Troubleshooting

Recirculation Door Actuator Circuit Tests				
Test	**Conditions**	**Test Point**	**Good Result**	**What to Do if Test Fails**
actuator position sensor feedback signal circuit	key on, engine off all connectors connected	Backprobe pins A11 and B5 at control head connector.	0.8V (recirc. on) to 4.7V (recirc. off)	Check wiring between control head and recirculation door actuator.† If wiring is okay, replace the actuator.†

* The voltage should be approximately the same as the battery voltage.

† It is assumed that reference voltage and ground circuits are functioning.

Table 5, Recirculation Door Actuator Circuit Tests

Blower Motor Circuit Tests

The blower motor power and ground are supplied directly to the blower motor assembly. The blower speed is controlled by the fan switch on the control head (climate control panel). The control head sends a pulse width modulated (PWM) signal to the blower motor. The frequency of this signal is 2000 Hz. The pulse width varies with the fan switch selection.

The protection modes for the blower motor are as follows:

- Reverse Voltage Protection—The motor will not operate if the polarity of the motor leads, circuits 98F and ground, are reversed.
- Current Protection—If the motor exceeds the maximum limit, the speed will be reduced until the current is within the limits (23.5A maximum).
- Temperature Protection—If the motor's internal temperature sensor senses that the temperature is too high, the blower speed is reduced to 1000 rpm to reduce the load on the motor and a comparison is made between the sensor reading and the maximum limit. If the temperature is still too high, the blower speed is further reduced to the minimum value of approximately 500 rpm and a temperature comparison is made to the maximum. If, after the second comparison, the temperature is still too high, the motor will shut down until it has cooled sufficiently.

Perform the tests in **Table 6** in the sequence presented. The directions under the column "What to Do if Test Fails" are sometimes dependent on good results from previous tests. If any of the tests fail, stop and perform the specified repair or check. If the blower motor passes the tests in **Table 6** and the blower still does not operate properly, check the blower motor. To quickly check for normal operation, set the fan switch to high and listen for a change in the sound of the blower near the HVAC unit while pressing the recirculation button on and off. The blower will be louder when recirculation is enabled.

Blower Motor Circuit Tests				
Test	**Conditions**	**Test Point**	**Good Result**	**What to Do if Test Fails**
main power to blower motor	battery switch on (if equipped) key off blower motor connector removed	Measure between pin 4 of blower motor connector and negative battery post.	12V*	Check fuse F2 in the PDM under the hood. If the fuse is blown, check for shorted wiring or a damaged blower motor. Check for an open in circuit 98F.

Blower Motor Circuit Tests				
Test	**Conditions**	**Test Point**	**Good Result**	**What to Do if Test Fails**
blower motor ground circuit	battery switch on (if equipped) key off blower motor connector removed	Measure between pin 3 of blower motor connector and the positive battery post.	12V*	Check for an open in blower motor ground circuit.
PWM signal from control head	battery switch on (if equipped) key on, engine off blower motor connector disconnected change the fan (blower) speed setting on the control head and observe frequency using the digital multimeter (DMM)	Probe pins 4 and 5 of the blower motor connector, harness side (DMM set to measure frequency).	0 Hz fan off 0 Hz fan on high 2000 Hz all other speeds	Check circuit 338H. Check control head.
voltage drop (power circuit)	battery switch on (if equipped) key on, engine off all connectors connected fan (blower) speed on high	Backprobe pin 4 at the blower motor connector, other lead on positive battery post.	less than 0.5V	Locate high resistance or open in circuit 98F.
voltage drop (ground circuit)	battery switch on (if equipped) key on, engine off all connectors connected fan (blower) speed on high	Backprobe pin 3 at the blower motor connector, other lead on negative battery post.	less than 0.5V	Locate high resistance or open in blower motor ground circuit.
blower motor current draw	battery switch on (if equipped) key on, engine off all connectors connected fan (blower) speed on high	Use current clamp around circuit 98F or blower motor ground wire.	less than 23.5A	Check blower motor.

* The voltage should be approximately the same as the battery voltage.

Table 6, Blower Motor Circuit Tests

Evaporator Probe Circuit Tests

The evaporator temperature sensor is a resistive element, where the resistance increases as the temperature decreases. The control head (climate control panel) uses this sensor to determine the evaporator temperature. The control head uses the temperature information to determine if the A/C compressor should be engaged or not in order to prevent the evaporator core from freezing. As refrigerant flows through the evaporator, condensation will form on the surface of the evaporator. If this condensation freezes because the evaporator temperature is too low, airflow will be restricted through the core and poor cooling will result. The control head will shut off the compressor when the evaporator temperature is near the point where freezing may occur. See **Table 7** for evaporator probe temperature versus resistance values for units manufactured up to and including January 7, 2007. See **Table 8** for evaporator probe temperature versus resistance values for units manufactured on or after January 8, 2007.

Perform the tests in **Table 9** in the sequence presented. The directions under the column "What to Do if Test Fails" are sometimes dependent on good results from previous tests. If any of the tests fail, stop and perform the specified repair or check.

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Evaporator Probe Temperature/Resistance (up to January 7, 2007)								
Temperature		Resistance: ohms	Temperature		Resistance: ohms	Temperature		Resistance: ohms
°F	°C		°F	°C		°F	°C	
5	–15	36,780	66	19	6500	84	29	4170
14	–10	27,830	68	20	6210	86	30	3995
23	–5	21,250	70	21	5935	88	31	3828
32	0	16,360	72	22	5673	90	32	3669
41	5	12,690	73	23	5426	91	33	3518
50	10	9927	75	24	5189	93	34	3373
59	15	7823	77	25	4964	95	35	3236
61	16	7466	79	26	4751	97	36	3104
63	17	7125	81	27	4548	99	37	2979
64	18	6805	82	28	4354	100	38	2860

Table 7, Evaporator Probe Temperature/Resistance (up to January 7, 2007)

Evaporator Probe Temperature/Resistance (from January 8, 2007)					
Temperature: °F (°C)	Resistance: ohms	Temperature: °F (°C)	Resistance: ohms	Temperature: °F (°C)	Resistance: ohms
-40 (-40)	92757	41 (5)	6998	122 (50)	993.2
-31 (-35)	66870	50 (10)	5485	131 (55)	823.2
-22 (-30)	48790	59 (59)	4330	140 (60)	685.8
-13 (-25)	35937	68 (20)	3443	149 (65)	574.2
-4 (-20)	26757	77 (25)	2757	158 70)	482.9
5 (-15)	20103	86 (30)	2221	167 (75)	408.3
14 (-10)	15252	95 (35)	1800	176 (80)	346.8
23 (-5)	11664	104 (40)	1468	185 (85)	295.6
32 (0)	9000	113 (45)	1204	—	—

Table 8, Evaporator Probe Temperature/Resistance (from January 8, 2007)

Evaporator Probe Circuit Tests				
Test	**Conditions**	**Test Point**	**Good Result**	**What to Do if Test Fails**
evaporator temperature probe	key off, engine off sensor probe removed and disconnected fill a cup with ice then add water to make an ice-water bath NOTE: use mostly ice and allow time for temperature to stabilize at 32°F (0°C) place the tip of the evaporator probe in the ice-water bath for 5 minutes before testing—leave the tip immersed while taking the resistance measurement—be sure the meter reading is stable before noting the final measurement	Measure across pins on the temperature probe.	for pre-1-8-07: 16,000 to 16,730Ω at 32°F (0°C) — for 1-8-07 on: 8910 to 9090Ω at 32°F (0°C)	Replace temperature probe.
evaporator temperature probe circuit test	battery switch on (if equipped) key on, engine off sensor probe installed, but connector is disconnected	Measure across temperature probe connector terminals.	5V	Check for an open in circuits 338K and 338GP. If wiring is okay, replace the control head.

Table 9, Evaporator Probe Circuit Tests

A/C Clutch Circuit Tests for Diagnosing No A/C Clutch Engagement

The A/C compressor clutch is controlled by the control head (climate control panel). When the control head determines that the A/C compressor is required, it grounds the A/C request input to the bulkhead module (BHM). When the BHM receives the A/C request signal from the climate control panel, it will apply power to the A/C clutch output when the following conditions are met—

- engine has been running more than 5 seconds;
- battery voltage is greater than 9.25V;
- low air pressure warning is not active on the ICU;
- A/C clutch has not been engaged in the previous 15 seconds.

NOTE: The **A/C clutch cycle timer strategy** is implemented differently, depending on BHM software versions. With BHM software version 6.1, the total A/C clutch cycle time (on + off time) is a minimum of 15 seconds. This ensures that the A/C compressor does not cycle more than 4 times per minute. With BHM software versions 6.4 and 6.5, the minimum compressor off time is 15 seconds. This means the total cycle time (on + off time) will always exceed 15 seconds. This too, ensures that the A/C compressor does not cycle more than 4 times per minute.

The BHM sends power to energize the A/C clutch. A binary switch is wired into this circuit, which will prevent the compressor clutch from engaging if the refrigerant pressure is too high or too low.

When **all** of the following conditions are met, the control head will send the A/C request signal to the bulkhead module:

- The air selection switch is in one of the A/C or defrost settings, or the recirculation mode is on.