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Title: Air Conditiong Control Head Diagnostics

Applies To: All

CHANGE LOG

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8/05/2014 - Initial Article Release

DESCRIPTION

This document is supplemental to IK1900228 and addresses Control Head issues.

SYMPTOM:

Incorrect vent temperatures with compressor engaged and correct pressure gauge readings

Inoperable modes or blower speeds

Possible Causes:

Active DTC

Actuator/ Doors needs to be recalibrated

No voltage or ground to HVAC Control head

Failed actuator

Mechanical door damage

Blower stuck

Failed LPM

No A/C request from A/C control head to Body Controller

A/C CONTROL HEAD DIAGNOSIS

Note-Body controller will not engage the clutch when A/C related DTCs are active. The following procedures are ONLY VALID if the A/C system is fully charged and the A/C system checks in IK1900000 were performed.
Note- When a failed circuit or component is detected, repair as needed and retest for original problem.

1	HVAC Module Inspection	Decision
A. Visually inspect HVAC module for clogged filters, obstructed ducts, and wiring disconnected from actuators and Linear Power Module (LPM). B. Inspect the 5 Amp and 10 Amp, and 30 Amp HVAC fuses. Are issues detected?		Yes: Repair as needed. If A/C does not operate correctly, go to step 2. If A/C now operates correctly, Diagnostic are complete.
		No: Go to step 2.

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2	Control Head Power	Decision
A. Disconnect the harness from the control head. B. Turn ignition Key-ON, HVAC control to NORM, and blower-ON. C. Connect a 12V test light between Pin-A1 and B6 of the A/C control head harness connector (1200). D. Connect a 12V test light between Pin-A2 and Pin B6 of the A/C control head harness connector (1200). Does the test light illuminate brightly in both steps C and step D? (If using a DMM, both Pin-A1 and Pin-A2 should have 12 V ± 1.5)		Yes: Go to step 3.
		No: Go to **Step 22 (Control Head B+/GND Diagnostics).**

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3	A/C Request to Body Controller	Decision
A. Turn ignition Key-ON, HVAC control switch to NORM, and blower ON. B. Open DLB. C. "Watch" *A/C Request*in the DLB Signal column. Is the*A/C Request*box check-marked?		Yes: Go to step 4.
		No: Go to **Step 5 (A/C Request Diagnostics).**

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4	A/C Operation	Decision
A. Turn ignition Key-ON, HVAC control to NORM, Blower ON, and temperature to coldest setting. B. Turn blower switch to each speed (1-7) and check for proper fan speed. C. Turn mode control to each position and check interior vents for proper mode. Note: Allow time for interior module doors to rotate to correct position. D. Vary mode control from NORM to MAX A/C and check recirculation mode (increase in vent air flow) E. Vary temperature control switch and check vents for change in air temperature. Does the system operate correctly including fan speeds, mode control, MAX A/C recirculation, and temperature control?		Yes: A/C system operates correctly.
		No, Blower, Mode, Recirculation, and Temperature controls do not function: Replace HVAC Controller.
		No, blower speed does not function correctly: Go to **Step 6 (Blower Speed Diagnostics).**
		No, Temperature Control does not operate correctly: Go to **Step 9 (Blend Door Diagnostics).**
		No, mode control switch does not function correctly: Go to

	Step 14 (Mode Control Diagnostics).
	No, recirculation does not function correctly: Go to **Step 18 (Recirculation Door Diagnostics).**

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Step 5: A/C Request Diagnostics

5	**A/C Request Diagnostics:**	**Decision**
A. Disconnect body controller J3 connector (1600). B. Turn ignition Key-ON, HVAC control switch to NORM, and blower-ON. C. Measure voltage at Pin-A2 of connector 1600. Does Pin-A2 have 12V +/- 1.5?		Yes: Inspect J3 cavity for bent pin and verify body controller has power and ground.
		No: Check the following circuits for open or high resistance: **Circuit A77A**(connector 1600 Pin-A2 to control head connector 1200 Pin-A4. If circuit is good, control head has failed.

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Step 6-8: Blower Speed Diagnostics

6	**LPM Voltage**	**Decision**
A. Disconnect the three wire LPM connector (1220) B. Use a head lamp to Load test Pin-6 (B+) to a good ground. C. Use a head lamp to Load test Pin-6 (B+) to Pin-5. Does the lamp burn brightly on step B and step C?		Yes: Go to step 7.
		Step B is Dim: Check B+ circuit from Pin-6 back to battery for high resistance.
		Step B is bright and step C is Dim: Check the following circuit for open or high resistance: Circuit A75-G (connector 1220 Pin-E to*left side dash mounted dual postground*)

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7	**Control Head Speed Signal**	**Decision**
A. Disconnect the three wire LPM connector (1220) B. Turn ignition Key-ON. C. Turn blower-ON to highest speed. D. Measure voltage at Pin-4 to Pin-5. E. Repeat step 4 for each fan speed. F. Reconnect the three wire LPM connector (1220) Do the measured voltages for each speed match the chart?		Yes: Go to step 8.
		No, replace control head.

Dash Switch speed	**Control Head Voltage to LPM**
Off	0-0.4V
1 (Lowest)	1.4V +/- 0.2
2	1.8V +/- 0.2
3	2.4V +/- 0.2

4	2.75V +/- 0.3
5	3.35V +/- 0.3
6	3.9V +/- 0.3
7 (Highest)	5.0V +/- 0.3

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8	Blower Voltage	Decision
A. Disconnect the two wire blower connector at the LPM. B. Turn ignition Key-ON. C. Turn blower-ON to highest speed. D. Measure voltage between red lead and black lead. E. Repeat step 4 for each fan speed. Does the motor voltage match the dash-switch speed?		Yes: Replace the blower.

Dash Switch Position	Motor Voltage
Off	0V
1 (Lowest)	3.85V
2	4.96 V +/-0.5
3	6.60 V +/-0.5
4	7.7 V +/-0.5
5	9.35 V +/-0.5
6	10.73 V +/-0.5
7 (Highest)	12.10V +/-0.5

No, Replace the LPM.

Step 9-13: Blend Door Diagnostics

9	Blend Door Recalibration	Decision
A. Turn the ignition Key-ON. B. Turn the A/C blower-ON. C. Set HVAC selector to Defrost Mode. D. Remove the fuse box cover. Remove the 5 Amp fuse from Battery to HVAC Control Head (ProStar position is F1-B). E. Wait approximately 30 seconds then reinstall the fuse. F. You should hear the doors recalibrate by moving from one extreme position to the other. **Note-**Do not operate the control head during the recalibration. G. Start vehicle and check for correct operation of all modes and temperature. Do all modes work correctly?		Yes: Blend door operates correctly. No: Go to step 10.

10	Blend Door Actuator Signal	Decision
A. Disconnect harness connector from blend door actuator. B. Turn the ignition Key-On. C. Turn the A/C blower-ON. D. Set HVAC selector to A/C MAX Mode. E.Connect a test light between harness Pin-A and Pin-B. F.Move temperature switch through ALL settings while observing the test light. Does the test light illuminate in all switch positions? (If using a DMM, Pin-A to Pin-B spec is 12V +/- 1.5)		Yes: Go to step 12. No: Go to step 11.

11	Blend Door Actuator Circuits	Decision
A. Inspect circuit A74B (connector 1200 Pin-B11, to connector 2010 Pin-C, to blend door actuator Pin-B). B. Inspect circuit A74C (connector 1200 Pin-B12, to connector 2010 Pin-D, to blend door actuator Pin-A). Are circuits open or shorted?		Yes:Repair as needed. No: Replace control head.

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12	Blend Door Movement	Decision
A. Remove blend door actuator from interior module. Connect the harness connector to the actuator. B. Turn the ignition Key-ON. C. Turn the blower-ON. D. Set HVAC selector to A/C MAX Mode. E. Move temperature switch through ALL settings while observing the actuator movement. F. Move the blend door by hand through its full range of movement. Does both the actuator respond to the control head signals and thedoor move freely?		Yes: Go to step 13. No, door binds or sticks: disassemble interior module and repair as needed. No, actuator does not function: replace actuator.

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13	Heater Core Sealing	Decision
A. Reassemble A/C system to operate. B. Use hose pinch off pliers the close off both heater hoses in engine compartment. C. Start the engine and raise the idle speed to 1500 rpm. D. Turn HVAC control switch to NORM. E. Turn Blower to highest speed and Temperature Control to coldest temp F. Insert thermometer into left side passenger dash vent. Do not allow thermometer to touch duct. G. Open windows and close both cab doors. H. After cab temperature stabilizes, record temperature. I. Remove both pair of pinch-off pliers. J. Watch duct air temp for several minutes. Does temperature rise above the specification with coolant in the heater core?		Yes: (Note-If vehicle has a manual coolant shut-off valve in the heater core circuit, verify it is in the off position.) Check Sealing around heater core for placement. Remove blower scroll housing, and heater core if required, to reposition seal around heater core. No: retrace steps 11-15 and decisions made.

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Step 14-17: Mode Control Diagnostics

14	Door Recalibration	Decision
A. Turn the ignition Key-On. B. Turn the blower ON. C. Set HVAC selector to Defrost Mode. D. Remove the fuse box cover. Remove the 5 Amp fuse from Battery to HVAC Control Head (ProStar position is F1-B). E. Wait approximately 30 seconds then reinstall the fuse. F. You should hear the doors recalibrate by moving from one extreme position to the other. **Note-**Do not operate the control head during the recalibration. G. Start vehicle and check for correct operation of all modes and temperature.		Yes: Mode control operates correctly. No: Go to step 15.

Do all modes work correctly?	

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15	Mode Door Actuator Signal	Decision
A. Disconnect harness connector from mode door actuator. B. Turn ignition Key-On. C. Turn blower ON D. Set HVAC selector to A/C MAX Mode. E.Connect a test light between harness Pin-A and Pin-B. F.Move mode switch through ALL settings while observing the test light. Does the test light illuminate in all switch positions? (If using a DMM, pin-A to Pin-B spec is 12V +/- 1.5)		Yes: Go to step 17. No: Go to step 16.

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16	Mode Door Actuator Circuits	Decision
A. Inspect circuit A74 (connector 1200 Pin-B9 to connector 2010 Pin-A to mode actuator Pin-B). B. Inspect circuit A74A (connector 1200 Pin-B10 to connector 2010 Pin-B to mode actuator Pin-A). Are circuits open or shorted?		Yes:Repair as needed. No: Replace control head.

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17	Mode Door Movement	Decision
A. Remove blend door actuator from interior module. Connect the harness connector to the actuator. B. Turn ignition Key-On. C. Turn blower ON. D. Move mode switch through ALL settings while observing the actuator movement. E. Move the blend door by hand through its full range of movement. Does both the actuator respond to the control head signals and thedoor move freely?		Yes, system is functioning correctly. No, door binds or sticks: repair interior module as needed. No, actuator does not function: Replace actuator.

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Step 18-21: Recirculation Door Diagnostics

18	Door Recalibration	Decision
A. Turn ignition Key-On. B. Turn blower ON. C. Set HVAC selector to Defrost Mode. D. Remove the fuse box cover. Remove the 5 Amp fuse from Battery to HVAC Control Head (ProStar position is F1-B). E. Wait approximately 30 seconds then reinstall the fuse. F. You should hear the doors recalibrate by moving from one extreme position to the other. **Note-**Do not operate the control head during the recalibration. G. Start vehicle and check for correct operation of all modes and temperature. Do all modes work correctly?		Yes: Recirculation Door operates correctly. No: Go to step 19.

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19	Recirculation Door Actuator Signal	Decision
A. Disconnect harness connector from recirculation door actuator. B. Turn ignition Key-On.		Yes: Go to step 21.

C. Turn blower ON. D. Set HVAC selector to A/C MAX Mode. E. Insert a test light between Pin-A and Pin-B of the recirculation door harness. F. Move mode switch from MAX to NORM. Does test light illuminate brightly in MAX? (If using a DMM, pin-A to Pin-B spec is 12V +/- 1.5)	No: Go to step 20.

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20	Recirculation Door Actuator Circuits	Decision
A. Inspect circuit A74D (connector 1200 Pin-B1 to connector 2010 Pin-E to mode actuator Pin-A). B. Inspect circuit A74E (connector 1200 Pin-B2 to connector 2010 Pin-F to mode actuator Pin-F). Are circuits open or shorted?		Yes:Repair as needed. No: Replace control head.

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21	Recirculation Door Actuator Movement	Decision
A. Remove blend door actuator from interior module. Connect the harness connector to the actuator. B. Turn ignition Key-ON. C. Turn blower ON. D. Move mode switch from NORM to MAX A/C while observing the actuator movement. E. Move the blend door by hand through its full range of movement. Does both the actuator respond to the control head signals and thedoor move freely?		Yes: Recirculation door is functioning correctly. No, door binds or sticks: repair interior module as needed. No, actuator does not function: replace actuator.

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Step 22-23: Control Head Power

22	Control Head Power	Decision
A. Disconnect the harness from the control head. B. Turn ignition Key-On, HVAC control to NORM, and A/C blower ON. C. Connect a 12V test light between a good ground and Pin -A1 of the A/C control head harness connector (1200). D. Wiggle fuse while watching test light to check for loose/ intermittent fuse connection. E. Connect a 12V test light between Pin-A1 and B6 of the 1200 connector. Does the test light illuminate brightly in step C - E?		Yes: Control head has power and ground. Pin A1 to a good ground does not illuminate the test light brightly: If 5A HVAC fuse is good, check circuit A73A for open or high resistance. Pin A1 to a good ground illuminates the test light bright but Pin-A1 to Pin-A6 does not, Check the following circuit for open or high resistance: Circuit A74G and A11-GCA (connector 1200 Pin-B6 to Left Side Dash Mounted Dual Post GND Plate)

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23	Control Head Power	Decision
A. Disconnect the harness from the control head. B. Turn ignition Key-ON, HVAC control switch to NORM, and A/C blower ON. C. Connect a 12V test light between Pin A2 and Pin B6 of the A/C control head harness connector (1200).		Yes: System is functioning correctly. No: If 10A HVAC fuse is good, check the following

D. Wiggle fuse while watching test light to check for loose/ intermittent fuse connection. Does the test light illuminate brightly in step C - D?	circuit for open or high resistance: Circuit A75D (connector 1200 Pin A2 to fuse F1-B Pin F2)

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