Heating, Ventilation & Air Conditioning

GENERAL

EQHA0010

SPECIFICATIONS

		2.0L, I4		2.7L, V6	
Compressor	Type	HS-18 (SWASH TYPE)		←	
	OIL (FD46 X G)	SIGNLE	DUAL	SIGNLE	DUAL
		150g	210g	150g	210g
	Capacity	180cc/rev		←	
	Thermal fuse	184°C OFF		←	
Refrigerant and quantity		670g (R-134a)	850g (R-134a)	670g (R-134a)	850g (R-134a)
Condensor	Quantity	290cc		←	
	Size	687W x 360.8H x 20T		←	
Heater Core	Type	Dimple		←	
Tripple Switch (Kgf/cm^2)	H/P	32.0 ± 2.0		←	
	M/P	14.0 ± 1.2		←	
	L/P	2.3 ± 0.25		←	

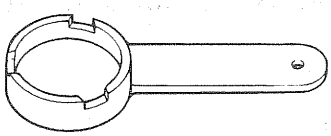
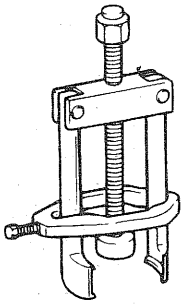
* H/P : High Pressure

M/P : Middle Pressure

L/P : Low Pressure

SPECIAL TOOLS

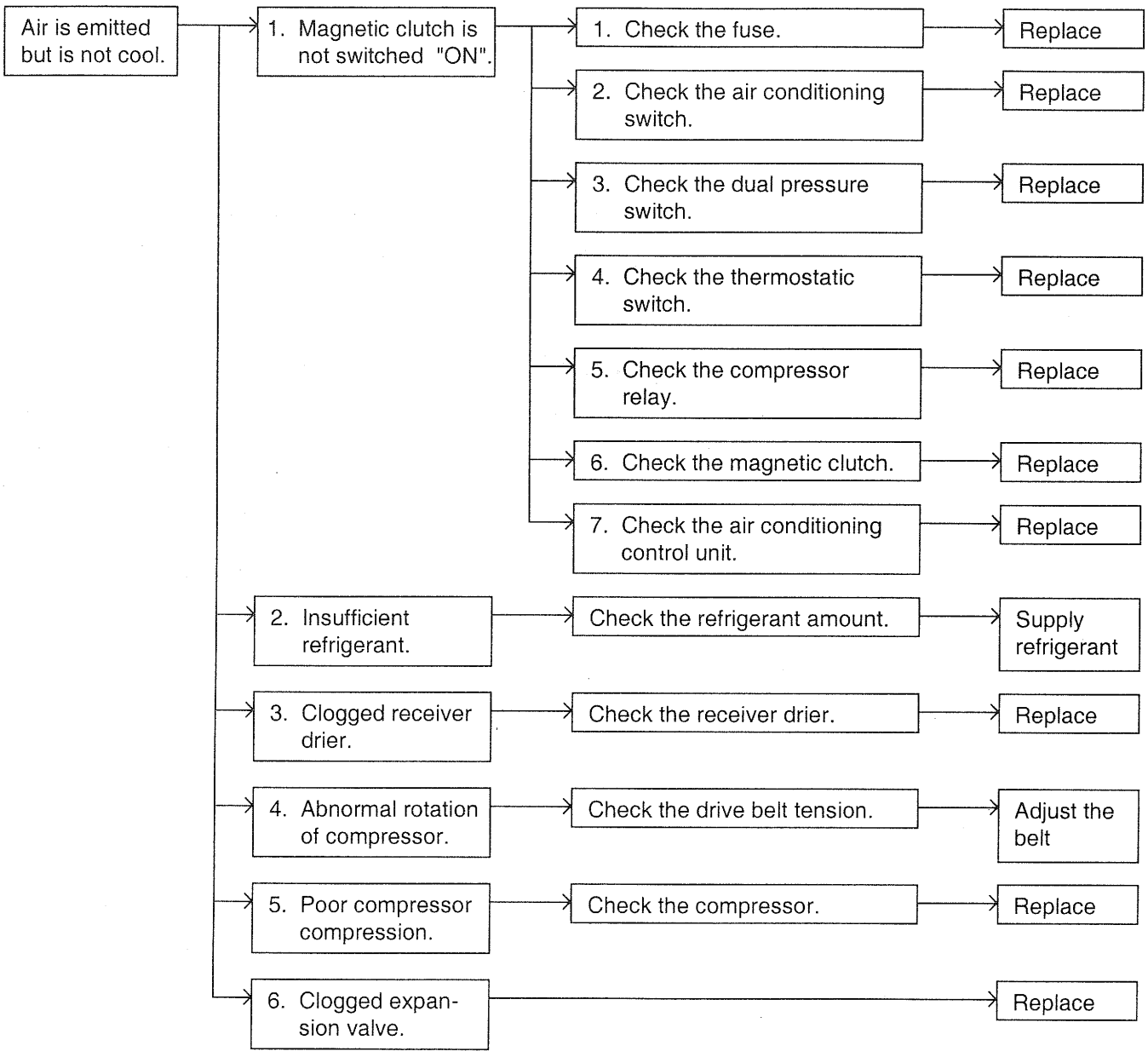
EQHA0050

Tool (Number and name)	Illustration	Use
09977-29000 Pressure plate bolt remover	 EQA9002A	Removal and installation of pressure plate
09455-34000 Bearing and gear puller	 EQA9002B	Removal of field coil

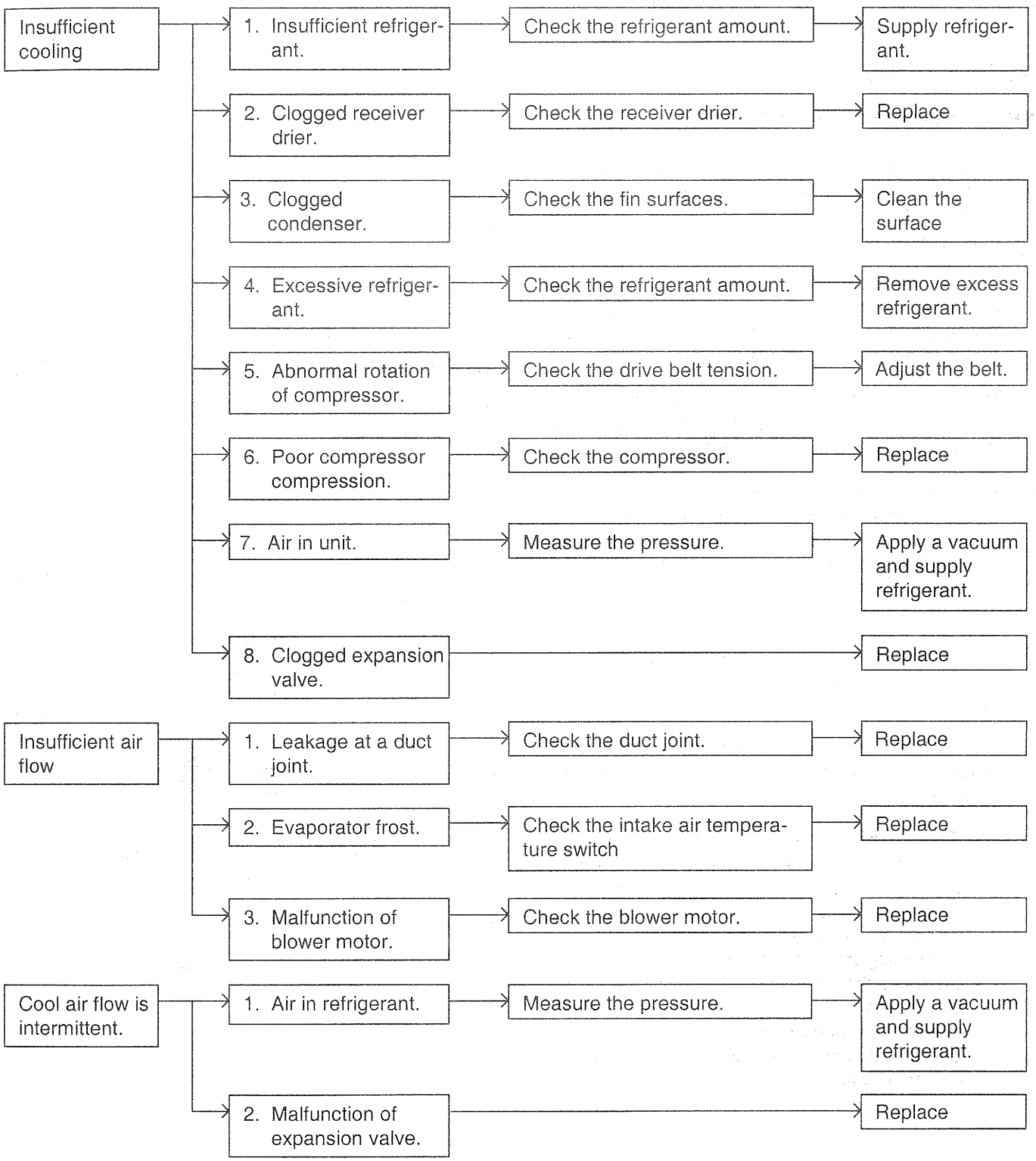
TROUBLESHOOTING EQHA0100

Before replacing or repairing air conditioning components, first determine if the malfunction is due to the refrigerant charge, air flow or compressor. The following diagnostic charts have been developed as a quick reference for determining the cause of the malfunction. If these charts do not satisfactorily describe the problem, refer to the appropriate section for a more detailed explanation. After correcting the malfunction, check the complete system to ensure that performance is satisfactory.

MALFUNCTION CAUSES AND REMEDIES (NUMBERS INDICATE CHECKING/INSPECTION ORDER.)



EQHA010A


Insufficient cooling
1. Insufficient refrigerant.
Check the refrigerant amount.
Supply refrigerant.
2. Clogged receiver drier.
Check the receiver drier.
Replace
3. Clogged condenser.
Check the fin surfaces.
Clean the surface
4. Excessive refrigerant.
Check the refrigerant amount.
Remove excess refrigerant.
5. Abnormal rotation of compressor.
Check the drive belt tension.
Adjust the belt.
6. Poor compressor compression.
Check the compressor.
Replace
7. Air in unit.
Measure the pressure.
Apply a vacuum and supply refrigerant.
8. Clogged expansion valve.
Replace
Insufficient air flow
1. Leakage at a duct joint.
Check the duct joint.
Replace
2. Evaporator frost.
Check the intake air temperature switch
Replace
3. Malfunction of blower motor.
Check the blower motor.
Replace
Cool air flow is intermittent.
1. Air in refrigerant.
Measure the pressure.
Apply a vacuum and supply refrigerant.
2. Malfunction of expansion valve.
Replace

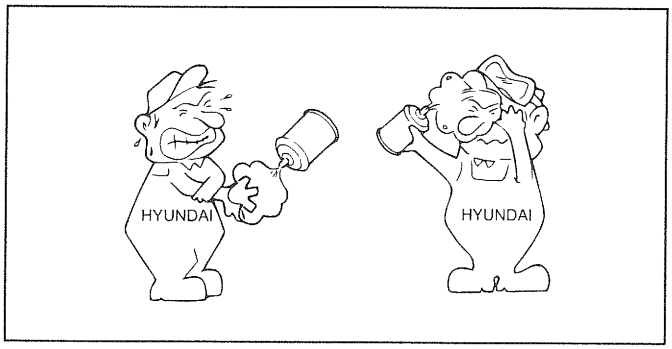
EQHA010B

AIR CONDITIONING SYSTEM

INSTRUCTIONS EQDA0100

WHEN HANDLING REFRIGERANT

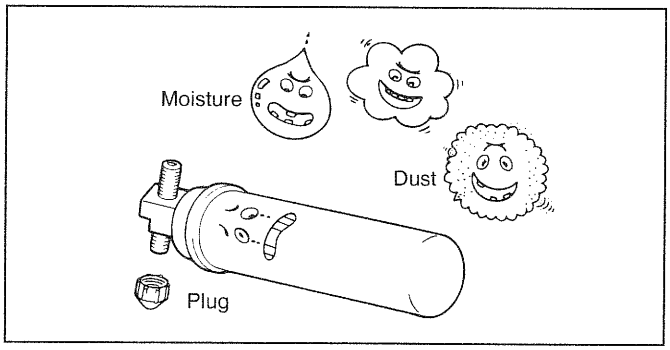
1. R-134a liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. If the refrigerant splashes into your eyes, wash them with clean water immediately. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands.
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. A leak detector is often used to check the system for refrigerant leakage. Bear in mind that the R-134a, upon coming into contact with flame (this detector burns propane to produce a small flame), produces phosgene and a toxic gas.
5. Use only recommended lubricant for R-134a A/C system and components. If lubricants other but recommended one used are system failure may occur.
6. The 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 A/C system 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 entry of 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.



EQDA010A

WHEN REPLACING PARTS ON A/C SYSTEM

1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings with a cap or plug immediately in disconnected parts 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.

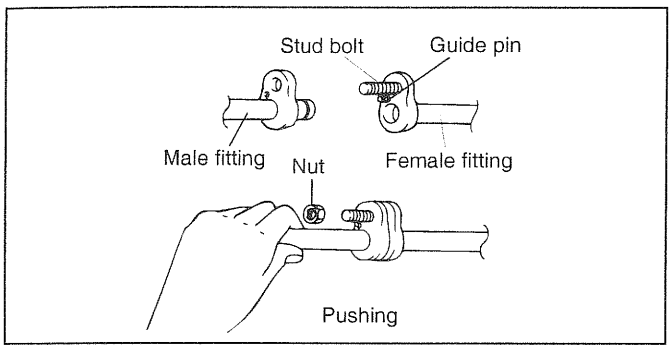


EQDA010B

WHEN INSTALLING CONNECTING PARTS

FLANGE WITH GUIDE PIN

Check the new O-ring for damage or something missed (use only specified one) and lubricate using compressor oil. Tighten with hand the nut by pushing the one side pipe. Tighten the nut to specified torque.



EQDA010C

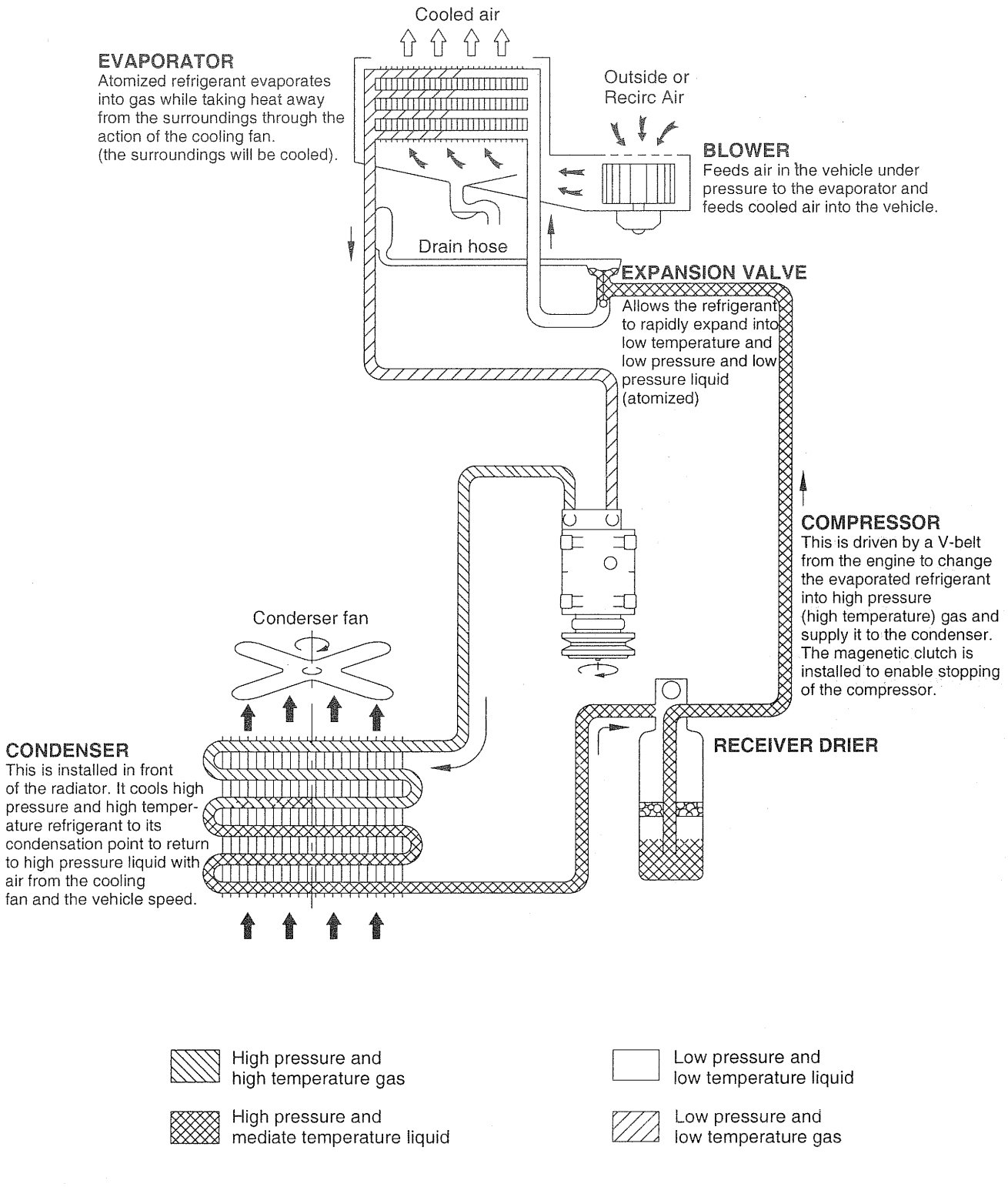
HANDLING TUBING AND FITTINGS

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 rebend 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.

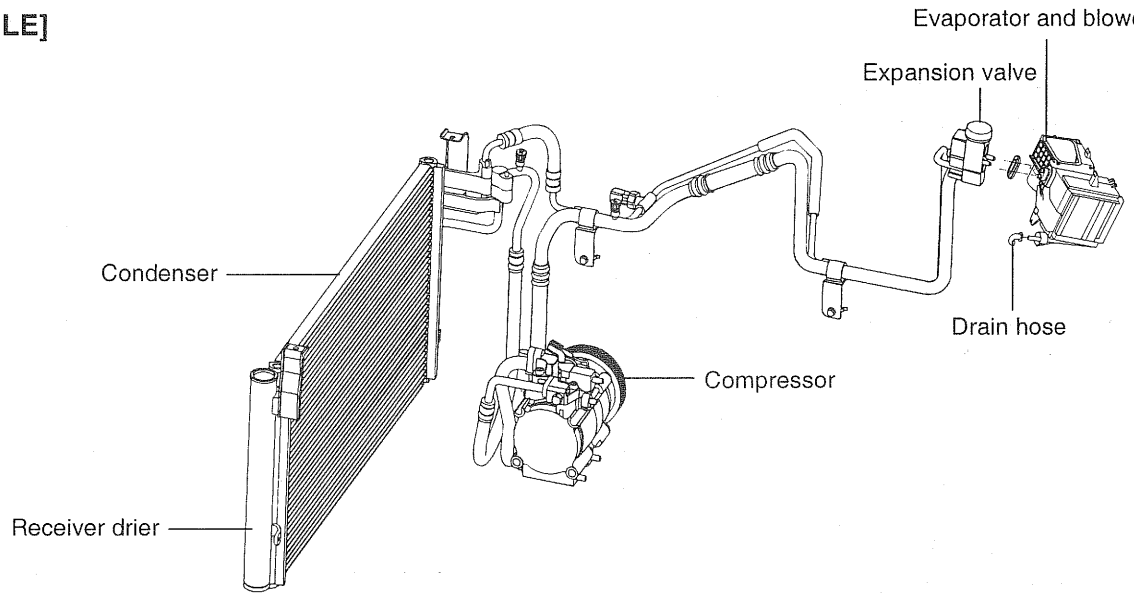
REFRIGERATION CYCLE EQHA0200



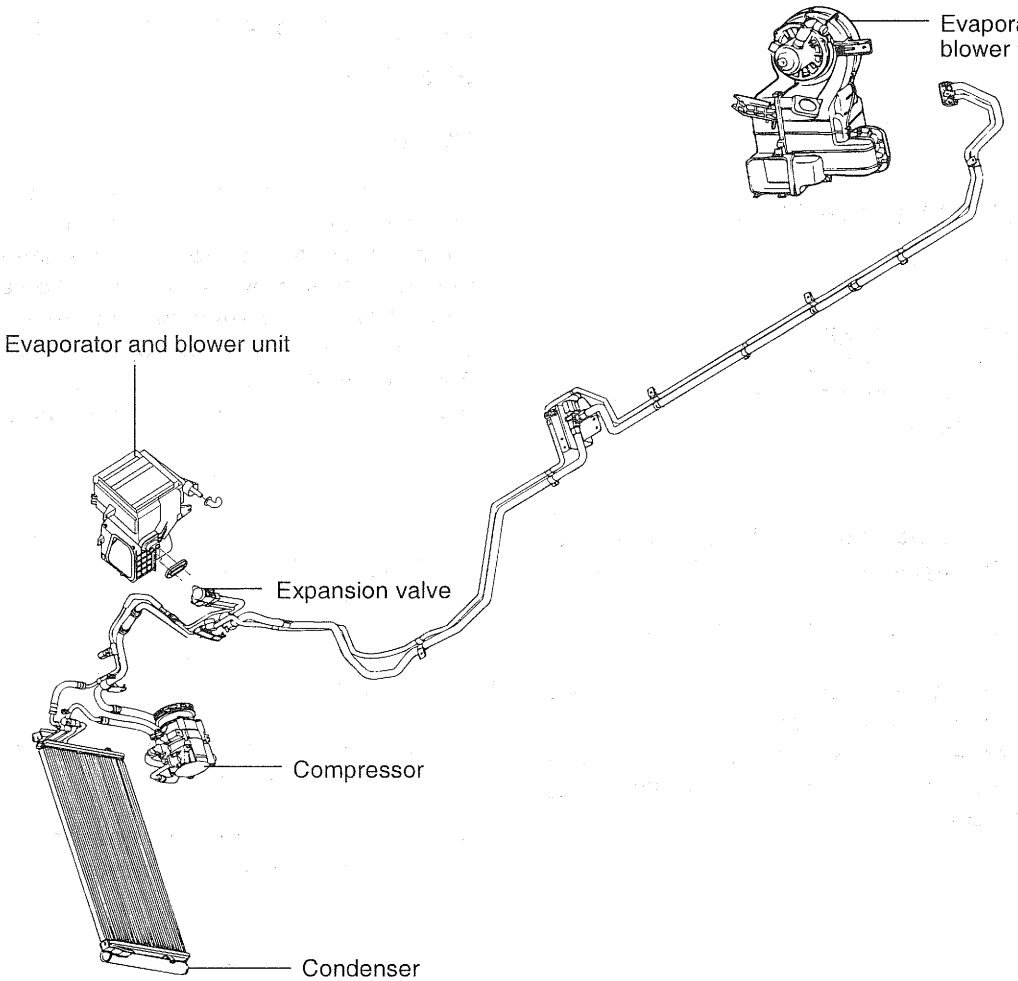
JCW97002

COMPONENTS EQHA0250

[SINGLE]



[DUAL]



EQHA001A+EQHA001B+KFWD042A

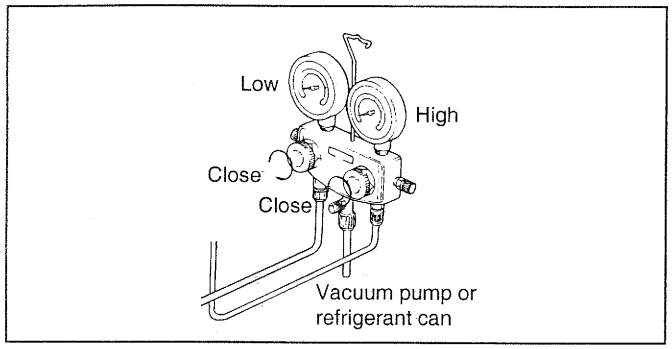
EQHA025A

INSTALLATION OF MANIFOLD GAUGE SET EQHA0300

CAUTION

When connecting the manifold gauge set test hoses, be sure to observe all safety precautions.

1. Close both hand valves of the manifold gauge fittings.
2. Install the charging hoses of the gauge set to the fittings. Connect the low-pressure hose to the low-pressure service port, and the high-pressure hose to the high-pressure service port. Tighten the hose nuts by hand.



EQHA030A

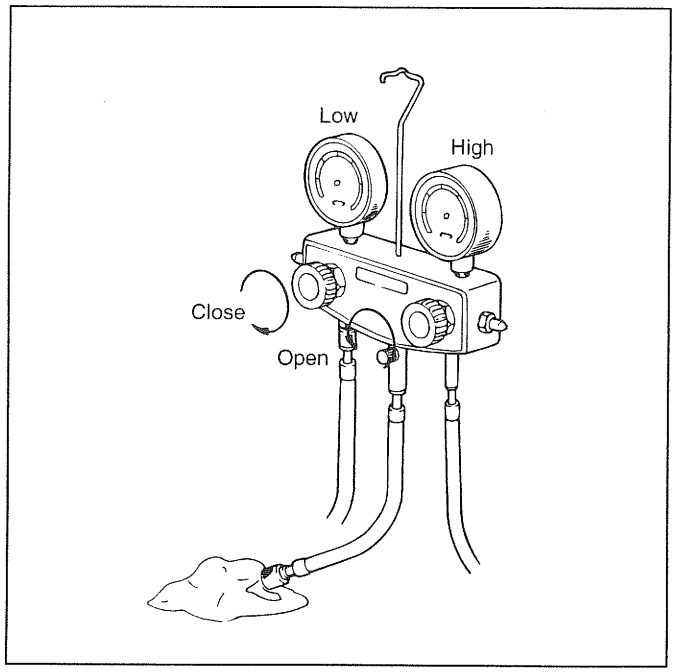
REFRIGERANT DISCHARGING PROCEDURE EQHA0350

1. Connect the manifold gauge set to the system.
2. Put a towel under the open end of the center hose.
3. Open the high pressure hand valve slowly to discharge the refrigerant slowly.

CAUTION

If discharging the refrigerant too fast, compressor may drain from the system.

4. Check if a towel is stained with oil. If so, gently lock the hand valve.
5. If the manifold gauge reading drops below 3.5kg/cm^2, open the low pressure hand valve slowly.
6. Open the high and low pressure hand valve slowly in order to drop the system pressure until the gauge indicates 0kg/cm^2.



EQHA035A

EVACUATING REFRIGERANT SYSTEM EQHA0400

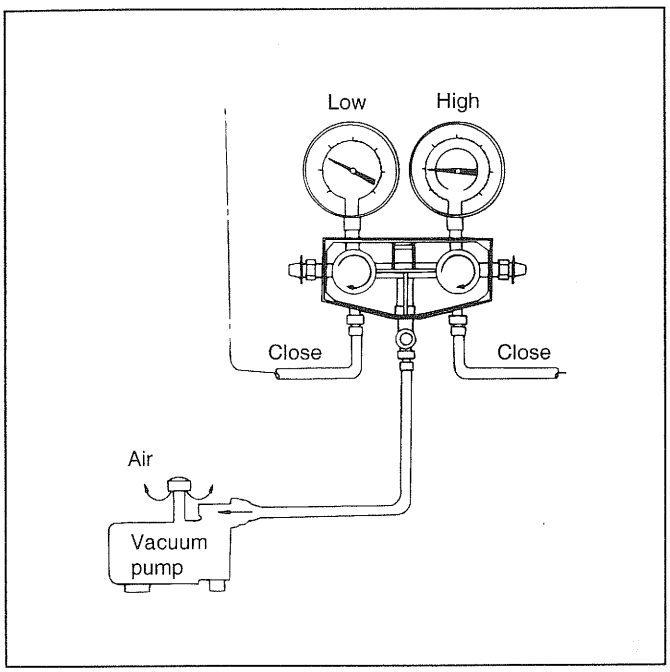
NOTE

It is necessary to evacuate the air conditioning system any time the system has been opened. Evacuation is necessary to rid the system of all air and moisture that may have been allowed to enter the unit. After installation of a component, the system should be evacuated for approximately 15 minutes. A component in service that has been opened for repair should be evacuated for 30 minutes.

1. Engine should be off.
2. Connect a manifold gauge set to the compressor gauge fittings. Close both high and low pressure valves.
3. Make sure the refrigerant has been discharged from the system.
4. Connect the center hose of the gauge set to the vacuum pump inlet.
5. Start the vacuum pump and then open the high and low manifold pressure valves.
6. After about ten minutes, check that the low pressure gauge reads more than 94,39 kPa (0.96 kg/cm^2, 13.7 psi) vacuum. If negative pressure can not be obtained, there is a leak in the system. In this case, repair the leak as following:

a. Close both the manifold valves and stop the vacuum pump.
b. Charge system with a can or refrigerant [about 0.4 kg (0.9 lb)]. Refer to Charging Refrigerant.
c. Check for refrigerant leakage with a leak detector. Repair any leakage found. Refer to Checking Refrigerant Leak.
d. Discharge refrigerant again, and then evacuate the system. If no leaks are found, continue evacuating the system.

7. Start the vacuum pump.

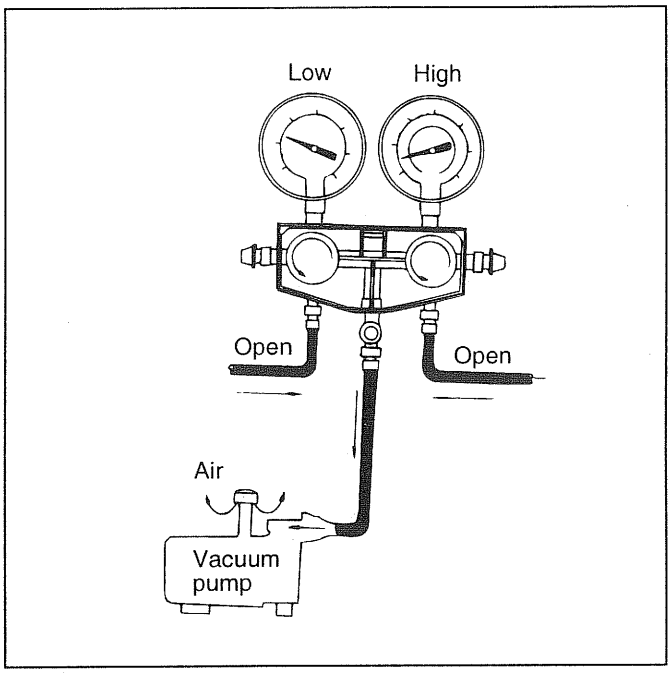


EQA9007A

8. Open both manifold pressure valves to obtain 94.39 kPa (0.96 kg/cm^2, 13.7 psi) of vacuum.

9. After the low pressure manifold gauge indicates close to 94.39 kPa (0.96 kg/cm^2, 13.7 psi), continue evacuating for 15 minutes.

10. After evacuating for 15 minutes, close both manifold pressure valves and stop the vacuum pump. Disconnect the hose from the vacuum pump. The system is now ready for charging.



EQA9007B

HANDLING REFRIGERANT SERVICE TAP VALVE EQHA0450

1. Before connecting the valve to the refrigerant container, turn the handle fully counterclockwise.

2. Turn the disc counterclockwise until it reaches its highest position.

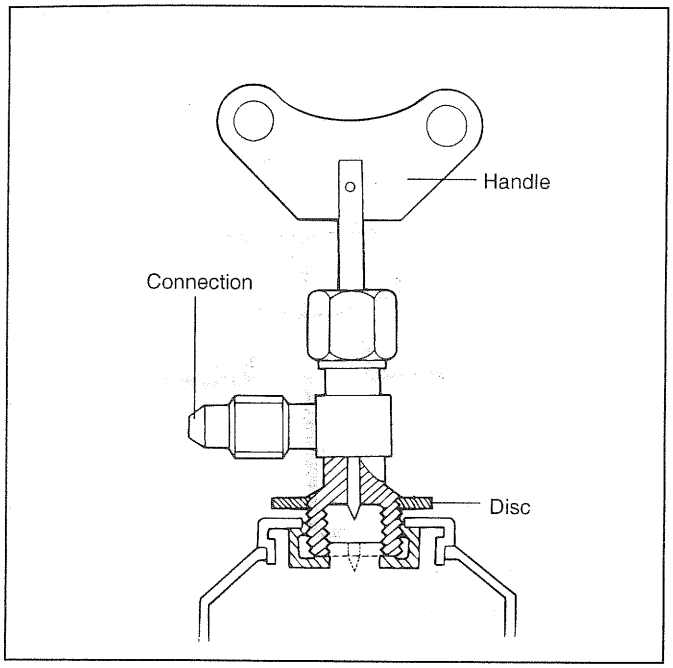
3. Connect the center hose to the valve fitting. Turn the disc fully clockwise by hand.

4. Turn the handle clockwise to make a hole in the sealed top.

5. Turn the handle fully counterclockwise to fill the center hose with air. Do not open the high and low-pressure hand valves.

6. Loosen the center hose nut connected to the center fitting of the manifold gauge.

7. Allow air to escape for a few seconds, and then tighten the nut.



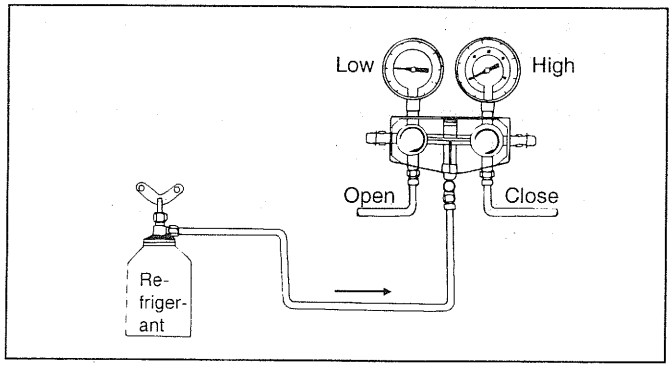
EQA9008A

CHARGING REFRIGERANT SYSTEM (VAPOR) EQHA0500

NOTE

This step is to charge the system through the low pressure side with refrigerant in a vapor state. When the refrigerant container is placed right side up, refrigerant will enter the system as a vapor.

1. Install the refrigerant can tap valve as described in Handling the Refrigerant Service Tap Valve section.
2. Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 412 kPa (4.2 kg/cm^2, 60 psi).

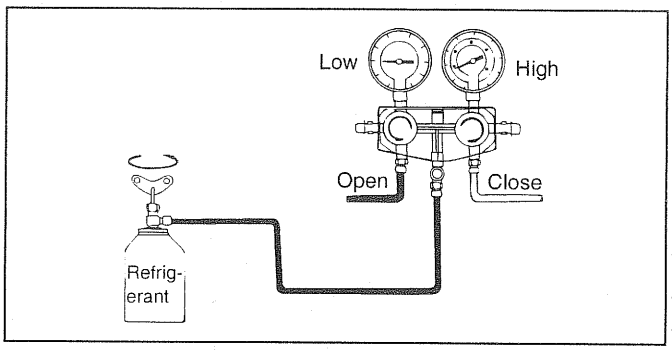


EQA9009A

3. Put the refrigerant in a pan of warm water (maximum temperature 40°C or 104°F) to keep vapor pressure in the container slightly higher than vapor pressure in the system.
4. Run the engine at fast idle and operate the air conditioning.

NOTE

Be sure to keep the container upright to prevent liquid refrigerant from being charged into the system through the suction side, resulting in possible damage to the compressor.



EQA9009B

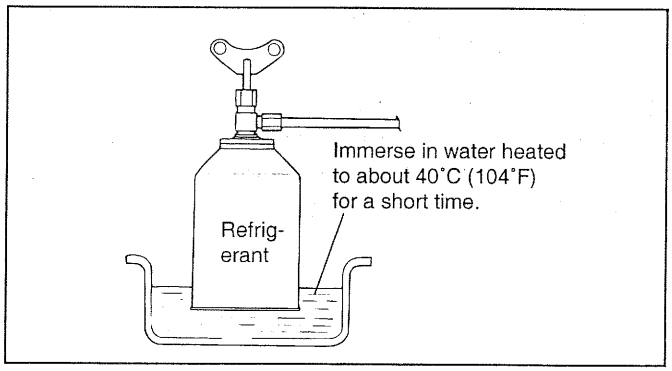
5. Charge the system to the specified amount. Then close the low pressure valve.

Specified amount
Single : 670g
Dual : 850g

When refrigerant charging speed is slow, immerse refrigerant can in water, heated to a temperature of about 40°C (104°F).

WARNING

- **Under any circumstances the refrigerant must not be warmed in water heated to a temperature of over 52°C (126°F).**
- **A blow torch or stove must never be used to warm up the can.**



EQA9009C

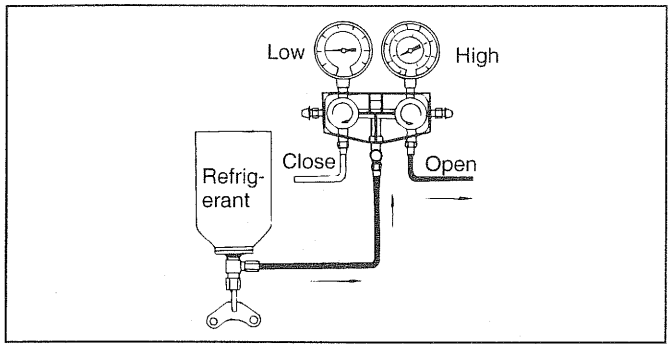
CHARGING REFRIGERANT SYSTEM (LIQUID)

NOTE

This step is to charge an empty system through the high pressure side with refrigerant in a liquid state. When the refrigerant container is held upside down, refrigerant will enter the system as a liquid.

CAUTION

Never run the engine when charging the system through the high pressure side. Do not open the low pressure valve when the system is being charged with liquid refrigerant.



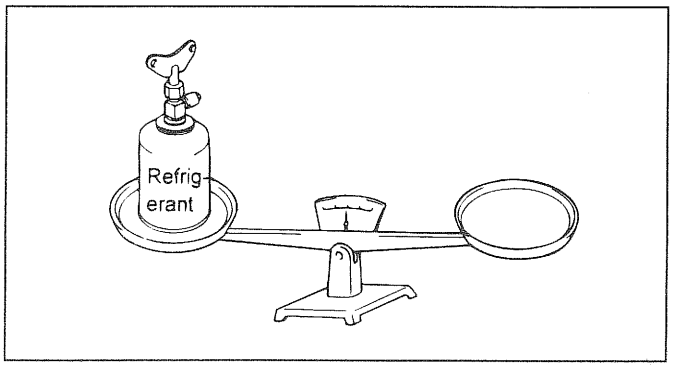
EQA9010A

1. Close both high and low pressure valves completely after the system is evacuated.
2. Install the refrigerant can tap valve as described in "Handling Refrigerant Service Tap Valve" section.
3. Open the high pressure valve fully and keep the container upside down.
4. Charge the system to the specified amount by weighing the refrigerant with a scale. Overcharging will cause discharge pressure (high side) to rise. Then, close the high pressure valve.

Specified amount
Single : 670g
Dual : 850g

NOTE

If the low pressure gauge does not show a reading, the system is restricted and must be repaired.



EQA9010B

5. After the specified amount of refrigerant has been charged into system, close the manifold gauge valve.
6. Confirm that there are no leaks in the system by checking with a leak detector. Refer to Checking Refrigerant Leak.

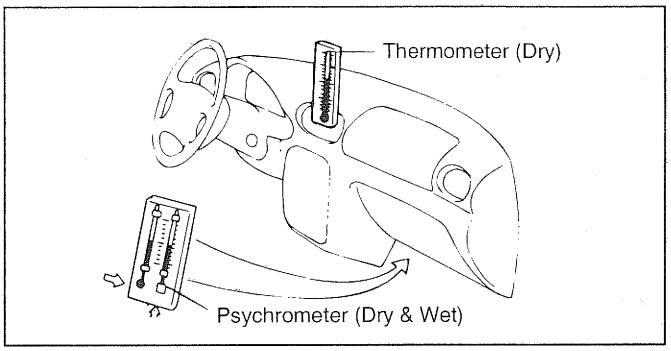
NOTE

Conducting a performance test prior to removing the manifold gauge is good service operation.

PERFORMANCE TEST EQHA0550

1. Install the manifold gauge set.
2. Run the engine at 2,000 rpm and set the controls for maximum cooling and high blower speed.
3. Keep all windows and doors open.
4. Place a dry-bulb thermometer in the cool air outlet.
5. Place a psychrometer close to the inlet of the cooling unit.
6. Check that the reading on the high pressure gauge is 1,373-1,575 kPa (14-16 kg/cm^2, 199-228 psi). If the reading is too high, pour water on the condenser. If the reading to too low, cover the front of the condenser.
7. Check that the reading on the dry-bulb thermometer at the air inlet at 25-35°C (77-95°F).

8. Calculate the relative humidity from the psychrometric graph by comparing the wet-and dry-bulb reading of the psychrometer at the air inlet.



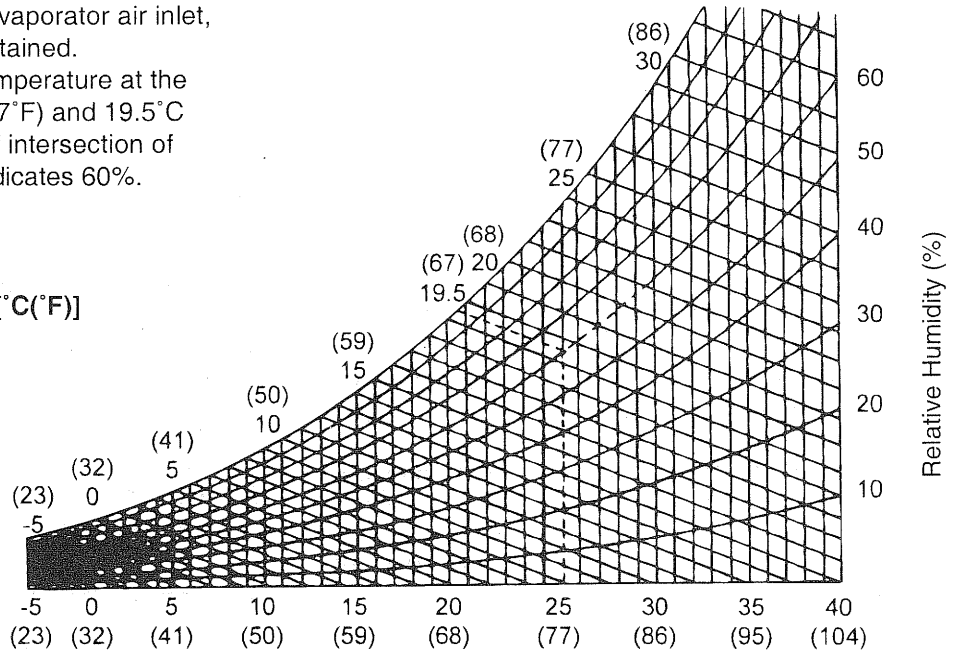
EQA9019A

HOW TO READ THE GRAPH :

After measuring the temperatures of the wet and dry-bulb thermometers at the evaporator air inlet, relative humidity (%) can be obtained.
Example : Dry-and wet-bulb temperature at the evaporator air inlet are 25°C (77°F) and 19.5°C (67°F) respectively, the point of intersection of the dotted lines in the graph indicates 60%.

WET-BULB TEMPERATURE [°C(°F)]

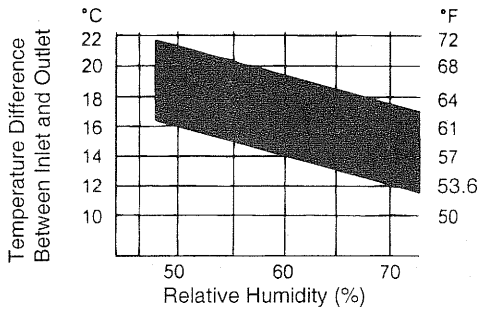
100 (212)
90 (194)
80 (176)
70 (158)
60 (140)
50 (122)
40 (104)
30 (86)
20 (68)
10 (50)



EQA9019B

9. Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.

10. Check that the intersection of the relative humidity and temperature difference is between block hard line. If the intersection is within the block hard line, cooling performance is satisfactory.



EQA9019C

COMPRESSOR OIL EQHA0600

The oil used to lubricate the compressor circulates in the system while the compressor is operating. Whenever replacing any component of the system or when a large amount of gas leakage occurs, add oil to maintain the original total amount of oil.

Single : 150g
Dual : 210g

HANDLING OF OIL

1. The oil should be free from moisture, dust, metal filings, etc.
2. Do not mix oils.
3. The moisture content in the oil increases when exposed to the air for prolonged periods. After use, seal the container immediately.

OIL RETURN OPERATION

To check the oil level or add the oil, idle engine for 20–30 minutes by setting the control set to maximum cooling and blower level, to return the lubricant to compressor.

CHECKING AND ADDING OF COMPRESSOR OIL LEVEL

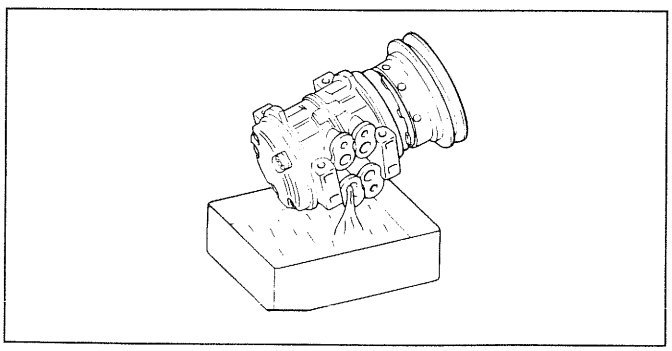
In order to add oil to operating compressor, check the compressor oil in the following procedure:

1. Perform the oil return operation, stop the engine, discharge the refrigerant, and dismantle the compressor from vehicle.

2. Discharge oil from the system line outlet.

NOTE

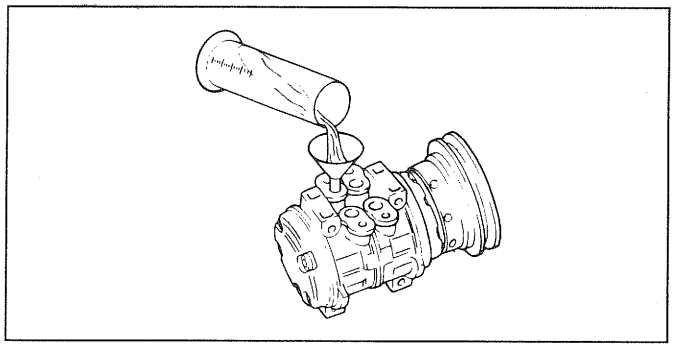
If compressor is cold, sometimes it can be hard to drain the oil. Then warm up the compressor (approx. 40–50°C) to drain the oil.



EQHA060A

3. Check the amount of the discharged oil. If it is less than 70cc, it means there is little leak of oil. Perform the leakage test on each system connection, and repair or replace faulty parts if necessary.

4. Check oil for contamination and set the oil level in the following procedure:



EQHA060B

a. When oil is clean

Discharge	Setting
Above 70cc	Oil level is normal, add equal amount of discharged oil.
Below 70cc	Oil level is low add 70cc of oil.

b. If oil is contaminated with metal fragment or other material, clean the receiver drier after charging the refrigerant into the air conditioning system.

CHECKING REFRIGERANT LEAKS EQHA0650

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.

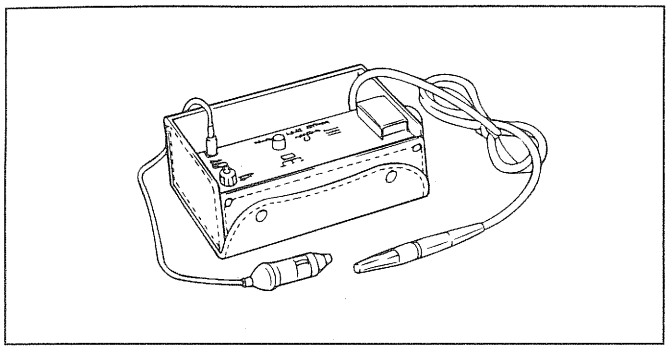
NOTE

In order to use the device properly, read the manuals supplied by the manufacturer to perform the specified maintenance and inspections.

If a gas leak is detected, proceed as follows:

1. Check the torque on the connection fitting 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 its seating face for damage. Always replace, even if the damage is slight.

3. Check 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.

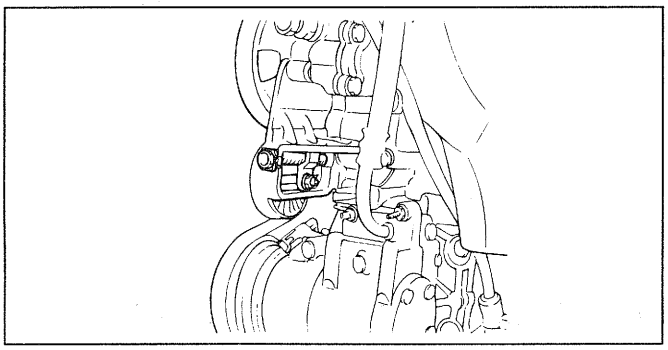


EQHA065A

[2.0L, I4 ENG] EQHA0700

Adjust the belt tension with tension bearing

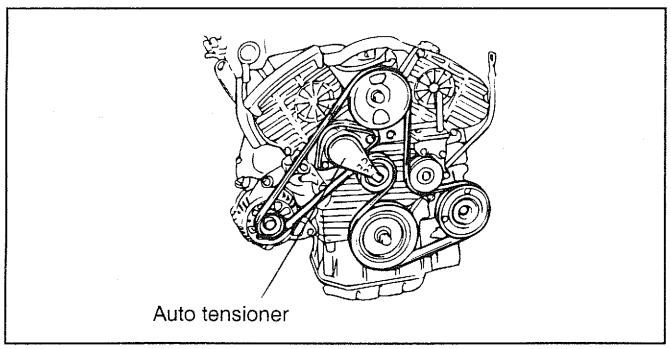
	Deflection (mm)	Tension(kg·f)
New one	8.8 - 11.0	75 ± 10
Used one	12.5 - 14.3	50 ± 5
After driving	11.7 - 15.3	50 ± 10



EPA9016D

[2.7L, V6 ENG]

The drive belt tension is adjusted automatically by auto tensioner.



EDA9031A

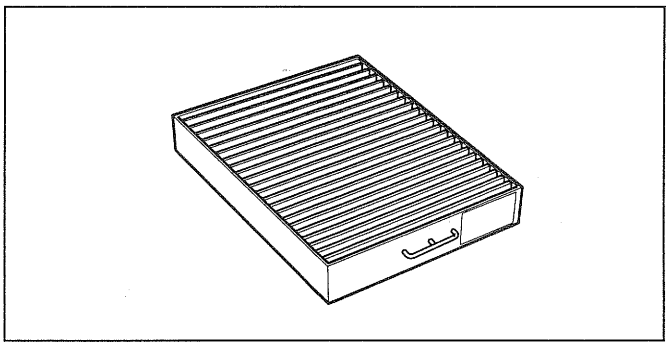
BLOWER UNIT AIR FILTER EQHA0750

Equus has combination filter which eliminates foreign materials and odor. The combination filter includes odor filter as well as conventional dust filter to ensure comfortable interior environment. Vehicle equipped with rear air conditioning has one more air filter in the rear air conditioning unit.

Filter service life : 15,000km

CAUTION

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

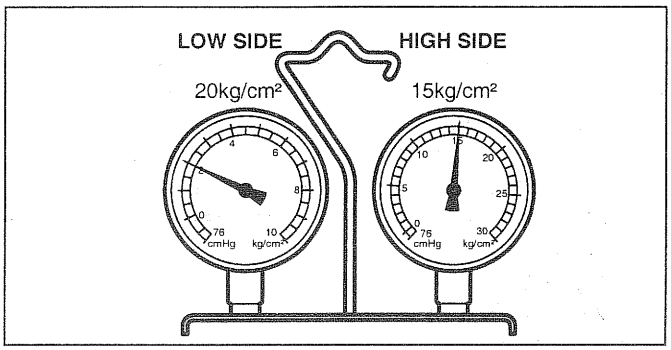


KFWD051A

PERFORMANCE TEST DIAGNOSIS USING MANIFOLD GAUGE EQHA0800

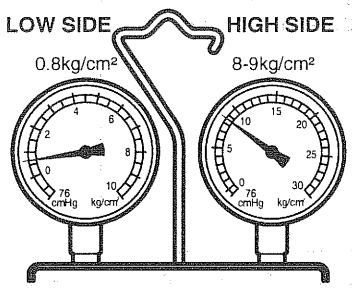
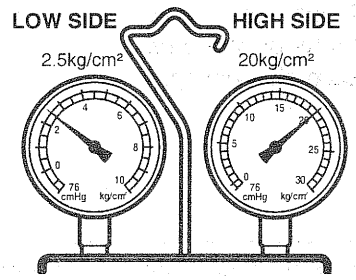
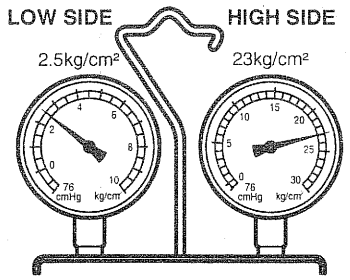
STANDARD VALUE

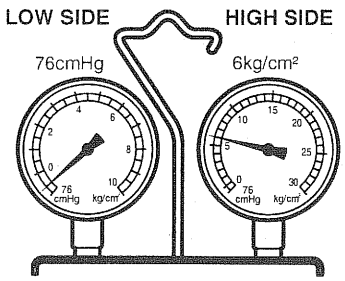
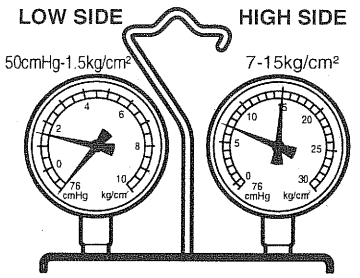
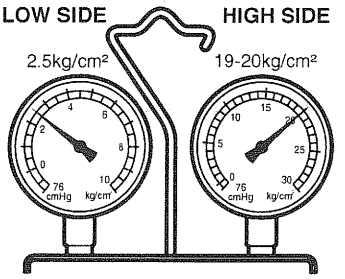
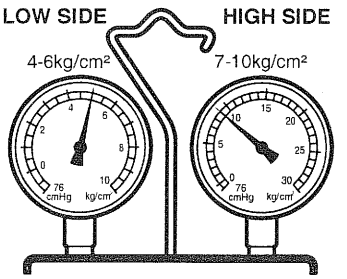
If cooling cycle is operating normally, manifold gauge reading will be approx. 1.5–2.0kg/cm^2 for low pressure side and approx. 14.5–15kg/cm^2 for high pressure side. When inlet temperature is 30–35°C, engine rpm is 2,000 max. cooling, and the blower is in highest level.



KFWD001A

DIAGNOSIS

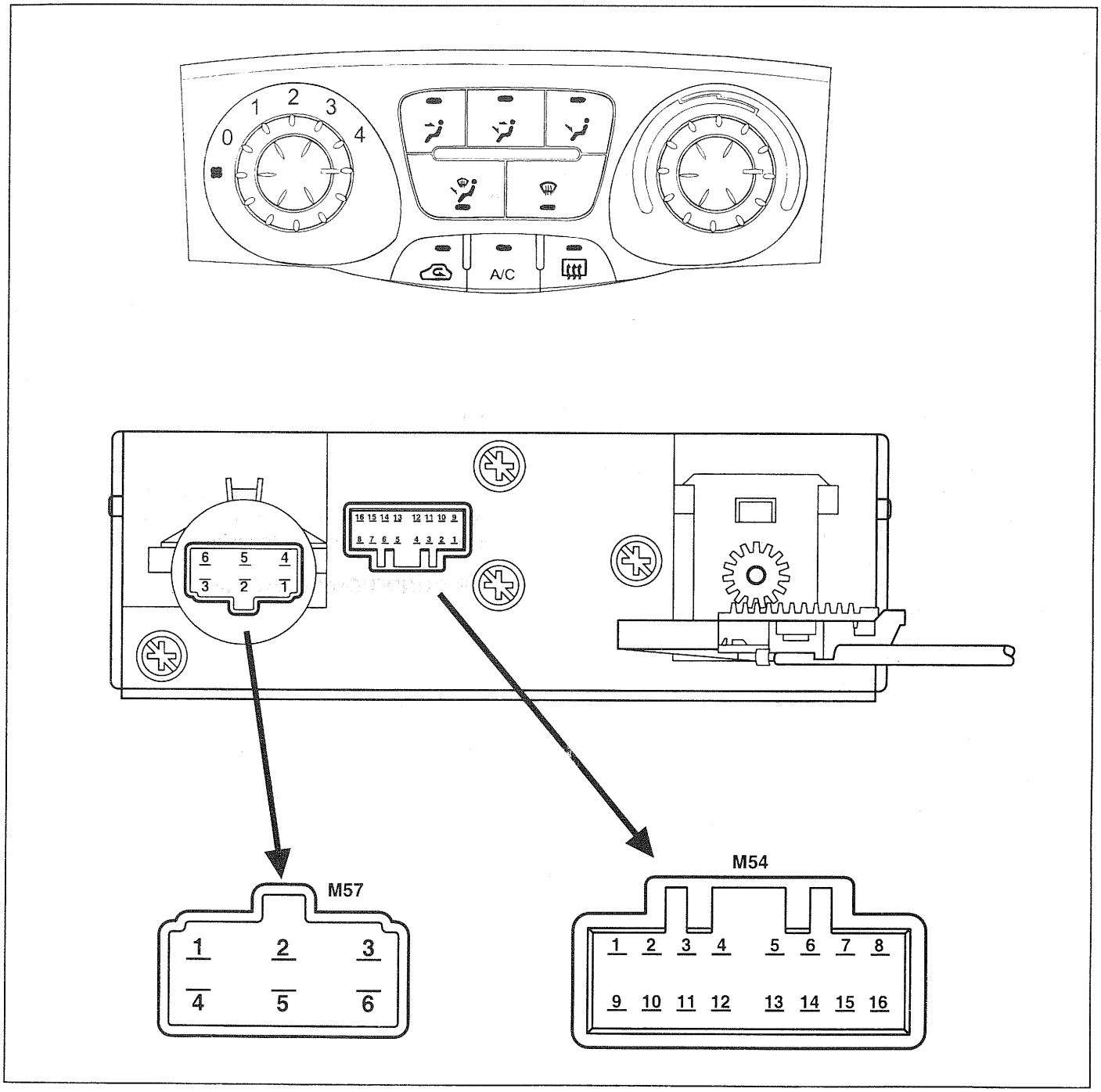
SYMPTOMS	PROBABLE CAUSES	REMEDY	MANIFOLD GAUGE READINGS
1. Low pressure and high pressure are low. 2. Cooler outlet air is a little cooler.	• Gas leak in freezing cycle.	• Checking, and repair. • Add refrigerant.	 KFWD002A
1. Low pressure and high pressure are high.	• Faulty cooling or faulty condenser freezing. • Belt slip.	• Maintain the proper level of refrigerant. Clean the condenser. • Repair the belt.	 KFWD003A
1. Low pressure and high pressure are high. 2. Low pressure pipe is not cold.	• Air intake in freezing cycle.	• Clean or repair the receiver drier. • Check for oil contamination.	 KFWD004A

SYMPTOMS	PROBABLE CAUSES	REMEDY	MANIFOLD GAUGE READINGS
1. Low pressure side indicates negative pressure and high pressure side indicates low pressure. 2. Front or dew on pipes connected with receiver or expansion valve.	• Dust or moisture frozen at expansion valve hole. • Gas leak at cooling vessel.	• Repair the receiver drier and replace the expansion valve. • Replace the expansion valve if cooling vessel is faulty.	 KFWD005A
1. Low pressure side pressure sometimes go to negative pressure or normal.	• Intaken moisture is frozen at expansion valve hole.	• Repair and bleed receiver drier	 KFWD006A
1. Low pressure and high pressure are high. 2. Much frost or dew sticks on low pressure side piping.	• Expansion valve failure. Cooling vessel inlet faulty. • Flow control faulty.	• Repair receiver drier. • Check oil contamination.	 KFWD007A
1. Low pressure side pressure is high and pressure side pressure is low.	• Leak inside compressor.	• Replace compressor.	 KFWD008A

MANUAL A/C COMPRESSOR CONTROLS

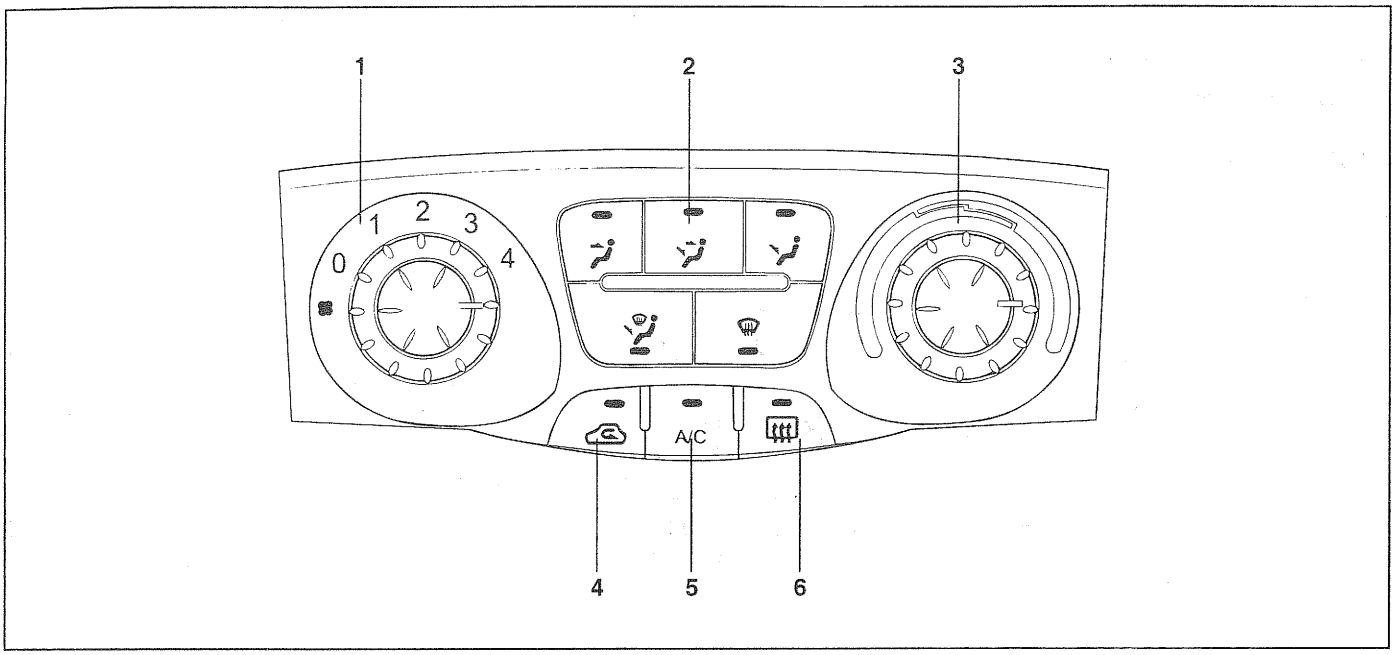
AIR CONDITIONER SWITCH (ROTARY + PUSH) EQHA0850

CONTROL PANEL



EQHA002A

SWITCH CONFIGURATION (ROTARY + PUSH) EQHA0860



EQHA086A

1. **BLOWER SWITCH**

   Blower switch controls blowing level of air conditioning system by controlling blower motor revolution. The switch has a electrical circuit containing a resister that will regulate blower motor input voltage, used to control the motor revolution.

2. **MODE SWITCH**

   Mode switch controls air conditioning system discharge level. The switch contains the electrical circuit be used to control actuator that is connected with mode door for discharge control.

3. **TEMPERATURE SWITCH**

   Temperature switch controls the temperature door position that will be used to regulate air conditioning system's discharge air temperature. The switch includes rack & pinion and cable.

4. **INTAKE SWITCH**

   Intake switch controls intake door used to regulate the intake air flow of air conditioning system. The switch contains the electrical circuit used to control actuator that is connected with intake door.

5. **AIR CONDITIONING SWITCH**

   Air conditioning switch on/off position of air conditioning system compressor. The switch contains the electrical circuit that will switch on/off the power supply of relay that is connected with compressor.

6. **REAR DEFOGGER SWITCH**

   REAR DEFOGGER switch is used to defog rear glass. Switching on the switch, ETACS will output rear glass heat wire control terminal level signal to operate the heat wire.

CHECKING EQHA0870

BLOWER SWITCH CHECK

Switching on blower, blower relay will be on to permit blower motor upper end voltage. Permitted voltage, blower motor and resisters will be used to determine current that go through blower motor and the resister of selected blower level, to ground.

DIAGNOSIS

Symptom	Probable causes	Checks
Blower malfunction	Broken circuit of resistor	Replace resistor
Blower discharge in "off" position	Blower switch is short-circuited	Switch off the switch and then check short-circuit between terminals of each blower level and GND/COMMON terminal.

AIR CONDITIONING SWITCH CHECK

Air conditioning system discharge requires the blower operation Upon selecting blower level 1, blower relay will be on and voltage will be permitted. The permitted voltage will go to control connector M53 terminal #3, and then pressing the switch, 9V or higher voltage will be output to connector M54 terminal #11.

DIAGNOSIS

Symptom	Probable causes	Checks
No discharge when switching on air conditioning switch.	Air conditioning system signal is faulty	With the air conditioning switch on, check voltage at connector M54 terminal #3. If the voltage is 9V or higher, check triple switch thermostat, engine ECU, and peripheral wiring.
		With the air conditioning switch on, check voltage at connector M54 terminal #3. If the voltage is 9V or lower, check voltage at terminal #9 and inspect peripheral wiring.

INTAKE SWITCH CHECK

Select fresh air mode using intake switch with ignition on, than 12V will be output from connector M54 terminal #6 and 0V will be permitted from terminal #13 to operate the motor in fresh air mode. Select recirculation mode using intake switch, than 12V will be output from the connector terminal #13 and 0V will be permitted from terminal #6 to operate the motor in recirculation mode.

DIAGNOSIS

Symptom	Probable causes	Checks
Fresh air mode failure	Actuator power supply failure	Disconnect the connector from actuator. Select fresh air mode using intake switch and check voltage at connector M54 terminal #5. If the voltage is 9V or higher, check actuator and peripheral wiring. If lower than 9V, it means internal defect of controller.
Recirculation mode failure	Actuator power supply failure	Disconnect the connector from actuator. Select recirculation mode using intake switch and check voltage at connector M54 terminal #13. If the voltage is 9V or higher, check actuator and peripheral wiring. If lower than 9V, it means internal defect of controller.

MODE SWITCH CHECK

Select mode switch with ignition on, than it will operate at the selected mode.
Selecting vent mode using the switch, 0V(ground) will be permitted at connector M54 terminal #9, and 9V or higher voltage will be set at other terminals(6, 7, 8, 14 & 15). The voltage signal will be sent to mode actuator that contains motor drive.
Motor drive will operate motor to set vent mode. Therefore mode selection will be enabled among bi-level, floor, mix. & defroster.

DIAGNOSIS

Symptom	Probable causes	Checks
A specific mode is impossible to select	Faulty signal transmission of the selected mode	Disconnect the connector from actuator. Check voltage at the wiring of selected mode. If the voltage is 8V or higher, it is controller's internal defect.
	Mode actuator, drive failure	Disconnect the connector from actuator. Check voltage at the wiring of selected mode. If the voltage is 1V or lower, check mode actuator and peripheral wiring.
Mode actuator, drive failure	Mode actuator, internal defect	If motor drive IC installed inside mode actuator is faulty, mode selection will be impossible. If 0V(ground) is permitted at selected mode wiring by means of controller but the actuator does not operate, it means mode actuator's internal defect.

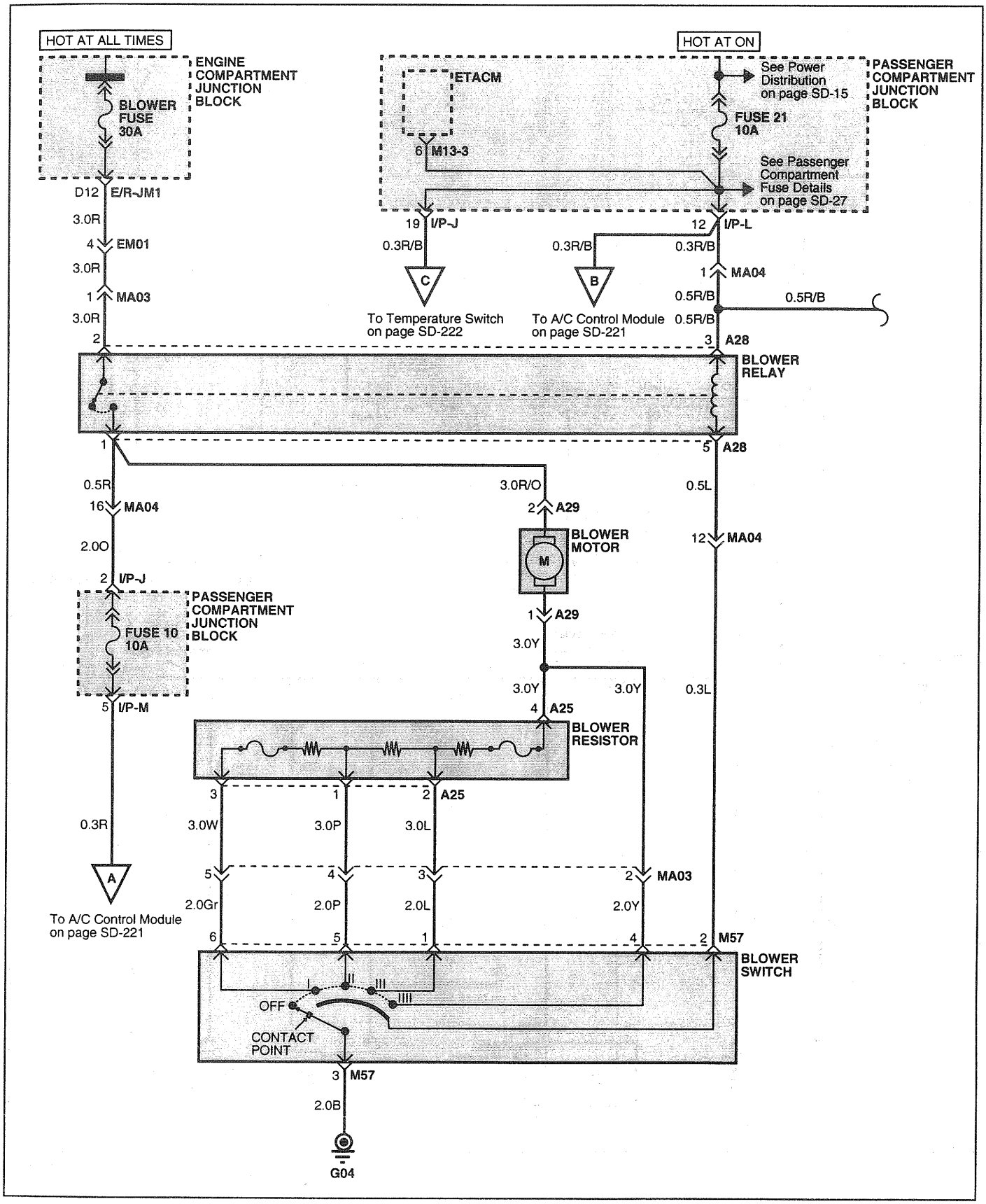
TEMPERATURE SWITCH CHECK

Temperature switch will use the internal mechanism including gear and shaft to operate temperature door that will shift between "WARM" and "COOL".
Temperature door is manually driven by cable that is connected with the switch.

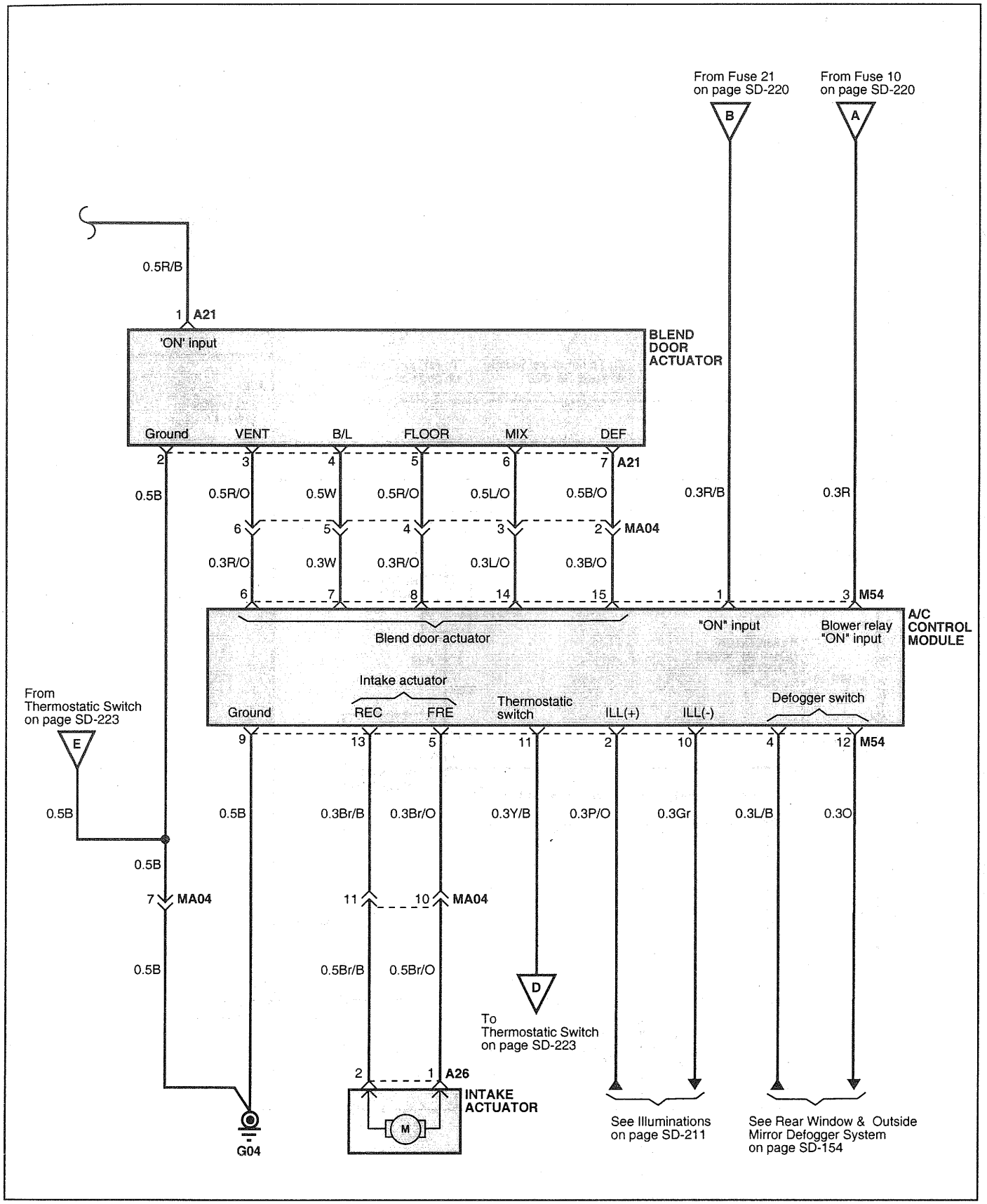
DIAGNOSIS

Symptom	Probable causes	Checks
Warm/cool shift is impossible	Poor connection of temperature cable.	Check connection between temperature cable and temperature door.
		Check if the cable is separated from temperature switch.

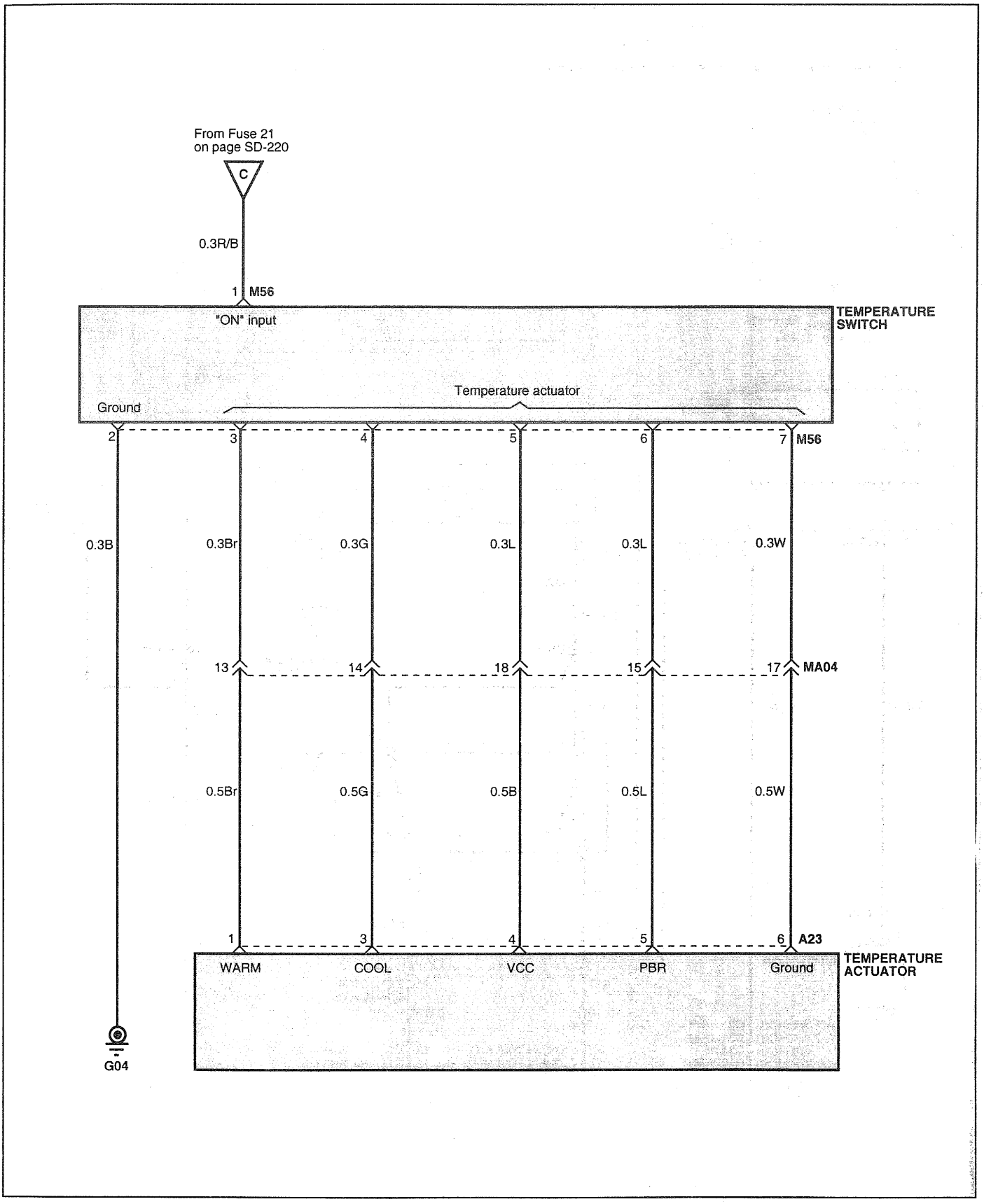
SCHEMATIC DIAGRAM EQHA0900



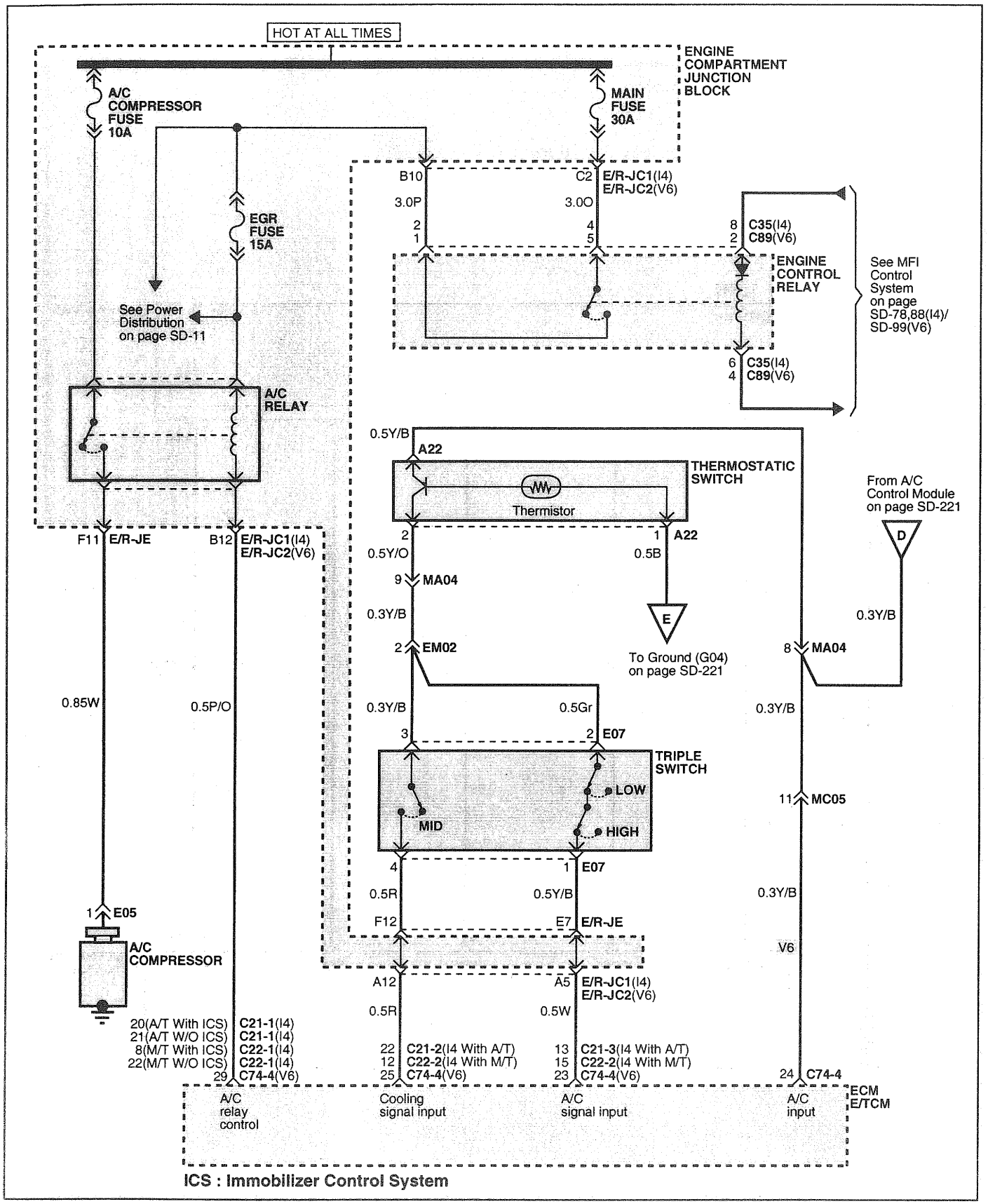
E2HA054A


From Fuse 21
on page SD-220
From Fuse 10
on page SD-220
B
A
0.5R/B
1 A21
'ON' input
BLEND
DOOR
ACTUATOR
Ground
VENT
B/L
FLOOR
MIX
DEF
2
3
4
5
6
7 A21
0.5B
0.5R/O
0.5W
0.5R/O
0.5L/O
0.5B/O
0.3R/B
0.3R
6
5
4
3
2 MA04
0.3R/O
0.3W
0.3R/O
0.3L/O
0.3B/O
6
7
8
14
15
1
3 M54
Blend door actuator
"ON" input
Blower relay
"ON" input
A/C
CONTROL
MODULE
Intake actuator
From
Thermostatic Switch
on page SD-223
Ground
REC
FRE
Thermostatic
switch
ILL(+)
ILL(-)
Defogger switch
E
9
13
5
11
2
10
4
12 M54
0.5B
0.5B
0.3Br/B
0.3Br/O
0.3Y/B
0.3P/O
0.3Gr
0.3L/B
0.3O
0.5B
7 MA04
11
10 MA04
0.5B
0.5Br/B
0.5Br/O
D
To
Thermostatic Switch
on page SD-223
2
1 A26
INTAKE
ACTUATOR
M
G04
See Illuminations
on page SD-211
See Rear Window & Outside
Mirror Defogger System
on page SD-154

E2HA054B


From Fuse 21
on page SD-220
C
0.3R/B
1 M56
"ON" input
TEMPERATURE SWITCH
Temperature actuator
Ground
2
3
4
5
6
7 M56
0.3B
0.3Br
0.3G
0.3L
0.3L
0.3W
13
14
18
15
17 MA04
0.5Br
0.5G
0.5B
0.5L
0.5W
1
3
4
5
6 A23
WARM
COOL
VCC
PBR
Ground
TEMPERATURE ACTUATOR
G04

E2HA054C


HOT AT ALL TIMES
ENGINE COMPARTMENT JUNCTION BLOCK
A/C COMPRESSOR FUSE 10A
MAIN FUSE 30A
EGR FUSE 15A
B10
C2 E/R-JC1(I4) E/R-JC2(V6)
3.0P
3.0O
2
1
4
5
8 C35(I4)
2 C89(V6)
ENGINE CONTROL RELAY
See MFI Control System on page SD-78,88(I4)/ SD-99(V6)
6 C35(I4)
4 C89(V6)
See Power Distribution on page SD-11
A/C RELAY
0.5Y/B
A22
THERMOSTATIC SWITCH
Thermistor
From A/C Control Module on page SD-221
D
F11 E/R-JE
B12 E/R-JC1(I4) E/R-JC2(V6)
2
0.5Y/O
1 A22
0.5B
9 MA04
0.3Y/B
0.3Y/B
E
2 EM02
To Ground (G04) on page SD-221
8 MA04
0.85W
0.5P/O
0.3Y/B
0.5Gr
0.3Y/B
3
2 E07
TRIPLE SWITCH
LOW
MID
HIGH
11 MC05
4
1 E07
0.5R
0.5Y/B
0.3Y/B
1 E05
F12
E7 E/R-JE
V6
A/C COMPRESSOR
A12
A5 E/R-JC1(I4) E/R-JC2(V6)
0.5R
0.5W
20(A/T With ICS) C21-1(I4)
21(A/T W/O ICS) C21-1(I4)
8(M/T With ICS) C22-1(I4)
22(M/T W/O ICS) C22-1(I4)
29 C74-4(V6)
22 C21-2(I4 With A/T)
12 C22-2(I4 With M/T)
25 C74-4(V6)
13 C21-3(I4 With A/T)
15 C22-2(I4 With M/T)
23 C74-4(V6)
24 C74-4
A/C relay control
Cooling signal input
A/C signal input
A/C input
ECM E/TCM
ICS : Immobilizer Control System

E2HA054D

CHECKING OF THE CONTROL PANEL ASSEMBLY EQHA0950

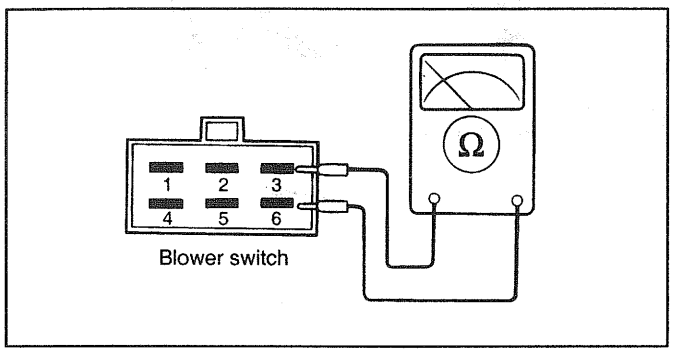
BLOWER SWITCH

Check for continuity between terminals as shown below.

Switch position \ Terminal	1 (M.H)	2 (B+)	3 (Ground)	4 (High)	5 (M.L)	6 (Low)
OFF						
1 (LOW)		○	○			○
2 (M.L)		○	○		○	
3 (M.H)	○	○	○			
4 (HIGH)		○	○	○		

EQHA095A

If continuity is not as specified, replace the control panel.



X97-023A

AIR CONDITIONING SWITCH

Check for continuity between terminals No. 12 and No.22.

MODE CONTROL SWITCH

Check for continuity between terminals.

Mode switch	Terminals
PANEL	6 ↔ 9
PANEL/FLOOR	7 ↔ 9
FLOOR	8 ↔ 9
FLOOR/DEFROST	14 ↔ 9
DEFROST	15 ↔ 9

EQHA095B

If continuity is not as specified, replace the control panel.

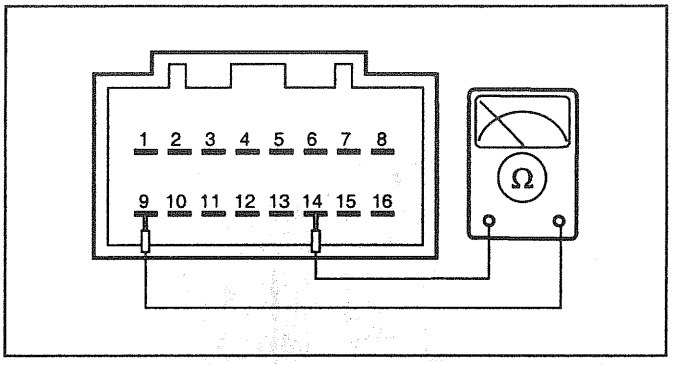
FRESH/RECIRCULATION BUTTON

Check for continuity between terminals.

Mode switch	Terminals
FRESH	4 ↔ 22
RECIRCULATION	12 ↔ 22

EQHA095C

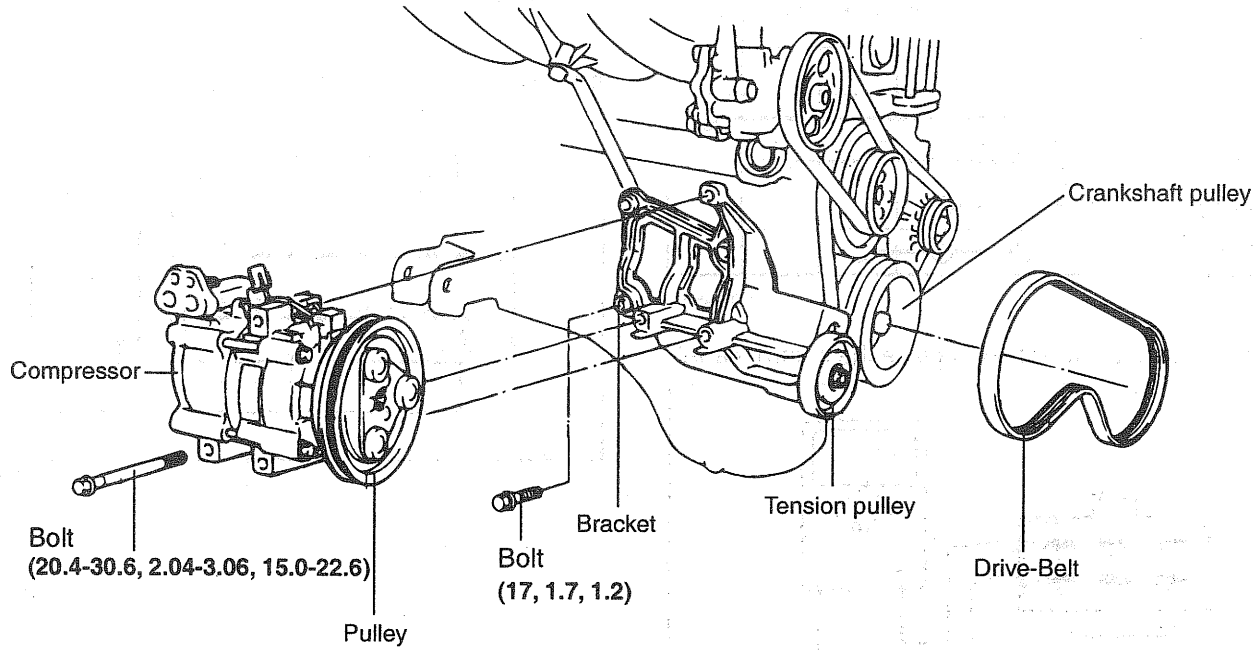
If continuity is not as specified, replace the control panel.



EQB9008A

COMPRESSOR EQHA1150

COMPONENTS



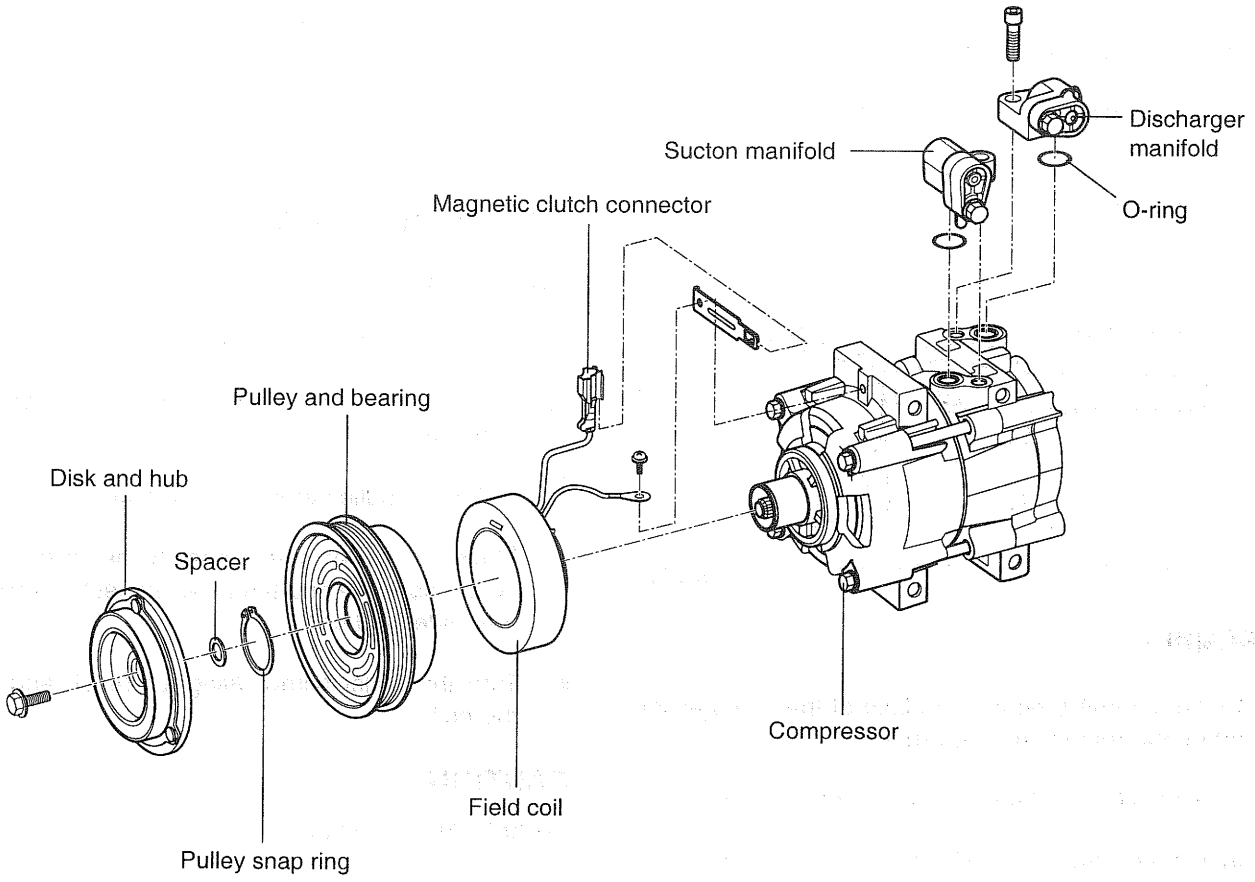
TORQUE : N.m (kg·m, lb·ft)

EQDA026B

REMOVAL AND INSTALLATION EQHA1200

1. Remove the drive belt after that loosed tension pulley.
2. Discharge the refrigerant.
3. Remove the discharge and suction hose.
4. Remove the compressor.
5. Installation is the reverse of removal.

COMPONENTS EQHA1250

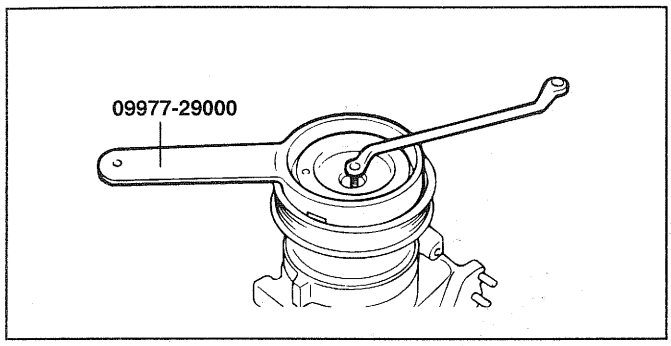


EQDA125A

CLUTCH HUB AND PULLEY EQHA1300

DISASSEMBLY

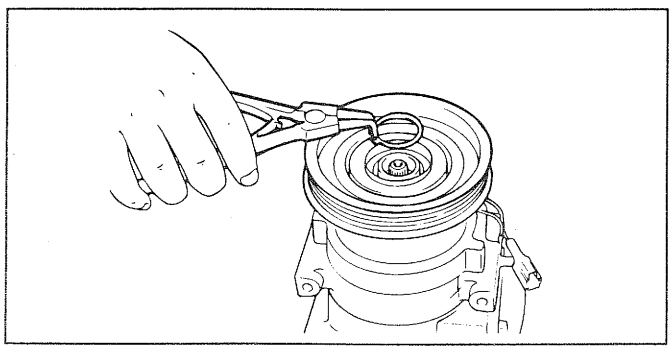
1. Remove the clutch hub supporting bolt using spanner wrench.
2. Pull out the clutch hub and shim from the compressor shaft. If it is hard to pull out the hub from compressor, insert 8mm bolt into the shaft hole to remove the hub from the shaft.
3. Remove the pulley supporting the snap ring.
4. Remove the pulley and bearing assembly from the compressor.



EQA9014A

ASSEMBLY

1. Clean the pulley bearing surface of the compressor head and remove dirt and rust.
2. Install pulley and bearing on the compressor.
3. Install the snap ring with bevelled side facing outside.
4. Place one space shim of specified side at the hub spline opening inside and slide the hub onto the compressor shaft end.
5. Install a new hub supporting bolt at the compressor shaft end. Tighten the bolt with tightening torque.

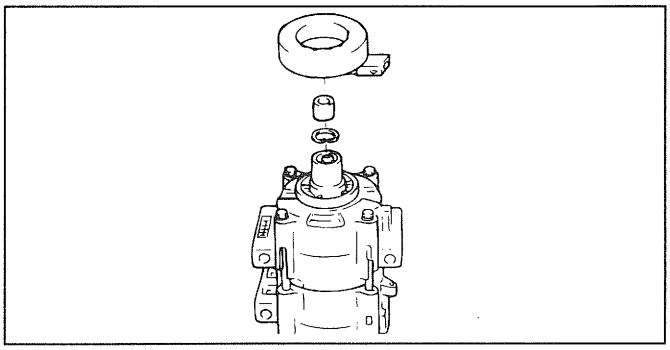


EQA9014B

Tightening torque : 102~153kg.cm

CAUTION

Do not use air tools.



EQHA130A

CLUTCH FIELD COIL

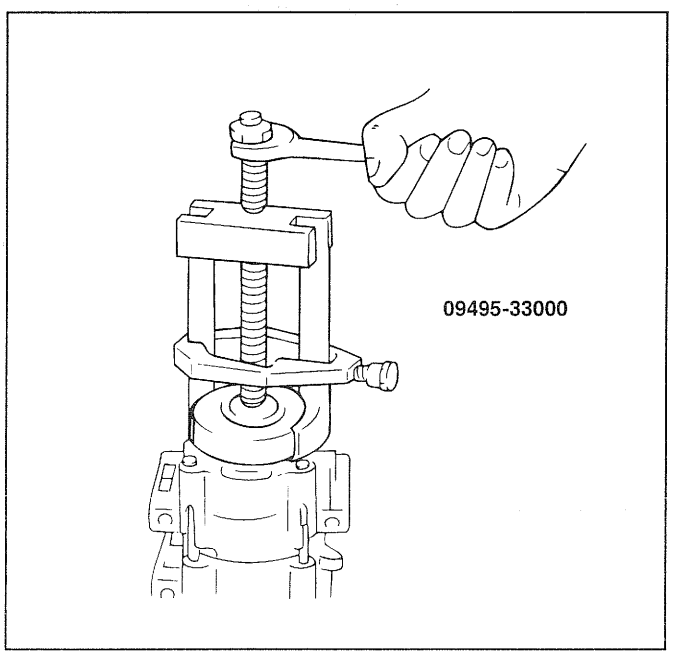
DISASSEMBLY

1. Remove the clutch hub and pulley.
2. Install a shaft protection tool at the compressor opening.
3. Install the pulley at the compressor.

   Place the puller screw end at the shaft protector center concave and the puller projection around the rear side field coil.
4. Turn the puller screw using a wrench and remove the coil.

CAUTION

Do not use air tools.



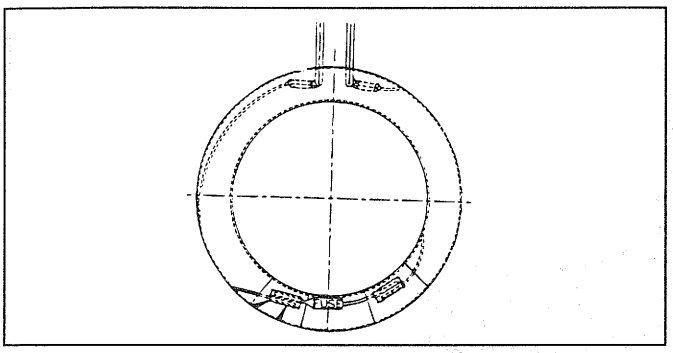
EQHA130B

THERMAL FUSE

1. Thermal fuse is located on the compressor clutch coil.

2. Outline

   Thermal fuse will detect clutch slip heat (184°C off) generated by compressor faulty operation, then interrupt coil power supply to stop the clutch operation. Therefore the clutch bearing and the pulley bearing damage will not be continued, to protect the belt and engine. Once thermal fuse operates, vehicle power supply will be interrupted and the compressor will not operate. Then check the clutch oil resistance (3.0–3.2Ω) to find thermal fuse condition, and replace the clutch coil if required.



HEW97018

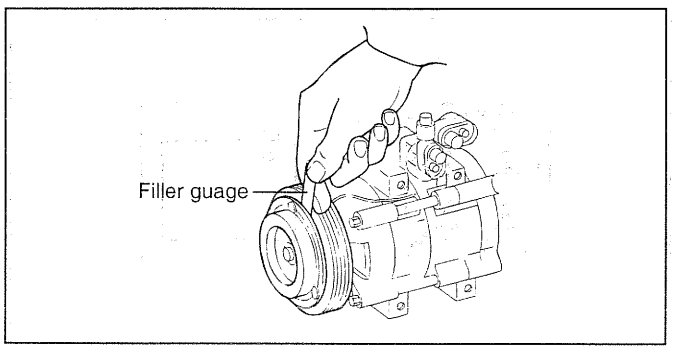
CLUTCH AIR GAP CHECKING

1. Check clutch air gap between clutch hub and pulley contact surface using filler gauge.

Clutch air gap : 0.35~0.65mm

2. Check gaps around pulley at 3 points.

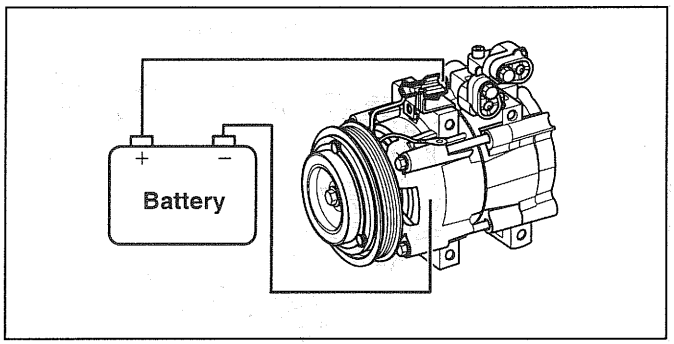
3. If clutch air gap is outside normal range, correct clutch air gap into normal range using a shim of proper size.



KFWD052A

MAGNETIC CLUTCH, OPERATION CHECK

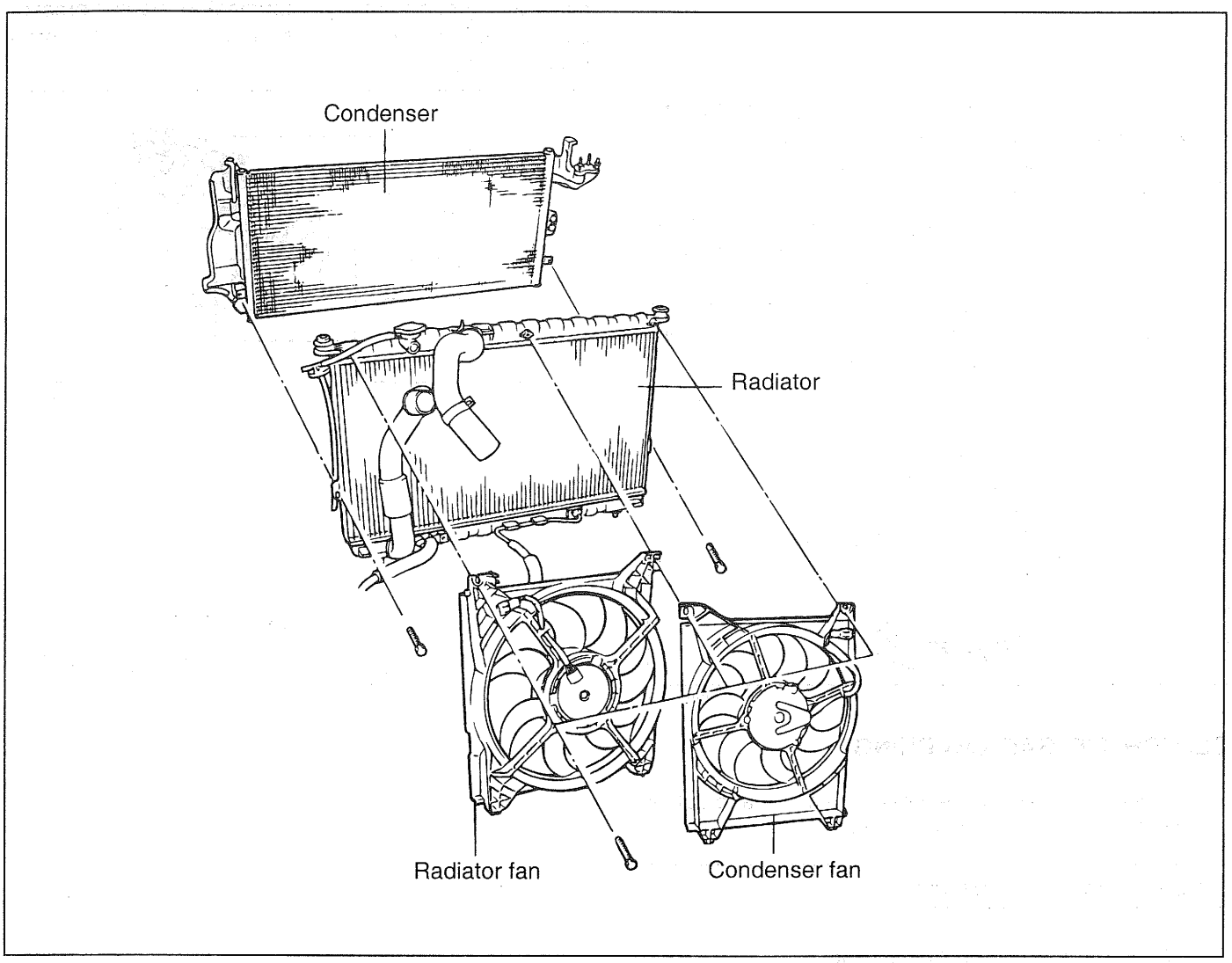
Connect the compressor side terminal to battery(+) terminal and ground battery(-) terminal to the compressor body. Check magnetic clutch operation noise to determine condition.



KFWD053A

CONDENSER FAN AND RELAY EQHA1350

COMPONENTS



HEW97019

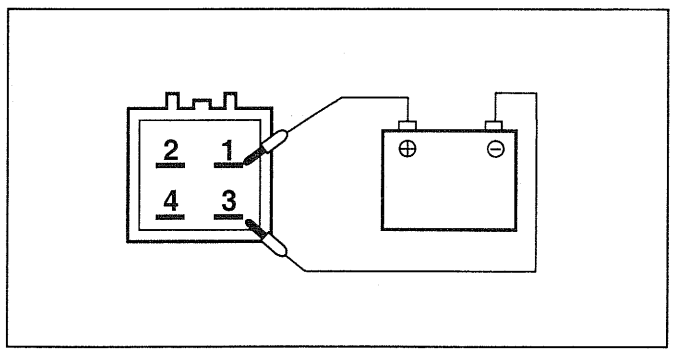
CHECKING EQHA1400

CONDENSER

1. Check condenser pin for clogging and damage. If clogged, clean it with water, and blow it with compressed air. If bent, gently stretch it using a screwdriver or a plier.
2. Check condenser connection area for leakage, and repair or replace it, if required.

CONDENSER FAN

1. Check the condenser fan for leakage.
2. Check the harness coupler for connection condition.
3. Check the condenser fan motor using battery voltage.



EQA9038A

CONDENSER AND RADIATOR FAN OPERATION CONDITION

COM-PRESSOR ON/OFF	VEHI-CLE SPEED (KPH)	FAN	COOLANT TEMPERATURE -30	90	95	100	105	110	115	120
OFF	44KPH below	R/FAN	OFF			LOW	MID-DLE	HIGH		
		C/FAN	OFF				MIDDLE			
	44KPH over	R/FAN	OFF		LOW		HIGH			
		C/FAN	OFF				MIDDLE			
	80 KPH over	R/FAN	OFF				HIGH			
		C/FAN	OFF				MIDDLE			
ON	20 KPH below	R/FAN	OFF		LOW		MID-DLE	HIGH		
		C/FAN	OFF		LOW		MID-DLE	HIGH		
	20 KPH over	R/FAN	OFF		LOW		HIGH			
		C/FAN	OFF		LOW		HIGH			
	80 KPH over	R/FAN	OFF				HIGH			
		C/FAN					HIGH			

* R/FAN : Radiator Fan C/FAN : Condenser Fan

ECU OPERATION CONDITION

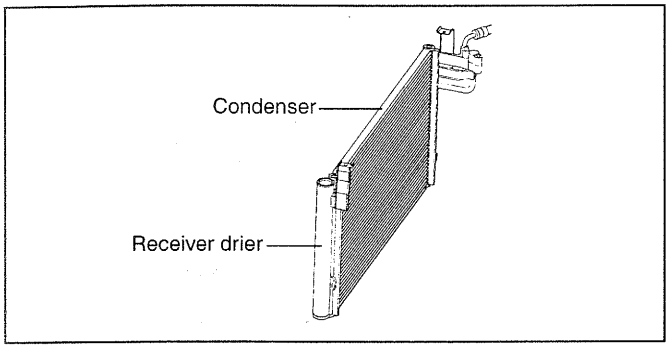
		ECU "HI"					
		OFF		ON			
ECU "LO"	OFF	OFF	OFF	MID	MID	OFF	
		OFF	OFF	MID	MID	ON	A/C
	ON	OFF	OFF	HIGH	HIGH	OFF	S/W
		LOW	LOW	HIGH	HIGH	ON	
		RAD FAN	COND FAN	RAD FAN	COND FAN		

EQHA140A

RECEIVER/DRIER EQHA1450

1. Check the fusible plug and the fittings for leakage, using a leak detector.

2. Run the engine at fast idle with the air conditioning "ON", and check both the inlet and outlet temperature. If difference in temperatures between the inlet and outlet is large, replace the receiver-drier.



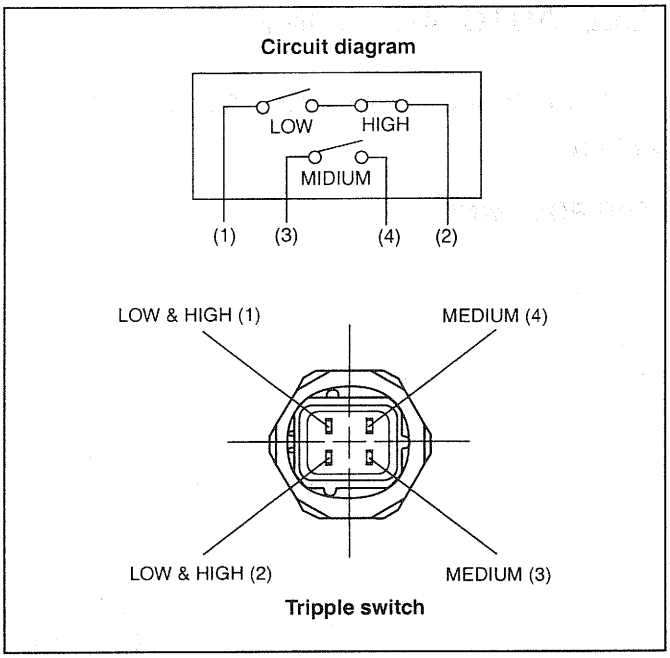
EQHA201A

NOTE

1. **Plug the all open fittings immediately to keep moisture out of the system.**
2. **Do not remove the blind plugs until ready for connection.**
3. **If the receiver-drier is replaced with a new unit, add 40cc of compressor oil to the compressor.**
4. **Evacuate, charge and test refrigeration system.**

TRIPLE SWITCH EQHA1500

Triple switch is a combination of the medium switch as well as conventional low pressure and high pressure switches. Low pressure switch will be turned off to stop compressor operation if refrigerant pressure is low. High pressure switch will be turned off to stop compressor operation if refrigerant pressure is too high. Medium switch will be turned on at medium level pressure to determine the A/C system overheating, in order to cool the A/C system operating radiator fan and condenser fan at high speed.



KFWD009A

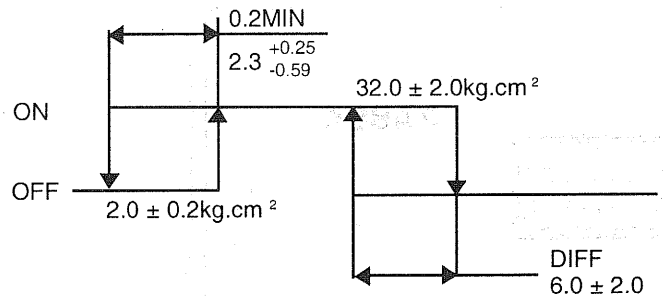
OPERATING CHARACTERISTIC

kg·cm²

Pressure	ON	OFF
High	32.0 ± 2.0	32.0 ± 2.0
Low	2.0 ± 0.2	2.3 ± 0.25
Medium	15.5 ± 0.8	11.5 ± 1.2

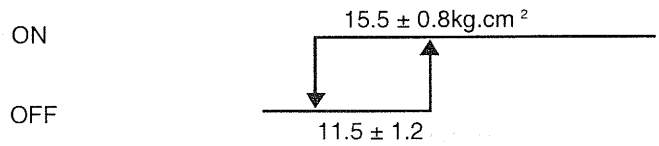
EQHA150B

LOW & HIGH



EQHA150A

MEDIUM

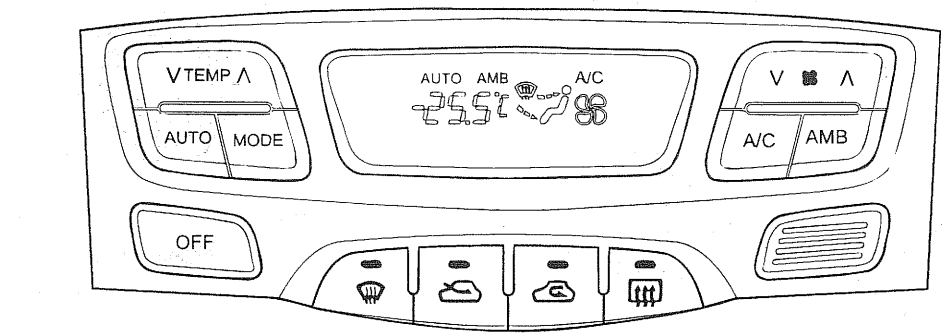


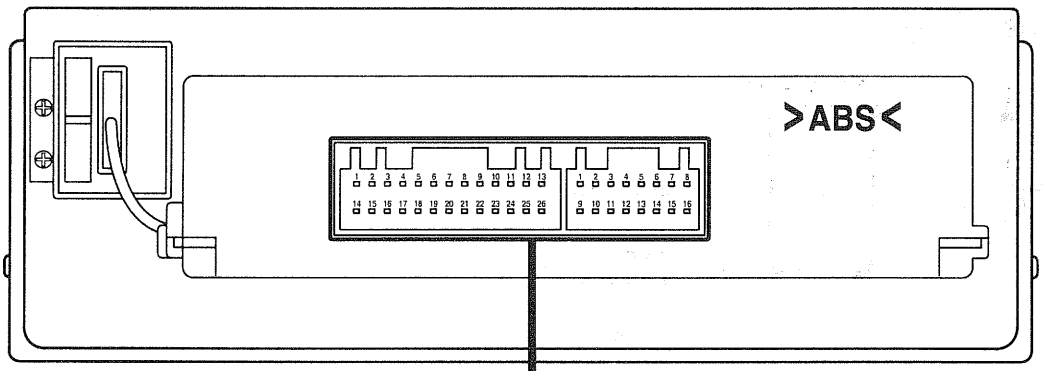
EQHA150C

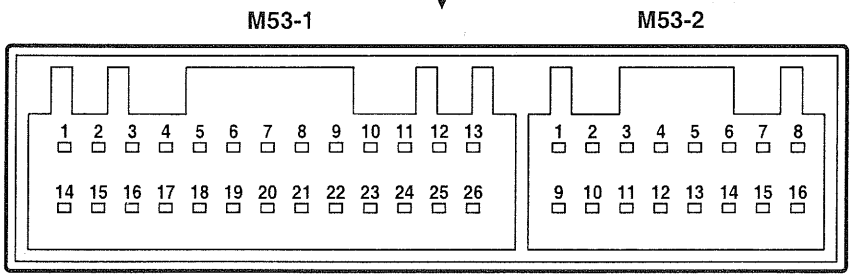
FULL AUTO A/C COMPRESSOR

FULL AUTOMATIC AIR CONDITIONER (FATC) EQHA1000

CONTROL PANEL



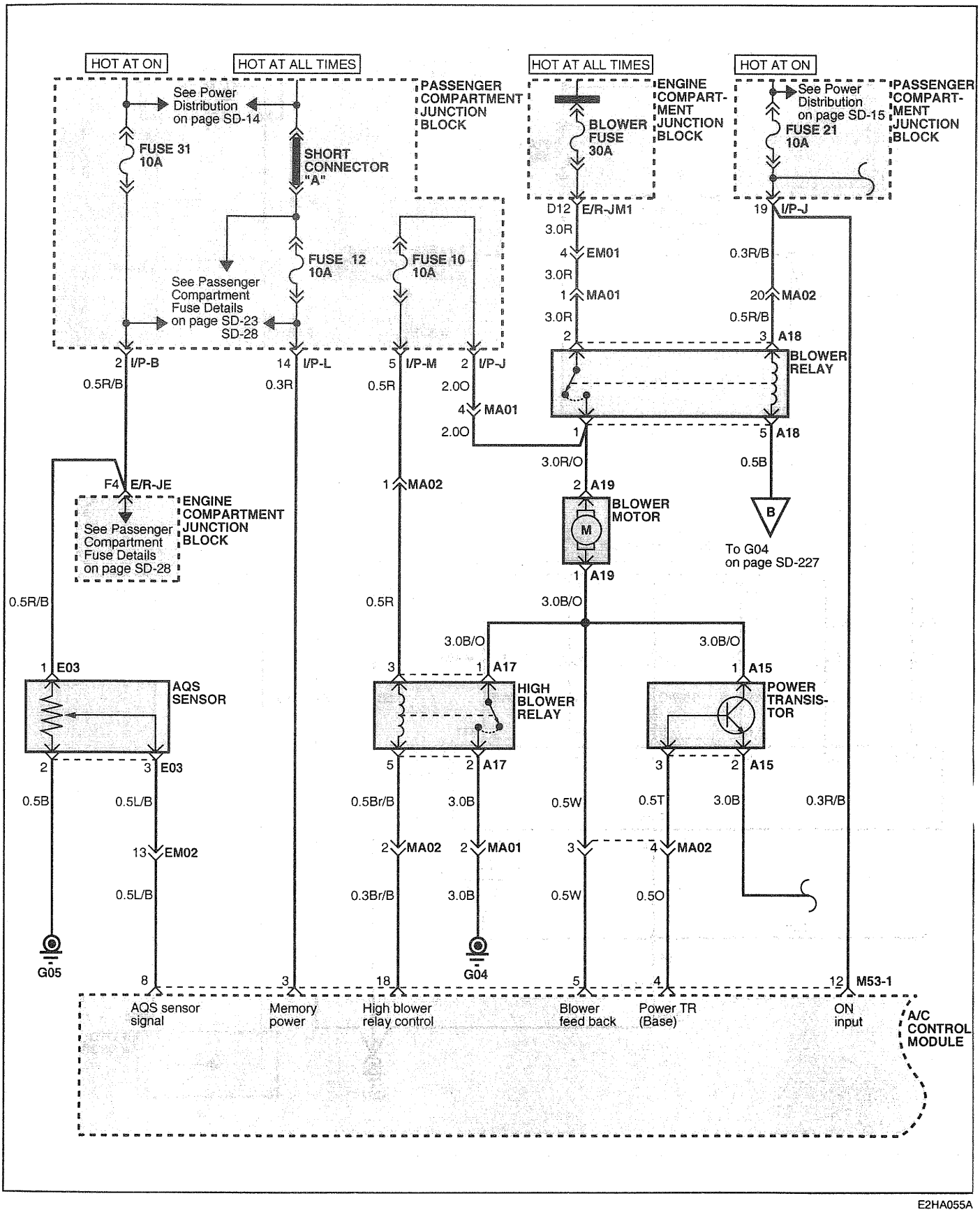




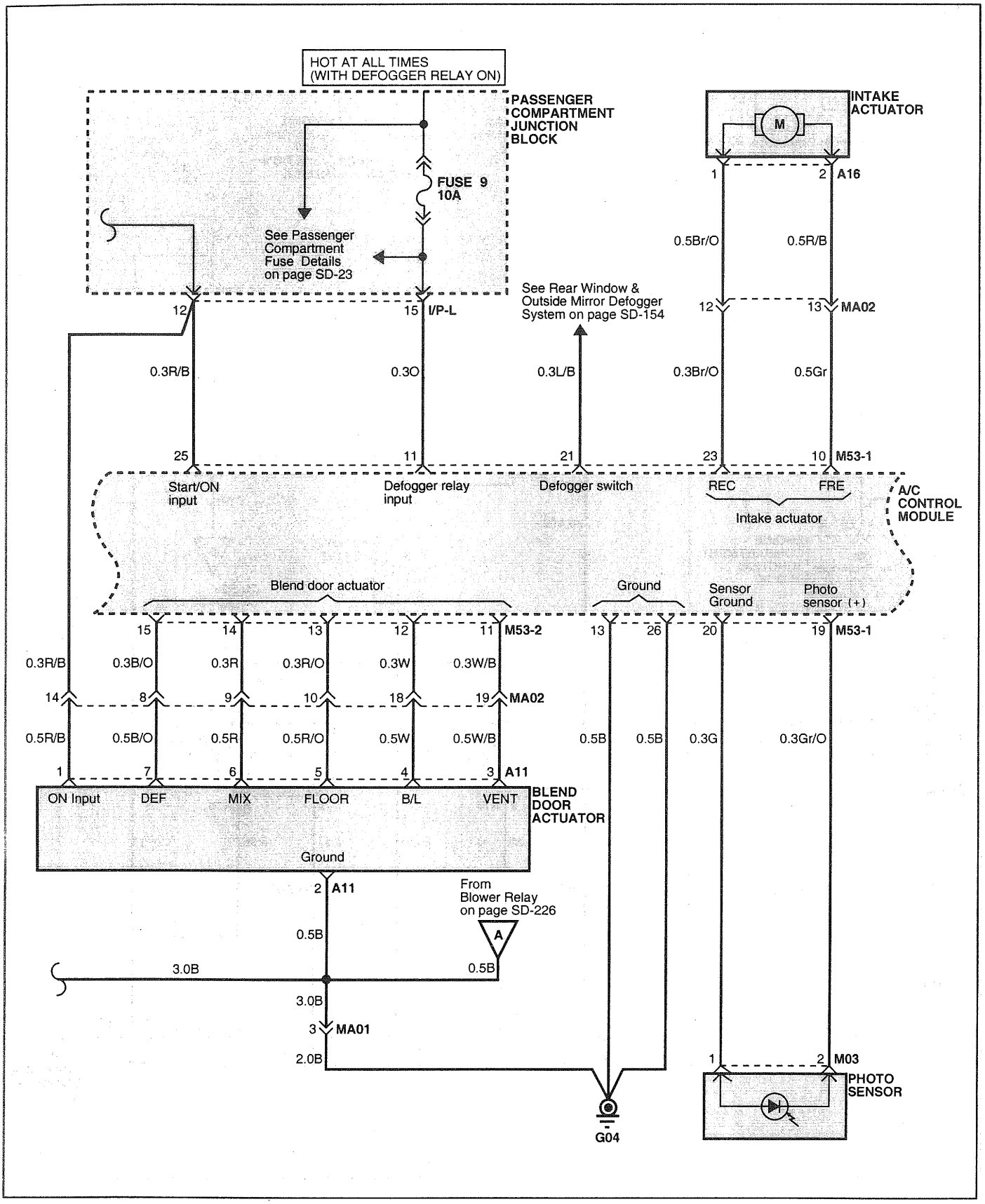
EQHA003A+KFWD017A

EQHA100A

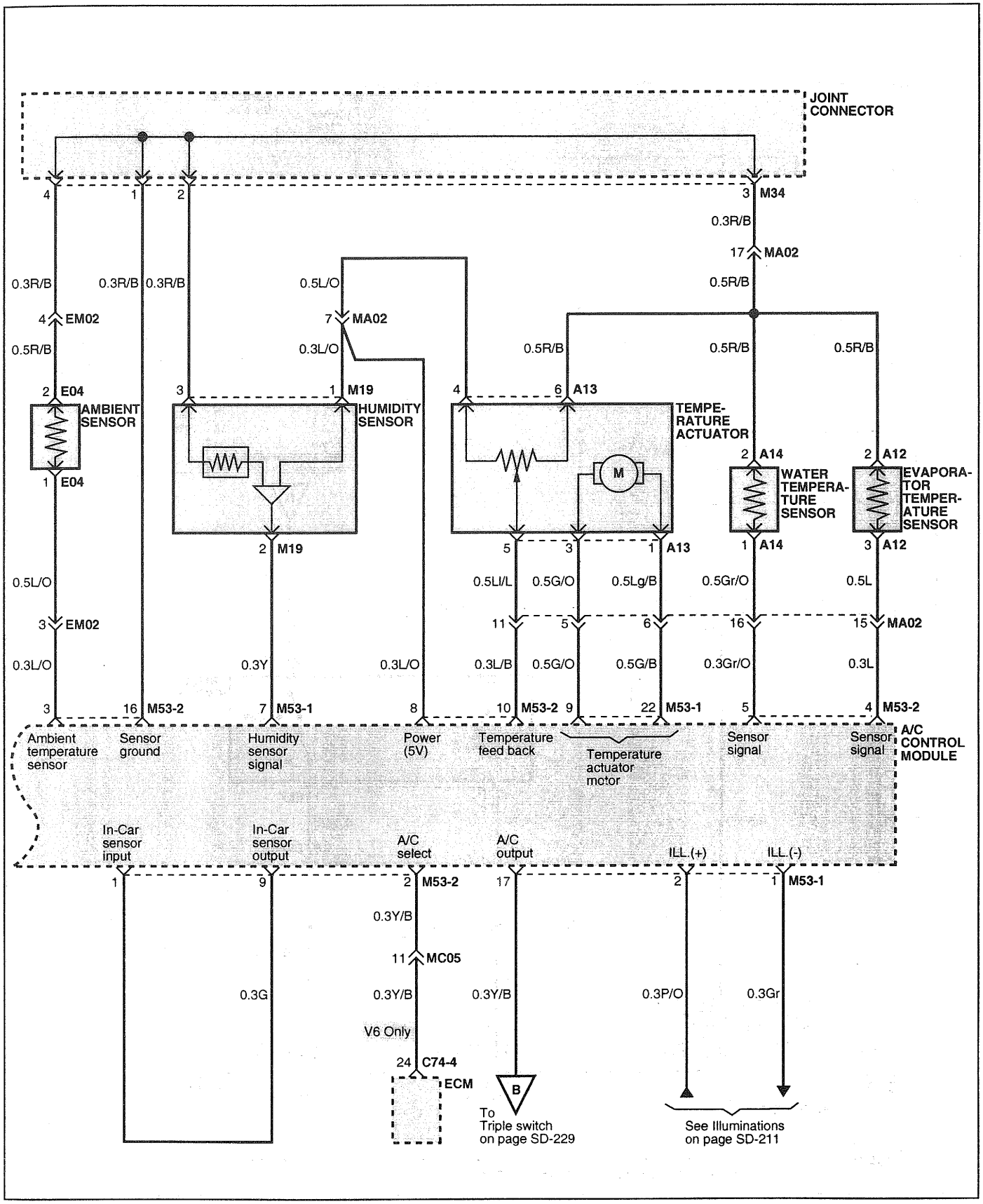
SCHEMATIC DIAGRAM EQHA1050



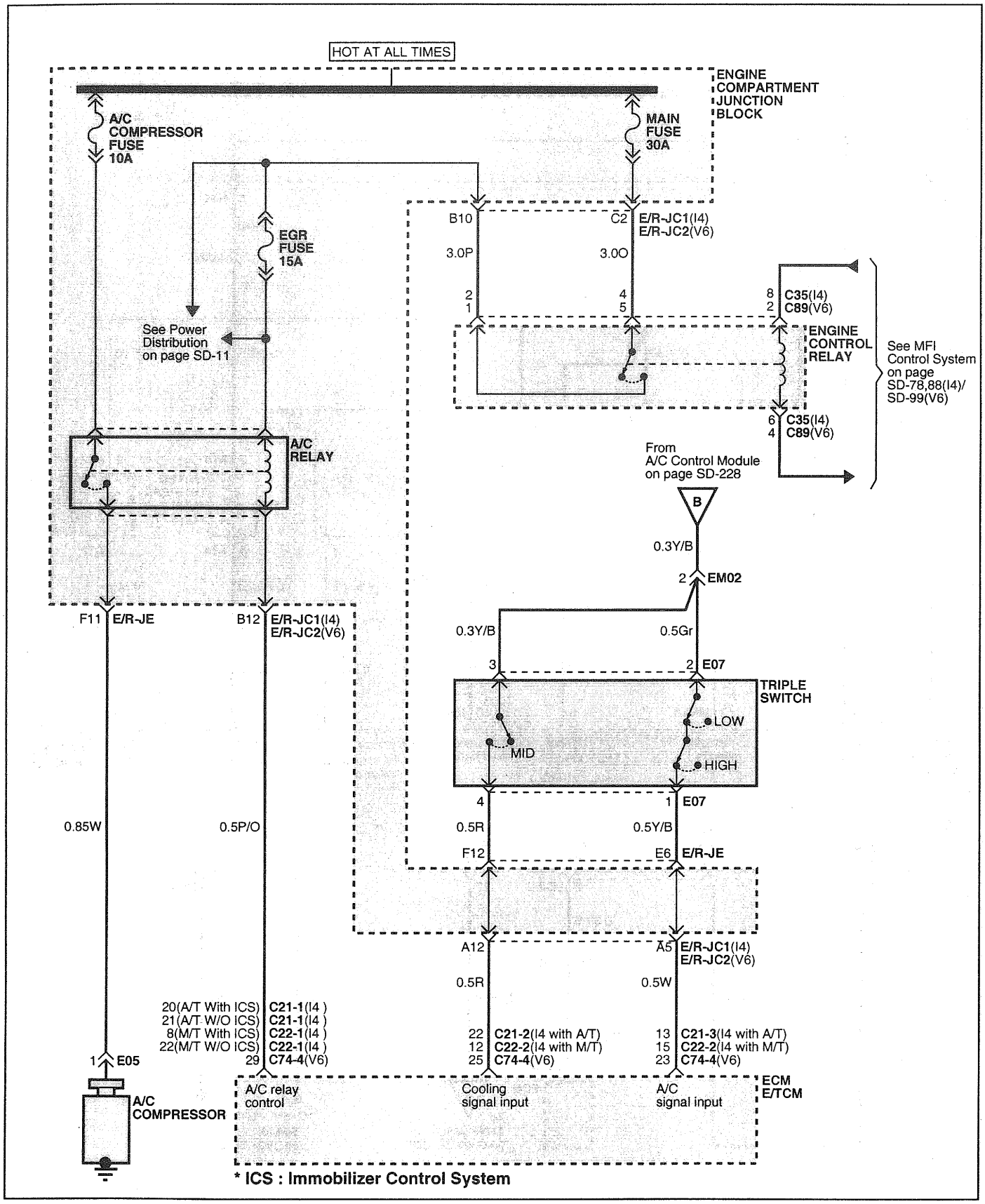
E2HA055A


HOT AT ALL TIMES
(WITH DEFOGGER RELAY ON)
PASSENGER COMPARTMENT JUNCTION BLOCK
FUSE 9
10A
See Passenger Compartment Fuse Details on page SD-23
INTAKE ACTUATOR
M
1
2
A16
0.5Br/O
0.5R/B
See Rear Window & Outside Mirror Defogger System on page SD-154
12
15
I/P-L
12
13
MA02
0.3R/B
0.3O
0.3L/B
0.3Br/O
0.5Gr
25
11
21
23
10
M53-1
Start/ON input
Defogger relay input
Defogger switch
REC
FRE
Intake actuator
A/C CONTROL MODULE
Blend door actuator
Ground
Sensor Ground
Photo sensor (+)
15
14
13
12
11
M53-2
13
26
20
19
M53-1
0.3R/B
0.3B/O
0.3R
0.3R/O
0.3W
0.3W/B
14
8
9
10
18
19
MA02
0.5R/B
0.5B/O
0.5R
0.5R/O
0.5W
0.5W/B
0.5B
0.5B
0.3G
0.3Gr/O
1
7
6
5
4
3
A11
ON Input
DEF
MIX
FLOOR
B/L
VENT
BLEND DOOR ACTUATOR
Ground
2
A11
From Blower Relay on page SD-226
A
0.5B
3.0B
0.5B
3.0B
3
MA01
2.0B
G04
1
2
M03
PHOTO SENSOR

E2HA055B


JOINT CONNECTOR
4
1
2
3 M34
0.3R/B
17 MA02
0.5R/B
0.3R/B
0.3R/B
0.3R/B
0.5L/O
4 EM02
7 MA02
0.5R/B
0.3L/O
0.5R/B
0.5R/B
0.5R/B
2 E04
AMBIENT SENSOR
3
1 M19
HUMIDITY SENSOR
4
6 A13
TEMPE-RATURE ACTUATOR
M
2 A14
WATER TEMPERA-TURE SENSOR
2 A12
EVAPORA-TOR TEMPER-ATURE SENSOR
1 E04
2 M19
5
3
1 A13
1 A14
3 A12
0.5L/O
0.5Ll/L
0.5G/O
0.5Lg/B
0.5Gr/O
0.5L
3 EM02
11
5
6
16
15 MA02
0.3L/O
0.3Y
0.3L/O
0.3L/B
0.5G/O
0.5G/B
0.3Gr/O
0.3L
3
16 M53-2
7 M53-1
8
10 M53-2
9
22 M53-1
5
4 M53-2
Ambient temperature sensor
Sensor ground
Humidity sensor signal
Power (5V)
Temperature feed back
Temperature actuator motor
Sensor signal
Sensor signal
A/C CONTROL MODULE
In-Car sensor input
In-Car sensor output
A/C select
A/C output
ILL.(+)
ILL.(-)
1
9
2 M53-2
17
2
1 M53-1
0.3Y/B
11 MC05
0.3G
0.3Y/B
0.3Y/B
0.3P/O
0.3Gr
V6 Only
24 C74-4
ECM
B
To Triple switch on page SD-229
See Illuminations on page SD-211

E2HA055C


HOT AT ALL TIMES
ENGINE COMPARTMENT JUNCTION BLOCK
A/C COMPRESSOR FUSE 10A
MAIN FUSE 30A
EGR FUSE 15A
See Power Distribution on page SD-11
B10
C2
E/R-JC1(I4)
E/R-JC2(V6)
3.0P
3.0O
2
1
4
5
8
2
C35(I4)
C89(V6)
ENGINE CONTROL RELAY
See MFI Control System on page SD-78,88(I4)/ SD-99(V6)
6
4
C35(I4)
C89(V6)
A/C RELAY
From A/C Control Module on page SD-228
B
0.3Y/B
2
EM02
F11
E/R-JE
B12
E/R-JC1(I4)
E/R-JC2(V6)
0.3Y/B
0.5Gr
3
2
E07
TRIPLE SWITCH
LOW
MID
HIGH
4
1
E07
0.85W
0.5P/O
0.5R
0.5Y/B
F12
E6
E/R-JE
A12
A5
E/R-JC1(I4)
E/R-JC2(V6)
0.5R
0.5W
20(A/T With ICS)
21(A/T W/O ICS)
8(M/T With ICS)
22(M/T W/O ICS)
C21-1(I4)
C21-1(I4)
C22-1(I4)
C22-1(I4)
29
C74-4(V6)
22
12
25
C21-2(I4 with A/T)
C22-2(I4 with M/T)
C74-4(V6)
13
15
23
C21-3(I4 with A/T)
C22-2(I4 with M/T)
C74-4(V6)
1
E05
A/C COMPRESSOR
A/C relay control
Cooling signal input
A/C signal input
ECM E/TCM
* ICS : Immobilizer Control System

E2HA055D

SWITCH OPERATION AND FEATURES EQHA1010

1. Full auto air conditioning system: One-touch button type(back-up feature on operation).
2. Manual air conditioning system: Combination of dial switch and one-touch button.
3. Rear air conditioning system: Manual operation with main button of two-touch type.

CONTROL PANEL SWITCHES WILL GENERATE BUZZER SOUND ON OPERATION

Button	Function	Display	System operation	Stop switch and system operation
Temperature switch (Temperature control) (Manual air-conditioning systems have dial type switches)	Temperature setting UP/ DOWN	Temperature setting indication Range: 17°C-32°C Scale: 0.5°C User may chose the temperature indication between °C/°F. 17°C=62°F 32°C=90°F 25°C=77°F	1. The switch will operate temperature door to regulate cool/ warm air ratio and resultingly control discharge air control. 2. The switch will raise up or lower down the temperature by unit of 0.5. 3. Setting at 17°C (62°F) will provide max. cooling, and setting at 32°C (90°F) will provide max. heating. 4. Switching off→on, it will display the temperature setting just before the previous switching-off. 5. In shifting 17.5°C→17°C or 31.5°C→32°C, raising temperature setting will generate buzzer sound 5 times at interval of 0.15 seconds. 6. Lowering temperature setting at 17°C or raising temperature setting at 32°C, it will generate buzzer sound 5 times at interval of 0.15 sec. 7. Pressing repeatly on: Shift one unit every 0.7 second. Holding down: First shift in 0.7 seconds and than shift every 0.3 seconds (buzzer sound for 0.1 second upon each shift)	Turning off the switch, the system will be off. Control temperature setting up/down.
AUTO (Auto control)	Auto control of air conditioning system	"AUTO" will be displayed on control panel VFD.	1. The system will provide auto control of the below features on the basis of temperature setting: • Temperature door • Mode door • Intake door(Shift between fresh air/recirculation) • Blower speed • Compressor. 2. "AUTO" will disappear upon releasing AUTO switch. 3. Features except manually selected switches will be controlled automatically upon releasing auto switch.	Off→system off Blower switch : Manually control blower MODE : Manually control discharge mode A/C : Manually control compressor on/off. Fresh air : Manually control fresh air Recirculation : Manually control recirculation Defroster : Manually control defroster (at condition of air conditioning system on and recirculation)

Button	Function	Display	System operation	Stop switch and system operation
AMB	Indicate ambient air temperature	'AMB' lamp will come on indicate ambient air temperature other lamps will go out.	1. The system will operate in the condition just before pressing AMB switch. 2. Pressing AMB switch, any previous indication will go out and 'AMB' lamp and ambient air temperature will come on 5 seconds, and then it will return to the previous indication just before pressing AMB switch.	AMB: Pressing AMB switch during ambient air temperature is indicated, ambient air temperature indication will be extinguished. Other switches: Pressing another switch during ambient air temperature is indicated, ambient air temperature indication will be extinguished and selected switch control will be performed.
INTAKE	Recirculation	Recirculation lamp will come on. "AUTO" lamp will go out.	Fix intake door at the position of recirculation.	Selecting fresh air at the current condition : Fresh air control off switch Fixing at the current condition (Fresh air selection is possible)- IND lamp will come in. AUTO-auto control (fresh air, recirculation).
	Fresh air	Fresh air lamp will come on. "AUTO" lamp will go out.	Fix intake door at the position of fresh air.	Selecting fresh air at the current condition : Fresh air control off switch Fixing at the current condition (Fresh air selection is possible)- IND lamp will come in. AUTO-auto control (fresh air, recirculation).

<table>
<tr><th>Button</th><th>Function</th><th>Display</th><th>System operation</th><th>Stop switch and system operation</th></tr>
<tr><td rowspan="3">Blower fan speed UP/ DOWN</td><td>Blower fan speed, UP/ DOWN control</td><td>Indicate fan operation On/off</td><td rowspan="3">1. Control blower motor revolution by meas of POWER TR's current variation.
2. Pressing fan UP/DOWN switches during auto control, the speed will shift up/down based on the current fan level.
3. Switching on a switch except fan switch at 'off' condition, the speed will rise steadily from LOW to the target speed. (Require 6 seconds from LOW to HI).
4. Shifting a step will take 0.7 seconds when pressing the switch once. Holding on the switch, a shift will occur every 0.3 seconds and buzzer sounds for 0.1 second.
5. Pressing UP switch at HI position or DOWN switch at LOW position, buzzer sound will occur 5 times at 0.4 second interval.</td><td rowspan="3">AUTO: Auto control
OFF : System off
Fan speed control: Manually control blower fan speed.</td></tr>
<tr><td colspan="2">Output increment step by step</td></tr>
<tr><td colspan="2">Fan speed levels and voltages
- Auto cooling : No level(4.5V~B+)
- Auto heating: No level(4.5V~B+)
- Manual control: 7 levels (3.8V~B+)</td></tr>
<tr><td>A/C Air conditioning switch</td><td>Compressor on/off control</td><td>• A/C lamp (on/off)
• AUTO lamp off</td><td>Airconditioning ON/OFF</td><td>A/C: A/C on/off, manual control.
OFF: System off AUTO: Auto control.
DEF: Defroster, manual control.</td></tr>
<tr><td rowspan="2">MODE (Discharge mode)</td><td rowspan="2">Mode door control VENT, FLOOR, B/L, MIX</td><td rowspan="2">MODE indication (on/off)
AUTO lamp off</td><td>1. Fix mode door at B/L or MIX
2. Manually operating mode switch, the switch will shift in the order of VENT-B/L-FLOOR-MIX</td><td>MODE: Shift control in order of Vent-B/L-Floor-Mix-Vent.
DEF: Defroster, manual control.
AUTO: Auto control</td></tr>
<tr><td colspan="2">A/C may be turned on at MIX mode enabling to turn off the switch to A/C position.</td></tr>
<tr><td>DEF (Defroster)
• Remove moisture/ frost on windshield.</td><td>DEF control</td><td>• DEF IND on
• DEF indication on
• A/C lamp on
• INTAKE IND off
• AUTO lamp off</td><td>1. Mode door: Fixed at defroster.
2. Intake door: Fresh air control (Selecting recirculation is enabled).
3. A/C: on (Compressor will be controlled on/off based on detected temperature by fin sensor).
4. Prevails over max. cooling and max. heating.
5. Prevails over mix mode control</td><td>AUTO: System auto control.
MODE: Discharge mode, manual control (release the defroster control).
A/C: A/C on/off, manual control
DEF: Return to the previous condition before selecting DEF switch.</td></tr>
</table>

<table>
<tr><th>Button</th><th>Function</th><th>Display</th><th>System operation</th><th>Stop switch and system operation</th></tr>
<tr><td rowspan="4">OFF</td><td rowspan="4">System off</td><td rowspan="2">Control panel LCD off
Indicator lamps on</td><td rowspan="2">1. Blower fan speed off.
2. Airconditioning off.
3. Intake door: Fixed at the condition prior to system off.
4. Temperature door: Auto control.
5. Mode door: Fixed at the condition prior to system off.
6. AMB
Pressing AMB switch after system off, 'AMB' lamp/ambient air temperature will come on for 5 seconds and than go out.</td><td>AUTO: Auto control.
Blower speed: Return to MANUAL LOW.
Others: Return to the previous condition before system off</td></tr>
<tr><td>A/C: Airconditioning on.
Others: Return to the previous condition before system off (Blower speed: Return to MANUAL LOW)</td></tr>
<tr><td colspan="2">• INTAKE(recirc/fresh air) control at the system off condition
1) Selecting fresh air switch at the recirculation position after system off: It will shift to the fresh air position and extinguish the recirculation indicator lamp. The LCD will be held off.
2) Selecting recirculation switch at the fresh air position after system off: It will shift to the recirculation position and extinguish the recirculation indicator lamp. The LCD will be held off.
3) Other switches will be held off at the above condition.</td><td>MODE: Held at the previous condition before system off. (Auto control is released).
Others: Return to the previous condition before system off (Blower speed: Return to MANUAL LOW)</td></tr>
<tr><td>DEF: Shift to defroster mode
Air conditioning on/Intake(fresh air)
Others: Return to the previous condition before system off</td></tr>
<tr><td colspan="2"></td><td>TEMP: Held at the previous condition before system off.
Others: Return to the previous condition before system off.</td></tr>
<tr><td>DEFOG</td><td>Rear glass defogger on</td><td>Defogger switch indicator on/off</td><td>1. Pressing DEFOG switch, the switch signal will be sent to ETACS. Receiving HTD signal from ETACS, DEFOG indicator will be on.
2. Pressing the switch again, defogging will stop and the indicator will go out.
3. Released by ETACS after 15 minutes of control.</td><td>Pressing DEFOG switch again, it will be released.</td></tr>
</table>

Button	Function	Display	System operation	Stop switch and system operation
AQS switch	AQS	AQS indicator on/ off	AQS indicator will come on and intake control (intake door) will be effected depending on AQS signal. Selection buttons are provided individually for AQS, recirculation and fresh air.	Pressing the switch again during the switch is on, it will be released (Indicator will go out). Selecting fresh air or recirculation during AQS is on, AQS will be off and shift to the selected mode.
RR A/C switch	RR A/C switch indicator on Valve power supply on RR A/C floor power supply on		Pressing the switch again during the switch is on, the switch will be released. Interrupt power supply for RR A/C solenoid valve and blower motor.	Pressing the switch again during the switch is on, it will be released.
RR A/C blower switch	RR A/C blower speed control A/C operation (only)		RR A/C blower speed control: Controlled by manual selection for 3 Steps; HI-HID-LO	A/C switch off Blower switch off
How to change temperature display mode on control panel LCD: 1. Holding AMB button pressed, TEMP DOWN condition of 3 seconds or longer will shift the unit from °C to °F. 2. Switching on battery power from off condition, the default unit, °C will be displayed.				

SYSTEM CONTROL FEATURES

SIGNAL I/O FOR EACH CONTROL FEATURE

Control item	Input	Output	Remarks
Required discharge temperature control	Auto SW, A/C SW, TEMP SW, INCAR sensor, AMB sensor, Photo sensor, Water temperature sensor, Fin thermo sensor, TEMP actuator.	TEMP actuator	
Mode control	AUTO SW, MODE SW, TEMP SW, DEF SW, Blower SW, OFF SW, INCAR sensor, AMB sensor, Photo sensor, Water temperature sensor, Fin thermo sensor, Power TR.	Blower motor Power TR HI-blower relay	Blower Switch Manual selection Control in priority
Mode door control	AUTO SW, MODE SW, DEF SW, Blower SW, OFF SW, TEMP SW, INCAR sensor, AMB sensor, Photo sensor.	Mode actuator	
Intake control	AUTO SW, A/C SW, DEF SW, TEMP SW, OFF SW, Intake SW, INCAR sensor, AMB sensor, Photo sensor, Power TR.	Mode actuator	
Compressor control	AUTO SW, A/C SW, DEF SW, TEMP SW, OFF SW, INCAR sensor, AMB sensor, Photo sensor	Compressor relay	

- During mode control, A/C may operate at DEF or MIX mode In order to enable dehumidification, driver may select A/C OFF during the A/C on condition.

CONTROL SPECIFICATION

Control item	Control features	Remarks
Required discharge temperature	Required temperature determined by temperature setting and sensor inputs.	
Auto control	Required discharge temperature is determined by temperature setting and each sensor input. The feature will use the required discharge temperature to perform auto control of temp actuator, mode actuator, intake actuator, blower motor and compressor, and maintain temperature setting stably.	
INCAR temperature correction	Upon detecting rapid change of temperature from INCAR sensor, it will correct incar temperature value to change gradually.	- 1°C UP/4sec delay - 1°C DOWN/4sec delay
AMB temperature correction	Upon detecting rapid change of temperature from AMB sensor, it will correct ambient temperature value to change gradually.	- 1°C UP/3min delay - 1°C DOWN/4sec delay
Photo correction	Upon detecting rapid change of photo intensity from PHOTO sensor, it will correct photo intensity value to change gradually.	- 350→1000(W/m^2)/1min delay - 350→1000(W/m^2)/5min delay
TEMP door control	Auto control to maintain optimum TEMP door opening(0%~100%), that will be computed from temperature setting and the input signal from each sensor.	Temperature setting range 17°C→32°C, 0.5°C step (62°F→90°F, 1°F step)
Blower speed	Auto control of blower speed, of which target value will be computed from temperature setting and the input signal from each sensor. (7 levels may be selected in case of manual selection.)	- Auto mode blower low voltage (Manual low voltage: 3.8) - Auto mode HTR blower HI speed: 10.6V
Electro-motive mode control	During auto control motion of mode, it will raise permitted voltage of blower motor gradually in order to improve comfortability.	6seconds for shifting LO→MAX HI
Photo compensation	During auto control, it will compensate blower level and discharge temperature according to photo intensity detected from PHOTO sensor at VENT or B/L mode. PHOTO compensation will begin 5 seconds after ignition on.	
Mode door control	Auto control of discharge mode based on required discharge temperature, that will be computed from temperature setting and the input signal from each sensor. (VENT→B/L→FLOOR→VENT) In case of manual selection (VENT→B/L→FLOOR→MIX→VENT)	- Upon switching system off in auto condition, mode door will maintain auto control condition. - Upon switching system off in manual condition, mode door will maintain manual control condition.
MIX mod control(in auto control)	If ambient temperature is -13°C or less in AUTO mode, discharge mode will be controlled at MIX. (When front window glass be defogged.)	Entering MIX mode, A/C will operate.

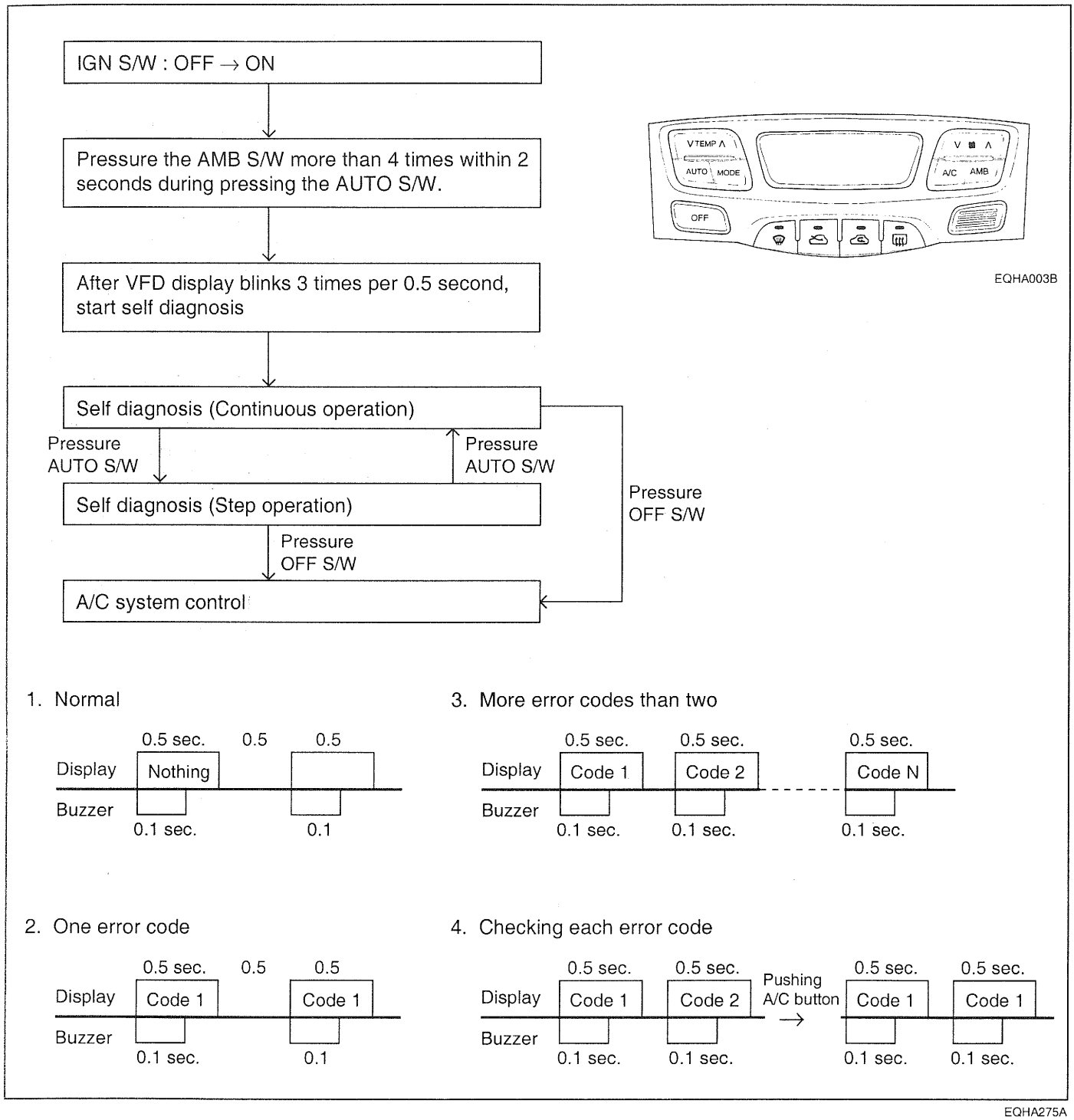
Control item	Control features	Remarks
INTAKE door control	Auto control of intake mode based on required discharge temperature that will be computed from temperature setting and the input signal from each sensor.	- Shift to REC upon selecting REC button at FRE condition (LED on). - Shift to FRE upon selecting FRE button at REC condition (LED on).
INTAKE control upon switching system off	Intake door will shift to REC position upon switching system off at auto condition, and maintain the previous condition upon switching system off at manual condition.	- F/R manual selection will be enabled upon switching system off. - REC indicator will come on upon switching system off at auto condition.
Compressor auto control	Auto control of Compressor on/off state based on temperature setting and input signal from each sensor.	- Auto control of compressor on/off upon selecting AUTO SW. - Compressor on upon manually selecting DEF SW.
Compressor clutch on/off control based on refrigerant temperature	If EVAP sensor detects temperature of 0.5°C or less, and temperature is 3°C or higher with compressor off, compressor will be on.	
MAX HOT	Selecting temperature setting at 32°C at auto condition, MAX HOT will be performed. It will prevail over MIX mode control.	- TEMP door: MAX HOT position - MODE door: FLOOR mode - INTAKE door: FRE mode - Compressor: off - Blower speed: auto HI(10.6V)
MAX COOL	Selecting temperature setting at 17°C at auto condition, MAX COOL will be performed.	- TEMP door: MAX COOL position - MODE door: FLOOR mode - INTAKE door: REC mode - Compressor: On - Blower speed: MAX HI
Electromotive heating control (CELO feature)	If temperature setting>incar temperature + 3°C at B/L or FLOOR at AUTO mode, and temperature sensor input is 68°C or less, it will effect electromotive heating control in order to prevent that cold air from outside may flow toward the feet of passengers.	- Blower speed: Controlled at AUTO LOW (0.5V)
	As coolant temperature will rise up, MODE door will shift in the order of DEF→MIX→AUTO.	Releasing condition 10 minutes after ignition on(In case of temperature sensor fail, it will apply substitute value, 20°C). Upon pressing blower switch when water temperature sensor detection is 58°C or higher. Upon pressing MODE switch.Upon pressing DEF switch.
	MODE: Manual selection is enabled (It will maintain the mode selection in case of manual mode, and blower will maintain CELO feature.) INTAKE door: As AUTO control or at manual selection mode.	
	Blower speed: Manual selection is enabled(No re-entry). Prevails over MAX HOT. No re-entry to CELO after releasing CELO with ignition on.	

<table>
<tr><th>Control item</th><th colspan="2">Control features</th><th>Remarks</th></tr>
<tr><td>Electromotive cooling control</td><td colspan="2">In order to prevent uncomfortableness by hot air from VENT or B/L discharge at AUTO mode (A/C on mode), blower speed will be held at LOW for approx. 9 seconds before entering AUTO control if EVAP sensor detection is 30°C or higher.</td><td></td></tr>
<tr><td>MAX HOT</td><td colspan="2">If the said condition is satisfied, electromotive cooling control will operate at any time.</td><td></td></tr>
<tr><td rowspan="5">Air Quality System (AQS)</td><td colspan="2">The AQS system will detect hazardous elements and odors contained in air as well as emission gas. If the harmful element concentration is higher than standard, the system will output LOW signal(0V) to ATC.</td><td>- Upon initial battery connection and ignition on, it will operate at AUTO mode. (AQS will not operate.)</td></tr>
<tr><td colspan="2">If the concentration is within the standard value, the system will output HI signal(3V) the ATC.</td><td>- Upon IGN 2 ON, the AQS assembly will be preheated for 34.5±5seconds. During the preheating, AQS will output 0V (ground). (REC mode)</td></tr>
<tr><td colspan="2">Depending on the signal from AQS, When AQS is on ATC will control INTAKE door as follows in order to prevent inflow of harmful gas:</td><td>- IGN2 ON: It will check circuit break on the AQS assembly's signal line for approx 7 seconds during the preheating, irrespective to the AQS switch condition.</td></tr>
<tr><td>Condition</td><td>INTAKE door position</td><td rowspan="3">- When AQS is selected prior to IGN2 OFF and IGN2 is turned off→on: AQS indicator will come on, and the system will operate at AQS mode. (Store the previous condition before IGN 2 OFF)</td></tr>
<tr><td>LOW</td><td>REC</td></tr>
<tr><td>HI</td><td>FRE</td></tr>
<tr><td>Initialization Upon battery-on</td><td colspan="2">Upon initial power supply, it will operate in the initial condition.</td><td>- Upon initial ignition on after battery connection, the system will operate at temperature setting 25°C and at AUTO mode.</td></tr>
<tr><td>Memory</td><td colspan="2">Upon removing ignition key, it will store FATC's operating condition</td><td>Turning ignition off and on again during FATC operation, the system will operate at the previous before the ignition off.</td></tr>
</table>

DIAGNOSIS SYSTEM EQHA2750

OPERATION METHOD (SELF-DIAGNOSIS)

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



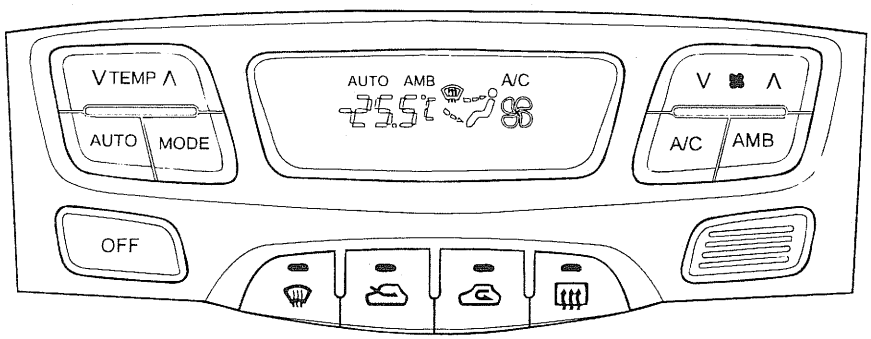
FAIL SAFE FUNCTION

EQHA1020

No.	Item	Failure	FAIL SAFE Function
1	Incar temperature sensor	Open/Short	25°C alternate value control
2	Ambient temperature sensor	Open/Short	20°C alternate value control
3	Pin thermo sensor	Open/Short	-2°C alternate value control
4	Water temperature sensor	Open/Short	-20°C alternate value control
5	Temperature door potentiometer	Open/Short setup temperature	For 17°C to 24.5°C, Set to maximum cooling position. For 25°C to 32°C, Set to maximum heating position.

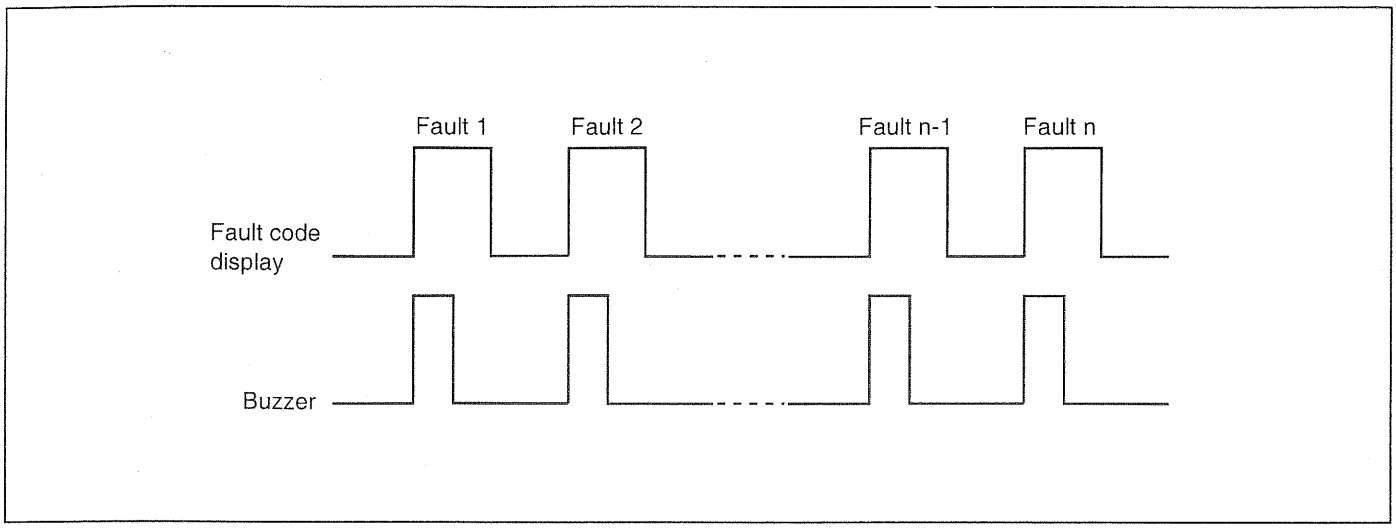
HOW TO READ SELF-DIAGNOSTIC CODE

1. After display panel flickers three times every 0.5 second, the corresponding error code flickers on setup temperature display panel every 0.5 second and shows two figures.
2. If error code is more than two, each code flickers 2 times in sequence.



EQHA003B

FAULT CODE DISPLAY



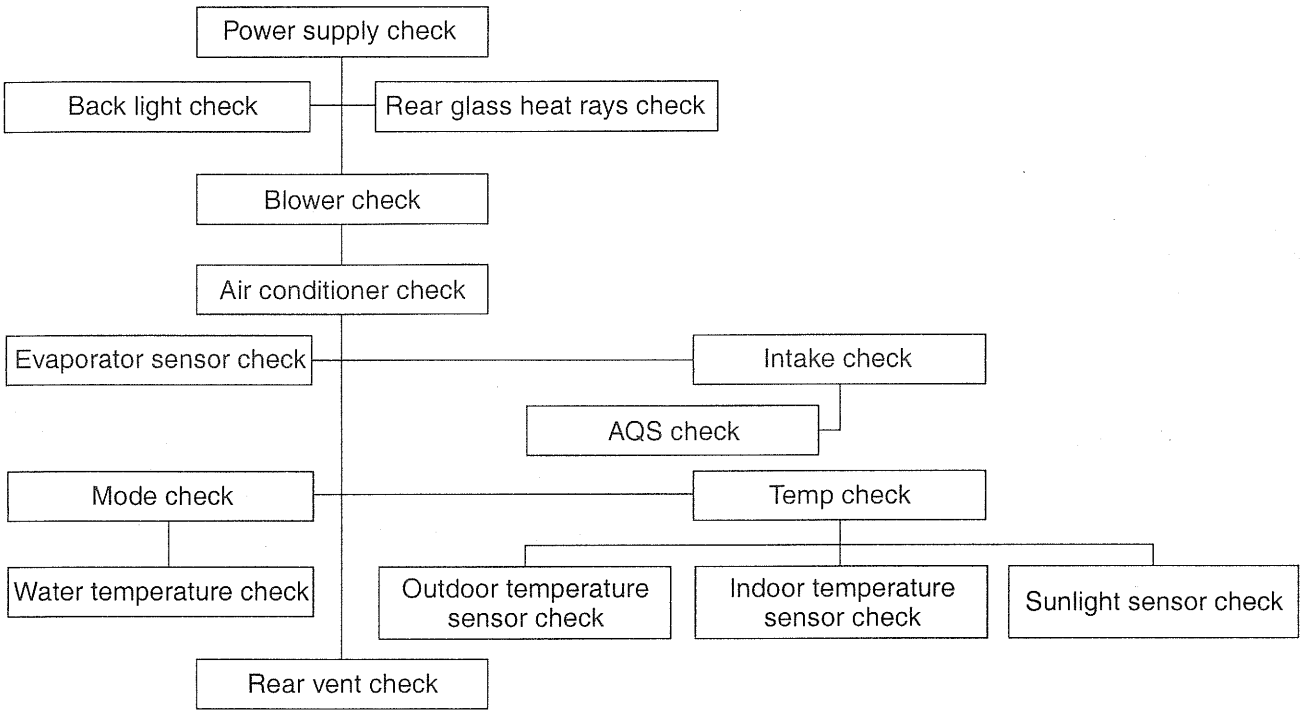
FO-HA01

DTC CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below.

DTC code	Detection item	Trouble area
00	Normal	-
11	Open INCAR Sensor circuit	• Incar sensor • Harness or connector between incar sensor and A/C control assembly • A/C control assembly
12	Shorted INCAR Sensor circuit	
13	Open Ambient sensor circuit	• Ambient sensor • Harness or connector between ambient sensor and A/C control assembly. • A/C control assembly.
14	Shorted Ambient sensor circuit	
15	Open water temp. sensor	• Water temp. sensor • Harness or connector between water temp. sensor and A/C control assembly. • A/C control assembly
16	Shorted water temp. sensor	
17	Open pin thermo sensor	• Pin thermo sensor • Harness or connector between evap. sensor and A/C control assembly • A/C control assembly
18	Shorted pin thermo sensor	
19	Open or shorted temp. door potentiometer	• Harness or connector between temp. door potentiometer and A/C control assembly
20	Defective temp. door potentiometer	• Temp. door potentiometer

CHECKPOINT BY TYPE EQHA1030



EQHA103A

Since FATC controller is complicated in functions as shown in the above chart, it is impossible to conclude its reason at the occurrence of failure. All possibilities of failure shall be considered for the purpose of efficient How to check.

1. Power supply check
2. Back light and Rear glass heat rays check
3. Blower check
4. Air conditioner check
5. Intake check and AQS check
6. Mode check
7. Temp check
8. Each sensor check
9. Rear vent check

POWER SUPPLY CHECK

In turning off IGN, battery supplies power for ordinary power, FATC connector (M53-1) through battery fuse (30A). FATC performs memory function by means of battery power supplied as described above. In turning on IGN, alternator is driven. At this time, IG2 power generated in alternator FATC connector (M53-1) and (M53-2) terminal through IG1 fuse (30A) and air conditioner fuse (10A). FAT carried out actual system operation by means of IG2 power supplied as described above.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
When IF is ON, memory function error occurs	Battery power supply error	Check voltage of battery after turning off IG. If 10V and more, check FATC connector and if no problem, check the inside of controller. If 10V and less. check fuse or wiring state of battery power source.
When IG is ON, system running error occurs.	IG2 power supply error	Check voltage of IG2 after turning on IG. If 10V and more, check FATC connector and if no problem, check the inside of controller. If 10V and less. check fuse or wiring state of IG2 power source.

BACK LIGHT AND REAR GLASS HEAT RAYS CHECK

In turning on IG and then light switch, battery power is supplied for FATC connector (M53-1), 2 terminal through wiring. The supplied power passes connector (M53-1), 1 terminal through light bulb in FATC and flows into reostart as shown in the above figure. The brightness is adjusted according to resistance value of reostart. In turning on IG and pressing rear glass heat rays switch, GRD(0V) is supplied for FATC connector (M53-1), 21 terminal. At this time, when signal is sent to ETACS, rear glass heat rays runs and when ETACS sends signal(10V) to FATC connector (M53-1), 11 terminal through heating wiring, switch and indicator of rear glass heat rays are turned on.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
When light switch is ON, partial error occurs in back light.	Light bulb lighting error in FATC	
When light switch is ON, entire error occurs in back light.	Light power supply error	Measure voltage of tail light shown in the above figure after switching on light. If 10V and more, check FATC connector and if no problem, measure signal voltage of reostart shown in the above figure. If 8V and more, check reostart wiring and reostart.
		If tail light is below 1V, check tail light wiring.
When rear glass heat rays switch is ON, rear glass heat rays doesn't work.	Heat rays running error	Measure voltage of rear glass heat rays with heat rays switch on. If 0V, check rear glass heat rays.

BLOWER CHECK

Perform blower check in blower manual running state because it is difficult to check blower at automatic control. Blower is controlled from level I to level 7 equally as in button operation and running logic. In turning on IG, blower relay is ON and voltage of 0.1 to 1.4V is transferred from FATC connector (M53-1), 4 terminal to base source of power TF according to FATC control (selectable from level 1 to level 7). At this time, voltage of blower motor's both ends is determined according to collector voltage of FATC connector (M53-1). 5 terminal. If FATC is controlled in level 7, GND(0V) is supplied for FATC connector (M53-1), 19 terminal and high blower relay is driven.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Amount of wind is wrong at manual selection of blower.	Power TR error	Check voltage of blower motor's both ends. (Level 1 : 3.8V, Level 2 : 5.3V, Level 3 : 6.7V, Level 4 : 8.1, Level 5 : 9.5V, Level 6 : 0.6V, Level 7 :13.5V [high-relay operation]) Measure voltage of each terminal and if there is difference more than ±0.6V, check power TR.
Blower wind is discharged despite pressing OFF switch.	Power TR error	Power TR change
Regular wind is discharged regardless of manual selection of blower.	Power TR error Internal error of FATC	Power TR change
Error occurs in High-relay operation	Power supply error of High blower relay	Select level 7 of blower and measure voltage of high speed relay. If 0V, check high blower relay state and wiring connection state. If 5V and more, check the inside of FATC.

AIR CONDITIONER CHECK

11V is outputted from connector (M53-1), 17 terminal in turning on INSULATING and pressing air conditioner switch. However, although 11V is outputted from FATC connector (M53-1), 17 terminal, compressor clutch isn't driven. Wind of air conditioner is discharged if only compressor clutch works. Output signal from air conditioner is inputted in engine computer through triple switch. Then, the engine computer considers several conditions and when output of air conditioner is judged to be practical, it gives GND to signal terminal of air conditioner relay. Accordingly, relay of air conditioner is ON and compressor clutch works. Triple switch checks pressure of refrigerant flowing through pipe and turns on/off switches in it according to standard. So, it controls that output signal of air conditioner outputted from FATC is inputted into engine computer, and also speed of condenser fan according to pressure level. (For high pressure, high-speed and for low pressure, low-speed)

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Wind of air conditioner isn't discharged into vehicle despite switching on air conditioner.	Signal output error of air conditioner	Switch on air conditioner and measure voltage of FATC connector (M53-1), 17 terminal as shown in the above figure. If 9V and more, check triple switch, air conditioner relay, engine computer and peripheral wiring.
		Switch on air conditioner and measure voltage of FATC connector (M53-1), 17 terminal as shown in the above figure. If 1V and less, check input value of evaporator sensor.
	Input error of evaporator sensor	If evaporator sensor is disconnected or short or voltage of its input source is more than 3.0V (below 0.5°C), output of air conditioner isn't made.

INTAKE AND AQS CHECK

In turning on IG and selecting outdoor mode with indoor switch, 12V is outputted from FATC connector (M53-1), 23 terminal, 0V is supplied for (M53-1), 10 terminal and motor works in direction of outdoor. In selecting indoor mode with indoor switch, 12V is outputted from FATC connector (M53-1), 10 terminal, 0V is supplied for (M53-1), 23 terminal and motor works in direction of indoor.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Outdoor mode running error	Power supply error in actuator	Separate connector linked with actuator, select outdoor mode with indoor switch and measure voltage of FATC connector (M53-1), 23 terminal. If 8V and more, check actuator or peripheral wiring state and if 9V and less, check the inside of controller.
Indoor mode running error	Power supply error in actuator	Select indoor mode in the above method and measure voltage of FATC connector (M53-1), 10 terminal. If 8V and more, check actuator or peripheral wiring state and if 9V and less, check the inside of controller.
Fixed in outdoor or indoor mode at AQS selection.	AQS signal terminal output error	Select AQS switch and measure AQS signal terminal as shown in the above figure. If there is no change of voltage over 10 min, check AQS.

MODE CHECK

In turning on IG and selecting mode switch, sequential operation begins in order of Vent→Bi-level→Blower→Mix. DIP mode works regardless of order at selecting it. In selecting Vent mode as mode switch, GND(0V) is supplied for FATC connector (M53-2), 11(Vent) terminal. Voltage of 9V and more is set in the rest terminals (M53-2),12, (M53-2),13, (M53-2),14, (M53-2),15 and motor drive IC in mode actuator which receives the signal, works in direction of vent mode setup. Vent, Built-in-level, Blower, Mix and Defrost mode can be selected in the method described above.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Specific mode isn't selected.	Signal transmission error of selected mode	Measure voltage of selected mode wiring without separating connector linked with actuator. If 8V and more, check the inside of controller.
	Mode actuator running error	If 1V and less at measuring in the above method, check mode actuator and peripheral wiring state.
Mode selection is impossible	Internal error of mode actuator	If motor driver IC built in mode actuator is bad, mode selection is impossible. When mode isn't selected though GND(0V) is supplied for selected mode wiring after selecting mode in controller, its cause is internal failure of mode actuator.

TEMP CHECK

In adjusting temp switch from 32°C to 17°C, 11V is outputted from FATC connector (M53-1), 9 terminal, 0V is supplied for (M53-1), 22 terminal and temp motor works in direction of COOL. In adjusting temp switch from 17°C to 32°C, 11V is outputted from FATC connector (M53-1), 22 terminal, 0V is supplied for A-9 terminal and temp motor works in direction of WARM. When temp actuator has to move to a certain location for its automatic control, temp feedback signal terminal moves equally in temp actuator and informs controller of location of temp actuator through FATC connector (M53-2), 10 terminal. Comparing original value with inputted value, it works until they are same. If 4.9V and more is inputted in (M53-2), 10 terminal, it is regarded as disconnection. If 0.1V and less is inputted in (M53-2), 10 terminal, it is regarded as short-circuit. In the case of disconnection or short-circuit as a result of self-diagnostic, substitute control is carried out as follows.

- If setup temperature is 17°C to 24.5°C, set to MAX COOL.
- If setup temperature is 25°C to 32.0°C, set to MAX WAR.

ERROR DIAGNOSTICS

Symptoms	Causes	How to check
Temp actuator running error	Power supply error in temp actuator	After altering 17°C to 32°C and adversely, measure voltage of (M53-1), 22 terminal. If Both of them are 9V and more, check temp actuator and peripheral wiring state and if one or both of them are 5V and less, its cause is internal failure of FATC.
	Sensor (+5) power supply error	If automatic control isn't operated smoothly, measure voltage of FATC connector (M53-2), 8 terminal. If under 4.8V or over 5.2V, its cause is internal failure of FATC.
	Driver error of temp actuator	If No. 20 is outputted as a result of self-diagnostic, check temp actuator driver.

EACH SENSOR CHECK

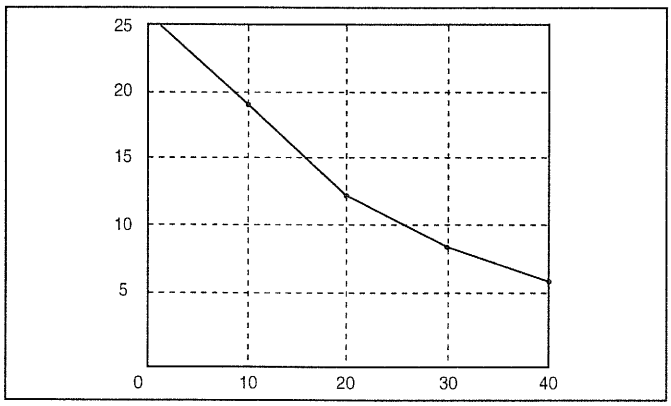
Resistance value set according to temperature of each part is inputted in FATC controller. Internal temperature of vehicle is automatically controlled by operating the inputted values. It is recommended to refer to resistance value and voltage value corresponding to each temperature and the followings explains essential functions of each sensor required for repair and self-diagnostics and substitute functions at disconnection or short-circuit.

- If 4.9V and more is inputted in (M53-2),1, (M53-2), 3, (M53-2), 4 and (M53-2), 5 terminal, it is regarded as disconnection.
- If 0.1V and less is inputted in (M53-2), 1, (M53-2), 3, (M53-2), 4 and (M53-2), 5 terminal, it is regarded as short-circuit.

IN CAR SENSOR

IN-CAR AIR TEMPERATURE SENSOR EQHA2200

In-car air temperature sensor is located at the control. It will detect interior temperature, which will be used for discharge temperature control, sensor failsafe, temperature door control, blower motor level control, A/C auto control, motive heating control and rear blower motor level control.

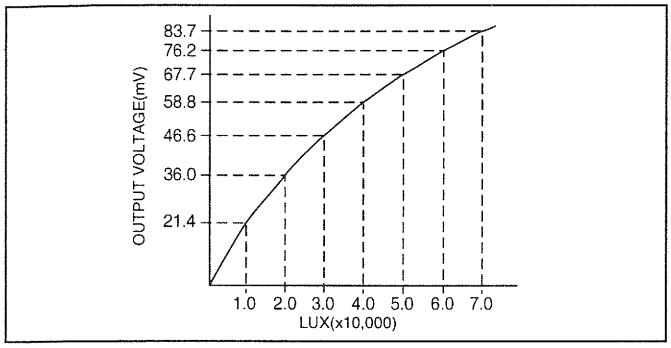


KFWD034A

PHOTO SENSOR

PHOTO SENSOR EQHA2050

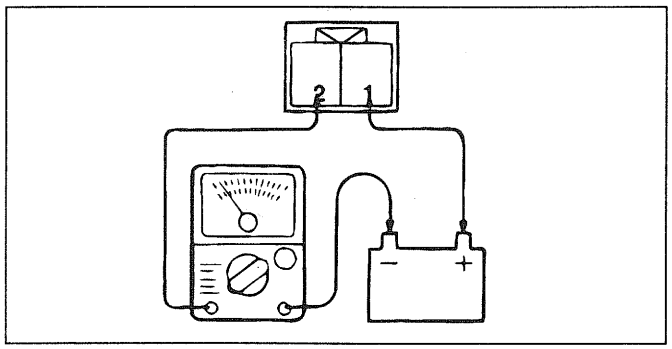
Photo sensor is located at left by driver side defrost nozzle. In response to photo intensity level in vehicle, the sensor will send signal to control unit for compensating blower level and discharge temperature.



KFWD028A

NOTE

Emit intensive light toward driver side and passenger side using the lamp, and check current change between terminal 1 & 2, and 2 & 3.



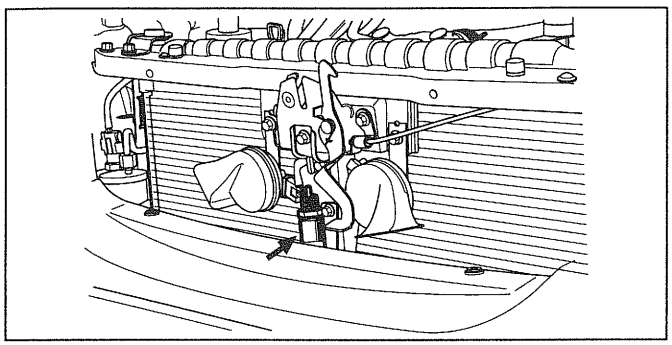
S6HA030C

AMBIENT TEMPERATURE SENSOR

AMBIENT AIR TEMPERATURE SENSOR EQHA2150

1. Air temperature sensor is located at front of the engine radiator, and detect ambient air temperature. It is a negative type thermistor, that resistance will rise with lower temperature, and reduce with higher temperature.

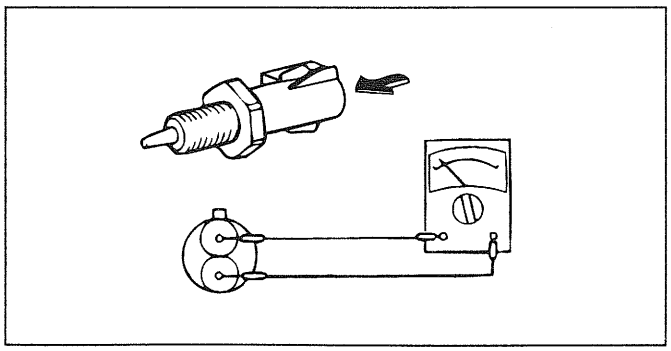
2. The sensor output will be used for discharge temperature sensor, sensor failsafe, temperature regulation door control, blower motor level control, mix mode control and in-car humidity control.



KFWD033A

CHECK

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-10	157.84	10	58.75
-5	122.00	20	37.30
0	94.98	30	24.26
5	74.45	40	16.14



HEW97038

A.Q.S (AIR QUALITY SENSOR)

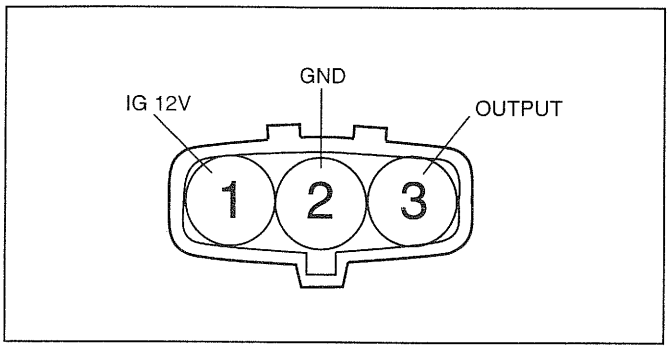
A.Q.S. SENSOR EQHA2100

1. A.Q.S. sensor 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 mondxide, hydrocarbon and allergen.

SENSOR OUTPUT

Condition	Resistance
Normal condition	5V
Hazardous gas detection	0V

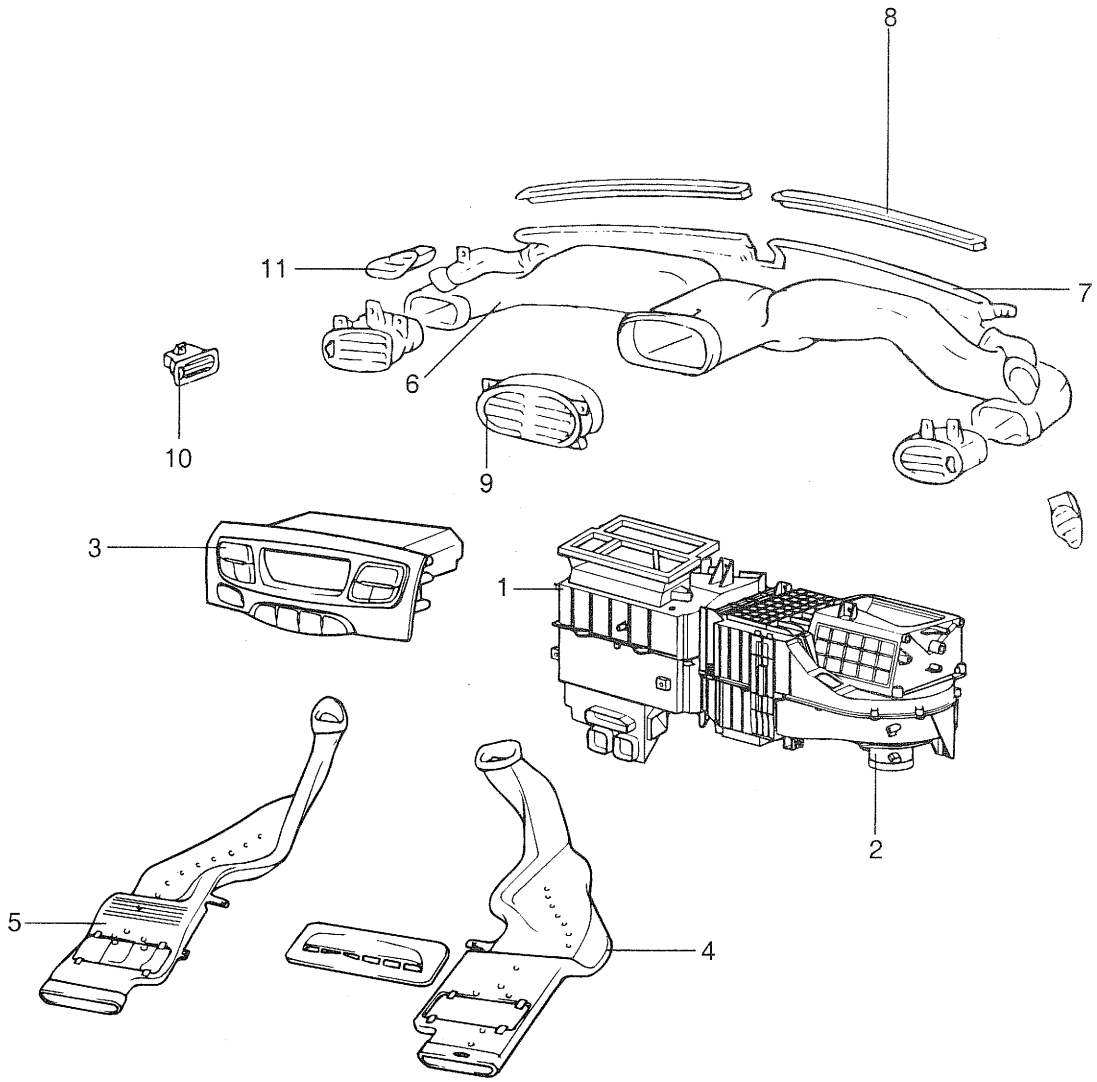


KFWD030A

VACUUM SYSTEM

VENTILATOR EQHA1550

COMPONENTS



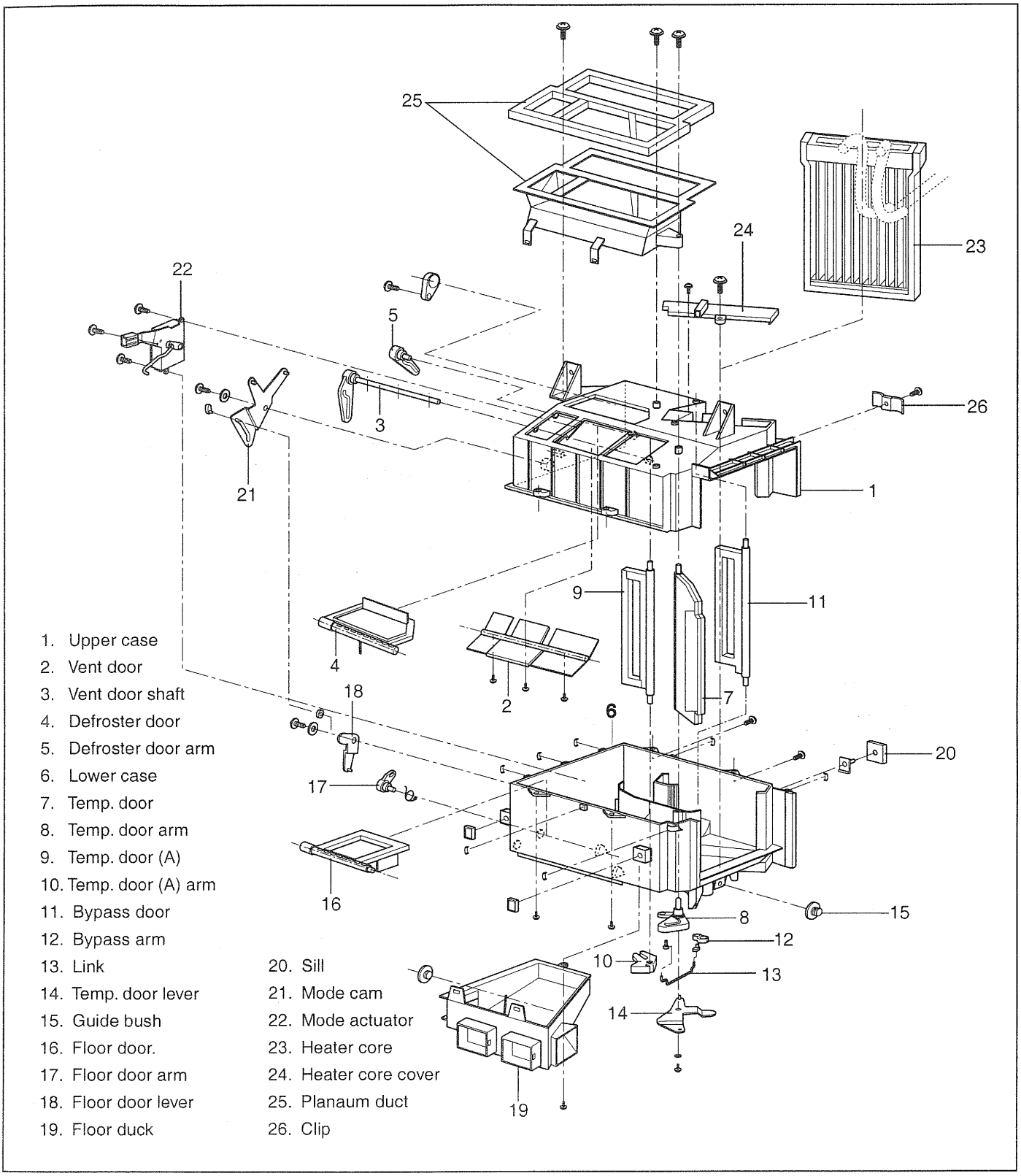
1. Heater unit
2. Eva and blower unit
3. Control switch
4. Floor (Rear) duct
5. Rear vent duct
6. Vent duct
7. Defroster duct
8. Defroster cover nozzle
9. Center nozzle
10. Side nozzle
11. Side defrostor nozzle

EQHA009A

HEATER

HEATER UNIT EQHA1600

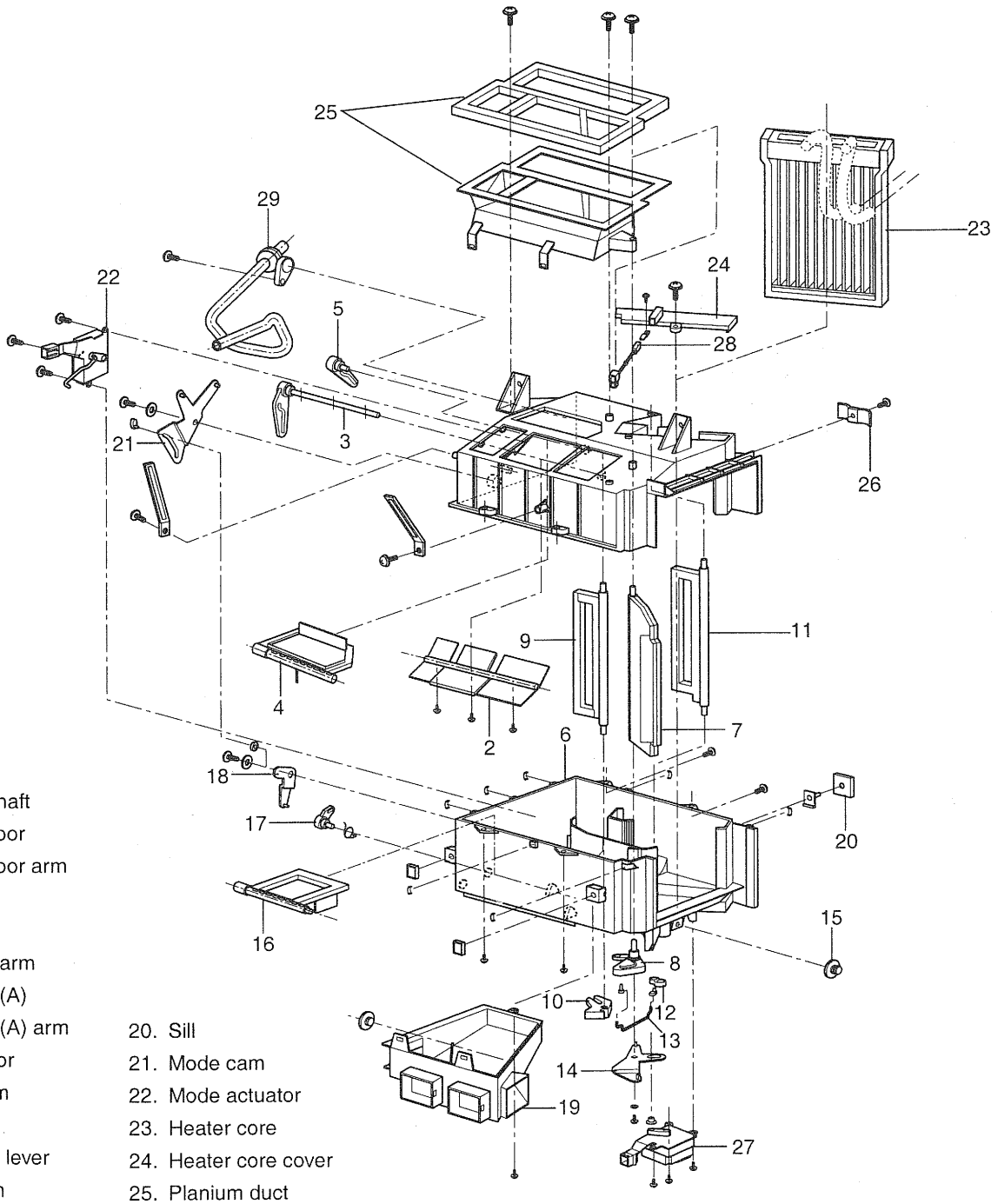
COMPONENTS (ROTARY+PUSH)



1. Upper case
2. Vent door
3. Vent door shaft
4. Defroster door
5. Defroster door arm
6. Lower case
7. Temp. door
8. Temp. door arm
9. Temp. door (A)
10. Temp. door (A) arm
11. Bypass door
12. Bypass arm
13. Link
14. Temp. door lever
15. Guide bush
16. Floor door.
17. Floor door arm
18. Floor door lever
19. Floor duck
20. Sill
21. Mode cam
22. Mode actuator
23. Heater core
24. Heater core cover
25. Planaum duct
26. Clip

KFWD037A

COMPONENTS EQHA1650



1. Upper case
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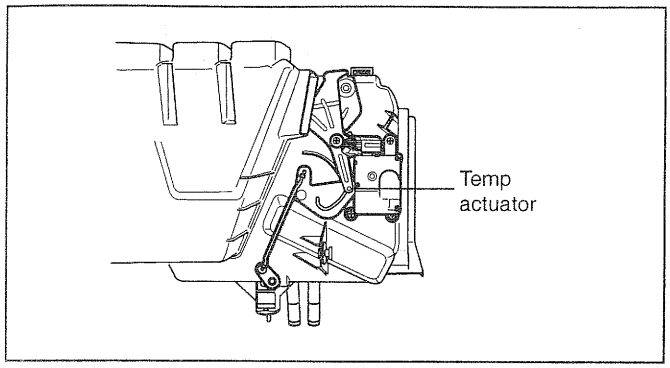
9. Temp. door (A)
10. Temp. door (A) arm
11. Bypass door
12. Bypass arm
13. Link
14. Temp. door lever
15. Guide bush
16. Floor door.
17. Floor door arm
18. Floor door lever
19. Floor duck
20. Sill
21. Mode cam
22. Mode actuator
23. Heater core
24. Heater core cover
25. Planium duct
26. Clip
27. Temp. door actuator
28. Coolant temp. sensor
29. Intake hose

KFWD038A

HEATER UNIT

TEMPERATURE CONTROL ACTUATOR EQHA01700

1. Temperature control actuators are installed at heater unit case. Control switches and vent duct switch will operate actuators, that will regulate temperature control position and discharge air temperature.



KFWD043A

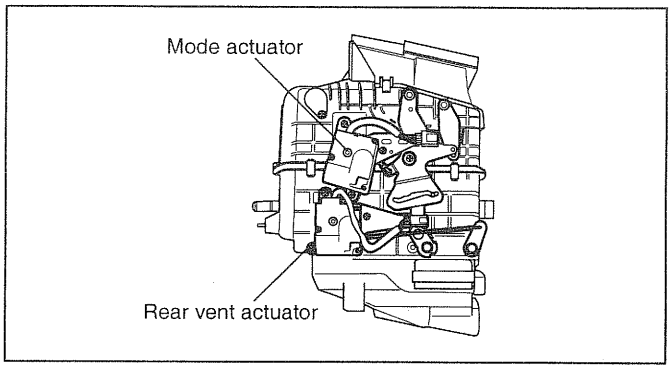
2. Temp actuator and terminal voltage check.

Terminal	Voltage	Remark
1	12V (+,-)	Change Polarity
3	12V (+,-)	Change Polarity
4	5V	Sensor Voltage
5	Change with resis-tance	Variable Resis-tance
6	Ground	Ground

MODE CONTROL ACTUATOR EQHA01750

1. Pressing mode select switch during IG2 on, driver side and passenger side mode door actuator will shift as follows :

   VENT ⇒ BL/LEVEL ⇒ FLOOR ⇒ MIX



KFWD044A

2. Mode actuator circuit diagram and voltage

Terminal	Descripton	Voltage
1	IG	12V
2	Ground	-
3	Vent	0V
4	Bilevel	12V
5	Floor	12V
6	Mix	12V
7	Defroster	12V

3. Heater

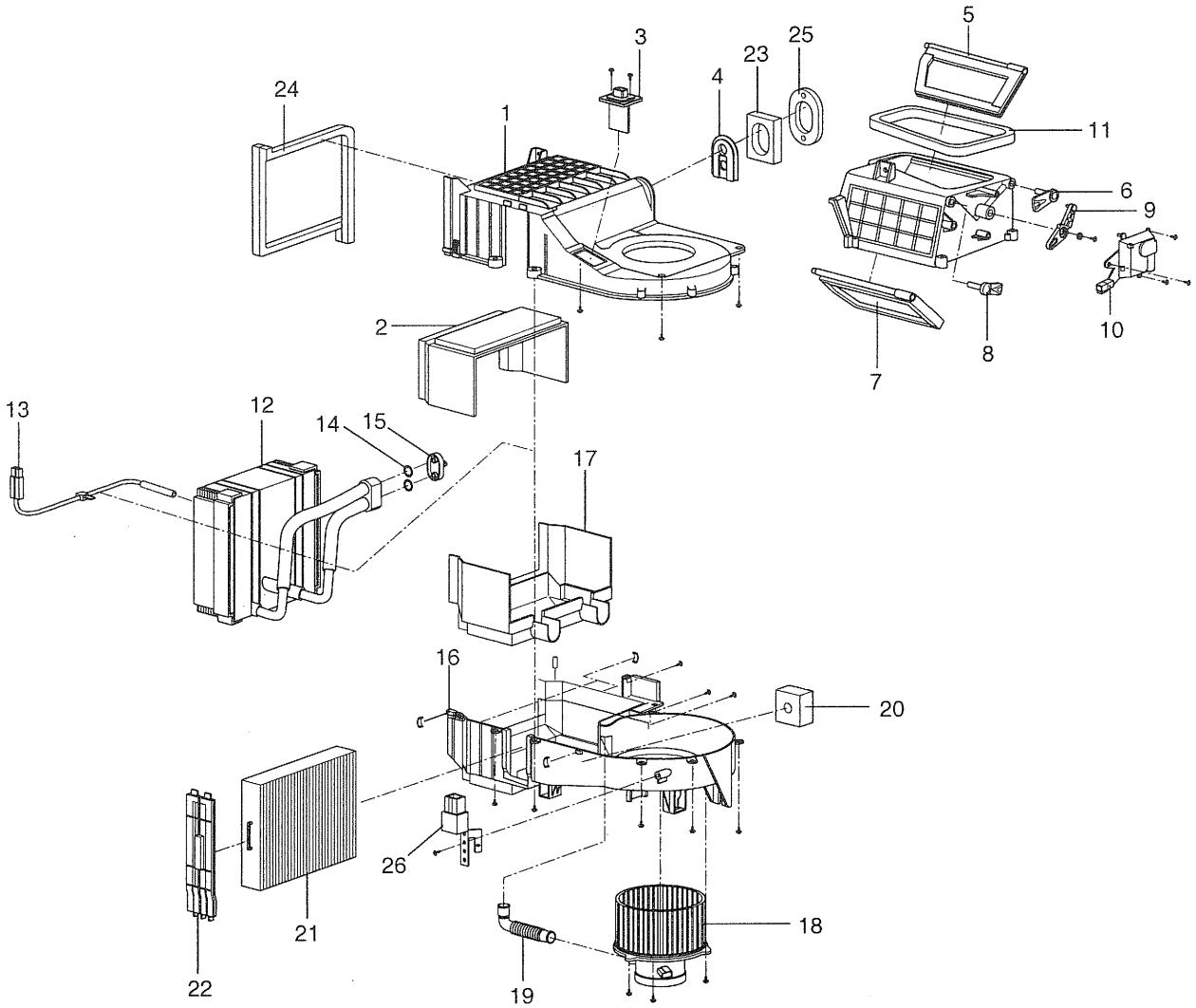
Mode / Positcon	Recirculation	Fresh				Remark
	COOL	1/2 COOL	WARM			
	Vent	Bi level	Floor	Mix	Defroster	
Vent	100	55±10	-	-	-	
Floor	-	45±10	54±5	42.9±7	-	
Defroster	-	-	18±5	35.1±7	72	
Side vent	-	-	28±4	22±4	28±4	

EQHA175A

BLOWER CONTROLS

BLOWER UNIT AND EVAPORATOR EQHA1800

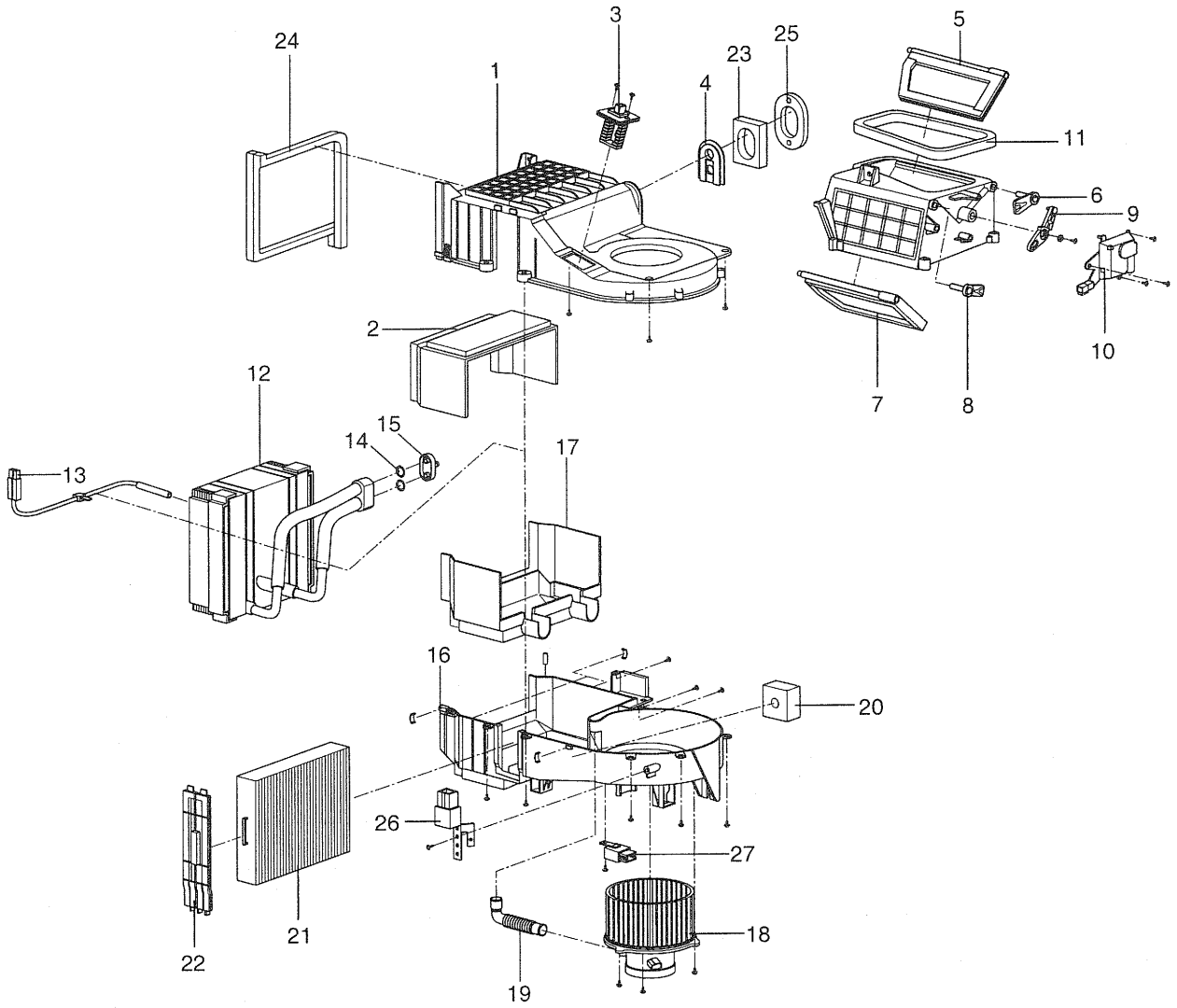
COMPONENTS (POTARY+PUSH)



1. Upper case
2. Evaporator upper case
3. Resistor
4. Bracket
5. Inlet duct door
6. Inlet duct arm
7. Inlet duct door (A)
8. Inlet duct arm (A)
9. Inlet duct lever
10. Actuator (Fresh/Recir)
11. Sill
12. Evaporator core
13. Thermistor
14. O-ring
15. Evaporator tube cap
16. Lower case.
17. Evaporator Lower cover
18. Motor and wheel
19. Blower motor cooling tube
20. Sill
21. Air filter
22. Air filter cover
23. Sill
24. Sill
25. Evaporator grommet
26. Power relay

KFWD040A

COMPONENTS(FATC) EQHA1850



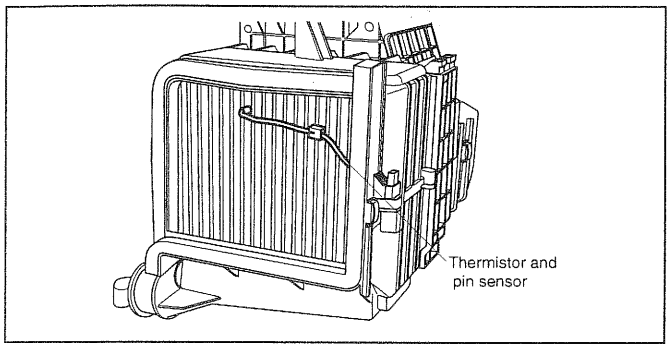
1. Upper case
2. Evaporator upper cover
3. Power TR
4. Bracket
5. Inlet duct door
6. Inlet duct arm
7. Inlet duct door (A)
8. Inlet duct arm (A)
9. Inlet duct lever
10. Actuator (Recir/Fresh)
11. Sill
12. Evaporator core
13. Pin sensor
14. O-ring
15. Evaporator tube cap
16. Lower case.
17. Evaporator lower cover
18. Motor and wheel
19. Blower motor cooling tube
20. Sill
21. Air filter
22. Air filter cover
23. Sill
24. Sill
25. Power relay
26. High relay

KFWD041A

SENSOR CHECKING EQHA1950

THERMISTOR AND PIN SENSOR

The thermistor and pin sensor will detect the core temperature and interrupt compressor relay power, in order to prevent evaporator freezing by excessive cooling.
The thermistor and pin sensor will use the negative characteristic of thermal.



KFWD049A

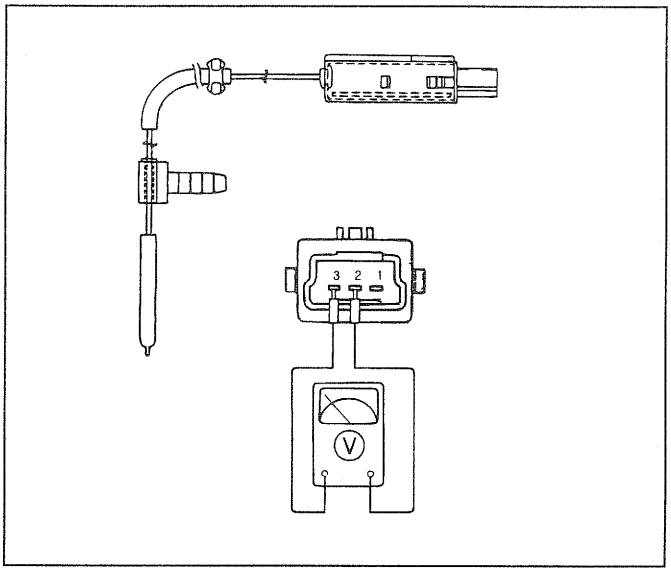
1. Thermistor (ROTARY+PUSH)

    1. Remove the glove box.
    2. Start the engine.
    3. Turn on the air conditioner.
    4. Using the multitester, check the output voltage terminal 2 and 3 in the thermistor.

Thermistor	Operating temperaturp	Outpul voltage
ON	0.5 ± 0.5°C	12V
OFF	2.5 ± 0.5°C	0V

2. Pin sensor (FATC)

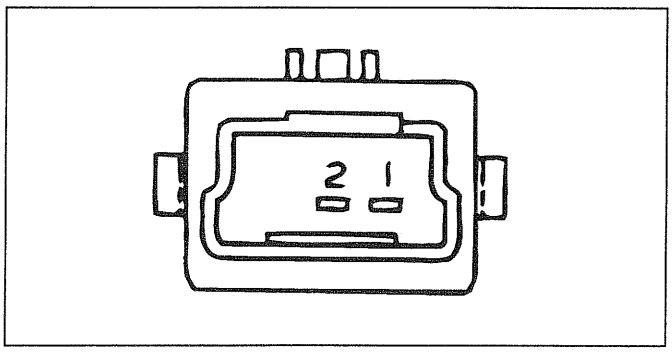
    1. This is the same method of the thermistor to check pin sensor.



HEW97015

Pin sensor tempenature-resistance-output voltage characteristic

Temp (°C)	Resistance (KΩ)	Output (V)	Temp (°C)	Resistance (KΩ)	Output (V)
-5	14.23	3.2	15	6	2.14
-2	12.42	3.04	20	4.91	1.9
0	11.36	2.93	25	4.03	1.67
2	10.4	2.83	30	3.34	1.47
5	9.12	2.66	35	2.78	1.29
10	7.38	2.4	40	2.28	1.11



HEW97016

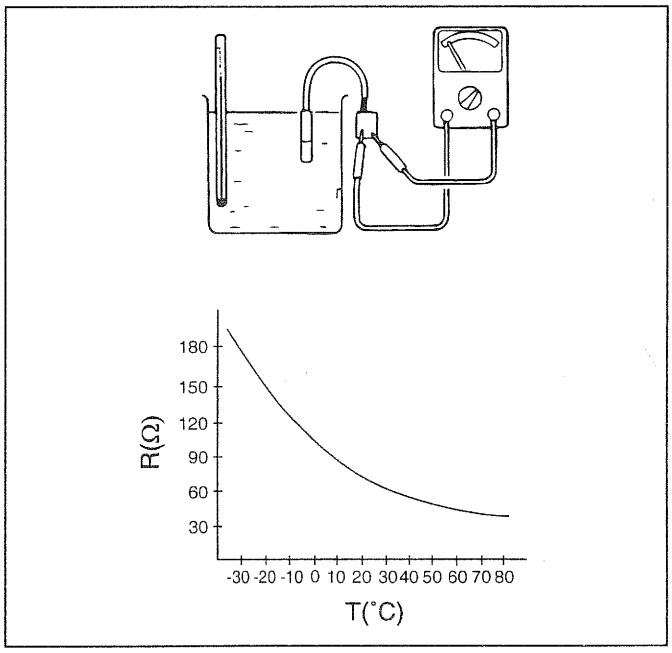
WATER TEMPERATURE SENSOR EQHA2000

1. Water temperature sensor is located at the heater core, and detect coolant temperature flowing through heater core. It is a negative type thermistor, that resistance will rise with lower temperature, and reduce with higher temperature.

2. The sensor will compare temperature setting with incar air temperature or ambient air temperature for motive heating control.

CHECK

Water temperature	Resistance
25°C	10KΩ
60°C	2.50KΩ



EQHA200A

3. Electromotive neating control

   At AUTO mode, discharge mode FLOOR or B/L, if coolant temperature is low, it will perform motive heating control to prevent cold air discharged toward passenger legs.

   1. Operation control

      - Discharge mode FLOOR or B/L at AUTO control
      - Coolant temperature is low

   2. System operation

      - Mode door : DEF⇒MIX⇒AUTO
      - Blower level : AUTO LO⇒AUTO HI
      - Intake door : Ambient air

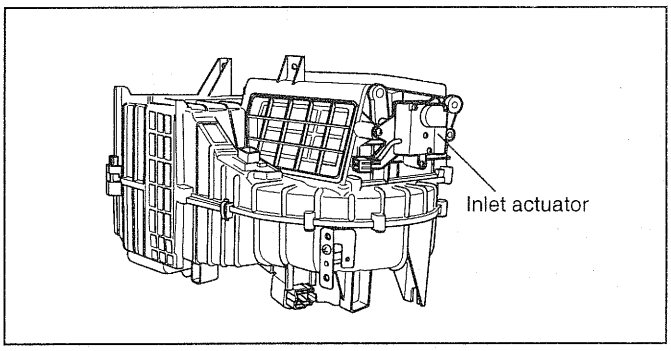
   3. Release operation condition

      - After the ignition is on for 10 minutes.
      - Coolant temperature high.
      - Upon selecting blower mode manual operation, it will release selected mode only. Upon selecting auto mode, it will re-enter.
      - No re-entering motive heating control after releasing motive heating control feature.
      - It will prevail over max. hot feature.

BLOWER MOTOR

FRESH RECIRCULATION SWITCHING ACTUATOR EQHA1900

Intake selection switch located at control panel will control the actuator. Pressing the switch, it will shift in the order of A.Q.S.-recirculation-fresh air-A.Q.S.



KFWD046A

CHECK

Input		Output
1	2	Fresh/recirculation shifting
-	+	Recirculation
+	-	Fresh

BLOWER MOTOR CHECKING (FATC) EQHA2250

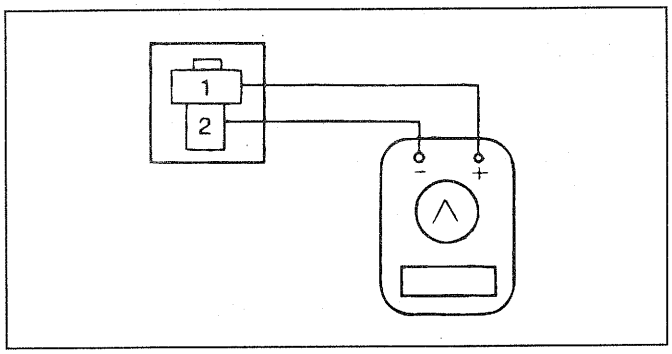
Connect battery voltage and check blower motor rotation.

POWER TR CHECKING

Operating the blower switch as AUTO⇒ LOW⇒ HIGH⇒ AUTO, and measure voltage between pin 1 and 2.

CHECK

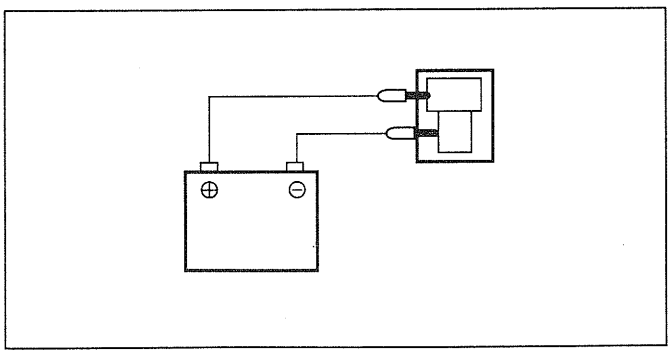
Fan	Motor Voltage
First speed	3.8V
Second speed	5.3V
Third speed	6.7V
Fourth speed	8.1V
Fifth speed	9.5V
Sixth speed	10.6V
Seventh speed	13.5V



HEW97039

BLOWER MOTOR CHECKING (ROTARY+PUSH) EQHA2350

Connect the battery voltage and check the blower motor rotation.



EQA9042A

BLOWER RELAY

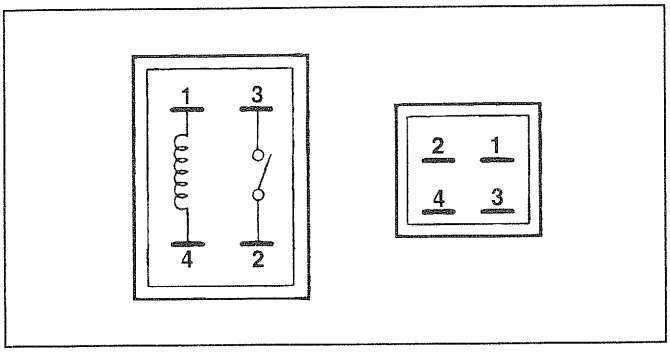
RELAY CHECKING EQHA2400

INSPECTION OF AIR CONDITIONING RELAY

1. Check for continuity between terminals.

Condition \ Terminal	1	2	3	4
A/C ON		○	○	
Apply battery voltage to terminal 2 and 3	○			○

EQHA240A



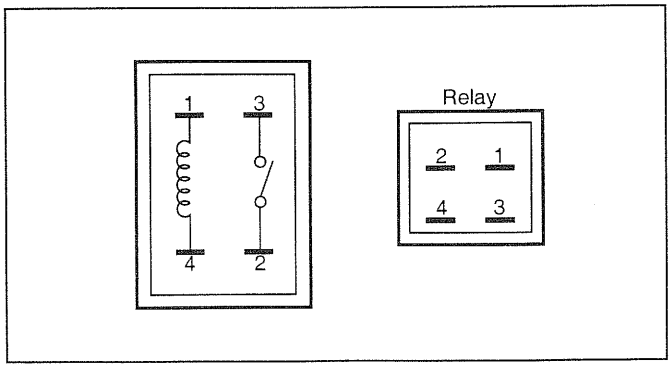
HEW97027

INSPECTION OF BLOWER RELAY EQHA2500

Check for continuity between terminals.

Condition \ Terminal	1	2	3	4
A/C ON	○	○		
Apply battery voltage to terminal 1 and 2			○	○

EQHA245B



EQA9042B

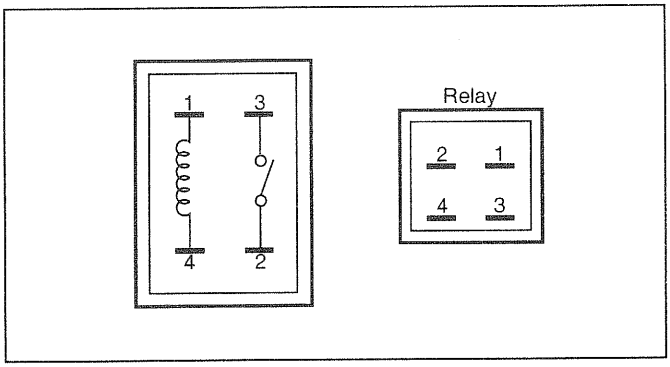
INSPECTION OF BLOWER RELAY AND HI-BLOW-ER RELAY EQHA2600

Check the continuity between terminals.

Condition \ Terminal	1	2	3	4
A/C ON		○	○	
Apply battery voltage to terminal 2 and 3	○			○

EQHA245A

[If continuity in not as specified, replace the relay.]



EQA9042B