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Availability:	ISIS, FleetISIS, IsSIR	**Revision:**	5
Major System:	ACCESSORIES	**Created:**	8/18/2014
Current Language:	English	**Last Modified:**	5/4/2017
Other Languages:	Français, Español,	**Author:**	Kevin Kochanek
Viewed:	6797		

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Title: Air Conditioning Control Head Diagnostics

Applies To: TerraStar, TranStar

CHANGE LOG

05/04/2017 - Corrected Coding
12/9/2014 - Formatted article to template standard.
10/28/2014 - Author updated for feedback purposes
8/05/2014 - Initial Article Release

DESCRIPTION

This document is supplemental toIK1900228 and addresses Control Head issues.

SYMPTOM(s)

Incorrect vent temperatures with compressor engaged and correct pressure gauge readings.

Inoperable modes or blower speeds.

Possible Causes:

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

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

DTC/Light	Description
Not Applicable	Not Applicable

Customer Observations or Concerns: Not Applicable

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Fluke DVOM Universal	ZTSE4357	Used for checking electrical connections	Not Applicable

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Air Conditioning Electrical Diagnostic Steps

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 IK1900228were performed.

NOTE:

When a failed circuit or component is detected, repair as needed and retest for original problem.

Step	Action	Decision
1	**HVAC Module Inspection** 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 cor Diagnostic are complete **No:**Go to step 2

Step	Action	Decision
2	**Control Head Power** A. Disconnect the harness from the control head. B. Turn ignition Key-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). **Note:**If using a DMM, both Pin-A1 and Pin-A2 should have 12 V ± 1.5V. Does the test light illuminate brightly in both steps C and step D?	**Yes:** Reconnect harness to control head but d reassemble control head to dash, and then go 3 **No:**Leave control head unplugged and go to St

Step	Action	Decision
3	**A/C Request to Body Controller:** A. Turn ignition Key-ON, HVAC control switch to NORM, and blower ON. B. Open DLB.	**Yes:**Go to step 4. **No:**Go to**Step 5 (A/C Request Diagnostics)**..

	C. “Watch”*A/C Request*in the DLB Signal column. Is the*A/C Request*box check-marked?	

Step	Action	Decision
4	**A/C Operation** A. Start Engine. B.Turn HVAC control to NORM, Blower ON, and temperature to coldest setting. C. Turn blower switch to each speed (1-7) and check for proper fanoperation. D. Turn mode control to each position and check interior vents for proper mode door operation. Note: Allow time for interior module doors to rotate to correct position. E. Vary mode control from NORM to MAX A/C and check recirculation mode (increase in vent air flow) F. Vary temperature control switch and check vents for change in air temperature. Does the system operate correctly including fan, mode control, MAX A/C recirculation, and temperature control?	**Yes:** A/C system operates correctly. **No:**Blower, Mode, Recirculation, and Tempera controls do not function: Replace HVAC Contr **No:**Blower speed does not function correctly: toStep 6 (Blower Speed Diagnostics). **No:**Temperature Control does not operate cor Go to**Step 9 (Blend Door Diagnostics).** **No:** mode control switch does not function cor Go to**Step 14 (Mode Control Diagnostics)**. **No:** recirculation does not function correctly: G to**Step 18 (Recirculation Door Diagnostics)**.

Step	Action	Decision
5	**A/C Request Diagnostics** 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 0V ?	**Yes:**Inspect J3 cavity for bent pins and verify b controller has power and ground. **Note: DLB should show A/C Request field o if body controller receives 0V on connector (1600) Pin A2.** After repairs are complete, reassemble unit an for operator concern. **No:**Check the following circuits for open or hig resistance: **Circuit A77A**(connector 1600 Pin-A2 to contro connector 1200 Pin-A4. If circuit is good, control head has failed. After repairs are complete, reassemble unit an for operator concern.

Step	Action	Decision

6	**Blower Speed Diagnostics** A.Turn ignition Key-ON. B. Disconnect the three wire LPM connector (1220) C. Use a head lamp to Load test Pin-6 (B+) to a good ground. D. Use a head lamp to Load test Pin-6 (B+) to Pin-5. Does the lamp burn brightly on step C and step D?	**Yes:**leave three wire LPM connector (1220) unplugged and the Key-On: Go to step 7. **Step C:**is Dim: Check B+ circuit from Pin-6 ba battery for high resistance.After repairs are co reassemble unit and retest for operator conce **Step C:**is bright and step D is Dim: Check the following circuit for open or high resistance: Circuit A75-G (connector 1220 Pin-E to*left sid mounted dual postground*). After repairs are complete, reassemble unit a for operator concern.

Step	Action	Decision
7	**Control Head Speed Signal** A. Turn blower-ON to highest speed. B. Measure voltage at Pin-4 to Pin-5. C. Repeat step 4 for each fan speed. D.Turn blower off and reconnectthe three wire LPM connector (1220). Do the measured voltages for each speed match the chart?	**Yes:**Leave the Key-On, and go to step 8. **No:**Key-Off. 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

Step	Action	Decision
8	**Blower Voltage:** A. Disconnect the two wire blower connector at the LPM. B. Turn blower-ON to highest speed. C. Measure voltage between red lead and black lead. D. Repeat step C for each fan speed. Does the motor voltage match the dash-switch speed?	**Yes:** Replace the blower. Reassemble and retest for operator concern. **No:**Replace the LPM. Reassemble unit and r operator concern.

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

	Action	

Step	**Blend Door Recalibration** A. Turn the ignition Key-ON.	Decision
9	B. Turn the A/C blower-ON. C. Set HVAC selector to Defrost Mode. D. Remove the fuse boxcover and remove the 5 Amp HVAC fuse (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.Reassemble unit to run and re operator concern. **No:**Go to step 10

Step	Action	Decision
10	**Blend Door Actuator Signal** 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

Step	Action	Decision
11	**Blend Door Actuator Circuits** 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. After repairs a complete, reassemble unit and retest f operator concern. **No:** Replace control head. Reassemble unit a for operator concern.

Step	Action	Decision
12	**Blend Door Movement** 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 the door move freely?	**Yes:** Reinstall blend door actuator, plu harness connector, and then go to step 13. **No:** door binds or sticks: disassemble interior and repair as needed. After repairs are comp reassemble unit and retest for operator conce **No:** actuator does not function: replace actua Reassemble unit and retest for operator conc

Step	Action	Decision
13	**Heater Core Sealing**	**Yes:**Check Sealing around heater cor

	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.	for placement. Remove blower scroll housing heater core if required, to reposition seal aro core. **Note:**If vehicle has a manual coolant shut-of the heater core circuit, verify it is in the off po After repairs are complete, reassemble unit a for operator concern. **No:**System is working correctly. Reassemble retest for operator concern.

Step	Action	Decision
	Is duct temperature correct until pliers are removed?	
14	**Mode Control Door Recalibration** 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. Do all modes work correctly?	**Yes:** Mode control operates correctly. **No:** Go to step 15.

Step	Action	Decision
15	**Mode Door Actuator Signal** 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.

Step	Action	Decision
16	**Mode Door Actuator Circuits** 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. After comple reassemble unit and retest. **No:** Replace control head. Reassemble unit and retest.

Step	Action	Decision
17	**Mode Door Movement** **A. Remove mode 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 mode door by hand through its full range of movement.** **Does both the actuator respond to the control head signals and thedoor move freely?** **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 the door move freely?**	**Yes:** system is functioning correctly. **No:** door binds or sticks: repair interior moc needed. After repairs are complete, reasse and retest for operator concern **No:** actuator does not function: Replace ac Reassemble unit and retest for operator co

Step	Action	Decision
18	**Recirculation Door Recalibration** 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 co Reassemble unit and retest for opera concern. **No:** Go to step 19.

Step	Action	Decision
19	A. Disconnect harness connector from recirculation door actuator. B. Turn ignition Key-On. 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) **Recirculation Door Actuator Signal**	**Yes:** Leave recirculation door actuat unplugged and go to step 21. **No:** Leave recirculation door actuator harr unplugged and go to step 20.

Step	Action	Decision
20	**A. Inspect circuit A74D (connector 1200 Pin-B1 to connector 2010 Pin-E to mode actuator Pin-A).**	**Yes:** Repair as needed. Reassemble retest for operator concern.

	B. Inspect circuit A74E (connector 1200 Pin-B2 to connector 2010 Pin-F to mode actuator Pin-F). **Are circuits open or shorted?** **Recirculation Door Actuator Circuits**	**No:** Replace control head. Reassemble ur for operator concern.

Step	Action	Decision
21	**Recirculation Door Actuator Movement** A. Remove recirculation 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 recirculation 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 functionin **No:** Door binds or sticks: repair interior mo needed. Reassemble unit and retest for op concern. **No:** actuator does not function: Replace ac Reassemble unit and retest for operator co

Step	Action	Decision
22	**Control Head Power** A. Turn ignition Key-ON. B. Connect a 12V test light between a good ground and Pin-A1 of the A/C control head harness connector (1200). C. Wiggle 10A fuse F4-L while watching test light to check for loose/ intermittent fuse connection. D. Connect a 12V test light between Pin-A1 and B6 of the 1200 connector and monitor test light. E. Connect a 12V test light between a good ground and Pin-A2 of the A/C control head harness connector (1200). F. Wiggle 5A fuse F1-B while watching test light to check for loose/ intermittent fuse connection. G. Connect a 12V test light between Pin-A2 and B6 of the 1200 connector and monitor test light Which of the following steps does not illuminate the test light brightly: Step C, D, F, or G?	**Step C:** does not illuminate the test l brightly: If 10A HVAC fuse is good, check circ for open or high resistance. After repairs are complete, reassemb and retest. **Step D:** does not illuminate the test light bri Check circuit A74G and A11-GCA for open resistance (Connector 1200) Pin-B6 to Left Dash Mounted Dual Post GND Plate). After repairs are complete, reassemble unit **Step F:** does not illuminate the test lig brightly: If 5A HVAC fuse is good, check circu for open or high resistance. After repairs are complete, reassemb and retest **Step G:** does not illuminate the test l brightly: Check circuit A74G and A11-GCA fo high resistance (Connector 11200 Pi Left Side Dash Mounted Dual Post G Plate). After repairs are complete, reassemb and retest.

WARRANTY INFORMATION

NOTE: There are multiple noun groups that the diagnostic time could be charged to.

WARRANTY CLAIM CODING:

Group:	**19000 -Truck Air Conditioner**
Noun:	**Multiple Nouns - Code to repair made**

Warranty Coding Manual

STANDARD REPAIR TIMES:

DIAGNOSTICS			
Step	**Description**	**Models**	**Hours**
1-23	A/C CONTROL HEAD DIAGNOSIS	All	Varies Per Model

Link to the Standard Repair Time Manual: Click Here

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