Heating, Ventilation and Air Conditioning

GENERAL

SPECIFICATION EED1CB3D

AIR CONDITIONER

Item		Specification
Compressor	Type	VS (Variable capacity)
	Oil type & Capacity	FD 46 XG(PAG)150±10cc
	Pulley type	6PK-TYPE
	Displacement	180cc/rev
Condenser	Heat rejection	14,000 ±5% kcal/hr
APT (A/C pressure transducer)	The method to measure the pressure	Voltage = 0.00878835 * Pressure (psig) + 0.5
Expansion valve	Type	Block
Refrigerant	Type	R-134a
	Capacity [oz.(g)]	19.4 ± 0.88 (550 ± 25)

BLOWER UNIT

Item		Specification
Intake	Operating method	Actuator
Blower	Type	Sirocco
	Speed step	Auto + 8 speed (Automatic), 4 speed (Manual)
	Speed control	Power transistor & Hi-relay (Automatic), Resistor (Manual)
Air filter	Type	Particle filter

HEATER AND EVAPORATOR UNIT

Item		Specification
Heater	Type	Pin & Tube type
	Heating capacity	4,600 ± 5% kcal/hr
	Mode operating method	Actuator
	Temperature operating method	Actuator
Evaporator	Temperature control type	Evaporator temperature sensor
	A/C ON/OFF [°C(°F)]	ON : 2.5 ± 0.5(35.8 ± 32.9), OFF: 0.6 ± 0.5(33.0 ± 32.9)

TROUBLESHOOTING E5984368

PROBLEM SYMPTOMS TABLE

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

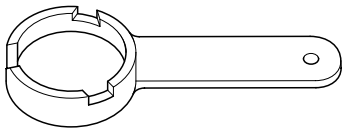
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.
After correcting the malfunction, check the complete system to ensure that performance is satisfactory.

STANDARD :

Symptom	Suspect Area	See page
No blower operation	1. Blower fuse	-
	2. Blower relay	HA - 63
	3. Blower motor	HA - 61
	4. Power transistor / Resistor	HA - 65, 67
	5. Blower speed control switch	HA - 72, 77
	6. Wire harness	-
No air temperature control	1. Engine coolant capacity	-
	2. Heater control assembly	HA - 72, 77
No compressor operation	1. Refrigerant capacity	HA - 3
	2. A/C fuse	-
	3. Magnetic clutch	HA - 23
	4. Compressor	HA - 21
	5. APT (A/C pressure transducer)	HA - 29
	6. A/C switch	-
	7. Evaporator temperature sensor	HA - 33, 44
	8. Wire harness	-
No cool comes out	1. Refrigerant capacity	HA - 3
	2. Refrigerant pressure	HA - 13
	3. Drive belt	-
	4. Magnetic clutch	HA - 23
	5. Compressor	HA - 21
	6. APT (A/C pressure transducer)	HA - 29
	7. Evaporator temperature sensor	HA - 33, 44
	8. A/C switch	-
	9. Heater control assembly	HA - 72, 77
	10. Wire harness	-

Symptom	Suspect Area	See page
Insufficient cooling	1. Refrigerant capacity	HA - 3
	2. Drive belt	-
	3. Magnetic clutch	HA - 23
	4. Compressor	HA - 21
	5. Condenser	HA - 26
	6. Expansion valve	HA - 52
	7. Evaporator	HA - 51
	8. Refrigerant lines	HA - 31
	9. APT (A/C pressure transducer)	HA - 29
	10. Heater control assembly	HA - 72, 77
No engine idle-up when A/C switch ON	1. Engine ECU	-
	2. Wire harness	-
No air inlet control	1. Heater control assembly	HA - 72, 77
No mode control	1. Heater control assembly	HA - 72, 77
	2. Mode actuator	HA - 56
No cooling fan operation	1. Cooling fan fuse	-
	2. Fan motor	-
	3. Engine ECU	-
	4. Wire harness	-

SPECIAL TOOLS EEE625B7

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

AIR CONDITIONING SYSTEM

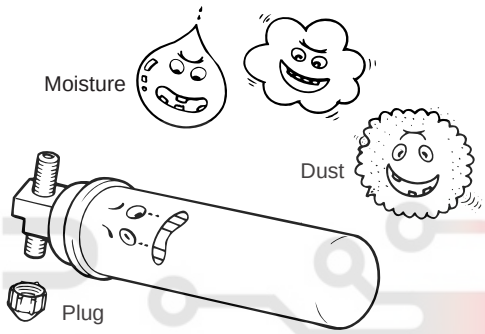
INSTRUCTIONS E4731052

WHEN HANDLING REFRIGERANT

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

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.



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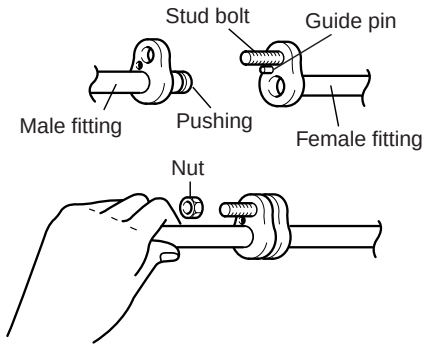
WHEN INSTALLING CONNECTING PARTS

FLANGE WITH GUIDE PIN

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



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

NOTE

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

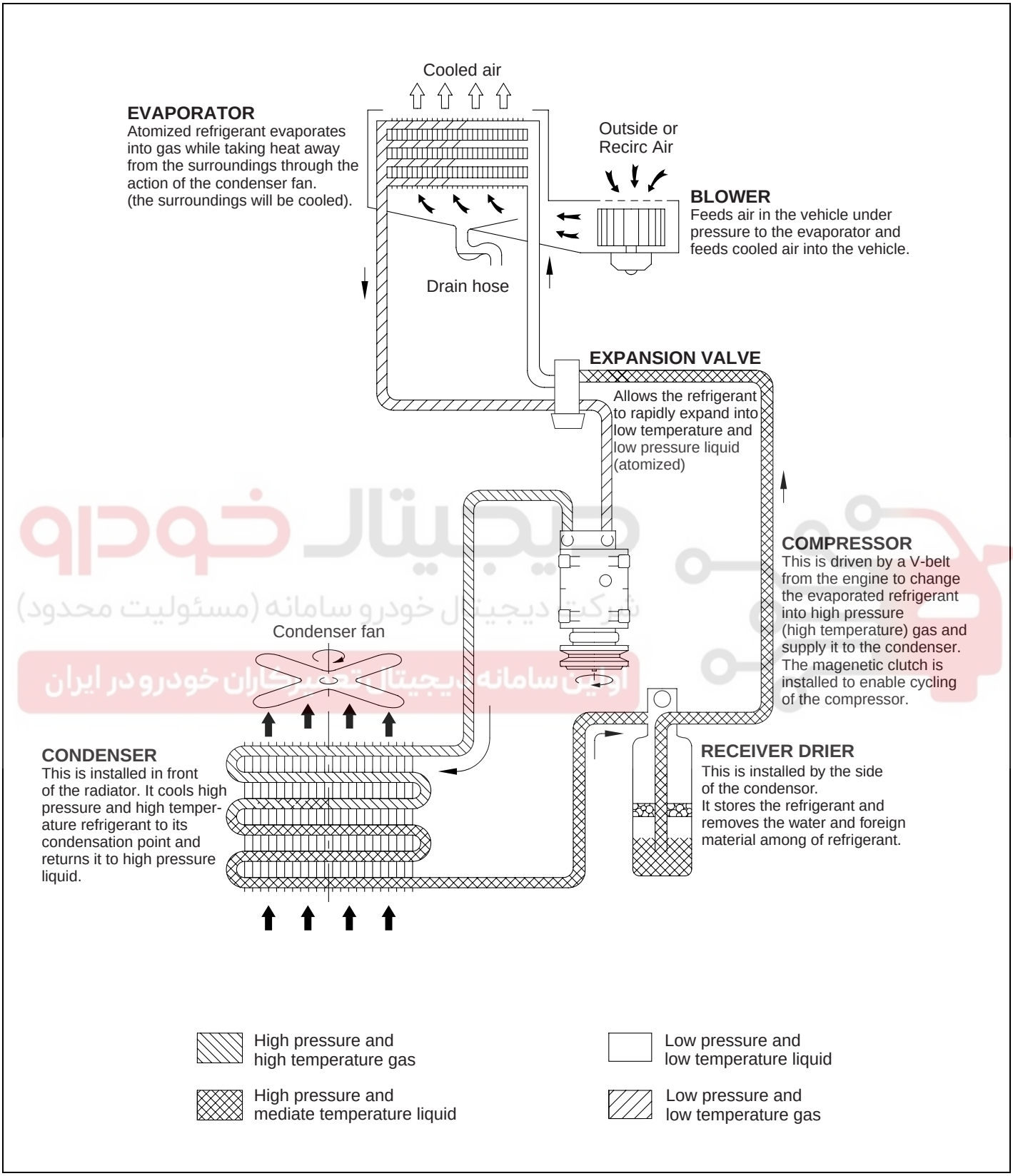
HANDLING TUBING AND FITTINGS

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

THE FOLLOWING PRECAUTIONS MUST BE OBSERVED

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

REFRIGERATION CYCLE EC68FD3E



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REFRIGERANT SYSTEM SERVICE BASICS E1A04FF2

REFRIGERANT RECOVERY

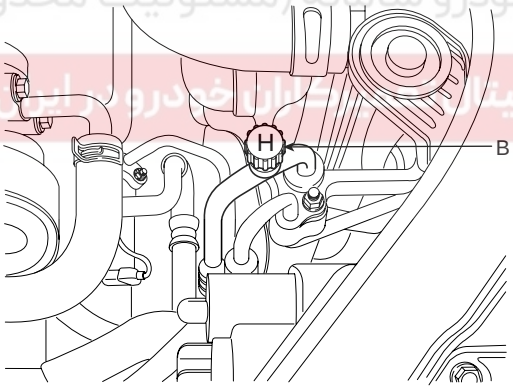
Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

CAUTION

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

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

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



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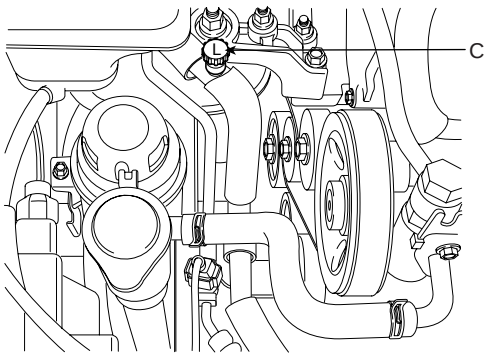

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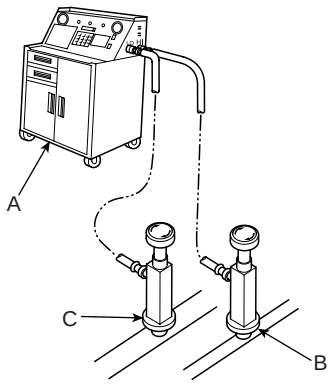

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2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

SYSTEM EVACUATION

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

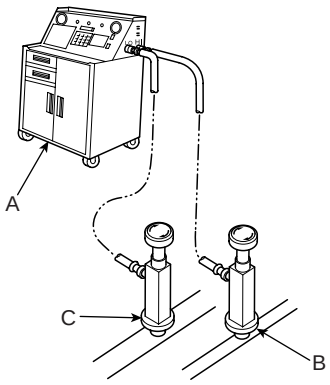
CAUTION

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

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

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using an R-134a refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)

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



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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 (Refer to Leak Test.).

4. Remove the low pressure valve from the low-pressure service port.

SYSTEM CHARGING

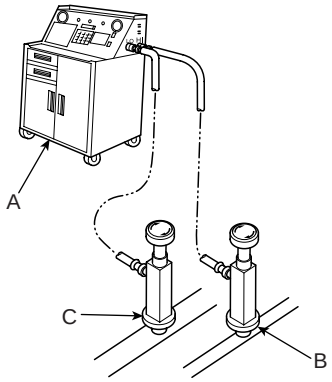
Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

CAUTION

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

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

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



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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 19.4 ± 0.88 oz. (550 ± 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 of refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

NOTE

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

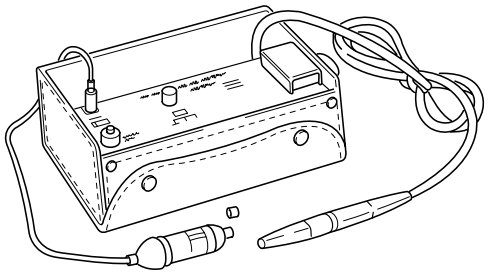
If a gas leak is detected, proceed as follows:

1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.

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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A/C SYSTEM PERFORMANCE TESTS

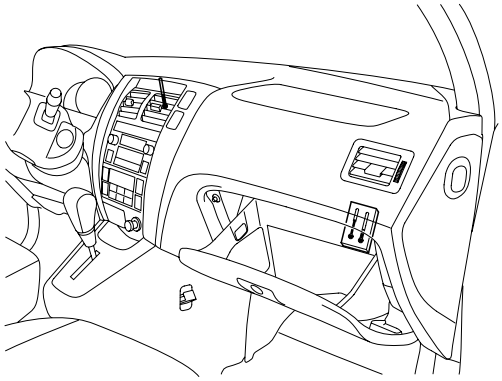
1. Connect an R-134a refrigerant. Recovery/Recycling/Charging System to the high-pressure service port and the low-pressure service port, following the equipment manufacturer's instructions.

2. Determine the relative humidity and air temperature.

3. Remove the glove box stopper and tension code and let the glove box hang down.

4. Insert a thermometer in the cool air outlet.

5. Place a thermometer near the blower unit inlet.

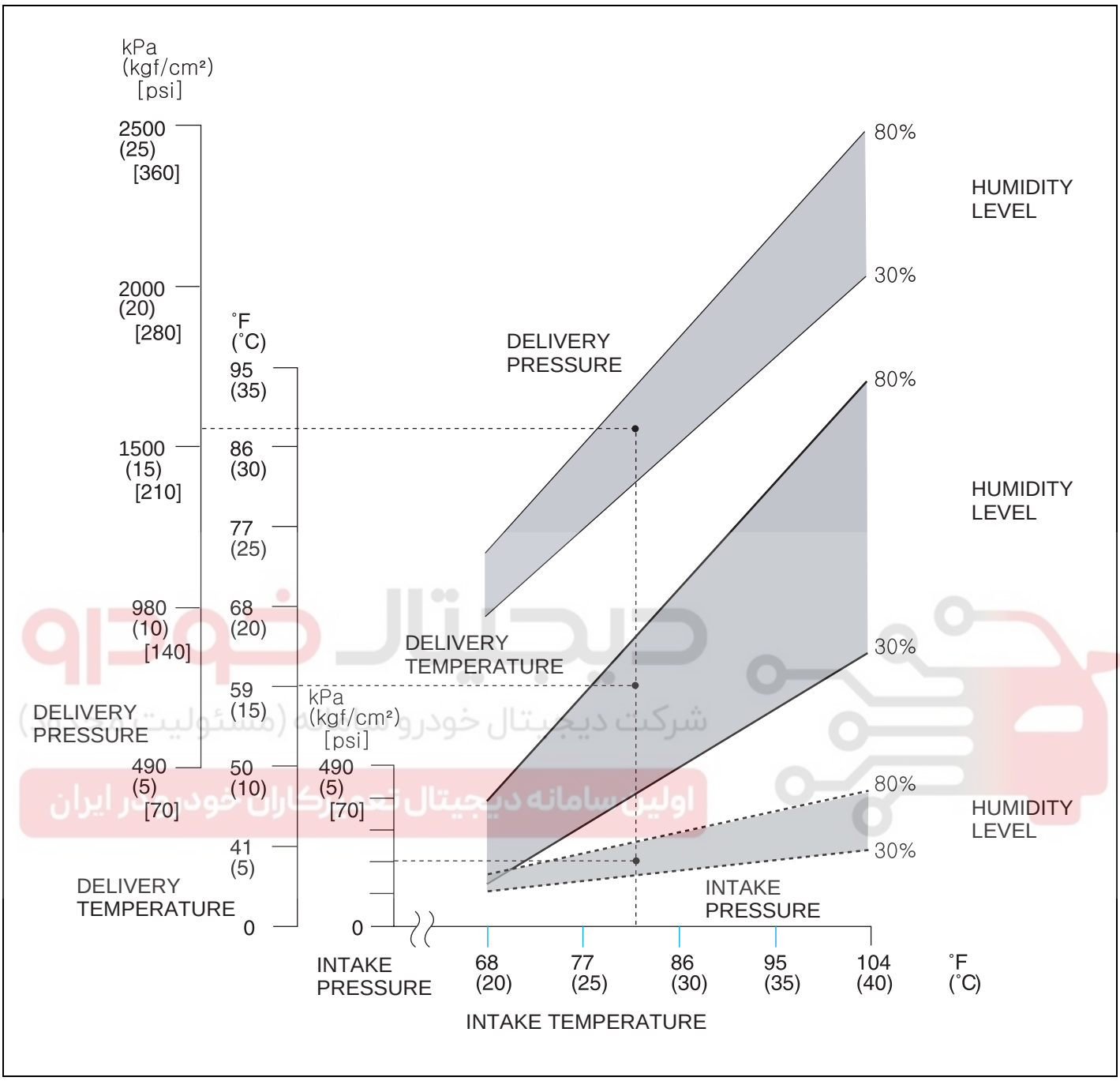


KQQE003A

6. Test condition
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control dial to Max cool, the mode control switch to Vent, and the recirculation control switch to Recirculation.
   - Turn the A/C switch in and the fan switch to Max.
   - Run the engine at 1,500 rpm.
   - No driver or passenger in vehicle.

7. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the cool air outlet, the intake temperature near the blower unit inlet, and the high and low system pressure from the A/C gauges.

8. To complete the chart
   - Mark the delivery temperature along the vertical line
   - Mark the intake temperature along the bottom line
   - Draw a line straight up from the air temperature to the humidity
   - Mark a point 10% above and 10% below the humidity level
   - From each point
   - Draw a horizontal line across the delivery temperature
   - The delivery temperature should fall between the two lines
   - Complete the low side pressure test and high side pressure test in the same way
   - Any measurements outside the line may indicate the near for more further inspection



LQIF011C

ON-VEHICLE INSPECTION EA9864CB

This is a method in which the trouble is located by using a gauge set. Read the gauge pressure when these conditions are established.

TEST CONDITIONS

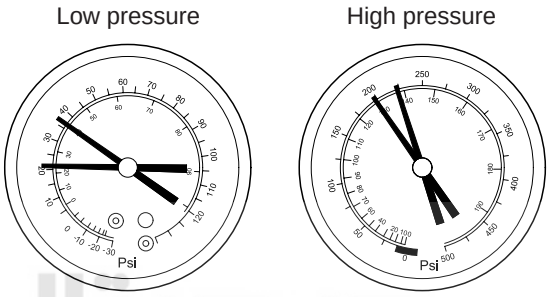
- Temperature at the air inlet with the switch set at recirculation is 30~35°C (86~95°F).
- Engine running at 1,500rpm.
- Blower speed control knob on "4" position.
- Temperature control knob on "COOL" position.

NOTE

It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.

1. Normally functioning refrigeration system.

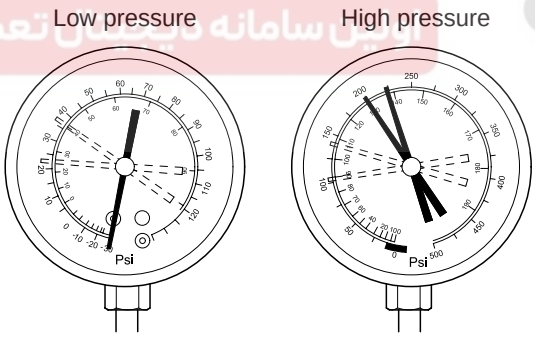
Low pressure side : 0.15~0.25MPa (1.5~2.5 kg/cm^2, 21.8~36.3psi)
High pressure side : 1.37~1.57MPa (14~16 kg/cm^2, 200~228psi)



EQEE006A

2. Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

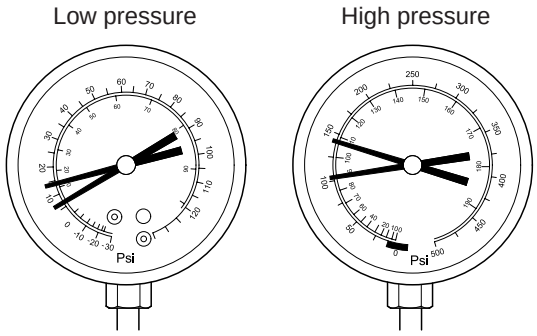


EQKE006B

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes becomes a vacuum and sometimes normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	- Drier in over saturated state - Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	- Replace drier - Remove moisture in cycle through repeatedly evacuating the system - Evacuate the system and charge new refrigerant to specified amount

3. Insufficient cooling

Condition : Insufficient cooling



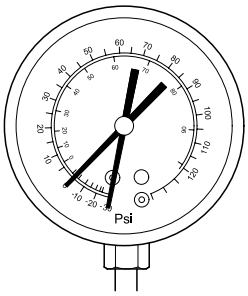
EQKE006C

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
- Pressure low on both low and high pressure sides - Insufficient cooling performance	Gas leakage at some place in refrigeration system	- Insufficient refrigerant in system - Refrigerant leaking	- Check for gas leakage with gas leak detector and repair if necessary - Evacuate the system and charge new refrigerant to specified amount - If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

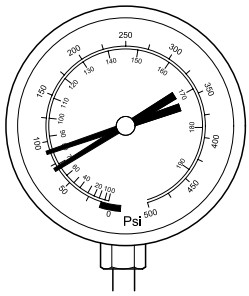
4. Poor circulation of refrigerant

Condition : Insufficient cooling

Low pressure



High pressure

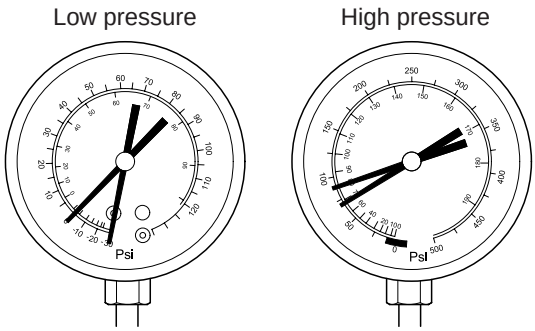


EQKE006D

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
- Pressure low in both low and high pressure sides - Frost on tube from receiver to unit	Refrigerant flow obstructed by dirt in drier	Condenser clogged	Replace drier

5. Refrigerant does not circulate

Condition : Does not cool (Cools from time to time in some cases)

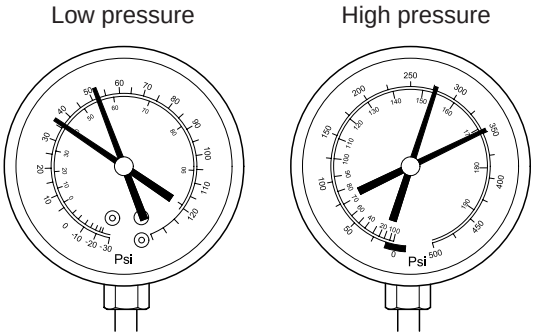


EQKE006E

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
- Vacuum indicated on low pressure side, very low pressure indicated on high pressure side - Frost or dew seen on piping before and after receiver/drier or expansion valve	- Refrigerant flow obstructed by moisture or dirt in refrigeration system - Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	- Check expansion valve - Clean out dirt in expansion valve by blowing with air - Replace drier - Evacuate the system and charge new refrigerant to specified amount - For gas leakage from expansion valve, replace expansion valve

6. Refrigerant overcharged or insufficient cooling of condenser

Condition : Insufficient cooling

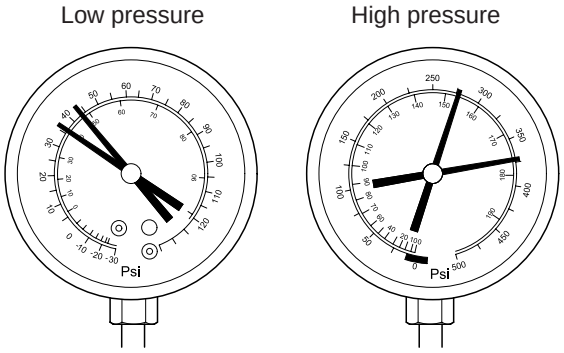


EQKE006F

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high on both low and high pressure sides	- Unable to develop sufficient performance due to excessive refrigerant - Insufficient cooling of condenser	- Excessive refrigerant in cycle → refrigerant overcharged - Condenser cooling → condenser fins clogged or condenser fan faulty	- (1) Clean condenser - (2) Check cooling fan with fluid coupling operation. - (3) If (1) and (2) are in normal state, check amount of refrigerant Evacuate the system and charge new refrigerant to specified amount

7. Air present in refrigeration system

Condition : Insufficient cooling

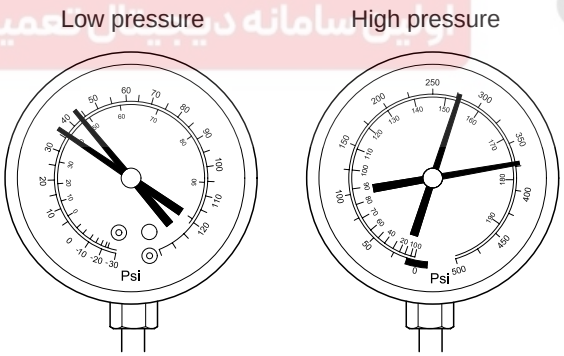


EQKE006G

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
- Pressure too high on both low and high pressure sides - The low pressure piping hot to the touch	Air entered in refrigeration system	- Air present in refrigeration system - Insufficient vacuum purging	- Check compressor oil to see if it is dirty or insufficient - Evacuate the system and charge new refrigerant to specified amount

8. Expansion valve functions improperly

Condition : Insufficient cooling



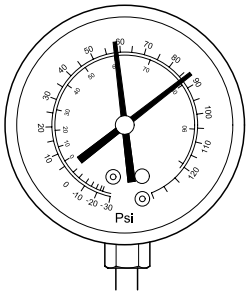
EQKE006G

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
- Pressure too high on both low and high pressure sides - Frost or large amount of dew on piping on low pressure side	Trouble in expansion valve	- Excessive refrigerant in low pressure piping - Expansion valve opened too wide	- Check expansion valve - Replace if defective

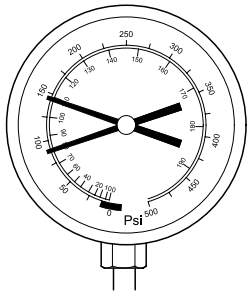
9. Defective compression compressor

Condition : Does not cool

Low pressure



High pressure

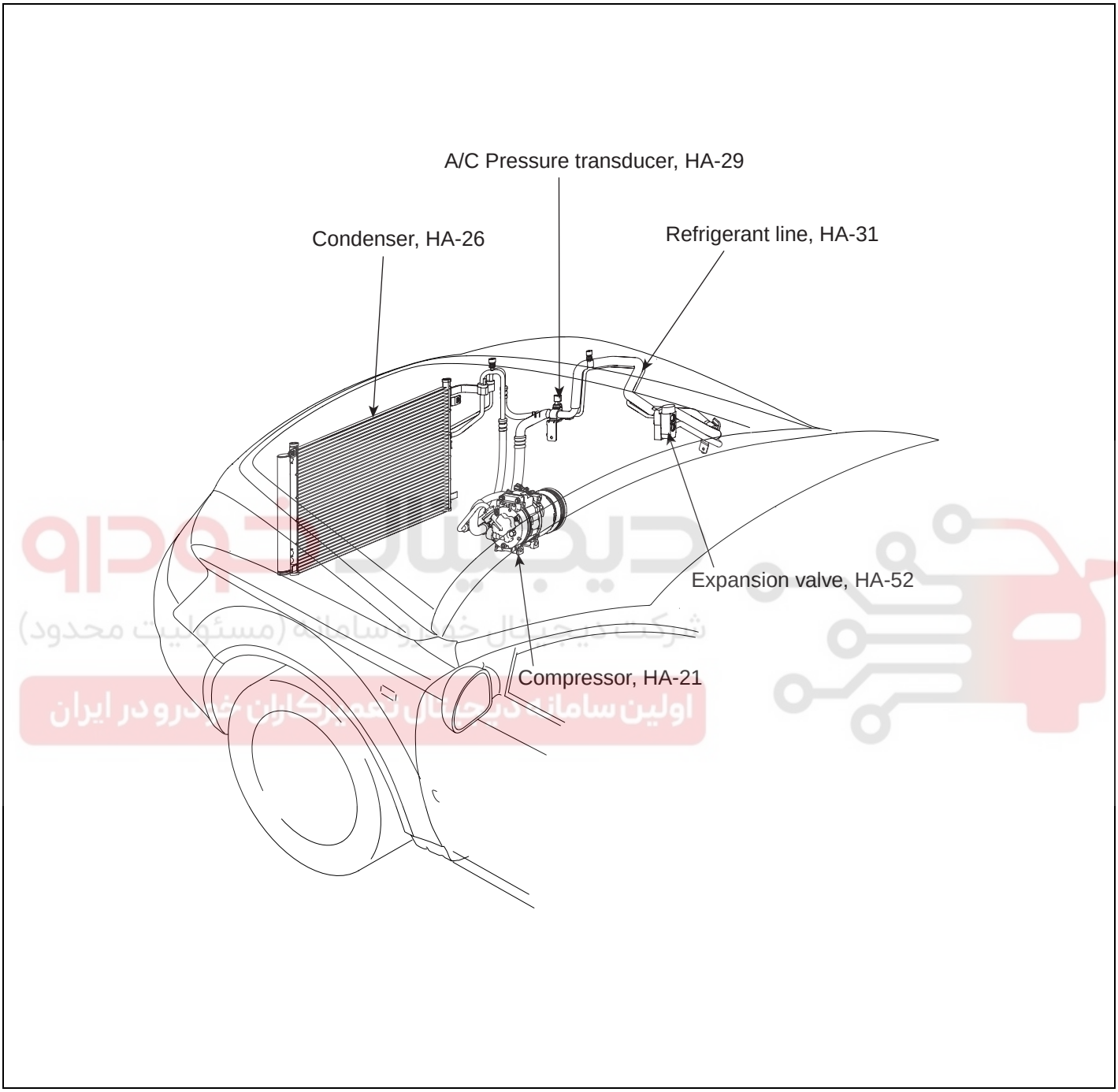


EQKE006H

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
- Pressure too high on low pressure side - Pressure too low on high pressure side	Internal leak in compressor	- Compression defective - Valve leaking or broken sliding parts	Repair or replace compressor

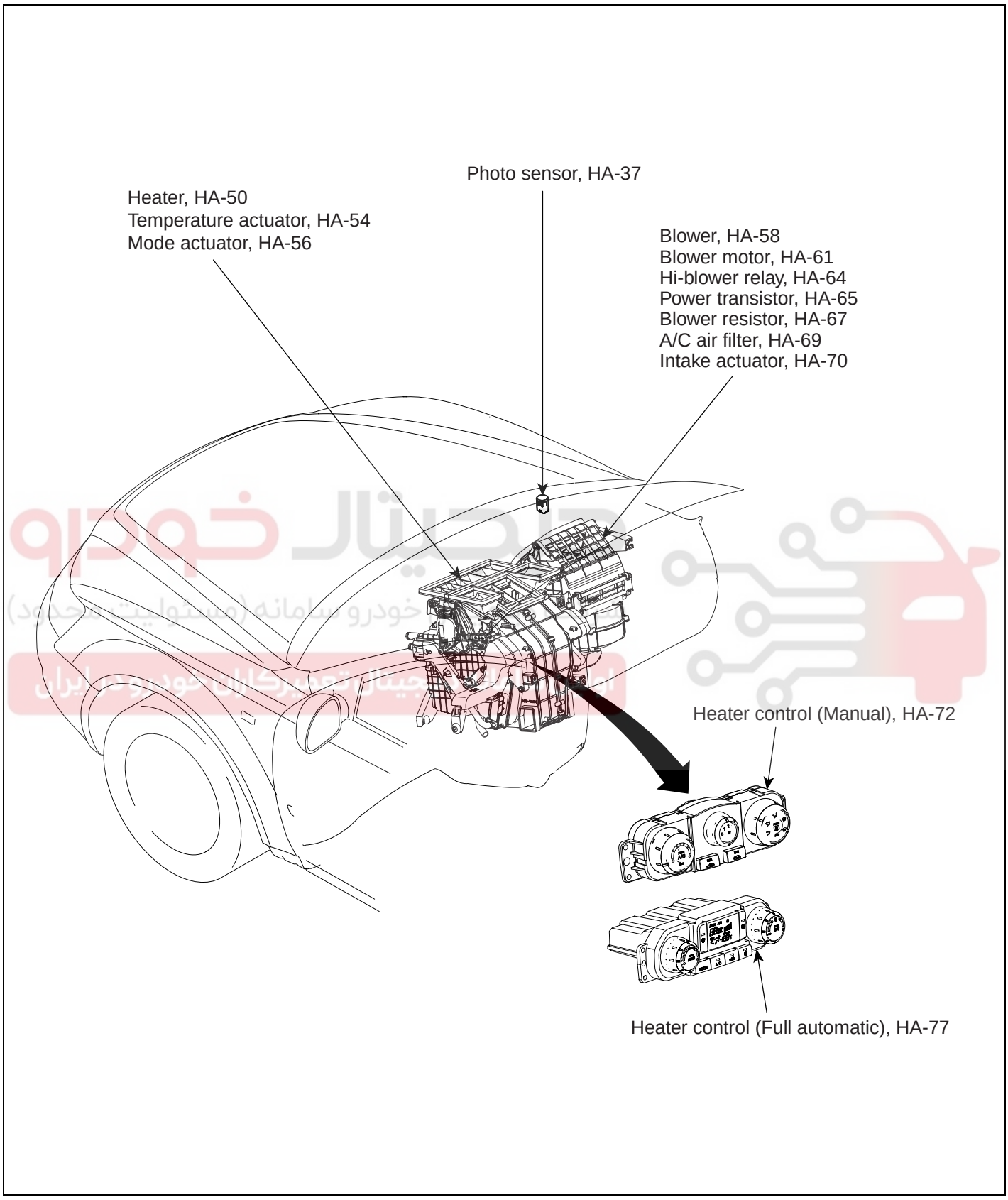
COMPONENT LOCATION INDEX EADF7118

ENGINE ROOM



EQRF001A

INTERIOR



EQRF001B

COMPRESSOR OIL

OIL SPECIFICATION EE9BC57D

- 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.
- Compressor (PAG) oil varies according to compressor model. Be sure to use oil specified for the model of compressor.

HANDLING OF OIL

- The oil should be free from moisture, dust, metal powder, etc.
- Do not mix with other oil.
- 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.)
- 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: PAG 150cc (5.07 fl.oz)

OIL RETURN OPERATION

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

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

REPLACEMENT OF COMPONENT PARTS

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

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

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

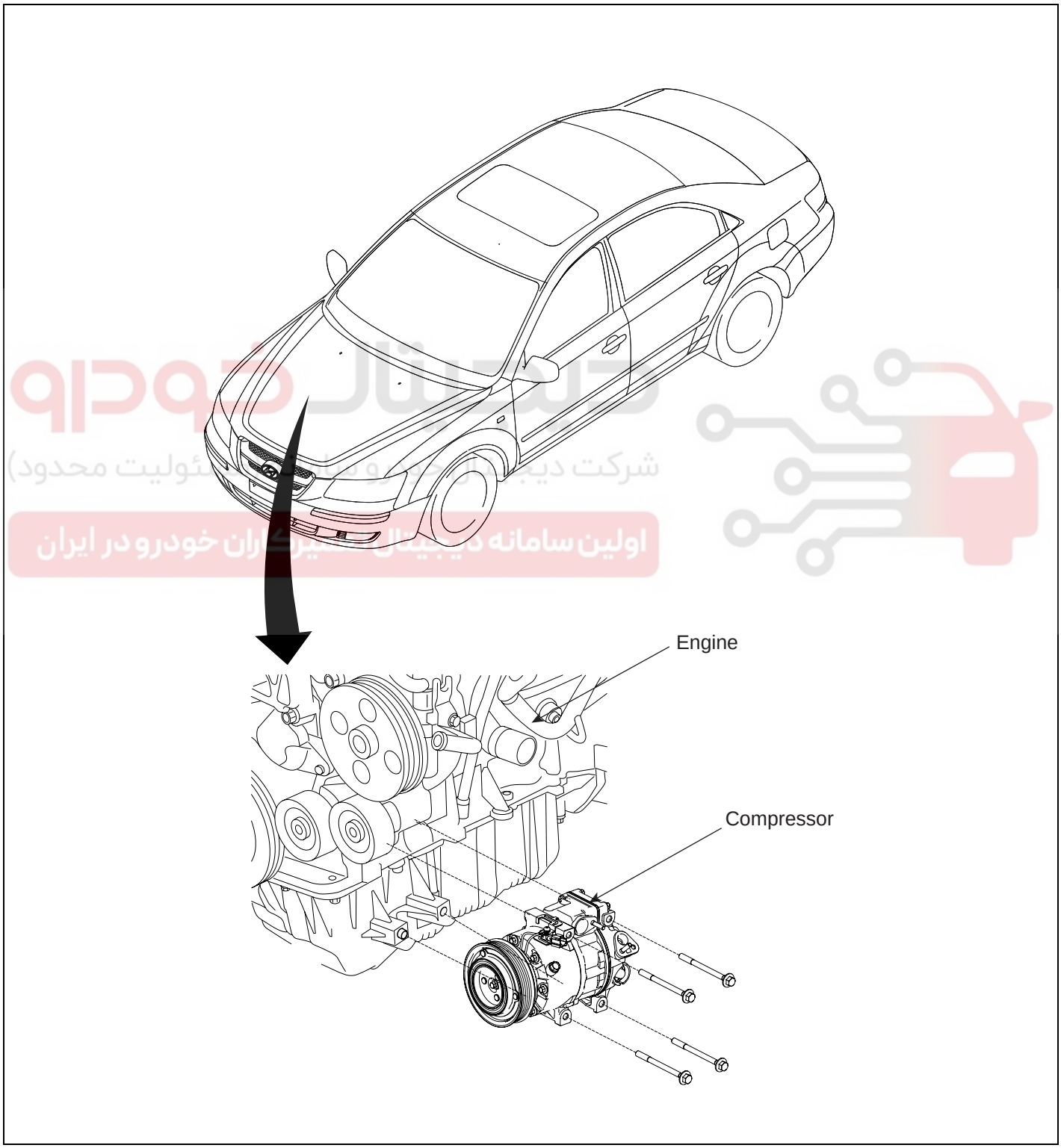
NOTE

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

A/C COMPRESSOR CONTROLS (MANUAL)

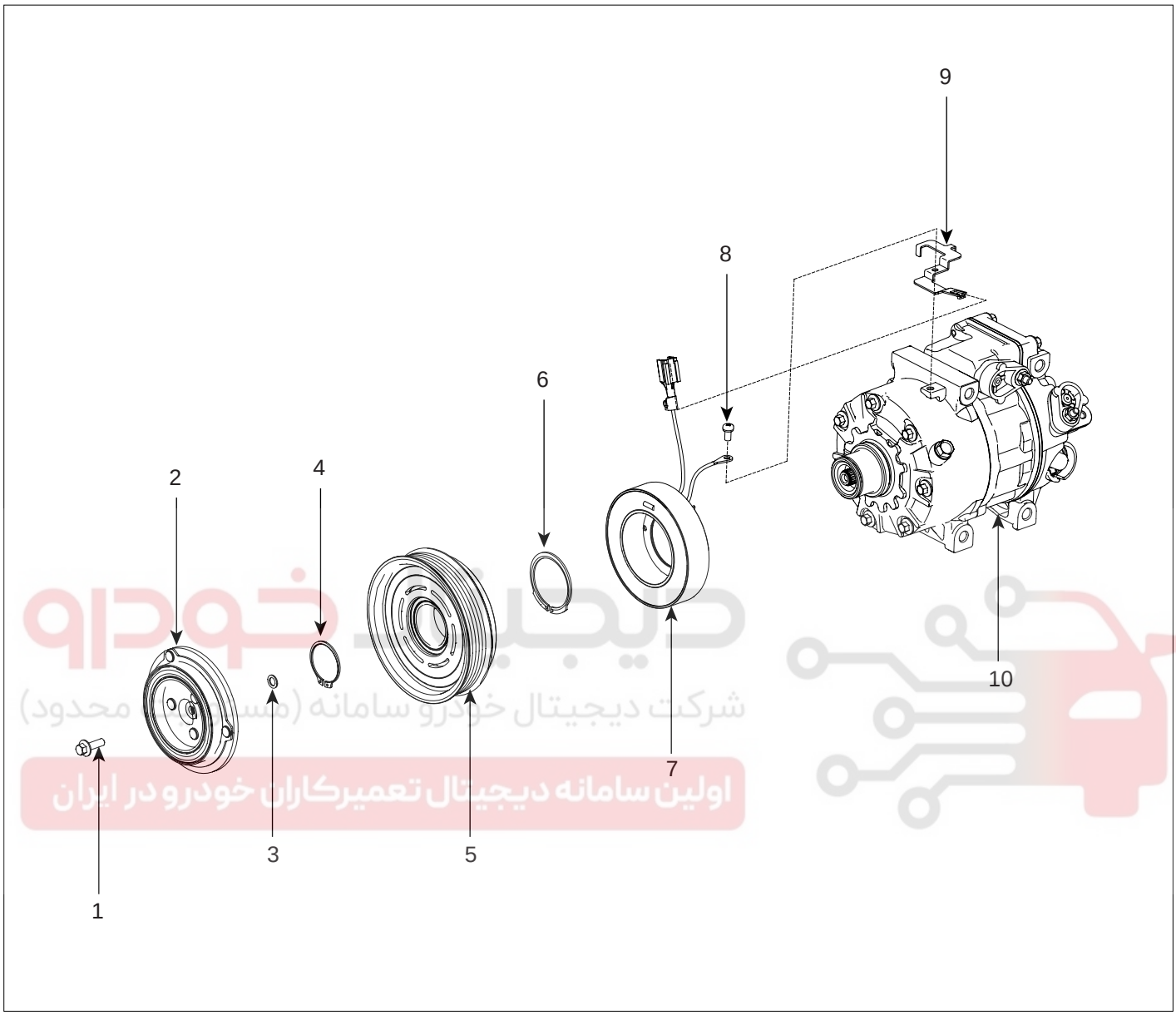
COMPRESSOR

COMPONENT LOCATION EFFCEBAD



EQRF105A

COMPONENTS

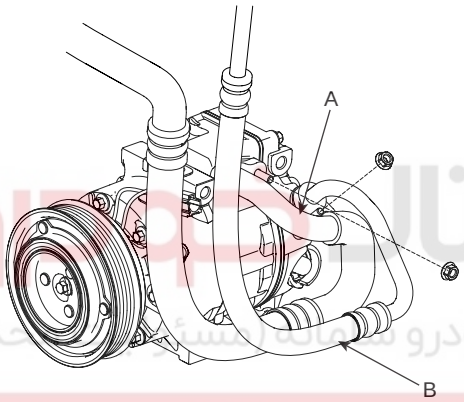


1. Bolt
2. Disc & hub assembly
3. Shim
4. Retainer ring
5. Pulley
6. Retainer ring
7. Field coil
8. Screw
9. Connector bracket
10. Compressor assembly

EQRF105B

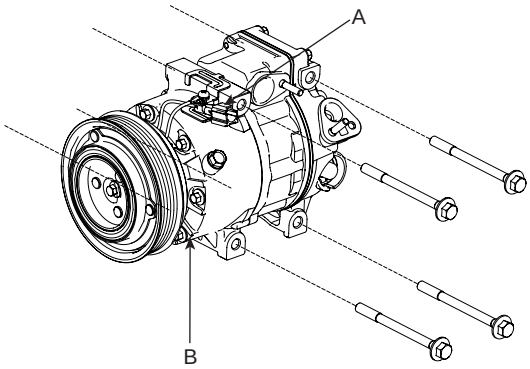
REMOVAL EDB3EDCD

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 (Refer to page HA-9).
4. Loosen the drive belt (Refer to the EM-Timing).
5. Remove the bolts, then disconnect the suction line (A) and discharge line (B) from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



KQRE105C

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

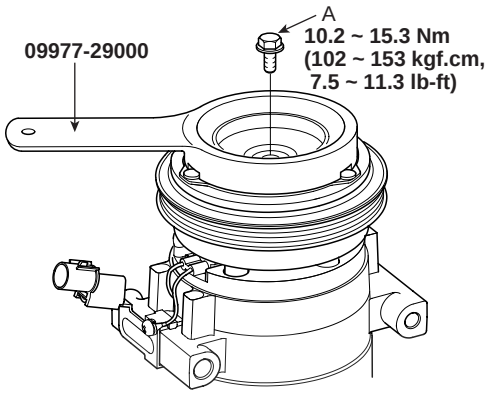


KQRE105D

DISASSEMBLY EA7DE4BF

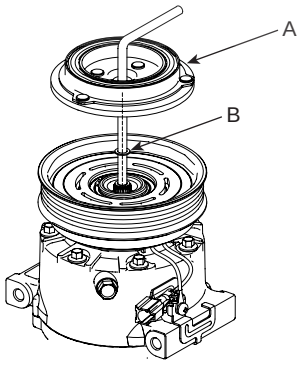
1. Remove the center bolt (A) while holding the disc & hub assembly with a commercially available disc & hub assembly bolt remover; Special tool number 09977-29000.

TORQUE : 10~15N.m (1.02~1.53 kgf.m, 7.5~11.3 lb-ft)



EQKE103A

2. Remove the disc & hub assembly (A) and shim (B), taking care not to lose the shims. If the clutch needs adjustment, increase or decrease the number and thickness of shims as necessary, then reinstall the disc & hub assembly, and recheck its clearance (Refer to page HA-24).

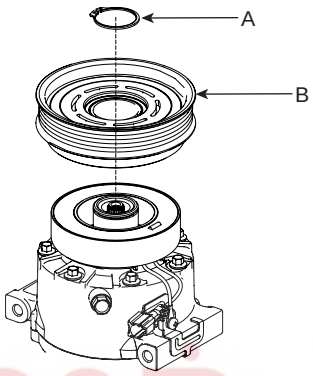


KQRE105J

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

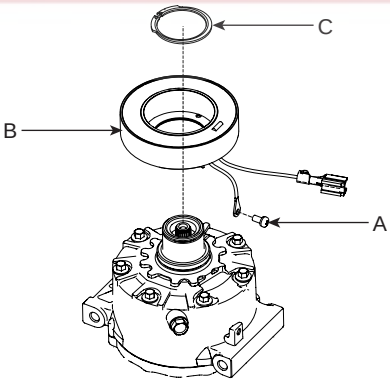
NOTE

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



KQRE105K

4. Remove the screw (A) from the field coil ground terminal and then remove the field coil (B) and retainer ring (C).



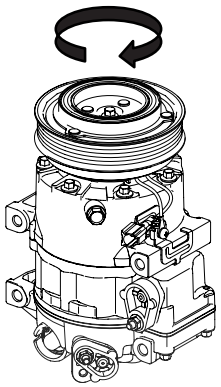
KQRE105L

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

INSPECTION E8DCBCCA

1. Check the plated parts of the disc & hub assembly for color changes, peeling or other damage. If there is damage, replace the clutch set.

2. Check the pulley 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.



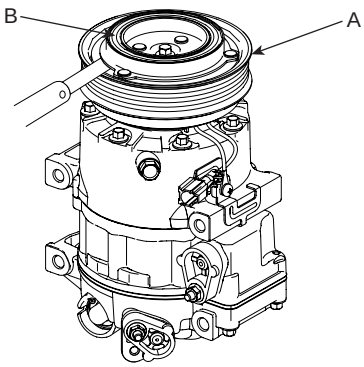
KQRE105F

3. Measure the clearance between the pulley (A) and the disc & hub assembly (B) all the way around. If the clearance is not within specified limits, remove the disc & hub assembly (Refer to page HA-23) and add or remove shims as needed to increase or decrease clearance.

Clearance: 0.5 ± 0.15mm (0.020 ± 0.006 in.)

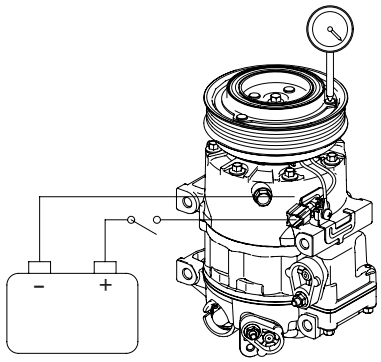
NOTE

The shims are available in eight thicknesses: 0.7mm, 0.8mm, 0.9mm, 1.0mm, 1.1mm, 1.2mm, 1.3mm and 1.4mm



KQRE105G

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

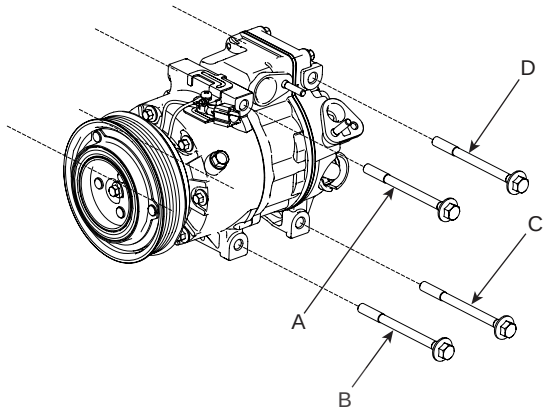


KQRE105H

INSTALLATION E9E09758

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

TORQUE : 20~33N.m (2.04 ~ 3.36 kgf.m, 14.7~24.3lb-ft)

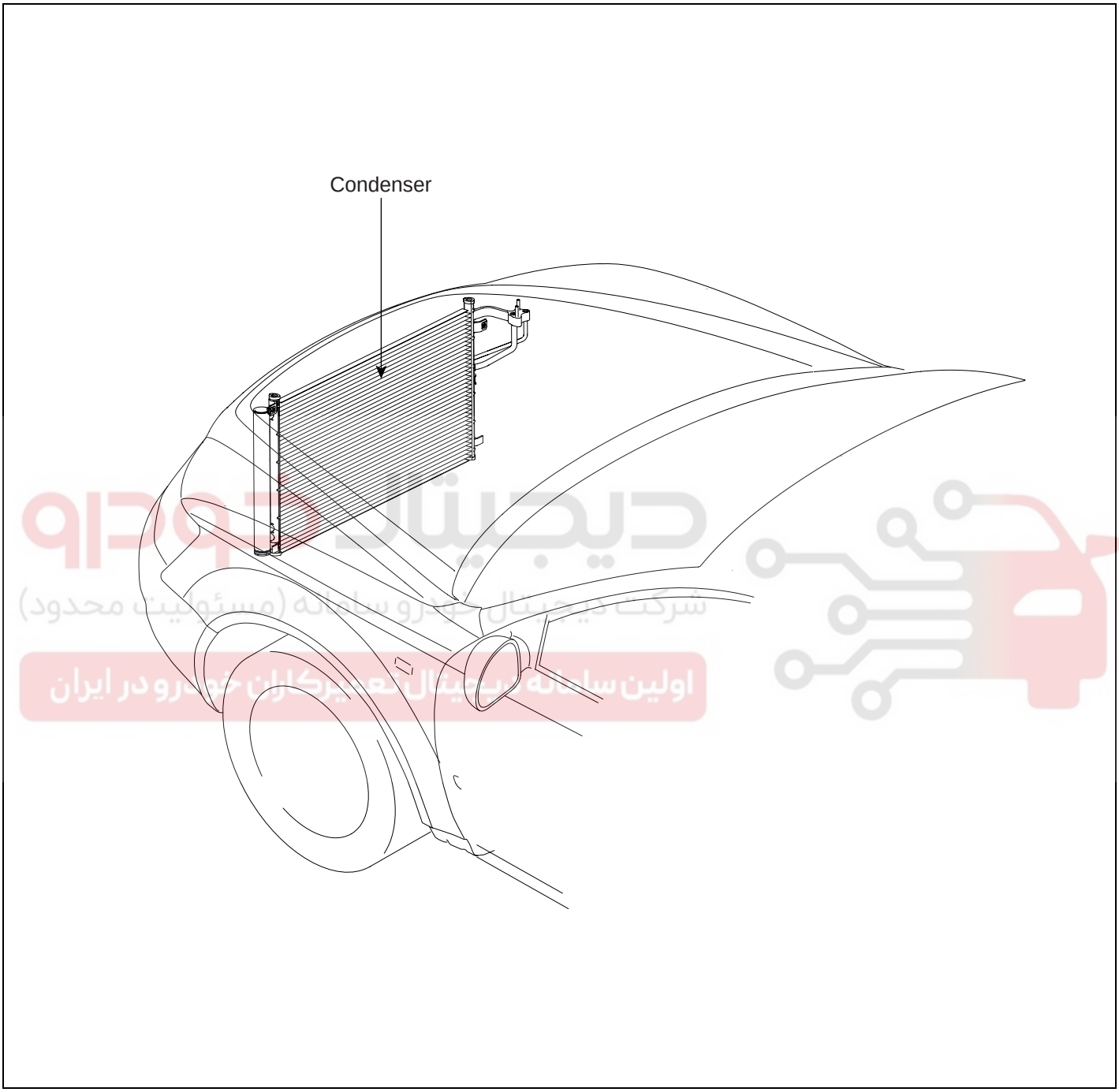


KQRE105E

2. Install in the reverse order of removal, and note these items.
   - If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume, Subtract the volume of drained oil from 150cc 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 (Refer to the EM-Timing) Charge the system and test its performance.

CONDENSER

COMPONENT LOCATION E84866E5



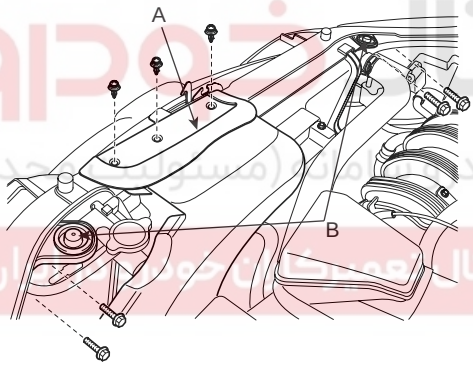
EQRF108A

INSPECTION EDD70B30

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.

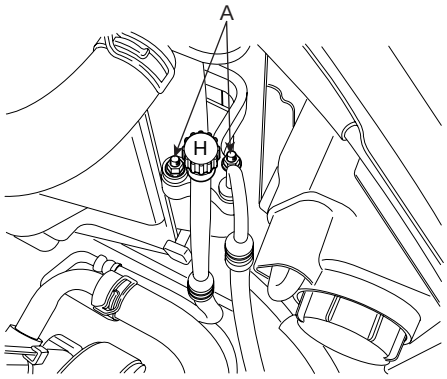
REPLACEMENT EFC6CCE6

1. Recover the refrigerant with a recovery/ recycling/ charging station (Refer to page HA-9).
2. Disconnect the negative (-) battery terminal.
3. Remove the air duct (A).
4. Remove the radiator bracket (B) after loosening the bolts.



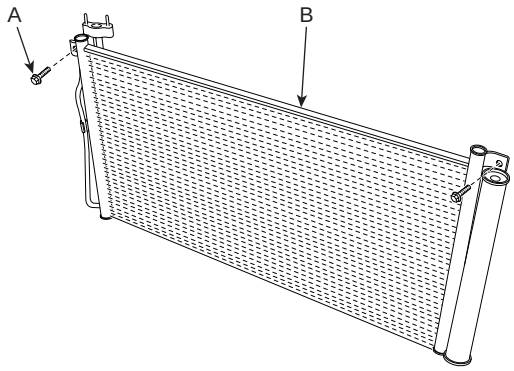
KQRE108B

5. Remove the nuts (A), then disconnect the discharge line and condenser line from the condenser.
   Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



KQRE113B

6. Remove the bolts (A), then remove the condenser (B) by lifting it up. Be careful not to damage the radiator and condenser fins when removing the condenser.



KQRE108C

7. Install in the reverse order of removal, and note these items :
   - If you're installing a new condenser, add refrigerant oil.
   - 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. (Refer to HA-11)

RECEIVER／DRIER

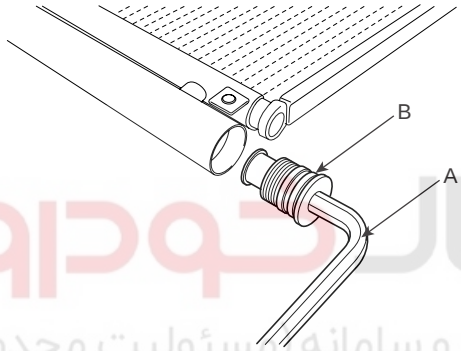
REPLACEMENT E256C8CB

1. Remove the condenser, and then remove the bottom cap (B) from the receiver/drier tank (A).

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

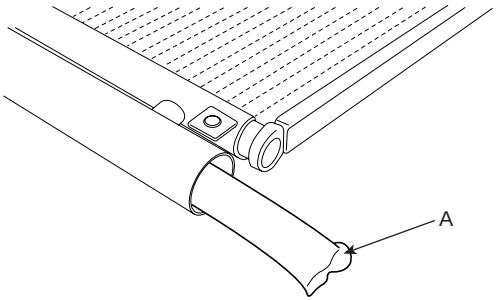
WARNING

Use of impact wrench may cause cracking on the receiver/drier tank connecting pipe to the condenser.



KQRE108D

2. Remove the desiccant (A) from the receiver/drier tank using a long nose plier.



KQRE108E

3. Check for crumbled desiccant and clogged bottom cap filter.

4. Apply air conditioning compressor oil along the O-rings and threads of the new bottom cap.

5. Insert the new desiccant into the receiver drier tank. The desiccant must be sealed in vacuum before it is exposed to air for use.

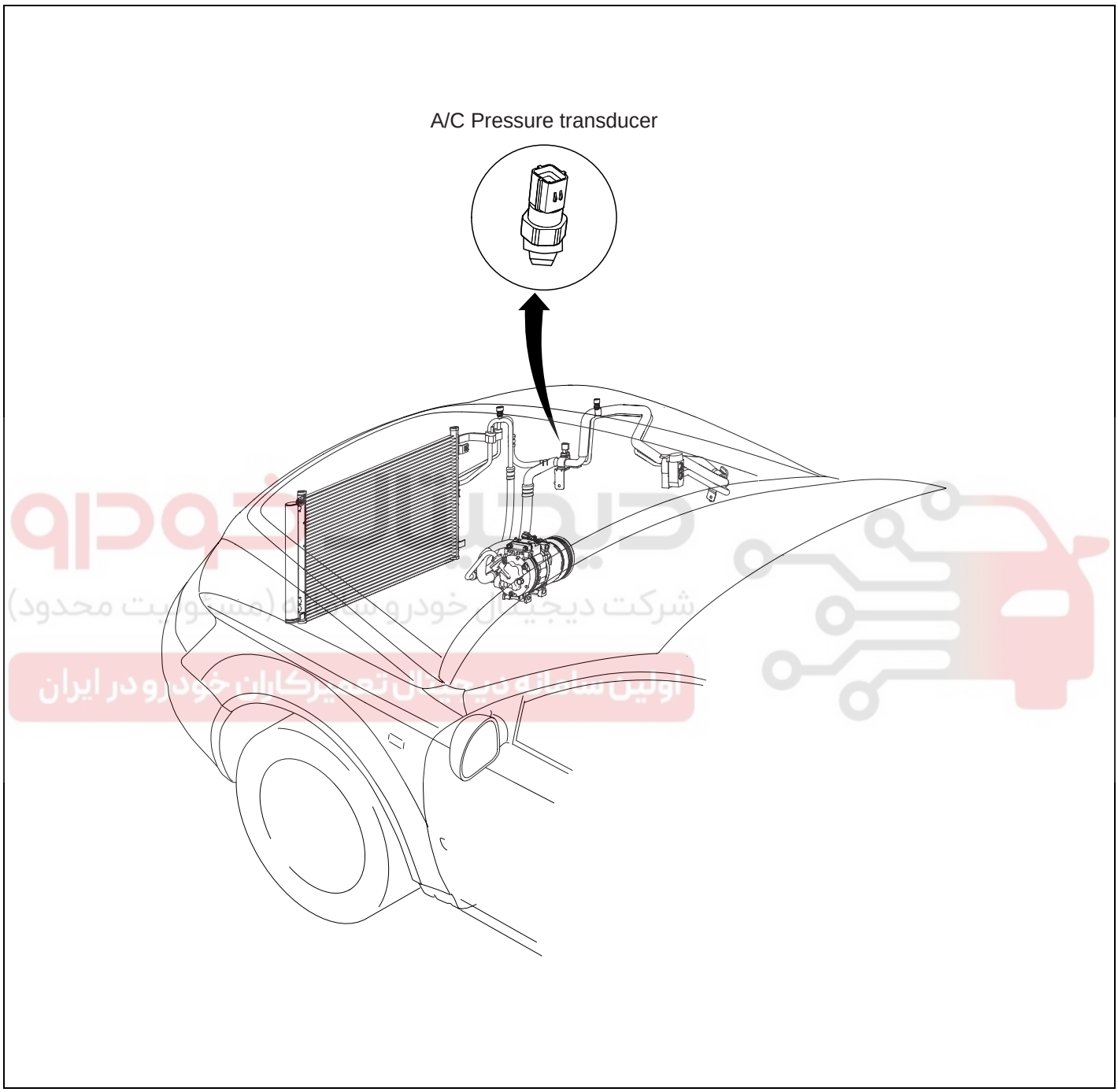
6. Install the new bottom cap to the receiver drier tank.

NOTE

- *Always replace the desiccant and bottom cap at the same time.*
- *If you're installing a new receiver/drier, add refrigerant oil.*
- *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. (Refer to HA-11)*

A/C PRESSURE TRANSDUCER

COMPONENT LOCATION EB9D9D38



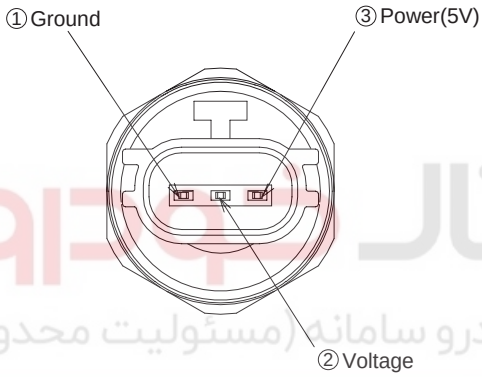
EQRF116A

DESCRIPTION E084BE42

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

INSPECTION EE16AAB1

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



EQRF116B

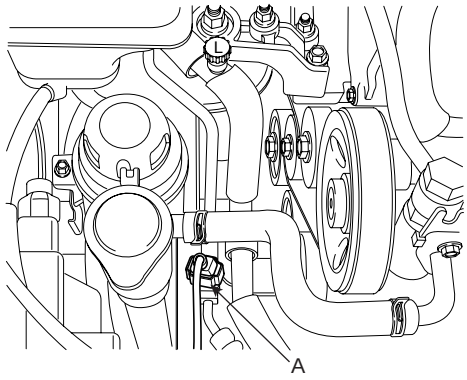
2. Inspection the voltage value whether it is sufficient to be regular value or not.

Voltage = 0.00878835 * Pressure (psig) + 0.5

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

REPLACEMENT EDA9C7E1

1. Disconnect negative (-) battery terminal.
2. Disconnect A/C pressure transducer connector (3P) from wiring harness.



KQRE116C

3. Remove the A/C pressure transducer.

CAUTION

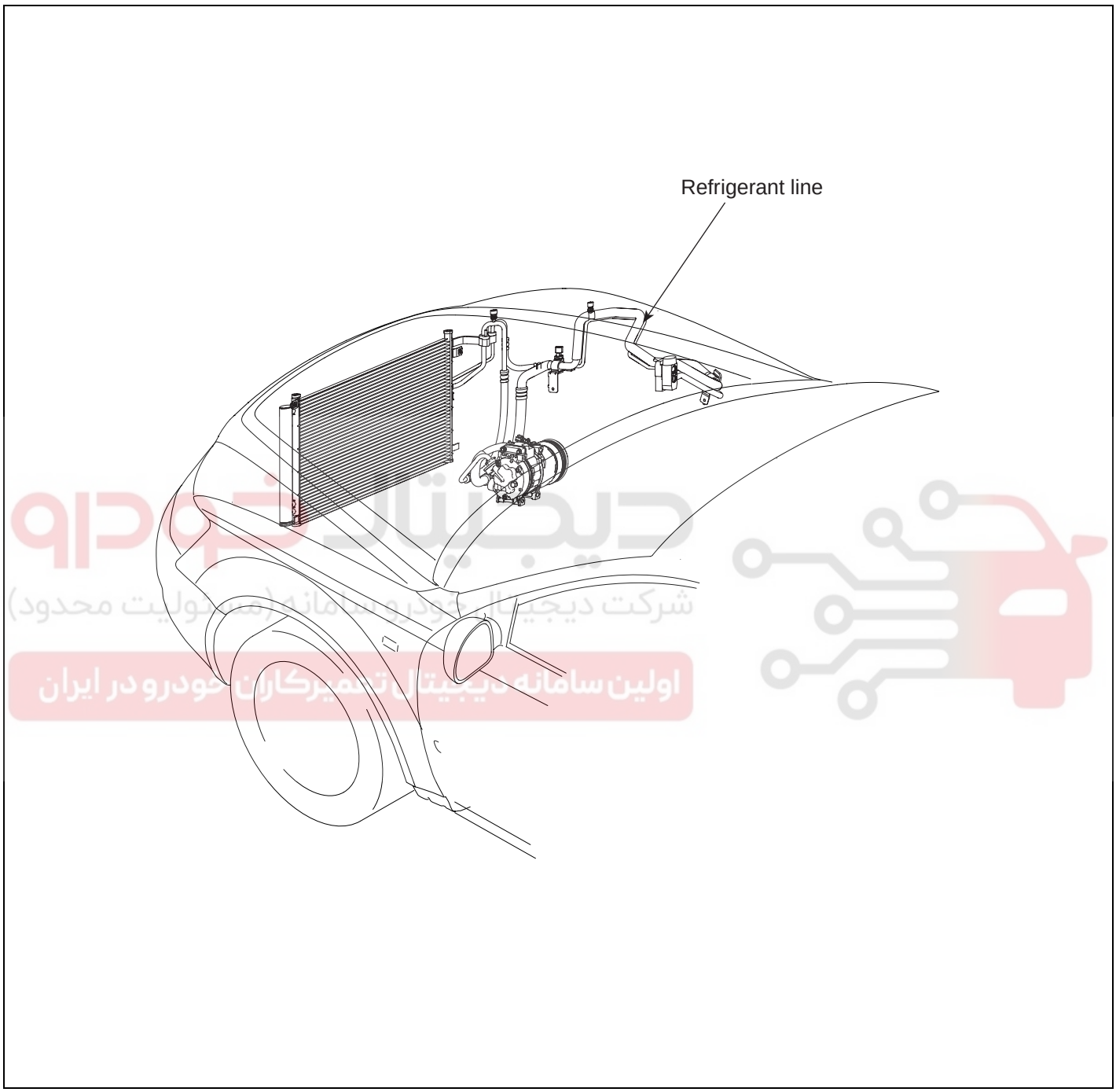
Take care that liquid suction pipe is not bent.

4. Installation is the reverse order of removal.

TORQUE : 10~12 N.m (1.02~1.22 kgf.m, 7.4~8.8 lb-ft)

REFRIGERANT LINE

COMPONENT LOCATION E4C40E5B



EQRF113A

REPLACEMENT EC7AECA0

1. Discharge refrigerant from refrigeration system (Refer to page HA-9).
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	lb-ft
Condenser x Discharge hose	5 ~ 7	0.5 ~ 0.6	3.7 ~ 5.2
Condenser x Liquid tube			
Compressor x Discharge hose	5 ~ 7	0.5 ~ 0.6	3.7 ~ 5.2
Compressor x Suction hose			
Expansion valve x Evaporator	12 ~ 15	1.2 ~ 1.5	8.7 ~ 10.8

4. Evacuate air in refrigeration system and charge system with refrigerant (Refer to page HA-9).

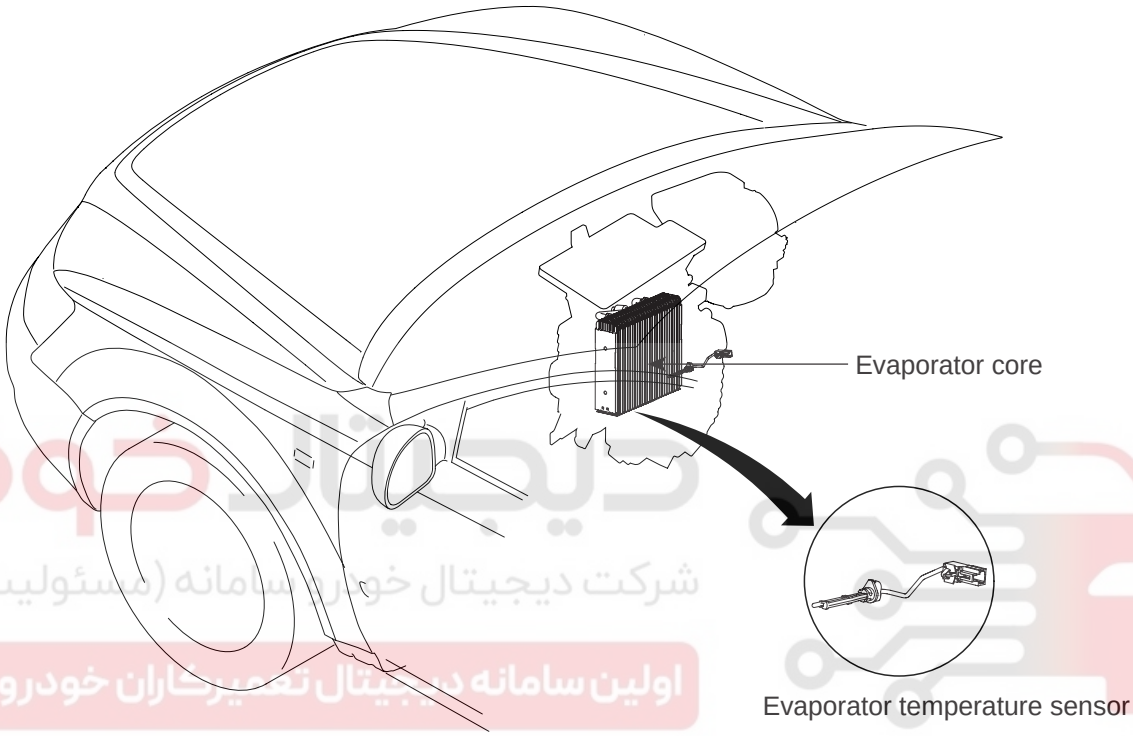
Specified amount: 550 ± 25g (19.4 ± 0.88 oz.)

5. Inspect for leakage of refrigerant.
   Using a gas leak detector, check for leakage of refrigerant (Refer to page HA-10).
6. Inspect A/C operation.

EVAPORATOR TEMPERATURE SENSOR

COMPONENT LOCATION EA4AB247

[MANUAL]



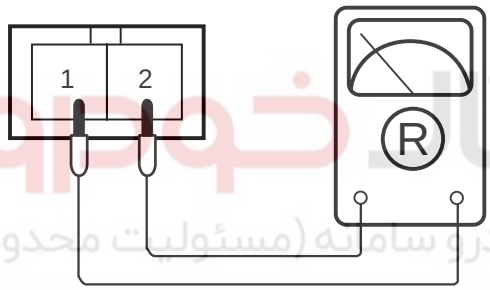
EQRF161A

DESCRIPTION EC03DC25

The evaporator temperature sensor will detect the evaporator core temperature and interrupt compressor relay power in order to prevent evaporator freezing by excessive cooling.
It is a negative type thermistor whose resistance is inversely proportional to temperature.

INSPECTION E1F5D600

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



AQGE116C

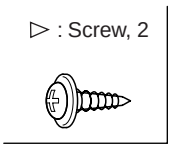
SPECIFICATION

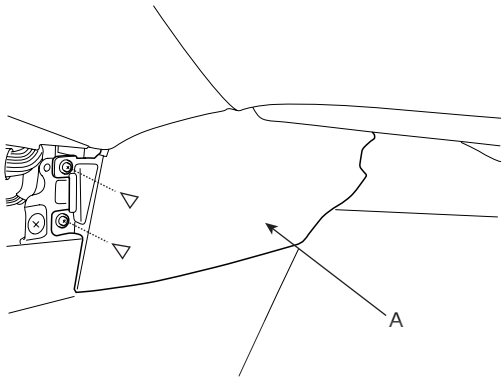
Evaporator core temperature [°C(°F)]	Resistance [KΩ]
-10 (14)	18.31
0 (32)	11.60
10 (50)	7.55
15 (59)	5.04
30 (86)	3.44
40 (104)	2.40

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 EBF2B272

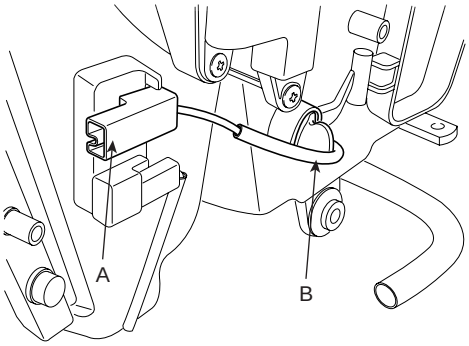
1. Remove the passenger's crush pad center low cover (A) after loosening 2 screws.





EQRF203F

2. Remove the under cover after loosening 2 screws.
3. Disconnect the connector pin (A).
4. Remove the evaporator temperature sensor (B) by pulling it after rotating 90° in a counterclockwise direction.



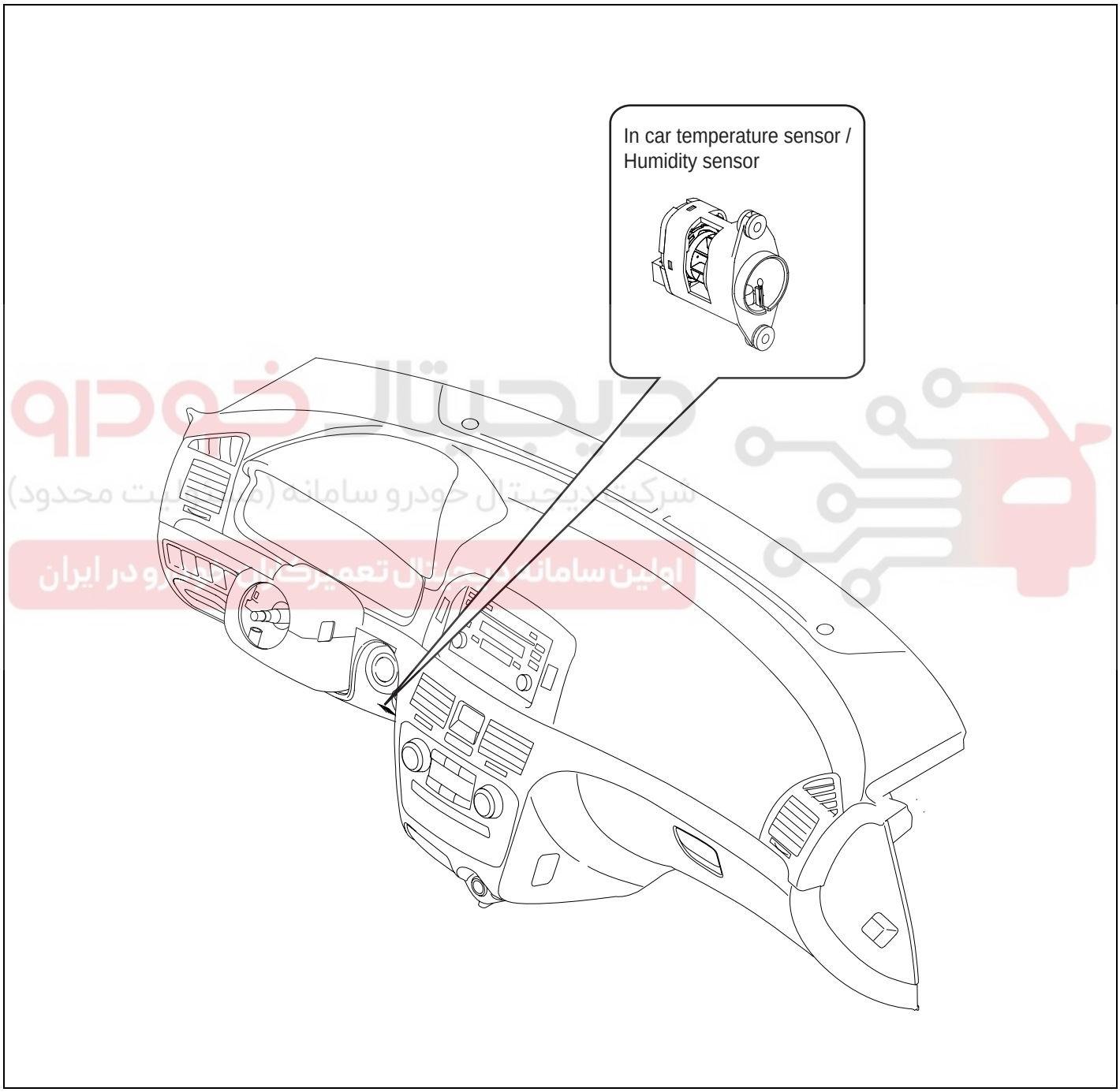
KQRE161B

5. Installation is the reverse order of removal.

A/C COMPRESSOR CONTROLS (FULL AUTO)

IN CAR SENSOR

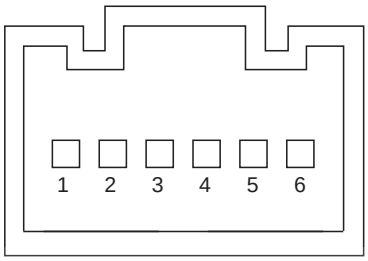
COMPONENT LOCATION E22A5D60



EQRF201A

DESCRIPTION E9FE38EA

1. In-car air temperature sensor is located at the lower crush pad.
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.

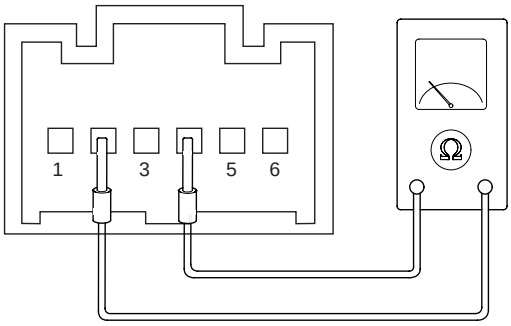


1. Motor (-)
2. Sensor ground (-)
3. Humidity sensor signal
4. In-car sensor temp.signal
5. Sensor power (+)
6. Motor (+)

EQRF201B

INSPECTION E41D0F98

1. Ignition "OFF".
2. Disconnect in-car sensor.
3. Using the multi-tester, Measure resistance between terminal "2" and "4" of in-car sensor.



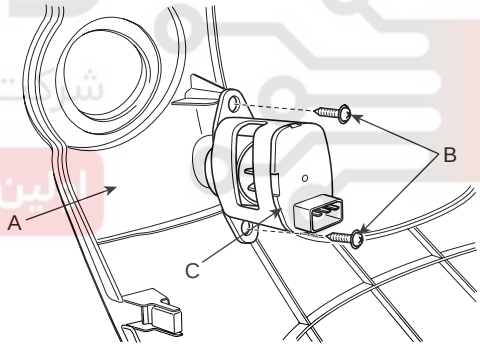
EQRF201E

SPECIFICATION

Temperature [°C(°F)]	Resistance between terminals 2 and 4 (KΩ)
-15 (5)	216.1 ± 3.2%
0 (32)	97.71 ± 2.4%
15 (59)	47.13 ± 1.7%
25 (77)	30.00 ± 1.2%
35 (95)	19.59 ± 1.6%
50 (122)	10.81 ± 2.2%

REPLACEMENT E5FABC1F

1. Disconnect the negative (-) battery terminal.
2. Remove the lower crush panel (A) (Refer to the Body group).
3. Disconnect the connector of in-car sensor.
4. Loosen the mounting screws (B) and then remove the in-car sensor (C).

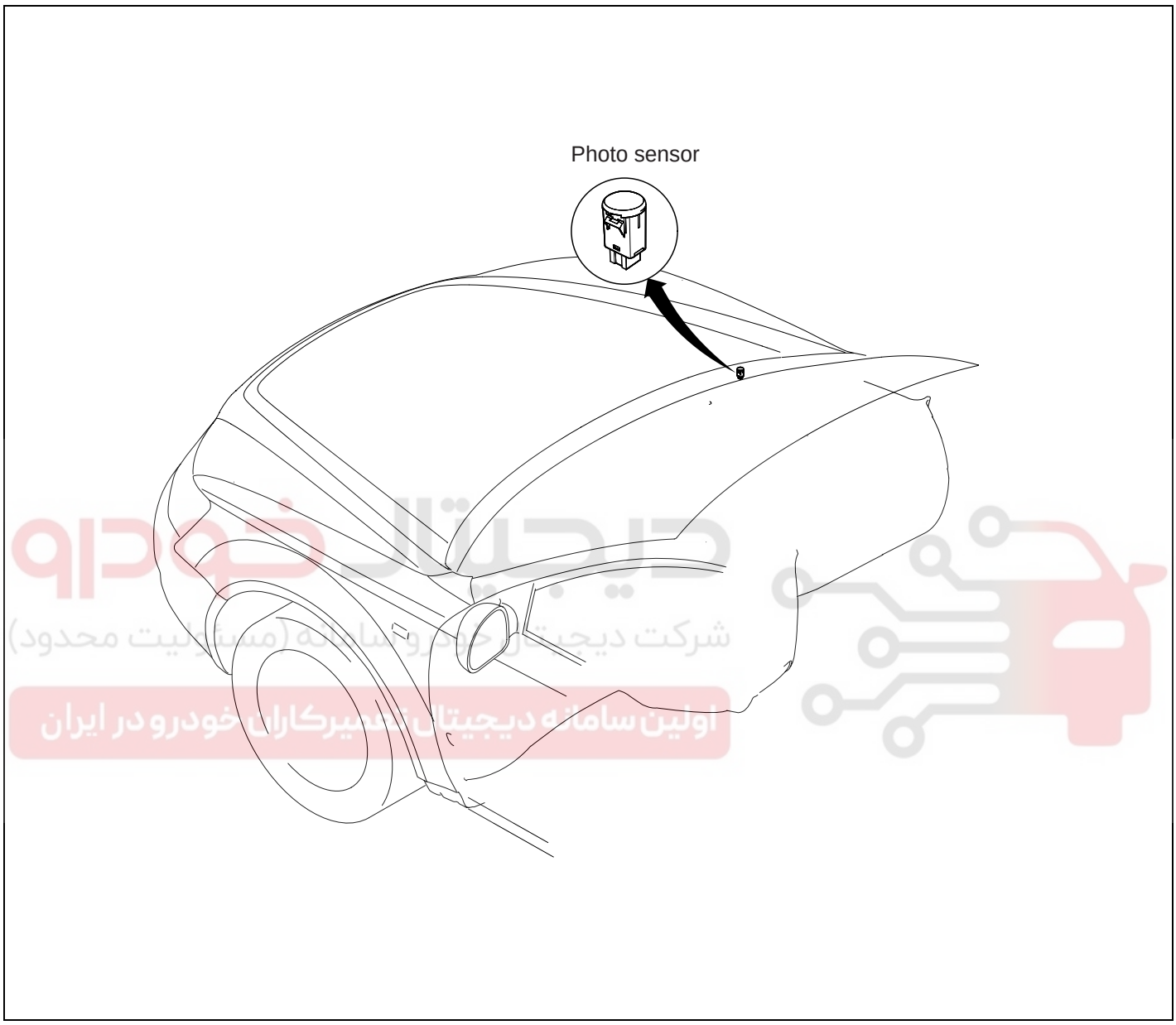


KQRE201C

5. Installation is the reverse order of removal.

PHOTO SENSOR

COMPONENT LOCATION EC142FAB



EQRF202A

DESCRIPTION EFCA8B8E

1. The photo sensor is located at the right part 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 E6E3D136

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

NOTE

When checking photo sensor, select a place where is exposed to sunshine directly.

1.2 CURRENT DATA

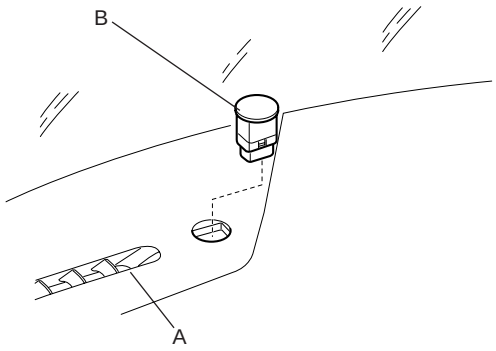
HEATER WATER TEMP.SNSR	13.0 °C
IN-CAR AIR TEMP.SNSR	31.0 °C
AMBIENT AIR TEMP.SNS	-7.0 °C
EVAPORATIVE SENSOR	31.0 °C
PHOTO SNSR.	2.0 V
AIR MIX POTENTIOMET.	10.59 %
DIRECTION POTENT.	8.23 %
HUMIDITY SENSOR	255 %

FIX PART FULL HELP GRPH RCRD

EQRF202B

REPLACEMENT EDECA3E9

1. Disconnect the negative (-) battery terminal.
2. Using the (-) driver, Remove the photo sensor (B) from the right part of defrost nozzle (A).

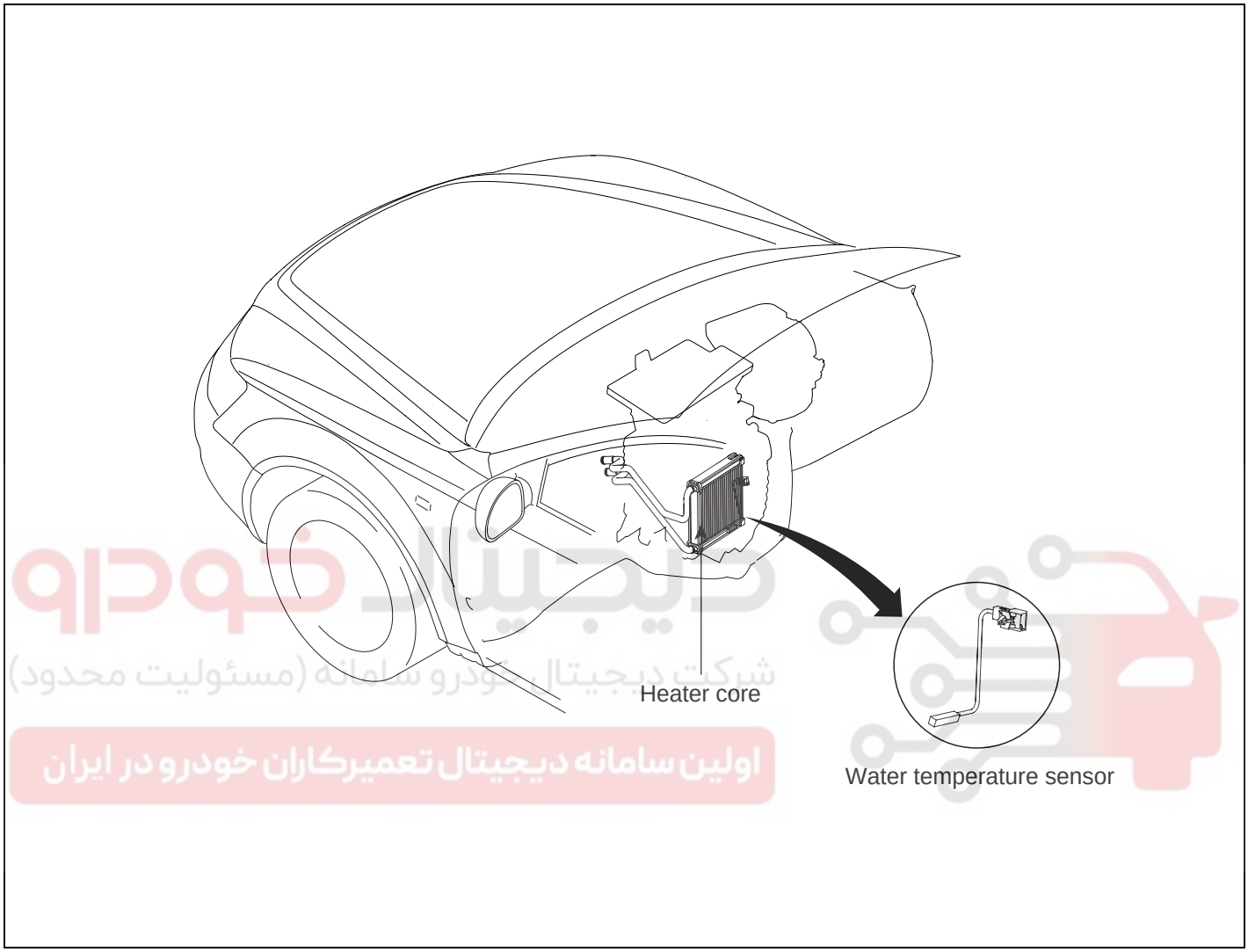


KQRE202C

3. Installation is the reverse order of removal.

WATER TEMPERATURE SENSOR

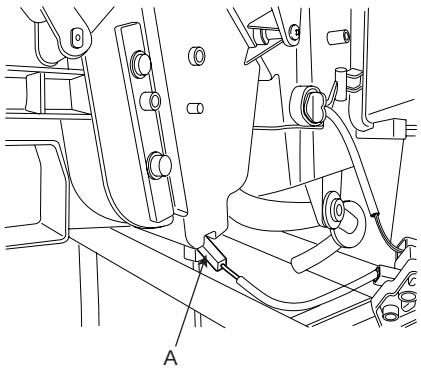
COMPONENT LOCATION E772BFC3



EQRF203A

DESCRIPTION E0784670

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



KQRE203B

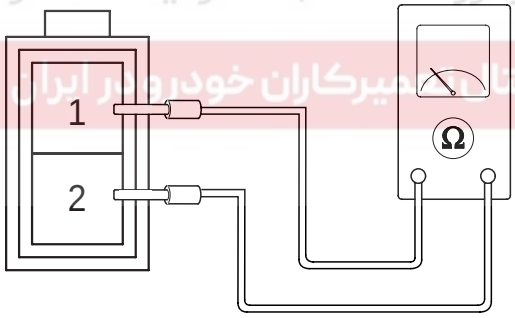
INSPECTION E3A3363A

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

SPECIFICATION

Coolant temperature [°C(°F)]	Resistance between terminals 1 and 2 (KΩ)
-10 (14)	55.27
0 (32)	32.61
20 (68)	12.48
40 (104)	5.33
60 (140)	2.50
80 (176)	1.27

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

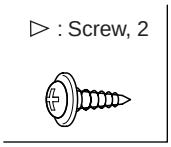


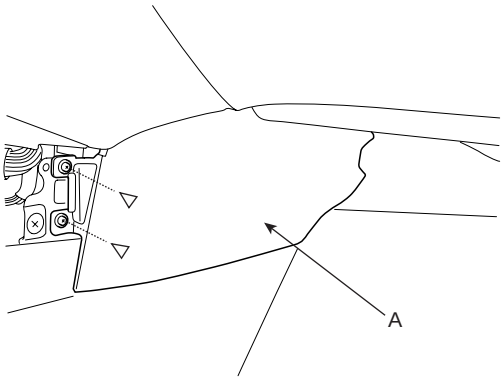
1. Water temperature sensor (+)
2. Ground (-)

EQRF203D

REPLACEMENT E41336B3

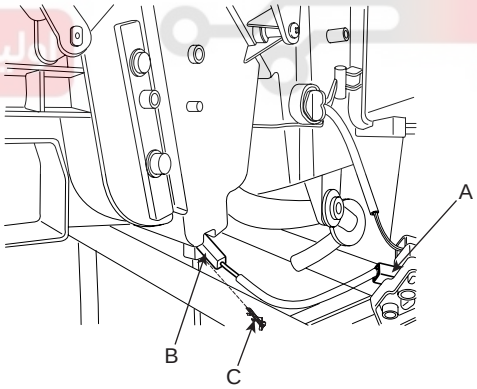
1. Disconnect the negative (-) battery terminal.
2. Remove the passenger's crush pad center low cover (A) after loosening 2 screws.





EQRF203F

3. Remove the under cover after loosening 2 screws.
4. Disconnect the connector (A) of water temperature sensor.
5. Pull the water temperature sensor(B) out at the heater unit with the stopper (C).



KQRE203E

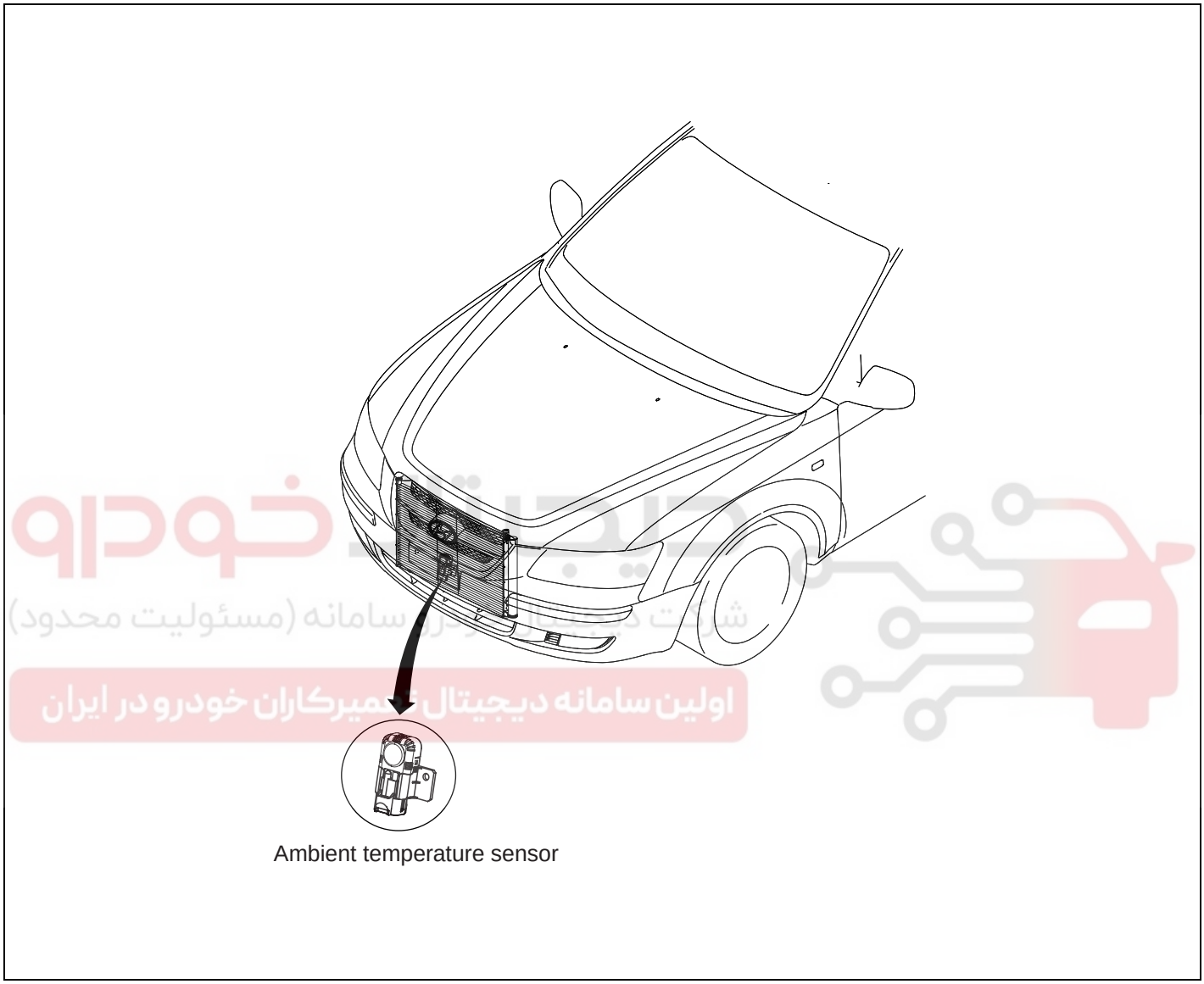
6. Install in the reverse order of removal.

NOTE

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

AMBIENT TEMPERATURE SENSOR

COMPONENT LOCATION E2E64D02



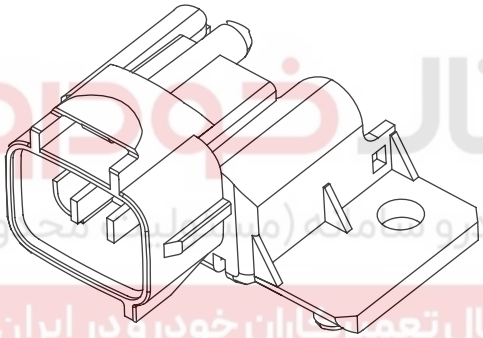
EQRF204A

DESCRIPTION EEC2DABC

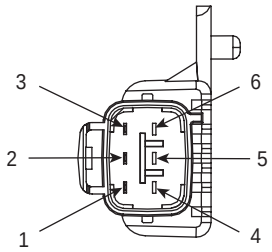
1. The ambient temperature sensor is located at the front of the condenser and detects ambient air temperature. It is a negative type thermistor; resistance will increase with lower temperature, and decrease with higher temperatures.
2. The sensor output will be used for discharge temperature control,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

NOTE

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



KQRE204B



1. Ambient temperature sensor (+)
2. Ambient temperature sensor ground (-)
3. -
4. AQS signal
5. AQS ground (-)
6. IG 2 (+)

EQRF204C

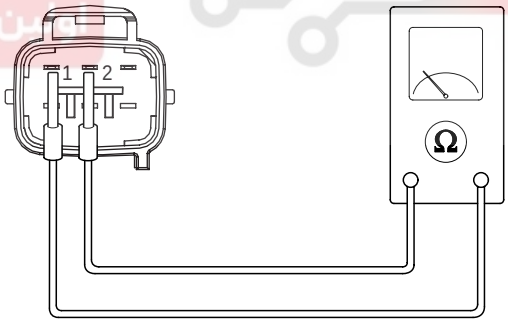
INSPECTION EF8CCCBF

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 temperature of the ambient temperature sensor.

SPECIFICATION

Ambient temperature [°C(°F)]	Resistance between terminals 1 and 2 (KΩ ±3%)
-20 (-4)	271.1
0 (32)	95.1
25 (77)	30.0
50 (122)	10.9
80 (176)	3.83

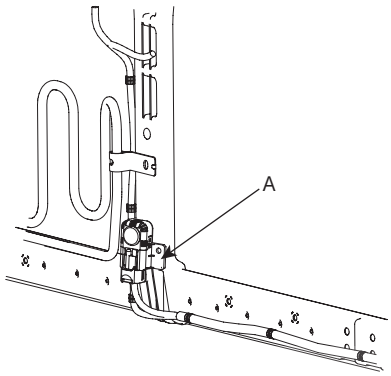
4. If the measured resistance is not specification, substitute with a known-good ambient temperature sensor and check for proper operation.
5. If the problem is corrected, replace the ambient temperature sensor.



KQRE204D

REPLACEMENT E23F036F

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper (Refer to the Body group).
3. Remove the ambient temperature sensor(A) after loosening the mounting screws.



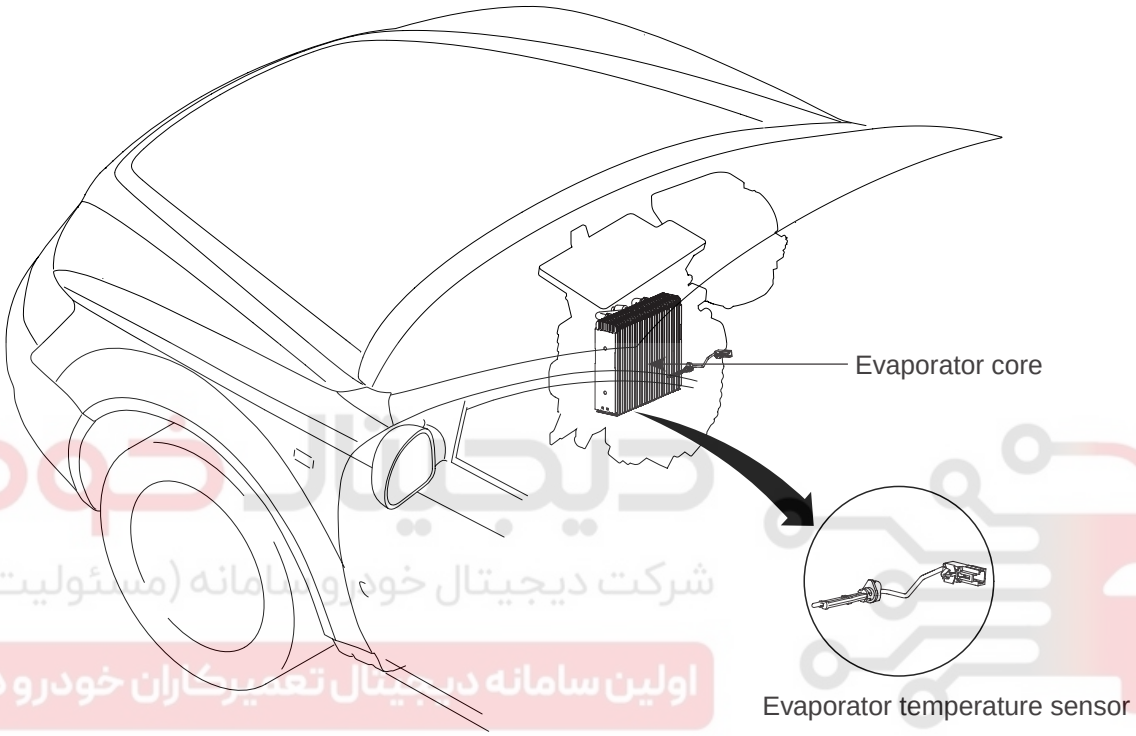
KQRE207E

4. Installation is the reverse order of removal.

EVAPORATOR TEMPERATURE SENSOR

COMPONENT LOCATION E9F5A2B5

[AUTOMATIC]



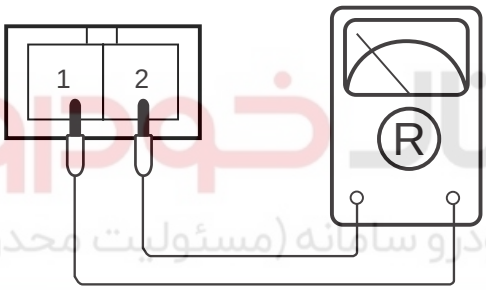
EQRF260A

DESCRIPTION EC67D4BE

The evaporator temperature sensor will detect the evaporator core temperature and interrupt compressor relay power in order to prevent evaporator freezing by excessive cooling.
It is a negative type thermistor whose resistance is inversely proportional to temperature.

INSPECTION E9F8EF21

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



AQGE116C

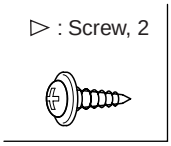
SPECIFICATION

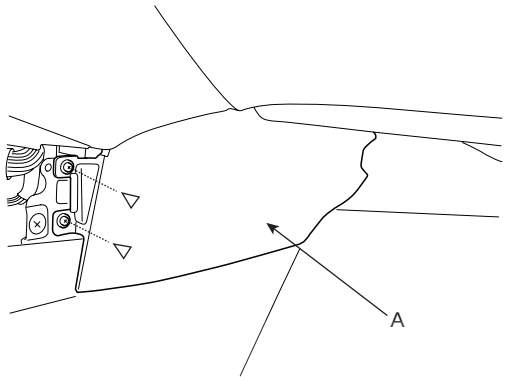
Evaporator core temperature [°C(°F)]	Resistance [KΩ]
-10 (14)	18.31
0 (32)	11.60
10 (50)	7.55
15 (59)	5.04
30 (86)	3.44
40 (104)	2.40

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 E11BC86D

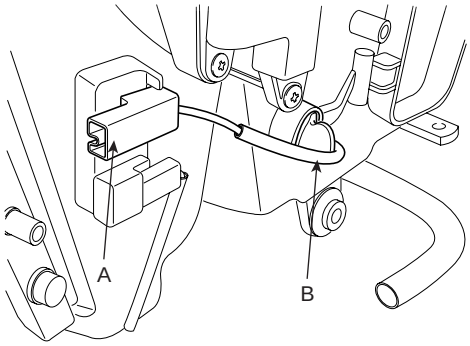
1. Remove the passenger's crush pad center low cover (A) after loosening 2 screws.





EQRF203F

2. Remove the under cover after loosening 2 screws.
3. Disconnect the connector pin (A).
4. Remove the evaporator temperature sensor (B) by pulling it after rotating 90° in a counterclockwise direction.

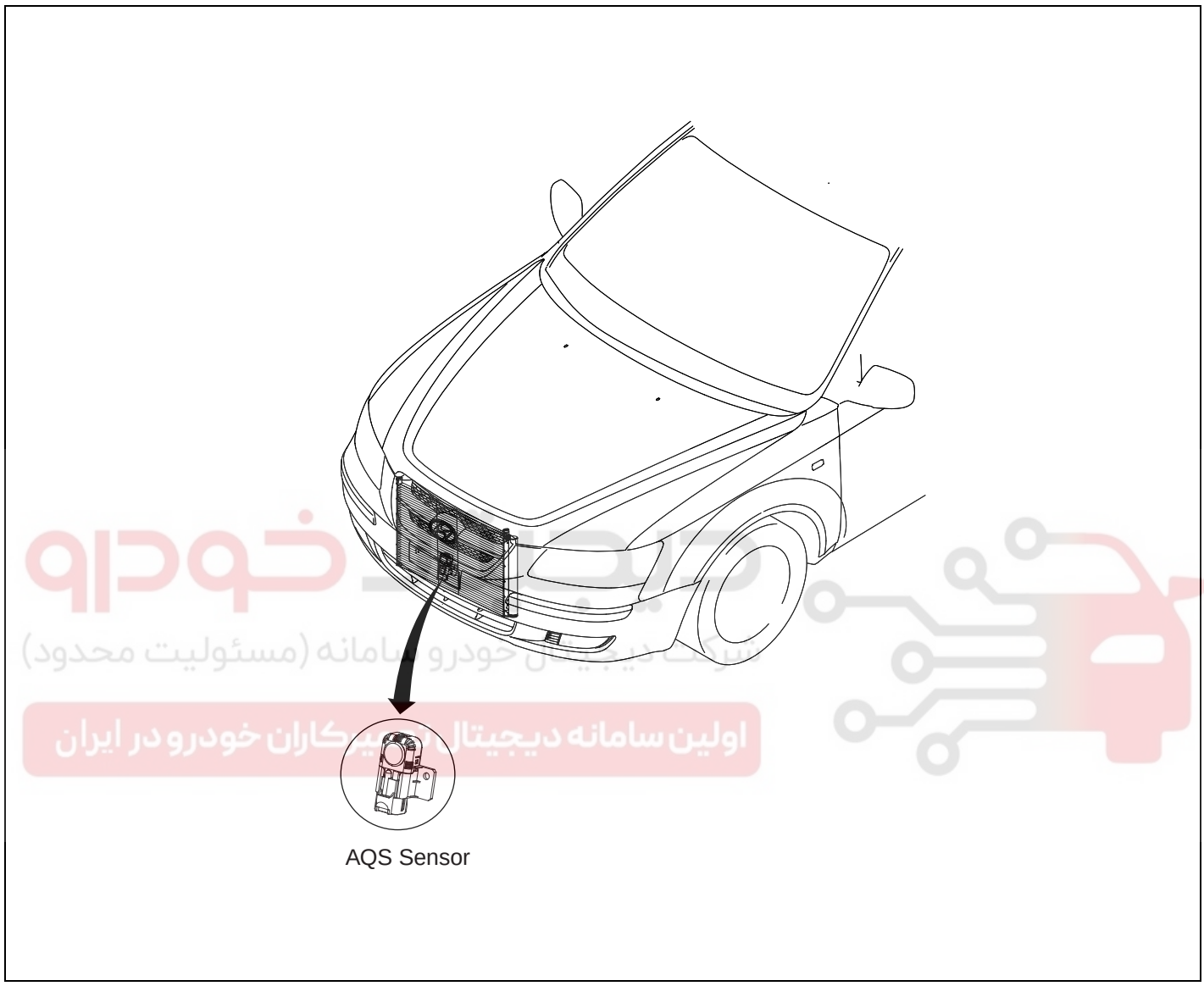


KQRE161B

5. Installation is the reverse order of removal.

A.Q.S (AIR QUALITY SENSOR)

COMPONENT LOCATION E685DB67



EQRF207A

DESCRIPTION EA92AFEA

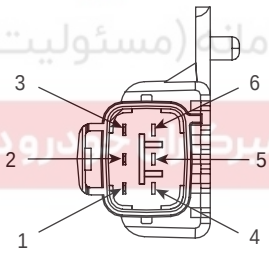
1. A.Q.S is located at center support in front of the engine radiator, and detects hazardous elements in ambient air providing output signal to control.
2. It will detect sulfurous acid gas, carbon dioxide, carbon monoxide, hydrocarbon and allergen.

INSPECTION E9BBBDA8

1. Ignition "ON".
2. Using the scan tool.
3. Check the output voltage of AQS between terminals 4 and 5.

SPECIFICATION

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

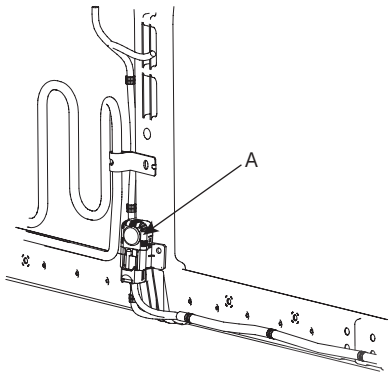


1. Ambient temperature sensor (+)
2. Ambient temperature sensor ground (-)
3. -
4. AQS signal
5. AQS ground (-)
6. IG 2 (+)

EQRF204C

REPLACEMENT EC4857AD

1. Disconnect the negative (-) battery terminal.
2. Remove the front bumper (Refer to the Body group).
3. Remove the AQS sensor (A) after loosening the mounting screws.

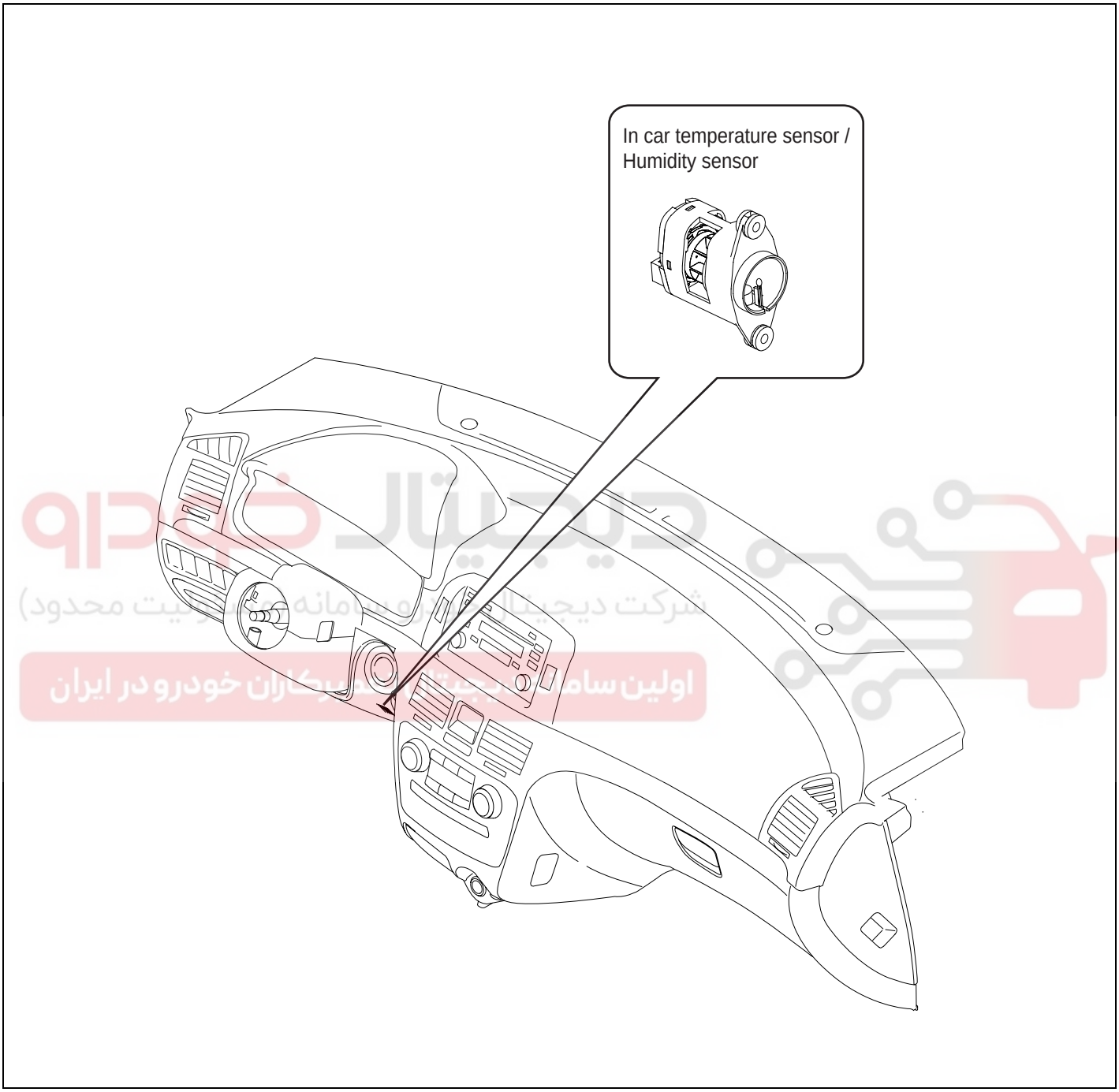


KQRE204E

4. Install in the reverse order of removal.

HUMIDITY SENSOR

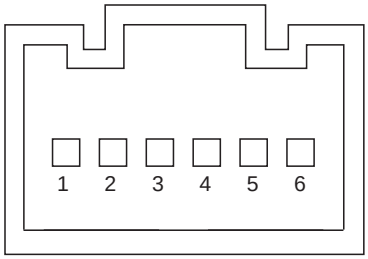
COMPONENT LOCATION E6CFCBE0



EQRF201A

DESCRIPTION E1D4EF2E

1. Humidity sensor is located at the lower crush pad and detects in-car humidity for in-car humidity control.
2. If ambient air temperature or in-car humidity is outside certain range, it will turn on A/C to control in-car humidity preventing in car fogging.
   Air conditioner operation depends on ambient temperature and humidity.



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

EQRF201B

INSPECTION EF0EC133

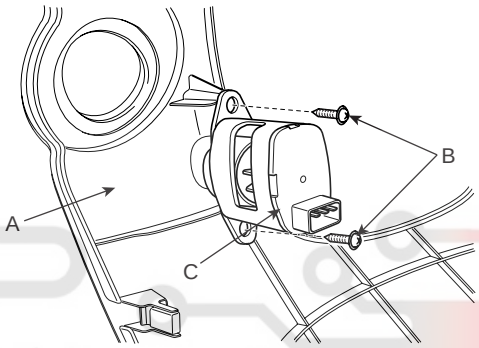
1. Ignition "ON".
2. Using the scan tool.
3. Check the frequency of humidity sensor between terminals 2 and 3.

Humidity (%)	Frequency between terminals 2 and 3(Hz)
0	7351± 10%
10	7224± 10%
20	7100± 10%
30	6976 ± 10%
50	6728 ± 10%
60	6600 ± 10%
70	6468 ± 10%
80	6330 ± 10%
90	6186 ± 10%
100	6033 ± 10%

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

REPLACEMENT EA3C7838

1. Disconnect the negative (-) battery terminal.
2. Remove the lower crush panel (A) (Refer to the Body group).
3. Disconnect the connector of humidity sensor.
4. Loosen the mounting screws (B) and then remove the humidity sensor (C).



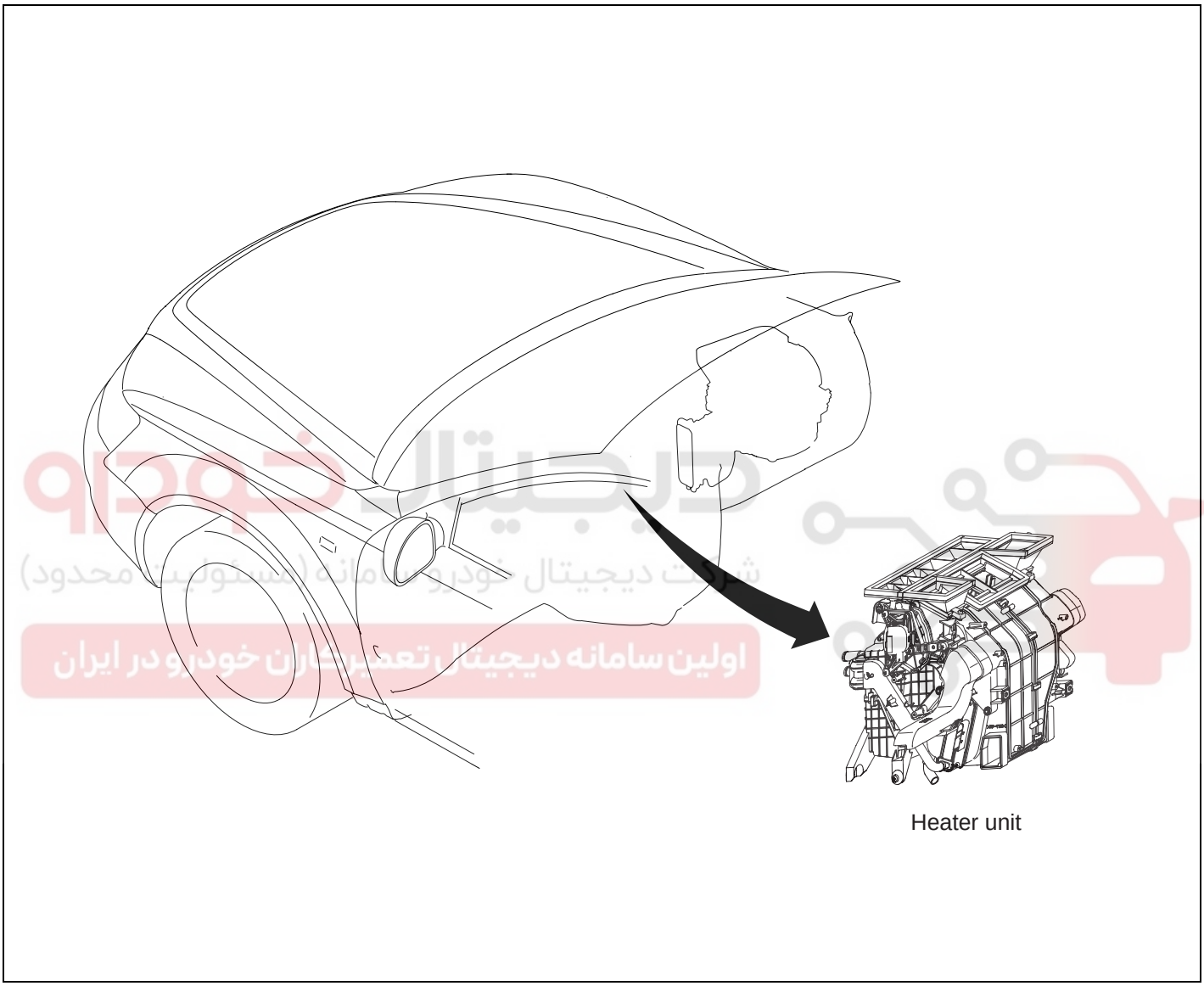
KQRE201C

5. Installation is the reverse order of removal.

HEATER

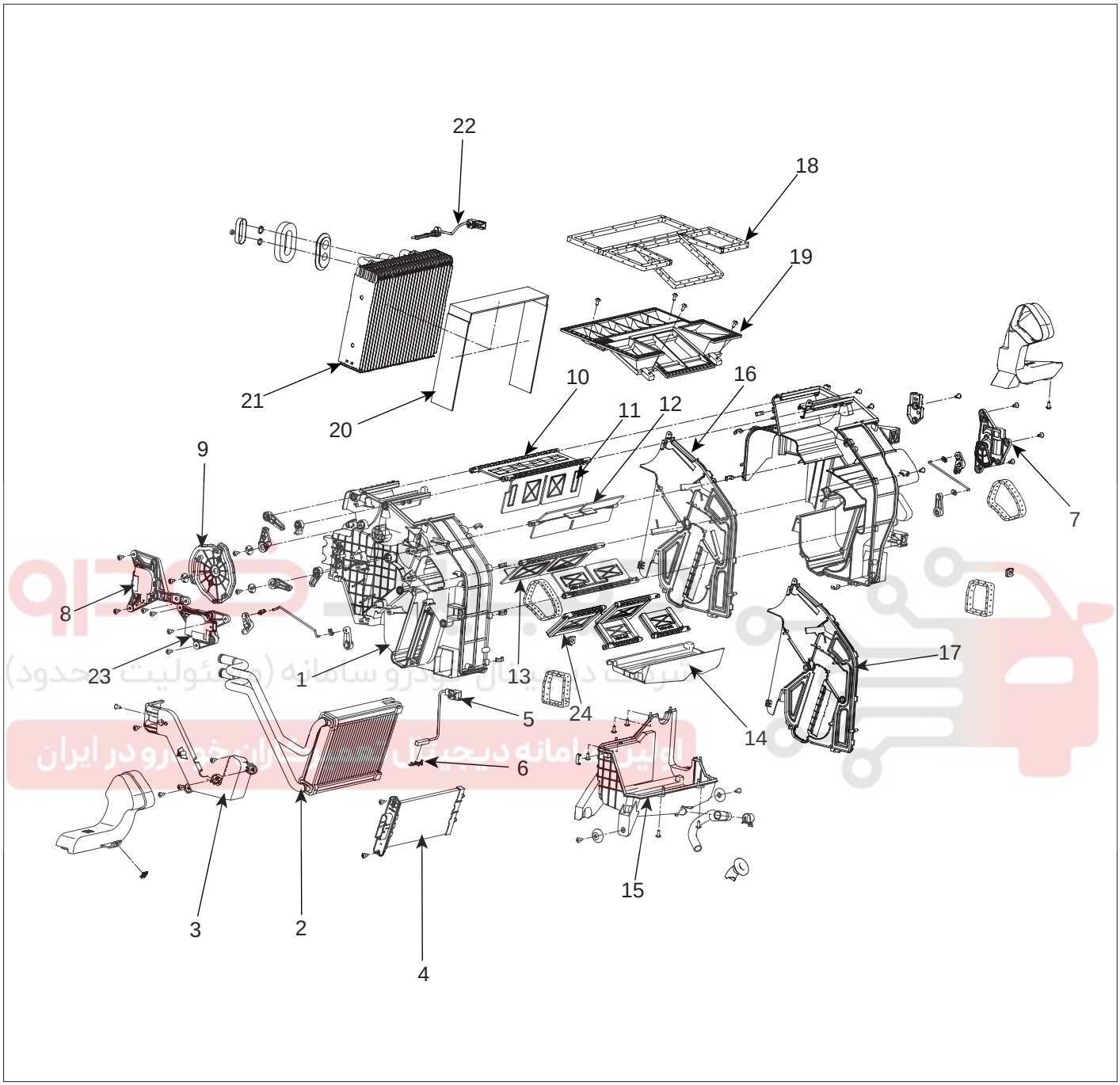
HEATER UNIT

COMPONENT LOCATION EE61D715



EQRF300A

COMPONENTS

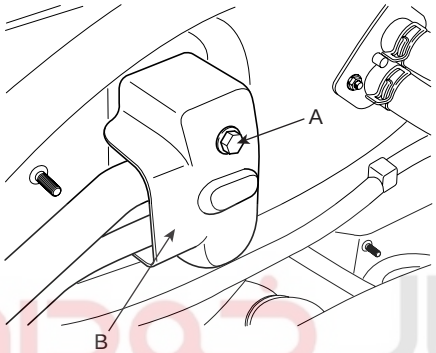


1. Heater & Evaporator case
2. Heater core
3. Heater core cover
4. PTC heater (Diesel only)
5. Water temperature sensor
6. Water temperature sensor stopper
7. Temperature control actuator
8. Mode control actuator
9. Mode cam
10. Defrost door
11. Vent door
12. Floor door
13. Temperature control door (Single type)
14. Insulation
15. Heater & Evaporator lower case
16. Heater separator (Single type)
17. Heater separator (Dual type)
18. Upper case seal
19. Heater & Evaporator upper case
20. Evaporator case seal
21. Evaporator core
22. Evaporator temperature sensor
23. Temperature control actuator (Dual type)
24. Temperature control door (Dual type)

EQRF300B

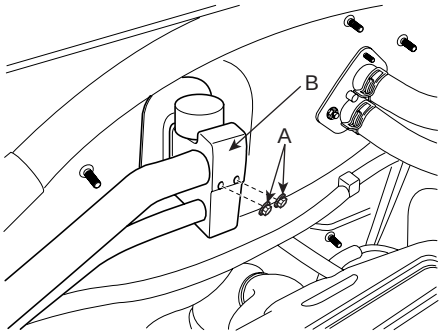
REPLACEMENT EDF1CFA1

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 expansion valve cover after loosening the nut (A).



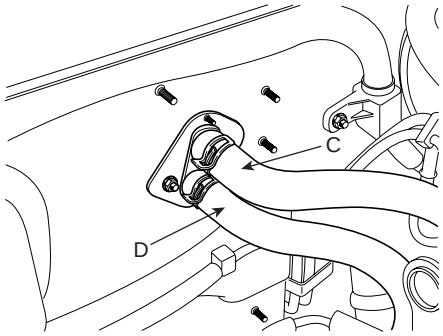
KQRE300C

5. Remove the expansion valve (B) from evaporator core after loosening nuts (A). Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



KQRE300D

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

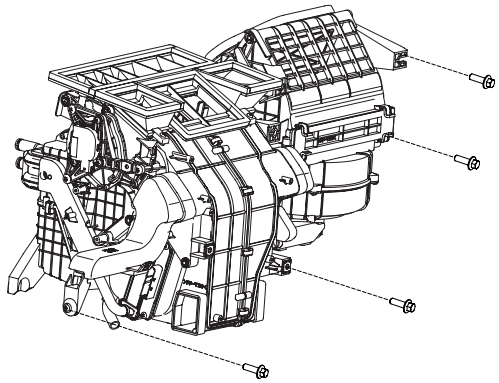


KQRE300E

CAUTION

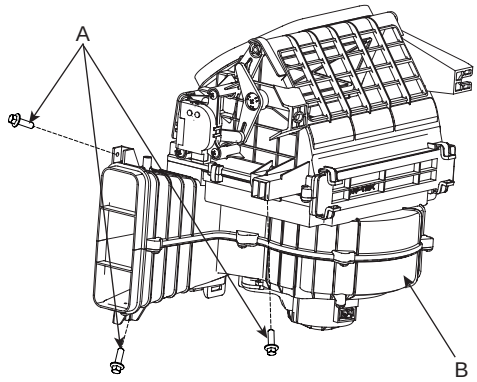
Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan. Be sure not to let coolant spill on electrical parts or painted surfaces. If any coolant spills, rinse it off immediately.

7. Remove the crush pad (Refer to the Body group).
8. Remove the cross member. (Refer to the Body group).
9. Disconnect the connectors from the temperature control actuator, the mode control actuator and the evaporator temperature sensor, then remove the mounting nut and the mounting bolts.
10. Remove the heater & evaporator unit after loosening the mounting bolts.



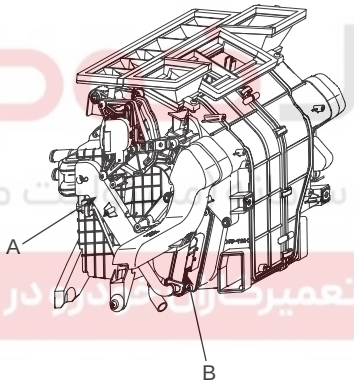
KQRE300F

11. Remove the blower unit from heater unit after loosening fixing screws on the connected part.



KQRE300G

12. Remove the side bracket (A) and heater core (B).



KQRE300H

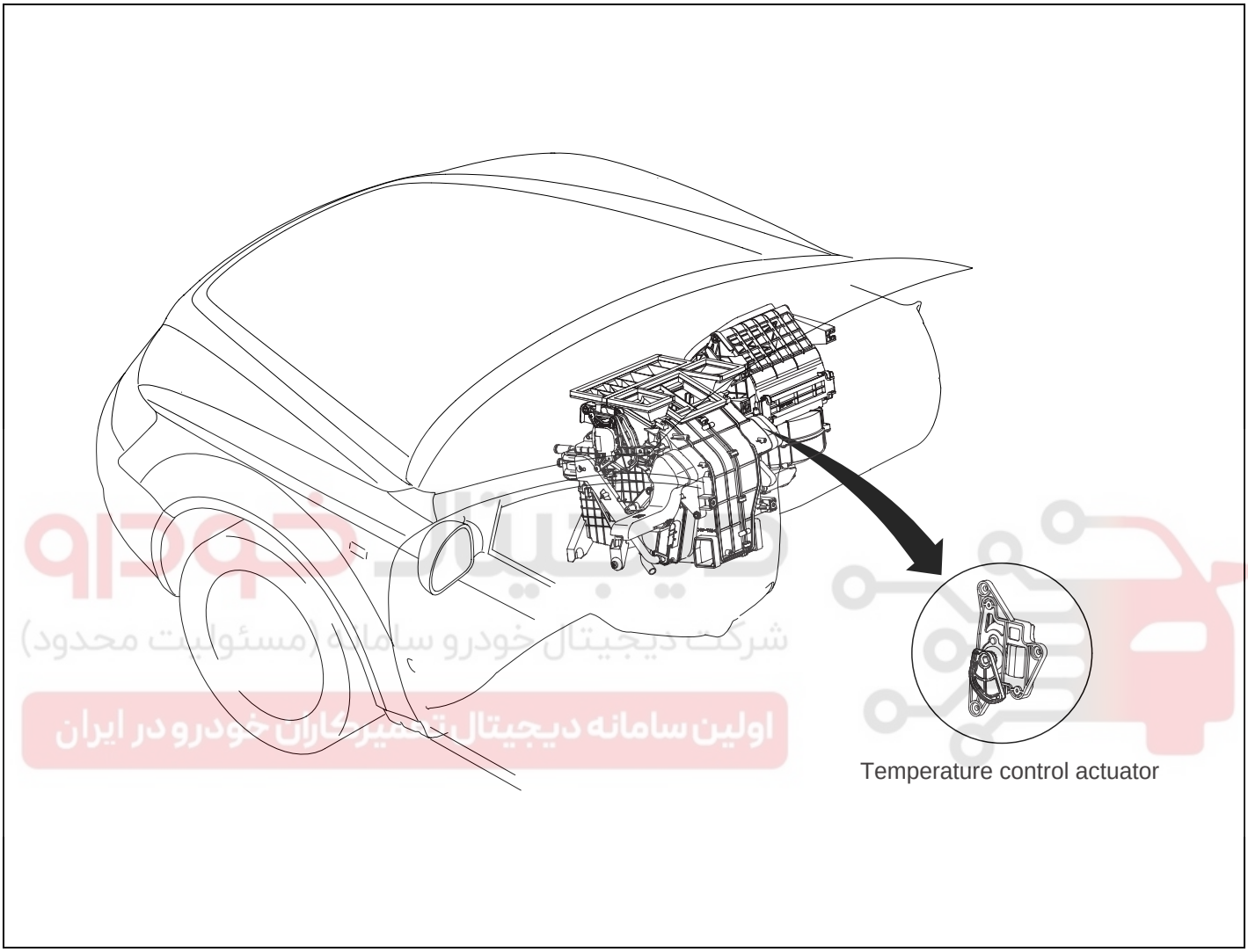
13. Be careful not to bend the inlet and outlet pipes during heater core removal, and pull out the heater core.

14. Install the heater core in the reverse order of removal.

15. Install in the reverse order of removal, and note these items :
    - If you're installing a new evaporator, add refrigerant oil.
    - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
    - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
    - Do not spill the refrigerant oil on the vehicle ; it may damage the paint ; if the refrigerant oil contacts the paint, wash it off immediately.
    - Apply sealant to the grommets.
    - Make sure that there is no air leakage.
    - Charge the system and test its performance.
    - Do not interchange the inlet and outlet heater hoses and install the hose clamps securely.
    - Refill the cooling system with engine coolant.

TEMPERATURE CONTROL ACTUATOR

COMPONENT LOCATION EC24C965



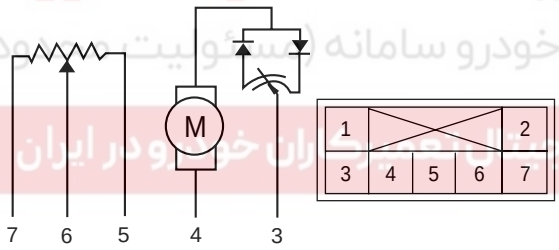
EQRF315A

DESCRIPTION E83F0C5B

1. Heater unit includes mode control actuator and temperature control actuator.
2. Temperature control actuator is located at the heater unit. 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 determined by position of temperature door.

INSPECTION E656A419

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.
4. Verify that the temperature control actuator operates to the cool position when the connections are reversed.



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

EQRF315B

5. Check the voltage between terminals 5 and 6.

SPECIFICATION

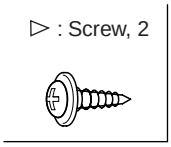
Door position	Voltage (5-6)	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage : 0.1V or less
Max. heating	4.7 ± 0.15V	High voltage : 4.9V or more

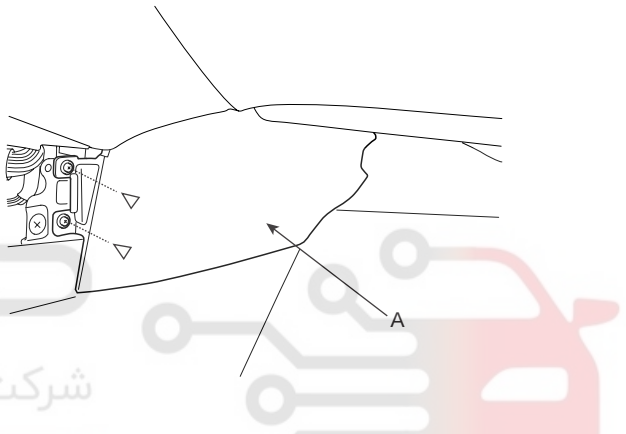
It will feedback current position of actuator to controls.

6. If the measured voltage is not within 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 E1BC6FDF

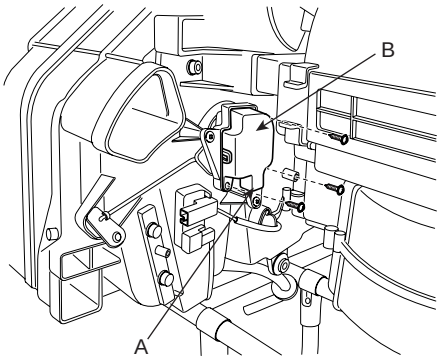
1. Disconnect the negative (-) battery terminal.
2. Remove the passenger's crush pad center lower cover (A). (Refer to the Body group).





EQRF203F

3. Disconnect the connector (A) of temperature control actuator after removing the air duct.
4. Loosen the mounting screw and then remove the temperature control actuator (B).

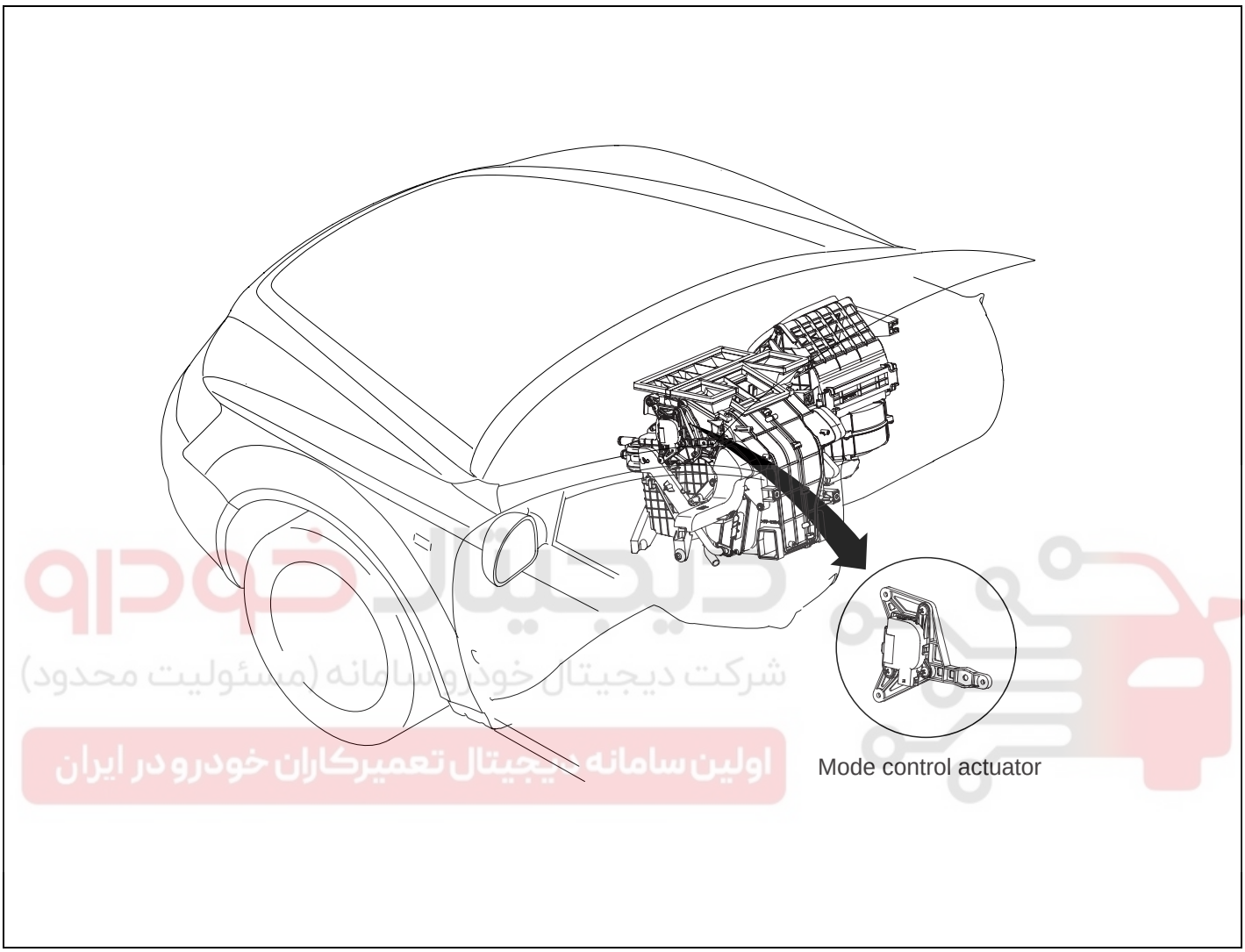


KQRE315C

5. Install in the reverse order of removal.

MODE CONTROL ACTUATOR

COMPONENT LOCATION E85AA0FD



EQRF316A

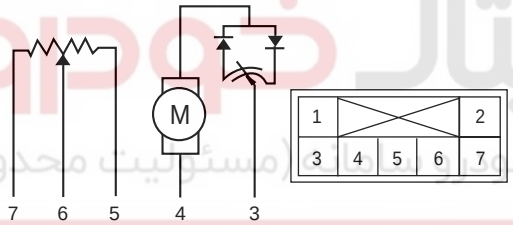
DESCRIPTION E7B1EDEA

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→ BI/LEVEL → floor → mix.

INSPECTION EDF50D8B

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



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

EQRF316B

5. Check the voltage between terminals 5 and 6.

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

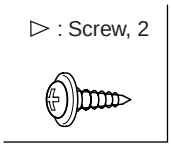
It will feedback current position of actuator to controls.

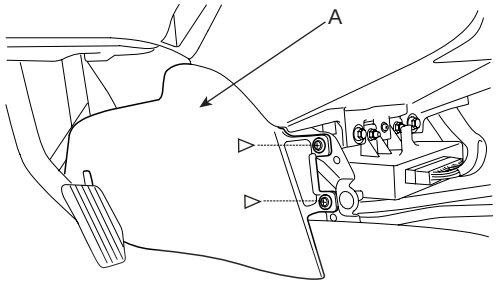
6. If the measured voltage is not specification, substitute with a known-good mode control actuator and check for proper operation.
7. If the problem is corrected, replace the mode control actuator.

REPLACEMENT E0F5BF29

1. Disconnect the negative (-) battery terminal.
2. Remove the driver's crush pad center lower cover (A). (Refer to the Body group).

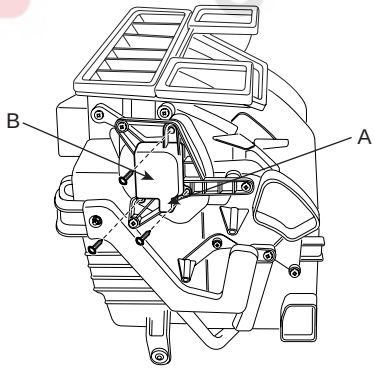
▷ : Screw, 2





EQRF316D

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



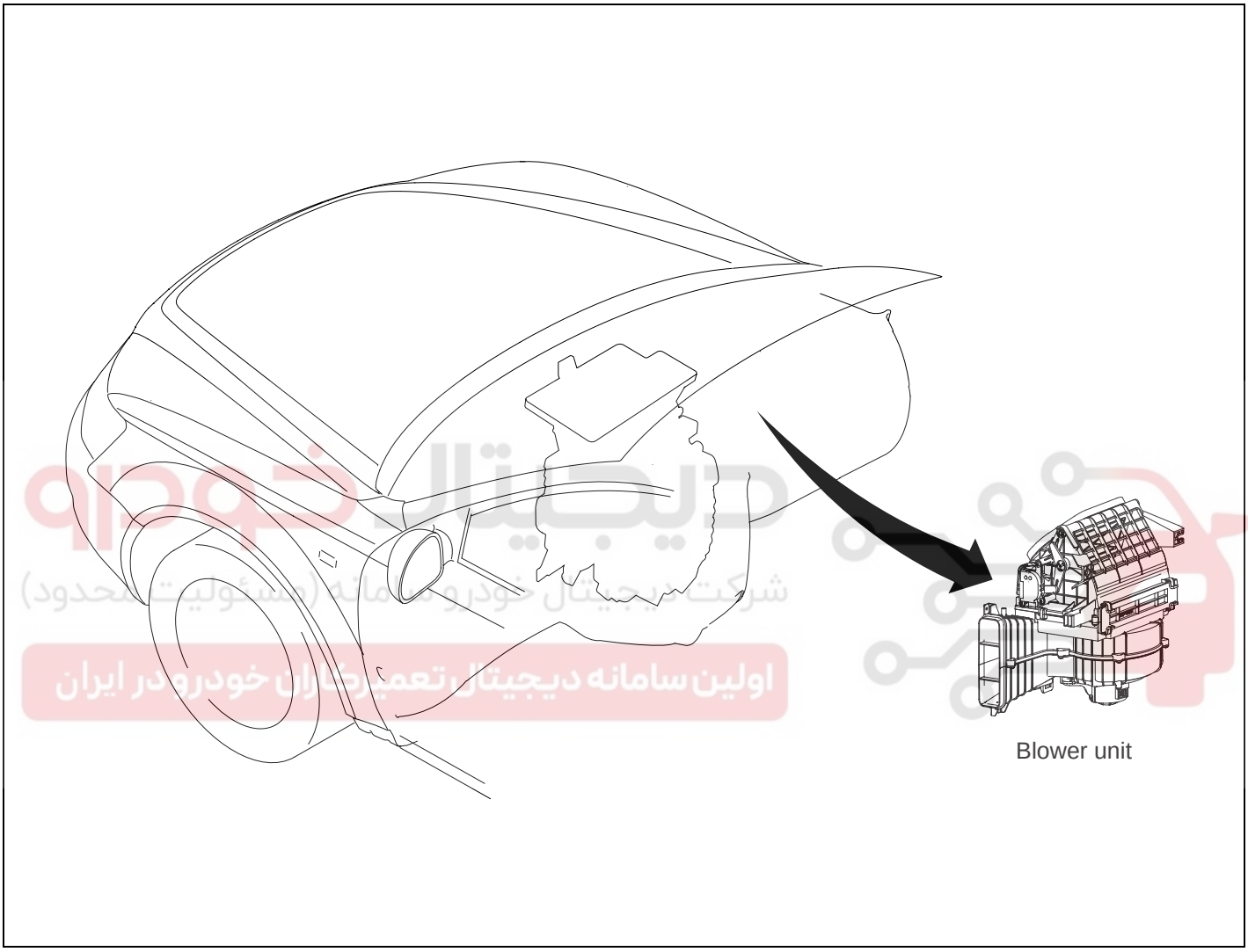
KQRE316C

5. Install in the reverse order of removal.

BLOWER CONTROLS

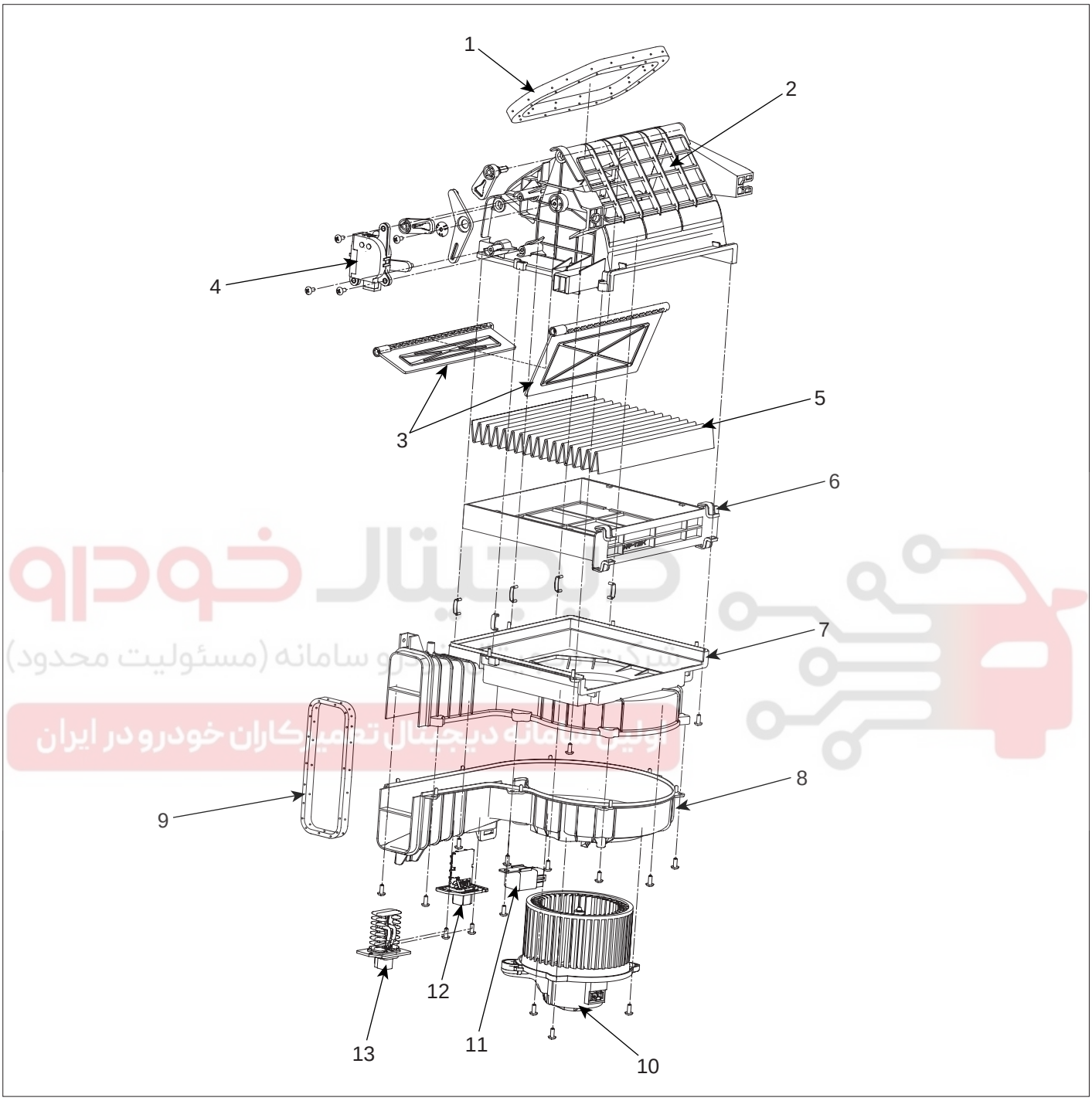
BLOWER UNIT

COMPONENT LOCATION E7160638



EQRF351A

COMPONENTS

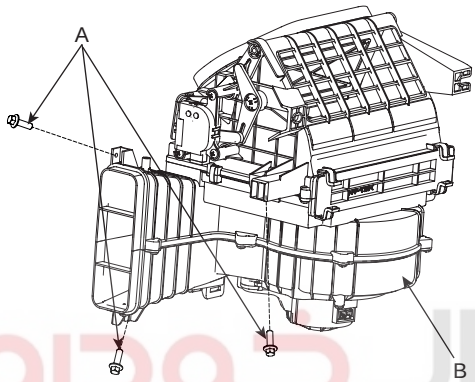


1. Outlet duct seal
2. Inlet duct case
3. Inlet door
4. Intake actuator
5. Air filter
6. Air filter housing
7. Blower upper case
8. Blower lower case
9. Blower seal
10. Blower motor
11. Hi-blower relay (AUTOMATIC)
12. Resistor (MANUAL)
13. Power transistor (AUTOMATIC)

EQRF351B

REPLACEMENT E76B02D3

1. Disconnect the negative (-) battery terminal.
2. Remove the heater unit (Refer to page HA-52)
3. Disconnect the connectors from the intake actuator, hi-blower relay, the blower motor, resistor (MANUAL) and power transistor (AUTOMATIC).
4. Remove the self-tapping screws (A) and the blower unit (B).



KQRE300G

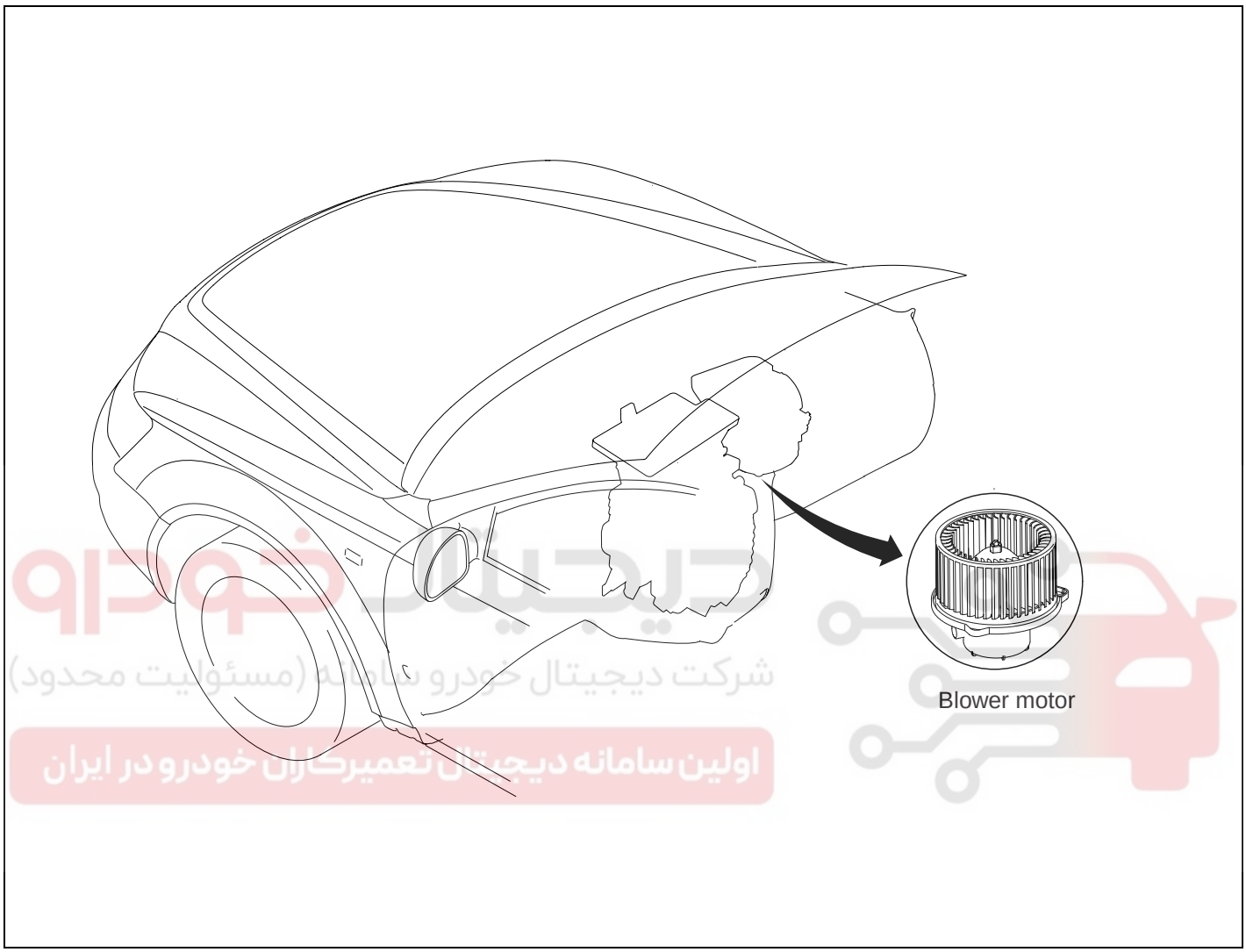
NOTE

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

5. Install in the reverse order of removal.

BLOWER MOTOR

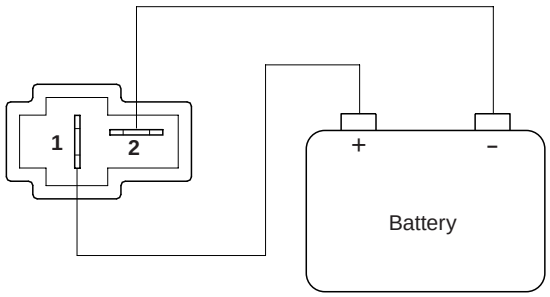
COMPONENT LOCATION EEE1B14C



EQRF352A

INSPECTION E22D2C89

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

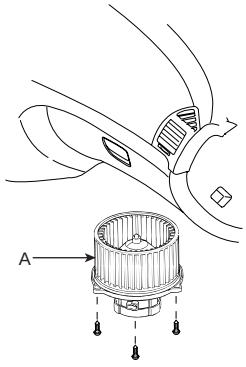


AQIE352C

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

REPLACEMENT E8E2E96A

1. Disconnect the negative (-) battery terminal.
2. Remove the under cover after loosening 2 screws.
3. Disconnect the connector of the blower motor.
4. Remove the blower motor (A) after loosening the mounting screws.

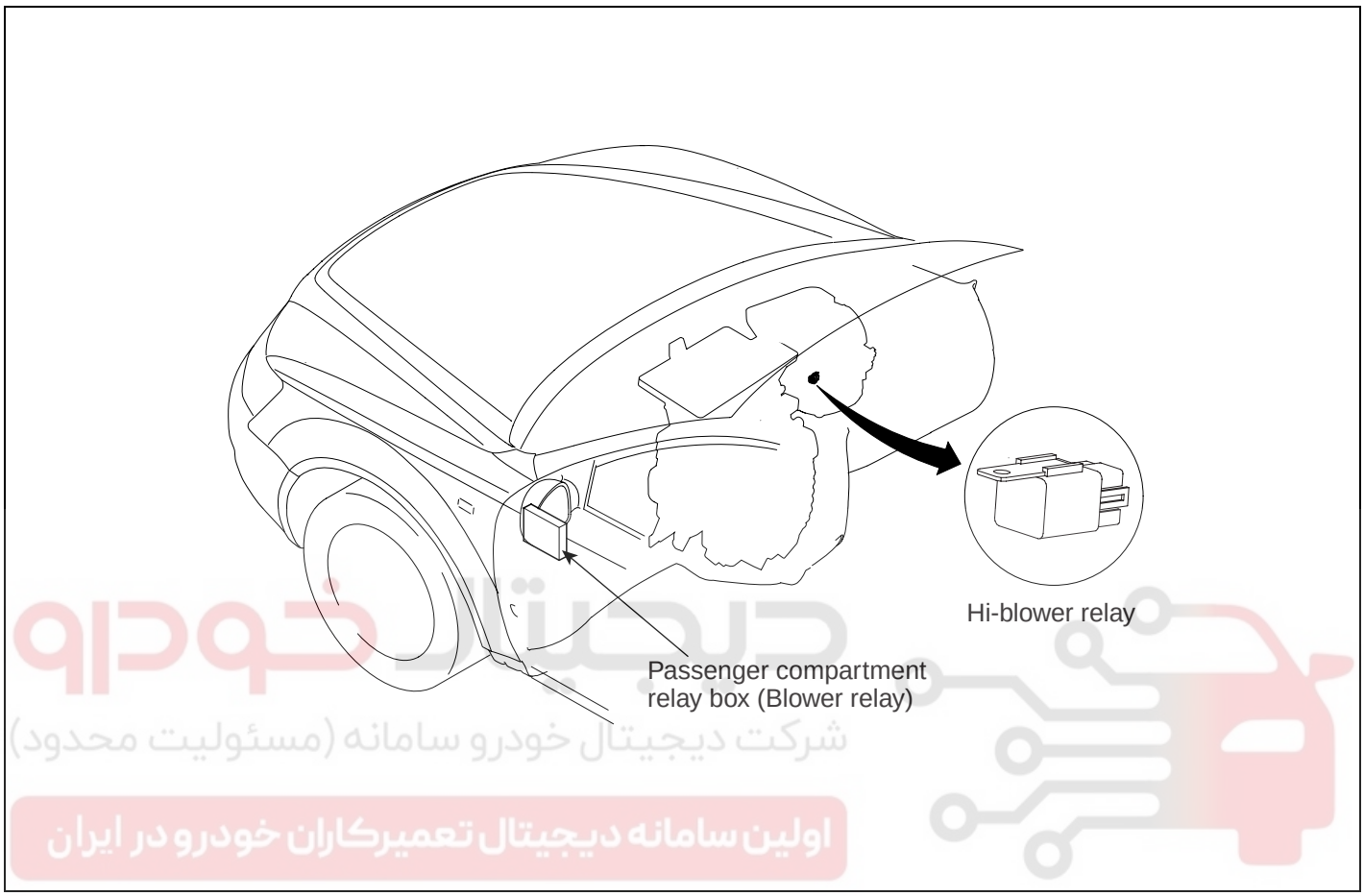


KQRE352B

5. Install in the reverse order of removal.

BLOWER RELAY

COMPONENT LOCATION E5EA1D98

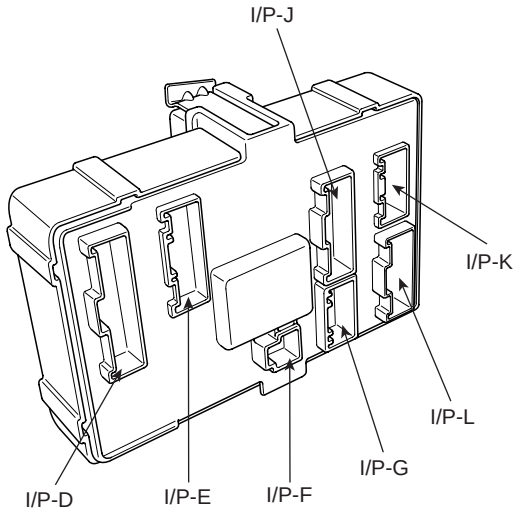


EQRF353A

INSPECTION E93988FD

1. Disconnect the negative (-) battery terminal.
2. Remove the passenger compartment relay box.

   Check for continuity between the terminals.
3. There should be continuity between the No.9 in the I/P-K and No.15 in the I/P-A terminals when power and ground are connected to the No.16 in the I/P-D and No.13 I/P-B terminals in the passenger compartment relay box.
4. There should be no continuity between the No.9 in the I/P-K and No.15 in the I/P-A terminals when power is disconnected.



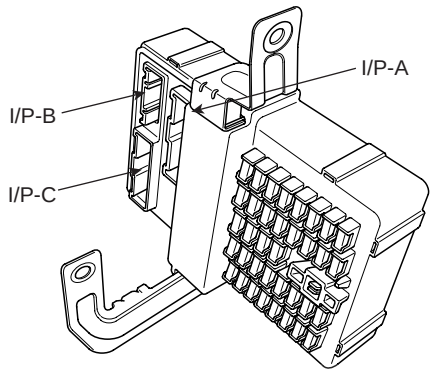
KTRE323A

Terminal / Position	I/P-K (9)	I/P-A (15)	I/P-D (16)	I/P-B (13)
Disconnected			○	○
Connected	○	○	⊖	⊕

ETRF323B

Terminal / Position	3	4	1	2
Disconnected			○	○
Connected	○	○	⊕	⊖

EQRF353C

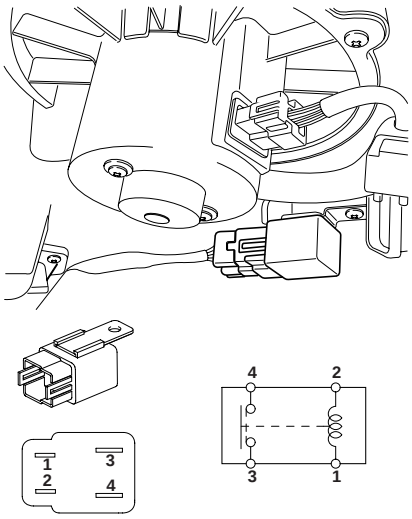


KTRE323D

5. If the blower motor voltage does not operate properly, substitute with a known-good blower relay and check for proper operation.
6. If the problem is corrected, replace the blower relay.

HI-BLOWER RELAY INSPECTION

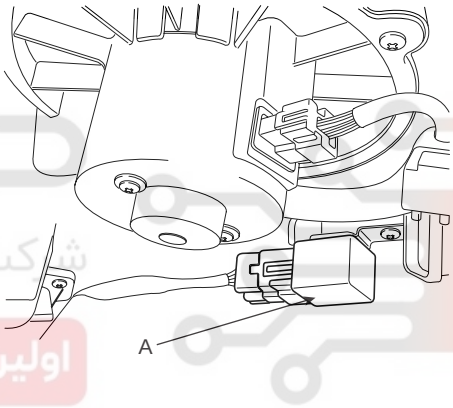
1. There should be continuity between the No.3 and No.4 terminals when power and ground are connected to the No.1 and No.2 terminals.
2. There should be no continuity between the No.3 and No.4 terminals when power is disconnected.



KQRE353B

REPLACEMENT E4C53243

1. Disconnect the negative (-) battery terminal.
2. Disconnect the connector of the hi-blower relay at the below blower unit.
3. Remove the hi-blower relay (A) after loosening the mounting screw.



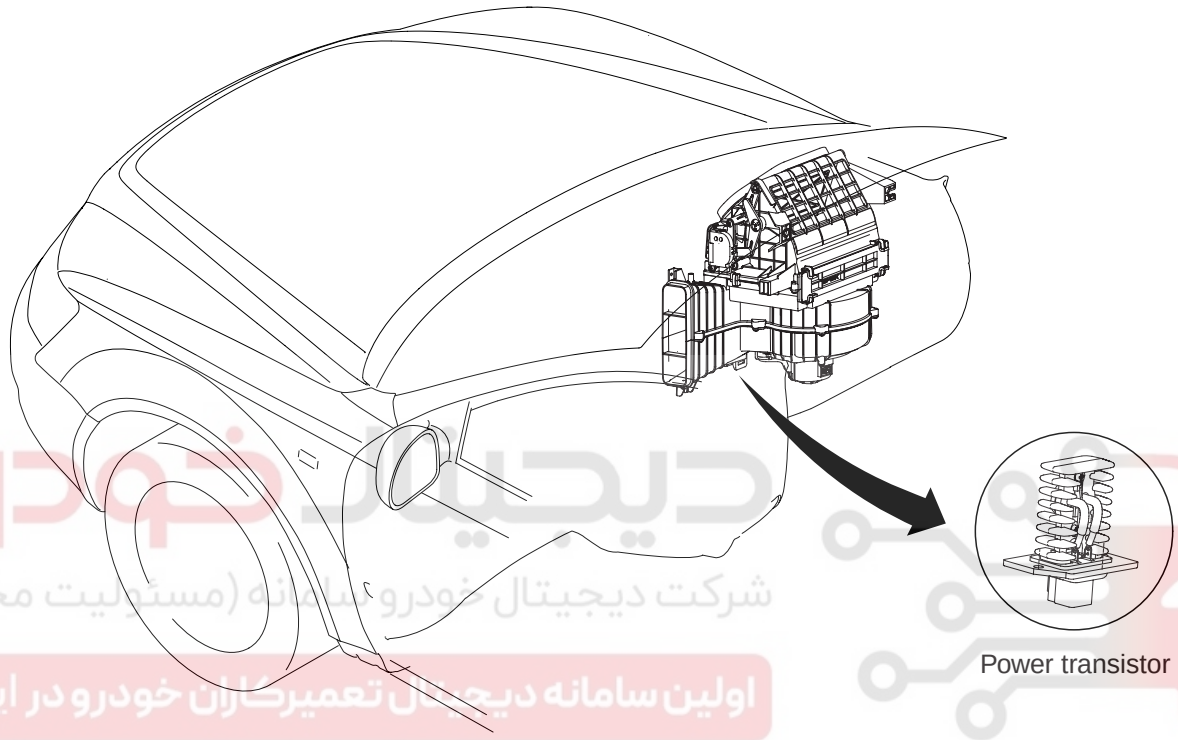
KQRE353D

4. Install in the reverse order of removal.

POWER TRANSISTOR

COMPONENT LOCATION E843EC6B

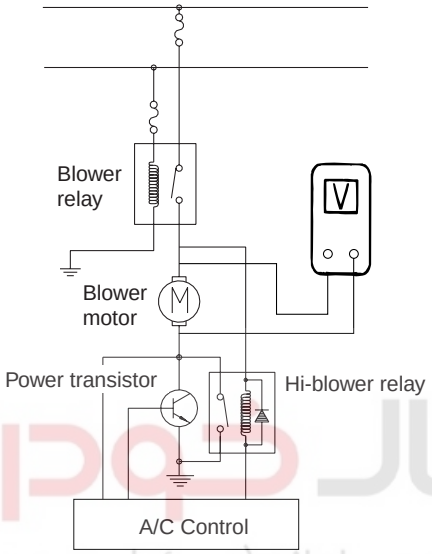
[AUTOMATIC]



EQRF355A

INSPECTION E7411DAA

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



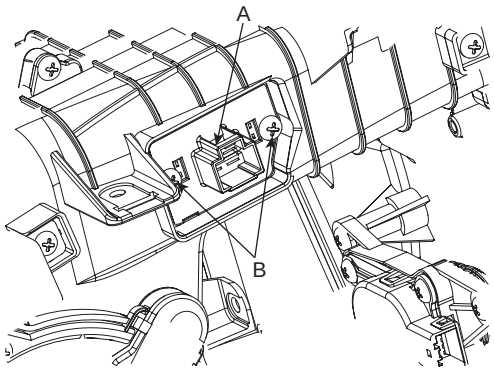
LQGE355A

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

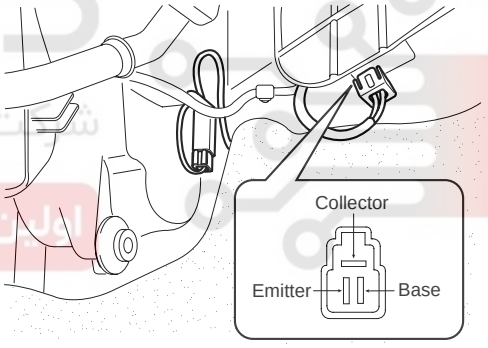
4. If the measured voltage is not within specification, substitute with a known-good power transistor and check for proper operation.
5. If the problem is corrected, replace the power transistor.

REPLACEMENT E2D5D14D

1. Disconnect the negative (-) battery terminal.
2. Disconnect the connector (A) of the power transistor at the below blower unit.



KQRE357C



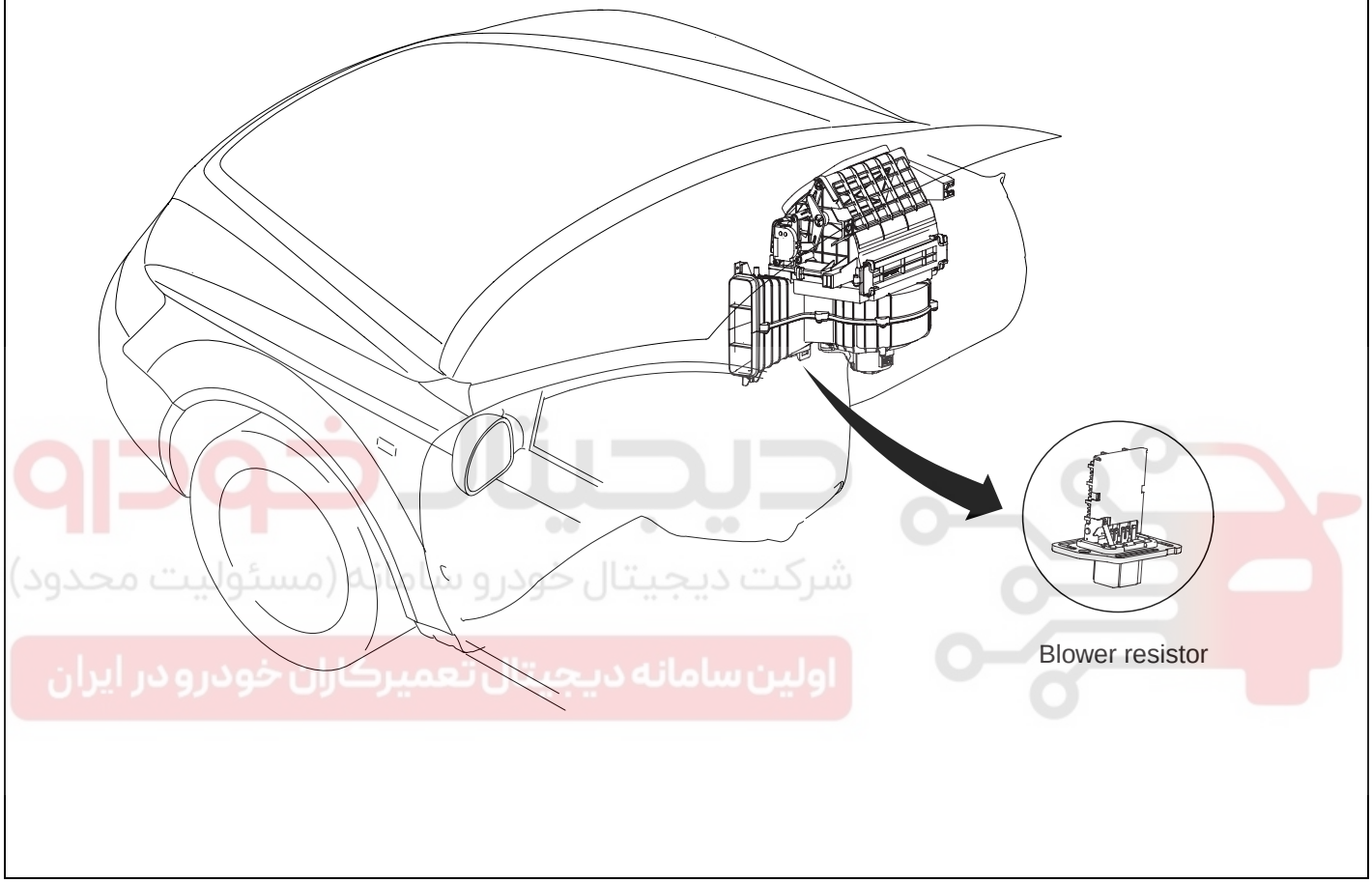
EQRF355B

3. Remove the power transistor after loosening the mounting screws (B).
4. Install in the reverse order of removal.

BLOWER RESISTOR

COMPONENT LOCATION EAC0BA25

[MANUAL]



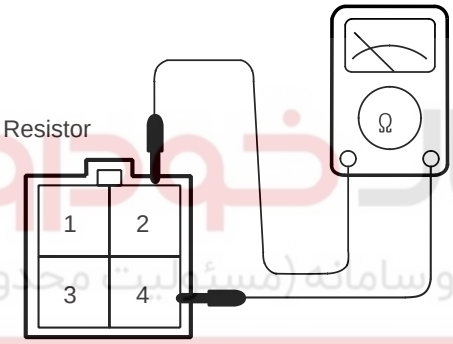
EQRF357A

INSPECTION EB2AD440

1. Measure terminal-to-terminal resistance of the blower resistor.
2. If measured resistance is not within specification, the blower resistor must be replaced. (After removing the resistor)

Terminal / Speed / Resistance ohmmeter	2	1	4	3	Resistance (Ω)
	MH	ML	HI	LO	
Measurement of resistance between each terminal			○—○		2.9 ± 5%
		○—○	○—○		1.5 ± 5%
	○—○	○—○	○—○		0.5 ± 5%

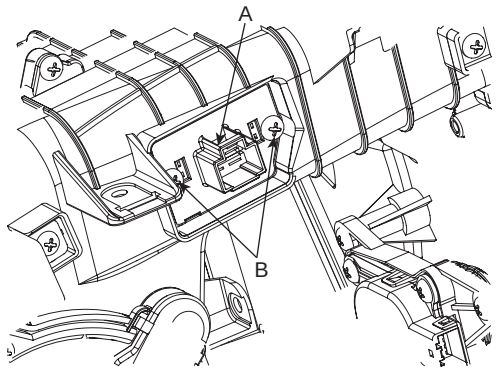
EQRF357B



LQGE354C

REPLACEMENT EAE623A2

1. Disconnect the negative (-) battery terminal.
2. Disconnect the connector (A) of the blower resistor at the below blower unit.



KQRE357C

3. Remove the blower resistor after loosening the mounting screws.
4. Install in the reverse order of removal.

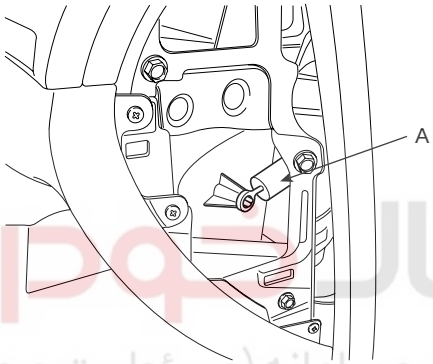
A/C AIR FILTER

DESCRIPTION E934EDB6

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.

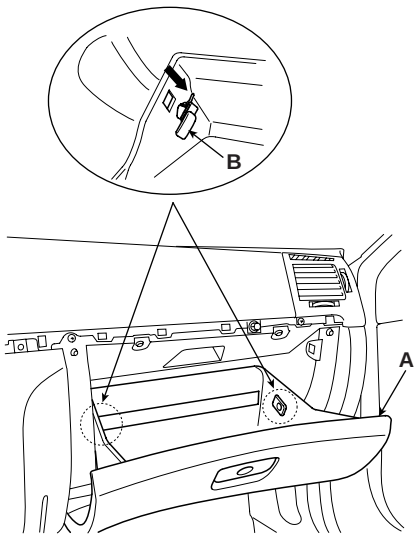
REPLACEMENT E9686BAD

1. Remove the damper (A) from the glove box after removing side cover by using scraper.



KQRE359A

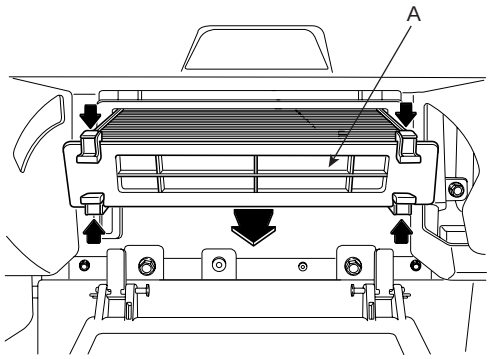
2. Open the glove box (A). Lower the glove box down completely by removing the glove box stopper (B) to the glove box.



KQRE359B

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

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



KQRE359C

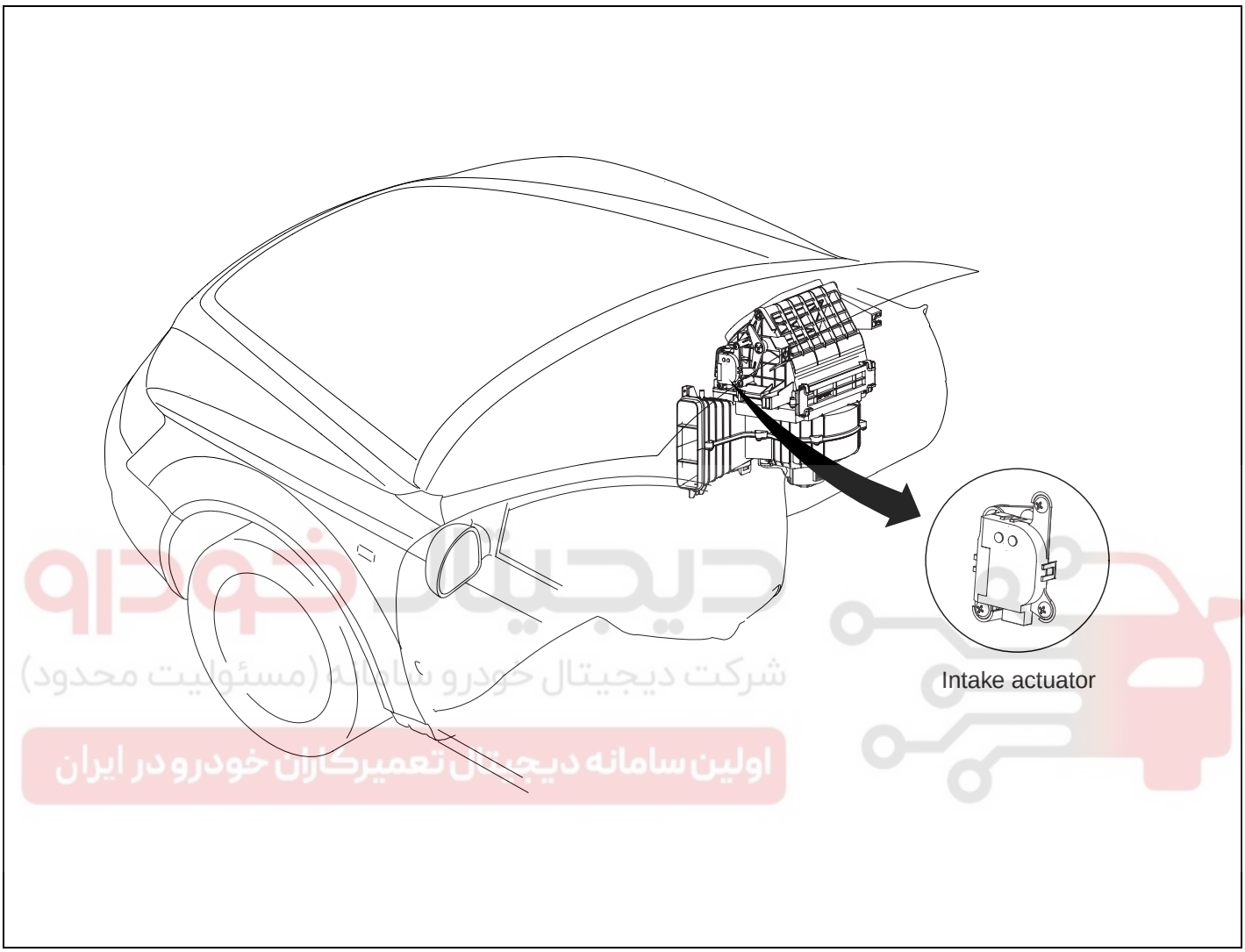
NOTE

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

Replacement period : 15,000 km (9320 mile)

INTAKE ACTUATOR

COMPONENT LOCATION EC31376D



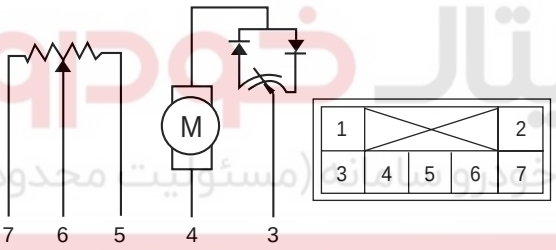
EQRF501A

DESCRIPTION EE43E001

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 E5EBA916

1. Ignition "OFF".
2. Disconnect the connector of intake actuator.
3. Verify that the intake actuator 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 the connections are reversed.



1. -
2. -
3. Recirculation position
4. Fresh position
5. Sensor ground
6. Feedback signal
7. Sensor power (5V)

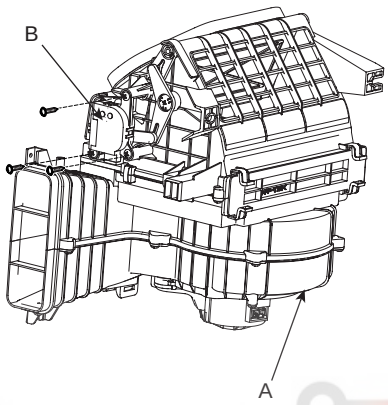
EQRF501B

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

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

REPLACEMENT EBB3DAC0

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



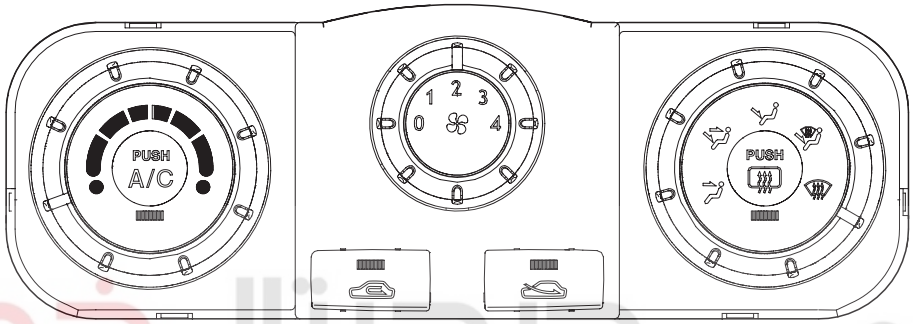
KQRE214E

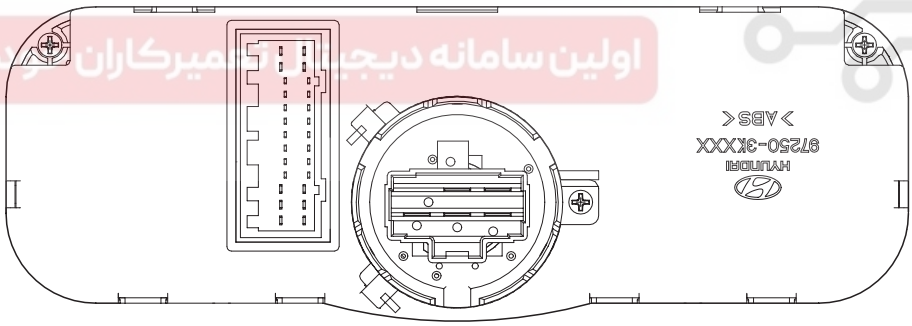
5. Install in the reverse order of removal.

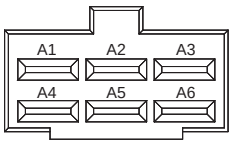
BLOWER AND A/C CONTROLS (MANUAL)

CONTROL PANEL

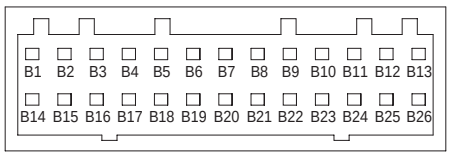
COMPONENTS ED5CE431







Connector A



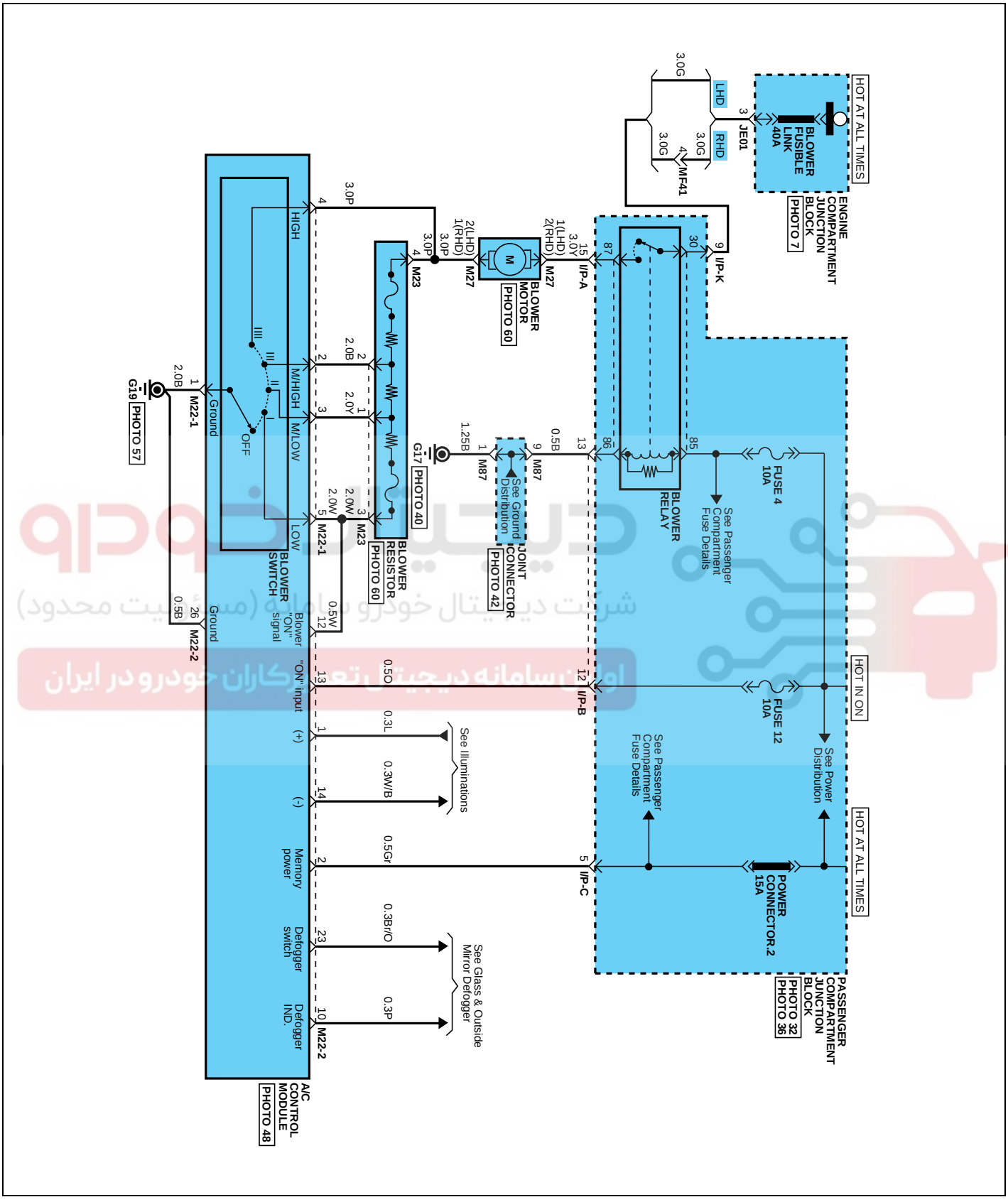
Connector B

EQRF450A

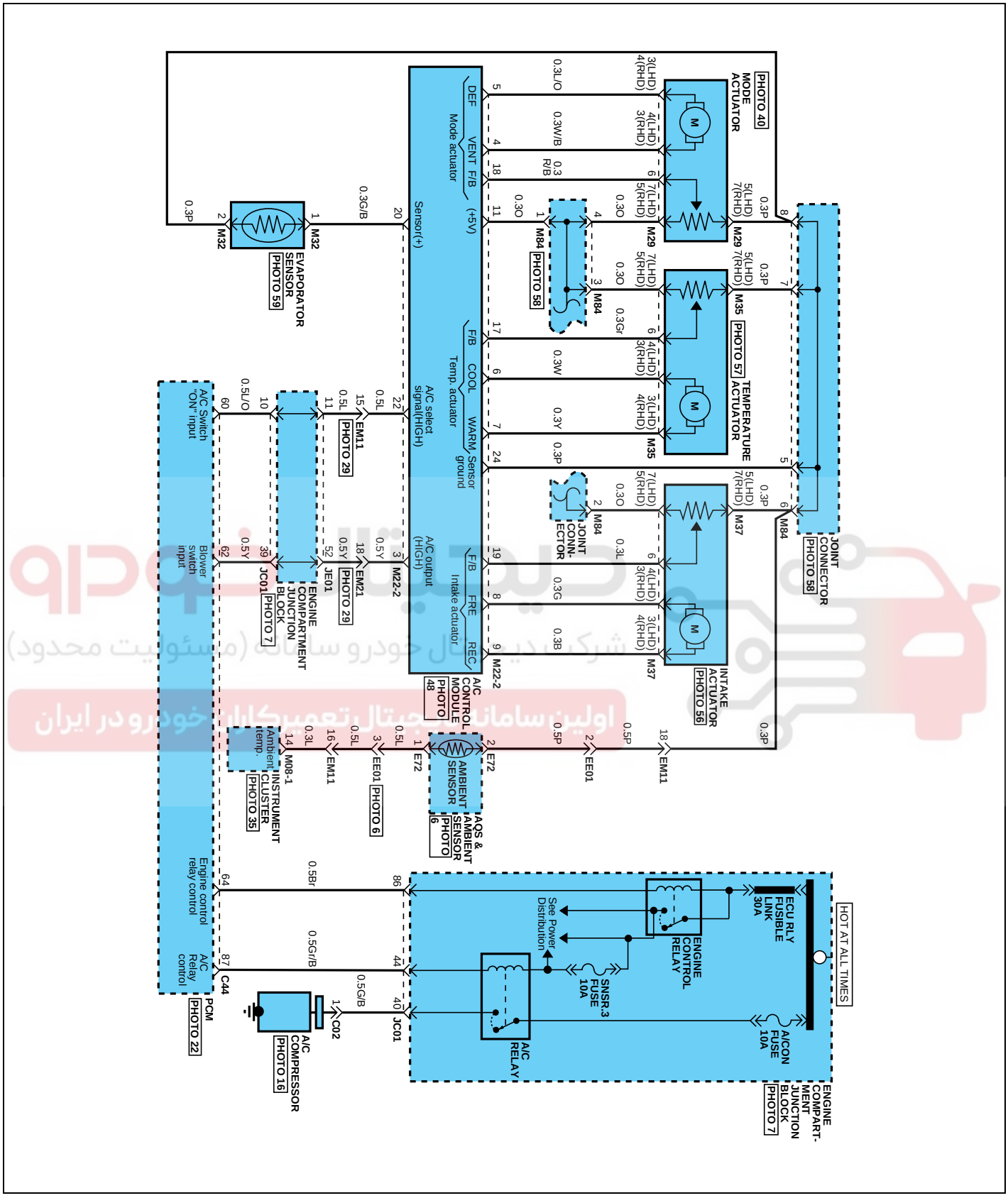
CONNECTOR PIN FUNCTION

CONNECTOR	PIN	FUNCTION
Connector (A)	1	IG2
	2	Middle high
	3	Middle low
	4	High
	5	Low
	6	-
Connector (B)	1	Tail lamp (+)
	2	Battery
	3	A/C output
	4	Mode vent
	5	Mode defrost
	6	Temp actuator cool
	7	Temp actuator warm
	8	Intake (Fresh)
	9	Intake (Recirculation)
	10	Rear defogger indicator
	11	Sensor power (+5V)
	12	Blower ON signal
	13	IG2
	14	Tail lamp (-) : Rheostat
	15	-
	16	-
	17	Temp actuator feedback signal
	18	Mode actuator feedback signal
	19	Intake actuator feedback signal
	20	Evaporator temperature sensor
	21	Blower ON signal to ECU
	22	A/C select signal
	23	Rear defogger switch
	24	Sensor ground
	25	-
	26	Ground

CIRCUIT DIAGRAM ECFD97BE



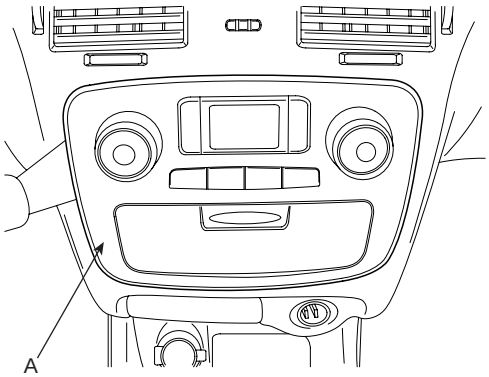
EQRF055A



EQRF055B

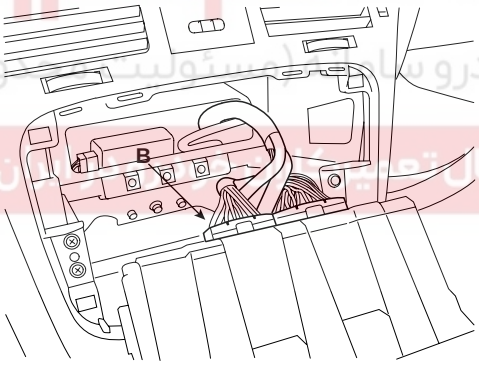
REPLACEMENT E4F1F782

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (A) after pulling it by using a regular screwdriver (-).



KTRE071F

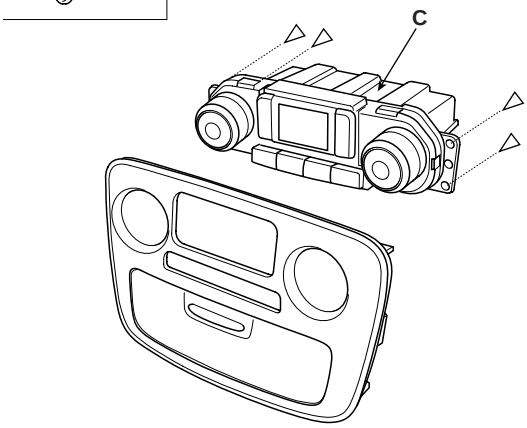
3. Disconnect the connectors (B) from the center facia.



KSRE170L

4. Remove the blower and A/C control unit (C).

▷ : Screw, 4



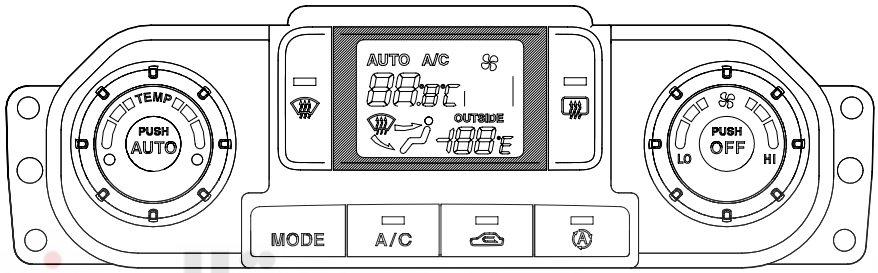
EQRF170N

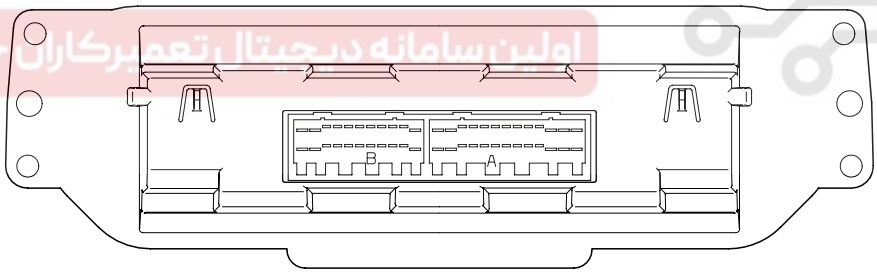
5. Install in the reverse order of removal.

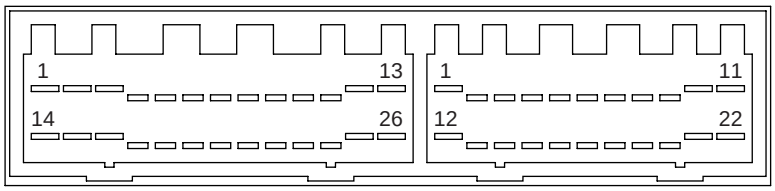
BLOWER AND A/C CONTROLS (AUTOMATIC)

CONTROL PANEL

COMPONENTS EB6C4D71







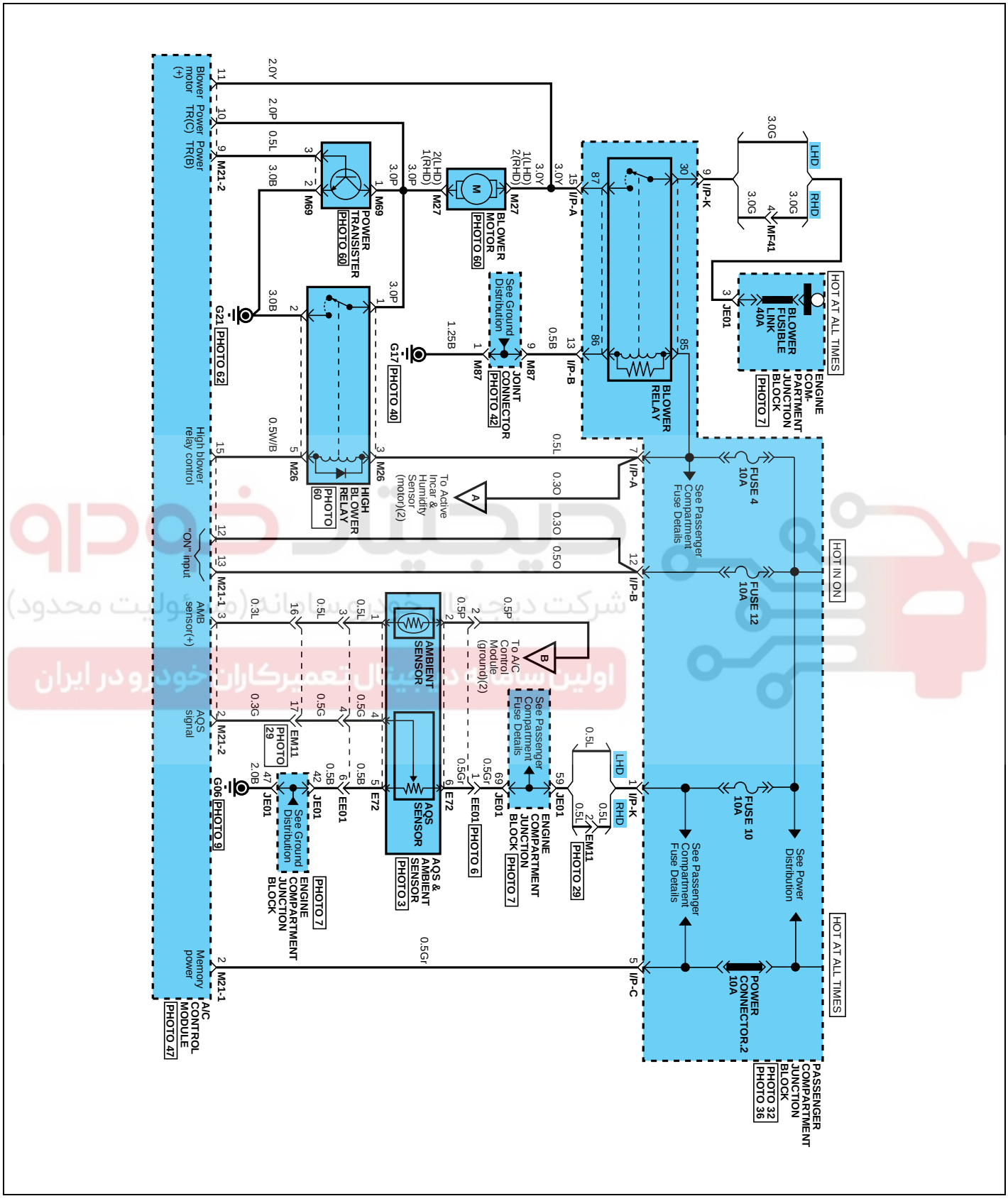
Connector A Connector B

EQRF500A

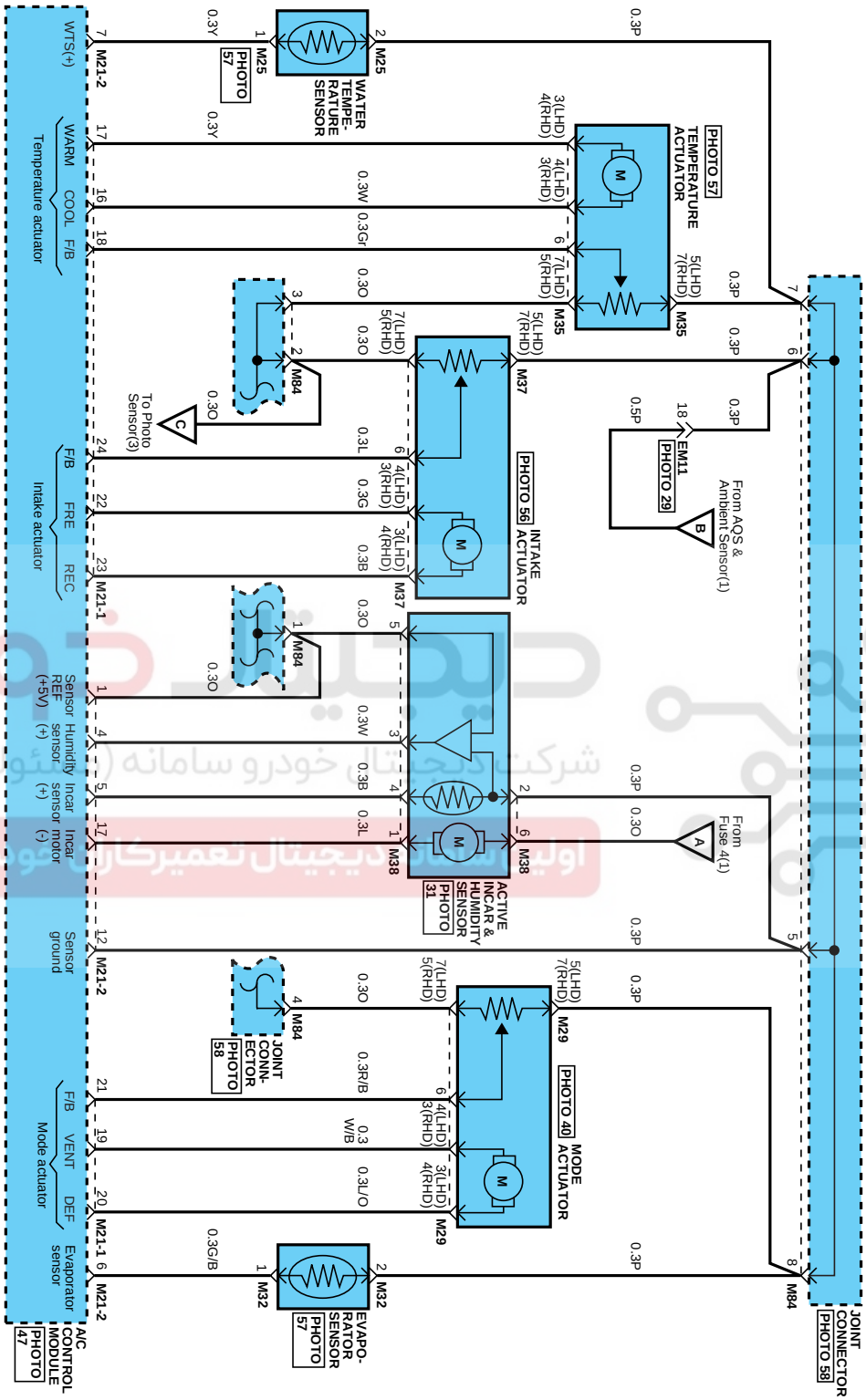
CONNECTOR PIN FUNCTION

CONNECTOR	PIN	FUNCTION	CONNECTOR	PIN	FUNCTION
CONNECTOR (A)	1	Tail lamp (+)	CONNECTOR (B)	1	Sensor power (5V)
	2	Battery (+)		2	AQS
	3	A/C output		3	Ambient sensor (+)
	4	A/C select signal		4	Humidity sensor (+)
	5	-		5	In car sensor (+)
	6	Diagnostic tool		6	Evaporator temperature sensor (+)
	7	-		7	Water temperature sensor
	8	-		8	Speed sensor
	9	Rear defogger indicator		9	Power transistor (B)
	10	Rear defogger switch		10	Power transistor (C)
	11	-		11	Blower motor (+)
	12	IG2		12	Sensor ground
	13	IG2		13	-
	14	Rheostat		14	-
	15	Hi-blower relay		15	Photo sensor (+)
	16	Temp actuator cool		16	-
	17	Temp actuator warm		17	In car motor
	18	Temp actuator feedback signal		18	-
	19	Mode vent		19	Blower ON signal
	20	Mode defrost		20	
	21	Mode actuator feedback signal		21	
	22	Intake fresh		22	
	23	Intake recirculation			
	24	Intake feedback signal			
	25	Ground			
	26	Ground			

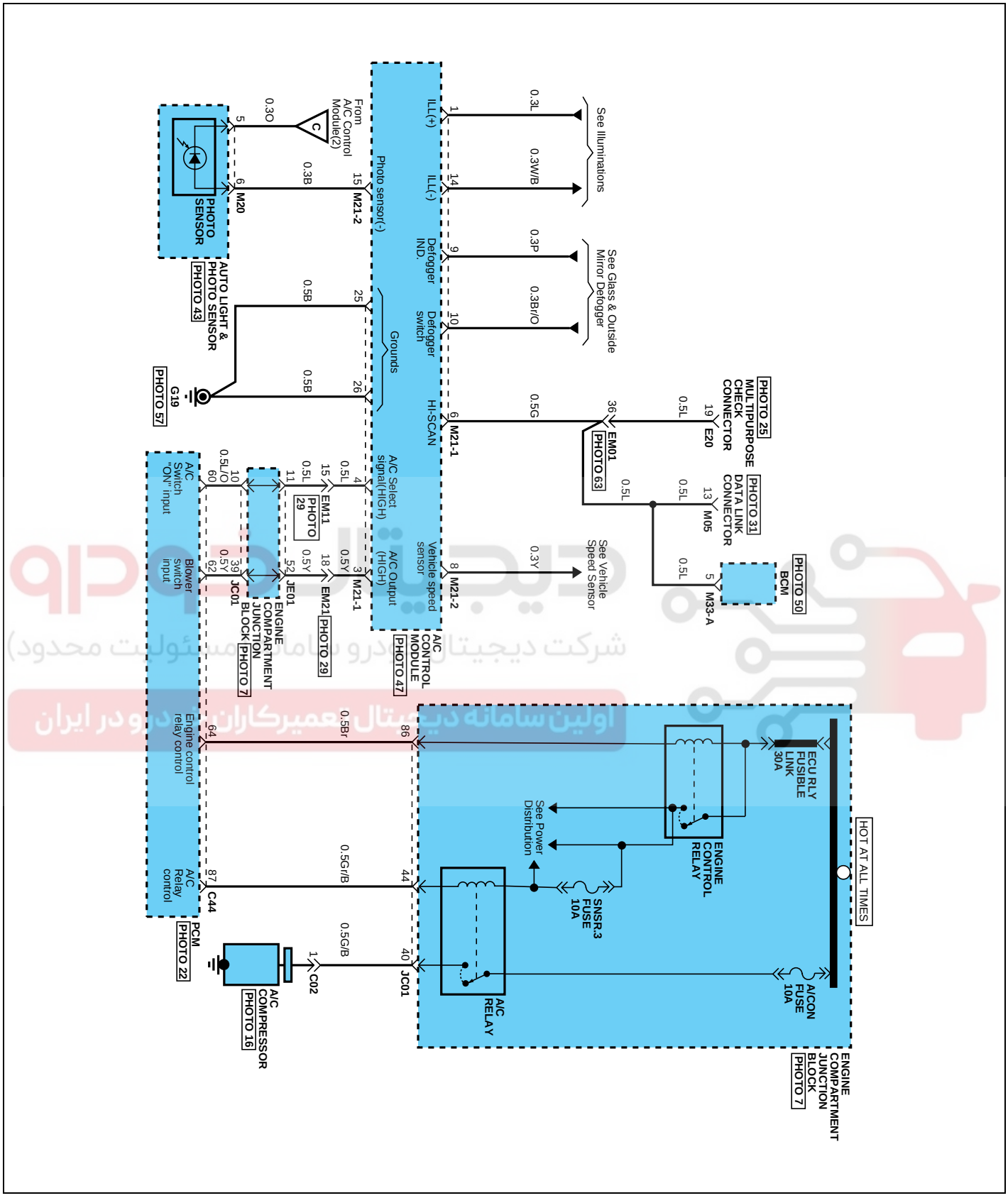
CIRCUIT DIAGRAM E8CBC91D



EQRF056A



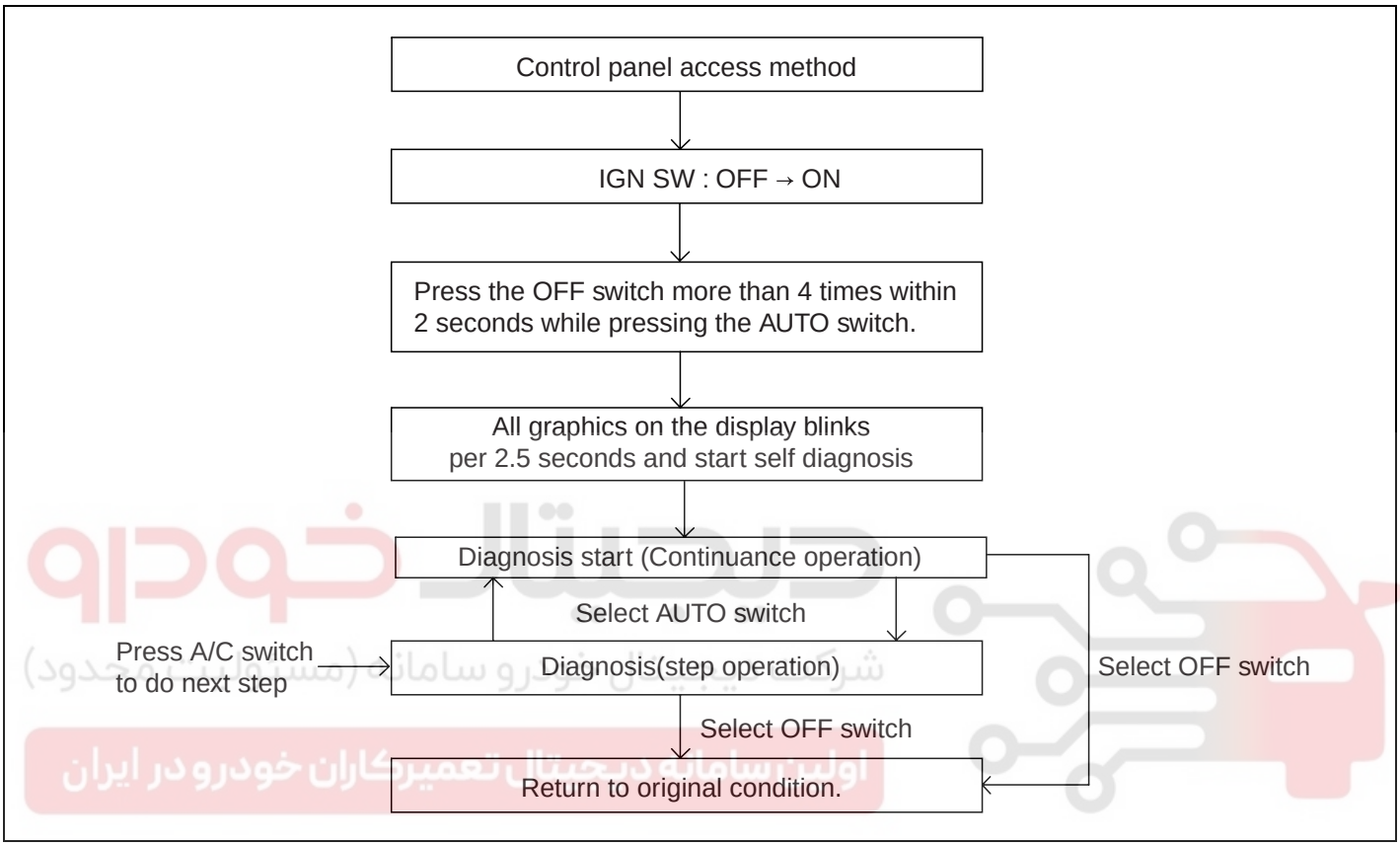
EQRF056B



SELF-DIAGNOSIS E3E3EBBC

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.



EQRF505L

NOTE

Turn off the A/C system during the DTC check.

HOW TO READ SELF-DIAGNOSTIC CODE

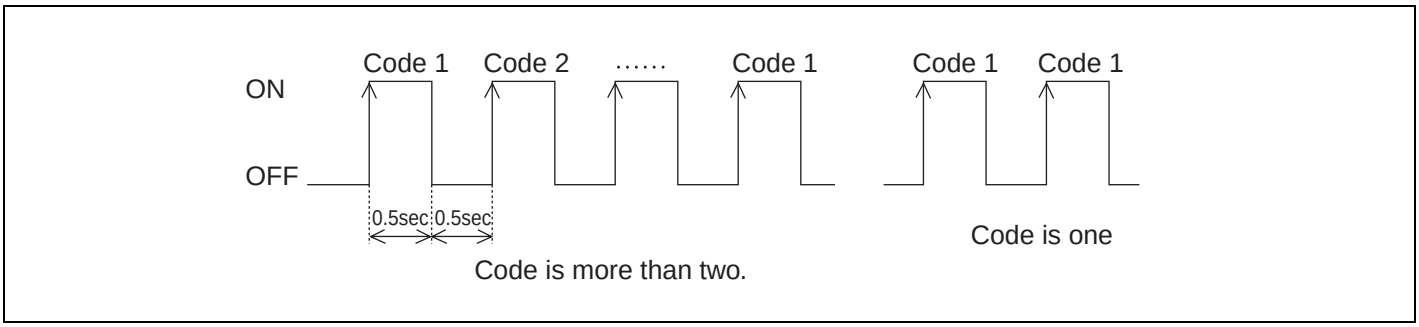
1. After the display panel flickers three times every 0.5 second, the corresponding fault code flickers on the setup temperature display panel every 0.5 second and will show two figures.

2. Fault code

Fault code		Fail description
Control unit	Scan tool (DTC)	
00	-	Normal
11	B1234	In-car temperature sensor open (High)
12	B1233	In-car temperature sensor short (Low)
13	B1238	Ambient temperature sensor open (High)
14	B1237	Ambient temperature sensor short (Low)
15	B1202	Water temperature sensor open (High)
16	B1203	Water temperature sensor short (Low)
17	B1242	Evaporator temperature sensor open (High)
18	B1241	Evaporator temperature sensor short (Low)
19	B1245	Air mix potentiometer open (Low) - Driver
19	B1246	Air mix potentiometer short (High) - Driver
20	B2406	Air mix motor failure (Driver)
21	B1249	Direction potentiometer open (Low) - Driver
21	B1250	Direction potentiometer short (High) - Driver
22	B2409	Direction control motor failure (Driver)
23	B1200	Humidity sensor open (High)
24	B1201	Humidity sensor short (Low)
25	B1208	Intake potentiometer open (Low)
25	B1209	Intake potentiometer short (High)
26	B2408	Intake motor
27	B1257	AQS sensor open (High)
28	B1258	AQS sensor short (Low)
31	B1259	AQS sensor failure

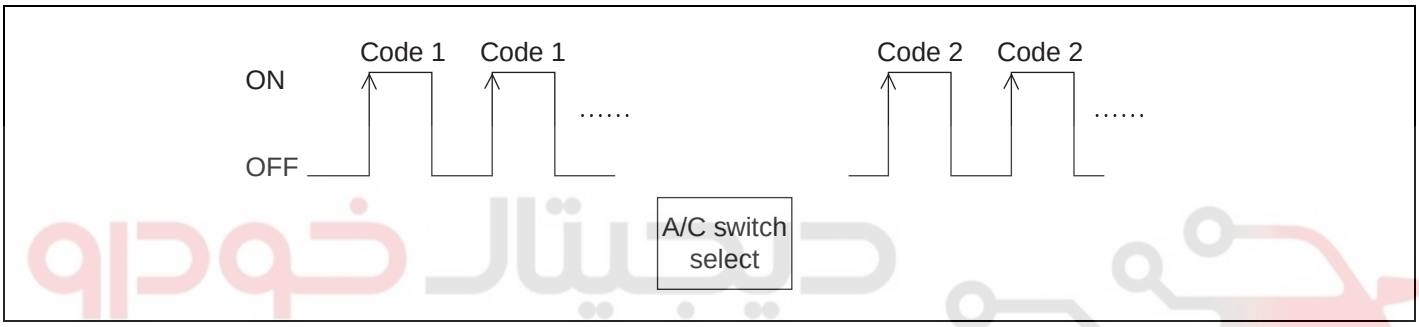
3. Fault code display

1) Continuance operation



EQRF356A

2) Step operation



EQRF356B

4. If a fault code is displayed during the DTC check, Inspect a malfunction cause by referring to the DTC code.

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) Humidity sensor: Control with the value of 10%

5) Temperature sensor : Control with the value of -2°C(28.4°F)

6) Temperature control actuator (Air mix potentiometer):
If temperature setting 17°C-24.5°C, fix at maximum cooling position.
If temperature setting 25°C-32°C, fix at maximum heating position.

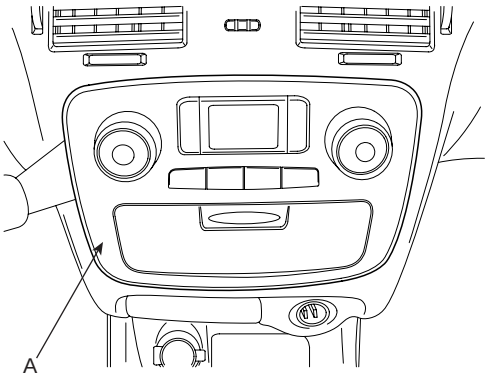
7) Mode control actuator (Direction potentiometer):
Fix vent position, while selecting vent mode.
Fix defrost position, while selecting all except vent mode.

8) Intake control actuator :
Fix fresh position, while selecting fresh mode.
Fix recirculation position, while selecting recirculation mode.

9) AQS sensor : AQS operation OFF.
- Intake position : The position before selecting AQS switch.

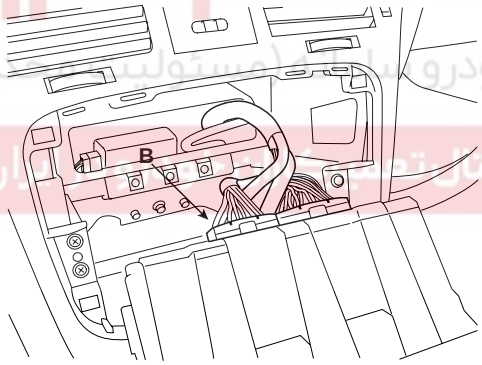
REPLACEMENT E7F5A3FD

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (A) after pulling it by using a regular screw driver(-).



KTRE071F

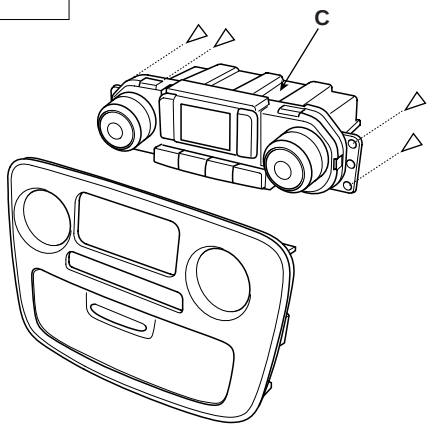
3. Disconnect the connectors(B) from the center facia.



KSRE170L

4. Remove the blower And A/C control unit (A).

▷ : Screw, 4

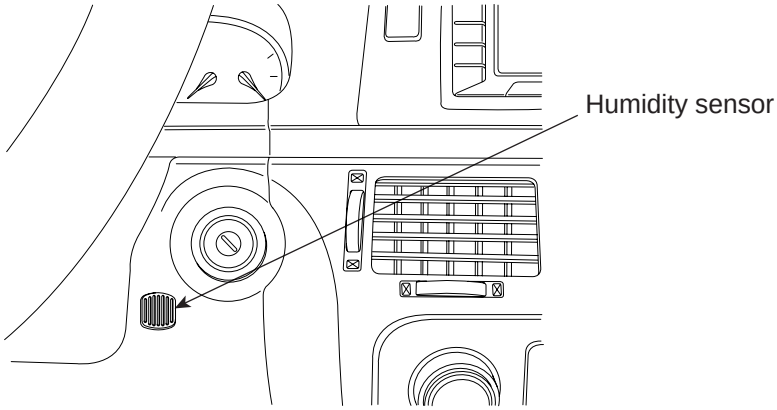


EQRF170N

5. Install in the reverse order of removal.

DTC B1200 HUMIDITY SENSOR OPEN (HIGH)

COMPONENT LOCATION E1A6A05F



EQRE510A

GENERAL DESCRIPTION EC4DA0E4

Humidity sensor located at crush pad, detects in-car humidity for in-car humidity control. If ambient air temperature or in-car humidity is outside certain range, it will turn on A/C to control in-car humidity for preventing in-car fogging. Air conditioner operation depends on ambient temperature and humidity.

DTC DESCRIPTION E678D738

The A/C controller sets DTC B1200 if there is an open circuit in humidity sensor signal harness or the measured frequency value of sensor is more than threshold value(about 7,100㎐)

DTC DETECTING CONDITION E6BBDF5A

Item	Detecting Condition	Possible cause
DTC Strategy	• Frequency check	• Open Circuit in signal harness • Faulty Humidity Sensor • Faulty A/C control unit
Threshold value	• ＞ 7,100 Hz	
Detecting time	• 0.01 sec	
FAIL SAFE	• Control with the value of 10%	

SPECIFICATION EEBB2DAD

Relative humidity(%)	Frequency(Hz)	Relative humidity(%)	Frequency(Hz)
10	7,224	55	6,664
15	7,162	60	6,600
20	7,100	65	6,534
25	7,038	70	6,468
30	6,976	75	6,399
35	6,915	80	6,330
40	6,853	85	6,258
45	6,791	90	6,186
50	6,728	95	6,110

MONITOR SCANTOOL DATA E0AFCDCB

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "Humidity Sensor" Parameter on the Scantool while drying the humidity sensor with a hair drier or heat gun adjusted to a low heat setting.

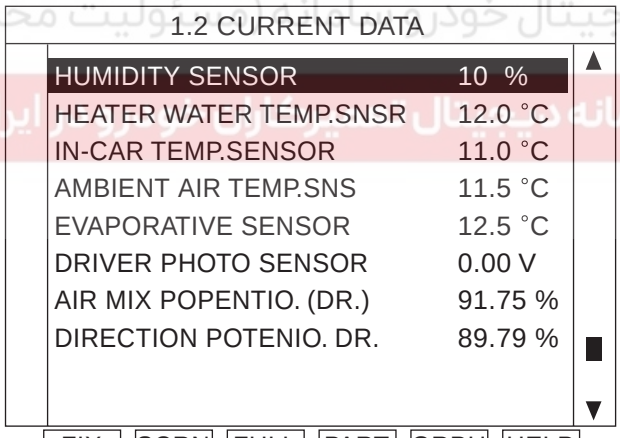


Fig 1

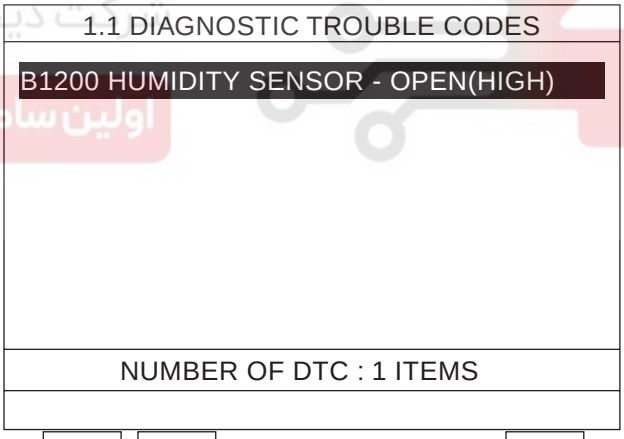


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1200.

LQIE510B

4. Are the DTC B1200 present and is parameter of "Humidity Sensor" fixed?
※ Parameter of "Humidity Sensor" will be fixed at 10%, if there is any fault in Humidity Sensor.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EA71DCFA

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EAF61F7E

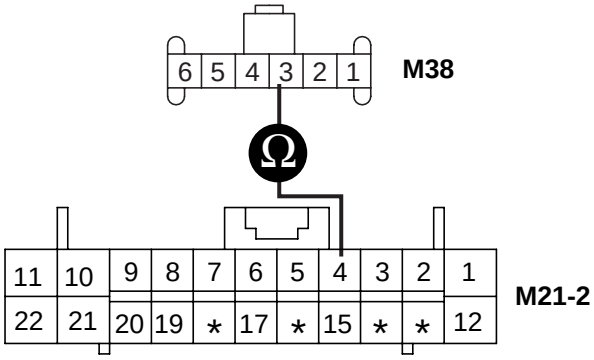
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect Humidity Sensor.

3) Measure resistance between terminal "3" of Humidity Sensor and terminal "4" of A/C Control Unit.

Specification : Approx. 0 Ω



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

EQRE510C

4) Is the measured resistance within specifications?

YES

Go to "Ground circuit Inspection " procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E83DB8E3

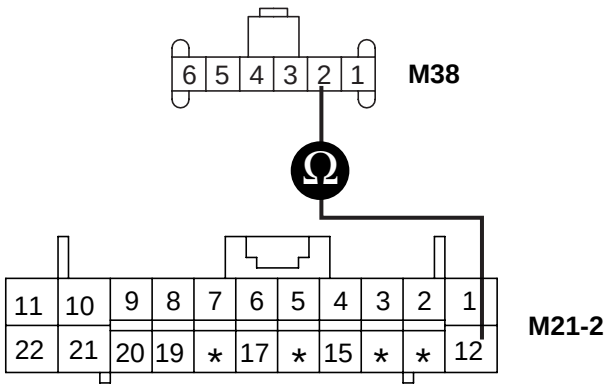
1. Check for open in ground harness.

1) Ignition "OFF"

2) Disconnect Humidity Sensor.

3) Measure resistance between terminal "2" of Humidity Sensor and terminal "12" of A/C Control Unit.

Specification :Approx. 0 Ω



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

EQRE510D

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E6A5FEDC

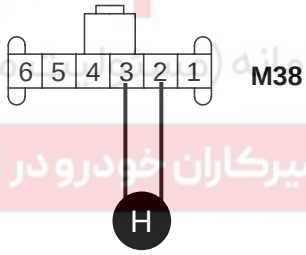
1. Check Humidity Sensor.

1) Engine "ON"

2) Connect Humidity Sensor.

3) Measure Frequency between terminal "3" and "2" of Humidity sensor while increasing humidity.

Specification : Refer the specifications in fig 5.



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

EQRE510E

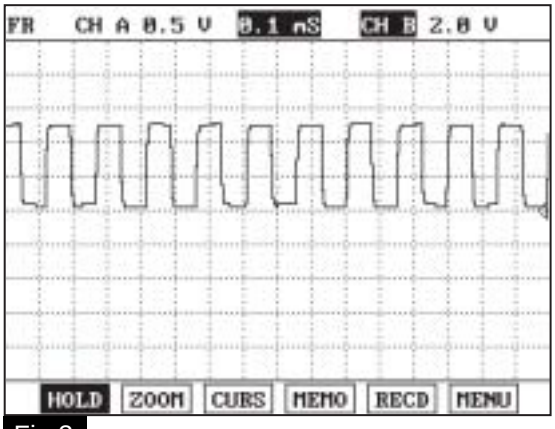


Fig 3

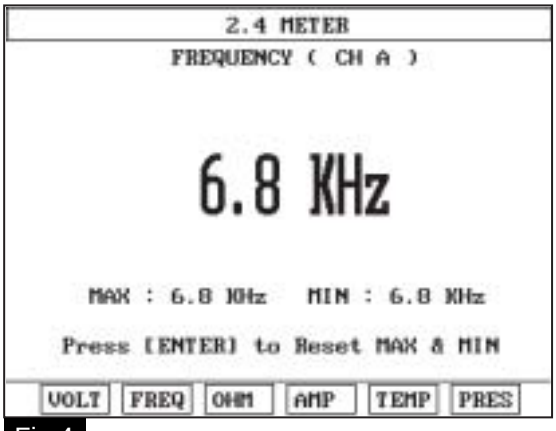


Fig 4

Fig 3 : Signal waveform of Humidity sensor.
Fig 4 : Frequency of Humidity sensor Measured by scantool.

LQIE510F

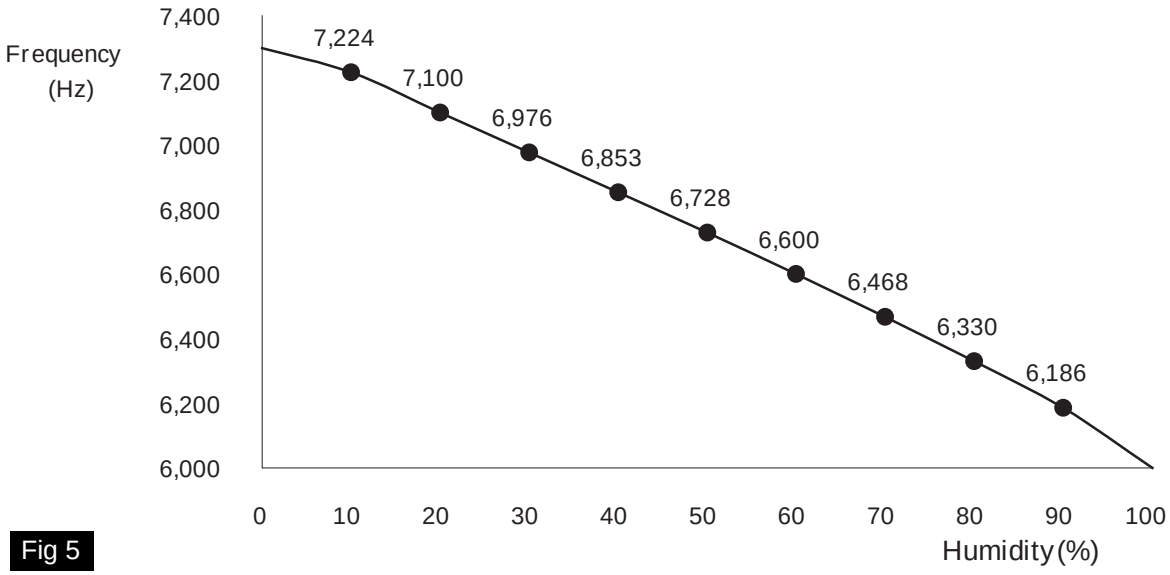


Fig 5

Fig 5) Specifications : Frequency value of humidity sensor as a function of Relative humidity.

LQIE510Q

4) Is the measured frequency within specifications in fig 5? (tolerance limits ± 5%)

YES

Go to "Check A/C Control Unit" procedure.

NO

Substitute with a known-good Humidity sensor and check for proper operation.
If the problem is corrected, replace Humidity sensor and then go to "Verification of Vehicle Repair" procedure.

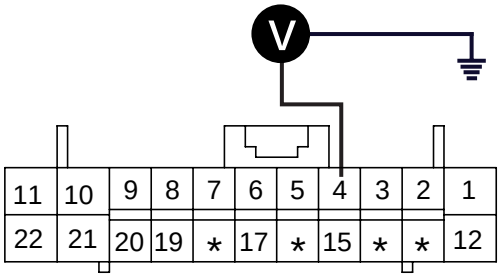
2. Check A/C Control Unit

1) Engine "ON"

2) Disconnect Humidity Sensor.

3) Measure voltage value between terminal "4" of A/C control unit and chassis ground.

Specification : 5V



4. Humidity sensor signal

EQRE510G

4) 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 A/C Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR ED15C0E6

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

1. Connect scantool and select "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

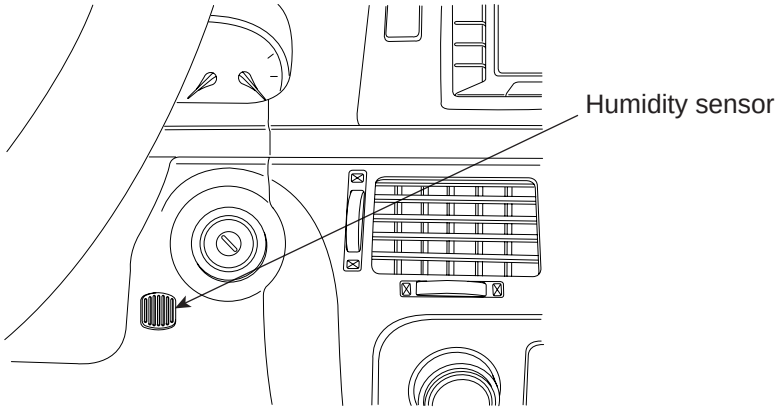
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1201 HUMIDITY SENSOR SHORT (LOW)

COMPONENT LOCATION EE1FABED



EQRE510A

GENERAL DESCRIPTION E4FF3BC1

Refer to DTC B1200.

DTC DESCRIPTION ED021BD7

The A/C controller sets DTC B1201 if there is a short circuit in humidity sensor signal harness or the measured frequency value of sensor is less than threshold value(about 6,186㎐)

DTC DETECTING CONDITION EA13B70D

Item	Detecting Condition	Possible cause
DTC Strategy	• Frequency check	• Open Circuit in power harness • Short Circuit in signal harnes • Faulty Humidity Sensor • Faulty A/C control unit
Threshold value	• < 6,186 Hz	
Detecting time	• 10msec	
FAIL SAFE	• Control with the value of 10%	

SPECIFICATION EACEDEFA

Refer to DTC B1200.

MONITOR SCANTOOL DATA EC00801D

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "Humidity Sensor" Parameter on the Scantool while drying the humidity sensor with a hair drier or heat gun adjusted to a low heat setting.

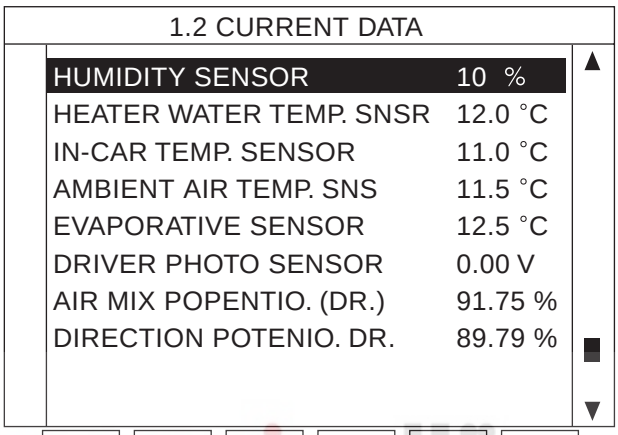


Fig 1

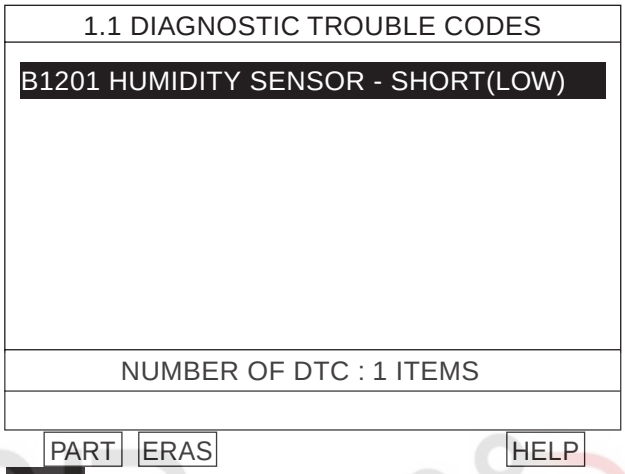


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1201.

LQIE511A

4. Are the DTC B1201 present and is parameter of "Humidity Sensor" fixed?
※ Parameter of "Humidity Sensor" will be fixed at 10%, if there is any fault in Humidity Sensor.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EFE57B49

Refer to DTC B1200.

SIGNAL CIRCUIT INSPECTION E47D8DB5

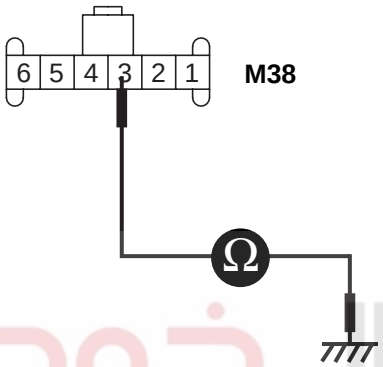
1. Check for short to ground in harness.

   1) Ignition "OFF"

   2) Disconnect Humidity Sensor.

   3) Measure resistance between terminal "3" of Humidity Sensor and chassis ground.

Specification : Approx. ∞ Ω



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

EQRE511B

4) Is the measured resistance within specifications?

YES

Go to "Power circuit Inspection " procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

POWER SUPPLY CIRCUIT INSPECTION ECA7349E

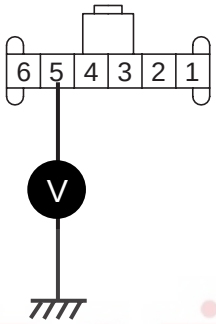
1. Check for open in power harness.

   1) Ignition "ON"

   2) Disconnect Humidity Sensor.

   3) Measure voltage value between terminal "5" of Humidity Sensor and chassis ground.

Specification : 5V



M38

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

EQRE511C

   4) Is the measured voltage within specifications?

YES

Go to "Component Inspection " procedure.

NO

Check for open in power harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EA86913D

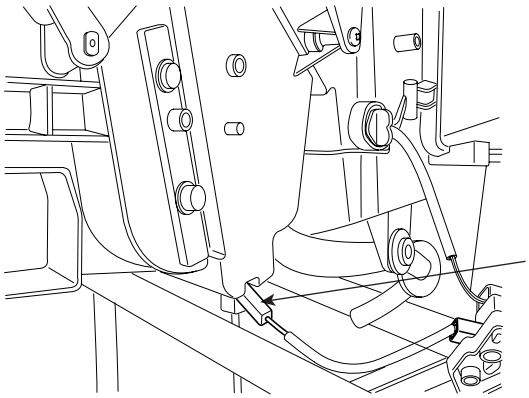
Refer to DTC B1200.

VERIFICATION OF VEHICLE REPAIR E009FE5D

Refer to DTC B1200.

DTC B1202 WATER TEMPERATURE SENSOR OPEN (HIGH)

COMPONENT LOCATION E7200D89



EQRE512A

GENERAL DESCRIPTION E547C1C5

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

DTC DESCRIPTION E93BE7A5

The A/C controller sets DTC B1202 if there is an open circuit in water temp. sensor signal harness or the measured resistance value of the sensor is more than the threshold value(about 176.3kΩ)

DTC DETECTING CONDITION EB7BE1EE

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Open Circuit in harness • Faulty water temp. Sensor • Faulty A/C control unit
Threshold value	• ＞ 176.3 kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of -2°C(28.4°F)	

SPECIFICATION EABF5ADA

Temperature[°C(°F)]	Resistance(kΩ)	Temperature[°C(°F)]	Resistance(kΩ)
-30(-22)	176.3	25(77)	10
-15(5)	73.6	35(95)	6.5
0(32)	32.9	60(140)	2.5
15(59)	15.8	80(176)	1.2

MONITOR SCANTOOL DATA EEAE6153

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "WATER TEMP. SENSOR" Parameter on the Scantool.

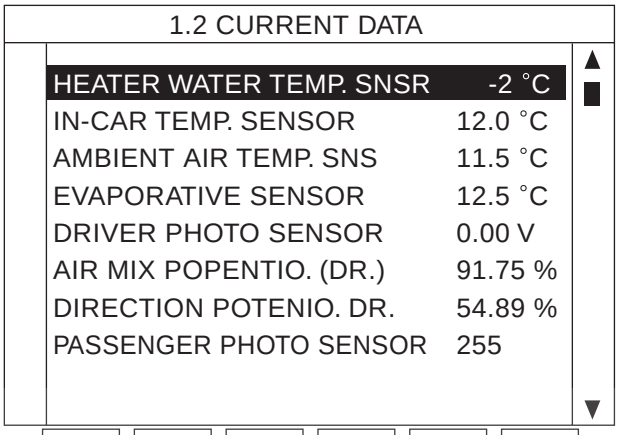


Fig 1

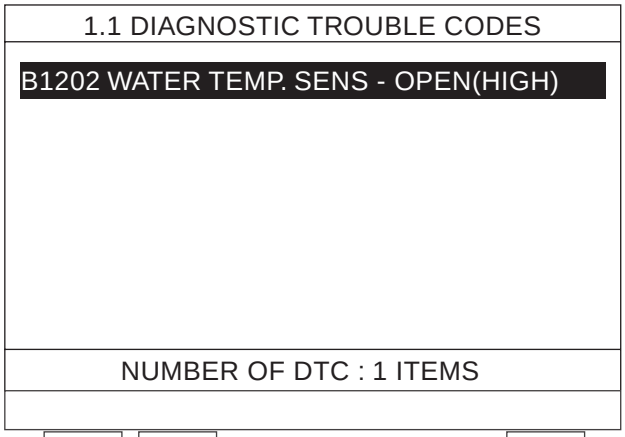


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1202.

EQRE512B

4. Are the DTC B1202 present and is parameter of "WATER TEMP. SENSOR" fixed?
※ Parameter of "WATER TEMP. SENSOR" will be fixed at -2℃(28.4°F), if there is any fault in WATER TEMP. SENSOR.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EC6C991B

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION E17AE5CE

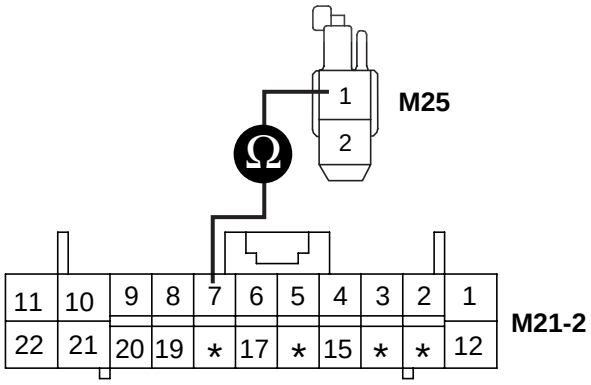
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect water temp. sensor.

   3) Measure resistance between terminal "1" of water temp. sensor and terminal "7" of A/C Control Unit.

Specification : Approx. 0 Ω



1. Water temp. sensor signal
2. Sensor ground

EQRE512C

   4) Is the measured resistance within specifications?

   YES

   Go to "Ground circuit Inspection " procedure.

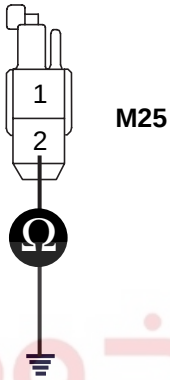
   NO

   Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E708CBA1

1. Check for open in ground harness.
   1) Ignition "OFF"
   2) Disconnect water temp. sensor.
   3) Measure resistance between terminal "2" of water temp. sensor and chassis ground.

Specification : Approx. 0 Ω



1. Water temp. sensor signal
2. Sensor ground

EQRE512D

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

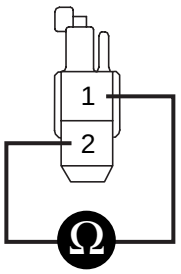
Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EF405FC8

1. Check water temp. sensor.
   1) Ignition "OFF"
   2) Disconnect water temp. sensor.

3) Measure resistance between terminal "1" and "2" of water temp. sensor.

Specification : Refer the specifications in fig 3.



M25

1. Water temp. sensor signal
2. Sensor ground

EQRE512E

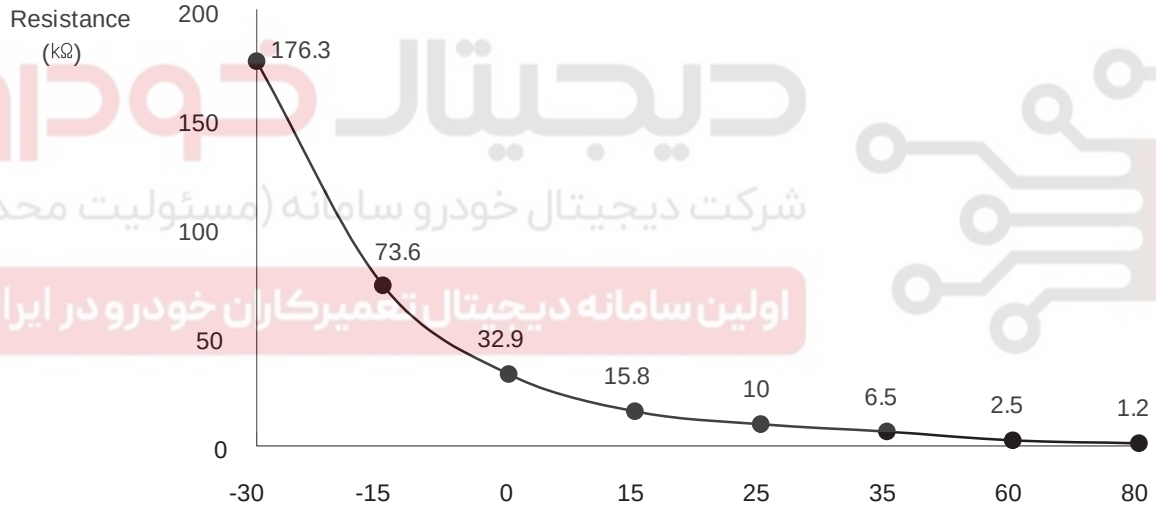


Fig 3

Fig 3) Specifications : Resistance value of water temp. sensor as a function of temperature.

LQIE512G

4) Is the measured resistance within specifications in fig 3)? (tolerance limits ± 3%)

YES

Go to "Check A/C Control Unit" procedure.

NO

Substitute with a known-good water temp. sensor and check for proper operation.
If the problem is corrected, replace water temp. sensor and then go to "Verification of Vehicle Repair" procedure.

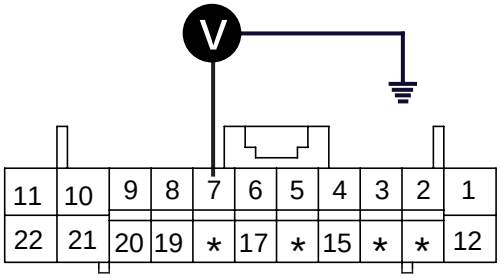
2. Check A/C Control Unit

   1) Engine "ON"

   2) Disconnect water temp. sensor.

   3) Measure Voltage between terminal "7" of A/C Control Unit and chassis ground.

Specification : Approx. 5V



7. Water temp. sensor signal

EQRE512F

4) Is the measured voltage within specifications?

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 Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E4AC2289

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

1. Connect scantool and select "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

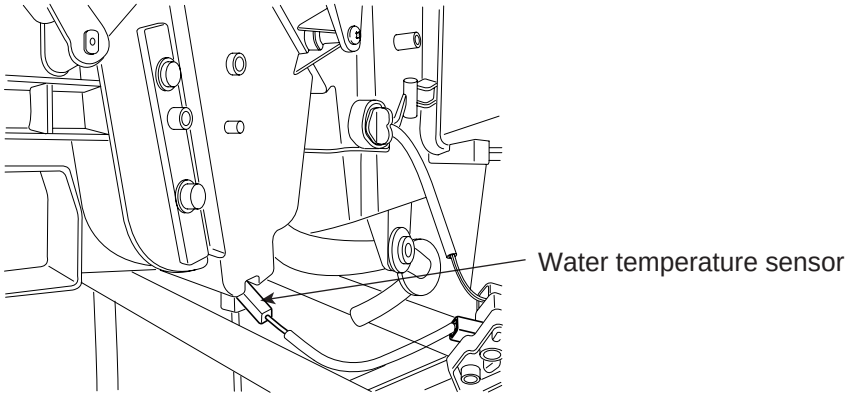
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1203 WATER TEMPERATURE SENSOR SHORT (LOW)

COMPONENT LOCATION EA31ACFE



EQRE512A

GENERAL DESCRIPTION ED1A317E

Refer to DTC B1202.

DTC DESCRIPTION E04DCBCD

The A/C controller sets DTC B1203 if there is a short circuit in water temp. sensor signal harness or the measured resistance value of sensor is less than threshold value(about 1.2kΩ)

DTC DETECTING CONDITION E9F4635F

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Short circuit in harness • Faulty water temp. Sensor • Faulty A/C control unit
Threshold value	• < 1.2 kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of -2°C(28.4°F)	

SPECIFICATION E60633EE

Refer to DTC B1202.

MONITOR SCANTOOL DATA E49E8DF3

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "WATER TEMP. SENSOR" Parameter on the Scantool.

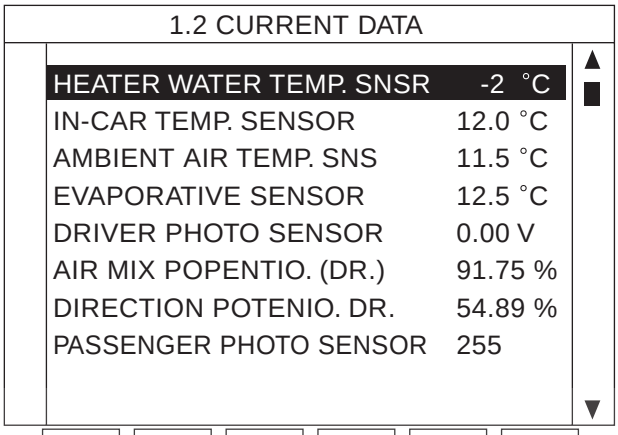


Fig 1

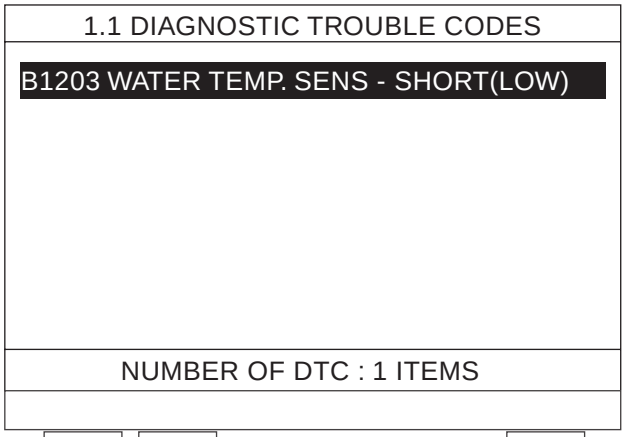


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1203.

EQRE513A

4. Are the DTC B1203 present and is parameter of "WATER TEMP. SENSOR" fixed?
※ Parameter of "WATER TEMP. SENSOR" will be fixed at -2℃(28.4°F), if there is any fault in WATER TEMP. SENSOR.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

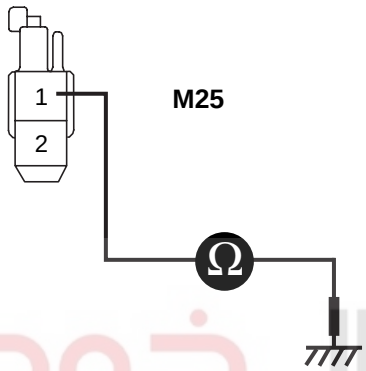
TERMINAL AND CONNECTOR INSPECTION E4FFBD3C

Refer to DTC B1202.

SIGNAL CIRCUIT INSPECTION E9012BEF

1. Check for short to ground in harness.
   1) Ignition "OFF"
   2) Disconnect water temp. sensor.
   3) Measure resistance between terminal "1" of water temp. sensor and chassis ground.

Specification : Approx. ∞Ω



1. Water temp. sensor signal
2. Sensor ground

EQRE513B

   4) Is the measured resistance within specifications?

YES

Go to "Component Inspection" procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EC7ACC13

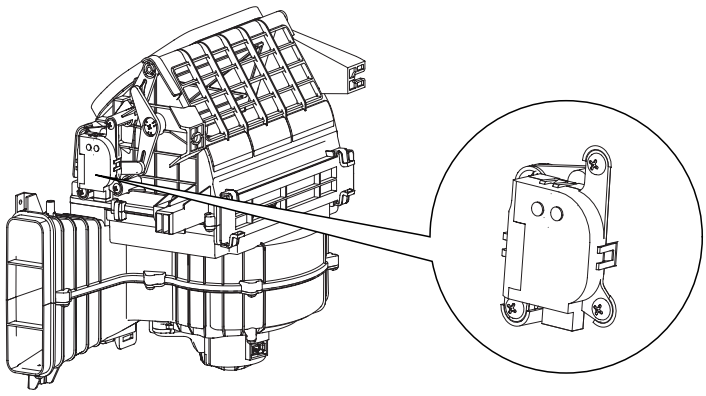
Refer to DTC B1202.

VERIFICATION OF VEHICLE REPAIR EE5647BB

Refer to DTC B1202.

DTC B1208 INTAKE POTENTIOMETER OPEN (LOW)

COMPONENT LOCATION ECBD83EA



Intake door actuator

EQRE527A

GENERAL DESCRIPTION E9DDAE1C

Intake door located at heater unit controls the inlet of car. When driver operates the intake switch, A/C controller recirculationeives mode signal from intake switch and operates intake door actuator to turn intake door to intended position. (with fresh mode signal, intake door is closed and with fresh mode signal, intake door is opened).

DTC DESCRIPTION EA22AC4B

The A/C controller sets DTC B1208 if there is an open circuit or poor connection in the intake potentiometer.

DTC DETECTING CONDITION EFEC790E

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in harness • Short circuit in harness • Faulty driver intake potentiometer
Threshold value	• < 0.1V	
Detecting time	• 0.3 sec	
FAIL SAFE	• If temperature setting 17~24.5°C(63~76°F) fix at max. cooling position. • Fix at fresh	

SPECIFICATION EB6B27DB

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

Door position	Voltage	Threshold value
Fresh	0.3±0.15V	Voltage value < 0.08V
Recirculation	4.7±0.15V	Voltage value > 4.9V

MONITOR SCANTOOL DATA E2432EFB

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "Intake Potentiometer" Parameter on the Scantool while operating intake switch.

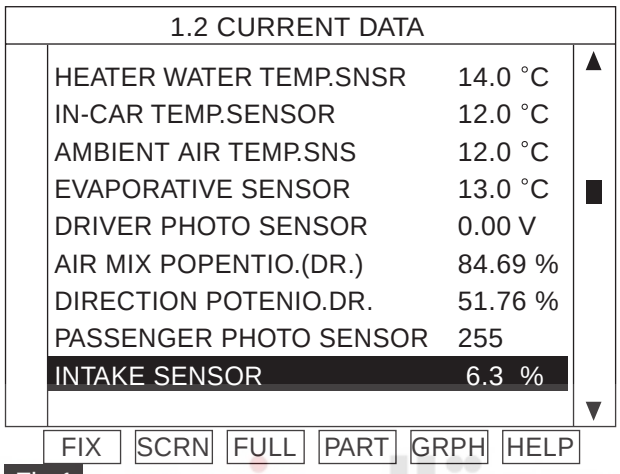


Fig 1

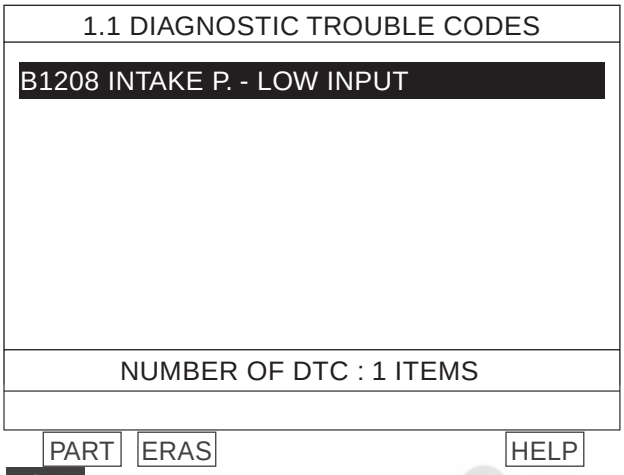


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1208.

EQRE521C

4. Are the DTC B1208 present and is parameter of "Intake Potentiometer" fixed?
※ Parameter of "Intake Potentiometer" will be fixed at 100%(or any value above 90%), or 0% (or any value below 10%), if there is any fault in Intake potentiometer.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION E322CCB8

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.

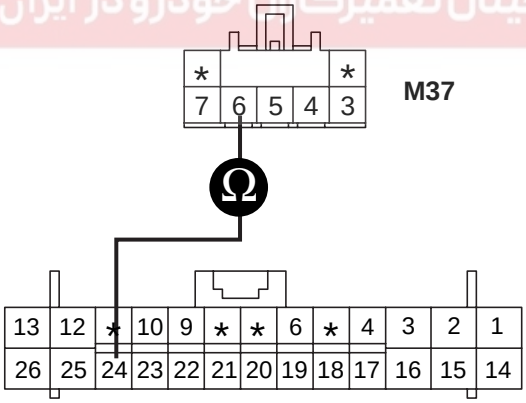
NO

Go to "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EE0773F6

1. Check for open in harness.
   1) Ignition "OFF"
   2) Disconnect Intake potentiometer.
   3) Measure resistance between terminal "6" of Intake Potentiometer and terminal "24" of A/C control unit.

Specification : Approx. 0 Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE527D

   4) Is the measured resistance within specifications?

YES

Go to "Check for short to ground in harness" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

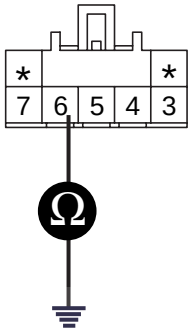
2. Check for short to ground in harness.

   1) Ignition "OFF"

   2) Disconnect Intake potentiometer.

   3) Measure resistance between terminal "6" of Intake Potentiometer and chassis ground.

Specification : Approx. ∞ Ω



M37

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE527E

4) Is the measured resistance within specifications?

YES

Go to "Power circuit Inspection" procedure.

NO

Check for short to ground in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

POWER SUPPLY CIRCUIT INSPECTION E78A9AED

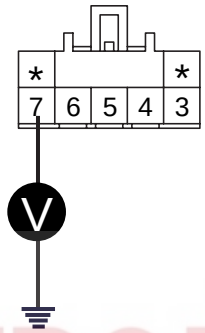
1. Check for short or open in harness.

   1) Ignition "ON"

   2) Connect Intake Potentiometer.

   3) Measure voltage between terminal "7" of Intake Potentiometer and chassis ground.

Specification : Approx. 5V



M37

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE527F

4) Is the measured voltage within specifications?

YES

Go to "Component inspection" procedure.

NO

Check for short or open in power harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E0CD7396

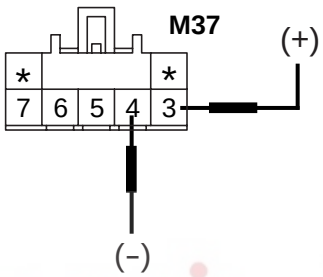
1. Check actuator motor.

   1) Ignition "OFF"

   2) Disconnect Intake Potentiometer.

   3) Verify that the temperature actuator operates to the fresh position when connecting 12V to the terminal "3" and grounding terminal "4".

   4) Verify that the temperature actuator operates to the recirculation position when the connections are reversed.



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE527H

   5) Does the actuator work properly?

   YES

   Go to "Check potentiometer" procedure.

   NO

   Substitute with a known-good actuator and check for proper operation. If the problem is corrected, replace actuator and then go to "Verification of Vehicle Repair" procedure.

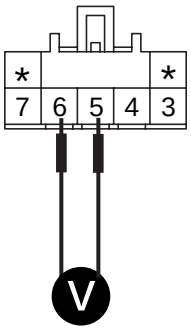
2. Check potentiometer

   1) Ignition "ON"

   2) Connect Intake potentiometer.

3) Measure voltage between terminal "5" and "6" of Intake potentiometer while operating Intake switch.

Specification : Refer to the specifications



M37

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE527I

Door position	Voltage (5-6)	Error detecting
Fresh	0.3 ± 0.15V	Low voltage : 0.08V or less
Recirculation	4.7 ± 0.15V	High voltage : 4.9V or more

Specifications : Voltage value of Intake potentiometer as a function of position of Intake.

4) Is the measured voltage within specifications?

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 actuator and check for proper operation. If the problem is corrected, replace actuator and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR ED73C5A2

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

1. Connect scantool and select "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

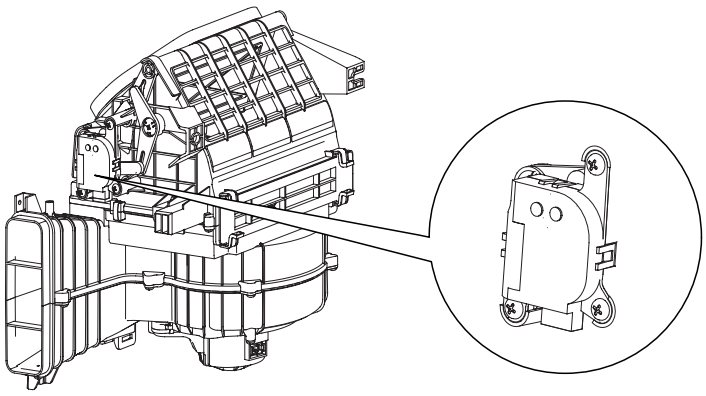
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1209 INTAKE POTENTIOMETER SHORT (HIGH)

COMPONENT LOCATION E38A4D83



Intake door actuator

EQRE527A

GENERAL DESCRIPTION EFD7C499

Refer to DTC B1208.

DTC DESCRIPTION EA8B4EFB

The A/C controller sets DTC B1209 if there is a short to power in the Intake potentiometer.

DTC DETECTING CONDITION E0D2C2D0

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty Intake potentiometer • Open circuit in harness
Threshold value	• > 4.9V	
Detecting time	• 0.3 sec	
FAIL SAFE	• Fix at fresh	

SPECIFICATION EFC13106

Refer to DTC B1208.

MONITOR SCANTOOL DATA E4D9B27C

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "Intake Potentiometer" Parameter on the Scantool while operating Intake switch.

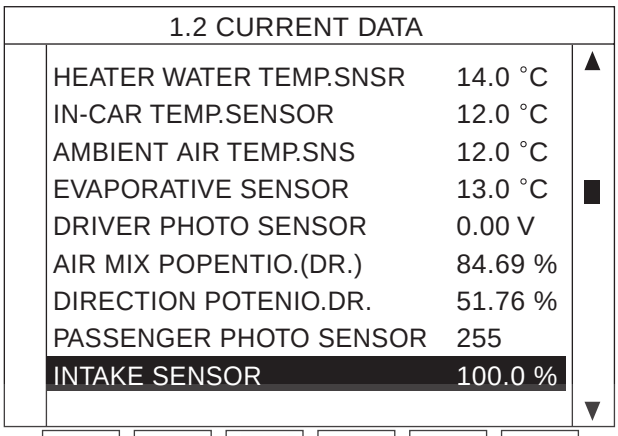


Fig 1

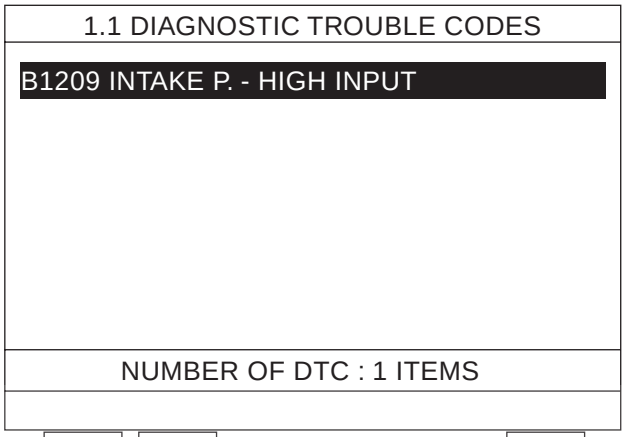


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1209.

EQRE522A

4. Are the DTC B1209 present and is parameter of "Intake potentiometer" fixed?
※ Parameter of "Intake potentiometer" will be fixed at 100%(or any value above 90%), or 0% (or any value below 10%), if there is any fault in Intake potentiometer.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION ED7A063F

Refer to DTC B1208.

SIGNAL CIRCUIT INSPECTION E86C2E4B

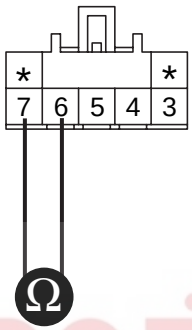
1. Check for short in harness.

   1) Ignition "OFF"

   2) Disconnect Intake potentiometer.

   3) Measure resistance between terminal "6" and "7" of Intake potentiometer.

Specification : Approx. ∞ Ω



M37

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE528B

4) Is the measured resistance within specifications?

YES

Go to "Ground circuit Inspection" procedure.

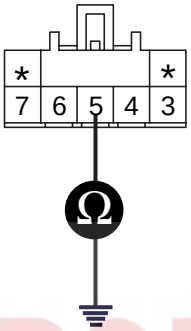
NO

Check for short to power harness in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E2C3FCCF

1. Check for open in harness.
   1) Ignition "OFF"
   2) Disconnect Intake Potentiometer.
   3) Measure resistance between terminal "5" of Intake Potentiometer and chassis ground.

Specification : Approx. 0 Ω



M37

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE527G

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection" procedure.

NO

Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EAB6908C

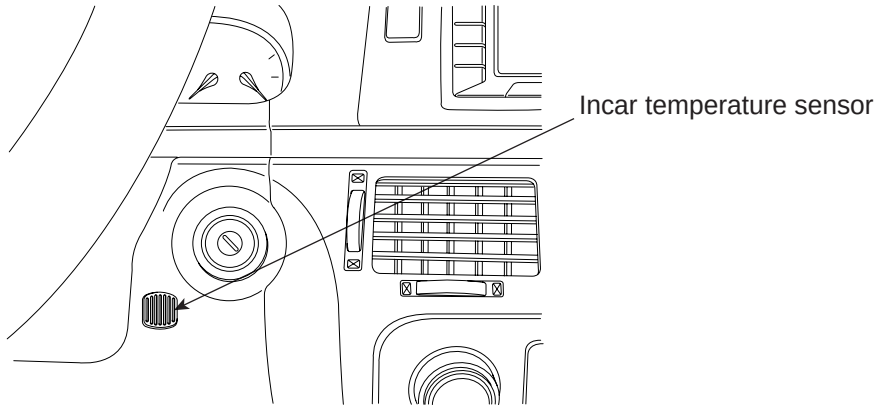
Refer to DTC B1208.

VERIFICATION OF VEHICLE REPAIR E4363609

Refer to DTC B1208.

DTC B1233 IN-CAR TEMPERATURE SENSOR SHORT (LOW)

COMPONENT LOCATION EAC6BF8C



EQRE514E

GENERAL DESCRIPTION E7D85F05

The incar temperature sensor located at crush pad, control unit 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.

DTC DESCRIPTION E55AF8E5

The A/C controller sets DTC B1233 if there is a short circuit in incar temp. sensor signal harness or the measured resistance value of sensor is less than threshold value(about 7.46kΩ)

DTC DETECTING CONDITION EACD9A64

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Short circuit in harness • Faulty incar temp. Sensor • Faulty A/C control unit
Threshold value	• < 7.46 kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of 25°C(77°F)	

SPECIFICATION E28AFD61

Temperature[°C(°F)]	Resistance(kΩ)	Temperature[°C(°F)]	Resistance(kΩ)
-30(-22)	509.57	25(77)	30
-15(5)	216.07	35(95)	15.59
0(32)	97.71	50(122)	10.81
15(59)	47.13	60(140)	7.46

MONITOR SCANTOOL DATA E7B28007

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "INCAR TEMP. SENSOR" Parameter on the Scantool.

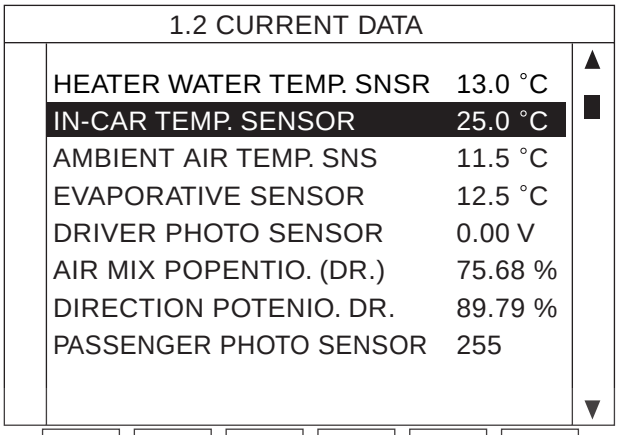


Fig 1

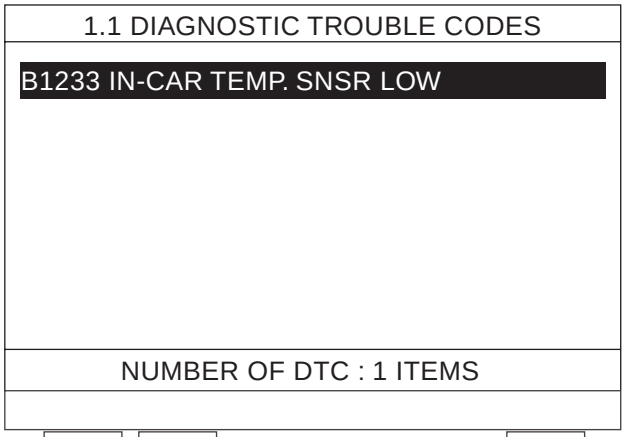


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1233.

EQRE514A

4. Are the DTC B1233 present and is parameter of "INCAR TEMP. SENSOR" fixed?
   ※ Parameter of "INCAR TEMP. SENSOR" will be fixed at 25℃(77°F), if there is any fault in INCAR TEMP. SENSOR.

   YES

   Go to "Inspection" procedure.

   NO

   Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EDFA69DA

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EDDD5E2B

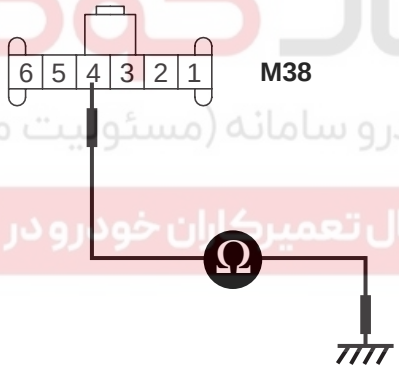
1. Check for short to ground in harness.

1) Ignition "OFF"

2) Disconnect incar sensor.

3) Measure resistance between terminal "4" of incar sensor and chassis ground.

Specification : Approx. ∞Ω



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

EQRE514B

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection" procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E1F67BD7

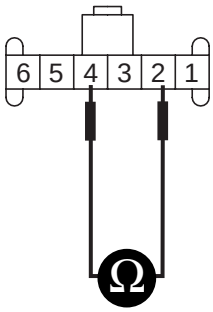
1. Check incar temp. sensor.

1) Ignition "OFF"

2) Disconnect incar sensor.

3) Measure resistance between terminal "4" and "2" of incar sensor.

Specification : Refer the specifications in fig 3.



M38

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

EQRE514F

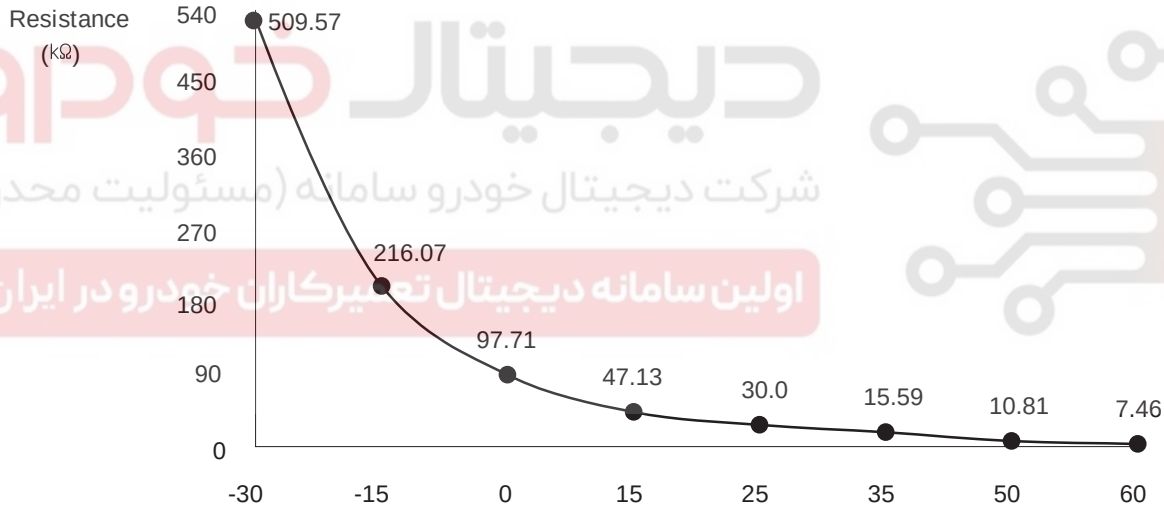


Fig 3

Fig 3) Specifications : Resistance value of incar temp. sensor as a function of temperature.

EQRE514G

4) Is the measured resistance within specifications in fig3? (tolerance limits ± 3%)

YES

Go to "Check A/C Control Unit" procedure.

NO

Substitute with a known-good incar sensor and check for proper operation.
If the problem is corrected, replace incar sensor and then go to "Verification of Vehicle Repair" procedure.

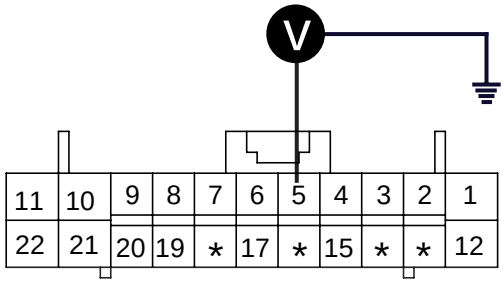
2. Check A/C Control Unit

   1) Engine "ON"

   2) Disconnect incar sensor.

   3) Measure Voltage between terminal "5" of A/C Control Unit and chassis ground.

Specification : Approx. 5V



M21-2

5. Incar sensor temp. signal

EQRE514C

4) Is the measured voltage within specifications?

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 Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EC230316

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

1. Connect scantool and select "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

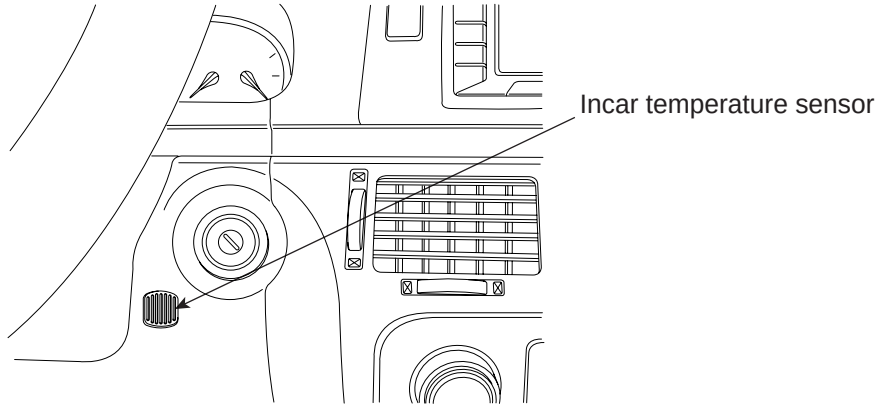
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1234 IN-CAR TEMPERATURE SENSOR OPEN (HIGH)

COMPONENT LOCATION ED2CFCE8



EQRE514E

GENERAL DESCRIPTION E1A3FE1B

Refer to DTC B1233.

DTC DESCRIPTION E4A3E4FA

The A/C controller sets DTC B1234 if there is an open circuit in incar temp. sensor signal harness or the measured resistance value of sensor is more than threshold value(about 509.57kΩ)

DTC DETECTING CONDITION E1AD2DD3

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Open Circuit in harness • Faulty incar temp. Sensor • Faulty A/C control unit
Threshold value	• ＞ 509.57 kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of 25°C(77°F)	

SPECIFICATION EB94B45F

Refer to DTC B1233.

MONITOR SCANTOOL DATA E3AA8147

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "INCAR TEMP. SENSOR" Parameter on the Scantool.

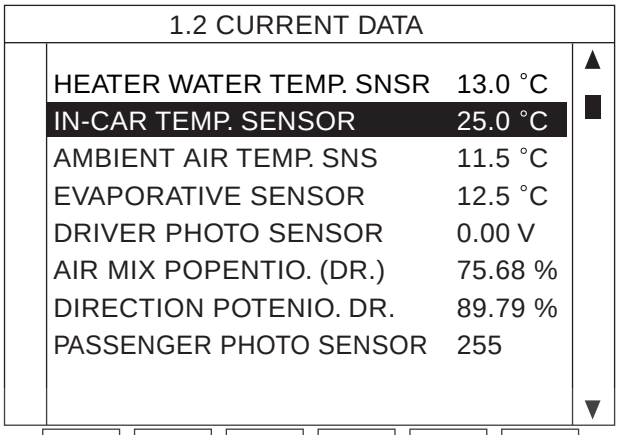


Fig 1

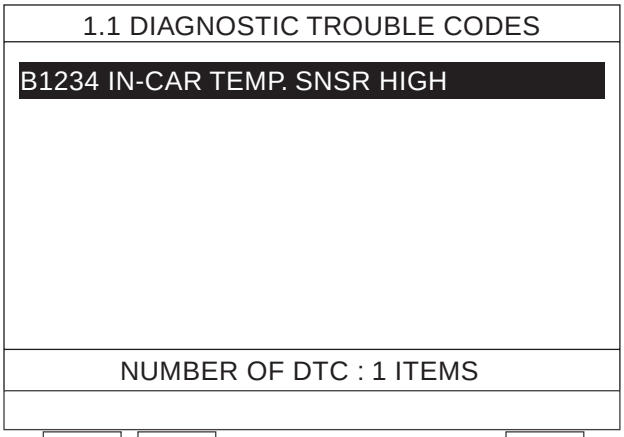


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1234.

EQRE515A

4. Are the DTC B1234 present and is parameter of "INCAR TEMP. SENSOR" fixed?
※ Parameter of "INCAR TEMP. SENSOR" will be fixed at 25℃(77°F), if there is any fault in INCAR TEMP. SENSOR.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EBDBDEB1

Refer to DTC B1233.

SIGNAL CIRCUIT INSPECTION E52FAD51

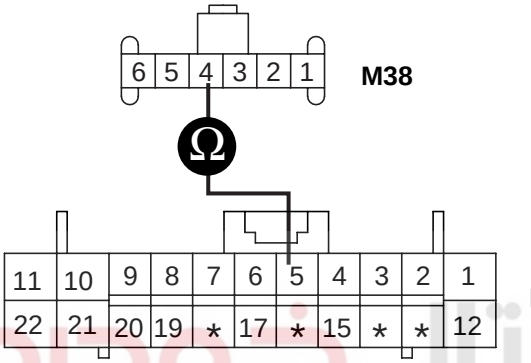
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect incar temp. sensor.

   3) Measure resistance between terminal "4" of incar temp. sensor and terminal "5" of A/C Control Unit..

Specification : Approx. 0 Ω



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

EQRE515B

4) Is the measured resistance within specifications?

YES

Go to "Ground circuit Inspection " procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E04C40CB

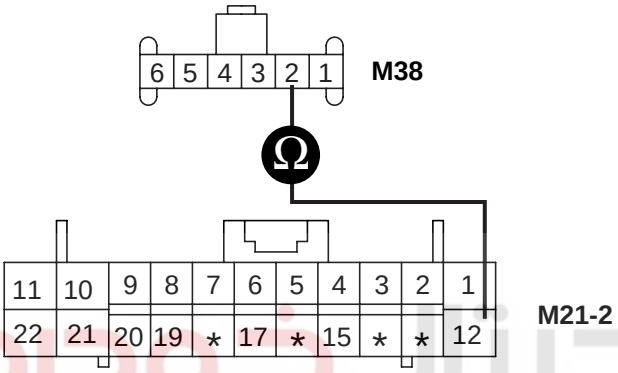
1. Check for open in ground harness.

   1) Ignition "OFF"

   2) Disconnect incar temp. sensor.

   3) Measure resistance between terminal "2" of incar temp. sensor and terminal "12" of A/C Control Unit.

Specification : Approx. 0 Ω



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

EQRE515C

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E3D83299

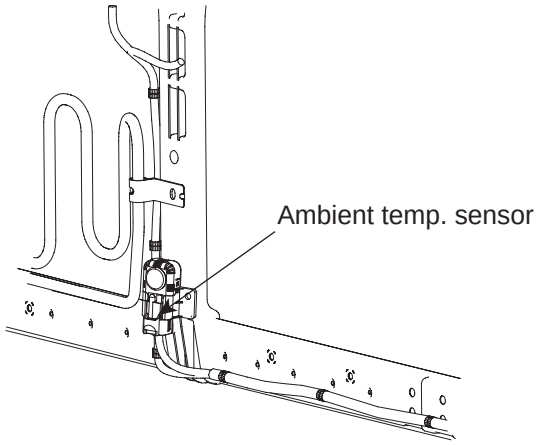
Refer to DTC B1233.

VERIFICATION OF VEHICLE REPAIR EB3E7FCD

Refer to DTC B1233.

DTC B1237 AMBIENT TEMPERATURE SENSOR SHORT (LOW)

COMPONENT LOCATION E7FAC5A7



EQRE516A

GENERAL DESCRIPTION EB112197

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

DTC DESCRIPTION ED52FE7D

The A/C controller sets DTC B1237 if there is a short circuit in ambient temp. sensor signal harness or the measured resistance value of sensor is less than threshold value(about 7.48kΩ)

DTC DETECTING CONDITION E593BC65

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Short circuit in harness • Faulty ambient temp. Sensor • Faulty A/C control unit
Threshold value	• < 7.48kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of 20°C(68°F)	

SPECIFICATION E6F6E4ED

Temperature[°C(°F)]	Resistance(kΩ)	Temperature[°C(°F)]	Resistance(kΩ)
-30(-22)	527.99	25(77)	30
-15(5)	218.21	35(95)	19.6
0(32)	97.83	50(122)	10.82
15(59)	47.12	60(140)	7.48

MONITOR SCANTOOL DATA E3443894

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "AMBIENT TEMP. SENSOR" Parameter on the Scantool.
   ※ Parameter of "AMBIENT TEMP. SENSOR" will be fixed at 20°C, if there is any fault in AMBIENT TEMP. SENSOR.

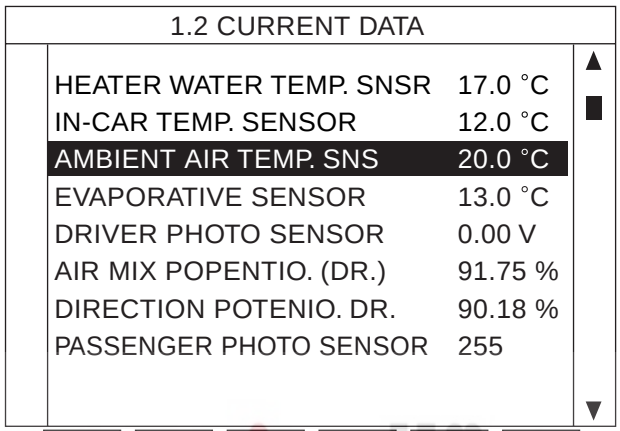


Fig 1

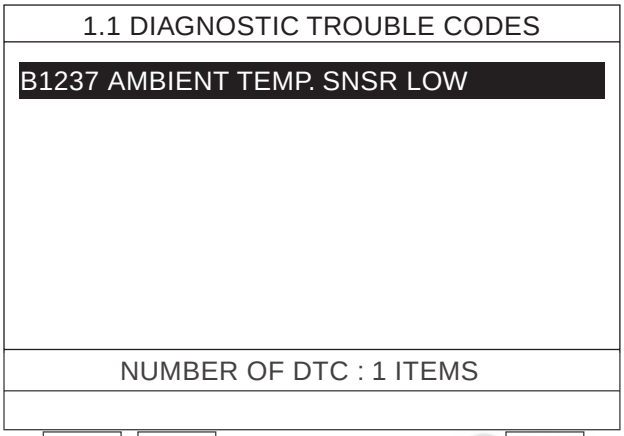


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1237.

LQIE516B

4. Are the DTC B1237 present and is parameter of "AMBIENT TEMP. SENSOR" fixed?

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION E1AF6B6A

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EF09EAD1

1. Check for short to ground in harness.
   1) Ignition "OFF"
   2) Disconnect ambient temp. sensor.
   3) Measure resistance between terminal "1" of ambient temp. sensor and chassis ground.

Specification : Approx. ∞Ω

E72

1. Ambient temp. sensor signal(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE516C

   4) Is the measured resistance within specifications?

YES

Go to "Component Inspection" procedure.

NO

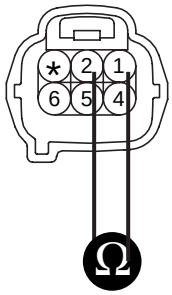
Check for short to ground in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E4F6BB93

1. Check Ambient temp. sensor.
   1) Ignition "OFF"
   2) Disconnect ambient temp. sensor.

3) Measure resistance between terminal "1" and "2" of ambient temp. sensor.

Specification : Refer the specifications in fig 3.



E72

1. Ambient temp. sensor signal
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE516D

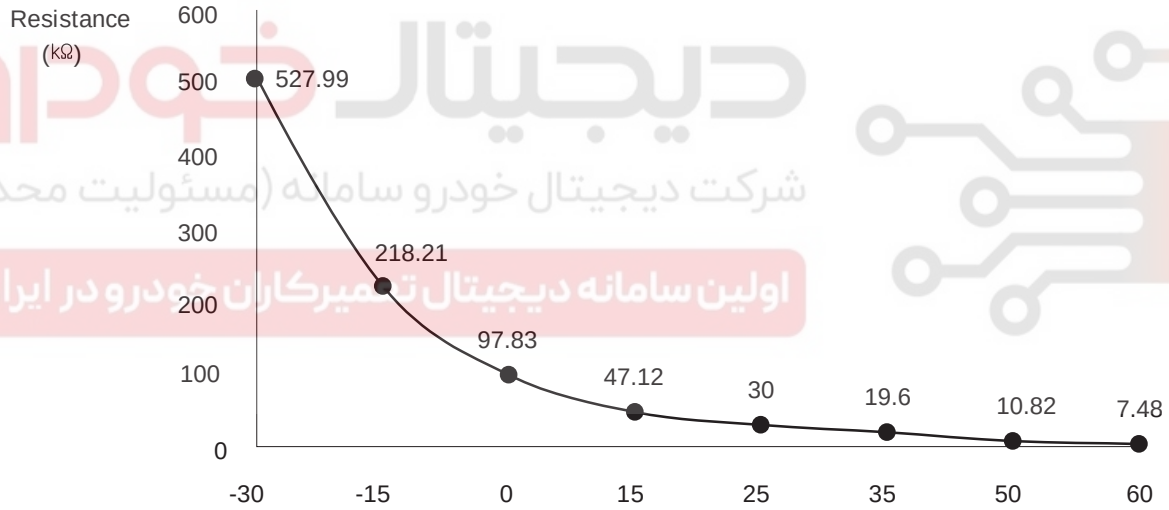


Fig 3

Fig 3) Specifications : Resistance value of ambient temp. sensor as a function of temperature.

EQRE516F

4) Is the measured resistance within specifications in fig3? (tolerance limits ±3%)

YES

Go to "Check A/C Control Unit" procedure.

NO

Substitute with a known-good ambient temp. sensor and check for proper operation.
If the problem is corrected, replace ambient temp. sensor and then go to "Verification of Vehicle Repair" procedure.

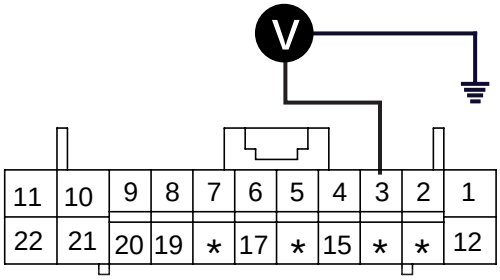
2. Check A/C Control Unit

   1) Engine "ON"

   2) Disconnect ambient temp. sensor.

   3) Measure voltage between terminal "3" of A/C Control Unit and chassis ground.

Specification : Approx. 5V



M21-2

3. Ambient temp. sensor signal

EQRE516E

4) Is the measured voltage within specifications?

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 Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EDB3124D

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

1. Connect scantool and select "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

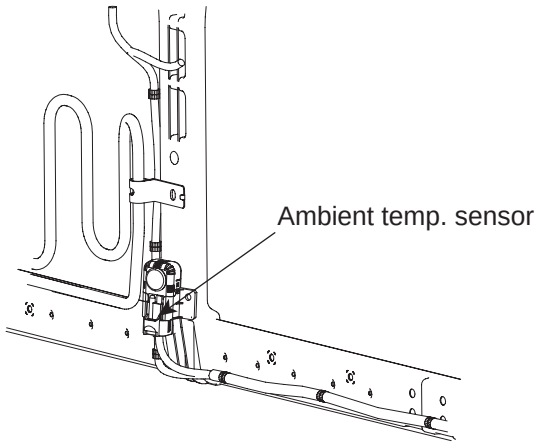
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1238 AMBIENT TEMPERATURE SENSOR OPEN (HIGH)

COMPONENT LOCATION E47E41BA



EQRE516A

GENERAL DESCRIPTION EA7D0D40

Refer to DTC B1237.

DTC DESCRIPTION E784EC44

The A/C controller sets DTC B1238 if there is an open circuit in ambient temp. sensor signal harness or the measured resistance value of sensor is more than threshold value(about 527kΩ)

DTC DETECTING CONDITION E257EDA9

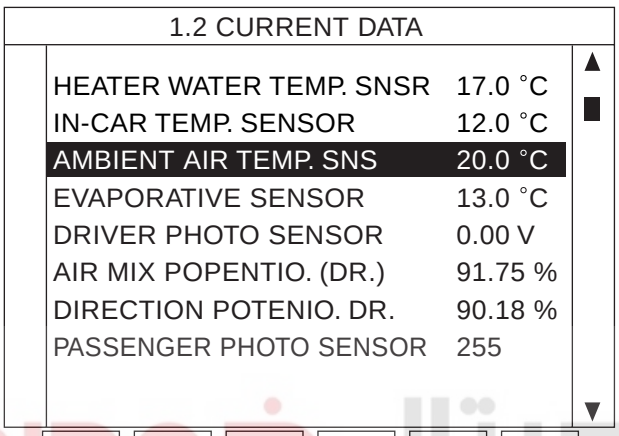
Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Open Circuit in harness • Faulty ambient temp. Sensor • Faulty A/C control unit
Threshold value	• ＞ 527kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of 20°C(67°F)	

SPECIFICATION EE2EBEFC

Refer to DTC B1237.

MONITOR SCANTOOL DATA EC27CEAB

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "AMBIENT TEMP. SENSOR" Parameter on the Scantool.
   ※ Parameter of "AMBIENT TEMP. SENSOR" will be fixed at 20℃(67°F), if there is any fault in AMBIENT TEMP. SENSOR.



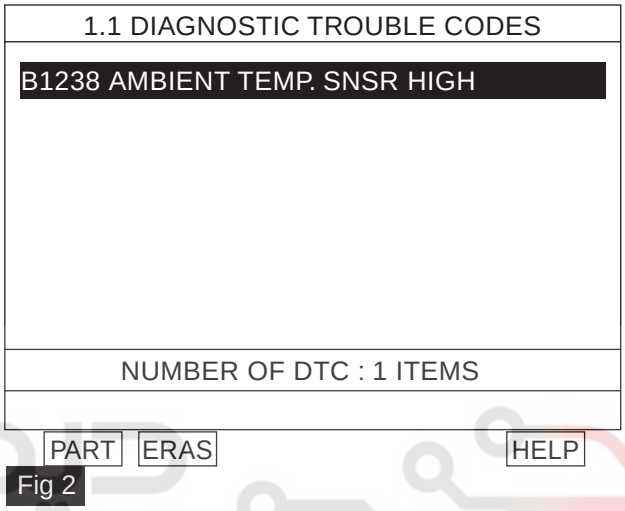


Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1238.

LQIE517A

4. Are the DTC B1238 present and is parameter of "AMBIENT TEMP. SENSOR" fixed?

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION E3CD9EEE

Refer to DTC B1237.

SIGNAL CIRCUIT INSPECTION EB7BE386

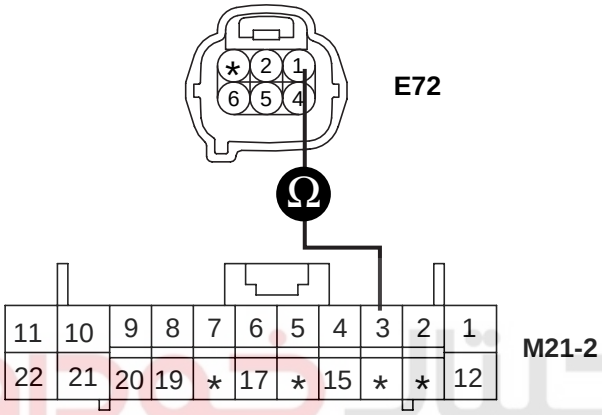
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect ambient temp. sensor.

   3) Measure resistance between terminal "1" of ambient temp. sensor and terminal "3" of A/C Control Unit.

Specification : Approx. 0 Ω



1. Ambient temp. sensor signal(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE518A

4) Is the measured resistance within specifications?

YES

Go to "Ground circuit Inspection " procedure.

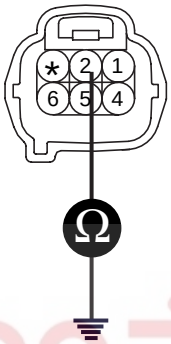
NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E3DD06B9

1. Check for open in ground harness.
   1) Ignition "OFF"
   2) Disconnect ambient temp. sensor.
   3) Measure resistance between terminal "2" of ambient temp. sensor and chassis ground.

Specification : Approx. 0 Ω



E72

1. Ambient temp. sensor signal(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE518B

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EDDDB0BA

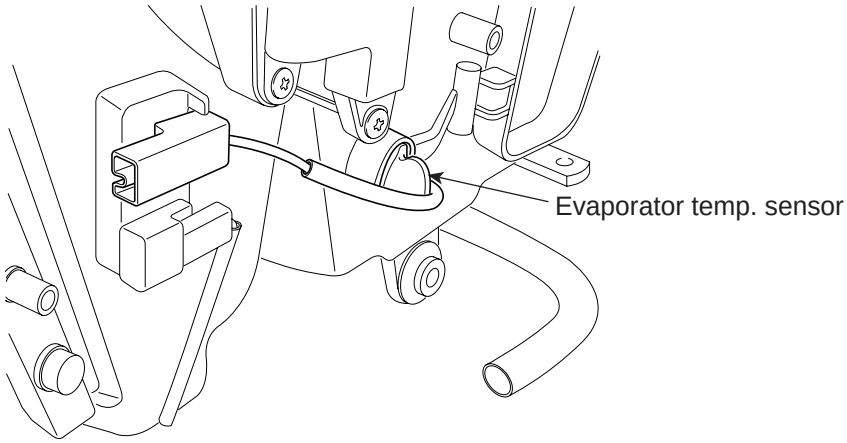
Refer to DTC B1237.

VERIFICATION OF VEHICLE REPAIR E39C67CD

Refer to DTC B1237.

DTC B1241 EVAPORATOR TEMPERATURE SENSOR SHORT (LOW)

COMPONENT LOCATION E2D9BE91



EQRE519A

GENERAL DESCRIPTION EA4B0598

The Evaporator temperature sensor located on heater unit, detects the core temperature and interrupts compressor relay power, in order to prevent evaporator freezing by excessive cooling. It is a negative type thermistor whose resistance is inversely proportional to temperature.

DTC DESCRIPTION EC6ED22F

The A/C controller sets DTC B1241 if there is a short circuit in evaporator temp. sensor signal harness or the measured resistance value of sensor is less than threshold value(about 0.9kΩ)

DTC DETECTING CONDITION EF9E2420

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Short circuit in harness • Faulty Evaporator temp. Sensor • Faulty A/C control unit
Threshold value	• < 0.9kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of -2°C(28.4°F)	

SPECIFICATION EE70CB3D

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

Temperature[°C(°F)]	Resistance(kΩ)	Temperature[°C(°F)]	Resistance(kΩ)
-10(14)	13.6	15(59)	3.9
0(32)	8	30(86)	2
5(41)	6.2	40(104)	1.3
10(50)	4.9	50(122)	0.9

MONITOR SCANTOOL DATA E2249A3D

1. Connect scantool to data link connector(DLC).
2. Engine "ON"
3. Monitor the "EVAPORATIVE SENSOR" Parameter on the Scantool.

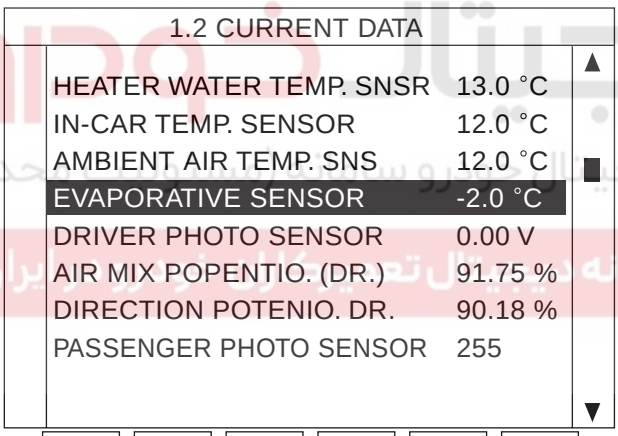


Fig 1

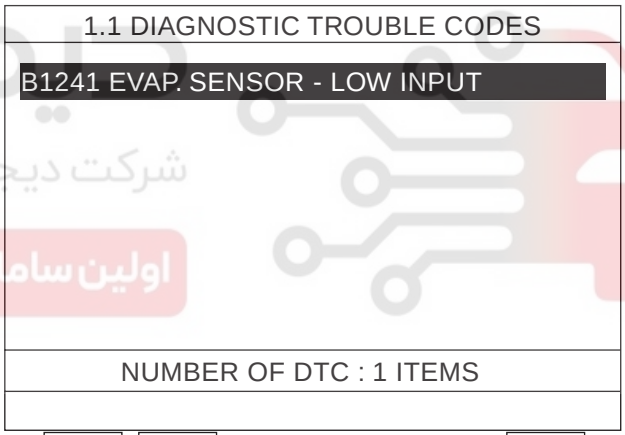


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1241.

LQIE519B

4. Are the DTC B1241 present and is parameter of "EVAPORATIVE SENSOR" fixed?
   ※ Parameter of "EVAPORATIVE SENSOR" will be fixed at -2℃(28.4°F), if there is any fault in EVAPORATIVE SENSOR.

   YES

   Go to "Inspection" procedure.

   NO

   Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION E5CEFB7D

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EFFE7FA3

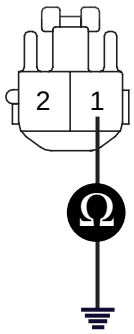
1. Check for short to ground in harness.

   1) Ignition "OFF"

   2) Disconnect evaporator temp. sensor.

   3) Measure resistance between terminal "1" of evaporator temp. sensor and chassis ground.

Specification : Approx. ∞Ω



M32

1. Evaporator temp. sensor signal
2. Evaporator temp. sensor ground

EQRE519C

   4) Is the measured resistance within specifications?

   YES

   Go to "Component Inspection" procedure.

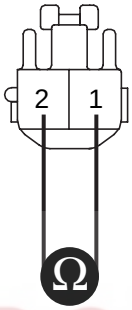
   NO

   Check for short to ground in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION ECD7CA04

1. Check evaporator temp. sensor.
   1) Ignition "OFF"
   2) Disconnect evaporator temp. sensor.
   3) Measure resistance between terminal "1" and "2" of evaporator temp. sensor.

Specification : Refer the specifications in fig 3.



M32

1. Evaporator temp. sensor signal
2. Evaporator temp. sensor ground

EQRE519D

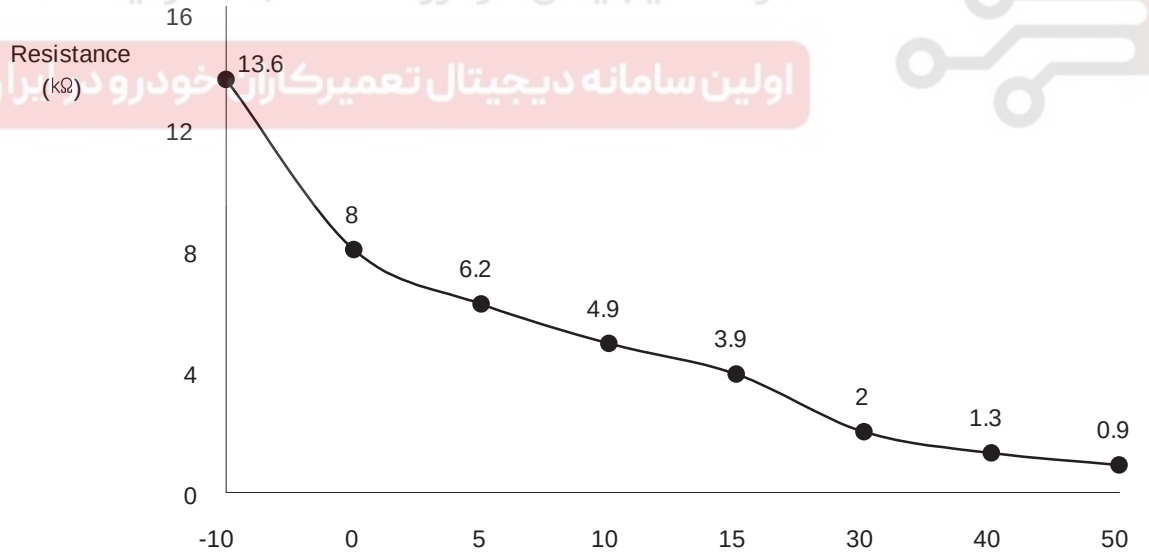


Fig 3

Fig 3) Specifications : Resistance value of evaporator temp. sensor as a function of temperature.

LQIE519F

4) Is the measured resistance within specifications in fig3? (tolerance limits ±3%)

YES

Go to "Check A/C Control Unit" procedure.

NO

Substitute with a known-good evaporator temp. sensor and check for proper operation.
If the problem is corrected, replace evaporator temp. sensor and then go to "Verification of Vehicle Repair" procedure.

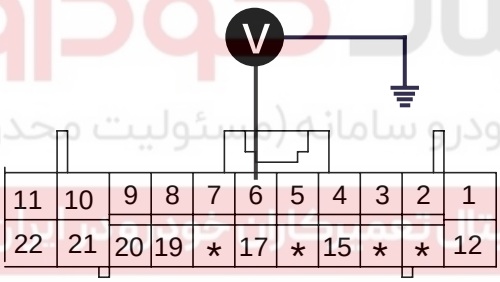
2. Check A/C Control Unit

1) Engine "ON"

2) Disconnect evaporator temp. sensor.

3) Measure voltage between terminal "6" of A/C Control Unit and chassis ground.

Specification : Approx. 5V



6. Evaporator temp. sensor signal

EQRE519E

4) Is the measured voltage within specifications?

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 Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E9D2E69C

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

1. Connect scantool and select "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

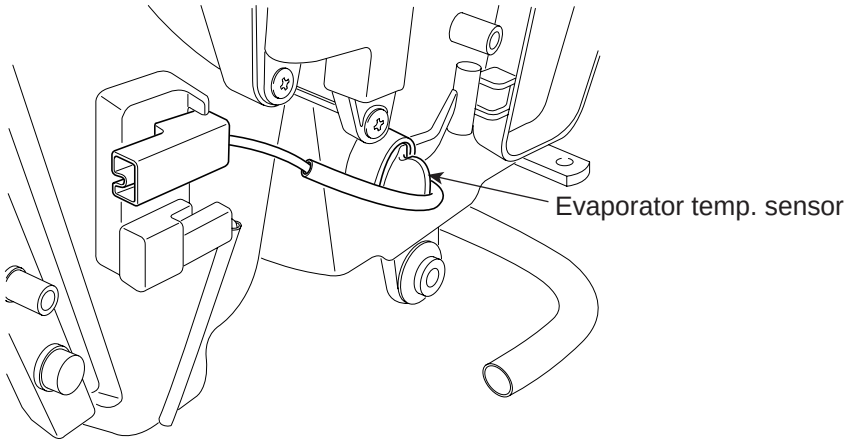
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1242 EVAPORATOR TEMPERATURE SENSOR OPEN (HIGH)

COMPONENT LOCATION E91ECC83



EQRE519A

GENERAL DESCRIPTION EDB7EF4F

Refer to DTC B1241.

DTC DESCRIPTION EAF2485F

The A/C controller sets DTC B1242 if there is an open circuit in evaporator temp. sensor signal harness or the measured resistance value of sensor is more than threshold value(about 13.6kΩ)

DTC DETECTING CONDITION EA7CA474

Item	Detecting Condition	Possible cause
DTC Strategy	• Resistance check	• Open Circuit in harness • Faulty Evaporator temp. Sensor • Faulty A/C control unit
Threshold value	• ＞ 13.6kΩ	
Detecting time	• 0.3 sec	
FAIL SAFE	• Control with the value of -2°C(28.4°F)	

SPECIFICATION E3415325

Refer to DTC B1241.

MONITOR SCANTOOL DATA EF0E0B48

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "EVAPORATIVE SENSOR" Parameter on the Scantool.

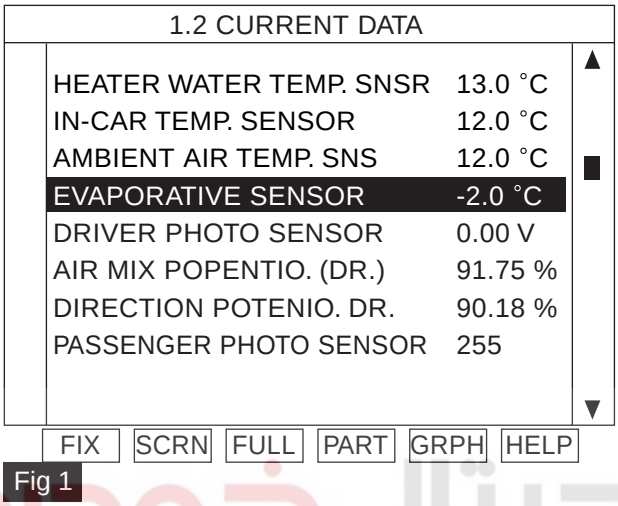


Fig 1

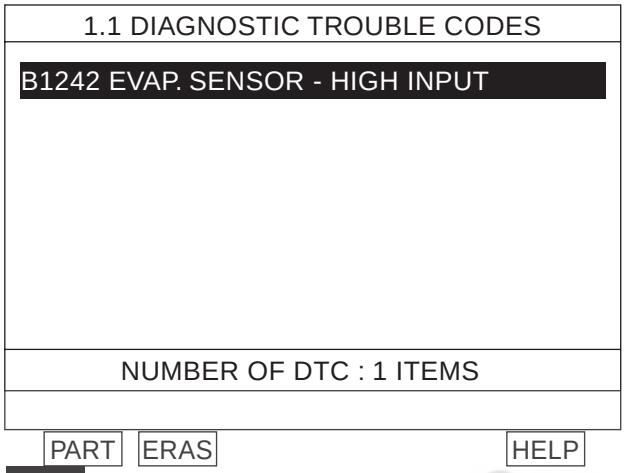


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1242.

LQIE520A

4. Are the DTC B1242 present and is parameter of "EVAPORATIVE SENSOR" fixed?
※ Parameter of "EVAPORATIVE SENSOR" will be fixed at -2℃(28.4°F), if there is any fault in EVAPORATIVE SENSOR.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION ED4ACC35

Refer to DTC B1241.

SIGNAL CIRCUIT INSPECTION EC556DAB

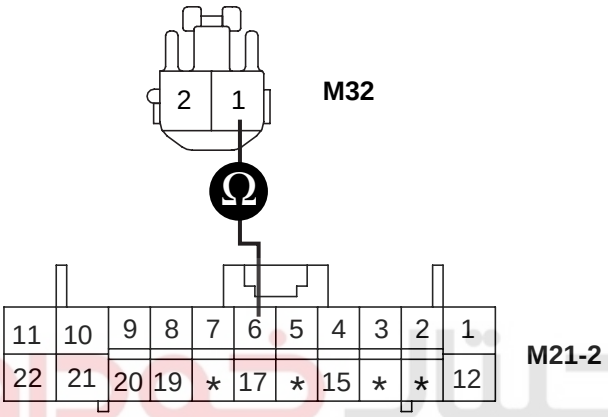
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect evaporator temp. sensor.

   3) Measure resistance between terminal "1" of evaporator temp. sensor and terminal "6" of A/C Control Unit.

Specification : Approx. 0 Ω



1. Evaporator temp. sensor signal
2. Evaporator temp. sensor ground

EQRE520B

4) Is the measured resistance within specifications?

YES

Go to "Ground circuit Inspection " procedure.

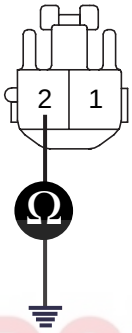
NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION EB24CCBB

1. Check for open in ground harness.
   1) Ignition "OFF"
   2) Disconnect evaporator temp. sensor.
   3) Measure resistance between terminal "2" of evaporator temp. sensor and chassis ground.

Specification : Approx. 0 Ω



M32

1. Evaporator temp. sensor signal
2. Evaporator temp. sensor ground

EQRE520C

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EC4BACFB

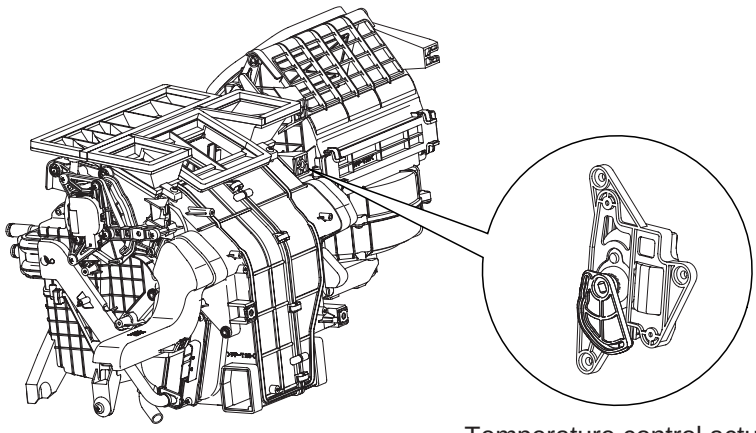
Refer to DTC B1241.

VERIFICATION OF VEHICLE REPAIR EAEDEBC4

Refer to DTC B1241.

DTC B1245 AIR MIX POTENTIOMETER OPEN (LOW) - DRIVER

COMPONENT LOCATION EE159CD3



Temperature control actuator

EQRE521A

GENERAL DESCRIPTION E11EA5B6

Temperature control actuator located at heater unit, 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.

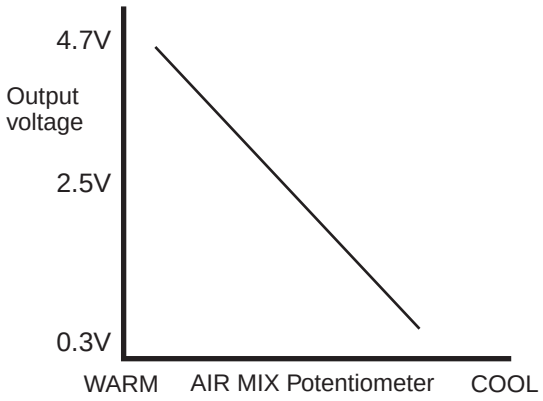
DTC DESCRIPTION ED991178

The A/C controller sets DTC B1245 if there is an open circuit or poor connection in the air mix potentiometer.

DTC DETECTING CONDITION EEA20D7B

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in harness • Short circuit in harness • Faulty driver Air Mix potentiometer
Threshold value	• < 0.1V	
Detecting time	• 0.3 sec	
FAIL SAFE	• If temperature setting 17~24.5°C(63~76°F) fix at max. cooling position. • If temperature setting 25~32°C(77~90°F) fix at max. heating position.	

SPECIFICATION E0DF0BD2



LQIE521B

MONITOR SCANTOOL DATA E8F291C9

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "Driver Air Mix Potentiometer" Parameter on the Scantool while operating temp. switch.

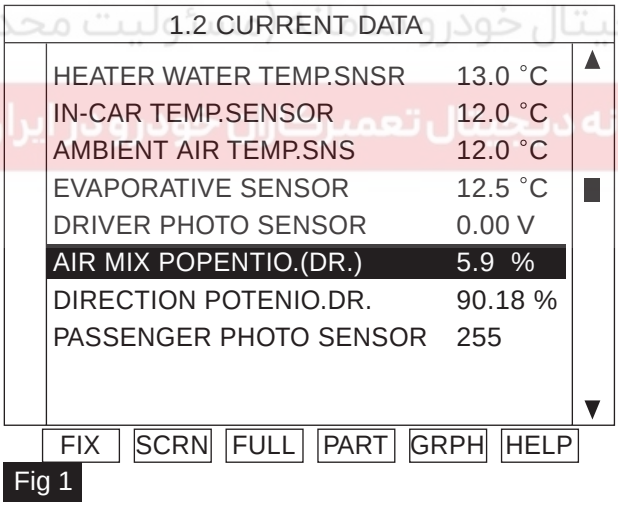


Fig 1

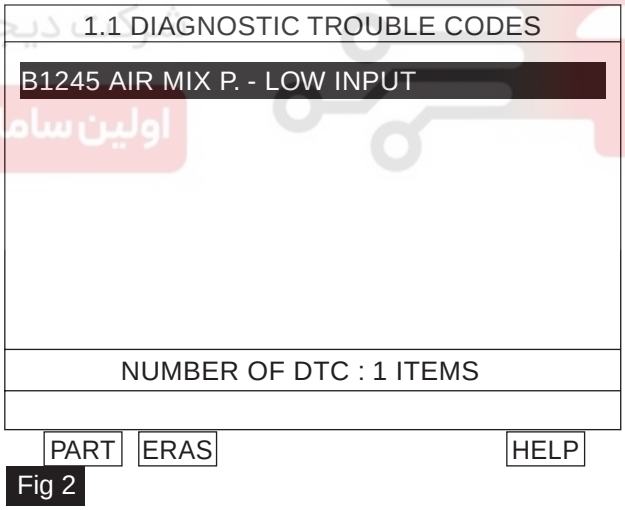


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1245.

LQIE521C

4. Are the DTC B1245 present and is parameter of "Driver Air Mix Potentiometer" fixed?
※ Parameter of "Driver Air Mix Potentiometer" will be fixed at 100%(or any value above 90%), or 0% (or any value below 10%), if there is any fault in Driver Air Mix potentiometer.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION ED352E86

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EF6ADC9F

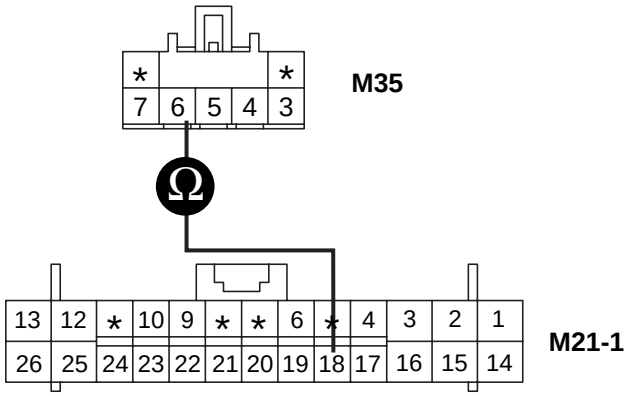
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect Driver Air Mix potentiometer.

3) Measure resistance between terminal "6" of Driver Air Mix Potentiometer and terminal "18" of A/C control unit.

Specification : Approx. 0 Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE521D

4) Is the measured resistance within specifications?

YES

Go to "Check for short to ground in harness" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

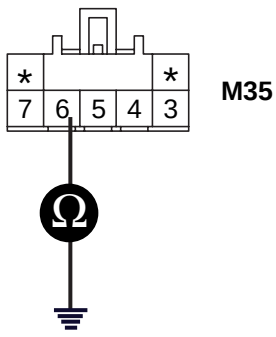
2. Check for short to ground in harness.

1) Ignition "OFF"

2) Disconnect Driver Air Mix potentiometer.

3) Measure resistance between terminal "6" of Driver Air Mix Potentiometer and chassis ground.

Specification : Approx. ∞ Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE521E

4) Is the measured resistance within specifications?

YES

Go to "Power circuit Inspection" procedure.

NO

Check for short to ground in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

POWER SUPPLY CIRCUIT INSPECTION E85689CE

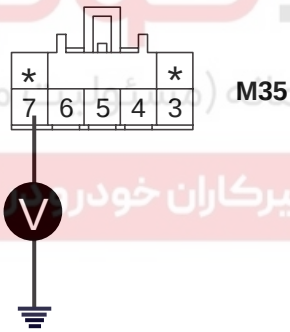
1. Check for short or open in harness.

1) Ignition "ON"

2) Connect Driver Air Mix Potentiometer.

3) Measure voltage between terminal "7" of Driver Air Mix Potentiometer and chassis ground.

Specification : Approx. 5V



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE521F

4) Is the measured voltage within specifications?

YES

Go to "Component inspection" procedure.

NO

Check for short or open in power harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E5513CEC

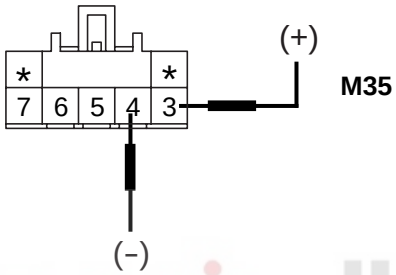
1. Check actuator motor.

   1) Ignition "OFF"

   2) Disconnect Driver Air Mix Potentiometer.

   3) Verify that the temperature actuator operates to the hot position when connecting 12V to the terminal "3" and grounding terminal "4".

   4) Verify that the temperature actuator operates to the cool position when the connections are reversed.



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE521H

   5) Does the actuator work properly?

YES

Go to "Check potentiometer" procedure.

NO

Substitute with a known-good actuator and check for proper operation. If the problem is corrected, replace actuator and then go to "Verification of Vehicle Repair" procedure.

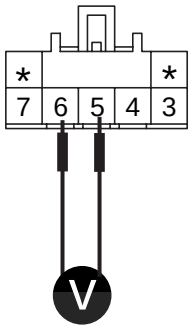
2. Check potentiometer

1) Ignition "ON"

2) Connect Driver Air Mix potentiometer.

3) Measure voltage between terminal "5" and "6" of Driver Air Mix potentiometer while operating the temp. switch.

Specification : Refer the specifications in fig 3)



M35

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE521I

Door position	Voltage (3-4)	Error detecting
MAX. Cooling	0.3 ± 0.15V	Low voltage : 0.08V or less
MAX. Heating	4.7 ± 0.15V	High voltage : 4.9V or more

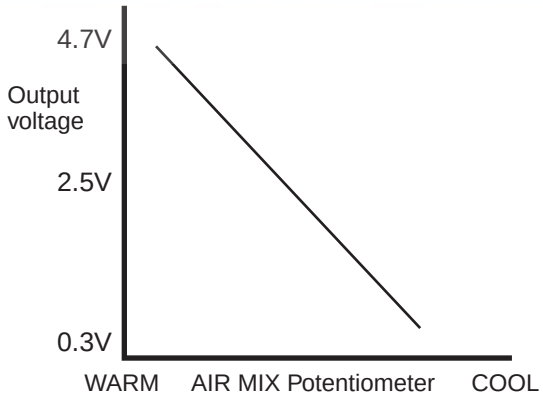


Fig 3

Fig 3) Specifications : Voltage value of air mix potentiometer as a function of position of setting temperature.

LQIE521J

4) Is the measured voltage within specifications in fig3?

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 actuator and check for proper operation. If the problem is corrected, replace actuator and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EB87AC3A

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

1. Connect scantool and select "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

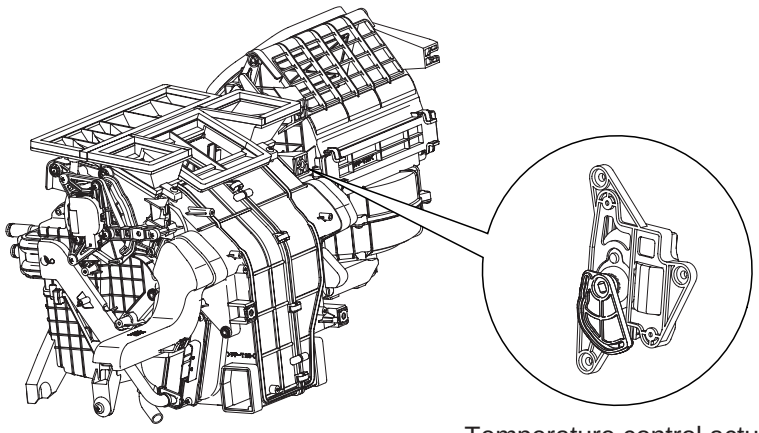
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1246 AIR MIX POTENTIOMETER SHORT (HIGH) - DRIVER

COMPONENT LOCATION E9A515E8



Temperature control actuator

EQRE521A

GENERAL DESCRIPTION E95AF565

Refer to DTC B1245.

DTC DESCRIPTION E5DCF622

The A/C controller sets DTC B1246 if there is a short to power in the air mix potentiometer.

DTC DETECTING CONDITION EA32F0CB

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty driver Air Mix potentiometer
Threshold value	• > 4.9V	
Detecting time	• 0.3 sec	
FAIL SAFE	• If temperature setting 17~24.5°C(63~76°F) fix at max. cooling position. • If temperature setting 25~32°C(77~90°F) fix at max. heating position.	

SPECIFICATION E2F8B08E

Refer to DTC B1245.

MONITOR SCANTOOL DATA E2B8EB37

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "Driver Air Mix Potentiometer" Parameter on the Scantool while operating temp. switch.

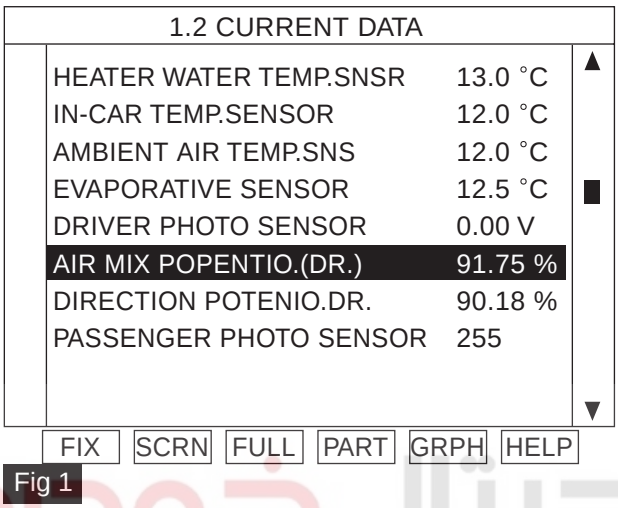


Fig 1

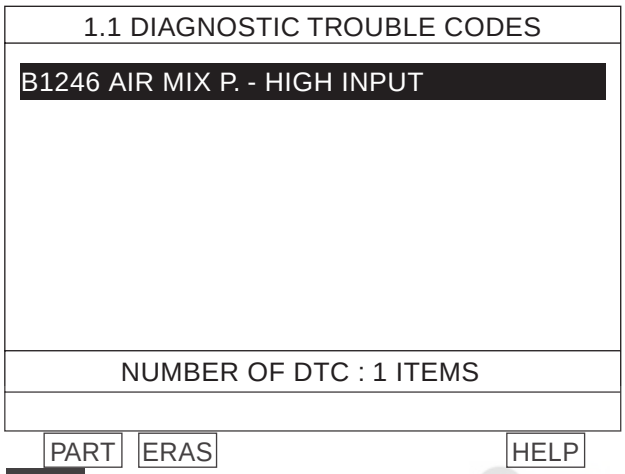


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1246.

LQIE522A

4. Are the DTC B1246 present and is parameter of "Driver Air Mix potentiometer" fixed?
※ Parameter of "Driver Air Mix potentiometer" will be fixed at 100%(or any value above 90%), or 0% (or any value below 10%), if there is any fault in Driver Air Mix potentiometer.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EEBC844B

Refer to DTC B1245.

SIGNAL CIRCUIT INSPECTION ECCE319F

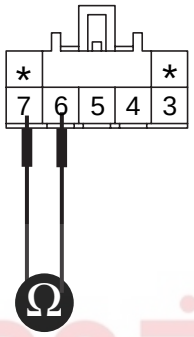
1. Check for short in harness.

   1) Ignition "OFF"

   2) Disconnect Driver Air Mix potentiometer.

   3) Measure resistance between terminal "6" and "7" of Driver Air Mix potentiometer.

Specification : Approx. ∞ Ω



M35

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE522B

   4) Is the measured resistance within specifications?

YES

Go to "Ground circuit Inspection" procedure.

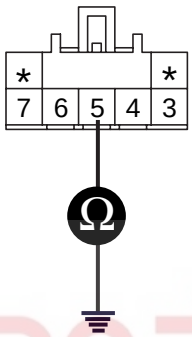
NO

Check for short to power harness in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION EA4B39E1

1. Check for open in harness.
   1) Ignition "OFF"
   2) Disconnect Driver Air Mix Potentiometer.
   3) Measure resistance between terminal "5" of Driver Air Mix Potentiometer and chassis ground.

Specification : Approx. 0 Ω



M35

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE521G

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection" procedure.

NO

Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION EDDB34AF

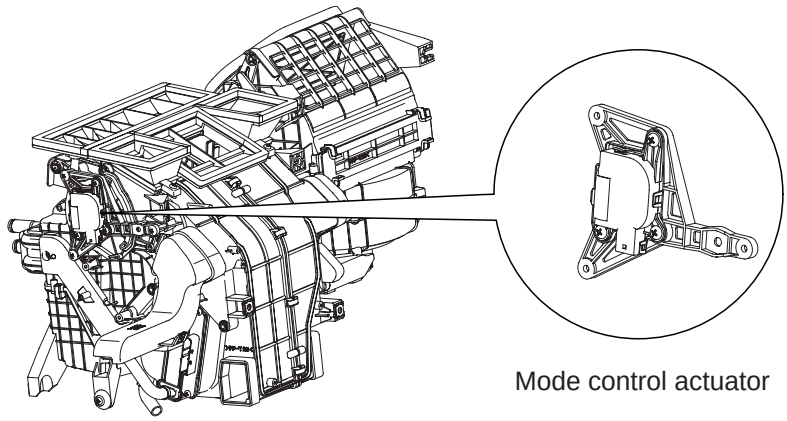
Refer to DTC B1245.

VERIFICATION OF VEHICLE REPAIR EFADDE2A

Refer to DTC B1245.

DTC B1249 DIRECTION POTENTIOMETER OPEN (LOW) - DRIVER

COMPONENT LOCATION EF27E511



EQRE523A

GENERAL DESCRIPTION E1C6CBDA

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.

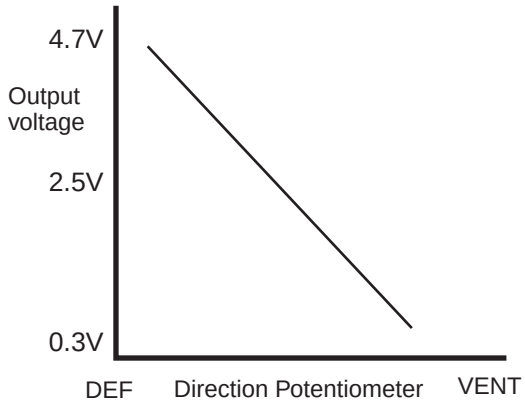
DTC DESCRIPTION EA6B8E0E

The A/C controller sets DTC B1249 if there is an open circuit or poor connection in the Direction potentiometer.

DTC DETECTING CONDITION EFA3C9A5

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in harness • Short circuit in harness • Faulty driver direction potentiometer
Threshold value	• < 0.1V	
Detecting time	• 0.3 sec	
FAIL SAFE	• Fix vent position, while selecting vent mode. • Fix defrost position while selecting except vent mode.	

SPECIFICATION EEEAF7E4



LQIE523B

MONITOR SCANTOOL DATA EED52D3E

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "DR. DIRECTION POTENTIO." parameter on the scantool while operating mode switch.

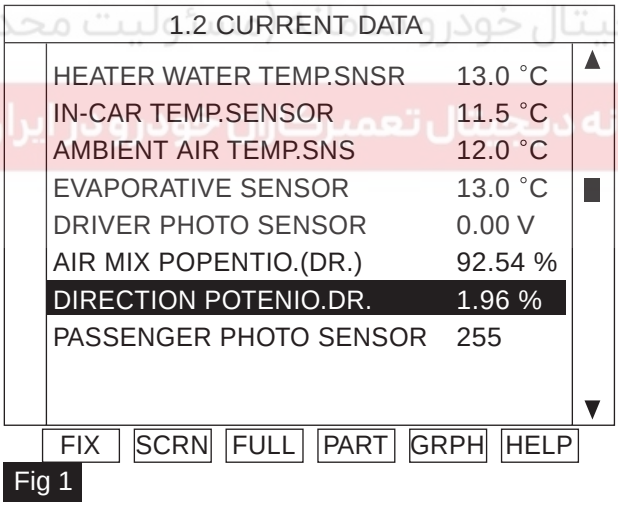


Fig 1

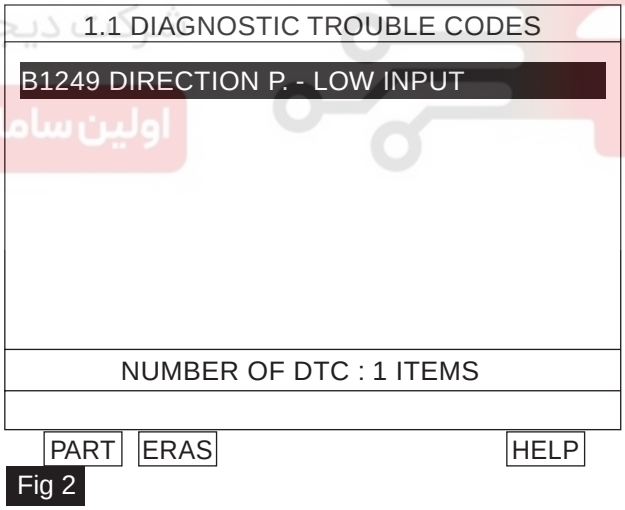


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1249.

LQIE523C

4. Are the DTC B1249 present and is parameter of "DR. DIRECTION POTENTIO." fixed?
※ Parameter of "DR. DIRECTION POTENTIO." will be fixed at 100%(or any value above 90%), or 0% (or any value below 10%), if there is any fault in Driver Direction potentiometer.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EDF45C9A

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EAAE0F3C

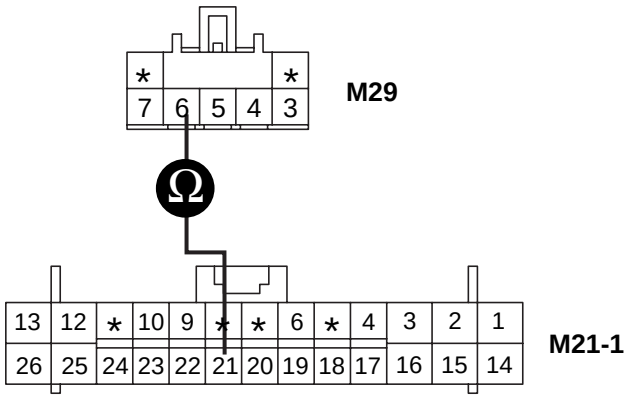
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect Driver mode Actuator.

3) Measure resistance between terminal "6" of Driver Direction potentiometer and terminal "21" of A/C control unit.

Specification : Approx. 0 Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE523D

4) Is the measured resistance within specifications?

YES

Go to "Check for short to ground in harness" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

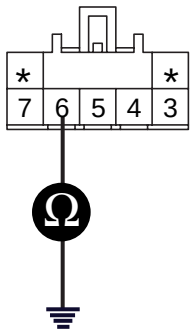
2. Check for short to ground in harness.

1) Ignition "OFF"

2) Disconnect Driver mode Actuator.

3) Measure resistance between terminal "6" of Driver Direction potentiometer and chassis ground.

Specification : Approx. ∞ Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE523E

4) Is the measured resistance within specifications?

YES

Go to "Power circuit Inspection" procedure.

NO

Check for short to ground in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

POWER SUPPLY CIRCUIT INSPECTION E7EF9AFF

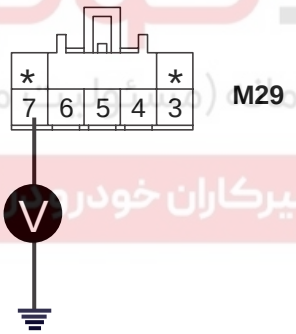
1. Check for short or open in harness.

1) Ignition "ON"

2) Connect Driver Direction potentiometer.

3) Measure voltage between terminal "7" of Driver Direction potentiometer and chassis ground.

Specification : Approx. 5V



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE523F

4) Is the measured voltage within specifications?

YES

Go to "Component Inspection" procedure.

NO

Check for short or open in power harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E05E82B7

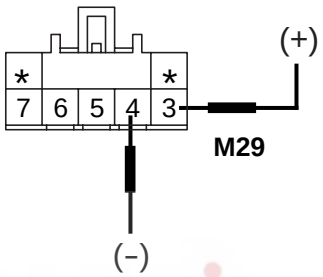
1. Check actuator.

   1) Ignition "OFF"

   2) Disconnect Driver Direction potentiometer.

   3) Verify that the mode actuator operates to the vent mode when connecting 12V to the terminal "3" and grounding terminal "4".

   4) Verify that the mode actuator operates to the def mode when the connections are reversed.



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE523H

   5) Does the actuator work properly?

YES

Go to "Check potentiometer" procedure.

NO

Substitute with a known-good actuator and check for proper operation. If the problem is corrected, replace actuator and then go to "Verification of Vehicle Repair" procedure.

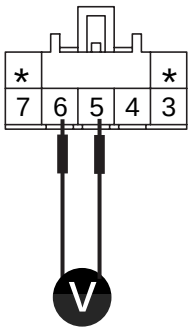
2. Check potentiometer

1) Ignition "ON"

2) Connect Driver Direction potentiometer.

3) Measure voltage between terminal "5" and "6" of Driver Direction potentiometer as the mode switch is operated.

Specification : Refer the specifications in fig 3



M29

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE523I

Door position	Voltage (3-4)	Error detecting
VENT	0.3 ± 0.15V	Under voltage : 0.08V or less Over voltage : 4.92V or more
BI-LEVEL(1)	1.35 ± 0.4V	
BI-LEVEL(2)	2.25 ± 0.4V	
FLOOR	3.0 ± 0.4V	
MIX	3.6 ± 0.4V	
DEF	4.7 ± 0.15V	

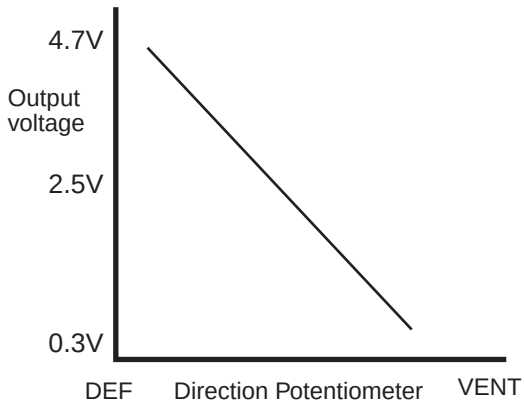


Fig 3

Fig 3) Specifications : Voltage value as a function of position of direction potentiometer.

LQIE523J

4) Is the measured voltage within specifications in fig3?

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 actuator and check for proper operation. If the problem is corrected, replace actuator and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E0CE7511

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

1. Connect scantool and select "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

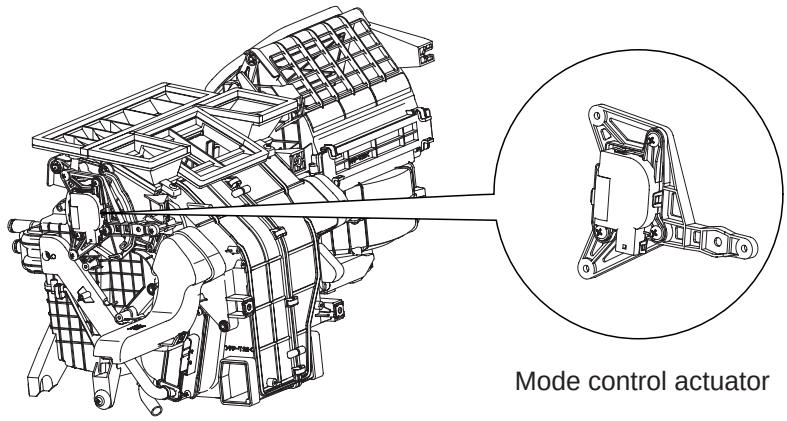
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1250 DIRECTION POTENTIOMETER SHORT (HIGH) - DRIVER

COMPONENT LOCATION EA42BAD0



EQRE523A

GENERAL DESCRIPTION EAD658FE

Refer to DTC B1249.

DTC DESCRIPTION E6C12DEB

The A/C controller sets DTC B1250 if there is a short to power in the Direction potentiometer.

DTC DETECTING CONDITION EBC426F4

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty driver direction potentiometer • Open circuit in harness
Threshold value	• > 4.9V	
Detecting time	• 0.3 sec	
FAIL SAFE	• Fix vent position	

SPECIFICATION E4E11504

Refer to DTC B1249.

MONITOR SCANTOOL DATA E4D3C602

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "DR. DIRECTION POTENTIO." parameter on the scantool while operating mode switch.

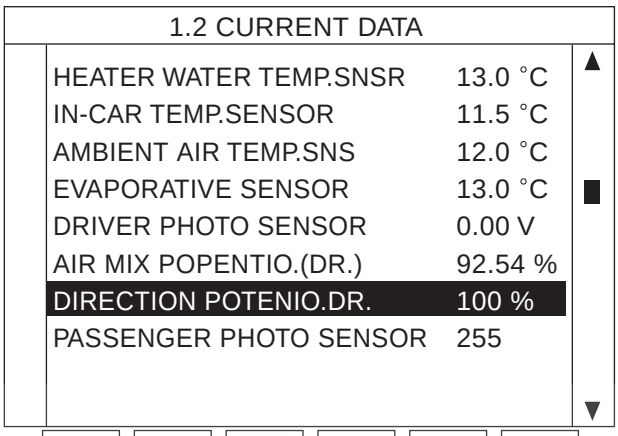


Fig 1

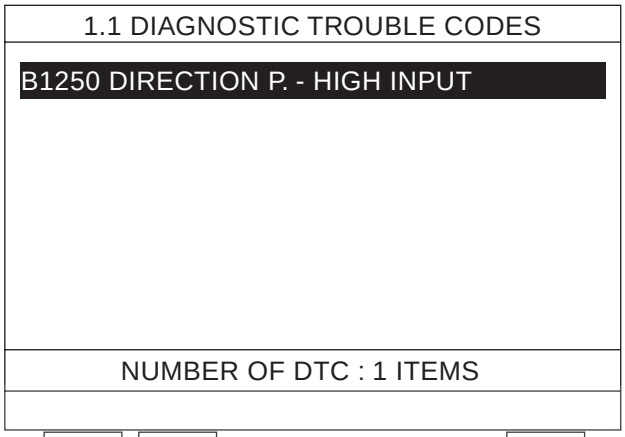


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1250.

LQIE524A

4. Are the DTC B1250 present and is parameter of "DR. DIRECTION POTENTIO." fixed?
※ Parameter of "DR. DIRECTION POTENTIO." will be fixed at 100%(or any value above 90%), or 0% (or any value below 10%), if there is any fault in Driver Direction potentiometer.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION E53E57EA

Refer to DTC B1249.

SIGNAL CIRCUIT INSPECTION EBC89BCE

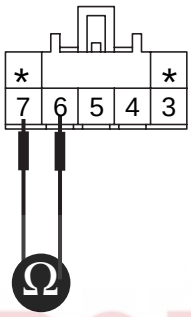
1. Check for short in harness.

   1) Ignition "OFF"

   2) Disconnect Driver mode Actuator.

   3) Measure resistance between terminal "6" and "7"of Driver Direction potentiometer.

Specification : Approx. ∞ Ω



M29

3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE524B

4) Is the measured resistance within specifications?

YES

Go to "Ground circuit inspection" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E8C728FF

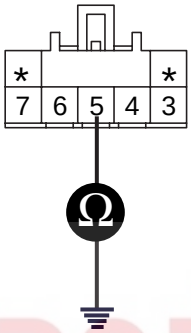
1. Check for open in ground harnesS.

   1) Ignition "OFF"

   2) Disconnect Driver mode Actuator.

   3) Measure resistance between terminal "5" of evaporator sensor and chassis ground.

Specification :Approx. 0 Ω



M29

3. Motor
4. Motor
5. Potentiometer GND
6. Potentiometer signal
7. Sensor REF +5V

EQRE523G

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E9E967A5

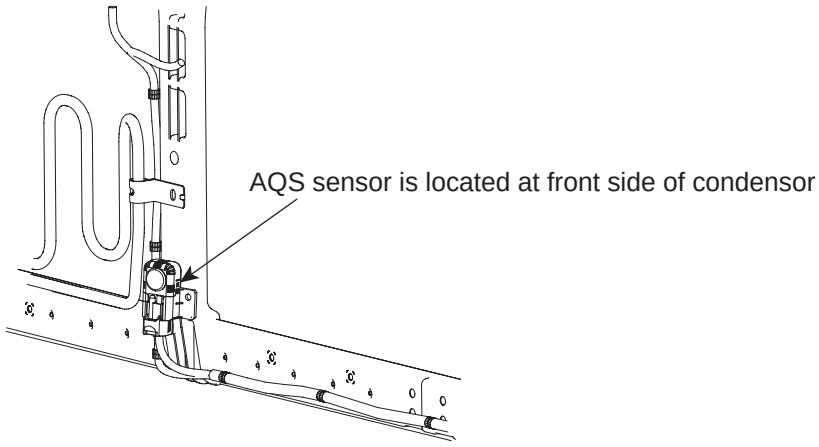
Refer to DTC B1249.

VERIFICATION OF VEHICLE REPAIR E06EED0E

Refer to DTC B1249.

DTC B1257 AQS SENSOR OPEN (HIGH)

COMPONENT LOCATION E0F08EE1



EQRE530A

GENERAL DESCRIPTION E5EF0BAB

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 freshsh 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 A/C controller for closing intake door.

DTC DESCRIPTION EB4D82AD

The A/C controller sets DTC B1257 if there is an open circuit in AQS sensor signal harness or the measured voltage value of sensor is more than threshold value.

DTC DETECTING CONDITION EDCB5BC5

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Open Circuit in power harness • Open circuit in ground harness • Faulty AQS Sensor • Poor connection of connected part
Threshold value	• > 4.9V	
Detecting time	• 1 sec	
FAIL SAFE	• AQS function OFF • Intake door : return to previous state	

SPECIFICATION EAB6DF34

※ 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	preheating(35 ± 2sec)
Normal	4.3V ± 0.3V	Intake door : Fresh
Gas detected	0.9V ± 0.3V	Intake door : Recirculation

MONITOR SCANTOOL DATA EEFFB9FA

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the " AQS sensor " Parameter on the Scantool. While making hazardous gas such as tobacco fumes around the AQS sensor.

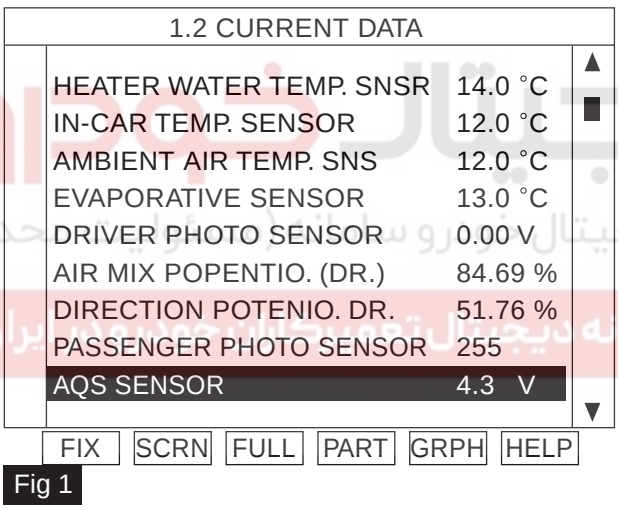


Fig 1

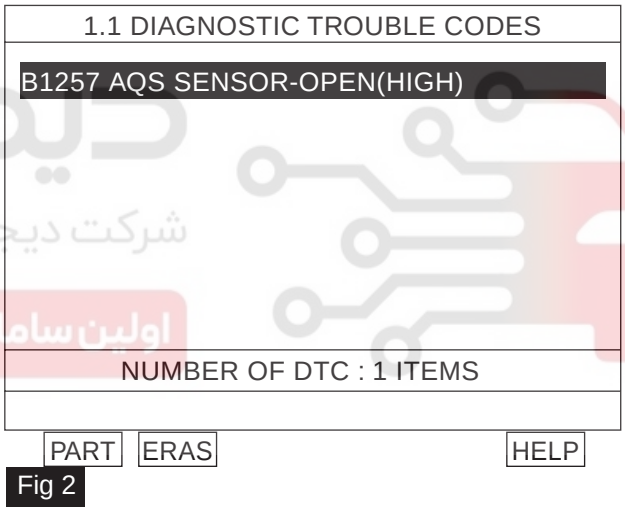


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1257.

EQRE517A

4. Are the DTC B1257 present and is parameter of "AQS SENSOR" fixed?

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION E6A481D0

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 "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION E8C0D6F7

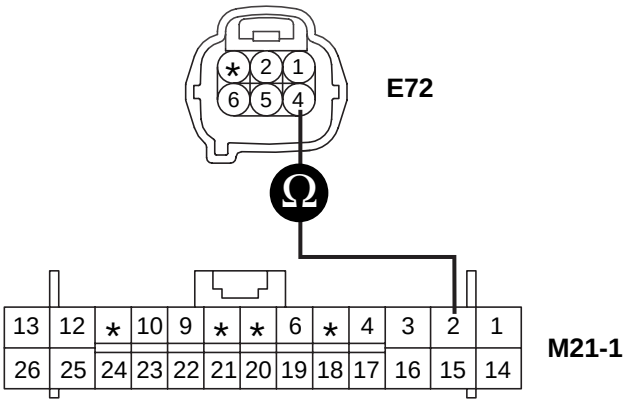
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect AQS sensor.

   3) Measure resistance between terminal "4" of AQS sensor and terminal "2" of A/C Control Unit.

Specification : Approx. 0 Ω



1. Ambient temp. sensor(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE531B

   4) Is the measured resistance within specifications?

   YES

   Go to "Ground circuit Inspection " procedure.

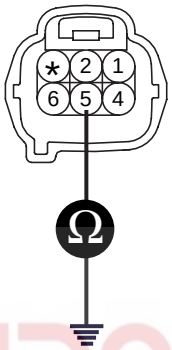
   NO

   Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E8C75C60

1. Check for open in ground harness.
   1) Ignition "OFF"
   2) Disconnect AQS sensor.
   3) Measure resistance between terminal "5" of AQS sensor and chassis ground.

Specification : Approx. 0 Ω



E72

1. Ambient temp. sensor(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE531C

4) Is the measured resistance within specifications?

YES

Go to "Component Inspection " procedure.

NO

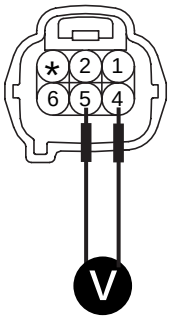
Check for open in ground harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E8D083E3

1. Check AQS sensor.
   1) Engine "ON"
   2) Connect AQS sensor.

3) Measure voltage between terminal "4" and "5" of AQS sensor.

Specification : Refer to the specifications.



E72

1. Ambient temp. sensor(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE530D

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	preheating(35 ± 2sec)
Normal	4.3V ± 0.3V	Intake door : Fresh
Gas detected	0.9V ± 0.3V	Intake door : Recirculation

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

4) Is the measured voltage within specifications?

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 AQS sensor and check for proper operation.
If the problem is corrected, replace AQS sensor and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EE6DFC8A

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

1. Connect scantool and select "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

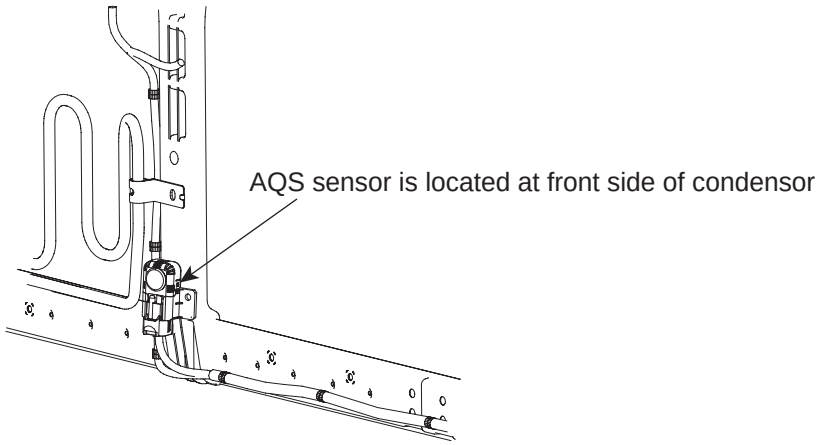
Go to the applicable troubleshooting procedure.

NO

System is performing to specification at this time.

DTC B1258 AQS SENSOR SHORT (LOW)

COMPONENT LOCATION EF99AB04



EQRE530A

GENERAL DESCRIPTION E285B7F4

Refer to DTC B1257.

DTC DESCRIPTION E9E59E1C

The A/C controller sets DTC B1258 if there is a short circuit in AQS sensor signal harness or the measured voltage value of the sensor is less than the threshold value.

DTC DETECTING CONDITION ED51A900

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty AQS Sensor • Fault A/C Control Unit
Threshold value	• < 0.1V	
Detecting time	• 1 sec	
FAIL SAFE	• AQS function OFF • Intake door : return to previous state	

SPECIFICATION EA7C1CBF

Refer to DTC B1257.

MONITOR SCANTOOL DATA E5CD1D31

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "AQS sensor" Parameter on the Scantool. While making hazardous gas such as tobacco fumes around the AQS sensor.

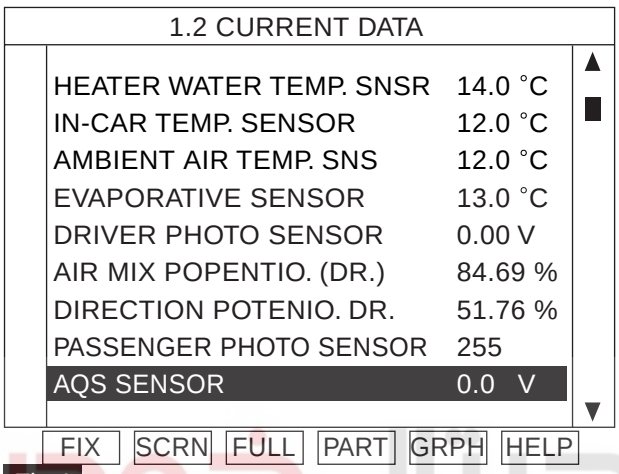


Fig 1

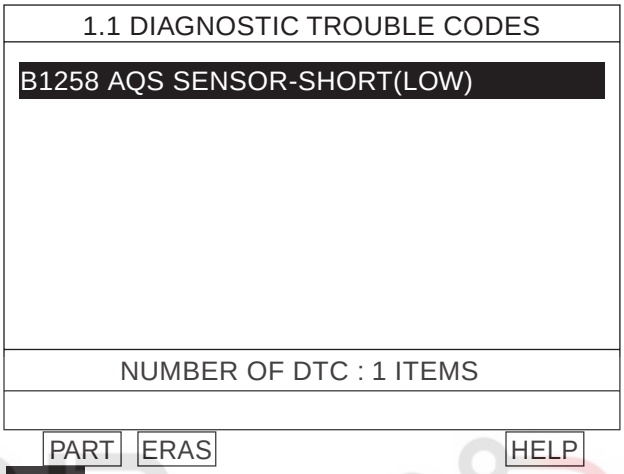


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1258.

EQRE516B

4. Are the DTC B1258 present and is parameter of "AQS SENSOR" fixed?

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C control unit's connector or was repaired and A/C control unit memory was not cleared. Thoroughly 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.

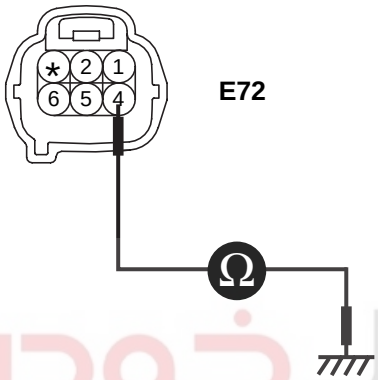
TERMINAL AND CONNECTOR INSPECTION ECEA3EC4

Refer to DTC B1257.

SIGNAL CIRCUIT INSPECTION E5F494FE

1. Check for open in harness.
   1) Ignition "OFF"
   2) Disconnect AQS sensor.
   3) Measure resistance between terminal "4" of AQS sensor and terminal chassis ground.

Specification : Approx. 0 Ω



1. Ambient temp. sensor(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE530C

4) Is the measured resistance within specifications?

YES

Go to "Component inspection" procedure.

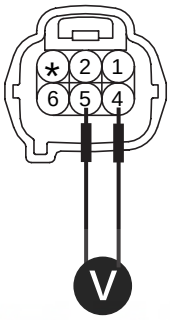
NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E7F9BE24

1. Check AQS sensor.
   1) Engine "ON"
   2) Connect AQS sensor.
   3) Measure voltage between terminal "4" and "5" of AQS sensor.

Specification : Refer the specifications.



E72

1. Ambient temp. sensor(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE530D

Operating condition	Voltage	Note
Right after IGN "ON"	2.5V ± 0.3V	preheating(35 ± 2sec)
Normal	4.3V ± 0.3V	Intake door : Fresh
Gas detected	0.9V ± 0.3V	Intake door : Recirculation

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

4) Is the measured voltage within specifications?

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 AQS sensor and check for proper operation.
If the problem is corrected, replace AQS sensor and then go to "Verification of Vehicle Repair" procedure.

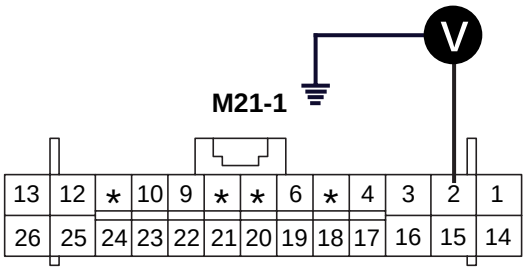
2. Check A/C Control Unit

1) Engine : "ON"

2) Disconnect AQS sensor.

3) Measure voltage between terminal "2" of A/C Control Unit and chassis ground.

Specification :Approx. 5V



2. AQS sensor signal input

EQRE530E

4) Is the measured voltage within specifications?

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

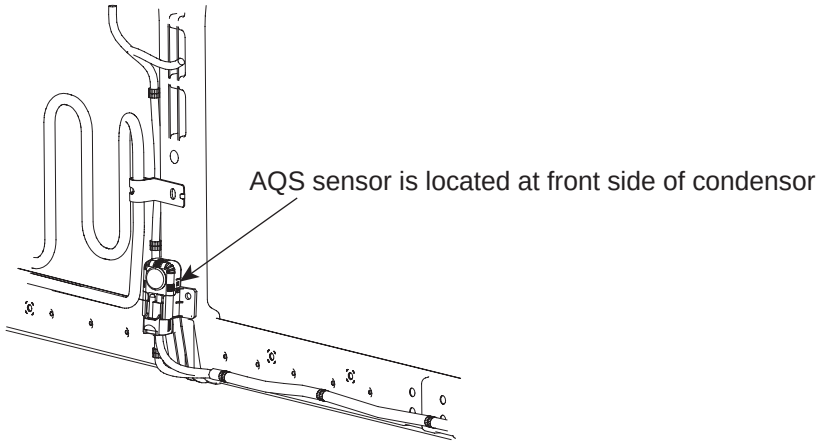
Substitute with a known-good A/C Control Unit and check for proper operation.
If the problem is correcirculationted, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E3C958DB

Refer to DTC B1257.

DTC B1259 AQS SENSOR FAULT

COMPONENT LOCATION EF2ECF5F



EQRE530A

GENERAL DESCRIPTION E5982CAA

Refer to DTC B1257.

DTC DESCRIPTION EC8D3F37

The A/C controller sets DTC B1259 if preheating time of AQS sensor is over 40sec or signal from AQS sensor is not within specifications.

DTC DETECTING CONDITION E0F5DDD5

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage/time check	• Faulty AQS Sensor • Poor connection of connected part
Threshold value	• Voltage : Preheating - 2.5V±0.3V Normal - 4.3V±0.3V Gas detected - 0.9V±0.3V • Preheating time > 40sec	
Detecting time	-	
FAIL SAFE	• AQS function OFF • Intake door : return to previous state	

SPECIFICATION E7DEFC5C

Refer to DTC B1257.

MONITOR SCANTOOL DATA EA39EE35

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the " AQS sensor " Parameter on the Scantool. While making hazardous gas such as tobacco fumes around the AQS sensor.

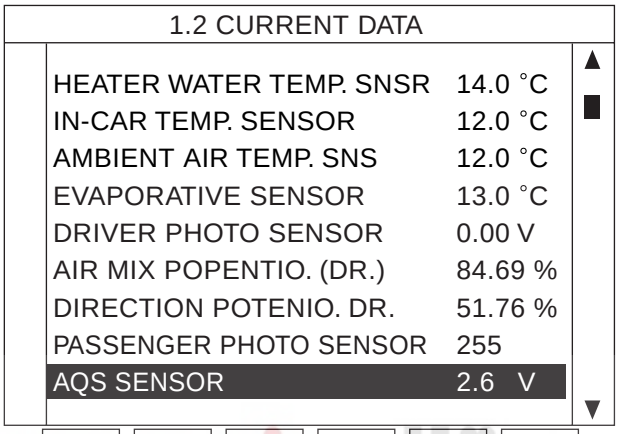


Fig 1

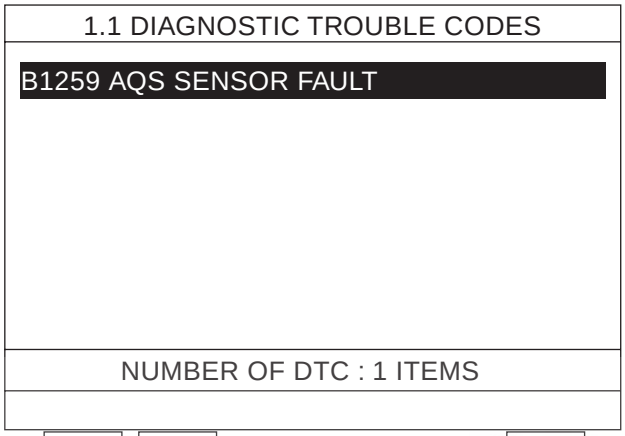


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B1259.

EQRE517B

4. Are the DTC B1259 present and is parameter of "AQS SENSOR" fixed?

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

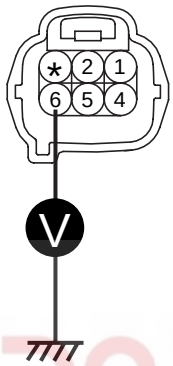
TERMINAL AND CONNECTOR INSPECTION E1BD9DA4

Refer to DTC B1257.

SIGNAL CIRCUIT INSPECTION EEABBB2E

1. Check for open in harness.
   1) Ignition "ON"
   2) Disconnect AQS sensor.
   3) Measure voltage value between terminal "6" of AQS sensor and chassis ground.

Specification : Approx. 12V



1. Ambient temp. sensor(+)
2. Ambient temp. sensor ground
4. AQS signal input
5. AQS ground
6. AQS power

EQRE532C

4) Is the measured resistance within specifications?

YES

Go to "Component inspection " procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E3EE9C85

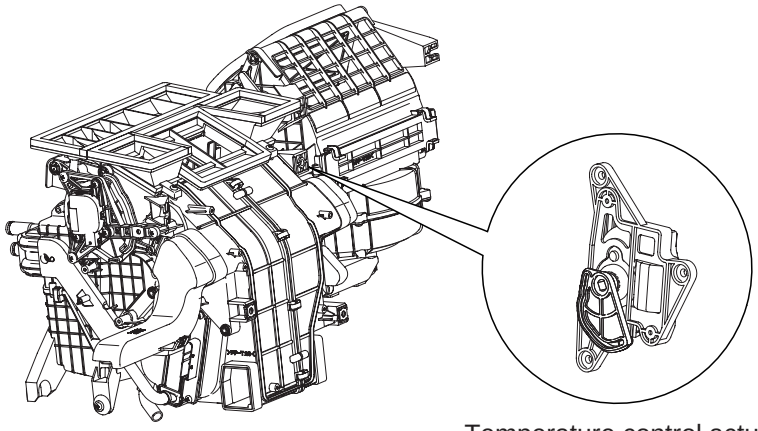
Refer to DTC B1257.

VERIFICATION OF VEHICLE REPAIR E91C2B30

Refer to DTC B1257.

DTC B2406 AIR MIX MOTOR (DRIVER)

COMPONENT LOCATION ECBB4E90



EQRE521A

GENERAL DESCRIPTION E2DE3A74

Temperature control actuator located at heater unit, 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.

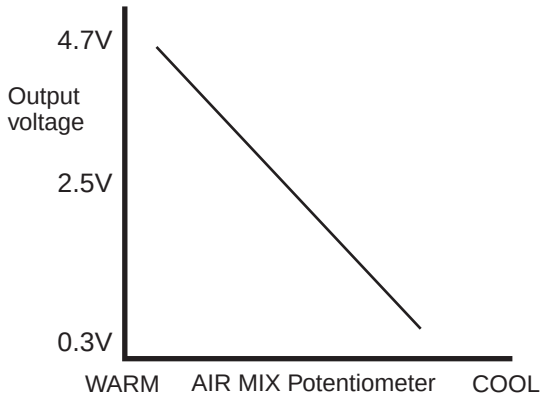
DTC DESCRIPTION E0CFB9E5

The A/C controller sets DTC B2406 if the air mix actuator doesn't move to intended position within 40sec (In this case, A/C controller try to move temp. door for 2sec. 3 times, every 20 sec. before setting DTC).

DTC DETECTING CONDITION E400FA99

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in harness • Short circuit in harness • Faulty driver Air Mix potentiometer • Fault A/C Control Unit
Threshold value	• < 0.1V	
Detecting time	• 0.3 sec	
FAIL SAFE	-	

SPECIFICATION ED34A19E



LQIE521B

MONITOR SCANTOOL DATA ECD1E58C

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "Driver Air Mix Potentiometer" Parameter on the Scantool while operating temp. switch.

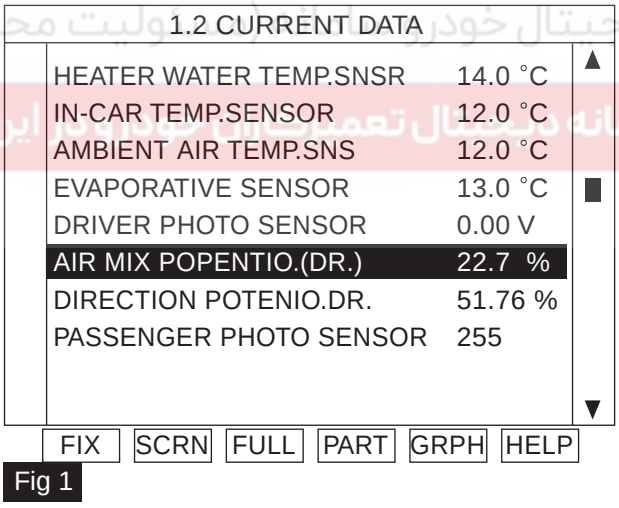


Fig 1

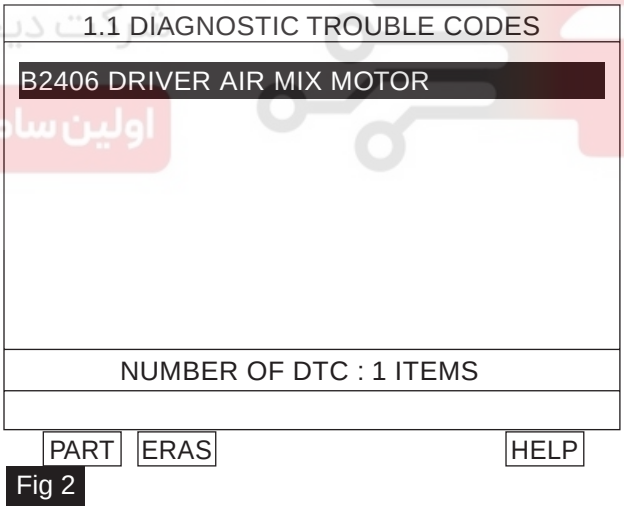


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B2406.

EQRE525A

4. Are the DTC B2406 present and is parameter of "Driver AIR MIX Potentiometer" fixed?
※ There is any fault in Driver AIR MIX Motor. If the parameter of "Driver AIR MIX DOOR" is 30% or less when the actuator operates to the hot position, or If the parameter is 60% and more when the actuator operates to the cold position.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

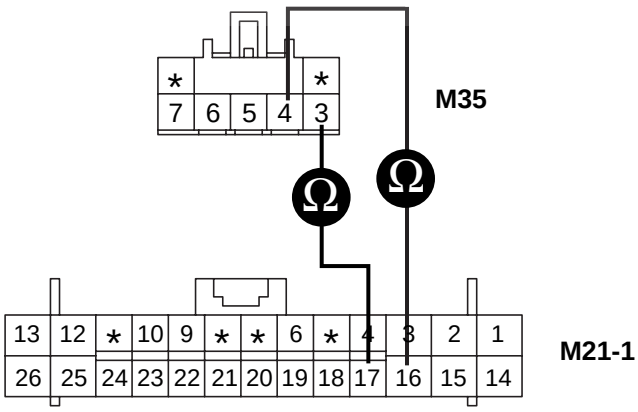
TERMINAL AND CONNECTOR INSPECTION E1EB2FE3

Refer to DTC 1245.

SIGNAL CIRCUIT INSPECTION ECD850DF

1. Check for open in harness.
   1) Ignition "OFF"
   2) Disconnect Driver Air Mix potentiometer.
   3) Measure resistance between terminal "3,4" of Driver Air Mix Motor and terminal "16,17" of A/C control unit.

Specification : Approx. 0 Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE525B

   4) Is the measured resistance within specifications?

YES

Go to "Check for short to ground in harness" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

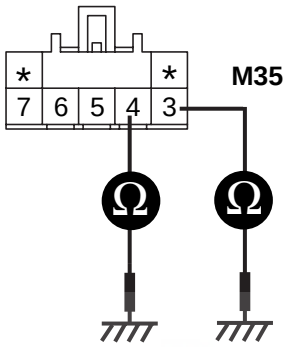
2. Check for short to ground in harness.

   1) Ignition "OFF"

   2) Disconnect Driver Air Mix Actuator.

   3) Measure resistance between terminal "3,4" of Driver Air Mix Motor and chassis ground.

Specification : Approx. ∞ Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE525C

4) Is the measured resistance within specifications?

YES

Go to "Visual/Physical Inspection " procedure.

NO

Check for short to ground in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

VISUAL/PHYSICAL INSPECTION EFEA33B3

1. Check actuator.
   ※ Check if Driver Air Mix Actuator works properly through ACTUATION TEST.

   1) Ignition : ON

   2) Connect Scantool and select " ACTUATION TEST" mode and press [F1]

1.3 ACTUATION TEST	
DRIVER AIR MIX DOOR - DRIVE 50%	
DURATION	UNTIL STOP KEY
METHOD	ACTIVATION
CONDITION	IG. KEY ON ENGINE RUNNING
PRESS [STRT], IF YOU ARE READY!	
STRT STOP	

Fig 3

Fig 3 : Selecting "ACTUATION TEST" mode.

LQIE525D

   3) Does Driver Air Mix Actuator work properly?

YES

Go to "Component Inspection" procedure.

NO

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.

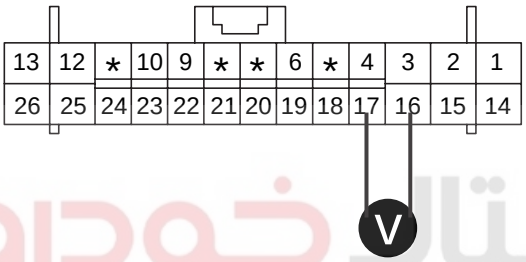
COMPONENT INSPECTION E4D92E5E

Refer to DTC 1245.

1. Check A/C Control Unit.
   1) Engine "ON"
   2) Connect A/C Control Unit.
   3) Measure voltage between terminal "16" and "17" of A/C Control Unit while operating the temp. switch.

Specification :Approx. 12V

M21-1



16. Motor
17. Motor

EQRE525E

4) Is the measured voltage within specifications?

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

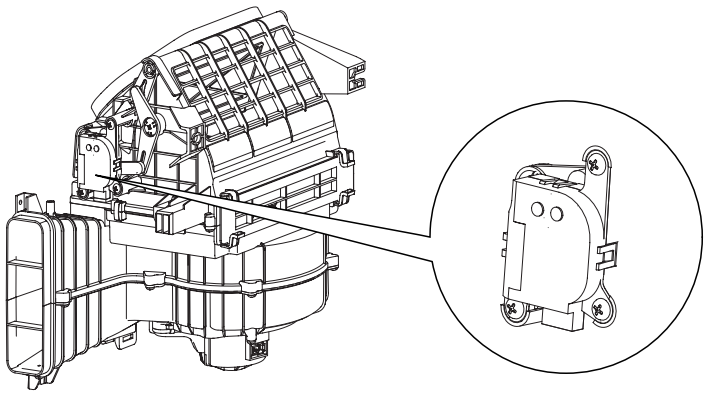
Substitute with a known-good A/C Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EFF2F0F2

Refer to DTC 1245.

DTC B2408 INTAKE MOTOR

COMPONENT LOCATION EFF31BF2



Intake door actuator

EQRE527A

GENERAL DESCRIPTION E503DC6D

Refer to DTC B1208.

DTC DESCRIPTION EE8CEE70

The A/C controller sets DTC B2408 if the intake motor Doesn't move to intended position within 40sec(The A/C controller attempts to move the intake door for a 2 second duration at a freshquency of 3 times every 20 seconds before storing a DTC.)

DTC DETECTING CONDITION EFF3BBBC

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in harness • Short circuit in harness • Faulty Intake potentiometer
Threshold value	• < 0.1V	
Detecting time	• 0.3 sec	
FAIL SAFE	-	

SPECIFICATION EF1DA0CF

Refer to DTC B1208.

MONITOR SCANTOOL DATA E00AF4A4

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "Intake Potentiometer" Parameter on the Scantool while operating Intake switch.

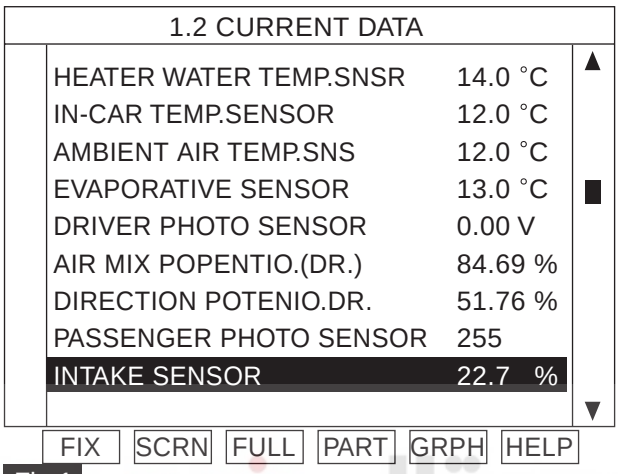


Fig 1

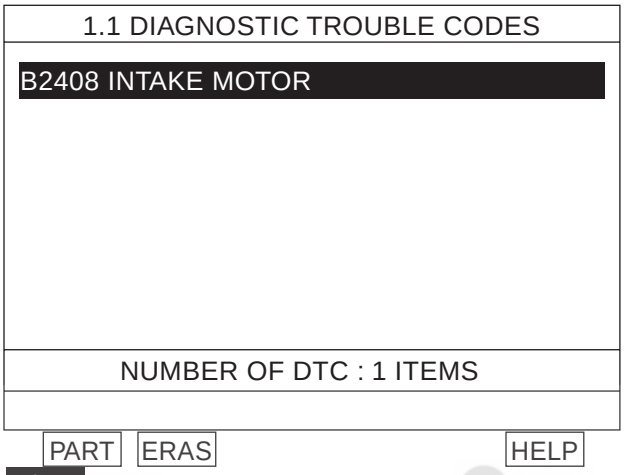


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B2408.

EQRE529A

4. Are the DTC B2408 present and is parameter of "Intake Potentiometer" fixed?
※ There is any fault in Intake potentiometer. If the parameter of "Intake potentiometer" is 30% or less when the actuator operates to the fresh position, or If the parameter is 60% and more when the actuator operates to the recirculation position.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION EDB5AEA3

Refer to DTC B1208.

SIGNAL CIRCUIT INSPECTION ECEDEF6D

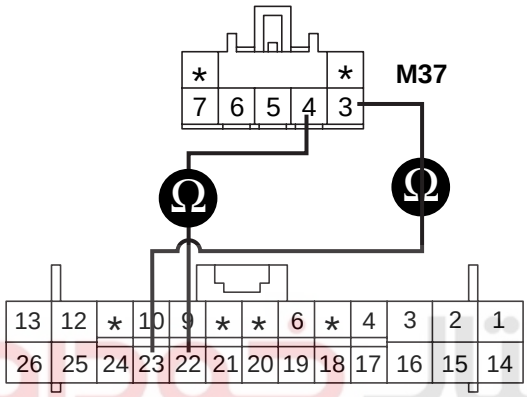
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect Intake potentiometer.

   3) Measure resistance between terminal "3,4" of Intake potentiometer and terminal "22,23" of A/C control unit.

Specification : Approx. 0 Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE529B

4) Is the measured resistance within specifications?

YES

Go to "Check for short to ground in harness" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

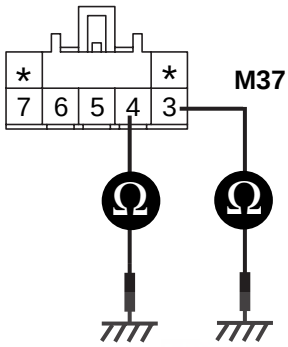
2. Check for short to ground in harness.

   1) Ignition "OFF"

   2) Disconnect Driver Air Mix Actuator.

   3) Measure resistance between terminal "3,4" of Driver Air Mix Motor and chassis ground.

Specification : Approx. ∞ Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE529C

4) Is the measured resistance within specifications?

YES

Go to "Visual/Physical Inspection " procedure.

NO

Check for short to ground in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

VISUAL/PHYSICAL INSPECTION EE5FB3CA

1. Check actuator.
   ※ Check if Driver Air Mix Actuator works properly through ACTUATION TEST.

   1) Ignition : ON

   2) Connect Scantool and select " ACTUATION TEST" mode and press [F1]

1.3 ACTUATION TEST	
DRIVER AIR OUTLET MODE - DRIVE FOOT	
DURATION	UNTIL STOP KEY
METHOD	ACTIVATION
CONDITION	IG. KEY ON ENGINE RUNNING
PRESS [STRT], IF YOU ARE READY!	
STRT STOP	

Fig 3

Fig 3 : Selecting "ACTUATION TEST" mode.

EQRE525D

   3) Does Intake Actuator work properly?

YES

Go to "Component Inspection" procedure.

NO

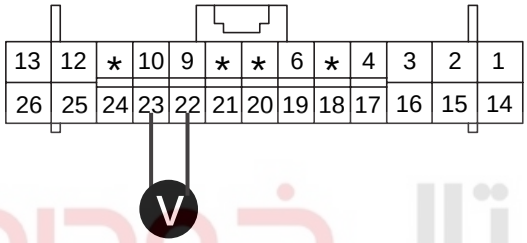
Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E7F85ECE

Refer to DTC 1208.

1. Check A/C Control Unit.
   1) Engine "ON"
   2) Connect A/C Control Unit.
   3) Measure voltage between terminal "22" and "23" of A/C Control Unit while operating the Intake switch.

Specification :Approx. 12V



M21-1

22. Motor
23. Motor

EQRE529E

4) Is the measured voltage within specifications?

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

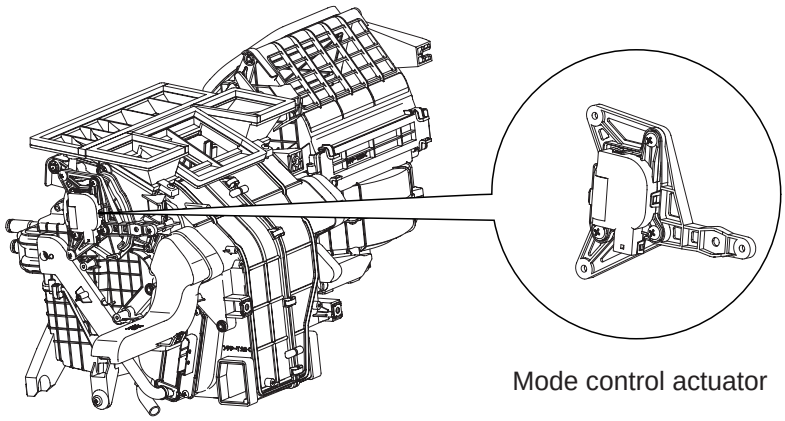
Substitute with a known-good A/C Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E8AA7A2F

Refer to DTC B1208.

DTC B2409 DIRECTION CONTROL MOTOR (DRIVER)

COMPONENT LOCATION E6C9B607



EQRE523A

GENERAL DESCRIPTION E3CC5BAF

Refer to DTC B1249.

DTC DESCRIPTION EA1E1C6E

The A/C controller sets DTC B2409 if the direction motor doesn't move to intended position within 40sec(In this case, A/C controller try to move mode door for 2sec. 3 times, every 20 sec. before setting DTC).

DTC DETECTING CONDITION ED5DDB3A

Item	Detecting Condition	Possible cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in harness • Short circuit in harness • Faulty driver direction potentiometer • Fault A/C Control Unit.
Threshold value	• < 0.1V	
Detecting time	• 0.3 sec	
FAIL SAFE	-	

SPECIFICATION E7A5F0BC

Refer to DTC B1249.

MONITOR SCANTOOL DATA ED43EEEF

1. Connect scantool to Data Link Connector(DLC).
2. Engine "ON"
3. Monitor the "DR DIRECTION POTENTIO" parameter on the scantool while operating mode switch.

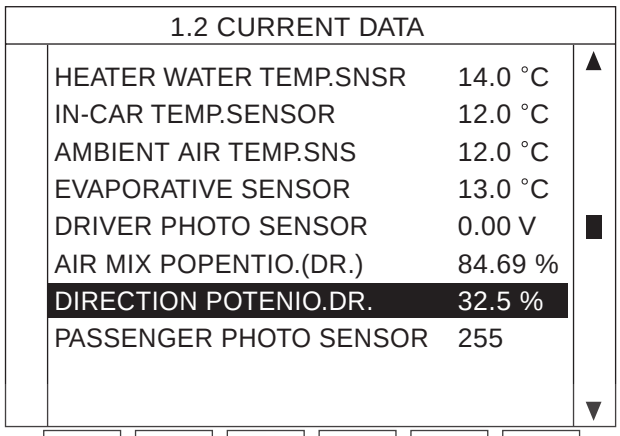


Fig 1

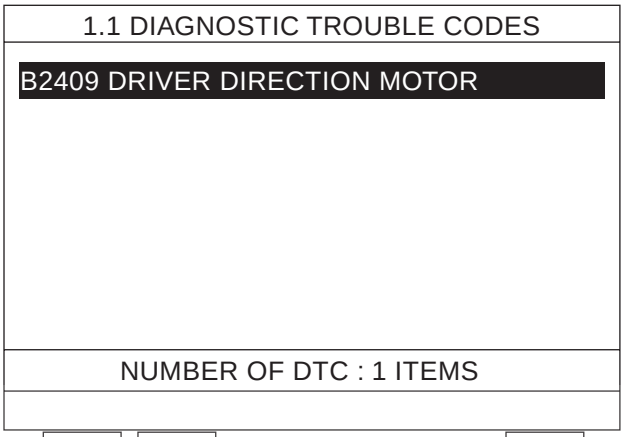


Fig 2

Fig 1 : The current data in abnormal state.
Fig 2 : DTC B2409.

LQIE526A

4. Are the DTC B2409 present and is parameter of "Driver DIRECTION POTENTIO." fixed?
※ There is any fault in Driver Direction Motor. If the parameter of "Driver DIRECTION POTENTIO." is 10% or less on "VENT" mode, or If the parameter is 90% or more on "DEF" mode.

YES

Go to "Inspection" procedure.

NO

Fault is intermittent caused by poor contact in the sensor's and/or A/C controller's connector or was repaired and A/C controller memory was not cleared. Thoroughly 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.

TERMINAL AND CONNECTOR INSPECTION ECFE3D11

Refer to DTC B1249.

SIGNAL CIRCUIT INSPECTION EB9D13E3

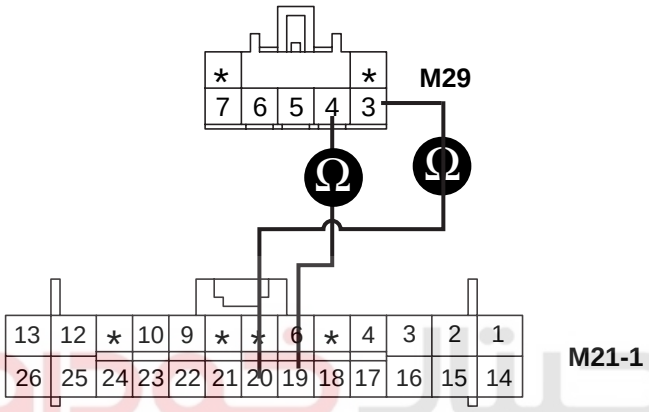
1. Check for open in harness.

   1) Ignition "OFF"

   2) Disconnect Driver mode Actuator.

   3) Measure resistance between terminal "3,4" of Driver Direction Motor and terminal "19,20" of A/C control unit.

Specification : Approx. 0 Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE526B

4) Is the measured resistance within specifications?

YES

Go to "Check for short to ground in harness" procedure.

NO

Check for open in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

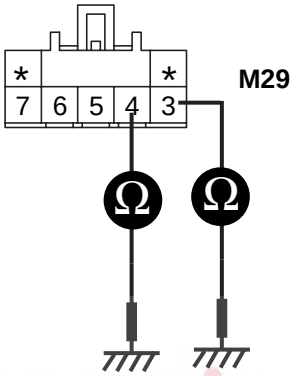
2. Check for short to ground in harness.

   1) Ignition "OFF"

   2) Disconnect Driver mode Actuator.

   3) Measure resistance between terminal "3,4" of Driver Direction Motor and chassis ground.

Specification : Approx. ∞ Ω



3. Motor
4. Motor
5. Potentiometer ground
6. Potentiometer signal
7. Sensor reference voltage(+5V)

EQRE526C

4) Is the measured resistance within specifications?

YES

Go to "Visual/Physical Inspection " procedure.

NO

Check for short to ground in signal harness. Repair as necessary and go to "Verification of Vehicle Repair" procedure.

VISUAL/PHYSICAL INSPECTION EFC8F9FF

1. Check actuator.
   ※ Check if Driver Direction Actuator works properly through ACTUATION TEST.

   1) Ignition : ON

   2) Connect Scantool and select " ACTUATION TEST" mode and press [F1]

1.3 ACTUATION TEST	
DRIVER AIR OUTLET MODE-DRIVE FOOT	
DURATION	UNTIL STOP KEY
METHOD	ACTIVATION
CONDITION	IG. KEY ON ENGINE RUNNING
PRESS [STRT], IF YOU ARE READY!	
STRT STOP	

Fig 3

Fig 3 : Selecting "ACTUATION TEST" mode.

LQIE526D

   3) Does Driver Direction Actuator work properly?

YES

Go to "Component Inspection" procedure.

NO

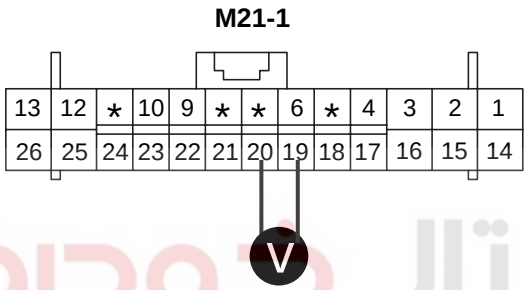
Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E1F3DB22

Refer to DTC 1249.

1. Check A/C Control Unit.
   1) Engine : "ON"
   2) Connect A/C Control Unit.
   3) Measure voltage between terminal "19" and "20" of A/C Control Unit while operating the mode switch.

Specification :Approx. 12V



19 : Motor
20 : Motor

EQRE526H

4) Is the measured voltage within specifications?

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 Control Unit and check for proper operation.
If the problem is corrected, replace A/C Control Unit and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E0EF14BE

Refer to DTC B1249.