

Heating, Ventilation & Air Conditioning

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GENERAL

EQJA0010

SPECIFICATIONS

Item		Specification
Compressor	Type	HS-18 (SWASH TYPE)
	OIL (FD46 x G)	150g
	Capacity	170 cc
	Thermal fuse	184°C OFF
Refrigerant and quantity		600 ± 25g (R134a)
Evaporator	Thermistor temp.	0.5 ± 0.5°C (OFF)
		2.5 ± 0.5°C (ON)
Triple Switch (Kgf/cm ²)	High Pressure	32.0 ± 2.0
	Medium Pressure	15.5 ± 0.8
	Low Pressure	2.3 ± 0.25

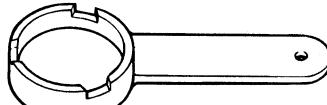
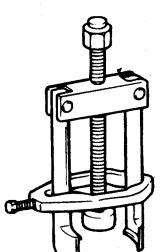
TIGHTENING TORQUE

EQJA0020

Item	Nm	kg·cm	lb·ft
Compressor mounting bolt	20 - 30	200 - 300	14 - 22
Expansion valve mounting bolt	8 - 12	80 - 120	5 - 8
Expansion valve mounting nut	10 - 15	100 - 150	7 - 11
Compressor to refrigerant hose	5 - 7	50 - 70	3 - 5
Suction hose to liquid tube	5 - 7	50 - 70	3 - 5

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

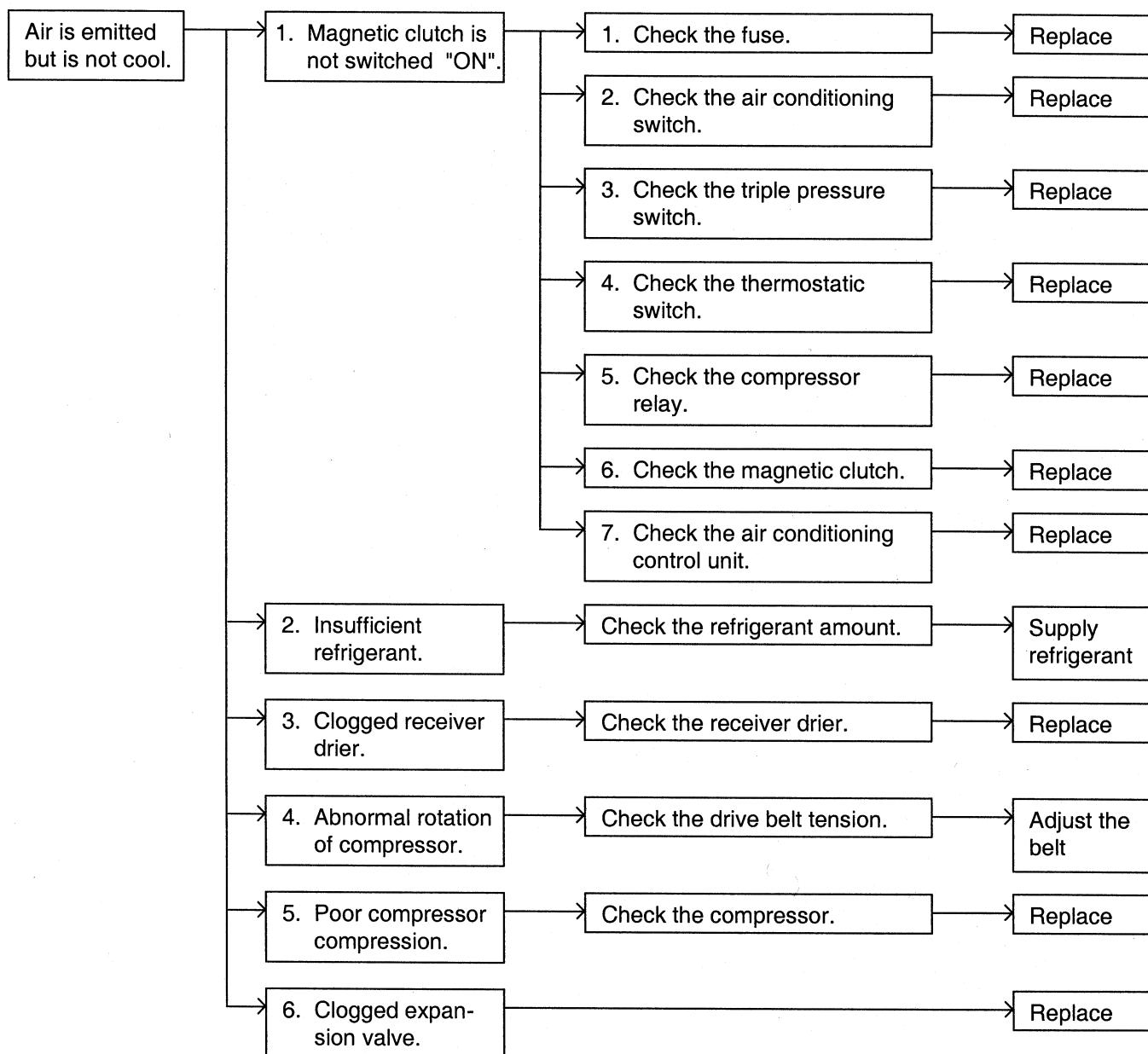
TROUBLESHOOTING

EQHA0100

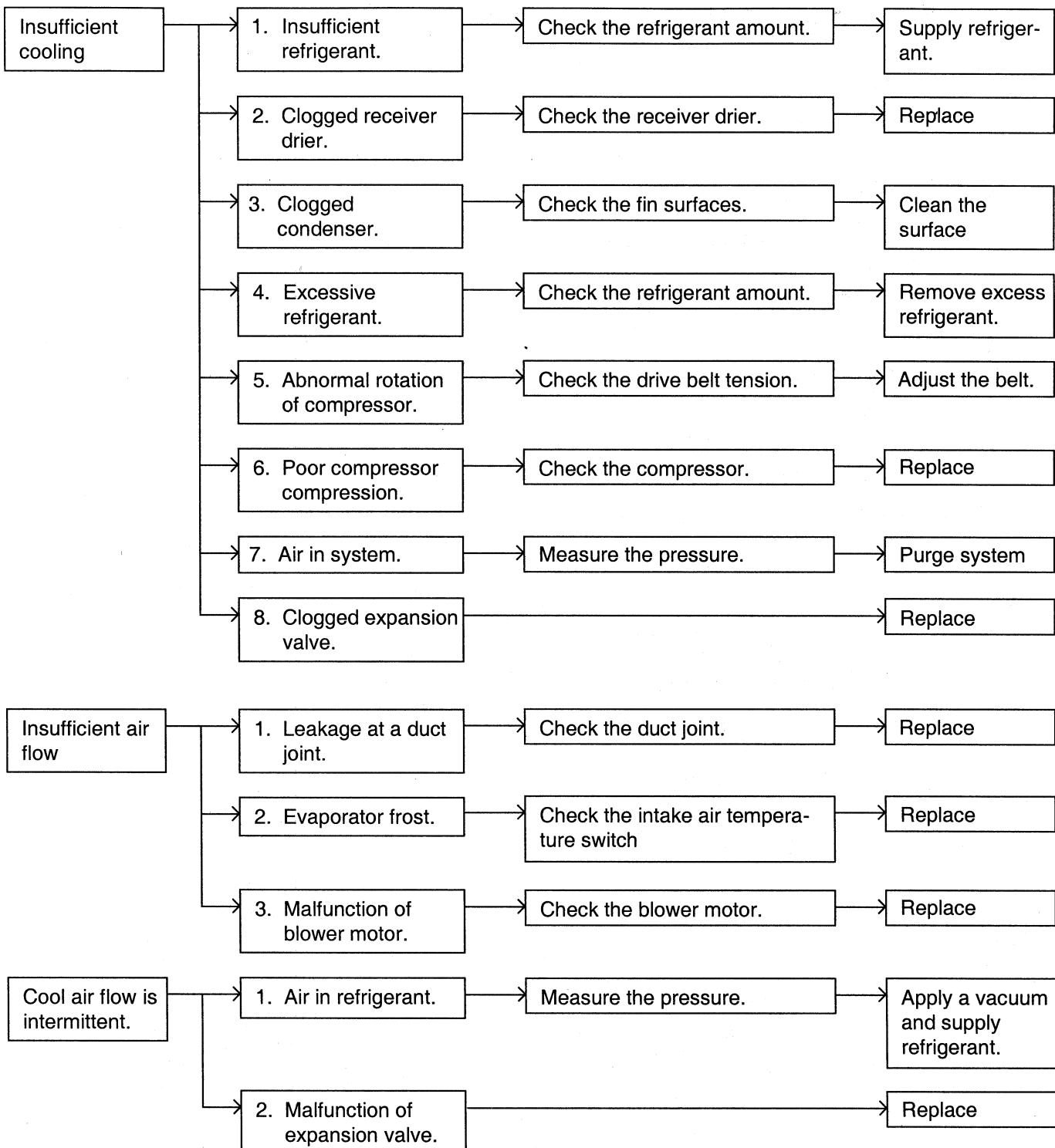
Before replacing or repairing air conditioning components, first determine if the malfunction is due to the refrigerant charge, air flow or compressor. The following diagnostic charts have been developed as a quick

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



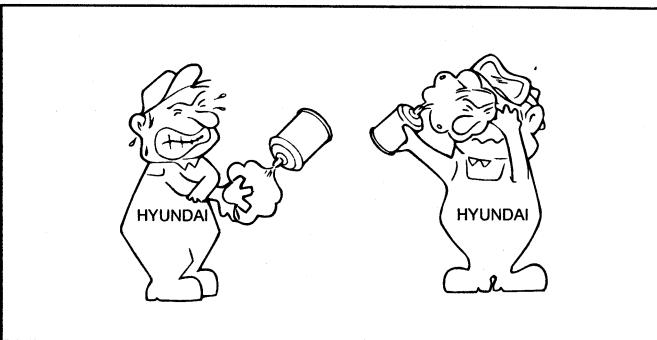
AIR CONDITIONING SYSTEM

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

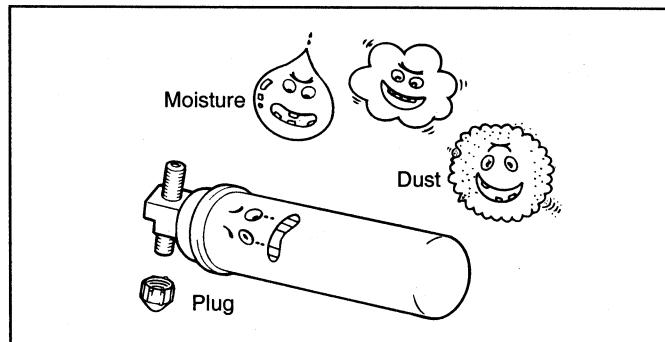
7. If an accidental discharge in the system occurs, ventilate the work area before resuming service.



EQDA010A

WHEN REPLACING PARTS ON A/C SYSTEM

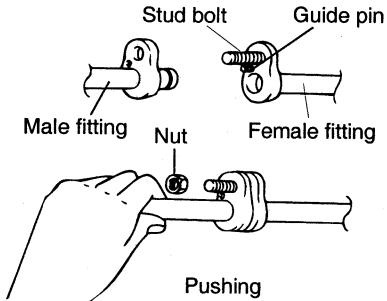
1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings of components with a cap or plug immediately to prevent intrusion of moisture or dust.
3. Do not remove the sealing caps from a replacement component until it is ready to be installed.
4. Before connecting an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



EQDA010B

WHEN INSTALLING CONNECTING PARTS**FLANGE WITH GUIDE PIN**

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



EQDA010C

HANDLING TUBING AND FITTINGS

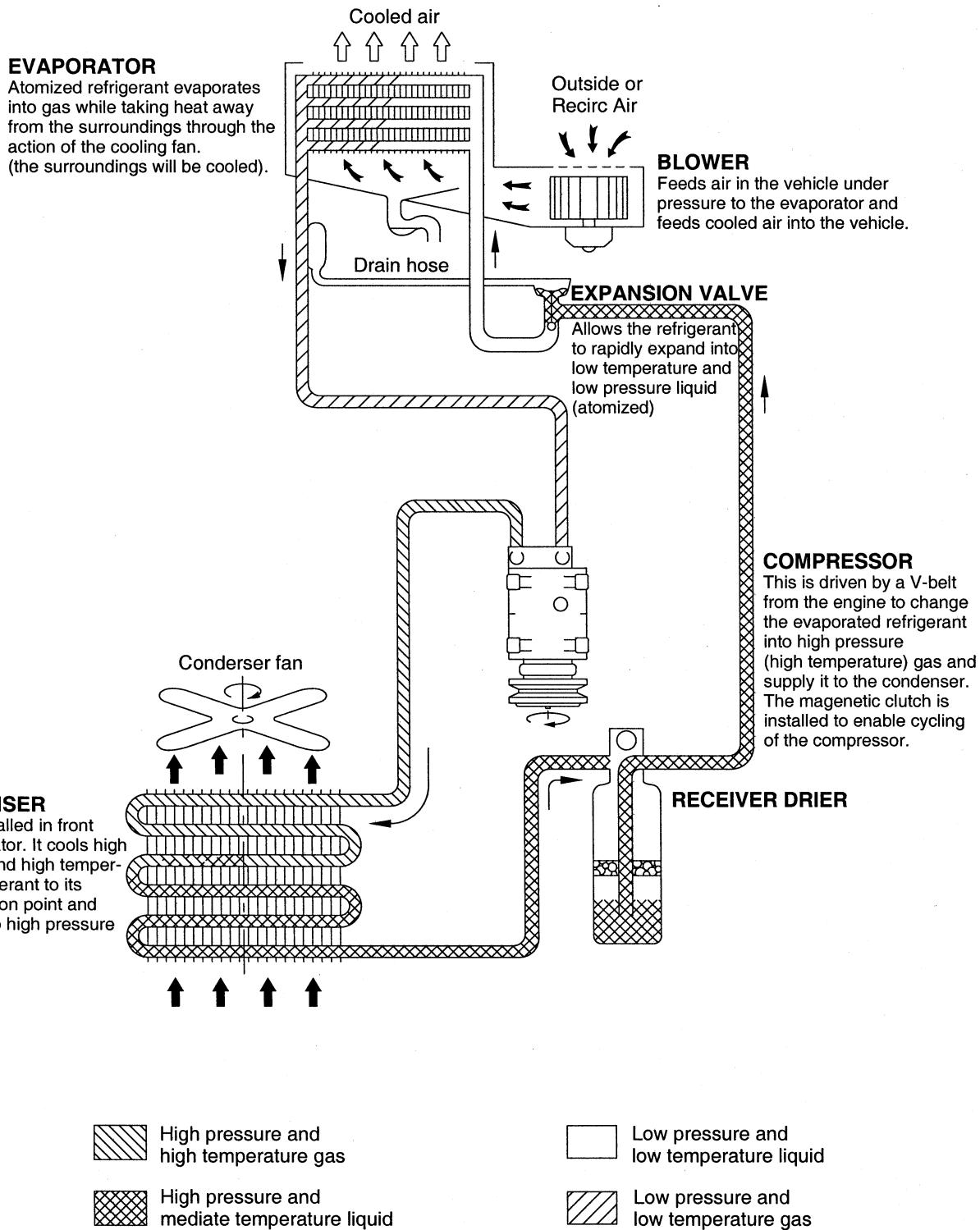
The internal parts of the refrigeration system will remain in a state of chemical stability as long as pure moisture-free refrigerant and refrigerant oil are used. Abnormal amounts of dirt, moisture or air can upset the chemical stability and cause problems or serious damage.

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.

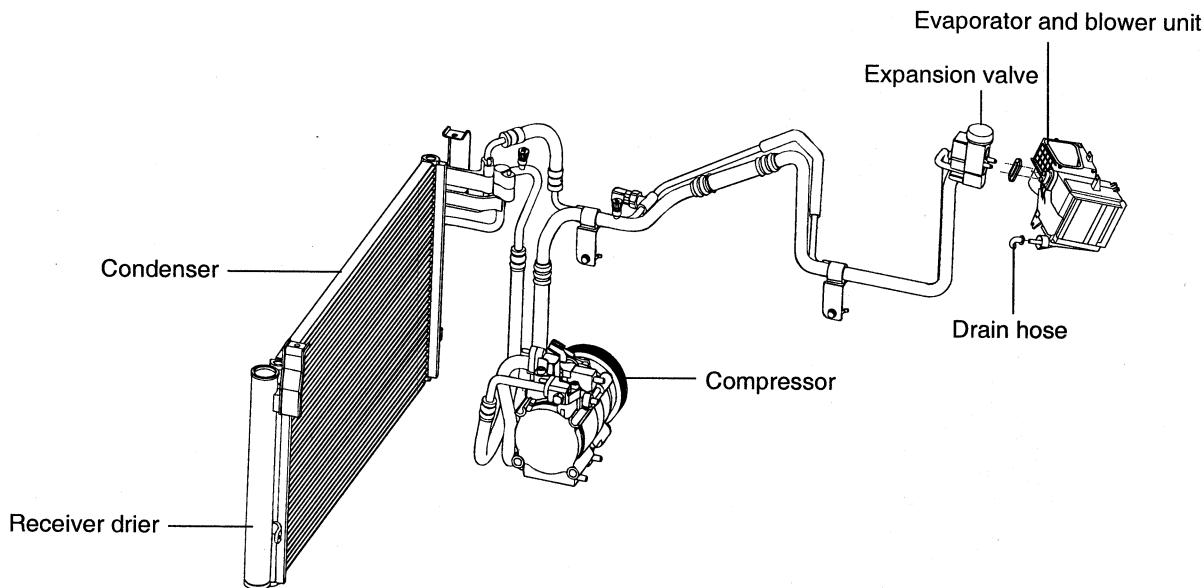
REFRIGERATION CYCLE

EQHA0200



COMPONENTS

EQJA0250



EQHA001A+KFWD042A

EQHA001C

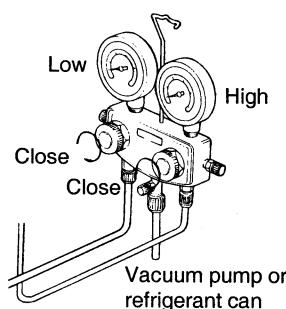
INSTALLATION OF MANIFOLD GAUGE

SET EQHA0300

CAUTION

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

1. Close both valves of the manifold gauge set.
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

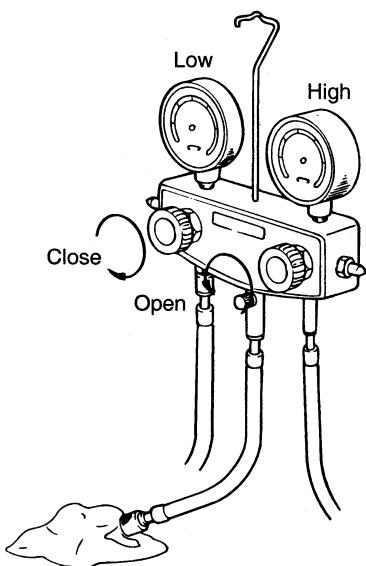
EQHA0350

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 valve slowly to discharge the refrigerant.

CAUTION

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

4. Check if the towel is stained with oil. If so, gently close the valve.
5. If the manifold gauge reading drops below 3.5kg/cm², open the low pressure valve slowly.
6. Open the high and low pressure valves slowly in order to drop the system pressure until the gauge indicates 0kg/cm².



EQHA035A

EVACUATING REFRIGERANT SYSTEM

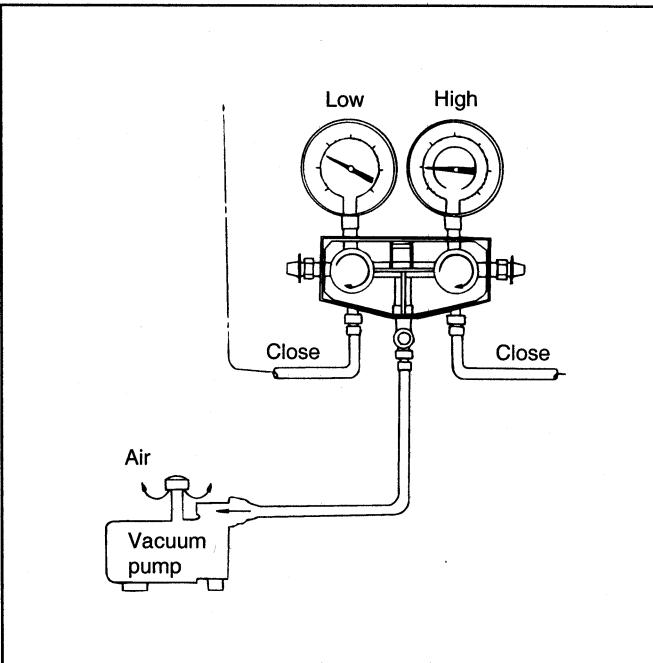
EQHA0400

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.

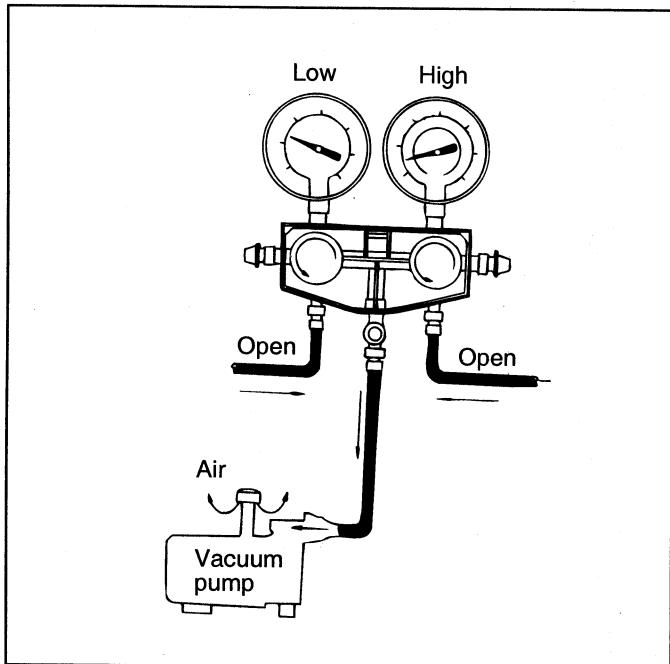
6. After about ten minutes, check that the low pressure gauge reads more than -94,39 kPa (-0.96 kg/cm², -13.7 psi) vacuum. If negative pressure can not be obtained, there is a leak in the system. In this case, repair the leak as following:
 - a. Close both the manifold valves and stop the vacuum pump.
 - 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 page HA-14.
 - d. Discharge refrigerant again, and then evacuate the system. If no leaks are found, continue evacuating the system.
7. Start the vacuum pump.



EQA9007A

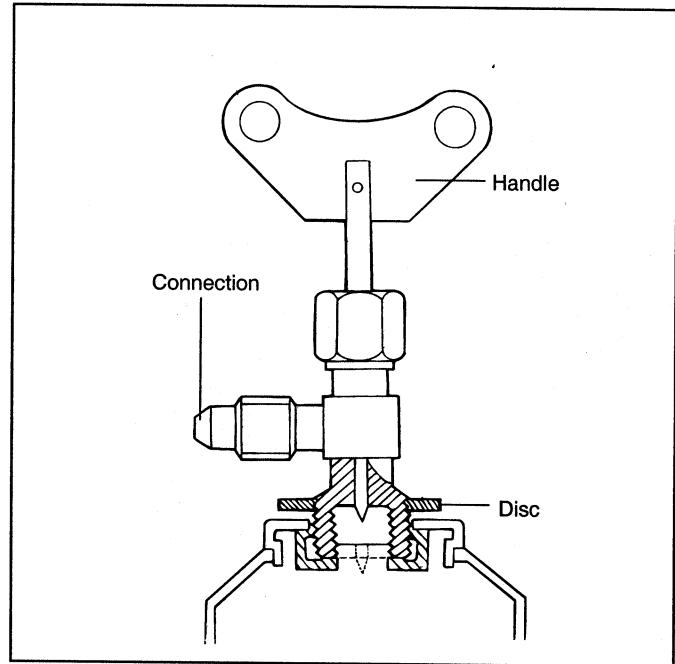
8. Open both manifold valves to obtain -94.39 kPa (-0.96 kg/cm², -13.7 psi) of vacuum.
9. After the low pressure manifold gauge indicates close to -94.39 kPa (-0.96 kg/cm², -13.7 psi), continue evacuating for 15 minutes.

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



EQA9007B

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



EQA9008A

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.

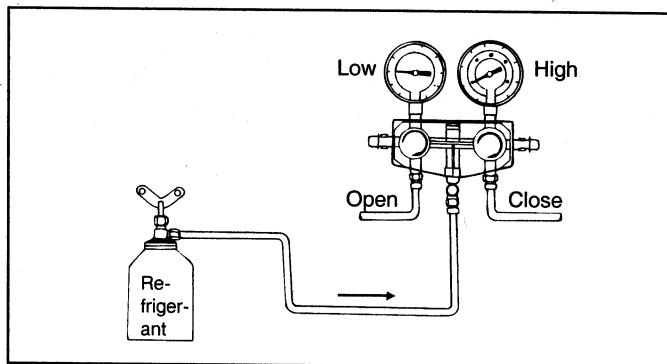
CHARGING REFRIGERANT SYSTEM

(VAPOR) EQJA0500

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. Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 412 kPa (4.2 kg/cm², 60 psi).

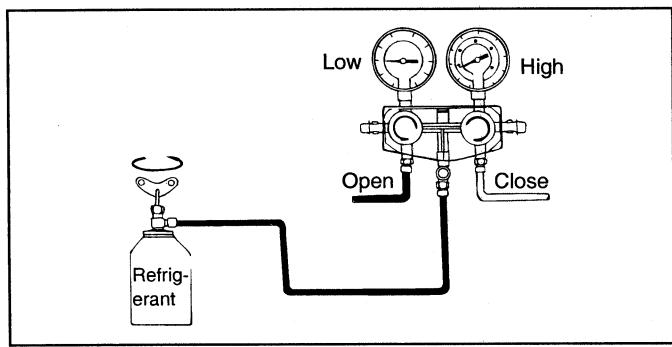


EQA9009A

- 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.
- 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

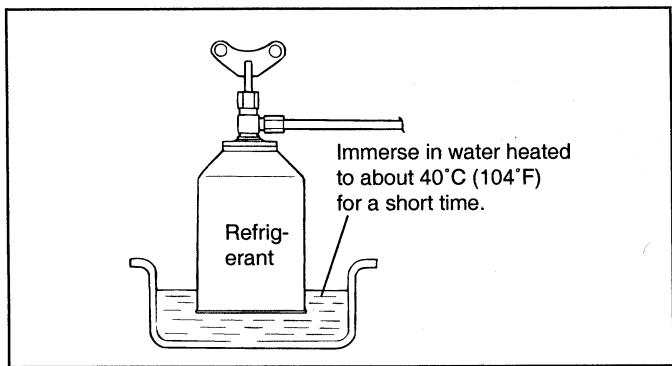
- Charge the system to the specified amount. Then close the low pressure valve.

Specified amount : $600 \pm 25\text{g}$

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

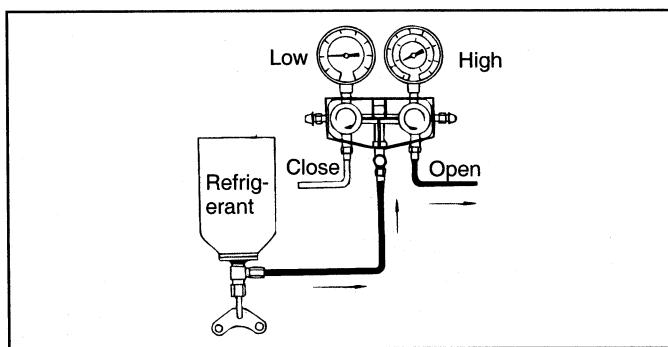
CHARGING REFRIGERANT SYSTEM (LIQUID)

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.



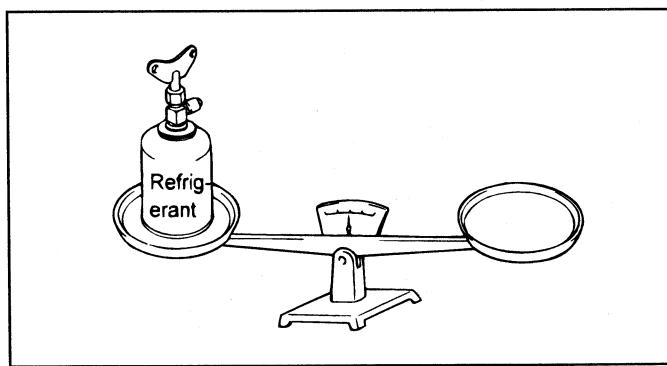
EQA9010A

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

Specified amount : $600 \pm 25\text{g}$

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 valve.
6. Confirm that there are no leaks in the system by checking with a leak detector. Refer to Checking Refrigerant Leak.
6. Check that the reading on the high pressure gauge is 1,373-1,575 kPa (14-16 kg/cm², 199-228 psi). If the reading is too high, pour water on the condenser. If the reading is 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 psychometric graph by comparing the wet-and dry-bulb reading at the air inlet.

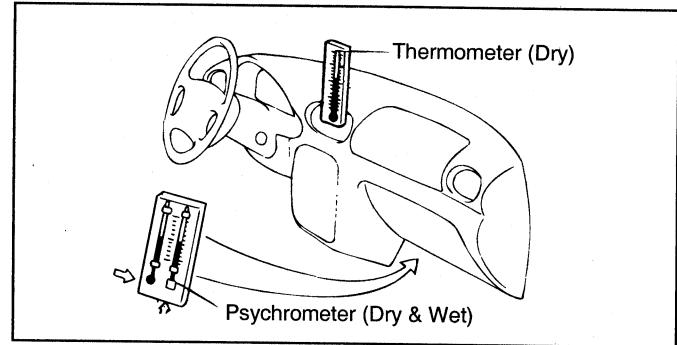
NOTE

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 wet—dry thermometer close to the inlet of the cooling unit.



EQA9019A

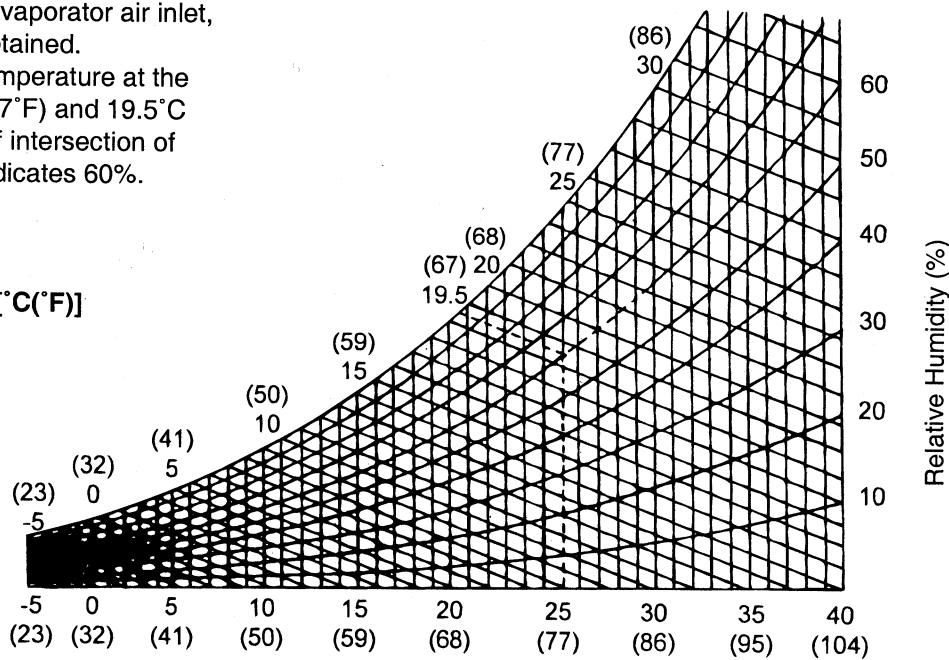
HOW TO READ THE GRAPH :

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%.

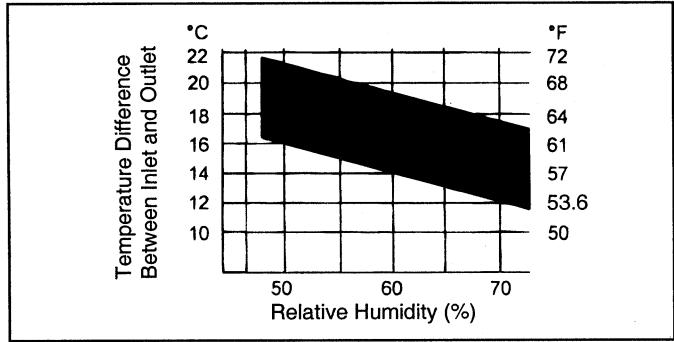
WET-BULB TEMPERATURE [°C(°F)]

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



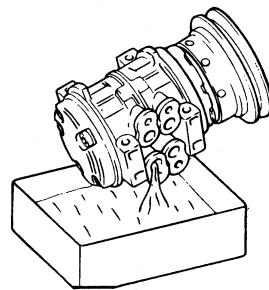
EQA9019B

- Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.
- Check that the intersection of the relative humidity and temperature difference falls within the block below. If the intersection is within the block, cooling performance is satisfactory.



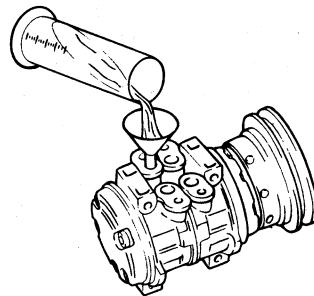
NOTE

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



EQHA060A

- Check the volume of the discharged oil. If it is less than 70cc, it means there is little leak. Perform the leakage test on each system connection, and repair or replace faulty parts if necessary.
- Check the oil for contamination and replenish the oil level in the following procedure:



EQHA060B

- When oil is clean

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

- If the oil is contaminated with metal fragments or other material, clean the receiver drier after charging the refrigerant.

COMPRESSOR OIL

EQJA0600

Oil lubricates the compressor and 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.

HANDLING OF OIL

- The oil should be free from moisture, dust, metal filings, etc.
- Do not mix oils.
- 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 the engine for 20–30 minutes with the controls 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 an operating compressor, check the compressor oil using the following procedure:

- Stop the engine, discharge the refrigerant, and dismantle the compressor from the vehicle.
- Pour oil from the system line outlet.

CHECKING FOR REFRIGERANT LEAKS

EQHA0650

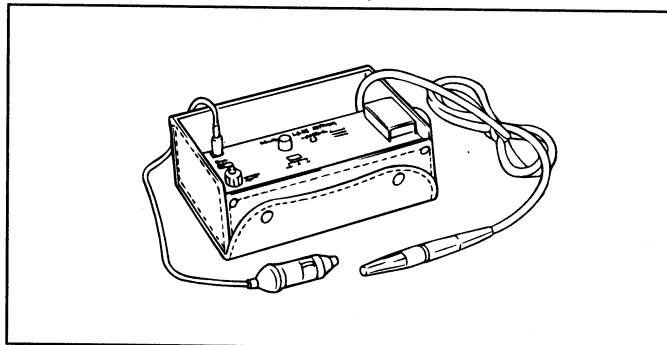
Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

NOTE

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

If a gas leak is detected, proceed as follows:

1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces for damage. Always replace, even if the damage is slight.
3. Check the compressor oil and add oil if required.
4. Charge the system and recheck for gas leaks. If no leaks are found, evacuate and charge the system again.



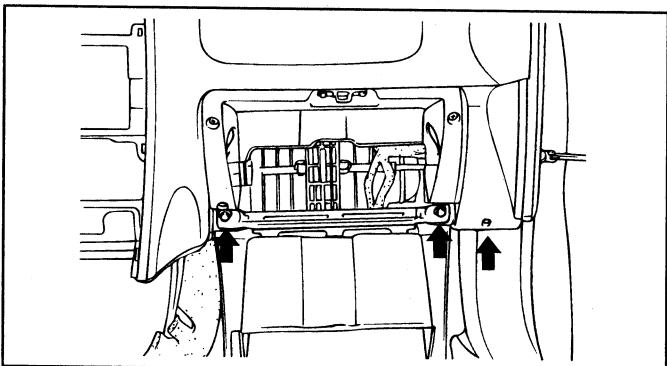
EQHA065A

BLOWER UNIT AIR FILTER EQJA0750

The combination filter eliminates foreign materials and odor. The combination filter includes an odor filter as well as conventional dust filter to ensure comfortable interior environment. Vehicles equipped with rear air conditioning have an air filter in the rear air conditioning unit.

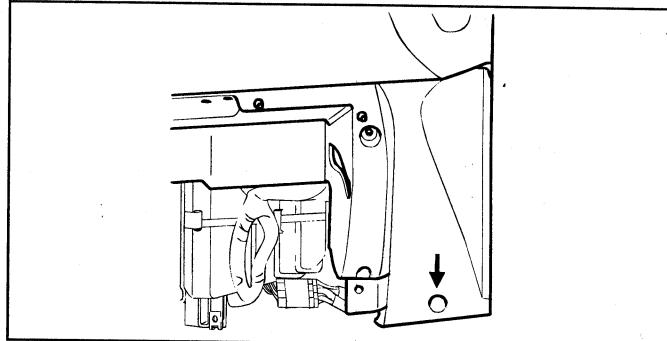
REMOVAL AND INSTALLATION

1. Remove the glove box housing.



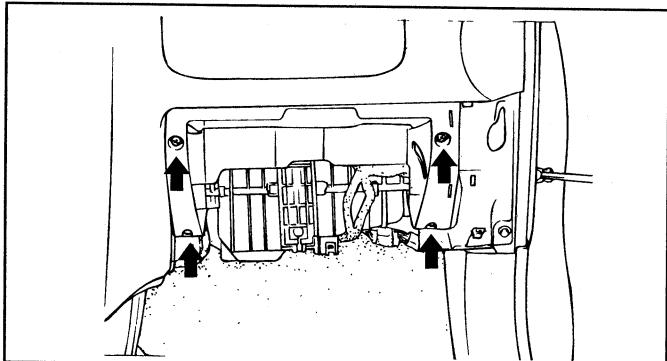
ESJA035K

2. Remove the lower side cover of the crash pad.



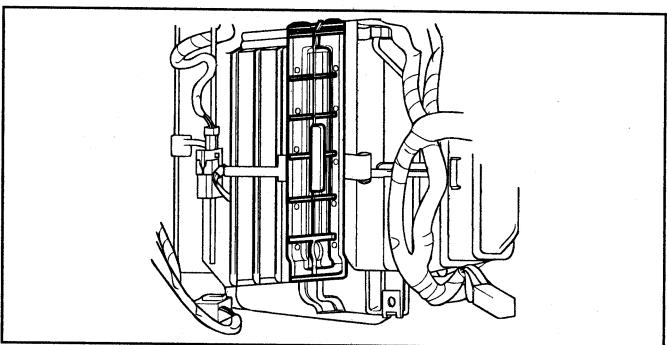
EQJA005B

3. Remove the upper cover of the glove box.



ESJA035L

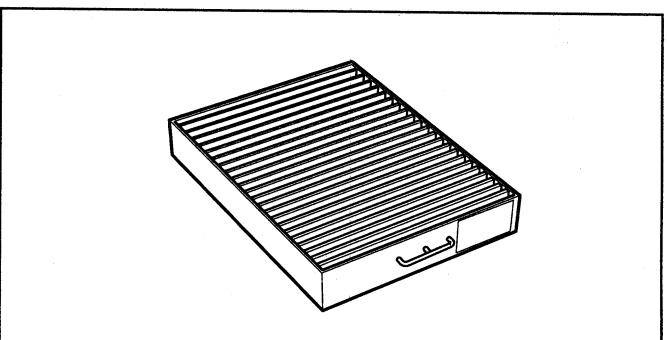
4. Remove the air filter cover and the air filter.



EQJA005A

CAUTION

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

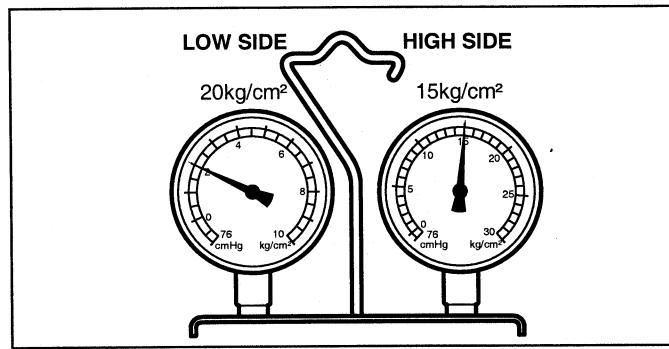


KFWD051A

PERFORMANCE TEST DIAGNOSIS USING MANIFOLD GAUGE EQHA0800

STANDARD VALUE

If cooling cycle is operating normally, the manifold gauge reading will be approx. 1.5–2.0kg/cm² for the low pressure side and approx. 14.5–15kg/cm² for the high pressure side. Inlet temperature should be 30–35°C, with the engine at 2,000 rpm, maximum cooling selected, and the blower on highest level.



KFWD001A

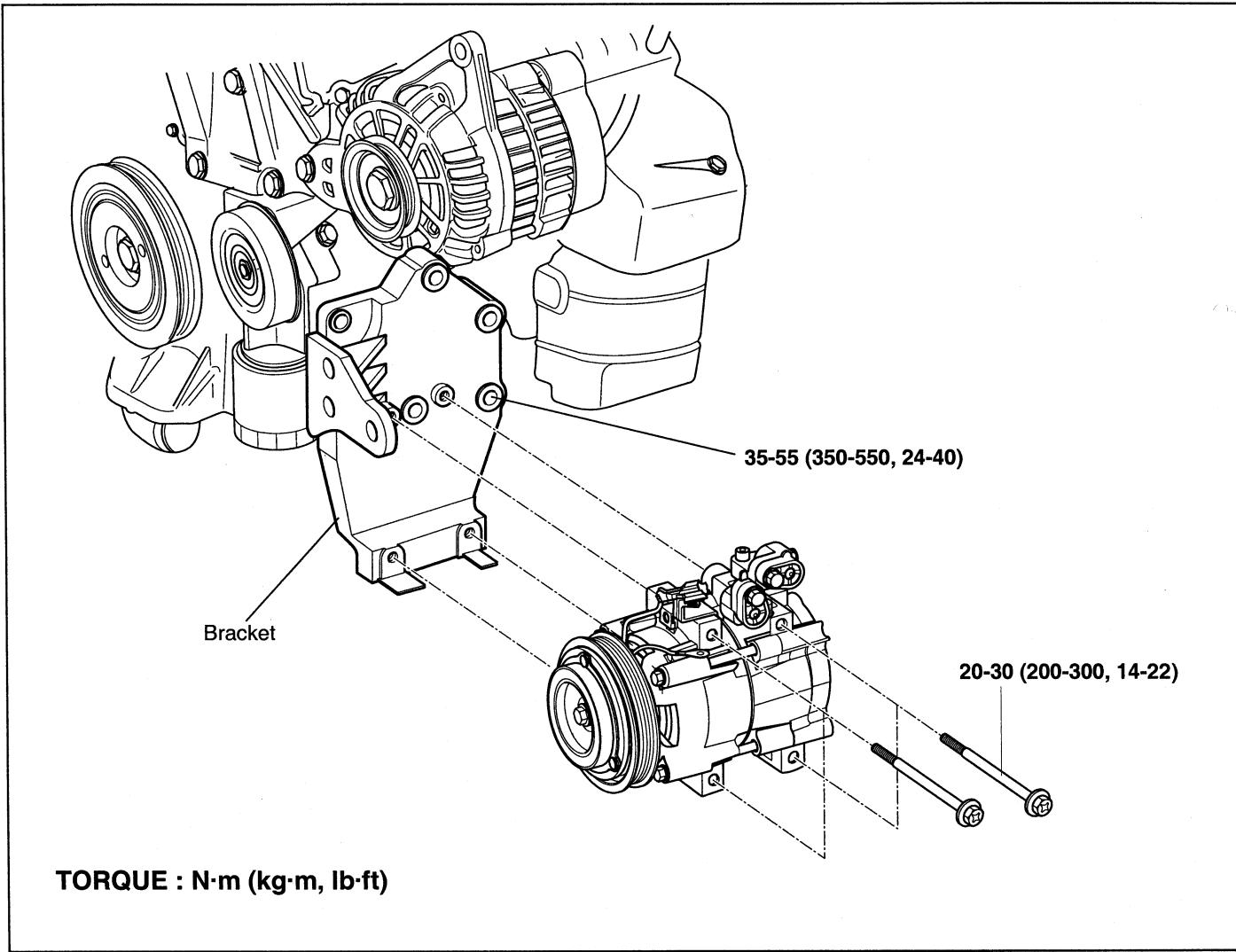
DIAGNOSIS

MANUAL A/C COMPRESSOR CONTROLS

COMPRESSOR

COMPONENTS

EQJA1150



KFWD035A

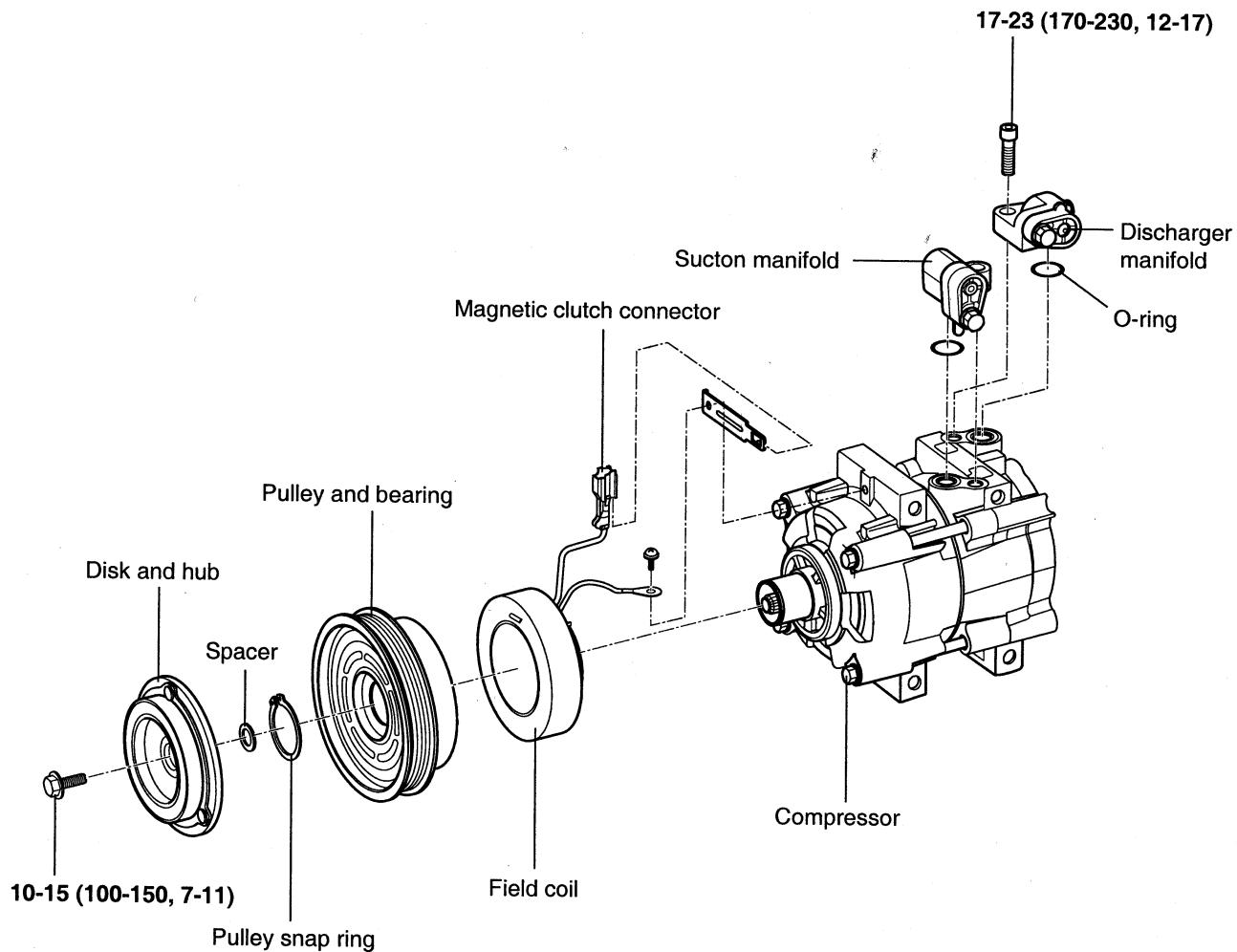
REMOVAL AND INSTALLATION

EQHA1200

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

COMPONENTS

EQJA1250

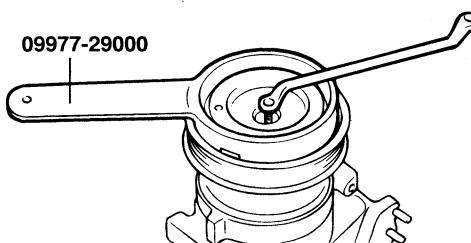


CLUTCH HUB AND PULLEY

EQHA1300

DISASSEMBLY

1. Remove the clutch hub supporting bolt using the Special Tool.

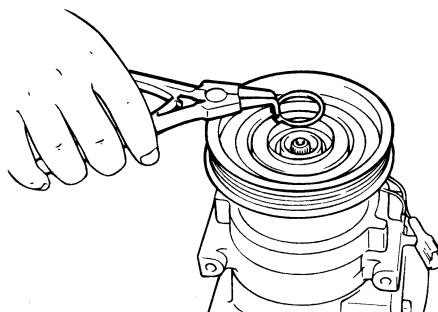


EQA9014A

2. Pull out the clutch hub and shim from the compressor shaft. If it is hard to pull out the hub from compressor, insert an 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.

ASSEMBLY

1. Clean the pulley bearing surface of the compressor head and remove dirt and rust.
2. Install the pulley and bearing on the compressor.
3. Install the snap ring with its bevelled side facing out.
4. Place one space shim of specified size over the hub spline and slide the hub onto the compressor shaft end.



EQA9014B

5. Install a new hub supporting bolt at the compressor shaft end. Tighten the bolt with tightening torque.

Tightening torque : 102~153kg.cm

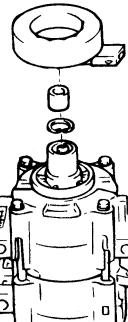
CAUTION

Do not use air tools.

CLUTCH FIELD COIL

DISASSEMBLY

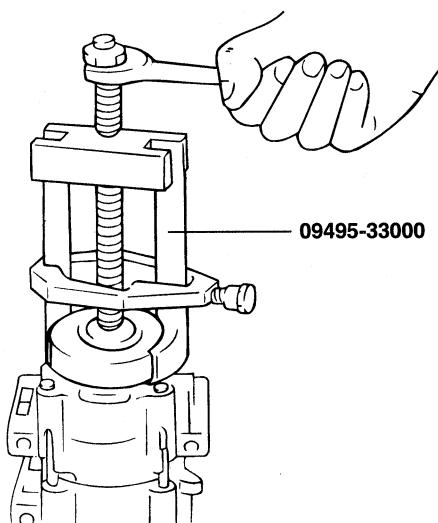
1. Remove the clutch hub and pulley.



EQHA130A

2. Install a shaft protection tool at the compressor opening.
3. Install the pulley on the compressor.

Place the puller screw end on the shaft arms center concave and the puller projection around the rear side of the field coil.



EQHA130B

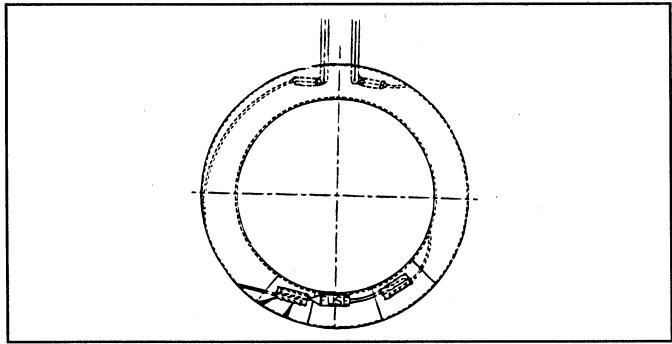
4. Turn the puller screw using a wrench and remove the coil.

CAUTION

Do not use air tools.

THERMAL FUSE

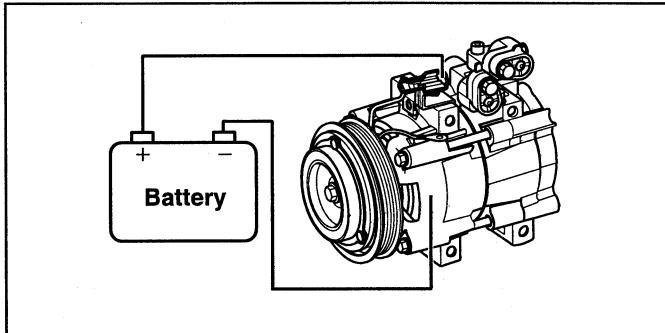
1. A thermal fuse is located on the compressor clutch coil.
2. The thermal fuse will detect clutch slip heat (184°C off) generated by faulty compressor operation, then interrupt the coil's power supply. Therefore, the clutch bearing and the pulley bearing will not be damaged, also protecting the belt and engine. Once the thermal fuse blows the compressor will not operate. Check the clutch oil resistance ($3.0\text{--}3.2\Omega$) to determine the thermal fuse condition, and replace the clutch coil if required.



HEW97018

MAGNETIC CLUTCH OPERATION

Connect the compressor terminal to battery(+) and the battery(-) terminal to the compressor body. Verify magnetic clutch operation by a clicking noise.



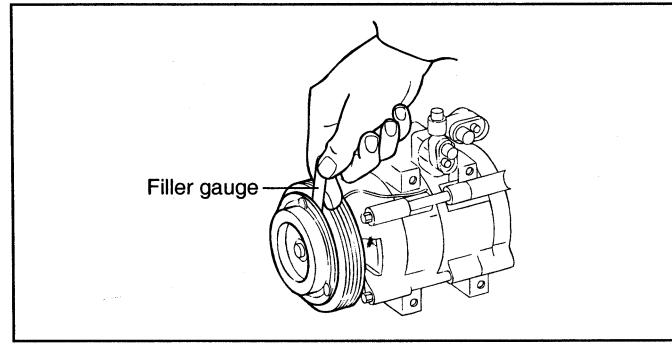
KFWD053A

CHECKING THE CLUTCH AIR GAP

1. Check the air gap between the clutch hub and pulley contact surface using a feeler gauge.

Clutch air gap : $0.35\text{--}0.65\text{mm}$

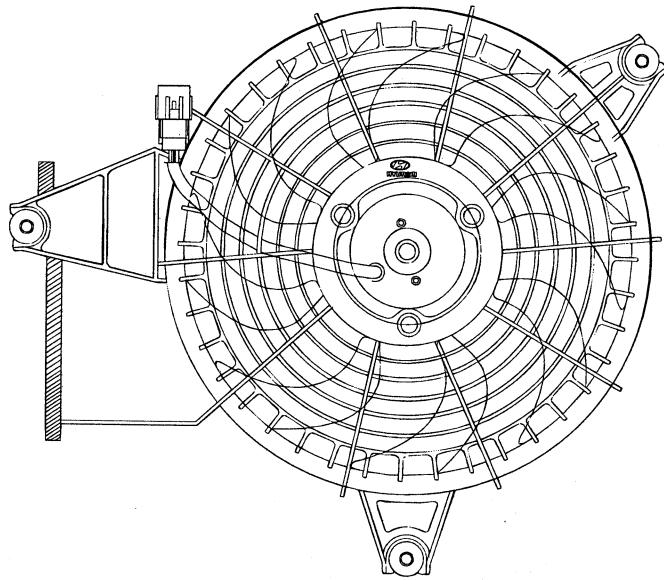
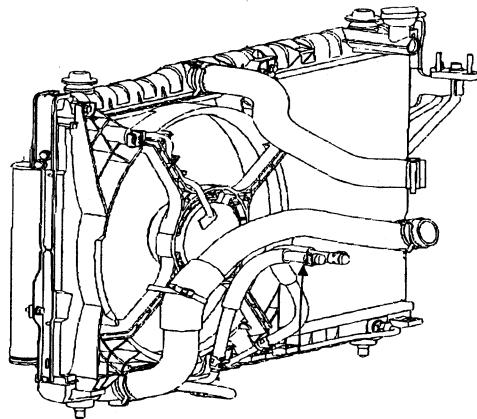
2. Check the gap around the pulley at 3 points.
3. If the clutch air gap is outside the normal range, correct it using a shim of proper size.



KFWD052A

CONDENSER FAN AND RELAY**CONDENSER FAN AND RELAY**

EQJA1350



Condenser fan

EQJA013D/EQJA013B

EQJA135A

CHECKING

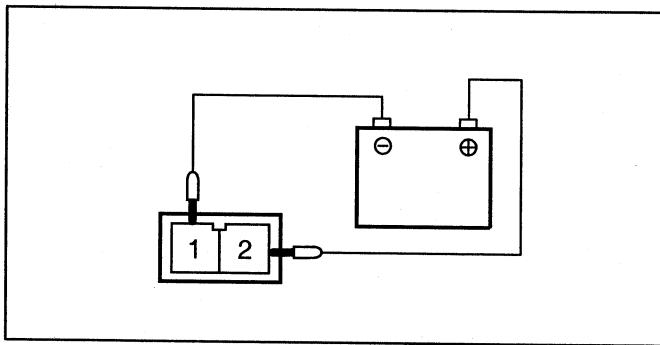
EQJA1400

CONDENSER

1. Check the condenser fins for clogging and damage. If clogged, clean them with water, and blow them with compressed air. If bent, gently bend them using a screwdriver or a pliers.
2. Check the condenser connections for leakage, and repair or replace it, if required.

CONDENSER FAN

1. Check the condenser fan for proper operation.
2. Check the harness connector.
3. Check the condenser fan motor using battery voltage as shown below.

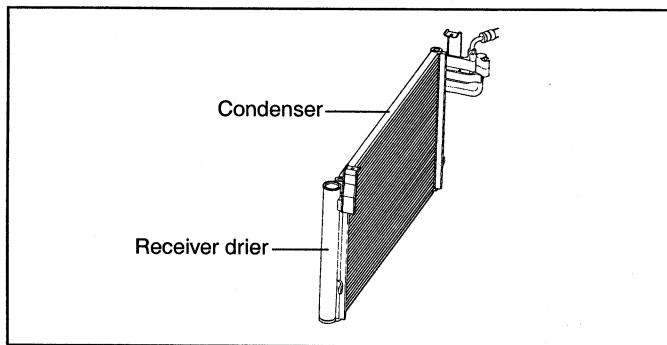


EQJA013C

RECEIVER/DRIER

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 temperatures. If the 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 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 the refrigeration system.**

TRIPLE PRESSURE SWITCH

TRIPLE SWITCH EQJA1500

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

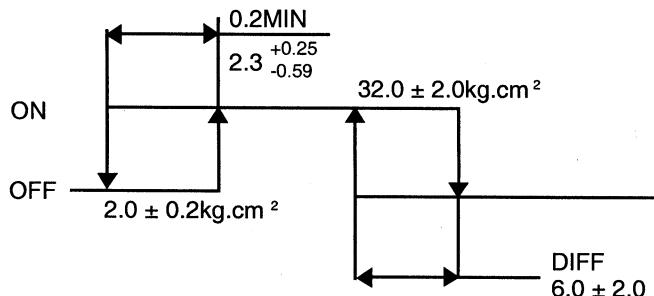
OPERATING CHARACTERISTIC

kg·cm²

Pressure	ON	OFF
High	32.0 ± 2.0	26.0 ± 2.0
Low	2.3 ± 0.25	2.0 ± 0.2
Medium	15.5 ± 0.8	11.5 ± 1.2

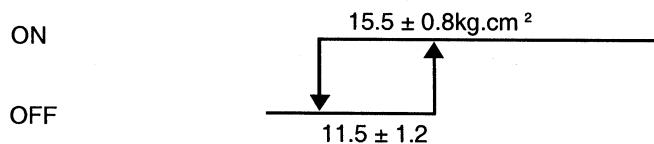
EQJA150B

LOW & HIGH



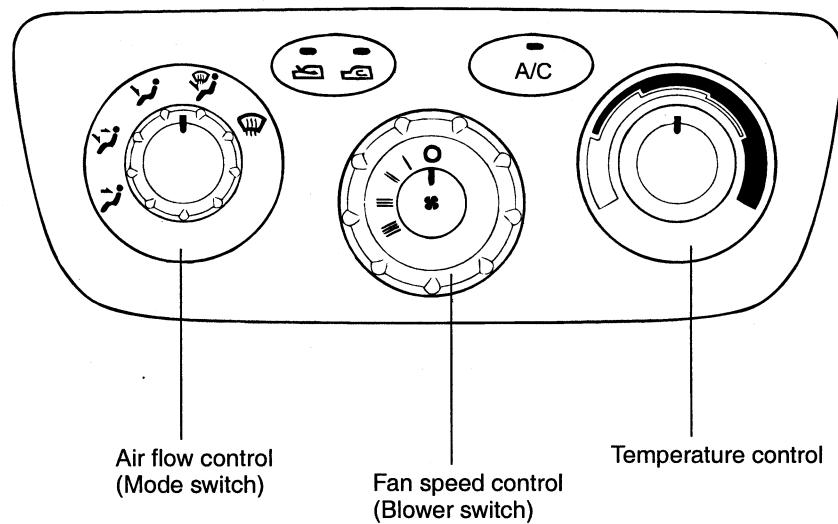
EQHA150A

MEDIUM



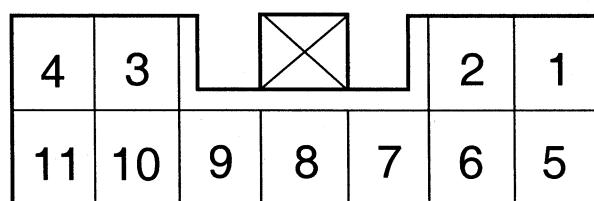
EQHA150C

CONTROL PANEL EQJA1000

Air flow control
(Mode switch)Fan speed control
(Blower switch)

Temperature control

M35

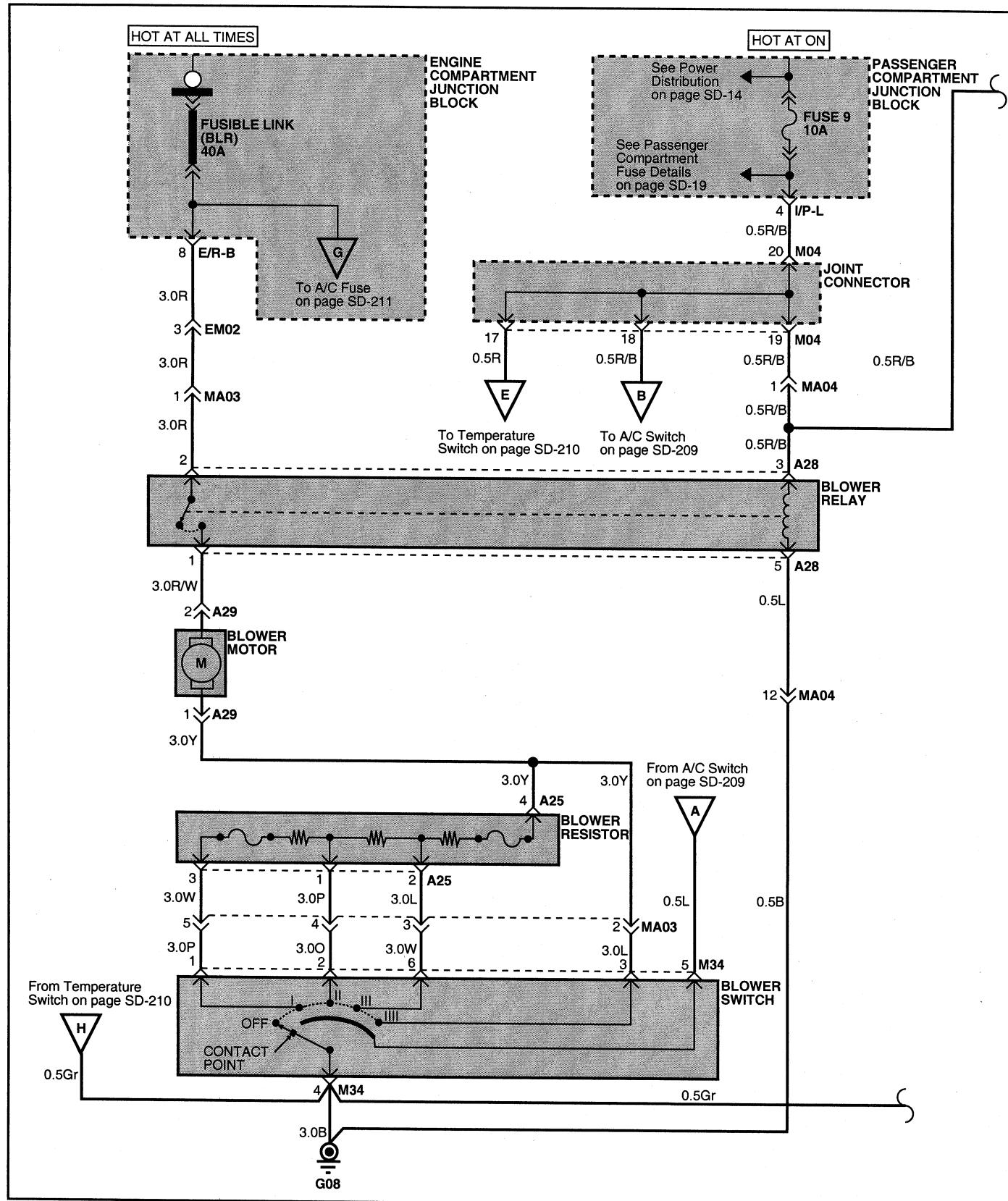


A/CON. switch

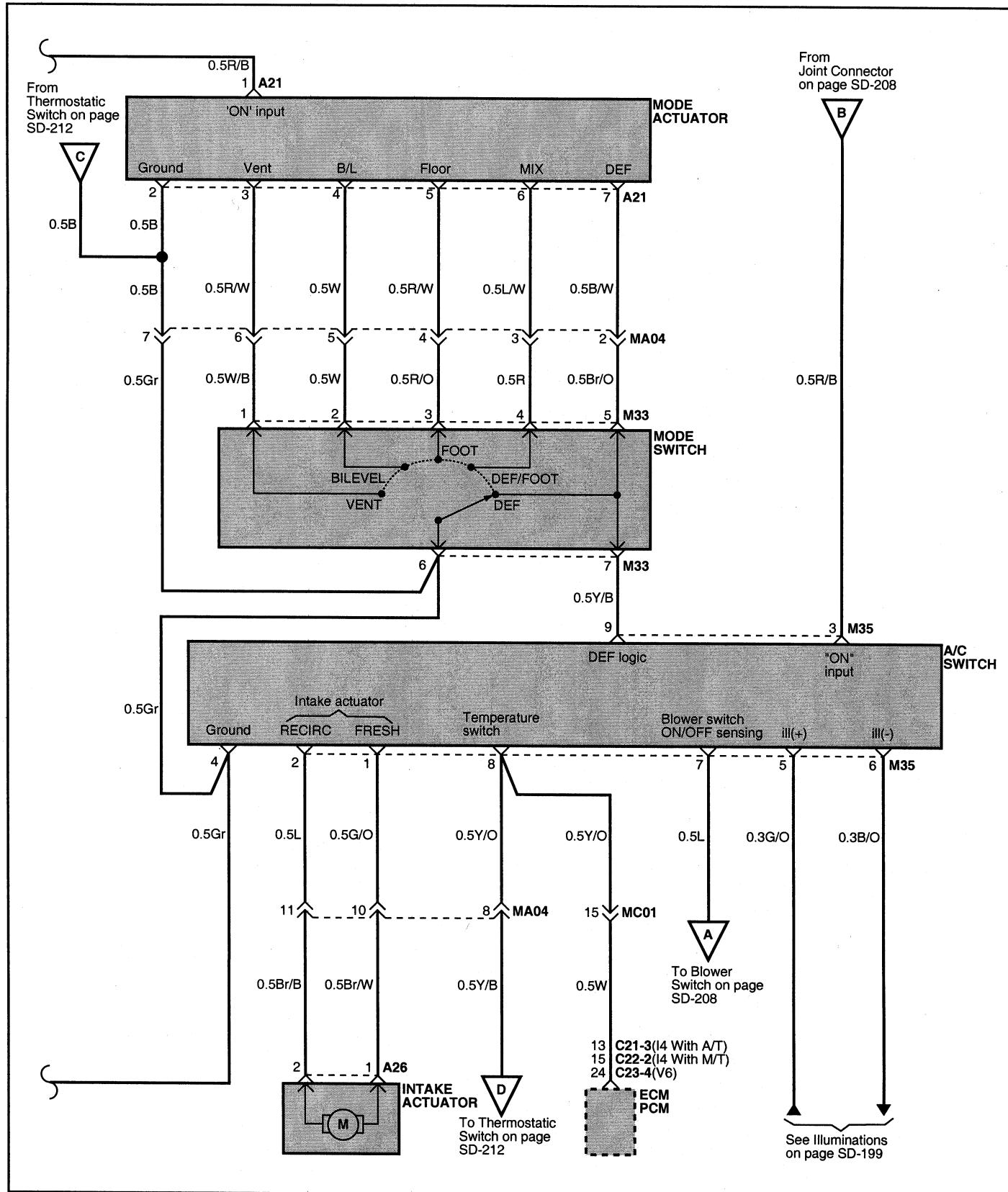
SCHEMATIC DIAGRAM

EQJA1050

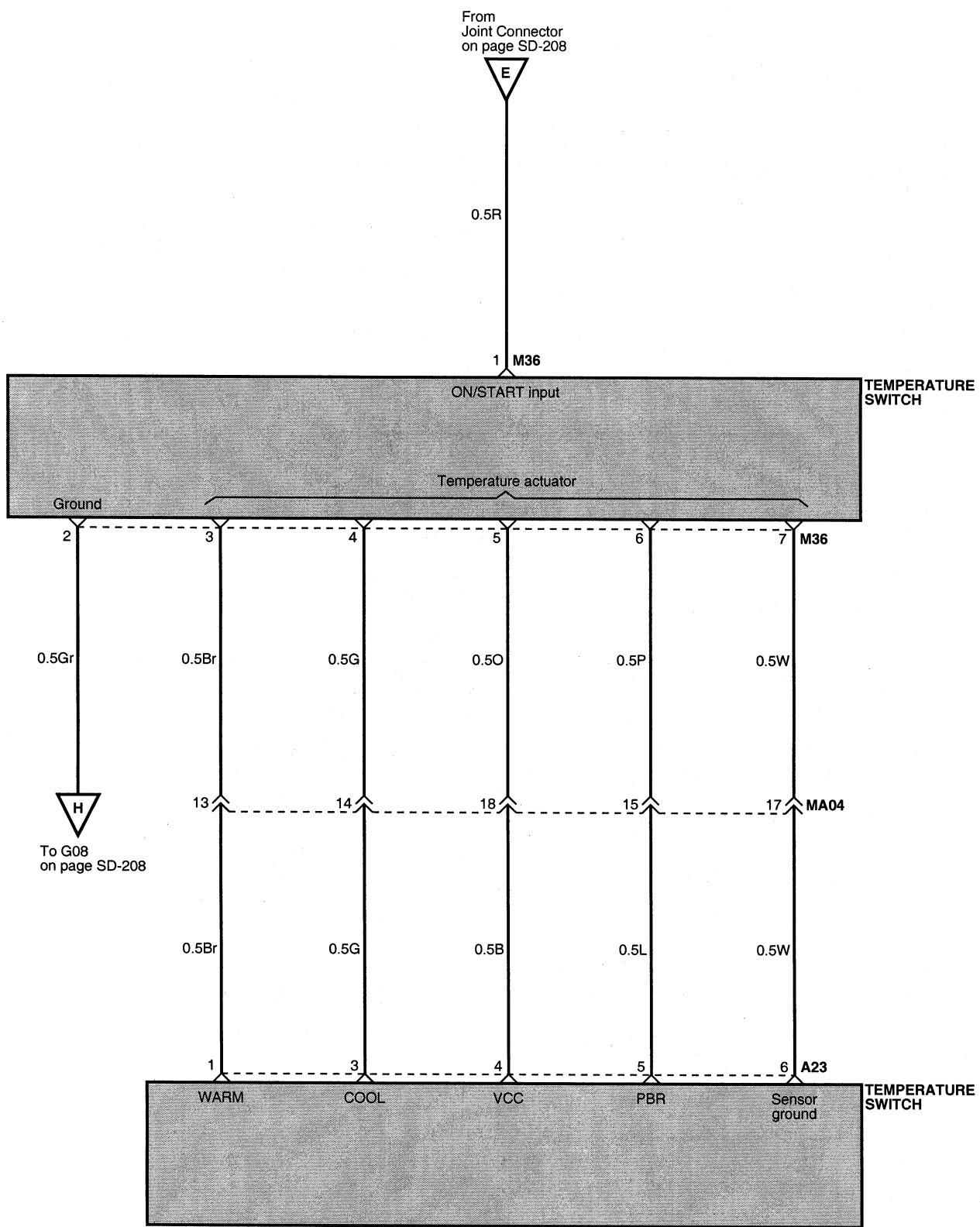
BLOWER AND A/C CONTROLS (MANUAL) (1)



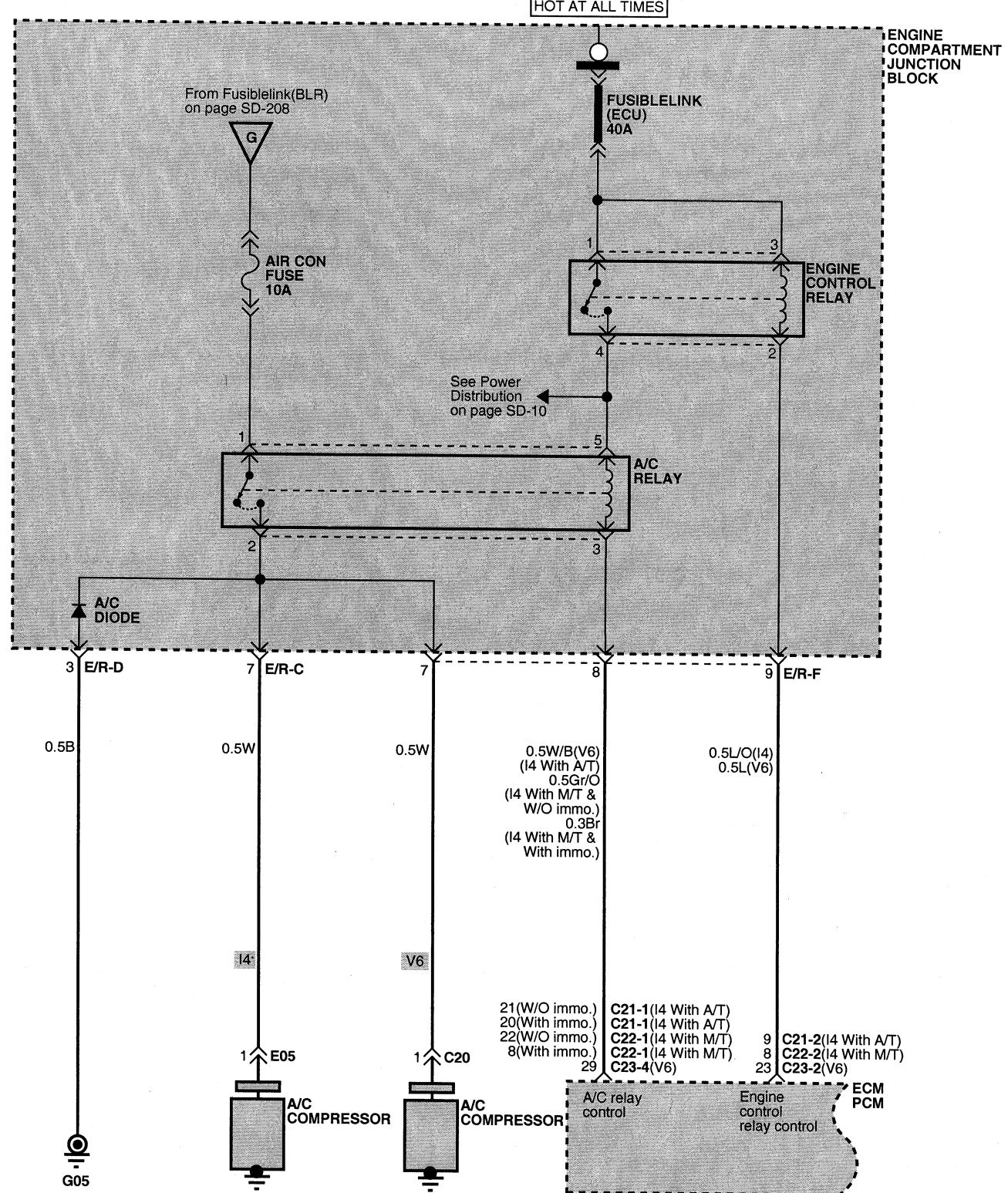
BLOWER AND A/C CONTROLS (MANUAL) (2)



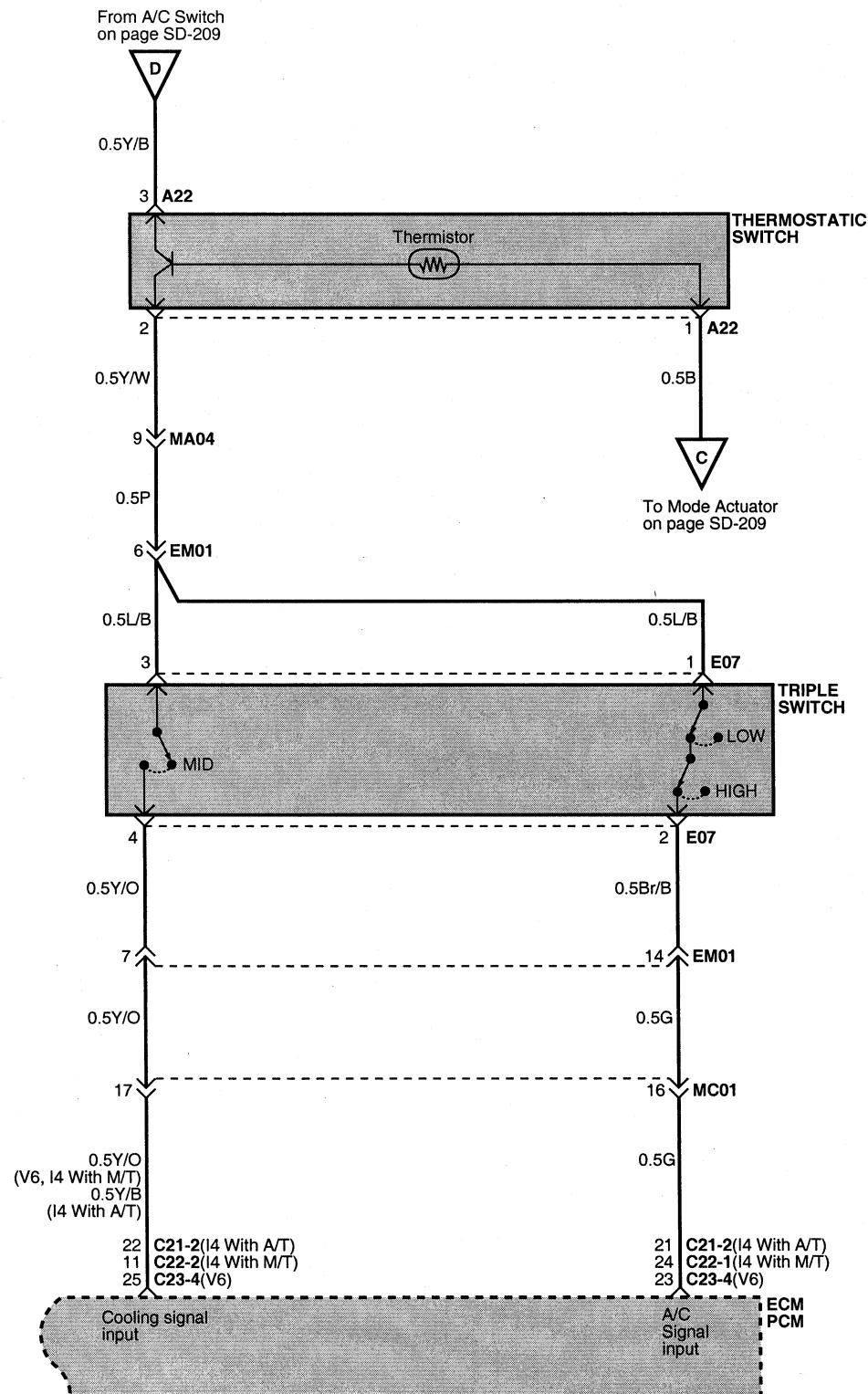
BLOWER AND A/C CONTROLS (MANUAL) (3)



BLOWER AND A/C CONTROLS (MANUAL) (4)



BLOWER AND A/C CONTROLS (MANUAL) (5)



SWITCH OPERATION AND FEATURES

B670A01O

HEATING AND VENTILATION

There are four controls for the heating and cooling system. They are:

1. Air flow control.

This is used to direct the flow of air. Air can be directed to the floor, dashboard outlets, or windshield. Five symbols are used to represent Face, Bi-Level, Floor, Floor-Defrost and Defrost air positions.

2. Air intake control.

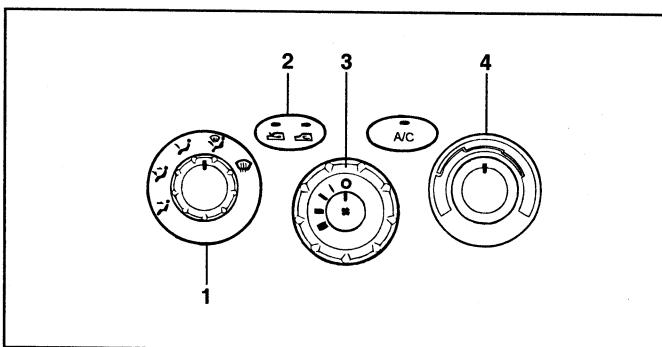
This allows you to select fresh outside air or recirculation inside air.

3. Fan speed control.

This is used to turn the fan on and select the fan speed.

4. Temperature control.

This is used to turn the heating system on and off and to select the degree of heating or cooling desired.



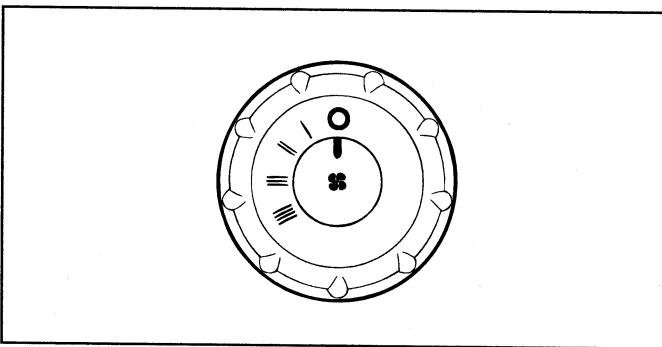
B670A01G

FAN SPEED CONTROL

(BLOWER CONTROL)

B670B01A

This is used to turn the blower fan on and off and to select the fan speed. The blower fan speed, and therefore the volume of air delivered from the system, may be controlled manually by setting the blower control between the "1" and "4" position.



B670B01G

AIR INTAKE CONTROL

B670C01A

This is used to select fresh outside air or recirculation inside air.



Fresh



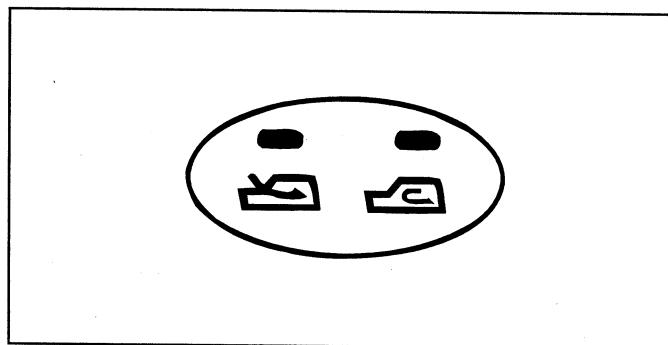
Recirculation

FRES-REC

With the "Fresh" mode selected, air enters the vehicle from outside and is heated or cooled according to the other functions selected. With the "Recirculation" mode selected, air from within the passenger compartment is drawn through the heating system and heated or cooled according to the other functions selected.

NOTE

It should be noted that prolonged operation of the heating system in "Fresh" mode will give rise to fogging of the windshield and side windows and the air within the passenger compartment will become stale. In addition, prolonged use of the air conditioning with the "Recirculation" mode selected may result in the air within the passenger compartment becoming excessively dry.

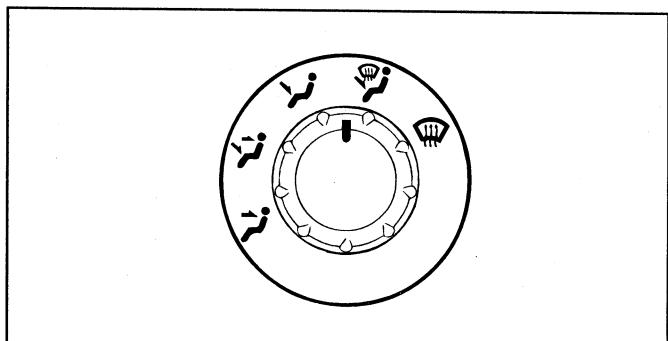


B670C01G

AIR FLOW CONTROL

B670D01A

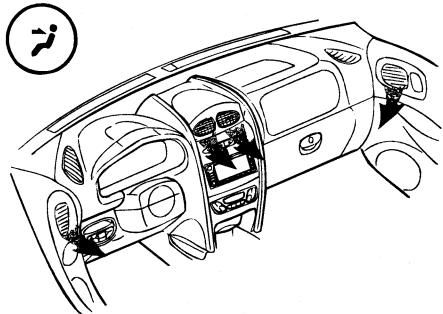
This is used to direct the flow of air. Air can be directed to the floor, dashboard outlets, or windshield. Five symbols are used to represent Face, Bi-Level, Floor, Floor-Defrost and Defrost air positions.



B670D01G

FACE-LEVEL

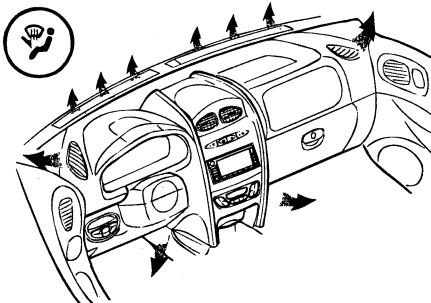
Selecting the "Face" mode will cause air to be discharged through the face-level vents.



B670D02G

FLOOR-DEFROST LEVEL

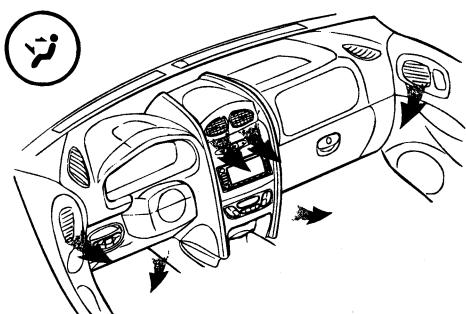
Air is discharged through the windshield defrost vents and the floor vents.



B670D05G

BI-LEVEL

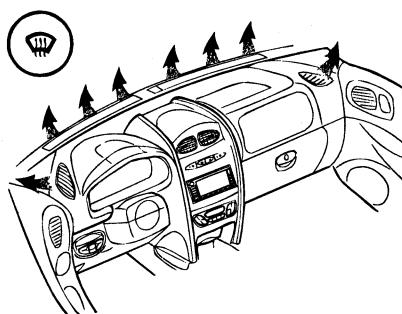
Air is discharged through the face-level vents and the floor vents. This makes it possible to have cooler air from the dashboard vents and warmer air from the floor outlets at the same time.



B670D03G

DEFROST-LEVEL

Air is discharged through the windshield defrost vents.

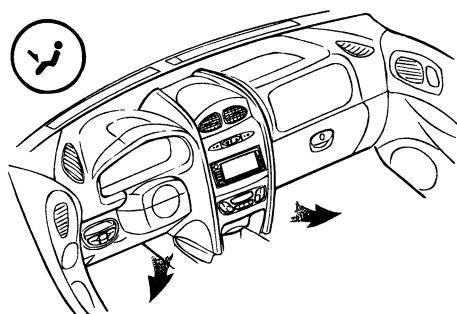


B670D06G

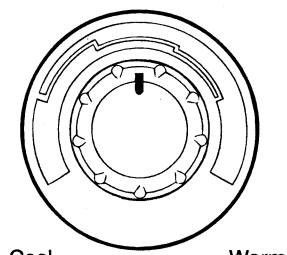
TEMPERATURE CONTROL

B670E01A

This is used to turn the heating system on and off and to select the degree of heating or cooling desired.



B670D04G



B670E01G

HEATING CONTROLS

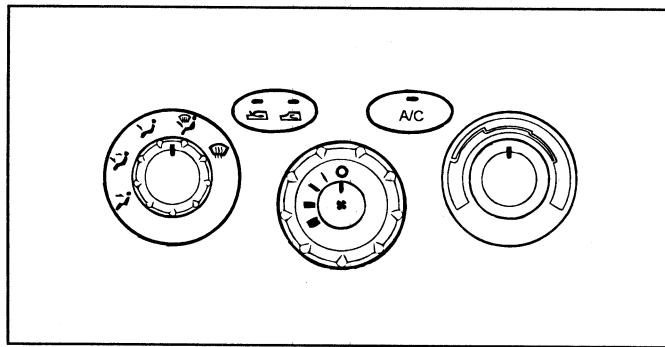
B690A01O

For normal heating operation, set the air intake control to the fresh air (**Fresh**) position and the air flow control to the floor (**Floor-Level**) position.

For faster heating, the air intake control should be set in the recirculate (**Recirculation**) position.

If the windows fog up, set the air flow control to the defrost (**Defrost-Level**) position and the air intake control to the fresh air (**Fresh**) position.

For maximum heat, move the temperature control to "Warm".



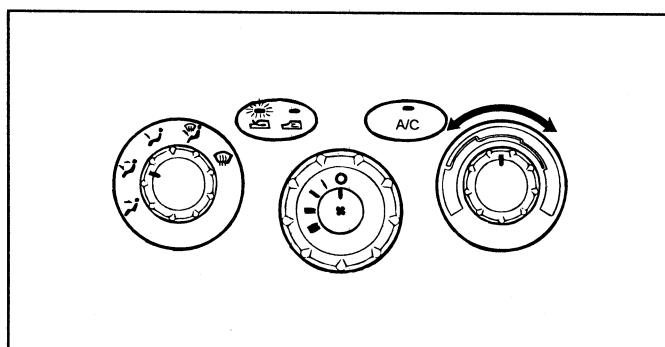
B690A01G

BI-LEVEL HEATING

B700A01O

Your Hyundai is equipped with bi-level heating controls. This makes it possible to have cooler air from the dashboard vents and warmer air from the floor outlets at the same time. To use this feature:

- Set the air intake control to the fresh air (**Fresh**) position.
- Set the air flow control at the bi-level (**Bi-level**) position.
- Set the temperature control between "Cool" and "Warm".



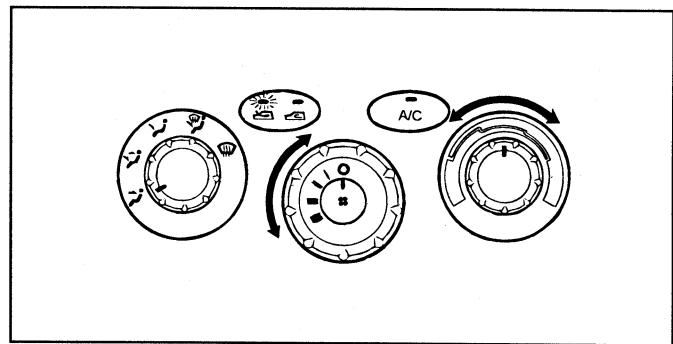
B700A01G

VENTILATION

B710A01O

To operate the ventilation system:

- Set the air intake control at the fresh air (**Fresh**) position.
- To direct all intake air to the dashboard vents, set the airflow control to the face (**Face-Level**) position.
- Adjust the fan speed control to the desired speed.
- Set the temperature control between "Cool" and "Warm".

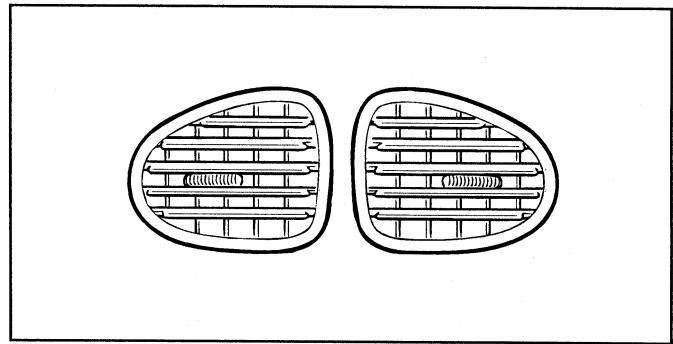


B710A01G

CENTER VENTILATOR

B710B01A

The center ventilators are located in the middle of the dashboard. To change the direction of the airflow, move the control knob on the middle of the ventilator as desired.

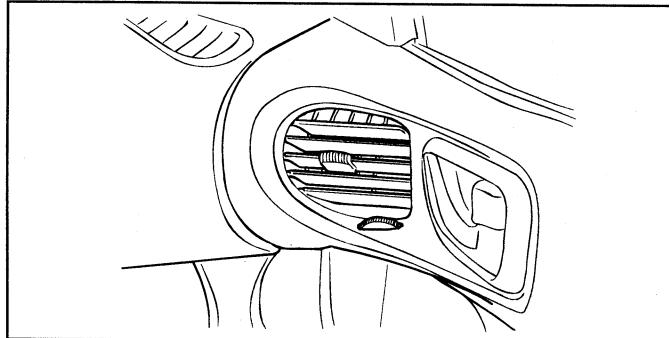


B710B01G

SIDE VENTILATOR

B710C01O

The side ventilators are located on each side of the front door. The side vent knobs control the amount of outside air entering the vehicle through the side vents. These vents can also be closed, so no air enters through the side vents. To change the direction of the air flow, turn the control knobs as desired.



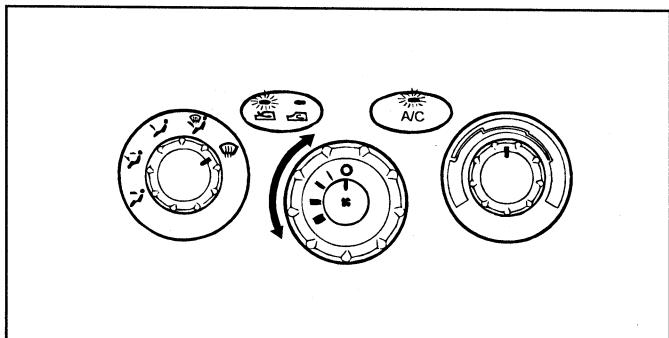
B710C01G

DEFROSTING/DEFOGGING

B720A05Y

To remove the interior fog on the windshield;

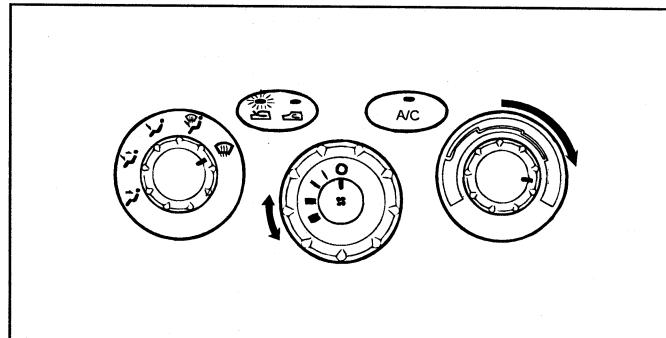
- Set the air flow control to the defrost (**Defrost-Level**) position.
- Set the air intake control to the fresh air (**Fresh**) position.
- Set the temperature control at the desired position.
- Set the fan speed control between the 1 and 4 position.
- If vehicle is so equipped, push on the A/C for increased defogging action.



B720A01G

To remove the frost or exterior fog on the windshield;

- Set the air flow control to the defrost (**Defrost-Level**) position.
- Set the air intake control to the fresh (**Fresh**) position.
- Set the temperature control to the warm.
- Set the fan speed control to position 3 or 4.



B720B01G

OPERATION TIPS

B730A01O

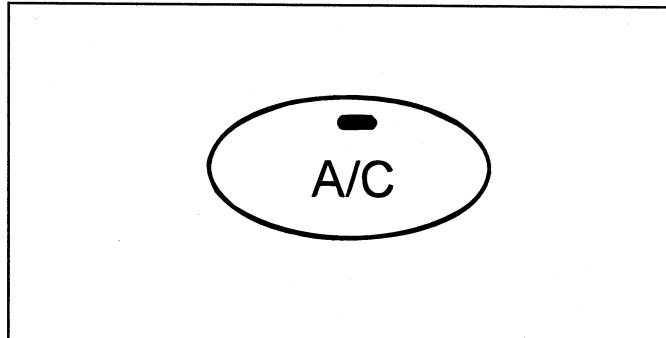
- To keep dust or unpleasant fumes from entering the car through the ventilation system, temporarily set the air intake control at the **Recirculation** position. Be sure to return the control to the **Fresh** position when the irritation has passed to keep fresh air in the vehicle.
- Air for the heating/cooling system is drawn in through the grilles just ahead of the windshield. Care should be taken that these are not blocked by leaves, snow, ice or other obstructions.

AIR CONDITIONING SYSTEM

B740A01S

AIR CONDITIONING SWITCH

The air conditioning is turned on or off by pushing the A/C button on the heating/air conditioning control panel.



B740A01G

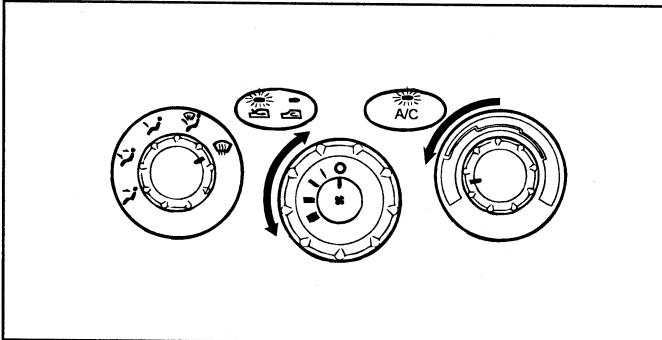
AIR CONDITIONING OPERATION (IF INSTALLED)

B740B01O

COOLING

To use the air conditioning to cool the interior:

- Set the side vent control to shut off the outside air entry.
- Turn on the fan control switch.
- Turn on the air conditioning switch by pushing in on the switch. The air conditioning indicator light should come on at the same time.
- Set the air intake control to the fresh air (**Fresh**) position.
- Set the temperature control to "Cool". (Cool" provides maximum cooling. The temperature may be moderated by moving the control toward "Warm".)
- Adjust the fan control to the desired speed. For greater cooling, turn the fan control to one of the higher speeds or temporarily select the recirculate (**Recirculation**) position on the air intake control.



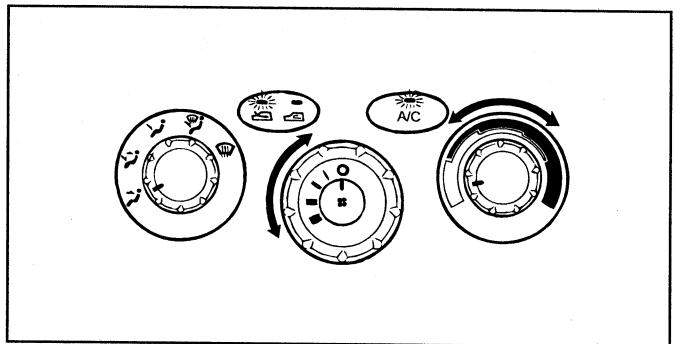
B740B01G

DE-HUMIDIFIED HEATING

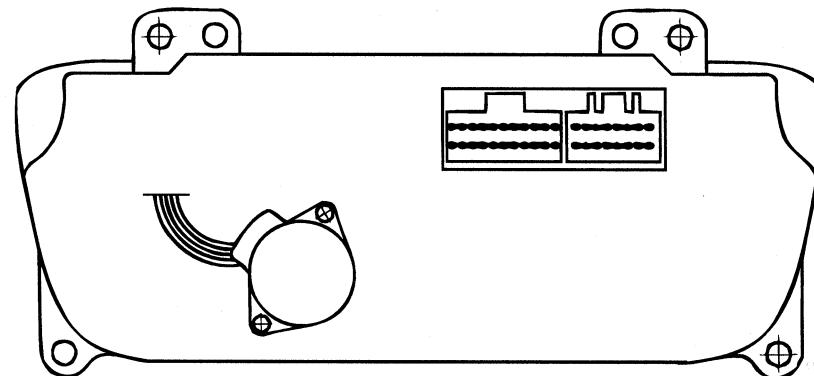
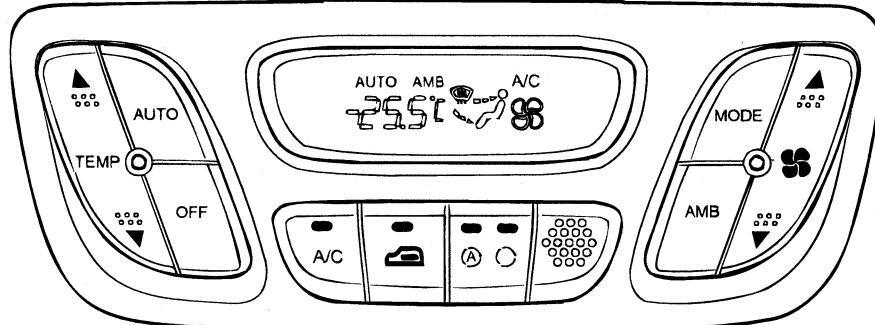
B740C01O

For dehumidified heating:

- Turn on the fan control switch.
- Turn on the air conditioning switch. The air conditioning indicator light should come on at the same time.
- Set the air intake control to the fresh air (**Fresh**) position.
- Set the air flow control to the face (**Face-Level**) position.
- Adjust the fan control to the desired speed.
- For more rapid action, set the fan at one of the higher speeds.
- Adjust the temperature control to provide the desired amount of warmth.

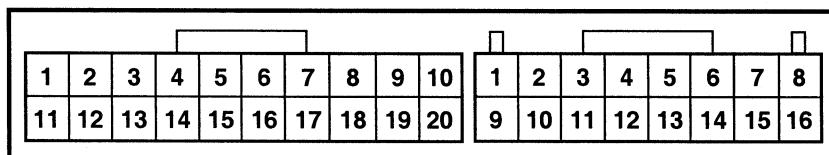


B740C01G

FULL AUTO A/C COMPRESSOR**FULL AUTOMATIC AIR CONDITIONER****(FATC)** EQJB1000**CONTROL PANEL**

M32-1

M32-1



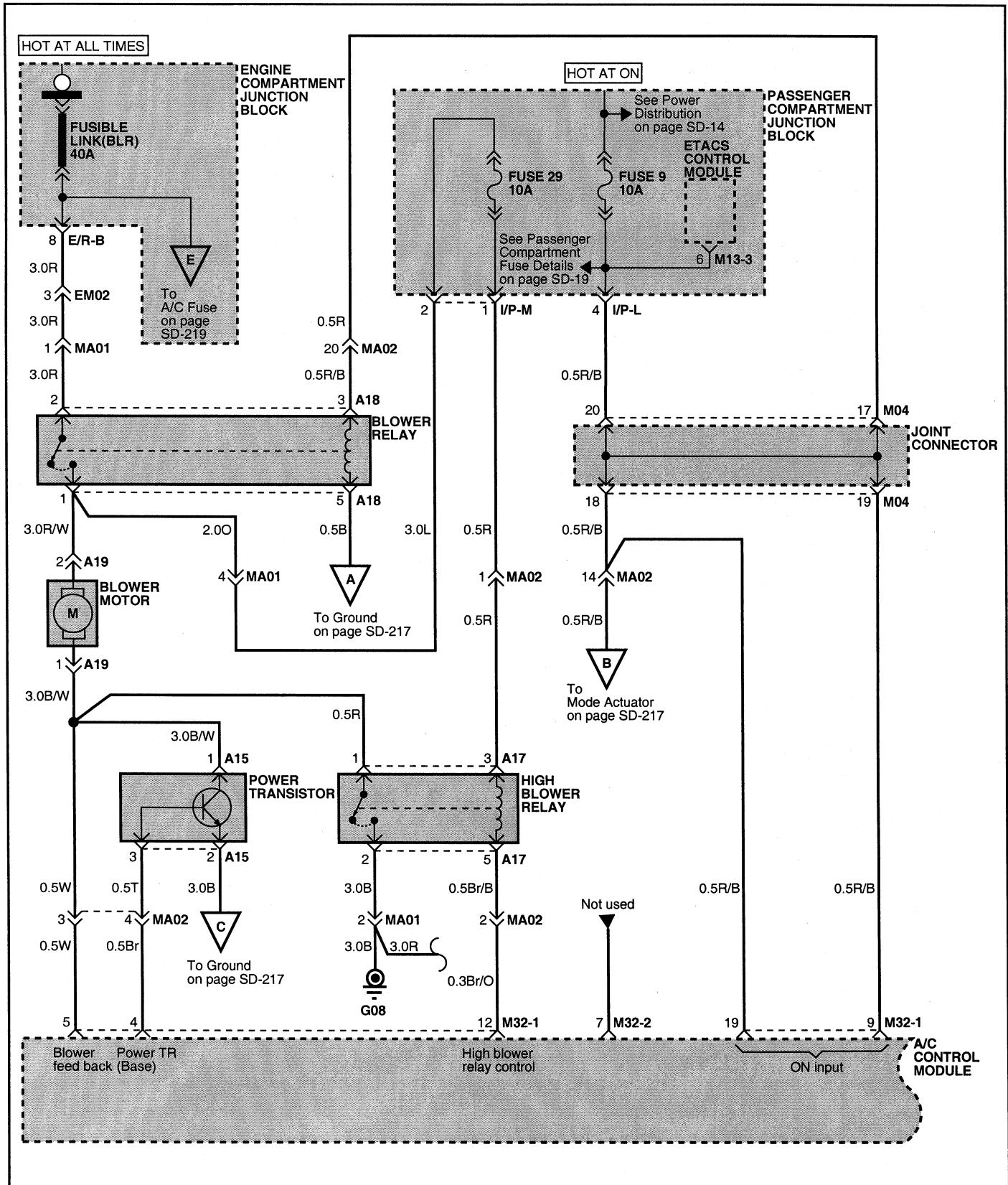
EQJA011A/EQJA011B

EQJB100A

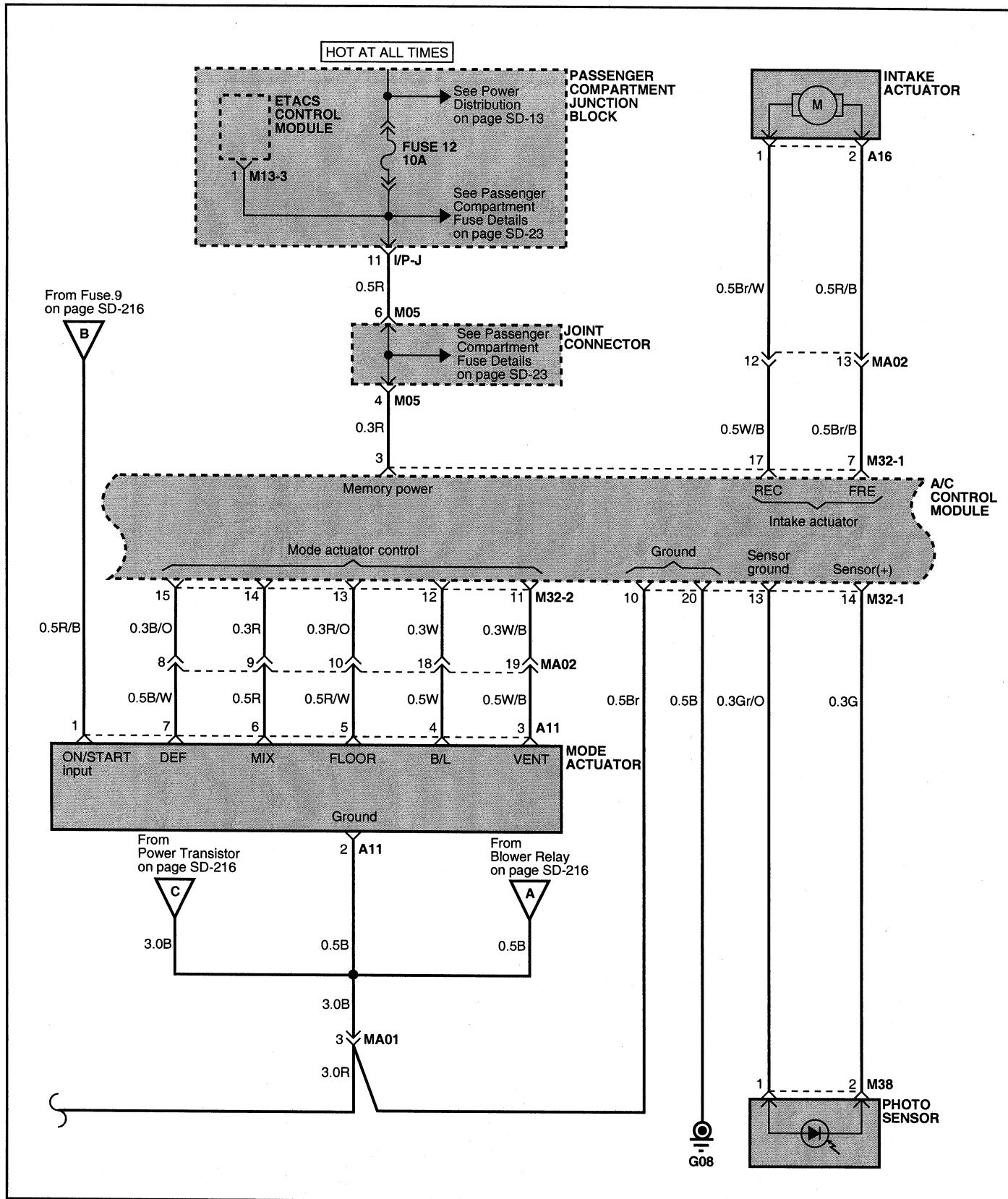
SCHEMATIC DIAGRAM EQJB1050

EQJB1050

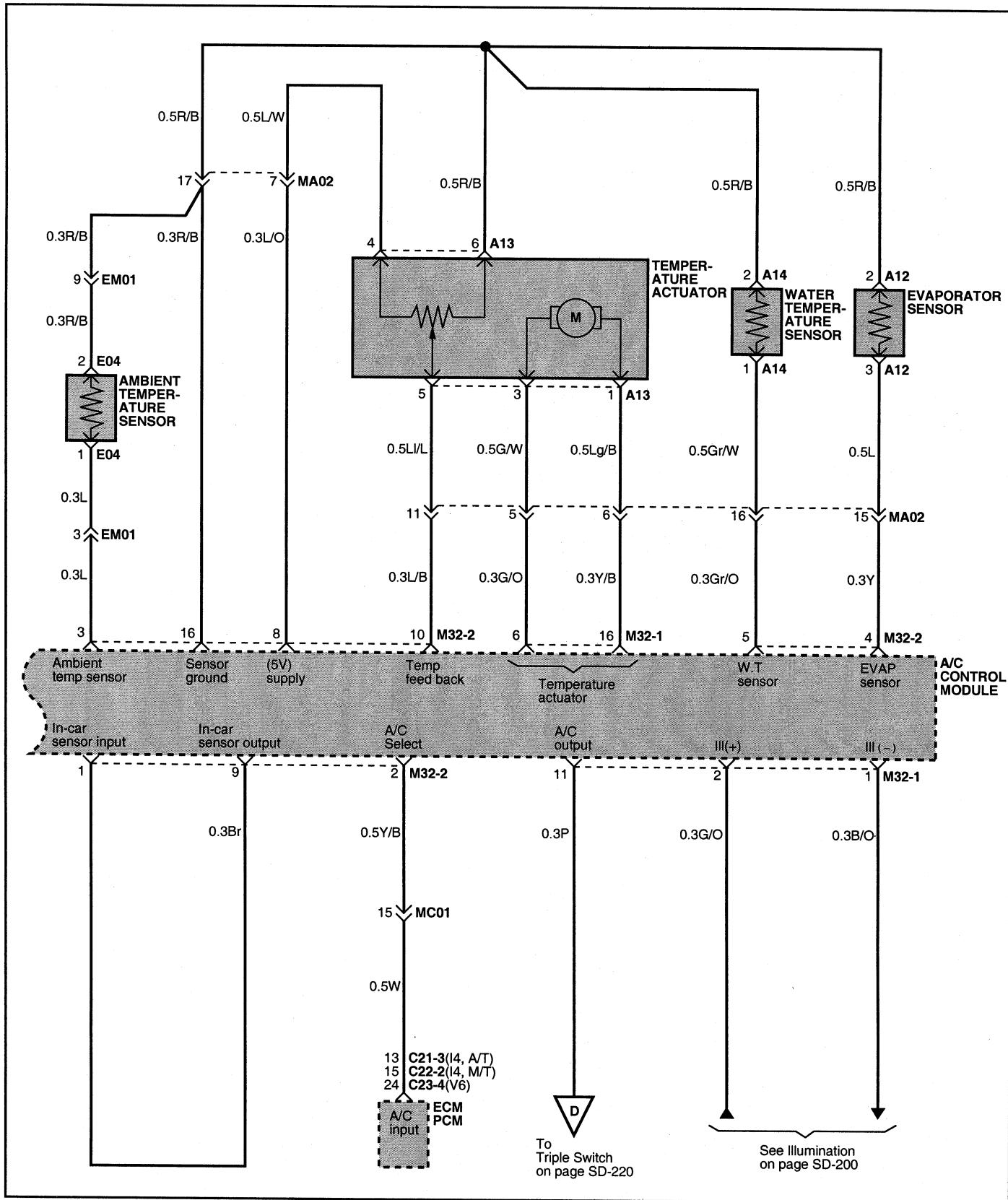
BLOWER AND A/C CONTROLS (FULL AUTO) (1)



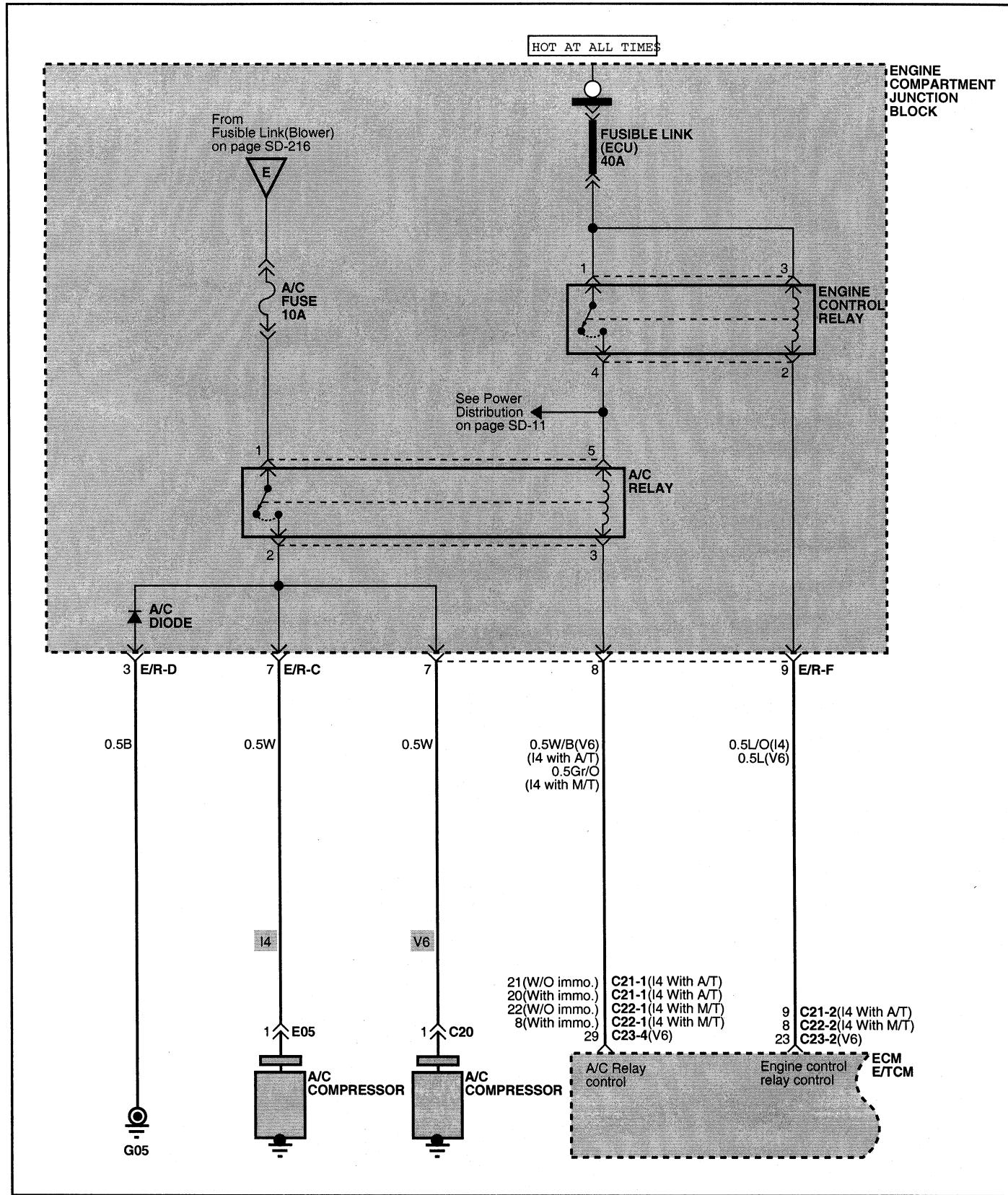
BLOWER AND A/C CONTROLS (FULL AUTO) (2)



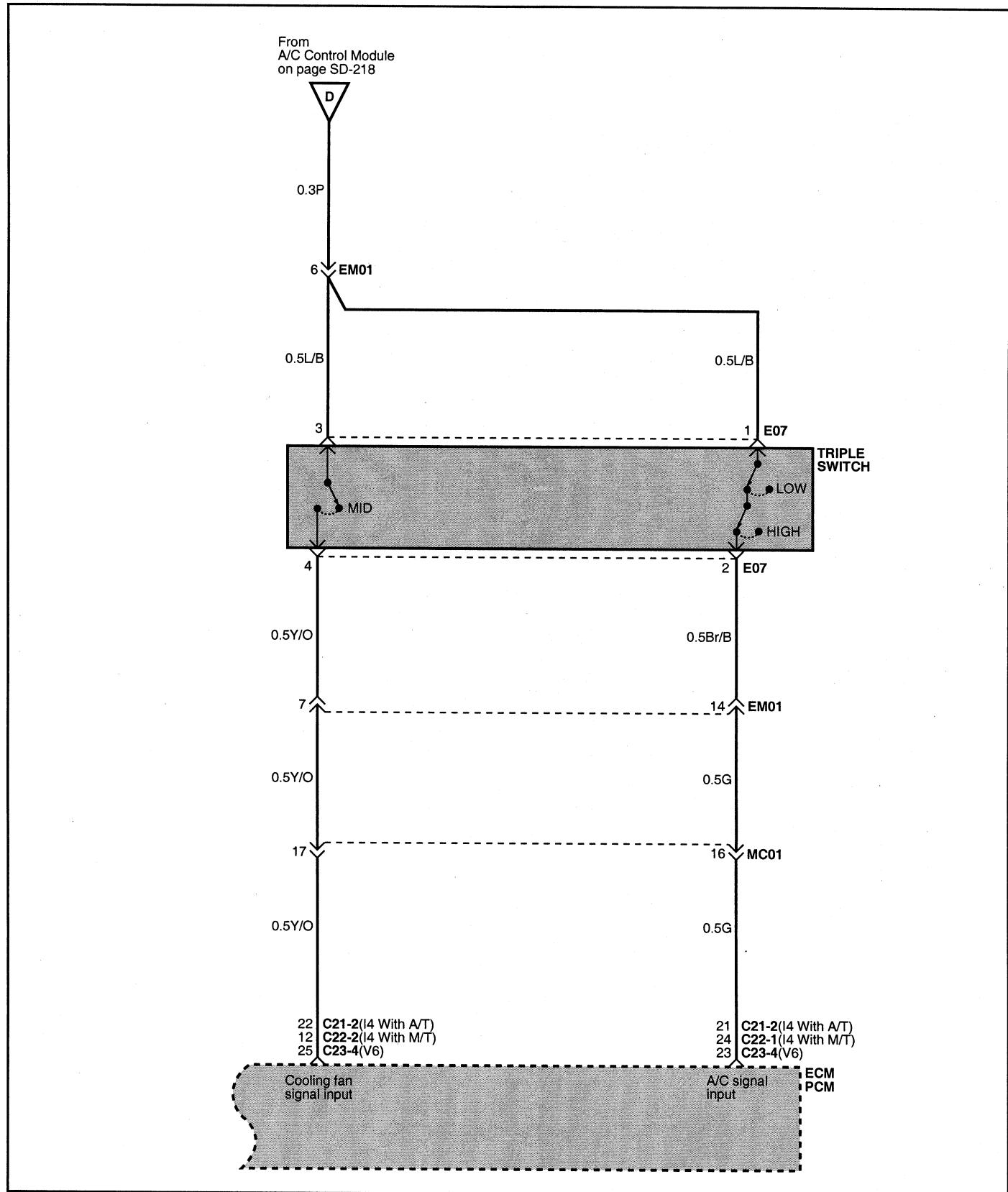
BLOWER AND A/C CONTROLS (FULL AUTO) (3)



BLOWER AND A/C CONTROLS (FULL AUTO) (4)



BLOWER AND A/C CONTROLS (FULL AUTO) (5)



SWITCH OPERATION AND FEATURES

EQJA1010

1. Full auto air conditioning system: One-touch button type.

2. Manual air conditioning system: Combination of dial switch and one-touch button.

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	<ol style="list-style-type: none"> 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 repeatedly on: Shift one unit every 0.7 second. Holding down: First shift in 0.7 seconds and then 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.

Button	Function	Display	System operation	Stop switch and system operation
AUTO (Auto control)	Auto control of air conditioning system	"AUTO" will be displayed on control panel.	<ol style="list-style-type: none"> 1. The system will provide auto control of the below features on the basis of temperature setting: <ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 (when air conditioning system is on and recirculation selected)
AMB	Indicate ambient air temperature	'AMB' lamp will come on indicate ambient air temperature other lamps will go out.	<ol style="list-style-type: none"> 1. 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. 	<ul style="list-style-type: none"> • AMB: Pressing the AMB switch when ambient air temperature is indicated, ambient air temperature indication will extinguish. • Other switches: Pressing another switch when the ambient air temperature is indicated, ambient air temperature indication will extinguish and selected switch control will be performed.

Button	Function	Display	System operation	Stop switch and system operation
INTAKE	Recirculation	Recirculation lamp will come on. "AUTO" lamp will go out.	Fix intake door at the circulation position.	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 fresh air position.	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).
Blower fan speed UP/DOWN	Blower fan speed, UP/DOWN control	Indicates fan operation on/off	1. Pressing fan UP/DOWN switches during auto control, the speed will shift up/down based on the current fan level. 2. 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). 3. 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. 4. Pressing UP switch at HI position or DOWN switch at LOW position, buzzer sound will occur 5 times at 0.15 second interval.	<ul style="list-style-type: none"> • AUTO: Auto control • OFF : System off • Fan speed control: Manually control blower fan speed.
A/C Air conditioning switch	Compressor on/off control	<ul style="list-style-type: none"> • A/C lamp (on/off) • AUTO lamp off 	Airconditioning on/off	A/C: A/C on/off, manual control. OFF: System off AUTO: Auto control. DEF: Defroster, manual control.
MODE (Discharge mode)	Mode door control VENT, FLOOR, B/L, MIX	MODE indication (on/off) AUTO lamp off	1. Fix mode door at B/L or MIX 2. Manual operating mode switch, the switch will shift in the order of VENT-B/L-FLOOR-MIX	MODE: Shift control in order of Vent-B/L-Floor-Mix-Vent. DEF: Defroster, manual control. AUTO: Auto control

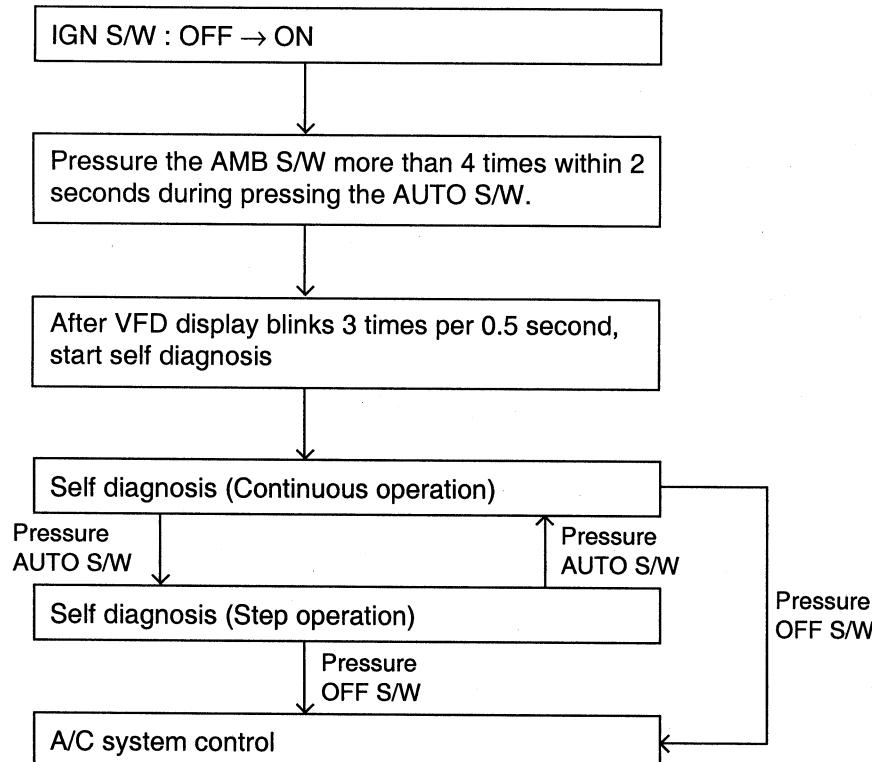
Button	Function	Display	System operation	Stop switch and system operation
DEF (Defroster) • Remove moisture/frost on wind-shield.	DEF control	<ul style="list-style-type: none"> • DEF IND on • DEF indication on • A/C lamp on • INTAKE IND off • AUTO lamp off 	<ol style="list-style-type: none"> 1. Mode 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 	<p>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.</p>

Button	Function	Display	System operation	Stop switch and system operation
OFF	System off	Control panel LCD off Indicator lamps on	<ol style="list-style-type: none"> 1. Blower fan speed off. 2. Airconditioning off. 3. Intake door: Fixed at the location 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 then go out. 	<p>AUTO: Auto control. Blower speed: Return to MANUAL LOW. Others: Return to the previous condition before system off</p>
			<ul style="list-style-type: none"> • INTAKE(recirc/fresh air) control at the system off condition <ol style="list-style-type: none"> 1) Selecting the 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 the 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. 	<p>A/C: Airconditioning on. Others: Return to the previous condition before system off (Blower speed: Return to MANUAL LOW)</p>
				<p>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)</p>
				<p>DEF: Shift to defroster mode Air conditioning on/Intake(fresh air) Others: Return to the previous condition before system off</p>
				<p>TEMP: Held at the previous condition before system off. Others: Return to the previous condition before system off.</p>
DEFOG	Rear glass defogger on	Defogger switch indicator on/off	<ol style="list-style-type: none"> 1. Pressing DEFOG switch, the switch signal will be sent to ETACS. 2. Pressing the switch again, defogging will stop and the indicator will go out. 3. Released by ETACS after 15 minutes of control. 	Pressing DEFOG switch again, it will be released.

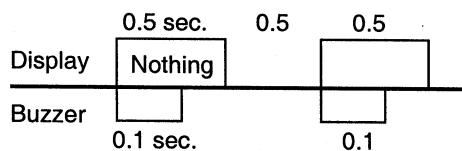
DIAGNOSIS SYSTEM EQJA2750

OPERATION METHOD (SELF-DIAGNOSIS)

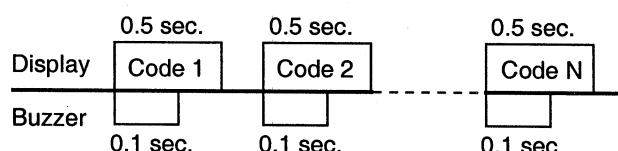
The F.A.T.C. module self test feature will detect electrical malfunction and provide error codes for system components with suspected failures.



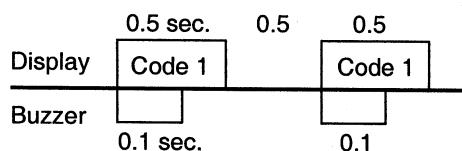
1. Normal



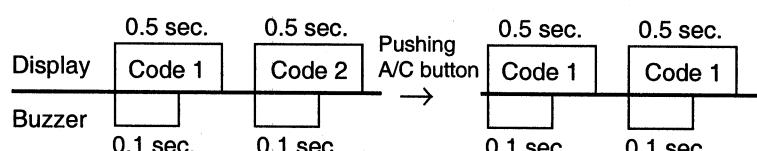
3. More error codes than two



2. One error code



4. Checking each error code



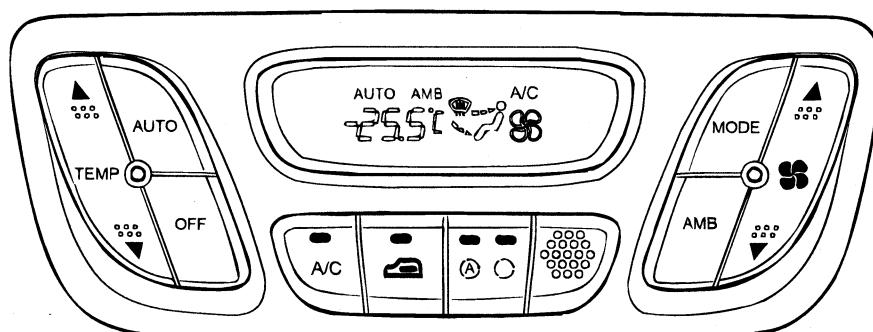
FAIL SAFE FUNCTION

EQJA1020

No.	Item	Failure	FAIL SAFE Function
1	In-car 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.

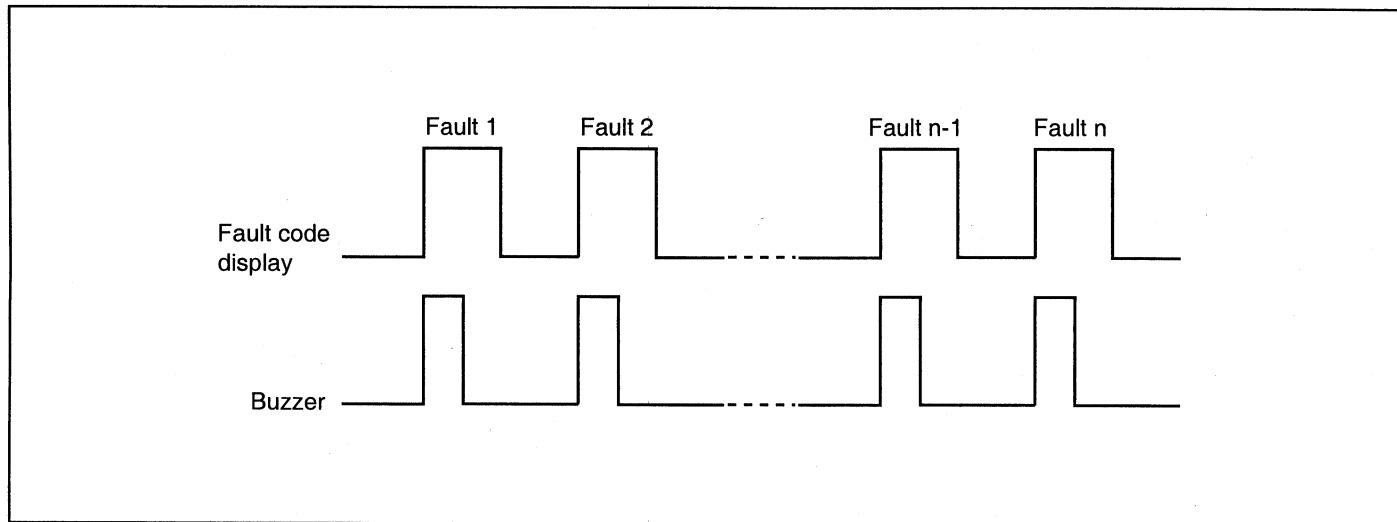
HOW TO READ SELF-DIAGNOSTIC CODE

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



EQJA011A

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.

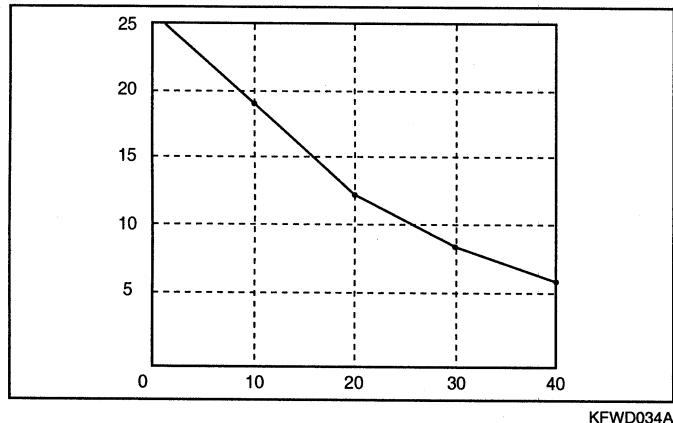
DTC code	Detection item	Trouble area
00	Normal	-
11	Open INCAR Sensor circuit	<ul style="list-style-type: none"> • Incar sensor
12	Shorted INCAR Sensor circuit	<ul style="list-style-type: none"> • Harness or connector between incar sensor and A/C control assembly • A/C control assembly
13	Open Ambient sensor circuit	<ul style="list-style-type: none"> • Ambient sensor
14	Shorted Ambient sensor circuit	<ul style="list-style-type: none"> • Harness or connector between ambient sensor and A/C control assembly. • A/C control assembly.
15	Open water temp. sensor	<ul style="list-style-type: none"> • Water temp. sensor
16	Shorted water temp. sensor	<ul style="list-style-type: none"> • Harness or connector between water temp. sensor and A/C control assembly. • A/C control assembly
17	Open pin thermo sensor	<ul style="list-style-type: none"> • Pin thermo sensor
18	Shorted pin thermo sensor	<ul style="list-style-type: none"> • Harness or connector between evap. sensor and A/C control assembly • A/C control assembly
19	Open or shorted temp. door potentiometer	<ul style="list-style-type: none"> • Harness or connector between temp. door potentiometer and A/C control assembly
20	Defective temp. door potentiometer	<ul style="list-style-type: none"> • Temp. door potentiometer

IN CAR SENSOR

IN-CAR AIR TEMPERATURE

SENSOR EQHA2200

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.



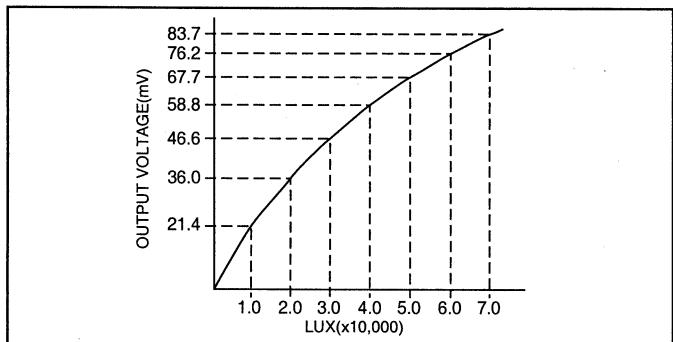
KFWD034A

PHOTO SENSOR

PHOTO SENSOR

EQJA2050

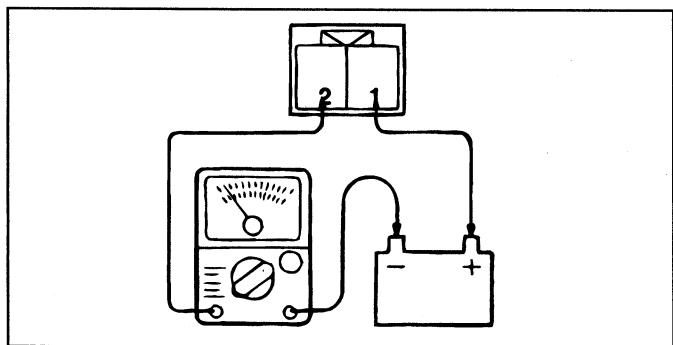
The photo sensor is located by the driver side defrost nozzle. In response to photo intensity level in vehicle, the sensor will send signal to control module to control the blower level and discharge temperature.



KFWD028A

NOTE

Emmit intensive light toward driver side and passenger side using a lamp, and check the current change between terminals 1 & 2.



S6HA030C

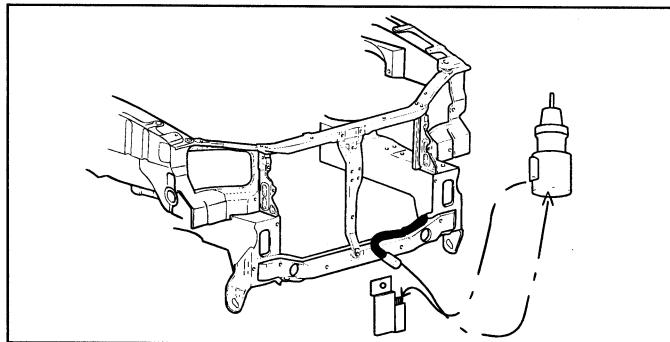
AMBIENT TEMPERATURE SENSOR

AMBIENT AIR TEMPERATURE

SENSOR

EQJA2150

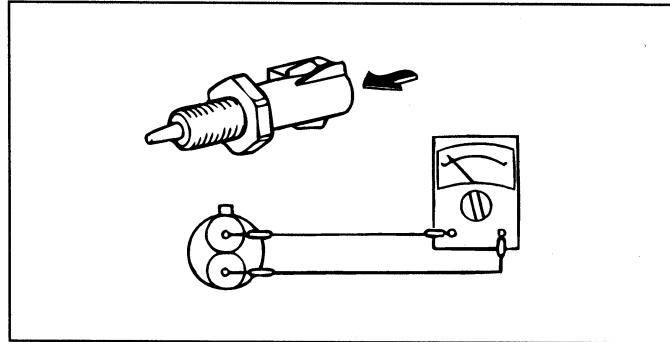
1. The air temperature sensor, located at the front of the engine radiator, and detect ambient air temperature. It is a negative type thermistor; resistance will increase with lower temperature, and decrease with higher temperatures.
2. The sensor output will be used for discharge temperature sensor,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



EQJA2150

CHECK

Temperature (°C)	Min. Resistance (Ω)	Max. Resistance (Ω)
-40	787.25	982.15
-20	254.8	287.5
0	89.2	109.6
20	35.0	39.5
40	15.1	17.1
60	7.1	8.0



HEW97038

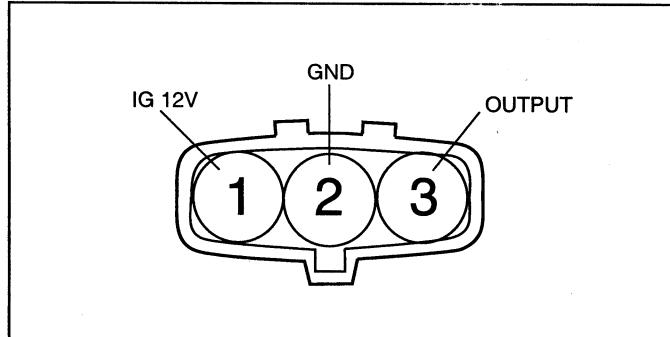
A.Q.S (AIR QUALITY SENSOR)**A.Q.S. SENSOR**

EQJA2100

1. The A.Q.S. sensor, located at the center support in front of the center member, detects hazardous elements in ambient air, and provides output signals to the control module.
2. It will detect sulfurous acid gas, carbon dioxide, carbon monoxide, hydrocarbon and allergen.

SENSOR OUTPUT

Condition	Resistance
Normal condition	5V
Hazardous gas detection	0V

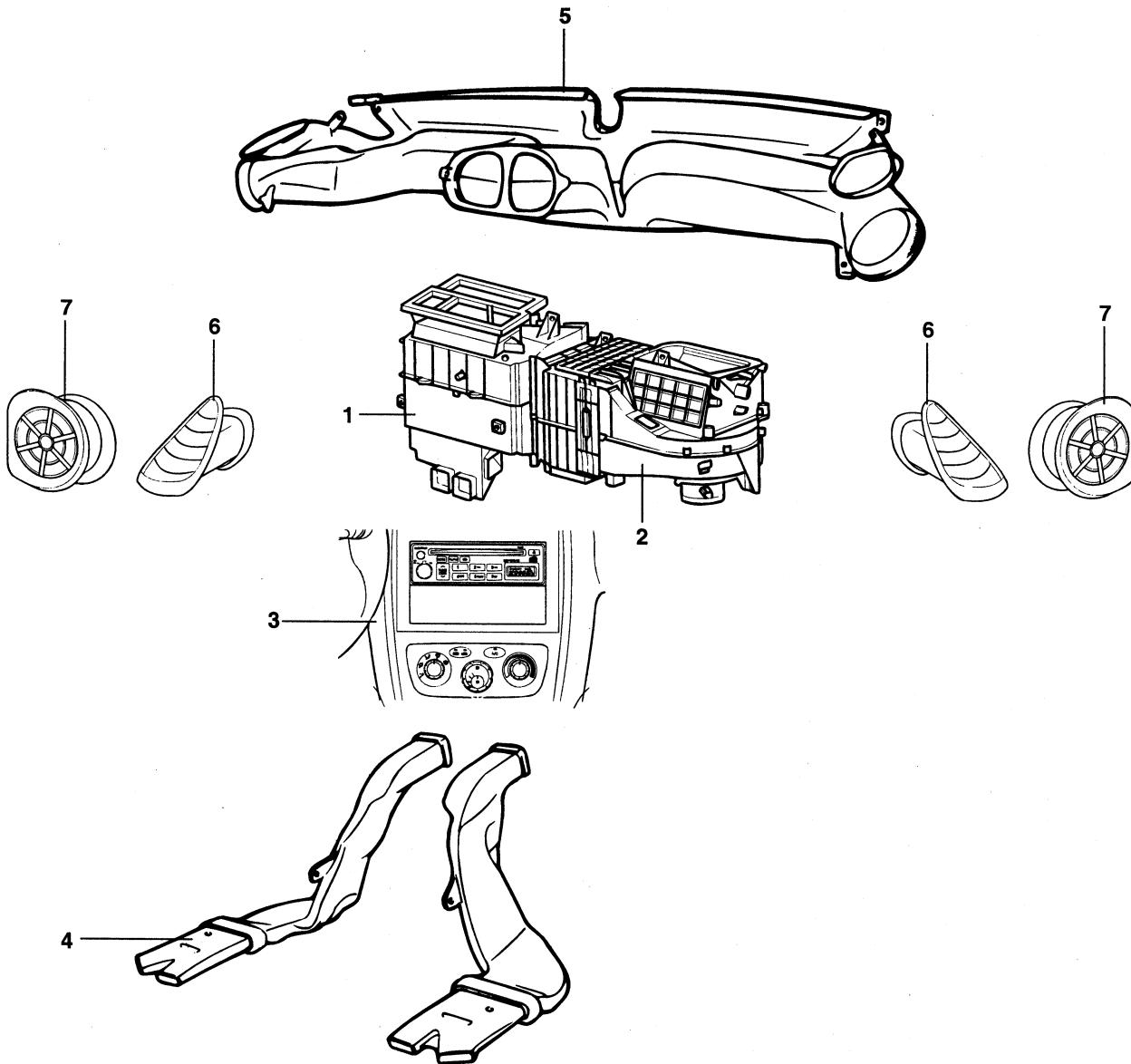


KFWD030A

VACUUM SYSTEM

VENTILATOR EQJA1550

COMPONENTS

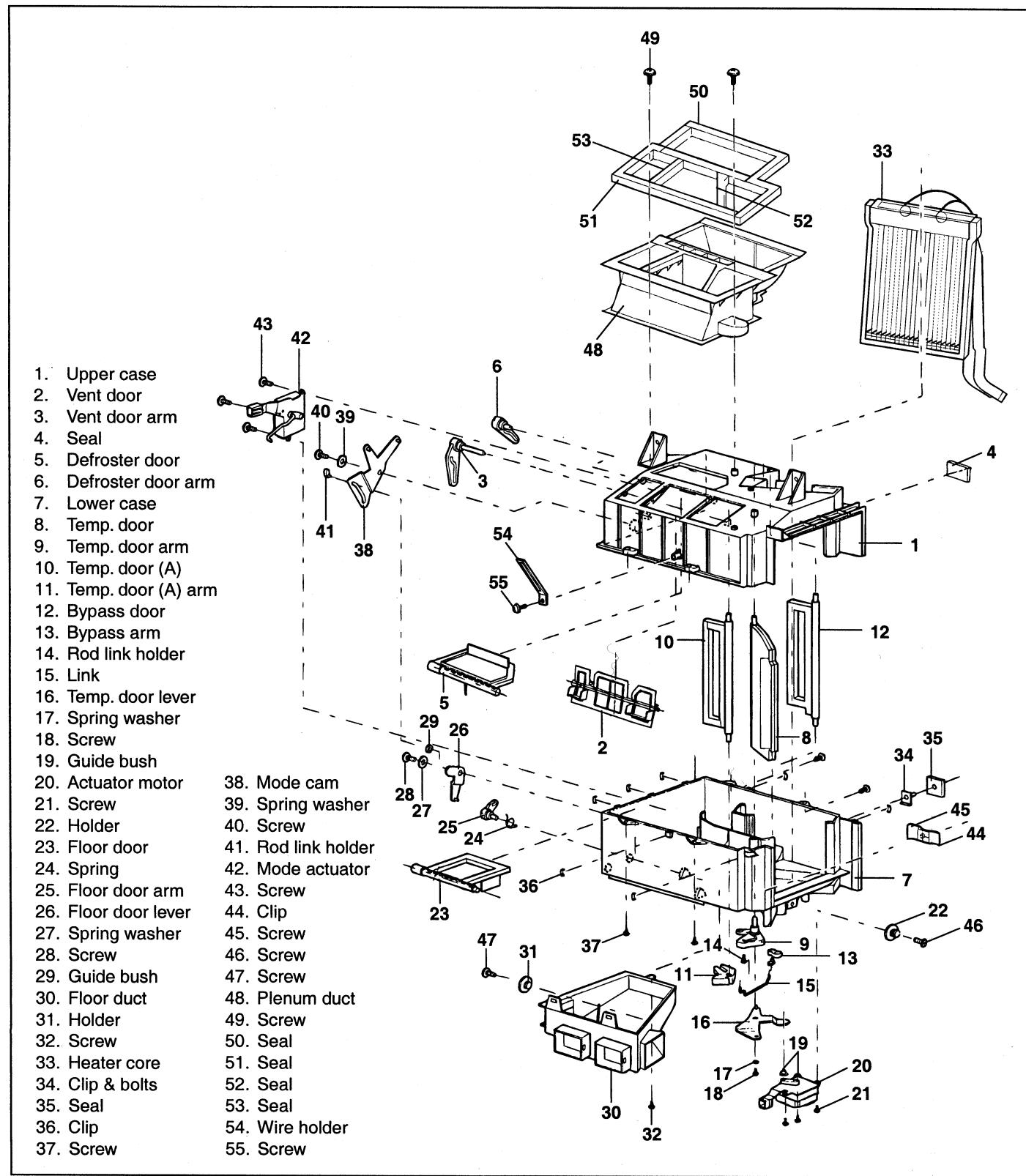


1. Heater unit
2. Eva and blower unit
3. Control switch
4. Floor duct
5. Defroster duct
6. Side nozzle
7. Side defroster nozzle

HEATER

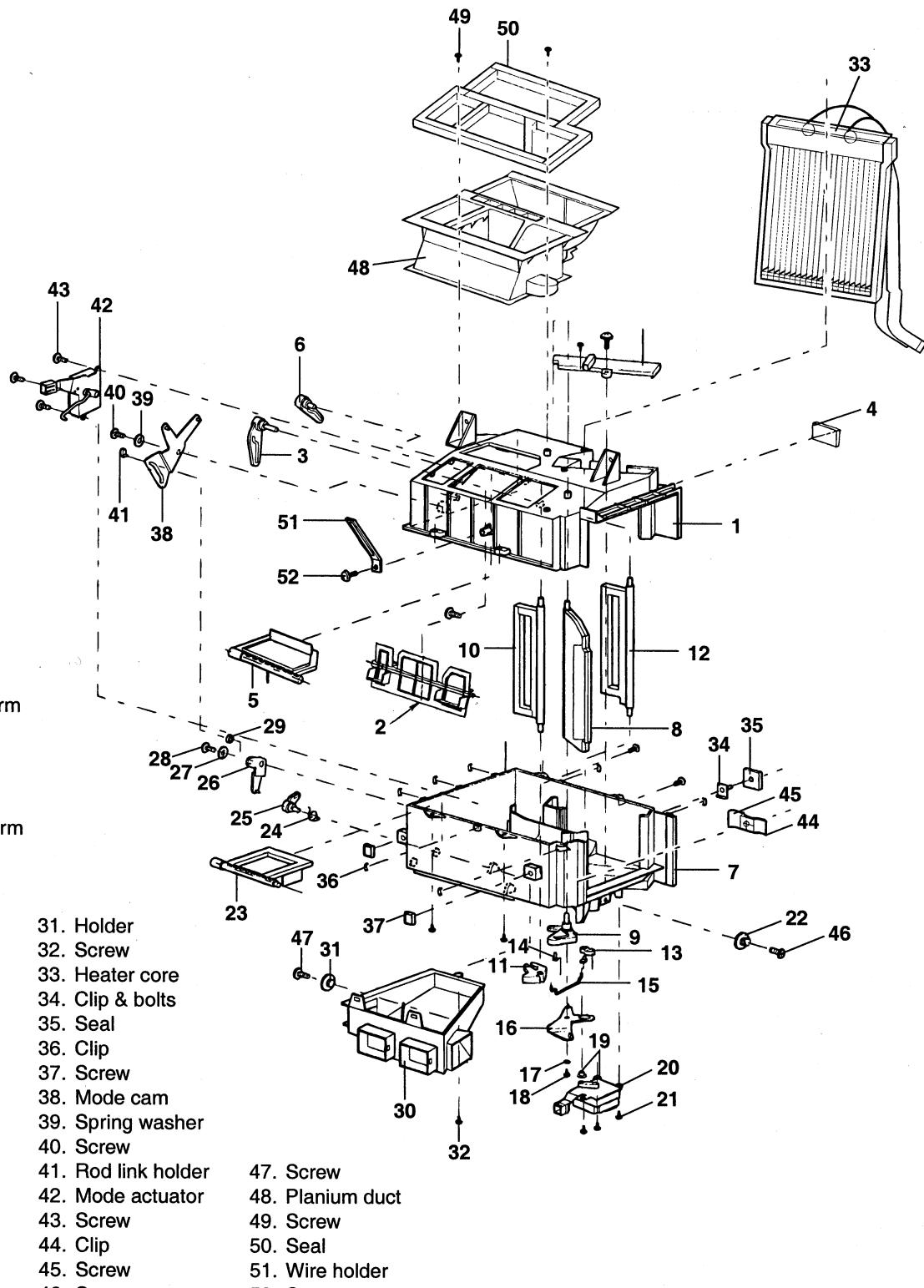
HEATER UNIT EQJA1600

COMPONENTS (ROTARY+PUSH)



COMPONENTS (FATC)

EQJA1650

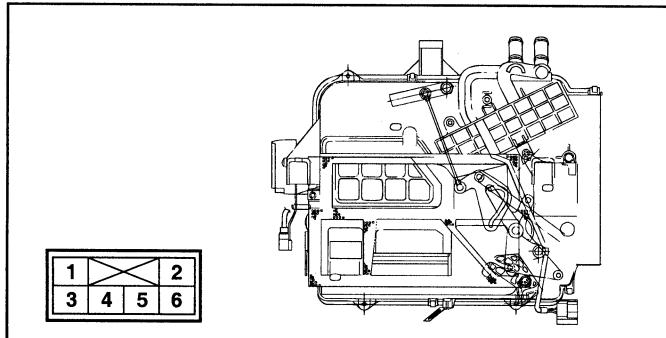


HEATER UNIT

TEMPERATURE CONTROL
ACTUATOR

EQJA1700

1. Temperature control actuators are installed in the heater unit case. The control switches and the vent ductswitch will operate actuators to regulate the temperature and discharge air.



EQJA020C

2. Temp switch terminal voltage check.

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

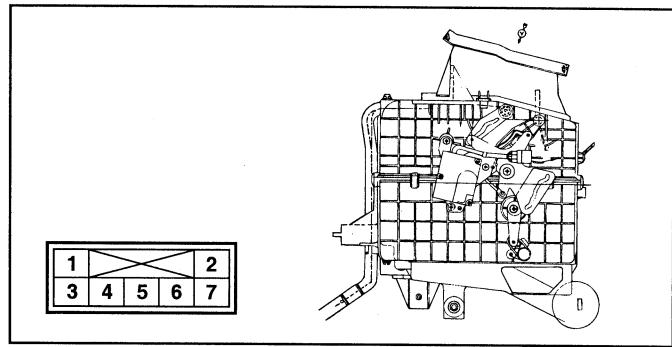
MODE CONTROL ACTUATOR

EQJA1750

1. Pressing the mode select switch with the ignition on will shift the driver side and passenger side mode door actuators as follows :

VENT ⇒ BI/LEVEL ⇒ FLOOR ⇒ MIX

2. Mode actuator circuit diagram and voltage



EQJA020D

Terminal	Description	Voltage
1	IG	12V
2	Ground	-
3	Vent	0V
4	Bi-level	12V
5	Floor	12V
6	Mix	12V
7	Defroster	12V

3. Heater

Mode Position	Recirculation	Fresh			
		COOL	1/2 COOL	WARM	
		Vent	Bi level	Floor	Mix
Vent	100	55±10	-	-	-
Floor	-	45±10	60 ± 7	52 ± 7	-
Defroster	-	-	20 ± 7	30 ± 7	75 ± 7
Side vent	-	-	20 ± 7	18 ± 7	25 ± 7

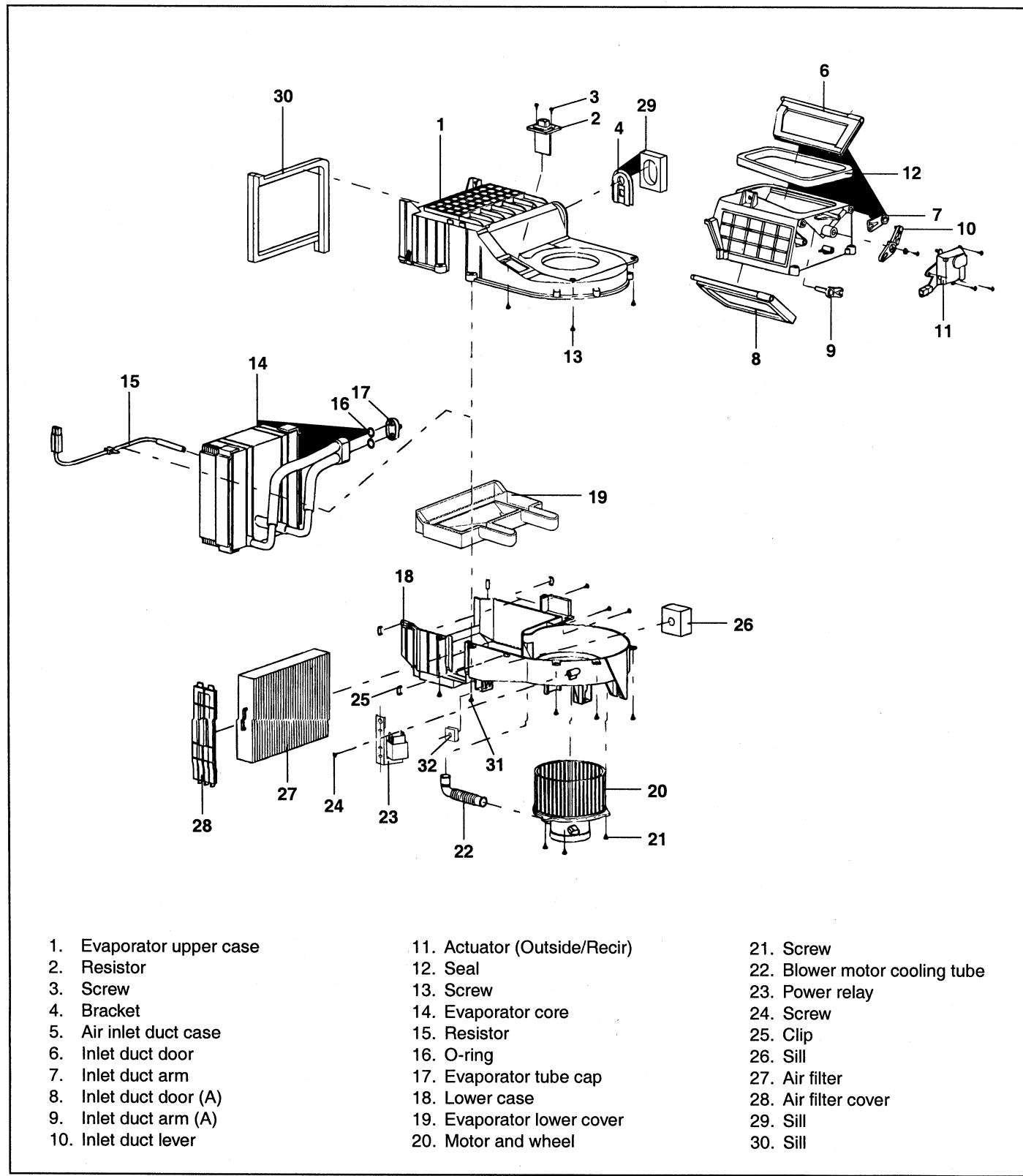
EQJA175A

BLOWER CONTROLS

BLOWER UNIT AND EVAPORATOR

EQJA1800

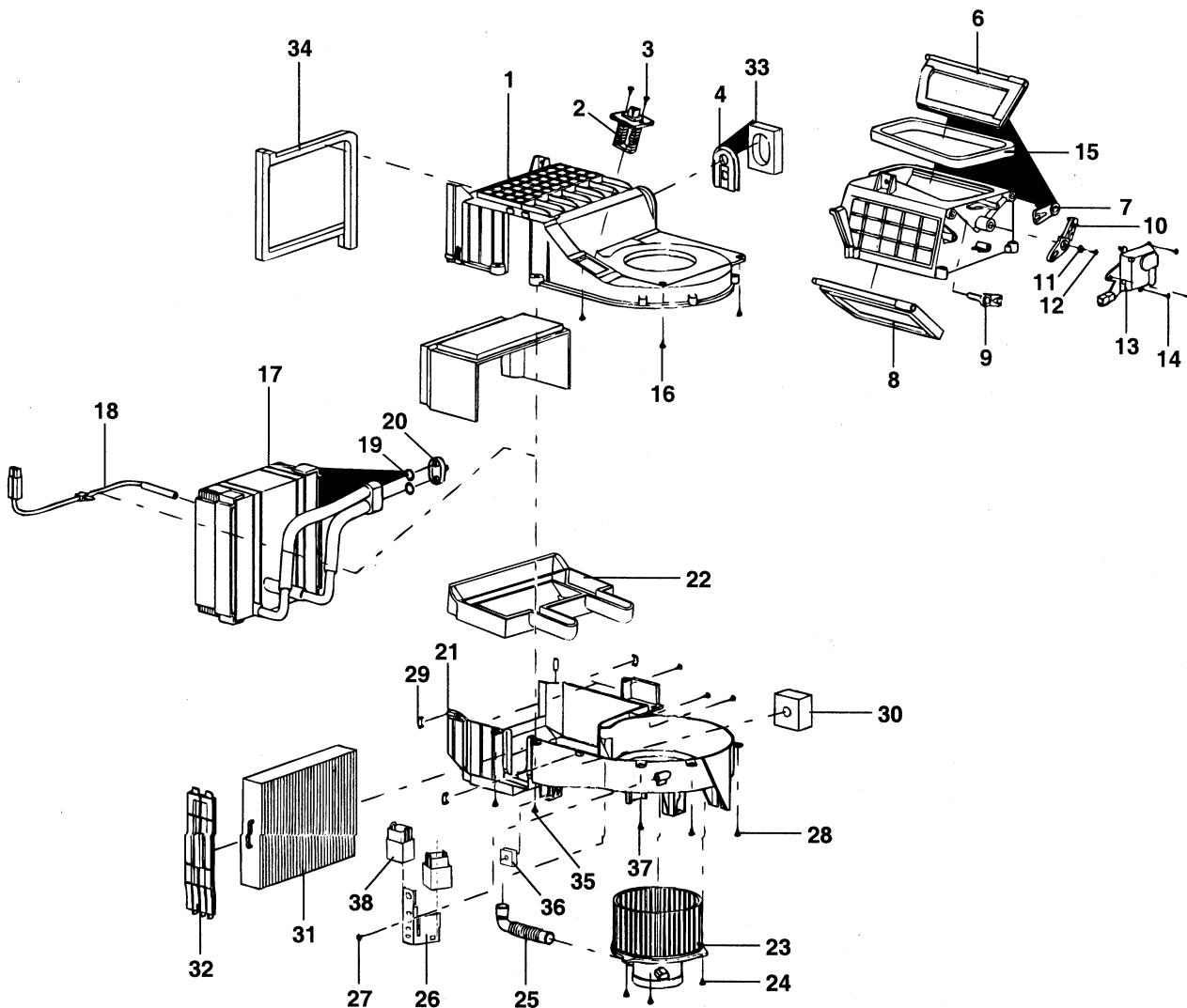
COMPONENTS (ROTARY+PUSH)



EQJA025B

COMPONENTS (FATC)

EQJA1850



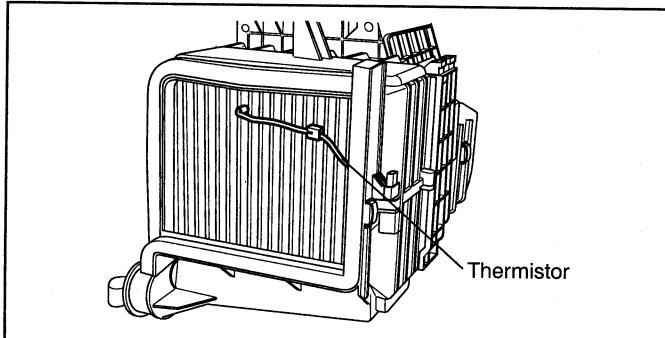
1. Evaporator upper cover	14. Screw	27. Screw
2. Power TR	15. Seal	28. Screw
3. Screw	16. Screw	29. Clip
4. Bracket	17. Evaporator core	30. Sill
5. Air inlet duct case	18. Pin sensor	31. Air filter
6. Inlet duct door	19. O-ring	32. Air filter cover
7. Inlet duct arm	20. Evaporator tube cap	33. Sill
8. Inlet duct door (A)	21. Lower case	34. Seal
9. Inlet duct arm (A)	22. Evaporator lower cover	35. Screw
10. Inlet duct lever	23. Motor and wheel	36. Nut
11. Spring washer	24. Screw	37. Screw
12. Screw	25. Blower motor cooling tube	38. Power relay
13. Actuator (Recir/Fresh)	26. Bracket	

SENSOR CHECKING EQJA1950

THERMISTOR

The thermistor will detect the core temperature and interrupt compressor relay power, in order to prevent evaporator freezing by excessive cooling.

The thermistor is an NTC device.



KFWD049A

1. Thermistor check

1. Remove the glove box.
2. Start the engine.
3. Turn on the air conditioner.
4. Using the multi-tester, check the output voltage between terminals 2 and 3 in the thermistor.

Thermistor	Operating temperature	Output voltage
ON	$0.5 \pm 0.5^{\circ}\text{C}$	12V
OFF	$2.5 \pm 0.5^{\circ}\text{C}$	0V

WATER TEMPERATURE SENSOR EQHA2000

1. The water temperature sensor is located at the heater core, and detects coolant temperature flowing through heater core. It is an NTC device: resistance will rise with lower temperature, and drop with higher temperature.

CHECK

Water temperature	Resistance
25°C	$10\text{K}\Omega$
60°C	$2.50\text{K}\Omega$

2. Electromotive heating control

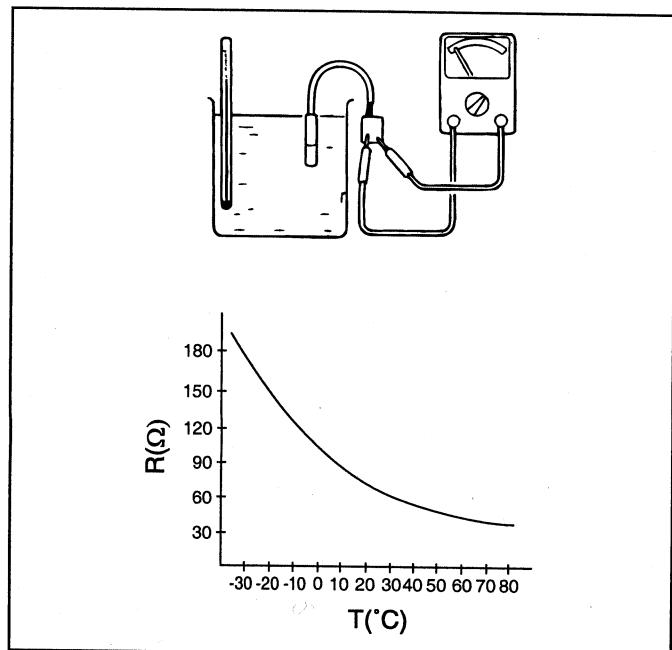
In AUTO mode, discharge mode to the FLOOR or Bi-LEVEL, if the coolant temperature is low, the sensor will prevent cold air from being discharged toward passenger's legs.

1. Operation control

- Discharge mode FLOOR or Bi-LEVEL with AUTO setting
- Coolant temperature is low

2. System operation

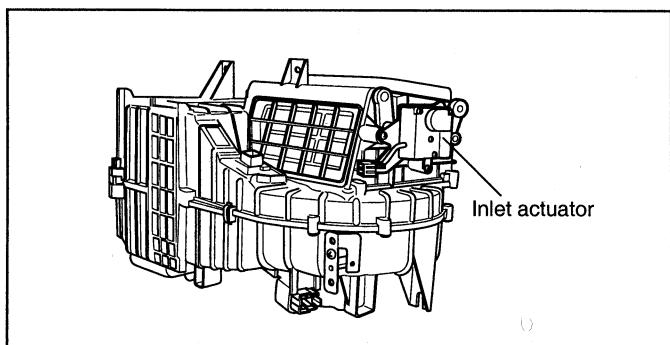
- Mode door : DEF \Rightarrow MIX \Rightarrow AUTO
- Blower level : AUTO LO \Rightarrow AUTO HI
- Intake door : Ambient air



EQHA200A

BLOWER MOTOR**FRESH AIR RECIRCULATION SWITCHING ACTUATOR** EQHA1900

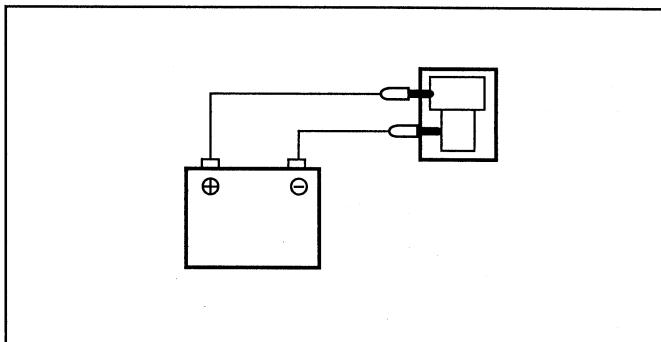
The intake selection switch is located on the control panel. Pressing the switch will shift between recirculation and fresh air modes.



KFWD046A

BLOWER MOTOR CHECKING**(ROTARY+PUSH)** EQHA2350

Apply the battery voltage as shown and check the blower motor rotation.



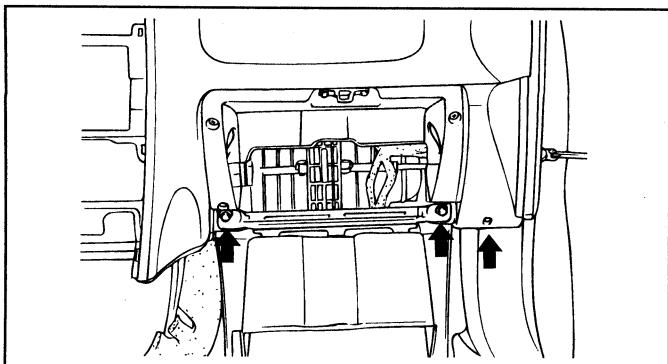
EQA9042A

CHECK

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

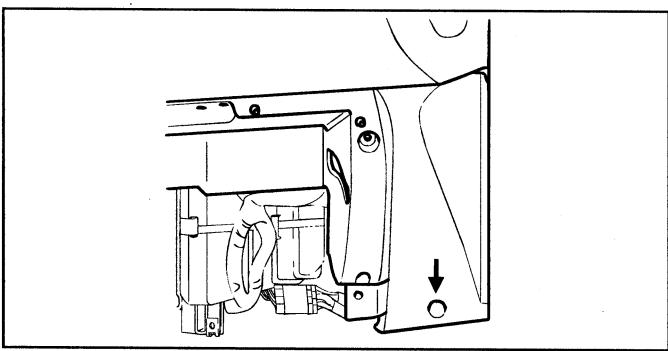
REMOVAL EQJA3000

1. Remove the glove box housing.



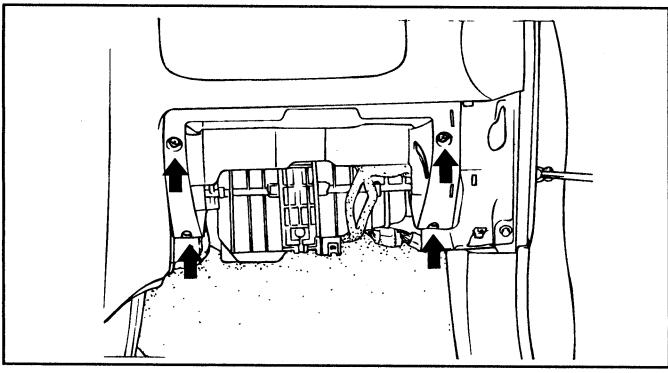
ESJA035K

2. Remove the lower side cover of the crash pad.



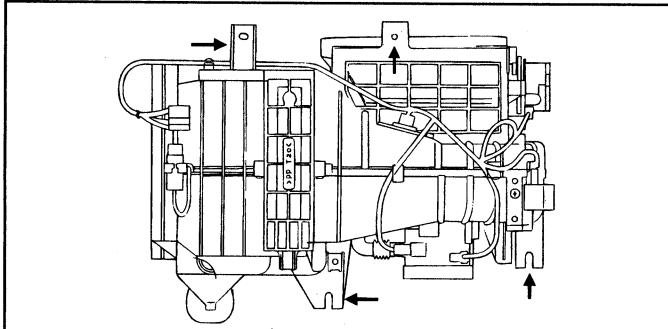
EQJA005B

3. Remove the upper cover of the glove box.



ESJA035L

4. Remove the evaporator and blower mounting bolts.



EQJA005C

5. Remove the blower motor.

INSTALLATION EQJA3100

Installation is the reverse of removal.