GENERAL

SPECIFICATION EC9792A5

AIR CONDITIONER

Item		Specification		
		D engine	β engine	δ engine
Compressor	Type	10PA17C (Swash plate)	10PA15C (Swash plate)	10PA17C (Swash plate)
	Oil type & Capacity	ND-OIL8 (PAG), 200 ~ 215cc	ND-OIL8 (PAG), 120 ~ 135cc	ND-OIL8 (PAG), 200 ~ 215cc
	Pulley type	6PK-TYPE	4PK-TYPE	6PK-TYPE
	Displacement	177.7cc/rev	155.3cc/rev	177.7cc/rev
Condenser	Heat rejection	13,500 ± 5% kcal/hr		
Triple switch	High [psi(kg/cm²)]	ON : 370 ± 2.8 (26.0 ± 0.2) OFF : 455 ± 2.8 (32.0 ± 0.2)		
	Low ([psi(kg/cm²)]	ON : 28.6 ~ 36.3 (2.00 ~ 2.55) OFF : 28.4 ± 2.8 (2.0 ± 0.2)		
	Medium [psi(kg/cm²)]	ON : 220 ± 11.4 (15.5 ± 0.8) OFF : 164 ± 17.1 (11.5 ± 1.2)		
Expansion valve	Type	Block		
Refrigerant	Type	R-134a		
	Capacity [oz.(g)]	18.0 ± 0.88 (510 ± 25)		

BLOWER UNIT

Item		Specification
Fresh and recirculation	Operating method	Actuator
Blower	Type	Sirocco
	Speed step	Auto + 8 speed (Automatic), 4 speed (Manual)
	Speed control	Power mosfet
Air filter	Type	Particle filter

HEATER AND EVAPORATOR UNIT

Item		Specification
Heater	Type	Pin & Tube type
	Heating capacity	4,500 ± 5% kcal/hr
	PTC heater capacity	900W +5%/-10%
	Mode operating method	Actuator
	Temperature operating method	Actuator
Evaporator	Temperature control type	Evaporator temperature sensor
	A/C ON/OFF [°C(°F)]	OFF : 0.5 ± 0.5(32.9 ± 32.9), ON : 2.5 ± 0.5(36.5 ± 32.9)

TROUBLESHOOTING E8E8AFE5

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.

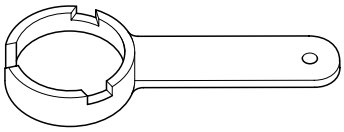
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.
After correcting the malfunction, check the complete system to ensure that performance is satisfactory.

STANDARD :

Symptom	Suspect Area	See page
No blower operation	1. Blower fuse	-
	2. Blower relay	HA - 69
	3. Blower motor	HA - 67
	4. Power mosfet	HA - 71
	5. Blower speed control switch	HA - 76, 83
	6. Wire harness	-
No air temperature control	1. Engine coolant capacity	-
	2. Heater control assembly	HA - 76, 83
No compressor operation	1. Refrigerant capacity	HA - 3
	2. A/C Fuse	-
	3. Magnetic clutch	HA - 26
	4. Compressor	HA - 24
	5. Triple pressure switch	HA - 32
	6. A/C switch	-
	7. Evaporator temperature sensor	HA - 36
	8. Wire harness	-
No cool comes out	1. Refrigerant capacity	HA - 3
	2. Refrigerant pressure	HA - 3, 14
	3. Drive belt	HA - 22
	4. Magnetic clutch	HA - 26
	5. Compressor	HA - 24
	6. Triple pressure switch	HA - 32
	7. Evaporator temperature sensor	HA - 36
	8. A/C switch	-
	9. Heater control assembly	HA - 76, 83
	10. Wire harness	-

Symptom	Suspect Area	See page
Insufficient cooling	1. Refrigerant capacity	HA - 3
	2. Drive belt	HA - 22
	3. Magnetic clutch	HA - 26
	4. Compressor	HA - 24
	5. Condenser	HA - 29
	6. Expansion valve	HA - 55
	7. Evaporator	HA - 53
	8. Refrigerant lines	HA - 34
	9. Triple pressure switch	HA - 32
	10. Heater control assembly	HA - 76, 83
No engine idle-up when A/C switch ON	1. Engine ECU	-
	2. Wire harness	-
No air inlet control	1. Heater control assembly	HA - 76, 83
No mode control	1. Heater control assembly	HA - 76, 83
	2. Mode actuator	HA - 62
No cooling fan operation	1. Cooling fan fuse	-
	2. Fan motor	-
	3. Engine ECU	-
	4. Wire harness	-

SPECIAL TOOLS E8CAB81A

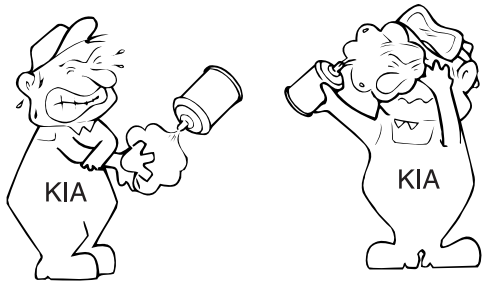
Tool (Number and name)	Illustration	Use
09977-29000 Pressure plate bolt remover	 EQA9002A	Removal and installation of pressure plate

AIR CONDITIONING SYSTEM

INSTRUCTIONS EDF4213E

WHEN HANDLING REFRIGERANT

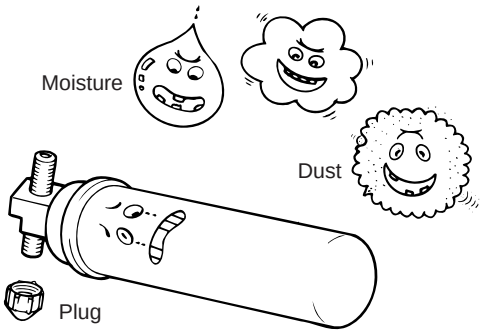
1. R-134a liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands. If the refrigerant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



LQAC003A

WHEN REPLACING PARTS ON A/C SYSTEM

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

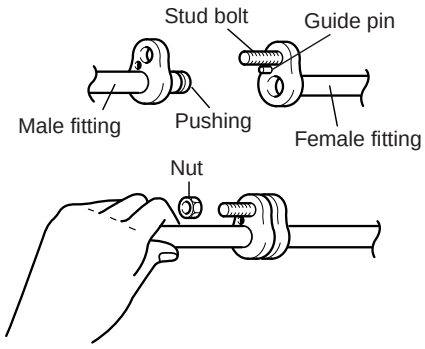


LQAC003B

WHEN INSTALLING CONNECTING PARTS

FLANGE WITH GUIDE PIN

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



LQAC003C

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

NOTE

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

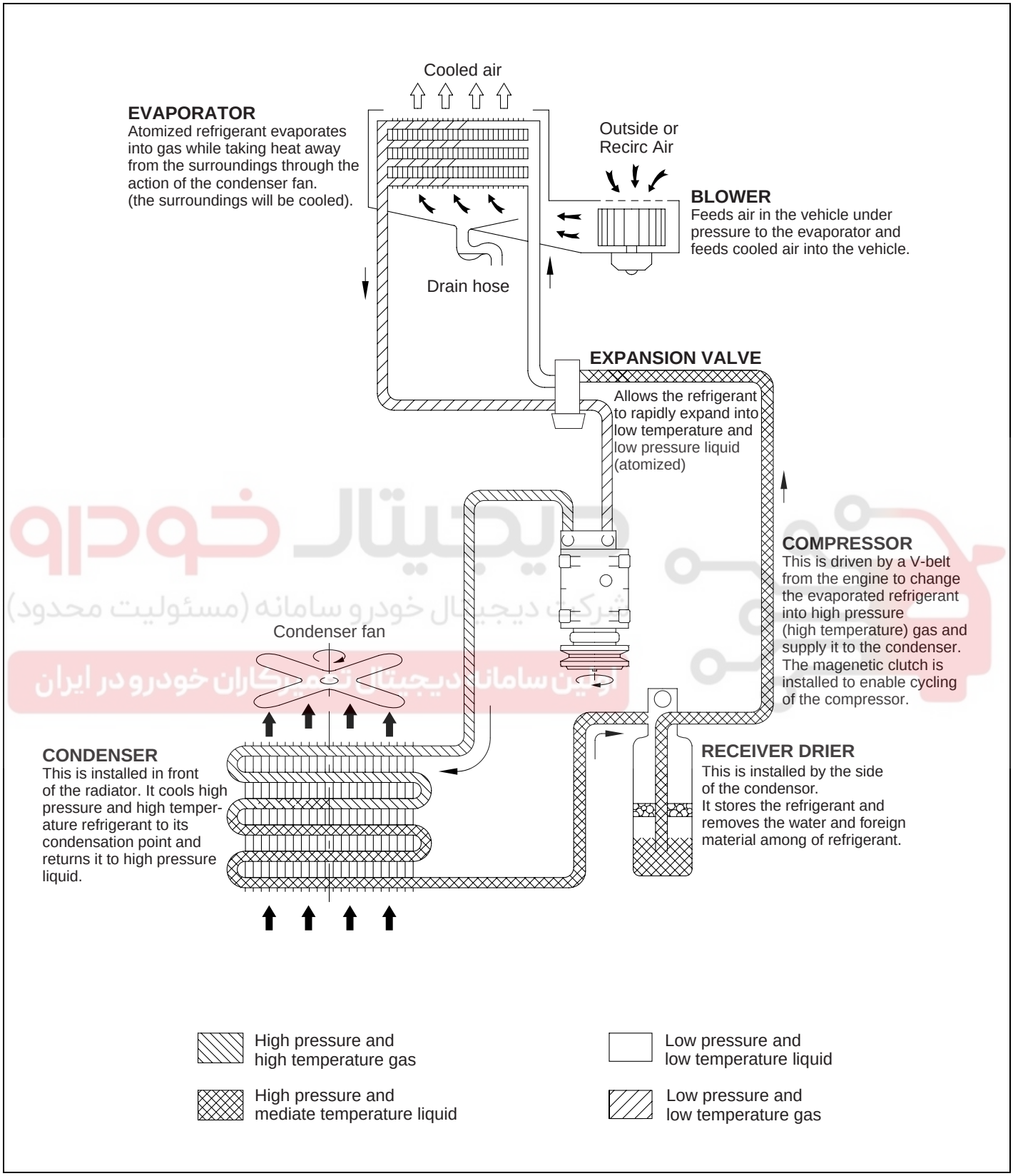
HANDLING TUBING AND FITTINGS

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 EFF7F053



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REFRIGERANT SYSTEM SERVICE BASICS ED457031

REFRIGERANT RECOVERY

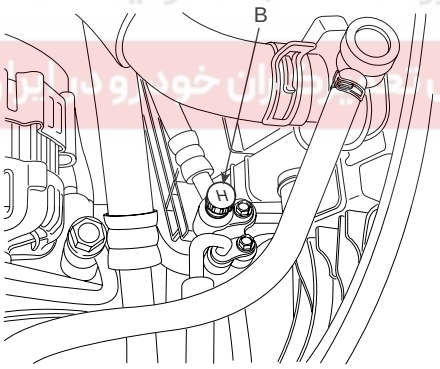
Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

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



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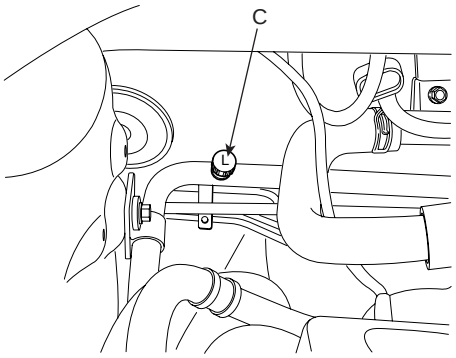

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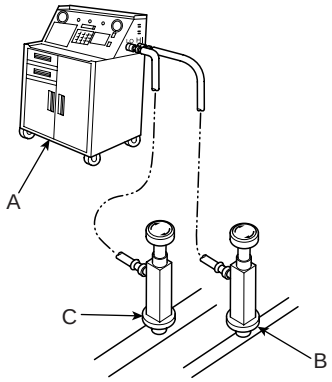


EQKE004A

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

SYSTEM EVACUATION

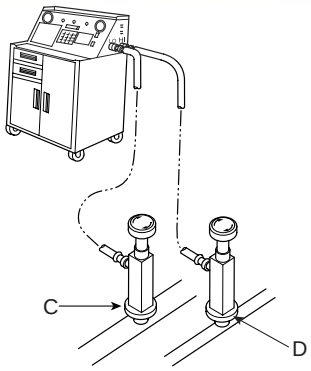
Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

CAUTION

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

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

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a 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 a 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.



AQGE011E

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

SYSTEM CHARGING

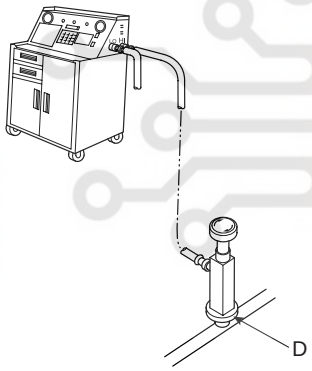
Use only service equipment that is U.L-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

CAUTION

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

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

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



LQIF011F

2. Add the same amount of new refrigerant oil to system that was removed during recovery. Use only Specified refrigerant oil. Charge the system with 18.0 ± 0.88 oz. (510 ± 25g) of R-134a refrigerant. Do not overcharge the system the compressor will be damaged.

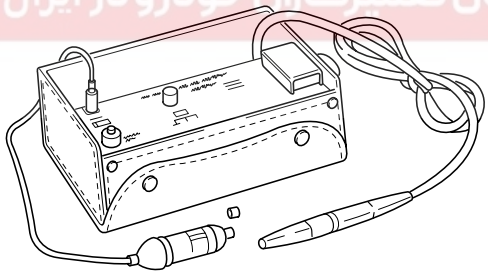
REFRIGERANT LEAK TEST E04389C6

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

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

If a gas leak is detected, proceed as follows:

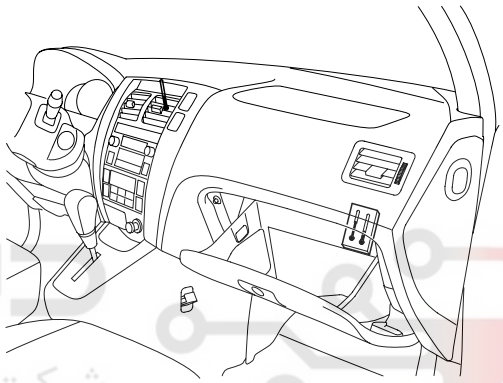
1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces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



LQAC013A

A/C SYSTEM PERFORMANCE TESTS

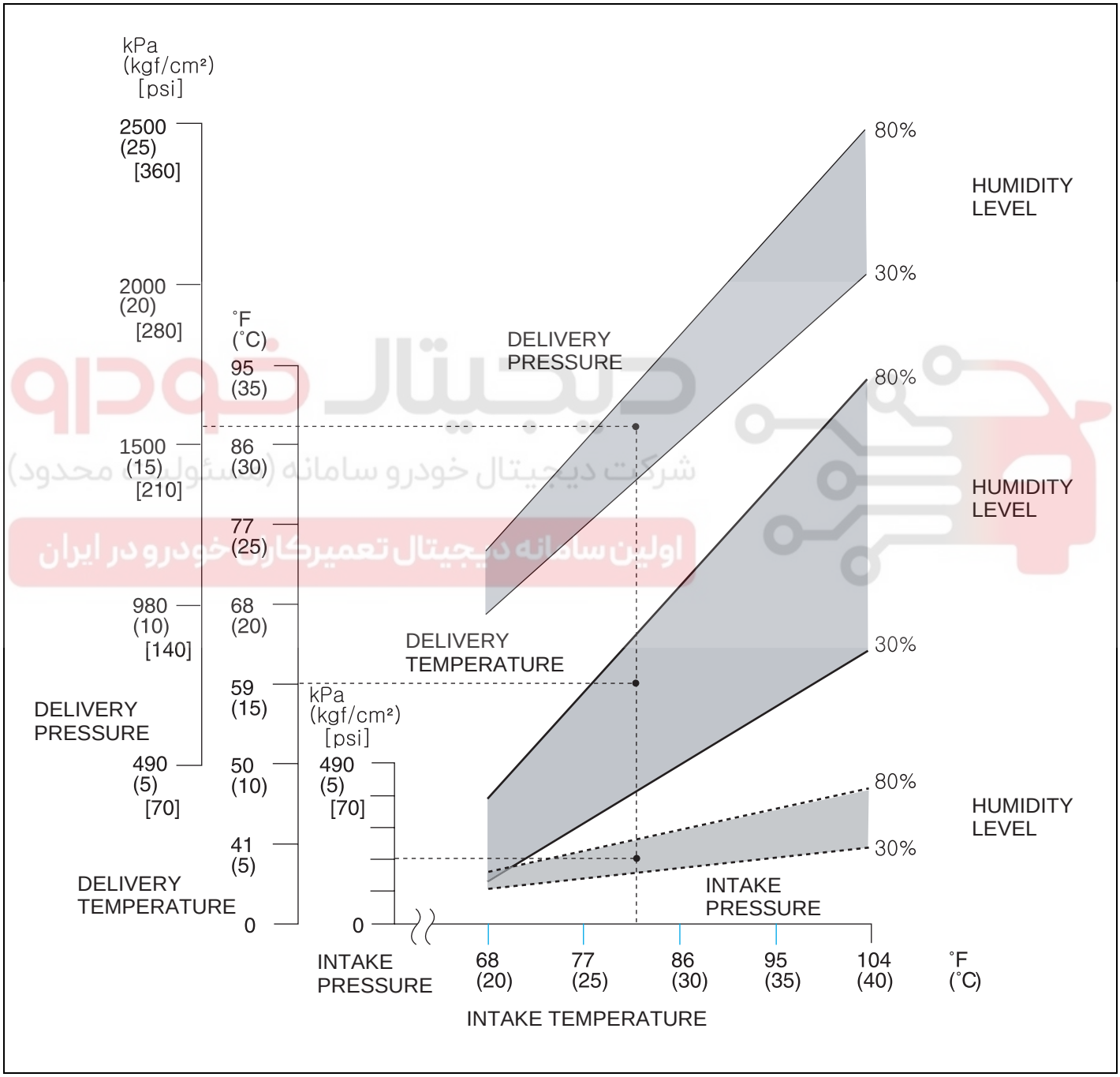
1. Connect a R-134a refrigerant. Recovery/Recycling/Charging System to the high-pressure service port as shown, following the equipment manufacturer's instructions.
2. Determine the relative humidity and air temperature.
3. Remove the glove box stopper and tension code and let the glove box hang down.
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 E54804DF

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

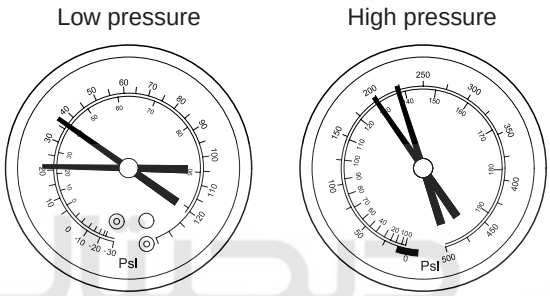
- Temperature at the air inlet with the switch set at recirculation is 30~35°C (86~95°F).
- Engine running at 1,500rpm.
- Blower speed control knob on "4" position.
- Temperature control knob on "COOL" position.

NOTE

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

1. Normally functioning refrigeration system.
Gauge reading :

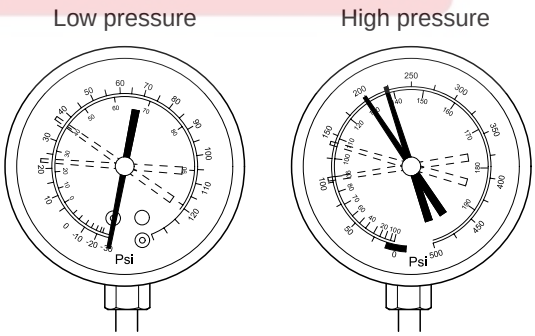
Low pressure side : 0.15~0.25MPa (1.5~2.5 kg/cm^2, 21.8~36.3psi)
High pressure side : 1.37~1.57MPa (14~16 kg/cm^2, 200~228psi)



EQEE006A

2. Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

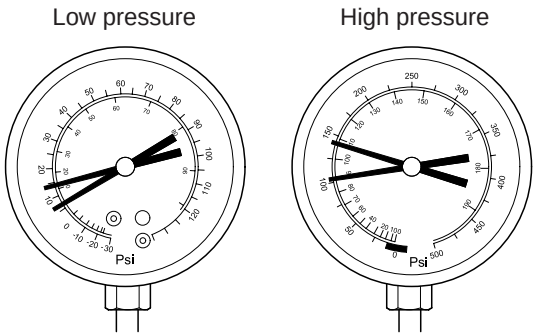


EQKE006B

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 air - Charge proper amount of new refrigerant

3. Insufficient cooling

Condition : Insufficient cooling

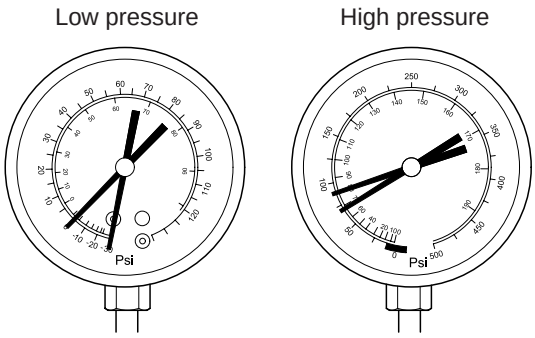


EQKE006C

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 - Charge proper amount of refrigerant - 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

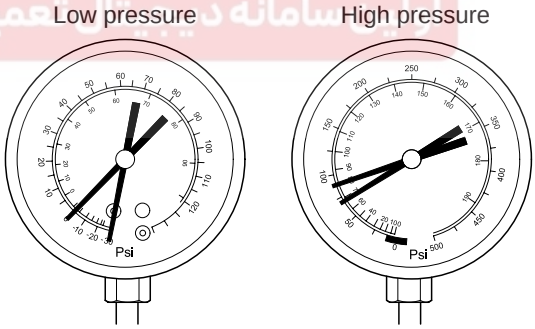


EQKE006D

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)

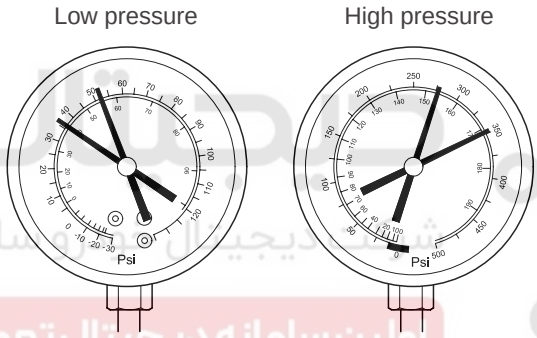


EQKE006E

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 air and charge new refrigerant to proper amount - For gas leakage from expansion valve, replace expansion valve

6. Refrigerant overcharged or insufficient cooling of condenser

Condition : Insufficient cooling

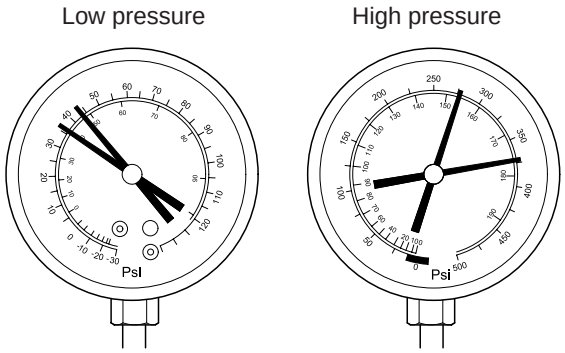


EQKE006F

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 refrigerantCharge proper amount of refrigerant

7. Air present in refrigeration system

Condition : Insufficient cooling

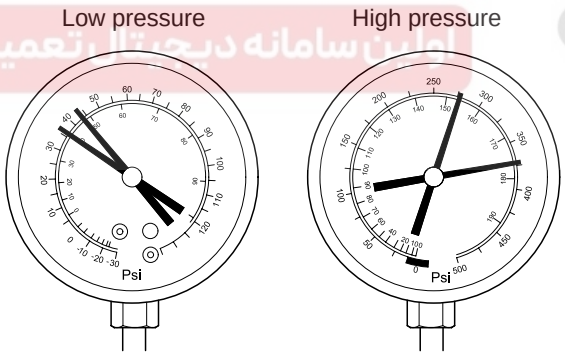


EQKE006G

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 air and charge new refrigerant

8. Expansion valve functions improperly

Condition : Insufficient cooling



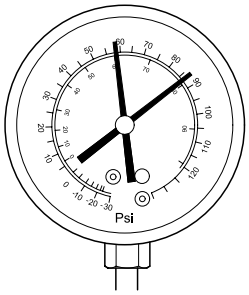
EQKE006G

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

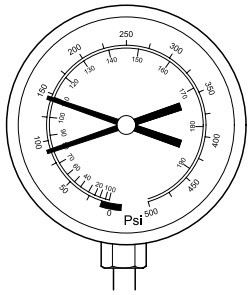
9. Defective compression compressor

Condition : Does not cool

Low pressure



High pressure

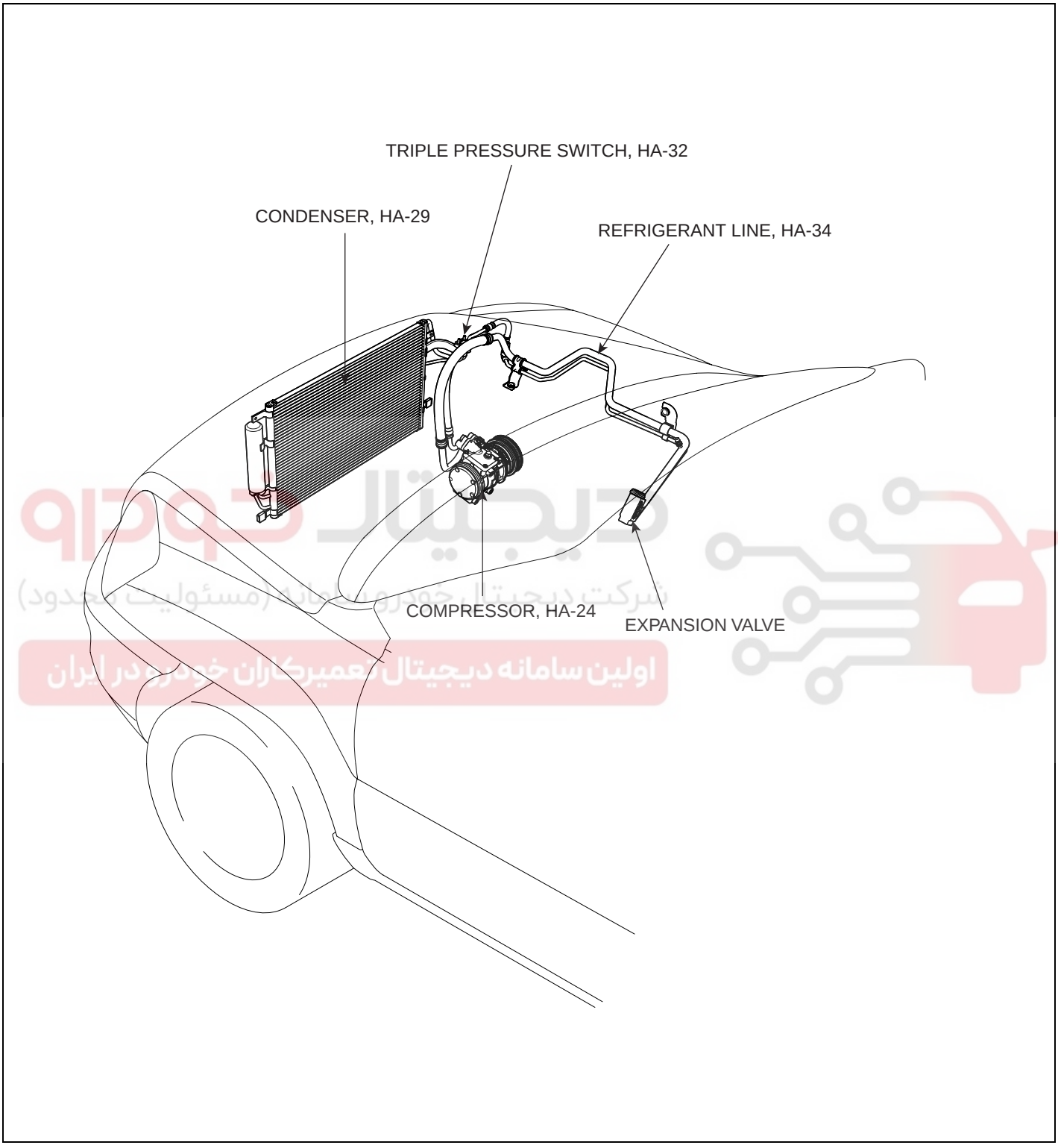


EQKE006H

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

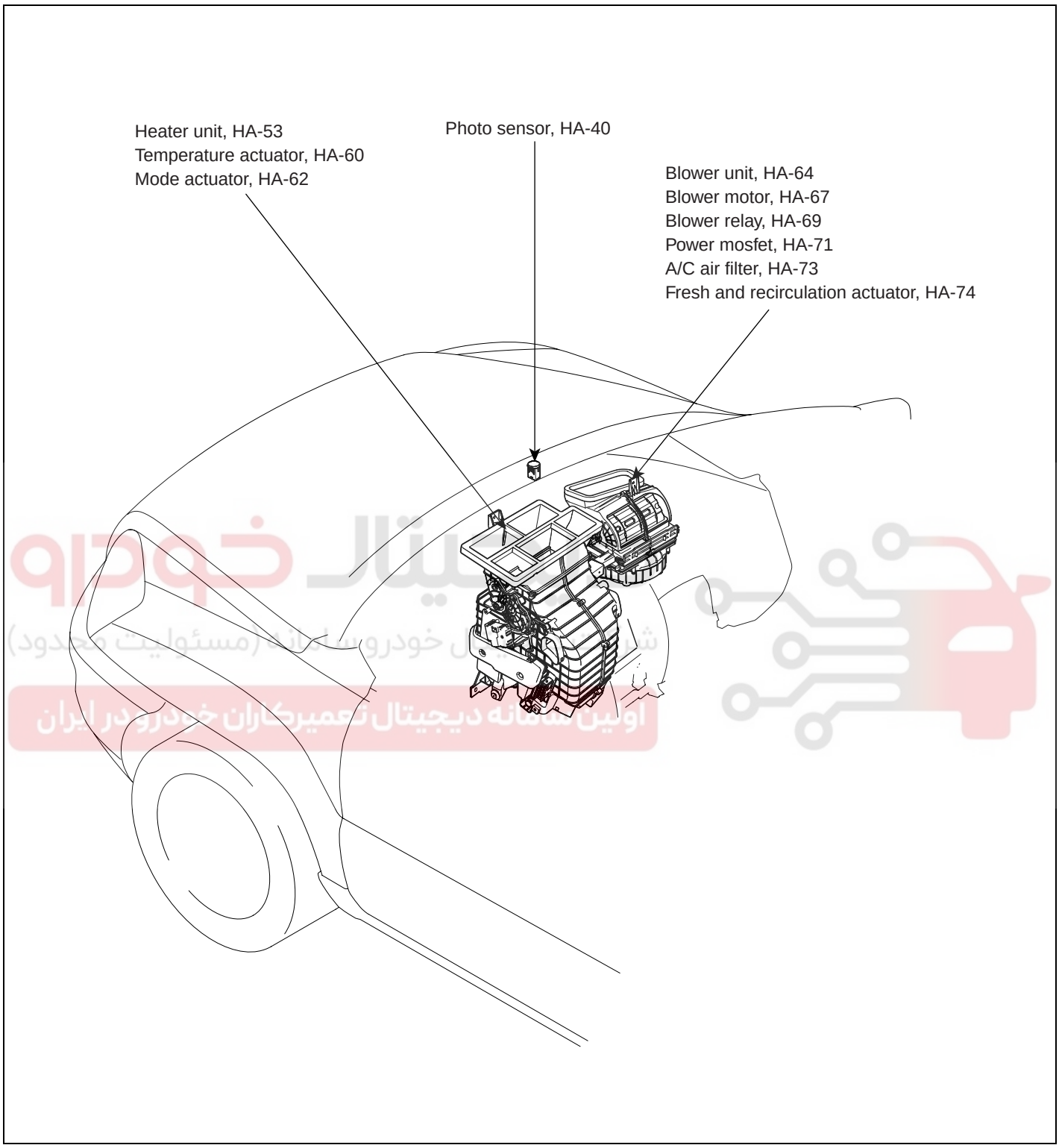
COMPONENT LOCATION INDEX E6FD39C5

ENGINE ROOM



LQIF001A

INTERIOR



LQIF001B

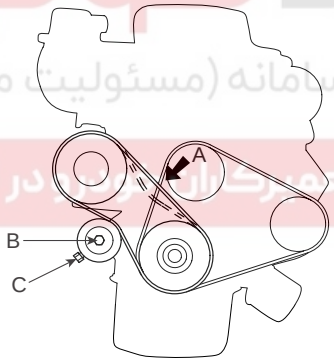
DRIVE BELT

INSPECTION E8E1E17A

1. Only Beta engine. Compressor shall be operated once or twice a month even in seasons air conditioning is not required, and compressor belt tension shall be adjusted from time to time.

2. Apply a force of 98N(10kgf, 22lbf), and measure the deflection at the mid point (A) between the air condition compressor and crankshaft pulley.

Item	Capacity (when 10kg (22 lb) load applied)	Tension
New belt	5 ~ 5.5 mm (0.197 ~ 0.217 in.)	65 ± 5 kg (143 ± 11 lb)
Used belt	6 ~ 7 mm (0.236 ~ 0.276 in.)	36 ± 5 kg (79 ± 11 lb)
Check after operation	8 mm (0.315 in.)	25 ~ 50 kg (55 ~ 110 lb)



EQKE005A

NOTE

These items when adjusting belt tension :

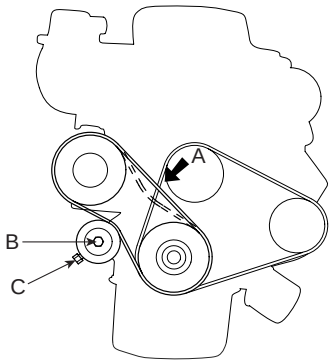
- If there are cracks or any damage evident on the belt, replace it with a new one.
- "Used belt" means a belt which has been used for five minutes or more.
- "New belt" means a belt which has been used for less than five minutes.

ADJUSTMENT EB5614FD

1. Loosen the tension mounting bolt(B).

2. Turn the adjusting bolt(C) to obtain the proper belt tension, then retighten the mounting bolt(B).

3. Recheck the deflection of the A/C compressor belt.



EQKE005A

NOTE

Do not adjustment the drive belt of Diesel engine. Diesel and Delta engine refer to the engine group.

COMPRESSOR OIL

OIL SPECIFICATION E0B4BAD8

- The HFC-134a system requires a 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 :
120~135cc (4.05~4.56 fl.oz) - β engine
200~215cc (6.76~7.27 fl.oz) - D engine, δ engine

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 oz.)
Condenser	30 cc (1.02 oz.)
Receiver/dryer	30 cc (1.02 oz.)
Refrigerant line (One piece)	10 cc (0.34 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.

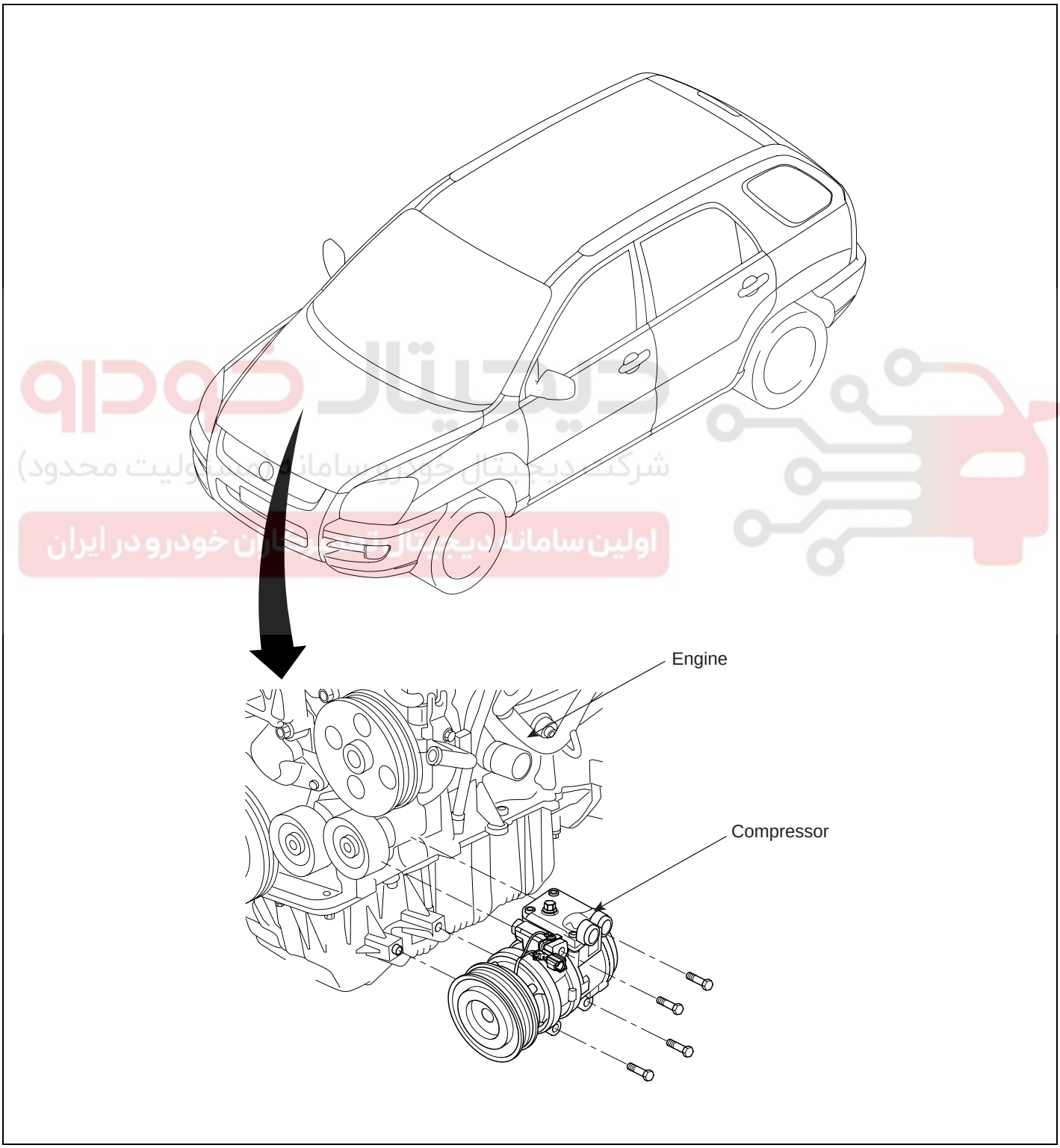
NOTE

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

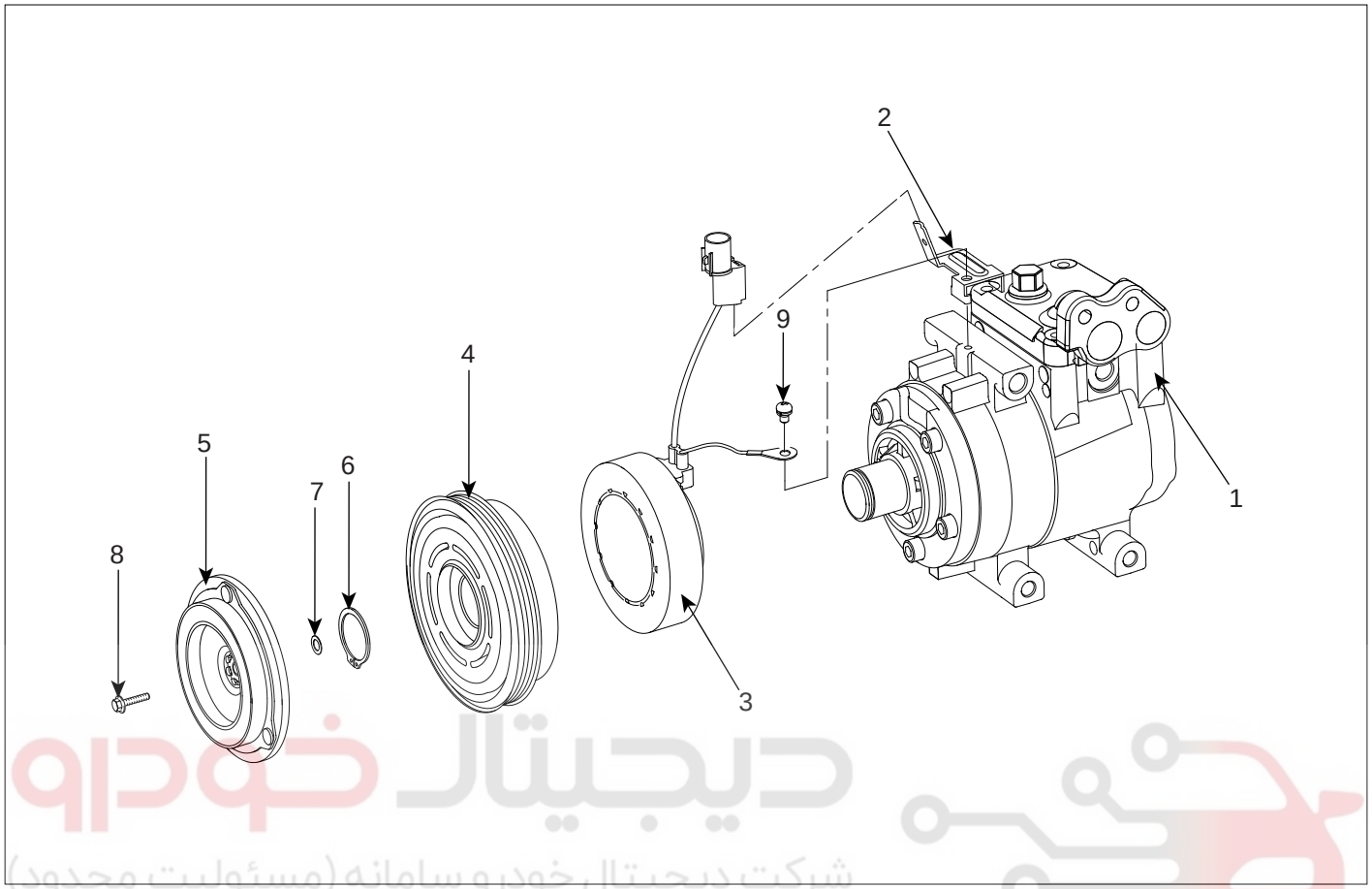
A/C COMPRESSOR CONTROLS (MANUAL)

COMPRESSOR

COMPONENT EEBFB35A



LQIF105A

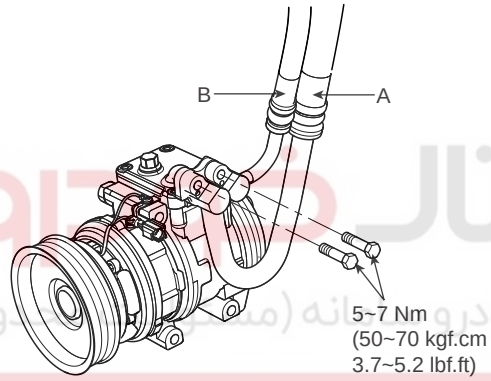


1. Compressor assembly
2. Connector bracket
3. Field coil
4. Pulley
5. Disc & hub
6. Retainer ring
7. Shim
8. Bolt
9. Screw

LQIF105B

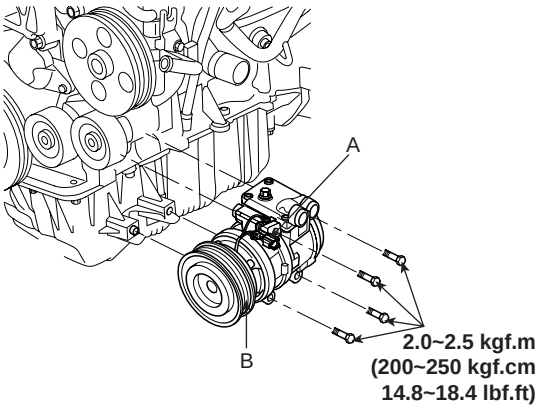
REMOVAL E84A6C68

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 (See page HA-10).
4. Loosen the drive belt (See page HA-22).
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.



LQIF105C

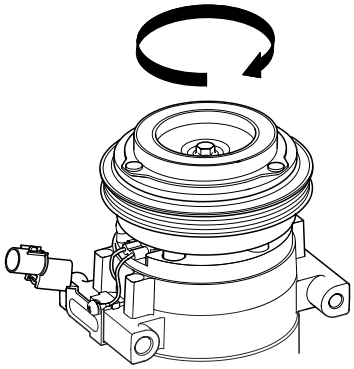
6. Disconnect the compressor clutch connector (A), then remove the mounting bolts and the compressor (B).



LQIF105D

INSPECTION E240C02D

1. Check the plated parts of the pressure plate 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.



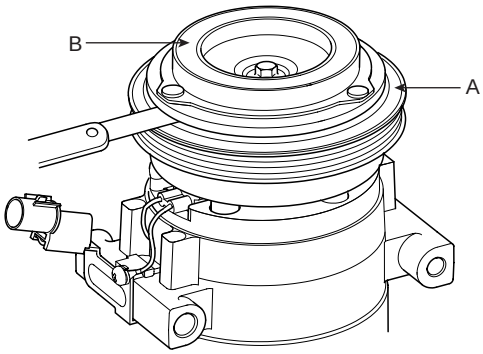
AQIE106A

3. Measure the clearance between the pulley (A) and the pressure plate (B) all the way around. If the clearance is not within specified limits, remove the pressure plate (See page HA-28) and add or remove shims as needed to increase or decrease clearance.

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

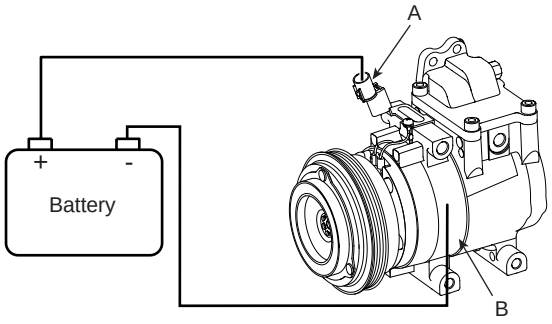
NOTE

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



AQIE106B

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.

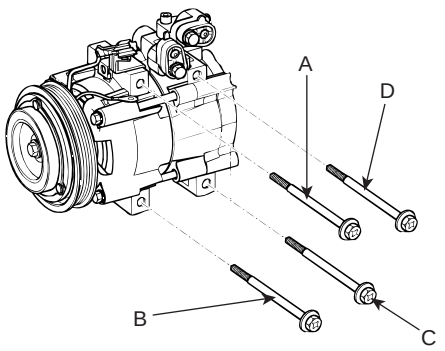


AQIE106C

INSTALLATION E1ADCD3B

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

Bolt	D Engine	β Engine	δ Engine
A	118mm (4.65in.)	118mm (4.65in.)	118mm (4.65in.)
B	118mm (4.65in.)	102mm (4.02in.)	118mm (4.65in.)
C	102mm (4.02in.)	102mm (4.02in.)	118mm (4.65in.)
D	94mm (3.70in.)	126mm (4.96in.)	94mm (3.70in.)

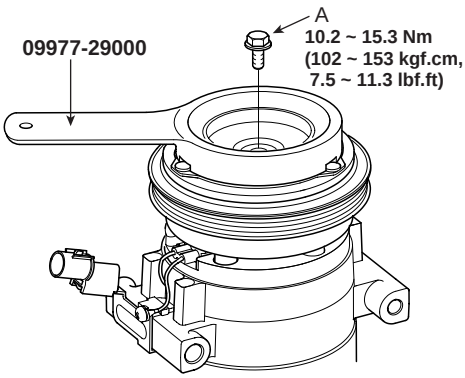


AQGE105D

2. Install in the reverse order of removal, and note these items.
   - If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume, Subtract the volume of drained oil from 120cc(4.20 oz.) the result is the amount of oil you should drain from the new compressor (through the suction fitting).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container and seal it to avoid moisture absorption.
   - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
   - Adjust the drive belt (See page HA-22).
   - Charge the system and test its performance.

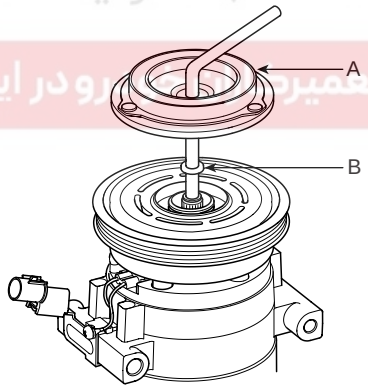
DISASSEMBLY EE9EB9D6

1. Remove the center bolt (A) while holding the pressure plate with a commercially available pressure plate bolt remover; Special tool number 09977-29000.



AQIE106D

2. Remove the pressure plate (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 pressure plate, and recheck its clearance (See page HA-26).

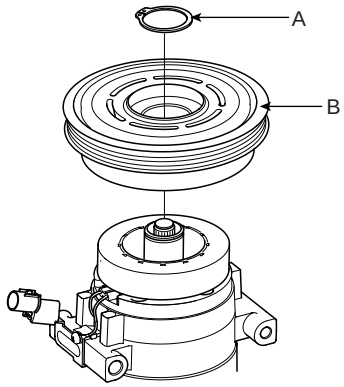


AQIE106E

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

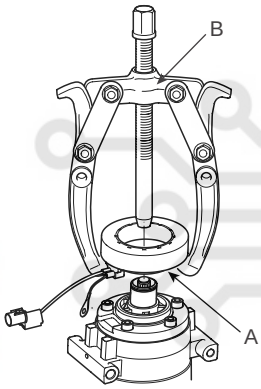
NOTE

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



AQIE106F

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

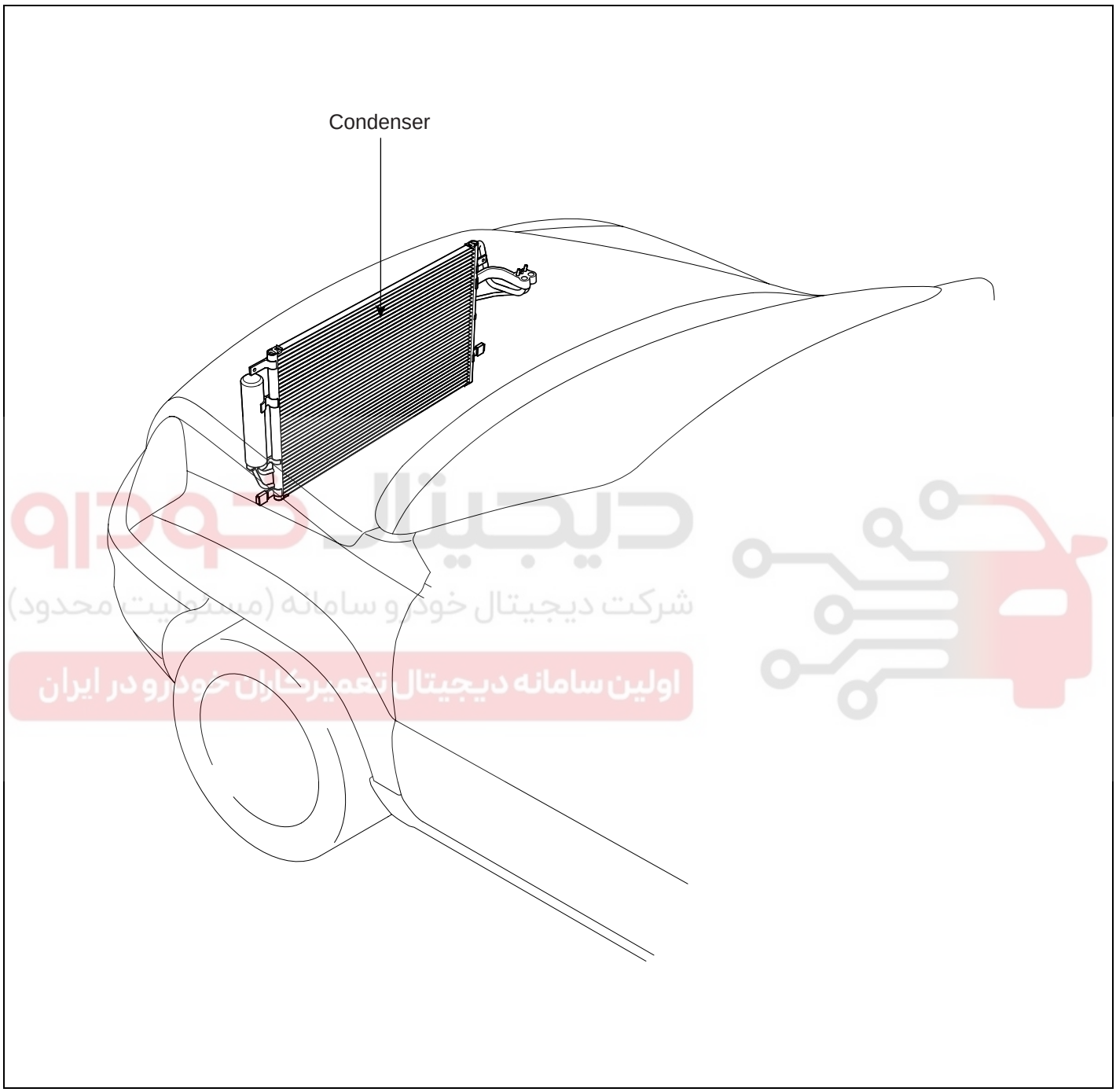


AQIE106G

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 snap rings, and make sure they are fully seated in the groove.
   - Make sure that the pulley turns smoothly after it's reassembled.

CONDENSER

COMPONENT EF64CAD7



LQIF108A

INSPECTION E94EE44A

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.

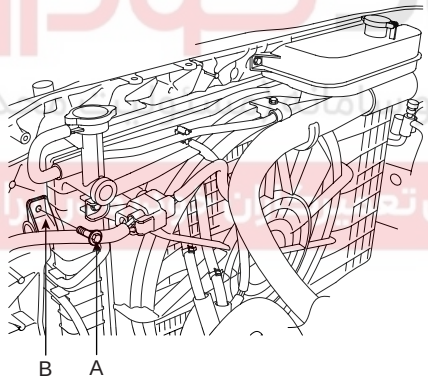
REPLACEMENT E711D129

1. Recover the refrigerant with a recovery/recycling/charging station (See page HA-10).

2. Remove the coolant reservoir, but do not disconnect the reservoir hose from the coolant reservoir and the radiator (δ Engine).

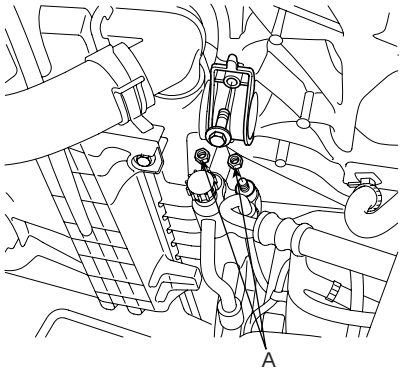
3. Remove the battery (D Engine).

4. Remove the bolt(A), then remove the radiator bracket(B) from the radiator.



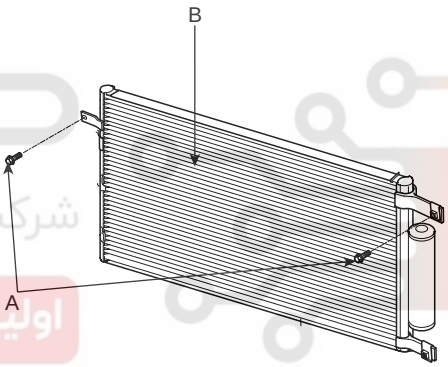
AQIE108B

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.



AQIE108C

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.



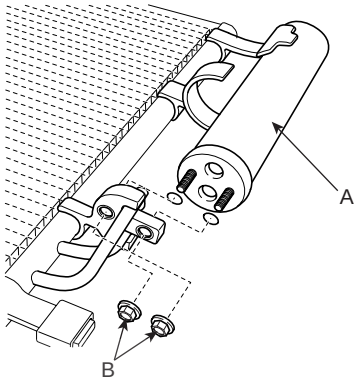
AQIE108D

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

RECEIVER／DRIER

REPLACEMENT EB14CAC0

1. Remove the condenser, and then remove the receiver/drier after loosening the nuts (B) at the lower receiver/drier (A).

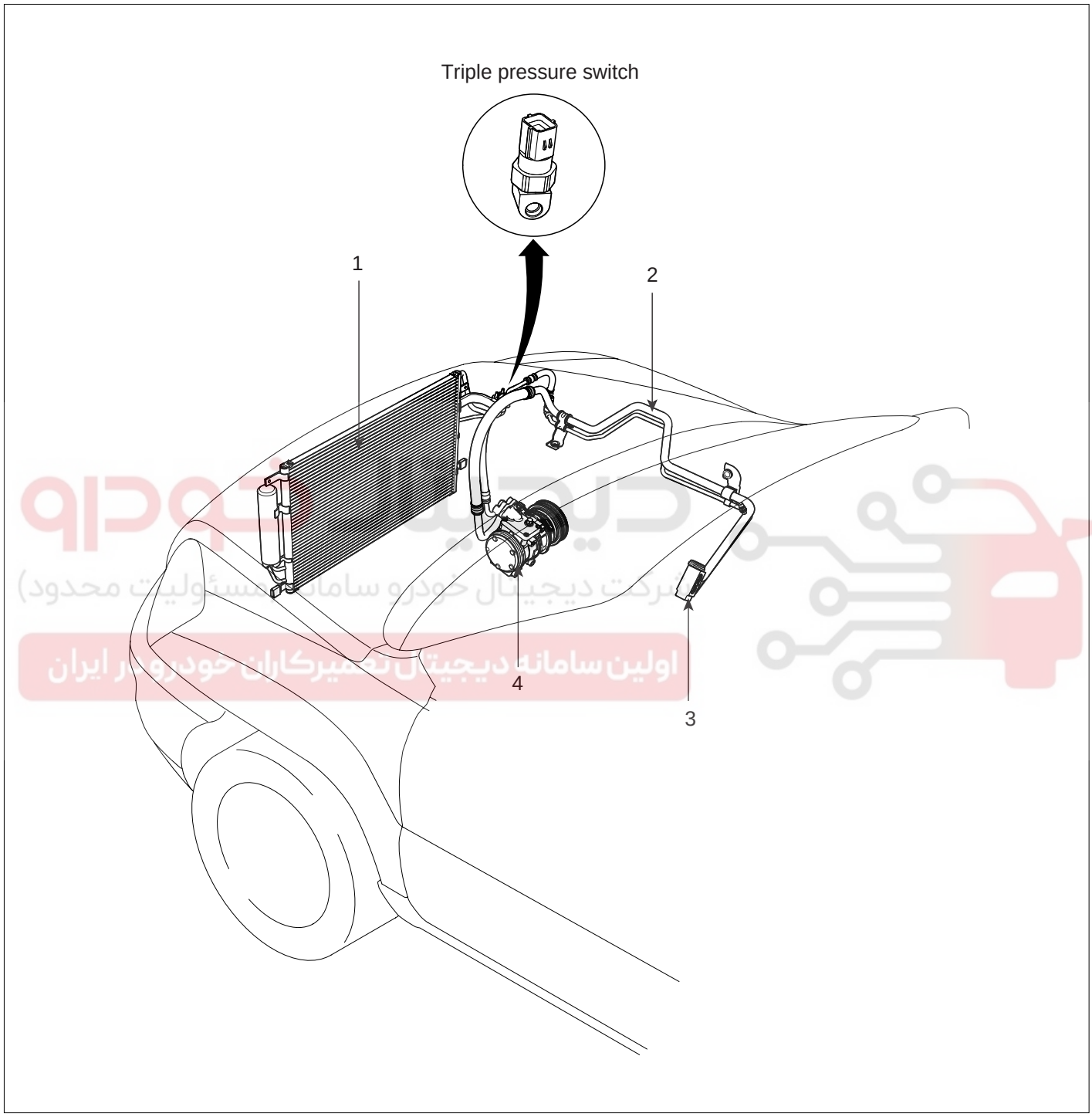


AQIE100A

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

TRIPLE PRESSURE SWITCH

COMPONENT E016D450

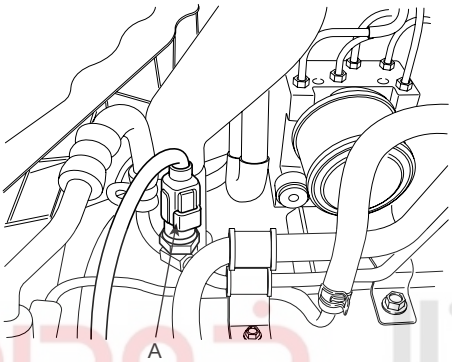


1. Condenser
2. Refrigerant line
3. Expansion valve
4. Compressor

LQIF101B

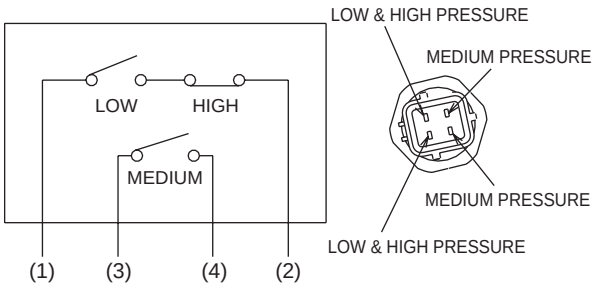
DESCRIPTION EB65DD76

The triple switch is a combination of a medium switch as well as conventional low pressure and high pressure switches. The low pressure switch will be turned off to stop compressor operation if refrigerant pressure is low. The high pressure switch will be turned off to stop compressor operation if refrigerant pressure is too high. The medium switch will be turned on at medium level pressure to cool the A/C system operating radiator fan and condenser fan at high speed.



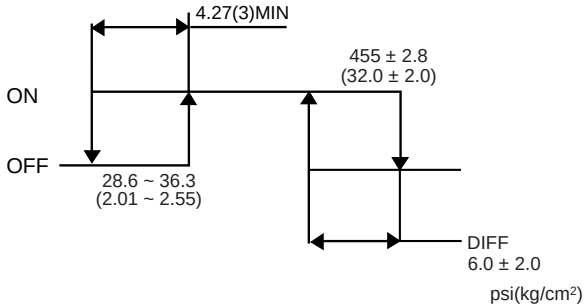
AQIE101A

Pressure	ON	OFF
High [psi (kg/cm²)]	370 ± 2.8 (26.0 ± 2.0)	455 ± 2.8 (32.0 ± 2.0)
Low [psi (kg/cm²)]	28.6 ~ 36.3 (2.01 ~ 2.55)	28.4 ± 2.8 (2.0 ± 0.2)
Medium [psi (kg/cm²)]	220 ± 11.4 (15.5 ± 0.8)	164 ± 17.1 (11.5 ± 1.2)



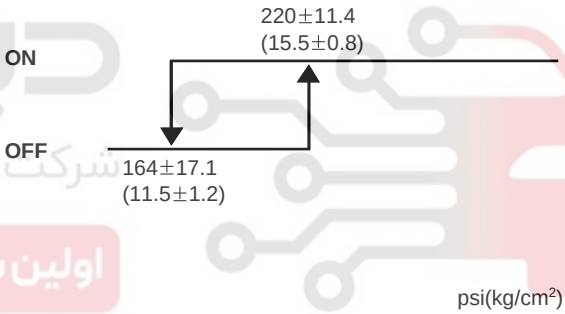
LQGE101E

LOW & HIGH PRESSURE



LQGE101C

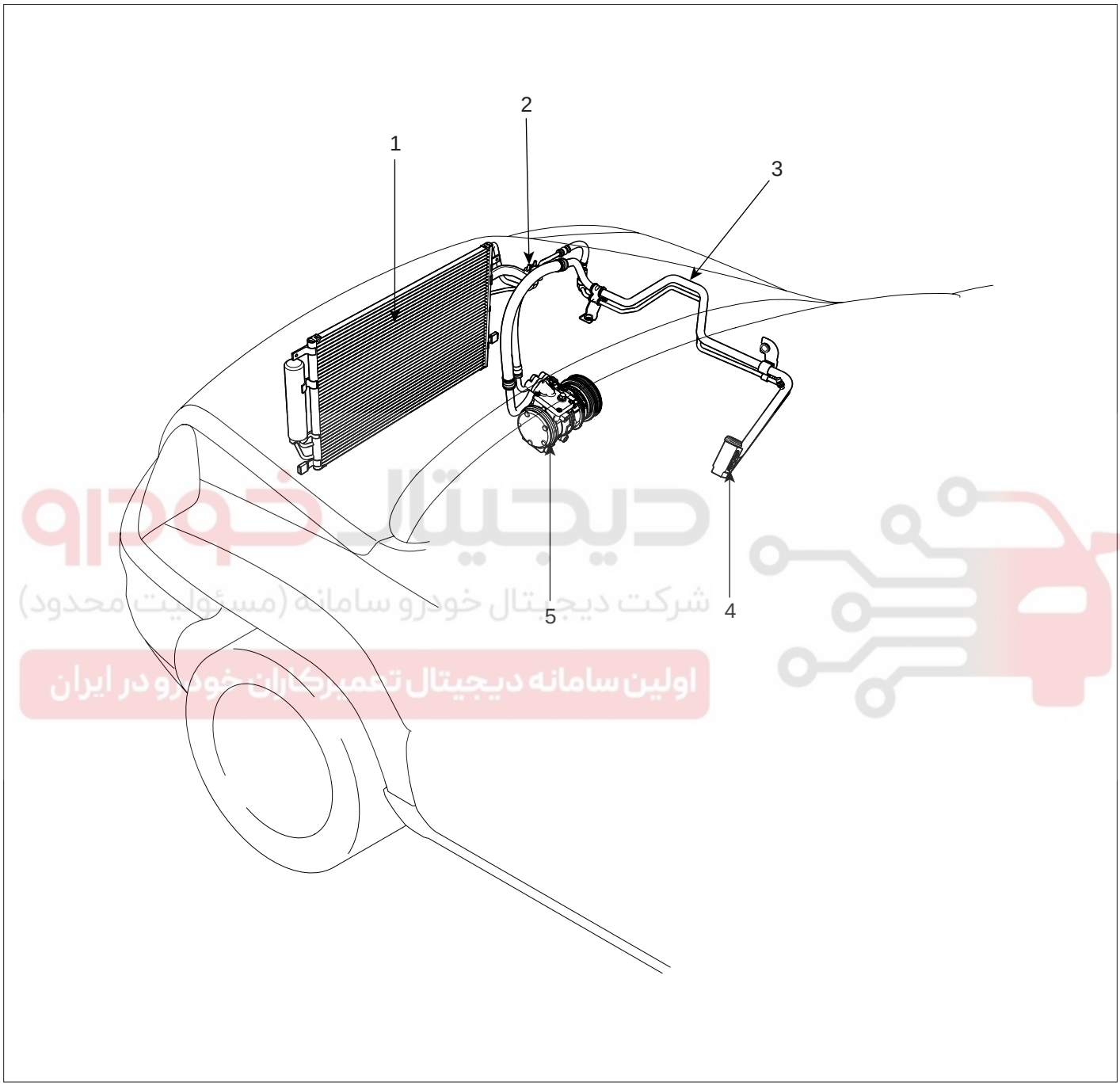
MEDIUM PRESSURE



LQIF101D

REFRIGERANT LINE

COMPONENT LOCATION E9C0B6D8



1. Condenser
2. Triple pressure switch
3. Refrigerant line
4. Expansion valve
5. Compressor

LQIF103A

REPLACEMENT EA8C6022

1. Discharge refrigerant from refrigeration system (see page HA-10).
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.

4. Evacuate air in refrigeration system and charge system with refrigerant (see page HA-10).

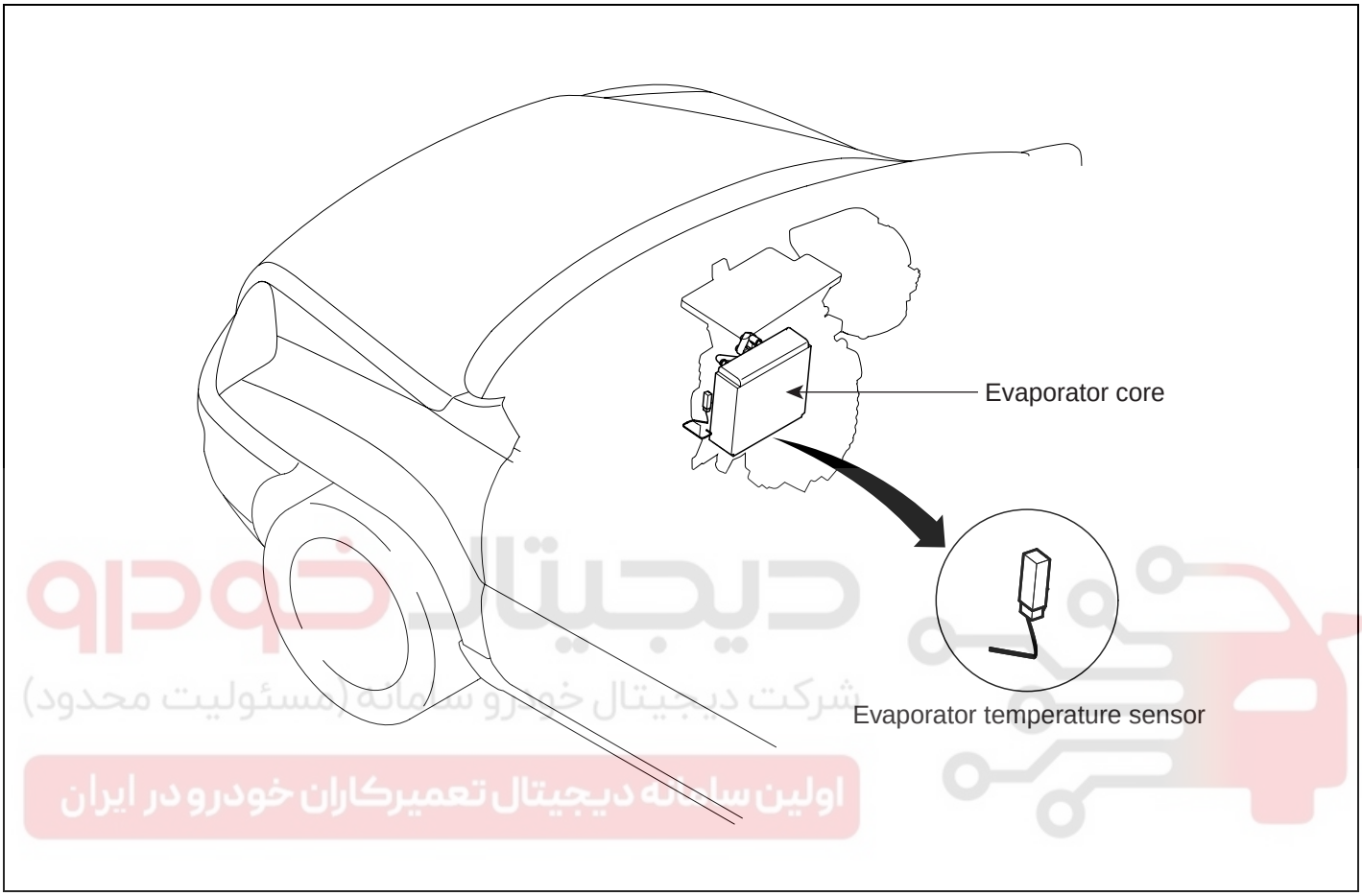
Specified amount : 510 ± 25g

5. Inspect for leakage of refrigerant.
   Using a gas leak detector, check for leakage of refrigerant (see page HA-12).
6. Inspect A/C operation.

Part tightened	N.m	kg.cm	lbf.ft
Condenser x Discharge hose	5 ~ 7	50 ~ 70	3.7 ~ 5.2
Condenser x Liquid tube	5 ~ 7	50 ~ 70	3.7 ~ 5.2
Compressor x Discharge hose	10 ~ 15	100 ~ 150	7.2 ~ 10.8
Compressor x Suction hose	10 ~ 15	100 ~ 150	7.2 ~ 10.8
Expansion valve x Evaporator	8 ~ 12	80 ~ 120	5.8 ~ 8.7

EVAPORATOR TEMPERATURE SENSOR

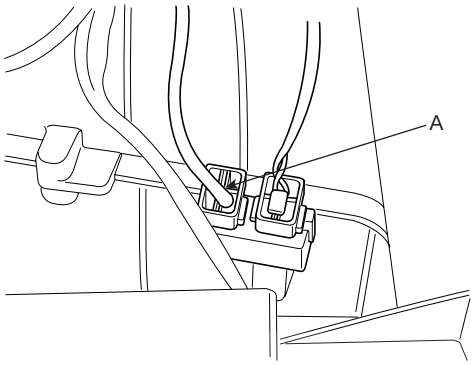
COMPONENT E06CC2C9



LQIF116A

DESCRIPTION EAD4A2FD

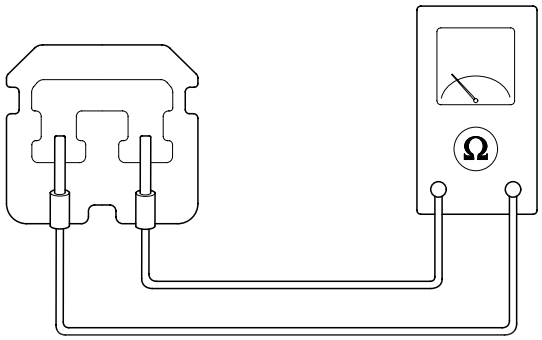
The evaporator temperature sensor will detect the evaporator core temperature and interrupt compressor relay power in order to prevent evaporator freezing by excessive cooling.
It is a negative type thermistor whose resistance is inversely proportional to temperature.



AQIE116B

INSPECTION E3EEBA6F

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



KQQE280B

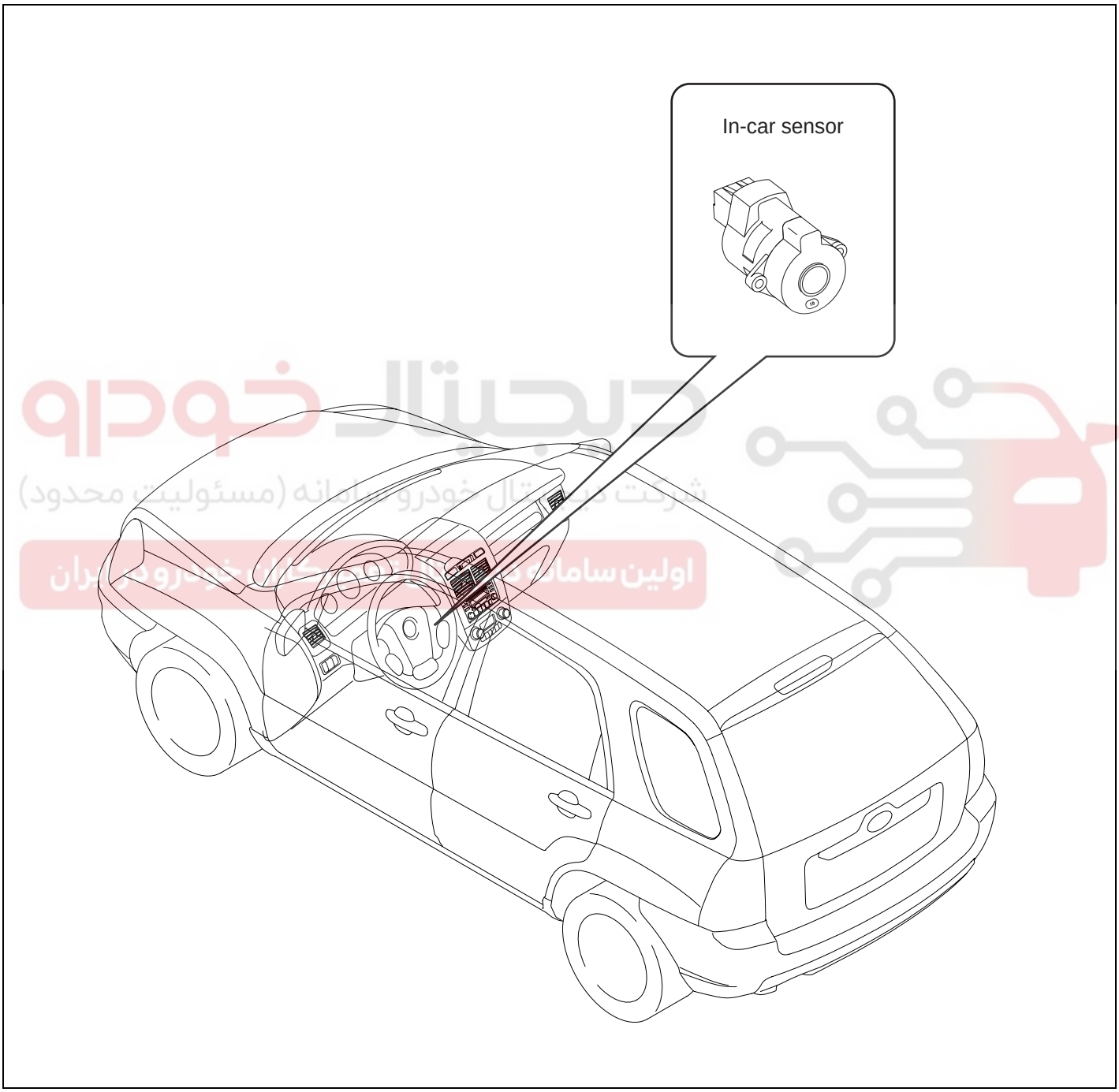
SPECIFICATION

Evaporator core temperature [°C(°F)]	Resistance [KΩ]
-10(14)	13.6
0(32)	8.0
10(50)	4.9
15(59)	3.9
30(86)	2.0
40(104)	1.3
50(122)	0.9

A/C COMPRESSOR CONTROLS (FULL AUTO)

IN CAR SENSOR

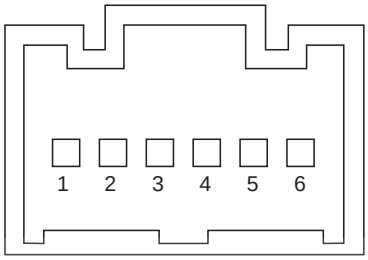
COMPONENT E13D793A



LQIF201A

DESCRIPTION E70623AF

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.

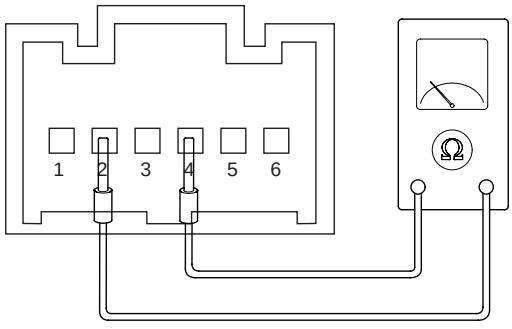


1. Motor(+)
2. Sensor ground (-)
3. Humidity sensor signal
4. In-car sensor temp. signal
5. Sensor power (+)
6. Motor (-)

LQIF201C

INSPECTION E9E7AB4B

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



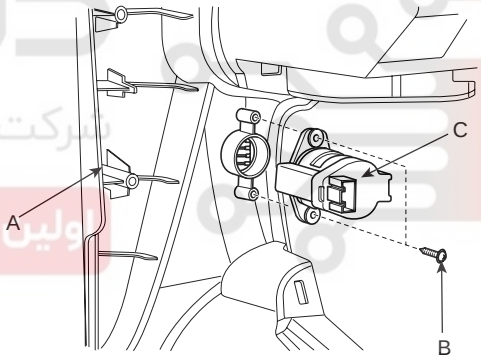
LQIF201E

SPECIFICATION

Temperature [°C(°F)]	Resistance between terminals 2and 4 (KΩ)
0 (32)	97.83 ± 2.61%
15 (59)	47.12 ± 1.45%
25 (77)	30.00 ± 1.20%
35 (95)	19.60 ± 1.44%
50 (122)	10.82 ± 2.26%

REPLACEMENT ECC2F3D3

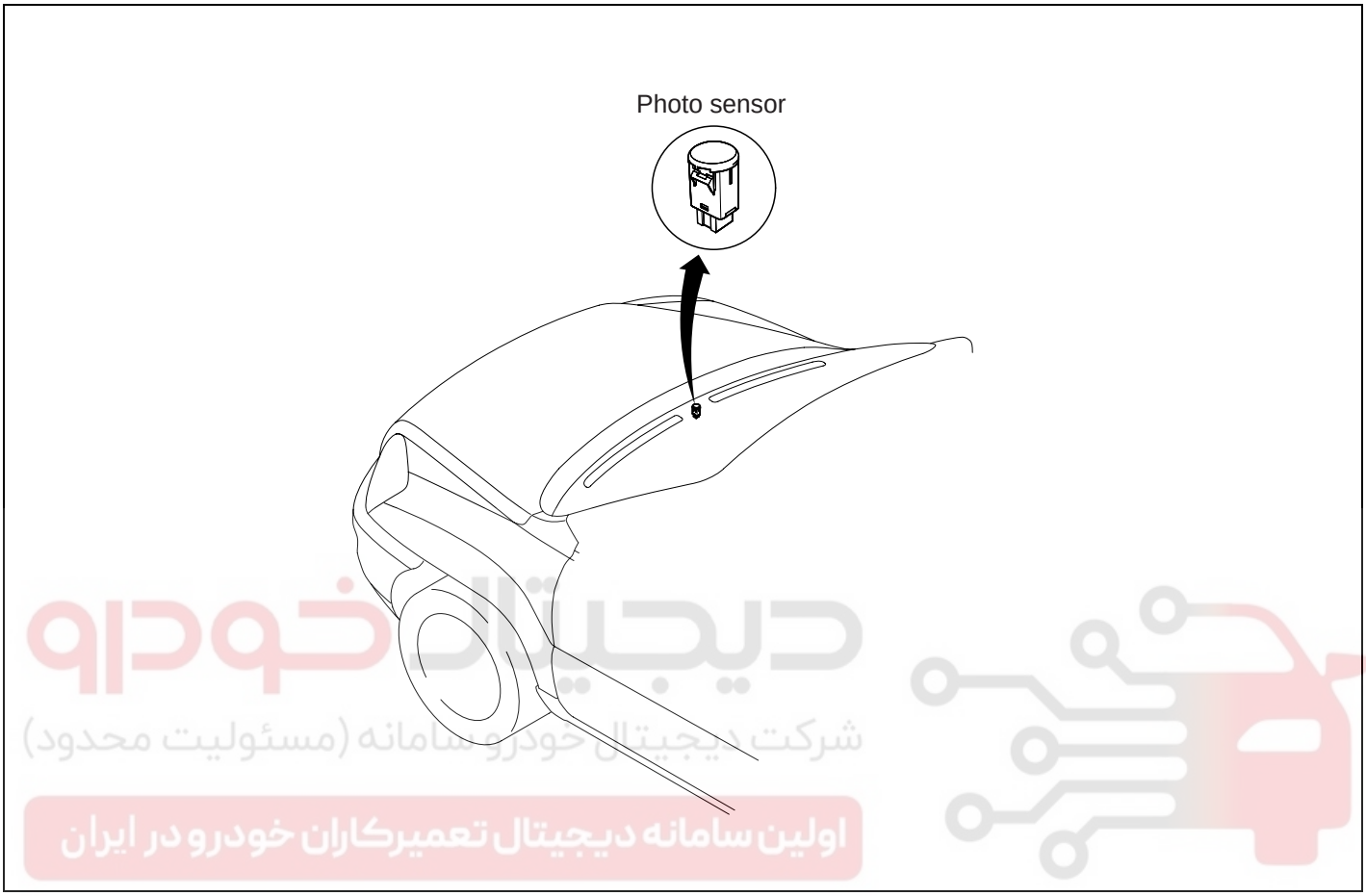
1. Disconnect the negative (-) battery terminal.
2. Remove the lower crush panel (A) (Refer to the Body group).
3. Disconnect the connector of in-car sensor.
4. Loosen the mounting screws (B) and then remove the in-car sensor (C).



LQIF201D

PHOTO SENSOR

COMPONENT EC6B368E



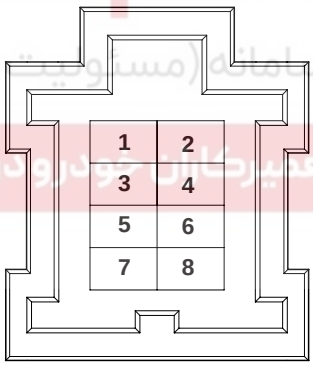
LQIF202A

DESCRIPTION EEDDC5DF

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

INSPECTION EE56E635

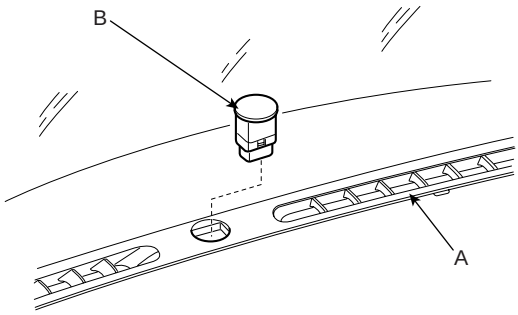
1. Ignition "ON"
2. Using the scan tool.
3. Emit intensive light toward photo sensor using a lamp, and check the output current change.
4. The current will rise with higher intensive light and reduce with lower intensive light.



LQIF202B

REPLACEMENT EB6ADAF1

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

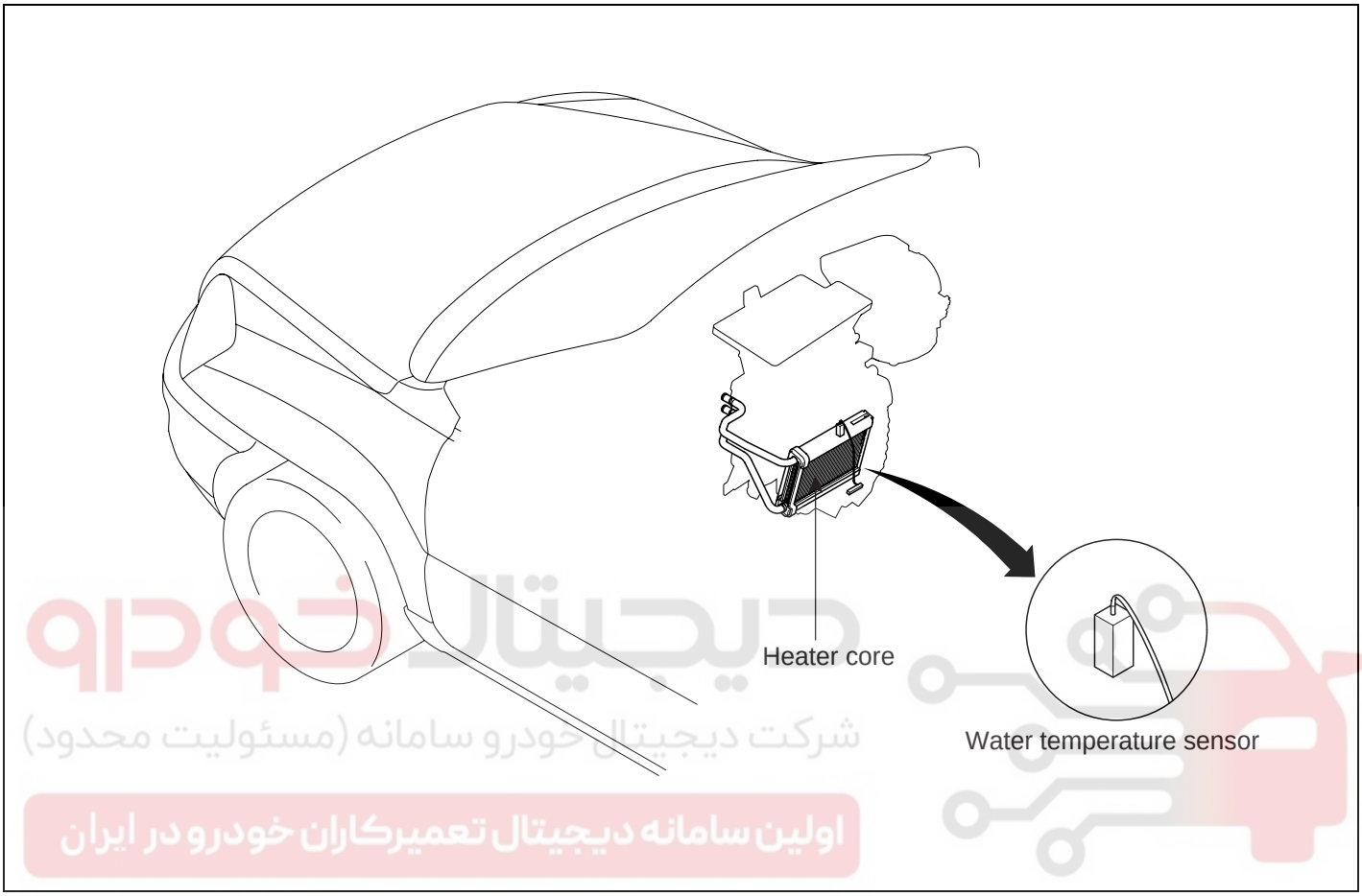


LQGE202D

3. Install in the reverse order of removal.

WATER TEMPERATURE SENSOR

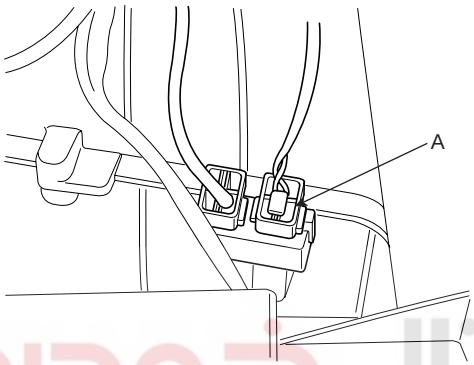
COMPONENT EA184ADD



LQIF203A

DESCRIPTION E16BBF49

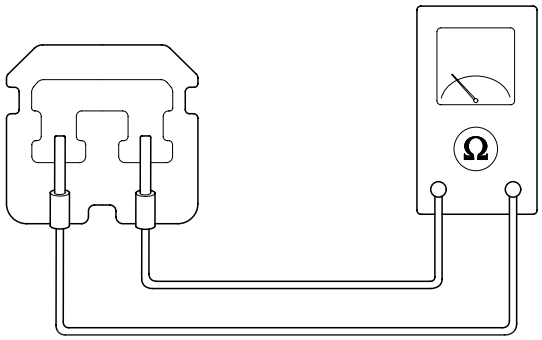
1. Water temperature sensor(A) is located at the heater unit.
2. It detects coolant temperature. Its signal is used for cold engine lockout control. When the driver operates the heater before the engine is warmed up, the signal from sensor causes the heater control unit to reduce blower motor speed until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



AQIE203B

INSPECTION E71C278B

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



KQQE280B

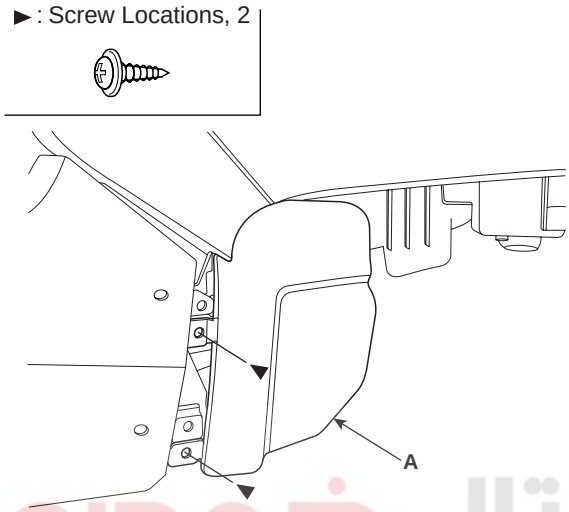
SPECIFICATION

Coolant temperature [°C(°F)]	Resistance between terminals 1and 2 (KΩ)
-15 (5)	73.6 ± 3%
0 (32)	32.9 ± 3%
15 (59)	15.8 ± 3%
25 (77)	10.0 ± 3%
35 (95)	6.0 ± 3%
60 (140)	2.5 ± 3%

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.

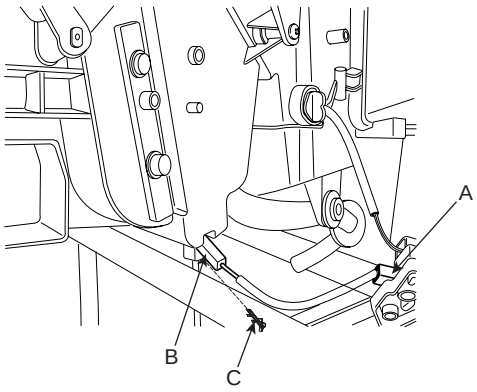
REPLACEMENT E4C4BE53

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



LQIF203C

3. Disconnect the connector(A) of water temperature sensor.
4. Remove the caulk of water temperature sensor by using the scraper.
5. Pull the water temperature sensor out at the heater unit with the clamp(C).



LQIF203D

NOTE

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

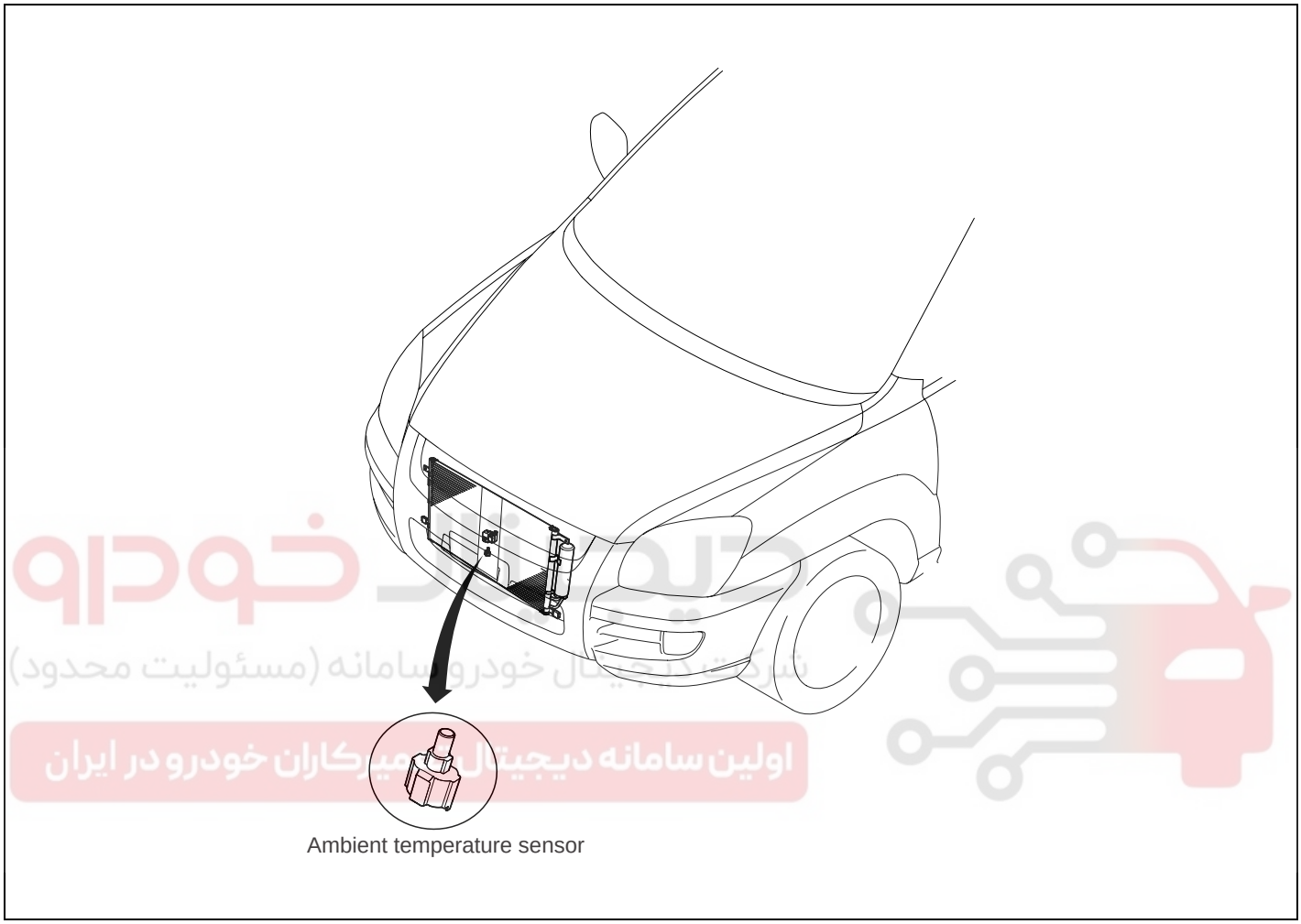
6. Install in the reverse order of removal.

NOTE

- *Apply caulk to the water temperature sensor.*
- *Make sure that there is no air leakage.*

AMBIENT TEMPERATURE SENSOR

COMPONENT EF6E0767



LQIF204A

DESCRIPTION E48B94FA

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℃ (35.6℉), the A/C compressor will be stopped.
The compressor will be operated by manual operating.

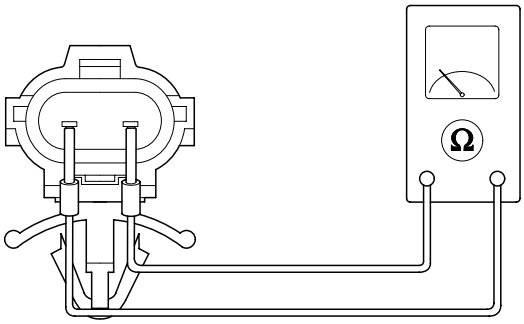
INSPECTION E5FF4BAB

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 [℃(℉)]	Resistance between terminals 1and 2 (kΩ)
-15 (5)	215.3±3%
0 (32)	97.5±3%
15 (59)	59.6±3%
25 (77)	30.0±3%
35 (95)	24.2±3%
60 (140)	16±3%

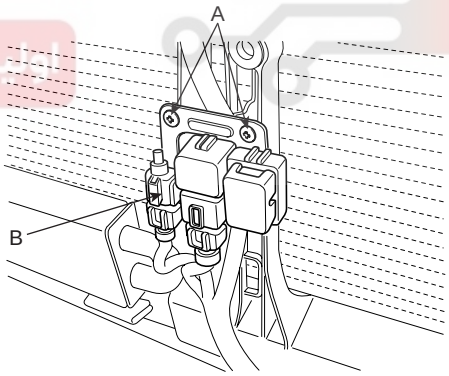
4. If the measured resistance is not specification, substitute with a known-good ambient temperature sensor and check for proper operation.
5. If the problem is corrected, replace the ambient temperature sensor.



EQKE209D

REPLACEMENT E9E26E9A

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

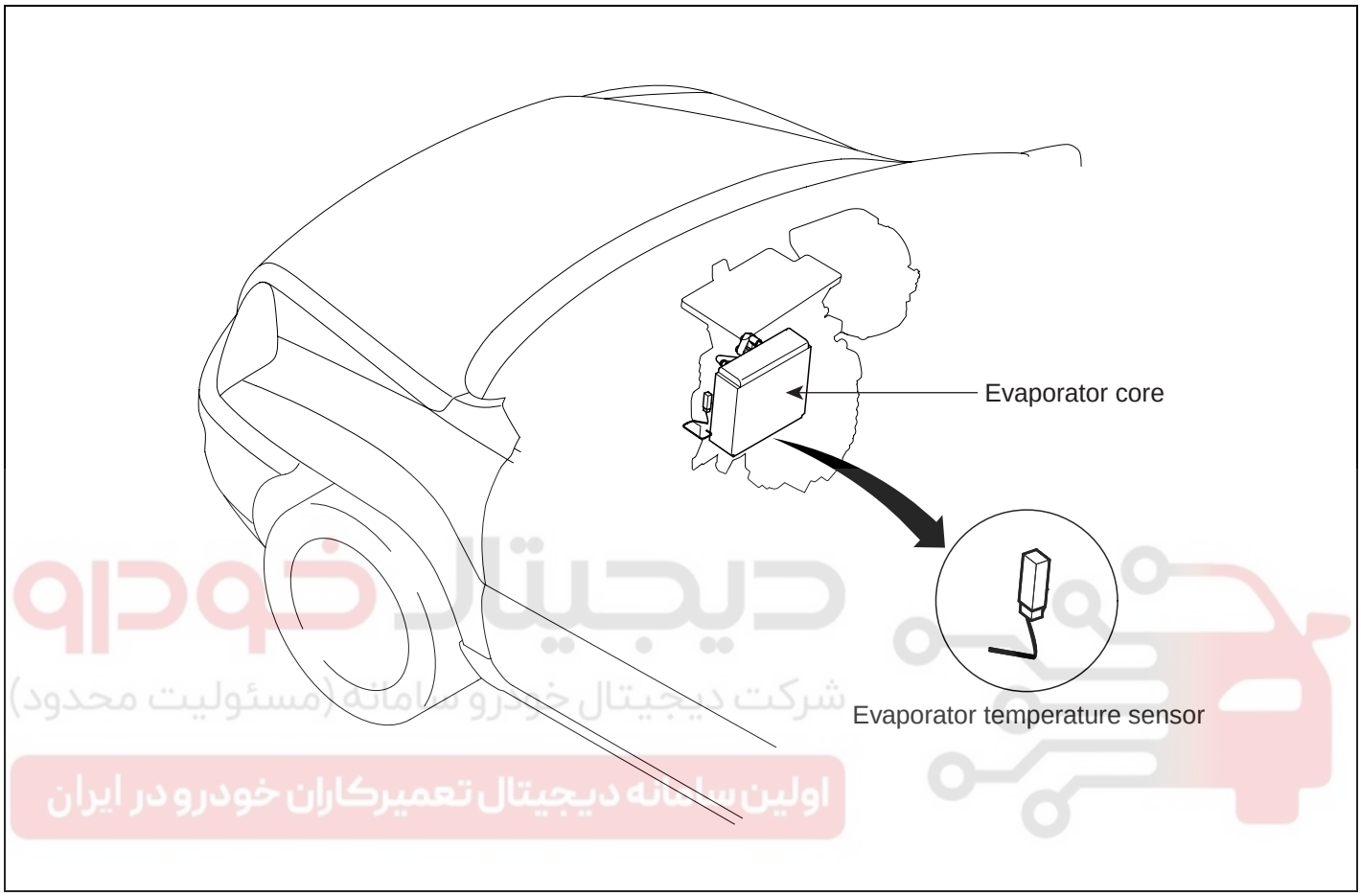


AQIE204E

4. Install in the reverse order of removal.

EVAPORATOR TEMPERATURE SENSOR

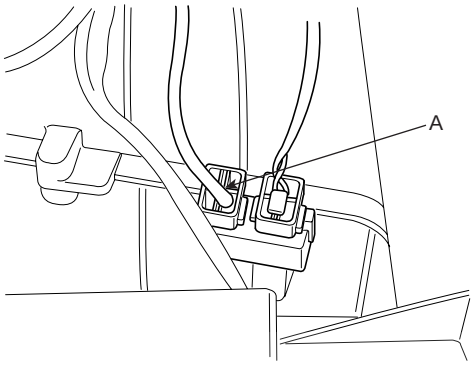
COMPONENT EDDDFB5B



LQIF116A

DESCRIPTION ED3FEB25

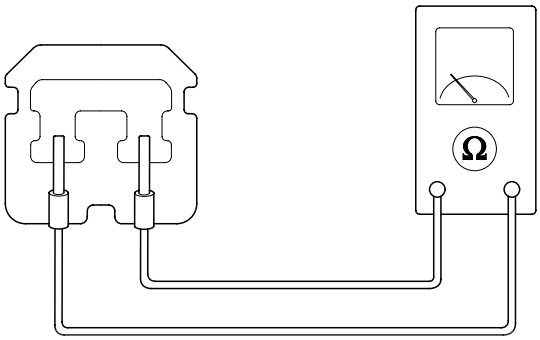
The evaporator temperature sensor will detect the evaporator core temperature and interrupt compressor relay power in order to prevent evaporator freezing by excessive cooling.
It is a negative type thermistor whose resistance is inversely proportional to temperature.



AQIE116B

INSPECTION ECB41E40

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



KQQE280B

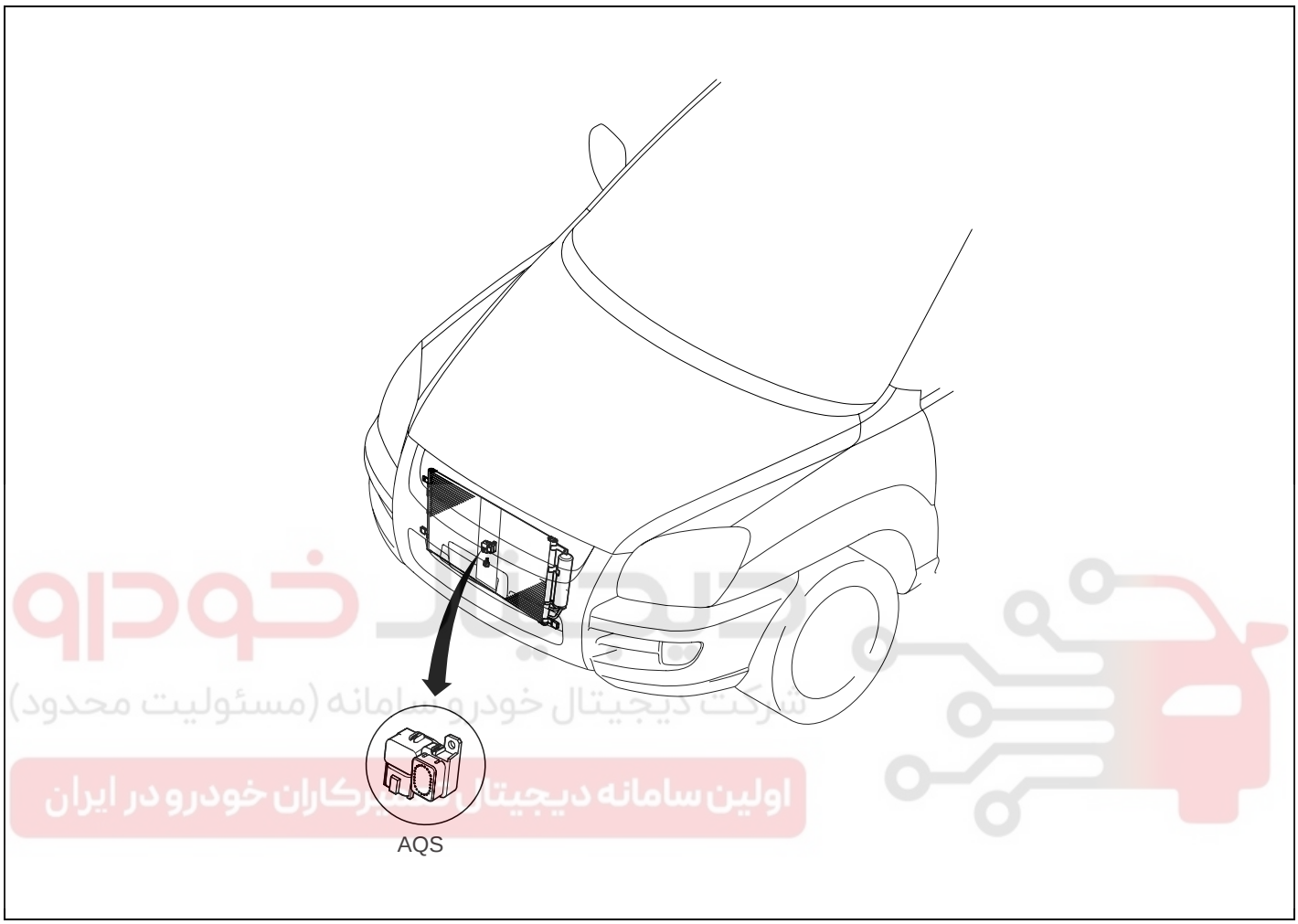
SPECIFICATION

Evaporator core temperature [°C(°F)]	Resistance [KΩ]
-10(14)	13.6
0(32)	8.0
10(50)	4.9
15(59)	3.9
30(86)	2.0
40(104)	1.3
50(122)	0.9

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.

A.Q.S (AIR QUALITY SENSOR)

COMPONENT E01D46A0



LQIF207A

DESCRIPTION EBBF979F

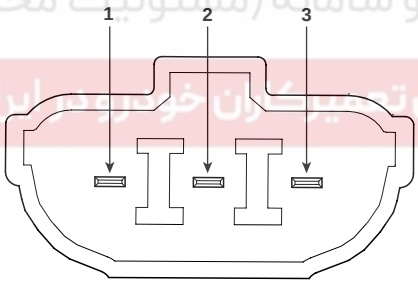
1. A.Q.S is located at center support in front of the engine radiator, and detects hazardous elements in ambient air providing output signal to control.
2. It will detect sulfurous acid gas, carbon dioxide, carbon monoxide, hydrocarbon and allergen.

INSPECTION EE7874BE

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

SPECIFICATION

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



1. IG2
2. Ground
3. Output voltage

LQIF207B

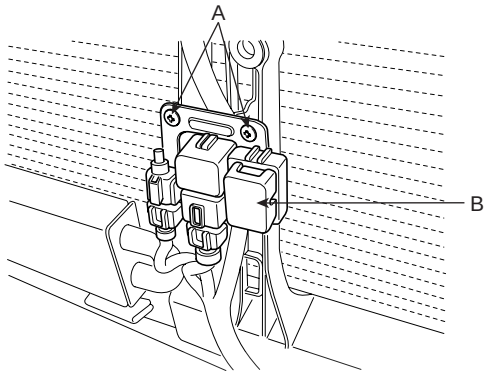
4. AQS diagnosis and fail safe.
   Detect the open of signal for 7 seconds without choosing the AQS switch when IG on.
   If 2.5V or more is detected for 3.5 seconds or more among 7 seconds, be judged the open of AQS signal.
   Operate as below fail safe function, while choosing AQS.
   Fail safe: Release the AQS (AQS cannot be selected), Fresh/recirculation maintains previous situation of AQS selection.

   NOTE

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

REPLACEMENT EA3F2B2D

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

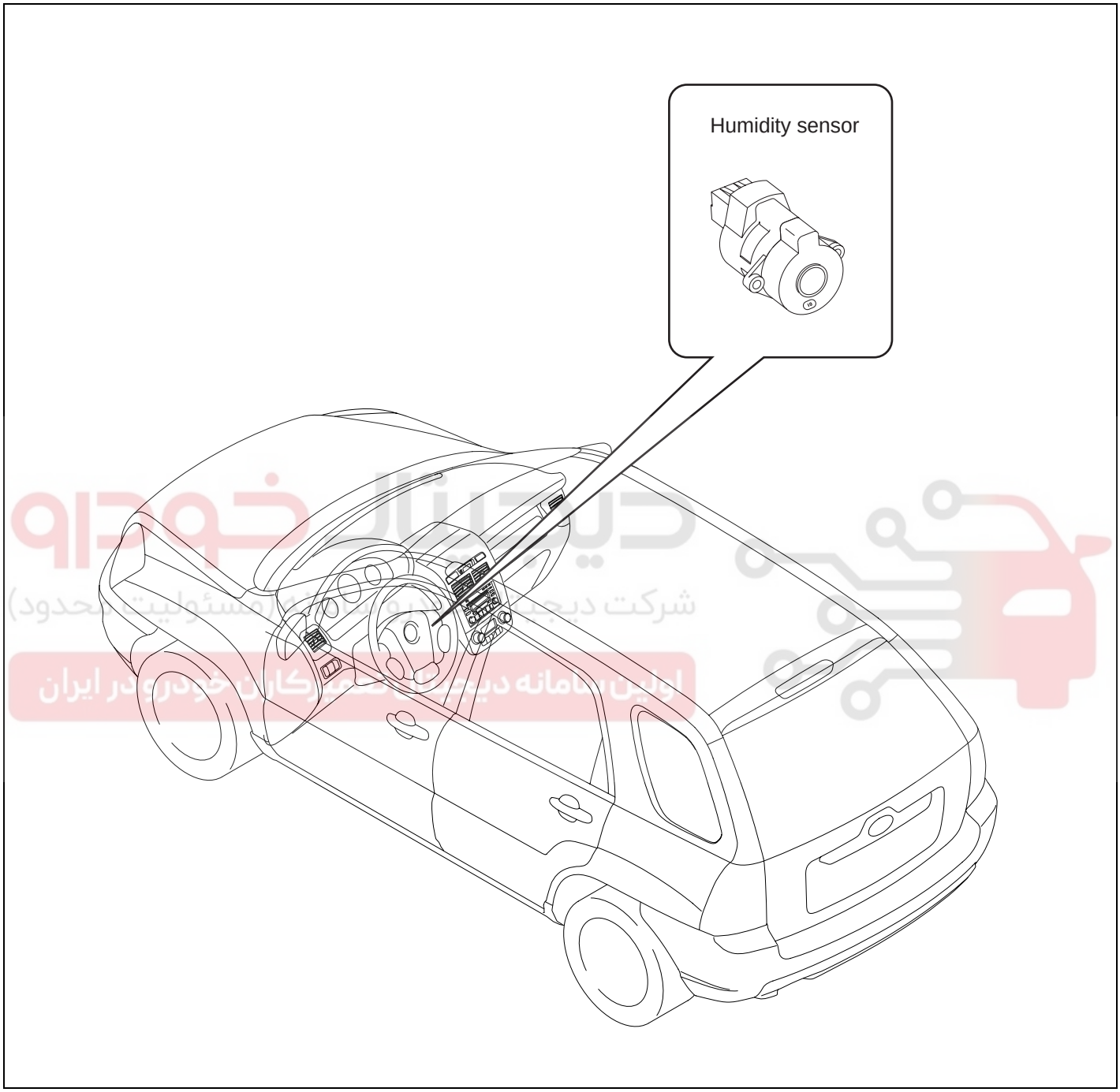


AQIE207C

4. Install in the reverse order of removal.

HUMIDITY SENSOR

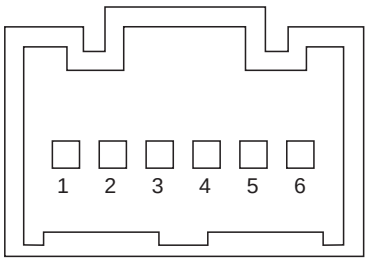
COMPONENT E4B7EF2E



LQIF208A

DESCRIPTION E34DAF5B

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



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

LQIF201C

INSPECTION E6ECF1D4

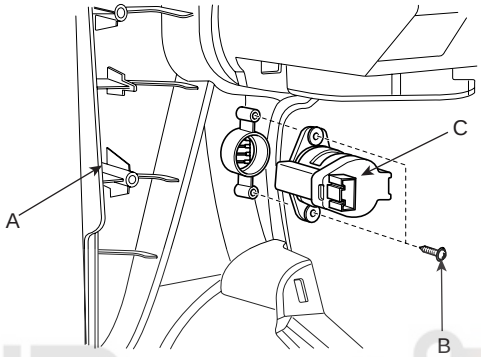
1. Ignition "ON"
2. Using the scan tool.
3. Check the frequency of humidity sensor between terminals 2 and 3.

Humidity (%)	Frequency between terminals 2and 3(Hz)
30	6976 ± 5%
50	6728 ± 5%
60	6600 ± 5%
70	6468 ± 5%
80	6330 ± 5%
100	6033 ± 5%

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 ECD242BF

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).



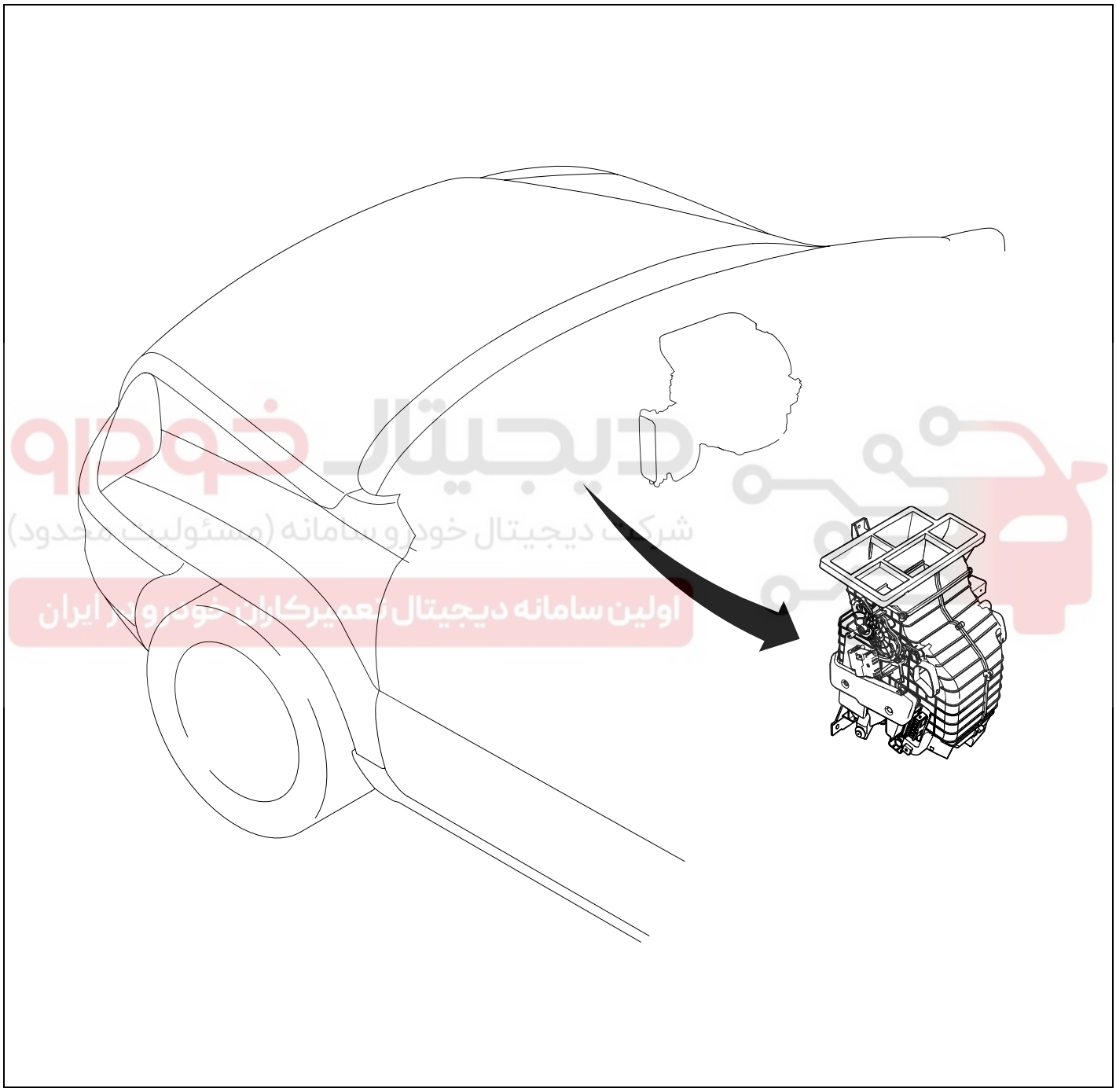
LQIF201D

5. Install in the reverse order of removal.

HEATER

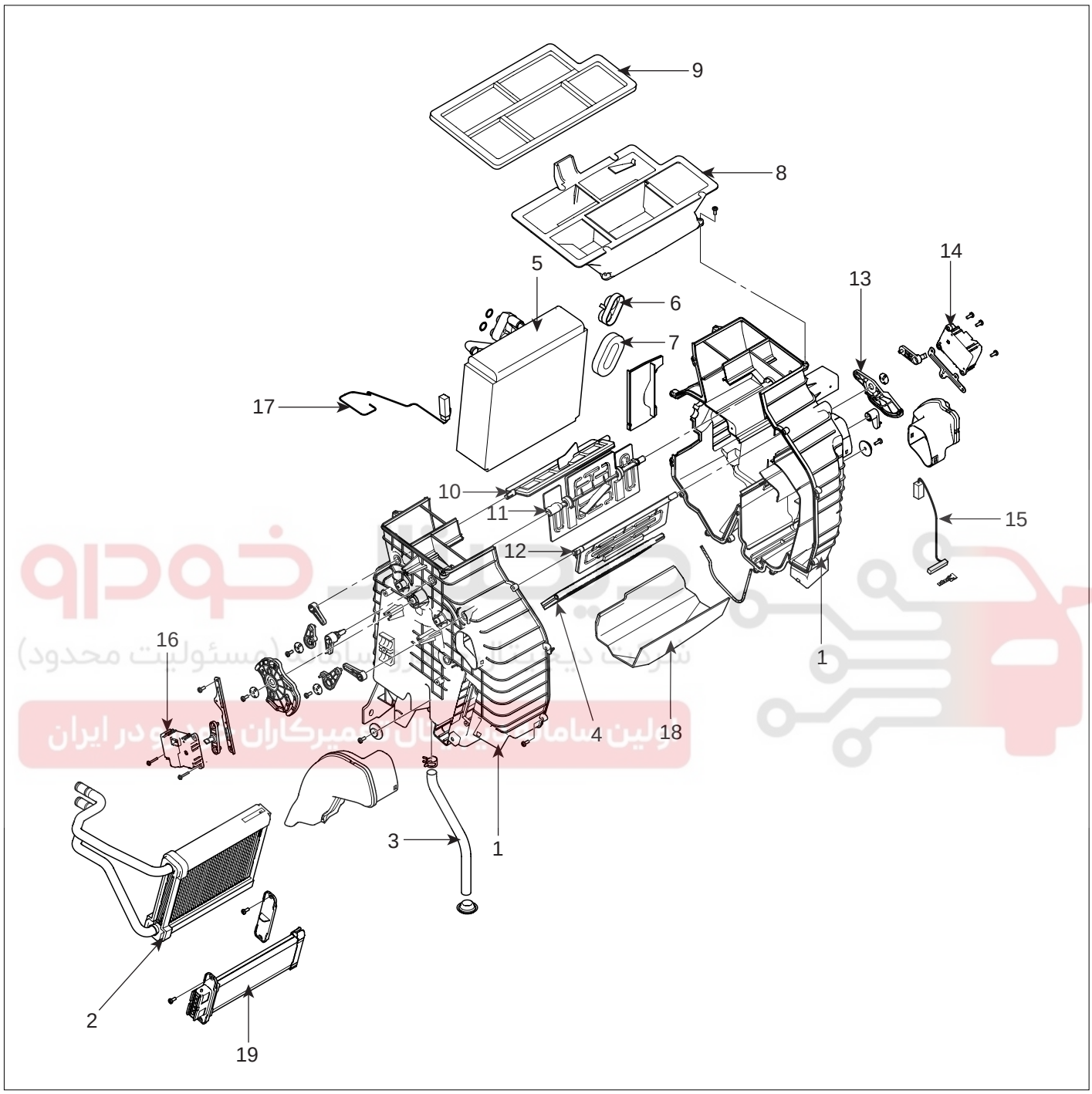
HEATER UNIT

COMPONENT LOCATION E60F1E94



LQIF300A

COMPONENTS E8ABACE2

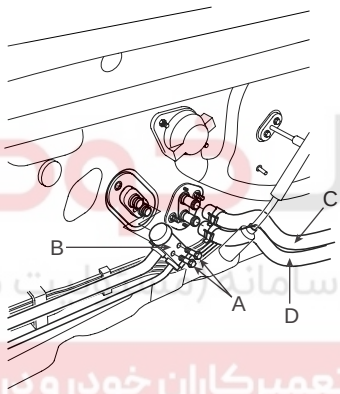


1. Heater & evaporator case
2. Heater core
3. Drain hose
4. Temp. door
5. Evaporator core
6. Bracket
7. Seal
8. Heater & evaporator upper case
9. Upper case seal
10. Defrost door
11. Vent door
12. Floor door
13. Cam
14. Temp. control actuator
15. Water temp. sensor (Full auto)
16. Mode control actuator
17. Evaporator temp. sensor
18. Insulation
19. PTC heater

LQIF300B

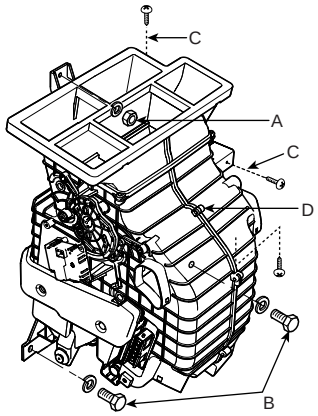
REPLACEMENT E4E79FF8

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/recycling/charging station.
3. Remove the bolts (A) and the expansion valve (B) from the evaporator core.
   Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.
4. When the engine is cool, disconnect the inlet (C) and outlet (D) heater hoses from the heater unit.
   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.



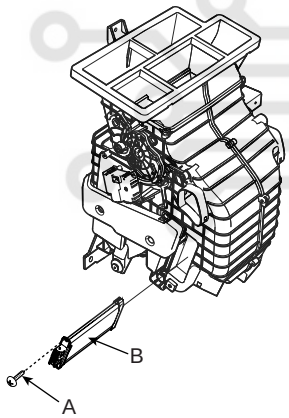
AQIE302A

5. Remove the crash pad (Refer to the Body group).
6. Remove the cross member.
7. Disconnect the connectors from the temperature control actuator, the mode control actuator and the evaporator temperature sensor, then remove the mounting nut (A) and the mounting bolts (B).
8. Remove the heater & evaporator unit after loosening the mounting screws (C).



AQIE302B

9. Remove the self-tapping screws and the side bracket (A).
10. Be careful not to bend the inlet and outlet pipes during heater core (A) removal, and pull out the heater core.



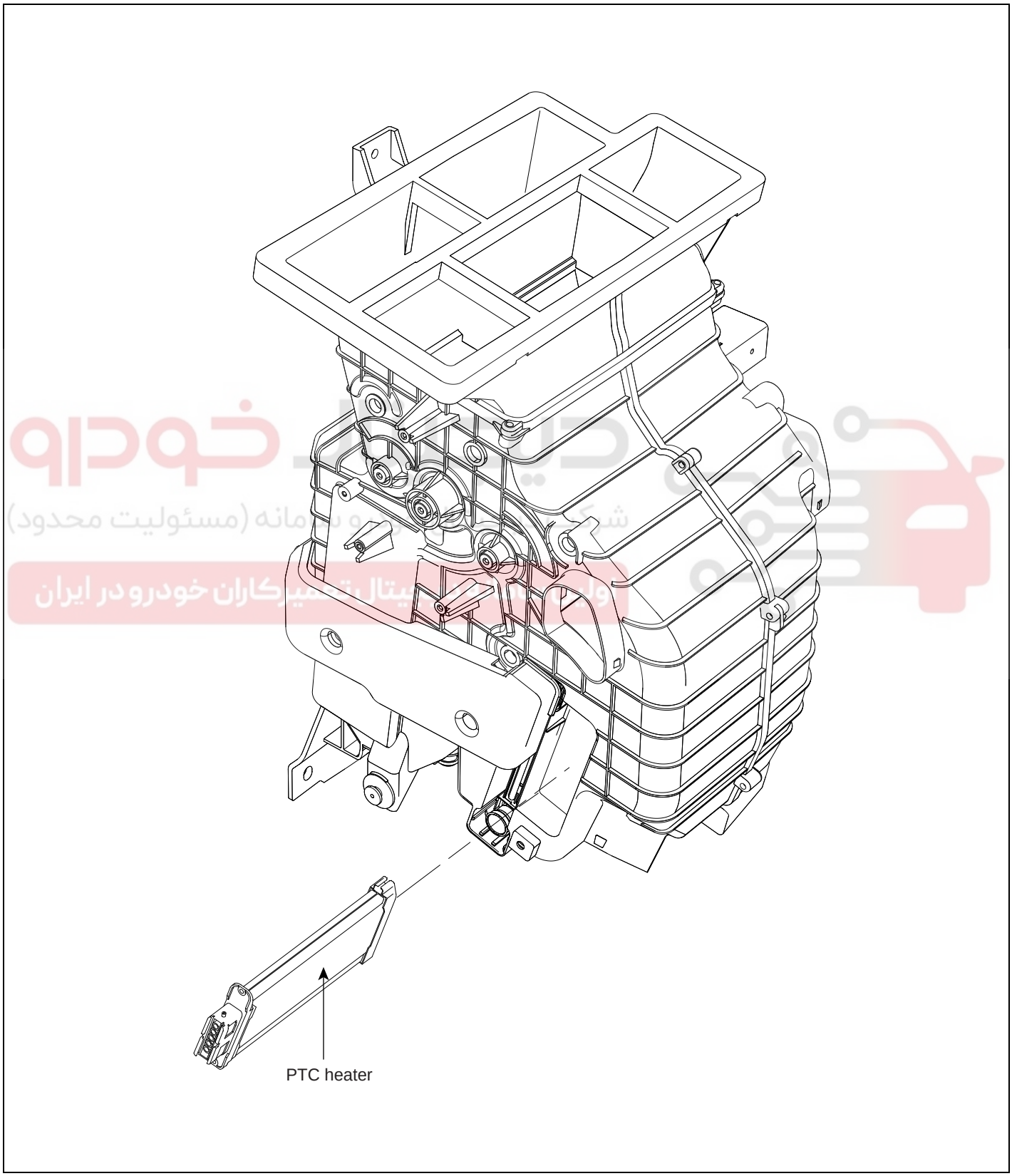
AQIE302C

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

12. Install in the reverse order of removal, and note these items :
    - If you're installing a new evaporator, add refrigerant oil (ND-OIL8).
    - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
    - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
    - Do not spill the refrigerant oil on the vehicle ; it may damage the paint ; if the refrigerant oil contacts the paint, wash it off immediately.
    - Apply sealant to the grommets.
    - Make sure that there is no air leakage.
    - Charge the system and test its performance.
    - Do not interchange the inlet and outlet heater hoses and install the hose clamps securely.
    - Refill the cooling system with engine coolant.

PTC (POSITIVE TEMPERATURE COEFFICIENT) HEATER

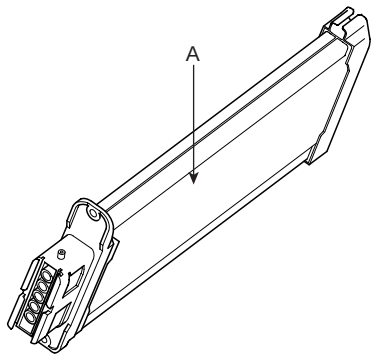
COMPONENTS ECBA1D65



EQQE341A

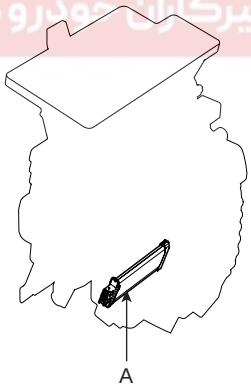
DESCRIPTION EBBFACA1

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



AQIE301B

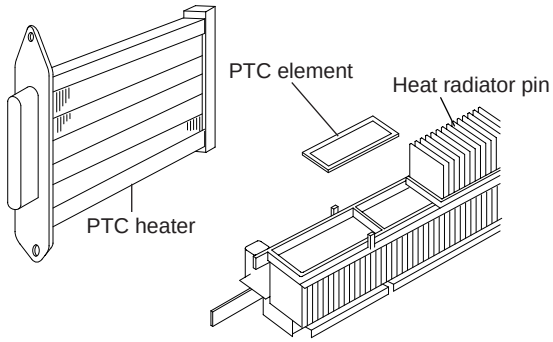
An electric heater heats up the interior by directly heating the air that passes through the heater.
PTC = positive Temperature Coefficient
The name itself implies that the element has a proportional resistance change sensitive to temperature. PTC heater (A) is installed at the exit or the backside of heater core.



AQIE301A

PTC CHARACTERISTICS

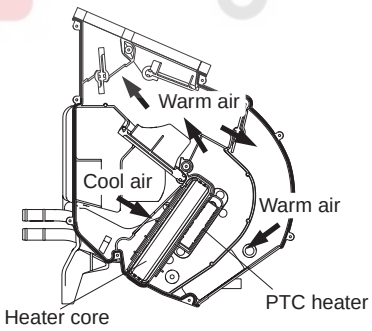
Current is limited due to a rapid resistance increase above a certain temperature.
It restrains surface temperature increase.
It restrains current overflow.



LQGE300F

OPERATION PRINCIPLE ECAFA7E1

ECU outputs a PTC on signal
Operate PTC from 1st setting to 3rd setting with an interval of 15 seconds.
Heat up the air, which passes through a heater core.



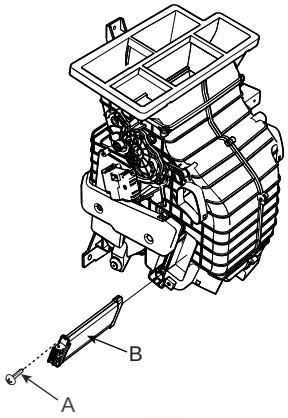
LQ8C111A

OPERATION CONDITION

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

REPLACEMENT ED2B0E4E

1. Disconnect the negative (-) battery terminal.
2. Disconnect the connector from the PTC heater.
3. Remove the self-tapping screws (A) and the PTC heater (A).



AQIE302C

4. Install the PTC heater in the reverse order of removal.

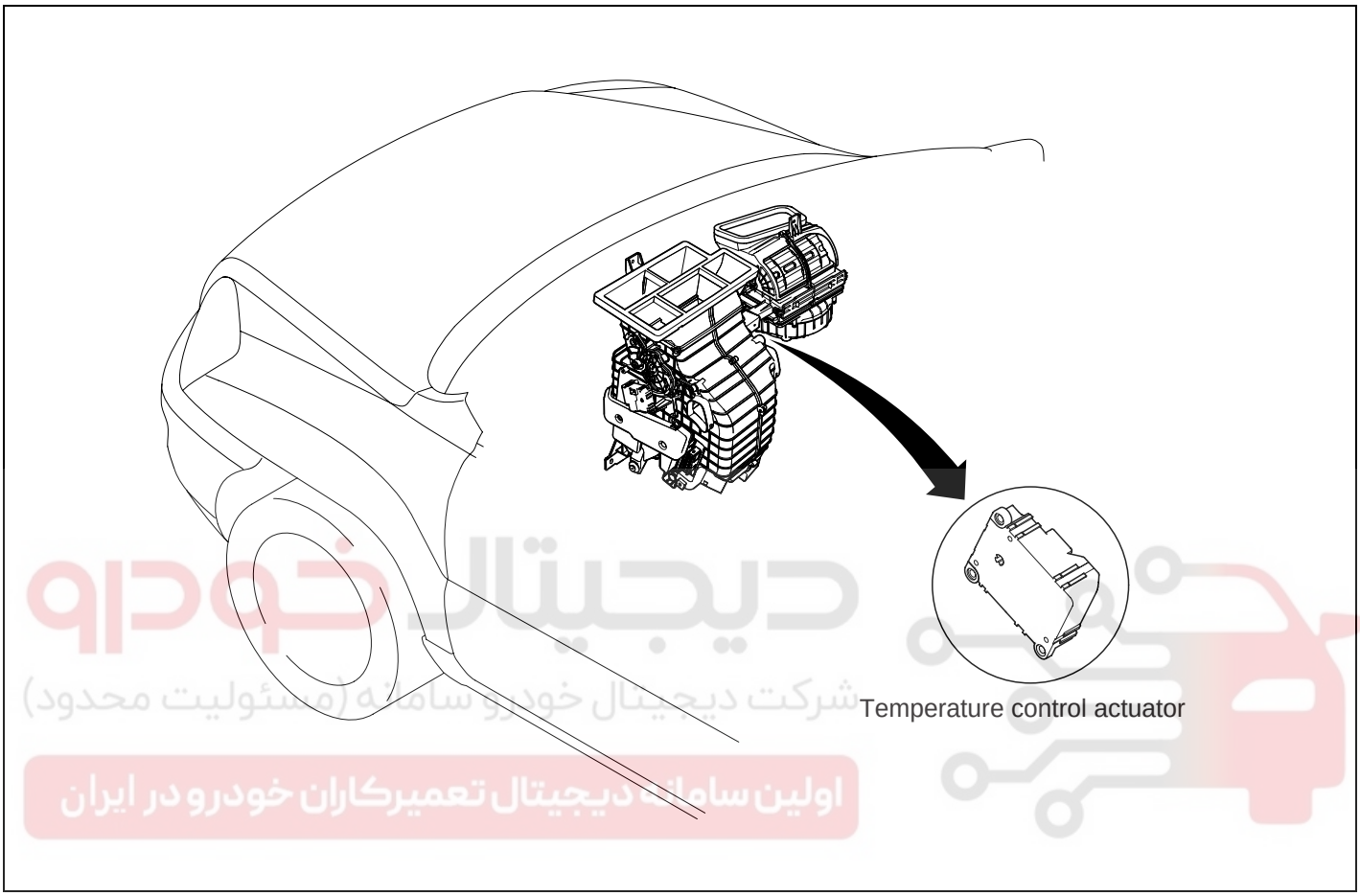
INSPECTION E864DA7B

Inspect the PTC operation by confirmation logic as below.

1. Entering method
   1) Set the floor mode, maximum heating
   2) Turn off the blower switch
   3) Press the intake button more than 5 times
   4) Indicator of entire button is flashed with an interval of 0.5 seconds continuously (Manual). Graphics of the entire LCD display switch on and off with an interval of 0.5 seconds continuously (Automatic)
   5) Confirm the PTC operation by operating the blower switch
      Manual: 1~4 step, Automatic: 1~8step.
   6) Each PTC relay is operated with an interval of 3 seconds.
   7) Execute the PTC operation by confirmation logic for 30 seconds.
2. Cancellation method
   1) Select the A/C button or intake button.
   2) IG "OFF"
   3) Cancel the logic after 30 seconds automatically.
3. If the PTC operation is not operated, substitute with a known-good PTC and check for proper operation.
   If the problem is corrected, replace the PTC.

TEMPERATURE CONTROL ACTUATOR

COMPONENT E2F15F31



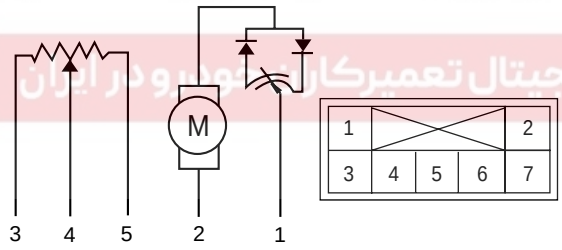
LQIF305A

DESCRIPTION E6FED52D

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

INSPECTION E0FEBE9A

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 1 and grounding terminal 2.
4. Verify that the temperature control actuator operates to the cool position when connecting in the reverse.



AQIE305B

5. Check the voltage between terminals 3 and 4.

SPECIFICATION

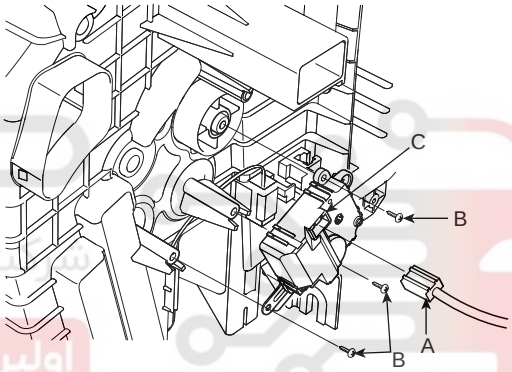
Door position	Voltage (3-4)	Error detecting
Max. cooling	0.3 ± 0.15V	Low voltage : 0.08V or less
Max. heating	4.7 ± 0.15V	High voltage : 4.9V or more

It will feed back current position of actuator to controls.

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

REPLACEMENT E327346A

1. Disconnect the negative (-) battery terminal.
2. Remove the side cover (Refer to the Body group).
3. Disconnect the connector (A) of temperature control actuator after removing the air duct.
4. Loosen the mounting screw (B) and then remove the temperature control actuator (C).

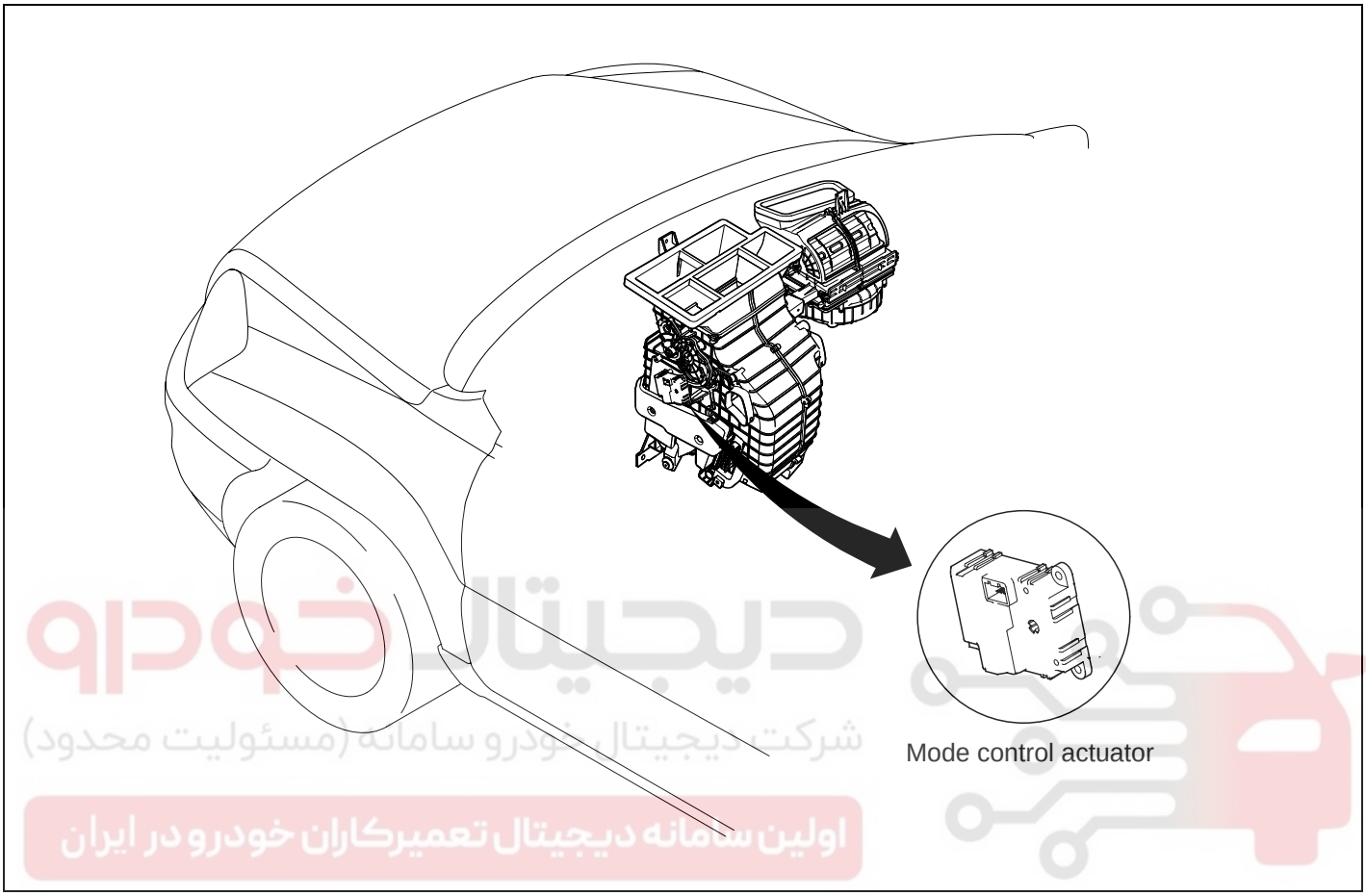


AQIE305C

5. Install in the reverse order of removal.

MODE CONTROL ACTUATOR

COMPONENT EE54AC19



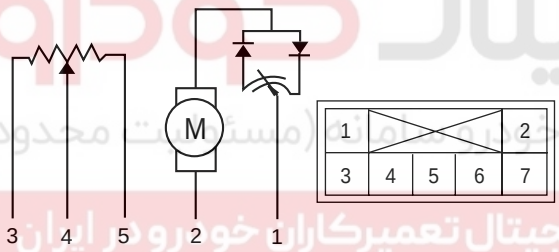
LQIF603A

DESCRIPTION E77D36E4

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

INSPECTION EEA49EEF

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



AQIE305B

5. Check the voltage between terminals 4 and 5.

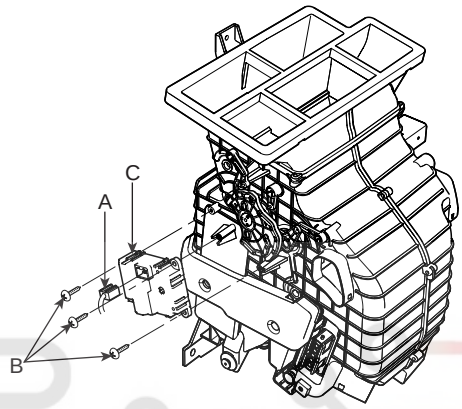
Door position	Voltage (4-5)	Error detecting
Vent	0.3 ± 0.15V	Low voltage : 0.08V or less
Defrost	4.7 ± 0.15V	High voltage : 4.9V or more

It will feed back 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 E2FD7BAB

1. Disconnect the negative (-) battery terminal.
2. Remove the lower crush panel (Refer to the Body group).
3. Disconnect the connector (A) of mode control actuator after removing the air duct.
4. Loosen the mounting screws (B) and then remove the mode control actuator (C).



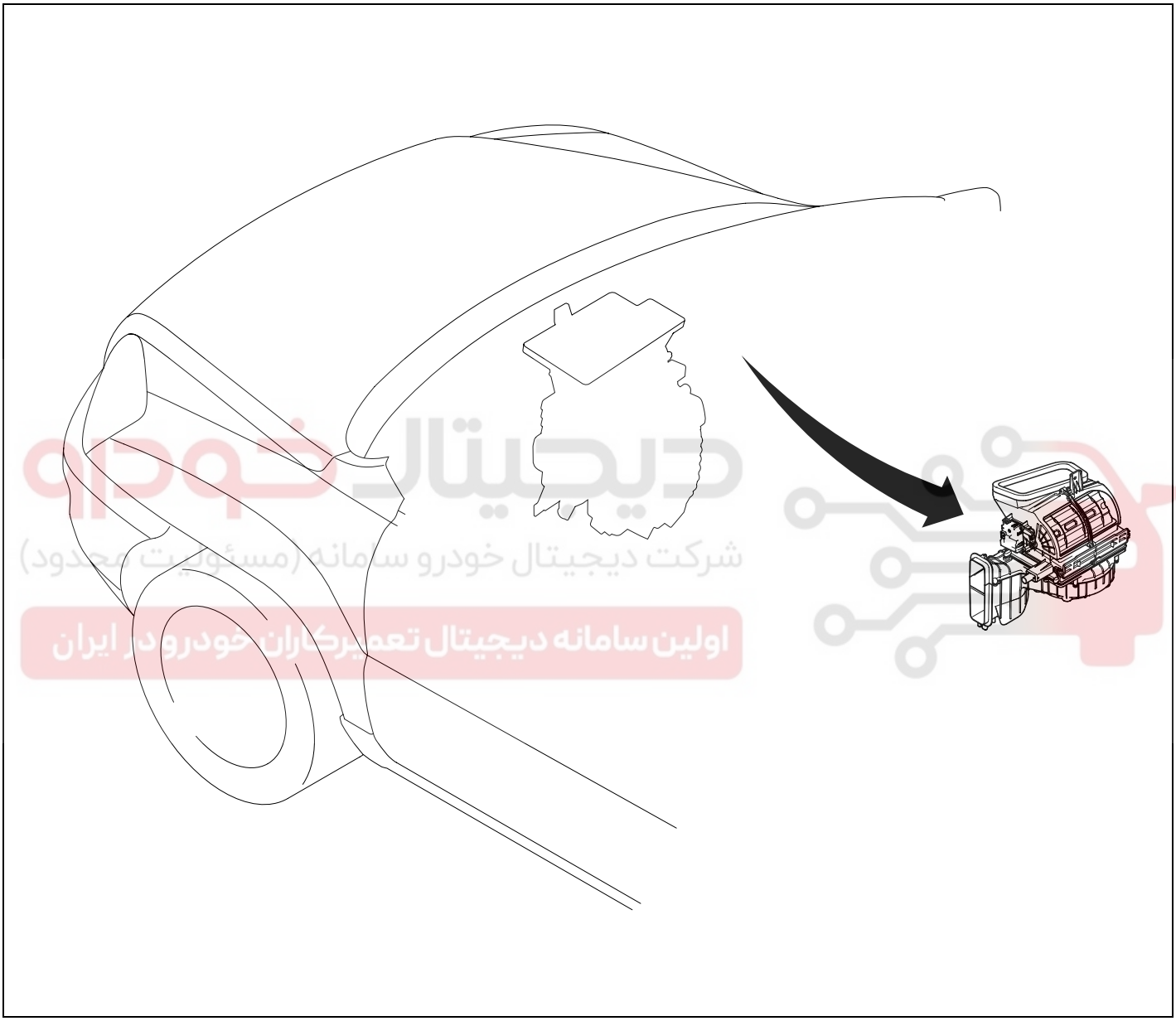
AQIE301D

5. Install in the reverse order of removal.

BLOWER CONTROLS

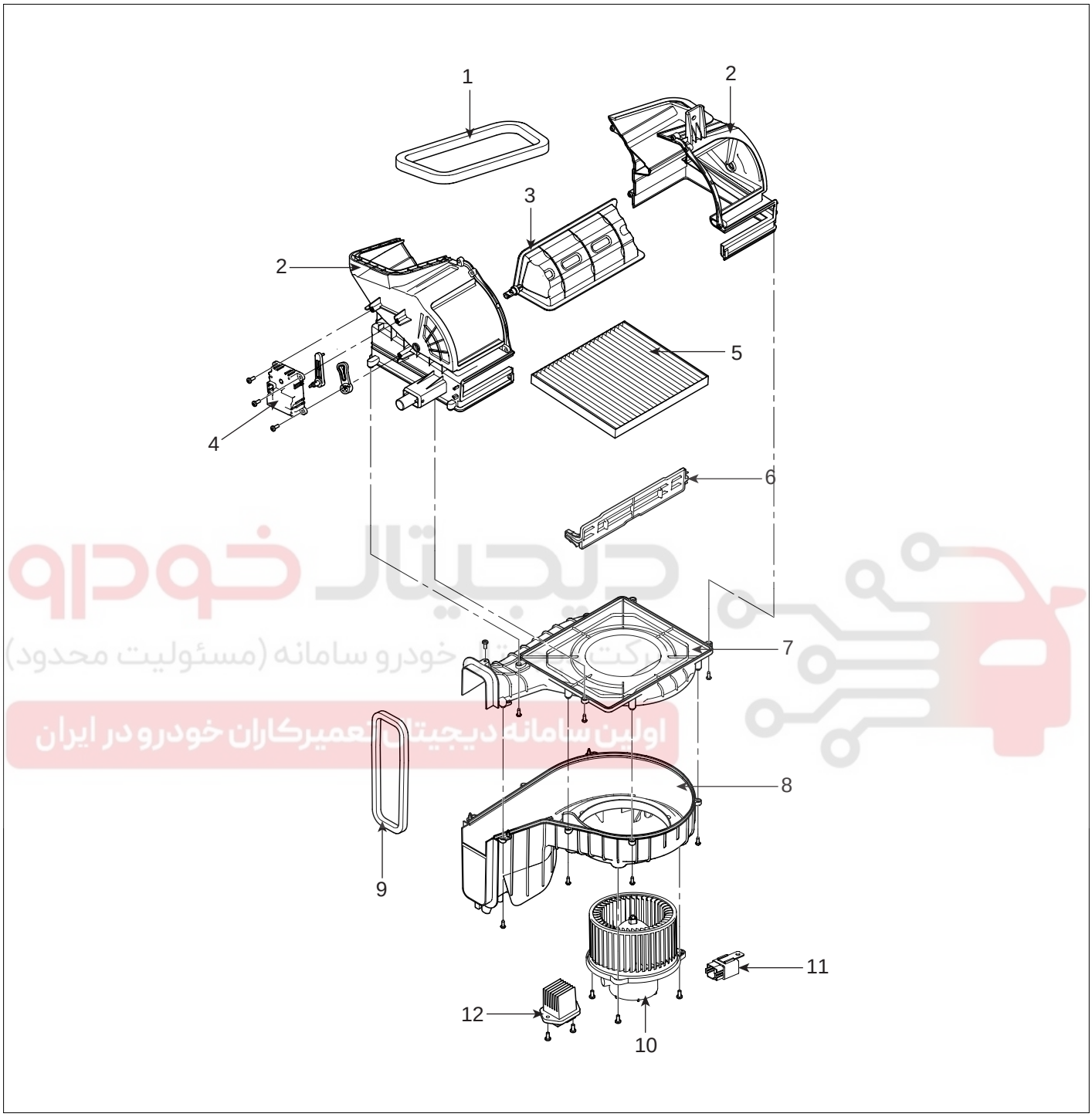
BLOWER UNIT

COMPONENT LOCATION E4EB2FAC



LQIF350A

COMPONENTS EB5F367C

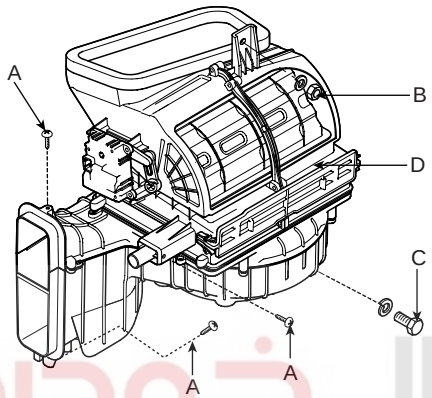


1. Outlet duct seal
2. Inlet duct case
3. Inlet door
4. Fresh and recirculation actuator
5. Air filter
6. Air filter cover
7. Blower upper case
8. Blower lower case
9. Blower seal
10. Blower motor
11. Blower relay
12. Power mosfet

LQIF350B

REPLACEMENT EDDA0E13

1. Disconnect the negative (-) battery terminal.
2. Remove the heater unit (See page HA-20)
3. Disconnect the connectors from the fresh and recirculation actuator, the blower relay, the blower motor and power mosfet.
   Remove the self-tapping screws (A), the mounting nut (B), the mounting bolt (C) and the blower unit (D).



AQIE351A

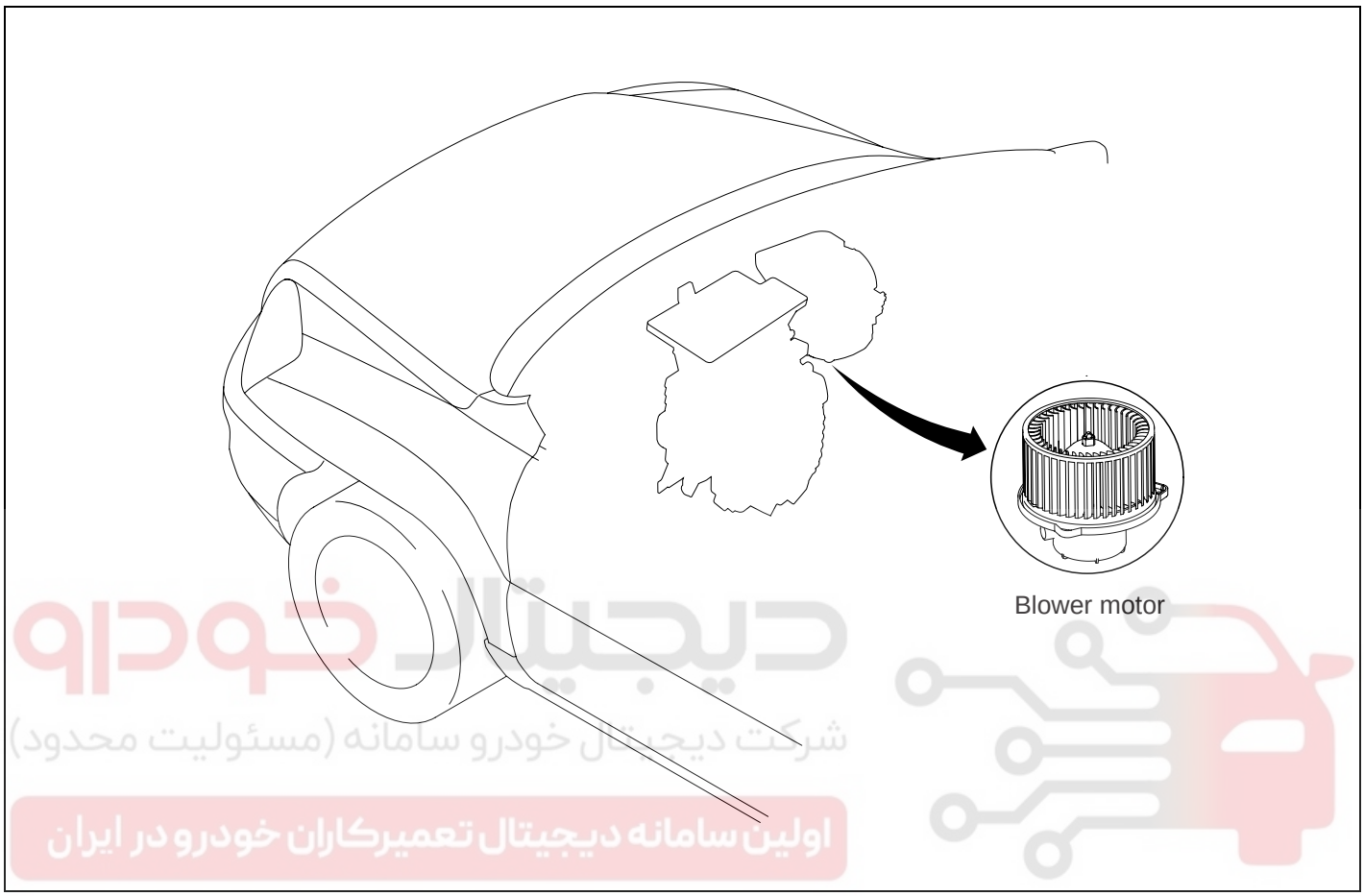
NOTE

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

4. Install in the reverse order of removal.

BLOWER MOTOR

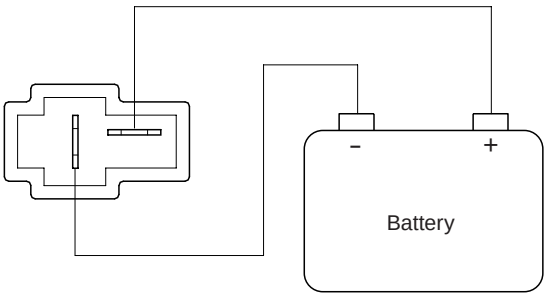
COMPONENTS E9DDB696



LQIF352A

INSPECTION E024FDD8

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

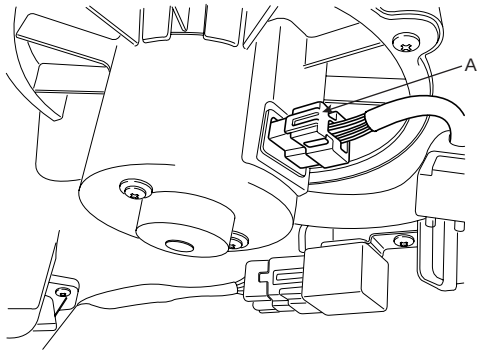


AQIE352C

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

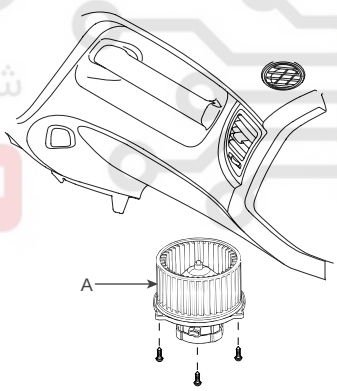
REPLACEMENT EEE74BB1

1. Disconnect the negative (-) battery terminal.
2. Disconnect the connector (A) of the blower motor.



AQIE352D

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

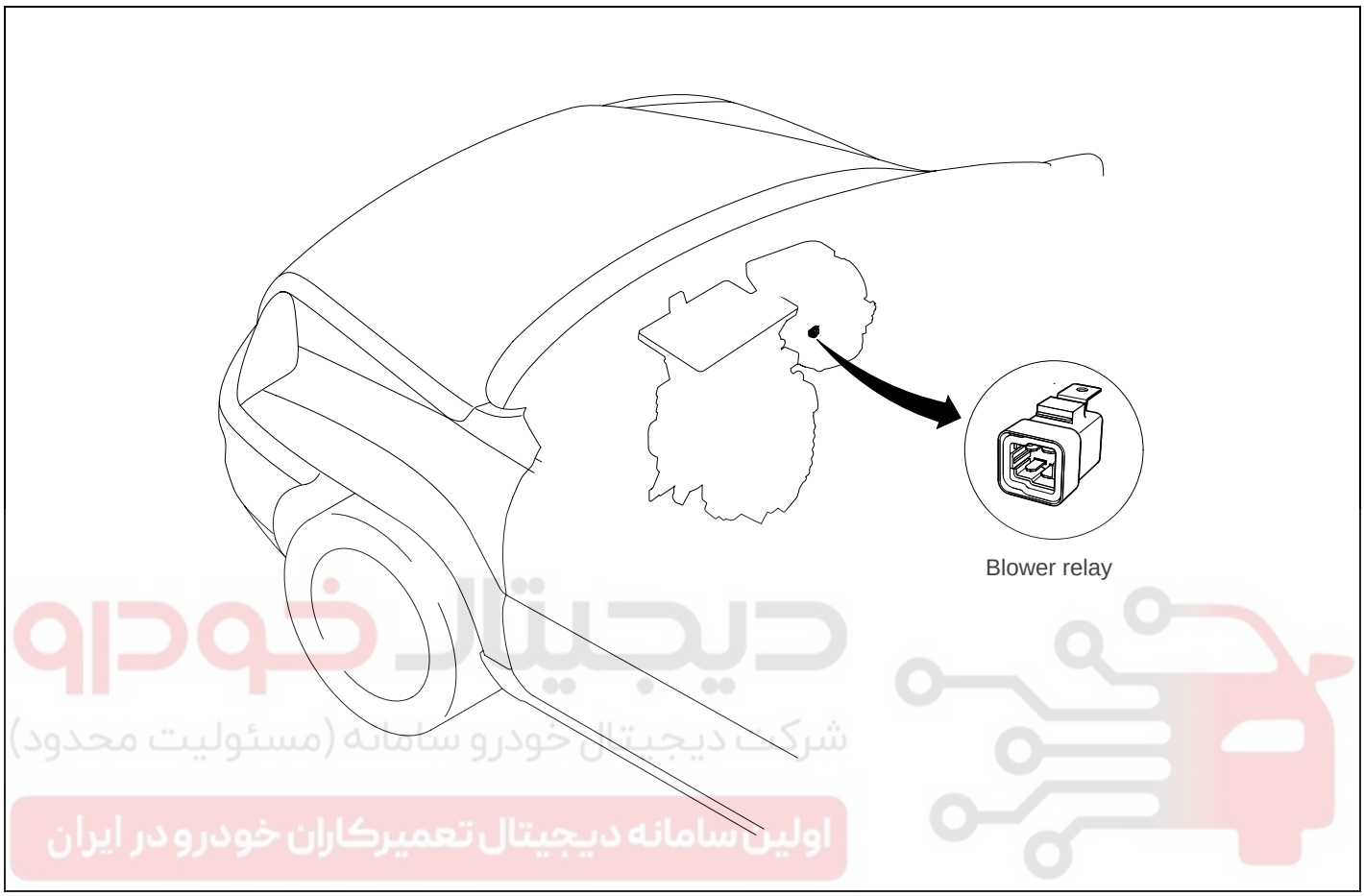


AQIE352B

4. Install in the reverse order of removal.

BLOWER RELAY

COMPONENT EF60991A

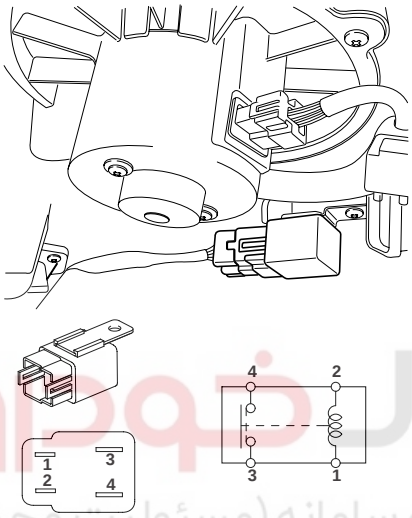


LQIF353A

INSPECTION EE7A25D1

Check for continuity between the terminals.

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.



AQIE353B

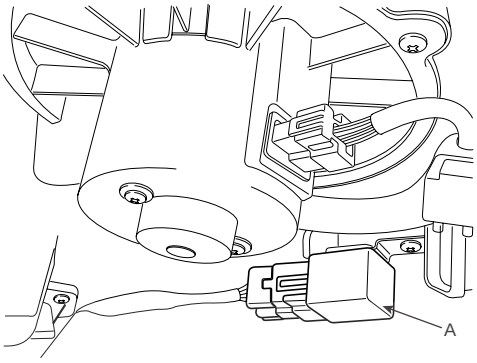
Terminal / Position	3	4	1	2
Power OFF			○	○
Power ON	○	○	⊕	⊖

LQGE353C

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

REPLACEMENT E364AE5D

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

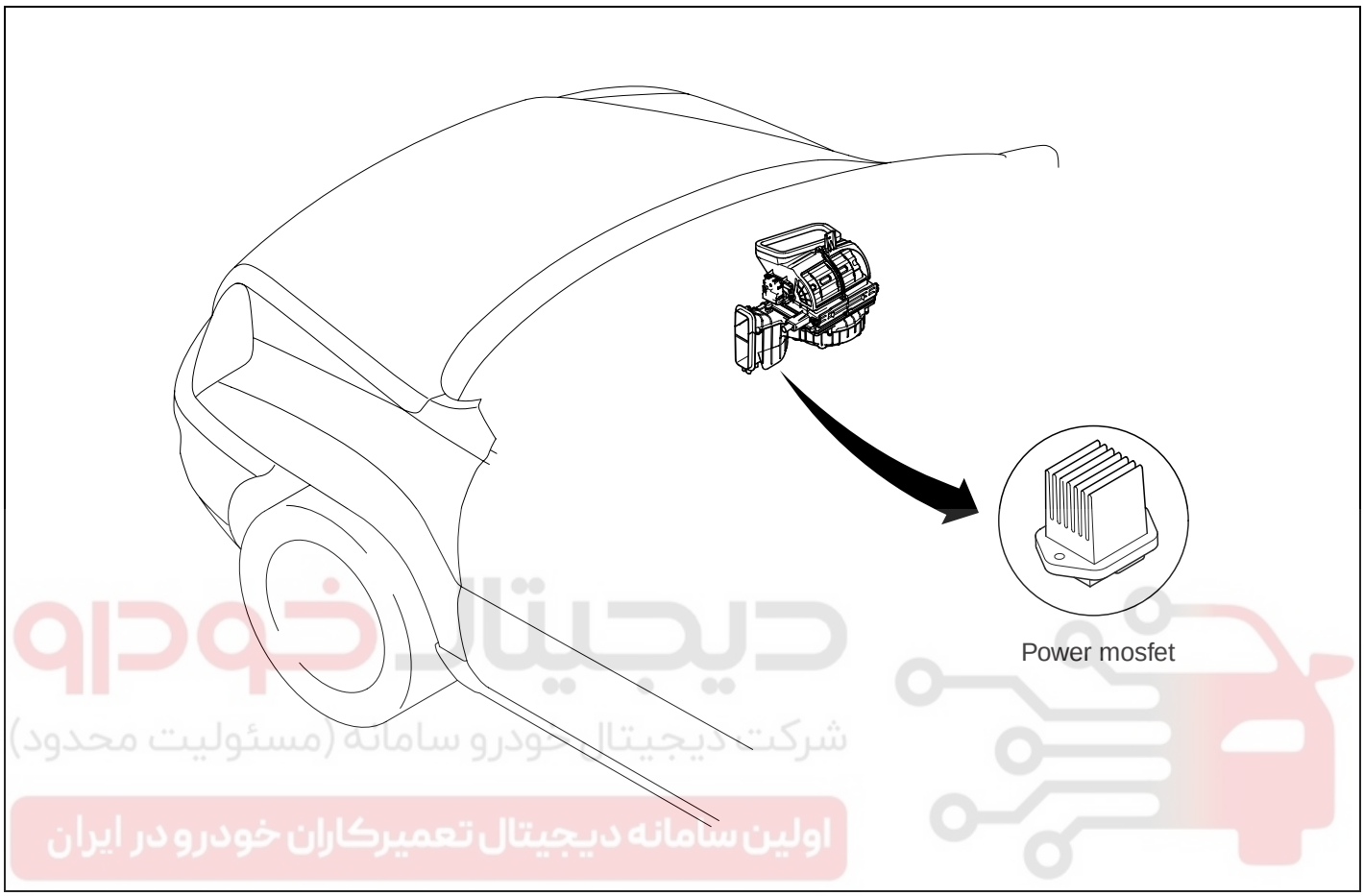


AQIE353D

4. Install in the reverse order of removal.

POWER MOSFET

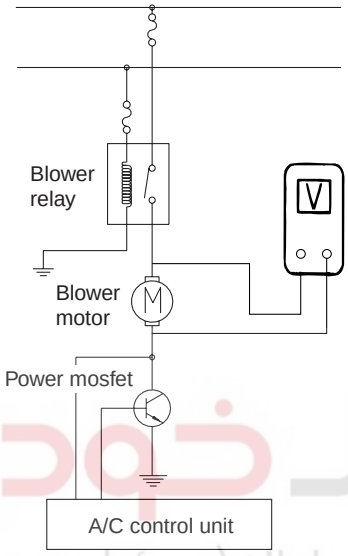
COMPONENT E21CCE8E



LQIF355A

INSPECTION EBEECAB5

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



LQIF355B

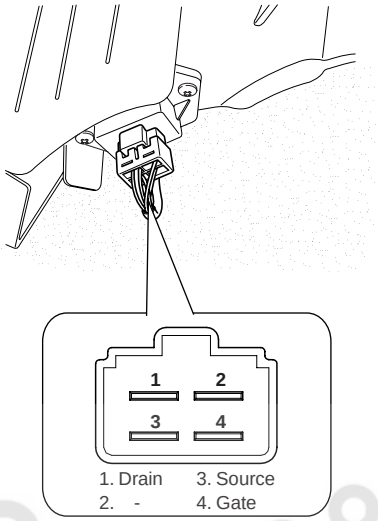
SPECIFICATION

Fan	Motor Voltage	
	Manual	Automatic
First speed	3.8 ±0.5V	3.8 ±0.5V
Second speed	4.8 ±0.5V	5.0 ±0.5V
Third speed	5.8 ±0.5V	6.2 ±0.5V
Fourth speed	6.8 ±0.5V	7.4 ±0.5V
Fifth speed	7.9 ±0.5V	8.6 ±0.5V
Sixth speed	8.9 ±0.5V	9.8 ±0.5V
Seventh speed	9.9 ±0.5V	11.0 ±0.5V
eighth speed	11.0 ±0.5V	Battery(+)
Ninth speed	Battery(+)	-

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

REPLACEMENT E3DA5ED1

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



LQIF355C

3. Remove the power mosfet after loosening the mounting screws.
4. Install in the reverse order of removal.

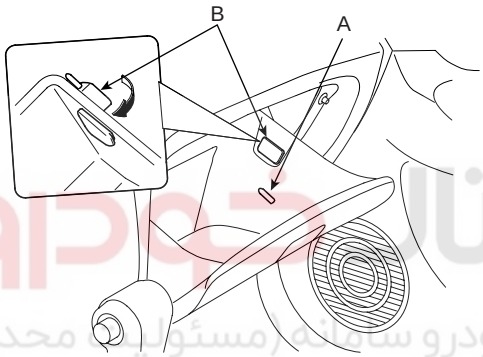
A/C AIR FILTER

DESCRIPTION EDAB9479

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.

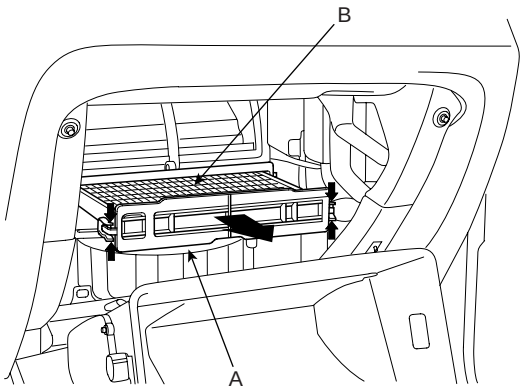
REPLACEMENT E56B5686

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



AQIE359A

2. Remove the filter cover (A) with pushing the knob.
3. Replace the air filter (B).



AQIE359B

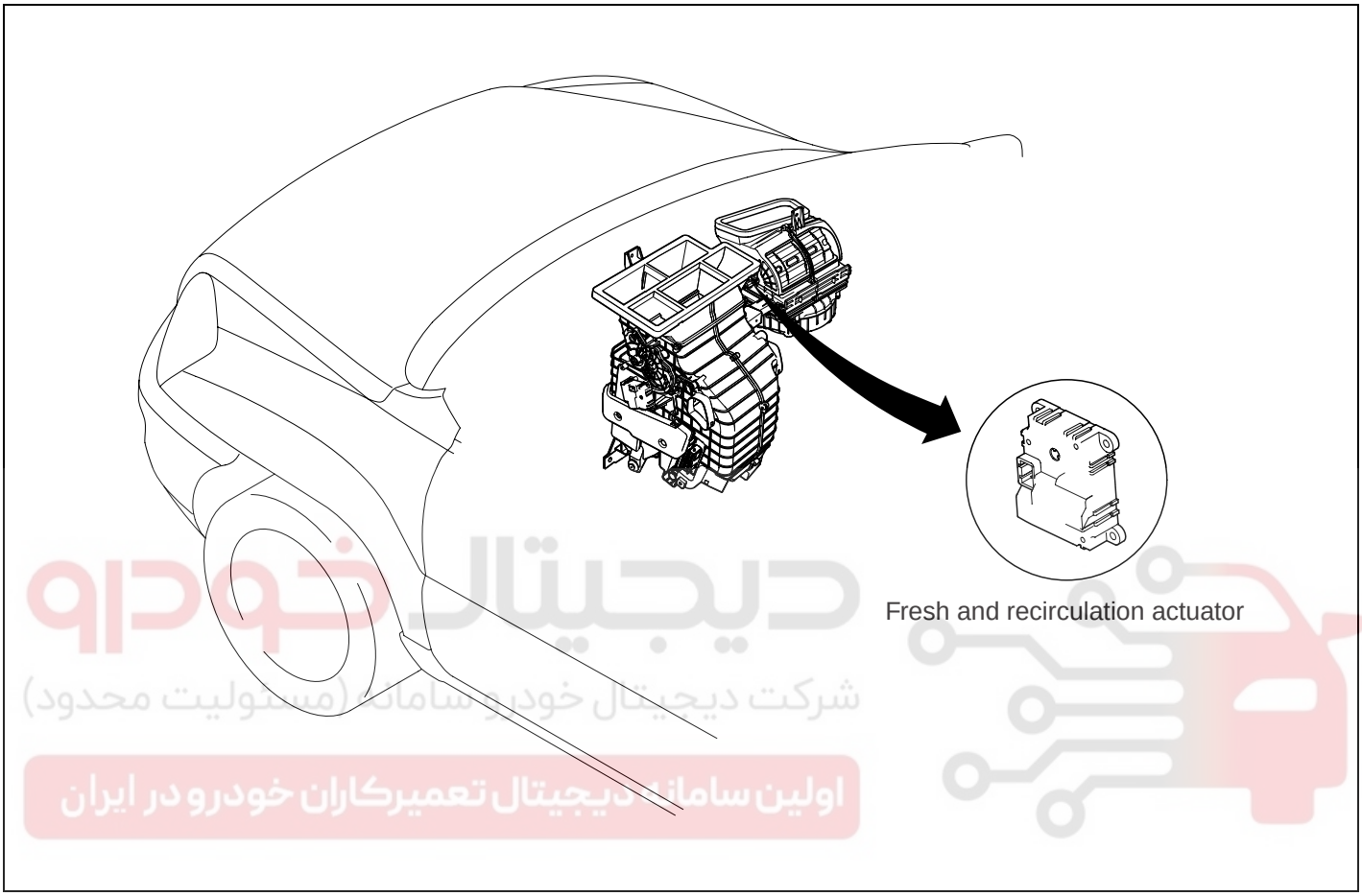
NOTE

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)

FRESH AND RECIRCULATION ACTUATOR

COMPONENT E2FAFFD4



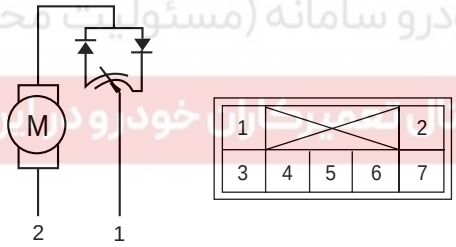
LQIF359C

DESCRIPTION EFFEC9CE

1. The fresh and recirculation 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 E2B83AB7

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

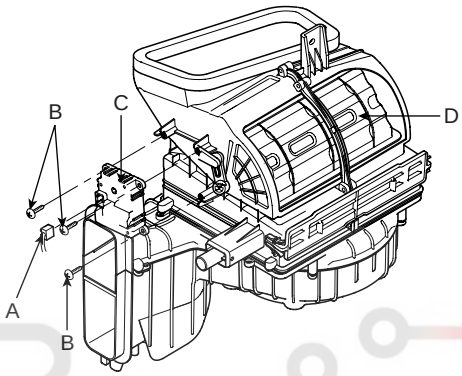


AQIE359D

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

REPLACEMENT E8DA964C

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



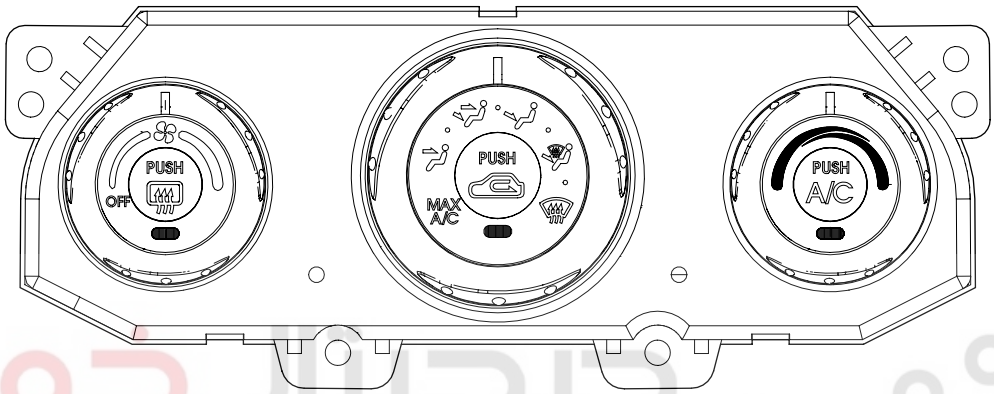
AQIE359E

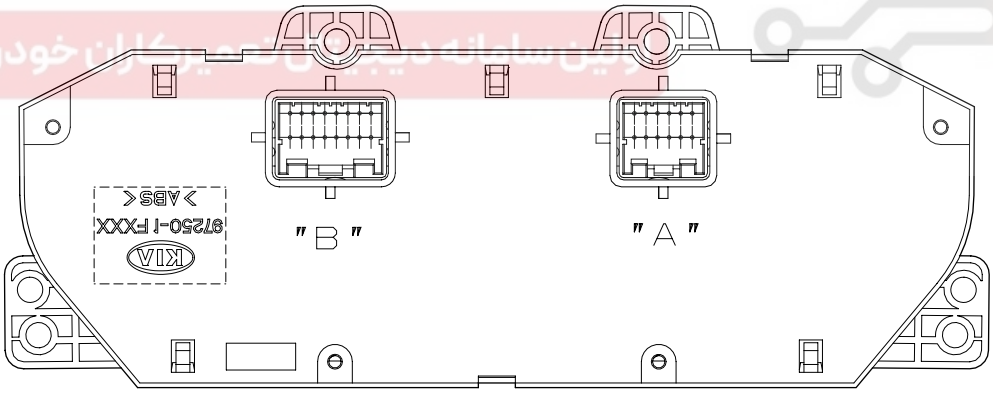
5. Install in the reverse order of removal.

BLOWER AND A/C CONTROLS (MANUAL)

CONTROL PANEL

COMPONENT EDA891D1





A1	A2	A3	A4	A5	A6
A7	A8	A9	A10	A11	A12

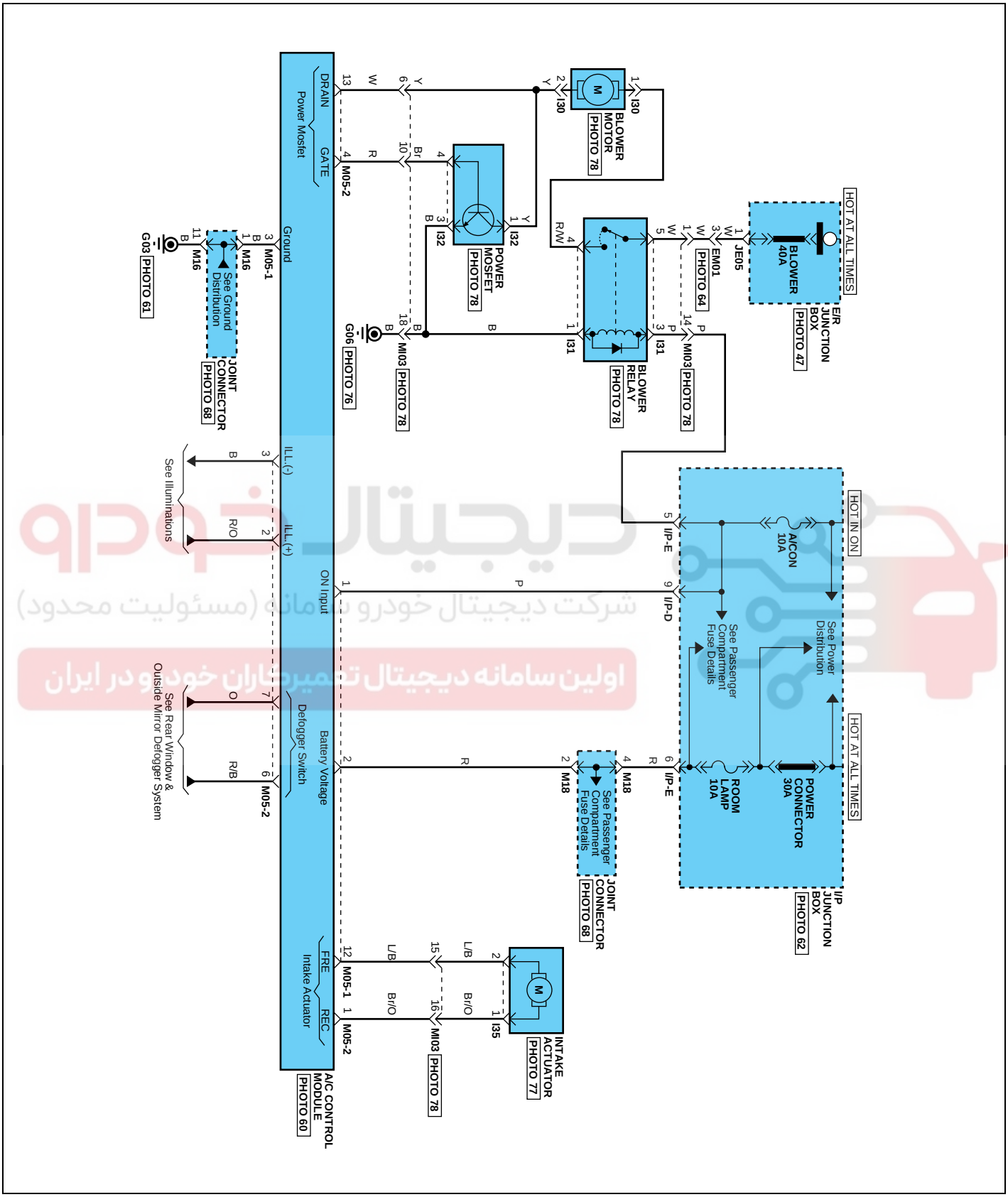
B1	B2	B3	B4	B5	B6	B7	B8
B9	B10	B11	B12	B13	B14	B15	B16

LQIF450A

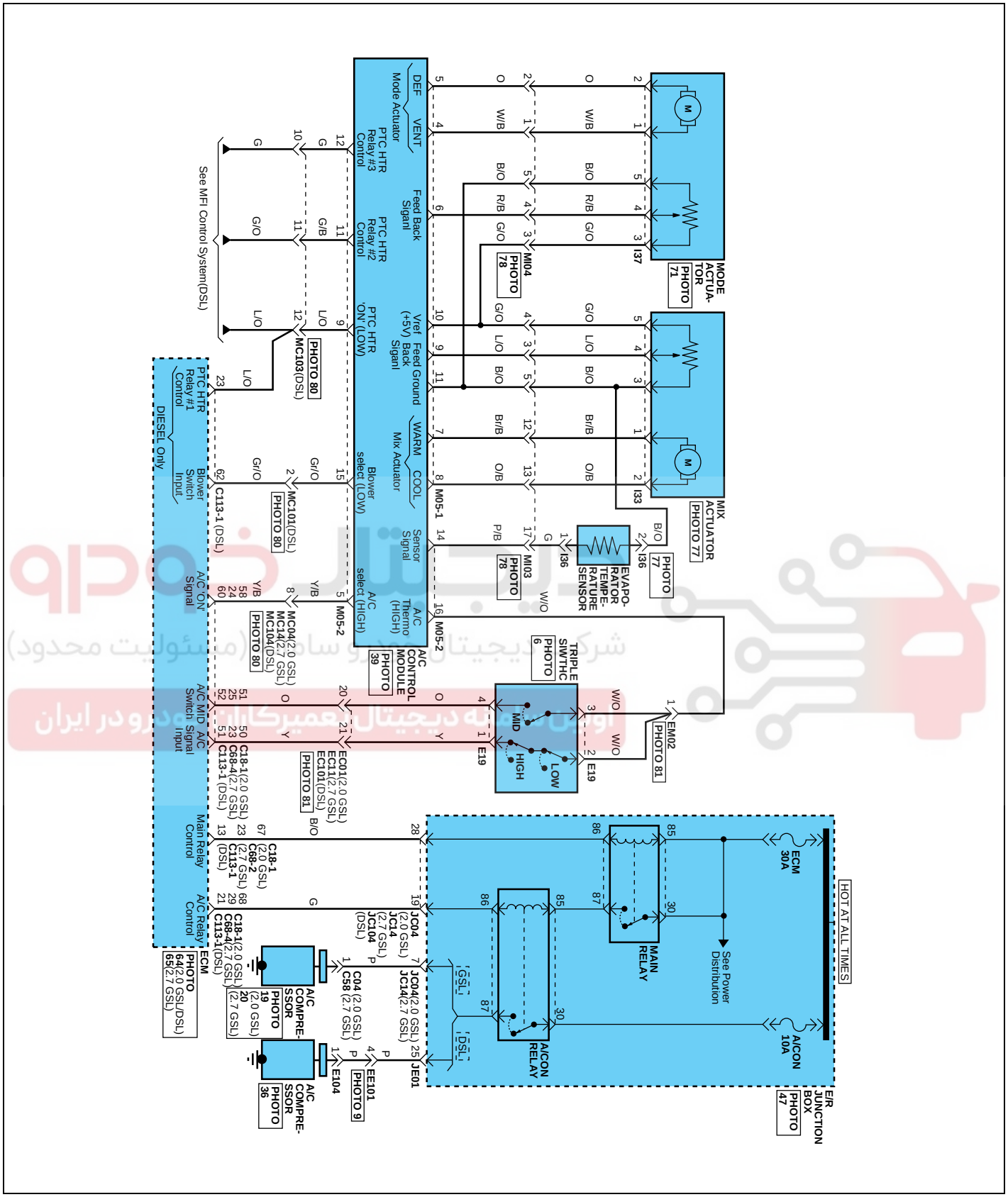
CONNECTOR PIN FUNCTION

CONNECTOR	PIN	FUNCTION	CONNECTOR	PIN	FUNCTION
Connector(A)	1	IG2	Connector (B)	1	Intake (Recirculation)
	2	Battery		2	Tail lamp(+)
	3	Ground		3	Rheostat
	4	Mode vent		4	Power mosfet (Gate)
	5	Mode defrost		5	A/C select
	6	Mode feedback		6	Rear defogger indicator
	7	Mix warm		7	Rear defogger switch
	8	Mix cool		8	-
	9	Mix feedback		9	PTC ON signal
	10	Sensor voltage(5V)		10	-
	11	Sensor ground		11	PTC2 relay(coil-)
	12	Intake (Fresh)		12	PTC3 relay(coil-)
				13	Power mosfet (Drain)
				14	Evaporator temperature sensor
				15	Blower select
				16	A/C output

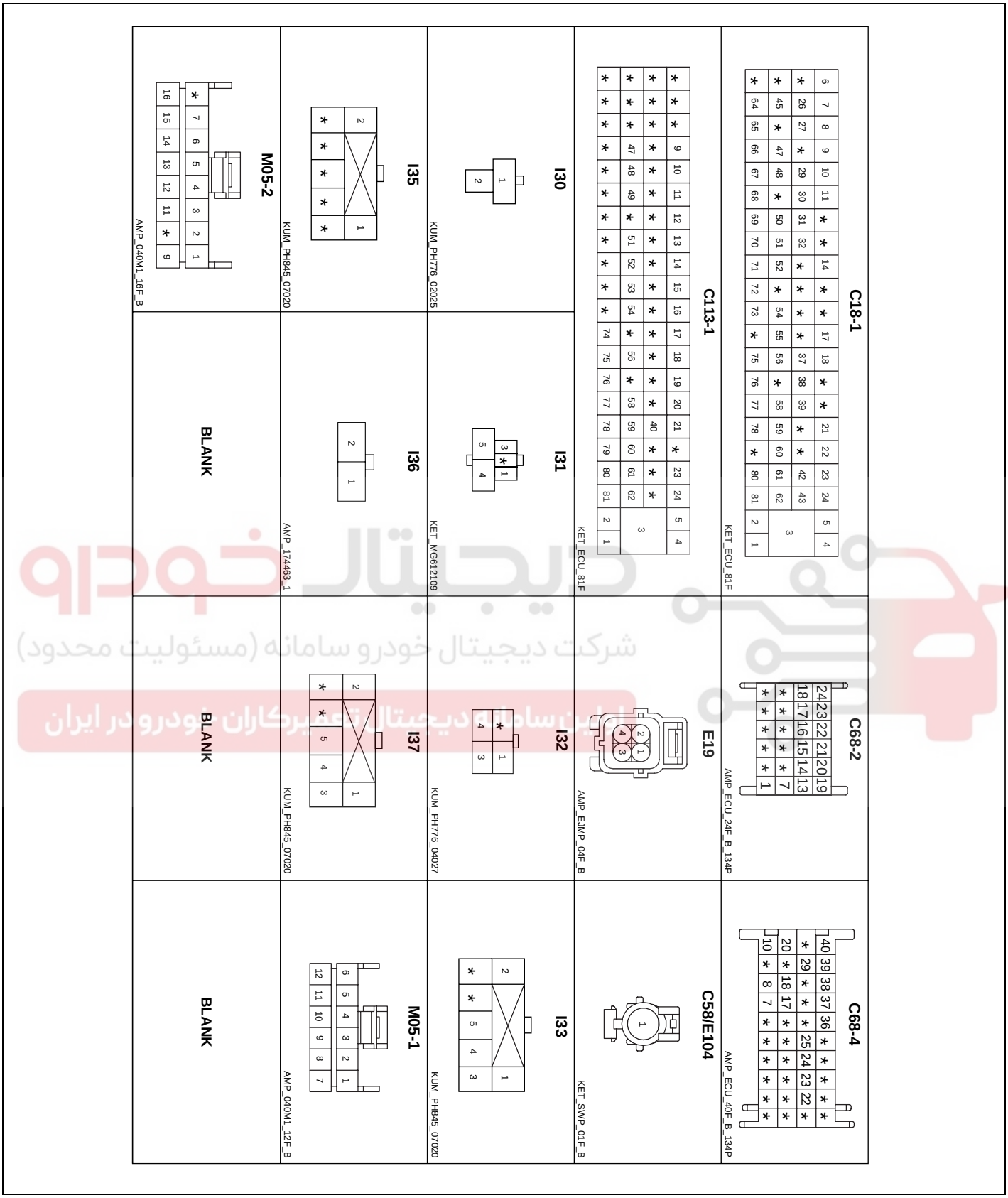
CIRCUIT DIAGRAM EB4EFEC2



LQIF451C



LQIF451D



LQIF451E

CONTROL LOGICS EEBCEFEA

1. Dissolution & reinstatement of logic

Specification	Control factor	Mix, Defrost	Floor	KEY ON	KEY OFF	Blower OFF	Blower ON	MAX A/C
Initial (Reinstatement)	A/C	ON (*1)	Previous	Previous	OFF	OFF	Previous off	ON(*2)
	Intake	Fresh (*1)	Previous	Fresh	Previous	Previous	Previous	Recirculation (*2)
Dissolution	A/C	Previous (*1)	Previous	Previous	OFF	OFF	Previous off	ON(*2)
	Intake	Previous (*1)	Previous	Previous	Previous	Previous	Previous	Recirculation (*2)

*1 : User is able to select, *2 : User is not able to select.

LQIF451G

NOTE

- *When selecting MAX A/C: A/C is ON and vent mode is selected.*
- *When selecting other modes from MAX A/C: It goes back in previously condition.*

2. Dissolution & reinstatement of logic procedure

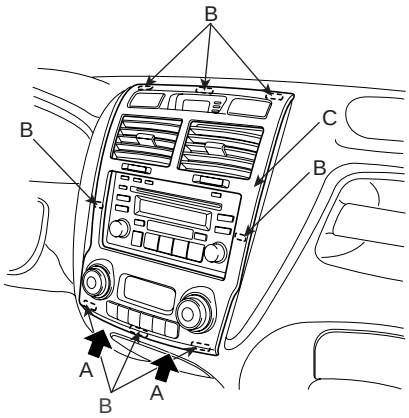
1) Ignition "ON".
2) Turn off the blower switch.
3) Move to defrost mode.
4) Press the intake button more than 5 times within 3 seconds.
5) Indicator of intake button is flashed 3 times.
6) Dissolution & reinstatement of logic is completed.
7) A/C and intake status is initialized to "A/C off" and "fresh status"

NOTE

When the battery happens to be disconnected or discharged, the logic is reinstated.

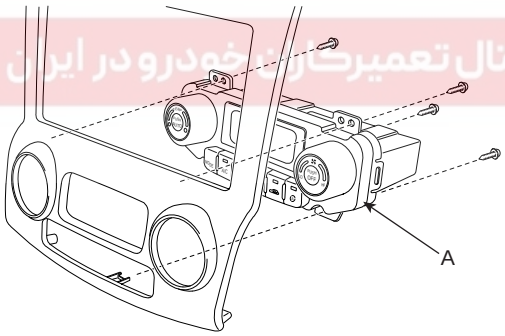
REPLACEMENT E9F9CC9C

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (C) after pulling it by using a screw driver (-) at part (A).
   Take care of fixing clips (B).



ATIE021A

3. Disconnect the connectors from the center facia.
4. Remove the blower and A/C control unit (A).



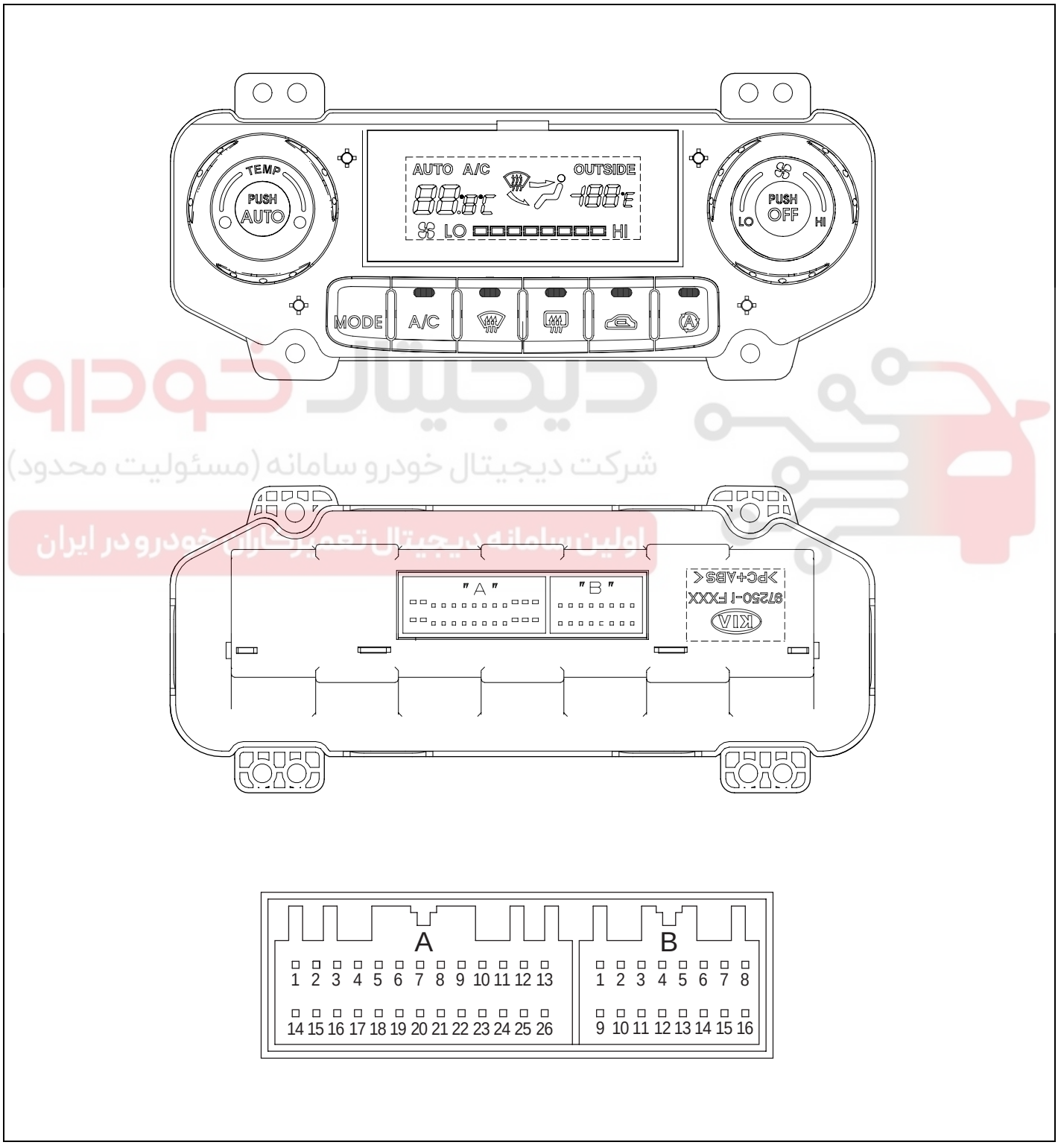
AQIE451F

5. Install in the reverse order of removal.

BLOWER AND A/C CONTROLS (AUTOMATIC)

CONTROL PANEL

COMPONENT EE8BF1DF



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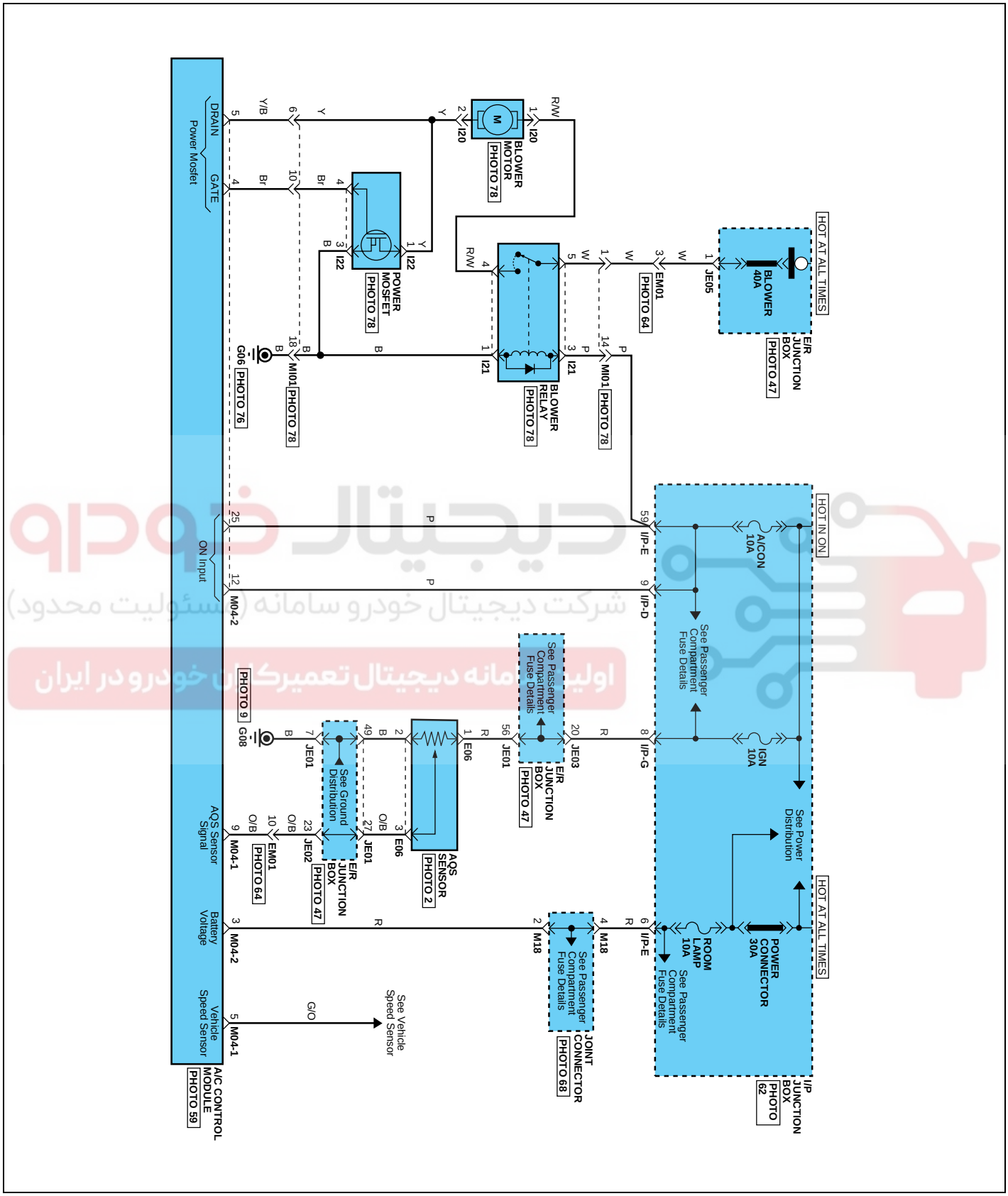
CONNECTOR PIN FUNCTION

CONNECTOR	PIN	FUNCTION	CONNECTOR	PIN	FUNCTION
CONNECTOR (A)	1	Rheostat	CONNECTOR (B)	1	In car sensor
	2	Tail lamp (+)		2	A/C select signal
	3	Battery (+)		3	Ambient sensor (+)
	4	Power mosfet (Gate)		4	Evaporator temperature sensor (+)
	5	Power mosfet (Drain)		5	Speed sensor
	6	PTC on signal		6	Diagnostic tool
	7	In car sensor motor (+)		7	Humidity sensor
	8	In car sensor motor (-)		8	Sensor voltage (5V)
	9	Mix cool		9	AQS
	10	Intake fresh		10	Mix feedback
	11	Rear defogger indicator		11	Mode feedback
	12	IG2		12	Photo sensor (+)
	13	Ground		13	Photo sensor ground
	14	Mode vent		14	Water temperature output
	15	Mode defrost		15	-
	16	-		16	Sensor ground
	17	A/C output			
	18	-			
	19	PTC2 relay (coil-)			
	20	PTC3 relay (coil-)			
	21	Rear defogger switch			
	22	Mix warm			
	23	Intake recirculation			
	24	Blower select signal			
	25	IG2			
	26	Ground			

CIRCUIT DIAGRAM EC61D6DC



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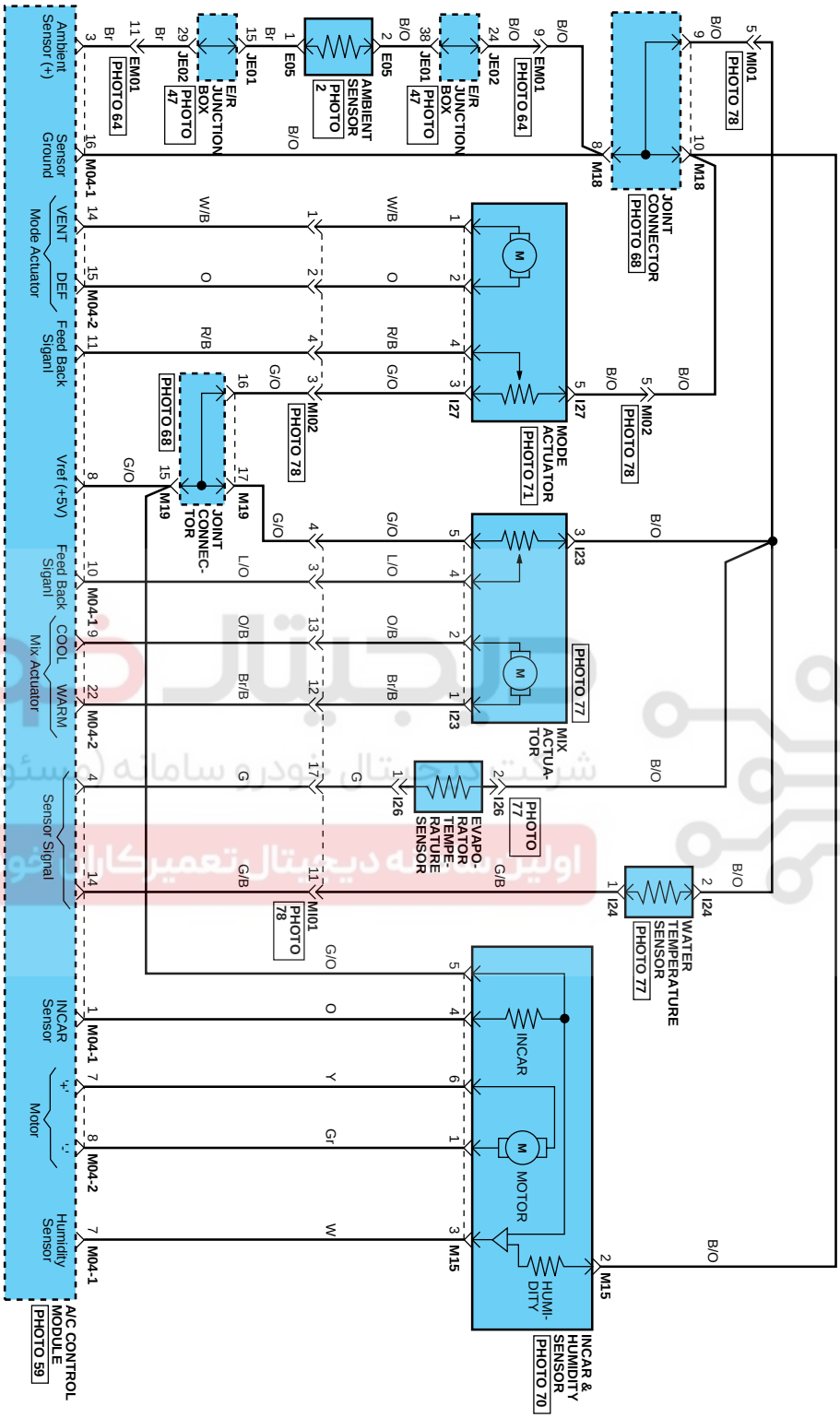

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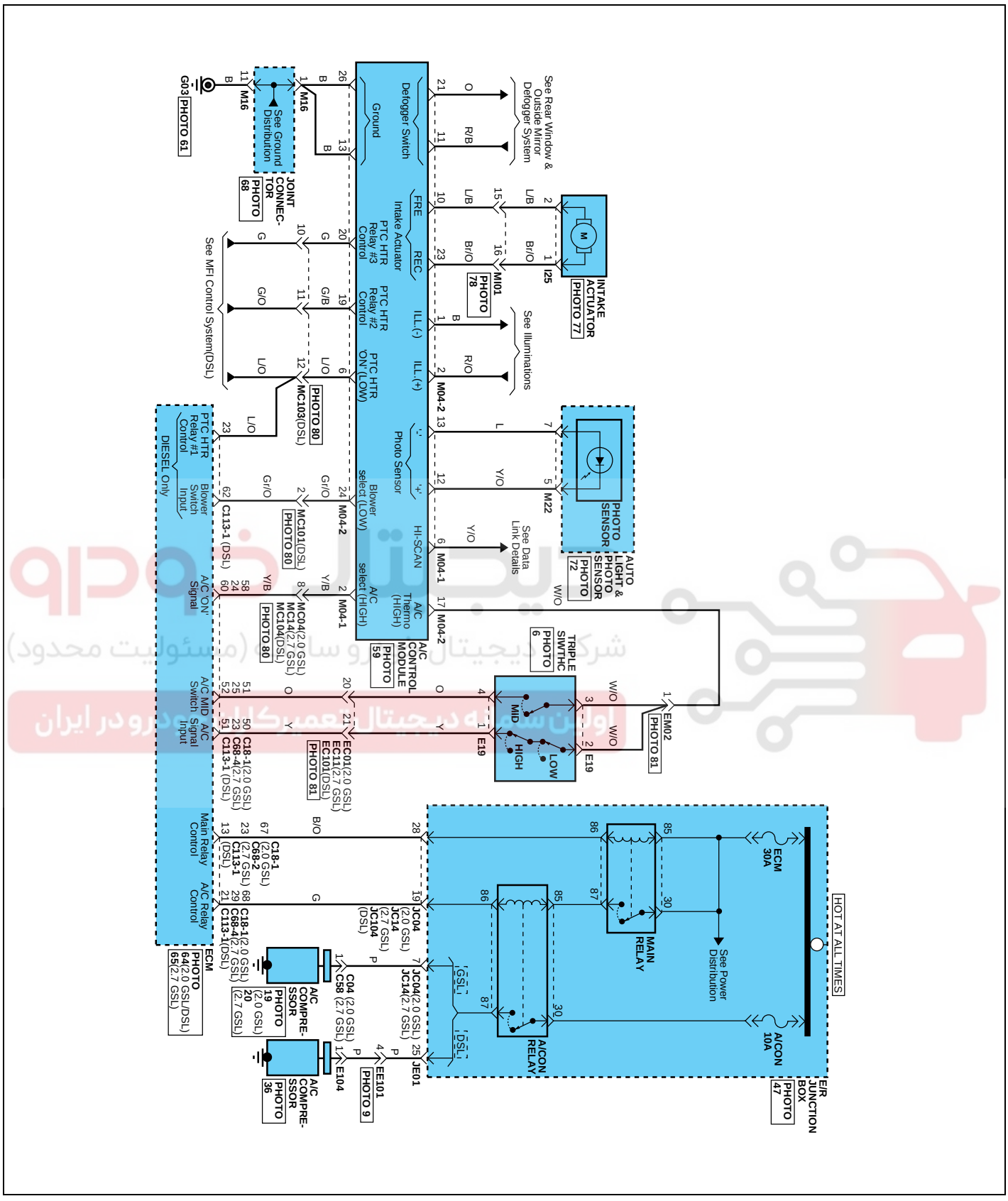

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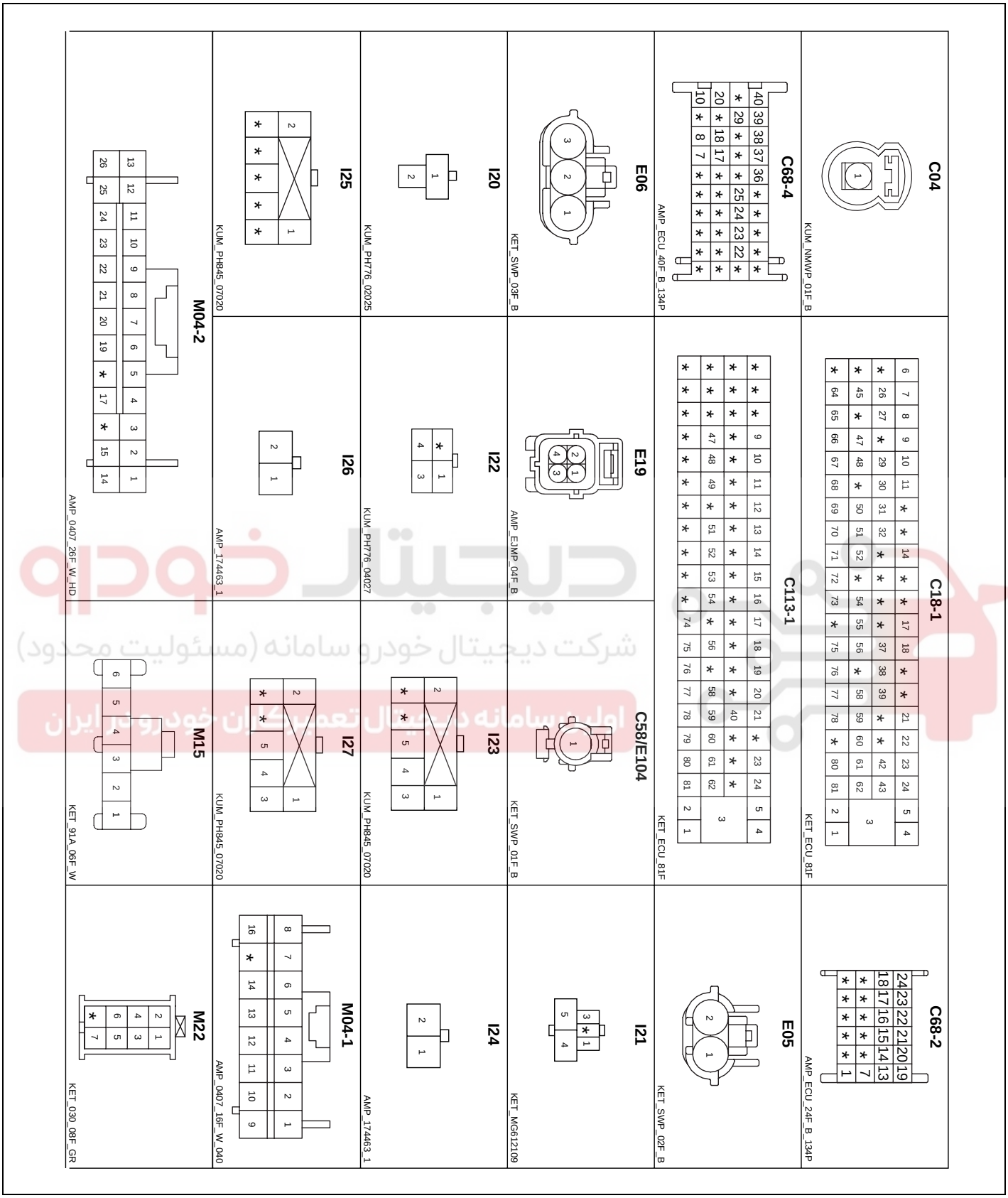

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CONTROL LOGICS E1BEE06E

1. Intake & A/C control logics

Mode	Intake		A/C	
	IG "ON"	System "ON"	IG "ON"	System "ON"
Vent, Bi-level	Memory	Previous	Memory	Previous
Floor	Fresh (*1)	Previous	Memory	Previous
Mix, Defrost	Fresh (*1)	Fresh (*1)	ON (*1)	Previous

NOTE

**1: User is able to select*

2. Dissolution & reinstatement of defrost logic

Specification	Control factor	Mix, Defrost	KEY ON	KEY OFF
Initial (Reinstatement)	A/C	ON	Previous	OFF
	Intake	Fresh	Fresh	Fresh
Dissolution	A/C	Previous	Previous	OFF
	Intake	Previous	Previous	Previous

3. Dissolution & reinstatement of defrost logic procedure

1) Ignition "ON".
2) Move to defrost mode.
3) Press intake button more than 5 times within 3 seconds while holding A/C switch down.
4) Graphics of the entire LCD display switch on and off 3 times with an interval of 0.5 seconds.
5) Dissolution & reinstatement of logic is completed.
6) A/C and intake status is initialized to "A/C off" and "fresh status".

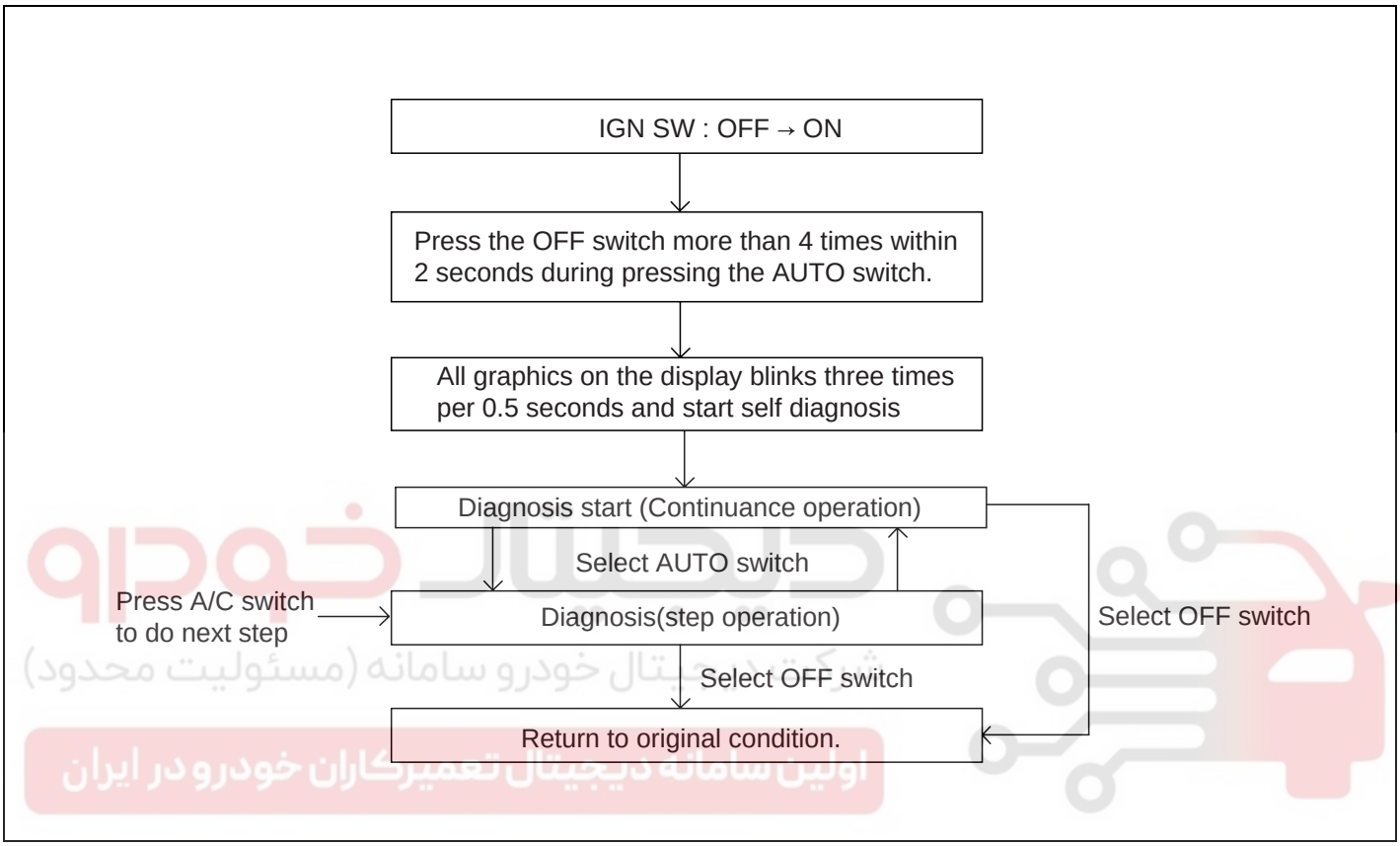
NOTE

When the battery happens to be disconnected or discharged, the logic is reinstated.

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.



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NOTE

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

HOW TO READ SELF-DIAGNOSTIC CODE

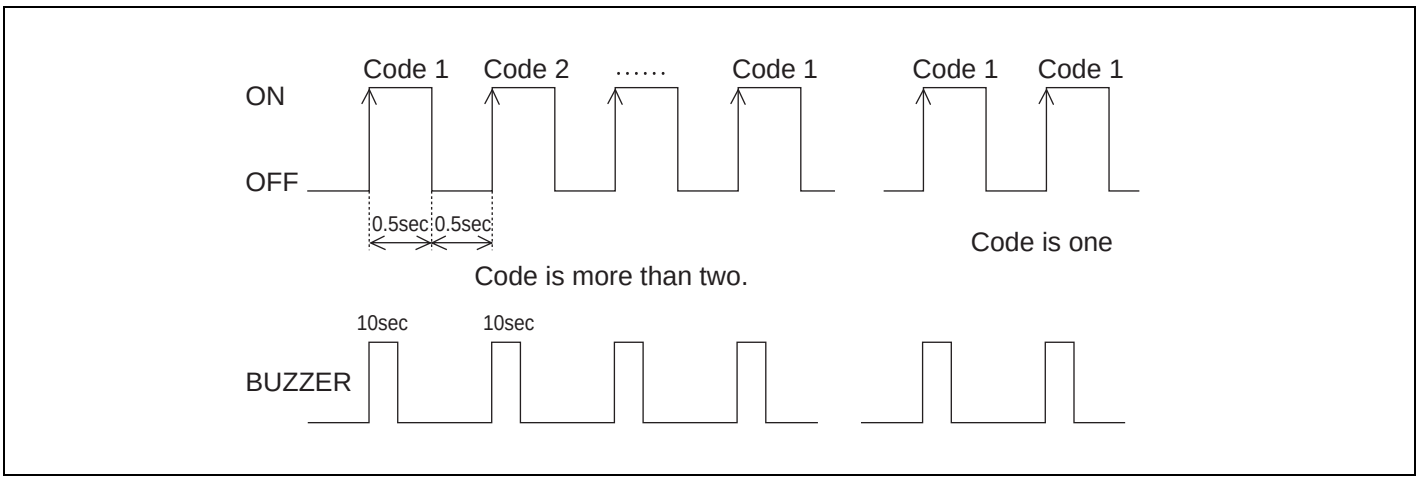
1. After the display panel flickers three times every 0.5 second, the corresponding fault code flickers on the setup temperature display panel every 0.5 second and will show two figures.

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 (Driver)
21	B1249	Direction potentiometer open (Low) - Driver
21	B1250	Direction potentiometer short (High) - Driver
22	B2409	Direction control motor (Driver)
23	B1200	Humidity sensor open (High)
24	B1201	Humidity sensor short (Low)

3. Fault code display

1) Continuance operation



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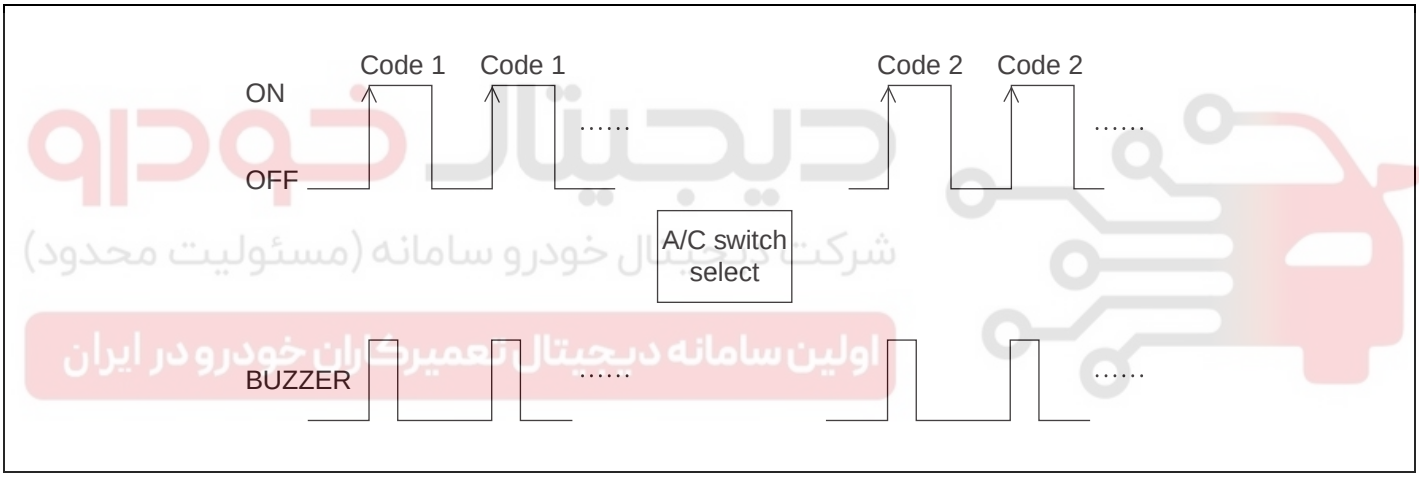
2) Step operation



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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 23°C(73.4°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%

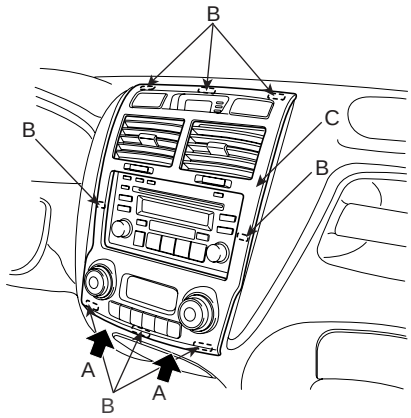
5) Photo sensor: None

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 except vent mode.

REPLACEMENT E7F5A3FD

1. Disconnect the negative (-) battery terminal.
2. Remove the center facia panel (C) after pulling it by using a screw driver (-) at part (A).
   Take care of fixing clips (B).



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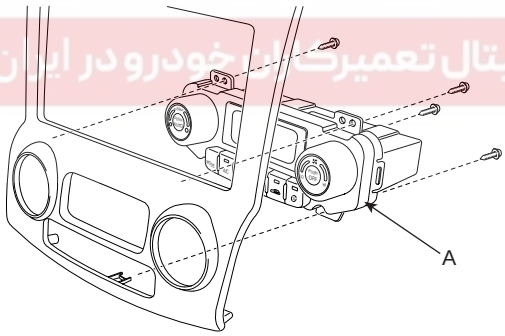
3. Disconnect the connectors from the center facia.
4. Remove the blower And A/C control unit (A).



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5. Install in the reverse order of removal.