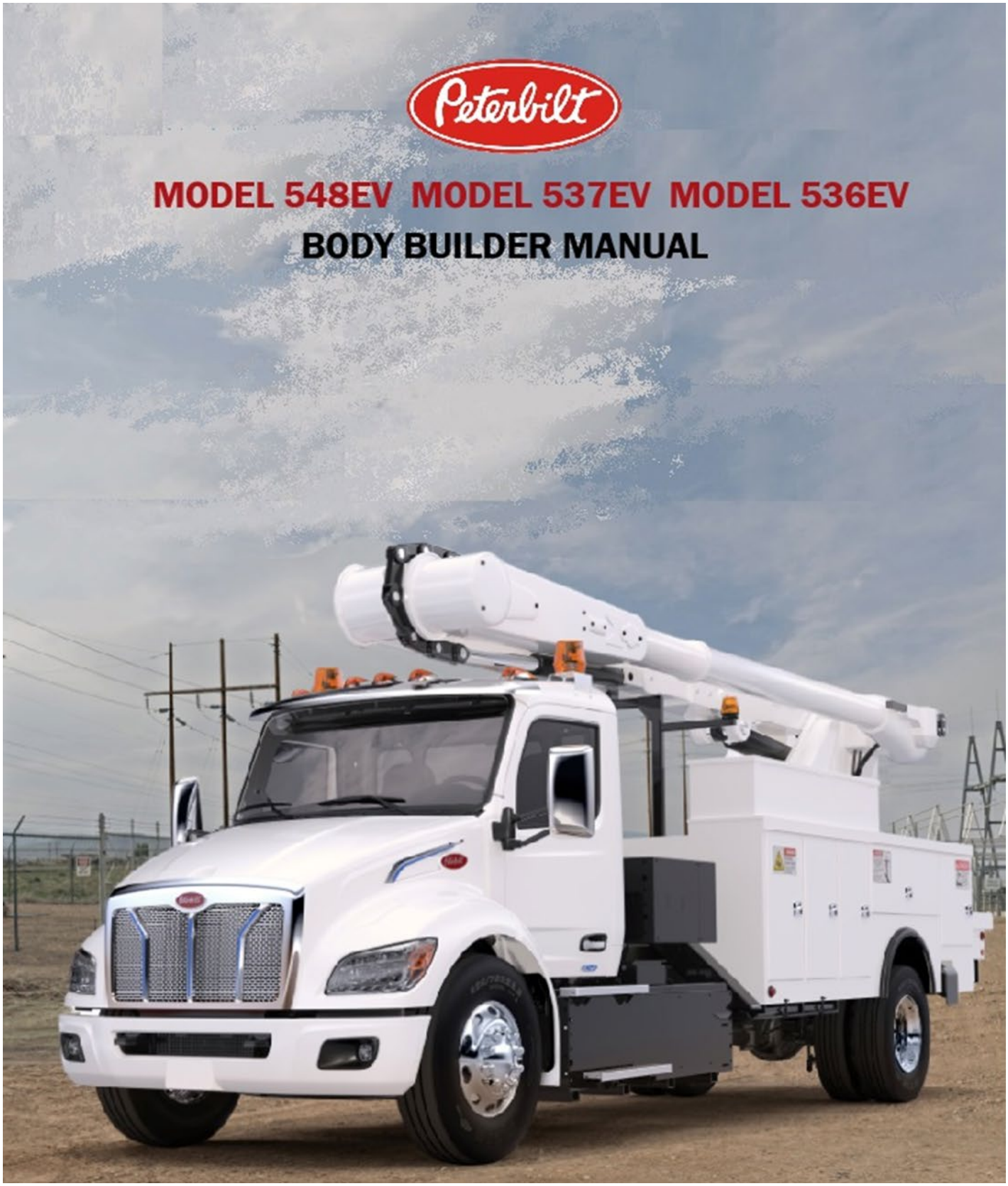
MODEL 548EV MODEL 537EV MODEL 536EV

BODY BUILDER MANUAL



MODEL 536EV MODEL 537EV MODEL 548EV

March 2026

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SECTION 1
INTRODUCTION AND BEV SAFETY

Since 548EV, 537EV, and 536EV trucks use electric propulsion and not internal combustion engines, different procedures for working on their powertrain and auxiliary components must be followed compared to 548, 537, or 536 Models. This manual contains important information regarding the electric vehicle components, operations, and safety warnings that differ from models with internal combustion engines.

Many procedures require the high voltage (HV) components to be turned off. Only personnel trained by Paccar and certified to Paccar Level 3 Certification are authorized to work on the HV system, including shutting it down.

Peterbilt strongly recommends that you read and fully understand this manual before adding a body or other equipment to the 548EV, 537EV, or 536EV models.

Please pay close attention to all safety alerts in this manual. These alerts are designed to protect you and to help prevent costly damage to the vehicle. Safety alerts are marked with symbols and signal words such as “DANGER,” “WARNING,” “CAUTION,” or “NOTE.” It is important that you do not ignore any of these alerts.

ACRONYMS AND ABBREVIATIONS

BBC	Bumper to Back of Cab. Measured from front of bumper to back of cab.
BEM	Battery Energy Monitor
BEV	Battery Electric Vehicle
BFA	Bumper to Front Axle. Measured from front of bumper to the centerline of front axle.
BOC	Back of Cab
CA	Cab to Axle. Measured from the BOC to the centerline of the rear axle(s).
CSS	Cell Supervisory Circuit
DC	Direct Current
EOF	Frame rail overhang behind rear axle--measured from the centerline of the rear axle(s).
ESS	Energy Storage System (aka HV Battery Pack)
FAX	Front Axle
FOF	Front of frame
GCWR	Gross Combination Weight Rating
GVWR	Gross Vehicle Weight Rating
HV	High Voltage
HVIL	High Voltage Interloop Lock
HVJB	High Voltage Junction Box
LV	Low Voltage
LT	Low Temperature
MSD	Master Service Disconnects
MT	Medium Temperature
OBD	On-Board Diagnostics
PCAS	Power Control Accessory Subsystem
PPC	PACCAR Powertrain Controller
SOC	Side of Cab
VECU	Vehicle Electronic Control Unit
WB	Wheelbase

TABLE 1-1. Abbreviations and Acronyms used in this manual

BEV SAFETY

SAFETY SIGNALS

There are several alerting messages in this book. Please read and follow them. They are there for your protection and information. These alerting messages can help you avoid injury to yourself or others and help prevent costly damage to the vehicle.

Key symbols and “signal words” are used to indicate what kind of message is going to follow. Pay special attention to comments prefaced by “WARNING”, “CAUTION”, “NOTE, and “DANGER”. Please do not ignore any of these alerts.

WARNING

Example:

WARNING

DO NOT attempt maintenance, repair, or interact in any way with the high voltage electrical system or any of its components unless you are a PACCAR Level 3 or higher EV-certified technician. The high voltage electrical system is capable of producing electric shock and dangerous burns. Failure to comply may result in death, personal injury, equipment damage, or property damage.

When you see this word and symbol, the message that follows is especially vital. It signals a **potentially hazardous situation** which, if not avoided, could result in death or serious injury. This message will tell you what the hazard is, what can happen if you do not heed the warning, and how to avoid it.

CAUTION

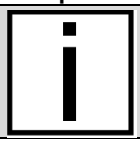
Example:

 **CAUTION**
Use a compatible charger when charging the propulsion battery pack. Noncompatible chargers may not charge the truck, which could negatively affect the propulsion battery pack life.

Signals a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the vehicle.

NOTE

Example:

 **NOTE**
Architecture changes on EMUX will not allow “Read Only” CAN devices to listen on S-CAN without additional modifications. A minimum of one additional CAN device with the ability to "acknowledge" messages will be required to complete the network on S-CAN and K-CAN. An incomplete network will result in the inability to read/view CAN communication on the S-CAN and K-CAN.

Provides general information: for example, the note could warn you on how to avoid damaging your vehicle or how to drive the vehicle more efficiently.

DANGER!

 **DANGER!**

The safety message following this symbol and signal word provides a warning against operating procedures that, if not avoided, will cause injury or death. They could also cause equipment or property damage. The alert will identify the hazard, how to avoid it, and the probable consequence of not avoiding the hazard.

Please take the time to read these messages when you see them, and remember:

WARNING!
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION!
Signals a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the vehicle.

NOTE
Useful information that is related to the topic being discussed.

DANGER!
Provides a warning against operating procedures that, if not avoided, will cause injury or death. They could also cause equipment or property damage.

BATTERY ELECTRIC VEHICLE SYSTEM

The following are highlights of some of the more common or critical aspects of this system.

- The Propulsion Battery Pack (ESS) internals may not be modified.
- The eMotor internals may not be modified.
- The PACCAR Powertrain Controller (PPC), High Voltage Junction Box (HVJB), and Power Controls Accessories Subsystem (PCAS) may not be modified.
- The battery chiller and coolant pumps may not be modified.
- The relay boxes may not be modified.
- Body Builder additional wiring should be routed, protected from heat, and properly secured to prevent damage from other components.
- High Voltage cables are orange and may not be modified.

WARNING

Removal of the Master Service Disconnects (MSDs) should only be done by personnel certified to de-energize the system.

Some electric vehicle components contain enough energy to be lethal if used improperly. For this reason, Battery Electric Vehicle (BEV) badges are displayed on both sides of all battery electric trucks. High Voltage (HV) labels are also placed near electrical components to warn and inform operators of dangers and precautions.

Do Not Work on High Voltage Electrical Systems

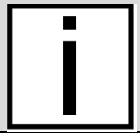
WARNING

DO NOT attempt maintenance, repair, or interact in any way with the high voltage electrical system or any of its components unless you are a PACCAR Level 3 or higher EV-certified technician. The high voltage electrical system is capable of producing electric shock and dangerous burns. Failure to comply may result in death, personal injury, equipment damage, or property damage.

WARNING

DO NOT work or do any repair on the high voltage electrical system and its components. Maintenance and service to the vehicle that involves the high-voltage system, including connecting or disconnecting high voltage cables, PCAS components, the drive motor, PS inverter, and onboard charger must be handled and de-energized by trained PACCAR level 3 certified electrical technicians. Contact the nearest authorized EV service certified dealership to schedule an appointment with the service department.

Working on the Low Voltage system may require LV de-energizing.



NOTE

The LV diagnostics de-energize procedure must be performed if you (1) are performing mechanical or low voltage work AND (2) you REQUIRE low voltage power. An example of this might be making a voltage measurement on a low voltage circuit or programming an electronic control unit (ECU).

1. Remove the key from the ignition.
2. Disconnect Charge Cable from Charge Inlet.
3. Turn the Low-Voltage (LV) disconnect switch to the “Off” position.
4. Disconnect the cut loop at the connector.

LV De-energizing Procedure is complete.

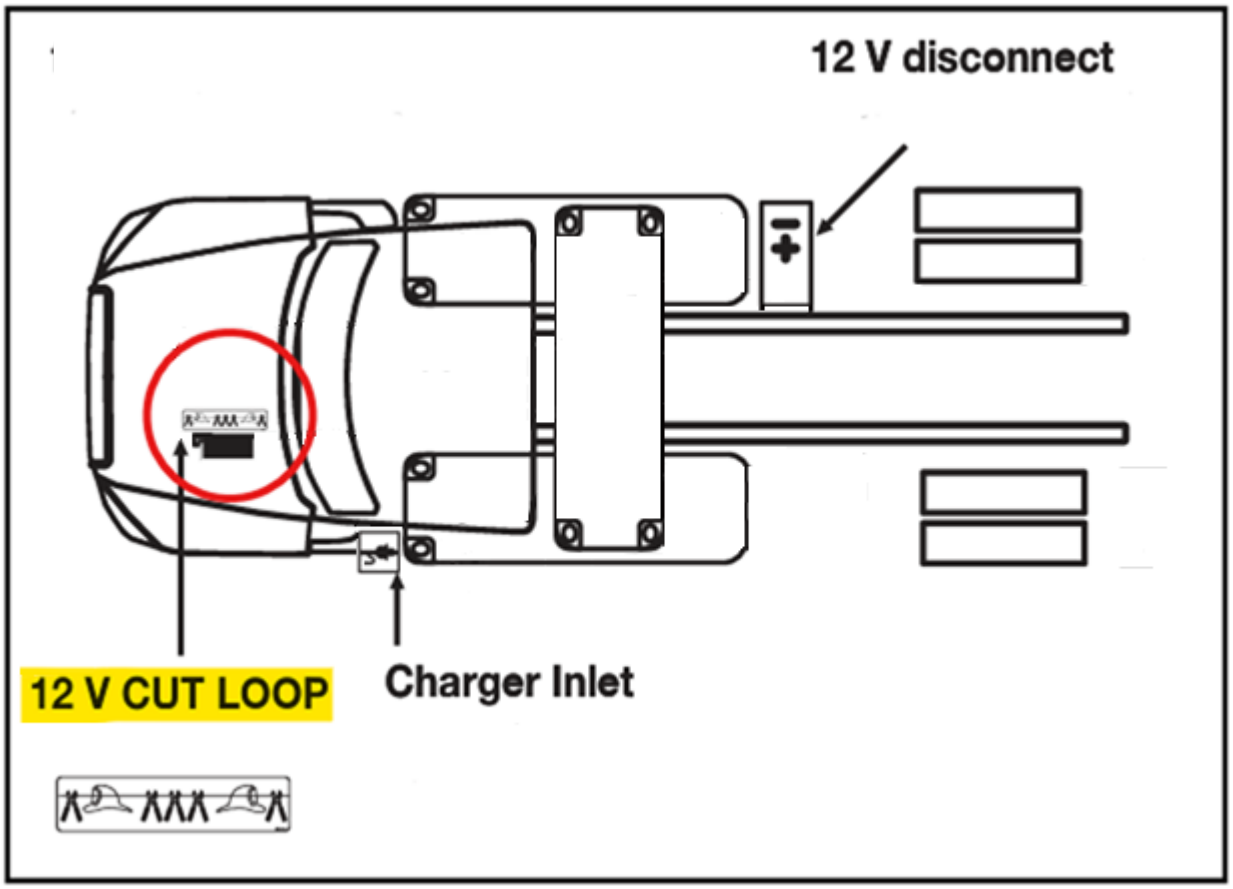


FIGURE 1-1. 12V Cut Loop Location

Cosmetic work and other work not related to low or high voltage systems are allowed on EV with no additional risk.

WARNING

Modifying your vehicle can make it unsafe. Some modifications can affect your vehicle's electrical system, stability, or other important functions. Before modifying your vehicle, check with your dealer to ensure the modification can be performed properly. Improper modifications could cause injury, death, or equipment damage.

WARNING

When working on the vehicle, avoid several key actions to ensure safety and prevent damage. Do not open or modify the motor internals. Do not add an auxiliary transmission or modify the driveline layout, as this can negatively affect vehicle performance.

JUMP STARTING OR CHARGING A DEAD 12V BATTERY

Jump starting and charging a dead 12V battery is not covered in this Body Builder Manual. Information on jump starting can be found in the Medium Duty Operator's Manual (available at www.Peterbilt.com).

PRONLONGED DIS-USE AND STORAGE

For service, if the truck sits for a long period of time, the battery will need periodic charging to avoid permanently damaging the battery. Optimal storage level for the batteries is 50-80%. Periodic checks of the charge level and re-charging on the monthly basis is recommended. Never leave the battery at 0% charge state, prolonged time at 0% charge can permanently damage the battery.

BATTERY ELECTRIC TRUCK COMPONENTS

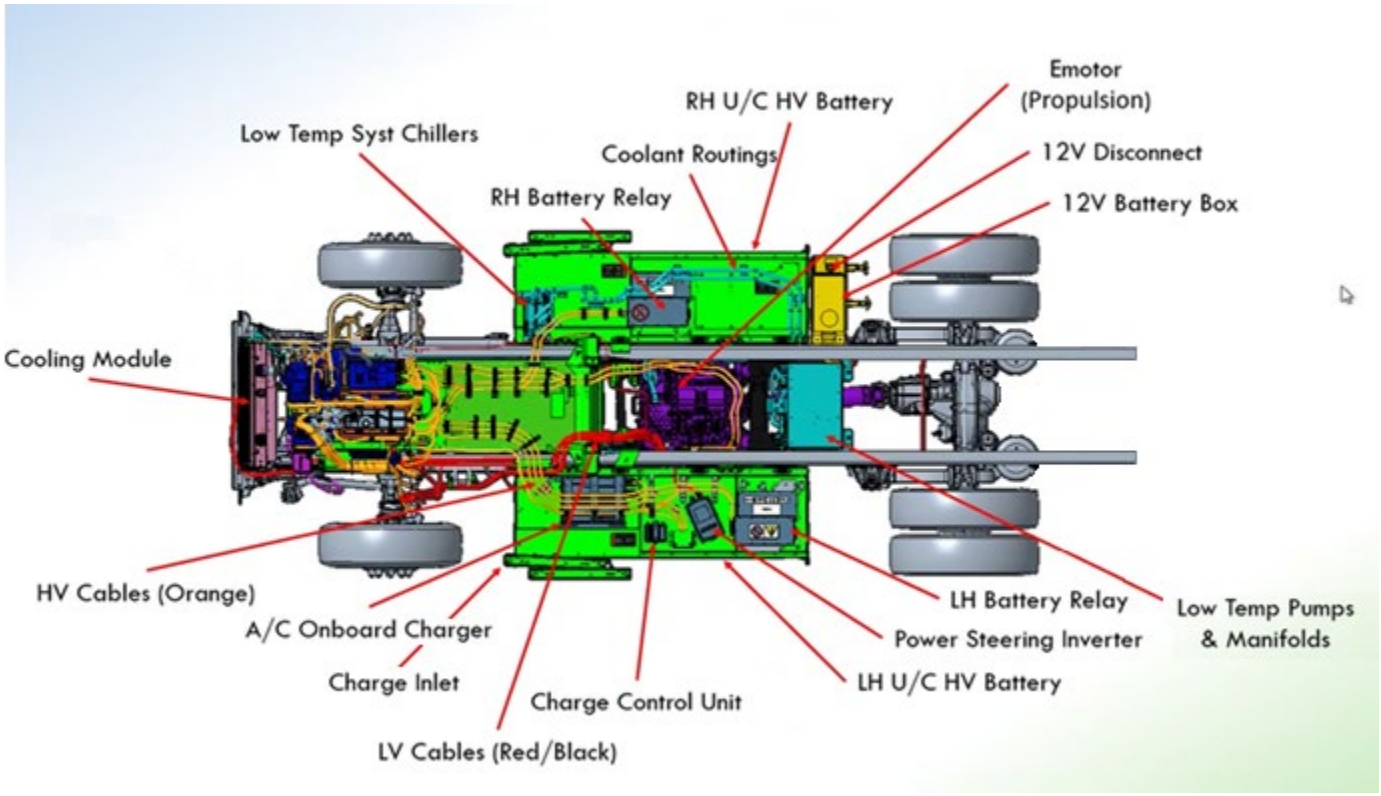


FIGURE 1-2. Battery Electric Vehicle Components

BATTERY ELECTRIC COMPONENTS DESCRIPTION

Air Compressor - The air compressor is driven by an electric motor. It is part of the PCAS and is a low voltage component.

Air Conditioning Compressor - The air conditioning compressor is driven by an electric motor. It is part of the PCAS and is a low voltage component.

Battery Management Unit (BMU) – The Master Battery Management Unit (BMU) is located in the S-box and is designed to provide communication between the vehicle and battery strings, management of the relay boxes, main contactor control and diagnostic, fuse diagnostic, and other functions of the battery management system.

Battery Coolant System – system consisting of battery refrigerant compressor, receiver/drier, refrigerant condenser (also for the battery), coolant pump, battery coolant chiller, coolant reservoir, coolant manifolds, and various refrigerant and coolant hoses.

Battery Energy Monitor (BEM) – Current, voltage, and temperature are monitored by the BEM and reported to VECU. Then BEM also tracks energy use over time and health of battery and reports this to the VECU.

Cell Supervisory Circuit (CSS) – The CSS is the electronic system responsible for monitoring and managing individual battery cells within a battery pack. Its primary functions include monitoring things like voltage and temperature, balancing charge levels, and protecting the battery pack from abnormal voltages and temperatures, and short circuits.

Charge Control Unit (CCU) – the CCU is a controller that does not bypass the Onboard Charger (OBC). This device facilitates communication between the vehicle and the charger. This device is necessary regardless of whether the vehicle is AC or DC charging.

Charger – see Onboard Charger (OBC)

Charge Inlet – a CCS1 (SAE J1772) connector used to charge the truck. It includes AC (normal charging) and DC (fast) charging capabilities.

Chiller – (aka TXV-Chiller) - a combination of a thermal expansion valve and a coolant-to-refrigerant heat exchanger. The thermal expansion valve causes incoming refrigerant to rapidly decrease in pressure and temperature. The heat exchanger allows the hot coolant to transfer its heat to the cold refrigerant. The function of the TXV-chiller is to maintain the optimum battery operation temperature by circulating chilled coolant through the high voltage batteries.

Coolant Pumps – There are two coolant pumps utilized, with one circulating coolant to the batteries (LT coolant pump) and one to the power electronics, powertrain, inverters, and cab (MT coolant pump). Pump speed is monitored and adjusted to enable the cooling system to maintain optimal operating temperatures.

Coolant Reservoir – See surge tank.

Cooling Module – consists of a radiator, air conditioning condenser, battery condenser, electric fans, and recirculation shields

Cut Loop - A cut loop, or "first responder loop," on an EV heavy truck is a clearly marked, low-voltage wiring harness that emergency personnel can cut to disable the

high-voltage system. This critical safety feature isolates the high-voltage battery from the rest of the truck's electrical components after a collision, protecting first responders from the risk of electrocution during rescue operations.

DC-DC Converter - The DC-DC converter is the battery electric truck's equivalent to a diesel truck's alternator. The DC-DC converter uses energy from the propulsion battery pack to power the low voltage components such as controllers and lights and charge the low voltage battery.

e-Motor - The e-motor used on the 548EV, 537EV, and 536EV consists of two electric motors, integrated inverters, an Electronic Control Unit (ECU), and a 3-speed transmission. The e-Motor delivers high continuous power and an efficient output torque.

Energy Storage System (ESS) – the ESS consists of the high voltage batteries and relays. Each ESS includes two HV battery packs, and one HV relay box.

Equipotential Bonding - Equipotential bonding is a safety feature that prevents shock and protects components by eliminating potential (voltage) differences. This is accomplished by the use of cables, straps, and bus bars connected between conductive components. The vehicle continuously monitors the high voltage system to ensure it is isolated from the chassis. The bonding system must be intact for the isolation monitoring to work properly.

HV Battery – See ESS

WARNING

The 548EV, 537EV and 536EV contain sealed Lithium-Ion high voltage propulsion batteries. If the batteries are disposed of improperly, there is a risk of severe burns and electric shock resulting in serious injury or death. Refer to Vehicle Storage Instructions in the Medium Duty Operator's Manual for battery EV storage requirements.

HV Cables (Orange) – due to the voltage supplied by the HV batteries, the cables connecting electrical components to the HV batteries must be rated for high voltage

also. They are characterized by an orange sheathing and specifically defined routing paths.

WARNING

Only Paccar-trained personnel certified to Paccar Level 3 Certification are authorized to move or disconnect HV cables.

High Voltage Interloop Lock (HVIL) - continuous low-voltage (LV) circuit that passes through every high-voltage (HV) connector and various switches, so that, if a connector is unplugged or a switch is flipped, the circuit will open. The S-Box controller monitors the HVIL for low-voltage. Should it not detect low voltage, the controller will disconnect the HV system.

High Voltage Junction Box (HVJB) – the HVJB distributes voltage from the HV batteries to the various HV electrical components such as the eMotor and ePTO.

Isolation Monitoring Device (IMD) – IMD's continuously monitor the insulation resistance between the high-voltage system and the chassis, ensuring safety by detecting potential insulation faults and leakage currents.

Battery Relay – part of ESS. There is one relay per ESS

LH U/C HV Battery – the ESS (HV Battery) mounted under the cab on the driver side of the vehicle.

Low Temperature Cooling System – aka Battery Coolant Circuit. The LT cooling system includes chillers, thermal expansion valves, coolant pump, LT surge tank, manifolds, and hoses. The low temperature circuit keeps the batteries cool.

Low Temperature System Chillers - chillers are refrigerant-to-coolant heat exchangers for use in maintaining the optimal battery operation temperature threshold of the battery packs.

Low Voltage (LV) Components – Components that are included with the vehicle requiring 12V. These include components on the PCAS such as coolant pumps, valves, and some components added after delivery such as additional lights and liftgates.

Low Voltage Disconnect (LVD) – Switch located on the 12V battery box. Used for interrupting voltage to the 12V system of the BEV.

Master Service Disconnects (MSD) - a safety device that disconnects the high voltage battery. It is used to protect technicians and emergency responders when working on the vehicle. An MSD is located on each relay box and should only be operated by EV certified personnel. (Contact a Peterbilt dealer for replacement parts or parts questions).

Medium Temperature Cooling System – aka Power Electronics Coolant Circuit. The MT cooling system includes radiator, coolant reservoir, coolant pump, coolant proportional valves, manifolds, and hoses. The medium temperature cooling circuit supplies coolant to the eMotor, air compressor, inverters, electronics and auxiliaries.

Onboard Charger (OBC) – The On-Board Charger (OBC) is an optional component that accepts AC chargers. The OBC converts the input AC power to DC power to fully charge the high-voltage batteries. Vehicles not equipped with the OBC can only charge using DC chargers.

Power Control Accessory Subsystem (PCAS) – module that houses the Auxiliary, Thermal Management, and Power Electronics Components.

- Auxiliary Components: air compressor, HVAC refrigerant compressor, Coolant Heater, Power Steering Pump
- Thermal Management: MT Manifolds, MT Coolant Pump, Cabin Pump, Check Valve, Proportional Valves, coolant reservoir
- Power Electronics: High Voltage Junction Box, Paccar Powertrain Controller, DC-DC Converters, S-Box, Under Hood Battery Relay Box

Propulsion Battery Packs – see ESS

RH U/C HV Battery – ESS (HV Battery) mounted under the cab on the passenger side of the vehicle

S-Box – The S-box is part of the PCAS and combines power from each battery string and sends the power to the High Voltage Junction Box (HVJB). The S-box also contains a Master Battery Management Unit (BMU), output fuses, and main contactors. It serves as the connection point for all high-voltage batteries and monitors various parameters, including state of charge, temperature, current,

voltage, and high-voltage interlock loop (HVIL) status, communicating this information through CAN. Additionally, each battery is equipped with its own high-voltage interlock circuit, which the S-Box continuously monitors.

Surge Tank - There are two surge tanks (aka reservoirs) used on BEV vehicles. An LT surge tank is used for battery cooling. It functions as a coolant reservoir and for overflow. The battery coolant surge tank is located behind a protective cover mounted to the back of cab

The other surge tank is used for Power Electronics Cooling and is in the MT cooling circuit. It is part of the PCAS.

Thermal Management - The thermal management system is responsible for maintaining the e-motor, e-powertrain components, and the batteries at an optimum temperature while driving. The thermal management system is divided into two coolant circuits: LT (Battery Coolant Circuit) and MT (Power Electronics Coolant Circuit). Two coolant reservoirs per thermal circuit distribute the coolant to the vehicle systems.

U/H HV Battery - See ESS

Vehicle Electronic Control Unit (VECU) – The VECU is an integrated electronic module used to manage and control various vehicle functions. It acts as the central processing unit for communication between different electronic systems and vehicle components, ensuring optimal performance, safety, and diagnostics.

CAUTION

Use a compatible charger when charging the propulsion battery pack. Noncompatible chargers may not charge the truck, which could negatively affect the propulsion battery pack life.

WARNING

Ensure the park brake is engaged before connecting the truck to a vehicle charger. Failure to engage the park brake before connecting the charger cable could result in injury, death, or equipment damage.

EQUIPOTENTIAL BONDING AND HIGH VOLTAGE INTERLOOP LOCK REQUIREMENTS

CAUTION

All HV components must be bonded to bonding studs provided on the chassis.

All HV components must be bonded to bonding studs provided on the chassis. The bonding stud locations include:

- Cooling Module (PCAS)
- RH Rail – Center
- LH Rail – Center
- LH Rail – rear of LH ESS
- LH Rail – front (only used with 5-string ESS)

If body builders add equipotential bonding cables to the vehicles, they must follow the guidelines of IEC 604445 including the requirements on insulation color. See figure **1.3.**

Figure 1-3. Yellow-Green Color Schemes used on Equipotential Bonding Cables

See the following pages for bonding stud locations.

WARNING

All HV connections, including ePTO, must be integrated into the HVIL circuit such that if any HV connection is broken, the HVIL circuit must be broken as well.

BONDING STUD LOCATIONS

PCAS Cooling Module

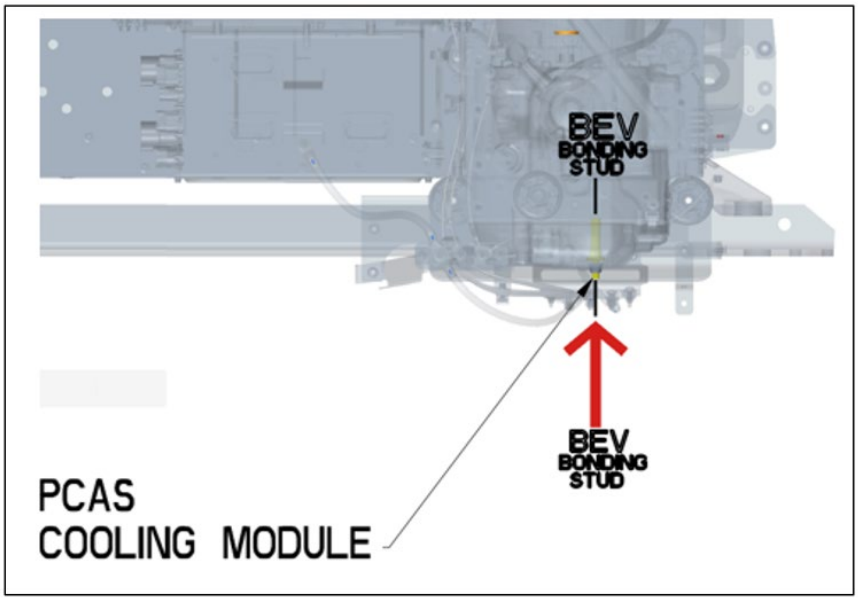


FIGURE 1-4. Bonding Stud Location (PCAS)

LH Rail – Center and LH Rail (rear of LH ESS)

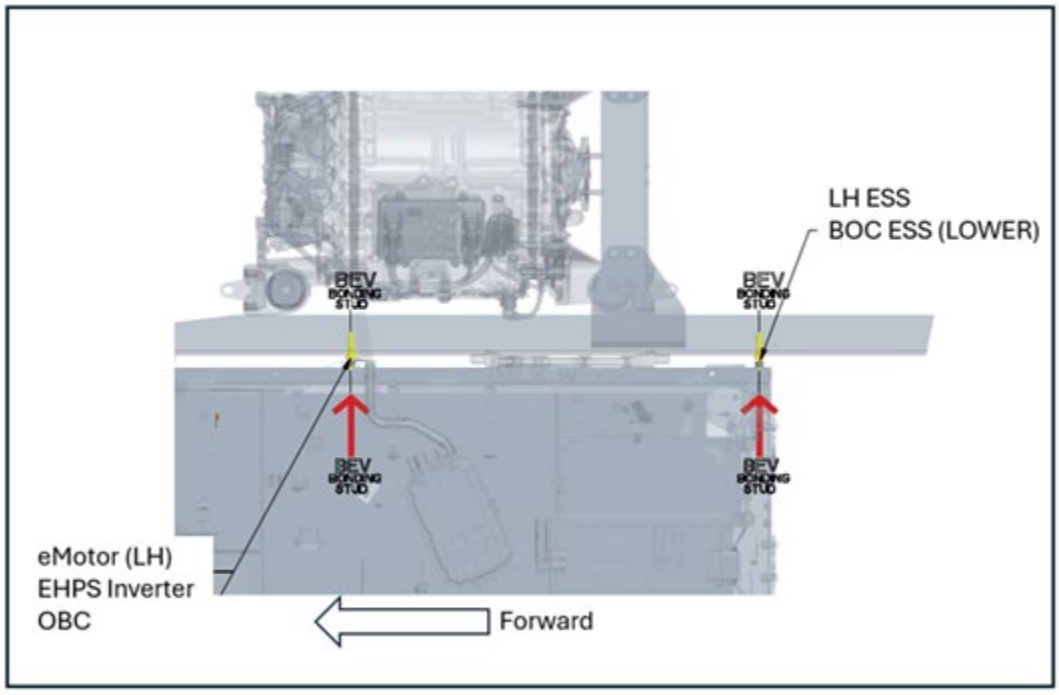
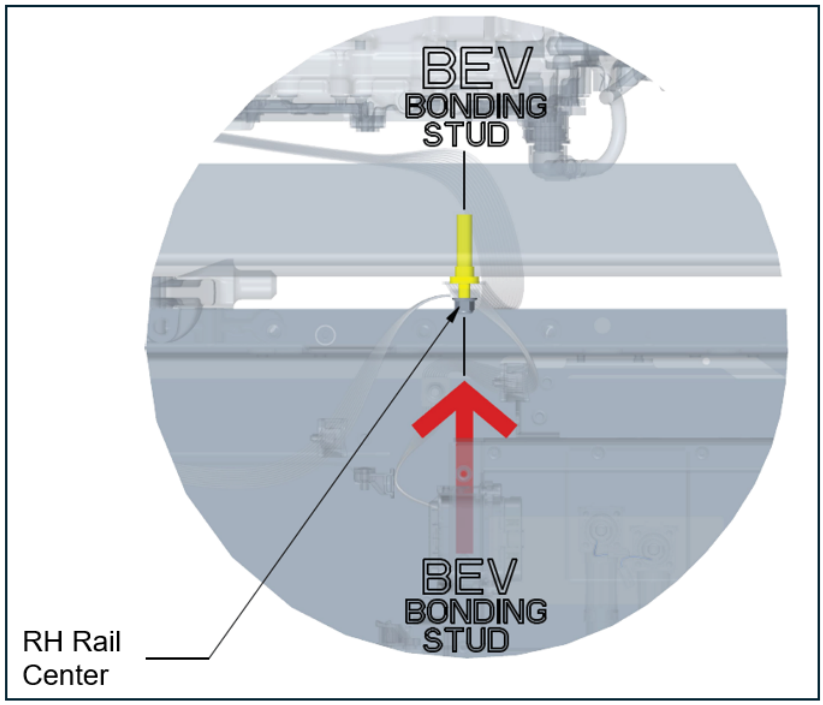


FIGURE 1-5. Bonding Stud Location (LH Rail)

BONDING STUD LOCATIONS (continued)



RH Rail - Center

FIGURE 1-6. Bonding Stud Location (RH Rail)

LH Rail – Front
(only used with 5-string ESS)

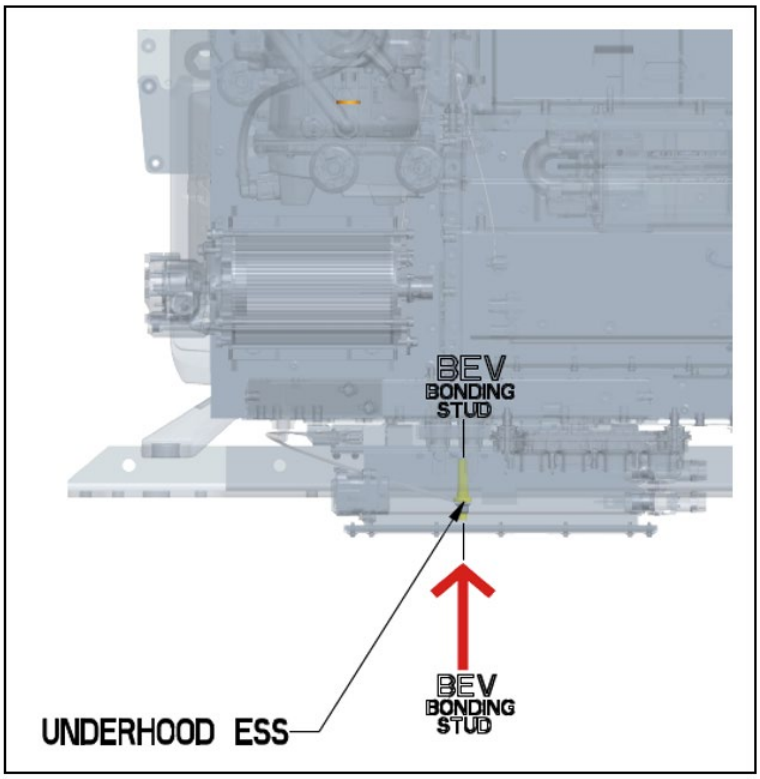


FIGURE 1-7. Bonding Stud Location (Front)

COMPRESSED AIR SYSTEM

The following are highlights of some of the more common or critical aspects of this system.

- Air system modification must meet applicable FMVSS regulations
- Compressed air tanks may not be modified (exception – addition or removal of fittings or relocation of the tank)
- Added devices or bodywork may not interfere with or rub air lines
- Air lines should be routed, protected from heat, and properly secured to prevent damage from other components
- Care should be taken so that air lines do not rub against other components
- Care should be taken to protect the air system from heat sources.

COOLING SYSTEM

The following are highlights of some of the more common or critical aspects of this system.

- Modifications to the design or locations of fill or vent lines, heater or defroster cores, and surge tank are not recommended.
- Modifications to the design of the cooling module (structure, heat exchangers, e-Fan) are not permitted, or warranty will be voided.
- Additional accessories plumbed into the Battery or Power Electronics Cooling system are not permitted at the risk of voiding vehicle warranty; apart from customer installed ePTO. See Chapter 4 for more details.
- Coolant level sensor tampering will void warranty.
- When installing auxiliary equipment in front of the vehicle, ensure that adequate air flow is available to the vehicle cooling system.
- Changes made to cooling fan circuit and controls are not allowed.
- See the owner's manual for appropriate winter front usage.

LOW VOLTAGE ELECTRICAL SYSTEM

The following are highlights of some of the more common or critical aspects of this system.

- Electrical harnesses providing battery power and electronic control signals to OBD components including datalinks may not be spliced. These emissions control/vehicle OBD components include the following:
  - Throttle pedal
  - Vehicle speed sensor
  - 9-pin OBD Connector
  - CAN Communication / OBD wiring

- The 12V batteries are monitored to keep them charged when truck is charged and when just sitting. Vehicles will automatically wake and charge the 12V battery as needed.

- Body builders should only connect devices to B-CAN, K-CAN, or S-CAN at approved connection points.

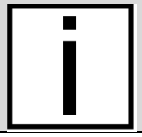
- Customer-installed CAN wiring must use shielded twisted-pair in compliance with J1939/14_202204 standards.

- If the 12V batteries are substituted, only use batteries that meet Peterbilt's requirements and guidelines. Contact your dealer with any questions.

- Relocating the 12V batteries and 12V battery disconnect switch is not recommended.

- The low voltage circuit can be turned off or after the HV circuit has been properly disconnected.

- Make any LV connections downstream of the 12V battery disconnect.



NOTE

There is a DAVIE routine that must be used when a 12V battery is replaced.

Outside Air Temperature (OAT) Sensor

An Outside Air Temperature (OAT) sensor is located in the driver's side mirror assembly on Peterbilt trucks and is shown in the figure below. If the body builder needs to modify the mirror assembly in any way, it is important that the OAT sensor stay positioned on the mirror assembly. Running the vehicle without the OAT sensor connected will cause the MIL lamp to illuminate. If needed, a replacement sensor can be ordered from your Peterbilt dealer.

FIGURE 1-8. Aerodynamic Mirror OAT Sensor Location

Coolant Sensor considerations are given in the Cooling section above. The OBD/Diagnostic connector port is located below the dash to the left of the steering wheel. This connector and its location may not be changed.

DIGITAL DISPLAY

The digital display for BEV vehicles is different from other digital displays. (See Figure **1-9**).

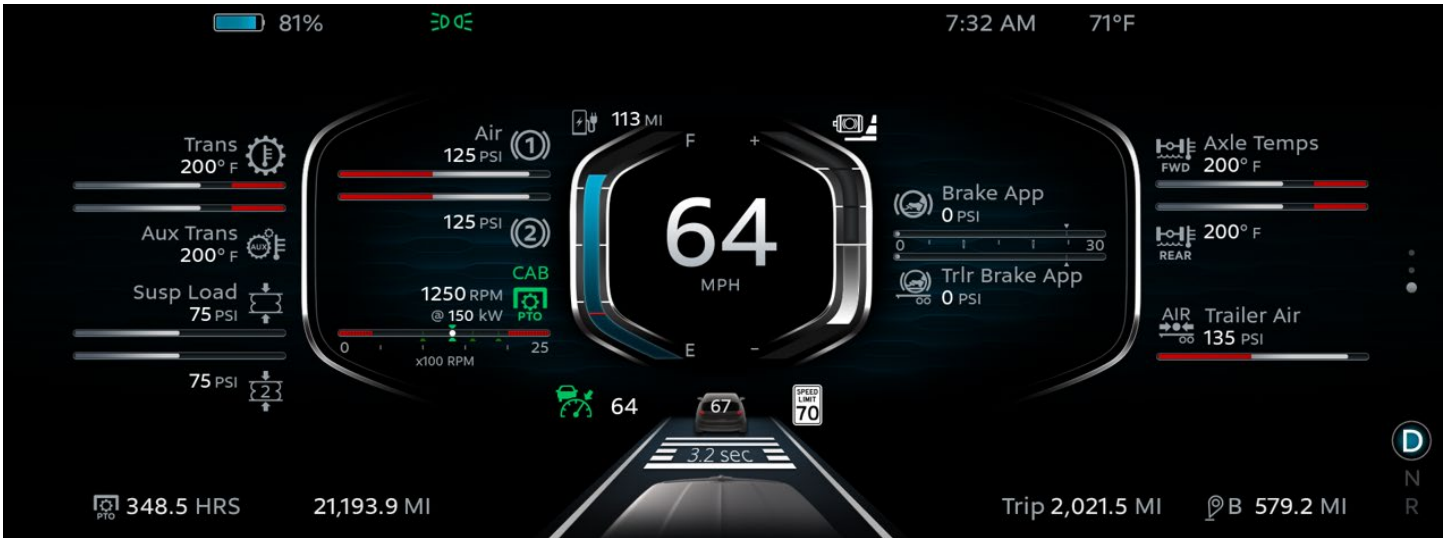


FIGURE 1-9. Digital Display for 579/567

The dash warning lights or telltales are also different for BEV. The light that will show up if the vehicle needs service is the Wrench (15P).

If there is a serious electrical issue with the propulsion system the Stop Engine Light will illuminate.

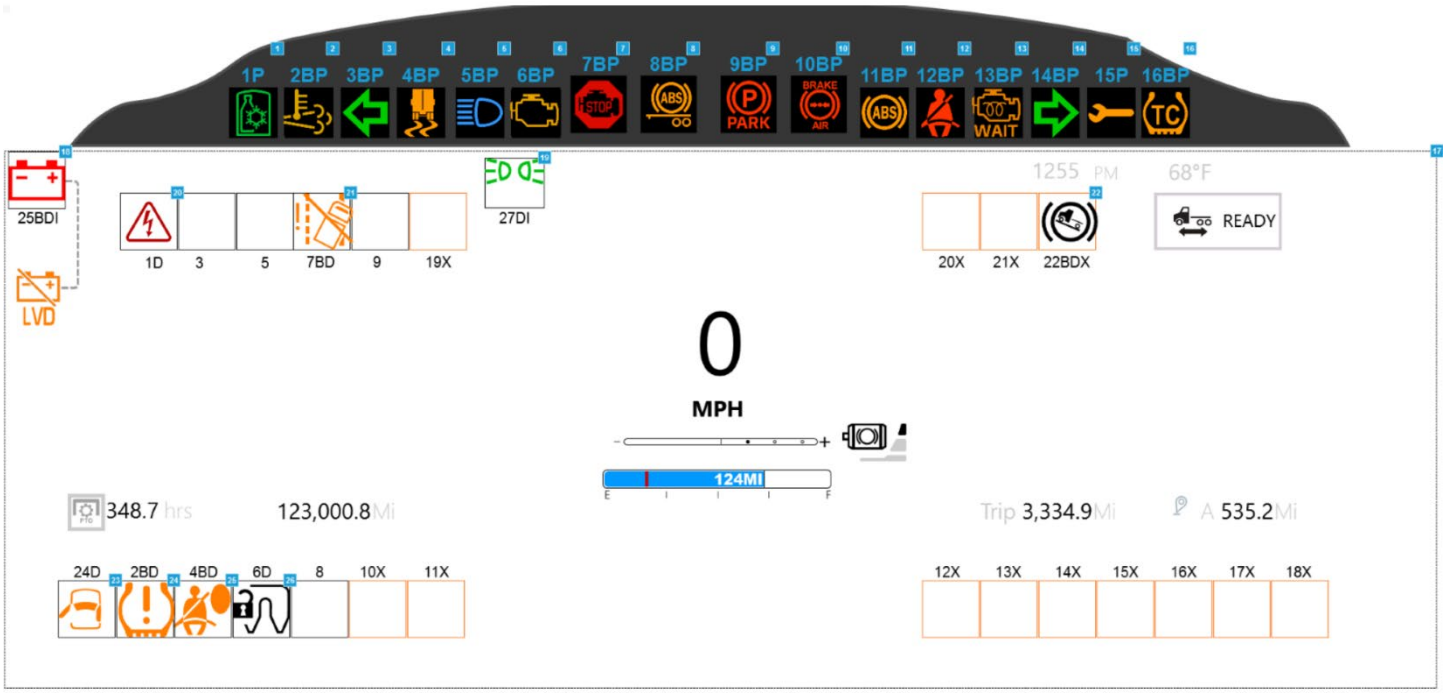


FIGURE 1-10. Warning Lights BEV

ENERGY STORAGE SYSTEM (ESS)

Modifications to the design of Energy Storage Systems (ESS) are not permitted and nothing may be mounted to the (ESS) or warranty will be voided.

WARNING
Modifications to the design of Energy Storage Systems (ESS) are not permitted and nothing may be mounted to the (ESS) or warranty will be voided.

BENDIX WINGMAN FUSION 3.0 RADAR CLEARANCE

IMPORTANT

Forward deer/moose guards: The field of view of both the radar and the camera need to be kept clear of any obstruction or the Fusion system performance may be affected. Bendix does not recommend the use of any forward vehicle guards that may interfere with a sensor's field of view, and use of such guards may void any Bendix warranty. Bendix includes the radar field of view diagram in the Service Data Sheet as a reference to help assist those fleets who are considering placement of such forward vehicle guards. Also, do not move the radar as it is designed by Bendix and the OEM to operate in the location placed by the OEM during factory installation.

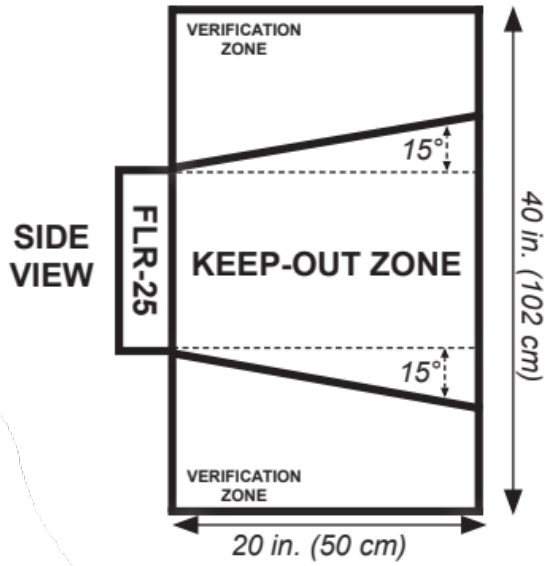
VERIFICATION ZONES

Length: 40 in. (102 cm)

Height (on both the top and bottom of the Keep-out Zone): 12.5 in. (31.75 cm)

Width (distance from radar midpoint): 20 in. (50 cm)

Any objects present in these areas (on both the top and bottom of the Keep-out Zone) should be verified by the manufacturer of the intruding object not to cause degradation of system performance. Failure to do so can result in impaired functions of the system and can result in false-positive activation of the system or a collision causing property damage, serious injuries, or death.



Measure from the raised surface at the front of the radar.

For proper sensor performance, the areas in front of and around the sensor antenna radiation cone need to be kept free of any materials or objects that may disturb the radar function.

The only exceptions are OEM-approved covers.

FIGURE 1-11. Fusion 3.0 Radar Clearance (Bendix SD-29-50022)

BENDIX WINGMAN FUSION 3.0 RADAR CLEARANCE

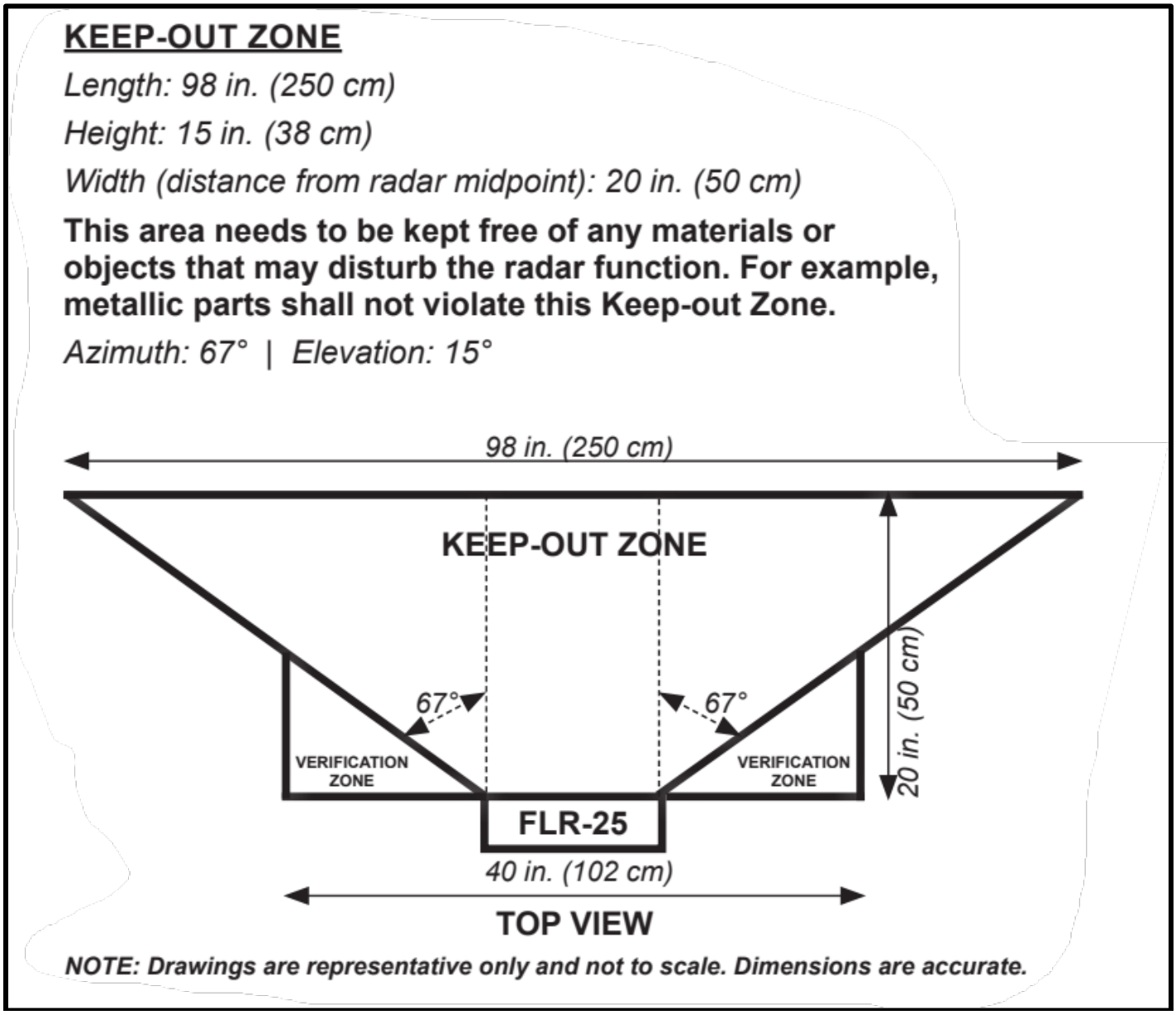


FIGURE 1-11. Fusion 3.0 Radar Clearance (Bendix SD-29-50022)

Additional service documentation for the Wingman Fusion system can be found on the Bendix website in the document library.

GENERAL WIRE ROUTING

The following are highlights of some of the more common or critical aspects of this system.

LOW VOLTAGE ROUTING

Whenever possible, low voltage battery cables, electrical wires, and wire harnesses should be secured by clamps attached to rigid components (for example, frame rails, brackets, etc.) or secured by tie straps fastened to other restrained lines at intervals not exceeding 460mm (18 in.).

Battery cables, alternator cables, electrical wires, and wire harnesses routed on the chassis should be covered by braided loom or convoluted tubing.

At the clamping or tie points, battery cables, electrical wires, and wire harnesses should be covered by braided loom or convoluted tubing.

HIGH VOLTAGE ROUTING

WARNING

Only Paccar-trained personnel certified to Paccar Level 3 Certification are authorized to move, disconnect, or add HV cables.

Great care must be taken when routing Low Voltage (LV) cables close to High Voltage (HV) cables. HV cables can generate significant electromagnetic fields and induce a voltage in LV cables. This can result in signal degradation, communication errors, and malfunctions in sensitive low voltage equipment.

If high voltage cables are added to the vehicle:

- HV and LV cables should never be zip-tied together.
- HV cables must be orange
- Bonding cables to follow the standard PACCAR implemented (green/yellow) color scheme.
- All HV cables to be shielded and the shielding must be grounded
- All body builder installed devices must include a High voltage Interlock Loop (HVIL) that connects to factory HVIL (this allows the HV system to be disabled).

PAINTING AND UNDERCOATING

Do not paint or undercoat any of the HV or LV electrical system. If frame rails, brackets, cab, hood, etc. need to be painted, ensure the electrical components are protected from paint.

HV FIRST RESPONDER INSTRUCTIONS

First Responder instructions are available through the QR below. Download and print the documentation with your current model year. Routinely check the NFPA site to ensure your first responder materials are up to date.

SECTION 2 **SAFETY AND COMPLIANCE**

FEDERAL MOTOR VEHICLE SAFETY STANDARDS COMPLIANCE

As an Original Equipment Manufacturer, Peterbilt Motors Company, ensures that our products comply with all applicable U.S. or Canadian Federal Motor Vehicle Safety Standards. However, the fact that this vehicle has no fifth wheel and that a Body Builder (Intermediate or Final Stage Manufacturer) will be making additional modifications means that the vehicle was incomplete when it left the build plant.

INCOMPLETE VEHICLE CERTIFICATION

An Incomplete Vehicle Document is shipped with the vehicle, certifying that the vehicle is not complete. See Figure 2–1. In addition, affixed to the driver's side door frame or edge is an Incomplete Vehicle Certification label. See Figure 2–2.

These documents list the U.S. or Canadian Federal Motor Vehicle Safety Standard regulations that the vehicle complied with when it left the build plant. You should be aware that if you add, modify or alter any of the components or systems covered by these regulations, it is your responsibility as the Intermediate or Final Stage Manufacturer to ensure that the complete vehicle is in compliance with the particular regulations upon completion of the modifications.

As the Intermediate or Final Stage Manufacturer, you should retain the Incomplete Vehicle Document for your records. In addition, you should record and retain the manufacturer and serial number of the tires on the vehicle. Upon completion of the vehicle (installation of the body and any other modifications), you should affix your certification label to the vehicle as required by Federal law. This tag identifies you as the "Intermediate or Final Stage Manufacturer" and certifies that the vehicle complies with Federal Motor Vehicle Safety Standards. (See Figure 2–2.) Be advised that regulations affecting the intermediate and final stage manufacturer may change without notice. Ensure you are referencing the most updated copy of the regulation during the certification and documentation processes.

In part, if the final stage manufacturer can complete and certify the vehicle within the instruction in the incomplete vehicle document (IVD), the certification label would need a statement that reads, "This vehicle has been completed in accordance with the prior manufacturers IVD where applicable. This vehicle conforms to all applicable

Federal Motor Vehicle Safety Standards [and Bumper and Theft Prevention Standards if applicable] in effect in (month, year)."

However, if the vehicle cannot be completed and certified within the guidance provided in the IVD, the final stage manufacturer must ensure the vehicle conforms to all applicable Federal Motor Vehicle Safety Standards (FMVSS). The final stage manufacturer's certification label would need a statement that reads, "This vehicle conforms to all applicable Federal Motor Vehicle Safety Standards [and Bumper and Theft Prevention Standards if applicable] in effect in (month, year).

These statements are just part of the certification regulation. Please refer to NHTSA/DOT Title 49 CFR part 567 certification for all of the details related to this regulation.

For Canadian final stage manufacturers see:
http://www.gazette.gc.ca/index-eng.html; and http://www.tc.gc.ca/eng/acts-regulations/menu.htm for the regulations.

Or contact: Transport Canada
Tower C, Place de Ville, 330 Sparks Street
Ottawa, Ontario K1A 0N5 (613) 990-2309
TTY: 1-888-675-6863

FIGURE 2-1. Incomplete Vehicle Certification Document

A DIVISION OF PACCAR Inc

INCOMPLETE VEHICLE DOCUMENT
MANUFACTURED BY
PETERBILT MOTORS COMPANY
A DIVISION OF PACCAR, INC.
1700 WOODBROOK STREET
DENTON, TEXAS 76025-7864

DOCUMENTO DE VEHÍCULO INCOMPLETO
FABRICADO POR
PETERBILT MOTORS COMPANY
A DIVISION OF PACCAR, INC.
1700 WOODBROOK STREET
DENTON, TEXAS 76025-7864

DOCUMENT DE VÉHICULE INCOMPLET
CONSTRUIT PAR
PETERBILT MOTORS COMPANY
A DIVISION OF PACCAR, INC.
1700 WOODBROOK STREET
DENTON, TEXAS 76025-7864

Fecha de fabricación de vehiculo incompleto:
Date de production du vehicule incomplet :
Date of incomplete vehicle manufacture: _____

Peso bruto nom. del. veh (GVWR):
PNBV :
GVWR: _____

Peso bruto nom. por eje delantero (GAWR):
PNBE avant :
GAWR front: _____

Peso bruto nom. por eje trasero (GAWR):
PNBE arrière :
GAWR rear: _____

Número de Identification:
Numéro d' identification :
Identification number: _____

Peso bruto nom. por eje 1.° intermedio (GAWR):
PNBE 1er intermédiaire :
GAWR 1st intermediate: _____

Peso bruto nom. por eje 2.°/ 3.° intermedio (GAWR):
PNBE 2/3ième intermédiaire :
GAWR 2nd/3rd intermediate: _____

Este vehículo ha sido designado para ser: (marque uno) ☐ **Camión** ☐ **Tractocamión**
Ce véhicule a été conçu pour être un : (cochez une case) **Camion** **Porteur-remorqueur**
This vehicle designed to be a: (check one) ☐ **Truck** ☐ **Truck Tractor**

ESTOS PESOS DE VEHÍCULOS SE APLICAN SI NO SE EFECTÚAN ALTERACIONES AL CHASIS, SUSPENSIÓN, EJES, LLANTAS, MAZAS, RINES O RUEDAS, ESTE VEHÍCULO PUEDE SER TERMINADO COMO CAMIÓN O COMO TRACTOCAMIÓN (VEA ADENTRO LAS RESTRICCIONES INDICADAS EN LOS PÁRRAFOS 108, 105 Y 121).
DE ACUERDO A LOS REQUISITOS DE LA LEY FEDERAL, EL FABRICANTE DE LA ETAPA FINAL QUE COMPLETE ESTE VEHÍCULO DEBE LLENAR Y ADHERIR LA ETIQUETA DE CERTIFICACIÓN A ESTE VEHÍCULO. EL FABRICANTE DE LA ETAPA DEBE REGISTRAR Y CONSERVAR ESTE NÚMERO DE SERIE DEL VEHÍCULO, EL FABRICANTE Y EL NÚMERO DE SERIE DE LAS LLANTAS Y EL NOMBRE Y DIRECCIÓN DEL PRIMER COMPRADOR DE ESTE VEHÍCULO, PARA PROPÓSITOS QUE NO SEAN DE REVENTA.

NORMAS FEDERALES DE SEGURIDAD VIGENTES EN LA FECHA DE FABRICACIÓN DEL VEHÍCULO INCOMPLETO. CUANDO SE TERMINE DE FABRICAR ESTE VEHÍCULO, CUMPLIRÁ CON LAS NORMAS DE SEGURIDAD DE VEHÍCULOS AUTOMOTORES ENUMERADAS ADENTRO, SI NO EFFECTÚA NINGUNA ALTERACIÓN AL VEHÍCULO (EXCEPTA EN LA FORMA QUE SE INDICA ADENTRO). LOS ESTÁNDARES ENLISTADOS SE APLICAN A LOS ESTANDÁRES DE SEGURIDAD DE VEHÍCULOS AUTOMOTRICES DES LOS EE.UU Y CANADÁ, EXCEPTO COMO SE INDICA.

CES POIDS DE VÉHICULE SONT APPLICABLES SI AUCUNE ALTÉRATION N'EST FAITE AU NIVEAU DU CHÂSSIS, DE LA SUSPENSION, DES ESSIEUX, DES PNEUS, DES MOYEUX DE ROUE, DES JANTES NI DES ROUES. CE VÉHICULE PEUT ÊTRE COMPLÉTÉ EN UN CAMION OU EN UN PORTEUR-REMORQUEUR (VOIR N° 108, 105 ET 121 CI-INCLUS POUR LES RESTRICTIONS). LE CONSTRUCTEUR FINAL QUI TERMINE LE VÉHICULE DOIT REMPLIR ET APPOSER L'ÉTIQUETTE DE CERTIFICATION SUR LE VÉHICULE CONFORMÉMENT À LA LOI FÉDÉRALE. LE CONSTRUCTEUR FINAL DOIT ENREGISTRER ET CONSERVER LE NUMÉRO DE SÉRIE DU VÉHICULE, LE NUMÉRO DE SÉRIE ET FABRICANT DES PNEUS ET LE NOM ET L'ADRESSE DU PREMIER ACHETEUR DE CE VÉHICULE AUTRE QUE POUR LA REVENTE.

NORMES DE SÉCURITÉ FÉDÉRALES DES VÉHICULES EFFECTIVES AU MOMENT DE LA PRODUCTION DE CE VÉHICULE INCOMPLET. CE VÉHICULE, UNE FOIS COMPLÉTÉ, SERA CONFORME AUX NORMES DE SÉCURITÉ DES VÉHICULES AUTOMOBILES RÉPERTORIÉES CI-INCLUS, SOUS RÉSERVE QU'AUCUNE MODIFICATION NE SOIT EFFECTUÉE SUR LE VÉHICULE (VOIR LES EXCEPTIONS CI-INCLUSES). LES NORMES RÉPERTORIÉES SONT APPLICABLES AUX NORMES DE SÉCURITÉ DE VÉHICULE À MOTEUR AUX ÉTATS-UNIS ET AU CANADA SAUF INDICATION CONTRAIRE.

THESE VEHICULE WEIGHTS ARE APPLICABLE IF NO ALTERATIONS ARE MADE TO THE FRAME, SUSPENSION, AXLE, TIRE, WHEEL HUB, WHEEL RIM OR WHEEL. THIS VEHICLE MAY BE MANUFACTURED INTO A TRUCK OR A TRUCK TRACTOR (SEE NO. 108, 105 & 121 BELOW FOR RESTRICTIONS). THE FINAL STAGE MANUFACTURER WHO COMPLETES THIS VEHICLE MUST COMPLETE AND AFFIX THE CERTIFICATION LABEL TO THIS VEHICLE AS REQUIRED BY FEDERAL LAW. THE FINAL STAGE MANUFACTURER MUST RECORD AND MAINTAIN THIS VEHICLE'S SERIAL NUMBER, MANUFACTURER AND SERIAL NUMBER OF ITS TIRES AND THE NAME AND ADDRESS OF THE FIRST PURCHASER OF THIS VEHICLE FOR PURPOSES OTHER THAN RESALE.

MOTOR VEHICLE SAFETY STANDARDS IN EFFECT AT THE TIME OF MANUFACTURE OF INCOMPLETE VEHICLE. THIS VEHICLE WHEN COMPLETED WILL CONFORM TO THE MOTOR VEHICLE SAFETY STANDARDS LIST BELOW, PROVIDED NO ALTERATIONS ARE MADE TO THE VEHICLE (EXCEPT AS NOTED BELOW). THE STANDARDS LISTED ARE APPLICABLE TO BOTH U.S. AND CANADIAN MOTOR VEHICLE SAFETY STANDARDS EXCEPT AS NOTED.

MOTOR VEHICLE SAFETY STANDARDS

NO. 101 **CONTROLS AND DISPLAYS**, PROVIDED THAT: NO MOTOR VEHICLE EQUIPMENT ADDED TO THIS VEHICLE OBSTRUCTS THE DRIVER'S ABILITY TO OPERATE CONTROLS AND VISUALLY LOCATE THEIR IDENTIFICATION
NO. 102 **TRANSMISSION SHIFT LEVER SEQUENCE, STARTER INTERLOCK AND TRANSMISSION BRAKING EFFECT**
NO. 103 **WINDSHIELD DEFROSTING AND DEFOGGING SYSTEMS**, PROVIDED THAT: NO MOTOR VEHICLE EQUIPMENT ADDED TO THIS VEHICLE INTERFERES WITH THE AIRFLOW OF THE DEFROSTING AND DEFOGGING SYSTEM.
NO. 104 **WINDSHIELD WIPING AND WASHING SYSTEM**
NO. 105 **HYDRAULIC/ELECTRICAL BRAKE SYSTEMS** (SEE BRAKE SYSTEM BELOW)
NO. 106 **BRAKE HOSES**
NO. 107 **REFLECTIVE SURFACES** (CANADIAN REGISTERED VEHICLES ONLY)
NO. 108 THIS VEHICLE WHEN COMPLETED AS A TRUCK TRACTOR WILL CONFORM TO STANDARD 108, **LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT**, PROVIDED THAT:
1) NO ALTERATIONS ARE MADE TO LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT
2) NO ALTERATIONS ARE MADE TO THE VEHICLE THAT WILL ALTER THE LOCATION OF LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT
3) NO ALTERATIONS ARE MADE IN THE ELECTRICAL POWER SUPPLY, SWITCHES OR WIRING OF ANY LAMP.
4) NO ITEM OF MOTOR VEHICLE EQUIPMENT ADDED TO THIS VEHICLE IMPAIRS THE EFFECTIVENESS OF LIGHTING EQUIPMENT REQUIRED BY STANDARD 108.
5) ALL LAMPS, REFLECTIVE DEVICES AND ASSOCIATED EQUIPMENT REQUIRED BY THIS STANDARD WERE SPECIFIED FOR THE VEHICLE PRIOR TO DATE OF INCOMPLETE MANUFACTURE.
IF THIS VEHICLE IS COMPLETED FOR USE **OTHER THAN AS A TRUCK TRACTOR**, THE CONFORMITY OF THIS STANDARD IS NOT SUBSTANTIALLY DETERMINED BY THE DESIGN OF THE INCOMPLETE VEHICLE AND THE MANUFACTURER OF THE INCOMPLETE VEHICLE MAKES NO REPRESENTATION AS TO THE CONFORMITY WITH THIS STANDARD.

NO. 108.1 **(ALTERNATIVE REQUIREMENTS FOR HEADLAMPS)** (CANADIAN REGISTERED VEHICLES ONLY)
NO. 111 **REARVIEW MIRRORS** PROVIDED THAT: NO MOTOR VEHICLE EQUIPMENT ADDED TO THIS VEHICLE OBSTRUCTS THE FIELD OF VIEW REQUIRED BY STANDARD 111.
NO. 113 **HOOD LATCH SYSTEMS**
NO. 115 **VEHICLE IDENTIFICATION NUMBER** (CANADIAN REGISTERED VEHICLES ONLY)
NO. 120 **TIRE SELECTION AND RIMS FOR MOTOR VEHICLES OTHER THAN PASSENGER CARS**, PROVIDED THAT: IF THIS VEHICLE WAS EQUIPPED WITH TEMPORARY TIRES AND/OR RIMS FOR SHIPMENT PURPOSE ONLY, IT IS THE RESPONSIBILITY OF THE FINAL STAGE MANUFACTURER TO EITHER MOUNT TIRES AND/OR RIMS WITH CAPACITY EQUAL TO OR GREATER THAN THE GAWR, OR TO RERATE THE AXLE SYSTEM AND GVWR ACCORDINGLY.
NO. 121 **AIR BRAKE SYSTEMS** (SEE BRAKE SYSTEM BELOW)
NO. 124 **ACCELERATOR CONTROL SYSTEMS**
NO. 136 **ELECTRONIC STABILITY CONTROL SYSTEMS FOR HEAVY VEHICLES**, PROVIDED THAT: THIS VEHICLE IS CONFIGURED AS A 6X4 TRUCK-TRACTOR, WITHOUT PUSHER OR TAG AXLE(S), WITH A FRONT GAWR OF LESS THAN OR EQUAL TO 14.6K LBS. AND A TANDEM REAR AXLE SET WITH A GAWR OF 45K LBS. OR LESS.
NO. 205 **GLAZING MATERIALS**, PROVIDED THAT: ANY GLAZING MATERIAL ADDED OR REPLACED ON THIS VEHICLE MUST CONFORM TO STANDARD 205
NO. 206 **DOOR LOCKS AND DOOR RETENTION COMPONENTS**
NO. 207 **SEATING SYSTEMS**
NO. 208 **OCCUPANT CRASH PROTECTION**
NO. 209 **SEAT BELT ASSEMBLIES**
NO. 210 **SEAT BELT ASSEMBLY ANCHORAGES**
NO. 302 **FLAMMABILITY OF INTERIOR MATERIALS**, PROVIDED THAT: ANY MATERIAL OR ITEM OF MOTOR VEHICLE EQUIPMENT INSTALLED WITHIN THE OCCUPANT COMPARTMENT MUST CONFORM TO STANDARD 302.
NO. 1106 **NOISE EMISSIONS** (CANADIAN REGISTERED VEHICLES ONLY)

BRAKE SYSTEMS - VEHICLE WAS MANUFACTURED WITH EITHER A 121 - AIR BRAKE SYSTEM OR A 105 - HYDRAULIC/ELECTRICAL BRAKE SYSTEM. THE BRAKE SYSTEM (WILL COMPLY) PROVIDED THAT:
1) THE GROSS VEHICLE WEIGHT RATING AND THE GROSS AXLE WEIGHT RATINGS OF THE COMPLETED VEHICLE ARE IDENTICAL TO THE RATINGS LISTED ON THIS DOCUMENT.
2) NO ALTERATIONS ARE MADE TO THE SUSPENSION, STEERING SYSTEM, BRAKE ACTUATION SYSTEM, FOUNDATION BRAKES, BRAKE DRUMS, WHEEL HUBS, WHEEL RIMS, WHEELS, OR TIRES.
3) THE COMPOSITE CG OF THE VEHICLE (INCOMPLETE VEHICLE PLUS THE BODY AND PAYLOAD AS MEASURED FROM THE GROUND) SHALL NOT EXCEED COMPOSITE CG / WHEELBASE RATIO OF 0.45 WITH AN UPPER LIMIT OF 1778MM (70 INCHES) FOR A 4X2 STRAIGHT TRUCK OR 1905MM (75 INCHES) FOR A 6X4 STRAIGHT TRUCK, WHEN THE VEHICLE IS LOADED TO A WEIGHT NOT EXCEEDING THE RATED GROSS VEHICLE WEIGHT RATING DISTRIBUTED PROPORTIONALLY TO THE AXLES.
4) NO ALTERATIONS ARE MADE TO THE ENGINE THAT AFFECT MAXIMUM GOVERNED ENGINE SPEED.
5) NO ALTERATIONS ARE MADE TO THE AIR COMPRESSOR OR THE AIR COMPRESSOR DRIVE SYSTEM THAT AFFECT AIR COMPRESSOR PERFORMANCE AT MAXIMUM GOVERNED ENGINE SPEED.
6) NO MODIFICATIONS, DELETIONS, ADDITIONS, REPLACEMENTS OR ALTERATIONS ARE MADE TO ANY COMPONENT IN THE BRAKE SYSTEM.
7) NO ALTERATIONS ARE MADE TO THE ELECTRICAL OR MECHANICAL COMPONENTS OF THE ANTILOCK BRAKING SYSTEM, THE HYDRAULIC BRAKE WARNING SYSTEM OR THE AIR PRESSURE WARNING SYSTEM.
8) IT IS NOT EXEMPT FROM THE STANDARD
IF THIS VEHICLE WAS EQUIPPED WITH A TRUCK-TRACTOR BRAKE SYSTEM, IT WILL NOT CONFORM TO STANDARD 121 OR 105 IF COMPLETED AS A FULL TRUCK. CONVERSELY, IF THE VEHICLE WAS EQUIPPED WITH A TRUCK BRAKING SYSTEM, IT WILL NOT CONFORM TO STANDARD 121 OR 105 IF COMPLETED AS A TRUCK-TRACTOR.

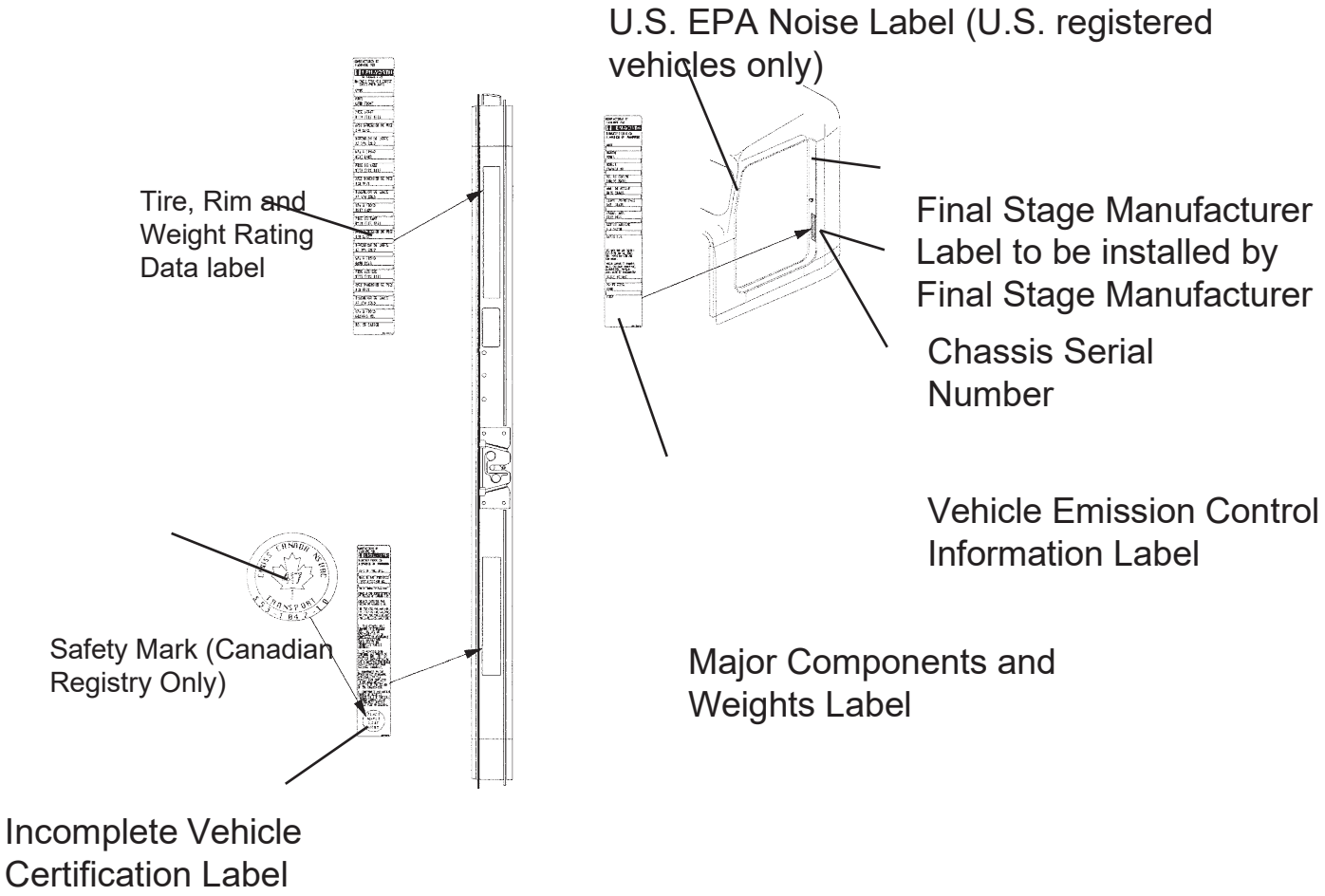


FIGURE 2-2 Locations of Certification Labels - Driver's Door and Frame

NOISE AND EMISSIONS REQUIREMENTS

This truck may be equipped with specific emissions control components/systems in order to meet applicable Federal and California noise and exhaust emissions requirements. Tampering with these emissions control components/systems is against the rules that are established by the U.S Code of Federal Regulations, Environment Canada Regulations and California Air Resources Board (CARB). These emissions control components/systems may only be replaced with original equipment parts.

Additionally, most vehicles in North America will be equipped with a Greenhouse Gas (GHG) “Vehicle Emission Control Information” door label indicating its certified configuration. The vehicle components listed on this label are considered emission control devices.

Modifying (i.e. altering, substituting, relocating) any of the emissions control components/systems defined above will affect the noise and emissions performance/certification. Modifications that alter the overall shape and aerodynamic performance of a tractor will also affect the emission certification. If modifications are required, they must first be approved by the manufacturer. Unapproved modifications could negatively affect emissions performance/certification. There is no guarantee that proposed modifications will be approved.

Tires may be substituted provided the new tires possess a Coefficient of rolling resistance (Crr) equal to or lower than Crr of the original tires. Consult your tire supplier(s) for appropriate replacement tires.

NOTE

All BEV vehicles will be equipped with an On-Board Diagnostics (OBD) system. The OBD system is designed to detect malfunctions of any engine or vehicle component that may increase emissions or interfere with the proper performance of the OBD system itself.

The OBD system consists of computer programs on one or more of the vehicle’s Electronic Control Units (ECUs). This program uses information from the control system and from additional sensors to detect malfunctions. When a malfunction is detected, information is stored in the ECU(s) for diagnostic purposes. A warning light is illuminated in the dash to alert the driver of the need for service of an emission-related component or system.

SAFETY RELATED COMPONENTS AND SYSTEMS

NOTE

Upfitting and other modifications may change the compliance of an as-built vehicle. As such, Peterbilt will not support any modifications that affect the as-built compliance of a vehicle.

Upfitting and other modifications may change the compliance of an as-built vehicle. As such, Peterbilt will not support any modifications that affect the as-built compliance of a vehicle. These may include modifications to the following:

- Stability Control Systems –Stability Control parameters are matched specifically to chassis components and center of gravity of the body type. Chassis modifications or alterations to wheelbase, GWAR, GVWR, brakes, suspension and other components affect the Stability Control system. Therefore, modifications or alterations to chassis with factory-installed Stability Control Systems are not supported. These include:
    - Intended Service
    - Body Type
    - Wheelbase (reducing or increasing wheelbase)
    - GAWR
    - GVWR
    - Brakes
    - Suspension
    - Lift Axles (removal or addition)
    - Conversion of a truck to a tractor
- Factory installed Safety Systems - Factory installed Safety Systems will not be removed or inactivated.
- Green House Gas Requirements

SECTION 3 **DIMENSIONS**

INTRODUCTION

This section has been designed to provide enough information to successfully layout a chassis in the body planning process. Optional equipment may not be depicted. Please contact your local Peterbilt dealer if more dimensional information is desired.

OVERALL DIMENSIONS

This section includes drawings and charts of the following Peterbilt Models: 548EV, 537EV and 536EV.

On the pages that follow, detail drawings dimensions are in inches (in) unless otherwise noted. These views illustrate important measurements critical to designing bodies of all types. See the Table of Contents at the beginning of the manual to locate the drawing that you need.

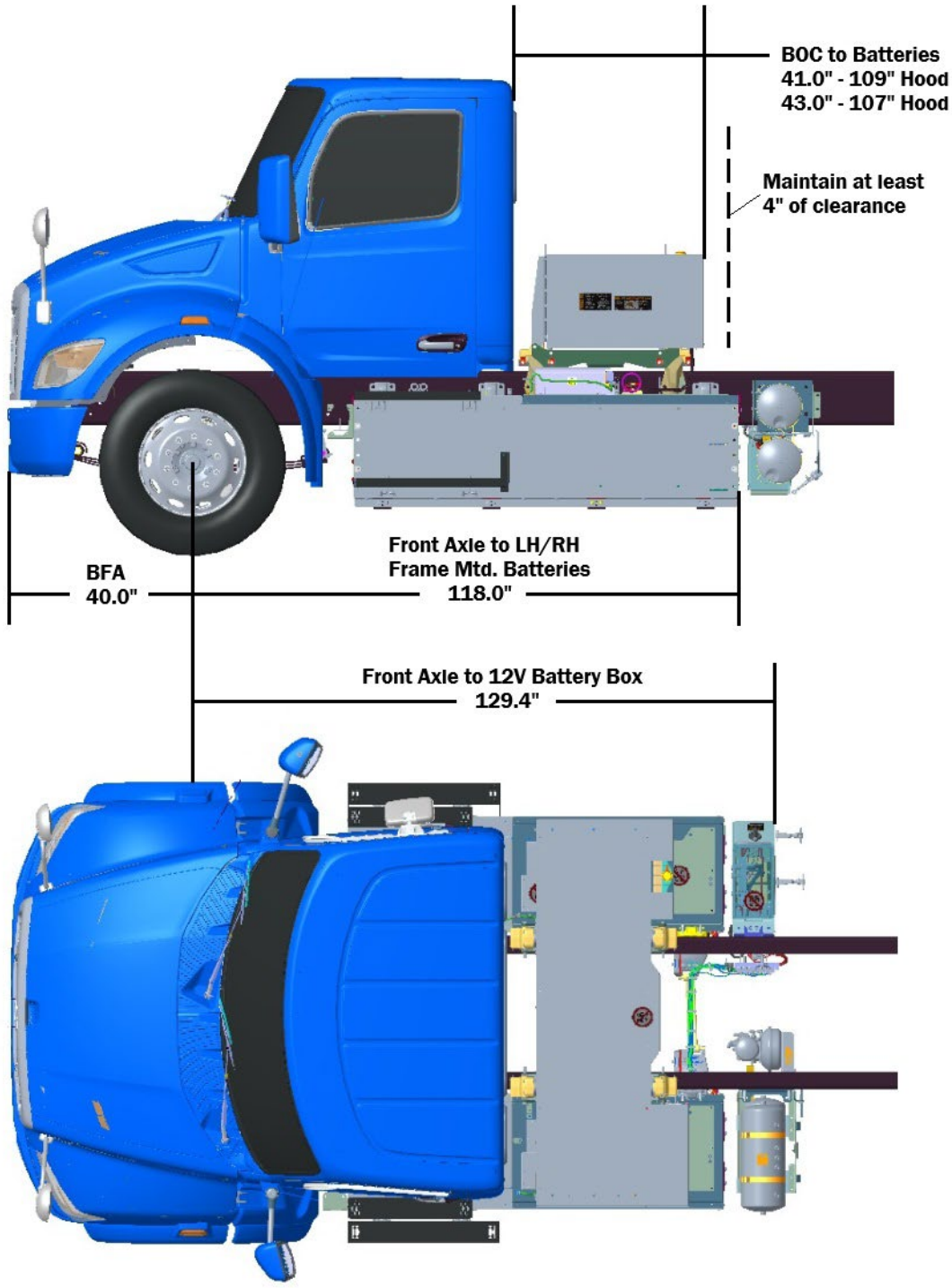
All heights are given from the bottom of the frame rail.

Peterbilt also offers .dxf files and frame layouts of ordered chassis prior to build. Please speak with your local dealership to request this feature when specifying your chassis.

Useful Dimensions	107" HOOD	109" HOOD
Bumper to Front Axle (BFA)	40.0" (1016mm)	40.0" (1016mm)
Front Axle to Back of Cab (FAB)	69.5" (1765mm)	67.5" (1715mm)
Front Axle to LH /RH Frame Mounted Batteries	118" (2997mm)	118" (2997mm)
Front Axle to 12V Battery	129.4" (3286mm)	129.4" (3286mm)
Back of Cab to BOC Batteries	43" (1092mm)	41" (1041mm)
Back of Cab to LH /RH Frame Mounted Batteries	50.6" (1285mm)	48.6" (1233mm)
Back of Cab to 12V Battery	61.9" (1572mm)	59.9" (1522mm)
Front Axle to Air Tanks	135.2" (3435mm)	135.2" (3435mm)
Back of Cab to Air Tanks	67.8" (1722mm)	65.8" (1671mm)

TABLE 3-1. BEV Dimensions

Medium Duty (3 ESS Strings)



DIMENSIONS ARE FOR REFERENCE ONLY

FIGURE 3-1. Medium Duty 109” hood Top & LH View – Overall Dimensions

FUSE ACCESS PANEL AND FUSE CLEARANCE

When mounting an ePTO or other components near the ESS (HV Batteries) ensure there is sufficient clearance to allow for the removal of the fuse access panels and fuses. Note that each battery (ESS) includes two battery “packs” and therefore there are two access panels and two fuses per battery.

The locations of the panels are shown in figure **3-2.**

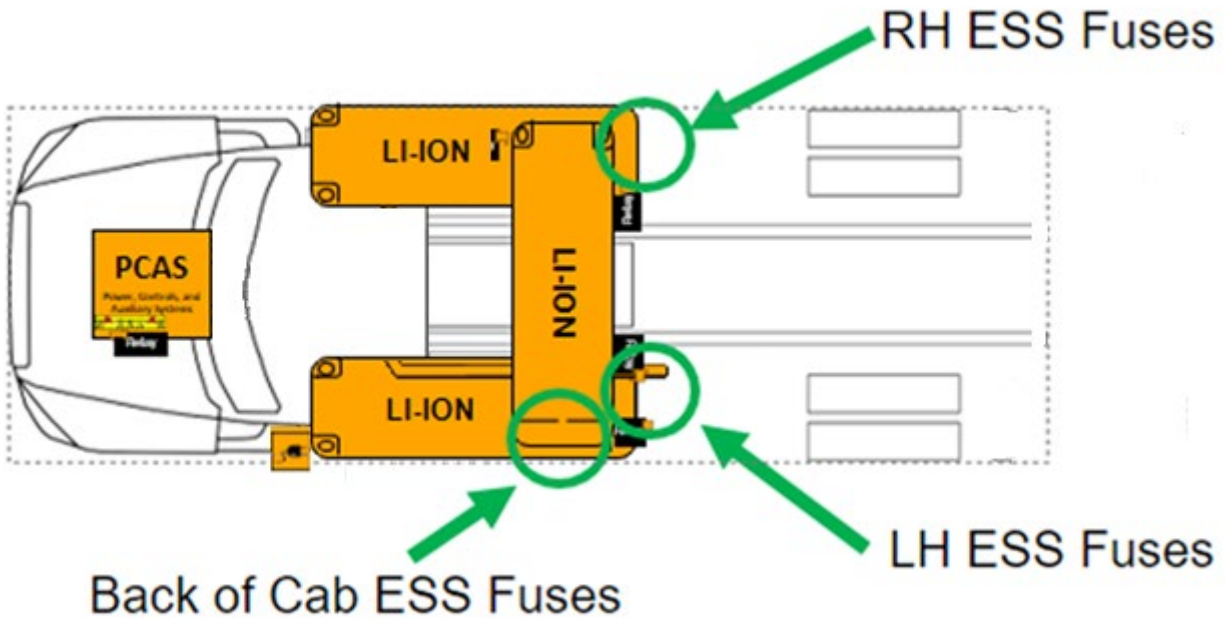


FIGURE 3-2. Fuse and Fuse Panel Locations

Ensure ESS Fuses have sufficient clearance to allow the access panel to be removed and fuses accessed.

To remove the Fuse Access Panel and access the Fuses 12” of clearance is recommended. See figure **3-3**.

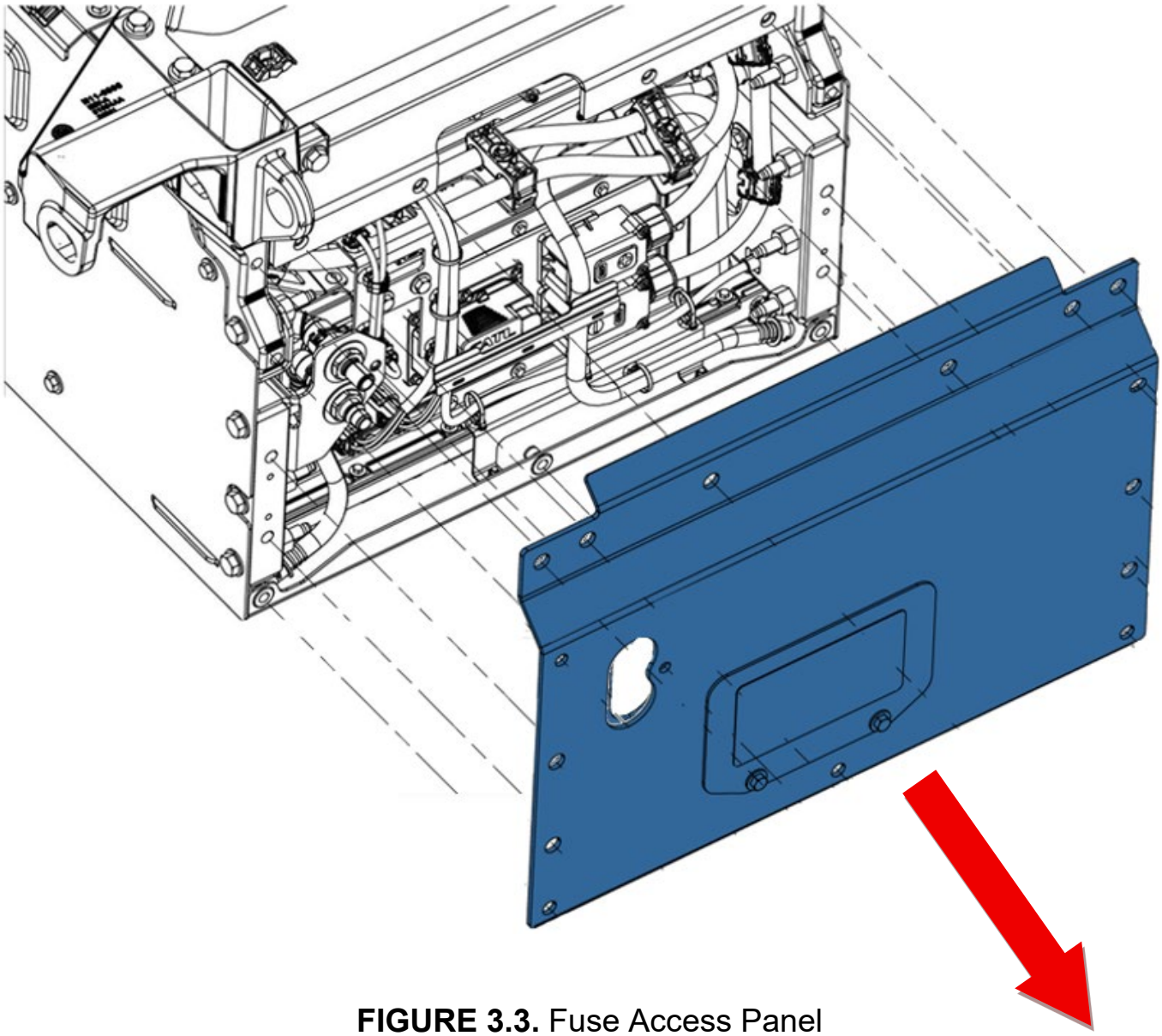


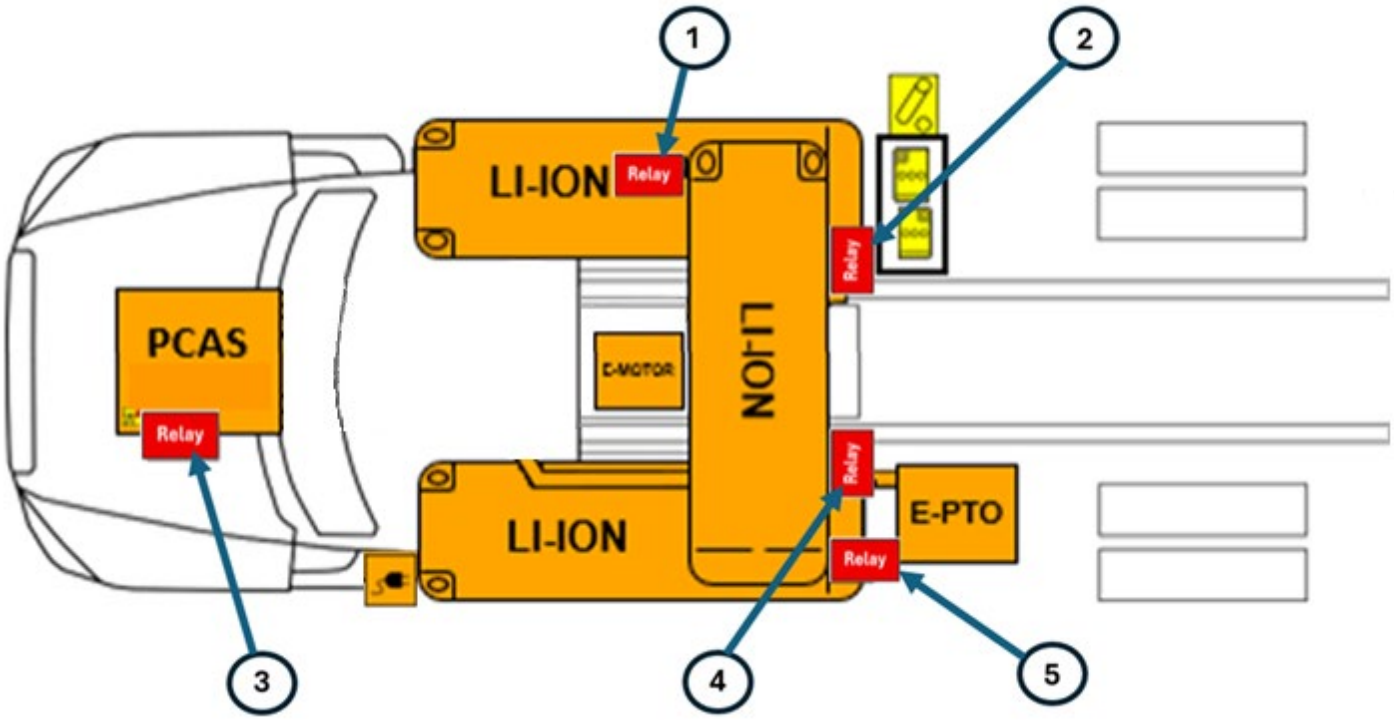
FIGURE 3.3. Fuse Access Panel

RELAY BOX CLEARANCE

Ensure relay boxes have sufficient clearance to access and remove MSD's.

To remove the Relay Box Cover a minimum of 8" of clearance is recommended.

See figure **3-4** for relay box locations.



Relay Box (and MSD) Locations	
1	RH Box Relay Box
2	Back of Cab LH Relay Box
3	Underhood Relay Box
4	Back of Cab LH Relay Box
5	LH Box Relay Box

FIGURE 3.4. Relay Box Locations

LOW VOLTAGE BATTERY BOX CLEARANCE

Ensure LV battery boxes have sufficient clearance remove the cover panel and batteries as well as any other necessary maintenance.

To be able to remove the cover a minimum of 4” of clearance is recommended.

To be able to remove the 12V batteries a minimum of 10” is recommended. See figure **3-5**.

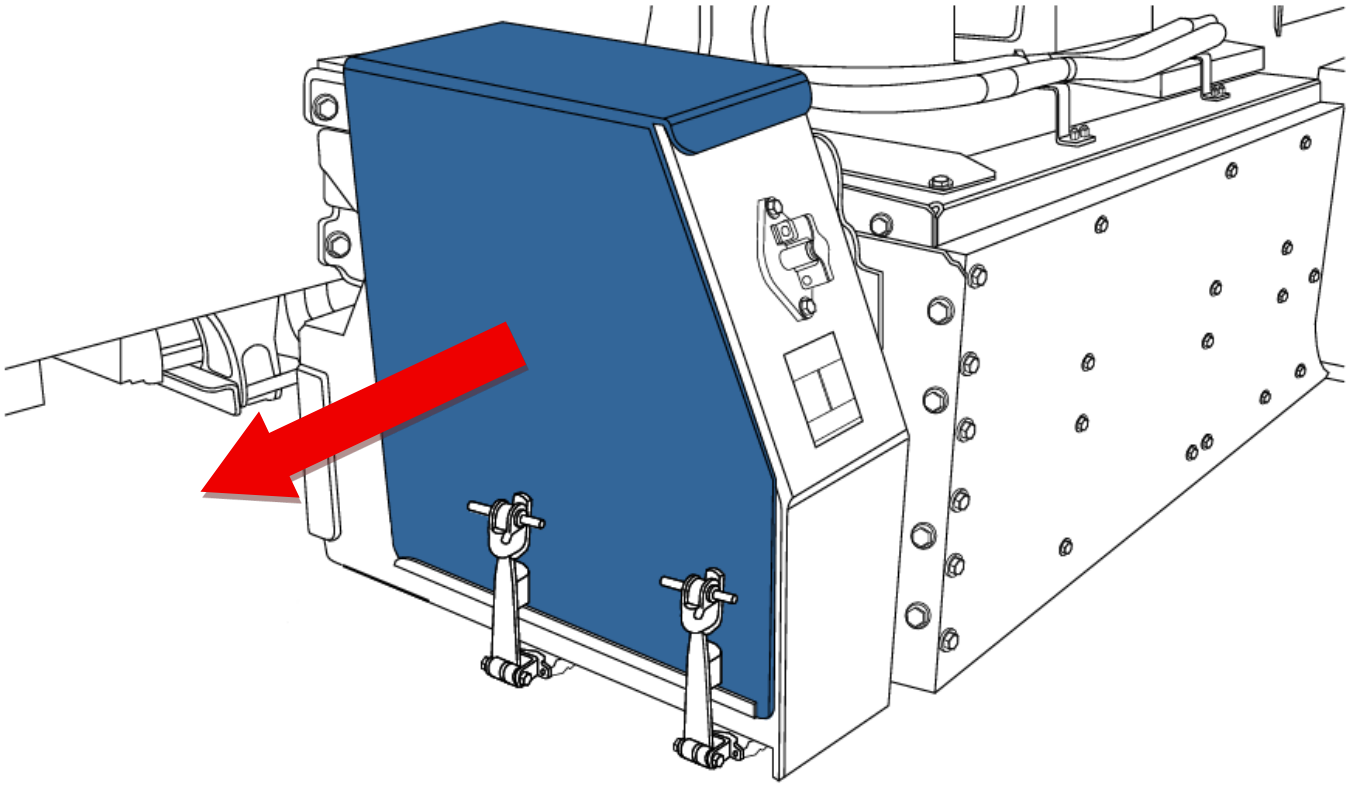


FIGURE 3-5. 12V (LV) Battery Box

FRAME RAILS

Frame rail configurations are shown in figure **3-6**. Rail height, flange and structural values can be found in the Body Mounting Section.

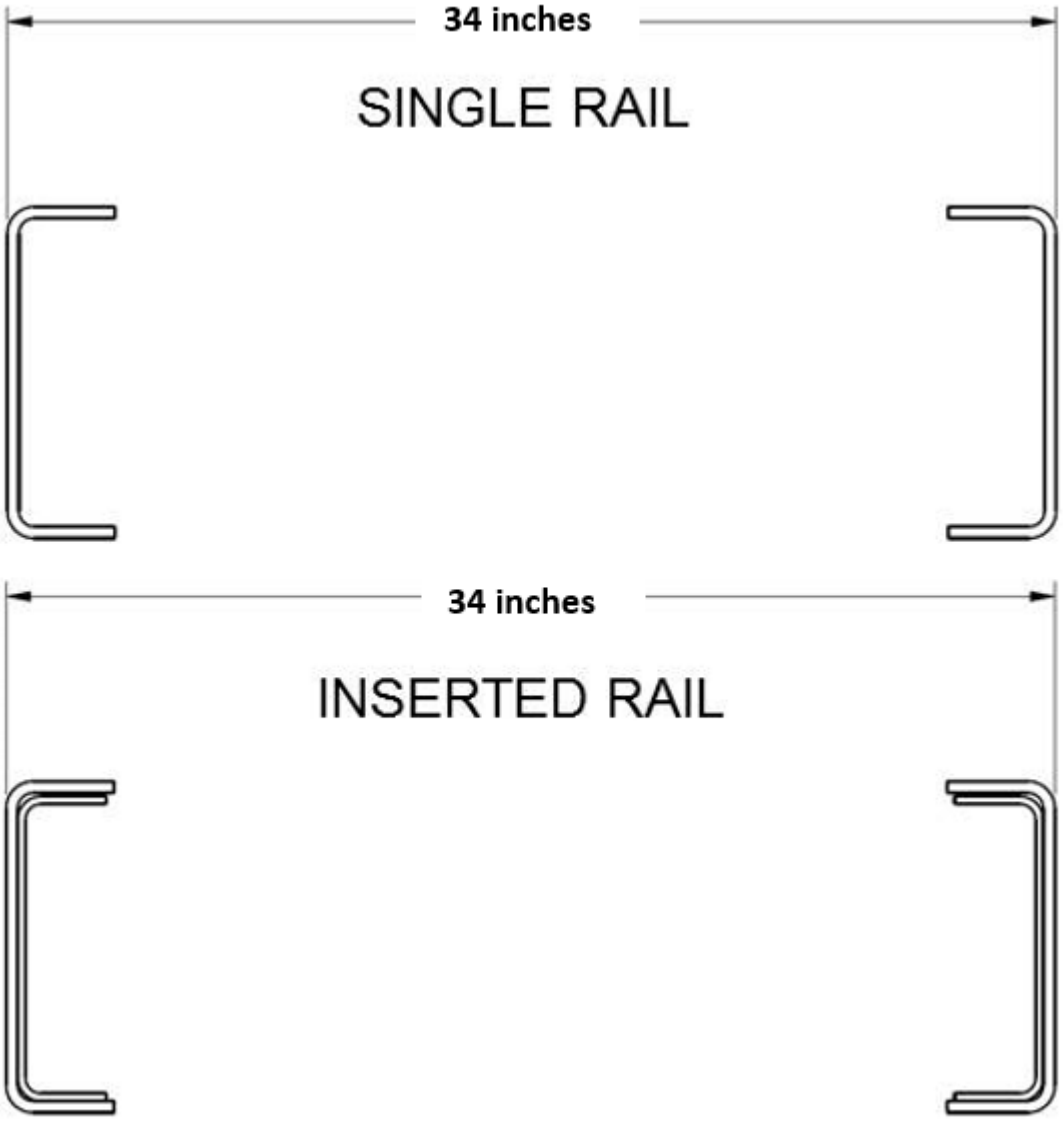


FIGURE 3-6. Frame Rail Configurations

FRAME HEIGHT CHARTS

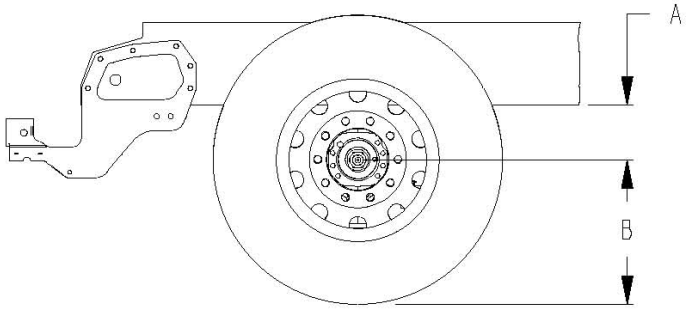
THE FOLLOWING FRAME HEIGHT CHARTS MAY BE USED FOR FINDING APPROXIMATE FRONT AND REAR FRAME HEIGHTS.

THE RESULTS ARE APPROXIMATIONS BECAUSE OF THE MANY VARIABLES SUCH AS TIRE TREAD THICKNESS, MANUFACTURING TOLERANCES, SPRING SET, AND THE LOADING IMPOSED IN THE LOADED SITUATION.

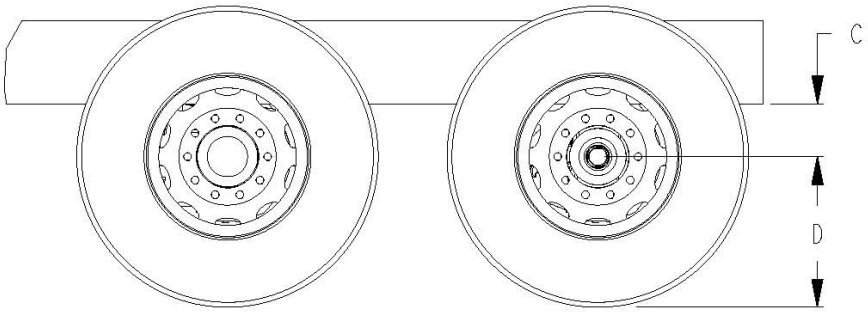
LOADED VALUES ARE QUOTES FOR REPRESENTATIVE LOADS AT THE GROUND FOR THE PARTICULAR SPRING AND AXLE COMBINATION, AND, AS SUCH, CAN VARY WITH LOADING VARIATIONS.

SPECIAL INSTALLATIONS ARE SOMETIMES POSSIBLE WITH CERTAIN SUSPENSIONS ALLOWING VARIATIONS FROM STANDARD. PLEASE CONTACT APPLICATIONS ENGINEERING FOR INFORMATION.

FRONT FRAME HEIGHT



REAR FRAME HEIGHT



NOTES:

1) "B" AND "D" DIMENSIONS CAN BE FOUND IN THE TIRES/WHEELS SECTION OR IN THE TIRE VENDOR'S LITERATURE.

FIGURE 3-7. Frame Height

MEDIUM DUTY BEV FRONT FRAME HEIGHTS "A"

TABLE 3-2. Front Frame Height “A”

Front Suspension Rating (lbs)	Spacer Height (mm)	A (in)	
		Light	Loaded
8,000	5	6.9	6.5
	30	7.9	7.5
	40	8.3	7.9
	50	8.7	8.3
	60	9.1	8.7
	70	9.5	9.1
	80	9.9	9.4
10,000	5	7.1	6.5
	30	8.1	7.5
	40	8.5	7.9
	50	8.9	8.3
	60	9.3	8.7
	70	9.7	9.1
	80	10.1	9.4
12,000	5	7.4	6.5
	30	8.4	7.5
	40	8.8	7.9
	50	9.2	8.3
	60	9.6	8.7
	70	10	9.1
	80	10.4	9.4
13,200	5	9.4	8.3
	30	10.4	9.3
	40	10.8	9.6
	50	11.2	10
	60	11.6	10.4
	70	12	10.8
	80	12.4	11.2
14,600	5	9.4	7.9
	30	10.4	8.9
	40	10.8	9.3
	50	11.2	9.7
	60	11.6	10.1
	70	12	10.5
	80	12.4	10.9

BEV FRONT FRAME HEIGHTS "A" (continued)

TABLE 3-2 (continued). Front Frame Height “A”

Front Suspension Rating (lbs)	Spacer Height (mm)	A (in)	
		Light	Loaded
16,000	5	10	8.5
	30	10.9	9.5
	40	11.3	9.9
	50	11.7	10.3
	60	12.1	10.7
	70	12.5	11.1
	80	12.9	11.5
20,000	5	10	7.7
	30	10.9	8.7
	40	11.3	9.1
	50	11.7	9.4
	60	12.1	9.8
	70	12.5	10.2
	80	12.9	10.6

REAR SUSPENSION "C" – Single Drive

TABLE 3-3. Single Drive Suspension Heights

Suspension	Rating	Version	C (in)	
			Light Height	Laden Height
AIR TRAC	20,000 lbs.	Standard	11.4	11.0
	23,000 lbs.	Standard	11.4	11.0
AIR LEAF	18,000 lbs.	Standard	7.0	7.0
TAPER LEAF	13,500 lbs.	Standard	9.4	7.4
	18,000 lbs.	Standard	8.9	7.0
REYCO 79KB	20,000 lbs.	Taperleaf (3.38" saddle)	11.8	9.4
	21,000 lbs.	Taperleaf (1.38" saddle)	9.8	7.4
	23,000 lbs.	Multileaf (1.38" saddle)	11.6	8.8
	26,000 lbs.	Multileaf (1.38" saddle)	11.8	9.2
	28,000 lbs.	Multileaf (1.38" saddle)	12.3	9.7
	31,000 lbs.	Multileaf (1.38" saddle)	13.3	10.8
REYCO 102	23K-29K lbs.	4.38 saddle	12.1	10.2
	23K-29K lbs.	4.63 saddle	12.2	10.4
	29,000 lbs.	3.50 saddle	11.7	10.0
	31,000 lbs.	3.50 saddle	12.2	10.5
	31,000 lbs.	4.38 saddle	12.5	10.7
	31,000 lbs.	4.63 saddle	12.7	10.9
REYCO 102AR (AIR)	17K -23K	Standard	9.3	9.3
		Low	8.3	8.3

REAR FRAME HEIGHTS "C" – Tandem Drive

TABLE 3-4. Tandem Drive Suspension Heights

Suspension	Rating	Version	C (in)	
			Light Height	Laden Height
AIR LEAF	38,000 lbs.	Standard	12.0	11.7
LOW AIR LEAF	40,000 lbs.	Standard	8.8	8.5
FLEX AIR	38,000 lbs.	Standard	8.7	8.5
LOW LOW AIR LEAF	40,000 lbs.	Standard	6.8	6.5
AIR TRAC	40K-46K lbs.	Standard	11.4	11.0
NEWAY ADZ	46K lbs.	Standard	10.0	10.0
REYCO 102 MULTILEAF	40,000 lbs.	1.75 saddle (STD)	11.7	9.9
		1.38 saddle	10.2	8.3
		3.38 saddle	13.4	11.5
	44,000 lbs.	1.75 saddle (STD)	11.7	9.8
		1.38 saddle	11.5	9.7
CHALMERS 854[1]	40,000 lbs.	LOW	11.2	8.9
		HIGH	12.4	10.2
		X-HIGH	14.5	12.2
		XX-HIGH	17.2	14.9
CHALMERS 854[1]	46,000 lbs.	LOW	11.3	8.9
		HIGH	12.5	10.1
		X-HIGH	14.7	12.2
		XX-HIGH	17.3	14.9
RT-403	40,000 lbs.	6.00 saddle	9.9	8.9
		7.19 saddle (std.)	11.2	10.1
HMX EX	40,000 lbs.	16.5	11.6	9.5
		17.5	12.6	10.5
		18.5	13.6	11.5
	46,000 lbs.	16.5	11.6	9.5
		17.5	12.6	10.5
		18.5	13.6	11.5
RS-463	46,000 lbs.	12.25 saddle	9.7	8.9
		14.00 saddle (std.)	11.5	10.6
		15.25 saddle	12.7	11.9
RT-463	46,000 lbs.	6.00 saddle	11.3	10.5
		7.2 saddle (std.)	13.0	11.4
		11.00 saddle	16.3	15.2

NOTES:

1) Laden dimension shown with standard restrictor cans. Add 0.7” for #29 High Stability Restrictor Cans.

FRAME SPACE REAR SUSPENSION "B"

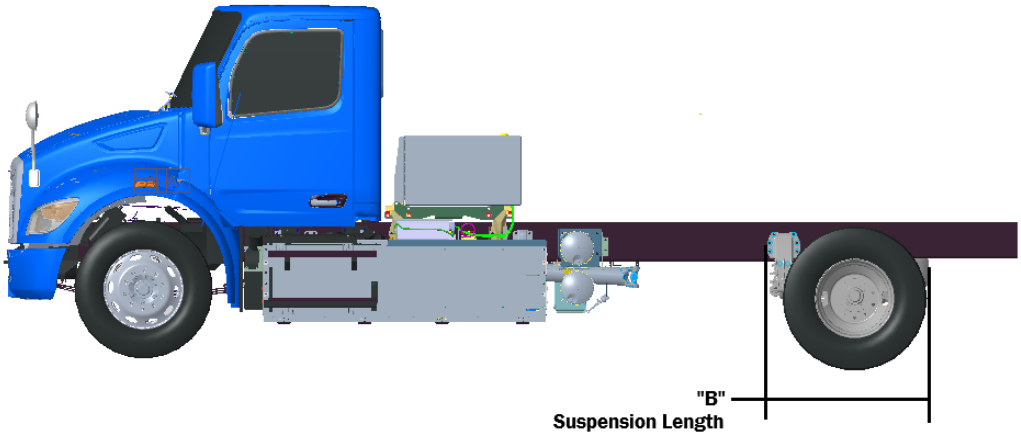


FIGURE 3-8. Suspension Length

TABLE 3-5. Suspension Length

REAR SUSPENSION (52" Axle Spacing on Tandems)	B (in)	OVERHANG (1)	NOTES
AIR LEAF SINGLE (18K)	32.2	23.5	2
AIR LEAF TANDEM	53	53	2
LOW/LOW LOW AIR LEAF	62.4	53	
LOW AIR LEAF SINGLE	36.5	27	
AIR TRAC SINGLE	27	27	3
AIR TRAC TANDEM	53	53	3
TAPER LEAF SINGLE (13.2/18K)	32.2	34.1	
FLEX AIR	59	53.7	7
CHALMERS 800 (54" SPACING)	49	52	4
HENDRICKSON HLM / AL	26.6	N/A	6
HENDRICKSON HLR2	30.5	N/A	6
HENDRICKSON HMX, HN	53	54	
HENDRICKSON R/RS/RT/RTE	53	53	3
HENDRICKSON SC20	25.6	15	6
HENDRICKSON SC8/10/13, FX, FXO, SCO	23.6	13.8	5, 6
NEWAY ADZ (54" SPACING)	61	58.3	
REYCO 102 SINGLE	30	25.8	
REYCO 102AR SINGLE	30	31	
REYCO 102 TANDEM	56	52.7	
REYCO 79KB	30.1	32.2	
WATSON-CHALIN AL2200	26.6	22.2	6
WATSON-CHALIN SL0893SSR	27.6	11.8	5, 6
WATSON-CHALIN SL1093SSR	27.6	11.8	6
WATSON-CHALIN SL1190SSR	26	12.8	6
WATSON-CHALIN SL2065	27.6	14.4	6

Notes:

1) Overhang for Tractor Taper EOF and Standard Mud flap Hangers on Suspensions; Square EOF w/o Crossmember
2) Add 2.0" to "B" dimension with quarter fenders.
3) Add 1.5" to "B" dimension with quarter fenders
4) Add 0.6" to "B" dimension with quarter fenders.D
5) Add 2.8" to "B" dimension with quarter fenders.
6) "B" dimension is from axle centerline (or bogie for tandem) to clear frame forward.
7) Extended Tractor Taper requires 58.0" overhang

LIFT AXLES

Tag and Pusher Axles are available with 548EV. Dimensional information for all available lift axles can be found in the Medium Duty Body Builders Manual (diesel engines).

FRAME MOUNTED COMPONENT GROUND CLEARANCE

The ground clearance tables are provided as a tool as a tool to help layout bodies prior to arrival, not all optional equipment is included.

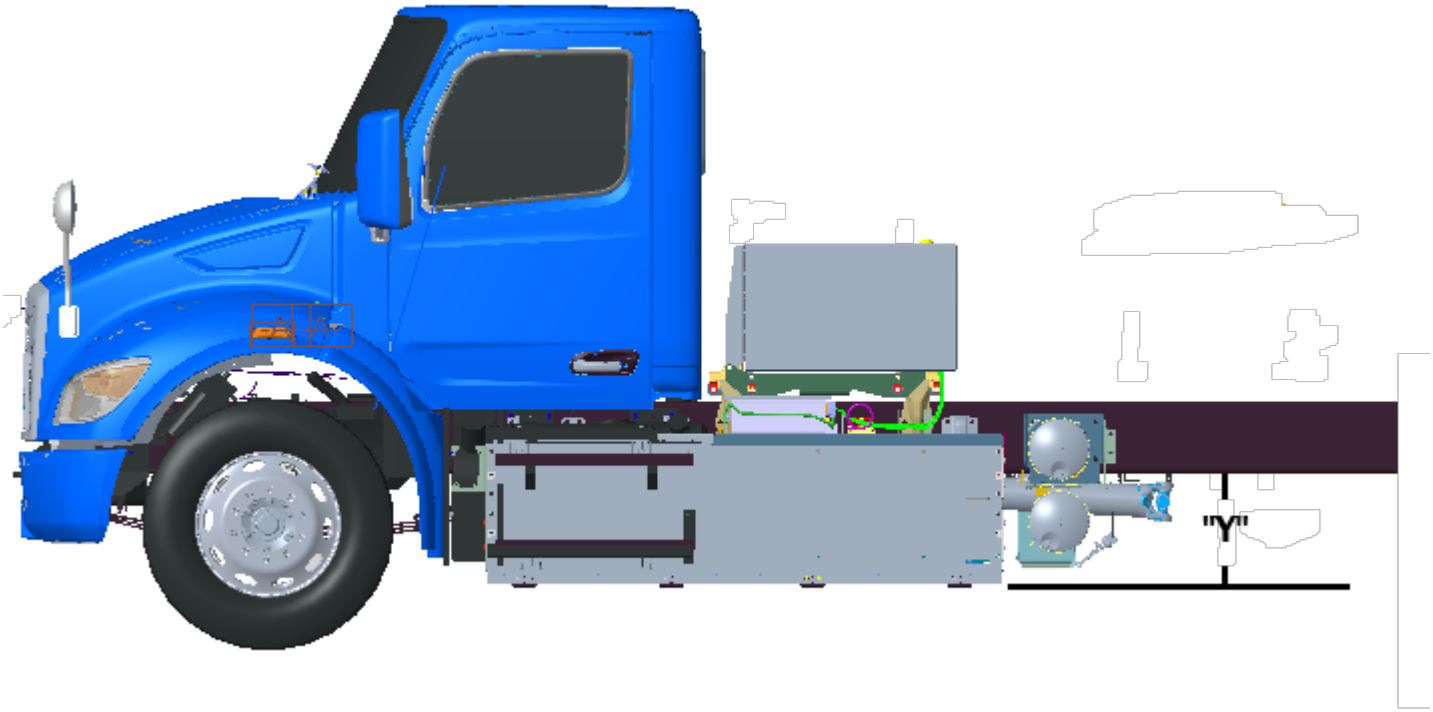


FIGURE 3-9. Ground Clearance

TABLE 3-6. Ground Clearance

Y = DISTANCE FROM BOTTOM OF FRAME TO BOTTOM OF COMPONENT	
Component	**Y**
Battery Packs (HV)	464 mm
12 V Battery Box	464 mm
ePTO	TBD

OVERALL CAB HEIGHT

The overall cab height tables are provided as a tool to help layout bodies prior to arrival; no roof mounted equipment is included.

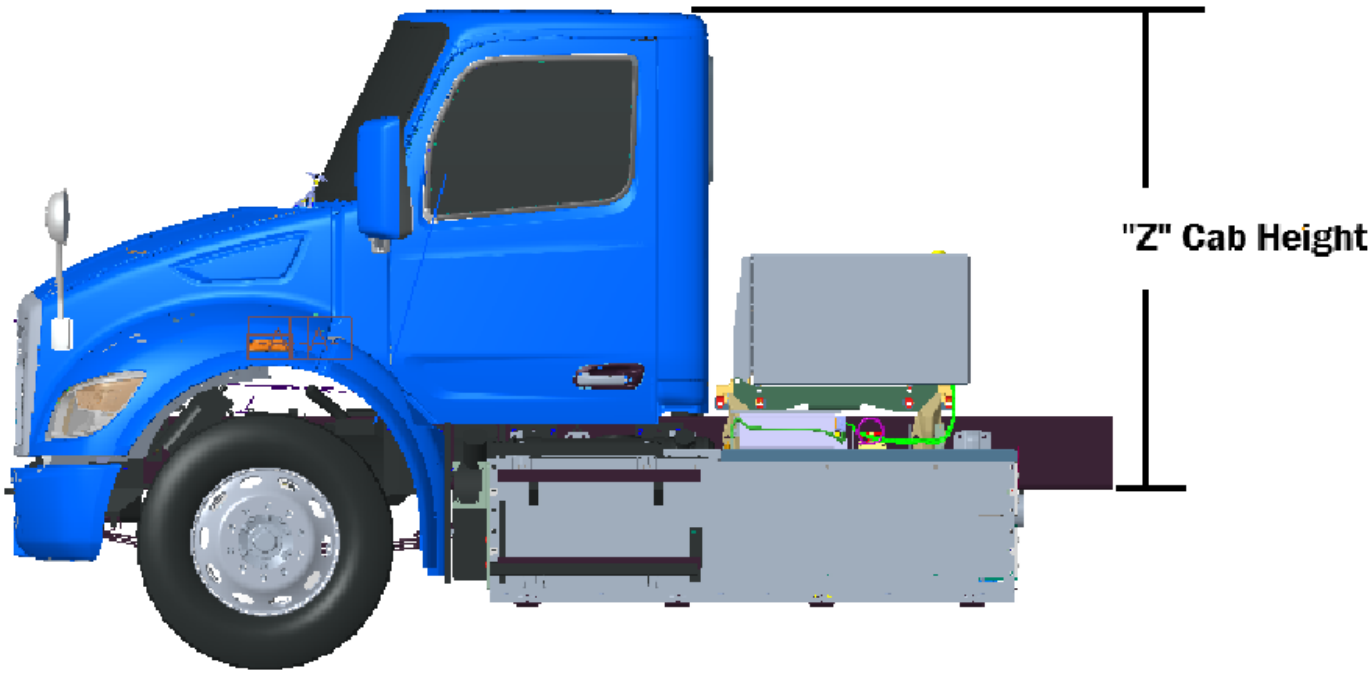


FIGURE 3-10. Cab Height

TABLE 3-7. Cab Height

Z = DISTANCE FROM BOTTOM OF FRAME TO TOP OF STANDARD CAB ROOF	
Model	**Z**
107” Hood	73.4 in.
109” Hood	74.4 in.

Notes:

1) Flat roof shown, Curved roof 4” taller
2) Roof mounted content such as horns and antennas are not included.

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SECTION 4 **ePTO AND MOUNTING**

OVERVIEW

Battery Electric Vehicles use electric Power Take-Offs (ePTO) to provide power to auxiliary equipment and auxiliary systems.

A typical ePTO consists of:

- eMotor
- Inverter
- Low Voltage Connection
- High Voltage Connection
- Coolant Ports
- Splined Motor Output Shaft and Mounting Flange
- Bonding Cable

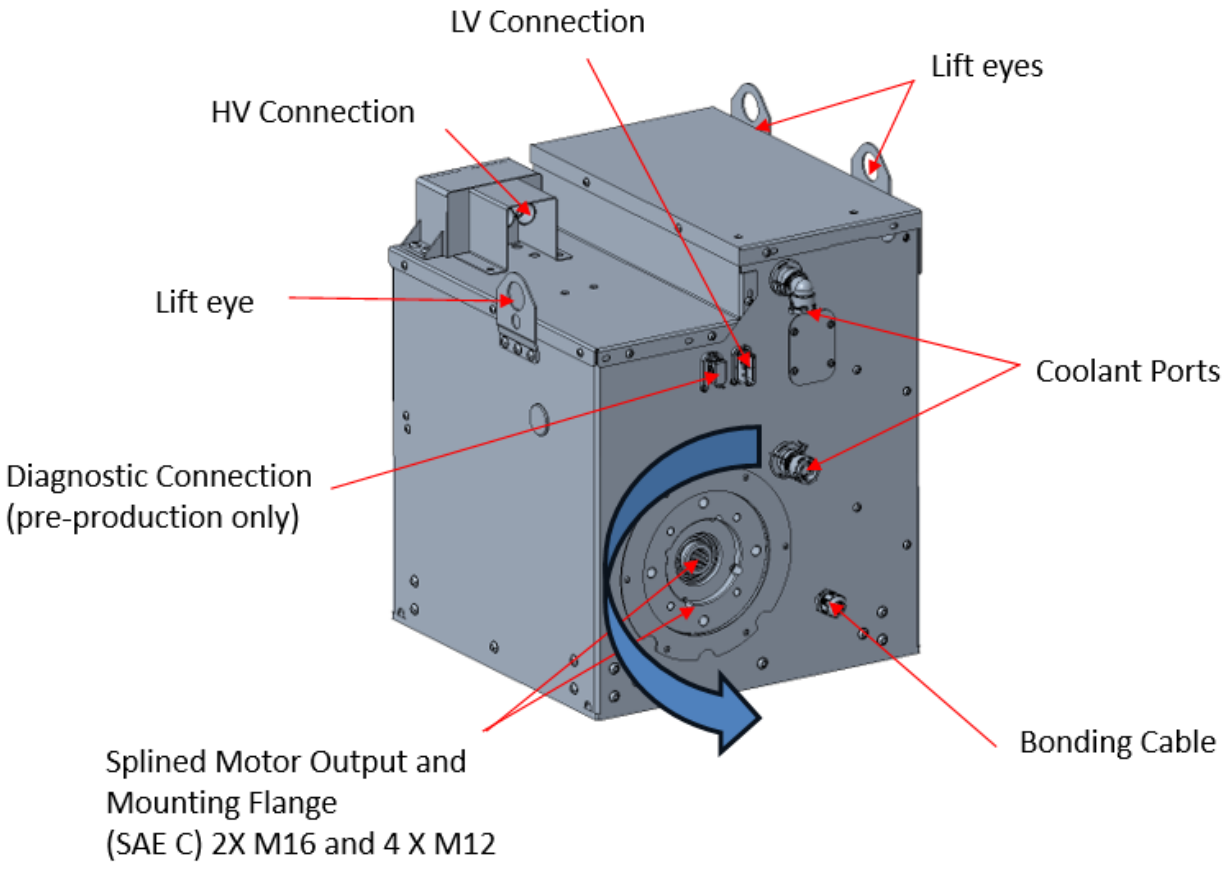

FIGURE 4-1. ePTO Example (ZF shown)

ABBRIVIATIONS AND ACRONYMS

AC	Alternating Current
BSL	Baseline
BEV	Battery Electric Vehicle
CAN	Controller Area Network
CDS	Corporate Design Standard
DC	Direct Current
ESD	Electrostatic discharge
EU	Europe
ePTO	Electric power take-off
F/O	Furnished by Owner
HD	Heavy Duty
HEV	Hybrid Electric Vehicle
HV	High Voltage (>60 V)
HVIL	High Voltage Interlock
IP	Ingress Protection
ISO	International Organization for Standards
LHD	Left Hand Drive
LV	Low Voltage (<60V)
MD	Medium Duty
NA	North America
OBD	Onboard Diagnostics
PB	Peterbilt
RFI	Request for information
FDS	Function design specification
RHD	Right-Handed Drive
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
TBD	To Be Determined
TRS	Technical Requirements Specification
TE	Tyco Electronics
VECU	Vehicle Electronic Control Unit

TABLE 4-1. Abbreviations and Acronyms for ePTO

ePTO INSTALLATION

There are several types of electric Power Take-Offs (ePTOs) and various suppliers for them including ZF, Muncie, Parker, Dana, and Bezares.

ePTOs can deliver either DC output or mechanical output.

Initially, ePTOs will not be installed at the factory; all installations will be F/O (Furnished by Owner) and the installations will need to be completed by the dealer or body builder. If applicable, the chassis will come with capped coolant connections, high-voltage (HV) connections, and low-voltage (LV) connections. Additionally, a pre-charge circuit with a resistance of 700 ohms and an active discharge circuit will be included.

WARNING

Do not add auxiliary transmission or modify the driveline layout, as this can negatively affect vehicle performance.

WARNING

Do not activate ePTO equipment until the pre-charge is completed. Confirmation of pre-charge completion will be sent via J1939 can bus.

Below are installation guidelines that must be followed for an F/O ePTO.

- All HV components must be bonded to bonding studs provided on the chassis.
- All HV connections, including ePTO, must be integrated into the HVIL circuit such that if any HV connection is broken, the HVIL circuit must be broken as well.
- An F/O Isolation Monitoring Device (IMD) should not be run after the ePTO contactors close to avoid causing interference with vehicle or charger IMD.
- Do not add auxiliary transmission or modify the driveline layout, as this can negatively affect vehicle performance.

WARNING

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- An F/O Isolation Monitoring Device (IMD) should not be run after the ePTO contactors close to avoid causing interference with vehicle or charger IMD.
- Do not add auxiliary transmission or modify the driveline layout, as this can negatively affect vehicle performance.

FURNISHED BY OWNER ePTO SPECIFICATIONS

Any ePTO installed by a dealer or body builder must meet the following requirements:

- The F/O ePTO system shall have a X-capacitance lower than 1000µF.
- The F/O ePTO system shall have a total Y-capacitance lower than 300nF.
- The F/O ePTO system shall have an insulation resistance of higher than 25MOhm (HV+ to PE and HV- to PE) at 1000V test voltage.

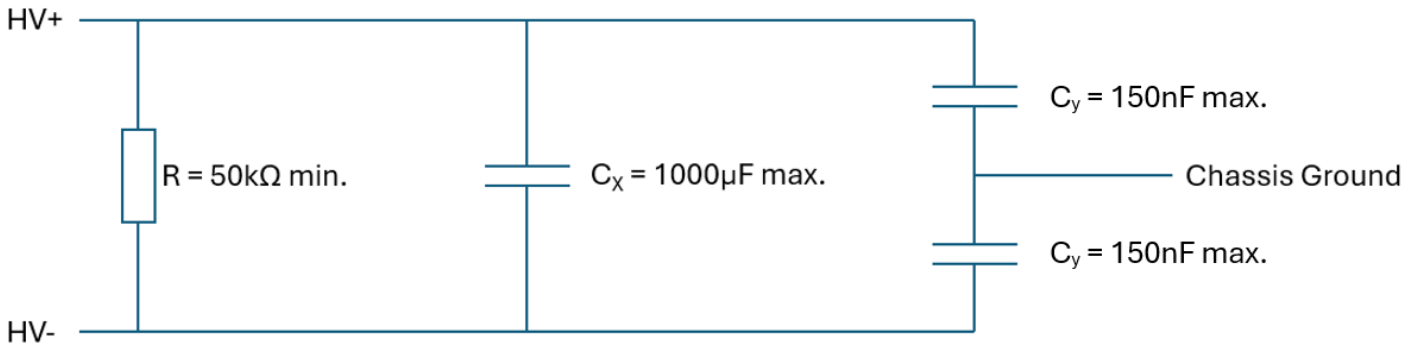


FIGURE 4-2. Required Capacitance and Resistance

ePTO HIGH VOLTAGE (HV) CONNECTION

	ePTO Low Power (≤25kW)	ePTO High Power (≤150kW)
Connector(s)	HVA-HD400 COD A	HVP-HD1000 A HVP-HD1000 B
Fuse	60A (MEV100C60-25BL1)	350A (QTY2) (MEV100A350-51TD)
Operating Voltage Range	538V to 672V	538V to 672V
Peak Voltage	701V	701V

TABLE 4-2. HV Connections for ePTO

WARNING

Do not attempt to service the HVJB. Contact your dealer if service is necessary.

ePTO INTERLOCK OPTIONS

Refer to PVP for programming ePTO Interlocks

- ePTO Mode Controls
- ePTO Speed Controls

ePTO BONDING / GROUNDING LOCATIONS

- Bonding / grounding locations for F/O ePTO can be found in Chapter 1.

OPERATING THE ePTO AND DRIVING AT THE SAME TIME

- To operate the ePTO and drive at the same time, turn the ePTO on (PACCAR calls this PTO Mode Control (PMC) = Enable. Put vehicle into drive/reverse and use accelerator pedal. These need to be configured in PACCAR Vehicle Pro PMC (PTO Mode control) and PSC (PTO Speed Control) parameters.
- A maximum vehicle speed can be configured while PTO is active between 6-158 MPH.

LIMITING THE SPEED OF THE VEHICLE WHEN ePTO IS ACTIVE

- To limit the speed configure parameter AA00063, minimum 6MPH maximum 158 MPH. If vehicle speed exceeds the set value, then no more acceleration will be permitted.

ePTO COOLANT CONNECTIONS

For ePTO installations in mobile applications, the following conditions must be met. Non-compliance may void the warranty:

- Maximum heat rejection: 10 kW with the 350 kW eMotor
- Minimum pressure drop of the ePTO fluid system: 450 mBar at 24 L/Min
  (If pressure drop is below this value, additional circuit restriction is required)

System capability for reference:

- Maximum inlet coolant temperature: 52˚C
- Maximum flow rate at maximum coolant temperature: 14 L/min

Coolant connections are located near the back of the LH ESS at the inside of the LH frame rail. (See Figures **4-3** and **4-4**).

Supply interface: quick connector Voss SV270 S14.
Return Interface: quick connector SAE J3207 NW12.
Both connectors will be plugged or capped from the factory.

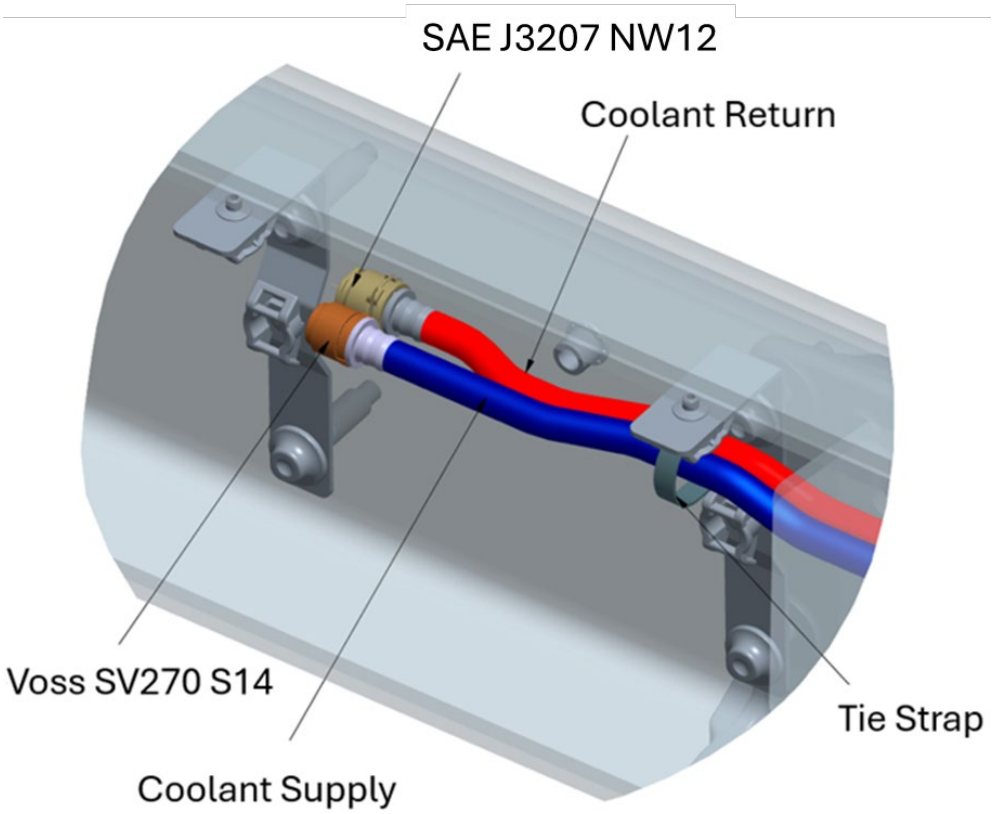


FIGURE 4-3. Coolant Connections

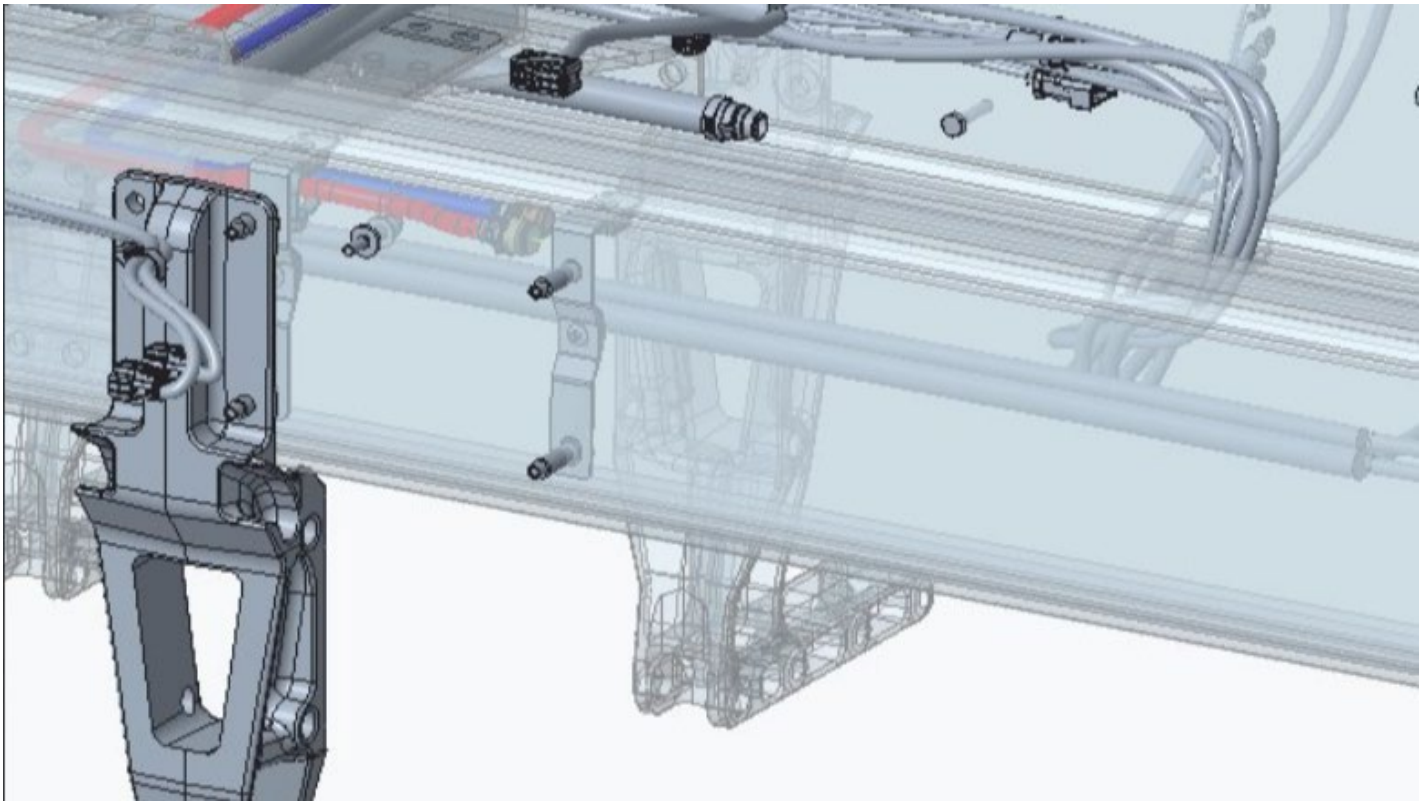


FIGURE 4-4. Coolant Connections

SECTION 5 **BODY MOUNTING**

INTRODUCTION

This section has been designed to provide guidelines to aid in body mounting. This is not intended as a complete guide, rather as general information. Body mounting strategies are unique to each body type and body builders must determine the appropriate method. Please note, an alignment adjustment is required after body installation. Front alignment and rear alignment must be performed prior to putting the vehicle into service.

Please contact your local Peterbilt dealer if more information is desired.

FRAME RAILS

Frame rail information is provided per rail.

TABLE 5-1. Single Frame Rails

Rail Height (in.)	Flange Width (in.)	Web Thickness (in)	Section Modulus (cu. In.)	RBM (per rail) (in.-lbs)	Weight (per rail) (lbs/in.)
10 5/8	3.45	0.313	14.8	1,776,000	1.44
10 3/4	3.50	0.375	17.8	2,136,000	1.74
10 11/16	3.50	0.500	22.35	2,683,000	2.35
11 5/8	3.875	0.375	21.4	2,568,000	1.91

TABLE 5-2. Built-up Frame Rails

Main Rail Height (in.)	Insert (in.)	Outsert (in.)	Section Modulus (cu. In.)	RBM (per rail) (in.-lbs)	Weight (per rail) (lbs/in.)
10 5/8	9.875 x 2.87 x .250	None	23.6	2,832,000	2.48
10 3/4	9.875 x 2.87 x .250	None	28.9	3,468,000	2.78
10 3/4	9.875 x 2.87 x .250	11.625 x 3.87 x .375	45.7	5,484,000	4.67
11 5/8	10.75 x 3.50 x .375	None	37.7	4,524,000	3.65

FACTORY INSTALLED BODY MOUNTING BRACKETS

2 OR 3 STRING BATTERIES

Due to the limited frame space on many 548EV, 537EV and 536EV trucks, drilling and adding brackets can be a challenging and time-consuming task. To address this, Peterbilt offers factory-installed Body Mounting Brackets that provide convenient, accessible locations for mounting bodies or equipment.

We highly urge you to utilize these brackets. Doing so will significantly reduce the need for component removal needed to access the frame rails and eliminate the drilling of extra holes.

2 STRING BATTERIES

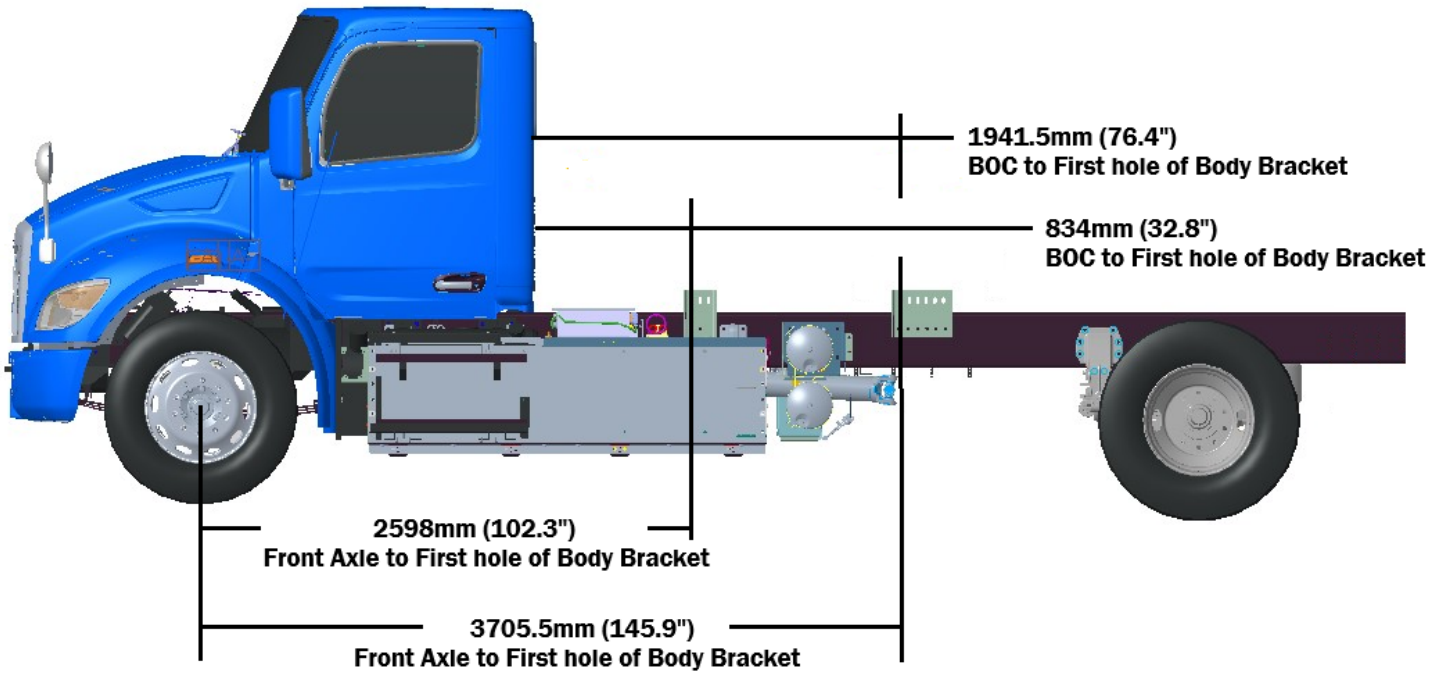


Figure 5.1 - Body Mounting Brackets for 2 String Batteries

FACTORY INSTALLED BODY MOUNTING BRACKETS

3 STRING BATTERIES

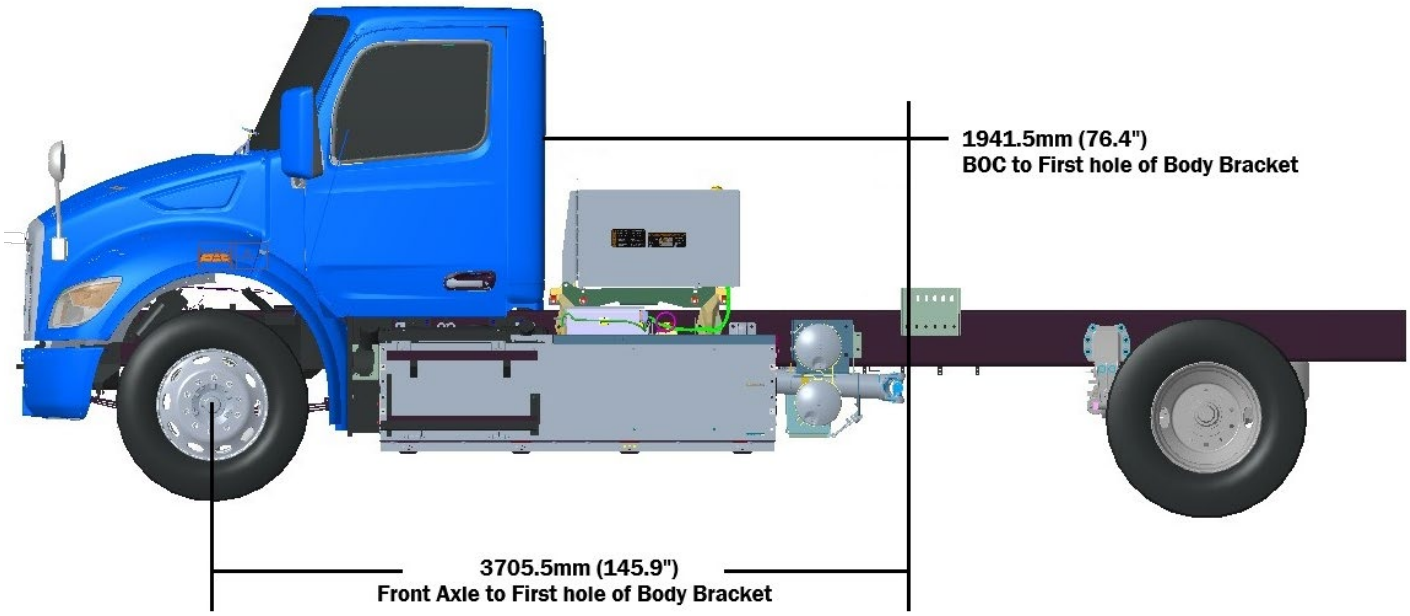


Figure 5.2 - Body Mounting Brackets for 3 String Batteries

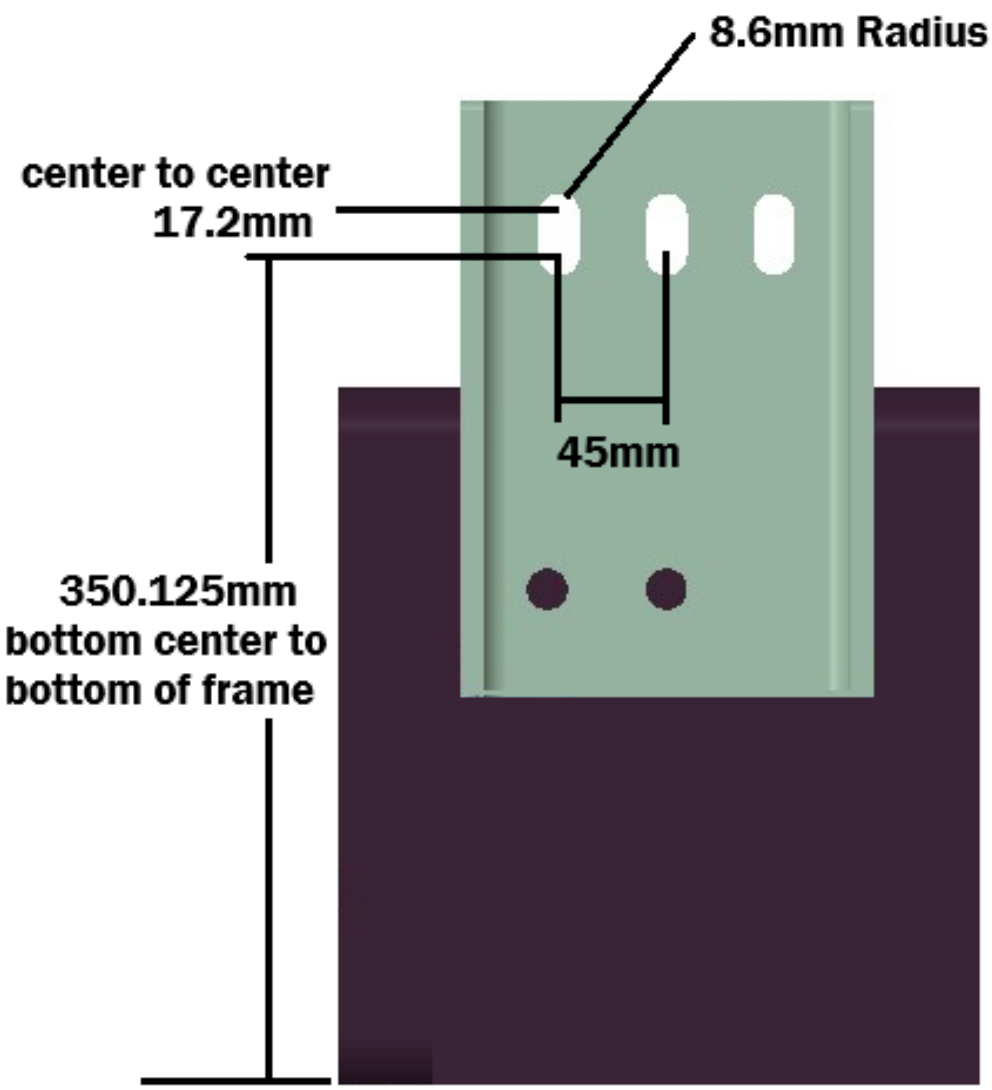


Figure 5.3 – Forward Body Mounting Bracket

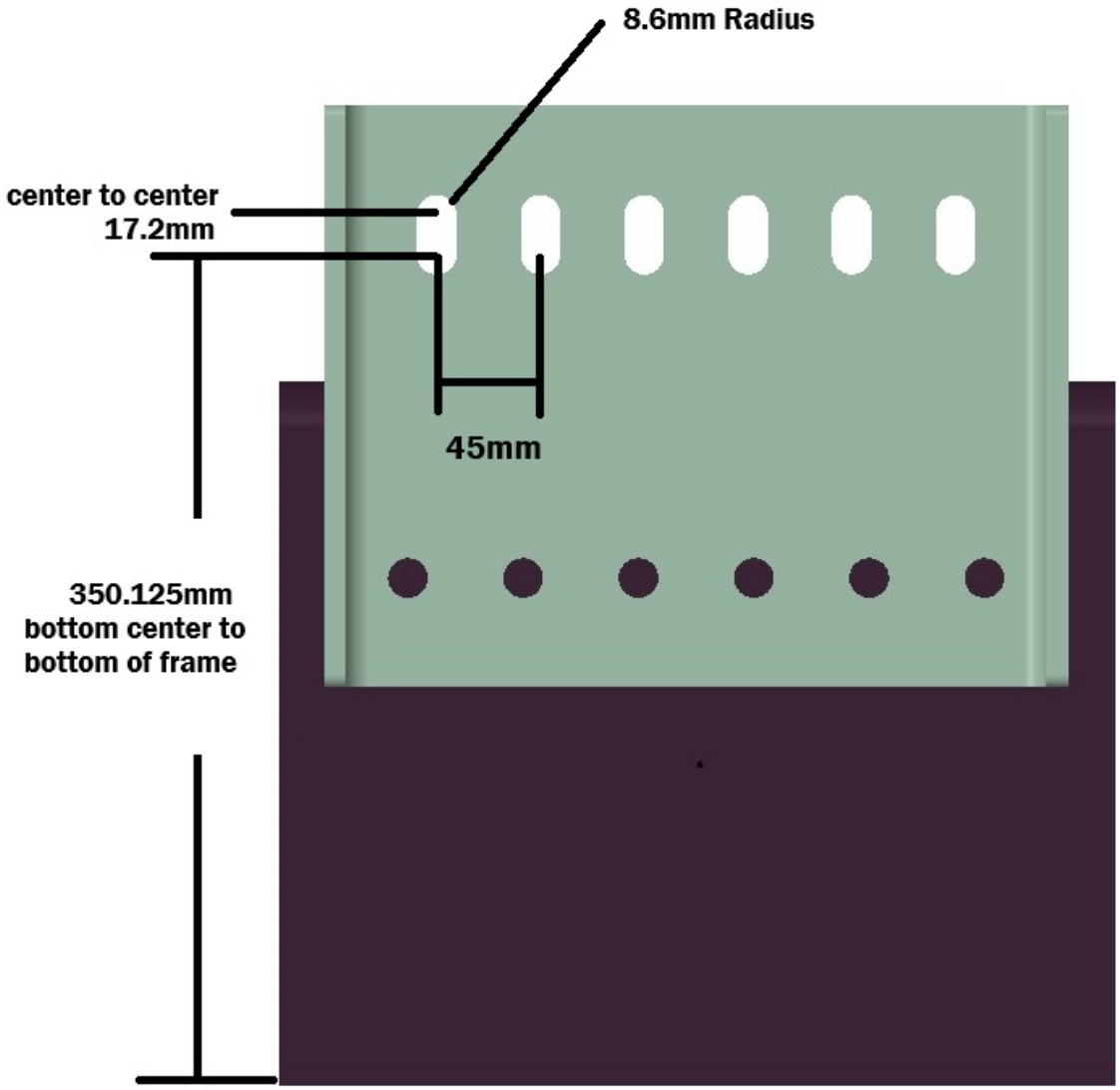


Figure 5.4 – Rear Body Mounting Bracket

CRITICAL CLEARANCES

REAR TIRES AND CAB

CAUTION

Insufficient clearance between rear tires and body structure could cause damage to the body during suspension movement.

Normal suspension movement could cause contact between the tires and the body. To prevent this, mount the body so that the minimum clearance between the top of the tire and the bottom of the body is 8 inches (203 mm). This should be measured with the body empty. See figure **5-3**.

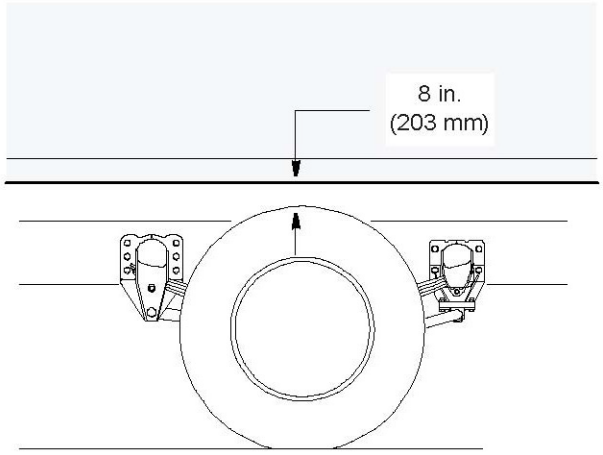


FIGURE 5-5. Minimum Clearance Between Top of Rear Tires and Body Structure Overhang

CAUTION

Maintain adequate clearance between the back of cab and the front (leading edge) of mounted body. It is recommended the body leading edge be mounted 4 in. behind the cab.

BODY MOUNTING USING BRACKETS

CAUTION

Always install a spacer between the body subframe and the top frame rail. Installation of a spacer between the body subframe and the top flange of the frame rail will help prevent premature wear of the components due to chafing or corrosion.

WARNING

When mounting a body to the chassis, DO NOT drill holes in the upper or lower flange of the frame rail. If the frame rail flanges are modified or damaged, the rail could fail prematurely and cause an accident. Mount the body using body mounting brackets or U–bolts.

FRAME SILL

If the body is mounted to the frame with brackets, we recommend a frame sill spacer made from a strip of rubber or plastic (Delrin or nylon). These materials will not undergo large dimensional changes during periods of high or low humidity. The strip will be less likely to fall out during extreme relative motion between body and chassis. See figure **5-4.**

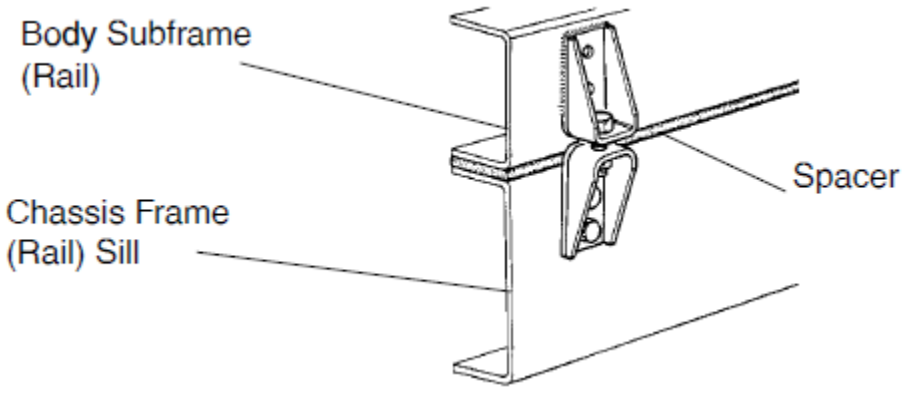


FIGURE 5-6. Spacer Between Frame Sill and Body Rail – Rubber or Plastic

BRACKETS

When mounting a body to the chassis with brackets, we recommend designs that offer limited relative movement, bolted securely but not too rigid. Brackets should allow for slight movement between the body and the chassis. For instance, figure **5-5** shows a high compression spring between the bolt and the bracket, and figure **5-6** shows a rubber spacer between the brackets. These designs will allow relative movement between the body and the chassis during extreme frame racking situations. Mountings that are too rigid could cause damage to the body. This is particularly true with tanker installations.

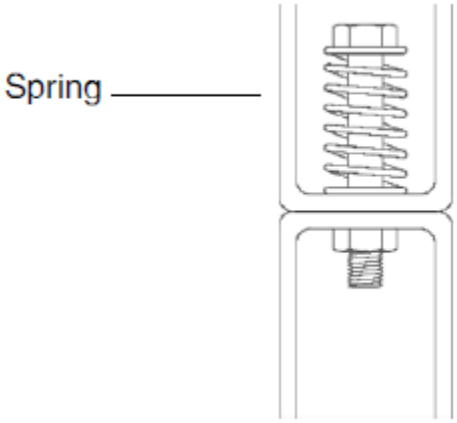


FIGURE 5-7.
Mounting Brackets

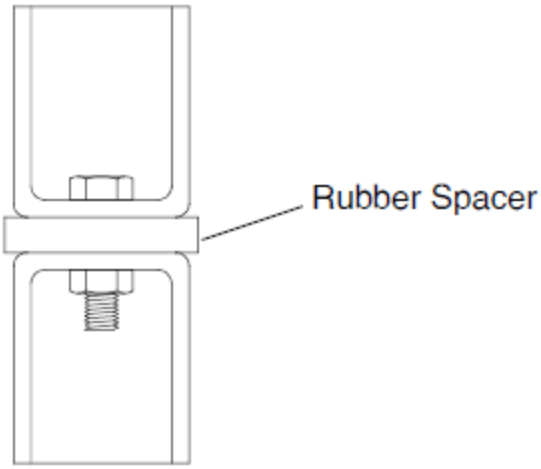


FIGURE 5-8.
Mounting Brackets

MOUNTING HOLES

When installing brackets on the frame rails, the mounting holes in the chassis frame bracket and frame rail must comply with the general spacing and location guidelines illustrated in figure **5-7**.

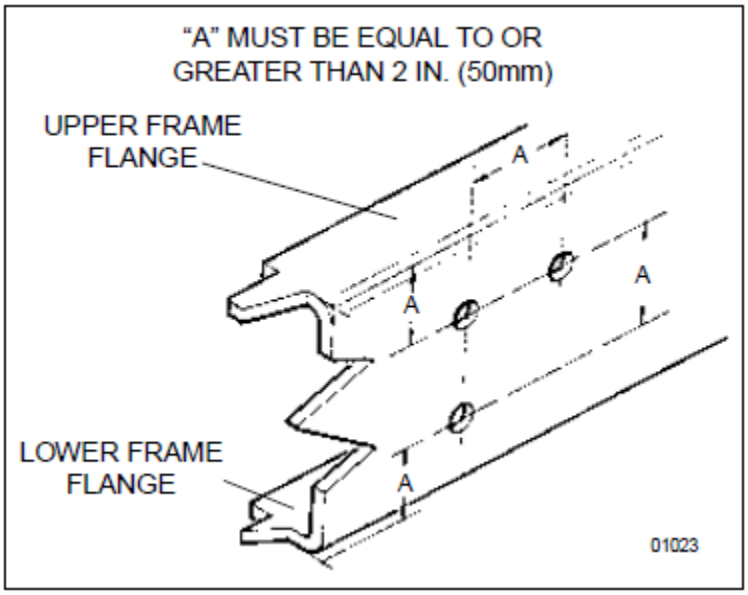


FIGURE 5-9. Hole Location Guidelines for Frame Rail and Bracket

Note that Peterbilt offers optional frame drilling. By utilizing this feature, the frame can be customized to specific requirements and could eliminate the need for any drilling needed for the body installation process.

Work with your dealer to make sure the **Additional Frame Drilling** option code is selected when the truck is spec'd.

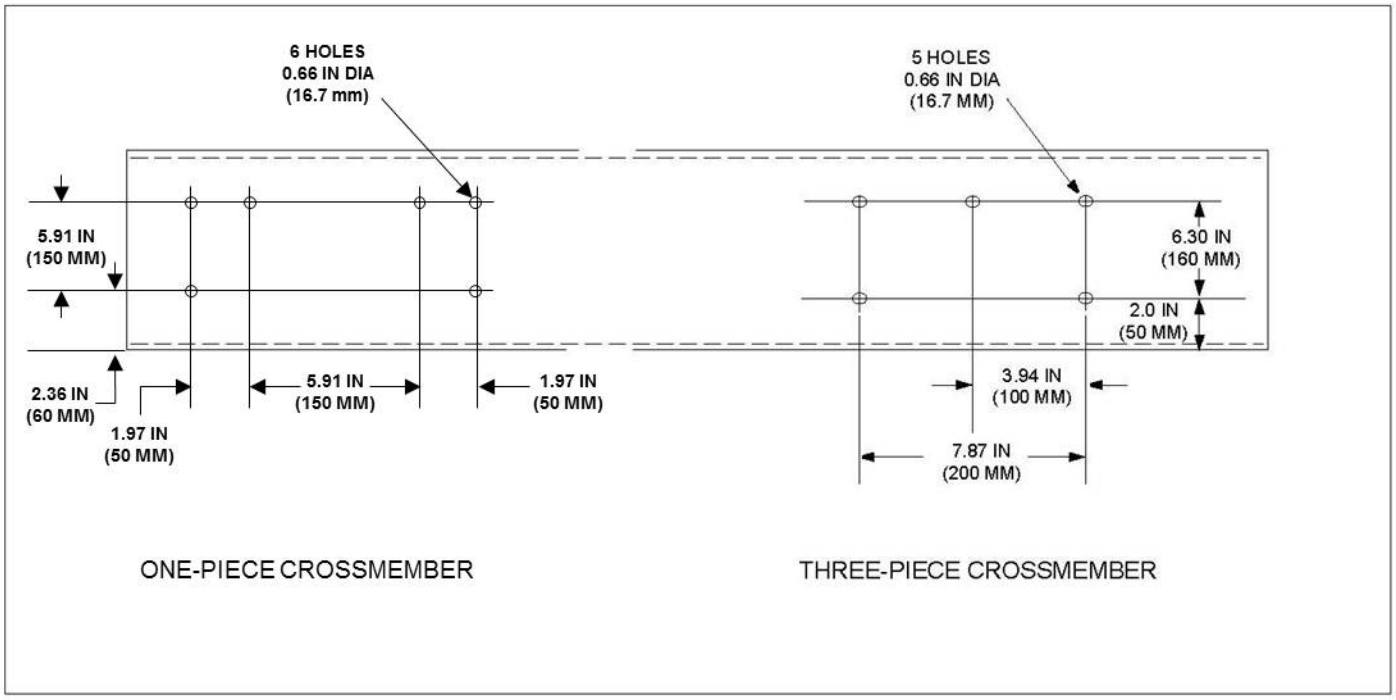


FIGURE 5-10. Crossmember Gusset Hole Patterns (Additional Holes Available in 50 mm Horizontal Increments)

FRAME DRILLING

WARNING

When mounting a body to the chassis, DO NOT drill holes in the upper or lower flange of the frame rail. If the frame rail flanges are modified or damaged, the rail could fail prematurely and cause an accident. Mount the body using body mounting brackets or U–bolts.

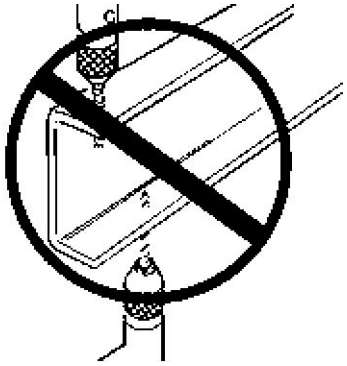


FIGURE 5-11. Frame Rail Flange Drilling Prohibited

WARNING

DO NOT drill closely spaced holes in the frame rail. Hole centers of two adjacent holes should be spaced no less than twice the diameter of the largest hole. Closer spacing could induce a failure between the two holes.

CAUTION

An appropriately sized bolt and nut must be installed and torqued properly in all unused frame holes. Failure to do so could result in a frame crack initiation around the hole.

CAUTION

Use care when drilling the frame web so the wires and air lines routed inside the rail are not damaged. Failure to do so could cause an inoperable electrical or air system circuit.

CAUTION

Never use a torch to make holes in the rail. Use the appropriate diameter drill bit. Heat from a torch will affect the material properties of the frame rail and could result in frame rail cracks.

CAUTION

The hole diameter should not exceed the bolt diameter by more than .060 inches (1.5mm).

BODY MOUNTING USING U–BOLTS

If the body is mounted to the frame with U–bolts, use a hardwood sill (minimum 1/2 inch (12.7 mm) thick) between the frame rail and body frame to protect the top surface of the rail flange.

WARNING

Do not allow the frame rails or flanges to deform when tightening the U–bolts. It will weaken the frame and could cause an accident. Use suitable spacers made of steel or hardwood on the inside of the frame rail to prevent collapse of the frame flanges.

Use a hardwood spacer between the bottom flange and the U–bolt to prevent the U–bolt from notching the frame flange. See figure **5-10.**

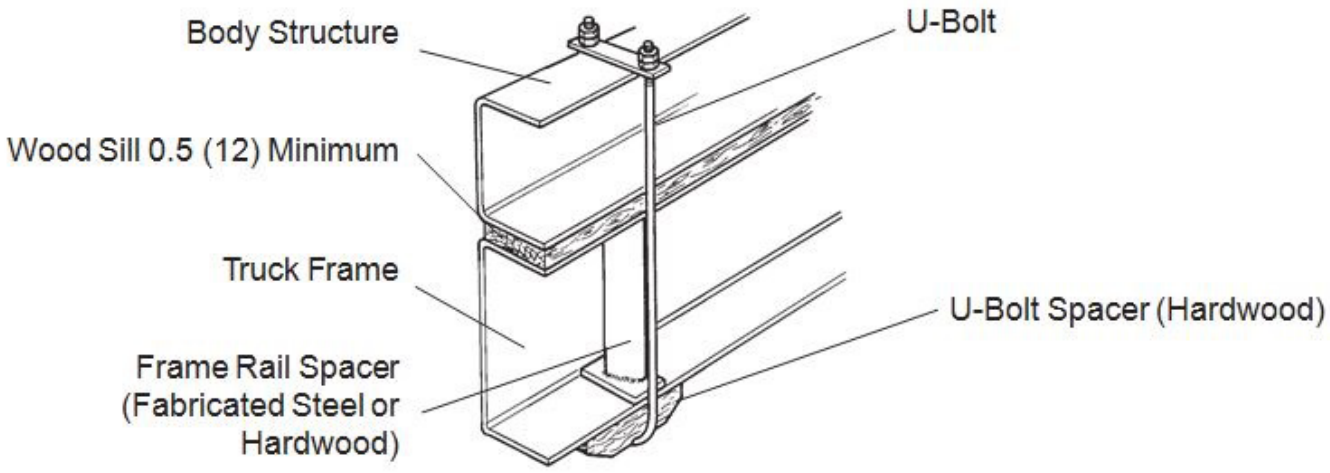


FIGURE 5-12. Acceptable U-Bolt Mounting with Wood and Fabricated Spacers

WARNING

Do not allow spacers and other body mounting parts to interfere with brake lines, fuel lines, or wiring harnesses routed inside the frame rail. Crimped or damaged brake lines, fuel lines, or wiring could result in loss of braking, fuel leaks, electrical overload or a fire. Carefully inspect the installation to ensure adequate clearances for air brake lines, fuel lines, and wiring.

Ensure spacers and body mounting parts do not interfere with brake lines, fuel lines, or wiring inside the frame rail, as damage can cause brake failure, fuel leaks, electrical issues, or fire. Carefully inspect for proper clearance during installation.
See figure **5-11.**

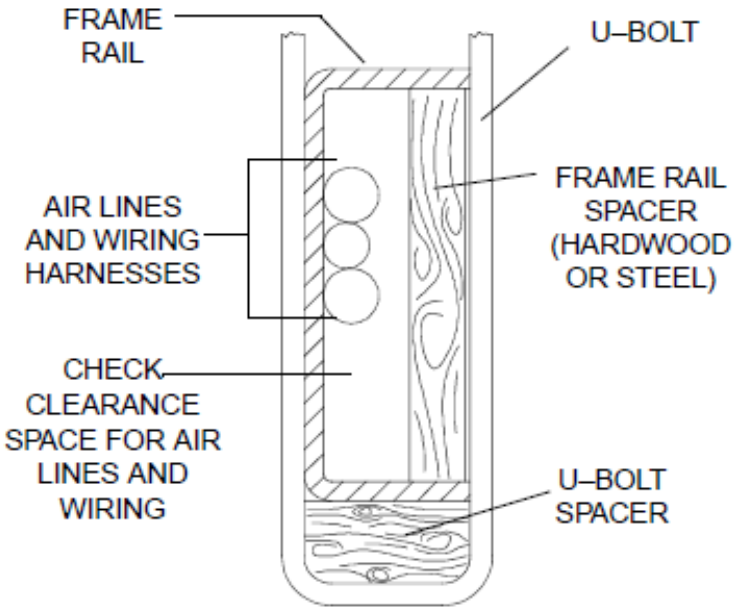


FIGURE 5-13. Clearance Space for Air Lines and Cables

WARNING

Do not notch frame rail flanges to force a U–bolt fit. Notched or damaged frame flanges could result in premature frame failure. Use a larger size U-bolt.

Do not notch frame rail flanges to force a U–bolt fit. Notched or damaged frame flanges could result in premature frame failure. Use a larger size U-bolt. See figure **5-12.**

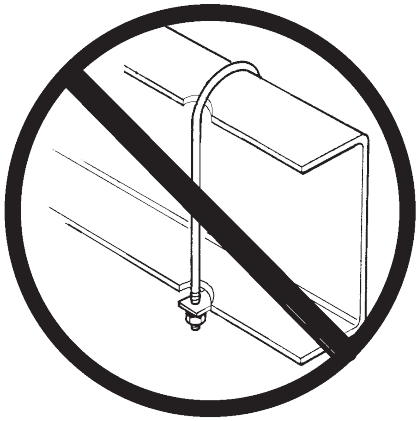


FIGURE 5-14. Clearance Space for Air Lines and Cables

CAUTION

Mount U–bolts so they do not chafe on frame rail, air or electric lines.

REAR BODY MOUNT

When U–bolts are used to mount a body, we recommend that the last body attachment be made with a “fishplate” bracket. See figure **5-12**. This provides a firm attaching point and helps prevent any relative fore or aft movement between the body and frame. For hole location guidelines, See figure **5-7**.

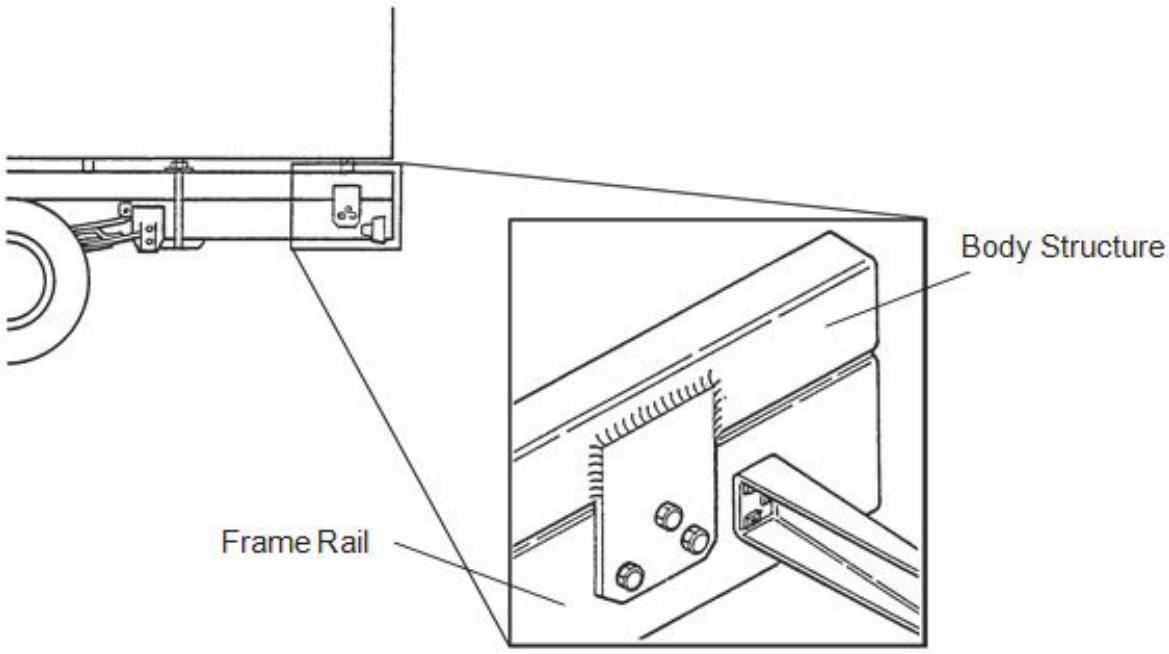


FIGURE 5-15. Fishplate Bracket at Rear End of Body

SECTION 6 **FRAME MODIFICATIONS**

INTRODUCTION

Peterbilt offers custom specified wheelbases and frame overhangs. So, in most cases frame modifications should not be necessary.

However, some body installations may require slight modifications, while other installations will require extensive modifications. Sometimes an existing dealer stock chassis may need to have the wheelbase changed to better fit a customer's application. The modifications may be as simple as modifying the frame cutoff, or as complex as modifying the wheelbase.

DRILLING RAILS

If frame holes need to be drilled in the rail, see SECTION 5 BODY MOUNTING for more information.

MODIFYING FRAME LENGTH

The frame overhang after the rear axle can be shortened to match a particular body length. Using a torch is acceptable; however, heat from a torch will affect the material characteristics of the frame rail. The affected material will normally be confined to within 1 to 2 inches (25 to 50mm) of the flame cut and may not adversely affect the strength of the chassis or body installation.

CHANGING WHEELBASE

Changing a chassis' wheelbase is not recommended. Occasionally, however, a chassis wheelbase will need to be shortened. Before this is done there are a few guidelines that should be considered.

WARNING

When changing the wheelbase, contact your local Peterbilt dealership for support. It is important to verify that these changes do not compromise vehicle frame strength.

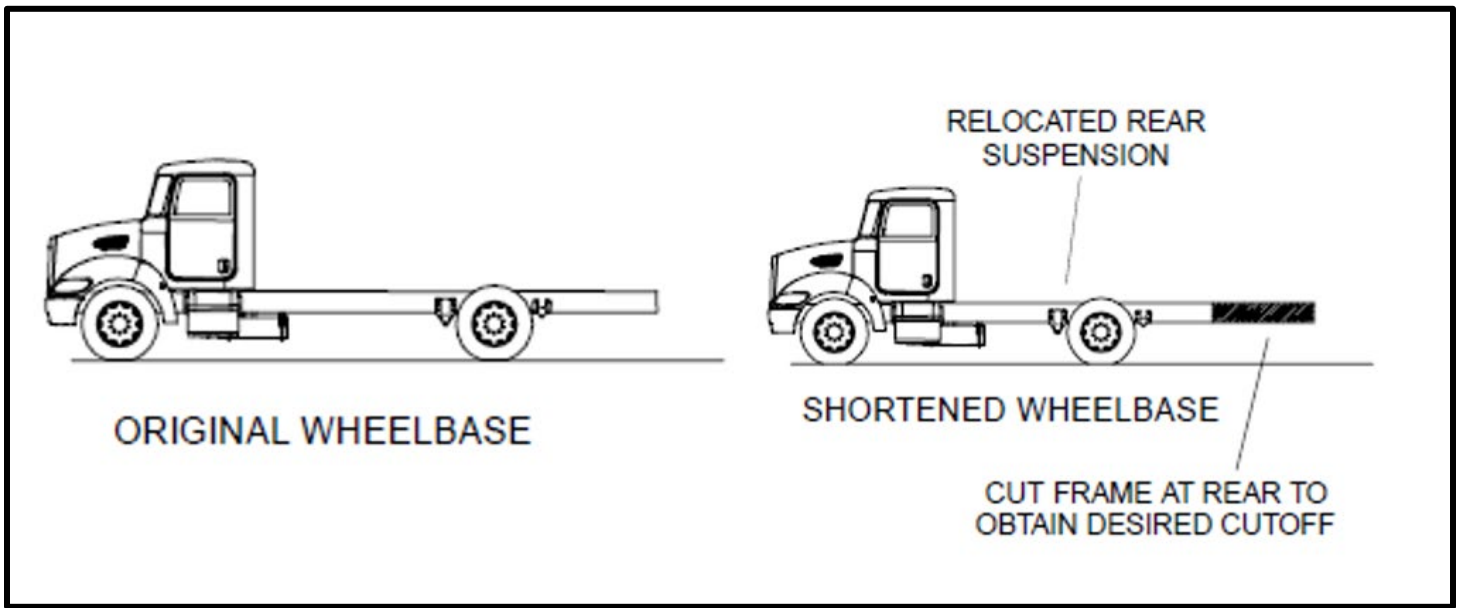


FIGURE 6-1. Shortening a Wheelbase

Before the rear suspension is relocated, check the new location of the spring hanger brackets. The new holes for the spring hanger brackets must not overlap existing holes and should adhere to the guidelines in the “FRAME DRILLING” section of this manual.

When shortening the wheelbase, the suspension should be moved forward and relocated onto the original rail. The rail behind the suspension can then be cut to achieve the desired frame overhang. See figure **6-1**.

TORQUE REQUIREMENTS

Torque values apply to fasteners with clean threads, lightly lubricated, with hardened steel washers, and nylon-insert nuts.

Fastener	Torque	
Size	Nm	lb-ft
5/16	22–30	16–22
3/8	41–54	30–40
7/16	75–88	55–65
1/2	109–122	80–90
9/16	156–190	115-140
5/8	224–265	165–195
3/4	394–462	290–340
7/8	517–626	380–460
1	952–1129	800–830
1-1/8	1346–1591	990–1170
1-1/4	1877–2217	1380–1630

TABLE 6-1. Customary Grade 8 UNF or UNC.

Fastener	Torque	
Size	Nm	lb-ft
M6	9–15	7–11
M8	23–31	17–23
M10	33–43	24–32
M12	75–101	55–75
M14	134–164	99–121
M16	163–217	120–160
M20	352–460	260–340

TABLE 6-2. U.S. Customary - Grade 8 Metric Class 10.9

WELDING

The frame rails are heat treated and should not be welded. The high heat of welding nullifies the special heat treatment of the rails, greatly reducing the tensile strength of the frame rail. If a frame member becomes cracked from overloading, fatigue, surface damage or a collision, the only permanent repair is to replace the damaged frame member with a new part.

CAUTION

Due to the sensitive nature of the BEV electrical and electronics systems, welding is not permitted on the chassis or any components secured to the vehicle. Welding could cause damage to the high voltage, bonding, or safety interlock systems that are necessary to safely operate the vehicle.

SECTION 7 **CAN COMMUNICATIONS**

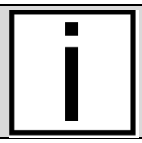
INTRODUCTION

Controller Area Network (CAN) is a serial network technology that was originally designed for the automotive industry but has also become popular in the commercial trucking industry. The CAN bus is primarily used in the embedded systems and network technology that provides fast communication among controllers up to real-time requirements, eliminating the need for the much more expensive and complex technology.

CAN is a two-wire high-speed network system, that is far superior to conventional hardwired technology's functionality and reliability. CAN implementations are also more cost-effective. CAN is designed for real-time requirements which can easily beat hardwired connections when it comes to short reaction times, timely error detection, quick error recovery, and error repair.

Characteristics of the Controller Area Network:

- A serial networking technology for embedded solutions
- Needs only two wires to communicate messages
- Operates at data rates of 250K and 500K
- Supports a maximum of 8 bytes per message frame
- One application can support multiple message IDs
- Supports message priority, i.e. the lower the message ID the higher its priority



NOTE

Architecture changes on EMUX will not allow "Read Only" CAN devices to listen on S-CAN without additional modifications. A minimum of one additional CAN device with the ability to "acknowledge" messages will be required to complete the network on S-CAN and K-CAN. An incomplete network will result in the inability to read/view CAN communication on the S-CAN and K-CAN.

EMUX – ECU INSTALLATION NOTES

- If adding two or more ECUs per truck that need to communicate with each other, install them on the same CAN network.
- If you add two or more ECUs that need to communicate with each other and some reside in the cab and some reside on the frame, use the optional B-CAN network.
- When transmitting messages to other ECUs on the network, only the listed Source Addresses (SA) are accepted.
- Body builders must only connect to the K-CAN, S-CAN, or B-CAN.
- Customer-installed CAN wiring must use shielded twisted-pair in compliance with J1939/14_202204 standards.

EMUX CAN COMMUNICATIONS ACRONYM LIBRARY

Acronym	Definition
CAN	Controller Area Network
CMT	Collision Mitigation Technology
CSG2	Central Security Gateway, used for Cyber Security on the truck
Direction	Defines which way the signal is being sent. In the following EMUX CAN message table, “Tx” means transmitted by the ECU being added to the truck and conversely “Rx” means received by the ECU being added to the truck.
ECU	Electronic Control Unit
Hex ID	29-bit CAN identifier in hexadecimal
J1939	SAE CAN Communication Standard
PGN	Parameter Group Number
PropB	PNG Message Name (Prop: Propriety)
RP170	American Trucking Association (ATA) and Technology & Maintenance Council (TMC) standardized connector for vocational/refuse chassis-to-body electrical interface.
RP1226	American Trucking Association (ATA) and Technology & Maintenance Council (TMC) 14-pin standardized connector for in-vehicle data access.
Rx	Receive
SA	Source Address
SAE	Society of Automotive Engineers
SCM	Speed Control Management
SPN	Suspect Parameter Number
TPMS	Tire Pressure Monitoring System
Tx	Transmit

TABLE 7-1. Abbreviations and Acronyms CAN Communications

SAE J1939

The Society of Automotive Engineers (SAE) Communications Subcommittee for Truck and Bus Controls has developed a family of standards concerning the design and use of devices that transmit electronic signals and control information among vehicle components. SAE J1939 and its companion documents are the accepted industry standard for the vehicle network of choice for commercial truck applications. SAE J1939 is used in the commercial vehicle area for communication in the embedded systems of the commercial vehicle.

SAE J1939 uses CAN as physical layer. It is a recommended practice that defines which and how the data is communicated between the Electronic Control Units within a vehicle network. Typical controllers are Engine, Brake, Transmission, etc. The messages exchanged between these units can be data such as vehicle road speed, torque control message from the transmission to the engine, oil temperature, and many more.

Characteristics of J1939:

- Extended CAN identifier (29-bit)
- Network management
- Definition of parameter groups for commercial vehicles and others
- Manufacturer specific parameter groups
- Diagnostics features
- A standard developed by the Society of Automotive Engineers
- Defines communication for vehicle networks
- A Higher-Layer Protocol using CAN as the physical layer
- Uses unshielded twisted pair wire
- Applies a maximum network length of 120 ft
- Applies a standard baud rate of 250 Kbit/sec or 500 Kbit/sec depending on the network
- Supports peer-to-peer and broadcast communication
- Supports message lengths up to 1785 bytes
- Defines a set of Parameter Group Numbers
- Two 120Ω terminating resistors per CAN

PARAMETER GROUP NUMBER

Parameter Groups contain information on parameter assignments within the 8-byte CAN data field of each message as well as repetition rate and priority. Parameters groups are, for instance, engine temperature, which includes coolant temperature, fuel temperature, oil temperature, etc. Parameter Groups and their numbers are listed in SAE J1939 and defined in SAE J1939/71, a document containing parameter group definitions plus suspect parameter numbers.

SUSPECT PARAMETER NUMBER

A Suspect Parameter Number is a number assigned by the SAE to a specific parameter within a parameter group. It describes the parameter in detail by providing the following information:

- Data Length in bytes
- Data Type
- Resolution
- Offset
- Range
- Reference Tag (Label)

SPNs that share common characteristics are grouped into Parameter Groups and they will be transmitted throughout the network using Parameter Group Number.

Direction	Hex ID	PGN	Message Name	Network	SA	SPN	Signal Name
Tx	0x18E0FF07	57344	Cab Message 1	BCAN;KCAN;SCAN	7	2596	Selected Maximum Vehicle Speed Limit
Tx	0x18E0FF21	57344	Cab Message 1	BCAN;KCAN;SCAN	33	2596	Selected Maximum Vehicle Speed Limit
Tx	0x18E0FFA0	57344	Cab Message 1	BCAN;KCAN;SCAN	160	2596	Selected Maximum Vehicle Speed Limit
Tx	0x18F00107	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	7	969	Remote Accelerator Enable Switch
Tx	0x18F00121	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	33	969	Remote Accelerator Enable Switch
Tx	0x18F001A0	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	160	969	Remote Accelerator Enable Switch
Tx	0x18F00107	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	7	970	Engine Auxiliary Shutdown Switch
Tx	0x18F00121	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	33	970	Engine Auxiliary Shutdown Switch
Tx	0x18F001A0	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	160	970	Engine Auxiliary Shutdown Switch
Rx	0x18F00127	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	39	561	ASR Engine Control Active
Rx	0x18F00127	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	39	562	ASR Brake Control Active
Rx	0x18F00127	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	39	563	Anti-Lock Braking (ABS) Active
Tx	0x18F00307	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	7	974	Remote Accelerator Pedal Position
Tx	0x18F00321	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	33	974	Remote Accelerator Pedal Position
Tx	0x18F003A0	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	160	974	Remote Accelerator Pedal Position
Rx	0x18F00300	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	0	92	Engine Percent Load At Current Speed
Rx	0x18F00503	61445	Electronic Transmission Controller 2	BCAN;KCAN;SCAN	3	523	Transmission Current Gear
Rx	0x18F11027	61712	Brakes 2	BCAN;KCAN;SCAN	39	8484	Demanded Brake Application Pressure
Rx	0x18FAC317	64195	Air Supply Pressure 3	BCAN;KCAN;SCAN	23	13132	Air Suspension Supply Pressure 2
Rx	0x18FD0617	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	23	5087	Vehicle Battery Voltage Low Lamp Command
Rx	0x18FD0617	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	23	5088	Vehicle Fuel Level Low Lamp Command
Rx	0x18FD0617	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	23	13108	Primary Air Pressure Low Lamp Command
Rx	0x18FD0617	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	23	13109	Secondary Air Pressure Low Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	5082	Engine Oil Pressure Low Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	167	5082	Engine Oil Pressure Low Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	5083	Engine Coolant Temperature High Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	167	5083	Engine Coolant Temperature High Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	5084	Engine Coolant Level Low Lamp Command
Rx	0x18FD07A7	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	167	5084	Engine Coolant Level Low Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	5086	Engine Air Filter Restriction Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	13105	Engine Oil Temperature High Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	13116	Transmission Oil Temperature High Lamp Command
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3454	Enable Switch – Transmission output shaft PTO
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3453	Enable Switch – Transmission input shaft PTO 2
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3452	Enable Switch – Transmission input shaft PTO 1
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3462	Engagement Status – Transmission output shaft PTO
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3461	Engagement Status – Transmission input shaft PTO 2
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3460	Engagement Status – Transmission input shaft PTO 1
Rx	0x18FDA427	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	39	3948	At least one PTO engaged
Tx	0x18FDD407	64980	Cab Message 3	BCAN;KCAN;SCAN	7	2641	Horn

Direction	Hex ID	PGN	Message Name	Network	SA	SPN	Signal Name
Tx	0x18FDD421	64980	Cab Message 3	BCAN;KCAN;SCAN	33	2641	Horn
Tx	0x18FDD4A0	64980	Cab Message 3	BCAN;KCAN;SCAN	160	2641	Horn
Rx	0x18FEAE27	65198	Air Supply Pressure	BCAN;KCAN;SCAN	39	1087	Service Brake Circuit 1 Air Pressure
Rx	0x18FEAE27	65198	Air Supply Pressure	BCAN;KCAN;SCAN	39	1088	Service Brake Circuit 2 Air Pressure
Rx	0x18FEAE27	65198	Air Supply Pressure	BCAN;KCAN;SCAN	39	1088	Service Brake Circuit 2 Air Pressure
Rx	0x18FEAE17	65198	Air Supply Pressure	BCAN;KCAN;SCAN	23	1090	Air Suspension Supply Pressure
Rx	0x18FEB300	65203	Fuel Information 1 (Liquid)	BCAN;KCAN;SCAN	0	1028	Total Engine PTO Governor Fuel Used
Rx	0x18FEE500	65253	Engine Hours, Revolutions	BCAN;KCAN;SCAN	0	247	Engine Total Hours of Operation
Rx	0x18FEE700	65255	Vehicle Hours	BCAN;KCAN;SCAN	0	248	Total Power Takeoff Hours
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
Tx	0x18FEF0A0	65264	Power Takeoff Information	BCAN;KCAN;SCAN	160	979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	981	Engine PTO Governor Accelerate Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	981	Engine PTO Governor Accelerate Switch
Tx	0x18FEF0A0	65264	Power Takeoff Information	BCAN;KCAN;SCAN	160	981	Engine PTO Governor Accelerate Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	983	Engine PTO Governor Coast/Decelerate Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	983	Engine PTO Governor Coast/Decelerate Switch
Tx	0x18FEF0A0	65264	Power Takeoff Information	BCAN;KCAN;SCAN	160	983	Engine PTO Governor Coast/Decelerate Switch
Rx	0x18FEF131	65265	Cruise Control/Vehicle Speed 1	BCAN;KCAN;SCAN	49	70	Parking Brake Switch
Rx	0x18FEF131	65265	Cruise Control/Vehicle Speed 1	BCAN;KCAN;SCAN	39	70	Parking Brake Switch
Rx	0x18FEF100	65265	Cruise Control/Vehicle Speed 1	BCAN;KCAN;SCAN	0	84	Wheel-Based Vehicle Speed
Rx	0x18FEF200	65266	Fuel Economy (Liquid)	BCAN;KCAN;SCAN	0	184	Engine Instantaneous Fuel Economy
Rx	0x18FEF200	65266	Fuel Economy (Liquid)	BCAN;KCAN;SCAN	0	185	Engine Average Fuel Economy
Rx	0x18FEF500	65269	Ambient Conditions	BCAN;KCAN;SCAN	0	171	Cab Interior Temperature
Rx	0x18FEF727	65271	Vehicle Electrical Power 1	BCAN;KCAN;SCAN	39	168	Battery Potential / Power Input 1
Rx	0x18FEFA27	65274	Brakes 1	BCAN;KCAN;SCAN	39	117	Brake Primary Pressure
Rx	0x18FEFA27	65274	Brakes 1	BCAN;KCAN;SCAN	39	118	Brake Secondary Pressure
Rx	0x18FEFC27	65276	Dash Display 1	BCAN;KCAN;SCAN	39	38	Fuel Level 2
Rx	0x18FEFC27	65276	Dash Display 1	BCAN;KCAN;SCAN	39	96	Fuel Level 1
Rx	0x18FF0E27	65294	Proprietary B	BCAN;KCAN;SCAN	39	520910	PTO Active Telltale
Rx	0x18FF0E27	65294	Proprietary B	BCAN;KCAN;SCAN	39	520911	PTO Cab Control Telltale
Rx	0x18FF0E27	65294	Proprietary B	BCAN;KCAN;SCAN	39	520912	PTO Remote Control Telltale
Rx	0x18FF0E27	65294	Proprietary B	BCAN;KCAN;SCAN	39	521279	PTO Mode Active Telltale
Rx	0x18FB6B5B	64363	High Voltage Bus Information	SCAN;KCAN	91	20804	High Voltage Bus ePTO Availability
Tx	0x19FF3107	65329	Proprietary B	SCAN;KCAN	7	519800	Body HV Enable Demand
Tx	0x19FF3107	65329	Proprietary B	SCAN;KCAN	7	519801	Body HV Enable Consent
Tx	0x19FF3107	65329	Proprietary B	SCAN;KCAN	7	519793	Body HV Activation Status
Rx	0x19FF3027	65328	Proprietary B	SCAN;KCAN	39	519807	ePTO Enable Demand
Rx	0x19FF3027	65328	Proprietary B	SCAN;KCAN	39	519808	ePTO Operational Status
Rx	0x19FF3027	65328	Proprietary B	SCAN;KCAN	39	519809	ePTO System Error
Rx	0x18FA3A27	64058	Electric PTO Drive Engagement 1	BCAN;KCAN	39	22148	Enable Switch - ePTO 1

SECTION 8 ELECTRICAL

INTRODUCTION

This section is written to provide information to the body builder when installing equipment into vehicles built with multiplexed instrumentation.

MULTIPLEXED SYSTEM

These topics apply to 2.1m HD chassis built with Ethernet Multiplexed (EMUX) architecture. EMUX architecture is the integration of an Ethernet connected system to support the network capacity and enhanced communication for today's advanced technology. The VECU has been updated to VECU3 with EMUX, among other changes to increase the security of vehicle data.

EMUX electrical architecture utilizes a multiplexed system. Multiplexing can be defined as the process of sending multiple digital signals on the same shared medium at the same time. These signals are introduced into the multiplexed system through data connection points which are defined by the J1939 backbone.

CAN BUS SPEEDS AND CIRCUIT DESIGNATION

EMUX ARCHITECURE	
J1939-14 (500 kbps)	**J1939-15 (250 kbps)**
B-CAN – 0813 Body Builder	K-CAN – 0829 Customer Installed Devices
S-CAN – 0827 Customer Installed Devices	

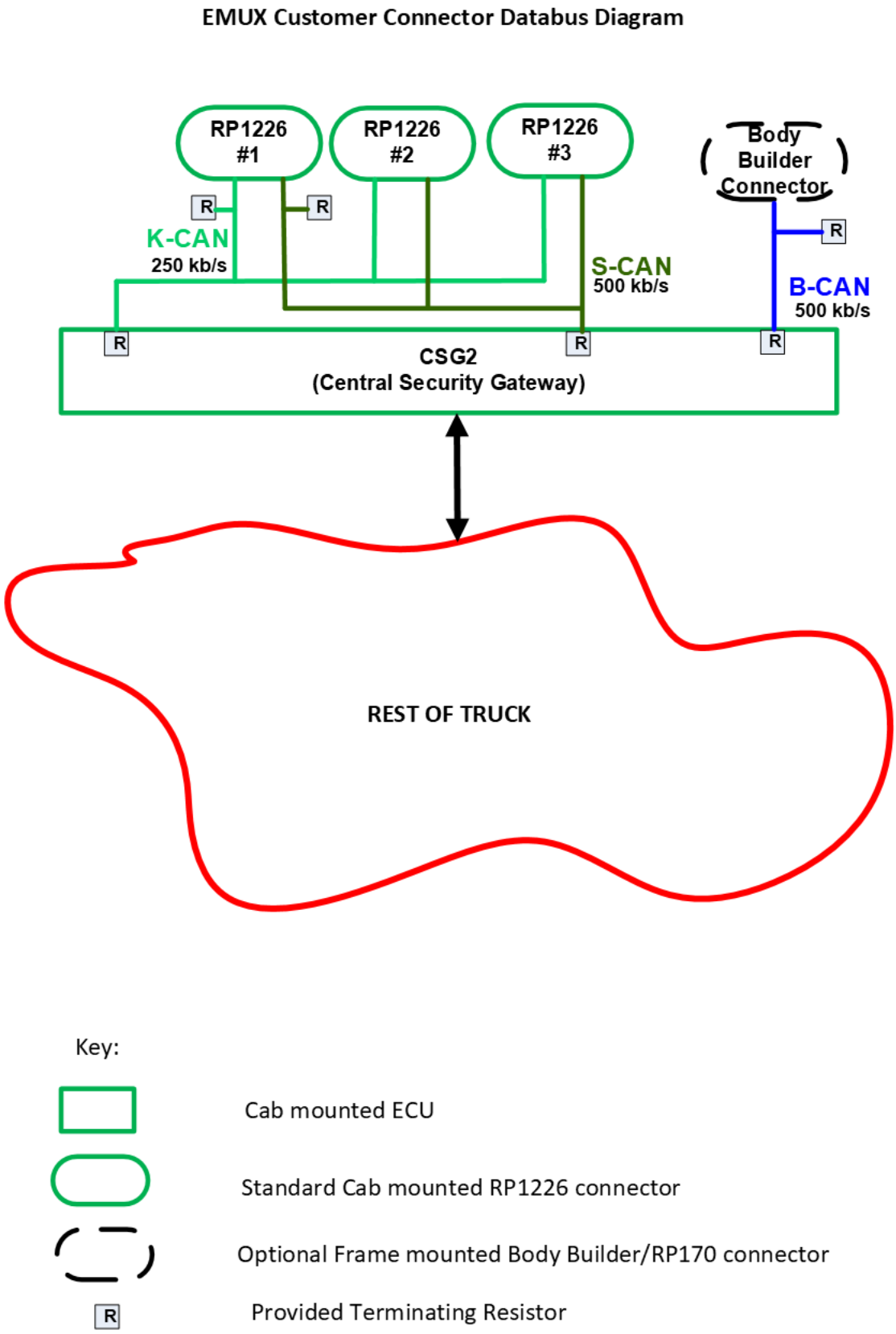


FIGURE 8-1. EMUX Customer Connector Interface Diagram

ELECTRICAL ACRONYM LIBRARY

Acronym	Definition
AI	Analog Input
BEM	Battery Energy Monitor
BOC	Back of Cab
BOS	Back of Sleeper
CAN	Controller Area Network
DC/DC	DC to DC
DI	Digital Input
DO	Digital Output
DTC	Diagnostics Trouble Code
ECM	Engine Control Module
ECU	Electronic Control Unit
EOA	Electric Over Air
EOF	End of Frame
EOH	Electric Over Hydraulic
FOF	Front of Frame
J1939	SAE CAN Communication Standard
HVJB	High Voltage Junction Box
LIN	Local Interconnect Network
LV Load	Low Voltage Loads (Added Lights, Liftgates, etc.)
MSB	Multiplexed Solenoid Bank
MSM	Master Switch Module
MUX	Multiplexed
OBD	On-Board Diagnostics
OEM	Original Equipment Manufacture
PCC	Predictive Cruise Control
PDC	Power Distribution Center
PGN	Parameter Group Number
PTO	Power Take-Off
RP1226	TMC Messaging Standard
SPN	Suspect Parameter Number
VECU	Vehicle Electronic Control Unit

TABLE 8-1. Acronyms

ELECTRICAL WIRING CIRCUIT CODES

The wire system uses 11 different colors with only one striped wire color. Each wire has a minimum of seven characters, with the first three characters as the wire color. The remaining four characters are related to the wire services. The colors determine the circuits function as follows:

ELECTRICAL WIRE CIRCUIT CODE TABLES

PACCAR Electrical Color Codes		
Insulation Color	Color Code	Electrical Function
~~Red w/ White Stripe~~	R-WXXXX	Direct Battery Power
Red	REDXXXX	Protected Battery Power
Orange	ORNXXXX	Ignition/Accessory/Start Bus Power
Yellow	YELXXXX	Activated Power
Brown	BRNXXXX	Control/Indicator/Backlighting Illumination
Black	BLKXXXX	Load Return
Gray	GRAXXXX	Control
Violet	VIOXXXX	Reference Voltage
Blue	BLUXXXX	Sensor Signal
Green	GRNXXXX	Sensor Common
White	WHTXXXX	Ground
Pink	PNKXXXX	High Voltage Interlock Loop (HVIL)

PACCAR Electrical Circuit Codes			
Number			Category
XXX0000	through	XXX0999	General
XXX1000	through	XXX1999	Power Supply
XXX2000	through	XXX2999	Lighting
XXX3000	through	XXX3999	Powertrain
XXX4000	through	XXX4999	Instrumentation
XXX5000	through	XXX5999	Safety Systems
XXX6000	through	XXX6999	Convenience/Security
XXX7000	through	XXX7999	HVAC
XXX8000	through	XXX8999	Undefined
XXX9000	through	XXX9999	Trailer/Customer/Bodybuilder

TABLE 8-2.- Circuit Codes

As noted in Chapter 1, any additional bonding cable must meet the guidelines of IEC 60445, including insulation color. Refer to Figure **1.3**.

ELECTRICAL COMPONENT OVERVIEW

OVERVIEW DIAGRAM OF ELECTRICAL COMPONENT LOCATIONS

(component locations may vary by truck model)

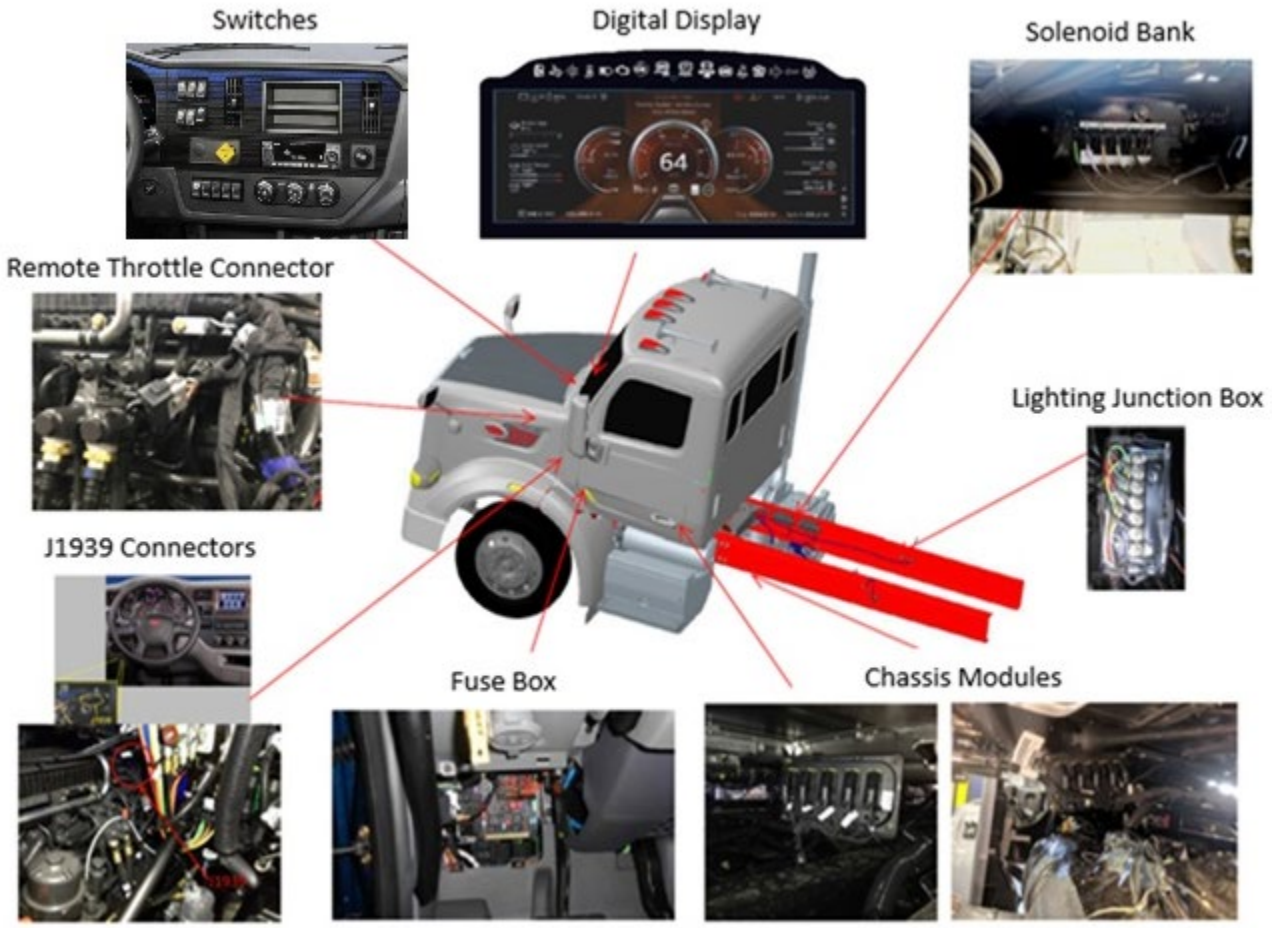
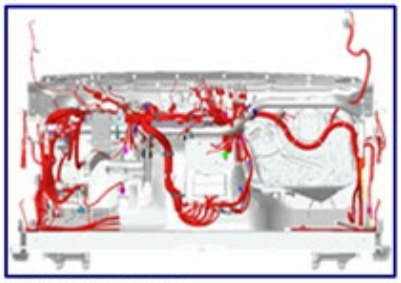


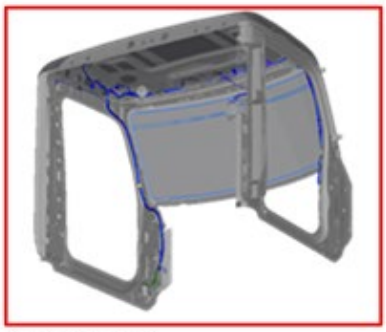
FIGURE 8-2.- Diagram of Electrical Component Locations

ELECTRICAL HARNESS OVERVIEW

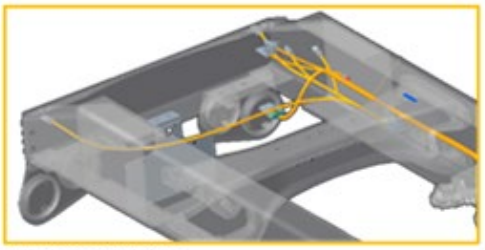
(harnesses may vary by truck model)



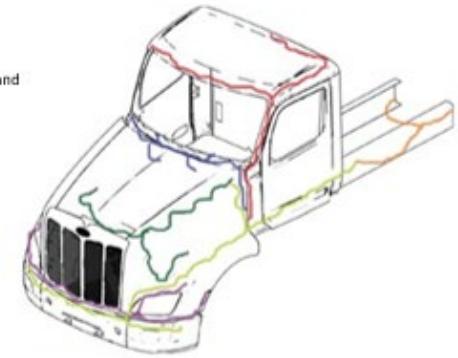
MAIN CAB (IP) HARNESS
1) Connections to Cab Roof, Engine, Allison Transmission and Main Chassis harnesses
2) Connections to Cab Power Distribution Center
3) Connections to VECU and Instrument Panels
4) Connections to Interior Body Builder components

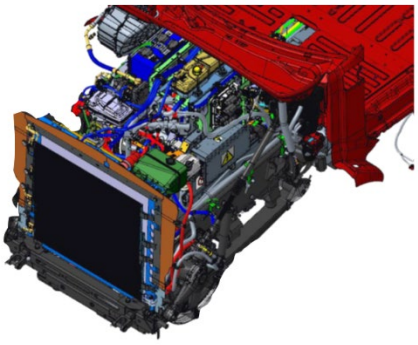


CAB ROOF HARNESS
1) Connections to Main Cab harness
2) Connections to Roof/Visor Lighting components
3) Connections to Radio and CB antennas

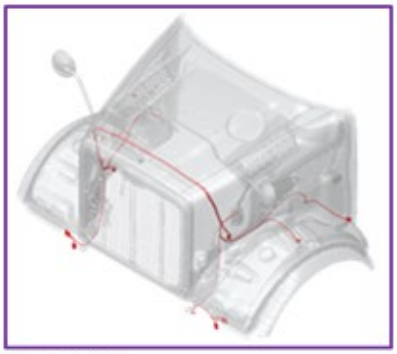


REAR CHASSIS HARNESS
1) Connections to Main Chassis harness
2) Connections to Tail Lights
3) Connections to Backup Alarm

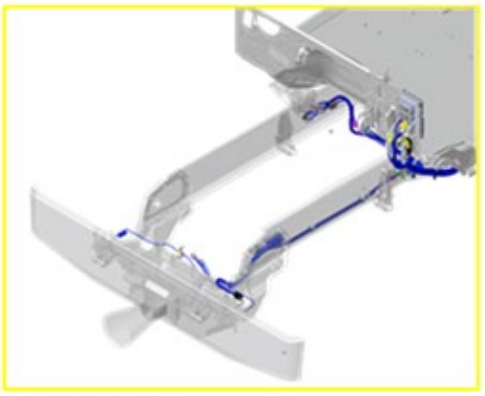




PCAS
1. Connections to Air Compressor, A/C Compressor



HOOD HARNESS
1) Connections to Main Chassis harness
2) Connections to Headlamps
3) Connections to Turn Signal Lamps



MAIN CHASSIS HARNESS
1) Connections to Main Cab, Engine, Hood, MSB, Lift Axle and Rear Chassis harnesses
2) Connections to Chassis Modules
3) Connections to Exterior Body Mounted Lighting components
4) Connections to Exterior Body Builder components

FIGURE 8-3.- Electrical Harness Overview

SYSTEM OVERVIEW – LOW VOLTAGE POWER SUPPLY

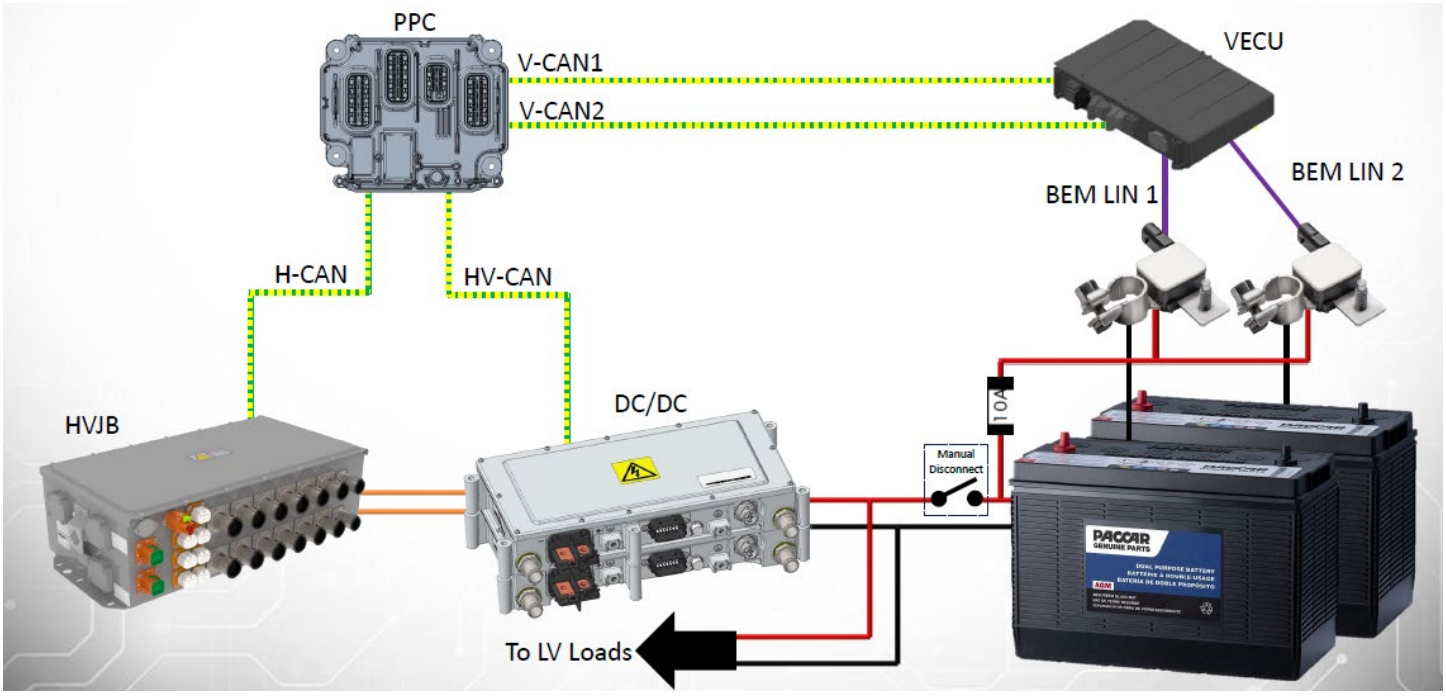


FIGURE 8-4.- Low Voltage Power Supply

BATTERY ENERGY MONITOR (BEM)

WARNING

Added LV devices must be installed downstream from the BEM to avoid the risk of incorrect monitoring. Any new circuits should NOT to be placed on negative battery post directly. Place new return lines to existing return bus or M8 post on BEM sensor

RP1226 CONNECTOR - IN-CAB CAN BASED MESSAGING CONNECTOR

There are three RP1226 connectors located inside the cab. The first RP1226 connector is located to the left of the steering wheel behind the dash near the OBD connector. The remaining two RP1226 connectors are located behind the center dash kick panel. Each RP1226 connector provides battery and ignition power, ground, and CAN bus speeds of 250kbps (K-CAN) and 500kbps (S-CAN) for customer use. The RP1226 connectors can be used for aftermarket telematics, ELD, body controllers, and/or PTO controls.

Note: Please refer to the TMC RP1226 recommended practice for additional information.

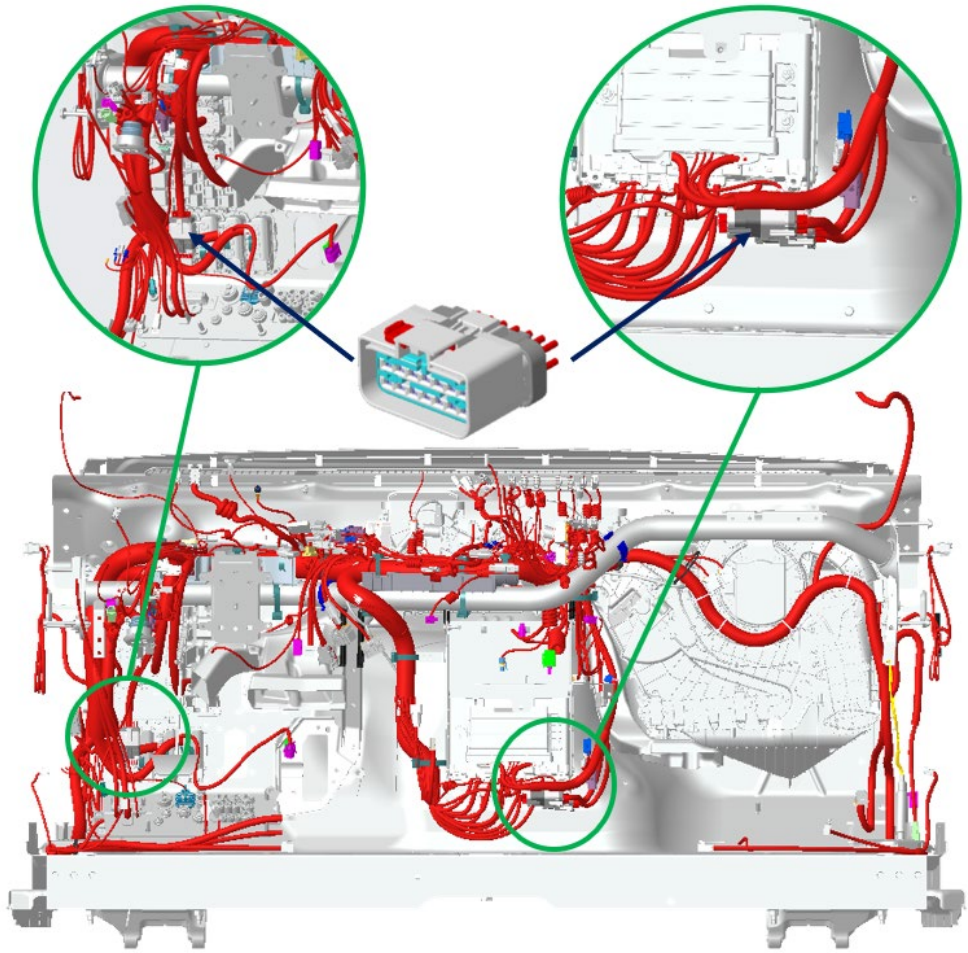
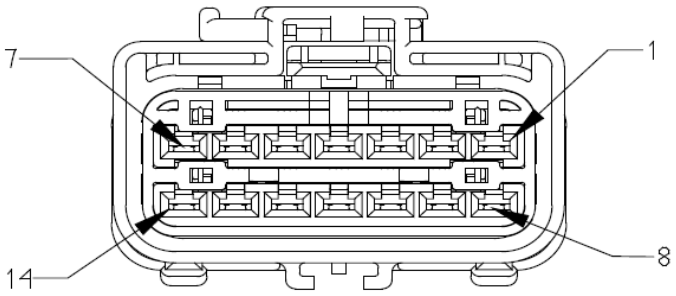


FIGURE 8-5.- RP1226 Connector Locations

RP1226 CONNECTOR



Pin	Description
1	PROTECTED POWER
2	J1939 S-CAN (+)
4	J1939 K-CAN (+)
7	IGNITION POWER
8	GROUND
9	J1939 S-CAN (-)
11	J1939 K-CAN (-)

FIGURE 8-6.- RP1226 Connector Pin Out Information

BODY CONNECTION POINTS – MEDIUM DUTY BEV

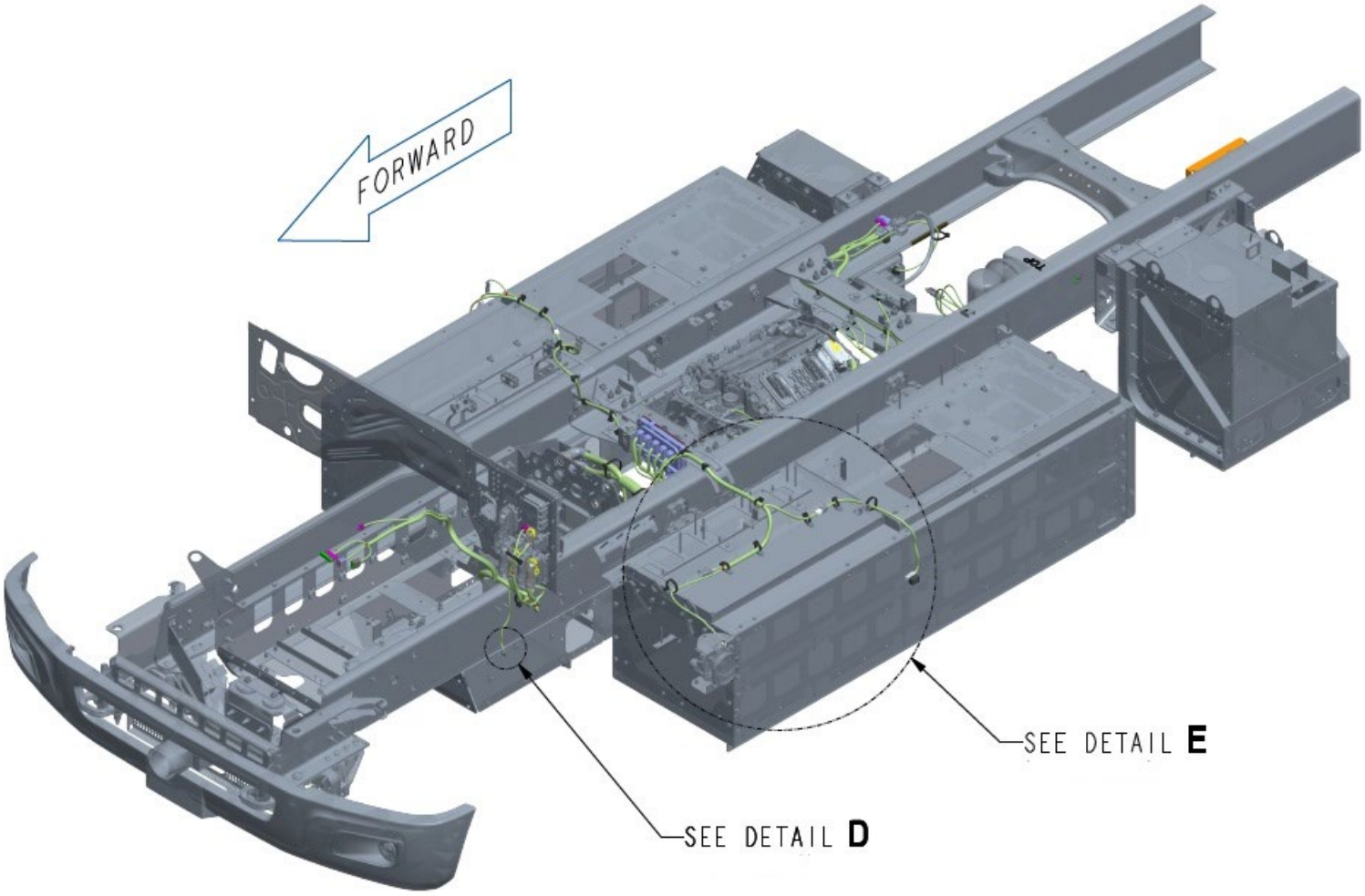


FIGURE 8-7.- Body Connections – Medium Duty Chassis

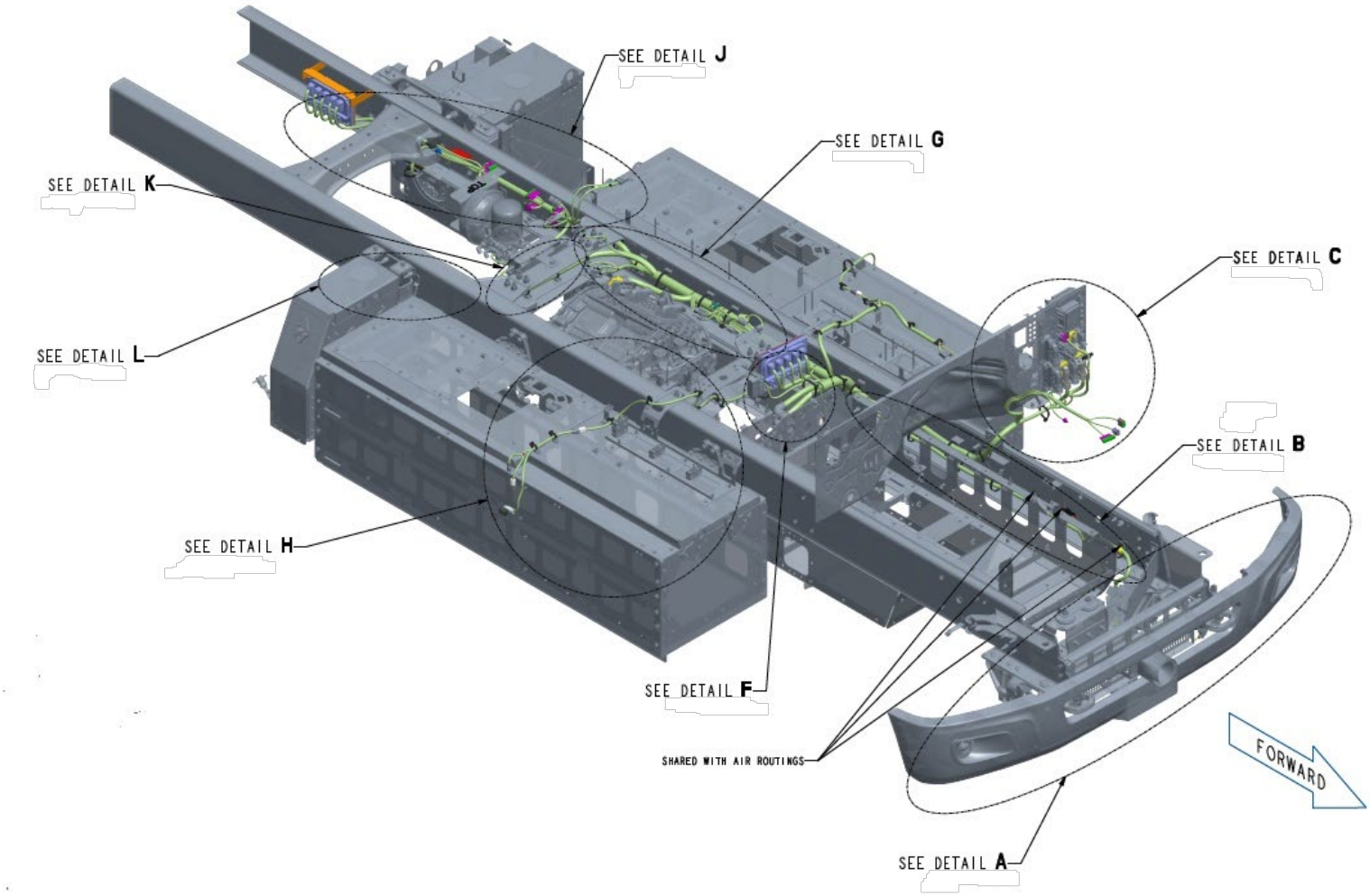


FIGURE 8-8.- Body Connections – Medium Duty Chassis

ELECTRIC ENGAGED EQUIPMENT

PTO CONNECTION LOCATIONS

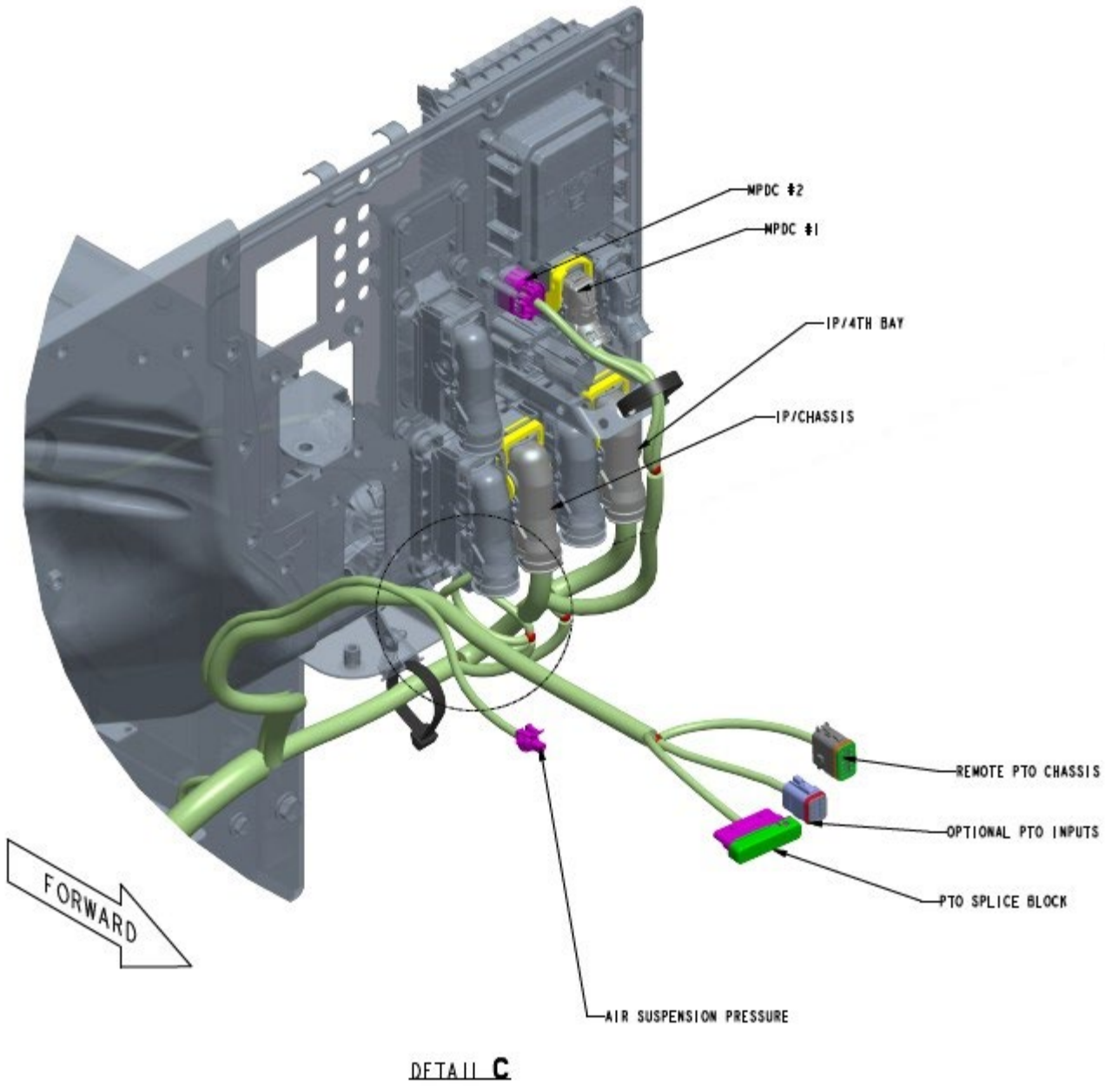
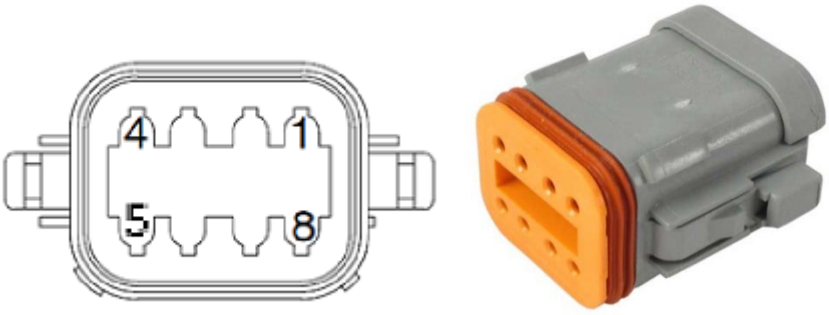


FIGURE 8-9.- 8-Pin and 12-Pin Connection Locations

PTO INPUT CONNECTOR

The 8-pin PTO connector is an optional connector located under hood in the PCAS area. This optional PTO connector is equipped with various input signals to provide remote PTO interlock and presets.



Pin	Description	Input/Output	Notes
1	+12V Body Ignition	IGN Bus, +12V	Fuse C_A6 (10 A)
2	PTO Interlock	DI, Active Low	E_A4(10 A)
3	Remote PTO Preset 3	DI, Active High	C_P13(10 A)
4	Remote PTO Preset 2	DI, Active High	C_P13(10 A)
5	Remote PTO Preset 1	DI, Active High	C_P13(10 A)
6	Remote PTO Preset Increment (+)	DI, Active High	C_P13(10 A)
7	Remote PTO Preset Decrement (-)	DI, Active High	C_P13(10 A)
8	Vehicle Ground	GND (Chassis)	N/A

FIGURE 8-10.- 8-Pin Connection Pin Out Information

REMOTE THROTTLE AND REMOTE PTO CONTROLS

12-PIN PTO CONNECTOR

The 12-pin PTO connector (P197C) is located under hood in the PCAS area.

P197C-Remote PTO Chassis

TRUCK CONNECTOR

Equipped: Optional
Available Locations: Firewall, BOC/BOS, EOF
Supplier: Deutsch-DT Series

MATING CONNECTOR

Mating Connector:
PACCAR P/N: P20-1372-1112H
TE P/N: DT04-12PA-CE02)
Terminals:
16-20 awg: 0460-202-16141
14 awg : 0460-215-16141
Plugs: 0413-217-1605

Note: Cap installed from Factory

Pin	Description	Input/Output	Notes
1	Resume/Decelerate	DI, Active Low	
2	Set/Accelerate	DI, Active Low	
3	Return (Variable Voltage Throttle)	GND (Sensor)	Twisted Triplet
4	Sensor (Variable Voltage Throttle)	AI, +0-5V	Twisted Triplet
5	PTO Activation Request	DI, Dual Active	Low = Engaged
6	PTO Shutdown	DI, Active Low	
7	+12V Body Ignition	IGN Bus, +12V	Fuse C_A6 (10 A)
8	Vehicle Ground	GND (Chassis)	Recommended source for all ground signals on this connector
9	Application Speed Limiter	DI, Dual Active	Low = Engaged
10	10-5V Supply (Variable Voltage Throttle)	DO, +5V	Twisted Triplet
11	+12V Body Ignition	IGN Bus, +12V	Fuse C_A6 (10 A)
12	Not Used	N/A	

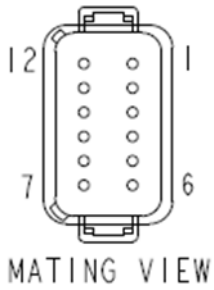


FIGURE 8-11.- 12-Pin Connection Pin Out Information

B-CAN AND K-CAN
ePTO CONNECTION LOCATION

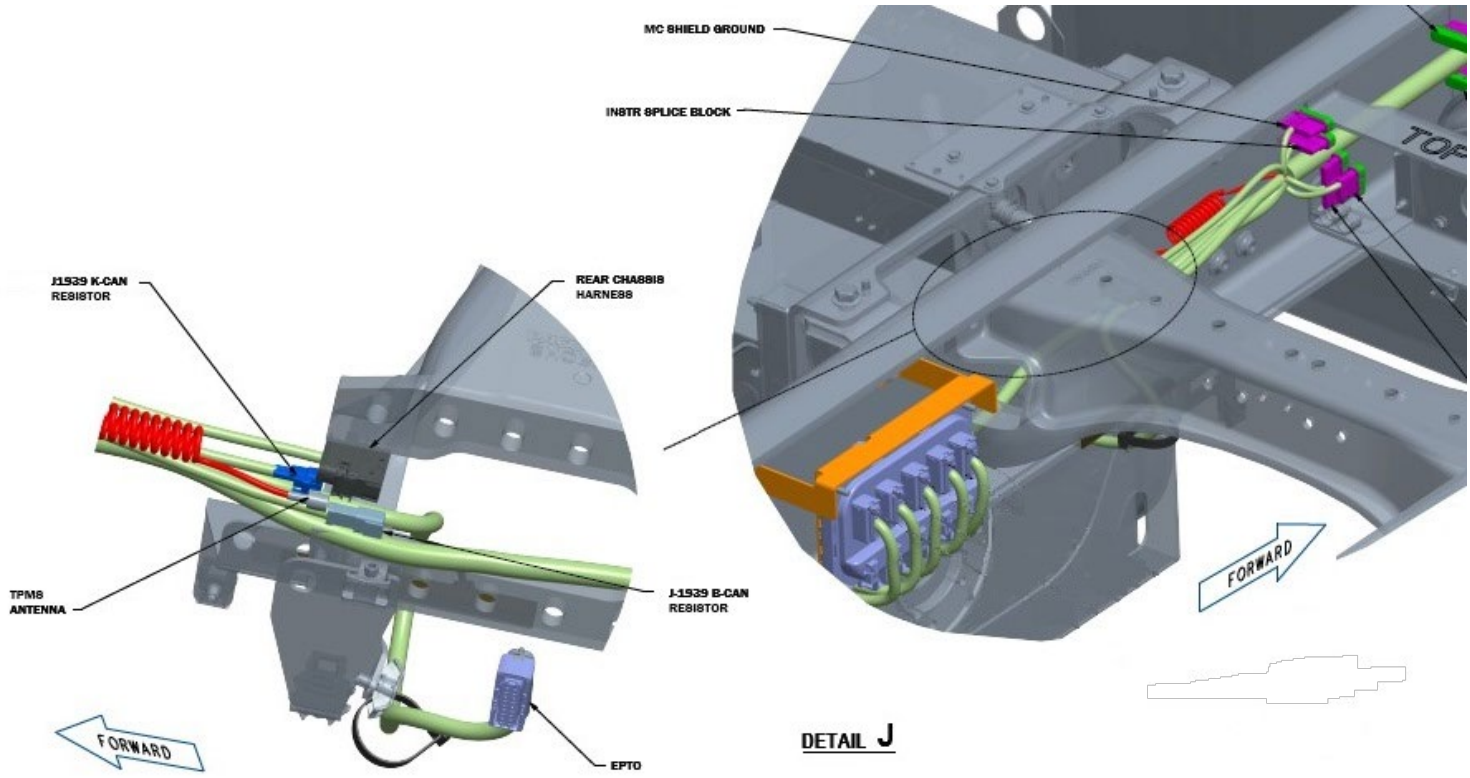
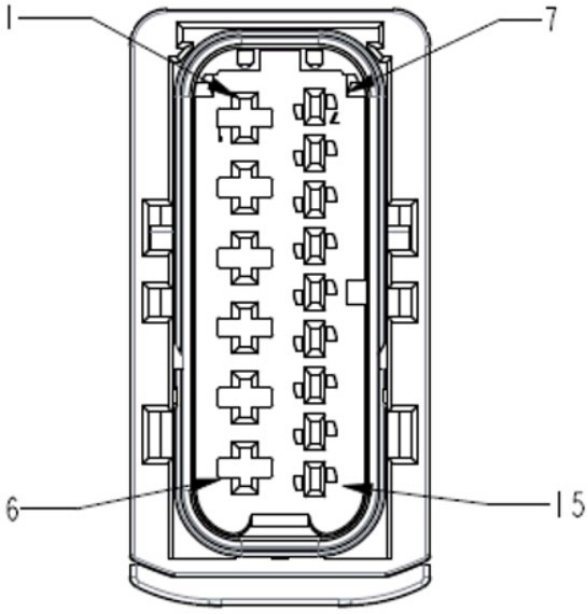


FIGURE 8-12.- B-CAN and K-CAN Connector and ePTO Locations



Pin	Description	Input/Output	Notes
1	EPTO BATT	12V	C_A10 (30A)
2	ePTO BATT 2	12V	E_L3 (30A)
3	N/A		
4	EPTO GROUND	GND	
5	EPTO GROUND	GND	
6	N/A		
7	EPTO IGNITION	IGN	
8	N/A		
9	E-MOTOR TO HVJB TO S-BOX TO CUT LOOP	CUT LOOP	
10	N/A		
11	ePTO HVIL	HVIL	
12	ePTO HVIL	HVIL	
13	N/A		
14	HV-CAN (-)	CAN	
15	HV-CAN (+)	CAN	

FIGURE 8-13.- P68 ePTO Connector

PRIMARY CHASSIS MODULE LOCATION

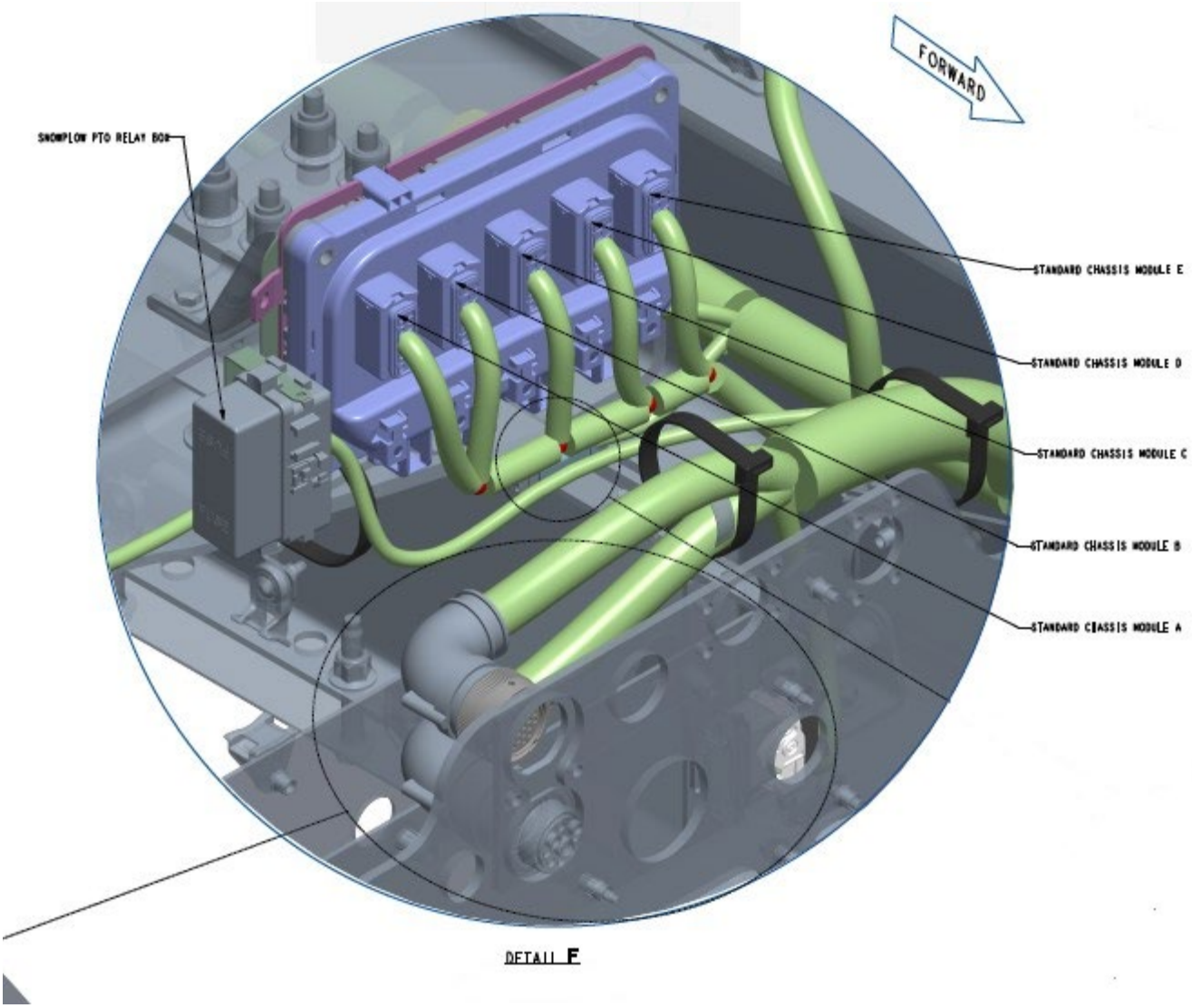


FIGURE 8-14.- Primary Module Location

SECONDARY CHASSIS MODULE LOCATION

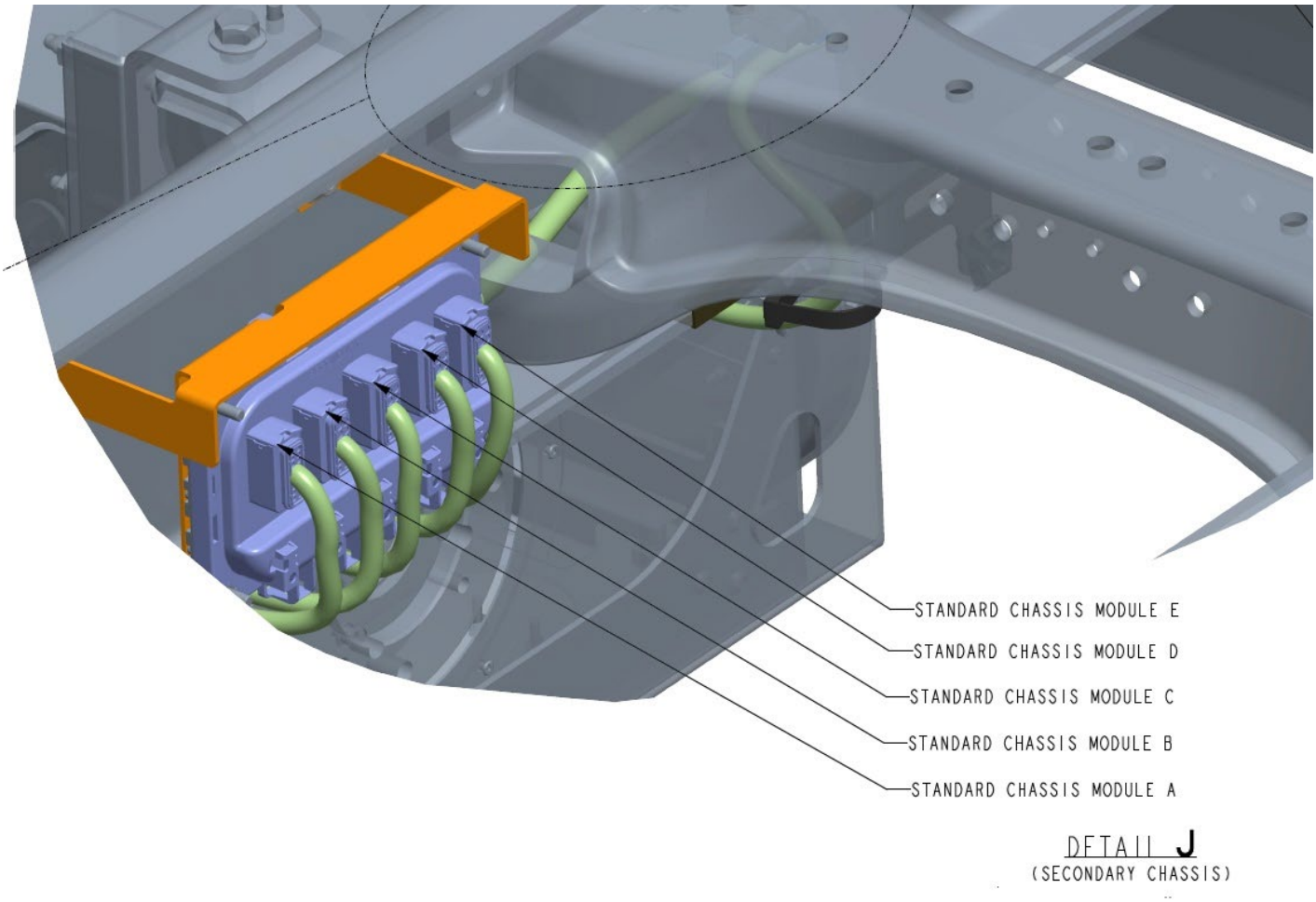


FIGURE 8-15.- Secondary Module Location

PUSHER CONNECTIONS

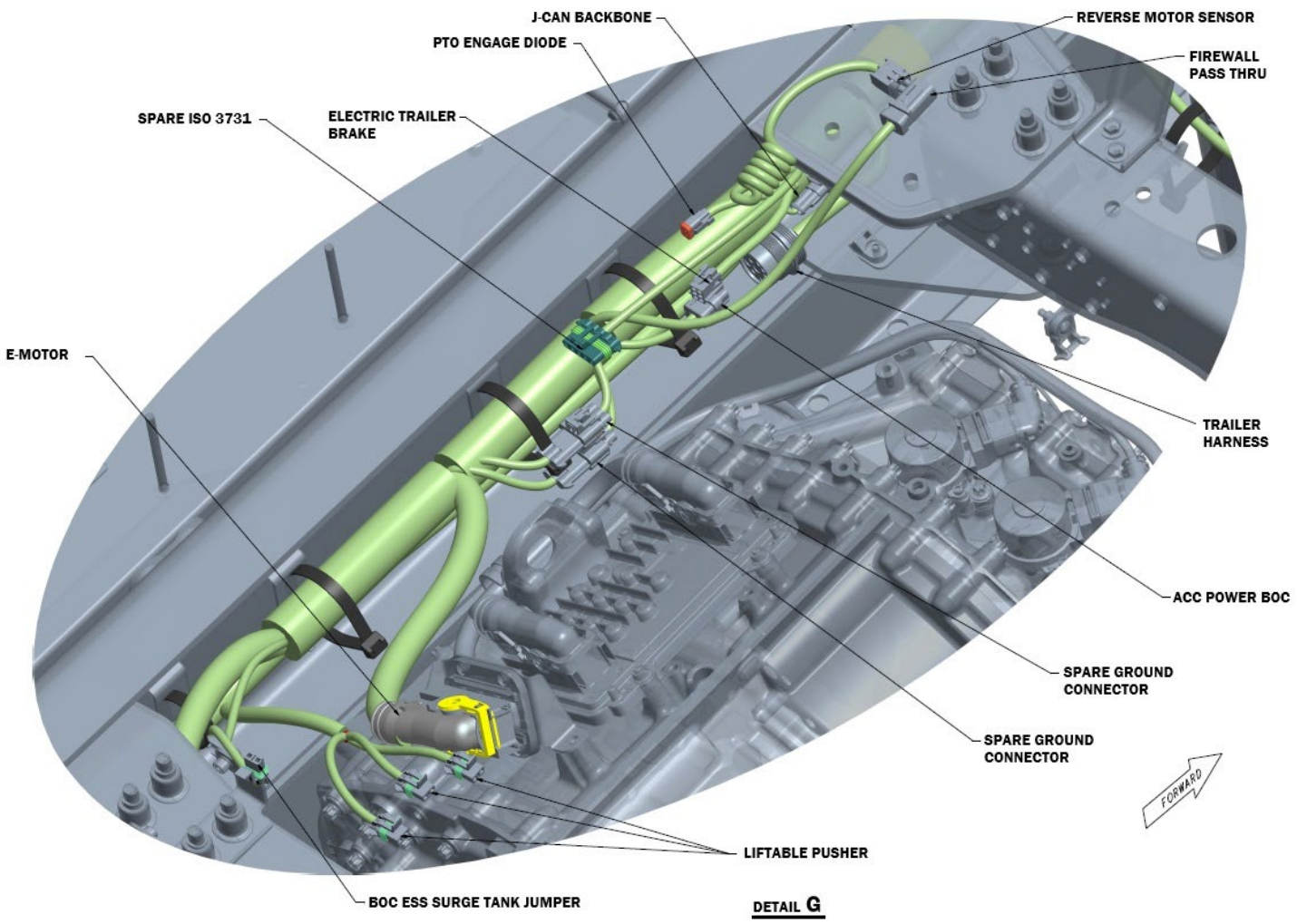


FIGURE 8-16.- Pusher Connections

SNOWPLOW CONNECTIONS

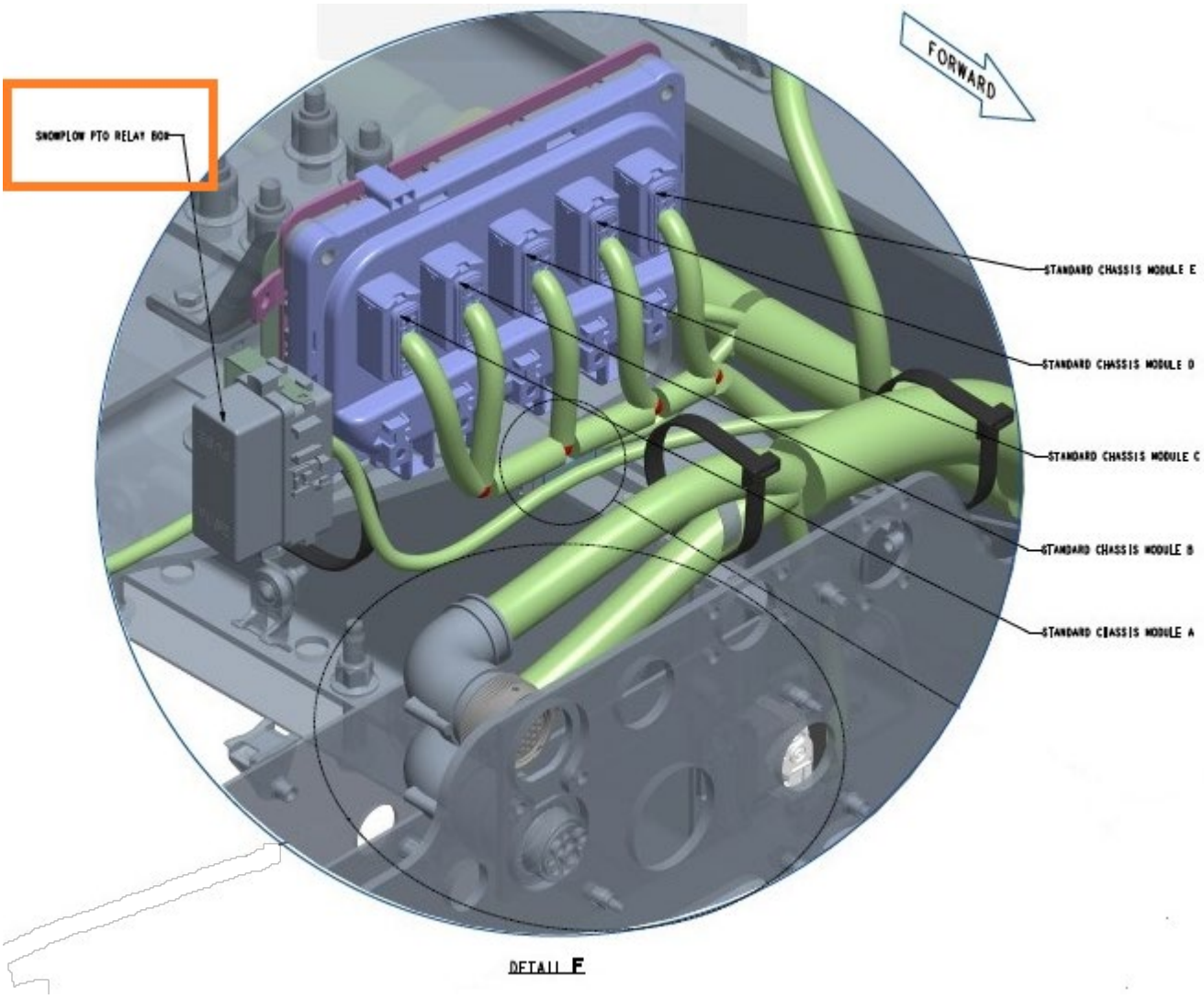


FIGURE 8-17.- Snow Plow Connection

CAB - POWER DISTRIBUTION CENTER

FUSE BOX ASSEMBLY LOCATION – PCAS SIDE

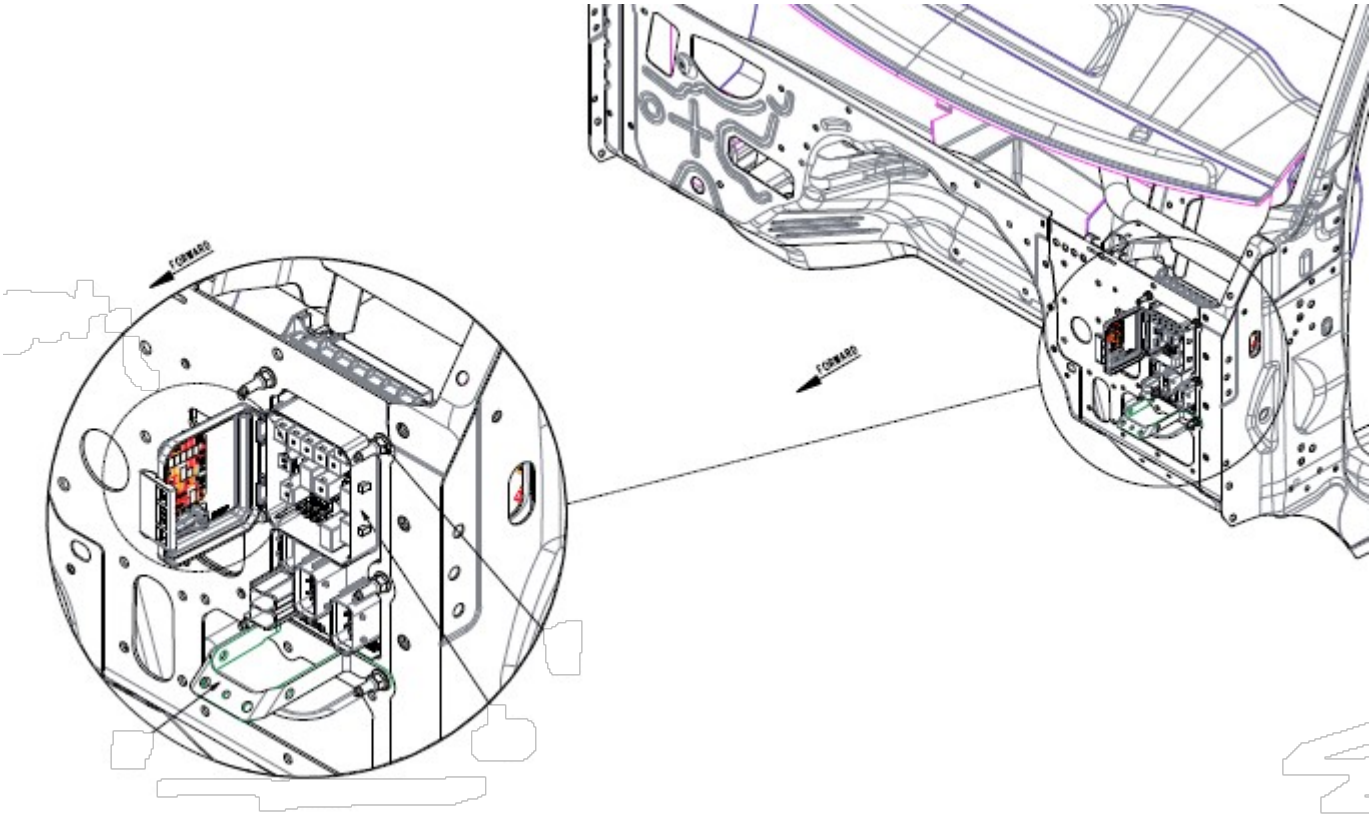
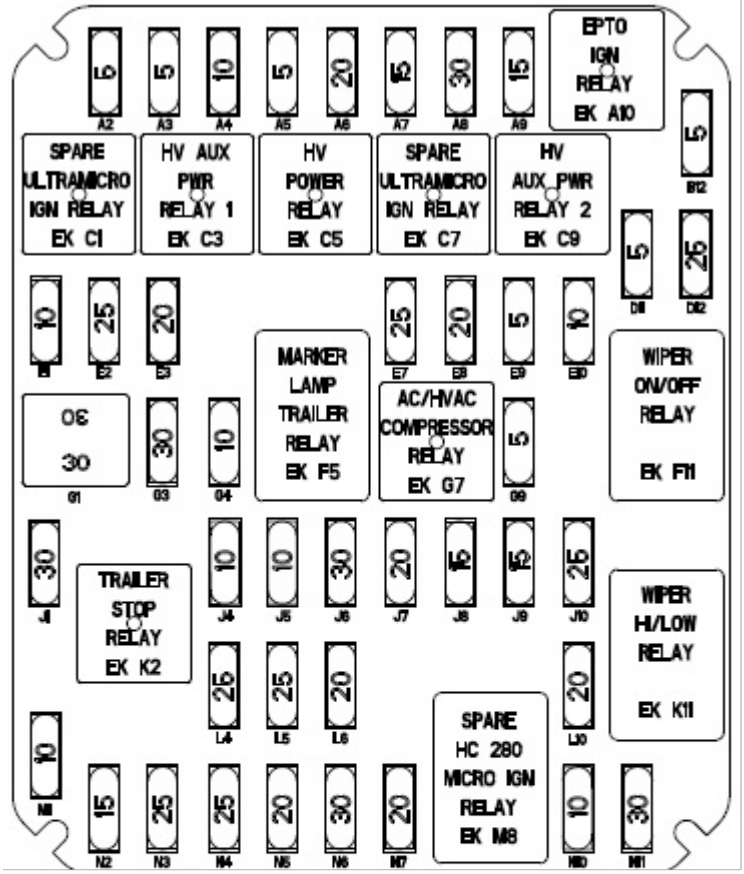


IMAGE SHOWN FOR REFERENCE ONLY, SEE THE CHASSIS SPECIFIC CAB PDC FUSE LABEL

FIGURE 8-18.- Fuse Box Assembly – PCAS Side

FUSE BOX ASSEMBLY – PCAS SIDE

Engine Side Fuse Box - Full Content Population



FUSE ID	AMP	TRACE RATING	DESCRIPTION
A2	5A	15A	EFAN WAKEUP/S-BOX IGN
A3	5A	5A	PCI2 IGN
A4	10A	10A	CHASSIS MODULE P/S
A5	5A	5A	SA-ECU/CAB COOLANT
A6	20A	20A	CHASSIS MOD SECONDARY F4
A7	-	15A	SPARE (15A, CONSTANT POWER BATT)
A8	30A	30A	CAB ABS
A9	15A	15A	BEV AUX PWR 3
B12	5A	5A	HVAC HEAD PWR/DOOR AJAR
D11	5A	10A	EPTO IGN
D12	25A	25A	WIPER MOTOR
E1	10A	10A	CAB ABS IGN (BENDIX) - 10A
E2	25A	25A	QUALCOMM TRLR TRACKS
E3	20A	20A	EXT REGEN/LNG CNG IGN
E7	25A	25A	CHASSIS MOD SECONDARY F6
E8	20A	20A	EMOTOR OIL PUMP BATT 1
E9	5A	15A	ICM PWR/DATA LOGGER BATT
E10	10A	10A	VECU BATT PWR 1
G1	30A JCASE	30A	HVAC BLDC MOTOR
G3	30A	30A	EPTO BATT
G4	10A	10A	EMOTOR/OBC/STEERING IGN
G9	5A	25A	CCU IGN
J1	30A	30A	SPARE BATT 8
J4	10A	10A	ACC RADAR/TPMS
J5	10A	10A	BACKUP LAMP
J6	30A	30A	TRAILER MARKER RELAY PWR
J7	20A	20A	HDLP LH HI/BRAKE
J8	15A	15A	HVJB IGN
J9	15A	15A	BEV AUX PWR 2
J10	25A	25A	WIPER ON CTL
L4	25A	25A	CHASSIS MOD PRIMARY F5
L5	25A	25A	CHASSIS MOD PRIMARY F6
L6	20A	20A	CHASSIS MOD PRIMARY F7
L10	20A	20A	EMOTOR OIL PUMP BATT 2
M1	10A	10A	MUX SOL BANK LT
N2	15A	15A	TRAILER STOP LP
N3	25A	25A	RH HDLP LO/DRL/PARK
N4	25A	25A	RH HDLP HI/FOG/DRL
N5	20A	20A	LH HDLP LO/DRL/PARK
N6	30A	30A	EPTO BATT 2
N7	20A	20A	CHASSIS MOD SECONDARY F5
N10	-	10A	SPARE (10A, IGNITION)
N11	30A	30A	PCI2 BATT

FIGURE 8-19.- Engine Side Fuse Box Assembly Full Content Population

FUSE BOX ASSEMBLY – DASH SIDE

Dash Side Fuse Box - Full Content Population

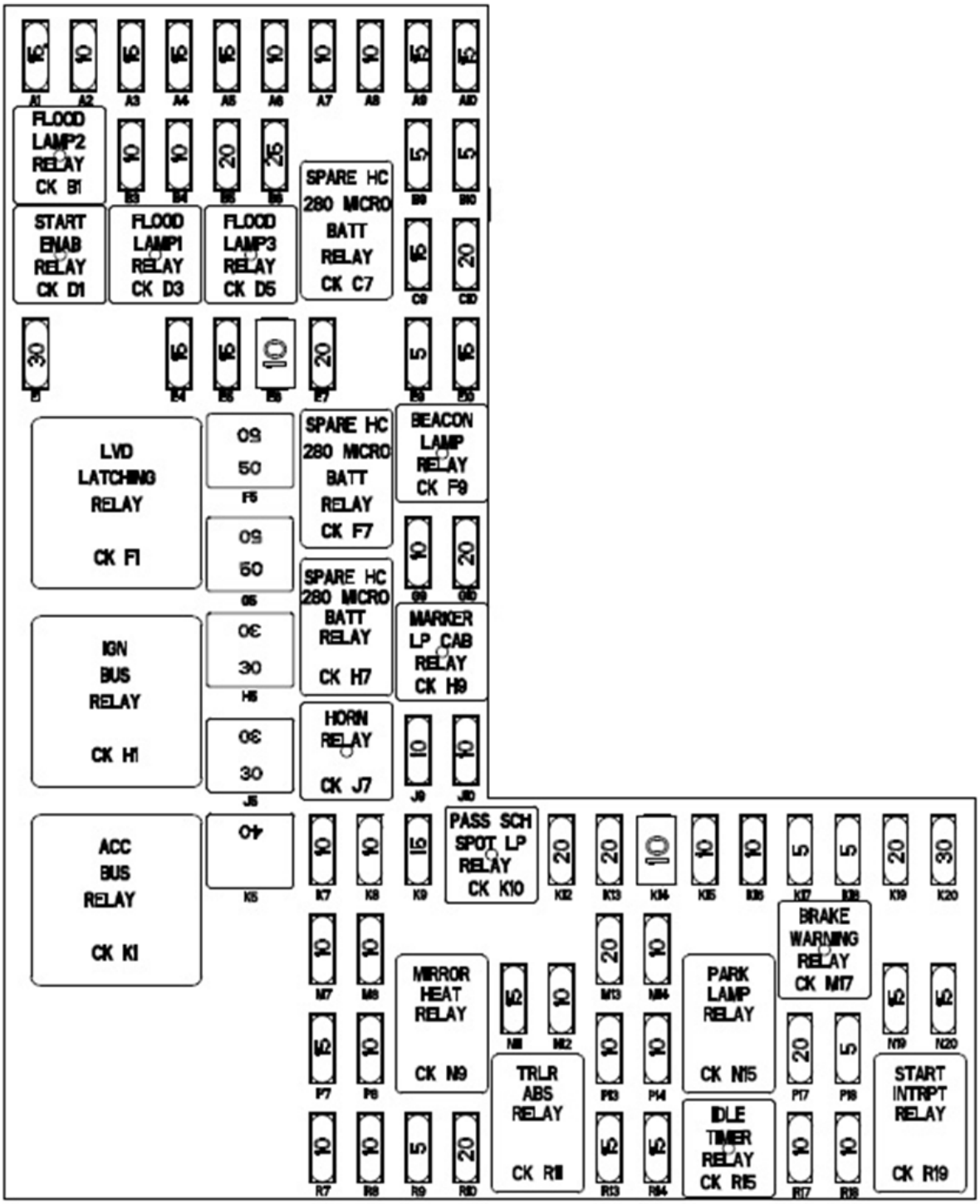


FIGURE 8-20a.- Dash Side Fuse Box Assembly Full Content Population

FUSE ID	AMP	TRACE RATING	DESCRIPTION
A1	15A	20A	FLOOD LP2
A2	10A	15A	SPOT LP - DRIVER SIDE
A3	15A	20A	FLOOD LP1
A4	15A	20A	FLOOD LP3
A5	15A	20A	BEACON LP
A6	10A	10A	BODY IGN/DATA LOGGER IGN
A7	10A	10A	RP1226 IGN
A8	10A	10A	RP1226 BATT
A9	15A	30A	EPB BATT PWR 1
A10	15A	30A	EPB BATT PWR 2
B3	10A	10A	GAUGE CLUSTER
B4	10A	10A	VECU BATT PWR 2
B5	20A	20A	CUTLOOP BATT
B6	-	25A	SPARE (25A, BATT)
B9	5A	20A	CSG2 BATT PWR
B10	5A	5A	MSM/SMARTWHEEL PWR

FUSE ID	AMP	TRACE RATING	DESCRIPTION
C9	15A	15A	CB/RADIO PWR
C10	20A	20A	CHASSIS MOD SECONDARY F1
E1	30A	30A	SPARE ACC 3
E4	15A	15A	POWER PORT 1
E5	15A	15A	POWER PORT 2/CIGAR LTR
E6	10A	15A	CAB DOME LP *
E7	20A	20A	SPARE LVD 1
E9	5A	5A	TRACTOR STOP LAMPS
E10	15A	15A	CHASSIS MOD SECONDARY F2
F5	50A JCASE	50A JCASE	HYD ABS PUMP SUPPLY
G5	50A JCASE	50A JCASE	HYD ABS BOOST MTR PWR
G9	10A	10A	S-BOX BATT
G10	20A	20A	SPARE BATT 2 / TELEMATICS
H5	30A JCASE	30A JCASE	RH DOOR MOD
J5	30A JCASE	30A JCASE	LH DOOR MOD
J9	10A	10A	DIAGNOSTIC POWER
J10	-	10A	SPARE (10A, BATT)
K5	40A JCASE	40A JCASE	TRAILER E-BRAKE
K7	10A	10A	HORN RELAY PWR
K8	10A	10A	CAB MARKER RELAY PWR
K9	15A	20A	CCU BATT
K12	20A	20A	HYD ABS AIR SEAT
K13	20A	20A	SPARE IGN 1
K14	10A	10A	ETRAC VALVE *
K15	10A	15A	VECU STOP LAMP SW
K16	10A	15A	PARK LP - CAB PWR
K17	5A	5A	VECU/MSM/D DISPLAY IGN
K18	5A	5A	CSG2/DECU/RH STALK IGN
K19	20A	20A	CHASSIS MOD SECONDARY F3
K20	30A	30A	TRAILER HOT LINE
M7	10A	10A	SPLICE FEED IGN
M8	10A	10A	RH HEATED SEAT
M13	20A	20A	SPARE IGN 2
M14	10A	10A	SIGN LAMP SW
N11	15A	20A	RH MIRROR HEAT
N12	10A	10A	LH HEATED SEAT
N19	15A	20A	LH MIRROR HEAT
N20	15A	20A	PARK LP - TRLR PWR
P7	15A	15A	AIR DRYER
P8	10A	10A	PRIMARY SHIFTER BATT 1
P13	10A	20A	KEY SW/GAUGE CLUSTER
P14	10A	10A	DIGITAL DISPLAY
P17	20A	20A	SPARE BATT 1
P18	5A	5A	HVAC HEAD ACC
R7	10A	10A	SPARE ACC 6
R8	10A	10A	REMOTE DIAG
R9	5A	5A	VECU ACC PWR
R10	20A	20A	SPARE ACC 1
R13	15A	15A	SPARE ACC SW 3/4/5
R14	15A	15A	SPARE ACC SW 1/2
R17	10A	10A	SPARE ACC 2
R18	10A	10A	RADIO WAKE UP

FIGURE 8-20b.- Dash Side Fuse Box Assembly Full Content Population

FUSE GROUPS

PRIMARY CHASSIS MODULE

Fuse Group	Function
F1	Electric Over Air Solenoid Kingpin Release
	Main Beam (aka High Beam) - LH
	Tractor Direction Indication and Hazard Lights - RH Rear (Brake Lamps Also)
F2	Tractor Direction Indication/Hazard/DRL Lights - LH Front
	Front Tractor Position lights (Park Lamps)
	Tractor Direction Indication Hazard Side Turn Indicator LH Front
	Dipped Beam (aka Low Beam) - LH
F3	Lift Axle #2 Solenoid
	Daytime Running Lights (DRL) Peterbilt - LH
	Tractor Direction Indication/Hazard/DRL Lights - RH Front
	Tractor Direction Indication Hazard Side Turn Indicator RH Front
	Dipped Beam (aka Low Beam) - RH
F4	Daytime Running Lights (DRL) Peterbilt - RH
	Main Beam (aka High Beam) - RH
	Fog/Driving Lights (Front) 1st Set
F5	Reverse Warning (aka Backup Alarm)
	(Rear) Direction Indication and Hazard Lights - LH Trailer
F6	Rear Tractor Position lights (Park Lamps)
	Reverse Lamps
	Tractor Direction Indication and Hazard Lights LH Rear (Brake Lamps Also)
F7	LVD Bipolar Output 1
	LVD Bipolar Output 2
	Lift Axle #1 Solenoid
	(Rear) Direction Indication and Hazard Lights - RH Trailer

TABLE 8-3 – Primary Chassis Module Fuse Group Function

SECONDARY CHASSIS MODULE

Fuse Group	Function
F1	Work Lights 1st Set (Frame mounted Flood Light Options without pass-through grommet)
F2	
F3	Sky/Auxiliary lights
	Snowplow Lamps
F4	Lift Axle #3 Solenoid
	Trailer Options - ISO 3731/Spare OR Additional 4/6/7-Way Trailer Connections
F5	Lift Axle #4 (Tag) Solenoid
	Trailer Options - ISO 3731/Spare OR Additional 4/6/7-Way Trailer Connections
F6	Trailer Options - Trailer Dump Gate Coiled BOC OR Configurable Output
	Trailer Options - ISO 3731/Spare OR Additional 4/6/7-Way Trailer Connections

TABLE 8-4 – Secondary Chassis Module Fuse Group Function

Fuse Group	Function
F1	Peterbilt Driving Lights
	Inside/Outside Air Filter Control
	Starter Interrupt / Start Enable Relay Control
	Mirror Heat Relay
	Cab Dome Lamp
	Sleeper Dome Lamp
	Trailer Marker/Clearance Lamps
	Supply KL-30
F2	Trailer Hotline Relay
	Work Lights (Flood Lamps) 2
	Work Lights (Flood Lamps) 3
	Passenger Spot Lamp
	Work Lights (Flood Lamps) 1
	Beacon/Strobe
	Trailer Brake Lamps
	Trailer/Cab Park Lamps
	Digital Vision System – Mirrors (DVS-M)
	Start Signal
	LED Headlamps Heater
	PTO Engaged Output for PTO Hour Meter and PTO Telltale
	Footwell Lamp
	Supply KL-30
	Sensor Supply 5V
F3	Cab Marker/Clearance Lamps Relay Output
	Washer Pump Control
	Auxiliary Lamps/ Chicken Panel Lamps
	MCS (Power)
	Windshield Wiper Control
	Supply KL-30
F4	Dash PWM Backlighting
	Dash Illumination 2
	Ignition Timer Relay Control

TABLE 8-5 – Secondary Chassis Module Fuse Group Function

ELECTRIC OVER AIR SOLENOIDS

Air solenoids are devices that translate the electrical signal into physical functions that control the air pressure in various circuits. The air solenoids are mounted to a bracket outside the cab. The solenoids are designed to stack on each other so that they share a common air supply which reduces the amount of air lines on the vehicle.

The aftermarket installer/final vehicle manufacturer needs to decide what type of valve to install and ensure that the documentation to the operator provides them with enough understanding of how the customized switches work.

SOLENOID BANK DIAGRAM

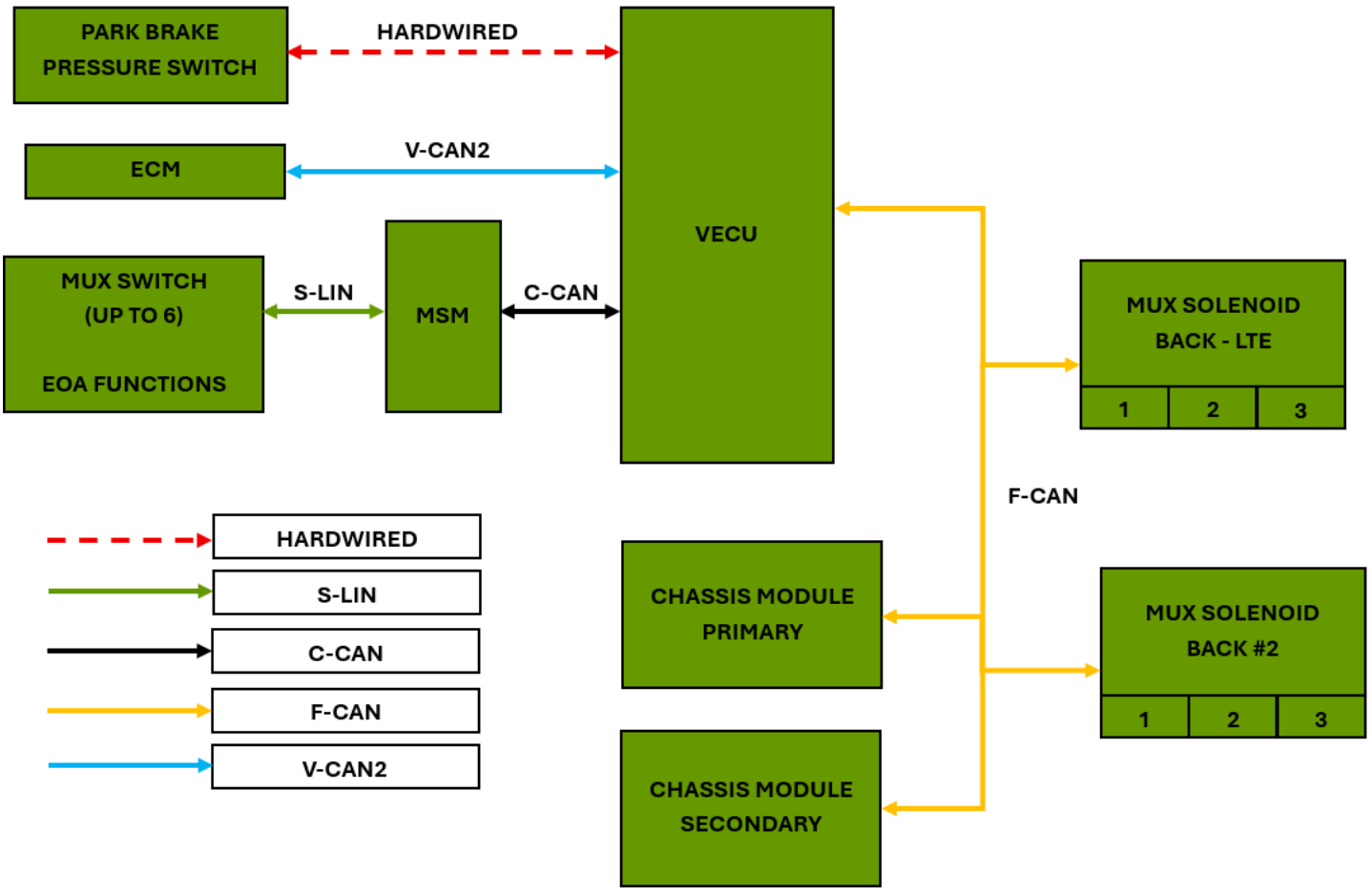


FIGURE 8-21.- Solenoid Bank Diagram

OVERVIEW LAYOUT

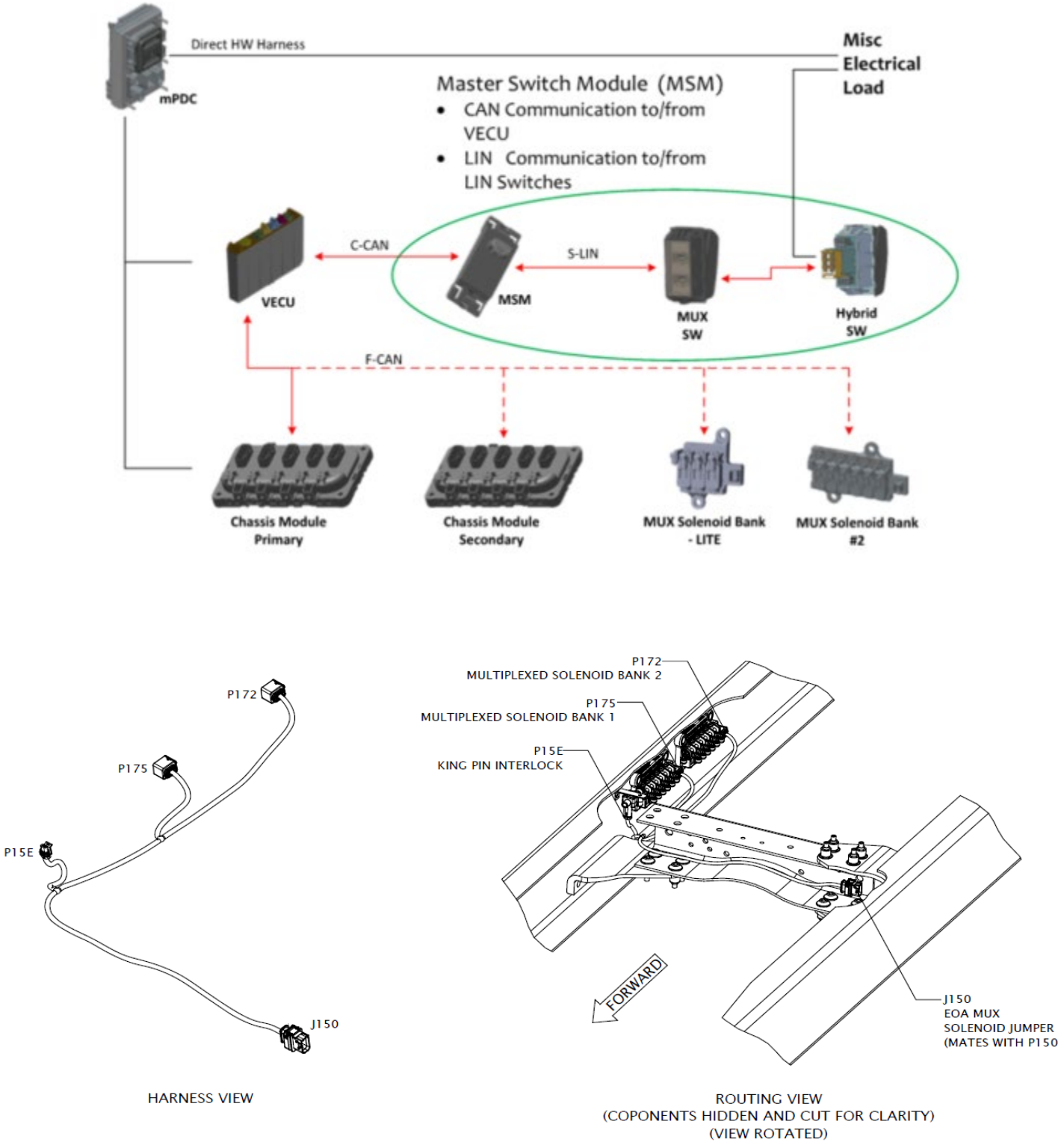


FIGURE 8-22.- Overview Layout

SWITCHES

Overview

Multiplexing: shorter wire bundles, improved diagnostics, and greater driver feedback. Safety critical switches use hybrid switch with hardwire for redundancy. The switches are less expensive with fewer wires behind the dash and on the chassis. The switches are self-diagnosable to improve troubleshooting with DAVIE.

Master Switch Module (MSM)
LIN Communication to/from Switches
CAN Communication to/from VECU

The 548EV, 537EV, and 536EV use the same LIN switch systems that are on the diesel versions of the 548, 537 and 536. There are LIN switches and there are LIN-Hybrid switches. LIN switches function as an input request to the OEM controllers and can drive various outputs depending on the switch selected. The LIN-Hybrid switches (like a spare switch) include a mechanical switch for controlling outputs.

Switch Location

Installing either a LIN or a LIN-hybrid switch requires a LIN jumper (part number S92-1127-0125) and a **Switch Relearn** (after installation). Installing a LIN-hybrid switch also requires wiring for the mechanical switch section - for that there are 3 options.

1. Order the S92-6450 hybrid switch harness
2. Order a harness layer for the hybrid switch
3. Order the connector (P22-1413) and terminals (1-968873-1) and hardwire the switches as needed

Switches on the same LIN bus can be reordered in any configuration without the need to run a relearn process with DAVIE4. Switches that are swapped across LIN busses will need to be relearned with DAVIE4. LIN bus 1 consists of all of the switches on the dash D-panel and B-panel. LIN bus 2 consists of all of the switches on the dash C-panel.

Overview Layout

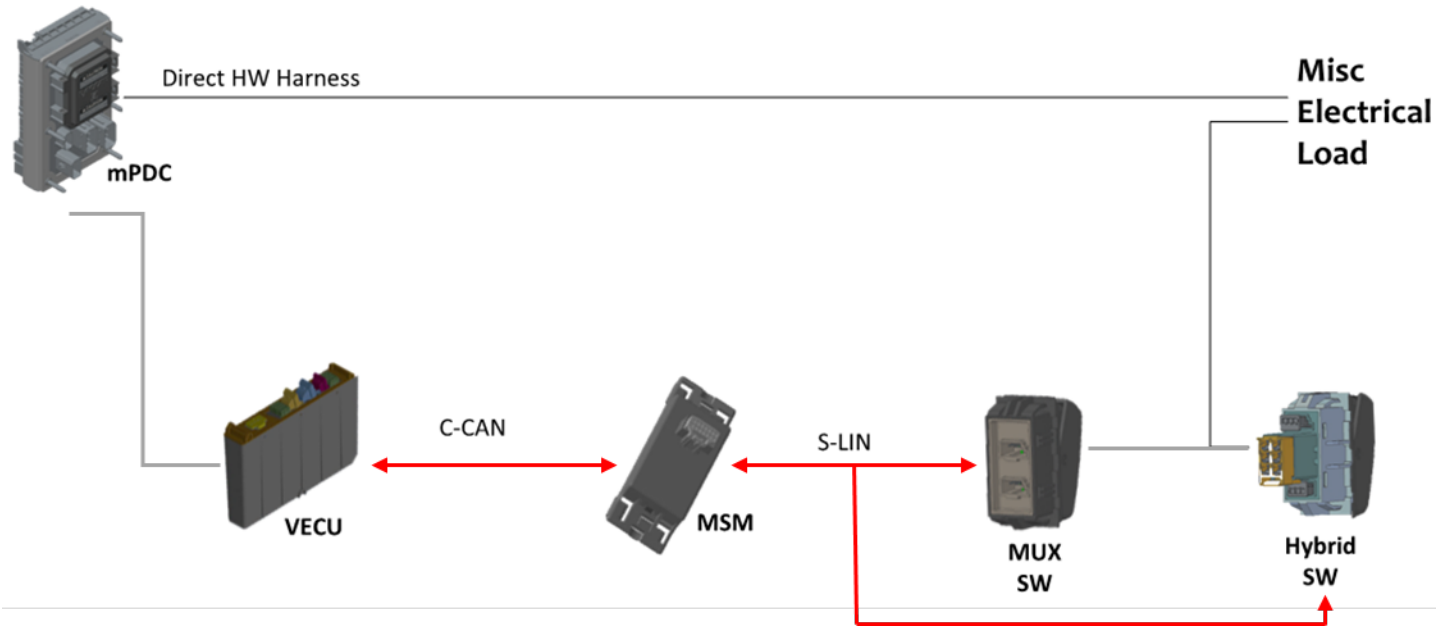
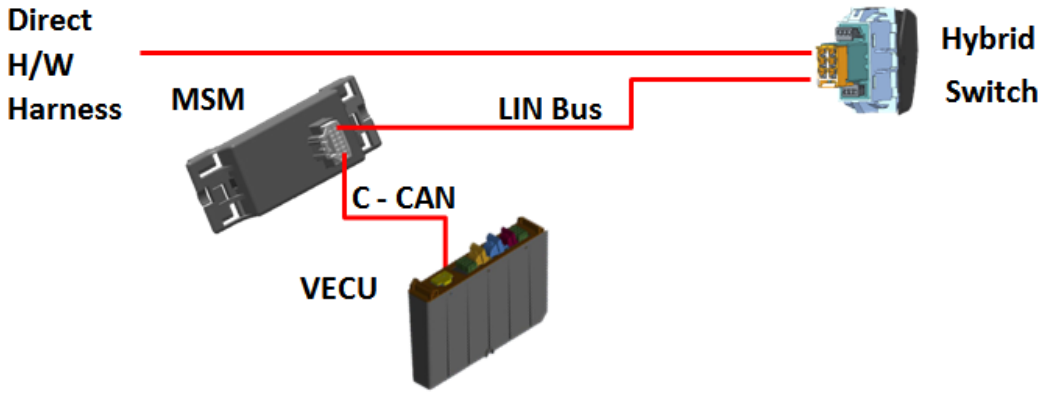


FIGURE 8-23.- Switches - Overview Layout

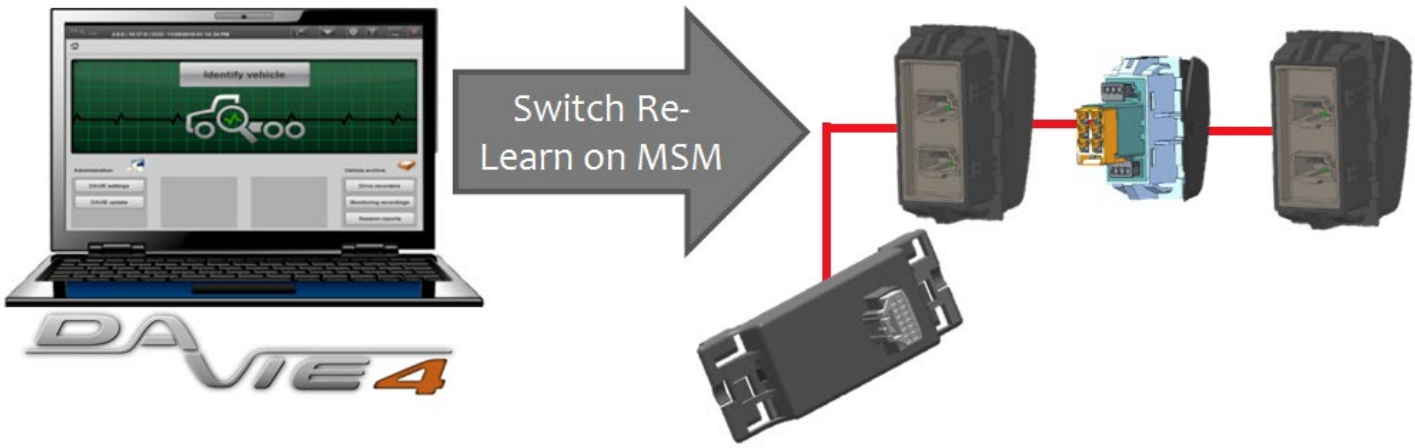
SPARE SWITCHES



Spare switches offer customers and body builders a convenient way to control power and air to various sources, like a body or trailer. They should be flexible and easily configurable to meet the vast and unique needs of body builders.

FIGURE 8-24.- Spare Switches

SWITCH RELEARN PROCESS



Switch replacement installation instructions:

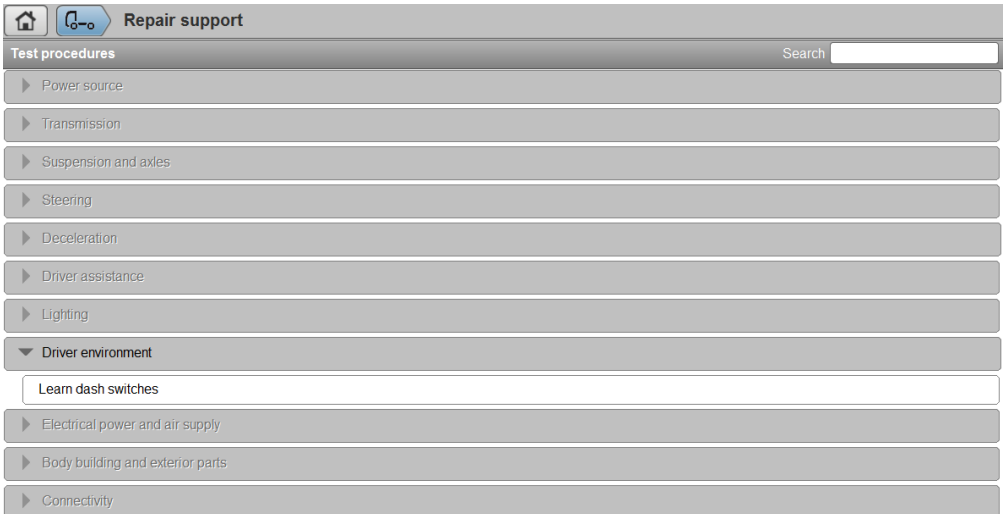
1. Turn off the vehicle and all switches
2. Remove dash panel
3. Unplug LIN jumpers from the original existing switch
4. Remove original switch
5. Replace the old switch with the new switch
6. Reconnect LIN jumpers into the replacement switch
7. Reinstall the dash panel
8. Open the DAVIE4 application and connect to the truck and identify the vehicle
9. Select the “Repair Support” tab.
10. Select the “Driver Environment” tab
11. Select the “Learn Dash Switches”
12. When prompted by DAVIE Cycle the key on and then off
13. Run “Quick Check”
14. Clear Inactive DTCs (Diagnostics trouble code) from MSM
15. Finished

New switch installation instructions:

1. Turn off the vehicle and put all switches into the off position
2. Remove the dash panels
3. Remove the switch blank
4. Add the new switch into the dash panel
5. Connect the LIN jumper between the last open switch to the newly installed switch
    a. Part Number S92-1127-0125
6. Reinstall the dash panel
7. Open the DAVIE4 application and connect to the truck and identify the vehicle
8. Select the “Repair Support” tab
9. Select the “Driver Environment” tab
10. Select the “Learn Dash Switches”

11. Cycle the key on and then off
12. Run “Quick Check”
13. Clear Inactive DTCs (Diagnostics trouble code) on the MSM
14. Finished

DAVIE Switch Relearn Screen View



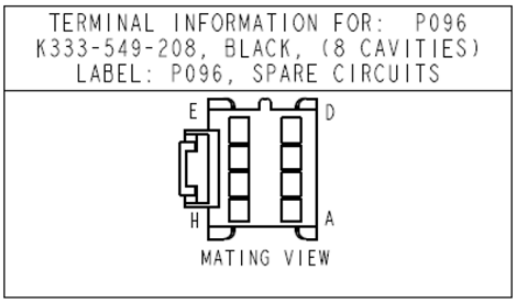
Dash Layout

FIGURE 8-25.- Switch Location – Dash Layout

SPARE POWER

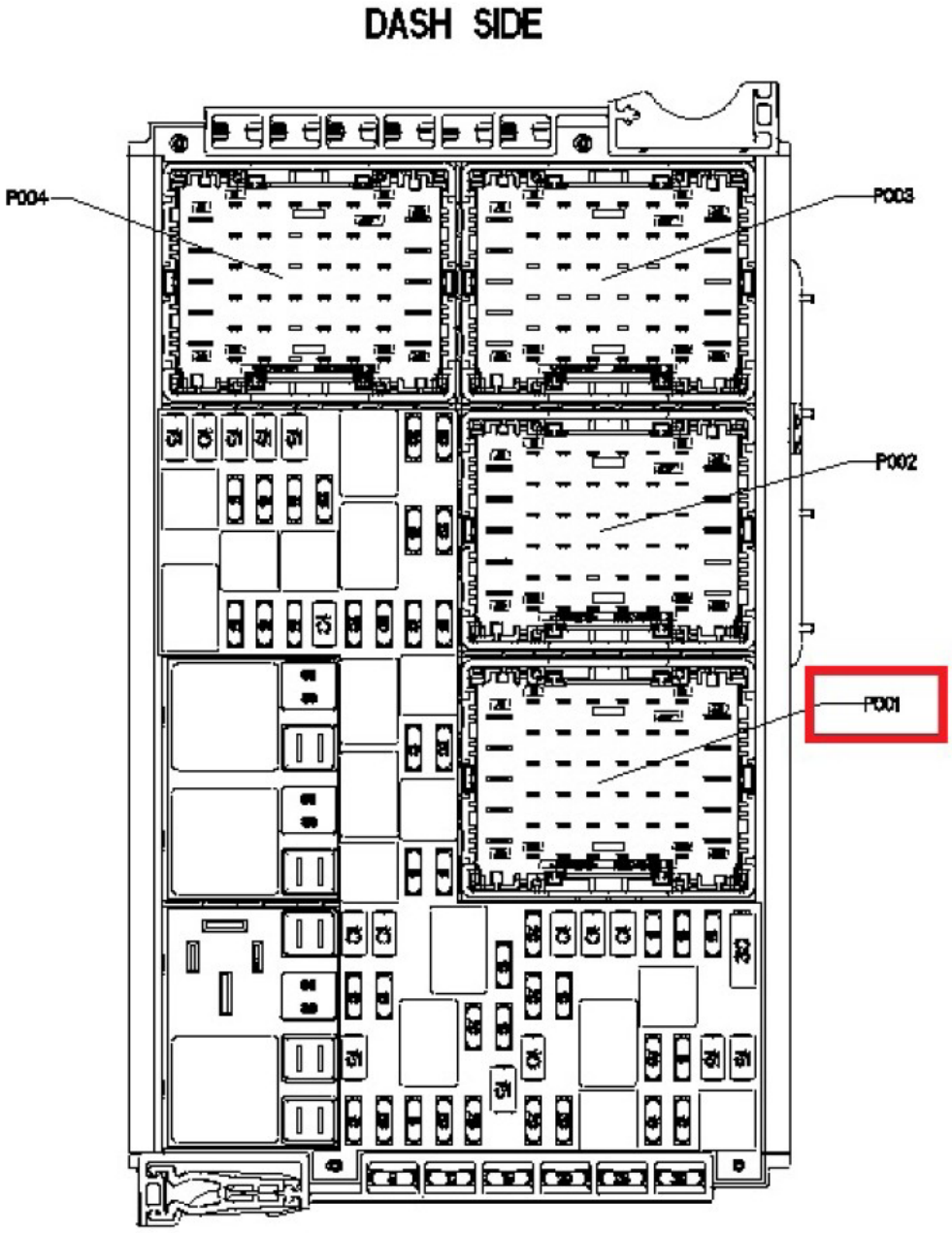
Spare power connector P096 is located on the lower left hand/driver side of the dash behind the kick panels. The mating harness is available from PACCAR parts with pre-labeled pigtails, part number S92-1250-1000.
NOTE: Any spare power requiring more than 20A must go directly to the battery box, not this spare circuit.

Spare Circuits Connector Part Number and Pinout Information



Pin	Description	Notes
A	Spare BATT #1	Fuse C_P17 (20A)
B	Spare BATT #2	Fuse C_G10 (20A)
C	Spare ACC #1	Fuse C_R10 (20A)
D	Spare GND	
E	Spare IGN #1	Fuse C_K13 (20A)
F	Spare IGN #2	Fuse C_M13 (20A)
G	Spare LVD #1	Fuse C_E7 (20A)
H	Spare Switch Backlight	

FIGURE 8-26.- Spare Power



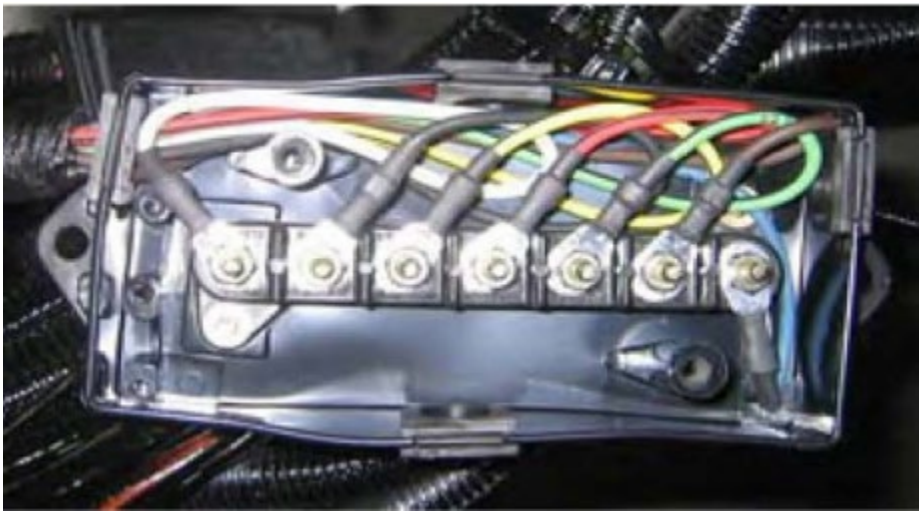
Spare Circuit Location on Power Distribution Center (Dash-Side, P001)

FIGURE 8-27.- Spare Power Location

OPTIONAL JUNCTION BOX

The junction box provides access to lighting signals. The standard wiring for this code is as follows: park terminal, marker lamp, stop, ground, turn RH, turn LH & a trailer ABS line. Trailer hot line is fused for 25A. Wiring of the junction box contains the same circuits that are included in a J560 receptacle.

Junction Box Wiring at BOC or EOF



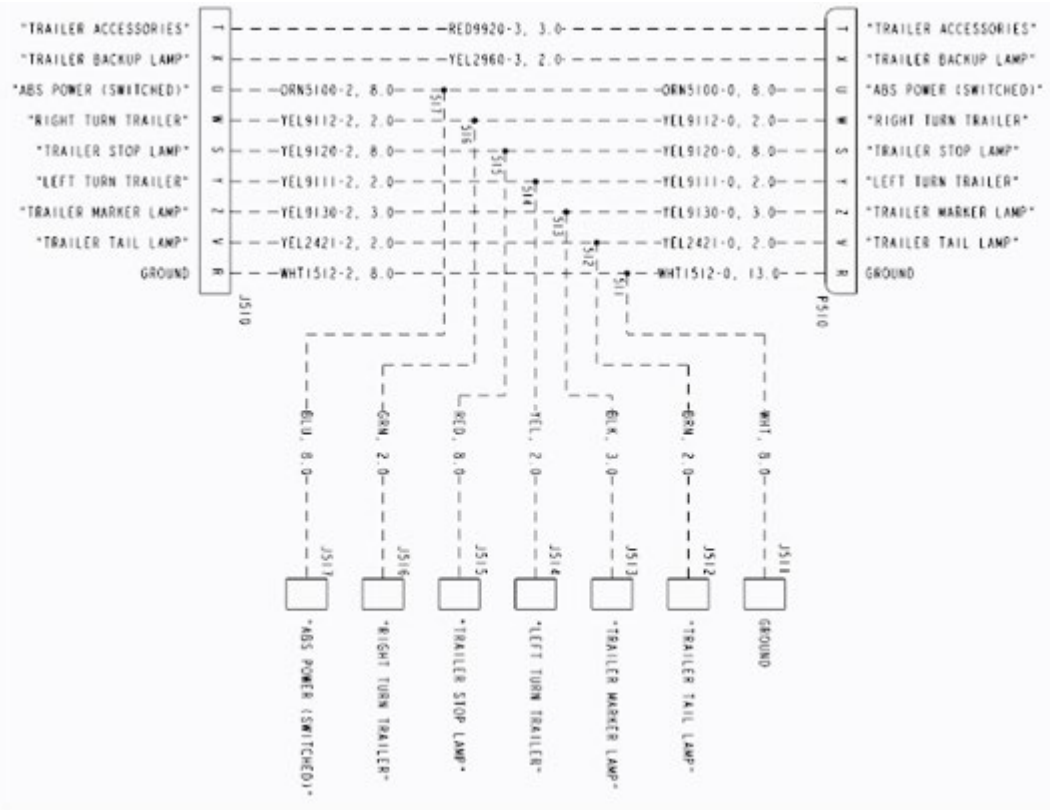
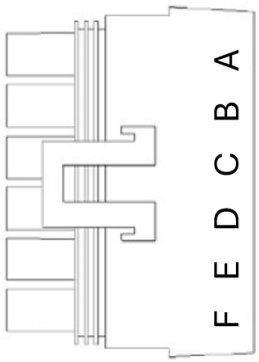


FIGURE 8-28.- Junction Box

BACK-UP SIGNAL

The back-up signal can be accessed from pin D of the 6-pin taillight connector located in the chassis harness at the end of frame. It will either be connected to a taillight, a jumper harness, or tied up in the frame rail if no taillights are provided from the factory.



PIN	CIRCUIT DESCRIPTION
A	BACK UP
B	PARK LAMP
C	LEFT TURN / STOP LAMP
D	RIGHT TURN / STOP LAMP
E	GROUND
F	

Mating Connector: Packard Part Number 12020786

FIGURE 8-29.- Back Up Signal Mating Connector

OPTIONAL SNOWPLOW LIGHTING

When the optional switch and wiring for snowplow lights are ordered, the truck will include a switch on the dash to control the snowplow lights and a 14-pin connector for the body builder at the front of the chassis.

Pin	Pin Description
1	LOW BEAM LH
2	LOW BEAM RH
3	HIGH BEAM LH
4	HIGH BEAM LH
5	TURN INDICATOR LH
6	TURN INDICATOR RH
7	MARKER LAMPS
8	NOT USED
9	SNOWPLOW GROUND
10	SNOWPLOW GROUND
11	TURN INDICATOR, LH DRL
12	TURN INDICATOR, RH DRL

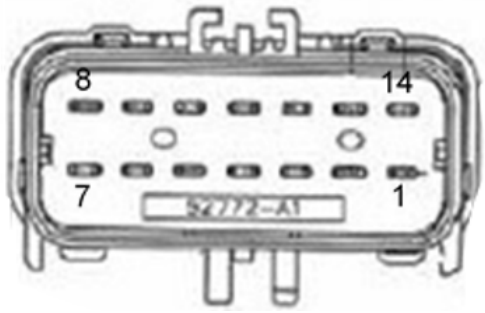


FIGURE 8-30.- Snowplow Lighting Connector

LIFT AXLES (PUSHERS & TAG)

All truck lift axles (pushers and tag) are direct wire Electric-Only. The wiring comes from the Primary Chassis Module or Secondary Chassis Module and goes directly to the axle mounted solenoid. This does not from the EOA Solenoid Bank. The activation signal comes from either a dash mounted MUX switch or a hardwired switch that is mounted outside of the cab. There are a maximum total of four lift axle controls available: 3 pushers and 1 tag axle, or 4 pushers and no tag axle. These are controlled with separate switches by default, but it is possible to have a single switch control all axles if they are the same type. The customer can order the following configurations: steerable, non-steerable, with auto-reverse, and with park brake interlock. A lift axle comes with a control switch (single or separate), a gauge, and a pressure regulator valve.

Lift Axle Diagram

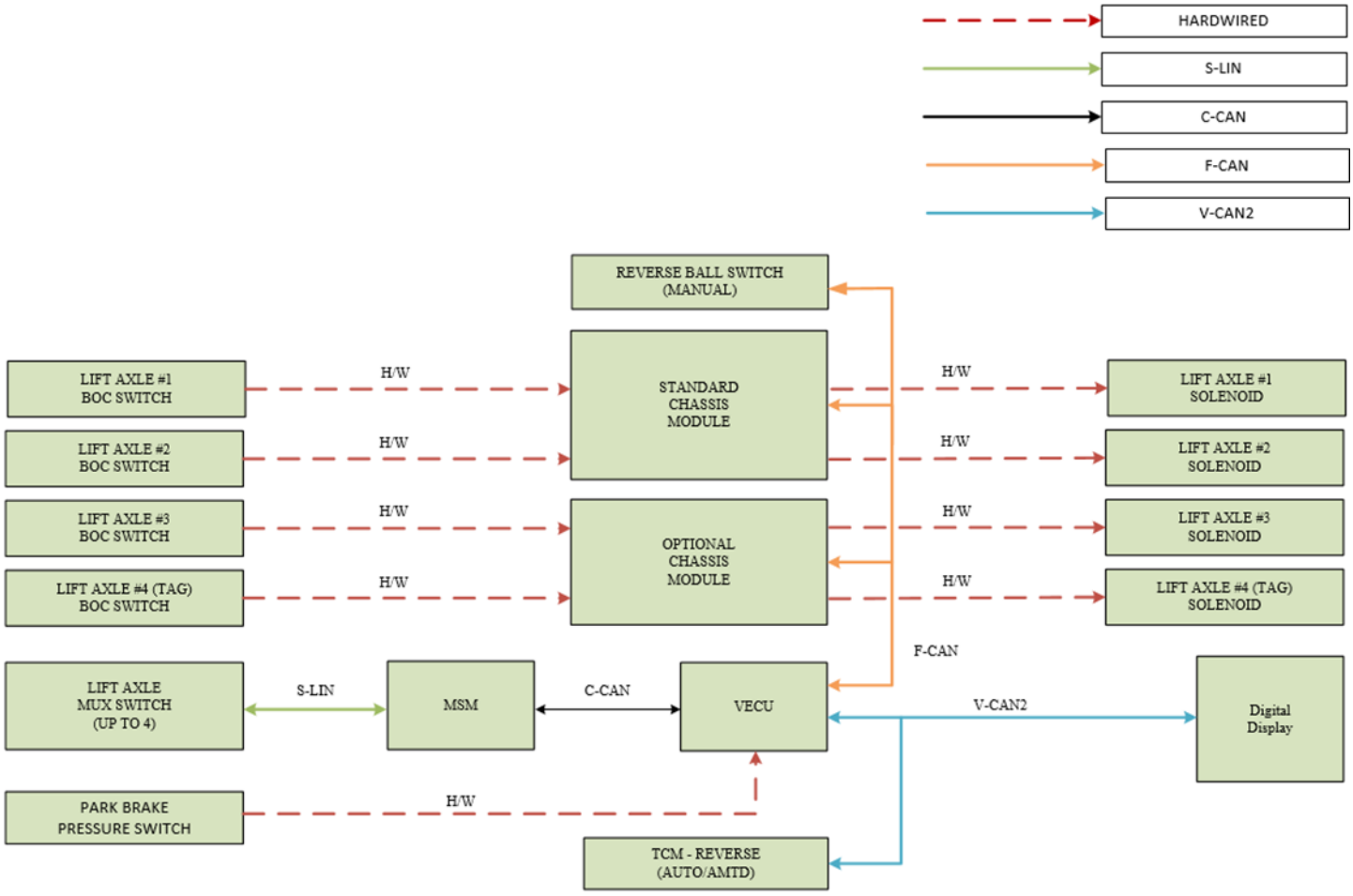


FIGURE 8-31.- Lift Axle Diagram

Truck Lift Axle Logic

Lift Axle Type	"Raise" Condition Logic	"Lower" Condition Logic
Steerable Lift Axle w/o Auto-Reverse	- Lift Switch is Inactive OR - Park Brake Active OR - Trans in Reverse	- Lift Switch is Active AND - Park Brake Inactive AND - Trans Not in Reverse
Steerable Lift Axle with Auto-Reverse OR Non-Steerable Lift Axle w/o Park Brake	- Lift Switch is Inactive OR - Park Brake Active	- Lift Switch is Active AND - Park Brake Inactive
Non-Steerable Lift Axle with Park Brake	- Lift Switch is Inactive AND - Park Brake Inactive	- Lift Switch is Active OR - Park Brake Active

Trailer Lift Axles

Trailer lift axles can be either EOA or Electric-Only type. There are two available EOA trailer lift axle controls using latching solenoids. If one axle is ordered, the customer will receive a switch labeled "Trailer Lift Axle". If two axles are ordered, the customer can have a single switch that controls both axles or two switches to control them separately. If two switches are present, they are labeled "Forward Trailer Lift Axle" and "Rear Trailer Lift Axle".

WINCH BRAKE

Use LIN dash switch for winch brake. When active it will display icon PTC-294A on the digital display and command the winch brake EOA to supply air. The body builder will need to install an additional EOA switch and program the VECU for that position to reflect winch brake.

A – PANEL DISPLAY IN DASH

FIGURE 8-32a.- Digital Display (Diesel Engine Vehicle)

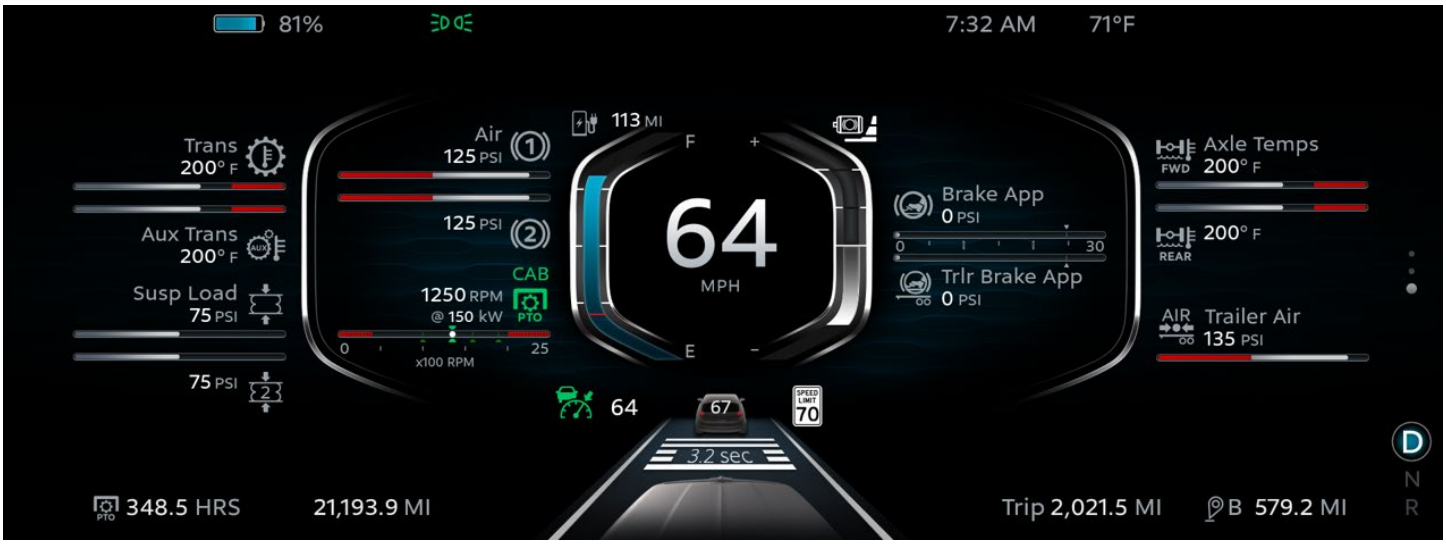
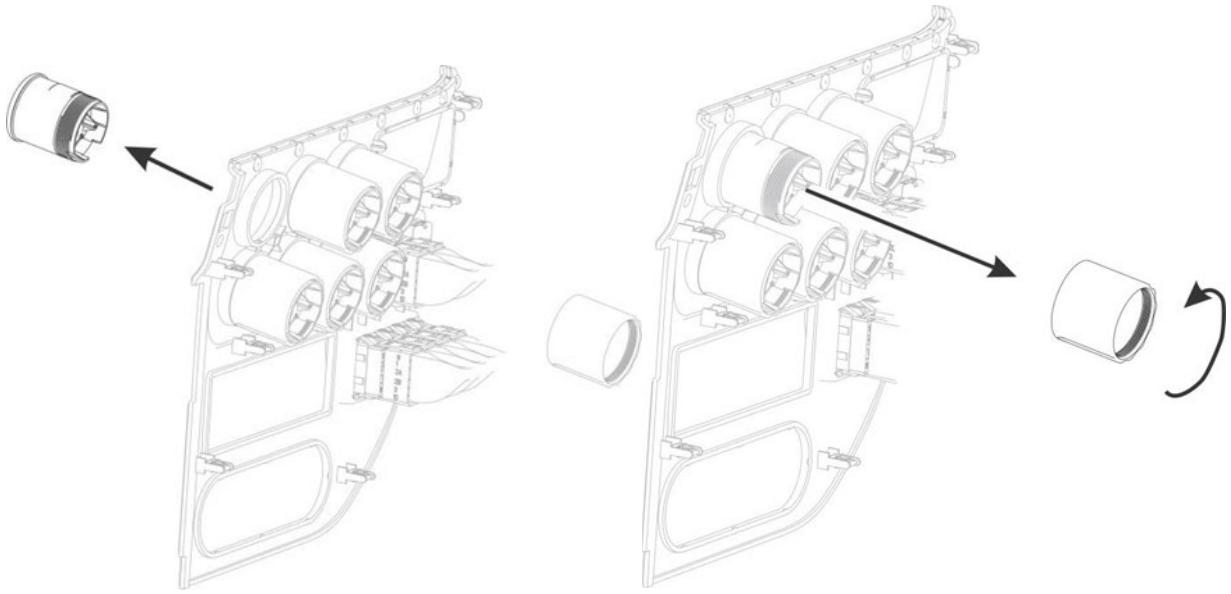


FIGURE 8-32b.- BEV Digital Display

PHYSICAL 52MM ROUND GAUGES

Gauges and switches are fastened directly to the dash panels. Once the panel is removed from the dash, the gauge or switch can be installed. Gauges are held by a screwed-on collar while switches have a plastic tab.



Optional gauges may be installed and connected to the Digital Display via a jumper harness.

FIGURE 8-33.- 52mm Physical Gauges

TELLTALE ICONS

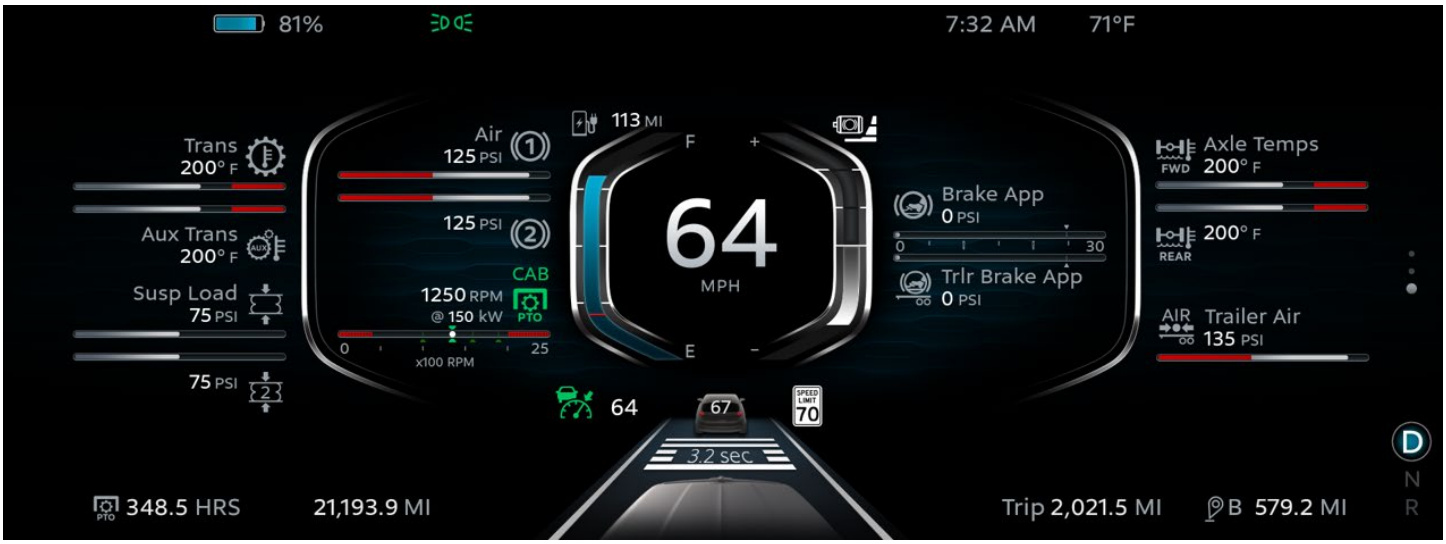


FIGURE 8-34.- Telltale Icons in Digital Display

Body builder telltales will populate on the digital portion of the display from a limited list and can be reconfigured using PVP (PACCAR Vehicle Pro) at your local Peterbilt dealership. The location of the telltale icon will be dependent on the configuration of the vehicle and what other telltale icons are present on the digital display.

There are 6 editable telltales and 4 dash tone generators that for customer use. **(See Table 8-6)**.

A_28	DIGITAL INPUT, BIPOLAR (8mA)	EDITABLE TELLTALE POSITION 1
A_29	DIGITAL INPUT, BIPOLAR (8mA)	EDITABLE TELLTALE POSITION 2
A_30	DIGITAL INPUT, BIPOLAR (8mA)	EDITABLE TELLTALE POSITION 3
A_34	DIGITAL INPUT, BIPOLAR (8mA)	EDITABLE TELLTALE POSITION 4
A_35	DIGITAL INPUT, BIPOLAR (8mA)	EDITABLE TELLTALE POSITION 5
A_36	DIGITAL INPUT, BIPOLAR (8mA)	EDITABLE TELLTALE POSITION 6
A_37	DIGITAL INPUT, BIPOLAR (8mA)	SPARE ALARM 1
A_38	DIGITAL INPUT, BIPOLAR (8mA)	SPARE ALARM 2
A_39	DIGITAL INPUT, BIPOLAR (8mA)	SPARE ALARM 3
A_40	DIGITAL INPUT, BIPOLAR (8mA)	SPARE ALARM 4

TABLE 8-6 – Editable Telltales and Tone Generators

TELLTALE CONNECTOR LOCATIONS BEHIND THE DASH

Remove the center kick panel under the dash cupholders to access the wiring for the telltale connectors.

The telltale connectors are on the instrument panel harness and use PACCAR connector P20-1195-1102. These are MOLEX Mini Fit 2-Position connectors. The mating connector is PACCAR P/N P20-1079. The spare alarm connectors are on the instrument panel harness and use PACCAR connector P20-1112. That is an Amp single-terminal connector. Mates with K333-53 Type A.

There are parameters that allow the user to set the polarity for each telltale and alarm input. Ground activated or 12v activated. These are configured on the sales order or (if needed to be changed in aftersales) by any user on PVP.

eolcfg_DROM_DD_TT_PIN_POLARITY_1	0 = GROUND ACTIVES TELLTALE 1 = 12V ACTIVATES TELLTALE
eolcfg_DROM_DD_TT_PIN_POLARITY_2	0 = GROUND ACTIVES TELLTALE 1 = 12V ACTIVATES TELLTALE PB: 0 = 3010010 DashPerm: DP1M344 = 1
eolcfg_DROM_DD_TT_PIN_POLARITY_3	0 = GROUND ACTIVES TELLTALE 1 = 12V ACTIVATES TELLTALE
eolcfg_DROM_DD_TT_PIN_POLARITY_4	0 = GROUND ACTIVES TELLTALE 1= 12V ACTIVATES TELLTALE
eolcfg_DROM_DD_TT_PIN_POLARITY_5	0 = GROUND ACTIVES TELLTALE 1 = 12V ACTIVATES TELLTALE
eolcfg_DROM_DD_TT_PIN_POLARITY_6	0 = GROUND ACTIVES TELLTALE 1 = 12V ACTIVATES TELLTALE DashPerm: DP1M344 = 1

TABLE 8-7 – Virtual Telltales

Those 6 telltale inputs trigger a virtual telltale to display on the dash. The virtual telltale is configured on the sales order or (if needed to be changed in aftersales) in PVP by Paccar employees only from a pre-determined list of available telltale icons.

eolcfg_DROM_DD_BBM_INPUT_1	DashPerm: DP1[M N]1## --- SEE BBM INPUT TABLE FOR ENUMERATION
eolcfg_DROM_DD_BBM_INPUT_2	DashPerm: DP1[M N]2## --- SEE BBM INPUT TABLE FOR ENUMERATION
eolcfg_DROM_DD_BBM_INPUT_3	DashPerm: DP1[M N]3## --- SEE BBM INPUT TABLE FOR ENUMERATION
eolcfg_DROM_DD_BBM_INPUT_4	DashPerm: DP1[M N]4## --- SEE BBM INPUT TABLE FOR ENUMERATION
eolcfg_DROM_DD_BBM_INPUT_5	DashPerm: DP1[M N]5## --- SEE BBM INPUT TABLE FOR ENUMERATION
eolcfg_DROM_DD_BBM_INPUT_6	DashPerm: DP1M6##

TABLE 8-8 – Virtual Telltales (configured on the Sales Order or in PVP

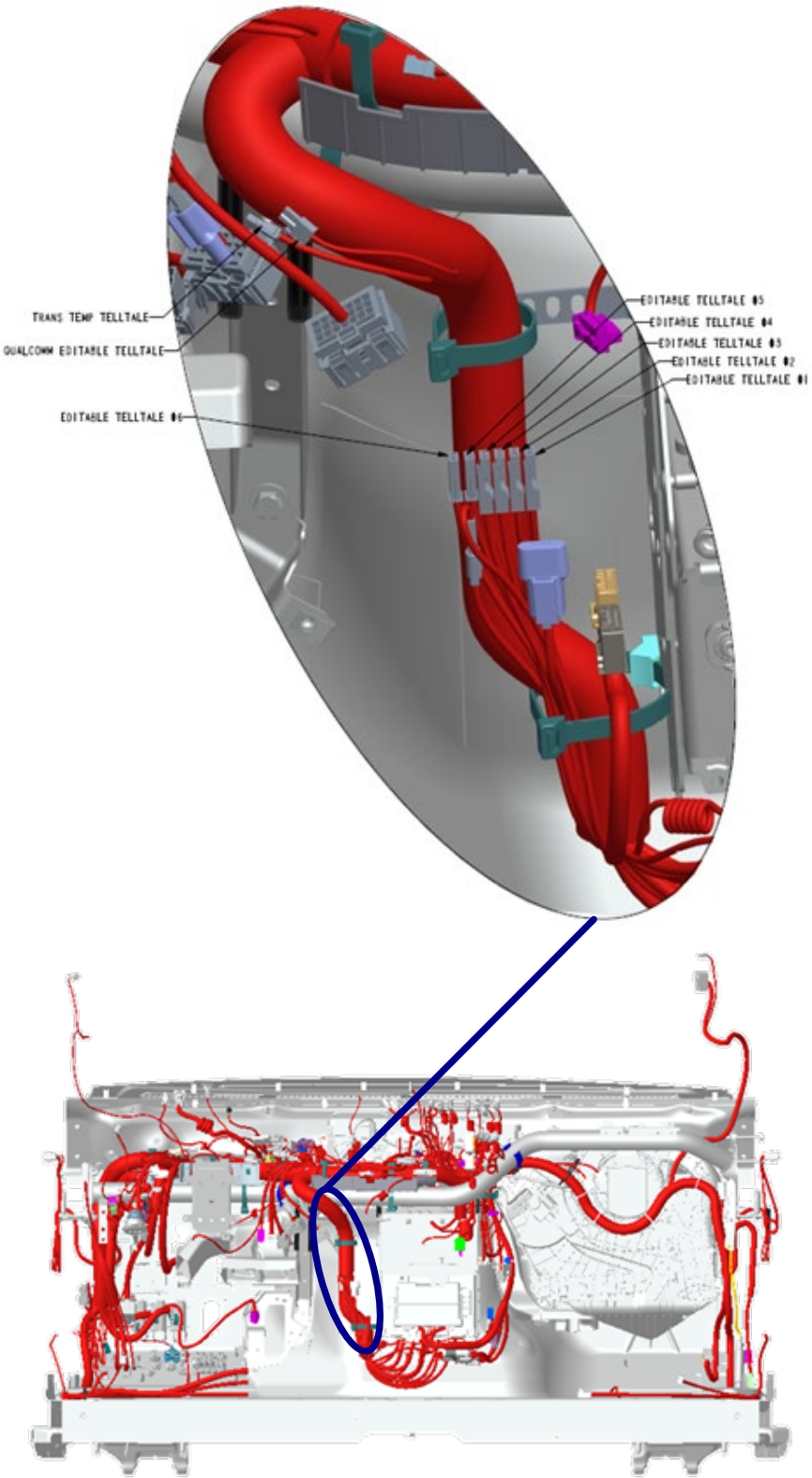


FIGURE 8-35a.- Telltale Connector Locations Behind the Dash

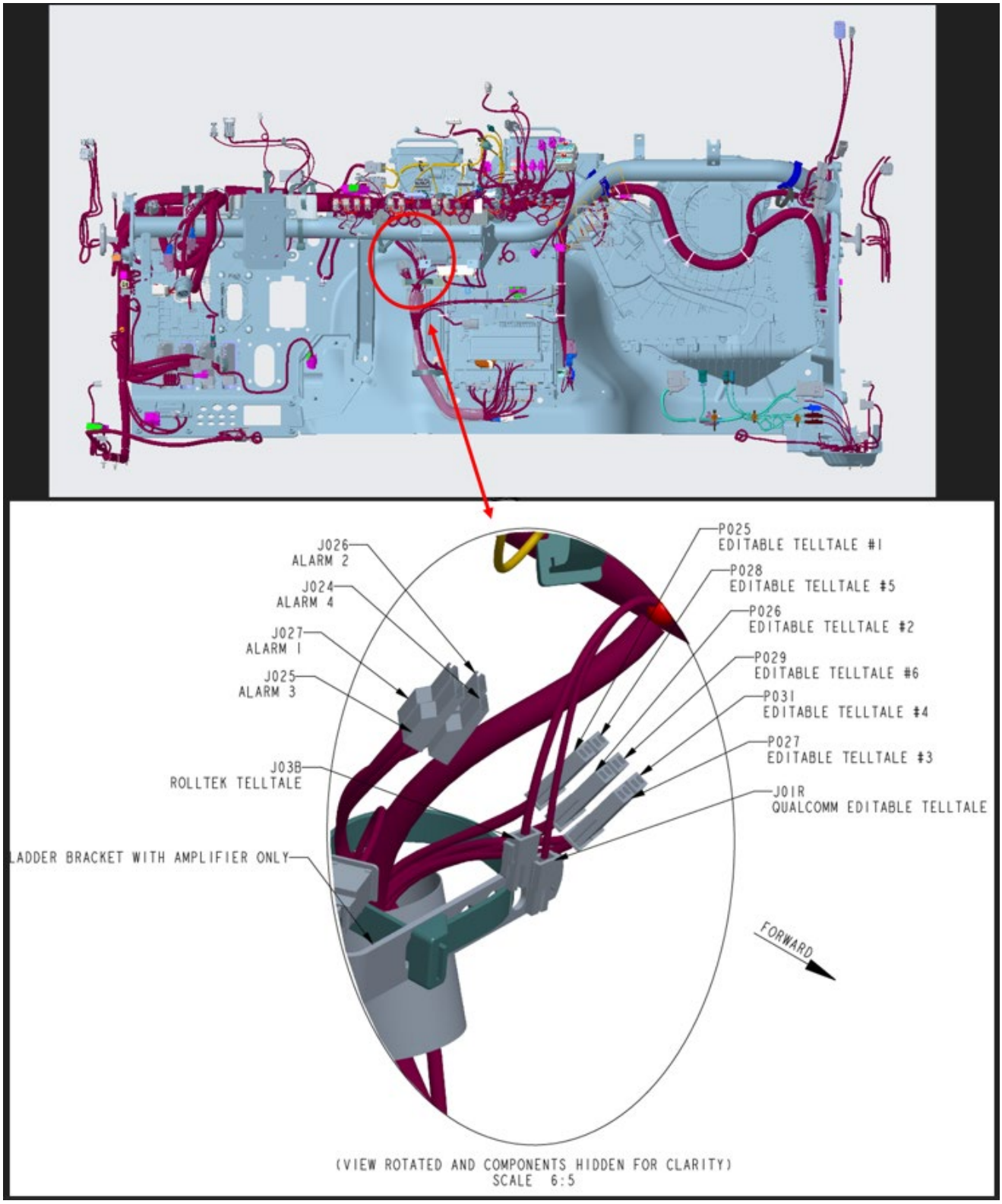


FIGURE 8-35b.- Telltale Connector Locations Behind the Dash

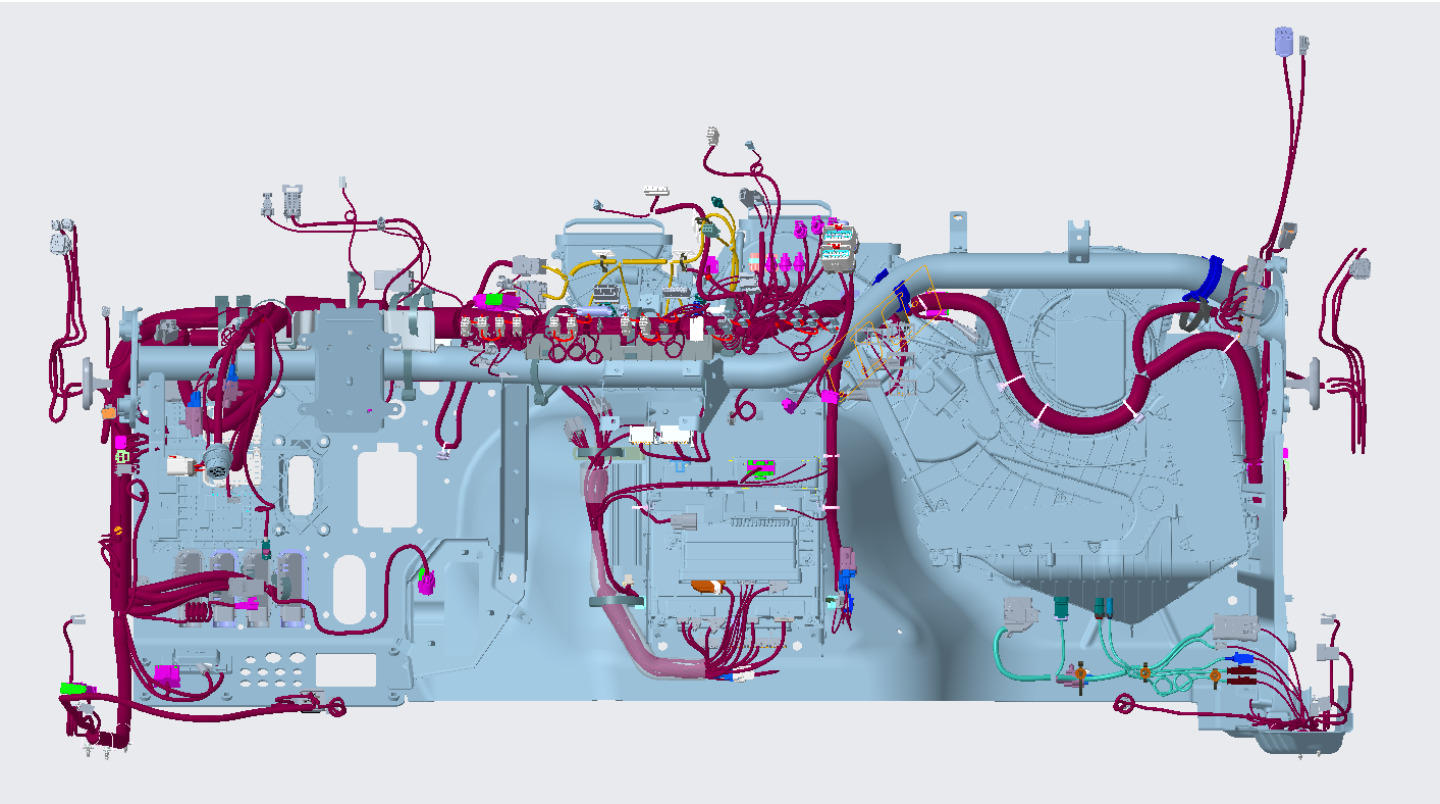


FIGURE 8-35c.- Telltale Connector Locations Behind the Dash

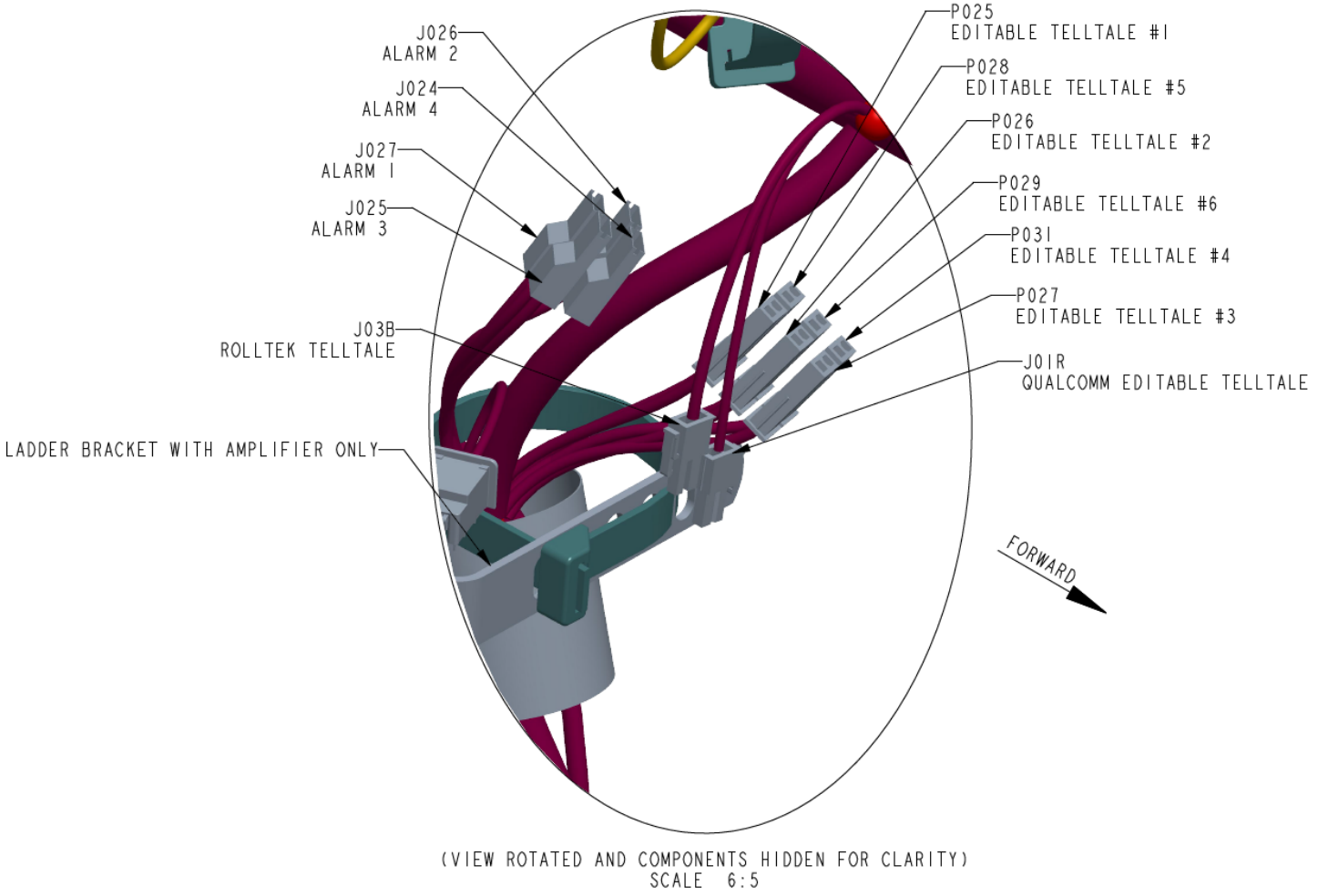


FIGURE 8-35d.- Telltale Connector Locations Behind the Dash

SECTION 9 **ROUTING**

LOW VOLTAGE ROUTING

INTRODUCTION

This section specifies the general requirements for securing hoses and electrical wires to present an orderly appearance, facilitate inspection and maintenance, and prevent potential damage to these lines.

DEFINITIONS

Bundle: Two or more air, electrical, fuel, or other lines tied together to form a unitized assembly.

Clamp: A cushioned rigid or semi-rigid, anti-chafing device for containing the bundle and securing it to the frame or other structural support. Standard clamps have a black elastomer lining. High temperature clamps (e.g., those used with com- pressor discharge hose) have a white or red elastomer lining (most applications for these are called out in the bills of material). An assembly of two clamps fastened together to separate components is referred to as a “butterfly” clamp. Note: the metal portion of clamps shall be stainless steel or otherwise made capable, through plating or other means, of passing a 200 hour salt spray test per ASTM B117 without rusting.

Metal hose clamps should not be used for harness routing when they cannot be sized correctly and allow movement inside the clamp. This movement can cause the elastomeric portion to wear down to the metal portion.

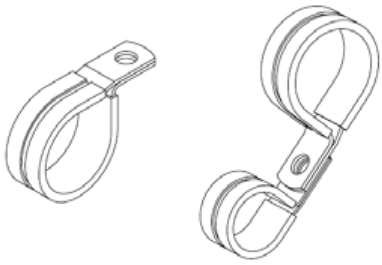


FIGURE 9-1. Clamp and Butterfly Clamp

Butterfly Tie: A tough plastic (nylon or equivalent) locking dual clamp tie strap used to separate bundles or single lines, hoses, etc. These straps must be UV stable. (Tyton DCT11)

FIGURE 9-2. Butterfly Tie

Tie Strap: A tough plastic (nylon, or equivalent) locking strap used to tie the lines in a bundle together between clamps or to otherwise secure hoses and wires as noted below. These straps must be UV stable.

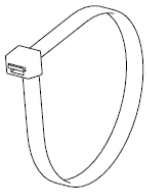


FIGURE 9-3. Tie Strap

Heavy Duty (HD) Mount: A black rigid device used for securing a tie strap to the frame or other structural support. Mounts are made of impact modified, heat stabilized UV resistant nylon capable of continuous operation between temperatures 220°F (150°) and -40°F (-40°).

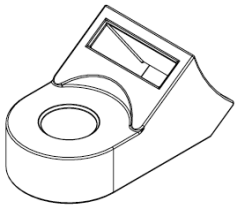


FIGURE 9-4. Heavy Duty (HD) Mount.

NOTE

Heavy duty tie straps 0.50in (12.7mm) wide (Tyton T255ROHIR or similar) shall be used whenever HD mounts are specified, although 0.25in (6.4mm) tie straps may be used in some specified applications.

Excess of material: More than 3 inches of slack for every 14 inch section of hose routing, except for air conditioner hoses.

Shortness of material: Less than 1 inch of slack on a 14 inch section of hose routing.

ROUTING REQUIREMENTS

Electrical Wiring

- Do not bend wires or use tie straps within 3 inches (75 mm) of (connected) wire connectors or plugs.
- Do not attach anything to HV cables. This includes zip ties or clamps.
- Electrical wiring must be routed so that other components do not interfere with it
- Electrical wiring must be routed away from moving components so that at least 13.0 mm (0.5 in.) of clearance exists when the component is in operation and at maximum limits of the component's travel
- Electrical wiring must be protected in the locations where they are routed
- Electrical wiring must be routed to avoid heat sources
- Electrical wiring must be secured to a crossmember when going from one frame rail to the other
- When crossing other components, electrical wiring must be separated from the component with a standoff or butterfly tie clamp
- Electrical wiring must not be routed directly over a sharp edge unless separated from the edge by a clip, standoff bracket, or similar spacing feature that prevents any risk of chafing or cutting
    - Alternatively, the installation of windlace applied to the edge along with PSA tape or convoluted tubing on the harness is acceptable
- Electrical wiring must be routed in a way that will not place strain on connectors.

Wires in Bundles

Electrical wires (other than the exceptions covered below) running parallel with air or coolant hose bundles, may be included in the bundle if they are isolated from the hoses with a covering of convoluted plastic tubing.

Exceptions

LV Battery cables (including jump start cables) may be bundled with or tied to the charging wire harness. They shall not be bundled with or tied directly to any other components, including hoses, wires, or bundles. They shall be separated from other routed components using butterfly ties at intervals not exceeding 14 inches (356 mm). A battery strap tie down (W84-1000, Y84-6000-014, or T255R0H1R) shall be used without exception to secure battery cables to frame mounted or other major component (e.g. motor, battery, transmission, etc.) mounted standoffs at intervals not exceeding 14 inches (356 mm). The (positive) battery cable shall be covered with convoluted plastic tubing from terminal to terminal.

Wires Crossing Other Components

Electrical wires crossing over other components, such as lines, bolt heads, fittings, close enough to rub shall be isolated with a covering of convoluted tubing and separated from the component by using butterfly tie clamps, butterfly ties, or plastic sheathing.

Piping

Use no street elbows in air brake, water, fuel, or hydraulic systems unless specified on the piping diagram and the build instructions. Use no elbows in the air brake system unless specified on the air piping diagram and the build instructions.

Hoses Crossing Components

Hoses crossing over other components close enough to rub shall be protected with a secured covering of convoluted plastic tubing (part number K344-813), another

section of hose, or plastic sheathing (part number K213-1312). The usage of butterfly ties, or butterfly clamps are also recommended.

Air Compressor Discharge Hoses

Wires or hoses shall not be tied to the high temperature air compressor discharge hose. Hoses and wires may be routed across the air compressor discharge hose at a distance of 18 inches (457 mm) or greater from the compressor discharge port. In this case the crossing hoses and wires shall be “butterfly” clamped to the air compressor discharge hose and covered with convoluted tubing at the clamp point (use high temperature clamps on the compressor hose).

Bundles

HD mount and tie strap, or clamp shall be located at intervals not to exceed 14 inches (356 mm) along the bundle.

Regular tie straps shall be located at intervals not to exceed 7 inches (178 mm) between HD mount or clamps. Extra tie straps may be used as needed to contain the hoses and wires in the bundle.

Routing of Wires and Hoses near Moving Components

Wires and Hoses shall be routed away from moving components, such as fans, shackle links, drivelines, steering linkages, etc. so that there is at least 0.5 inches (12.7 mm) clearance when the component is operating at its maximum travel limits.

A minimum clearance of 1.0 inches (25.4 mm) shall be maintained between steering axle tires (and associated rotating parts) in all positions and routed components, such as hoses, oil lines, wires, pipes, etc.

HIGH VOLTAGE ROUTING

Modifications to HV routing should be rare. Only personnel trained by Paccar and certified to Paccar Level 3 Certification are authorized to work on the HV system.

ROUTING SECUREMENT REQUIREMENTS

This section specifies recommended routing aids and securements for HV cables.

- Zip-ties may only be used if they are firmly securing the HV Cable keeping it in place.
- HV and LV cables should never be zip-tied together.
- It is recommended that zip-ties not be used on cables without protective material to prevent damage to outer insulation when removing zip-tie. For example but not limited to corrugated Tube or braided sleeve.
- Securement of 1 zip-tie is insufficient to give direction to cable. Rather 2 zip ties are held within 20mm of each other to ensure cable routing and direction.
- Ensure that the zip-ties used are appropriate for use:
    - Tie Design = infinitely many (smooth no teeth), reusable (metal barb locking mechanism, with teeth (less abrasive and better under vibration).
    - Length = cable diameter < (max bundle diameter / cable range)
    - Environmental Conditions (CTS0051) = UV Rating, Chemical Resistance (CMT0021), and or Temperature Rating (CTS0053).
    - Strength = Tensile Rating of the zip-tie to be appropriate (cable weight, truck movements and vibrations based on location, CTS0015).

- It is recommended to use soft rubber inserts in between a routing aid and cable, when possible, to prevent abrasion to the outer insulation, and to allow for cable diameter variation due to supplier tolerances; inserts to meet environmental conditions.
- Rubber inserts must be properly secured in the clamps to keep the rubber in place.
- Dynamic areas require securement that does not allow movement of cable within the clamp; inserts to contact and compress cable OD.
- It is recommended that High Voltage Cables are not secured to electrically conductive or sharp materials.
- It is recommended for Routing Aides to contain Poka Yoke Features, to prevent mistakes during assembly. Examples include mismatch of Cable OD and insert ID, or routing aid installation in the wrong location.

- It is recommended for routing aides to have a tension control mechanism to ensure they are fastened.
- Routing Aides must not contain sharp edges, radii's to be 2mm or greater
- It is recommended routing aides can be installed with 1 hand operation, during the assembly process.
- Routing Aides are to be made of durable material and have a width of 20mm in contact with the cable to ensure proper relief and guidance.
- Routing aides to be fixed onto bracket and not moved or rotated during the installation process. Installation of routing aides to be drop-and-go.

GENERAL ROUTING REQUIREMENTS

- A cable must not be routed less than the supplier's recommended bend radius to prevent damage to the electrical shielding and conductor.
- A HV cable must not start a bend sooner than a supplier recommended distance from the backend of a connector to prevent stress on the connector, allowing water intrusion, or damage to the conductor. Supplier guidelines (installation drawings, applications specification, and so forth) for connector cable assemblies to call out tolerance needs for first securement.
- HV Cable Routing needs to account for the serviceability of the connectors and high voltage components. Sufficient room to be available for proper installation, allowing connectors to be connected and disconnected. From termination point there needs to an unblocked distance to allow for connector install in a straight path.
- The first fixation must provide adequate support. Following supplier guidelines between fixation and connector; ensuring cables align with backside of connector. Due to the stiffness and behavior of a HV cable, ensure a straight section of path between two opposing bends, cable resulting in an s shape. (See Figure 7 green sections).
- To alleviate stress on the cable and create accurate routings, it is required to Protection from edges and surfaces
- Any cable going around edges must maintain a 25mm clearance, using controlled securement.
- If a cable is closer than 25mm to an edge:
    - Additional cable securements are to be added and cable wrap must be considered.

    - Additional securements to be fixed to the same structure as the edge to maintain the most control.
    - Any lines closer than 25mm to be discussed in design review with stakeholders.
- Cables routed along a surface must have an approved restraint between the cable and the surface.
- Cables must not be able to touch a nearby surface when pulled.
- To prevent unintended heat transfer from coolant, return lines to HV cables, a separation of 50mm is maintained where possible.
- HV cables must avoid being routed directly beneath coolant fittings to prevent leakage onto the cable.
- High voltage cables must never prevent access to MSD or service fuses.
    - Cable routings near an MSD or safety disconnect must have gloved handed access. HV Cables must not be able to be pulled within 50mm, during installation and removal.

APPENDICES

Revision Log

Revision Log – BEV Ph 3 HD Body Builder Manual				
Revision	**Author**	**Date of Publication**	**Pages #**	**Description of Changes**
-	Mark Bohannon	April 15, 2026	n/a	Initial Release