Countries:	BAHAMAS, BOLIVIA, BELIZE, CANADA, CHILE, TAIWAN, COLOMBIA, COSTA RICA, DOMINICAN REPUBLIC, ECUADOR, EL SALVADOR, TRINIDAD AND TOBAGO, UNITED STATES, URUGUAY, VENEZUELA, MEXICO, ARUBA, NICARAGUA, PERU, PUERTO RICO, Curaçao, GUAM, GUATEMALA, GUYANA, HAITI, HONDURAS, JAMAICA, KOREA, SOUTH KOREA, PANAMA	**Document ID**:	IK0800092
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Other Languages:	Français, Español,	**Author**:	Charles Schroeder
Viewed:	61075		

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Title: The First Check to make when Troubleshooting any Body Controller or ESC Issue

Applies To: All Vehicles with ESCs or Body Controllers

Change Log

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

04/25/2019 - Added Mega-Fuse torque value based on dealer feedback.
11/01/2017 - Added note at Step 6 to check for telematics that could cause unusual vehicle behavior.
09/28/2016 - Updated Figure 1 to show the checkmark may not be present on 4044470C1 250k Baud body controllers.
05/24/2016 - Added feature information for 500k grid control.
05/19/2016 - Updated ESC connector information based on dealer feedback. Added additional information for Gen 4 with 500k Baud and associated fault codes.

Description

This outlines how to verify BCM/ESC is receiving proper voltage and ground inputs to power up.

- 2015 - Current Body Control Module (BCM)
  - Gen 4 BCMs on trucks with 500k Baud data link, utilize enhanced grid control that monitors the key switch
  - Fault codes are present when a signal is missing
- 2007 - 2015 Body Control Module (BCM)
- Pre-2007 Electronic System Controller (ESC)

Symptoms

NOTE:
Do not diagnose these faults when *INACTIVE* without a driver complaint

Faults apply to Gen 4 Body Controllers with 500k Baud Only			
SPN	**FMI**	**Module and Source Address (SA)**	**Description**
520981	14	Body Controller (33)	Only Ignition input is being detected (status of Key_Switch_State = 1)
520982	5	Body Controller (33)	Accessory Grid Undercurrent
520982	6	Body Controller (33)	Accessory Grid Overcurrent
520983	14	Body Controller (33)	Only Starter input is being detected (status of Key_Switch_State = 4)
520984	14	Body Controller (33)	Starter input and Accessory input are detected (status of Key_Switch_State = 6)
520985	14	Body Controller (33)	Starter input, Accessory input, and Ignition input are detected (status of Key_Switch_State = 7)

Below are the only conditions the Body Controller should observe for Key_Switch_State:

- Accessory Only
- Ignition and Accessory (Key on Engine Off or Key On Engine Running)
- Ignition and Starter input (Crank) - (Accessory signal is removed during cranking)

If any other combinations of key switch state are observed a fault will be set. If the Accessory circuits are undercurrent or overcurrent a fault will be set. The Body Controller will not supply power to the output when overcurrent or undercurrent faults are active. You must troubleshoot the output wiring.

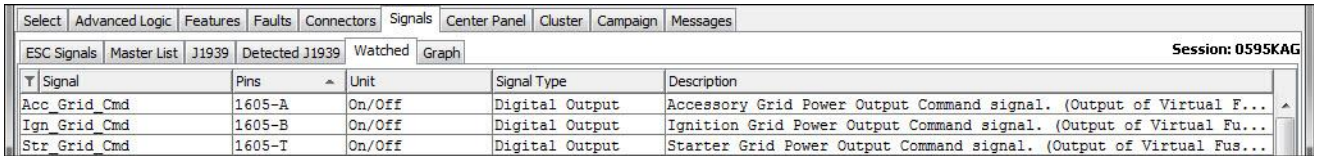
Troubleshooting (All)

1. Hook up DLB and monitor these pins in DLB. There should be a check mark next to both the **ignition**, **accessory** and **power feed** signals. Don't go by the voltage number reading in DLB, it isn't accurate. Only look for the check marks. You will probably see that one of these three signals is not getting a check mark beside it.
2. Hook up your break out box to the 1600 connector of the Body Controller and check the voltage on all 3 power pins with a multimeter. For pin numbers, see below.
3. If both 1600 connector pins have voltage, but the problem persists, then you need to load test the two 1600 connector pins through the breakout box with a headlamp using the Body Controller ground circuits.
4. Load test the main battery circuit to the Body Controller J8 (Gen 4 BCM) or J6 (Gen II BCM or ESC) power feed stud.
5. Remove Mega-Fuse. Clean it thoroughly and inspect for cracks. Ohm the fuse end to end to insure it is not cracked internally as this has been known to be a problem.
6. If you have found the BCM is powered up properly, there is potential for improperly installed devices on the data link could cause unusual behavior. Any aftermarket device installed on the data link should be checked to verify it is not causing an issue with the vehicle.
    - The device could cause issues on the data link
    - The method the device was installed onto the data link could cause issues.
    - Removing the device and inspecting the installation method/splice is recommended

Troubleshooting specific to 500k Baud Vehicles

- Make a session in DLB from feature 0595KAG
    - If you need assistance making a session in DLB please use IK2600008 - How to Diagnose Electrical Problems with Diamond Logic® Builder

Accessory Grid Control output:	1605-A	Maximum Current: 20 Amps
Ignition Grid Control output:	1605-B	Maximum Current: 10 Amps
Starter Grid Control output:	1605-T	Maximum Current: 10 Amps

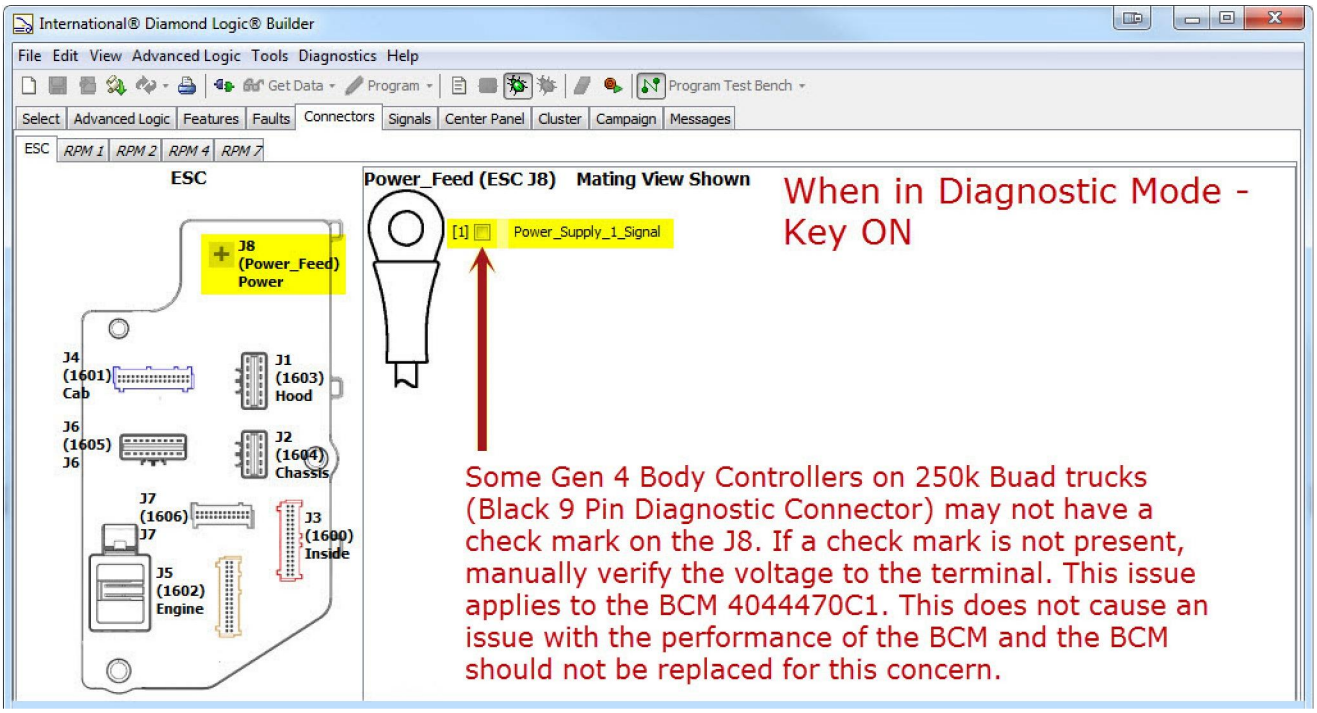


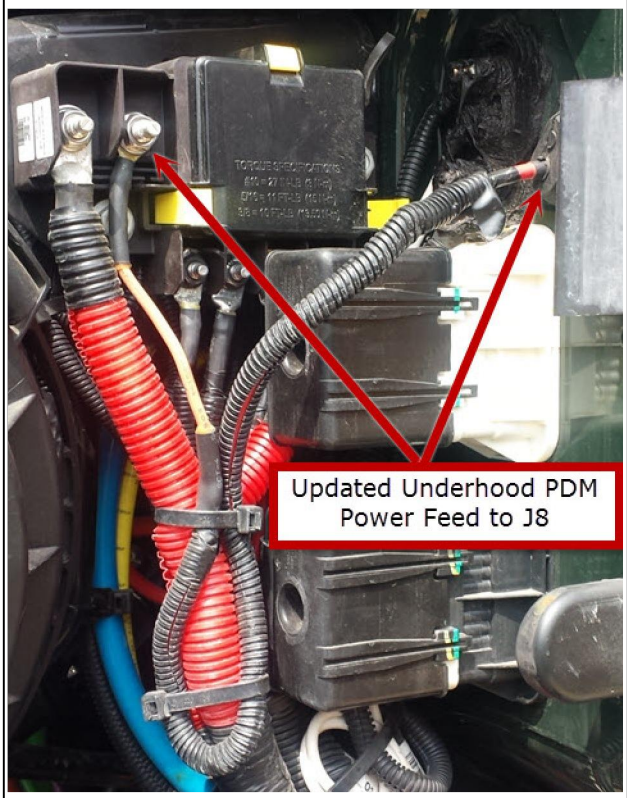
NOTE:

The Body Controller will disable these outputs when an overcurrent/undercurrent fault is Active. Do not replace the Body Controller for this issue. Troubleshoot the outputs for those circuits.

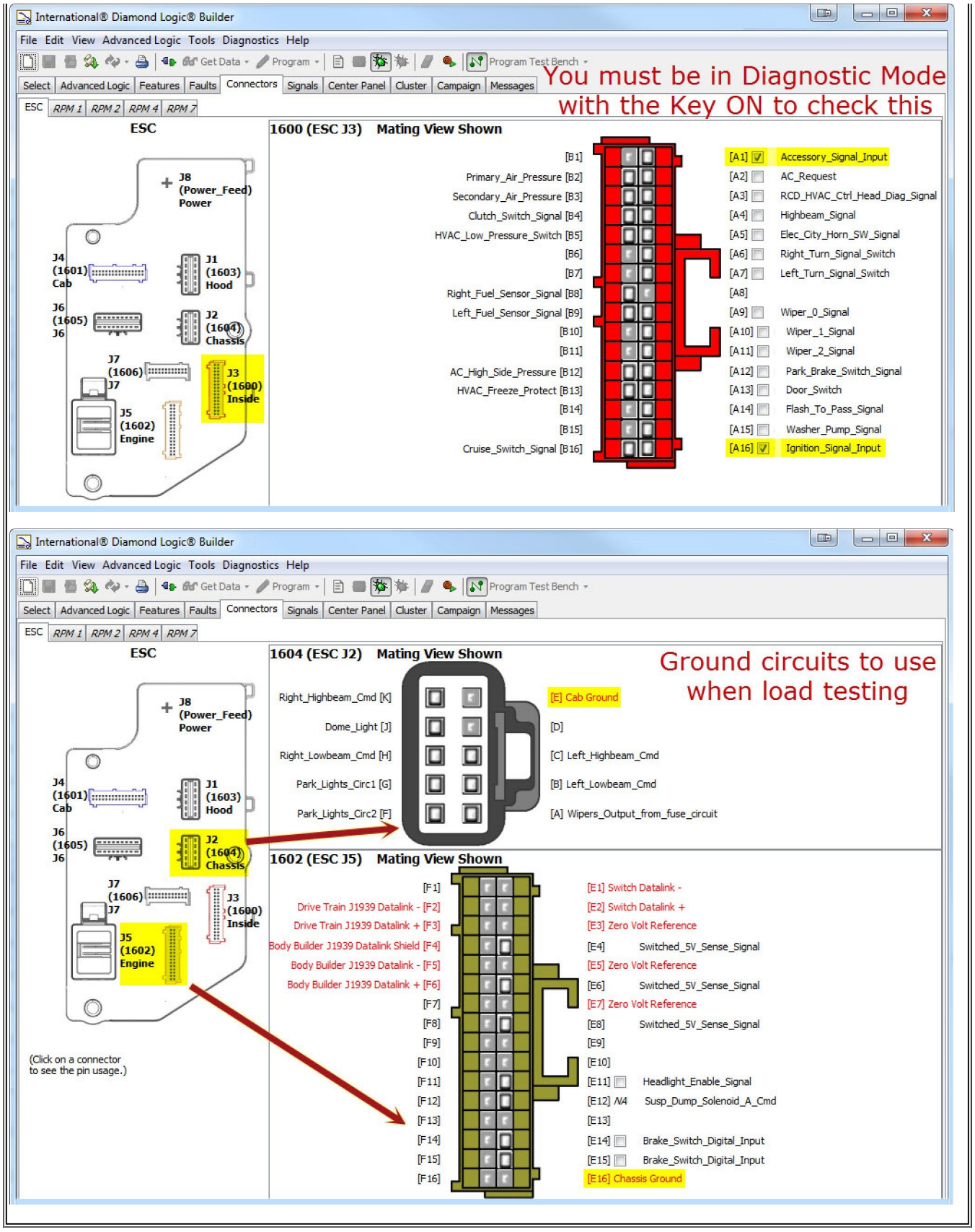
Gen 4 Body Controller Signals to Watch

Figure 1 - 2015 - Present Gen 4 Body Controller



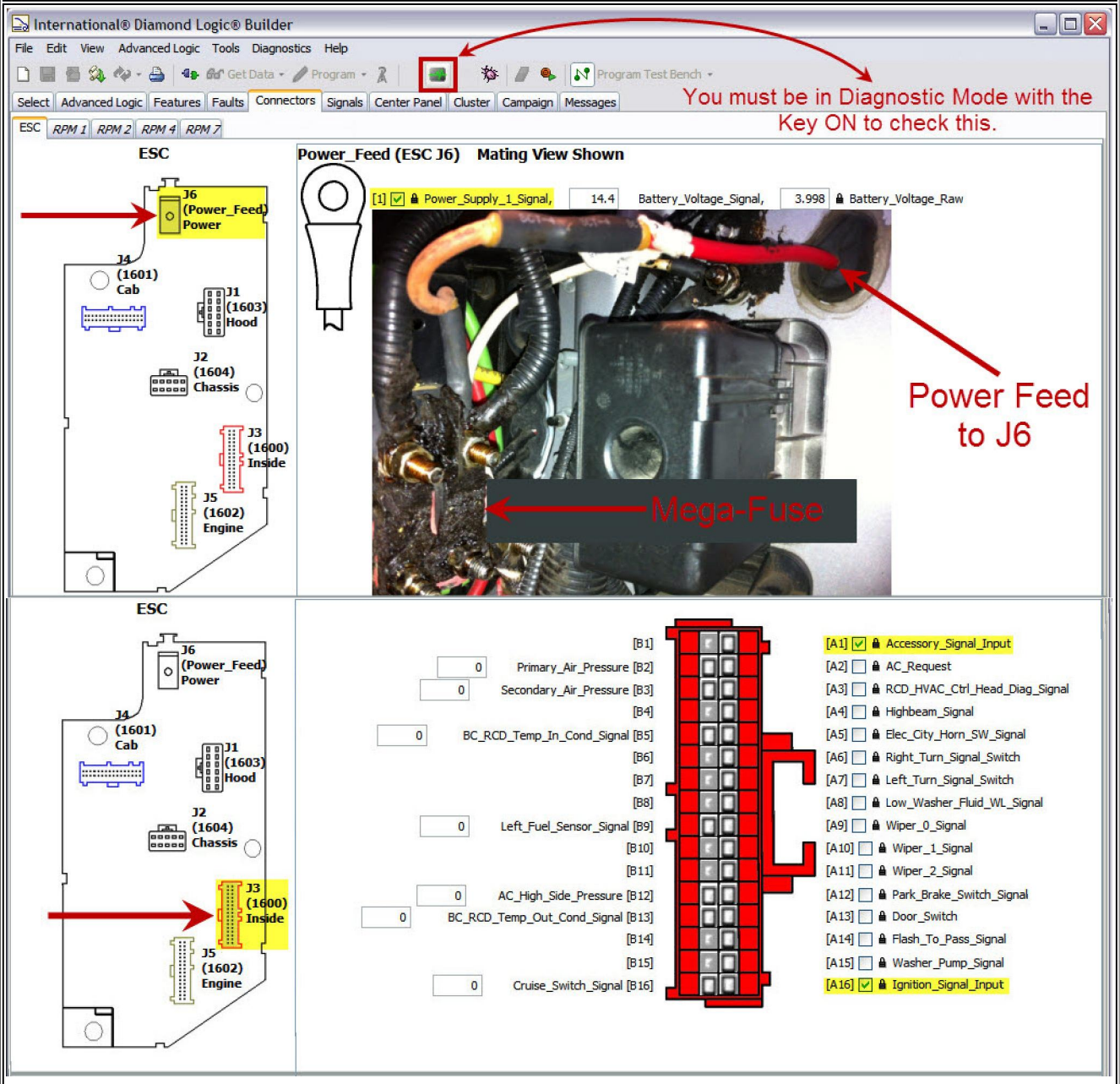


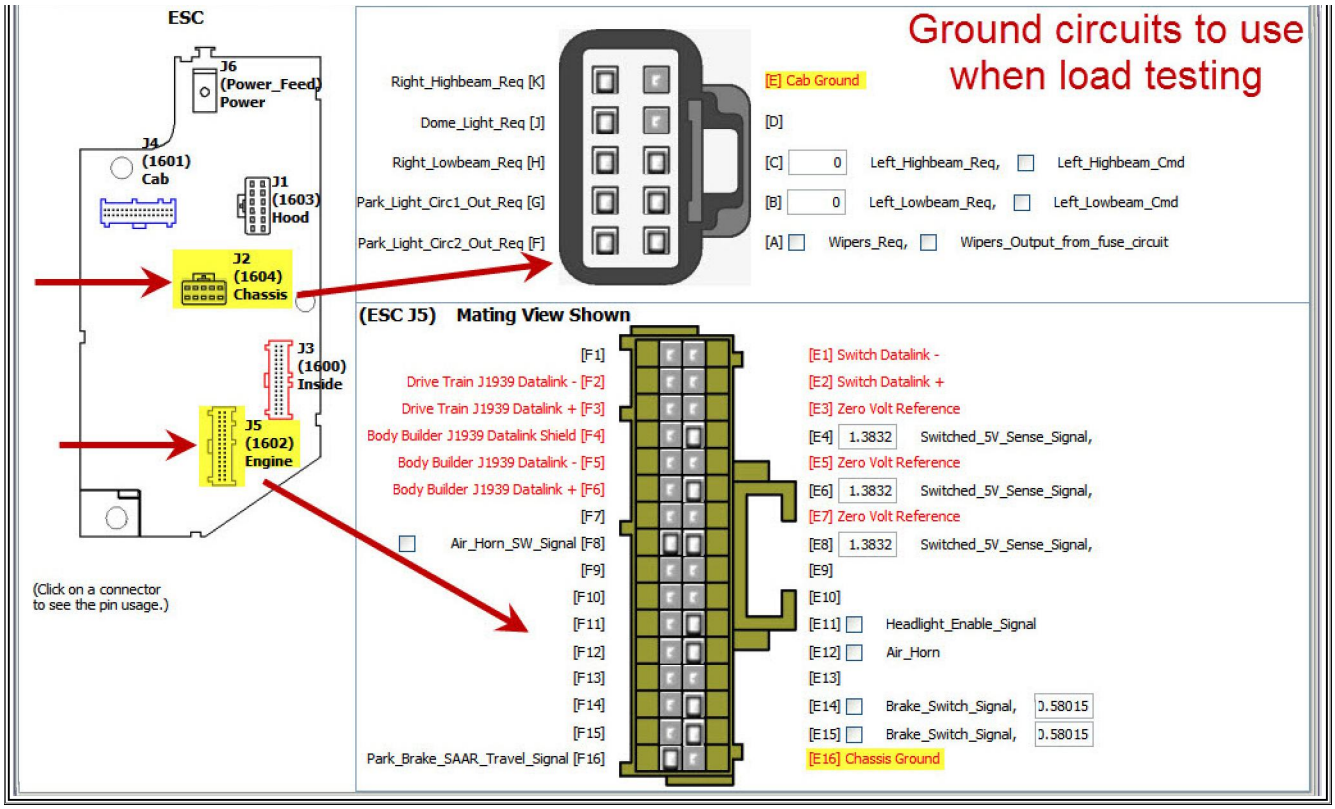
- The updated PDM is only used with Navistar Engine on ProStar models
- The updated PDM is used on all LT/RH models



Gen II Body Controller Signals to Watch

Figure 2 - 2007-2015 Gen II Body Controller





Mega-Fuse Torque Value

The mega-fuse nut should be torqued to 11.3 NM (8.33 FT-LBS)

The connections need to be protected from corrosion using Grafo grease 2643099R3 or Tribo Tuff grease 2519646C1 or NANO2133005

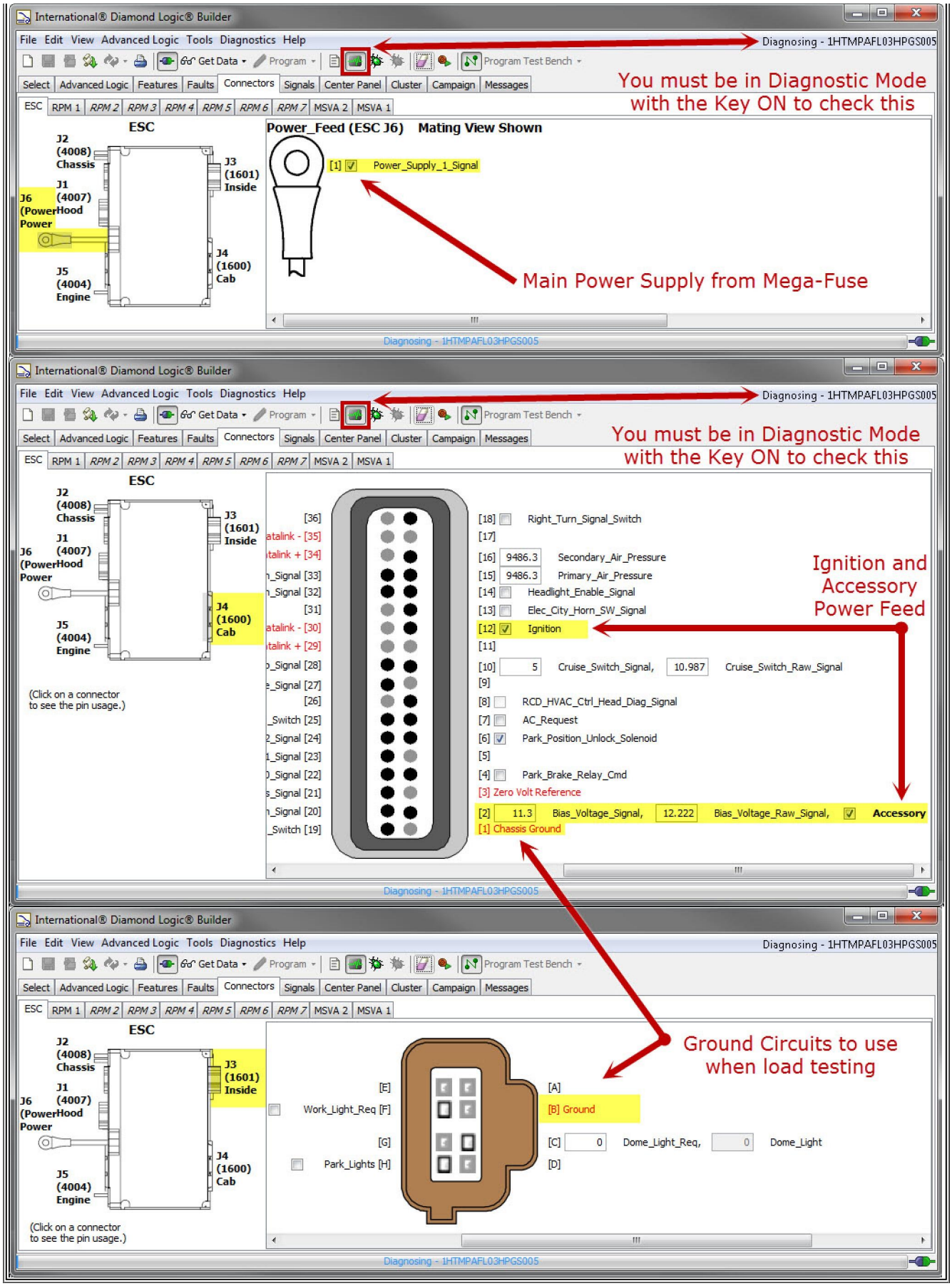
Body Controller Circuit Diagrams

- ProStar / LoneStar
- DuraStar / WorkStar / TranStar
- TerraStar

ESC Signals to Watch

- The ESC works the same way as the Body Controller. Here are the Connector and Pin locations for the ESC

Figure 3 - Pre-2007 ESC


International® Diamond Logic® Builder
File Edit View Advanced Logic Tools Diagnostics Help
Diagnosing - 1HTMPAFL03HPGS005
Get Data
Program
Program Test Bench
Select Advanced Logic Features Faults Connectors Signals Center Panel Cluster Campaign Messages
ESC RPM 1 RPM 2 RPM 3 RPM 4 RPM 5 RPM 6 RPM 7 MSVA 2 MSVA 1
You must be in Diagnostic Mode with the Key ON to check this
ESC
J2 (4008) Chassis
J3 (1601) Inside
J1 (4007) Hood
J6 (Power Power
J4 (1600) Cab
J5 (4004) Engine
Power_Feed (ESC J6) Mating View Shown
[1] Power_Supply_1_Signal
Main Power Supply from Mega-Fuse
Diagnosing - 1HTMPAFL03HPGS005
International® Diamond Logic® Builder
File Edit View Advanced Logic Tools Diagnostics Help
Diagnosing - 1HTMPAFL03HPGS005
Get Data
Program
Program Test Bench
Select Advanced Logic Features Faults Connectors Signals Center Panel Cluster Campaign Messages
ESC RPM 1 RPM 2 RPM 3 RPM 4 RPM 5 RPM 6 RPM 7 MSVA 2 MSVA 1
You must be in Diagnostic Mode with the Key ON to check this
ESC
J2 (4008) Chassis
J3 (1601) Inside
J1 (4007) Hood
J6 (Power Power
J4 (1600) Cab
J5 (4004) Engine
(Click on a connector to see the pin usage.)
[18] Right_Turn_Signal_Switch
[17]
[16] 9486.3 Secondary_Air_Pressure
[15] 9486.3 Primary_Air_Pressure
[14] Headlight_Enable_Signal
[13] Elec_City_Horn_SW_Signal
[12] Ignition
[11]
[10] 5 Cruise_Switch_Signal, 10.987 Cruise_Switch_Raw_Signal
[9]
[8] RCD_HVAC_Ctrl_Head_Diag_Signal
[7] AC_Request
[6] Park_Position_Unlock_Solenoid
[5]
[4] Park_Brake_Relay_Cmd
[3] Zero Volt Reference
[2] 11.3 Bias_Voltage_Signal, 12.222 Bias_Voltage_Raw_Signal, Accessory
[1] Chassis Ground
Ignition and Accessory Power Feed
Diagnosing - 1HTMPAFL03HPGS005
International® Diamond Logic® Builder
File Edit View Advanced Logic Tools Diagnostics Help
Diagnosing - 1HTMPAFL03HPGS005
Get Data
Program
Program Test Bench
Select Advanced Logic Features Faults Connectors Signals Center Panel Cluster Campaign Messages
ESC RPM 1 RPM 2 RPM 3 RPM 4 RPM 5 RPM 6 RPM 7 MSVA 2 MSVA 1
ESC
J2 (4008) Chassis
J3 (1601) Inside
J1 (4007) Hood
J6 (Power Power
J4 (1600) Cab
J5 (4004) Engine
(Click on a connector to see the pin usage.)
[E]
Work_Light_Req [F]
[G]
Park_Lights [H]
[A]
[B] Ground
[C] 0 Dome_Light_Req, 0 Dome_Light
[D]
Ground Circuits to use when load testing
Diagnosing - 1HTMPAFL03HPGS005

ESC Circuit Diagrams

- All Models with ESC

Hide Details

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