A/C-HEATER SYSTEM - AUTOMATIC

Article Text

1991 Audi 90

For chip

Monday, October 18, 1999 05:32PM

ARTICLE BEGINNING

1991 AIR CONDITIONING & HEATING
Audi Automatic A/C-Heater Systems

90, 100, 200

*** PLEASE READ THIS FIRST ***

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

DESCRIPTION

The A/C-heater control panel has buttons to control system. Blower speed is controlled automatically according to difference between selected temperature and interior temperature. Blower speed can also be controlled manually. Depressing the HI or LO buttons will raise or lower blower speed. The WARMER or COOLER buttons are used to raise or lower temperature as desired.

The climate control system automatically maintains temperatures set between 64øF (18øC) and 85øF (29øC). If a temperature above 85øF (29øC) is selected, the word HI appears in temperature display. If a temperature below 64øF (18øC) is selected, the word LO is displayed. Selection of these temperatures overrides automatic climate control system.

OPERATION

A/C SYSTEM

If the vehicle interior is hot and the climate control system is programmed to maintain a temperature of 75øF (24øC), the system will open recirculation doors. The fresh air door will close and 85% of inside air will be recirculated. Heater control valve will close and air will flow from registers. Temperature control door should be closed. No air should flow through heater core. Blower speed will increase from low to high over a 10-second period. As interior cools down, recirculation door will close as fresh air door begins to open.

If needed, heater control valve will open, temperature control door will begin to open and blower speed will slow down. Air flowing from registers will warm slightly. The 3 factors controlling operation of system are outside temperature, inside temperature and temperature setting.

HEATER SYSTEM

If vehicle is very cold and climate control system is programmed to maintain a temperature of 75øF (24øC), the system will

close recirculation door and outside air will flow into system. Heater control valve will open, allowing coolant to flow through heater core. Air will flow from floor vents. Temperature control door will open, and all air will flow through heater core. Blower speed can be controlled manually, regardless of heater setting, by pushing HI or LO button.

NOTE: The blower delay feature is overridden when DEFROST button is depressed. Hot air does not flow from registers in DEFROST mode. If system is in BI-LEV (bi-level) mode, warm air flows out of floor vents and cooler air flows out of registers.

A/C-HEATER CONTROL PANEL & AIR DISTRIBUTION

The A/C-heater control panel receives input from driver and system components. It processes input signals and operates system accordingly. See Fig. 1.

OFF Mode

When OFF button is pressed, system is switched off. Fresh air intake is closed and temperature display is turned off. Outside temperature is shown on display.

ECON Mode

In ECON (economy) mode, A/C compressor is turned off. Temperature, blower speed and air distribution are automatically regulated. Air distribution is determined by difference between actual interior temperature and selected temperature.

AUTO Mode

When AUTO button is pressed, A/C compressor is turned on. Temperature, blower speed and air distribution are automatically regulated. Air distribution is determined by difference between actual interior temperature and selected temperature.

BI-LEV Mode

When BI-LEV (bi-level) button is pressed, A/C compressor is turned on. Temperature, blower speed and air distribution are automatically regulated. Air distribution is fixed at center and footwell outlets.

DEFROST Mode

In this setting, temperature and blower speed are automatically regulated. All air is directed toward the windshield.

NOTE: If vacuum system fails, climate control system automatically switches to maximum defrost.

HI & LO Settings

These settings are used to raise or lower blower speed in all operating modes. The HI or LO settings are canceled by pressing

another mode button.

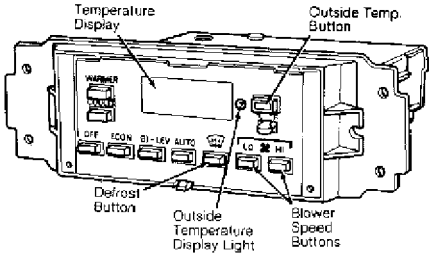


Fig. 1: Identifying A/C-Heater Control Panel
Courtesy of Audi of America, Inc.

A/C PROGRAMMER

The A/C programmer receives input signals from A/C-heater control panel. The programmer contains 5 solenoids which operate the vacuum servos for air distribution and heater valve. Based on input signals, the programmer also switches on the A/C compressor and radiator fan and controls the servomotor for temperature regulation. The programmer is located behind right side of glove box.

A/C BLOWER CONTROL UNIT

The A/C blower control unit receives signal from A/C-heater control panel, and regulates the amount of power supplied to the fresh air blower motor accordingly. The A/C blower control unit is located on top of evaporator assembly. See Fig. 2.

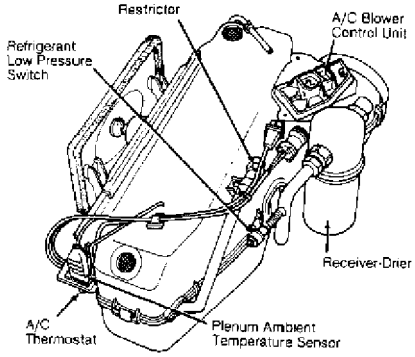


Fig. 2: Identifying Evaporator Assembly Components
Courtesy of Audi of America, Inc.

AMBIENT TEMPERATURE SENSORS

Two sensors measure the outside air temperature and send input signals to the A/C-heater control panel. The A/C-heater control

panel measures both sensor readings and uses the lowest temperature value to calculate correction factor for interior temperature regulation. One sensor is located in front of radiator and the other is located in evaporator plenum chamber. See Fig. 2.

IN-CAR TEMPERATURE SENSORS

The in-car temperature sensors measure interior air temperature and send signals to the A/C-heater control panel. A small fan drives air over instrument panel sensor to ensure accurate measurement. One sensor is mounted on top of instrument panel and the other is located next to front dome light.

REFRIGERANT LOW PRESSURE SWITCH

The refrigerant low pressure switch disengages A/C compressor clutch if refrigerant pressure drops below 15 psi (1.1 kg/cmý). Switch is located in suction line from A/C accumulator and can be removed without discharging refrigerant from system. See Fig. 2.

REFRIGERANT HIGH PRESSURE SWITCH

Switch controls cooling fan 2nd stage operation. Switch closes when pressure reaches 200 psi (14.1 kg/cmý). Switch is located in high pressure line to A/C compressor and identified by yellow or green housing. It can be removed without discharging refrigerant from system.

A/C HIGH PRESSURE CUT-OUT SENSOR

Sensor measures refrigerant pressure and sends resistance signal to A/C-heater control panel. If refrigerant pressure goes above 435 psi (30.6 kg/cmý), the A/C-heater control panel will shut A/C compressor off to prevent system damage. The A/C high pressure cut-out sensor, located next to refrigerant high pressure switch, is identified by red housing.

A/C THERMOSTAT

The A/C thermostat controls power supply to A/C compressor clutch relay to prevent ice from forming on evaporator. If evaporator temperature falls below 32øF (0øC), A/C thermostat switch opens, A/C compressor clutch relay opens and A/C compressor clutch disengages. The A/C thermostat is located on evaporator housing, with its capillary tube inserted in evaporator.

ENGINE COOLANT OVERHEAT SWITCH

When coolant temperature is greater than 247øF (120øC), switch sends a ground signal to terminal No. 20 of A/C-heater control panel. The A/C-heater control panel then sends a signal to A/C programmer, which in turn disengages the A/C compressor clutch. The

engine coolant overheat switch is part of the electronic thermoswitch, located on cylinder head coolant flange.

ADJUSTMENTS

HEATER FLAP

1) Remove windshield wiper assembly. Remove heater box cover. Remove 5 screws and servomotor cover with gasket attached. Turn ignition on. Set A/C control panel to HI.
2) Select diagnosis Channel No. 8. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. A value of 9-14 will be displayed; correct value is 12.
3) To adjust, insert screwdriver through hole in servomotor housing. See Fig. 3. Turn screwdriver clockwise to decrease value or counterclockwise to increase value.

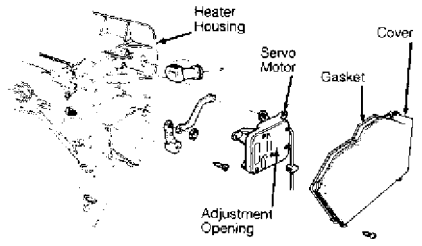


Fig. 3: Adjusting Heater Flap
Courtesy of Audi of America, Inc.

TROUBLE SHOOTING

ACCESSING MEMORY FAULT CHANNEL

NOTE: While information is being displayed on A/C-Heater control panel, A/C system will run in last mode selected.

1) Start engine, and operate A/C-heater system in AUTO mode. Simultaneously press and hold outside temperature and OFF buttons. Release outside temperature button and then OFF button. Display panel should read 01. Fault channel numbers are displayed with a short vertical line before first fault channel number.
2) Pressing WARMER button will advance display of fault channel by one. Each time WARMER button is pressed, system will advance to next fault channel until last number is reached; it will then return to 01. Pressing COOLER button decreases fault channel number by one. Memory fault channels are not trouble codes, but identify individual circuits. See Figs. 4-6.
3) To call up information about a particular channel, press outside temperature button. To exit memory fault sequence display, select any A/C operating mode or turn ignition off.

Diagnostic channel no.	Display	Specified display
1	System error	00 = no system error 09 = coolant temperature sensor — interruption Displayed system errors **Note** Coolant temperature sensor will be phased in during production.
2	Measurement value of inside temperature sensor — on roof	Depends on temperature —
3	Measurement value of inside temperature sensor — on instrument panel	
4	Measurement value of outside temperature sensor — (plenum)	Depends on temperature —
5	Measurement value of outside temperature sensor — cowl	
6	Measurement value of coolant temperature sensor **Note** Will be phased in during production.	Depends on temperature — **Note** Display value for vehicles without coolant temperature sensor. 255 = open circuit
7	Graphic display of output control information for A.C. programmer	Depends on program —

Fig. 4: Memory Fault Channels No. 1-7
Courtesy of Audi of America, Inc.

8	Actual value of feedback potentiometer on temperature regulating flap servo motor.	Depends on program — A numerical value for the position of the servo motor is shown
9	Specified value of feedback potentiometer on temperature regulating flap servo motor.	Depends on program Only check when the value in channel 8 is between 30 and 200. Actual servo motor position (channel 8) and specified servo motor position (channel 9) must not differ by more than 3. If difference is greater than 3, ■ adjust feedback potentiometer. ● specified value: 9-14
10	Specified voltage on fresh air blower	Depends on program **Note** Specified voltage in volts. ■ see diagnostic channel no. 15

92I02531 92A02532 92C02533

Fig. 4: Memory Fault Channels No. 1-22

Fig. 5: Memory Fault Channels No. 8-10
Courtesy of Audi of America, Inc.

Diagnostic channel no.	Display	Specified display
11	Vehicle electrical system voltage	Depends on instantaneous operating condition greater than 9.5 volts
12	Total of electrical system voltage interruptions — values between 5 and 9.5V **Note** Values less than 5 volts are recognized as an open low-pressure switch.	Depends on running performance since display was last erased **Note** Erase (for example, by disconnecting the battery).
13	Program number	No determination, is of no significance for troubleshooting
14	Switch position of high-pressure switch (red housing)	0-5 (high-pressure switch closed)
15	Specified voltage on fresh air blower in volts	Depends on program
16	Pulse counter	Of no significance for troubleshooting. (counts from 0-256)
17	Graphic display of compressor shut-off conditions	Depends on program —
18	Graphic display of electrical outputs	Depends on program —
19	Number of times compressor shut off via high-pressure switch (red housing)	Depends on running performance since display was last reset **Note** Reset (for example, by disconnecting the battery).
20	Number of times compressor shut off via high-pressure switch (red housing) since last ignition switch cycle or reset from OFF button	0 **Note** After 8th shut-off during a driving period, the compressor does not switch on again.
21	Program number	Of no significance for troubleshooting
22	Speed signal **Note** At high vehicle speeds fresh air blower speed is limited in "Fresh Air" mode.	00 when vehicle stopped 01 or greater dependent on vehicle speed

Fig. 6: Memory Fault Channels No. 11-22
Courtesy of Audi of America, Inc.

ACCESSING ERROR CODE

NOTE: Some faults are displayed without having to start memory fault sequence.

Access memory fault channel numbers. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. While display is in any channel number, press outside temperature button. If no fault code is present in memory, display panel will change to previous channel number. If a fault code is present, fault code (a number other than previous channel number) will be displayed. Circuit or sensor of channel number is faulty.

TESTING

* PLEASE READ THIS FIRST *

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

A/C-HEATER SYSTEM CONTROL QUICK CHECK

NOTE: Test steps must be followed in entirety and in sequence.

1) Turn ignition on. Set A/C mode to OFF position. Indicator light on OFF button should illuminate. If indicator light illuminates, go to next step. If indicator light does not illuminate, go to A/C CONTROL PANEL NOT ILLUMINATED under TESTING.

2) Press outside temperature button. See Fig. 1. Outside temperature should be displayed. If outside temperature is displayed, go to next step. If outside temperature is not displayed, go to FAULT MEMORY CANNOT BE INITIATED/OUTSIDE TEMPERATURE CANNOT BE DISPLAYED under TESTING.

3) With outside temperature button pressed, button indicator light should illuminate. If indicator light glows, go to next step. If indicator light does not illuminate, replace A/C control panel.

4) Press all mode buttons one after another. Indicator light on each button should illuminate. If indicator light on each button illuminates, go to next step. If any indicator light does not illuminate, replace A/C control panel.

5) Set A/C mode to AUTO position. Set temperature to 18øC. Switch temperature display from øC to øF using switch below outside temperature button. See Fig. 1. Display should change to 64øF. If display changes, go to next step. If display does not change, replace A/C control panel.

6) Set switch for temperature display from øF to øC. Set temperature gradually to HI, then to LO and again to HI. Temperature display should change. If temperature display changes, go to next step. If temperature does not change, replace A/C control panel.

7) Turn on parking lights. Adjust illumination control back and forth. Brightness of A/C control panel should change accordingly. If brightness changes accordingly, go to next step. If A/C control panel illumination brightness cannot be regulated, go to A/C CONTROL PANEL ILLUMINATION CANNOT BE REGULATED under TESTING.

8) Turn illumination control to full bright position. A/C control panel background illumination should be uniform. If illumination is okay, go to next step. If illumination is not okay, replace A/C control panel.

9) Turn parking lights off. Set A/C mode to ECON position. Set temperature to LO position. Turn ignition off, and wait 20 seconds. Turn ignition on. Mode settings should not change. If mode setting does not change, go to next step. If mode setting changes, go to A/C CONTROL PANEL MEMORY LOSS under TESTING.

10) Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis on Channel No. 1. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If diagnosis can be started, go to next step. If diagnosis cannot be started, see FAULT MEMORY CANNOT BE INITIATED/OUTSIDE TEMPERATURE CANNOT BE DISPLAYED under TESTING.

11) Call up information on memory Channel No. 1. Error codes 00-09 should come up. Code 09 only applies to vehicles without coolant temperature sensor. If specified code(s) come up, go to next step. If codes other than specified codes come up, see Fig. 7.

Errors displayed on memory channel 1

Error code	Error code	Correction of error
00	No error recognized	
01	Inside temperature sensor (instrument panel), open circuit	■ check affected component and related wiring according to wiring diagram
02	Inside temperature sensor (instrument panel), short-circuit	
03	Outside temperature sensor (plenum), open circuit	
04	Outside temperature sensor (plenum), short circuit	
05	Outside temperature sensor open circuit	
06	Outside temperature sensor short circuit	
07	Feedback potentiometer on adjustment motor for temperature regulating flap, interruption/open	■ check temperature regulating flap servo motor (with feedback potentiometer),
08	Feedback potentiometer on adjustment motor for temperature regulating flap, short circuit	
09	Coolant temperature sensor open circuit	■ check coolant temperature sensor and its wiring according to diagram
10	Coolant temperature sensor short circuit	**Note** Coolant temperature sensor will be phased in during production.

Fig. 7: Memory Fault Channel No. 1 Error Codes 00-10
Courtesy of Audi of America, Inc.

Error code number	Error code	Correction of error
11	Inside temperature sensor (roof), open circuit	■ check inside temperature sensor (roof) and its wiring according to wiring diagram
12	Inside temperature sensor (roof), short circuit	
13	Electrical system voltage is or was once less than 9.5 V but greater than 5 V during the current driving period **Note** Values less than 5 V are recognized as an open low-pressure switch.	■ check electrical system voltage
14	Compressor off, high-pressure switch (red housing) cycled 8 times	■ check high-pressure switch (red housing),
15	Adjustment motor for temperature regulating flap (with feedback potentiometer) is set improperly	■ check temperature regulating flap servo motor (with feedback potentiometer),
16	High-pressure switch has open circuit or cycled at least 1 time during current driving period	■ check high-pressure switch (red housing) and its wiring according to wiring diagram

Fig. 8: Memory Fault Channel No. 1 Error Codes 11-16
Courtesy of Audi of America, Inc.

12) Leave diagnostic display on. Set A/C mode to AUTO position. Start engine. Compressor should come on. If compressor comes

on, go to next step. If compressor does not come on, go to COMPRESSOR DOES NOT RUN IN AUTO, BI-LEV OR DEFROST MODES under TESTING.

13) Radiator cooling fan should be running on 1st speed. If radiator cooling fan is running as specified, go to next step. If radiator cooling fan is not running as specified, go to FAN DOESN'T RUN AT 1ST SPEED IN AUTO, BI-LEV & DEFROST MODES under TESTING.

14) Set A/C mode to ECON position. Compressor should operate. If compressor does not operate, go to next step. If compressor operates continuously, go to COMPRESSOR RUNS IN ECON & OFF MODES under TESTING.

15) If radiator cooling fan is running on 1st speed, go to RADIATOR FAN ALWAYS RUNS AT 1ST SPEED IN ECON & OFF MODES under TESTING. If radiator cooling fan is not operating at 1st speed, go to next step.

16) Set A/C mode to OFF position. If fresh air blower is off, go to next step. If fresh air blower continues to run, go to A/C FRESH AIR BLOWER OPERATES AT ALL TIMES IN OFF MODE under TESTING.

17) Set A/C mode to AUTO position. Set temperature to 24øC. Set blower to HI. Fresh air blower should operate at a higher speed. If fresh air blower operates as indicated, go to next step. If fresh air blower does not operate as indicated, go to FRESH AIR BLOWER DOES NOT RUN IN AUTO, BI-LEV, DEFROST OR ECON MODES under TESTING.

18) Set blower control to LO position. Fresh air blower should run at a lower speed. If fresh air blower runs as specified, go to next step. If fresh air blower speed cannot be regulated, go to FRESH AIR BLOWER SPEED CANNOT BE REGULATED under TESTING.

19) Set A/C mode to DEFROST position. Set temperature gradually to HI, LO and then HI position again. Fresh air blower speed should change. If fresh air blower speed changes, go to next step. If fresh air blower speed does not change, replace A/C control panel.

20) Set A/C mode to AUTO position. Set temperature to LO. Open instrument panel outlets. Recirculation/fresh air flap should go into recirculation mode within one minute, heater valve should close and most of air volume should come from instrument panel outlets. If operation is okay, go to next step. If operation is not as specified, check control of vacuum units and flaps. Go to VACUUM UNITS & FLAPS POSITION under TESTING.

21) Check if temperature regulating flap is in cooling position. If flap is in cooling position, go to next step. If temperature regulating flap is not in cooling position, check adjustment motor for temperature regulating flap (with feedback potentiometer). Go to ADJUSTMENT MOTOR FOR REGULATING FLAP (WITH FEEDBACK POTENTIOMETER) under TESTING.

22) Set temperature to HI. If recirculation/fresh air flap is in fresh air position and heater valve is in open position, go to next step. If recirculation/fresh air flap or heater valve is not in specified position, check control vacuum units and flap position. Go to VACUUM UNITS & FLAPS POSITION under TESTING.

23) Ensure a greater portion of air comes out of footwells and a smaller amount out of defrost vents. If air distribution is as specified, go to next step. If air distribution is not as specified, go to VACUUM UNITS & FLAPS POSITION under TESTING.

24) Check if regulating flap is in heating position. If flap is in heating position, go to next step. If regulating flap is not in heating position, go to ADJUSTMENT MOTOR FOR REGULATING FLAP (WITH FEEDBACK POTENTIOMETER) under TESTING.

25) Set A/C mode to DEFROST position. A greater portion of air volume should come out of defrost vents and a smaller amount out of footwell outlets. If air distribution is as specified, go to next step. If air distribution is not as specified, check control of vacuum units and flap position. Go to VACUUM UNITS & FLAPS POSITION under TESTING.

26) Set temperature to LO and A/C mode to BI-LEV position. A greater portion of air volume should come out of footwell and instrument panel outlets and a smaller amount out of defrost vents. If air distribution is as specified, go to next step. If air distribution is not as specified, check control of vacuum units and flap position. Go to VACUUM UNITS & FLAPS POSITION under TESTING.

27) Set temperature to HI setting. Select diagnostic Channel No. 8. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Wait one minute. Display should show 9-14. If display is as specified, go to next step. If display is not as specified, check adjustment motor for temperature regulating flap (with feedback potentiometer). Go to ADJUSTMENT MOTOR FOR REGULATING FLAP (WITH FEEDBACK POTENTIOMETER) under TESTING.

28) Set temperature to 26øC. Wait 30 seconds. Select diagnostic Channel No. 8 and 9 and call up related diagnostic display. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Deviation between specified feedback value on diagnostic Channel No. 9 and actual feedback value on diagnostic Channel No. 8 must be less than 3. If value is as specified, go to next step. If value is not as specified, go to ADJUSTMENT MOTOR FOR REGULATING FLAP (WITH FEEDBACK POTENTIOMETER) under TESTING.

NOTE: If specified feedback value is less than 30 or greater than 200 because of higher or lower ambient temperatures, select other temperature.

29) Check kick-down function (A/T models). See KICK-DOWN SWITCH under TESTING. For irregular idle in A/C mode, check idle speed increase (A/C readiness) and RPM increase (compressor on). Go to IDLE SPEED INCREASE (A/C ON) & RPM INCREASE (COMPRESSOR ON) under TESTING.

30) If temperature control does not function correctly, check inside temperature sensor. Go to INSIDE TEMPERATURE SENSORS under TESTING. Check outside temperature sensor. Go to OUTSIDE TEMPERATURE SENSORS under TESTING.

A/C CONTROL PANEL NOT ILLUMINATED

1) Turn ignition on. Turn parking lights off. Using a DVOM, check voltage between A/C control panel connector terminals No. 25 and 7. See Fig. 6. If voltage reading is less than 8 volts, repair voltage supply to terminal No. 25 or ground connection to terminal No. 7. If voltage reading is greater than 8 volts, go to next step.

2) Measure voltage between control panel terminals No. 13 and 7. If voltage is greater than 8 volts, go to next step. If voltage is less than 8 volts, replace A/C control panel.

3) Disconnect control panel connector. Measure voltage between connector terminals No. 13 and 7. If voltage is greater than 8 volts, repair short circuit in wiring to terminal No. 13. If voltage is less than 8 volts, replace A/C control panel.

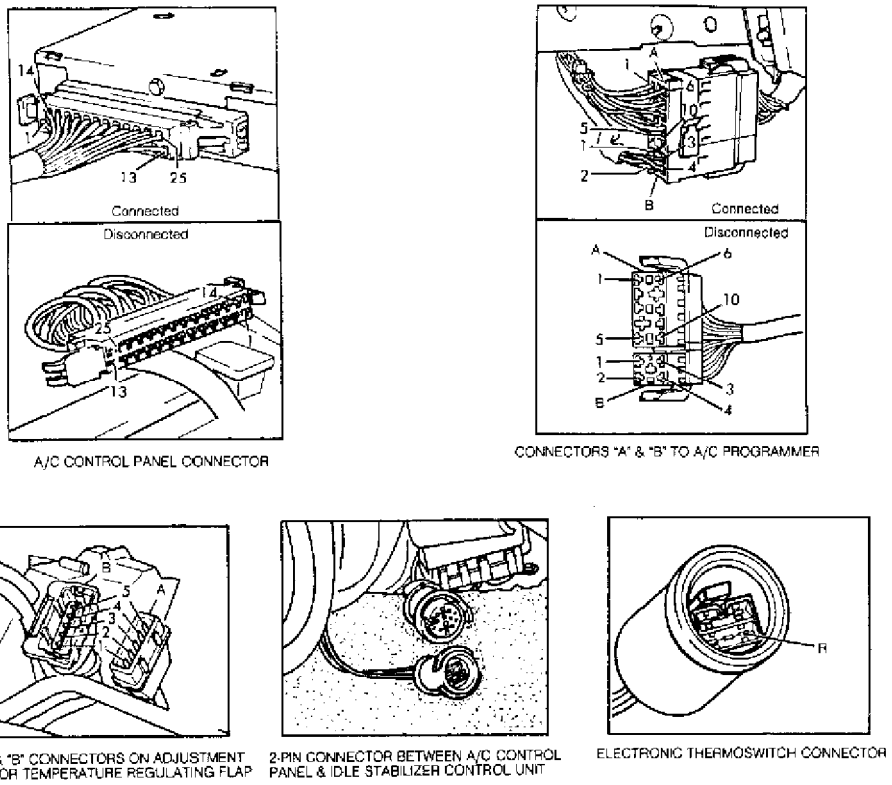


Fig. 9: Automatic A/C-Heater System Connectors & Terminal ID
Courtesy of Audi of America, Inc.

FAULT MEMORY CAN'T BE INITIATED/OUTSIDE TEMP DOESN'T DISPLAY

1) Turn ignition on. Using a DVOM, measure voltage between A/C control panel connector terminals No. 25 and 7. See Fig. 9. If voltage reading is less than 8 volts, repair voltage supply to terminal No. 25 or ground connection to terminal No. 7. If voltage is greater than 8 volts, go to next step.

2) Measure voltage between terminals No. 7 and 11. If voltage is greater than 6 volts but less than 4.7 volts, go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING. If voltage is greater than 4.7 volts but less than 6 volts, go to next step.

3) Disconnect A/C programmer connector. Access fault codes. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Press outside temperature button to call up outside temperature reading. If functions can be performed, go to step 4). If functions cannot be performed, go to step 5),

4) Reconnect A/C programmer connector. Measure voltage between connector terminals No. 4 and 7. See Fig. 9. If voltage is less than 8 volts, repair voltage supply to terminal No. 4 or ground connection to terminal No. 7. If voltage is greater than 8 volts, check wiring between A/C programmer connector terminals No. 8, 9 and 10 and A/C control panel connectors No. 10, 21 and 22 for short or open circuit. Repair wiring as necessary. If wiring is okay, replace A/C programmer.

5) Check wiring between terminals No. 8, 9 and 10 of connector "A" and A/C control panel terminals No. 10, 21 and 22 for short or open circuit. See Fig. 9. Repair wiring as necessary. If wiring is okay, replace A/C control panel.

ERRORS IN CLIMATE CONTROL REGULATION

NOTE: Perform this test only if referred from another test.

1) Turn ignition on. Using a DVOM, measure voltage between terminals No. 4 and 7 of connector "A" to A/C programmer. See Fig. 9. If voltage is less than 8 volts, repair voltage supply from terminal No. 4 or ground connection from terminal No. 7 of connector "A". If voltage is greater than 8 volts, go to next step.

2) Measure voltage between terminals No. 6 and 7 of connector "A" to A/C programmer. If voltage is greater than 4.7 volts but less than 6 volts, go to next step. If voltage is less than 4.7 volts or greater than 6 volts, go to step 5).

3) Check wiring from connector "A" terminals No. 8, 9 and 10 to A/C control panel connector terminals No. 10, 21 and 22. See Fig. 9. Repair wiring as necessary. If wiring is okay, measure voltage between A/C control panel connector terminals No. 25 and 7. If voltage is greater than 8 volts, go to next step. If voltage is less than 8 volts, repair supply voltage to terminal No. 25 or ground connection to terminal No. 7.

4) Replace A/C programmer. Check affected function. If function is still inoperative, reinstall old A/C programmer, and replace A/C control panel.

5) Disconnect A/C programmer connector. Measure voltage between connector "A" terminals No. 6 and 7. If voltage is greater than 4.7 volts but less than 6 volts, replace A/C programmer. If voltage is less than 4.7 volts or greater than 6 volts, go to next step.

6) Measure voltage between A/C control panel connector terminals No. 7 and 25. See Fig. 9. If voltage is less than 8 volts, repair voltage supply to terminal No. 25 or ground connection to terminal No. 7. If voltage is greater than 8 volts, go to next step.

7) Measure voltage between A/C control panel connector terminals No. 7 and 11. If voltage is greater than 6 volts, go to step 8). If voltage is less than 6 volts but greater than 4.7 volts, check wiring from A/C programmer connector to terminal No. 11 of A/C control panel connector. If voltage is less than 4.7 volts, go to step 9).

8) Disconnect A/C control panel connector. Measure voltage between terminals No. 7 and 11. If voltage is greater than 6 volts,

repair short circuit in wiring to terminal No. 11. If voltage is less than 6 volts, replace A/C control panel.

9) Disconnect adjustment motor for temperature regulating flap 5-pin connector. Measure voltage between terminals No. 3 and 4 of connector "B". See Fig. 9. If voltage is greater than 4.7 volts, replace adjustment motor for temperature regulating flap (with feedback potentiometer). If voltage is less than 4.7 volts, go to next step.

10) Check wiring from A/C control panel connector terminal No. 11 to A/C programmer and to adjustment motor for temperature regulating flap. See Fig. 9. Repair wiring as necessary. If wiring is okay, replace A/C control panel.

A/C CONTROL PANEL ILLUMINATION CANNOT BE REGULATED

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Turn parking lights on. Turn illumination control to full bright. Measure voltage between A/C control panel connector terminals No. 7 and 25. If voltage reading is less than 8 volts, repair voltage supply to terminal No. 25 or ground connection to terminal No. 7. If voltage is greater than 8 volts, go to next step.

2) Measure voltage between A/C control panel terminals No. 7 and 24. See Fig. 9. If voltage reading is less than 8 volts, repair voltage supply to terminal No. 24. If voltage reading is greater than 8 volts, go to next step.

3) Measure voltage between A/C control panel connector terminals No. 7 and 13. If voltage reading is less than 8 volts, repair voltage supply to terminal No. 13. If voltage reading is greater than 8 volts, go to next step.

4) With illumination control still in full bright position, measure voltage between A/C control panel connector terminals No. 7 and 24. If voltage reading is less than 6 volts, replace A/C control panel. If voltage reading is greater than 6 volts, go to next step.

5) Disconnect A/C control panel connector. Measure voltage between terminals No. 7 and 24. If voltage reading is less than 6 volts, replace A/C control panel. If voltage reading is greater than 6 volts, repair short in terminal No. 24 circuit.

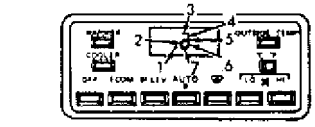
A/C CONTROL PANEL MEMORY LOSS

Turn ignition off. Measure voltage between A/C control panel connector terminals No. 7 and 12. See Fig. 9. If voltage reading is less than 8 volts, repair voltage supply to terminal No. 12 or ground connection to terminal No. 7. If voltage reading is greater than 8 volts, replace A/C control panel.

COMPRESSOR DOES NOT RUN IN AUTO, BI-LEV OR DEFROST MODES

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis fault check on Channel No. 17. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Segment 1 should illuminate. See Fig. 7. If segment 1 illuminates, go to step

5). If segment 1 does not illuminate, check if other segments are illuminated. Go to step 2), 3) or 4) as required.



Segment 1 – A/C Compressor On.
Segment 2 – A/C Compressor Off. High Pressure Switch (Red Housing) Open.
Segment 3 – A/C Compressor Off. Outside Temperature Too Low Or Operating Mode Set To ECON or OFF.
Segment 4 – A/C Compressor Off. Electrical System Voltage Less Than 9.5 Volts.
Segment 5 – A/C Compressor Off. Low Pressure Switch Open.
Segment 6 – A/C Compressor Off. Kick-Down Switch Closed. (A/C Compressor Switches On After 12 Seconds).
Segment 7 – A/C Compressor Off. Electronic Thermoswitch (Multi-Function Temperature Sensor)

Fig. 10: Memory Fault Channel No. 17 Segments
Courtesy of Audi of America, Inc.

2) If segment 2 illuminates, go to A/C HIGH PRESSURE SWITCH under TESTING. If segment 3 illuminates, go to OUTSIDE TEMPERATURE SENSORS under TESTING.

3) If segment 4 illuminates, go to ELECTRICAL SYSTEM VOLTAGE under TESTING. If segment 5 illuminates, go to A/C REFRIGERANT LOW PRESSURE SWITCH under TESTING.

4) If segment 6 illuminates, go to KICK-DOWN SWITCH under TESTING. If segment 7 illuminates, go to ELECTRONIC THERMOSWITCH under TESTING. If no segments illuminate, replace A/C control panel.

5) Measure voltage between A/C programmer connector "A" terminals No. 5 and 7. If voltage reading is less than 1.5 volts, check A/C relay or A/C compressor clutch. Repair or replace as necessary. If voltage reading is greater than 1.5 volts, go to next step.

6) Check wiring from programmer connector terminal No. 5 to A/C relay for short circuit. Repair wiring as necessary. If wiring is okay, go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.

A/C HIGH PRESSURE SWITCH

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis on Channel No. 17. See ACCESSING ERROR CODE under TROUBLE SHOOTING. If segment 2 illuminates, go to next step. See Fig. 10. If segment 2 does not illuminate, go to step 4).

2) Remove A/C high pressure switch connector. Using a jumper wire, jumper A/C high pressure switch connector. Wait 10 seconds. If segment 1 illuminates, replace A/C high pressure switch. If segment 1 does not illuminate, go to next step.

3) Check wiring from A/C control panel connector terminals No. 5and 6 to A/C high pressure switch for short or open circuit. See Fig. 9. Repair wiring as necessary. If wiring is okay, replace A/C control panel.

4) Check for short circuit in wiring between A/C control

panel connector terminal No. 5 to A/C high pressure switch. Repair wiring as necessary. See WIRING DIAGRAMS. If wiring is okay, replace A/C control panel.

OUTSIDE TEMPERATURE SENSORS

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis on Channel No. 4. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Measure temperature at installation location (near plenum on evaporator) of outside temperature sensor. Read diagnostic display on Channel No. 4 and determine temperature using OUTSIDE TEMPERATURE SENSOR RESISTANCE VALUES table.

2) Compare measured and calculated temperature. If temperature difference is greater than 3øC, go to next step. If temperature difference is less than 3øC, go to step 4).

3) Start diagnosis on Channel No. 5. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Measure temperature at installation location (in front of condenser on firewall) of outside temperature sensor. Read diagnostic display on Channel No. 5 and determine temperature using OUTSIDE TEMPERATURE SENSOR RESISTANCE VALUES table. Compare measured and calculated temperature. Difference should be less than 3øC. If difference is greater than 3øC, go to next step.

4) Disconnect connector on affected outside temperature sensor. Measure resistance of affected outside temperature sensor and calculate temperature using OUTSIDE TEMPERATURE SENSOR RESISTANCE VALUES table. If difference is greater than 3øC, replace affected outside temperature sensor. If difference is less than 3øC, go to next step.

5) Check wiring from A/C control panel connector terminals No. 1and 6 or terminals No. 1 and 16 for open or short circuit. Repair wiring as necessary. If wiring is okay, replace A/C control panel.

OUTSIDE TEMPERATURE SENSOR RESISTANCE VALUES TABLE

Outside Temp. øF (øC) At Location	Diagnostic Display Channels No. 4 & 5	Resistance (Ohms) of Outside Temp. Sensor
32 (0)	159	3288
36 (2)	153	2992
39 (4)	146	2697
43 (6)	140	2439
46 (8)	134	2216
50 (10)	127	1995
54 (12)	122	1826
57 (14)	116	1657
61 (16)	110	1508
64 (18)	104	1379
68 (20)	98	1250
72 (22)	93	1150
75 (24)	88	1050

79 (26)	.....	83	.....	961
82 (28)	.....	78	.....	883
86 (30)	.....	73	.....	805
90 (32)	.....	69	.....	744
93 (34)	.....	65	.....	683
97 (36)	.....	61	.....	628
100 (38)	.....	57	.....	580
104 (40)	.....	54	.....	532
108 (42)	.....	50	.....	493
111 (44)	.....	47	.....	455
115 (46)	.....	44	.....	421
118 (48)	.....	42	.....	390
122 (50)	.....	39	.....	360
126 (52)	.....	37	.....	335
129 (54)	.....	34	.....	311
133 (56)	.....	32	.....	289
136 (58)	.....	30	.....	269
140 (60)	.....	28	.....	249

ELECTRICAL SYSTEM VOLTAGE

1) Turn ignition on. Set A/C mode to AUTO position. Start diagnosis on Channel No. 11. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Measure voltage between A/C control panel connector terminals No. 7 and 19. If voltage reading is greater than 5 volts, go to next step. If voltage reading is less than 5 volts, go to A/C REFRIGERANT LOW PRESSURE SWITCH under TESTING.

2) Compare displayed and measured voltage. Difference between displayed and measured voltage should be less than 1.5 volts. If difference is greater than 1.5 volts, replace A/C control panel.

A/C REFRIGERANT LOW PRESSURE SWITCH

NOTE: A/C refrigerant low pressure switch shuts off A/C compressor when refrigerant pressure is low.

1) Turn ignition on. Set A/C mode to AUTO position and temperature to 24øC. Start diagnosis on Channel No. 17. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Segment 5 should glow. See Fig. 7. If segment 5 glows, go to step 4). If segment 5 does not glow, go to next step.

2) Remove connector from low pressure switch. Segment 5 should glow. If segment 5 does not glow, go to step 3). If segment 5 glows, check if compressor is switched off by low pressure switch during cooling performance test. Compressor should be on. If compressor is not switched off by low pressure switch during performance test, go to step 6).

3) Check wiring between low pressure switch and A/C control panel connector terminal No. 19 for short circuit. See Fig. 9. Repair wiring as necessary. If wiring is okay, replace A/C control panel.

4) Remove low pressure switch. Using a jumper wire, jumper

low pressure switch terminals. If segment 5 glows, measure voltage between A/C control panel connector terminals No. 7 and 19. If less than 5 volts are present, repair voltage supply for terminal No. 19. If greater than 5 volts are present, replace A/C control panel. If segment 5 does not glow, go to next step.

5) Connect A/C pressure gauges. System pressure should be greater than 43.5 psi (3.06 kg/cmý), depending on ambient temperature. If system pressure is as specified, replace low pressure switch. If system pressure is not as specified, recharge refrigerant system.

6) Remove low pressure switch. Using a jumper wire, jumper low pressure switch terminals. Connect A/C pressure gauges, and perform cooling performance test. If low pressure side drops under 17.4 psi (1.20 kg/cmý) during cooling performance test, system is low on refrigerant. Check for leaks, and replace restrictor. If low pressure side does not drop during cooling performance test, replace low pressure switch.

KICK-DOWN SWITCH

NOTE: Not all A/T models have a kick-down switch. A/C compressor is switched off for 12 seconds when kick-down switch is closed.

1) Turn ignition on. Set A/C mode to AUTO position and temperature to 24øC. Start diagnosis on Channel No. 17. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Segment 6 should glow. See Fig. 7. If segment 6 glows, go to step 5). If segment 6 does not glow, go to next step.

2) Depress accelerator pedal (switch closed). Segment 6 should glow. If segment 6 does not glow, release accelerator pedal. Measure voltage between A/C control panel connector terminals No. 7 and 9. If voltage reading is less than 1.5 volts, go to next step. If voltage reading is greater than 1.5 volts, go to step 4).

3) Verify kick-down switch mechanical operation. Replace kick-down switch if it is defective. If kick-down switch is okay, check for shorted wiring between A/C control panel connector and kick-down switch. Repair as necessary. If wiring is okay, replace A/C control panel.

4) Depress accelerator pedal (switch closed). Measure voltage between A/C control connector terminals No. 7 and 9. If voltage reading is less than 1.5 volts, replace A/C control panel. If voltage reading is greater than 1.5 volts, verify kick-down switch mechanical operation. Replace kick-down switch if it is defective. If kick-down switch is okay, check kick-down wiring for short circuit. See WIRING DIAGRAMS.

5) Check kick-down mechanical operation. Repair or replace kick-down switch as necessary. If kick-down switch operation is okay, measure voltage between A/C control panel connector terminals No. 7 and 9. If voltage reading is greater than 1.5 volts, replace A/C control panel. If voltage reading is less than 1.5 volts, go to next step.

6) Check wiring between A/C control panel connector terminal

No. 9 and kick-down switch for short circuit. Check ground circuit. Repair as necessary. If wiring is okay, replace A/C control panel.

ELECTRONIC THERMOSWITCH

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis on Channel No. 17. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If segment 7 glows, go to next step. See Fig. 7. If segment 7 does not glow, go to step 3).

2) Disconnect electronic thermoswitch connector. If segment 7 does not glow, replace electronic thermoswitch. If segment 7 glows, check wiring between A/C control panel connector terminal No. 20 and electronic thermoswitch for short circuit. Check ground circuit. Repair wiring as necessary. If circuits are okay, replace A/C control panel.

3) Disconnect electronic thermoswitch connector. Use jumper wire to jumper thermoswitch connector terminal "R" to ground. See Fig. 9. If segment 7 does not glow, go to step 5). If segment 7 glows, A/C compressor should be switched on by electronic thermoswitch when vehicle is driven or during cooling performance test.

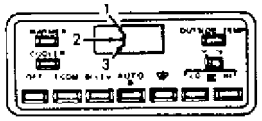
4) If compressor does not switch on, check engine cooling system and radiator cooling fan control or replace electronic thermoswitch if necessary.

5) Check for open circuit between A/C control panel connector terminal No. 20 and electronic thermoswitch connector. Repair wiring as necessary. If wiring is okay, replace A/C control panel.

COMPRESSOR RUNS IN ECON & OFF MODES

1) Turn ignition on. Set A/C mode to ECON position. Set temperature to 24øC. Start diagnosis on Channel No. 18. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If segment 1 illuminates, replace A/C control panel. See Fig. 11. Go to next step if segment 1 does not illuminate,.

2) Disconnect A/C programmer connector. Start engine. If compressor operates, check A/C relay, A/C compressor clutch and related wiring. Repair or replace as necessary. If compressor does not operate, reconnect A/C programmer connector, and go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.



Segment 1 - A/C Compressor On.
Segment 2 - Radiator Cooling Fan Runs On 1st Speed.
Segment 3 - Idle Speed Increases With A/C On (Idle Speed Increase Does Not Apply To All Vehicles).

Fig. 11: Memory Fault Channel No. 18 Segments
Courtesy of Audi of America, Inc.

FAN DOESN'T RUN AT 1ST SPD IN AUTO, BI-LEV & DEFROST MODES

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis on Channel No. 18. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If segment 2 illuminates, go to next step. See Fig. 11. If segment 2 does not illuminate, replace A/C control panel.
2) Measure voltage between A/C programmer connector terminals No. 3 and 7. If voltage reading is less than 1.5 volts, check series resistor for cooling fan, cooling fan, cooling fan after-run control unit and related wiring. If voltage reading is greater than 1.5 volts, go to next step.
3) Check wiring between radiator cooling fan after-run control unit and A/C programmer connector "A" terminal No. 3. See Fig. 12. Repair wiring as necessary. See WIRING DIAGRAMS. If wiring is okay, go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.

RADIATOR FAN ALWAYS RUNS AT 1ST SPEED IN ECON & OFF MODES

1) Turn ignition on. Set A/C mode to ECON position. Set temperature to 24øC. Start diagnosis on Channel No. 18. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If segment 2 illuminates, replace A/C control panel. See Fig. 11. Disconnect A/C control panel connector if segment 2 does not illuminate.
2) If cooling fan continues to operate at 1st speed, check radiator cooling fan series resistor, radiator cooling fan, radiator cooling fan after-run control unit, thermoswitch and related wiring. See WIRING DIAGRAMS.
3) If cooling fan stops, reconnect A/C control panel connector, and go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.

A/C FRESH AIR BLOWER OPERATES AT ALL TIMES IN OFF MODE

1) Turn ignition on. Disconnect A/C control panel connector. If fresh air blower continues to operate, go to step 3). If fresh air blower operation stops, go to next step.
2) Measure voltage between A/C control panel connector terminal No. 7 and 25. See Fig. 12. If voltage reading is greater than 8 volts, replace control panel. If voltage reading is less than 8 volts, check voltage supply to terminal No. 25 and ground connection to terminal No. 7.
3) Disconnect connectors from A/C blower control unit. If fresh air blower operates, check for short circuit between A/C blower control unit to fresh air blower. If fresh air blower fails to operate, go to next step.
4) Check wiring between A/C control panel connector terminal No. 15 and blower control unit for short circuit. See Fig. 12. Repair wiring as necessary. If wiring is okay, replace blower control unit.

FRESH AIR BLOWER DOESN'T RUN IN AUTO, BI-LEV, DEFROST OR ECON MODES

1) Turn ignition on. Disconnect A/C control panel connector. Connect LED test light between A/C control panel connector terminals No. 15 and 25. See Fig. 12. If fresh air blower operates, go to next step. If fresh air blower fails to operate, go to step 3).
2) Check wiring between A/C control panel connector terminal No. 14 and A/C blower control unit for short circuit. See WIRING DIAGRAMS. Repair wiring as necessary. Replace A/C control panel if wiring is okay.
3) Reconnect A/C control panel connector. Set A/C mode to AUTO position. Set temperature to LO and blower to HI position. Remove both connectors from blower control unit. Connect LED test light between blower control unit connector terminals No. 5 and 6. If LED test light illuminates, go to next step. If LED test light does not illuminate, check wiring between A/C blower control unit connector terminal No. 5 or 6. See WIRING DIAGRAMS.
4) Using a jumper wire, jumper A/C blower control unit connector terminals No. 1 and 3. If fresh air blower operates, replace A/C blower control unit. If fresh air blower fails to operate, go to next step.
5) Measure voltage between A/C control unit connector terminals No. 1 and 5. If voltage reading is greater than 8 volts, go to next step. If voltage reading is less than 8 volts, check and repair voltage supply to terminal No. 1. See WIRING DIAGRAMS.
6) Check wiring to A/C blower control unit connector to fresh air blower and ground connection from fresh air blower. See WIRING DIAGRAMS. Repair wiring as necessary. If wiring is okay, replace fresh air blower.

FRESH AIR BLOWER SPEED CANNOT BE REGULATED

1) Turn ignition on. Measure voltage between A/C control panel connector terminals No. 7 and 25. If voltage is greater than 8 volts, go to next step. If voltage is less than 8 volts, repair voltage supply to terminal No. 25 or ground connection to terminal No. 7. See WIRING DIAGRAMS.
2) Check for open or short circuit between A/C control panel connector terminals No. 14 and 15 and A/C blower control unit. Repair wiring as necessary. If wiring is okay, go to next step.
3) Check for an open circuit in A/C blower control unit ground connection from terminal No. 5. Repair as necessary. If circuit is okay, replace A/C blower control unit. Check function of new unit. If fresh air blower speed still cannot be regulated, reinstall old A/C blower control unit, and replace A/C control panel.

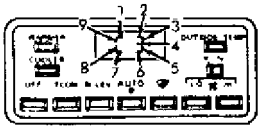
VACUUM UNITS & FLAPS POSITION

NOTE: Perform this test only if referred by A/C-HEATER SYSTEM CONTROL QUICK CHECK.

1) Start engine. Open all instrument panel air outlets. Set A/C mode to AUTO position and temperature to LO. Wait one minute. Start diagnosis on Channel No. 7. See ACCESSING MEMORY FAULT CHANNEL

under TROUBLE SHOOTING. Segments 2, 3, 4, 5 and 6 should illuminate. See Fig. 12. If all these segments illuminate, go to next step. If any segment does not illuminate, replace A/C control panel.

2) Disconnect vacuum line connector from A/C programmer. Check all vacuum lines and servos for leaks. Ensure all vacuum servos, flaps and water valves operate smoothly. Repair as necessary. If system checks out okay, go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.



Segment 1 – Temperature Regulating Flap Moves Toward Heating Position.
Segment 2 – Recirculated/Fresh Air Flap In Recirculated Air Mode.
Segment 3 & 5 – Footwell/Defrost Outlet Flap In Air From Instrument Panel Outlet Position.
Segment 4 – Heater Valve Closed.
Segment 5 – Footwell/Defrost Outlet Flap In Air From Instrument Panel Outlet Position. (Segment 3 Does Not Light Up)
Segment 6 – Footwell/Defrost Outlet Flap In Air From Footwell Outlets Position.
Segment 7 – Temperature Regulating Flap Moves Toward Cooling Position.
Segment 8 – A/C Compressor On.
Segment 9 – Radiator Cooling Fan Runs On 1st Speed.

Fig. 12: Memory Fault Channel No. 7 Segments
Courtesy of Audi of America, Inc.

ADJUSTMENT MOTOR FOR REGULATING FLAP-W/FEEDBACK POTENTIOMETER

1) Turn ignition on. Set A/C mode to AUTO position. Set temperature to 24øC. Start diagnosis on Channel No. 1. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If fault codes 07, 08 and 15 are not present, go to step 5). If only code 15 is present, go to step 9). If fault codes 07, 08 and 15 are present, go to next step.

2) Disconnect 5-pin connector on adjustment motor for temperature regulating flap. Measure voltage between terminals No. 3 and 4 of connector "B". See Fig. 12. If voltage reading is greater than 6 volts or less than 4.7 volts, check wiring for an open or short circuit at 5-pin connector terminals No. 3 and 4 to A/C control panel. Repair as necessary. If wiring is okay, go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.

3) If voltage is greater than 4.7 volts but less than 6 volts, check wiring for an open or short circuit at 5-pin connector on adjustment motor terminal No. 5 to A/C control panel connector terminal No. 3. Repair as necessary. If wiring is okay, go to next step.

4) Turn ignition off. Wait 10 seconds. Turn ignition on. Start diagnosis on Channel No. 1. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If fault code 08 is present, replace A/C control panel. If code 07 is present, jumper terminals No. 4 and 5 of 5-pin connector "B". If code 08 appears on display, replace adjustment motor for temperature regulating flap with feedback potentiometer. If code 08 is not present, replace A/C control panel.

5) Gradually set temperature to LO and observe movement of

temperature regulating flap linkage. If temperature regulating flap linkage moves to cooling position, go to next step. If linkage does not move to cooling position, go to step 9).

6) Gradually set temperature to HI. Observe movement of temperature regulating flap linkage. If linkage moves to heating position, go to next step. If linkage does not move into heating position, go to step 9).

7) Start diagnosis on Channel No. 8. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Go to next step if display shows 9-14. If display shows a value higher than 14 but less than 9, adjust potentiometer on adjustment motor to 12.

8) Set temperature to 26øC. Wait 30 seconds. Start diagnosis on Channel No. 8 and 9. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Difference between specified feedback value on Channel No. 9 and actual feedback value on Channel No. 8 should be less than 3. If value is not as specified, replace A/C control panel.

9) Connect a LED test light between terminals No. 1 and 2 of connector "A" to A/C programmer. Set temperature to LO. LED test light should illuminate or start flashing. If test light illuminates or flashes, go to next step. If test light does not illuminate or flash, go to step 11).

10) If temperature regulating flap linkage moves in cooling direction, go to next step. If linkage does not move as indicated, check wiring for an open or short circuit between connector "A" and A/C programmer. Repair as necessary. If wiring is okay, remove motor for temperature regulating flap, and check flap operation. If flap operation is okay, replace adjustment motor for temperature regulating flap. If flap operation is not okay, replace flap.

11) Set temperature to HI. If LED test light does not illuminate or flash, go to step 14). If test light illuminates or flashes, observe regulating flap linkage. If flap moves in heating direction, go to next step. If flap does not move in heating direction, remove adjustment motor for temperature regulating flap, and check flap operation. If flap operation is okay, replace adjustment motor for temperature regulating flap. If flap operation is not okay, replace flap.

12) Check wiring for an open or short circuit from A/C control panel connector terminals No. 3, 6 and 7 to adjustment motor for temperature regulating flap. Repair as necessary. If wiring is okay, go to next step.

13) Replace adjustment motor for temperature regulating flap. Set temperature to 24øC. Call up diagnosis on Channel No. 1. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If display shows a value of 15, replace adjustment motor for temperature regulating flap and A/C control panel.

14) Disconnect connector "A" to A/C programmer. Measure resistance between terminals No. 1 and 2 of connector "A". If resistance is greater than 29 ohms but less than 100 ohms, check wiring to A/C programmer terminals No. 1 and 2. Repair as necessary. If wiring is okay, go to ERRORS IN CLIMATE CONTROL REGULATION under TESTING.

15) If resistance is less than 30 ohms or greater than 99

ohms, check wiring between terminals No. 1 and 2 of connector "A" and adjustment motor for open or short circuit. Repair as necessary. If wiring is okay, replace adjustment motor.

IDLE SPEED INCREASE (A/C ON) & RPM INCREASE (COMPRESSOR ON)

NOTE: Idle RPM increase is not available on engines equipped with CIS-E III fuel injection system. Idle speed will not increase when blower speed is set at LO position.

1) Turn A/C system on. Start engine. Set A/C mode to ECON position. Set temperature on HI. Adjust blower speed back and forth between LO and HI. Idle speed should increase by 70-150 RPM with blower speed at HI. If idle speed increases as specified, go to step 10). If idle speed does not increase as specified, go to next step.

2) Turn engine off. Turn ignition on, and set A/C mode to ECON position. Set temperature and blower speed to HI. Start diagnosis on Channel No. 18. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. If segment 3 illuminates, go to next step. See Fig. 11. If segment 3 does not illuminate, replace A/C control panel.

3) Set blower speed to LO. Re-enter diagnosis on Channel No. 18. If segment 3 illuminates, replace A/C control panel. If segment 3 does not illuminate, measure voltage between A/C control panel connector terminals No. 23 and 25. If voltage reading is less than 8 volts, go to next step. If voltage reading is greater than 8 volts, go to step 5).

4) Disconnect A/C control panel connector. Check current between connector terminals No. 7 and 25. If reading is greater than 10 milliamps, check wiring from A/C control panel terminal No. 23 to idle stabilizer control unit terminal No. 6 for an open or short circuit. Repair as necessary. If wiring is okay, check engine electronics. If reading is less than 10 milliamps, replace A/C control panel.

5) Set A/C mode to ECON position. Set temperature and blower speed to HI. Measure voltage between A/C control panel connector terminals No. 23 and 25. If voltage is less than 3 volts, go to next step. If voltage is greater than 3 volts, go to step 7).

6) Check wiring on terminal No. 23 on A/C control panel connector to idle stabilizer control unit terminal No. 6 for an open circuit. See WIRING DIAGRAMS. Repair as necessary. If wiring is okay, problem is not in automatic A/C-heater system. Check engine electronics.

7) Disconnect 2-pin connector between idle stabilizer control unit and A/C control panel terminal No. 23. See Fig. 12. Measure current between A/C control panel harness side terminal No. 23 and idle stabilizer control unit connector. If reading is greater than 3 milliamps, go to next step. If reading is less than 3 milliamps, go to step 9).

8) Check wiring between 2-pin connector to idle stabilizer control unit terminal No. 6 for short circuit. Repair as necessary. If wiring is okay, problem is not in automatic A/C-heater system. Check engine electronics.

9) Check wiring between 2-pin connector and A/C control panel connector terminal No. 23 for grounded or short circuit. Repair as necessary. If wiring is okay, replace A/C control panel.

10) Turn ignition on. Adjust A/C control panel back and forth between AUTO and ECON within 10 second interval. A/C compressor should click or engage. If compressor does not engage, go to COMPRESSOR DOES NOT RUN IN AUTO, BI-LEV OR DEFROST MODES under TESTING. If compressor engages, go to next step.

11) Start engine. Set A/C mode to AUTO position. Set temperature and blower speed to LO. Engine RPM should change as A/C thermostat switches compressor clutch on and off. If engine RPM does not change, go to next step.

12) Turn ignition off. Disconnect fuel injection control unit or idle stabilizer control unit connector. Turn ignition on. Set A/C mode to AUTO position. On non-turbo models, measure voltage on terminal No. 33 and ground. On turbo models, measure voltage at terminal No. 2 and ground. On all models, repair wiring as necessary if voltage is less than 8 volts. If voltage is greater than 8 volts, go to next step.

13) Set A/C mode to ECON position. Repeat voltage measurements. If voltage is greater than 8 volts, check wiring between compressor clutch relay to control unit or idle stabilizer connector for open or short circuit. Repair wiring as necessary. If wiring is okay, replace compressor clutch relay. If voltage reading is less than 8 volts, fault is not in automatic A/C-heater system. Check engine electronics.

INSIDE TEMPERATURE SENSORS

1) Start engine. Set A/C mode to AUTO position. Turn interior light off. Set temperature to 24øC. Check suctioning capability of inside temperature sensor blower motor (in instrument panel). If suction is okay, go to step 3). If suction is not okay, go to next step.

2) Measure voltage between inside temperature sensor blower terminals. If voltage reading is greater than 8 volts, replace inside temperature sensor blower. If voltage reading is less than 8 volts, check voltage supply or ground circuit. Repair as necessary.

3) Start diagnosis on Channel No. 3. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Measure temperature at temperature sensor installation location. Compare reading with displayed value and actual temperature at sensor location. See INTERIOR TEMPERATURE SENSOR RESISTANCE VALUES table. If difference is less than 3øC, go to next step. If difference is greater than 3øC, go to step 5).

4) Start diagnosis on Channel No. 02. See ACCESSING MEMORY FAULT CHANNEL under TROUBLE SHOOTING. Measure temperature at installation location of temperature sensor located on roof. Compare display value and installation location temperature reading. See INTERIOR TEMPERATURE SENSOR RESISTANCE VALUES table. Temperature difference should not be greater than 3øC. If temperature difference is not as specified, go to next step.

5) Disconnect connector at affected temperature sensor. Measure sensor resistance and calculate temperature using INTERIOR TEMPERATURE SENSOR RESISTANCE VALUES table. If difference between compared to measured temperature is greater than 3øC, replace defective temperature sensor.

6) If difference is less than 3øC, check wiring from affected temperature sensor to A/C control panel terminals No. 4 and 6 or check terminals No. 6 and 18 for an open or short circuit. Repair as necessary. If wiring is okay, replace A/C control panel.

INTERIOR TEMPERATURE SENSOR RESISTANCE VALUES TABLE

Inside Temp. øF (øC) At Location	Diagnostic Display On Channels No. 2 & 3	Resistance (Ohms) of Interior Temp. Sensor
39 (4)	187	7699
43 (6)	182	6951
46 (8)	177	6308
50 (10)	171	566
54 (12)	166	5178
57 (14)	160	4690
61 (16)	154	4259
64 (18)	148	3886
68 (20)	142	3513
72 (22)	137	3225
75 (24)	131	2938
79 (26)	125	2683
82 (28)	119	2460
86 (30)	113	2237
90 (32)	108	2062
93 (34)	103	1888
97 (36)	97	1732
100 (38)	92	1595
104 (40)	87	1459
108 (42)	83	1350
111 (44)	78	1242
115 (46)	74	1144
118 (48)	70	1058
122 (50)	65	972

REMOVAL & INSTALLATION

* PLEASE READ THIS FIRST *

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

A/C-HEATER CONTROL PANEL

Removal & Installation

Pry off A/C heater control panel cover. Remove 2 A/C control panel-to-console screws. Remove A/C control panel from console. To install, reverse removal procedure. Inspect control panel electrical connectors and contacts for damage.

EVAPORATOR ASSEMBLY

Removal

1) From engine compartment, loosen water drain hose retainer, and push hose into plenum chamber. Disconnect vacuum unit hose and thermostat wires. Discharge A/C system using approved refrigerant recovery/recycling equipment. Remove refrigerant hoses, and plug openings.

2) From inside vehicle, remove lower dash panel. Remove 4 evaporator housing screws around air vent on evaporator unit.

3) From engine compartment, carefully loosen assembly. Pull evaporator assembly up toward center of vehicle to remove. Separate housing halves to service evaporator.

Installation

Assemble evaporator case. See Fig. 13. Insert assembly into plenum chamber. Place drain hose through hole without kinking it, and clamp hose into place. Attach refrigerant lines loosely, and cement gasket into place around opening. Install screws. Tighten hoses, and recharge system.

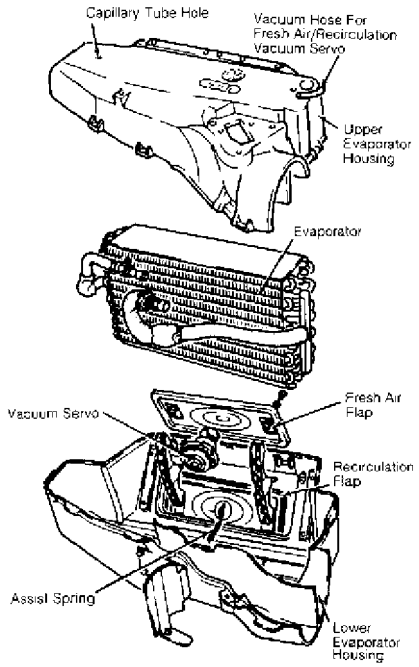


Fig. 13: Exploded View of Evaporator Assembly
Courtesy of Audi of America, Inc.

HEATER ASSEMBLY

Removal

1) Disconnect battery cable and thermostat wiring. Remove windshield wiper assembly and evaporator-heater duct clamp.

2) Remove electrical wiring. Loosen restraining strap, and remove coolant reservoir cap. Clamp heater hoses closed near heater core. Disconnect hoses from core. Upper hose goes to water pump; lower hose goes to cylinder head.

3) From inside vehicle, disconnect vacuum lines. Disconnect air ducts and electrical wiring. Remove 4 screws around evaporator housing opening. Lift heater assembly up into engine compartment. Remove grommet and control cable. Loosen clips and wiring harness.

Installation

To install, reverse removal procedure. Seal all air duct connections carefully to prevent air leaks.

TEMPERATURE FLAP SERVO

Removal & Installation

Remove windshield wiper assembly. Remove heater box cover. Remove 5 screws and servomotor cover with gasket attached. Disconnect electrical connector. Release linkage, and note position of spacers for reassembly. Remove servomotor. To install, reverse removal procedure.

BLOWER MOTOR - 100/200

Removal - Fresh Air Blower

Remove heater box, see Heater/Evaporator Box Removal & Installation below. Remove blower cooling hose. Remove lock ring, stop washer and grommet.

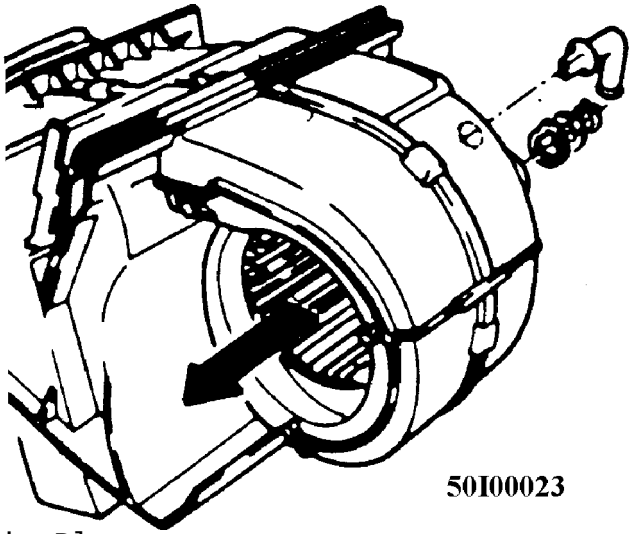


Fig. 14: Air Blower
Courtesy of Audi of America, Inc.

NOTE: Before installing fresh air blower guides, lubricate with Vaseline.

Installation

To install simply follow the same steps as Removing, but in reverse order.

Removal - Heater/Evaporator Box

Remove water box cover under hood. Remove windshield wiper assembly. Remove center console. Remove cap from engine coolant overflow bottle. Remove heater retaining band (arrow 1) in Fig. 15. Clamp off heater hoses to heater core and remove (arrows in Fig. 15. Remove all retainers between body and heater. Remove heater box.

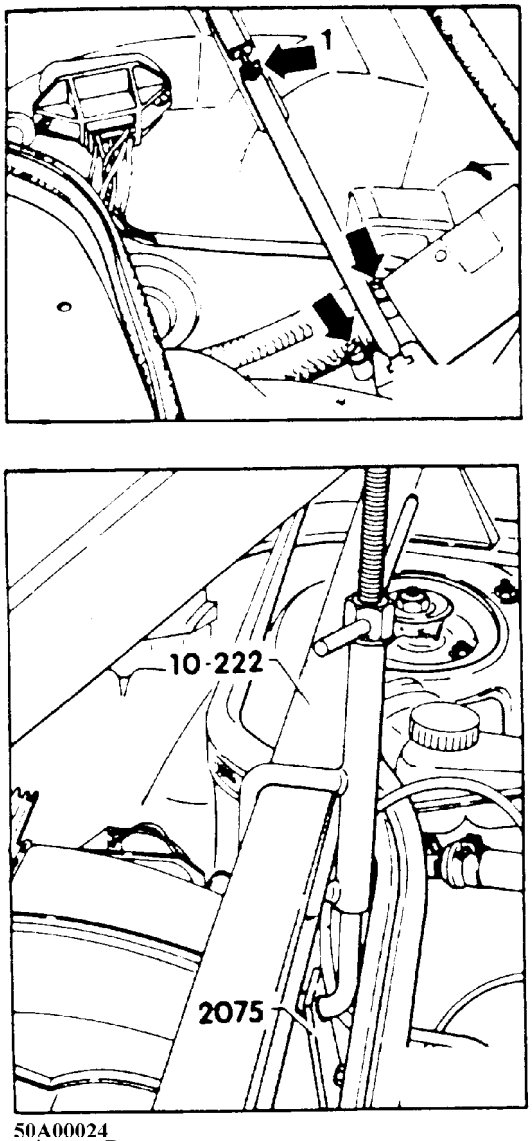


Fig. 15: Heater Box
Courtesy of Audi of America, Inc.

Installation

NOTE: Before installing heater box, always replace self-adhesive gasket. When connecting water hoses, the lower connection on heater core is connected to the hose going to the water pump.

To install simply follow the same steps as Removing, but in reverse order.

BLOWER MOTOR - 90

Removal & Installation

Remove glove compartment. Remove screws. To install do the same procedures as removing, but in the reverse order.

NOTE: Clean old heat-conducting paste off of heat sink and control unit each time unit is removed, then apply new paste to contact surfaces.

A/C SYSTEM SPECIFICATIONS

A/C SYSTEM SPECIFICATIONS TABLE

Application	Specification
Compressor Type	Nippondenso 6-Cyl. or 10-Cyl.
Compressor Belt Deflection	
90	(1) 5/16" (5 mm)
Compressor Belt Tension	
100 & 200	
New	100 lbs. (45 kg)
Used	80-90 lbs. (36-40 kg)
Compressor Oil Capacity	2.7 ozs.
Refrigerant (R-12) Capacity	(2) 37 ozs.
System Operating Pressures (3)	
High Side	154-255 psi (11-18 kg/cmý)
Low Side	19-46 psi (1.3-3.2 kg/cmý)

(1) - With thumb pressure applied at belt center.
(2) - When recharging system, add at least 18 ozs. of refrigerant to low side port BEFORE operating compressor.
(3) - Measure operating pressures with temp. at 77øF (25øC).

WIRING DIAGRAMS

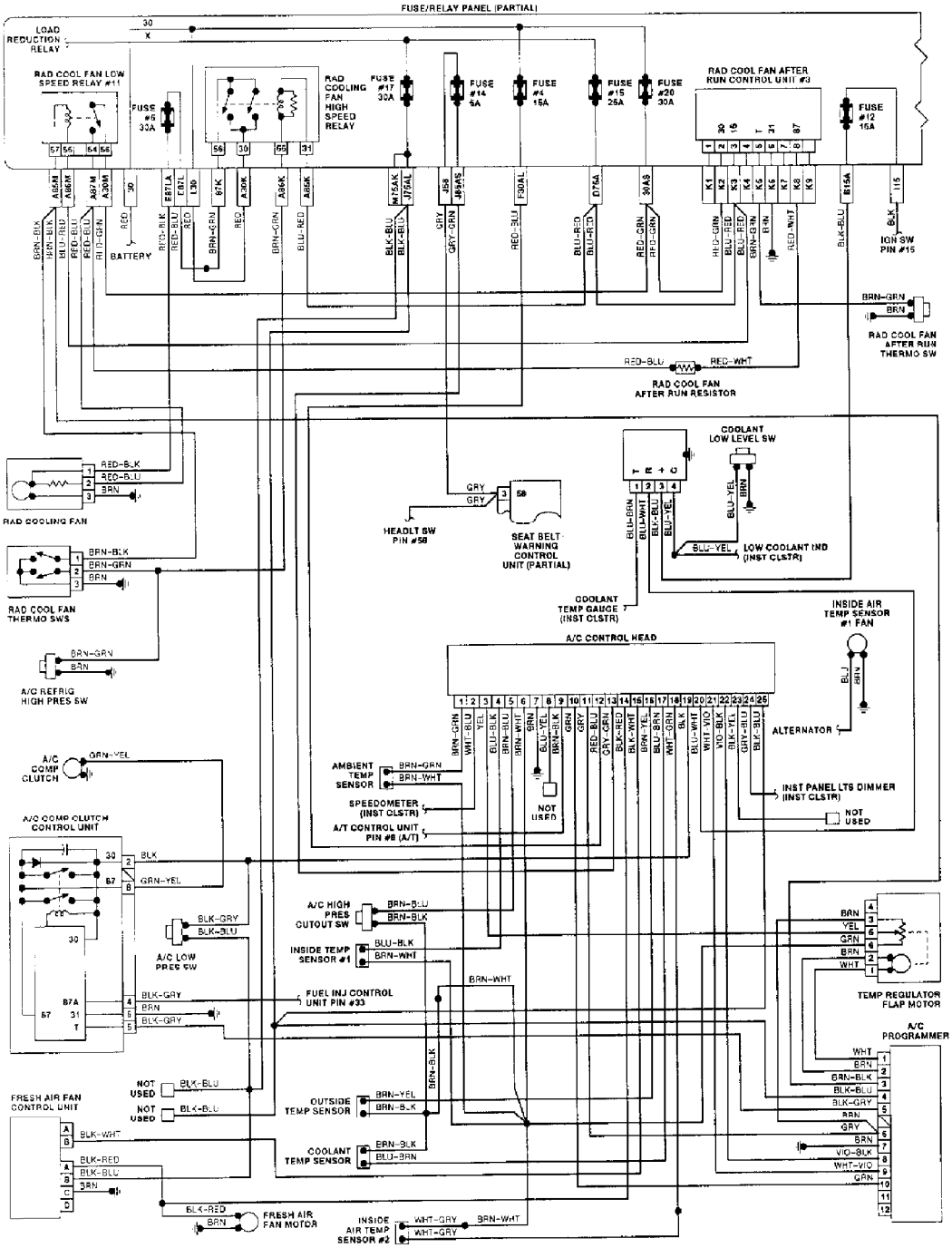


Fig. 16: Automatic A/C-Heater System Wiring Diagram (90)

A/C-HEATER SYSTEM - AUTOMATIC
Article Text (p. 32)
1991 Audi 90
For chip

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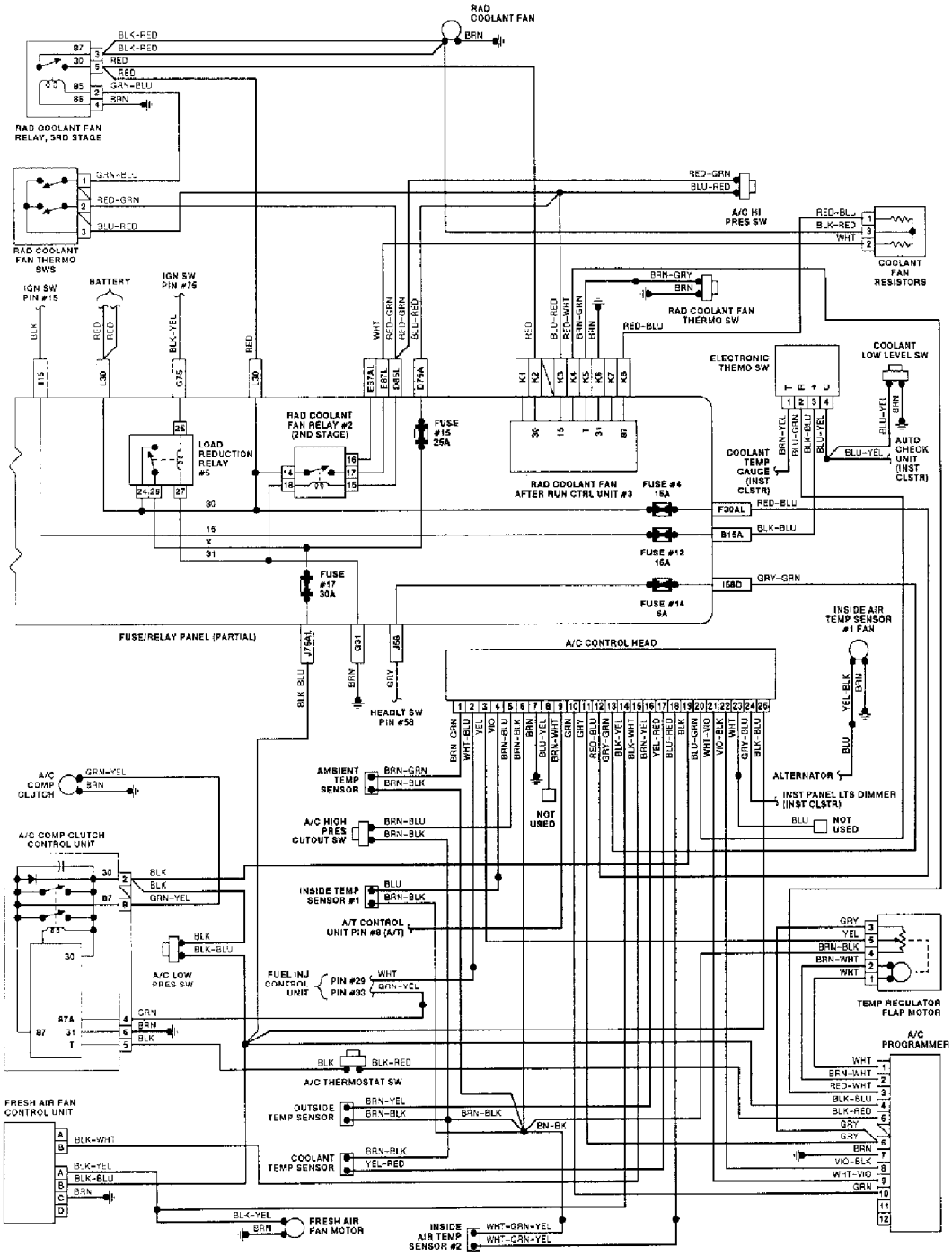

Fig. 17: Automatic A/C-Heater System Wiring Diagram (100)

A/C-HEATER SYSTEM - AUTOMATIC
Article Text (p. 33)
1991 Audi 90
For chip

Monday, October 18, 1999 05:33PM

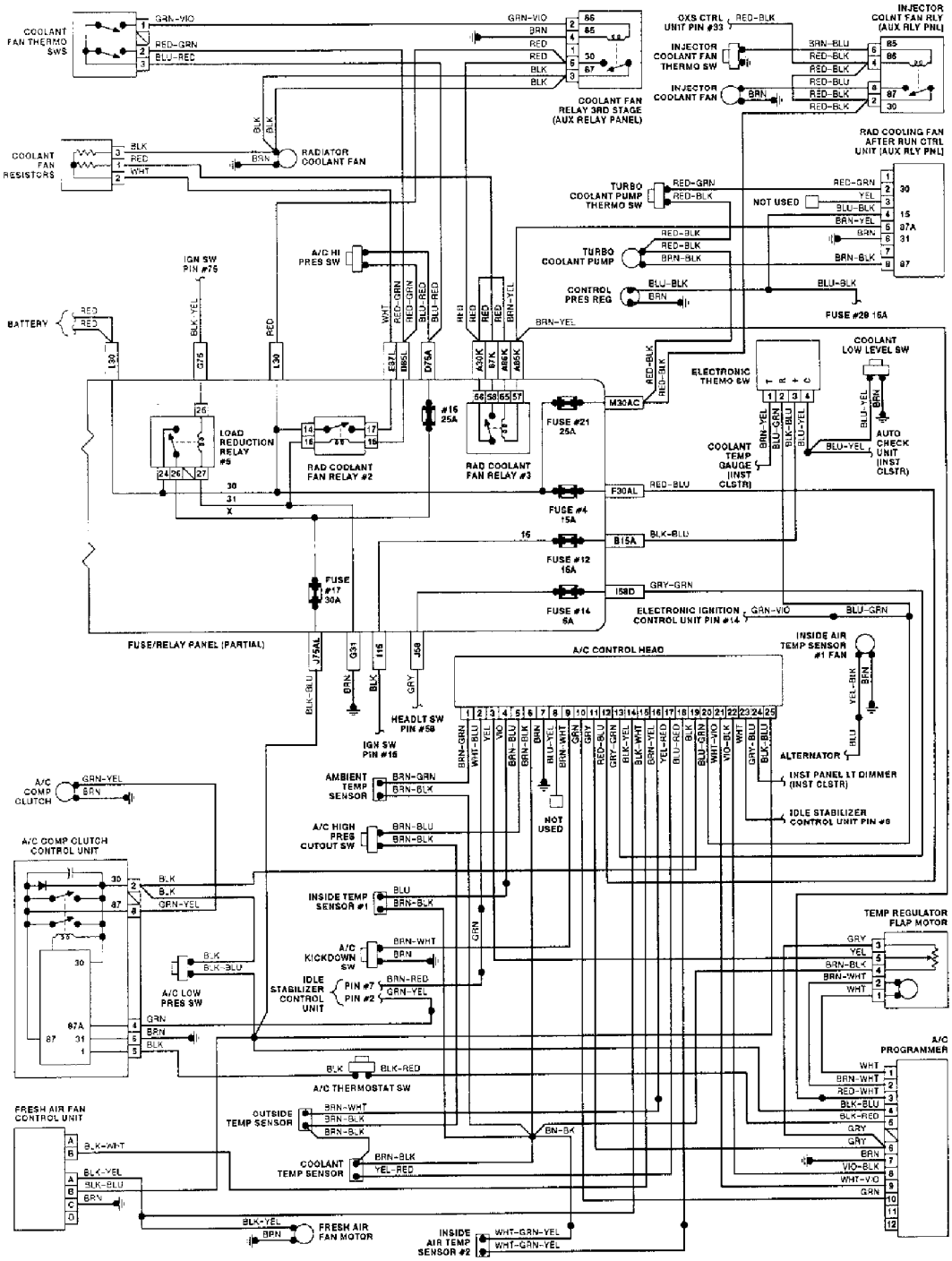

Fig. 18: Automatic A/C-Heater System Wiring Diagram (200)

END OF ARTICLE