

22. INDICATOR LIGHTS AND ALARMS

22.1. 60AJC — TWO INDICATOR LIGHTS AND AUDIBLE ALARMS PROGRAMMABLE MODE FOR VARIOUS SWITCH ACTIONS (WASTE SOLUTION)

FEATURE CODE DESCRIPTION:

60AJC — BDY INTG, INDICATOR LIGHTS (2) One for Gate Open and One for Rear Alert, Includes Audible Alarm, Programmable Mode for Various Switch Action (requires 2 Remote Power Module (RPM) inputs).

FEATURE/BODY FUNCTION:

This feature provides a custom alarm package designed for the Refuse/Waste Applications. It provides both an audible and visual alarm for Gate Open and Rear Alert. Red indicator lights are located in prime viewing area of the driver in the switch pack. Audible alarm provides a second level of warning to the driver to indicate the status of these two equipment options.

The gate open indicator light is ON constant when the gate open input is active with the park brake set. If the park brake is released, with the gate open input active, the gate open indicator shall flash at 0.6-second intervals, accompanied by an audible alarm. Flexibility is provided through programmable parameters to establish whether the inputs are active high (12V) or active low (GND). See the Diamond Logic® Builder software to set programmable parameters.

Rear Alert provides the operator the capability to communicate from the rear of the vehicle to the cab. A customer-mounted switch is wired into the black 23-pin RPM input connector (See the Diamond Logic® Builder software for pin location). The ignition (IGN) switch must be in "ignition" for this feature to function. Programmable Parameters allow the customer to establish whether the input is active at 12 volts or active at GND. When the operator activates the customer-mounted switch, the rear alert light in the gauge cluster illuminates and an audible alarm sounds.



Figure 106 Switch Pack Display of "Gate Open" and "Rear Alert" Indicator Lights

PROGRAMMABLE PARAMETERS:

Required software feature codes: (595AMD or 595AMC**) and 595AKP

** Software feature code 595AMD should be used with an automatic transmission, whereas software feature code 595AMC should be used for a truck with a manual transmission.

Software feature codes that must be removed: NONE

The **TEM_Tail_Gate_Input_Active_State** parameter sets the voltage level that determines when the Gate Open alert should be active.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

When the **TEM_Tail_Gate_Park_Brake_Inhibit** parameter is turned ON, the tailgate alert will only alert when the Park Brake is released.

The **TEM_Tail_Gate_Transmission_Interlock** parameter indicates the action of the tailgate alert based on transmission gear.

0 = Ignores Gear

1 = Alert will only activate if the transmission is NOT in reverse

2 = Alert will only activate if transmission is in reverse

3 = Alert will activate for the tailgate sensor or if the transmission is in reverse

The **TEM_Rear_Alert_Input_Active_State** parameter sets the voltage level that determines when the rear alert should be active.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

The **TEM_Tail_Gate_Alarm_Timeout** parameter determines the length of time that the audible alarm will beep continuously after the gate is opened and the park brake is released. If this parameter is set to 0, the audible alarm will beep continuously as long as the gate open indicator is illuminated. Once the audible alarm has stopped continuous beeping (as set by the **TEM_Tail_Gate_Alarm_Timeout** parameter) and the gate open indicator remains illuminated, the **TEM_Tail_Gate_Alarm_Period** parameter determines the length of time between individual beeps of the audible alarm.

Table 104

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Tail_Gate_Input_Active_State	2160	This parameter is used to set the voltage level that indicates when the tail gate alert should be active.	3	List	0	3	

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Tail_Gate_Park_Brake_Inhibit	2165	When set, the tailgate alert will only alert if the park brake is not set.	Off	On/ Off			
TEM_Tail_Gate_Transmission_Interlock	2167	This parameter is used to determine how the tailgate alert acts based upon the transmission.	0	List			
TEM_Rear_Alert_Input_Active_State	2168	This parameter is used to set the voltage level that indicates when the rear alert should be active.	3	List	0	3	
TEM_Tail_Gate_Alarm_Period	2172	Once the audible alarm has stopped continuous beeping and the gate open indicator remains illuminated, this parameter determines the length of time between individual beeps of the audible alarm.	20	s	10	60	1
TEM_Tail_Gate_Alarm_Timeout	2175	This parameter determines the length of time that the audible alarm will beep continuously. If this parameter is set to 0, the audible alarm will beep continuously as long as the gate open indicator is illuminated.	10	s	10	60	1

WIRING INFORMATION

**If the truck has a manual transmission, to interlock indicator lights and alarm with the transmission, splice a wire off of the reverse light circuit and run that wire into a pin on the black 23-pin RPM input connector (see the Diamond Logic® Builder software for correct pin and switch locations). This wire will indicate to the

Body Controller (BC) that the truck is in reverse. This is only required if the customer wishes to interlock the functionality of the indicator lights and audible alarm with reverse (and they have a manual transmission).

- The customer must run a wire from the tailgate switch to the pin labeled Tail_Gate_Open_Input on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for correct pin locations).
- The customer must run a wire from the rear alert switch to the pin labeled Rear_Alert_Switch_Input on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for correct pin locations).

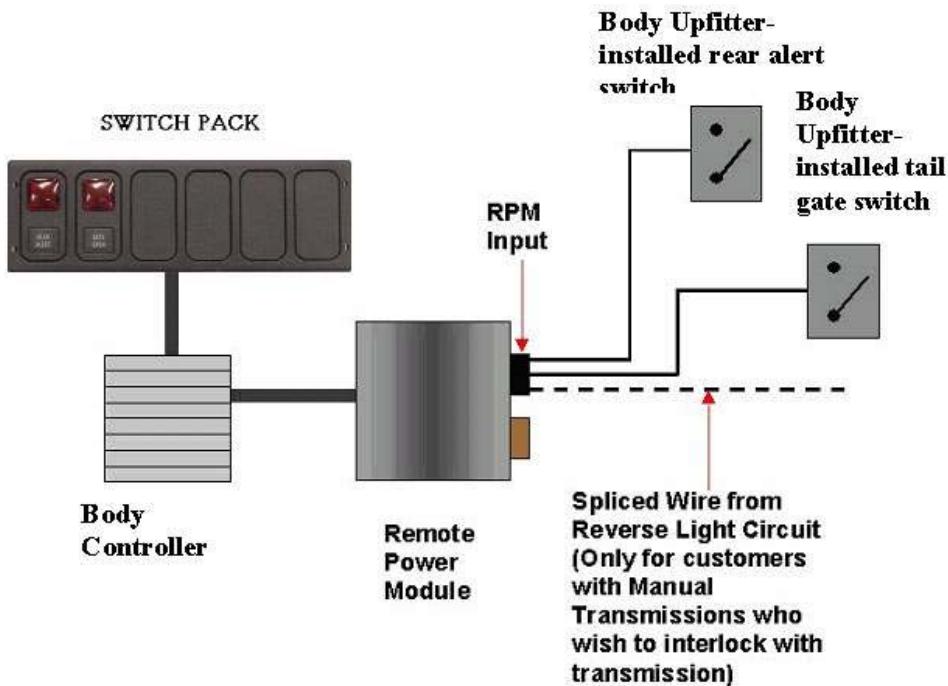


Figure 107

TESTING

- Set park brake.
- Open the tailgate.
- Verify that the input labeled Tail_Gate_Open_Input is receiving the correct voltage (as programmed in the Diamond Logic® Builder software).
- Verify that the red "Gate Open" indicator light in the switch pack comes on.
- Release park brake.

6. Verify that indicator light flashes and audible alarm sounds and works according to the set programmable parameters seen above.
7. Close tail gate.
8. Reset park brake.
9. Activate Rear Alert switch.
10. Verify that the input labeled Rear_Alert_Switch_Input is receiving the correct voltage (as programmed in the Diamond Logic® Builder software).
11. Verify that the red "Rear Alert" indicator light in the switch pack comes on and an audible alarm sounds.

HOW TO ADD THIS FEATURE:**1) For an AUTOMATIC TRANSMISSION**

- Requires Warning Assy. 3587024C1 and LED 3587031C1 be added to the switch pack if this feature is added aftermarket
- Software feature codes 595AKP and 595AMD must be enabled using the Diamond Logic® Builder software (see local dealer). NOTE: these features can be added individually in the field.
- Set programmable parameters for software feature codes using the Diamond Logic® Builder software (See Local Dealer).
- Install the wiring from tailgate switch into a pin on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for pin locations).
- Install the wiring from rear alert switch into a pin on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for pin locations).
- Customer must install indicator light labels in switch pack (indicator graphics or suitable substitutes can be used from the graphics sheets that come with the RPM kit).

2) For a MANUAL TRANSMISSION

- Requires Warning Assy. 3587024C1 and LED 3587031C1 be added to the switch pack if this feature is added aftermarket.
- Software feature codes 595AKP and 595AMC must be enabled using the Diamond Logic® Builder software (see local dealer).
- Set programmable parameters for software feature codes using the Diamond Logic® Builder software (See Local Dealer).
- Install the wiring from tailgate switch into a pin on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for pin locations).
- Install the wiring from rear alert switch into a pin on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for pin locations).
- Splice a wire into the backup light circuit and run that wire into a pin on the black 23-pin input connector on the RPM (See the Diamond Logic® Builder software for pin locations).
- Customer must install indicator light labels in switch pack (indicator graphics or suitable substitutes can be used from the graphics sheets that come with the RPM kit).

22.2. 60AJD — BODY INTEGRATED, INDICATOR LIGHTS (UTILITY SOLUTIONS)

FEATURE CODE DESCRIPTION:

60AJD — BDY INTG, INDICATOR LIGHTS (2) One for Boom Out of Stow, One for Outriggers Deployed, Includes Audible Alarm and Interlock to Parking Brake, Programmable Mode for Various Switch Actions (requires 2 RPM inputs)

FEATURE/BODY FUNCTION:

This feature provides a custom alarm package designed for the Utility Application. It provides both an audible and visual alarm for Boom Out Of Stow and Outriggers Not Stowed. Red indicator lights are in viewing area of the driver in the switch pack. Audible alarm provides a second level of warning to the driver to indicate the status of these two equipment options. Indicator lights are ON constant when either the boom or outrigger inputs are active with the park brake set. If the park brake is released, with either input active, the respective indicator shall flash at 0.6-second intervals, accompanied by an audible alarm.

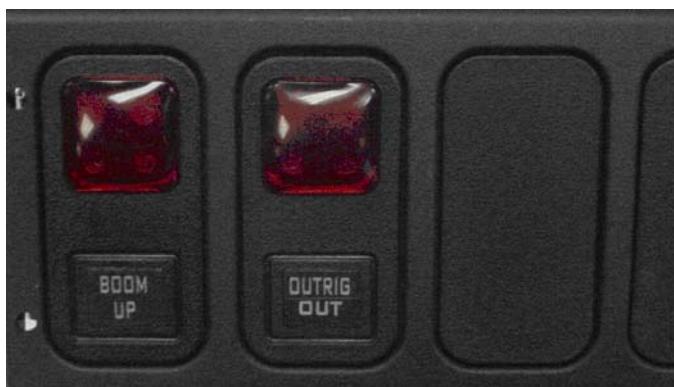


Figure 108 Switch Pack Display of “Outrig Out” and “Boom Up”

PROGRAMMABLE PARAMETERS:

Required software feature codes: 595AKR, 595AKS

Software feature codes that must be removed: NONE

If the **TEM_Boom_Not_Stowed_Alarm_Inhibit** parameter is turned on, the audible alarm for the boom-not-stowed will be disabled.

If the **TEM_Outrig_Deploy_Alarm_Inhibit** parameter is turned on, the audible alarm for the outriggers deployed warning light will be disabled.

The **TEM_Console_Boom_Not_Stow_Param** parameter sets the active state of the Remote Power Module Input connected to the Boom switch. This active state indicates when the Boom is out of stow.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

The **TEM_Consol_Outrig_Deployed_Param** parameter sets the active state of the RPM input connected to the outrigger switch. This active state indicates when the outriggers are down.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

Table 105

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Boom_Not_Stowed_Alarm_Inhibit	2061	If this parameter is set, the audible alarm for the boom-not-stowed warning light will be inhibited.	Off	On/ Off			
TEM_Outrig_Deploy_Alarm_Inhibit	2074	If this parameter is set, the audible alarm for the outriggers deployed warning light will be inhibited.	Off	On/ Off			
TEM_Consol_Boom_Not_Stow_Param	2150	Active state for the RPM input connected to the boom switch(es)	1	List	0	3	
TEM_Consol_Outrig_Deployed_Param	2151	Active state on the RPM input for the outriggers deployed warning light.	1	List	0	3	

WIRING INFORMATION

- The customer must run a wire from the customer-mounted “Outriggers out of Stow” switch to the pin labeled Outrig_Not_Stow_Input on the black 23-pin input connector on the RPM (see the Diamond Logic® Builder software for correct pin locations).
- The customer must run a wire from the customer-mounted “Boom out of Stow” switch to the pin labeled Boom_Not_Stow_Input on the black 23-pin input connector on the RPM (see the Diamond Logic® Builder software for correct pin locations).

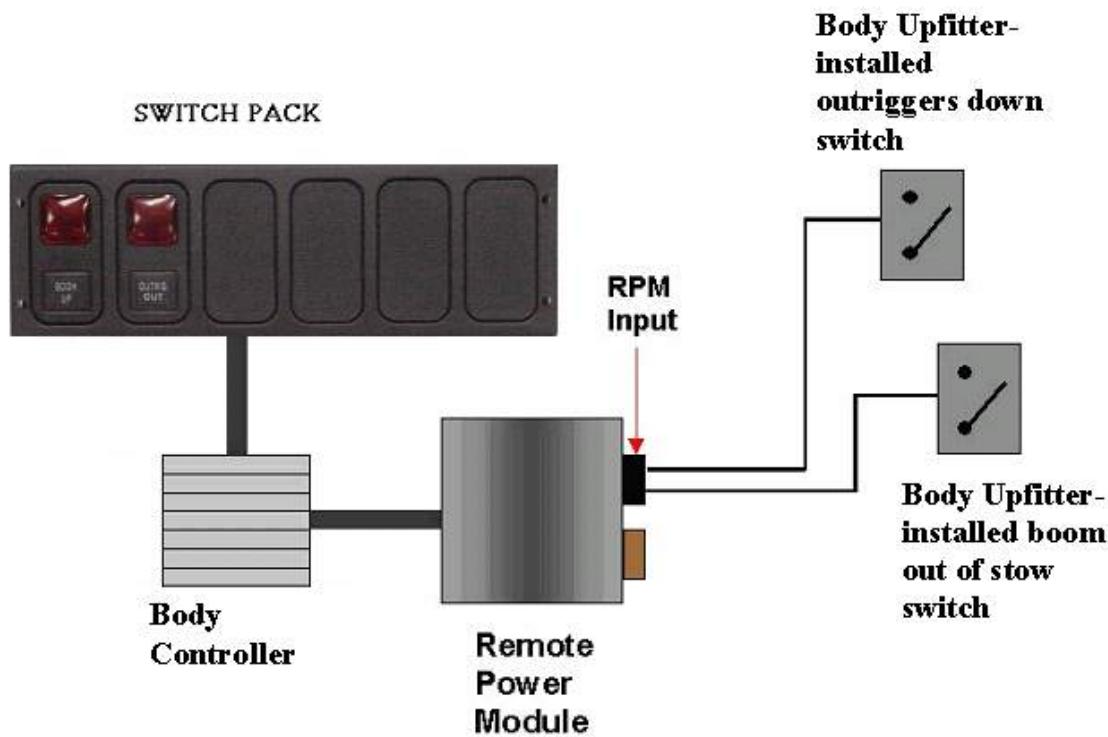


Figure 109

TESTING

1. Set the park brake.
2. Take boom out of stow.
3. Verify that the RPM input labeled **Boom_Not_Stow_Input** is receiving the correct active state voltage (as programmed in the Diamond Logic® Builder software).
4. Verify that the boom up indicator light is on constantly.
5. Take off the parking brake (with boom still out of stow).
6. Verify that the boom up indicator light is now flashing and the audible alarm is sounding.
7. Set park brake and put boom back in stow.
8. Put outriggers down.
9. Verify that the RPM input labeled **Outrig_Non_Stow_Input** is receiving the correct active state voltage (as programmed or the Diamond Logic® Builder software).

10. Verify that the outrig out indicator light is on constantly.
11. Take off the parking brake (with outriggers still down).
12. Verify that the outrig out indicator light is now flashing and the audible alarm is sounding.

HOW TO ADD THIS FEATURE:

- Requires Warning Assy. 3587024C1 and LED 3587031C1 be added to the instrument cluster if this feature is added aftermarket.
- Software feature codes 595AKR and 595AKS must be enabled using the Diamond Logic® Builder software (see local dealer). NOTE: these features can be added individually in the field.
- Set the programmable parameters for the required software feature codes using the Diamond Logic® Builder software (see local dealer).
- Customer must install wiring from the customer-mounted boom switch, into a pin on the black 23-pin RPM input connector (see the Diamond Logic® Builder software for correct pin locations).
- Customer must install wiring from the customer-mounted outriggers switch, into a pin on the black 23-pin RPM input connector (see the Diamond Logic® Builder software for correct pin locations).
- Customer must install indicator light labels (indicator graphics or suitable substitutes can be used from the graphics sheets that come with the RPM kit).

22.3. 60AJK — DUMP BOX INDICATOR LIGHTS AND ALARM

FEATURE CODE DESCRIPTION:

060AJK - INDICATOR LIGHTS (2), One for Body Up, One for Gate Open, Includes Audible Alarm, Programmable Mode for Various Switch Actions (Requires 2 RPM Inputs).

FEATURE / BODY FUNCTION:

This feature provides the operator of Dump Box Applications with visual and audible warning indications for a raised dump box body and open dump gate using Body Builder-installed switches. The visual indications that are provided for this feature are a "Body Up" light and a "Gate Open" light. Red indicator lights are located in prime viewing area of the driver in the switch pack. Audible alarm provides a second level of warning to the driver to indicate the status of these two equipment options.

The "Gate Open" indicator light is on constant when the gate open input is active with the park brake set. If the park brake is released, with the gate open input active, the gate open indicator shall flash at 0.6 second intervals, accompanied by an audible alarm. Flexibility is provided through programmable parameters to establish whether the inputs are active high (12V) or active low (GND). See the Diamond Logic® Builder software to set programmable parameters.

For both the "BODY UP" and "GATE OPEN" indications, the associated light will illuminate continuously and the associated audible alarm (default off) will sound when the corresponding input has entered an active state on the condition that the park brake is set and the vehicle speed is less than or equal to 10 MPH.

For both the "BODY UP" and "GATE OPEN" indications, the associated light will illuminate in a slow flashing manner and the associated audible alarm (default of five fast beeps) will sound when the corresponding input is in an active state and either the park brake has been released or the vehicle speed has exceeded 10 MPH.

Both the "BODY UP" and "GATE OPEN" lights will be off when the RPM input is inactive.

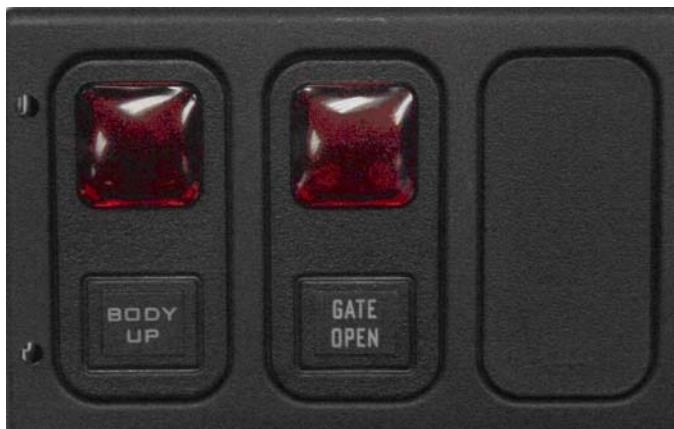


Figure 110

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature codes: 595AKT and 595AKU

Software feature codes that must be removed: NONE

The **TEM_Body_Up_Input_Active_State** parameter indicates the state that the BC will read as active for the customer-installed switch for the dump body up function (as it goes into the RPM input). This active state will be used to tell the BC when the dump body has been raised up.

The **TEM_Tail_Gate_Input_Active_State** parameter indicates the state that the BC will read as active for the customer-installed switch for the dump gate open function (as it goes into the RPM input). This active state will be used to tell the BC when the dump body has been raised opened.

The **TEM_Body_Up_Alarm_Beeper** parameter allows the customer to set the alarm type for the condition when the dump body has been raised (active) and either the park brake has been released or the vehicle speed has exceeded 10 MPH. The default alarm type is five fast beeps.

The **TEM_Gate_Alarm_Beeper** parameter allows the customer to set the alarm type for the condition when the dump gate has been opened (active) and either the park brake has been released or the vehicle speed has exceeded 10 MPH. The default alarm type is five fast beeps.

The **TEM_Body_Up_Beeper** parameter allows the customer to set the alarm type for the condition when the dump body has been raised (active) and both the park brake is set and the vehicle speed is equal to or less than 10 MPH. The default alarm type is off.

The **TEM_Gate_Open_Beeper** parameter allows the customer to set the alarm type for the condition when the dump gate has been opened (active) and both the park brake is set and the vehicle speed is equal to or less than 10 MPH. The default alarm type is off.

Table 106

Parameter	ID	Description	Defaults	Units	Min	Max	Step
TEM_Body_Up_Alarm_Beeper	2259	Allows the selection of one of four beeper cadences 0 = Off, 1 = 5 fast beeps, 2 = 3 slow beeps, 3 = continuous beeps	1	List	0	3	1
TEM_Body_Up_Beeper	2260	Allows the selection of one of four beeper cadences 0 = Off, 1 = 5 fast beeps, 2 = 3 slow beeps, 3 = continuous beeps	0	List	0	3	1
TEM_Body_Up_Input_Active_State	2261	This parameter selects the active state of the BODY UP RPM input. 0 = Open, 1 = GND, 3 = 12 volts	3	List	0	3	1
TEM_Gate_Alarm_Beeper	2262	Allows selection of one of four beeper cadences 0 = Off, 1 = 5 fast beeps, 2 = 3 slow beeps, 3 = continuous beeps	1	List	0	3	1

Parameter	ID	Description	Defaults	Units	Min	Max	Step
TEM_Gate_Open_Beeper	2263	Allows the selection of one of four beeper cadences 0 = Off, 1 = 5 fast beeps, 2 = 3 slow beeps, 3 = continuous beeps	0	List	0	3	1
TEM_Tail_Gate_Input_Active_State	2160	This parameter is used to set the voltage level that indicates when the tailgate alert should be active. 0 = Open, 1 = GND, 3 = 12V	3	List	0	3	1

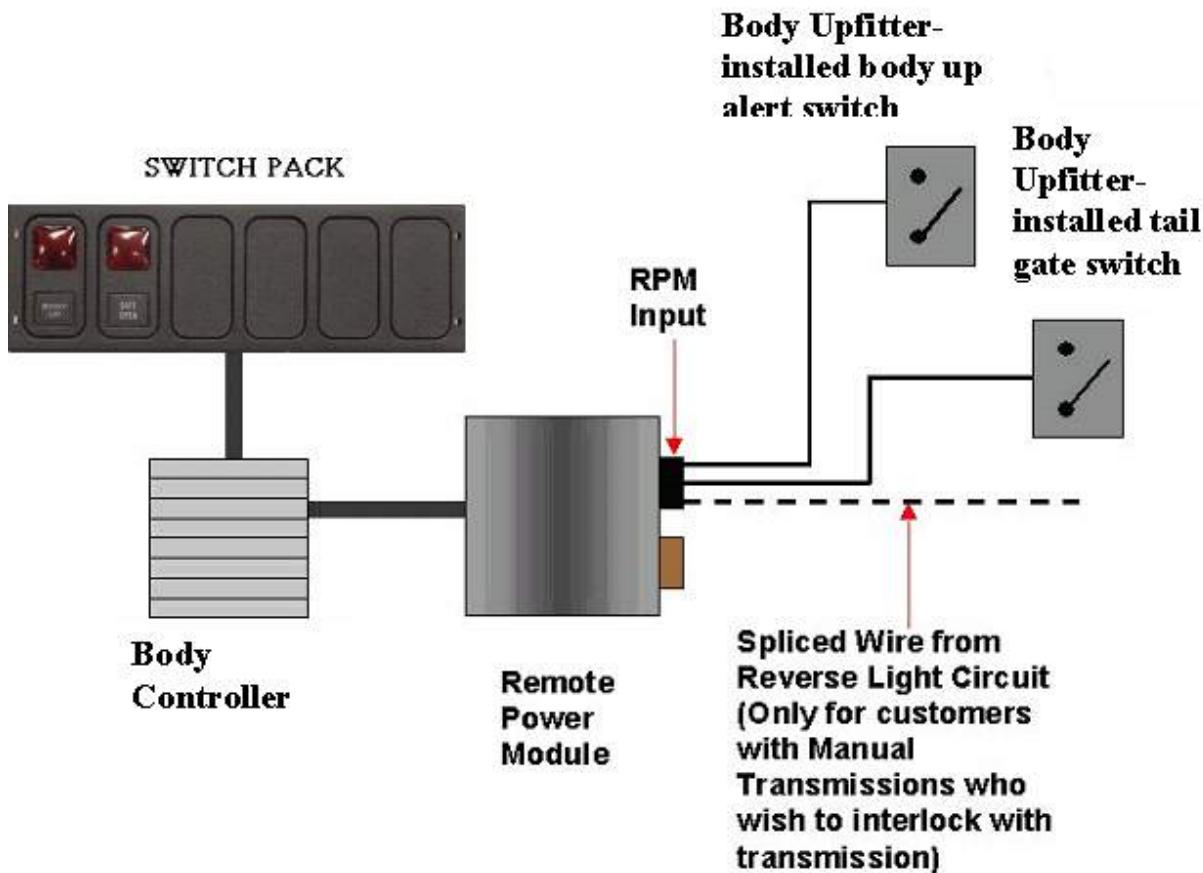


Figure 111

WIRING INFORMATION:

The customer must run a wire from the customer-mounted “Gate Open” switch to the pin labeled Tail_Gate_Open_Input on the black 23-pin input connector on the RPM (see the Diamond Logic® Builder software for correct pin locations).

The customer must run a wire from the customer-mounted “Body Up” switch to the pin labeled TEM_Body_Up_Signal on the black 23-pin input connector on the RPM (see the Diamond Logic® Builder software for correct pin locations).

TESTING:

1. Set park brake.
2. Open the tailgate.
3. Verify that the input labeled TEM_Tail_Gate_Input_Active_State input is receiving the correct voltage (as programmed in the Diamond Logic® Builder software).
4. Verify that the Red “Gate Open” indicator light in the switch pack comes on.
5. Release park brake.
6. Verify that indicator light flashes and audible alarm sounds and works according to the set programmable parameters seen above.
7. Close tailgate.
8. Reset park brake.
9. Raise the body.
10. Verify that the input labeled TEM_Body_Up_Input_Active_State is receiving the correct voltage (as programmed in the Diamond Logic® Builder software).
11. Verify that the red “Body Up” indicator light in the switch pack comes on, and an audible alarm sounds.
12. Reset park brake.

HOW TO ADD THIS FEATURE:

- Requires Warning Assy. 3587024C1 and LED 3587031C1 be added to the instrument cluster if this feature is added aftermarket.
- Software feature codes 595AKT and 595AKU must be enabled using Diamond Logic® Builder software (See Local Dealer). NOTE: these features can be added individually in the field.
- Set programmable parameters for software feature codes using the Diamond Logic® Builder software (See Local Dealer).
- Customer must install wiring from the customer-mounted body switch, into a pin on the black 23-pin RPM input connector (see the Diamond Logic® Builder software for correct pin locations).

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- Customer must install wiring from the customer-mounted tailgate switch, into a pin on the black 23-pin RPM input connector (see the Diamond Logic® Builder software for correct pin locations).
 - Customer must install indicator light labels (indicator graphics or suitable substitutes can be used from the graphics sheets that come with the RPM kit).

23. INPUT/OUTPUT EXPANSION HARNESS

FEATURE CODE DESCRIPTION:

60ACW — BODY INTG, I/O EXPANSION HARNESS (for Diamond Logic® Builder Only) includes a harness with five blunt-cut wires routed on lower left of instrument panel. Two GND active inputs and two (0.5 Amp) relay driver outputs are provided.

FEATURE / BODY FUNCTION:

This feature is an input/output expansion feature for Diamond Logic® Builder to be utilized by Body Builders. This expansion feature provides the following: (2) digital inputs, (2) 0.5 AMP relay driver outputs, (1) ZVR on the BC as well as an expansion overlay harness that is part of the IP harness. The expansion overlay harness grants access to these inputs, outputs, and ZVR by providing blunt-cut wires that are strapped to the main IP harness trunk near the J1939 diagnostic connector on the interior of the cab. The overlay harness was designed to be long enough to allow the wires to be inserted into the 72-way pass thru connector if desired.

When this feature is added to the vehicle, the body controller pins will not show up on the connector view of DLB until they are written to with Advanced Logic. 595AKH must be turned on and the inputs/outputs must be used in Advanced Logic to show up on the connector view of DLB. The following pins are NOT assigned with 595AKH Digital Logic must be used to assign these pins.

Description of each digital input:

- GND active inputs,

Digital Input 1: pin F14 of BC connector #1602

Digital Input 2: pin F12 of BC connector #1602

Refer to #1602 connector pinout for pinout description.

Description of each relay driver output:

- 0.5 Amp relay driver output,

Relay Driver Output 1: pin E1 of the BC connector #1601

Relay Driver Output 2: pin E2 of the BC connector #1601

Refer to Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Aux Inputs and Drivers.

Description of ZVR:

- Allows for the return of DC current from an external sensor or switch.

CAUTION – Do not connect any additional electrical loads to ZVR. Adding non-approved electrical loads may adversely affect total electrical operation.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software Feature Codes that MUST be added: 595AKH

Software Feature Codes that MUST be removed: NONE

There are no customer or Body Builder programmable features associated with this feature.

WIRING INFORMATION:

For wiring information for this feature, see Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Aux Inputs and Drivers.

TESTING:

Use Diamond Logic® Builder software to program and test drivers and inputs.

HOW TO ADD THIS FEATURE:

Add the feature code 595AKH with Diamond Logic® Builder. Create advanced logic using the GND active inputs and/or the 0.5 AMP relay driver outputs. View the connectors tab in Diamond Logic® Builder to verify the pin assignments and connect to these circuits.

The following features are part of the General Electrical System Code (08000) and are documented here for informational purposes only. They are standard features that come with all vehicles.

24. PTO (POWER TAKE OFF)

24.1. 60ABA – PTO ACCOMMODATION CABLE SHIFT

FEATURE CODE DESCRIPTION:

60ABA – BDY INTG, PTO ACCOMMODATION for Monitoring Cable Shift Engaged PTO, With Indicator Light and Audible Alarm in Gauge Cluster (requires one Remote Power Module (RPM) input)

FEATURE/BODY FUNCTION:

This feature utilizes a customer-mounted PTO feedback switch wired to a RPM input to drive an indicator light in the gauge cluster that allows the operator to determine that the PTO is engaged. An audible alarm is used to warn the operator when the PTO is engaged during unsafe vehicle operating conditions such as when the park brake is released or the engine speed is too high. Operating limits are established through programmable parameters that are set in the Body Controller (BC). The RPM input also drives a PTO hourmeter to allow the operator to measure stationary PTO hours for maintenance records and fuel tax purposes. To view the PTO hourmeter, press the gauge cluster display selector button momentarily until the text portion of the display indicates "PTO Hour."

A Cable-Shifted PTO is a gear-to-gear engagement type mechanism. Very specific transmission operating modes are required to allow safe engagement of a Cable-Shifted PTO. In essence, the PTO gear in the transmission must be stopped before engagement of a Cable-Shifted PTO should be attempted. The clutch must be depressed with the vehicle parked in order to engage the PTO for a manual transmission. An automatic transmission must be in any driving gear with vehicle parked in order to engage a Cable-Shifted PTO.

The PTO alarms are controlled by programmable parameters set in the BC. Factory default settings for these programmable parameters are listed in the tables below.

→ **Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).**

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: *Software feature codes can be added through the Diamond Logic® Builder software. Programmable Parameters are also programmable through the Diamond Logic® Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595AJT, 595AJU

Conflicts with Software features: 595ACZ, 595AJV, 595AJW, 595AJX, 595AJY, 595AMZ

ALARMS

If **TEM_PTO_Eng_Run_Alarms** is turned on, then an alarm will sound if the PTO is engaged while the engine is turned off.

If **TEM_PTO_Eng_Spd_Alarms** is turned on, then an alarm will sound if the PTO is engaged and the engine speed is over the value set by **TEM_PTO_Eng_Spd_Alarm_Limit**

If **TEM_PTO_Non_Neut_Alarms** is turned on, then an audible alarm will sound if the PTO is engaged and the transmission is taken out of neutral

If **TEM_PTO_Pk_Brake_Alarms** is turned on, then an audible alarm will sound if the PTO is engaged and the park brake is released

If **TEM_PTO_Veh_Spd_Alarms** is turned on, then an audible alarm will sound if the PTO is engaged and the vehicle speed is over the value set by **TEM_PTO_Veh_Spd_Alarm_Limit**

Table 107 PTO Alarms

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Default	Description	Min	Max	Step
TEM_PTO_Eng_Run_Alarms	2137	Off	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine is turned off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarm_Limit	2136	1600 RPM	See TEM_PTO_Eng_Spd_Alarms	0	5000	1
TEM_PTO_Eng_Spd_Alarms	2135	On	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine speed is over TEM_PTO_Eng_Spd_Alarm_Limit	NA	NA	NA
TEM_PTO_Non_Neut_Alarms	2132	Off	If this Parameter is 1, an alarm will sound if the PTO is engaged and transmission is taken out of neutral	NA	NA	NA
TEM_PTO_Pk_Brake_Alarms	2131	On	If this Parameter is 1, an alarm will sound if the PTO is engaged and the park brake is released	NA	NA	NA
TEM_PTO_Veh_Spd_Alarms	2133	On	If this Parameter is 1, an alarm will sound if the PTO is engaged and the vehicle speed is over TEM_PTO_Veh_Spd_Alarm_Limit	NA	NA	NA
TEM_PTO_Veh_Spd_Alarm_Limit	2134	3 MPH	See TEM_PTO_Veh_Spd_Alarms	3	100	1

Other Parameters

The **TEM_RPM_PTO_Engaged_Param** parameter indicates the active state that the Body Controller (BC) will read as active for the TEM PTO feedback switch. This active state will be used to indicate when the PTO is engaged.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

Table 108

Parameter	ID	Default	Description	Min	Max	Step
TEM_RPM_PTO_Engaged_Param	2147	1	Active State for the TEM PTO engagement feedback switch.	List	List	List

WIRING INFORMATION

→ Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs.

- The wiring to the RPM input is customer supplied.
- A wire must be connected from the Body Builder-installed PTO feedback switch to the pin labeled **PTO_Feedback_Switch** in the black 23-pin RPM input connector (J3).

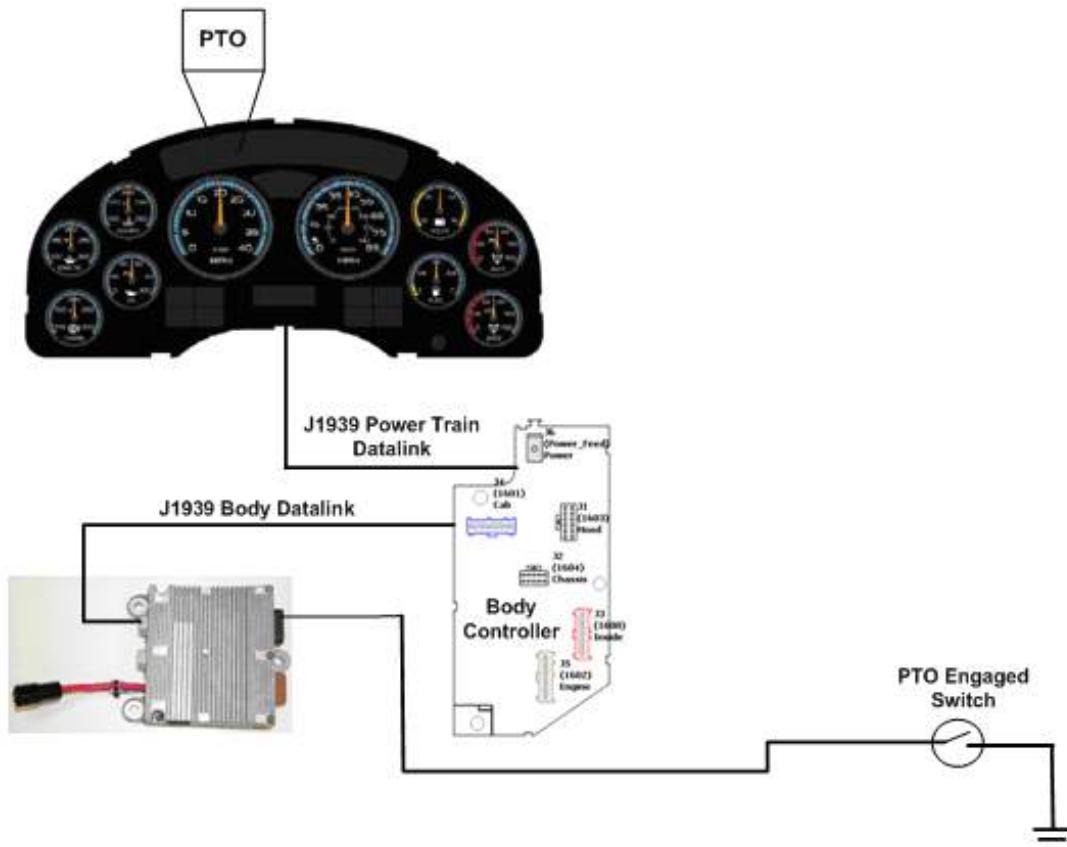


Figure 112 Diagram of Cable Shift PTO System

RPM CONNECTOR INFORMATION

**** HPV Wire Terminal Kits are REQUIRED to allow Body Builders to create wire harnesses for the RPM connectors.**

HPV terminal kits are pre-made kits that include six power output terminals and seals for the brown 8-way connector and six terminals for the black 23-way connector.

Table 109

HPV Kits	Part Number
RPM Terminal Kit 12 Gauge	2585651C91
RPM Terminal Kit 14 Gauge	2585423C91

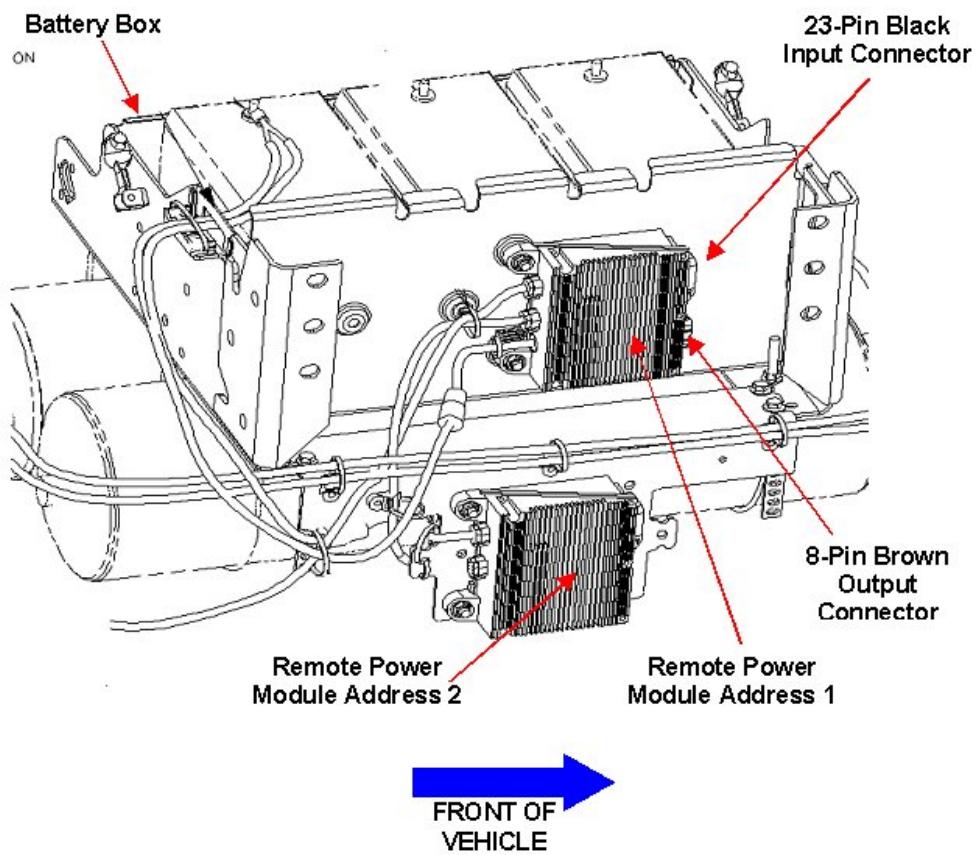
NOTE – The following connectors are optional because they are already provided with the RPMs.

This information is given so that the Body Builder could purchase connectors in the event that the original connectors were damaged or lost, or so that the Body Builder can pre-fabricate a wire harness.

Table 110 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black)

Connector Part No.	3548934C1	2585981C91
Description	Connector, Body, Brown 8-Way RPM Output	Connector, Body, Black 23-Way RPM Input Kit
Terminal Part	3534163C1 - 12 Gauge 3535931C1 - 14 Gauge 3535930C1 - 16 & 18 Gauge	1698937C1
Cable Seal Part	3548945C1 - 12 & 14 Gauge 3535937C1 - 16 & 18 Gauge	N/A
Connector Lock Part	3548943c1	N/A
CPA Lock	3573833c1	N/A
Cavity Plug	3535938c1	Built into the connector

→ **RPM address 1 is located Back of Battery Box on 4000 model trucks**

**Figure 113 RPM Mounting Location on a 4000 Model Truck**

→ RPM address 1 is located Under Cab, driver's side on 7000 model truck.

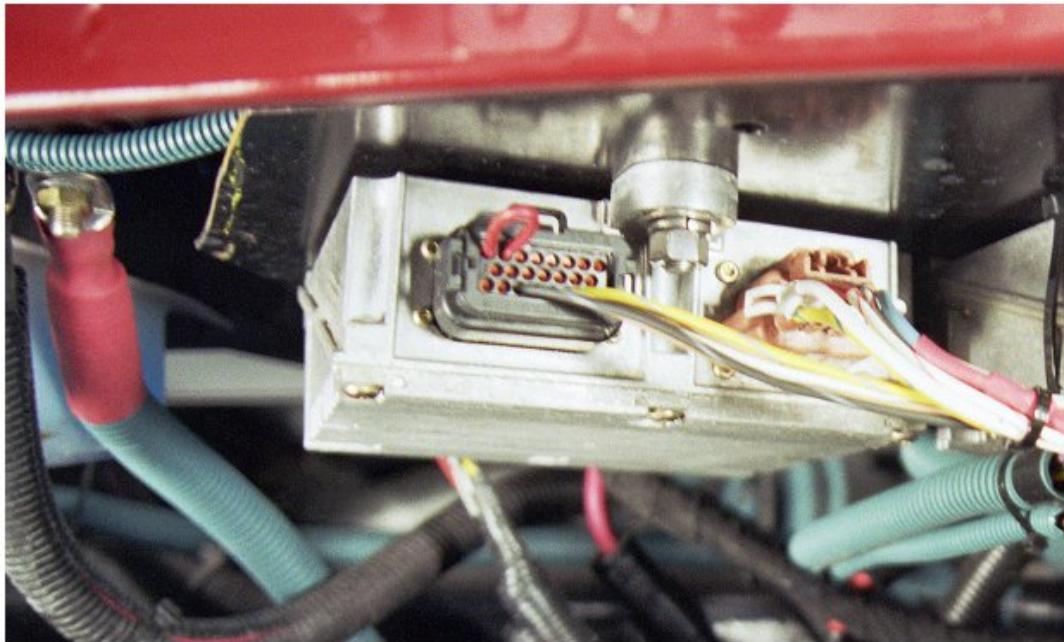


Figure 114 RPM Mounting Location on a 7000 Model Truck

TESTING

Verify that the RPM input labeled PTO_Feedback_Switch (pin position specified by the Diamond Logic® Builder software) is receiving the correct voltage (12V or Ground (GND)) as specified by the programmable parameter in the Diamond Logic® Builder software.

Make certain that the PTO indicator light in the gauge cluster illuminates by engaging the PTO.

The audible alarm can be tested by activating a vehicle condition that will sound the alarm based upon the settings of the programmable parameters. For example, if the park brake interlock is programmed on, release the park brake and engage the PTO. The audible alarms should sound with continuous beeps.

HOW TO ADD THIS FEATURE:

- Software feature codes 595AJT and 595AJU must be enabled on the vehicle using the Diamond Logic® Builder software (see Local Dealer)
- Use the Diamond Logic® Builder software to make sure that software feature codes 595ACZ, 595AJV, 595AJW, 595AJX, 595AJY, and 595AMZ are NOT enabled on the vehicle (see local dealer).
- Set the desired programmable parameters for each signal using the Diamond Logic® Builder software (see Local Dealer)
- Connect a wire from a Body Builder-installed PTO feedback switch to the pin labeled PTO_Feedback_Switch in the black 23-pin connector on the RPM as defined by the Diamond Logic® Builder software program for this particular vehicle.
- Perform the PTO testing procedure that is listed above.

24.2. 60ABB – PTO ACCOMMODATION MUNCIE® POWERFLEX™ LECTRA-SHIFT

Refer to the circuit diagram manual for PTO Accommodation for Lectra-Shift.

FEATURE CODE DESCRIPTION:

60ABB – BDY INTG, PTO ACCOMMODATION for Muncie Lectra-Shift PTO Engagement and Disengagement, With Switch Mounted on Dash; Includes Indicator Light and Audible Alarm in Gauge Cluster (requires one RPM input and one output)

FEATURE/BODY FUNCTION:

This feature provides a center stable, momentary rocker switch in a cab switch pack that drives a RPM output and a 40 Ampere (AMP) relay that are used to engage and disengage the Muncie® Lectra-Shift PTO. The high current relay output is engaged momentarily to shift in the PTO gear mechanism. Once engaged, the RPM output is activated to keep the PTO gear in the engaged position. This feature utilizes a customer-mounted PTO feedback switch wired to a RPM input to drive an indicator light in the gauge cluster that allows the operator to determine that the PTO is engaged. An audible alarm is used to warn the operator when the PTO is engaged during unsafe vehicle operating conditions such as when the park brake is released or the engine speed is too high. Operating limits are established through programmable parameters that are set in the BCM. The RPM input also drives a PTO hourmeter to allow the operator to measure stationary PTO hours for maintenance records and fuel tax purposes. To view the PTO hourmeter, press the gauge cluster display selector button momentarily until the text portion of the display indicates "PTO Hour."

The Lectra-Shift is a gear-to-gear engagement PTO mechanism. Very specific transmission operating modes are required to allow safe engagement of a Lectra-Shift PTO. In essence, the PTO gear in the transmission must be stopped before engagement of the Lectra-Shift PTO should be attempted. The clutch must be depressed with the vehicle parked in order to engage the Lectra-Shift PTO for a manual transmission. An automatic transmission must be in any driving gear with vehicle parked in order to engage the Lectra-Shift PTO. Engagement, disengagement and reengagement parameters should be set according to the type of transmission on which the Lectra-Shift is mounted.

The PTO alarms are controlled by programmable parameters set in the BC. Factory default settings for these programmable parameters are listed in the tables below.

Through programmable parameters, the vehicle can be programmed to customize the number of times that an operator can request a PTO engagement per key cycle. The customer can also customize the maximum time allowed to engage the solenoid per attempt, and the length of time between a failed engagement attempt and the next time the operator can attempt to engage the PTO.

→ ***Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).***

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature codes: 595AJT, 595AJU, 595AJV, 595AJZ

Software feature codes that must be removed: 595AJW, 595AJX, 595AJY, 595AMZ

ENGAGEMENT

*These parameters set rules that must be met in order for the PTO to be engaged.

If **TEM_PTO_Brake_Engmnt_Inhib** parameter is turned on, then the brake pedal must be depressed in order for the PTO to engage.

If **TEM_PTO_Cltch_Engmnt_Inhib** parameter turned on, then the clutch pedal must be depressed for the PTO to engage.

If **TEM_PTO_Eng_Run_Engmnt_Inhib** parameter is turned on, then the engine has to be running in order for the PTO to be engaged.

If **TEM_PTO_Eng_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the engine speed is over a certain threshold, which is defined as a programmable parameter in **TEM_PTO_Eng_Spd_Engmnt_Limit**

If **TEM_PTO_Neut_Engmnt_Inhib** parameter is turned on, then the PTO can only be engaged if the transmission is NOT in Neutral or Park

If **TEM_PTO_Non_Neut_Engmnt_Inhib** parameter is turned on, then the transmission must be in Neutral or Park for the PTO to be engaged.

If **TEM_PTO_Pk_Brake_Engmnt_Inhib** parameter is turned on, then the Park Brake must be set in order for the PTO to be engaged.

If **TEM_PTO_Veh_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the Vehicle Speed is over the value prescribed by **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 111

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Brake_Engmnt_Inhib	2095	If this Parameter is 1, the PTO will not be engaged if the brake pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Cltch_Engmnt_Inhib	2094	If this Parameter is 1, the PTO will not be engaged if the clutch pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Eng_Run_Engmnt_Inhib	2096	If this Parameter is 1, the PTO will not be engaged if the engine is not running	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Inhib	2092	If this Parameter is 1, the PTO will not be engaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Limit	2093	See TEM_PTO_Eng_Spd_Engmnt_Inhib	1000 RPM	100	5000	1

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Neut_Engmnt_Inhib	2089	If this Parameter is 1, the PTO will only be engaged if the Transmission is not in Neutral or Park	On	NA	NA	NA
TEM_PTO_Non_Neut_Engmnt_Inhib	2088	If this Parameter is 1, the PTO will not be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Engmnt_Inhib	2087	If this Parameter is 1, the PTO will not be engaged if the Park Brake is not set.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Inhib	2090	If this Parameter is 1, the PTO will not be engaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_Engmnt_Limit	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Limit	2091	See TEM_PTO_Veh_Spd_Engmnt_Inhib	0	1	100	1

DISENGAGEMENT

* These parameters set the conditions under which the PTO will be disengaged.

If **TEM_PTO_Eng_Run_Disengages** parameter is turned on, then the PTO will be disengaged if the engine is turned off.

If **TEM_PTO_Eng_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the engine speed rises above the value set by **TEM_PTO_Eng_Spd_DisEng_Limit**.

If **TEM_PTO_Non_Neut_Disengages** parameter is turned on, then the PTO will be disengaged if the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Disengages** parameter is turned on, then the PTO will be disengaged if the Park Brake is released.

If **TEM_PTO_Veh_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the vehicle speed is over the valued specified by **TEM_PTO_Veh_Spd_DisEng_Limit**.

Table 112

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Disengages	2114	If this Parameter is 1, the PTO will be disengaged if the engine is turned off.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_DisEng_Limit	2113	See TEM_PTO_Eng_Spd_Disengages	1400 RPM	0	5000	1
TEM_PTO_Eng_Spd_Disengages	2112	If this Parameter is 1, the PTO will be disengaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_DisEng_Limit	On	NA	NA	NA
TEM_PTO_Non_Neut_Disengages	2109	If this Parameter is 1, the PTO will be disengaged if the transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Disengages	2108	If this Parameter is 1, the PTO will be disengaged if the Park Brake is released.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Disengages	2110	If this parameter is 1, the PTO will be disengaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_DisEng_Limit.	On	NA	NA	NA
TEM_PTO_Veh_Spd_DisEng_Limit	2111	See TEM_PTO_Veh_Spd_Disengages	5 MPH	3	100	1

RE-ENGAGEMENT

* These parameters set the conditions under which the PTO can be re-engaged.

NOTE – All re-engagement parameters should be set to 0 with Lectra-Shift PTOs to prevent gear grind and damage to the transmission.

If **TEM_PTO_Eng_Run_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine stopping) when the engine is restarted.

If **TEM_PTO_Eng_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine overspeed) when the engine speed falls below **TEM_PTO_Eng_Spd_Engmnt_Limit**.

If **TEM_PTO_Key_State_Allow_ReEng** parameter is turned on, then the PTO will be allowed to reengage when the key state is returned to run.

If **TEM_PTO_Non_Neut_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to transmission out of neutral) when the transmission is placed back into neutral.

If **TEM_PTO_Pk_Brake_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to park brake released) when the park brake is reapplied.

If **TEM_PTO_Veh_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to the vehicle being over the vehicle speed value) when the vehicle speed is falls **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 113

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Allow_ReEng	2122	If this Parameter is 1, the PTO will be reengaged after a disengage due to the engine stopping when the engine is restarted.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Allow_ReEng	2120	If this Parameter is 1, the PTO will be reengaged after a disengage due to engine overspeed when the engine speed is below TEM_PTO_Eng_Spd_Engmnt_Limit .	Off	NA	NA	NA
TEM_PTO_Key_State_Allow_ReEng	2069	If this parameter is set, the PTO will be allowed to reengage when the key state is returned to run.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Allow_ReEng	2148	If this Parameter is 1, the PTO will be reengaged after a disengage due to transmission out of neutral when the transmission is placed back into neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Allow_ReEng	2149	If this Parameter is 1, the PTO will be reengaged after a disengage due to park brake released when the park brake is reapplied.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Allow_ReEng	2119	If this Parameter is 1, the PTO will be reengaged after a disengage due to vehicle overspeed when the vehicle speed is below TEM_PTO_Veh_Spd_Engmnt_Limit .	Off	NA	NA	NA

ALARMS

*These parameters utilize the gauge cluster to sound an alarm to the driver when certain programmable parameters are violated.

If **TEM_PTO_Eng_Run_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the engine is turned off.

If **TEM_PTO_Eng_Spd_Alarms** parameter is turned on, then an alarm will sound if the PTO is engaged and the engine speed is over the value set by **TEM_PTO_Eng_Spd_Alarm_Limit**.

If **TEM_PTO_Non_Neut_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the park brake is released.

If **TEM_PTO_Veh_Spd_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the vehicle speed is about the value set by **TEM_PTO_Veh_Spd_Alarm_Limit**.

Table 114 PTO Alarms

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Alarms	2137	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine is turned off	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarm_Limit	2136	See TEM_PTO_Eng_Spd_Alarms	1400 RPM	0	5000	1
TEM_PTO_Eng_Spd_Alarms	2135	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine speed is over TEM_PTO_Eng_Spd_Alarm_Limit.	On	NA	NA	NA
TEM_PTO_Non_Neut_Alarms	2132	If this Parameter is 1, an alarm will sound if the PTO is engaged and transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Alarms	2131	If this Parameter is 1, an alarm will sound if the PTO is engaged and the park brake is released	Off	NA	NA	NA

Table 114 PTO Alarms (cont.)

TEM_PTO_Veh_Spd_Alarms	2133	If this Parameter is 1, an alarm will sound if the PTO is engaged and the vehicle speed is over TEM_PTO_Veh_Spd_Alarm_Limit.	On	NA	NA	NA
TEM_PTO_Veh_Spd_Alarm_Limit	2134	See TEM_PTO_Veh_Spd_Alarms	5 MPH	3	100	1

Other Parameters

The **TEM_PTO_Retaining_Solenoid_Fuse** parameter is the fusing value for the Remote Power Module output feeding the retaining coil that holds the electric solenoid in the engaged position. If current exceeds this value, the BC will turn off the output.

The **TEM_PTO_Lectra_Shift_Max_Retries** parameter allows the customer to establish the maximum number of times that the operator can request a PTO engagement per key cycle.

The **TEM_PTO_Lectra_Shift_Retry_Time** parameter sets the time between a failed engagement attempt and the time that the operator can attempt to engage the PTO again.

The **TEM_PTO_Allowed_Engagement_Time** parameter sets the maximum time allowed for the solenoid to make one engagement attempt.

The **TEM_RPM_PTO_Engaged_Param** parameter indicates the state that the BC will read as active for the TEM PTO feedback switch (as it goes into the RPM input). This active state will be used to tell the BC when the PTO is engaged.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

Table 115

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Retaining_Solenoid_Fuse	2022	Fuse value for the TEM PTO Single Polarity engagement retaining solenoid power.	20 Amps	0	20	0.1

TEM_PTO_Lectra_Shift_Max_Retries	2058	The maximum number of times a PTO engagement request is allowed to be issued in a key cycle.	0 Retries	0	65535	1
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Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Lectra_Shift_Retry_Time	2059	Time frame for retry counting in Lectra-Shift engagement algorithm.	600 Seconds	0	600	1
TEM_PTO_Allowed_Engagement_Time	2057	Time allowed for engagement of the Lectra-Shift PTO.	3 Seconds	0	10	0.1
TEM_RPM_PTO_Engaged_Param	2147	Active State for the TEM PTO engagement feedback switch.	1	List	List	List

WIRING INFORMATION

→ Please use the **Diamond Logic® Builder** software to determine pin locations for RPM inputs (refer to the **CONNECTOR** screen view) and to set programmable parameters (refer to the **FEATURE** screen view).

- When a vehicle is ordered from International with this feature, a 3-pin connector is provided which mates with the connector from the Muncie Lectra-Shift Solenoid. This connector is located in the transmission/engine harness located above the transmission. The customer is responsible for connecting two wires from this connector to the RPM connectors.
 - The white wire is pre-wired from a relay to the Lectra-Shift connector. This wire is for the engagement coil.
 - The red wire is for the holding coil in the solenoid. The red wire must be connected to the brown 8-pin RPM output connector pin labeled **PTO_Lectra-Shift_Retaining_Solenoid_Output**.
 - The black wire is for the PTO feedback switch. The customer must wire from this pin into the black 23-pin RPM input connector pin labeled **PTO_Feedback_Switch**.
- When the customer has completed the wiring from the connector, plug the 3-pin connector into the connector provided by the Muncie Solenoid (See the Figure below).
- The customer is responsible for providing GND to the solenoid.

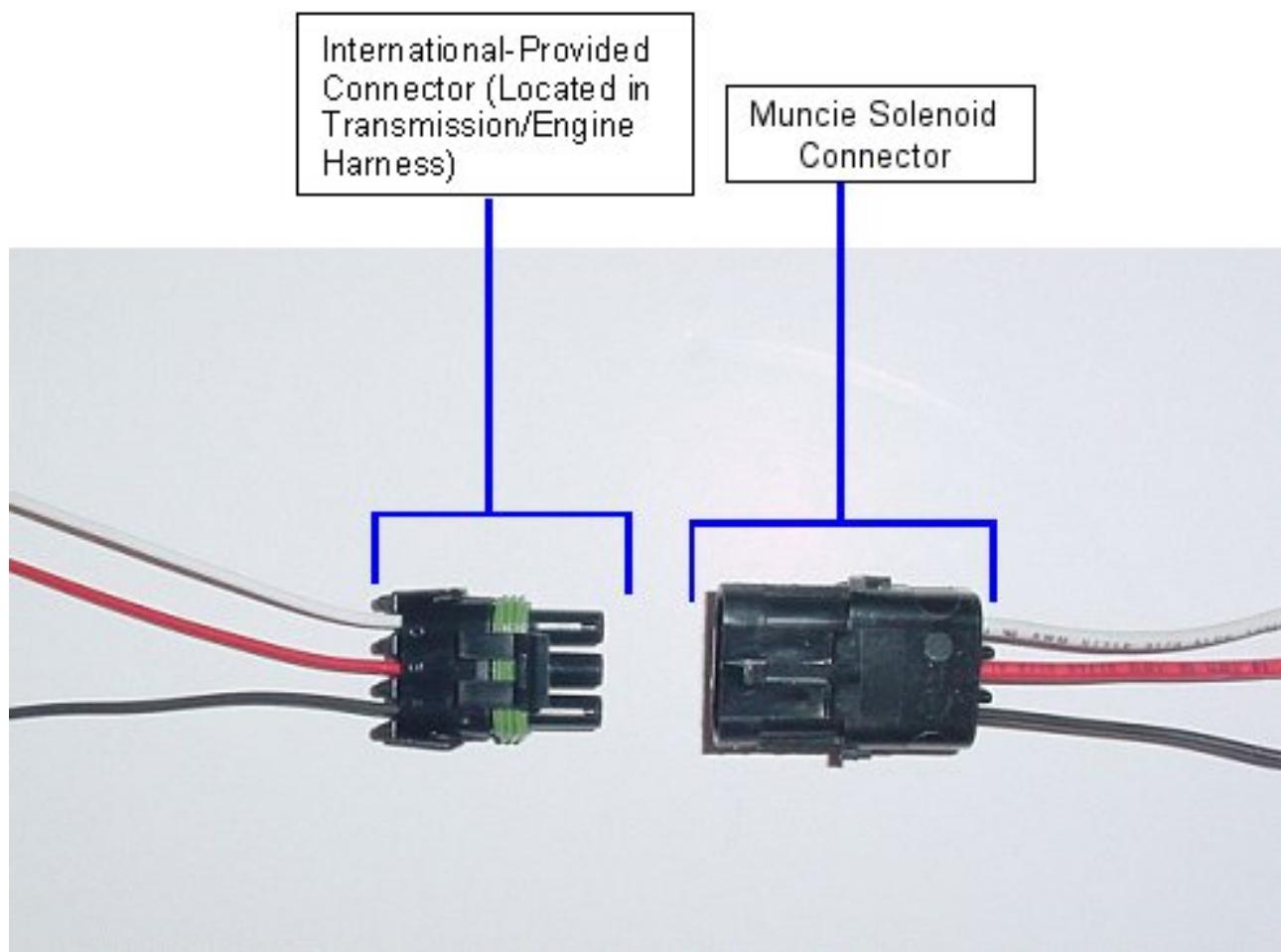


Figure 115 Lectra-Shift PTO Solenoid Connectors

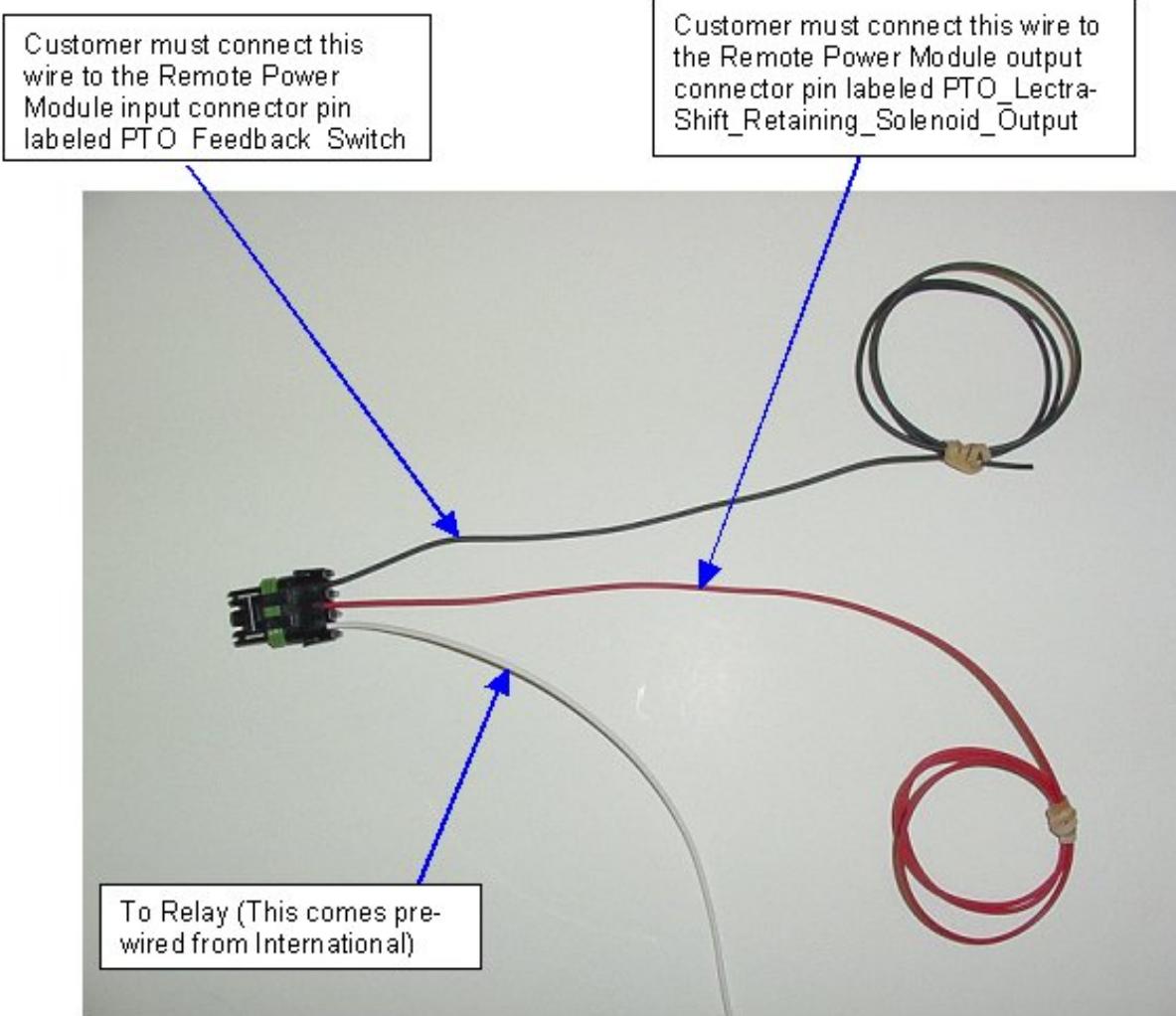


Figure 116 International Supplied Harness for Lectra-Shift PTO

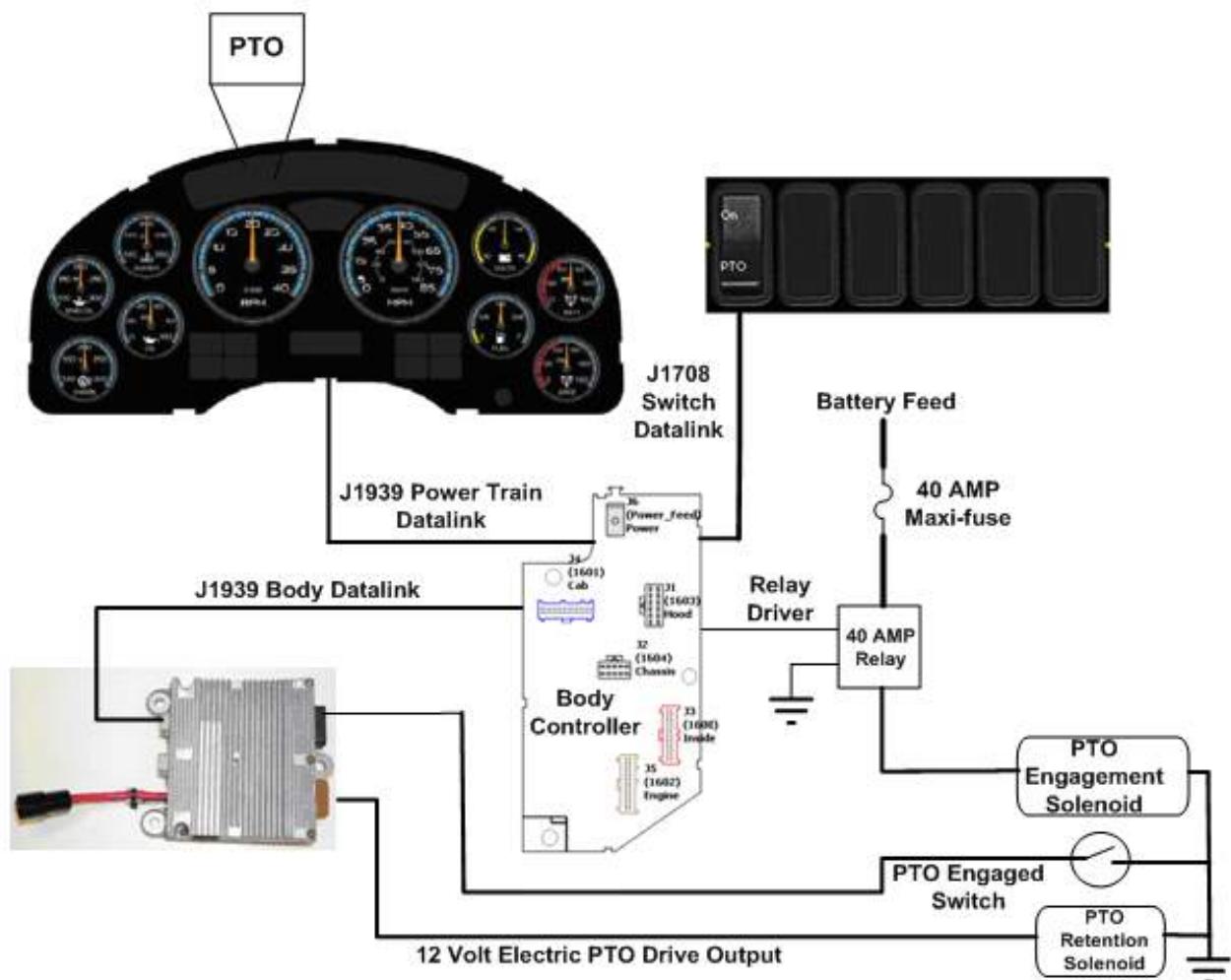


Figure 117 Diagram of Lectra-Shift PTO System

RPM CONNECTOR INFORMATION

** HPV Wire Terminal Kits are REQUIRED to allow Body Builders to create wire harnesses for the RPM connectors.

HPV terminal kits are pre-made kits that include six power output terminals and seals for the brown 8-way connector and six terminals for the black 23-way connector.

Table 116

HPV Kits	Part Number
RPM Terminal Kit 12 Gauge	2585651C91
RPM Terminal Kit 14 Gauge	2585423C91

NOTE – The following connectors are optional because they are already provided with the RPMs.

This information is given so that the Body Builder could purchase connectors in the event that the original connectors were damaged or lost, or so that the Body Builder can pre-fabricate a wire harness.

Table 117 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black)

Connector Part No.	3548934C1	2585981C91
Description	Connector, Body, Brown 8-Way RPM Output	Connector, Body, Black 23-Way RPM Input Kit
Terminal Part	3534163C1 - 12 Gauge 3535931C1 - 14 Gauge 3535930C1 - 16 & 18 Gauge	1698937C1
Cable Seal Part	3548945C1 - 12 & 14 Gauge 3535937C1 - 16 & 18 Gauge	N/A
Connector Lock Part	3548943C1	N/A
CPA Lock	3573833C1	N/A
Cavity Plug	3535938C1	Built into the connector

→ RPM address 1 is located Back of Battery Box on 4000 model trucks

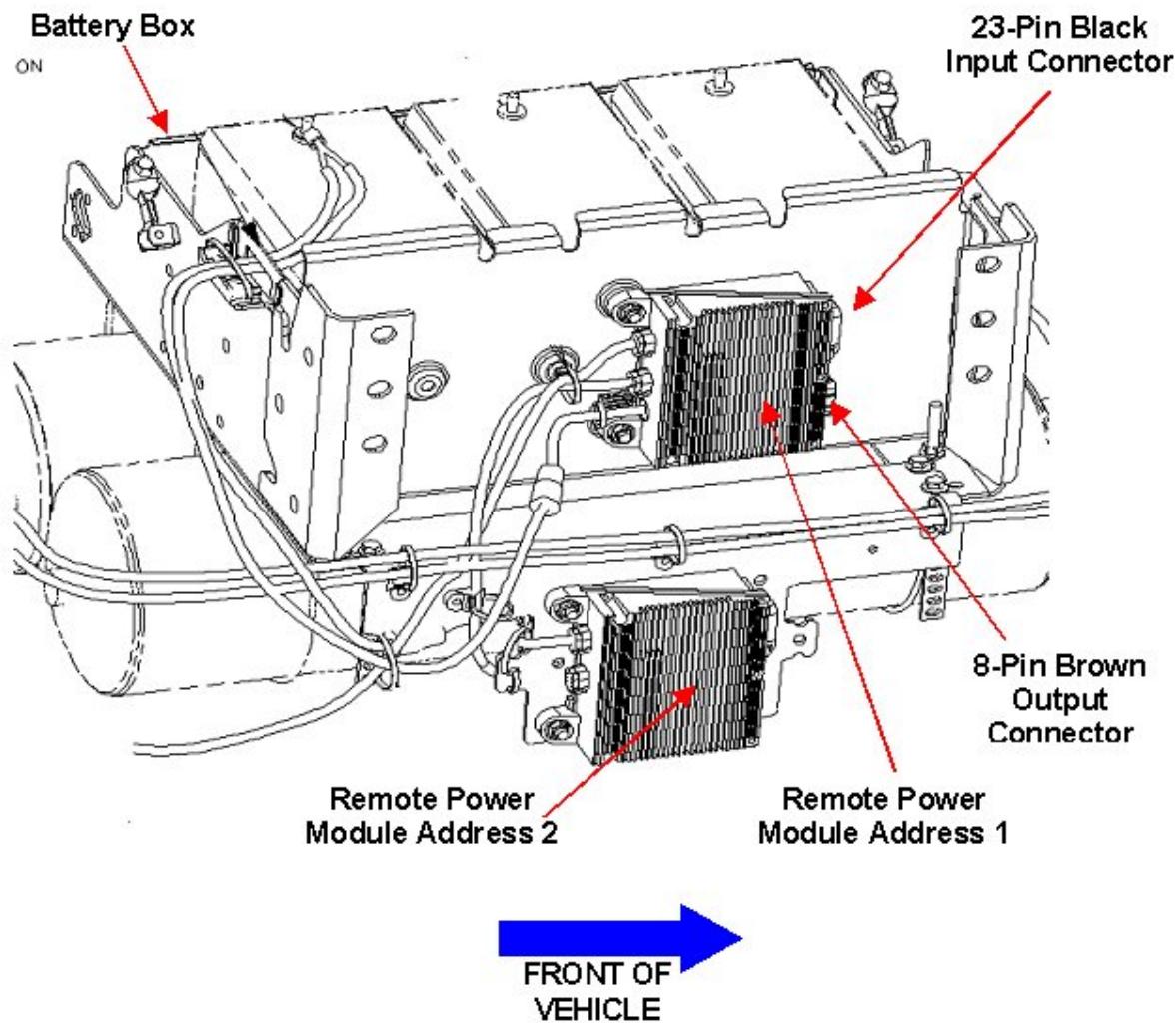


Figure 118 RPM Mounting Location on a 4000 Model Truck

→ RPM address 1 is located Under Cab, driver's side on 7000 model truck.

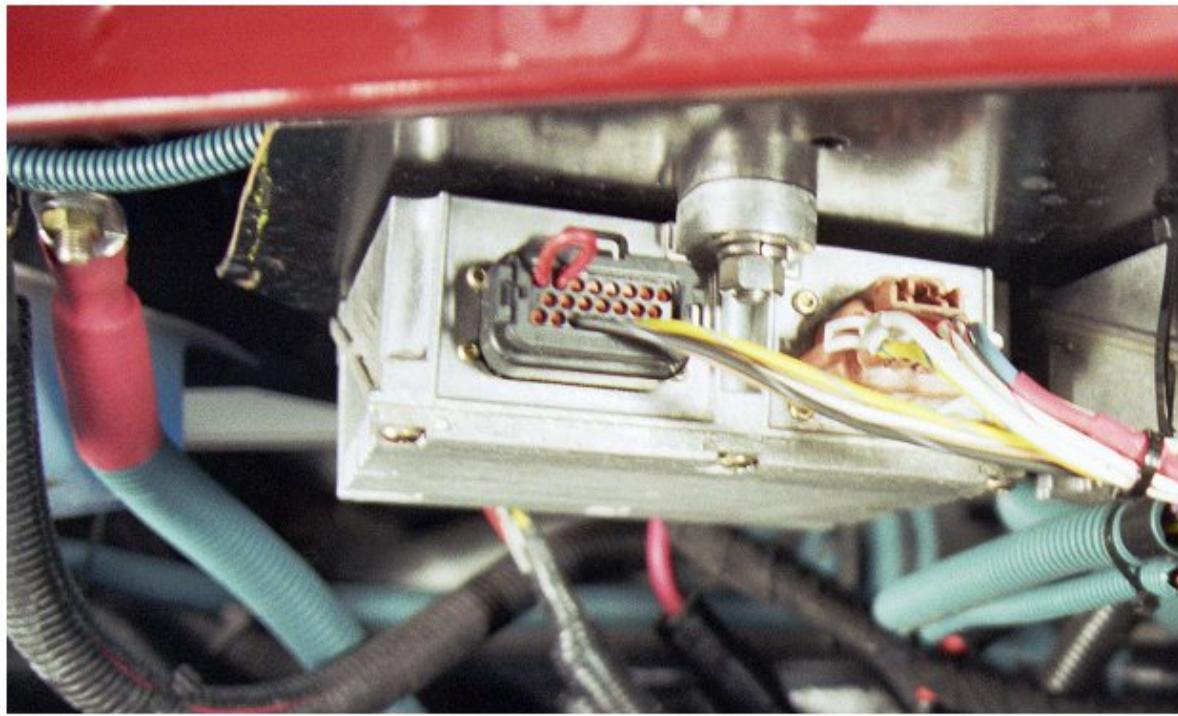


Figure 119 RPM Mounting Location on a 7000 Model Truck

TESTING

1. Depress the PTO switch in the cab to the ON position. Ensure that all PTO interlock conditions are enabled.
2. Verify that the pin labeled PTO_Lectra-Shift_Retaining_Solenoid_Output of the Brown 8-way Remote Power Module output connector has battery voltage levels present.
3. Verify that the Remote Power Module Input labeled PTO_Feedback_Switch (Pin position specified by the Diamond Logic® Builder software) is receiving the correct voltage (12V or GND) as specified by the customer in the Diamond Logic® Builder software.
4. Make certain that the switch indicator lights are functioning by engaging the PTO and verifying that the green light in the top section of the switch illuminates.
5. Make certain that the PTO indicator light in the gauge cluster is functioning by engaging the PTO.
6. The audible alarm can be tested by activating a vehicle condition that will sound the alarm based upon the settings of the programmable parameters. For example, if the park brake interlock is programmed on, release the park brake and engage the PTO. The audible alarms should sound with continuous beeps.

HOW TO ADD THIS FEATURE:

- A. If vehicle does not have a Remote Power Module installed, follow the Remote Power Module installation procedure listed in this document.

- B. If the vehicle already has a Remote Power Module, follow the procedure listed below to add specific wiring for Lectra-Shift.

→Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs and outputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).

- Software feature codes 595AJT, 595AJU, 595AJV, and 595AJZ must be enabled on the vehicle using the Diamond Logic® Builder software (see local dealer).
- Use the Diamond Logic® Builder software to make sure that software feature codes 595AJW, 595AJX, 595AJY, and 595AMZ are NOT enabled on the vehicle (see local dealer).
- Set the desired programmable parameters for each signal using the Diamond Logic® Builder software (see Local Dealer)
- Connect a wire from the pin labeled **PTO_Lectra-Shift_Retaining_Solenoid_Output** pin the brown 8-pin RPM output connector to the coil on the solenoid.
- Connect a wire from a Body Builder-installed PTO feedback switch to the pin labeled **PTO_Feedback_Switch** in the black 23-Pin RPM input connector.

Perform the PTO testing procedure that is listed above.



WARNING – Batteries expel explosive gases. Keep sparks, flames, burning cigarettes or other ignition (IGN) sources away at all times. Always wear safety glasses and a face shield when working near batteries to prevent personal injury and/or property damage.

Open hood and disconnect batteries on the vehicle.

In Cab Interior installation:

Remove BC kick panel to access the BC.

1. Locate an 18 gauge wire long enough to reach from the BC Connector 1601 to the 76-way dash panel connector 1700.
2. Disconnect connector 1700 outside the cab on the dash panel.
3. Terminate one end of the wire with a BC terminal and insert it into connector 1601 pin E11.
4. Terminate the other end of the wire with a 76-way wire terminal and insert it into cavity 12 of connector 1700.
5. Install dash switch.
 - a. Ensure the switch assigned to the Lectra-Shift is a center stable momentary switch.
 - b. If the switch is not a momentary switch, use a DIN removal tool and remove the affected switch pack from the Instrument Panel (IP). Install a momentary switch in the position assigned to the PTO switch. Re-install the switch pack in the IP.
6. Re-install the BC kick panel.

EXTERIOR WIRING AND FUSE/RELAY INSTALLATION:

1. Position an in-line 40 AMP fuse and relay near the mega-fuse in the engine compartment.
2. Terminate an 18 gauge wire with a terminal and insert one end into connector 1700 pin 12.
3. Terminate the other end with a relay socket terminal and connect it to the 40 AMP relay coil terminal 86.
4. Connect a second 18 gauge wire from the 40 AMP relay coil terminal 85 to the GND stud on the dash panel using a ring terminal.
5. Connect a 10 gauge wire from the battery side of the mega-fuse to one side of the in-line fuse.
6. Connect a 10 gauge wire from the other side of the in-line fuse to the moving contact of the 40 AMP relay.
7. Connect a 10 gauge wire from the normally open relay contact to the white wire of the Lectra-Shift supplied wire harness.
8. Tie-wrap the in-line fuse and relay to the center chassis harness. Ensure that the terminals of the relay and fuse are pointed down to prevent water intrusion.
9. Route the harness down along the engine harness next to the Engine Control Module (ECM) above the clutch linkage; follow the portion of the transmission/engine harness coming out of the engine ECM. Tape or tie-wrap the single white Lectra-Shift pull-in coil wire to the transmission/engine harness.
10. Connect the red wire to the brown 8-pin RPM output connector pin labeled PTO_Lectra_Shift_Retaining_Solenoid_Output.
11. Connect the black wire to the black 23-pin RPM input connector pin labeled PTO_Feedback_Switch.
12. Reconnect vehicle batteries.
13. Test the PTO operation.

24.3. 60ABE — PTO ACCOMMODATION FOR ELECTRIC OVER HYDRAULIC PTO

FEATURE CODE DESCRIPTION:

60ABE – BDY INTG, PTO ACCOMMODATION for Electric over Hydraulic PTO, Does Not Include Solenoids, With Switch Mounted on Dash, Includes Audible Alarm and Indicator Light in Gauge Cluster (Requires one RPM input and one output)

FEATURE/BODY FUNCTION:

This feature provides a latched switch in a switch pack to drive one RPM output to engage an Electric over Hydraulic PTO.

This feature utilizes a customer-mounted PTO feedback switch wired to a RPM input to drive an indicator light in the gauge cluster that allows the operator to determine that the PTO is engaged. An audible alarm is used to warn the operator when the PTO is engaged during unsafe vehicle operating conditions such as when the park brake is released or the engine speed is too high. Operating limits are established through programmable parameters that are set in the BC. The RPM input also drives a PTO hourmeter to allow the operator to measure stationary PTO hours for maintenance records and fuel tax purposes. To view the PTO hourmeter, press the gauge cluster display selector button momentarily until the text portion of the display indicates "PTO Hour."

The PTO alarms are controlled by programmable parameters set in the BC. Factory default settings for these programmable parameters are listed in the tables below.

→ Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

*Software feature codes can be added through the Diamond Logic® Builder software. Programmable Parameters are also programmable through the Diamond Logic® Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595AJT, 595AJU, 595AJW, 595AJZ

Software feature codes that must be removed: 595AJV, 595AJX, 595AJY, 595AMZ

ENGAGEMENT

*These parameters set rules that must be met in order for the PTO to be engaged.

If **TEM_PTO_Brake_Engmnt_Inhib** parameter is turned on, then the brake pedal must be depressed in order for the PTO to engage.

If **TEM_PTO_Cltch_Engmnt_Inhib** parameter is turned on, then the clutch pedal must be depressed for the PTO to engage.

If **TEM_PTO_Eng_Run_Engmnt_Inhib** parameter is turned on, then the engine has to be running in order for the PTO to be engaged.

If **TEM_PTO_Eng_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the engine speed is over a certain threshold, which is defined as a programmable parameter in **TEM_PTO_Eng_Spd_Engmnt_Limit**

If **TEM_PTO_Neut_Engmnt_Inhib** parameter is turned on, then the PTO can only be engaged if the Transmission is NOT in Neutral or Park

If **TEM_PTO_Non_Neut_Engmnt_Inhib** parameter is turned on, then the Transmission must be in Neutral or Park for the PTO to be engaged.

If **TEM_PTO_Pk_Brake_Engmnt_Inhib** parameter is turned on, then the Park Brake must be set in order for the PTO to be engaged.

If **TEM_PTO_Veh_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the Vehicle Speed is over the value prescribed by **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 118

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Brake_Engmnt_Inhib	2095	If this Parameter is 1, the PTO will not be engaged if the brake pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Cltch_Engmnt_Inhib	2094	If this Parameter is 1, the PTO will not be engaged if the clutch pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Eng_Run_Engmnt_Inhib	2096	If this Parameter is 1, the PTO will not be engaged if the engine is not running	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Inhib	2092	If this Parameter is 1, the PTO will not be engaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Limit	2093	See TEM_PTO_Eng_Spd_Engmnt_Inhib	1000 RPM	100	5000	1
TEM_PTO_Neut_Engmnt_Inhib	2089	If this Parameter is 1, the PTO will only be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Non_Neut_Engmnt_Inhib	2088	If this Parameter is 1, the PTO will not be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Pk_Brake_Engmnt_Inhib	2087	If this Parameter is 1, the PTO will not be engaged if the Park Brake is not set.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Inhib	2090	If this Parameter is 1, the PTO will not be engaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Limit	2091	See TEM_PTO_Veh_Spd_Engmnt_Inhib	3 MPH	1	100	1

DISENGAGEMENT

* These parameters set the conditions under which the PTO will be disengaged.

If **TEM_PTO_Eng_Run_Disengages** parameter is turned on, then the PTO will be disengaged if the engine is turned off.

If **TEM_PTO_Eng_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the engine speed rises above the value set by **TEM_PTO_Eng_Spd_DisEng_Limit**.

If **TEM_PTO_Non_Neut_Disengages** parameter is turned on, then the PTO will be disengaged if the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Disengages** parameter is turned on, then the PTO will be disengaged if the Park Brake is released.

If **TEM_PTO_Veh_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the vehicle speed is over the valued specified by **TEM_PTO_Veh_Spd_DisEng_Limit**.

Table 119

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Disengages	2114	If this Parameter is 1, the PTO will be disengaged if the engine is turned off.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_DisEng_Limit	2113	See TEM_PTO_Eng_Spd_Disengages	1800 RPM	0	5000	1
TEM_PTO_Eng_Spd_Disengages	2112	If this Parameter is 1, the PTO will be disengaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_DisEng_Limit	On	NA	NA	NA
TEM_PTO_Non_Neut_Disengages	2109	If this Parameter is 1, the PTO will be disengaged if the transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Disengages	2108	If this Parameter is 1, the PTO will be disengaged if the Park Brake is released.	Off	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Veh_Spd_Disengages	2110	If this Parameter is 1, the PTO will be disengaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_DisEng_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_DisEng_Limit	2111	See TEM_PTO_Veh_Spd_Disengages	0 MPH	3	100	1

REENGAGEMENT

* These parameters set the conditions under which the PTO can be reengaged.

If **TEM_PTO_Eng_Run_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine stopping) when the engine is restarted.

If **TEM_PTO_Eng_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine overspeed) when the engine speed falls below TEM_PTO_Eng_Spd_Engmnt_Limit.

If **TEM_PTO_Ext_Input_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to the designated external input being in active state) when the external input is no longer in active state.

If **TEM_PTO_Key_State_Allow_ReEng** parameter is turned on, then the PTO will be allowed to reengage when the key state is returned to run.

If **TEM_PTO_Non_Neut_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to transmission out of neutral) when the transmission is placed back into neutral.

If **TEM_PTO_Pk_Brake_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to park brake released) when the park brake is reapplied.

If **TEM_PTO_Veh_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after disengagement due to the vehicle being over the vehicle speed value) when the vehicle speed falls below TEM_PTO_Veh_Spd_Engmnt_Limit.

Table 120

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Allow_ReEng	2122	If this Parameter is 1, the PTO will be reengaged after a disengage due to the engine stopping when the engine is restarted.	Off	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Spd_Allow_ReEng	2120	If this Parameter is 1, the PTO will be reengaged after a disengage due to engine overspeed when the engine speed is below TEM_PTO_Eng_Spd_Engmnt_Limit.	On	NA	NA	NA
TEM_PTO_Ext_Input_Allow_ReEng	2121	If this Parameter is 1, the PTO will be reengaged after a disengage due to the designated external input when the external input is no longer active.	Off	NA	NA	NA
TEM_PTO_Key_State_Allow_ReEng	2069	If this parameter is set, the PTO will be allowed to reengage when the key state is returned to run.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Allow_ReEng	2148	If this Parameter is 1, the PTO will be reengaged after a disengage due to transmission out of neutral when the transmission is placed back into neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Allow_ReEng	2149	If this Parameter is 1, the PTO will be reengaged after a disengage due to park brake released when the park brake is reapplied.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Allow_ReEng	2119	If this Parameter is 1, the PTO will be reengaged after a disengage due to vehicle overspeed when the vehicle speed is below TEM_PTO_Veh_Spd_Engmnt_Limit.	Off	NA	NA	NA

ALARMS

* These parameters set the conditions in which an audible alarm in the gauge cluster will sound.

If **TEM_PTO_Eng_Run_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the engine is turned off.

If **TEM_PTO_Eng_Spd_Alarms** parameter is turned on, then an alarm will sound if the PTO is engaged and the engine speed is over the value set by **TEM_PTO_Eng_Spd_Alarm_Limit**.

If **TEM_PTO_Non_Neut_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the transmission is taken out of neutral

If **TEM_PTO_Pk_Brake_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the park brake is released

If **TEM_PTO_Veh_Spd_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the vehicle speed is about the value set by **TEM_PTO_Veh_Spd_Alarm_Limit**.

Table 121 PTO Alarms

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Alarms	2137	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine is turned off	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarm_Limit	2136	See TEM_PTO_Eng_Spd_Alarms	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarms	2135	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine speed is over TEM_PTO_Eng_Spd_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Alarms	2132	If this Parameter is 1, an alarm will sound if the PTO is engaged and transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Alarms	2131	If this Parameter is 1, an alarm will sound if the PTO is engaged and the park brake is released	Off	NA	NA	NA

Table 121 PTO Alarms (cont.)

TEM_PTO_Veh_Spd_Alarms	2133	If this Parameter is 1, an alarm will sound if the PTO is engaged and the vehicle speed is over TEM_PTO_Veh_Spd_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Alarm_Limit	2134	See TEM_PTO_Veh_Spd_Alarms	Off	NA	NA	NA

Other Parameters

* These parameters allow the customer to program the active state of the Remote Power Module Input and set the maximum current of the Remote Power Module Output.

The **TEM_RPM_PTO_Engaged_Param** parameter indicates the state that the BC will read as active for the TEM PTO feedback switch (as it goes into the RPM input). This active state will be used to indicate when the PTO is engaged.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

The **TEM_Hyd_PTO_Engagement_Out_Param** parameter sets the current at which the BC will fuse the Remote Power Module output that drives the engagement of the PTO. This is used to define the maximum amount of current that can flow through the Remote Power Module output.

Table 122

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_RPM_PTO_Engaged_Param	2147	Active State for the TEM PTO engagement feedback switch.	1	List	List	List

WIRING INFORMATION

→ Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).

- All wiring to RPM inputs and outputs is customer supplied.

- One wire must be connected from the pin labeled PTO_Output in the brown 8-pin RPM output connector to the coil on the hydraulic solenoid. This wire drives the engagement and disengagement of the solenoid. The customer supplies a GND wire for the hydraulic solenoid.
- A second wire must be connected from the Body Builder-installed PTO feedback switch (GND active) to the pin labeled PTO_Feedback_Switch in the black 23-pin RPM input connector. This feedback switch is used to determine whether or not the PTO is engaged by determining if the switch is in the active state. If the switch is indeed in the active state and the PTO is running, then an indicator light in the gauge cluster will be on. When the switch is not in the active state, the indicator light will not be on.
- The switch provided is labeled PTO.

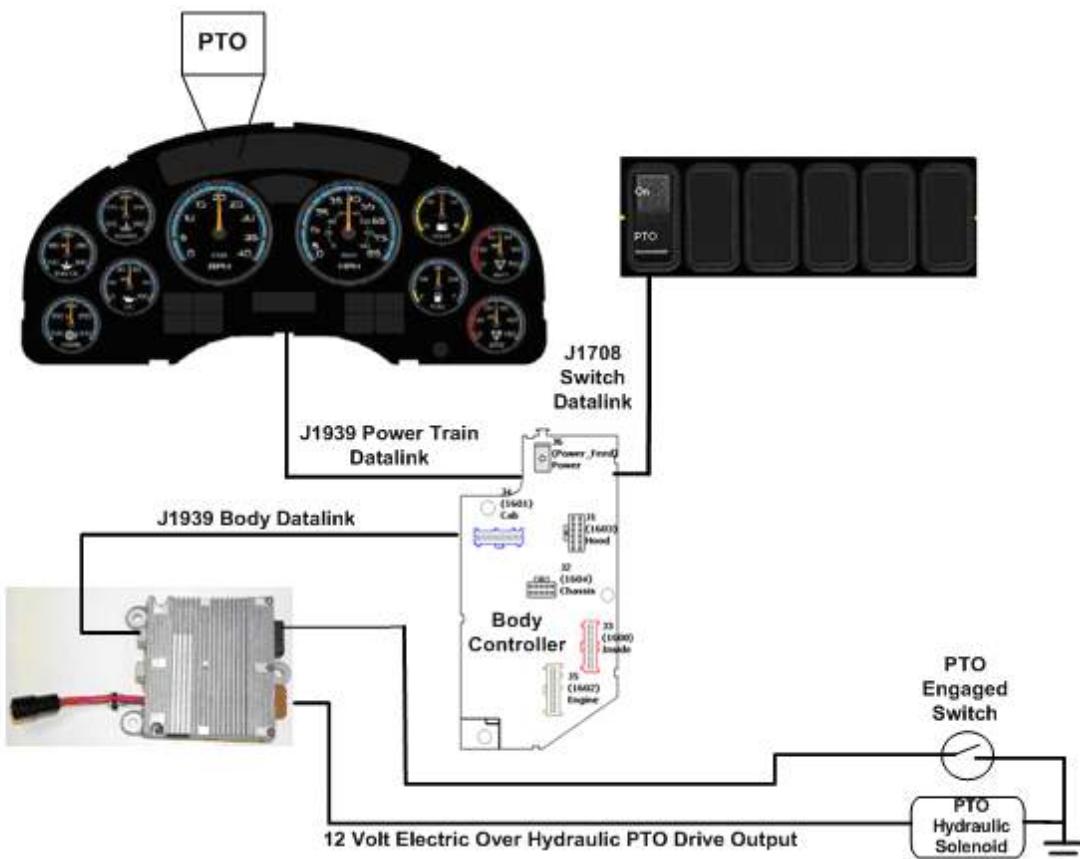


Figure 120 Overview of Electric Over Hydraulic PTO System

RPM CONNECTOR INFORMATION

**** HPV Wire Terminal Kits are REQUIRED to allow Body Builders to create wire harnesses for the RPM connectors.**

HPV terminal kits are pre-made kits that include six power output terminals and seals for the brown 8-way connector and six terminals for the black 23-way connector.

Table 123

HPV Terminal Kits	Part Number
RPM Terminal Kit 12 Gauge	2585651C91
RPM Terminal Kit 14 Gauge	2585423C91

NOTE – The following connectors are optional because they are already provided with the RPMs.

This information is given so that the Body Builder can purchase connectors in the event that the original connectors are damaged or lost, or so that the Body Builder can pre-fabricate a wire harness.

Table 124 8–Way RPM Output Connector (Brown) and 23–Way RPM Input Connector (Black)

Connector Part No.	3548934C1	2585981C91
Description	Connector, Body, Brown 8–Way RPM Output	Connector, Body, Black 23–Way RPM Input Kit
Terminal Part	3534163C1 - 12 Gauge 3535931C1 - 14 Gauge 3535930C1 - 16 & 18 Gauge	1698937C1
Cable Seal Part	3548945C1 - 12 & 14 Gauge 3535937C1 - 16 & 18 Gauge	N/A
Connector Lock Part	3548943c1	N/A
CPA Lock	3573833c1	N/A
Cavity Plug	3535938c1	Built into the connector

→ RPM address 1 is located Back of Battery Box on 4000 model trucks

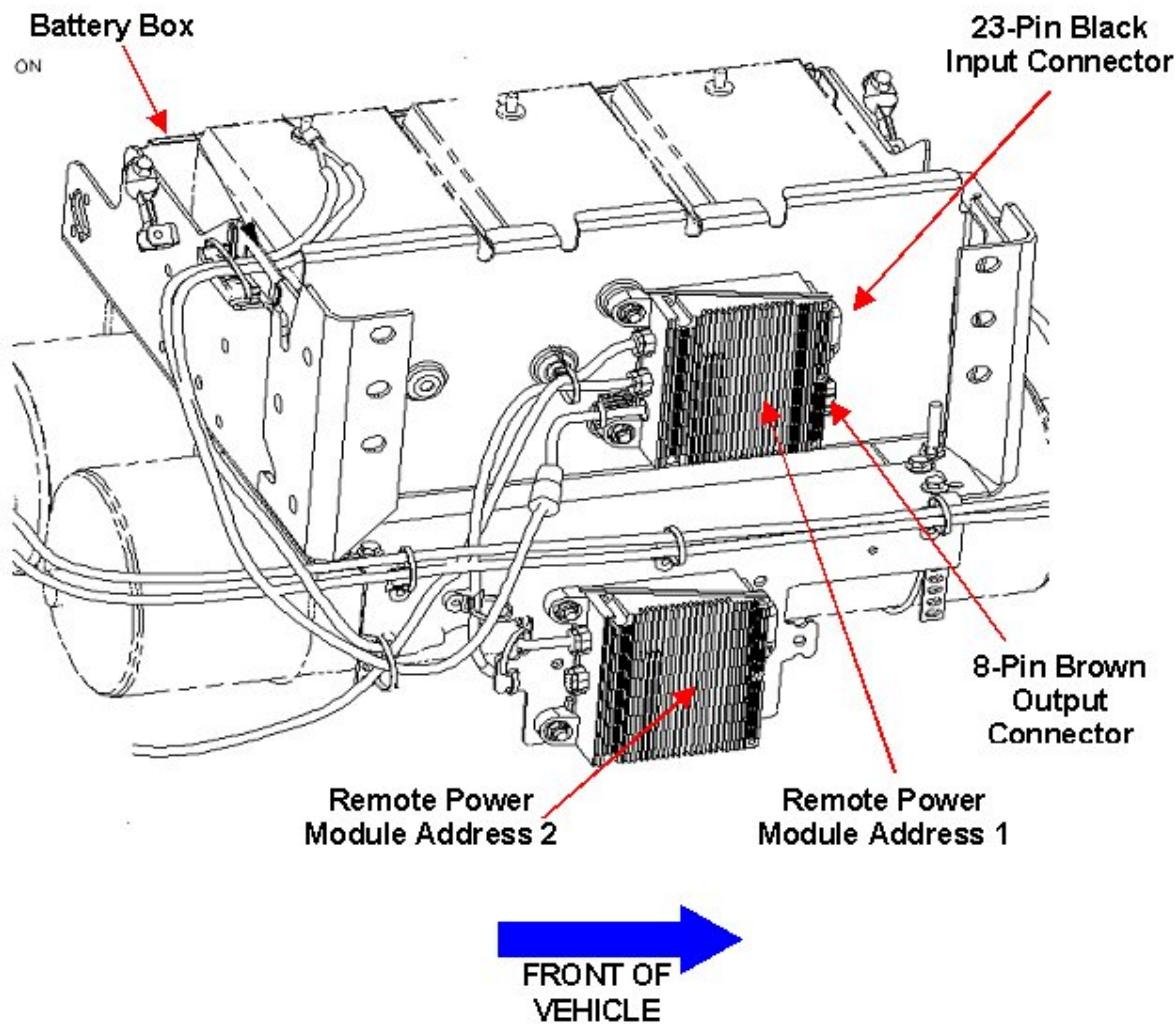


Figure 121 RPM Mounting Location on a 4000 Model Truck

→ RPM address 1 is located Under Cab, driver's side on 7000 model truck.

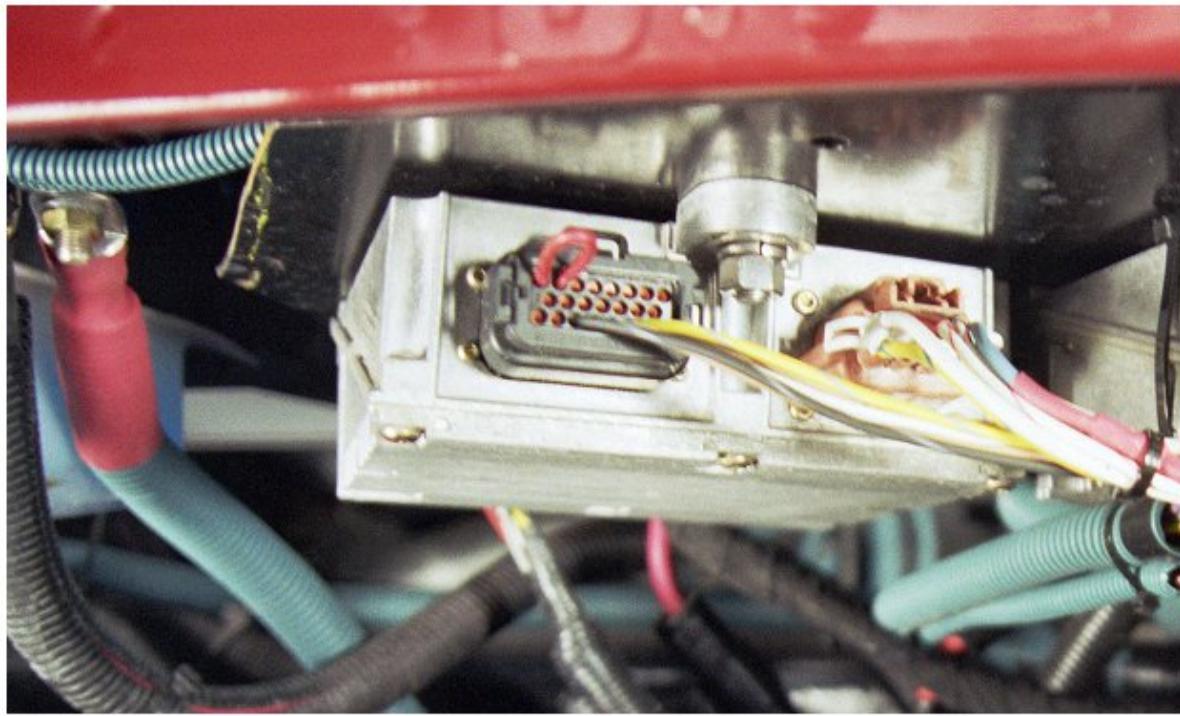


Figure 122 RPM Mounting Location on a 7000 Model Truck

TESTING

1. To determine if the PTO is working, depress the PTO switch in the cab to the on position. Ensure that all interlock conditions are enabled.
2. Verify that the pin labeled **PTO_Output** of the brown 8-way Remote Power Module output connector has the battery voltage levels present.
3. Verify that the RPM input labeled **PTO_Feedback_Switch** (pin position specified by the Diamond Logic® Builder software) is receiving the correct voltage (12V or GND) as specified by the programmable parameter in the Diamond Logic® Builder software.
4. Make certain that the indicator light in the top section of the PTO switch illuminates by engaging the PTO.
5. Make certain that the PTO indicator light in the gauge cluster illuminates by engaging the PTO.
6. The Audible Alarm can be tested by violating the set programmable parameters and determining if the Alarm sounds. For example: If the park brake interlock is programmed ON, release the park brake and engage the PTO. The audible alarm should sound with continuous beeps.

HOW TO ADD THIS FEATURE:

- Software feature codes 595AJT, 595AJU, 595AJW, and 595AJZ must be enabled on the vehicle using the Diamond Logic® Builder software (see local dealer).
- Use the Diamond Logic® Builder software to make sure that software feature codes 595AJV, 595AJX, 595AJY, and 595AMZ are NOT enabled on the vehicle (see local dealer).
- Set the desired programmable parameters for each signal using the Diamond Logic® Builder software (see Local Dealer)
- Connect a wire from the pin labeled **PTO_Output** in the brown 8-pin RPM output connector, to the coil on the solenoid.
- Connect a wire from a Body Builder-installed PTO feedback switch to the pin labeled **PTO_Feedback_Switch** in the black 23-Pin RPM input connector.
- Perform the PTO testing procedure that is listed above.

*** Constant Engagement Hydraulic Pump**

- Another use of 60ABE is to control a dump valve on a constantly engaged hydraulic pump. In this case the operator would use the RPM (address 1) output A to activate and deactivate the dump valve. This dump valve is used to control hydraulic pressure in the system, reducing wear on the system and increasing fuel economy.

24.4. 60ABK — PTO ACCOMMODATION ELECTRIC OVER AIR NON-CLUTCHED

FEATURE CODE DESCRIPTION:

60ABK – BDY INTG, PTO ACCOMMODATION. Accommodation for Electric over Air, Non-Clutched PTO Engagement and Disengagement, Does not Include Air Solenoid, With Switch Mounted on Dash, Includes Audible Alarm and Indicator Light in Gauge Cluster (requires one RPM input and one output)

FEATURE/BODY FUNCTION:

This feature provides a momentary switch in the in-cab switch pack to drive a RPM output to engage an Electric over Air, Non-Clutched PTO.

A RPM input is used to drive an indicator light in the gauge cluster to indicate when the PTO is engaged. An audible alarm sounds when certain programmable parameters are violated. The RPM input also drives a PTO hourmeter to allow the operator to measure stationary PTO hours for maintenance records and fuel tax purposes. To view the hourmeter, press the gauge cluster selection button momentarily until the text portion of the display indicates "PTO Hour."

The Non-Clutched air-shifted PTO is a gear-to-gear engagement mechanism. Very specific transmission operating modes are required to allow safe engagement of the PTO. In essence, the PTO gear in the transmission must be stopped before engagement of the PTO should be attempted. The clutch must be depressed with the vehicle parked in order to engage the PTO for a manual transmission. An automatic transmission must be in any driving gear with vehicle parked in order to engage the PTO. Engagement, disengagement, and reengagement parameters should be set according to the type of transmission where the Non-Clutched PTO is mounted.

The PTO alarms are controlled by programmable parameters set in the BCM. Through these programmable parameters, the vehicle owner can customize the functionality of the PTO. Factory default settings for these programmable parameters are listed in the tables below.

→ ***Please use the Diamond Logic® Builder software to determine pin and switch locations for RPM inputs and outputs and to set programmable parameters (refer to pin and switch location section).***

→ All reengagement parameters for Non-Clutched PTOs are defaulted OFF. These parameters are defaulted to OFF because reengaging a Non-Clutched PTO automatically (after it has disengaged) could cause the gears to grind and damage the PTO.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

*Software feature codes can be added through the Diamond Logic® Builder software. Programmable Parameters are also programmable through the Diamond Logic® Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595AJT, 595AJU, 595AJX, 595AJZ

Software feature codes that must be removed: 595AJV, 595AJW, 595AJY, 595AMZ

ENGAGEMENT

*These parameters set rules that must be met in order for the PTO to be engaged.

If **TEM_PTO_Air_Pres_Engmnt_Inhib** parameter is turned on, the PTO cannot be engaged if the primary vehicle air pressure is below the programmable parameter set by **TEM_PTO_Air_Pres_Engmnt_Limit**.

If **TEM_PTO_Brake_Engmnt_Inhib** parameter is turned on, then the brake pedal must be depressed in order for the PTO to engage.

If **TEM_PTO_Cltch_Engmnt_Inhib** parameter is turned on, then the clutch pedal must be depressed for the PTO to engage.

If **TEM_PTO_Eng_Run_Engmnt_Inhib** parameter is turned on, then the engine has to be running in order for the PTO to be engaged.

If **TEM_PTO_Eng_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the engine speed is over a certain threshold, which is defined as a programmable parameter in **TEM_PTO_Eng_Spd_Engmnt_Limit**

If **TEM_PTO_Neut_Engmnt_Inhib** parameter is turned on, then the PTO can only be engaged if the Transmission is NOT in Neutral or Park.

If **TEM_PTO_Non_Neut_Engmnt_Inhib** parameter is turned on, then the Transmission must be in Neutral or Park for the PTO to be engaged.

If **TEM_PTO_Pk_Brake_Engmnt_Inhib** parameter is turned on, then the Park Brake must be set in order for the PTO to be engaged.

If **TEM_PTO_Veh_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the Vehicle Speed is over the value prescribed by **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 125

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Engmnt_Inhib	2097	If this Parameter is 1, the PTO will not be engaged if the primary vehicle air pressure is below TEM_PTO_Air_Pres_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Air_Pres_Engmnt_Limit	2098	See TEM_PTO_Air_Pres_Engmnt_Inhib	90 psi	1	500	1
TEM_PTO_Brake_Engmnt_Inhib	2095	If this Parameter is 1, the PTO will not be engaged if the brake pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Cltch_Engmnt_Inhib	2094	If this Parameter is 1, the PTO will not be engaged if the clutch pedal is not depressed	Off	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Engmnt_Inhib	2096	If this Parameter is 1, the PTO will not be engaged if the engine is not running	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Inhib	2092	If this Parameter is 1, the PTO will not be engaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Limit	2093	See TEM_PTO_Eng_Spd_Engmnt_Inhib	1000 RPM	100	5000	1
TEM_PTO_Neut_Engmnt_Inhib	2089	If this Parameter is 1, the PTO will only be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Non_Neut_Engmnt_Inhib	2088	If this Parameter is 1, the PTO will not be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Engmnt_Inhib	2087	If this Parameter is 1, the PTO will not be engaged if the Park Brake is not set.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Inhib	2090	If this Parameter is 1, the PTO will not be engaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Limit	2091	See TEM_PTO_Veh_Spd_Engmnt_Inhib	3 MPH	1	100	1

DISENGAGEMENT

* These parameters set the conditions under which the PTO will be disengaged.

If **TEM_PTO_Air_Pres_Disengages** parameter is turned on, then the PTO will be disengaged if the primary air pressure is below the value set in **TEM_PTO_Air_Pres_DisEng_Limit**.

If **TEM_PTO_Eng_Run_Disengages** parameter is turned on, then the PTO will be disengaged if the engine is turned off.

If **TEM_PTO_Eng_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the engine speed rises above the value set by **TEM_PTO_Eng_Spd_DisEng_Limit**.

If **TEM_PTO_Non_Neut_Disengages** parameter is turned on, then the PTO will be disengaged if the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Disengages** parameter is turned on, then the PTO will be disengaged if the Park Brake is released.

If **TEM_PTO_Veh_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the vehicle speed is over the valued specified by **TEM_PTO_Veh_Spd_DisEng_Limit**.

Table 126

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_DisEng_Limit	2116	See TEM_PTO_Air_Pres_Disengages	80 psi	0	500	1
TEM_PTO_Air_Pres_Disengages	2115	If this Parameter is 1, the PTO will be disengaged if the primary air pressure is below the value set in TEM_PTO_Air_Pres_DisEng_Limit.	On	NA	NA	NA
TEM_PTO_Eng_Run_Disengages	2114	If this Parameter is 1, the PTO will be disengaged if the engine is turned off.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_DisEng_Limit	2113	See TEM_PTO_Eng_Spd_Disengages	1800 RPM	0	5000	1
TEM_PTO_Eng_Spd_Disengages	2112	If this Parameter is 1, the PTO will be disengaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_DisEng_Limit	On	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Non_Neut_Disengages	2109	If this Parameter is 1, the PTO will be disengaged if the transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Disengages	2108	If this Parameter is 1, the PTO will be disengaged if the Park Brake is released.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Disengages	2110	If this Parameter is 1, the PTO will be disengaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_DisEng_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_DisEng_Limit	2111	See TEM_PTO_Veh_Spd_Disengages	0 MPH	3	100	1

REENGAGEMENT

* These parameters set the conditions under which the PTO can be reengaged.

NOTE – All reengagement parameters should be set to 0 with non-clutched air-shifted PTOs to prevent gear grind and damage to the transmission.

If **TEM_PTO_Air_Pres_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to low air pressure) when the primary air pressure rises about the value specified by **TEM_PTO_Air_Pres_Engmnt_Limit**.

If **TEM_PTO_Eng_Run_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine stopping) when the engine is restarted.

If **TEM_PTO_Eng_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine overspeed) when the engine speed falls below **TEM_PTO_Eng_Spd_Engmnt_Limit**.

If **TEM_PTO_Key_State_Allow_ReEng** parameter is turned on, then the PTO will be allowed to reengage when the key state is returned to run.

If **TEM_PTO_Non_Neut_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to transmission out of neutral) when the transmission is placed back into neutral.

If **TEM_PTO_Pk_Brake_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to park brake released) when the park brake is reapplied.

If **TEM_PTO_Veh_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to the vehicle being over the vehicle speed value) when the vehicle speed falls below **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 127

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Allow_ReEng	2124	If this Parameter is 1, the PTO will be reengaged after a disengage due to low vehicle air pressure when the primary air pressure is over TEM_PTO_Air_Pres_Engmnt_Limit.	Off	NA	NA	NA
TEM_PTO_Eng_Run_Allow_ReEng	2122	If this Parameter is 1, the PTO will be reengaged after a disengage due to the engine stopping when the engine is restarted.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Allow_ReEng	2120	If this Parameter is 1, the PTO will be reengaged after a disengage due to engine overspeed when the engine speed is below TEM_PTO_Eng_Spd_Engmnt_Limit.	Off	NA	NA	NA
TEM_PTO_Key_State_Allow_ReEng	2069	If this parameter is set, the PTO will be allowed to reengage when the key state is returned to run.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Allow_ReEng	2148	If this Parameter is 1, the PTO will be reengaged after a disengage due to transmission out of neutral when the transmission is placed back into neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Allow_ReEng	2149	If this Parameter is 1, the PTO will be reengaged after a disengage due to park brake released when the park brake is reapplied.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Allow_ReEng	2119	If this Parameter is 1, the PTO will be reengaged after a disengage due to vehicle overspeed when the vehicle speed is below TEM_PTO_Veh_Spd_Engmnt_Limit.	Off	NA	NA	NA

ALARMS

*These parameters utilize the gauge cluster to sound an alarm to the driver when certain programmable parameters are violated.

If **TEM_PTO_Air_Pres_Alarms** parameter is turned on, then an audible alarm will sound in the cab if the primary air pressure drops below the value specified by **TEM_PTO_Air_Pres_Alarm_Limit**.

If **TEM_PTO_Eng_Run_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the engine is turned off.

If **TEM_PTO_Eng_Spd_Alarms** parameter is turned on, then an alarm will sound if the PTO is engaged and the engine speed is over the value set by **TEM_PTO_Eng_Spd_Alarm_Limit**.

If **TEM_PTO_Non_Neut_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the park brake is released.

If **TEM_PTO_Veh_Spd_Alarms** parameter is turned on, then an audible alarm will sound if the PTO is engaged and the vehicle speed is over the value set by **TEM_PTO_Veh_Spd_Alarm_Limit**.

Table 128 PTO Alarms

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Alarm_Limit	2139	See TEM_PTO_Air_Pres_Alarms.	Off	NA	NA	NA
TEM_PTO_Air_Pres_Alarms	2138	If this Parameter is 1, an alarm will sound if the primary air pressure is below TEM_PTO_Air_Pres_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Eng_Run_Alarms	2137	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine is turned off	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarm_Limit	2136	See TEM_PTO_Eng_Spd_Alarms	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarms	2135	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine speed is over TEM_PTO_Eng_Spd_Alarm_Limit.	Off	NA	NA	NA

Table 128 PTO Alarms (cont.)

TEM_PTO_Non_Neut_Alarms	2132	If this Parameter is 1, an alarm will sound if the PTO is engaged and transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Alarms	2131	If this Parameter is 1, an alarm will sound if the PTO is engaged and the park brake is released	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Alarms	2133	If this Parameter is 1, an alarm will sound if the PTO is engaged and the vehicle speed is over TEM_PTO_Veh_Spd_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Alarm_Limit	2134	See TEM_PTO_Veh_Spd_Alarms	Off	NA	NA	NA

Other Parameters

* These parameters allow the customer to program the active state of the RPM input and set the maximum current of the RPM output.

The **TEM_RPM_PTO_Engaged_Param** parameter indicates the state that the BC will read as active for the TEM PTO feedback switch (as it goes into the RPM input). This active state will be used to indicate when the PTO is engaged.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

The **TEM_Hyd_PTO_Engagement_Out_Param** parameter sets the current at which the BC will fuse the RPM output that drives the engagement of the PTO. This is used to define the maximum amount of current that can flow through the RPM output.

Table 129

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_RPM_PTO_Engaged_Param	2147	Active State for the TEM PTO engagement feedback switch.	1	List	List	List
TEM_Hyd_PTO_Engagement_Out_Param	1993	This is the fuse level of the Hydraulic PTO FET.	20 Amps	0	20	0.1

WIRING INFORMATION

→ **Please use the Diamond Logic® Builder software to determine pin and switch locations for RPM inputs and outputs and to set programmable parameters (refer to pin and switch location section).**

- All wiring to RPM inputs and outputs is customer supplied.
- One wire must be connected from the pin labeled PTO_Output in the Brown 8-pin RPM output connector, to the coil on the air solenoid. This wire drives the engagement and disengagement of the solenoid. The customer supplies a GND wire for the air solenoid.
- A second wire must be connected from the Body Builder-installed PTO feedback switch (GND active) to the pin labeled PTO_Feedback_Switch in the black 23-pin RPM input connector. This switch is used to determine whether or not the PTO is engaged by determining if the switch is in the active state. If the switch is indeed in the active state and the PTO is running, then an indicator light in the gauge cluster will be on. When the switch is not in the active state, the indicator light will not be on.
- The switch provided is not labeled; therefore the customer will have to install a PTO label for the switch from the bag of switch labels provided with the vehicle. The customer should use the Diamond Logic® Builder software to determine the location of the in-cab switch.

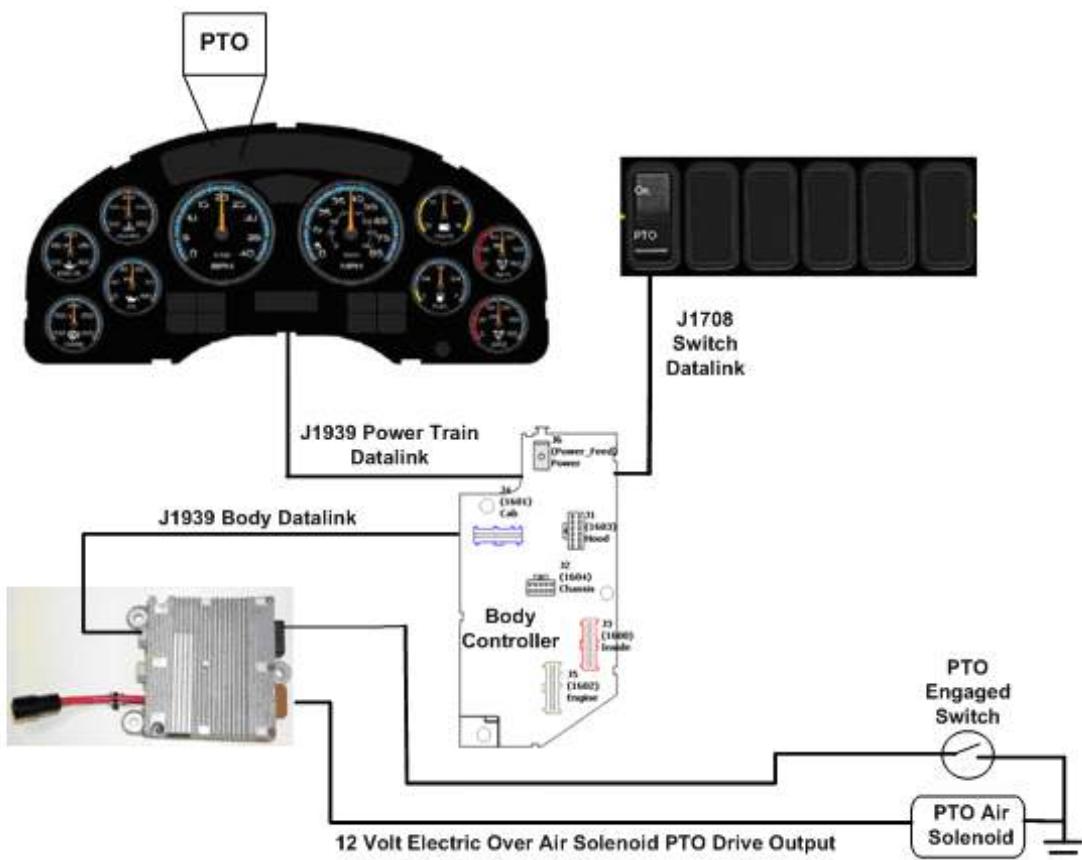


Figure 123 Diagram of Electric Over Air (Non-Clutched) PTO System

RPM CONNECTOR INFORMATION

**** HPV kits are REQUIRED to allow Body Builders to wire in and out of the RPM connectors.**

HPV kits are pre-made kits that include terminals and seals for BOTH RPM connectors.

Table 130

HPV Kits	Part Number
RPM Terminal Kit 12 Gauge	2585651C91
RPM Terminal Kit 14 Gauge	2585423C91

NOTE – The following connectors are optional because they are already provided with the RPMs.

This information is given so that the Body Builder can purchase connectors in the event that the original connectors are damaged or lost, or so that the Body Builder can pre-fabricate a harness.

Table 131 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black)

Description	Connector, Body, Brown 8-Way RPM Output	Connector, Body, Black 23-Way RPM Input Kit
Connector Part No.	3548934C1	2585981c91
Terminal Part	3534163C1 - 12 Gauge 3535931C1 - 14 Gauge 3535930C1 - 16 & 18 Gauge	1698937C1
Cable Seal Part	3548945C1 - 12 & 14 Gauge 3535937C1 - 16 & 18 Gauge	N/A
Connector Lock Part	3548943c1	N/A
CPA Lock	3573833c1	N/A
Cavity Plug	3535938c1	Included

→ RPM address 1 is located Back of Battery Box on 4000 model trucks

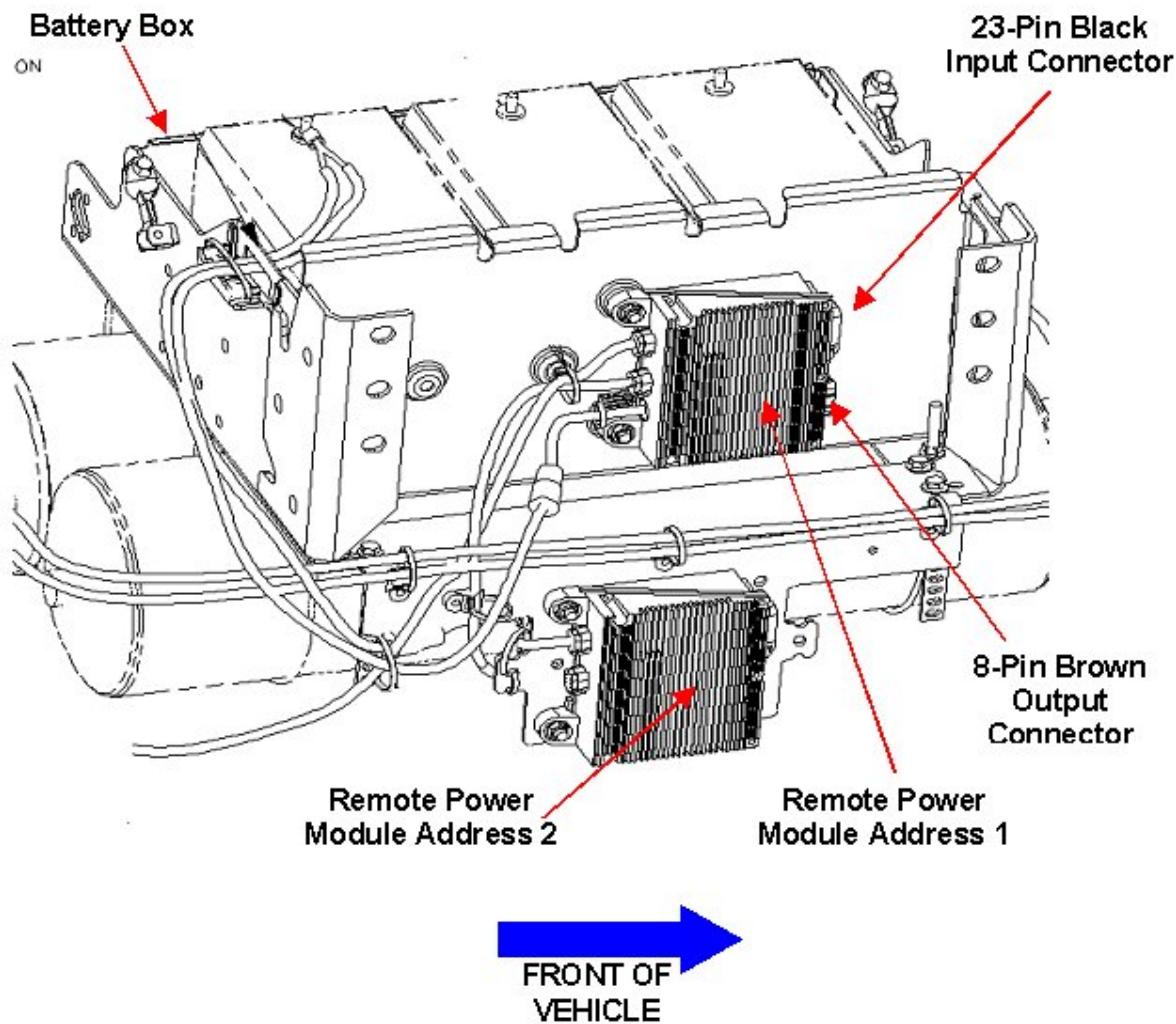


Figure 124 RPM Mounting Location on a 4000 Model Truck

→ RPM address 1 is located Under Cab, driver's side on 7000 model truck.

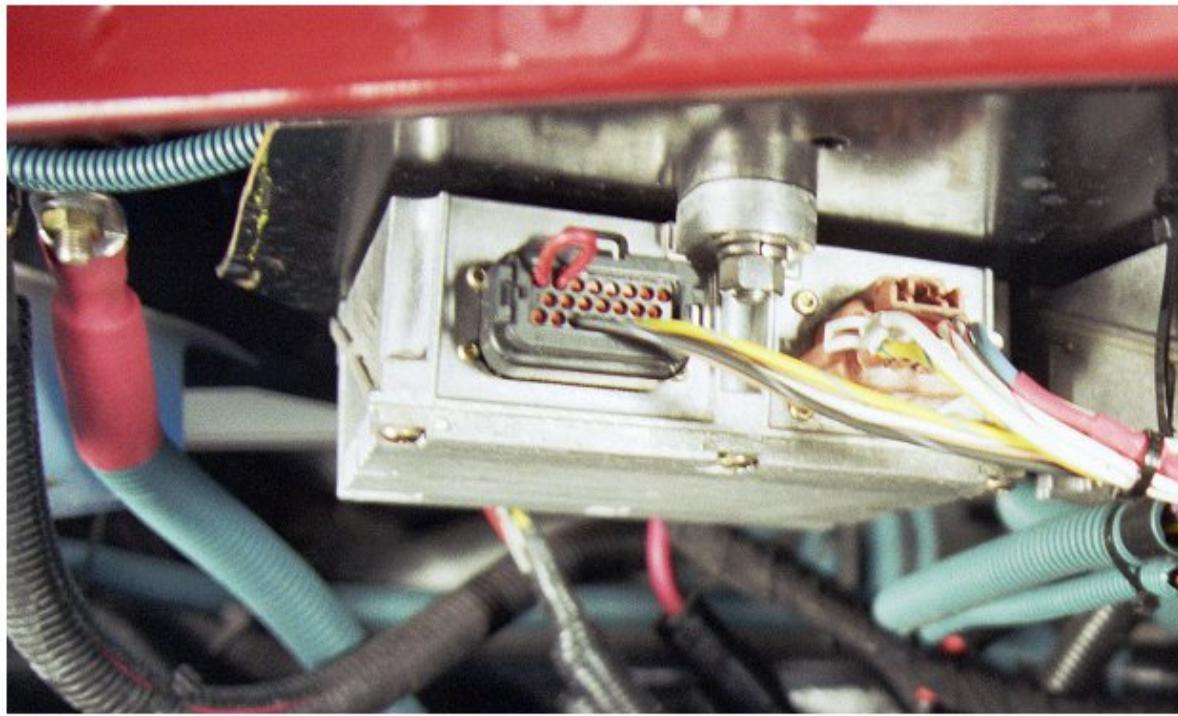


Figure 125 RPM Mounting Location on a 7000 Model Truck

TESTING

1. To determine if the PTO is working, depress the PTO switch in the cab to the on position. Ensure that all interlock conditions are enabled.
2. Verify that the pin labeled **PTO_Output** of the brown 8-way RPM output connector has the battery voltage levels present.
3. Verify that the RPM input labeled **PTO_Feedback_Switch** (Pin position specified by the Diamond Logic® Builder software) is receiving the correct voltage (12V or GND) as specified by the customer in the Diamond Logic® Builder software.
4. Make certain that the indicator light in the top section of the PTO switch illuminates by engaging the PTO.
5. Make certain that the PTO indicator light in the gauge cluster illuminates by engaging the PTO.
6. The audible alarm can be tested by violating the set programmable parameters and determining if the alarm sounds. For example: If the park brake interlock is programmed ON, release the park brake and engage the PTO. The audible alarm should sound with continuous beeps.

HOW TO ADD THIS FEATURE:

- Software feature codes 595AJT, 595AJU, 595AJX, and 595AJZ must be enabled on the vehicle using the Diamond Logic® Builder software (see Local Dealer).
- Use the Diamond Logic® Builder software to make sure that software feature codes 595AJV, 595AJW, 595AJY, and 595AMZ are NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using the Diamond Logic® Builder software (see Local Dealer)
- Connect a wire from the pin labeled **PTO_Output** in the Brown 8-pin RPM output connector to the coil on the solenoid.
- Connect a wire from a Body Builder-installed PTO feedback switch to the pin labeled **PTO_Feedback_Switch** in the Black 23-Pin RPM input connector.
- Perform the PTO testing procedure that is listed above.

24.5. 60ABL — PTO ACCOMMODATION ELECTRIC OVER AIR CLUTCHED

FEATURE CODE DESCRIPTION:

60ABL – BDY INTG, PTO ACCOMMODATION. Accommodation for Electric over Air, Clutched PTO Engagement and Disengagement, Does not Include Air Solenoid, With Switch Mounted on Dash, Includes Audible Alarm and Indicator Light in Gauge Cluster (requires one RPM input and one output)

FEATURE/BODY FUNCTION:

This feature provides a latched switch in the in-cab switch pack to drive a RPM output that provides power to engage and disengage the Electric over Air, Clutched PTO. A RPM input is used to drive an indicator light in the gauge cluster, allowing the operator to discern whether or not the PTO is engaged. An audible alarm sounds when certain programmable parameters are violated. The RPM input also drives a PTO hourmeter to allow the operator to measure stationary PTO hours for maintenance records and fuel tax purposes. To view the hourmeter, press the gauge cluster selection button momentarily until the text portion of the display indicates "PTO Hour."

This PTO feature is a rule-based option. The operation of the PTO is governed by rules of engagement, disengagement, reengagement, and alarms. These rules are defined through programmable parameters. Through these programmable parameters, the vehicle owner can customize the functionality of the PTO. Factory default settings for these programmable parameters are listed in the tables below.

→ **Please use the Diamond Logic® Builder software to determine pin and switch locations for RPM inputs and outputs and to set programmable parameters (refer to pin and switch location section).**

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

*Software feature codes can be added through the Diamond Logic® Builder software. Programmable Parameters are also programmable through the Diamond Logic® Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595AJT, 595AJU, 595AJY, 595AJZ

Software feature codes that must be removed: 595AJV, 595AJW, 595AJX, 595AMZ

ENGAGEMENT

*These parameters set rules that must be met in order for the PTO to be engaged.

If **TEM_PTO_Air_Pres_Engmnt_Inhib** parameter is turned on, the PTO cannot be engaged if the primary vehicle air pressure is below the programmable parameter set by **TEM_PTO_Air_Pres_Engmnt_Limit**.

If **TEM_PTO_Brake_Engmnt_Inhib** parameter is turned on, then the brake pedal must be depressed in order for the PTO to engage.

If **TEM_PTO_Cltch_Engmnt_Inhib** parameter is turned on, then the clutch pedal must be depressed for the PTO to engage.

If **TEM_PTO_Eng_Run_Engmnt_Inhib** parameter is turned on, then the engine has to be running in order for the PTO to be engaged.

If **TEM_PTO_Eng_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the engine speed is over a certain threshold, which is defined as a programmable parameter in **TEM_PTO_Eng_Spd_Engmnt_Limit**

If **TEM_PTO_Neut_Engmnt_Inhib** parameter is turned on, then the PTO can only be engaged if the Transmission is NOT in Neutral or Park

If **TEM_PTO_Non_Neut_Engmnt_Inhib** parameter is turned on, then the Transmission must be in Neutral or Park for the PTO to be engaged.

If **TEM_PTO_Pk_Brake_Engmnt_Inhib** parameter is turned on, then the Park Brake must be set in order for the PTO to be engaged.

If **TEM_PTO_Veh_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the Vehicle Speed is over the value prescribed by **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 132

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Engmnt_Inhib	2097	If this Parameter is 1, the PTO will not be engaged if the primary vehicle air pressure is below TEM_PTO_Air_Pres_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Air_Pres_Engmnt_Limit	2098	See TEM_PTO_Air_Pres_Engmnt_Inhib	90 psi	1	500	1
TEM_PTO_Brake_Engmnt_Inhib	2095	If this Parameter is 1, the PTO will not be engaged if the brake pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Cltch_Engmnt_Inhib	2094	If this Parameter is 1, the PTO will not be engaged if the clutch pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Eng_Run_Engmnt_Inhib	2096	If this Parameter is 1, the PTO will not be engaged if the engine is not running	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Inhib	2092	If this Parameter is 1, the PTO will not be engaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_Engmnt_Limit	On	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Spd_Engmnt_Limit	2093	See TEM_PTO_Eng_Spd_Engmnt_Inhib	1000 RPM	100	5000	1
TEM_PTO_Neut_Engmnt_Inhib	2089	If this Parameter is 1, the PTO will only be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Non_Neut_Engmnt_Inhib	2088	If this Parameter is 1, the PTO will not be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Engmnt_Inhib	2087	If this Parameter is 1, the PTO will not be engaged if the Park Brake is not set.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Inhib	2090	If this Parameter is 1, the PTO will not be engaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Limit	2091	See TEM_PTO_Veh_Spd_Engmnt_Inhib	3 MPH	1	100	1

DISENGAGEMENT

* These parameters set the conditions under which the PTO will be disengaged.

If **TEM_PTO_Air_Pres_Disengages** parameter is turned on, then the PTO will be disengaged if the primary air pressure is below the value set in **TEM_PTO_Air_Pres_DisEng_Limit**.

If **TEM_PTO_Eng_Run_Disengages** parameter is turned on, then the PTO will be disengaged if the engine is turned off.

If **TEM_PTO_Eng_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the engine speed rises above the value set by **TEM_PTO_Eng_Spd_DisEng_Limit**.

If **TEM_PTO_Non_Neut_Disengages** parameter is turned on, then the PTO will be disengaged if the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Disengages** parameter is turned on, then the PTO will be disengaged if the Park Brake is released.

If **TEM_PTO_Veh_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the vehicle speed is over the value specified by **TEM_PTO_Veh_Spd_DisEng_Limit**.

Table 133

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_DisEng_Limit	2116	See TEM_PTO_Air_Pres_Disengages	80 psi	0	500	1
TEM_PTO_Air_Pres_Disengages	2115	If this Parameter is 1, the PTO will be disengaged if the primary air pressure is below the value set in TEM_PTO_Air_Pres_DisEng_Limit.	On	NA	NA	NA
TEM_PTO_Eng_Run_Disengages	2114	If this Parameter is 1, the PTO will be disengaged if the engine is turned off.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_DisEng_Limit	2113	See TEM_PTO_Eng_Spd_Disengages	1800 RPM	0	5000	1
TEM_PTO_Eng_Spd_Disengages	2112	If this Parameter is 1, the PTO will be disengaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_DisEng_Limit	On	NA	NA	NA
TEM_PTO_Non_Neut_Disengages	2109	If this Parameter is 1, the PTO will be disengaged if the transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Disengages	2108	If this Parameter is 1, the PTO will be disengaged if the Park Brake is released.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Disengages	2110	If this Parameter is 1, the PTO will be disengaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_DisEng_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_DisEng_Limit	2111	See TEM_PTO_Veh_Spd_Disengages	0 MPH	3	100	1

REENGAGEMENT

* These parameters set the conditions under which the PTO can be reengaged.

If **TEM_PTO_Air_Pres_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to low air pressure) when the primary air pressure rises about the value specified by **TEM_PTO_Air_Pres_Engmnt_Limit**.

If **TEM_PTO_Eng_Run_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine stopping) when the engine is restarted.

If **TEM_PTO_Eng_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine overspeed) when the engine speed falls below **TEM_PTO_Eng_Spd_Engmnt_Limit**.

If **TEM_PTO_Key_State_Allow_ReEng** parameter is turned on, then the PTO will be allowed to reengage when the key state is returned to run.

If **TEM_PTO_Non_Neut_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to transmission out of neutral) when the transmission is placed back into neutral.

If **TEM_PTO_Pk_Brake_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to park brake released) when the park brake is reapplied.

If **TEM_PTO_Veh_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to the vehicle being over the vehicle speed value) when the vehicle speed falls below **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 134

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Allow_ReEng	2124	If this Parameter is 1, the PTO will be reengaged after a disengage due to low vehicle air pressure when the primary air pressure is over TEM_PTO_Air_Pres_Engmnt_Limit .	Off	NA	NA	NA
TEM_PTO_Eng_Run_Allow_ReEng	2122	If this Parameter is 1, the PTO will be reengaged after a disengage due to the engine stopping when the engine is restarted.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Allow_ReEng	2120	If this Parameter is 1, the PTO will be reengaged after a disengage due to engine overspeed when the engine speed is below TEM_PTO_Eng_Spd_Engmnt_Limit .	On	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Key_State_Allow_ReEng	2069	If this parameter is set, the PTO will be allowed to reengage when the key state is returned to run.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Allow_ReEng	2148	If this Parameter is 1, the PTO will be reengaged after a disengage due to transmission out of neutral when the transmission is placed back into neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Allow_ReEng	2149	If this Parameter is 1, the PTO will be reengaged after a disengage due to park brake released when the park brake is reapplied.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Allow_ReEng	2119	If this Parameter is 1, the PTO will be reengaged after a disengage due to vehicle overspeed when the vehicle speed is below TEM_PTO_Veh_Spd_Engmnt_Limit.	Off	NA	NA	NA

ALARMS

*These parameters utilize the gauge cluster to sound an alarm to the driver when certain programmable parameters are violated.

If **TEM_PTO_Air_Pres_Alarms** parameter is turned on, then an audible alarm will sound in the cab if the primary air pressure drops below the value specified by **TEM_PTO_Air_Pres_Alarm_Limit**.

If **TEM_PTO_Eng_Run_Alarms** parameter is turned on, then an audible alarm will sound in the cab if the PTO is engaged and the engine is turned off.

If **TEM_PTO_Eng_Spd_Alarms** parameter is turned on, then an alarm will sound in the cab if the PTO is engaged and the engine speed is over the value set by **TEM_PTO_Eng_Spd_Alarm_Limit**.

If **TEM_PTO_Non_Neut_Alarms** parameter is turned on, then an audible alarm will sound in the cab if the PTO is engaged and the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Alarms** parameter is turned on, then an audible alarm will sound in the cab if the PTO is engaged and the park brake is released

If **TEM_PTO_Veh_Spd_Alarms** parameter is turned on, then an audible alarm will sound in the cab if the PTO is engaged and the vehicle speed is about the value set by **TEM_PTO_Veh_Spd_Alarm_Limit**.

Table 135 PTO Alarms

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Alarm_Limit	2139	See TEM_PTO_Air_Pres_Alarms.	Off	NA	NA	NA
TEM_PTO_Air_Pres_Alarms	2138	If this Parameter is 1, an alarm will sound if the primary air pressure is below TEM_PTO_Air_Pres_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Eng_Run_Alarms	2137	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine is turned off.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarm_Limit	2136	See TEM_PTO_Eng_Spd_Alarms	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Alarms	2135	If this Parameter is 1, an alarm will sound if the PTO is engaged and the engine speed is over TEM_PTO_Eng_Spd_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Alarms	2132	If this Parameter is 1, an alarm will sound if the PTO is engaged and transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Alarms	2131	If this Parameter is 1, an alarm will sound if the PTO is engaged and the park brake is released	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Alarms	2133	If this Parameter is 1, an alarm will sound if the PTO is engaged and the vehicle speed is over TEM_PTO_Veh_Spd_Alarm_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Alarm_Limit	2134	See TEM_PTO_Veh_Spd_Alarms	Off	NA	NA	NA

Other Parameters

* These parameters allow the customer to program the active state of the RPM input and set the maximum current of the RPM output.

The **TEM_RPM_PTO_Engaged_Param** parameter indicates the state that the BC will read as active for the TEM PTO feedback switch (As it goes into the RPM input). This active state will be used to indicate when the PTO is engaged.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

The **TEM_Hyd_PTO_Engagement_Out_Param** parameter sets the current at which the BC will fuse the Remote Power Module output that drives the engagement of the PTO. This is used to define the maximum amount of current that can flow through the Remote Power Module output.

Table 136

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_RPM_PTO_Engaged_Param	2147	Active State for the TEM PTO engagement feedback switch.	1	List	List	List
TEM_Hyd_PTO_Engagement_Out_Param	1993	This is the fuse level of the Hydraulic PTO FET.	20 Amps	0	20	0.1

WIRING INFORMATION

→ Please use the Diamond Logic® Builder software to determine pin and switch locations for RPM inputs and outputs and to set programmable parameters (refer to pin and switch location section).

- All wiring to RPM inputs and outputs is customer supplied.
- One wire must be connected from the pin labeled PTO_Output in the Brown 8-pin RPM output connector to the coil on the air solenoid. This wire drives the engagement and disengagement of the solenoid. The customer supplies a GND wire for the air solenoid.
- A second wire must be connected from the Body Builder-installed PTO feedback switch (GND active) to the pin labeled PTO_Feedback_Switch in the Black 23-pin RPM input connector. This switch used to determine whether or not the PTO is engaged by checking if the switch is in the active state. If the switch is indeed in the active state and the PTO is running, then an indicator light in the gauge cluster will be on. When the switch is not in the active state, the indicator light will not be on.
- The switch provided is labeled PTO.

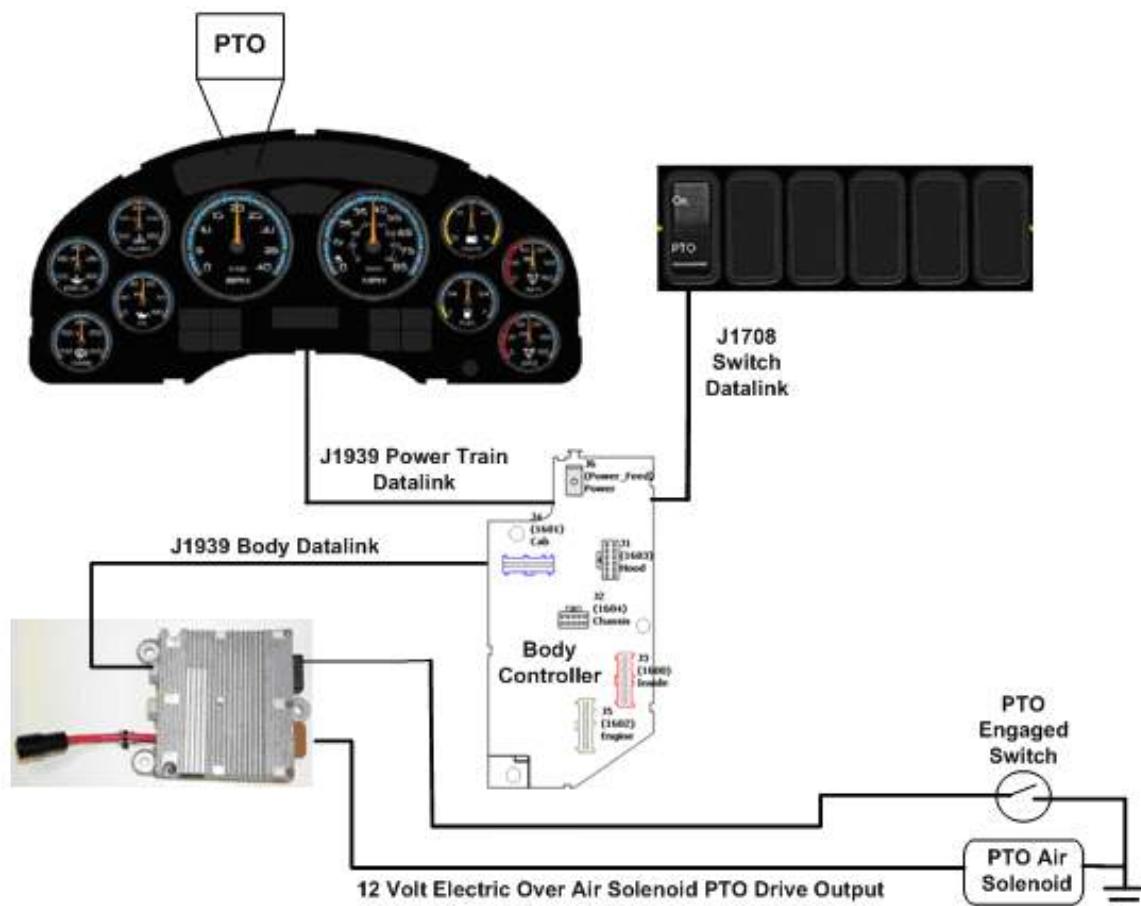


Figure 126 Diagram of Electric Over Air (Clutched) PTO System

RPM CONNECTOR INFORMATION

** HPV kits are REQUIRED to allow Body Builders to wire in and out of the RPM connectors.

HPV kits are pre-made kits that include terminals and seals for BOTH RPM connectors.

Table 137

HPV Kits	Part Number
RPM Terminal Kit 12 Gauge	2585651C91
RPM Terminal Kit 14 Gauge	2585423C91

NOTE – The following connectors are optional because they are already provided with the RPMs.

This information is given so that the Body Builder can purchase connectors in the event that the original connectors are damaged or lost, or so that the Body Builder can pre-fabricate a harness.

Table 138 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black)

Description	Connector, Body, Brown 8-Way RPM Output	Connector, Body, Black 23-Way RPM Input Kit
Connector Part No.	3548934C1	2585981c91
Terminal Part	3534163C1 - 12 Gauge 3535931C1 - 14 Gauge 3535930C1 - 16 & 18 Gauge	1698937C1
Cable Seal Part	3548945C1 - 12 & 14 Gauge 3535937C1 - 16 & 18 Gauge	N/A
Connector Lock Part	3548943c1	N/A
CPA Lock	3573833c1	N/A
Cavity Plug	3535938c1	Included

→ RPM address 1 is located Back of Battery Box on 4000 model trucks

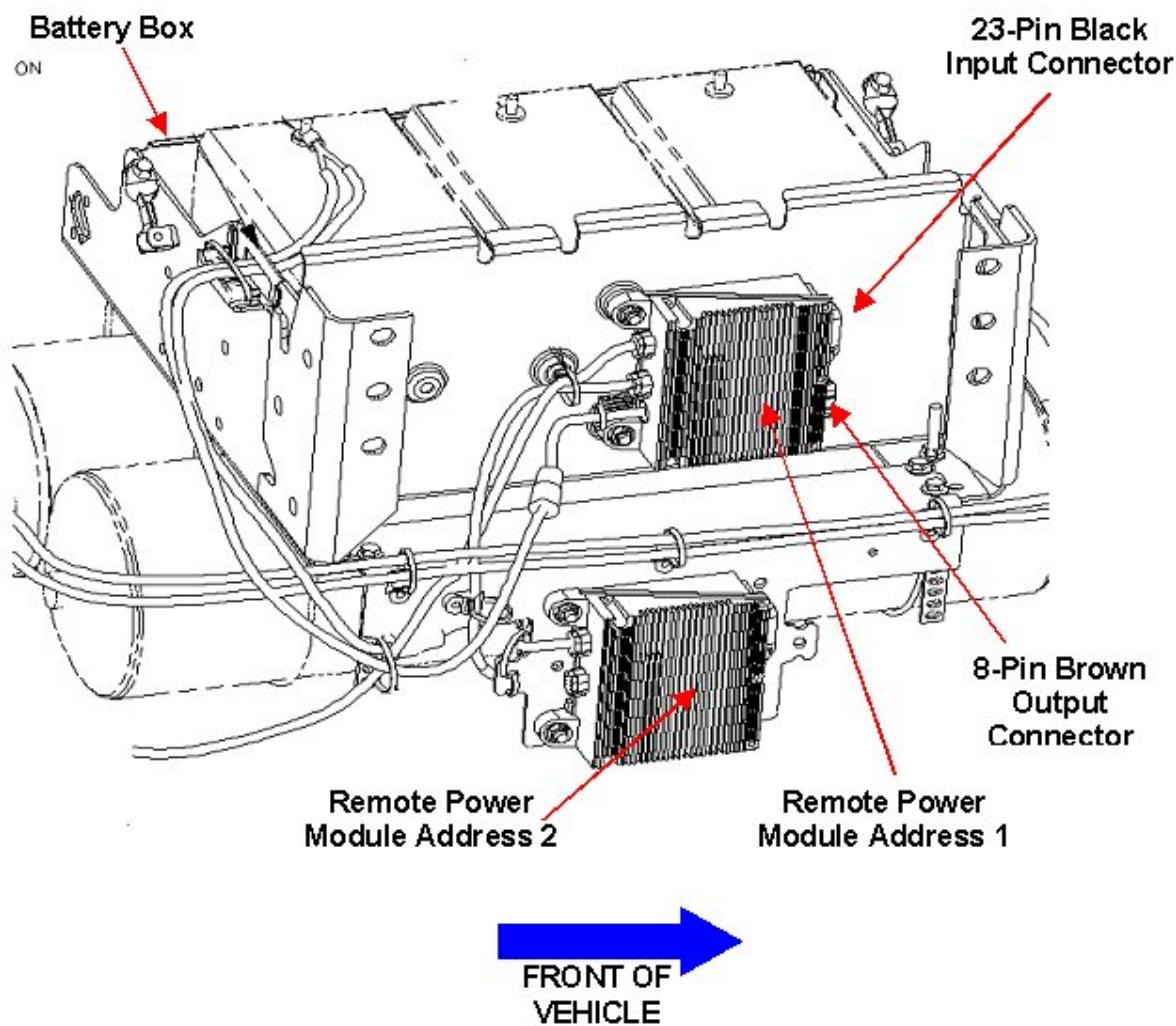


Figure 127 RPM Mounting Location on a 4000 Model Truck

→ RPM address 1 is located Under Cab, driver's side on 7000 model truck.

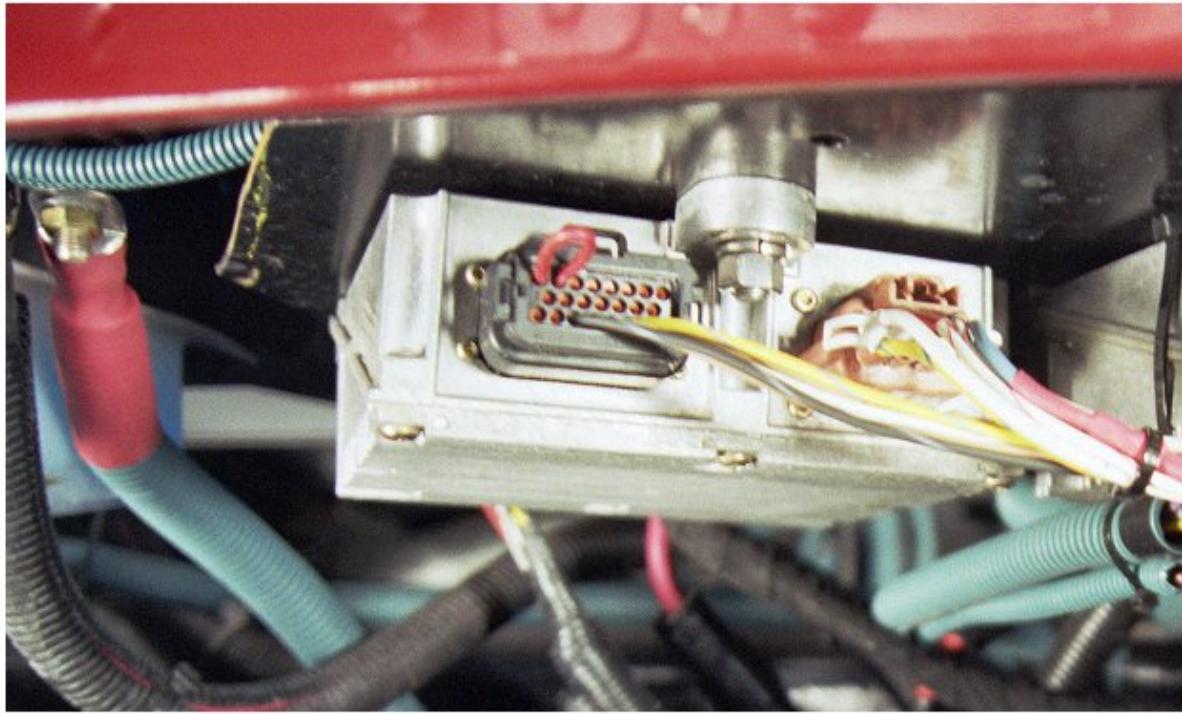


Figure 128 RPM Mounting Location on a 7000 Model Truck

TESTING

1. To determine if the PTO is working, depress the PTO switch in the cab to the on position. Ensure that all interlock conditions are enabled.
2. Verify that the pin labeled **PTO_Output** of the Brown 8-way Remote Power Module output connector has the battery voltage levels present.
3. Verify that the Remote Power Module Input labeled **PTO_Feedback_Switch** (Pin position specified by the Diamond Logic® Builder software) is receiving the correct voltage (12V or GND) as specified by the customer in the Diamond Logic® Builder software.
4. Make certain that the indicator light in the top section of the PTO switch illuminates by engaging the PTO.
5. Make certain that the PTO indicator light in the gauge cluster illuminates by engaging the PTO.
6. The audible alarm can be tested by violating the set programmable parameters and determining if the alarm sounds. For example, if the park brake interlock is programmed ON, release the park brake and engage the PTO. The audible alarm should sound with continuous beeps.

HOW TO ADD THIS FEATURE:

- Software feature codes 595AJT, 595AJU, 595AJY, and 595AJZ must be enabled on the vehicle using the Diamond Logic® Builder software (see Local Dealer).
- Use the Diamond Logic® Builder software to make sure that software feature codes 595AJV, 595AJW, 595AJX, and 595AMZ are NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using the Diamond Logic® Builder software (see Local Dealer)
- Connect a wire from the pin labeled **PTO_Output** in the Brown 8-pin RPM output connector to the coil on the solenoid.
- Connect a wire from a Body Builder-installed PTO feedback switch to the pin labeled **PTO_Feedback_Switch** in the Black 23-Pin RPM input connector.
- Perform the PTO testing procedure that is listed above.

24.6. 13XAA — PTO CONTROL

FEATURE CODE DESCRIPTION:

13XAA — PTO CONTROL, DASH MOUNTED For Customer Provided PTO; Includes Switch, Electric/Air Solenoid, Piping and Wiring

FEATURE/BODY FUNCTION:

This feature provides the customer with the ability to control a customer-supplied PTO with an in-dash switch and an air solenoid. This feature provides all the software and wiring to the air solenoid located inside the driver's side frame rail next to the transmission. Customer must supply and route air plumbing to the PTO. Programmable parameters allow customers to customize the functionality of their PTO.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature codes: 595AJZ and 595AMZ

Software feature codes that must be removed: 595AJU, 595AJV, 595AJW, 595AJX, and 595AJY

ENGAGEMENT

*These parameters set rules that must be met in order for the PTO to be engaged.

If **TEM_PTO_Air_Pres_Engmnt_Inhib** parameter is turned on, the PTO cannot be engaged if the primary vehicle air pressure is below the programmable parameter set by **TEM_PTO_Air_Pres_Engmnt_Limit**.

If **TEM_PTO_Brake_Engmnt_Inhib** parameter is turned on, then the brake pedal must be depressed in order for the PTO to engage.

If **TEM_PTO_Clutch_Engmnt_Inhib** parameter is turned on, then the clutch pedal must be depressed for the PTO to engage.

If **TEM_PTO_Eng_Run_Engmnt_Inhib** parameter is turned on, then the engine has to be running in order for the PTO to be engaged.

If **TEM_PTO_Eng_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the engine speed is over a certain threshold, which is defined as a programmable parameter in **TEM_PTO_Eng_Spd_Engmnt_Limit**

If **TEM_PTO_Neut_Engmnt_Inhib** parameter is turned on, then the PTO can only be engaged if the transmission is NOT in Neutral or Park.

If **TEM_PTO_Non_Neut_Engmnt_Inhib** parameter is turned on, then the transmission must be in Neutral or Park for the PTO to be engaged.

If **TEM_PTO_Pk_Brake_Engmnt_Inhib** parameter is turned on, then the park brake must be set in order for the PTO to be engaged.

If **TEM_PTO_Veh_Spd_Engmnt_Inhib** parameter is turned on, then the PTO cannot be engaged if the vehicle speed is over the value prescribed by **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 139

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Engmnt_Inhib	2097	If this Parameter is 1, the PTO will not be engaged if the primary vehicle air pressure is below TEM_PTO_Air_Pres_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Air_Pres_Engmnt_Limit	2098	See TEM_PTO_Air_Pres_Engmnt_Inhib	90 psi	1	500	1
TEM_PTO_Brake_Engmnt_Inhib	2095	If this Parameter is 1, the PTO will not be engaged if the brake pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Cltch_Engmnt_Inhib	2094	If this Parameter is 1, the PTO will not be engaged if the clutch pedal is not depressed	Off	NA	NA	NA
TEM_PTO_Eng_Run_Engmnt_Inhib	2096	If this Parameter is 1, the PTO will not be engaged if the engine is not running	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Inhib	2092	If this Parameter is 1, the PTO will not be engaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Eng_Spd_Engmnt_Limit	2093	See TEM_PTO_Eng_Spd_Engmnt_Inhib	1000 RPM	100	5000	1
TEM_PTO_Neut_Engmnt_Inhib	2089	If this Parameter is 1, the PTO will only be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Non_Neut_Engmnt_Inhib	2088	If this Parameter is 1, the PTO will not be engaged if the Transmission is not in Neutral or Park	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Engmnt_Inhib	2087	If this Parameter is 1, the PTO will not be engaged if the Park Brake is not set.	Off	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Veh_Spd_Engmnt_Inhib	2090	If this Parameter is 1, the PTO will not be engaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_Engmnt_Limit	On	NA	NA	NA
TEM_PTO_Veh_Spd_Engmnt_Limit	2091	See TEM_PTO_Veh_Spd_Engmnt_Inhib	3 MPH	1	100	1

DISENGAGEMENT

* These parameters set the conditions under which the PTO will be disengaged.

If **TEM_PTO_Air_Pres_Disengages** parameter is turned on, then the PTO will be disengaged if the primary air pressure is below the value set in **TEM_PTO_Air_Pres_DisEng_Limit**.

If **TEM_PTO_Eng_Run_Disengages** parameter is turned on, then the PTO will be disengaged if the engine is turned off.

If **TEM_PTO_Eng_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the engine speed rises above the value set by **TEM_PTO_Eng_Spd_DisEng_Limit**.

If **TEM_PTO_Non_Neut_Disengages** parameter is turned on, then the PTO will be disengaged if the transmission is taken out of neutral.

If **TEM_PTO_Pk_Brake_Disengages** parameter is turned on, then the PTO will be disengaged if the Park Brake is released.

If **TEM_PTO_Veh_Spd_Disengages** parameter is turned on, then the PTO will be disengaged if the vehicle speed is over the valued specified by **TEM_PTO_Veh_Spd_DisEng_Limit**.

Table 140

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_DisEng_Limit	2116	See TEM_PTO_Air_Pres_Disengages	80 psi	0	500	1
TEM_PTO_Air_Pres_Disengages	2115	If this Parameter is 1, the PTO will be disengaged if the primary air pressure is below the value set in TEM_PTO_Air_Pres_DisEng_Limit.	On	NA	NA	NA

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Eng_Run_Disengages	2114	If this Parameter is 1, the PTO will be disengaged if the engine is turned off.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_DisEng_Limit	2113	See TEM_PTO_Eng_Spd_Disengages	1800 RPM	0	5000	1
TEM_PTO_Eng_Spd_Disengages	2112	If this Parameter is 1, the PTO will be disengaged if the engine speed is over the value set in TEM_PTO_Eng_Spd_DisEng_Limit	On	NA	NA	NA
TEM_PTO_Non_Neut_Disengages	2109	If this Parameter is 1, the PTO will be disengaged if the transmission is taken out of neutral.	Off	NA	NA	NA
TEM_PTO_Pk_Brake_Disengages	2108	If this Parameter is 1, the PTO will be disengaged if the Park Brake is released.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Disengages	2110	If this Parameter is 1, the PTO will be disengaged if the vehicle speed is over the value set in TEM_PTO_Veh_Spd_DisEng_Limit.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_DisEng_Limit	2111	See TEM_PTO_Veh_Spd_Disengages	0 MPH	3	100	1

REENGAGEMENT

* These parameters set the conditions under which the PTO can be reengaged.

If **TEM_PTO_Air_Pres_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to low air pressure) when the primary air pressure rises about the value specified by **TEM_PTO_Air_Pres_Engmnt_Limit**.

If **TEM_PTO_Eng_Run_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine stopping) when the engine is restarted.

If **TEM_PTO_Eng_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to engine overspeed) when the engine speed falls below **TEM_PTO_Eng_Spd_Engmnt_Limit**.

If **TEM_PTO_Key_State_Allow_ReEng** parameter is turned on, then the PTO will be allowed to reengage when the key state is returned to run.

If **TEM_PTO_Non_Neut_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to transmission out of neutral) when the transmission is placed back into neutral.

If **TEM_PTO_Pk_Brake_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to park brake released) when the park brake is reapplied.

If **TEM_PTO_Veh_Spd_Allow_ReEng** parameter is turned on, then the PTO will be reengaged (after a disengage due to the vehicle being over the vehicle speed value) when the vehicle speed falls below **TEM_PTO_Veh_Spd_Engmnt_Limit**.

Table 141

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Air_Pres_Allow_ReEng	2124	If this Parameter is 1, the PTO will be reengaged after a disengage due to low vehicle air pressure when the primary air pressure is over TEM_PTO_Air_Pres_Engmnt_Limit .	Off	NA	NA	NA
TEM_PTO_Eng_Run_Allow_ReEng	2122	If this Parameter is 1, the PTO will be reengaged after a disengage due to the engine stopping when the engine is restarted.	Off	NA	NA	NA
TEM_PTO_Eng_Spd_Allow_ReEng	2120	If this Parameter is 1, the PTO will be reengaged after a disengage due to engine overspeed when the engine speed is below TEM_PTO_Eng_Spd_Engmnt_Limit .	On	NA	NA	NA
TEM_PTO_Key_State_Allow_ReEng	2069	If this parameter is set, the PTO will be allowed to reengage when the key state is returned to run.	Off	NA	NA	NA
TEM_PTO_Non_Neut_Allow_ReEng	2148	If this Parameter is 1, the PTO will be reengaged after a disengage due to transmission out of neutral when the transmission is placed back into neutral.	Off	NA	NA	NA

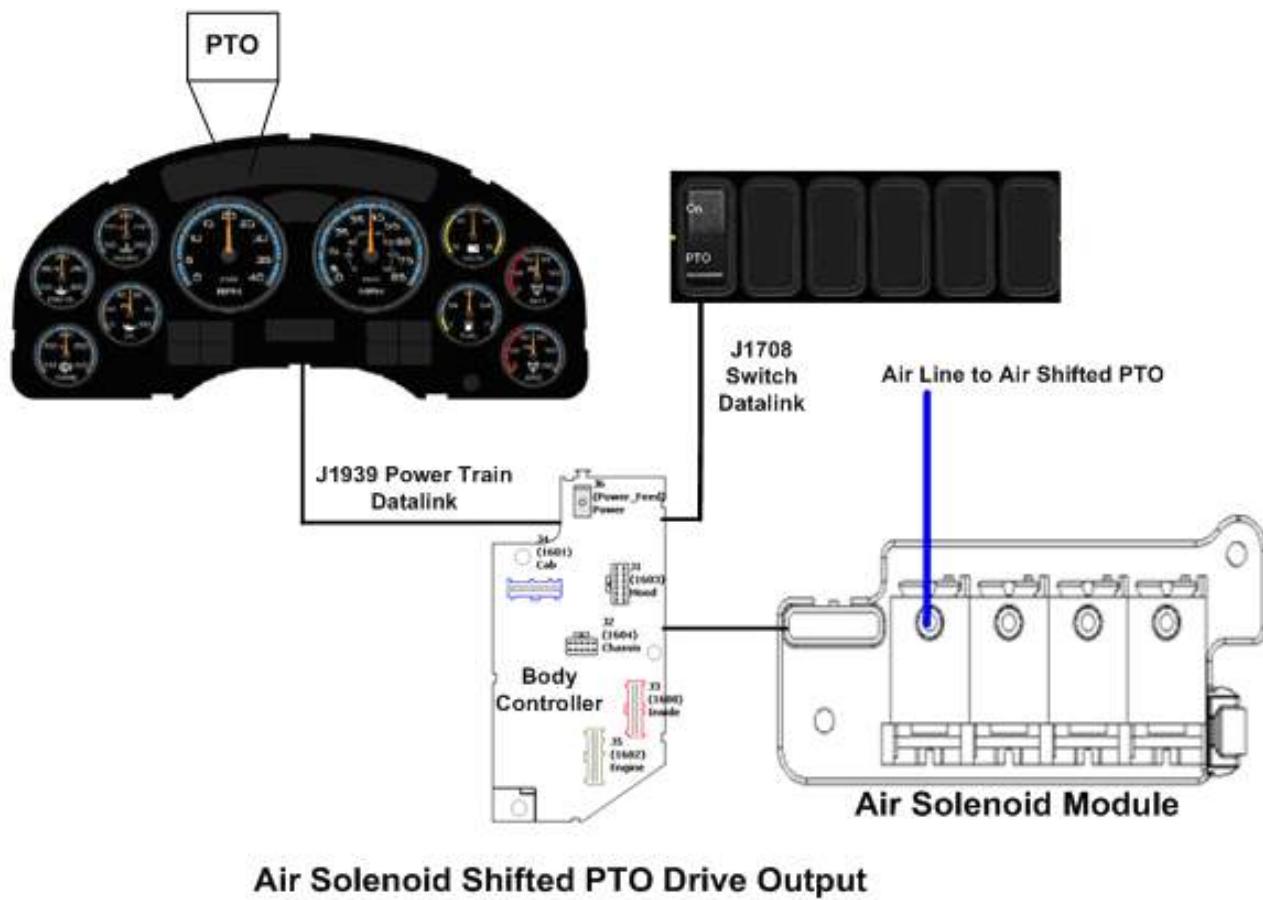
Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
TEM_PTO_Pk_Brake_Allow_ReEng	2149	If this Parameter is 1, the PTO will be reengaged after a disengage due to park brake released when the park brake is reapplied.	Off	NA	NA	NA
TEM_PTO_Veh_Spd_Allow_ReEng	2119	If this Parameter is 1, the PTO will be reengaged after a disengage due to vehicle overspeed when the vehicle speed is below TEM_PTO_Veh_Spd_Engmnt_Limit.	Off	NA	NA	NA

ALARMS

****Alarm parameters should not be set for this feature!!!!**

WIRING INFORMATION

- Customer must supply and route air plumbing from the International-provided air solenoid (Located inside the driver's side frame rail, adjacent to the Transmission) to the PTO.



Air Solenoid Shifted PTO Drive Output

Figure 129

TESTING

1. Depress the In-cab PTO switch to the ON position.
2. Verify that all enabled interlock conditions are met.
3. Verify that the International-provided air solenoid is supplying air pressure at the solenoid output.

HOW TO ADD THIS FEATURE:

- Software feature codes 595AJZ and 595AMZ must be added to the truck using the Diamond Logic® Builder software.
- Software feature codes 595AJU, 595AJV, 595AJW, 595AJX, and 595AJY must NOT be enabled on the truck.
- Set desired “Engagement”, “Disengagement”, and “Reengagement” programmable parameters.
- Add a latched switch (P/N 3578910C1) in the in-cab switch pack in the position specified by the Diamond Logic® Builder software.
- If the truck does not already have a 4-pack solenoid base, the customer should order a 4-pack base (part number 2505594C1) and an air solenoid (part number 2506711C91).
- Add wiring as per the Electrical Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Air Solenoid.

24.7. 16WLM — PTO HOURMETER

FEATURE CODE DESCRIPTION:

16WLM — HOURMETER, PTO for Customer Provided PTO; Indicator Light and Hourmeter in Gauge Cluster
Includes Return Wire for PTO Feedback Switch

FEATURE/BODY FUNCTION: This feature provides the customer with a wire (Circuit K88B 14 gauge, light green - cut blunt - located in the transmission harness) to be wired into a PTO body builder-installed feedback switch. Also included in this feature is a PTO indicator light in the gauge cluster and a PTO hourmeter, which allows the operator to measure stationary PTO hours for maintenance records and fuel tax purposes. To view the hourmeter, press the gauge cluster selection button momentarily until the text portion of the display indicates "PTO Hour".

NOTE – This feature cannot be used if 16HGJ (Optional Transmission Oil Temperature Gauge for a MANUAL Transmission) is utilized.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software feature codes that must be added: 595AJU and 595AYN

Software feature codes that must NOT be enabled: 595AEW

The **BC_PTO_Engaged_Param** parameter defines the voltage that will be read as the active state for the PTO engagement feedback switch.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

Table 142

Parameter	ID	Description	Default	Units	Min	Max	Step
BC_PTO_Engaged_Param	2199	Active State for the PTO engagement feedback switch.	1	No_Units	NA	NA	NA

WIRING INFORMATION

- The customer must wire the International-provided PTO engagement feedback return wire (14 gauge, Light Green) into the PTO feedback switch which should be a GND active switch.

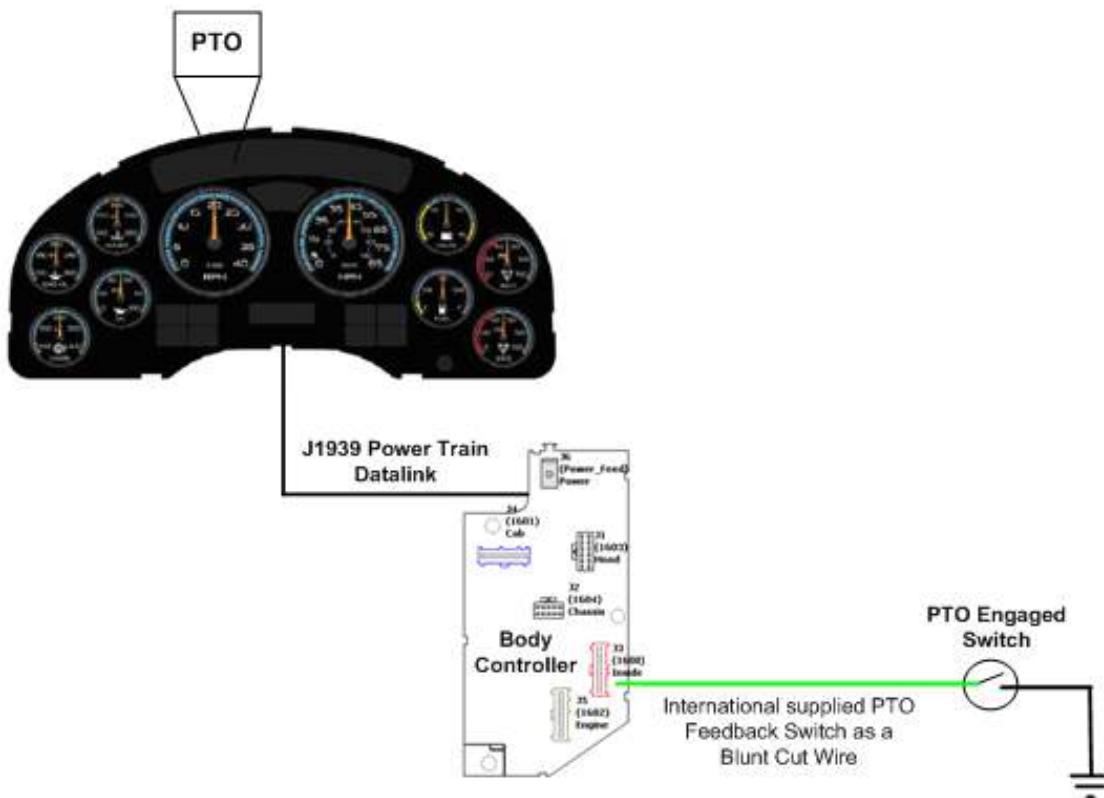


Figure 130

TESTING

1. Customer should apply the correct active state voltage (as programmed in the Diamond Logic® Builder software) to the International-provided PTO engagement feedback wire.
2. Verify that the PTO indicator light in the gauge cluster comes on and stays on as long as the active state voltage is applied.

HOW TO ADD THIS FEATURE:

- The customer must enable software feature code 595AJU and 595AYN using the Diamond Logic® Builder software.
- The customer must make sure that software feature code 595AEW is NOT enabled using the Diamond Logic® Builder software.
- The customer must set BC_PTO_Engaged_Param to desired active state for the PTO feedback switch.
- When adding this feature to a vehicle, alternate wiring methods must be performed. It is not possible to add a wire to connector 1702 pin 13 as described by the electrical circuit diagram manual. The dash panel grommet is sealed, and additional wires may not be added.
- In order to add this feature, connect an 18 gauge wire to the PTO feedback switch, and terminate it in an open wire terminal cavity in connector 1700 or 1701.
- Add another 18 gauge wire in the corresponding cavity on the cab harness connector, and terminate it in the BC Connector 1600 terminal pin B7.

25. ENGINE SPEED CONTROL FEATURES

25.1. 12VXY — REMOTE MOUNTED ENGINE CONTROL

FEATURE CODE DESCRIPTION:

12VXY – ENGINE CONTROL, REMOTE MOUNTED Provisions for: Includes module and connector for Body Builder installation of remote engine speed control with SAE J1939 communication with Maxxforce electronic engines.

FEATURE/BODY FUNCTION:

This feature is an accommodation for a Remote Engine Speed Control Module (RESCM). This feature also provides a public J1939 datalink to the Body Controller (BC) from the RESCM. The feature has associated software (595AHA) that is programmed into the BC, which allows it to control the engine remotely through the RESCM.

There are programmable parameters that are used by this function both in the BC and the Engine Control Module (ECM). The parameters in the BC are listed below and the parameters in the ECM allow the selection of disabling the cab controls, engine speed presets, stationary or variable speed control, etc. The ECM parameters are programmed with the Master Diagnostics software.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature codes: 595AHA

Software feature codes that must be removed: NONE

These parameters should be left at their factory default values!

Table 143

Parameter	ID	Description	Default	Units	Min	Max	Step
Remote_Accelerator_Enable	1870	Enables the remote accelerator.	1	NONE	0	1	1
RESCM_Require_Park_Brake	2240	Enables the park brake interlock for RESCM.	1	NONE	0	1	1

WIRING INFORMATION

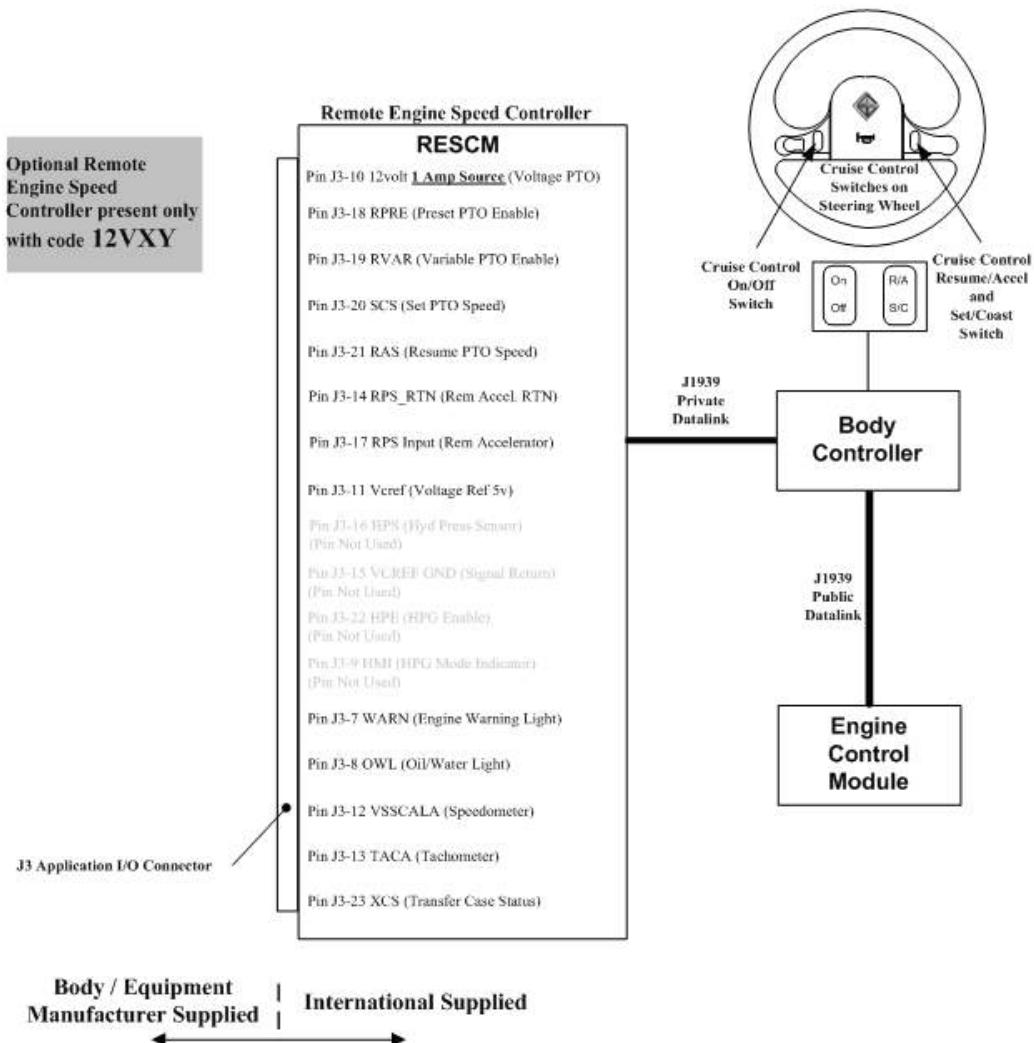


Figure 131 RESCM Overview Diagram

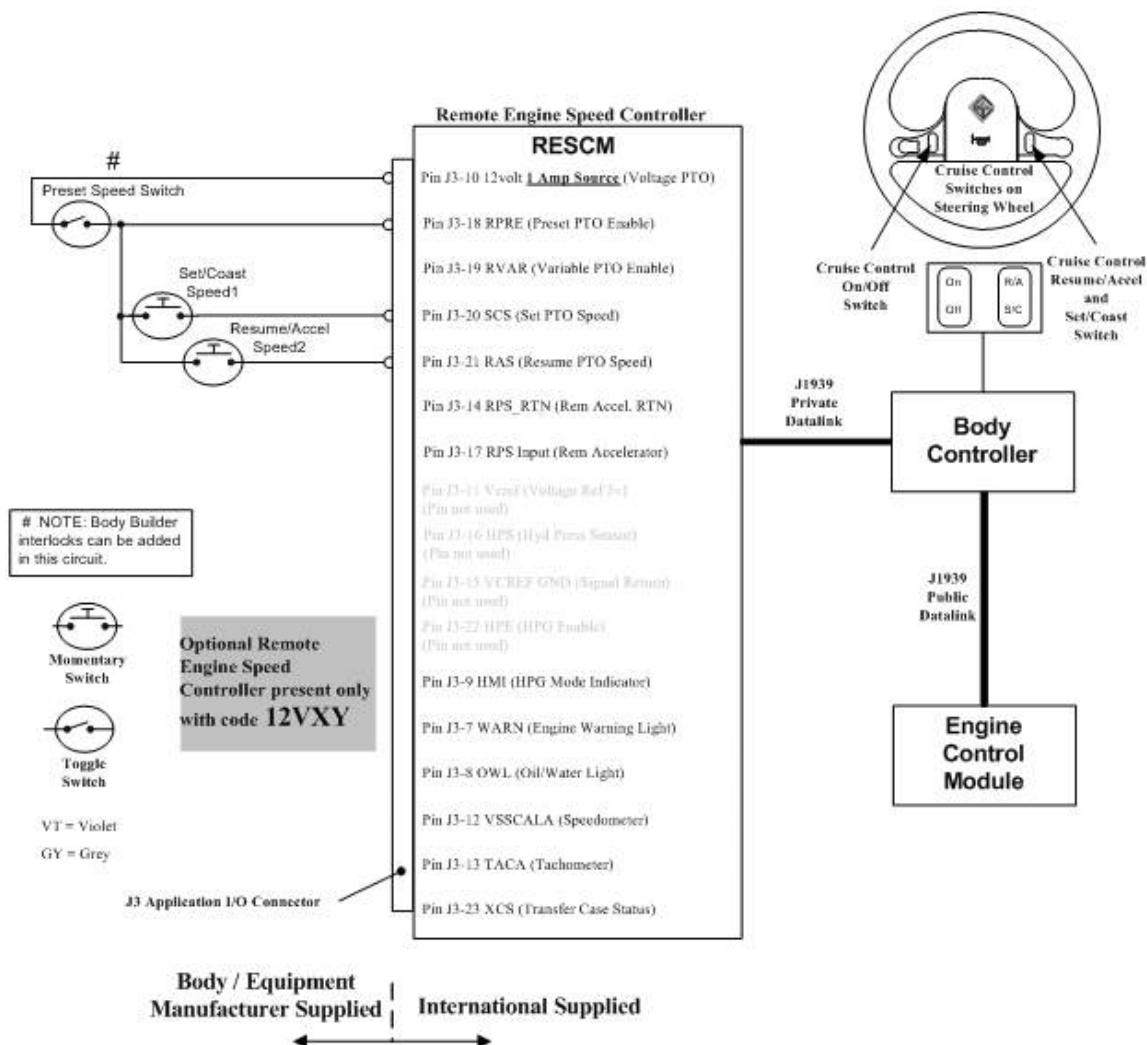


Figure 132 Remote Installation For Preset Engine Control Using the Remote Engine Speed Controller

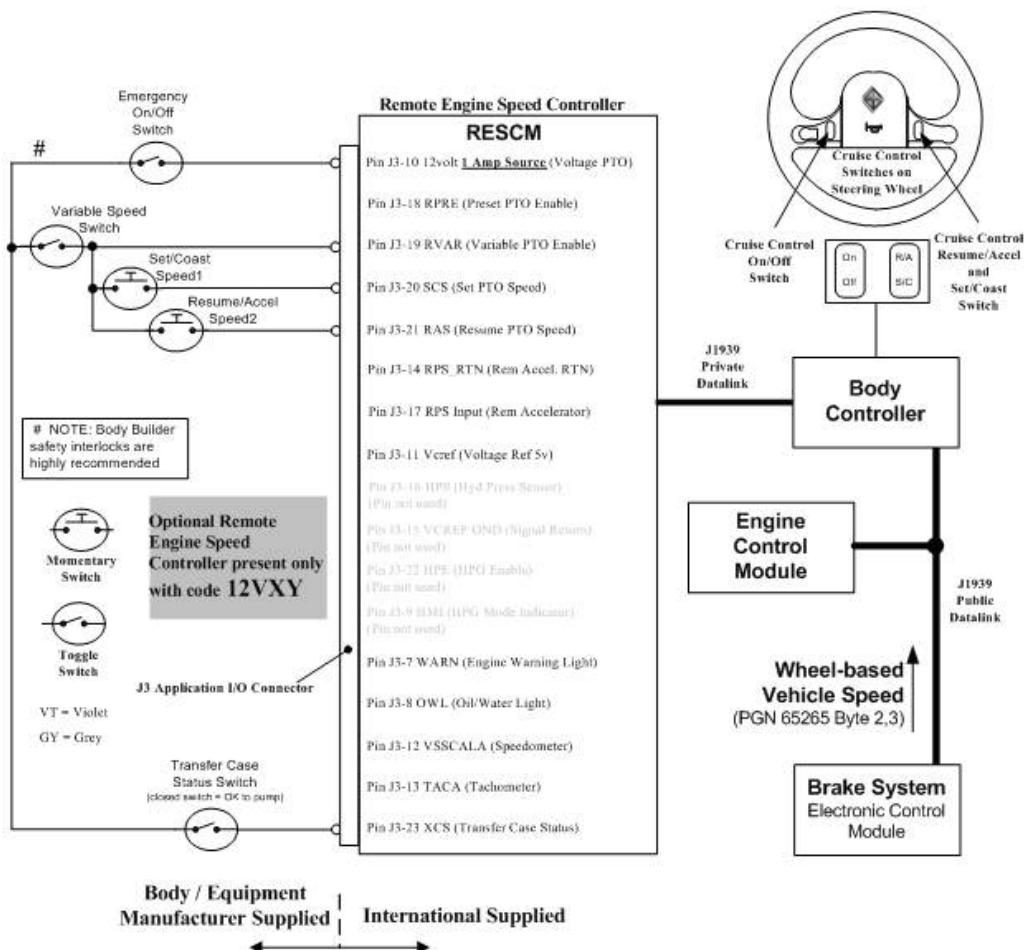


Figure 133 Split Shaft Engine Speed Control

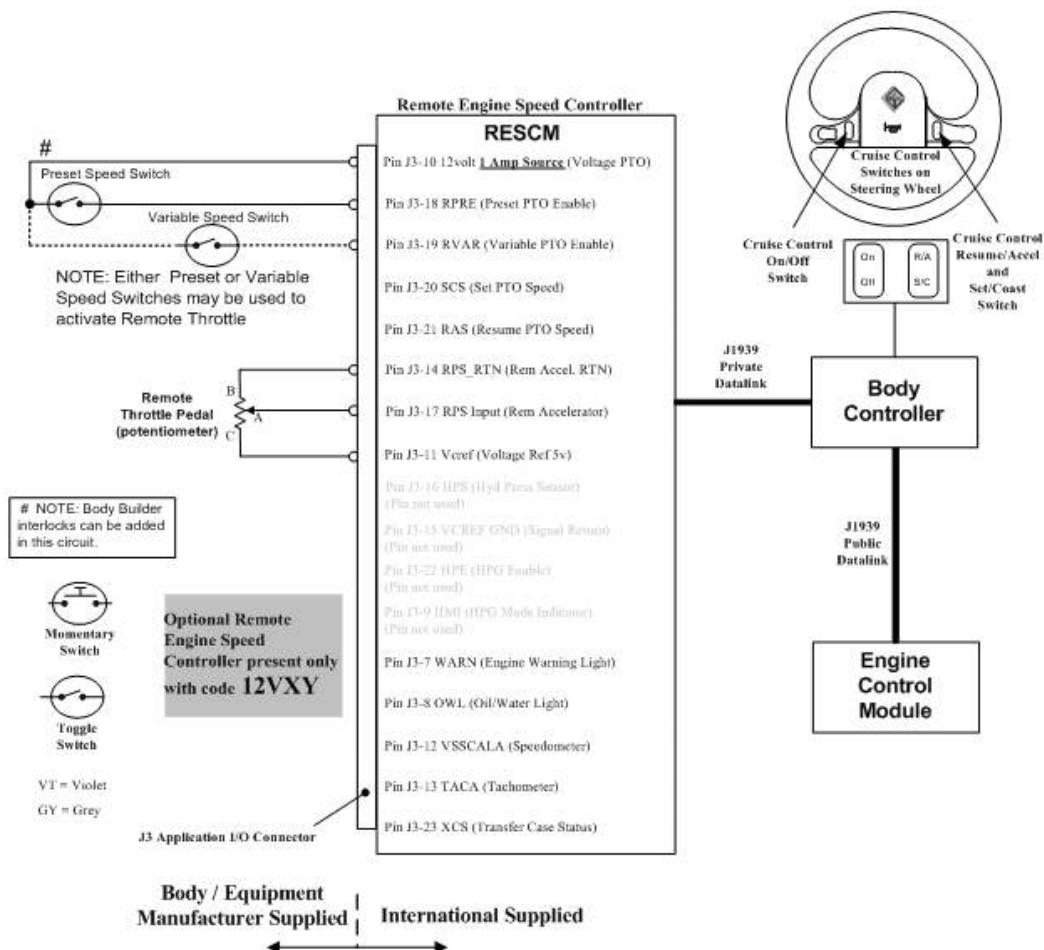


Figure 134 Remote Throttle Interface

TESTING:

12VXY is tested and programmable parameters are set via the Master Diagnostics Software package.

25.2. 12VXT – THROTTLE, HAND CONTROL, STATIONARY, VARIABLE SPEED

FEATURE CODE DESCRIPTION:

12VXT – THROTTLE, HAND CONTROL Engine Speed Control; Electronic, Stationary, Variable Speed; Mounted on Steering Wheel

FEATURE/BODY FUNCTION:

Stationary Variable Speed feature 12VXT allows the equipment operator to feather engine speed up or down to make fine adjustments to engine speed to achieve the desired functionality. The vehicle must be in a stationary position. Application examples are Fire (to throttle up to get a certain water flow), Utility Bucket, Crane, and Digger Derrick.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: No software in the Body Controller (BC) is required.

Software feature codes that must be removed: NONE

WIRING INFORMATION

No additional wiring is associated with this feature.

TESTING:

This feature is added by programming the Engine Control Module (ECM) for stationary, variable speed control.

Refer to the Body Builder Book CT-471 (PBB-71000A) for engine ECM programming functionality.

25.3. 12VXU – THROTTLE, HAND CONTROL, STATIONARY PRE-SET

FEATURE CODE DESCRIPTION:

12VXU – THROTTLE, HAND CONTROL Engine Speed Control for PTO; Electronic, Stationary Pre-Set, Two Speed Settings; Mounted on Steering Wheel

FEATURE/BODY FUNCTION:

Stationary Preset Speed feature 12VXU allows the user to operate auxiliary equipment at two pre-determined engine speed settings while in a stationary position. Application examples are Garbage Packer, Recovery, Sewer Suckers, and other applications that are meant to run at a set speed.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: No software in the BC is required.

Software feature codes that must be removed: NONE

WIRING INFORMATION

No additional wiring is associated with this feature.

TESTING:

This feature is added by programming the Engine Control Module (ECM) for stationary, pre-set speed control.

Refer to the Body Builder Book CT-471 (PBB-71000A) for engine ECM programming functionality.

25.4. 12VXV – THROTTLE, HAND CONTROL, MOBILE, VARIABLE SPEED

FEATURE CODE DESCRIPTION:

12VXV – THROTTLE, HAND CONTROL Engine Speed Control for PTO; Electronic, Mobile, Variable Speed; (Range 2 to 20 MPH) Mounted on Steering Wheel

FEATURE/BODY FUNCTION:

Mobile Variable Speed feature 12VXV allows the equipment operator to feather engine speed up or down to make fine adjustments to engine speed to achieve the desired functionality. The vehicle is moving; however, the accelerator and brake pedals are inoperative. Speed is controlled through the steering wheel controls. Application examples are Concrete Mixer, Asphalt Spreader, Dump (dumping gravel, etc.), and other applications that require fine control of engine speed while the vehicle is moving.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: No software in the BC is required.

Software feature codes that must be removed: NONE

WIRING INFORMATION

No additional wiring is associated with this feature.

TESTING:

This feature is added by programming the Engine Control Module (ECM) for mobile, variable speed control.

Refer to the Body Builder Book CT-471 (PBB-71000A) for engine ECM programming functionality.

25.5. 12VZA — REMOTE MOUNTED ENGINE CONTROL

FEATURE CODE DESCRIPTION:

12VZA – ENGINE CONTROL, REMOTE MOUNTED Provision for; Includes Wiring for Body Builder Installation of PTO Controls; With Ignition (IGN) Switch Control for International post 2007 Emissions Electronic Engines

FEATURE/BODY FUNCTION:

This feature is an accommodation for remote engine speed control using hard wires directly into the ECM for International post 2007 emission electronic engines. This feature provides 13 blunt-cut wires in the engine compartment above the steering shaft. These wires can be spliced to Body Builder-supplied switches and throttle control devices to control the engine speed.

There are no programmable BC parameters that are used by this function. The programmable parameters are located in the ECM of the engine.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

No BC features

For proper ECM parameter programming, see the Body Builder book CT-471 PBB-71000.

WIRING INFORMATION

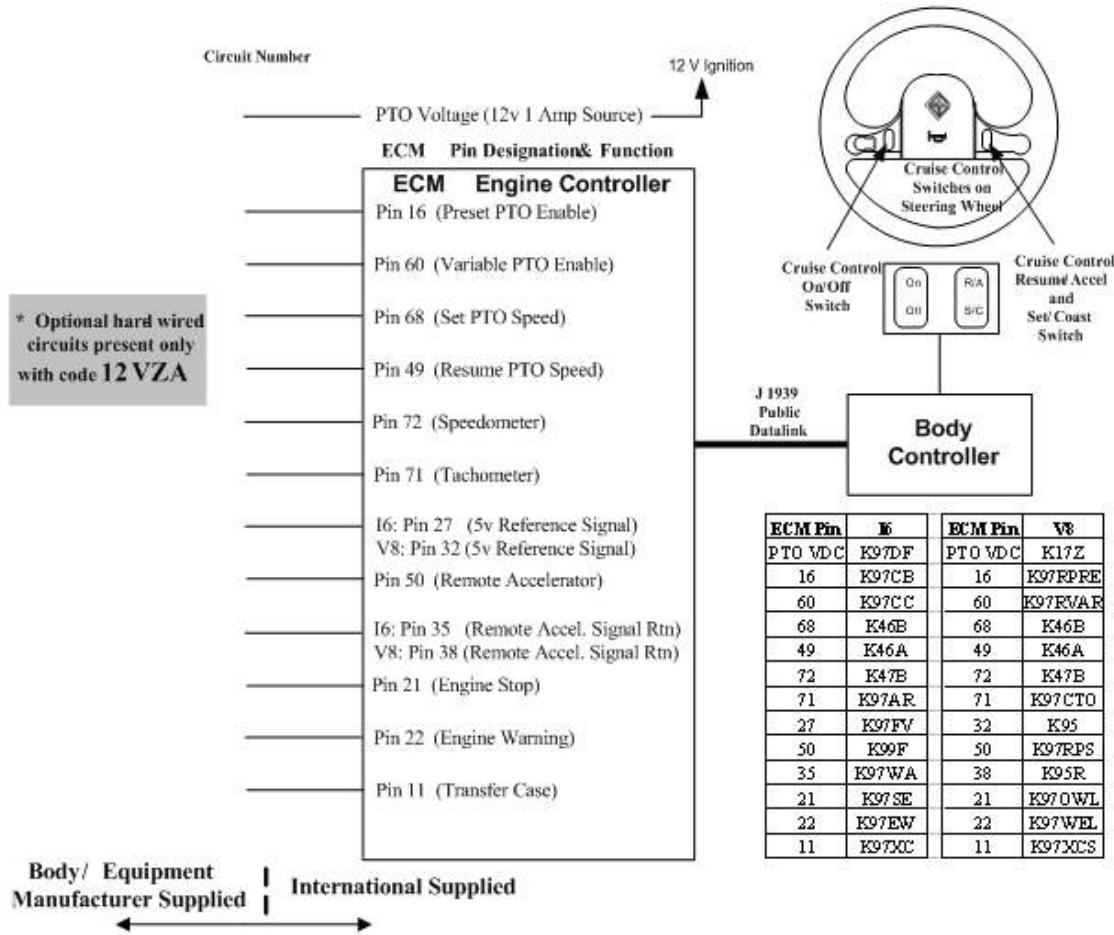


Figure 135 Hard Wired ECM Engine Control Overview Diagram

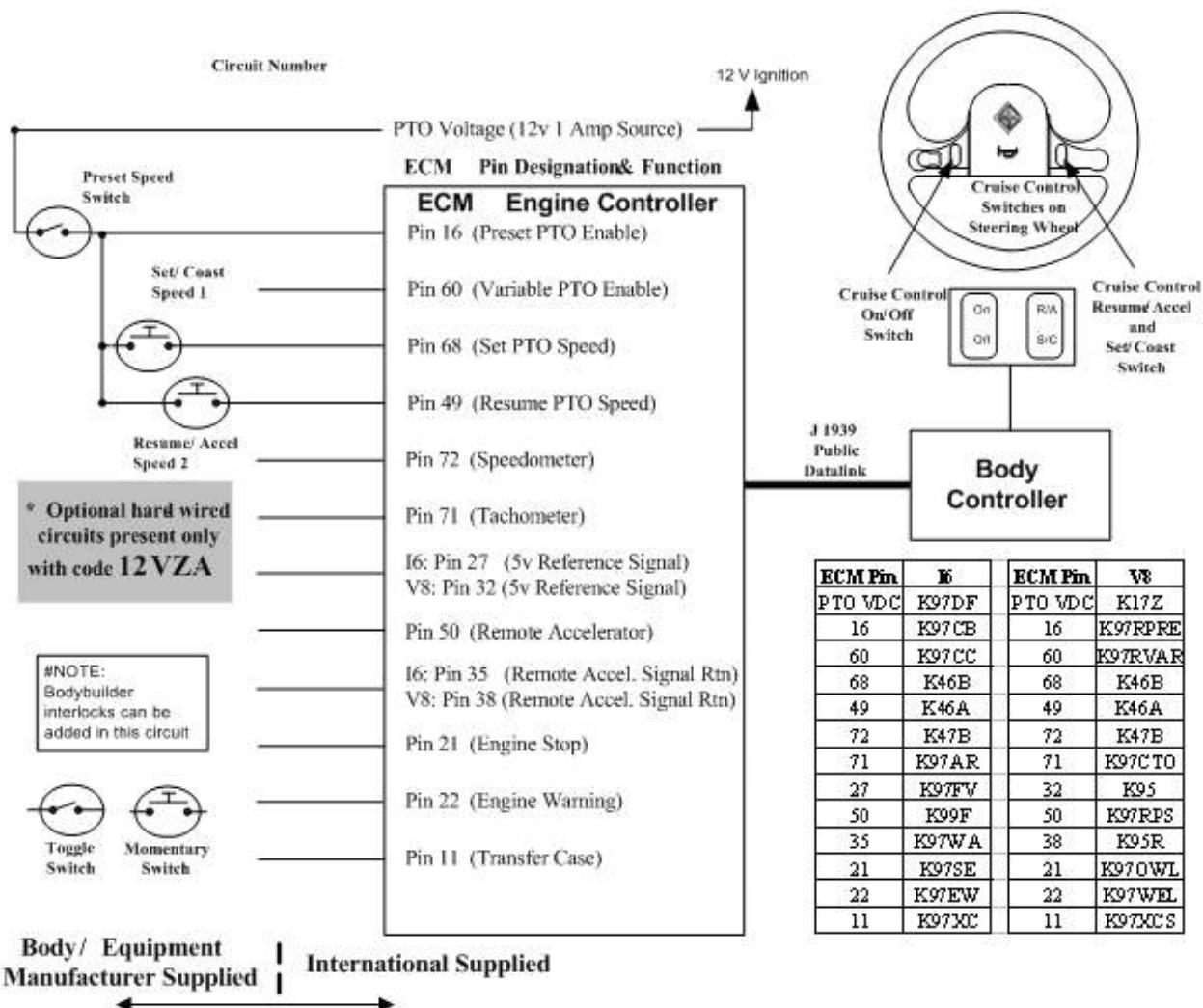


Figure 136 Remote Installation for Preset Engine Control Using the Hard Wired ECM Inputs

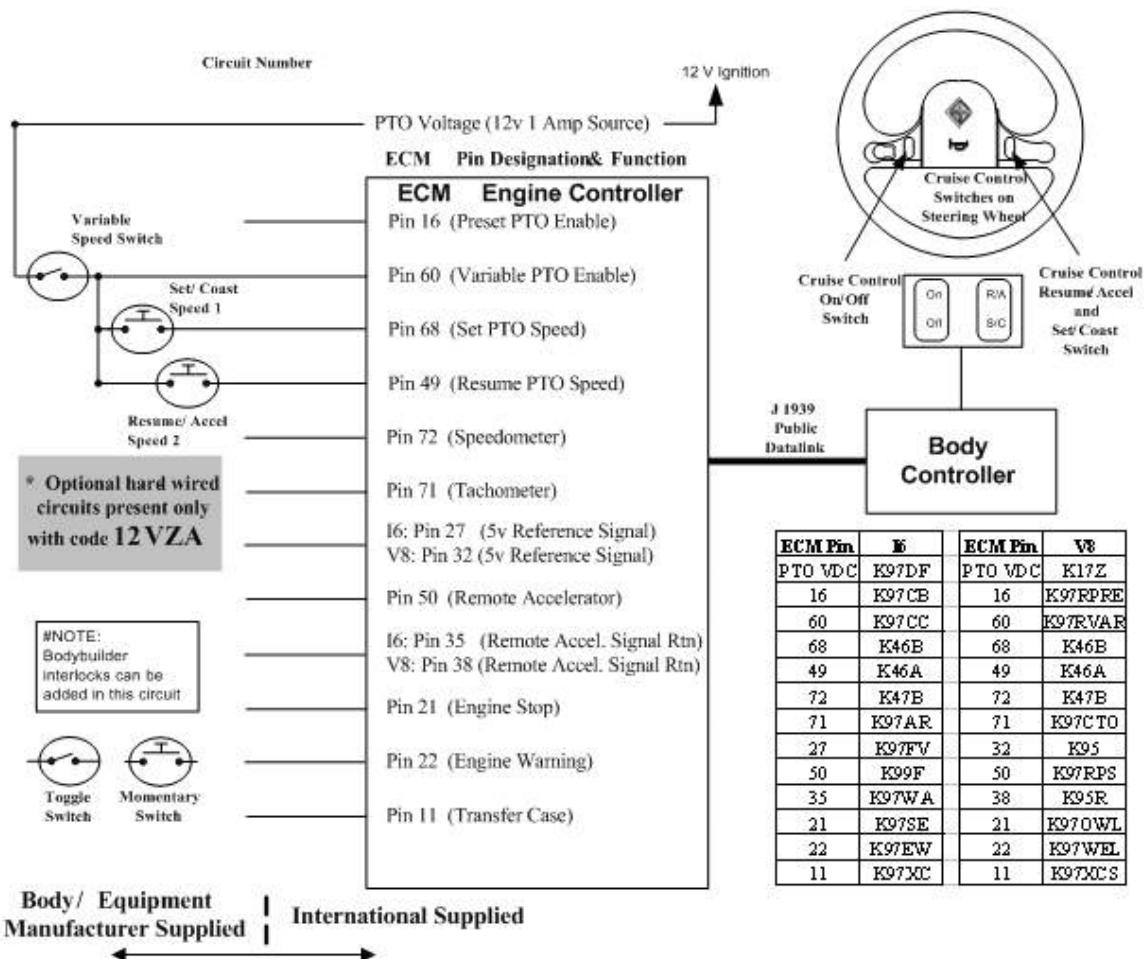


Figure 137 Remote Installation for Variable Engine Control Using the Hard Wired ECM Inputs

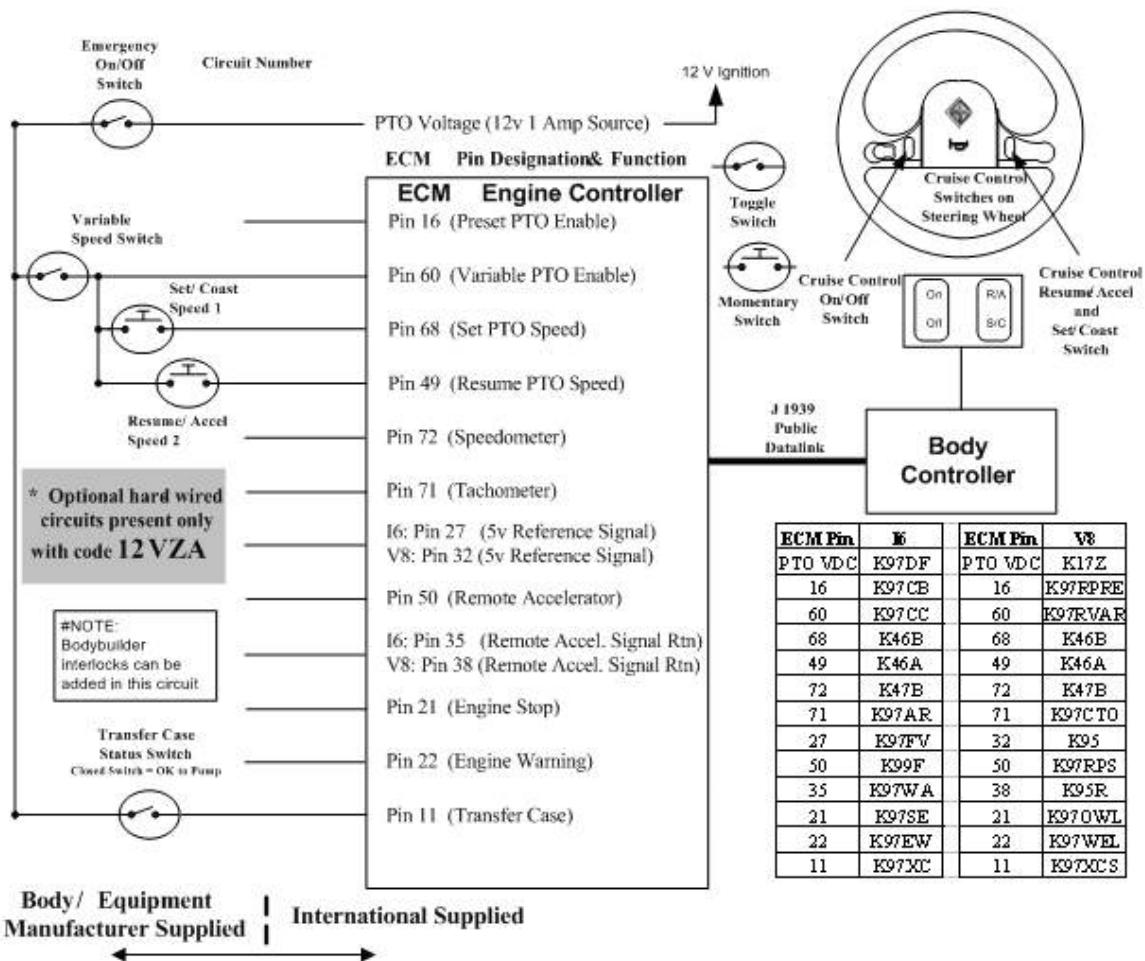


Figure 138 Split Shaft Engine Speed Control using the ECM Hard Wired Inputs

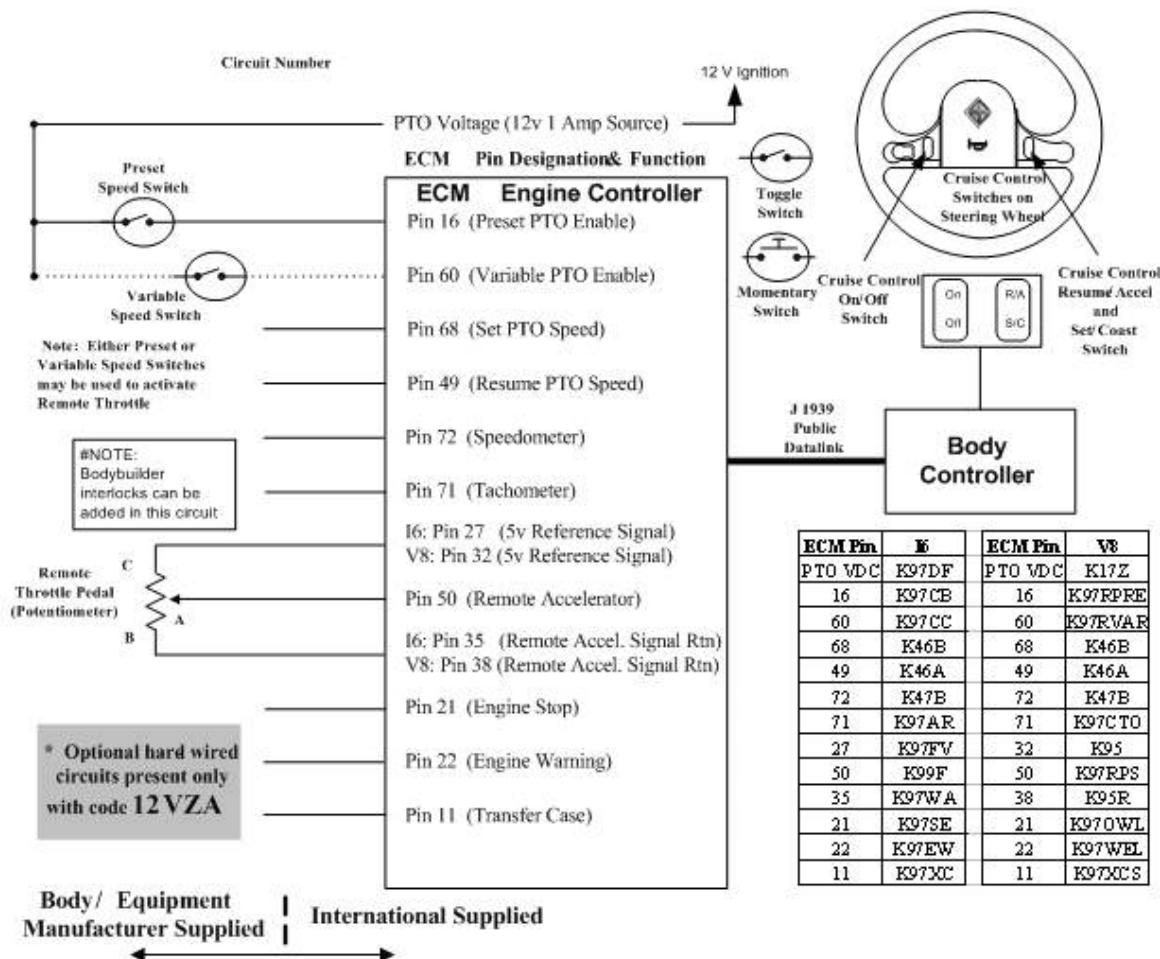


Figure 139 Remote Throttle Interface using the ECM Hard Wired Inputs

TESTING:

12VZA is tested and programmable parameters are set via the Master Diagnostics Software package.

25.6. 60AJA — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — RECOMMENDED APPLICATION: RECOVERY**FEATURE CODE DESCRIPTION:**

60AJA – BDY INTG, THROTTLE CONTROL Accommodation for Single Customer-Mounted External Engine Speed Control Switch, Programmable Mode for Various Switch Actions and Engine Speed Control Option; Useable Only While Vehicle is Stopped and the Park Brake is Applied (requires one Remote Power Module (RPM) input)

FEATURE/BODY FUNCTION:

TEM or customer-mounted single remote center stable, momentary switch; when the operator moves the switch to the up position, the switch supplies 12 volts to the RPM input to activate Remote engine speed control preset-1; when the operator returns the switch to the center position or stable position, the engine will remain at preset-1 until the operator moves the switch to the down position; in the down position, the switch then supplies a Ground (GND) to the RPM input to deactivate Remote engine speed control preset-1; when the operator returns the switch to the center position or stable position, the engine will remain at idle.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKJ

Conflicts with software features: 595AKK, 595AKL, 595AKM, 595AKN

Activation Parameters:

1. Momentary 12 volt input to RPM
2. Park brake applied
3. Transmission in neutral or park or clutch pedal not depressed
4. Vehicle speed is less than one MPH
5. Engine running and at idle
6. Optional PTO feedback is true.

Deactivation Parameters:

1. Momentary GND input to RPM
2. Park brake not applied
3. Transmission not in neutral or park or clutch pedal depressed
4. Vehicle speed is greater than one MPH.
5. Engine not running
6. Service brake depressed
7. Optional PTO feedback not true

FEATURE ORDERING NOTES:

1. This feature requires one RPM input.

2. If 60AJA is ordered, 12VXU must also be ordered which requires entering TEM or customer-requested Remote engine speed control preset-1 RPMs.
3. TEM or customer must supply single pull, double throw, center stable, momentary switch and all associated wiring from switch to RPM.
4. The optional PTO interlock is defaulted off; this interlock only works with International pre-engineered PTO features. If the TEM or customer has one of the International pre-engineered PTO features and needs to have this interlock turned on, this will require an additional parameter change by someone who is at least Diamond Logic® Builder Level 2 or 3 certified.

HOW TO INSTALL THIS FEATURE:

Software Installation:

1. Use Diamond Logic® Builder to install Body Controller (BC) software feature code 595AKJ, and set the feature code parameters to the following settings:
 - a. 595AKJ – Set parameter 2035 to 1. Reference feature configuration programmable parameters.
 - b. 595AKJ – Set parameter 2158 to 3. Reference feature configuration programmable parameters.
 - c. 595AKJ – Set parameter 2036 to on for optional PTO interlock. Reference feature configuration programmable parameters.
2. Use Diamond Logic® Builder to remove BC software feature codes 595AKK, 595AKL, 595AKM, and 595AKN.
3. Use Master Diagnostics to program Engine control module: PTO in-cab control: on
4. Use Master Diagnostics to program Engine control module: PTO in-cab mode: stationary pre-set
5. Use Master Diagnostics to program Engine control module: PTO Power Take Off mode: remote and in-cab operation
6. Use Master Diagnostics to program Engine control module: PTO Preset-1 RPM set (700.00 to 2800.00) (Note: this is the RPM the customer or TEM has requested)

PROGRAMMABLE PARAMETERS:

1. 2036 TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock; This parameter sets the optional PTO interlock mode on or off. If set on, the Remote engine speed control preset-1 will be interlocked to all International pre-engineered PTO features that use a center panel switch. This means that the remote engine speed control will only be allowed to operate if the PTO is being requested to engage. If this parameter is not set, the engine speed control will operate regardless of the PTO request.
 - a. On
 - b. Off
2. 2035 TEM_Ext_Eng_Spd_Control_Mode; This parameter sets the mode of operation for the TEM external engine speed control feature and should be set to 1.
 - a. 1, 12 volts on the engine speed control input causes engine to ramp to preset-1. GND on the same input causes the engine to return to idle.

3. 2158 TEM_Ext_Eng_Spd_Ctrl_Active_State; This is the active state for the external engine speed control switch input to the RPM and should be set to 3.

- a. 3, 12 volts – The input is connected to 12 volts through a switch.

Table 144

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock	2036	If this parameter is a one, external engine speed controls will be interlocked to PTO request.	0	On/ Off	0	1	1
TEM_Ext_Eng_Speed_Control_Mode	2035	This parameter sets the mode of operation for the TEM external engine speed control feature.	1	List	0	3	1
TEM_Ext_Eng_Spd_Ctrl_Active_State	2158	This is the active state for the external engine speed control switch.	3	List	0	1	3

HARDWARE INSTALLATION:

1. Reference the connectors tab within Diamond Logic® Builder to verify the correct RPM input pin on the black 23-pin connector. The pin is named Remote_Engine_Speed_Sw_Input.
2. Connect an 18 gauge wire to input pin, and run this wire to the center pole on the switch.
3. Connect one of the remaining switch pole to a 12 volt power source.
4. Connect the only remaining switch pole to a chassis GND source.
5. Mount switch.

Input connector part number – 2005482C1

Input terminal part number – 1698937C1

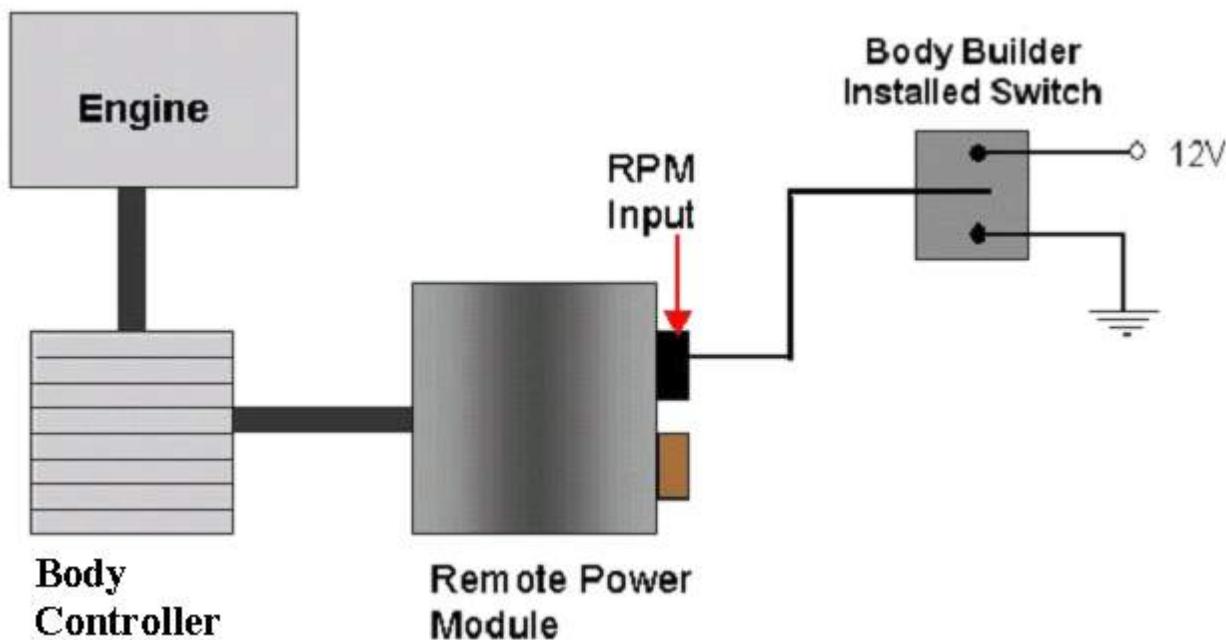


Figure 140

FEATURE TESTING:

1. Stationary Remote engine speed control preset-1 Activation; Start engine, set park brake, transmission in neutral or park, vehicle speed is less than one MPH, and take the switch to the up position, or supply 12 volts on the input pin labeled `Remote_Engine_Speed_Sw_Input`, or use Diamond Logic® Builder to force the RPM input pin to the 12 volt state.
2. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is receiving GND as long as the switch is closed.
3. Verify that the engine ramps to the first preset speed.
4. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
5. Deactivate the remote engine speed control switch (release GND).
6. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is an open circuit when switch is in the center stable position.
7. Verify that the engine returns to idle.

25.7. 60AJE — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — RECOMMENDED APPLICATION: VARIOUS**FEATURE CODE DESCRIPTION:**

60AJE – BDY INTG, THROTTLE CONTROL Accommodation for On Demand Engine Speed for Single Customer-Mounted Pressure Switch, Programmable Mode for Various Switch Actions, Useable Only While Vehicle is Stopped and the Park Brake is Applied (requires one RPM input)

FEATURE/BODY FUNCTION:

TEM or customer-mounted single remote momentary, latched switch or normally open pressure switch; when the operator moves the switch to the up position or the switch closes, the switch supplies GND or 12 volts to the RPM input which starts ramping the engine to Engine Speed Preset-1, the engine will continue to ramp to the Engine Speed Preset-1 as long as the switch continues to supply either GND or 12 volts to the RPM input; when the operator moves the switch to the down position or the switch opens, the switch removes the GND or 12 volt RPM input to deactivate Remote engine speed control preset-1 returning the engine to idle.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKK

Conflicts with software features: 595AKJ, 595AKL, 595AKM, 595AKN

Activation Parameters:

1. Momentary or latched GND or 12 volt input to RPM
2. Park brake applied
3. Transmission in neutral or park or clutch pedal not depressed
4. Vehicle speed is less than one MPH
5. Engine running and at idle
6. Optional PTO feedback is true.

Deactivation Parameters:

1. No GND or 12 volt input to RPM
2. Park brake not applied
3. Transmission not in neutral or park or clutch pedal depressed
4. Vehicle speed is greater than one MPH.
5. Engine not running
6. Service brake depressed
7. Optional PTO feedback not true

FEATURE ORDERING NOTES:

1. This feature requires one RPM input.

2. If 60AJE is ordered, 12VXU must also be ordered which requires entering TEM or customer-requested Remote engine speed control preset-1 RPMs.
3. TEM or customer must supply single momentary, latched or normally open pressure switch and all associated wiring from switch to RPM.
4. The optional PTO interlock is defaulted off; this interlock only works with International pre-engineered PTO features. If the TEM or customer has one of the International pre-engineered PTO features and needs to have this interlock turned on, this will require an additional parameter change by someone who is at least Diamond Logic® Builder Level 2 or 3 certified.

HOW TO INSTALL THIS FEATURE:

Software Installation:

1. Use Diamond Logic® Builder to install Body Controller (BC) software feature code 595AKK, and set the feature code parameters to the following settings:
 - a. 595AKK – Set parameter 2035 to 3. Reference feature configuration programmable parameters.
 - b. 595AKK – Set parameter 2158 to 3 for 12 volt input or 1 for GND input. Reference feature configuration programmable parameters.
 - c. 595AKK – Set parameter 2036 to on for optional PTO interlock. Reference feature configuration programmable parameters.
2. Use Diamond Logic® Builder to remove BC software feature codes 595AKJ, 595AKL, 595AKM, and 595AKN.
3. Use Master Diagnostics to program Engine control module: PTO in-cab control: on
4. Use Master Diagnostics to program Engine control module: PTO in-cab mode: stationary pre-set
5. Use Master Diagnostics to program Engine control module: PTO Power Take Off mode: remote and in-cab operation
6. Use Master Diagnostics to program Engine control module: PTO Preset-1 RPM set (700.00 to 2800.00) (Note: this is the RPM the customer or TEM has requested)

PROGRAMMABLE PARAMETERS:

1. 2036 TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock; This parameter sets the optional PTO interlock mode on or off. If set on, the Remote engine speed control preset-1 will be interlocked to all International pre-engineered PTO features that use a center panel switch. This means that the remote engine speed control will only be allowed to operate if the PTO is being requested to engage. If this parameter is not set, the engine speed control will operate regardless of the PTO request.
 - a. On
 - b. Off
2. 2035 TEM_Ext_Eng_Spd_Control_Mode; This parameter sets the mode of operation for the TEM external engine speed control feature and should be set to 3.
 - a. 3, Engine will ramp for only as long as the engine speed control input is held in its active state.

3. 2158 TEM_Ext_Eng_Spd_Ctrl_Active_State; This is the active state for the external engine speed control switch input to the RPM and should be set to 3 or 1.

- a. 3, 12 volts – The input is connected to 12 volts through a switch.
- b. 1, GND – The input is connected to GND through a switch.

Table 145

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock	2036	If this parameter is a one, external engine speed controls will be interlocked to PTO request.	0	On/ Off	0	1	1
TEM_Ext_Eng_Speed_Control_Mode	2035	This parameter sets the mode of operation for the TEM external engine speed control feature.	3	List	0	3	1
TEM_Ext_Eng_Spd_Ctrl_Active_State	2158	This is the active state for the external engine speed control switch.	1	List	0	1	3

HARDWARE INSTALLATION:

1. Reference the connectors tab within Diamond Logic® Builder to verify the correct RPM input pin on the black 23-pin connector. The pin is named Remote_Engine_Speed_Sw_Input.
2. Connect an 18 gauge wire to input pin, and run this wire to one pole on the switch.
3. Connect the remaining switch pole to a 12 volt or GND power source.
4. Mount switch.

Input connector part number – 2005482C1

Input terminal part number – 1698937C1

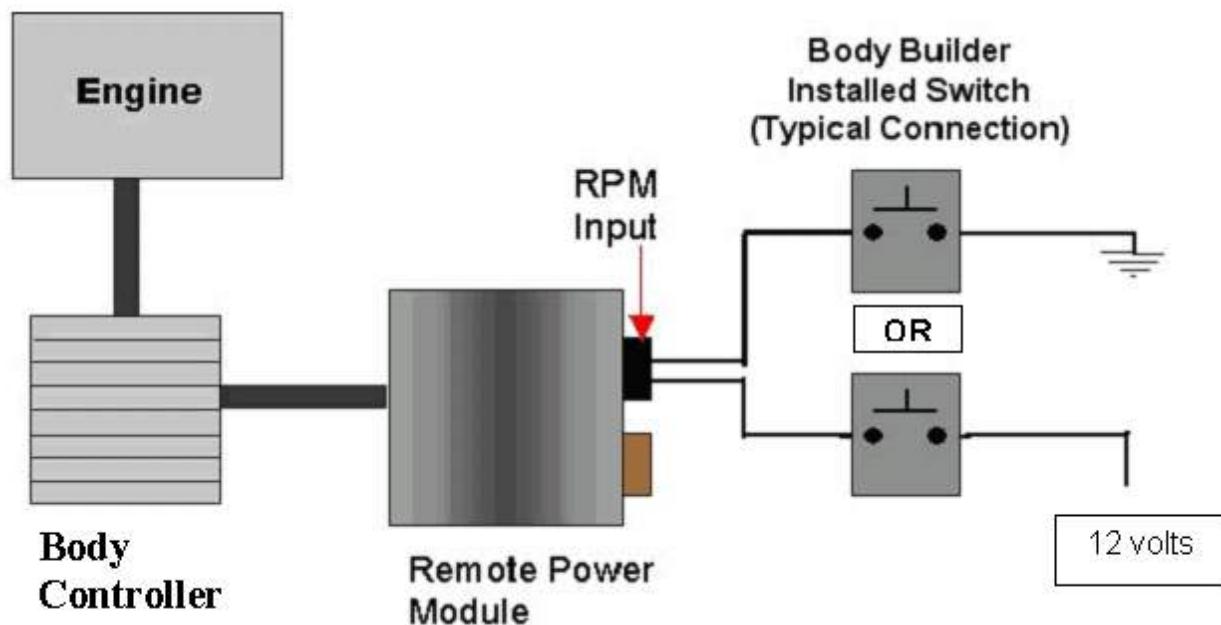


Figure 141

FEATURE TESTING:

1. Stationary Remote engine speed control preset-1 Activation; Start engine, set park brake, transmission in neutral or park, vehicle speed is less than one MPH, and take the switch to the closed position, or supply 12 volts or GND on the input pin labeled `Remote_Engine_Speed_Sw_Input`, or use Diamond Logic® Builder to force the RPM input pin to the 12 volt or GND state.
2. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is receiving GND or 12 volts as long as the switch is closed.
3. Verify that the engine ramps to the first preset speed.
4. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
5. Deactivate the remote engine speed control switch (release GND).
6. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is an open circuit when switch is in the down or open position.
7. Verify that the engine returns to idle.

25.8. 60AJG — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — RECOMMENDED APPLICATION: UTILITY**FEATURE CODE DESCRIPTION:**

60AJG – BDY INTG, THROTTLE CONTROL Accommodation for Single Customer-Mounted External Engine Speed Control Switch, for Utility Applications, Programmable Mode for Various Switch Actions and Engine Speed Control Option, Only with Vehicle Stopped and Park Brake is Applied (requires one RPM input)

FEATURE/BODY FUNCTION:

TEM or customer-mounted single remote, momentary switch; when the operator moves the switch to the up position or the switch closes for the first time, the switch supplies the GND or 12 volts to the RPM input which activates Engine Speed Preset-1; when the operator moves the switch to the down position or the switch opens, the engine will remain at Engine Speed Preset-1; when the operator moves the switch to the up position or the switch closes for the second time, Remote engine speed control preset-1 is deactivated returning the engine to idle.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKL

Conflicts with software features: 595AKJ, 595AKK, 595AKM, 595AKN

Activation Parameters:

1. First momentary GND or 12 volt input to RPM
2. Park brake applied
3. Transmission in neutral or park or clutch pedal not depressed
4. Vehicle speed is less than one MPH
5. Engine running and at idle
6. Optional PTO feedback is true.

Deactivation Parameters:

1. Second momentary GND or 12 volt input to RPM
2. Park brake not applied
3. Transmission not in neutral or park or clutch pedal depressed
4. Vehicle speed is greater than one MPH.
5. Engine not running
6. Service brake depressed
7. Optional PTO feedback not true

FEATURE ORDERING NOTES:

1. This feature requires one RPM input.

2. If 60AJG is ordered, 12VXU must also be ordered which requires entering TEM or customer-requested Remote engine speed control preset-1 RPMs.
3. TEM or customer must supply single momentary switch and all associated wiring from switch to RPM.
4. The optional PTO interlock is defaulted off; this interlock only works with International pre-engineered PTO features. If the TEM or customer has one of the International pre-engineered PTO features and needs to have this interlock turned on, this will require an additional parameter change by someone who is at least Diamond Logic® Builder Level 2 or 3 certified.

HOW TO INSTALL THIS FEATURE:

Software Installation:

1. Use Diamond Logic® Builder to install Body Controller (BC) software feature code 595AKL, and set the feature code parameters to the following settings:
 - a. 595AKL – Set parameter 2035 to 2. Reference feature configuration programmable parameters.
 - b. 595AKL – Set parameter 2158 to 3 for 12 volt input or 1 for GND input. Reference feature configuration programmable parameters.
 - c. 595AKL – Set parameter 2036 to on for optional PTO interlock. Reference feature configuration programmable parameters.
2. Use Diamond Logic® Builder to remove BC software feature codes 595AKK, 595AKJ, 595AKM, and 595AKN.
3. Use Master Diagnostics to program Engine control module: PTO in-cab control: on
4. Use Master Diagnostics to program Engine control module: PTO in-cab mode: stationary pre-set
5. Use Master Diagnostics to program Engine control module: PTO Power Take Off mode: remote and in-cab operation
6. Use Master Diagnostics to program Engine control module: PTO Preset-1 RPM set (700.00 to 2800.00) (Note: this is the RPM the customer or TEM has requested)

PROGRAMMABLE PARAMETERS:

1. 2036 TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock; This parameter sets the optional PTO interlock mode on or off. If set on, the Remote engine speed control preset-1 will be interlocked to all International pre-engineered PTO features that use a center panel switch. This means that the remote engine speed control will only be allowed to operate if the PTO is being requested to engage. If this parameter is not set, the engine speed control will operate regardless of the PTO request.
 - a. On
 - b. Off
2. 2035 TEM_Ext_Eng_Spd_Control_Mode; This parameter sets the mode of operation for the TEM external engine speed control feature and should be set to 3.
 - a. 3, Pulling the engine speed control input momentarily to its active state causes the engine to ramp to preset-1; another momentary active state causes the engine to return to idle.

3. 2158 TEM_Ext_Eng_Spd_Ctrl_Active_State; This is the active state for the external engine speed control switch input to the RPM and should be set to 3 or 1.

- a. 3, 12 volts – The input is connected to 12 volts through a switch.
- b. 1, GND – The input is connected to GND through a switch.

Table 146

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock	2036	If this parameter is a one, external engine speed controls will be interlocked to PTO request.	0	On/ Off	0	1	1
TEM_Ext_Eng_Speed_Control_Mode	2035	This parameter sets the mode of operation for the TEM external engine speed control feature.	2	List	0	3	1
TEM_Ext_Eng_Spd_Ctrl_Active_State	2158	This is the active state for the external engine speed control switch.	1	List	0	1	3

HARDWARE INSTALLATION:

1. Reference the connectors tab within Diamond Logic® Builder to verify the correct RPM input pin on the black 23-pin connector. The pin is named Remote_Engine_Speed_Sw_Input.
2. Connect an 18 gauge wire to input pin, and run this wire to one pole on the switch.
3. Connect the remaining switch pole to a 12 volt or GND power source.
4. Mount switch.

Input connector part number – 2005482C1

Input terminal part number – 1698937C1

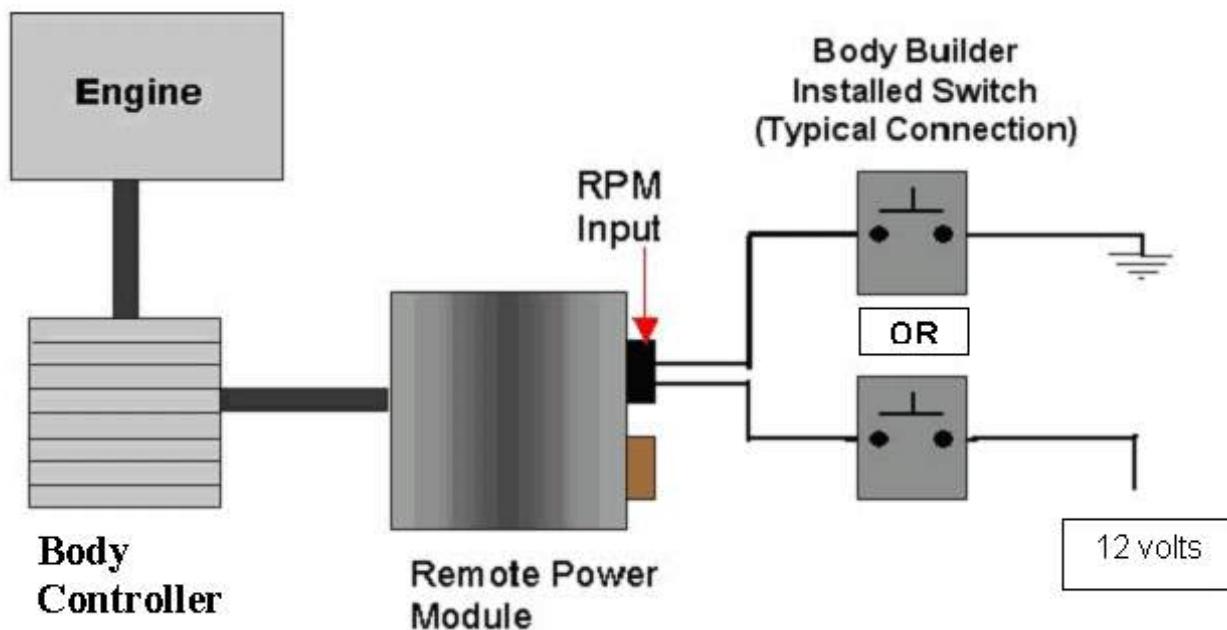


Figure 142

FEATURE TESTING:

1. Stationary Remote engine speed control preset-1 Activation; Start engine, set park brake, transmission in neutral or park, vehicle speed is less than one MPH, and take the switch to the closed position, or supply 12 volts or GND on the input pin labeled `Remote_Engine_Speed_Sw_Input`, or use Diamond Logic® Builder to force the RPM input pin to the 12 volt or GND state.
2. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is receiving GND or 12 volts as long as the switch is closed.
3. Verify that the engine ramps to the first preset speed.
4. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
5. Deactivate the remote engine speed control switch (release GND).
6. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is an open circuit when switch is in the down or open position.
7. Verify that the engine returns to idle.

25.9. 60AJH — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — RECOMMENDED APPLICATION: UTILITY**FEATURE CODE DESCRIPTION:**

60AJH – BDY INTG, THROTTLE CONTROL for Dual Function Input, for Utility Applications, Remote Throttle Control When Engine is Running, and Activating Output for Emergency Power When the Engine is Not Engaged; Useable Only When Vehicle is Stopped and Park Brake is Applied (requires one RPM input and output)

FEATURE/BODY FUNCTION:

Stationary Remote engine speed control preset-1 interlocked to park brake and transmission in neutral or park and vehicle speed and engine running or optional PTO interlock; when engine is not running, the GND input will turn on a 12 volt, 20 Ampere (AMP) RPM out used to control emergency pump.

TEM or customer-mounted single remote, momentary or normally open pressure switch; when the operator moves the switch to the up position or the switch closes for the first time, the switch supplies a GND to the RPM input which activates Engine Speed Preset-1; when the operator moves the switch to the down position or the switch opens, the engine will remain at Engine Speed Preset-1; when the operator moves the switch to the up position or the switch closes for the second time, the switch supplies a GND to the RPM input which deactivates Remote engine speed control preset-1 returning the engine to idle; when the engine is not running and the operator moves the switch to the up position and holds or the switch closes and holds, the switch will supply a GND signal to the RPM input which then turns on a 12 volt, 20 AMP RPM output used for emergency pump control.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKM

Conflicts with software features: 595AKJ, 595AKK, 595AKL, 595AKN

Activation Parameters, Preset-1:

1. First momentary GND input to RPM
2. Park brake applied
3. Transmission in neutral or park or clutch pedal not depressed
4. Vehicle speed is less than one MPH
5. Engine running and at idle
6. Optional PTO feedback is true.

Deactivation Parameters, Preset-1:

1. Second momentary GND input to RPM
2. Park brake not applied
3. Transmission not in neutral or park or clutch pedal depressed
4. Vehicle speed is greater than one MPH.
5. Engine not running

-
- 6. Service brake depressed
 - 7. Optional PTO feedback not true

Activation Parameters, Emergency Pump:

- 1. Hold GND input to RPM
- 2. Park brake applied
- 3. Transmission in neutral or park or clutch pedal not depressed
- 4. Vehicle speed is less than one MPH.
- 5. Engine not running
- 6. Optional PTO feedback is true

FEATURE ORDERING NOTES:

- 1. This feature requires one RPM input, one 12 volt, 20 AMP RPM output.
- 2. If 60AJH is ordered, 12VXU must also be ordered which requires entering TEM or customer-requested Remote engine speed control preset-1 RPMs.
- 3. TEM or customer must supply single momentary or normally open pressure switch and all associated wiring from switch to RPM.

HOW TO INSTALL THIS FEATURE:

Software Installation:

- 1. Use Diamond Logic® Builder to install Body Controller (BC) software feature code 595AKM, and set the feature code parameters to the following settings:
 - a. 595AKM – Set Parameter 2060, fusing value for the output driving the emergency pump in the combination remote engine speed control emergency pump feature.
- 2. Use Diamond Logic® Builder to remove BC software feature codes 595AKK, 595AKJ, 595AKL, and 595AKN.
- 3. Use Master Diagnostics to program Engine control module: PTO in-cab control: on
- 4. Use Master Diagnostics to program Engine control module: PTO in-cab mode: stationary pre-set
- 5. Use Master Diagnostics to program Engine control module: PTO Power Take Off mode: remote and in-cab operation
- 6. Use Master Diagnostics to program Engine control module: PTO Preset-1 RPM set (700.00 to 2800.00) (Note: this is the RPM the customer or TEM has requested)

PROGRAMMABLE PARAMETERS:

- 1. 2060 TEM_Emergency_Pump_Fuse; fusing value for the output driving the emergency pump in the combination remote engine speed control emergency pump feature

Table 147

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Emergency_pump_Fuse	2060	Fusing value for the output driving the emergency pump in the combination remote engine speed control emergency pump feature	0	A	0	20	0.1

HARDWARE INSTALLATION:

1. Reference the connectors tab within Diamond Logic® Builder to verify the correct RPM input pin on the black 23-pin connector. The pin is named Remote_Engine_Speed_Sw_Input.
2. Reference the connectors tab within Diamond Logic® Builder to verify the correct RPM output pin on the brown connector. The pin is named Utility_Emergency_Pump_Output.
3. Connect an 18 gauge wire to input pin, and run this wire to one pole on the switch.
4. Connect the remaining switch pole to a GND power source.
5. Connect emergency pump relay to RPM output connector using 12 gauge wire.
6. Mount switch.

Input connector part number – 2005482C1

Input terminal part number – 1698937C1

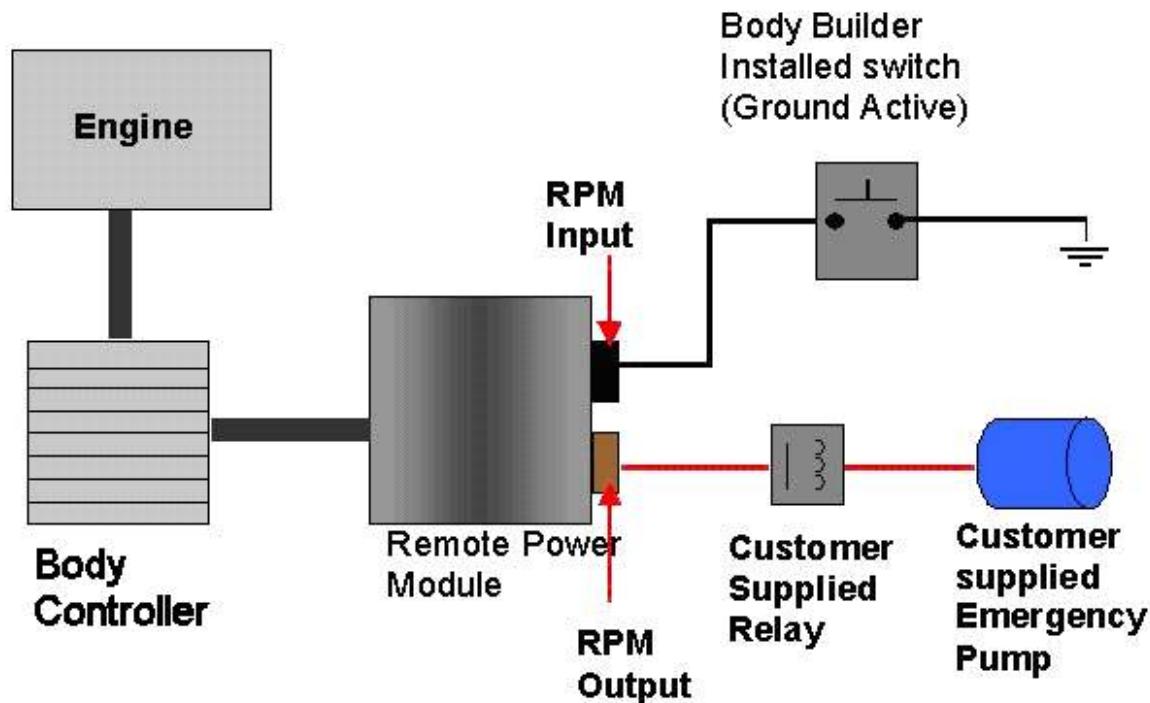


Figure 143

FEATURE TESTING:

1. Verify the RPM input labeled **Remote_Engine_Speed_Sw_Input** (pin position specified Diamond Logic® Builder software) is receiving GND as long as the switch is closed.
2. Verify that the engine ramps to the first preset speed.
3. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
4. Deactivate the remote engine speed control switch (release GND).
5. Verify the RPM input labeled **Remote_Engine_Speed_Sw_Input** (pin position specified Diamond Logic® Builder software) is an open circuit when switch is in the down or open position.
6. Verify that the engine returns to idle.
7. Verify 12 volts 20 AMPS on RPM out put connector labeled **Utility_Emergency_Pump_Output**.

25.10. 60AJJ — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — RECOMMENDED APPLICATION: REFUSE**FEATURE CODE DESCRIPTION:**

60AJJ – BDY INTG, THROTTLE CONTROL Accommodation for Single Customer-Mounted Momentary Switch, for Refuse Applications, Programmable Mode Various Switch Actions, Useable Only While Vehicle is Stopped and the Park Brake is Applied (requires one RPM input)

FEATURE/BODY FUNCTION:

TEM or customer-mounted single remote, latched switch; when the operator moves the switch to the up position or the switch closes, the switch supplies 12 volts to the RPM input which activates Engine Speed Preset-1, the engine will stay at Engine Speed Preset-1 as long as the switch continues to supply 12 volts to the RPM input; when the operator moves the switch to the down position or the switch opens, the switch removes the 12 volt RPM input to deactivate Remote engine speed control preset-1 returning the engine to idle.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKN

Conflicts with software features: 595AKJ, 595AKK, 595AKL, 595AKM

Activation Parameters:

1. Latched switch that supplies 12 volt input to RPM
2. Park brake applied
3. Transmission in neutral or park or clutch pedal not depressed
4. Vehicle speed is less than one MPH
5. Engine running and at idle
6. Optional PTO feedback is true.

Deactivation Parameters:

1. No 12 volt input to RPM
2. Park brake not applied
3. Transmission not in neutral or park or clutch pedal depressed
4. Vehicle speed is greater than one MPH.
5. Engine not running
6. Service brake depressed
7. Optional PTO feedback not true

FEATURE ORDERING NOTES:

1. This feature requires one RPM input.
2. If 60AJJ is ordered, 12VXU must also be ordered which requires entering TEM or customer-requested Remote engine speed control preset-1 RPMs.

3. TEM or customer must supply single latched switch and all associated wiring from switch to RPM.
4. The optional PTO interlock is defaulted off; this interlock only works with International pre-engineered PTO features. If the TEM or customer has one of the International pre-engineered PTO features and needs to have this interlock turned on, this will require an additional parameter change by someone who is at least Diamond Logic® Builder Level 2 or 3 certified.

HOW TO INSTALL THIS FEATURE:

Software Installation:

1. Use Diamond Logic® Builder to install Body Controller (BC) software feature code 595AKN, and set the feature code parameters to the following settings:
 - a. 595AKN – Set parameter 2035 to 3. Reference feature configuration programmable parameters.
 - b. 595AKN – Set parameter 2158 to 3 for 12 volt input. Reference feature configuration programmable parameters.
 - c. 595AKN – Set parameter 2036 to on for optional PTO interlock. Reference feature configuration programmable parameters.
2. Use Diamond Logic® Builder to remove BC software feature codes 595AKJ, 595AKK, 595AKL, and 595AKM.
3. Use Master Diagnostics to program Engine control module: PTO in-cab control: on
4. Use Master Diagnostics to program Engine control module: PTO in-cab mode: stationary pre-set
5. Use Master Diagnostics to program Engine control module: PTO Power Take Off mode: remote and in-cab operation
6. Use Master Diagnostics to program Engine control module: PTO Preset-1 RPM set (700.00 to 2800.00) (Note: this is the RPM the customer or TEM has requested)

PROGRAMMABLE PARAMETERS:

1. 2036 TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock; This parameter sets the optional PTO interlock mode on or off. If set on, the Remote engine speed control preset-1 will be interlocked to all International pre-engineered PTO features that use a center panel switch. This means that the remote engine speed control will only be allowed to operate if the PTO is being requested to engage. If this parameter is not set, the engine speed control will operate regardless of the PTO request.
 - a. On
 - b. Off
2. 2035 TEM_Ext_Eng_Spd_Control_Mode; This parameter sets the mode of operation for the TEM external engine speed control feature and should be set to 3.
 - a. 3, Engine will ramp for only as long as the engine speed control input is held in its active state.
3. 2158 TEM_Ext_Eng_Spd_Ctrl_Active_State; This is the active state for the external engine speed control switch input to the RPM and should be set to 3.
 - a. 3, 12 volts – The input is connected to 12 volts through a switch.

Table 148

Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Ext_Eng_Spd_Ctrl_PTO_Ilock	2036	If this parameter is a one, external engine speed controls will be interlocked to PTO request.	0	On/ Off	0	1	1
TEM_Ext_Eng_Speed_Control_Mode	2035	This parameter sets the mode of operation for the TEM external engine speed control feature.	3	List	0	3	1
TEM_Ext_Eng_Spd_Ctrl_Active_State	2158	This is the active state for the external engine speed control switch.	1	List	0	1	3

HARDWARE INSTALLATION:

1. Reference the connectors tab within Diamond Logic® Builder to verify the correct RPM input pin on the black 23-pin connector. The pin is named Remote_Engine_Speed_Sw_Input.
2. Connect an 18 gauge wire to input pin, and run this wire to one pole on the switch.
3. Connect the remaining switch pole to a 12 volt power source.
4. Mount switch.

Input connector part number – 2005482C1

Input terminal part number – 1698937C1

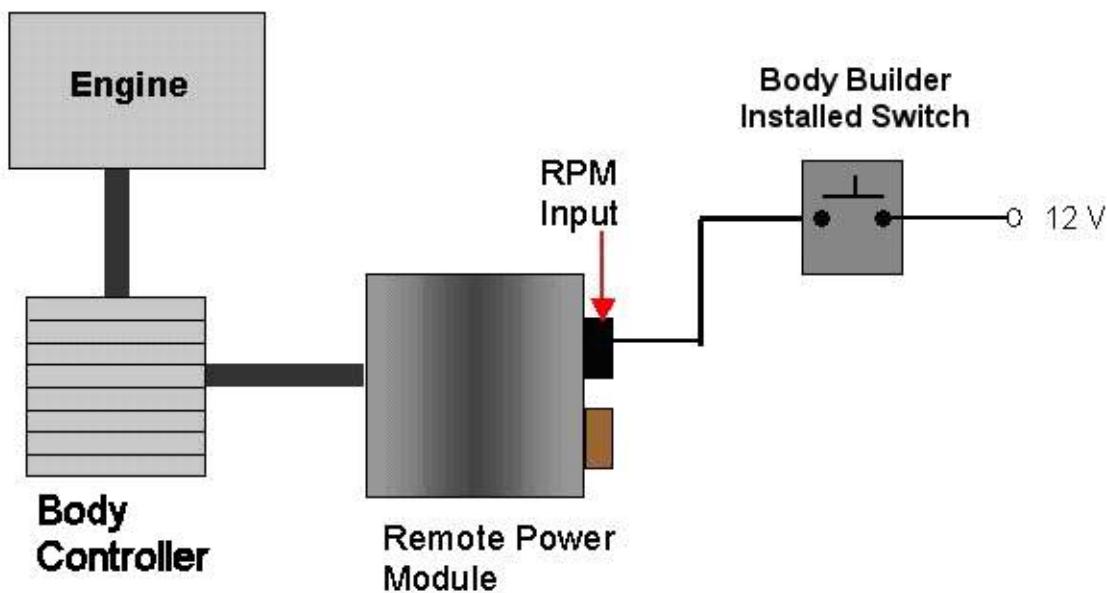


Figure 144

FEATURE TESTING:

1. Stationary Remote engine speed control preset-1 Activation; Start engine, set park brake, transmission in neutral or park, vehicle speed is less than one MPH, and take the switch to the closed position, or supply 12 volts on the input pin labeled `Remote_Engine_Speed_Sw_Input`, or use Diamond Logic® Builder to force the RPM input pin to the 12 volt.
2. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is receiving 12 volts as long as the switch is closed.
3. Verify that the engine ramps to the first preset speed.
4. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
5. Deactivate the remote engine speed control switch (release 12 volts).
6. Verify the RPM input labeled `Remote_Engine_Speed_Sw_Input` (pin position specified Diamond Logic® Builder software) is an open circuit when switch is in the down or open position.
7. Verify that the engine returns to idle.

25.11. REMOTE ENGINE SPEED CONTROL – CATERPILLAR AND CUMMINS ENGINES

Caterpillar and Cummins engine controllers must be programmed using the appropriate diagnostic/programming software for these functions to operate properly. Please see a certified Caterpillar or Cummins dealer for proper installation and functionality of these features.

FEATURE CODE DESCRIPTION:

Remote Engine Speed Control Features Available with Caterpillar Engines

FEATURE/BODY FUNCTION:

Feature codes 12VYC and 12VXY are not available on Caterpillar engines. The following features are available to the Body Builder by directly wiring to the engine controller:

- Vehicle Speed
- Engine Speed
- Remote PTO On/Off
- Remote PTO Ramp Up/Ramp Down
- Frequency Output Signals for Driving Off-board Engine Warning Lights
- Remote Throttle (Pedal) Control

FEATURE CODE DESCRIPTION:

Remote Engine Speed Control Features Available with 2004 Cummins Engines

FEATURE/BODY FUNCTION:

Feature codes 12VYC and 12VXY are not available on Cummins engines. The following features are available to the Body Builder by directly wiring to the engine controller:

- Engine Speed
- Remote PTO On/Off
- Remote PTO Ramp Up/Ramp Down
- Frequency Output Signals for Driving Off-board Engine Warning Lights
- Remote Throttle (Pedal) Control

Vehicle speed on a Cummins engine can be accessed on a datalink or via a second vehicle speed sensor added to the transmission.

26. REMOTE AIR SOLENOID MODULE

26.1. 08WGA, 08WGB, 08WGC, 08WGD, 08WGP, AND 08WGR — TEM AIR SOLENOIDS

Refer to Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Air Solenoid.

FEATURE CODE DESCRIPTION:

Normally Closed

08WGA – SOLENOID, AIR for Customer Use; Provides (1) Normally Closed Pilot Air Source, Approx. 4 CFM, Includes Switch in Cab; Air Available Only With Key in “Ignition (IGN)” or “Accessory” Position; Air Will Exhaust with Key in “Off” Position

08WGB – SOLENOID, AIR for Customer Use; Provides (2) Normally Closed Pilot Air Source, Approx. 4 CFM, Includes Switch in Cab; Air Available Only With Key in “IGN” or “Accessory” Position; Air Will Exhaust with Key in “Off” Position

08WGC – SOLENOID, AIR for Customer Use; Provides (3) Normally Closed Pilot Air Source, Approx. 4 CFM, Includes Switch in Cab; Air Available Only With Key in “IGN” or “Accessory” Position; Air Will Exhaust with Key in “Off” Position

08WGD – SOLENOID, AIR for Customer Use; Provides (4) Normally Closed Pilot Air Source, Approx. 4 CFM, Includes Switch in Cab; Air Available Only With Key in “IGN” or “Accessory” Position; Air Will Exhaust with Key in “Off” Position

Normally Open

08WGP – SOLENOID, AIR for Customer Use; Provides (5) Normally Open Pilot Air Source, Approx. 4 CFM, Includes Switch in Cab; Air Exhausted Only With Key in “IGN” or “Accessory” Position; Air Will be Supplied with Key in “Off” Position

08WGR – SOLENOID, AIR for Customer Use; Provides (6) Normally Open Pilot Air Source, Approx. 4 CFM, Includes Switch in Cab; Air Exhausted Only With Key in “IGN” or “Accessory” Position; Air Will be Supplied with Key in “Off” Position

FEATURE/BODY FUNCTION:

These air solenoids provide Instrument Panel (IP)-mounted, rocker switches and normally closed and/or normally open air solenoids that allow the operator to control up to four normally closed or five or six normally open body-mounted air accessories from the cab. Note: these air solenoids are to be used as a pilot air source and are not to be used as an air supply. All of the air solenoid feature codes include windowed latching rocker switches and do not include any interlock features. Product graphics are included for application to each switch window.

The air solenoids will turn off and the air will be exhausted for normally closed solenoids, and air pressure will be maintained with the normally open solenoids with the IGN key turned off. Take precautions to ensure that equipment controlled by these solenoids will not cause personal injury when the IGN key is turned off.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software feature codes that must be installed based on the feature code being installed:

08WGA — 595AHX; 08WGB — 595AHY; 08WGC — 595AHZ; 08WGD — 595AJA; 08WGP — 595AKZ;
08WGR — 595AJC

Software feature codes that must not be enabled: NONE

WIRING INFORMATION

Use the Diamond Logic® Builder software to determine switch locations of the air solenoid switches.

Customer supplies air plumbing from the air solenoids to the desired air-controlled accessory.



Figure 145

There are several positions where the solenoid packs may be mounted.

- (1) The first 4-pack is mounted on the inboard side of the driver's side frame rail in front of the rear cab crossmember.
- (2) The second and third 4-packs for a 6x4 suspension are mounted on the forward rear suspension crossmember.
- (3) The second and third 4-packs for a 4x2 suspension are located on the passenger side frame rail in front of the rear suspension crossmember.
- (4) A 6x4 or SS 4x2 can have a fourth 4-pack which mounts on the passenger side frame rail in front of the forward rear suspension crossmember.

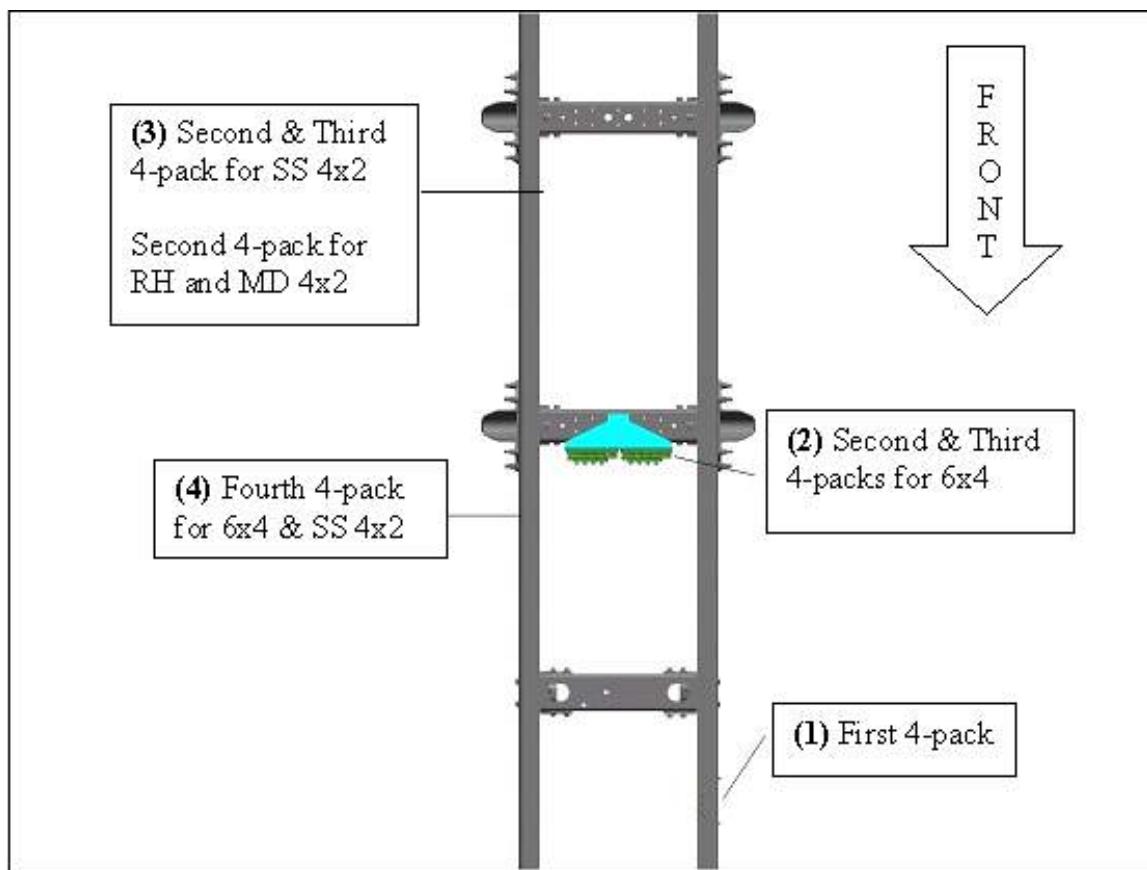


Figure 146

TESTING

Directions for 4-pack:

This procedure can be used for each auxiliary air solenoid added to the vehicle.

1. Activate the in-cab auxiliary air solenoid switch.
2. Verify that the particular air solenoid either provides air pressure for normally closed or exhausts the air for normally open solenoids.
3. Verify that the proper pin in the air solenoid 4-pack connector has battery voltage.
4. Pin A for all air solenoids should have continuity with the negative battery stud.

HOW TO ADD THESE FEATURES:

** See the "How Do I - General Information" section of this electrical guide.

Feature codes 595AHX, 595AHY, 595AHZ, 595AJA, 595AKZ, or 595AJC must be added depending on the number and type of air outputs desired.

Use the Diamond Logic Builder software to determine correct in-cab switch location(s) for the switches controlling the air outputs.

Below is a listing of parts that may be required depending on how the vehicle was equipped at the factory.

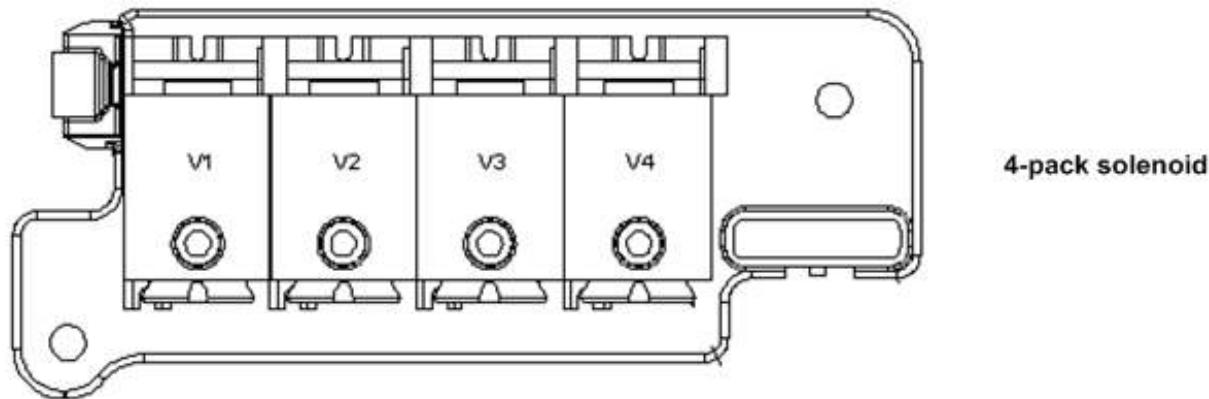
Table 149

Part Number	Description
3610975C1	Support, 4-pack Solenoid (Bracket for 7700 w/ Chalmers or HMX suspension)
3610976C1	Support, 8-pack Solenoid (Bracket holds 2 4-pack solenoids for 7700 w/ Chalmers or HMX suspension)
3610977C1	Support, 4-pack Solenoid (Bracket for 7700 w/ Hendrickson Air suspension w/ 3/8 frame rails)
3610978C1	Support, 8-pack Solenoid (Bracket holds 2 4-pack solenoids for 7700 w/ Hendrickson Air suspension w/ 3/8 frame rails)
3610973C1	Support, 4-pack Solenoid (All other 6x4 vehicles)
3610974C1	Support, 8-pack Solenoid (Bracket holds 2 4-pack solenoids for all other 6x4 vehicles)
2506711C91	Kit, Air Brake Solenoid N.C. (includes labels and O-rings)
2506712C91	Kit, Air Brake Solenoid N.O. (includes labels and O-rings)
2506713C91	Kit, Air Horn Solenoid (includes labels and O-rings)
3549776C4	Housing, Switch 6-Pack DIN Multiplex
3549777C4	Housing, Switch 12-Pack DIN Multiplex

SCENARIOS FOR ADDING AIR SOLENOIDS:

* The vehicle has a 4-pack with unused solenoid locations.

Add the solenoid to the solenoid pack, and add the appropriate rocker to the switch pack. See the Switch Pack section for switch information, and use the Diamond Logic® Builder software in conjunction with Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Air Solenoid for terminal and connector information. The BC will have to be programmed for the additional solenoid and switch. Add solenoids per the view below.



Note: Fill V1 first, V2 second, V3 third and finally V4

Figure 147

* The vehicle does not have any solenoid switch pack.

A 4-pack and solenoid(s) will have to be added. The solenoids are controlled by the BC. There is no multiplexing from the BC to the solenoid pack. See the Switch Pack section for switch information and use the Diamond Logic® Builder software in conjunction with Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Air Solenoid for terminal and connector information.

* The vehicle has a 4-pack, but it is full.

Use the same procedure that was used above for a vehicle that already has a solenoid pack that is completely full. A total of two 4-packs may be added to 4000 and 8000 series vehicles. Four total 4-packs may be added to 7000 series vehicles. Additional 4-packs are required to be wired per Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Air Solenoid.

The BC will have to be programmed for the additional air features to work properly.

26.2. 08WEE – SWITCH, AIR HORN, PASSENGER, FIRE TRUCK

FEATURE CODE DESCRIPTION:

08WEE – SWITCH, AIR HORN, PASSENGER Fire Truck Application; Switch Located in Instrument Panel (IP) Close to Passenger; Driver Also To Activate Switch at Steering Wheel

FEATURE/BODY FUNCTION:

The passenger side air horn switch provides a method for an individual to activate the vehicle air horn from the passenger seat. The feature consists of a hard wired momentary switch that is located in the lower right corner of the central IP. This second rocker switch is used in conjunction with the air horn switch that is located in the steering wheel.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

The air horn software feature code 595ALD must be enabled on the vehicle Body Controller (BC) using the Diamond Logic® Builder software (see local dealer).

There are no programmable parameters associated with this feature.

WIRING INFORMATION

Both the hard wired rocker switch in the IP and the air horn switch in the steering wheel are connected to a single input on the BC connector 1602 Pin F8. The air solenoid is driven from the BC output connector 1602 Pin E12.

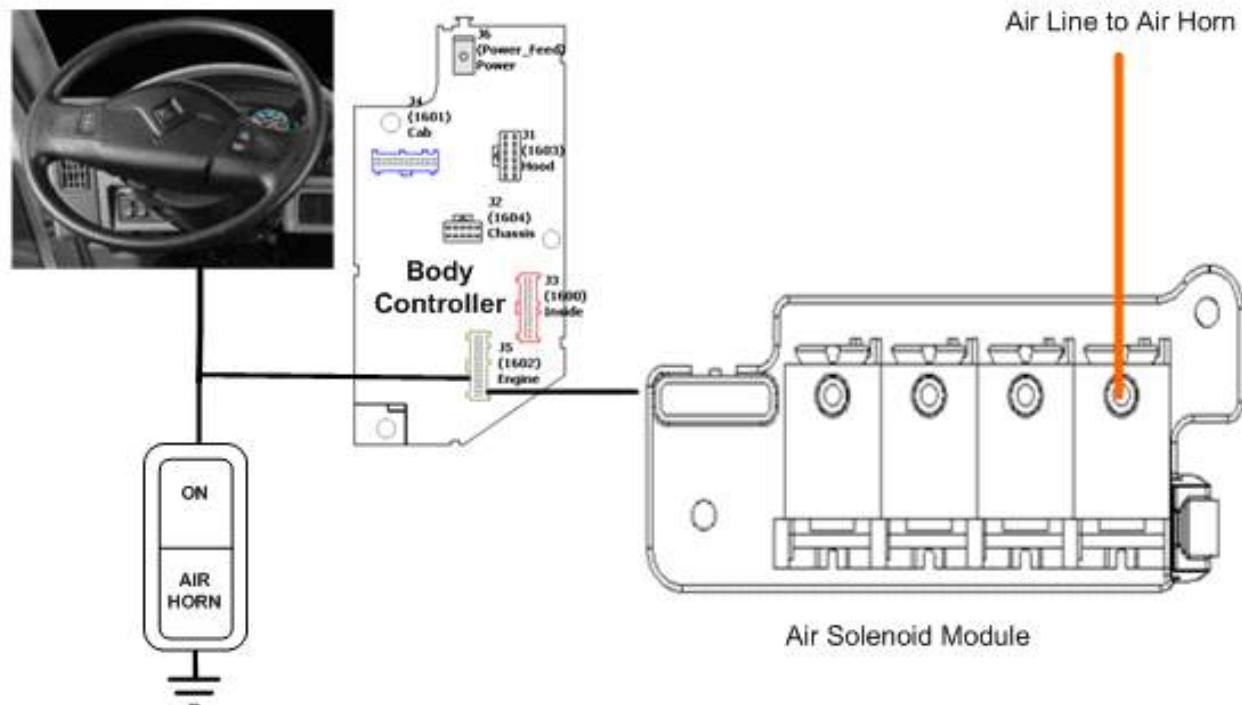


Figure 148 Air Horn Switch Part Number 3551415C1

TESTING SYSTEM OPERATION

1. Turn the Ignition (IGN) key to the accessory position.
2. Momentarily depress the air horn switch in the steering wheel. Note that the air horn sounds.
3. Momentarily depress the air horn rocker switch. Note that the air horn sounds.

HOW TO ADD THIS FEATURE:

1. Remove the central IP trim piece.



Figure 149 Center Panels to Remove

2. Locate an open switch position in the lower right corner of the IP.
3. Use a switch hole punching tool to cut a hole in the plastic plate of the central IP plate.
4. Remove the storage box or 12-pack of switches located above plastic plate. Use a scribe or other marker tool to outline the hard wired switch openings in the steel plate located behind the plastic switch plate.
5. Drill a pilot hole in the center of the desired switch location.
6. Use the switch punch to open the hole in the plastic plate. The recommended method to create a rectangular switch slot is to use a Green Lee Punch (part number ZTSE4426 from SPX).
7. Insert the air horn switch in the plastic plate.
8. Wire the mating switch connector as Circuit Diagram Manual S08322, Chapter 4 Cab Accessories, Horn – Electric.
9. Attach the switch connector to the air horn switch.
10. Reinstall the plastic switch plate and central IP trim piece.

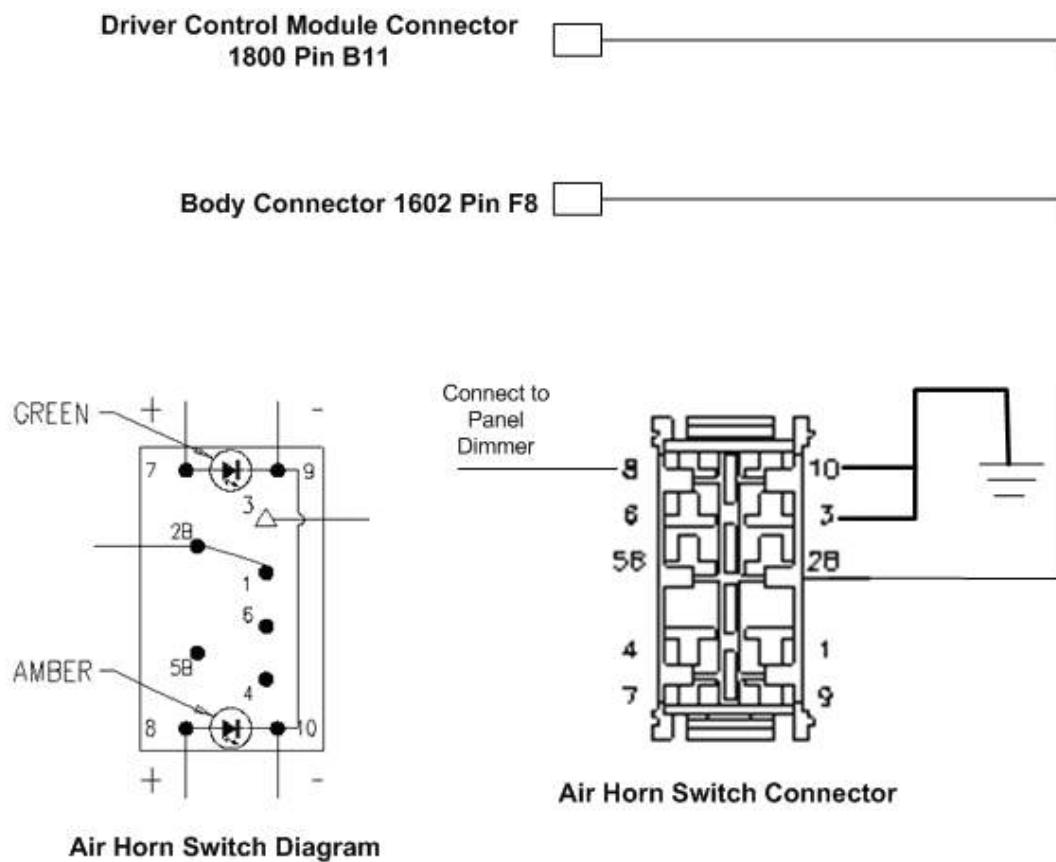


Figure 150 General Circuit Diagram for Adding the Passenger Side Air Horn Switch

27. REMOTE START / STOP

27.1. 60ABC — REMOTE START/STOP

Refer to the circuit diagram in S08322, Chapter 10, Chassis Accessories, Remote Start/Stop.

FEATURE CODE DESCRIPTION:

60ABC — BDY INTG, REMOTE START/STOP To Start and Stop Vehicle Engine

FEATURE/BODY FUNCTION:

The Remote Start / Stop feature provides the operator with the ability to remotely start or stop the engine from a single ground (GND) active switch closure located on the vehicle body equipment. The vehicle park brake must be set, and the hood of the vehicle must be closed. The vehicle must also be equipped with an automatic transmission and must be in neutral. This feature requires the customer to provide the GND active switch as well as the wiring from that switch into the Remote Start/Stop connector located in the middle of the chassis. The customer will also provide the terminals and seals for the International-provided connector.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKW

Software feature code that must be removed: 595AKV

If **TEM_Rem_Start_Stop_PTO_Ilock** is turned on, then the operator can only use Remote Start/Stop when the in-cab, International PTO switch is in the ON position.

The **TEM_Rem_Start_Stop_Crank_Delay_Gen2** parameter determines how long the engine will wait before starting once the remote start/stop feature is activated.

Table 150

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Rem_Start_Stop_PTO_Ilock	2192	If this parameter is set, the remote start/stop functionality will not function unless the PTO switch is in the on position.	Off	On/ Off			
TEM_Rem_Start_Stop_Crank_Delay_Gen2	2438	This is the time that the remote start/stop feature delays before starting to crank the engine.	0.5	S	0.1	1	0.01

WIRING INFORMATION

- When 60ABC is ordered on a truck, a connector (# 9778) is provided for the TEM to wire into for Remote Start/Stop. This connector is located in the mid-chassis harness. The mid-chassis harness is located approximately halfway between the rear axle (or forward-rear axle for trucks with tandem rear axles) and the back of the cab on the driver's side frame rail. The customer should wire into the circuit with the Dark Blue wire (# N104CA).
- The customer must provide a GND active momentary switch that is wired into the mid-chassis Remote Start/Stop connector.
- The customer must also order the terminals and seals (based on their wire gauge) for the International-provided connector so that the customer can wire the switch into the connector.

Table 151

Customer Wire Gauge	Terminal Part Numbers	Seal Part Numbers
12AWG	1673748C1	0589390C1
14AWG	0587577C1	0589391C1
16AWG	0587577C1	1652325C1



Remote Start / Stop Connector

Customer
mounted ground
active momentary
switch

**Figure 151 Remote Start Stop Connector in Mid-Chassis Harness**

TESTING

1. When starting and stopping the engine, make sure that the Body Builder switch is providing a GND signal to the mid-chassis wire. The vehicle ignition (IGN) key must be in the ON position and the hood must be closed.
2. If the engine is running, a momentary switch closure of the body builder-supplied switch will stop the engine.
3. If the engine is stopped, push and hold the body builder-supplied switch until the vehicle starts.

HOW TO ADD THIS FEATURE:

- Refer to the circuit diagram in S08322, Chapter 10, Chassis Accessories, Remote Start/Stop for proper circuit and connector/pin information.

27.2. 60ABD — REMOTE START/STOP WITH EMERGENCY PUMP

Refer to the circuit diagram in S08322, Chapter 10, Chassis Accessories, Remote Start/Stop.

FEATURE CODE DESCRIPTION:

60ABD — BDY INTG, REMOTE START/STOP To Start and Stop Vehicle Engine, Will Start Emergency Pump Motor, Programmable Time Intervals

FEATURE/BODY FUNCTION:

The Remote Start / Stop feature provides the ability to remotely start or stop the engine from a single GND active switch closure located on the vehicle body equipment. This feature operates in two modes, namely the remote start / stop mode and the emergency pump mode. The vehicle park brake must be set and the hood of the vehicle must be closed. The vehicle must also be equipped with an automatic transmission and must be in neutral. The user may engage the same switch to control an emergency pump solenoid / motor combination, if the vehicle engine cannot be restarted.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595AKV

Software feature code that must be removed: 595AKW

If **TEM_Rem_Start_Stop_PTO_Ilock** is turned on, then the operator can only use Remote Start/Stop when the in-cab, International PTO switch is in the ON position.

If the engine shuts off unexpectedly or will not start, 60ABD provides the operator with the ability to use an emergency pump solenoid / motor. The **TEM_Remote_Engine_Stop_Time** parameter sets the time to hold the switch down, after the engine has unexpectedly shut off, before the emergency pump activates. Also, if the truck is stopped remotely and the remote switch is held in the active position, the emergency pump will start by holding the switch for the time set by the **TEM_Remote_Engine_Stop_Time** parameter.

The **TEM_Rem_Start_Stop_Crank_Delay_Gen2** parameter determines how long the engine will wait before starting once the remote start/stop feature is activated

Table 152

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Rem_Start_Stop_PTO_Ilock	2192	If this parameter is set, the remote start/stop functionality will not function unless the PTO switch is in the on position.	Off	On/ Off			

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Remote_Engine_Stop_Time	2072	Time allotted to stop the engine for the remote engine start/stop with emergency pump feature.	5	s	0	60	0.01
TEM_Remote_Start_Stop_Crank_Delay_Gen2	2438	This is the time that the remote start/stop feature delays before starting to crank the engine.	0.5	S	0.1	1	0.01

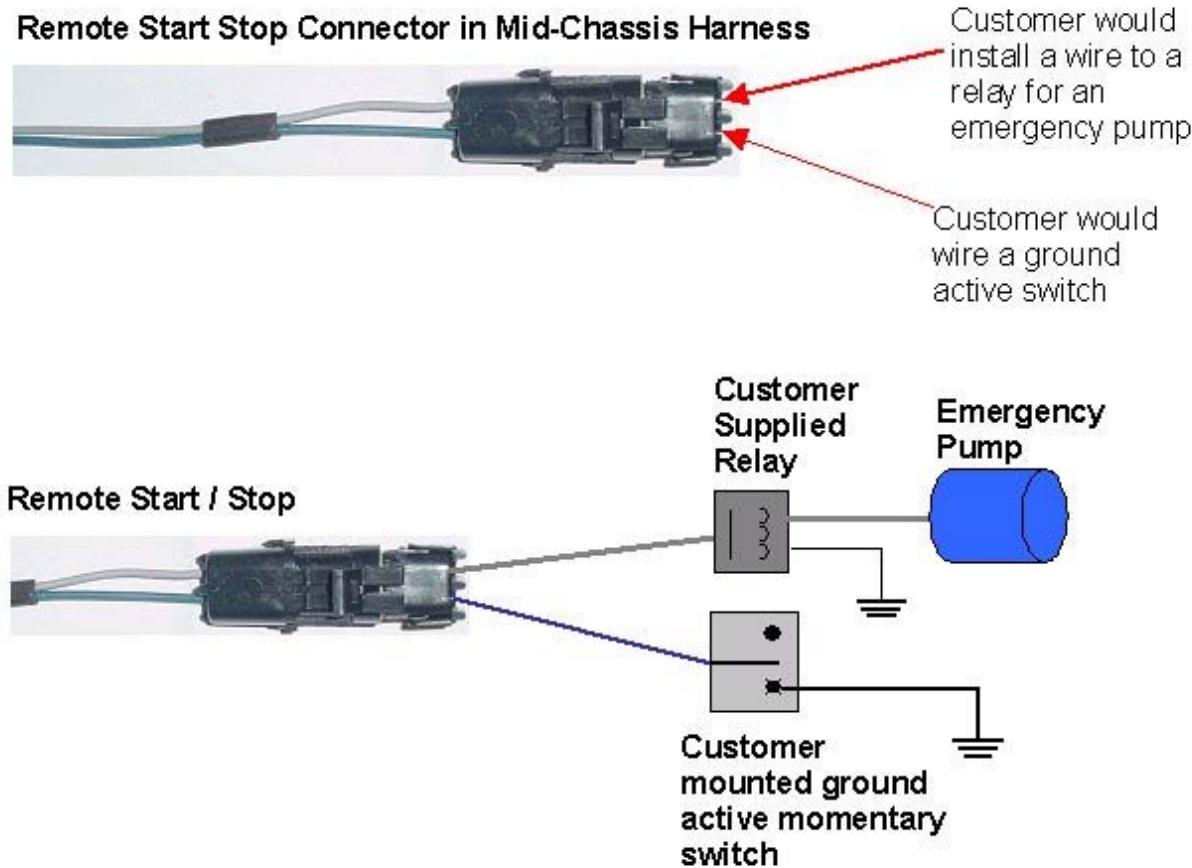
WIRING INFORMATION

- When 60ABD is ordered on a truck, two mid-chassis wires with a connector (# 9778) are provided for the TEM to wire into for Remote Start/Stop with emergency pump. This connector is located in the mid-chassis harness. The mid chassis harness is located approximately halfway between the rear axle (or forward-rear axle for trucks with tandem rear axles) and the back of the cab on the driver's side frame rail.
 - The first wire is the wire used to stop and start the engine (# N104CA). It is a dark blue wire.
 - The second wire is used to control an emergency pump (#N59CA). It is a grey wire.
- The customer must also order the terminals and seals (based on their wire gauge) for the International-provided connector so that the customer can wire the switch into the connector.

Table 153

Customer Wire Gauge	Terminal Part Numbers	Seal Part Numbers
12AWG	1673748C1	0589390C1
14AWG	0587577C1	0589391C1
16AWG	0587577C1	1652325C1

- The customer must provide a GND active momentary switch that is wired into the mid-chassis connector.
- If the customer orders 60ABD but decides not to use an emergency pump, the customer should simply use the Diamond Logic® Builder software to enable software feature code 595AKW, and remove software feature code 595AKV.

**Figure 152**

International does not suggest adding a remote start on vehicles with manual transmissions.

TESTING

1. When starting and stopping the engine, make sure that the Body Builder switch is providing a GND signal to the mid-chassis wire. The vehicle IGN key must be in the ON position and the hood must be closed.
2. If the engine is running, a momentary switch closure of the body builder-supplied switch will stop the engine.
3. If the engine is stopped, push and hold the body builder-supplied switch until the vehicle starts.
4. If the engine will not start, release the start/stop switch momentarily, activate the switch again, and hold it until the emergency pump control wire supplies GND to the emergency pump relay. The emergency pump will remain ON as long as the switch is active.

HOW TO ADD THIS FEATURE:

- Refer to the circuit diagram in S08322, Chapter 10, Chassis Accessories, Remote Start/Stop for proper circuit and connector/pin information.

28. LIFT GATE ACCOMMODATION PACKAGE

28.1. 08WJA, 08WJB — POWER SOURCE FOR LIFT GATE

FEATURE CODE DESCRIPTION:

08WJA – POWER SOURCE, SPECIAL for Customer-Installed Lift Gate; 200 AMP max, includes 2 gauge power cable to end-of-frame, switch on Instrument Panel (IP), with a time out feature, battery discharge protection, controlling a mag switch which provides power

08WJB – POWER SOURCE, for Customer-Installed Lift Gate; heavy duty, includes 0 gauge power cable to end-of-frame, switch on IP, with a time out feature, battery discharge protection, controlling a mag switch which provides power

FEATURE/BODY FUNCTION:

Feature code 08WJA or 08WJB provides a factory-installed, dedicated power source for lift gate operation. This feature includes an IP-mounted master switch, which illuminates when the system is turned on, and an optional "AUX" button on the key fob to enable or disable the lift gate. The purpose of the in-cab master switch and the "AUX" button on the key fob is to help prevent unauthorized use of the lift gate. These switches also activate a 60 minute timer in the BC that will disable the lift gate after 60 minutes. For continued use of the lift gate, the master switch or the aux button on the key fob must be used to activate the system for an additional ten minutes. A Battery Protection Module, activated by the BC 60 minute timer, and a 200 AMP mag switch, mounted in or at the battery box, enables power to the lift gate motor. A circuit protected cable from the battery to the mag switch and a heavy gauge wire routed from the mag switch to the end of frame, to provide power to the lift gate motor is also provided.

This feature will provide battery discharge protection for users who operate the lift gate with or without the engine running. Without the engine running, key off, the Battery Protection Module will constantly monitor battery voltage and shut down the lift gate operation before battery voltage reaches a state of charge that will not allow the vehicle to restart. With the key switch in any position except start or off, an audible alarm will also sound in the cab during certain low voltage conditions. In addition to battery voltage monitoring, this feature has time out functionality from the BC to automatically disable the lift gate after a selected time. The default time out is 60 minutes. A road speed interlock from the BC is provided that activates above approximately 2 MPH. If activated, the indicator light in the switch flashes and the lift gate is disabled by the BC which prevents the lift gate from being operated while the vehicle is in motion. The lift gate master switch, or the aux button on the key fob, must be activated again to continue use of the lift gate after vehicle has stopped.

The lift gate shall be activated for 60 minutes when the key switch is in any position and the lift gate switch is pressed to the momentary on position (up position), or key fob aux button is pressed, and the vehicle speed is lower than 2 MPH and voltage conditions are met.

The lift gate shall be deactivated when any of the following conditions are met:

1. The lift gate switch is pressed to the momentary off position (down position), or the push button is cycled depending on the programmable feature on the vehicle.
2. The aux button on the key fob is pressed.
3. The voltage is lower than the safe voltage value, and the shutdown override time expires or the vehicle speed is greater than 2 MPH.
4. The programmable time limit, set at 60 minutes, has been reached.

A cable accommodation is required to fit body van length of 14-26 feet. An additional 40 inch cable length is provided for ease of installation.

Design accommodation for a lift gate with maximum current draw of up to 200 AMPS for code 08WJA and 200+ AMPS for code 08WJB is available.

This feature can work with the work light feature but cannot work with the work light Remote Keyless Entry (RKE) key fob feature.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

*Software feature codes can be added through the Diamond Logic® Builder software. Programmable parameters are also programmable through the Diamond Logic® Builder software.

Required software feature code: 595AYM for lift gate with rocker switch or 595AGN for lift gate with push button switch

Software features that must be removed: 595ABT

The Lift_Gate_Alarm_Time parameter is programmed to allow the operation of the lift gate for a period of 60 seconds. At the end of 60 seconds, the master switch or the aux button on the key fob must be used to reactivate the system.

The Lift_Gate_Enable_Timeout parameter is programmed to allow continual operation of the lift gate, in 10 minute increments, with the master switch or aux button on the key fob after the time out period of 60 minutes.

The Lift_Gate_Enable_Hi_Current parameter will set an alarm if amperage load goes above the programmed value.

The Lift_Gate_Enable_Lo_Current parameter will set an alarm if amperage load goes below the programmed value.

The Lift_Gate_Enable_OC_Current parameter will set an alarm if amperage load goes below the programmed value.

The Lift_Gate_Enable_Timeout parameter can be adjusted to vary the amount of time, in ten minute increments, that the lift gate will remain enabled. If this value is set to 6, the lift gate will remain enabled for 60 minutes from the time that it is enabled.

Table 154

Parameter	ID	Description	Default	Units	Min	Max	Set
Lift_Gate_Alarm_Time	2249	Lift Gate Alarm Time Value	60	s	1	120	1
Lift_Gate_Enable_Hi_Current	2234	Lift Gate Enable High Current Detection Level (AMPS)	10	A	0	10	0.1
Lift_Gate_Enable_Lo_Current	2233	Work Light Low Current Detection Level (AMPS)	0.3	A	0	10	0.1

Parameter	ID	Description	Default	Units	Min	Max	Set
Lift_Gate_Enable_OC_Current	2232	Lift Gate Enable Open Circuit Detection Level (AMPS)	0.3	A	0	10	0.1
Lift_Gate_Enable_Timeout	2235	Amount of time, in 10 minute increments, that the lift gate will remain enabled.	60	Min	10	240	10

WIRING INFORMATION

For 08WJA and 08WJB, please refer to Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Lift Gate.

For 08WJA::

The Body Builder will be required to cut the 2 straplocks securing the power cable and route and clip the power cable to the lift gate motor. Then trim the power cable to length and add a lug terminal for securing cable to the lift gate motor. Two product graphics, from the plastic bag for Body Builders, need to be installed on the van body in the approximate locations shown.

For 08WJB::

The Body Builder will be required to route a 0 gauge cable from the mag switch, back along the frame to the lift gate motor.

Code 08WJB is identical to code 08WJA with the following exceptions:

Added - 3598246C91 Cable Assy, Lift Gate Feed with "0" gauge cable and 3-10 Awg fusible links.

Removed - 3592398C91 Cable Assy, Lift Gate Feed with "2" gauge cable and 2-10 Awg fusible links.

Also the 3592400C93-REF "2" gauge Cable Assy, Lift Gate - 33.5 feet Ref - Cut to length is changed to "0" gauge cable. The Body Builder will be required to remove the "2" gauge cable from the mag switch, back along the frame to the lift gate motor and replace it with the "0" gauge cable.

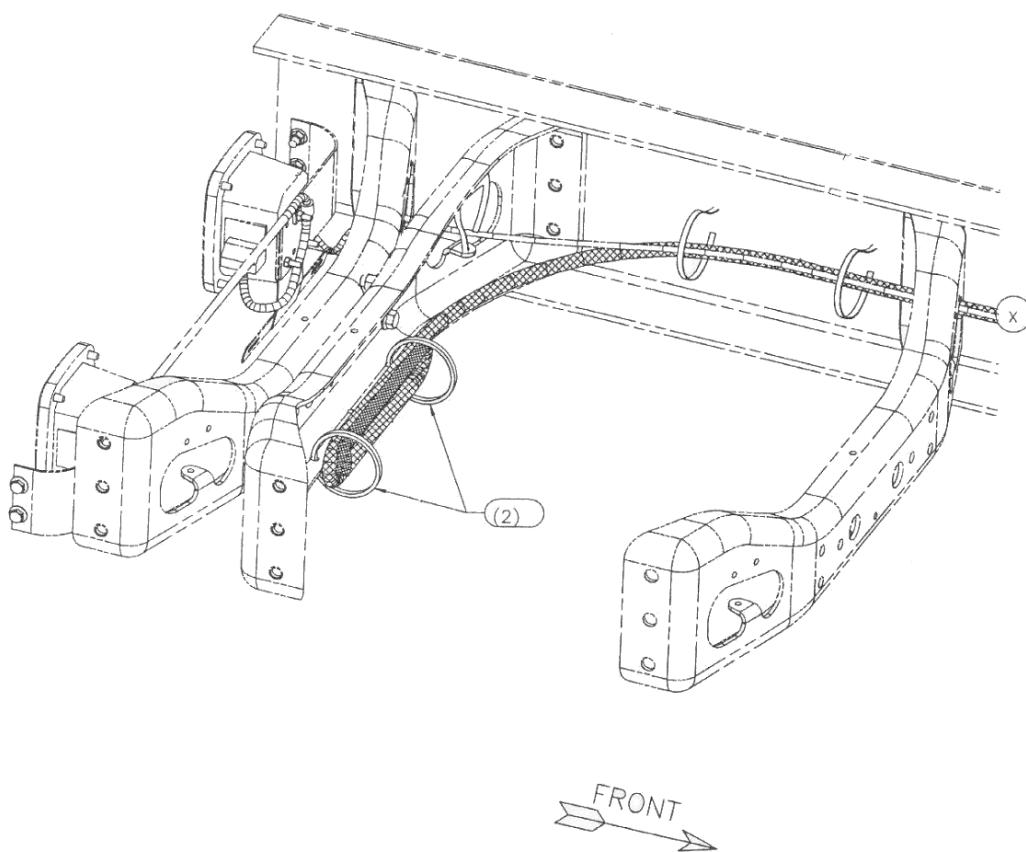


Figure 153 Harness Routing Diagram

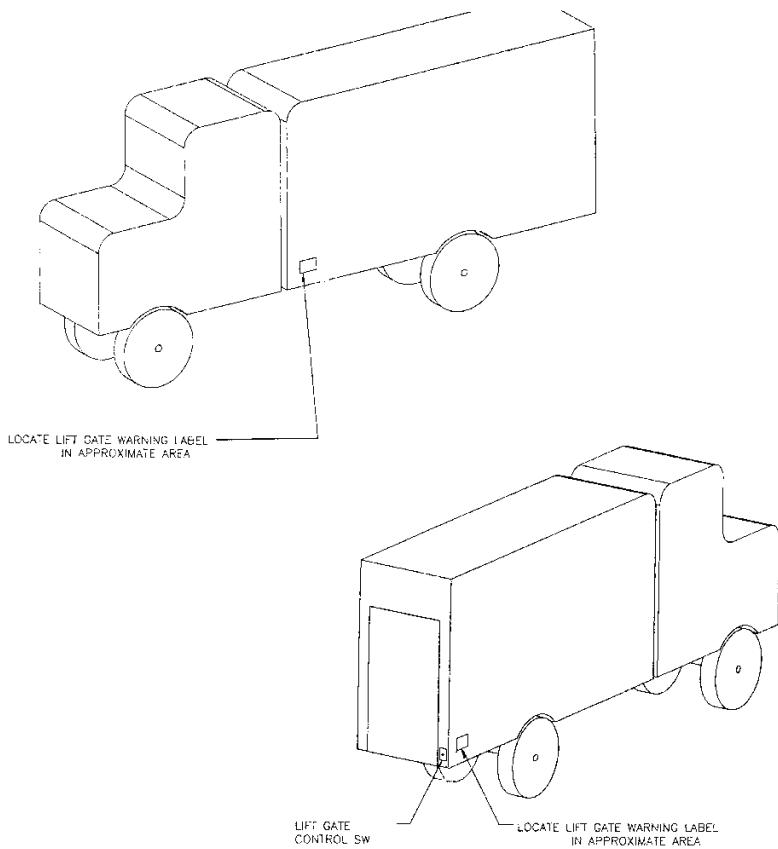


Figure 154 Warning Label Locations Diagram

TESTING

1. The body builder or lift gate installer must bring the batteries up to a full charge before trying to test the system for functionality.
2. With the batteries at a full charge, voltage in the 12.6 to 12.9 range, and the lift gate power controlled by the Battery Protection System, the system will operate as described in the above section.

HOW TO ADD THIS FEATURE:

Use the Diamond Logic® Builder software to add the following software feature:

Required software feature code: 595AYM for lift gate with rocker switch or 595AGN for lift gate with push button switch

Software features that must be removed: 595ABT

Hardware:

Please refer to Circuit Diagram Manual S08322, Chapter 10, Chassis Accessories, Lift Gate for circuit locations and routing and an International dealer for parts information.

29. AWARE TELEMATICS ACCOMMODATION PACKAGES

29.1. 08RHC – AWARE TELEMATICS SYSTEM MODULE AND ANTENNA

FEATURE CODE DESCRIPTION:

08RHC – TELEMATICS SYSTEM International Aware Vehicle Intelligence, Includes Module and Antenna, Subject to Verizon Wireless Coverage; Hardware Only, Separate Service Agreement Required To Receive Service; Additional Feature Codes May Be Required for Optional Service

FEATURE/BODY FUNCTION:

The AwareTM Telematics module is a data collection and communication system mounted on a vehicle. It consists of a GPS and cellular antenna and a data communicator module. The data communicator module collects the vehicle's location and system information and sends it to the network control center through wireless technology.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

The Aware Vehicle Intelligence system is equipped with a broad array of standard features to provide a comprehensive vehicle monitoring system using cell phone wireless communications.

Standard Aware Vehicle Intelligence Features

- Vehicle Location and Critical Data Snapshot
- Bread Crumb Trail
- Record of Stops
- Landmark Reporting
- The Alert System
- Diagnostic Reporting
- Productivity Reporting
- Maintenance and Service Scheduling
- Body and Chassis Equipment Monitoring

The programmable parameters for the system may be configured either through Diamond Logic® Builder or the Aware Internet Portal system. The following website provides instructions for configuring the parameters of the system:

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/Manuals/AWARE%20parameter%20configuration.pdf>

WIRING INFORMATION

The wiring for each vehicle make or model is found in the specific vehicle installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

The typical wiring of the system is performed as per the following diagram.

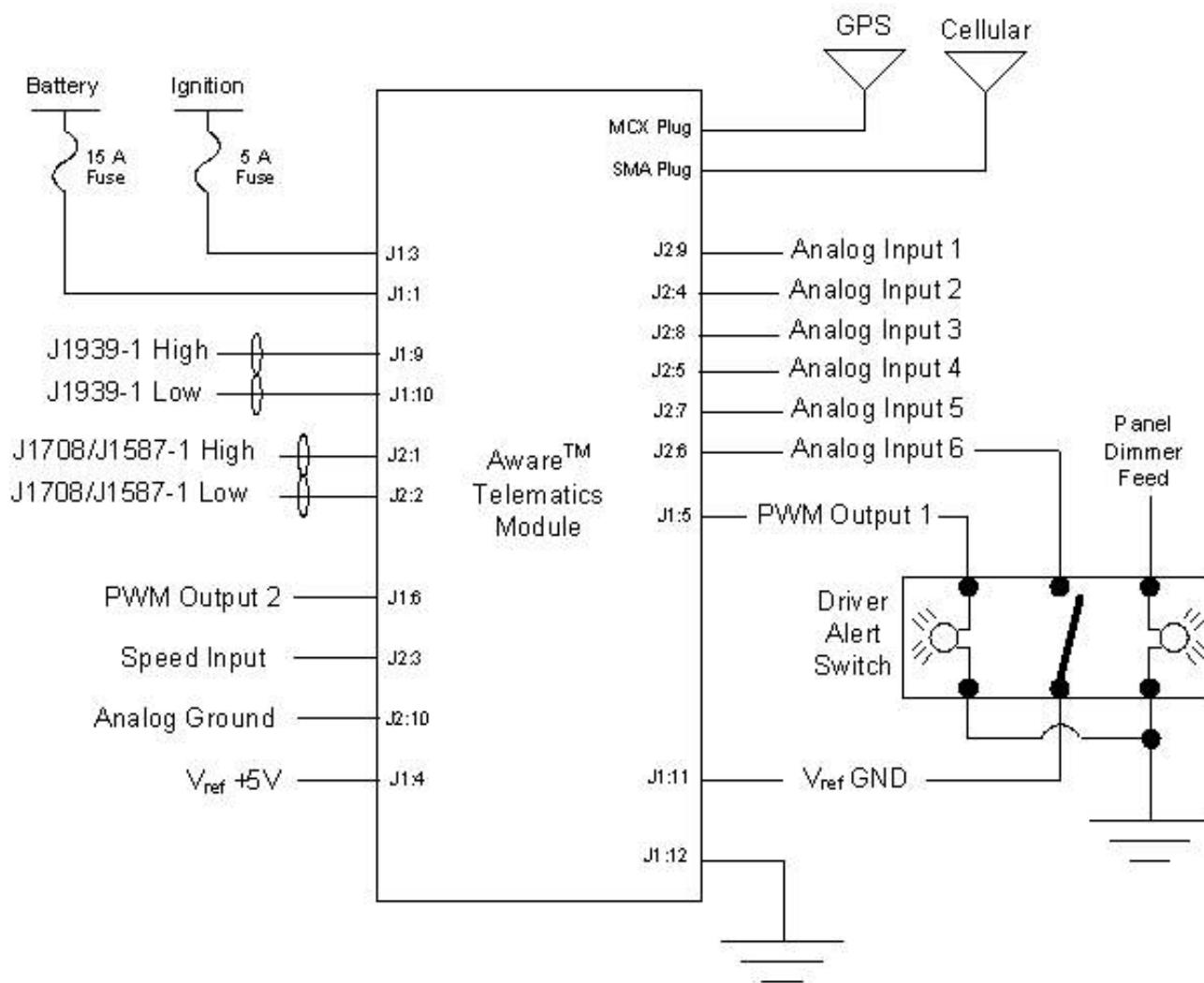


Figure 155 Aware™ Telematics Module Schematic

TABLE A - PIN LOCATOR		
CONNECTOR	PIN NO.	DESCRIPTION
J2	1	J158T/J1708 HIGH
	2	J158T/J1708 LOW
	3	SPEED INPUT
	4	ANALOG IN 2
	5	ANALOG IN 4
	6	ANALOG IN 6
	7	ANALOG IN 5
	8	ANALOG IN 3
	9	ANALOG IN 1
	10	ANALOG GROUND
	11	J1939 LOW 2
	12	J1939 HIGH 2
J1	1	BATTERY +
	2	BATTERY BACKUP
	3	IGNITION
	4	VOLTAGE REFERENCE +5VDC
	5	PWM OUTPUT 1
	6	PWM OUTPUT 2
	7	RS 232 TRANSMIT
	8	RS 232 RECEIVE
	9	J1939 HIGH 1
	10	J1939 LOW 1
	11	VOLTAGE REFERENCE GROUND
	12	CHASSIS GROUND

Figure 156 Aware™ Telematics Module Pinout**TESTING SYSTEM OPERATION**

The testing of the Aware system for each vehicle make or model is found in the specific installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

HOW TO ADD THIS FEATURE:

Contact a local International dealer to purchase an aftermarket Aware kit for the specific make and model of the vehicle. An installation guide for each vehicle make or model is found on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

29.2. 08RHD – AWARE TELEMATICS DRIVER ALERT SWITCH

FEATURE CODE DESCRIPTION:

08RHD – TELEMATICS DRVR ALERT SWTCH International Aware Vehicle Intelligence, Installed in Instrument Panel (IP)

FEATURE/BODY FUNCTION:

The “Send Alert” switch provides a means for the driver to send a notification to the vehicle fleet manager. The intended purpose of the switch is to be decided between the driver and the fleet manager. For example, activating the send alert switch could indicate that the driver has arrived at a destination, or it could be used to indicate that a problem has occurred with the vehicle or the equipment.



Figure 157

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

The send alert switch is an optional feature for the Aware Vehicle Intelligence system. The programmable parameters associated with the switch may be configured either through Diamond Logic® Builder or the Aware Internet Portal system.

The following website provides instructions for configuring the parameters of the system.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/Manuals/AWARE%20parameter%20configuration.pdf>

WIRING INFORMATION

The wiring for each vehicle make or model is found in the specific vehicle installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

The typical wiring of the system is performed as per the following diagram.

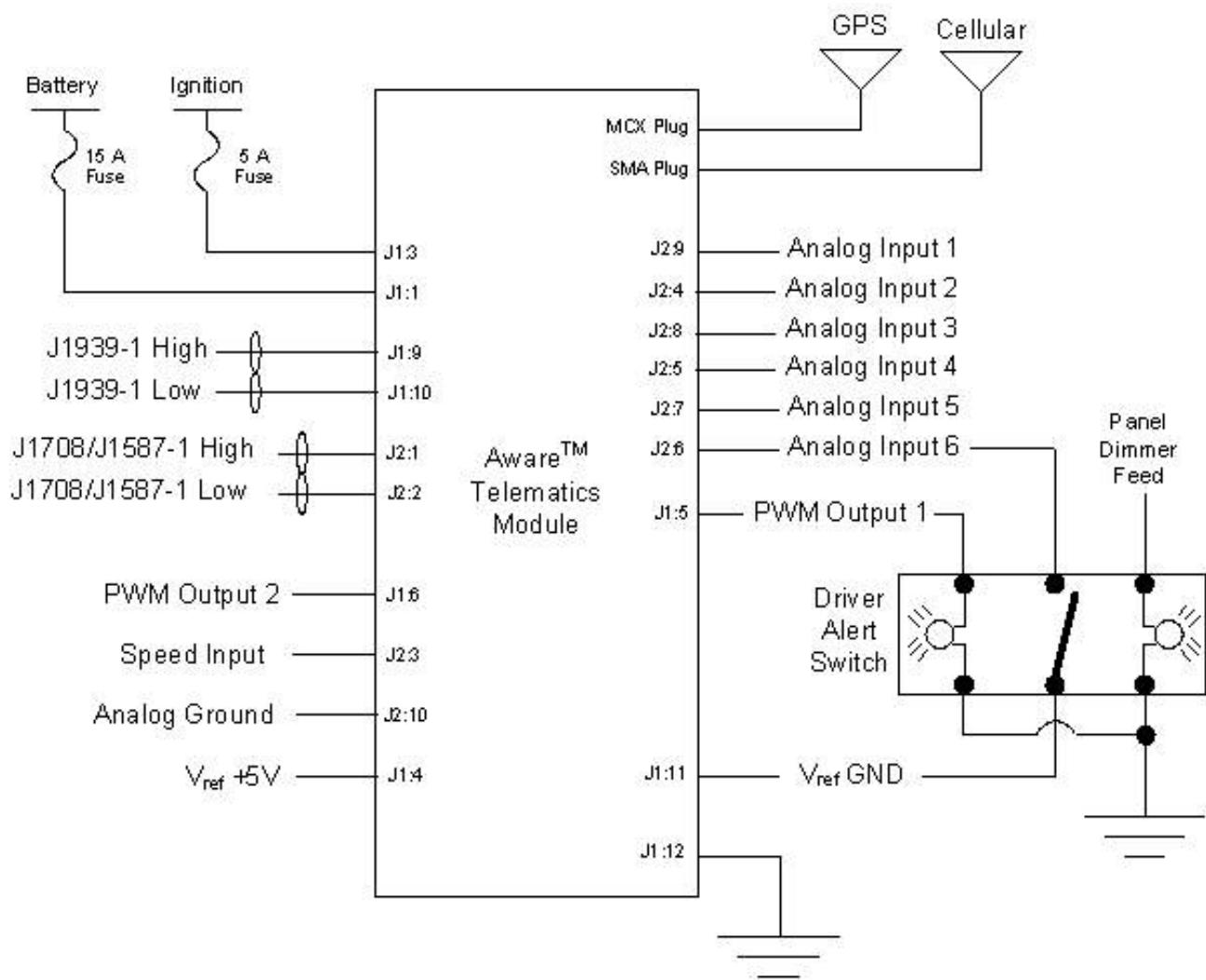


Figure 158 Aware™ Telematics Module Schematic

TABLE A - PIN LOCATOR		
CONNECTOR	PIN NO.	DESCRIPTION
J2	1	J158T/J1708 HIGH
	2	J158T/J1708 LOW
	3	SPEED INPUT
	4	ANALOG IN 2
	5	ANALOG IN 4
	6	ANALOG IN 6
	7	ANALOG IN 5
	8	ANALOG IN 3
	9	ANALOG IN 1
	10	ANALOG GROUND
	11	J1939 LOW 2
	12	J1939 HIGH 2
J1	1	BATTERY +
	2	BATTERY BACKUP
	3	IGNITION
	4	VOLTAGE REFERENCE +5VDC
	5	PWM OUTPUT 1
	6	PWM OUTPUT 2
	7	RS 232 TRANSMIT
	8	RS 232 RECEIVE
	9	J1939 HIGH 1
	10	J1939 LOW 1
	11	VOLTAGE REFERENCE GROUND
	12	CHASSIS GROUND

Figure 159 Aware™ Telematics Module Pinout

TESTING SYSTEM OPERATION

The testing of the send alert switch for each vehicle make or model is found in the specific installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

HOW TO ADD THIS FEATURE:

Contact a local International dealer to purchase an aftermarket send alert switch kit. An installation guide for each vehicle make or model is found on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

It is assumed that the vehicle already has an Aware Telematics module installed before adding the send alert switch feature. The switch may be quickly connected to the base telematics harness provided with the 08RHC Aware Telematics feature.

29.3. 08RHE – AWARE TELEMATICS OPT INPUTS, ACCESS EQUIP

FEATURE CODE DESCRIPTION:

08RHE – TELEMATICS OPTIONAL INPUTS International Aware Vehicle Intelligence, For Accessory Equipment

FEATURE/BODY FUNCTION:

The Aware™ Telematics optional inputs provide the wiring to allow connection of customer-supplied sensor or switches. The feature provides a means to connect up to four accessory inputs to the Aware Telematics module. If required, the feature also provides a 5 volt sensor supply and a sensor Ground (GND) connection. Sensor or switch data values may be communicated wirelessly to the Aware Internet Portal viewing screens.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

The programmable parameters for the optional accessory inputs may be configured either through Diamond Logic® Builder or the Aware Internet Portal system. The following website provides instructions for configuring the parameters of the system.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/Manuals/AWARE%20parameter%20configuration.pdf>

WIRING INFORMATION

The wiring for each vehicle make or model is found in the specific vehicle installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

The typical wiring of the system is performed as per the following diagram.

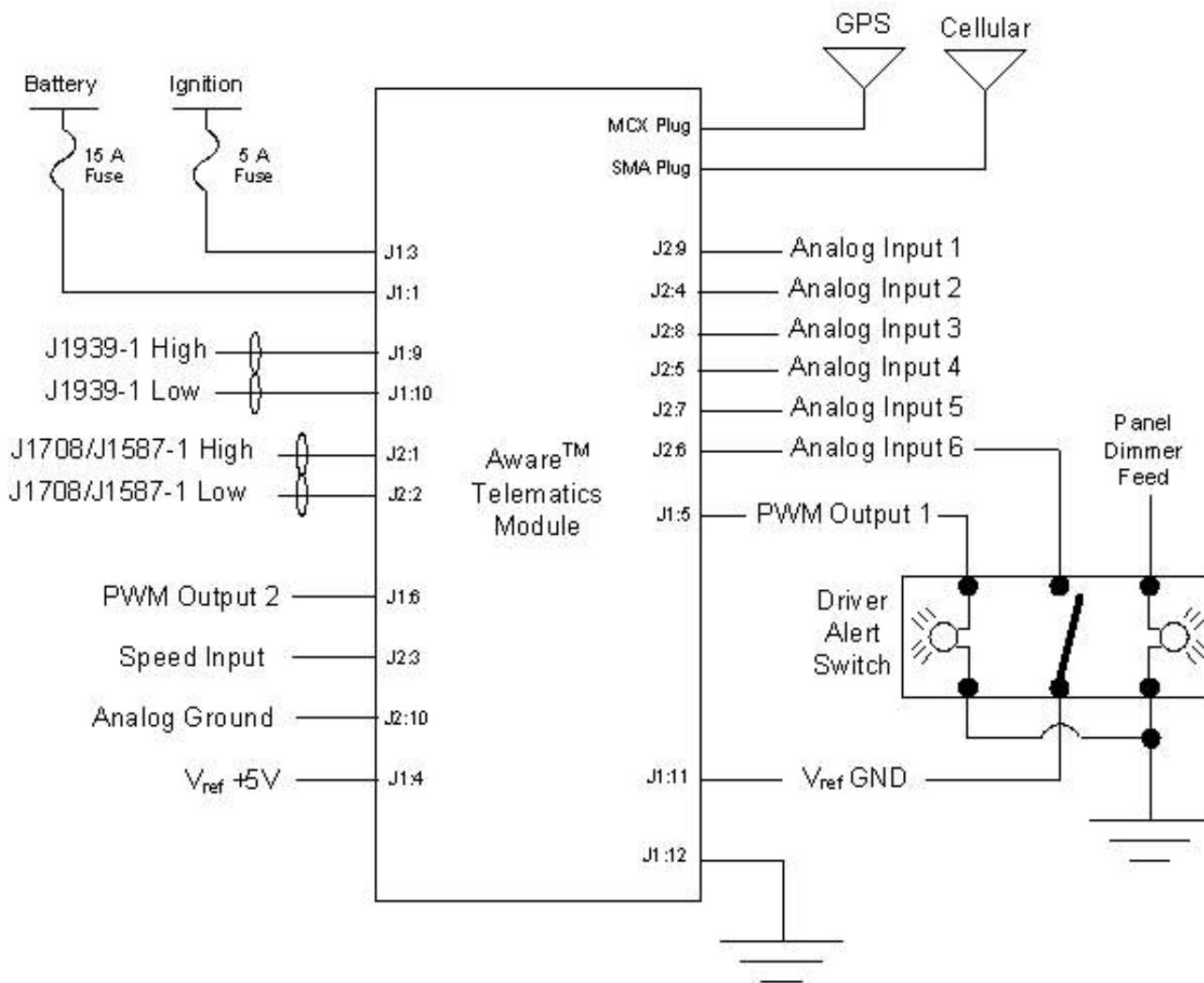


Figure 160 Aware™ Telematics Module Schematic

TABLE A - PIN LOCATOR		
CONNECTOR	PIN NO.	DESCRIPTION
J2	1	J158T/J1708 HIGH
	2	J158T/J1708 LOW
	3	SPEED INPUT
	4	ANALOG IN 2
	5	ANALOG IN 4
	6	ANALOG IN 6
	7	ANALOG IN 5
	8	ANALOG IN 3
	9	ANALOG IN 1
	10	ANALOG GROUND
	11	J1939 LOW 2
	12	J1939 HIGH 2
J1	1	BATTERY +
	2	BATTERY BACKUP
	3	IGNITION
	4	VOLTAGE REFERENCE +5VDC
	5	PWM OUTPUT 1
	6	PWM OUTPUT 2
	7	RS 232 TRANSMIT
	8	RS 232 RECEIVE
	9	J1939 HIGH 1
	10	J1939 LOW 1
	11	VOLTAGE REFERENCE GROUND
	12	CHASSIS GROUND

Figure 161 Aware™ Telematics Module Pinout

TESTING SYSTEM OPERATION

The testing of the send alert switch for each vehicle make or model is found in the specific installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

HOW TO ADD THIS FEATURE:

Contact a local International dealer to purchase an aftermarket Aware kit for the specific make and model of vehicle. An installation guide for each vehicle make or model is found on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

29.4. 08RHY – AWARE TELEMATICS DATA LOGGING

FEATURE CODE DESCRIPTION:

08RHY – TELEMATICS DATA LOGGING With Indicator Light on IP, for Fuel Tax & Hours of Service Features; Light is "ON" When AWARE Telematics System is Non-Functional or Unable to Store Additional Data; Indicator Light Labeled "NO DATA LOGGED" with Light On; Driver Must Keep Manual Records for Vehicle Operation

FEATURE/BODY FUNCTION:

The Electronic Fuel Tax Reporting Service automatically records fuel tax information. This service requires a valid fuel card and is subject to Verizon 1XRTT cellular coverage.

A variety of electronic fuel tax reporting options are available.

- Mileage and fuel activity by vehicle, by state
- Calculated Fuel and Third Structure Tax Liability
- IFTA Report (tax summary by state for all IFTA qualified vehicles)
- Kentucky Third Structure Tax by Vehicle
- Oregon Third Structure Tax by Vehicle

Additional details for activating the electronic fuel tax reporting option are available through an International Account Manager.

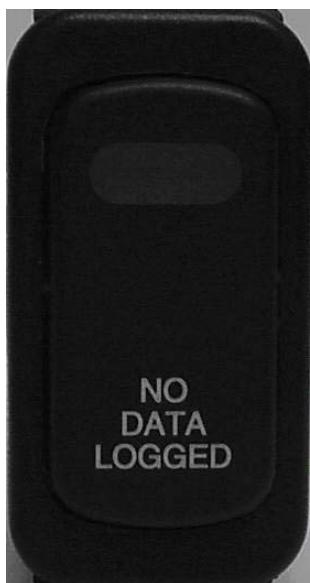


Figure 162

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

The "No Data Logged" indicator is an optional feature for the Aware Vehicle Intelligence system. The programmable parameters associated with the no data logged indicator may be configured either through Diamond Logic® Builder or the Aware Internet Portal system.

The following website provides instructions for configuring the parameters of the system.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/Manuals/AWARE%20parameter%20configuration.pdf>

WIRING INFORMATION

The wiring for each vehicle make or model is found in the specific vehicle installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

The typical wiring of the system is performed as per the following diagram.

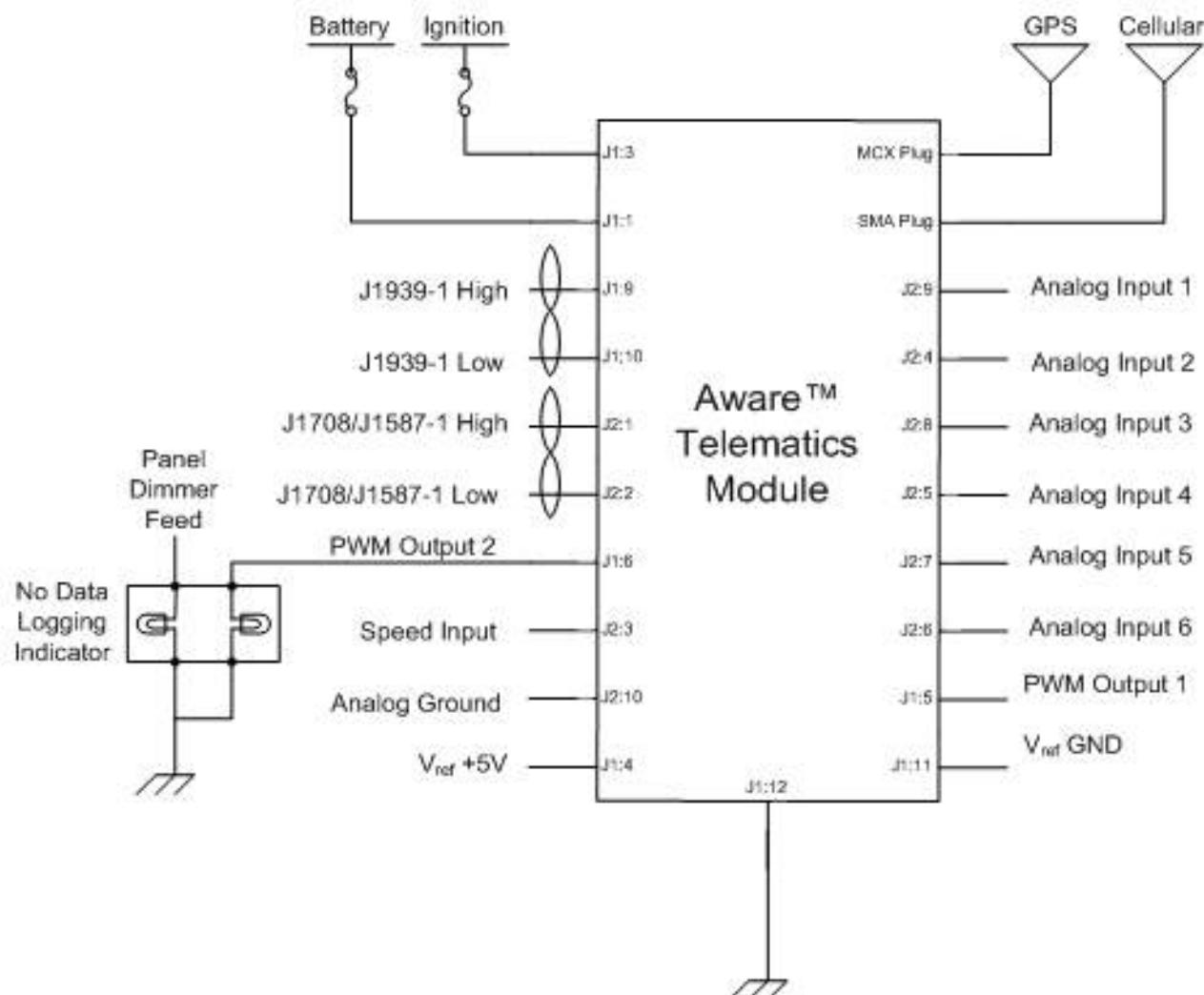


Figure 163 Aware™ Telematics Module Schematic

TABLE A - PIN LOCATOR		
CONNECTOR	PIN NO.	DESCRIPTION
J2	1	J158T/J1708 HIGH
	2	J158T/J1708 LOW
	3	SPEED INPUT
	4	ANALOG IN 2
	5	ANALOG IN 4
	6	ANALOG IN 6
	7	ANALOG IN 5
	8	ANALOG IN 3
	9	ANALOG IN 1
	10	ANALOG GROUND
	11	J1939 LOW 2
	12	J1939 HIGH 2
J1	1	BATTERY +
	2	BATTERY BACKUP
	3	IGNITION
	4	VOLTAGE REFERENCE +5VDC
	5	PWM OUTPUT 1
	6	PWM OUTPUT 2
	7	RS 232 TRANSMIT
	8	RS 232 RECEIVE
	9	J1939 HIGH 1
	10	J1939 LOW 1
	11	VOLTAGE REFERENCE GROUND
	12	CHASSIS GROUND

Figure 164 Aware™ Telematics Module Pinout

TESTING SYSTEM OPERATION

The testing of the no data logged indicator for each vehicle make or model is found in the specific installation guides provided on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

HOW TO ADD THIS FEATURE:

Contact a local International dealer to purchase an aftermarket no data logged indicator kit. An installation guide for each vehicle make or model is found on the Aware website.

<https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmmsg/>

It is assumed that the vehicle already has an Aware™ Telematics module installed before adding the send alert switch feature. The switch may be quickly connected to the base telematics harness provided with the 08RHC Aware Telematics feature.

30. POWER PACK 3 FOR STATIONARY OPERATION

FEATURE CODE DESCRIPTION:

60AAC – BDY INTG, POWER INVERTER 3000 Watt Dynamic (With Engine Running); On/Off Switch in Instrument Panel (IP); Includes 120 volt AC Wiring; Connection for Customer-Mounted Power Outlet

60AAE – BDY INTG, POWER INVERTER Temporary Mount on Frame Rail for Customer Installation; 3000 Watt Dynamic (With Engine Running); On/Off Switch in IP; Includes 120 volt AC Wiring Connection for Customer-Mounted Power Outlet



WARNING – Shock hazard. Only trained technicians should service high voltage components. High voltage circuits and components contain voltage levels that may cause equipment damage, electric shock, and/or deadly electrocution if handled incorrectly.



WARNING – DO NOT OPEN the Power Pack 3. Hazardous voltages exist internally even after the Power Pack 3 is removed from the vehicle. Only a Qualified Technician may perform service inside the Power Pack 3. Failure to follow this warning may result in property damage, personal injury, or death.



WARNING – The alternator may generate high voltage, particularly at high rpm, which can be harmful. Do not touch the 3-phase output terminals. Failure to follow this warning may result in property damage, personal injury or death.



WARNING – The alternator output is a hazardous 3-phase AC voltage — Do not cut the cable or touch the terminals. Failure to follow this warning could result in property damage, personal injury, or death.

FEATURE / BODY FUNCTION:

The Power Pack 3 Inverter system is an advanced Power Generation and Power Management system to provide both DC power and an on-board 120 volt AC power source. The Power Pack 3 system is integrated with the Diamond Logic® Electrical system. The DC portion of the system provides 14 volts DC at a maximum of 100 Amperes (AMPS) to charge the vehicle batteries. The AC portion of the system provides a 120 Volts AC single, phase 60 Hertz output at a maximum of 25 AMPS. The system may be ordered from International, factory-installed either mounted in the battery box or as a temporary mounted inverter module behind the cab. The body upfitter is tasked with mounting the inverter in a body compartment with the temporary mount.

The Power Pack system consists of an inverter module, a special 3-phase 42 volt AC alternator, a multiplexed switch in the cab, and associated wiring harness. The engine must be running in order for the Power Pack system to generate AC or DC voltages. The 120 volt AC output is only functional when the vehicle is stationary

with the park brake set. The 120 volt AC output contains a Ground (GND) fault interrupter device and a weather sealed power plug.

CAUTION – If 120 volts AC Shore power is integrated into the body wiring, the shore power connection must never be directly connected to the Power Pack 3 AC output.

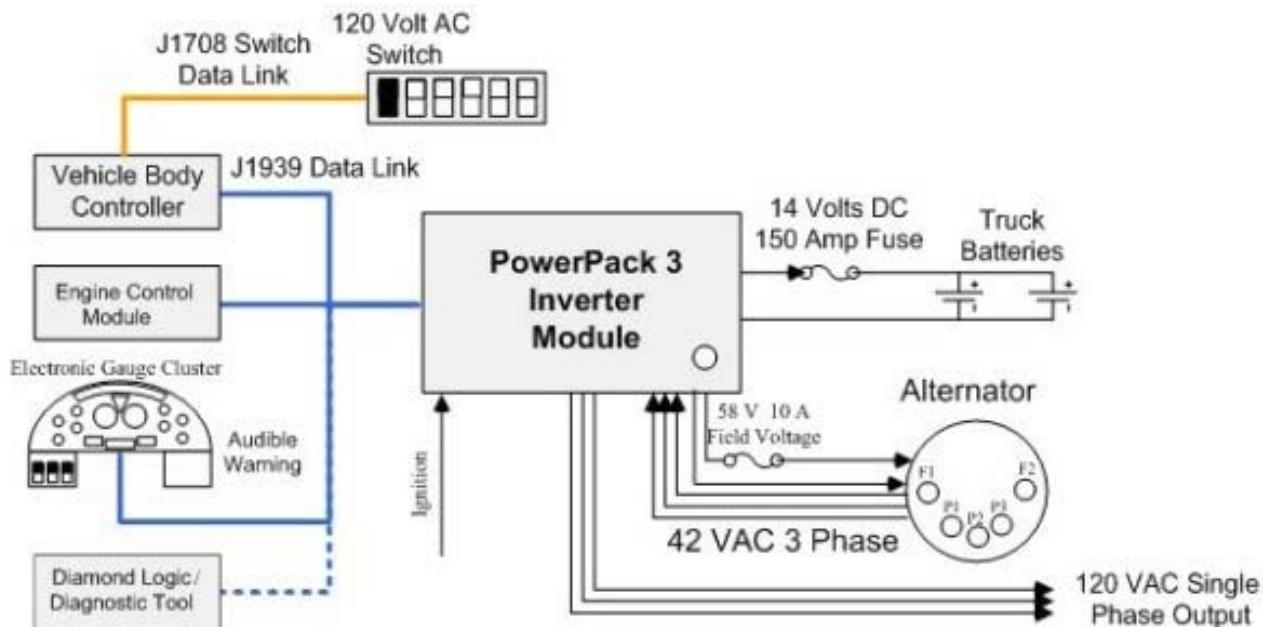


Figure 165 Power Pack 3 Block Diagram

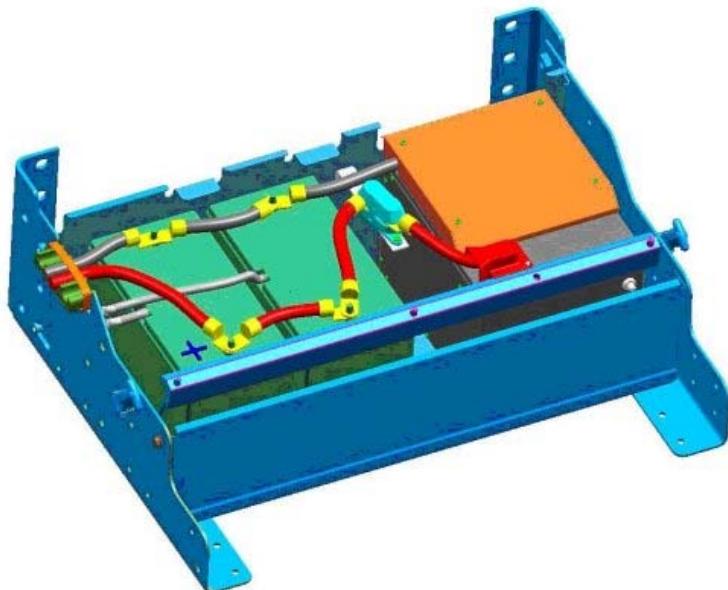


Figure 166 Battery Box Mounted Power Pack 3

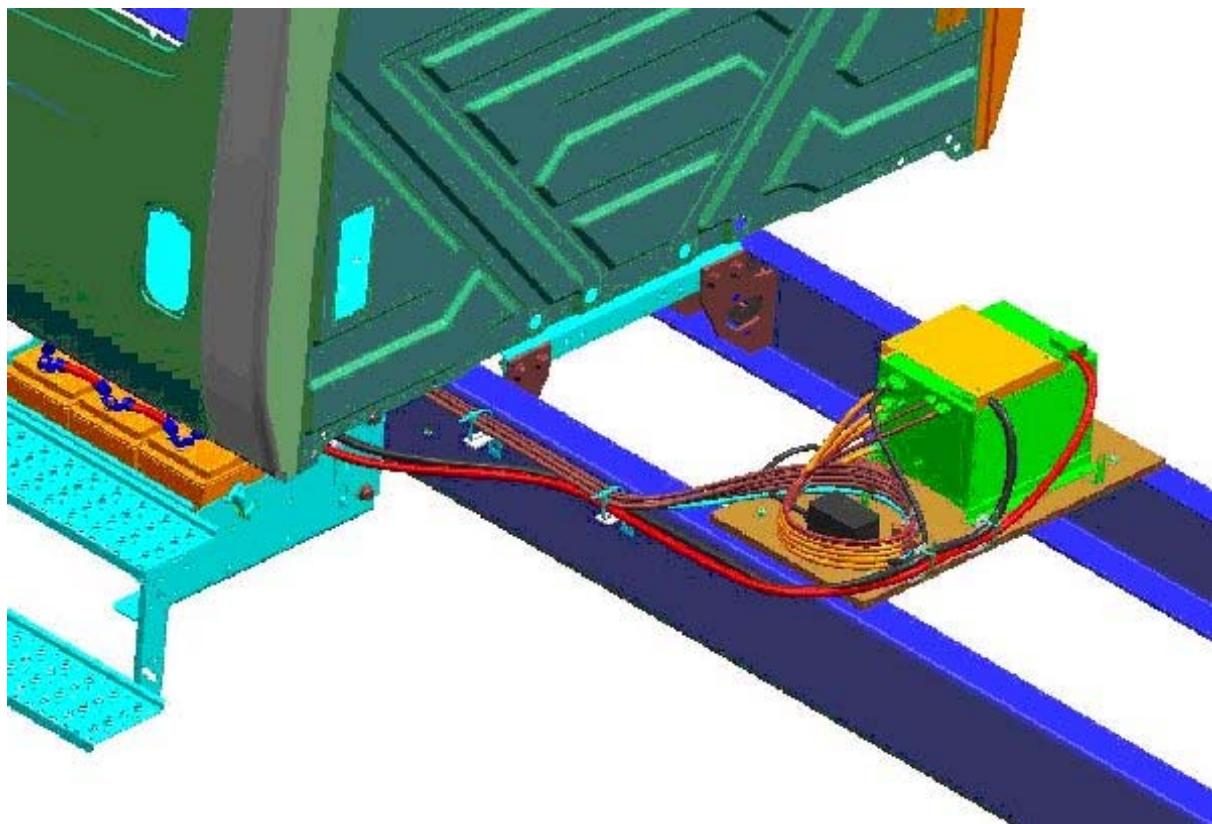


Figure 167 Remote Mount Power Pack 3

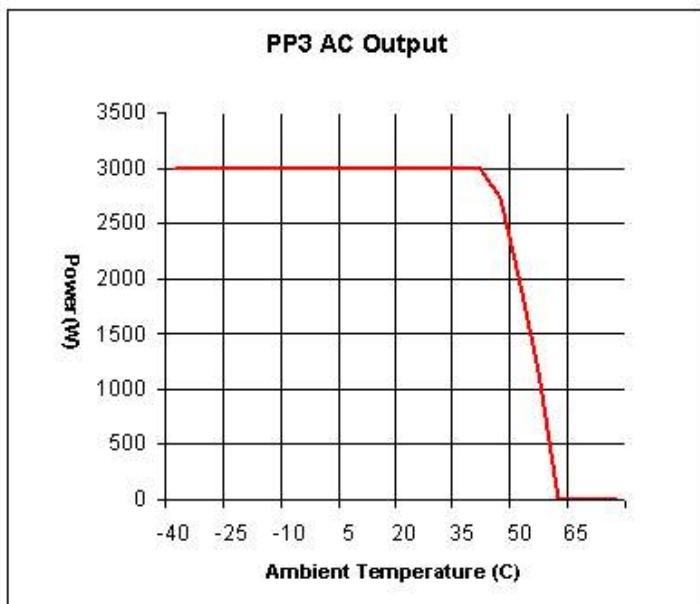


Figure 168 AC Derating Curve

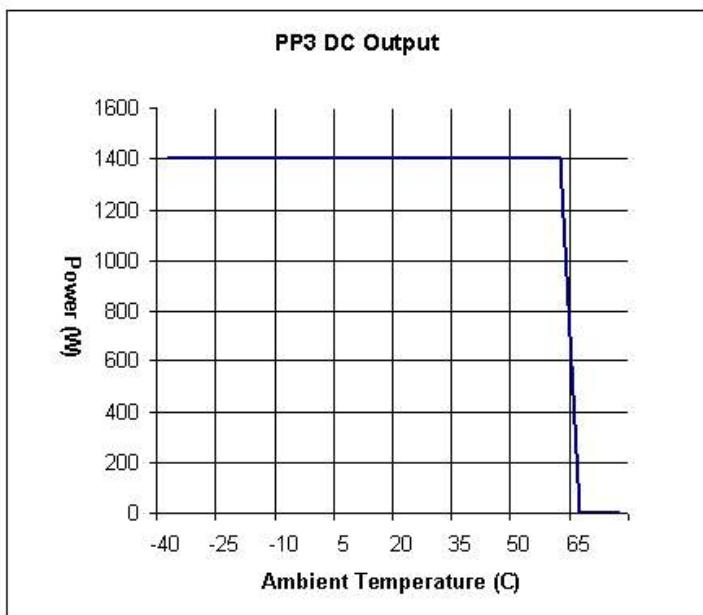


Figure 169 DC Derating Curve

USING POWER PACK 3 WITH REMOTE ENGINE SPEED CONTROL:

Power Pack 3 provides full power output for the 120 volt AC section at an engine RPM of 935 or greater. The Power Pack 3 inverter module uses special datalink commands to raise the engine RPM to 935 when the 120 volt AC rocker switch is turned on. Since the engine cannot respond to both datalink commands and direct Engine Control Module (ECM) hard wired engine speed control commands, the body upfitter must use specific alternative wiring methods to permit remote engine speed control from remote body locations as well as allow Power Pack 3 to raise engine speed as required. Vehicles equipped with Power Pack 3 may not be used with the feature 12VZA which provides remote engine speed control through hard wires connected directly to the engine ECM. The following alternative features are compatible with Power Pack 3 and may be used to achieve various engine speed control functions.

- Preset or variable engine speed control using the steering wheel cruise control switches
- Preset variable or remote pedal/throttle using the Remote Engine Speed Control Module (RESCM). Requires Body Controller (BC) feature 595AHA
- Preset 1 using Remote Power Module (RPM) inputs; i.e., feature code 60AJE
- Preset or variable engine speed control using Diamond Logic® Advanced Ladder Logic

When the Power Pack 3 AC output is turned off and no other form of remote engine speed control is requested, the engine will be at an idle speed of approximately 700 RPM. If the Power Pack 3 AC switch is turned on, the engine speed shall be increased to 935 RPM. If another form of remote engine speed control is activated, the Power Pack 3 will release engine speed control to that input. When the remote engine speed request is removed, the engine will return to 935 RPM until the Power Pack is turned off.

Body Controller: Software Feature Codes / Programmable Parameters: Stationary Mode

Software feature code 595AZU must be enabled on the vehicle Body Controller using the Diamond Logic® Builder software (see local dealer).

Parameter PPE3_param_incrThrottle_rqst_enable will enable the automatic throttle request. This will automatically ramp the engine to the value set in parameter 2344 when the Power Pack is requested on.

Parameter PPE3_param_incrThrottle_startDelay is the amount of time that the Power Pack will wait to turn on. This is to allow the engine to ramp to the operating RPM before the Power Pack is activated.

Parameter PPE3_param_incrThrottle_targetRPMs is the target RPM for the engine to ramp to when the Power Pack is activated.

Parameter PPE3_param_incrThrottle_timeout is the amount of time that the inverter is inhibited from coming back on due to inadequate engine speed.

Table 155

Parameter	ID	Description	Default	Units	Min	Max	Step
PPE3_param_incrThrottle_rqst_enable	2357	If this is true, then the automatic throttle increase request has been enabled.	1	On/Off	0	1	1
PPE3_param_incrThrottle_startDelay	2399	This parameter allows the throttle to ramp to the target RPM prior to enabling the PPE. The logic for this parameter is that a maximum load on the PPE would turn off the inverter if the alternator RPMs are not at target.	2	Seconds	0	5	0.1
PPE3_param_incrThrottle_targetRPMs	2344	This is the target RPM rate for the throttle increase feature.	935	RPM	900	2000	1
PPE3_param_incrThrottle_timeout	2345	The amount of time until the inverter is inhibited because the engine speed is not at an adequate level	5	Seconds	0	30	0.1

WIRING INFORMATION:



WARNING – All electrical connections to the Power Pack 3 must be made by a qualified electrician. Failure to follow this warning could result in property damage, personal injury, or death.

A Hubbell Watertight Safety-Shroud male plug (Hubbell part number HBL2611SW) is needed to connect to the AC output plug to mate with the Power Pack supplied Hubbell Watertight Safety-Shroud female socket (Hubbell part number HBL2613SW). These plugs are available at electrical and industrial supply houses.

Using this part combination will allow for a weather resistant connection to the Power Pack 3 unit. Alteration of the AC output plug, failure to use the correct male plug, or removal of the supplied socket will not guarantee a watertight connection.

The AC output from the Power Pack 3 is wired to a Ground Fault Circuit Interrupter (GFCI) to ensure protection against GND fault conditions. Be aware that standard duplex GFCI and non-GFCI receptacles need to be protected with a circuit breaker, usually rated for 15 or 20 AMPS.

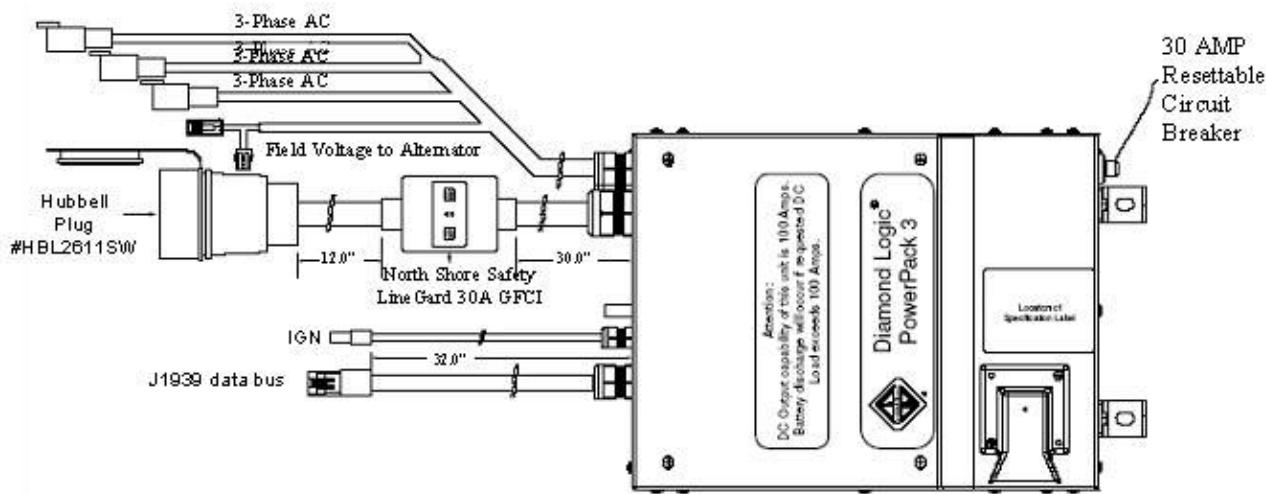


Figure 170 Power Pack 3 Inverter/Regulator Component Detail

Power Pack 3 Kit, Left Side under Cab for vehicles built after March 2007.

Power Pack 3 Kit, Right Side under Cab for vehicles built after March 2007.

Power Pack 3 Kit, Remote Mount for vehicles built after March 2007.

Fuse, 58 volt, 10 amp: Alternator Field Wire fuse. International Part Number: 2590768C1

TESTING SYSTEM OPERATION:

- Start engine; ensure that the park brake is set.
- Verify that the batteries are being charged. The voltmeter should be reading greater than 13.5 volts.
- Depress 120 VAC rocker switch in IP.
- Verify that the engine ramps to 935 RPM.
- Verify green light in rocker switch is on solid within five seconds.
- Verify 120 volt AC output voltage.



Figure 171

Power Pack 3 Troubleshooting

If the Power Pack 3 output does not power up or shuts down during vehicle operation, follow these steps to troubleshoot the system:

1. Set the 120VAC ON/OFF switch to OFF position, and ensure interlocks are satisfied, as described above, correcting as necessary.
2. Attempt to restart the Power Pack 3 by pressing the ON switch.
3. If the unit continues to shut-down, (blinking green light in the rocker switch) disconnect any AC loads before restarting the Power Pack 3.
4. Check for green light on GFCI. If there is a red light press the reset button on GFCI.
5. Press the 120VAC switch to OFF, check the 30-Amp circuit breaker, and reset if necessary.
6. Wait several minutes to allow the system alternator and Power Pack 3 unit to cool, and then attempt to restart.
7. If the unit does not restart, then turn the vehicle's ignition OFF, and then back ON again. This will restart the Power Pack 3 output protection circuits.
8. If the above steps fail to restart the Power Pack 3 unit, then have the system serviced by a qualified technician.

NOTE – If the unit does not restart, the problem could be caused by overheating or other circuit protection devices. If the Power Pack 3 circuit breaker or the GFCI device is tripped, the green light in rocker switch will continue to show an indication that AC power is ON. Be advised to check these other elements of the system if 120 volt AC power is not present as expected.

Diagnostic Indications Using the In-Cab Rocker Switch or Diamond Logic® Builder

SPN	FMI	Byte 7	Byte 8	Switch Indicator Blink Rate	Condition Description/ Comments/ Probable Cause(s)
168	2	0	0	Fast	Communication fault from ESC to the PowerPack. Check for open circuit or short in J1939 datalink. If switch is not blinking, verify vehicle is programmed for Powerpack feature and the switchpack is operating correctly.
168	3	0	0	Fast	DC module over voltage condition on vehicle DC bus. System detected voltage over 15 volts. Remove any external power supply/charger from vehicle.
168	3	0	0	Slow	AC module over voltage condition on high voltage DC bus. Likely an internal failure for AC output. AC has been shut down. DC output remains on.
168	4	0	0	Fast	DC module under voltage condition on vehicle DC Bus. System detected low DC voltage. This could be due to insufficient input power from the alternator. Check the 3 phase wires from the alternator to the PowerPack.
168	4	0	0	Slow	AC module under voltage condition on high voltage DC bus. System detected low internal voltages. This could be due to insufficient input power from the alternator. Check the 3 phase wires from the alternator to the PowerPack.
168	6	0	0	Slow	AC module has shut down due to overload condition. AC overloaded, remove some or all of AC load.
168	8	0	0	Fast	Phase missing fault/alternator fault. One of the three 3-phase wires has an open circuit. Check the 3 phase wires from the alternator to the PowerPack.
168	16	0	0	Fast	DC module over temperature condition. PowerPack is experiencing extremely high internal temperatures. AC and DC has been shut down. Allow the system to cool down.
168	16	0	0	Slow	AC module over temperature condition. PowerPack has detected high internal temperatures although less severe. AC inverter has shutdown, but DC output remains on. Shut the system down to allow it to cool down or remove some of the loads.
168	17	0	0	Fast	PowerPack Fuse Open. Check DC battery charging connections from Powerpack. Check 150A fuse.
639	14	37	255	Fast	Communication fault between PowerPack and the ESC. Check for open circuit or short in J1939 datalink. Also, check the ignition circuit to the Powerpack module.

Figure 172

NOTE – A complete after market parts kit is under development. The Power Pack 3 kit part number is not available at this time.

HOW TO ADD THIS FEATURE:

1. Remove power from batteries.
 - a. Remove the lid from the battery box.
 - b. Remove all battery cables from the batteries and battery box, starting with the negative terminals.
2. Replace the 3 battery box with a 4 battery box.
 - a. Remove cab steps from the battery box.
 - b. Remove the front side of the battery box.
 - c. Remove all batteries.
 - d. Remove old battery box from the frame rail.
 - e. Remove any options that may be on box, and transfer to new box.
 - f. Attach new 4 battery box to the frame rail. Some new mounting holes may need drilled in the frame rail. Re-use existing holes as much as possible.
 - g. Add cover hold downs, and add new box to frame. 777937C1 retainers, 934871R1 nuts, 30278R1 screws, 30264R1 washers.
 - h. Put batteries in the two forward locations of the 4 battery box.
 - i. Install the Power Pack 3 Inverter Module in the most rearward location of the battery box. Align the PP3 module such that the mounting stud on the rear panel of the module projects through the rear of the battery box.
 - j. Ensure that the PP3 harnesses are carefully routed through the openings in the rear panel of the battery box without kinking or pinching.
 - k. Attach the battery box hold down bracket to secure the batteries and the PP3 Inverter Module.
 - l. Attach the retainer nut to the PP3 module stud on the back side of the battery box.
 - m. Attach vent tubes to each battery, and route out of battery box.

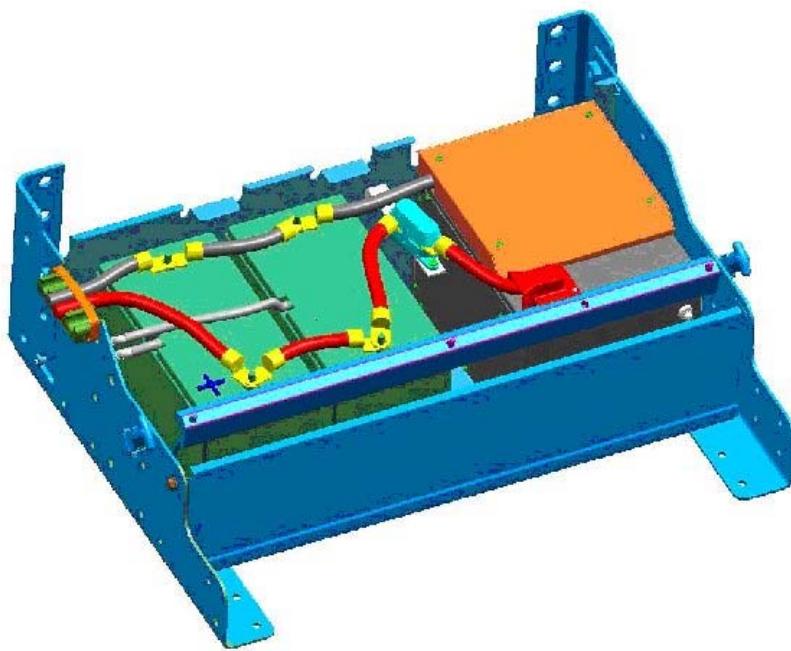


Figure 173 Sample Inverter on Installation on the Driver's Side of the Vehicle

3. Add new alternator.
 - a. Remove air filter and **cover turbo intake to prevent items from falling into intake.**
 - b. Remove serpentine belt and old alternator.
 - c. Tie off old cables.
 1. Seal terminal ends with heat shrink tube, fold back onto trunk of harness, and tape to trunk of harness.
 - d. Attach the Leece-Neville alternator (part number 3606039C91) to the engine. Transfer belt pulley from old alternator to the new alternator.
 - e. Check alternator mounting bolt torque. DO NOT OVER TORQUE.
 1. Alternator to bracket mounting bolts 30 to 35 lb ft
 - f. Add new alternator harness overlay.
 1. Route the PP3 harness next to existing engine harness to the starter; then follow battery cables to the battery box.
 2. At base of battery box, route inverter cables to back of battery box by going under the frame rail.
 - g. Use tie wraps, every 12 inches, to attach the alternator harness to the battery cables.

Alternator Harness

The harness from the Power Pack 3 to the alternator must be properly routed and securely fastened to avoid any hot or sharp areas and to prevent cable movement. Failure to use the proper size wire can result in overheating conditions that could cause fire, personal injury, and void of warranty.

- h. Add Ignition (IGN) lead to the in-cab fuse relay panel.

1. Connect an 18 gauge wire from the Power Pack 3 IGN feed connector to the dash pass thru connector 1702 pin 5.
2. Connect an 18 gauge wire from the dash pass thru connector 1702 pin 5 to an IGN feed in the cab fuse/relay panel cavity G2-H2 (see fuse box detail).
3. Add 10 AMP fuse to fuse locations G2-H2.
4. Connect to inverter overlay harness (connector 9740 at the center of valve cover). Strap lock the connector to the main center chassis harness.
5. Remove terminating resistor from J1939 datalink back bone harness (connector 7801M located on the top center of the engine valve cover). Connect the PP3 J1939 datalink harness (connector 7801M) to J1939 inverter (connector 7801N). Save J1939 terminator resistor assembly.
6. Strap harness to existing harnesses.

Keep clear of sharp edges or anything that can rub or damage wire insulation.

4. Connect harness wires to the alternator.
 - a. Attach 3-Phase AC output ring terminal wires to bolt studs on the back of alternator. 80-120 in lb (inch-pounds, NOT foot-pounds) Three phase wire attachment order to the alternator does not matter.
 - b. Attach field coil wires to the top of alternator using two nuts 15-20 in lb (inch- pounds, NOT foot-pounds).

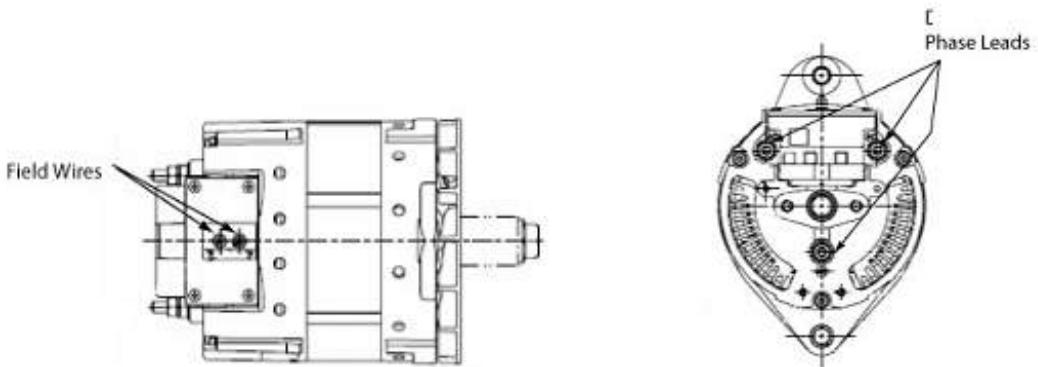


Figure 174 3-Phase and Field Wire Alternator Connections

5. Make connections from the Power Pack 3 wire harness to the inverter module.
 - a. At back of the battery box:
 1. Connect 3-Phase AC alternator connectors (9741, 9742, 9743) which are large 4 gauge, 1-pin connectors. Ensure the connectors are fully mated with a positive click of the male connector into the female connector.
 2. Connect inverter IGN connector (7899) 1-pin connector.
 3. Connect inverter J1939 connector (7801R) 3-pin connector.
 4. Connect field voltage connector (9740) 2-pin connector.

- b. Connect terminating resistor connector to (7801L) located on inverter harness near inverter connection to the J1939 data bus connector.
6. Secure Power Pack 3 harness to the chassis harness.
 - a. Keep harness clear of sharp edges or anything that can rub or damage wire insulation. Use tie wraps every 12 inches to attach the PP3 alternator harness to battery cables.
7. Confirm connections.
8. Remove cloth from air intake, and reinstall air filter.



WARNING – Shock Hazard. Never make electrical connections to a "live" unit. Make the connections to the Power Pack 3 first and the batteries last. Failure to follow this warning may result in property damage, personal injury or death.

9. Installing battery cables

Step 1: Make sure that the batteries are disconnected from the vehicle.

Step 2: Install the in-line fuse on the positive battery terminal or within 18 inches of the battery or DC wiring bus system.

Step 3: Route, but DO NOT connect, the positive DC (red) input cable from the Power Pack 3 to the in-line fuse on the battery or DC wiring bus system. Make sure to protect all cables from where they contact hard or sharp edges.

Step 4: Connect the Power Pack 3 to the battery in THIS order.

- A. Install washers and nuts, and torque terminal nuts. (120 inch-pounds)
- B. Connect red cables to the positive battery posts.
- C. Connect black cables to the negative battery posts.

Step 5: Verify that all connections are tight and the cables are secure.

General Cable Installation Tips:



WARNING – Fire and Explosion Hazard. Double check the polarity of the DC input connections. Reverse polarity may severely damage the Power Pack 3. Fire and/or explosion of the batteries may also occur as a result of reversed polarity. Failure to follow this warning may result in property damage, personal injury or death.

DC cables should be as short as possible. The optional installation kit includes all DC cables. The Power Pack 3 is polarity sensitive, and careful attention must be paid to the polarity. The black DC cable must be connected to the battery negative (-) and the negative (-) Power Pack 3 terminal, located under the top cover (orange).

The red DC cable must be connected to the fuse which is connected to the positive (+) battery connection and the positive (+) Power Pack 3 terminal, located under the red cover.

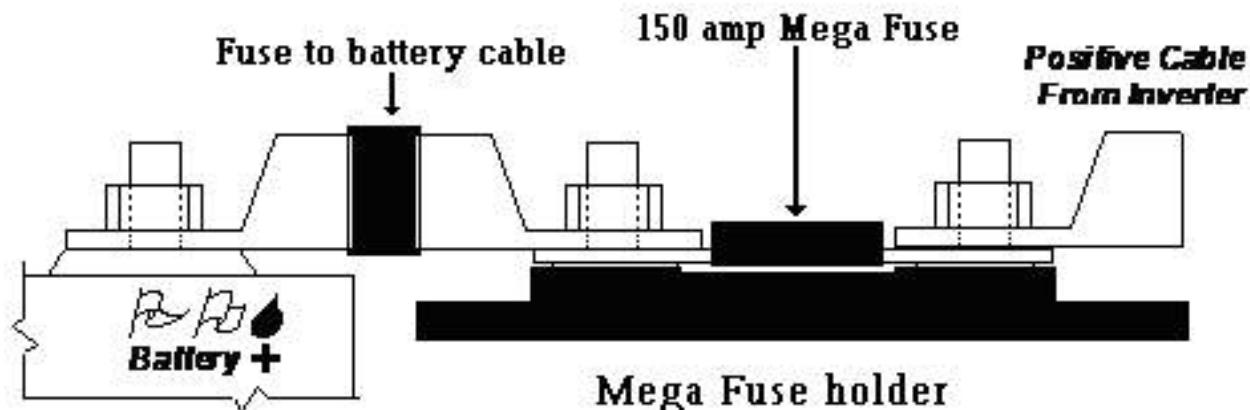


Figure 175 Fuse Wiring

Route the AC power wiring separately from the DC wiring and low voltage wiring such as audio and video signal wires with as much physical separation from the AC wires as possible.



WARNING – Fire Hazard. Make sure all connections are tight and properly made. Failure to follow this warning may result in property damage, personal injury or death.

CAUTION – An in-line 150 AMP DC fuse is REQUIRED on the positive battery cable to properly protect the Power Pack 3 and batteries. Failure to properly fuse the input leads to the Power Pack 3 can result in damage to the unit.

10. Add switch to switch pack.

Removal/Replacement of Switches and Switch Packs

To remove a switch pack from the IP, use the DIN radio removal tool part number 2504954C1.

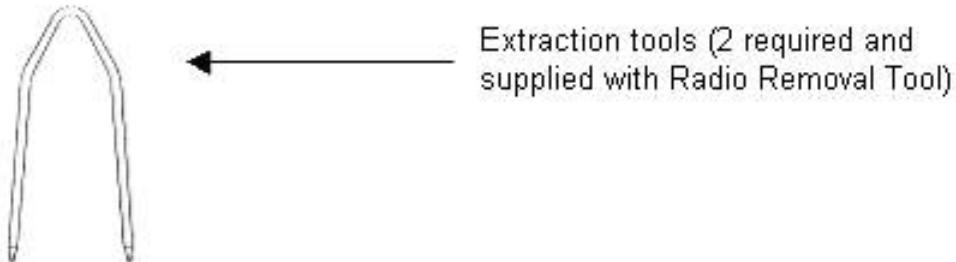


Figure 176

Insert the extraction tools (2) into the two holes on either side of a switch pack housing until the locking tabs are fully depressed. The switch pack can then be removed from the panel and the extraction tools removed.



Figure 177

To remove individual switches or blanks from a switch pack, squeeze the locking tabs on the rear of the switch or blank (top and bottom) and push it from the housing.

To install a switch pack in the panel, make the necessary connections, then simply push the assembly into place until the locking tabs are fully engaged.

NOTE – The switch pack can be inadvertently installed upside down. To avoid this when no switches are present in the housing, make sure the white wire in the lead assemblies on the rear of the housing are towards the top.

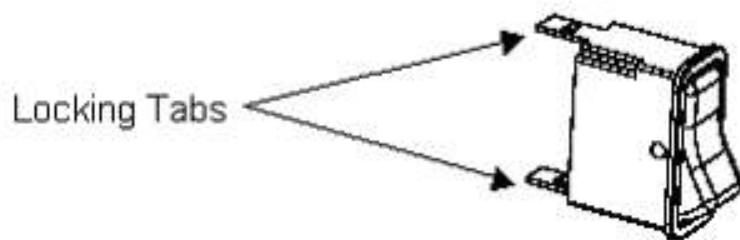


Figure 178

To install a switch in the switch pack housing, insert the switch in the proper slot, and push in until the switch locking tabs are fully engaged (switches are keyed and cannot be installed upside down).

LED Installation

The LEDs are installed from the rear of the switch housing (snap fit rear cover must first be removed). The amber backlight LED (part number 3533928C1) must be installed in the lower position and the green indicator LED (part number 3578733C1) in the upper position. The LEDs can be identified by the color of the base – black for the amber LED and white for the green LED.

To install an LED, insert it into the hole in the printed wiring board and, with a small flat blade screwdriver, turn the LED clockwise until locked. Replace the rear cover when complete.

11. Program Vehicle.

- a. Using DLB, activate feature 0595AJU "BC PROG, INVERTER ON In-Cab Multiplex Switch enables 3kw Inverter."
- b. After 0595AJU is activated, use DLB to locate position for 120 volt on switch location. Make note of location for switch install. Exit DLB.
- c. Use Master Diagnostics to program the engine for proper operation with Power Pack 3

Open Master Diagnostics. Turn IGN key on. Open com port, go to view >session>basic plus session. Right click add/delete parameters, delete all currently selected parameters from "Selected Parameters" window. In the available parameters window, double click on:

PTO Power Take Off mode

PTO in-cab control

PTO remote pedal

If PTO in-cab control is on, set Power Take Off mode to **remote and in-cab operation**.

If in-cab control is off, then set PTO mode to **remote operation** only.

Set remote pedal on.

Default ramp rate 100.

Right click, enter password, right click, then program all.

Cycle IGN key from off to on.

12. Checking system operation

- a. Start engine, and ensure that the park brake is set.
- b. Verify that the batteries are being charged. Voltmeter should be reading greater than 13.5 volts.
- c. Depress 120 VAC rocker switch in IP.
- d. Verify that the engine ramps to 935 RPM.
- e. Verify green light in rocker switch is on solid within 5 seconds.
- f. Check 120 volt AC output voltage.

31. POWER PACK 3 FOR MOBILE OPERATION

FEATURE CODE DESCRIPTION:

60AJN – BDY INTG, POWER INVERTER 3000 Watt Dynamic (With Engine Running); On/Off Switch in Instrument Panel (IP); Includes 120 volt AC Wiring; Connection for Customer-Mounted Power Outlet

60AJP – BDY INTG, POWER INVERTER Temporary Mount on Frame Rail for Customer Installation; 3000 Watt Dynamic (With Engine Running); On/Off Switch in IP; Includes 120 volt AC Wiring Connection for Customer-Mounted Power Outlet



WARNING – Shock hazard. Only trained technicians should service high voltage components. High voltage circuits and components contain voltage levels that may cause equipment damage, electric shock, and/or deadly electrocution if handled incorrectly.



WARNING – DO NOT OPEN the Power Pack 3. Hazardous voltages exist internally even after the Power Pack 3 is removed from the vehicle. Only a Qualified Technician may perform service inside the Power Pack 3. Failure to follow this warning may result in property damage, personal injury, or death.



WARNING – Shock Hazard. The alternator may generate high voltage, particularly at high rpm, which can be harmful. Do not touch the 3-phase output terminals. Failure to follow this warning may result in property damage, personal injury or death.



WARNING – Shock Hazard. The alternator output is a hazardous 3-phase AC voltage — Do not cut the cable or touch the terminals. Failure to follow this warning could result in property damage, personal injury, or death.

FEATURE / BODY FUNCTION:

The Power Pack 3 Inverter system is an advanced Power Generation and Power Management system to provide both DC power and an on-board 120 volt AC power source. The Power Pack 3 system is integrated with the Diamond Logic Electrical system. The DC portion of the system provides 14 volts DC at a maximum of 100 Amperes (AMPS) to charge the vehicle batteries. The AC portion of the system provides a 120 VAC single phase 60 Hertz output at a maximum of 25 AMPS. The system may be ordered from International, factory-installed either mounted in the battery box or as a temporary mounted inverter module behind the cab. The body builder is tasked with mounting the inverter in a body compartment with the temporary mounted feature.

The Power Pack system consists of an inverter module, a special 3-phase 42 volt AC alternator, a multiplexed switch in the cab, and associated wiring harness. The engine must be running in order for the Power Pack

system to generate AC or DC voltages. The 120 volt AC output is only functional when the vehicle is stationary with the park brake set. The 120 volt AC output contains a Ground (GND) fault interrupter device and a weather sealed power plug.

CAUTION – If 120 volts AC Shore power is integrated into the body wiring, the shore power connection must never be directly connected to the Power Pack 3 AC output.

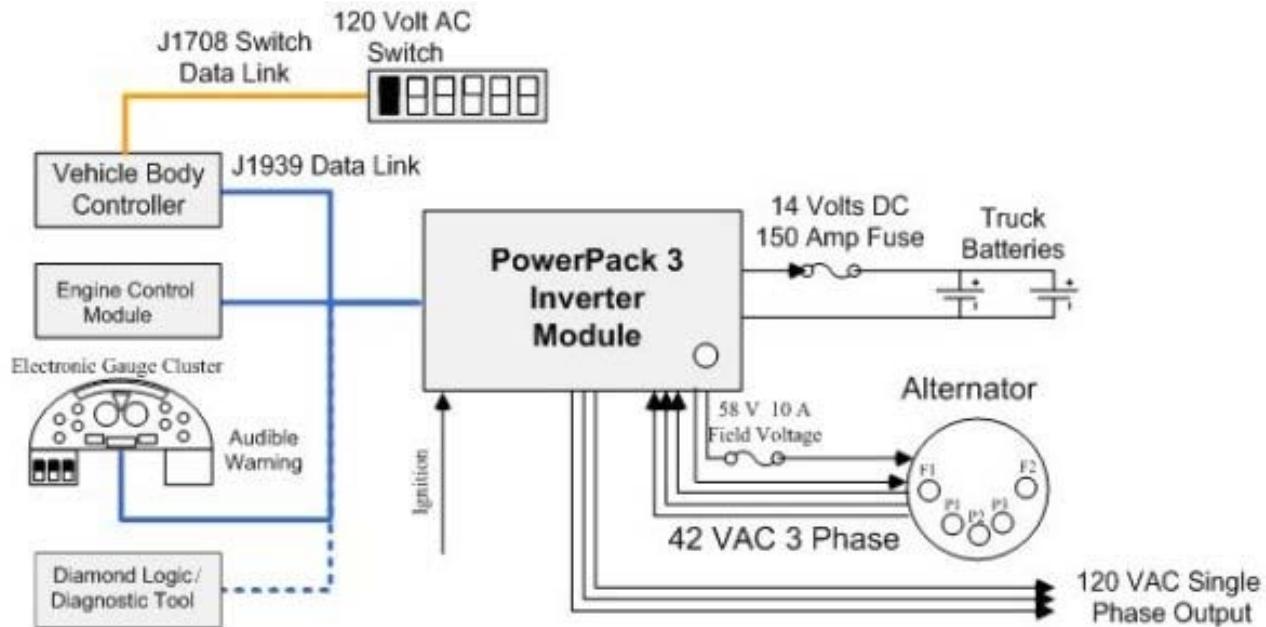


Figure 179 Power Pack 3 Block Diagram

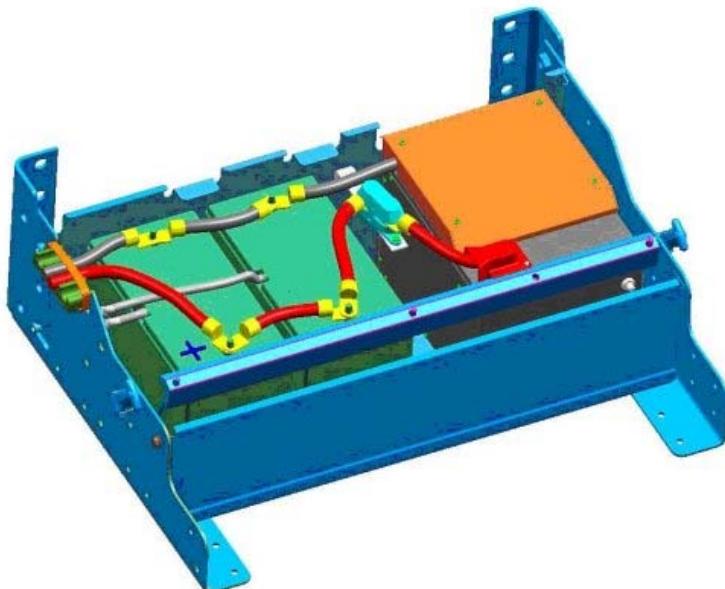


Figure 180 Battery Box Mounted Power Pack 3

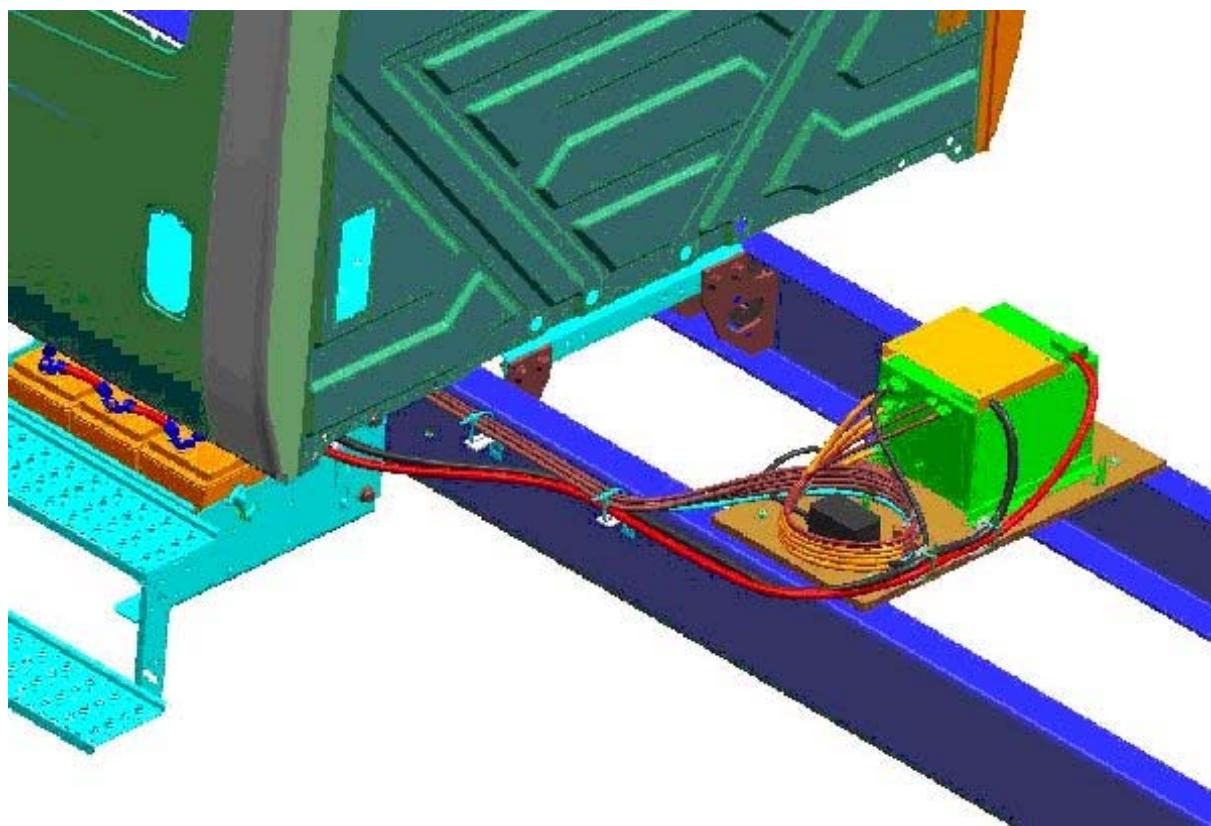


Figure 181 Remote Mount Power Pack 3

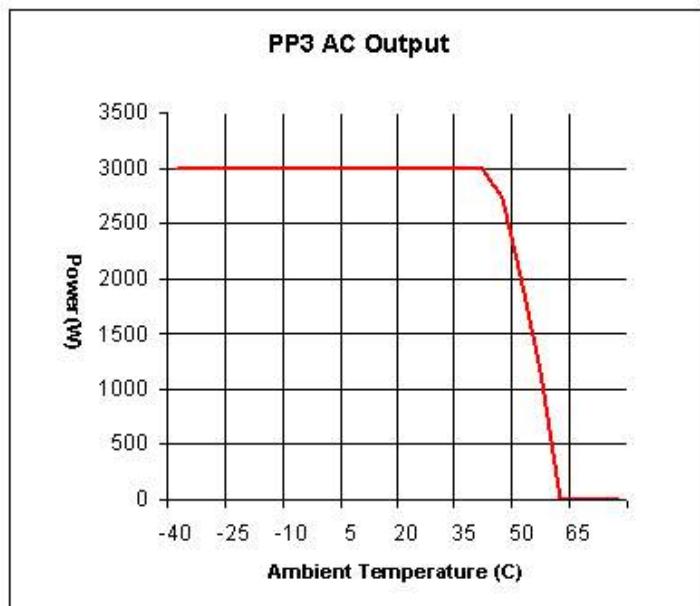


Figure 182 AC Derating Curve

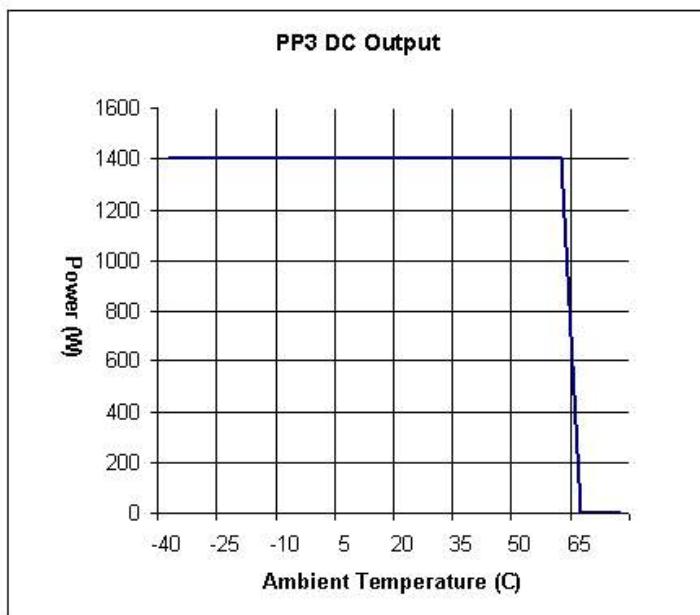


Figure 183 DC Derating Curve

USING POWER PACK 3 WITH REMOTE ENGINE SPEED CONTROL:

Power Pack 3 provides full power output for the 120 volt AC section at any engine speed. Vehicles equipped with the mobile version of Power Pack 3 may be used with any of the following engine speed control functions.

- Preset or variable engine speed control using the steering wheel cruise control switches
- Preset variable or remote pedal/throttle using the Remote Engine Speed Control Module (RESCM). Requires Body Controller (BC) feature 595AHA
- Preset 1 using Remote Power Module (RPM) inputs; i.e., feature code 60AJE
- Preset or variable engine speed control using Diamond Logic® Advanced Ladder Logic
- 12VZA which provides remote engine speed control through hard wires connected directly to the engine ECM.

Body Controller: Software Feature Codes / Programmable Parameters: Mobile Operation

Software feature code **595BAH** must be enabled on the vehicle Body Controller using the Diamond Logic® Builder software (see local dealer).

Parameter: PPE3_Stationary or Mobile: In Stationary mode the AC function can be used only while the trucked is parked with the park brake set. Mobile operation enables 120 AC anytime the engine is running. These features are defaulted to Mobile Operation.

Parameter: PPE3_Auto ON or Manual ON: Allows the AC power to turn ON automatically each time the vehicle is started. These features are defaulted to AUTO ON.

Parameter: PPE3_Auto Restart: Allows the Power Pack to restart should there be an over current situation. The number restart retries and duration before the restart is also programmable. These features are defaulted to **Auto Restart ON with 3 retries with 40 seconds between retries**.

Parameter: PPE3_ReStart_Attempts: Number of times the Power Pack will attempt to re-start the system after an overload. These features are defaulted to **3 retries**.

Parameter: PPE3_ReStart_Delay: The amount of time between re-start attempts should there be an over current situation. These features are defaulted to **40 seconds** between retries.

Parameter: PPE3_param_incrThrottle_rqst_enable will enable the automatic throttle request. This will automatically ramp the engine to the value set in parameter 2344 when the Power Pack is requested on. This parameter is defaulted OFF for these features.

Parameter: PPE3_param_incrThrottle_startDelay is the amount of time that the Power Pack will wait to turn on. This is to allow the engine to ramp to the operating RPM before the Power Pack is activated. This parameter is defaulted to 2 seconds for these features.

Parameter: PPE3_param_incrThrottle_targetRPMs is the target RPM for the engine to ramp to when the Power Pack is activated. This parameter is defaulted to 935 RPM for these features.

Parameter: PPE3_param_incrThrottle_timeout is the amount of time that the inverter is inhibited from coming back on due to inadequate engine speed. This parameter is defaulted to 5 seconds for these features.

Table 156 Programmable Parameters used with 595BAH

Parameter	ID	Description	Default	Units	Min	Max	Step
PPE3_param_Auto_or_Manual_ON	2473	If this is true, then the AC Power is automatically activated when the engine is started.	1	On/Off	0	1	1
PPE3_param_mobile_or_stationary	2487	If this is true, then the AC Power is available any time the engine is running	1	On/Off	0	1	1
PPE3_param_Auto_ReStart	2488	If this is true, then the Power Pack 3 system will automatically attempt a re-start after an over load event.	1	On/Off	0	1	1
PPE3_param_ReStart_Attempts	2490	This number indicates the number of re-start attempts after an overload event.	3	Number	0	7	1
PPE3_param_ReStart_Delay	2489	If this is true, then the automatic throttle increase request has been enabled.	40	Seconds	0	60	10

Table 156 Programmable Parameters used with 595BAH (cont.)

Parameter	ID	Description	Default	Units	Min	Max	Step
PPE3_param_incrThrottle_request_enable	2357	If this is true, then the automatic throttle increase request has been enabled.	0	On/Off	0	1	1
PPE3_param_incrThrottle_startDelay	2399	This parameter allows the throttle to ramp to the target RPM prior to enabling the PPE. The logic for this parameter is that a maximum load on the PPE would turn off the inverter if the alternator RPMs are not at target.	2	Seconds	0	5	0.1
PPE3_param_incrThrottle_targetRPMs	2344	This is the target RPM rate for the throttle increase feature.	935	RPM	900	2000	1
PPE3_param_incrThrottle_timeout	2345	The amount of time until the inverter is inhibited because the engine speed is not at an adequate level	5	Seconds	0	30	0.1

WIRING INFORMATION:

WARNING – All electrical connections to the Power Pack 3 must be made by a qualified electrician. Failure to follow this warning could result in property damage, personal injury, or death.

A Hubbell Watertight Safety-Shroud male plug (Hubbell part number HBL2611SW) is needed to connect to the AC output plug to mate with the Power Pack supplied Hubbell Watertight Safety-Shroud female socket (Hubbell part number HBL2613SW). These plugs are available at electrical and industrial supply houses.

Using this part combination will allow for a weather resistant connection to the Power Pack 3 unit. Alteration of the AC output plug, failure to use the correct male plug, or removal of the supplied socket will not guarantee a watertight connection.

The AC output from the Power Pack 3 is wired to a Ground Fault Circuit Interrupter (GFCI) to ensure protection against GND fault conditions. Be aware that standard duplex GFCI and non-GFCI receptacles need to be protected with a circuit breaker, usually rated for 15 or 20 AMPS.

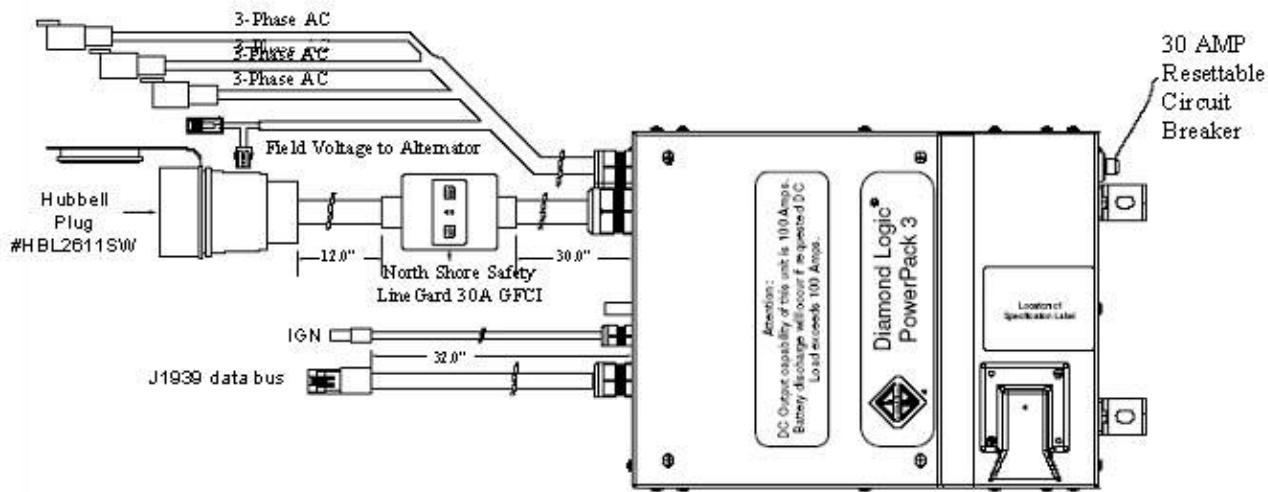


Figure 184 Power Pack 3 Inverter/Regulator Component Detail

Power Pack 3 Kit, Left Side under Cab for vehicles built after March 2007.

Power Pack 3 Kit, Right Side under Cab for vehicles built after March 2007.

Power Pack 3 Kit, Remote Mount for vehicles built after March 2007.

Fuse, 58 volt, 10 amp: Alternator Field Wire fuse. International Part Number: 2590768C1

TESTING SYSTEM OPERATION:

1. Start the engine. Verify that the batteries are being charged. The voltmeter should be reading greater than 13.5 volts.
2. Verify green light in rocker switch is ON solid within five seconds.
3. Verify 120 volt AC output voltage.



Figure 185

Power Pack 3 Troubleshooting

If the Power Pack 3 output does not power up or shuts down during vehicle operation, follow these steps to troubleshoot the system:

1. Set the 120VAC ON/OFF switch to OFF position, and ensure interlocks are satisfied, as described above, correcting as necessary.
2. Attempt to restart the Power Pack 3 by pressing the ON switch.
3. If the unit continues to shut-down, (blinking green light in the rocker switch and red warning light illuminated) disconnect any AC loads before restarting the Power Pack 3.
4. Check for green light on GFCI. If there is a red light press the reset button on GFCI.
5. Press the 120VAC switch to OFF, check the 30-Amp circuit breaker, and reset if necessary.
6. Wait several minutes to allow the system alternator and Power Pack 3 unit to cool, and then attempt to restart.
7. If the unit does not restart, then turn the vehicle's ignition OFF, and then back ON again. This will restart the Power Pack 3 output protection circuits.
8. If the above steps fail to restart the Power Pack 3 unit, then have the system serviced by a qualified technician.

NOTE – If the unit does not restart, the problem could be caused by overheating or other circuit protection devices. If the Power Pack 3 circuit breaker or the GFCI device is tripped, the green light in rocker switch will continue to show an indication that AC power is ON. Be advised to check these other elements of the system if 120 volt AC power is not present as expected.

Diagnostic Indications Using the In-Cab Rocker Switch or Diamond Logic® Builder

SPN	FMI	Byte 7	Byte 8	Switch Indicator Blink Rate	Condition Description/ Comments/ Probable Cause(s)
168	2	0	0	Fast	Communication fault from ESC to the PowerPack. Check for open circuit or short in J1939 datalink. If switch is not blinking, verify vehicle is programmed for Powerpack feature and the switchpack is operating correctly.
168	3	0	0	Fast	DC module over voltage condition on vehicle DC bus. System detected voltage over 15 volts. Remove any external power supply/charger from vehicle.
168	3	0	0	Slow	AC module over voltage condition on high voltage DC bus. Likely an internal failure for AC output. AC has been shut down. DC output remains on.
168	4	0	0	Fast	DC module under voltage condition on vehicle DC Bus. System detected low DC voltage. This could be due to insufficient input power from the alternator. Check the 3 phase wires from the alternator to the PowerPack.
168	4	0	0	Slow	AC module under voltage condition on high voltage DC bus. System detected low internal voltages. This could be due to insufficient input power from the alternator. Check the 3 phase wires from the alternator to the PowerPack.
168	6	0	0	Slow	AC module has shut down due to overload condition. AC overloaded, remove some or all of AC load.
168	8	0	0	Fast	Phase missing fault/alternator fault. One of the three 3-phase wires has an open circuit. Check the 3 phase wires from the alternator to the PowerPack.
168	16	0	0	Fast	DC module over temperature condition. PowerPack is experiencing extremely high internal temperatures. AC and DC has been shut down. Allow the system to cool down.
168	16	0	0	Slow	AC module over temperature condition. PowerPack has detected high internal temperatures although less severe. AC inverter has shutdown, but DC output remains on. Shut the system down to allow it to cool down or remove some of the loads.
168	17	0	0	Fast	PowerPack Fuse Open. Check DC battery charging connections from Powerpack. Check 150A fuse.
639	14	37	255	Fast	Communication fault between PowerPack and the ESC. Check for open circuit or short in J1939 datalink. Also, check the ignition circuit to the Powerpack module.

Figure 186

NOTE – A complete after market parts kit is under development. The Power Pack 3 kit part number is not available at this time.

HOW TO ADD THIS FEATURE:

1. Remove power from batteries.
 - a. Remove the lid from the battery box.
 - b. Remove all battery cables from the batteries and battery box, starting with the negative terminals.
2. Replace the 3 battery box with a 4 battery box.
 - a. Remove cab steps from the battery box.
 - b. Remove the front side of the battery box.
 - c. Remove all batteries.
 - d. Remove old battery box from the frame rail.
 - e. Remove any options that may be on box, and transfer to new box.
 - f. Attach new 4 battery box to the frame rail. Some new mounting holes may need drilled in the frame rail. Re-use existing holes as much as possible.
 - g. Add cover hold downs, and add new box to frame. 777937C1 retainers, 934871R1 nuts, 30278R1 screws, 30264R1 washers.
 - h. Put batteries in the two forward locations of the 4 battery box.
 - i. Install the Power Pack 3 Inverter Module in the most rearward location of the battery box. Align the PP3 module such that the mounting stud on the rear panel of the module projects through the rear of the battery box.
 - j. Ensure that the PP3 harnesses are carefully routed through the openings in the rear panel of the battery box without kinking or pinching.
 - k. Attach the battery box hold down bracket to secure the batteries and the PP3 Inverter Module.
 - l. Attach the retainer nut to the PP3 module stud on the back side of the battery box.
 - m. Attach vent tubes to each battery, and route out of battery box.

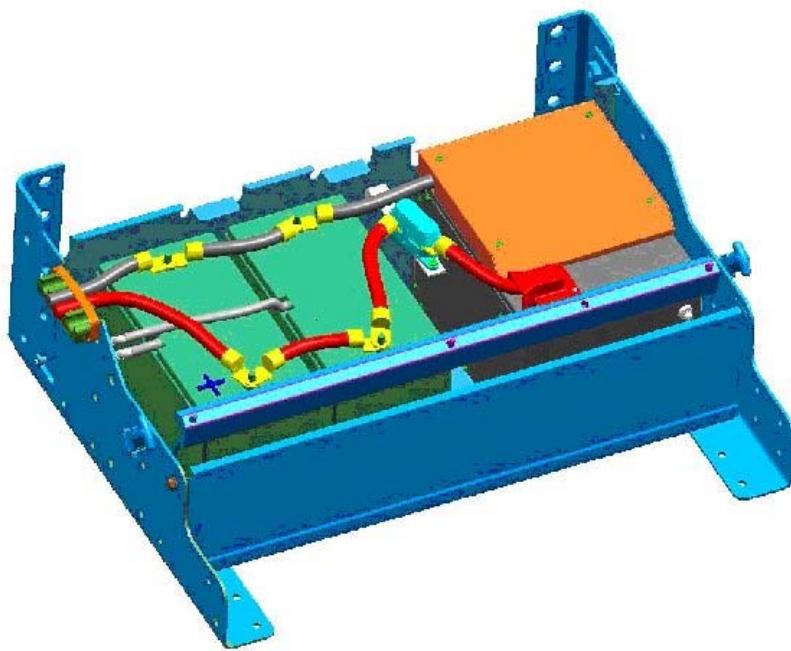


Figure 187 Sample Inverter on Installation on the Driver's Side of the Vehicle

3. Add new alternator.
 - a. Remove air filter and **cover turbo intake to prevent items from falling into intake.**
 - b. Remove serpentine belt and old alternator.
 - c. Tie off old cables.
 1. Seal terminal ends with heat shrink tube, fold back onto trunk of harness, and tape to trunk of harness.
 - d. Attach the Leece-Neville alternator (part number 3606039C91) to the engine. Transfer belt pulley from old alternator to the new alternator.
 - e. Check alternator mounting bolt torque. DO NOT OVER TORQUE.
 1. Alternator to bracket mounting bolts 30 to 35 lb ft
 - f. Add new alternator harness overlay.
 1. Route the PP3 harness next to existing engine harness to the starter; then follow battery cables to the battery box.
 2. At base of battery box, route inverter cables to back of battery box by going under the frame rail.
 - g. Use tie wraps, every 12 inches, to attach the alternator harness to the battery cables.

Alternator Harness

The harness from the Power Pack 3 to the alternator must be properly routed and securely fastened to avoid any hot or sharp areas and to prevent cable movement. Failure to use the proper size wire can result in overheating conditions that could cause fire, personal injury, and void of warranty.

- h. Add Ignition (IGN) lead to the in-cab fuse relay panel.

1. Connect an 18 gauge wire from the Power Pack 3 IGN feed connector to the dash pass thru connector 1702 pin 5.
2. Connect an 18 gauge wire from the dash pass thru connector 1702 pin 5 to an IGN feed in the cab fuse/relay panel cavity G2-H2 (see fuse box detail).
3. Add 10 AMP fuse to fuse locations G2-H2.
4. Connect to inverter overlay harness (connector 9740 at the center of valve cover). Strap lock the connector to the main center chassis harness.
5. Remove terminating resistor from J1939 datalink back bone harness (connector 7801M located on the top center of the engine valve cover). Connect the PP3 J1939 datalink harness (connector 7801M) to J1939 inverter (connector 7801N). Save J1939 terminator resistor assembly.
6. Strap harness to existing harnesses.

Keep clear of sharp edges or anything that can rub or damage wire insulation.

4. Connect harness wires to the alternator.
 - a. Attach 3-Phase AC output ring terminal wires to bolt studs on the back of alternator. 80-120 in lb (inch-pounds, NOT foot-pounds) Three phase wire attachment order to the alternator does not matter.
 - b. Attach field coil wires to the top of alternator using two nuts 15-20 in lb (inch- pounds, NOT foot-pounds).

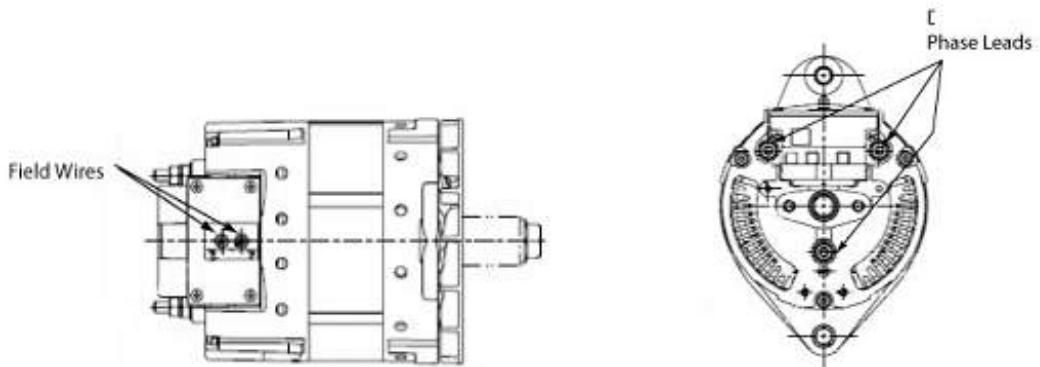


Figure 188 3-Phase and Field Wire Alternator Connections

5. Make connections from the Power Pack 3 wire harness to the inverter module.
 - a. At back of the battery box:
 1. Connect 3-Phase AC alternator connectors (9741, 9742, 9743) which are large 4 gauge, 1-pin connectors. Ensure the connectors are fully mated with a positive click of the male connector into the female connector.
 2. Connect inverter IGNITION connector (7899) 1-pin connector.
 3. Connect inverter J1939 connector (7801R) 3-pin connector.
 4. Connect field voltage connector (9740) 2-pin connector.

- b. Connect terminating resistor connector to (7801L) located on inverter harness near inverter connection to the J1939 data bus connector.
6. Secure Power Pack 3 harness to the chassis harness.
 - a. Keep harness clear of sharp edges or anything that can rub or damage wire insulation. Use tie wraps every 12 inches to attach the PP3 alternator harness to battery cables.
7. Confirm connections.
8. Remove cloth from air intake, and reinstall air filter.



WARNING – Shock Hazard. Never make electrical connections to a "live" unit. Make the connections to the Power Pack 3 first and the batteries last. Failure to follow this warning may result in property damage, personal injury or death.

9. Installing battery cables

Step 1: Make sure that the batteries are disconnected from the vehicle.

Step 2: Install the in-line fuse on the positive battery terminal or within 18 inches of the battery or DC wiring bus system.

Step 3: Route, but DO NOT connect, the positive DC (red) input cable from the Power Pack 3 to the in-line fuse on the battery or DC wiring bus system. Make sure to protect all cables from where they contact hard or sharp edges.

Step 4: **Connect the Power Pack 3 to the battery in THIS order.**

- A. Install washers and nuts, and torque terminal nuts. (120 inch-pounds)
- B. Connect red cables to the positive battery posts.
- C. Connect black cables to the negative battery posts.

Step 5: Verify that all connections are tight and the cables are secure.

General Cable Installation Tips:



WARNING – Fire and Explosion Hazard. Double check the polarity of the DC input connections. Reverse polarity may severely damage the Power Pack 3. Fire and/or explosion of the batteries may also occur as a result of reversed polarity. Failure to follow this warning may result in property damage, personal injury or death.

DC cables should be as short as possible. The optional installation kit includes all DC cables. The Power Pack 3 is polarity sensitive, and careful attention must be paid to the polarity. The black DC cable must be connected to the battery negative (-) and the negative (-) Power Pack 3 terminal, located under the top cover (orange).

The red DC cable must be connected to the fuse which is connected to the positive (+) battery connection and the positive (+) Power Pack 3 terminal, located under the red cover.

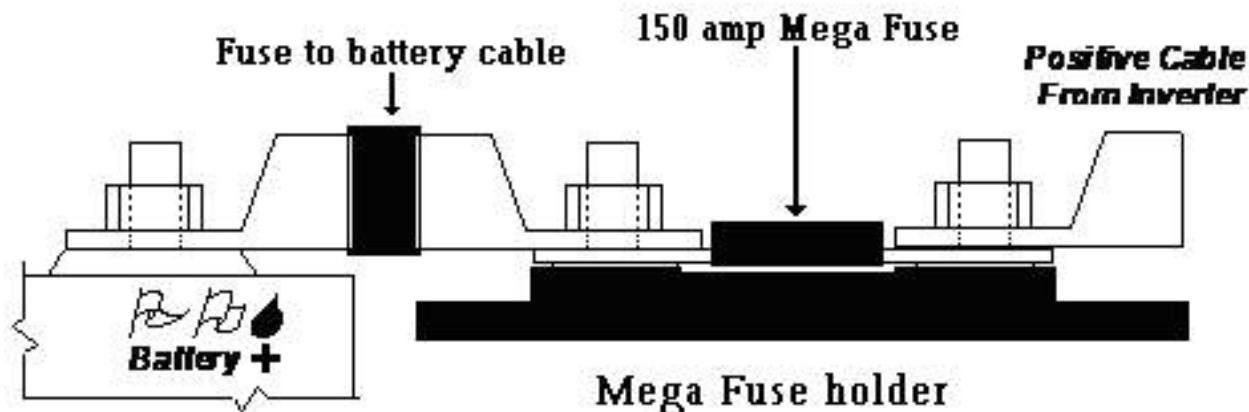


Figure 189 Fuse Wiring

Route the AC power wiring separately from the DC wiring and low voltage wiring such as audio and video signal wires with as much physical separation from the AC wires as possible.



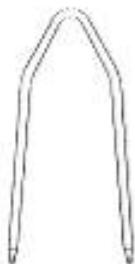
WARNING – Fire Hazard. Make sure all connections are tight and properly made. Failure to follow this warning may result in property damage, personal injury or death.

CAUTION – An in-line 150 AMP DC fuse is REQUIRED on the positive battery cable to properly protect the Power Pack 3 and batteries. Failure to properly fuse the input leads to the Power Pack 3 can result in damage to the unit.

10. Add switch to switch pack.

Removal/Replacement of Switches and Switch Packs

To remove a switch pack from the IP, use the DIN radio removal tool part number 2504954C1.



Extraction tools (2 required and supplied with Radio Removal Tool)

Figure 190

Insert the extraction tools (2) into the two holes on either side of a switch pack housing until the locking tabs are fully depressed. The switch pack can then be removed from the panel and the extraction tools removed.



Figure 191

To remove individual switches or blanks from a switch pack, squeeze the locking tabs on the rear of the switch or blank (top and bottom) and push it from the housing.

To install a switch pack in the panel, make the necessary connections, then simply push the assembly into place until the locking tabs are fully engaged.

NOTE – The switch pack can be inadvertently installed upside down. To avoid this when no switches are present in the housing, make sure the white wire in the lead assemblies on the rear of the housing are towards the top.

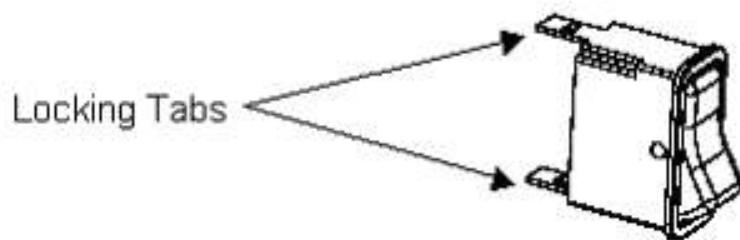


Figure 192

To install a switch in the switch pack housing, insert the switch in the proper slot, and push in until the switch locking tabs are fully engaged (switches are keyed and cannot be installed upside down).

LED Installation

The LEDs are installed from the rear of the switch housing (snap fit rear cover must first be removed). The amber backlight LED (part number 3533928C1) must be installed in the lower position and the green indicator LED (part number 3578733C1) in the upper position. The LEDs can be identified by the color of the base – black for the amber LED and white for the green LED.

To install an LED, insert it into the hole in the printed wiring board and, with a small flat blade screwdriver, turn the LED clockwise until locked. Replace the rear cover when complete.

11. Program Vehicle.

- a. Using DLB, activate feature 0595AJU "BC PROG, INVERTER ON In-Cab Multiplex Switch enables 3kw Inverter."
- b. After 0595AJU is activated, use DLB to locate position for 120 volt on switch location. Make note of location for switch install. Exit DLB.

12. Checking system operation

- a. Start engine, and ensure that the park brake is set.
- b. Verify that the batteries are being charged. Voltmeter should be reading greater than 13.5 volts.
- c. Verify green light in rocker switch is ON solid within 5 seconds.
- d. Check 120 volt AC output voltage.

32. THEFT DETERRENT

FEATURE CODE DESCRIPTION:

60ACX – BODY INTG, THEFT DETERRENT SYS Includes one (1) Switch Pack of Six Switches

FEATURE / BODY FUNCTION:

The International Theft Deterrent system provides a means to help control the mobility of a vehicle. Once the vehicle has been started, the driver is required to enter a pre-programmed code (theft deterrent code). The theft deterrent code must also be entered when driving is resumed after the vehicle is at idle with the park brake set. The theft deterrent feature is effective in preventing a vehicle from being driven by unauthorized individuals.

THEFT DETERRENT CODE:

The theft deterrent code is any combination of one to eight digits (between 1 and 99999999) selected by the customer. The Theft Deterrent system will come from the factory disabled. The dealer will be responsible for enabling the system and programming the desired theft deterrent code during the regular dealer Pre-Delivery Inspection (PDI). This is not included in the normal PDI reimbursement and is not a warranty expense.

THEFT DETERRENT SWITCHES:

Six switches located in the Instrument Panel (IP) provide the functions of the Theft Deterrent system. Five of the switches are dual digit switches (3-position, center stable momentary switches) numbered 0 to 9. The remaining switch is the ENGINE STOP/CLEAR ENTRY switch, which is a combination switch indicator and a standard momentary switch (see the illustration below).



Figure 193

The red ENGINE STOP indicator portion of the ENGINE STOP/CLEAR ENTRY switch flashes to alert the driver that the theft deterrent code must be entered (within the preprogrammed time delay or the engine will shut down). The momentary CLEAR ENTRY position is pressed whenever the driver needs to clear a failed code so that the correct code can be re-entered.

NOTE – If the operator enters the wrong security code, the vehicle must be stopped and the park brake must be set/engaged before the system will clear the previous theft deterrent code entry.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software feature code 595AYU must be enabled on the vehicle Body Controller (BC) using the Diamond Logic Builder software (see local dealer).

PROGRAMMABLE PARAMETERS

Anti_Theft_Active_Min: Length of time the engine is shut down

Anti_Theft_Code_Length: Number of digits in the theft deterrent code

Anti_Theft_Code_Master_Lo: Lower 4 digits of the numerical theft deterrent code to be entered by the driver

Anti_Theft_Code_Master_Hi: Upper 4 digits of the numerical theft deterrent code to be entered by the driver

Anti_Theft_Enable: Parameter to enable or disable the theft deterrent feature

Anti_Theft_Warning_Time: The amount of time after the park brake has been released or the vehicle starts moving until the vehicle enters shutdown mode

Table 157

Parameter	ID	Description	Default	Units	Min	Max	Step
Anti_Theft_Active_Min	2227	The minimum amount of time the truck is disabled once it enters shutdown mode	10	Seconds	10	60	1
Anti_Theft_Code_Length	2257	The number representing the code length in terms of number of digits	5	Number	1	8	1
Anti_Theft_Code_Master_Lo	2224	Lower 4 numbers of the anti-theft code required to keep truck operating	2345	Number	0	9999	1
Anti_Theft_Code_Master_Hi	2226	Upper 4 numbers of the anti-theft code required to keep truck operating	0001	Number	0	9999	1
Anti_Theft_Enable	2222	Enables and disables the anti-theft feature	0	On/ Off	0	1	1
Anti_Theft_Warning_Time	2245	The amount of time after the park brake has been released or the vehicle starts moving until the vehicle enters shutdown mode	1	Seconds	1	655	1

WIRING INFORMATION:

2588809C93 KIT, THEFT DETERRENT

Table 158

Item	Part Number	Quantity	Description
1	2588808C91	001	MODULE, THEFT DETERRENT SWITCH
2	3519350C1	001	RELAY, MICRO SPDT
3	239481R1	002	TERMINAL, CABLE
4	3544921C1	004	SLEEVE, CABLE INSULATING* HEAT S
5	3515517C1	004	TERMINAL, CABLE 280 M/P FEMALE
6	3535930C1	001	TERMINAL, CABLE* GT 280 SERIES 5
7	3535937C1	001	SEAL, CABLE TERMINAL* GT 280 SER
8	997129R2	AR	CABLE, LIGHTING, 18 GAUGE W/GXL
9	2588813R2	001	MANUAL, INST THEFT DETER KIT
10	3522073C1	001	TERMINAL, CABLE FEMALE

TESTING:

Engine Start/Theft Deterrent Code Entry Sequence:

The correct engine start and theft deterrent code entry sequence is as follows:

1. Driver starts vehicle with park brake set.
2. The driver enters the code programmed by the dealer by pressing the switch positions for that code (read from left to right). For example, if the code is 54321, the driver should press switch positions 5 4 3 2 1 in that order.

If an error is made while entering the code, the driver presses the CLEAR ENTRY position of ENGINE STOP/CLEAR ENTRY switch and enters the correct code. The park brake must be set for clearing the incorrect code.

3. When the correct code is entered, the gauge cluster alarm will sound one short beep and, at the same time, the ENGINE STOP indicator will flash once. If the wrong code is entered, the gauge cluster will sound one long beep and the ENGINE STOP indicator will be illuminated for approximately 1.5 seconds.
4. Park brake is released.
5. Vehicle may be driven without interruption.

NOTE – The theft deterrent code must be re-entered every time the park brake is set/engaged or when the key switch is cycled from the run position.

Table 159 System Response Table

Driver Action	System Alerts	Engine Operating Status
Engine started with park brake set	No system alerts	Engine runs without interruption.
Correct theft deterrent code entered (vehicle stopped and park brake set)	Gauge cluster alarm will sound one short beep and, at the same time, the ENGINE STOP indicator will flash once.	Engine runs without interruption.

Table 159 System Response Table (cont.)

Driver Action	System Alerts	Engine Operating Status
Engine started with park brake released	Warning sequence is begun. The gauge cluster alarm will beep continuously, and the red ENGINE STOP indicator will flash slowly.	Engine will shut down unless theft deterrent code is entered within programmed delay time.
Engine started and driven greater than 3 MPH	Warning sequence is begun. The gauge cluster alarm will beep continuously, and the red ENGINE STOP indicator will flash slowly.	Engine will shut down unless theft deterrent code is entered within programmed delay time.
Park brake is released with engine running.	Warning sequence is begun. The gauge cluster alarm will beep continuously, and the red ENGINE STOP indicator will flash slowly.	Engine will shut down unless correct theft deterrent code is entered within programmed delay time.
Correct theft deterrent code is entered after the warning sequence has begun (within the programmed delay time).	The continuous alarm beeps, and ENGINE STOP indicator flashing stops after the alarm sounds once and the ENGINE STOP indicator flashes once.	Engine runs without interruption.
Incorrect theft deterrent code is entered.	Alarm activates for one long beep, and ENGINE STOP indicator turns on for ~ 1.5 seconds.	Engine runs without interruption until the programmed time delay expires.
Clear switch is depressed with park brake set.	No system alerts. Theft deterrent code must be entered before driving vehicle.	Engine runs without interruption.
Clear switch is depressed with park brake released (assumes correct code previously entered).	No action. Previously entered theft deterrent code is not cleared.	Engine runs without interruption.
With vehicle stopped while in warning mode, set park brake (within the programmable delay time).	The ENGINE STOP indicator stops flashing, and the alarm stops beeping. The theft deterrent code must be entered before driving vehicle.	Engine runs without interruption.

NOTE – There is a ten second period between the beginning of the warning sequence and engine shut down. During this period, the vehicle can be started and moved. Once shutdown occurs, the sequence can be re-initiated after a programmable time delay (default = 10 seconds).

THEFT DETERRENT TROUBLESHOOTING TIPS:

Please review the following problem descriptions for help with installation.

The theft deterrent feature can be enabled using the Diamond Logic® Builder software program. Those who do not have the software will need to see an International dealer for programming assistance.

1. Existing vehicle switches no longer operate:

Solution: The theft deterrent switch pack populates in the first switch location in the IP. Physically locate the switch pack in the DIN location below the radio, and ensure that the cab harness connector for switch packs is plugged into the theft deterrent switch pack. Use Diamond Logic® Builder (DLB) to

determine the new location for existing vehicle switches. Physically move those switches in the switch packs to match the DLB layout.

2. The engine shuts down even though the correct theft deterrent code was entered:

The theft deterrent code must be entered **AFTER** the engine is started and before the park brake is released. After the engine is started, enter the correct theft deterrent code. The **ENGINE STOP** indicator in the top portion of the first switch will illuminate for one fast blink with the correct code entered. If the wrong code is entered, the **ENGINE STOP** light will be illuminated for 1.5 seconds, hence the system will still be armed to shut down until the correct code is entered.

3. Theft deterrent code never works:

The theft deterrent code has been designed to be as flexible as possible and still work with the overall design of the Body Controller (BC) in the vehicle. It is important that programmable parameters are set correctly. The theft deterrent code is controlled by three programmable parameters. They are as follows:

Anti_Theft_Code_Length Number of digits in theft deterrent code

Anti_Theft_Code_Master_Hi Upper portion of theft deterrent code

Anti_Theft_Code_Master_Lo Lower portion of theft deterrent code

The theft deterrent code may be any length from one to eight digits. The Anti_Theft_Code_Length programmable parameter must contain the length of the desired code. For example, if the theft deterrent code is 739042, then the code length should have a 6 entered for the Anti_Theft_Code_Length parameter. Use DLB to enter the code length under the FEATURES tab. Find the desired programmable parameter in the list on the bottom half of the screen.

The theft deterrent code must be entered in two different parameters.

The Anti_Theft_Code_Master_Lo is the right most 4 digits of the code.

The Anti_Theft_Code_Master_Hi is the left or upper digits of the theft deterrent code.

For example, if the theft deterrent code is 739042, enter the following digits into the two parameters:

Anti_Theft_Code_Master_Hi: 73

Anti_Theft_Code_Master_Lo: 9042

For theft deterrent codes that are four digits or less, place a 0 in the parameter Anti-Theft_Code_Master_Hi. It is not necessary to enter a leading zero in the code as long as the code length is four digits or less.

4. Can leading zeros be entered in the theft deterrent code?

Leading zeroes may be used in either parameter as long as the Anti_Theft_Code_Length count is large enough to include them in the count.

For example, if the theft deterrent code is 0142, the programmable parameters should be entered as follows:

Anti_Theft_Code_Length: 4

Anti_Theft_Code_Master_Hi: 0

Anti_Theft_Code_Master_Lo: 0142

NOTE – On early versions, the leading zero will not stay visible in the parameter entry, but the 0 still needs to be entered on the switch packs when entering the theft deterrent code.

For example, if the theft deterrent code is 075142, the programmable parameters should be entered as follows:

Anti_Theft_Code_Length: 6

Anti_Theft_Code_Master_Hi: 07

Anti_Theft_Code_Master_Lo: 5142

For example, if the theft deterrent code is 60925, the programmable parameters should be entered as follows:

Anti_Theft_Code_Length: 5

Anti_Theft_Code_Master_Hi: 6

Anti_Theft_Code_Master_Lo: 0925

5. **Once the engine shut down sequence is initiated, the engine stumbles but does not shut down. The theft deterrent relay keeps cycling off and on.**

The Ignition (IGN) interrupter relay that was added for this system must have the coil powered from an un-switched battery source. This stumbling condition is caused by the relay being powered from an IGN source instead of a battery source. Ensure an un-switched battery feed powers the coil of the theft deterrent relay.

6. **Engine will not shut down even though the ENGINE STOP light is on for a constant ten seconds.**

Ensure that the theft deterrent relay coil is connected to the BC connector 1601 pin # for pre 2007 engine vehicles or BC connector 1601 Pin E4 for post 2007 engine vehicles. If the relay is not being energized, the vehicle engine will still be de-powered through an alternate means, thus rendering the vehicle immobile. If the shut down sequence has been initiated and the ENGINE STOP light is illuminated for ten seconds, then the theft deterrent relay should also be energized to kill the engine.

LOST OR FORGOTTEN THEFT DETERRENT CODES:

In the event of a lost or forgotten theft deterrent code, the dealer will be the customer's point of contact – ***International Tech Services personnel will not provide any information to callers concerning theft deterrent codes.***

HOW TO ADD THIS FEATURE:

1. Purchase a theft deterrent kit, part number 2588809C93, from a local International dealer.
2. Add software feature code 595AYU to the vehicle BC using the Diamond Logic Builder software (see local dealer).

3. Install theft deterrent kit as per this drawing.
4. Test the system.

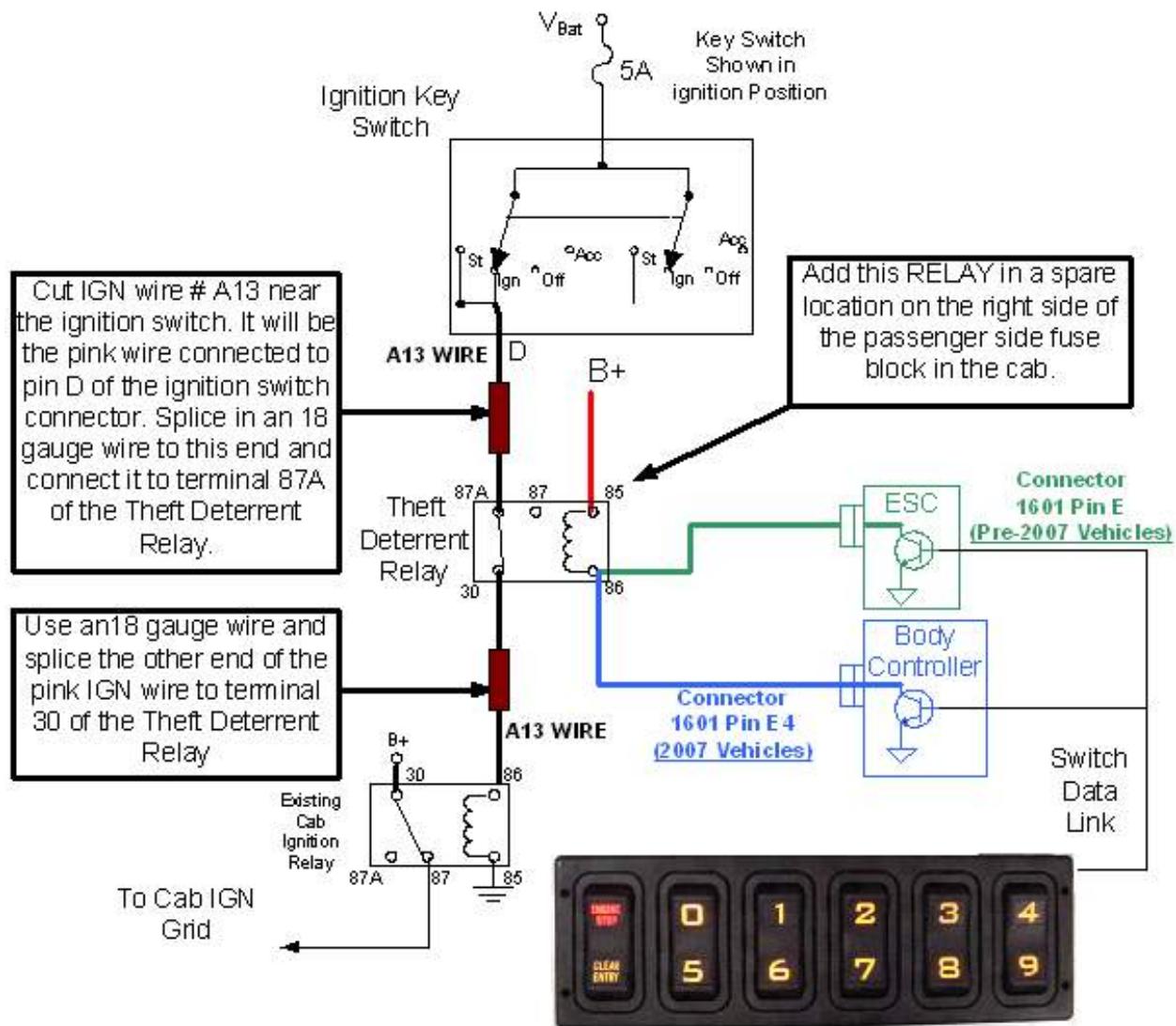


Figure 194

33. HYBRID ELECTRIC VEHICLE

33.1. 13GSC — EATON 6SPD HYBRID WITH EPTO CAPABILITY

FEATURE CODE DESCRIPTION:

13GSC – EATON 6SPD HYBRID WITH ePTO CAPABILITY for a Hybrid Electric Vehicle, includes warning lights, hood open light and capability to activate up to four demand circuits for PTO operation (Requires six RPM inputs and one output)

The Eaton Hybrid system uses electric energy stored in a large high voltage (HV) battery. An electric motor connected to the driveline prior to the transmission gears assists the engine to drive the truck which can improve fuel economy. The diesel engine is connected to the driveline as needed by means of an electric clutch. Energy is re-generated during deceleration (braking) and during efficient diesel engine operating conditions.

This feature also adds the functionality for operating a PTO in a diesel engine off mode (called electric PTO, or ePTO). The E-PTO mode consists of electric PTO operation while the diesel engine is off most of the time. It includes vehicle interlocks, engagement, disengagement, and automatic control of diesel engine on/off operation. The system will run the diesel engine automatically as needed to recharge the High Voltage Battery, as well as if the 12 volt batteries are low or the air pressure is low.

IMPORTANT! Hands on training for the basic hybrid components is required along with reviewing documentation provided by Eaton Corporation. This includes all cautions and warnings, before attempting to diagnose, service or relocate any of the Hybrid electric components.

FEATURE / BODY FUNCTION:

This feature comprises the following functions: 0595BAL, 0595BAM and 0595BAN broken down into the components of each feature as described below:

0595BAL: This feature provides a hood open warning lamp [Red] and a hood open switch to prevent starting the diesel engine when the hood is open.

0595BAN: This feature provides two hybrid warning lamps (CHECK HYBRID [Amber] and STOP HYBRID [Red]) in a center panel mounted switch pack.

0595BAM: This feature provides an air solenoid to control a PTO engagement mechanism. This feature also provides for up to four demand circuits through RPM inputs that cause the hybrid electric motor to run and turn the PTO shaft via the clutch gear and transmission counter shafts. Each of these circuits have separate parameters that can be set to keep the hybrid electric motor running for a period of time after the demand circuit becomes inactive. This feature provides an RPM input to disable the PTO, as required. Programmable parameters allow the system designer to select the active state for this input. This feature will also request the Hybrid Control Module (HCM) to start the diesel engine if the air pressure or 12-volt chassis battery voltage falls below established parameter values.

This feature uses an RPM input to monitor the PTO feedback switch on the PTO mechanism.

NOTE – To utilize a PTO hour meter, feature 0595AJU must be added (using Diamond Logic® Builder software).

For convenience a diagram of the RPM pin connections (Figure 193) is included in this document.

> Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

*Software feature codes can be added through the Diamond Logic® Builder software. Programmable Parameters are also programmable through the Diamond Logic® Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Refer to the Hybrid Electrical Troubleshooting Guide for more information.

Required software feature codes: 595BAL, 595BAM, 595BAN

Software feature codes that must be removed: 595AJT

ePTO DEMAND CIRCUITS

*These parameters set active states for demand circuits used in ePTO control and the length of time that the hybrid electric motor will be requested on after a demand circuit becomes inactive. These conditions are monitored such that the system will automatically start and stop as needed.

The **HEV_Demand_Cir_1_Enabled** parameter enables this input as hydraulic demand input circuit #1 for use in ePTO control as either active high or active low. Disabling it allows this input to be used in other logic without affecting the ePTO logic.

- 0 = disabled
- 1 = input active when grounded
- 3 = input active when at 12V

The **HEV_Demand_Cir_1_Motor_On_Time** parameter sets the amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive. After this time, the motor will turn off until demand is requested active again.

The **HEV_Demand_Cir_2_Enabled** parameter enables this input as hydraulic demand input circuit #2 for use in ePTO control as either active high or active low. Disabling it allows this input to be used in other logic without affecting the ePTO logic.

- 0 = disabled
- 1 = input active when grounded
- 3 = input active when at 12V

The **HEV_Demand_Cir_2_Motor_On_Time** parameter sets the amount of time that the hybrid electric motor will be on after demand circuit #2 becomes inactive. After this time, the motor will turn off until demand is requested active again.

The **HEV_Demand_Cir_3_Enabled** parameter enables this input as hydraulic demand input circuit #3 for use in ePTO control as either active high or active low. Disabling it allows this input to be used in other logic without affecting the ePTO logic.

- 0 = disabled
- 1 = input active when grounded

- 3 = input active when at 12V

The **HEV_Demand_Cir_3_Motor_On_Time** parameter sets the amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive. After this time, the motor will turn off until demand is requested active again.

The **HEV_Demand_Cir_4_Enabled** parameter enables this input as hydraulic demand input circuit #4 for use in ePTO control as either active high or active low. Disabling it allows this input to be used in other logic without affecting the ePTO logic.

- 0 = disabled
- 1 = input active when grounded
- 3 = input active when at 12V

The **HEV_Demand_Cir_4_Motor_On_Time** parameter sets the amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive. After this time, the motor will turn off until demand is requested active again.

Table 160

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_Demand_Cir_1_Enabled	2391	Enables input as hydraulic demand circuit #1 for use in ePTO control as either active high or active low. Disabling this input frees it to be used in other logic without affecting the ePTO logic. 0 = Disabled 1 = Enabled active low 3 = Enabled active high	1 (List)	0	3	
HEV_Demand_Cir_1_Motor_On_Time	2495	Amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive	0s	0	600	1

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_Demand_Cir_2_Enabled	2396	Enables input as hydraulic demand circuit #2 for use in ePTO control as either active high or active low. Disabling this input frees it to be used in other logic without affecting the ePTO logic. 0 = Disabled 1 = Enabled active low 3 = Enabled active high	1 (List)	0	3	
HEV_Demand_Cir_2_Motor_On_Time	2390	Amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive	0s	0	600	1
HEV_Demand_Cir_3_Enabled	2400	Enables input as hydraulic demand circuit #3 for use in ePTO control as either active high or active low. Disabling this input frees it to be used in other logic without affecting the ePTO logic. 0 = Disabled 1 = Enabled active low 3 = Enabled active high	1 (List)	0	3	
HEV_Demand_Cir_3_Motor_On_Time	2304	Amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive	0s	0	600	1

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_Demand_Cir_4_Enabled	2425	<p>Enables input as hydraulic demand circuit #4 for use in ePTO control as either active high or active low. Disabling this input frees it to be used in other logic without affecting the ePTO logic.</p> <p>0 = Disabled 1 = Enabled active low 3 = Enabled active high</p>	1 (List)	0	3	
HEV_Demand_Cir_4_Motor_On_Time	2270	Amount of time that the hybrid electric motor will be on after demand circuit #1 becomes inactive	0s	0	600	1

RUN/STOP DIESEL ENGINE

* These parameters set the conditions under which the ESC will request to start the diesel engine to recharge the air supply or battery voltage and to stop running the diesel engine when not needed. These conditions are monitored such that the system will automatically start and stop the diesel engine as needed.

The **HEV_Run_Engine_Max_Air_Pressure** parameter is the pressure above which the Hybrid Control Module (HCM) will be requested to quit running the diesel engine to recharge the air supply. This pressure must be greater than **HEV_Run_Engine_Min_Air_Pressure**.

The **HEV_Run_Engine_Max_Air_Press_Time** parameter sets the amount of time that the diesel engine will run after the air pressure supply reaches the upper air pressure limit set for ePTO (set by **HEV_Run_Engine_Max_Air_Pressure**). This allows the diesel engine to run for a minimum amount of time.

The **HEV_Run_Engine_Max_Battery_Voltage** parameter sets the battery voltage limit that must be met for the diesel engine to stop running after a set amount of time. This voltage must be greater than **HEV_Run_Engine_Min_Battery_Voltage**.

The **HEV_Run_Engine_Max_Bat_Volt_Time** parameter sets the amount of time to recharge the batteries before the ESC will request the diesel engine to stop running. This parameter sets the minimum amount of time that the diesel engine will run if the 12-volt batteries are low.

The **HEV_Run_Engine_Min_Air_Pressure** parameter sets the minimum desired ePTO operating air pressure. If in ePTO mode and the system air pressure falls below this value for a set amount of time, the HCM will be requested to start the diesel engine to recharge the air supply.

The **HEV_Run_Engine_Min_Air_Press_Time** parameter sets the amount of time that air pressure is below the minimum before the ESC will request the Hybrid Control Module (HCM) to start the diesel engine to recharge the air supply.

The **HEV_Run_Engine_Min_Battery_Voltage** parameter sets the minimum battery voltage level during ePTO with diesel engine off. If in ePTO mode and the battery voltage falls below this value for a set amount of time, the HCM will be requested to start the diesel engine to recharge the batteries.

The **HEV_Run_Engine_Min_Bat_Volt_Time** parameter sets the amount of time that the voltage is below the minimum (HEV_Run_Engine_Min_Battery_Voltage parameter) before the ESC will request the HCM to start the diesel engine to recharge the 12V batteries.

Table 161

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_Run_Engine_Max_Air_Pressure	2520	Pressure above which the Hybrid Control Module (HCM) will be requested to quit running the diesel engine to recharge the air supply	120 psi	90	150	1
HEV_Run_Engine_Max_Air_Press_Time	2517	Amount of time that the diesel engine will run after the air pressure supply reaches the upper air pressure limit set for ePTO (set by HEV_Run_Engine_Max_Air_Pressure)	10s	0	600	1
HEV_Run_Engine_Max_Battery_Voltage	2513	Battery voltage limit that must be met for the diesel engine to stop running after a set amount of time	13.2V	0	20	0.1
HEV_Run_Engine_Max_Bat_Volt_Time	2516	Amount of time to recharge the batteries before the ESC will request the diesel engine to stop running	300s	0	600	1

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_Run_Engine_Min_Air_Pressure	2521	Minimum desired ePTO operating air pressure. If in ePTO mode and the system air pressure falls below this value for a set amount of time, the HCM will be requested to start the diesel engine to recharge the air supply	100 psi	90	150	1
HEV_Run_Engine_Min_Air_Press_Time	2519	Amount of time that air pressure is below the minimum before the ESC will request the Hybrid Control Module (HCM) to start the diesel engine to recharge the air supply	10s	0	600	1
HEV_Run_Engine_Min_Battery_Voltage	2513	Minimum battery voltage level during ePTO with diesel engine off. If in ePTO mode and the battery voltage falls below this value for a set amount of time, the HCM will be requested to start the diesel engine to recharge the batteries	12.1V	0	20	0.1
HEV_Run_Engine_Min_Bat_Volt_Time	2515	Amount of time that the voltage is below the minimum (HEV_Run_Engine_Min_Battery_Voltage parameter) before the ESC will request the HCM to start the diesel engine to recharge the 12V batteries	60s	0	600	1

ePTO

* These parameters set various input/output conditions for operating ePTO.

The **HEV_ePTO_Body_Equip_Pwr_Fuse** parameter sets the fuse value for the HEV ePTO Body Equipment Power output (on the RPM).

The **HEV_ePTO_Disengagement_Cmd_RPM_State** parameter enables the PTO disengagement/disable signal by selecting the input to the RPM as either active high (12V) or active low (ground). When the input goes active, it will immediately disengage the PTO by deactivating the air solenoid. Disabling it (0) allows this input to be used in other logic code without affecting the ePTO logic.

- 0 = disabled
- 1 = input active when grounded
- 3 = input active when at 12V

The **HEV_ePTO_Engaged_Param** parameter indicates the active state of the Hybrid Electric Vehicle (HEV) ePTO clutch engaged feedback signal into the RPM.

- 0 = disabled
- 1 = engaged when pulled low
- 3 = engaged when pulled high

The **HEV_ePTO_Interlock_Enabled** parameter allows the Body Equipment Power output to be interlocked to the ePTO request from the HCM. When this parameter is enabled, power at this RPM output will automatically be turned on when ePTO mode is requested. With this parameter turned off, this power will be on automatically with key on and interlocks met (park brake set, transmission in neutral, etc.).

Table 162

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_ePTO_Body_Equip_Pwr_Fuse	2522	Sets the fuse value for the HEV ePTO Body Equipment Power output (on the RPM)	20A	0	20	0.1
HEV_ePTO_Disengagement_Cmd_RPM_State	2533	Enables the PTO disengagement/ disable signal by selecting the input to the RPM as either active high (12V) or active low (ground) 0 = Disabled 1 = Enabled active low 3 = Enabled active high	3	0	3	List

Off - Indicates a 0 is set in for this parameter						
On - Indicates a 1 is set for the parameter						
Parameter	ID	Description	Default	Min	Max	Step
HEV_ePTO_Engaged_Param	2523	Indicates the active state of the Hybrid Electric Vehicle (HEV) ePTO clutch engaged feedback signal into the RPM	1	0	3	List
HEV_ePTO_Interlock_Enabled	2594	Allows the Body Equipment Power output to be interlocked to the ePTO request from the HCM. When this parameter is enabled, power at this RPM output will automatically be turned on when ePTO mode is requested.	On			

HEV SIGNALS AVAILABLE TO ADVANCED LOGIC:

The following signals are available for use in Advanced Logic in Diamond Logic® Builder. Some of the signals are used in conjunction with some of the parameters defined above.

ePTO DEMAND CIRCUITS

The HEV_Demand_Circuit_1 signal is the Hybrid Electric Vehicle Hydraulic Demand Input Circuit 1. It is an input signal connected to RPM1 Input 1. The input must be enabled by setting the HEV_Demand_Cir_1_Enabled parameter. Refer to parameter descriptions above for the proper settings.

The HEV_Demand_Circuit_2 signal is the Hybrid Electric Vehicle Hydraulic Demand Input Circuit 2. It is an input signal connected to RPM1 Input 2. The input must be enabled by setting the HEV_Demand_Cir_2_Enabled parameter. Refer to parameter descriptions above for the proper settings.

The HEV_Demand_Circuit_3 signal is the Hybrid Electric Vehicle Hydraulic Demand Input Circuit 3. It is an input signal connected to RPM1 Input 3. The input must be enabled by setting the HEV_Demand_Cir_3_Enabled parameter. Refer to parameter descriptions above for the proper settings.

The HEV_Demand_Circuit_4 signal is the Hybrid Electric Vehicle Hydraulic Demand Input Circuit 4. It is an input signal connected to RPM1 Input 4. The input must be enabled by setting the HEV_Demand_Cir_4_Enabled parameter. Refer to parameter descriptions above for the proper settings.

HOOD OPEN

The HEV_Hood_Open_Switch signal is an input reflecting the status of the Hood Open Switch (ON = open, OFF = closed).

LAMP STATUS

The HEV_Amber_Warning_Lamp signal is an input from the Hybrid Control Module (HCM) to indicate a non-critical fault in the hybrid system.

The HEV_Red_Warning_Lamp signal is an input signal from the Hybrid Control Module (HCM) to indicate a critical fault in the hybrid system.

INTERLOCK CONDITIONS

The HEV_Prohibit_Driving² signal is a read only data link output from the ESC to the HCM which then passes it to the transmission control module (TCM) on public data link from the Hybrid Control Module (HCM) to prohibit the vehicle from being driven.

The HEV_Prohibit_Driving_Req² is a written to data link semaphore1 output from the ESC to the HCM which then passes it to the transmission control module (TCM) on public data link from the Hybrid Control Module (HCM) to prohibit the vehicle from being driven.

The HEV_OK_To_Start_Engine signal is a data link output from the ESC to the HCM to allow the diesel engine to be started.

DIESEL ENGINE/HYBRID ELECTRIC MOTOR

The HEV_Run_Engine signal is a data link output from the ESC to the HCM.

The HEV_Run_Engine_Req² signal is a written to data link semaphore1 output from the ESC to the HCM requesting the diesel engine to run.

The HEV_Run_Traction_Motor signal is a data link output from the ESC to the HCM requesting the hybrid electric motor to run.

The HEV_Run_Traction_Motor_Req signal is a written to data link semaphore¹ output from the ESC to the HCM requesting the hybrid electric motor to run.

ePTO

The HEV_Remote_PTO_Disable signal is a body builder provided hardware input³ signal connected to RPM1 input 5, disabling the ePTO air solenoid (ON = disable ePTO, OFF = allow normal ePTO operation).

The Hybrid_Remote_PTO_Disable signal is a written to data link semaphore¹ output signal disabling the ePTO air solenoid (ON = disable ePTO, OFF = allow normal ePTO operation).

The HEV_ePTO_Engaged signal is a data link output from ESC to the HCM indicating that the ePTO is engaged.

The HEV_ePTO_Requested signal is a data link input signal HCM to the ESC indicating that the in cab, shift console mounted ePTO button has been depressed and all interlocks are met.

Notes:

¹ Semaphores are messages sent to another module to request that the other module take action.

² These signals may become unavailable in a future release of the software.

³ Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view).

WIRING INFORMATION

> Please use the Diamond Logic® Builder software to determine pin locations for RPM inputs (refer to the CONNECTOR screen view) and to set programmable parameters (refer to the FEATURE screen view).

- All wiring to RPM inputs and outputs is customer supplied.
- One wire may be connected to an RPM output (RPM #1, brown connector terminal A labeled PTO_Output in the DLB connector view) and use as a 12-volt, 20 ampere source power for body builder installed equipment. (Note: this RPM output can be biased to either the accessory key position or interlocked to the activation of the ePTO mode of operation [default state] via feature 595BAM parameter 2494).
- A second wire must be connected from the Body Builder-installed PTO feedback switch (GND active) to the pin labeled PTO_Feedback_Switch in the black 23-pin RPM input connector. This feedback switch is used to determine whether or not the PTO is engaged by determining if the switch is in the active state. If the switch is in its active state, then an indicator light in the gauge cluster shall be activated. When the switch is not in the active state, the indicator light will not be on.
- The switch provided is labeled PTO.

RPM CONNECTOR INFORMATION

** HPV Wire Terminal Kits are REQUIRED to allow Body Builders to create wire harnesses for the RPM connectors.

HPV terminal kits are pre-made kits that include six power output terminals and seals for the brown 8-way connector and six terminals for the black 23-way connector.

Table 163

HPV Terminal Kits	Part Number
RPM Terminal Kit 12 Gauge	2585651C91
RPM Terminal Kit 14 Gauge	2585423C91

NOTE – The following connectors are optional because they are already provided with the RPMs.

This information is given so that the Body Builder can purchase connectors in the event that the original connectors are damaged or lost, or so that the Body Builder can pre-fabricate a wire harness.

Table 164 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black)

Connector Part No.	3548934C1	2585981C91
Description	Connector, Body, Brown 8-Way RPM Output	Connector, Body, Black 23-Way RPM Input Kit
Terminal Part	3534163C1 - 12 Gauge 3535931C1 - 14 Gauge 3535930C1 - 16 and 18 Gauge	1698937C1

Table 164 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black) (cont.)

Connector Part No.	3548934C1	2585981C91
Cable Seal Part	3548945C1 - 12 and 14 Gauge	N/A
	3535937C1 - 16 and 18 Gauge	
Connector Lock Part	3548943C1	N/A
CPA Lock	3573833C1	N/A
Cavity Plug	3535938C1	Built into the connector

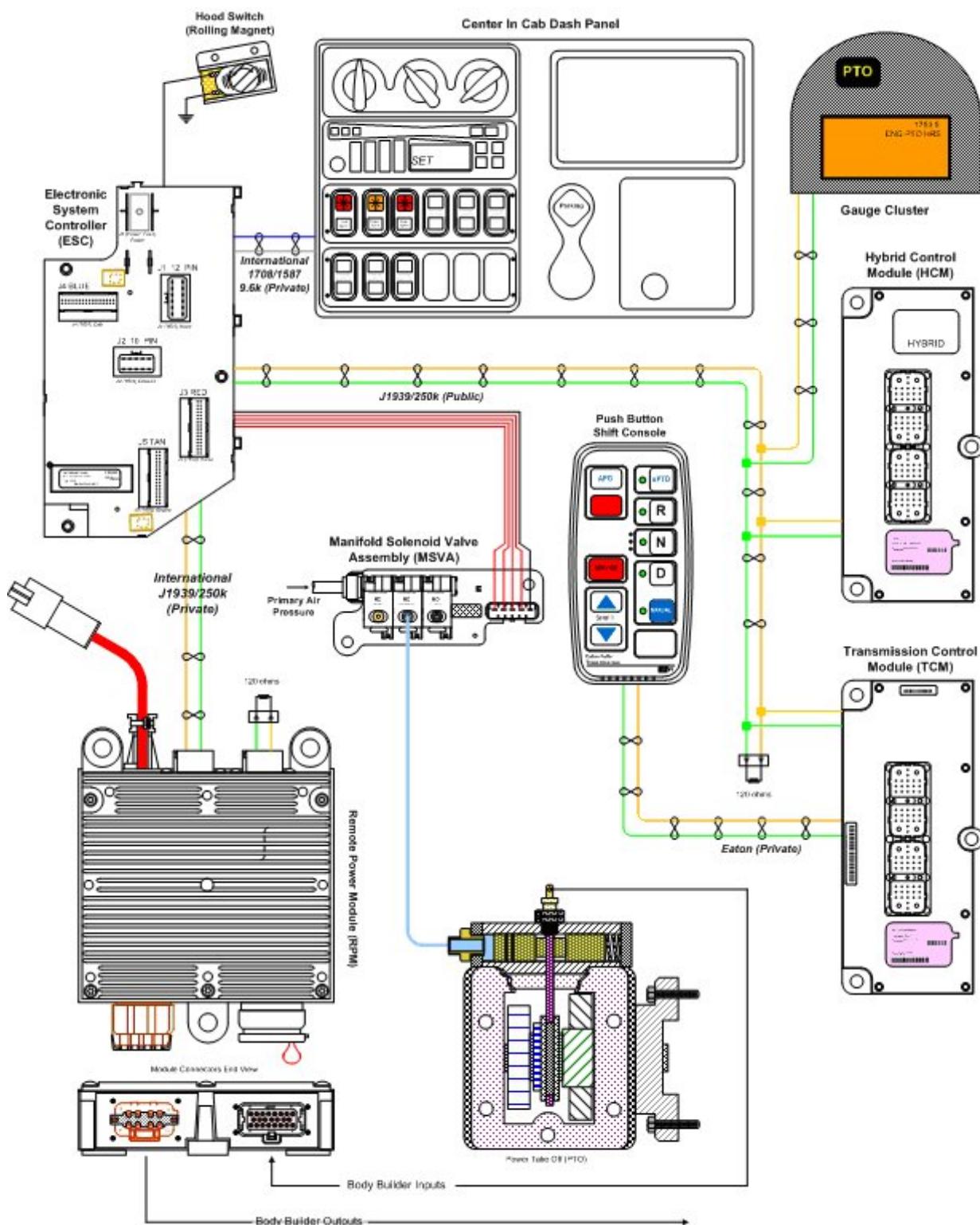


Figure 195 Overview of Hybrid with ePTO Capability

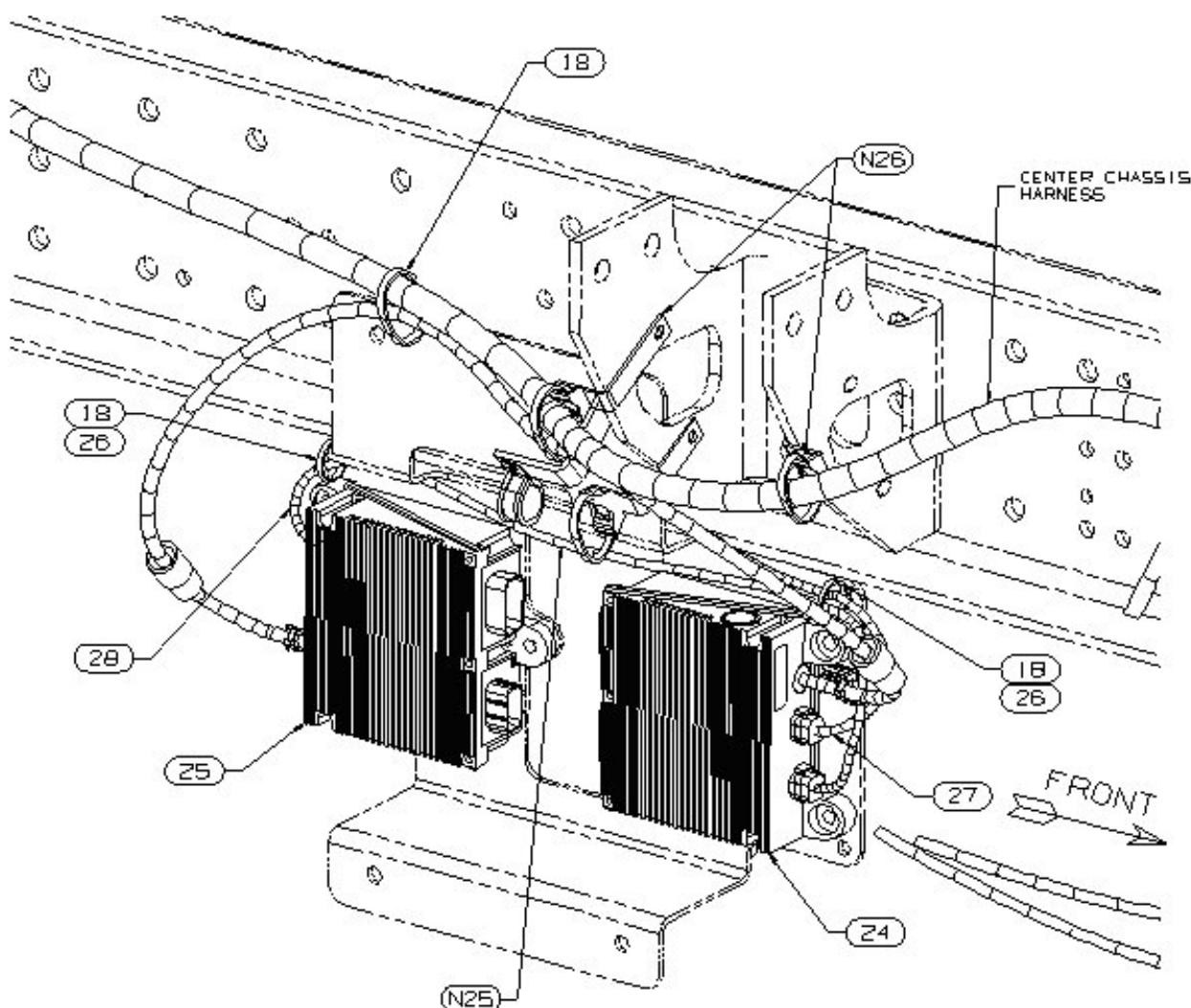
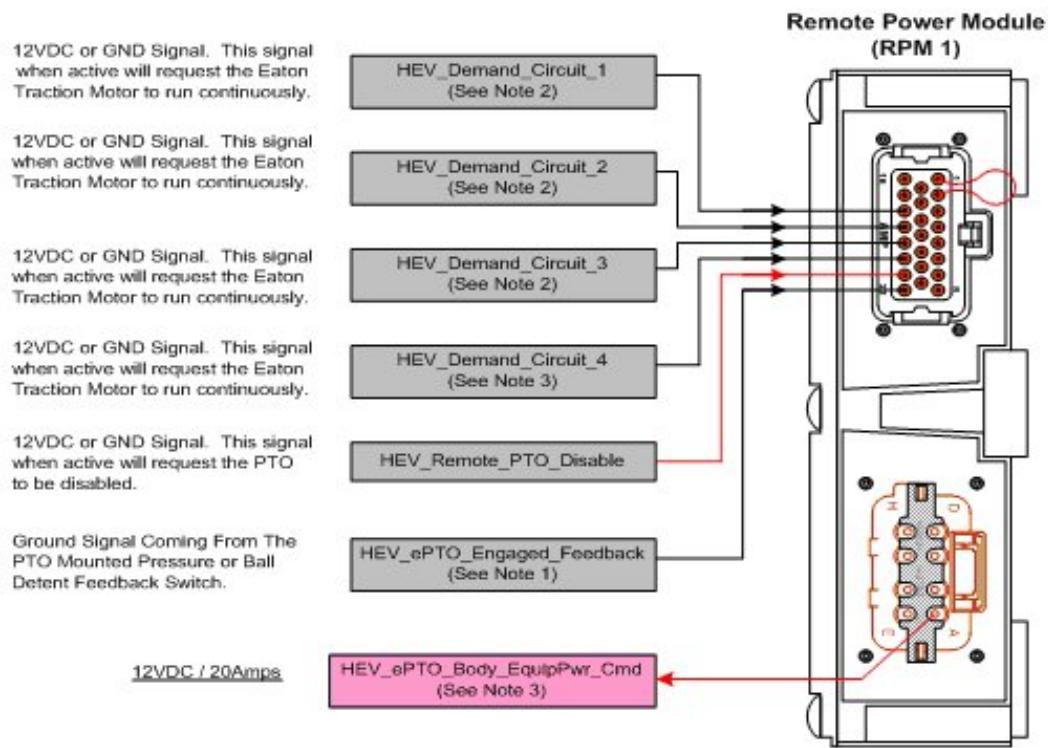


Figure 196 RPM Mounting Location on a DuraStar Model Truck

Body Builder Integration Points: This is where the connections are made to integrate the hybrid ePTO application with the chassis. The following two figures illustrate the necessary connections.



Note 1: Using Diamond Logic Builder (DLB), the **HEV_ePTO_Engaged_Feedback** signal can be programmed to send the 'PTO engaged' feedback to the hybrid system by either a 12 volt input, or to become active when the RPM input is open. By default, it is preset to "Enabled active low" from the factory. This signal is associated with the programmable parameter below:

HEV_ePTO_Engaged_Param (default setting =1 "Engaged when pulled low")

When the input becomes active (12V pr ground is applied) a 'PTO engaged' feedback signal will be sent to the hybrid system.

Note 2: The following signals: **HEV_Demand_Circuit_1**, **HEV_Demand_Circuit_2**, **HEV_Demand_Circuit_#** and **HEV_Demand_Circuit_4** can be programmed to request the electric motor by either a 12 volt OR a ground input to the RPM. By default, they are preset to 'Enabled active low' from the factory. These signals are associated with programmable time outs as follows:

HEV_Demand_Cir_1_Motor_On_Time (default setting = 0 seconds),
HEV_Demand_Cir_2_Motor_On_Time (default setting = 30 seconds),
HEV_Demand_Cir_3_Motor_On_Time (default setting = 30 seconds),
HEV_Demand_Cir_4_Motor_On_Time (default setting = 120 seconds).

When the input becomes inactive (12V pr ground is removed) the electric motor will continue to run during programmable time out period. There must not be any other requests active during timeout period for motor to be requested off.

Note 3: This signal is interlocked to: Vehicle Speed < 3 mph, Neutral Gear and Park Brake Set

Figure 197 RPM Connections for ePTO Hybrid Application

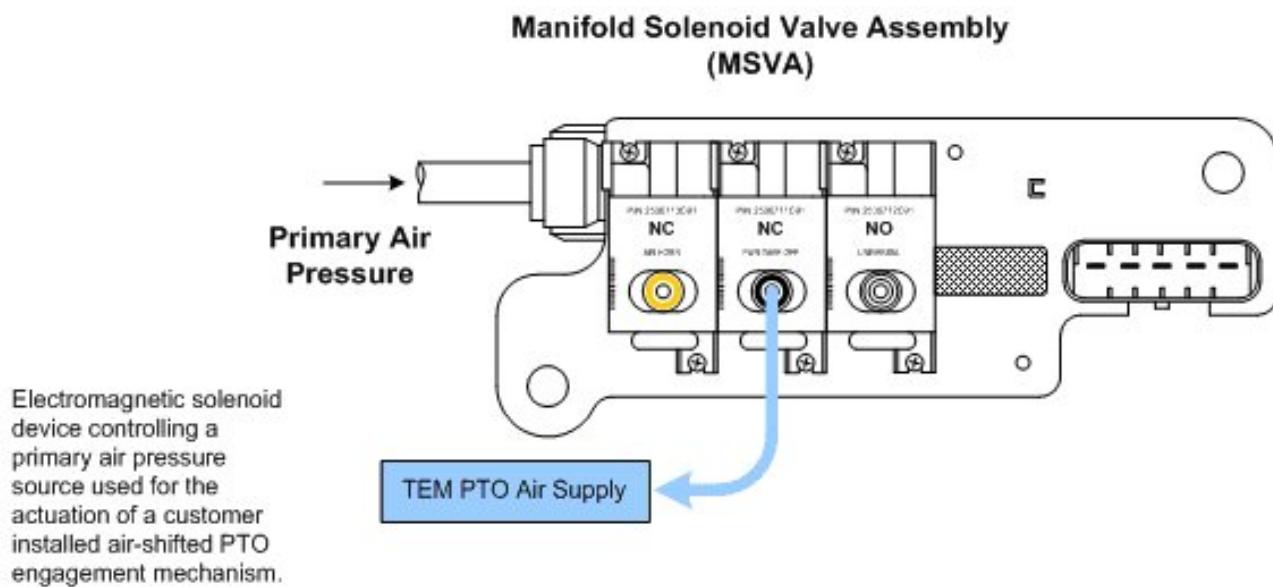


Figure 198 Air Solenoid Connections for ePTO Hybrid Application

Mounting positions for air solenoids are different based upon vehicle air accessory content. Locate the air solenoid labeled "Pwr Take Off" for controlling the PTO mechanism.

NORMAL SYSTEM OPERATION TEST

- Start the diesel engine with transmission in neutral and the park brake set. Make sure the air pressure is greater than 110 psi and battery voltage is greater than 13.3 volts.
- Depress the ePTO button on the shifter.
- Verify that PTO lamp in the gauge cluster is turned on when the ePTO is successfully engaged.
- Verify that the diesel engine shuts off.
- Activate one of the hybrid demand circuit inputs. Verify that the hybrid electric motor activates.
- De-activate the hybrid demand circuit input. Verify that the hybrid electric motor shuts off after the programmed timeout period has elapsed.

GENERAL SYSTEM TESTS

- To determine if the HOOD OPEN warning is working, open the hood and check that the HOOD OPEN light is on and that the diesel engine cannot be started. (This functionality/feature also includes the park brake and the in-cab key switch in ignition run position. The feature is designed to prevent the hybrid electric motor from cranking or starting the engine. If the hood is open and/or the park brake is not set, the engine can still be started from the in-cab-key switch.)
- Verify that the pin labeled HEV_ePTO_Body_Equip_Pwr_Cmd of the brown 8-way Remote Power Module output connector has the battery voltage levels present. (If parameter 2494 is enabled [default] this output will source 12 volts at 20 amperes once the unit is in the ePTO mode of operation. Otherwise it will source 12 volts at 20 amperes when the in-cab key switch is in the ignition / run position and the vehicle is stationary).

- Verify that the RPM input labeled HEV_ePTO_Engaged_Feedback, HEV_Remote_PTO_Disable, HEV_Demand_Circuit_1, HEV_Demand_Circuit_2, HEV_Demand_Circuit_3 and HEV_Demand_Circuit_4 (pin positions specified by the Diamond Logic® Builder software) is receiving the correct voltage (12V or GND) as specified by the programmable parameter in the Diamond Logic® Builder software.
- Verify that the STOP HYBRID and CHECK HYBRID lamps work by cycling the in-cab key switch to the ignition / run position. This action will initiate a lamp test, illuminating these lamps for a period of 8 seconds following the key switch initialization.
- If the Service Disconnect switch is pushed in, the Check Hybrid light should be solid ON to indicate the hybrid system is offline.

LOW AIR PRESSURE TEST

- Start the diesel engine with transmission in neutral and the park brake set. Make sure the air pressure is greater than 110 psi and battery voltage is greater than 13.3 volts.
- Depress the ePTO button on the shifter.
- Verify that the diesel engine shuts off.
- Depress the brake pedal a number of times to allow air pressure to drop below the minimum air pressure (default = 100 psi).
- Wait for the minimum air pressure time to elapse (default = 10 sec).
- Verify that the diesel engine starts to recharge the air supply.

ePTO DISABLE TEST

- Start the diesel engine with transmission in neutral and the park brake set. Make sure the air pressure is greater than 110 psi and battery voltage is greater than 13.3 volts.
- Depress the ePTO button on the shifter.
- Verify that the diesel engine shuts off.
- Disengage the ePTO through the RPM input “HEV_Remote_PTO_Disable”.
- Verify that the ePTO is disabled.
- Once the HEV_Remote_PTO_Disable switch has been activated, the PTO mechanism cannot be re-engaged until the HEV_Remote_PTO_Disable switch has been returned to its inactive state and the ePTO request switch located in the Eaton shift console is recycled.

HOW TO ADD THIS FEATURE:

This feature cannot be added aftermarket at the present time.

33.2. 13GSB — EATON 6SPD HYBRID WITHOUT ePTO CAPABILITY

FEATURE CODE DESCRIPTION:

13GSC – EATON 6SPD HYBRID WITHOUT ePTO CAPABILITY for a Hybrid Electric Vehicle, includes warning lights.

FEATURE / BODY FUNCTION:

This feature provides two warning lamps (STOP HYBRID and CHECK HYBRID) in a switch pack.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

*Software feature codes can be added through the Diamond Logic® Builder software.

Required software feature codes: 595BAN

Software feature codes that must be removed: None

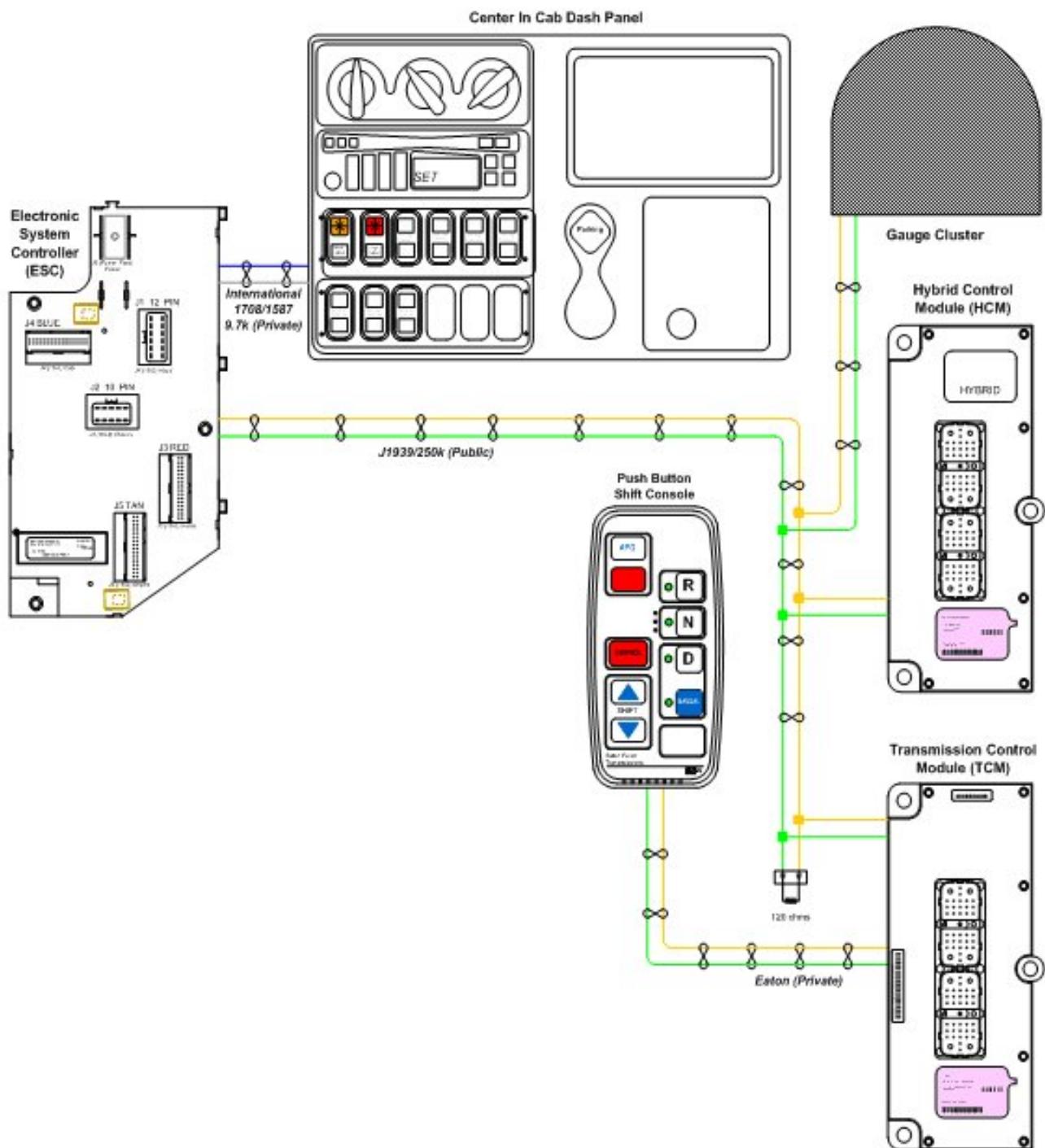


Figure 199 Overview of Hybrid without ePTO Capability

TESTING

1. Verify that the STOP HYBRID and CHECK HYBRID lamps work by having key in run position and perform a bulb check. The lamps should be on for 8 seconds.
2. Simulate the light turning on with Diamond Logic Builder or Eaton Service Ranger service tools.
3. If the Service Disconnect switch is pushed in, the Check Hybrid light should be flashing to indicate the hybrid system is offline.

HOW TO ADD THIS FEATURE:

This feature cannot be added aftermarket at the present time.

34. ELECTRICAL FUNCTIONALITY WITHOUT ASSOCIATED FEATURE CODES

The following features are part of the General Electrical System Code (08000) and are documented here for informational purposes only. They are standard features that come with all vehicles.

34.1. DOME LIGHT FEATURES

FEATURE CODE DESCRIPTION:

Standard Feature

FEATURE / BODY FUNCTION:

The dome light feature allows for the ability to program the amount of time the dome light stays on after the cab doors have been closed, the initial brightness the dome lights will go to when the cab doors are shut and the ability of “theater dimming” (gradually fading to black instead of immediately turning off).

Dome lamps are controlled by the BC. After the door is shut, the dome lamps stay on for 20 seconds at 80% voltage and a slight dimming of the lamp can be observed. After the 20 seconds, the lamps will dim then go out. The BC can be programmed by the dealer to go out as soon as the door is closed.

The dome circuit is fused internal to the BC at 10 AMP. If the vehicle has courtesy lights, do not exceed five AMPS additional load. If the vehicle does not have courtesy lights, do not exceed eight AMPS additional load.

If additional loads are required, use a relay. If a relay is added, theater dimming must be turned off to prevent relay chatter.

CAUTION – Care must be taken when splicing into the dome lamp circuit. Do not splice into the door switch circuits. The door switch circuits go to the BC and do not function the same as vehicles without a BC.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software Feature Codes that MUST be added: 595AKY

If the Dome_Light_Dim_Enable parameter is turned on, the dome light theater dimming feature is enabled.

The Dome_Light_Dim_Step_Size parameter sets the percentage that the light will be reduced for each 20-millisecond loop.

The Dome_Light_PWM_Percent_Level parameter is the programmable percentage of maximum voltage that the dome light will be pulling when it is waiting to dim.

The Dome_Light_Wait_Time parameter sets the amount of time, after the door is shut, that the dome light stays at the voltage set by Dome_Light_PWM_Percent_Level before dimming at the rate set by Dome_Light_Dim_Step_Size.

If the current in the dome light circuit falls below the level set by the Dome_Light_Lo_Current parameter, the BC will register a fault code.

If the current in the dome light circuit exceeds the level set by the Dome_Light_Hi_Current parameter, the BC will shut off the circuit and register a fault code.

The Dome_Light_OC_Current parameter should be left at its factory default of zero.

The Dome_Light_Key_Off_Timeout parameter sets the amount of time that the dome light will remain on after the truck is turned off and the door is left open.

Table 165

Parameter	ID	Description	Default	Units	Min	Max	Step
Dome_Light_Dim_Enable	177	Enable/disable dome light theater dimming. A value of 1 enables, and a value of 0 disables the dimming feature.	1	No_ Units	NA	NA	NA
Dome_Light_Dim_Step_Size	178	The size (in percentages) that the dome light_req should be stepped down each loop	1	Percent	1	10	1
Dome_Light_PWM_Percent_Level	179	The level at which the dome light should be set while it is waiting to dim	80	Percent	10	100	5
Dome_Light_Wait_Time	182	This is the amount of time the dome light should wait before dimming.	20	s	1	655	1
Dome_Light_Lo_Current	1895	Dome Light Low Current Detection Level (AMPS)	0	A	0	10	0.1
Dome_Light_Hi_Current	1896	Dome Light High Current Detection Level (AMPS)	10	A	0	10	0.1
Dome_Light_OC_Current	1897	Dome Light Open Circuit Detection Level (AMPS)	0	A	0	10	0.1
Dome_Light_Key_Off_Timeout	2213	The amount of time that the dome light will remain on after the truck is turned off and the door is left open	10	min	1	120	1

34.2. PARK BRAKE APPLIED BC CONNECTIONS

FEATURE / BODY FUNCTION:

International provides a location to obtain a "Park Brake Applied" status signal.

CAUTION – If a stop lamp circuit is required, do not splice into the circuits that go to the brake switches (air or hydraulic). Circuits that come from the low current, brake switches must not be altered. Any attempt to alter will result in system trouble.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software feature codes that MUST be added: 595ANR

Software feature codes that MUST be removed: NONE

There are no programmable parameters for this feature.

Pin F1 of connector #1601 is switched to 12V when the park brake is applied. This pin is rated for a maximum load current of 0.5 AMP. This pin can be connected to a relay coil to activate a relay for park brake interlock. To use the pin, remove cavity plug from connector and insert a wire and terminal.

34.3. BRAKE APPLIED BC CONNECTIONS

FEATURE / BODY FUNCTION:

International provides a location to obtain a "Brake Applied" status signal.

CAUTION – If a stop lamp circuit is required, do not splice into the circuits that go to the brake switches (air or hydraulic). Circuits that come from the low current, brake switches must not be altered. Any attempt to alter will result in system trouble.

SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software feature codes that MUST be added: NONE

Software feature codes that MUST be removed: NONE

There are no programmable parameters for this feature.

Pin F15 of connector #1601 is switched to 12V when the service brake is applied. This pin is rated for a maximum load current of 0.5 AMP. This pin can be connected to a relay coil to activate a relay for park brake interlock. To use the pin, remove cavity plug from connector and insert a wire and terminal.

35. CROSS REFERENCE

This section has been added to assist you in cross referencing software feature codes from pre-2007 and post-2007 model years. It is presented in two ways, the first is sorted by the pre-2007 software feature code and the second is sorted on the post-2007 feature code.

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number

BC 595Code	2007 BC 595Code	Feature Description
All denotes 2000, 4000, 7000, 8000, Bus and Prostar Models		
514011	595ANL	BC PROG, RR AXLE SWITCH CON'T With Dash Mounted HI/LOW switch
595006	None	Not Required or Implemented for 2007 BC
595007	595AEP	BC PROG, AIR PRESSURE GAUGES Auxiliary
595008	595ABB	BC PROG, AIR PRESSURE GAUGES
595009	595ABV	BC PROG, ABS INDICATOR for Full Power Hydraulic OR Air Brake Systems, Not Including Trailer
595010	None	Not Required or Implemented for 2007 BC
595011	595ACB	BC PROG, TRACTION CONTROL IND {Bendix ATC Off Road} With Traction Warning Light, for Air Brakes
595012	595ABW	BC PROG, TRAILER ABS INDICATOR
595013	None	Not Required or Implemented for 2007 BC
595014	595AAZ	BC PROG, PARK BRAKE INDICATOR
595015	595AAD	BC PROG, BRAKE SWITCH
595016	595AGC	BC PROG, ENGINE EXHAUST BRAKE
595017	595ANE	BC PROG, ENGINE COMPRESSION BR Located in Switch Pack
595018	595ALB	BC PROG, HEADLIGHTS W/DRL Less Auto
595019	595AMS 595AMT 595ACE	BC PROG, FOG LIGHTS Push Button Location A BC PROG, FOG LIGHTS Push Button Location B BC PROG, FOG LIGHTS Rocker Switch
595020	None	Not Required or Implemented for 2007 BC
595021	595AAL	BC PROG, TURN SIGNALS/BRAKE With Combined Stop and Turns
595022	595ALD	BC PROG, AIR HORN Digital Input
595023	595AAV	BC PROG, HORN ELECTRIC
595024	595AKY	BC PROG, DOME LIGHTS
595025	None	Not Required or Implemented for 2007 BC
595026	None	Not Required or Implemented for 2007 BC
595027	None	Not Required or Implemented for 2007 BC
595028	None	Not Required or Implemented for 2007 BC

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595029	None	Not Required or Implemented for 2007 BC
595030	595ABC	BC PROG, TRAILER LIGHTING
595031	595AAC	BC PROG, KEY STATE
595032	595AHE	BC PROG, REMOTE POWER MOD #1
595033	595ACY	BC PROG, FIFTH WHEEL SLIDE
595034	595AHA	BC PROG, REMOTE ENGINE SPEED
595035	None	Not Required or Implemented for 2007 BC
595036	None	Not Required or Implemented for 2007 BC
595037	595ADP	BC PROG, CLUTCH SWITCH
595038	595AYP	BC PROG, AUTO NEUTRAL
595039	595ALN	BC PROG, RR AXLE SHIFT CONTROL Without Dash Mounted HI/LOW switch
595040	595ACU	BC PROG, LOCKING DIFFERENTIAL for Single & Dual With Single Switch
595041	595ACZ	BC PROG, POWER DIVIDER LOCK
595042	None	Not Required or Implemented for 2007 BC
595045	None	Not Required or Implemented for 2007 BC
595046	None	Not Required or Implemented for 2007 BC
595047	595ALE	BC PROG, POWER WINDOW/DOOR LOC With 1 Door
595048	595AYD	BC PROG, LOW WASHER FLUID IND.
595049	None	Not Required or Implemented for 2007 BC
595050	None	Not Required or Implemented for 2007 BC
595051	595ACW	BC PROG, ENGINE FAN OVERRIDE Includes Manual Switch for Automatic Manual Fan Control
595052	595ABD	BC PROG, FUEL TANK GAUGE Single Right Side
595054	None	Not Required or Implemented for 2007 BC
595057	None	Not Required or Implemented for 2007 BC
595058	None	Not Required or Implemented for 2007 BC
595059	None	Not Required or Implemented for 2007 BC
595060	595ADZ	BC PROG, TRANS OIL TEMP Through TCM
595061	595ABP	BC PROG, VOLTmeter
595063	595ABA	BC PROG, SEATBELT INDICATOR
595064	None	Not Required or Implemented for 2007 BC
595065	None	Not Required or Implemented for 2007 BC
595066	595ABL	BC PROG, ENGINE OIL PRESS GAUG

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595067	595ABK	BC PROG, ENGINE COOLANT TEMP
595068	None	Not Required or Implemented for 2007 BC
595069	595ABN	BC PROG, SPEEDOMETER
595070	None	Not Required or Implemented for 2007 BC
595071	None	Not Required or Implemented for 2007 BC
595072	None	Not Required or Implemented for 2007 BC
595073	None	Not Required or Implemented for 2007 BC
595074	None	Not Required or Implemented for 2007 BC
595075	595ANP	BC PROG, BRAKE APPL GAUGE IN EGC/AGSP
595076	None	Not Required or Implemented for 2007 BC
595077	None	Not Required or Implemented for 2007 BC
595078	None	Not Required or Implemented for 2007 BC
595079	None	Not Required or Implemented for 2007 BC
595080	None	Not Required or Implemented for 2007 BC
595081	None	Not Required or Implemented for 2007 BC
595082	None	Not Required or Implemented for 2007 BC
595083	595AAP	BC PROG, CRUISE CONT'L STEER WH
595084	None	Not Required or Implemented for 2007 BC
595085	None	Not Required or Implemented for 2007 BC
595086	595AYA	BC PROG, AXLE TEMP GAUGE Dual
595087	595AYB	BC PROG, AXLE TEMP GAUGE Single, for SS & Medium
595088	None	Not Required or Implemented for 2007 BC
595089	None	Not Required or Implemented for 2007 BC
595090	None	Not Required or Implemented for 2007 BC
595091	595ANG	BC PROG, RETARD OVER HEAT WARN Light
595092	595ALX	BC PROG, WAIT TO START IND.
595093	595AYK	BC PROG, FRONT AIR SUSPENSION
595094	None	Not Required or Implemented for 2007 BC
595095	None	Not Required or Implemented for 2007 BC
595096	None	Not Required or Implemented for 2007 BC
595097	595ADX	BC PROG, MONITOR ENG OIL TEMP Through ECM
595098	None	Not Required or Implemented for 2007 BC
595099	595AMV 595AMW 595AYY	BC PROG, SNOW PLOW LIGHTS Push Button Location A BC PROG, SNOW PLOW LIGHTS Push Button Location B
595100	595ADK	BC PROG, AIR SHIELD LIGHTING

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595101	None	Not Required or Implemented for 2007 BC
595102	None	Not Required or Implemented for 2007 BC
595103	None	Not Required or Implemented for 2007 BC
595104	None	Not Required or Implemented for 2007 BC
595105	595AYS	BC PROG, IP CONFIGURATION for MD, RH, & SS
595106	595AAK	BC PROG, DRL OMIT
595107	595ABY	BC PROG, POWER WINDOW/DOOR LOC With 2 Doors
595108	595AEJ	BC PROG, POWER WINDOW/DOOR LOC With 4 Doors
595109	None	Not Required or Implemented for 2007 BC
595110	595ANN	BC PROG, STOP RELAY Active With Brake Lights
595111	595ANB	BC PROG, MARKER INTERRUPT SW Located in Switch Pack
595112	595ADR	BC PROG, PRNDL No PRNDL, Manual Transmission
595113	595AEL	BC PROG, PRNDL With 1000/2000 5 SPD Transmission With Park Paw & Shifter Interlock
595114	595AET	BC PROG, PRNDL With 1000/2000 5 Speed Transmission not With Power Park or Park Pawl
595115	595AEV	BC PROG, PRNDL With 1000/2000 5 Speed Transmission With Power Park & Shifter Interlock
595116	595AEU	BC PROG, PRNDL With 3000/4000 5 & 6 Speed Transmission
595117	None	Not Required or Implemented for 2007 BC
595118	595ALV	BC PROG, HEATER DIAGNOSTICS
595119	595AHB	BC PROG, REMOTE POWER MOD #4
595120	595AHC	BC PROG, REMOTE POWER MOD #7
595121	595AHD	BC PROG, REMOTE POWER MOD #2
595122	595AHG	BC PROG, SINGLE SPD XFER CASE
595123	None	Not Required or Implemented for 2007 BC
595124	None	Not Required or Implemented for 2007 BC
595125	595ALK	BC PROG, AUXILIARY TRANS
595126	595ABH	BC PROG, ENGINE TYPE MFG Caterpillar
595127	595ABJ	BC PROG, ENGINE TYPE MFG Cummins
595128	None	Not Required or Implemented for 2007 BC
595129	595ABZ	BC PROG, KEYLESS ENTRY REMOTE
595130	595ABG	BC PROG, ENGINE TYPE MFG International
595131	None	Not Required or Implemented for 2007 BC
595132	None	Not Required or Implemented for 2007 BC

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595133	None	Not Required or Implemented for 2007 BC
595134	None	Not Required or Implemented for 2007 BC
595135	None	Not Required or Implemented for 2007 BC
595136	None	Not Required or Implemented for 2007 BC
595137	595AHW	BC PROG, HAZARD OVERRIDE BRAKE
595138	None	Not Required or Implemented for 2007 BC
595139	None	Not Required or Implemented for 2007 BC
595140	None	Not Required or Implemented for 2007 BC
595141	None	Not Required or Implemented for 2007 BC
595142	None	Not Required or Implemented for 2007 BC
595143	595ADN	BC PROG, METRIC GAUGE
595144	None	Not Required or Implemented for 2007 BC
595145	595AEW	BC PROG, TRANS OIL TEMP
595146	595AEZ	BC PROG, AMMETER 150 AMP
595147	None	Not Required or Implemented for 2007 BC
595148	None	Not Required or Implemented for 2007 BC
595149	None	Not Required or Implemented for 2007 BC
595150	595ANP	BC PROG, BRAKE APPL GAUGE IN EGC/AGSP
595151	595AMY	BC PROG, SWITCH AUXILIARY In Center Panel, With 30 amp Fuse Circuit, Accessory Controlled
595152	None	Not Required or Implemented for 2007 BC
595153	595AAW	BC PROG, LOW ENGINE COOLANT
595154	None	Not Required or Implemented for 2007 BC
595157	595ALY	BC PROG, DRAIN VALVE {HUMPHERY}
595158	595AHL	BC PROG, TRANSFER CASE 2-SPD
595159	595ALZ	BC PROG, PRNDL Interlock for Column Shifter with Allison 1000 & 2000 Series
595160	595AHK	BC PROG, 2-SPD AXLE Parameter for Use With Manual Transmission
595161	595AHT	BC PROG, FOG LIGHTS OMIT DIAGNOSTICS
595162	595ALW	BC PROG, STOP/TURN/PARK/MARKER DIAGNOSTICS OMIT
595163	595ADV	BC PROG, PDL WARNING BUZZER
595164	595AEK	BC PROG, TRACTION CONTROL IND {Wabco ATC MUD/SNOW} With Traction Warning Light, for Full Power Hydraulic Brake or Air Brakes, Not Including Trailer

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595166	595ALC	BC PROG, 2-SPD AXLE Parameter for Use With Automatic Transmission
595167	595ANM	BC PROG, ENGINE DISPLAY for HDD Engines
595168	595AJE	BC PROG, WORK LHT DIAGNOSTICS OMIT
595169	None	Not Required or Implemented for 2007 BC
595170	595AJT	BC PROG, PTO MONITOR for Indicator and Alarm Connected to Remote Power Module
595171	595AJV	BC PROG, PTO SHIFT for Lectra Shift Control
595172	595AKJ	BC PROG, EXT ENGINE SPD CONT'L for single external control
595173	595AJK	BC PROG, AUXILIARY LOAD #1 for Rocker Switch
595174	595AJL	BC PROG, AUXILIARY LOAD for (2) Rocker Switches
595175	595AJM	BC PROG, AUXILIARY LOAD for (3) Rocker Switches
595176	None	Not Required or Implemented for 2007 BC
595177	None	Not Required or Implemented for 2007 BC
595178	595AKA	BC PROG, DUAL OUTPUT AUX #1 With Single Latched Switch
595179	595AJZ	BC PROG, PTO CONTROL LOGIC for Dash Switch
595180	595ALR	BC PROG, HYDRAULIC BRAKE SPLIT for Full Power System
595181	595AKB	BC PROG, INTERLOCK AUX LOAD #1
595182	595AKC	BC PROG, INTERLOCK AUX LOAD #2
595183	595AJN	BC PROG, AUXILIARY LOAD for (4) Rocker Switches
595184	595AHJ	BC PROG, TRANSMISSION RETARDER
595185	595AAX	BC PROG, THROTTLE SWITCH Pack On/Off
595186	595ALS	BC PROG, POWER PARK BRK SPLIT for Full Power System
595187	None	Not Required or Implemented for 2007 BC
595188	595AAH	BC PROG, LIGHTS ON W/WIPERS
595189	595AJP	BC PROG, AUXILIARY LOAD for (5) Rocker Switches
595190	595AJR	BC PROG, AUXILIARY LOAD for (6) Rocker Switches
595192	595ABE	BC PROG, FUEL TANK GAUGE Dual Left Side Draw
595193	595AJW	BC PROG, PTO SHIFT for Hydraulic Clutch or Pneumatic Non Clutch Engagement Accommodation
595194	None	Not Required or Implemented for 2007 BC
595195	None	Not Required or Implemented for 2007 BC
595196	595AKM	BC PROG, EXT ENGINE SPD CONT'L for Emergency Power Output and Utility Application
595197	595AMD	BC PROG, TAILGATE OPEN WARNING Light and Buzzer, for Use With Electronic Transmissins Only

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595198	595AKP	BC PROG, ALARM IN CAB With External Control
595199	None	Not Required or Implemented for 2007 BC
595200	595AKD	BC PROG, DUAL CONTL AUX LOAD#1
595201	595AKR	BC PROG, AERIAL BOOM WARNING Light and Buzzer
595202	595AKS	BC PROG, OUTRIGGER WARNING Light and Buzzer
595203	595AHU	BC PROG, ELECTRIC TRAILER BRAK
595204	None	Not Required or Implemented for 2007 BC
595206	595AHM	BC PROG, VANDAL LOCK WARNING
595207	None	Not Required or Implemented for 2007 BC
595208	595AER	BC PROG, TACHOMETER 4000 RPM
595209	None	Not Required or Implemented for 2007 BC
595210	595AGB	BC PROG, BUZZER EMERGENCY EXIT and Warning Light
595212	595AEX	BC PROG, CROSSING GATE DISABLE Switch Mounted in Panel
595213	595AGL	BC PROG, POST TRIP INSPECTION
595214	595AGP	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Steering Wheel Mounted (Sequential), Auto Activated Stop Arm and Crossing Gate Without Alarm
595215	595AGR	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Steering Wheel Mounted (Non-Sequential)
595218	595AGS	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, (Non-Sequential), Auto Activated Stop Arm and Crossing Gate Without Alarm
595219	595AMN	BC PROG, OVERRIDE DOOR/FLASH Switch, Mounted in Panel, for Red Pupil Warning Lights
595220	None	Not Required or Implemented for 2007 BC
595221	595AHN	BC PROG, INTERLOCK WHEELCHAIR With Indicator Light in Cluster
595222	None	Not Required or Implemented for 2007 BC
595223	595AKX	BC PROG, THROTTLE CRUISE Switches in 6 Pack
595224	595ALU	BC PROG, FOG LIGHTS Bus Only
595225	595AGT	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, (Sequential)
595227	595AYT	BC PROG, IP CONFIGURATION for Bus
595228	595AEV	BC PROG, PRNDL With 1000/2000 5 Speed Transmission With Power Park & Shifter Interlock
595229	None	Not Required or Implemented for 2007 BC
595230	595AMA	BC PROG, HAZARD LIGHTS "ON" With Pupil Warning Lights

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595231	595AZX	BC PROG, LOGIC BUILDER Prototype Enabler
595232	595AAA	BC PROG, BODY CONTROLLER
595233	None	Not Required or Implemented for 2007 BC
595234	None	Not Required or Implemented for 2007 BC
595235	None	Not Required or Implemented for 2007 BC
595238	595AKE	BC PROG, DUAL CONTL AUX LOAD#2
595239	595AKG	BC PROG, DUAL CONTL AUX LOAD#3
595240	595AKL	BC PROG, EXT ENGINE SPD CONT'L With Utility Application
595241	595AKK	BC PROG, EXT ENGINE SPD CONT'L for on Demand Engine Speed With Utility Application
595242	None	Not Required or Implemented for 2007 BC
595243	None	Not Required or Implemented for 2007 BC
595244	595AJY	BC PROG, PTO SHIFT With Pneumatic Engagement Mechanism for Clutch type Electric Over Air PTO
595245	595AKW	BC PROG, REMOTE START/STOP Without Emergency Pump Motor Functionality
595246	595AKV	BC PROG, REMOTE START/STOP With Emergency Pump Motor Functionality
595247	None	Not Required or Implemented for 2007 BC
595248	595AJU	BC PROG, PTO HOURMETER ENABLER Captures Hours PTO is Engaged and Displayed on LCD Cluster
595249	595AMP 595AMR	BC PROG, HEATED MIRRORS in Push Button Location A BC PROG, HEATED MIRRORS in Push Button Location B
595250	595ABR	BC PROG, WORK LIGHT Push Button B
595251	595AZZ	BC PROG, PARK / MARKER LIGHTS Dual Output, 20AMP
595252	595AJX	BC PROG, PTO SHIFT With Pneumatic Non Clutch Engagement Accommodation
595253	595AYC	BC PROG, WINDSHIELD WIPER Without Low Washer Fluid Indicator
595254	595ADW	BC PROG, MONITOR ENG OIL TEMP Through Body Controller
595255	595AMC	BC PROG, TAILGATE OPEN WARNING Light and Buzzer, for Use With Non-Electronic Transmissions Only
595256	None	Not Required or Implemented for 2007 BC
595259	595AHX	BC PROG, AIR SOLENOID MODULE #1
595260	595AHY	BC PROG, AIR SOLENOID MODULE #2
595261	595AHZ	BC PROG, AIR SOLENOID MODULE #3
595262	595AJA	BC PROG, AIR SOLENOID MODULE #4

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595263	595AKN	BC PROG, EXT ENGINE SPD CONT'L On Demand Engine Speed for Refuse
595265	595AJH	BC PROG, SWITCH AUXILIARY In Center Panel, With 40 amp Fuse Circuit, Accessory Controlled
595266	595AYN	BC PROG, PTO MONITOR for Indicator and Alarm Connected to Body Controller
595267	595AMZ	BC PROG, PTO SHIFT for Customer Provided PTO, Mounted on Dash, With Programmable Parameters for, Engagement, Disengagement, and Reengagement
595269	595ALA	BC PROG, TRANSFER CASE 2-SPD With Neutral Gear, for 6x6 or 4x4
595270	595AGU	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, With Override "RED" Light
595271	595AGE	BC PROG, SWITCH, DOOR CONTROL Steering Wheel Mounted
595272	595AGG	BC PROG, SWITCH, DOOR CONTROL Mounted in Panel
595273	595ACA	BC PROG, AIR SUSPENSION DUMP
595274	595AHH	BC PROG, TRANSFER CASE PTO
595275	595ALG	BC PROG, HEADLIGHTS W/DRL Active with Pupil Warning Lights or Engine Running with Park Brake Released
595276	595AEY	BC PROG, CROSSING GATE DISABLE Switch With Stop Arm Inhibit, Mounted in Panel
595277	595AJS	BC PROG, ADD AUX SWITCHES for (6) Rocker Switches
595278	595AME	BC PROG, AIR PRESSURE GAUGES Primary & Secondary, for Air Brake Chassis, for Bus Without Door Switch
595279	595AMG	BC PROG, AIR PRESSURE GAUGES for Hydraulic Chassis With Air Compressor, for Bus without Door Switch
595280	None	Not Required or Implemented for 2007 BC
595281	None	Not Required or Implemented for 2007 BC
595282	595AJG	BC PROG, REMOTE POWER MOD #4 With Latched Switches
595283	595AKH	BC PROG, DLB I/O EXPANSION Includes 2 Digital Inputs & 2 Relay Driver Outputs
595284	595ALJ	BC PROG, FUEL WARNING Low Fuel Warning Light and Audible Alarm Activated Separately so Warning Light is Activated Prior to Audible Alarm
595285	595ALH	BC PROG, DAYTIME RUN/LIGHT Non-Programmable;With Low Beams and Marker Lights on Full
595286	595AGV	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, (Non-Sequential), Manual Activated Stop Arm and Crossing Gate With Alarm
595287	595AYL	BC PROG, THROTTLE CRUISE Without Cruise in Switch Pack

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595288	595AJD	BC PROG, WIPERS W/SPD OVERRIDE Includes Hi, Lo and Intermittent Speeds Plus Washer Effects, Wiper Will be Forced to Slow Intermittent With Park Brake Set and Wiper Left On for a Pre-determined time
595289	None	Not Required or Implemented for 2007 BC
595291	595AGK	BC PROG, FUEL FILTER PLUGGED
595292	595AMB	BC PROG, TURN SIGNALS/BRAKE Hazard Lights, With Separate Stop and Turns
595293	595AGN 595AYM	BC PROG, LIFT GATE WIRING PAK Push Button B
595295	595AGM	BC PROG, WATER IN FUEL IND.
595296	595AZY	BC PROG, EXTERIOR LIGHT CHECK Push Button "B"; for MD, RH & SS
595297	595AKZ	BC PROG, AIR SOLENOID MODULE #5
595298	595AJJ	BC PROG, IP CLUSTER DISPLAY Omit Faults
595299	595AKT	BC PROG, TAILGATE OPEN WARNING Light and Buzzer
595300	595AJC	BC PROG, AIR SOLENOID MODULE #6
595301	595AKU	BC PROG, DUMP BODY UP WARNING Light and Buzzer
595302	None	Not Required or Implemented for 2007 BC
595303	None	Not Required or Implemented for 2007 BC
595304	None	Not Required or Implemented for 2007 BC
595306	595AEH	BC PROG, EXTERIOR LIGHT CHECK for Bus
595307	595AGH	BC PROG, SWITCH, DOOR CONTROL Mounted in Panel and Steering Wheel
595308	595AGJ	BC PROG, SWITCH, DOOR CONTROL for Manual Door Input Switch
595309	None	Not Required or Implemented for 2007 BC
595310	None	Not Required or Implemented for 2007 BC
595311	None	Not Required or Implemented for 2007 BC
595312	595AGW	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Steering Wheel Mounted Switch, (Sequential), With Door Deactivation, Auto Activated Stop Arm and Crossing Gate Without Alarm
595313	595AGX	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch 3 Position With (Sequential) Operation
595314	595AAH	BC PROG, LIGHTS ON W/WIPERS
595315	595AGA	BC PROG, BUZZER EMERGENCY EXIT Red Always Hot Override With Exit Buzzer
595316	595ANK	BC PROG, IP CENTER PANEL #1 Location, Reserved for Non-Multiplexed Functionality

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595317	595AEL	BC PROG, PRNDL With 1000/2000 5 SPD Transmission With Park Paw & Shifter Interlock
595318	595AGY	BC PROG, PUPIL WARNING LIGHTS Steering Wheel Mounted Switch, (Sequential) With Illinois Master Switch
595319	595AGZ	BC PROG, PUPIL WARNING LIGHTS Steering Wheel Mounted Switch, (Sequential) With Illinois Master Switch, With Door Deactivation
595320	None	Not Required or Implemented for 2007 BC
595321	595AYY	BC PROG, SNOW PLOW LIGHTS GEN 2, With Rocker Switch
595322	595AMX	BC PROG, ENGINE RAMP With Low Battery
595323	595AHP	BC PROG, INTERLOCK WHEELCHAIR With Transmission in Park, Indicator Light in Cluster, Bus Only
595324	595AMH	BC PROG, PRNDL W/1000/2000 5-SPD With Power Park and Lift Door BUS
595325	595AMJ	BC PROG, PRNDL 1000/2000 5-SPD With Park Pawl and Shifter Interlock With Lift Door Switch, for Bus
595326	595AHR	BC PROG, INTERLOCK WHEELCHAIR With Transmission in Park, Less Indicator Light in Cluster, Bus Only
595327	595AHS	BC PROG, INTERLOCK WHEELCHAIR Less Indicator Light in Cluster, Bus Only
595328	595AZV	BC PROG, PARK BRAKE ALARM
595330	595AMM	BC PROG, TRANSMISSION WARN IND for 1000,2000, 3000, & 4000
595331	595AND	BC PROG, ECONOMY MODE LIGHT 95 for Allison Transmissions
595332	595ANC	BC PROG, RANGE INHIBITED WARN Light, for 1000, 2000, 3000 & 4000 Allison Gen 4 Transmission
595333	595AZU	BC PROG, INVERTER ON In Cab Multiplex Switch enables 3kw Inverter
595334	595AYU	BC PROG, THEFT DETERRENT SYS to Read a Combination Code From a 6-Pack and Send TSC1 Messages to Limit Engine Speed if an Incorrect Code is Entered
595336	595ADL	BC PROG, HVAC In Cab
595337	595AZS	BC PROG, ADVANCED LOGIC DLB for Service and Engineering Changes on Bus Only Not to be infused on any vehicle (DO NOT INFUSE)
595338	595AZM	BC PROG, POST TRIP INSPECTION With Snooze
595339	595ANA	BC PROG, ENGINE RAMP With A/C on
595341	None	Not Required or Implemented for 2007 BC
595342	None	Not Required or Implemented for 2007 BC

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
595343	595AZN	
595344	595ANY	BC PROG, INTERLOCK WHEELCHAIR Less Indicator Light in Cluster, for Cutaway Bus Chassis
595345	595AZR	
595346	595AZW	
595347	None	Not Required or Implemented for 2007 BC
595348	595AYV	BC PROG, XFER CASE STATUS To TCM; for Allison Gen 4 Transmissions
595351	595AZJ	BC PROG, MAX SPEED PARAMETER for PWL; Set at 80 mph, With Bus Models with Steering Wheel Control Pupil Warning lights.
None	595ADA	BC PROG, BRAKE APPL GAUGE IN Prostar Secondary Gauge Cluster
None	595ADB	BC PROG, TRAILER AUX CIRCUIT Accessory Powered
None	595ADC	BC PROG, TRAILER AUX CIRCUIT Battery Powered
None	595ADD	BC PROG, TRANSMISSION PTO Single
None	595ADG	BC PROG, FUEL HEATER Will be Activated by BC
None	595ADH	BC PROG, COMPASS DISPLAY
None	595ADS	BC PROG, PRNDL Gear Display Eaton
None	595ADT	BC PROG, PRNDL Gear Display Freedomline
None	595ADU	BC PROG, INTERIOR FLOOR LIGHTS in Cab
None	595AEA	BC PROG, ROLL STABILITY PROG
None	595AEB	BC PROG, TRANSMISSION PTO Dual PTO
None	595AEC	BC PROG, ELECT LOAD W/ICON SYS
None	595AED	BC PROG, BRAKE WARN INDICATOR Light and Audible Alarm; Parking Brake/Motion Warning System for Engaged Parking Brake
None	595AEE	BC PROG, COLLISION AVOIDANCE Requires Input From the Right Turn Signal.
None	595AEG	BC PROG, SKIRT LIGHTS Customer Supplied
None	595BAA	BC PROG, AIR POWER HYD PARK
None	595BAB	BC PROG, ENGINE FAN DRIVE {Borg-Warner} Variable Speed
None	595BAC	BC PROG, PRNDL With 1000/2000 5 Speed Transmission With Power Park & Arens Shifter
None	595AAE	BC PROG, WINDSHIELD WIPER
None	595AAG	BC PROG, HEADLIGHTS W/DRL With Auto
None	595AAJ	BC PROG, HEADLIGHT REMINDER
None	595AAM	BC PROG, PARK / MARKER LIGHTS
None	595AAN	BC PROG, MARKER INTERRUPT SW Located in Steering Wheel

Table 166 595 Feature Codes Sorted by Pre-2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
None	595AAR	BC PROG, INTERIOR DOME LIGHTS in Cab
None	595AAS	BC PROG, INTERIOR DOME LIGHTS in Sleeper
None	595AAT	BC PROG, INTERIOR FLOOR LIGHTS in Sleeper
None	595AAU	BC PROG, HEATED MIRRORS Rocker Switch, Aftermarket Only
None	595ABM	BC PROG, TACHOMETER 2500 RPM
None	595ABS	BC PROG, WORKLIGHT ON W/BACKUP
None	595ABT	BC PROG, REMOTE for Worklights
None	595ABU	BC PROG, REMOTE for Trailer Auxiliary Circuit Battery Powered
None	595ABX	BC PROG, EXTERIOR LIGHT CHECK for ProStar
None	595ACC	BC PROG, AXLE TEMP GAUGE Dual
None	595ACD	BC PROG, AXLE TEMP GAUGE Single
None	595ACE	BC PROG, FOG LIGHTS Rocker Switch
None	595ACG	BC PROG, OUTSIDE TEMP MONITOR
None	595ACL	BC PROG, ELECTRICAL LOAD CONTL
None	595ACM	BC PROG, ENGINE COMPRESSION BR Located in Steering Wheel
None	595ACN	BC PROG, AIR HORN Analog Input
None	595ACP	BC PROG, FIFTH WHEEL UNLOCK
None	595ACR	BC PROG, FRT AXLE LOAD MONITOR
None	595ACS	BC PROG, RR AXLE LOAD MONITOR
None	595ACT	BC PROG, LOCKING DIFFERENTIAL Includes Two Switches one for each Differential
None	595ACV	BC PROG, ENGINE AIR MONITOR
None	595ACX	BC PROG, INTAKE MANIFOLD PRESS
None	595ADJ	BC PROG, REMOTE START/STOP In Bunk
None	595ADM	BC PROG, HVAC In Sleeper
None	595ADY	BC PROG, TRANS OIL TEMP Through Body
None	595ANR	BC PROG, PARK BRAKE RELAY
None	595ANS	BC PROG, MAX. ENGINE OIL TEMP Before the Warn Indicator Light is Activated
None	595ANT	BC PROG, IDLE MANAGEMENT SYS for Cummins ICON, W/Freedomline Xmsns, Cruise Control State Must be Maintained Across Key Cycles Instead of Resetting
None	595ANU	BC PROG, ENGINE IDLE Increment/Decrement to allow idle adjust on Cummins or IBB Engines
None	595ANV	BC PROG, DIAGNOSTICS LOCATION No On Board Display

Table 166 595 Feature Codes Sorted by Pre–2007 Feature Code Number (cont.)

BC 595Code	2007 BC 595Code	Feature Description
None	595ANW	BC PROG, DIAGNOSTICS LOCATION Display in Gauge Cluster
None	595ANX	BC PROG, DIAGNOSTICS LOCATION In VID
None	595ANZ	BC PROG, IDLE MANAGEMENT SYS for Cummins ICON, N/Freedomline Xmsns, Cruise Control State Must be Maintained Across Key Cycles Instead of Resetting
None	595AXY	BC PROG, FUEL TANK GAUGE Dual Right Side Draw
None	595AYE	BC PROG, IP CONFIGURATION for ProStar
None	595AYG	BC PROG, ENGINE TYPE MFG International HDD
None	595AYH	BC PROG, ENGINE FAN DRIVE Variable Speed
None	595AYJ	BC PROG, CRUSE CONT'L STEER WH ON/OFF, With Diagnosable Switches
None	595AYM	BC PROG, LIFT GATE WIRING PAK Rocker Position
None	595AYR	BC PROG, ECONOMY MODE SWITCH
None	595AYW	BC PROG, EXHAUST CLOGGED IND. Indicator for Clogged Diesel Particulate Filter in Aftertreatment
None	595AYX	BC PROG, EXHAUST HIGH TEMP Indicator for High Exhaust Temperatures (Aftertreatment)
None	595AYZ	BC PROG, INHIBIT REGEN SWITCH Latched (TWO POSITION, BI-STABLE)
None	595AZA	BC PROG, INHIBIT REGEN SWITCH Momentary (THREE POSITION, CENTER-STABLE)
None	595AZB	BC PROG, ENGINE COMPRESSION BR With Programmable Levels; Uses On/Off Switch in Steering Wheel and 1/2/3 Switch in Switchpack
None	595AZC	BC PROG, ENGINE COMPRESSION BR With Programmable Levels; Located in Switch Pack
None	595AZD	BC PROG, ENGINE COMPRESSION BR With Variable & Programmable Levels; Located in Switch Pack
None	595AZE	BC PROG, EXHAUST TEMP LIGHT Indicator Light in IP; for High Exhaust Temperatures (Aftertreatment) for ProStar.
None	595AZG	BC PROG, EXHAUST CLOGGED IND. Indicator Light in IP; for Clogged Diesel Particulate Filter In Aftertreatment, for ProStar
None	595AZH	BC PROG, PARKED REGEN SWITCH for Aftertreatment
None	595AZK	BC PROG, FRT AXLE LOAD MONITOR Meets SAE Standard, Forward Axle
None	595AZL	BC PROG, RR AXLE LOAD MONITOR Meets SAE Standards, for Rear Axle
	595AMU	BC PROG, WORK LIGHT Rocker Switch

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number

2007 BC 595Code	ESC 595Code	Feature Description
All denotes 2000, 4000, 7000, 8000, Bus and Prostar Models		
595ANL	514011	BC PROG, RR AXLE SWITCH CON'T With Dash Mounted HI/LOW switch
595AAA	595232	BC PROG, BODY CONTROLLER
595AAC	595031	BC PROG, KEY STATE
595AAD	595015	BC PROG, BRAKE SWITCH
595AAE	None	BC PROG, WINDSHIELD WIPER
595AAG	None	BC PROG, HEADLIGHTS W/DRL With Auto
595AAH	595188	BC PROG, LIGHTS ON W/WIPERS
595AAH	595314	BC PROG, LIGHTS ON W/WIPERS
595AAJ	None	BC PROG, HEADLIGHT REMINDER
595AAK	595106	BC PROG, DRL OMIT
595AAL	595021	BC PROG, TURN SIGNALS/BRAKE With Combined Stop and Turns
595AAM	None	BC PROG, PARK / MARKER LIGHTS
595AAN	None	BC PROG, MARKER INTERRUPT SW Located in Steering Wheel
595AAP	595083	BC PROG, CRUISE CONT'L STEER WH
595AAR	None	BC PROG, INTERIOR DOME LIGHTS in Cab
595AAS	None	BC PROG, INTERIOR DOME LIGHTS in Sleeper
595AAT	None	BC PROG, INTERIOR FLOOR LIGHTS in Sleeper
595AAU	None	BC PROG, HEATED MIRRORS Rocker Switch, Aftermarket Only
595AAV	595023	BC PROG, HORN ELECTRIC
595AAW	595153	BC PROG, LOW ENGINE COOLANT
595AAX	595185	BC PROG, THROTTLE SWITCH Pack On/Off
595AAZ	595014	BC PROG, PARK BRAKE INDICATOR
595ABA	595063	BC PROG, SEATBELT INDICATOR
595ABB	595008	BC PROG, AIR PRESSURE GAUGES
595ABC	595030	BC PROG, TRAILER LIGHTING
595ABD	595052	BC PROG, FUEL TANK GAUGE Single Right Side
595ABE	595192	BC PROG, FUEL TANK GAUGE Dual Left Side Draw
595ABG	595130	BC PROG, ENGINE TYPE MFG International
595ABH	595126	BC PROG, ENGINE TYPE MFG Caterpillar
595ABJ	595127	BC PROG, ENGINE TYPE MFG Cummins
595ABK	595067	BC PROG, ENGINE COOLANT TEMP

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595ABL	595066	BC PROG, ENGINE OIL PRESS GAUG
595ABM	None	BC PROG, TACHOMETER 2500 RPM
595ABN	595069	BC PROG, SPEEDOMETER
595ABP	595061	BC PROG, VOLTMETER
595ABR	595250	BC PROG, WORK LIGHT Push Button B
595ABS	None	BC PROG, WORKLIGHT ON W/BACKUP
595ABT	None	BC PROG, REMOTE for Worklights
595ABU	None	BC PROG, REMOTE for Trailer Auxiliary Circuit Battery Powered
595ABV	595009	BC PROG, ABS INDICATOR for Full Power Hydraulic OR Air Brake Systems, Not Including Trailer
595ABW	595012	BC PROG, TRAILER ABS INDICATOR
595ABX	None	BC PROG, EXTERIOR LIGHT CHECK for ProStar
595ABY	595107	BC PROG, POWER WINDOW/DOOR LOC With 2 Doors
595ABZ	595129	BC PROG, KEYLESS ENTRY REMOTE
595ACA	595273	BC PROG, AIR SUSPENSION DUMP
595ACB	595011	BC PROG, TRACTION CONTROL IND {Bendix ATC Off Road} With Traction Warning Light, for Air Brakes
595ACC	None	BC PROG, AXLE TEMP GAUGE Dual
595ACD	None	BC PROG, AXLE TEMP GAUGE Single
595ACE	595019	BC PROG, FOG LIGHTS Rocker Switch
595ACE	None	BC PROG, FOG LIGHTS Rocker Switch
595ACG	None	BC PROG, OUTSIDE TEMP MONITOR
595ACL	None	BC PROG, ELECTRICAL LOAD CONTL
595ACM	None	BC PROG, ENGINE COMPRESSION BR Located in Steering Wheel
595ACN	None	BC PROG, AIR HORN Analog Input
595ACP	None	BC PROG, FIFTH WHEEL UNLOCK
595ACR	None	BC PROG, FRT AXLE LOAD MONITOR
595ACS	None	BC PROG, RR AXLE LOAD MONITOR
595ACT	None	BC PROG, LOCKING DIFFERENTIAL Includes Two Switches one for each Differential
595ACU	595040	BC PROG, LOCKING DIFFERENTIAL for Single & Dual With Single Switch
595ACV	None	BC PROG, ENGINE AIR MONITOR
595ACW	595051	BC PROG, ENGINE FAN OVERRIDE Includes Manual Switch for Automatic Manual Fan Control

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595ACX	None	BC PROG, INTAKE MANIFOLD PRESS
595ACY	595033	BC PROG, FIFTH WHEEL SLIDE
595ACZ	595041	BC PROG, POWER DIVIDER LOCK
595ADA	None	BC PROG, BRAKE APPL GAUGE IN Prostar Secondary Gauge Cluster
595ADB	None	BC PROG, TRAILER AUX CIRCUIT Accessory Powered
595ADC	None	BC PROG, TRAILER AUX CIRCUIT Battery Powered
595ADD	None	BC PROG, TRANSMISSION PTO Single
595ADG	None	BC PROG, FUEL HEATER Will be Activated by BC
595ADH	None	BC PROG, COMPASS DISPLAY
595ADJ	None	BC PROG, REMOTE START/STOP In Bunk
595ADK	595100	BC PROG, AIR SHIELD LIGHTING
595ADL	595336	BC PROG, HVAC In Cab
595ADM	None	BC PROG, HVAC In Sleeper
595ADN	595143	BC PROG, METRIC GAUGE
595ADP	595037	BC PROG, CLUTCH SWITCH
595ADR	595112	BC PROG, PRNDL No PRNDL, Manual Transmission
595ADS	None	BC PROG, PRNDL Gear Display Eaton
595ADT	None	BC PROG, PRNDL Gear Display Freedomline
595ADU	None	BC PROG, INTERIOR FLOOR LIGHTS in Cab
595ADV	595163	BC PROG, PDL WARNING BUZZER
595ADW	595254	BC PROG, MONITOR ENG OIL TEMP Through Body Controller
595ADX	595097	BC PROG, MONITOR ENG OIL TEMP Through ECM
595ADY	None	BC PROG, TRANS OIL TEMP Through Body
595ADZ	595060	BC PROG, TRANS OIL TEMP Through TCM
595AEA	None	BC PROG, ROLL STABILITY PROG
595AEB	None	BC PROG, TRANSMISSION PTO Dual PTO
595AEC	None	BC PROG, ELECT LOAD W/ICON SYS
595AED	None	BC PROG, BRAKE WARN INDICATOR Light and Audible Alarm; Parking Brake/Motion Warning System for Engaged Parking Brake
595AEE	None	BC PROG, COLLISION AVOIDANCE Requires Input From the Right Turn Signal.
595AEG	None	BC PROG, SKIRT LIGHTS Customer Supplied
595AEH	595306	BC PROG, EXTERIOR LIGHT CHECK for Bus
595AEJ	595108	BC PROG, POWER WINDOW/DOOR LOC With 4 Doors

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595AEK	595164	BC PROG, TRACTION CONTROL IND {Wabco ATC MUD/SNOW} With Traction Warning Light, for Full Power Hydraulic Brake or Air Brakes, Not Including Trailer
595AEL	595113	BC PROG, PRNDL With 1000/2000 5 SPD Transmission With Park Paw & Shifter Interlock
595AEL	595317	BC PROG, PRNDL With 1000/2000 5 SPD Transmission With Park Paw & Shifter Interlock
595AEP	595007	BC PROG, AIR PRESSURE GAUGES Auxiliary
595AER	595208	BC PROG, TACHOMETER 4000 RPM
595AET	595114	BC PROG, PRNDL With 1000/2000 5 Speed Transmission not With Power Park or Park Pawl
595AEU	595116	BC PROG, PRNDL With 3000/4000 5 & 6 Speed Transmission
595AEV	595115	BC PROG, PRNDL With 1000/2000 5 Speed Transmission With Power Park & Shifter Interlock
595AEV	595228	BC PROG, PRNDL With 1000/2000 5 Speed Transmission With Power Park & Shifter Interlock
595AEW	595145	BC PROG, TRANS OIL TEMP
595AEX	595212	BC PROG, CROSSING GATE DISABLE Switch Mounted in Panel
595AEY	595276	BC PROG, CROSSING GATE DISABLE Switch With Stop Arm Inhibit, Mounted in Panel
595AEZ	595146	BC PROG, AMMETER 150 AMP
595AGA	595315	BC PROG, BUZZER EMERGENCY EXIT Red Always Hot Override With Exit Buzzer
595AGB	595210	BC PROG, BUZZER EMERGENCY EXIT and Warning Light
595AGC	595016	BC PROG, ENGINE EXHAUST BRAKE
595AGE	595271	BC PROG, SWITCH, DOOR CONTROL Steering Wheel Mounted
595AGG	595272	BC PROG, SWITCH, DOOR CONTROL Mounted in Panel
595AGH	595307	BC PROG, SWITCH, DOOR CONTROL Mounted in Panel and Steering Wheel
595AGJ	595308	BC PROG, SWITCH, DOOR CONTROL for Manual Door Input Switch
595AGK	595291	BC PROG, FUEL FILTER PLUGGED
595AGL	595213	BC PROG, POST TRIP INSPECTION
595AGM	595295	BC PROG, WATER IN FUEL IND.
595AGN 595AYM	595293	BC PROG, LIFT GATE WIRING PAK Push Button B
595AGP	595214	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Steering Wheel Mounted (Sequential), Auto Activated Stop Arm and Crossing Gate Without Alarm

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595AGR	595215	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Steering Wheel Mounted (Non-Sequential)
595AGS	595218	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, (Non-Sequential), Auto Activated Stop Arm and Crossing Gate Without Alarm
595AGT	595225	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, (Sequential)
595AGU	595270	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, With Override "RED" Light
595AGV	595286	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch, (Non-Sequential), Manual Activated Stop Arm and Crossing Gate With Alarm
595AGW	595312	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Steering Wheel Mounted Switch, (Sequential), With Door Deactivation, Auto Activated Stop Arm and Crossing Gate Without Alarm
595AGX	595313	BC PROG, PUPIL WARNING LIGHTS 8 Lamps, Panel Mounted Switch 3 Position With (Sequential) Operation
595AGY	595318	BC PROG, PUPIL WARNING LIGHTS Steering Wheel Mounted Switch, (Sequential) With Illinois Master Switch
595AGZ	595319	BC PROG, PUPIL WARNING LIGHTS Steering Wheel Mounted Switch, (Sequential) With Illinois Master Switch, With Door Deactivation
595AHA	595034	BC PROG, REMOTE ENGINE SPEED
595AHB	595119	BC PROG, REMOTE POWER MOD #4
595AHC	595120	BC PROG, REMOTE POWER MOD #7
595AHD	595121	BC PROG, REMOTE POWER MOD #2
595AHE	595032	BC PROG, REMOTE POWER MOD #1
595AHG	595122	BC PROG, SINGLE SPD XFER CASE
595AHH	595274	BC PROG, TRANSFER CASE PTO
595AHJ	595184	BC PROG, TRANSMISSION RETARDER
595AHK	595160	BC PROG, 2-SPD AXLE Parameter for Use With Manual Transmission
595AHL	595158	BC PROG, TRANSFER CASE 2-SPD
595AHM	595206	BC PROG, VANDAL LOCK WARNING
595AHN	595221	BC PROG, INTERLOCK WHEELCHAIR With Indicator Light in Cluster
595AHP	595323	BC PROG, INTERLOCK WHEELCHAIR With Transmission in Park, Indicator Light in Cluster, Bus Only
595AHR	595326	BC PROG, INTERLOCK WHEELCHAIR With Transmission in Park, Less Indicator Light in Cluster, Bus Only

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595AHS	595327	BC PROG, INTERLOCK WHEELCHAIR Less Indicator Light in Cluster, Bus Only
595AHT	595161	BC PROG, FOG LIGHTS OMIT DIAGNOSTICS
595AHU	595203	BC PROG, ELECTRIC TRAILER BRAK
595AHW	595137	BC PROG, HAZARD OVERRIDE BRAKE
595AHX	595259	BC PROG, AIR SOLENOID MODULE #1
595AHY	595260	BC PROG, AIR SOLENOID MODULE #2
595AHZ	595261	BC PROG, AIR SOLENOID MODULE #3
595AJA	595262	BC PROG, AIR SOLENOID MODULE #4
595AJC	595300	BC PROG, AIR SOLENOID MODULE #6
595AJD	595288	BC PROG, WIPERS W/SPD OVERRIDE Includes Hi, Lo and Intermittent Speeds Plus Washer Effects, Wiper Will be Forced to Slow Intermittent With Park Brake Set and Wiper Left On for a Pre-determined time
595AJE	595168	BC PROG, WORK LHT DIAGNOSTICS OMIT
595AJG	595282	BC PROG, REMOTE POWER MOD #4 With Latched Switches
595AJH	595265	BC PROG, SWITCH AUXILIARY In Center Panel, With 40 amp Fuse Circuit, Accessory Controlled
595AJJ	595298	BC PROG, IP CLUSTER DISPLAY Omit Faults
595AJK	595173	BC PROG, AUXILIARY LOAD #1 for Rocker Switch
595AJL	595174	BC PROG, AUXILIARY LOAD for (2) Rocker Switches
595AJM	595175	BC PROG, AUXILIARY LOAD for (3) Rocker Switches
595AJN	595183	BC PROG, AUXILIARY LOAD for (4) Rocker Switches
595AJP	595189	BC PROG, AUXILIARY LOAD for (5) Rocker Switches
595AJR	595190	BC PROG, AUXILIARY LOAD for (6) Rocker Switches
595AJS	595277	BC PROG, ADD AUX SWITCHES for (6) Rocker Switches
595AJT	595170	BC PROG, PTO MONITOR for Indicator and Alarm Connected to Remote Power Module
595AJU	595248	BC PROG, PTO HOURMETER ENABLER Captures Hours PTO is Engaged and Displayed on LCD Cluster
595AJV	595171	BC PROG, PTO SHIFT for Lectra Shift Control
595AJW	595193	BC PROG, PTO SHIFT for Hydraulic Clutch or Pneumatic Non Clutch Engagement Accommodation
595AJX	595252	BC PROG, PTO SHIFT With Pneumatic Non Clutch Engagement Accommodation
595AJY	595244	BC PROG, PTO SHIFT With Pneumatic Engagement Mechanism for Clutch type Electric Over Air PTO

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595AJZ	595179	BC PROG, PTO CONTROL LOGIC for Dash Switch
595AKA	595178	BC PROG, DUAL OUTPUT AUX #1 With Single Latched Switch
595AKB	595181	BC PROG, INTERLOCK AUX LOAD #1
595AKC	595182	BC PROG, INTERLOCK AUX LOAD #2
595AKD	595200	BC PROG, DUAL CONTL AUX LOAD#1
595AKE	595238	BC PROG, DUAL CONTL AUX LOAD#2
595AKG	595239	BC PROG, DUAL CONTL AUX LOAD#3
595AKH	595283	BC PROG, DLB I/O EXPANSION Includes 2 Digital Inputs & 2 Relay Driver Outputs
595AKJ	595172	BC PROG, EXT ENGINE SPD CONT'L for single external control
595AKK	595241	BC PROG, EXT ENGINE SPD CONT'L for on Demand Engine Speed With Utility Application
595AKL	595240	BC PROG, EXT ENGINE SPD CONT'L With Utility Application
595AKM	595196	BC PROG, EXT ENGINE SPD CONT'L for Emergency Power Output and Utility Application
595AKN	595263	BC PROG, EXT ENGINE SPD CONT'L On Demand Engine Speed for Refuse
595AKP	595198	BC PROG, ALARM IN CAB With External Control
595AKR	595201	BC PROG, AERIAL BOOM WARNING Light and Buzzer
595AKS	595202	BC PROG, OUTRIGGER WARNING Light and Buzzer
595AKT	595299	BC PROG, TAILGATE OPEN WARNING Light and Buzzer
595AKU	595301	BC PROG, DUMP BODY UP WARNING Light and Buzzer
595AKV	595246	BC PROG, REMOTE START/STOP With Emergency Pump Motor Functionality
595AKW	595245	BC PROG, REMOTE START/STOP Without Emergency Pump Motor Functionality
595AKX	595223	BC PROG, THROTTLE CRUISE Switches in 6 Pack
595AKY	595024	BC PROG, DOME LIGHTS
595AKZ	595297	BC PROG, AIR SOLENOID MODULE #5
595ALA	595269	BC PROG, TRANSFER CASE 2-SPD With Neutral Gear, for 6x6 or 4x4
595ALB	595018	BC PROG, HEADLIGHTS W/DRL Less Auto
595ALC	595166	BC PROG, 2-SPD AXLE Parameter for Use With Automatic Transmission
595ALD	595022	BC PROG, AIR HORN Digital Input
595ALE	595047	BC PROG, POWER WINDOW/DOOR LOC With 1 Door

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595ALG	595275	BC PROG, HEADLIGHTS W/DRL Active with Pupil Warning Lights or Engine Running with Park Brake Released
595ALH	595285	BC PROG, DAYTIME RUN/LIGHT Non-Programmable;With Low Beams and Marker Lights on Full
595ALJ	595284	BC PROG, FUEL WARNING Low Fuel Warning Light and Audible Alarm Activated Separately so Warning Light is Activated Prior to Audible Alarm
595ALK	595125	BC PROG, AUXILIARY TRANS
595ALN	595039	BC PROG, RR AXLE SHIFT CONTROL Without Dash Mounted HI/LOW switch
595ALR	595180	BC PROG, HYDRAULIC BRAKE SPLIT for Full Power System
595ALS	595186	BC PROG, POWER PARK BRK SPLIT for Full Power System
595ALU	595224	BC PROG, FOG LIGHTS Bus Only
595ALV	595118	BC PROG, HEATER DIAGNOSTICS
595ALW	595162	BC PROG, STOP/TURN/PARK/MARKER DIAGNOSTICS OMIT
595ALX	595092	BC PROG, WAIT TO START IND.
595ALY	595157	BC PROG, DRAIN VALVE {HUMPHERY}
595ALZ	595159	BC PROG, PRNDL Interlock for Column Shifter with Allison 1000 & 2000 Series
595AMA	595230	BC PROG, HAZARD LIGHTS "ON" With Pupil Warning Lights
595AMB	595292	BC PROG, TURN SIGNALS/BRAKE Hazard Lights, With Separate Stop and Turns
595AMC	595255	BC PROG, TAILGATE OPEN WARNING Light and Buzzer, for Use With Non-Electronic Transmissions Only
595AMD	595197	BC PROG, TAILGATE OPEN WARNING Light and Buzzer, for Use With Electronic Transmissins Only
595AME	595278	BC PROG, AIR PRESSURE GAUGES Primary & Secondary, for Air Brake Chassis, for Bus Without Door Switch
595AMG	595279	BC PROG, AIR PRESSURE GAUGES for Hydraulic Chassis With Air Compressor, for Bus without Door Switch
595AMH	595324	BC PROG, PRNDL W/1000/2000 5-SPD With Power Park and Lift Door BUS
595AMJ	595325	BC PROG, PRNDL 1000/2000 5-SPD With Park Pawl and Shifter Interlock With Lift Door Switch, for Bus
595AMM	595330	BC PROG, TRANSMISSION WARN IND for 1000,2000, 3000, & 4000
595AMN	595219	BC PROG, OVERRIDE DOOR/FLASH Switch, Mounted in Panel, for Red Pupil Warning Lights

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595AMP 595AMR	595249	BC PROG, HEATED MIRRORS in Push Button Location A BC PROG, HEATED MIRRORS in Push Button Location B
595AMS	595019	BC PROG, FOG LIGHTS Push Button Location A
595AMT	595019	BC PROG, FOG LIGHTS Push Button Location B
595AMU		BC PROG, WORK LIGHT Rocker Switch
595AMV 595AMW 595AYY	595099	BC PROG, SNOW PLOW LIGHTS Push Button Location A BC PROG, SNOW PLOW LIGHTS Push Button Location B
595AMX	595322	BC PROG, ENGINE RAMP With Low Battery
595AMY	595151	BC PROG, SWITCH AUXILIARY In Center Panel, With 30 amp Fuse Circuit, Accessory Controlled
595AMZ	595267	BC PROG, PTO SHIFT for Customer Provided PTO, Mounted on Dash, With Programmable Parameters for, Engagement, Disengagement, and Reengagement
595ANA	595339	BC PROG, ENGINE RAMP With A/C on
595ANB	595111	BC PROG, MARKER INTERRUPT SW Located in Switch Pack
595ANC	595332	BC PROG, RANGE INHIBITED WARN Light, for 1000, 2000, 3000 & 4000 Allison Gen 4 Transmission
595AND	595331	BC PROG, ECONOMY MODE LIGHT 95 for Allison Transmissions
595ANE	595017	BC PROG, ENGINE COMPRESSION BR Located in Switch Pack
595ANG	595091	BC PROG, RETARD OVER HEAT WARN Light
595ANK	595316	BC PROG, IP CENTER PANEL #1 Location, Reserved for Non-Multiplexed Functionality
595ANM	595167	BC PROG, ENGINE DISPLAY for HDD Engines
595ANN	595110	BC PROG, STOP RELAY Active With Brake Lights
595ANP	595075	BC PROG, BRAKE APPL GAUGE IN EGC/AGSP
595ANP	595150	BC PROG, BRAKE APPL GAUGE IN EGC/AGSP
595ANR	None	BC PROG, PARK BRAKE RELAY
595ANS	None	BC PROG, MAX. ENGINE OIL TEMP Before the Warn Indicator Light is Activated
595ANT	None	BC PROG, IDLE MANAGEMENT SYS for Cummins ICON, W/Freedomline Xmsns, Cruise Control State Must be Maintained Across Key Cycles Instead of Resetting
595ANU	None	BC PROG, ENGINE IDLE Increment/Decrement to allow idle adjust on Cummins or IBB Engines
595ANV	None	BC PROG, DIAGNOSTICS LOCATION No On Board Display
595ANW	None	BC PROG, DIAGNOSTICS LOCATION Display in Gauge Cluster
595ANX	None	BC PROG, DIAGNOSTICS LOCATION In VID

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595ANY	595344	BC PROG, INTERLOCK WHEELCHAIR Less Indicator Light in Cluster, for Cutaway Bus Chassis
595ANZ	None	BC PROG, IDLE MANAGEMENT SYS for Cummins ICON, N/Freedomline Xmsns, Cruise Control State Must be Maintained Across Key Cycles Instead of Resetting
595AXY	None	BC PROG, FUEL TANK GAUGE Dual Right Side Draw
595AYA	595086	BC PROG, AXLE TEMP GAUGE Dual
595AYB	595087	BC PROG, AXLE TEMP GAUGE Single, for SS & Medium
595AYC	595253	BC PROG, WINDSHIELD WIPER Without Low Washer Fluid Indicator
595AYD	595048	BC PROG, LOW WASHER FLUID IND.
595AYE	None	BC PROG, IP CONFIGURATION for ProStar
595AYG	None	BC PROG, ENGINE TYPE MFG International HDD
595AYH	None	BC PROG, ENGINE FAN DRIVE Variable Speed
595AYJ	None	BC PROG, CRUSE CONT'L STEER WH ON/OFF, With Diagnosable Switches
595AYK	595093	BC PROG, FRONT AIR SUSPENSION
595AYL	595287	BC PROG, THROTTLE CRUISE Without Cruise in Switch Pack
595AYM	None	BC PROG, LIFT GATE WIRING PAK Rocker Position
595AYN	595266	BC PROG, PTO MONITOR for Indicator and Alarm Connected to Body Controller
595AYP	595038	BC PROG, AUTO NEUTRAL
595AYR	None	BC PROG, ECONOMY MODE SWITCH
595AYS	595105	BC PROG, IP CONFIGURATION for MD, RH, & SS
595AYT	595227	BC PROG, IP CONFIGURATION for Bus
595AYU	595334	BC PROG, THEFT DETERRENT SYS to Read a Combination Code From a 6-Pack and Send TSC1 Messages to Limit Engine Speed if an Incorrect Code is Entered
595AYV	595348	BC PROG, XFER CASE STATUS To TCM; for Allison Gen 4 Transmissions
595AYW	None	BC PROG, EXHAUST CLOGGED IND. Indicator for Clogged Diesel Particulate Filter in Aftertreatment
595AYX	None	BC PROG, EXHAUST HIGH TEMP Indicator for High Exhaust Temperatures (Aftertreatment)
595AYY	595321	BC PROG, SNOW PLOW LIGHTS GEN 2, With Rocker Switch
595AYZ	None	BC PROG, INHIBIT REGEN SWITCH Latched (TWO POSITION, BI-STABLE)

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
595AZA	None	BC PROG, INHIBIT REGEN SWITCH Momentary (THREE POSITION, CENTER-STABLE)
595AZB	None	BC PROG, ENGINE COMPRESSION BR With Programmable Levels; Uses On/Off Switch in Steering Wheel and 1/2/3 Switch in Switchpack
595AZC	None	BC PROG, ENGINE COMPRESSION BR With Programmable Levels; Located in Switch Pack
595AZD	None	BC PROG, ENGINE COMPRESSION BR With Variable & Programmable Levels; Located in Switch Pack
595AZE	None	BC PROG, EXHAUST TEMP LIGHT Indicator Light in IP; for High Exhaust Temperatures (Aftertreatment) for ProStar.
595AZG	None	BC PROG, EXHAUST CLOGGED IND. Indicator Light in IP; for Clogged Diesel Particulate Filter In Aftertreatment, for ProStar
595AZH	None	BC PROG, PARKED REGEN SWITCH for Aftertreatment
595AZJ	595351	BC PROG, MAX SPEED PARAMETER for PWL; Set at 80 mph, With Bus Models with Steering Wheel Control Pupil Warning lights.
595AZK	None	BC PROG, FRT AXLE LOAD MONITOR Meets SAE Standard, Forward Axle
595AZL	None	BC PROG, RR AXLE LOAD MONITOR Meets SAE Standards, for Rear Axle
595AZM	595338	BC PROG, POST TRIP INSPECTION With Snooze
595AZN	595343	
595AZR	595345	
595AZS	595337	BC PROG, ADVANCED LOGIC DLB for Service and Engineering Changes on Bus Only Not to be infused on any vehicle (DO NOT INFUSE)
595AZU	595333	BC PROG, INVERTER ON In Cab Multiplex Switch enables 3kw Inverter
595AZV	595328	BC PROG, PARK BRAKE ALARM
595AZW	595346	
595AZX	595231	BC PROG, LOGIC BUILDER Prototype Enabler
595AZY	595296	BC PROG, EXTERIOR LIGHT CHECK Push Button "B"; for MD, RH & SS
595AZZ	595251	BC PROG, PARK / MARKER LIGHTS Dual Output, 20AMP
595BAA	None	BC PROG, AIR POWER HYD PARK
595BAB	None	BC PROG, ENGINE FAN DRIVE {Borg-Warner} Variable Speed
595BAC	None	BC PROG, PRNDL With 1000/2000 5 Speed Transmission With Power Park & Arens Shifter
None	595006	Not Required or Implemented for 2007 BC

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
None	595010	Not Required or Implemented for 2007 BC
None	595013	Not Required or Implemented for 2007 BC
None	595020	Not Required or Implemented for 2007 BC
None	595025	Not Required or Implemented for 2007 BC
None	595026	Not Required or Implemented for 2007 BC
None	595027	Not Required or Implemented for 2007 BC
None	595028	Not Required or Implemented for 2007 BC
None	595029	Not Required or Implemented for 2007 BC
None	595035	Not Required or Implemented for 2007 BC
None	595036	Not Required or Implemented for 2007 BC
None	595042	Not Required or Implemented for 2007 BC
None	595045	Not Required or Implemented for 2007 BC
None	595046	Not Required or Implemented for 2007 BC
None	595049	Not Required or Implemented for 2007 BC
None	595050	Not Required or Implemented for 2007 BC
None	595054	Not Required or Implemented for 2007 BC
None	595057	Not Required or Implemented for 2007 BC
None	595058	Not Required or Implemented for 2007 BC
None	595059	Not Required or Implemented for 2007 BC
None	595064	Not Required or Implemented for 2007 BC
None	595065	Not Required or Implemented for 2007 BC
None	595068	Not Required or Implemented for 2007 BC
None	595070	Not Required or Implemented for 2007 BC
None	595071	Not Required or Implemented for 2007 BC
None	595072	Not Required or Implemented for 2007 BC
None	595073	Not Required or Implemented for 2007 BC
None	595074	Not Required or Implemented for 2007 BC
None	595076	Not Required or Implemented for 2007 BC
None	595077	Not Required or Implemented for 2007 BC
None	595078	Not Required or Implemented for 2007 BC
None	595079	Not Required or Implemented for 2007 BC
None	595080	Not Required or Implemented for 2007 BC
None	595081	Not Required or Implemented for 2007 BC
None	595082	Not Required or Implemented for 2007 BC

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
None	595084	Not Required or Implemented for 2007 BC
None	595085	Not Required or Implemented for 2007 BC
None	595088	Not Required or Implemented for 2007 BC
None	595089	Not Required or Implemented for 2007 BC
None	595090	Not Required or Implemented for 2007 BC
None	595094	Not Required or Implemented for 2007 BC
None	595095	Not Required or Implemented for 2007 BC
None	595096	Not Required or Implemented for 2007 BC
None	595098	Not Required or Implemented for 2007 BC
None	595101	Not Required or Implemented for 2007 BC
None	595102	Not Required or Implemented for 2007 BC
None	595103	Not Required or Implemented for 2007 BC
None	595104	Not Required or Implemented for 2007 BC
None	595109	Not Required or Implemented for 2007 BC
None	595117	Not Required or Implemented for 2007 BC
None	595123	Not Required or Implemented for 2007 BC
None	595124	Not Required or Implemented for 2007 BC
None	595128	Not Required or Implemented for 2007 BC
None	595131	Not Required or Implemented for 2007 BC
None	595132	Not Required or Implemented for 2007 BC
None	595133	Not Required or Implemented for 2007 BC
None	595134	Not Required or Implemented for 2007 BC
None	595135	Not Required or Implemented for 2007 BC
None	595136	Not Required or Implemented for 2007 BC
None	595138	Not Required or Implemented for 2007 BC
None	595139	Not Required or Implemented for 2007 BC
None	595140	Not Required or Implemented for 2007 BC
None	595141	Not Required or Implemented for 2007 BC
None	595142	Not Required or Implemented for 2007 BC
None	595144	Not Required or Implemented for 2007 BC
None	595147	Not Required or Implemented for 2007 BC
None	595148	Not Required or Implemented for 2007 BC
None	595149	Not Required or Implemented for 2007 BC
None	595152	Not Required or Implemented for 2007 BC

Table 167 595 Feature Codes Sorted by Post-2007 Feature Code Number (cont.)

2007 BC 595Code	ESC 595Code	Feature Description
None	595154	Not Required or Implemented for 2007 BC
None	595169	Not Required or Implemented for 2007 BC
None	595176	Not Required or Implemented for 2007 BC
None	595177	Not Required or Implemented for 2007 BC
None	595187	Not Required or Implemented for 2007 BC
None	595194	Not Required or Implemented for 2007 BC
None	595195	Not Required or Implemented for 2007 BC
None	595199	Not Required or Implemented for 2007 BC
None	595204	Not Required or Implemented for 2007 BC
None	595207	Not Required or Implemented for 2007 BC
None	595209	Not Required or Implemented for 2007 BC
None	595220	Not Required or Implemented for 2007 BC
None	595222	Not Required or Implemented for 2007 BC
None	595229	Not Required or Implemented for 2007 BC
None	595233	Not Required or Implemented for 2007 BC
None	595234	Not Required or Implemented for 2007 BC
None	595235	Not Required or Implemented for 2007 BC
None	595242	Not Required or Implemented for 2007 BC
None	595243	Not Required or Implemented for 2007 BC
None	595247	Not Required or Implemented for 2007 BC
None	595256	Not Required or Implemented for 2007 BC
None	595280	Not Required or Implemented for 2007 BC
None	595281	Not Required or Implemented for 2007 BC
None	595289	Not Required or Implemented for 2007 BC
None	595302	Not Required or Implemented for 2007 BC
None	595303	Not Required or Implemented for 2007 BC
None	595304	Not Required or Implemented for 2007 BC
None	595309	Not Required or Implemented for 2007 BC
None	595310	Not Required or Implemented for 2007 BC
None	595311	Not Required or Implemented for 2007 BC
None	595320	Not Required or Implemented for 2007 BC
None	595341	Not Required or Implemented for 2007 BC
None	595342	Not Required or Implemented for 2007 BC
None	595347	Not Required or Implemented for 2007 BC