

SELF-DIAGNOSTICS

The A/C-heater control assembly monitors system circuits and stores codes in memory if problems are detected. All codes are stored in memory except Code 22. Malfunction is current if Code 22 is displayed. To retrieve stored codes, see [RETRIEVING CODES](#).

RETRIEVING CODES

NOTE: The following code retrieval procedure is performed using A/C-heater control assembly indicators. Codes may also be retrieved using scan tool. Follow scan tool manufacturer's instructions to retrieve codes.

1. While pressing and holding AUTO button and air intake control button, turn ignition on. Indicators will flash on and off at one-second intervals, 4 times in succession, as an indicator check. Press OFF button to cancel indicator check.
2. After indicator check is complete, system will enter self-diagnostic mode. Stored trouble codes will appear in sequence. See [AUTOMATIC A/C-HEATER SYSTEM TROUBLE CODES](#) table.
3. Press A/C switch to display codes one at a time. Press OFF button to exit self-diagnostics.

AUTOMATIC A/C-HEATER SYSTEM TROUBLE CODES

Code Number	Condition/Affected Circuit
00	Normal
B1411/11 (1)	Room Temperature Sensor Circuit
B1412/12 (2)	Ambient Temperature Sensor Circuit
B1413/13	Evaporator Temperature Sensor Circuit
B1421/21 (3)	Solar Sensor Circuit
B1422/22 (4)	Compressor Lock Sensor Circuit
B1423/23	Abnormal Refrigerant Pressure (Pressure Switch Circuit)
B1431/31	Air Mix Damper Position Sensor Circuit
B1432/32	Air Inlet Damper Position Sensor Circuit
B1433/33	Air Outlet Damper Position Sensor Circuit
B1441/41	Air Mix Damper Control Servomotor Circuit
B1442/42	Air Inlet Damper Control Servomotor Circuit
B1443/43	Air Outlet Damper Control Servomotor Circuit

(1) If in-vehicle temperature is -4°F (-20°C) or less, code may set even though system is normal.

(2) If outside air temperature is -58°F (-50°C) or less, code may set even though system is normal.

(3) If testing is done in a dark area, code may set even though system is normal. Shine a light at solar sensor and recheck codes.

(4) Malfunction is current.

CLEARING CODES

Remove ECU-B fuse from underhood junction block for 10 seconds or longer to clear memory. After installing fuse, verify only normal code (Code 00) appears.

ACTUATOR CHECK

1. Perform **RETRIEVING CODES** . When system enters self-diagnostic mode, press air intake control button. Each mode door, motor, and relay will operate at one-second intervals. Press A/C button to display codes one at a time and to step through checks one at a time.
2. Check airflow and temperature by hand. Each display code is associated with a system operating condition. [Fig. 1](#) Press OFF button to cancel actuator check mode.

Step No.	Display code	Conditions					
		Blower motor	Air flow vent	Max. cool damper	Air inlet damper	Magnetic clutch	Air mix damper
1	0	0	FACE	0% open	FRESH	OFF	Cool side (-10% open)
2	1	1	↑	↑	↑	↑	↑
3	2	17	↑	100% open	R/F (54.5% open)	ON	↑
4	3	↑	↑	↑	↑	↑	↑
5	4	↑	↑	↑	(RECIRC)	↑	Cool/Hot (50% open)
6	5	↑	BI-LEVEL*1 (52.0% open)	↑	↑	↑	↑
7	6	↑	FOOT*2 (31.0% open)	↑	↑	↑	Hot side (110% open)
8	7	↑	↑	↑	↑	↑	↑
9	8	↑	FOOT/DEF	↑	↑	↑	↑
10	9	31	DEF	↑	↑	↑	↑

*1: There is air leakage from defroster.

*2: There is no air leakage from defroster.

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[Fig. 1: Identifying Actuator Check Display Codes](#)

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CODE B1411/11: IN-VEHICLE TEMPERATURE SENSOR CIRCUIT

1. Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition on.
2. Backprobe A/C ECU connector terminal C13-3 (Green/Red wire) with positive voltmeter lead, and terminal C13-9 (Green/White wire) with negative voltmeter lead. Measure voltage while heating sensor. See **ROOM TEMPERATURE SENSOR CIRCUIT VOLTAGE SPECIFICATIONS** table.
3. If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test room (in-vehicle) temperature sensor. See **ROOM TEMPERATURE SENSOR** under TESTING. Replace sensor as necessary. If sensor is okay, go to next step.
4. Inspect wiring harness and connectors between sensor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU. Retest system.

ROOM TEMPERATURE SENSOR CIRCUIT VOLTAGE SPECIFICATIONS

Sensor Temperature °F (°C)	(1) Volts
77 (25)	1.8-2.2
104 (40)	1.2-1.6
(1) As temperature increases, voltage should gradually decrease.	

CODE B1412/12: AMBIENT TEMPERATURE SENSOR CIRCUIT

1. Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition on.
2. Backprobe A/C ECU connector terminal C14-7 (Black/Red wire) with positive voltmeter lead, and terminal C14-16 (White/Red wire) with negative voltmeter lead. Measure voltage while heating ambient (outside) temperature sensor. See **OUTSIDE TEMPERATURE SENSOR CIRCUIT VOLTAGE SPECIFICATIONS** table.
3. If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test outside temperature sensor. See **AMBIENT TEMPERATURE SENSOR** under TESTING. Replace sensor as necessary. If sensor is okay, go to next step.
4. Inspect wiring harness and connectors between sensor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU. Retest system.

OUTSIDE TEMPERATURE SENSOR CIRCUIT VOLTAGE SPECIFICATIONS

Sensor Temperature °F (°C)	(1) Volts
77 (25)	1.35-1.75
104 (40)	0.85-1.25
(1) As temperature increases, voltage should gradually decrease.	

CODE B1413/13: EVAPORATOR TEMPERATURE SENSOR CIRCUIT

1. Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition

on.

- Backprobe A/C ECU connector terminal C12-1 (Green/Yellow wire) with positive voltmeter lead, and terminal C12-9 (Black/Yellow wire) with negative voltmeter lead.
- Measure evaporator temperature sensor voltage at specified temperature. See **EVAPORATOR TEMPERATURE SENSOR CIRCUIT VOLTAGE SPECIFICATIONS** table.
- If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test evaporator temperature sensor. See **EVAPORATOR TEMPERATURE SENSOR** under TESTING. Replace sensor as necessary. If sensor is okay, go to next step.
- Inspect wiring harness and connectors between sensor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

EVAPORATOR TEMPERATURE SENSOR CIRCUIT VOLTAGE SPECIFICATIONS

Sensor Temperature °F (°C)	(1) Volts
32 (0)	2.0-2.4
59 (15)	1.4-1.8
(1) As temperature increases, voltage should gradually decrease.	

CODE B1421/21: SOLAR SENSOR CIRCUIT (PASSENGER SIDE)

NOTE: If testing is done in a dark area, code may set even though system is normal. Shine a bright light at solar sensor and recheck for code.

- Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition on.
- Backprobe A/C ECU connector terminal C13-15 (Yellow/Black wire) with positive voltmeter lead, and terminal C13-16 (Blue wire) with negative voltmeter lead. Measure sensor circuit voltage. See **SOLAR SENSOR CIRCUIT VOLTAGE SPECIFICATIONS** table.
- If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test solar sensor. See **SOLAR SENSOR** under TESTING. Replace sensor as necessary. If sensor is okay, go to next step.
- Inspect wiring harness and connectors between sensor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

SOLAR SENSOR CIRCUIT VOLTAGE SPECIFICATIONS

Condition	(1) Volts
Sensor Subjected To Bright Light	0.8-4.3
Sensor Covered By Cloth	Less Than 0.8
(1) As light intensity decreases, voltage should increase.	

CODE B1422/22: COMPRESSOR LOCK SENSOR CIRCUIT

1. Locate Engine Control Module (ECM) in engine compartment. Leave harness connectors attached. Start engine. Press AUTO button to ON position.
2. Backprobe ECM connector terminal E5-10 (White/Blue wire) with positive voltmeter lead and connect negative voltmeter lead to ground. Battery voltage (10-14 volts) should exist.
3. If battery voltage exists, no problem is indicated at this time. If battery voltage does not exist, test compressor (A/C magnetic clutch) lock sensor. See [COMPRESSOR LOCK SENSOR](#) under TESTING. If sensor is okay, go to next step. Replace sensor as necessary.
4. Inspect wiring harness and connectors between A/C ECU, ECM, and compressor lock sensor. Repair harness and connectors as necessary. If wiring harness and connectors are okay, temporarily substitute known-good ECM and/or A/C ECU, and retest system.

CODE B1423/23: PRESSURE SWITCH CIRCUIT

1. Locate Engine Control Module (ECM) in engine compartment. Leave harness connectors attached. Connect manifold gauge set to A/C system service valves. Turn ignition on.
2. Backprobe ECM connector terminal E9-2 (Red/Yellow wire) with positive voltmeter lead and connect negative voltmeter lead to ground. The pressure switch circuit wiring changes from a Red/Yellow wire to a Green Red wire.
3. Start engine. Press A/C button to ON position. Battery voltage should exist with refrigerant pressure greater than 28 psi (2.0 kg/cm²) and less than 455 psi (32 kg/cm²). If voltage is as specified, no problem is indicated at this time.
4. If voltage is not as specified, test pressure switch. See [PRESSURE SWITCH](#) under TESTING. If switch is okay, go to next step. Replace pressure switch as necessary.
5. Inspect wiring harness and connectors between pressure switch, ECM and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good ECM and/or A/C ECU, then retest system.

CODE B1431/31: AIR MIX DAMPER POSITION SENSOR CIRCUIT

1. Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition on.
2. Backprobe A/C ECU connector terminal C12-6 (Orange wire) with positive voltmeter lead, and terminal C12-9 (Black/Yellow wire) with negative voltmeter lead.
3. Measure sensor circuit voltage while changing set temperature to activate air mix damper. See [AIR MIX DAMPER POSITION SENSOR SPECIFICATIONS](#) table.

AIR MIX DAMPER POSITION SENSOR SPECIFICATIONS

Set Temperature	(1) Volts
Maximum Cool	3.5-4.5
Maximum Hot	0.5-1.5
(1) As set temperature increases, voltage should gradually decrease.	

4. If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test air mix damper position sensor. See [AIR MIX DAMPER](#)

CONTROL SERVO MOTOR & POSITION SENSOR under TESTING. If position sensor is defective, replace air mix damper control servomotor. If position sensor is okay, go to next step.

5. Inspect wiring harness and connectors between sensor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

CODE B1432/32: AIR INLET DAMPER POSITION SENSOR CIRCUIT

1. Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition on.
2. Backprobe A/C ECU connector terminal C13-11 (Gray wire) with positive voltmeter lead, and terminal C13-1 (Black/White wire) with negative voltmeter lead.
3. Measure sensor voltage while pressing air intake control (recirculated/fresh air) button to change air inlet between recirculated air and fresh air. As servomotor operates, note voltage. See **AIR INLET DAMPER POSITION SENSOR SPECIFICATIONS** table.
4. If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test air inlet door position sensor. See **AIR INLET DAMPER CONTROL SERVO MOTOR & POSITION SENSOR** under TESTING. If air inlet door position sensor is defective, replace air inlet door servomotor. If position sensor is okay, go to next step.
5. Inspect wiring harness and connectors between sensor and A/C control assembly. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

AIR INLET DAMPER POSITION SENSOR SPECIFICATIONS

Position	(1) Volts
Recirculated Air	3.5-4.5
Fresh Air	0.5-1.5
(1) As door moves from recirculated air position toward fresh air position, voltage should gradually decrease.	

CODE B1433/33: AIR OUTLET DAMPER POSITION SENSOR CIRCUIT

1. Remove A/C ECU (combination meter ECU), leaving harness connectors attached. Turn ignition on.
2. Backprobe A/C ECU connector terminal C12-3 (Lt. Green/Red wire) with positive voltmeter lead, and terminal C12-9 (Black/Yellow wire) with negative voltmeter lead.
3. Measure sensor circuit voltage while air outlet damper (air vent mode) control servomotor is moved from vent to defrost position. As servomotor operates, note voltage. See **AIR OUTLET DAMPER POSITION SENSOR SPECIFICATIONS** table.
4. If voltage is as specified, temporarily substitute a known-good A/C ECU, then retest system. If voltage is not as specified, test air outlet damper position sensor. See **AIR OUTLET CONTROL SERVO MOTOR & POSITION SENSOR** under TESTING. If position sensor is okay, go to next step. If air outlet damper position sensor is defective, replace air outlet control servomotor.
5. Inspect wiring harness and connectors between sensor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then

retest system.

AIR OUTLET DAMPER POSITION SENSOR SPECIFICATIONS

Position	(1) Volts
Vent	3.5-4.5
Defrost	0.5-1.5

(1) As door moves from defrost position toward vent position, voltage should gradually increase.

CODE B1441/41: AIR MIX DAMPER CONTROL SERVO MOTOR CIRCUIT

1. Warm engine to normal operating temperature. After system enters self-diagnostic mode, perform **ACTUATOR CHECK**. Press A/C switch button to enter step mode and display codes. See **AIR MIX DAMPER AIRFLOW** table. Air mix damper operation should be as specified.
2. If air mix damper functions as specified, no problem is indicated at this time. If air mix damper does not function as specified, test air mix damper control servomotor. See **AIR MIX DAMPER CONTROL SERVO MOTOR & POSITION SENSOR** under TESTING. Replace servomotor as necessary. If servomotor is okay, go to next step.
3. Inspect wiring harness and connectors between servomotor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

AIR MIX DAMPER AIRFLOW

Code	Air Mix Damper	Expected Result
0-3	Fully Closed	Cool Air Comes Out
4-5	Half Open	Blend (Cool/Hot) Air Comes Out
6-9	Fully Open	Hot Air Comes Out

CODE B1442/42: AIR INLET DAMPER CONTROL SERVO MOTOR CIRCUIT

1. Warm engine to normal operating temperature. After system enters self-diagnostic mode, perform **ACTUATOR CHECK**. Press A/C button to enter step mode and display codes. See **AIR INLET DAMPER AIRFLOW** table. Air inlet damper operation should be as specified.
2. If air inlet damper functions as specified, no problem is indicated at this time. If air inlet damper does not function as specified, test air inlet damper control servomotor. See **AIR INLET DAMPER CONTROL SERVO MOTOR & POSITION SENSOR** under TESTING. Replace servomotor as necessary. If servomotor is okay, go to next step.
3. Inspect wiring harness and connectors between servomotor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

AIR INLET DAMPER AIRFLOW

Code	Damper Position
0-1	Fresh Air
2	Fresh/Recirculated Air
3-5	Recirculated Air

6-9

Fresh Air

CODE B1443/43: AIR OUTLET DAMPER CONTROL SERVO MOTOR CIRCUIT 

1. Warm engine to normal operating temperature. After system enters self-diagnostic mode, perform **ACTUATOR CHECK**. Press A/C button to enter step mode and display codes. See **AIR OUTLET DAMPER AIRFLOW** table. Air outlet damper operation should be as specified.
2. If air outlet damper functions as specified, no problem is indicated at this time. If air outlet damper does not function as specified, test air outlet damper control servomotor. See **AIR OUTLET DAMPER CONTROL SERVO MOTOR & POSITION SENSOR** under TESTING. Replace servomotor as necessary. If servomotor is okay, go to next step.
3. Inspect wiring harness and connectors between servomotor and A/C ECU. Repair as necessary. If wiring harness and connectors are okay, temporarily substitute a known-good A/C ECU, then retest system.

AIR OUTLET DAMPER AIRFLOW

Code	Airflow Mode
0-4	Face
5	Bi-Level
6-7	Foot
8	Foot/Defrost
9	Defrost

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