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|--------------------------|----------------------------------------------|-----------------------|---------------|
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| <b>Availability:</b>     | ISIS, FleetISIS, Body Builder                | <b>Revision:</b>      | 5             |
| <b>Major System:</b>     | ACCESSORIES                                  | <b>Created:</b>       | 5/2/2013      |
| <b>Current Language:</b> | English                                      | <b>Last Modified:</b> | 7/8/2014      |
| <b>Other Languages:</b>  | NONE                                         | <b>Author:</b>        | Matthew Boyer |
| <b>Viewed:</b>           | 13859                                        |                       |               |

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## Coding Information

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**Title: 2010 and Later ProStar and LoneStar HVAC Diagnostic Information**

**Applies To: 2010 and Later ProStar and LoneStar Trucks**

## Change Log

Dealers: Please refer to the change log text box below for recent changes to this article:

7/8/2014 - Updated troubleshooting information for DTC 2058

## Description

This iKNOW describes the unique service procedures and signals that apply to the post 2010 Bergstrom air conditioning system installed in ProStar and LoneStar vehicles.

## HVAC Door Motor

If any of the following components are serviced, the HVAC door system needs to be calibrated:

- Blend air control, mode air control, or temperature air control door actuators or doors
- Any wiring that runs from the above listed HVAC door actuators to the HVAC control head
- Any wiring to the HVAC control head
- The HVAC control head

For resetting the system, the connector to the HVAC control head needs to be removed for a minimum of 15 seconds with the key in the on position. Alternatively, the battery power from the truck can be removed to accomplish the same thing, although this may interfere with driver programmable settings. For more information refer to [IK1900203 - Troubleshooting and Resetting HVAC Doors](#)

## HVAC Control Head

The HVAC control head performs 3 tasks. It provides the A/C request to the body controller from the user, controls the operation of all the door actuators in the HVAC system based on knob position, and sends a signal to the body controller for the status of the HVAC door actuators. The body controller does not control any of the HVAC door positions. If the HVAC control head is replaced with an incompatible part number, any of the following situations can result:

- Door actuators working opposite of driver selected positions
- Air conditioning inoperative
- HVAC door actuators inoperative
- Door actuator fault codes in the Body Controller

As a result, the correct part number should be verified using the parts catalog, and cross checked to the old HVAC control head.

## A/C Refrigerant and Oil

The HVAC system contains 40 OZ (2.5 LBS) for daycab models, and 48 OZ(3.0 LBS) for sleeper cab models of R-134a refrigerant. The refrigerant should be purchased from Navistar parts to ensure that a quality brand name refrigerant is used. Please see [IK1900165 - R134a refrigerant quality and concerns with some imported refrigerants](#) for more details.

300 cc(10.14 OZ) of PAG 100 oil (PN ZGGR725028) is the lubricating oil installed in all post 2010 ProStar and LoneStar trucks A/C compressors.

Mineral oil (PN ZGGR6912) should be used as lubricating oil for assembly on all o-rings and fittings.

## Air Conditioning Compressor Operation

The following interlocks must be met for the A/C compressor to transition states from off to on:

- Ignition and Accessory voltage at body controller (Checkmarks at A1 and A16 at 1602 of B/C)
- Air conditioning request from HVAC control head to B/C (Checkmark at 1600\_A2)
- Engine running signal (Engine\_Running)
- Engine speed above 300 RPM (Engine\_Speed)
- Low pressure input is grounded (Checkmark at 1600\_B5)
- Freeze Probe Thermistor input is  $\geq 38^{\circ}\text{F}$  ( HVAC\_Freeze\_Protect\_Raw above 2.4976 volts 1600\_B13)
- A/C high side pressure is greater than 35 psi, but less than 218 psi (AC\_High\_Side\_PSI) - Pressures may change due to programmable parameters. See table below.
- No HVAC fault codes active

## HVAC Filter Maintenance

Remove the fresh air filter(s) once each season and check for dirt, lint, etc. Replace if necessary. Vehicles operating in unusually dusty conditions may require inspecting and replacing the air filter (s) more often. ProStar and LoneStar models have 3 air filters. 2 are recirculation filters that are located on the inside of the cab. Those filters may be carefully power-washed with a soap solution and reused. Be sure to wash and rinse both sides and be sure to keep the spray head at least six inches away from the filter to prevent damage. The fresh air filter is located on the outside of the cab.

## HVAC Flushing Procedure

A new air conditioning service tool has been developed to flush the air conditioning system after a catastrophic A/C compressor failure. The tool is an essential dealer tool for all medium duty and heavy duty dealers.

[Tool Information](#)

[Flushing Instructions](#)

## DLB Session

Please download and import the attached DLB session for diagnosing electrical issues

[ProStar\\_LoneStar\\_AC](#)

## Fault Codes

| Signal                         | B/C Pin  | SPN                  | FMI | Description                                             | Action                                                                                                                                                   |
|--------------------------------|----------|----------------------|-----|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| BC_RCD_Pressure_Raw_Signal     | 1600-B12 | <a href="#">2609</a> | 16  | HVAC High Pressure Protection                           | <b>HVAC Pressure Sensor Reading Above 480 PSI</b>                                                                                                        |
| Switched_5V_Sense_Raw_Signal   | 1602-E6  | <a href="#">1079</a> | 1   | 5 volt sensor supply below normal                       | <b>Short Circuit From 1602_E6 to 6201_C</b>                                                                                                              |
| RCD_HVAC_Ctrl_Head_Diag_Signal | 1600-A3  | <a href="#">3985</a> | 9   | HVAC Control Head Circuit Failed To Communicate With BC | <b>Open Circuit From 1200_A9 to 1600_A2</b>                                                                                                              |
| RCD_HVAC_Ctrl_Head_Diag_Signal | 1600-A3  | <a href="#">1552</a> | 2   | HVAC Control Head Temperature Mix DM1                   | <b>HVAC Temperature Door Stuck, Defective Door Actuator, or Open/Shorted Circuit 1200_B11 to Temp Actuator Pin A, or 1200_B12 to Temp Actuator Pin F</b> |
| RCD_HVAC_Ctrl_Head_Diag_Signal | 1600-A3  | <a href="#">3981</a> | 2   | HVAC Control Head Mode Fault DM1                        | <b>HVAC Mode Door Stuck, Defective Door Actuator, or Open/Shorted Circuit 1200_B9 to Mode Actuator A, or 1200_B10 to Mode Actuator Pin F</b>             |
| RCD_HVAC_Ctrl_Head_Diag_Signal | 1600-A3  | <a href="#">3984</a> | 2   | HVAC Control Head Air Inlet DM1                         | <b>HVAC Air Inlet Door Stuck, Defective Door Actuator, or Open/Shorted Circuit 1200_B1 to</b>                                                            |

|                                 |     |                      |      |                                           | 4202_A, or 1200_B2 to 4202_F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----|----------------------|------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| J1939BB_Rcv_61217_058_033_Timer | N/A | <a href="#">2058</a> | 9/14 | Rear HVAC Data Link Communication Failure | <p><b>Body Builder J1939 Datalink: Loss of Communication between the Body Controller and Rear HVAC Controller. Likely causes of failure:</b></p> <ul style="list-style-type: none"> <li>• Rear HVAC Controls not powered up or defective.</li> <li>• Body Controller Datalink interface is defective.</li> <li>• Open J1939 Body Datalink.</li> <li>• Datalink shorted to ground or shorted together.</li> <li>• Datalink leads miss pinned or terminal pin backed out.</li> </ul> <p><b>Note: Ignition key must be ON for datalink voltage tests.</b></p> <ol style="list-style-type: none"> <li>1. Load test power and ground connections to the Rear HVAC Controller. At connector 5210 perform a continuity test between Pin 4 and a known good ground. Pin 4 should be grounded with less than 1 ohm resistance.</li> <li>2. Turn ignition switch to the ON position (do not start engine) at connector 5210 check pin 3 which should be</li> </ol> |

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|--|--|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  |  |  | <p>equal to current battery voltage (approx. 12 volts). If voltage is missing troubleshoot loss of HVAC power source (supplied by sleeper relay 5001).</p> <p>3. Check J1939 body datalink voltage at the Rear HVAC controller harness connector 5210 pins 15 and 16. Ignition switch must be ON. Measure DC voltage at pin 15 (J1939+) voltage should be approx. 2.6 volts. Measure DC voltage at pin 16 (J1939-) voltage should be approx. 2.3 volts. Each voltage may vary by several tenths of a volt higher or lower than those readings.</p> <p>4. If the reading are in spec but the fault code remains active - ensure the datalink has 60 ohms resistance across it if ok go to step 9, If you get 120 ohms you have an open somewhere in the datalink or you are missing one of the terminating resistors.</p> <p>5. If the readings are out of spec or missing ensure the</p> |
|--|--|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--|--|--|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  |  |  |  | <p>voltages on the datalink wires do not match (i.e. 2.5 volts) the 2 wires may be shorted together or reversed. Check for harness continuity between the Rear HVAC connector 5210 pins 15 and 16 (J1939 datalink) and the body controller connector 1602 pins F5 and F6. Repair circuits if open.</p> <p>6. Make sure pins are properly seated and not mis pinned. If you have good harness continuity but either datalink voltage is out of spec or or missing ensure the resistance to ground is greater than 10K ohms. Check resistance from Rear HVAC Controller connector 5210 pins 15 and 16 to ground, resistance should be greater than 10K ohms. If resistance is less than 1,000 ohms you have a short to ground.</p> <p>7. Ensure proper datalink voltages are present at the body controller conenctor 1602 pins F5 and F6,</p> |
|--|--|--|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                         |     |                        |   |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------|-----|------------------------|---|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         |     |                        |   |                                             | <p>if not then replace the body controller.</p> <p>8. If the body controller datalink voltage is correct and the harness tests passed yet the fault still exist go to step 9.</p> <p>9. Check datalink for any customer installed equipment and ensure it was installed properly. Refer to the Body Builder Electrical Guide <a href="#">HERE</a> General Electrical section for proper installation information. Ensure the datalink pins are NOT reversed.</p> <p>10. If there are no problems with the customer installed equipment and the fault still exists replace the Rear HVAC controller module.</p> |
| Rear_HVAC_Blower_UP                     | N/A | <a href="#">3982</a>   | 2 | HVAC Rear Blower Speed Control Switch Error | <b>Faulty Switch Actuator or Micro switch for HVAC Rear Blower Speed Control Switch</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Rear_HVAC_Temp_UP                       | N/A | <a href="#">3983</a>   | 2 | Rear HVAC Temperature Control Switch Error  | <b>Faulty Switch Actuator or Micro switch for Rear HVAC Temperature Control Switch</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| HVAC Control Head Multiple Motor Faults | N/A | <a href="#">520465</a> | 2 | HVAC Control Head Multiple Motor Faults     | <b>HVAC Motor in Wrong Position or Jammed (HVAC</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|  |  |  |  |  |                                                       |
|--|--|--|--|--|-------------------------------------------------------|
|  |  |  |  |  | <b>Control Head<br/>Multiple Motor fault<br/>DM1)</b> |
|--|--|--|--|--|-------------------------------------------------------|

## Programmable Parameters

Below is the list of programmable parameters that control the operation of the HVAC system. These are how the parameters are set from the factory for proper operation.

| Parameter ID | Parameter                                         | Value | Units     | Description                                                                                                                                                                                                                                                                                                                                    |
|--------------|---------------------------------------------------|-------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2562         | <a href="#">HVAC Compressor HP OFF Time</a>       | 9     | Seconds   | When AC Head pressure is above 400 psi, the compressor is cycled OFF for 9 seconds and ON for 1 second. This parameter is the OFF time                                                                                                                                                                                                         |
| 2561         | <a href="#">HVAC Compressor HP ON Time</a>        | 1     | Seconds   | During high pressure mode the AC Compressor is cycled OFF and ON. This parameter sets how long the compressor is ON                                                                                                                                                                                                                            |
| 2563         | <a href="#">HVAC Emergency Shutdown Pressure</a>  | 420   | PSI       | Maximum AC Head Pressure allowed before emergency compressor shutdown. There is a relief value that will release the coolant into the atmosphere if the head pressure exceeds 500 - 530 psi. This value should be somewhat less than that (arbitrarily chose 480 psi) Value will be typically the same as parameter 'HVAC_Pressure_Over_Limit' |
| 2551         | <a href="#">HVAC Freeze Probe High Limit</a>      | 505   | A2Dcounts | High limit for Freeze Probe to allow Compressor to operate                                                                                                                                                                                                                                                                                     |
| 2542         | <a href="#">HVAC Freeze Probe Low Limit</a>       | 511   | A2Dcounts | Low limit for Freeze Probe to allow Compressor to operate                                                                                                                                                                                                                                                                                      |
| 2576         | <a href="#">HVAC Leave HiPressureMode Timeout</a> | 15    | Seconds   | When leaving High Pressure Mode, this is the maximum amount of time we can wait for the pressure to drop below 300 psi before going to Normal Operation (Compressor ON) Mode                                                                                                                                                                   |
| 2548         | <a href="#">HVAC_Max_Initial_Pressure</a>         | 218   | PSI       | Maximum head pressure allowable when turning the compressor ON. (Transition from Compressor OFF to Normal Operation Mode)                                                                                                                                                                                                                      |

|      |                                          |     |     |                                                    |
|------|------------------------------------------|-----|-----|----------------------------------------------------|
| 2546 | <a href="#">HVAC Pressure High Limit</a> | 350 | PSI | Maximum pressure where HVAC Compressor can operate |
| 2556 | <a href="#">HVAC Pressure Low Limit</a>  | 35  | PSI | Low limit allowed to turn On Compressor            |

## A/C High Pressure Transducer Electrical Fault / Signal Table

This table outlines what the A/C pressure transducer signal reads if there is a electrical fault in the system. The pressure readings may vary slightly.

| Signal                | B/C Pin   | Description                                                                                                                          | DLB Reading                                                                             |
|-----------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| AC_High_Side_Pressure | 1600 -B12 | Open circuit for air conditioning high side pressure sensor wiring on any wire, failed sensor, or short to ground on the signal wire | 6525.8 PSI. No fault code is generated by this condition                                |
| AC_High_Side_Pressure | 1600 -B12 | Short circuit from air conditioning high side pressure sensor feed(5 volts) to the sensor signal wire                                | 530 PSI. Fault code 2609 16 HVAC Pressure Protection is set. Fault clears at key cycle  |
| AC_High_Side_Pressure | 1600 -B12 | Short to power(12v) to air conditioning high side pressure sensor feed wire                                                          | 1080 PSI. Fault code 2609 16 HVAC Pressure Protection is set. Fault clears at key cycle |

## Additional Resources

- [IK0800092](#) - The First Check to make when Troubleshooting any Body Controller or ESC Issue
- [0000002221](#) - Heat Ventilation Air Conditioning (HVAC) FOR 2010 ProStar and LoneStar Models (Revision 1)
- [0000002122](#) - ProStar®+ and LoneStar® (EPA 10) - Electrical Circuit Diagrams Manual – Models Built June 14, 2010 and After, Revision 4 (Supersedes S08344 and S08371)
- [TS11900001](#) - Air Conditioning (A/C) condenser replacement versus flushing
- [IK1900156](#) - A/C HVAC Service Resource Center
- [IK1900193](#) - Post 2010 A/C Pressure Transducer Diagnostics

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