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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:

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.
 12/14/2015 - Added Gen4 BCM information.
 04/01/2015 - Updated link to ProStar Circuit Diagram.

Description

This outlines how to verify BCM/ESC the 2015-Current Body controller, the 2007-2015 Body Controller, and pre-2007 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.

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

Select	Advanced Logic	Features	Faults	Connectors	Signals	Center Panel	Cluster	Campaign	Messages
ESC Signals	Master List	J1939	Detected J1939	Watched	Graph	Session: 0595KAG			
Signal	Pins	Unit	Signal Type	Description					
Acc_Grid_Cmd	1605-A	On/Off	Digital Output	Accessory Grid Power Output Command signal. (Output of Virtual F...					
Ign_Grid_Cmd	1605-B	On/Off	Digital Output	Ignition Grid Power Output Command signal. (Output of Virtual Fu...					
Str_Grid_Cmd	1605-T	On/Off	Digital Output	Starter Grid Power Output Command signal. (Output of Virtual Fus...					

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	

International® Diamond Logic® Builder

File Edit View Advanced Logic Tools Diagnostics Help

Select Advanced Logic Features Faults Connectors Signals Center Panel Cluster Campaign Messages

ESC RPM 1 RPM 2 RPM 4 RPM 7

ESC

Power_Feed (ESC J8) Mating View Shown

When in Diagnostic Mode - Key ON

J8 (Power_Feed) Power

J4 (1601) Cab

J6 (1605) J6

J1 (1603) Hood

J2 (1604) Chassis

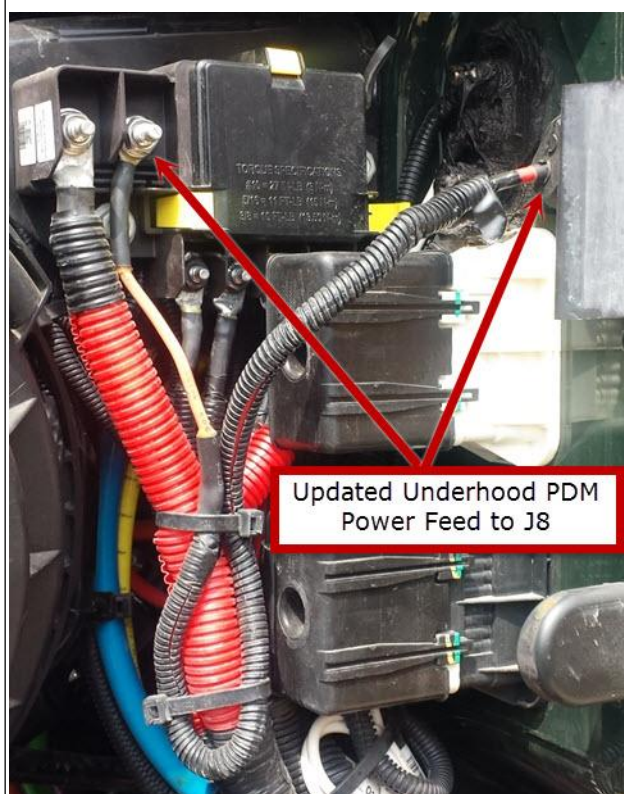
J7 (1606) J7

J5 (1602) Engine

J3 (1600) Inside

[1] Power_Supply_1_Signal

Some Gen 4 Body Controllers on 250k Buad trucks (Black 9 Pin Diagnostic Connector) may not have a check mark on the J8. If a check mark is not present, update and retest prior to replacing any components.



- The updated PDM is only used with Navistar Engine

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Get Data Program Program Test Bench

Select Advanced Logic Features Faults Connectors Signals Center Panel Cluster Campaign Messages

ESC RPM 1 RPM 2 RPM 4 RPM 7

ESC

1600 (ESC J3) Mating View Shown

1604 (ESC J2) Mating View Shown

1602 (ESC J5) Mating View Shown

Ground circuits to use when load testing

ESC

J8 (Power_Feed) Power

J4 (1601) Cab

J6 (1605)

J7 (1606)

J5 (1602) Engine

J1 (1603) Hood

J2 (1604) Chassis

J3 (1600) Inside

(Click on a connector to see the pin usage.)

[B1] Primary_Air_Pressure [B2] Secondary_Air_Pressure [B3] Clutch_Switch_Signal [B4] HVAC_Low_Pressure_Switch [B5] Right_Fuel_Sensor_Signal [B8] Left_Fuel_Sensor_Signal [B9] AC_High_Side_Pressure [B12] HVAC_Freeze_Protect [B13] Cruise_Switch_Signal [B16]

[A1] ☒ Accessory_Signal_Input [A2] ☐ AC_Request [A3] ☐ RCD_HVAC_Ctrl_Head_Diag_Signal [A4] ☐ Highbeam_Signal [A5] ☐ Elec_City_Horn_SW_Signal [A6] ☐ Right_Turn_Signal_Switch [A7] ☐ Left_Turn_Signal_Switch [A8] ☐ Wiper_0_Signal [A9] ☐ Wiper_1_Signal [A10] ☐ Wiper_2_Signal [A11] ☐ Park_Brake_Switch_Signal [A12] ☐ Door_Switch [A13] ☐ Flash_To_Pass_Signal [A14] ☐ Washer_Pump_Signal [A15] ☐ Ignition_Signal_Input [A16] ☒

[K] Right_Highbeam_Cmd [J] Dome_Light [H] Right_Lowbeam_Cmd [G] Park_Lights_Circ1 [F] Park_Lights_Circ2

[E] Cab Ground [D] [C] Left_Highbeam_Cmd [B] Left_Lowbeam_Cmd [A] Wipers_Output_from_fuse_circuit

[F1] Drive Train J1939 Datalink - [F2] Drive Train J1939 Datalink + [F3] Body Builder J1939 Datalink Shield [F4] Body Builder J1939 Datalink - [F5] Body Builder J1939 Datalink + [F6] [F7] [F8] [F9] [F10] [F11] [F12] [F13] [F14] [F15] [F16]

[E1] Switch Datalink - [E2] Switch Datalink + [E3] Zero Volt Reference [E4] Switched_5V_Sense_Signal [E5] Zero Volt Reference [E6] Switched_5V_Sense_Signal [E7] Zero Volt Reference [E8] Switched_5V_Sense_Signal [E9] [E10] [E11] ☐ Headlight_Enable_Signal [E12] N/A Susp_Dump_Solenoid_A_Cmd [E13] [E14] ☐ Brake_Switch_Digital_Input [E15] ☐ Brake_Switch_Digital_Input [E16] ☒ Chassis Ground

Gen II Body Controller Signals to Watch

Figure 2 - 2007-2015 Gen II Body Controller

International® Diamond Logic® Builder

File Edit View Advanced Logic Tools Diagnostics Help

Select Advanced Logic Features Faults Connectors Signals Center Panel Cluster Campaign Messages

ESC RPM 1 RPM 2 RPM 4 RPM 7

Power_Feed (ESC J6) Mating View Shown

[1] ☒ Power_Supply_1_Signal, 14.4 Battery_Voltage_Signal, 3.998 Battery_Voltage_Raw

ESC

J6 (Power_Feed) Power

J4 (1601) Cab

J1 (1603) Hood

J2 (1604) Chassis

J3 (1600) Inside

J5 (1602) Engine

ESC

J6 (Power_Feed) Power

J4 (1601) Cab

J1 (1603) Hood

J2 (1604) Chassis

J3 (1600) Inside

J5 (1602) Engine

Power_Feed (ESC J6) Mating View Shown

[A1] ☒ Accessory_Signal_Input

[A2] ☐ AC_Request

[A3] ☐ RCD_HVAC_Ctrl_Head_Diag_Signal

[A4] ☐ Highbeam_Signal

[A5] ☐ Elec_City_Horn_SW_Signal

[A6] ☐ Right_Turn_Signal_Switch

[A7] ☐ Left_Turn_Signal_Switch

[A8] ☐ Low_Washer_Fluid_Wtl_Signal

[A9] ☐ Wiper_0_Signal

[A10] ☐ Wiper_1_Signal

[A11] ☐ Wiper_2_Signal

[A12] ☐ Park_Brake_Switch_Signal

[A13] ☐ Door_Switch

[A14] ☐ Flash_To_Pass_Signal

[A15] ☐ Washer_Pump_Signal

[A16] ☒ Ignition_Signal_Input

Primary_Air_Pressure [B1]

Secondary_Air_Pressure [B2]

BC_RCD_Temp_In_Cond_Signal [B4]

Left_Fuel_Sensor_Signal [B9]

AC_High_Side_Pressure [B12]

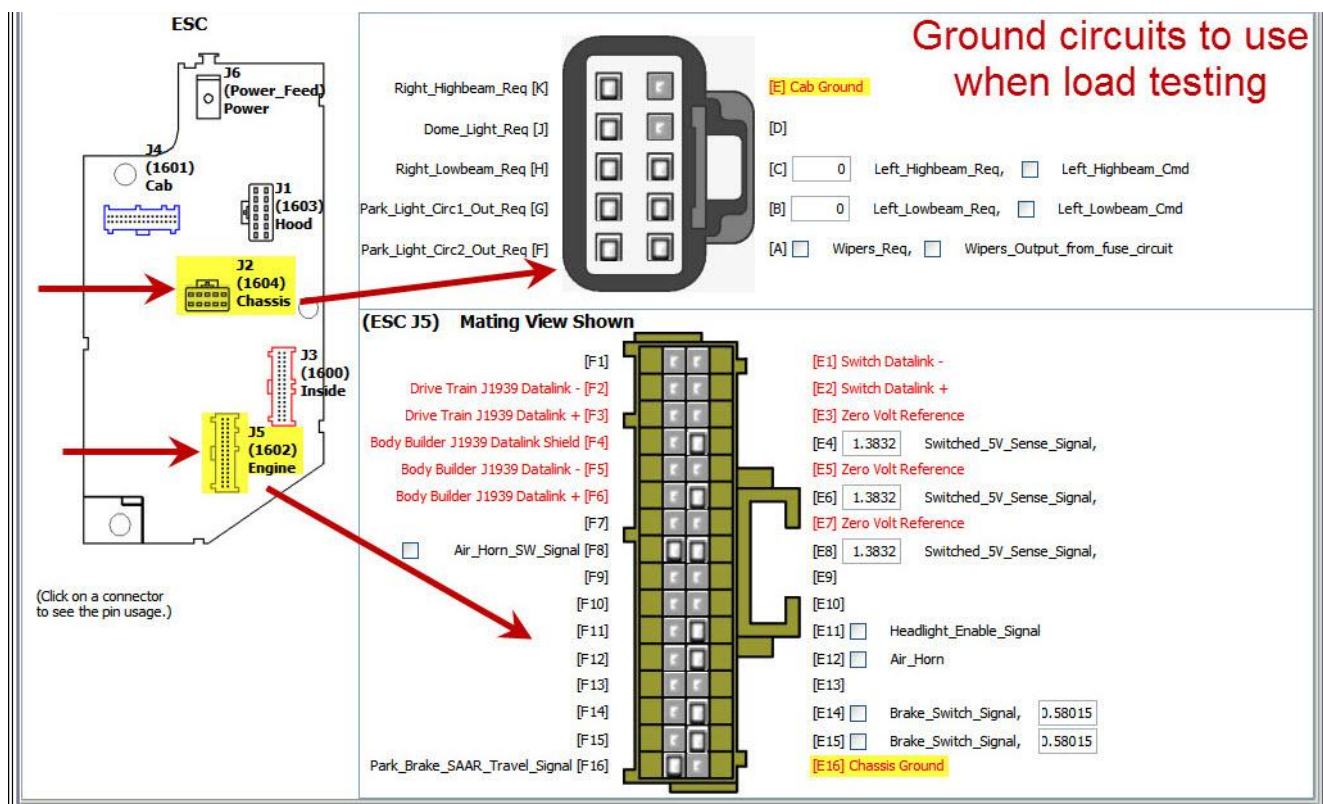
BC_RCD_Temp_Out_Cond_Signal [B13]

Cruise_Switch_Signal [B15]

Mega-Fuse

Power Feed to J6

You must be in Diagnostic Mode with the Key ON to check this.

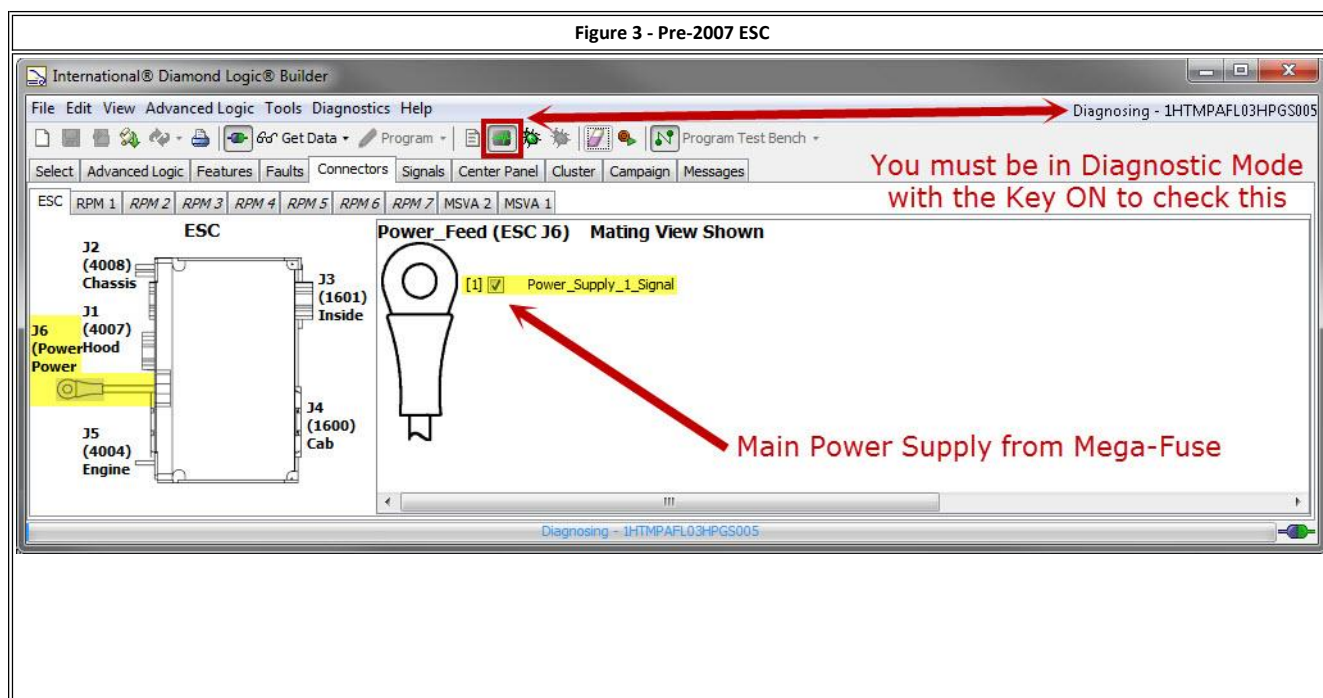


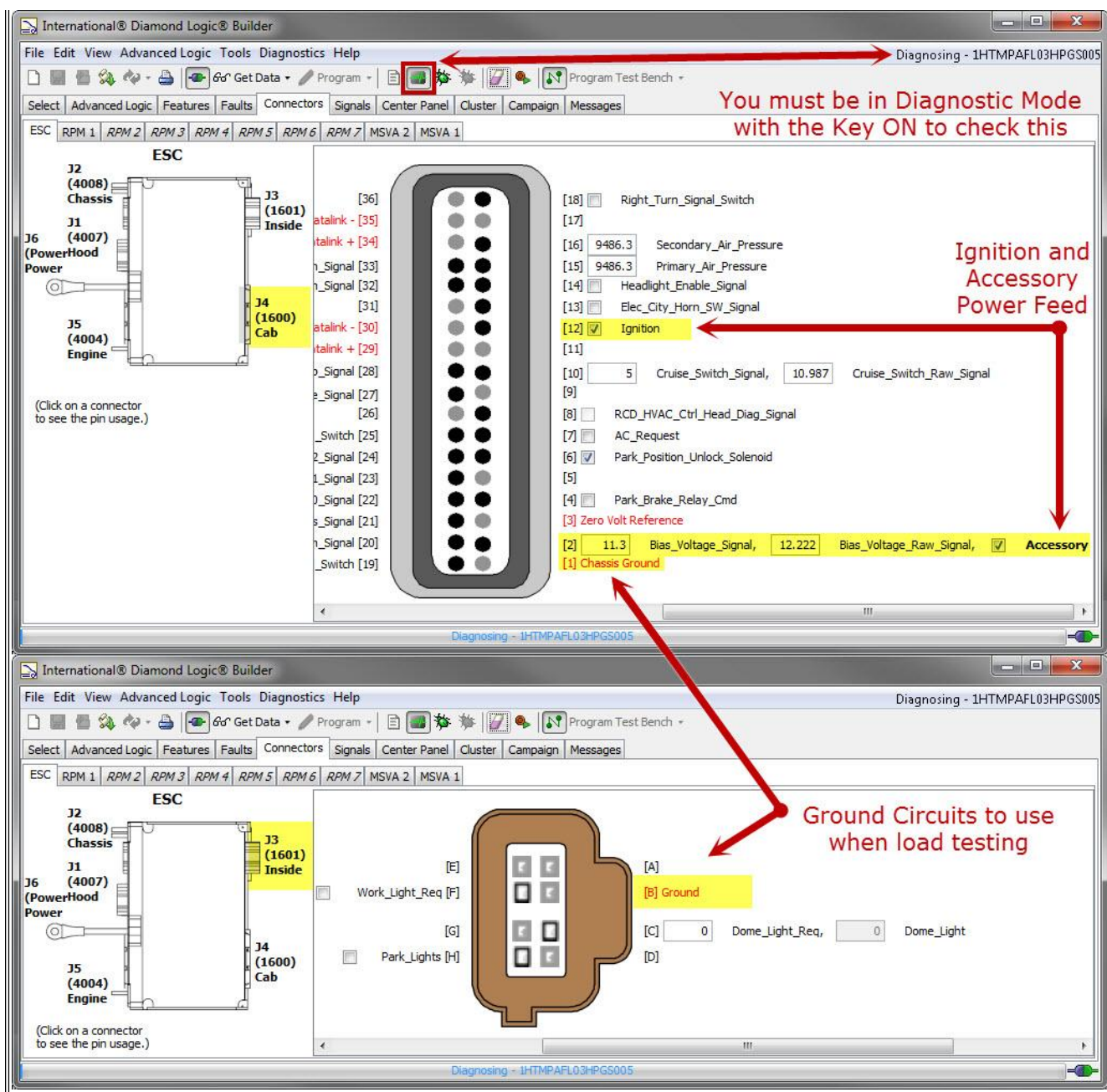
Body Controller Circuit Diagrams

- [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





ESC Circuit Diagrams

- [All Models with ESC](#)

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