A/C-HEATER SYSTEM - MANUAL

1991 Mitsubishi Montero

1991 MANUAL A/C-HEATER SYSTEMS
Chrysler Motors, Mitsubishi

Chrysler Motors: Colt Vista, Ram-50
Mitsubishi: Montero, Pickup

* PLEASE READ THIS FIRST *

CAUTION: When discharging air conditioning system, use only approved refrigerant recovery/recycling equipment. Make every attempt to avoid discharging refrigerant into the atmosphere.

A/C SYSTEM SPECIFICATIONS

SPECIFICATIONS TABLE

Compressor Type	
Colt Vista & Montero	Nippondenso 10-Cyl.
Pickup & Ram-50	Sanden Scroll
Compressor Belt Deflection	
Colt Vista	11/32-7/16" (8-11 mm)
Montero	21/64-3/8" (8.5-9.5 mm)
Pickup & Ram-50	21/64-25/64" (8.5-10 mm)
Compressor Oil Capacity	
Colt Vista & Montero	2.7 ozs.
Pickup & Ram-50	5.0 ozs.
Refrigerant (R-12) Capacity	
Colt Vista & Montero	32 ozs.
Pickup & Ram-50	30 ozs.
System Operating Pressures (1)	
Colt Vista, Pickup & Ram-50	
High Side	130-220 psi (9.1-15.5 kg/cm²)
Low Side	20-26 psi (1.4-1.8 kg/cm²)
Montero	
Dual Unit	
High Side	142-199 psi (9.9-14.0 kg/cm²)
Low Side	16-30 psi (1.1-2.1 kg/cm²)
Single Unit	
High Side	102-142 psi (7.1-9.9 kg/cm²)
Low Side	18-32 psi (1.3-2.2 kg/cm²)

(1) - With ambient temperature at least 80°F (27°C).

DESCRIPTION

Slight variations exist among the manual A/C-heater systems used. Either Sanden Scroll or Nippondenso 10-cylinder compressor is used. Cycling of the compressor clutch is controlled by switches which monitor temperatures and pressures.

Compressors will only operate within the normal operating temperatures and pressures set for each model. An electric condenser fan operates whenever A/C system is operating. System components used vary depending upon model. Most systems include an A/C compressor control unit, fan switch, evaporator, temperature sensor, high and low (or dual) pressure switch, engine coolant temperature switch, compressor, condenser, receiver-drier and various pipes and hoses.

OPERATION

A/C SWITCH

The A/C switch is located in the lower, center section of control panel. See Fig. 1. When switch is pushed, air conditioning will operate if blower motor control lever is in a position other than OFF.

When activated, the A/C button/switch allows the A/C compressor clutch to engage and operate the compressor. On some models, a light on the button will glow when button/switch is activated.

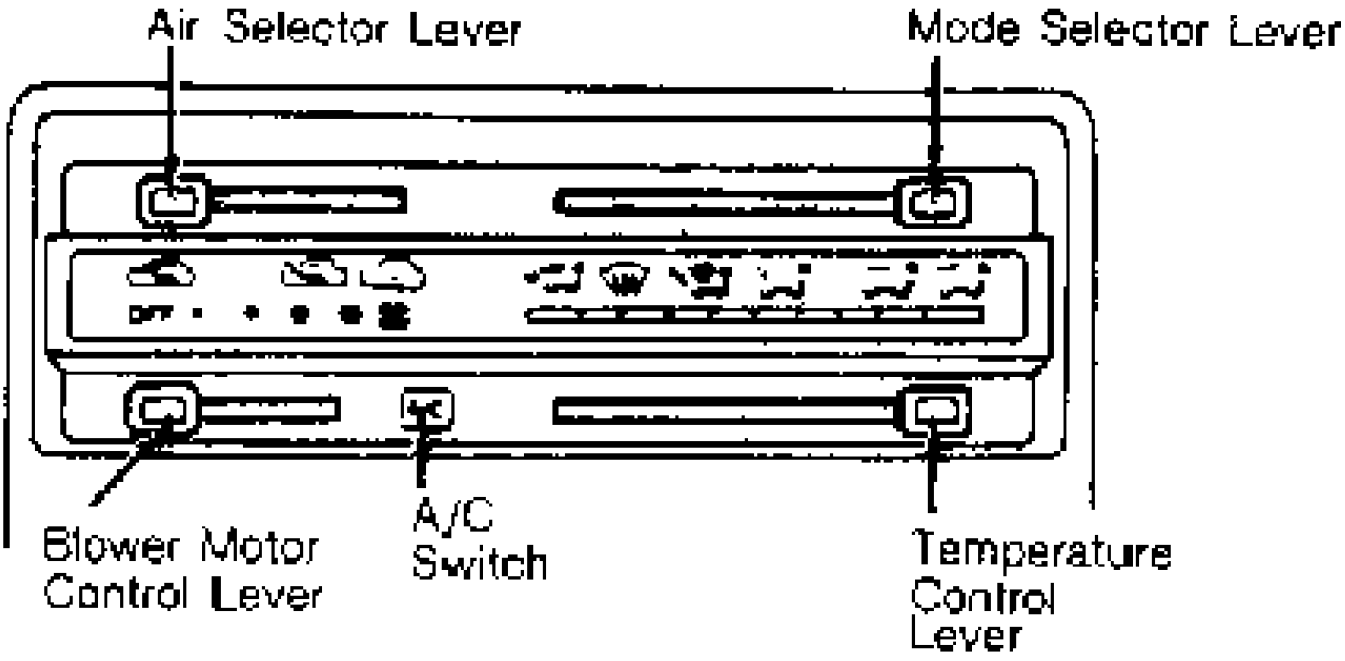

Fig. 1: A/C Switch & Control Panel
Courtesy of Mitsubishi Motor Sales of America.

AIR SELECTOR LEVER

The air selector lever is located in the upper, left corner of control panel and moves horizontally to select the source of air needed inside of passenger compartment. Lever moves from OFF position on the left to the outside air mode, to the mixture of both outside and inside air mode, and to the recirculation mode on the right. Lever should normally be set in the recirculation mode for maximum A/C cooling.

BLOWER MOTOR CONTROL LEVER

Blower motor control lever is located on the lower, left corner of control panel and moves horizontally to select blower motor speeds. As lever is moved from far left or OFF position, increasing

speeds of blower operation are selected. In order for A/C system to operate, blower motor control lever MUST be in a position other than OFF.

MODE SELECTOR LEVER

Mode selector lever is located in upper right corner of control panel. Either 2 or 6 modes are available to achieve desired distribution of air from various outlets.

On all models, air is directed to windshield and side windows and comes out from the panel outlets when mode selector lever is positioned to the far left. When lever is moved one detent to the right, air is directed to windshield and side windows simultaneously.

On 6-mode models, air is directed to floor area, windshield, and side windows when lever is moved 2 detents to the right. When lever is moved 3 detents to the right, air is directed to floor area. When lever is moved to the second to last detent on control panel, air is directed to floor area and panel outlets. When lever is in the far right position, air will be directed to panel outlets only.

TEMPERATURE CONTROL LEVER

The temperature control lever operates blend-air door in the heater/air conditioning unit, mixing cooled and heated air so the selected air temperature can be obtained. The system will provide cooled air when A/C switch is in ON position and blower motor is in any position other than OFF. The temperature control lever should be in the far left (maximum cooling) side of temperature selection scale when maximum A/C cooling is desired.

DUAL PRESSURE SWITCH

The dual pressure switch, located in the refrigerant line near condenser, is wired in series with compressor clutch. Whenever system pressures drop below or increase above the control point of the switch, power supplied to compressor will be cut and compressor activity will cease until pressures are back to within operating ranges.

ENGINE COOLANT TEMPERATURE SWITCH

The engine coolant temperature switch, located on thermostat housing, is wired in series with compressor clutch. When coolant temperature is greater than switch control temperature, power to compressor is cut and compressor is turned off until temperature returns to operating range.

EVAPORATOR THERMISTOR

The evaporator thermistor, attached to evaporator fins, is wired in series with compressor clutch and prevents evaporator freezing. Power to compressor clutch is cut if control temperature is exceeded, allowing evaporator to thaw. When temperature returns to operating range, thermistor allows power to compressor clutch.

FUSIBLE PLUG

A fusible plug, located on receiver-drier, melts and allows refrigerant to escape when ambient temperatures in engine compartment reach 221°F (105°C). Once fusible plug has blown, it cannot be reused and must be replaced.

HIGH PRESSURE SWITCH

The high pressure switch, installed in refrigerant line, is wired in series with compressor clutch. When refrigerant pressures rise above switch control pressure point, power to compressor clutch is cut. The high pressure switch may also be activated when airflow through condenser is blocked or when system is overcharged.

HIGH/LOW PRESSURE CUT-OFF SWITCH

The High/Low Pressure Cut-Off (HLPCO) switch, located on refrigerant line, is wired in series with compressor clutch. Switch cuts off power to compressor clutch when refrigerant pressures are above or below switch control point. When pressure returns to normal operating range, compressor clutch operation resumes.

LOW PRESSURE SWITCH

The low pressure switch, located in receiver-drier, is wired in series with compressor clutch. When refrigerant pressure drops below switch control point (usually due to leak in system), power to compressor clutch is cut.

REFRIGERANT TEMPERATURE SWITCH

The refrigerant temperature switch, located on rear of compressor, detects refrigerant temperature discharged from compressor. A/C Control Unit (ACCU) uses this information to control compressor clutch cycling.

ADJUSTMENTS

NOTE: For adjustment procedures not covered in this article, see appropriate HEATER SYSTEM article in the AIR CONDITIONING & HEAT Section.

MODE CONTROL CABLE

Montero

Move mode selector lever to far left (DEF) position. Move mode door lever upward in direction indicated by arrow. See Fig. 2. Connect inner wire to lever, and secure outer housing using clip. Operate mode control knob to ensure proper operation.

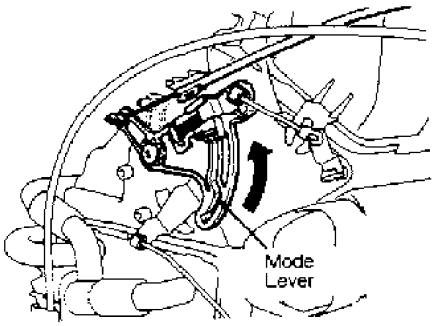

Fig. 2: Adjusting Mode Selection Cable (Montero)
Courtesy of Mitsubishi Motor Sales of America.

TEMPERATURE CONTROL CABLE

Montero

1) Move temperature selector lever to far left position. Remove heater control valve cover. Disconnect heater control valve wire from blend door lever. Push heater control valve inward (closed).

2) Move blend door lever downward in direction indicated by arrow. See Fig. 3. Connect inner wire to lever, and secure outer housing using clip. Adjust heater control valve wire so valve is fully closed. Operate mode control knob to ensure proper operation. Reinstall heater control valve cover.

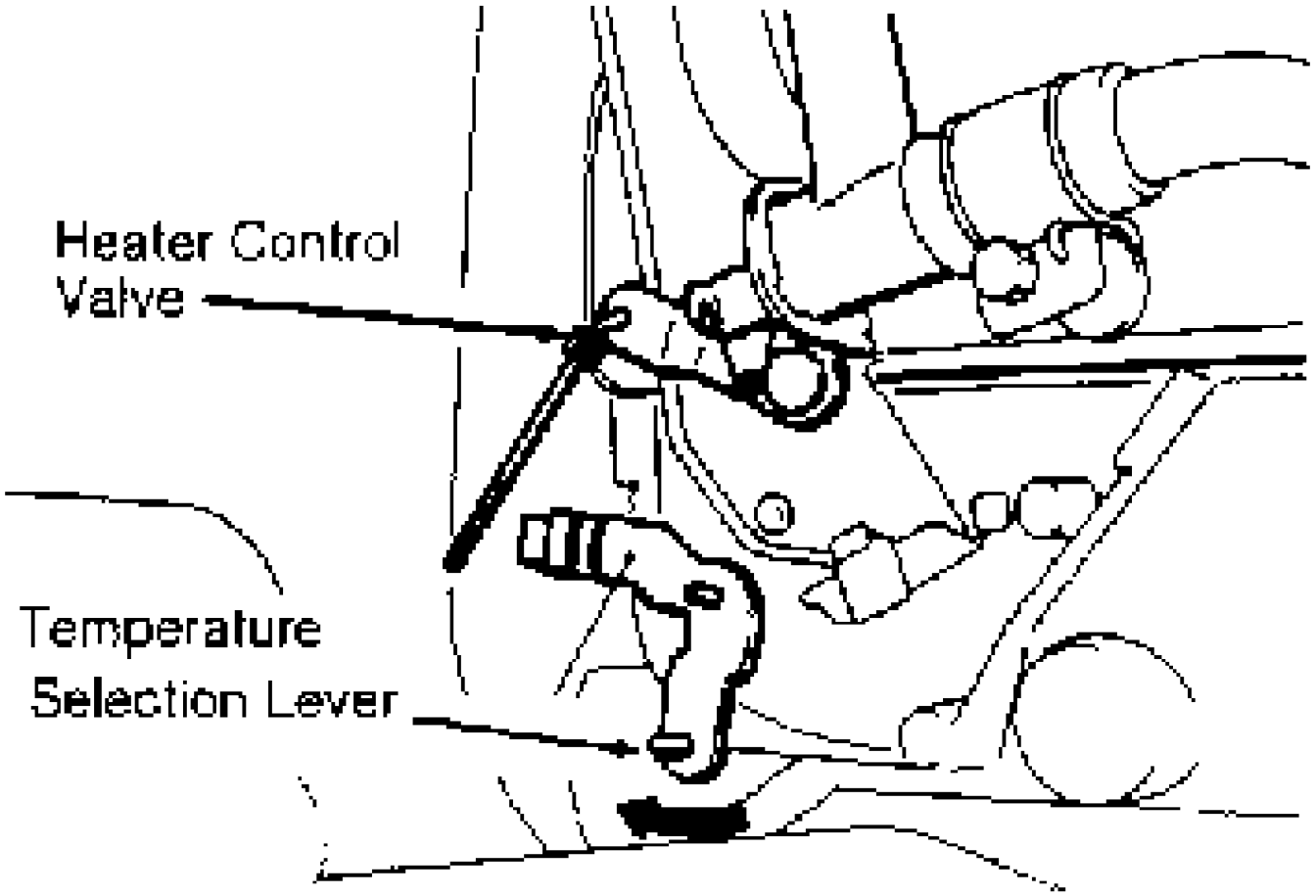

Fig. 3: Adjusting Temperature Selection Cable (Montero)
Courtesy of Mitsubishi Motor Sales of America.

TROUBLE SHOOTING

AIR NOT COOL

1) Ensure compressor clutch is operating. If compressor clutch is not operating, check fuses and relay. Check A/C switch. Check high and low pressure switches or dual pressure switch. Check thermistor, thermo relay or Electronic Cycling Clutch Switch (ECCS).

Check blower switch and relay. Check A/C compressor clutch coil.

2) Ensure system is properly charged with correct amount of refrigerant. Add refrigerant or evacuate and recharge system as necessary. Ensure receiver-drier is not clogged. Check compressor belt for proper tension. Check for clogged expansion valve. Check compressor operation. Repair or replace compressor as necessary.

INSUFFICIENT AIRFLOW

Check for air leakage at air duct joint. Check for frost on evaporator. Ensure blower motor is operating properly. Check for obstructed air intake.

INSUFFICIENT COOLING

Ensure system is properly charged with correct amount of refrigerant and free of air and moisture. Add refrigerant or evacuate and recharge system as necessary. Ensure receiver-drier is not clogged. Ensure sufficient airflow through condenser exists. Check compressor belt for proper tension. Check compressor operation. Repair or replace compressor as necessary. Check for clogged expansion valve. Replace expansion valve as necessary.

INTERMITTENT COOL AIR

Check for air or moisture in system. Evacuate and recharge system as necessary. Check for expansion valve malfunction. Replace expansion valve if necessary. Check compressor belt for proper tension.

TESTING

A/C SWITCH

1) Disconnect A/C switch harness connector. Using appropriate wiring diagram as a guide, jumper appropriate terminals of A/C switch wiring harness connector. See Fig. 4.

2) Turn blower on and momentarily turn ignition on without starting engine. Listen for compressor clutch engagement. If compressor clutch does not engage, check fuse and other components wired in series with compressor clutch.

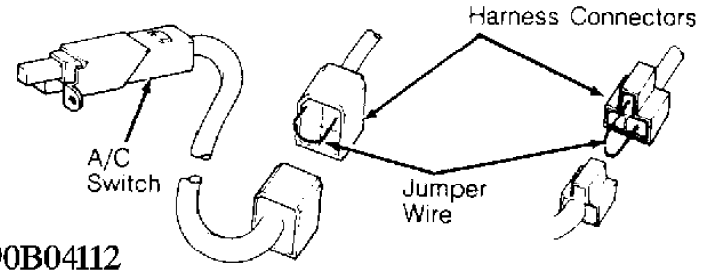

Fig. 4: A/C Switch Connector ID
Courtesy of Mitsubishi Motor Sales of America.

AIR THERMO & AIR INLET SENSORS

1) Disconnect sensor connector at evaporator case. Using an ohmmeter, measure continuity between sensor terminals. See AIR THERMO & AIR INLET SENSORS SPECIFICATIONS table.

2) If resistance is not within specifications, sensor is faulty and must be replaced. If resistance is within specifications and all other components are okay, replace A/C compressor control unit (if equipped).

AIR THERMO & AIR INLET SENSORS SPECIFICATIONS TABLE

Sensor Temperature	Ohms
Air Thermo Sensor	
32°F (0°C)	11,400
50°F (10°C)	7320
68°F (20°C)	4860
86°F (30°C)	3310
104°F (40°C)	2320
Air Inlet Sensor	
32°F (0°C)	3310
50°F (10°C)	2000
68°F (20°C)	1250
86°F (30°C)	810
104°F (40°C)	530

BLOWER RESISTOR

Disconnect blower resistor connector. Using an ohmmeter, measure resistance between terminals indicated in BLOWER RESISTOR RESISTANCE table. See Fig. 5.

BLOWER RESISTOR RESISTANCE TABLE

Terminal	Ohms
Colt Vista	
1 & 2	Approx. 1.22
1 & 3	Approx. 0.41
1 & 4	Approx. 2.65
1 & 5	Approx. 0
Montero (Front)	
1 & 2	Approx. 1.22
1 & 3	Approx. 0.41
1 & 4	Approx. 2.25
1 & 5	Approx. 0
Montero (Rear)	
2 & 4	Approx. 0.5
1 & 4	Approx. 1.8
3 & 4	Approx. 3.3
Pickup & Ram-50	
1 & 2	Approx. 1.19
1 & 3	Approx. 0.50
1 & 4	Approx. 2.33
1 & 5	Approx. 0

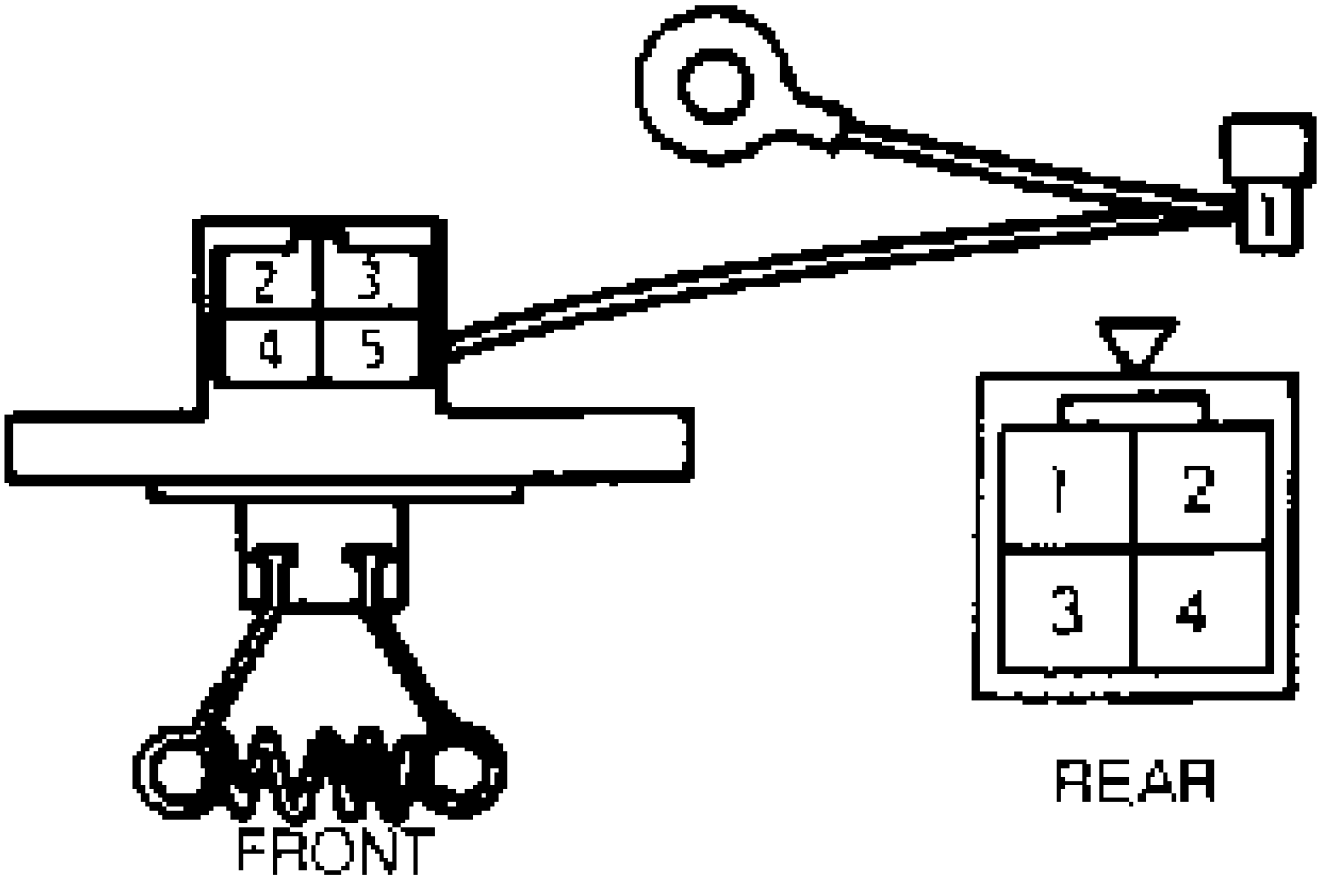

Fig. 5: Testing Blower Resistor
Courtesy of Mitsubishi Motor Sales of America.

BLOWER SWITCH

With blower switch in position indicated in BLOWER SWITCH CONTINUITY TEST table, ensure continuity exists between terminals listed. See Fig. 6 or 7.

BLOWER SWITCH CONTINUITY TEST TABLE

Switch Position	Terminal Numbers	Continuity
Colt Vista		
OFF	1-7	No
Low	1, 2 & 7	Yes
Medium 1	2 & 4	Yes
Medium 2	2 & 5	Yes
High	2 & 6	Yes
Montero		
OFF	1-7	No
Low	1, 2 & 7	Yes
Medium 1	2, 4 & 7	Yes
Medium 2	1, 5 & 7	Yes
High	2, 6 & 7	Yes
Pickup & Ram-50		
OFF	1-6	No
Low	1, 2 & 6	Yes
Medium 1	1, 3 & 6	Yes
Medium 2	1, 4 & 6	Yes
High	1, 5 & 6	Yes

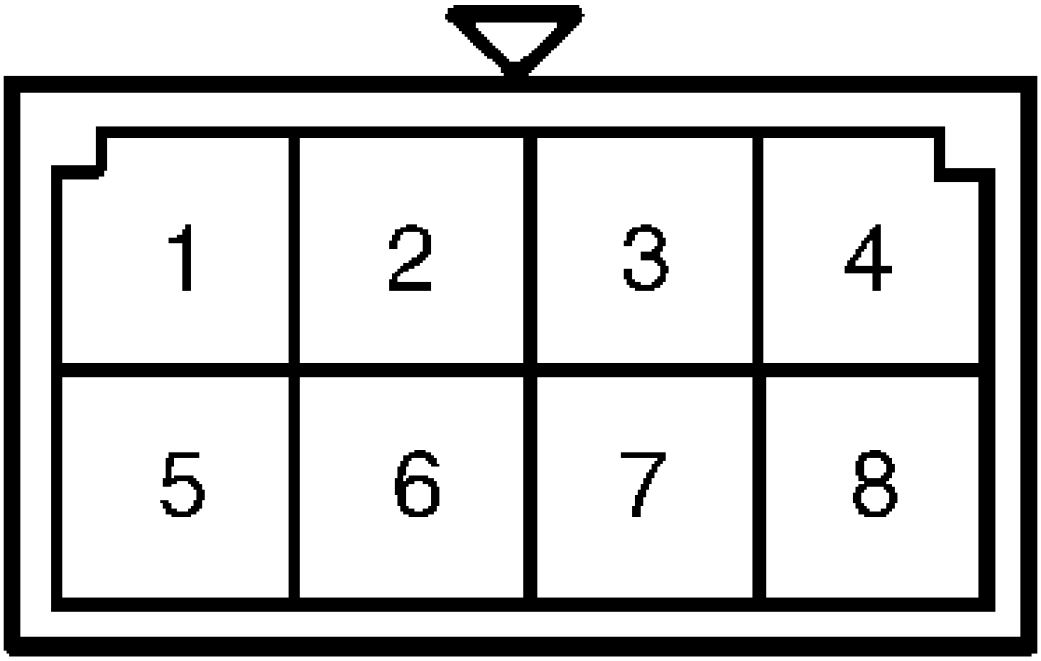

Fig. 6: Blower Switch Terminal ID (Pickup, Ram-50)
Courtesy of Mitsubishi Motor Sales of America.

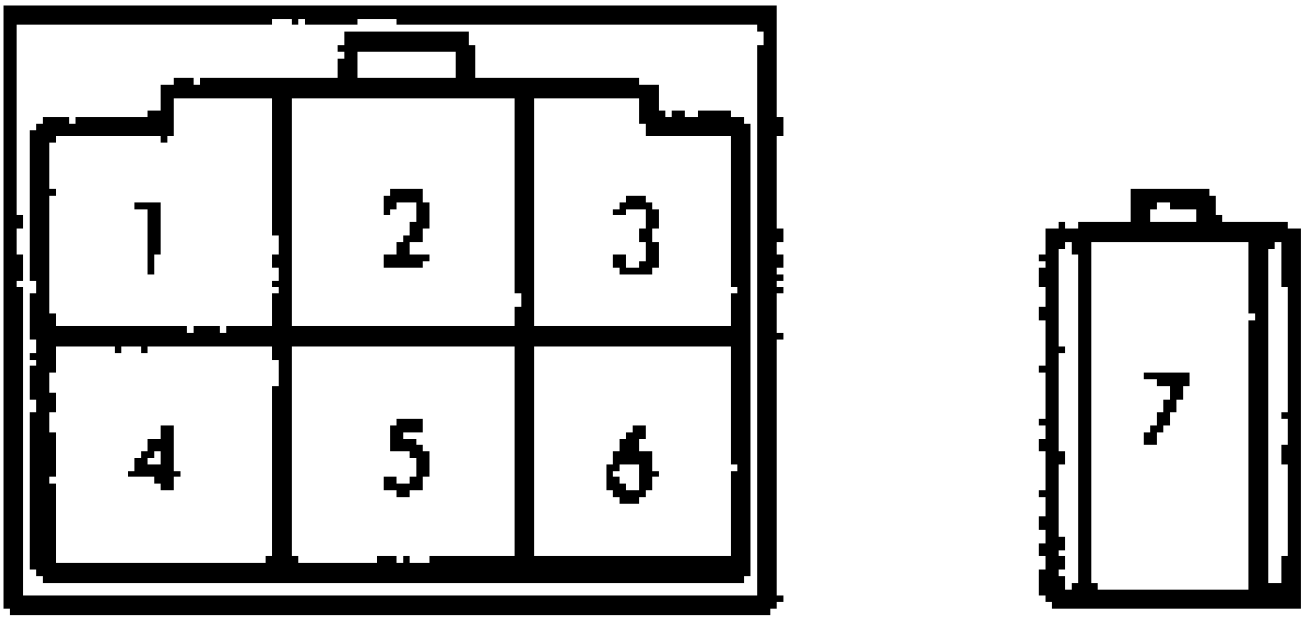

Fig. 7: Front Blower Switch Terminal ID (Colt Vista & Montero) Courtesy of Mitsubishi Motor Sales of America.

DUAL PRESSURE SWITCH

Montero, Pickup & Ram-50

1) Turn engine off. Disconnect harness connector at dual pressure switch (located near condenser). Jumper harness connector. Turn A/C switch and blower switch to ON positions. Momentarily turn ignition on and listen for compressor clutch engagement.

2) If compressor clutch does not engage, check evaporator thermistor and engine coolant temperature switch. Check for a faulty fuse. Repair or replace components as necessary. If compressor clutch engages, go to next step.

3) Connect manifold gauge set to system, and check operating pressures. Dual pressure switch should allow compressor operation if system pressure is 30-384 psi (2-27 kg/cm^2). If dual pressure switch does not operate within specified pressure range, discharge system using approved refrigerant recovery/recycling equipment, and replace switch.

4) After replacing switch, recharge system, and monitor pressures for proper compressor operation. If dual pressure switch cuts power to compressor clutch while driving even though temperatures inside have not yet decreased, high pressure side of dual pressure switch has possibly been activated. Go to next step.

5) Discharge system using approved refrigerant recovery/recycling equipment. Replace switch, and recharge system. Ensure compressor clutch operates within 30-384 psi (2-27 kg/cm^2). Check for sufficient system cooling.

ENGINE COOLANT TEMPERATURE SWITCH

1) Turn engine off. Disconnect connector at engine coolant temperature switch. Jumper wires on harness side of connector. If vehicle uses a single connector, ground connector.

2) Press A/C switch to ON position and turn blower switch to ON position. Momentarily turn ignition on and listen for compressor clutch engagement. Clutch should engage. If clutch does not engage, check fuse and other components wired in series with compressor clutch.

EVAPORATOR THERMISTOR

Disconnect connector and remove thermo relay from evaporator core. Jumper wires on harness side connector. Turn A/C switch to ON position and turn on blower. Momentarily turn ignition on and listen for compressor clutch engagement. If clutch does not engage, check fuse and other components wired in series with compressor clutch.

HIGH PRESSURE SWITCH

Colt Vista

Disconnect high pressure switch connector. Jumper wires on harness side of connector. Momentarily turn ignition on and listen for compressor clutch engagement. If clutch does not engage, check fuse and other components wired in series with compressor clutch.

HIGH/LOW PRESSURE CUT-OFF SWITCH

Pickup & Ram-50

1) Turn engine off. Disconnect High/Low Pressure Cut-Off (HLPCO) switch, located on refrigerant line near condenser. Jumper HLPCO wiring harness connector. Turn A/C switch and blower switch to ON positions. Momentarily turn ignition on and listen for compressor clutch engagement.

2) If compressor clutch does not engage, check evaporator thermistor and engine coolant temperature switch. Check for a faulty fuse. Repair or replace as necessary. If compressor clutch engages, go to next step.

3) Connect manifold gauge set to system, and check operating pressures. HLPCO switch should allow compressor operation if system pressure is 28-385 psi (1.9-27 kg/cm^2). If HLPCO switch does not operate within specified pressure range, discharge system using approved refrigerant recovery/recycling equipment, and replace switch.

4) After replacing switch, recharge system, and monitor pressures for proper compressor function. If HLPCO switch cuts power to compressor clutch while driving even though temperatures inside have not yet decreased, high pressure side of new HLPCO switch has possibly been activated. Go to next step.

5) Discharge system using approved refrigerant recovery/recycling equipment. Replace switch, and recharge system. Ensure compressor clutch operates within 28-385 psi (1.9-27 kg/cm^2). Check for sufficient system cooling.

LOW PRESSURE SWITCH

Colt Vista

Disconnect low pressure switch connector. Jumper wires on harness side of connector. Momentarily turn ignition on and listen for compressor clutch engagement. If clutch does not engage, check fuse and other components wired in series with compressor clutch.

COMPRESSOR CLUTCH

Disconnect wiring to compressor clutch. Connect battery voltage directly to A/C compressor clutch wiring harness connector terminals. If a click is heard, clutch engagement is okay. If click is not heard, pulley and armature are not making contact. Repair or replace as necessary.

REAR BLOWER SWITCH

Montero

With blower switch in position indicated in REAR BLOWER SWITCH CONTINUITY TEST table, ensure continuity exists between terminals listed. See Fig. 8.

REAR BLOWER SWITCH CONTINUITY TEST TABLE

Switch Position	Terminal Numbers	Continuity
OFF	1-6	No
Low	1, 2 & 6	Yes
Medium 1	1, 3 & 6	Yes
Medium 2	1, 4 & 6	Yes
High	1, 5 & 6	Yes

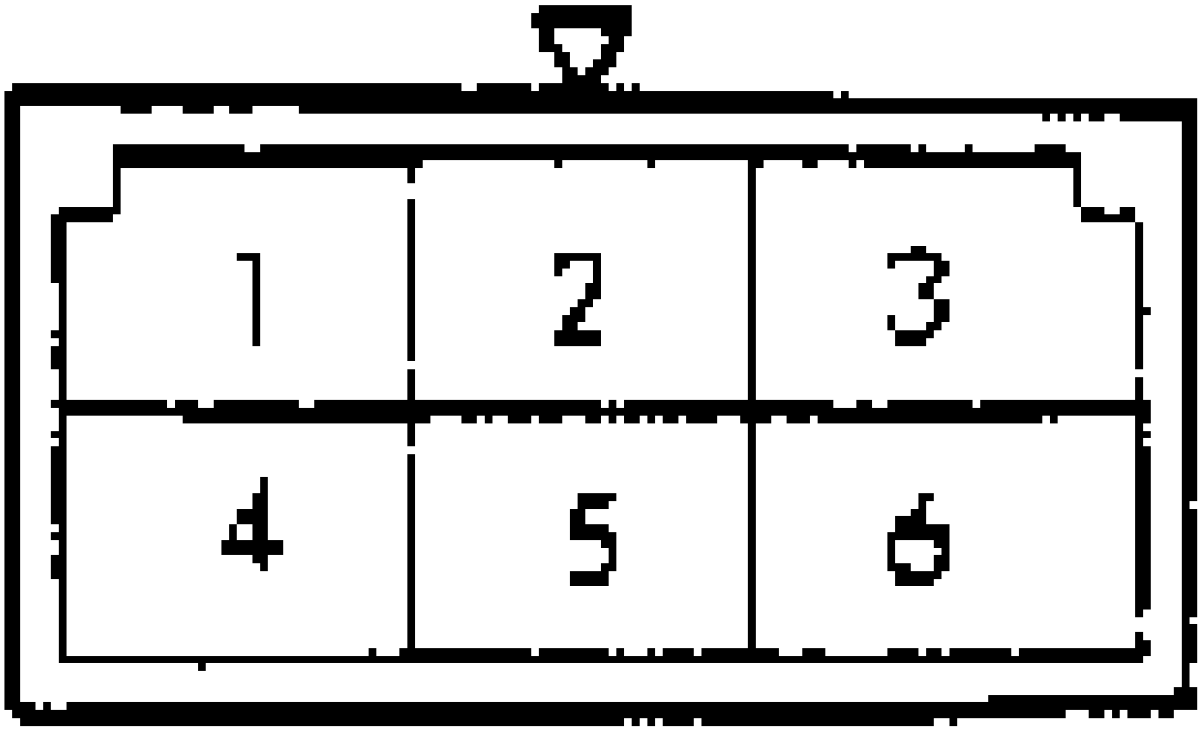

Fig. 8: Identifying Rear Blower Switch Terminals (Montero)
Courtesy of Mitsubishi Motor Sales of America.

REFRIGERANT TEMPERATURE SENSOR

Disconnect refrigerant temperature sensor electrical connector. Using an ohmmeter, measure resistance between terminals. At

77°F (25°C) resistance should be approximately 80,470 ohms. If resistance deviates greatly, replace sensor.

RELAYS

4-Terminal Relay

1) Either round or square relays may be used. Testing is same for either relay. Remove relay from holder. Using an ohmmeter, ensure continuity exists between terminals No. 2 and 4 and does not exist between terminals No. 1 and 3. See Fig. 9.

2) Connect battery voltage to terminal No. 2, and ground terminalNo. 4. Ensure continuity exists between terminals No. 1 and 3. If continuity is not as specified, replace relay.

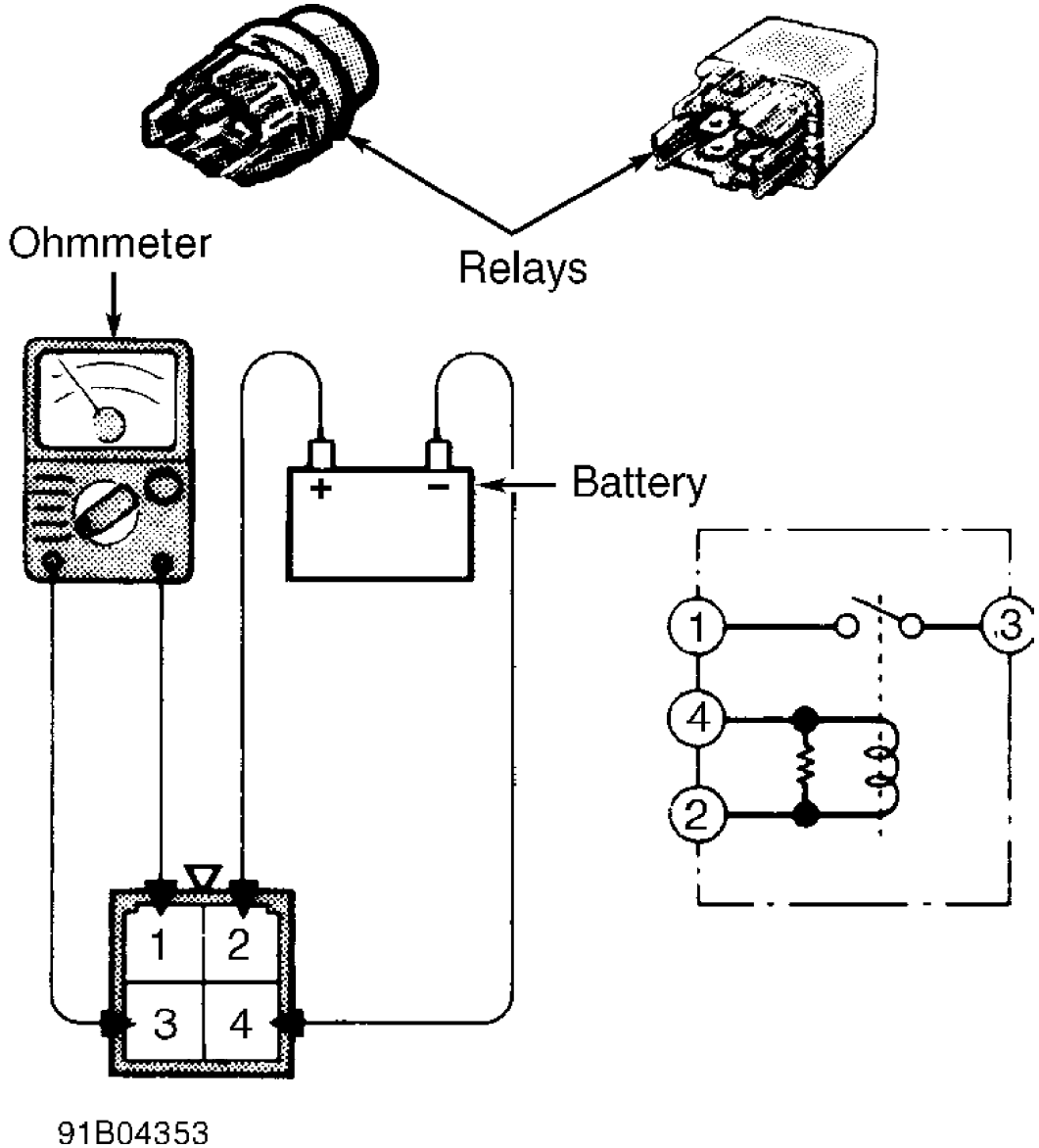

Fig. 9: Testing 4-Terminal Relays
Courtesy of Mitsubishi Motor Sales of America.

6-Terminal Relay

Remove relay from holder. Using an ohmmeter, ensure

continuity exists between terminals No. 2 and 5 and terminals No. 1 and 3 and does not exist between terminals No. 3 and 6. Connect battery voltage to terminal No. 2, and ground terminal No. 5. Ensure continuity exists between terminals No. 3 and 6 and does not exist between terminals No. 1 and 3. See Fig. 10. If continuity is not as specified, replace relay.

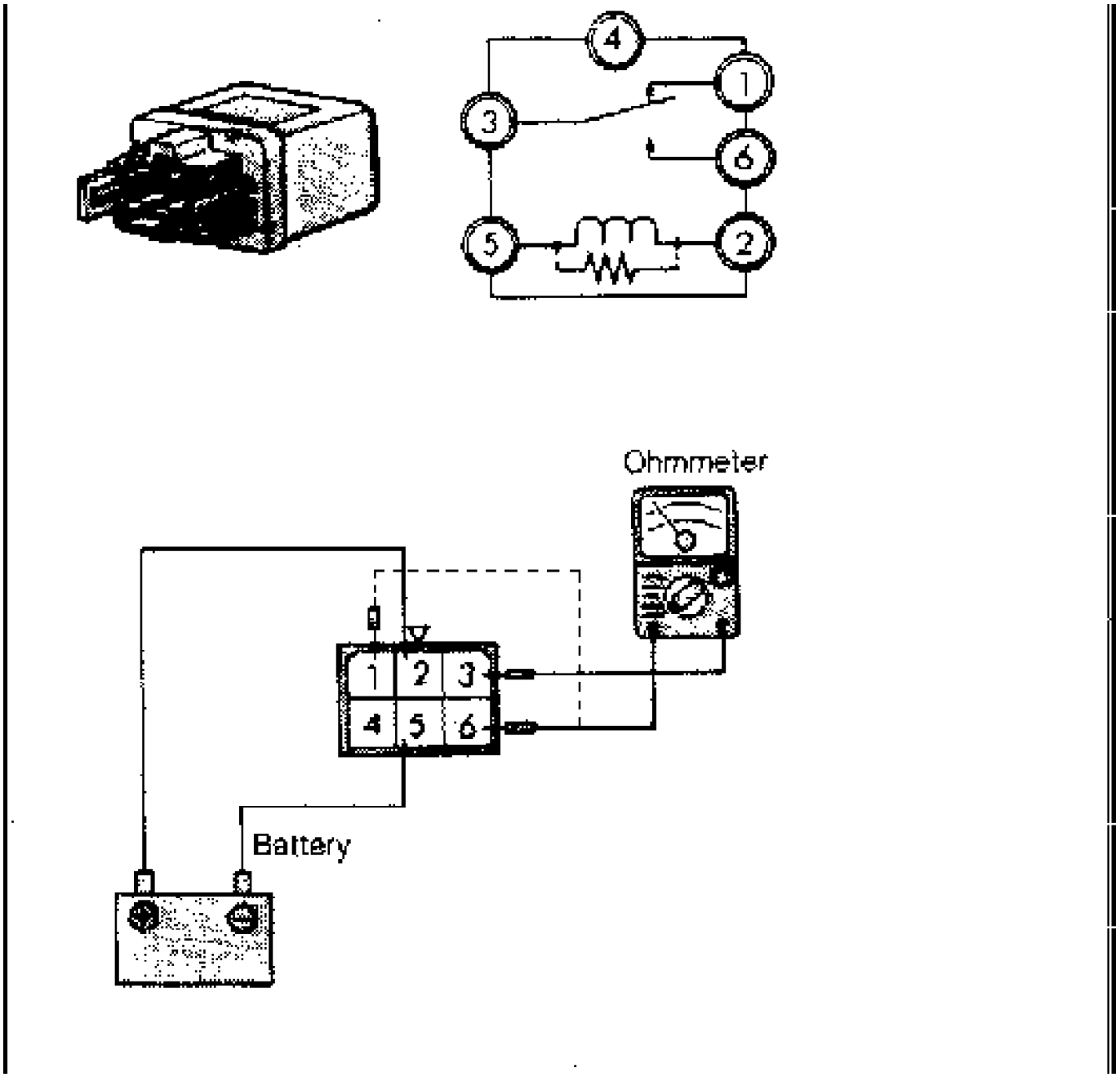

Fig. 10: Testing 6-Terminal Relay
Courtesy of Mitsubishi Motor Sales of America.

REMOVAL & INSTALLATION

NOTE: For removal and installation procedures not covered in this

article, see appropriate HEATER SYSTEM article in the AIR CONDITIONING & HEAT Section.

A/C SWITCH

Removal & Installation (Colt Vista)

From back side of control panel, push right control panel clip right while pushing control panel out of dash panel. Allow control panel to hang. Remove side bracket. Press temperature switch control assembly left, and then remove A/C switch. To install, reverse removal procedure.

Removal & Installation (Montero)

Remove lap heater duct. Remove glove box stoppers and glove box. Remove heater control knobs. Remove center panel screw hole plugs, and remove screws. Remove center panel. Disconnect center panel wiring harness. Remove A/C switch. To install, reverse removal procedure.

Removal & Installation (Pickup & Ram-50)

Remove heater control knobs. Remove glove box. Remove center panel mounting screws. Use a trim stick to remove upper side of panel. Remove A/C switch assembly mounting screws. Pull switch assembly toward vehicle interior. Remove switch. To install, reverse removal procedure.

COMPRESSOR

Removal & Installation (Colt Vista)

Discharge A/C system using approved refrigerant recovery/recycling equipment. Disconnect high tension cable from ignition coil. Remove distributor cap. Loosen idler pulley adjusting bolt, and remove belt. Disconnect compressor electrical connector. Remove high and low pressure lines and "O" rings from compressor. Remove compressor mounting bolts. Remove compressor. To install, reverse removal procedure.

Removal & Installation (Montero, Pickup & Ram-50)

DischargeA/C system using approved refrigerant recovery/recycling equipment. Loosen idler pulley, and remove belt. Disconnect compressor electrical connector. Disconnect high and low pressure lines from compressor. Remove compressor mounting bolts. Remove compressor. To install, reverse removal procedure.

CONDENSER

Removal & Installation (Colt Vista)

Discharge A/C system using approved refrigerant recovery/recycling equipment. Remove front grille and grille brackets. Remove front end cover and condenser harness. Disconnect electrical fan connector. Slowly disconnect pressure lines from condenser. Remove 2 condenser mounting bolts. Lift up and remove condenser from vehicle. To install, reverse removal procedure.

Removal & Installation (Montero)

Discharge A/C system using approved refrigerant recovery/recycling equipment. Remove radiator grille. Slowly disconnect pressure lines from condenser. Disconnect condenser fan motor connector. Remove condenser fan mounting bolts and motor. Remove condenser mounting bolts. Remove condenser from vehicle. To install, reverse removal procedure.

Removal & Installation (Pickup & Ram-50)

Discharge A/C system using approved refrigerant recovery/recycling equipment. Remove grille. Slowly disconnect pressure lines at condenser. Remove upper condenser mounting bolts. Remove condenser. To install, reverse removal procedure.

EVAPORATOR ASSEMBLY

Removal & Installation (Colt Vista)

1) Discharge A/C system using approved refrigerant recovery/recycling equipment. Remove drain hose from evaporator. Disconnect refrigerant line connections. Discard "O" ring seals.

2) Remove lower glove box and dash insert (or reinforcement). See Fig. 11 Remove upper glove box and duct joint. Remove defroster ducts and duct joints from right side of evaporator. Disconnect A/C harness connector and main harness connector. Remove evaporator assembly. To install, reverse removal procedure.

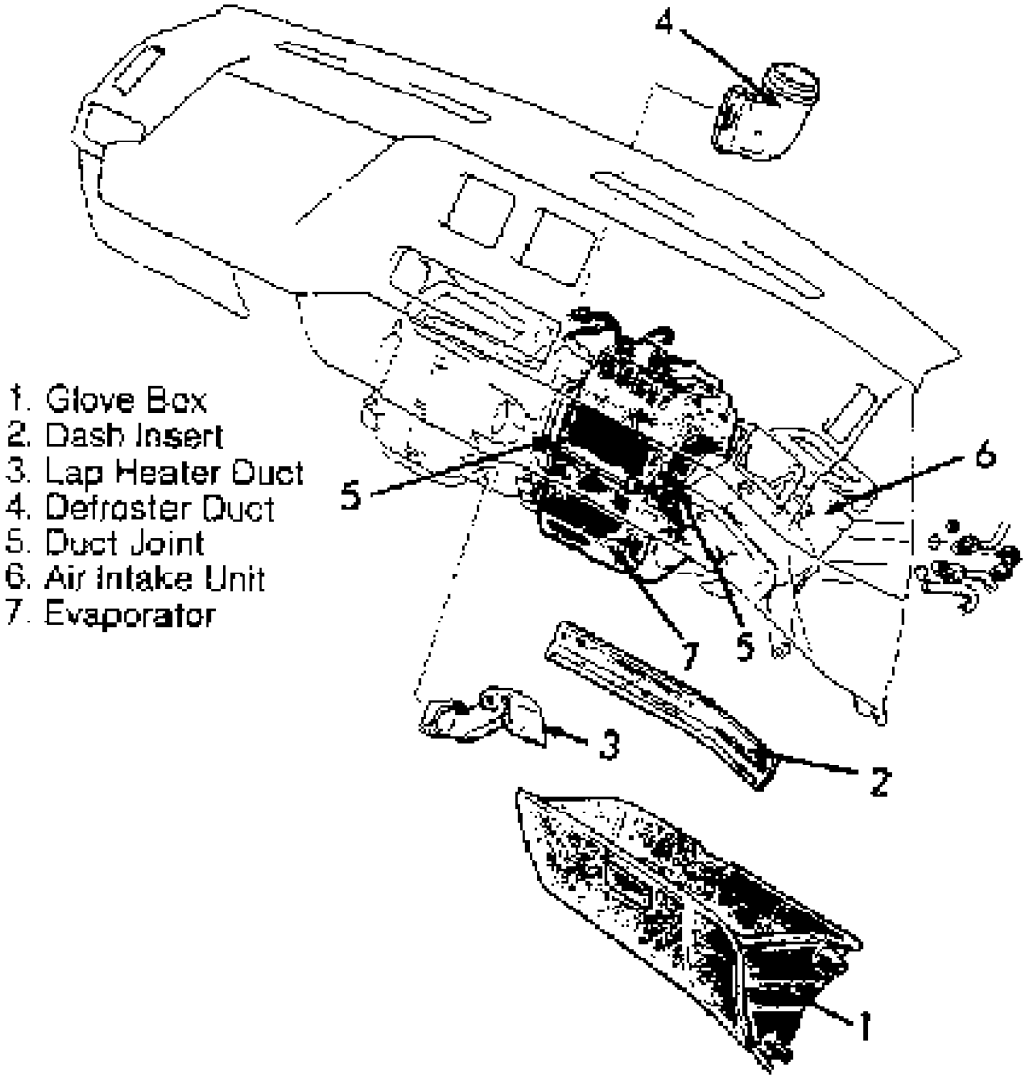

Fig. 11: Removing Evaporator Assembly (Colt Vista)
Courtesy of Mitsubishi Motor Sales of America.

Removal & Installation (Montero)

1) Discharge A/C system using approved refrigerant

recovery/recycling equipment. Remove glove box with lower frame attached. Loosen duct joint bolt to free duct joint. Disconnect A/C switch harness. Disconnect evaporator drain hose.

2) Disconnect refrigerant lines at firewall side of engine compartment. Remove evaporator top attaching bolts in passenger compartment. Remove evaporator assembly. See Fig. 12 or 13. To install, reverse removal procedure.

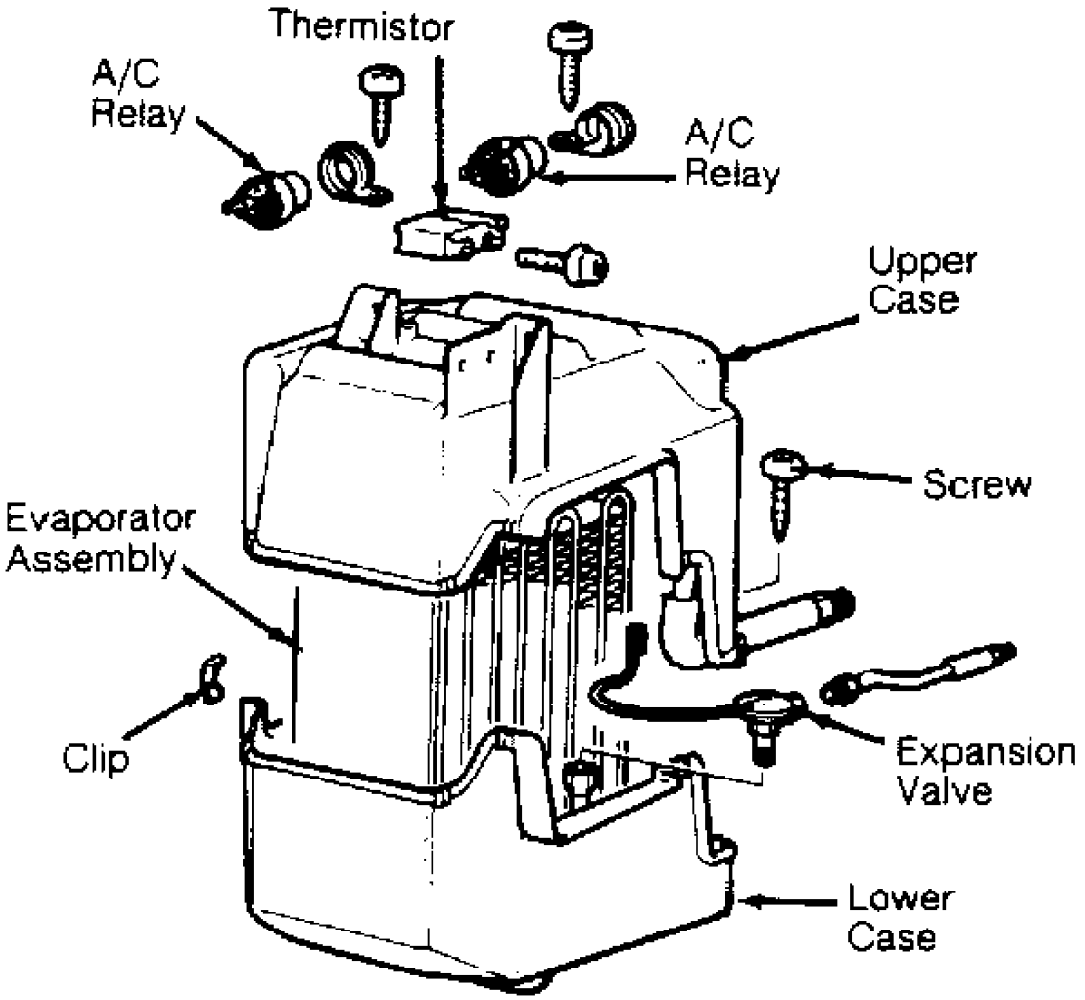

Fig. 12: Exploded View of Front Evaporator (Montero)
Courtesy of Mitsubishi Motor Sales of America.

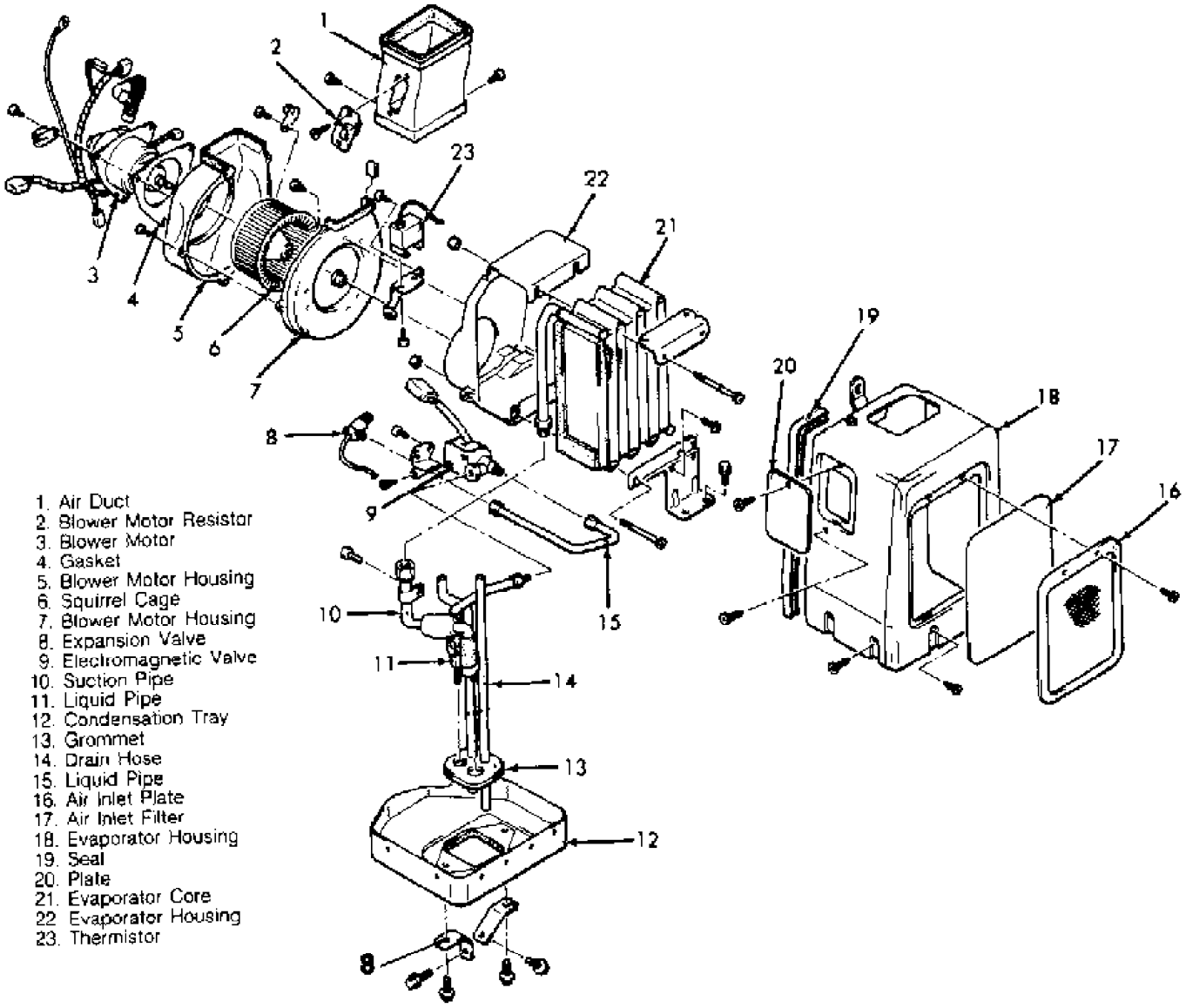

Fig. 13: Exploded View of Rear Evaporator Assembly (Montero)
Courtesy of Mitsubishi Motor Sales of America.

Removal & Installation (Pickup & Ram-50)

Discharge A/C system using approved refrigerant recovery/recycling equipment. Disconnect liquid pipe and suction hose connections. Remove glove box assembly. Remove air and defroster ducts. Remove evaporator drain hose and clamp. Disconnect wiring connectors. Remove nut from firewall evaporator assembly mounting bracket. Remove evaporator assembly. To install, reverse removal procedure.

WIRING DIAGRAMS

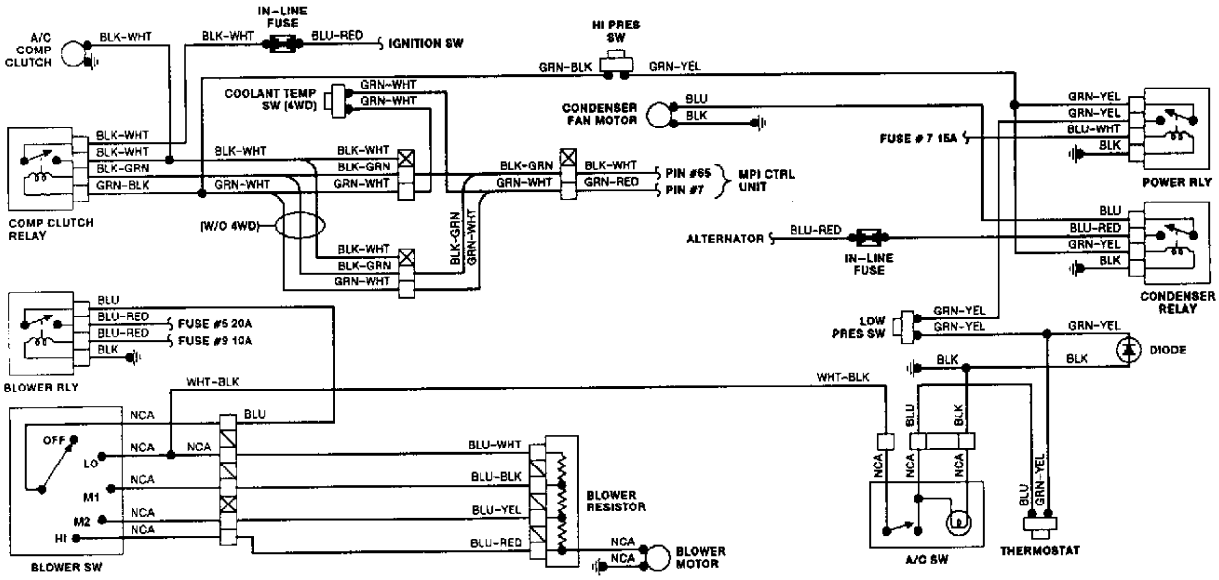

Fig. 14: Manual A/C-Heater Wiring Diagram (Colt Vista)

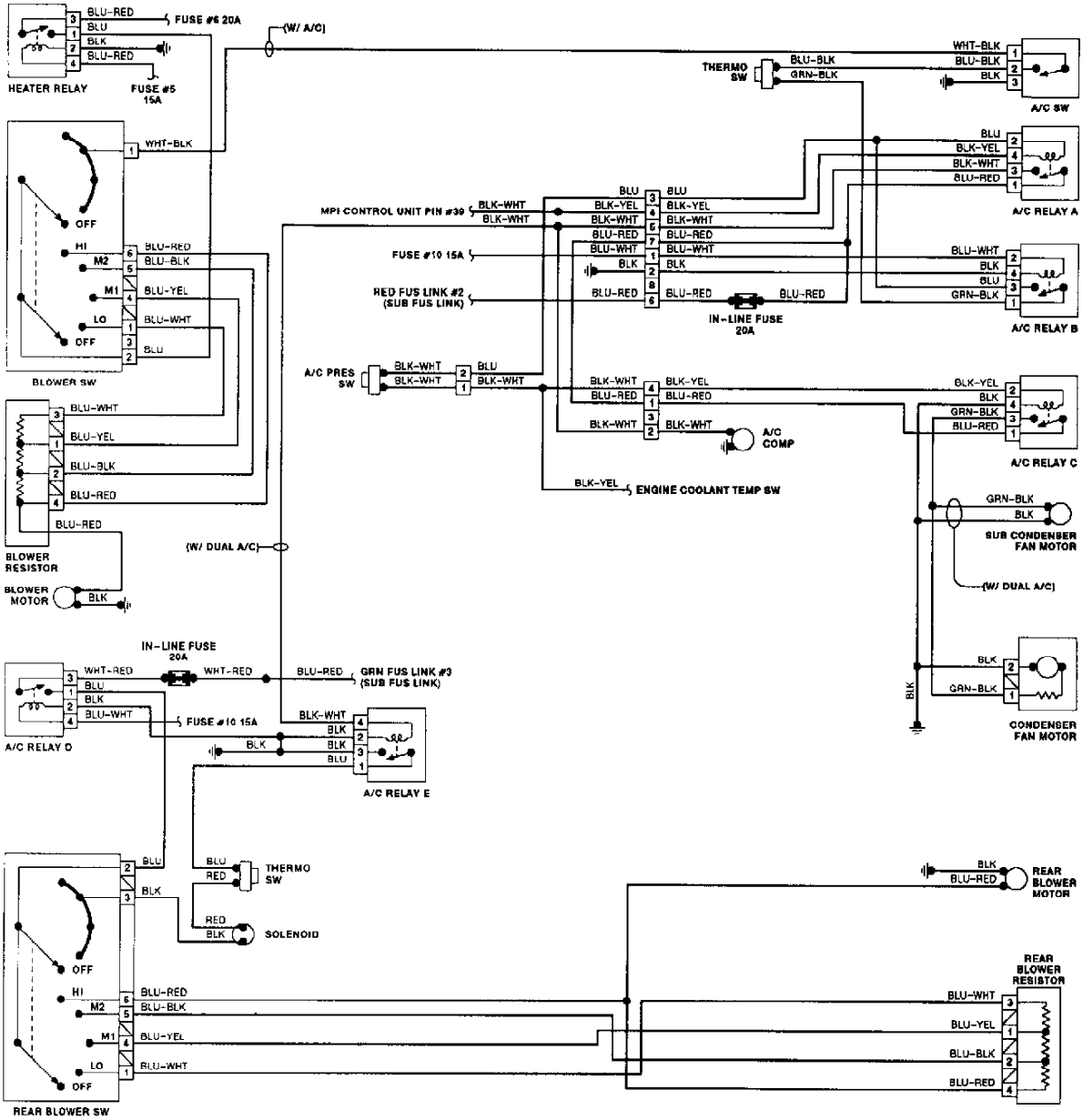

Fig. 15: Manual A/C-Heater Wiring Diagram (Montero)

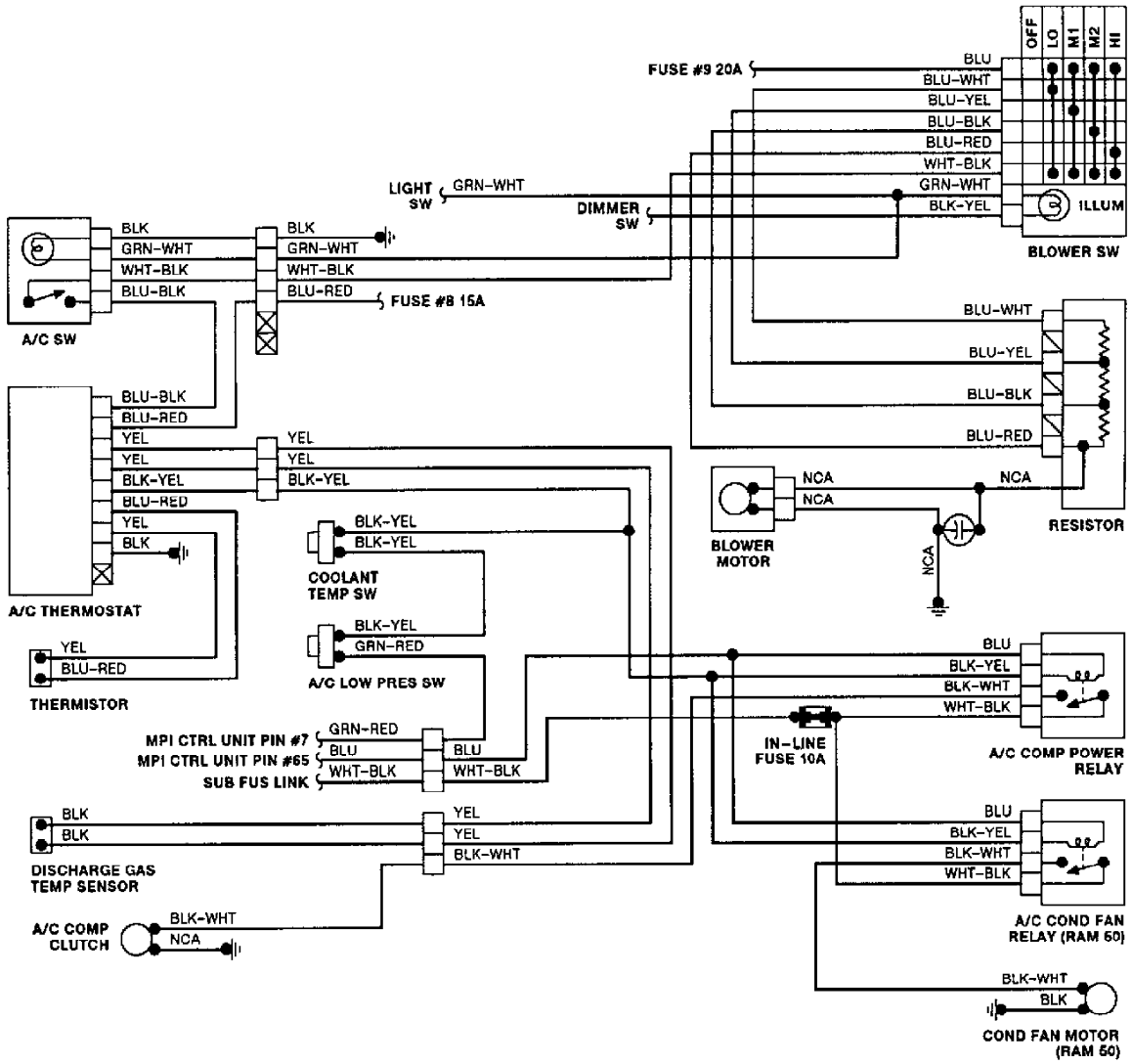

Fig. 16: Manual A/C-Heater Wiring Diagram (Pickup & Ram-50)