

# **SERVICE MANUAL**

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## **TRUCK SERVICE MANUAL**

### **Body Builder Electrical Data Book**

**Truck Model: 3200**

**Truck Model: 4100**

**Truck Model: 4200**

**Truck Model: 4300**

**Truck Model: 4400**

**Truck Model: 7300**

**Truck Model: 7400**

**Truck Model: 7500**

**Truck Model: 7600**

**Truck Model: 7700**

**Truck Model: 8500**

**Truck Model: 8600**

**S08300, Formerly PBB-73000B**

**08/10/2005**



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## FOREWORD

**Contents** — In this manual, International® Truck and Engine Corporation provides information about its different products to assist those who wish to modify these products for individual applications. International does not recommend or approve any firm nor make any judgements on the quality of the work performed by a particular firm. Individuals who use the services of a body builder must satisfy themselves as to the quality of the work.

The party installing a body, a fifth wheel, any other equipment, or making any modifications to complete the vehicle for delivery and make it road-ready is responsible to see that the completed vehicle complies with all applicable certification procedures and safety standards, as may be set forth in Federal, State, and local statutes, rules and regulations.

Specifications, descriptions and illustrative material in this literature are as accurate as known at time of publication but are subject to change without notice. Illustrations are not always to scale and may include optional equipment and accessories but may not include all standard equipment.

In addition to this Body Builder Electrical Data Book, publication CT-471, Body Builder Data, may be required. The CT-471 - Body Builder Data is a set of booklets which includes a General Information Body Builder Data booklet for information about the International® Truck and Engine product line; model series Body Builder Data booklets which contain information related to the features and specifications for each of their respective models; Component Body Builder Data booklet containing information for components which have common application in two or more truck series and any supplemental Body Builder Data booklets containing information for components which have common application in two or more truck series.

## INTRODUCTION

**DISCLAIMER:** INTERNATIONAL DOES NOT TAKE ANY RESPONSIBILITY FOR CUSTOMER OR BODY BUILDER WIRING.

**NOTE – After-market installed wiring for engine speed control must comply with the following guidelines:**

1. Sealed switches and connectors must be used for switches and connections that are exposed to the weather or to salt spray emanating from the vehicle's tires.
2. Route and clip wiring to minimize chafing and exposure to weather. Use conduit, loom, and/or tape to achieve this.
3. Fuse all power leads as close to the power source as possible. Remember fuses protect the wiring - size fuses accordingly.
4. All ground connections that will be made to the frame or body must be connected to clean bare metal. Remove all dirt, paint, grease and rust that would insulate the terminal from ground. After connecting the ground, seal the connection with a good quality grease or surface sealant to protect the connection from corrosion.
5. Spliced wires should be twisted together and soldered. Use a heat shrink tube with a meltable inner wall to seal the connection. Do not expose splices to the weather.



**WARNING – To avoid serious personal injury, possible death, or damage to the vehicle, make sure the transmission is in neutral, parking brake is set, and the wheels are blocked before undertaking service procedures. In addition, turn off the engine when you leave the vehicle. Never leave the vehicle unattended with the engine running.**



**WARNING** – To avoid personal injury, possible death, or damage to the vehicle when adding electrical features, disconnect batteries. Reconnect batteries when installation is complete.

- Whenever disconnecting battery terminals, always disconnect the ground terminal first. When reconnecting, always connect the ground terminal last.
- To prevent injury to the eyes, face, limbs and body, it is imperative that lighted materials, flames or sparks be kept away from the vent openings of the battery. The gas mixture in the battery cells, which escapes through the vents, could ignite and/or cause an explosion. This is particularly true when jumper cables are being used.
- In addition, inhaling of gas produced by the normal operation of the battery could result in partial or permanent damage to the respiratory system.
- Always wear eye protection when working around batteries. Do not attempt to jump-start a vehicle having a frozen battery because the battery may explode. If a frozen battery is suspected, examine all fill vents on the battery. If ice can be seen, do not attempt to start with jumper cables as long as the battery remains frozen. Thaw out the battery and recharge.
- Do not check battery condition by shorting (flashing) across terminals.
- Failure to observe these instructions could result in personal injury and/or damage to the vehicle.

Battery cable terminals must be clean and tight. Use hot water and common baking soda for removing terminal corrosion and for cleaning the top of the battery. Brighten the contact surface with steel wool, apply a light coat of lubricant sealing grease such as Fleetrite® 472141-C1 or equivalent and reassemble. Be sure the terminals are clamped tightly and that the battery is clamped securely in place.

When working around the terminals and battery, use extra care to avoid shorting. A good practice is to insulate pliers and screwdrivers.

**Contents** - In this Body Builder Electrical Data Book, International® Truck and Engine Corporation provides information about its different electrical features to assist those who wish to modify these products for individual applications. This information is intended for use by properly trained, professional technicians who have the equipment, tools, safety instructions, and know-how to perform the modifications properly and safely. International does not recommend or approve any firm nor make any judgements on the quality of the work performed by a particular firm. Individuals who use the services of a body builder must satisfy themselves as to the quality of the work.

The party installing a body, a fifth wheel, any other equipment, or making any modifications to complete the vehicle for delivery and make it road-ready is responsible to see that the completed vehicle complies with all applicable certification procedures and safety standards, as may be set forth in Federal, State, and local statutes, rules and regulations.

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## SAFETY INFORMATION

**IMPORTANT** – Read the following before starting the service procedure.

You must follow your company safety procedures when you service or repair equipment. Be sure to understand all of the procedures and instructions before you begin work on the unit.

International uses the following types of notations to give warning of possible safety problems and to give information that will prevent damage to the equipment being serviced or repaired.



**WARNING** – A warning indicates procedures that must be followed exactly. Personal injury or possible death, along with damage to the vehicle, can occur if the procedure is not followed.

**CAUTION** – A caution indicates procedures that must be followed exactly. If the procedure is not followed, damage to equipment or components can occur.

**NOTE** – A note indicates an operation, procedure or instruction that is important for correct service.

Some procedures require the use of special tools for safe and correct service. Failure to use these special tools when required can cause injury to service personnel or damage to vehicle components.

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## 1. DESCRIPTION

International vehicle electrical systems are becoming increasingly complex with the addition of electronic engine and transmission controls, electronically driven instrument gauges, and anti-lock brake systems to name a few. While most systems still operate on battery voltage (12 volts), some systems operate at as high as 107 volts (electronic fuel injection) and as low as five (5) volts (electronic engine controls).

International publishes Electrical Circuit Diagram Manuals for all its models. Body builders and installers should refer to these manuals before connecting body lights and accessories to the vehicle electrical system to assure that circuits chosen are both appropriate and not overloaded. Modifications not defined in the circuit diagram book are **not** to be made to the vehicle electrical/electronic control systems without first contacting International for assistance at its Tech Central Department, telephone 1-800-336-4500.

## 2. ELECTRICAL ABBREVIATIONS

**Table 1 Electrical Abbreviations**

ABS	Antilock Brake System
A or AMP	Ampere
BOC	Back of Cab
ECU	Electronic Control Unit
ECM	Engine Control Module
ESC	Electrical System Controller
FET	Field Effect Transistor
FR	Front
GA	Gauge
GND	Ground
HVAC	Heater, Ventilation, Air Conditioner
HYD	Hydraulic
IGN	Ignition
IP	Instrument Panel
PDC	Power Distribution Center
RESCM	Remote Engine Speed Control Module
ROF	Rear of Frame
RPM	Remote Power Module
RR	Rear
SW	Switch
TEM	Truck Equipment Manufacturer
VSS	Vehicle Speed Sensor

### 3. COLOR CODE SYSTEM FOR INTERNATIONAL® TRUCK

**Table 2 Color Code System**

Color	Description
Red	Alternator/Battery Feeds
Pink	Ignition Feeds
Light Blue	Accessory Feeds
Yellow	Headlight System (Daytime Running Lights, Fog, Hi-beam, Etc.); Data Link J1939 (+)
Dark Blue	Interior Lights (Dome, Panel, Etc.); Data Link J1708 (+)
Brown	Exterior Lights (Tail, Marker, Clearance, Etc.)
Orange	Exterior Lights (Turn, Back-up, Etc.)
Gray	Engine / Chassis Systems (Fuel Solenoid, Horn, Etc.); Data Link J1708 (-)
Tan	Engine / Chassis Monitoring Systems (Gauges)
Green	Data Link J1939 (-)
Light Green	Driver Aid Systems (Windshield Washer, Heater, Etc.)
Violet	Engine Controls - Electronic
White	Ground
Black	Battery Ground Cables or Computer Data Link Systems

**NOTE: The wiring in multiple conductor jacketed cable does not follow the above color code system. See the electrical circuit diagram manual for specific colors and circuit numbers used with each system. Use only "GXL", "SXL" or "TXL" insulated wire. Crimp and solder all connections.**

### 4. RECOMMENDED CIRCUIT PROTECTION

**Table 3 Recommended Circuit Protection**

Wire Gauge	Protective Device Size	Maximum Current (Amps)
18 Ga	10 AMP Fuse/ Circuit Breaker	8 A
16 Ga	15 AMP Fuse/ Circuit Breaker	12 A
14 Ga	20 AMP Fuse/ Circuit Breaker	16 A
12 Ga	25 AMP Fuse/ Circuit Breaker	20 A
10 Ga	30 AMP Fuse/ Circuit Breaker	24 A
8 Ga	12 Gauge Fusible Link	80 A
6 Ga	10 Gauge Fusible Link	108 A
4 Ga	2-12 Gauge Fusible Link	160 A

**CAUTION – Wire gauge is designed to match fuse / circuit breaker rating. Do not increase the size of a circuit breaker or fuse. To do so could cause wiring to overheat and burn.**

## 5. CIRCUIT PROTECTION DEVICES

The information in this section applies to all models except the 3200, 4200, 4300, 4400, and 7000.

**Table 4** Circuit Protection Devices

Size	Circuit Breakers	Part Number	Color
7.5 A	Type III — Manual Reset	3536177C1	Brown
10 A	Type III — Manual Reset	3536178C1	Red
15 A	Type III — Manual Reset	3536179C1	Blue
20 A	Type III — Manual Reset	3536180C1	Yellow
25 A	Type III — Manual Reset	3536181C1	White
30 A	Type III — Manual Reset	3536182C1	Green
Size	Fuses	Part Number	Color
5 A	MINI — SAE J2077	3534208C1	Tan
7.5 A	MINI — SAE J2077	3546109C1	Brown
10 A	MINI — SAE J2077	3534209C1	Red
15 A	MINI — SAE J2077	3534210C1	Blue
20 A	MINI — SAE J2077	3534211C1	Yellow
25 A	MINI — SAE J2077	3534212C1	Natural
30 A	MINI — SAE J2077	3534213C1	Green

Circuit breakers and fuses can be installed in the chassis wiring using the following in-line connectors:

- 1676841C91 - Inline socket & cable for circuit breaker/fuse (20 A Maximum)
- 1682115C91 - Inline socket & cable for circuit breaker/fuse (30 A Maximum)

**Table 5**

Size	Devices	Part Number	Color
20 A	Autofuse	131224C1	Yellow
20 A	Circuit Breaker — Type III	3529688C1	
30 A	Autofuse	571691C1	Green
30 A	Circuit Breaker — Type III	3529690C1	

## 6. ELECTRICAL COMPONENTS COMMONLY USED BY EQUIPMENT INSTALLERS

The information in this section applies to all models except the 3200, 4200, 4300, 4400, and 7000.

**Table 6**

1000, 3000, 5000, 9000 Conventional	Type
<b>At Fuse Block</b>	
1666118C1	Terminal, Fuse Block (18/20 Gauge)
0557374C1	Terminal, Fuse Block (14/16 Gauge)
0557375C1	Terminal, Fuse Block (10/12 Gauge)
<b>At Tail Lights</b>	
589390C1	Seal, Wire - (Blue) .165-.138 O.D. Cable (12-14 Gauge)
589391C1	Seal, Wire - (Gray) .137-.111 O.D. Cable (14-16 Gauge)
1652325C1	Seal, Wire - (Lt Gn) .110-.080 O.D. Cable (16-20 Gauge)
1661375C2	Body Connector, 5-Way Male
1661377C1	Terminal, Female - 14/16 Gauge
1661376C1	Lock, 5-Way Male Connector
1677851C1	Body Connector, 5-Way Female
1671609C1	Terminal, Male - 14/16 Gauge
1677914C1	Lock, 5-Way Female Connector
587579C1	Sealing Plug (For Empty Connector Cavities)

**NOTE – Any unused circuit cavities must be plugged with sealing plugs provided with chassis harness.**

### Connectors 9900 and 9910

Connectors 9900 and 9910 have their mating connectors attached filled with cavity plugs. To use connectors, remove cavity plugs and use the following:

**Table 7**

Terminals	Wire Gauge
2033912C1	12, 14
2033911C1	16, 18, 20
<b>Cavity Seals</b>	
0589390C1	12
0589391C1	14
1652325C1	16, 18, 20
<b>Mating Connector Part Nos.</b>	
4450A Connector	2039312C91

9900 Lock	2039342C1
4460A Connector	1686834C1
9910 Lock	1671608C1

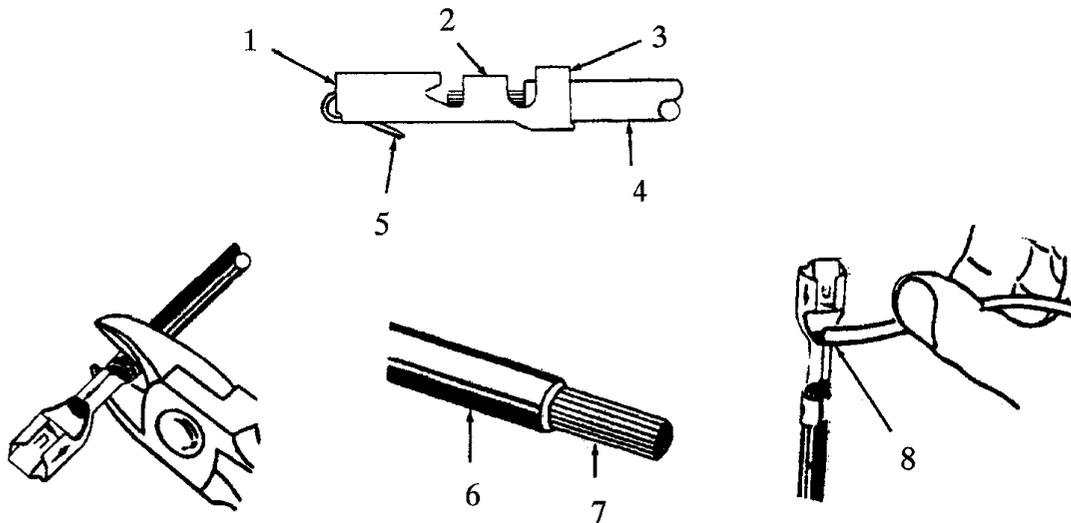
## 7. STANDARD TERMINALS AND SPLICES

### Standard Terminals

1. Cut the cable just before the insulation wings on the terminal.
2. Remove the insulation being careful not to cut any of the wire strands.
3. Position cable in the new terminal.
4. Hand crimp the core wings first, then the insulation wings.

**NOTE – Always use the recommended crimp tool for each terminal. A detailed crimp chart is included in the repair kit.**

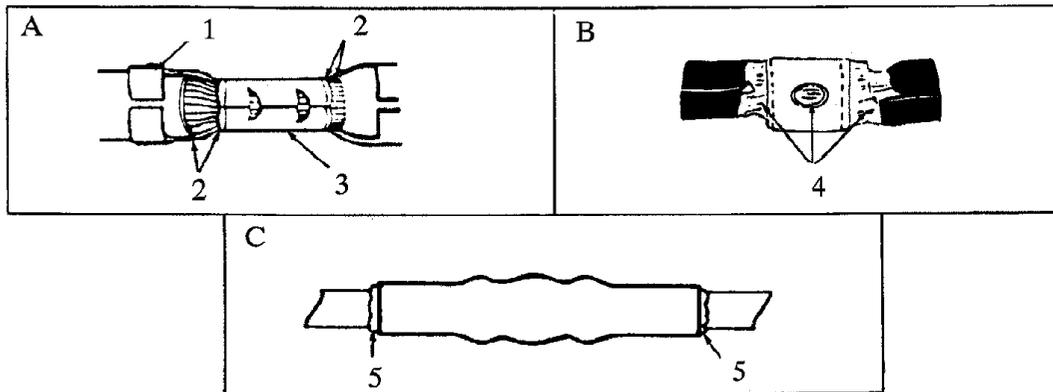
5. Solder all hand crimped terminals and electrically check for continuity.



**Figure 1 Standard Terminal**

1. MATING END
2. CORE WINGS
3. INSULATION WINGS
4. CABLE
5. LOCK TANG
6. INSULATION
7. WIRE STRANDS
8. SOLDER

## 8. SPLICE INSPECTION



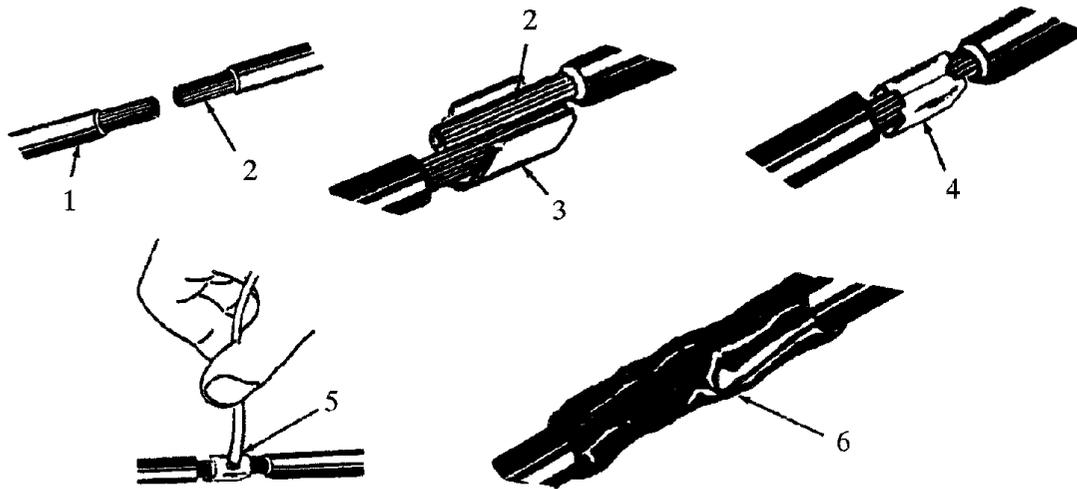
**Figure 2 Splice Inspection**

- A. TERMINAL APPLICATION
- B. SOLDER APPLICATION
- C. CRIMP AND SEAL HEAT APPLICATION
- 1. INSULATION CRIMP
- 2. WIRE STRANDS VISIBLE IN THIS AREA
- 3. CORE CRIMP
- 4. GOOD SOLDER APPLICATION
- 5. EVIDENCE OF GLUE

## 9. SPLICE CLIP INSTALLATION

**NOTE – A new clip must be located a minimum of 1.5 inches (40 mm) from a connector, sleeve or another clip.**

1. Cut off the old clip or bad section of wire.
2. Remove the insulation being careful not to cut any of the wire strands.
3. Install the proper clip on the wire strands.
4. Hand crimp the clip until securely fastened.
5. Solder the clip and electrically check for continuity.
6. Cover the entire splice with splice tape. Extend the tape onto the insulation on both sides of the splice(s).



**Figure 3 Splice Clip Installation**

1. INSULATION
2. WIRE STRANDS
3. CLIP (POSITIONED CORRECTLY)
4. CRIMPED CORRECTLY
5. SOLDER
6. TAPE

## 10. CRIMP AND SEAL SPLICE SLEEVE INSTALLATION

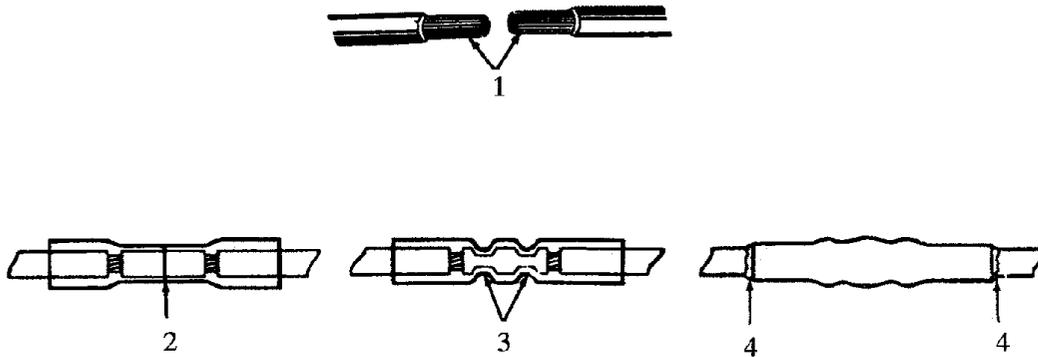
**NOTE – A new sleeve must be located a minimum of 1.5 inches (40 mm) from a connector, clip or another sleeve.**

1. Cut off the old sleeve or bad section of the wire.
2. Remove insulation being careful not to cut any of the wire strands.
3. Install the proper sleeve on the wire strands, making sure the ends of the wire hit the stop.
4. Hand crimp to the sleeve. Gently tug on the wire to make sure that they are secure.

**NOTE – Always use the recommended crimp tool for each sleeve. A detailed crimp chart is included in the Repair Kit.**

**CAUTION – Use appropriate heat gun. Do not use a match or open flame to heat the sleeve seal.**

5. Electrically check the sleeve and wire cable for continuity.



**Figure 4 Crimp and Seal Splice Sleeve Installation**

1. WIRE STRANDS
2. WIRE STOP
3. CRIMP CONNECTOR
4. EVIDENCE OF GLUE

## 11. DATA LINK REPAIR

### 11.1. J1708

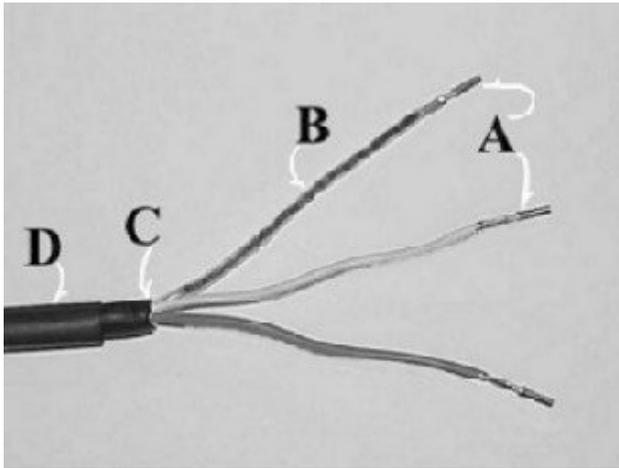
Repairs to damaged J1708 circuits should be accomplished using similar types of wiring. Splices should be crimped and soldered. Insure the twist in the wire pair is maintained and individual wires are covered with heat shrink.

### 11.2. J1939/11 SHIELDED ONLY

Repairs to damaged J1939 circuits should be accomplished using identical types of wiring. Splices should be crimped, soldered and covered with heat shrink. Insure the twist in the wire pair is maintained and that any wire bundles in the engine compartment are shielded and covered with heat shrink.

### 11.3. WIRE REPAIR

This instruction addresses termination and splicing of J1939 wire.



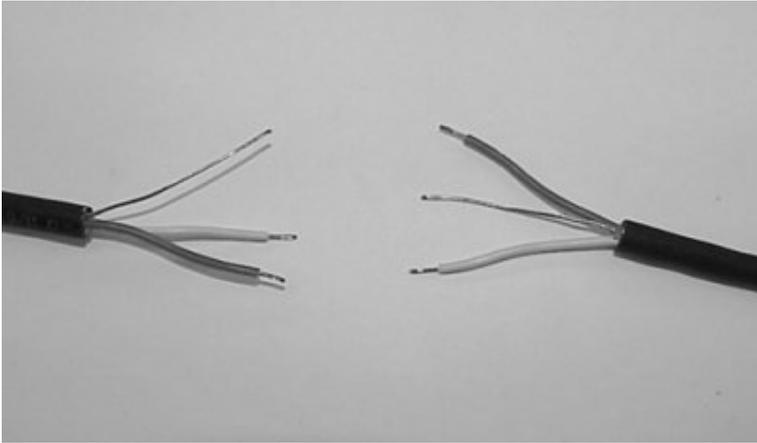
**Figure 5 Preparation of J1939 Wire for Connection**

1. Strip back (view C) outer shield 3 1/8 in. (76 mm).
2. Strip (view A) green wire and yellow wire 1/4 in. (6.35 mm) being careful not to cut individual strands.
3. Re-twist all three wires if they have separated.
4. Sleeve drain wire (view B) may be soldered to aid in sleeving.
5. Install terminals on green and yellow wire ends, and crimp.
6. The 1/4" heat shrink tube (view D) will be shrunk later after the wires have been inserted into the crimp connector.

## 12. WIRE SPLICING

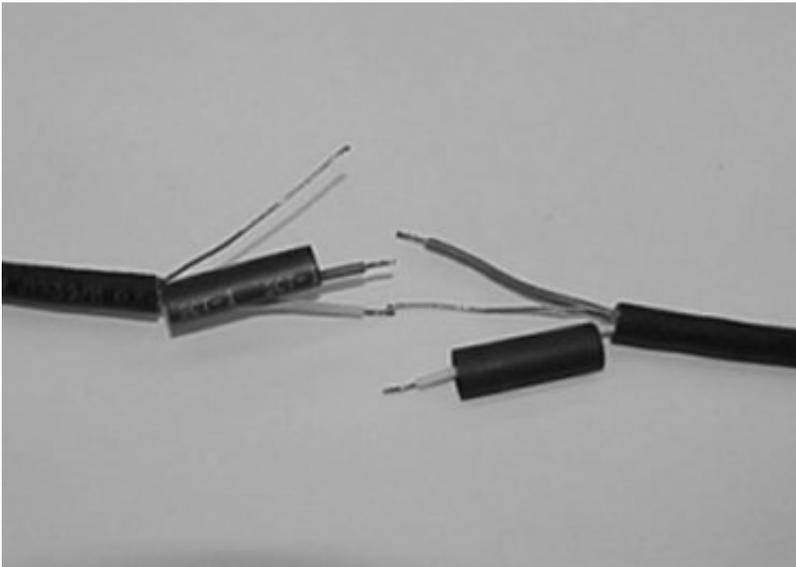
### Shielded Wire

1. Strip wire ends 1/4 inch.
2. Re-twist any loose wires.



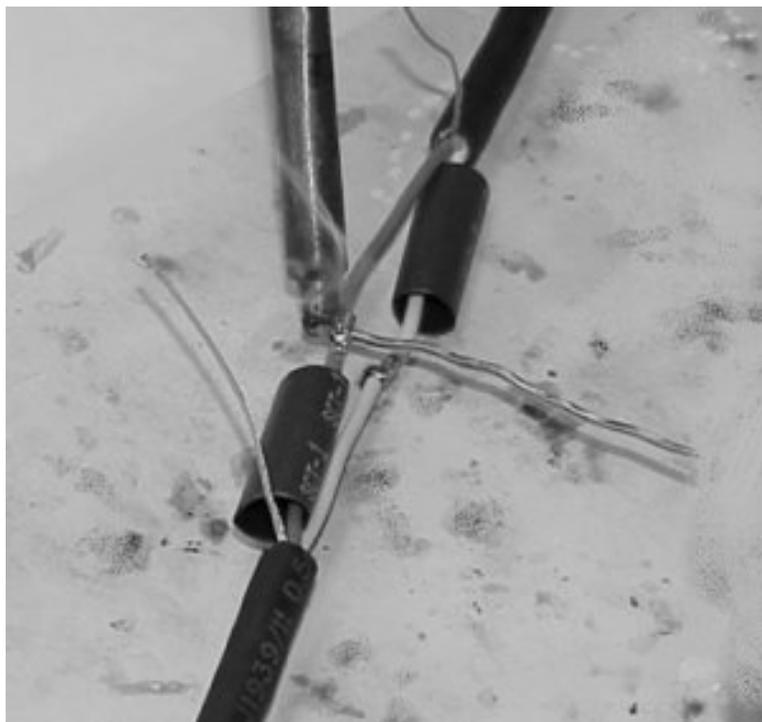
**Figure 6 Re-Twist Any Loose Wires**

3. Slide 2-inch pieces of heat shrink tube over wire for later use.



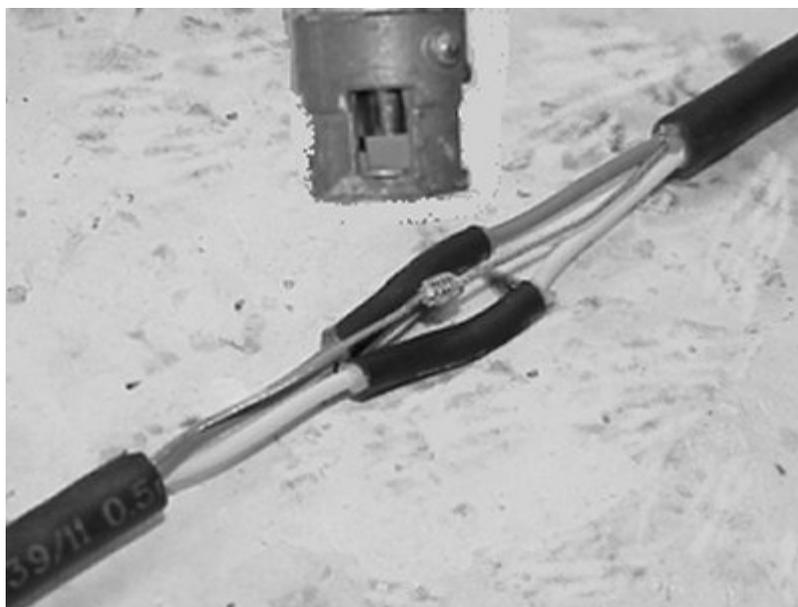
**Figure 7 Put Heat Shrink Tube Over Each Wire**

4. Insert ends of wires into splice joint and crimp.
5. Solder the wires and crimp joint together.



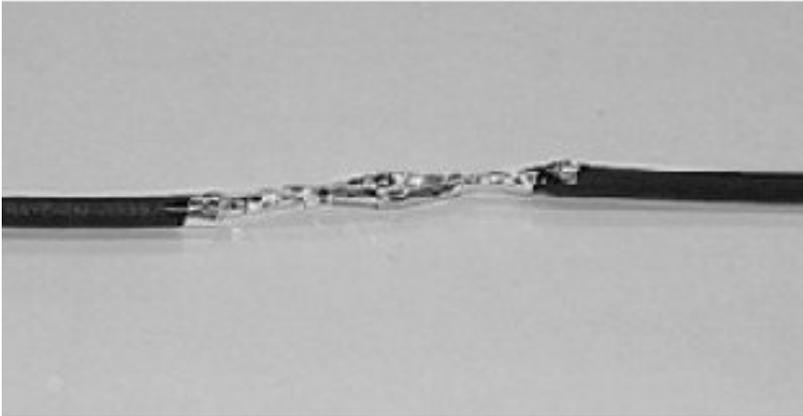
**Figure 8 Solder Wires Together**

6. Center heat shrink tube over splice and shrink.



**Figure 9 Center Heat Shrink Tube Over Splice**

7. Wrap wires with foil tape. Maintain at least 1/2 wrap overlap.



**Figure 10 Center Heat Shrink Tube Over Cable**

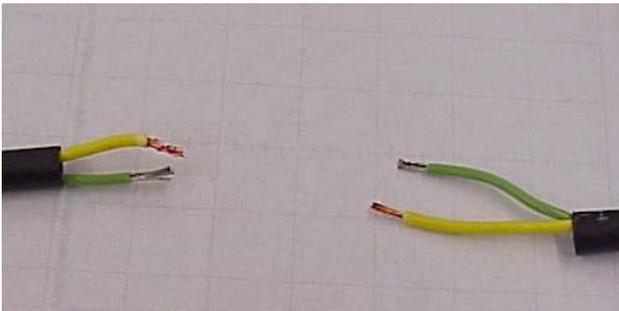
8. Center heat shrink tube over the splice and shrink.



**Figure 11 Center Heat Shrink Tube Over Cable**

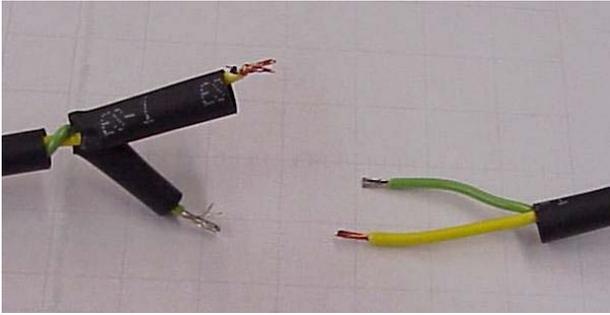
### **Non-Shield Wire**

1. Strip wire ends 1/4 inch.

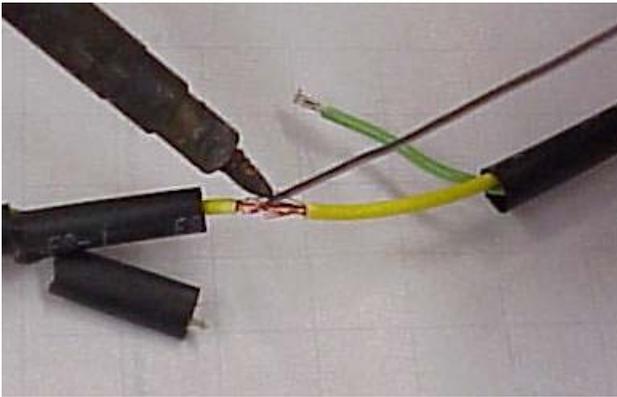


**Figure 12**

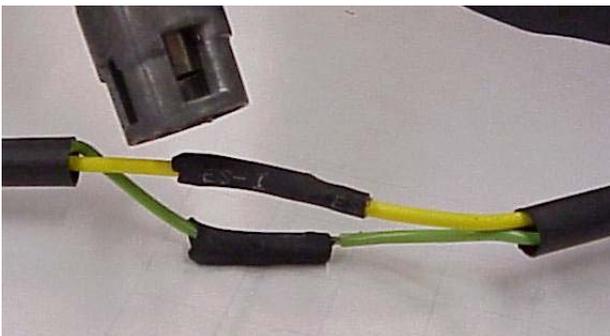
2. Re-twist any loose wire strands.
3. Slide 2 inch pieces of heat shrink tube over wire for later use.

**Figure 13**

4. Insert ends of wires into splice joint and crimp.
5. Solder the wires and crimp joint together.

**Figure 14**

6. Center heat shrink tube over splice and shrink.

**Figure 15**

7. Wrap wires with electrical tape or heat shrink tubing. Maintain at least 1/2 wrap overlap.



**Figure 16**

8. Once electrical tape or heat shrink tubing is in place, there should be no exposed wires.



**Figure 17**

## **14. J1939 HIGH SPEED DATA LINK CABLE (SAE J1939/11) - PRIOR TO JANUARY 2002**

The information in this section applies to all 3200, 4200, 4300, 4400, and 7000 models.

Performing the proper repairs or modifications of the cable is critical to the integrity and performance of the vehicle systems. (For repair procedure see Electrical Troubleshooting Guide - S08250 or Data Link Repair in this manual.) This information based on SAE J1939/15 and TMC RP 142.

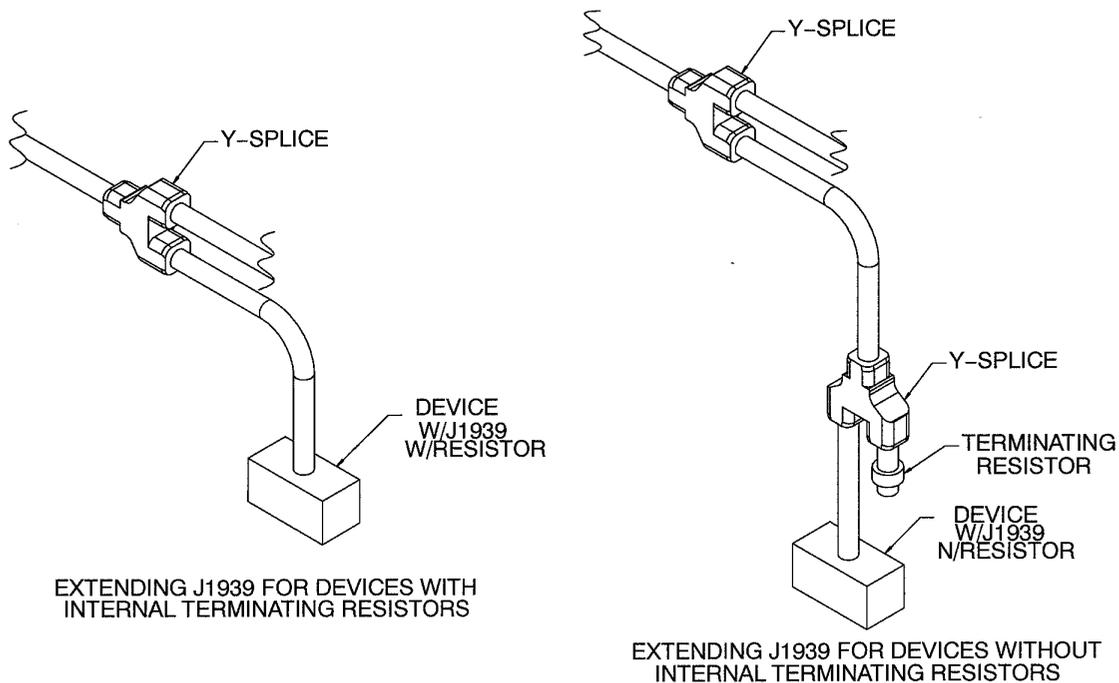
These instructions are intended for modifications that meet the SAE spec; i.e., no internal resistor. When extending the backbone the proper materials must be used. The data link cable consists of a twisted pair of insulated wires, covered by a metallized foil shield, a drain wire and all are covered by an insulating jacket. The data link cable must meet the SAE - specified characteristic impedance of 120 ohms. Never splice regular automotive type wire such as GXL, SXL, TXL into the data link cable. Use data link cable furnished by Raychem, part number 2021D0309.

The backbone is the main part of the cable. This is terminated at each end with a resistor. When adding a device the backbone must be extended. This is done by removing the resistor from the "Y" connector, inserting the backbone extension, then plugging the resistor and the device into the extension.

Parts required for extending backbone:

**Table 8 Parts Required for Extending Backbone**

Part	International Number
Y Connector	3537130C1
Resistor Cap	3537129C1
Male J1939 Connector	3537127C1
Female J1939 Terminal	3537131C1
Cavity Plug	3537132C1
Female J1939 Connector	3537128C1
Male J1939 Terminal	1659963C1

**Figure 18 Extending J1939**

## 15. J1939 HIGH SPEED DATA LINK CABLE (SAE J1939/15) - BEGINNING JANUARY 2002

The information in this section applies to all 3200, 4200, 4300, 4400, and 7000 models.

Performing the proper repairs or modifications of the cable is critical to the integrity and performance of the vehicle systems. (For repair procedure see Electrical Troubleshooting Guide - S08250 or Data Link Repair in this manual.) This information based on SAE J1939/15 and TMC RP 142.

These instructions are intended for modifications that meet the SAE spec; i.e., no internal resistor. When extending the backbone the proper materials must be used. The data link cable consists of a twisted pair of insulated wires and are covered by an insulating jacket. The data link cable must meet the SAE - specified

characteristic impedance of 120 ohms. Never splice regular automotive type wire such as GXL, SXL, TXL into the data link cable. Use data link cable furnished by Raychem, part number 2021D0309.

The backbone is the main part of the cable. This is terminated at each end with a 120 ohm resistor. When adding a device the backbone must be extended. This is done by removing the resistor, inserting the backbone extension, then plugging the resistor and the device into the extension.

The International® high performance vehicle will always have a power train J1939 system. This is for key operations that come from the factory direct. A second J1939 system is put in place for body builders and will be referred to as body builder J1939. Circuit diagrams are shown in chapter 9 of the Circuit Diagram Book (S08250) under Remote Power Units, Solenoid Packs, Remote Engine Speed Controller.

### 15.1. J1939

J1939 is a high speed serial communications data link. The system requires two resistor caps. the first resistor cap for body builder J1939 currently starts in the engine compartment. the second resistor cap ends where the last module is placed. the wire between these two resistors is called the backbone. The backbone cannot be longer than 131.2 feet (40m). A module can tap into the backbone. This point is called the Node. The distance between two nodes can not be less than 3.9 inches (0.1m). The cable length from the node to the module cannot be longer than 9.8 feet (3m).

With the research of the robustness of the J1939-15 lite (unshielded) International removed the shield from their high performance vehicle in January 2002. Mixing of the shielded (J1939-11) and unshielded (J1939-15) is not recommended.

### 15.2. ADDING BODY BUILDER J1939, POWER AND GROUND TO A HIGH PERFORMANCE TRUCK

Without any body builder J1939: Ask service parts for "Adding body builder J1939 data link"

Most of the software information is processed in the Electronic System Controller (ESC). Therefore the J1939 wires must be connected to the ESC. The Green wire, that contains a circuit number 5 and (-) in diagram books, is connected to ESC gray connector 4004 pin 35. The Yellow wire, also known as circuit number 5 (+) in the circuit diagram books, is connected to ESC Gray connector 4004 pin 34. Insert Red wire in the fuse block into cavity F2-F3. the power wire J14M in F2-E3 should already be there. Add a 5 amp fuse between F2-F3 and F2-E3. Ground wire J11-GQR needs to go onto the ground stud labeled 4005 in the diagram book located near Power Distribution Center (PDC).

**CAUTION – While working on connector 4004 a strap lock will be removed. Failure to replace this will cause premature connector and wiring failure.**

Continue to route with current dash harness to center chassis harness. This will route under the PDC and end at center chassis connection located near the PDC. It may be easier to follow the center chassis harness from under the cab and see where it connects to the dash harness in engine compartment. After installing the 6 way connector, refer to the circuit diagram book connector 4410.

### 15.3. VEHICLES EQUIPPED WITH BODY BUILDER J1939 DATA LINK

You have either added the body builder J1939 or it is already there in the dash (engine compartment). You need to decide what needs to be added to the chassis section.

The body builder data link is located under the hood near the steering shaft assembly, just below the PDC. Depending upon the level of sophistication desired, adding the components listed below can be performed by simply removing the terminating resistor cap located near the PDC and then adding the additional harness to extend the J1939 body builder data link. Complete the installation by connecting additional International designed Remote Power Modules (RPM) or remote Air Solenoid Modules.

J1939 cable - International part number 3572112R1

Resistor cap 3519178C91 for 3 way connector that mates to 1667741C1

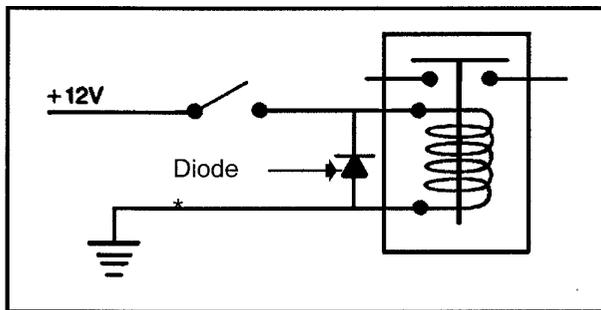
Resistor cap 3544372C91 for 6 way connector that mates to control modules.

## 16. SUPPRESSION

International® strongly recommends these electromagnetic devices be electrically suppressed, when adding electromagnetic devices such as relays, magnetic switches, and solenoids.

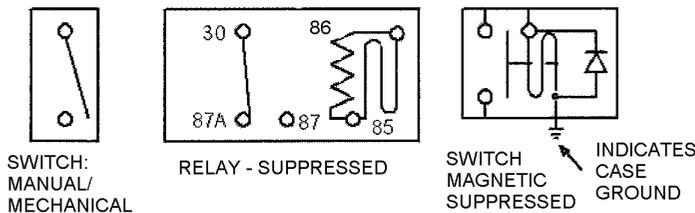
Unsuppressed electromagnetic devices can generate large voltage spikes which are conducted into the vehicle electrical system. These voltage spikes may adversely affect customer added electronic devices and in some instances may affect International installed electronic components.

When installing electromagnetic devices, specify suppressed units. If suppressed units are not available, diode suppression may be added as shown below:



(Diagram represents magnetic switch)  
 \*Use diode trade no. 1N4005  
 (preferred)

A - SWITCH AND RELAY POSITIONS AS SHOWN ON  
 CIRCUIT DIAGRAMS INDICATE NORMAL POSITION  
 WITH IGNITION OFF UNLESS OTHERWISE NOTED



**Figure 19 Adding Diode Suppression**

The following suppressed relays and magnetic switches are available from International.

**Table 9** Suppressed Relays and Magnetic Switches

Part Number	Description
2012557C1	Relay - Continuous Duty (Suppressed) SPDT 25 amp. (Not Sealed) - <b>Item A</b>
3505300C1	Relay - Continuous Duty (Suppressed) SPDT 25 amp (Sealed) - <b>Item B</b>
1691520C91	Magnetic Switch - Continuous Duty (Suppressed) 100 amp.
1693479C91	Magnetic Switch - Intermittent Duty (Suppressed) 100 amp.
3519350C1	Micro Relay — SPDT (Suppressed), NO — 20 Amp, NC — 10 Amp

**Item A Requires:**

- 1 - 593385C1 - body
- 1 - 593387C1 - lock
- 2 - 1661709C1 terminal
- 3 - 1661710C1 terminal

**Item B Requires:** (A/R = As Required)

- 1 - 3512331C91 - Body
- A/R - 2039343C1 - terminal (16/18 GA)
- A/R - 1652325C1 - cable seal (16/18 GA)
- A/R - 2039344C1 - terminal (14/12 GA)
- A/R - 589390C1 - cable seal (14/12 GA)
- 1 - 3515185C1 - lock
- 1 - 587579C1 - sealing plug (if needed)

## 17. WELDING INFORMATION

Whenever electric welding is done on any part of the vehicle, it is not necessary to disconnect the International® electronic modules in the cab such as the Electrical System Controller, Remote Power Module and the Instrument Cluster. The welder's ground must be connected as close to the weld as possible. If vehicle is equipped with an International Engine, disconnect both the positive (+) and the negative (-) battery cables including the **electronic power feeds** prior to electric welding. If it is necessary to weld close to an electronic component, it is recommended that the component be temporarily removed.

Consult manufacturers instructions for all other electronic modules such as: Allison Transmission, Eaton Auto Shift Transmission, Bendix ABS, Wabco ABS, Cummins Engine, Caterpillar Engine, Detroit Diesel Engine.

## 18. ROUTING GUIDELINES

- Any hosing, tubing, battery cable, wiring or electrical harness must not rub on a sharp edge. However, due to the high abrasion resistance of synflex tubing, it is permissible for synflex tubing to make contact with the lower edge of the frame rail flange when the tubing is making the transition from the outside to down and under the rail. This does not mean that proper clearance or the need for protective wrap is not needed when synflex line contacts sharp edges or threaded fasteners.
- Any hosing, tubing, battery cable, wiring or electrical harness must not rub or make contact with a hot surface. There should be 5" minimum clearance from the exhaust depending on the situation. The further back from the turbo, the less clearance required.
- Nothing should rub or make contact with the copper compressor discharge tubing other than the clamp(s) that support it.
- All hosing, tubing, battery cables or electrical harnesses should be supported at least every 18" to 20".
- Straplocks used to directly clamp or support battery cables or main engine wiring harnesses must be no less than 7/16" in width.
- Straplocks are not to be used on any bulk hose materials (heater hoses, make-up lines, etc.).

## 19. ELECTRICAL DOS AND DON'TS

The information in this section applies to all 3200, 4200, 4300, 4400, and 7000 models.

**Table 10 Electrical Dos and Don'ts**

ITEM	DO	DON'T
Accessory (power taps with key in "Accessory" mode)	a) Connect to accessory relay output in the inside cab fuse block; circuit A12B or b) Connect to optional Body Accessory relay located in the PDC, circuit R3-5.	Connect to key switch accessory output.
Battery - Clean (unfused) power and maxi-fused power feeds and ground connection points	a) Use any unused Maxi-fuse position outside Power Distribution Center or b) Use inline Maxi-holder from Mega-fuse unfused side.	a) Exceed additional 45 amps b) Exceed 3 ring terminals total on Maxi-fuse stud.
Ground	Ground additional electrical loads (customer supplied devices) to chassis or ground studs located on the dash panel.	Ground to vehicle batteries for additional loads.
Ground — with ammeter	Ground to frame or dash ground stud to allow for ammeter to register current.	Ground directly to batteries for meter signal.
Ignition (power taps with key in "Ignition")	a) Connect to the ignition relay output in the inside cab fuse block; circuit A13AH or b) Connect to the ignition relay output outside the cab PDC; circuit J13CW.	Connect circuits directly to key switch ignition circuits.
Start (power taps with key in "Start")	Connect to the starter relay input circuit J17 at the outside fuse block.	Connect circuits directly to the key switch start circuits.
Electrical System Controller (access to pinouts of discrete circuits)	Connect to ESC outputs only.	a) Exceed ESC outputs amperage refer to ESC section b) Connect to signal inputs of the ESC.
Electric City Horn	a) Connect to circuit J85AA (Dash), M85E (Forward chassis) and M85J (Horn jumper) or b) Only use suppressed type horn assembly.	Connect to Electric City Horn circuit without a diode for protection.
Air Horn (or Air Horn Accommodation)	Connect air line to output side of the solenoid pack controlled through Electrical System Controller.	Connect to input side of air switch electrical circuit.
CB Radio (or CB Accommodation)	Use power connector 2303 and CB antenna connector 2306 at CB opening in overhead console with optional code 08RCB.	Exceed 10 amps.
Radio installation for customer aftermarket radio accommodation	a) Connect to pigtail (A13B) owner/operator ignition feed b) Use a relay if load exceeds 5 amps.	Exceed 5 amps.

Table 10 Electrical Dos and Don'ts (cont.)

ITEM	DO	DON'T
Cruise / Stationary Throttle via Remote Throttle module and via hardwire for remote hook-up	Inline six engines without optional code 12VWV - Add circuit to Pins 37, 36, 32, and 31 of Engine ECM Connector 6007 depending on desired function; for 4200 with out optional code 12VYC - Add circuits to Pin X3-19, X3-20, X3-21, and X3-14 of the ECM connector depending on desired function Refer to 12VWV or 12VYC Component Information Diamond Logic™ Controller Engine Control Features and Programmable Parameters for vehicles equipped with these optional codes or the remote engine speed control module.	Connect to the ESC Cruise Control Input circuits.
Engine Oil Pressure warning for remote panel display	Inline six engines without optional code 12VWV - Add circuit to Pin 54 of Engine ECM Connector 6007; for 4200 optional is unavailable; Refer to 12VWV or 12VYC Component Information Diamond Logic™ Controller Engine Control Features and Programmable Parameters for vehicles equipped with these optional codes. Install discrete oil pressure sensor or tap signal off the ATA or public J1939 Data Link.	Connect directly to oil pressure sensor circuit.
Vehicle Speed output with Manual Transmission for optional feature control; i.e., sand spreader	Inline six engines without optional code 12VWV - Add circuit to Pin 58 of Engine ECM Connector 6007. For 4200 without optional code 12VYC — Add circuit to Pin 17 of Engine ECM2 Connector 6020; provides 30,000 pulse/mile output for speed. Use an isolated Dual wound sensor with manual transmission. Refer to Component Information Diamond Logic™ Controller Engine Control Features and Programmable Parameters for vehicles equipped with 12VWV or 12VYC optional codes.	a) Connect into the speedometer sensor circuit on the engine.  b) Wire into Speed sensor circuit on transmission. Use sensors in parallel with existing output speed sensor it will cause VSS Diagnostic Trouble Code DTC to set.
Vehicle Speed output with Automatic Transmission for optional feature control; i.e., sand spreader	Inline six engines without optional code 12VWV - Add circuit to Pin 58 of Engine ECM Connector 6007; For 4200 without optional code 12VYC — Add circuit to Pin 17 of Engine ECM2 Connector 6020; provides 30,000 pulse/mile output for speed. Refer to Component Information Diamond Logic™ Controller Engine Control Features and Programmable Parameters for vehicles equipped with 12VWV or 12VYC optional codes. Allison Transmission utilizes a variable frequency pulse generated by Transmission ECU for vehicle speed information refer to Allison service information, with optional codes 13WTA or 13 WTE Connector 7205, cavity F; L92 # 167 Allison MD; Connector 7306, cavity H; L92 # 122 LCT 2000/2400.	a) Connect into the speedometer sensor circuit on the engine.

Table 10 Electrical Dos and Don'ts (cont.)

ITEM	DO	DON'T
Tachometer Signal Output for remote panel display	Inline six engines without optional code 12VWV - Add circuit to Pin 59 of Engine ECM Connector 6007; for 4200 without optional code 12VYC - Add circuit to Pin 11 of Engine ECM2 Connector 6020; provides a 12/pulse/eng rpm* Refer to Component Information Diamond Logic™ Controller Engine Control Features and Programmable Parameters for vehicles equipped with 12VWV or 12VY Optional codes.	Connect into the tachometer sensor circuits on the engine.
Engine Coolant Temperature Gauge Output Signal for remote panel display	Install discrete Engine Coolant Temperature sensor. Refer to Component Information Diamond Logic™ Controller Engine Control Features and Programmable Parameters. Refer to ATA Data Link or public J1939 support Information.	Connect into Engine Coolant Temperature sensor circuits.
Alternator warning light output circuit for remote panel display	Connect wire to alternator warning light output terminal and connect the other side of the warning light circuit to ignition feed.	Connect warning light circuit to ground circuit.
Low Air warning signal for remote panel display	a) Tap into air line with additional sensor or b) Refer to public J1939 Data Link information to extract Air PSI signal.	Connect into electrical Low Air sensor circuits.
Park Brake Warning Output Signal for circuit interlock features installed	a) Tap into air line with additional switch for vehicles with air brakes or b) Connect into ESC circuit pin 4; Connector 1600 with a ground active signal Air or Hydraulic brake vehicles.	a) Connect into existing air park brake switch electrical circuit b) Exceed 200 ma total.*
Trans Warning Output signal for remote panel display	Connect wire to to ECU circuit 115 for WTC III and circuit 125 for LCT 2000/24000 transmission models. Circuit goes open to ground to actuate a remote mounted light. An external relay is required if current is .05 Amps or greater.	a) Splice into the transmission harness for signal uses b) Utilize this signal for vehicle shutdown system.
Transmission Interface (Body Builder Connections)	See PBB-43100, 4300, 4400 Models : Medium Conventional Body Builder Diagrams and PBB-50100, 7000 Series Model Medium & Heavy Conventional Body Builder Diagrams.	Splice into the transmission harness for signal uses.
Back Up Lights	Connect into body builder Connectors 4450; Cavity E circuit 71 or connect into tail light harness Connector 9303 Refer to Body Builder Connections and circuit diagrams.	Exceed 6 Amps total circuit
Clearance / Marker Lights	Connect into body builder Connector 4450; Cavity D circuit 58 or connect into tail light harness Connector 9303 Refer to Body Builder Connections and circuit diagrams.	Exceed 20 Amps total circuits.

Table 10 Electrical Dos and Don'ts (cont.)

ITEM	DO	DON'T
Dome Light	a) Connect into ESC Connector 1601; Pin C for output circuit b) Theater Dimming must be turned off in the ESC.	Connect into any door switch circuit. Exceed 10 Amps total circuit.
Fog Light	a) Connect into ESC Connector 4007; Pin A for the Fog Light output circuit. b) Fog Light accommodation must be added to the ESC.	Connect into fog light switch circuit. Exceed 15 Amps.
Headlights (including Plow Lights without Plow Light option)	Connect into Plow Light 7-way Harness connector provided with optional code 08THJ.	Connect into head light switch circuit. Exceed 20 Amps total circuit.
Panel Lights	Connect into panel lamp Buss Connector 1002 located behind the instrument panel left of the interior fuse panel.	Connect into panel dimmer switch circuit or Panel light adapter circuit A62N. Exceed 5 Amps.
Stop Lights	Connect into body builder Connector (4450 cavity B and C; circuits 56 left/ 57 right combined) (4460 cavity A and B; circuits 56 left /57 right separate) or connect into tail light harness Connector 9303. Refer to Body Builder Connections and circuit diagrams.	Connect into the stop light switch circuit at the brake pedal. Exceed 8 amps total.
Tail Lights	Connect into body builder Connector 4450; Cavity A circuits 68 or connect into tail light harness Connector 9303. Refer to Body Builder Connections and circuit diagrams.	Exceed 20 Amps Total Circuit.
Turn Signals	Connect to body builder connector (4450 cavity B and C; circuits 56 left/ 57 right combined) (4460 cavity A and B; circuits 56 left/ 57 right separate).	Connect to the input side of the turn signal switch or the electrical system controller circuit inputs. Exceed 8 amps total circuit.
Work Light	a) Connect into ESC connector 4007 PIN F Work Light Output circuit b) Work lamp accommodation must be programmed into the ESC.	Exceed 10 Amps.
Remote Power Module Connection	Connect to body builder connectors at the Remote Power Module (J3- output circuits and J4- remote inputs). Refer to Remote Power Module Section.	Exceed 20 amps per channel output with a maximum 80 amps total draw per module.

**Table 10 Electrical Dos and Don'ts (cont.)**

ITEM	DO	DON'T
Remote mounted Fuel Level (Low Fuel Warning)	Install additional fuel sender. Extract fuel gauge data from the Public J1939 data link.	Connect to fuel level gauge sender circuit or short existing fuel sending unit to chassis ground.
HVAC Interrupt (A/C compressor clutch & Blower fan interrupts)	Add a secondary A/C Evaporator to cool remote areas by tapping into the refrigerant lines with the authorized hoses. Use only the standard HVAC Control for controlling the A/C system.	Connect into HVAC A/C clutch circuit between the ESC and the A/C compressor clutch for purposes of controlling the A/C system. Connect to the high side of the pressure transducer or either of the A/C system thermistors.
Clutch switch	Install additional switch.	Connect into the clutch switch or circuit.
Brake Switch	a) Connect to the ESC connector 4004 Pin 21 active ground output circuit ESC must be programmed with the Separate Stop Feature.  b) Install additional switch.	Connect into the brake switch or circuit.

## 20. HOW DO I - GENERAL INFORMATION

The International parts system is set up to give part information that is specific to a particular vehicle as built, including all optional features that were ordered. If a feature is to be added after the vehicle was built, provide the dealer with the vehicle VIN number and the feature code to be added. The dealer will contact "Parts Spec" to obtain a listing of parts required for that feature.

The circuits provided for the feature will be what are referred to as "overlay circuits" and are to be layered on and taped to existing harnesses. In some cases, a total harness may be provided. The harness may include standard wiring circuits.

The body builder will have to refer to the circuit diagram book for connector cavity information. If the decision is made to build the overlays locally, part numbers of the terminals can be found in the back of the circuit diagram book (Connector Composites section).

All hardware associated with a specific feature code, switches, brackets, etc. will be provided. The body builder must decide which parts are to be ordered – it is not required that all parts for a code be ordered. Generally, except for a few features, there are no "kits" available, hence, detailed instructions are not provided, and this section will cover some basic direction.

If a feature is not available on a specific model, a parts list will not be provided.

Some features will require reprogramming of the ESC. If unsure, contact the dealer. If reprogramming is required, the vehicle must be returned to the dealer.

If the body builder adds a feature, they must assume full responsibility for proper operation of that feature.

International parts purchased from a dealer carry a one-year, unlimited mileage warranty. Other than the one year parts warranty, International assumes no warranty for body builder installed components or the labor to repair the body builder added feature if it is determined that the failure is not OEM related.



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## 1. MULTIPLEXING ARCHITECTURE

The electrical system on these vehicles has been significantly redesigned. Unlike the electrical systems on previous models, which utilized point-to-point wiring for all input signals and output loads, this system uses multiplex technology to provide control and communication between major functional areas of the vehicle. Multiplexing simply means, communicating multiple pieces of information via a single twisted pair of wires (called the data link) without requiring a wire for each piece of information. This information could be gauge information such as engine oil pressure, or switch information that controls vehicle functions such as headlamps.

The electrical system relies on a collection of electronic circuit modules and software to perform vehicle functions instead of implementing similar features using complex wire harness designs with electromechanical relays and switches. These electronic module components are connected together by data links. The data links can be thought of as computer networks that allow the electronic components on the vehicle to communicate with one another.

The concept of multiplexing is not new since data links for communicating between engine controllers, the instrument cluster and the diagnostic connector have been used for several years.

The goal of multiplexing is to reduce cab harness wiring and to simplify circuits. This is accomplished by using a low current data link for communicating between cab switches, the Electrical System Controller and the Instrument Cluster. Other data links in the vehicle allow other electrical controllers, the ESC and the Instrument Cluster to communicate with each other.

## 2. DATA LINKS

International's multiplexing uses two types of data links, J1708 and J1939. The J1708 data link is often referred to as ATA and J1939 is often referred to as CAN. These two types are utilized in four separate data links on the vehicle.

- **Power Train data link – J1939**

This data link provides a path for communication between the engine controller, transmission controller, antilock brake system (ABS) controller, pyrometer ammeter module (PAM), Electrical System Controller (ESC), auxiliary gauge switch pack (AGSP) and the electronic gauge cluster (EGC). It also provides for programming and diagnostic functions.

- **Body Builder data link – J1939**

This data link provides a path for communication between the remote power module(s), remote PTO, air solenoid 7 pack(s) and the ESC.

- **Switch data link – J1708**

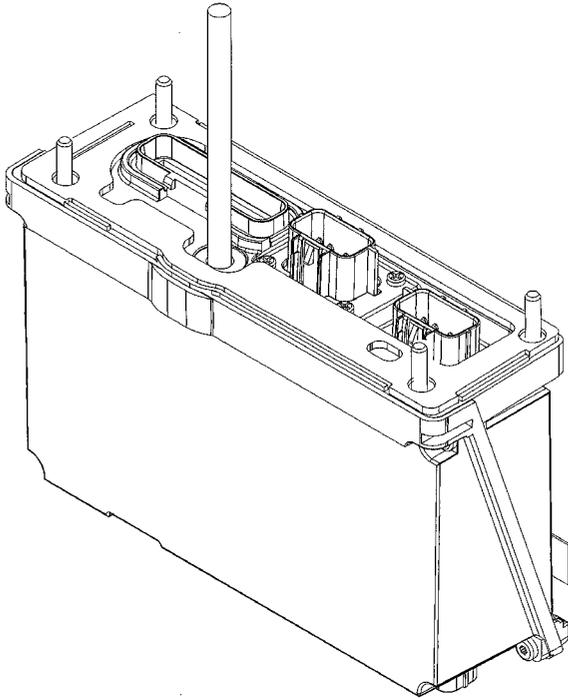
This J1708 data link provides a path for communication between the center panel switch packs, door pods and ESC.

- **ATA data link – J1708**

This is the same J1708 data link (sometimes referred to as ATA) that has been used in the past. This data link is used almost exclusively for communicating with the engine diagnostic and programming tool to identify engine electrical system problems or program desired settings controlled by the engine ECM.

### 3. ELECTRICAL SYSTEM CONTROLLER (ESC)

The heart of the multiplex system is the Electrical System Controller (ESC).

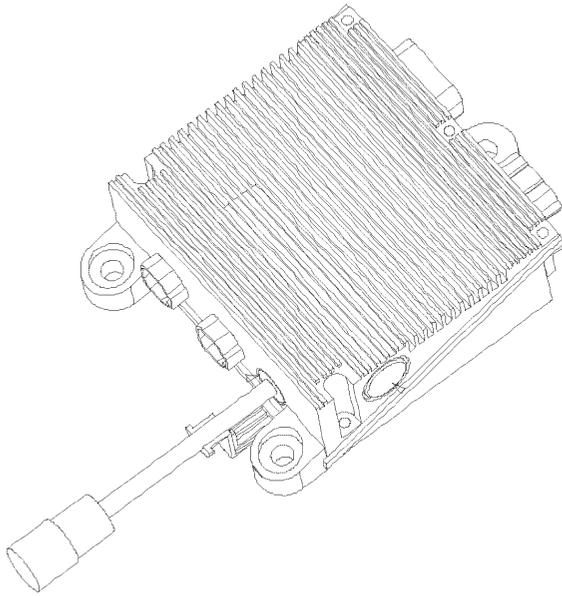


**Figure 20**

The ESC communicates with the switch packs on the switch data link, controllers from other features on the power train data link and remote power modules on the body builder data link. It also receives input from various sensors and hard wire inputs throughout the truck. The ESC converts these inputs, in accordance with the programmed “rules”, into data to be transmitted on the data links. It is also the power source for circuits that feed the components, controlled by the multiplexed switches, inside and outside of the cab. The primary vehicle software programming resides in the ESC.

### 4. REMOTE POWER MODULE (RPM)

Remote Power Modules provide a method of distributing and controlling power to various device loads on the vehicle, outside the cab, without running high current wires from in-cab switches to the loads or splicing into existing wiring.



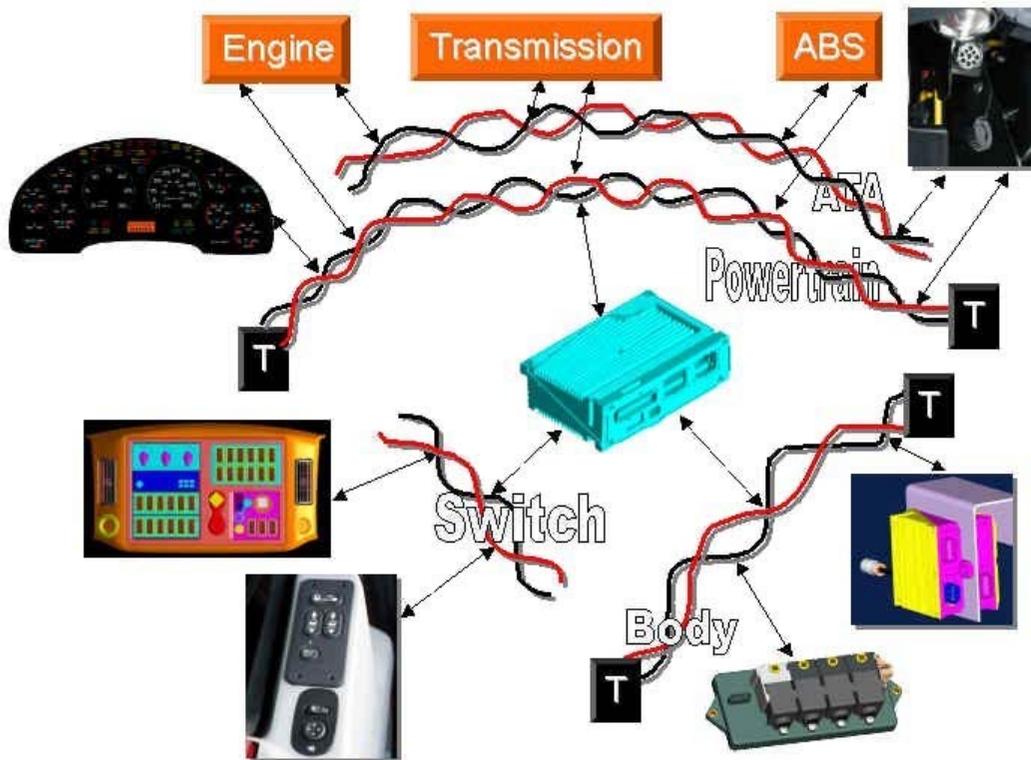
**Figure 21**

The RPM is connected to the Electrical System Controller (ESC) via the Body Builder J1939 data link (the ESC is capable of controlling up to three RPM's on the vehicle). The only wires connected to the RPM are battery power for driving the loads, the data link cable and connections to the load devices being operated by the RPM. Power is fed to the RPM through a fusible link to the battery source. Each RPM has 6 independently controllable, 20 Amp outputs (80 maximum per RPM) with virtual (software programmable) fusing similar to the ESC. If higher current capacity is needed, two outputs can be paralleled or the RPM can control a high current relay while still maintaining logic and diagnostic capability without having to wire to the inside of the cab.

Because the RPM is connected to the ESC via the data link, it also serves as an "integration gateway" to the ESC and the vehicle electrical system. Six inputs on each RPM allow information from body accessories to be communicated to the ESC and processed for interlocks, operator information/warning, etc. These inputs also allow the Body Builder to add body-mounted switches to turn on or off the same electrical devices controlled by in-cab switches.

Additional information concerning the use and installation of RPM's is contained in the applicable Feature sections that follow (see 60AAA / 60AAB in particular for detailed data on RPM connectors/pin functions, wiring and mounting).

The following is an example of how a vehicle electrical system might be configured.



**Figure 22**

The International® Diamond Logic™ electrical system, along with ICAP™ and the new Diamond Logic™ Builder software, provide the body builder with an unprecedented flexibility in adding and customizing the electrical features on a vehicle.

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## 1. GENERAL

The following section provides you with basic information of how to integrate TEM's electrical systems with the vehicle electrical system. This section includes feature descriptions, programming information and sales codes where applicable. Also included is a description of how the feature works and in some cases what the feature can be used for.

If the vehicle was not ordered with the desired feature, this section covers basic information on how to add a feature to the vehicle.

An Index of Feature Codes covered in this section is included in the Table below.

**Before proceeding, review the Introduction information.**

**Table 11 Feature Code Index**

Feature Code	Description	Section	Page
04SBL	Optional Aux. Air Pressure Gauge - Hydraulic Chassis	Gauge Cluster - Optional Gauges	04SBL(See 04SBL — Instrument Cluster – Adding Gauges, page 95)
08518	Cigar Lighter	Fused Battery Connections Inside Cab	08518(See Fused Battery Connections Inside Cab — 08518, 08718, 08WCK, page 88)
08585	Auxiliary Toggle Switch for Fog or Driving Lights	Lights - Fog/ Driving Lights	08585(See 08585, 08WPL, 08WPM, 08WLM, and 08WLN, page 142)
08718	Power Source, Cigar Type Receptacle	Fused Battery Connections Inside Cab	08718(See Fused Battery Connections Inside Cab — 08518, 08718, 08WCK, page 88)
08HAA	Body Builder Wiring, End of Frame Without Connector	Lights - Stop/Turn/Tail	08HAA(See 08HAA — Body Builder Wiring At End Of Frame, page 126)
08HAB	Body Builder Wiring, Back of Cab With Connector	Lights - Stop/Turn/Tail	08HAB(See 08HAB and 08HAE — Body Builder Wiring, page 130)
08HAE	Body Builder Wiring, End of Frame With Connector	Lights - Stop/Turn/Tail	08HAE(See 08HAB and 08HAE — Body Builder Wiring, page 130)
08HAG	Electric Brake Accommodation Package for Separate Stop/Turn, End of Frame	Electric Trailer Brakes/Lights	08HAG(See 08HAG and 08HAH — Electric Trailer Brakes, page 198)
08HAH	Electric Brake Accommodation Package for Combined Stop/Turn, End of Frame	Electric Trailer Brakes/Lights	08HAH(See 08HAG and 08HAH — Electric Trailer Brakes, page 198)
08NAA	Extending Frame and Taillight Harnesses	Lights - Stop/Turn/Tail	08NAA(See 08NAA — Extending Tail Light Harnesses, page 135)
08RBK	CB Radio Antennas	CB and 2-Way Radio Connections Inside Cab	08RBK(See 08RCB and 08RBK — CB Radios, page 90)

Table 11 Feature Code Index (cont.)

Feature Code	Description	Section	Page
08RCB	CB Radio Accommodation Package	CB and 2-Way Radio Connections Inside Cab	08RCB(See 08RCB and 08RBK — CB Radios, page 90)
08REA	2-Way Radio Accommodation Package	CB and 2-Way Radio Connections Inside Cab	08REA(See 08REA and 08RGA – 2-Way Radio, page 92)
08RGA	2-Way Radio Accommodation Package	CB and 2-Way Radio Connections Inside Cab	08RGA(See 08REA and 08RGA – 2-Way Radio, page 92)
08SAJ	In Cab Switch Controls for Body Accessories, 2 RPM's (BOC)/12 Switches	In Cab Switch Controls for Body Accessories Using Remote Power Modules	08SAJ(See Remote Power Modules (RPM), page 323)
08THJ	Auxiliary Harness for Front Plow Lights	Lights - Auxiliary Front Lights	08THJ(See 08THJ — Auxiliary Harness, page 159)
08THN	Hazard Lights Override Stop Lights	Lights - Hazards Lights Override Stop Lights	08THN(See 08THN, page 173)
08THV	Front Harness for Guidepost Lights	Lights - Auxiliary Front Lights	08THV(See 08THV — Front Guide Post Lights, page 167)
08TKK	Trailer Auxiliary Feed Circuit	Fused Battery Connections Outside Cab	08TKK(See 08TKK — Trailer Auxiliary Circuit, page 85)
08TME	7 Way Trailer Socket at End of Frame	Lights - Trailer Sockets	08TME(See 08TME and 08TMG – 7-Way Trailer Socket At End Of Frame, page 138)
08TMG	7 Way Trailer Socket at End of Frame	Lights - Trailer Sockets	08TMG(See 08TME and 08TMG – 7-Way Trailer Socket At End Of Frame, page 138)
08TMH	Switched Power to Cab Roof	Lights - Other External Lighting	08TMH(See 08TMH — Switched Power to Cab Roof, page 169)
08WAD	Battery Disconnect Switch	Battery, Ignition and Accessory Taps - Battery Disconnect Switch	08WAD(See 08WAD, 08WCS, 08WHX and 08WHY — Battery Disconnect Switch, page 78)
08WCK	Power Source, 2 Post Terminal Type	Fused Battery Connections Inside Cab	08WCK(See Fused Battery Connections Inside Cab — 08518, 08718, 08WCK, page 88)
08WCS	Battery Disconnect Switch	Battery, Ignition and Accessory Taps - Battery Disconnect Switch	08WCS(See 08WAD, 08WCS, 08WHX and 08WHY — Battery Disconnect Switch, page 78)
08WEB	Extending Frame and Taillight Harnesses	Lights - Stop/Turn/Tail	08WEB(See 08WEB — Center Chassis Extension Harness, page 137)

Table 11 Feature Code Index (cont.)

Feature Code	Description	Section	Page
08WGA	Remote Air Solenoids	Remote Air Solenoid Modules	08WGA(See 08WGA, 08WGB, 08WGC, 08WGD, 08WGP and 08WGR — TEM Air Solenoids, page 415)
08WGB	Remote Air Solenoids	Remote Air Solenoid Modules	08WGB(See 08WGA, 08WGB, 08WGC, 08WGD, 08WGP and 08WGR — TEM Air Solenoids, page 415)
08WGC	Remote Air Solenoids	Remote Air Solenoid Modules	08WGC(See 08WGA, 08WGB, 08WGC, 08WGD, 08WGP and 08WGR — TEM Air Solenoids, page 415)
08WGD	Remote Air Solenoids	Remote Air Solenoid Modules	08WGD(See 08WGA, 08WGB, 08WGC, 08WGD, 08WGP and 08WGR — TEM Air Solenoids, page 415)
08WGL	Windshield Wiper Speed Control	Cab Features	08WGL(See 08WGL — Windshield Wiper Speed Control, page 428)
08WGP	Remote Air Solenoids	Remote Air Solenoid Modules	08WGP(See 08WGA, 08WGB, 08WGC, 08WGD, 08WGP and 08WGR — TEM Air Solenoids, page 415)
08WGR	Remote Air Solenoids	Remote Air Solenoid Modules	08WGR(See 08WGA, 08WGB, 08WGC, 08WGD, 08WGP and 08WGR — TEM Air Solenoids, page 415)
08WHX	Battery Disconnect Switch	Battery Disconnect Switch	08WHX(See 08WAD, 08WCS, 08WHX and 08WHY — Battery Disconnect Switch, page 78)
08WHY	Battery Disconnect Switch	Battery Disconnect Switch	08WHY(See 08WAD, 08WCS, 08WHX and 08WHY — Battery Disconnect Switch, page 78)
08WHZ	Fused Battery Connections Outside Cab	Battery, Ignition and Accessory Taps - Battery Disconnect Switch	08WHZ(See 08WHZ — Body Power Feeds, page 81)
08WJA	Special 200 Amp Max Lift Gate Power Source	High Current In Cab Switch Controls For Body Accessories	08WJA(See 08WJA, 08WJB — Power Source For Lift Gate, page 392)
08WJB	Power Source For Customer Lift Gate	High Current In Cab Switch Controls For Body Accessories	08WJB(See 08WJA, 08WJB — Power Source For Lift Gate, page 392)

Table 11 Feature Code Index (cont.)

Feature Code	Description	Section	Page
08WLL	Pedestal Mounted Work Light	Lights - Work Light/Aux Rear Light	08WLL(See 08WLL (Tractor) and 08WMA (Straight Truck), page 152)
08WLM	Fog Lights (Peterson) - Amber, Oval - 4000 Series	Lights - Fog/Driving Lights	08WLM(See 08585, 08WPL, 08WPM, 08WLM, and 08WLN, page 142)
08WLN	Fog Lights (Peterson) - Clear, Oval - 4000 Series	Lights - Fog/Driving Lights	08WLN(See 08585, 08WPL, 08WPM, 08WLM, and 08WLN, page 142)
08WMA	Work Light Accommodation Package - Customer Supplied Light or Aux. Application	Lights - Work Light/Aux Rear Light	08WMA(See 08WLL (Tractor) and 08WMA (Straight Truck), page 152)
08WPK	Courtesy Lights	Lights - In Cab Lighting	
08WPL	Fog Lights - Amber, Oval - 4000 Series	Lights - Fog/Driving Lights	08WPL(See 08585, 08WPL, 08WPM, 08WLM, and 08WLN, page 142)
08WPM	Fog Lights - Clear, Oval - 4000 Series	Lights - Fog/Driving Lights	08WPM(See 08585, 08WPL, 08WPM, 08WLM, and 08WLN, page 142)
08WPZ	Test Exterior Lamps Except Back-Ups	Lights — Exterior Lamp Test	08WPZ(See 08WPZ — Test Exterior Lamps Except Back Ups, page 177)
08WRB	Headlights On With Wipers	Lights — On With Wipers	08WRB(See 08WRB — Headlights On With Wipers, page 179)
08WSK	In Cab Switch Controls for Body Accessories, 1 RPM (EOF)/6 Switches	In Cab Switch Controls for Body Accessories Using Remote Power Modules	08WSK(See Remote Power Modules (RPM), page 323)
08WSM	In Cab Switch Controls for Body Accessories, 1 RPM (BOC)/6 Switches	In Cab Switch Controls for Body Accessories Using Remote Power Modules	08WSM(See Remote Power Modules (RPM), page 323)
08WTJ	In Cab Switch Controls for Body Accessories, 1 RPM (EOF)/6 Switches	In Cab Switch Controls for Body Accessories Using Remote Power Modules	08WTJ(See 08WTJ — Switch Body Circuits Frame MTG Rear, page 371)
08XBK	Auxiliary 40 Amp Circuit, Switch Controlled	High current In Cab Switch Controls for Body Accessories	08XBK(See 08XBK — Auxiliary 40 Amp Circuit, Switch Controlled, page 390)
12VXY	Remote Mounted Engine Speed Control	Remote Engine Speed Control	12VXY(See 12VXY — Remote Mounted Engine Control, page 203)
13WTA	Allison Spare Input/Output for General Truck, Utility, Refuse, Dump, Bus and Pickup & Delivery	Automatic Transmission Interfaces	13WTA(See Automatic Transmission Interfaces, page 183)

Table 11 Feature Code Index (cont.)

Feature Code	Description	Section	Page
13WTB	Allison Spare Input/Output for Dump/Construction with Two-Speed Axle or Auxiliary Transmission	Automatic Transmission Interfaces	13WTB(See Automatic Transmission Interfaces, page 183)
13WTE	Allison Spare Input/Output for Fire Truck/ Emergency Vehicles	Automatic Transmission Interfaces	13WTE(See Automatic Transmission Interfaces, page 183)
13WTK	Allison Spare Input/Output for Sewer Evacuator	Automatic Transmission Interfaces	13WTK(See Automatic Transmission Interfaces, page 183)
13WTL	Allison Spare Input/Output for Refuse With Automatic Neutral for PTO	Automatic Transmission Interfaces	13WTL(See Automatic Transmission Interfaces, page 183)
13XAA	Dash Mounted PTO Control for Customer Provided Clutched Electric Over Air PTO	PTO	13XAA(See 13XAA — PTO Control, page 271)
16HGG	Optional Engine Oil Temperature Gauge	Gauge Cluster - Optional Gauges	16HGG(See 16HGG — Instrument Cluster – Adding Gauges, page 99)
16HGH	Optional Allison Transmission Oil Temperature Gauge	Gauge Cluster - Optional Gauges	16HGH(See 16HGH — Instrument Cluster – Adding Gauges, page 103)
16HGJ	Optional Manual Transmission Oil Temperature Gauge	Gauge Cluster - Optional Gauges	16HGJ(See 16HGJ — Instrument Cluster – Adding Gauges, page 108)
16HGL	Optional Rear Axle Oil Temperature Gauge	Gauge Cluster - Optional Gauges	16HGL(See 16HGL — Instrument Cluster – Adding Gauges, page 113)
16HGN	Optional Air Application Gauge	Gauge Cluster - Optional Gauges	16HGN(See 16HGN — Instrument Cluster – Adding Gauges, page 119)
16HKA	Optional IP Cluster display — Omit fault codes	Gauge Cluster - Optional Gauges	16HKA(See 16HKA — Instrument Cluster – Omit Fault Codes, page 123)
16WJU	Power Windows/Locks (2)	Power Windows/Locks, Remote Keyless Entry	16WJU(See 16WJU, 16WJV and 16WKZ — Electric Windows, Remote Lock and Unlock, and Use of the Aux Feature, page 191)
16WJV	Power Windows/Locks (4)	Power Windows/Locks, Remote Keyless Entry	16WJV(See 16WJU, 16WJV and 16WKZ — Electric Windows, Remote Lock and Unlock, and Use of the Aux Feature, page 191)
16WKZ	Remote Keyless Entry & Use of Aux Feature	Power Windows/Locks, Remote Keyless Entry	16WKZ(See 16WJU, 16WJV and 16WKZ — Electric Windows, Remote Lock and Unlock, and Use of the Aux Feature, page 191)

Table 11 Feature Code Index (cont.)

Feature Code	Description	Section	Page
16WLM	PTO Hourmeter for Customer Supplied PTO	PTO	16WLM(See 16WLM — PTO Hourmeter, page 279)
60AAA	Remote Power Module (1) With 6-Switch Pack	In Cab Switch Controls for Body Accessories Using Remote Power Modules	60AAA(See 60AAA (One), 60AAB (Two) — Remote Power Modules (RPM), page 356)
60AAB	Remote Power Modules (2) With 6-Switch Packs (2)	In Cab Switch Controls for Body Accessories Using Remote Power Modules	60AAB(See 60AAA (One), 60AAB (Two) — Remote Power Modules (RPM), page 356)
60ABA	Cable Shift PTO Accommodation Package	PTO	60ABA(See 60ABA – PTO Accommodation Cable Shift, page 208)
60ABB	Lectra-Shift PTO Accommodation Package	PTO	60ABB(See 60ABB – PTO Accommodation Muncie® Powerflex™ Lectra-Shift, page 214)
60ABC	Remote Start/Stop	Remote Start/Stop	60ABC(See 60ABC — Remote Start/Stop, page 304)
60ABD	Remote Start/Stop With Emergency Pump Accommodation	Remote Start/Stop	60ABD(See 60ABD — Remote Start/Stop with Emergency Pump, page 306)
60ABE	Electric Over Hydraulic PTO Accommodation Package	PTO	60ABE(See 60ABE — PTO Accommodation for Electric over Hydraulic PTO, page 231)
60ABK	Electric Over Air (Non-Clutched) PTO Accommodation Package	PTO	60ABK(See 60ABK — PTO Accommodation Electric over Air Non-Clutched, page 244)
60ABL	Electric Over Air (Clutched) PTO Accommodation Package	PTO	60ABL(See 60ABL — PTO Accommodation Electric Over Air Clutched, page 258)
60ACE	In Cab Switch Controls for High Current (40A) Body Accessories	High current In Cab Switch Controls for Body Accessories	60ACE(See 60ACE — Dual Output Latched Switch 40 Amps, page 387)
60ACG	In Cab Switch Control (1) With Vehicle Speed Interlock for Body Accessories	Interlocked Switch Controls for Body Accessories	60ACG(See 60ACG — One Interlocked Latched Switch Disengage at 30 MPH, page 400)
60ACH	In Cab Switch Controls (2) With Vehicle Speed Interlock for Body Accessories	Interlocked Switch Controls for Body Accessories	60ACH(See 60ACH — Two Interlocked Latched Switch Disengage at 30 MPH, page 406)

Table 11 Feature Code Index (cont.)

Feature Code	Description	Section	Page
60ACS	In Cab/External Switch Control (1) for Body Accessories	In Cab & External (3 way) Controls for Body Accessories	60ACS(See 60ACS — One Momentary Rocker Switch / Remote Switch Capability, page 373)
60ACT	In Cab/External Switch Controls (2) for Body Accessories	In Cab & External (3 way) Controls for Body Accessories	60ACT(See 60ACT — Two Momentary Rocker Switches/ Remote Switch Capability, page 377)
60ACU	In Cab/External Switch Controls (3) for Body Accessories	In Cab & External (3 way) Controls for Body Accessories	60ACU(See 60ACU — Three Momentary Rocker Switches/ Remote Switch Capability, page 381)
60ACW	Body Integration Input/Output Expansion Harness	Electrical System Controller (ESC)	60ACW(See 60ACW — Body Integration, I/O Expansion Harness, page 63)
60AJA	Throttle Control Accommodation for Single Customer Mounted External Engine Speed Control Switch - Recovery Applications	Remote Throttle	60AJA(See 60AJA — Remote Throttle Control Interlocked to Park Brake Applied — Recovery Only, page 281)
60AJC	Special Gauge Cluster Indicators and Alarms (Gate Open and Rear Alert) for Refuse Applications	Special Gauge Cluster Indicators and Alarms	60AJC(See 60AJC — Two Indicator Lights and Audible Alarms Programmable Mode for Various Switch Actions (Waste Solution), page 309)
60AJD	Special Gauge Cluster Indicators and Alarms (Boom Not Stowed and Outriggers Not Stowed) for Utility Applications	Special Gauge Cluster Indicators and Alarms	60AJD(See 60AJD — Body Integrated, Indicator Lights (Utility Solutions), page 315)
60AJE	Throttle Control Accommodation for Single Customer Mounted External Engine Speed Control Switch - General Purpose	Remote Throttle	60AJE(See 60AJE — Remote Throttle Control Interlocked to Park Brake Applied, page 285)
60AJG	Throttle Control Accommodation for Single Customer Mounted External Engine Speed Control Switch - Utility Applications	Remote Throttle	60AJG(See 60AJG — Remote Throttle Control Programmable Mode for Various Switch Actions, page 291)
60AJH	Remote Throttle Control for Dual Function Engine Running/Emergency Power Engine Off	Remote Throttle	60AJH(See 60AJH — Remote Throttle Control for Dual Function Engine Running / Emergency Power Engine Off, page 296)

**Table 11 Feature Code Index (cont.)**

Feature Code	Description	Section	Page
60AJJ	Remote Throttle Control for Customer mounted Momentary Switch - Refuse Applications	Remote Throttle	60AJJ(See 60AJJ — Remote Throttle Control Interlocked to Park Brake Applied — Refuse, page 300)
60AJK	Body Integration, Indicator Lights	Special Gauge Cluster Indicators and Alarms	60AJK(See 60AJK — Dump Box Indicator Lights And Alarm, page 319)
None	Lights On With Wipers	Lights - Lights On With Wipers	Lights On With Wipers(See Lights On With Wipers (LOWW) / Day Time Running Lights (DTRL), page 175)
None	Day Time Running Lights	Lights - Daytime Running Lights	Day Time Running Lights(See Lights On With Wipers (LOWW) / Day Time Running Lights (DTRL), page 175)
Standard	Park Brake Set Connection	ESC	Park Brake Set Connection(See Park, Dome and Brake (Stop Lamp) ESC Connections, page 66)
Standard	Brake Applied Connection	ESC	Brake Applied Connection(See Park, Dome and Brake (Stop Lamp) ESC Connections, page 66)
Standard	Dome Light Tap	ESC	Dome Light Tap(See Park, Dome and Brake (Stop Lamp) ESC Connections, page 66)

## 2. ELECTRICAL SYSTEM CONTROLLER (ESC)

### 2.1. ELECTRICAL SYSTEM CONTROLLER (3200, 4200, 4300, 4400, 7000 MODELS)

At the center of the Diamond Logic™ Electrical System is the Electrical System Controller (ESC). The ESC is an electronic module that provides multiple analog and switched input/output interfaces to monitor vehicle sensors and control vehicle functions through solid state switches, relay driver outputs and serial data communications. Serial data links connected to the ESC include:

- A Drivetrain J1939 data link to communicate information between the engine, transmission, ABS, the ESC and the instrument panel.
- A Switch Data Link for communicating switch status between the rocker switch assemblies (in the instrument panel and the switches in the door pods) and the ESC.
- A Body Builder Data Link to interface optional input/output modules with the ESC.

The ESC is located under the instrument panel on the driver's side and is attached to the cab dash panel. It has connections to the dash harness in the engine compartment and to the instrument panel harness inside the cab. The ESC receives battery power from the maxi-fuse block and ignition power from the instrument panel harness.

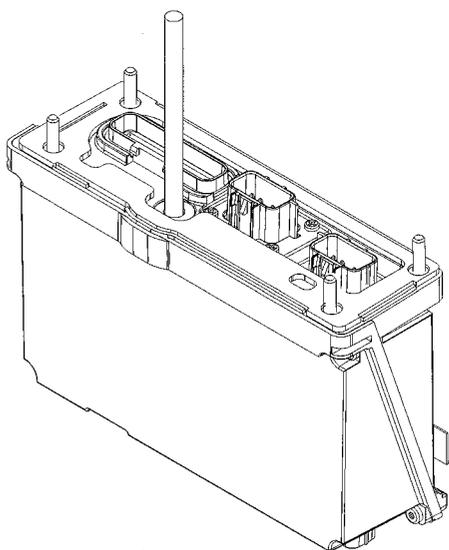
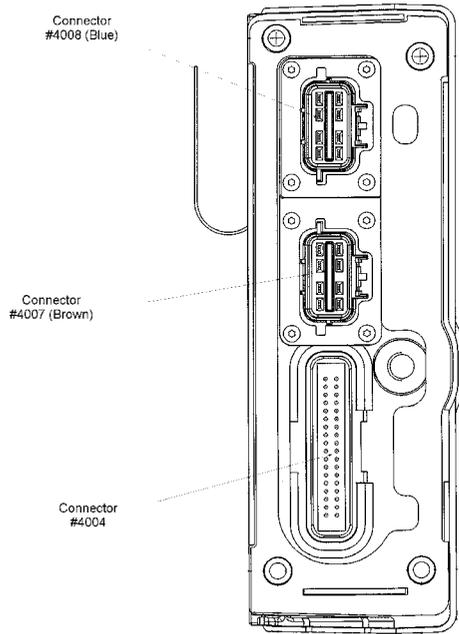


Figure 23 Electrical System Controller

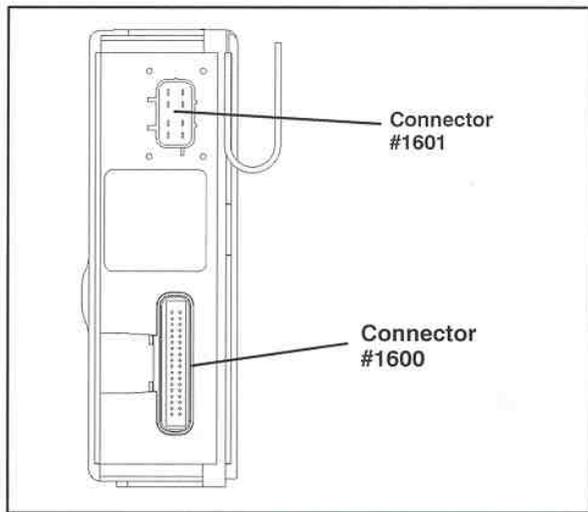
**NOTE – Pin 3 of the cab 36-way connector (1600) and pin 26 of the chassis 36-way connector (4004) are the Zero Volt Reference for various sensors on the vehicle and should NEVER have battery voltage applied to them. Doing so will permanently damage the ESC. Do not connect other ground signals to the Zero Volt Reference.**

#### Standard Interface Signals

The ESC provides standard interface signals for Park Brake Set, Dome Light and Brake Applied. These interface signals are described at the end of this section.



**Figure 24 Engine Compartment View**



**Figure 25 Inside Cab View**

## ESC Module Connectors

Table 12

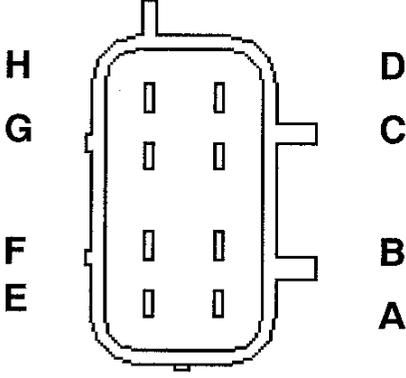
		
#4007 Brown Front End Output		Engine Side Bottom 8-Way Connector
Pin	Source	Description
A	20 amp FET	Fog Lamps/ Plow Lights
B	10 amp FET	Right Front Turn Signal
C	10 amp FET	Left Front Turn Signal
D	20 amp FET	Headlamp, Low Beam
E	10 amp FET	Horn, Electric
F	10 amp FET	Work Lamp
G	20 amp FET	Headlamp, High Beam
H	15 amp FET	Park/ Marker Lamps

Table 13

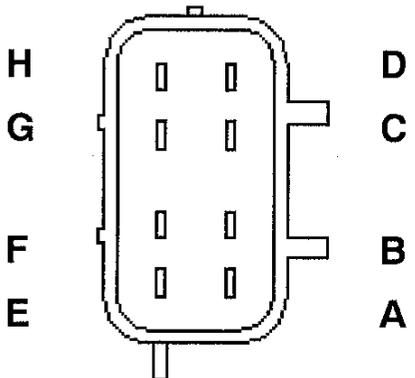
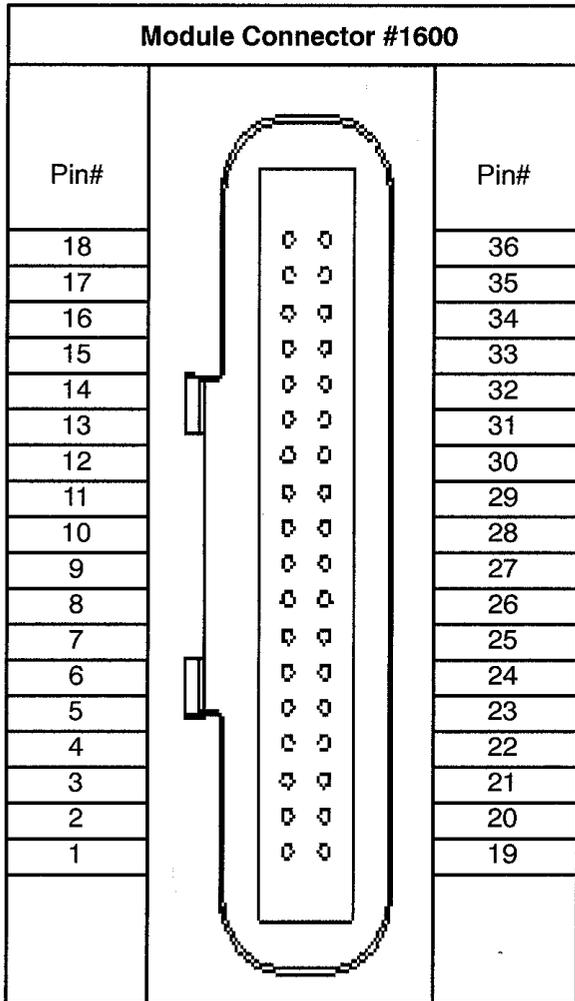
		
#4008 Blue Chassis Output		Engine Side Top 8-Way Connector
Pin	Source	Description
A	10 amp FET	Solenoid Valve Power
B	10 amp FET	Right Rear Turn Lamp
C	10 amp FET	Left Rear Turn Lamp
D	-----	Hyd. Pump Monitor
E	-----	Not used
F	15 amp FET	Windshield Wiper Power
G	10 amp FET	AC Compressor Clutch
H	-----	Not used

Table 14

#1601 Brown Inside Cab Output		Inside Cab 8-Way Connector
Pin	Source	Description
A	Relay Driver	Various
B	Ground	Ground
C	10 amp FET	Dome Lamps
D	20 amp FET	Fog Lamps/ Plow Lights
E	Relay Driver	Various
F	10 amp FET	Work Lamps
G	20 amp FET	Mirror Heaters
H	15 amp FET	Park/ Marker Lamps

**Module Connector #1600 Inside The Cab**

**WARNING: NO CONNECTIONS OR SPLICES ARE ALLOWABLE ON ANY SIGNALS THAT ARE HIGHLIGHTED IN BOLD ITALIC BELOW.**



**Figure 26 Inside Cab Mating View**

Table 15

#1600 In-Cab		Air Chassis		Hydraulic Chassis	
36-Way Connector		Pin Description		Pin Description	
Pin	Type	Automatic Transmission	Manual Transmission	Automatic Transmission	Manual Transmission
1	Chassis Ground	Connect to Ground Stud			
2	<b>Input (12v Active)</b>	<b>Accessory Key Switch</b>	<b>Accessory Key Switch</b>	<b>Accessory Key Switch</b>	<b>Accessory Key Switch</b>
3	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>
4	Output (Gnd Active)	Park Brake	Park Brake	Park Brake	Park Brake
5	Input (Gnd Active)	Air Horn Switch Signal			
6	Output (Gnd Active)	Trans. Park Interlock	Not used	Trans. Park Interlock	Not used
7	<b>Input (Gnd Active)</b>	<b>A/C Request</b>	<b>A/C Request</b>	<b>A/C Request</b>	<b>A/C Request</b>
8	<b>Input (Gnd Active)</b>	<b>HVAC Diagnostic</b>	<b>HVAC Diagnostic</b>	<b>HVAC Diagnostic</b>	<b>HVAC Diagnostic</b>
9	Input (Gnd Active)	Not used	Not used	Not used	Not used
10	<b>Input (Gnd Active)</b>	<b>Cruise Control Switches</b>	<b>Cruise Control Switches</b>	<b>Cruise Control Switches</b>	<b>Cruise Control Switches</b>
11	Output (Gnd Active)	Not used	Not used	Not used	Not used
12	<b>Input (12v Active)</b>	<b>Ignition Key Switch</b>	<b>Ignition Key Switch</b>	<b>Ignition Key Switch</b>	<b>Ignition Key Switch</b>
13	<b>Input (Gnd Active)</b>	<b>Electric Horn Switch</b>	<b>Electric Horn Switch</b>	<b>Electric Horn Switch</b>	<b>Electric Horn Switch</b>
14	<b>Input (12v Active)</b>	<b>Headlight Enable</b>	<b>Headlight Enable</b>	<b>Headlight Enable</b>	<b>Headlight Enable</b>
15	<b>Input</b>	<b>Primary Air Pressure Sensor</b>	<b>Primary Air Pressure Sensor</b>	<b>Auxiliary Air Pressure Sensor</b>	<b>Auxiliary Air Pressure Sensor</b>
16*	Input	<b>Secondary Air Pressure Sensor</b>	<b>Secondary Air Pressure Sensor</b>	Secondary Air Sensor	Secondary Air Sensor
17	Input (Gnd Active)	Not used	Clutch Switch Input	Not used	Clutch Switch Input
18	<b>Input (Gnd Active)</b>	<b>Right Turn Signal Switch</b>			

#1600 In-Cab		Air Chassis		Hydraulic Chassis	
36-Way Connector		Pin Description		Pin Description	
Pin	Type	Automatic Transmission	Manual Transmission	Automatic Transmission	Manual Transmission
19	<i>Input (Gnd Active)</i>	<i>Left Turn Signal Switch</i>			
20	<i>Input (Gnd Active)</i>	<i>High Beam Switch</i>	<i>High Beam Switch</i>	<i>High Beam Switch</i>	<i>High Beam Switch</i>
21	<i>Input (Gnd Active)</i>	<i>Flash to Pass Switch</i>			
22	<i>Input (Gnd Active)</i>	<i>Wiper_0 Switch</i>	<i>Wiper_0 Switch</i>	<i>Wiper_0 Switch</i>	<i>Wiper_0 Switch</i>
23	<i>Input (Gnd Active)</i>	<i>Wiper_1 Switch</i>	<i>Wiper_1 Switch</i>	<i>Wiper_1 Switch</i>	<i>Wiper_1 Switch</i>
24	<i>Input (Gnd Active)</i>	<i>Wiper_2 Switch</i>	<i>Wiper_2 Switch</i>	<i>Wiper_2 Switch</i>	<i>Wiper_2 Switch</i>
25	<i>Input (Gnd Active)</i>	<i>Door Switches</i>	<i>Door Switches</i>	<i>Door Switches</i>	<i>Door Switches</i>
26	Input (Gnd Active)	Spare Input	Spare Input	Spare Input	Spare Input
27	<i>Output (5 v, 100m Amp)</i>	<i>Sensor 5 Vdc Out</i>			
28	<i>Input (Gnd Active)</i>	<i>Windshield Wash Switch</i>	<i>Windshield Wash Switch</i>	<i>Windshield Wash Switch</i>	<i>Windshield Wash Switch</i>
29	<i>Switch Data Link + 1708</i>	<i>Switch Data Link +</i>			
30	<i>Switch Data Link - 1708</i>	<i>Switch Data Link -</i>			
31	Input (Gnd Active)	Spare Input	Spare Input	Spare Input	Spare Input
32	<i>Input (Gnd Active)</i>	<i>Park Brake Switch</i>	<i>Park Brake Switch</i>	<i>Park Brake Switch</i>	<i>Park Brake Switch</i>
33	<i>Input (Gnd Active)</i>	<i>Brake Analog Switch</i>	<i>Brake Analog Switch</i>	<i>Brake Switch</i>	<i>Brake Switch</i>
34	Drive Train J1939+				
35	Drive Train J1939-				

#1600 In-Cab		Air Chassis		Hydraulic Chassis	
36-Way Connector		Pin Description		Pin Description	
Pin	Type	Automatic Transmission	Manual Transmission	Automatic Transmission	Manual Transmission
36	Drive Train J1939 Shield				

\* The circuit attached to this pin should NOT have additional connections or splices added on an air chassis.

Note: All outputs will handle up to a 500 mAmp load unless stated otherwise.

Note: Circuits labeled "Gnd Active", "12v Active", or "5v Active" are open circuit until active.

**No connections or splices are allowable on any signals that are highlighted in bold italic.**

Module Connector #4004 Outside The Cab

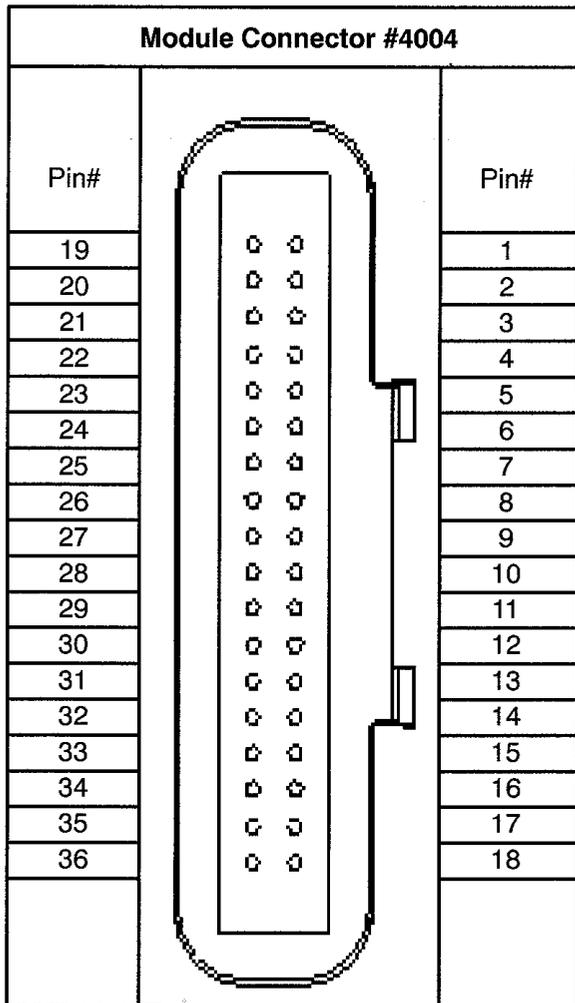


Figure 27 Outside Cab Mating View

Table 16

#4004 Chassis		Air Chassis		Hydraulic Chassis	
Harness Connector		Pin Description		Pin Description	
Pin	Type	Automatic Transmission	Manual Transmission	Automatic Transmission	Manual Transmission
1	<i>Input</i>	<i>RR Axle Oil Temp. Sensor</i>	<i>RR Axle Oil Temp. Sensor</i>	<i>RR Axle Oil Temp. Sensor</i>	<i>RR Axle Oil Temp. Sensor</i>
2	<i>Input</i>	<i>FR Axle Oil Temp. Sensor</i>	<i>FR Axle Oil Temp. Sensor</i>	<i>Not used</i>	<i>Not used</i>
3	<i>Input</i>	<i>PTO Hour Meter</i>	<i>PTO Hour Meter OR Manual Transmission Oil Temp</i>	<i>PTO Hour Meter</i>	<i>PTO Hour Meter OR Manual Transmission Oil Temp</i>
4	<i>Input</i>	<i>Fuel Level #2 Sensor</i>	<i>Fuel Level #2 Sensor</i>	<i>Fuel Level #2 Sensor</i>	<i>Fuel Level #2 Sensor</i>
5	<i>Input</i>	<i>Fuel Level #1 Sensor</i>	<i>Fuel Level #1 Sensor</i>	<i>Fuel Level #1 Sensor</i>	<i>Fuel Level #1 Sensor</i>
6	<i>Input</i>	<i>AC Outlet Temp. Sensor</i>	<i>AC Outlet Temp. Sensor</i>	<i>AC Outlet Temp. Sensor</i>	<i>AC Outlet Temp. Sensor</i>
7	<i>Input</i>	<i>AC Inlet Temp. Sensor</i>	<i>AC Inlet Temp. Sensor</i>	<i>AC Inlet Temp. Sensor</i>	<i>AC Inlet Temp. Sensor</i>
8	<i>Input</i>	<i>HVAC High Side Xducer</i>	<i>HVAC High Side Xducer</i>	<i>HVAC High Side Xducer</i>	<i>HVAC High Side Xducer</i>
9	Input (Gnd Active)	Not used	Not used	Not used	Not used
10	Input (Gnd Active)	Reverse Gear Monitor for Lift Axle (7000 Series)	Reverse Gear Monitor for Lift Axle (7000 Series)	Not used	Not used
11	<i>Input (12v Active)</i>	<i>Water in Fuel Warn Light</i>	<i>Water in Fuel Warn Light</i>	<i>Water in Fuel Warn Light</i>	<i>Water in Fuel Warn Light</i>
12	<i>Input (Gnd Active)</i>	<i>Low Washer Fluid W/L</i>	<i>Low Washer Fluid W/L</i>	<i>Low Washer Fluid W/L</i>	<i>Low Washer Fluid W/L</i>
13	<i>Input (12v Active)</i>	<i>Brake Application Air</i>	<i>Brake Application Air</i>	<i>ABS Drive Axle Event</i>	<i>ABS Drive Axle Event</i>
14	<i>Input (Gnd Active)</i>	<i>Fuel Filter Plugged W/L</i>	<i>Fuel Filter Plugged W/L</i>	<i>Fuel Filter Plugged W/L</i>	<i>Fuel Filter Plugged W/L</i>
15	<i>Input (12v Active)</i>	<i>Neutral Switch</i>	<i>Neutral Switch</i>	<i>Neutral Switch</i>	<i>Neutral Switch</i>
16	<i>Input (Gnd Active)</i>	<i>Park Brake Status</i>	<i>Park Brake Status</i>	<i>Park Brake Status</i>	<i>Park Brake Status</i>
17	Output (Gnd Active)	Trailer Marker Relay	Trailer Marker Relay	Trailer Marker Relay	Trailer Marker Relay

#4004 Chassis		Air Chassis		Hydraulic Chassis	
Harness Connector		Pin Description		Pin Description	
Pin	Type	Automatic Transmission	Manual Transmission	Automatic Transmission	Manual Transmission
18	Input (Gnd Active)	Not used	Not used	Not used	Not used
19	Output (Gnd Active)	AutoNeutral Relay/ PRNDL Interlock	Not used	AutoNeutral Relay/ PRNDL Interlock	Not used
20	Output (Gnd Active)	Wiper Relay High	Wiper Relay High	Wiper Relay High	Wiper Relay High
21	Output (Gnd Active)	Separate Stop Relay	Separate Stop Relay	Separate Stop Relay	Separate Stop Relay
22	Output (Gnd Active)	4 Pack Solenoid Chan 3	4 Pack Solenoid Chan 3	4 Pack Solenoid Chan 3	4 Pack Solenoid Chan 3
23	Output (Gnd Active)	Lift Axle 1 (7000 Series)	Lift Axle 1 (7000 Series)	<b>ABS Warning Lamp/ Test</b>	<b>ABS Warning Lamp/ Test</b>
24	Output (Gnd Active)	4 Pack Solenoid Chan 2	4 Pack Solenoid Chan 2	4 Pack Solenoid Chan 2	4 Pack Solenoid Chan 2
25	Output (1 Amp) (12v Active)	Fuel Transfer Pump	Fuel Transfer Pump	Fuel Transfer Pump	Fuel Transfer Pump
<b>26</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>	<b>Zero Volt Reference</b>
<b>27</b>	<b>Output (5 v, 100 mAmp)</b>	<b>Sensor 5 Vdc Out</b>	<b>Sensor 5 Vdc Out</b>	<b>Sensor 5 Vdc Out</b>	<b>Sensor 5 Vdc Out</b>
28*	Output (1 Amp) (12v Active)	Not used	Not used	<b>Hydromax Cont. High</b>	<b>Hydromax Cont. High</b>
29	Output (Gnd Active)	Wiper Speed Low	Wiper Speed Low	Wiper Speed Low	Wiper Speed Low
30	Output (Gnd Active)	4 Pack Solenoid Chan 4	4 Pack Solenoid Chan 4	4 Pack Solenoid Chan 4	4 Pack Solenoid Chan 4
31	Output (Gnd Active)	4 Pack Solenoid Chan 1	4 Pack Solenoid Chan 1	4 Pack Solenoid Chan 1	4 Pack Solenoid Chan 1
32	Output (Gnd Active)	Lift Axle 2 (7000 Series)	Lift Axle 2 (7000 Series)	Not used	Not used
<b>33</b>	<b>Input (Gnd Active)</b>	<b>Brake Analog Switch</b>	<b>Brake Analog Switch</b>	<b>Brake Analog Switch</b>	<b>Brake Analog Switch</b>
34	Body Data Link +	Body Link J1939+	Body Link J1939+	Body Link J1939+	Body Link J1939+
35	Body Data Link -	Body Link J1939-	Body Link J1939-	Body Link J1939-	Body Link J1939-

#4004 Chassis		Air Chassis		Hydraulic Chassis	
Harness Connector		Pin Description		Pin Description	
Pin	Type	Automatic Transmission	Manual Transmission	Automatic Transmission	Manual Transmission
36	Body Data Link Shield	Body Link J1939 Shield			
<p>* The circuit attached to this pin should NOT have additional connections or splices added on a hydraulic chassis.</p> <p>Note: All outputs will handle up to a 500 mAmp load unless stated otherwise.</p> <p>Note: Circuits labeled "Gnd Active", "12v Active", or "5v Active" are open circuit until active.</p> <p><b><i>No connections or splices are allowable on any signals that are highlighted in bold italic.</i></b></p>					

## 2.2. 60ACW — BODY INTEGRATION, I/O EXPANSION HARNESS

### FEATURE CODE DESCRIPTION:

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 ground 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 and (2) relay driver outputs to the ESC. Inputs, (2) relay driver outputs and (1) zero-volt reference (ZVR) on the ESC as well as an expansion overlay harness that is part of the Instrument Panel (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 48-way passthru connector if desired.

### Description of each digital input:

- Ground active inputs,

**Digital Input 1:** pin 26 of ESC connector #1600

**Digital Input 2:** pin 31 of ESC connector #1600

Refer to #1600 connector pinout for pinout description.

### Description of each relay driver output:

- 0.5 Amp relay driver output,

**NOTE – The following pins are NOT assigned with 595283. Digital Logic must be used to assign these pins.**

**Relay Driver Output 1:** pin A of ESC connector #1601

**Relay Driver Output 2:** pin E of ESC connector #1601

Refer to #1601 connector pinout for pinout description.

### Description of ZVR:

- Allows for the return of D.C. 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.**

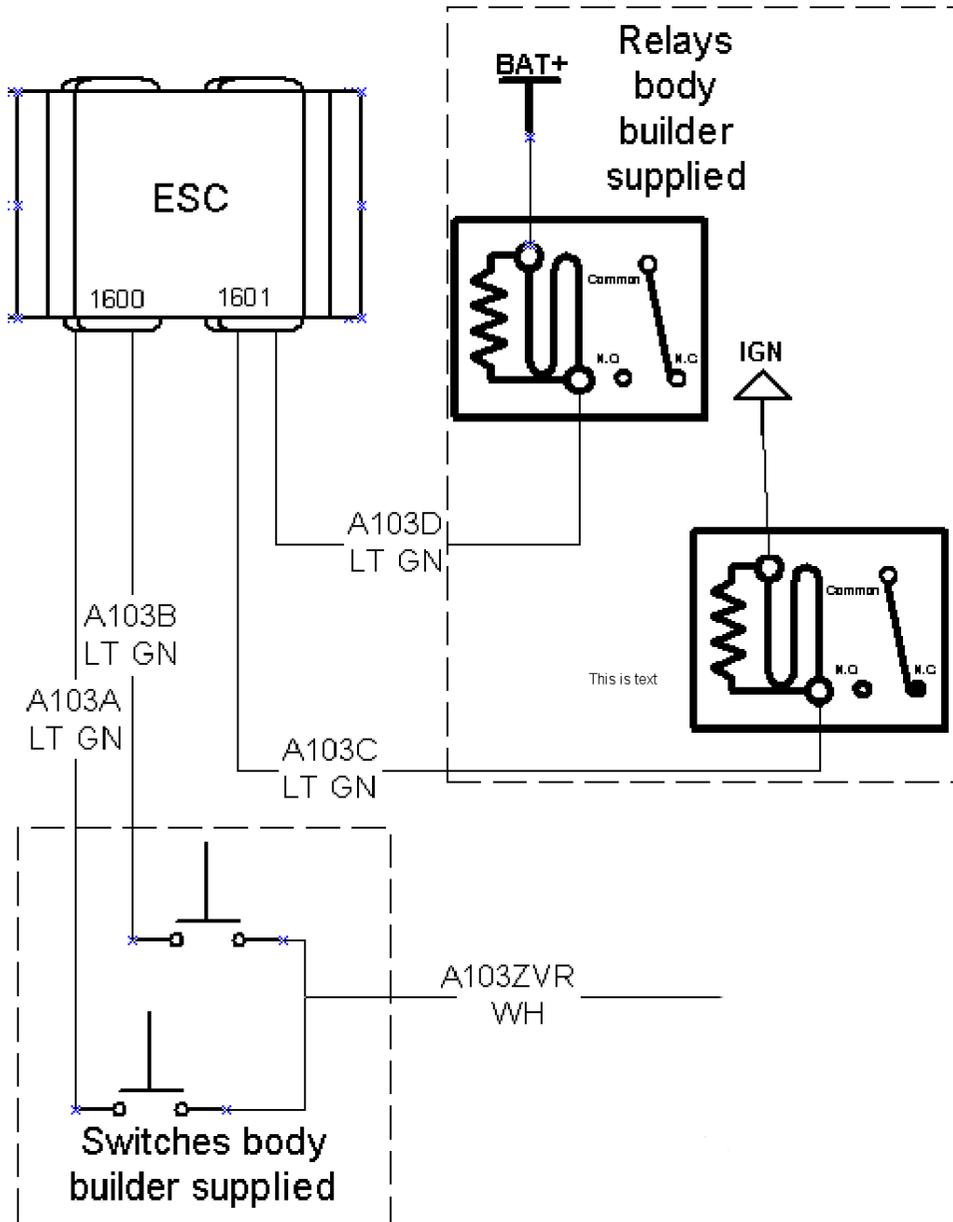
### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software Feature Codes that MUST be added: 595283

Software Feature Codes that MUST be removed: NONE

There are no customer or body builder programmable features associated with this feature.

**WIRING INFORMATION:**



**Figure 28** Circuit example for 060ACW

**TESTING:**

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

**HOW DO I ADD THIS FEATURE:**

Connect wiring harness to ESC and switches or relays as shown in Example Circuit. Customer is responsible for proper connectors to ESC and switches or relays.

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

### 2.3. PARK, DOME AND BRAKE (STOP LAMP) ESC CONNECTIONS

Part of General Electrical System Code (08000)

**FEATURE CODE DESCRIPTION:**

ELECTRICAL SYSTEM 12-Volt, Standard Equipment

**FEATURE / BODY FUNCTION:**

International provides location to obtain a “Park Brake Set” and with some features a “Brake Applied” signal is available.

**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 ESC and do not function the same as vehicles less ESC.**

**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: 595014, 595015, 595021, and 595024

Software Feature Codes that MAY be added: 595137 and \*\*595162\*\*

Software Feature Codes that MUST be removed: NONE

\*\* Feature Code 595162 automatically sets the rear chassis light parameters that are set at 0.5 Amp to 0 Amp. This feature code is primarily used for customers with LED style lights. This is done because LED style lights operate at less than 0.5 amps, therefore, if the open and low current parameters were still set to 0.5 amps, the system would register a fault code, even if the lights were operating correctly.

**CHASSIS LIGHT PARAMETERS**

By turning the **Stop\_Override\_Hazard\_Enabled** parameter ON, the stoplights will always override the hazard lights.

If the current in the Left Rear turn signal circuit falls below the level set by the **LT\_RR\_Turn\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the Left Rear light circuit exceeds the level set by the **LT\_RR\_Turn\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **LT\_RR\_Turn\_OC\_Current** parameter should be left at its factory default of zero.

If the current in the Right Rear turn signal circuit falls below the level set by the **RT\_RR\_Turn\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the Right Rear light circuit exceeds the level set by the **RT\_RR\_Turn\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **RT\_RR\_Turn\_OC\_Current** parameter should be left at its factory default of zero.

If the current in the Left Front turn signal circuit falls below the level set by the **LT\_FT\_Turn\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the Left Front light circuit exceeds the level set by the **LT\_FT\_Turn\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **LT\_FT\_Turn\_OC\_Current** parameter should be left at its factory default of zero.

If the current in the Right Front turn signal circuit falls below the level set by the **RT\_FT\_Turn\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the Right Front light circuit exceeds the level set by the **RT\_FT\_Turn\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **RT\_FT\_Turn\_OC\_Current** parameter should be left at its factory default of zero.

**Table 17**

Parameter	ID	Description	Default	Units	Min	Max	Step
Stop_Override_Hazard_Enabled	562	Enable/ disable stoplights override hazard lights. A value of 1 enables and a value of 0 disables the feature.	ON	No_Units	NA	NA	NA
LT_RR_Turn_Lo_Current	1904	Left Rear Turn Signal Low Current Detection Level (Amps)	0.5	A	0	10	0.1
LT_RR_Turn_Hi_Current	1905	Left Rear Turn Signal High Current Detection Level (Amps)	10	A	0	10	0.1
LT_RR_Turn_OC_Current	1906	Left Rear Turn Signal Open Circuit Detection Level (Amps)	0.5	A	0	10	0.1
RT_RR_Turn_Lo_Current	1907	Right Rear Turn Signal Low Current Detection Level (Amps)	0.5	A	0	10	0.1
RT_RR_Turn_Hi_Current	1908	Right Rear Turn Signal High Current Detection Level (Amps)	10	A	0	10	0.1
RT_RR_Turn_OC_Current	1909	Right Rear Turn Signal Open Circuit Detection Level (Amps)	0.5	A	0	10	0.1

Parameter	ID	Description	Default	Units	Min	Max	Step
LT_FT_Turn_Lo_Current	1910	Left Front Turn Signal Low Current Detection Level (Amps)	0.5	A	0	10	0.1
LT_FT_Turn_Hi_Current	1911	Left Front Turn Signal High Current Detection Level (Amps)	10	A	0	10	0.1
LT_FT_Turn_OC_Current	1912	Left Front Turn Signal Open Circuit Detection Level (Amps)	0.5	A	0	10	0.1
RT_FT_Turn_Lo_Current	1913	Right Front Turn Signal Low Current Detection Level (Amps)	0.5	A	0	10	0.1
RT_FT_Turn_Hi_Current	1914	Right Front Turn Signal High Current Detection Level (Amps)	10	A	0	10	0.1
RT_FT_Turn_OC_Current	1915	Right Front Turn Signal Open Circuit Detection Level (Amps)	0.5	A	0	10	0.1

### DOMES LIGHT PARAMETERS

If the **Dome\_Light\_Dim\_Enable** parameter is turned ON, the dome light 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 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 ESC 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 ESC 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 18

Parameter	ID	Description	Default	Units	Min	Max	Step
Dome_Light_Dim_Enable	177	Enable/ disable dome light theatre dimming. A value of 1 enables and a value of 0 disables the dimming feature.	ON	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 at 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	6000	10
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

**WIRING INFORMATION:****Park Brake Applied Signal**

Pin 4 of Connector #1600 is switched to ground 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 pin, remove cavity plug from connector and insert a wire and terminal.

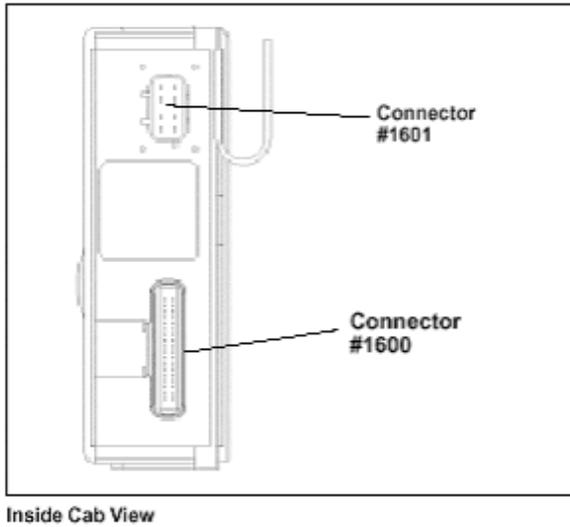


Figure 29 Terminal P/N 3517243C1 – 18 gauge

**Service Brake Applied Signal**

If the vehicle is equipped with a feature designed for trailers with separate stop and turn, see section “Trailer Socket/Body Builders Wiring”, a stop circuit is available.

Splice into circuit 70 after the fuse. Note there is no access inside the cab; if required, circuit will have to be routed through dash.

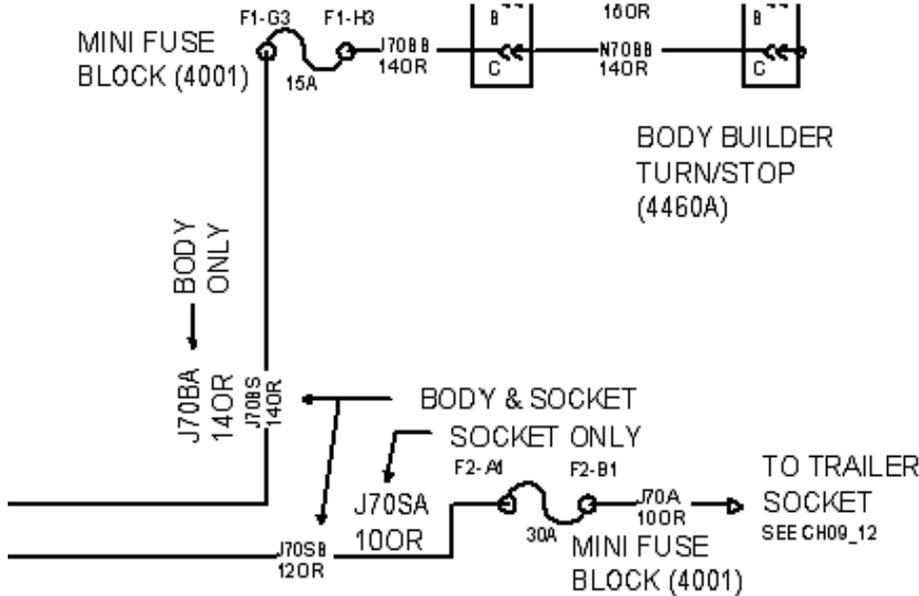


Figure 30

If the vehicle was not ordered with a feature providing a separate stop circuit, see “How Do I Add” in section 9 for information.

### Dome Lamps

Dome lamps are controlled by the ESC. After the door is shut, the dome lamps stay on for 20 seconds at 80% voltage, a slight dimming of the lamp can be observed. After the 20 seconds, the lamps will dim then go out, "Theater Dimming". The ESC can be programmed by the dealer to go out as soon as the door is closed.

The dome circuit is fused internal to the ESC at 10 amp. If vehicle has courtesy lights, do not exceed 5 amp additional load. If vehicle does not have courtesy lights, do not exceed 8 amp additional load.

In order for Body Builders to use the dome light circuit, they must splice into the wire coming from Pin C on the Brown ESC output connector (#1601). Correct splicing techniques (shown in section 1 of this book) should be used so that splicing is done safely and effectively.

If additional loads are required, use a relay. If a relay is added, "Theater Dimming" must be turned off to prevent relay chatter.

See the circuit diagram below for available circuits for dome light operation. These circuits are A63E, A63M (if equipped with courtesy lights), C63C and D63C. The maximum current draw for the dome lamp system is 10 amps.

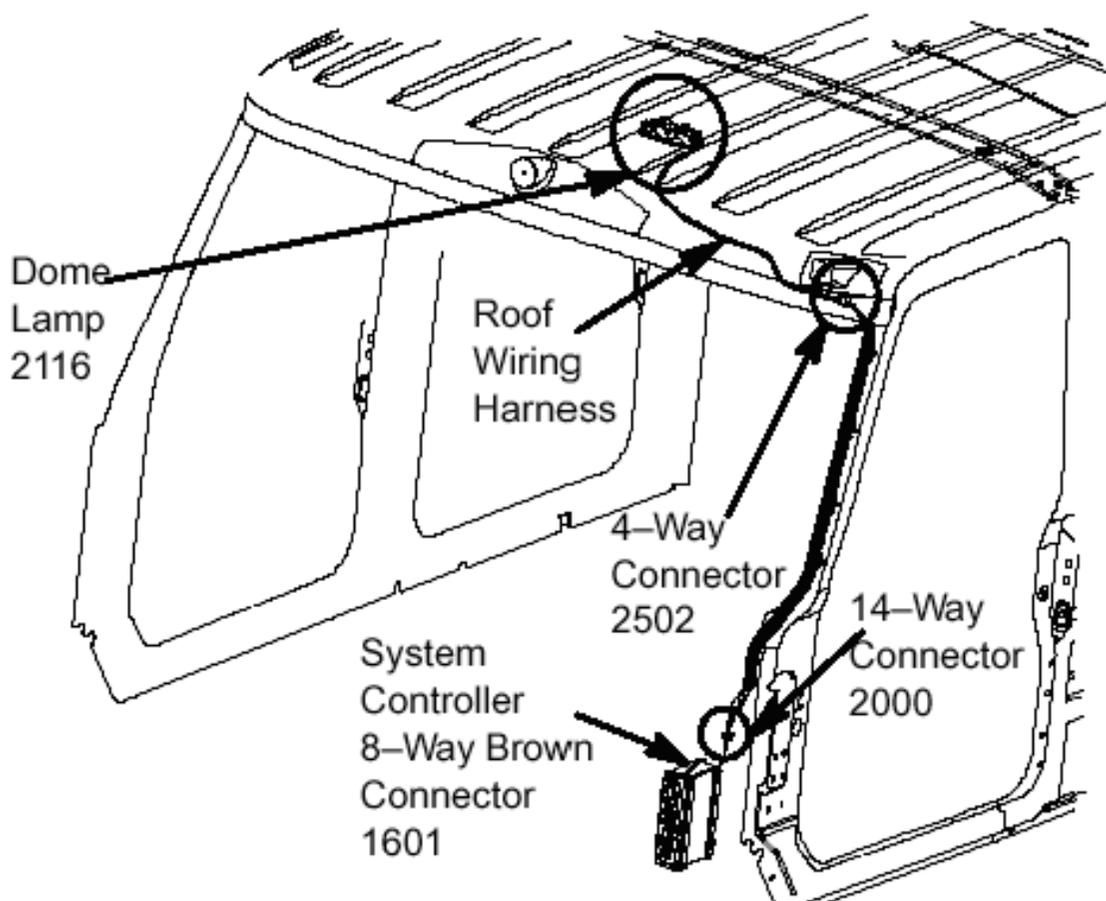


Figure 31 Dome Light Wiring

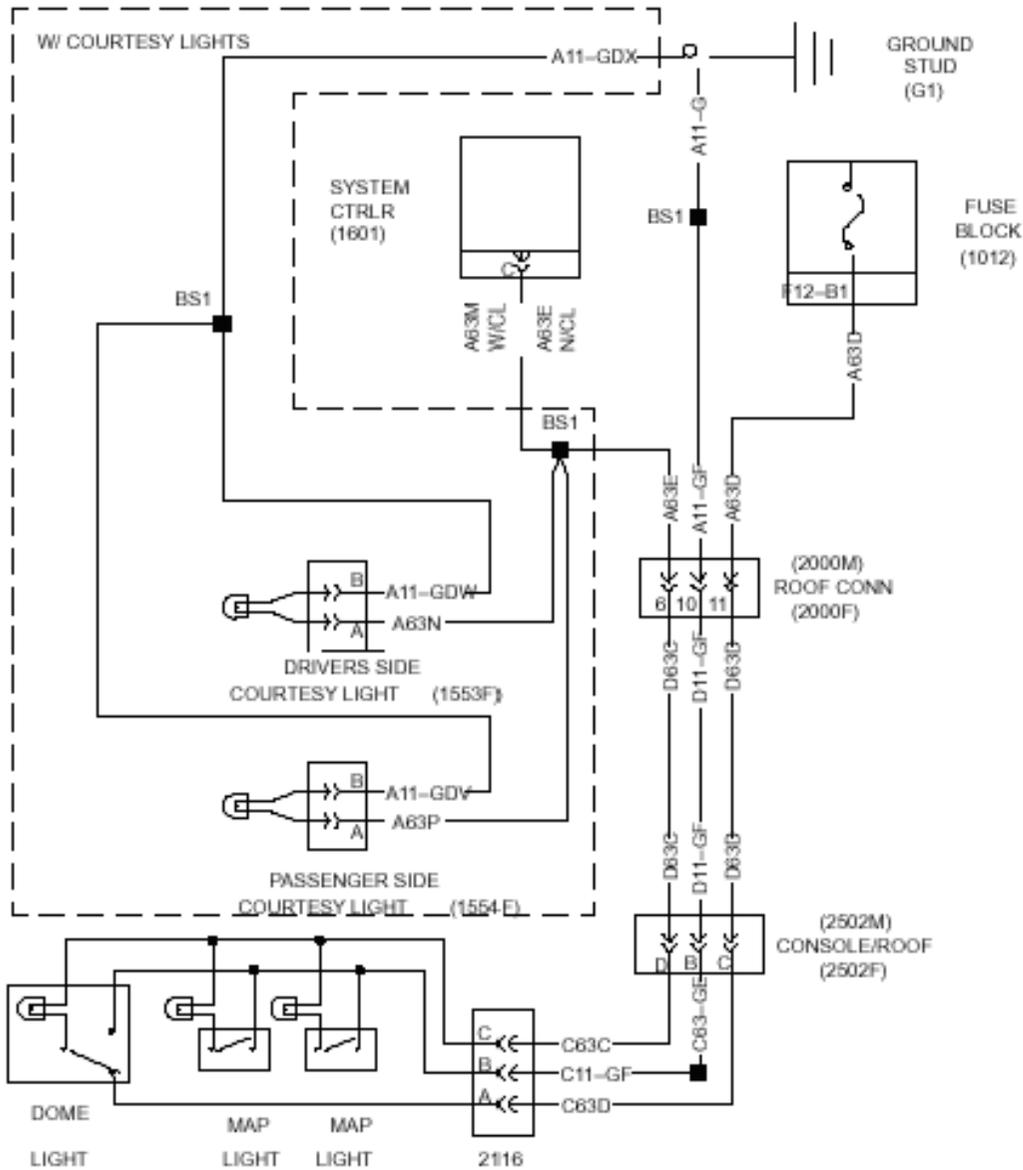


Figure 32 Dome Light Circuit Diagram

**TESTING:**

If parameters are changed in the Diamond Logic™ Builder software or ICAP, verify that the desired functionality is obtained.

### 3. BATTERY, IGNITION AND ACCESSORY TAPS

#### 3.1. STANDARD BATTERY AND IGNITION TAPS

##### FEATURE CODE DESCRIPTION:

None, see radio and power source connections and fused battery connection sections for additional information.

##### FEATURE / BODY FUNCTION:

Battery, ignition and accessory taps allow the customer to obtain battery ignition and accessory power from various locations on the vehicle to operate various bodybuilder or after-market accessories such as lights, motors, heaters, cell phones, computers, etc.

**NOTE – When adding any circuit, be sure to protect the circuit being added – see the General Electric section for circuit protection information.**

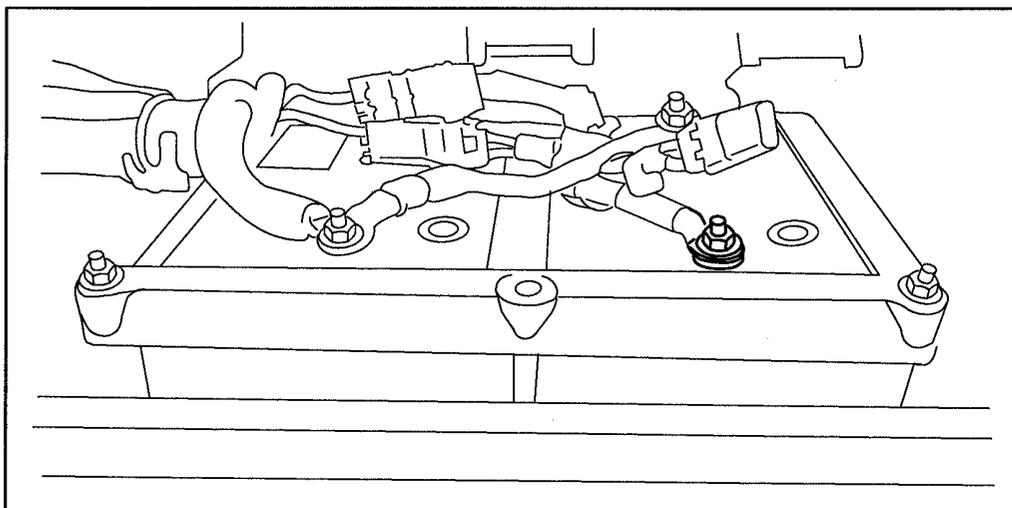
**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE**

##### WIRING INFORMATION:

Battery Connections

**Location 1:** Exterior Battery Tap In Battery Box. Attach to battery post using ring terminals. Circuits should not be connected to the battery if vehicle is equipped with sealed battery terminals.

**NOTE – Do not use starter stud for battery power, as extra terminals may cause nut to loosen.**



**Figure 33 Location 1: Exterior Battery Tap In Battery Box**

**Location 2 :** Exterior Battery Tap Driver's Side Engine Compartment Mega-Fuse Assembly

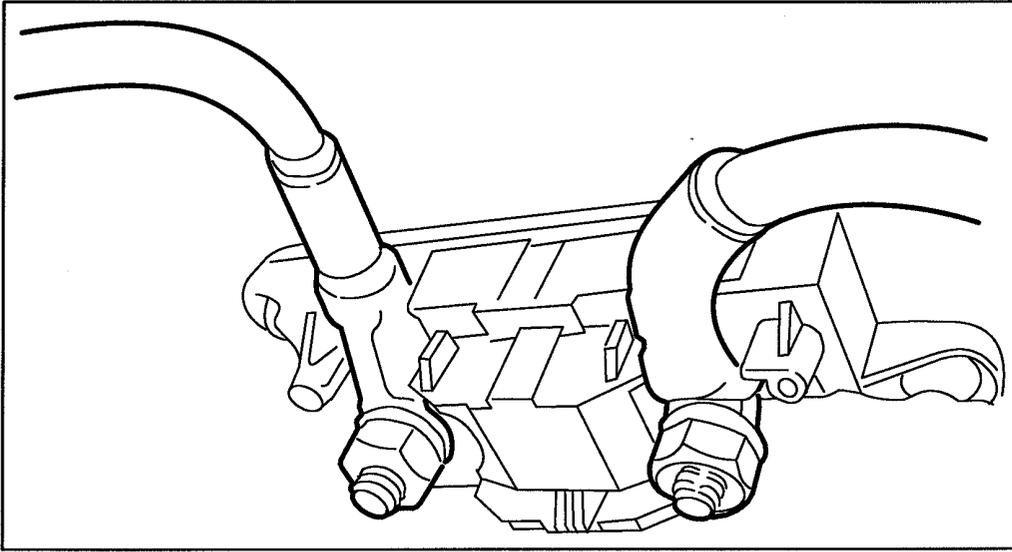


Figure 34 Location 2 : Exterior Battery Tap Driver's Side Engine Compartment PDC

Location 3: Located by inside fuse panel, circuit A14G, (red circuit)

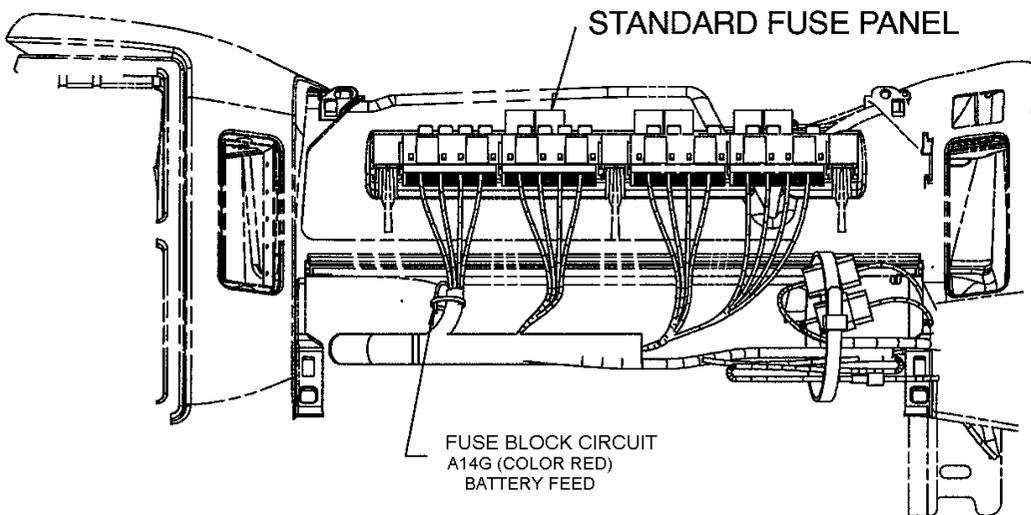


Figure 35 Location 3

**Table 19 Battery Feed Connection Points**

Circuit Number	Max. Current (Amps)	Terminal Size	Nut Torque	Special Instructions	Description	Location
A14G	15	—	—	A	Pigtail at Fuse Block	Inside Cab Passenger Side
—	20	5/16	12 Nm / 9 lbf-ft	—	Mega-Fuse Stud, Fused Side*	Outside Dash Panel Driver's Side
—	—	3/8	15 Nm / 11 lbf-ft	B	Positive Battery Terminal*	Battery Box

\* Additional "in-line" fuse of appropriate size must be added for circuit being added. Fuse should be located close to power source.

#### Special Instructions

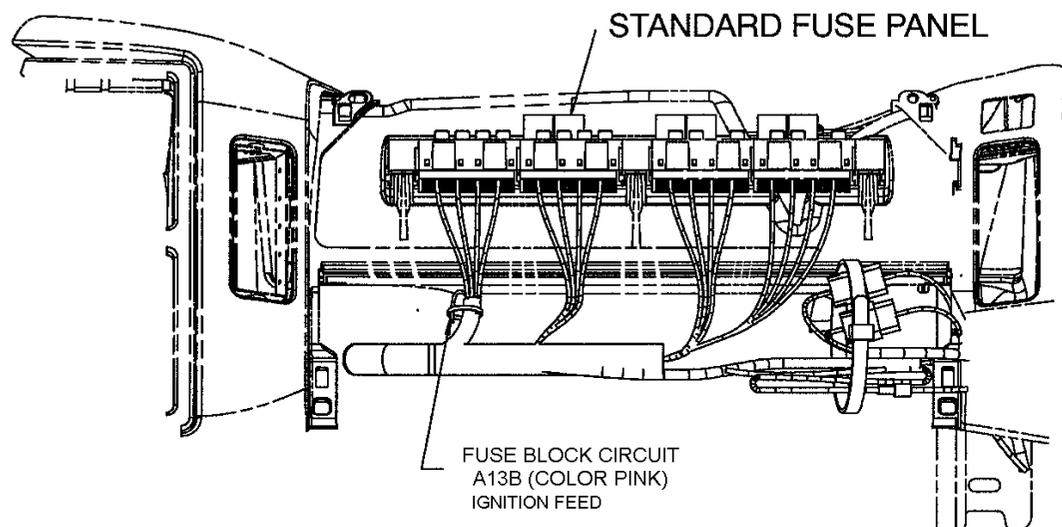
A. Pigtail circuit protected by a 15-amp fuse in fuse block. A relay is required if the battery load exceeds 15 amps.

B. Circuits should not be connected to the battery if vehicle is equipped with sealed battery terminals.

**NOTE: Do not use starter stud for battery power, as extra terminals may cause nut to loosen.**

#### Connecting to Ignition System

**Location 1:** Located by inside fuse panel

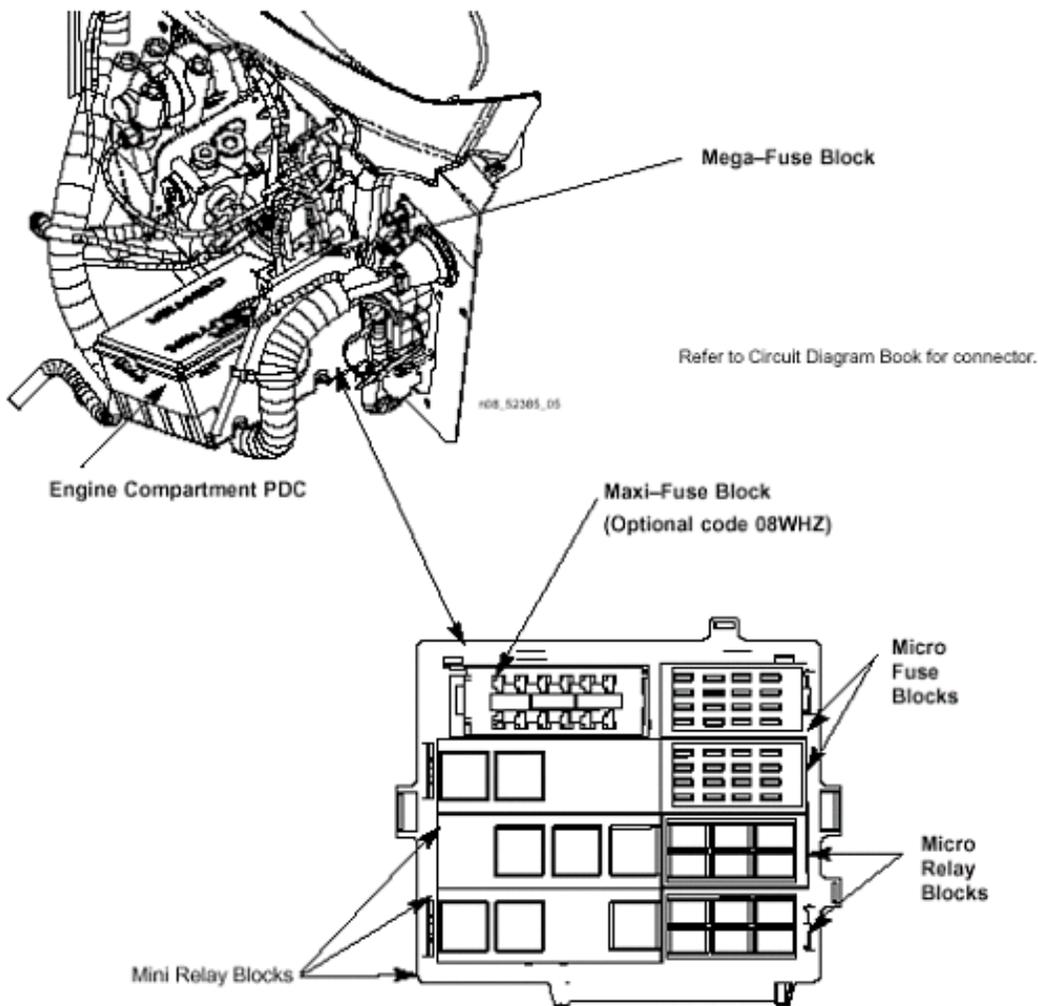


**Figure 36 Passenger Side PDC**

**Table 20**

Circuit Number	Color	Max. Current (Amps)	Special Instructions	Description	Location
A13B	Pink	5	A	Pigtail protected by 5 amp fuse	Inside Cab Passenger Side
<b>Special Instructions</b>					
A. A relay is required if the accessory load exceeds 5 amps.					

**Location 2:** Located in the PDC, power distribution center, under the hood



**Figure 37**

On most vehicles, there are unused ignition bussed fuse locations in the PDC. These can be used for low current ignition loads provided that the total ignition load in the PDC does not exceed the 40A rating for the ISO cube ignition relay. For Relay and Fuse descriptions, see the product graphic located on the inside of the PDC cover.

To add circuits to the Maxi Fuse Block, the block must first be removed. The Maxi fuse block is held in with three snaps. In some cases, the Micro Fuse block, Micro Relay Blocks and the Mini Relay blocks will have to be removed.

To remove the other blocks, remove sliding harness entrance door, spread out side of PDC to unlatch Micro Fuse and Relay blocks. Slide out Mini Relay blocks Note, if blocks are too tight, using a 3/16 square bar insert into square hole in bottom of PDC and tap blocks loose.

Fuse terminal part numbers

18 gauge – 3515517c1

16 gauge – 3573312c1

14 gauge – 3516158c1

12 gauge – 3516158c1

**TESTING:**

- For Battery taps, test to see that battery voltage is present at all times.
- For Accessory taps, test to see that battery voltage is present when the ignition key is in “Accessory” or “Ignition” key states
- For Ignition taps, test to see that battery voltage is present when the ignition key is in “Ignition” key state.

### 3.2. 08WAD, 08WCS, 08WHX AND 08WHY — BATTERY DISCONNECT SWITCH

#### FEATURE CODE DESCRIPTION:

08WAD – BATTERY DISCONNECT SWITCH {Joseph Pollak} Lever Operated

08WCS – BATTERY DISCONNECT SWITCH {Joseph Pollak 51-315} Positive Type, Lever Operated, Mounted on Cab Floor

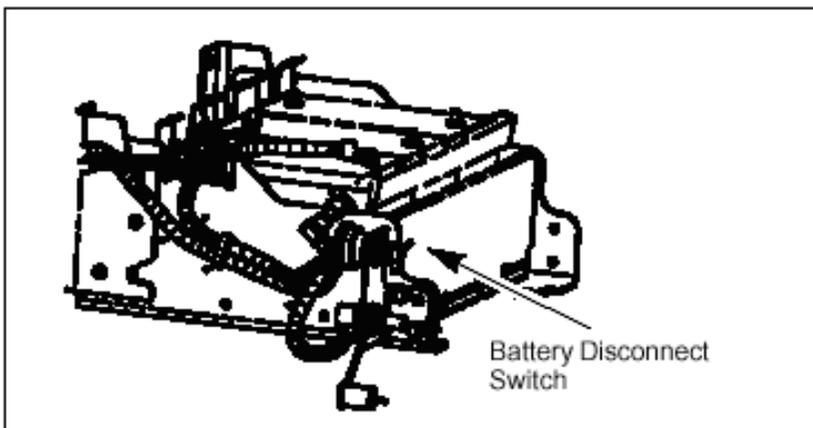
08WHX – BATTERY DISCONNECT SWITCH {Pollak 51-316} Locking, Key Operated, Positive Type, Mounted on Battery Box

08WHY – BATTERY DISCONNECT SWITCH {Joseph Pollak 51-316} Positive Type, Locking, Key Operated, Mounted on Cab Floor

#### FEATURE / BODY FUNCTION:

The disconnect switch is used to shut down the entire battery fed electrical system. When a vehicle is not going to be used for several days or longer, this switch will shut off the system so that the electrical components on the vehicle, if left on, do not drain the batteries of their charge. Customers have the choice between a key or lever operated battery disconnect switch.

**NOTE – The disconnect switch should never be used to shut off the engine as there is a possibility of the alternator generating a high positive voltage spike which may result in electrical damage.**



**BATTERY DISCONNECT SWITCH – CODE 08WAD**

Figure 38

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE**

#### WIRING INFORMATION:

No additional wiring is necessary if the vehicle is ordered from International with the sales feature codes listed above.

#### TESTING:

1. Close switch.

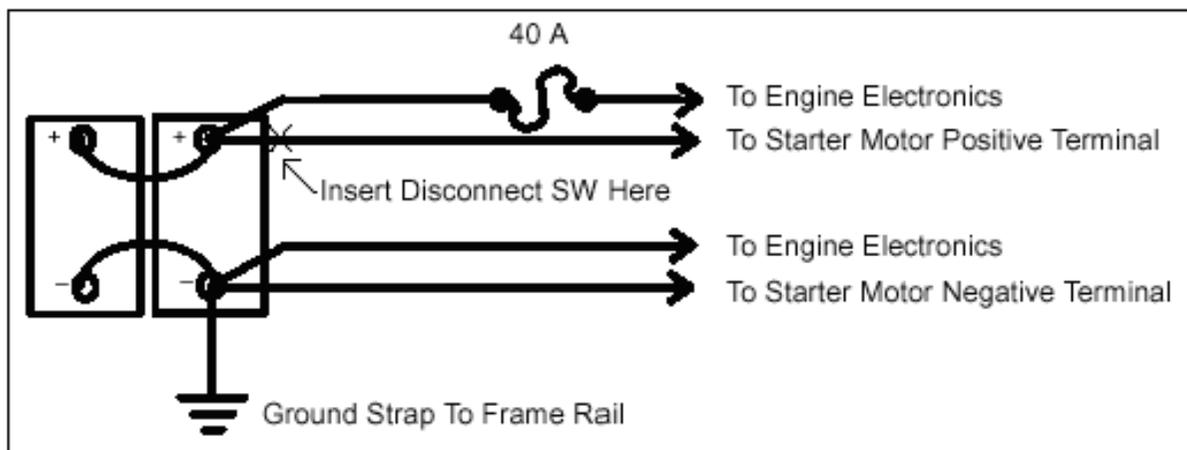
2. Verify that the vehicle is providing 12-14 Volts to the starter motor.
3. Verify vehicle will start.
4. Turn engine off.
5. Open disconnect switch.
6. Verify vehicle systems do not have any electrical power.

#### **HOW DO I ADD THIS FEATURE:**

The disconnect switch cannot be put into the battery ground cable as was previously done. The electronic modules will provide a ground path around the master disconnect switch if this is tried. The engine and transmission modules must always be connected to the batteries, even when the master disconnect switch is opened. Separate power and ground circuits are provided on each vehicle to the engine and transmission electronics. To install a master disconnect switch, break into the positive battery cable, or use OEM cables, going from the batteries to the cranking motor and insert disconnect switch into that circuit, as shown in Figure 1. Insure that adequate electrical insulation is used between the positive battery cable, the switch mounting, and the surrounding area. Place boots or covers over the disconnect switch studs to protect the batteries and cables from accidental shorting. Do not disturb the direct connections from the battery to the engine or transmission electronics. To reduce corrosion, dielectric grease should cover eyelets and studs.

**CAUTION – Make sure that batteries are disconnected prior to performing any electrical work.**

If a non-OEM switch is to be used, make sure it is designed to handle at least 1,000 amp (intermittent duty)



**Figure 39 Installation Circuit For Battery Disconnect Switch**

**NOTE – If there is more than one positive cable, eyelet terminals will have to be stacked on the switch stud. Some installations may not have ground strap to rail – if none exists, there is no need to add one.**

## 4. GROUND CONNECTIONS

**FEATURE CODE DESCRIPTION:** NONE

**FEATURE / BODY FUNCTION:**

Locations for connecting to the vehicle ground have been provided both inside and outside the cab. The table below lists the connection points along with information about each point. For a complete diagram of Ground connections, circuit numbers, connector and terminal part numbers, see vehicle circuit diagram book.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:** NONE

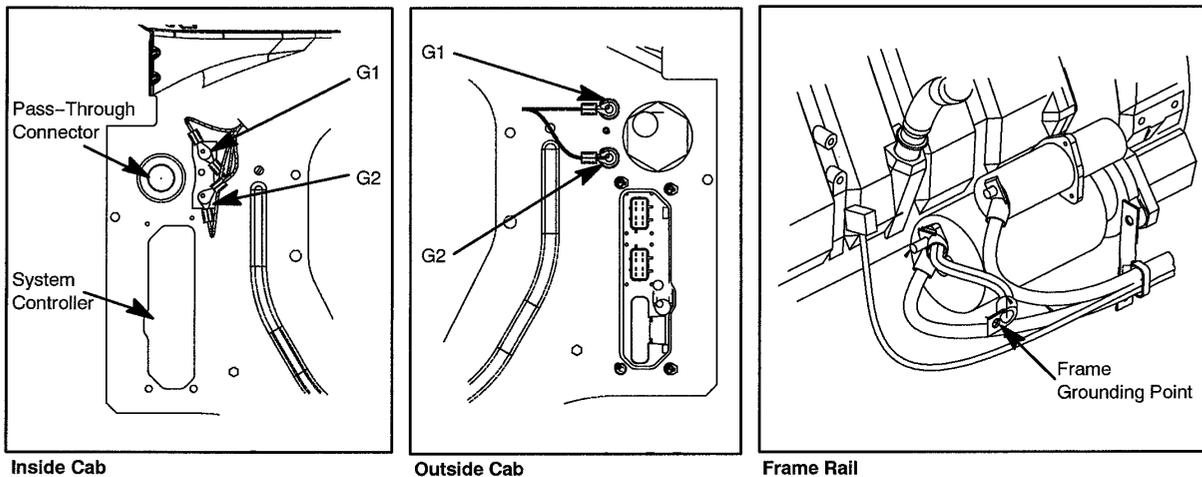
**WIRING INFORMATION:**

In addition to the negative battery post, the following locations are recommended for grounding.

**Table 21 Battery Feed Connection Points**

Max. Additional Current	Terminal Size	Nut Torque	Description	Location
30 Amps	5/16	27 Nm / 20 lbf-ft	Pass Thru Stud G1	Inside and Outside Cab Driver's Side
30 Amps	5/16	27 Nm / 20 lbf-ft	Pass Thru Stud G2	Inside and Outside Cab Driver's Side
—	3/8	46 Nm / 34 lbf-ft	Frame Rail	Frame Rail

**NOTE – Do not use starter stud for grounding, as extra terminals may cause nut to loosen. See Ground Installation Instructions and Corrosion Protection Treatment.**



**Figure 40 Ground Connections**

**TESTING:**

Test ground circuit to determine that the ground circuit is closed.

## 5. FUSED BATTERY CONNECTIONS OUTSIDE CAB

### 5.1. 08WHZ — BODY POWER FEEDS

Refer to the Circuit Diagram in S08285, Chapter 2, page 3.

**FEATURE CODE DESCRIPTION:**

08WHZ -FUSE PANEL {Packard MP 800} Maxi Fuse; Mounted in Power Distribution Center Under Hood

**FEATURE / BODY FUNCTION:**

This feature provides up to six-fused battery feed points for body builder use. The circuits may be fused per body builder requirements. The fuse block is standard if optional features such as Lectra – Shift, PTO and 40-amp power feed are ordered.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:** NONE

**WIRING INFORMATION:**

To add circuits to the Maxi Fuse Block, the PDC fuse /relay block must first be removed. The Maxi fuse block is held in with three snaps.

To remove the other blocks, remove sliding harness entrance door, spread out side of PDC to unlatch Micro Fuse and Relay blocks. Slide out Mini Relay blocks Note, if blocks are too tight, using a 3/16 square bar insert into square hole in bottom of PDC and tap blocks loose.

**Table 22 Fuse Terminal Part Numbers**

10 Gauge Wire	3515522C1
8 Gauge Wire	3516157C1
Lock	3515520C1

When selecting fuse size/cable gauge refer to the Recommended Circuit Protection of the General Electric section of the Body Builders Book.

**Table 23**

Maxi Fuse P/Ns	Rating
3534200c1	20
3534201c1	25
3534202c1	30
3534203c1	35
3534204c1	40
3534205c1	50
3525615c1	60
3534206c1	70
3534207c1	80

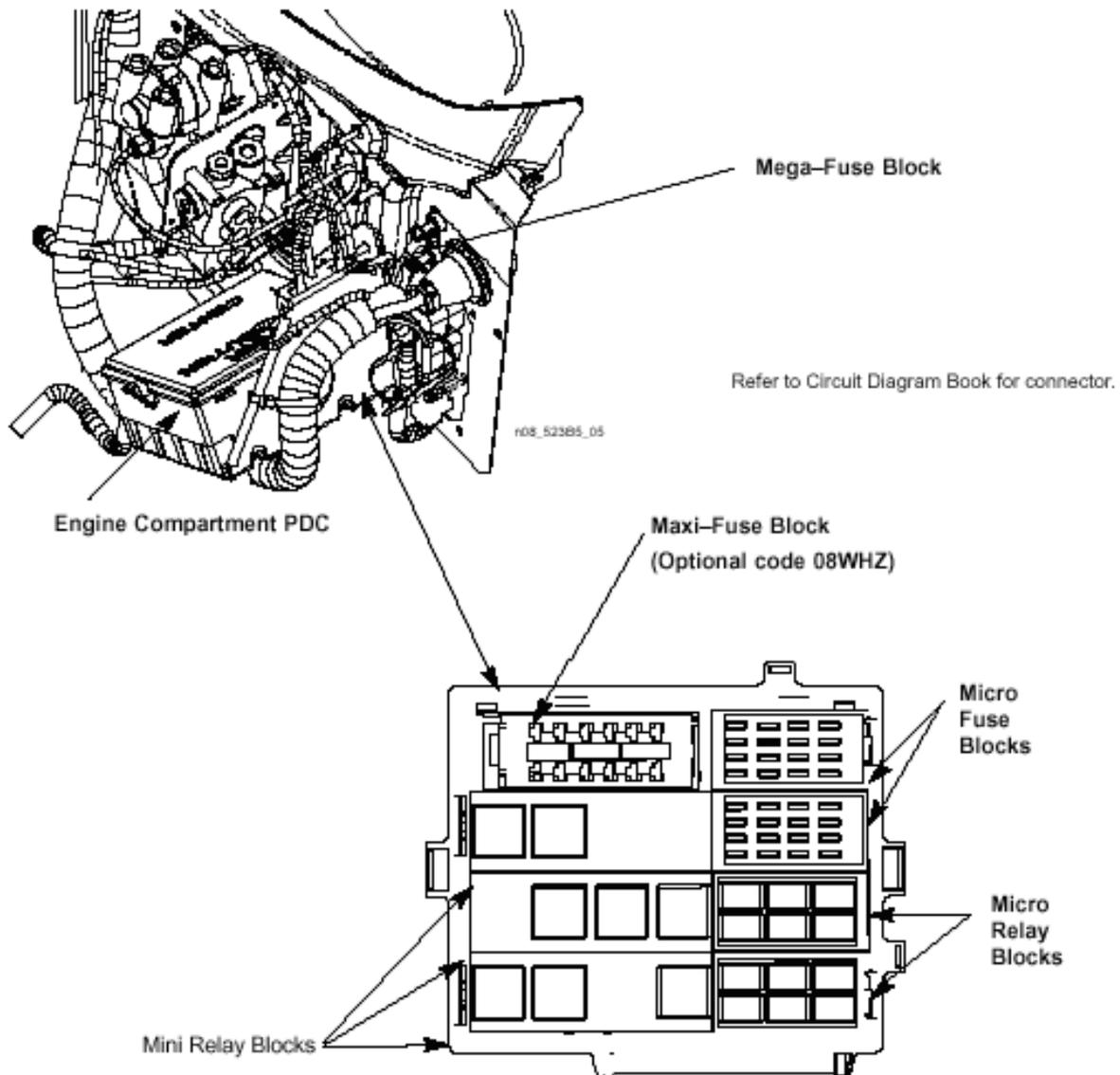


Figure 41

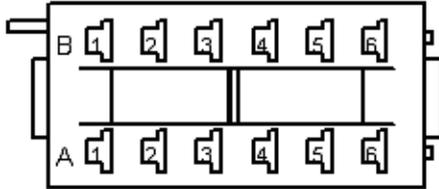
**NOTE –** When adding a circuit, note that it is battery fed and the TEM will have to add appropriate switches/relays, etc. If the electrical load is left on, it will result in discharged batteries.

**HOW DO I ADD THIS FEATURE:**

If the vehicle is not equipped with the fuse block shown below, one can be ordered from the dealer.

The TEM will have to fabricate a 6-gauge jumper to go from the mega fuse to the maxi fuse block. The maxi fuse block requires a ¼" eyelet and the mega fuse requires a 5/16" eyelet.

(LOCATED IN POWER DISTRIBUTION CENTER)



CONNECTOR - 3545997C1  
LOCK - 3515520C1  
BOLT - 22728R1  
WASHER - 17B474  
NUT - 9413992

Figure 42

NOTE – Identify the fuse function on the chart on the bottom of the PDC lid.

### 5.2. 08TKK — TRAILER AUXILIARY CIRCUIT

Refer to the Circuit Diagram in S08285, Chapter 9, page 27.

**FEATURE CODE DESCRIPTION:**

08TKK - FUSE PANEL {Packard MP 800} Maxi Fuse and relay; Mounted in Power Distribution Center Under Hood

**FEATURE / BODY FUNCTION:**

This feature provides a thirty (30) amp fused circuit that is ignition controlled. The trailer Auxiliary circuit will provide a blunt cut wire with heat shrink at the end of the frame with the Electric Trailer Brake wiring. The customer will need to supply and install the appropriate trailer socket assembly for their application.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

08HAG OR 08HAH Electric Trailer Brake/Lights (Customer cannot use both)

**WIRING INFORMATION:**

This feature will provide a 10 gauge Orange wire located at the end of the frame with the Electric Trailer Brake wires. The wire will be labeled 72EB.

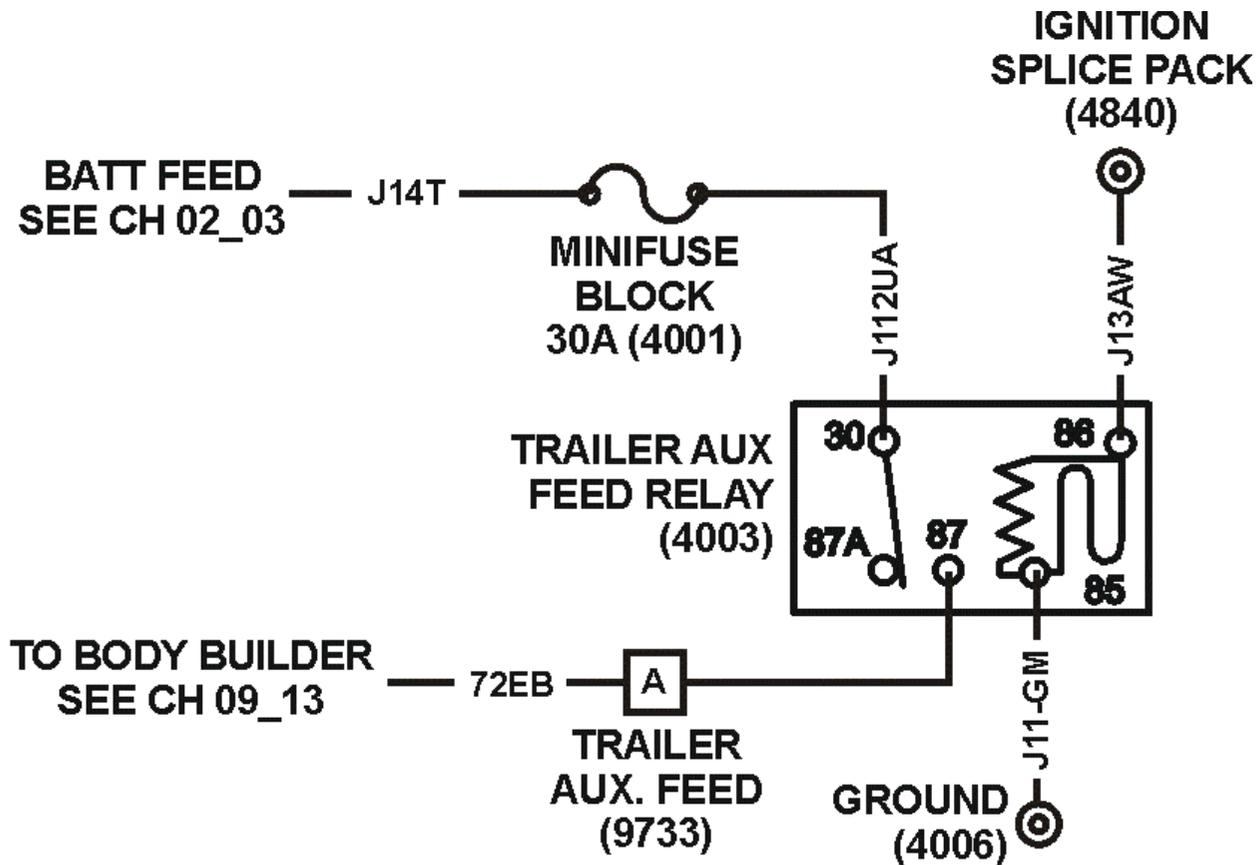


Figure 43 Trailer Auxiliary Circuit

Table 24 Part Numbers

10 Gauge Wire	3515522C1
30 Amp Maxi Fuse	3534202C1

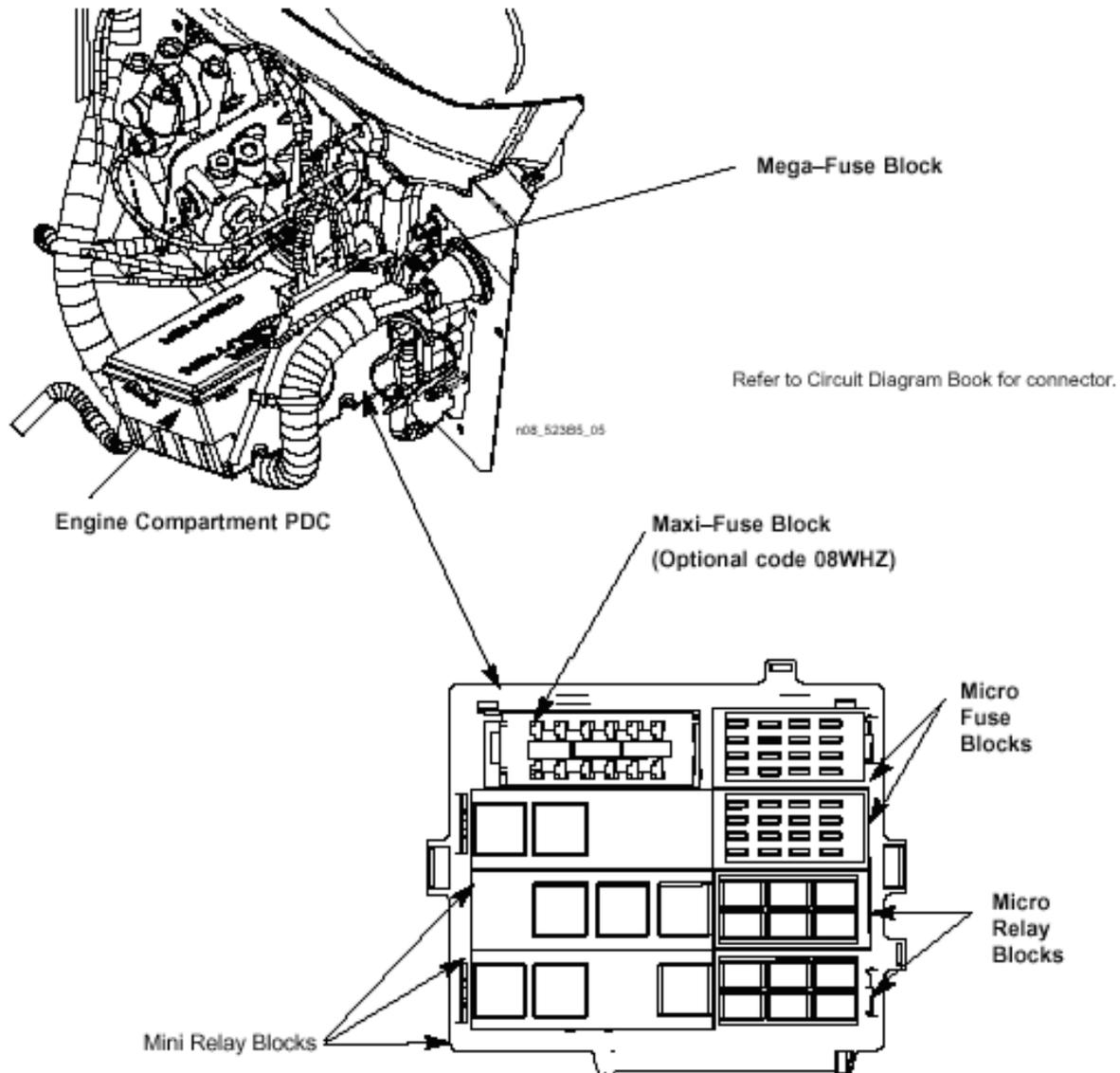


Figure 44

**TESTING:**

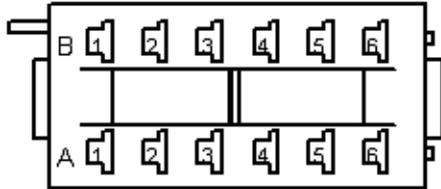
1. Make proper trailer connections.
2. Turn key on.
3. Verify that the Orange wire marked R72EB has battery voltage.

**HOW DO I ADD THIS FEATURE:**

If the vehicle is not equipped with the fuse block shown below, one can be ordered from the dealer.

The TEM will have to fabricate a 6-gauge jumper to go from the mega fuse to the maxi fuse block. The maxi fuse block requires a ¼ " eyelet and the mega fuse requires a 5/16" eyelet.

(LOCATED IN POWER DISTRIBUTION CENTER)



CONNECTOR - 3545997C1  
 LOCK - 3515520C1  
 BOLT - 22728R1  
 WASHER - 17B474  
 NUT - 9413992

**Figure 45**

**NOTE – Identify the fuse function on the chart on the bottom of the PDC lid.**

1. Locate a vacant ISO relay location in Power Distribution Center, under hood.
2. Supply **Ignition** power to Pin-5 of relay location.
3. Supply Ground to Pin-2 of relay location.
4. Supply fused (30 amp) battery power to Pin-1 of relay location.
5. Connect 10 gauge wire to Pin-4 of relay location.
6. Route 10 gauge wire with dash harness to center chassis harness. Continue to route wire with chassis harness to end of frame.
7. Install relay and fuse.
8. Verify that wire at end of frame has battery voltage with key on, and is open with the key off.

## 6. FUSED BATTERY CONNECTIONS INSIDE CAB — 08518, 08718, 08WCK

Refer to the Circuit Diagram in S08285, Chapter 3, page 1.

### FEATURE CODE DESCRIPTION:

08518 – CIGAR LIGHTER

08718 – POWER SOURCE Cigar Type Receptacle Without Plug and Cord

08WCK – POWER SOURCE, TERMINAL TYPE 2-Post

### FEATURE / BODY FUNCTION:

08518 – Provides cigar lighter.

08718 - This option provides a power source for customers who wish to use CB radios, hand held spotlights or trouble lights, or other accessories that plug into the power socket receptacle for 12-Volt power.

08WCK – Customers often desire the ability to power 12-volt accessories with the truck's electrical system. This option provides a power source for items equipped to receive power from post-type terminals.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE

Locations for connecting to the vehicle Ignition have been provided. The table below lists the connection point along with information about that point. For a complete diagram of the Ignition system and for connector and terminal part numbers, see vehicle circuit diagram book.

**Table 25 Vehicle Ignition Connections**

Feature Code	Max. Current (Amps)	Power Feed	Description
008WCK	20	Battery	Power Source, Two Post Type
008718	20	Battery	Power Source (Cigar-Type Receptacle)
008518	15	Battery	Cigar Lighter (provides customer with a 15 amp. battery supply)



## 7. CB AND 2-WAY RADIO CONNECTIONS INSIDE CAB

### 7.1. 08RCB AND 08RBK — CB RADIOS

Refer to the Circuit Diagram in S08285, Chapter 3, page 2.

#### **FEATURE CODE DESCRIPTION:**

08RCB – CB RADIO Accommodation Package; Header Mounted; Feeds From Accessory Side of Ignition Switch; Includes Power Source and Two Antennas Bases With Wiring

08RBK – CB ANTENNA (2) {Pana-Pacific} Full Wave; 4.0' Length Includes "International" Name on Top

#### **FEATURE / BODY FUNCTION:**

08RCB - When installing a CB radio, this feature provides the power circuits required for hook-up. This accommodation package includes a 10 amp accessory power and ground connector, dual CB antenna cables routed from the mirror to the cab overhead header opening, and two CB antenna mounts located at the top of each mirror. A strap is also provided in the header to mount the customer supplied CB radio. The CB antennas are not provided with this code. If the two antennas are desired, an additional feature code 08RBK must be ordered.

08RBK – Provides two 4' long CB antennas.

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:** NONE

#### **WIRING INFORMATION:**

Locations for connecting to the vehicle Ignition have been provided. The table below lists the connection point along with information about that point. For a complete diagram of the Ignition system and for connector and terminal part numbers, see vehicle circuit diagram book.

**Table 26**

Feature Code	Max. Current (Amps)	Power Feed	Description
008RCB	10	Accessory	CB Radio Accommodation Package (Includes 2 Antenna Bases and Cable)

The mating connector for the CB connector is 1661196C1 and terminal 1661209C1 (16 ga.)

#### **TESTING:**

- To test these circuits, refer to the above chart and verify that battery voltage is present in the correct key-state for each respective feature.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without one of the desired features, they can be installed in the field. Refer to the section "How Do I" General Information section of the body builders book for information on obtaining required parts. The same parts that are used in the OEM installation are available (cables, components, etc.). Also, refer to the circuit diagram that applies to your vehicle to aid in the installation.

## 7.2. 08REA AND 08RGA – 2-WAY RADIO

Refer to the Circuit Diagram in S08285, Chapter 3, page 10.

### FEATURE CODE DESCRIPTION:

08REA – 2-WAY RADIO Wiring Effects; Wiring With 20 Amp Fuse Protection, Includes Ignition Wire With 5 Amp Fuse, Wire Ends Heat Shrink and 10' Coil Taped to Base Harness

08RGA – 2-WAY RADIO Wiring Effects; Wiring With 20 Amp Fuse Protection, Includes Ignition Wire With 5 Amp Fuse, Wire Ends Heat Shrink and Routed to Center of Header Console in Cab

### FEATURE / BODY FUNCTION:

08REA – Feature code 08REA provides a fused 20 amp battery feed power wire, ground wire and fused 5 amp ignition feed for applications requiring two-way radio communications such as local municipal government units or state DOT highway maintenance vehicles. The three wires are taped to the main cab harness.

08RGA – Feature code 08RGA provides a fused 20 amp battery feed power wire, ground wire and fused 5 amp ignition feed for applications requiring two-way radio communications such as local municipal government units or state DOT highway maintenance vehicles. The three wires are located in the center of the header console in the cab.

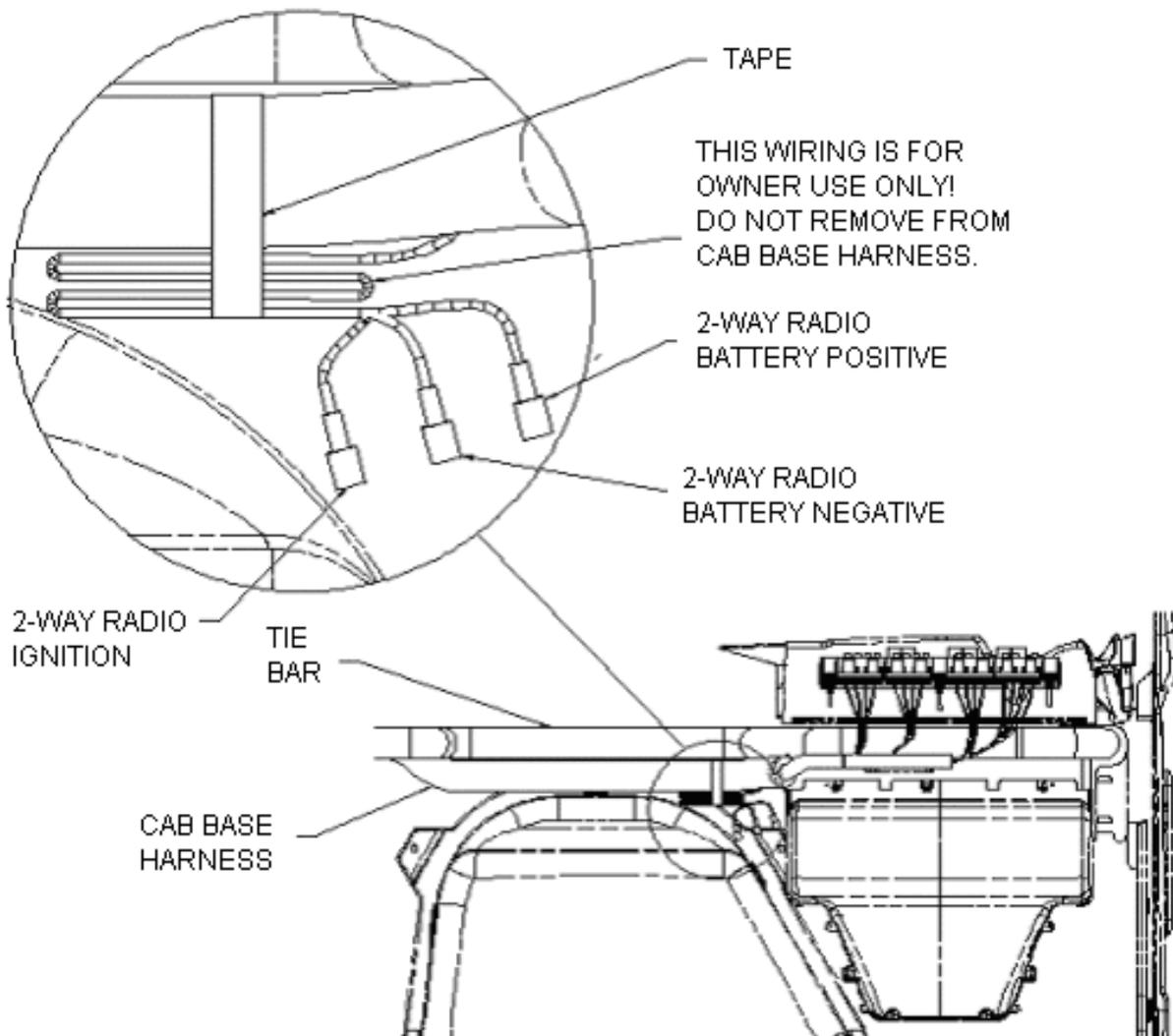
### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE

### WIRING INFORMATION:

Locations for connecting to the vehicle Ignition have been provided. The table below lists the connection point along with information about that point. For a complete diagram of the Ignition system and for connector and terminal part numbers, see vehicle circuit diagram book.

**Table 27**

Feature Code	Max. Current (Amps)	Power Feed	Description
008REA	20	Battery	Power feed to two-way radio
	5	Ignition	Ignition feed to two-way radio
008RGA	20	Battery	Power feed to two-way radio
	5	Ignition	Ignition feed to two-way radio



**Figure 47**

08REA and 08RGA provide radio power and ground directly from the battery to minimize electrical noise on the line.

The cable is coiled up under the instrument panel as shown above in 08REA, and is of sufficient length to route to the back of the Travelcrew cab.

The wiring is located in the center of the header console in the cab for 08RGA.

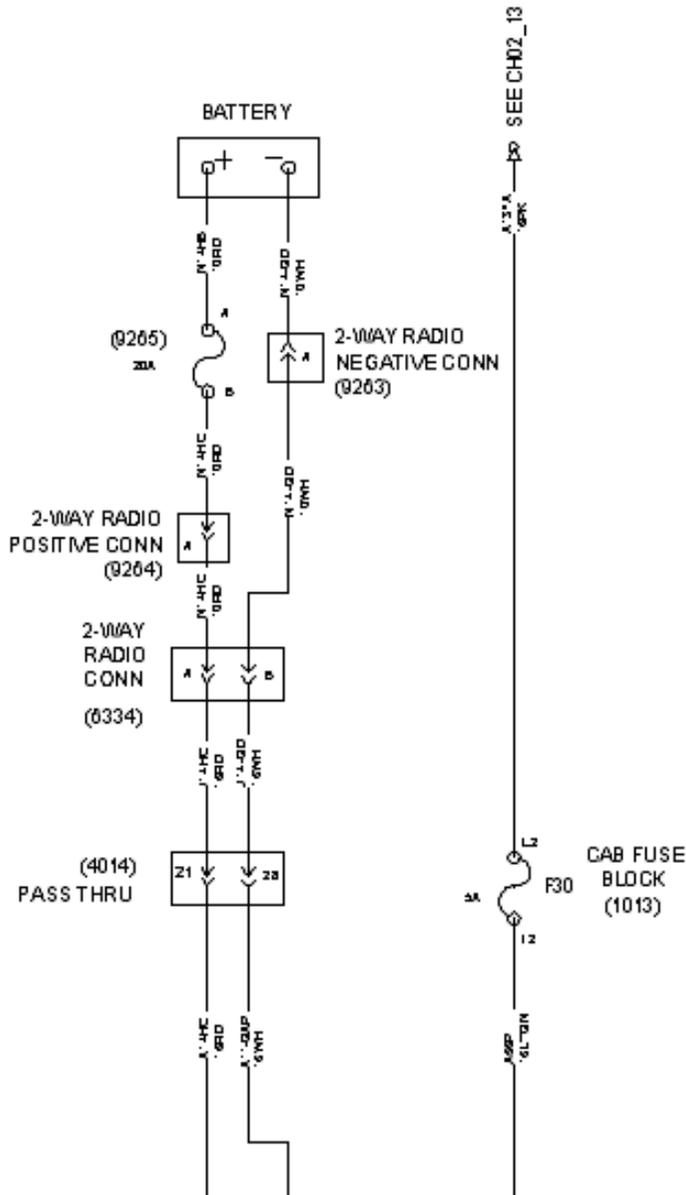


Figure 48

**TESTING:**

- To test these circuits, refer to the above chart and verify that battery voltage is present in the correct key-state for each respective feature.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without one of the desired features, they can be installed in the field. Refer to the section "How Do I" General Information section of the body builders book for information on obtaining required parts. The same parts that are used in the OEM installation are available (cables, components, etc.). Also, refer to the circuit diagram that applies to your vehicle to aid in the installation.

## 8. GAUGE CLUSTER — OPTIONAL GAUGES

### 8.1. 04SBL — INSTRUMENT CLUSTER – ADDING GAUGES

#### FEATURE CODE DESCRIPTION:

04SBL - AIR COMPRESSOR {Bendix Tu-Flo 550} 13.2 CFM Capacity; and Tank for Air Source on Hydraulic Chassis

#### FEATURE / BODY FUNCTION:

04SBL – Provides system air pressure when an air compressor is ordered with a hydraulic brake vehicle.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

04SBL (Auxiliary Air gauge): 595007

The **Aux\_Air\_Press\_Alrm\_Ty\_Param** parameter defines the number of beeps associated with the Auxiliary air pressure gauge alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Aux\_Air\_Press\_Filter\_Param** parameter sets the Auxiliary air gauge update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Aux\_Air\_Press\_Max\_WL** parameter sets the maximum point for auxiliary air in-gauge warning light. When the auxiliary air pressure rises above this set parameter, the warning light in the gauge will illuminate.

The **Aux\_Air\_Press\_Min\_WL** parameter sets the minimum point for auxiliary air in-gauge warning light. When the auxiliary air pressure falls below this set parameter, the warning light in the gauge will illuminate.

**Table 28**

Parameter	ID	Description	Default	Units	Min	Max	Step
Aux_Air_Press_Alrm_Ty_Param	107	Auxiliary air pressure gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	255	No_Units	255	255	25
Aux_Air_Press_Filter_Param	108	Auxiliary air gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1

Parameter	ID	Description	Default	Units	Min	Max	Step
Aux_Air_Press_Max_WL	1963	Maximum threshold for auxiliary air in-gauge warning light	150	psig	0	150	1
Aux_Air_Press_Min_WL	1964	Minimum threshold for auxilliary air in-gauge warning light	72	psig	0	150	1

**WIRING INFORMATION:**

The standard cluster includes:

ODOMETER DISPLAY: Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout (Odometer, trip odometer and fault code readout electronic-liquid crystal display)

WARNING SYSTEM: Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible)

GAUGE CLUSTER GAUGES (6): Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Speedometer

GAUGE, AIR PRESSURE: Air 1 and Air 2 Gauges; Located in Instrument Cluster

**TESTING:**

Use INTUNE or the Diamond Logic™ Builder software to steer each gauge to test values.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without a desired gauge, one or more can be added. Proper programming indicating final gauge location and feature code must be done before the gauge will function. Refer to the section "How Do I" General Information section of the body builders book for information on how to obtain gauge, circuits and sensor P/N's.

**Table 29** Optional Gauge Part Numbers

Optional Gauges	ENGLISH Part Number	METRIC Part Number
Auxiliary Air Pressure Gauge	3533899C1	3533900C1

Always refer to the circuit diagram manual for information.

- A. Remove EGC shroud from instrument panel.
- B. Remove four screws which hold the EGC in place.
- C. Tilt the EGC forward to gain access to the back of the EGC.
- D. Remove the 12-way connector from the center of the EGC.
- E. Remove any additional connectors from the EGC.

Installation of the gauge cluster is the reverse of the removal procedure.

Remove the back cover from the EGC – Item 12

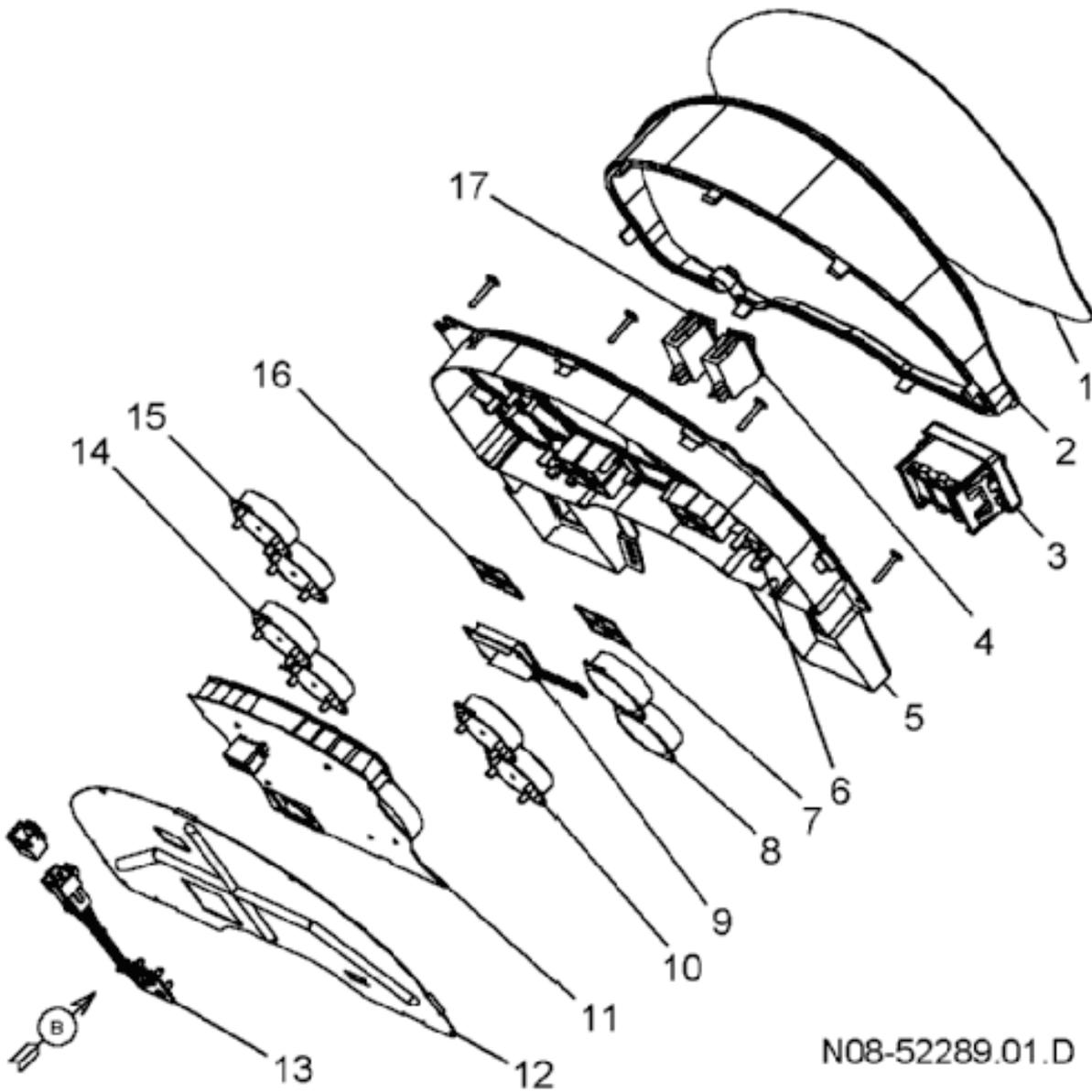
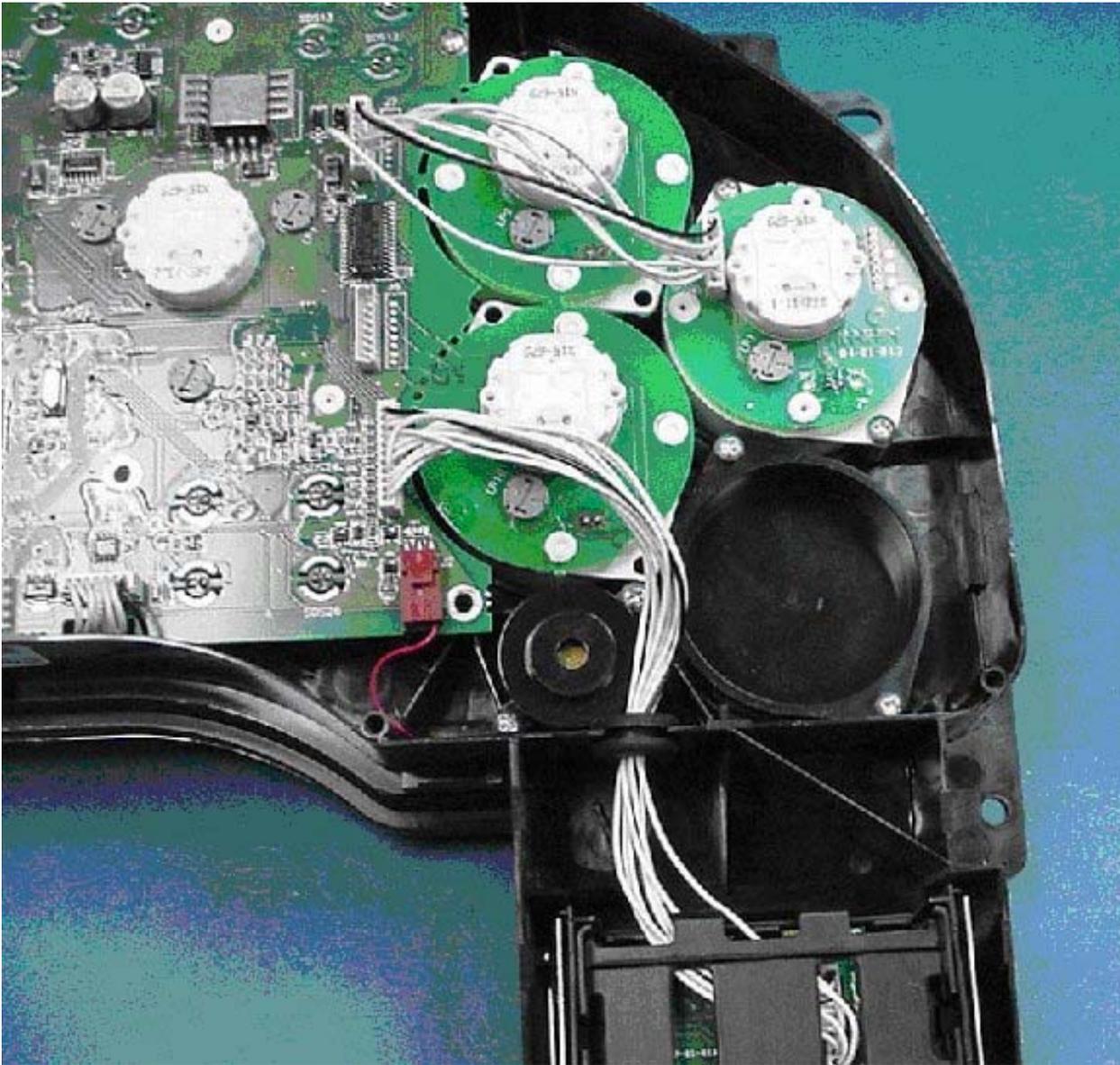


Figure 49

Remove the filler plug from desired gauge location, see view below



**Figure 50 Back of Electronic Gauge Cluster**

Install gauge in open space and attach jumper. Note if the additional gauge is being added to the upper position, the jumper must connect to the upper connector.

## 8.2. 16HGG — INSTRUMENT CLUSTER – ADDING GAUGES

### FEATURE CODE DESCRIPTION:

16HGG – GAUGE, OIL TEMP, ENGINE

### FEATURE / BODY FUNCTION:

16HGG – Provides engine oil temperature to the vehicle operator.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

16HGG (Engine Oil Temperature): 595097 **OR** 595254 (Customer cannot use both)

\*\* Software Feature Code 595097 is used to read engine oil temperature off the datalink.

\*\* Software Feature Code 595254 is used to read engine oil temperature from a hard-wired analog sensor.

The **Eng\_Oil\_Temp\_Alrm\_Ty\_Param** parameter defines the number of beeps associated with the Engine oil temperature alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Eng\_Oil\_Temp\_Filter\_Param** parameter sets the engine oil temperature update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Eng\_Oil\_Temp\_Max\_WL** parameter sets the maximum point for engine oil temperature in-gauge warning light. When the oil temperature rises above this set parameter, the warning light in the gauge will illuminate.

The **Eng\_Oil\_Temp\_Min\_WL** parameter sets the minimum point for engine oil temperature in-gauge warning light. When the oil temperature falls below this set parameter, the warning light in the gauge will illuminate.

**Table 30**

Parameter	ID	Description	Default	Units	Min	Max	Step
Eng_Oil_Temp_Alrm_Ty_Param	218	Engine oil temperature gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	25	No_Units	0	255	25
Eng_Oil_Temp_Filter_Param	219	Engine oil temperature gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1

Parameter	ID	Description	Default	Units	Min	Max	Step
Eng_Oil_Temp_Max_WL	1949	Maximum set point for engine oil temperature in-gauge warning light	230	F	100	300	0.03
Eng_Oil_Temp_Min_WL	1950	Minimum set point for engine oil temperature in-gauge warning light	100	F	100	300	0.03

**WIRING INFORMATION:**

The standard cluster includes:

ODOMETER DISPLAY: Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout (Odometer, trip odometer and fault code readout electronic- liquid crystal display)

WARNING SYSTEM: Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible)

GAUGE CLUSTER GAUGES (6): Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Speedometer

GAUGE, AIR PRESSURE: Air 1 and Air 2 Gauges; Located in Instrument Cluster

**TESTING:**

Use INTUNE or the Diamond Logic™ Builder software to steer each gauge to test values.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without a desired gauge, one or more can be added. Proper programming indicating final gauge location and feature code must be done before the gauge will function. Refer to the section "How Do I" General Information section of the body builders book for information on how to obtain gauge, circuits and sensor P/N's.

**Table 31** Optional Gauge Part Numbers

Optional Gauges	ENGLISH Part Number	METRIC Part Number
Engine Oil Temperature Gauge	3533886C1	3533895C1

Always refer to the circuit diagram manual for information.

- A. Remove EGC shroud from instrument panel.
- B. Remove four screws which hold the EGC in place.
- C. Tilt the EGC forward to gain access to the back of the EGC.
- D. Remove the 12-way connector from the center of the EGC.
- E. Remove any additional connectors from the EGC.

Installation of the gauge cluster is the reverse of the removal procedure.

Remove the back cover from the EGC – Item 12

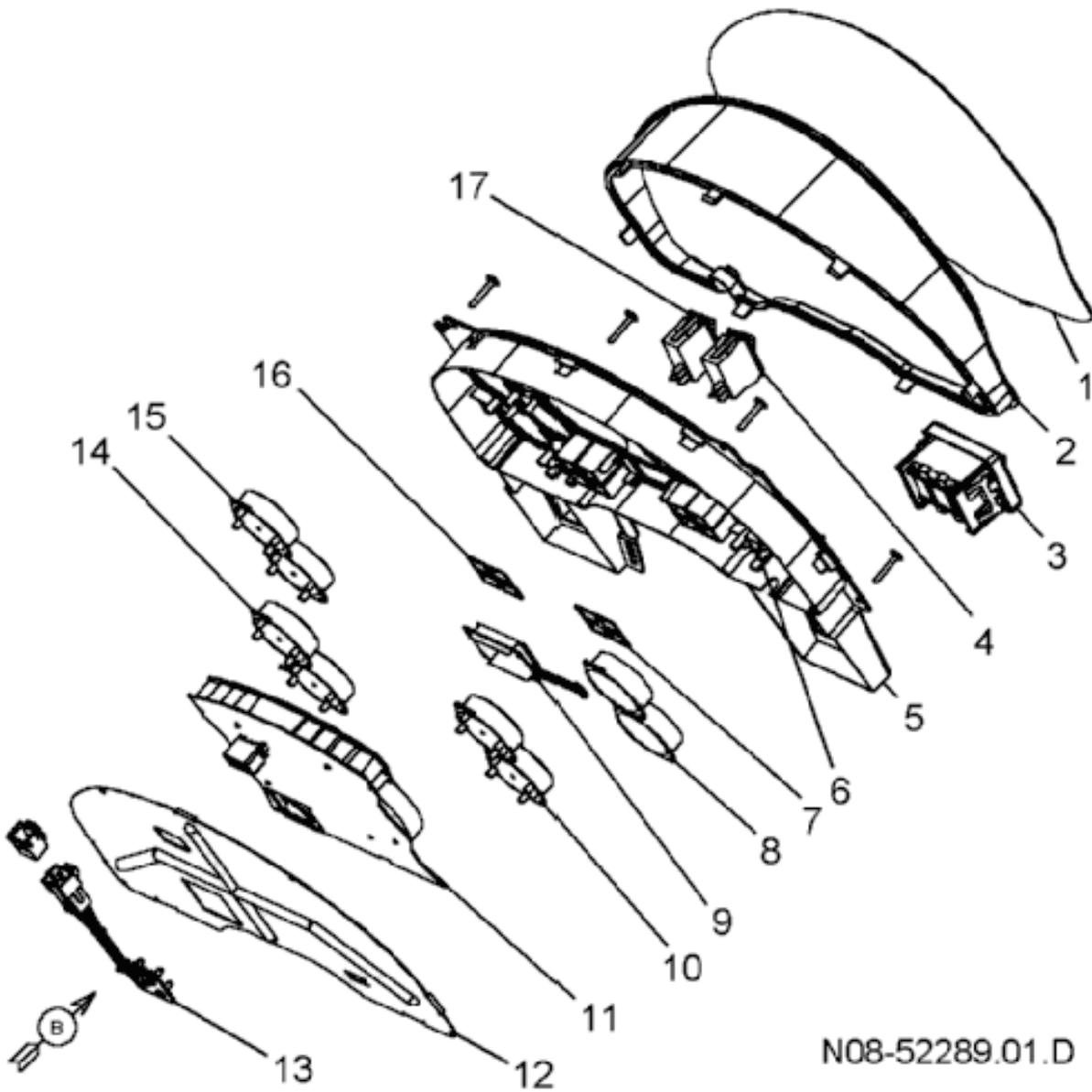
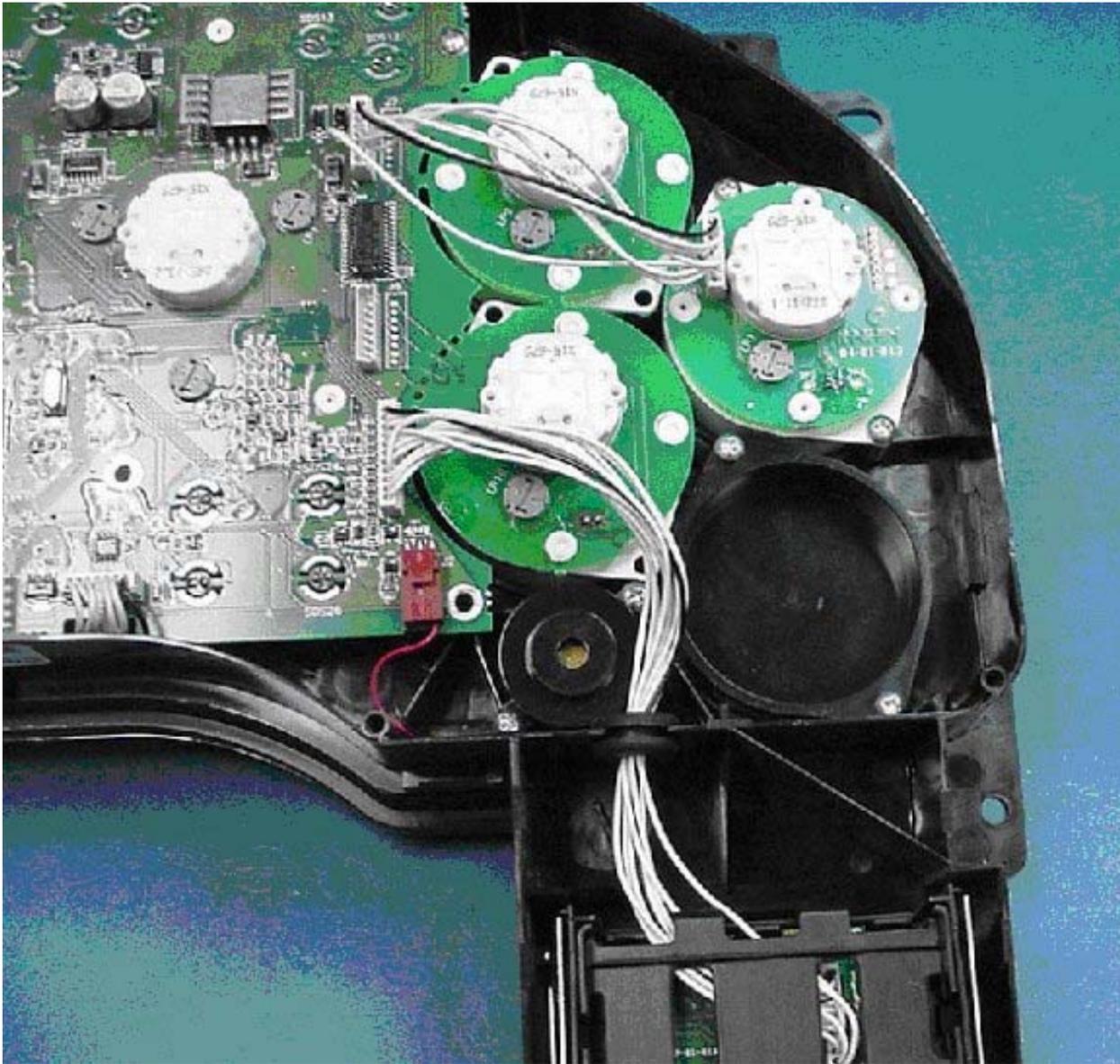


Figure 51

Remove the filler plug from desired gauge location, see view below.



**Figure 52 Back of Electronic Gauge Cluster**

Install gauge in open space and attach jumper. Note if the additional gauge is being added to the upper position, the jumper must connect to the upper connector.

### 8.3. 16HGH — INSTRUMENT CLUSTER – ADDING GAUGES

#### FEATURE CODE DESCRIPTION:

16HGH – GAUGE, OIL TEMP, ALLISON TRAN

#### FEATURE / BODY FUNCTION:

16HGH – Provides Allison transmission fluid temperature information to the vehicle operator.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

16HGH (Allison Transmission Oil Temperature gauge): 595060

The **Trans\_Oil\_Temp\_Alm\_Ty\_Param** parameter defines the number of beeps associated with the Transmission oil temperature alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Trans\_Oil\_Temp\_Filter\_Param** parameter sets the Transmission oil temperature update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Trans\_Oil\_Temp\_Max\_WL** parameter sets the maximum point for Transmission oil temperature in-gauge warning light. When the oil temperature rises above this set parameter, the warning light in the gauge will illuminate.

The **Trans\_Oil\_Temp\_Min\_WL** parameter sets the minimum point for Transmission oil temperature in-gauge warning light. When the oil temperature falls below this set parameter, the warning light in the gauge will illuminate.

**Table 32**

Parameter	ID	Description	Default	Units	Min	Max	Step
Trans_Oil_Temp_Alm_Ty_Param	587	Transmission oil temperature gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	25	No_Units	0	255	25
Trans_Oil_Temp_Filter_Param	589	Transmission oil temperature gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1

---

Parameter	ID	Description	Default	Units	Min	Max	Step
Trans_Oil_Temp_Max_WL	1959	Maximum set point for transmission oil temperature in-gauge warning light	250	F	100	400	0.03
Trans_Oil_Temp_Min_WL	1960	Minimum set point for transmission oil temperature in-gauge warning light	100	F	100	400	0.03

**WIRING INFORMATION:**

The standard cluster includes:

ODOMETER DISPLAY: Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout (Odometer, trip odometer and fault code readout electronic- liquid crystal display).

WARNING SYSTEM: Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible).

GAUGE CLUSTER GAUGES (6): Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Speedometer.

GAUGE, AIR PRESSURE: Air 1 and Air 2 Gauges; Located in Instrument Cluster.

**TESTING:**

Use INTUNE or the Diamond Logic™ Builder software to steer each gauge to test values.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without a desired gauge, one or more can be added. Proper programming indicating final gauge location and feature code must be done before the gauge will function. Refer to the section "How Do I" General Information section of the body builders book for information on how to obtain gauge, circuits and sensor P/N's.

**Table 33** Optional Gauge Part Numbers

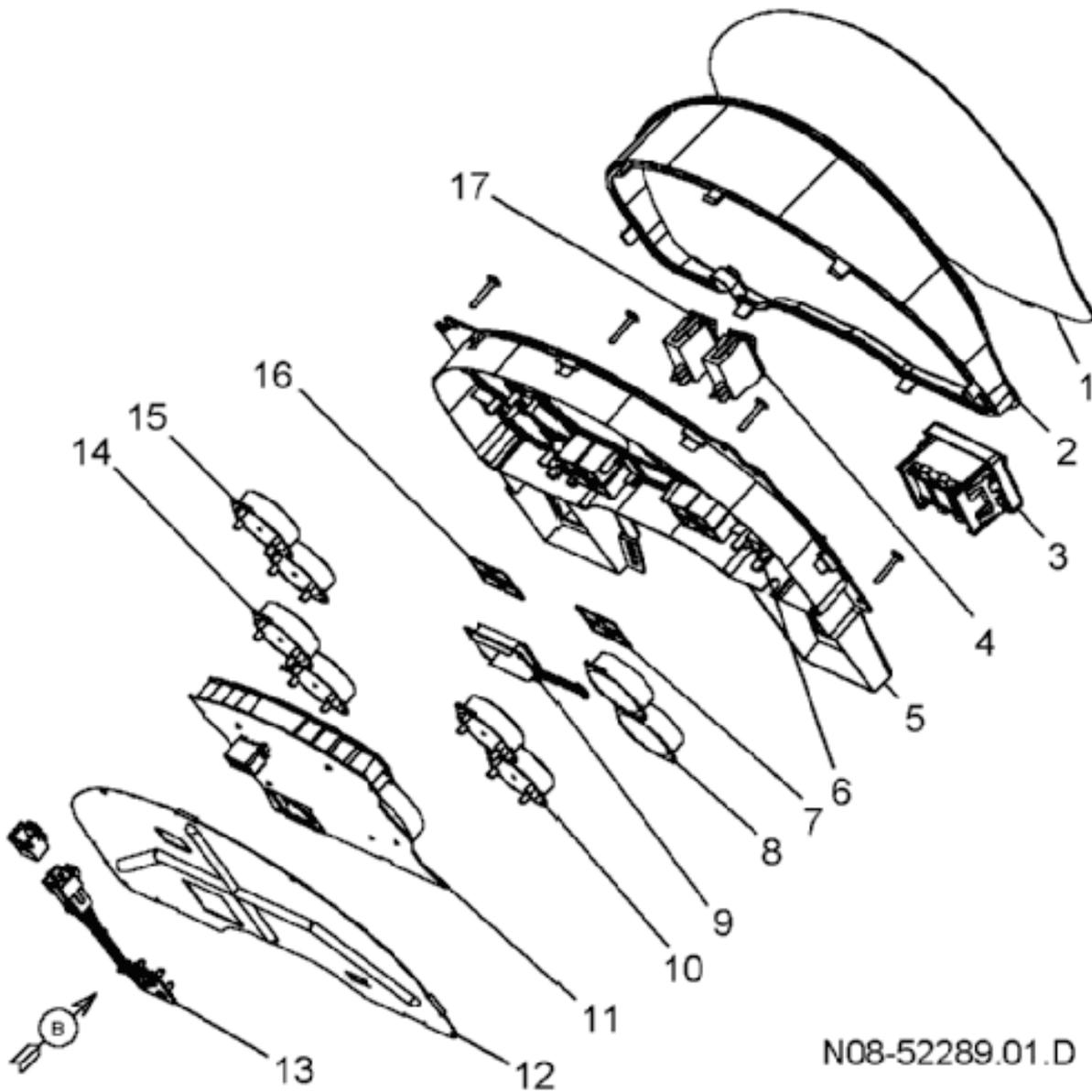
Optional Gauges	ENGLISH Part Number	METRIC Part Number
Transmission Oil Temperature Gauge	3533885C1	3533894C1

Always refer to the circuit diagram manual for information.

- A. Remove EGC shroud from instrument panel.
- B. Remove four screws which hold the EGC in place.
- C. Tilt the EGC forward to gain access to the back of the EGC.
- D. Remove the 12-way connector from the center of the EGC.
- E. Remove any additional connectors from the EGC.

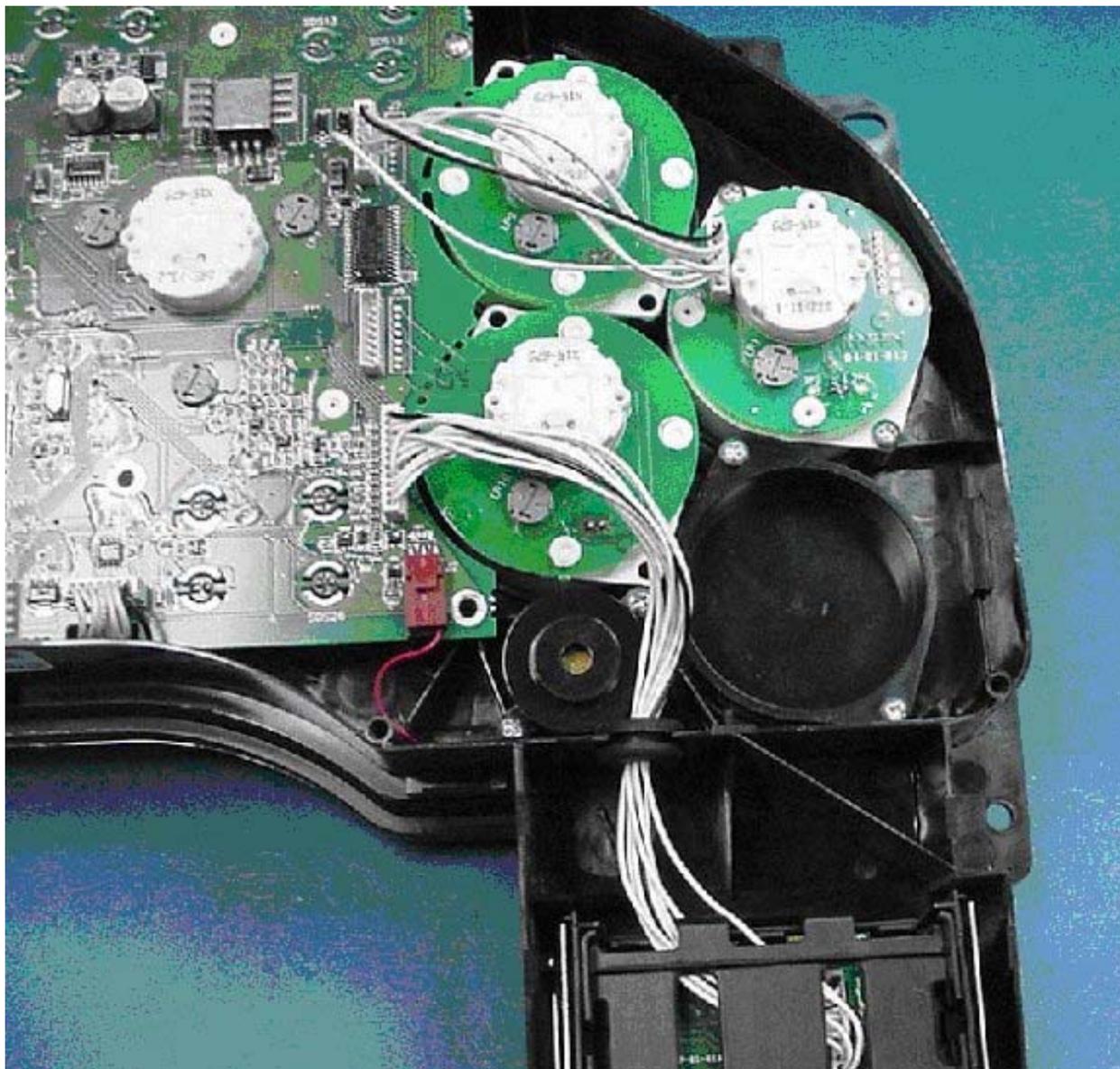
Installation of the gauge cluster is the reverse of the removal procedure.

Remove the back cover from the EGC – Item 12



**Figure 53**

Remove the filler plug from desired gauge location, see view below



**Figure 54 Back of Electronic Gauge Cluster**

Install gauge in open space and attach jumper. Note if the additional gauge is being added to the upper position, the jumper must connect to the upper connector.

## 8.4. 16HGJ — INSTRUMENT CLUSTER – ADDING GAUGES

### FEATURE CODE DESCRIPTION:

16HGJ – GAUGE, OIL TEMP, MANUAL TRAN

### FEATURE / BODY FUNCTION:

16HGJ – Provides manual transmission oil temperature to the vehicle operator. Manual transmissions should not be operated at temperatures above 250 °F (120 °C).

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

16HGJ (Oil Temperature gauge on a manual transmission): 595145

The **Trans\_Oil\_Temp\_Alm\_Ty\_Param** parameter defines the number of beeps associated with the Transmission oil temperature alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Trans\_Oil\_Temp\_Filter\_Param** parameter sets the Transmission oil temperature update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Trans\_Oil\_Temp\_Max\_WL** parameter sets the maximum point for Transmission oil temperature in-gauge warning light. When the oil temperature rises above this set parameter, the warning light in the gauge will illuminate.

The **Trans\_Oil\_Temp\_Min\_WL** parameter sets the minimum point for Transmission oil temperature in-gauge warning light. When the oil temperature falls below this set parameter, the warning light in the gauge will illuminate.

**Table 34**

Parameter	ID	Description	Default	Units	Min	Max	Step
Trans_Oil_Temp_Alm_Ty_Param	587	Transmission oil temperature gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	25	No_Units	0	255	25
Trans_Oil_Temp_Filter_Param	589	Transmission oil temperature gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1

---

Parameter	ID	Description	Default	Units	Min	Max	Step
Trans_Oil_Temp_Max_WL	1959	Maximum set point for transmission oil temperature in-gauge warning light	250	F	100	400	0.03
Trans_Oil_Temp_Min_WL	1960	Minimum set point for transmission oil temperature in-gauge warning light	100	F	100	400	0.03

**WIRING INFORMATION:**

The standard cluster includes:

ODOMETER DISPLAY: Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout (Odometer, trip odometer and fault code readout electronic- liquid crystal display).

WARNING SYSTEM: Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible).

GAUGE CLUSTER GAUGES (6): Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Speedometer.

GAUGE, AIR PRESSURE: Air 1 and Air 2 Gauges; Located in Instrument Cluster.

**TESTING:**

Use INTUNE or the Diamond Logic™ Builder software to steer each gauge to test values.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without a desired gauge, one or more can be added. Proper programming indicating final gauge location and feature code must be done before the gauge will function. Refer to the section "How Do I" General Information section of the body builders book for information on how to obtain gauge, circuits and sensor P/N's.

**Table 35** Optional Gauge Part Numbers

Optional Gauges	ENGLISH Part Number	METRIC Part Number
Transmission Oil Temperature Gauge	3533885C1	3533894C1

Always refer to the circuit diagram manual for information.

- A. Remove EGC shroud from instrument panel.
- B. Remove four screws which hold the EGC in place.
- C. Tilt the EGC forward to gain access to the back of the EGC.
- D. Remove the 12-way connector from the center of the EGC.
- E. Remove any additional connectors from the EGC.

Installation of the gauge cluster is the reverse of the removal procedure.

Remove the back cover from the EGC – Item 12.

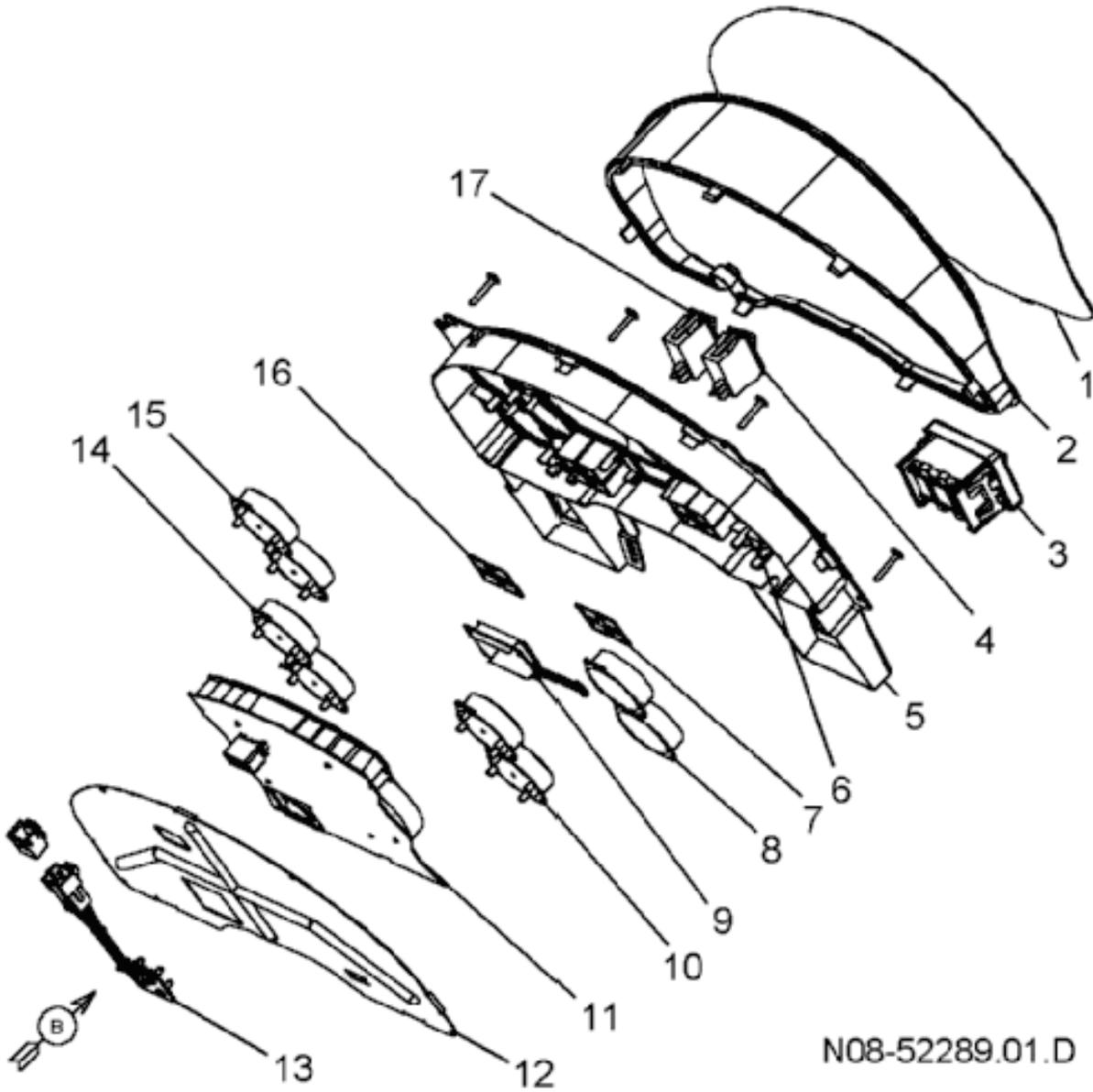
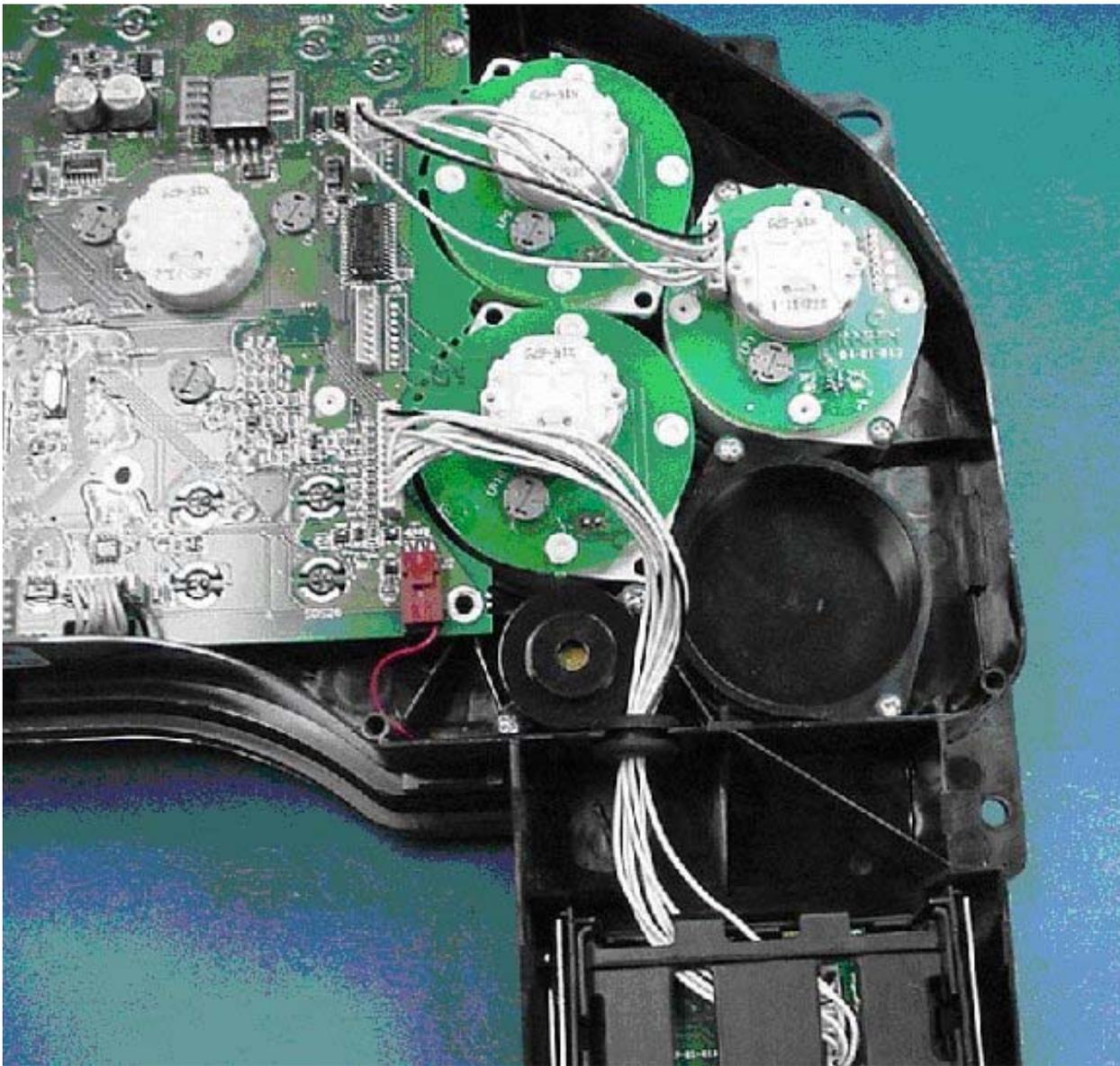


Figure 55

Remove the filler plug from desired gauge location, see view below.



**Figure 56 Back of Electronic Gauge Cluster**

Install gauge in open space and attach jumper. Note if the additional gauge is being added to the upper position, the jumper must connect to the upper connector.

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## 8.5. 16HGL — INSTRUMENT CLUSTER – ADDING GAUGES

### FEATURE CODE DESCRIPTION:

16HGL – GAUGE, OIL TEMP, REAR AXLE

### FEATURE / BODY FUNCTION:

16HGL – Provides rear axle operating information to the vehicle operator. Rear axle temperature should not exceed 240 °F (115 °C).

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

16HGL (Rear Axle Temperature): 595086 **OR** 595087 (Customer cannot use both)

\*\* Software Feature Code 595086 is used to read Rear-rear axle temperature AND Forward-rear axle temperature.

\*\* Software Feature Code 595087 is used to read just Rear-rear axle temperature.

#### → **595086 (Rear-rear and Forward-rear Axle Temperature)**

The **Fwd\_RR\_Axle\_Temp\_Alrm\_Ty\_Param** parameter defines the number of beeps associated with the forward rear axle temperature alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Fwd\_RR\_Axle\_Temp\_Filter\_Param** parameter sets the forward rear axle temperature update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Rear\_RR\_Axle\_Temp\_Alrm\_Ty\_Param** parameter defines the number of beeps associated with the rear rear axle temperature alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Rear\_RR\_Axle\_Temp\_Filter\_Param** parameter sets the rear rear axle temperature update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Rear\_RR\_Axle\_Temp\_Max\_WL** parameter sets the maximum point for Rear rear axle temperature in-gauge warning light. When the Rear rear axle temperature rises above this set parameter, the warning light in the gauge will illuminate.

The **Rear\_RR\_Axle\_Temp\_Min\_WL** parameter sets the minimum point for Rear rear axle temperature in-gauge warning light. When the Rear rear axle temperature falls below this set parameter, the warning light in the gauge will illuminate.

The **Fwd\_RR\_Axle\_Temp\_Max\_WL** parameter sets the maximum point for Forward rear axle temperature in-gauge warning light. When the Forward rear axle temperature rises above this set parameter, the warning light in the gauge will illuminate.

The **Fwd\_RR\_Axle\_Temp\_Min\_WL** parameter sets the minimum point for Forward rear axle temperature in-gauge warning light. When the Forward rear axle temperature falls below this set parameter, the warning light in the gauge will illuminate.

Table 36

Parameter	ID	Description	Default	Units	Min	Max	Step
Fwd_RR_Axle_Temp_Alrm_Ty_Param	276	Forward rear axle temperature gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	25	No_Units	0	255	25
Fwd_RR_Axle_Temp_Filter_Param	277	Forward rear axle temperature gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1
Rear_RR_Axle_Temp_Alrm_Ty_Param	518	Rear rear axle temperature gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	25	No_Units	0	255	25
Rear_RR_Axle_Temp_Filter_Param	519	Rear rear axle temperature gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1
Rear_RR_Axle_Temp_Max_WL	1969	Maximum set point for rear rear axle temperature in-gauge warning light	230	F	100	300	1
Rear_RR_Axle_Temp_Min_WL	1970	Minimum set point for rear rear axle temperature in-gauge warning light	100	F	100	300	1
Fwd_RR_Axle_Temp_Max_WL	1971	Maximum set point for forward rear axle temperature in-gauge warning light	230	F	100	300	1
Fwd_RR_Axle_Temp_Min_WL	1972	Minimum set point for forward rear axle temperature in-gauge warning light	100	F	100	300	1

→ 595087 (Just Rear-Rear Axle Temperature)

The **Rear\_RR\_Axle\_Temp\_Alrm\_Ty\_Param** parameter defines the number of beeps associated with the rear rear axle temperature alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Rear\_RR\_Axle\_Temp\_Filter\_Param** parameter sets the rear rear axle temperature update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Rear\_RR\_Axle\_Temp\_Max\_WL** parameter sets the maximum point for Rear rear axle temperature in-gauge warning light. When the Rear rear axle temperature rises above this set parameter, the warning light in the gauge will illuminate.

The **Rear\_RR\_Axle\_Temp\_Min\_WL** parameter sets the minimum point for Rear rear axle temperature in-gauge warning light. When the Rear rear axle temperature falls below this set parameter, the warning light in the gauge will illuminate.

**Table 37**

Parameter	ID	Description	Default	Units	Min	Max	Step
Rear_RR_Axle_Temp_Alrm_Ty_Param	518	Rear rear axle temperature gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	25	No_Units	0	255	25
Rear_RR_Axle_Temp_Filter_Param	519	Rear rear axle temperature gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1
Rear_RR_Axle_Temp_Max_WL	1969	Maximum set point for rear rear axle temperature in-gauge warning light	230	F	100	300	1
Rear_RR_Axle_Temp_Min_WL	1970	Minimum set point for rear rear axle temperature in-gauge warning light	100	F	100	300	1

### **WIRING INFORMATION:**

The standard cluster includes:

ODOMETER DISPLAY: Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout (Odometer, trip odometer and fault code readout electronic- liquid crystal display)

WARNING SYSTEM: Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible)

GAUGE CLUSTER GAUGES (6): Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Speedometer

GAUGE, AIR PRESSURE: Air 1 and Air 2 Gauges; Located in Instrument Cluster

**TESTING:**

Use INTUNE or the Diamond Logic™ Builder software to steer each gauge to test values.

**HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without a desired gauge, one or more can be added. Proper programming indicating final gauge location and feature code must be done before the gauge will function. Refer to the section “How Do I” General Information section of the body builders book for information on how to obtain gauge, circuits and sensor P/N's.

**Table 38 Optional Gauge Part Numbers**

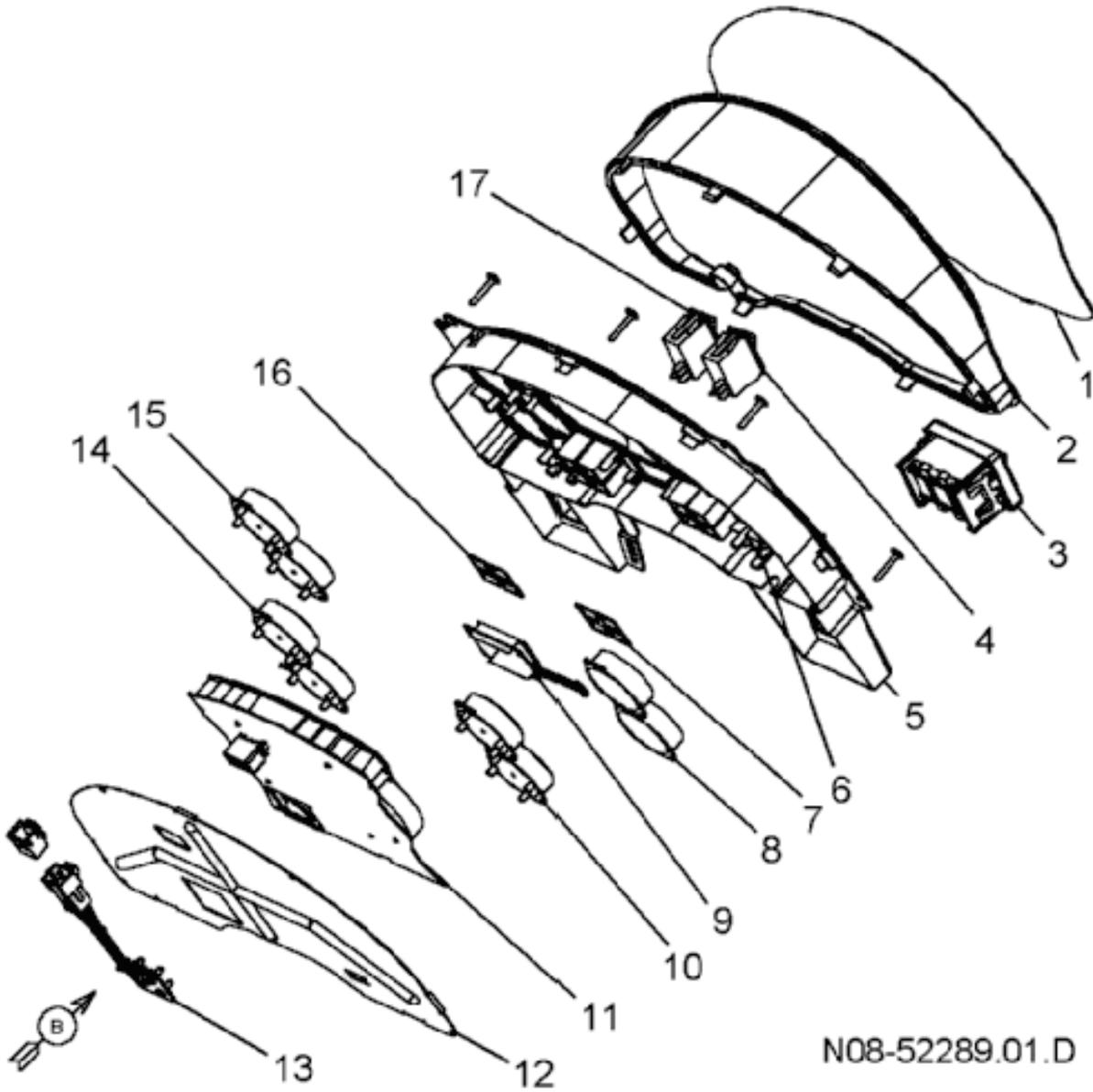
Optional Gauges	ENGLISH Part Number	METRIC Part Number
Rear-rear Axle Oil Temperature Gauge	3533890C1	3533897C1
Forward-rear Axle Oil Temperature Gauge	3533891C1	3533898C1

Always refer to the circuit diagram manual for information.

- A. Remove EGC shroud from instrument panel.
- B. Remove four screws which hold the EGC in place.
- C. Tilt the EGC forward to gain access to the back of the EGC.
- D. Remove the 12-way connector from the center of the EGC.
- E. Remove any additional connectors from the EGC.

Installation of the gauge cluster is the reverse of the removal procedure.

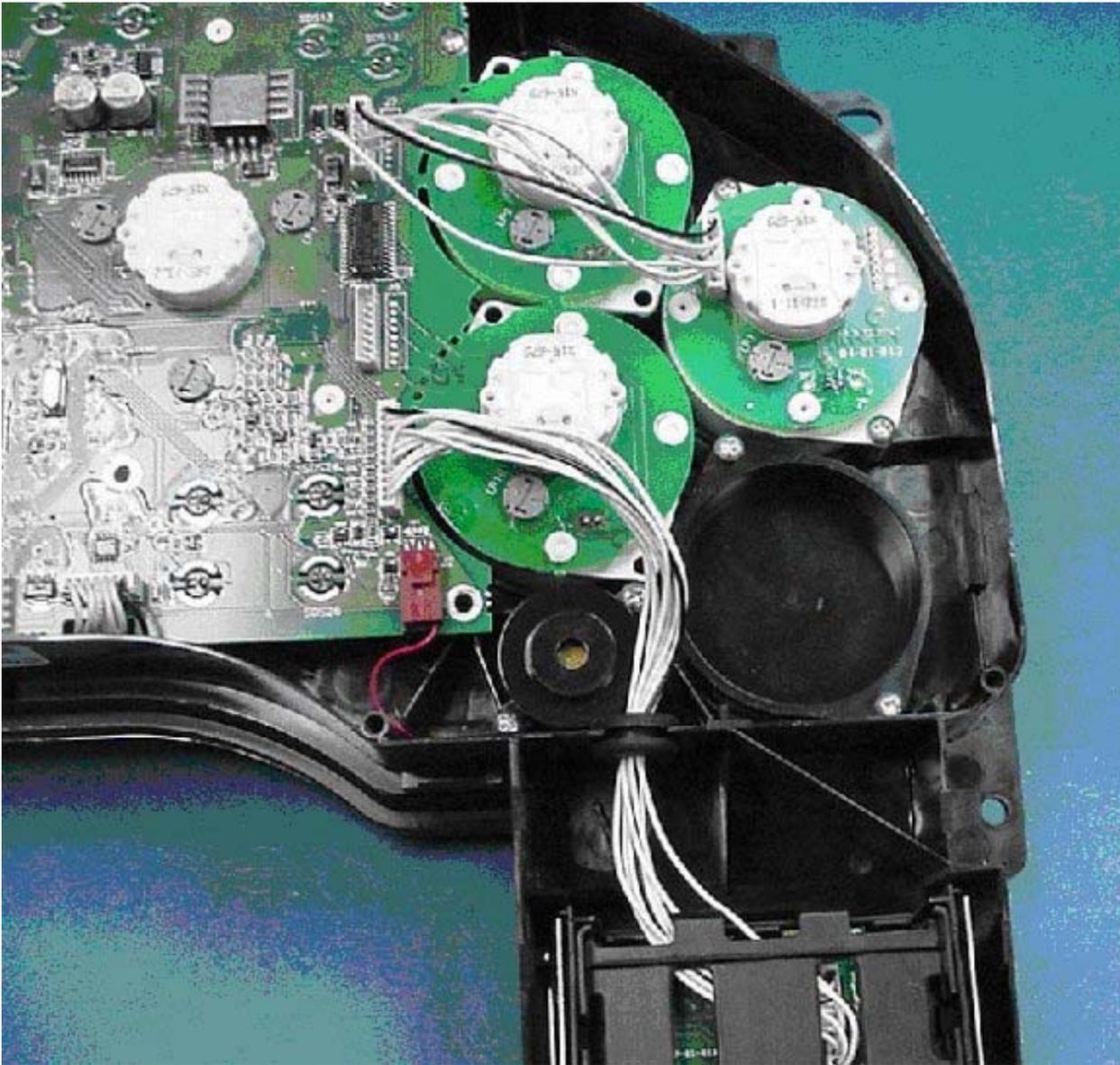
Remove the back cover from the EGC – Item 12.



N08-52289.01.D

Figure 57

Remove the filler plug from desired gauge location, see view below.



**Figure 58 Back of Electronic Gauge Cluster**

Install gauge in open space and attach jumper. Note if the additional gauge is being added to the upper position, the jumper must connect to the upper connector.

## 8.6. 16HGN — INSTRUMENT CLUSTER – ADDING GAUGES

### FEATURE CODE DESCRIPTION:

16HGN – GAUGE, AIR APPLICATION

### FEATURE / BODY FUNCTION:

16HGN – This feature gives a visual read-out of the amount of pressure being applied to the brake pedal.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

16HGN (Air application gauge): 595150

The **Brake\_App\_Alm\_Ty\_Param** parameter defines the number of beeps associated with the Brake application gauge alarm. The number of beeps is the value entered divided by 5. A value of 255 is continuous beeping.

The **Brake\_App\_Filter\_Param** parameter sets the Brake application gauge update rate. The higher the number is, the faster the update rate. 255 is the fastest update rate available, and 1 is the slowest update rate available.

The **Brake\_App\_Max\_WL** parameter sets the maximum point for the brake application in-gauge warning light. When the brake pressure rises above this set parameter, the warning light in the gauge will illuminate.

The **Brake\_App\_Min\_WL** parameter sets the minimum point for brake application in-gauge warning light. When brake pressure falls below this set parameter, the warning light in the gauge will illuminate.

**Table 39**

Parameter	ID	Description	Default	Units	Min	Max	Step
Brake_App_Alm_Ty_Param	127	Brake application gauge alarm type. The number of "beeps" is the value of this parameter divided by 5, 255 is a continuous tone.	0	No_Units	0	255	25
Brake_App_Filter_Param	128	Brake application gauge update rate. A value of 1 is the slowest and 255 is the fastest update rate.	255	No_Units	1	255	1
Brake_App_Max_WL	1979	Maximum set point for brake application in-gauge warning light	150	psig	0	150	0.5
Brake_App_Min_WL	1980	Minimum set point for brake application in-gauge warning light	0	psig	0	150	0.5

### WIRING INFORMATION:

The standard cluster includes:

ODOMETER DISPLAY: Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout (Odometer, trip odometer and fault code readout electronic- liquid crystal display)

WARNING SYSTEM: Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible)

GAUGE CLUSTER GAUGES (6): Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Speedometer

GAUGE, AIR PRESSURE: Air 1 and Air 2 Gauges; Located in Instrument Cluster

### **TESTING:**

Use INTUNE or the Diamond Logic™ Builder software to steer each gauge to test values.

### **HOW DO I ADD THESE FEATURES:**

If the vehicle was ordered without a desired gauge, one or more can be added. Proper programming indicating final gauge location and feature code must be done before the gauge will function. Refer to the section "How Do I" General Information section of the body builders book for information on how to obtain gauge, circuits and sensor P/N's.

**Table 40** Optional Gauge Part Numbers

Optional Gauges	ENGLISH Part Number	METRIC Part Number
Air Application Gauge	3533887C1	~

Always refer to the circuit diagram manual for information.

- A. Remove EGC shroud from instrument panel.
- B. Remove four screws which hold the EGC in place.
- C. Tilt the EGC forward to gain access to the back of the EGC.
- D. Remove the 12-way connector from the center of the EGC.
- E. Remove any additional connectors from the EGC.

Installation of the gauge cluster is the reverse of the removal procedure.

Remove the back cover from the EGC – Item 12

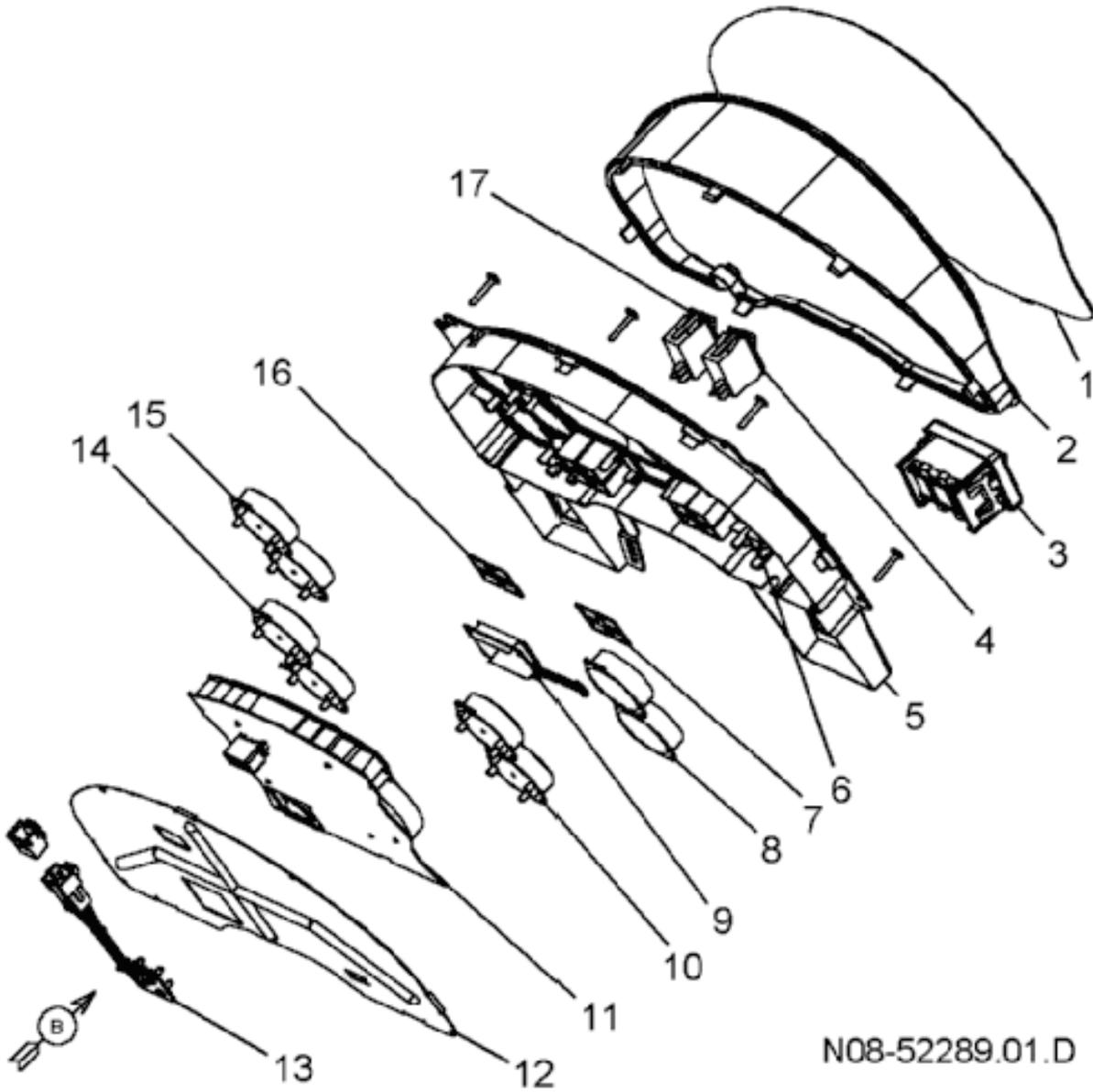
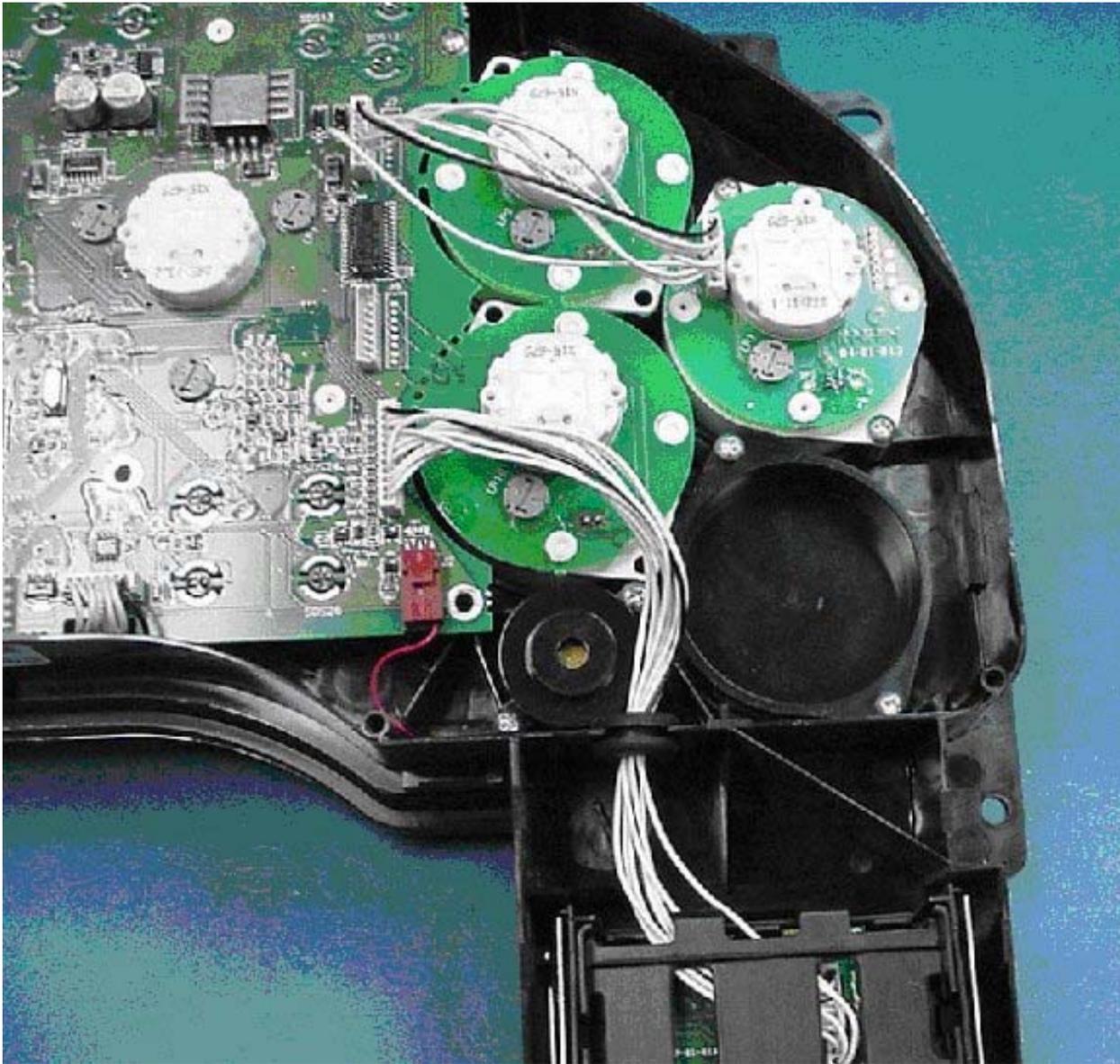


Figure 59

Remove the filler plug from desired gauge location, see view below.



**Figure 60 Back of Electronic Gauge Cluster**

Install gauge in open space and attach jumper. Note if the additional gauge is being added to the upper position, the jumper must connect to the upper connector.

---

## 8.7. 16HKA — INSTRUMENT CLUSTER – OMIT FAULT CODES

### **FEATURE CODE DESCRIPTION:**

16HKA – IP CLUSTER DISPLAY — Omit display of fault codes in instrument cluster and disable blink codes, requires service tool to retrieve and view fault codes.

### **FEATURE / BODY FUNCTION:**

Optional feature that removes the ability to read fault codes inside the vehicle, using the cluster's LCD display. No hardware change is needed. This is a software configurable feature.

### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

16HKA (IP Cluster Display Omit Fault Codes): 595298

### **WIRING INFORMATION:**

No additional wiring is needed.

### **TESTING:**

1. Set Park Brake
2. Press and hold Cruise On switch and Cruise Resume switch
3. Odometer should **NOT** display "NO FAULTS" or a number of FAULTS.

### **HOW DO I ADD THESE FEATURES:**

Select software feature code 595282 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)

## 9. LIGHTS

### 9.1. STOP/TURN/TAIL

International provides standard rear stop and turn signal lights on every vehicle. If the bodybuilder or TEM needs to add different rear light configurations, such as separate stop and rear turn signals, various methods are offered to tap into the tail light circuits. The first and most common way is to use the standard sealed tail light 5-way Packard connector to provide lighting circuits for body mounted lights that need combined stop and rear turn signals. It is recommended that a sealed mating connector and terminals be used to attach body wiring to the vehicle wiring. If the existing rear lighting is used, and a marker or identification light feed is needed, International recommends using the 5-way connector on the driver side rear tail light. Other optional methods for adding various light configurations are available (feature codes 08HAA, 08HAB and 08NAA).

A feed terminal for body marker lights is provided in "terminal D" position on the left tail lamp. To wire body lights, Body Builders are to attach a terminal (International® part number 1661209C1 or Packard Electric part number 12015857) and seal (International part number 589390C1 or Packard Electric part number 12015193) to the body feed cable. The cable can then be snapped into the empty cavity of the existing 5-way connector. **(NOTE: if a splice is absolutely necessary use heat shrink tubing with proper wire.)**

To connect to the tail light wiring harness, instead of using the OEM tail lights, use International® connector 1677851C1 or Packard Electric 12085036. Be sure to use a terminal plug in any unused cavities in the connector body. Alternately, order feature code 08NAA which includes separate wiring for standard left and right tail lights with 8' of extra cable for extending tail light wiring and separate wiring for left and right body mounted tail lights with 8' of extra cable.

The standard tail light connectors are located at the lights mounted to both the driver and passenger sides of the frame rail at the rear.

#### Standard Tail, Marker, and Clearance Lamp Connection

##### **FEATURE CODE DESCRIPTION:**

None, Standard with standard tail lamps.

##### **FEATURE / BODY FUNCTION:**

International provides a connection point at the left rear standard tail lamp. The connection point is made available so that power can be provided to additional tail, marker and clearance lamps.

##### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:** NONE

##### **WIRING INFORMATION:**

There is an unused cavity in the left rear tail lamp connector that can be used to provide tail, marker and clearance power. Remove the connector from the lamp and remove the cavity seal. Terminate added circuit with terminal and seal below and insert into cavity "D".

Table 41

Parts	Part Numbers
Terminal (12 gauge)	2033816C1
Seal	589390C1

**NOTE – Circuit is protected internally by the ESC at 15 amp. If current is close to or exceeds 15 amp, a relay must be added.**

If the rear lighting is to be entirely body mounted, and a connection to the rear harness tail lamp connector is needed, use connector, terminal and seal specified below.

Table 42

Parts	Part Numbers
Connector	1677851C1
Terminal	1687848C1 — 12 Ga. 2033912C1 — 14 Ga.
Lock	1677914C1
Seal	0589390C1 — 12 Ga. 0589391C1 — 14 Ga.

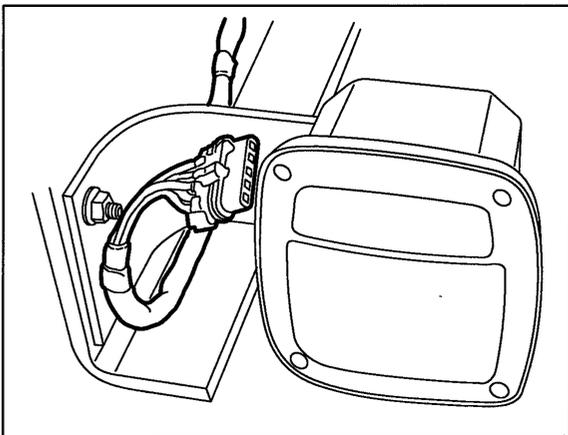
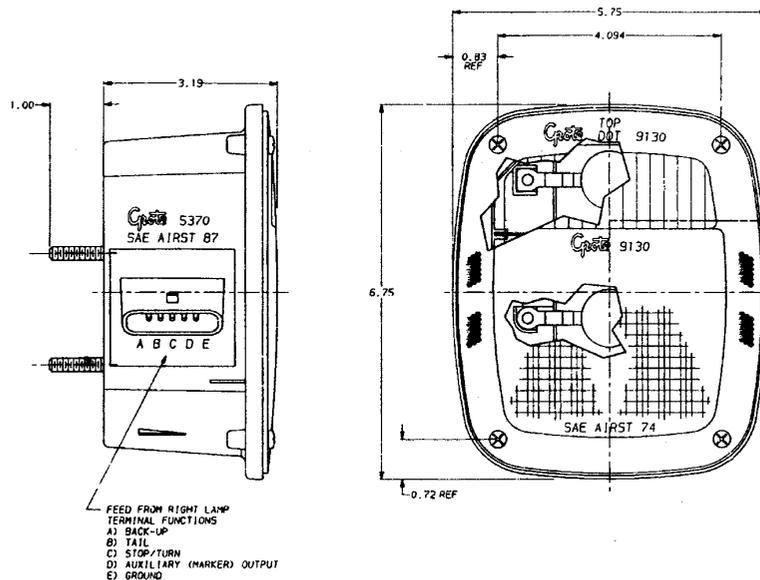


Figure 61 Feed Terminal Location on Left Tail Lamp



**Figure 62 Feed Terminal Location on Left Tail Lamp**

**TESTING:**

- When additional lights are added, test those lights for functionality and test the connection point for battery voltage.

**08HAA — Body Builder Wiring At End Of Frame**

Refer to the Circuit Diagram in S08285, Chapter 9, page 13.

**FEATURE CODE DESCRIPTION:**

008HAA – BODY BUILDER WIRING To Rear of Frame, With Stop, Tail, Turn, and Marker Lights Circuits, Ignition Controlled Auxiliary Feed and Ground, Less Trailer Socket

**FEATURE / BODY FUNCTION:**

This feature is for vehicles that have heavy-duty lighting requirements. This feature has a 30 Amp Ignition Feed. Right and left turn signals can support up to 7 turn lamps per side. Code 08HAA is designed for separate stop and turn lamps only. The 7-wire breakout is located at the back of frame and there is no connector. The wires are blunt cut with heat shrink covering.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Software Feature Codes that must be added: 0595030

Software Feature Codes that must be removed: NONE

**These parameters should be left at their factory default values!**

**Table 43**

Parameter	ID	Description	Default	Units	Min	Max	Step
Park_Light_ Lo_Current	1880	Park and ID Lights Low Current Detection Level (Amps)	0.5	A	0	15	0.1
Park_Light_ Hi_Current	1881	Park and ID Lights High Current Detection Level (Amps)	20	A	0	15	0.1
Park_Light_ OC_Current	1882	Park and ID Lights Open Circuit Detection Level (Amps)	0.5	A	0	15	0.1

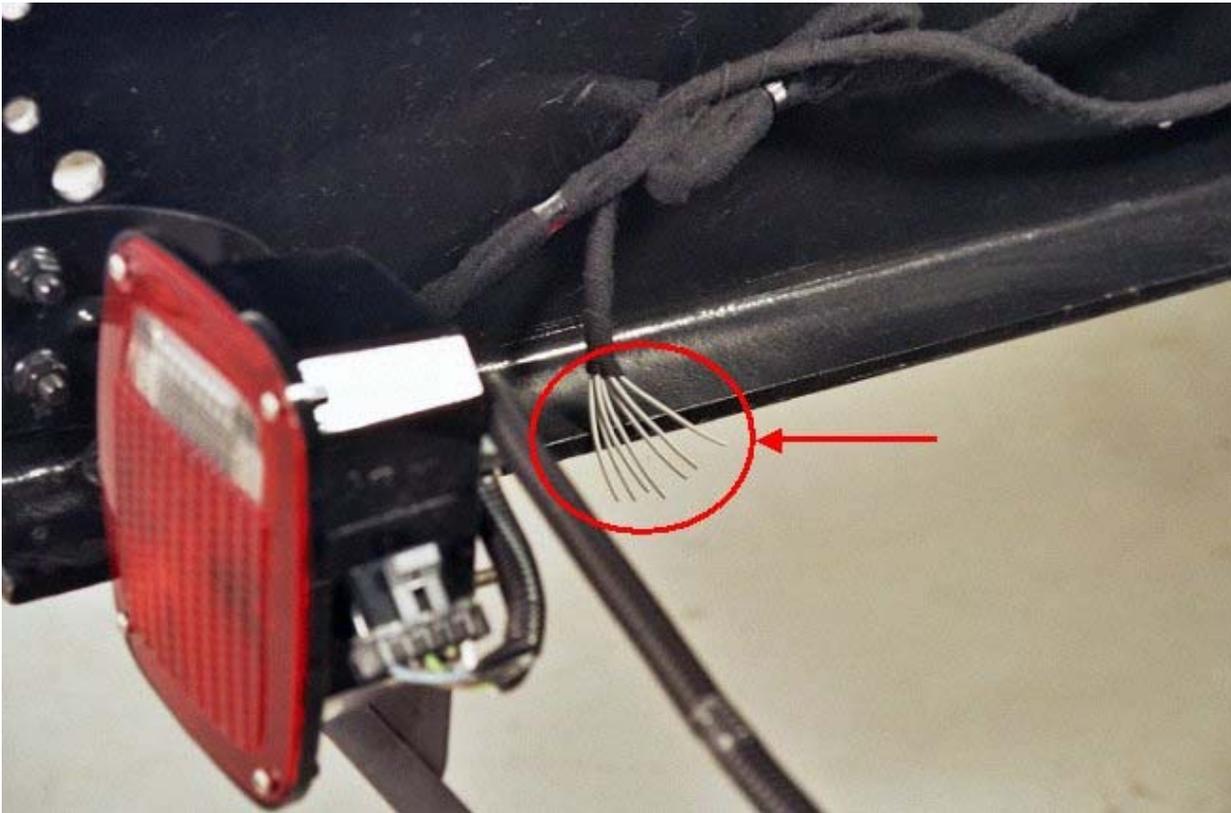
**WIRING INFORMATION:**

08HAA gives 7 wires located at end of frame that are blunt cut.

**Table 44 08HAA**

Cavity	Circuit Number	Maximum Current	Description	Fused by
N/A	R70	30 A	Stop Lights	F2-B1
N/A	R68	20 A	Park Lights	F2-F1
N/A	R94	30 A	Ignition Feed	F2-B2
N/A	R58	20 A	Identification Lights	F2-H1
N/A	R56	15 A	Left Turn	F2-H2
N/A	R57	15 A	Right Turn	F2-F2
N/A	R10	N/A	Ground	

Connector pinout is labeled as Trailer Socket (9734) connector in Chapter 9 page 13 of the circuit diagram book. The connector itself is not supplied and wires are blunt cut.



**Figure 63 Location of 7-Wire Breakout at the End of Frame**

**TESTING:**



**WARNING – To avoid property damage, personal injury or death, park the vehicle on a level surface, set the parking brake, chock the wheels and turn the engine off.**

1. Turn on vehicle headlights.
2. Verify that the taillight circuit (# R68) has battery voltage levels present.
3. Verify that the marker light circuit (# R58) has battery voltage levels present.
4. Turn off vehicle headlights.
5. Turn on Left Turn Signal in vehicle.
6. Verify that left turn circuit (# R56) is cycling between battery voltage and ground.
7. Turn off vehicle left turn signal.
8. Turn on Right Turn Signal in vehicle.
9. Verify that right turn circuit (# R57) is cycling between battery voltage and ground.

- 
10. Turn off vehicle left turn signal.
  11. Put the vehicle in reverse.
  12. Turn key to "ignition" position.
  13. Verify that the Ignition circuit (# R94) has battery voltage levels present.
  14. Press the vehicle brake pedal.
  15. Verify that the stop circuit (# R70) has battery voltage levels present.
  16. Release brake pedal.

CIRCUIT DIAGRAM: See Electrical Circuit Diagram Manual S08285 Chapter 9.

**HOW DO I ADD THIS FEATURE:**

Feature 08HAA is not available with code 08HAG and 08HAH Electric Trailer Brake or code 08TME and 08TMG Trailer Connection Socket. If the vehicle has any of these codes, 08HAA cannot be installed in the vehicle.

This feature is not easy to install and every effort should be made to order the vehicle with the desired code.

Refer to the "How Do I" General Information section of the body builder book for obtaining information on obtaining required circuits.

Refer to the 7-Way Socket at End of frame for information covering circuit connections and use of the circuit diagram manual to aid in assembly.

**08HAB and 08HAE — Body Builder Wiring**

Refer to the Circuit Diagram in S08285, Chapter 9, page 10.

**FEATURE CODE DESCRIPTION:**

008HAB – Body Builder wiring, **back of cab** at left frame, includes 7-way sealed connector for tail/amber/backup/accessory power/ground and sealed connectors for combination stop/turn. And a 3-way for separate stop/turn lights.

008HAE – Body Builder wiring, at **end of left frame**, includes 7-way sealed connector for tail/ amber/ backup/ accessory power/ground and sealed connectors for combination stop/turn. And a 3-way for separate stop/turn lights.

**FEATURE / BODY FUNCTION:**

These features provide power to operate various body loads or after-market accessories such as stop/tail/backup/marker/rear turn signal lights, motors, heaters, etc. There are two connectors that come with these options. A 7-way and a 3-way, both have sealed mating connectors and sealing plugs pre-installed. The 7-way connector provides the combined stop and turn signal circuits while the 3-way provides the separate stop and turn signal circuits. It is always recommended that sealed mating connectors terminals be used to attach body wiring to the vehicle wiring. Also, if this option is used in place of the standard rear lighting connector, it is recommended that a mating connector with sealing plugs be placed into the standard rear tail light connector.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Software Feature Codes that must be added: 0595030

Software Feature Codes that must be removed: NONE

**These parameters should be left at their factory default values!**

**Table 45**

Parameter	ID	Description	Default	Units	Min	Max	Step
Park_Light_Lo_Current	1880	Park and ID Lights Low Current Detection Level (Amps)	0.5	A	0	15	0.1
Park_Light_Hi_Current	1881	Park and ID Lights High Current Detection Level (Amps)	20	A	0	15	0.1
Park_Light_OC_Current	1882	Park and ID Lights Open Circuit Detection Level (Amps)	0.5	A	0	15	0.1

**WIRING INFORMATION:**

08HAB: Connectors are located inside the driver's side frame rail at the back of the cab.

08HAE: Connectors are located inside the driver's side frame rail at the end of the frame.

**Table 46 7-Way Connector Information**

Wire Number	Cavity	Gauge	Color	Description	Fuse Rating (Amps)	Available Current (Amps)
68BB	A	14	Brown	Tail Light	20	20
56BB	B	16	Orange	Left Turn Light	10	8
57BB	C	16	Orange	Right Turn Light	10	8
58BB	D	14	Brown	Marker Light	20	20
71BB	E	16	Orange	Back-up Light	10	6
12BB	F	14	Light Blue	Accessory Feed	20	20
11-GBB	G	12	White	Ground	—	

**Table 47 More 7-Way Connector Information**

Description	Chassis Harness	Body Builder Harness
(4450) 7-Way Connector	2039311C91	2039312C91
Lock	2039342C1	
12 Gauge Seals	589390C1	
14 Gauge Seals	589391C1	
16 Gauge Seals	1652325C1	
12 Gauge Terminals	2039344C1	1687848C1
14 Gauge Terminals	3535486C1	2033912C1
16 Gauge Terminals	2039343C1	2033911C1

**Table 48 3-Way Connector Information**

Wire Number	Cavity	Gauge	Color	Description	Fuse Rating (Amps)	Available Current (Amps)
56BC	A	16	Orange	Left Turn Light	10	6
57BC	B	16	Orange	Right Turn Light	10	6
70BB	C	14	Orange	Stop Light	15	15

**Table 49 More 3-Way Connector Information**

Description	Chassis Harness	Body Builder Harness
(4460) 3-Way Connector	1686834C1	3553961C1
Lock	1664408C1	355 4019C1
14 Gauge Seals	589391C1	
16 Gauge Seals	1652325C1	

**Table 49 More 3-Way Connector Information (cont.)**

Description	Chassis Harness	Body Builder Harness
14 Gauge Terminals	2033816C1	2033912C1
16 Gauge Terminals	2033819C1	2033911C1

**Figure 64 7-Way and 3-Way Connectors for 08HAB (Back of Cab)**

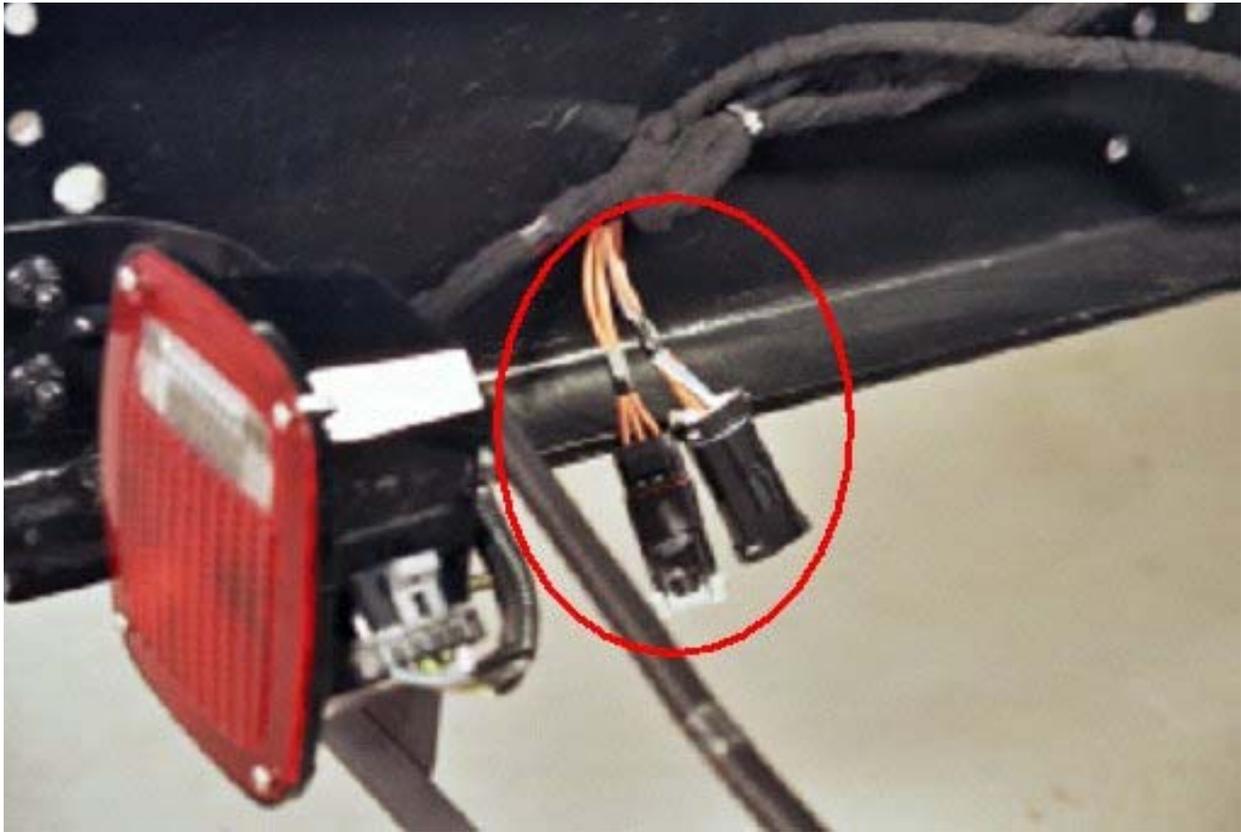


Figure 65 7-Way and 3-Way Connectors for 08HAE (End of Frame)

**TESTING:**



**WARNING – To avoid property damage, personal injury or death, park the vehicle on a level surface, set the parking brake, chock the wheels and turn the engine off.**

For Combined Stop and Turn:

1. Turn ON vehicle headlights.
2. Verify that the taillight circuit, Cavity A of 7-way socket with Brown 14 gauge wire, has battery voltage levels present.
3. Verify that the marker light circuit, Cavity D of 7-way socket with Brown 14 gauge wire, has battery voltage levels present.
4. Turn OFF vehicle headlights.
5. Turn on Left Turn Signal in vehicle.
6. Verify that left turn/stop circuit, Cavity B of 7-way socket with Orange 16 gauge wire, is cycling between battery voltage and ground.

7. Turn off vehicle left turn signal.
8. Turn on Right Turn Signal in vehicle.
9. Verify that right turn/stop circuit, Cavity C of 7-way socket with Orange 16 gauge wire, is cycling between battery voltage and ground.
10. Turn off vehicle left turn signal.
11. Put the vehicle in reverse.
12. Verify that the body backup lights are working correctly.
13. Verify that the backup light circuit, Cavity E of 7-way socket with Orange 16 gauge wire, has battery voltage levels present.
14. Take the vehicle out of reverse.
15. Turn key to “accessory” or “ignition” position.
16. Verify that the Accessory circuit, Cavity F of 7-way socket with Light Blue 14 gauge wire, has battery voltage levels present.
17. Press the vehicle brake pedal.
18. Verify that the brake lights are functioning correctly.
19. Verify that the left turn/stop circuit, Cavity B of 7-way socket with Orange 16 gauge wire, AND the right turn/stop circuit, Cavity C of 7-way socket with Orange 16 gauge wire have battery voltage levels present.
20. Release brake pedal.

#### For Separate Stop and Turn

1. Turn ON vehicle headlights.
2. Verify that the taillight circuit, Cavity A of 7-way socket with Brown 14 gauge wire, has battery voltage levels present.
3. Verify that the marker light circuit, Cavity D of 7-way socket with Brown 14 gauge wire, has battery voltage levels present.
4. Turn OFF vehicle headlights.
5. Turn ON Left Turn Signal in vehicle.
6. Verify that left turn circuit, Cavity A of 3-way socket with Orange 16 gauge wire, is cycling between battery voltage and ground.
7. Turn OFF vehicle left turn signal.
8. Turn ON Right Turn Signal in vehicle.
9. Verify that right turn circuit, Cavity B of 3-way socket with Orange 16 gauge wire, is cycling between battery voltage and ground.
10. Turn OFF vehicle left turn signal.

11. Put the vehicle in reverse.
12. Verify that the backup light circuit, Cavity E of 7-way socket with Orange 16 gauge wire, has battery voltage levels present.
13. Take the vehicle out of reverse.
14. Turn key to “accessory” or “ignition” position.
15. Verify that the Accessory circuit, Cavity F of 7-way socket with Light Blue 14 gauge wire, has battery voltage levels present.
16. Press the vehicle brake pedal.
17. Verify that the stop circuit, Cavity C of 3-way socket with Orange 14 gauge wire, has battery voltage levels present.
18. Release brake pedal.

**HOW DO I ADD THIS FEATURE:**

This feature is not easy to install and every effort should be made to order the vehicle with the desired code.

Refer to the “How Do I” General Information section of the body builder book for obtaining information on obtaining required circuits.

Refer to the 7-Way Socket at End of frame for information covering circuit connections and use of the circuit diagram manual to aid in assembly.

**08NAA — Extending Tail Light Harnesses****FEATURE CODE DESCRIPTION:**

08NAA – TAIL LIGHT WIRING MODIFIED Includes: Separate Wiring for Standard Lt and Rt Tail Lights, With 8.0' of Extra Cable; Separate Wiring for Lt and Rt Body Mounted Tail Lights, With 8.0' of Extra Cable

**FEATURE / BODY FUNCTION:**

Feature code 08NAA provides 8 additional feet of stop turn and tail light wiring to relocate the stop/turn lights provided with the vehicle.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE****WIRING INFORMATION:**

The extra harness length for code 08NAA is coiled at the rear of frame on both the right and left frame rail per view below. The loose harness connector is covered with a sealed connector, if standard taillights are being removed, use sealing cap to protect open connector.

If a harness is to be connected to the OEM connector see below for parts requirements. The P/N for the 08NAA extension harness is 3547275C91.

**Table 50 Left Side Connector**

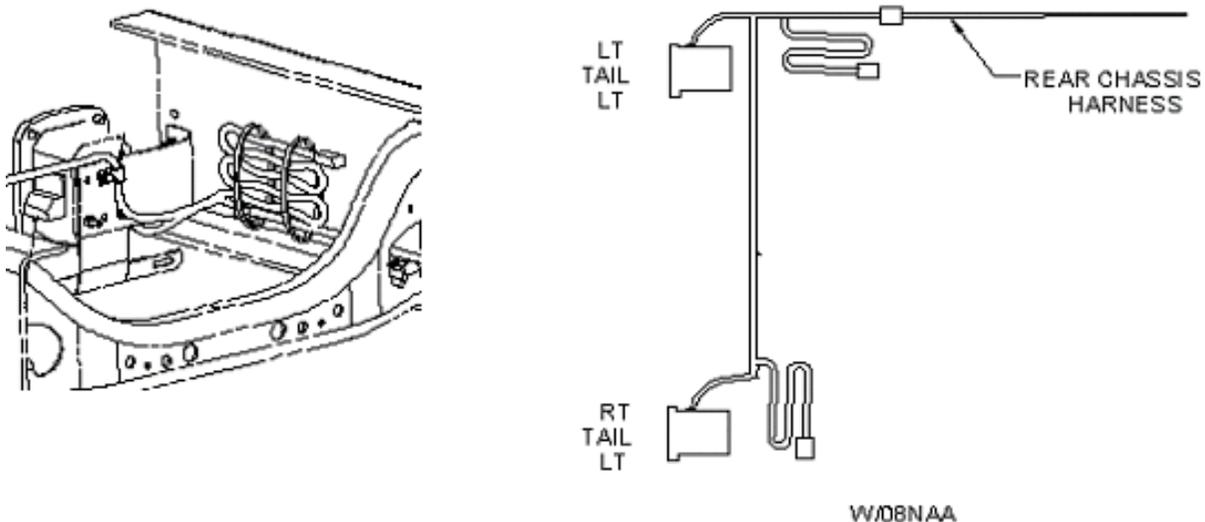
Connector Cavity Information and Parts Required to connect to OEM Connector					
Connector P/N	Cavity	Circuit #	Description	Term P/N	Seal P/N
1677851C1	A	S71H	Back Up	2033911C1	589391C1
	B	S68F	Tail	2033911C1	589391C1
	C	S56E	Stop/ Turn	2033911C1	589391C1
	D	Plug	—	2033911C1	589391C1
	E	S10–GF	Ground	2033911C1	589391C1

**Table 51 Right Side Connector**

Connector Cavity Information and Parts Required to connect to OEM Connector					
Connector P/N	Cavity	Circuit #	Description	Term P/N	Seal P/N
1677851C1	A	S71G	Back Up	2033911C1	589391C1
	B	S68G	Tail	2033911C1	589391C1
	C	S57E	Stop/ Turn	2033911C1	589391C1
	D	Plug	—	2033911C1	589391C1
	E	S10–GE	Ground	2033911C1	589391C1

Plug P/N – 587579C1

Connector Lock P/N – 1677914C1

**Figure 66****HOW DO I ADD THIS FEATURE:**

See the part numbers identified in the “Wiring Information” section of this document.

**08WEB — Center Chassis Extension Harness****FEATURE CODE DESCRIPTION:**

08WEB - SPECIAL WIRING HARNESS, BODY for Chassis, With 6' Additional Length to Accommodate Drop Frame Beverage Body Application

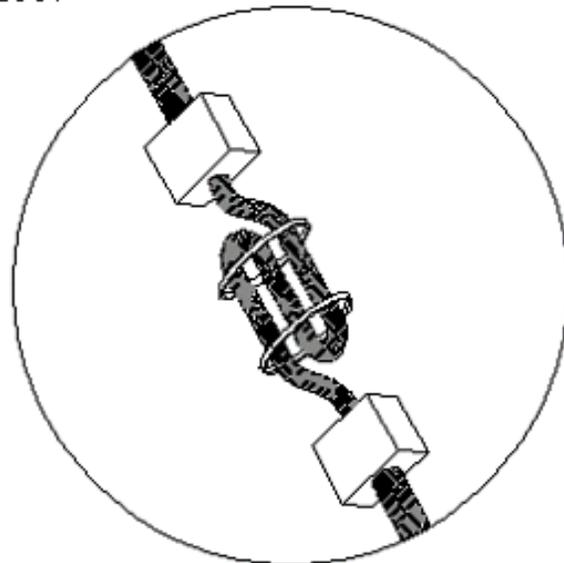
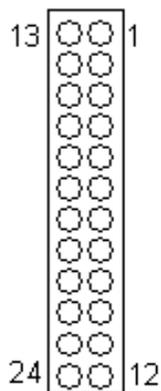
**FEATURE / BODY FUNCTION:**

Feature code 08WEB provides an additional 6 feet to the center chassis harness. This feature is to accommodate drop frame applications but may be specified when additional chassis harness length is desired.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE****WIRING INFORMATION:**

A 6' extension of the center chassis harness is provided for Beverage Body Applications. A 24-pin connector is provided at the end of the extension.

24-Pin Connector Part Number is 3558026c1



ADDITIONAL JUMPER  
TO BE ADDED BETWEEN  
CENTER AND REAR  
CHASSIS HARNESS  
W/08WEB

**Figure 67**

**HOW DO I ADD THIS FEATURE:**

See the part numbers identified in the "Wiring Information" section of this document.

## 9.2. TRAILER SOCKETS

### 08TME and 08TMG – 7-Way Trailer Socket At End Of Frame

Refer to the Circuit Diagram in S08285, Chapter 9, page 13.

#### **FEATURE CODE DESCRIPTION:**

08TME-TRAILER CONNECTION SOCKET 7-Way; Mounted at Rear of Frame, Wired for Turn Signals Independent of Stop, Compatible With Trailers That Have Amber or Side Lamps.

08TMG-TRAILER CONNECTION SOCKET 7-Way; Mounted at Rear of Frame, Wired for Turn Signals Combines With Stop, Compatible With Trailers That Use Combined Stop, Tail, Turn Lamps.

#### **FEATURE / BODY FUNCTION:**

These features are used to connect trailer lighting circuits to the vehicle. These options are for providing separate and combined stop and turn signals and are located at the “End Of The Frame”. These 7-way sockets provide ignition controlled fused 30 Amp center pins for trailer antilock brake systems. Feature 08TMG is designed for trailers with combined stop and turn lamps. With all trailer connection features, the socket is a standard SAE recommended socket used in the trucking industry. The circuit arrangement in the socket is also the same as SAE recommendation, except for 08TMG which has no separate stop circuit.

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Software Feature Codes that must be added: 595012, 595015 and 595030.

Software Feature Codes that must be removed: NONE

**These parameters should be left at their factory default values!**

**Table 52**

Parameter	ID	Description	Default	Units	Min	Max	Step
Park_Light_ Lo_Current	1880	Park and ID Lights Low Current Detection Level (Amps)	0.5	A	0	15	0.1
Park_Light_ Hi_Current	1881	Park and ID Lights High Current Detection Level (Amps)	20	A	0	15	0.1
Park_Light_ OC_Current	1882	Park and ID Lights Open Circuit Detection Level (Amps)	0.5	A	0	15	0.1

#### **WIRING INFORMATION:**

A 7-Way Trailer socket is provided at the end of the driver's side frame rail.

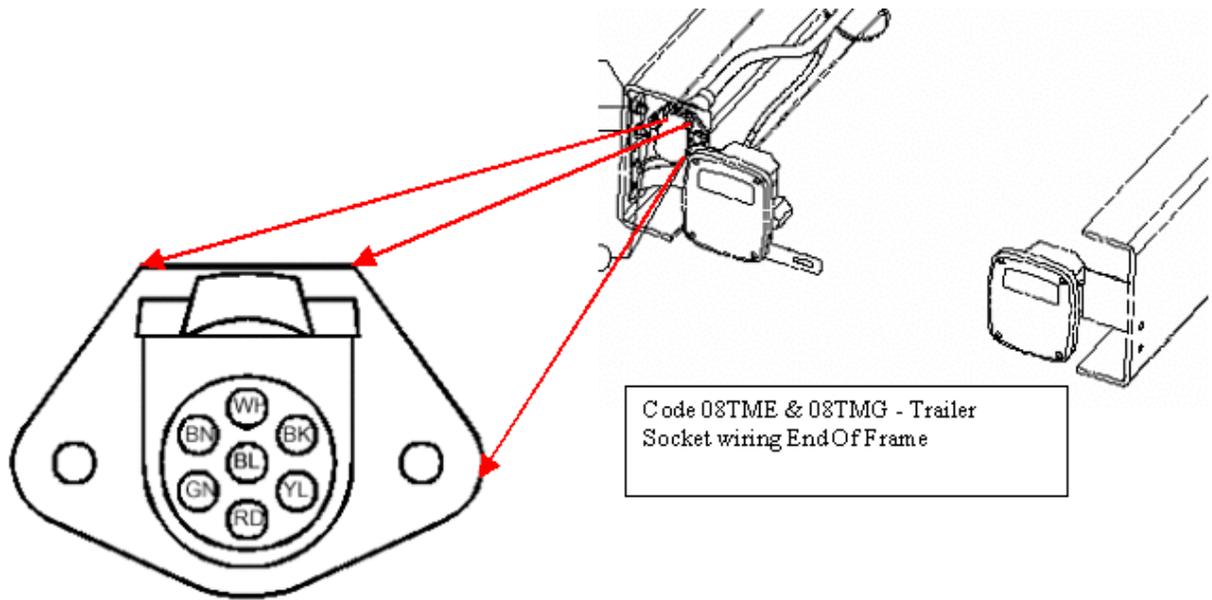


Figure 68 Trailer Socket (Mating End View)

Table 53 Electrical Description of 08TME

Circuit Description	Fused	Available Current	Color
Ground	~	~	White
Tail Lamp	20	20	Brown
Right Turn	15	15	Green
Left Turn	15	15	Yellow
Marker	20	20	Black
Stop	30	30	Red
Center Pin	30	30	Blue

Table 54 Electrical Description of 08TMG

Circuit Description	Fused	Available Current	Color
Ground	~	~	White
Tail Lamp	20	20	Brown
Right Turn/Stop	15	15	Green
Left Turn/Stop	15	15	Yellow
Marker	20	20	Black
Stop	~	Not provided	~
Center Pin	30	30	Blue

**TESTING:**

## 08TME

1. Turn ON vehicle headlights.
2. Verify that the taillights circuit (Brown wire, top left cavity on trailer socket) has battery voltage levels present.
3. Verify that trailer marker circuit (Black wire, Top right cavity on trailer socket) has battery voltage levels present.
4. Turn OFF vehicle headlights.
5. Turn on vehicle right turn lamp.
6. Verify that the trailer right turn lamp circuit (Green wire, bottom left cavity on trailer socket) is cycling between battery voltage and ground.
7. Turn off vehicle right turn lamp.
8. Turn on vehicle Left turn lamp.
9. Verify that the trailer left turn lamp circuit (Yellow wire, bottom right cavity on trailer socket) is cycling between battery voltage and ground.
10. Turn off vehicle Left turn lamp.
11. Press the vehicle brake pedal.
12. Verify that the trailer brake light circuit (Red wire, bottom center cavity on trailer socket) has battery voltage levels present when the ignition key is in the accessory position.
13. Verify that trailer brake circuit (Blue wire, center cavity on trailer socket) has battery voltage levels present.
14. Release brake pedal.

## 08TMG

1. Turn ON vehicle headlights.
2. Verify that the taillights circuit (Brown wire, top left cavity on trailer socket) has battery voltage levels present.
3. Verify that trailer marker circuit (Black wire, Top right cavity on trailer socket) has battery voltage levels present.
4. Turn OFF vehicle headlights.
5. Turn on vehicle Right turn lamp.
6. Verify that the trailer right turn/stop lamp circuit (Green wire, bottom left cavity on trailer socket) is cycling between battery voltage and ground.
7. Turn off vehicle right turn lamp.

- 
8. Turn on vehicle Left turn lamp.
  9. Verify that the trailer left turn/stop lamp circuit (Yellow wire, bottom right cavity on trailer socket) is cycling between battery voltage and ground.
  10. Turn off vehicle Left turn lamp.
  11. Press the vehicle brake pedal.
  12. Verify that the right turn/stop circuit (Green wire, bottom left cavity on trailer socket) and the left turn/stop circuit (Yellow wire, bottom right cavity on trailer socket) have battery voltage levels present.
  13. Verify that the trailer brake light circuit (Red wire, bottom center cavity on trailer socket) has battery voltage levels present when the ignition key is in the accessory position.
  14. Release brake pedal.

**HOW DO I ADD THIS FEATURE:**

Adding these features after the vehicle is built is not an easy task; it is encouraged that the vehicle be ordered with the desired feature.

Refer to the "How Do I" General Information section of the body builder's book to obtain information on circuits and components. You MUST have the circuit diagram manual that applies to your vehicle to complete the installation.

The installation requires additional fuses and relays be added to the PDC in the Engine Compartment. Be sure to label the function of the added relays and fuses to the decal on the underside of the PDC cover.

The loose circuits that you get will be numbered and correspond to the circuits outlined in the circuit diagram book.

### 9.3. FOG/DRIVING LIGHTS

#### 08585, 08WPL, 08WPM, 08WLM, and 08WLN

Refer to the Circuit Diagram in S08285, Chapter 7, page 7.

#### **FEATURE CODE DESCRIPTION:**

4000

- 08585 – TOGGLE SWITCH, AUXILIARY and Wiring; For Driving Lights or Fog Lights Mounted by Customer
- 08WPL – FOG LIGHTS (2) Amber, Oval, With H355W Halogen Bulb
- 08WPM – FOG LIGHTS (2) Clear, Oval, With H355W Halogen Bulb

7000

- 08585 – TOGGLE SWITCH, AUXILIARY and Wiring; For Driving Lights or Fog Lights Mounted by Customer
- 08WLM – FOG LIGHTS {Peterson} Amber, Halogen, Rectangular
- 08WLN – FOG LIGHTS {Peterson} Clear, Halogen, Rectangular

#### **FEATURE / BODY FUNCTION:**

Feature codes 08WPL, 08WPM, 08WLM, and 08WLN come with the fog light system (wiring and fog lamps) completely installed. Feature code 08585 is an accommodation package that comes with wiring and a fog light connector. Customer must supply the mating connector, terminals, and seals, and must install the fog lamps.

All above features operate as follows, to turn on the fog lamps; the headlamps must be on and in the low beam position. The lamps will go off if the headlamps are switched to high beam.



Figure 69 4007 (ESC J1)

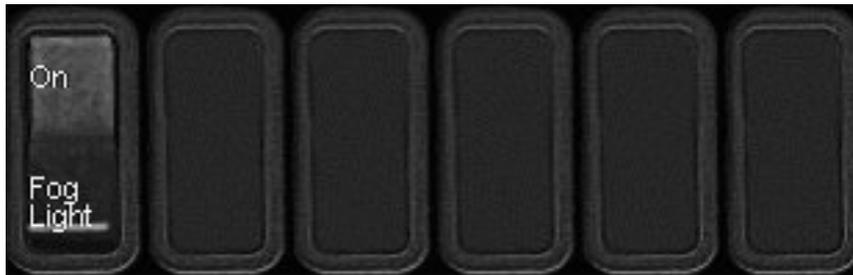


Figure 70 Fog Light Switch in Switchpack

For the customers who prefer to mount their own lamps, installation integrity is improved with the factory toggle switch and wiring feature.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Required Software Feature Codes: 595019 (and 595161 for 08585)

Software Feature Codes that must be removed: NONE

If the current in the fog light circuit falls below the level set by the **Fog\_Light\_Lo\_Current** parameter, the ESC will illuminate the “Check Electrical System” warning light in the gauge cluster and will register a fault code.

If the current in the fog light circuit exceeds the level set by the **Fog\_Light\_Hi\_Current** parameter, the ESC will shut off the circuit, illuminate the “Check Electrical System” warning light in the gauge cluster, and register a fault code.

The **Fog\_Light\_OC\_Current** parameter should be left at its factory default of zero.

**Table 55**

Parameter	ID	Description	Default	Units	Min	Max	Step
Fog_Light_ Lo_Current	1877	Fog Lights Low Current Detection Level (Amps)	0	A	0	20	0.1
Fog_Light_ Hi_Current	1878	Fog Lights High Current Detection Level (Amps)	20	A	0	20	0.1
Fog_Light_ OC_Current	1879	Fog Lights Open Circuit Detection Level (Amps)	0	A	0	20	0.1

**WIRING INFORMATION:**

With feature 08585 and if the vehicle is a 3200, 4200, 4300 or 4400, a “thin” fog lamp must be used if mounted in the bumper opening.

The fog lamp connections are located at the front of the frame on each side. See view below.

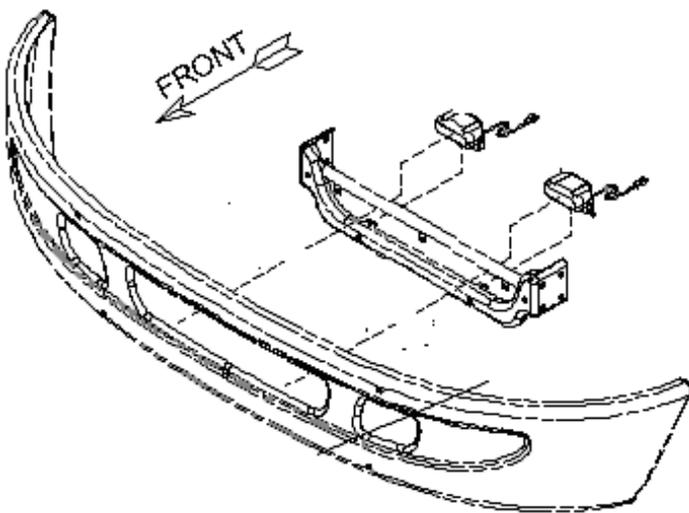
Care must be taken when adding fog lamps as lamps may have a ground wire and also have a grounded base. Be sure that the feed circuit, cavity A, the connector at front of frame, is not connected to ground.

The circuit is rated at 20 amp and is protected internally by the ESC.

Mating connector P/N 587568C91

Terminal (16 gauge) P/N 587575C1

Seal P/N 1652325C1

**Figure 71**

Thin fog lamps must be used if mounted in the bumper opening of the 3200, 4200, 4300 and 4400 models.

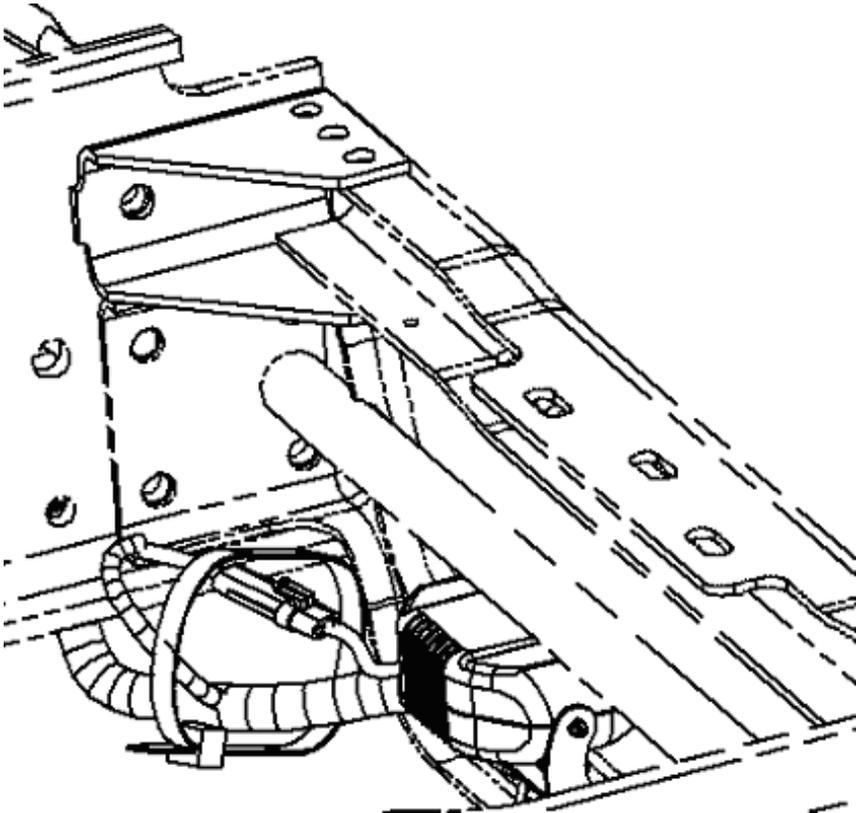
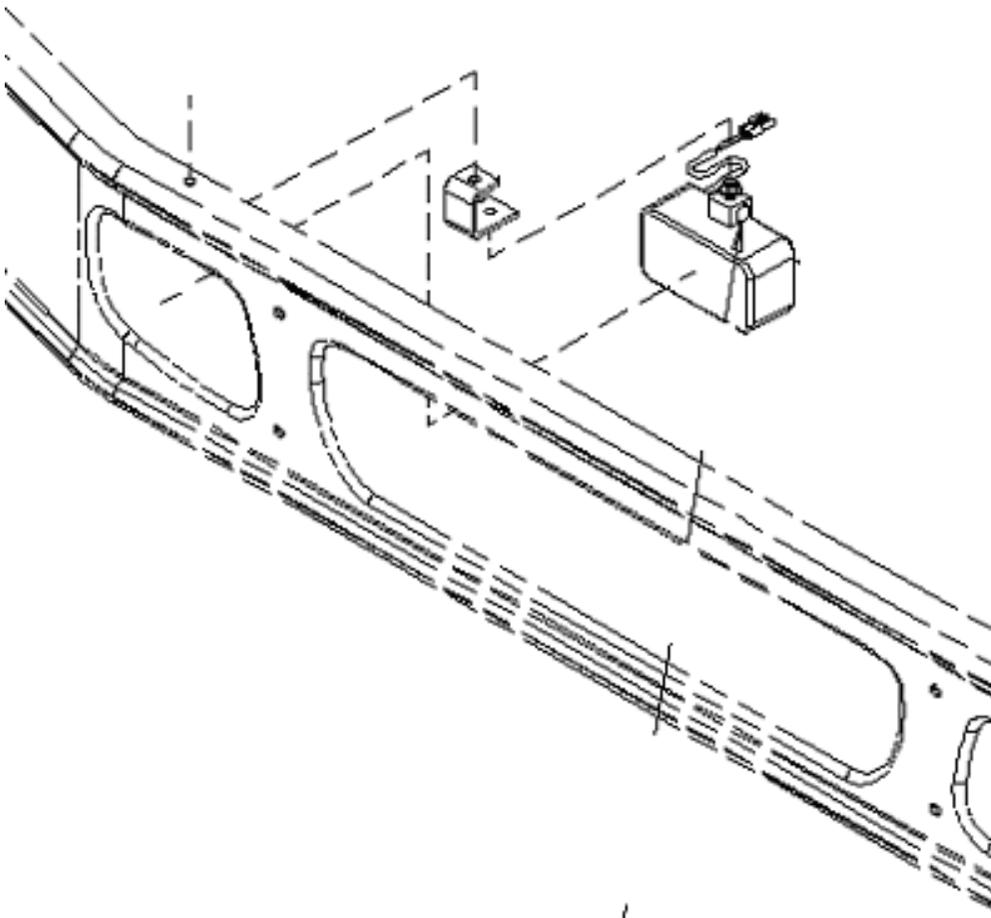


Figure 72 View of Fog Lamp Breakout



**Figure 73 View of Bumper Mounting — 7000 Models**

**TESTING:**

1. Activate Fog Light Switch with the ignition key on and the headlamp switch on the low-beam mode.
2. Verify that pin A (labeled Fog\_Light) on the Brown ESC output connector (#4007) is providing battery voltage.
3. Verify that the fog lights are functioning correctly.
4. Turn Fog Light switch OFF.
5. Verify that the Fog Light output goes OFF.

**HOW DO I ADD THIS FEATURE:**

- Software feature code 595019 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Install fog light switch (part number 3563064C1) in the designated switch pack location. Use ICAP or the Diamond Logic™ Builder software to determine the fog light switch assignment after the software has been programmed into the ESC.

- Set the desired programmable parameters for each signal using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Customer must wire the desired load into the pin A in the Brown ESC output connector (#4007 – Hood)

There are two fog light kits available from your International dealer, 2507255C91, Fog Lights Clear and 2507254C91 Fog Lights Amber. These kits provide the parts for the slim line fog lights for the 4000 models only. The installation instructions are shown below for reference.

### Fog Light Installation

**Models:** 4200, 4300, 4400, 8500



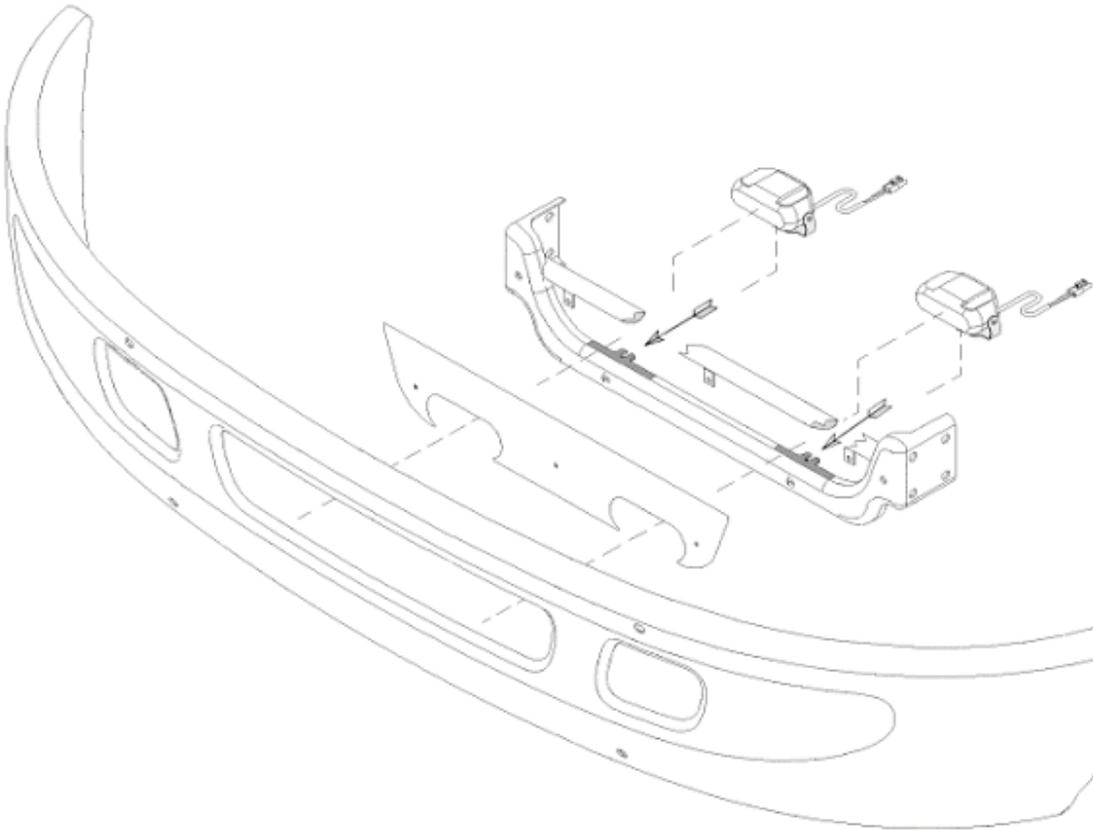
**WARNING – Turn off ignition switch before starting Procedure to avoid injury.**

**Description:** This document addresses installation, Switching, and Programming of fog lights on International 4200, 4300, 4400, and 8500 trucks.

**Table 56** Parts Information

Part Number	Description	Quantity
2507254C91	Amber Light Kit	1
2507255C91	Clear Light Kit	1

Install fog lights using hardware included in the kit. The Figure below shows installation.

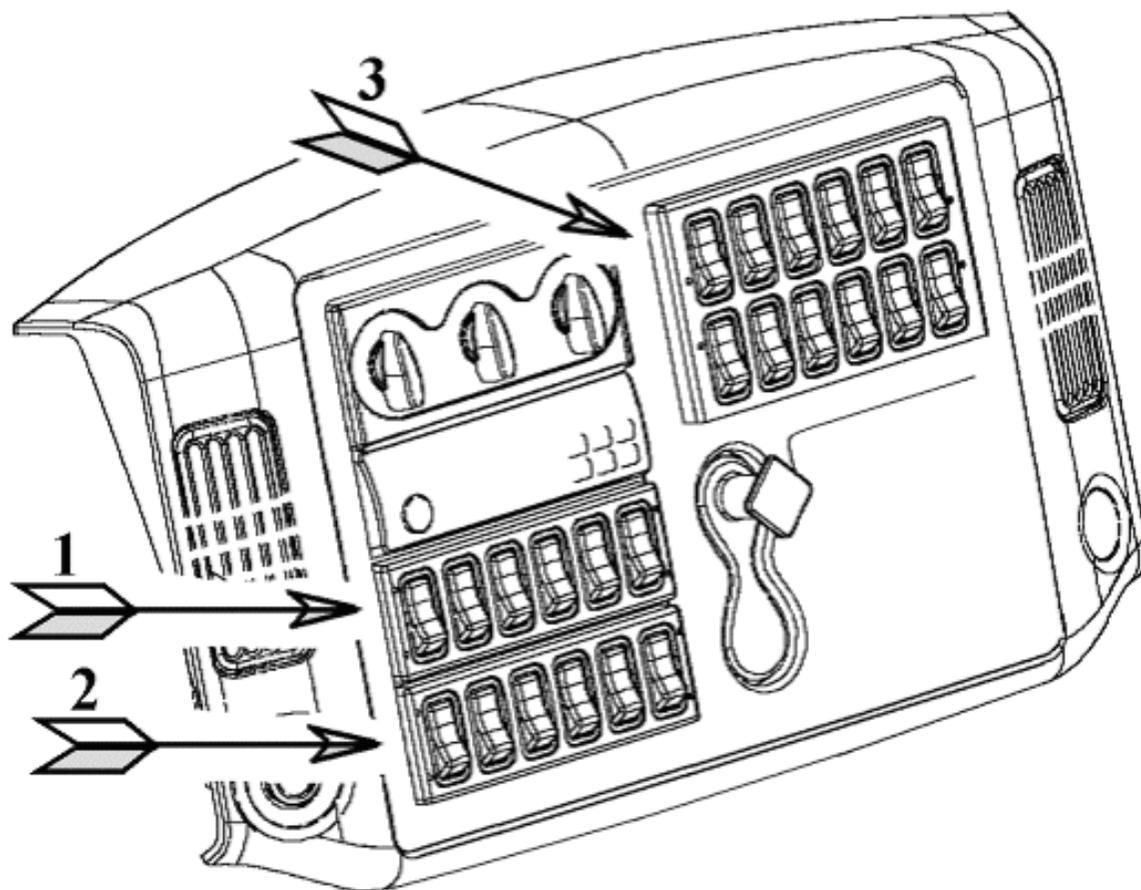


**Figure 74 Front View with Attachment Points**

### Switch Installation

Refer to the Figure below.

If there is available switch capacity in Location One, install the fog light control switch in Location one. If the Location One switch pack module is fully populated, install a six pack (p/n 3549776C4) in Location Two. Additional switch blanks (p/n 3533950C1) may be needed to cover unused switch locations.



**Figure 75 Control Panel**

- Location 1: Six pack
- Location 2: Six Pack
- Location 3: Twelve Pack

**Wiring Fog Lights**

Wire fog lights according to wiring diagram Figure below.

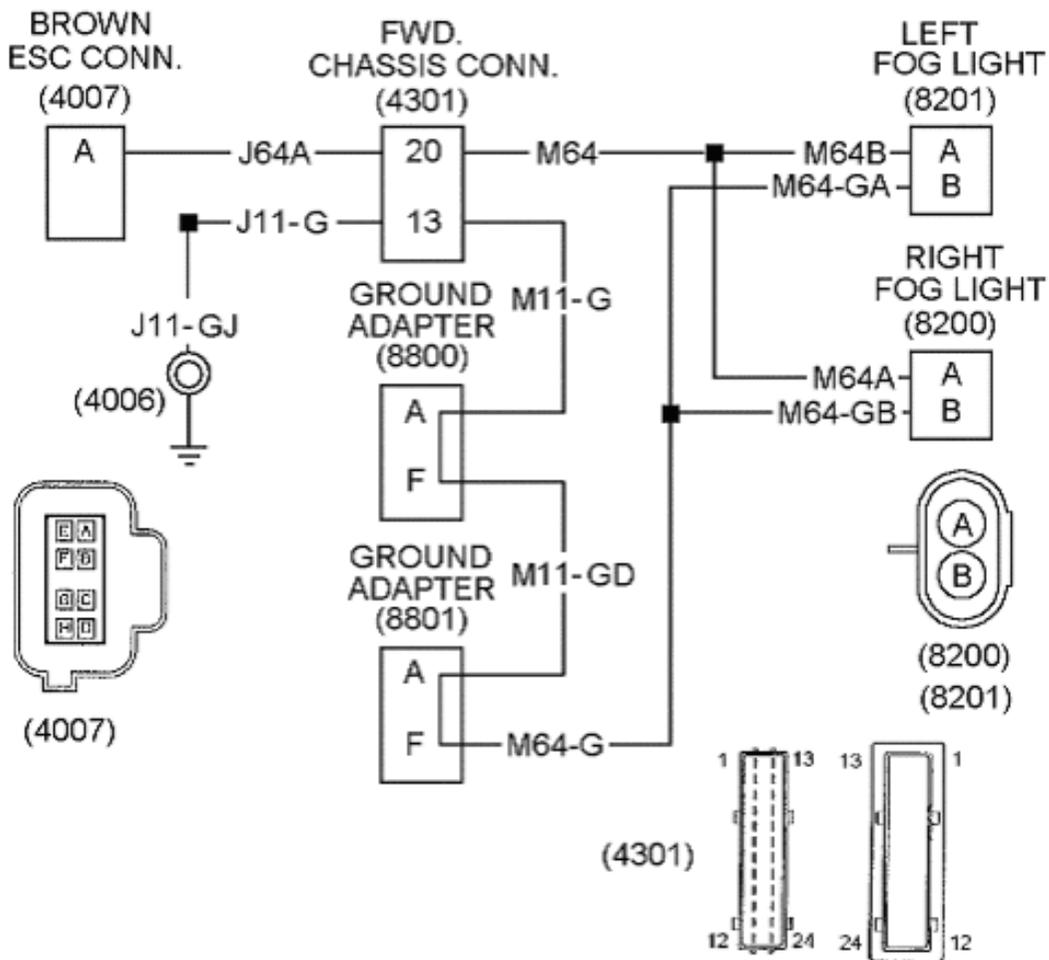


Figure 76 Wiring Diagram

### Programming Fog Lights

Adding fog lights will require reprogramming the system controller. See local dealer.

Table 57 Fog Light Kit — Clear

Part Number	Description
2507255C91	Fog Light Kit Clear
3555568C91	Light, Fog w/Brkt (Clear) Slim
3535162C1	Nut, Hex Metr Prev Torq*M8X1.25
306132C1	Strap, Cable Lock
3560279C91	Harness, *Fog Lights
3560225C91	Harness, Electrical, Chassis Wi
3549438C91	Switch, Light *Assy — Fog Light

**Table 57 Fog Light Kit — Clear (cont.)**

Part Number	Description
3554890C1	Screen, Air Intake Radiator Gua
3552493C1	Bolt, Sems M6X1.0–25 SST Blk Ox
3526712C1	Nut, Special *M6
3535292C1	Bolt, Sems All 6mm X15 Torx
30592R1	Nut, Speed Standard Part M6 X1
2507524R1	Manual, Inst Fog Light Instl

**Table 58 Fog Light Kit — Clear**

Part Number	Description
2507254C91	Fog Light Kit Amber
3555569C91	Light, Fog w/Brkt (Amber) Slim
3535162C1	Nut, Hex Metr Prev Torq*M8X1.25
306132C1	Strap, Cable Lock
3560279C91	Harness, *Fog Lights
3560225C91	Harness, Electrical, Chassis Wi
3549438C91	Switch, Light *Assy — Fog Light
3554890C1	Screen, Air Intake Radiator Gua
3552493C1	Bolt, Sems M6X1.0–25 SST Blk Ox
3526712C1	Nut, Special *M6
3535292C1	Bolt, Sems All 6mm X15 Torx
30592R1	Nut, Speed Standard Part M6 X1
2507524R1	Manual, Inst Fog Light Instl

## 9.4. WORK LIGHT / AUX. REAR LIGHT

### 08WLL (Tractor) and 08WMA (Straight Truck)

Refer to the Circuit Diagram in S08285, Chapter 7, page 7.

#### **FEATURE CODE DESCRIPTION:**

08WLL – LIGHT Work; Pedestal Mounted With Switch on Instrument Panel

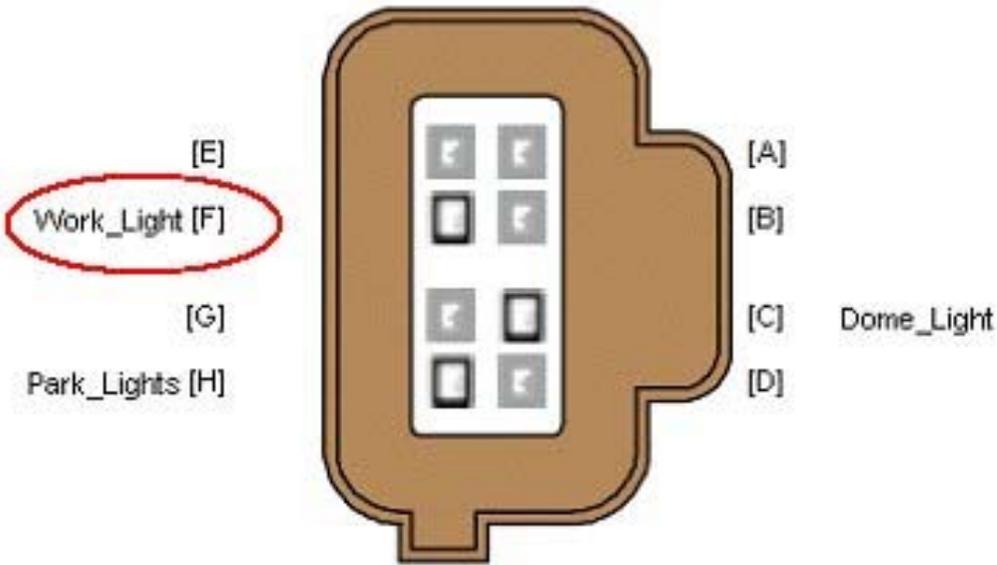
08WMA – SWITCH, TOGGLE, FOR WORK LIGHT Lighted; on Instrument Panel and Wiring Effects for Customer Furnished Back of Cab Light

#### **FEATURE / BODY FUNCTION:**

With the International installed work light (08WLL), nighttime trailer hook-ups are made easier with a work light mounted at the back of the cab on tractors. This light illuminates the fifth wheel area of the vehicle. Both features include a switch in the instrument panel, which illuminates when the switch is on. These feature provide the ability to activate either an in-cab load (Pin F of ESC connector #1601), an out-of-cab load (Pin F of ESC connector #4007), or both depending on the pin selected and as long as the total load does not exceed 10 amps.

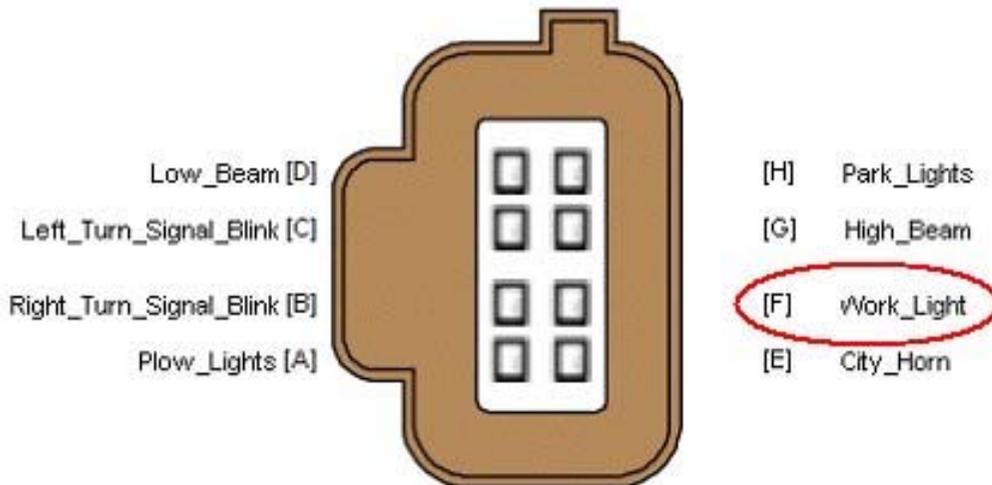
The feature without the light (08WMA) can be used to satisfy any number of electrical needs for vehicles with straight truck brakes (4091) such as lights inside dry van boxes, small pumps, and illumination to aid in various job functions.

If the engine is off, there is a time out feature, which is factory set at 120 minutes. The time out period can be changed by an International dealer. If the vehicle is running, the work light will not time out after 120 minutes. If the work light is left on when the vehicle is moving, the green indicator light in the work light switch will flash.



Connect to this pin for an In-cab load

Figure 77 1601 (ESC J3)



Connect to this pin for an Out-of-cab load

Figure 78 4007 (ESC J1)



Figure 79 Work Light Switch in 3-Switchpack Below and Left of Gauge Cluster

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Required Software Feature Codes:

**08WLL:** 595250

**08WMA:** 595250, 595168

Software Feature Code that must be removed: 595025

The **Work\_Light\_Timeout\_Enable** parameter is used to set the amount of time that the customer desires the work light to remain ON after the ignition key is turned off. This parameter is for customers who desire to have their work light time out after a specified length of time so that the light does not drain the battery in case the operator forgets to turn the light off.

If the current in the work light circuit falls below the level set by the **Work\_Light\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the work light circuit exceeds the level set by the **Work\_Light\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **Work\_Light\_OC\_Current** parameter should be left at its factory default of zero.

**Table 59**

Parameter	ID	Description	Default	Units	Min	Max	Step
Work_Light_Timeout_Enable	640	This signal is a parameter that can be adjusted to vary the amount of time that the work light will remain on after the ignition key is turned off. If this value is set to 6, the work light will remain on for 60 minutes after the ignition key is turned off.	120	Min	10	1440	10
Work_Light_Lo_Current	1898	Work Light Low Current Detection Level (Amps)	0	A	0	10	0.1

Parameter	ID	Description	Default	Units	Min	Max	Step
Work_Light_Hi_Current	1899	Work Light High Current Detection Level (Amps)	10	A	0	10	0.1
Work_Light_OC_Current	1900	Work Light Open Circuit Detection Level (Amps)	0	A	0	10	0.1

**WIRING INFORMATION:**

The maximum current load for the work light/aux light is 10 amp. The circuit protection is internal to the ESC.

**Table 60 Parts Required to Connect to Work Light Cable**

Connector P/N	Lock P/N	Term P/N	Seal P/N
1661778C1	1661874C1	1661872C1	1661872C1

**Table 61 Terminals Designed for 16-Gauge Wire**

Connector Cavity	Circuit Number	Circuit Description
A	J65*	Work Light Feed
B	J65-G**	Work Light Ground
* "16BK" for 7000 Models		
** "J11-GK for 7000 models		



**Figure 80** Arrow Indicates Location of Work Light Connector (Straight Truck)



**Figure 81 Arrow Indicates Location of Work Light (Tractor)**

**TESTING:**

1. Activate Work Light Switch.
2. Verify that Pin F (labeled Work\_Light) on the Brown ESC output connector (#4007) and/or Pin F (labeled Work\_Light) on the Brown ESC output connector (#1601) is providing battery voltage.
3. Verify that the work light (or alternate load) is functioning properly.
4. Turn work light switch OFF.
5. Verify that the Work Light output goes OFF.

**HOW DO I ADD THIS FEATURE:**

- For 08WLL, the Software feature code 595250 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer)

- For 08WMA, the Software feature codes 595250 and 595168 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to make sure that software feature code 595025 is NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Customer must wire the desired load into the pin labeled Work\_Light on either the Brown ESC output connector (#4007 – Hood) or the Brown ESC output connector (#1601 – Inside Cab)
- Customer must install a 3-position momentary rocker switch (Part Number 3549804C91) in the far right position of the 3-switch switchpack below and to the left of the gauge cluster. The switch is backlit with an amber light (Part Number 3533928C1) for better viewing during night operations. The switch has a green indicator light (Part Number 3578733C1) in the top half of the switch to indicate when the work light is on.

## 9.5. AUXILIARY FRONT LIGHTS

### 08THJ — Auxiliary Harness

Refer to the Circuit Diagram in S08285, Chapter 8, page 9.

#### **FEATURE CODE DESCRIPTION:**

08THJ – AUXILIARY HARNESS 3.0' for Auxiliary Front Head Lights and Turn Signals for Front Plow Applications

#### **FEATURE / BODY FUNCTION:**

When front mounted equipment blocks the vehicle headlamps and turn lamps, such as a snowplow, a feature code is available to connect to added lamps.

This feature provides a 3-foot extension harness and comes with a sealed 7-way connector cap. The connector is located behind the driver's side headlight under the hood.

When the headlight switch is turned to the PARK or ON position both the vehicle park and auxiliary park lights will come on. If the turn signal switch is activated, both the vehicle turn and auxiliary turn signal lights will come on.

An auxiliary lighting switch labeled PLOW LIGHTS is mounted in the dash panel. The switch controls whether the auxiliary or vehicle headlights are ON. The headlamp switch must be ON for the auxiliary headlamps to operate. Note that both sets of headlamps cannot be turned on at the same time. The plow light switch will only function with the ignition key in the ON or accessory position.

This option is not available with the fog light or customer mounted fog light options and is not available, factory installed, on 4000 models.

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Required Software Feature Code: 595099

Software Feature Code that must be removed: 595019

If the current in the plow lights circuit falls below the level set by the **Plow\_Lights\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the plow lights circuit exceeds the level set by the **Plow\_Lights\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **Plow\_Lights\_OC\_Current** parameter should be left at its factory default of zero.

**Table 62**

Parameter	ID	Description	Default	Units	Min	Max	Step
Plow_Lights_OC_Current	1916	Plow Lights Open Circuit Detection Level (Amps)	0	A	0	20	0.1

Parameter	ID	Description	Default	Units	Min	Max	Step
Plow_Lights_Hi_Current	1917	Plow Lights High Current Detection Level (Amps)	20	A	0	20	0.1
Plow_Lights_Lo_Current	1918	Plow Lights Low Current Detection Level (Amps)	0	A	0	20	0.1

### **WIRING INFORMATION:**

The circuit ratings are as follows: headlamp hi beam 20 amp, headlamp low beam 20 amp, left turn 10 amp, right turn 10 amp and park 15 amp. Since the auxiliary park and turn current is shared with vehicle lighting current, make sure the added lighting does not exceed the stated current rating for each circuit. All circuit protection is internal to the ESC.

**NOTE – If the plow lights are turned on without the lights being connected, the ESC will log a headlamp fault code.**

**Table 63 Aux. Connector Circuit Identification**

Circuit Number	Cavity	Function
64HI	A	Hi Beam
11-G	B	Ground
64LO	C	Low Beam
56D	D	T/S Left
58F	E	Park
57D	F	T/S Right
Plug	G	Plug



Connector on chassis harness viewed from mating end. This harness is located behind the driver's side headlight under the hood.

**CONNECTOR – 2039311C91**

**PLUG – 0587579C1**

**LOCK – 2039342C1**

**Figure 82**

To mate with the chassis harness use the following

**Table 64 Part Information**

Part	Quantity	Description
2039312C91	1	BODY, CONNECTOR* 7 WAY METRI-PACK 280 SERIES, SEALED – FEM
587579C1	1	PLUG, FILLER*, SEALING WEATHERPACK-GREEN
2033912C1	6	TERMINAL, CABLE*, CABLE* METRI-PACK 280 SERIES MALE BLADE
589391C1	6	SEAL*, CABLE TERMINAL WEATHERPACK-GRAY
2039342C1	1	LOCK, CONNECTOR BODY*,
The terminals and seals in the above table are for 14-gauge cable.		

**NOTE – It is suggested that an extra connector (Part # 2039312C91), completely filled with plugs, be saved and connected to the chassis harness connector when the plowing season is over – this procedure protects against corrosion.**

**TESTING:**

1. Activate the Plow Light switch in the dash (See ICAP or the Diamond Logic™ Builder software for switch locations).
2. Turn ON vehicle Park Lights.
3. Verify that Auxiliary Connector Cavity E has battery voltage levels present.
4. Turn ON vehicle Headlights to the LOW BEAM position.
5. Verify that Auxiliary Connector Cavity C has battery voltage levels present.
6. Turn vehicle headlights to the HIGH BEAM position.
7. Verify that Auxiliary Connector Cavity A has battery voltage levels present.
8. Turn ON vehicle left turn signal.
9. Verify that Auxiliary Connector Cavity D has intermittent voltage levels present.
10. Turn ON vehicle right turn signal.
11. Verify that Auxiliary Connector Cavity F has intermittent voltage levels present.
12. Turn OFF the plow light switch.
13. Verify all vehicle lights are operating correctly.

**HOW DO I ADD THIS FEATURE:**

There is a Plow Light kit available 2585355C91 to facilitate installation. The instructions that come with the kit are shown below.

Note if the vehicle is equipped with Fog lights, that feature will have to be removed and circuit J64A removed from connector 4007 at the ESC.

**NOTE – If the vehicle has hydraulic brakes the instructions for installing relay circuits do not apply as the cavities have factory installed circuits in the cavities indicated DO NOT REMOVE THESE CIRCUITS, use alternate open cavities. Be sure to mark the function of the added relays on the decal located on the bottom of the PDC cover.**

### 2585355C91 KIT, AUXILIARY (SNOWPLOW) LIGHT Instructions

This instruction sheet covers installation of Auxiliary light wiring, switch and programming.

#### Dash Harness (3588838C91)

1. Disconnect Battery Power.
2. Disconnect System Controller Connector (4007 Brown). Insert terminals from service harness (3588838C91) as shown below:

<b>System Controller</b>	
<b>BROWN</b>	<b>4007</b>
<b>CIR</b>	<b>CAV</b>
<b>64AB</b>	<b>A</b>
<b>53LO</b>	<b>D</b>
<b>52HI</b>	<b>G</b>



**Figure 83**

Remove and tape or shrink-wrap any already existing terminals. Reconnect Connector.

3. Remove cover from power distribution center (PDC). Insert into mini fuse block M-2 (4002) the following relay terminals:

Relay Block 4002	<b>M-2</b>
CIR	CAV
64G	D1
53LO	D2
53B	E1
64LO	F1
64AB	F2
64GA	G1
52HI	G2
52B	H1
64HI	J1
64C	J2

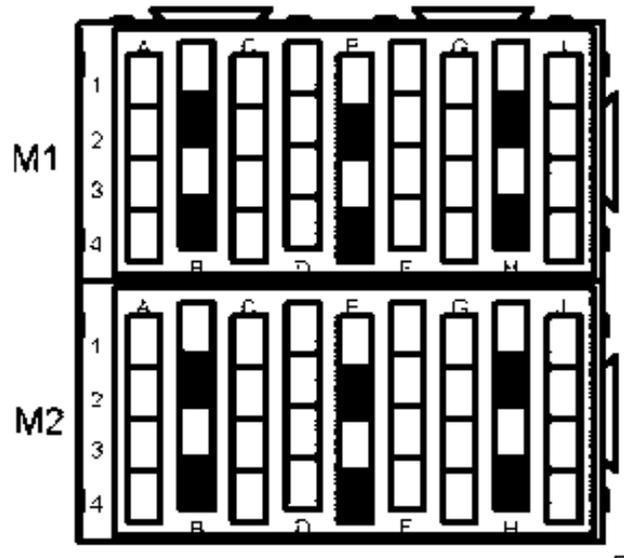


Figure 84

Insert (2) relays (3519350C1) into fuse block and lock with 3536085C1(2) and 3555642C1.

4. Insert terminals into the Dash to Forward Chassis Harness connector on the dash side (4301) as shown below:

Dash Fwd Chassis	
CIR	CAV
52B	4
53B	5
64LO	20

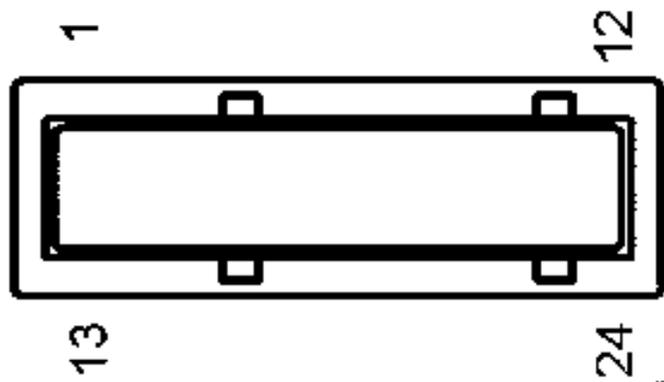


Figure 85

Remove and tape or shrink-wrap any already existing terminals.

5. Insert circuit 64HI into auxiliary connector (4305M) part number 2039311C91 in cavity "A" as shown:

AUX Conn	4305M
CIR	CAV
64HI	A



Figure 86

Plug remaining cavities with plug (587579C1) and insert lock (2039342C1).

6. Tie – Wrap service harness as necessary

#### Forward Chassis Harness (3560224C92)

1. Insert terminals into the Forward Chassis to Dash harness connector on the forward chassis harness side as shown below: Remove and tape or shrink-wrap any already existing terminals. Route harness along existing harness and tie wrap as needed. Note on some 4000 series models, service harness may need to be routed on engine side of washer bottle, to allow enough length for horn and radiator ground to connect. Re-connect Dash to forward chassis connectors. **NOTE: If this connector exists on service harness, remove terminals, lock, seal and discard connector, lock and seal.**
2. Connect Dash 7-Way connector (2039312C91) to Forward chassis 7-Way connector (2039311C91).
3. Connect horn connector, radiator ground to service harness connectors, taping away existing connectors.
4. Connect left and right headlight/turn signal connectors using service harness connectors, taping away existing connectors.
5. Tie – Wrap service harness as necessary.

Fwd Chassis Dash	4300
CIR	CAV
52B	4
53B	5
56B	9
85E	10
57B	11
58B	12
M11G	13
64LO	20

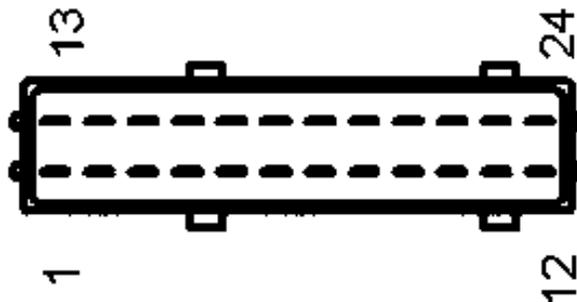


Figure 87

### Programming and Switch

Reprogram ESC using ICAP or the Diamond Logic™ Builder software (See authorized International Dealer). If vehicle is equipped with fog lights (595019), this feature must be removed prior to adding Snow Plow lights (595099). ICAP or the Diamond Logic™ Builder software will determine the location of the plow light switch.

**Table 65 2585355C91 KIT, AUXILIARY (SNOWPLOW) LIGHT**

Part	Quantity	Description
3560224C92	1	HARNESS, CHASSIS WIRING*, BASE W/SNOW PLOW LIGHTS
2039312C91	1	BODY, CONNECTOR*, 7 WAY METRI-PACK 280 SERIES, SEALED - FEM
2039342C1	2	LOCK, CONNECTOR BODY*, NULL
3588838C91	1	HARNESS, AUXILIARY HEAD LIGHT WIRING, AUX HEADLIGHTS (SNOWPLOW)
3519350C1	2	RELAY, ELECT-HORN ETC, MICRO SPDT
3555642C1	2	PLUG, FILLER*, CAVITY BLOCK FOR MICRO RELAY BLOCK
3536085C1	2	LOCK, CONNECTOR BODY, LOCK – 280 ALPHABLOCK SECONDARY, MULTI
2039311C91	1	BODY, CONNECTOR*, 7 WAY METRI-PACK 280 SERIES, SEALED - MAL
3563066C1	1	SWITCH, ELECTRONIC*, PLOW LIGHT
3578733C1	1	LIGHT, INDICATOR*, LED ON (GREEN) 1.0 CANDLEPOWER
3533928C1	1	LIGHT, INDICATOR*, LED BACKLIGHT (AMBER)
587579C1	13	PLUG, FILLER*, SEALING WEATHERPACK-GREEN
289862C1	20	STRAP, CABLE LOCK, CABLE LOCK
2585356R1	1	MANUAL, INST SHT AUX LT KIT

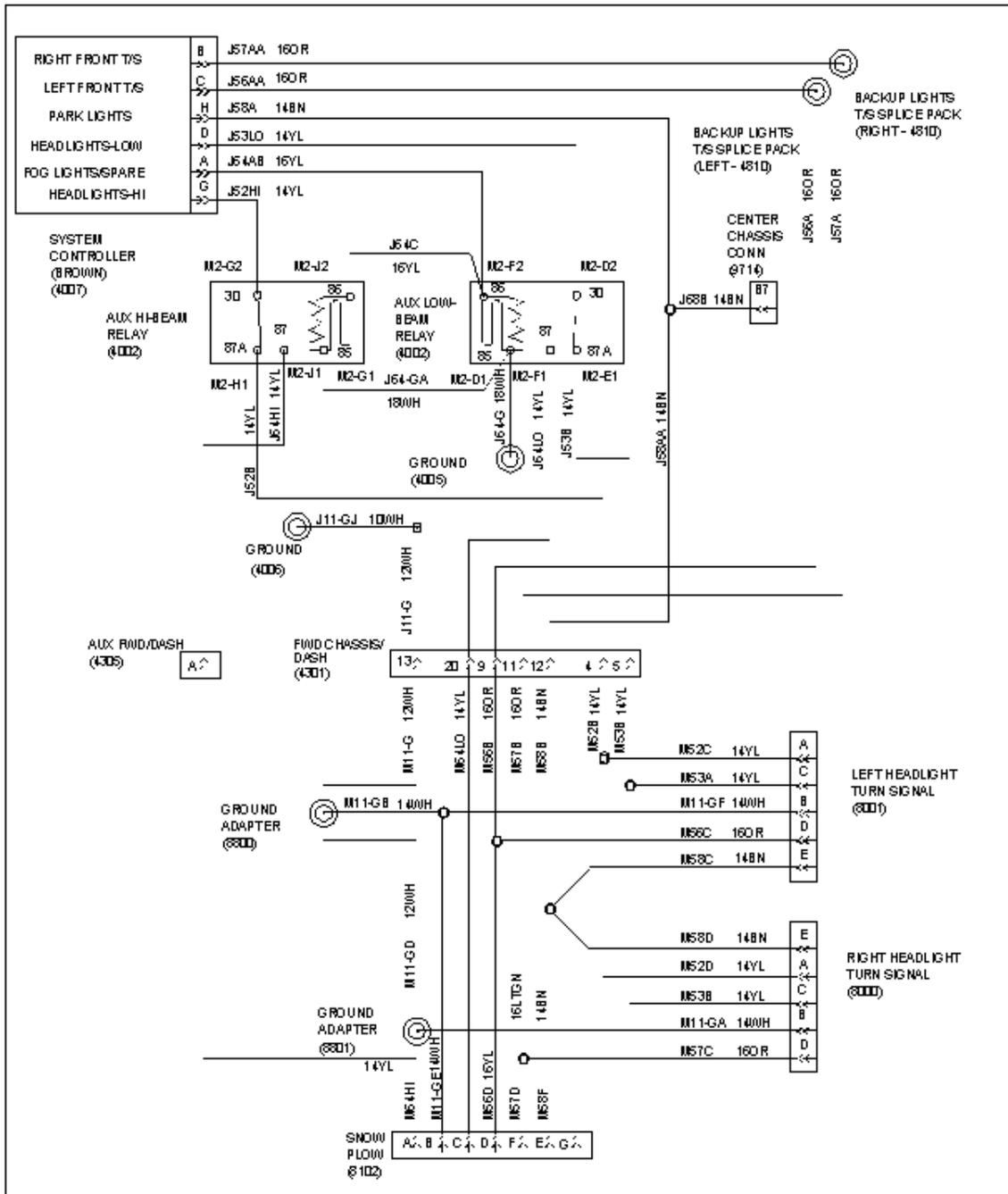


Figure 88 Extra Connector (2039312C91), Plugs (587579C1) and Lock (20393342C1) are provided for weather protection when Aux lights are not connected

**08THV — Front Guide Post Lights**

**FEATURE CODE DESCRIPTION:**

DISCONNECT, FRONT HARNESS for Guide Post Lights; Connectors Located at Headlight Connection, for Customer Installation.

**FEATURE / BODY FUNCTION:**

This feature provides two additional connectors located in the front wiring harness for front parking or identification lights. This feature is commonly used for customer or bodybuilder added guidepost lights typically mounted at each end of the front bumper. These connectors come with mating connectors and sealing plugs pre-installed. The guide post light circuit is directly tied to the vehicle parking light system, so when the headlight switch is turned to the “PARK” or “ON” position, these auxiliary lights will turn on with the standard vehicle lighting. This feature should be used in any application where operation in tight spaces requires constant identification of the vehicle’s width.

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Software Feature Codes that must be added: NONE

Software Feature Codes that must be removed: NONE

**WIRING INFORMATION:**

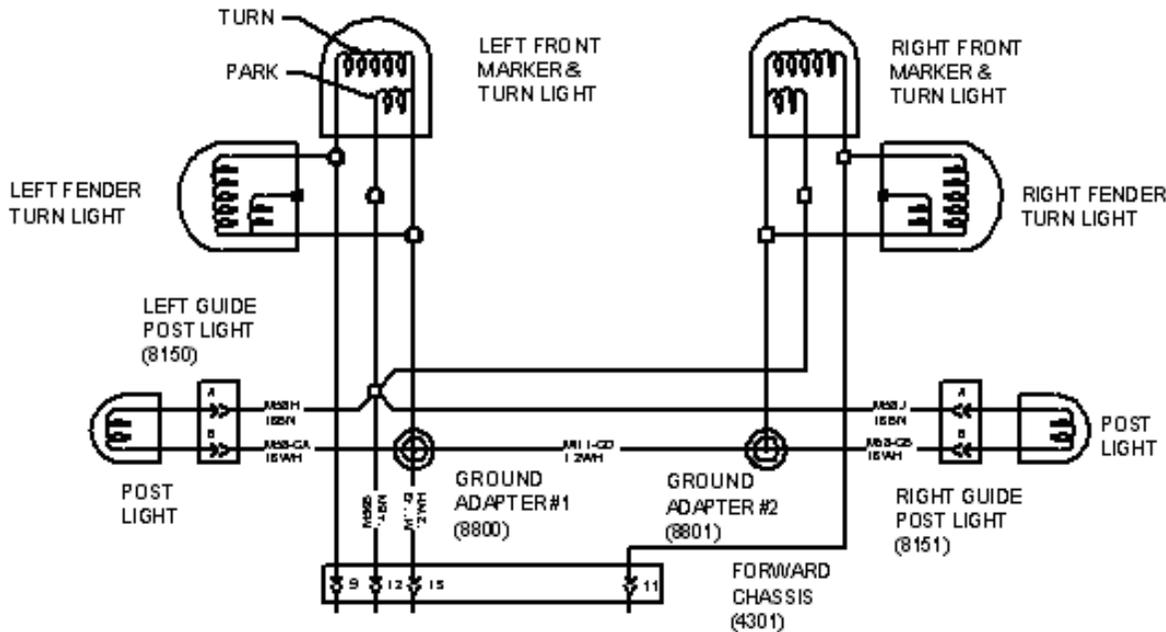


Figure 89

**Table 66 Connector Cavity Information and Parts Required**

Connector		Circuit #			Term	Seal
P/N	Cavity	Left Side	Right Side	Gauge	P/N	P/N
1661778C1	A	M58H	M58J	16	1661875C1	1661872C1
	B	M58-GA	M58-GB	16	1661875C1	1661872C1

Plug part number: 2025431C1

Lock part number: 1661874C1

**TESTING:**

1. Turn the Headlight switch to PARK position and verify that both right and left Guide Post lights are on.
2. Turn the Headlight switch to ON position and verify that both right and left Guide Post lights are on.

**HOW DO I ADD THIS FEATURE:**

If the vehicle was not ordered with the feature, it may be added. Refer to the part numbers identified in the Wiring section above for information on parts and components. See also "How Do I" - General Information section of the body builder book.

## 9.6. OTHER EXTERNAL LIGHTING

### 08TMH — Switched Power to Cab Roof

#### FEATURE CODE DESCRIPTION:

08TMH - SWITCH, AUXILIARY Accessory Control; for Wiring in Roof, With Maximum of 20 amp Load With Switches In Instrument Panel

#### FEATURE / BODY FUNCTION:

This feature consists of a switch mounted in the center panel with wiring that is routed up the right "A" pillar. The circuit is protected with a 20 amp fuse. This feature is only available on the 7000 models.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE

#### WIRING INFORMATION:

The wiring in the roof includes both ground and feed circuits and the circuits are blunt cut covered with heat shrink sleeve. The ground is circuit is WHITE and the feed is BROWN.

Switch Part Number: **3557932C1**

Switch Label: "**Roof Aux**"

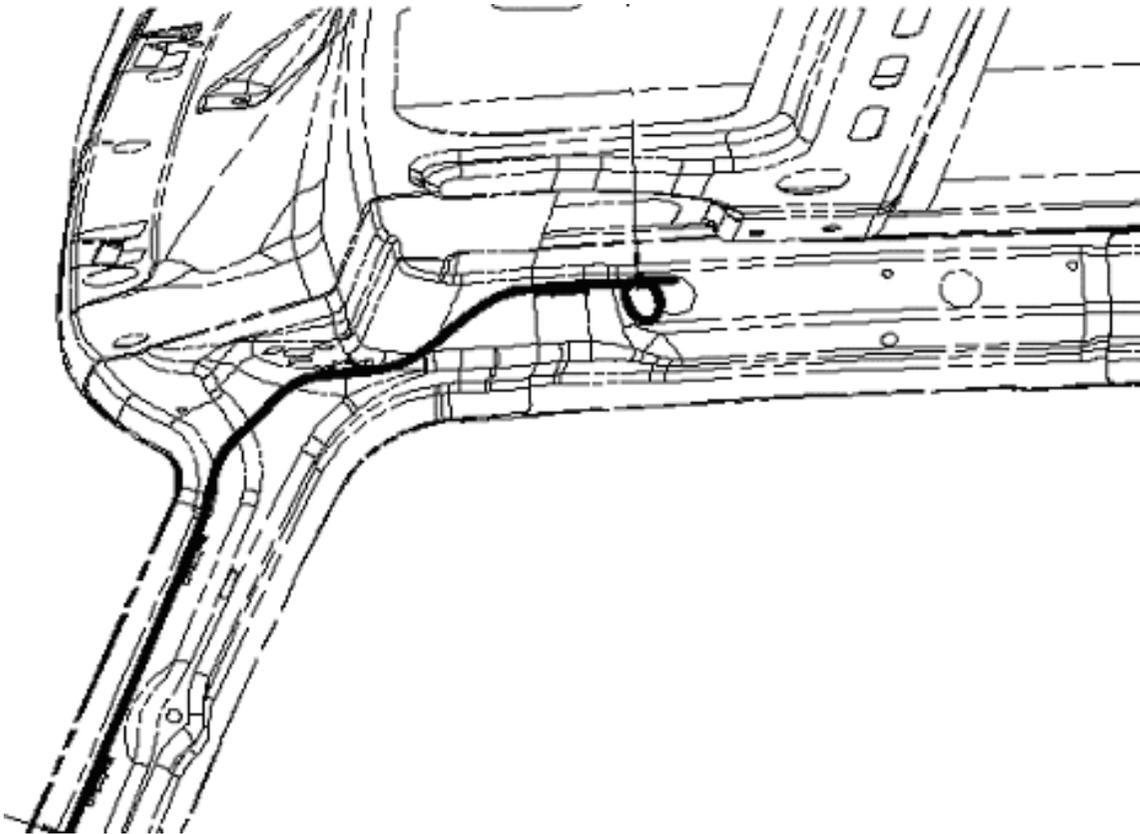
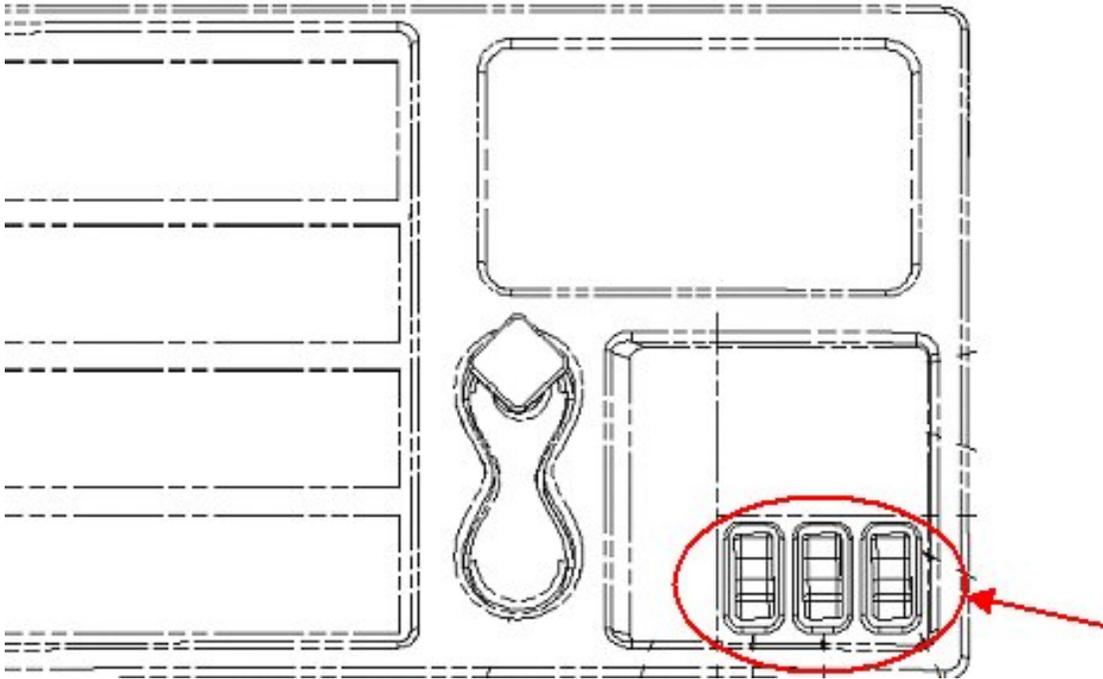


Figure 90 View Of Right Pillar And Roof Area, Viewed From Inside Vehicle



**Figure 91 The Switch Controlling the Aux Roof Circuit Will Be In One Of The Three Switch Positions Viewed Above**

This switch is “hard wired” and there are no multiplex circuits associated with this feature. The switch is lighted to give an “ON” indication.

**NOTE – This feature does not depend on any ignition key position, and can be turned on with the key off. Care must be taken as leaving the switch on may discharge batteries.**

Since the desired hole location for the harness to exit the cab and location may vary from customer to customer, circuits are left in roof for customer to drill hole.

Note that there are roof reinforcements that should not be drilled into. Lower headliner to locate harness and determine best hole location. Install grommet into the hole and seal around cables and grommet to prevent leakage of moisture into cab.

When connecting to load, be sure to use sealed connectors or a splice protected with heat shrink sleeve with meltable inner lining.

**TESTING:**

1. Turn on in-cab switch.
2. Verify that the added feature operates.
3. Verify that the feed wire is receiving battery voltage.

**HOW DO I ADD THIS FEATURE:**

If the vehicle was not ordered with the feature, it may be added. For information on parts and components, see “How Do I” General Information section of the body builders book.

## 9.7. IN CAB LIGHTING

### Standard Panel Light Dimmer Connection

#### FEATURE CODE DESCRIPTION:

ELECTRICAL SYSTEM 12-Volt, Standard Equipment

#### FEATURE / BODY FUNCTION:

This standard connection provides a fused connection point (5 amps maximum for all circuits connected to this point) to allow auxiliary lights to be dimmed as the panel lights are dimmed.

**NOTE – This circuit utilizes a Pulse Width Modulated (PWM) signal – do not connect a relay coil to it.**

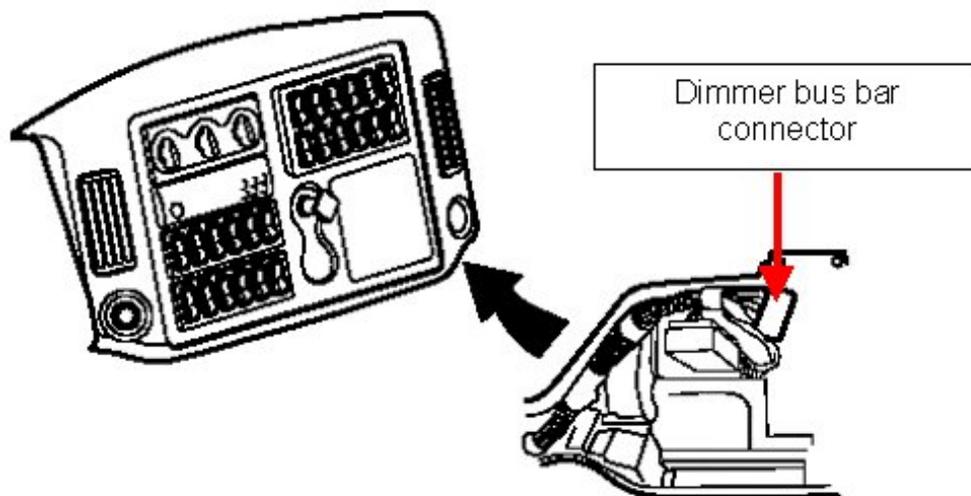
#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software Feature Codes that must be added: NONE

Software Feature Codes that must be removed: NONE

#### WIRING INFORMATION:

The connection is located under the instrument panel left of the interior fuse panel.



**Figure 92**

To connect to this circuit, remove the lock from the wire side of the buss bar connector and insert the added wire with terminal (terminal part number 1661208C1) on an unused connection point.

**NOTE – The cover opposite the wires should also be removed to verify that the new connection is properly seated.**

Reinstall the cover and lock.

**TESTING:**

1. Check that the added circuit properly dims when the Panel Dimmer switch is activated with the headlamp switch in the PARK or ON position.

## 9.8. HAZARD LIGHT OVERRIDE STOP LIGHTS

### 08THN

#### FEATURE CODE DESCRIPTION:

08THN - TURN SIGNAL SWITCH With Hazard Flasher Overrides Brake, to be done With Programming System Controller.

#### FEATURE / BODY FUNCTION:

This feature is for vehicles with combination stop and turn lamps. This feature allows hazard flashers to continue flashing when service brakes are applied. This feature is used on bulk fuel transport where some states require hazard lamps to remain flashing when stopped at R/R crossings. When the Stop Override Hazard programmable parameter below is turned on, this feature allows hazard flashers on the rear of the vehicle to stop flashing and stay illuminated as long as the brake pedal is depressed.

This feature can be enabled or disabled by using ICAP or the Diamond Logic™ Builder software.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required Software Feature Codes: 0595021 or 0595229 (BUS)

Software Feature Codes that must be removed: NONE

Activating the **Stop\_Override\_Hazard\_Enabled** parameter means that the brake lights will override the hazard lights if both are activated at the same time.

**Table 67**

Parameter	ID	Description	Default	Units	Min	Max	Step
Stop_Override_Hazard_Enabled	562	Activate/ deactivate stop light override of flashing hazards on rear of vehicle. A value of 1 enables and a value of 0 disables this feature.	On	On/ Off	NA	NA	NA

#### WIRING INFORMATION:

None required.

#### TESTING:

##### **Stop Override Hazard Disabled:**

1. Turn on the Hazard lights and verify normal operation (flashing), front and rear.
2. Depress the brake pedal and verify that both front and rear hazard lights remain flashing.

##### **Stop Override Hazard Enabled:**

1. Turn on the Hazard lights and verify normal operation, front and rear.

2. Depress the brake pedal and verify that both rear stoplights are on (not flashing) and that the front hazard lights remain flashing.
3. Release the brake pedal and verify that normal operation of the flashing hazards resumes at the rear of the vehicle.

**HOW DO I ADD THIS FEATURE:**

- If it is desired to have the HAZARD lights override the STOP lights, then the Stop\_Override\_Hazard\_Enabled parameter must be turned OFF.

## 9.9. LIGHTS ON WITH WIPERS (LOWW) / DAY TIME RUNNING LIGHTS (DTRL)

### FEATURE CODE DESCRIPTION:

Lights On With Wipers (LOWW) - None

Day Time Running Lights (DTRL) - None

### FEATURE / BODY FUNCTION:

The Lights On With Wipers (LOWW) function turns on low beam headlights (tail, marker & clearance lights are also turned on with low beam headlights) whenever the windshield wipers are ON steady or intermittent. The headlights will not be enabled in washer mode. When the wipers are turned OFF, headlights will remain ON until the key is turned OFF or the headlight switch is cycled from OFF to ON to OFF.

The Day Time Running Lights (DTRL) function will turn on low beam headlights at 75% of normal brightness whenever the key is in the RUN position and the Park Brake is OFF.

Both features may be enabled or disabled by using ICAP or the Diamond Logic™ Builder software. Note, the DTRL is required by law for Canadian registered vehicles and the feature must not be turned off.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595018

Software Feature Codes that must be removed: NONE

**Table 68**

Parameter	ID	Description	Default	Units	Min	Max	Step
LOWW_Enabled	317	Activate/ Deactivate headlights on with wipers. A value of 1 enables and a value of 0 disables this feature.	Off	On/ Off	NA	NA	NA
DTRL_Enabled (See Note)	188	Activate/ Deactivate day time running lights. A value of 1 enables and a value of 0 disables this feature.	On	On/ Off	NA	NA	NA

**NOTE – The DTRL\_Enable parameter is accessible only to Dealers.**

### WIRING INFORMATION:

None required.

### TESTING:

#### **LOWW**

1. Turn on Wipers (To the Low Speed) with ignition switch in Run position.

2. Verify that the low beam headlights (and tail, marker and clearance lights) are on.
3. Turn on wipers (intermittent) with ignition in Run position.
4. Verify low beam headlights are on.
5. Turn off wipers and verify headlights remain on.
6. Cycle the Headlight switch and verify that headlights are off.

**DTRL**

1. Set the ignition switch to Run with the Park Brake off.
2. Verify that low beam headlights are on.
3. Set the Park Brake to on and verify that the low beam headlights turn off.
4. Set the ignition switch to Accessory with the Park Brake off and verify that the low beam headlights are off.

**HOW DO I ADD THIS FEATURE:****LOWW**

(1) Activate the LOWW\_Enabled parameter using ICAP or the Diamond Logic™ Builder software.

**DTRL**

(1) Go to your local dealer and have them enable the DTRL\_Enabled parameter with their version of ICAP or the Diamond Logic™ Builder software.

---

## 9.10. 08WPZ — TEST EXTERIOR LAMPS EXCEPT BACK UPS

### FEATURE CODE DESCRIPTION:

08WPZ: Test Exterior Lights Pre-Trip Inspection will cycle all exterior lamps except back-up lights.

### FEATURE / BODY FUNCTION:

Exterior light test feature allows easier verification of light illumination during walk-around checks. Exterior lights shall illuminate in a fashion that allows the operator to verify the illumination of exterior lights.

To enable the external lamp check sequence:

- Turn the key to 'IGN' or 'ACCESSORY'
- All exterior lights are off
- All of the external lights inputs, Park Light Switch, Service Brake Switch, Cruise Switch and Key State have a good status
- Set the Park Brake
- Simultaneously press the cruise on and cruise resume switches

AND THEN

- Press and release the brake pedal.

To disable the external lamp check sequence, the operator must:

- Press the service brake OR
- Manually turn on any of the external lights OR
- Any of the external lights inputs, Park Light Switch, Service Brake Switch, Cruise Switch and Key State have a bad status OR
- Turn the key to the 'OFF' or 'Crank' position OR
- Release the park brake.

The backup lamp cannot be included within this test since the ESC does not control this lamps functionality.

The lamp test repeatedly flashes all the lights on in the following sequence. This allows the operator to get outside the vehicle and verify that all the lights are working properly.

The following sequence is repeated with no delay between the steps; The programmable time parameter PP shall have a default value of two seconds, a minimum of one second, and a maximum of 10 seconds, with increments of one second. This PP is set at FLEET access.

**Table 69**

Sequence Number	Lights Requested On	Time In This Sequence
0	High Beam on Plow (if plow is installed)	PP
1	High Beams and Park Lights on	PP
2	Fog Lamps (if installed) and Park Lights on	PP
	If fog lamps not installed, skip sequence one	
3	Low Beam on Plow (if plow installed)	PP
4	Low Beam and Park Lights on	PP
5	Right Front and Rear Turn Light and Park Lights on	PP
6	Left Front and Rear Turn Light and Park Brake Lights on	PP
7	All lights off	PP
8	Brake Lights	PP
9	All Lights off	PP

**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Required software feature code: 595296

Software Feature Codes that must be removed: NONE

**Table 70**

Parameter Name	Parameter ID#	Parameter Description	Default Settings	Units	Minimum Value	Maximum Value	STEP
Ext_Lamp_Test_Seq_Time	PV-262	The time between each step of the exterior lamp check	2	S	1	10	1

**WIRING INFORMATION:**

None required.

**TESTING:**

Refer to the **FEATURE/BODY FUNCTION** section.

**HOW DO I ADD THIS FEATURE:**

1. Enable the Software feature code using ICAP or the Diamond Logic™ Builder software (see local dealer).
2. Set the desired programmable features from the table above.

---

## 9.11. 08WRB — HEADLIGHTS ON WITH WIPERS

### FEATURE CODE DESCRIPTION:

08WRB: Headlights will automatically turn on if windshield wipers are turned on.

### FEATURE / BODY FUNCTION:

This feature is a software only feature, no hardware is needed. It will automatically turn the headlights on while the windshield wipers are activated. It will also shut the headlights off once the windshield wipers are deactivated.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595134

Software Feature Codes that must be removed: NONE

### WIRING INFORMATION:

None required.

### TESTING:

Turn headlights off if they are on.

Turn on windshield wipers.

Check and see if lights are on.

**CAUTION – Continuous use of wipers without fluid can damage wipers and/or windshield.**

### HOW DO I ADD THIS FEATURE:

Enable the Software feature code using ICAP or the Diamond Logic™ Builder software (see local dealer).

## 10. HVAC

### 10.1. 16WKB — AIR CONDITIONING

Refer to the Circuit Diagram in S08285, Chapter 11, pages 1 and 2.

#### **FEATURE CODE DESCRIPTION:**

16WKB: Air Conditioner (International Blend Air) with integral heater, defroster and R134-A Refrigerant.

#### **FEATURE / BODY FUNCTION:**

This is an electrical connection point for detecting when the air conditioner clutch is ON. No direct electrical connection point is provided for tapping into the A/C clutch wire. However, if an A/C Clutch connection is necessary, the body builder may use weather sealed splice techniques to tap into wire J77B at the ESC. The added load required by the body builder should not exceed 2 amps. This control wire shall be at battery volts when the A/C clutch is ON and 0 volts when OFF. The software in the ESC determines when this wire shall be ON or OFF based upon the mode of the HVAC controls in the cab and condenser temperatures and high side pressures of the A/C System. This control wire shall be OFF as necessary to protect the A/C compressor.

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:** NONE

#### **WIRING INFORMATION:**



**Figure 93 Location: ESC on Engine Compartment Side**

LOCATION: ESC on the engine compartment side

WIRE GAUGE: 16GA

WIRE NUMBER/COLOR: J77B-LTGN

---

ESC CONNECTOR (4008): 3548933C1 (BLUE) Pin G

LOCK: 3548943C1

TERMINAL: 3535930C1

SEAL: 3535936C1

CIRCUIT DIAGRAM: See Electrical Circuit Diagram Manual S08285 Chapter 11

**TESTING:**

1. Start the vehicle. Turn on air conditioner.
2. Verify that the wire feeding the body load is at battery volts when the A/C Clutch is ON and 0 volts when OFF.
3. Ensure that no faults codes are present when the truck is on.

**BODY BUILDER IMPORTANT INFORMATION:**

In some applications it may be advantageous to add an additional AC evaporator to cool remote areas of the vehicle. The following procedures and part numbers will accommodate this addition.

**NOTE – Do not break into the A/C Clutch circuit (J77B, K77A) for the purpose of controlling the A/C system.**

**Do not connect to the high side of the pressure transducer.**

**Do not connect to either of the A/C system thermistors.**

**PARTS INFORMATION**

**Pre 2004 Emission DT 466 and 530 Engines**

Hose, A/C assy accumulator to compressor (for I6) - 2585758C91

Hose, A/C assy condenser to evaporator (for I6) - 2585759C91

**Post 2004 Emission DT 466 and 570 Engines, Low Cab Mount**

Hose, A/C assy accumulator to compressor (for I6) - 2588940C91

Hose, A/C assy condenser to evaporator (for I6) - 2585759C91

**Post 2004 Emission DT 466 and 570 Engines, Mid High Cab**

Hose, A/C assy accumulator to compressor (for I6) - 2588941C91

Hose, A/C assy condenser to evaporator (for I6) - 2585759C91

**For VT 365 Engines**

Hose, A/C assy accumulator to compressor (for V8) - 2585760C91

Hose, A/C assy condenser to evaporator (for V8) - 2585761C91

#### PROCEDURE



**WARNING – To avoid property damage, personal injury or death, park the vehicle on a level surface, set the parking brake, chock the wheels and turn the engine off.**



**WARNING – Wear a face shield, or other adequate eye protection, and nonporous gloves when working with refrigerant. The temperature of liquid refrigerant may cause injury or blindness if the refrigerant contacts the eyes. Should liquid refrigerant come in contact with skin, remove contaminated clothing, including shoes and treat the injury as though the skin had been frostbitten. See a doctor immediately.**



**WARNING – Refrigerant must be recovered from the air conditioning system before any components of the system are replaced. Removing components while pressure is in the system will cause personal injury or death.**

1. Recover the refrigerant from the AC system.
2. Remove the AC hose from the condenser to the evaporator and install the new hose.
3. Remove the AC hose from the accumulator to the compressor and install the new hose.
4. Install the AC hose from the new evaporator to the aux. fitting on the newly installed hose from the condenser to the evaporator.
5. Install the AC hose from the new evaporator to the aux. fitting on the newly installed hose from the accumulator to the compressor.
6. Evacuate the system.
7. Recharge the system using R-134a refrigerant. The original truck system holds 30 oz. and the new evaporator should require an additional 16 oz. The additional requirement will vary from system to system depending on the length of hoses and the capacity of the new evaporator. The additional capacity will also require an additional 40 cc (1.2 fl. Oz.) of PAG oil in the system.

**CAUTION – Failure to add additional PAG oil to the increased capacity AC system will result in improper lubrication and lead to premature component failure.**

8. Operate the vehicle to make sure the AC is performing properly and is not leaking.

---

## 11. AUTOMATIC TRANSMISSION INTERFACES

### 11.1. AUTOMATIC TRANSMISSION INTERFACES

#### FEATURE CODE DESCRIPTIONS:

13ACS – TRANSMISSION, AUTOMATIC {Allison 2000P SERIES} 5-Speed, With Overdrive, With PTO Gear, Less Retarder

13ACE – TRANSMISSION, AUTOMATIC {Allison HD-4560P} Wide Ratio, 5-Speed; With PTO Gear, With Oil Level Sensor and Less Retarder

13ACG – TRANSMISSION, AUTOMATIC {Allison HD-4560P} Wide Ratio, 6-Speed; With PTO Gear, With Oil Level Sensor and Less Retarder

13ABB – TRANSMISSION, AUTOMATIC {Allison MD-3060P} Close Ratio, 5-Speed; With PTO Gear and Less Retarder

13ABW – TRANSMISSION, AUTOMATIC {Allison MD-3066P} Close Ratio, 5-Speed; With PTO Gear and Less Retarder

13ABA – TRANSMISSION, AUTOMATIC {Allison MD-3060P} Close Ratio, 6-Speed; With PTO Gear and Less Retarder

13ABH – TRANSMISSION, AUTOMATIC {Allison MD-3560P} Wide Ratio, 6-Speed; With PTO Gear and Less Retarder

13ABV – TRANSMISSION, AUTOMATIC {Allison MD-3066P} Close Ratio, 6-Speed; With PTO Gear and Less Retarder Oil Level Sensor and Less Retarder

13ABJ – TRANSMISSION, AUTOMATIC {Allison MD-3560P} Wide Ratio, 5-Speed; With PTO Gear and Less Retarder

13ADM – TRANSMISSION, AUTOMATIC {Allison 3000EVS\_P} Close Ratio, 6-Speed; Includes Oil Level Sensor, With Provision for PTO, Less Retarder

13ADN – TRANSMISSION, AUTOMATIC {Allison 3000EVS\_P} Close Ratio, 5-Speed; Includes Oil Level Sensor, With Provision for PTO, Less Retarder

13ADP – TRANSMISSION, AUTOMATIC {Allison 3500EVS\_P} Wide Ratio, 6-Speed; Includes Oil Level Sensor, With Provision for PTO, Less Retarder

13ADR – TRANSMISSION, AUTOMATIC {Allison 3500EVS\_P} Wide Ratio, 5-Speed; Includes Oil Level Sensor, With Provision for PTO, Less Retarder

13ADS – TRANSMISSION, AUTOMATIC {Allison 4000EVS\_P} Close Ratio, 5-Speed; Includes Oil Level Sensor, With Provision for PTO, Less Retarder

13ADU – TRANSMISSION, AUTOMATIC {Allison 4500EVS\_P} Wide Ratio, 5-Speed; Includes Oil Level Sensor, With Provision for PTO, Less Retarder

13WTA – ALLISON WT SPARE INPUT/OUTPUT for General Truck, Utility, Refuse, Dump, Bus and Pickup and Delivery

13WTB – ALLISON WT SPARE INPUT/OUTPUT For Dump/Construction With Two-Speed Axle or Auxiliary Transmission

13WTE – ALLISON WT SPARE INPUT/OUTPUT for Fire Truck/Emergency Vehicles

13WTK – ALLISON WT SPARE INPUT/OUTPUT for Sewer Evacuator

13WTL – ALLISON WT SPARE INPUT/OUTPUT for Refuse With Automatic Neutral for PTO

**FEATURE / BODY FUNCTION:**

The features listed above describe both Allison transmission sales features as well as Allison vocational electrical interface sales features. Review each entry carefully and chose the transmission and optional electrical interface feature that is right for your equipment application. Allison electrical interface connections are optional equipment on International vehicles. You must choose one of the features described below to receive a cable harness interface connection on your vehicle factory installed.

Allison provides electrical inputs and outputs for a variety of vehicle controls. The controls may be specific for fire truck, emergency vehicle, loader etc., see Allison Controls and General Information for details.

13WTA – This feature provides a spare input/output on an Allison WT transmission for customers with a General Truck, Utility, Refuse, Dump, Bus or Pickup and Delivery application.

13WTB – This feature provides a spare input/output on an Allison WT transmission for customers with a Dump/Construction application with a Two-Speed axle or auxiliary transmission.

13WTE – This feature provides a spare input/output on an Allison WT transmission for customers with Fire Truck or Emergency application.

13WTK – This feature provides a spare input/output on an Allison WT transmission for customers with Sewer Vacuum application.

13WTL – This feature provides a spare input/output on an Allison WT transmission for customers with a refuse application that requires Automatic Neutral for a PTO.

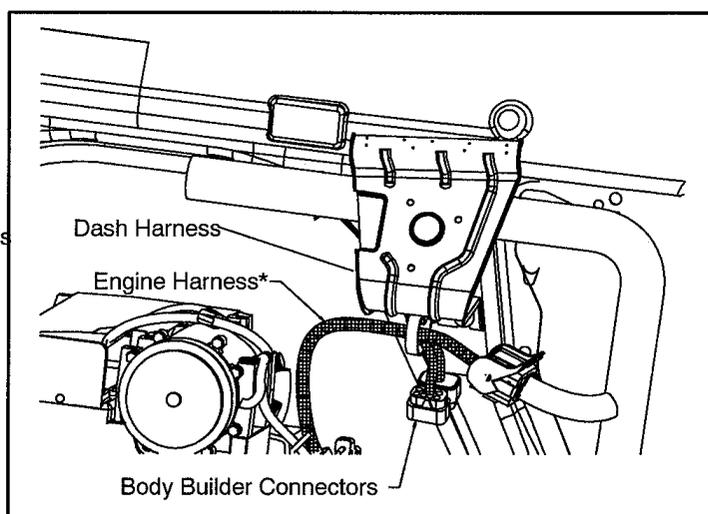
**SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS: NONE**

**WIRING INFORMATION:**

See Allison Controls and General Information for technical details and circuit design.

With the Allison MD, HD and 2000/2400, the interface connection is located under the windshield wiper motor bracket.

Connectors Located on Front of Dash Panel, Driver's Side for the MD Series Transmissions



Connectors 7506 and 7206 have their mating connectors attached filled with cavity plugs. To use connectors, remove cavity plugs and use the following:

**Figure 94**

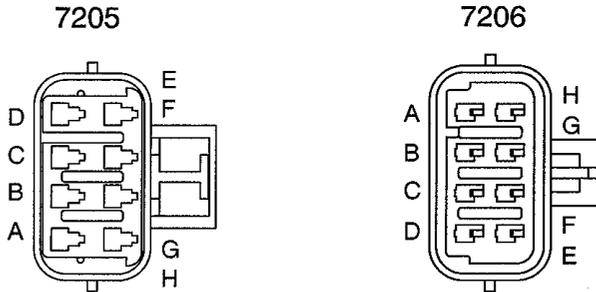
With the MD and HD, there are two connectors – 7205 and 7206. Connectors 7506 and 7206 have their mating connectors attached filled with cavity plugs. To use connectors, remove cavity plugs and use the following:

**Table 71**

Mating Connector for 7205		
Connector	Connector Lock	Cavity Plug
3525874C1	3525875C1	2025431C1
Terminals	Wire Gauge	
1667742C1	16, 18, 20	
Cable Seals	Wire Gauge	
1661872C1	16, 18, 20	
Mating Connector for 7206		
Connector	Connector Lock	Cavity Plug
3525872C1	3525873C1	2025431C1
Terminals	Wire Gauge	
1661875C1	16, 18, 20	

Cable Seals	Wire Gauge	
1661872C1	16, 18, 20	

**Harness Connectors Viewed from Mating End**

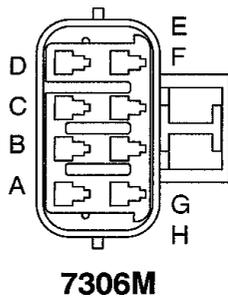


**Figure 95**

The Allison 2000/2400 has one connector – 7306M. Connector 7306M has its mating connector attached and filled with cavity plugs. To use connector, remove cavity plugs and use the following:

**Table 72 Mating Connector for 7306M**

Connector	Connector Lock	Cavity Plug
3525874C1	3525875C1	2025431C1
Terminals	Wire Gauge	
1667742C1	16, 18, 20	
Cable Seals	Wire Gauge	
1661872C1	16, 18, 20	



**Harness Connectors  
Viewed from Mating End**

**Figure 96 7306M**

The circuit numbers on the harness correspond to the circuit numbers used by Allison. The table below gives the MD circuit and connector cavity information. For a complete circuit diagram of the Transmission wiring, and for connector and terminal part numbers, see vehicle circuit diagram book.

Table 73

Cavity	Circuit Number	I/O	Maximum Current	Description
Connector Number 7205				
A	L92B161	—	—	Signal Ground
B	Plug	—	—	—
C	Plug	—	—	—
D	L92#125	Output	500 mAmp	Retarder Indicator
E	Plug	—	—	—
F	L92#167	Output	—	Output Speed Indicator
G	L92#105	Output	500 mAmp	Sump/ Retarder Temp. Overheat Indicator
H	L92#137	Input	—	Service Brake Status
Connector Number 7206				
A	L92#155	Input	—	Auxiliary Function Range Inhibit
B	L92#117	Input	—	Auto Neutral for PTO
C	L92C161	—	—	Signal Ground
D	L92#118	Input	—	Fire Truck Pump Mode
E	L92#153	Input	—	Auxiliary Hold
F	L92#114	Output	500 mAmp	Range Indicator
G	L92#112	Output	500 mAmp	PTO Enable 2
H	Plug	—	—	—
NOTE 1: See Allison technical manual for suggested circuit design.				
NOTE 2: See special features table below for package content.				
<b>NOTE 3: MUST COMPLY WITH FMVSS STANDARD #102.</b>				

The table below gives the 2000/2400 circuit and connector cavity information. For a complete circuit diagram of the Transmission wiring, and for connector and terminal part numbers, see vehicle circuit diagram book.

Table 74 **Circuit and Connector Cavity Information**

Cavity	Circuit Number	I/O	Maximum Current	Description
Connector 7306M				
A	L92C128	—	—	Signal Ground
B	L92#106	Input	—	PTO Enable
C	L92#119	Output	500 mAmp	PTO Enable 2
D	L47C126	Output	—	Non- Zero Crossing Speedo (16 Pulses/ Rev)

**Table 74 Circuit and Connector Cavity Information (cont.)**

Cavity	Circuit Number	I/O	Maximum Current	Description
E	L92#111	Input	—	Auxiliary Function Range Inhibit
F	L92#108	Input	—	Auto Neutral for PTO
G	L92#121	Output	500 mAmp	Range Indicator
H	L92#122	Output	—	Output Speed Indicator

Note 1: See Allison technical manual for suggested circuit design.

Note 2: See special features table below for package content.

**NOTE 3: MUST COMPLY WITH FMVSS STANDARD #102.**

Shown below are the various vocational feature codes that are available. Note the Group and Package number correspond to Allison Group and Package number.

**Table 75 Spare Input/ Output Package Content**

CODE	13WTA#	13WTB#	13WTE#	13WTK#	13WTL@
Group	70	73	71	75	73
Package	113	146	117	150	142
Other requirements	None (Max Feature Pkg.)	Two Speed Axle	Fire Truck or Crash Truck (Max Feature Pkg.)	Sewer Evacuator (Max Feature Pkg.)	Refuse with Automatic Neutral for PTO (Max Feature Pkg.)
Fun No.	Function Name	Wire Number (For Body Builder Use)			
<b>Features That Are Enabled When Vehicle is Shipped:</b>					
I-A	Secondary Shift Schedule	M	M	M	M
I-C	PTO Enable	118	118		118
I-H	Engine Brake and Preselect Request	119/ 169	119/ 169	119/ 169	119/ 169
I-Q	Two- Speed Axle Enable		153		
I-Y	ABS Input	154	154	154	154
I-Z	Retarder Enable	163	163	163	163
I-AA	Service Brake Status	137	137	137	137
I-AG	Auto Neutral for Refuse Packer and PTO Enable				153/ 117
O-A	Engine Brake Enable	132	132	132	132

**Table 75 Spare Input/ Output Package Content (cont.)**

CODE	13WTA#	13WTB#	13WTE#	13WTK#	13WTL@
Group	70	73	71	75	73
Package	113	146	117	150	142
Other requirements	None (Max Feature Pkg.)	Two Speed Axle	Fire Truck or Crash Truck (Max Feature Pkg.)	Sewer Evacuator (Max Feature Pkg.)	Refuse with Automatic Neutral for PTO (Max Feature Pkg.)
Fun No.	Function Name	Wire Number (For Body Builder Use)			
O-B	Sump/ Retarder Temperature Indicator	105	105	105	105
O-C	Range Indicator	114		114 (4th)	114 (4th)
O-D	Output Speed Indicator A	167	167	167	167
O-G	PTO Enable	112	112		112
O-J	Two- Speed Axle Enable		114		
O-Q	Retarder Indicator	125	125	125	125
O-S	Neutral Indicator for PTO				114
<b>Feature Input Functions Available for Aftermarket Use:</b>					
I-D	Shift Selection Transition				155*
I-E	Auxiliary Function Range Inhibit (STD)	155*	155*		155*
I-G	Auxiliary Hold	153			
I-J	Fire Truck Pump Mode			117/ 118*	
I-L	Auto Neutral for PTO (STD)	117*			
I-W	Direction Change Enable	177*			177*
I-AJ	4th Gear Lockup for Pump Mode				117/ 118*

**Table 75 Spare Input/ Output Package Content (cont.)**

CODE		13WTA#	13WTB#	13WTE#	13WTK#	13WTL@
Group		70	73	71	75	73
Package		113	146	117	150	142
Other requirements		None (Max Feature Pkg.)	Two Speed Axle	Fire Truck or Crash Truck (Max Feature Pkg.)	Sewer Evacuator (Max Feature Pkg.)	Refuse with Automatic Neutral for PTO (Max Feature Pkg.)
Fun No.	Function Name	Wire Number (For Body Builder Use)				
Feature Output Functions Available for Aftermarket Use:						
O-I	Engine Overspeed Indicator				112	
<p><b>NOTES:</b></p> <p>M = Mode Button Located on Shift Tower</p> <p># = Not Available with Code 13AAZ</p> <p>@ = Requires Code 13AAZ, Automatic Neutral</p> <p>* = Not Activated</p>						

**NOTE – Add 13WTW – ALLISON WT SPARE INPUT/OUTPUT Automatic Neutral for Refuse Packer With Service Brake Status**

**Group 77, Package 152**

**CIRCUIT NUMBERS SAME AS 13WTL. IN FUNCTION NAME SECTION, ADD (WITH SERVICE BRAKE STATUS) IN ROW I-AG**

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## 12. POWER WINDOWS / LOCKS, REMOTE KEYLESS ENTRY

### 12.1. 16WJU, 16WJV AND 16WKZ — ELECTRIC WINDOWS, REMOTE LOCK AND UNLOCK, AND USE OF THE AUX FEATURE

Refer to the Circuit Diagram in S08285, Chapter 3, page 4.

**FEATURE CODE DESCRIPTION:** 16WKZ – KEYLESS ENTRY SYSTEM REMOTE With Panic and Auxiliary Buttons, Includes One Key Fob (Transmitter)

16WJU – WINDOW, POWER (2) And Power Locks, Left and Right Doors

16WJV – WINDOW, POWER (4) And Power Door Locks, Front and Rear Doors, Left and Right

**FEATURE/BODY FUNCTION:**

Driver and passenger power windows and door locks are available. The driver switches are located on the driver door trim and can control all door windows and locks. The passenger switches are located on the passenger door trim and can control the passenger door window and all locks. Window express down is available for all window switches by momentarily depressing the window down switch. The driver can “lockout” all non-driver controllable window switches by momentarily depressing the lower left switch on the driver door control.



**Figure 97** Driver's Side Door Pod



**Figure 98 Passenger's Side Door Pod**

The International Keyless Entry System uses electronic door pods in the driver and passenger side doors which also operate the power door locks and the power windows. If equipped with Remote Keyless Entry (optional code), the memory in the receiver (front passenger door pod) learns the transmitter codes from the key fobs (transmitters) and only recognizes those which it has learned in the programming process. Each vehicle's passenger side door pod has the ability to learn up to six transmitter codes allowing the vehicle to be accessed by six different key fobs. Each key fob has a unique code which can be learned by any number of RKE equipped vehicles.

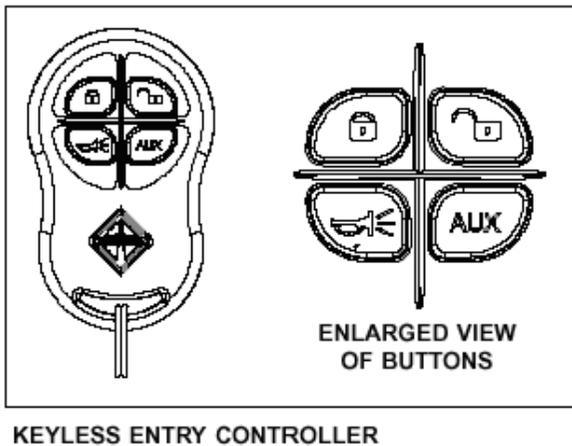
The Key FOB controls the following functions:

- Chirp of the horn and doors lock if the lock button is pressed on the key fob
- Autolock function, which automatically locks the doors at a vehicle speed of 15 MPH see details below.
- Panic function, button with horn symbol, which chirps the horn on/off in unison with the headlights and park lights for three minutes when the Panic button on the key fob is pressed and the ignition switch is off. If the button is pressed prior to the time out period, the lights etc., will go off
- Pressing the "AUX" button will toggle the work light circuit on. Pressing the button will turn the work light off. Vehicle must be ordered with work light or work light accommodation package

With the ignition on, if Wheel Based Vehicle Speed is above the AutoLock speed, the park brake was release below the auto lock speed and is still released, and the doors were closed below the auto lock speed and are still closed, all doors will lock.

The autolock feature will only lock the doors once regardless of the number of times the truck stops and starts. Cycling the key and/or opening the door, while below the Auto Lock speed, will allow the autolock feature to lock the doors again when the speed conditions are met.

**NOTE – Horn chirp, autolock are programmable parameters.**



**Figure 99 Keyless Entry Controller**

### Transmitter Learning And Erasing

Before the transmitter can be used for the first time, it has to be "learned" by the receiver. Up to 6 transmitters with different identification codes can be learned by a single RKE Pod.

These procedures are designed for manual learning/erasing operations on a complete vehicle. They can be used for learning replacement transmitters, for using up to six transmitters for accessing the same vehicle, or for accessing any number of vehicles using the same transmitter. If RKE is being added to the vehicle, additional programming of the Electrical System Controller is required to operate the horn, panic, and dome light functions with RKE.

#### Procedure For Erasing All Learned Transmitters

1. Cycle the Ignition from Off to On. Step 2. must be initiated (all four buttons pressed) within 10 seconds of this Ignition event.
2. On the **Driver** Door Pod do the following:

While holding down the Driver Window-Up, Driver Window-Down, and Unlock Switches depress and hold the Lock switch. All four switches must be held for at least 5 seconds. 6 or 7 seconds is recommended. After the 5 seconds the Door Pod RKE unit will erase all learned transmitters and the RKE will be disabled. At this point the erase procedure is finished and a new Ignition cycle must be initiated to perform any transmitter learning.

#### Procedure For Learning A Transmitter

**NOTE – This learning procedure cannot be performed during the same Ignition cycle as the "erase all learned transmitters" procedure. If necessary, the erase procedure should be completed before this procedure is started.**

1. Cycle the Ignition from Off to On (leaving the Ignition on will not work, it must be cycled). Step 2. must be initiated (all four buttons pressed) within 10 seconds of this Ignition event.
2. On the **Passenger** Door Pod do the following:

While holding down the Window-Up, Window-Down, and Unlock switches, depress and hold the Lock switch. All four switches must be held for at least 5 seconds. 6 or 7 seconds is recommended.

3. After the 5 seconds the Door Pod RKE unit will enter "Learn Mode" and stay there for 10 seconds (or until a transmitter is learned). Once the RKE enters the "Learn Mode", the four buttons can be released. During the ten second "Learn Mode" any function on the new fob/transmitter must be keyed at least twice (See Note 1).

Note 1. After the transmitter is learned the next keying of the new transmitter will perform the indicated function. It is recommended that the transmitter be successively keyed until the selected key's function is actually performed; i.e., pressing the Lock Button on the transmitter two times should learn its code, on the third push it should lock the door and momentarily beep the city horn. This is a good way to quickly confirm the success of the learning.

Note 2. Steps 1. through 5. of the learning process must be repeated for each transmitter to be learned.

### PARTS INFORMATION

Replacement Key Fobs/Transmitters can be obtained from Service Parts by ordering part number 3544938C2.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required Software feature code for sales code 16WKZ: 595129

Turning the **Panic\_Enable** parameter ON enables the Panic Mode feature of the keyless remote. The panic function chirps the horn on/off in unison with the headlights and park lights for three minutes when the Panic button on the key fob is pressed and the ignition switch is off. If the button is pressed prior to the time out period, the lights and horn will go off.

Turning the **Chirp\_Enable** parameter ON enables the Chirp feature for the keyless remote. The chirp feature results in a "chirping" sound with the truck is locked and unlocked.

**Table 76**

Parameter	ID	Description	Default	Units	Min	Max	Step
Panic_Enable	644	Enable/ disable the Panic Mode for the Keyless Remote. A value of 1 enables and a value of 0 disables the feature.	On	No_Units	NA	NA	NA
Chirp_Enable	647	Enable/ disable the remote lock "chirp" for Keyless Remote. A value of 1 enables and a value of 0 disables the feature.	On	No_Units	NA	NA	NA

Required Software feature code for sales code

- 16WJU: 595107
- 16WJV: 595108

The **AutoLock\_Speed** parameter sets the vehicle speed at which the vehicle doors will lock automatically.

**Table 77**

Parameter	ID	Description	Default	Units	Min	Max	Step
AutoLock_Speed	652	Autolock speed. The speed at which the vehicle doors will lock automatically (requires power locks); Setting this parameter to zero will disable Auto Door Locks.	15	mph	0	155	1

**WIRING INFORMATION**

When using the “Aux” feature, the work light circuit can be used for other features other than a work light - see “Work Light Feature for additional information.

If truck was built with power locks but not the keyless entry, see “How Do I Add Work Light Feature.”

With the Diamond Logic™ Builder software, some other systems can be activated but, only one. For example, the Aux button could turn on headlights or hazard lamps, not both.

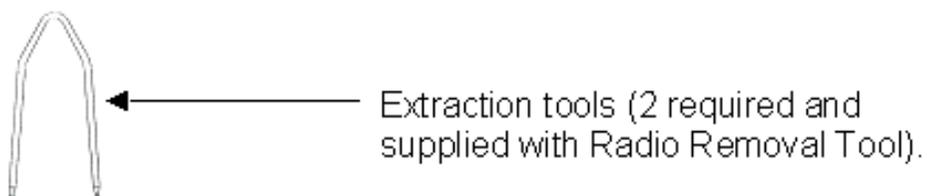
**HOW TO ADD THIS FEATURE:**

The Remote Keyless Entry (RKE) feature can be added if Power Windows/Power Locks (16WJU / 16WJV) are already installed on the vehicle by replacing the standard front passenger side door pod with an RKE compatible door pod.

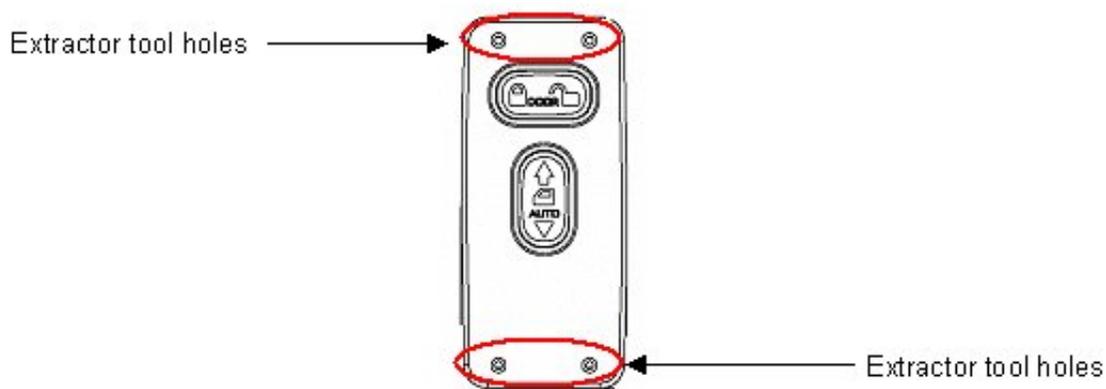
- Software feature code 595129 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see local dealer).
- Remove the existing passenger side door pod and replace it with the RKE compatible pod, part number 3544937C5 as described below. The desired quantity of Remote Key Fobs, part number 3544938C2, must also be ordered.
- Set the applicable programmable parameters, chirp enable, panic enable - see above, using ICAP or the Diamond Logic™ Builder software (see local dealer). The auto lock with vehicle speed option should already be set since power locks are installed.
- As noted above, additional wiring may be required if the Aux button on the Key Fob will be utilized for turning on a work light or other functions.
- Program the RKE receiver to recognize the desired Key Fobs as described above.

**REMOVAL/REPLACEMENT OF PASSENGER SIDE DOOR POD:**

To remove the door pod use the DIN Radio Removal Tool part number 2504954C1.

**Figure 100**

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

**Figure 101**

To install the new replacement pod connect the appropriate connectors and push the pod in until the locking tabs are fully engaged.

## 13. ELECTRIC TRAILER BRAKES / LIGHTS

### 13.1. 08HAG AND 08HAH — ELECTRIC TRAILER BRAKES

Refer to the Circuit Diagram in S08285, Chapter 9, page 27.

#### FEATURE CODE DESCRIPTION:

08HAG – ELECTRIC TRAILER BRAKE/LIGHTS Accommodation Package to Rear of Frame; for Separate Trailer Stop, Tail, Turn, Marker Light Circuits; Includes Electric Trailer Brake Accommodation Package With Cab Connections for Mounting Customer Installed Electric Brake Unit, Less Trailer Socket

08HAH – ELECTRIC TRAILER BRAKE/LIGHTS Accommodation Package to Rear of Frame; for Combined Trailer Stop, Tail, Turn, Marker Light Circuits; Includes Electric Trailer Brake Accommodation Package With Cab Connections for Mounting Customer Installed Electric Brake Unit, Less Trailer Socket

#### FEATURE/BODY FUNCTION:

These features provide a four-circuit breakout, blunt cut with heat shrink covering located under the instrument panel on the left side of the steering column. The circuits include a ground circuit, an electric brake feed to electric trailer brakes, a 30 amp power circuit plus the stop lamp feed. The circuits are designed to work with all popular electric trailer brake controllers.

The two different features are designed to handle trailers with separate stop and turn and combination stop and turn circuits.

The seven circuits that connect to the trailer are located at the rear of frame and are blunt cut with heat shrink covering. The appropriate socket assembly needs to be added by customer.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature codes: 595030, 595203

Software feature codes that must be removed: NONE

**These parameters should be left at their factory default values!**

**Table 78**

Parameter	ID	Description	Default	Units	Min	Max	Step
Park_Light_Lo_Current	1880	Park and ID Lights Low Current Detection Level (Amps)	.5	A	0	15	0.1
Park_Light_Hi_Current	1881	Park and ID Lights High Current Detection Level (Amps)	20	A	0	15	0.1
Park_Light_OC_Current	1882	Park and ID Lights Open Circuit Detection Level (Amps)	.5	A	0	15	0.1

#### WIRING INFORMATION

Inside the cab, locate the breakout (under the instrument panel on the left side of the steering column) and connect leads to the electric brake controller.

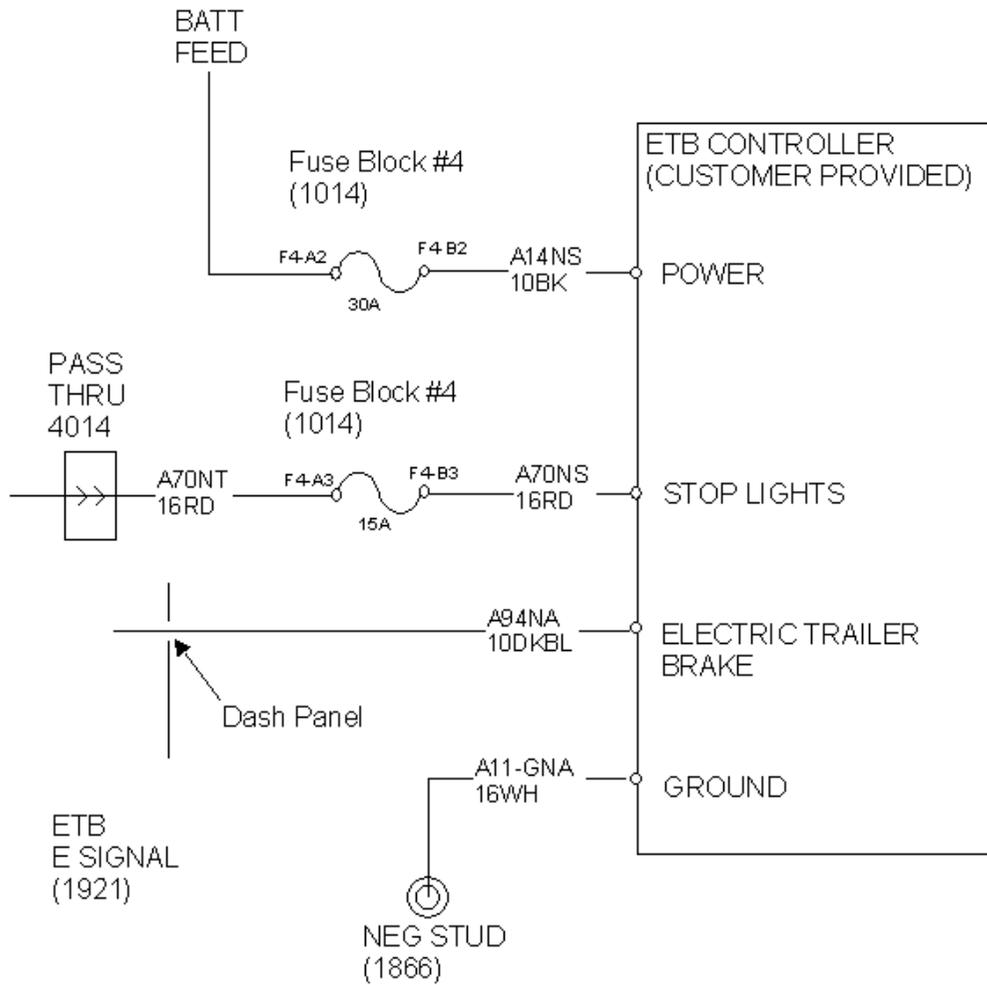


Figure 102

The circuit colors/function to the electric brake controller are as follows:

**Table 79**

Circuit	Wire Color	Wire Gauge
Power feed to the controller	Black	10
Stop lamp feed	Red	16
Feed to electric trailer brakes	Dark Blue	10
Ground	White	16

08HAG and 08HAH give 7 wires located at end of frame that are blunt cut. Also give 4 wires located under cab Instrument Panel.

The following are the wires for the circuits found in the blunt-cut wires located at the end of the frame.

**Table 80**

Circuit Number	Maximum Current	Description/ Labeled	Color
<b>08HAG and 08HAH Label Number 9724 CH09_13 of circuit diagram book</b>			
R70	30 A	Stop Lights	Red
R68	20 A	Park Lights	Brown
R94	30 A	Trailer Brake	Dark Blue
R58	20 A	Identification Lights	Black
R10	N/A	Ground	White
<b>08HAG Label Number 9724 CH09_13</b>			
R56	15 A	Left Turn	Yellow
R57	15 A	Right Turn	Light Green
<b>08HAH Label Number 9724 CH09_13</b>			
R56	15 A	Left/ Stop Turn	Yellow
R57	15 A	Right/ Stop Turn	Light Green
<b>08HAG and 08HAH Label ETB CONTROLLER CH09_27</b>			
ADJ11-GNA	—	GROUND SIGNAL	White
A14NS	30 A	POWER SUPPLY SIGNAL	Black
A70NS	15 A	STOP LIGHTS	Red
A94NA	20 A	ELEC BRAKE SIGNAL	Dark Blue

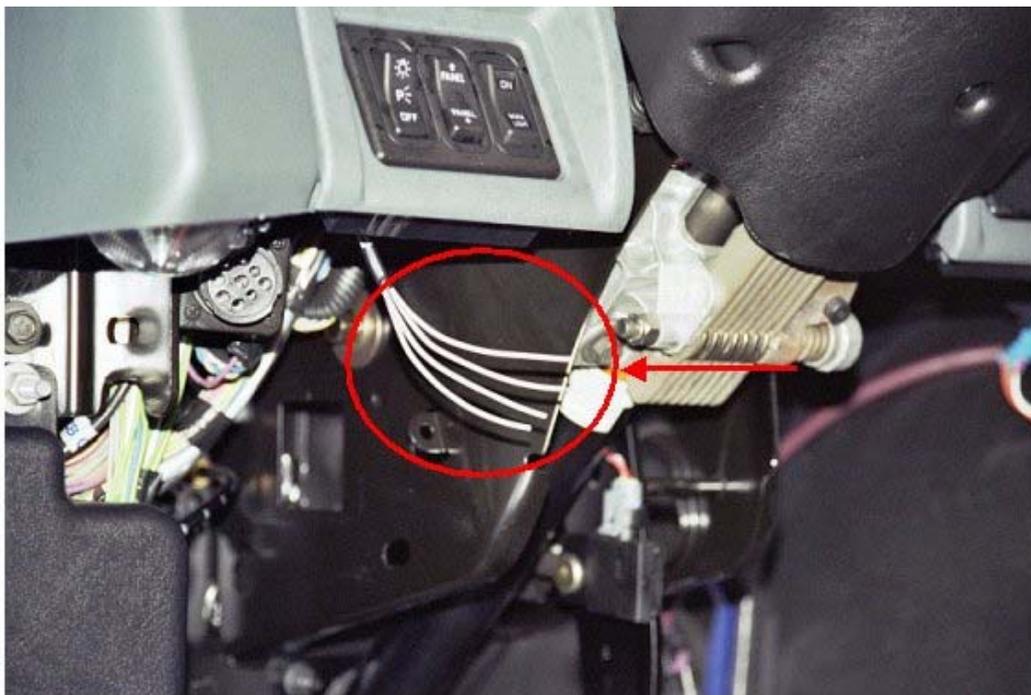


Figure 103 Location of 4-Wire Breakout Under Dash

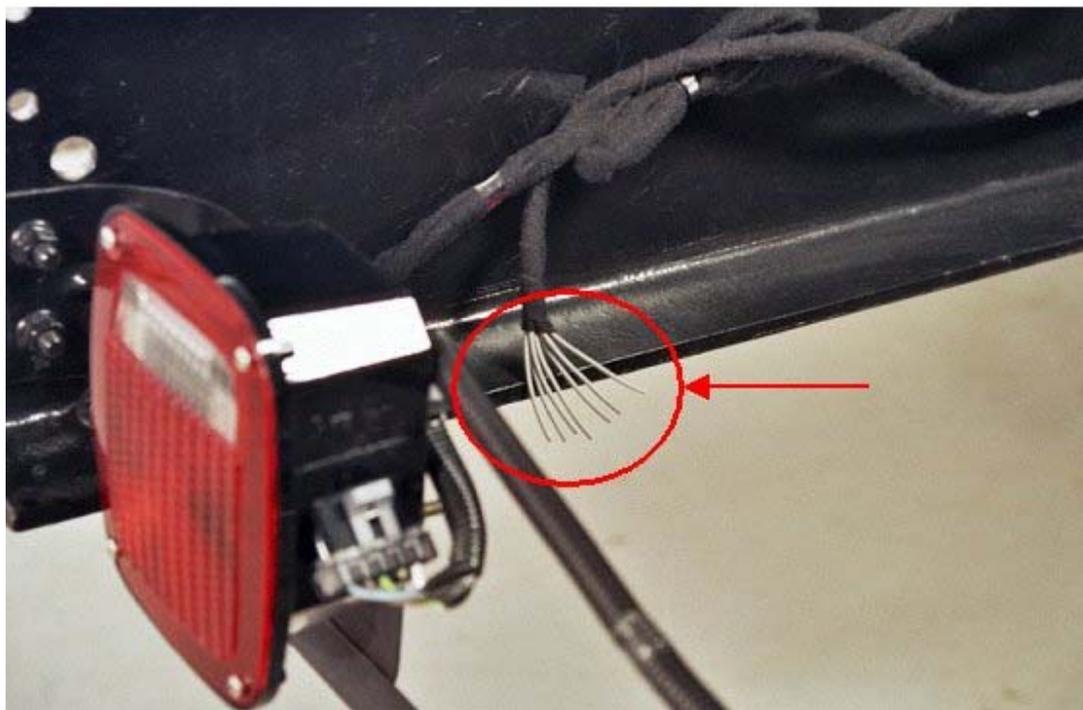


Figure 104 Location of 7-Wire Breakout at End of Frame

**NOTE** – Many trailers combine trailer marker lamps with the tail lamp, if so, leave the black circuit covered with the heat shrink tube.

**TESTING:**

1. Make proper trailer connections.
2. Turn on headlights.
3. Verify that the BROWN taillight wire and the BLACK identification light wire have battery voltage levels present.
4. Turn off headlights.
5. Press the footbrake.
6. Verify that the RED brake wire has battery voltage levels present.
7. Release the footbrake.
8. Turn on the left turn signal.
9. Verify that the YELLOW left turn signal wire is cycling between battery voltage and ground.
10. Turn off left turn signal.
11. Turn on the right turn signal.
12. Verify that the LIGHT GREEN right turn signal wire is cycling between battery voltage and ground.
13. Turn off right turn signal.
14. Activate Trailer Brakes with the trailer brake controller.
15. Verify that the DARK BLUE Electric Trailer Brake wire has variable voltage levels present commensurate with the position of the brake controller lever.
16. Verify that Trailer Brakes are functioning correctly by calibrating the electric trailer brake controller according to the manufacturer's instructions.

## 14. ENGINE CONTROL

### 14.1. 12VXY — REMOTE MOUNTED ENGINE CONTROL

#### FEATURE CODE DESCRIPTION:

08HAG – ENGINE CONTROL, REMOTE MOUNTED Provisions for: Includes module and connector for body builder installation of remote engine speed control with SAE J1939 communication with NGD 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 data link to the ESC from the RESCM. The feature also has associated software (595034) that is programmed into the ESC, which allows it to control the engine remotely through the RESCM.

There are programmable parameters that are used by this function. The programmable parameters are located in the ECM of the engine. They consist of preset engine speeds which the engine will maintain, if speed control is activated and the speeds are selected.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature codes: 595034

Software feature codes that must be removed: NONE

**These parameters should be left at their factory default values!**

**Table 81**

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

#### WIRING INFORMATION

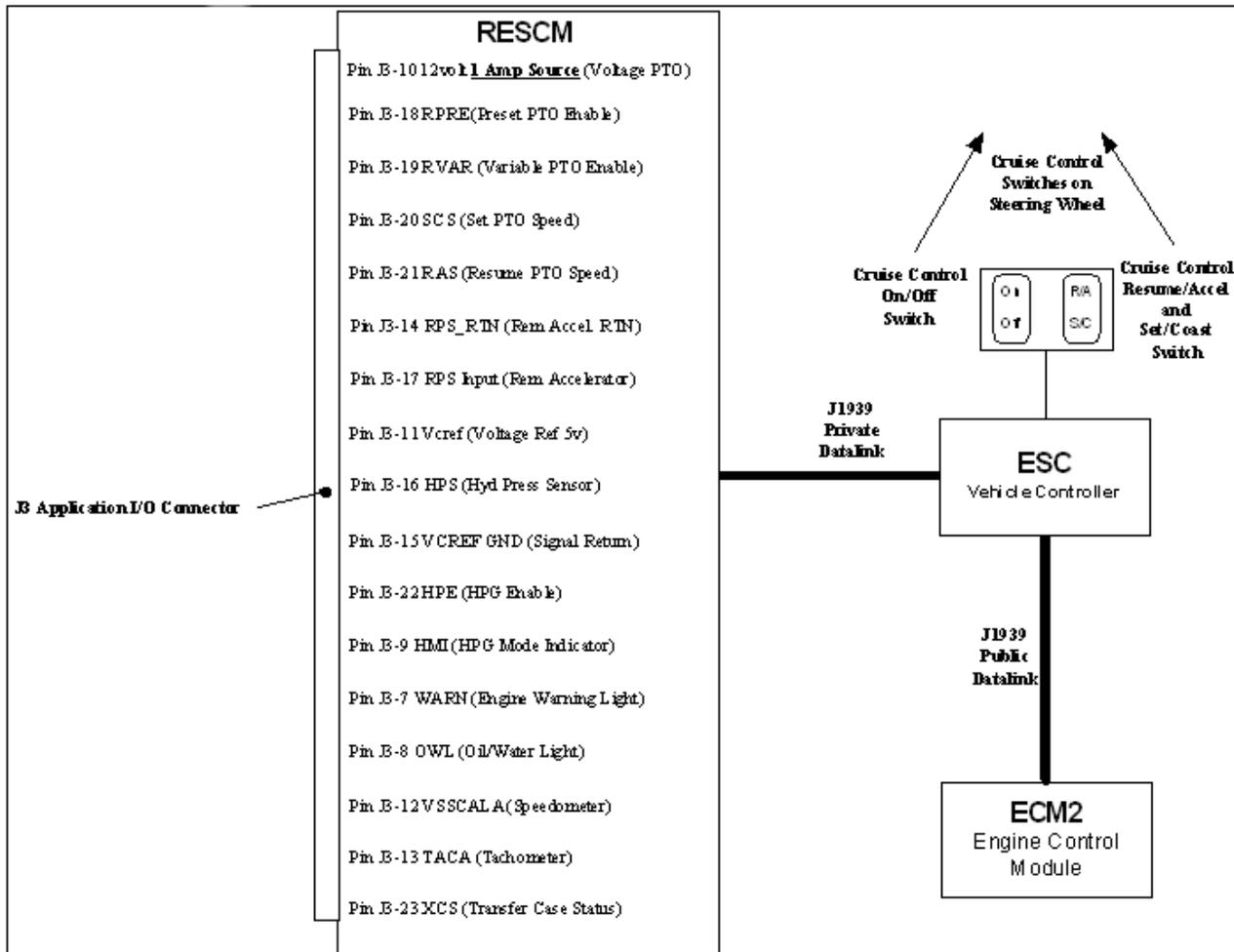


Figure 105 Remote Engine Speed Control Module Overview Diagram

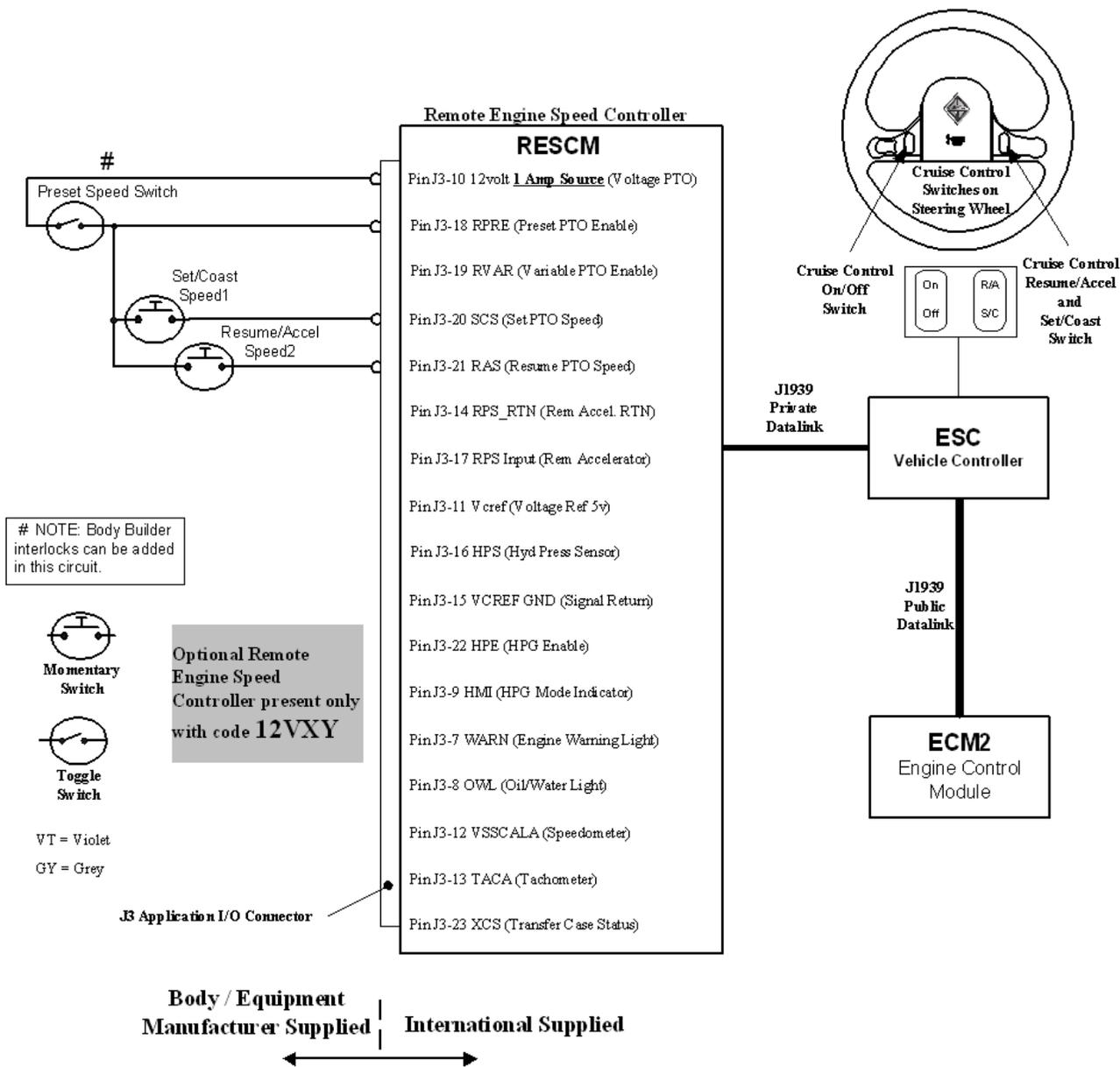


Figure 106 Remote Installation For Preset Engine Control Using the Remote Engine Speed Controller

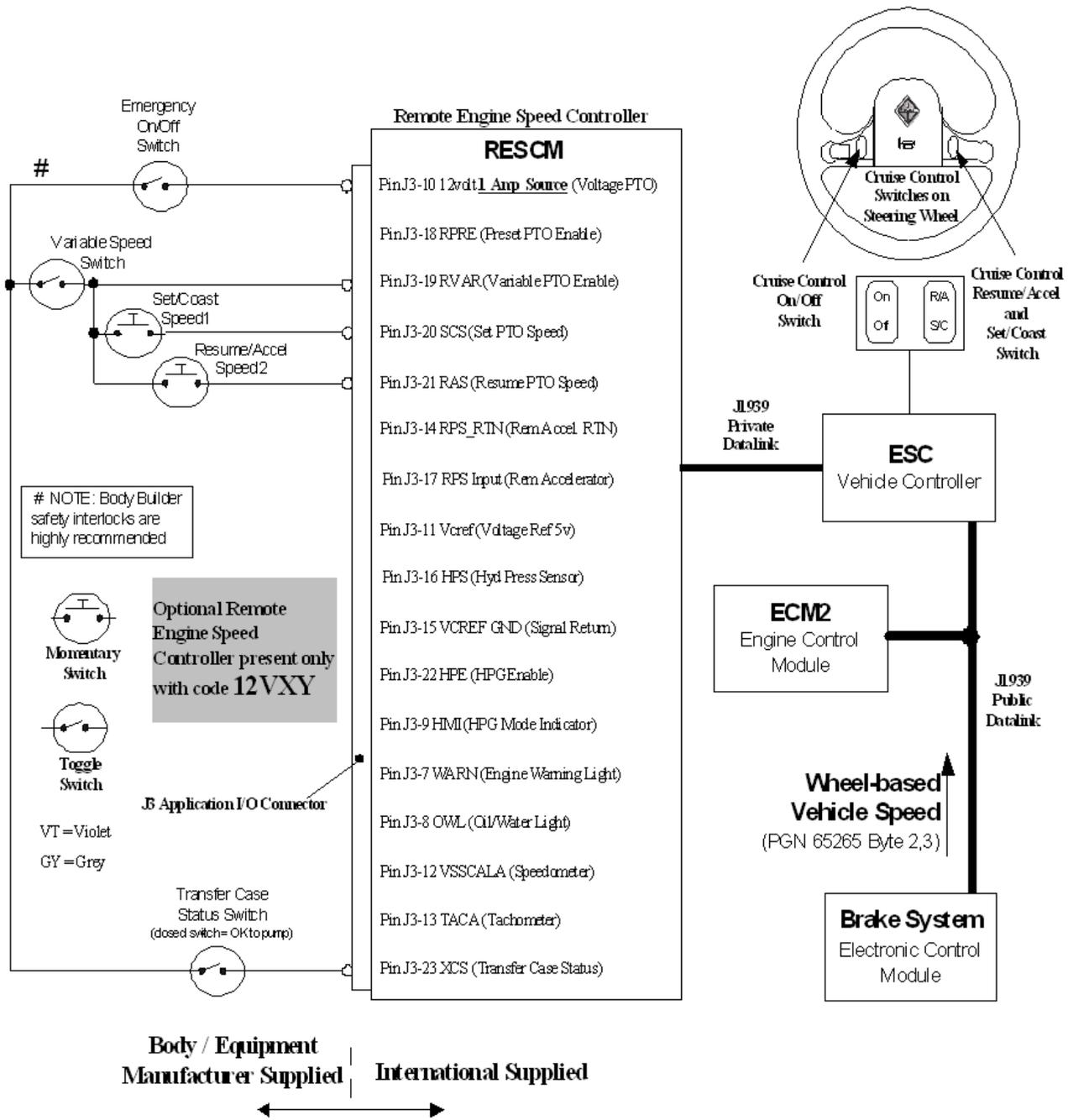


Figure 107 Split Shaft Engine Speed Control

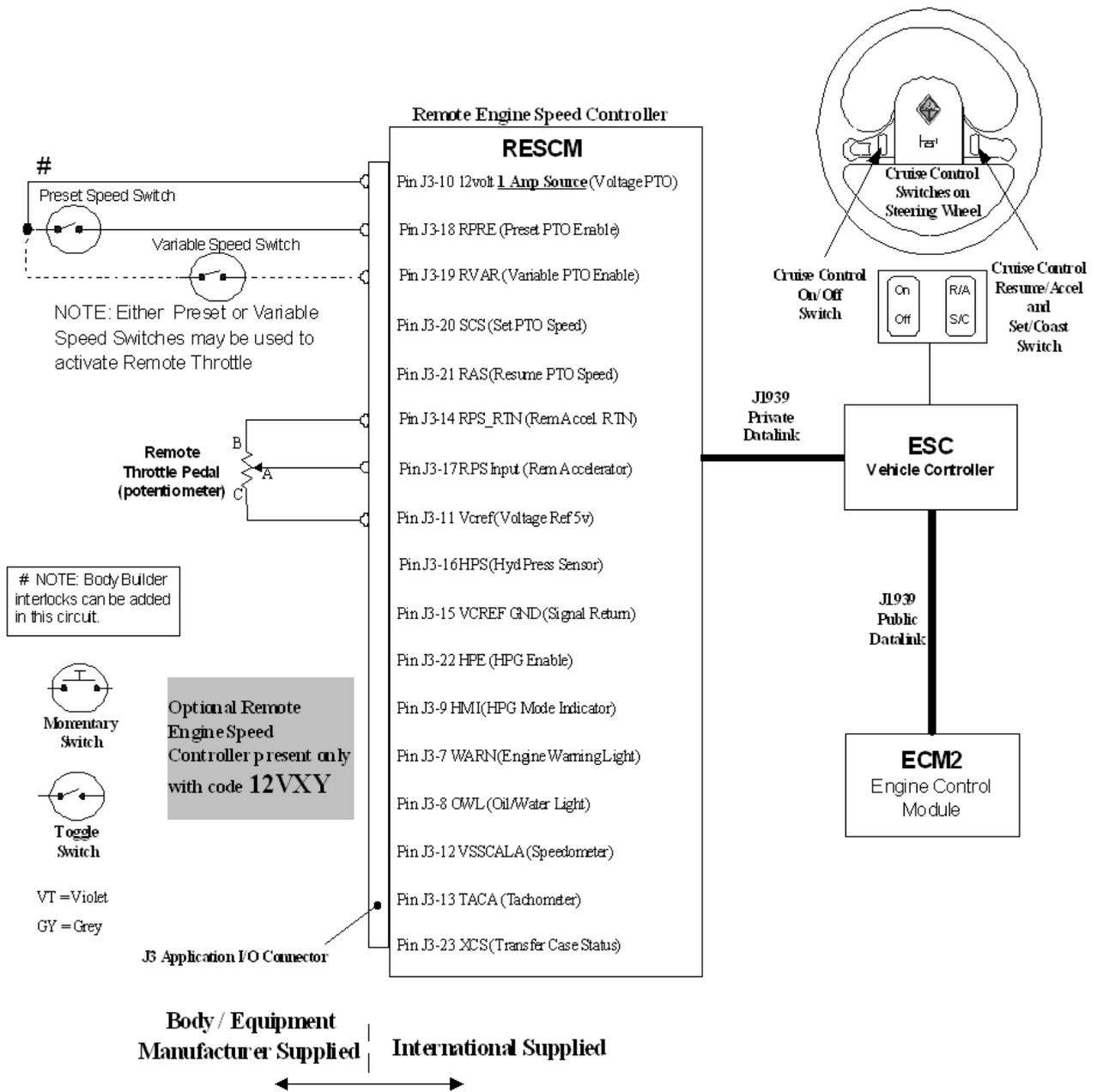


Figure 108 Remote Throttle Interface

**NOTE –** Close the circuit from J3-10 to either circuit J3-18 or circuit J3-19 to enable the remote potentiometer. When either of these circuits are closed, the engine speed requested by the remote potentiometer is demanded as long as the Remote Throttle p

**TESTING:**

12VXY is tested via the Master Diagnostics Software (MDS) package of the MPSI Pro-Link 9000 Electronic Service Tool (EST).

## 15. PTO

### 15.1. 60ABA – PTO ACCOMMODATION CABLE SHIFT

**FEATURE CODE DESCRIPTION:** BDY INTG, PTO ACCOMMODATION for Monitoring Cable Shift Engaged PTO, With Indicator Light and Audible Alarm in Gauge Cluster (requires 1 Remote Power Module input)

**FEATURE/BODY FUNCTION:** This feature utilizes a customer-mounted PTO feedback switch (ground active) wired to a Remote Power Module (RPM) input to drive an indicator light in the gauge cluster that allows the operator to discern that their PTO is engaged. An audible alarm is used to warn the operator 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, you 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 monitored by an audible alarm. The functionality of these alarms is controlled by programmable parameters. Factory default settings for these programmable parameters are listed in the tables below.

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

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

Required software feature codes: 595170, 595248

Conflicts with Software features: 595171, 595193, 595252, 595244, 595267

#### 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 about the value set by **TEM\_PTO\_Veh\_Spd\_Alarm\_Limit**

**Table 82 PTO Alarms**

<b>Off</b> - Indicates a 0 is set in for this parameter						
<b>On</b> - Indicates a 1 is set for the parameter						
Parameter	ID	Default	Description	Min	Max	Step

**Table 82 PTO Alarms (cont.)**

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 ESC 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

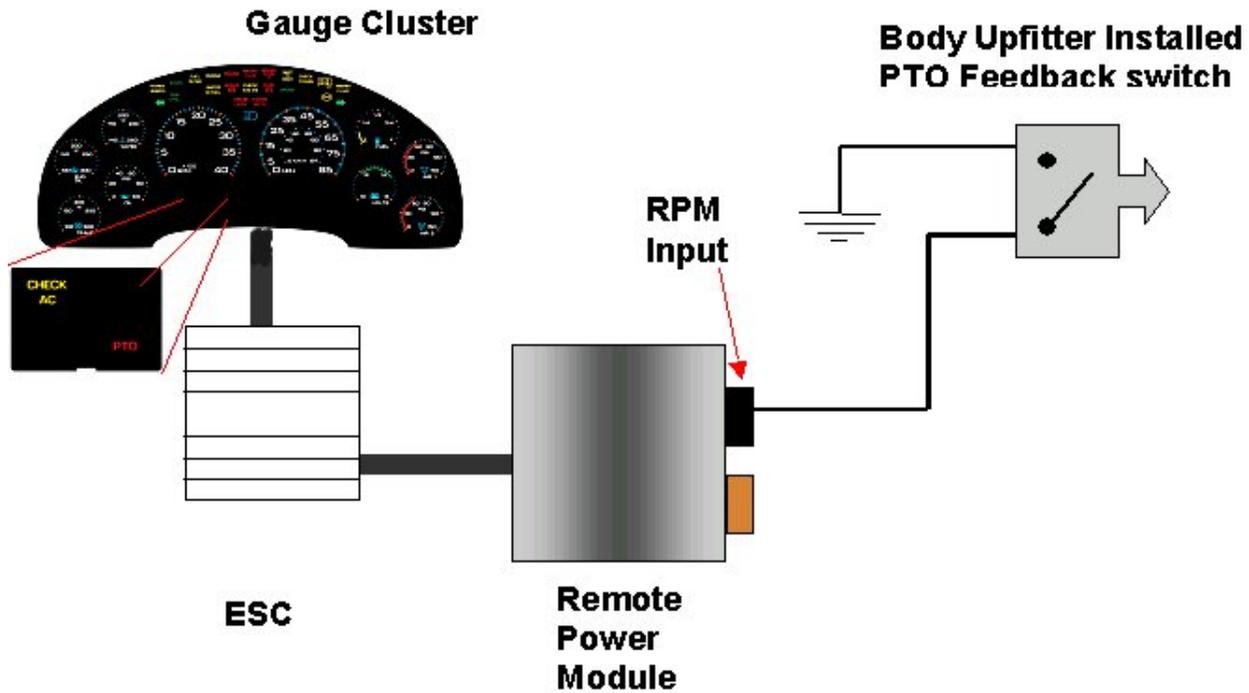
**Table 83**

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 ICAP or the Diamond Logic™ Builder software to determine pin locations for RPM inputs and set programmable parameters (refer to pin and switch location section).

- The wiring to the RPM input is customer supplied.
- A wire must be connected from the Bodybuilder installed PTO feedback switch (ground active), to the pin labeled PTO\_Feedback\_Switch in the Black 23-pin RPM input connector (J3).



**Figure 109 Overview of Cable Shift PTO System**

**RPM CONNECTOR INFORMATION**

**\*\* HPV kits are REQUIRED to allow Body Builders to wire in and out of the Remote Power Module connectors.**

HPV kits are pre-made kits that include 6 terminals and 6 seals for BOTH RPM connectors.

**Table 84**

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

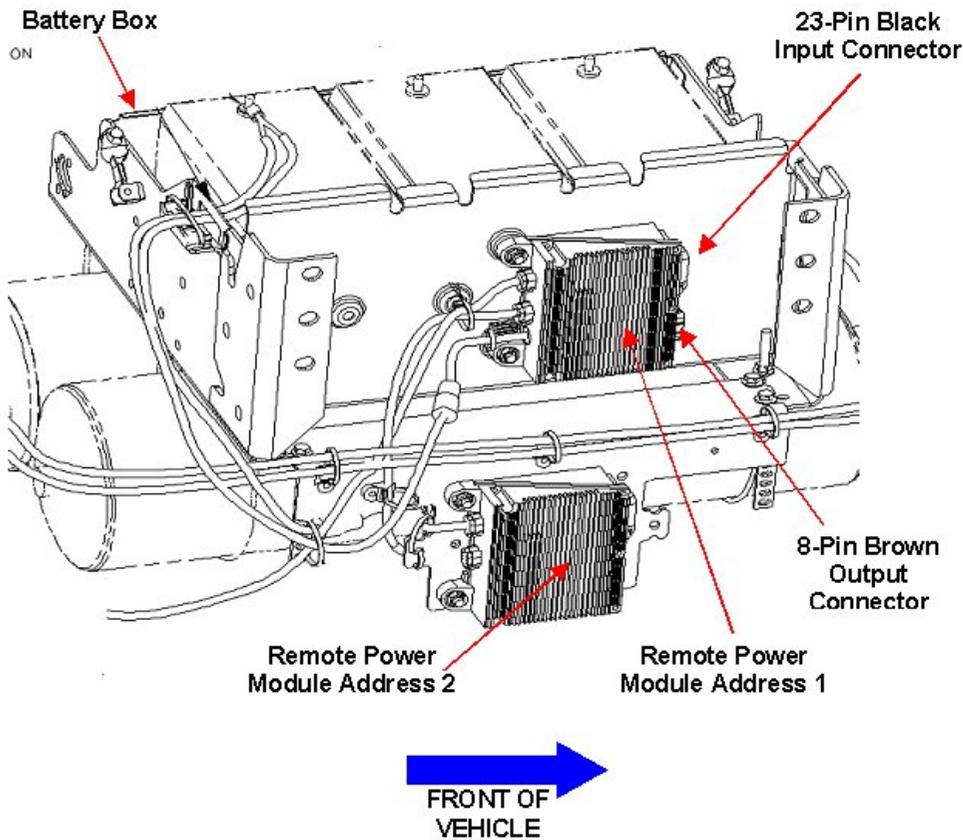
**NOTE – The following connectors are optional because they are already provided with the Remote Power Modules.**

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 harness.

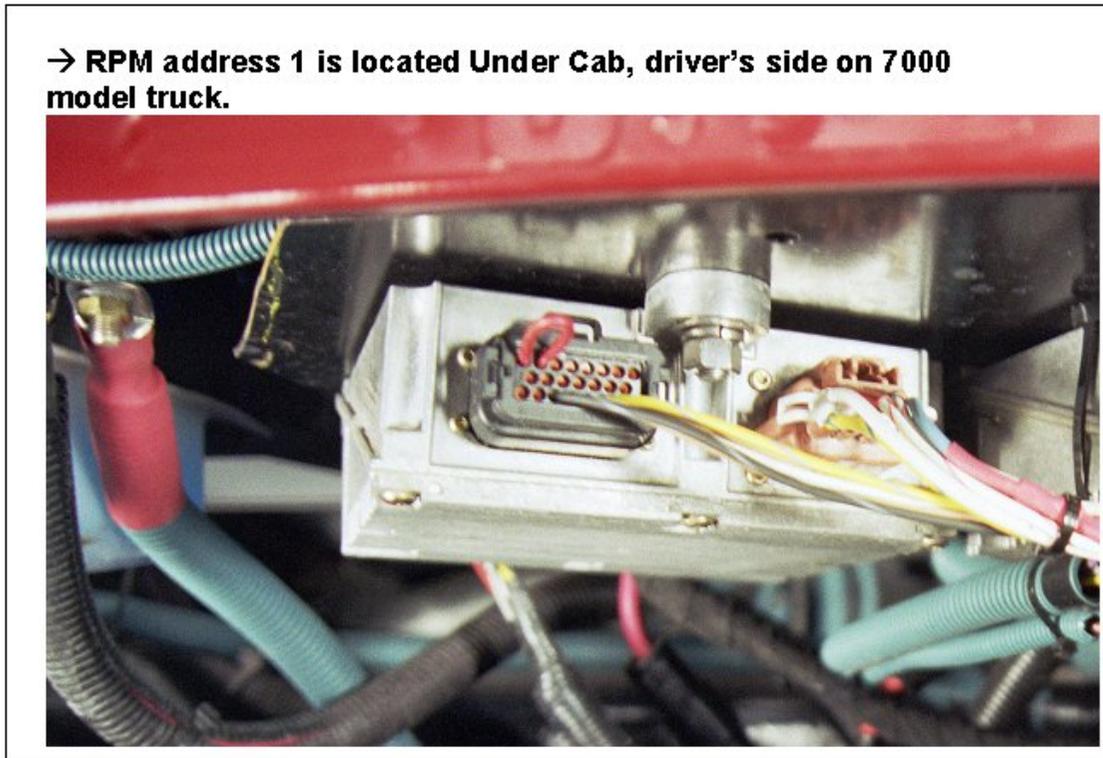
**Table 85 8-Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black)**

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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	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 110 RPM Mounting Location on a 4000 Model Truck**



**Figure 111 RPM Mounting Location on a 7000 Model Truck**

### **TESTING**

1. Verify that the Remote Power Module Input labeled PTO\_Feedback\_Switch (Pin position specified by ICAP or the Diamond Logic™ Builder software) is receiving the correct voltage (12V or Ground) as specified by the customer in ICAP or the Diamond Logic™ Builder software.
2. Make certain that the PTO indicator light in the gauge cluster illuminates by engaging the PTO.
3. 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 alarms should sound with continuous beeps.

### **HOW TO ADD THIS FEATURE:**

- Software feature codes 595170 and 595248 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to make sure that software feature codes 595171, 595193, 595252, 595244, and 595267 are NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Connect a wire from a Bodybuilder-installed PTO feedback switch to the pin labeled PTO\_Feedback\_Switch in the Black 23-Pin Connector on the RPM
- Perform the PTO testing procedure that is listed above.

## 15.2. 60ABB – PTO ACCOMMODATION MUNCIE® POWERFLEX™ LECTRA-SHIFT

Refer to the Circuit Diagram in S08285, Chapter 9, page 28.

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module input and 1 output)

**FEATURE/BODY FUNCTION:** This feature provides a momentary switch in the in-cab switchpack that drives a Remote Power Module (RPM) output and a relay that are used to engage and disengage the Muncie® Lectra-Shift PTO. A Remote Power Module input is used to drive an indicator light in the gauge cluster, allowing the operator to discern whether or not the PTO is actually engaged. An audible alarm sounds when certain programmable parameters are violated. The RPM input also drives 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”.

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.

Through programmable parameters the truck can be programmed to customize the number of times that an operator can request 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 ICAP or 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:

Required software feature codes: 595170, 595171, 595179, 595248

Software feature codes that must be removed: 595193, 595252, 595244, 595267

### 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 86**

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_Clch_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	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

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	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 87**

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

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_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	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_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

### **REENGAGEMENT**

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

**NOTE – All reengagement parameters should be left off with Lectra shift PTO’s 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 88

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 89 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 89 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 that feeds the retaining coil that holds the electric solenoid in the engaged position. If current exceeds this value, the ESC 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 you can attempt to engage the PTO again.

The **TEM\_PTO\_Allowed\_Engagement\_Time** parameter sets the maximum time allowed for the solenoid to engage in one engagement attempt.

The **TEM\_RPM\_PTO\_Engaged\_Param** parameter indicates the state that the ESC 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 ESC when the PTO is engaged.

0 = Input active when open circuit

1 = Input active when grounded

3 = Input active when at 12V

**Table 90**

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

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 ICAP or 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).***

- When a truck 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 Remote Power Module 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 Remote Power Module 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 Remote Power Module input connector Pin labeled **PTO\_Feedback\_Switch**.
- When the customer has completed the wiring from the connector, they can then plug the 3-pin connector into the connector provided by the Muncie Solenoid (See the Figure below).
- The customer is responsible for providing ground to the solenoid.

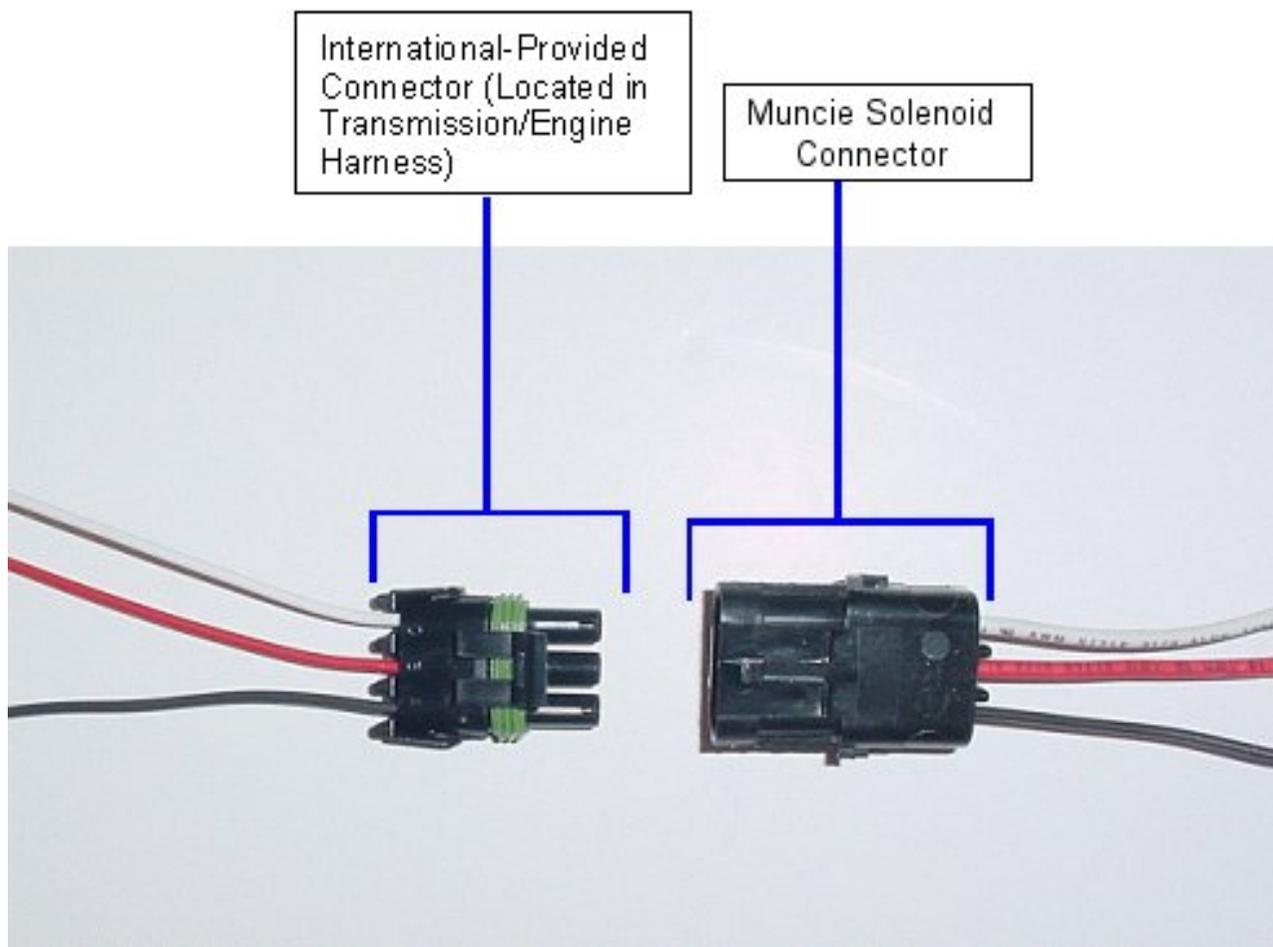


Figure 112 Lectra-Shift PTO Solenoid Connectors

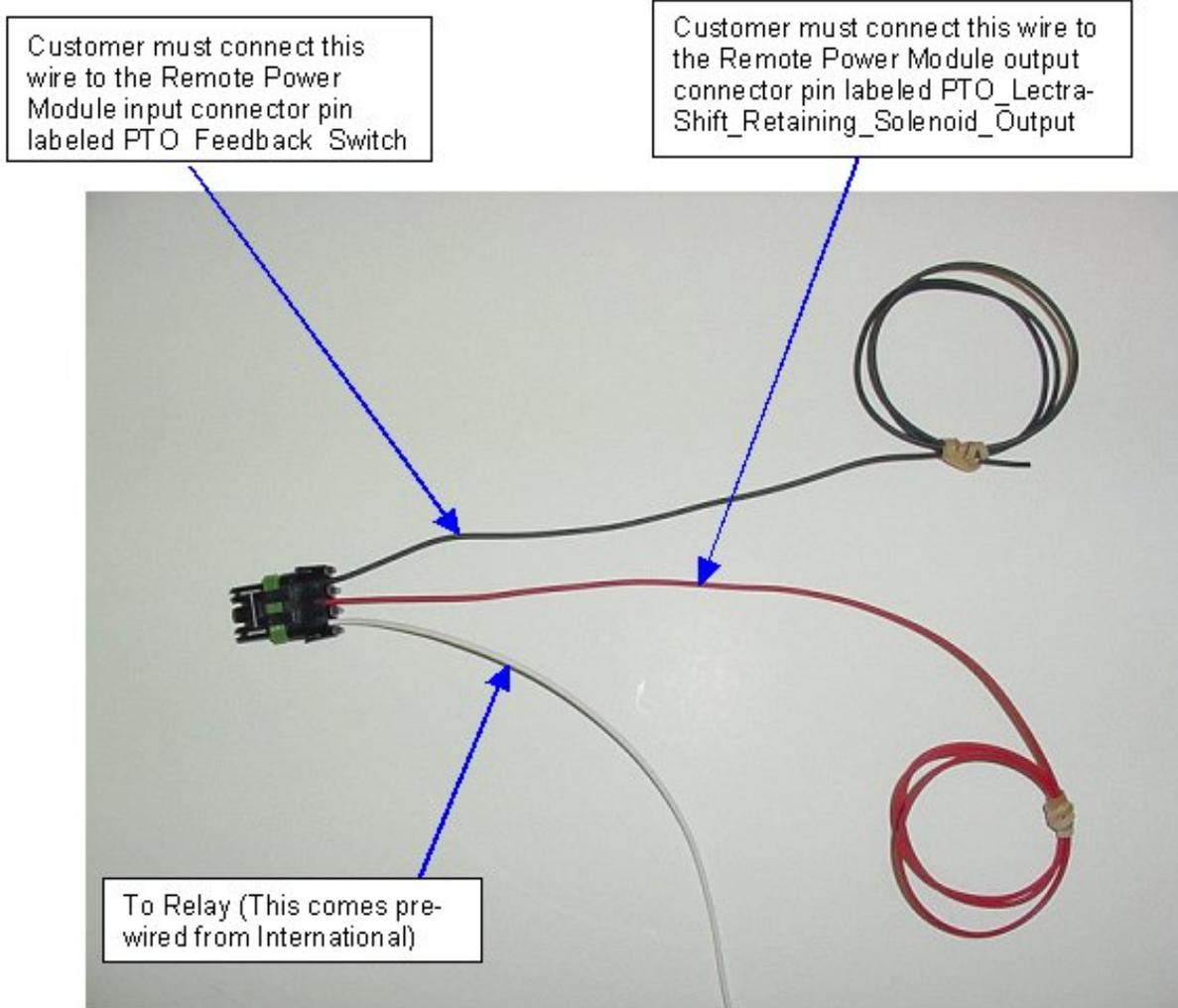


Figure 113 International Supplied Harness for Lectra-Shift PTO

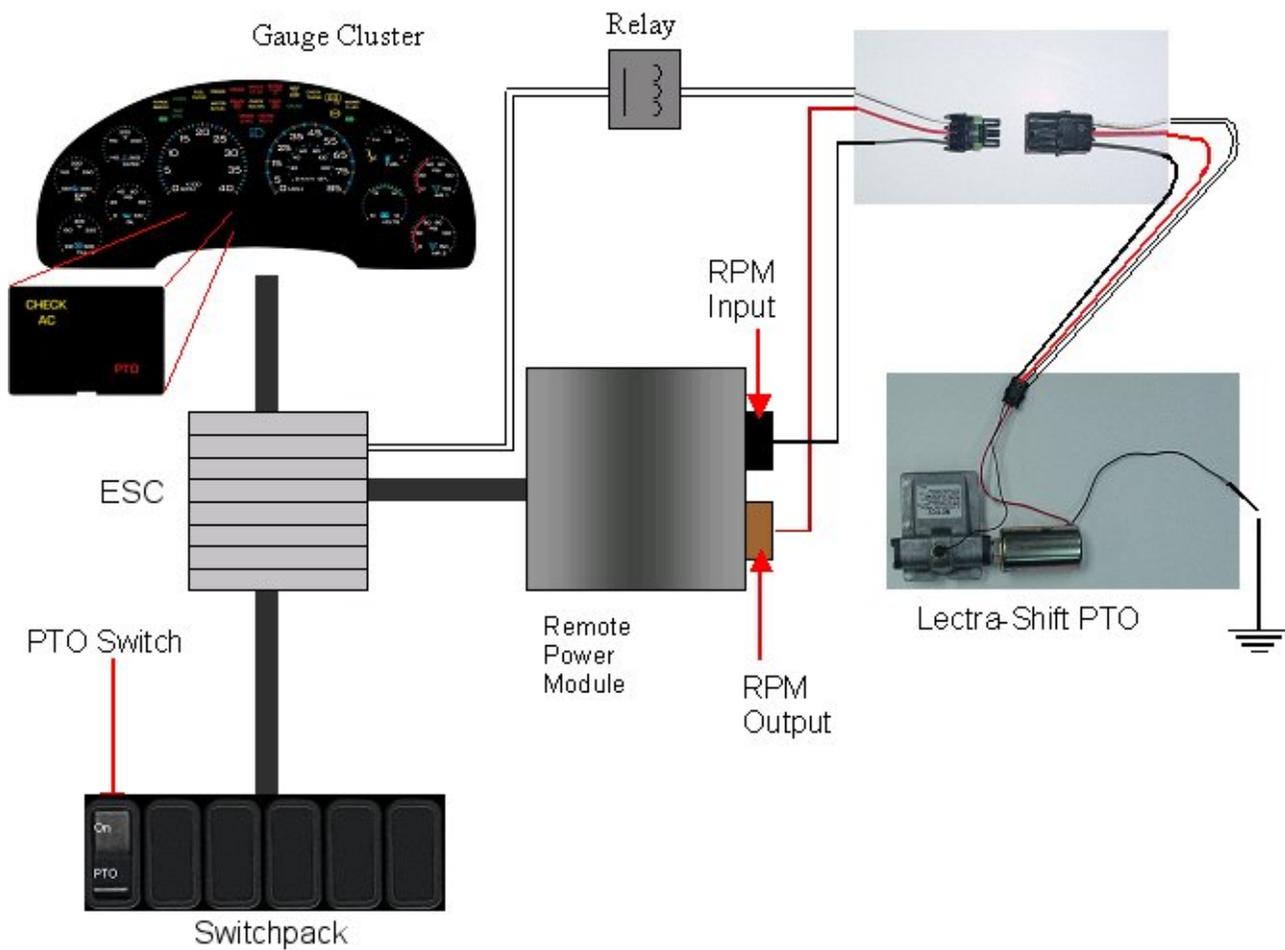


Figure 114 Diagram of Lectra-Shift PTO System

**RPM CONNECTOR INFORMATION**

**\*\* HPV kits are REQUIRED to allow Body Builders to wire in and out of the Remote Power Module connectors.**

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

**Table 91**

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 Remote Power Modules.**

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 harness.

**Table 92 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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	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

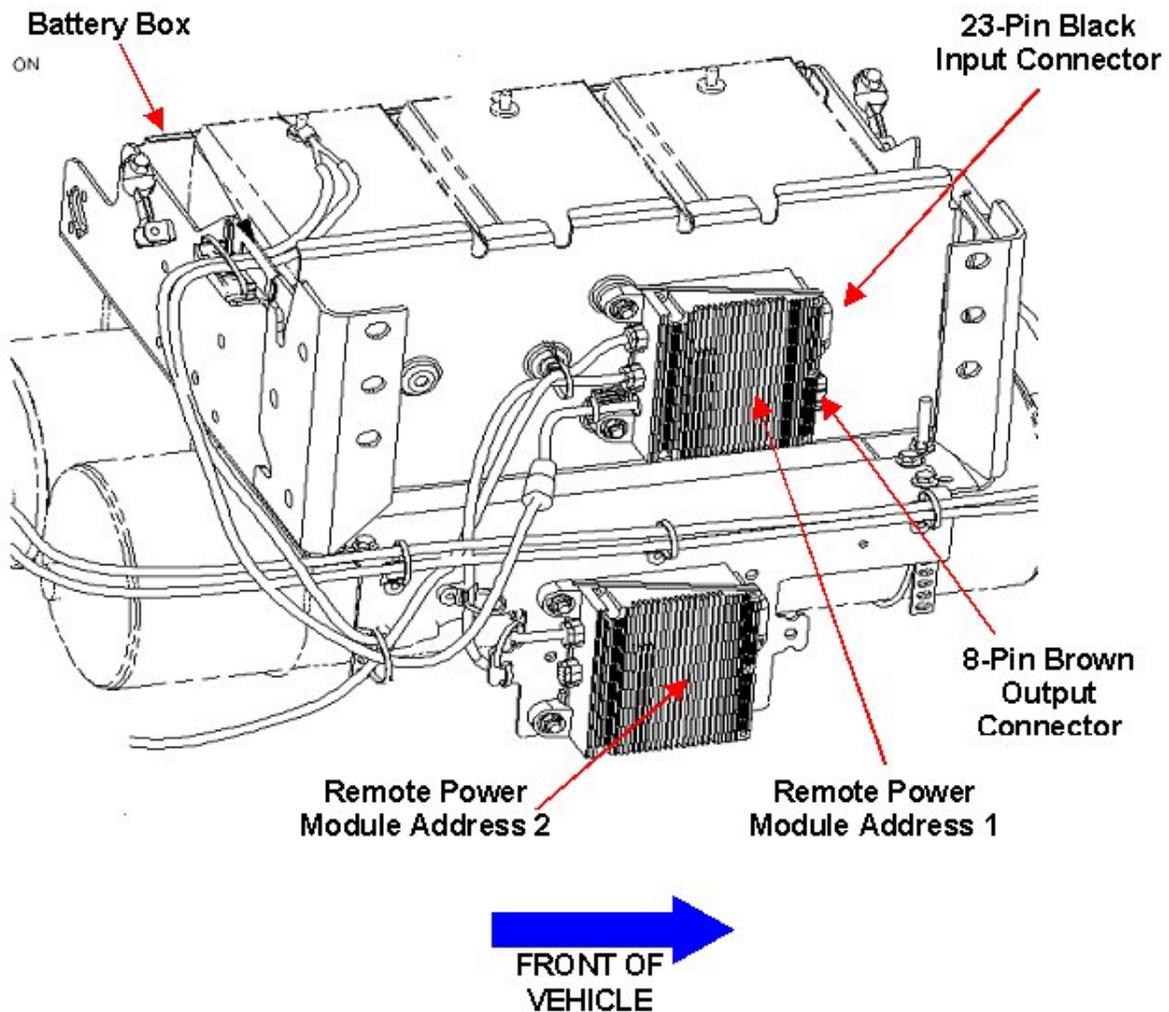
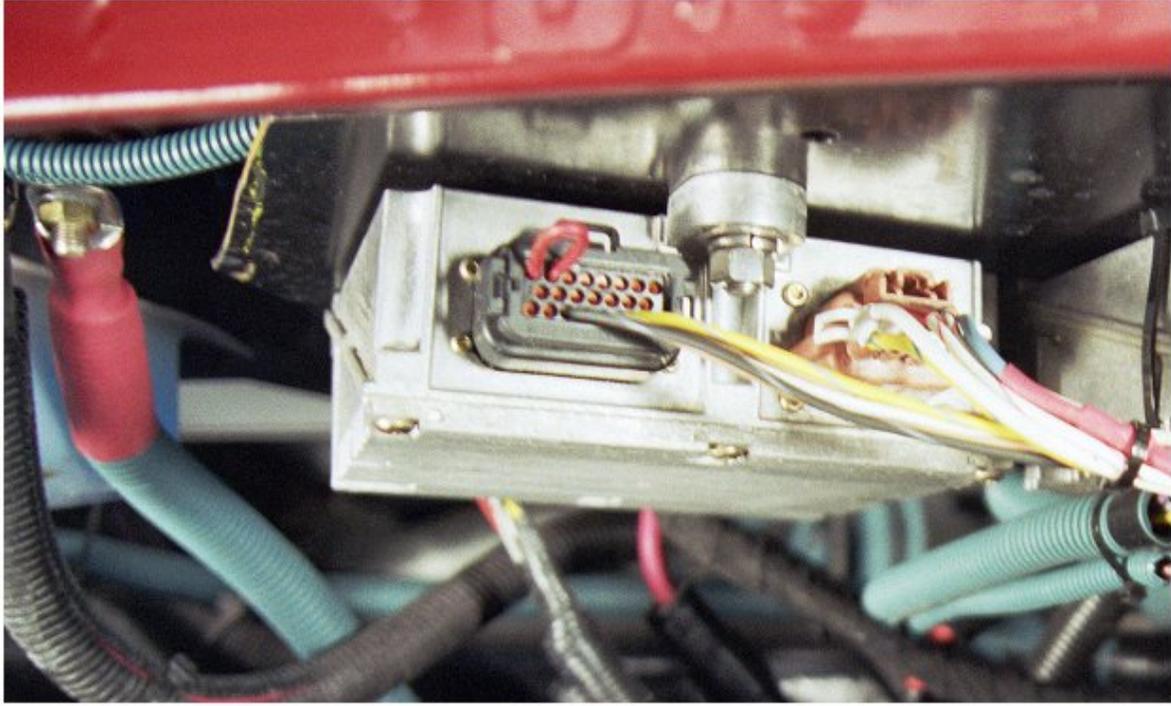


Figure 115 RPM Mounting Location on a 4000 Model Truck

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



**Figure 116 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 ICAP or the Diamond Logic™ Builder software) is receiving the correct voltage (12V or Ground) as specified by the customer in ICAP or 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. Test the Audible Alarm by violating an alarm programmable parameter and verifying that the Alarm sounds. 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 Installment 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 ICAP or the Diamond Logic™ Builder software to add the correct software codes (See above section) and 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 595170, 595171, 595179, and 595248 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to make sure that software feature codes 595193, 595252, 595244, and 595267 are NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using ICAP or 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 Bodybuilder-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 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 ESC kick panel to access the 36-way ESC connector number 1600

1. Using Harness wire part number 3510323R1
  - a. Disconnect the 48 way Pass Thru connector outside the cab
  - b. Install gray circuit wire CY12LC to cavity 48 of the Pass Thru connector number 1700. (Not necessary to remove the connector)
  - c. Install gray circuit wire CY12LC to cavity 11 of the 36-way ESC connector number 1600.
  - d. Tape circuit CY12LC to the Cab harness and secure.
2. Install dash switches
  - a. Ensure the switch assigned to the Lectra Shift is a momentary switch.
  - b. If the switch is not a momentary switch, use a din removal tool and remove the affected switchpack from the instrument panel. Install a momentary switch in the position assigned to PTO. Reinstall the switchpack in the instrument panel.

---

### PDC Under-hood Exterior Installation Steps

1. Remove the PDC panel cover to access interior circuits
2. Disassemble the PDC fuse panel block to gain access to the relay location and wire up the 40 Amp Relay located next to the Body Accessory Relay.
3. Using Harness wire part 3582955C91
  - a. Remove two screws holding the strain relief and twist the connector body, disassemble the pass thru connector (#4014). (do not remove the white terminal disk lock).
  - b. Connect the pink circuit wire J12LC to cavity 48 of the Pass thru connector 4014
  - c. Route harness to the PDC following the existing harness assembly.
  - d. Connect the white circuit wire J11-GC to ground stud (4005 Or 4006)
  - e. Connect the white/violet circuit wire J14LS to the PDC block location #4003 cavity R4-4 (Terminal 87 on the Relay) Install red terminal lock.
  - f. Connect the dual red splice terminal end circuit wires J14PL & J14LC to the PDC block location #4003 cavity R4-1 (Terminal 30 on the Relay) Install red terminal lock.
  - g. Connect small terminal end red circuit wire J14PL to the PDC block location #4003 cavity R4-5 (Terminal 86 on the Relay) Install red terminal lock.
  - h. Connect the pink circuit wire J12LC to PDC block location #4003 cavity R4-2 (Terminal 85 on the Relay) Install red terminal lock.
  - i. The large terminal end of the red circuit wire J14PL will connect to the maxi fuse block.
  - j. Install Relay assembly into Relay Location R4.
4. Using Harness 3581924C91 red wires with Maxi Fuse Block
  - a. Remove the harness from the Maxi Fuse Block
  - b. Reusing mounting hardware install the unfused side of the unmarked spare red power circuit to the Maxi Fuse block. (Not the teal end or fusible link side of the wire)
  - c. Remove the secondary lock from the Maxi Fuse Block and install J14PL into cavity A1 of the Maxi Fuse Block. Re-install the white secondary lock assembly and secure.
  - d. Install 40 Amp Maxi-fuse.
  - e. Install the fusible side of the unmarked power wire to the unfused side of the Mega fuse. (Towards the front of the truck) Remove and reinstall mounting hardware. Also tape wrap the dash harness wires to the dash harness.
  - f. Install the Maxi fuse block assembly into the PDC housing
  - g. Using the Coroplast tape warp install the protective tape onto the white circuit wire J14LS back up into the harness enough to sufficiently protect the wire outside the PDC fuse panel.
  - h. Re-assembly the PDC fuse panel box and stuff the wires back into place making sure that wires are correctly routed back to their original locations.
  - i. Reinstall PDC cover and secure
  - j. Strap lock dash harness effects and secure diode assembly.

5. Using wire harness 3582957C91
  - Route the harness down along the engine harness next to the 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.
6. Connect the RED wire to the Brown 8-pin Remote Power Module output connector Pin labeled **PTO\_Lectra-Shift\_Retaining\_Solenoid\_Output**.
7. Connect BLACK wire to the Black 23-pin Remote Power Module input connector Pin labeled **PTO\_Feedback\_Switch**.
8. Reconnect vehicle batteries.
9. Test the PTO operation.

**Table 93 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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	N/A
Connector Lock Part	3548943c1	N/A
CPA Lock	3573833c1	N/A
Cavity Plug	3535938c1	Included

### 15.3. 60ABE — PTO ACCOMMODATION FOR ELECTRIC OVER HYDRAULIC PTO

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module input and 1 output)

**FEATURE/BODY FUNCTION:** This feature provides a latched switch in the in-cab switch-pack to drive a Remote Power Module output that provides current to engage the Electric over Hydraulic PTO. A Remote Power Module 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, you 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 ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595170, 595179, 595193, 595248

Software feature codes that must be removed: 595171, 595252, 595244, 595267

#### **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 94

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_Clutch_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\_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 95**

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 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 96

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.	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 97 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 97 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 ESC 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 ESC 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 98**

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 ICAP or 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 hydraulic solenoid. This wire drives the engagement and disengagement of the solenoid. The customer supplies a ground wire for the hydraulic solenoid.
- A second wire must be connected from the Bodybuilder installed PTO feedback switch (ground 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 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.

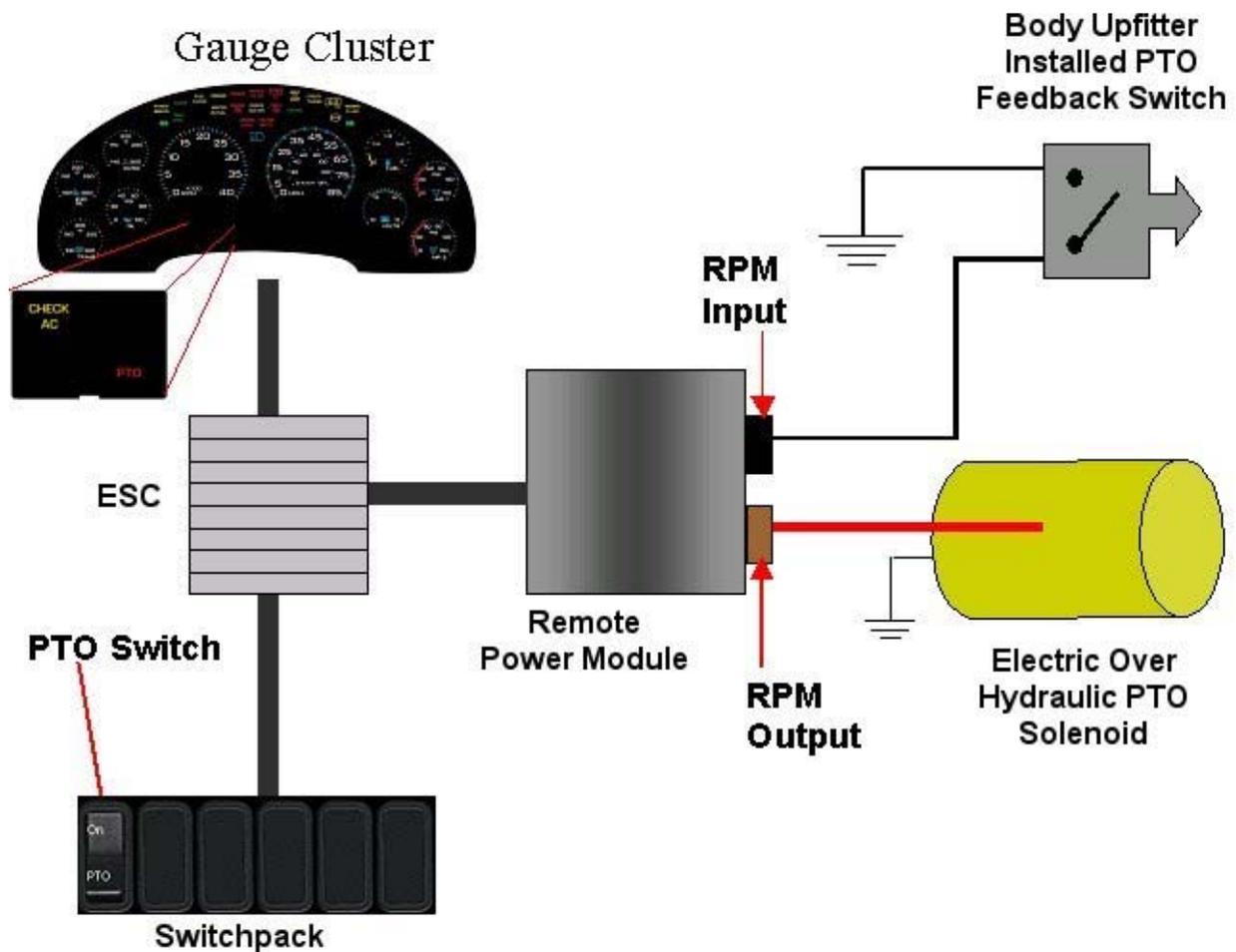


Figure 117 Overview of Electric Over Hydraulic PTO System

#### RPM CONNECTOR INFORMATION

**\*\* HPV kits are REQUIRED to allow Body Builders to wire in and out of the Remote Power Module connectors.**

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

**Table 99**

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 Remote Power Modules.**

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 harness.

**Table 100 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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	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

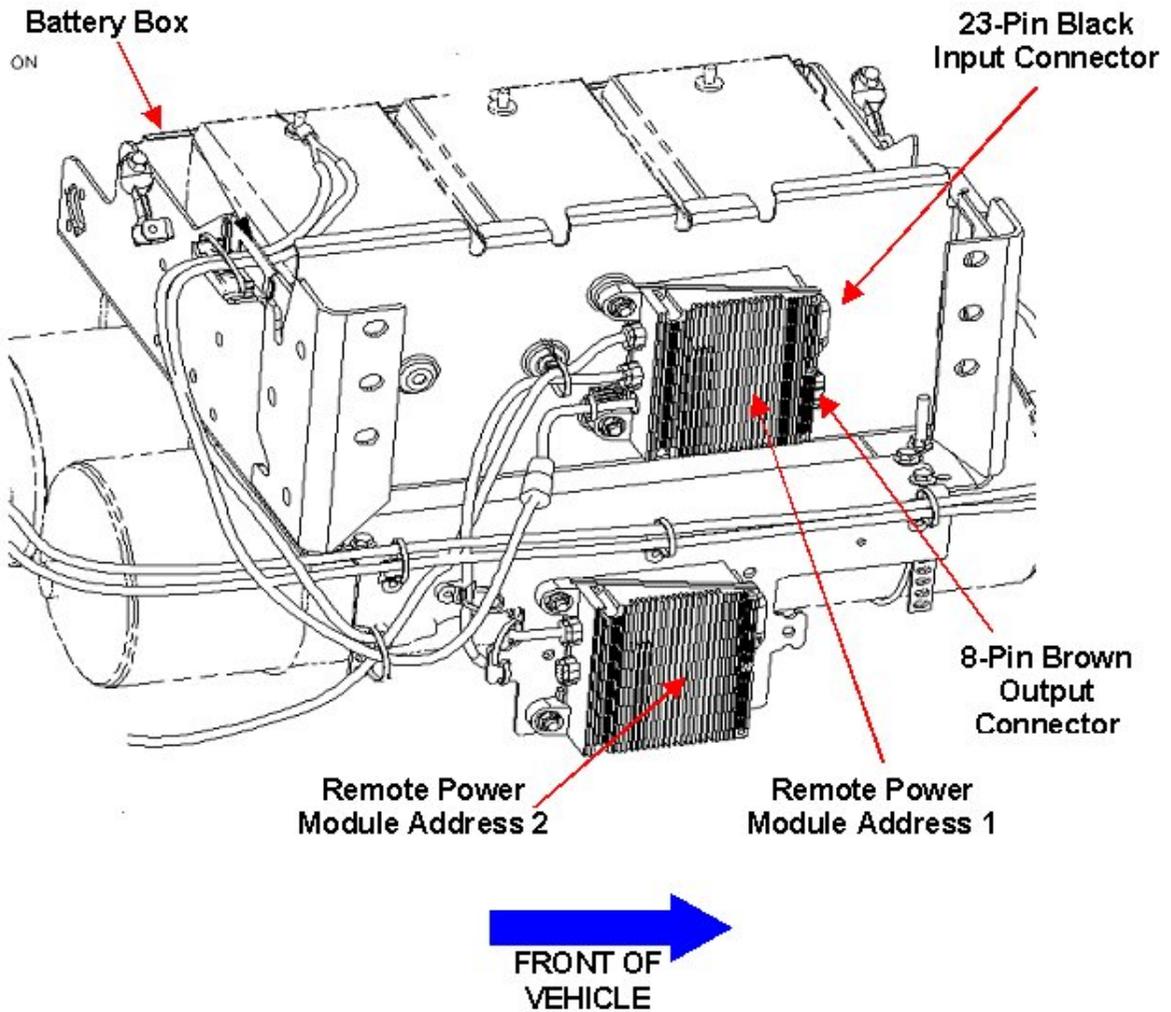
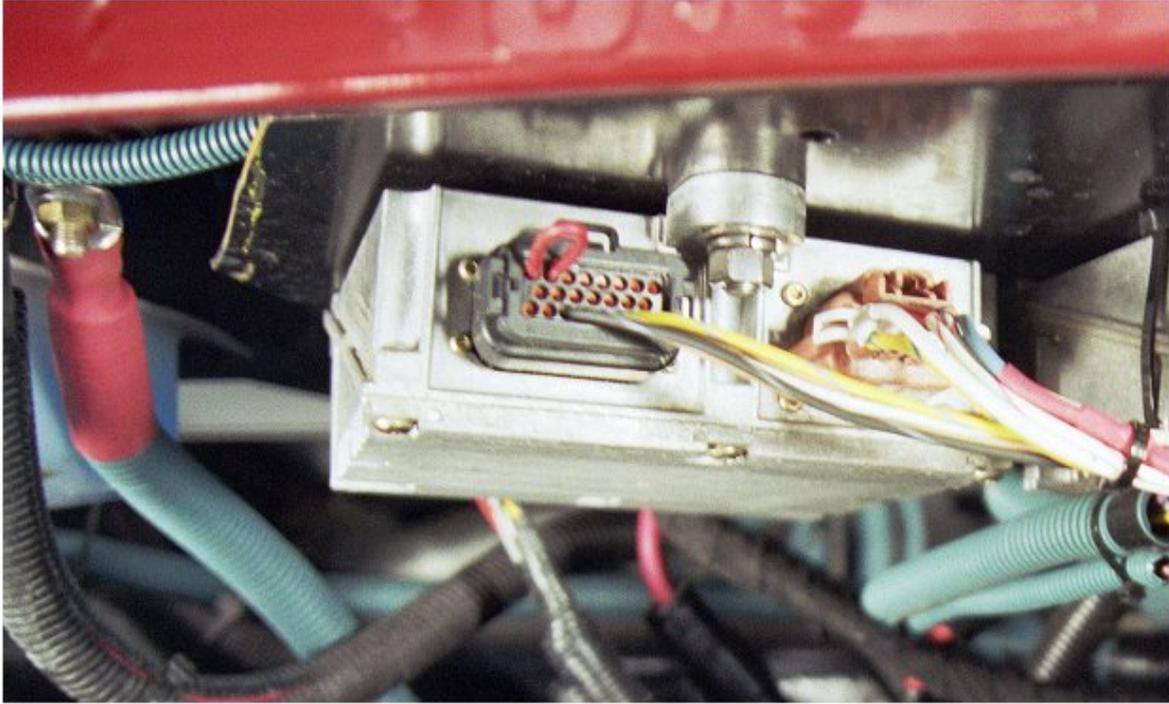


Figure 118 RPM Mounting Location on a 4000 Model Truck

→ **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. 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 ICAP or the Diamond Logic™ Builder software) is receiving the correct voltage (12V or Ground) as specified by the customer in ICAP or 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 595170, 595179, 595193, and 595248 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer)

- Use ICAP or the Diamond Logic™ Builder software to make sure that software feature codes 595171, 595252, 595244, and 595267 are NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using ICAP or 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 Bodybuilder-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 Engage Hydraulic Pump**

- Another use of 60ABE is to control a dump valve on a constantly engaged hydraulic pump. In this case you 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.

## 15.4. 60ABK — PTO ACCOMMODATION ELECTRIC OVER AIR NON-CLUTCHED

**FEATURE CODE DESCRIPTION:** 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 1 Remote Input Power Module Input and 1 Output)

**FEATURE/BODY FUNCTION:** This feature provides a momentary switch in the in-cab switch-pack to drive a Remote Power Module (RPM) output that provides current to engage the Electric over Air, Non-Clutched PTO. A Remote Power Module input is used to drive an indicator light in the gauge cluster, allowing the operator to discern whether or not the PTO is actually 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, you 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 ICAP or 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 PTO's 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595170, 595179, 595252, 595248

Software feature codes that must be removed: 595171, 595193, 595244, 595267

### **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 101**

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

<b>Off</b> - Indicates a 0 is set in for this parameter						
<b>On</b> - 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 valued specified by **TEM\_PTO\_Veh\_Spd\_DisEng\_Limit**.

**Table 102**

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 – \*These parameters are not recommended to be set if you have a non-clutched type PTO.**

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 103

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 about the value set by **TEM\_PTO\_Veh\_Spd\_Alarm\_Limit**.

**Table 104 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 104 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 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 ESC 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 ESC 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 105

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 ICAP or 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 ground wire for the air solenoid.
- A second wire must be connected from the Bodybuilder installed PTO feedback switch (ground 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 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 ICAP or the Diamond Logic™ Builder software to determine the location of the in-cab switch.

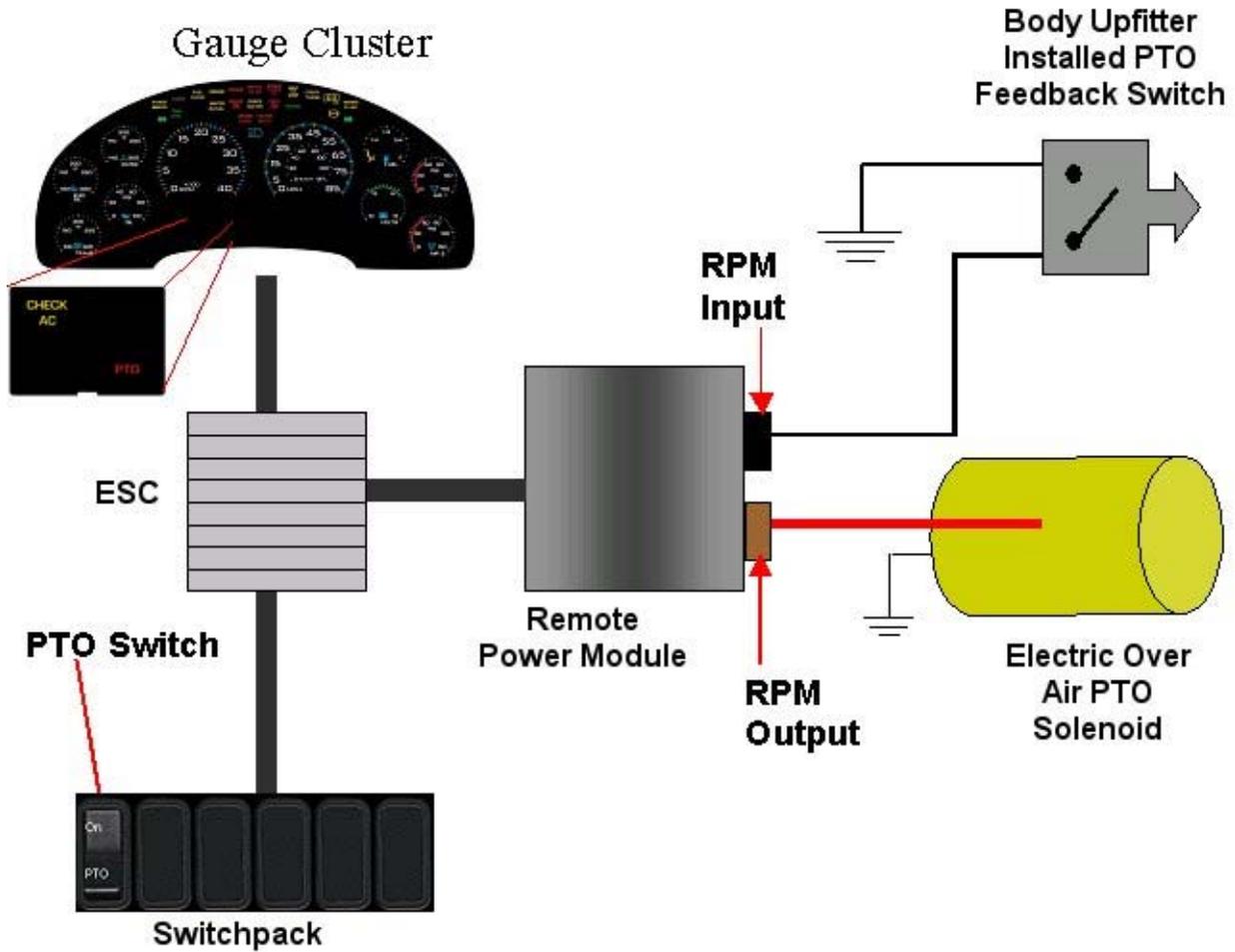


Figure 120 Overview of Electric Over Air (Non-Clutched) PTO System

**RPM CONNECTOR INFORMATION**

**\*\* HPV kits are REQUIRED to allow Body Builders to wire in and out of the Remote Power Module connectors.**

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

**Table 106**

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 Remote Power Modules.**

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 harness.

**Table 107 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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	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

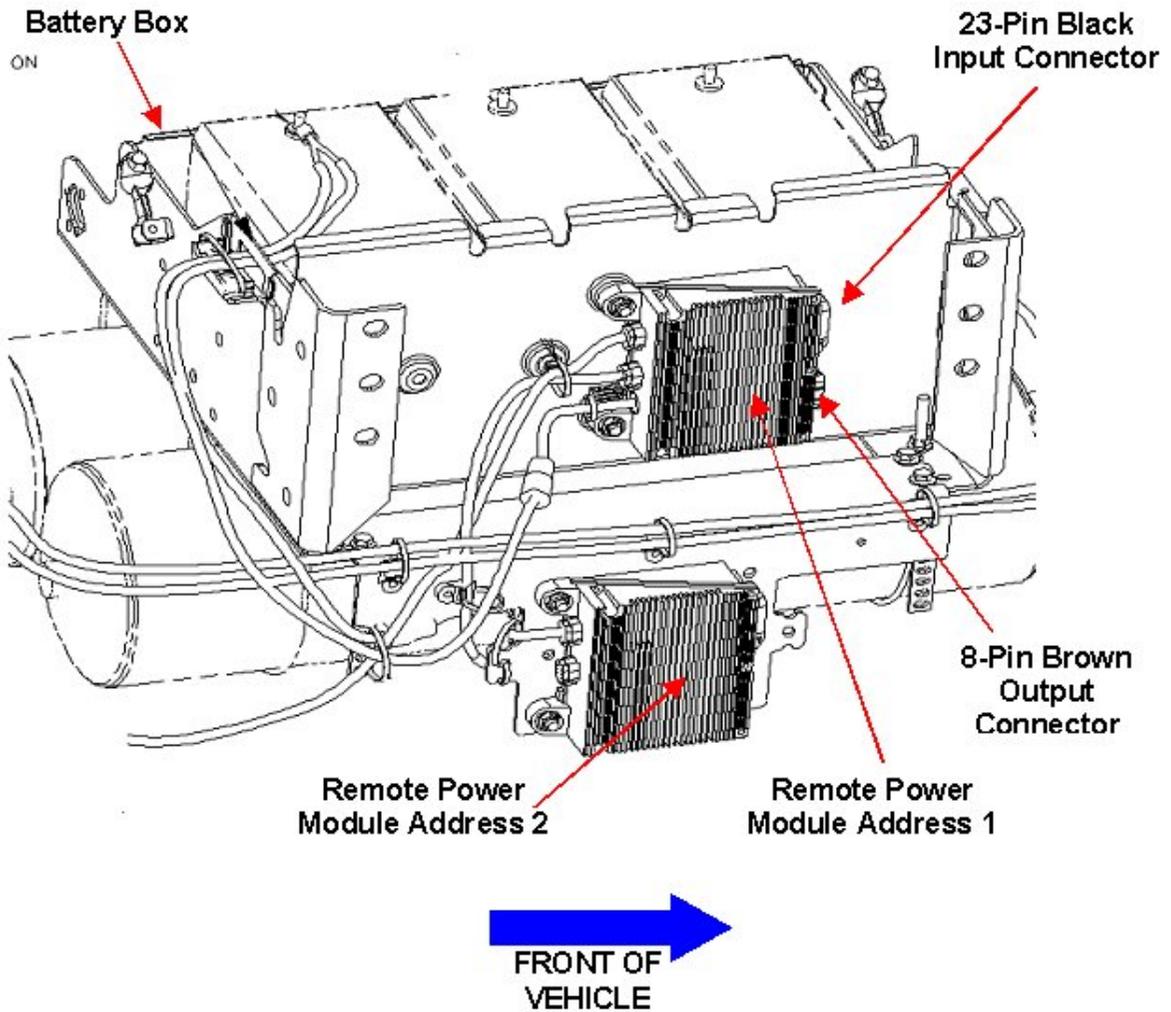
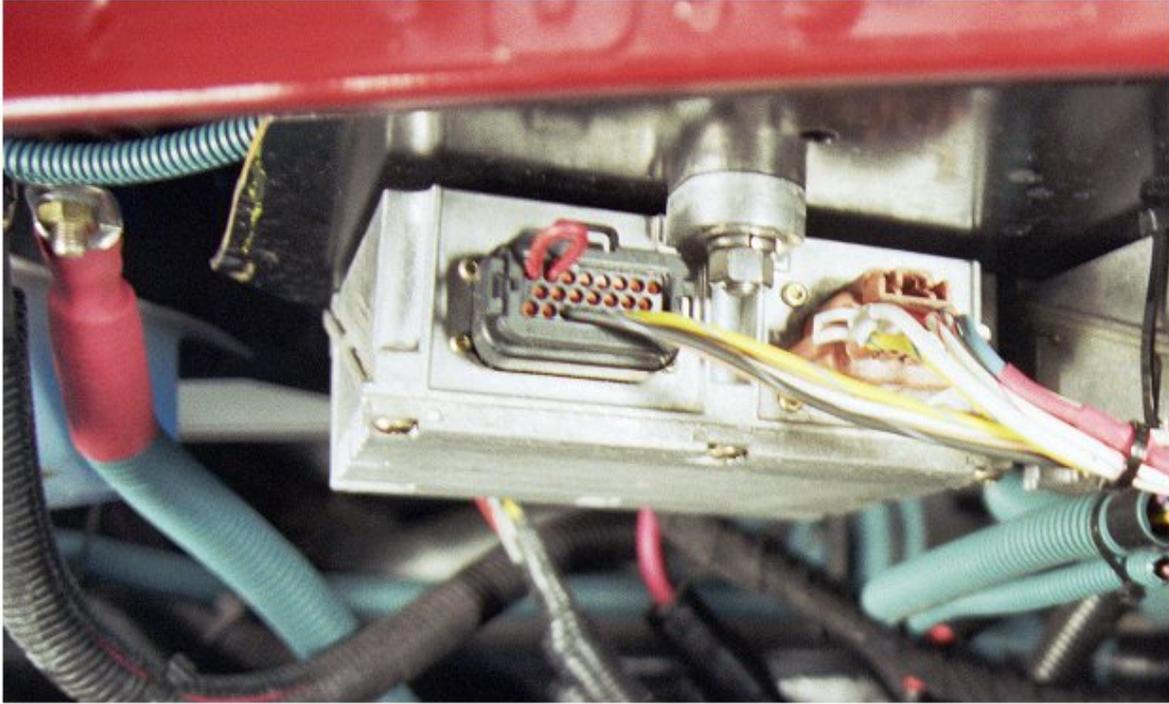


Figure 121 RPM Mounting Location on a 4000 Model Truck

→ **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 Remote Power Module Input labeled PTO\_Feedback\_Switch (Pin position specified by ICAP or the Diamond Logic™ Builder software) is receiving the correct voltage (12V or Ground) as specified by the customer in ICAP or 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 595170, 595179, 595252, and 595248 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer).

- 
- Use ICAP or the Diamond Logic™ Builder software to make sure that software feature codes 595171, 595193, 595244, and 595267 are NOT enabled on the vehicle (see Local Dealer)
  - Set the desired programmable parameters for each signal using ICAP or 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 Bodybuilder-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.

## 15.5. 60ABL — PTO ACCOMMODATION ELECTRIC OVER AIR CLUTCHED

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module Input and 1 Output)

**FEATURE/BODY FUNCTION:** This feature provides a latched switch in the in-cab switch-pack to drive a Remote Power Module output that provides power to engage and disengage the Electric over Air, Clutched PTO. A Remote Power Module 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, you 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 ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software. Body Builders must set programmable parameters that are appropriate for their PTO application.

Required software feature codes: 595170, 595179, 595248, 595244

Software feature codes that must be removed: 595171, 595193, 595252, 595267

### 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 108**

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

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	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 109

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 110**

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 111 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 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 ESC 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 ESC 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 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_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 ICAP or 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 ground wire for the air solenoid.
- A second wire must be connected from the Bodybuilder installed PTO feedback switch (ground 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 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.

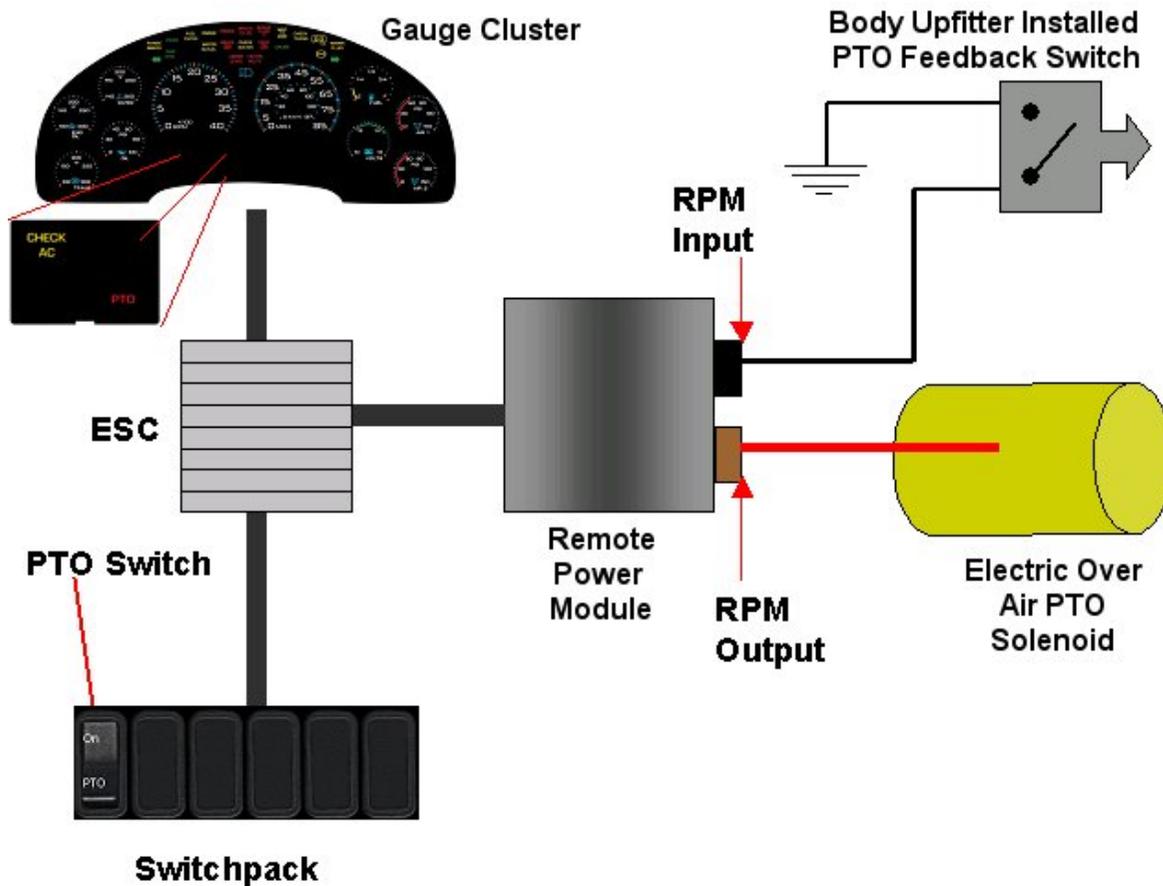


Figure 123 Overview of Electric Over Air (Clutched) PTO System

**RPM CONNECTOR INFORMATION**

**\*\* HPV kits are REQUIRED to allow Body Builders to wire in and out of the Remote Power Module connectors.**

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

**Table 113**

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 Remote Power Modules.**

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 harness.

**Table 114 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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	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

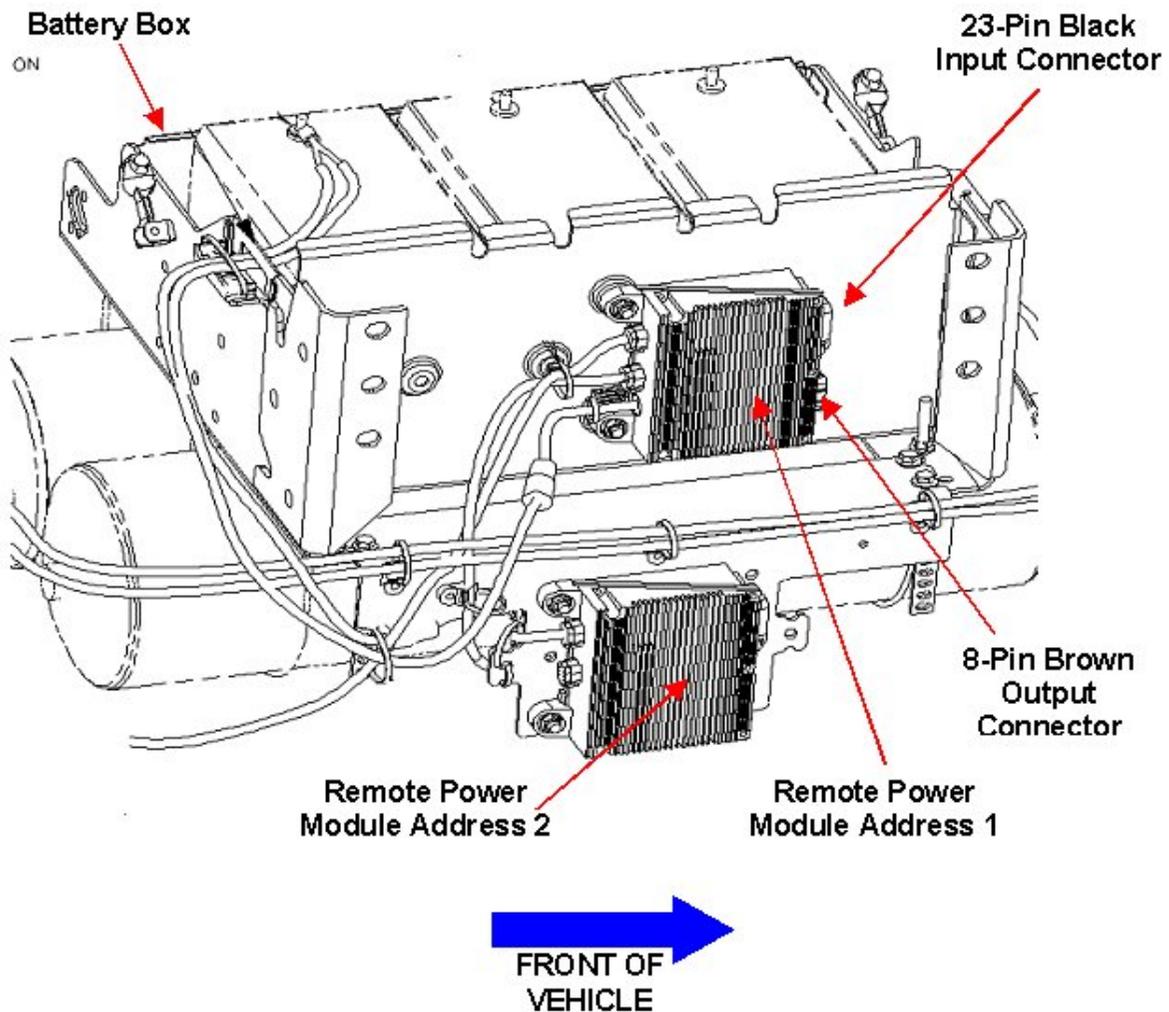


Figure 124 RPM Mounting Location on a 4000 Model Truck

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

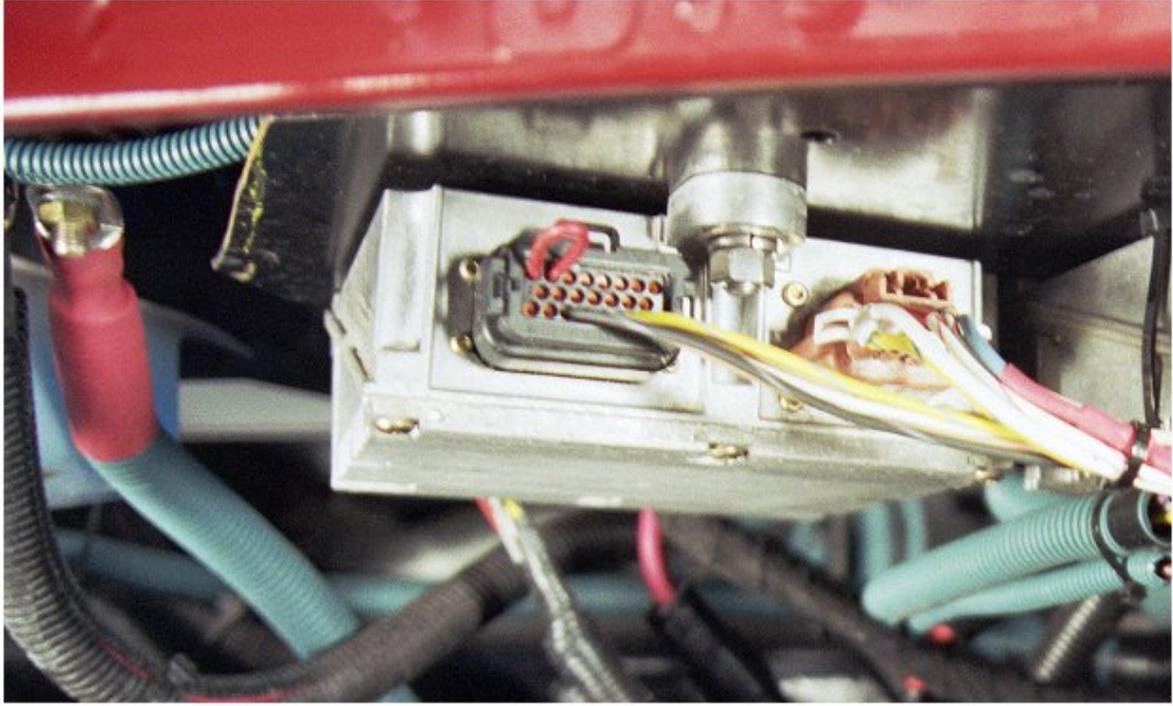


Figure 125 RPM Mounting Location on a 7000 Model Truck

### **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 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 ICAP or the Diamond Logic™ Builder software) is receiving the correct voltage (12V or Ground) as specified by the customer in ICAP or 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 595170, 595179, 595244, and 595248 must be enabled on the vehicle using ICAP or the Diamond Logic™ Builder software (see Local Dealer).

- Use ICAP or the Diamond Logic™ Builder software to make sure that software feature codes 595171, 595193, 595252, and 595267 are NOT enabled on the vehicle (see Local Dealer)
- Set the desired programmable parameters for each signal using ICAP or 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 Bodybuilder-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.

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## 15.6. 13XAA — PTO CONTROL

**FEATURE CODE DESCRIPTION:** 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: 595080, 595179, and 595267

Software feature codes that must be removed: 595171, 595193, 595252, 595244, and 595248

### **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 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_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 116**

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

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_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 117**

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

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_ 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**

**\*\*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.

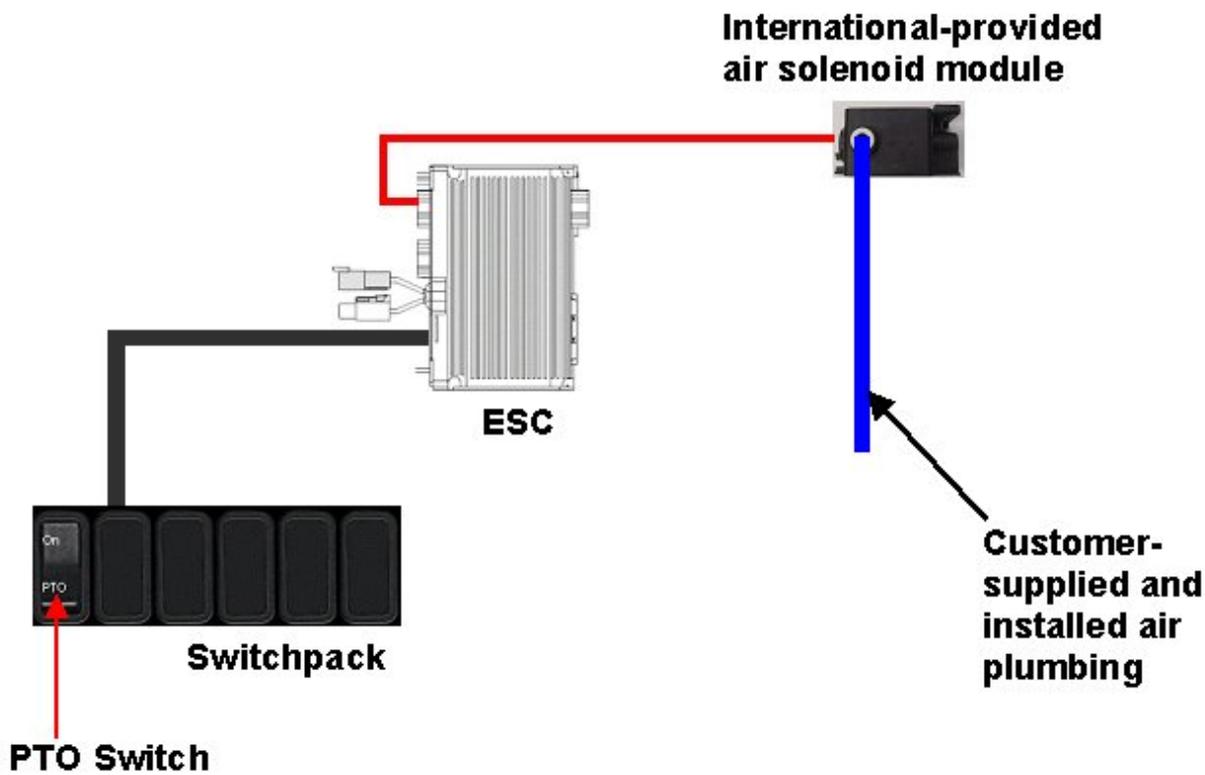


Figure 126

**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 ESC pin labeled Air\_Solenoid\_Power (Pin A of the Blue ESC “Chassis” connector # 4008) is providing battery voltage.
4. Verify that the International-provided air solenoid is supplying air pressure at the solenoid output.

**HOW TO ADD THIS FEATURE:**

- Software Feature Codes 595080, 595179, and 595267 must be added to the truck using ICAP or the Diamond Logic™ Builder software.
- Software feature codes 595171, 595193, 595252, 595244, and 595248 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 ICAP or the Diamond Logic™ Builder software.
- If the truck already has a 4-pack or a 7-pack of solenoids, the customer should order another air solenoid (P/N 2506711C91) and install it in the next location on the solenoid pack.

- If the truck does not already have a 4-pack or 7-pack, the customer should order a 4-pack bracket (P/N 2505594C1) and an air solenoid (P/N 2506711C91).

## 15.7. 16WLM — PTO HOURMETER

**FEATURE CODE DESCRIPTION:** 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 Ga. Lt Gn - 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: 595266 and 595248

Software Feature Codes that must NOT be enabled: 595145

The **ESC\_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 118**

Parameter	ID	Description	Default	Units	Min	Max	Step
ESC_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.

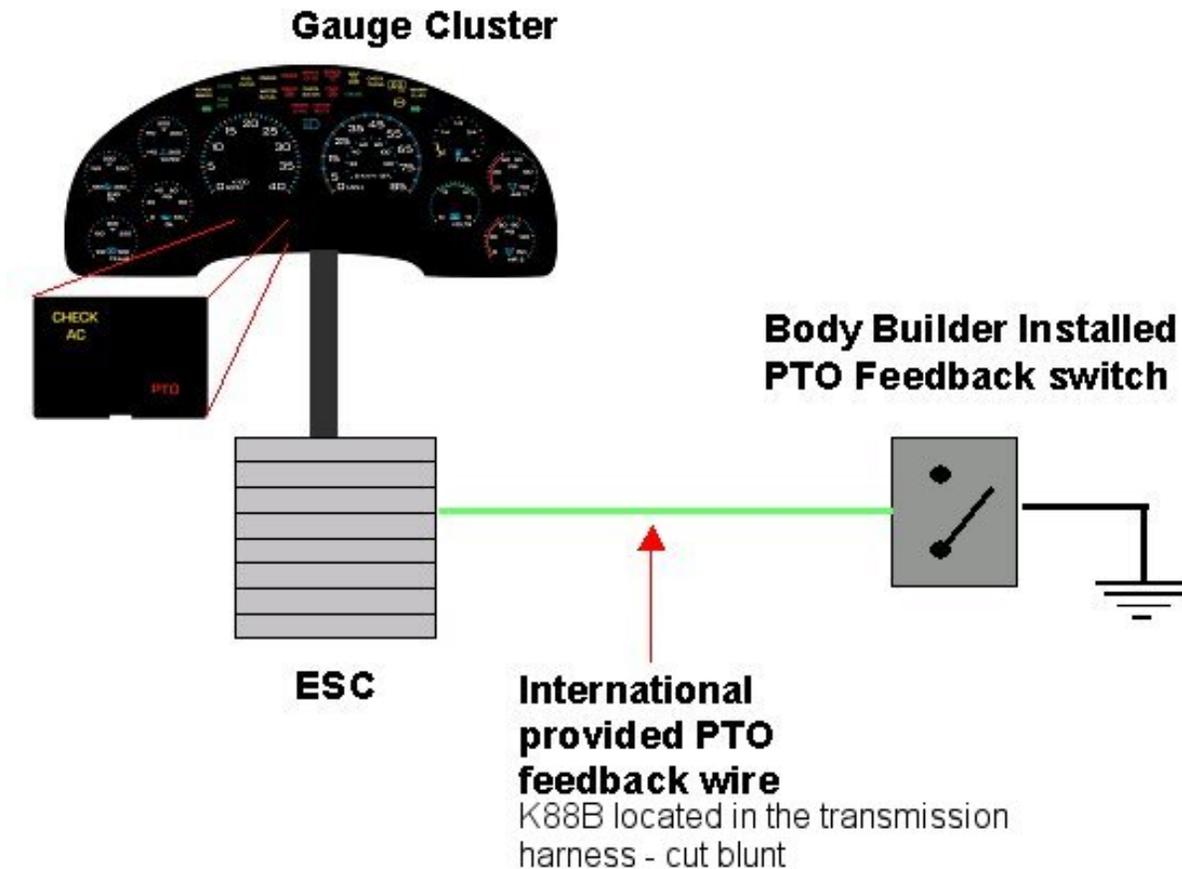


Figure 127

**TESTING**

1. Customer should apply the correct active state voltage (As programmed in ICAP or 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 595266 using ICAP or the Diamond Logic™ Builder software.
- The customer must make sure that software feature code 595145 is NOT enabled using ICAP or the Diamond Logic™ Builder software.
- The customer must set the ESC\_PTO\_Engaged\_Param to the desired active state for the PTO feedback switch.
- Customer must install a wire from the ESC pin labeled **ESC\_PTO\_Engaged\_Switch\_Raw** (Pin 3 on the 36-pin ESC connector #4004) to the PTO feedback switch.

## 16. REMOTE THROTTLE

### 16.1. 60AJA — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — RECOVERY ONLY

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module input)

**FEATURE/BODY FUNCTION:** This feature provides the operator of **Recovery** applications with external control of the engine speed with a customer-mounted switch. Activation of a customer-installed switch increases the engine speed to the first preset value. This feature utilizes one pin on the Black 23-pin Remote Power Module input connector (Use ICAP or the Diamond Logic™ Builder software to determine correct pin location). The ESC reads the voltage on this input pin and communicates the correct action to the Engine Control Module. This code is offered to add additional functionality and to provide a simpler alternative to the hardwired Remote Engine Speed Controls offered by 12VVW or 12VYC. Use customer supplied single pull, double throw, center stable, momentary switch. All remote throttle switches and associated wiring should be customer supplied. Feature code 12VXU is required to program the engine for the desired mode of engine speed control. This option is only useable when Vehicle Speed is 0 Mph and Park Brake is applied.

**60AJA Default Switch Action:** Applying 12 volts on the Remote Power Module input ramps the engine to first preset speed. Applying ground on the Remote Power Module input returns the engine to idle.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595172

Software feature codes that must be removed: 595241, 595240, 595196, 595263

**Table 119**

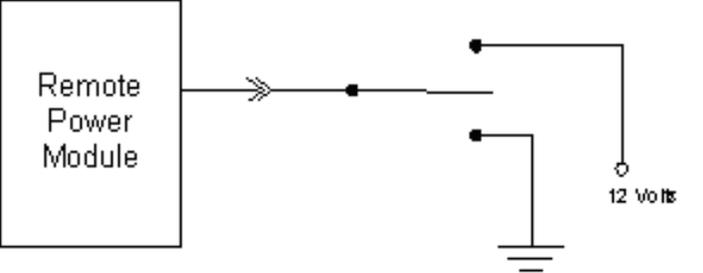
Off - Indicates a 0 is set in for this parameter							
On - Indicates a 1 is set for the parameter							
Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Ext_Eng_Speed_Control_Mode	2035	This parameter sets the mode of operation for the TEM External Engine Speed Control feature.	1	List	0	3	1
TEM_Ext_Eng_Spd_Ctrl_Active_State	2158	This is the active state for the external engine speed control switch.	3	List	List	List	List

**TEM\_Ext\_Eng\_Spd\_Control\_Mode**

This parameter controls the mode in which the engine speed control feature operates. The setting of this parameter depends upon the type of switch that will be controlling the engine speed and the speed control action that is desired. The mode is described in terms of what the engine will do based on what state is on the Remote Power Module Input. The valid states on an RPM input are:

- Ground – The input is connected to ground through a switch
- Floating – The input is not connected to anything
- 12 Volts – The input is connected to 12 Volts through a switch

**Table 120**

Setting	Mode Explanation	Diagram
1	<p>In this mode, the feature will be expecting the switch to be a center stable momentary up/down switch wired as shown in the diagram. When the remote power module input is pulled to 12 Volts (switch is in the up position on the diagram), the engine speed will ramp to engine preset 1. When the remote power module input is pulled to ground (switch is in the down position on the diagram), the engine speed will return to idle. When the switch is left in the center stable position (as it is presently shown in the diagram) no action will occur. E.g. if the engine was already ramped, it will stay ramped, and if the engine was at idle, it would stay at idle.</p>	 <p>The diagram illustrates a center-stable momentary switch connected to a Remote Power Module. The switch has three positions: up, center, and down. The up position connects the Remote Power Module input to a 12 Volt source. The down position connects the Remote Power Module input to ground. The center position leaves the Remote Power Module input floating.</p>

**TEM\_Ext\_Eng\_Spd\_Ctrl\_PTO\_Ilock**

\*This parameter can only be used on vehicles that have an International PTO feature. If this parameter is set, the remote engine speed control will be interlocked to PTO. 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.

**TEM\_Ext\_Eng\_Spd\_Ctrl\_Active\_State**

This parameter tells the engine control feature what state to look for on the remote power module input. This parameter setting is only used when TEM\_Ext\_Eng\_Spd\_Control\_Mode is set to 2, or 3. The valid settings for this parameter are:

Table 121

Setting	Active State
0	Floating (the plunger provides a floating input to the remote power module when depressed. This setting is not recommended)
1	Ground (the plunger provides a ground to the remote power module input when depressed)
3	12 Volts (the plunger provides 12 Volts to the remote power module input when depressed)

The engine speed control will only operate when the vehicle is stopped with the park brake applied and the transmission in neutral. The increased engine speed will be cancelled if any of these conditions are not met or if:

- The cruise disable switch is depressed
- The brake pedal is depressed
- The clutch is depressed (if present)

### WIRING INFORMATION

- Customer provides a remote-mounted, center-stable, momentary switch that is wired into the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Black 23-pin input connector on the Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin location). This switch should be 12V in one momentary position and ground in the other momentary position.

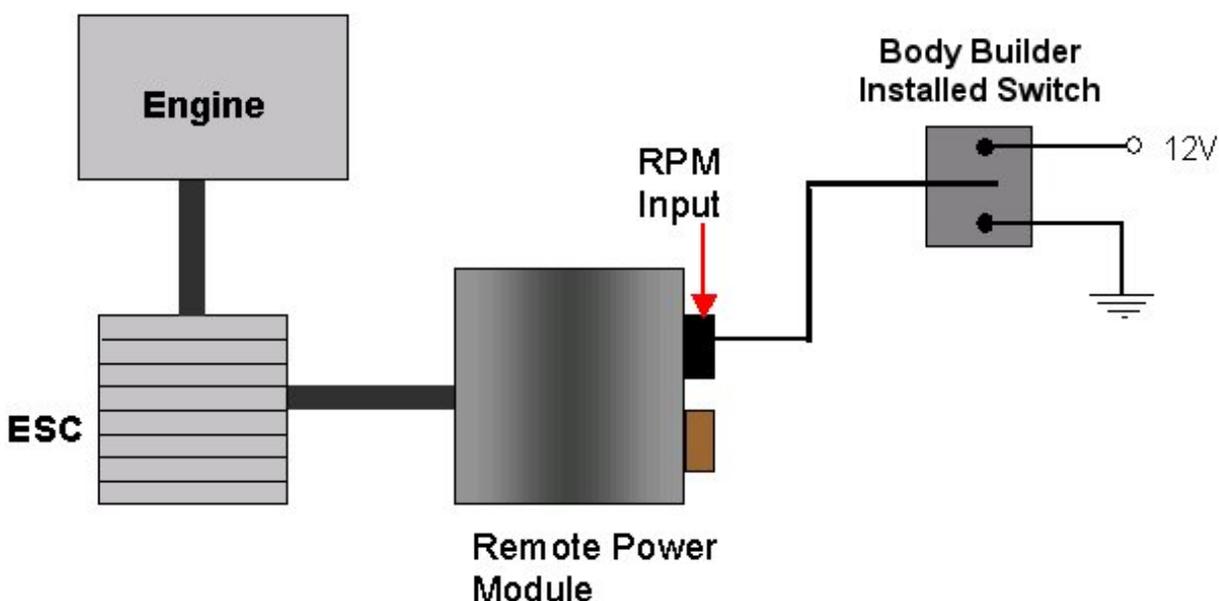


Figure 128

**TESTING**

1. Start vehicle.
2. Activate the Remote Engine Speed Control Switch (Close switch to active input condition that has been programmed, i.e. 12 volts or Ground).
3. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground as long as the switch is closed).
4. Verify that the engine ramps to the first preset speed.
5. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
6. Deactivate the Remote Engine Speed Control switch (Release Ground).
7. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software) is an open circuit.
8. Verify that the engine returns to idle.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595172 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that software feature codes 595241, 595240, 595196, and 595263 are removed from the vehicle (See Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to determine which pin on the Black 23-pin Remote Power Module input connector has been assigned to Remote Engine Speed Control
- Customer must install a remote-mounted switch to control Engine Speed and a wire that runs from the switch to the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Remote Power Module input connector.

## 16.2. 60AJE — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module input)

**FEATURE/BODY FUNCTION:** This feature is a general purpose Remote Throttle feature to be used on all applications. The customer can achieve temporary Remote Engine Speed Control using a pressure switch or a momentary switch. The customer can also achieve permanent engine speed control by using a latched switch. As long as the input is active, the engine will ramp up to the first engine pre-set speed. When the switch is released, the engine speed returns to normal idle. This input is interlocked with park brake so that the customer can only use this option when the park brake is applied and the vehicle is stopped. This feature utilizes one pin on the Black 23-pin Remote Power Module input connector (Use ICAP or the Diamond Logic™ Builder software to determine correct pin location). The ESC reads the voltage on this input pin and communicates the correct action to the Engine Control Module. This code is offered to add additional functionality and to provide a simpler alternative to the hardwired Remote Engine Speed Controls offered by 12VVW or 12VYC. All remote throttle switches and associated wiring should be customer supplied. Feature code 12VXU is required to program the engine for the desired mode of engine speed control.

**60AJE Default Switch Action:** When ground is applied to the Remote Power Module input, the engine ramps to the first preset speed and maintains that speed as long as the input is held at ground. Removing ground from the Remote Power Module input returns the engine to idle.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595241

Software feature codes that must be removed: 595172, 595240, 595196, 595263

**Table 122**

Parameter	ID	Description	Default	Units	Min	Max	Step
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	3	List

The engine speed control will only operate when the vehicle is stopped with the park brake applied and the transmission in neutral. The increased engine speed will be cancelled if any of these conditions are not met or if:

- The cruise disable switch is depressed
- The brake pedal is depressed
- The clutch is depressed (if present)

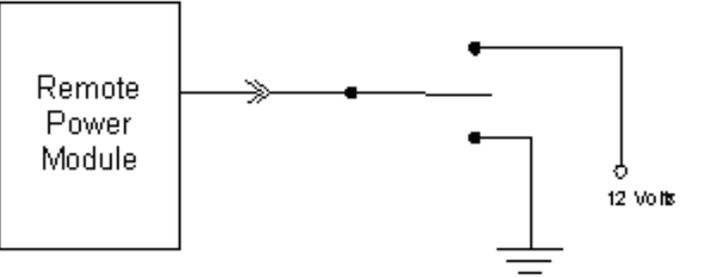
**TEM\_Ext\_Eng\_Spd\_Control\_Mode**

This parameter controls the mode in which the engine speed control feature operates. The setting of this parameter depends upon the type of switch that will be controlling the engine speed and the speed control action that is desired. The mode is described in terms of what the engine will do based on what state is on the Remote Power Module Input. The valid states on an RPM input are:

- Ground – The input is connected to ground through a switch
- Floating – The input is not connected to anything
- 12 Volts – The input is connected to 12 Volts through a switch

There are 4 different settings for this programmable mode parameter

**Table 123**

Setting	Mode Explanation	Diagram
0	This mode disables the remote engine speed control. Use this if the feature is not desired.	NA
1	In this mode, the feature will be expecting the switch to be a center stable momentary up/down switch wired as shown in the diagram. When the remote power module input is pulled to 12 Volts (switch is in the up position on the diagram), the engine speed will ramp to engine preset 1. When the remote power module input is pulled to ground (switch is in the down position on the diagram), the engine speed will return to idle. When the switch is left in the center stable position (as it is presently shown in the diagram) no action will occur. E.g. if the engine was already ramped, it will stay ramped, and if the engine was at idle, it would stay at idle.	

Setting	Mode Explanation	Diagram
2	<p>In this mode, the feature will be expecting a momentary (not latched) type switch. When the switch is depressed and released, the engine will ramp to engine preset 1. When the switch is depressed and released again, the engine will return to idle. There are two different connection diagrams shown for the two possible active states of the input. The selecting of the active state is done with the active state parameter explained below.</p>	
3	<p><b>THIS IS THE DEFAULT SWITCH ACTION!</b> In this mode the feature will be expecting a momentary (not latched) type plunger switch or a momentary pressure switch. When the plunger is depressed, the engine will ramp to engine preset 1 for as long as the plunger is held. When the plunger is released, the engine speed will return to idle. There are two different connection diagrams shown for the two possible active states of the input. The selecting of the active state is done with the active state parameter explained below.</p>	

**TEM\_Ext\_Eng\_Spd\_Ctrl\_PTO\_Ilock**

This parameter can only be used on vehicles that have an International PTO feature.

If this parameter is set, the remote engine speed control will be interlocked to PTO. 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.

**TEM\_Ext\_Eng\_Spd\_Ctrl\_Active\_State**

This parameter tells the engine control feature what state to look for on the remote power module input. This parameter setting is only used when TEM\_Ext\_Eng\_Spd\_Control\_Mode is set to 2, or 3. The valid settings for this parameter are:

Table 124

Setting	Active State
0	Floating (the plunger provides a floating input to the remote power module when depressed. This setting is not recommended)
1	Ground (the plunger provides a ground to the remote power module input when depressed)
3	12 Volts (the plunger provides 12 Volts to the remote power module input when depressed)

### WIRING INFORMATION

- Customer provides a ground active switch that is wired into the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Black 23-pin input connector on the Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin location).

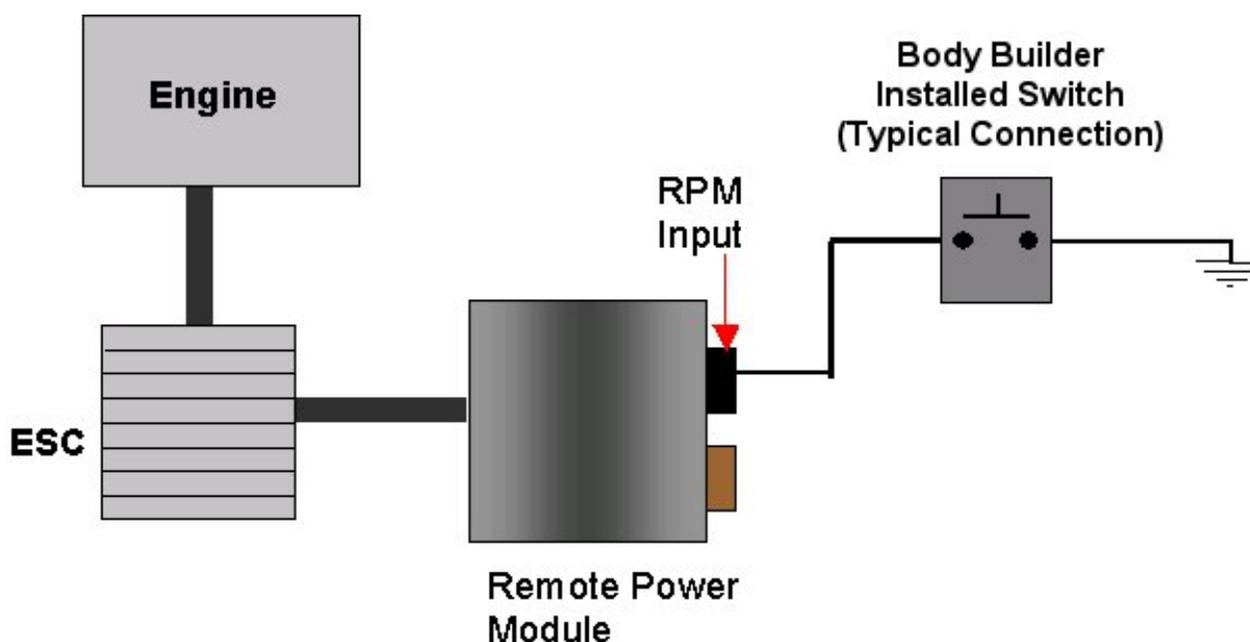


Figure 129

### TESTING

1. Start vehicle.
2. Activate the Remote Engine Speed Control Switch (Close switch to active input condition that has been programmed; i.e., 12 volts or Ground).
3. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground as long as the switch is closed).
4. Verify that the engine ramps to the first preset speed.

5. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
6. Deactivate the Remote Engine Speed Control switch (Release Ground).
7. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software) is an open circuit.
8. Verify that the engine returns to idle.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595241 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that software feature codes 595172, 595240, 595196, and 595263 are removed from the vehicle (See Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to determine which pin on the Black 23-pin Remote Power Module input connector has been assigned to Remote Engine Speed Control
- Customer must install a remote-mounted switch to control Engine Speed and a wire that runs from the switch to the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Remote Power Module input connector.

### 16.3. 60AJG — REMOTE THROTTLE CONTROL PROGRAMMABLE MODE FOR VARIOUS SWITCH ACTIONS

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module input)

**FEATURE/BODY FUNCTION:** This feature provides the operator of **Utility applications** with external control of the engine speed with a customer-mounted switch. Activation of a customer-installed switch increases the engine speed to the first preset value. This feature utilizes one pin on the Black 23-pin Remote Power Module input connector (Use ICAP or the Diamond Logic™ Builder software to determine correct pin location). The ESC reads the voltage on this input pin and communicates the correct action to the Engine Control Module. Use customer supplied single pull, double throw, center stable, momentary switch. This code is offered to add additional functionality and to provide a simpler alternative to the hardwired Remote Engine Speed Controls offered by 12VWV or 12VYC. All remote throttle switches and associated wiring should be customer supplied. Feature code 12VXU is required to program the engine for the desired mode of engine speed control. This option is only useable when Vehicle Speed is 0 Mph and Park Brake is applied.

**60AJG Default Switch Action:** Applying momentary ground to the Remote Power Module ramps engine to first preset speed. Applying momentary ground a second time returns engine to idle.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595240

Software feature codes that must be removed: 595241, 595172, 595196, 595263

**Table 125**

Parameter	ID	Description	Default	Units	Min	Max	Step
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	List	List	List

The engine speed control will only operate when the vehicle is stopped with the park brake applied and the transmission in neutral. The increased engine speed will be cancelled if any of these conditions are not met or if:

- The cruise disable switch is depressed
- The brake pedal is depressed
- The clutch is depressed (if present)

#### **TEM\_Ext\_Eng\_Spd\_Control\_Mode**

This parameter controls the mode in which the engine speed control feature operates. The setting of this parameter depends upon the type of switch that will be controlling the engine speed and the speed control action that is desired. The mode is described in terms of what the engine will do based on what state is on the Remote Power Module Input. The valid states on an RPM input are:

- Ground – The input is connected to ground through a switch
- Floating – The input is not connected to anything
- 12 Volts – The input is connected to 12 Volts through a switch

Table 126

Setting	Mode Explanation	Diagram
2	In this mode, the feature will be expecting a momentary (not latched) type switch. When the switch is depressed and released, the engine will ramp to engine preset 1. When the switch is depressed and released again, the engine will return to idle. There are two different connection diagrams shown for the two possible active states of the input. The selecting of the active state is done with the active state parameter explained below.	

### TEM\_Ext\_Eng\_Spd\_Ctrl\_PTO\_Ilock

This parameter can only be used on vehicles that have an International PTO feature.

If this parameter is set, the remote engine speed control will be interlocked to PTO. 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.

### TEM\_Ext\_Eng\_Spd\_Ctrl\_Active\_State

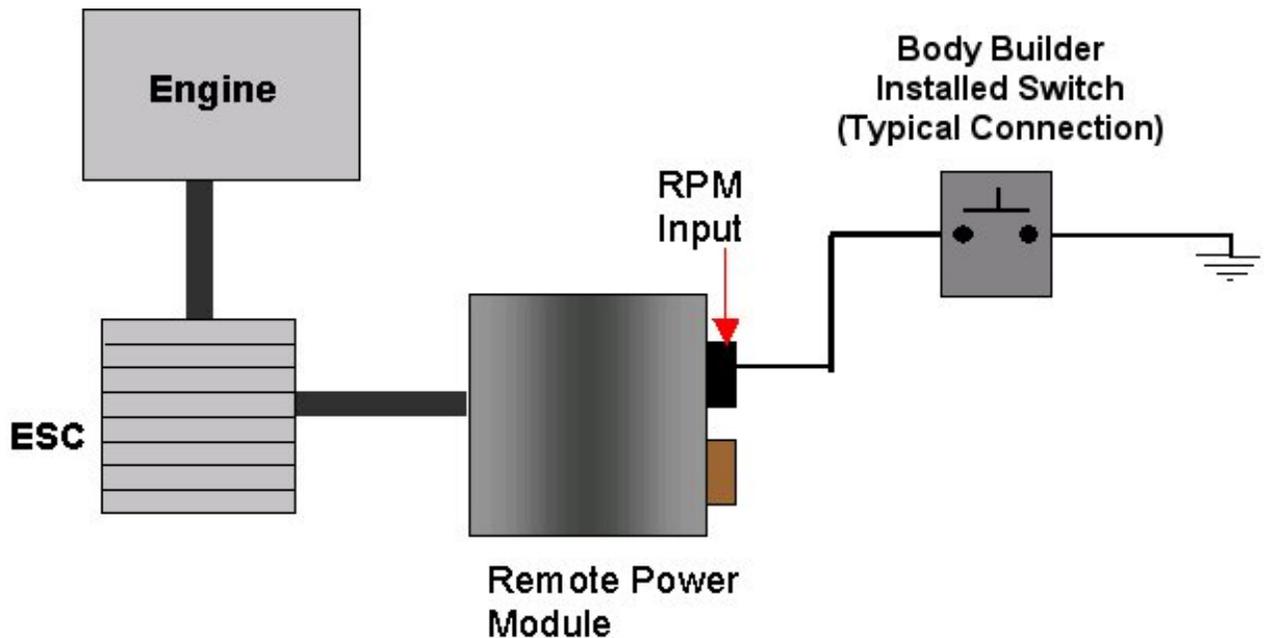
This parameter tells the engine control feature what state to look for on the remote power module input. This parameter setting is only used when TEM\_Ext\_Eng\_Spd\_Control\_Mode is set to 2, or 3. The valid settings for this parameter are:

Table 127

Setting	Active State
0	Floating (the plunger provides a floating input to the remote power module when depressed. This setting is not recommended)
1	Ground (the plunger provides a ground to the remote power module input when depressed)
3	12 Volts (the plunger provides 12 Volts to the remote power module input when depressed)

## WIRING INFORMATION

- Customer provides a ground active momentary switch that is wired into the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Black 23-pin input connector on the Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin location).



**Figure 130**

### **TESTING**

1. Start vehicle.
2. Activate the Remote Engine Speed Control Switch (Close switch to active input condition that has been programmed; i.e., 12 volts or Ground).
3. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground as long as the switch is closed).
4. Verify that the engine ramps to the first preset speed.
5. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
6. Deactivate the Remote Engine Speed Control switch (Release Ground).
7. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software) is an open circuit.
8. Verify that the engine returns to idle.

### **HOW TO ADD THIS FEATURE:**

- Select software feature code 595240 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that software feature codes 595241, 595172, 595196, and 595263 are removed from the vehicle (See Local Dealer)

- Use ICAP or the Diamond Logic™ Builder software to determine which pin on the Black 23-pin Remote Power Module input connector has been assigned to Remote Engine Speed Control
- Customer must install a remote-mounted switch to control Engine Speed and a wire that runs from the switch to the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Remote Power Module input connector.

## 16.4. 60AJH — REMOTE THROTTLE CONTROL FOR DUAL FUNCTION ENGINE RUNNING / EMERGENCY POWER ENGINE OFF

**FEATURE CODE DESCRIPTION:** BDY INTG, THROTTLE CONTROL for Dual Function Input, for Utility Applications, Remote Throttle Control When Engine is Running, and Activating an Output for Emergency Power When the Engine is Not Engaged; Useable Only When Vehicle is Stopped and Park Brake is Applied (requires 1 Remote Power Module input and 1 Remote Power Module output)

**FEATURE/BODY FUNCTION:** This feature allows a customer to mount a remote switch (ground active), wired into an input on the Remote Power Module for a throttle control when the engine is running, and to activate a Remote Power Module output to drive a relay that activates an emergency pump when the engine is not running. This feature is interlocked with vehicle speed and park brake so that the feature is only useable when the vehicle is stopped and the park brake is applied. **A momentary switch closure to ground ramps engine to first preset speed. Second switch closure to ground returns engine to idle. With engine off, a switch closure to ground engages an RPM output to control an emergency pump motor.**

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595196

Conflicts with Software features: 595241, 595240, 595172, 595263

The **TEM\_Emergency\_Pump\_Fuse** parameter is the value at which the ESC will fuse the output that drives the emergency pump in combination with the Remote Engine Speed Control emergency pump feature. The ESC will shut off the Remote Power Module output if the current flowing through that output exceeds the value set by this parameter.

**Table 128**

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 RESC emergency pump feature.	20	A	0	20	0.1

### WIRING INFORMATION

- Customer provides a remote-mounted switch that is wired into the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Black 23-pin input connector on the Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin location).
- Customer provides the wiring from the pin labeled UTILITY\_EMERGENCY\_PUMP\_Output on the Brown 8-pin Remote Power Module output connector, to a customer-supplied relay. From that relay, a wire runs to the emergency pump (See ICAP or the Diamond Logic™ Builder software for correct pin location).

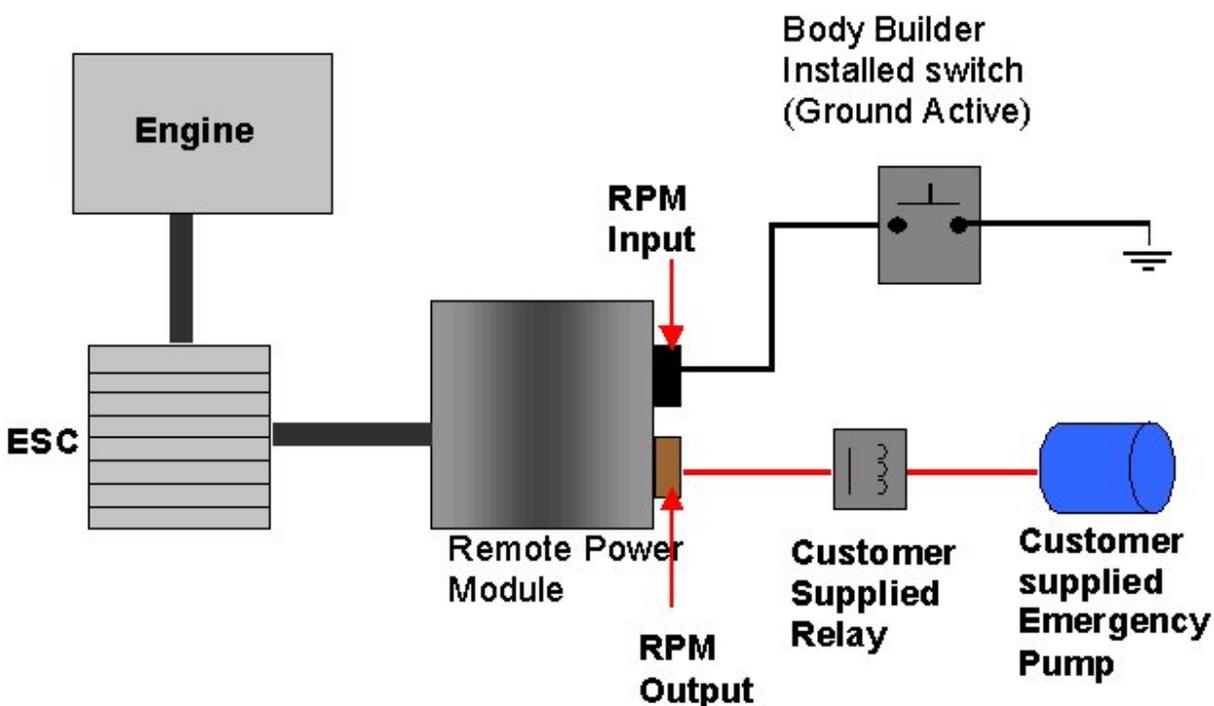


Figure 131

### RPM CONNECTOR INFORMATION

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

Table 129

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

**Table 130 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 Ga. 3535931C1 - 14 Ga. 3535930C1 - 16 & 18 Ga.	Included
Cable Seal Part	3548945C1 - 12 & 14 Ga. 3535937C1 - 16 & 18 Ga.	N/A
Connector Lock Part	3548943c1	N/A

**Table 130 8–Way RPM Output Connector (Brown) and 23-Way RPM Input Connector (Black) (cont.)**

Connector Part No.	3548934C1	2585981c91
CPA Lock	3573833c1	N/A
Cavity Plug	3535938c1	Included

**TESTING**

1. Start vehicle.
2. Activate the Remote Engine Speed Control Switch.
3. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground).
4. Verify that the engine ramps to the first preset speed.
5. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
6. Deactivate the Remote Engine Speed Control switch.
7. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground).
8. Verify that the engine returns to idle.
9. Shut off engine.
10. Press and hold the Remote Engine Speed Control Switch.
11. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground).
12. Verify that the Remote Power Module output pin labeled UTILITY\_EMERGENCY\_PUMP\_Output is providing the correct battery voltage (As set in programmable parameter).
13. Verify that the Emergency Pump works.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595196 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that software feature codes 595241, 595240, 595172, and 595263 are removed from the vehicle (See Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to determine which pin on the Black 23-pin Remote Power Module input connector has been assigned to Remote Engine Speed Control switch input.
- Connect the customer-mounted switch to the specified Remote Power Module input pin.

- Check with ICAP or the Diamond Logic™ Builder software to determine what pin in the Brown 8-pin connector has been assigned to the Emergency pump output for the Remote Engine Speed Control with Emergency pump feature.
- Connect the emergency pump to the specified Remote Power Module output pin.

## 16.5. 60AJJ — REMOTE THROTTLE CONTROL INTERLOCKED TO PARK BRAKE APPLIED — REFUSE

**FEATURE CODE DESCRIPTION:** 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 1 Remote Power Module input).

**FEATURE/BODY FUNCTION:** This feature provides the operator of Refuse applications with external control of the engine speed with a customer-mounted switch. Activation of a customer-installed switch increases the engine speed to the first preset value. This feature utilizes one pin on the Black 23-pin Remote Power Module input connector (Use ICAP or the Diamond Logic™ Builder software to determine correct pin location). The ESC reads the voltage on this input pin and communicates the correct action to the Engine Control Module. This code is offered to add additional functionality and to provide a simpler alternative to the hardwired Remote Engine Speed Controls offered by 12VVW or 12VYC. Use customer supplied single pull, double throw, center stable, momentary switch. All remote throttle switches and associated wiring should be customer supplied. Feature code 12VXU is required to program the engine for the desired mode of engine speed control. This option is only useable when Vehicle Speed is 0 Mph and Park Brake is applied.

**60AJJ Default Switch Action:** Applying 12 volts to the Remote Power Module input ramps the engine up to the first preset speed. Engine maintains preset speed only as long as the input is held at 12 volts. Removing 12 volts from the Remote Power Module input returns the engine to idle.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required software feature code: 595263

Software feature codes that must be removed: 595241, 595240, 595196, 595172

**Table 131**

Parameter	ID	Description	Default	Units	Min	Max	Step
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.	3	List	List	List	List

**TEM\_Ext\_Eng\_Spd\_Control\_Mode**

This parameter controls the mode in which the engine speed control feature operates. The setting of this parameter depends upon the type of switch that will be controlling the engine speed and the speed control action that is desired. The mode is described in terms of what the engine will do based on what state is on the Remote Power Module Input. The valid states on an RPM input are:

- Ground – The input is connected to ground through a switch
- Floating – The input is not connected to anything
- 12 Volts – The input is connected to 12 Volts through a switch

**Table 132**

Setting	Mode Explanation	Diagram
3	In this mode the feature will be expecting a momentary (not latched) type plunger switch or a momentary pressure switch. When the plunger is depressed, the engine will ramp to engine preset 1 for as long as the plunger is held. When the plunger is released, the engine speed will return to idle. There are two different connection diagrams shown for the two possible active states of the input. The selecting of the active state is done with the active state parameter explained below.	<p>The diagram illustrates two electrical connection options for a Remote Power Module (RPM) input. In the top diagram, the RPM input is connected to a switch that, when closed, grounds the input. This is labeled 'If Active State is Ground'. In the bottom diagram, the RPM input is connected to a switch that, when closed, connects the input to a 12-volt power source. This is labeled 'If Active State is 12 Volts'.</p>

**TEM\_Ext\_Eng\_Spd\_Ctrl\_PTO\_Ilock**

This parameter can only be used on vehicles that have an International PTO feature.

If this parameter is set, the remote engine speed control will be interlocked to PTO. 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.

**TEM\_Ext\_Eng\_Spd\_Ctrl\_Active\_State**

This parameter tells the engine control feature what state to look for on the remote power module input. This parameter setting is only used when TEM\_Ext\_Eng\_Spd\_Control\_Mode is set to 2, or 3. The valid settings for this parameter are:

**Table 133**

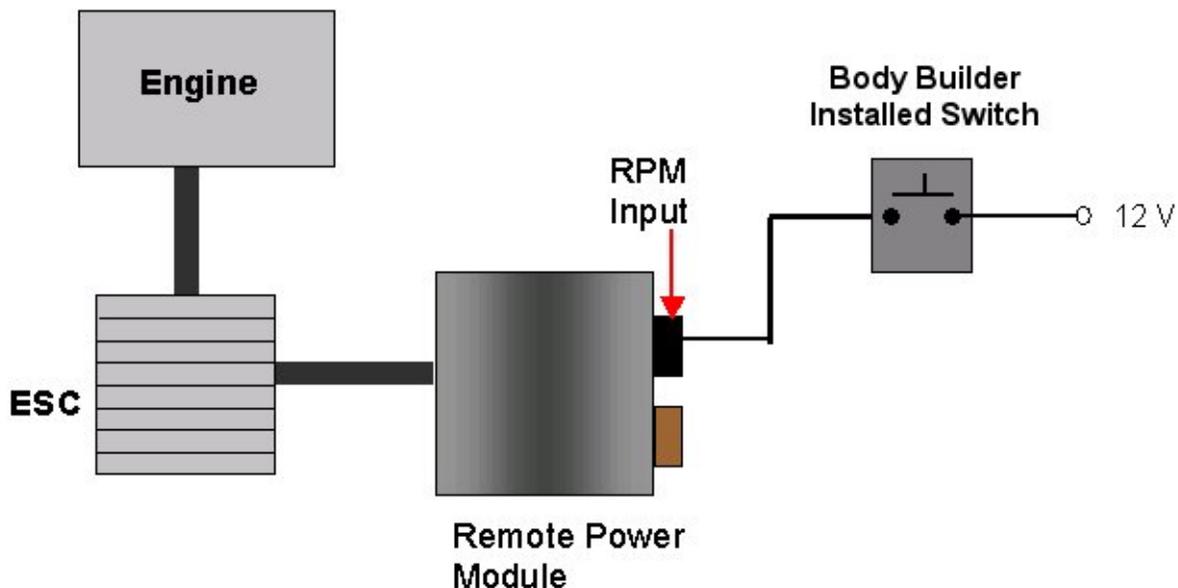
Setting	Active State
0	Floating (the plunger provides a floating input to the remote power module when depressed. This setting is not recommended)
1	Ground (the plunger provides a ground to the remote power module input when depressed)
3	12 Volts (the plunger provides 12 Volts to the remote power module input when depressed)

The engine speed control will only operate when the vehicle is stopped with the park brake applied and the transmission in neutral. The increased engine speed will be cancelled if any of these conditions are not met or if:

- The cruise disable switch is depressed
- The brake pedal is depressed
- The clutch is depressed (if present)

### WIRING INFORMATION

- Customer provides a remote-mounted switch that is wired into the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Black 23-pin input connector on the Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin location).

**Figure 132**

### TESTING

1. Start vehicle.
2. Activate the Remote Engine Speed Control Switch (Close switch to active input condition that has been programmed; i.e., 12 volts or Ground).

3. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software is receiving Ground as long as the switch is closed).
4. Verify that the engine ramps to the first preset speed.
5. If engine does not ramp to the first preset speed, check engine programming to verify that the correct engine speed control parameters are set.
6. Deactivate the Remote Engine Speed Control switch (Release Ground).
7. Verify the Remote Power Module Input labeled Remote\_Engine\_Speed\_Sw\_Input (Pin position specified by ICAP or the Diamond Logic™ Builder software) is an open circuit.
8. Verify that the engine returns to idle.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595263 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that software feature codes 595241, 595240, 595196, and 595172 are removed from the vehicle (See Local Dealer)
- Use ICAP or the Diamond Logic™ Builder software to determine which pin on the Black 23-pin Remote Power Module input connector has been assigned to Remote Engine Speed Control
- Customer must install a remote-mounted switch to control Engine Speed and a wire that runs from the switch to the pin labeled Remote\_Engine\_Speed\_Sw\_Input on the Remote Power Module input connector.

## 17. REMOTE START / STOP

### 17.1. 60ABC — REMOTE START/STOP

Refer to the Circuit Diagram in S08285, Chapter 9, page 31.

**FEATURE CODE DESCRIPTION:** 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 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 ground 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: 595245

Software feature code that must be removed: 595246

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.

**Table 134**

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			

**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 ground 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 135

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

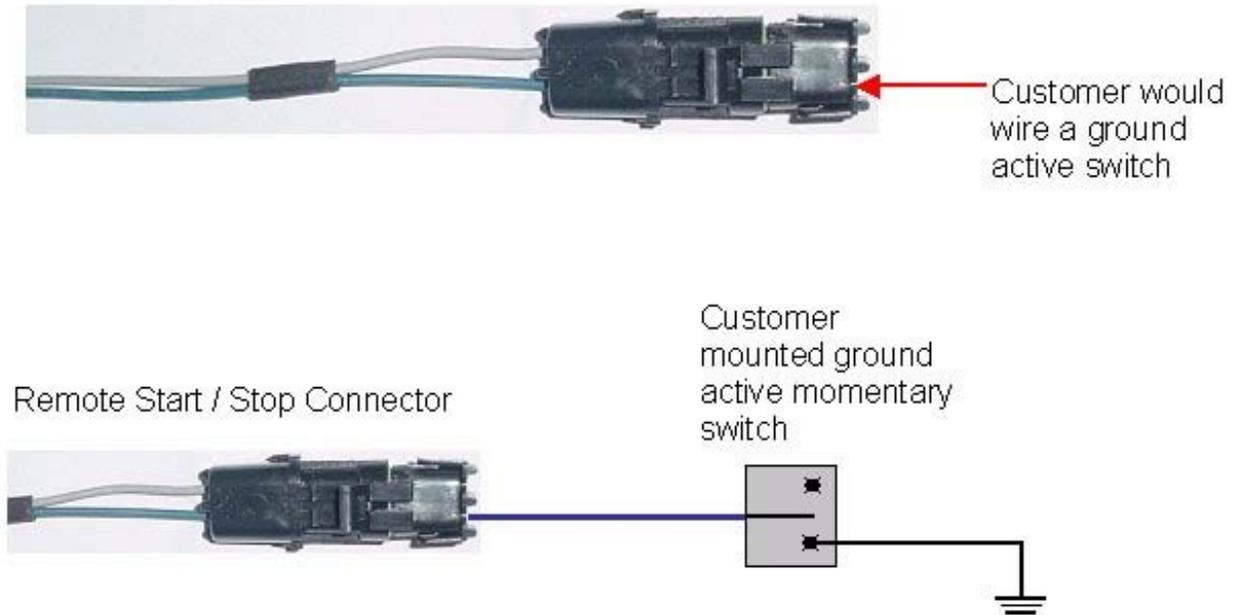


Figure 133 Remote Start Stop Connector in Mid-Chassis Harness

*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 Bodybuilder switch is providing a ground signal to the mid-chassis wire. The vehicle ignition 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:

- An aftermarket solution to this feature is currently being developed by engineering.

## 17.2. 60ABD — REMOTE START/STOP WITH EMERGENCY PUMP

Refer to the Circuit Diagram in S08285, Chapter 9, page 31.

**FEATURE CODE DESCRIPTION:** 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 ground 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: 595246

Software feature code that must be removed: 595245

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 of 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 that you hold the switch down for, after the engine has unexpectedly shut off, before the emergency pump activates. Also, if you stop the truck remotely and continue to hold the remote switch in the active position, the emergency pump will start if you hold the switch for the time set by the **TEM\_Remote\_Engine\_Stop\_Time** parameter.

**Table 136**

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_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

### 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 Gray wire is used to control an emergency pump.
- 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 137**

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

- The customer must provide a ground 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 ICAP or the Diamond Logic™ Builder software to enable software feature code 595245, and remove software feature code 595246.

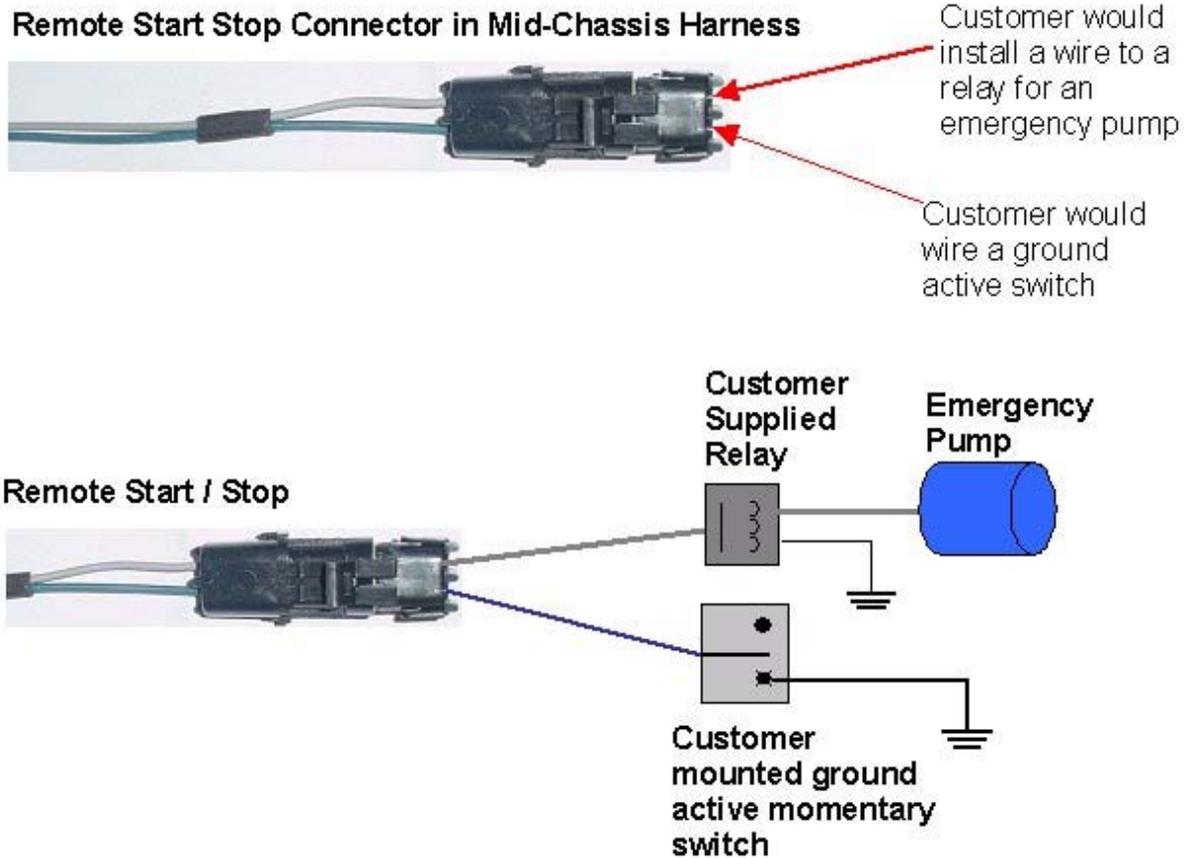


Figure 134

***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 Bodybuilder switch is providing a ground signal to the mid-chassis wire. The vehicle ignition 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 and then activate the switch again and hold it until the emergency pump control wire supplies ground to the emergency pump relay. The emergency pump will remain ON as long as the switch is active.

### **HOW TO ADD THIS FEATURE:**

- Engineering is currently developing an aftermarket solution to this feature.

## 18. SPECIAL GAUGE CLUSTER INDICATORS AND ALARMS

### 18.1. 60AJC — TWO INDICATOR LIGHTS AND AUDIBLE ALARMS PROGRAMMABLE MODE FOR VARIOUS SWITCH ACTIONS (WASTE SOLUTION)

**FEATURE CODE DESCRIPTION:** BDY INTG, INDICATOR LIGHTS (2) 1 for Gate Open and 1 for Rear Alert, Includes Audible Alarm, Programmable Mode for Various Switch Action (requires 2 Remote Power Module inputs).

**FEATURE/BODY FUNCTION:** This feature provides a custom alarm package designed for the Refuse/Waste Applications. 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 gauge cluster. 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 (ground). (See ICAP or 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 Remote Power Module input connector (See ICAP or the Diamond Logic™ Builder software for pin location). The ignition switch must be in “Run” for this feature to function. Programmable Parameters allow the customer to establish whether the input is active at 12 volts or active at ground. When the operator activates the customer-mounted switch, the Rear Alert light in the gauge cluster illuminates and an audible alarm sounds.



Figure 135 Gauge Cluster Display of “Gate Open” and “Rear Alert” Indicator Lights

#### PROGRAMMABLE PARAMETERS:

Required software feature codes: (595197 or 595255\*\*) and 595198

\*\* Software feature code 595197 should be used with an automatic transmission, whereas Software feature code 595255 should be used for a truck with a manual transmission.

Software feature codes that must be removed: 595201, 595202

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 138

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	
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	

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_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 your truck has a manual transmission and you wish to interlock your indicator lights and alarm with the transmission, you must splice a wire off of the reverse light circuit and run that wire into a pin on the Black 23-pin Remote Power Module Input connector (See ICAP or the Diamond Logic™ Builder software for correct pin and switch locations). This wire will indicate to the ESC 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 Remote Power Module (See ICAP or 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 Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin locations)

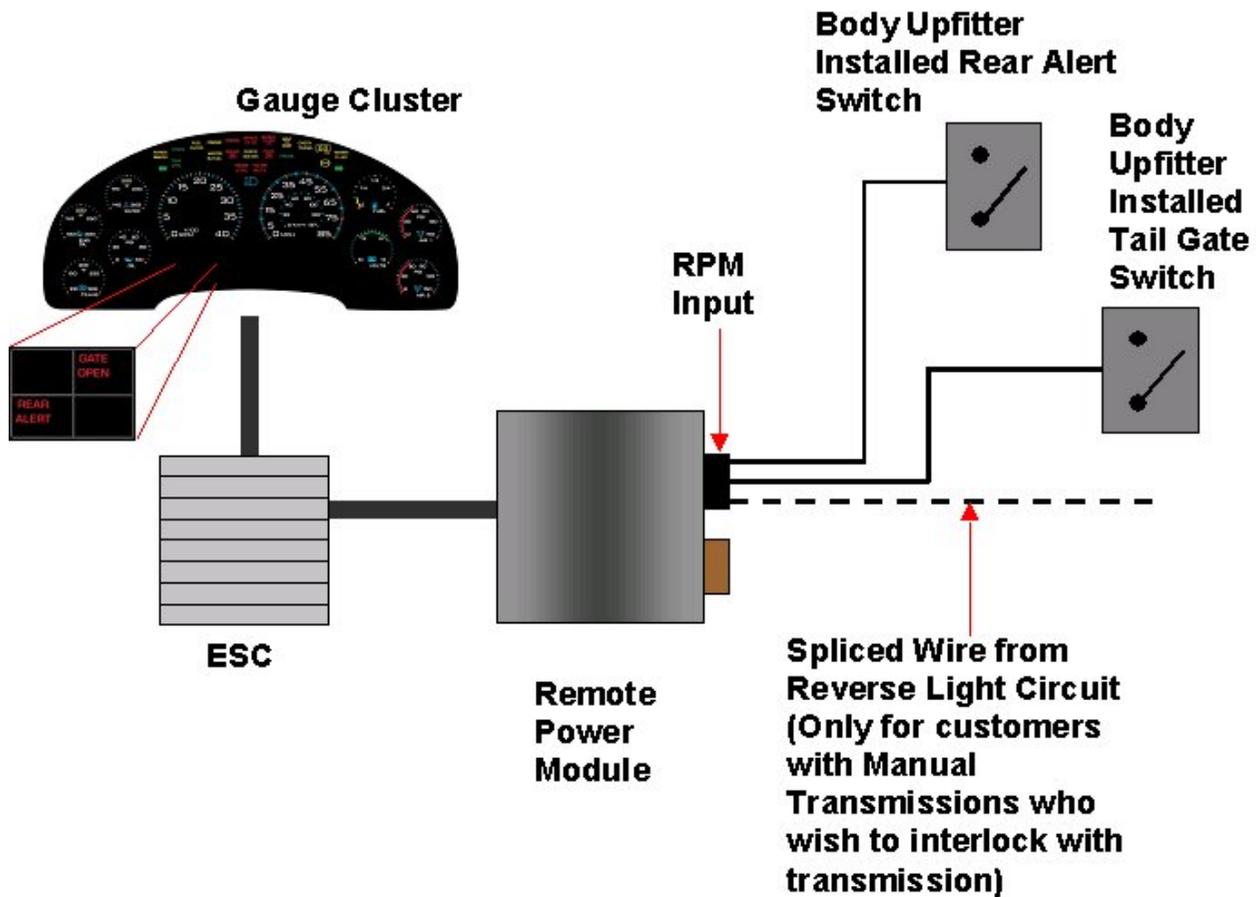


Figure 136

**TESTING**

1. Set park brake.
2. Open the tail gate.
3. Verify that the input labeled Tail\_Gate\_Open\_input is receiving the correct voltage (As programmed in ICAP or the Diamond Logic™ Builder software).
4. Verify that the Red “Gate Open” indicator light in the gauge cluster 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 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 ICAP or the Diamond Logic™ Builder software).
11. Verify that the red “Rear Alert” indicator light in the gauge cluster comes on and an audible alarm sounds.

**HOW TO ADD THIS FEATURE:**

## 1) For an AUTOMATIC TRANSMISSION

- Requires lens 3584294C1 be added to the instrument cluster if this feature is added aftermarket.
- Software feature codes 595198 and 595197 must be enabled using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that feature codes 595201 and 595202 are removed from the vehicle (See Local Dealer)
- Set programmable parameters for software feature codes using ICAP or 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 Remote Power Module (See ICAP or 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 Remote Power Module (See ICAP or the Diamond Logic™ Builder software for pin locations).
- Customer must install indicator light labels in gauge cluster.

## 2) For a MANUAL TRANSMISSION

- Requires lens 3584294C1 be added to the instrument cluster if this feature is added aftermarket.
- Software feature codes 595198 and 595255 must be enabled using ICAP or the Diamond Logic™ Builder software (See Local Dealer).
- Using ICAP or the Diamond Logic™ Builder software, make sure that feature codes 595201 and 595202 are removed from the vehicle (See Local Dealer).
- Set programmable parameters for software feature codes using ICAP or 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 Remote Power Module (See ICAP or 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 Remote Power Module (See ICAP or 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 Remote Power Module (See ICAP or the Diamond Logic™ Builder software for pin locations).
- Customer must install indicator light labels in gauge cluster.

## 18.2. 60AJD — BODY INTEGRATED, INDICATOR LIGHTS (UTILITY SOLUTIONS)

**FEATURE CODE DESCRIPTION:** BDY INTG, INDICATOR LIGHTS (2) 1 for Boom Out of Stow, 1 for Outriggers Deployed, Includes Audible Alarm and Interlock to Parking Brake, Programmable Mode for Various Switch Actions (requires 2 Remote Power Module inputs)

**FEATURE/BODY FUNCTION:** This feature provides a custom alarm package designed for the **Utility Application**. 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 gauge cluster. 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 137 Gauge Cluster Display of “Outrig Not Stowed” and “Boom Not Stowed”

### PROGRAMMABLE PARAMETERS:

Required software feature codes: 595201, 595202

Conflicts with Software features: 595197, 595198, 595255

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\_Consol\_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 Remote Power Module 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 139**

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 Remote Power Module (See ICAP or 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 Remote Power Module (See ICAP or the Diamond Logic™ Builder software for correct pin locations)

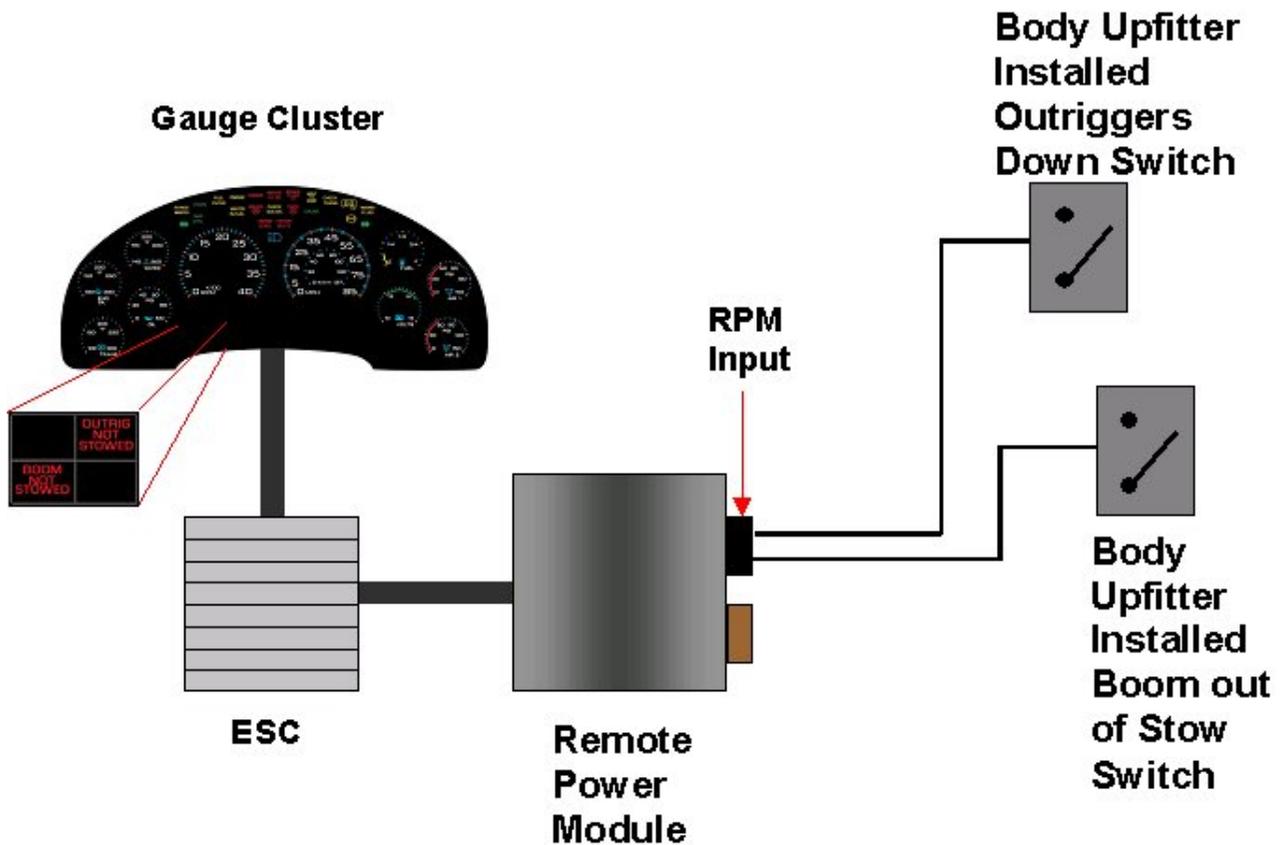


Figure 138

**TESTING**

1. Set the park brake.
2. Take boom out of stow.
3. Verify that the Remote Power Module input labeled Boom\_Not\_Stow\_Input is receiving the correct active state voltage (As programmed in ICAP or the Diamond Logic™ Builder software).
4. Verify that the boom out of stow indicator light is on constantly.
5. Take off the parking brake (With boom still out of stow).
6. Verify that the boom out of stow 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 Remote Power Module input labeled Outrig\_Not\_Stow\_Input is receiving the correct active state voltage (As programmed in ICAP or the Diamond Logic™ Builder software).
10. Verify that the outriggers down indicator light is on constantly.

11. Take off the parking brake (With outriggers still down).
12. Verify that the outriggers down indicator light is now flashing and the audible alarm is sounding.

**HOW TO ADD THIS FEATURE:**

- Requires lens 3584294C1 be added to the instrument cluster if this feature is added aftermarket.
- Software feature codes 595201 and 595202 must be enabled using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Using ICAP or the Diamond Logic™ Builder software, make sure that software feature codes 595197, 595198, and 595255 are removed from the vehicle. (See Local Dealer)
- Set the programmable parameters for the required software feature codes using ICAP or 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 Remote Power Module Input Connector. (See ICAP or 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 Remote Power Module Input Connector. (See ICAP or the Diamond Logic™ Builder software for correct pin locations)
- Customer must install indicator light labels

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### 18.3. 60AJK — DUMP BOX INDICATOR LIGHTS AND ALARM

#### FEATURE CODE DESCRIPTION:

060AJK - INDICATOR LIGHTS (2), 1 for Body Up, 1 for Gate Open, Includes Audible Alarm, Programmable Mode for Various Switch Actions (Requires 2 Remote Power Module 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 opened dump gate using Body Builder installed switches. This visual indications that are provided for this feature are a “**BODY UP**” light and a “**GATE OPEN**” light. These indications are provided within the lower left hand section of the instrument cluster, and are controlled by J1939 datalink messages received from the ESC. Similarly, a J1939 datalink message from the ESC will activate an audible alarm based on the programmable parameter that was set within the ESC for that alarm. The ESC receives a Body Builder J1939 message from a RPM (Remote Power Module) that has two inputs connected to Body Builder installed switches that indicate whe the dump box body has been raised or the box gate has been opened. Programmed parameters within the ESC allow the input active state for the installed switches to be configured for active when the input is either OPEN, GND, or 12V. These visual and audible indications will only function when the ignition key is in the RUN position.

For both the “**BODY UP**” and “**GATE OPEN**” indications, the associated light will illuminate continuously and the associated audible alarm (default of 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 5 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.

#### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Required Software Feature Codes: 595299 and 595301

Software Feature Codes that must be removed: NONE

The **TEM\_Body\_Up\_Input\_Active\_State** parameter indicates the state that the ESC 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 ESC when the dump body has been raised up.

The **TEM\_Tail\_Gate\_Input\_Active\_State** parameter indicates the state that the ESC 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 ESC 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.

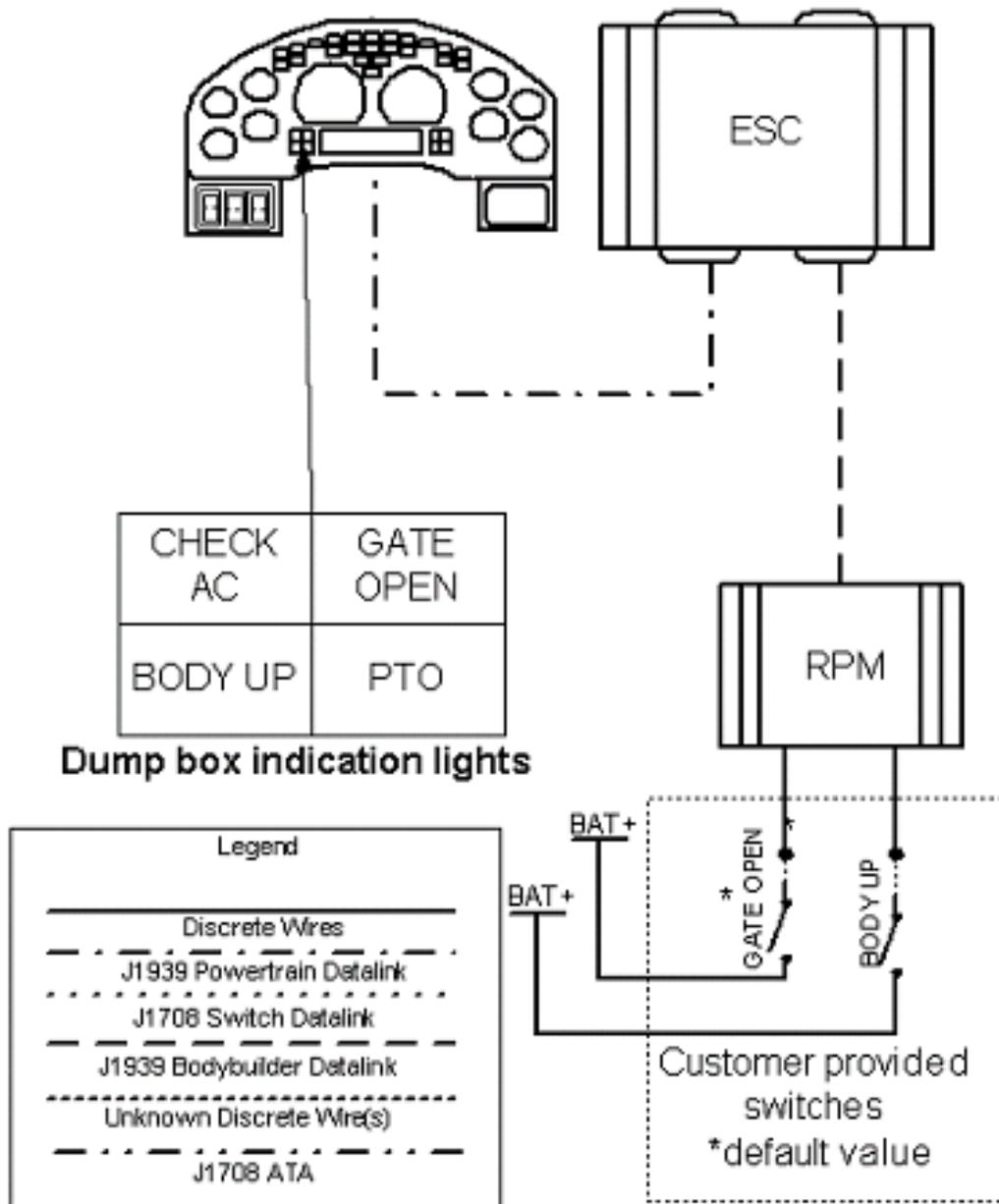
The **TEM\_Body\_Up\_Beeper** parameter allows the customer to set the alarm type for the condition when the dump body has been raised (active) and both the park brake is set and the vehicle speed is equal to or less than 10 MPH. The default alarm type is off.

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 140**

Parameter	ID	Description	Units	Settings				
				Default	0	1	2	3
TEM_Body_Up_Input_Active_State	PV-275	Determines the Input Active Status.	None	3	Open	GND	NA	12 Volts
TEM_Tail_Gate_Input_Active_State	PV-226	Determines the Input Active State	None	3	Open	GND	NA	12 Volts
TEM_Body_Up_Alarm_Beeper	PV-274	Determines the type of alarm when the Vehicle Speed is greater than 10 mph	None	1	Off	5 fast beeps	3 slow beeps	continuous beeps
TEM_Gate_Alarm_Beeper	PV-276	Determines the type of alarm when the Vehicle Speed is less than 10 mph	None	1	Off	5 fast beeps	3 slow beeps	continuous beeps
TEM_Body_Up_Beeper	PV-273	Determines the type of alarm when the Vehicle Speed is greater than 10 mph	None	0	Off	5 fast beeps	3 slow beeps	continuous beeps
TEM_Gate_Open_Beeper	PV-277	Determines the type of alarm when the Vehicle Speed is greater than 10 mph	None	0	Off	5 fast beeps	3 slow beeps	continuous beeps

**WIRING INFORMATION:**



**Figure 139**

Connect gate open switch to RPM conn J3 input. Connector cavity is found in ICP or Diamond Logic™ Builder labeled “TEM\_Tail\_gate\_signal”.

Connect body up switch to RPM conn J3 input. Connector cavity is found in ICAP or Diamond Logic™ Builder labeled “TEM\_Body\_up\_signal”.

**TESTING:**

1. Raise the dump body, the light should go on.
2. Open the dump gate, the dump gate light should go on.

3. Release the park brake with raised dump body or open dump gate and the alarm should give off a continuous 5 fast beeps.

**HOW DO I ADD THIS FEATURE:**

- Software feature codes 595299 and 595301 must be enabled using ICAP or Diamond Logic™ Builder software (See Local Dealer).
- Set programmable parameters for software feature codes using ICAP or the Diamond Logic™ Builder software (See Local Dealer).
- If vehicle does not have Remote Power Module installed, then customer must install RPM using codes 60AAA or 60AAB.
- Connect gate open switch to RPM connector J3 input.
- Connect body up switch to RPM connector J3 input.

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## 19. IN CAB SWITCH CONTROLS FOR BODY ACCESSORIES USING REMOTE POWER MODULES

### 19.1. REMOTE POWER MODULES (RPM)

#### FEATURE CODE DESCRIPTION:

Refer to the Circuit Diagram in S08285, Chapter 9, page 15.

**08WSK** – SWITCH, BODY CIRCUITS, REAR for Bodybuilder; With 6 Switches in Instrument Panel; One Power Module, With 6 Channels, 20 Amp Per Channel and 80 Amp Max Output, Switches Control the Power Modules Through Multiplex Wiring, Mounted at Rear on Frame

**08WSM** – SWITCH, BODY CIRCUITS, MID for Bodybuilder, With 6 Switches in Instrument Panel; One Power Module With 6 Channel, 20 Amp Max. Per Channel and 80 Amp Max Output, Switches Control the Power Module Through Multiplex Wiring, Mounted Battery Box Back of Cab

**08SAJ** – SWITCH, BODY CIRCUITS, MID for Body Builders; 12 Switches in Instrument Panel, With Two Power Modules With 6 Channels, 20 Amp Max. per Channel, 80 Amp Max Output, Switch Control Power Modules Through Multiplex Wiring, Mounted on Battery Box BOC

#### FEATURE/BODY FUNCTION:

On the 4000 models, Code 08SAJ and Code 08WSM have the remote power modules mounted at the back of the battery box.

On the 7000 models, Code 08SAJ and Code 08WSM have the remote power modules mounted under the cab, left rear.

International has developed a method of controlling loads on the vehicle, outside the cab, without running individual wires from each switch to the load. This is accomplished by an electronic device called a Remote Power Module (RPM). This module is used to distribute and control power to various devices on the vehicle from switches inside the cab. The RPM is connected to the Electrical System Controller via the Body Builder J1939 datalink (not the powertrain or ATA datalink). The only wires connected to the RPM are battery power (for driving the loads), datalink cable (which includes power and ground to operate the module), and a wire for each vehicle device operated by the RPM.

#### SOFTWARE FEATURE CODES AND PROGRAMMABLE PARAMETERS:

**08WSK:** 595119

The **PwrMod4\_Fuse\_Level1\_Param** sets the limit (in amps) of the current flowing from Output #1 of Remote Power Module #4.

The **PwrMod4\_Fuse\_Level2\_Param** sets the limit (in amps) of the current flowing from Output #2 of Remote Power Module #4.

The **PwrMod4\_Fuse\_Level3\_Param** sets the limit (in amps) of the current flowing from Output #3 of Remote Power Module #4.

The **PwrMod4\_Fuse\_Level4\_Param** sets the limit (in amps) of the current flowing from Output #4 of Remote Power Module #4.

The **PwrMod4\_Fuse\_Level5\_Param** sets the limit (in amps) of the current flowing from Output #5 of Remote Power Module #4.

The **PwrMod4\_Fuse\_Level6\_Param** sets the limit (in amps) of the current flowing from Output #6 of Remote Power Module #4.

The **PwrMod4\_Init\_State1\_Param** parameter determines the initial state of RPM #4, output #1. If the parameter is set to 1, Output #1 of Remote Power Module #4 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod4\_Init\_State2\_Param** parameter determines the initial state of RPM #4, output #2. If the parameter is set to 1, Output #2 of Remote Power Module #4 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod4\_Init\_State3\_Param** parameter determines the initial state of RPM #4, output #3. If the parameter is set to 1, Output #3 of Remote Power Module #4 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod4\_Init\_State4\_Param** parameter determines the initial state of RPM #4, output #4. If the parameter is set to 1, Output #4 of Remote Power Module #4 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod4\_Init\_State5\_Param** parameter determines the initial state of RPM #4, output #5. If the parameter is set to 1, Output #5 of Remote Power Module #4 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod4\_Init\_State6\_Param** parameter determines the initial state of RPM #4, output #6. If the parameter is set to 1, Output #6 of Remote Power Module #4 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

**Table 141**

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod4_Fuse_Level1_Param	454	Current Limit in amps for Output #1 of Remote Power Module #4	20	A	0	20	0.1
PwrMod4_Fuse_Level2_Param	455	Current Limit in amps for Output #2 of Remote Power Module #4	20	A	0	20	0.1
PwrMod4_Fuse_Level3_Param	456	Current Limit in amps for Output #3 of Remote Power Module #4	20	A	0	20	0.1
PwrMod4_Fuse_Level4_Param	457	Current Limit in amps for Output #4 of Remote Power Module #4	20	A	0	20	0.1

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod4_Fuse_Level5_Param	458	Current Limit in amps for Output #5 of Remote Power Module #4	20	A	0	20	0.1
PwrMod4_Fuse_Level6_Param	459	Current Limit in amps for Output #6 of Remote Power Module #4	20	A	0	20	0.1
PwrMod4_Init_State1_Param	460	If this parameter is set to 1, Output #1 of Remote Power Module #4 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod4_Init_State2_Param	461	If this parameter is set to 1, Output #2 of Remote Power Module #4 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod4_Init_State3_Param	462	If this parameter is set to 1, Output #3 of Remote Power Module #4 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod4_Init_State4_Param	463	If this parameter is set to 1, Output #4 of Remote Power Module #4 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod4_Init_State5_Param	464	If this parameter is set to 1, Output #5 of Remote Power Module #4 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod4_Init_State6_Param	465	If this parameter is set to 1, Output #6 of Remote Power Module #4 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA

**08WSM: 595032**

The **PwrMod1\_Fuse\_Level1\_Param** sets the limit (in amps) of the current flowing from Output #1 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level2\_Param** sets the limit (in amps) of the current flowing from Output #2 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level3\_Param** sets the limit (in amps) of the current flowing from Output #3 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level4\_Param** sets the limit (in amps) of the current flowing from Output #4 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level5\_Param** sets the limit (in amps) of the current flowing from Output #5 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level6\_Param** sets the limit (in amps) of the current flowing from Output #6 of Remote Power Module #1.

The **PwrMod1\_Init\_State1\_Param** parameter determines the initial state of RPM #1, output #1. If the parameter is set to 1, Output #1 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State2\_Param** parameter determines the initial state of RPM #1, output #2. If the parameter is set to 1, Output #2 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State3\_Param** parameter determines the initial state of RPM #1, output #3. If the parameter is set to 1, Output #3 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State4\_Param** parameter determines the initial state of RPM #1, output #4. If the parameter is set to 1, Output #4 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State5\_Param** parameter determines the initial state of RPM #1, output #5. If the parameter is set to 1, Output #5 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State6\_Param** parameter determines the initial state of RPM #1, output #6. If the parameter is set to 1, Output #6 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

**Table 142**

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod1_Fuse_Level1_Param	392	Current Limit in amps for Output #1 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_Fuse_Level2_Param	393	Current Limit in amps for Output #2 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_Fuse_Level3_Param	394	Current Limit in amps for Output #3 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_Fuse_Level4_Param	395	Current Limit in amps for Output #4 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_Fuse_Level5_Param	396	Current Limit in amps for Output #5 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_Fuse_Level6_Param	397	Current Limit in amps for Output #6 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_Init_State1_Param	398	If this parameter is set to 1, Output #1 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod1_Init_State2_Param	399	If this parameter is set to 1, Output #2 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State3_Param	400	If this parameter is set to 1, Output #3 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State4_Param	401	If this parameter is set to 1, Output #4 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State5_Param	402	If this parameter is set to 1, Output #5 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State6_Param	403	If this parameter is set to 1, Output #6 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA

**08SAJ:** 595032 and 595121

The **PwrMod2\_Fuse\_Level1\_Param** sets the limit (in amps) of the current flowing from Output #1 of Remote Power Module #2.

The **PwrMod2\_Fuse\_Level2\_Param** sets the limit (in amps) of the current flowing from Output #2 of Remote Power Module #2.

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The **PwrMod2\_Fuse\_Level3\_Param** sets the limit (in amps) of the current flowing from Output #3 of Remote Power Module #2.

The **PwrMod2\_Fuse\_Level4\_Param** sets the limit (in amps) of the current flowing from Output #4 of Remote Power Module #2.

The **PwrMod2\_Fuse\_Level5\_Param** sets the limit (in amps) of the current flowing from Output #5 of Remote Power Module #2.

The **PwrMod2\_Fuse\_Level6\_Param** sets the limit (in amps) of the current flowing from Output #6 of Remote Power Module #2.

The **PwrMod2\_Init\_State1\_Param** parameter determines the initial state of RPM #2, output #1. If the parameter is set to 1, Output #1 of Remote Power Module #2 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod2\_Init\_State2\_Param** parameter determines the initial state of RPM #2, output #2. If the parameter is set to 1, Output #2 of Remote Power Module #2 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod2\_Init\_State3\_Param** parameter determines the initial state of RPM #2, output #3. If the parameter is set to 1, Output #3 of Remote Power Module #2 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod2\_Init\_State4\_Param** parameter determines the initial state of RPM #2, output #4. If the parameter is set to 1, Output #4 of Remote Power Module #2 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod2\_Init\_State5\_Param** parameter determines the initial state of RPM #2, output #5. If the parameter is set to 1, Output #5 of Remote Power Module #2 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod2\_Init\_State6\_Param** parameter determines the initial state of RPM #2, output #6. If the parameter is set to 1, Output #6 of Remote Power Module #2 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Fuse\_Level1\_Param** sets the limit (in amps) of the current flowing from Output #1 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level2\_Param** sets the limit (in amps) of the current flowing from Output #2 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level3\_Param** sets the limit (in amps) of the current flowing from Output #3 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level4\_Param** sets the limit (in amps) of the current flowing from Output #4 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level5\_Param** sets the limit (in amps) of the current flowing from Output #5 of Remote Power Module #1.

The **PwrMod1\_Fuse\_Level6\_Param** sets the limit (in amps) of the current flowing from Output #6 of Remote Power Module #1.

The **PwrMod1\_Init\_State1\_Param** parameter determines the initial state of RPM #1, output #1. If the parameter is set to 1, Output #1 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State2\_Param** parameter determines the initial state of RPM #1, output #2. If the parameter is set to 1, Output #2 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State3\_Param** parameter determines the initial state of RPM #1, output #3. If the parameter is set to 1, Output #3 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State4\_Param** parameter determines the initial state of RPM #1, output #4. If the parameter is set to 1, Output #4 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State5\_Param** parameter determines the initial state of RPM #1, output #5. If the parameter is set to 1, Output #5 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

The **PwrMod1\_Init\_State6\_Param** parameter determines the initial state of RPM #1, output #6. If the parameter is set to 1, Output #6 of Remote Power Module #1 will be turned ON at ignition key-on. If the parameter value is set to 0, the output will be OFF at key-on.

**Table 143**

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod2_Fuse_Level1_Param	35	Current Limit in amps for Output #1 of Remote Power Module #2	20	A	0	20	0.1
PwrMod2_Fuse_Level2_Param	36	Current Limit in amps for Output #2 of Remote Power Module #2	20	A	0	20	0.1
PwrMod2_Fuse_Level3_Param	37	Current Limit in amps for Output #3 of Remote Power Module #2	20	A	0	20	0.1
PwrMod2_Fuse_Level4_Param	38	Current Limit in amps for Output #4 of Remote Power Module #2	20	A	0	20	0.1
PwrMod2_Fuse_Level5_Param	39	Current Limit in amps for Output #5 of Remote Power Module #2	20	A	0	20	0.1

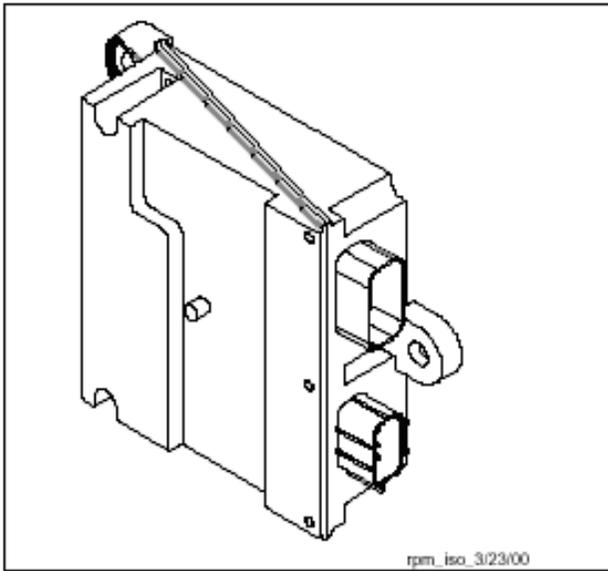
Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod2_Fuse_Level6_Param	40	Current Limit in amps for Output #6 of Remote Power Module #2	20	A	0	20	0.1
PwrMod2_Init_State1_Param	41	If this parameter is set to 1, Output #1 of Remote Power Module #2 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod2_Init_State2_Param	42	If this parameter is set to 1, Output #2 of Remote Power Module #2 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod2_Init_State3_Param	43	If this parameter is set to 1, Output #3 of Remote Power Module #2 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod2_Init_State4_Param	44	If this parameter is set to 1, Output #4 of Remote Power Module #2 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod2_Init_State5_Param	45	If this parameter is set to 1, Output #5 of Remote Power Module #2 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod2_ Init_State6_ Param	46	If this parameter is set to 1, Output #6 of Remote Power Module #2 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_ Units	NA	NA	NA
PwrMod1_ Fuse_Level1_ Param	392	Current Limit in amps for Output #1 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_ Fuse_Level2_ Param	393	Current Limit in amps for Output #2 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_ Fuse_Level3_ Param	394	Current Limit in amps for Output #3 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_ Fuse_Level4_ Param	395	Current Limit in amps for Output #4 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_ Fuse_Level5_ Param	396	Current Limit in amps for Output #5 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_ Fuse_Level6_ Param	397	Current Limit in amps for Output #6 of Remote Power Module #1	20	A	1	20	0.1
PwrMod1_ Init_State1_ Param	398	If this parameter is set to 1, Output #1 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_ Units	NA	NA	NA

Parameter	ID	Description	Default	Units	Min	Max	Step
PwrMod1_Init_State2_Param	399	If this parameter is set to 1, Output #2 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State3_Param	400	If this parameter is set to 1, Output #3 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State4_Param	401	If this parameter is set to 1, Output #4 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State5_Param	402	If this parameter is set to 1, Output #5 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA
PwrMod1_Init_State6_Param	403	If this parameter is set to 1, Output #6 of Remote Power Module #1 will be turned on at ignition key-on, if set to 0 output will be off at key-on.	OFF	No_Units	NA	NA	NA

### **WIRING INFORMATION**

Each module receives power from a 4-gauge cable, protected by a fusible link, connected to the battery stud of the starter motor or the battery depending on the location of the RPM.



**Figure 140 Remote Power Module**

Each generic RPM has the ability to operate up to 6 devices of 20 amps or less not to exceed 80 amps for the entire module. Each RPM comes with a six-pack of switches that is inserted into the center section of the instrument panel. Each generic switch controls 1 output of the RPM. The switch mapping is one to one with the RPM, i.e. switch one controls output channel one on the RPM. The switch pack is connected to the switch data bus that communicates switch operation to the Electrical System Controller, which communicates that operation to the RPM. The RPM also has inputs on the module itself that can be programmed to control the outputs. This means that the RPM functions like a 3-way lamp switch in a home. Each in-cab switch is a momentary rocker switch that is stable in the center position. The upper section of each switch has an indicator light to provide the status of each power output channel. Pressing the upper section of the switch will latch the respective power output channel ON and illuminate the indicator. Pressing the lower section of the switch will latch the power output channel OFF and turn the indicator OFF. Likewise, the output channels may be controlled remotely by using a three-position momentary single pole, double throw switch on each remote switch input. Applying battery volts to the remote switch input will turn the output channel ON. Applying ground to the remote switch input will turn the output channel OFF. The lamp indicator on the instrument panel switch will always display the current status of the output channel as long as the ignition key is in the Run or Accessory position. Each RPM in-cab switch operates with the key in the Accessory or Ignition position. The RPM remote input switches operate at any time. If conflict exists between switches the OFF state always wins.

A maximum of 3 RPM's may be connected to the vehicle which allows a total of 18 devices to be controlled as long as the 80 amp per module is not exceeded. The modules can be relocated from their mounting position as long as the data link cable will reach its new mounting location without the datalink cable being modified.

### Addressing Remote Power Modules

All remote power modules require jumpers to tell the system controller what remote power module it is controlling. Jumpers are to be installed in a 23-way connector in location J4 shown in the figure below.

**Table 144**

Jumper Wire Color	Remote Power Module Location	Cavity Location
Red Wire	1st Back of Cab	1-2

Jumper Wire Color	Remote Power Module Location	Cavity Location
Green Wire	2nd Back of Cab	3-4
Blue Wire	End of Frame	5-6

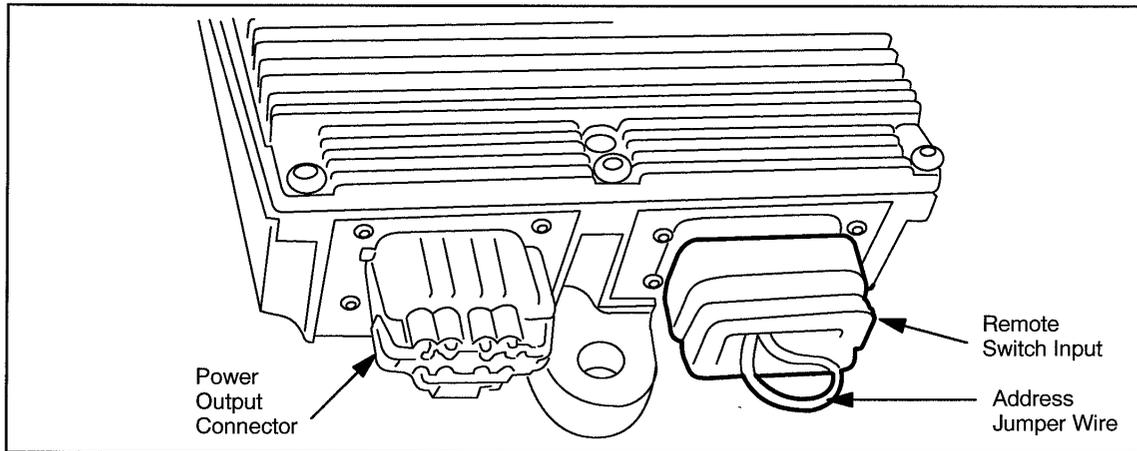


Figure 141 Remote Power Module Connections

J3 23-Way Connector

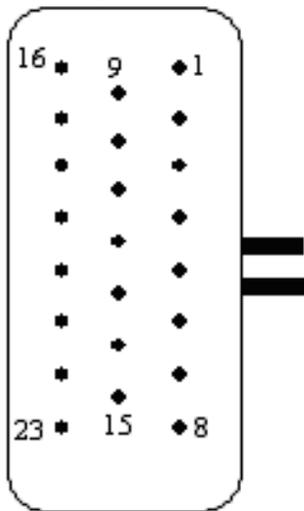
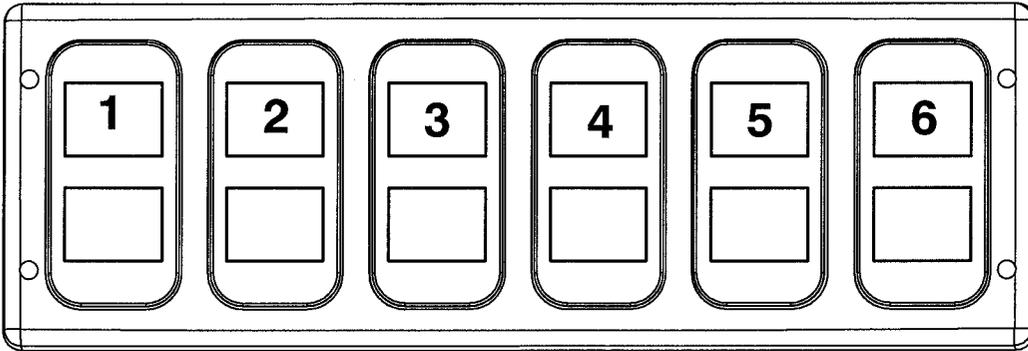
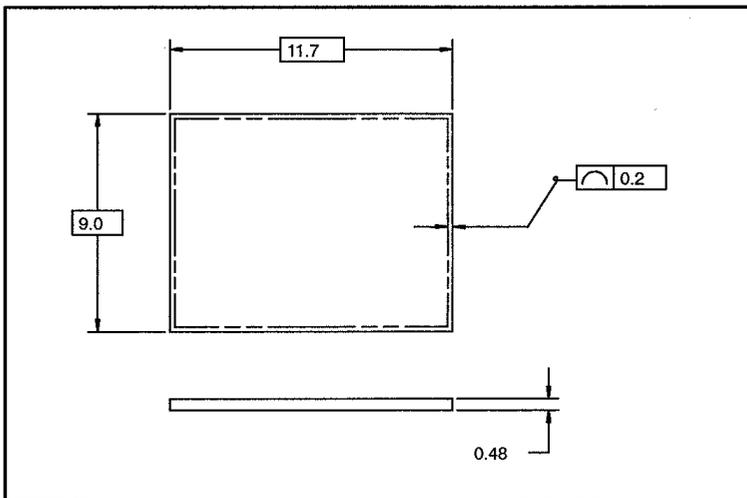


Figure 142 J3 23-Way Connector



**Figure 143 Instrument Panel Mounted Switch Pack**



**Figure 144 Switch Label Dimensions in Millimeters**

**Switch Labeling:** Switch packs provided with the Remote Power Module Feature are general purpose “un-labeled” rocker switches. Since the functions of the rocker switches are unknown at the time of vehicle assembly, un-labeled rocker switches are provided so the body builder can customize the switches to any particular need. A package of switch labels is provided for usage by the body builder to finish the labeling of the switches. If the body builder requires a label name not already provided by International, a custom label may be designed by following the specification of the attached switch label appliqué drawing. Supply of custom labels is the responsibility of the body builder.

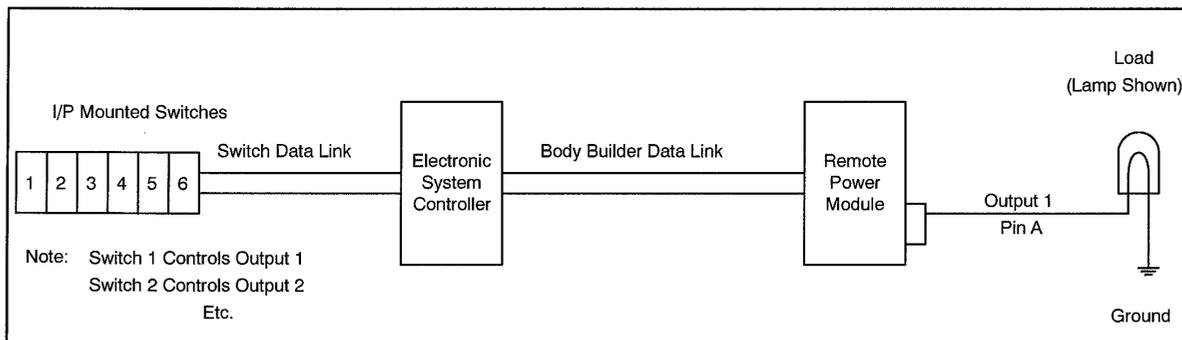
The suppliers for the windowed rocker labels are:

**Dura-Tech**

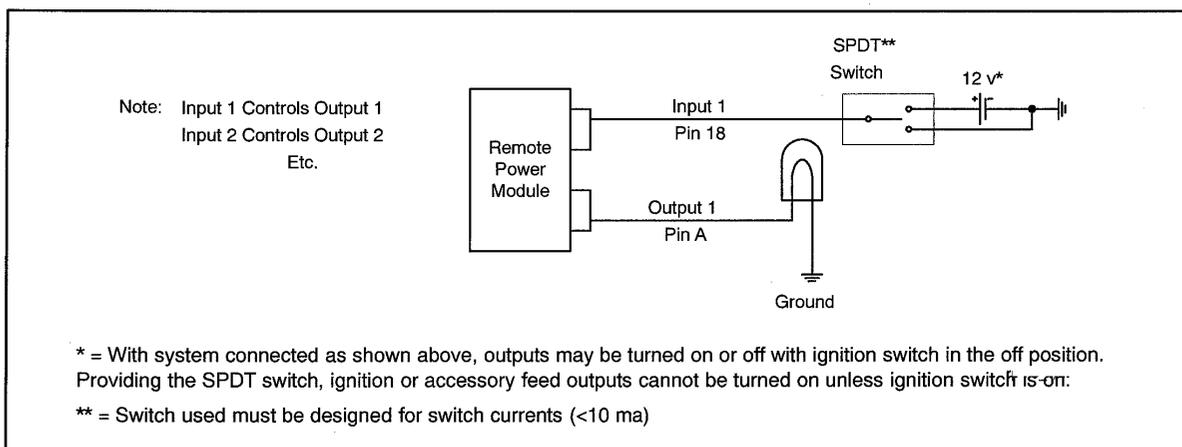
3216 Commerce  
 St. LaCrosse, Wisconsin 54603  
 Telephone: 608-781-2570  
 Web site: duratech.com

**Pollak Switch Products Division**

300 Dan Road  
 Canton, Mass. 02021  
 Telephone: 781-830-0340



**Figure 145 Example with RPM Output Controlled by Switch Inside Cab**



**Figure 146 Example with RPM Output Controlled by Switch Located on Chassis**

**Table 145**

	Pin	Signal Name	Signal Direction	Rating (Amps)
Body Data Link				

	Pin	Signal Name	Signal Direction	Rating (Amps)	
	1	Air Solenoid Power***	Input/ Pass-Thru	1	
	2	Ground	Ground/ Pass-Thru		
	3	Body Builder J1939+	Data Link		
	4	Body Builder J1939-	Data Link		
	6	Battery	Input/ Pass-Thru	5	
	Body Data Link				
	1	Air Solenoid Power***	Input/ Pass-Thru	1	
	2	Ground	Ground/ Pass-Thru		
	3	Body Builder J1939+	Data Link		
	4	Body Builder J1939-	Data Link		
	6	Battery	Input/ Pass-Thru	5	
	Module Battery Feed				
	1	Supply Voltage	Input	80	
	<p>NOTE: Body Data Link Output is supplied with the mate to this connector which is sealed and includes a 120 ohm terminating resistor.</p> <p>NOTE: No additional circuits can be added.</p> <p>**RPM does not use air solenoid power. There is no 12V on this pin unless there is a 7-pack air solenoid module.</p>				

Table 146

Pin	Signal Name	Signal Direction	Rating (Amps)
Signal Connector			
1	Module Select Common	Ground	
2	Module Select #1	Digital Input	0.010
3	Module Select Common	Ground	
4	Module Select #2	Digital Input	0.010
5	Module Select Common	Ground	
6	Module Select #3		0.010
7			
8			
9			
10			
11			

Pin	Signal Name	Signal Direction	Rating (Amps)
12			
13			
14			
15			
16			
17			
18	Input #1	Switch Input	0.010
19	Input #2	Switch Input	0.010
20	Input #3	Switch Input	0.010
21	Input #4	Switch Input	0.010
22	Input #5	Switch Input	0.010
23	Input #6	Switch Input	0.010
Power Connector			
A	Output #1	Output	20
B	Output #2	Output	20
C	Output #3	Output	20
D	Output #4	Output	20
E	Output #5	Output	20
F			
G			
H	Output #6	Output	20

**NOTE – Refer to the Recommended Circuit Protection in the General section when selecting wire gage and fusing.**

**Table 147 Mating Connector Information**

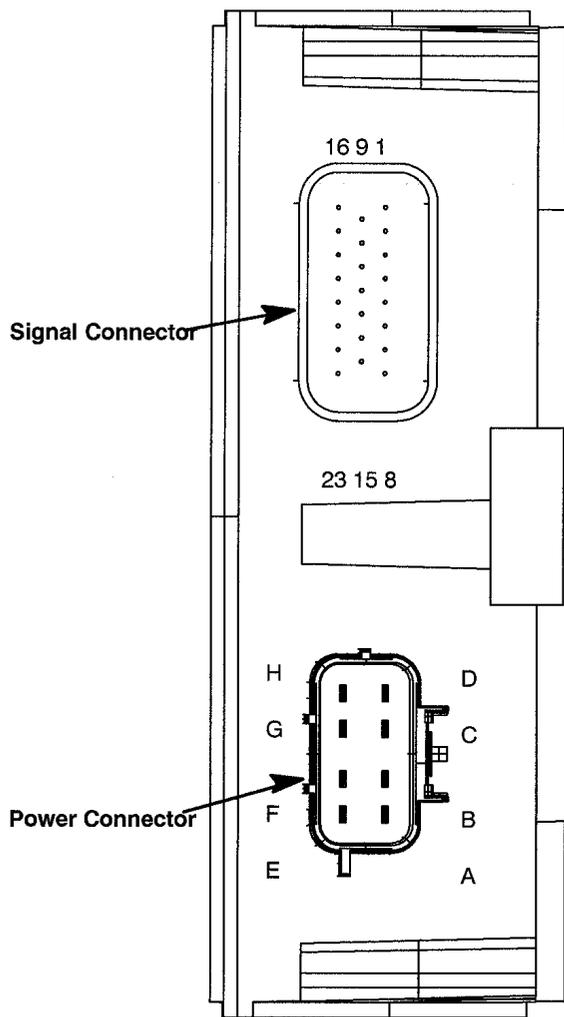
Signal Connector — 23 Way	
Connector	Lock
770680-1 (Amp)	1688285C1
Terminal	Cable Gauge
2005483C1	16, 18, 20

**Table 148 Mating Connector Information**

Power Connector — 8 Way	
Connector	Lock
3548934C1	3548943C1

**Table 148 Mating Connector Information (cont.)**

Terminal	Cable Gauge
3535929C1	20, 22
3535930C1	16, 18
3534163C1	12
3535931C1	14
Cable Seal	Cable Gauge
3535935C1	20, 22
3535936C1	16, 18
3535937C1	14
3548945C1	12
Plug	2025431C1



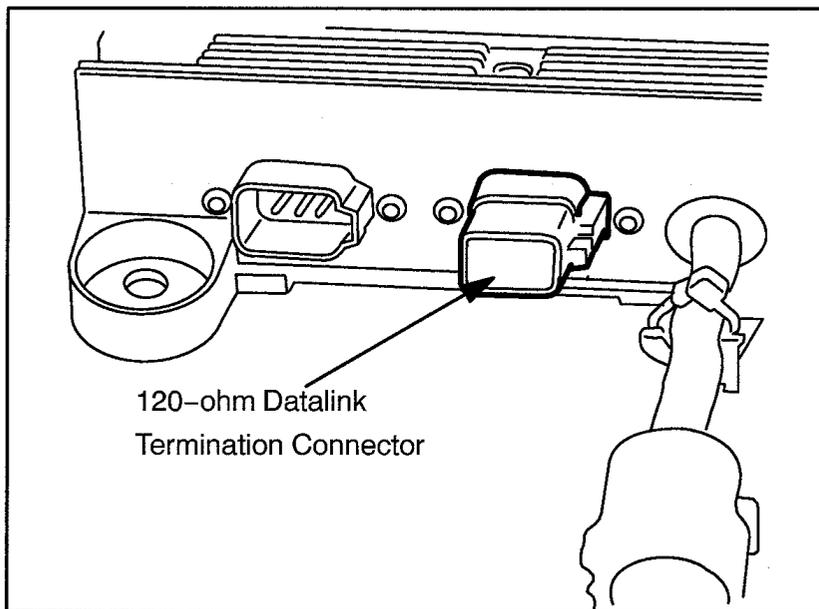
**Figure 147**

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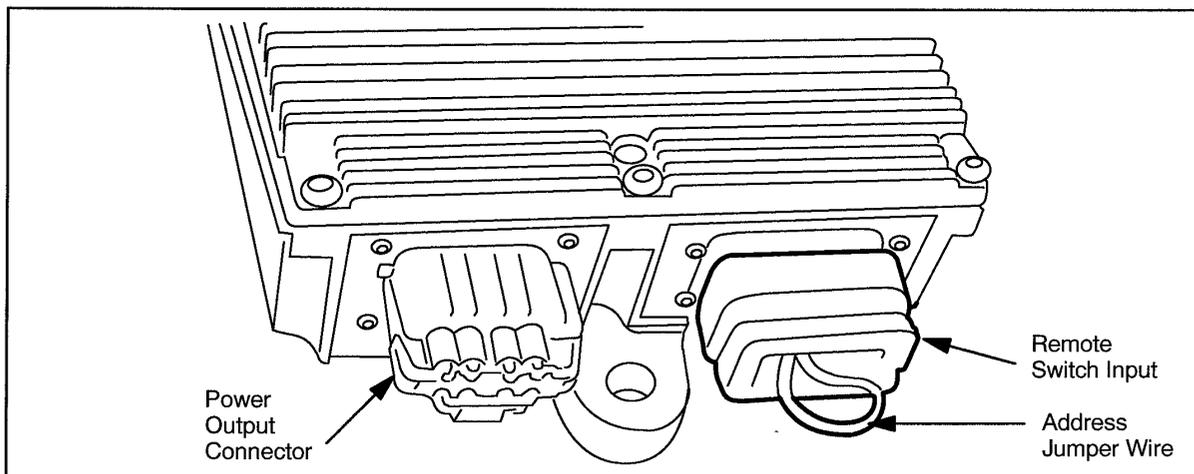
**\*\* For Switch Product Graphic Label Kit order Part Number 3552005C3 \*\***

Here are some facts about the use of the Remote Power Module (RPM):

- Each RPM provides 6 outputs, the loads on each output are protected by virtual fuses and are programmable in 100mA (milliamp) increments, 20A max. per channel, 80A max. per module.
- A maximum of three RPMs per vehicle may be factory installed.
- Power is fed to the RPM through a fused link from the battery that controls lights, mirrors, solenoids, fans, etc.
- If higher current capacity is needed, the RPM can control a high current relay and still maintain logic and diagnostic capability without having to wire to the inside of the cab.
- The RPM outputs may be programmed to be On or Off with each key on cycle (assumes a momentary switch is used in the cab).
- There is an input connector for the bodybuilder switches.
  - A 3-way output control may be achieved by using a single pole double throw switch with the RPM inputs. The respective RPM output may be turned on by the in-cab switch and off by the remote switch, and vice versa. The in-cab switch indicator displays the status of the RPM output.
  - The switch input actually goes to ESC so that the program rules can be checked. If all of the rules checkout OK the controller will activate the channel. If the preprogrammed logic rules for this circuit are not met, the switch will flash until the desired condition is activated.
  - A 12-volt input will turn a channel on and a ground input will turn the channel off.
  - If a latching switch is used by the TEM or bodybuilder with the remote switch inputs, the channel cannot be controlled by the in-cab switch.
- RPMs have diagnostic capability.
  - As mentioned, the fusing current can be programmed, if that current is exceeded, the circuit will be “fused” and the RPM will send that message to ESC indicating which RPM and what output is over current.
  - The RPM has two 6 pin connectors.
- The last module must have a 120-ohm terminating resistor in the data link connector.
  - All power, ground and datalink signals are contained in these connectors.
  - The two identical connectors located on the power input side of the module are the data link connectors. They are pass thru connectors that allow for the daisy chaining of modules. Only one connector plugs into the chassis harness.



**Figure 148 120-ohm Datalink Termination Connector on RPM**



**Figure 149 Remote Power Module Connectors**

### **TESTING**

1. Turn key to accessory or ignition key state.
2. Activate first in-cab switch.
3. Verify that Remote Power Module output #1 is providing battery voltage.
4. Deactivate first in-cab switch.
5. Apply 12V to Remote Power Module input #1.
6. Verify that Remote Power Module output #1 is providing battery voltage.

- 
7. Apply ground to Remote Power Module input #1.
  8. Verify that Remote Power Module output #1 shuts off.
  9. Activate second in-cab switch.
  10. Verify that Remote Power Module output #2 is providing battery voltage.
  11. Deactivate second in-cab switch.
  12. Apply 12V to Remote Power Module input #2.
  13. Verify that Remote Power Module output #2 is providing battery voltage.
  14. Apply ground to Remote Power Module input #2.
  15. Verify that Remote Power Module output #2 shuts off.
  16. Activate third in-cab switch.
  17. Verify that Remote Power Module output #3 is providing battery voltage.
  18. Deactivate third in-cab switch.
  19. Apply 12V to Remote Power Module input #3.
  20. Verify that Remote Power Module output #3 is providing battery voltage.
  21. Apply ground to Remote Power Module input #3.
  22. Verify that Remote Power Module output #3 shuts off.
  23. Activate fourth in-cab switch.
  24. Verify that Remote Power Module output #4 is providing battery voltage.
  25. Deactivate fourth in-cab switch.
  26. Apply 12V to Remote Power Module input #4.
  27. Verify that Remote Power Module output #4 is providing battery voltage.
  28. Apply ground to Remote Power Module input #4.
  29. Verify that Remote Power Module output #4 shuts off.
  30. Activate fifth in-cab switch.
  31. Verify that Remote Power Module output #5 is providing battery voltage.
  32. Deactivate fifth in-cab switch.
  33. Apply 12V to Remote Power Module input #5.
-

- 
34. Verify that Remote Power Module output #5 is providing battery voltage.
  35. Apply ground to Remote Power Module input #5.
  36. Verify that Remote Power Module output #5 shuts off.
  37. Activate sixth in-cab switch.
  38. Verify that Remote Power Module output #6 is providing battery voltage.
  39. Deactivate sixth in-cab switch.
  40. Apply 12V to Remote Power Module input #6.
  41. Verify that Remote Power Module output #6 is providing battery voltage.
  42. Apply ground to Remote Power Module input #6.
  43. Verify that Remote Power Module output #6 shuts off.

→ If any Remote Power Module outputs have been programmed to turn ON automatically when the key is turned ON, (See Programmable Parameters) then turn the key to the ON position and verify that those outputs are providing battery voltage.

#### **HOW TO ADD THIS FEATURE:**

Three Remote Power Modules can be added to a vehicle. There are two kits available, the actual RPM kit 2585983C91 and also an Address kit 2585982C91. Shown below are the instructions that accompany the kits.

#### **Installation of Remote Power Module address jumpers.**

**Table 149 Kit Contents**

1	Jumper Red Wire
1	Jumper Green Wire
1	Jumper Blue Wire

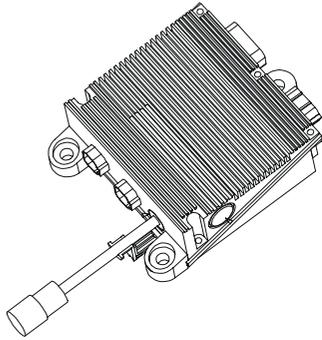
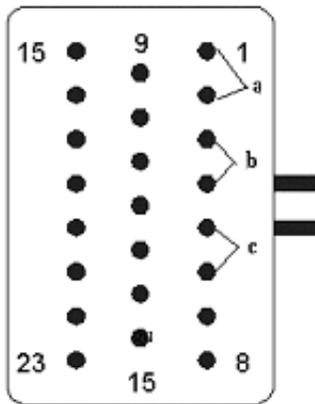


Figure 150

J3 23-way Connector



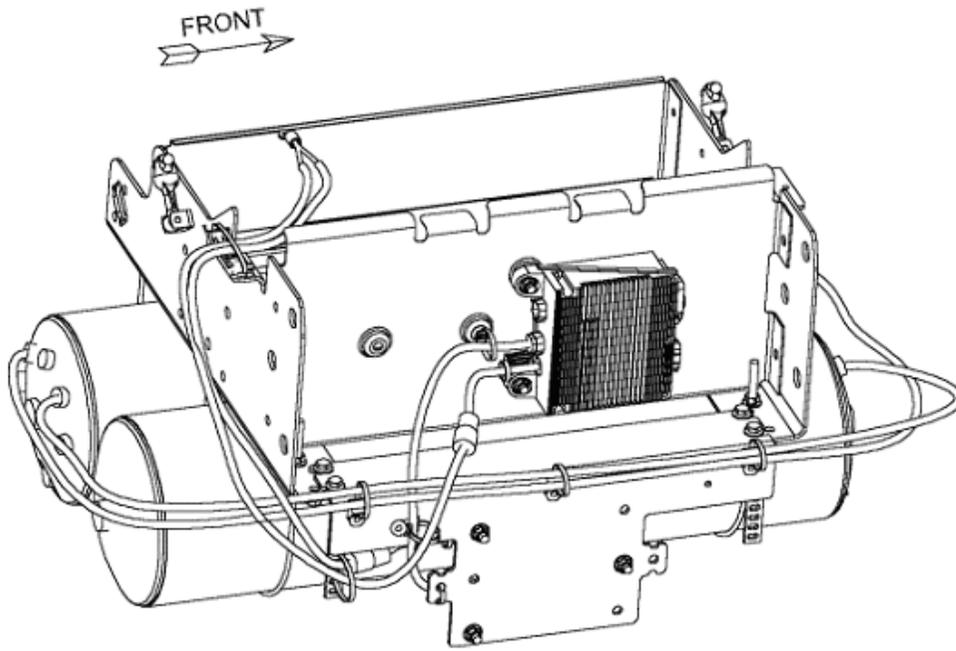
**Addressing Remote Power Modules**

All remote power modules require jumpers to tell the system controller what remote power module it is controlling. Jumpers are to be installed in a 23- way connector in location J3 shown in the Figure above.

This Kit contains

Jumper wire color	Remote power module location	Cavity Loc.
Red wire	1 <sup>st</sup> back of cab	a
Green wire	2 <sup>nd</sup> back of cab	b
Blue wire	End of frame	c
Red, Green and Blue wire	Forward chassis	a b c
Red Wire	Remote Engine Speed Controller	a

Figure 151



4000 Single RPM

Figure 152 4000 Single RPM

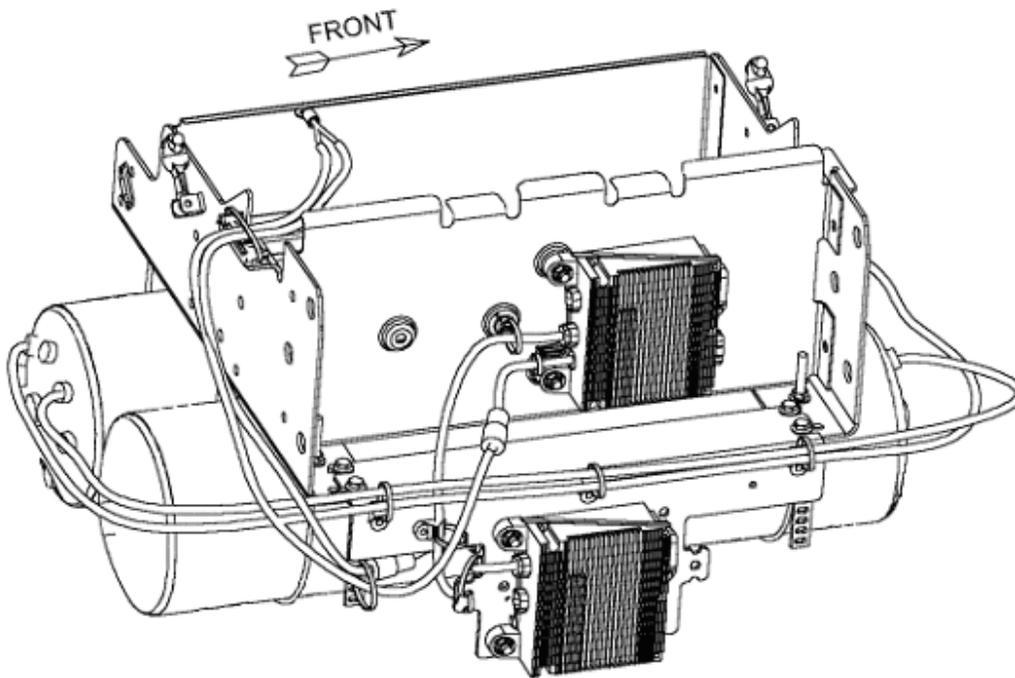


Figure 153 4000 with 2 RPMs

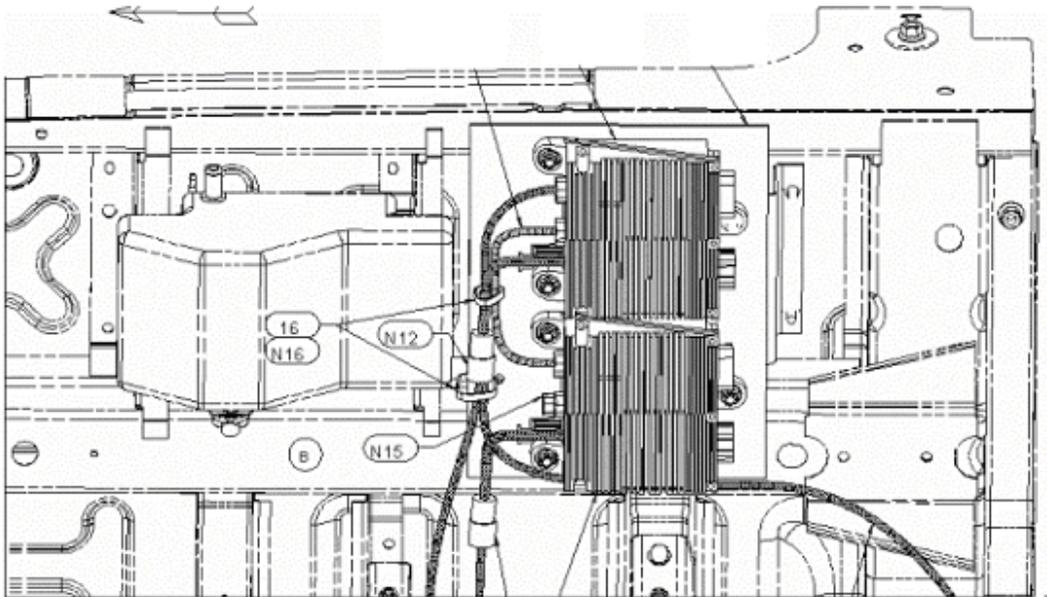


Figure 154 7000 Models Under Cab Mounting

Table 150 2585983C91 KIT, REMOTE POWER MODULE BACK OF CAB

Part	Description	Quantity
2585982C91	KIT, REMOTE POWER MODULE JUMPER	1
3554070C93	HARNESS, ELEC*RPU/ RPTO BOC DATA	1
3558934C92	HARNESS, CHASSIS WIRING* SINGLE	1
3572525C91	HARN, DASH WRG, BB DLINK, PWR AND GND	1
3574372C91	HARN, DASH WRG, SMRT SOL PK(7/14)	1
MIN5	FUSE 5A (3534208C1)	1
3559775C1	RESISTOR, ELECT* TERMINATING RES	1
3549776C4	HOUSING, SWITCH*6 PACK DIN MULT	1
3578910C1	SWITCH, BLANK RCKR-2 POS BISTAB	6
3578733C1	LIGHT, IND, LED ON-GREEN, BRIGHT	6
3533928C1	LIGHT, IND, LED AMBER BKLGT	6
3552005C3	KIT, LIGHT* PRODUCT GRAPHIC FOR	1
2506418R2	MANUAL, INST RMT PWR MOD/BOC	1

#### How Do I Install a Back of Cab Remote Power Module Kit and Switch Pack

- Purchase a remote power module and switch pack kit, Part Number 2585983C91 from International Service Parts.

- Place all parts on a convenient workspace to locate and identify all piece parts. Read all of these instructions before beginning the installation.
- This Kit is for left mounted battery box for 4000s' and under cab for 7000's. If truck has right mounted battery box, add 3558936C91. If adding two RPM's use jumper harness 3558937C91 from first to second RPM and add 3558934C92 cable for the battery feed.
- If RPM brackets are needed, the following part numbers will need to be ordered

4000 models: RPM Bracket for second Back of Cab RPM – 3558794C1

7000 models (1 or 2 RPM's): Day Cab – 3582976C2, Crew/Extended Cab – 3582983C2

Mounted under driver side of cab for 7000 Models

3582976C2 - Day Cab Mounting Bracket

3582983C2 - Crew/Extended Cab Mounting Bracket

3558794C1 - Mounting Bracket.

- Mounted under battery box for 4000 Model
- Attach the mounting bracket the underside of the vehicle cab on 7000 models (driver's side) and the back of the battery box if a second RPM is mounted on a 4000 series. See figures above.
- Attach the remote power module to the vehicle-mounting bracket and securely tighten the fasteners.
- Install dash harness and center chassis harness as per the following instructions. The schematic diagram is provided for your assistance in the installation.
- Wrap the add-on harnesses to respective dash and center chassis harnesses with electrical tape or other harness wrap after the installation. Ensure harnesses are routed away from sharp edges and properly clipped for good wire harness support.

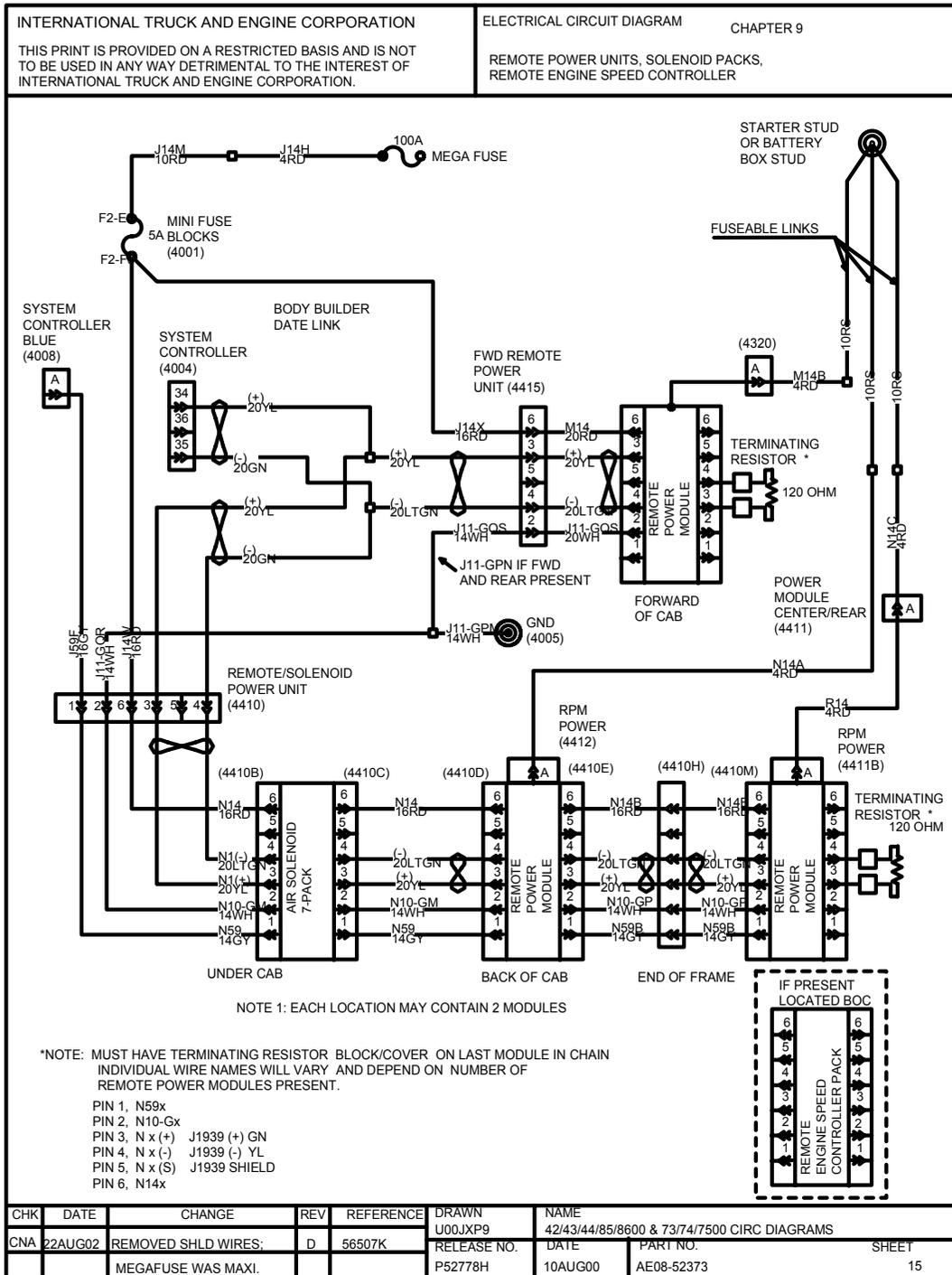


Figure 155

Installation Instructions

1. Install J11-GPN and J11-GQR to ground stud 4005 near Power Distribution Panel.
2. Insert J14W & J14X {Red} into the Power Distribution Panel (4001) cavity F2-F3.
3. Insert J5M (+) {Yellow} into Electronic System Controller (4004) cavity 34.

4. Insert J5M (-) {Green} into Electronic System Controller (4004) cavity 35.
5. Insert the Terminating Resistor into connector (4415) if not using a Forward of Cab RPM or in Forward RPM if using the Forward RPM.
6. Insert J59F {gray} into Electronic System Controller (4008) cavity A. Circuit is only required if air solenoid is being added with RPM and is not needed if air solenoid was factory installed.
7. Insert 5 amp fuse in cavity F2-F3 of the Power Distribution Panel.

**NOTE – If an Air Solenoid 7-Pack is not present, plug connector into first RPM at Back of Cab.**

#### How do I hook it up?

- The RPM has 2 pins in the black 23-pin signal connector that must be jumpered correctly to properly address the module. The first RPM should be addressed as #1 (pins 1 and 2 jumpered together) The second RPM should be addressed as #2 (pins 3 and 4 jumpered together) The RPM is available from International Service Parts with pre-installed address jumpers by separate part numbers.
- No two modules can have the same address on the same vehicle.
- The two identical 6 pin connectors located on the power input side of the module are the data link connectors. They are pass thru connectors that allow for the daisy chaining of modules. Only one connector plugs into the chassis harness.
- The last module in the chain must have a 120-ohm terminating resistor in the data link connector.
- Connect the heavy gauge battery cable to the one way connector on the remote power module and the other end to the vehicle batteries.

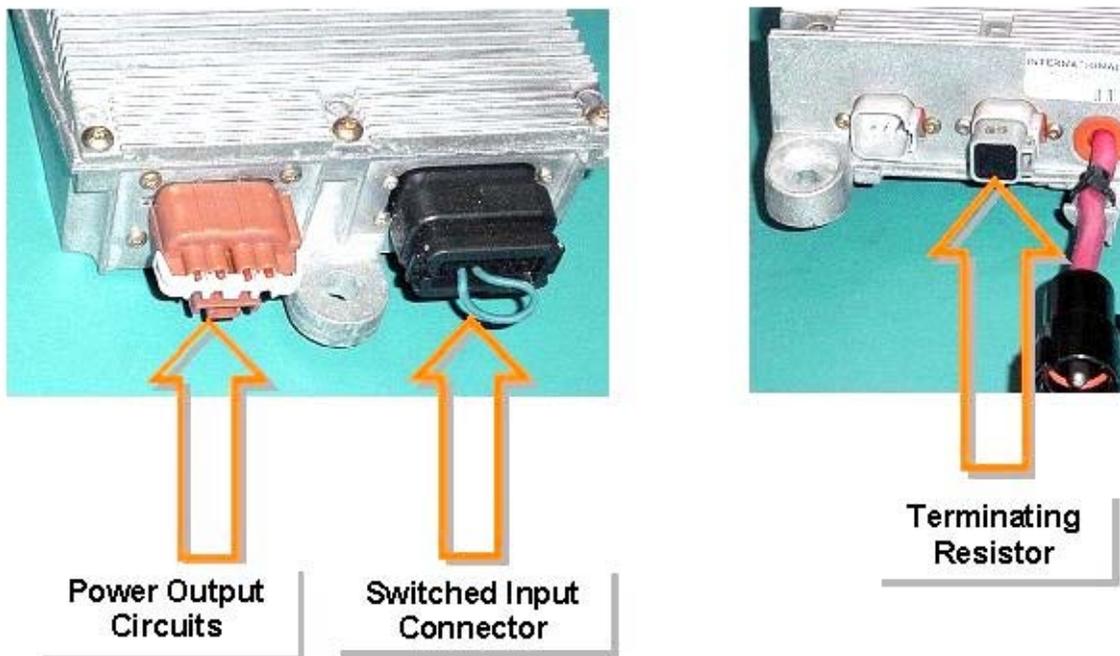
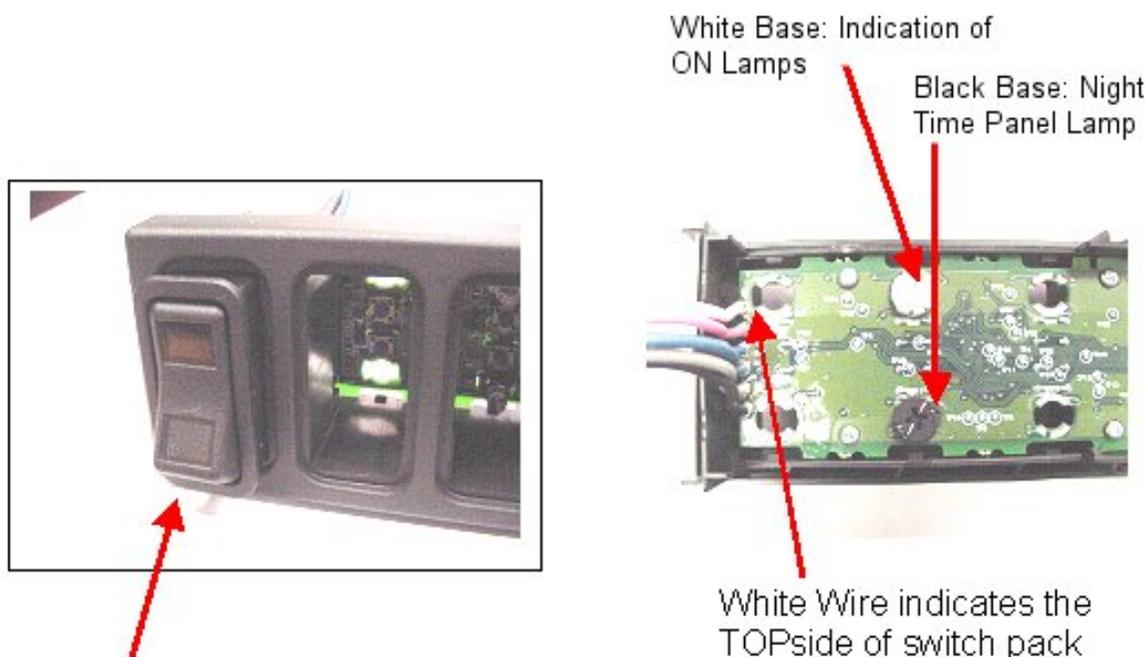


Figure 156

### Installation of Switch Packs



**Figure 157**

- Install 2 position-latched switches into each position of the switch housing. Push each switch in to the switch pack until it snaps into place. There is a keying feature so it cannot be installed upside down.
- Remove the rear cover of the switch pack. It is attached with a snap fit. See the attached pictures to determine which end is up on the switch pack. Install the LED lamps with the white base in the upper section of each switch on the switch pack housing. These are the indication of ON lamps and will glow green when activated. Note that the LED lamps have a keying feature as they are installed in the switch pack circuit board. If the lamps are forced in against the proper orientation, they will not illuminate.
- Install the LED lamps with the black base in the lower section of each switch on the switch pack housing. These are the back light lamps and will glow amber when the panel lights are on. Re-attach the rear cover and secure the wire harnesses under the cover hooks.
- Locate a free switch pack opening in the central instrument panel.
- If no switch packs are present in the vehicle, remove the switch blank below the radio space and locate the 6-pin cab harness for the switch packs. Connect the cab switch harness to the left side switch pack harness (as viewed from the front). Connectors are keyed to ensure proper connection. Ensure that the switch pack is installed in the proper orientation. The green indication of ON lamps must be on top when viewing the front of the switch pack.
- If one 6-switch pack is already present, locate the new switch pack in the lower left switch pack area.
- Connect the second harness of the first switch pack to the input cable harness of the second switch pack.
- Install the second switch pack into center instrument panel. It is secured with a snap action.
- Determine the function of each of the newly added rocker switches. Locate the set of switch labels in the parts kit. Place the labels named "ON" in the upper section of each windowed rocker switch. Place the switch name in the lower portion of the rocker switch.

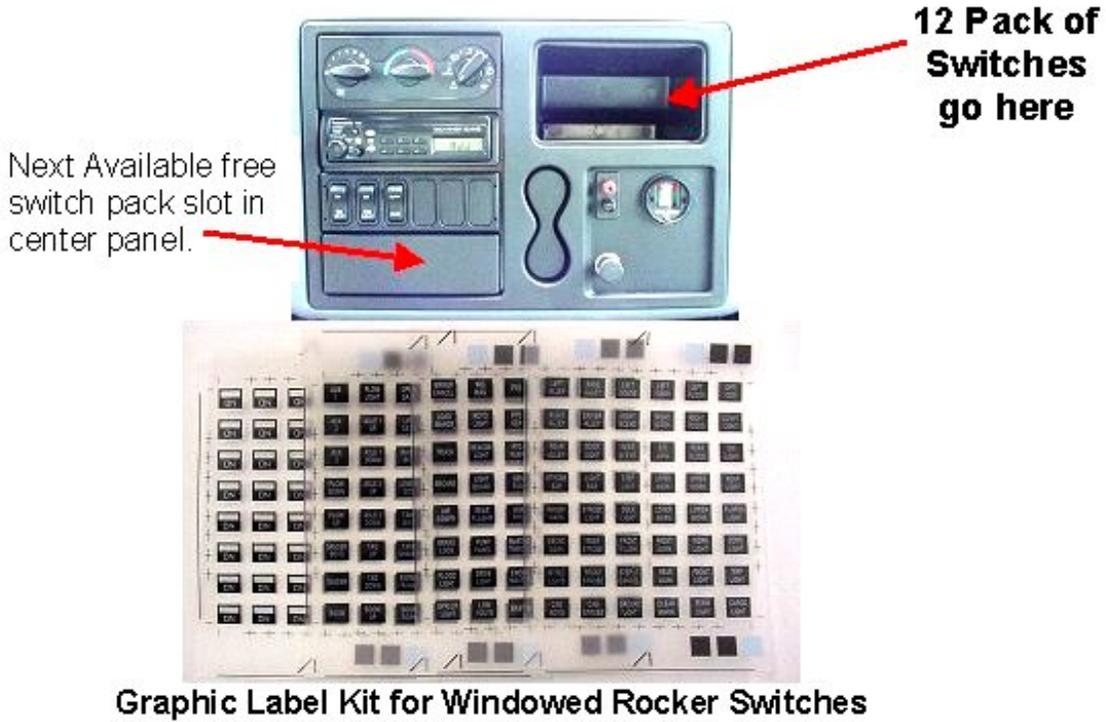


Figure 158

If an additional switch pack is being installed it is connected to the multiplex system by “daisy chaining” it’s connectors to the existing switch pack (or to the Cab Harness if no switch pack is currently installed). It is important to connect the switch packs in the correct order. Connecting the switch packs together and to the cab harness in the wrong order will cause switch pack addressing problems.

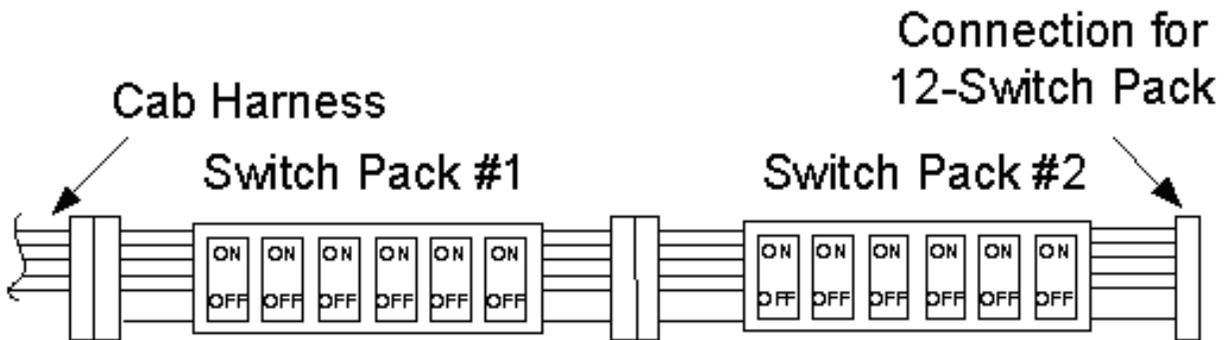
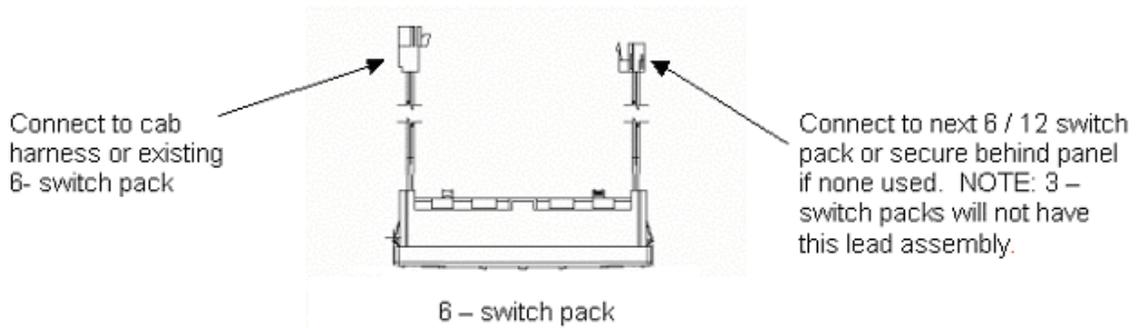
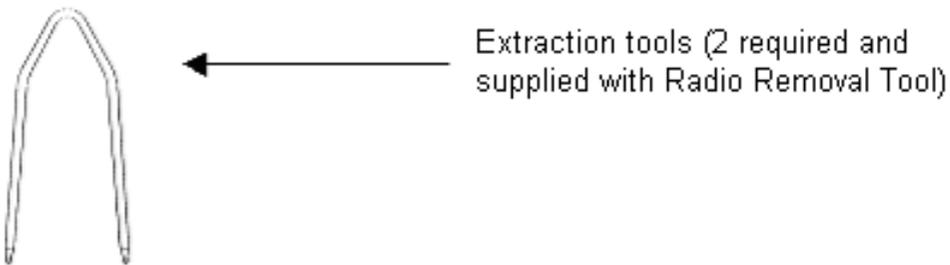


Figure 159

**Figure 160****Removal/Replacement of Switches and Switch Packs**

To remove a switch pack from the panel use the DIN Radio Removal Tool part number 2504954C1.

**Figure 161**

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.

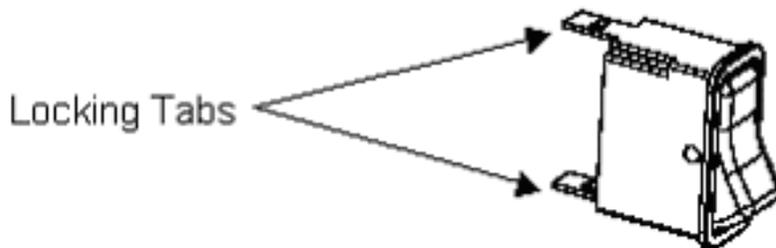


**Figure 162**

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.**



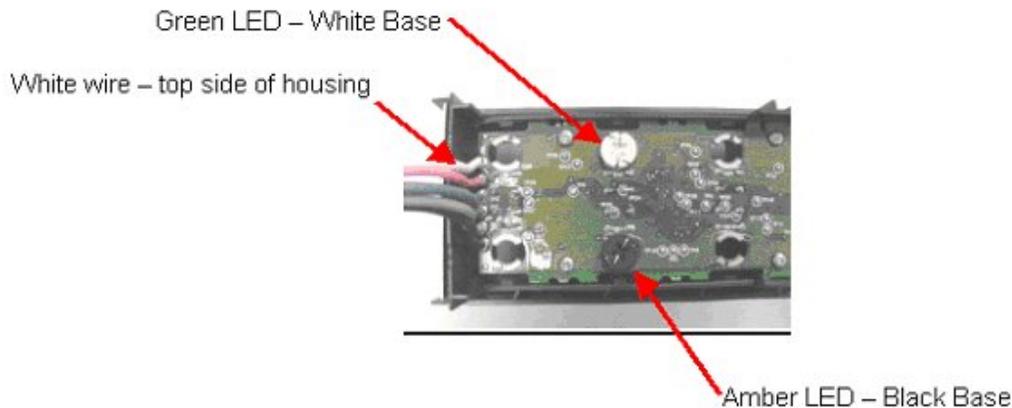
**Figure 163**

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 LED's 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 LED's 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.



**Figure 164**

### Programming The System

- The remote power module and switch pack system is now installed.
- The electrical system must now be programmed to recognize these new components.
- If you own either the ICAP or the Diamond Logic™ Builder software Program, enable the appropriate 595xxx software feature code as follows:
  - 595032 – Remote Power Module 1, one to one mapping between switch pack and power module
  - 595121 – Remote Power Module 2, one to one mapping between switch pack and power module
  - 595119 – Remote Power Module 4, one to one mapping between switch pack and power module
  - 595120 – Remote Power Module 7, one to one mapping between switch pack and power module
  - For body integration features, make selections from entire list of 595 software codes.
- The system may also be programmed at your nearest International Dealer Contact your dealer for details if you want to purchase either of these programs.

When other Body Integration Features are used, please refer to the **Body Integration Feature** section for further directions on installing these features.

## 19.2. 60AAA (ONE), 60AAB (TWO) — REMOTE POWER MODULES (RPM)

### FEATURE CODE DESCRIPTION:

**60AAA** – BDY INTG, REMOTE POWER MODULE Mounted Under Cab; Up to 6 Outputs & 6 Inputs, Max. 20 amp. per Channel, Max. 80 amp. Total (Includes 1 Switch Pack With Latched Switches)

**60AAB** – BDY INTG, REMOTE POWER MODULE (2) Mounted Under Cab; Up to 6 Outputs & 6 Inputs each, Max. 20 amp. per Channel, Max. 80 amp. Total per Power Module (Includes Switch Packs With Latched Switches)

### FEATURE/BODY FUNCTION: 60AAA

Provides 6 load outputs providing a maximum of 20 amps per channel and a maximum of 80 total amps per module. Also provides 6 inputs, drawing information from customer-mounted, outside of cab switches, and/or from information available along the datalink cables. The RPM is also used to distribute and control power to various devices on the vehicle from switches inside the cab.

\* However many outputs you fill in the order, you get any remaining switches that would be unused out of 6. For example, if you place an order where 4 outputs are used up, you would get two more switches. If you place an order where you use up 5 outputs, you will get 1 switch. **You get as many switches as you have outputs left over.**

### FEATURE/BODY FUNCTION: 60AAB

Each RPM provides 6 load outputs providing a maximum of 20 amps per channel and a maximum of 80 total amps per module. Also provides 6 inputs, drawing information from customer-mounted, outside of cab switches, and/or from information available along the datalink cables. These RPMs are used to distribute and control power to various devices on the vehicle from switches inside the cab.

\* However many outputs you fill in the order, you get any remaining switches that would be unused out of 12. For example, if you place an order where 8 outputs are used up, you would get 4 more switches. **You get as many switches as you have outputs left over.**

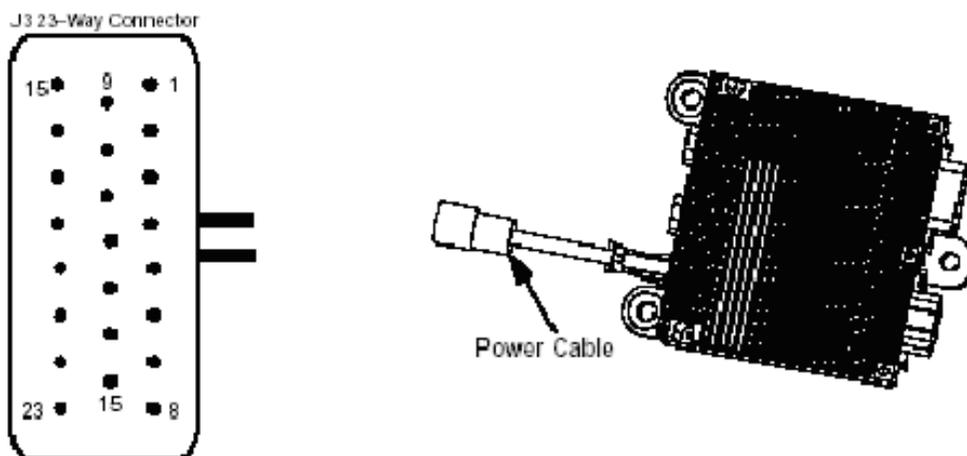
### SOFTWARE FEATURE CODES AND PROGRAMMABLE PARAMETERS:

Hardware only, no 595 codes

### WIRING INFORMATION

**Address Jumpers:**

1	Jumper Red Wire
1	Jumper Green Wire
1	Jumper Blue Wire

**Figure 165****Addressing Remote Power Modules**

All remote power modules require jumpers to tell the system controller what remote power module it is controlling. Jumpers are to be installed in a 23-way connector in location J4 shown in the figure above.

**Table 151**

Jumper Wire Color	Remote Power Module Location	Cavity Location
Red Wire	1st Back of Cab	1–2
Green Wire	2nd Back of Cab	3–4
Blue Wire	End of Frame	5–6

When adding Remote Power Modules, programming the Electronic System Controller is required.

**Table 152 8-Way ESC (Brown and Blue) and RPM Connector (Brown)**

Connector Part No.	Description	Terminal Part	Seal Part	Lock Part	Connector ID
3548934C1	Connector, Body*, 8-Way Brown Packard GT 280 Sealed Male Lock 3548943C1	3535931C1	3535937C1	3548943C1	4007
3548933C1	Connector, Body*, 8-Way Blue Packard GT 280 Sealed Male Lock 3548943C1	3535931C1	3535937C1	3548943C1	4008
2005482C1	Connector, Body 23-Way (remote address and external switch)	1698937C1	Plug 1688285C1	N/A	381

## Switches

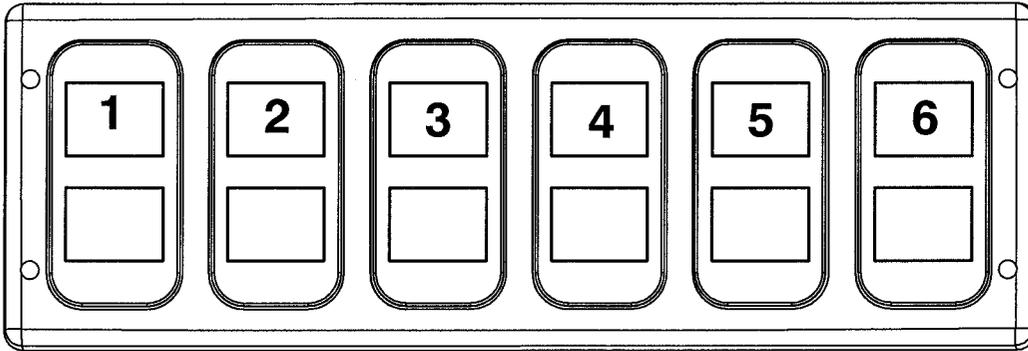


Figure 166 Instrument Panel Mounted Switch Pack

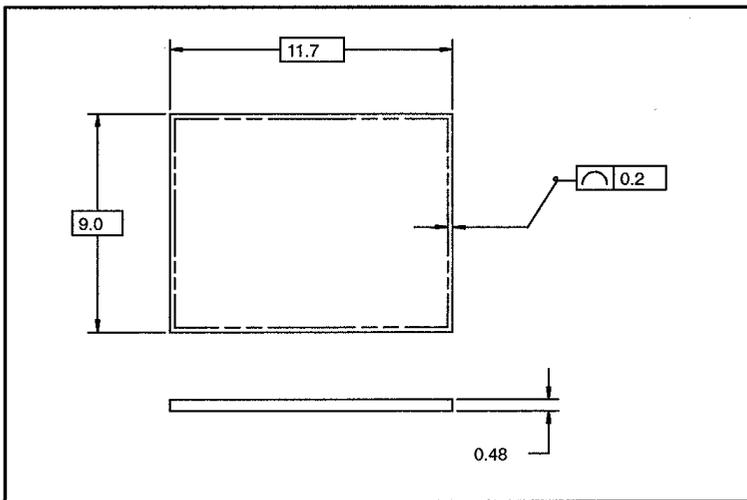


Figure 167 Switch Label Dimensions in Millimeters

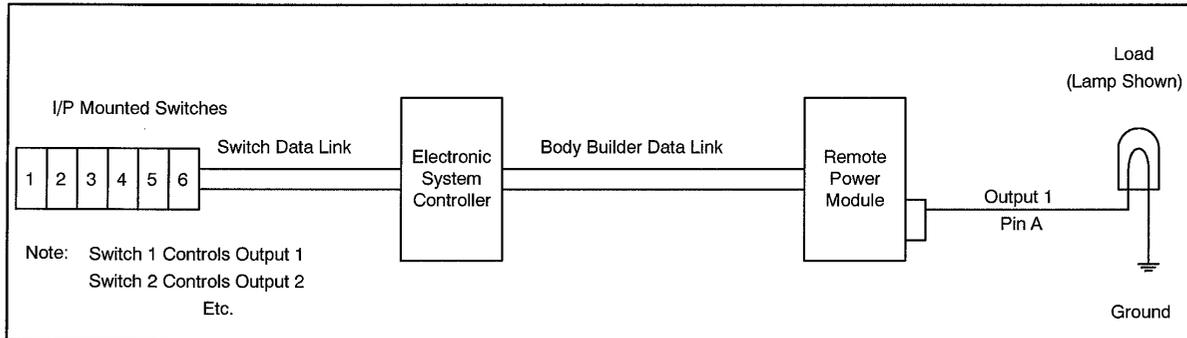
**Switch Labeling:** Switch packs provided with the Remote Power Module Feature are general purpose “un-labeled” rocker switches. Since the functions of the rocker switches are unknown at the time of vehicle assembly, un-labeled rocker switches are provided so the body builder can customize the switches to any particular need. A package of switch labels is provided for usage by the body builder to finish the labeling of the switches. If the body builder requires a label name not already provided by International, a custom label may be designed by following the specification of the attached switch label appliqué drawing. Supply of custom labels is the responsibility of the body builder.

The suppliers for the windowed rocker labels are:

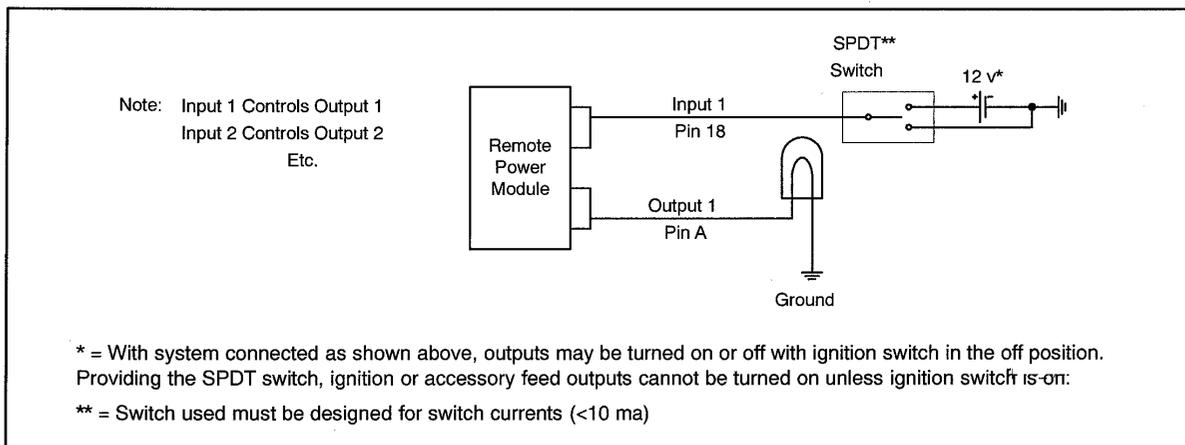
**Dura-Tech**

3216 Commerce  
St. LaCrosse, Wisconsin 54603  
Telephone: 608-781-2570  
Web site: duratech.com

**Pollak Switch Products Division**  
 300 Dan Road  
 Canton, Mass. 02021  
 Telephone: 781-830-0340



**Figure 168 Example with RPM Output Controlled by Switch Inside Cab**



**Figure 169 Example with RPM Output Controlled by Switch Located on Chassis**

**Table 153**

Pin	Signal Name	Signal Direction	Rating (Amps)
Signal Connector			
1	Module Select Common	Ground	
2	Module Select #1	Digital Input	0.010
3	Module Select Common	Ground	
4	Module Select #2	Digital Input	0.010
5	Module Select Common	Ground	
6	Module Select #3		0.010
7			
8			

Pin	Signal Name	Signal Direction	Rating (Amps)
9			
10			
11			
12			
13			
14			
15			
16			
17			
18	Input #1	Switch Input	0.010
19	Input #2	Switch Input	0.010
20	Input #3	Switch Input	0.010
21	Input #4	Switch Input	0.010
22	Input #5	Switch Input	0.010
23	Input #6	Switch Input	0.010
Power Connector			
A	Output #1	Output	20
B	Output #2	Output	20
C	Output #3	Output	20
D	Output #4	Output	20
E	Output #5	Output	20
F			
G			
H	Output #6	Output	20

Table 154

Pin	Signal Name	Signal Direction	Rating (Amps)
Body Data Link			
1	Air Solenoid Power***	Input/ Pass-Thru	1
2	Ground	Ground/ Pass-Thru	
3	Body Builder J1939+	Data Link	
4	Body Builder J1939-	Data Link	
6	Battery	Input/ Pass-Thru	5
Body Data Link			
1	Air Solenoid Power***	Input/ Pass-Thru	1

Pin	Signal Name	Signal Direction	Rating (Amps)
2	Ground	Ground/ Pass-Thru	
3	Body Builder J1939+	Data Link	
4	Body Builder J1939-	Data Link	
6	Battery	Input/ Pass-Thru	5
Module Battery Feed			
1	Supply Voltage	Input	80

NOTE: Body Data Link Output is supplied with the mate to this connector which is sealed and includes a 120 ohm terminating resistor.

NOTE: No additional circuits can be added.

\*\*RPM does not use air solenoid power. There is no 12V on this pin unless there is a 7-pack air solenoid module.

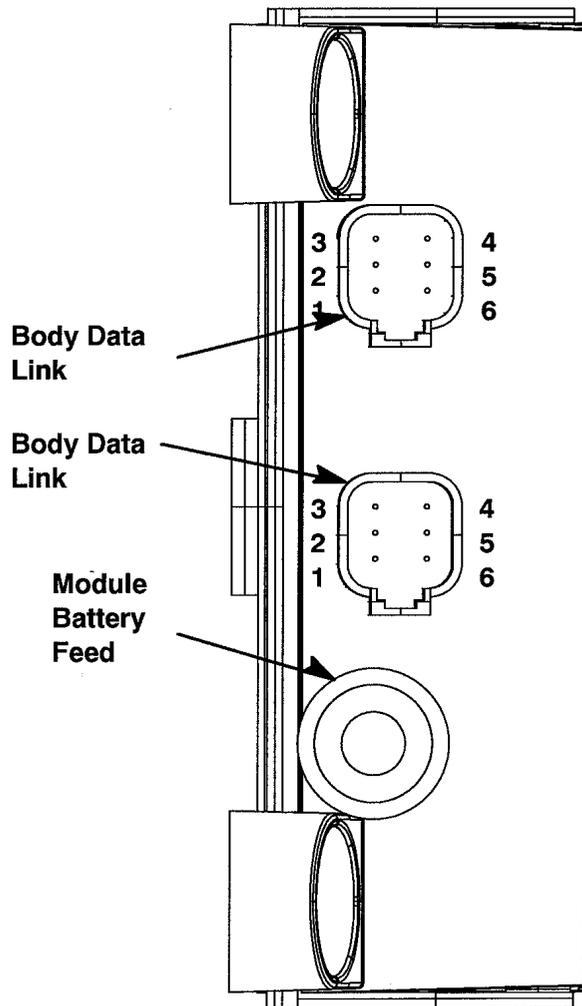


Figure 170

**Table 155 Mating Connector Information**

Signal Connector — 23 Way	
Connector	Lock
770680-1 (Amp)	1688285C1
Terminal	Cable Gauge
2005483C1	16, 18, 20

**Table 156 Mating Connector Information**

Power Connector — 8 Way	
Connector	Lock
3548934C1	3548943C1
Terminal	Cable Gauge
3535929C1	20, 22
3535930C1	16, 18
3534163C1	12
3535931C1	14
Cable Seal	Cable Gauge
3535935C1	20, 22
3535936C1	16, 18
3535937C1	14
3548945C1	12
Plug	2025431C1

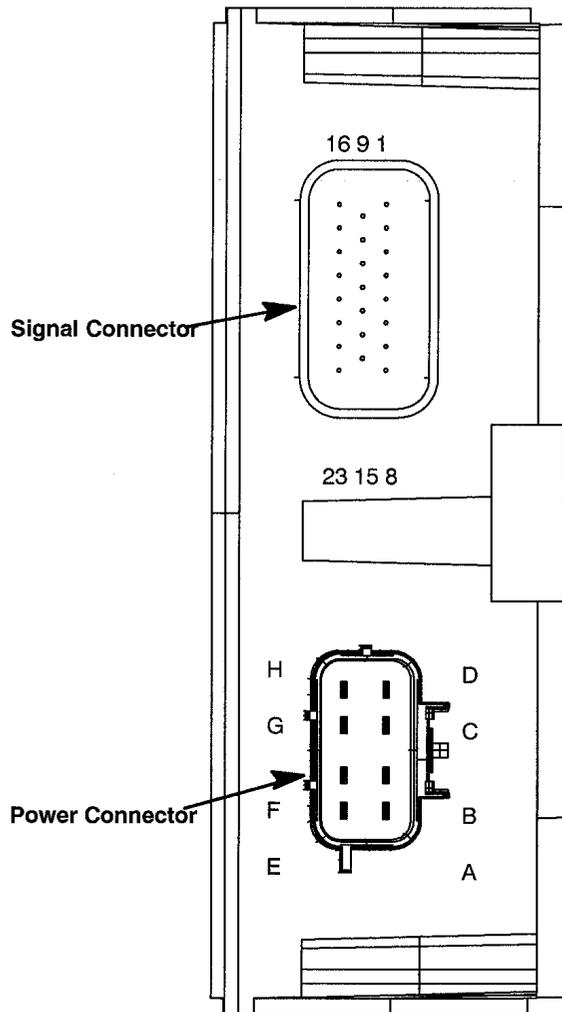
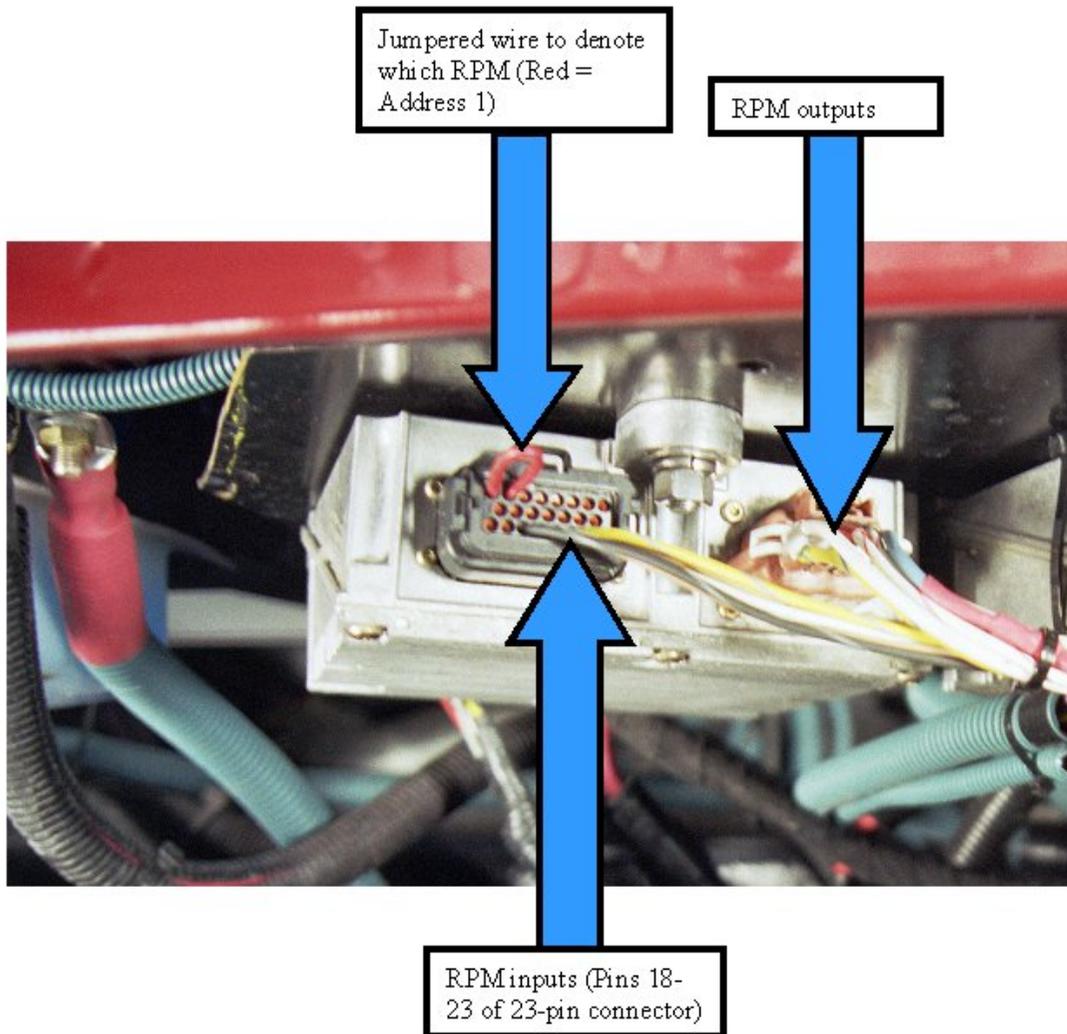


Figure 171



**Figure 172**

### **TESTING**

1. Turn the ignition key to the accessory position.
2. If a “one to one” mapping software feature was installed, turn on the first switch.
3. The green indicator should illuminate and the first channel output of the remote power module should be at battery volts.
4. Each respective switch and power module output should operate in a similar fashion.

If a body integration feature was installed, refer to the electrical Body Builder Book for a functional description of each feature.

**Circuit Diagrams:** See Electrical Circuit Diagram Manual S08285 Chapter 9, Page 15.

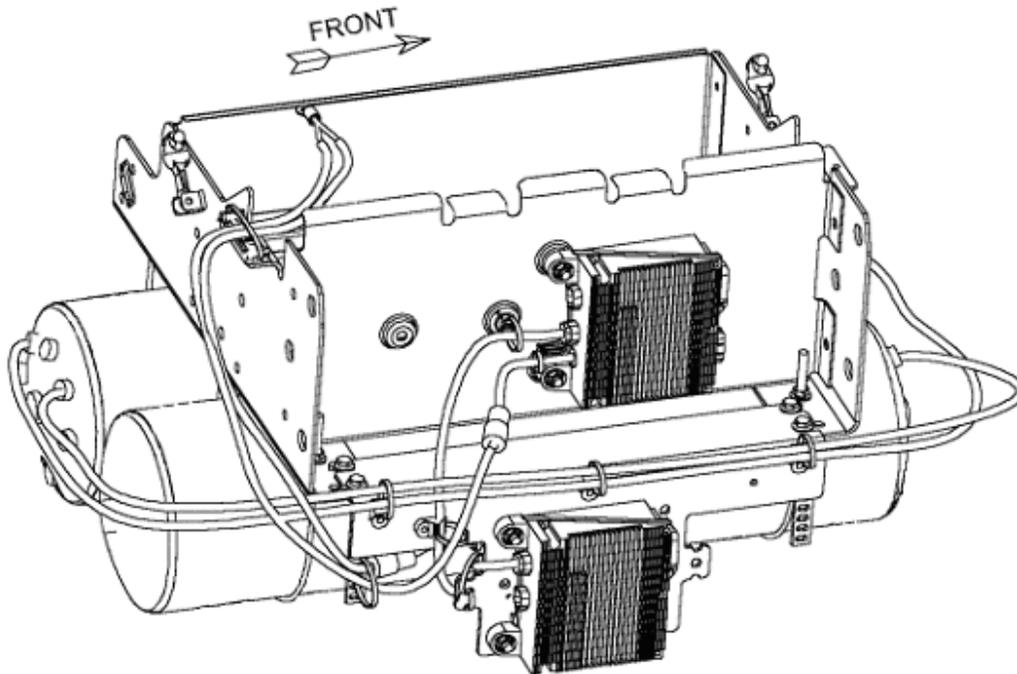
**How Do I Install a Back of Cab Remote Power Module Kit and Switch Pack**

- Purchase a remote power module and switch pack kit, Part Number 2585983C91 from International Service Parts.
- Place all parts on a convenient workspace to locate and identify all piece parts. Read all of these instructions before beginning the installation.
- This Kit is for left mounted battery box for 4000s' and under cab for 7000's. If truck has right mounted battery box, add 3558936C91. If adding two RPM's use jumper harness 3558937C91 from first to second RPM and add 3558934C92 cable for the battery feed.

If RPM brackets are needed, the following part numbers will need to be ordered

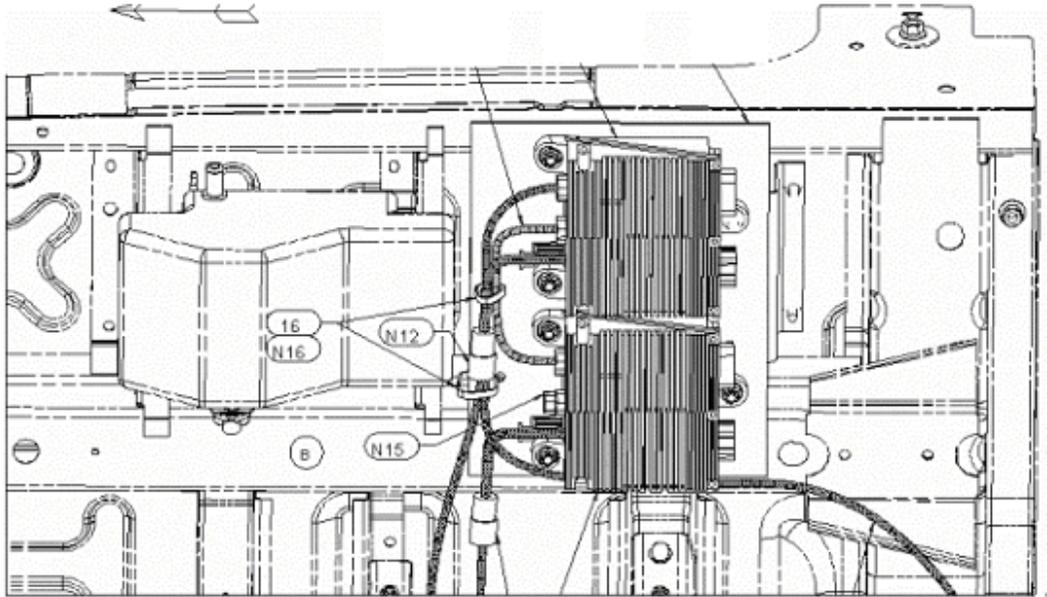
4000 models: RPM Bracket for second Back of Cab RPM – 3558794C1

7000 models ( 1 or 2 RPM's ): Day Cab – 3582976C2, Crew/Extended Cab – 3582983C2



**Figure 173 Mounted Under Battery Box for 4000 Model**

3558794C1 - Mounting Bracket.



**Figure 174 Mounted Under Driver Side Of Cab for 7000 Models**

3582976C2 - Day Cab Mounting Bracket

3582983C2 - Crew/Extended Cab Mounting Bracket

- Attach the mounting bracket to the underside of the vehicle cab on 7000 models (driver's side) and the back of the battery box if a second RPM is mounted on a 4000 series. See figures above.
- Attach the remote power module to the vehicle-mounting bracket and securely tighten the fasteners.
- Install dash harness and center chassis harness as per the following instructions. The schematic diagram is provided for your assistance in the installation.
- Wrap the add-on harnesses to respective dash and center chassis harnesses with electrical tape or other harness wrap after the installation. Ensure harnesses are routed away from sharp edges and properly clipped for good wire harness support.

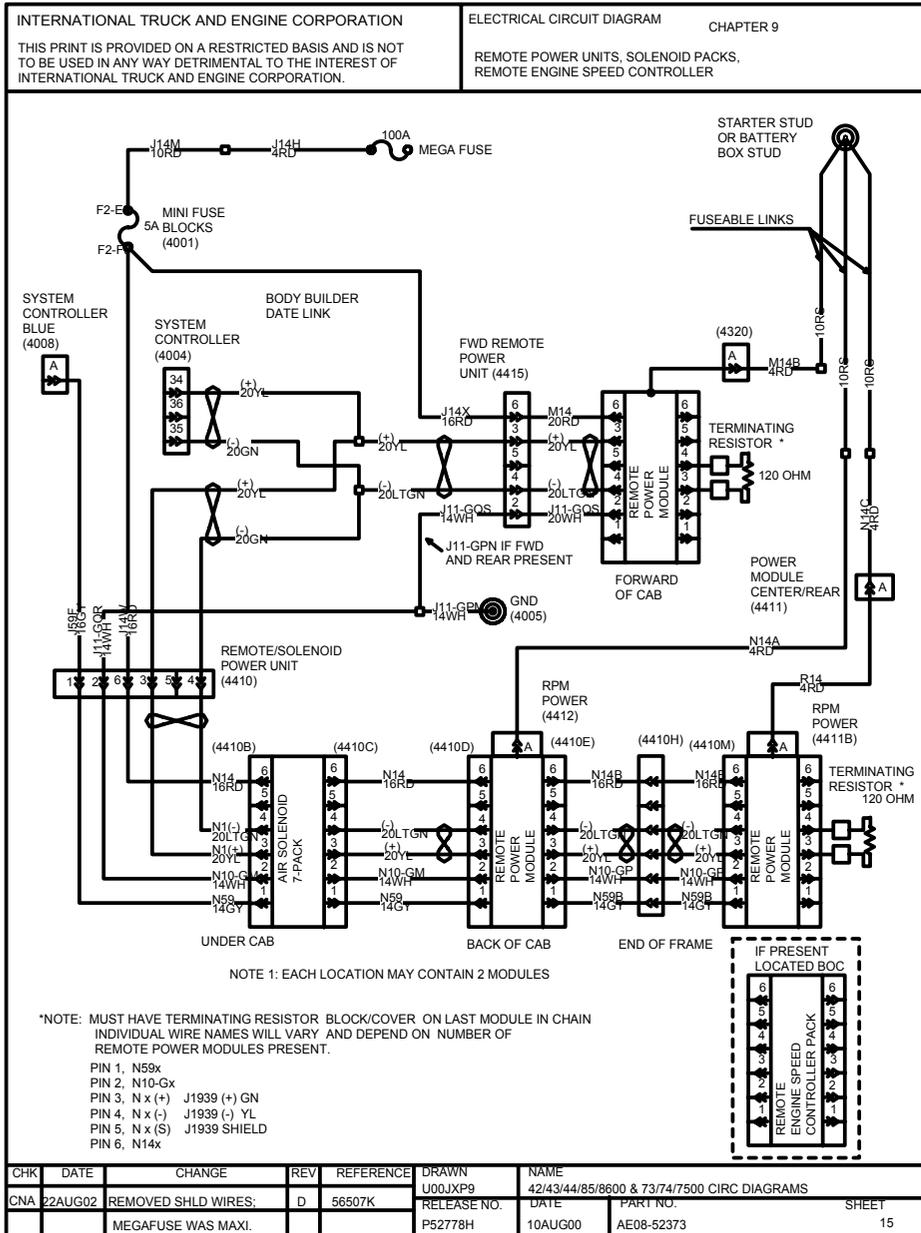


Figure 175

Installation Instructions

1. Install J11-GPN and J11-GQR to ground stud 4005 near Power Distribution Panel.
2. Insert J14W & J14X {Red} into the Power Distribution Panel (4001) cavity F2-F3.
3. Insert J5M (+) {Yellow} into Electronic System Controller (4004) cavity 34.
4. Insert J5M (-) {Green} into Electronic System Controller (4004) cavity 35.
5. Insert the Terminating Resister into connector (4415) if not using a Forward of Cab RPM or in Forward RPM if using the Forward RPM.
6. Insert J59F {gray} into Electronic System Controller (4008) cavity A.

7. Insert 5 amp fuse in cavity F2-F3 of the Power Distribution Panel.

**NOTE – If an Air Solenoid 7-Pack is not present, plug connector into first RPM at Back of Cab.**

#### How do I hook it up?

- The RPM has 2 pins in the black 23-pin signal connector that must be jumpered correctly to properly address the module. The first RPM should be addressed as #1 (pins 1 and 2 jumpered together) The second RPM should be addressed as #2 (pins 3 and 4 jumpered together) The RPM is available from International Service Parts with pre-installed address jumpers by separate part numbers.
- No two modules can have the same address on the same vehicle.
- The two identical 6 pin connectors located on the power input side of the module are the data link connectors. They are pass thru connectors that allow for the daisy chaining of modules. Only one connector plugs into the chassis harness.
- The last module in the chain must have a 120-ohm terminating resistor in the data link connector.
- Connect the heavy gauge battery cable to the one way connector on the remote power module and the other end to the vehicle batteries.

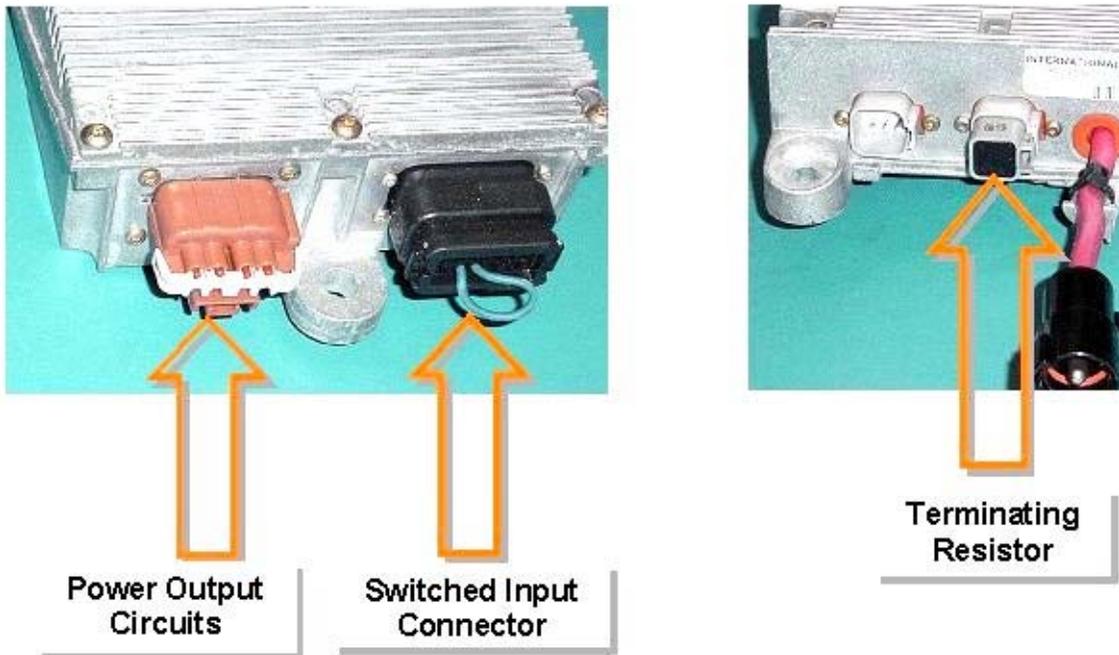
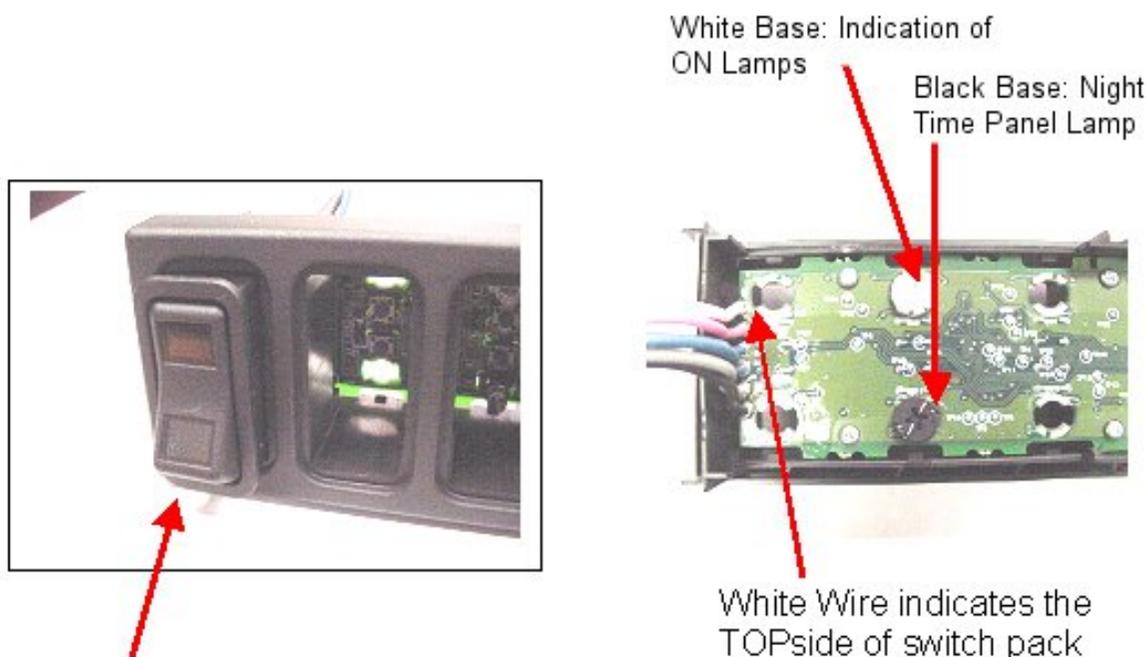


Figure 176

### Installation of Switch Packs



**Figure 177**

- Install 2 position-latched switches into each position of the switch housing. Push each switch in to the switch pack until it snaps into place. There is a keying feature so it cannot be installed upside down.
- Remove the rear cover of the switch pack. It is attached with a snap fit. See the attached pictures to determine which end is up on the switch pack. Install the LED lamps with the white base in the upper section of each switch on the switch pack housing. These are the indication of ON lamps and will glow green when activated. Note that the LED lamps have a keying feature as they are installed in the switch pack circuit board. If the lamps are forced in against the proper orientation, they will not illuminate.
- Install the LED lamps with the black base in the lower section of each switch on the switch pack housing. These are the back light lamps and will glow amber when the panel lights are on. Re-attach the rear cover and secure the wire harnesses under the cover hooks.
- Locate a free switch pack opening in the central instrument panel.
- If no switch packs are present in the vehicle, remove the switch blank below the radio space and locate the 6-pin cab harness for the switch packs. Connect the cab switch harness to the left side switch pack harness (as viewed from the front). Connectors are keyed to ensure proper connection. Ensure that the switch pack is installed in the proper orientation. The green indication of ON lamps must be on top when viewing the front of the switch pack.
- If one 6-switch pack is already present, locate the new switch pack in the lower left switch pack area.
- Connect the second harness of the first switch pack to the input cable harness of the second switch pack.
- Install the second switch pack into center instrument panel. It is secured with a snap action.
- Determine the function of each of the newly added rocker switches. Locate the set of switch labels in the parts kit. Place the labels named "ON" in the upper section of each windowed rocker switch. Place the switch name in the lower portion of the rocker switch.

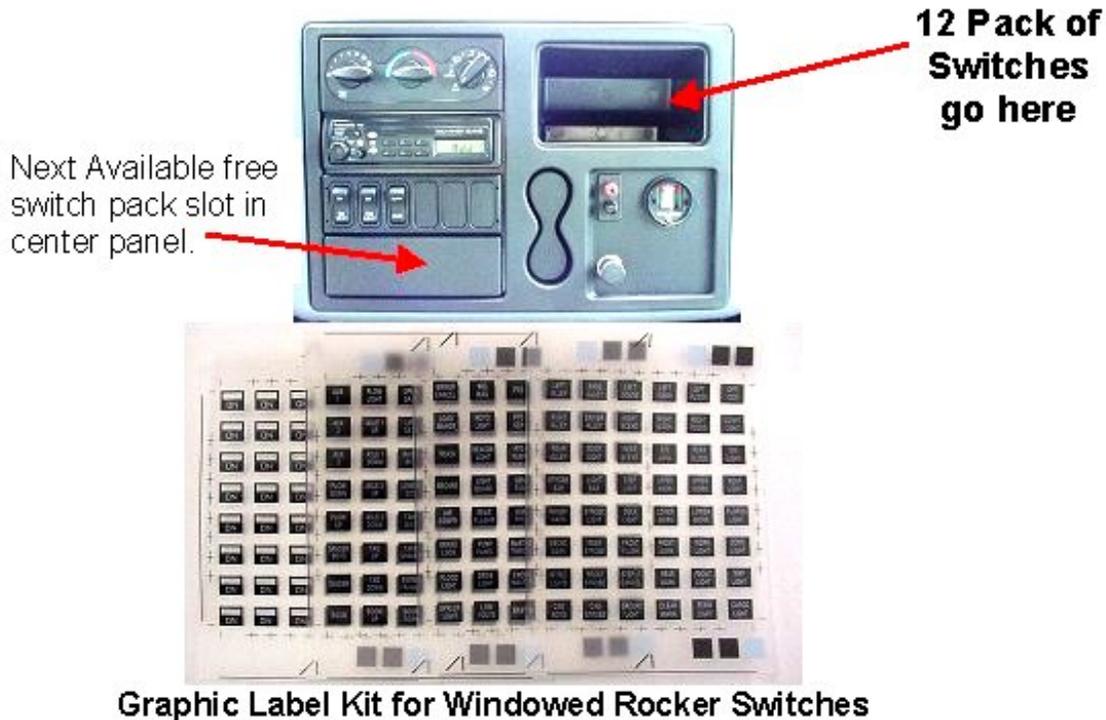


Figure 178

### Programming The System

- The remote power module and switch pack system is now installed.
- 60AAA and 60AAB can be modified by using other Body Integration (60) codes. These codes can be added using ICAP or the Diamond Logic™ Builder software.
- The system may also be programmed at your nearest International Dealer Contact your dealer for details if you want to purchase either of these programs.
- When other Body Integration Features are used, please refer to the **Body Integration Feature** section for further directions on installing these features.

### Testing the Remote Power Module System

- Turn the ignition key to the accessory position.
- If a “one to one” mapping software feature was installed, turn on the first switch.
- The green indicator should illuminate and the first channel output of the remote power module should be at battery volts.
- Each respective switch and power module output should operate in a similar fashion.

If a body integration feature was installed, refer to the electrical Body Builder Book for a functional description of each feature.

### 19.3. 08WTJ — SWITCH BODY CIRCUITS FRAME MTG REAR

#### FEATURE CODE DESCRIPTION:

**08WTJ** – SWITCH, BODY CIRCUITS, REAR for Bodybuilder with 6 switches in instrument panel (2–position switches), one power module with 6 channels, 20 amp per channel and 80 amp maximum output. Switches control the power modules through multiplex wiring, mounted at the rear of the frame.

#### FEATURE/BODY FUNCTION:

Feature 08WJT adds 1 RPM to the end of the frame to be used by itself or in combination with 60AAA (1 RPM BOC) or 60AAB (2 RPMs BOC). The Remote Power Module will have 6 channels, 20A per channel, and 80A maximum output. There will be 6, 2–position, switches located in the Instrument Panel, that will control the RPM through multiplex wiring.

#### SOFTWARE FEATURE CODES AND PROGRAMMABLE PARAMETERS:

Required software feature code: 595282

Conflicts with Software features: NONE

**Table 157**

Parameter Name	ID	Description	Default Settings	Units	Min Value	Max Value	Step
TEM_Aux13_Output_Fuse_Param	PV-TEM-Aux-13	Default setting for TEM_Aux13_Output_Fuse Param	20	Amps	0	20	0.1
TEM_Aux14_Output_Fuse_Param	PV-TEM-Aux-14	Default setting for TEM_Aux14_Output_Fuse Param	20	Amps	0	20	0.1
TEM_Aux15_Output_Fuse_Param	PV-TEM-Aux-15	Default setting for TEM_Aux15_Output_Fuse Param	20	Amps	0	20	0.1
TEM_Aux16_Output_Fuse_Param	PV-TEM-Aux-16	Default setting for TEM_Aux16_Output_Fuse Param	20	Amps	0	20	0.1
TEM_Aux17_Output_Fuse_Param	PV-TEM-Aux-17	Default setting for TEM_Aux17_Output_Fuse Param	20	Amps	0	20	0.1
TEM_Aux18_Output_Fuse_Param	PV-TEM-Aux-18	Default setting for TEM_Aux18_Output_Fuse Param	20	Amps	0	20	0.1

#### WIRING INFORMATION

Refer to current remote power module.

#### TESTING

Refer to current remote power module.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595282 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Refer to current remote power module for further installation instructions.

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

**Table 158**

Part Number	Description
3595804F91	Consists of the following:
6 of 3533928C1	Light, Indicator, LED backlight (Amber)
6 of 3578733C1	Light, Indicator, LED on (Green) 1.0 CAN
6 of 3578910C1	Switch, Electronic, Blank Rocker — 2 POS

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## 20. IN CAB AND EXTERNAL SWITCH (3-WAY) CONTROLS FOR BODY ACCESSORIES

### 20.1. 60ACS — ONE MOMENTARY ROCKER SWITCH / REMOTE SWITCH CAPABILITY

**FEATURE CODE DESCRIPTION:** BDY INTG, SWITCH MOMNTRY 3POS Rocker, Backlit, with "ON" Indicator Mounted on Dash, Latching Software, for 1 Auxiliary Load 20 amp. Maximum; Power Available Only in "Ignition" or "Accessory" Position, Output Also Controlled by a Customer Remote Mounted Switch (requires 1 Remote Power Module input and 1 output)

**FEATURE/BODY FUNCTION:** This feature provides a three-way switch control function for a remote power module output. An in-cab 3-position momentary switch is connected to a remote power module (RPM) output. In addition, a customer supplied remote mounted momentary switch may be used to control the same RPM output. This switch must be active at 12 volts and must use ground to deactivate the output. Thus, a three-way switch control action may be performed with these two switch inputs. The RPM output may be turned OFF or ON from either switch, however, an OFF command from either switch takes precedence and will turn the RPM output OFF. This feature is useful when a lamp or other load requires control from both in the cab or from a remote location on the body.

The in-cab switch provides a green lamp in the top section of the switch to indicate when the RPM output is ON. The RPM provides an active high output that will source up to 20 amps at battery voltage levels. The output current level may be limited through programmable parameters between .1 and 20 amps in .1 amp increments. This virtual fusing level is controlled in software and mimics the performance of an SAE fuse.

The RPM output may be activated with the in-cab switch provided that the ignition key is in the Accessory or Ignition position. The RPM output may also be activated with the remote switch input with ignition key OFF or ON. It is important to turn off RPM outputs that have been enabled remotely before leaving a parked vehicle with the ignition key off. Otherwise, the system will remain active and drain the batteries.

60AAA or 60AAB is a prerequisite feature that must be ordered along with 60ACS. 60ACS uses a single momentary switch in place of one of the latching switches that is provided with 60AAA and 60AAB. For example, instead of the 6 latching switches that are provided with 60AAA, a vehicle with 60ACS will have a switch pack of 5 latching switches and 1 momentary switch.

→ Please use ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature code: 595200

Conflicts with Software features: NONE

The **TEM\_Aux1\_w\_Ext\_Sw\_Fuse\_Level** parameter sets the amount of current that flows through Auxiliary output 1. If current rises above this level, fusing takes place and the RPM output is shut down.

By turning the **TEM\_Aux1\_w\_Ext\_Switch\_Init\_State** parameter ON, the ESC forces the Remote Power Module output to be ON whenever the truck's key-state is turned from OFF to ACCESSORY or IGNITION.

Table 159

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Aux1_ w_Ext_Sw_ Fuse_Level	1998	This is the level above which the RPM will fuse the TEM Auxiliary output with external switch.	20	A	0	20	0.1
TEM_Aux1_ w_Ext_Switch_ Init_State	2032	This program- mable parameter sets the init state of RPM channel used with TEM Auxiliary with external switch #1.	Off	On/ Off	NA	NA	NA

**WIRING INFORMATION**

- Customer may mount a switch and install the wiring into the pin labeled 3POS\_SWITCH\_AUX1\_Input in the Black 23-pin Remote Power Module input connector. Installation of the remote switch is optional with this feature. (See ICAP or the Diamond Logic™ Builder software for input pin location)
- Customer must install wiring from the pin labeled 3POS\_SWITCH\_AUX1\_Output Brown 8-pin Remote Power Module output connector to the electrical load that is to be controlled. (See ICAP or the Diamond Logic™ Builder software for output pin location)

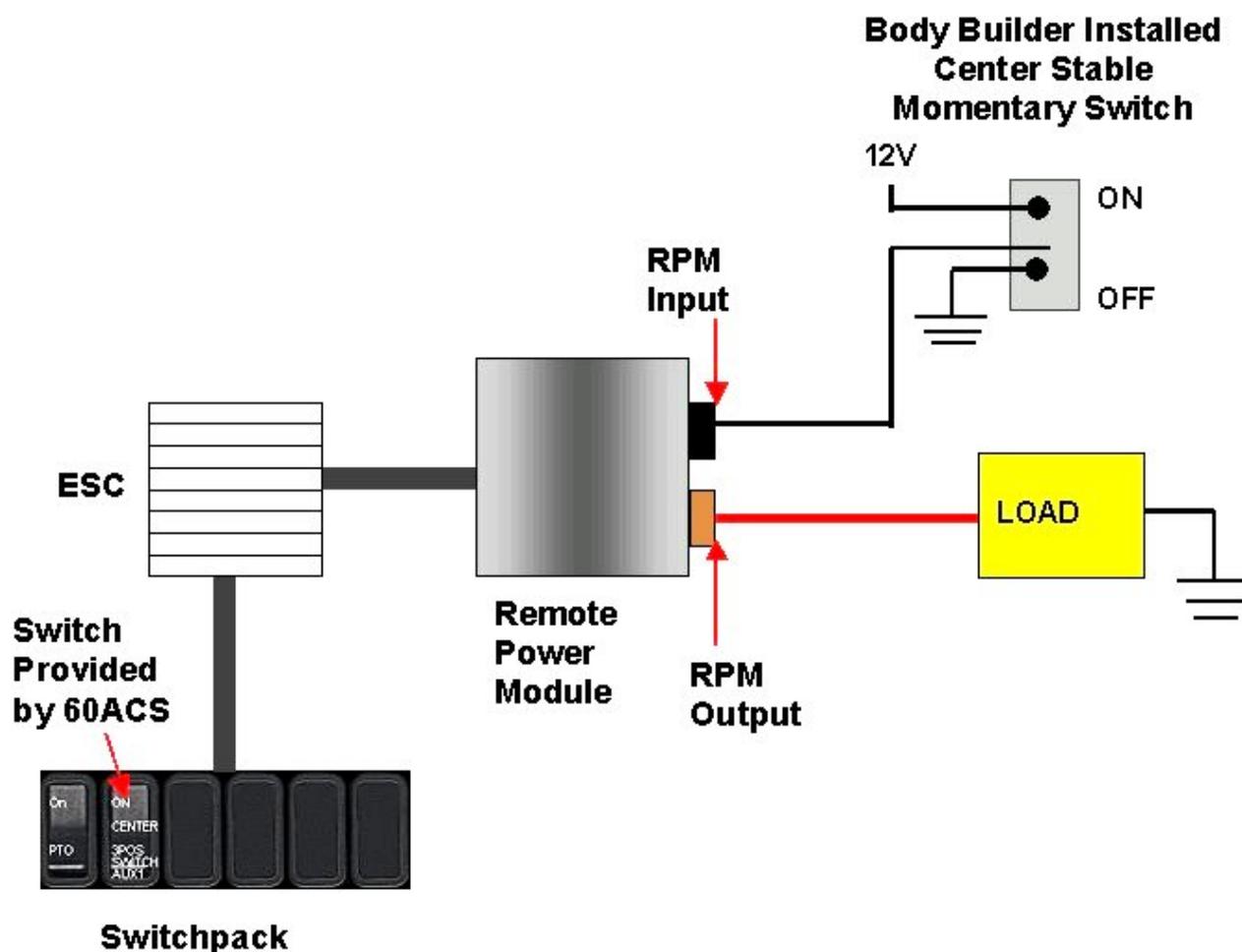


Figure 179

**TESTING**

1. This feature allows the customer the ability to activate the output when the ignition key is turned from OFF to ACCESSORY or IGNITION. This functionality is obtained by turning programmable parameters (TEM\_Aux1\_w\_Ext\_Switch\_Init\_State and TEM\_Aux2\_w\_Ext\_Switch\_Init\_State) ON
2. Activate the first remote Body Builder installed switch to 12 volts by using a momentary switch action.
3. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX1\_Output is providing the battery volts at rated current levels. (As programmed in ICAP or the Diamond Logic™ Builder software)
4. Verify that the green switch indicator light comes on.
5. Verify that the Remote Power Module input labeled 3POS\_SWITCH\_AUX1\_Input is receiving battery volts from the customer-mounted switch. (As programmed in ICAP or the Diamond Logic™ Builder software)
6. Deactivate the first remote Body Builder installed switch by providing a momentary switch action to ground.
7. Verify that the Remote Power Module output goes OFF.

8. Activate the first in-cab switch.
9. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX1\_Output is providing the battery volts (As programmed in ICAP or the Diamond Logic™ Builder software).
10. Verify that the green switch indicator light comes on.
11. Deactivate the first in-cab switch.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595200 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- The 3-position momentary switch with latching software must be installed in the in-cab switch pack.
- The customer must install wiring from the RPM output
- The customer may mount a remote switch and install the wiring into the RPM input

## 20.2. 60ACT — TWO MOMENTARY ROCKER SWITCHES/ REMOTE SWITCH CAPABILITY

**FEATURE CODE DESCRIPTION:** BDY INTG, SWITCH MOMNTRY 3POS Rocker, Backlit, with "ON" Indicator Mounted on Dash, Latching Software, for 2; Auxiliary Load 20 amp. Maximum; Power Available Only in "Ignition" or "Accessory" Position, Output Also Controlled by a Customer Remote Mounted Switch (requires 2 Remote Power Module input and 2 outputs)

**FEATURE/BODY FUNCTION:** This feature provides three-way switch control function for two remote power module outputs. Each RPM output is controlled by an in-cab 3-position momentary switch, and a 3-position momentary Body Builder-installed, remote mounted switch. These customer-installed, remote-mounted switches must be active at 12 volts and must use ground to deactivate the output. Each in cab 3-position momentary switch is connected to a remote power module (RPM) output. In addition, each customer supplied, remote mounted momentary switch may be used to control the respective RPM outputs. Thus, three-way switch control action may be performed. The RPM outputs may be turned OFF or ON from either the respective in-cab switch, or the respective Body Builder switch, however, an OFF command from either switch takes precedence and will turn the RPM output OFF. This feature is useful when a lamp or other load requires control from both in the cab or from a remote location on the body.

The in-cab switches provide green lamps in the top section of the switches to indicate when the RPM outputs are ON. The RPM provides active high outputs that will source up to 20 amps at battery voltage levels. The output current level may be limited through programmable parameters between .1 and 20 amps in .1 amp increments. This virtual fusing level is controlled in software and mimics the performance of an SAE fuse.

The RPM outputs may be activated with the respective in-cab switches provided that the ignition key is in the Accessory or Ignition position. The RPM outputs may also be activated with the remote switch inputs with ignition key OFF or ON. It is important to turn off RPM outputs that have been enabled remotely OFF before leaving a parked vehicle with the ignition key off. Otherwise, the system will remain active and drain the batteries.

60AAA or 60AAB is a pre-requisite feature that must be ordered along with 60ACT. 60ACT uses two momentary switches in place of two latching switches that that are provided with 60AAA and 60AAB. For example, instead of the 6 latching switches that are provided with 60AAA, a vehicle with 60ACT will have a switch pack of 4 latching switches and 2 momentary switches.

→ Please use ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature code: 595238

Software features that must be removed: NONE

The **TEM\_Aux1\_w\_Ext\_Sw\_Fuse\_Level** parameter sets the amount of current that flows through Auxiliary output 1. If current rises above this level, fusing takes place and the RPM output is shut down.

By turning the **TEM\_Aux1\_w\_Ext\_Switch\_Init\_State** parameter ON, the ESC forces the Remote Power Module Auxiliary output 1 to be ON whenever the truck's key-state is turned from OFF to ACCESSORY or IGNITION.

The **TEM\_Aux2\_w\_Ext\_Sw\_Fuse\_Level** parameter sets the amount of current that flows through Auxiliary output 2. If current rises above this level, fusing takes place and the RPM output is shut down.

By turning the **TEM\_Aux2\_w\_Ext\_Switch\_Init\_State** parameter ON, the ESC forces the Remote Power Module Auxiliary output 2 to be ON whenever the truck's key-state is turned from OFF to ACCESSORY or IGNITION.

**Table 160**

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Aux1_w_Ext_Sw_Fuse_Level	1998	This is the level above which the RPM will fuse the TEM Auxiliary output with external switch.	20	A	0	20	0.1
TEM_Aux1_w_Ext_Switch_Init_State	2032	This program- mable parameter sets the init state of RPM channel used with TEM Auxiliary with external switch #1.	Off	On/ Off	NA	NA	NA
TEM_Aux2_w_Ext_Sw_Fuse_Level	2106	This is the level above which the RPM will fuse the TEM Auxiliary output #2 with external switch.	20	A	0	20	0.1
TEM_Aux2_w_Ext_Switch_Init_State	2142	This program- mable parameter sets the init state of RPM channel used with TEM Auxiliary with external switch #2.	Off	On/ Off	NA	NA	NA

### **WIRING INFORMATION**

- Customer may mount a switch and install the wiring into the pin labeled 3POS\_SWITCH\_AUX1\_Input in the Black 23-pin Remote Power Module input connector. Installation of the remote switch is optional with this feature. (See ICAP or the Diamond Logic™ Builder software for input pin location)
- Customer may mount a switch and install the wiring into the pin labeled 3POS\_SWITCH\_AUX2\_Input in the Black 23-pin Remote Power Module input connector. Installation of the remote switch is optional with this feature. (See ICAP or the Diamond Logic™ Builder software for input pin location)
- Customer must install wiring from the pin labeled 3POS\_SWITCH\_AUX1\_Output Brown 8-pin Remote Power Module output connector to the electrical load that is to be controlled. (See ICAP or the Diamond Logic™ Builder software for output pin location)
- Customer must install wiring from the pin labeled 3POS\_SWITCH\_AUX2\_Output Brown 8-pin Remote Power Module output connector to the electrical load that is to be controlled. (See ICAP or the Diamond Logic™ Builder software for output pin location)

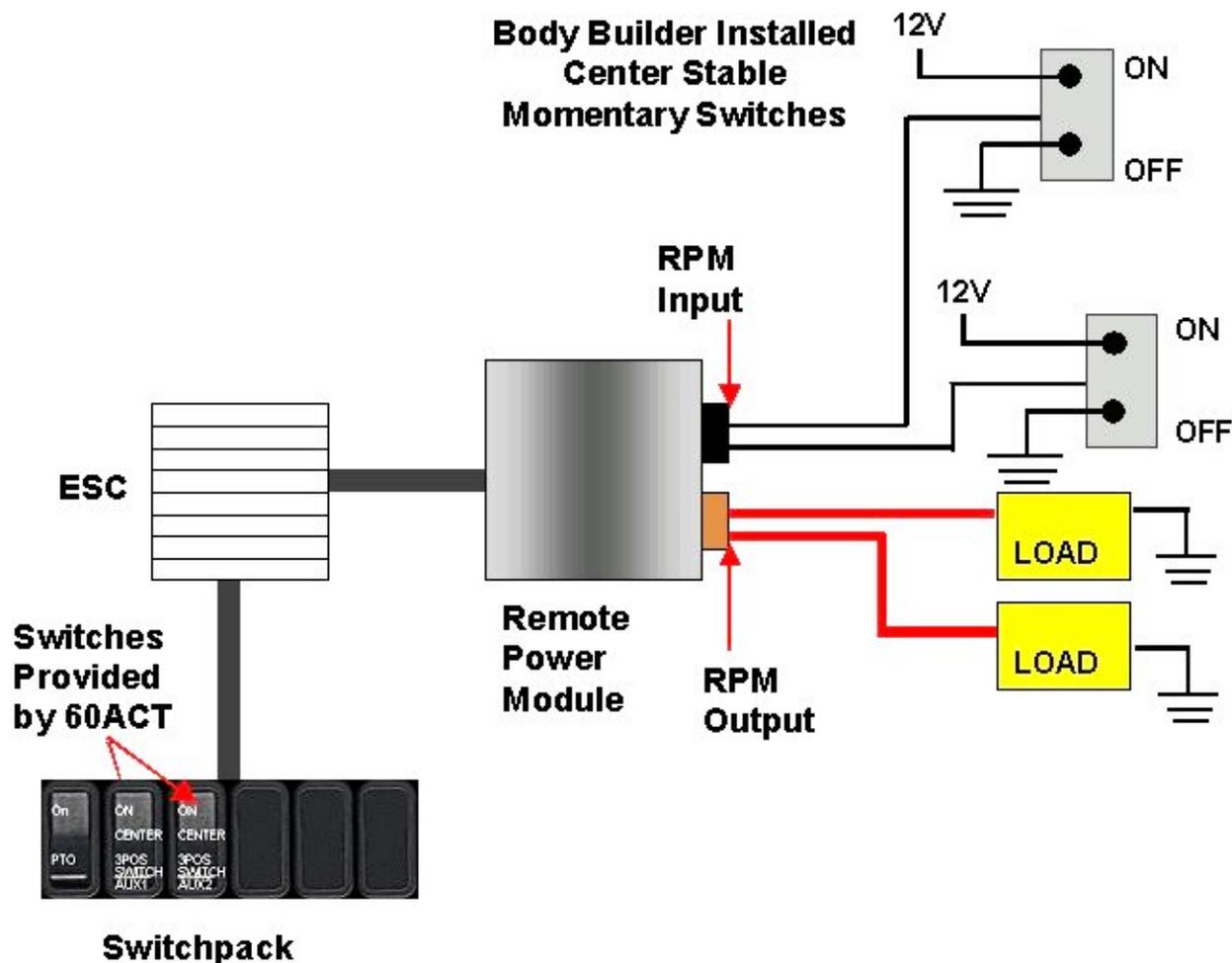


Figure 180

**TESTING**

1. This feature allows the customer the ability to activate the output when the ignition key is turned from OFF to ACCESSORY or IGNITION. This functionality is obtained by turning programmable parameters (TEM\_Aux1\_w\_Ext\_Switch\_Init\_State and TEM\_Aux2\_w\_Ext\_Switch\_Init\_State) ON
2. Activate the first remote Body Builder installed switch to 12 volts by using a momentary switch action.
3. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX1\_Output is providing the battery volts at rated current levels. (As programmed in ICAP or the Diamond Logic™ Builder software)
4. Verify that the green switch indicator light comes on.
5. Verify that the Remote Power Module input labeled 3POS\_SWITCH\_AUX1\_Input is receiving battery volts from the customer-mounted switch. (As programmed in ICAP or the Diamond Logic™ Builder software)
6. Deactivate the first remote Body Builder installed switch by providing a momentary switch action to ground.
7. Verify that the Remote Power Module output goes OFF.

8. Activate the first in-cab switch.
9. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX1\_Output is providing the battery volts (As programmed in ICAP or the Diamond Logic™ Builder software).
10. Verify that the green switch indicator light comes on.
11. Deactivate the first in-cab switch.
12. Activate the second remote Body Builder installed switch to 12 volts by using a momentary switch action.
13. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX2\_Output is providing the battery volts at rated current levels. (As programmed in ICAP or the Diamond Logic™ Builder software)
14. Verify that the green switch indicator light comes on.
15. Verify that the Remote Power Module input labeled 3POS\_SWITCH\_AUX2\_Input is receiving battery volts from the customer-mounted switch. (As programmed in ICAP or the Diamond Logic™ Builder software)
16. Deactivate the second remote Body Builder installed switch by providing a momentary switch action to ground.
17. Verify that the Remote Power Module output goes OFF.
18. Activate the second in-cab switch.
19. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX2\_Output is providing the battery volts (As programmed in ICAP or the Diamond Logic™ Builder software).
20. Verify that the green switch indicator light comes on.
21. Deactivate the second in-cab switch.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595238 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- The 3-position momentary switch with latching software must be installed in the in-cab switch pack.
- The customer must install wiring from the RPM outputs to the loads that are to be controlled
- The customer may mount a switch (12 volts active and Ground de-active) and install the wiring into the RPM inputs (Use ICAP or the Diamond Logic™ Builder software to determine switch and pin location assignments)

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### 20.3. 60ACU — THREE MOMENTARY ROCKER SWITCHES/ REMOTE SWITCH CAPABILITY

**FEATURE CODE DESCRIPTION:** BDY INTG, SWITCH MOMNTRY 3POS (3) Rocker, Backlit, with "ON" Indicator Mounted on Dash, Latching Software, for 3; Auxiliary Load 20 amp. Maximum; Power Available Only in "Ignition" or "Accessory" Position, Output Also Controlled by a Customer Remote Mounted Switch (requires 3 Remote Power Module inputs and 3 outputs)

**FEATURE/BODY FUNCTION:** This feature provides three-way switch control function for three remote power module outputs. Each RPM output is controlled by an in-cab 3-position momentary switch, and a 3-position momentary Body Builder-installed, remote mounted switch. These customer-installed, remote-mounted switches must be active at 12 volts and must use ground to deactivate the output. Each in cab 3-position momentary switch is connected to a remote power module (RPM) output. In addition, each customer supplied, remote mounted momentary switch may be used to control the respective RPM outputs. Thus, three-way switch control action may be performed. The RPM outputs may be turned OFF or ON from either the respective in-cab switch, or the respective Body Builder switch, however, an OFF command from either switch takes precedence and will turn the RPM output OFF. This feature is useful when a lamp or other load requires control from both in the cab or from a remote location on the body.

The in-cab switches provide green lamps in the top section of the switches to indicate when the RPM outputs are ON. The RPM provides active high outputs that will source up to 20 amps at battery voltage levels. The output current level may be limited through programmable parameters between .1 and 20 amps in .1 amp increments. This virtual fusing level is controlled in software and mimics the performance of an SAE fuse.

The RPM outputs may be activated with the respective in-cab switches provided that the ignition key is in the Accessory or Ignition position. The RPM outputs may also be activated with the remote switch inputs with ignition key OFF or ON. It is important to turn off RPM outputs that have been enabled remotely before leaving a parked vehicle with the ignition key off. Otherwise, the system will remain active and drain the batteries.

60AAA or 60AAB is a pre-requisite feature that must be ordered along with 60ACU. 60ACU uses three momentary switches in place of three latching switches that that are provided with 60AAA and 60AAB. For example, instead of the 6 latching switches that are provided with 60AAA, a vehicle with 60ACU will have a switch pack of 3 latching switches and 3 momentary switches.

→ Please use ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature code: 595239

Software features that must be removed: NONE

The **TEM\_Aux1\_w\_Ext\_Sw\_Fuse\_Level** parameter sets the amount of current that flows through Auxiliary output 1. If current rises above this level, fusing takes place and the RPM output is shut down.

By turning the **TEM\_Aux1\_w\_Ext\_Switch\_Init\_State** parameter ON, the ESC forces the Remote Power Module Auxiliary output 1 to be ON whenever the truck's key-state is turned from OFF to ACCESSORY or IGNITION.

The **TEM\_Aux2\_w\_Ext\_Sw\_Fuse\_Level** parameter sets the amount of current that flows through Auxiliary output 2. If current rises above this level, fusing takes place and the RPM output is shut down.

By turning the **TEM\_Aux2\_w\_Ext\_Switch\_Init\_State** parameter ON, the ESC forces the Remote Power Module Auxiliary output 2 to be ON whenever the truck's key-state is turned from OFF to ACCESSORY or IGNITION.

The **TEM\_Aux3\_w\_Ext\_Sw\_Fuse\_Level** parameter sets the amount of current that flows through Auxiliary output 3. If current rises above this level, fusing takes place and the RPM output is shut down.

By turning the **TEM\_Aux3\_w\_Ext\_Switch\_Init\_State** parameter ON, the ESC forces the Remote Power Module Auxiliary output 3 to be ON whenever the truck's key-state is turned from OFF to ACCESSORY or IGNITION.

**Table 161**

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Aux1_w_Ext_Sw_Fuse_Level	1998	This is the level above which the RPM will fuse the TEM Auxiliary output with external switch.	20	A	0	20	0.1
TEM_Aux1_w_Ext_Switch_Init_State	2032	This program- mable parameter sets the init state of RPM channel used with TEM Auxiliary with external switch #1.	Off	On/ Off	NA	NA	NA
TEM_Aux2_w_Ext_Sw_Fuse_Level	2106	This is the level above which the RPM will fuse the TEM Auxiliary output #2 with external switch.	20	A	0	20	0.1
TEM_Aux2_w_Ext_Switch_Init_State	2142	This program- mable parameter sets the init state of RPM channel used with TEM Auxiliary with external switch #2.	Off	On/ Off	NA	NA	NA

Parameter	ID	Description	Default	Units	Min	Max	Step
TEM_Aux3_w_Ext_Sw_Fuse_Level	2107	This is the level above which the RPM will fuse the TEM Auxiliary output #3 with external switch.	20	A	0	20	0.1
TEM_Aux3_w_Ext_Switch_Init_State	2143	This program- mable parameter sets the init state of RPM channel used with TEM Auxiliary with external switch #3.	Off	On/ Off	NA	NA	NA

### WIRING INFORMATION

- Customer may mount a switch and install the wiring into the pin labeled 3POS\_SWITCH\_AUX1\_Input in the Black 23-pin Remote Power Module input connector. Installation of the remote switch is optional with this feature. (See ICAP or the Diamond Logic™ Builder software for input pin location)
- Customer may mount a switch and install the wiring into the pin labeled 3POS\_SWITCH\_AUX2\_Input in the Black 23-pin Remote Power Module input connector. Installation of the remote switch is optional with this feature. (See ICAP or the Diamond Logic™ Builder software for input pin location)
- Customer may mount a switch and install the wiring into the pin labeled 3POS\_SWITCH\_AUX3\_Input in the Black 23-pin Remote Power Module input connector. Installation of the remote switch is optional with this feature. (See ICAP or the Diamond Logic™ Builder software for input pin location)
- Customer must install wiring from the pin labeled 3POS\_SWITCH\_AUX1\_Output Brown 8-pin Remote Power Module output connector to the electrical load that is to be controlled. (See ICAP or the Diamond Logic™ Builder software for output pin location)
- Customer must install wiring from the pin labeled 3POS\_SWITCH\_AUX2\_Output Brown 8-pin Remote Power Module output connector to the electrical load that is to be controlled. (See ICAP or the Diamond Logic™ Builder software for output pin location)
- Customer must install wiring from the pin labeled 3POS\_SWITCH\_AUX3\_Output Brown 8-pin Remote Power Module output connector to the electrical load that is to be controlled. (See ICAP or the Diamond Logic™ Builder software for output pin location)

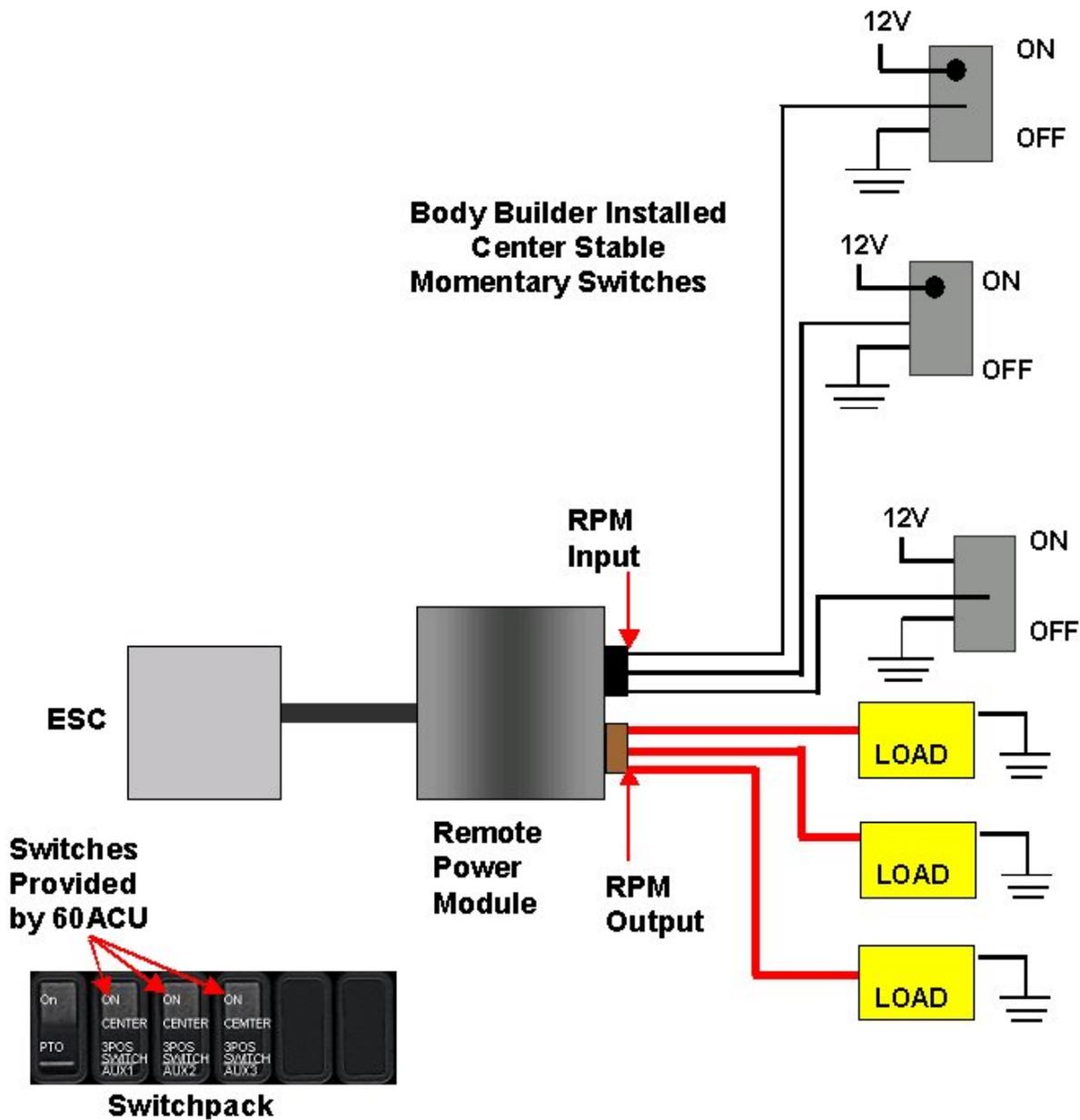


Figure 181

**TESTING**

1. This feature allows the customer the ability to activate the output when the ignition key is turned from OFF to ACCESSORY or IGNITION. This functionality is obtained by turning programmable parameters (TEM\_Aux1\_w\_Ext\_Switch\_Init\_State and TEM\_Aux2\_w\_Ext\_Switch\_Init\_State) ON
2. Activate the first remote Body Builder installed switch to 12 volts by using a momentary switch action.
3. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX1\_Output is providing the battery volts at rated current levels (as programmed in ICAP or the Diamond Logic™ Builder software).

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4. Verify that the green switch indicator light comes on.
  5. Verify that the Remote Power Module input labeled 3POS\_SWITCH\_AUX1\_Input is receiving battery volts from the customer-mounted switch (as programmed in ICAP or the Diamond Logic™ Builder software).
  6. Deactivate the first remote Body Builder installed switch by providing a momentary switch action to ground.
  7. Verify that the Remote Power Module output goes OFF.
  8. Activate the first in-cab switch.
  9. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX1\_Output is providing the battery volts (as programmed in ICAP or the Diamond Logic™ Builder software).
  10. Verify that the green switch indicator light comes on.
  11. Deactivate the first in-cab switch.
  12. Activate the second remote Body Builder installed switch to 12 volts by using a momentary switch action.
  13. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX2\_Output is providing the battery volts at rated current levels (as programmed in ICAP or the Diamond Logic™ Builder software).
  14. Verify that the green switch indicator light comes on.
  15. Verify that the Remote Power Module input labeled 3POS\_SWITCH\_AUX2\_Input is receiving battery volts from the customer-mounted switch (as programmed in ICAP or the Diamond Logic™ Builder software).
  16. Deactivate the second remote Body Builder installed switch by providing a momentary switch action to ground.
  17. Verify that the Remote Power Module output goes OFF.
  18. Activate the second in-cab switch.
  19. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX2\_Output is providing the battery volts (as programmed in ICAP or the Diamond Logic™ Builder software).
  20. Verify that the green switch indicator light comes on.
  21. Deactivate the second in-cab switch.
  22. Activate the third remote Body Builder installed switch to 12 volts by using a momentary switch action.
  23. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX3\_Output is providing the battery volts at rated current levels (as programmed in ICAP or the Diamond Logic™ Builder software).
  24. Verify that the green switch indicator light comes on.
  25. Verify that the Remote Power Module input labeled 3POS\_SWITCH\_AUX3\_Input is receiving battery volts from the customer-mounted switch (as programmed in ICAP or the Diamond Logic™ Builder software).
  26. Deactivate the third remote Body Builder installed switch by providing a momentary switch action to ground.
-

27. Verify that the Remote Power Module output goes OFF.
28. Activate the third in-cab switch.
29. Verify that the Remote Power Module output labeled 3POS\_SWITCH\_AUX3\_Output is providing the battery volts (as programmed in ICAP or the Diamond Logic™ Builder software).
30. Verify that the green switch indicator light comes on.
31. Deactivate the third in-cab switch.

**HOW TO ADD THIS FEATURE:**

- Select software feature code 595239 using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- The 3-position momentary switch with latching software must be installed in the in-cab switch pack.
- The customer must install wiring from the RPM outputs to the loads that are to be controlled
- The customer may mount a switch (12 volts active and Ground de-active) and install the wiring into the RPM inputs (use ICAP or the Diamond Logic™ Builder software to determine switch and pin location assignments).

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## 21. HIGH CURRENT IN CAB SWITCH CONTROLS FOR BODY ACCESSORIES

### 21.1. 60ACE — DUAL OUTPUT LATCHED SWITCH 40 AMPS

**FEATURE CODE DESCRIPTION:** BDY INTG, SWITCH DUAL OUTPUT 2 Position Latched Rocker, Backlit, with "ON" Indicator Mounted on Dash, for 1; Auxiliary Load 40 amp Maximum; Power Available Only in "Ignition" or "Accessory" Position; Controls 2 Remote Power Modules (requires 2 Remote Power Module outputs)

**FEATURE/BODY FUNCTION:** This feature provides one two-positioned latched rocker switch that controls 1 Auxiliary load with a 40 amp Maximum. This feature was designed for owners who have a load that requires an Remote Power Module output of greater than 20 amps. This feature requires 2 RPM outputs and power would only be available in Ignition or Accessory Key-state.

Through Programmable Parameters, the owner can send the correct amount of current he wants to the two outputs. This allows the owner to customize the amperage supplied to the RPM output based on his specific needs.

→ Please use ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature code: 595178

Software features that must be removed: NONE

The **TEM\_Dual1\_Output1\_Fuse\_Param** is programmed to allowed a specified amount of current to go to the RPM output 1. If the current exceeds this specified amount, the virtual fusing shuts the output off.

The **TEM\_Dual1\_Output2\_Fuse\_Param** is programmed to allowed a specified amount of current to go to the RPM output 2. If the current exceeds this specified amount, the virtual fusing shuts the output off.

Table 162

Parameter	ID	Description	Default	Units	Min	Max	Set
TEM_Dual1_Output1_Fuse_Param	1988	This is the maximum current Dual 1 Output 1 is allowed to source before the virtual fusing turns the output off.	20	A	0	20	0.1
TEM_Dual1_Output2_Fuse_Param	1989	This is the maximum current Dual 1 Output 2 is allowed to source before the virtual fusing turns the output off.	20	A	0	20	0.1

**WIRING INFORMATION**

- This feature requires the customer to supply the wiring that runs from the pins labeled DUAL\_OUTPUT\_SWITCH\_Output1 and DUAL\_OUTPUT\_SWITCH\_Output2 on Brown 8-pin Remote Power Module output connector, to the customer-installed feature that requires the load.

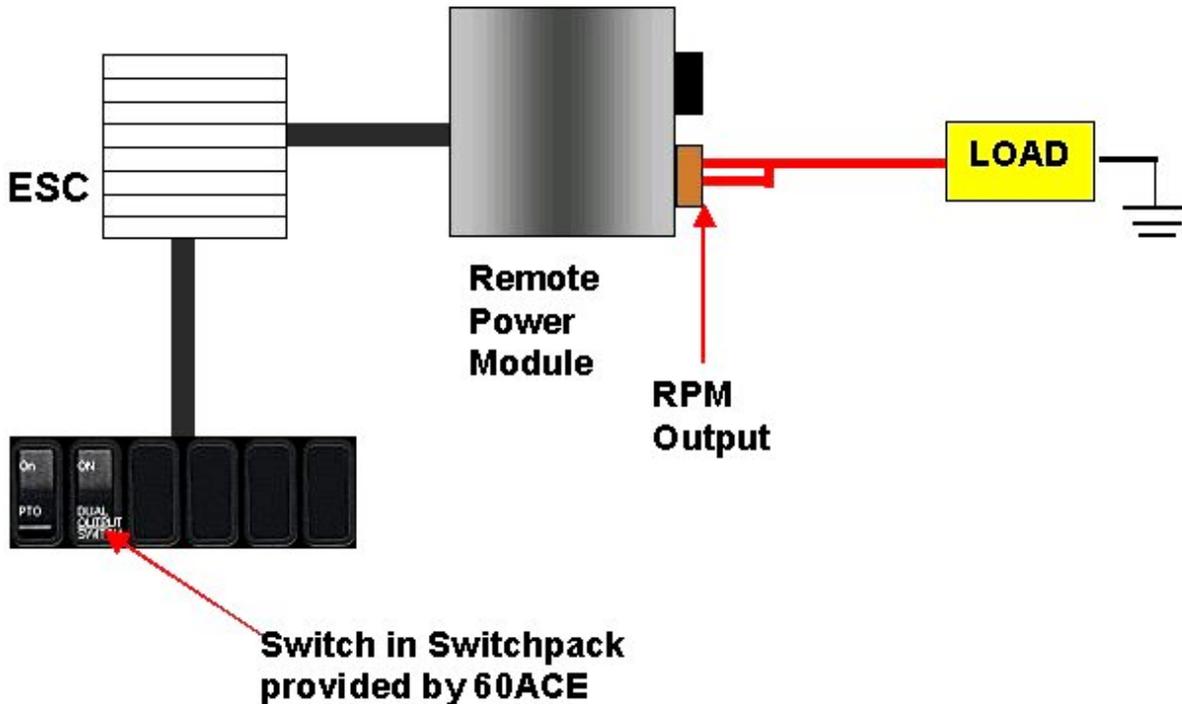


Figure 182

**TESTING**

- Depress the switch.

2. Verify that you are pulling the desired voltage from the Remote Power Module outputs labeled DUAL\_OUTPUT\_SWITCH\_Output1 and DUAL\_OUTPUT\_SWITCH\_Output2 (as programmed by ICAP or the Diamond Logic™ Builder software).

**HOW TO ADD THIS FEATURE:**

- Software feature code 595178 MUST be enabled using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Install the switch in the in-cab switch pack
- Customer must supply wiring from the RPM output

## 21.2. 08XBK — AUXILIARY 40 AMP CIRCUIT, SWITCH CONTROLLED

Refer to the Circuit Diagram in S08285, Chapter 9, page 29.

**FEATURE CODE DESCRIPTION:** 08XBK – SWITCH, AUXILIARY Switch 40 amp Circuit for Customer Use; Includes Wiring Connection at PDC and Control in Cab.

**FEATURE/BODY FUNCTION:** Feature code 08XBK provides a 40 Amp battery feed for customer use. An in cab rocker switch controls the circuit. A blank window switch is provided with this feature along with a graphic overlay kit that allows custom labeling of the switch function.

### SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:

Software Feature Codes that must be added: 595265 (TEM) ESC Prog, High Current Relay Load Output

Software Feature Codes that must be removed: NONE

### WIRING INFORMATION

A blunt cut wire (Light Green) taped back to the Dash Harness near the PDC is provided for customer interface to this circuit. The battery feed to this wire is through a relay that is enabled by a ground from ESC connector 1601 when the switch is activated.

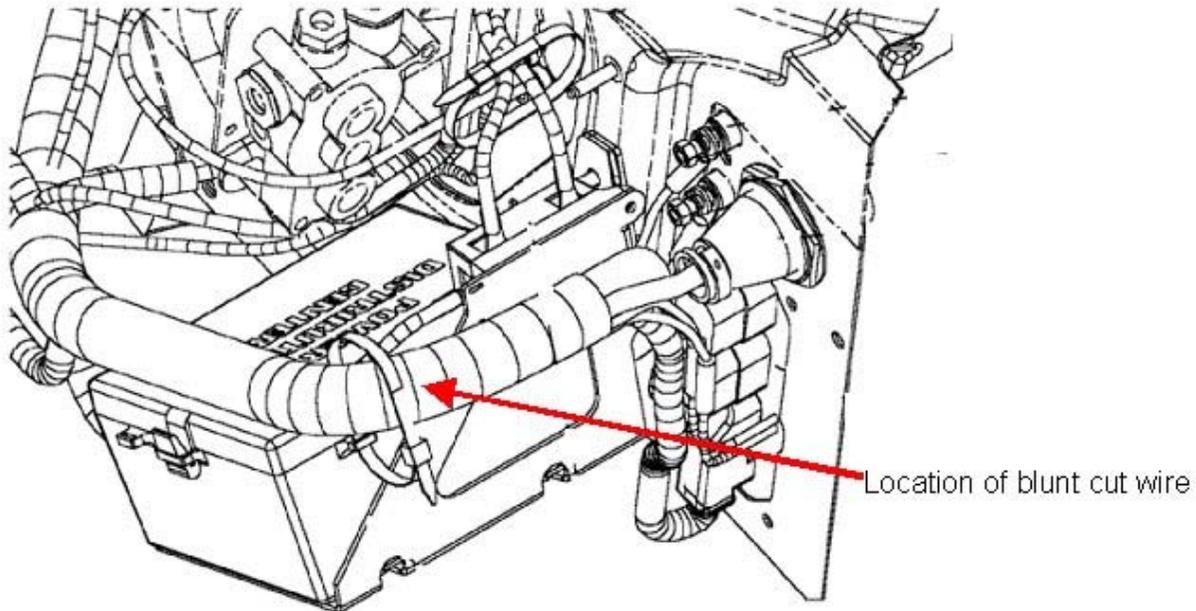


Figure 183

**TESTING**

To test this circuit, verify that battery voltage is present at the wire provided when the in cab switch is activated with the ignition key in the ON or ACCESSORY position. The green indicator in the rocker switch shall be illuminated when the output is ON.

**HOW TO ADD THIS FEATURE:**

If the vehicle was not ordered with the feature, it may be added. For information on parts and components, see "How Do I" - General Information section of the body builder book.

Use ICAP or the Diamond Logic™ Builder software to add the following software feature: **595265 (TEM) ESC Prog, High Current Relay Load Output**

Also refer to the "How Do I Add Additional Rocker Switches" section to determine the assigned location of the rocker switch for this feature.

### 21.3. 08WJA, 08WJB — POWER SOURCE FOR LIFT GATE

#### **FEATURE CODE DESCRIPTION:**

08WJA – POWER SOURCE, SPECIAL for Customer Installed Lift Gate; 200 Amp max, includes 2ga. power cable to end-of-frame, switch on instrument panel, 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 0ga. power cable to end-of-frame, switch on instrument panel, 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 instrument panel 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 ESC 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 10 minutes. A Battery Protection Module, activated by the ESC 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 battery to 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.

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 timeout functionality from the ESC to automatically disable the lift gate after a selected time. The default timeout is 60 minutes. A road speed interlock from the ESC 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 ESC 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:**

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:**

The lift gate switch is pressed to the momentary OFF position (down position), OR the aux button on the key fob is pressed, OR the voltage is lower than the safe voltage value and the shutdown override time expires or the vehicle speed is greater than 2 MPH, or 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 and a relaxed extra cable of 40 inches for feasible connectivity.

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

This feature cannot exist with work light feature 08WLL or 08WMA. The lift gate feature will be using same cluster switch location and same ESC pin allocation as the work light feature. The body builder may power work lights from the lift gate motor power cable. This would allow the customer to have work lights in the van body and would not discharge the battery as the system shuts down after 60 minutes or if any of the other conditions listed above are met.

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

\*Software feature codes can be added through ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature code: 595293

Software features that must be removed: 595025

The **Lift\_Gate\_Alarm\_Time** parameter is programmed to allow the operation of the lift gate for a period of 60 minutes. At the end of 60 minutes 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 timeout period of 60 minutes.

The **Lift\_Gate\_Disable\_Threshold** parameter is programmed to sound a low voltage alarm if the battery voltage falls below 11.5 volts for more than 40 seconds while the lift gate is in operation. This parameter will also deactivate the lift gate if the battery voltage falls below 11.5 volts for more than 100 seconds. The lift gate cannot be reactivate until the battery voltage rises above 11.5 volts.

**Table 163**

Parameter	ID	Description	Default	Units	Min	Max	Set
Lift_Gate_Alarm_Time	PV-268	Lift Gate Alarm Time Value	60	s	1	120	1
Lift_Gate_Disable_Threshold	PV-267	Voltage level that Lift Gate will be disabled at.	11.5	V	11.5	13.8	0.1
Lift_Gate_Enable_Timeout	PV-56	Amount of time, in 10 minute increments, that the lift gate will remain enabled.	60	Min	10	240	10

#### **WIRING INFORMATION**

For 08WJA and 08AJB:

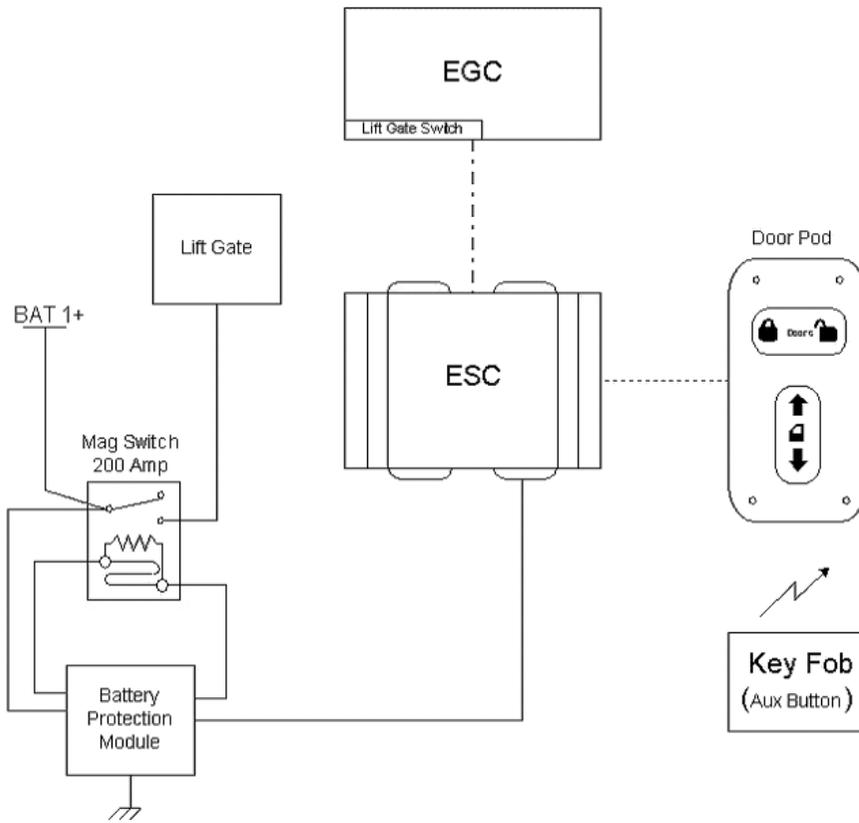
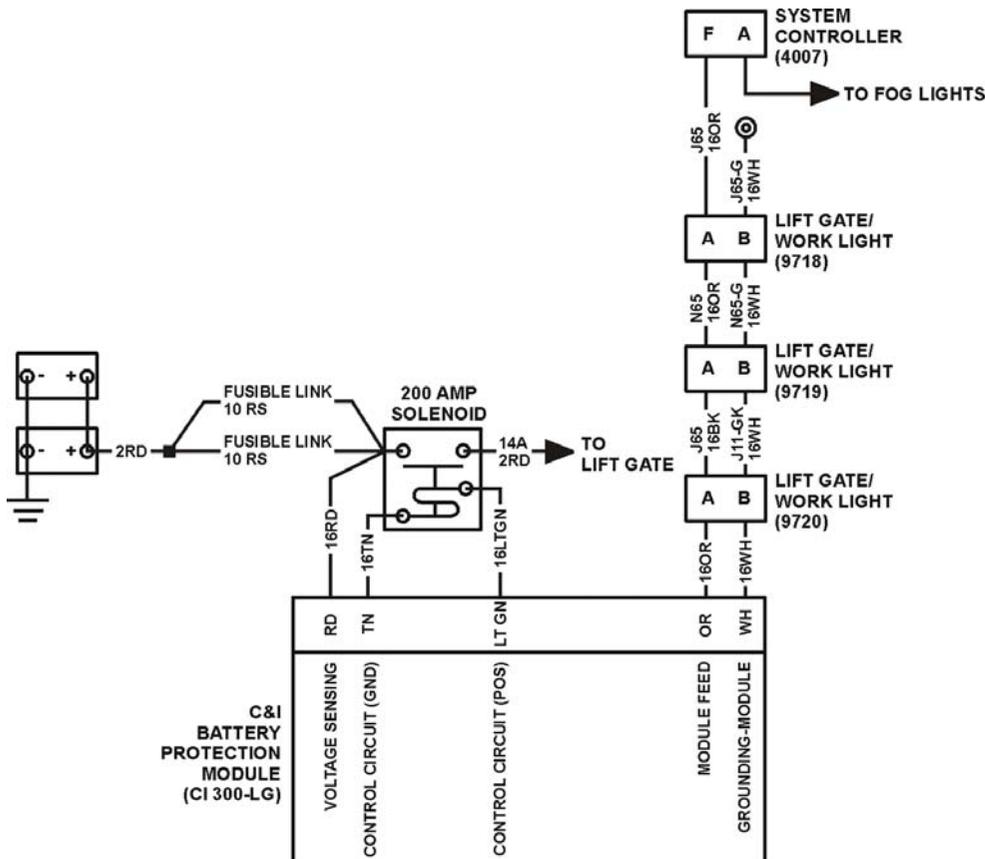


Figure 184 Lift Gate Function Diagram



**Figure 185 Lift Gate Circuit Diagram**

**For 08WJA::**

The body builder will be required to cut the straplocks at (2) 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 an 0 GA cable from the Mag Switch, back along the frame to the lift gate motor.

Code 08WJB is identical to code 08WJA except that the 3592398C91 Cable Assy, Lift Gate Feed with "2" gauge cable and 2 - 10 Awg fusible links are replaced with 3598246C91 Cable Assy, Lift Gate Feed with "0" gauge cable and 3 - 10 Awg fusible links and 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 route the 2 GA cable from the Mag Switch, back along the frame to the lift gate motor is changed to "0" gauge cable.

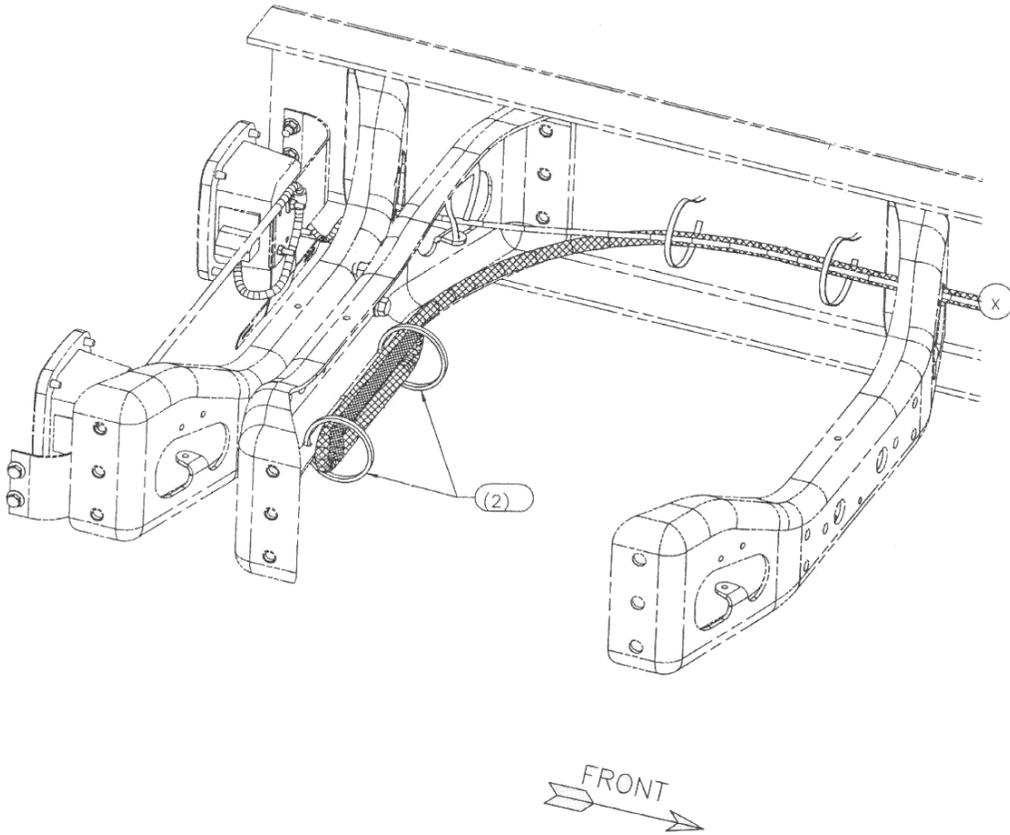
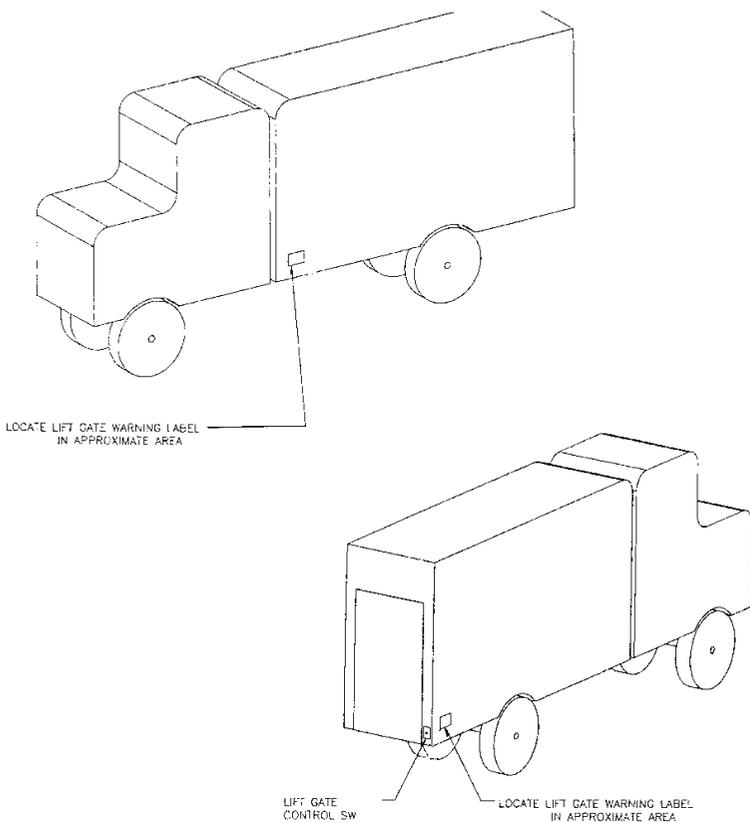


Figure 186 Harness Routing Diagram



**Figure 187 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 ICAP or the Diamond Logic™ Builder software to add the following software feature:

Required software feature code: 595293

Software features that must be removed: 595025

### **Hardware:**

Table 164

Part #	Description	Quantity
3593177C1	Switch, Momentary Multiplex	1
3545544C92	Harness, Dash — Work Light / Lift Gate Circuits	1
3553986F92	Harness, Center Chassis — Work Light / Lift Gate Circuits	1
3542321C92	Cable Assy, Work Light / Power Control	1
3592395C3	Mag Switch Mounting Bracket	1
3593085C92	Control, Battery Discharge Protection	1
3592818C91	200 Amp Mag Switch, Battery Disconnect	1
3592398C91	Cable Assy, Lift Gate Feed W/Fusible Links	1
3592400C93-REF	Cable Assy, Lift Gate Power — 33.5 feet Ref — Cut to length	1
449632C1	Conduit, Nylon 1/2 in. ID Slit	35 feet

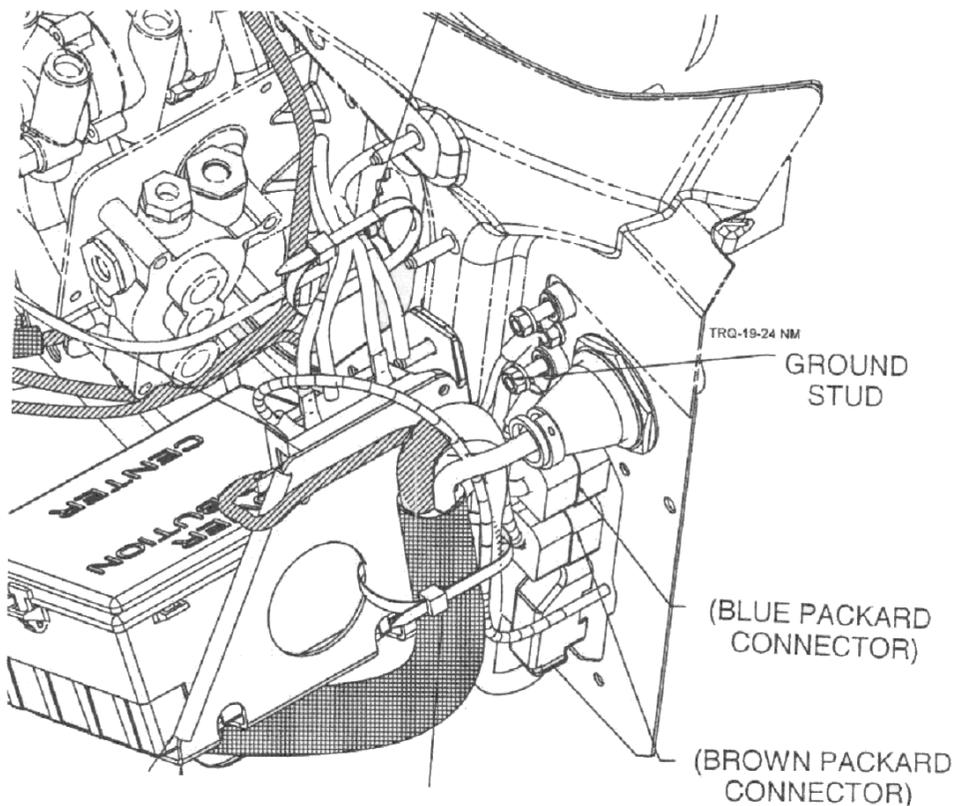


Figure 188 Connector Locations Diagram

Install the 3593177C1 switch in the lower left, inner switch location of the cluster. Harness 3545544C92, insert circuit J65 into cavity "F" of BROWN Connector. See figure above for location of brown connector and figure below for location of "F" cavity. Install an eyelet terminal for a 5/16 stud on circuit J65-G and install on the ground stud. See figure above for location. Route harness with dash harness to connection with center chassis harness. Connect to harness 3553986F92 and route this harness back to the rear cab

mounting Xnbr. Connect 3542321C92 Cable Assy and route this cable assy to the battery box and connect to the 3593085C92 Bat Discharge Control. Mount the 3593085C92 Control and the 3592818C91 200 Amp Mag Sw on bracket 3592395C3 and mount this assy in the battery box. Install 3592398C91 Cable Assy W/Fusible Links from battery "POS" terminal to Mag Switch. Install 3592400C93 2 AWG Cable Assy from mag sw to lift gate motor after installing 449632C1 conduit over this cable for protection against shorts. See Circuit Diagram for the proper Circuit connections.

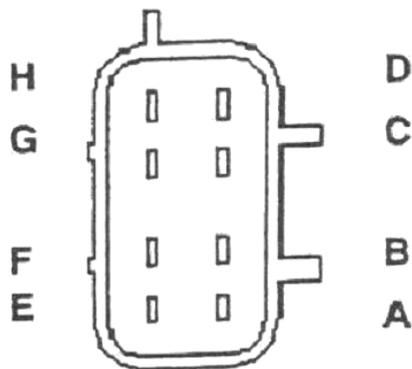


Figure 189 #4007 Connector Pin Locations Diagram

Table 165

#4007 Brown Front End Output		Engine Side Bottom 8-Way Connector
PIN	SOURCE	DESCRIPTION
A	20 Amp FET	Fog Lamps
B	10 Amp FET	Right Front Turn Signal
C	10 Amp FET	Left Front Turn Signal
D	20 Amp FET	Headlamp, Low Beam
E	10 Amp FET	Horn, Electric
F	10 Amp FET	Work Lamp/Lift Gate
G	20 Amp FET	Headlamp, High Beam
H	20 Amp FET	Park/Marker Lamps

## 22. INTERLOCKED SWITCH CONTROLS FOR BODY ACCESSORIES

### 22.1. 60ACG — ONE INTERLOCKED LATCHED SWITCH DISENGAGE AT 30 MPH

**FEATURE CODE DESCRIPTION:** BDY INTG, SWITCH, INTERLOCKED 2 Position Latched Rocker, Backlit, with "ON" Indicator Mounted on Dash for 1; Auxiliary Load 20 amp Maximum; Output will disengage when Vehicle Exceeds 30 MPH, Programmable; Power Available Only in "Ignition" or "Accessory Position (requires 1 Remote Power Module output)

**FEATURE/BODY FUNCTION:** This feature provides a 2-position Latched Rocker switch that controls 1 auxiliary load of 20 amps maximum and requires one RPM output. Output will be defaulted to turn off when vehicle speed reaches 30 miles per hour. The output will only be available in Ignition or Accessory Key-State. This feature is used for applications such as a rear shining light. If the operator forgets to turn the light off before he drives away, the light will shut off when the driver hits 30 miles per hour.

The owner can interlock the switch with certain programmable conditions. These conditions can be set as programmable parameters using ICAP or the Diamond Logic™ Builder software. These parameters are listed and explained below.

→ Please use ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature code: 595181

Conflicts with Software features: NONE

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- **TEM\_Aux1\_Misc\_Interlock\_Param**

This parameter (TEM\_Aux1\_Misc\_Interlock\_Param) is the master parameter for this feature. The setting for this parameter selects the interlocking condition for the output. The following table indicates which interlocking condition corresponds to which setting for the parameter. To select the interlocking condition simply set the value of this parameter to the corresponding setting on the table.

**Table 166**

Setting	Interlocking Condition
0	Apply no interlocks to this output
1	Activate this output when the park brake is set AND the switch is on
2	Activate this output when the park brake is not set AND the switch is on
3	Activate this output when a door is open AND the switch is on
4	Activate this output when all doors are closed AND the switch is on
5	Activate this output when the PTO is engaged AND the switch is on (Requires a PTO feature)
6	Activate this output when the PTO is not engaged AND the switch is on (Requires a PTO feature)
7	Activate this output when the engine is running AND the switch is on
8	Activate this output when the engine is not running AND the switch is on
9	Activate this output when the vehicle speed exceeds the value set in TEM_Aux_1_Speed_Interlock_Param AND the switch is on
10	Activate this output when the vehicle speed is less than the value set in TEM_Aux_1_Speed_Interlock_Param AND the switch is on
11	Activate this output when the vehicle is stopped AND the switch is on
12	Activate this output when the vehicle is moving AND the switch is on
13	Activate this output when the transmission gear is higher than TEM_Aux1_Gear_Interlock_Param AND the switch is on (Requires Automatic Transmission)
14	Activate this output when the transmission gear is lower than TEM_Aux1_Gear_Interlock_Param AND the switch is on (Requires Automatic Transmission)
15	Activate this output when the transmission is in neutral AND the switch is on (Requires Automatic Transmission)
16	Activate this output when the transmission is not in neutral AND the switch is on (Requires Automatic Transmission)

Value	Unit	Set With Template
0	Number	<input type="checkbox"/>
<input type="checkbox"/>	On/Off	<input type="checkbox"/>
10	List	<input checked="" type="checkbox"/>

Value	Description
0	Apply no interlocks to this output
1	Activate this output when the park brake is...
2	Activate this output when the park brake is...
3	Activate this output when a door is open AN...
4	Activate this output when all doors are clo...
5	Activate this output when the PTO is engage...
6	Activate this output when the PTO is not en...
7	Activate this output when the engine is run...
8	Activate this output when the engine is not...
9	Activate this output when the vehicle speed...
10	Activate this output when the vehicle speed...
11	Activate this output when the vehicle is st...
12	Activate this output when the vehicle is mo...
13	Activate this output when the transmission ...
14	Activate this output when the transmission ...
15	Activate this output when the transmission ...
16	Activate this output when the transmission ...

**Figure 190 Drop Down List of Possible Parameters for TEM\_Aux1\_Misc\_Interlock\_Param**

• **TEM\_Aux1\_Interlock\_Latches\_Off**

Normally, if the output is deactivated because the interlocking condition is not met, the output will re-activate as soon as the interlocking condition is re-established as long as the switch is still on. If this behavior is not desirable, the parameter TEM\_Aux1\_Interlock\_Latches\_Off parameter can be set. When it is set and the output is deactivated because the interlocking condition is not met, the output will not reactivate when the interlocking condition is re-established even if the switch is still on. To re-activate the output in this case, the switch must be re-cycled (flipped off and then on again).

• **TEM\_Aux1\_Speed\_Interlock\_Param**

If TEM\_Aux1\_Misc\_Interlock\_Param is set to 9 or 10, the speed-interlock parameter (TEM\_Aux1\_Speed\_Interlock\_Param) must also be set. This parameter must be set to the actual speed to use in the condition selected by TEM\_Aux1\_Misc\_Interlock\_Param (default unit for this parameter is MPH). The speed parameter is only used if TEM\_Aux1\_Misc\_Interlock\_Param is set to 9 or 10.

**Example:** If you want the output to only come on when the vehicle is traveling over 15 MPH, you would set TEM\_Aux1\_Misc\_Interlock\_Param to 9 and set TEM\_Aux1\_Speed\_Interlock\_Param to 15 MPH.

• **TEM\_Aux1\_Gear\_Interlock\_Param**

If TEM\_Aux1\_Misc\_Interlock\_Param is set to 13 or 14 and the vehicle has an automatic transmission, the gear-interlock parameter (TEM\_Aux1\_Gear\_Interlock\_Param) must also be set. This parameter must be set to the transmission gear to use in the condition selected by TEM\_Aux1\_Misc\_Interlock\_Param. The transmission gear is set as follows:

Table 167

Setting	Transmission Gear
125	Transmission in Neutral
126	Transmission is in the 1st forward gear
127	Transmission is in the 2nd forward gear
128	Transmission is in the 3rd forward gear
125 + x	Transmission is in the xth forward gear
124	Transmission is in the 1st reverse gear
123	Transmission is in the 2nd reverse gear
125 – y	Transmission is in the yth reverse gear
The transmission gear parameter is only used if TEM_Aux1_Misc_Interlock_Param is set to 13 or 14.	

**Example:** if you want the output to only come on when the vehicle transmission is in a reverse gear, you would set TEM\_Aux1\_Misc\_Interlock\_Param to 10 and TEM\_Aux1\_Gear\_Interlock\_Param to 125.

- **TEM\_Aux1\_w\_llocks\_Output\_Fuse**

This parameter is the value at which the output will fuse (shut off). The allowable values are from 1 to 20 Amperes.

Table 168

Parameter	ID	Description	Default	Units	Min	Max	Set
TEM_Aux1_Interlock_Latches_Off	2006	If this is set, when the output is turned off due to an interlock, it will remain off until the switch is recycled.	Off	On/ Off			
TEM_Aux1_Speed_Interlock_Param	2007	The speed parameter for the TEM Aux #1 with Interlocks feature.	30	Mph	0	100	1
TEM_Aux1_Gear_Interlock_Param	2008	The transmission gear parameter for the TEM Aux #1 with Interlocks feature (124 is reverse, 125 is neutral, 126 is 1st gear, 127 is second gear etc.).	0	Number	0	250	1

Parameter	ID	Description	Default	Units	Min	Max	Set
TEM_Aux1_w_locks_Output_Fuse	2009	Fuse parameter for the TEM Single output with interlocks feature.	20	A	0	20	0.1
TEM_Aux1_Misc_Interlock_Param	2033	Miscellaneous or control parameter used for setting the interlock for the auxiliary 1 with interlocks.	10	List			

**WIRING INFORMATION**

- The wiring out of the pin labeled INTERLOCKED\_SWITCH\_AUX1\_Output on the Brown 8-pin Remote Power Module output connector is customer supplied

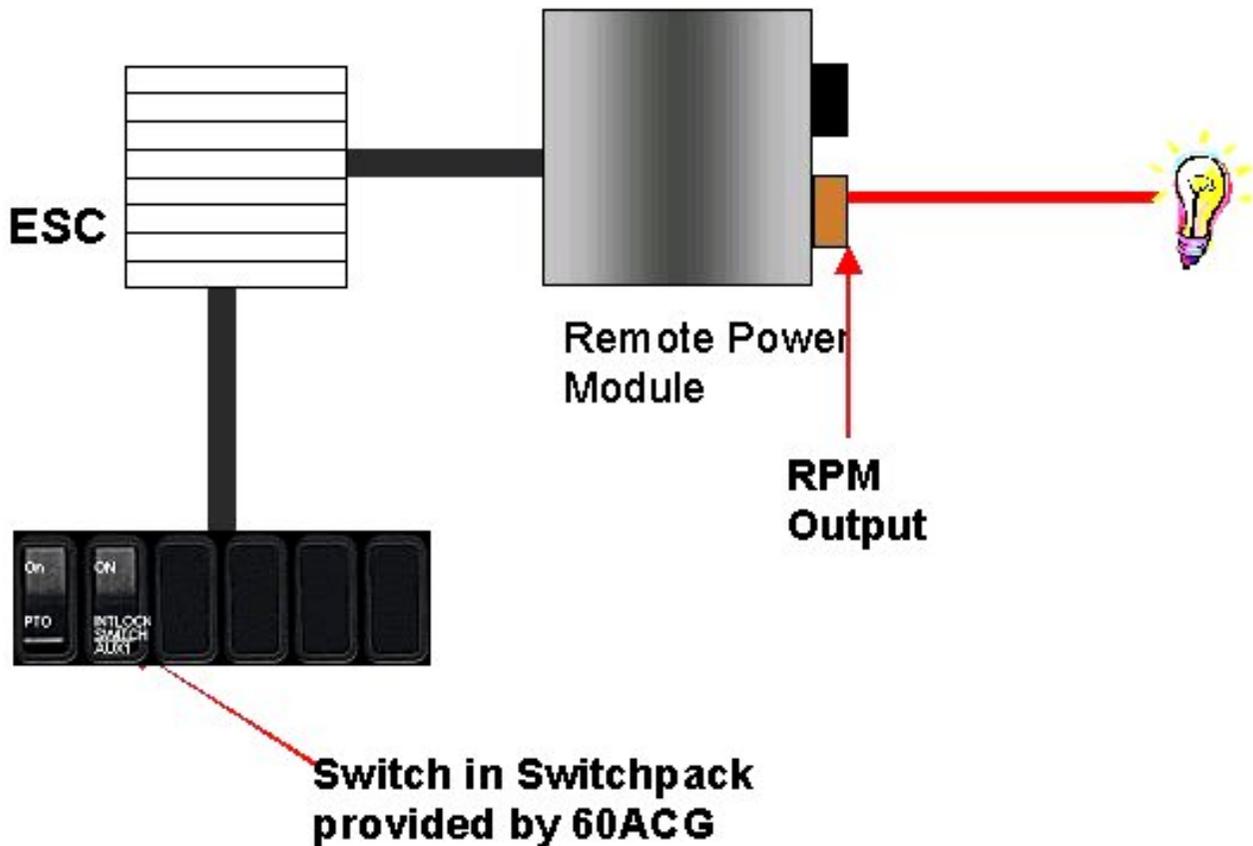


Figure 191

**TESTING**

1. Depress switch.
2. Verify that the RPM output labeled INTERLOCKED\_SWITCH\_AUX1\_Output is obtaining the desired voltage (As programmed by ICAP or the Diamond Logic™ Builder software).
3. Verify the functionality of the 30 Mph interlock by violating the parameter and determine that the output shuts off.
4. Test all other interlocks can by violating the programmable parameters to see if the output shuts off

**HOW TO ADD THIS FEATURE:**

- Software feature code 595181 MUST be enabled using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- The 2-position latched rocker switch must be installed in the in-cab switch pack
- Customer must install the wiring from the RPM output.

## 22.2. 60ACH — TWO INTERLOCKED LATCHED SWITCH DISENGAGE AT 30 MPH

**FEATURE CODE DESCRIPTION:** BDY INTG, SWITCH, INTERLOCKED (2) 2 Position Latched Rockers, Backlit, with "ON" Indicator Mtd on Dash, for 2; Auxiliary Load each 20 amp Maximum; Outputs will Disengage when Vehicle Exceeds 30 MPH, Programmable; Power Available Only in "Ignition" or "Accessory" Position (requires 2 Remote Power Module outputs)

**FEATURE/BODY FUNCTION:** This feature provides TWO 2-position Latched Rocker switches that control 2 auxiliary loads, each having a 20-amp maximum, and requiring a total of 2 RPM outputs. Outputs are defaulted to disengage when vehicle speed reaches 30 miles per hour. The outputs will only be available in Ignition or Accessory Key-State. This feature is used for applications such as a rear shining light. If the operator forgets to turn the light off before he drives away, the light will shut off when the driver hits 30 miles per hour.

The owner can interlock the switch with certain programmable conditions. These conditions can be set as programmable parameters using ICAP or the Diamond Logic™ Builder software. These parameters are listed and explained below.

\*\* This feature includes two copies of the functionality provided by 60AGC e.g. two outputs with two switches. Each one of these outputs is exactly the same as that provided by 60AGC. The two outputs in this feature are completely autonomous (independent of each other). Each of the two outputs have their own set of 5 **parameters as described in the description for 60AGC** that can be set as described in 60AGC.

→ Please use ICAP or 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 ICAP or the Diamond Logic™ Builder software. Programmable Parameters are also programmable through ICAP or the Diamond Logic™ Builder software.

Required software feature codes: 595181, 595182

Conflicts with Software features: NONE

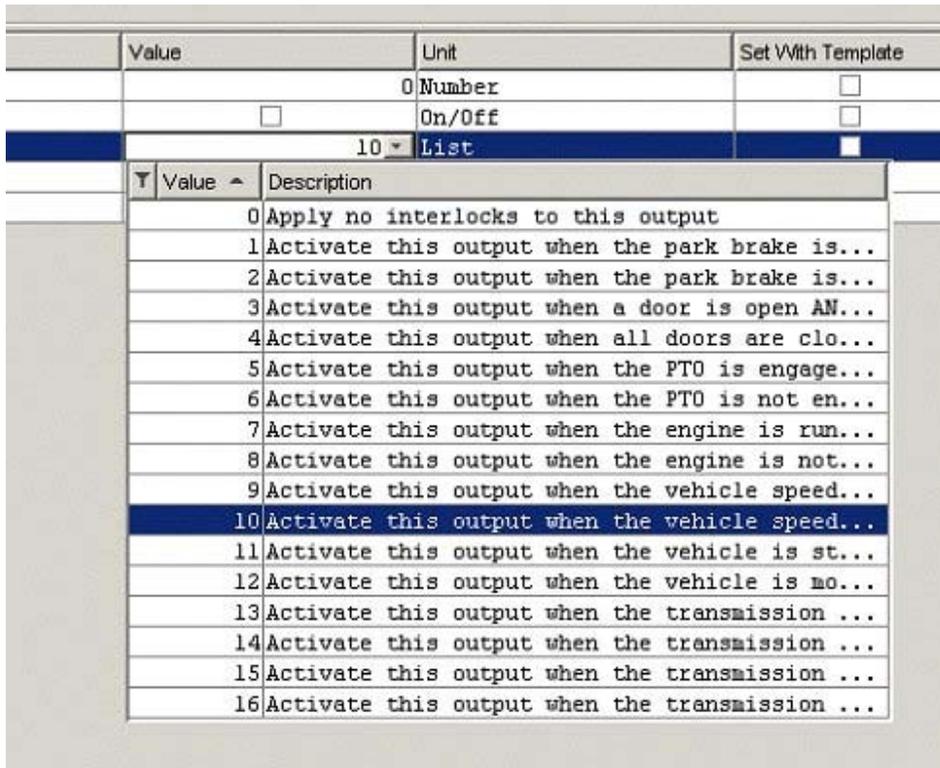
#### • TEM\_Aux1\_Misc\_Interlock\_Param

This parameter (TEM\_Aux1\_Misc\_Interlock\_Param) is the master parameter for this feature. The setting for this parameter selects the interlocking condition for the output. The following table indicates which interlocking condition corresponds to which setting for the parameter. To select the interlocking condition simply set the value of this parameter to the corresponding setting on the table.

**Table 169**

Setting	Interlocking Condition
0	Apply no interlocks to this output
1	Activate this output when the park brake is set AND the switch is on
2	Activate this output when the park brake is not set AND the switch is on
3	Activate this output when a door is open AND the switch is on
4	Activate this output when all doors are closed AND the switch is on

Setting	Interlocking Condition
5	Activate this output when the PTO is engaged AND the switch is on (Requires a PTO feature)
6	Activate this output when the PTO is not engaged AND the switch is on (Requires a PTO feature)
7	Activate this output when the engine is running AND the switch is on
8	Activate this output when the engine is not running AND the switch is on
9	Activate this output when the vehicle speed exceeds the value set in TEM_Aux_1_Speed_Interlock_Param AND the switch is on
10	Activate this output when the vehicle speed is less than the value set in TEM_Aux_1_Speed_Interlock_Param AND the switch is on
11	Activate this output when the vehicle is stopped AND the switch is on
12	Activate this output when the vehicle is moving AND the switch is on
13	Activate this output when the transmission gear is higher than TEM_Aux1_Gear_Interlock_Param AND the switch is on (Requires Automatic Transmission)
14	Activate this output when the transmission gear is lower than TEM_Aux1_Gear_Interlock_Param AND the switch is on (Requires Automatic Transmission)
15	Activate this output when the transmission is in neutral AND the switch is on (Requires Automatic Transmission)
16	Activate this output when the transmission is not in neutral AND the switch is on (Requires Automatic Transmission)



**Figure 192 Drop Down List of Possible Parameters for TEM\_Aux1\_Misc\_Interlock\_Param**

• **TEM\_Aux1\_Interlock\_Latches\_Off**

Normally, if the output is deactivated because the interlocking condition is not met, the output will re-activate as soon as the interlocking condition is re-established as long as the switch is still on. If this behavior is not desirable, the parameter TEM\_Aux1\_Interlock\_Latches\_Off parameter can be set. When it is set and the output is deactivated because the interlocking condition is not met, the output will not reactivate when the interlocking condition is re-established even if the switch is still on. To re-activate the output in this case, the switch must be re-cycled (flipped off and then on again).

• **TEM\_Aux1\_Speed\_Interlock\_Param**

If TEM\_Aux1\_Misc\_Interlock\_Param is set to 9 or 10, the speed-interlock parameter (TEM\_Aux1\_Speed\_Interlock\_Param) must also be set. This parameter must be set to the actual speed to use in the condition selected by TEM\_Aux1\_Misc\_Interlock\_Param (default unit for this parameter is MPH). The speed parameter is only used if TEM\_Aux1\_Misc\_Interlock\_Param is set to 9 or 10.

**Example:** If you want the output to only come on when the vehicle is traveling over 15 MPH, you would set TEM\_Aux1\_Misc\_Interlock\_Param to 9 and set TEM\_Aux1\_Speed\_Interlock\_Param to 15 MPH.

• **TEM\_Aux1\_Gear\_Interlock\_Param**

If TEM\_Aux1\_Misc\_Interlock\_Param is set to 13 or 14 and the vehicle has an automatic transmission, the gear-interlock parameter (TEM\_Aux1\_Gear\_Interlock\_Param) must also be set. This parameter must be set to the transmission gear to use in the condition selected by TEM\_Aux1\_Misc\_Interlock\_Param. The transmission gear is set as follows:

Table 170

Setting	Transmission Gear
125	Transmission in Neutral
126	Transmission is in the 1st forward gear
127	Transmission is in the 2nd forward gear
128	Transmission is in the 3rd forward gear
125 + x	Transmission is in the xth forward gear
124	Transmission is in the 1st reverse gear
123	Transmission is in the 2nd reverse gear
125 – y	Transmission is in the yth reverse gear
The transmission gear parameter is only used if TEM_Aux1_Misc_Interlock_Param is set to 13 or 14.	

**Example:** if you want the output to only come on when the vehicle transmission is in a reverse gear, you would set TEM\_Aux1\_Misc\_Interlock\_Param to 10 and TEM\_Aux1\_Gear\_Interlock\_Param to 125.

- **TEM\_Aux1\_w\_Ilocks\_Output\_Fuse**

This parameter is the value at which the output will fuse (shut off). The allowable values are from 1 to 20 Amperes.

- **TEM\_Aux2\_Misc\_Interlock\_Param**

This parameter (TEM\_Aux2\_Misc\_Interlock\_Param) is the master parameter for this feature. The setting for this parameter selects the interlocking condition for the output. The following table indicates which interlocking condition corresponds to which setting for the parameter. To select the interlocking condition simply set the value of this parameter to the corresponding setting on the table.

Table 171

Setting	Interlocking Condition
0	Apply no interlocks to this output
1	Activate this output when the park brake is set AND the switch is on
2	Activate this output when the park brake is not set AND the switch is on
3	Activate this output when a door is open AND the switch is on
4	Activate this output when all doors are closed AND the switch is on
5	Activate this output when the PTO is engaged AND the switch is on (Requires a PTO feature)
6	Activate this output when the PTO is not engaged AND the switch is on (Requires a PTO feature)
7	Activate this output when the engine is running AND the switch is on

Setting	Interlocking Condition
8	Activate this output when the engine is not running AND the switch is on
9	Activate this output when the vehicle speed exceeds the value set in TEM_Aux_1_Speed_Interlock_Param AND the switch is on
10	Activate this output when the vehicle speed is less than the value set in TEM_Aux_1_Speed_Interlock_Param AND the switch is on
11	Activate this output when the vehicle is stopped AND the switch is on
12	Activate this output when the vehicle is moving AND the switch is on
13	Activate this output when the transmission gear is higher than TEM_Aux1_Gear_Interlock_Param AND the switch is on (Requires Automatic Transmission)
14	Activate this output when the transmission gear is lower than TEM_Aux1_Gear_Interlock_Param AND the switch is on (Requires Automatic Transmission)
15	Activate this output when the transmission is in neutral AND the switch is on (Requires Automatic Transmission)
16	Activate this output when the transmission is not in neutral AND the switch is on (Requires Automatic Transmission)

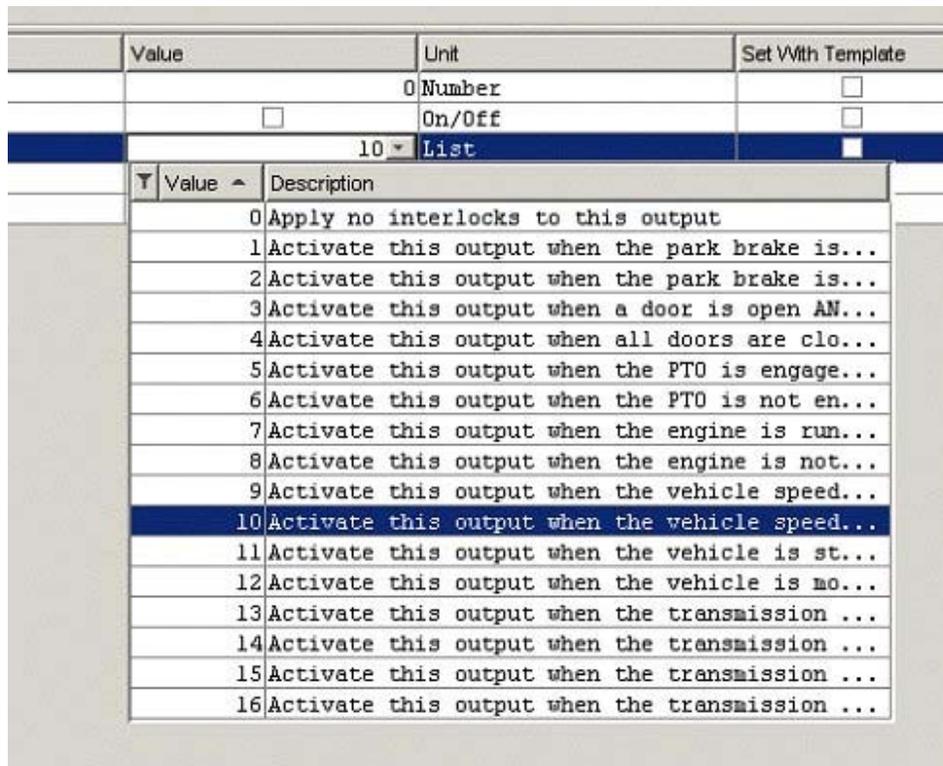


Figure 193 Drop Down List of Possible Parameters for TEM\_Aux2\_Misc\_Interlock\_Param

- TEM\_Aux2\_Interlock\_Latches\_Off

Normally, if the output is deactivated because the interlocking condition is not met, the output will re-activate as soon as the interlocking condition is re-established as long as the switch is still on. If this behavior is not desirable, the parameter TEM\_Aux2\_Interlock\_Latches\_Off parameter can be set. When it is set and the output is deactivated because the interlocking condition is not met, the output will not reactivate when the interlocking condition is re-established even if the switch is still on. To re-activate the output in this case, the switch must be re-cycled (flipped off and then on again).

- **TEM\_Aux2\_Speed\_Interlock\_Param**

If TEM\_Aux2\_Misc\_Interlock\_Param is set to 9 or 10, the speed-interlock parameter (TEM\_Aux2\_Speed\_Interlock\_Param) must also be set. This parameter must be set to the actual speed to use in the condition selected by TEM\_Aux2\_Misc\_Interlock\_Param (default unit for this parameter is MPH). The speed parameter is only used if TEM\_Aux2\_Misc\_Interlock\_Param is set to 9 or 10.

**Example:** If you want the output to only come on when the vehicle is traveling over 15 MPH, you would set TEM\_Aux2\_Misc\_Interlock\_Param to 9 and set TEM\_Aux2\_Speed\_Interlock\_Param to 15 MPH.

- **TEM\_Aux2\_Gear\_Interlock\_Param**

If TEM\_Aux2\_Misc\_Interlock\_Param is set to 13 or 14 and the vehicle has an automatic transmission, the gear-interlock parameter (TEM\_Aux2\_Gear\_Interlock\_Param) must also be set. This parameter must be set to the transmission gear to use in the condition selected by TEM\_Aux2\_Misc\_Interlock\_Param. The transmission gear is set as follows:

**Table 172**

Setting	Transmission Gear
125	Transmission in Neutral
126	Transmission is in the 1st forward gear
127	Transmission is in the 2nd forward gear
128	Transmission is in the 3rd forward gear
125 + x	Transmission is in the xth forward gear
124	Transmission is in the 1st reverse gear
123	Transmission is in the 2nd reverse gear
125 – y	Transmission is in the yth reverse gear
The transmission gear parameter is only used if TEM_Aux2_Misc_Interlock_Param is set to 13 or 14.	

**Example:** if you want the output to only come on when the vehicle transmission is in a reverse gear, you would set TEM\_Aux2\_Misc\_Interlock\_Param to 10 and TEM\_Aux2\_Gear\_Interlock\_Param to 125.

- **TEM\_Aux2\_w\_llocks\_Output\_Fuse**

This parameter is the value at which the output will fuse (shut off). The allowable values are from 1 to 20 Amperes.

Table 173

Parameter	ID	Description	Default	Units	Min	Max	Set
TEM_Aux1_ Interlock_ Latches_Off	2006	If this is set, when the output is turned off due to an interlock, it will remain off until the switch is recycled.	Off	On/ Off			
TEM_Aux1_ Speed_ Interlock_ Param	2007	The speed parameter for the TEM Aux #1 with Interlocks feature.	30	Mph	0	100	1
TEM_Aux1_ Gear_ Interlock_ Param	2008	The transmission gear parameter for the TEM Aux #1 with Interlocks feature (124 is reverse, 125 is neutral, 126 is 1st gear, 127 is second gear etc.).	0	Number	0	250	1
TEM_Aux1_ w_llocks_ Output_Fuse	2009	Fuse parameter for the TEM Single output with interlocks feature.	20	A	0	20	0.1
TEM_Aux1_ Misc_ Interlock_ Param	2033	Miscellaneous or control parameter used for setting the interlock for the auxiliary 1 with interlocks.	10	List			
TEM_Aux2_ Interlock_ Latches_Off	2010	If this is set, when the output is turned off due to an interlock, it will remain off until the switch is recycled.	Off	On/ Off			
TEM_Aux2_ Speed_ Interlock_ Param	2011	The speed parameter for the TEM Aux #2 with Interlocks feature.	30	Mph	0	100	1
TEM_Aux2_ Gear_ Interlock_ Param	2012	The transmission gear parameter for the TEM Aux #2 with Interlocks feature (124 is reverse, 125 is neutral, 126 is 1st gear, 127 is second gear etc.).	0	Number	0	250	1

Parameter	ID	Description	Default	Units	Min	Max	Set
TEM_Aux2_w_llocks_Output_Fuse	2013	Fuse parameter for the TEM Single output with interlocks feature.	20	A	0	20	0.1
TEM_Aux2_Misc_Interlock_Param	2034	Miscellaneous or control parameter used for setting the interlock for the auxiliary 2 with interlocks.	10	List			

**WIRING INFORMATION**

- The wiring out of the pin labeled INTERLOCKED\_SWITCH\_AUX1\_Output on the Brown 8-pin Remote Power Module output connector is customer supplied.
- The wiring out of the pin labeled INTERLOCKED\_SWITCH\_AUX2\_Output on the Brown 8-pin Remote Power Module output connector is customer supplied.

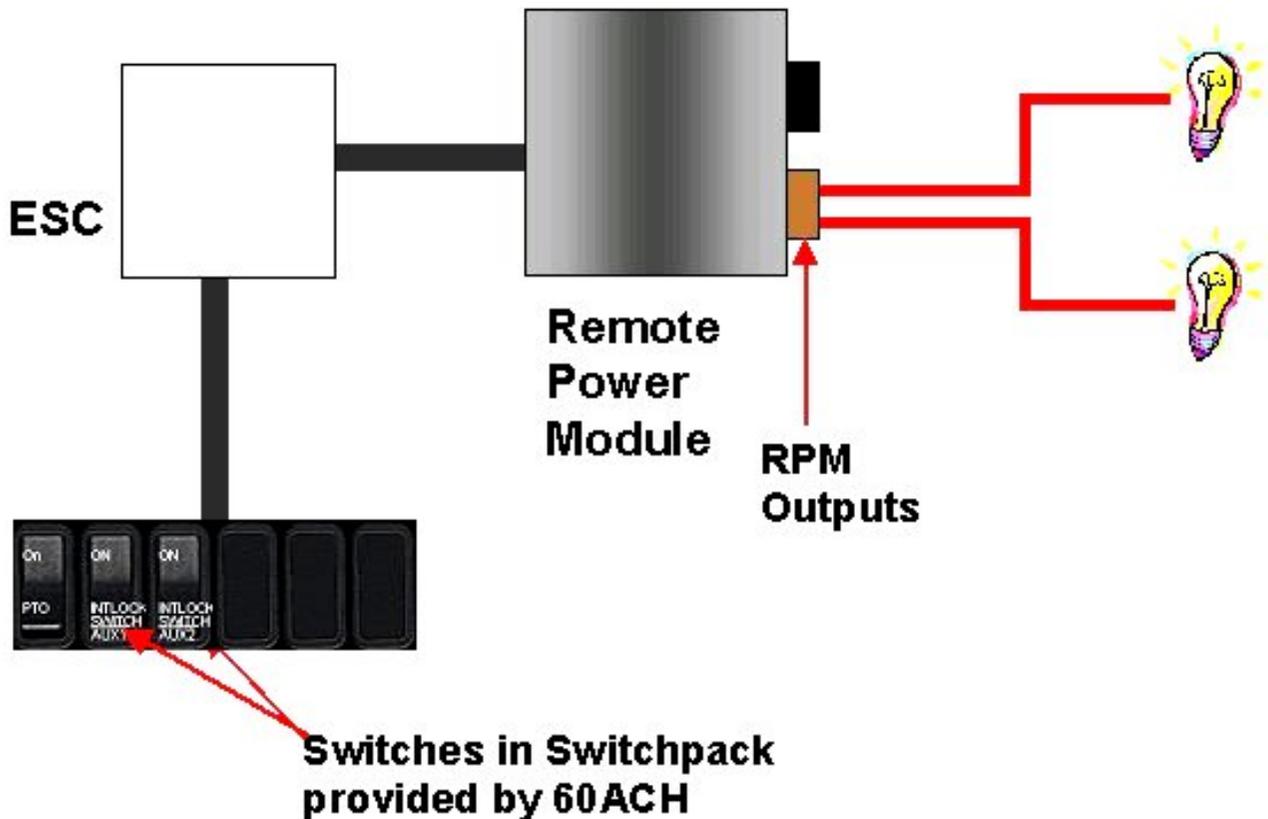


Figure 194

**TESTING**

1. Depress switch.
2. Verify that the RPM output labeled INTERLOCKED\_SWITCH\_AUX1\_Output is obtaining the desired voltage (As programmed by ICAP or the Diamond Logic™ Builder software).
3. Verify the functionality of the 30 Mph interlock by violating the parameter and determine that the output shuts off.
4. Test all other interlocks can by violating the programmable parameters to see if the output shuts off
5. Depress the second switch.
6. Verify that the RPM output labeled INTERLOCKED\_SWITCH\_AUX2\_Output is obtaining the desired voltage (as programmed by ICAP or the Diamond Logic™ Builder software).
7. Verify the functionality of the 30 Mph interlock by violating the parameter and determine that the output shuts off.
8. Test all other interlocks can by violating the programmable parameters to see if the output shuts off

**HOW TO ADD THIS FEATURE:**

- Software feature code 595181 and 595182 MUST be enabled using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- Programmable Parameters must be set using ICAP or the Diamond Logic™ Builder software (See Local Dealer)
- The 2-position latched rocker switch must be installed in the in-cab switch pack
- Customer must install the wiring from the RPM outputs.

## 23. REMOTE AIR SOLENOID MODULE

### 23.1. 08WGA, 08WGB, 08WGC, 08WGD, 08WGP AND 08WGR — TEM AIR SOLENOIDS

Refer to the Circuit Diagram in S08285, Chapter 9, page 14.

#### **FEATURE CODE DESCRIPTION:**

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” 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 “Ignition” 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 “Ignition” 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 “Ignition” or “Accessory” Position; Air Will Exhaust with Key in “Off” Position

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 “Ignition” 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 “Ignition” or “Accessory” Position; Air Will be Supplied with Key in “Off” Position

#### **FEATURE/BODY FUNCTION:**

These air solenoids provide instrument panel mounted rocker switches and normally closed and/or normally closed air solenoids that allow the operator to control up to four 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.** Feature codes 08WGA, 08WGB, 08WGC and 08WGD include windowed latching rockers and do not include any interlock features. Product graphics are included for application to each switch window.



**WARNING – The air solenoids will turn off and the air will be exhausted with the ignition key turned off. Take precautions to ensure that equipment controlled by these solenoids will not cause personal injury when the ignition key is turned off.**

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Software Feature Codes that must be installed: 08WGA — 595259, 595080; 08WGB — 595260, 595080; 08WGC — 595261, 595080; 08WGD — 595262, 595080; 08WGP — 595297, 595080; 08WGR — 595300, 595080

Software Feature Codes that must be not be enabled: NONE

If the current in the Air Solenoid Power circuit falls below the level set by the **Air\_Solenoid\_Power\_Lo\_Current** parameter, the ESC will register a fault code.

If the current in the Air Solenoid Power circuit exceeds the level set by the **Air\_Solenoid\_Power\_Hi\_Current** parameter, the ESC will shut off the circuit and register a fault code.

The **Air\_Solenoid\_Power\_OC\_Current** parameter should be left at its factory default of zero.

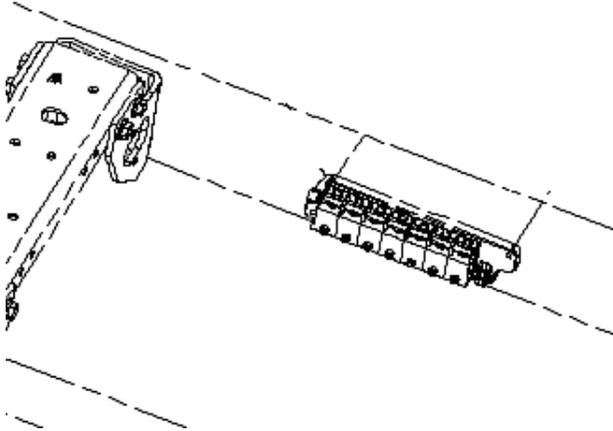
**Table 174**

Parameter	ID	Description	Default	Units	Min	Max	Step
Air_Solenoid_Power_Lo_Current	1874	Air Solenoid Power Low Current Detection Level (Amps)	0	A	0	10	0.1
Air_Solenoid_Power_Hi_Current	1875	Air Solenoid Power High Current Detection Level (Amps)	10	A	0	10	0.1
Air_Solenoid_Power_OC_Current	1876	Air Solenoid Power Open Circuit Detection Level (Amps)	0	A	0	10	0.1

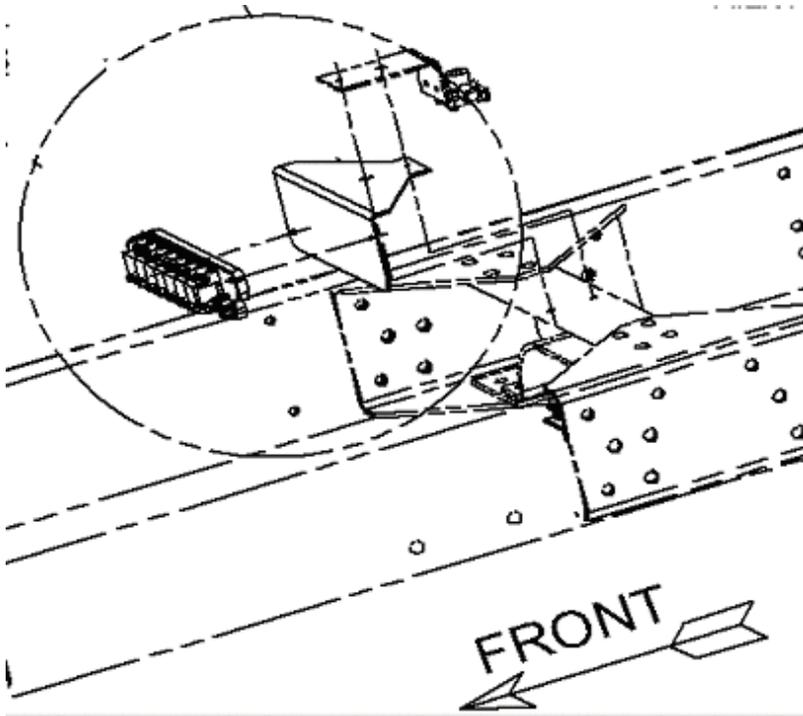
**WIRING INFORMATION**

- Use ICAP or 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.

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



**Figure 195** On Driver's Side Rail In Front Of Rear Cab Cross Member (4-Pack And First 7-Pack Are Mounted Here)



**Figure 196** Located on Center Cross Member (With Hendrickson Suspension) (Second 7-pack is mounted here)

**On trucks without Hendrickson Suspension, the second 7-pack is located on the passenger-side frame rail in front of the rear tandem axle**

### **TESTING**

#### **Directions for 4-pack & 7-pack**

1. Activate first in-cab auxiliary air solenoid switch.
2. Verify that the first air solenoid provides air pressure.
3. Verify that pin A of the Blue ESC output connector (# 4008) is providing voltage.
4. Deactivate first in-cab auxiliary air solenoid switch.
5. Activate second in-cab auxiliary air solenoid switch.
6. Verify that the second air solenoid provides air pressure.
7. Verify that pin A of the Blue ESC output connector (# 4008) is providing voltage.
8. Deactivate second in-cab auxiliary air solenoid switch.
9. Activate third in-cab auxiliary air solenoid switch.
10. Verify that the third air solenoid provides air pressure.
11. Verify that pin A of the Blue ESC output connector (# 4008) is providing voltage.
12. Deactivate third in-cab auxiliary air solenoid switch.
13. Activate fourth in-cab auxiliary air solenoid switch.
14. Verify that the fourth air solenoid provides air pressure.
15. Verify that pin A of the Blue ESC output connector (# 4008) is providing voltage.
16. Deactivate fourth in-cab auxiliary air solenoid switch.

#### **Directions for 7-pack**

17. Activate the fifth in-cab auxiliary air solenoid switch.
  18. Verify the fifth air solenoid provides air pressure.
  19. Verify the pin-A of the (blue) ESC output connector (#4008) is providing voltage.
  20. De-activate fifth in-cab auxiliary air solenoid switch.
  21. Activate the sixth in-cab auxiliary air solenoid switch.
  22. Verify the sixth air solenoid provides air pressure.
-

23. Verify the pin-A of the (blue) ESC output connector (#4008) is providing voltage.
24. De-activate sixth in-cab auxiliary air solenoid switch.
25. Activate the seventh in-cab auxiliary air solenoid switch.
26. Verify the seventh air solenoid provides air pressure.
27. Verify the pin-A of the (blue) ESC output connector (#4008) is providing voltage.
28. De-activate seventh in-cab auxiliary air solenoid switch.

#### **HOW TO ADD THESE FEATURES:**

\*\* See the “How Do I” General Information section of the body builders book.

- Electrical power is provided to the air solenoid pack from an ESC output. Wiring must be added from Pin A of the Blue ESC output connector (# 4008) to the air solenoid.
- Feature codes 595259, 595260, 595261, or 595262 must be added depending on the number of air outputs desired.
- Programmable parameters listed above can be modified or left at default settings.
- Use ICAP or the Diamond Logic™ Builder software to determine correct in-cab switch location(s) for the switches controlling the air outputs.

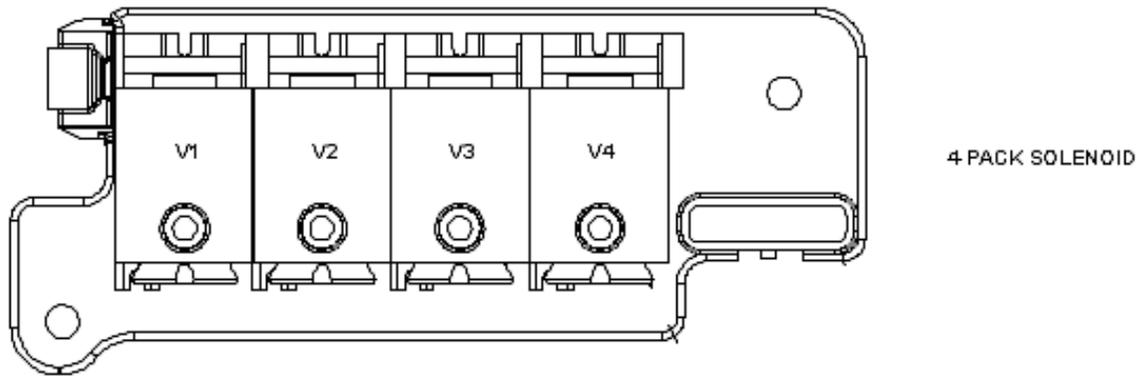
Listed below is a listing of parts that may be required depending on how the vehicle was equipped at the factory.

**Table 175 Air Solenoid and Switch Modules**

Part Number	Description
2505594C1	Bracket, Solenoid Four Pack (Base)
2505595C2	Bracket, Solenoid Seven Pack (Base) No. 1
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
2507928C1	Bracket, Solenoid Seven Pack (Base) No. 2

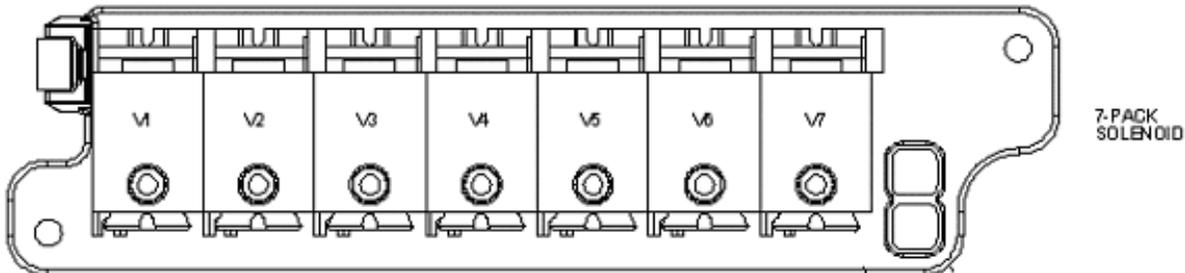
- The vehicle has a four or seven pack with unused solenoid locations.

In the above situation, simply add the solenoid to the solenoid pack, add the appropriate rocker to the switch pack – see the Switch Pack section for additional information. The ESC will have to be programmed for the additional solenoid and switch. Add solenoids per the views below.



NOTE: FILL V1 FIRST, V2 SECOND...V4 LAST

**Figure 197**



NOTE FILL V1 FIRST, V2 SECOND, V3 THIRD.....V7 LAST

**Figure 198**

- The vehicle does not have any solenoid switch pack

In the above situation, a four pack and solenoid(s) will have to be added. In the case of the four pack, the solenoids are controlled by the ESC there is no multiplexing from the ESC to the solenoid pack – see the Switch Pack Section for information on switches.

Circuits will have to be added from the ESC to the four pack – See the 7-Way Socket at end of frame for general circuit addition and circuit diagram manual use.

- The vehicle has a Four Pack but it is filled up.

An additional Four Pack cannot be added. The Four Pack must be replaced with the Seven Pack. Note the order that the solenoids are positioned on the Four Pack, they must be installed in the same order on the Seven Pack.

The Seven Pack communicates with the ESC over the data link. If the vehicle is equipped with a Remote Power Module, Simply disconnect the harness 6- way connector from the remote power module and plug onto the Seven Pack. Install jumper 3558937C91 (500 mm length) or 3558936C91 (400 mm length) between Seven Pack and Remote power module.

If there is no Remote Power Module, the installation gets more difficult. Adding a remote Seven Pack is very similar to adding a remote Power Module with primary difference being the solenoid pack does not need power from the battery, addressing jumper and there is no remote control feature. Both units use the same terminating resistor and after mounting of the solenoid pack the terminating resistor must be connected to the open connector of the solenoid pack. The same harnesses used in the remote power installation can be used to connect the solenoid pack. (you will not need harness P/N 3558934C92) Do not order the complete Remote Power Module kit, only parts as needed. Refer to the Remote Power module installation for instructions.

See switch pack section for information on adding switches.

The ESC will have to be programmed for the additional base, solenoid and switch.

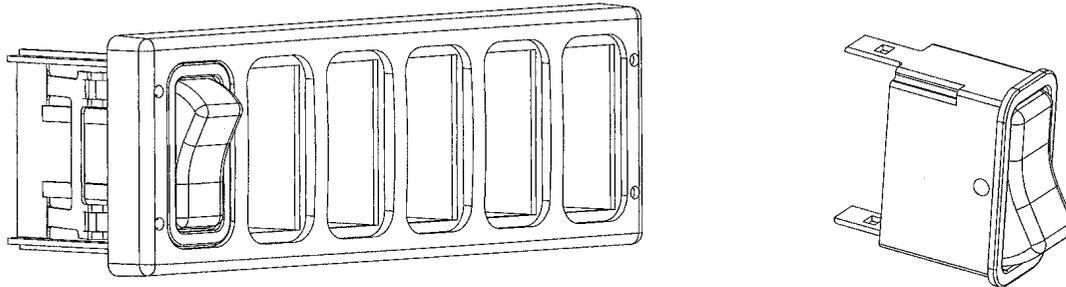
- The vehicle has a Seven Pack but it is full.

A second Seven Pack can be installed. The P/N for the second seven pack is 2507928C1, as indicated parts listing above, the second seven pack is different than the one if a single switch pack is used. If two of the same P/N's are used, the system will not function.

The second Seven Pack can be installed in front or behind, use same cables as used when installing with a Remote Power Module above.

See switch pack section for information on adding switches.

## 24. SWITCHES — GENERAL DESCRIPTION



**Figure 199**

All switches are rocker actuators that do not require hard wiring. The switches are used in switch pack modules (6 or 12 switches) that connect to the multiplex system through the switch housing cable harnesses.

In the Switch Actuator Table below, column 2 references the part numbers of the new replacement switch and columns 3 and 4 are the replacement LED's part numbers. Column 5 is the switch description. Columns 6, 7 and 8 describe the switch functions. **Position Number** reflects the number of positions the switch can physically be placed in. **Position On** denotes the position of the switch for activation. **Switch Action** indicates whether the switch is Momentary (spring loaded, switch returns to a specific state) or if the switch is Latching (switch stays in the selected state). Items 26, 27 and 32 are blank switches with two clear square windows on them. These switches require a stick on graphic kit to identify function and allow for custom switches. The graphic kit can be purchased under part number 3552005C3. See the Switch Graphic Label Kit Table below for the graphic labels that are provided with this kit.

**NOTE – Switches are no longer packaged with LED's (Light Emitting Diodes). LED's must be ordered separately. Refer to Table 1 to locate the proper LED part numbers. Each switch usually requires two LED's that are installed from the rear side of the switch pack assembly (see How Do I Add Additional Rocker Switches in this section). If the switch has an ON indicator, a green LED will be located in the upper portion. An amber LED is required in the lower portion providing for nighttime viewing. If a switch does not contain an ON indicator, then an amber LED should be installed in the upper as well as the lower section.**

**24.1. SWITCH ACTUATORS FOR MULTIPLEX SYSTEM****Table 176 Switch Actuators for Multiplex System**

1	2	3	4	5	6	7	8
Part ID	New Part Number	Indicator LED	Back Light LED	Description	Position Number	Position On	Switch Action
1	3563061C1			Head Light Switch	3	Mid/ Up	Latching
2	3563062C1			Dimmer Switch	2	Up/ Down	Momentary
3	3563063C1	3578733C1	3533928C1	Work Light Switch	2	Up/ Down	Latching
4	3563064C1	3578733C1	3533928C1	Fog Light Switch	2	Up	Latching
5	3563069C1	3578733C1	3533928C1	Front Axle Switch	2	Up	Latching
6	3563065C1	3578733C1	3533928C1	Exhaust Brake Switch	2	Up	Latching
7	3560046C1	3578733C1	3533928C1	Engine Compression Brake On/ Off	2	Up	Latching
8	3560047C1		3533928C1	Engine Compression Brake Selector	3	All	Latching
9	3549930C1			Ether Start Switch	2	Up	Momentary
10	3563066C1	3578733C1	3533928C1	Plow Light Switch	2	Up	Latching
11	3563067C1	3578733C1	3533928C1	Traction Disable Switch	2	Up	Latching
12	3563068C1		3533928C1	2 Speed Axle Hi/ Low	2	Up/ Hi	Latching
13	3563111C1		3533928C1	Transfer Case Hi/ Low	2	Up/ Hi	Latching
14	3563079C1	3578733C1	3533928C1	PTO On/ Off	2	Up	Latching

Table 176 Switch Actuators for Multiplex System (cont.)

1	2	3	4	5	6	7	8
Part ID	New Part Number	Indicator LED	Back Light LED	Description	Position Number	Position On	Switch Action
15	3563070C1		3533928C1	Marker Interrupt	2	Down	Momentary
16	3563071C1	3578733C1	3533928C1	Mirror Heat	2	Up	Latching
17	3560048C1	3578733C1	3533928C1	Fan Override	2	Up	Latching
18	3563072C1	3578733C1	3533928C1	Auto Neutral Switch	2	Up	Latching
19	3563073C1	3578733C1	3533928C1	Power Divider Lock	2	Up	Latching
20	3563074C1	3578733C1	3533928C1	Diff Lock	2	Up	Latching
21	3563075C1	3578733C1	3533928C1	Air Suspension Dump	2	Up	Latching
22	3563077C1	3578733C1	3533928C1	Retarder On/ Off	2	Up	Latching
23	3563078C1		3533928C1	Retarder Hi/ Low	2	Up/ Hi	Latching
24	3563080C1	3578733C1	3533928C1	Air Assist	2	Up	Momentary
25	3559784C1	3578733C1	3533928C1	Engine Override	2	Up	Momentary
26*	3564004C1	3578733C1	3533928C1	Window Rocker Blank (3 Position)	3	Up	Momentary
27*	3578910C1	3578733C1	3533928C1	Window Rocker Blank (2 Position)	2	Up	Latching
28	3560961C1	3578733C1	3533928C1	Blower Road Switch	2	Up/ Down	Latching
29	3563113C1		3533928C1	Wet Tank Drain	2	Up	Momentary
30	3563114C1		3533928C1	Primary Tank Drain	2	Up	Momentary

**Table 176 Switch Actuators for Multiplex System (cont.)**

1	2	3	4	5	6	7	8
Part ID	New Part Number	Indicator LED	Back Light LED	Description	Position Number	Position On	Switch Action
31	3563115C1		3533928C1	Secondary Tank Drain	2	Up	Momentary
32*	3579027C1	3578733C1	3533928C1	Window Rocker Blank (2 Position)	2	Up	Momentary

\* **NOTE:** Switch 26, 27 and 32 are to be used with remote power module.

**Table 177 3552005C3 Switch Graphic Label Kit**

	Graphic		Graphic		Graphic
1	LEFT ALLEY	2	RIGHT ALLEY	3	REAR ALLEY
4	STROBE BAR	5	PRIMRY WARN	6	SECND WARN
7	INTSEC LIGHTS	8	CAB ROTO	9	MANGR CANCEL
10	LOAD MANGR	11	TRUCK	12	MACHINE
13	AIR COMPR	14	BRAKE LOCK	15	FLOOD LIGHT
16	SPREDR LIGHT	17	AUX 1	18	AUX 2
19	AUX 3	20	PLOW DOWN	21	PLOW UP
22	SANDER ROTO	23	SANDER	24	BOOM
25	ON	26	ON	27	ON
28	ON	29	ON	30	ON
31	ON	32	ON	33	PASS ALLEY
34	DRIVER ALLEY	35	ROOF LIGHT	36	LIGHT BAR
37	STROBE LIGHT	38	REAR STROBE	39	FRONT STROBE
40	CAB STROBE	41	WIG WAG	42	ROTO LIGHT
43	BEACON LIGHT	44	LIGHT BOARD	45	REAR FLASHR
46	PUMP PANEL	47	DRIVE LIGHT	48	LOW VOLTS
49	PLOW LIGHT	50	AXLE 1 UP	51	AXLE 1 DOWN
52	AXLE 2 UP	53	AXLE 2 DOWN	54	TAG UP
55	TAG DOWN	56	BOOM UP	57	ON
58	ON	59	ON	60	ON
61	ON	62	ON	63	ON
64	ON	65	LEFT SCENE	66	RIGHT SCENE

Table 177 3552005C3 Switch Graphic Label Kit (cont.)

	Graphic		Graphic		Graphic
67	REAR SCENE	68	STEP LIGHT	69	DECK LIGHT
70	FRONT FLASH	71	STEP LT CANCEL	72	GROUND LIGHT
73	PTO	74	PTO GEN	75	PTO PUMP
76	GEN RUN	77	AUX PTO	78	MASTER THROTL
79	EMERG MASTER	80	MASTER	81	OPEN GATE
82	LIFT GATE	83	RAISE BOX	84	LOWER BOX
85	TARP WIND	86	TARP UNWIND	87	EMERG PANIC
88	BOOM DOWN	89	ON	90	ON
91	ON	92	ON	93	ON
94	ON	95	ON	96	ON
97	LEFT WARN	98	RIGHT FLOOD	99	SIDE WARN
100	UPPER WARN	101	LOWER WARN	102	FRONT WARN
103	REAR WARN	104	CLEAR WARN	105	OXYGEN
106	OXYGEN LIGHT	107	EXHST FAN	108	FAN LOW
109	FAN HIGH	110	DO NOT MOVE	111	AUX WARN
112	DOOR OPEN	113	CAMERA LIGHT	114	PUMP
115	BOX UP	116	SHAKER	117	BLOWER
118	DRAIN VALVE	119	FILL VALVE	120	BOOM LEFT
121	LOCK DOOR	122	UNLOCK DOOR	123	12 VOLT OUTLET
124	HOPPER LIGHT	125	FAN	126	ESPAR HEAT
127	A/C	128	A/C HEAT	129	LEFT FLOOD
130	COMPT LIGHT	131	REAR FLOOD	132	UPPER WORK
133	LOWER WORK	134	WORK LIGHT	135	FRONT LIGHT
136	PERIM LIGHT	137	CODE AMBER	138	CODE GREEN
139	CODE RED	140	CODE BLUE	141	PUMP AND ROLL
142	110 V INVT	143	BACKUP LIGHT	144	AIR HORN
145	TRAP LIGHT	146	HIGH IDLE	147	BACK ALARM
148	LEFT WING	149	RIGHT WING	150	SPARE
151	SPARE	152	BOOM RIGHT	153	HIGH
154	LOW	155	METEOR LIGHT	156	ALLEY
157	OIL LEVEL	158	CRANE	159	SPOT LIGHT
160	HIGH RAIL	161	OPTI COM	162	COMPT LIGHT
163	BIN LIGHT	164	REAR LIGHT	165	FLORES LIGHT

**Table 177 3552005C3 Switch Graphic Label Kit (cont.)**

	Graphic		Graphic		Graphic
166	DOME LIGHT	167	MAP LIGHT	168	CARGO LIGHT
169	SIREN	170	SIREN HORN	171	ELECT HORN
172	SIREN BRAKE	173	PUMP ENG'D	174	OK TO HI IDLE
175	OK TO PUMP	176	CITY HORN	177	ELECT SUCTN
178	OVER RIDE	179	XFER CASE	180	WINCH
181	OUTRIG DOWN	182	OUTRIG UP	183	CONVEYOR
184	BOOM STOW	185	(BLANK)	186	(BLANK)
187	(BLANK)	188	(BLANK)	189	(BLANK)
190	(BLANK)	191	(BLANK)	192	(BLANK)

## 25. CAB FEATURES

### 25.1. 08WGL — WINDSHIELD WIPER SPEED CONTROL

#### **FEATURE CODE DESCRIPTION:**

08WGL – Windshield Wiper Speed Control. Forces wipers to slowest Intermittent Speed when the park brake is set and left on for a predetermined time.

#### **FEATURE/BODY FUNCTION:**

Feature 08WGL is a software feature that forces the windshield wipers to their slowest intermittent speed when the park brake is set and the wipers are left on for a programmable period of time (Wipers\_To\_Low\_Int\_Timeout).

The user may override this feature by manually moving the wiper switch to another position. The wipers will remain at this speed for the same programmable period of time and then return to their slowest intermittent speed after that time has passed.

If the ignition switch is turned off, this feature will be overridden.

There are two programmable parameters associated with this feature; Wipers\_To\_Low\_Int\_Enabled and Wipers\_To\_Low\_Int\_Timeout. These parameters can be modified by anyone with the appropriate interface tool and Fleet access or higher.

#### **SOFTWARE FEATURE CODES / PROGRAMMABLE PARAMETERS:**

Software Feature Codes that must be installed: 08WGL — 595288 (use with ESC2), 595289 (use with ESC1)

Software Feature Codes that must be not be enabled: 08WGL — 595253 (use with ESC2), 595029 (use with ESC1 if wiper with speed override functionality is requested)

The **Wipers\_To\_Low\_Int\_Enabled** parameter shall enable or disable this feature. The default setting shall be ON when this feature is ordered.

The **Wipers\_To\_Low\_Int\_Timeout** parameter shall determine the amount of time the park brake has to be set before the wipers are forced to their slowest intermittent speed. The default value for this parameter is 60 seconds. The minimum time allowed is 10 seconds and the maximum time allowed is 300 seconds with 10 second intervals.

Table 178

Parameter	ID	Description	Default	Units	Min	Max	Step
Wipers_To_Low_Int_Enabled	2171	Enables or disables the wiper speed override, if it is present	1	None	0	1	
Wipers_To_Low_Int_Timeout	2228	Defines the amount of time the parking brake has to be set before the wiper speed is overridden	60	s	10	300	

**WIRING INFORMATION**

This feature is software driven.

**TESTING**

1. Start vehicle and make sure the parking brake is engaged.
2. Turn the windshield wipers on any setting except for the slowest intermittent speed.
3. Leave the wipers on this setting for 60 seconds without adjusting the wiper speed.
4. After 60 seconds, the wipers should slow to the lowest speed.
5. Adjust the wiper speed control.
6. The wiper setting should match the user set speed.

**HOW TO ADD THESE FEATURES:**

Use ICAP or the Diamond Logic™ Builder software to install the appropriate software and determine correct settings for programmable parameters.



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