OBD 2013 / GHG 14 Electrical Models - M2106, M2112, 108SD, 114SD

Body Builder Reference Guide
Revision 8/1/14
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Transmission Interfaces (Grey Plug) (Plugs may also be frame located) (Module 34C)

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Chassis Module (CHM Under Cab) (Module 335, 32K)

Power Net Distribution Box (PNDB) (Module 33P/281/293)
FORWARD CHASSIS HARNESS Module 288
1) Connections to Bulkhead module and Underhood PDM
2) Connections to headlamps
3) Connections to side marker/turn lamps
4) Connections to Chassis Module

AFT CHASSIS HARNESS Module 28A
1) Connections to Chassis Module
2) Connections to tail lamps

POWERTRAIN HARNESS Module 286, 283
1) Connections to the Bulkhead Module and Underhood PDM

BODY BUILDER AND TRAILER PDM’s Modules 353 and 335
1) PDM for higher current trailer wiring (and TEM lighting)
2) PDM for SmartPlex 20A circuits
3) PNDB for Body power distribution

OVERHEAD CAB HARNESS Module 287
1) Inline connection to Main cab Harness (at bottom of A pillar)
2) Connections to Marker Lamps
3) Connections to Dome Lamp

MAIN CAB HARNESS Module 320
1) Connections to bulkhead connector
2) Connections to diagnostic connector (behind ignition switch)
3) Connections to CPC
4) Pass-thru connector to engine compartment
5) Gauge Cluster
6) HVAC unit and controller
7) Steering wheel horn and windshield wiper

FRONTWALL HARNESS Module 321
1) Connections to Bulkhead Module and Underhood PDM
2) Connection to Starter Mag Switch
3) Connection to Wiper Motor
4) Connection to the low coolant level sensor and horn (under surge tank)
5) Connection under cab to Washer pump and level switch
6) Pass-thru connector to Main Cab Harness and Powertrain Harness

ABS/AMU HARNESS Module 332
1) Connections to Forward chassis harness and frame ground studs near Chassis module
2) Connections to AMU (Mod 877 without ABS)
3) Connections to Wabco ABS ECU
4) Connections to rear combo valves
Power Net Distribution Box (PNDB) Mod 33P

The PNDB is a power distribution module designed for the SmartPlex system to deliver more consistent and better protected power from the battery to the other components on the truck.

The PNDB also has protected keep alive circuits that maintain power even when the cutoff switch is in the off position. The primary reason for this change is to provide power to the DEF purge system, which drains urea from the delivery system and prevents the system from freezing during cold conditions.

The PNDB located at the front wall is equipped with three MIDI fuses which supply power to the Main Power Distribution Module. These fuse connections were relocated from the battery box in 2010 to prevent corrosion and improve the truck’s reliability in severe conditions.

A secondary PNDB is available as an option for the body builder and is located with the trailer and bodybuilder PDM located in the cab behind the drivers seat on day cabs or under the rear bench seat for crew cab units. Ordered with 33M-001.

<table>
<thead>
<tr>
<th>CONNECTOR</th>
<th>PIN</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>X2 KEEP ALIVE CIRCUIT</td>
<td>1</td>
<td>AFTER TREATMENT ECU</td>
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<tr>
<td></td>
<td>2</td>
<td>EMERGENCY POWER</td>
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<tr>
<td></td>
<td>3</td>
<td>RADIO AND CLOCK</td>
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<tr>
<td></td>
<td>4</td>
<td>ALTERNATOR REMOTE SENSE</td>
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<tr>
<td>X1 SOLENOID CONTROL</td>
<td>A</td>
<td>GROUND</td>
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<tr>
<td></td>
<td>B</td>
<td>SIGNAL OFF</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>LED INDICATOR</td>
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<tr>
<td></td>
<td>D</td>
<td>SIGNAL ON</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>SIGNAL RETURN</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>GROUND</td>
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<table>
<thead>
<tr>
<th>Fuse</th>
<th>Description</th>
<th>Function</th>
<th>Rating</th>
<th>Max. Fuse Allowed</th>
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<tbody>
<tr>
<td>ATC-A</td>
<td>Keep Alive Power</td>
<td>After Treatment ECU</td>
<td>30 AMPS</td>
<td>30 AMPS</td>
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<tr>
<td>ATC-B</td>
<td>Keep Alive Power</td>
<td>Emergency Power</td>
<td>20 AMPS</td>
<td>30 AMPS</td>
</tr>
<tr>
<td>ATC-C</td>
<td>Keep Alive Power</td>
<td>Radio and Clock</td>
<td>5 AMPS</td>
<td>30 AMPS</td>
</tr>
<tr>
<td>ATC-D</td>
<td>Keep Alive Power</td>
<td>Alternator Remote Sense</td>
<td>5 AMPS</td>
<td>30 AMPS</td>
</tr>
<tr>
<td>MIDI-1 (Fuse 1)</td>
<td>High AMP Fuse</td>
<td>Powertrain PDM</td>
<td>175 AMPS</td>
<td>200 AMPS</td>
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<tr>
<td>MIDI-2 (Fuse 2)</td>
<td>High AMP Fuse</td>
<td>PDM #2</td>
<td>125 AMPS</td>
<td>200 AMPS</td>
</tr>
<tr>
<td>MIDI-3 (Fuse 3)</td>
<td>High AMP Fuse</td>
<td>PDM #1</td>
<td>125 AMPS</td>
<td>200 AMPS</td>
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</tbody>
</table>

ATC Fuse output keeps power on after disconnect. Mating connector 23-13153-410 Typical Terminal 23-13211-000 thru -004
Positive Load Disconnect Switch Mod 293

The disconnect switch system can be ordered as a negative or positive disconnect switch.

In cab disconnect switches are offered in a locking or non-locking configuration.

Exterior battery mounted switches are offered in the locking configuration only.

Cutoff switches are equipped with red LED lights, which are illuminated when power is on.

Trucks equipped with the body builder auxiliary power system will have an additional LED light on the switch.

Note: Both PNDB units will be deactivated when the switch is in the off position.
Main Power Distribution Module (PDM) Mod 285

The main Power Distribution Module (PDM) distributes battery power to the various control modules on the vehicle.

The PDM contains mini fuses that protect the power feed circuits to these modules.

For most trucks there will be spare fuse slots available for customers to add additional wiring to the truck after it is purchased.

There are four plugs attaching to the module that supply output connections.

Common spare fuse sockets are listed below but may vary based on the options that have been requested.

Common Spare Fuse locations
F6, F10, F11, F14, F21, F23, F25, F26

PDM Plugs contain output wires

Multiple Wire output Pin A & B on Grey Plug and Pin D on Blue Plug

Single Wire Output found on Green Plug in Pin G

Main Power Distribution Module (PDM)

Power Distribution Module Fuse Specifications*

<table>
<thead>
<tr>
<th>Fuse Location</th>
<th>MEGA Fuse</th>
<th>OUTPUT Connection</th>
<th>Primary Function</th>
<th>Rating</th>
<th>Secondary Function</th>
<th>Rating</th>
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<tr>
<td>F1</td>
<td>Mint A</td>
<td>Green A Sparce</td>
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<tr>
<td>F2</td>
<td>Mint A</td>
<td>Green H Engine ECU</td>
<td></td>
<td>30A</td>
<td></td>
<td>30A</td>
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<tr>
<td>F3</td>
<td>Mint A</td>
<td>F4 gray Engine ECU</td>
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<td>30A</td>
<td></td>
<td>30A</td>
</tr>
<tr>
<td>F5</td>
<td>Mint A</td>
<td>Black B Ignition Switch</td>
<td></td>
<td>10A</td>
<td></td>
<td>10A</td>
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<td>F6</td>
<td>Mint A</td>
<td>Black C Spare</td>
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<tr>
<td>F7</td>
<td>Mint A</td>
<td>Gray F Bulkhead Module</td>
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<td>30A</td>
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<td>30A</td>
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<tr>
<td>F8</td>
<td>Mint A</td>
<td>Green C DC/DC</td>
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<td>30A</td>
<td></td>
<td>30A</td>
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<tr>
<td>F9</td>
<td>Mint A</td>
<td>Green D Trans ECU</td>
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<td>30A</td>
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<td>30A</td>
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<td>F10</td>
<td>Mint A</td>
<td>Blue D Spare</td>
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<tr>
<td>F11</td>
<td>Mint A</td>
<td>Green F</td>
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<tr>
<td>F12</td>
<td>Mint A</td>
<td>Blue I</td>
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<td>F13</td>
<td>Mint A</td>
<td>Gray E Chassis Module</td>
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<td>30A</td>
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<td>30A</td>
</tr>
<tr>
<td>F14</td>
<td>Mint A</td>
<td>Black B Spare</td>
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<tr>
<td>F15</td>
<td>Mint A</td>
<td>Black A Bulkhead Module</td>
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<td>30A</td>
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<td>30A</td>
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<td>Mint A</td>
<td>Black A Bulkhead Module</td>
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<td>30A</td>
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<td>30A</td>
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<td>F17</td>
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<td>Gray C Chassis Module</td>
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<td>F20</td>
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<td>F21</td>
<td>Mint A</td>
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<td>Black G Bulkhead Module</td>
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<td>F23</td>
<td>Mint A</td>
<td>Gray H Spare</td>
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<td>F24</td>
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<td>Black E</td>
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<tr>
<td>F25</td>
<td>Mint A</td>
<td>Gray D Spare</td>
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<tr>
<td>F26</td>
<td>Mint A</td>
<td>Black B</td>
<td></td>
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<tr>
<td>F27</td>
<td>Mint A</td>
<td>Black D</td>
<td></td>
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Pin part number for harness connection
23-13213-120 TERM-FLAME,(20-16) PAC12077411
23-13213-121 TERM-FLAME,(14-12) PAC12129493
23-13213-122 TERM-FLAME,(10) PAC12077413

Main Power Distribution Module (PDM) Mod 285

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VBAT Fuse System

BHM and CHM output pins are powered by multiple VBAT fuses through the main PDM unit. If one of these fuses is tripped or blown then all pins in the circuit will be affected.

For this reason seemingly unrelated issues can occur at the same time if a fuse is overloaded and trips.

The lists below show which pins are controlled with the VBAT fuses.

### Chassis Module CHM

<table>
<thead>
<tr>
<th>CHM Power Input</th>
<th>CHM Power Input Pin</th>
<th>Fuse Supplying CHM Power Input</th>
<th>CHM Outputs Supplied</th>
<th>CHM Output Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power In</td>
<td>Power Out</td>
<td>Right Low Beam</td>
<td>C3.L</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turn Right Front/ Side</td>
<td>C3.R</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turn Right Rear</td>
<td>C1.P</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right Stop Lamp</td>
<td>C1.L</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left Stop Lamp</td>
<td>C1.N</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right DRL</td>
<td>C3.K</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fog/Road Lamps</td>
<td>C1.C/C3.D</td>
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<tr>
<td></td>
<td></td>
<td>Trailer Turn Right</td>
<td>C2.E</td>
<td></td>
</tr>
<tr>
<td>BVM1</td>
<td>C4.P</td>
<td>Fuse 19(30A)</td>
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<tr>
<td></td>
<td></td>
<td>Left Park Lamp</td>
<td>C4.C</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right Park Lamp</td>
<td>C4.L</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Left Marker Lamp</td>
<td>C4.D</td>
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<td></td>
<td></td>
<td>Right Marker Lamp</td>
<td>C4.M</td>
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<td>Trailer Marker Relay</td>
<td>C2.F</td>
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<td></td>
<td>Right High Beam</td>
<td>C4.K</td>
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<td></td>
<td>Left Backup Lamp</td>
<td>C1.A</td>
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<td></td>
<td></td>
<td>Right Backup Lamp</td>
<td>C1.J</td>
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<td></td>
<td></td>
<td>Backup Alarm</td>
<td>C1.H</td>
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<td></td>
<td></td>
<td>Turn Left Front/ Side</td>
<td>C3.N</td>
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<td></td>
<td></td>
<td>Turn Left Rear</td>
<td>C1.G</td>
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<tr>
<td></td>
<td></td>
<td>Left DRL</td>
<td>C4.F</td>
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<td></td>
<td></td>
<td>Trailer Turn Left</td>
<td>C2.H</td>
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<td></td>
<td></td>
<td>Fuel Water Separator Heater</td>
<td>C3.A</td>
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<td></td>
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<td>AAVA Solenoid 0</td>
<td>C5.H</td>
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<td>AAVA Solenoid 1</td>
<td>C5.J</td>
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<td>AAVA Solenoid 2</td>
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<td>AAVA Solenoid 3</td>
<td>C5.M</td>
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<td>BVM2</td>
<td>C3.J</td>
<td>Fuse 17(30A)</td>
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<td></td>
<td></td>
<td>Common Feed w/ BVM2</td>
<td>C3.J</td>
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<td>BVM3</td>
<td>C4.J</td>
<td>Fuse 13(30A)</td>
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<td></td>
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<td>AAFA Solenoid 2</td>
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<td>AAFA Solenoid 3</td>
<td>C5.M</td>
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<tr>
<td>BVM4</td>
<td>C3.S</td>
<td>Fuse 17(30A)</td>
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</table>

### Bulkhead Module BHM

<table>
<thead>
<tr>
<th>BHM Power Input</th>
<th>BHM Power Input Pin</th>
<th>Fuse Supplying BHM Power Input</th>
<th>BHM Outputs Supplied</th>
<th>BHM Output Pin</th>
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<tbody>
<tr>
<td>Power In</td>
<td>Power Out</td>
<td>BVM1</td>
<td>B3.D</td>
<td>Fuse 22(30A)</td>
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<td>Battery (dome lamps)</td>
<td>B5.A</td>
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<td>Battery (smart switches)</td>
<td>B7.A12</td>
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<td></td>
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<td>Ignition (VCU)</td>
<td>B6.A8</td>
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<td>Ignition (engine)</td>
<td>B2.K</td>
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<td></td>
<td>Ignition (ABS)</td>
<td>B7.P</td>
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<td>Ignition (trans)</td>
<td>B2.L</td>
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<td></td>
<td></td>
<td>Fuel Water Sensor Power</td>
<td>B1.F</td>
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<td>Dome Lamps Switched</td>
<td>B5.B</td>
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<td>Left Low Beam</td>
<td>B1.R</td>
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<td>A/C Clutch</td>
<td>B2.M</td>
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<td>Smart Switch 1 Indicator</td>
<td>B7.B4</td>
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<td>Smart Switch 2 Indicator</td>
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<td>Smart Switch 3 Indicator</td>
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<td>Smart Switch 4 Indicator</td>
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<td>BVM2</td>
<td>B4.G</td>
<td>Fuse 20(30A)</td>
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<td>Accessory (radio)</td>
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<td>Wake Up (instrument cluster)</td>
<td>B5.D</td>
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<td>Left High Beam</td>
<td>B1.L</td>
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<td>Wiper High</td>
<td>B3.F</td>
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<td>Horn</td>
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<td>Washer Pump</td>
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<td>12V Output (cigarette lighter)</td>
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<td>Spare 8.5A (utility light/spotlight)</td>
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<td>Left Heated Mirror</td>
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<td>Right Backup Lamp</td>
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<td>Backup Alarm</td>
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<td></td>
<td>Turn Left Rear</td>
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<td>Left Marker Lamp</td>
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<td>Right Marker Lamp</td>
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<td>Trailer Marker Relay</td>
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<td>Right High Beam</td>
<td>C4.K</td>
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<td>Left Backup Lamp</td>
<td>C1.A</td>
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<td>Right Backup Lamp</td>
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<td>Backup Alarm</td>
<td>C1.H</td>
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<td>Turn Left Front/ Side</td>
<td>C3.N</td>
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<td>Turn Left Rear</td>
<td>C1.G</td>
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<td></td>
<td>Left DRL</td>
<td>C4.F</td>
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<td>Trailer Turn Left</td>
<td>C2.H</td>
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<td>Fuel Water Separator Heater</td>
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<td>AAFA Solenoid 0</td>
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<td>AAFA Solenoid 1</td>
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<td>AAFA Solenoid 3</td>
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<td>Spillway 8.5A (utility light/spotlight)</td>
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<tr>
<td></td>
<td></td>
<td>Left Heated Mirror</td>
<td>B4.F</td>
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<td></td>
<td></td>
<td>Right Heated Mirror</td>
<td>B4.E</td>
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</table>
Bulkhead Module (BHM) Mod 32A

The BHM is the primary command module for the multiplex system. The BHM controls the operation of the other modules in the system, either directly or indirectly using messages sent over the J1939 network. The BHM is mounted on the driver side of the front wall and connects to the interior wiring through an opening in the front wall. The BHM has four harness connections on the engine side of the front wall and three harness connections to the cab interior. The BHM contains all system parameters and the unit controls power flow and circuit protection to the various components of the multiplex electrical system. The BHM can also directly support up to 5 smart switches. The BHM is programmable and can be changed and updated by flashing the unit through ServiceLink.

Power supply for the BHM is supplied using VBAT fuses, which reside in the main PDM (see page 8). The BHM is programmable and the feature screen in ServiceLink can be used to change or add parameters to the BHM.

Key Bulkhead Module Outputs

- Bulkhead Module outputs have defined amperage limits.
- If higher loads are required, bulkhead module outputs should be used as signal power in conjunction with a relay.

<table>
<thead>
<tr>
<th>Pin part numbers for harness connection</th>
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<tbody>
<tr>
<td>Outside Cab Connections:</td>
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<tr>
<td>23-13212-120 TERM-FEMALE,(18-16) PAC153047191</td>
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<tr>
<td>23-13212-121 TERM-FEMALE,(14-12) PAC15304720</td>
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<tr>
<td>23-13212-122 TERM-FEMALE,(10) PAC15326004</td>
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<tr>
<td>Inside Cab Connections:</td>
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<tr>
<td>23-13213-102, PAC12129494 TERM-FEMALE,(12-14)</td>
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<tr>
<td>23-13213-100, PAC12034046 TERM-FEMALE,(16-18)</td>
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<tr>
<th>20A</th>
<th>B.5.F - Cigar Lighter Output</th>
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<tbody>
<tr>
<td>12A</td>
<td>B.3.E - Horn</td>
</tr>
<tr>
<td>Combined</td>
<td>B.5.E - SPARE (Utility Light/Spotlight)</td>
</tr>
<tr>
<td>Combined</td>
<td>B.4.M - SPARE (Utility Light/Spotlight)</td>
</tr>
<tr>
<td>12A</td>
<td>B.5.G - SPARE (Ignition)</td>
</tr>
<tr>
<td>Combined</td>
<td>B.5.H - Panel Lamps</td>
</tr>
<tr>
<td>Combined</td>
<td>B.7.A1 - Panel Lamps (Smart Switch)</td>
</tr>
<tr>
<td>12A</td>
<td>B.4.F - SPARE (Left Heated Mirror)</td>
</tr>
<tr>
<td>Combined</td>
<td>B.4.E - SPARE (Right Heated Mirror)</td>
</tr>
<tr>
<td>6.7A</td>
<td>B.6.A9 - Accessory (HVAC)</td>
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<tr>
<td>Combined</td>
<td>B.6.A10 - Accessory (Radio)</td>
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<tr>
<td>6.7A</td>
<td>B.5.A - Battery (Dome Lamps)</td>
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<tr>
<td>Combined</td>
<td>B.7.A12 - Battery (Smart Switch)</td>
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<td>6.7A</td>
<td>B.6.A8 - Ignition (VCU)</td>
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<td>Combined</td>
<td>B.2.K - Ignition (Engine)</td>
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<tr>
<td>6.7A</td>
<td>B.1.P - Ignition (ABS)</td>
</tr>
<tr>
<td>Combined</td>
<td>B.2.L - Ignition (Trans)</td>
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<tr>
<td>6.7A</td>
<td>B.1.F - Fuel Water Sensor Power</td>
</tr>
<tr>
<td>Combined</td>
<td>B.5.D - Wake Up (Instrument Cluster)</td>
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<tr>
<td>6.7A</td>
<td>B.5.B - Dome Lamps Switched</td>
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<td>Combined</td>
<td>B.1.L - Left High Beam</td>
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<tr>
<td>6.7A</td>
<td>B.1.R - Left Low Beam</td>
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<tr>
<td>Combined</td>
<td>B.5.C - Clearance Lamps</td>
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<td>6.7A</td>
<td>B.1.K - Tail/License Plate/Trailer Relay</td>
</tr>
<tr>
<td>Combined</td>
<td>B.3.F - Wiper High</td>
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<tr>
<td>6.7A</td>
<td>B.3.H - Wiper Low</td>
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<tr>
<td>Combined</td>
<td>B.3.G - Washer Pump</td>
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<tr>
<td>6.7A</td>
<td>B.2.M - AC Clutch</td>
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<tr>
<td>Combined</td>
<td>B.4.B - Starter Relay (Crank)</td>
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### Connector B3 Frontwall Harness Pinouts

<table>
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<th>Pin</th>
<th>Signal Name</th>
<th>Signal Type</th>
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<td>B1-A</td>
<td>71567-Datasink</td>
<td>Datasink</td>
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<tr>
<td>B1-B</td>
<td>J1587-Datasink</td>
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<td>B1-C</td>
<td>J1587-Datasink</td>
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<tr>
<td>B1-D</td>
<td>J1587-Datasink</td>
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<tr>
<td>B1-E</td>
<td>J1587-Datasink</td>
<td>Datasink</td>
</tr>
<tr>
<td>B1-F</td>
<td>J1587-Datasink</td>
<td>Datasink</td>
</tr>
<tr>
<td>B1-G</td>
<td>J1587-Datasink</td>
<td>Datasink</td>
</tr>
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<td>B1-H</td>
<td>J1587-Datasink</td>
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### Connector B2 Engine Harness Pinouts

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<td>B2-C</td>
<td>71567-Datasink</td>
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<tr>
<td>B2-D</td>
<td>71567-Datasink</td>
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<td>B2-E</td>
<td>71567-Datasink</td>
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<td>B2-F</td>
<td>71567-Datasink</td>
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</tr>
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<td>B2-G</td>
<td>71567-Datasink</td>
<td>Datasink</td>
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<td>B2-H</td>
<td>71567-Datasink</td>
<td>Datasink</td>
</tr>
<tr>
<td>B2-J</td>
<td>EngineECU/IgnitionPower</td>
<td>DigitalOutput</td>
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<tr>
<td>B2-K</td>
<td>EngineECU/IgnitionPower</td>
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<td>B2-L</td>
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<tr>
<td>B2-M</td>
<td>A/C/E/CoolRadiator</td>
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<td>B2-N</td>
<td>A/C/E/CoolRadiator</td>
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<td>B2-P</td>
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### Connector B7 Dash Harness Pinouts

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<td>B7-C</td>
<td>SmartSwitch2/D2</td>
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<td>B7-D</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
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<td>B7-E</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B7-F</td>
<td>SmartSwitch2/D2</td>
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<tr>
<td>B7-H</td>
<td>SmartSwitch2/D2</td>
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</tr>
<tr>
<td>B7-I</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B7-J</td>
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<td>B7-K</td>
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<td>B7-L</td>
<td>SmartSwitch2/D2</td>
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<td>B7-M</td>
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### Connector B4 Wall Harness Pinouts

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<td>AnalogInput</td>
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<tr>
<td>B4-C</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-D</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-E</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-F</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-G</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-H</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-I</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-J</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>B4-K</td>
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<td>AnalogInput</td>
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<tr>
<td>B4-L</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
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### Connector B5 Dash Harness Pinouts

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<tr>
<td>B5-B</td>
<td>PassengerDoorOpen</td>
<td>DigitalOutput</td>
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<tr>
<td>B5-C</td>
<td>DriveDoorOpen</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>B5-D</td>
<td>HeadlampSwitchOn</td>
<td>DigitalOutput</td>
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<td>B5-E</td>
<td>HeadlampSwitchOn2</td>
<td>DigitalOutput</td>
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<td>B5-F</td>
<td>HeadlampSwitchOn            2</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>B5-G</td>
<td>HeadlampSwitchOn2</td>
<td>DigitalOutput</td>
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<td>B5-H</td>
<td>HeadlampSwitchOn2</td>
<td>DigitalOutput</td>
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### Connector B6 Dash Harness Pinouts

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<th>Signal Name</th>
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<td>B6-A</td>
<td>IgnitionSwitchAccessory</td>
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<td>B6-B</td>
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<td>B6-C</td>
<td>IgnitionSwitchAccessory</td>
<td>DigitalOutput</td>
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<td>B6-D</td>
<td>IgnitionSwitchAccessory</td>
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<td>IgnitionSwitchAccessory</td>
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<tr>
<td>B6-H</td>
<td>IgnitionSwitchAccessory</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>B6-I</td>
<td>IgnitionSwitchAccessory</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>B6-J</td>
<td>IgnitionSwitchAccessory</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>B6-K</td>
<td>IgnitionSwitchAccessory</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>B6-L</td>
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</tr>
<tr>
<td>B6-M</td>
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</tr>
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<td>B6-N</td>
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</tr>
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<td>B6-O</td>
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</tr>
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<td>B6-P</td>
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<td>B6-Q</td>
<td>IgnitionSwitchAccessory</td>
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<td>B6-R</td>
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</table>

### Connector A1 Forward Chassis Harness Pinouts

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Name</th>
<th>Signal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1-A</td>
<td>71587-Datasink</td>
<td>Datasink</td>
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### Connector A4 Dash Harness Pinouts

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Name</th>
<th>Signal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4-A</td>
<td>PanelLamp(smartSwitch)</td>
<td>DigitalOutput</td>
</tr>
<tr>
<td>A4-B</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-C</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-D</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-E</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-F</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-G</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-H</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-I</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-J</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-K</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-L</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-M</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-N</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-O</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-P</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-Q</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-R</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-S</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-T</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-U</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-V</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
<tr>
<td>A4-W</td>
<td>SmartSwitch2/D2</td>
<td>AnalogInput</td>
</tr>
</tbody>
</table>
Chassis Module (CHM) - Module 30K

The Chassis Module (CHM) serves in the multiplex electrical system by acting as a dependant to the Bulkhead Module (BHM).

The CHM responds to commands from the BHM and broadcasts the status of the inputs and outputs that are received, and delivered by the module.

All vehicles are multiplexed and will always come equipped with a Chassis Module.

The CHM is under the cab to improve durability and free up frame space.

---

Key Chassis Module Outputs

- Chassis Module outputs have defined amperage limits.
- If higher loads are required, Chassis Module outputs should be used as signal power in conjunction with a relay.

| 20A | C3-A Optional Fuel Water Separator Heater |
| 10A | C4-C Left Park Lamp |
| 7.5A Combined | C4-L Right Park Lamp |
| 7.5A Combined | C4-D Left Marker Lamp |
| 7.5A Combined | C4-M Right Marker Lamp |
| 6.7A Combined | C2-F Trailer Marker Relay |
| 6.7A Combined | C3-N Turn Left Front/Side |
| 6.7A Combined | C1-G Turn Left Rear |
| 6.7A Combined | C2-H Trailer/Turn Left |
| 6.7A Combined | C3-R Turn Right Front/Side |
| 6.7A Combined | C1-P Turn Right Rear |
| 6.7A Combined | C2-E Trailer/Turn Right |
| 6.7A Combined | C1-A Left Backup Lamp |
| 6.7A Combined | C1-J Right Backup Lamp |
| 6.7A Combined | C1-H Backup Alarm |
| 6.7A | C3-L Right Low Beam |
| 6.7A | C4-K Right High Beam |
| 6.7A | C1-N Left Stop Lamp |
| 6.7A | C1-L Right Stop Lamp |
| 6.7A | C3-K Right DRL |
| 6.7A | C4-F Left DRL |
| 6.7A | C3-C Optional Fog/Road Lamps |
| 6.7A | C3-D Optional Fog/Road Lamps |
| 0.85A | C5-H AMU Solenoid #0 |
| 0.85A | C5-J AMU Solenoid #1 |
| 0.85A | C5-L AMU Solenoid #2 |
| 0.85A | C5-M AMU Solenoid #3 |
| 0.2A | C2-A Trailer Power Relay |

Pin part number for harness connection:
23-13212-120 TERM-FEMALE,(18-16) PAC153047191
23-13212-121 TERM-FEMALE,(14-12) PAC15304720
23-13212-121 TERM-FEMALE,(10) PAC153260004
### Chassis Module (CHM) Pin Detail

#### C2 Trailers Module Harness

<table>
<thead>
<tr>
<th>Connector and Pin Numbers</th>
<th>Signal Name</th>
<th>Signal Type</th>
<th>Full Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2-A</td>
<td>Trailer Power Relay</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C2-B</td>
<td>Ground</td>
<td>Power Ground</td>
<td>X</td>
</tr>
<tr>
<td>C2-D</td>
<td>Trailer Stop Lamp Relay Pass-through</td>
<td>Pass-through</td>
<td>X</td>
</tr>
<tr>
<td>C2-E</td>
<td>Trailer Right Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C2-F</td>
<td>Trailer Marker Lamps Relay</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C2-G</td>
<td>Trailer Tail Light Relay Pass-through</td>
<td>Pass-through</td>
<td>X</td>
</tr>
<tr>
<td>C2-H</td>
<td>Trailer Left Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
</tbody>
</table>

#### C3 Forward Chassis Harness

<table>
<thead>
<tr>
<th>Connector and Pin Numbers</th>
<th>Signal Name</th>
<th>Signal Type</th>
<th>Full Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3-A</td>
<td>Fuel/Water Separator Heater</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-B</td>
<td>J1587/Datalink</td>
<td>Datalink</td>
<td>X</td>
</tr>
<tr>
<td>C3-C</td>
<td>Fog/Headlamps</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-D</td>
<td>Fog/Headlamps</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-E</td>
<td>Low Air Pressure</td>
<td>Digital Input (active low)</td>
<td>X</td>
</tr>
<tr>
<td>C3-F</td>
<td>Park Brake</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-G</td>
<td>ServiceBrake</td>
<td>Digital Input (active low)</td>
<td>X</td>
</tr>
<tr>
<td>C3-H</td>
<td>Ground</td>
<td>Power Ground</td>
<td>X</td>
</tr>
<tr>
<td>C3-J</td>
<td>MainBattery/Power/(BAT2)</td>
<td>Power</td>
<td>X</td>
</tr>
<tr>
<td>C3-K</td>
<td>Right DRL</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-L</td>
<td>Right Headlamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-M</td>
<td>Ignition</td>
<td>Digital Input (active low)</td>
<td>X</td>
</tr>
<tr>
<td>C3-N</td>
<td>Left/ElectricLamps Pass-through</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-O</td>
<td>Right/ElectricLamps Pass-through</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-P</td>
<td>Taillight/License Plate Lamps Pass-through</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-Q</td>
<td>Right/Headlamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-R</td>
<td>Right/Electric Lamp Pass-through</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C3-S</td>
<td>J1939/Datalink</td>
<td>Datalink</td>
<td>X</td>
</tr>
</tbody>
</table>

#### C4 Forward Chassis Harness

<table>
<thead>
<tr>
<th>Connector and Pin Numbers</th>
<th>Signal Name</th>
<th>Signal Type</th>
<th>Full Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C4-A</td>
<td>Module Wake-Up Signal</td>
<td>Digital Input/Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-B</td>
<td>Address Identification A</td>
<td>Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C4-C</td>
<td>Left Park Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-D</td>
<td>Left Marker Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-E</td>
<td>Address Identification C</td>
<td>Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C4-F</td>
<td>Left DRL</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-G</td>
<td>J1939/Datalink</td>
<td>Datalink</td>
<td>X</td>
</tr>
<tr>
<td>C4-H</td>
<td>Ground/(Address Identification D)</td>
<td>Signal Ground</td>
<td>X</td>
</tr>
<tr>
<td>C4-J</td>
<td>Main Battery Power (BAT3)</td>
<td>Power</td>
<td>X</td>
</tr>
<tr>
<td>C4-K</td>
<td>Right High Beam</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-L</td>
<td>Right Park Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-M</td>
<td>Right Marker Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C4-N</td>
<td>Address Identification B</td>
<td>Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C4-P</td>
<td>Main Battery Power (BAT1)</td>
<td>Power</td>
<td>X</td>
</tr>
<tr>
<td>C4-R</td>
<td>J1939/Datalink</td>
<td>Datalink</td>
<td>X</td>
</tr>
<tr>
<td>C4-S</td>
<td>Ground</td>
<td>Power Ground</td>
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</table>

#### C5 Air Management Unit

<table>
<thead>
<tr>
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<th>Signal Name</th>
<th>Signal Type</th>
<th>Full Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C5-A</td>
<td>AMU Analog Input 0</td>
<td>Digital Input (active low), Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C5-B</td>
<td>AMU Analog Input 1</td>
<td>Digital Input (active low), Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C5-C</td>
<td>Ground</td>
<td>Signal Ground</td>
<td>X</td>
</tr>
<tr>
<td>C5-F</td>
<td>AMU Analog Input 2</td>
<td>Digital Input (active low), Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C5-G</td>
<td>AMU Analog Input 3</td>
<td>Digital Input (active low), Analog Input</td>
<td>X</td>
</tr>
<tr>
<td>C5-H</td>
<td>AMU Solenoid 0</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C5-J</td>
<td>AMU Solenoid 1</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C5-L</td>
<td>AMU Solenoid 2</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C5-M</td>
<td>AMU Solenoid 3</td>
<td>Digital Output</td>
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#### C1 Tail Light Harness

<table>
<thead>
<tr>
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<th>Signal Name</th>
<th>Signal Type</th>
<th>Full Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1-A</td>
<td>Left Backup Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-B</td>
<td>Left Tail Light Pass-through</td>
<td>Pass-through</td>
<td>X</td>
</tr>
<tr>
<td>C1-C</td>
<td>Right/Left Tail Light Pass-through</td>
<td>Pass-through</td>
<td>X</td>
</tr>
<tr>
<td>C1-D</td>
<td>License Plate Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-E</td>
<td>Left Rear Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-F</td>
<td>Backup Alarm</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-G</td>
<td>Right Rear Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-H</td>
<td>Right Backup Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-J</td>
<td>Right Stop Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-K</td>
<td>Left Stop Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-L</td>
<td>Right Rear Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-M</td>
<td>Left Stop Lamp</td>
<td>Digital Output</td>
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</tr>
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</table>

#### C1 Tail Light Harness

<table>
<thead>
<tr>
<th>Connector and Pin Numbers</th>
<th>Signal Name</th>
<th>Signal Type</th>
<th>Full Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1-A</td>
<td>Left Backup Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-B</td>
<td>Left Tail Light Pass-through</td>
<td>Pass-through</td>
<td>X</td>
</tr>
<tr>
<td>C1-C</td>
<td>Right/Left Tail Light Pass-through</td>
<td>Pass-through</td>
<td>X</td>
</tr>
<tr>
<td>C1-D</td>
<td>License Plate Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-E</td>
<td>Left Rear Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-F</td>
<td>Backup Alarm</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-G</td>
<td>Right Rear Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-H</td>
<td>Right Backup Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-J</td>
<td>Right Stop Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-K</td>
<td>Left Stop Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-L</td>
<td>Right Rear Turn Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
<tr>
<td>C1-M</td>
<td>Left Stop Lamp</td>
<td>Digital Output</td>
<td>X</td>
</tr>
</tbody>
</table>

### Diagrams

- **C1 Tail Light Harness**
- **C2 Trailers Module Harness**
- **C3 Forward Chassis Harness**
- **C4 Forward Chassis Harness**
- **C5 Air Management Unit**

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*Page 13*
Multiplexing System - Mod 160

The term "multiplexing" describes how the SmartPlex electrical system works.

Multiplexing is defined as the process of sending multiple electronic messages through the same signal path at the same time - in this case, through the data link.

The system communicates using two primary forms of communication called data links: J1939 datalink (High speed) and the J1708/J1587 datalink (low speed).

J1939 (Yellow J1939+ Green J1939– In a twisted pair )
- A high speed vehicle communications network, which permits devices to broadcast requests as well as receive information from all other devices on the network.
- Each message includes an identifier much like a CB channel setting that defines the message priority, who sent it, and what data is contained within it.
- A terminating resistor is installed at each end of the network to dampen feedback signals.

J1708/1587 (Will be obsolete in 2016)
- Normally found in pre 2010 production models as a pair of wires which are dark green J1587+ Orange J1587–. The interface with this system was removed for all trucks produced after 2009 and system information is only available through J1939 or with the use of a gateway conversion system (see Page 16).

J1939 Backbone - The main J1939 datalink wiring that lies between the two terminating resistors. It does not include the branch nodes to each ECU or to the diagnostic connector.
- * Minimum length between any 2 nodes = 10 cm
- * Maximum branch length = 3 meter
- * Maximum total network length = 40 meters

Node Branch Circuit - The section of J1939 datalink between the backbone and each control unit that has J1939, and between the backbone and the diagnostic connector.

Diagnostic Connector - a 9-pin diagnostic connector is used for troubleshooting the electrical system. It can be found under the dash on the driver side, outboard of the steering column.

Control Unit - connects to the J1939 datalink via a branch circuit.

NODE - A node is the connection point for a device or control unit. See “System Tap Points” for more information on adding nodes to the backbone.

Gateway - A gateway is a conversion device that translates information from J1939 into J1708 signals for use with systems that do not accept J1939 signals.
**Dash Tap Points**

**Ignition Power, Ground and Dash Illumination**

Tapping into dash illumination and ignition power and ground can be accomplished by using the center tap point connections located in the center back wall of the dash.

**Note:**
* Ignition power source will be powered during engine cranking
* Ignition power source will not be powered when key is in accessory position.

**J1939 Connections**

Tying into the J1939 backbone is accomplished by tapping into the system using the terminating resistor tee’s located at each end of the backbone.

The Chassis terminating resistor is located in a tee along the left frame rail, usually behind the cab.

The cab terminating resistor is located in the dash tucked up above the dash tap points for the J1587.

The correct datalink resistance measured at any device, or at the diagnostic plug should be 60 ohms with the battery disconnected.

**IMPORTANT:**
- It is essential that both terminating resistors remain connected to the ends of the J1939 backbone to dampen feedback signals.
- Numerous J1939 problems can be attributed to terminated resistors are missing or disconnected.
- If connections under dash become disconnected. Connections should never be reconnected back together directly IE ABS with ABS as this creates an independent circuit in the system that is not connected to the backbone.

**J1939 Connections for Body Builders**

To connect easily to J1939 at dash or chassis locations order the following parts:
1. Tee and Jumper FTL# A06-37868-000
2. Jumper Plug # DUFDTM06 2S E004
3. Female Pins DUFWM2SB

**Component Module Locations**

<table>
<thead>
<tr>
<th>Component</th>
<th>Module Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>General J1939 harness drawings, schematics, and installation drawings</td>
<td>160</td>
</tr>
<tr>
<td>Engine harness, installation drawings and wiring diagrams</td>
<td>283 and 286</td>
</tr>
<tr>
<td>Transmission harness, installation drawings and wiring diagrams</td>
<td>34A, 34B and 343</td>
</tr>
<tr>
<td>ABS harness and installation drawings</td>
<td>330, 332, and 333</td>
</tr>
<tr>
<td>Gateway harness and installation drawings</td>
<td>860 and 835</td>
</tr>
<tr>
<td>General dash wiring (IGN/ILLUM)</td>
<td>320</td>
</tr>
</tbody>
</table>
J1708 Gateway Communications

Option code 786-008 - Qualcomm and PeopleNet Gateway
160-026 - Diagnostics with Gateway

- On EPA2010 and forward engines, manufacturers will no longer provide J1708/J1587 data bus and the system will be supported using one single communication system data bus – J1939.

- To accommodate a few of the major systems that still use J1708 a gateway module is available that translates a predefined subset of the standard J1939 messages into J1708/J1587 format.

- At this time only Qualcomm, and PeopleNet, telematics systems have been developed for the Gateway.

Third Party Connections

- Most third party systems converted to J1939 with 2010 or offer their own propriety gateway translation systems.

- To tie into the J1939 system see page 15 for connection instructions.
Low Current Smart Switches

Smart switches are low current switches that use signals to communicate with the BHM to tell what function they effect and what state they are in (on or off etc.).

There are two primary types of Smart Switch:
1. A two position switch supplies an on or off signal to the BHM.
2. A three position switch allows for an up/down/off signal to the BHM.

Smart switches identify themselves by two voltage signals to the bulkhead module.
(Used in applications where more than one input is required.)

Each switch has a unique combination of resistors that control the voltage signal to the BHM allowing it to identify the switch.

Each channel can talk independently to the Bulkhead module at the same time.

In order for a smart switch to work on the vehicle the BHM must be programmed to hear it, this is done through the features screen using ServiceLink.

Accessing the features screen can be accomplished on-site at the body builder if they are set up with ServiceLink.

Three common faults can occur with Smart Switches
1. Extra Smart Switch fault - indicates that a smart switch has been installed that the vehicle is not programmed to utilize.
2. Duplicate Smart Switch fault - indicates that there are two or more identical smart switches connected to either the BHM or SEM smart switch ports. To fix this error the duplicate smart switches must be removed from the system.
3. Missing Smart Switch fault - indicates that a smart switch has been programmed but is not installed.

860-004 SMART SWITCH EXPANSION MODULE (SEM)

A Switch Expansion Module (SEM) is available for the vehicle when more than five smart switches are installed on the vehicle. Each adds up to 6 smart switches (beyond the standard 5 supported directly by BHM).

The function of the SEM is to; read all of the smart switch Id’s and positions; transmit the smart switch IDs and position data on the J1939 datalink; turn on the smart switch indicator lights when commanded to do so by the Bulkhead Module (BHM).
High current Switch (Battery Hot)
- Optional battery hot power switches are factory-installed, switch controlled power provisions that can be ordered for a SmartPlex vehicle.
- Optional switches can be ordered in various switch configurations as shown below.
- All optional high current switches mount on the dash, provide fuse protected battery power, and route to a customer access point ending in blunt cut wires.
- Optional switches are commonly used to provide battery-powered lighting, such as dome, spot, or beacon lights. Other applications include using the optional switch as a triggering mechanism to enable other features, such as hydraulic lift operations or access panel locks.

Module 329 Options (Battery Hot):
329-007 ILLUMINATED ROCKER SWITCH WITH WIRE TO BACK OF CAB AND MARKER LIGHT CIRCUIT TO JUNCTION BLOCK ON FRAME BACK OF CAB
329-010 (2) EXTRA SWITCHES IN DASH WITH INDICATOR LAMP AND WIRE TO CHASSIS AT BACK OF CAB/SLEEPER
329-012 (4) EXTRA SWITCHES IN DASH WITH INDICATOR LAMP AND WIRE TO CHASSIS AT BACK OF CAB/SLEEPER
329-015 (1) ILLUMINATED ROCKER SWITCH WITH WIRE TO CHASSIS AT BACK OF CAB
329-017 (3) EXTRA SWITCHES IN DASH WITH INDICATOR LAMP AND WIRE TO CHASSIS AT BACK OF CAB/SLEEPER
329-055 (4) EXTRA SWITCHES IN DASH WITH INDICATOR LAMP AND WIRE TO CHASSIS BACK OF CAB/SLEEPER AND ONE EXTRA SWITCH IN DASH WITH NO WIRING
329-077 (8) EXTRA SWITCHES IN DASH. (4) WITH INDICATOR LAMPS AND WIRES TO CHASSIS AT BACK OF CAB, (4) WIRED BY BODY BUILDER
329-082 (7) EXTRA SWITCHES IN DASH. (4) WITH INDICATOR LAMPS AND WIRES TO CHASSIS AT BACK OF CAB, (3) WIRED BY BODY BUILDER
329-083 (8) EXTRA SWITCHES IN DASH. (4) WITH INDICATOR LAMPS AND WIRES TO CHASSIS AT BACK OF CAB, (3) WIRED BY BODY BUILDER
329-1AA ONE ON/OFF/ON ROCKER SWITCH IN THE DASH WITHOUT INDICATOR LIGHT, WIRE ROUTED TO CHASSIS AT BACK OF CAB NO LABEL
329-1AB TWO ON/OFF/ON ROCKER SWITCH IN THE DASH WITHOUT INDICATOR LIGHT, WIRE ROUTED TO CHASSIS AT BACK OF CAB NO LABELS

Optional Power Switches:
Additional un-wired dash switches can be ordered for optional switches 5 through 8. These switches will come mounted on the dash to the right of the steering column. Each switch is equipped with two LED lights; one LED provides switch illumination and on position indication. Constant fused power up to 10A is supplied to each switch from the Power Distribution Module (PDM).

Extra dash switches are not connected and require a customer supplied mating plug and pins to connect the switches to additional wiring. (See plug part numbers on this page)

Connecting a Switch Using a Chassis Junction Block:
Ref service bulletin, Power Switches and Connections # SB-54.39 from your dealer.
Switches will be pre-wired to a Junction block attached to the frame rail near the Chassis Module (CHM). The red wire in the junction block receives power from the output circuit of the optional switch.

IMPORTANT: The power distribution module (PDM) fuse supplying power to the optional switch is rated for 10 amps and this load should not be exceeded by the combined current load of the circuit.

| Optional-switch Current Capacity | | |
|---|---|---|---|
| Switch Output Current Capacity | PDM Fuse F25 | | Switch Output Current Capacity | PDM Fuse F26 | |
| 10A | Switch 1 | 10A | 10A | Switch Protected |
| 10A | Shared by switch 1 and 2 | 10A | 10A | Used by switch 3 |
| 10A | Shared by switch 1 and 2 | 10A | 20A | Shared by switch 3 and 4 |
| 10A | Shared by switch 1 and 2 | 10A | 20A | |

Junction Block

Blunt cut power wires from opt high current power switches located in frame BOC.

Optional-switch Current Capacity

<table>
<thead>
<tr>
<th>No. of Switches</th>
<th>PDM Fuse F25</th>
<th>Switch Output Current Capacity</th>
<th>PDM Fuse F26</th>
<th>Switch Output Current Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10A</td>
<td>Switch 1</td>
<td>10A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10A</td>
<td>Shared by switch 1 and 2</td>
<td>10A</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20A</td>
<td>Shared by switch 1 and 2</td>
<td>10A</td>
<td>10A</td>
</tr>
<tr>
<td>4</td>
<td>20A</td>
<td>Shared by switch 1 and 2</td>
<td>10A</td>
<td>20A</td>
</tr>
</tbody>
</table>
High Current Switch (BH) Schematics

Four-switch Configuration Wiring Diagram

- Hot at all times (Battery B+)
- Optional Switches
- Heat shrink protected
- 14 GA circuits

One-switch Configuration Wiring Diagram Without Junction Block

- Optional switch output
- 14 GA circuits
- Heat shrink protected

One-switch Configuration Wiring Diagram With Junction Block and marker light feed

- Optional switch
- Marker lights
- Junction Block
- Chassis Module

Page 19
High current Switch

Optional ignition interlocked or battery powered switches are switch controlled power provisions that are factory installed.

Optional switches can be ordered in a (6)-, (8)-, or (10)-switch configurations.

All optional high current switches mount on the dash, provide fuse protected and ignition interlocked power, and route to a customer access point ending in an in cab junction box.

The junction box will be located under the passenger seat for fixed base seat configurations.

The junction box will be shipped loose for customer install for all non-fixed passenger seats.

Optional switches are commonly used to provide battery-powered lighting, as dome, spot, or beacon lights. Other applications include using the optional switch as a triggering mechanism to enable other features, such as hydraulic lift operations or access panel locks.

Module 329 Options (Ignition Interlocked)

329-090 (10) IGNITION CONTROLLED EXTRA SWITCHES WITH INDICATOR LIGHTS WIRED TO POWER DISTRIBUTION BOX WITH RELAYS PROVIDING 20 AMPS PER CIRCUIT TO JUNCTION BLOCK AND ONE CIRCUIT AT 30 AMPS

329-091 (6) IGNITION CONTROLLED EXTRA SWITCHES WITH INDICATOR LIGHTS WIRED TO POWER DISTRIBUTION BOX WITH RELAYS PROVIDING 20 AMPS PER CIRCUIT TO JUNCTION BLOCK AND ONE CIRCUIT AT 30 AMPS

329-092 (8) IGNITION CONTROLLED EXTRA SWITCHES WITH INDICATOR LIGHTS WIRED TO POWER DISTRIBUTION BOX WITH RELAYS PROVIDING 20 AMPS PER CIRCUIT TO JUNCTION BLOCK AND ONE CIRCUIT AT 30 AMPS

Optional-Switch Current Capacity

<table>
<thead>
<tr>
<th>No. of Switches</th>
<th>Auxiliary PNDB Power Feed</th>
<th>Rating</th>
<th>Switch Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>All 20A</td>
<td>All 20A</td>
<td>All Switches independently fused</td>
</tr>
<tr>
<td>8</td>
<td>All 20A</td>
<td>All 20A</td>
<td>All Switches independently fused</td>
</tr>
<tr>
<td>10</td>
<td>All 20A</td>
<td>All 20A</td>
<td>All Switches independently fused</td>
</tr>
</tbody>
</table>

Optional SW 1 is fused at 30A in all configurations

Note: For non-fixed passenger seat solutions the PNDB will be shipped loose in cab for customer install.
High Current Schematic (Ignition Interlocked)
Pre labeled High Current Switch Options:

Mod 329 optional switch packages can be customized with the following predefined labels by adding a line note to the sales order.

**Step 1**
Select the 329-XXX option to drive the number of extra switches you require

**Step 2**
Have the dealer salesmen add the part numbers for the spare switches from the choices on this page that you would like pre installed.

The addition of the line note will drive a demand and the factory will install the corresponding switch displays in lieu of standard OPT switches in the truck.

**Note:**
Switches will come pre-wired as per the current optional switch data codes and will not be pre-wired to the locations defined by the switch label.

### Optional Switch Connector

<table>
<thead>
<tr>
<th>Connector Pin</th>
<th>Signal Name</th>
<th>Signal Type</th>
<th>Circuit Color</th>
<th>Circuit Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 B 3 B2A 4 T</td>
<td>FusedBatteryPower</td>
<td>Input</td>
<td>T</td>
<td>999 for optional switches 1 and 2. 999B for optional switches 3 and 4.</td>
</tr>
<tr>
<td>5B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ground</td>
<td>Ground</td>
<td>BR</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>IlluminationFeed</td>
<td>Input</td>
<td>BR</td>
<td>29A</td>
</tr>
</tbody>
</table>

### Option and Blank Switches

<table>
<thead>
<tr>
<th>Option and Blank Switches</th>
<th>A06-30769-076</th>
<th>A06-30769-014</th>
<th>A06-30769-117</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Optional</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Blank</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
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</tbody>
</table>

### Chassis Switches

<table>
<thead>
<tr>
<th>Chassis Switches</th>
<th>A06-30769-081</th>
<th>A06-30769-110</th>
<th>A06-30769-109</th>
<th>A06-30769-025</th>
<th>A06-30769-077</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup Alarm</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>Trailer Latch</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Tailgate Latch</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Trailer Aux</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>Trailer Auxiliary</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

### Chassis Lamps and Lights

<table>
<thead>
<tr>
<th>Chassis Lamps and Lights</th>
<th>A06-30769-158</th>
<th>A06-30769-157</th>
<th>A06-30769-155</th>
<th>A06-30769-092</th>
<th>A06-30769-091</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plow 2 Lamp</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Tall Gate Latch</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Cab Strobe</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Fog Lamp</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Plow Lamp</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Salt Light</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Sander Lamp</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Spot Lamp</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Rear Fog Lamp</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Utility Lamp</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Road Lamp</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Foot well Light</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
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</table>

### Heater Switches

<table>
<thead>
<tr>
<th>Heater Switches</th>
<th>A06-30769-002</th>
<th>A06-30769-021</th>
<th>A06-30769-018</th>
<th>A06-30769-064</th>
<th>A06-30769-149</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup Alarm</td>
<td>On</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>Mirror Heat</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Fuel Heater</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Bunk Heater</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Exhaust Brake</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

### Drivetrain Switches

<table>
<thead>
<tr>
<th>Drivetrain Switches</th>
<th>A06-30769-116</th>
<th>A06-30769-115</th>
<th>A06-30769-062</th>
<th>A06-30769-082</th>
<th>A06-30769-101</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINE START</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>HDWY Control</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>PTO</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Trans Retarder</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Engine Brake</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Engine Start</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Mirror Heat</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Fuel Heater</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Bunk Heater</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Exhaust Brake</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Shift Tower</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>PTO</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
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<td>Off</td>
</tr>
<tr>
<td>Engine Brake</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Engine Start</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>
Vehicle Interface Lighting

353-022 VEHICLE INTERFACE WIRING WITH BODY BUILDER CONNECTOR MOUNTED BACK OF CAB
353-023 VEHICLE INTERFACE WIRING WITH BODY BUILDER CONNECTOR MOUNTED END OF FRAME
353-026 VEHICLE INTERFACE WIRING AND PDM WITH BODY BUILDER CONNECTOR, BACK OF CAB
353-027 VEHICLE INTERFACE WIRING AND PDM WITH BODY BUILDER CONNECTOR AT END OF FRAME
353-038 MARKER LAMP CONNECTION FOR BODY BUILDERS LOCATED BACK OF CAB

Lighting Interface Harness Mod 353

<table>
<thead>
<tr>
<th>Connector Pin</th>
<th>Signal Name</th>
<th>Signal Type</th>
<th>Circuit Color</th>
<th>Circuit Number</th>
<th>Marker Lamp Only (353-038)</th>
<th>Low Current (353-022 or 353-023)</th>
<th>High Current (353-026 or 353-027)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tail Lamp</td>
<td>+12V via PDM Fuse 7</td>
<td>BR</td>
<td>23</td>
<td>R-W 36L</td>
<td>20 A</td>
<td>20 A</td>
</tr>
<tr>
<td>2</td>
<td>Back Up Lamp</td>
<td>+12V via PDM Fuse 12</td>
<td>DKBL</td>
<td>120B</td>
<td>R-W 36P</td>
<td>7.5 A</td>
<td>20 A</td>
</tr>
<tr>
<td>3</td>
<td>Right Turn Lamp</td>
<td>+12V via PDM Fuse 3</td>
<td>DKG</td>
<td>38R</td>
<td>R-W 36N</td>
<td>7.5 A</td>
<td>20 A</td>
</tr>
<tr>
<td>4</td>
<td>Right Stop Lamp</td>
<td>+12V via PDM Fuse 5</td>
<td>R-W</td>
<td>36R</td>
<td>Y 38L</td>
<td>6.7 A</td>
<td>20 A</td>
</tr>
<tr>
<td>5</td>
<td>Left Stop Lamp</td>
<td>+12V via PDM Fuse 2</td>
<td>Y</td>
<td>36N</td>
<td>R-W 36P</td>
<td>6.7 A</td>
<td>20 A</td>
</tr>
<tr>
<td>6</td>
<td>Left Turn Lamp</td>
<td>+12V via PDM Fuse 5</td>
<td>Y</td>
<td>38L</td>
<td>R-W 36P</td>
<td>7.5 A</td>
<td>20 A</td>
</tr>
<tr>
<td>7</td>
<td>Marker Lamp</td>
<td>+12V via PDM Fuse 3</td>
<td>Y</td>
<td>48B</td>
<td>R-W 36P</td>
<td>20 A</td>
<td>20 A</td>
</tr>
<tr>
<td>8</td>
<td>Ignition Power</td>
<td>+12V via PDM Fuse 4</td>
<td>Y</td>
<td>52F</td>
<td>R-W 36P</td>
<td>7.5 A</td>
<td>20 A</td>
</tr>
<tr>
<td>9</td>
<td>Battery Power</td>
<td>+12V via PDM Fuse 11</td>
<td>R</td>
<td>14U</td>
<td>R-W 36P</td>
<td>7.5 A</td>
<td>20 A</td>
</tr>
<tr>
<td>10</td>
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<td>+12V via PDM Fuse 11</td>
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Note: Connector should have an orange ribbon tape within 2” for easy identification
Trailer and Body Builder Lighting Module

For all 2010 and later configurations specified with the trailer and body builder options, Freightliner provides an in-cab lighting module that provides high current capacity circuits that are protected from the elements and easy to access for maintenance and assembly people.

Body Builder PDM

**Floor Mount Configuration for Extend Cab Units**

**Back wall Configuration for Day Cab Units**

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**Under-Cab Harness Pinout**

**Pin** | **Wire size** | **Usage Description** | **Circuit #** |
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**Under-Cab Harness Pinout**
Trailer and Body Builder Lighting Module

For all 2010 and later configurations specified with the trailer and body builder options, Freightliner provides an in-cab trailer control module that provides high current capacity circuits that are protected from the elements and easy to access for maintenance and assembly people.

Reference modules: 287, 87M, 296, 308

---

**Fuse Location**

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<th>Fuse</th>
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<th>Function</th>
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Mod 296/297 Separate Stop/Turn

297-001 SAE J560 7-WAY PRIMARY TRAILER CABLE RECEPTACLE MOUNTED END OF FRAME
297-005 SAE J560 7-WAY PRIMARY TRAILER CABLE RECEPTACLE MOUNTED ON CHASSIS BACK OF CAB/SLEEPER
297-008 SAE J560 7-WAY PRIMARY TRAILER CABLE RECEPTACLE BRACKET MOUNTED LH DECK BACK OF CAB
296-010 PRIMARY CONNECTOR/RECEPTACLE WIRED FOR SEPERATE STOP/TURN, CENTER PIN POWERED THROUGH IGNITION
296-013 PRIMARY CONNECTOR/RECEPTACLE WIRED FOR SEPERATE STOP/TURN, CENTER PIN WIRED TO BACKUP LIGHT CIRCUIT
296-026 PRIMARY CONNECTOR/RECEPTACLE WIRED FOR SEPERATE STOP/TURN, CENTER PIN POWERED THROUGH IGNITION WITH STOP SIGNAL PRE-WIRE PACKAGE

ELECTRIC TRAILER BRAKE PRE-WIRE INCLUDED WITH 296-026

ELECTRIC TRAILER PRE-WIRE BLUNT CUTS UNDER STEERING COLUMN AND END OF FRAME
Mod 296/297 Combination Stop/Turn

- 296-025 PRIMARY CONNECTOR/RECEPTACLE WIRED FOR COMBINATION STOP/TURN, CENTER PIN POWERED THROUGH IGNITION
- 296-027 PRIMARY CONNECTOR/RECEPTACLE WIRED FOR COMBO STOP/TURN, CENTER PIN POWERED THROUGH IGNITION WITH STOP SIGNAL PRE-WIRE PACKAGE
- 297-001 SAE J560 7-WAY PRIMARY TRAILER CABLE RECEPTACLE MOUNTED END OF FRAME
- 297-005 SAE J560 7-WAY PRIMARY TRAILER CABLE RECEPTACLE MOUNTED ON CHASSIS BACK OF CAB/SLEEPER
- 297-008 SAE J560 7-WAY PRIMARY TRAILER CABLE RECEPTACLE BRACKET MOUNTED LH DECK BACK OF CAB

ELECTRIC TRAILER PRE-WIRE INCLUDED WITH 296-027

ELECTRIC TRAILER PRE-WIRE BLUNT CUTS UNDER STEERING COLUMN AND END OF FRAME
Body Builder Floor Plug Interface

Connections to the trailer and body builder unit are achieved using a 76 Pin plug located on the cab floor rear of the driver seat.

Refer to the diagram and chart on this page to determine what pins are used for connections and what pins are available for additional body builder connections.

---

**Connector Plug Number**

DTNA Part: 23-13153-063

**Supplier Part:** AFLR 63694 001

**Terminal Part Number**

DTNA Part: Male 1.6, 20-14 AWG

23-13211-410, 411, 530

Male 2.8, 14-8 AWG

23-13211-430, 431, 432

---

**UCAB_H_FLR_1A**

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Tail Lights and EOF Connections

Body builders utilizing factory lights and needing additional lighting interfacing should use the 353 data codes for body builder interfaces.

Body builders wishing to supply their own taillights can order the “Wiring Only” option shown below.

Many connectors come with mating connectors included and require only the terminals to be supplied by the body builder.

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<td>294-007</td>
<td>INTEGRAL STOP/TAIL/BACKUP LIGHTS WITH 7 FEET ADDITIONAL WIRE AT CHASSIS END OF FRAME</td>
<td>X</td>
<td>-</td>
<td>7</td>
<td>X</td>
<td>-</td>
<td>-</td>
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<tr>
<td>294-010</td>
<td>TRUCK-LITE 3 CHAMBER MODULES WITH 45 SERIES SEALED HGAM LAMPS</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>294-011</td>
<td>WIRING ONLY WITH SEPARATE STOP AND TURN LIGHT CIRCUITS TO END OF FRAME FOR CUSTOMER FURNISHED LAMPS</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
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<tr>
<td>294-015</td>
<td>INTEGRAL STOP/TAIL/BACKUP LIGHTS WITH 36 INCHES ADDITIONAL WIRE AT CHASSIS END OF FRAME</td>
<td>X</td>
<td>-</td>
<td>3</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Tractor Configurations</td>
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<tr>
<td>294-023</td>
<td>FREIGHTLINER LED FLANGE MOUNTED STOP/TAIL/TURN LIGHTS WITH SEPARATE INCANDESCENT BACKUP LIGHTS</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
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<tr>
<td>294-024</td>
<td>ORM STOP/TAIL/BACKUP LIGHTS AND PROVIDE WIRING WITH SEPARATE STOP/TURN WIRES TO 4 FEET BEYOND END OF FRAME</td>
<td>X</td>
<td>-</td>
<td>4</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>294-025</td>
<td>FREIGHTLINER LED STOP/TAIL/TURN/BACKUP/LICENSE LIGHTS BY TRUCK-LITE</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>294-029</td>
<td>ORM STOP/TAIL/BACKUP LIGHTS AND PROVIDE WIRING FOR COMBINED STOP/TURN LIGHTS TO FOUR FEET BEYOND END OF FRAME</td>
<td>X</td>
<td>-</td>
<td>4</td>
<td>X</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>294-030</td>
<td>FREIGHTLINER LED FLANGE MOUNTED STOP/TAIL/TURN LIGHTS WITH SEPARATE BACKUP LIGHTS AND ADDITIONAL 7 FEET WIRING END OF FRAME</td>
<td>X</td>
<td>-</td>
<td>7</td>
<td>X</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>294-031</td>
<td>ORM STOP/TAIL/BACKUP LIGHTS AND PROVIDE WIRING WITH SEPARATE STOP/TAIL WIRES TO 7 FEET BEYOND END OF FRAME</td>
<td>X</td>
<td>-</td>
<td>7</td>
<td>X</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>294-032</td>
<td>WIRING HARNESS ONLY TO END OF FRAME FOR STOP/TAIL/TURN WITH BRAKE LIGHT ACTIVATION WITH PARK BRAKE APPLIED WITH IGNITION</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Transmission Interface Connector

Depending on the transmission that is installed in the vehicle, the transmission interface harness provides the VIW connection for the current generation of 1000/2000 series or 3000/4000 series electronic controls.

The transmission interface harness provides most of the optional I/O circuits and speedometer signal in a conveniently located connector.

Connectors can be ordered in three locations using the options shown below.

There should be a green ribbon tape at the connector for easy locating and identification.

### Data Book Codes for the Transmission Interface Harness

<table>
<thead>
<tr>
<th>Data Book Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>34C-001</td>
<td>Transmission Interface Harness at the Frontwall</td>
</tr>
<tr>
<td>34C-002</td>
<td>Transmission Interface Harness at Back of Cab</td>
</tr>
<tr>
<td>34C-003</td>
<td>Transmission Interface at End of Frame</td>
</tr>
</tbody>
</table>

### Transmission Interface (Gray Plug)

- **FTL Male Part Number**: 23-13153-057
- **Terminal Pin**: 23-13211-031
- **Vndr Male Part Number**: 54241601
- **Terminal Pin**: 54001626

- **FTL Female Part Number**: 23-13153-056
- **Terminal Pin**: 23-13211-021
- **Vndr Female Part Number**: 54241631
- **Terminal Pin**: 54001625

### Transmission Interface Connector Pinout Assignments on M2 Vehicles

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>232E</td>
<td>163</td>
<td>Ignition Signal</td>
</tr>
<tr>
<td>2</td>
<td>497C7 (O)</td>
<td>150</td>
<td>PTO Enable</td>
</tr>
<tr>
<td>3</td>
<td>497C8 (O)</td>
<td>113</td>
<td>Secondary Mode Indicator</td>
</tr>
<tr>
<td>4</td>
<td>497Y</td>
<td>103</td>
<td>Digital Ground</td>
</tr>
<tr>
<td>5</td>
<td>497K (O)</td>
<td>125</td>
<td>Vehicle Speed Sensor</td>
</tr>
<tr>
<td>6</td>
<td>497C4 (O)</td>
<td>105</td>
<td>Output Speed Indicator A</td>
</tr>
<tr>
<td>7</td>
<td>497C3 (O)</td>
<td>146</td>
<td>Neutral Indicator for PTO</td>
</tr>
<tr>
<td>8</td>
<td>497D3 (I)</td>
<td>143</td>
<td>PTO Enable</td>
</tr>
<tr>
<td>9</td>
<td>497C1 (O)</td>
<td>130</td>
<td>Engine Overspeed Indicator</td>
</tr>
<tr>
<td>10</td>
<td>497D5 (I)</td>
<td>142</td>
<td>Secondary Mode Input</td>
</tr>
<tr>
<td>11</td>
<td>497D6 (I)</td>
<td>101</td>
<td>Auxiliary Function Range Inhibit (standard)</td>
</tr>
<tr>
<td>12</td>
<td>497D10 (I)</td>
<td>117</td>
<td>Automatic Neutral-Dual Input With Park Brake</td>
</tr>
<tr>
<td>13</td>
<td>497C6 (O)</td>
<td>164</td>
<td>Sump Retarder Temperature Indicator</td>
</tr>
<tr>
<td>14</td>
<td>497D1 (I)</td>
<td>123</td>
<td>3rd Lockup Pump Mode</td>
</tr>
<tr>
<td>15</td>
<td>497D4 (I)</td>
<td>122</td>
<td>Transfer Case Low</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

- **†**: When more than one function is listed, see the Allison Transmission Vocational Model Guide for the applicable function.
- **‡**: Output
- **§**: Neutral Indicator for PTO
- **I**: Input

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Engine Interface Connector

Freightliner provides an engine interface harness when an rpm control system is ordered for optional body builder features and PTO (power takeoff) applications.

The optional features provided by this harness include:
- Fast idle
- Increment/decrement
- Multiple fixed speeds
- Variable RPM title

Module 148 determines the type of remote engine throttle. Module 163 determines the location of the interface connector. Module 87L determines the interlock requirements.

There should be a tan ribbon tape at the connector for easy locating and identification.

### DD13 Interface

<table>
<thead>
<tr>
<th>Pin</th>
<th>Harness</th>
<th>Usage Description</th>
<th>Circuit #</th>
<th>CPC Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eng Control Dash</td>
<td>Dash Engine Control</td>
<td>483Z</td>
<td>4/2</td>
</tr>
<tr>
<td>2</td>
<td>Engine Control Remote VSG Select</td>
<td>439U</td>
<td>2/9</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Engine Control Cruise Control On/Off Enable</td>
<td>492U</td>
<td>1/14</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Engine Control Cruise Control Set/Coast</td>
<td>483A</td>
<td>1/12</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Engine Control Cruise Control Resume/Accel</td>
<td>483B</td>
<td>1/16</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Engine Control Limiter 0</td>
<td>439V1</td>
<td>3/11</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Engine Control Limiter 1</td>
<td>439V2</td>
<td>2/11</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Engine Control Tachometer</td>
<td>483E</td>
<td>1/9</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Engine Control Throttle Inhibit</td>
<td>492Z</td>
<td>1/17</td>
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<tr>
<td>10</td>
<td>Engine Control Remote Accelerator Select</td>
<td>483N</td>
<td>2/8</td>
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<tr>
<td>11</td>
<td>Engine Control Variable Speed Governor</td>
<td>483C</td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Engine Control +5V Sensor Supply</td>
<td>483D</td>
<td>3/3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Eng Control Dash Dash Engine Control</td>
<td>492Y</td>
<td>4/2</td>
<td></td>
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<tr>
<td>14</td>
<td>Power Ignition Dash Power</td>
<td>439A</td>
<td>2/3</td>
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<tr>
<td>15</td>
<td>Spare</td>
<td>---</td>
<td>---</td>
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</tr>
<tr>
<td>16</td>
<td>Spare</td>
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### Cummins Interface

<table>
<thead>
<tr>
<th>Pin</th>
<th>Harness</th>
<th>Usage Description</th>
<th>Circuit #</th>
<th>ECM Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eng Control Dash</td>
<td>Engine RPM Chass</td>
<td>400G</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Engine Control Remote PTO</td>
<td>439U</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Engine Control CC/PTO On/Off Switch w/RPM</td>
<td>492U</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Engine Control CC/PTO Set w/RPM</td>
<td>483A</td>
<td>12</td>
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<tr>
<td>5</td>
<td>Engine Control CC/PTO Resume w/RPM</td>
<td>483B</td>
<td>19</td>
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<tr>
<td>6</td>
<td>Engine Control Max Operating Speed/Gov</td>
<td>483B</td>
<td>66</td>
<td></td>
</tr>
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<td>7</td>
<td>Spare</td>
<td>---</td>
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</tr>
<tr>
<td>8</td>
<td>Engine Control Tachometer</td>
<td>483E</td>
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<td>Spare</td>
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<tr>
<td>10</td>
<td>Engine Control Remote Throttle On/Off</td>
<td>483N</td>
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<td>11</td>
<td>Engine Control Remote Throttle Signal w/RPM</td>
<td>483C</td>
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<td>12</td>
<td>Engine Control Remote Throttle Power</td>
<td>483D</td>
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<td>13</td>
<td>Engine Control Eng B1 Snr Com Ground w/RPM</td>
<td>492Y</td>
<td>32</td>
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<tr>
<td>14</td>
<td>Spare</td>
<td>---</td>
<td>---</td>
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<tr>
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<td>16</td>
<td>Spare</td>
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</table>
PTO Installation Compatibility

All SmartPlex PTO controls employ a multiplexed dash mounted Smart Switch, PTO Control wiring, and air piping, which is driven by several different factors on the M2 and SD Platforms.

Factors include but are not limited to:
- Transmission type
- Transmission programming package
- PTO make and model, and interlock type

PTO controls are pre-wired specifically to match the transmission and PTO combination. For this reason data code combinations for Modules 372 and 362 are critical.

Module 372 specifies the Number and Type of PTO Controls
- Single or Dual controls
- Interlock Scheme (Park Brake Interlock, Neutral Interlock, Park Brake & Neutral Interlock)

Module 362 specifies which PTO will be installed. This can be specified two ways
- A factory installed PTO can be chosen (Contact your CAE representative for a quote)
- For "Customer Installed" data codes select from the options in the chart

If a 372 code other than 372-998 or 372-051 is specified, a corresponding 362 data code must be specified to ensure the correct wiring, PTO connector style, and air piping connections are in place.

The charts on this page are designed to help guide you through the compatibility process.

PTO Wiring can be found in module 885.

---

### Customer Installed PTO Compatibility Chart

<table>
<thead>
<tr>
<th>Mod 362 PTO Options</th>
<th>Option Description</th>
<th>Electric over Air Shift PTO Control</th>
<th>Electric Over Hydraulic Shift PTO Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>362-801</td>
<td>MUNCIE RS4 SERIES REAR MOUNT PTO, CUSTOMER INSTALLED</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-177</td>
<td>CHELSEA 221 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-1BU</td>
<td>CHELSEA 230/231/236 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-1M2</td>
<td>CHELSEA 236 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-802</td>
<td>CHELSEA 442 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-1T6</td>
<td>CHELSEA 489 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-1PB</td>
<td>CHELSEA 541 SERIES REAR MOUNT, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-1T8</td>
<td>CHELSEA 812 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-805</td>
<td>MUNCIE 82 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
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<tr>
<td>362-803</td>
<td>MUNCIE SERIES CS6 WITH ELEC/AIR CONTROLS, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
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<tr>
<td>362-800</td>
<td>MUNCIE SERIES CS8, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
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<tr>
<td>362-040</td>
<td>MUNCIE SERIES TG6 &amp; TG8, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
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<tr>
<td>362-1U0</td>
<td>MUNCIE SERIES TG6, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>362-1U1</td>
<td>MUNCIE SERIES TG8, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td>X</td>
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<tr>
<td>362-1BV</td>
<td>CHELSEA 270 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
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</tr>
<tr>
<td>362-1DV</td>
<td>CHELSEA 277 SERIES WITH REMOTE SOLENOID, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>362-035</td>
<td>CHELSEA 277 SERIES, CUSTOMER INSTALLED PTO</td>
<td>X</td>
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</tr>
<tr>
<td>362-145</td>
<td>CHELSEA PTO - CHL340UHX GSXD</td>
<td>X</td>
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</tr>
<tr>
<td>362-158</td>
<td>CUSTOMER INSTALLED MUNCIE CS10 SERIES PTO</td>
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</tr>
<tr>
<td>362-807</td>
<td>CUSTOMER INSTALLED MUNCIE 41 SERIES PTO</td>
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<tr>
<td>362-157</td>
<td>MUNCIE SERIES CS20, CUSTOMER INSTALLED PTO</td>
<td>X</td>
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</tr>
<tr>
<td>362-804</td>
<td>MUNCIE SERIES CS6 WITH ELECHYD CONT, CUSTOMER INSTALLED PTO</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Factory installed PTO's are available and can also be selected (Contact CAE representative for quotes and availability)
PTO Controls

All SmartPlex PTO controls employ a Multiplexed dash mounted Smart Switch. PTO Control wiring and air piping is driven by several different factors on the M2 and SD Platforms.

Factors include but are not limited to:
- Transmission type, Transmission programming package,
- PTO make and model, PTO Interlock type

PTO controls are pre-wired specifically to match the transmission and PTO combination. For this reason data code combinations for Modules 372 and 362 are critical.

Module 372 specifies the Number and Type of PTO Controls
- Single or Dual controls
- Interlock Scheme (Park Brake Interlock, Neutral Interlock, Park Brake & Neutral Interlock)

Module 362 specifies which PTO will be installed. This can be specified two ways:
- A factory installed PTO can be chosen (Contact CAE representative for quote)
- For "Customer Installed" data codes select from the options in Chart Below

If a 372 code other than 372-998 or 372-051 is specified, a corresponding 362 data code must be specified to ensure the correct wiring, PTO connector style, and air piping connections are in place.

The charts on this page are designed to guide you through the compatibility process.

---

### Factory Installed PTO Control Compatibility Chart

<table>
<thead>
<tr>
<th>Mod 372 PTO Control Options</th>
<th>Option Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>372-035</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP</td>
</tr>
<tr>
<td>372-063</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-036</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP - PK BRK INTERLOCK</td>
</tr>
<tr>
<td>372-065</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP - PK BRK INTERLOCK FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-037</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP - NEUT INTERLOCK</td>
</tr>
<tr>
<td>372-067</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP - NEUT INTERLOCK FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-043</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP - PK BRK &amp; NEUT INTERLOCK</td>
</tr>
<tr>
<td>372-073</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP - PK BRK &amp; NEUT INTERLOCK FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-058</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP WITH PDI MODIFICATION TO INCREASE ENGINE RPM TO HIGH IDLE WHEN PTO IS ENGAGED</td>
</tr>
<tr>
<td>372-068</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP WITH PDI MODIFICATION TO INCREASE ENGINE RPM TO HIGH IDLE WHEN PTO IS ENGAGED FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-044</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP FOR AGS2 TRANS - STATIONARY MODE</td>
</tr>
<tr>
<td>372-066</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP FOR AGS2 TRANS - STATIONARY MODE FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-045</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP FOR AGS2 TRANS - MOBILE MODE</td>
</tr>
<tr>
<td>372-051</td>
<td>CUSTOMER FURNISHED AND INSTALLED PTO CONTROLS **</td>
</tr>
<tr>
<td>372-064</td>
<td>(1) DASH MTD PTO SWITCH W/IND LAMP FOR AGS2 TRANS - MOBILE MODE FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-069</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS</td>
</tr>
<tr>
<td>372-054</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS - PK BRK INTERLOCKS</td>
</tr>
<tr>
<td>372-072</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS - PK BRK INTERLOCKS FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-062</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS - NEUT INTERLOCKS</td>
</tr>
<tr>
<td>372-071</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS - NEUT INTERLOCKS FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-061</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS - PK BRK &amp; NEUT INTERLOCKS</td>
</tr>
<tr>
<td>372-070</td>
<td>(2) DASH MTD PTO SWITCHES W/IND LAMPS - PK BRK &amp; NEUT INTERLOCKS FOR CUST INST PTO</td>
</tr>
<tr>
<td>372-998</td>
<td>NO PTO CONTROLS ***</td>
</tr>
</tbody>
</table>

(X) Designates availability of PTO control/PTO control type and transmission

** If customer is supplying their own controls and does not require factory installed parts 372-051 should be specified to notify the plant to route clearance for pto Install

*** 372-998 should be specified only when a PTO will not be needed or added in the future (no routing provision will be done)
PTO Air Control Schematics
Schematics are for reference only, see the following modules for vehicle specific configurations.
- Wiring - module 885
- Airing - module 372
- Factory PTO - Module 362

PTO Switch Control Schematic
Module: 885

PTO Air Schematics
Module: 372

PTO Electrical Schematic
Module: 885
PTO Electric Control Schematics

Schematics are for reference only, see the following modules for vehicle specific configurations.

- Wiring - module 885
- Airing - module 372
- Factory PTO - Module 362

PTO Control Schematic
Allison 3000/4000 series
Mod - 885

PTO Control Schematic
Allison 1000/2000 series
Mod - 885
Remote Start/Stop Controls

The remote start stop feature is available but requires a few interlocks for the safety of the operators.
- Transmission neutral interlock
- Hood switch
- PTO switch in the dash

Schematics are for reference only, see the following modules for vehicle specific configurations.
- Wiring - module 157

Remote Start Stop Controls

157-007 MANUAL REMOTE ENGINE START/STOP WITH PTO RE-ENGAGE
- Available only with Allison or Eaton Fuller RT/O/X, FM, FR/FRO, RTLO, UltraShift or UltraShift Plus transmissions.
- Available only in combination with DC 99C-013 2013 ONBOARD DIAGNOSTICS/2010 EPA/CARB/GHG14
- Requires one of the following:
  - DC 372-043 (1) DASH MOUNTED PTO SWITCH WITH INDICATOR LAMP - PARK BRAKE AND NEUTRAL INTERLOCK
  - DC 372-073 (1) DASH MOUNTED PTO SWITCH WITH INDICATOR LAMP - PARK BRAKE AND NEUTRAL INTERLOCK FOR CUSTOMER INSTALLED PTO
- Requires DC 018-002 AIR BRAKE PACKAGE
The VDR Prep Harness comes standard with all SmartPlex vehicles that require NFPA 1901 compliant seat options. Reference Module 74F for wiring details and schematics.

The VDR prep harness supplies a centrally located EDR black box connection under center of dash and includes all the connections needed for connection to the primary J1939 compliant VDR / EDR Units (see next page).
For M2 Models Service brake and ABS signals are broadcasting via J1939. The Weldon V-Mux VDR can accept M2 information via J1939 connection therefore no additional hard wiring is required with this harness.

### Weldon Vehicle Data Recorder to FTL Harness

| Connector: B DTM06-12SB to FTL Connector DRCG_DASH_0_vdr_2A |
|---|---|---|---|
| 1 | INPUT TYPE | BB2A Pin | INPUT TYPE |
| 1 | Seat Belt 1 Status | Gnd/Batt | 1 | DRIVER SEATBELT BUCKLE | Gnd |
| 2 | Seat Belt 2 Status | Gnd/Batt | 2 | FRONT PASS SEATBELT BUCKLE | Gnd |
| 3 | Seat Belt 3 Status | Gnd/Batt | 3 | RR DRIVER SEATBELT BUCKLE | Gnd |
| 4 | Seat Belt 4 Status | Gnd/Batt | 4 | RR CENTER SEATBELT BUCKLE | Gnd |
| 5 | Seat Belt 5 Status | Gnd/Batt | 5 | PP PASS SEATBELT BUCKLE | Gnd |
| 6 | Seat Belt 6 Status | Gnd/Batt | 6 | OPT PASS SEATBELT BUCKLE | Gnd |
| 7 | Occupancy 6 status | Gnd/Batt | 7 | OPT PASS SEAT OCCUPY | Gnd |
| 8 | Occupancy 5 status | Gnd/Batt | 8 | RR PASS SEAT OCCUPY | Gnd |
| 9 | Occupancy 4 status | Gnd/Batt | 9 | RR CENTER PASS SEAT OCCUPY | Gnd |
| 10 | Occupancy 3 status | Gnd/Batt | 10 | RR DRIVER PASS SEAT OCCUPY | Gnd |
| 11 | Occupancy 2 status | Gnd/Batt | 11 | FRONT PASS SEAT OCCUPY | Gnd |
| 12 | Occupancy 1 status | Gnd/Batt | 12 | DRIVER SEAT OCCUPY | Gnd |

### 813-1C0 NFPA VEHICLE DATA RECORDER AND SEATBELT DISPLAY

813-1C1 - NFPA VEHICLE DATA RECORDER AND SEATBELT DISPLAY WITH DETROIT VIRTUAL TECHNICIAN REMOTE ENGINE DIAGNOSTICS

813-1C2 - NFPA VEHICLE DATA RECORDER & SEATBELT DISPLAY W/DETOUR VIRTUAL TECH VISIBILITY PKG: REMOTE ENGINE DIAG W/WEB ACCESS, ENGINE & IFTA/IPR REPORTS & LOCATION DATA

### FRC Vehicle Data Recorder to FTL Harness

| Connector: Seat/Belt J1 DT06-12S to FTL Connector DRCG_DASH_0_IMPR_BB_2A |
|---|---|---|---|
| 1 | INPUT TYPE | BB2A Pin | INPUT TYPE |
| 12 | Seat Belt 1 Status | Gnd/Batt | 1 | DRIVER SEATBELT BUCKLE | Gnd |
| 11 | Seat Belt 2 Status | Gnd/Batt | 2 | FRONT PASS SEATBELT BUCKLE | Gnd |
| 10 | Seat Belt 3 Status | Gnd/Batt | 3 | RR DRIVER SEATBELT BUCKLE | Gnd |
| 9 | Seat Belt 4 Status | Gnd/Batt | 4 | RR CENTER SEATBELT BUCKLE | Gnd |
| 8 | Seat Belt 5 Status | Gnd/Batt | 5 | PP PASS SEATBELT BUCKLE | Gnd |
| 7 | Seat Belt 6 Status | Gnd/Batt | 6 | OPT PASS SEATBELT BUCKLE | Gnd |
| 6 | Occupancy 6 status | Gnd/Batt | 7 | OPT PASS SEAT OCCUPY | Gnd |
| 5 | Occupancy 5 status | Gnd/Batt | 8 | RR PASS SEAT OCCUPY | Gnd |
| 4 | Occupancy 4 status | Gnd/Batt | 9 | RR CENTER PASS SEAT OCCUPY | Gnd |
| 3 | Occupancy 3 status | Gnd/Batt | 10 | RR DRIVER PASS SEAT OCCUPY | Gnd |
| 2 | Occupancy 2 status | Gnd/Batt | 11 | FRONT PASS SEAT OCCUPY | Gnd |
| 1 | Occupancy 1 status | Gnd/Batt | 12 | DRIVER SEAT OCCUPY | Gnd |

### CONNECTOR "POWER/DATABUS DT06-8SA" to FTL Connector DRCG_DASH_0_IMPR_BB_2A

| Connector: POWER/DATABUS DT06-8SA to FTL Connector DRCG_DASH_0_IMPR_BB_2A |
|---|---|---|---|
| 1 | INPUT TYPE | BB2A Pin | INPUT TYPE |
| 1 | Supply + (Battery) | Batt | 1 | Supply + (Battery) | Batt |
| 2 | Supply - (GND) | Gnd | 2 | Supply - (GND) | Gnd |
| 3 | Ignition | IGN (+12V) | 3 | Ignition | IGN (+12V) |
| 4 | Parking Brake Signal | N/R Supplied by J1939 | 4 | Parking Brake Signal | N/R Supplied by J1939 |
| 5 | Master Optical Warning | N/R | 5 | Master Optical Warning | N/R |
| 6 | J1939 (shield) | Gnd | 6 | J1939 (shield) | Gnd |
| 7 | J1939 (-) | Lo | 7 | J1939 (-) | Lo |
| 8 | J1939 (+) | Hi | 8 | J1939 (+) | Hi |
Snow Plow Lamp (304-038, 304-039)

Factory installed provision for snow plow light control that provides an in dash control switch and wiring for customer installed plow lights.

When the snow plow lamp switch in the cab is activated, the truck headlights are turned off and the headlight controls will operate the customer installed headlights. Low beams will be off with high beam request.

Note: Power to snow plow module typically provided through fuses F3 and F4 located in the Power Distribution Module.

Data code 304-038 provides a single connector and switch for plow mounted headlights.

Data code 304-039 provides dual connectors and switch for hood mounted headlights.

The plow light connector should have a blue ribbon tape at the connectors for easy location and identifications.

### 304-039 Snow Plow Headlight Single Connector

- **Connector Pin**: A, B, C, D, E, F
- **Signal Name**: High Beam, Ground, Low Beam, Marker Lamp, Left Turn Signal, Right Turn Signal
- **Signal Type**: Output
- **Circuit Color**: LTG, BK, LTG, BR, Y, BR
- **Circuit Number**: 462K, 462C, 462J, 102C, 38LP, 38LP
- **Amperage**: 30, -

**Note:** Power to snow plow module typically provided through fuses F3 and F4 located in the Power Distribution Module.

### 304-039 Snow Plow Headlight Dual Connector (RH Side)

- **Connector Pin**: A, B, C, D, E, F
- **Signal Name**: High Beam, Ground, Low Beam, Marker Lamp, Left Turn Signal, Right Turn Signal
- **Signal Type**: Output
- **Circuit Color**: LTG, BK, LTG, BR, Y, BR
- **Circuit Number**: 463H, 463C, 463L, 102C, 38LP, 38LP
- **Amperage**: -

**TypePin**
- Mating connector supplied with Chassis Packard Connector: PAC 12059168
- Terminal supplied by Body Builder Packard Terminal: PAC 12048074

### 304-039 Snow Plow Headlight Dual Connector (LH Side)

- **Connector Pin**: A, B, C, D, E, F
- **Signal Name**: High Beam, Ground, Low Beam, Marker Lamp, Left Turn Signal, Right Turn Signal
- **Signal Type**: Output
- **Circuit Color**: LTG, BK, LTG, BR, Y, BR
- **Circuit Number**: 462K, 462C, 462J, 102C, 38LP, 38LP
- **Amperage**: 30, -

**TypePin**
- Mating connector supplied with Chassis Packard Connector: PAC 12059168
- Terminal supplied by Body Builder Packard Terminal: PAC 12048074

Dual connectors located near front crossmember

Single connector can be found on LH frame rail near radiator.

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**OBD 2013/ GHG 14**

**Snow Plow Lamps**
SmartPlex Electrical System (35M module)

When ordered, the 35M SmartPlex module is a factory installed option that provides Truck Equipment Manufacturers (TEMs) ease of integration with Freightliner’s multiplexed electrical system. TEM’s can easily take advantage of information provided on the J1939 bus to create safety and interdependent interlocks with a simple program parameter versus having to cut into chassis wiring to install relays. This shortens installation time for TEM’s and eliminates additional electrical connections that can be problematic in the field.

Included in 35M is a SmartPlex Hub Module and all the wiring necessary to make available twelve 20 amp outputs, ten 7 amp outputs and six ground inputs. The twelve 20A outputs are provided in the 12 pin connector and the 7 amp outputs and ground inputs are provided in the 16 pin connector. The connectors are located inside the cab behind the driver seat. The 20 amp outputs are fused and relayed in a relay module behind the driver seat. The 7 amp outputs are run directly through the SmartPlex Hub Module and are FET transistor protected in the module.

| Switches and indicator lamps are ordered separately from the 35M module. Switches are ordered by style and quantity. Indicator lamps are available for order in red, amber, or green. Some pre-labeled indicator lamps are also available for order. Switch lense inserts are provided based on the vocational use of the truck ordered. Custom lenses can be requested through Vencor Inc., (www.vencorinc.com). |

Note: Switches and indicator lamps are not functional as received from the factory and require programming. Each switch and indicator lamp will have a unique parameter providing the desired function. For example if you wanted switch #1 to turn on 20 amp output #1 only when the park brake was set you would program a specific parameter to accomplish this. Authorized dealers as well as trained equipment manufacturers with a body builder log in can program a vehicle. Equipment manufacturers can contact their dealer or the body builder support desk at 855-253-0426 for training.
Smartplex is a configurable system that allows a common set of electronic components to manage different options in various vehicle configurations. Smartplex allows the customer to select the switches needed for the vehicle, then configure the output circuits for specific functions. Smartplex allows up to 24 switches and indicators in the overhead console, and 6 hardwired input circuits, to control twelve 20-amp output circuits and ten 6.7-amp output circuits. Any combination of smart switches and hardwire input circuits can be configured to operate the output circuits that are wired to customer interface connector 1A, and customer interface connector 2A. The configuration is programmable with ServiceLink using parameters that can be accessed using the "Parameter Search Tool".

An authorized Freightliner dealer can provide programming or a truck equipment manufacturer with a body builder login id will have access to the “SmartPlex Parameter Search Tool” and “ServiceLink” to perform programming. You can contact the Body Builder Support desk at 855-253-0426 to receive instruction on requesting a login id as well as request additional training.
### SmartPlex Switch and Indicators

Each switch and indicator has its own unique part number.

Parameters are designed for specific switches and indicators.
- **Note how the programming parameter aligns to the switch part number.**
- **For example all on/off latching switches have a part number that is A06-86377-100. If the truck was ordered with 2 on/off latching switches, the first 2 part numbers in this group would be provided so you would receive A06-86377-100 and A06-86377-101.**
- **An example of a parameter for the first on/off latching switch A06-86377-100 would be 26-20100-002.** Which would provide the function of energizing 6.7amp output number 1 on customer interface connector 2A.

As you can see in the table below, any parameter beginning with the base number 26-20100-XXX will be to operate on/off latching switch #1 A06-86377-100 and as you change the last 3 numbers of the parameter, the function changes.

You can have only one parameter for a given switch or indicator. Because the switches and indicators are unique, you can not have an identical part number plugged into the SmartPlex system at the same time or an error will occur. You can however move a switch or indicator from one position to another without having to reprogram anything.

### Service Parameters

<table>
<thead>
<tr>
<th>Reference Parameter</th>
<th>Description</th>
<th>Input</th>
<th>Part Number</th>
<th>Interlock</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-20100-002</td>
<td>Turns on single output with Ignition Enabling when the switch is depressed</td>
<td>Smart-Switch ON/OFF Latching</td>
<td>A06-86377-100</td>
<td>Ignition Enabling</td>
<td>6.7A Output 1</td>
</tr>
<tr>
<td>26-20100-003</td>
<td>Turns on single output with Ignition Enabling when the switch is depressed</td>
<td>Smart-Switch ON/OFF Latching</td>
<td>A06-86377-100</td>
<td>Ignition Enabling</td>
<td>20A Output 1</td>
</tr>
<tr>
<td>26-20100-004</td>
<td>Turns on single output which is interlocked with park brake when the switch is depressed</td>
<td>Smart-Switch ON/OFF Latching</td>
<td>A06-86377-100</td>
<td>Ignition Enabling - Park Brake Interlock</td>
<td>6.7A Output 1</td>
</tr>
<tr>
<td>26-20100-005</td>
<td>Turns on single output which is interlocked with park brake when the switch is depressed</td>
<td>Smart-Switch ON/OFF Latching</td>
<td>A06-86377-100</td>
<td>Ignition Enabling - Park Brake Interlock</td>
<td>20A Output 1</td>
</tr>
</tbody>
</table>

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**Customer Interface Connector 2A**
- 12 HSD 12V 20Amp Outputs

**Customer Interface Connector 1A**
- 6 Digital Ground Inputs
- 10 HSD 12V 7Amp Outputs