

Manual A/C-Heater Systems - Sedona

GENERAL

SPECIFICATIONS

AIR CONDITIONING

ITEM		GASOLINE
		Σ 3.5
Compressor	Type	HS-18 (Swash plate)
	Oil type & Capacity	FD46XG (PAG), 210± 10cc
Comp.pulley	Type	6PK
	Pulley Dia. [in(mm)]	Ø4.528 (Ø115)
Condenser	Type	Corrugated
Triple Pressure S/W (Dual pressure S/W)	High [psi (kg/cm²)]	455±28 (32.0 ± 2.0)
	Medium [psi (kg/cm²)]	256±11 (18.0 ± 0.8)
	Low [psi (kg/cm²)]	32.7± 3.60 (2.3± 0.25) 4.27 (0.30)
Expansion Valve Type		Block
Refrigerant	Type	R-134a
	Capacity [oz (g)]	35.27±1.76 (1000±50)

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Fig. 1: Air Conditioning Specifications
Courtesy of KIA MOTORS AMERICA, INC.

BLOWER AND EVAPORATOR UNIT (FRONT)

ITEM		MANUAL
Fresh and Recirculation	Operating method	Actuator
Blower	Rotating direction	Clockwise
	Speed step	1 - 4 Speed
	Speed control	Resistor
Evaporator	Type	Laminate
	Temp. control type	Thermister
	Thermistor	OFF: 36.5°F (2.5°C) ON: 45.5°F (7.5°C)
	Cooling capacity	4500 kcal/h ± 10%

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Fig. 2: Blower & Evaporator Specifications (Front)
Courtesy of KIA MOTORS AMERICA, INC.

BLOWER AND EVAPORATOR UNIT (REAR)

ITEM		SPECIFICATION
Fresh and Recirculation	Operating method	Actuator
Blower	Rotating direction	Clockwise
	Speed step	1 - 3 Speed
	Speed control	Resistor
Evaporator	Type	Laminate
	Cooling capacity	4100 kcal/h \pm 10%

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Fig. 3: Blower & Evaporator Specifications (Rear)
Courtesy of KIA MOTORS AMERICA, INC.

HEATER UNIT

ITEM		FRONT	REAR
Heater mode selection	Type	Dimpled	←
	Heating capacity	4900 kcal/h \pm 10%	←
	Operating method	Actuator	-
Temp selection	Operating method	Actuator	←

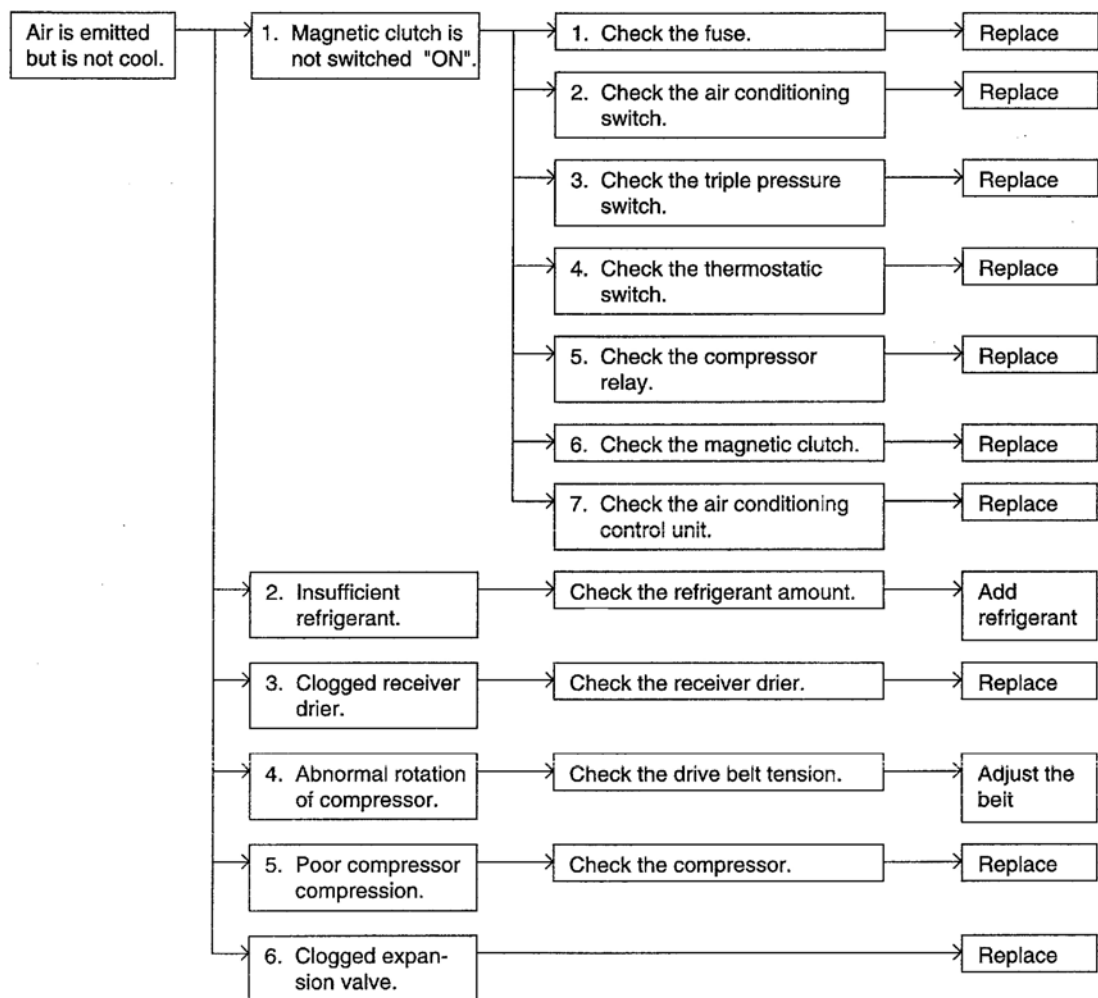
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Fig. 4: Heater Unit Specifications
Courtesy of KIA MOTORS AMERICA, INC.

TROUBLESHOOTING

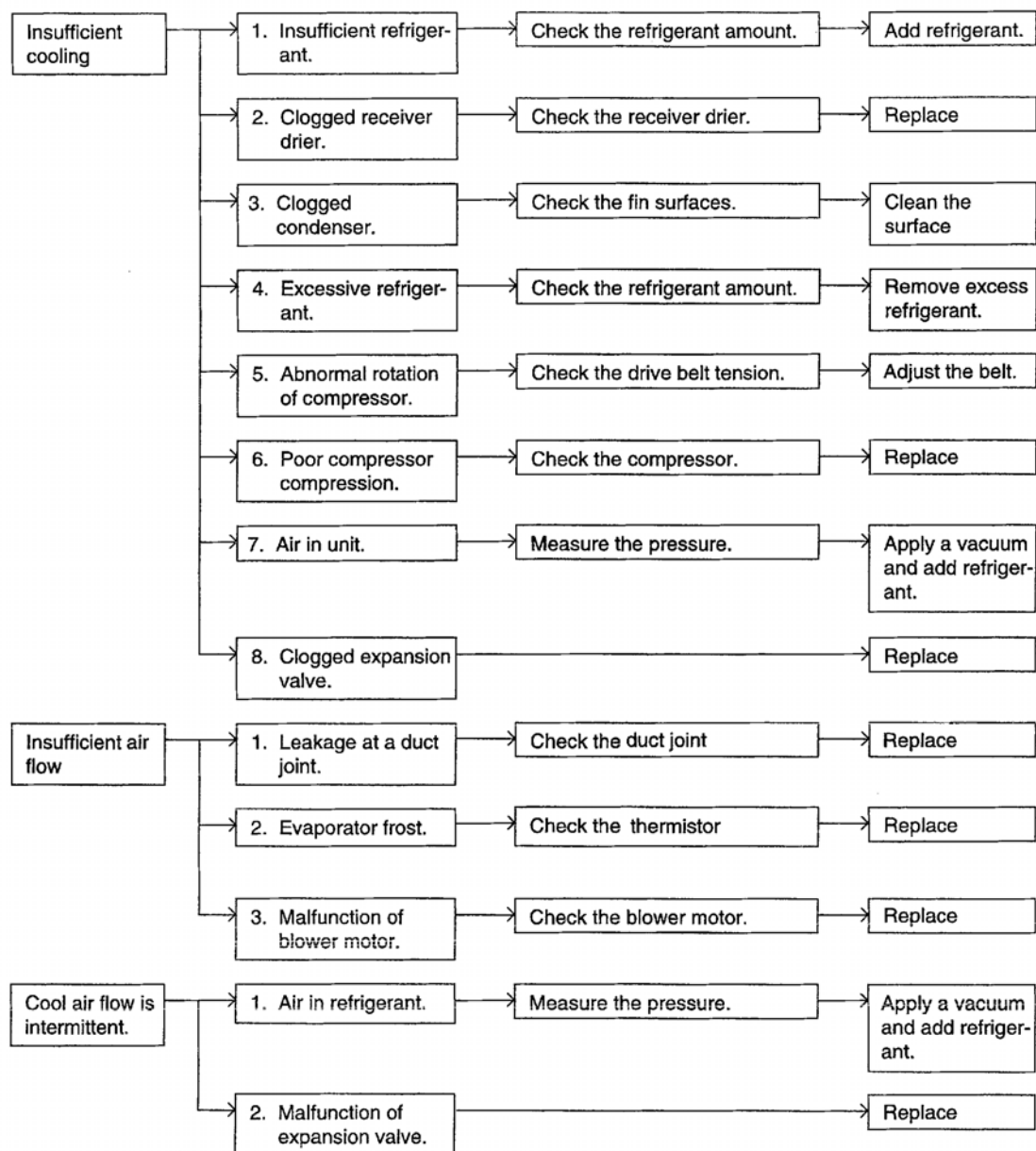
Before replacing or repairing air conditioning components, first determine if the malfunction is due to the refrigerant charge, air flow or compressor.

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.



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Fig. 5: Troubleshooting Guide (1 Of 2)
 Courtesy of KIA MOTORS AMERICA, INC.



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Fig. 6: Troubleshooting Guide (2 Of 2)
 Courtesy of KIA MOTORS AMERICA, INC.

AIR CONDITIONING SYSTEM

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.

REFRIGERANT HANDLING

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.

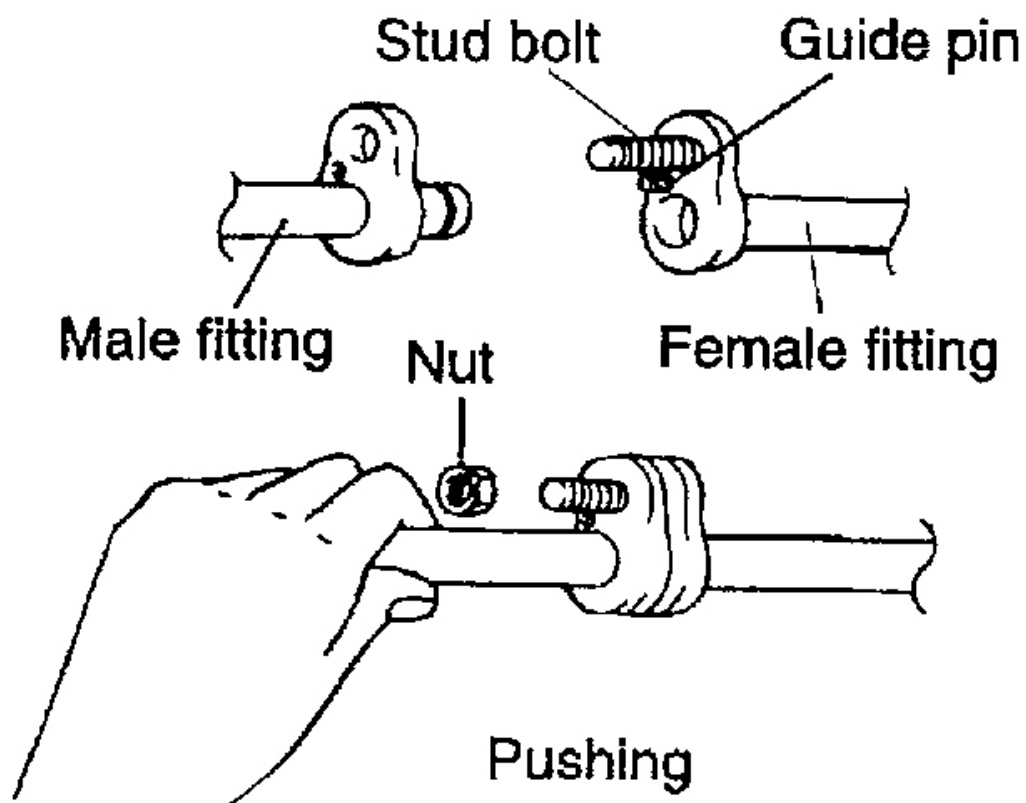
WHEN REPLACING PARTS ON A/C SYSTEM

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.

WHEN INSTALLING CONNECTING PARTS

FLANGE WITH GUIDE PIN

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



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Fig. 7: Illustrating Proper Connections
Courtesy of KIA MOTORS AMERICA, INC.

Size	Tightening torque (N·m (kg·m, lb·ft))	
	General bolt, nut	
	4T	7T
M6	4 - 6 (0.4 - 0.6, 2.9 - 4.3)	7 - 11 (0.7 - 1.1, 5.0 - 7.9)
M8	9 - 14 (0.9 - 1.4, 6.5 - 10)	17 - 26 (1.7 - 2.6, 12 - 18)
M10	19 - 28 (1.9 - 2.8, 14 - 20)	35 - 55 (3.5 - 5.5, 25 - 39)
Size	Flange bolt, nut	
	4T	7T
M6	5 - 7 (0.5 - 0.7, 3.6 - 5.0)	8 - 12 (0.8 - 1.2, 5.8 - 8.6)
M8	10 - 15 (1.0 - 1.5, 7 - 10)	19 - 28 (1.9 - 2.8, 14 - 20)
M10	21 - 31 (2.1 - 3.1, 15 - 22)	39 - 60 (3.9 - 6.0, 28 - 43)

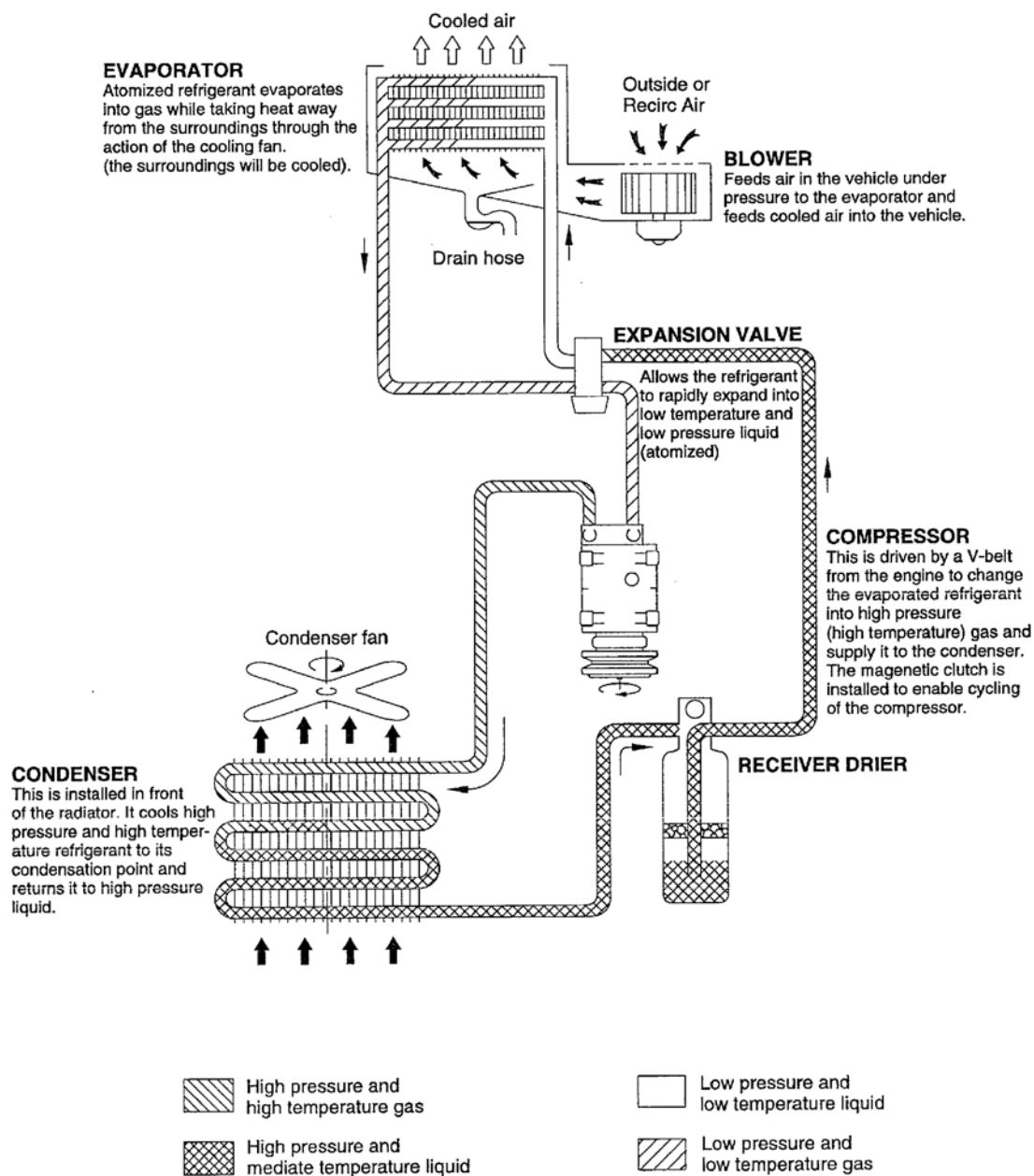
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Fig. 8: Flange Bolt Tightening Torque
 Courtesy of KIA MOTORS AMERICA, INC.

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.

REFRIGERANT SYSTEM SERVICE BASICS



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Fig. 9: Illustrating Refrigeration Cycle
Courtesy of KIA MOTORS AMERICA, INC.

REFRIGERANT RECOVERY

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

CAUTION: • Air conditioning refrigerant or lubricant vapor can irritate your eyes,

nose, or throat.

- **Be careful when connecting service equipment.**
- **Do not breathe refrigerant or vapor.**

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the high-pressure service port and the low-pressure service port as shown, following the equipment manufacturer's instructions.
2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

SYSTEM EVACUATION

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

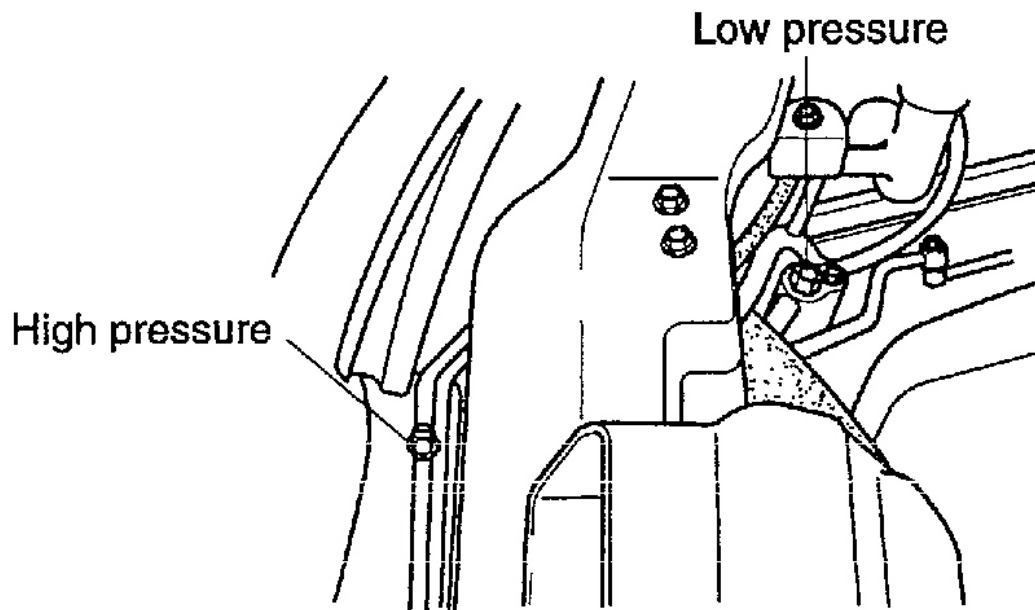
CAUTION:

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

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)
2. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the high-pressure service port and the low-pressure service port as shown, following the equipment manufacturer's instructions.



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Fig. 10: Locating Pressure Ports
Courtesy of KIA MOTORS AMERICA, INC.

3. If the low-pressure does not reach more than 93.3 kPa (700 mm Hg, 27.6 in. Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see Leak Test).

SYSTEM CHARGING

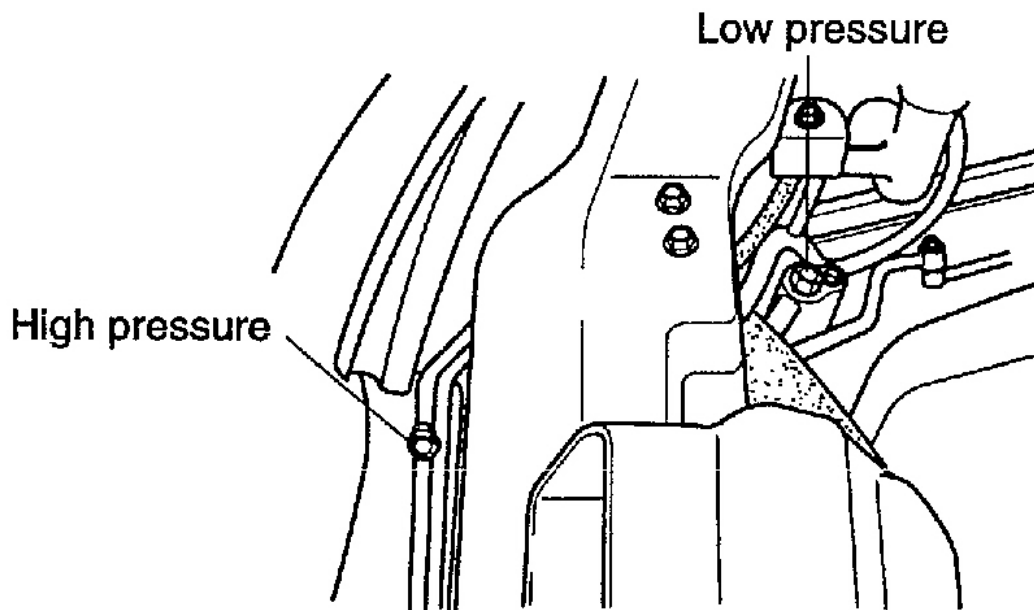
Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a (R-134a) from the air conditioning system.

CAUTION:

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

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

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



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Fig. 11: Locating Pressure Ports

Courtesy of KIA MOTORS AMERICA, INC.

Add the same amount of new refrigerant oil to system that was removed during recovery. Use only Specified refrigerant oil.

Charge the system with 1000 \pm 50 g (35.27 \pm 1.76 oz.) of R-134a refrigerant. Do not overcharge the system the compressor will be damaged.

REFRIGERANT LEAK TEST

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

CAUTION:

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

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with

compressed air.

WARNING:

- **Compressed air mixed with R-134a forms a combustible vapor.**
- **The vapor can burn or explode causing serious injury.**
- **Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.**

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

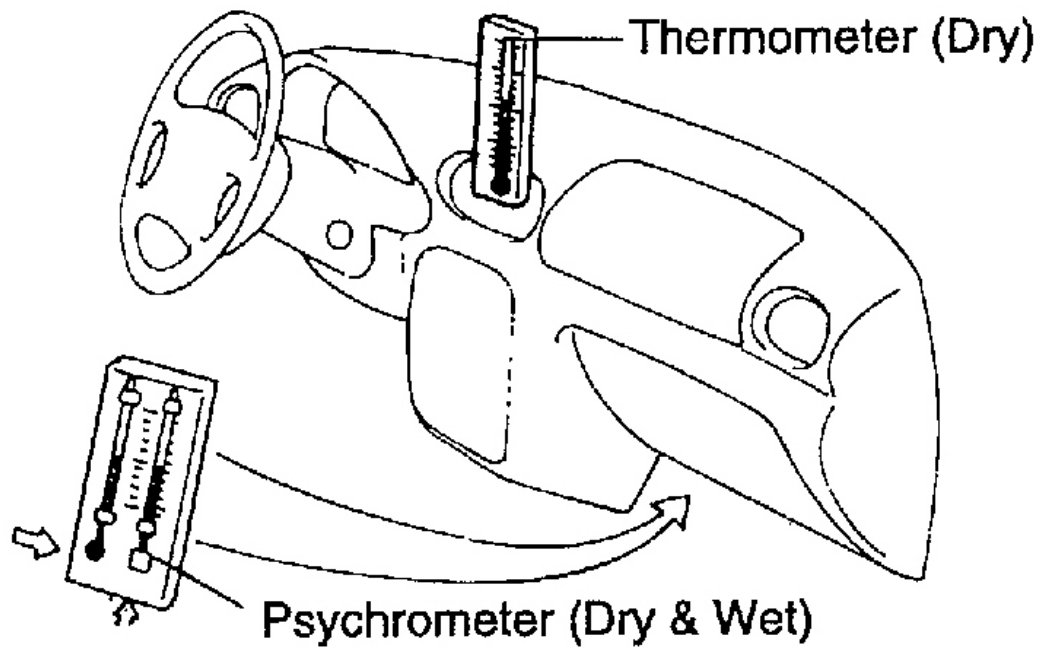
1. Connect a R-134a refrigerant Recovery/Recycling/Charging System to the high-pressure service port and the low-pressure service port as shown in the previous column, following the equipment manufacturer's instructions.
2. Open the high-pressure valve to charge the system to the specified capacity, then close the supply valve, and remove the charging system couplers.

Refrigerant capacity: 1000+/-50 g (35.27+/-1.76 oz.)

3. Check the system for leaks using a R-134a refrigerant leak detector with an accuracy of 14 g (0.5 oz.) per year or better.
4. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.) recover the system according to the Recovery Procedure.
5. After checking and repairing leaks, the system must be evacuated.

PERFORMANCE TEST

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.
6. Check 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 psychrometric graph by comparing the wet-and dry-bulb reading at the air inlet.



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Fig. 12: Illustrating Psychrometer & Thermometer
Courtesy of KIA MOTORS AMERICA, INC.

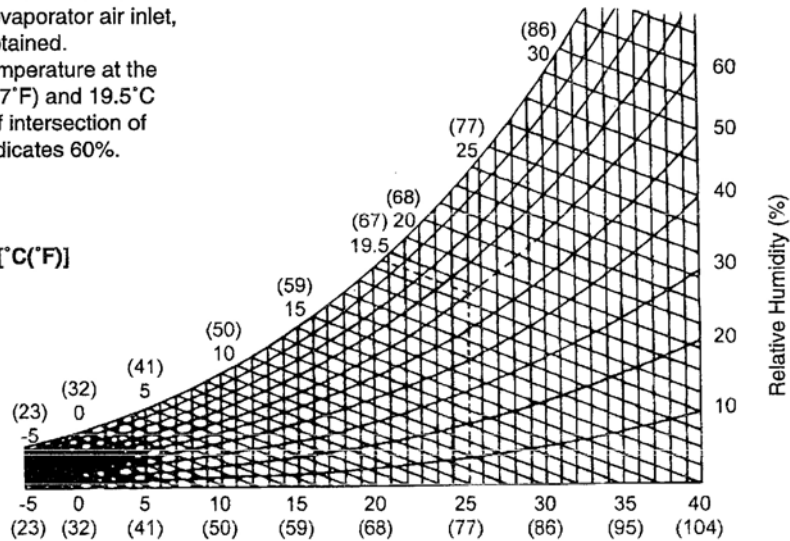
HOW TO READ THE GRAPH :

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)

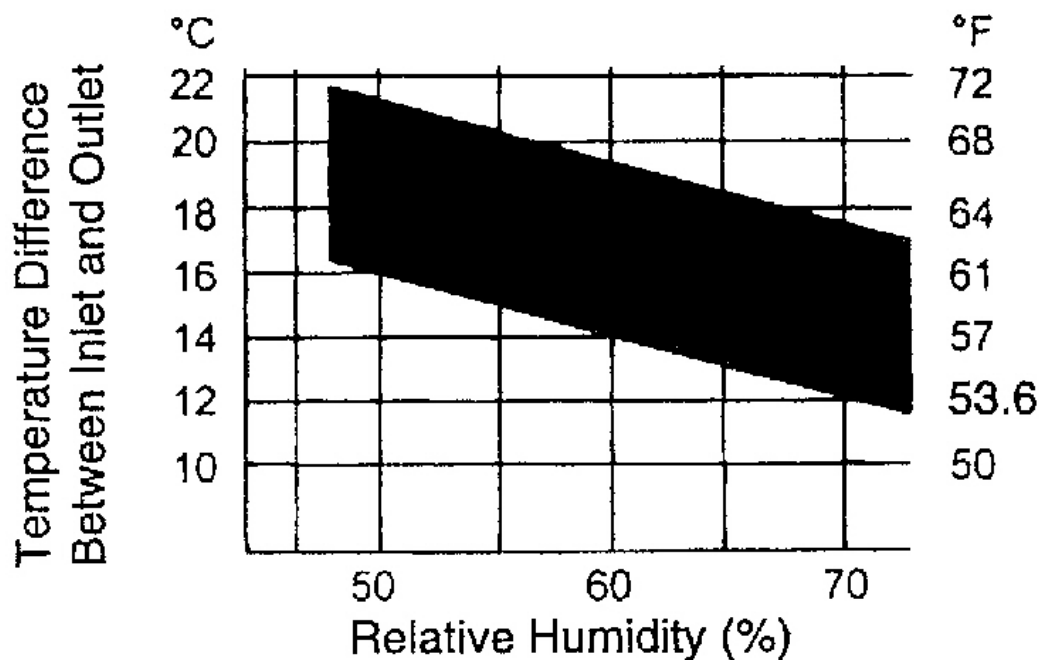


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Fig. 13: Relative Humidity Graph

Courtesy of KIA MOTORS AMERICA, INC.

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 falls within the block below. If the intersection is within the block, cooling performance is satisfactory.



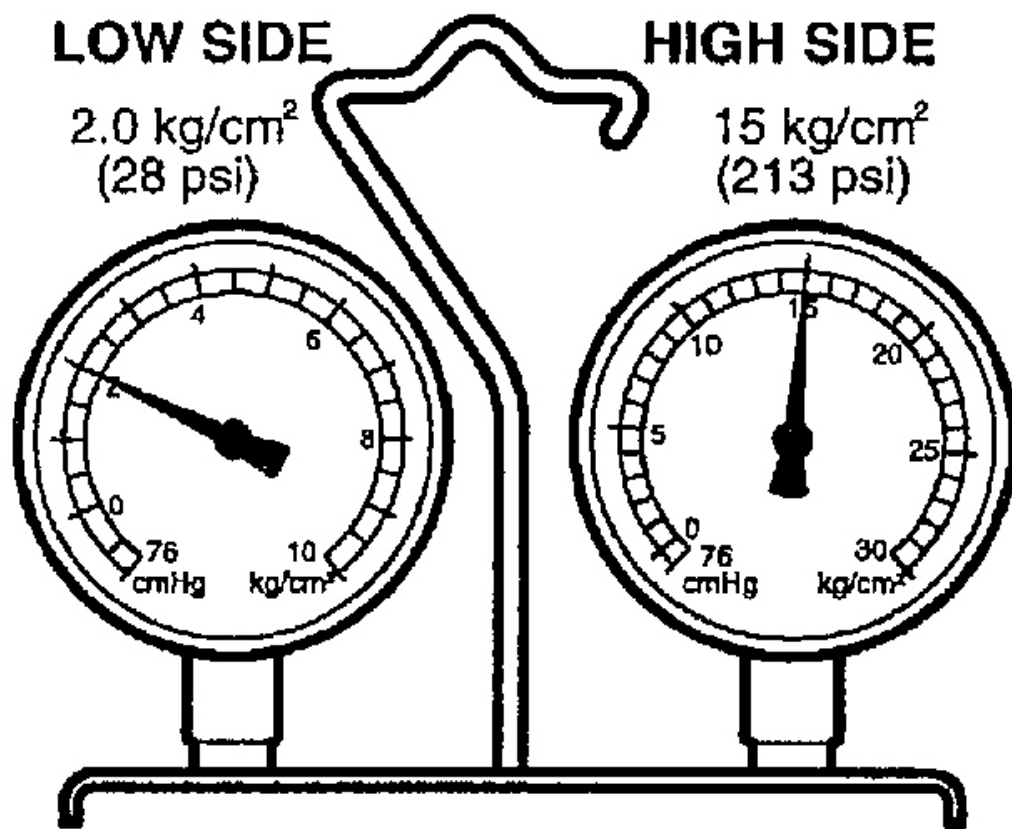
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Fig. 14: Humidity To Temperature Graph
 Courtesy of KIA MOTORS AMERICA, INC.

PERFORMANCE TEST DIAGNOSIS USING MANIFOLD GAUGE

STANDARD VALUE

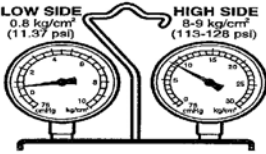
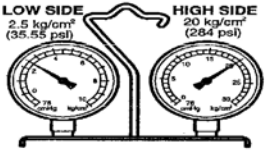
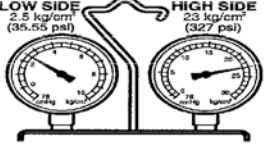
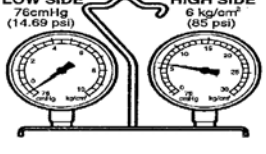
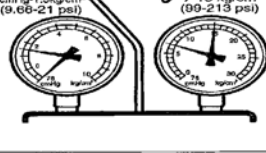
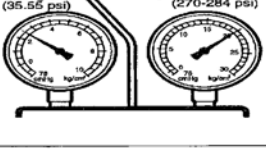
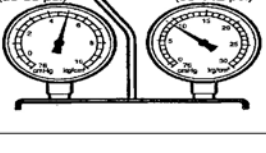
If cooling cycle is operating normally, the manifold gauge reading will be approx. 1.5-2.0 kg/cm² (21-28 psi) for the low pressure side and approx. 14.5-15 kg/cm² (206-213 psi) for the high pressure side. Inlet temperature should be 30-35°C (80-95°F), with the engine at 2,000 RPM, maximum cooling selected, and the blower on highest level.



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Fig. 15: Illustrating Standard Value Gauge Reading
Courtesy of KIA MOTORS AMERICA, INC.

DIAGNOSIS

SYMPTOMS	PROBABLE CAUSES	REMEDY	MANIFOLD GAUGE READINGS
1. Low pressure and high pressure are low. 2. Cooler outlet air is a little cooler.	<ul style="list-style-type: none"> Gas leak. 	<ul style="list-style-type: none"> Check and repair. Add refrigerant. 	
1. Low pressure and high pressure are high.	<ul style="list-style-type: none"> Faulty cooling or condenser freezing. Belt slip. 	<ul style="list-style-type: none"> Maintain the proper level of refrigerant. Clean the condenser. Adjust the belt. 	
1. Low pressure and high pressure are high. 2. Low pressure pipe is not cold.	<ul style="list-style-type: none"> Air in the system. 	<ul style="list-style-type: none"> Clean or repair the receiver drier. Check for oil contamination. 	
1. Low pressure side indicates negative pressure and high pressure side indicates low pressure. 2. Frost or dew on pipes connected with receiver or expansion valve.	<ul style="list-style-type: none"> Dust or moisture frozen at expansion valve. Gas leak. 	<ul style="list-style-type: none"> Repair the receiver drier and replace the expansion valve. Replace the expansion valve if the receiver-drier is faulty. 	
1. Low pressure side pressure sometimes goes to negative pressure or normal.	<ul style="list-style-type: none"> Intaken moisture is frozen at expansion valve hole. 	<ul style="list-style-type: none"> Repair and bleed receiver drier 	
1. Low pressure and high pressure are high. Much frost or dew on the low pressure side piping. 2.	<ul style="list-style-type: none"> Expansion valve failure. Receiver-drier faulty. Flow control faulty. 	<ul style="list-style-type: none"> Repair receiver drier. Check oil contamination. 	
1. Low pressure side pressure is high and high pressure side pressure is low.	<ul style="list-style-type: none"> Leak inside compressor. 	<ul style="list-style-type: none"> Replace compressor. 	

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Fig. 16: Gauge Readings Diagnostic Chart
 Courtesy of KIA MOTORS AMERICA, INC.

COMPRESSOR OIL

DESCRIPTION

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

1. The oil should be free from moisture, dust, metal fillings, 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.

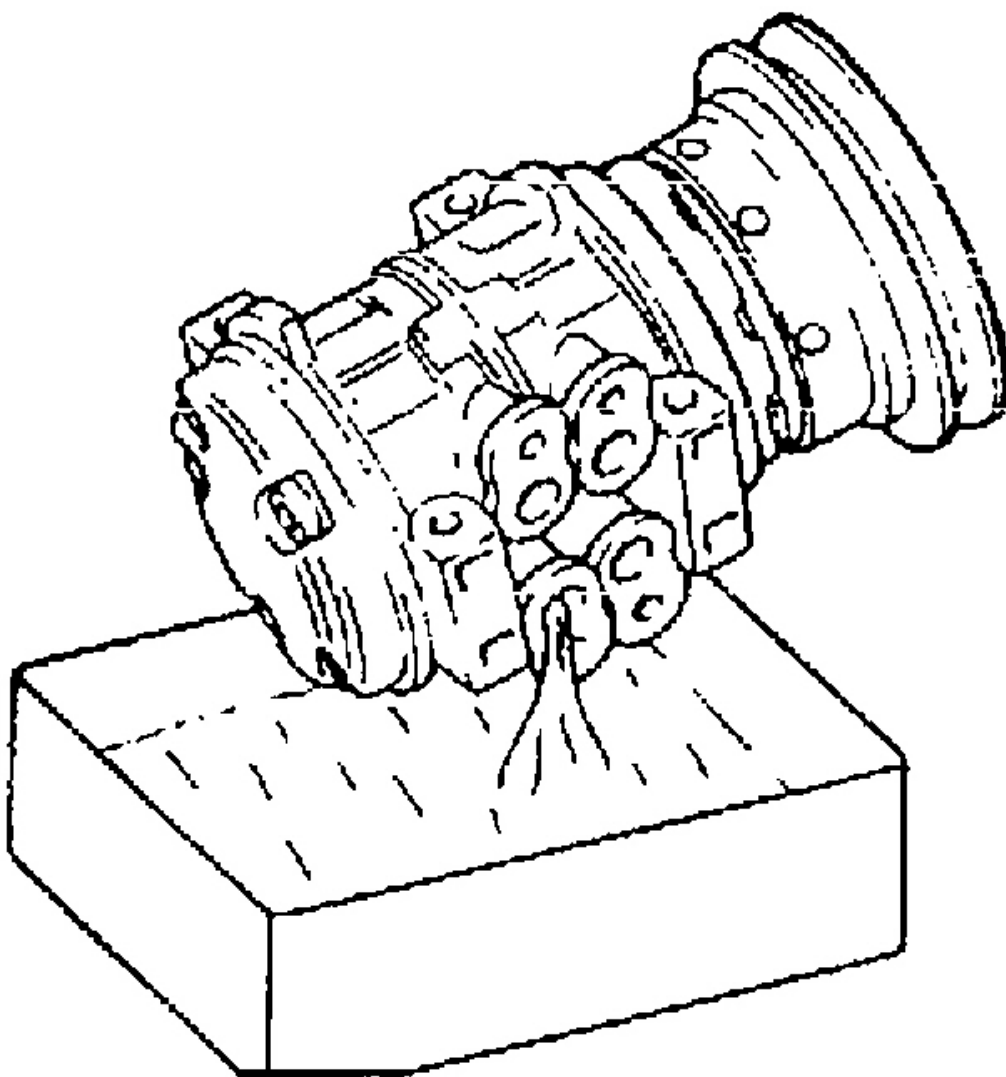
OIL RETURN OPERATION

To check the oil level or add the oil, idle 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:

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



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Fig. 17: Emptying Compressor Oil
Courtesy of KIA MOTORS AMERICA, INC.

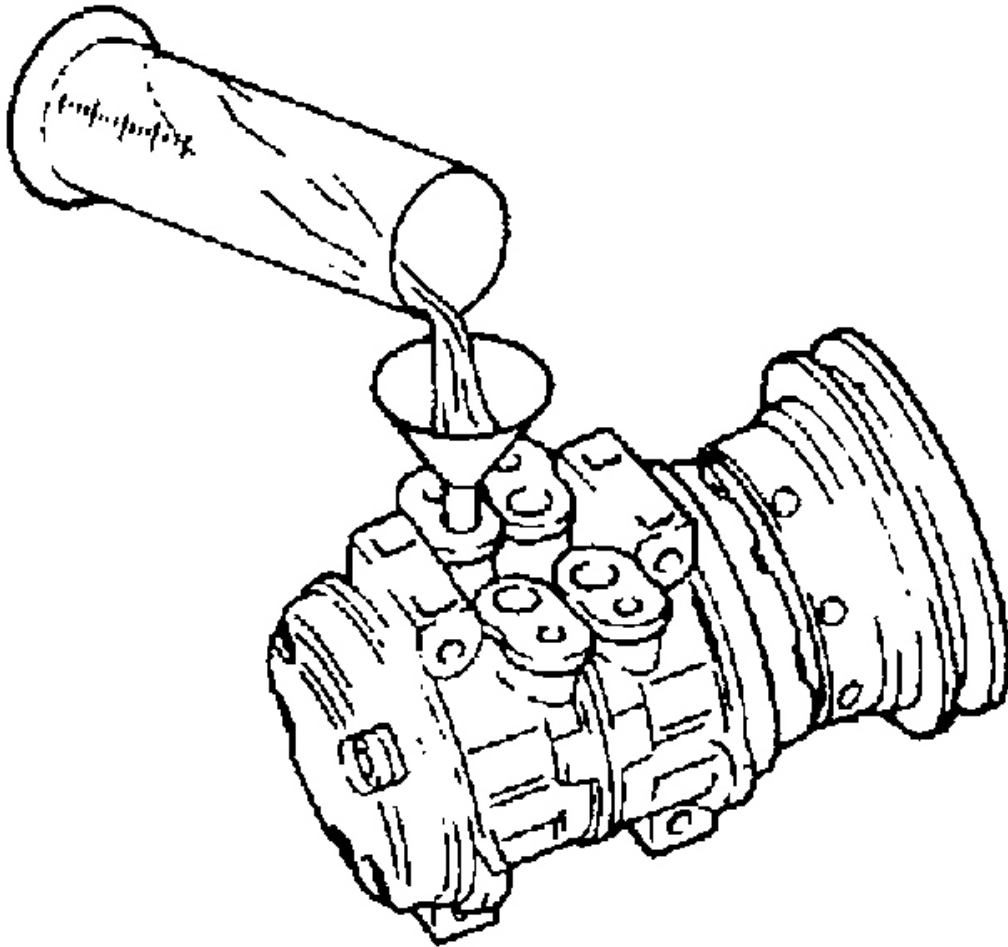
3. Check the volume of the discharged oil. If it is less than 70 cc, it means there is little leak. Perform the leakage test on each system connection, and repair or replace faulty parts if necessary.
4. Check the oil for contamination and replenish the oil level in the following procedure:
 - a. When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

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Fig. 18: Compressor Oil Capacity
Courtesy of KIA MOTORS AMERICA, INC.

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



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Fig. 19: Filling Compressor With Oil
Courtesy of KIA MOTORS AMERICA, INC.

CHECKING FOR REFRIGERANT LEAKS

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:

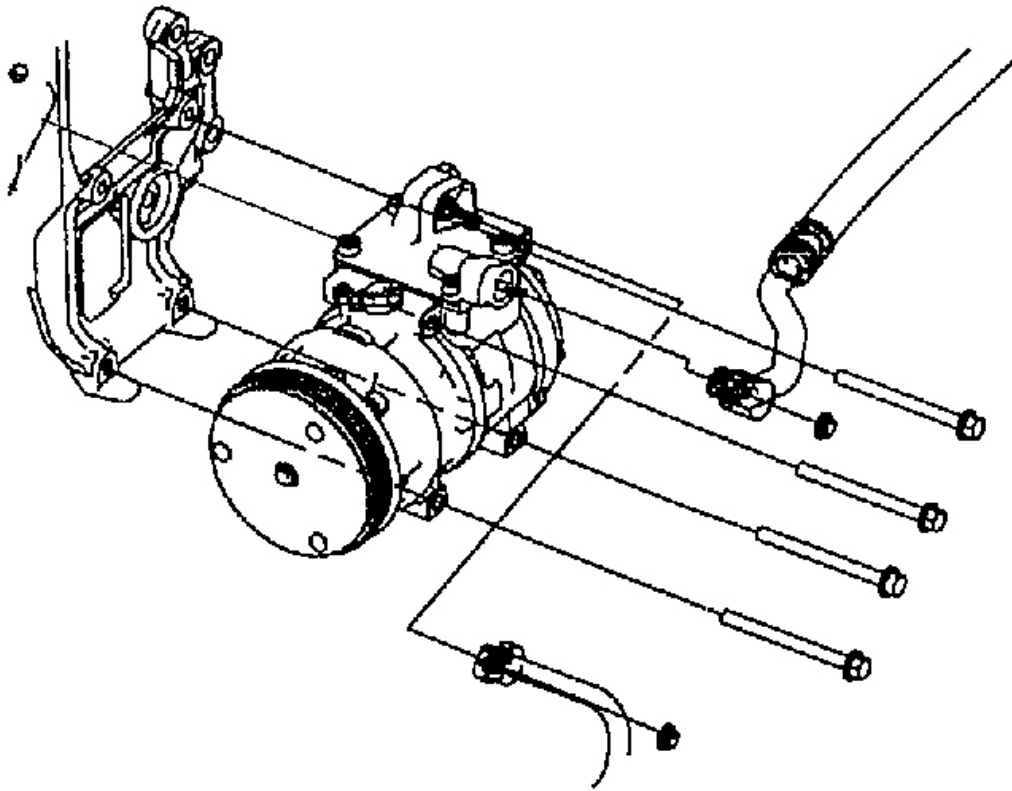
1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces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

MANUAL A/C COMPRESSOR CONTROLS

COMPRESSOR

REMOVAL AND INSTALLATION

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.



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Fig. 20: Removing & Installing Compressor
Courtesy of KIA MOTORS AMERICA, INC.

5. Installation is the reverse of removal.

Tightening torque: 20-30 N.m (2.0-3.0 kg-m, 14-21 lb. ft)

ADJUSTMENT

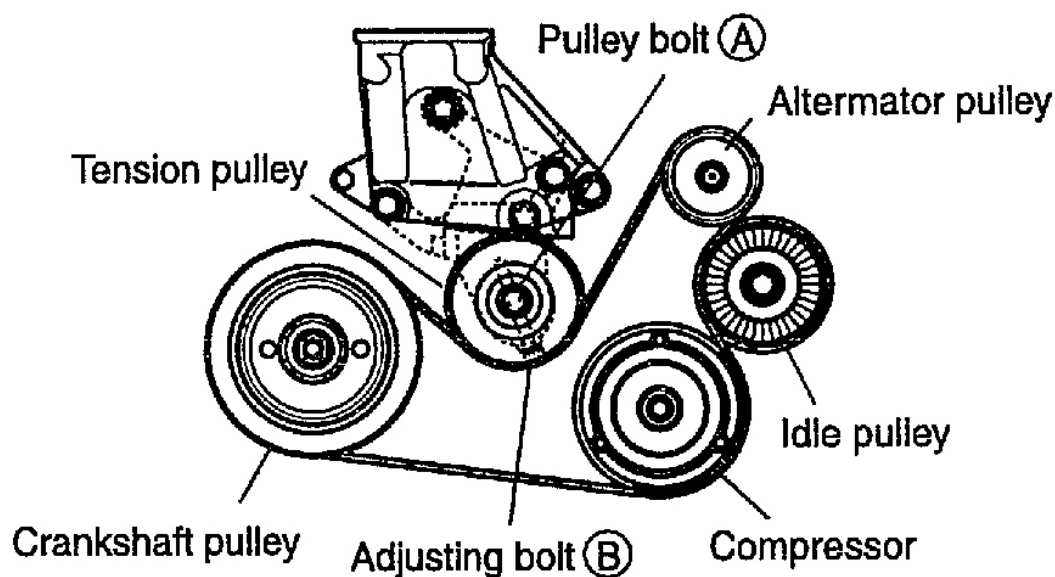
1. Loosen the pulley bolt A.
2. Turn the adjusting bolt B and adjust the deflection of the drive belt to the within specification.

	Deflection: When applying moderate pressure 98N (10kg, 22lb)
New	5.0 ~ 5.5 mm
Used	6.0 ~ 7.0 mm

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Fig. 21: Drive Belt Deflection Specification
Courtesy of KIA MOTORS AMERICA, INC.

3. Tighten the pulley bolt A.



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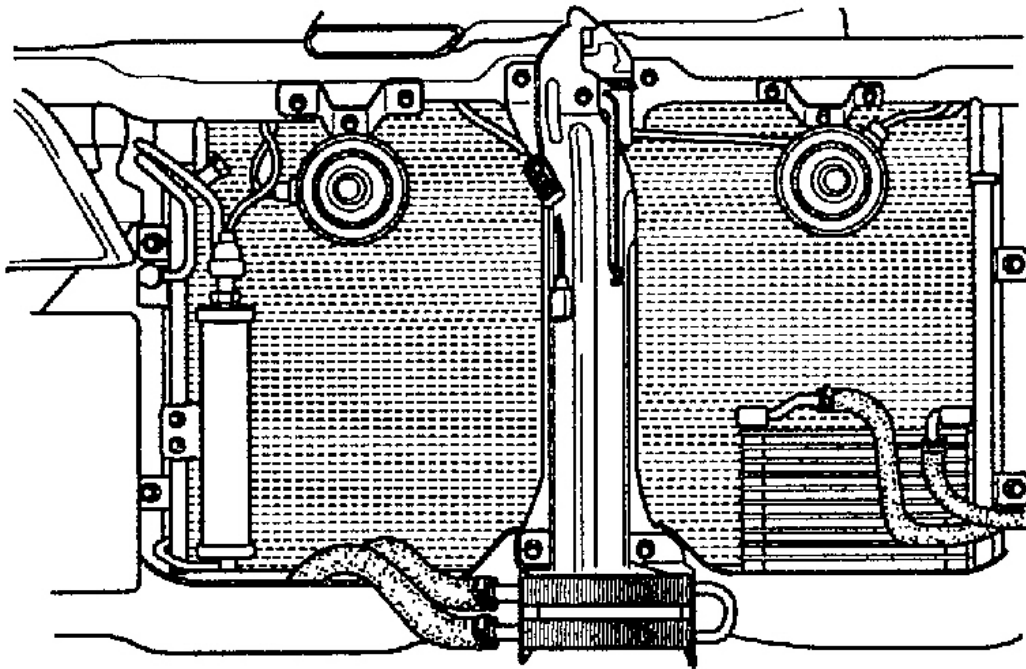
Fig. 22: Adjusting Drive Belt Tension
Courtesy of KIA MOTORS AMERICA, INC.

CONDENSER FAN AND RELAY

CHECKING

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.

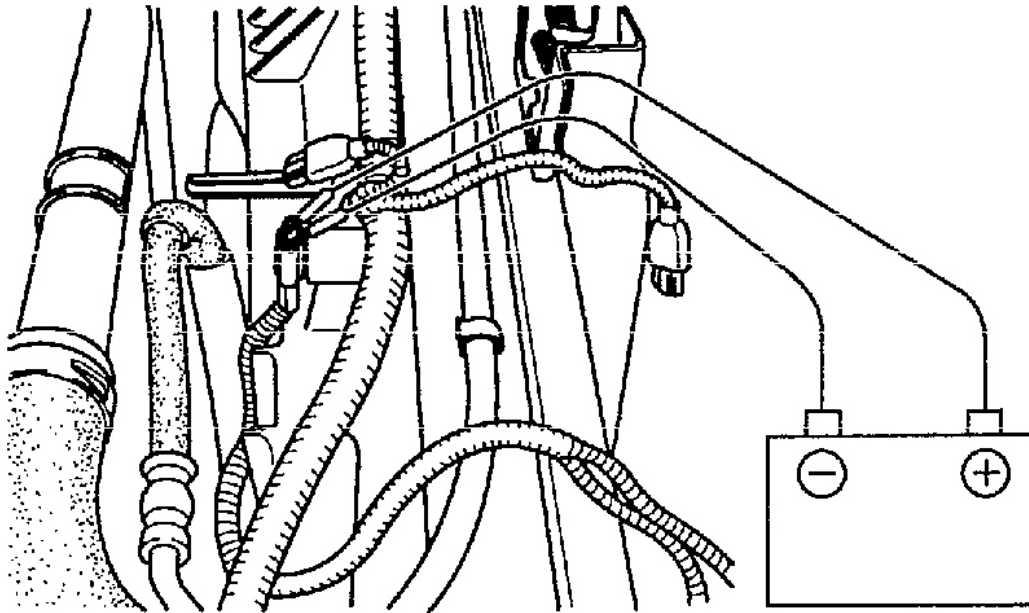


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Fig. 23: Checking The Condenser Fins For Clogging & Damage
Courtesy of KIA MOTORS AMERICA, INC.

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.



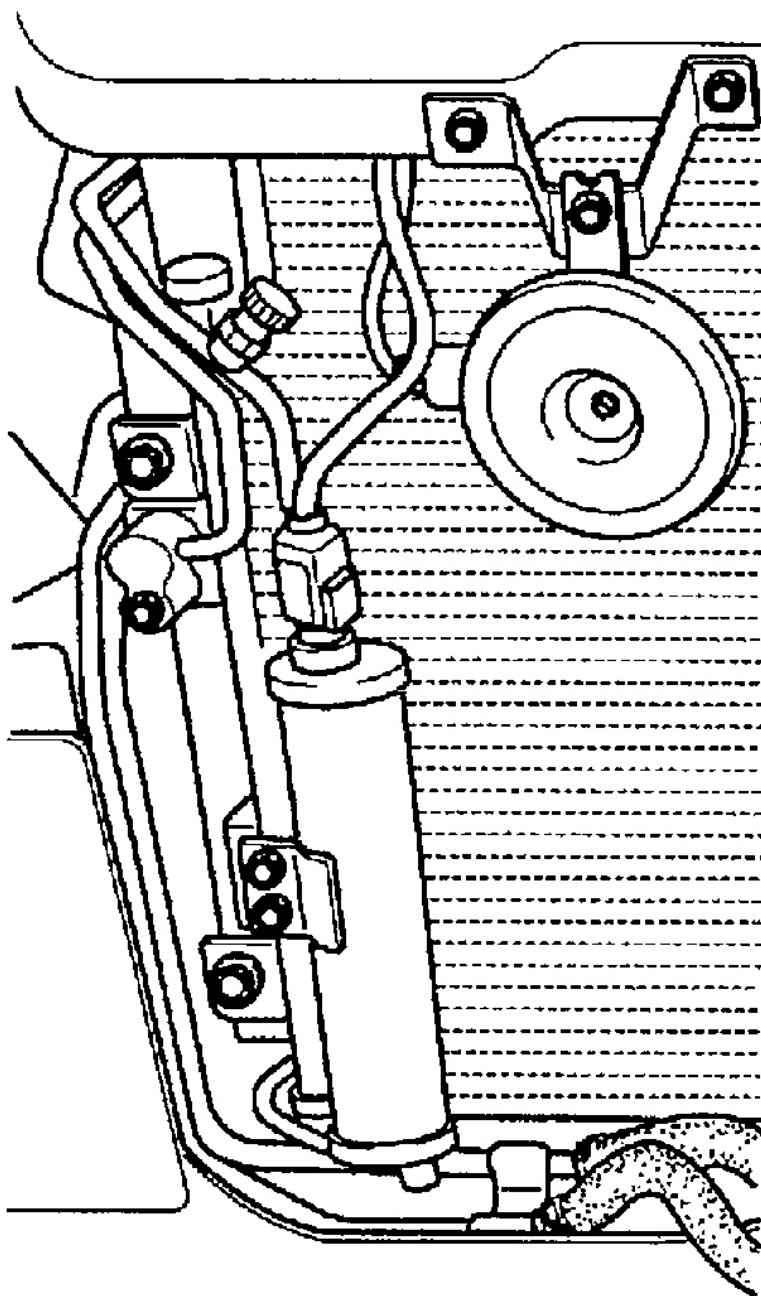
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Fig. 24: Checking The Condenser Fan Motor Using Battery Voltage
Courtesy of KIA MOTORS AMERICA, INC.

RECEIVER/DRIER

CHECK

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.



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Fig. 25: Testing The Receiver/Drier Inlet & Outlet Temperatures
Courtesy of KIA MOTORS AMERICA, INC.

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. Evacuate, charge and test the refrigeration system.

TRIPLE PRESSURE SWITCH

DESCRIPTION

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.

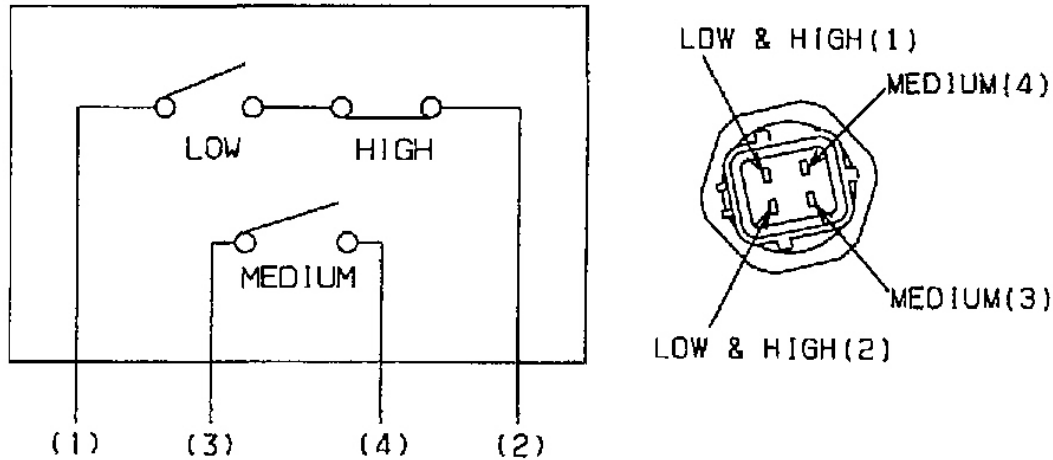


Fig. 26: Illustrating Triple Pressure Switch Connector & Circuit
Courtesy of KIA MOTORS AMERICA, INC.

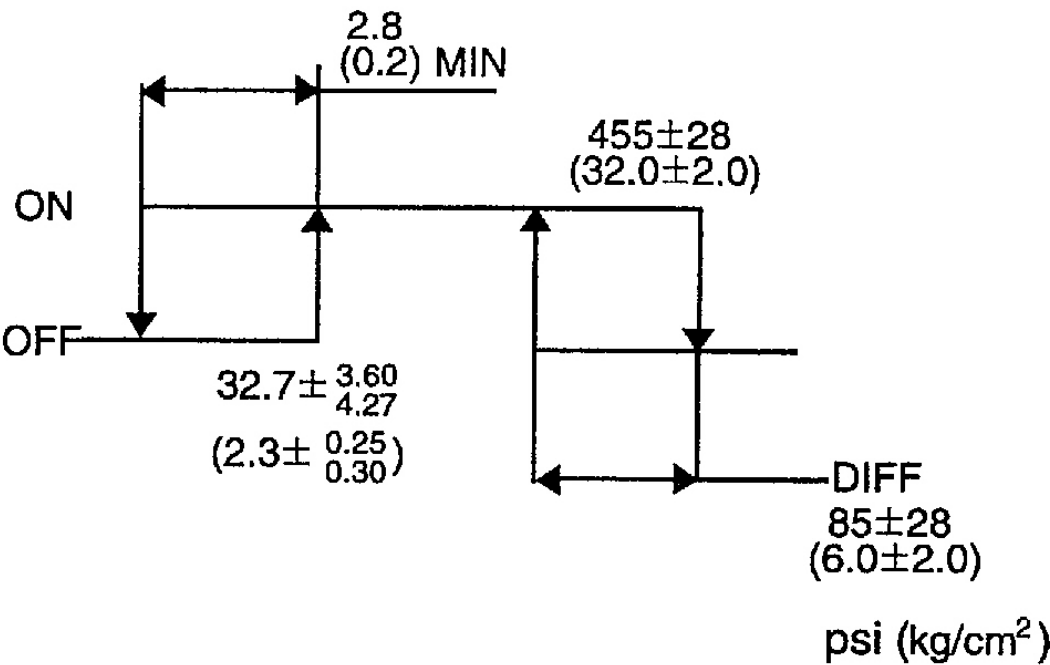
OPERATING CHARACTERISTIC

Pressure	ON	OFF (DIFF)
High	455±28 (32.0±2.0)	85±28 (6.0±2.0)
Low	32.7± ^{3.60} _{4.27} (2.3± ^{0.25} _{0.30})	2.8 (0.2)
Medium	256±11 (18.0±0.8)	199±17 (14.0±1.2)

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Fig. 27: Operating Characteristic Chart
Courtesy of KIA MOTORS AMERICA, INC.

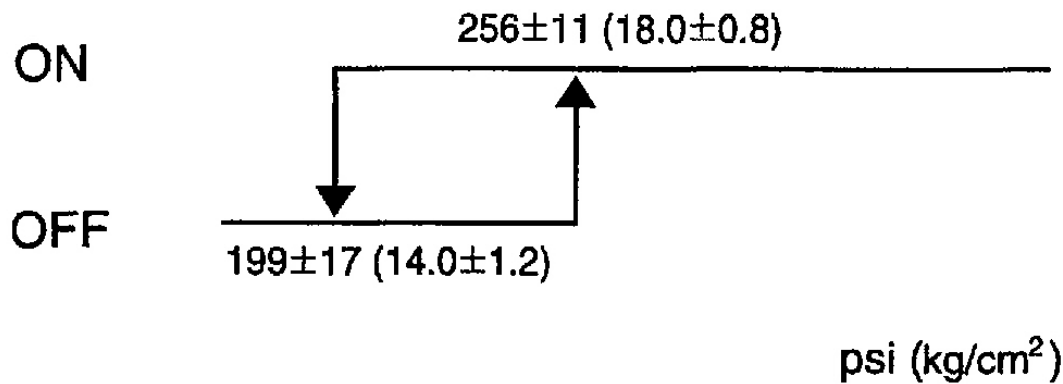
LOW & HIGH



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Fig. 28: Illustrating LOW & HIGH Switch Operation
Courtesy of KIA MOTORS AMERICA, INC.

MEDIUM



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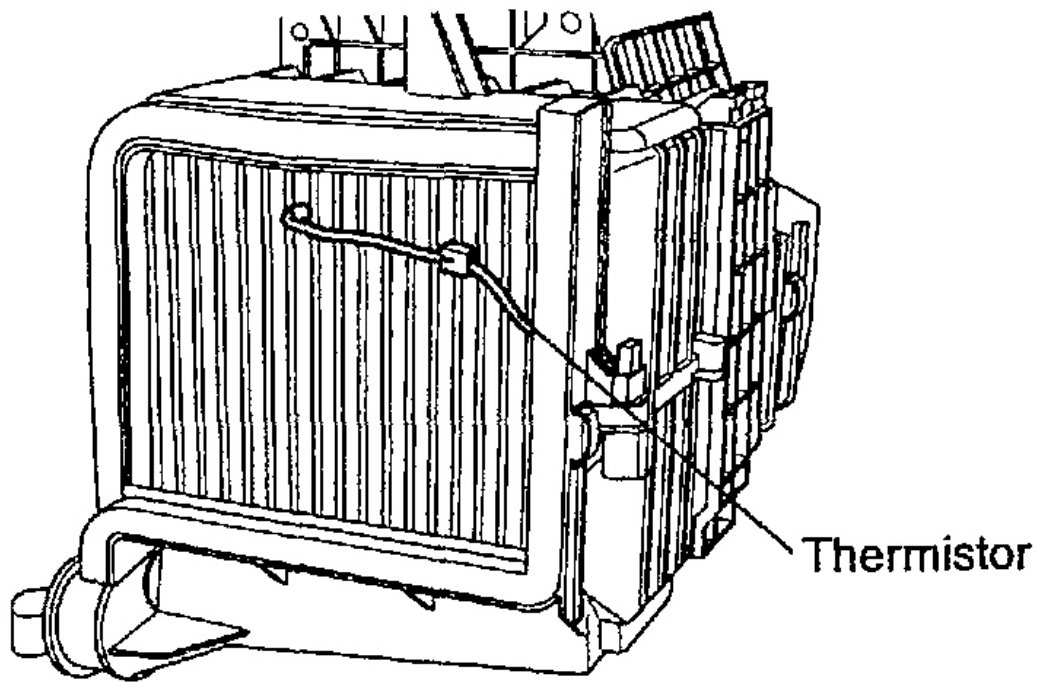
Fig. 29: Illustrating MEDIUM Switch Operation
Courtesy of KIA MOTORS AMERICA, INC.

THERMOSTATIC SWITCH (THERMISTOR)

SENSOR CHECKING

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.

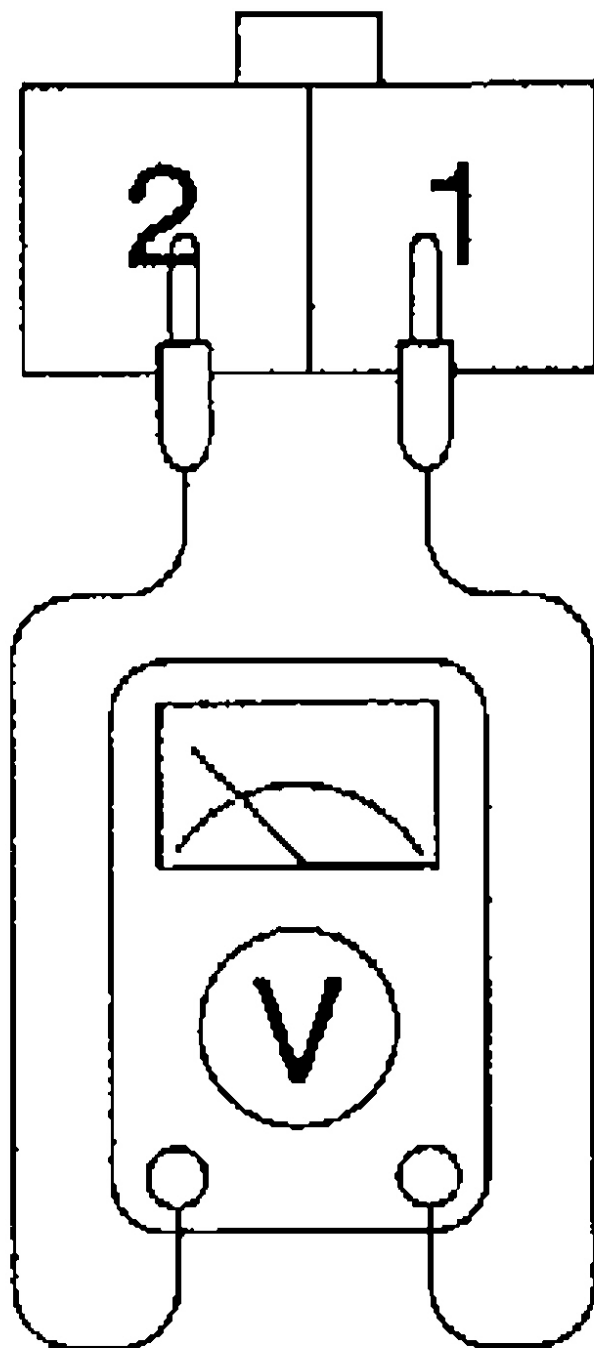


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Fig. 30: Locating Thermostatic Switch
Courtesy of KIA MOTORS AMERICA, INC.

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 1 and 2 in the thermistor.



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Fig. 31: Testing Thermistor
Courtesy of KIA MOTORS AMERICA, INC.

Thermistor	Operating temperature	Output voltage
ON	45.5°F (7.5°C)	0V
OFF	36.5°F (2.5°C)	12V

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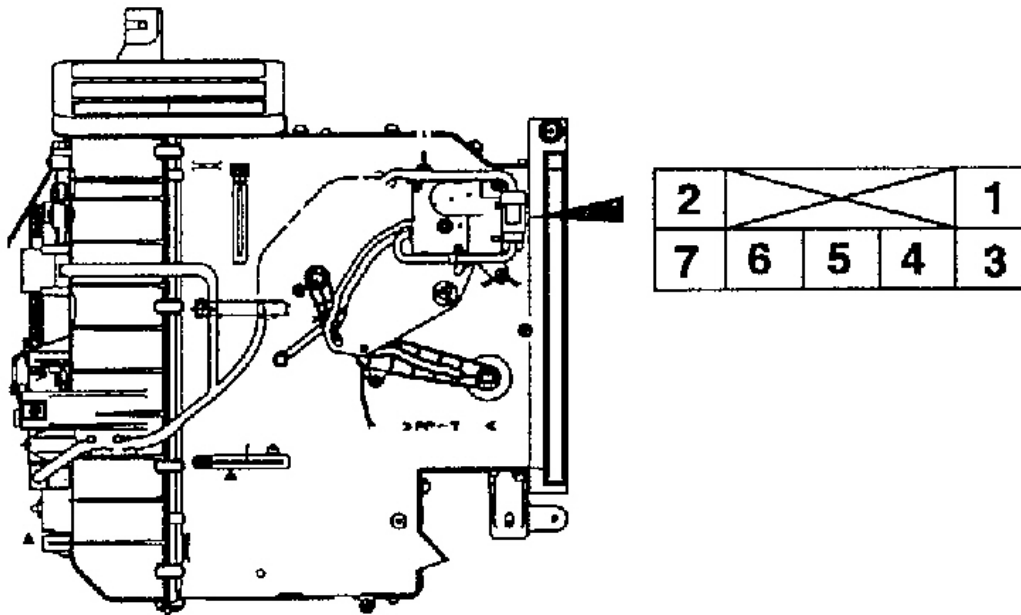
Fig. 32: Thermistor Operating Voltage Chart
 Courtesy of KIA MOTORS AMERICA, INC.

THE OTHER MANUAL A/C COMPRESSOR CONTROLS

TEMPERATURE ACTUATOR POTENTIOMETER

INSPECTION (FRONT)

1. Temperature control actuator is installed in the heater unit case. The control switches and the vent duct switch will operate actuator to regulate the temperature and discharge air.



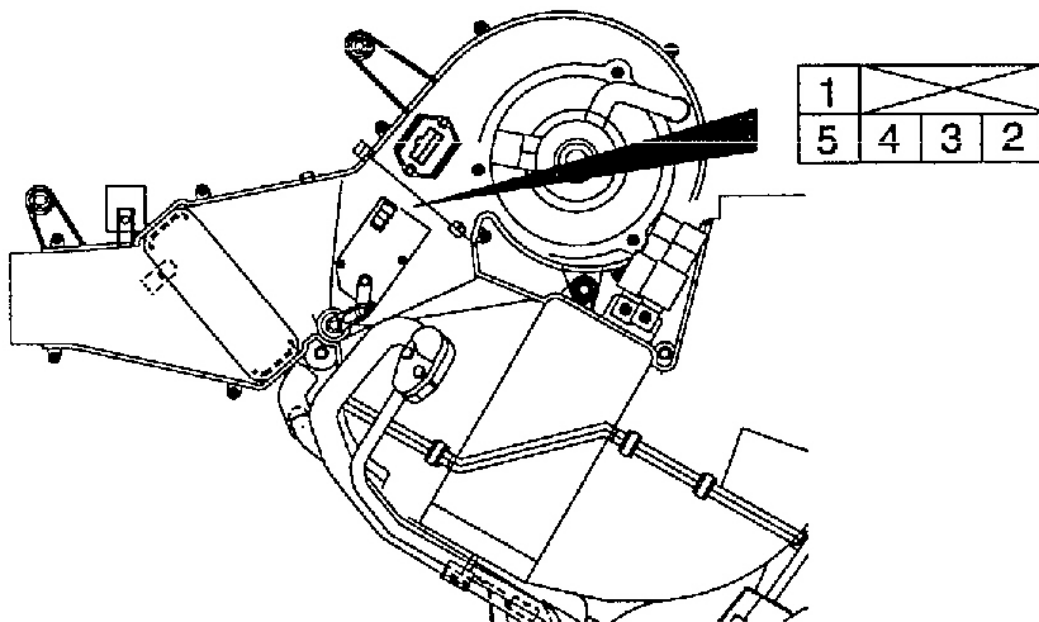
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Fig. 33: Illustrating Front Temperature Control Actuator & Connector
Courtesy of KIA MOTORS AMERICA, INC.

2. Verify that the temp actuator operates to the warm position when connecting 12V to the terminal 1 and grounding terminal 3.
3. Verify that the temp actuator operates to the cool position when connecting in the reverse.

INSPECTION (REAR)

1. Temperature control actuator is installed in the rear heater unit case. The control switches and the vent duct switch will operate actuator to regulate the temperature and discharge air.



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Fig. 34: Illustrating Rear Temperature Control Actuator & Connector
Courtesy of KIA MOTORS AMERICA, INC.

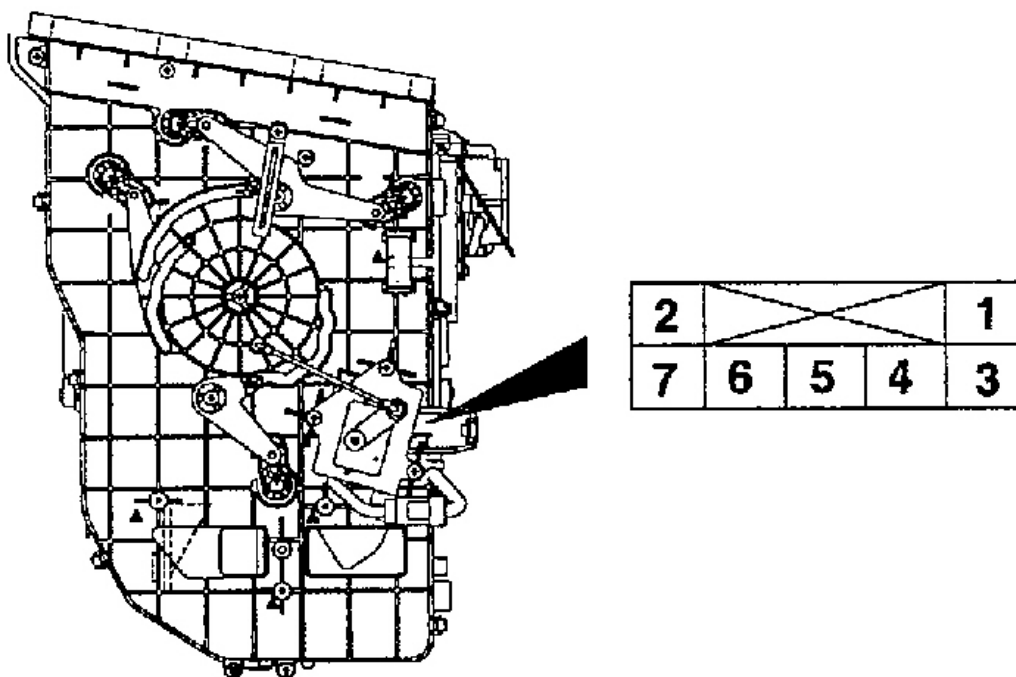
2. Verify that the temp actuator operates to the warm position when connecting 12V to the terminal 1 and grounding terminal 4.
3. Verify that the temp actuator operates to the cool position when grounding terminal 5.

MODE CONTROL ACTUATOR

INSPECTION

1. Apply 12V to mode actuator terminal 2 and ground terminal 1.
2. Verify that the mode actuator operates as below when grounding terminals 3, 4, 5, 6 and 7 in sequence.

VENT --> BI/LEVEL --> HEAT --> D/F --> DEF



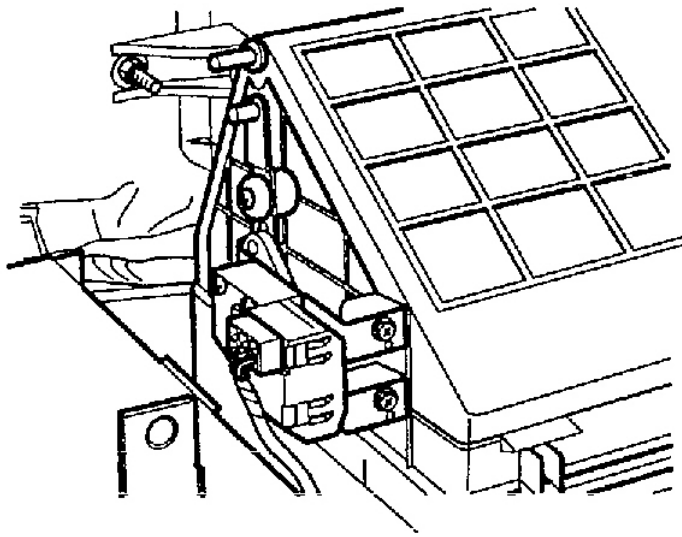
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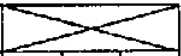
Fig. 35: Illustrating Mode Control Actuator & Connector
 Courtesy of KIA MOTORS AMERICA, INC.

FRESH AND RECIRCULATION ACTUATOR

DESCRIPTION

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



1			
5			
	4	3	2

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Fig. 36: Illustrating Fresh & Recirculation Actuator & Connector
 Courtesy of KIA MOTORS AMERICA, INC.

CHECK

Input (Manual)		Output
+	-	Fresh/recirculation shifting
1	5	Recirculation
1	3	Fresh

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Fig. 37: Actuator Position Chart
 Courtesy of KIA MOTORS AMERICA, INC.

BLOWER CONTROLS

BLOWER MOTOR

CHECK

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

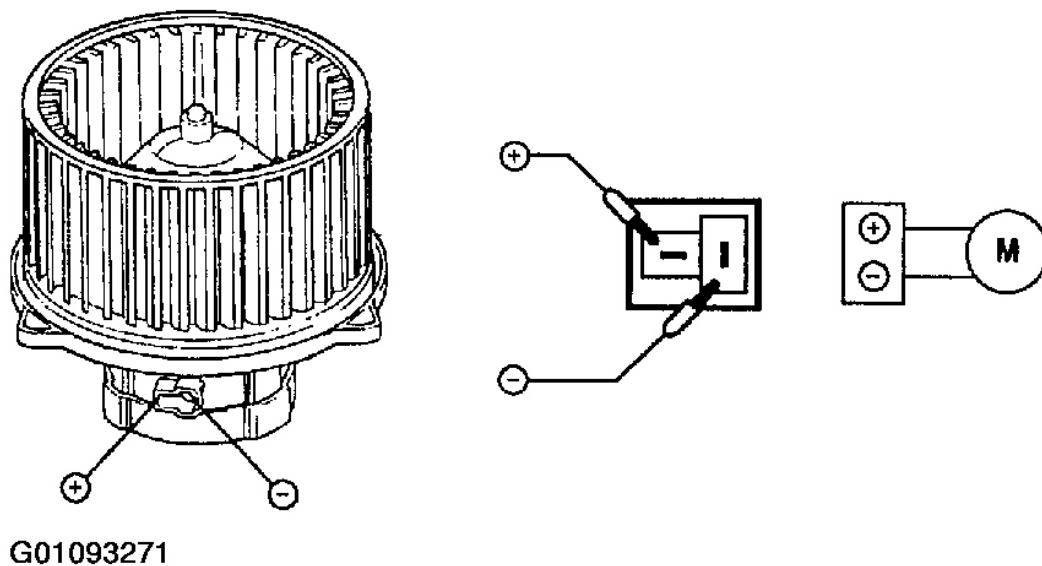
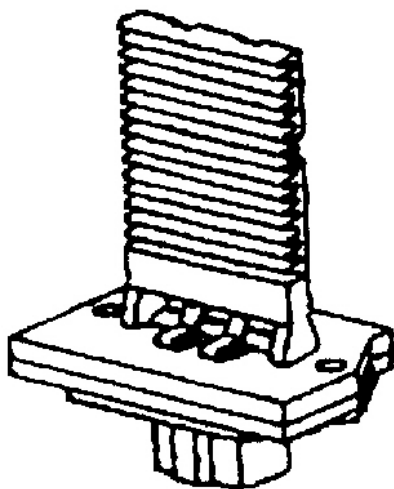


Fig. 38: Testing Blower Motor Operation
Courtesy of KIA MOTORS AMERICA, INC.

BLOWER SPEED CONTROLLER

CHECK (FRONT)



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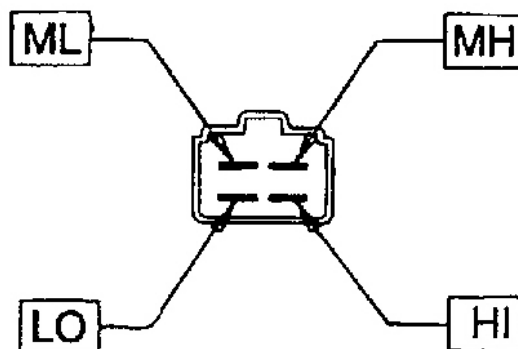
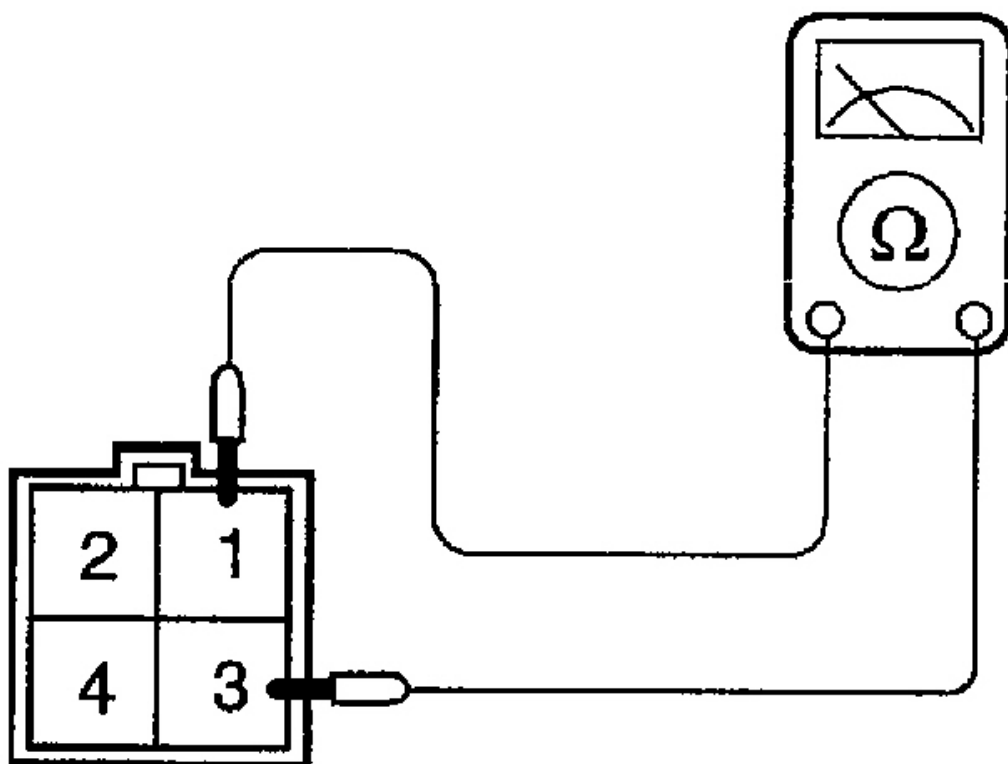


Fig. 39: Illustrating Front Blower Speed Controller & Connector
Courtesy of KIA MOTORS AMERICA, INC.

1. Check for continuity and resistance between terminals.



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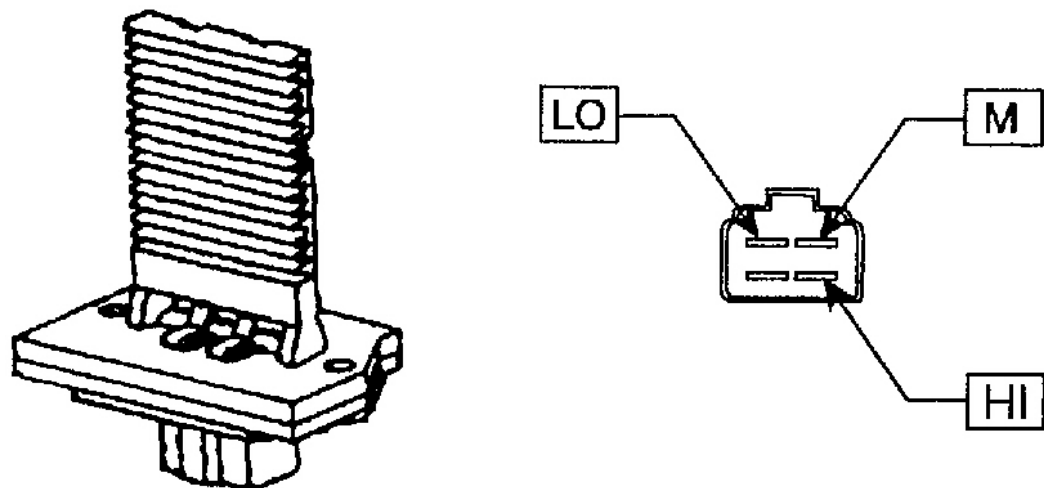
Fig. 40: Testing Front Blower Speed Controller Resistance
 Courtesy of KIA MOTORS AMERICA, INC.

Terminal	Resistance (Ω)
3 - 1	0.35
3 - 2	0.90
3 - 4	1.87

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Fig. 41: Blower Front Speed Controller Resistance Chart

CHECK (REAR)



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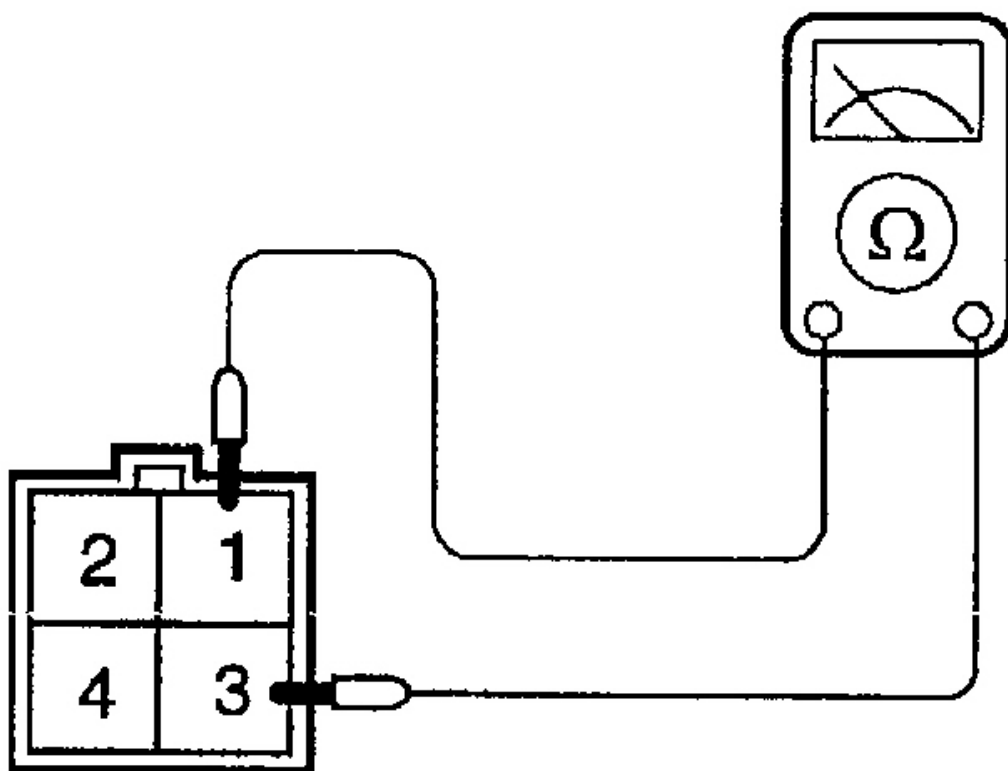
Fig. 42: Illustrating Rear Blower Speed Controller & Connector
Courtesy of KIA MOTORS AMERICA, INC.

- 1. Check for continuity and resistance between terminals.

Terminal	Resistance (Ω)
3 - 1	0.35
3 - 2	0.80

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Fig. 43: Testing Rear Blower Speed Controller Resistance
Courtesy of KIA MOTORS AMERICA, INC.



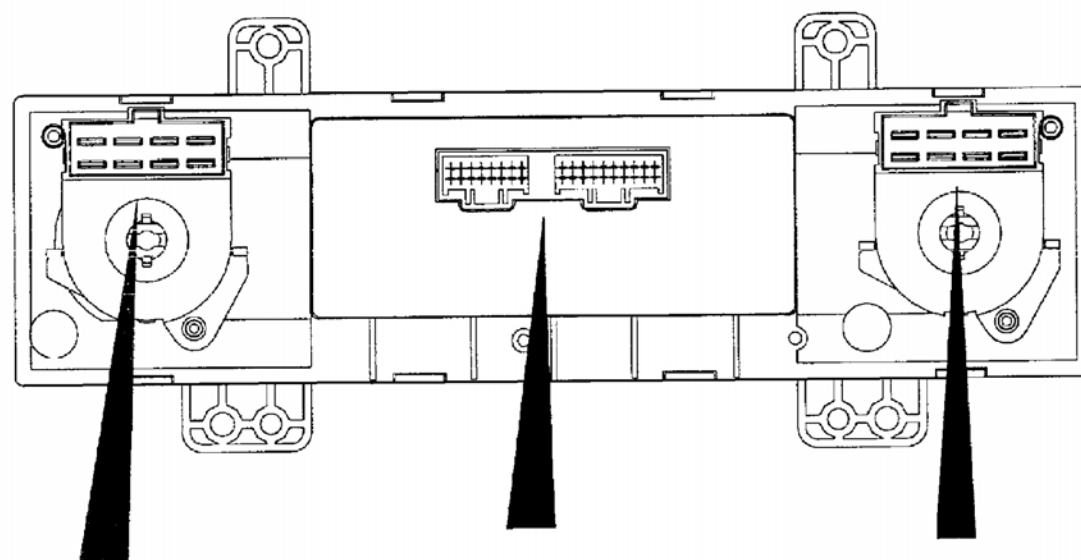
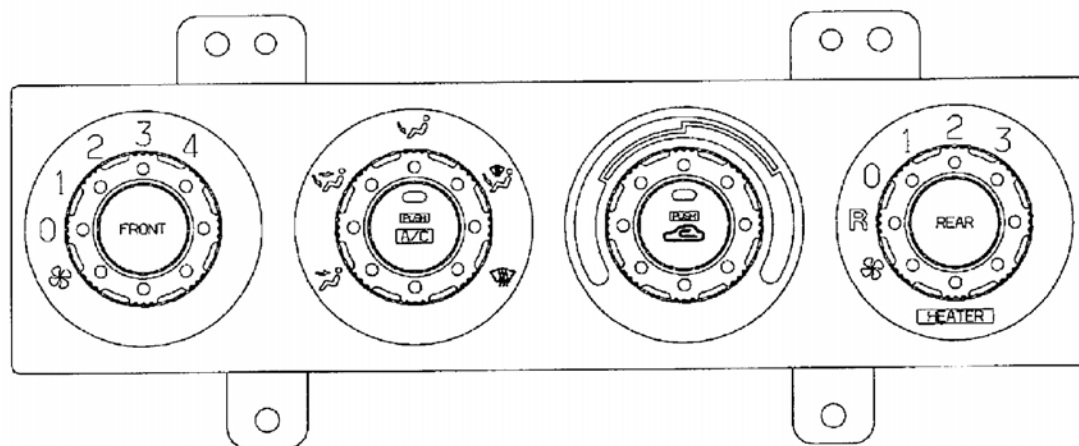
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Fig. 44: Blower Rear Speed Controller Resistance Chart
Courtesy of KIA MOTORS AMERICA, INC.

BLOWER AND A/C CONTROLS (MANUAL)

CONTROL PANEL

CONTROL PANEL



4	3	2	1
8	7	6	5

(C)

Front blower
connector (B)

8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9

(B)

Main connector (A)

10	9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11

(A)

4	3	2	1
8	7	6	5

Rear blower
connector (C)

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Fig. 45: Illustrating Control Panel Pinout

CONNECTOR PIN DESCRIPTION

CONNECTOR PIN DESCRIPTION

Item	PIN NO.	PIN Name	Item	PIN NO.	PIN Name
Main Connector (A)	1	ILL +	Front blower (C)	1	Middle low
	2	Intake (Fresh)		2	Middle high
	3	-		3	High
	4	Sensor voltage (5V)		4	Ground
	5	Mix feedback		5	Common
	6	Mix (Warm)		6	Low
	7	Mode (Face - floor)		7	ILL+
	8	Mode (Floor - defrost)		8	ILL-
	9	Check coupler			
	10	IG1			
	11	ILL -			
	12	Intake (Recirculation)			
	13	C5 joint (Blower on)			
	14	Sensor ground			
	15	Mix (Cool)			
	16	Mode (Face)			
	17	Mode (Floor)	Rear auxiliary control switch	1	Low
	18	Mode (Defrost)		2	Middle
	19	B+		3	High
	20	Ground		4	Ground
Main Connector (B)	1	Thermistor		5	-
	2	-		6	Auxiliary relay ground
	3	-		7	ILL +
	4	-		8	ILL -
	5	A/C Select high			
	6	Rear heater switch			
	7	-			
	8	-			
	9	-			
	10	-			
	11	-			
	12	-			
	13	A/C Thermo high			
	14	-			
	15	-			
	16	-			

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Fig. 46: Illustrating Control Panel Pin Description
Courtesy of KIA MOTORS AMERICA, INC.

DEFROST LOGIC

DEFROST LOGIC

- IG-ON/OFF logic

Condition	Mode	A/C	Intake
IG OFF	-	-	Fresh
IG ON	Face, Face - floor	Memory	Memory
	Floor	Memory	Fresh
	Defrost, Floor - defrost	ON	Fresh

NOTE
Memory function <ul style="list-style-type: none">When moving blower switch off to on, A/C and intake are changed to previous status.At initial the battery on, the A/C is off and the intake is changed to fresh status.At blower switch off, the intake is changed to fresh status.

- Defrost, Floor - defrost logic

Mode		A/C output	A/C indicator	Intake
Defrost, Floor - defrost	ON	ON	Previous	Fresh
	OFF	Indicator status	Previous	Previous

NOTE
The intake button enables to change the intake status at defrost and floor - defrost mode.
The A/C button enables to change the A/C button indicator status, but A/C output is always on at defrost and floor - defrost mode.
Be impossible to enter defrost and floor - defrost logic again as defrost ↔ floor - defrost changing.

- Function of MAX A/C

Condition	Mode	A/C	Intake
Blower off	Face	OFF	Fresh
Blower on (Step : 1, 2, 3, 4)	Face	ON	Recirculation

- Dissolution & Reinstatement of logic

Turn off the blower switch.

Move to defrost mode.

Press the intake button more than 5 times within 3 seconds.

Indicator of intake button is flashed 3 times.

Dissolution & reinstatement of logic is completed.

A/C and intake status is initialized to "A/C off" and "fresh status"

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

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Fig. 47: Illustrating Defrost Logic
Courtesy of KIA MOTORS AMERICA, INC.