

# A/C-HEATER SYSTEM - AUTOMATIC

1994 Mitsubishi 3000GT

1994 AIR CONDITIONING & HEAT  
Mitsubishi Automatic A/C-Heater Systems

3000GT

## A/C SYSTEM SPECIFICATIONS

AUTOMATIC A/C SYSTEM SPECIFICATIONS TABLE

Application	Specification
Compressor Type .....	Sanden MSC105 Scroll
Compressor Belt Deflection	
DOHC .....	5/32-7/32" (4.0-5.5 mm)
SOHC .....	19/64-3/8" (7.5-9.5 mm)
Compressor Oil Capacity (1) .....	4.6-6.0 ozs.
Refrigerant Capacity .....	26-28 ozs.
System Operating Pressures (2)	
High Side .....	111-118 psi (7.8-8.3 kg/cm <sup>2</sup> )
Low Side .....	18.5-27.5 psi (1.3-1.9 kg/cm <sup>2</sup> )

(1) - Use SUN PAG 56 refrigerant oil.

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

**WARNING:** To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES/SAFETY EQUIPMENT section.

**CAUTION:** When battery is disconnected, radio will go into anti-theft protection mode. Obtain radio anti-theft protection code from owner prior to servicing vehicle.

## DESCRIPTION

The A/C system can be operated manually or automatically. Selecting the desired temperature and pressing the AUTO button puts system in automatic control. When the AUTO button is pressed, the indicator in the display window illuminates, and airflow source, airflow outlet, blower speed and compressor operation are automatically controlled to maintain temperature at the selected level.

The temperature setting is retained in memory even after ignition is turned off, unless battery has been disconnected. When heater is requested, air will be directed to windshield and side windows, and blower will operate in low speed to prevent cold/unheated air from being directed to vehicle occupants until coolant temperature is sufficiently warm.

## OPERATION

### A/C-HEATER CONTROL PANEL

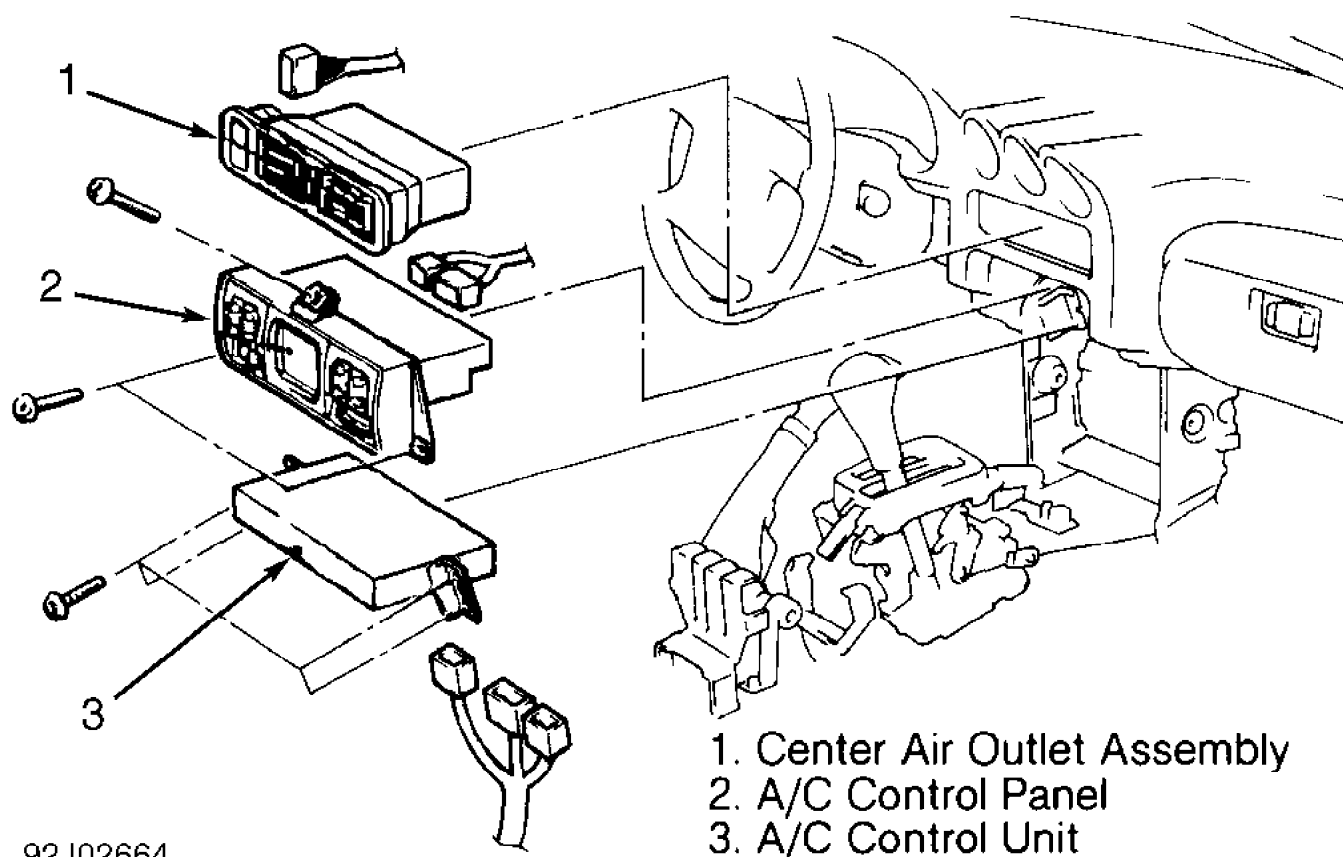
When the AUTO button is pressed and the desired temperature is selected, the A/C system operates in automatic mode to maintain temperature at the level selected. Specific function can be manually

selected by pushing the appropriate button.

When fresh air setting is selected and defrost button is pressed, A/C can be used to defog windshield and windows. Pressing the ECON button puts A/C system in economy mode, operating compressor only when necessary to maintain temperature at selected level.

## A/C CONTROL UNIT

The A/C control unit is located under center console. See Fig. 1. Control unit receives input signals from temperature setting, in-car temperature sensor and photo sensor. These signals are transmitted to blend-air damper motor, mode selector damper motor and blower motor control to maintain desired vehicle interior temperature.



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Fig. 1: Locating A/C Control Unit  
Courtesy of Mitsubishi Motor Sales of America

## SENSORS

### Air Inlet (Outside Air) Temperature Sensor

Mounted on blower assembly, sensor informs control unit of air temperature entering evaporator.

### Coolant Temperature Sensor

Sensor is mounted on heater assembly, left of glove box. Sensor informs control unit of heater core temperature.

### In-Car Temperature Sensor

Mounted on center of headliner, sensor informs control unit of actual interior temperature of vehicle.

#### Photo Sensor

Mounted on top right of airflow vent, sensor transmits signal to control unit based on how much sunlight is entering vehicle.

#### Evaporator Thermistor

Mounted in evaporator fin, thermistor informs control unit of evaporator temperature.

#### Potentiometer

Potentiometer is built as part of the blend-air damper motor and mode selector damper motor. Potentiometer informs control unit of damper position.

### BLOWER MOTOR SPEED CONTROL

Power transistor, located behind glove box outer case, regulates blower motor speed. Signal from control unit energizes power transistor to operate blower motor at a speed required to maintain automatic setting. On high blower speed, the power transistor is bypassed and high-speed blower relay is used.

### TROUBLE SHOOTING

The self-diagnostic function provides indication of abnormal conditions in A/C control unit, related sensors and wirings. Self-diagnostic function includes an automatic control back-up, which provides substitute value(s) in case of system failure. Data link connector is located under left side of dash. Diagnostic codes can be accessed with an analog voltmeter.

### ACCESSING DIAGNOSTIC TROUBLE CODES (DTC)

1) Ensure ignition is off. Using Diagnostic Test Harness (MB991529), connect voltmeter positive lead to Data Link Connector (DLC) terminal No. 11. Connect negative lead to DLC terminal No. 4 or 5. See Fig. 2.

2) Turn ignition on. Count voltmeter sweeps to identify Diagnostic Trouble Code (DTC). Long sweeps identify first digit of DTC, and short sweeps identify second digit. A short pause separates first and second digits of DTC. See DTC IDENTIFICATION table. If 2 or more DTCs are present, the codes will be repeatedly displayed in numerical order until ignition is turned off.

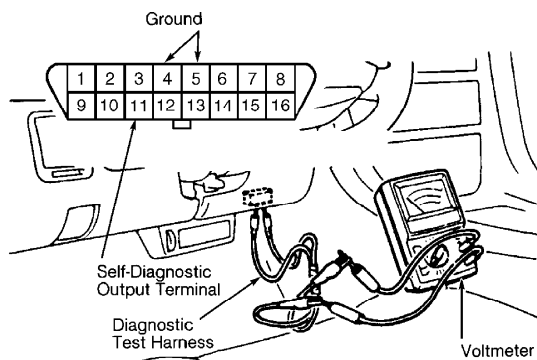


Fig. 2: Locating Data Link Connector  
Courtesy of Chrysler Corp.

#### DTC IDENTIFICATION TABLE

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DTC	Cause
0	Normal
11	In-Car Temp. Sensor Open Circuit
12	In-Car Temp. Sensor Short Circuit
13	Air Inlet (Outside Air) Temp. Sensor Open Circuit
14	Air Inlet (Outside Air) Temp. Sensor Short Circuit
21	Evaporator Thermistor Open Circuit
22	Evaporator Thermistor Short Circuit
31	Blend-Air Damper Potentiometer Short/Open Circuit
32	Mode Selector Damper Potentiometer Short/Open Circuit
41	Defective Blend-Air Damper Motor
42	Defective Mode Selector Damper Motor

## CLEARING TROUBLE CODES

Turn ignition off. Disconnect battery cable for at least 10 seconds. Reconnect battery cable, and check voltmeter. Ensure a normal code (Code 0) is displayed. When using an analog voltmeter, normal code is indicated by continuous voltmeter needle sweep pattern.

## TESTING

**WARNING:** To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES/SAFETY EQUIPMENT section.

## A/C SYSTEM PERFORMANCE

1) Park vehicle away from direct sunlight. Close high-pressure and low-pressure valves of manifold gauge. Connect manifold gauge to A/C system. Start engine.

2) Set mode selector lever at face position. Set temperature control lever at maximum cool setting, and air selector lever at recirculated air setting. Turn A/C on. Operate blower fan in high speed. Adjust engine speed to 1000 RPM with compressor clutch engaged. Close all doors and windows. Ensure hood is open.

**NOTE:** If clutch cycles, take temperature reading before clutch disengages.

3) Insert thermometer in center vent. Run engine for 20 minutes, and note discharge air temperature on thermometer. Ensure discharge temperature and system low-side and high-side pressures are within specification. See A/C SYSTEM PERFORMANCE SPECIFICATIONS table.

### A/C SYSTEM PERFORMANCE SPECIFICATIONS TABLE

Application	(1) Specification
Discharge Air Temperature	33.8-39.2°F (1.0-4.0°C)
Low-Side Pressure	18.5-27.5 psi (1.30-1.93 kg/cm <sup>2</sup> )
High-Side Pressure	110.9-118.1 psi (7.80-8.30 kg/cm <sup>2</sup> )

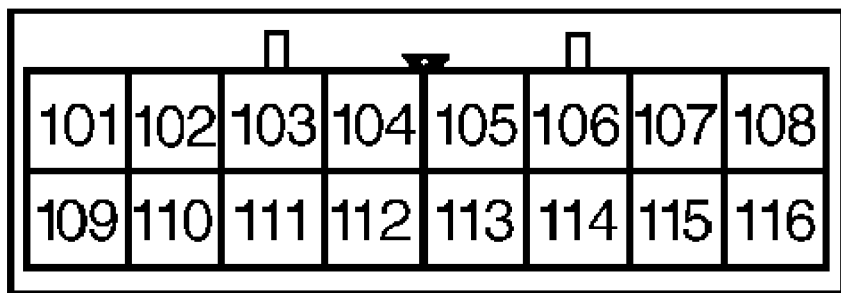
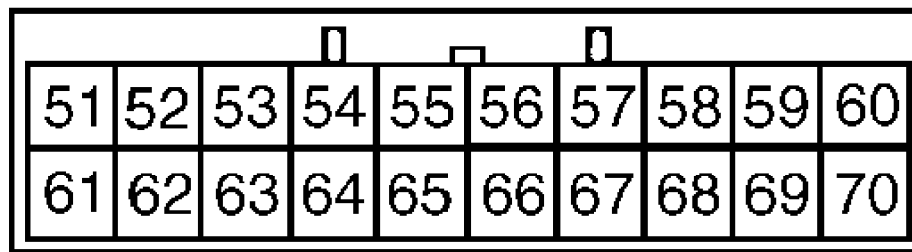
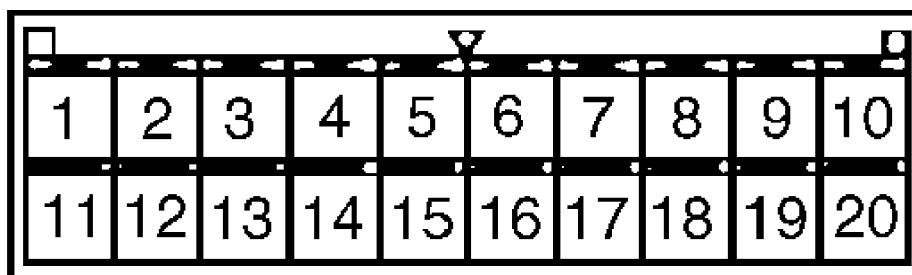
(1) - Specification listed with ambient temperature at 80°F (27°C).

## A/C CONTROL UNIT CIRCUIT TEST

Check voltage between ground and indicated A/C control unit terminals. See A/C CONTROL UNIT CIRCUIT TEST table. See Fig. 3.

A/C CONTROL UNIT CIRCUIT TEST TABLE

Terminal No. (Circuit)	Condition	Volts
53 (Back-Up Power) .....	At All Times .....	12
107 (Ground) .....	At All Times .....	0
108 (Power Source) .....	Ignition On .....	12
115 (Ground) .....	At All Times .....	0
116 (Power Source) .....	Ignition On .....	12



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Fig. 3: Identifying A/C Control Unit Terminals  
Courtesy of Mitsubishi Motor Sales of America

## POTENTIOMETER CIRCUIT TEST

Check voltage between ground and indicated A/C control unit terminals. See POTENTIOMETER CIRCUIT TEST table. See Fig. 3.

POTENTIOMETER CIRCUIT TEST TABLE

Terminal No. (Component)	Condition	Volts
56 (Blend-Air Damper) ..	(1) Max. Cool Setting .....	0.1-0.3
	(1) Max. Hot Setting .....	4.7-5.0
57 (Mode Selector Damper) .....	(1) Face Setting .....	0.1-0.3
	(1) Defrost Setting .....	4.7-5.0
58 (Damper Ground) .....	At All Times .....	0
60 (Power Source) .....	At All Times .....	4.8-5.2

(1) - Damper position.

### IN-CAR TEMP SENSOR, AIR INLET TEMP SENSOR & EVAPORATOR THERMISTOR CIRCUIT TEST

Check voltage between ground and indicated A/C control unit terminals. See IN-CAR TEMPERATURE SENSOR, AIR INLET TEMPERATURE SENSOR & EVAPORATOR THERMISTOR CIRCUIT TEST table. See Fig. 3.

IN-CAR TEMP SENS, AIR INLET TEMP SENS & EVAP THERMISTOR CKT TEST TABLE

Terminal No. (Component/Circuit)	Condition	Volts
55 (Air Inlet Temperature Sensor) .....	(1) 77°C (25°C) .....	2.2-2.8
60 (Sensor Power Source) ...	At All Times .....	4.8-5.2
66 (In-Car Temperature Sensor) .....	(1) 77°C (25°C) .....	2.3-2.9
67 (Evaporator Thermistor) .....	(1) (2) 77°C (25°C) .....	2.3-2.9

(1) - Sensor resistance should be 4000 ohms.

(2) - Measure voltage with A/C off.

### COOLANT TEMPERATURE SENSOR & PHOTO SENSOR CIRCUIT TEST

Check voltage between ground and indicated A/C control unit terminals. See COOLANT TEMPERATURE SENSOR & PHOTO SENSOR CIRCUIT TEST table. See Fig. 3.

COOLANT TEMPERATURE SENSOR & PHOTO SENSOR CIRCUIT TEST TABLE

Terminal No. (Component/Circuit)	Condition	Volts
59 (Coolant Temperature Sensor) .....	(1) Ignition Off .....	12
59 (Coolant Temperature Sensor) .....	(2) Ignition On .....	0
69 (Photo Sensor -) .....	(3) In Sunlight .....	-0.1 To -0.2
69 (Photo Sensor -) .....	(4) In Darkness .....	0
70 (Photo Sensor +) .....	At All Times .....	0

(1) - With coolant temperature less than 122°F (50°C).

- (2) - With coolant temperature greater than 122°F (50°C).
- (3) - Brightness at 100,000 lux or more.
- (4) - Brightness at less than 0 lux.

## BELT LOCK CONTROLLER CIRCUIT TEST

With A/C compressor operating, check voltage between ground and A/C control unit terminal No. 116 (A/C output signal). See Fig. 3. Voltage should be 10-12 volts. Belt lock controller is located under glove box.

## BLEND-AIR SELECTOR, MODE SELECTOR & FRESH/RECIRCULATED AIR SELECTOR DAMPER MOTOR CIRCUIT TEST

Check voltage between ground and indicated A/C control unit terminals. See BLEND-AIR SELECTOR, MODE SELECTOR & FRESH/RECIRCULATED AIR SELECTOR DAMPER MOTOR CIRCUIT TEST table. See Fig. 3.

BLEND-AIR SELECTOR, MODE SELECTOR & FRESH/RECIRCULATED  
AIR SELECTOR DAMPER MOTOR CIRCUIT TEST TABLE

Terminal No. (Component/Circuit)	Condition	Volts
102 (Fresh/Recirc. Air Selector Damper Motor -)	.. (1) Recirc. Air Setting .....	0.5
102 (Fresh/Recirculated Air ..	(2) Fresh Air Setting .....	10
103 (Mode Selector Motor -)	..... (3) Face Setting .....	0.5
103 (Mode Selector Motor -)	... (4) Defrost Setting .....	10
104 (Fresh/Recirculated Air Selector Damper Motor +)	.. (5) Recirc. Air Setting .....	10
104 (Fresh/Recirc. Air .....	(6) Fresh Air Setting .....	0.5
105 (Blend-Air Motor +)	..... (7) 63°F (17°C) .....	0.5
105 (Blend-Air Motor +)	..... (8) 90.5°F (32.5°C) .....	10
111 (Blend-Air Motor -)	..... (7) 63°F (17°C) .....	10
111 (Blend-Air Motor -)	..... (8) 90.5°F (32.5°C) .....	0.5
112 (Mode Selector Motor +)	..... (3) Face Setting .....	10
112 (Mode Selector Motor +)	... (4) Defrost Setting .....	0.5

- (1) - Output turns off 40 seconds after damper moves to recirculated air setting.
- (2) - Output turns off 40 seconds after damper moves to fresh air setting.
- (3) - Output turns off 40 seconds after damper moves to face setting.
- (4) - Output turns off 40 seconds after damper moves to defrost setting.
- (5) - Output turns off 40 seconds after recirculated air has been activated.
- (6) - Output turns off 40 seconds after fresh air has been activated.
- (7) - Output turns off 40 seconds after damper moves to maximum cool setting.
- (8) - Output turns off 40 seconds after damper moves to maximum hot setting.

## POWER TRANSISTOR & BLOWER MOTOR RELAY CIRCUIT TEST

Check voltage between ground and indicated A/C control unit terminals. See POWER TRANSISTOR & BLOWER MOTOR RELAY CIRCUIT TEST table. See Fig. 3.

POWER TRANSISTOR & BLOWER MOTOR RELAY CIRCUIT TEST TABLE

Terminal No. (Component/Circuit)	Condition	Volts
51 (Power Transistor Collector) ..	OFF .....	12
51 (Power Trans. Collector) .....	Low .....	7
51 (Power Trans. Collector) .....	High .....	0
52 (Power Transistor Base) .....	OFF .....	0
52 (Pwr. Transistor Base) .....	Low .....	Approx. 1.3
52 (Pwr. Transistor Base) .....	High .....	Approx. 1.2
101 (High-Speed Relay) .....	High .....	1.5 Or Less
101 (High-Speed Relay) .....	Medium .....	12
101 (High-Speed Relay) .....	Low .....	12
101 (High-Speed Relay) .....	OFF .....	12

### IN-CAR TEMPERATURE SENSOR

1) Connect ohmmeter to in-car temperature sensor terminals. Measure resistance value of sensor at room temperature of 77°F (25°C). Resistance should be approximately 4000 ohms. Replace sensor if resistance is not as specified.

2) To check in-car temperature sensor circuit, measure voltage between A/C control unit terminal No. 66 and ground at room temperature of 77°F (25°C). See Fig. 3. Voltage should be 2.3-2.9 volts.

3) If voltage is not as specified, check circuit on harness between sensor and A/C control unit. Check for poor connection at A/C control unit connector, or check for a defective A/C control unit. Repair or replace as necessary.

### AIR INLET TEMPERATURE SENSOR

1) Connect ohmmeter to air inlet temperature sensor terminals. Measure sensor resistance at room temperature of 77°F (25°C). Resistance should be approximately 4000 ohms. Replace sensor if resistance is not as specified.

2) To check sensor circuit, measure voltage between A/C control unit terminal No. 55 and ground at room temperature of 77°F (25°C). See Fig. 3. Voltage should be 2.2-2.8 volts.

3) If voltage is not as specified, check circuit on harness between sensor and A/C control unit. Check for poor connection at A/C control unit connector, or check for a defective A/C control unit. Repair or replace as necessary.

### COOLANT TEMPERATURE SENSOR

1) Disconnect coolant temperature sensor connector. Connect ohmmeter to coolant temperature sensor terminals. Check sensor continuity with coolant temperature at 73-87°F (23-31°C). Continuity should be present. If continuity does not exist, replace coolant temperature sensor.

2) To check sensor circuit, measure voltage between A/C control unit terminal No. 59 and ground with temperature less than 122°F (50°C). Voltage should be 12 volts with ignition off. Measure voltage between control unit terminal No. 59 and ground with temperature greater than 122°F (50°C). Ensure voltage is zero volts with ignition on.

3) If voltage is not as specified, check harness circuit between coolant temperature sensor and A/C control unit. Check for poor connection at A/C control unit connector, or check for a defective A/C control unit. Repair or replace as necessary.



## EVAPORATOR THERMISTOR

1) Using ohmmeter, check resistance of thermistor at indicated temperatures. See EVAPORATOR THERMISTOR RESISTANCE table. Replace evaporator thermistor if resistance largely deviates from specified value.

2) To check thermistor circuit, measure voltage between A/C control unit terminal No. 67 and ground with temperature at 77°F (25°C). See Fig. 3. Voltage should be 2.3-2.9 volts.

3) If voltage is not as specified, check harness circuit between evaporator thermistor and A/C control unit. Check for poor connection at A/C control unit connector, or check for a defective A/C control unit. Repair or replace as necessary.

EVAPORATOR THERMISTOR RESISTANCE TABLE (1)

Water Temperature °F (°C)	Ohms
77 (25) .....	3980-4120
104 (40) .....	2210-2350

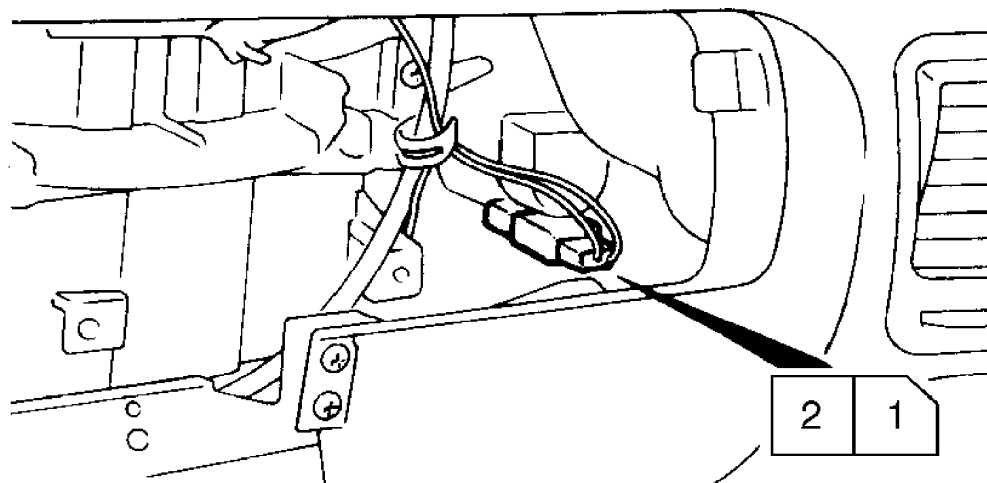
(1) - With thermistor submerged in warm water at specified temperatures for minimum of one minute.

## FRESH/RECIRCULATED AIR DAMPER MOTOR

CAUTION: DO NOT continue to apply battery voltage when damper has completed its travel or if motor fails to rotate.

1) Ensure damper is not in recirculated or fresh air position. Disconnect fresh/recirculated air damper motor connector. Apply battery voltage to motor connector. See Fig. 4. Ensure motor rotates when battery voltage is applied.

2) Reverse battery polarity on motor connector. Ensure motor rotates in the opposite direction. If motor does not function as specified, check wiring or replace defective motor.



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Fig. 4: Testing Fresh/Recirculated Air Damper Motor  
Courtesy of Mitsubishi Motor Sales of America

## BLEND-AIR DAMPER MOTOR

**CAUTION:** DO NOT continue to apply battery voltage when damper has completed its travel or if motor fails to rotate.

1) Ensure damper is not in maximum hot or maximum cool position. Disconnect blend-air damper motor connector. Apply battery voltage to motor connector Red/Green wire and Black/White wire terminals. Ensure motor rotates when battery voltage is applied.

2) Reverse battery polarity on motor connector. Ensure motor rotates in the opposite direction. If motor does not function as specified, check wiring or replace defective motor.

### **BLEND-AIR DAMPER POTENTIOMETER**

1) Connect ohmmeter between motor connector Blue/Green wire and Blue/White wire terminals. Resistance should gradually change as damper is moved from maximum hot to maximum cool position.

2) Resistance should be 200 ohms at maximum hot position, and 4800 ohms at maximum cool position. Replace blend-air damper motor if resistance is not as specified.

3) To check potentiometer circuit, set damper to maximum cool position. Measure voltage between A/C control unit connector terminal No. 56 and ground. See Fig. 3. Voltage should be 0.1-0.3 volt. Measure voltage between control unit terminal No. 56 and ground with damper at maximum hot position. Voltage should be 4.7-5.0 volts.

4) If voltage is not as specified, check harness circuit between blend-air damper potentiometer and A/C control unit. Check for poor connection at A/C control unit connector, or check for a defective A/C control unit. Repair or replace as necessary.

### **MODE SELECTOR DAMPER MOTOR**

**CAUTION:** DO NOT continue to apply battery voltage when damper has completed its travel or if motor does not rotate.

1) Ensure damper is not in defrost or face position. Disconnect mode selector damper motor connector. Apply battery voltage to motor connector Red/Yellow wire and Green/Blue wire terminals. Ensure motor rotates when battery voltage is applied.

2) Reverse battery polarity on motor connector. Motor should rotate in the opposite direction. If motor does not function as specified, check wiring or replace defective motor.

### **MODE SELECTOR DAMPER POTENTIOMETER**

1) Connect ohmmeter between damper motor connector Blue/Green wire and Blue/White wire terminals. Resistance should gradually change as damper is moved from defrost to face position.

2) Resistance should be 200 ohms at defrost position, and 4800 ohms at face position. Replace mode selector damper motor if resistance is not as specified.

3) To check potentiometer circuit, set damper to face position. Measure voltage between A/C control unit connector terminal No. 57 and ground. See Fig. 3. Voltage should be 0.1-0.3 volt. Measure voltage between control unit terminal No. 57 and ground with damper at defrost position. Voltage should be 4.7-5.0 volts.

4) If voltage is not as specified, check harness circuit between mode selector damper potentiometer and A/C control unit. Check for poor connection at A/C control unit connector, or check for a defective A/C control unit. Repair or replace as necessary.

### **REMOVAL & INSTALLATION**

**WARNING:** To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES/SAFETY EQUIPMENT section.

**CAUTION:** When battery is disconnected, radio will go into anti-theft protection mode. Obtain radio anti-theft protection code from owner prior to servicing vehicle.

## **A/C-HEATER CONTROL PANEL**

### **Removal & Installation**

1) Disconnect battery ground cable. Drain coolant. Remove cup holder and plug from rear floor console. Remove rear console. Remove radio panel, radio and switch panel from front floor console. Remove front console side covers and trim plates. Remove shift lever knob (M/T models) and front floor console.

2) Using flat-tip screwdriver, remove clips from center air outlet panel. Remove center air outlet assembly using plastic trim stick. Remove A/C-heater control panel. Remove A/C control unit from panel. To install, reverse removal procedure.

## **POWER TRANSISTOR & BELT LOCK CONTROLLER**

### **Removal & Installation**

Remove glove box door stops and outer case. Remove power transistor. Remove glove box under cover and belt lock controller. To install, reverse removal procedure.

## **FRESH/RECIRCULATED AIR DAMPER MOTOR**

### **Removal & Installation**

Remove glove box door stops and outer case. Remove fresh/recirculated air selector damper motor. To install, reverse removal procedure.

## **BLEND-AIR DAMPER MOTOR**

### **Removal & Installation**

1) Disconnect battery ground cable. Drain coolant. Remove cup holder and plug from rear floor console. Remove rear console. Remove radio panel, radio and switch panel from front floor console. Remove front console side covers and trim plates. Remove shift lever knob (M/T models) and front floor console.

2) Using flat-tip screwdriver, remove clips from center air outlet panel. Remove center air outlet assembly using plastic trim stick. Remove A/C-heater control panel and A/C control unit. Remove blend-air damper motor. To install, reverse removal procedure.

## **MODE SELECTOR DAMPER MOTOR**

### **Removal & Installation**

Remove left knee protector. Remove left console cover, left shower duct and lap cooler duct. Remove mode selector damper motor assembly. To install, reverse removal procedure.

## **PHOTO SENSOR**

### **Removal & Installation**

Remove glove box door stops and outer case. Disconnect photo sensor connector. Using a trim stick, pry out photo sensor from top of

left defroster outlet. To install, reverse removal procedure.

## **COOLANT TEMPERATURE SENSOR**

### **Removal & Installation**

Drain coolant. Remove glove box door stops and outer case. Reach behind glove box opening and remove coolant temperature sensor. To install, reverse removal procedure. Refill coolant and check for leaks.

## **AIR-INLET TEMPERATURE SENSOR**

### **Removal & Installation**

Remove glove box door stops and outer case. Remove air-inlet temperature sensor mounted near evaporator case. To install, reverse removal procedure.

## **IN-CAR TEMPERATURE SENSOR**

### **Removal & Installation**

Use trim stick to pry out in-car temperature sensor from headliner. Disconnect electrical connector, and remove sensor. To install, reverse removal procedure.

## **WIRING DIAGRAMS**



