



**MODEL 520**  
**BODY BUILDER MANUAL**



MODEL  
**520**

This page is intentionally left blank.

---

# BODY BUILDER MANUAL CONTENTS

<b>SECTION 1: INTRODUCTION</b>	1-1
<b>SECTION 2: SAFETY AND COMPLIANCE</b>	
SAFETY SIGNALS	2-1
FEDERAL MOTOR VEHICLE SAFETY STANDARDS AND COMPLIANCE	2-2
NOISE AND EMISSIONS REQUIREMENTS	2-3
FUEL SYSTEM	2-4
COMPRESSED AIR SYSTEM	2-4
EXHAUST AND EXHAUST AFTER-TREATMENT SYSTEM	2-5
COOLING SYSTEM	2-6
AIR INTAKE SYSTEM	2-6
CHARGE AIR COOLER SYSTEM	2-6
<b>SECTION 3: DIMENSIONS</b>	
INTRODUCTION	3-1
ABBREVIATIONS	3-1
OVERALL DIMENSIONS	3-1
FRAME RAILS	3-10
FRAME HEIGHT CHARTS	3-12
REAR SUSPENSION LAYOUTS	3-19
Reyco 79KB Single	3-20
Reyco 102AR Single	3-21
Neway ADZ252	3-22
Neway ADZ369/378	3-23
Peterbilt Air Leaf	3-24
Peterbilt Air Trac Single	3-25
Peterbilt Air Trac Tandem	3-26
Peterbilt Air Trac Tri-Drive	3-27
Peterbilt Low Air Leaf	3-28
Chalmers 854	3-29
Hendrickson HMX	3-30
Hendrickson RT/RTE	3-31
Hendrickson HN	3-32
Hendrickson R	3-33
Hendrickson RS	3-34
PUSHER AND TAG LAYOUTS	3-35
Hendrickson	3-35
Watson-Chalin	3-39
EXHAUST HEIGHT CALCULATIONS	3-43
GROUND CLEARANCE CALCULATIONS	3-44
OVERALL CAB HEIGHT CALCULATIONS	3-45
FRAME COMPONENTS	3-46
<b>SECTION 4: BODY MOUNTING</b>	
INTRODUCTION	4-1
FRAME RAILS	4-1
CRITICAL CLEARANCES	4-2
BODY MOUNTING USING BRACKETS	4-3
Brackets	4-4
Mounting Holes	4-5
Frame Drilling	4-6
BODY MOUNTING USING U-BOLTS	4-7
REAR BODY MOUNT	4-9

**SECTION 5: FRAME MODIFICATIONS**

INTRODUCTION	5-1
DRILLING RAILS	5-1
MODIFYING FRAME LENGTH	5-2
CHANGING WHEELBASE	5-2
CROSSMEMBERS	5-4
TORQUE REQUIREMENTS	5-5
WELDING	5-5

**SECTION 6: CAN COMMUNICATIONS**

INTRODUCTION	6-1
EMUX – ECU INSTALLATION NOTES	6-1
VMUX CAN COMMUNICATIONS ACRONYM LIBRARY	6-2
EMUX CAN COMMUNICATIONS ACRONYM LIBRARY	6-2
SAE J1939	6-3
PARAMETER GROUP NUMBER	6-3
SUSPECT PARAMETER NUMBER	6-3
VMUX CAN MESSAGES AVAILABLE ON BODY CONNECTIONS	6-4
EMUX CAN MESSAGES AVAILABLE ON BODY CONNECTIONS	6-13
MODEL 520 FRONT END LOADER WITH BENDIX FUSION	6-29

**SECTION 7: ELECTRICAL**

INTRODUCTION	7-1
ELECTRICAL ACRONYM LIBRARY	7-1
ELECTRICAL WIRING CIRCUIT CODES	7-2
MULTIPLEX SYSTEM	7-3
CAN Bus Speeds and Circuit Designation	7-3
VMUX CUSTOMER CONNECTOR DATABUS DIAGRAM	7-4
EMUX CUSTOMER CONNECTOR DATABUS DIAGRAM	7-5
ELECTRICAL COMPONENT OVERVIEW	7-6
IN CAB CAN BASED MESSAGING CONNECTOR	7-7
ELECTRIC ENGAGED EQUIPMENT	7-7
BODY CONNECTION POINTS – MODEL 520	7-8
ELECTRIC ENGAGED EQUIPMENT	7-19
RP170 CONNECTOR	7-19
RP170 CONNECTOR LOCATIONS (14-PIN)	7-20
RP170 CONNECTOR LOCATIONS (8-PIN)	7-21
RP170 CONNECTOR LOCATIONS (31-PIN)	7-22
RP170 CONNECTOR LOCATIONS (14-PIN LIGHTING)	7-23
OPTIONAL 8-PIN PTO INPUT CONNECTOR	7-24
REMOTE THROTTLE AND REMOTE PTO CONTROLS	7-25
OPTIONAL 12-PIN PTO CONNECTOR - PACCAR MX ENGINES	7-25
OPTIONAL 12-PIN PTO CONNECTOR - CUMMINS ENGINES	7-27
POWER DISTRIBUTION CENTERS	7-28
CHASSIS MODULE	7-30
CHASSIS MODULE FUNCTION DESIGNATIONS	7-31
FUSE GROUPS	7-32
ELECTRIC OVER AIR SOLENOIDS	7-34
SWITCHES	7-37
SWITCH RELEARN PROCESS	7-38
SPARE POWER	7-40
TRANSMISSION BACKUP SIGNALS	7-41
LIFT AXLES (PUSHER & TAG)	7-42
DIGITAL DISPLAY	7-43
TELLTALE ICONS	7-43
TERMINALS AND PINS FOR BODY BUILDER CONNECTIONS	7-45

**SECTION 8: POWER TAKE-OFF (PTO)**

INTRODUCTION	8-1
ACRONYM LIBRARY	8-1
TRANSMISSION MOUNTED PTO – GENERAL	8-2
Manual Transmission	8-2
Automatic Transmission	8-3
FRONT ENGINE PTO	8-4
REAR ENGINE PTO	8-5
PTO QUICK EXHAUST VALVE	8-6
INSTALLTION OF PTO MODEL	8-7
Chelsea 890	8-7
MX PTO MODE CONTROL (PMC)	8-8
MX PTO MODE ACTIVATION	8-8
MX PTO MODE CONTROL LOCATION	8-8
MX PTO MODE FEATURES	8-9
MX PTO MODE PROTECTIONS AND LIMITS	8-9
MX PTO SPEED CONTROL (PSC) FEATURES	8-10
MX PTO SPEED CONTROL INTERLOCKS	8-11
PTO SPEED CONTROL ICONS	8-11
REMOTE PMC CONNECTIONS	8-12
PTO MODE CONTROL FLOW CHARTS	8-13
MX PTO TROUBLESHOOTING GUIDE	8-14

**SECTION 9: AFTERTREATMENT**

INTRODUCTION	9-1
GENERAL GUIDELINES FOR DEF SYSTEM	9-1
DEF SYSTEM SCHEMATICS	9-2
INSTALLATION REQUIREMENTS AND DIMENSIONS FOR DEF SYSTEM	9-3
DEF ASSEMBLY RELOCATION - SUPPLY MODULE REQUIREMENTS	9-3
ROUTING TO THE DOSING MODULE (INJECTOR)	9-4

**SECTION 10: ROUTING**

INTRODUCTION	10-1
DEFINITIONS	10-1
ROUTING REQUIREMENTS	10-3
ROUTING OF WIRES AND HOSES NEAR EXHAUST SYSTEM	10-5

This page is intentionally left blank.

# SECTION 1 INTRODUCTION



The Peterbilt 520 Body Builder Manual is designed to provide body builders with a comprehensive information set to guide the body planning and installation process. Use this information when installing bodies or other associated equipment. This manual contains appropriate dimensional information, guidelines for mounting bodies, modifying frames, electrical wiring information, and other information useful in the body installation process.

The Peterbilt 520 Body Builder Manual can be very useful when specifying a vehicle, particularly when the body builder is involved in the vehicle definition and ordering process. Information in this manual will help reduce overall costs through optimized integration of the body installation with vehicle selection. Early in the process, professional body builders can often contribute valuable information that reduces the ultimate cost of the body installation.

In the interest of continuing product development, Peterbilt reserves the right to change specifications or products at any time without prior notice. It is the responsibility of the user to ensure that he is working with the latest released information.

Check [Peterbilt.com](http://Peterbilt.com) for the latest released version.

If you require additional information or reference materials, please contact your local Peterbilt dealer.

This page is intentionally left blank.

---

# SECTION 2 SAFETY AND COMPLIANCE

## SAFETY SIGNALS

There are a number of alerting messages in this book. Please read and follow them. They are there for your protection and informational reference. 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”, and “NOTE.” Please do not ignore any of these alerts.

### Warnings, Cautions, and Notes

#### WARNING



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.

Example:

**WARNING!** Be sure to use a circuit breaker designed to meet liftgate amperage requirements. An incorrectly specified circuit breaker could result in an electrical overload or fire situation. Follow the liftgate installation instructions and use a circuit breaker with the recommended capacity.

#### CAUTION



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

Example:

#### NOTE



**CAUTION: Never use a torch to make a hole in the rail. Use the appropriate drill bit.**

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.

Example:

**NOTE: Be sure to provide maintenance access to the battery box and fuel tank fill neck.**

**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.

**FEDERAL MOTOR VEHICLE SAFETY STANDARDS AND 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 doing 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 Information label. See Figure 2-2.

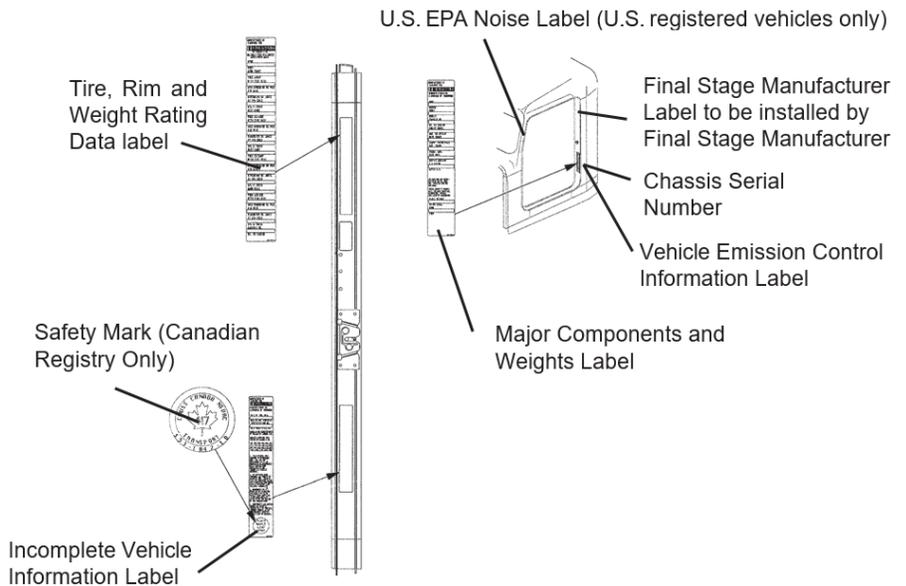
**NOTE**



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.



**FIGURE 2-1.** Incomplete Vehicle Document (IVD)



**FIGURE 2-2.** Locations of Information Labels - Driver's Door and Frame

As the Intermediate or Final Stage Manufacturer, you must retain the Incomplete Vehicle Document for your records. In addition, you must 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 must affix your certification label to the vehicle as required by Federal law. This label 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 completes and can certify the vehicle with guidance provided in the incomplete vehicle document, the certification label would need a statement that reads, “This vehicle has been completed in accordance with the prior manufacturer’s 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 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

## NOISE AND EMISSIONS REQUIREMENTS

### NOTE



This truck may be equipped with specific emissions control components/systems to meet applicable Federal and California noise and exhaust emissions regulations established by the U.S. Code of Federal Regulations, Environment Canada, and the California Air Resources Board. 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 with your tire supplier(s) for appropriate replacement tires.

Contact the engine manufacturer for any requirements and restrictions **prior** to any modifications.

- For Cummins, contact 1-800-DIESELS or your local Cummins distributor.

It is possible to relocate the DEF tank; however, the relocation requirements in section 9 of this manual need to be followed. Any variances from the relocation requirements may cause the emissions control components/systems to operate improperly potentially resulting in engine de-rate.

**NOTE**

All engine emissions certified 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 exhaust emissions or interfere with the proper performance of the OBD system itself.

All diesel engines will be equipped with an On-Board Diagnostics (OBD) system. The OBD system consists of computer program 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 Malfunction Indicator Light (MIL) is illuminated in the dash to alert the driver of the need for service of an emission-related component or system.

To ensure compliance to emissions regulations, the final configuration of certain features of the completed vehicle must meet specific requirements. This section describes requirements relevant for only the most common or critical modifications done by body builders. For a complete description of acceptable modifications, see the application guidance available from the manufacturer of the engine installed in the chassis.

**FUEL SYSTEM**

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

The overall system restriction may not exceed the restriction limitations set forth by the engine manufacturer for both supply and return.

- Ensure that fuel lines are not pinched or can potentially be damaged when installed between body and frame.
- Fuel lines must be routed and secured without dips or sags, and properly secured to prevent damage.
- There must be easy access to filter(s) and fill cap.
- The tank vent may not obstruct.
- Added accessories (heaters, generators) cannot introduce air into system.
- Fuel tank must be located so that the fuel level is not above cylinder head.
- "Ultra-Low Sulfur Fuel Only" labels must be present on the dash and fuel fill.
- Modification of the pressure side secondary filter and plumbing is not allowed without engine manufacturer approval.
- Body installation of fuel tank or routing of lines must not cause significant increase in fuel temperature.
- Fuel hoses shall meet or exceed OEM supplied hose material construction specifications.
- Care must be taken that fuel lines do not route against other components.
- Formed nylon fuel lines with quick-connects are installed underneath the cab and hood along the frame rail. Behind the cab from the fuel tee to tanks are wirebraid-reinforced rubber lines. Supply and return fittings are poka-yoked to prevent incorrect assembly.

**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 tank may not be modified.
- Added devices or bodywork may not interfere with or rub air lines.
- Air supply to the engine doser may not be restricted or disconnected.
- 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.

## **EXHAUST AND EXHAUST AFTERTREATMENT SYSTEM**

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

- The following aftertreatment and exhaust system components may not be modified:
  - DPF/SCR assembly
  - Exhaust pipes between the engine and aftertreatment devices (DPF, SCR Catalyst) and between aftertreatment devices
  - NO<sub>x</sub> Sensors
  - PM Sensor
- The following modifications may only be done within the guidelines outlined in section 9 of this manual:
  - Modifications to Diesel Exhaust Fluid (DEF) throttle, suction, or pressure lines
  - Modification or relocation of the DEF tank
  - Modification of coolant lines to and from the DEF tank
- All DEF and coolant lines should be routed, protected, and properly secured to prevent damage during vehicle operation or other components.
- The DPF/SCR or its mounting may not be modified.
- The NO<sub>x</sub> sensor may not be relocated or altered in any way; this includes re-clocking the aftertreatment canister or reorienting the sensor(s)
- Exhaust pipes used for tailpipes/stacks must be properly sized and must prevent water from entering.
- Ensure adequate clearance between the exhaust and body panels, hoses, and wire harnesses (see routing section of this manual for more details)
- The body in the vicinity of the DPF/SCR aftertreatment device must be able to withstand temperatures up to 400°C (750°F)
- Do not add thermal insulation to the external surface of the DPF/SCR aftertreatment device.
- The SCR water drain hole may not be blocked.
- Allow adequate clearance (25mm (1 inch)) for servicing the DPF/SCR sensors, wiring, and clamped joints.
- Drainage may not come in contact with the DPF/SCR, sensors, or wiring.
- Allow sufficient clearance for removing sensors from DPF/SCR. Thermistors require four inches. Other sensors require one inch.
- Wiring should be routed, protected from heat, and properly secured to prevent damage from other components.
- The exhaust system from an auxiliary power unit (APU) must not be connected to any part of the vehicle aftertreatment system or vehicle tail pipe.

### 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 core, and surge tank are not recommended.
- Additional accessories plumbed into the engine cooling system are not permitted, at the risk of voiding vehicle warranty.
- Coolant level sensor tampering will void warranty.
- When installing auxiliary equipment in front of the vehicle, or additional heat exchangers, ensure that adequate air flow is available to the vehicle cooling system. Refer to engine manufacturer application guidelines for further detail.
- When installing FEPTO drivelines, the lower radiator anti-recirculation seal must be retained with FEPTO driveline clearance modification only.
- Changes made to cooling fan circuit and controls are not allowed, with the exception of AC minimum fan on time parameter.
- See operator's manual for appropriate winter front usage.

### AIR INTAKE SYSTEM

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

- The air intake screen may not be blocked, either fully or partially
- Modification to the air intake system may not restrict airflow. For example, pipe diameter may not be reduced.
- All sensors must be retained in existing locations.
- To retain system seal, proper clamp torque must be used. Refer to service manual for proper clamp torque.

### CHARGE AIR COOLER SYSTEM

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

- The Charge Air Cooler may not be modified.
- The installation of engine overspeed shutdown devices must not introduce restriction in the intake system.
- All plumbing associated with the charge air cooler may not be modified

## 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 engine and emissions control devices/vehicle OBD components including datalinks may not be spliced. These emissions control devices/vehicle OBD components include the following:
  - throttle pedal
  - vehicle speed sensor
  - aftertreatment wiring.
  - 9-pin OBD Connector
  - CAN Communication / OBD Diagnostic wiring
- If the alternator or battery is substituted, it must meet the requirements of the engine manufacturer's guidelines. This includes alternator ground voltage drop and alternator ground cable effectiveness. See the engine manufacturer's guidelines for recommended test procedure. Additionally, the maximum voltage differential and the peak-peak voltage differential between the engine ECM block ground stud and battery negative terminal may not exceed 500 mV under any combination of loads or operating conditions.
- Only an OBD compliant battery disconnect switch may be installed on vehicles equipped with EPA 2013 and beyond compliant diesel engines. An OBD compliant switch and harness, even in the off position, supply a small amount of power to the engine controller and enable certain emissions critical functions (e.g., DEF line purge). Any modifications to the electrical system which interrupt this power supply will cause OBD fault codes and illumination of the MIL. In addition, such a modification will render the engine non-compliant with certain emission regulations. As a general rule of thumb, you can remove and replace a battery disconnect switch on a truck equipped with a battery disconnect switch at the factory. However, if a battery disconnect switch was not installed in the factory a significant harness modification is required before a battery disconnect switch can be added.
- Installation of aftermarket transfer-cases must address the vehicle speed sensor position. The standard position of the speed sensor is at the transmission tail shaft. When a transfer-case is added, it is best to relocate the sensor to the axle side output shaft of the transfer-case. This is typically accomplished by adding a tone wheel into the driveline yoke assembly.
- Wiring extensions for the aftertreatment wiring are available for relocating the DEF tank from your dealer via PACCAR Parts. For relocation of DEF tank, refer to the aftertreatment section of this manual.
- 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.
- The emission system requires an accurate Outside Air Temperature (OAT) reading to properly run its control algorithms. The 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 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.
- **WARNING:** *When jump starting using a battery charger/booster, verify that the battery charger/booster is set to the same jump start voltage and amperage specifications as the vehicle electrical system and batteries (i.e. if the vehicle electrical system is a 12 volt system, the jump start voltage on the battery charger/booster shall be set at no higher than a 12 volt setting). Failure to comply may cause an explosion and/or fire resulting in death, personal injury, equipment, or property damage.*



- See additional general wire routing statements on next page.



## GENERAL WIRE ROUTING

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

- Whenever possible, battery cables, electrical wires, and wire harnesses should be secured by clamps attached to rigid components (for example, the engine, frame, bracket, 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 wires harnesses routed on the chassis and engine 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.

## BENDIX WINGMAN FUSION 2.0 RADAR CLEARANCE

Some vehicles are equipped with the Bendix Wingman Fusion bumper mounted radar. When mounting cattle guards or other equipment to the front of the bumper, it is important to follow the manufacturers' guidelines for radar clearance. Please see the diagram below from Bendix SD-61-4963 to ensure proper clearance.

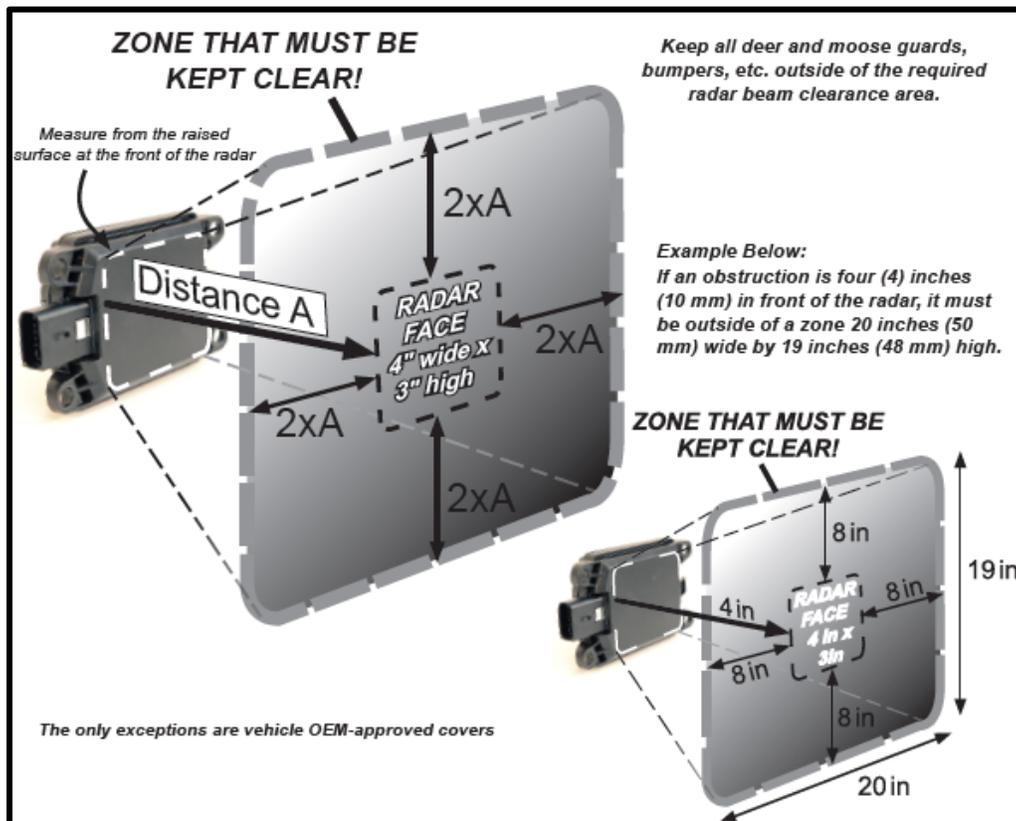
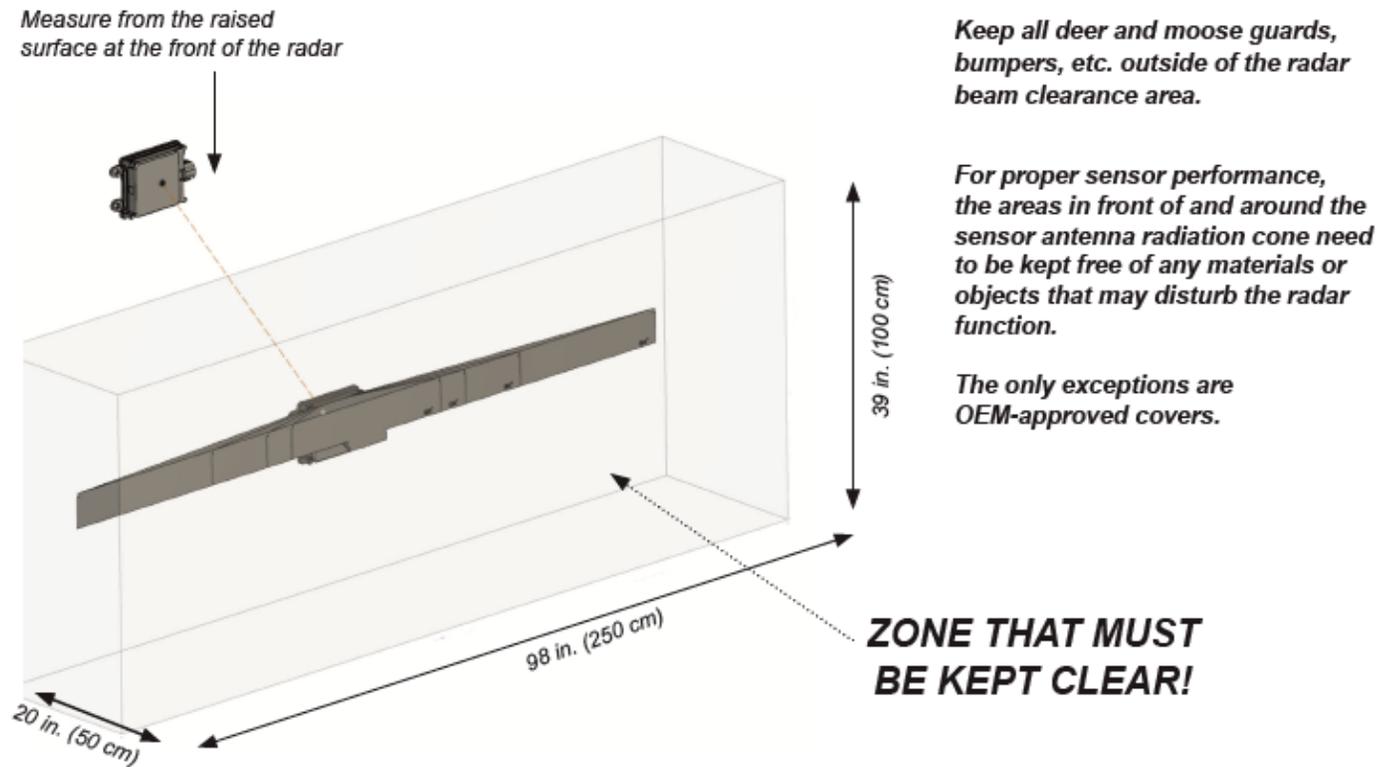


FIGURE 2-5: Fusion 2.0 Radar Clearance

## BENDIX WINGMAN FUSION 2.9 RADAR CLEARANCE



NOTE: Drawing is representative only and not to scale. Dimensions are accurate.

FIGURE 2-6: Fusion 2.9 Radar Clearance (Bendix SD-29-50022)

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

### SAFETY RELATED COMPONENTS AND SYSTEMS

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, GAWR, 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. All dimensions are inches unless otherwise noted. Optional equipment may not be depicted. Please contact your local Peterbilt dealer if more dimensional information is desired.

## ABBREVIATIONS

Throughout this section and in other sections as well, abbreviations are used to describe certain characteristics on your vehicle. Table 3-1 below lists the abbreviated terms used.

**TABLE 3-1.** Abbreviations Used

AF	After Frame – Frame rail overhang behind rear axle(s)
CA	Cab to Axle – Dimension from back of the cab to the centerline of the rear axle(s)
WB	Wheelbase – Measured from front axle to the centerline of the rear axle(s)
FS	Front suspension height
RS	Rear suspension height
SLR	Tire Static Loaded Radius
SOC	Side of cab
BOC	Back of cab
UC	Under cab
BBC	Bumper to back of cab
BFA	Bumper to front axle
FAB	Front axle to back of cab
FDA	Front drive axle
FEPTO	Front engine PTO extension. Measured from the front of the grille to the front of the bumper
SH	Short aero hood (107")
MH	Medium aero hood (109")
VH	Vocational hood (109")

## OVERALL DIMENSIONS

This section includes drawings and charts of the following Peterbilt Model 520. Several optional configurations are also included.

On the pages that follow, detailed drawings show particular views of each vehicle. They illustrate important measurements critical to integrating 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.

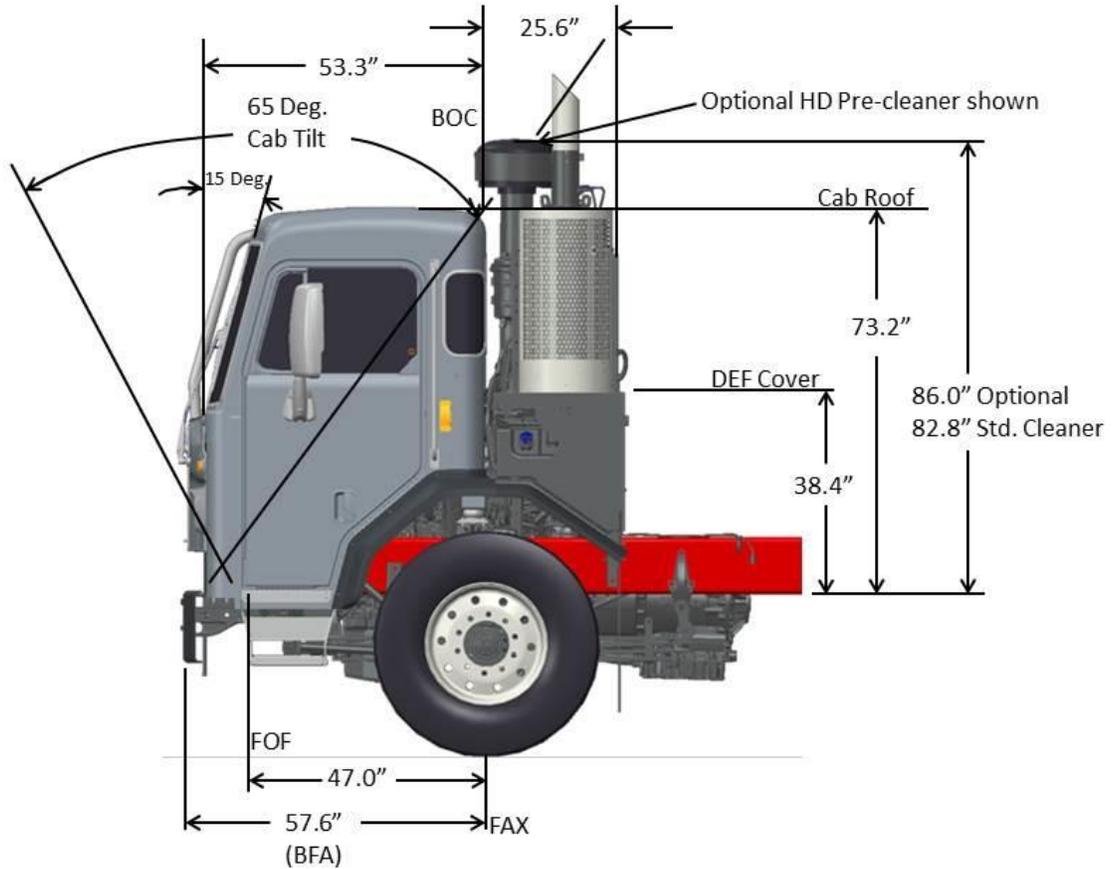
EPA 2024 MODEL 520



FIGURE 3-1. Various Views of the Model 520

**EXTERIOR DIMENSIONS**

**Model 520 Dimensions**

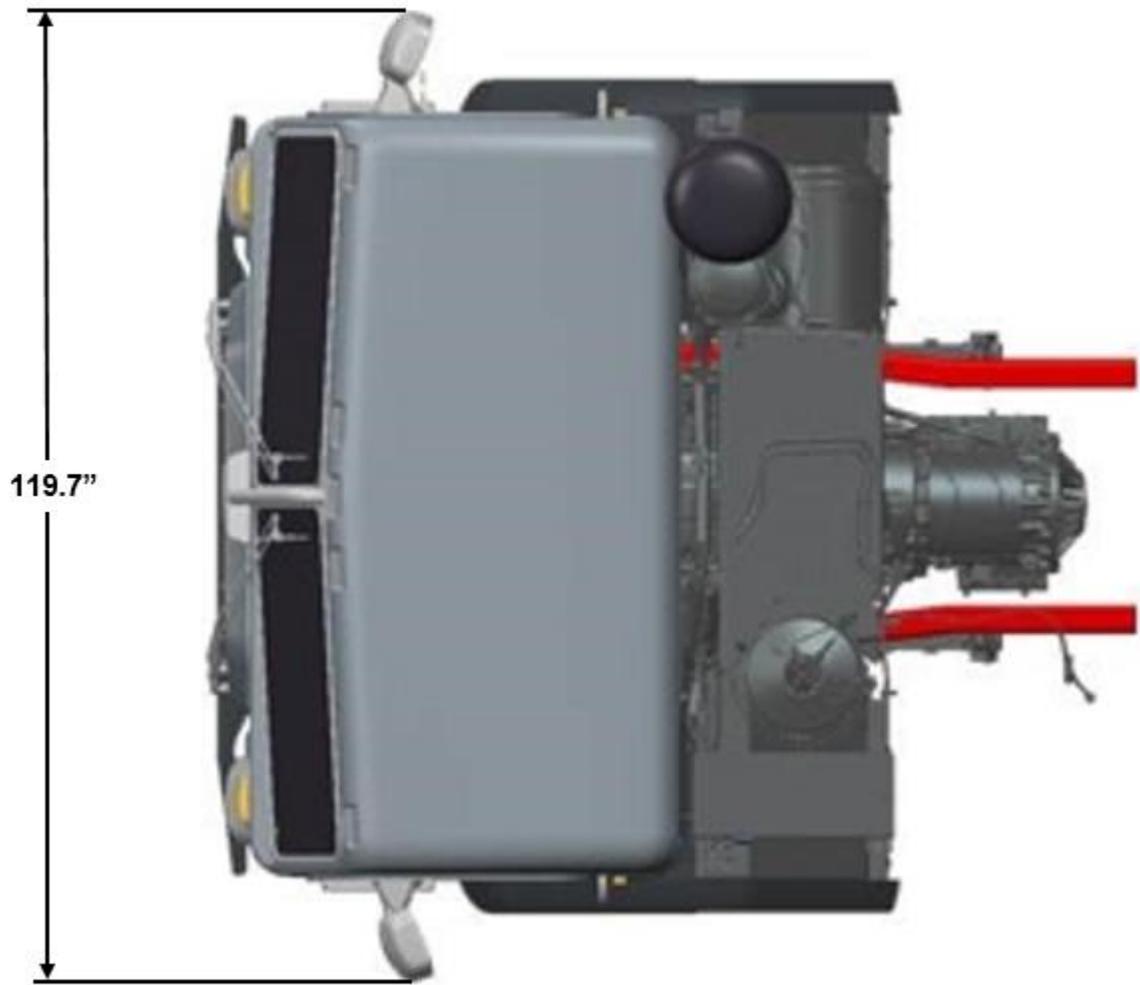


**FIGURE 3-2.** 520 Cab Dimensions

Notes:

1. Shown with optional HD Air intake Pre-Cleaner
2. Shown with optional front cab guard.
3. Door dimension is 33.4"W x 61"H.
4. Diesel truck shown, but Natural Gas has same BOC dimension for After-treatment.

EXTERIOR DIMENSIONS



**FIGURE 3-3. 520 Overall Width Dimensions**

Notes:

- 1. Shown with Velvac mirrors.
- 2. West coast mirrors 111.8"

INTERIOR DIMENSIONS

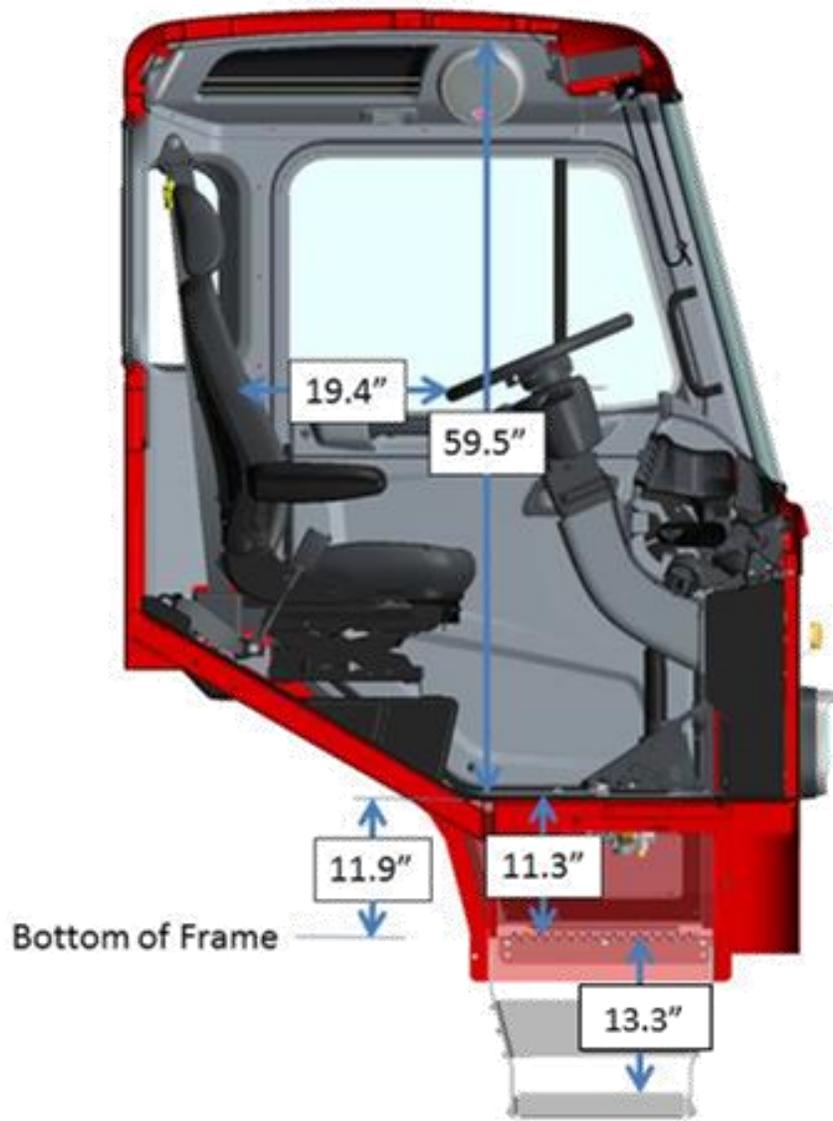


FIGURE 3-4. View Looking Through Cab to the Driver's Side (LH Steer)

INTERIOR DIMENSIONS

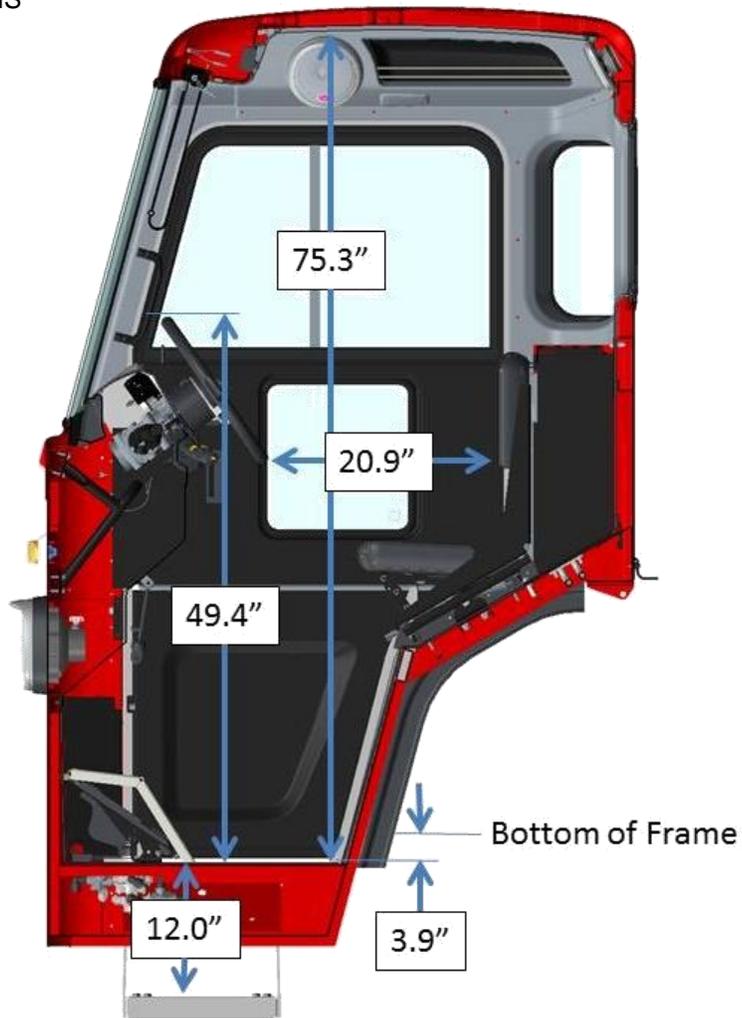


FIGURE 3-5. View Looking Through the Cab at The RH Drive Standup Version

INTERIOR DIMENSIONS

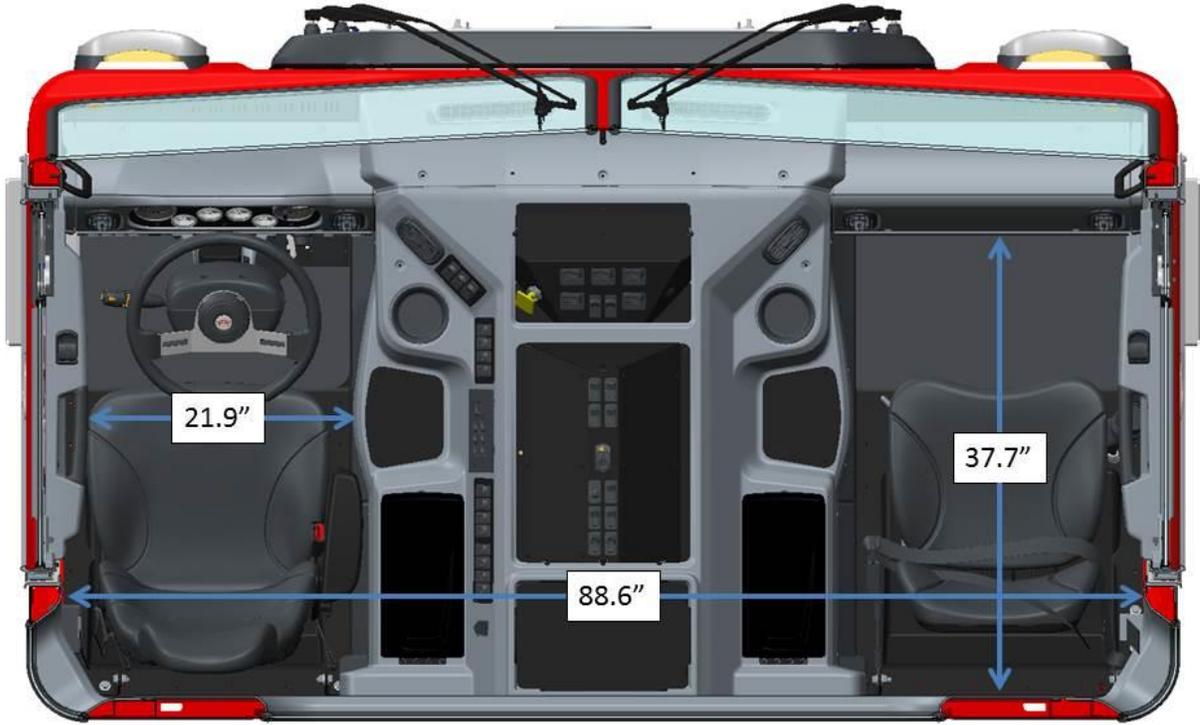


FIGURE 3-6. Top View of LH Steer Model

INTERIOR DIMENSIONS

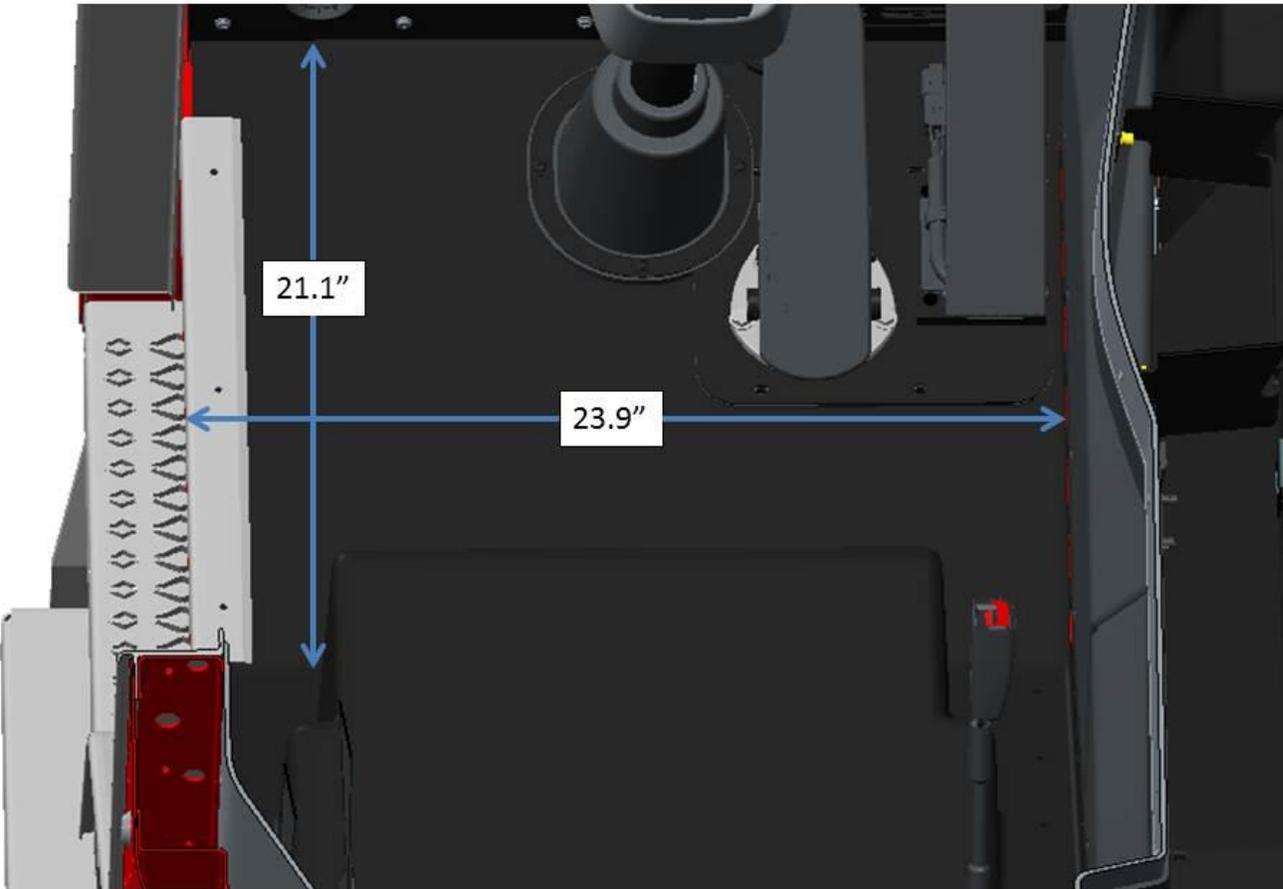


FIGURE 3-7. Floor Dimensions for LH Floor

INTERIOR DIMENSIONS

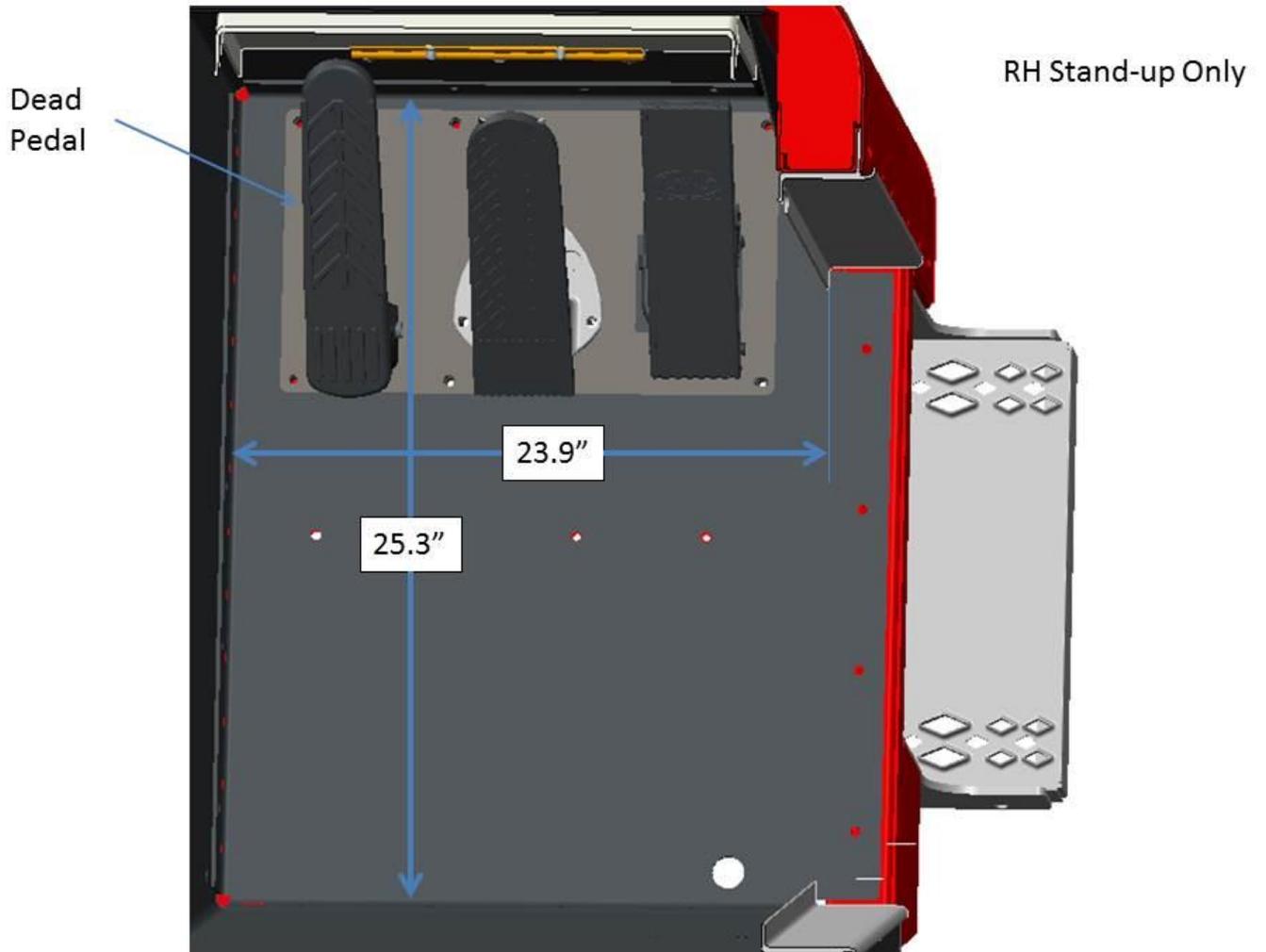
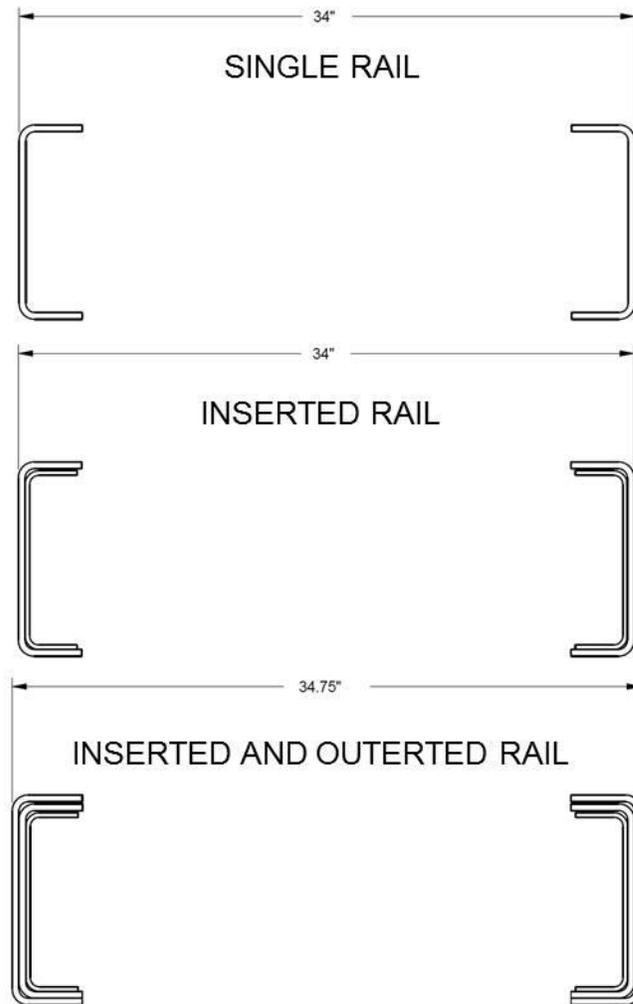


FIGURE 3-8. Passenger Floor RH Stand Up

**FRAME RAILS**

Frame rail configurations are shown in Figure 3-9. The under-cab area of the 520 frame rails is splayed as shown in Figure 3-10. Frame height, flange and structural values can be found in the Body Mounting Section.



**FIGURE 3-9.** Frame Rail Configurations



NOTE: The outserted frame section does not extend through the rear suspension area. The outserted frame section does not extend through the splayed area.

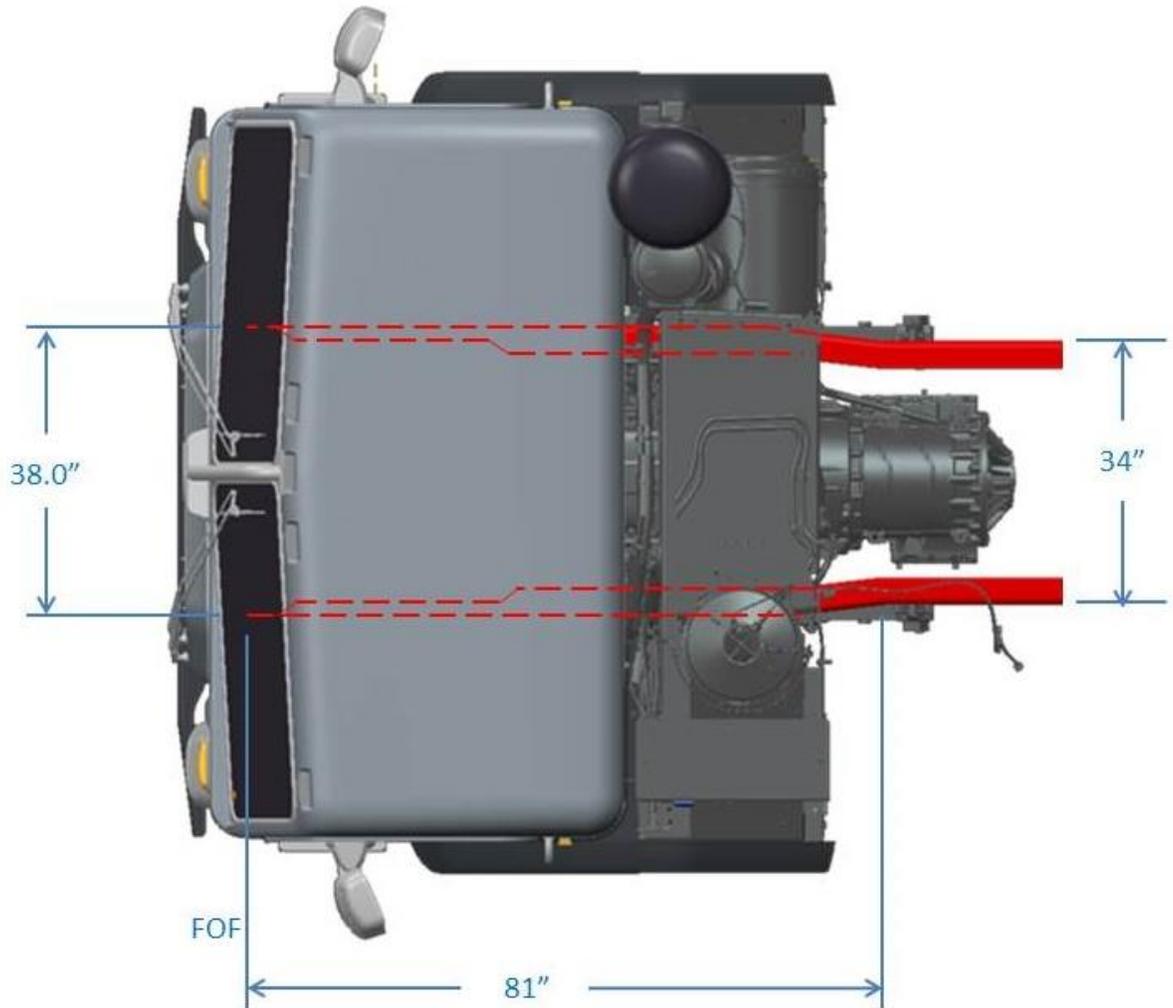
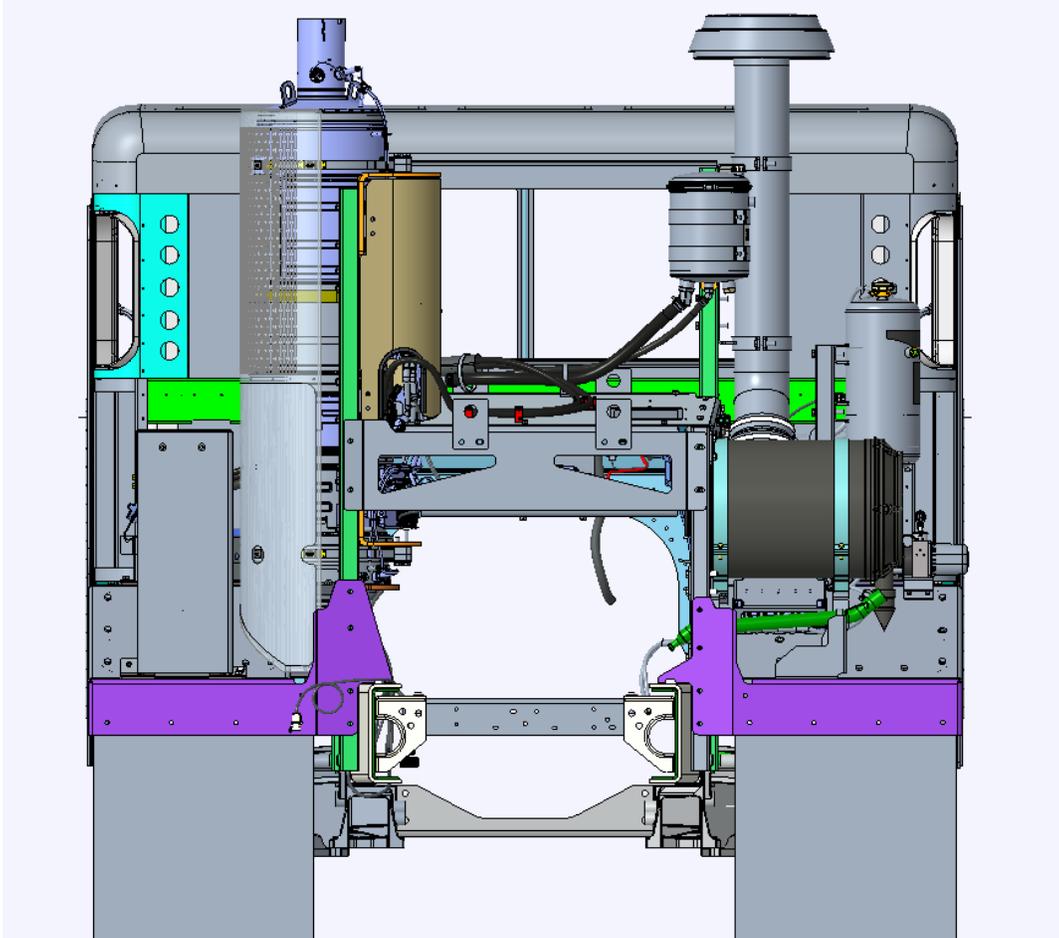


FIGURE 3-10. Model 520 Frame Rail

## 2024 EMISSIONS

## EPA 2024 520 (Back View)



**FIGURE 3-11.** Model 520 – Rear View – 2024 Emissions

The emissions changes for EPA 2024 on the Model 520 were minimal. No changes to the DPF/SCR canister were required. Some components mounted to the rear stanchion were relocated:

- The air intake pipe for the EPA 2024 520 is located 280mm inboard.
- The surge tank for EPA 2024 is now vertically mounted and is 57mm inboard.
- The power steering reservoir was relocated.

**FRAME HEIGHT CHARTS**

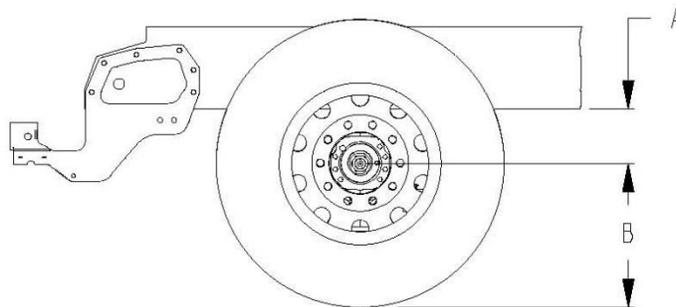
THE FOLLOWING FRAME HEIGHT CHARTS MAY BE USED FOR FINDING APPROXIMATE FRONT AND REAR FRAME HEIGHTS.

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.

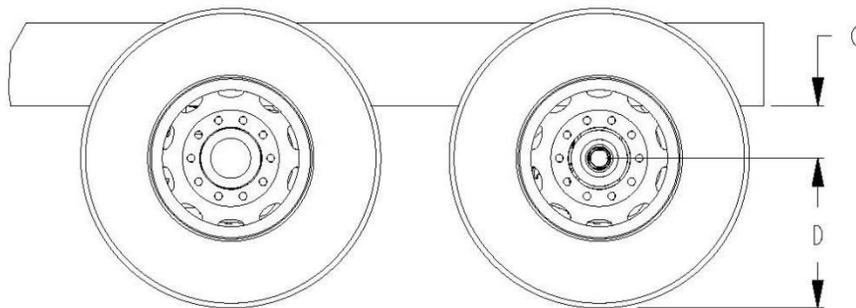
LOADED VALUES ARE QUOTES FOR REPRESENTATIVE LOADS AT THE GROUND FOR THE PARTICULAR SPRING AND AXLE COMBINATION, AND, AS SUCH, CAN VARY WITH LOADING VARIATIONS.

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 3-12. Frame Height**

**TABLE 3-2.** Front Frame Height "A" – 520

<b>FRONT FRAME HEIGHT "A"</b>				
<b>SUSPENSION</b>		<b>SPACER (mm)</b>	<b>LIGHT (in.)</b>	<b>LOADED (in.)</b>
20,000 lbs.	TAPERLEAF	OMIT	14.0	10.9
		25 mm (2)	15.0	11.9
17,000-23,000 lbs.	TAPERLEAF @ 18,000 lbs.	OMIT (1)	12.2	10.7
		25 mm	13.15	10.65
	TAPERLEAF @ 20,000 lbs.	OMIT (1)	12.5	9.5
		25 MM	13.5	10.5
17,000-23,000 lbs.	TAPERLEAF @ 23,000 lbs.	OMIT (1)	12.9	9.1
		25 mm	13.9	10.1
36,000 lbs.	TANDEM 4	25 mm (2)	13.2	11.2

**NOTES:**

- 1) Omit spacer block standard.
- 2) 25mm spacer block standard and required.
- 3) Standard 3-1/2" drop axle heights shown, for 5" drop axles, subtract an additional 1-1/2".
- 4) Spacer blocks are used by Engineering to obtain level frame and are not options.
- 5) "A" dimension shown is to bottom of frame rail. Add frame rail height dimension for frame height.

**REAR FRAME HEIGHTS "C"**

**TABLE 3-3. Single Drive Suspension Heights**

<b>Suspension</b>	<b>Rating</b>	<b>Version</b>	<b>Light Height</b>	<b>Laden Height</b>
LOW AIR LEAF	21,000 lbs.	Standard	6.8	6.5
AIR TRAC	20,000 lbs.	Standard	11.4	11.0
	23,000 lbs.	Standard	11.4	11.0
REYCO 79KB	20,000 lbs.	Taper-leaf (3.38" saddle)	9.4	11.8
	21,000 lbs.	Taper-leaf (1.38" saddle)	7.4	9.8
	23,000 lbs.	Multi-leaf (1.38" saddle)	8.8	11.6
	26,000 lbs.	Multi-leaf (1.38" saddle)	9.2	11.8
	28,000 lbs.	Multi-leaf (1.38" saddle)	9.6	12.3
	31,000 lbs.	Multi-leaf (1.38" saddle)	10.7	13.3
REYCO 102	23K-29K lbs.	4.38 saddle	12.0	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

**TABLE 3-4.** Tandem Drive Peterbilt Suspension Heights

<b>Suspension</b>	<b>Rating</b>	<b>Version</b>	<b>Light Height</b>	<b>Laden Height</b>
AIR LEAF	38,000 lbs.		12.0	11.7
LOW AIR LEAF	40,000 lbs.		8.8	8.5
FLEX AIR	38,000 lbs.		8.8	8.5
LOW-LOW AIR LEAF	40,000 lbs.		6.8	6.5
AIR TRAC	40K-46K lbs.		11.4	11.0
QUADRAFLEX	38,000 lbs.	Taper-leaf	10.6	8.7

**TABLE 3-5.** Tandem Drive Neway Suspension Heights

<b>Suspension</b>	<b>Rating</b>	<b>Version</b>	<b>Light Height</b>	<b>Laden Height</b>
NEWAY AD	52,000 lbs.		10.0	10.0
NEWAY ADZ	46K-52K lbs.		10.0	10.0

**TABLE 3-6.** Tandem Drive Reyco Suspension Heights

<b>Suspension</b>	<b>Rating</b>	<b>Version</b>	<b>Light Height</b>	<b>Laden Height</b>
REYCO 102 MULTILEAF	40,000 lbs.	1.75 saddle (STD)	11.7	9.8
		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
REYCO 102AR (AIR)	34K-40K	STD LOW	8.3	8.3

**TABLE 3-7. Tandem Drive Chalmers Suspension Heights**

<b>Suspension</b>	<b>Rating</b>	<b>Version</b>	<b>Light Height</b>	<b>Laden Height</b>
CHALMERS 854 & 860	40,000 lbs.	LOW	11.1	8.9
		HIGH	12.4	10.2
		X-HIGH	14.5	12.2
		XX-HIGH	17.2	14.9
CHALMERS 854 & 860	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
CHALMERS 854 & 860	50K-52K	LOW	11.3	8.9
		HIGH	12.5	10.1
		X-HIGH	14.6	12.1
		XX-HIGH	17.3	14.8
CHALMERS 872	46,000 lbs.	LOW	11.2	8.8
		HIGH	12.5	10.3
		X-HIGH	14.6	12.2
		XX-HIGH	17.3	14.9
CHALMERS 872	50,000 lbs.	LOW	11.2	8.8
		HIGH	12.5	10.3
		X-HIGH	14.6	12.1
		XX-HIGH	17.3	14.8

**NOTES:**

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

**TABLE 3-8. Tandem Drive Hendrickson Suspension Heights**

<b>Suspension</b>	<b>Rating</b>	<b>Version</b>	<b>Light Height</b>	<b>Laden Height</b>
RT-403	40,000 lbs.	6.00	9.9	8.9
		7.188 (std.)	11.2	10.1
RTE-403	40,000 lbs.	6.00	9.9	8.4
		7.188 (std.)	11.2	9.5
R-403	40,000 lbs.	12.80	5.8	5.8
		15.81 (std.)	8.8	8.8
		17.60	10.6	10.6
RS-403	40,000 lbs.	12.25	9.9	9.1
		14.00 (std.)	11.7	10.8
		15.25	12.9	12.1
HMX	40,000 lbs.	16.5 (low)	10.6	9.5
		18.5 (std.)	12.6	11.5
HMX	46,000 lbs.	16.5 (low)	10.6	9.5
		18.5 (std.)	12.6	11.5
HMX EX	40,000 lbs	16.5	11.6	9.5
		17.5	12.6	10.5
		18.5 (std.)	13.6	11.5
	46,000 lbs	16.5	11.6	9.5
		17.5	12.6	10.5
		18.5 (std.)	13.6	11.5
52,000 lbs	18.5	13.6	11.5	
HN462	46,000 lbs.	20.25 (high)	15.0	13.3
R-463	46,000 lbs.	15.75 (std.)	8.8	8.8
		20.50	13.5	13.5
RS-463	46,000 lbs.	12.25	9.7	8.9
		14.0 (std.)	11.5	10.6
		15.25	12.7	11.9
RT-463	46,000 lbs.	6.00	11.3	10.5
		7.188 (std.)	13.0	11.4
		11.00	16.3	15.2
RTE-463	46,000 lbs.	7.188 (std.)	11.6	10.2
		11.00	15.4	14.0
RS-503	50,000 lbs.	14.0 (std.)	11.7	10.8
		15.25	12.9	12.1
RT-503	50,000 lbs.	7.188 (std.)	12.1	11.1
		11.0 1	16.4	15.4
RTE-503	50,000 lbs.	7.188 (std.)	11.6	10.2
		11.00	15.4	14.0

**NOTES:**

- 1) With SISU 70k axle subtract 0.39" from light/laden
- 2) With SISU 70k axle subtract 0.28" from light and 0.39" from laden

**TABLE 3-8 (cont).** Tandem Drive Hendrickson Suspension Heights

RS-523	52,000 lbs.	14.0 (std.)	11.7	10.8
RT-523 , RT-650	52K-65K	7.188 (std.)	12.1	11.1
		11.00	16.4	15.4
HN522	52,000 lbs.	18.50 (std.)	12.6	11.5
RS650	65,000 lbs.	15.00 (std.)	12.0 <sup>1</sup>	11.0 <sup>2</sup>
		19.00	16.0 <sup>2</sup>	15.1 <sup>2</sup>
R650 *	65,000 lbs.	20.25 (std.)	12.5	12.5
R850 w/70K Meritor	85,000 lbs.	20.25	12.0	12.0
R850 w/SISU 70K		20.25	12.1	12.1
RS850 w/SISU 70K	85,000 lbs.	16.75	11.5	10.6

**TABLE 3-9.** Tri-Drive Suspension Heights

SUSPENSION	RATING (lbs.)		LIGHT (in.)	LOADED (in.)
<b>TRI-DRIVE SUSPENSION</b>				
AIR TRAC	40K-46K		11.4	11.0
NEWAY ADZ369	69,000		10.0	10.0
NEWAY ADZ378	78,000		10.0	10.0

### REAR SUSPENSION LAYOUTS

The rear suspension layouts are provided as a tool to help layout bodies prior to arrival. The applicable dimensions are shown. Verify the axle spacing that is shown, as alternate spacing may exist and could change some of the dimensions. The dimensions shown below are the most typical installations, in special cases some hole locations will move.

If the holes shown will be used for body installation, please confirm with the local Peterbilt dealer the drawing below will be the installation used on the specific truck. In this case, ordering the frame layout of the chassis is advised. This can be done on any Peterbilt truck and will be provided ahead of the build schedule. Ensure proper torque to reinstall any suspension components. See Tables 5-1 and 5-2 on page 5-4.

For hole locations not detailed, please work with the local Peterbilt Dealer to request that information.

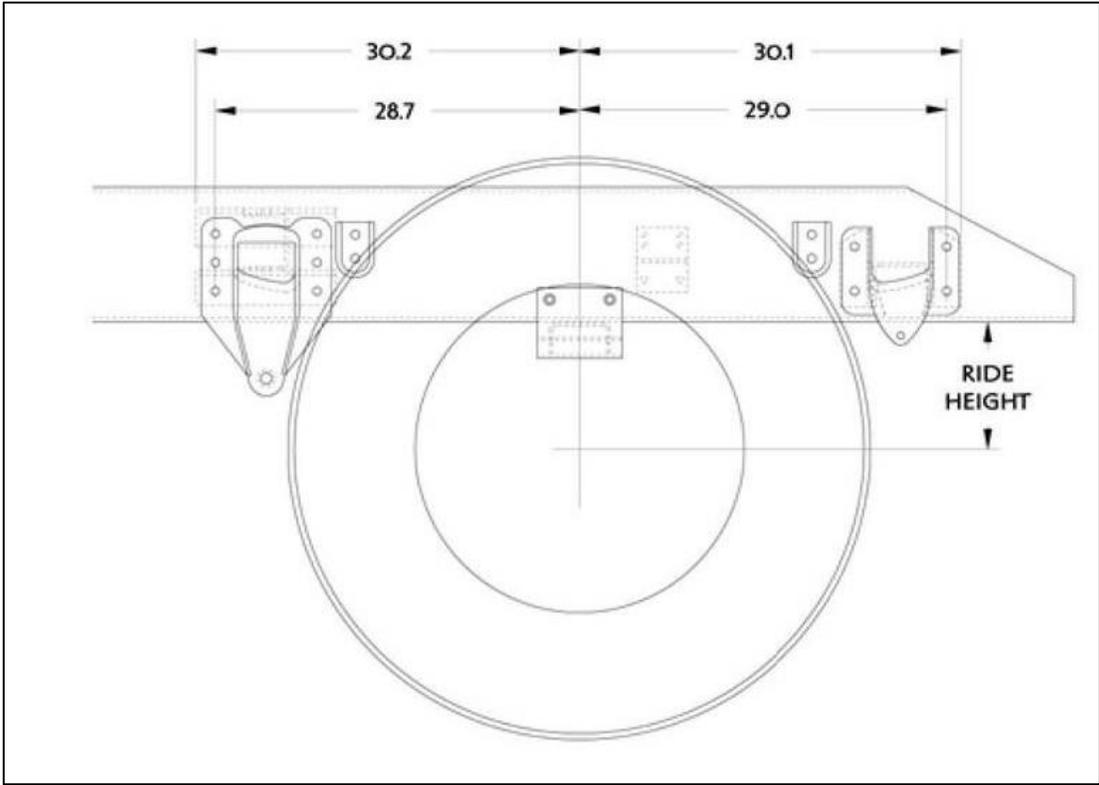


FIGURE 3-13. Reycy 79KB Frame Drilling (Dimensions in Inches)

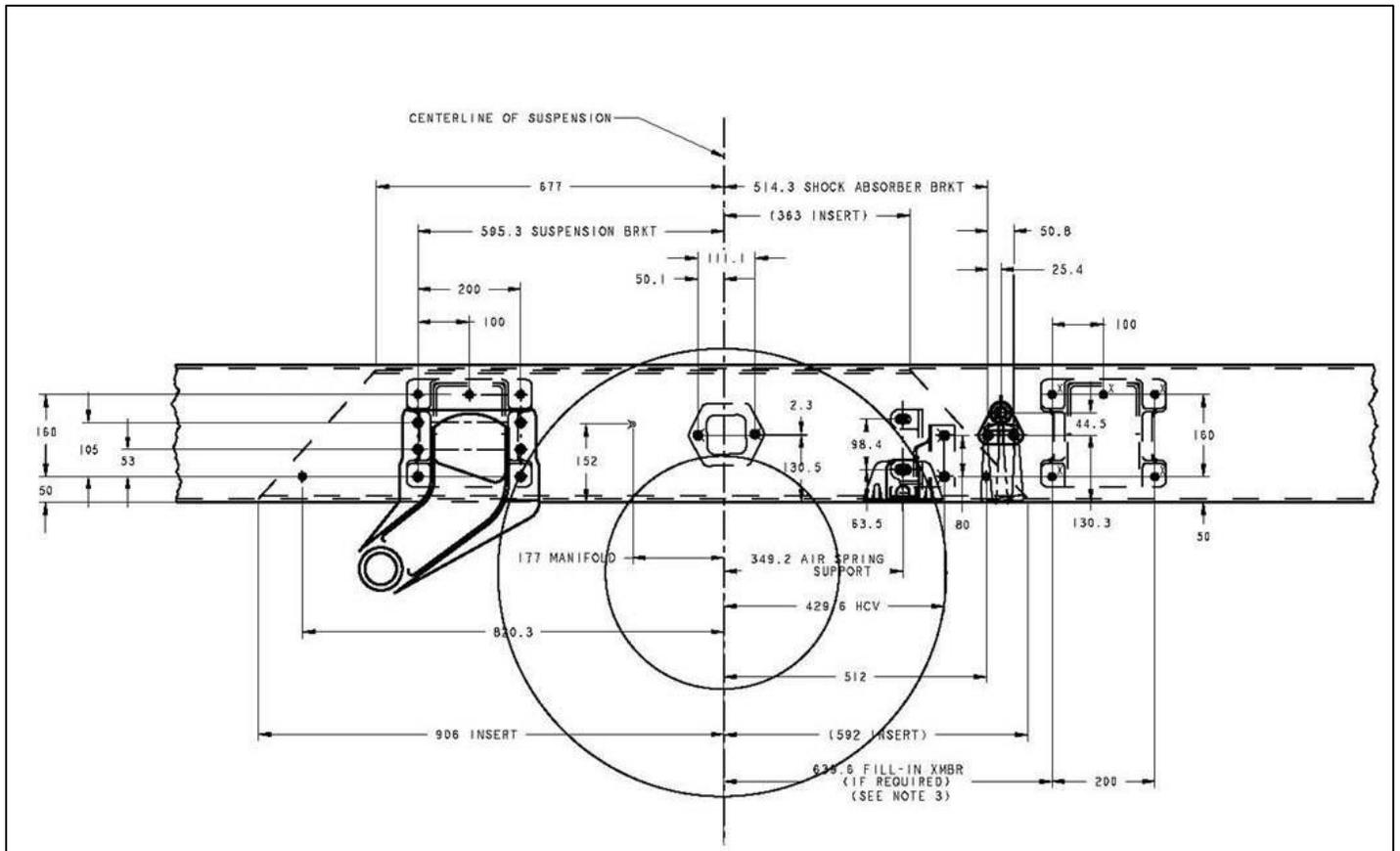


FIGURE 3-14. Reyco 102AR Frame Drilling (Dimensions in Millimeters)

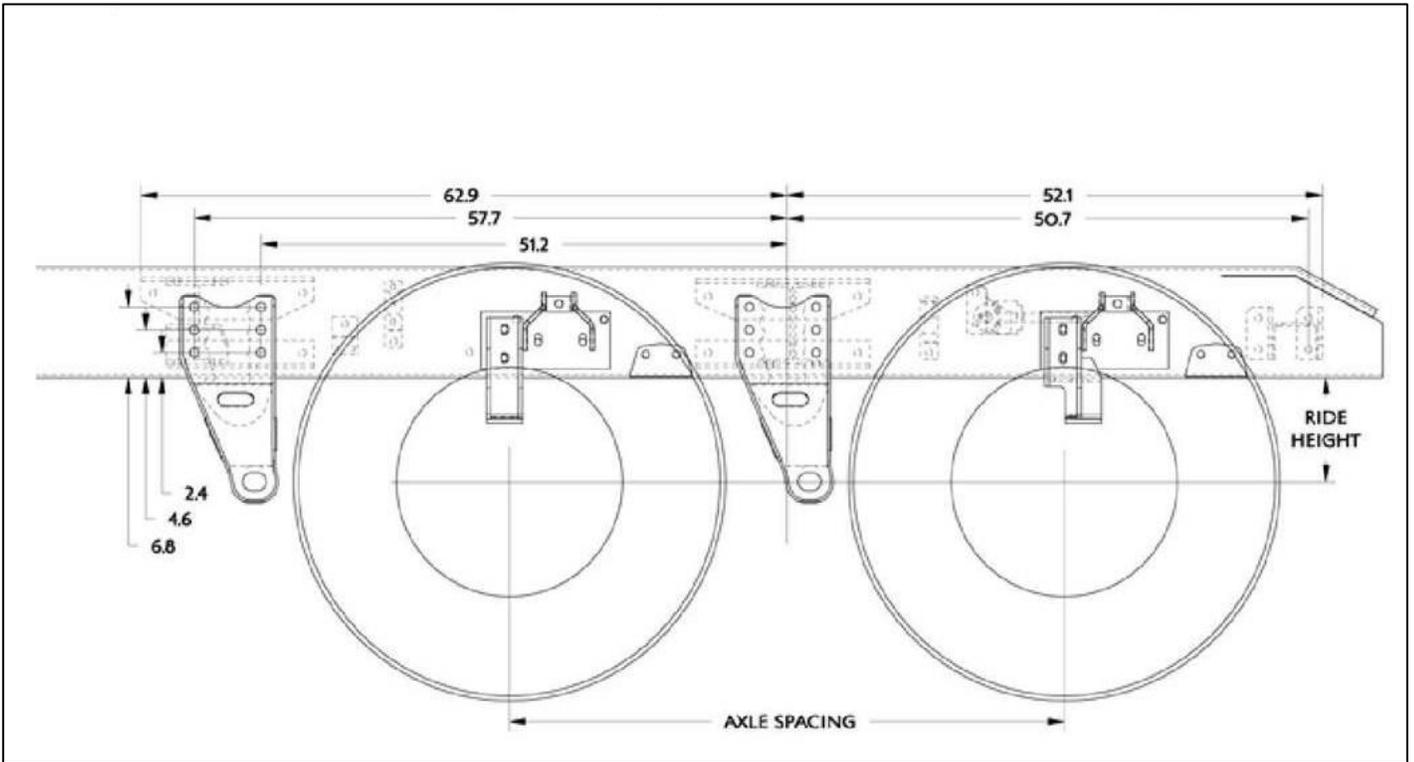


FIGURE 3-15. Neway ADZ 252 Frame Drilling (Dimensions in Inches)

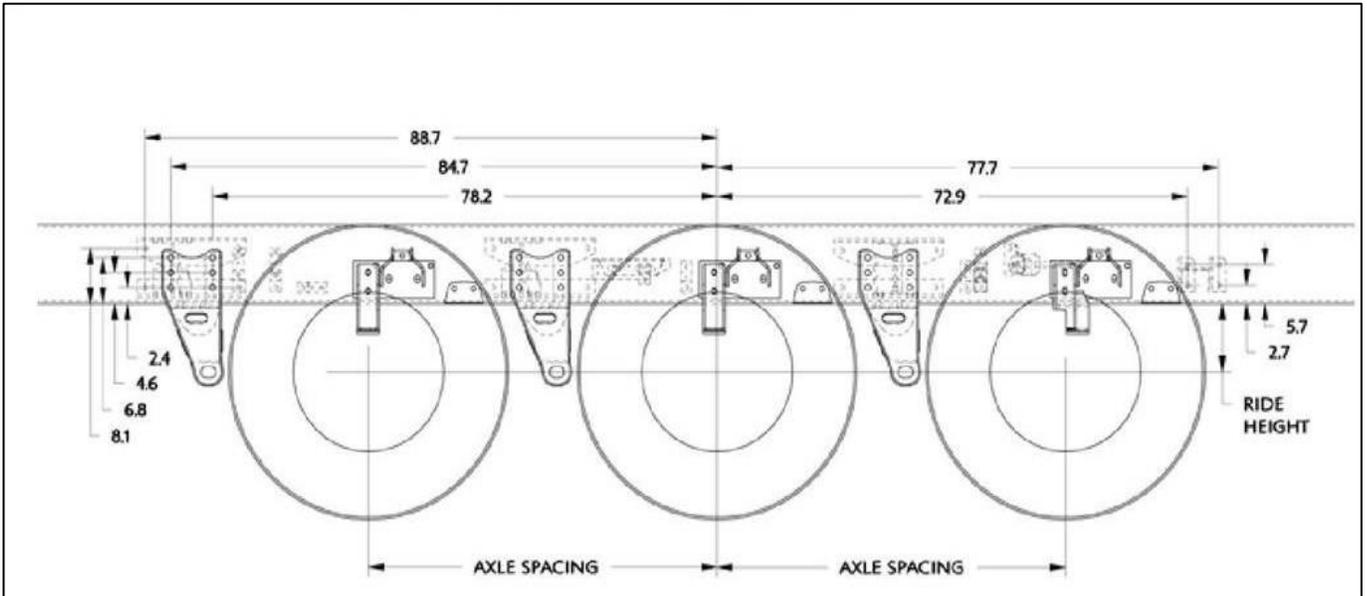


FIGURE 3-16. Neway ADZ 369/378 Frame Drilling (Dimensions in Inches)











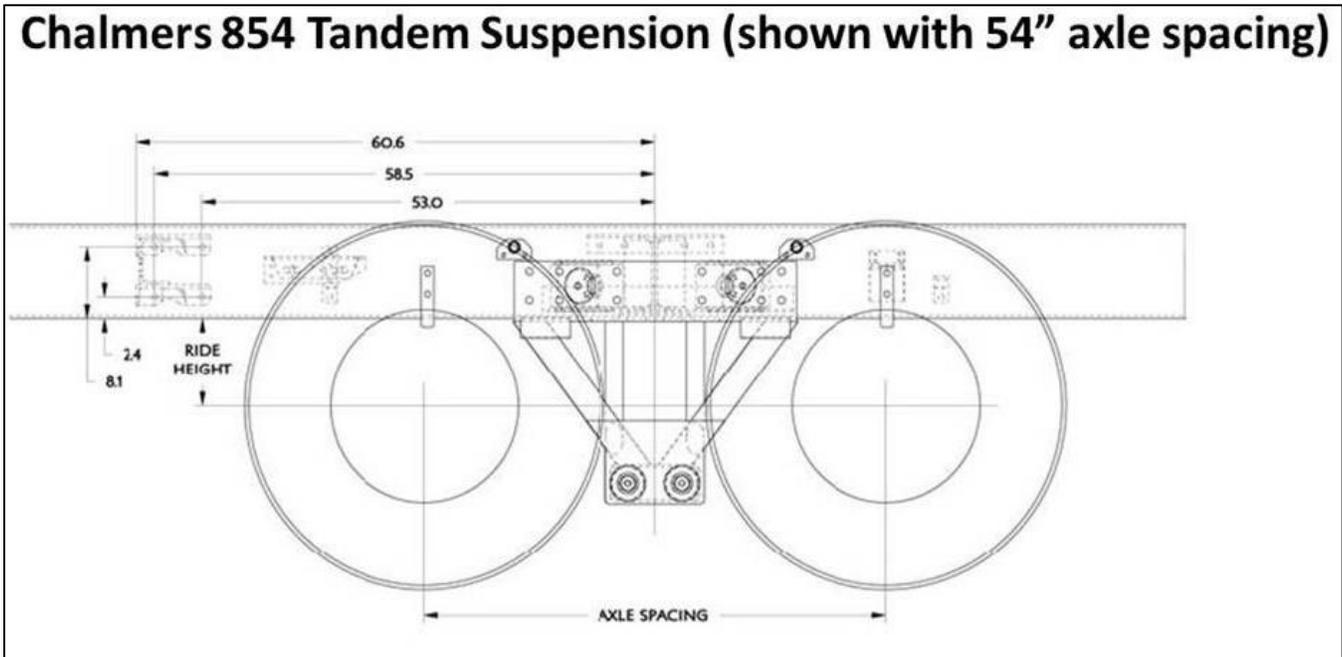


FIGURE 3-22. Chalmers 854 Tandem Frame Drilling

### Hendrickson HMX Tandem Suspension (shown with 54" axle spacing w/o tracking rods)

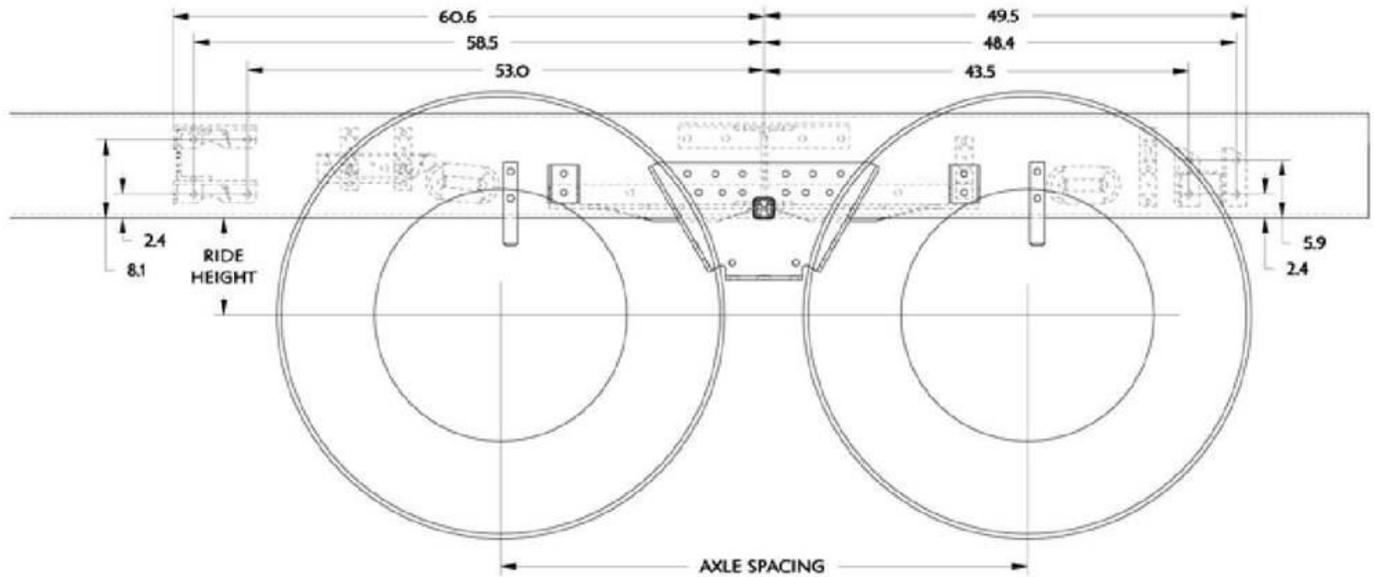


FIGURE 3-23. Hendrickson HMX Tandem Frame Drilling

### Hendrickson RT/RTE Tandem Suspension (shown with 54" axle spacing w/o tracking rods)

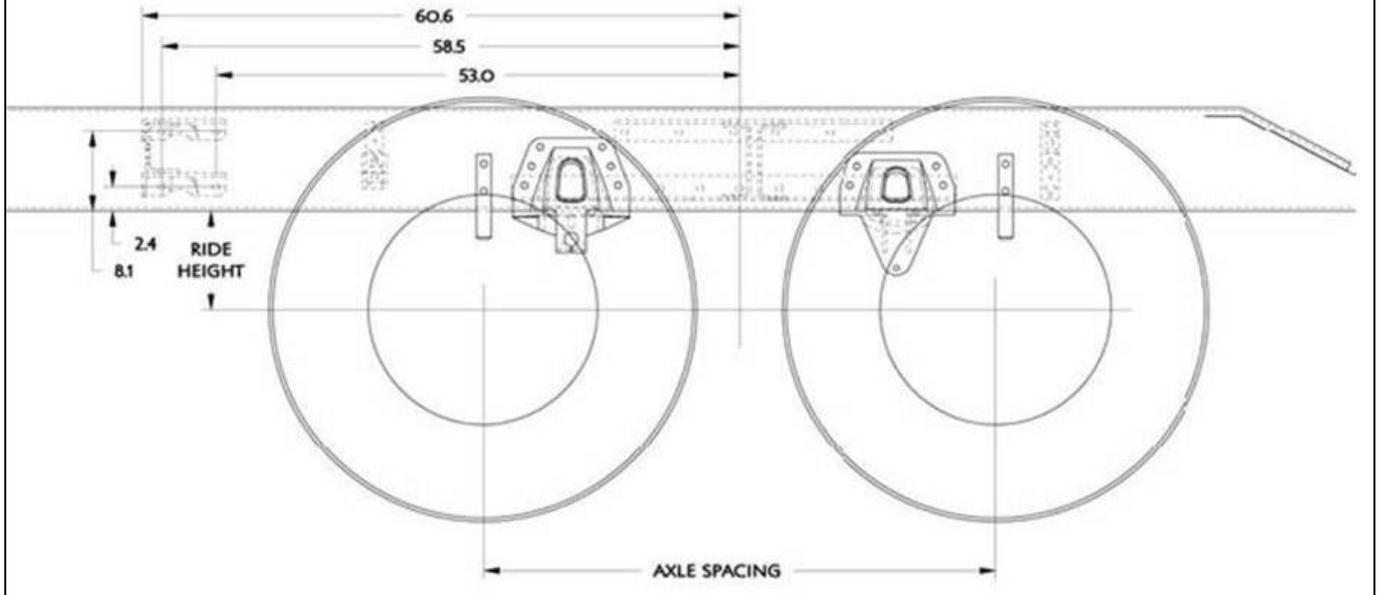


FIGURE 3-24. Hendrickson RT/RTE Tandem Frame Drilling

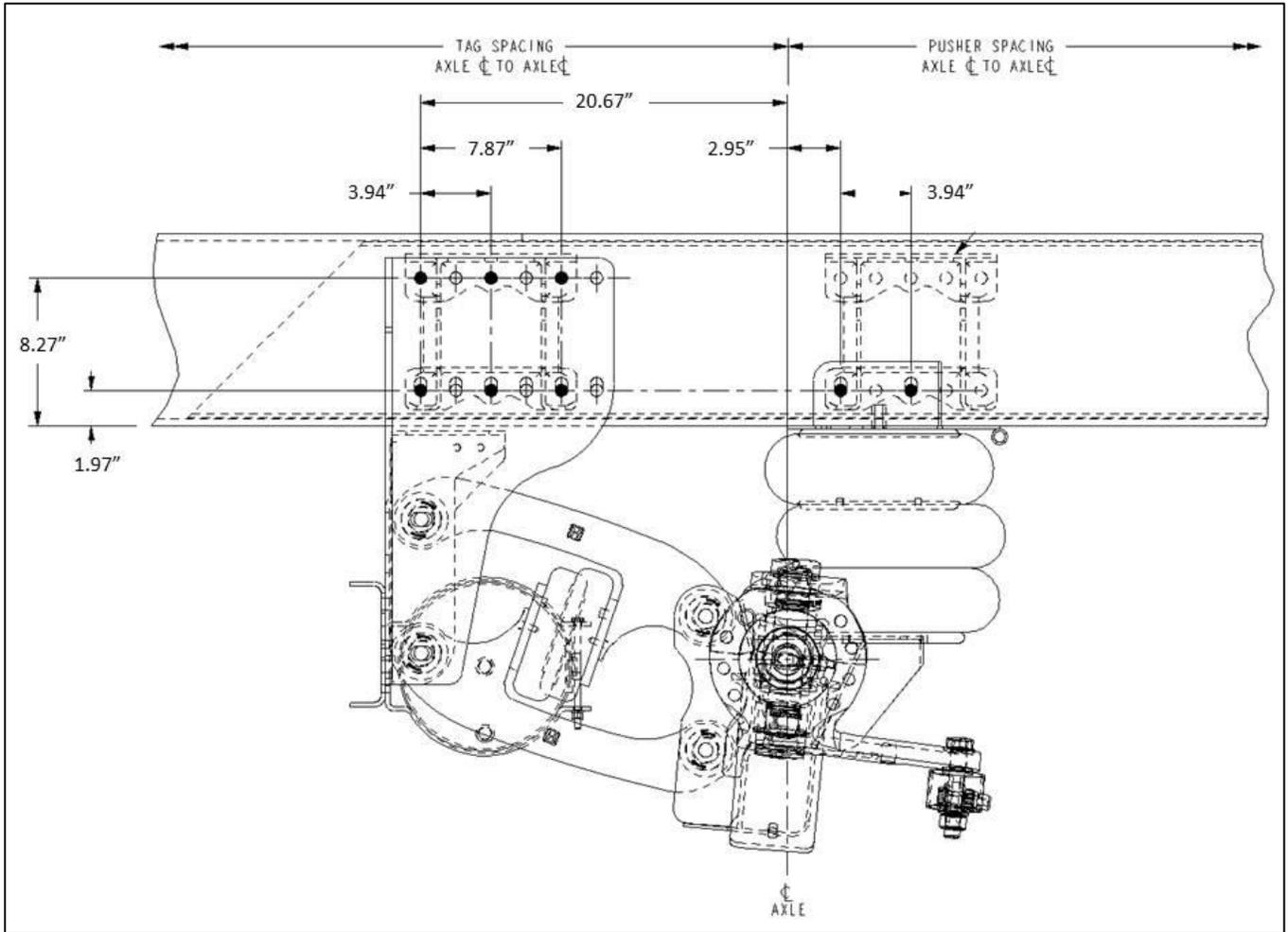






**PUSHER AND TAG AXLE LAYOUTS**

The rear pusher axle layouts are provided as a tool to help layout bodies prior to arrival. The applicable dimensions are shown. When using the pusher layouts to determine available frame space please be aware clearances required are not shown. For information that may not be detailed in these drawings, work with your local Peterbilt Dealer to request that information.



**FIGURE 3-28.** Hendrickson SC8, SC10, SC13, SCO13, FX or FXO Pusher or Tag

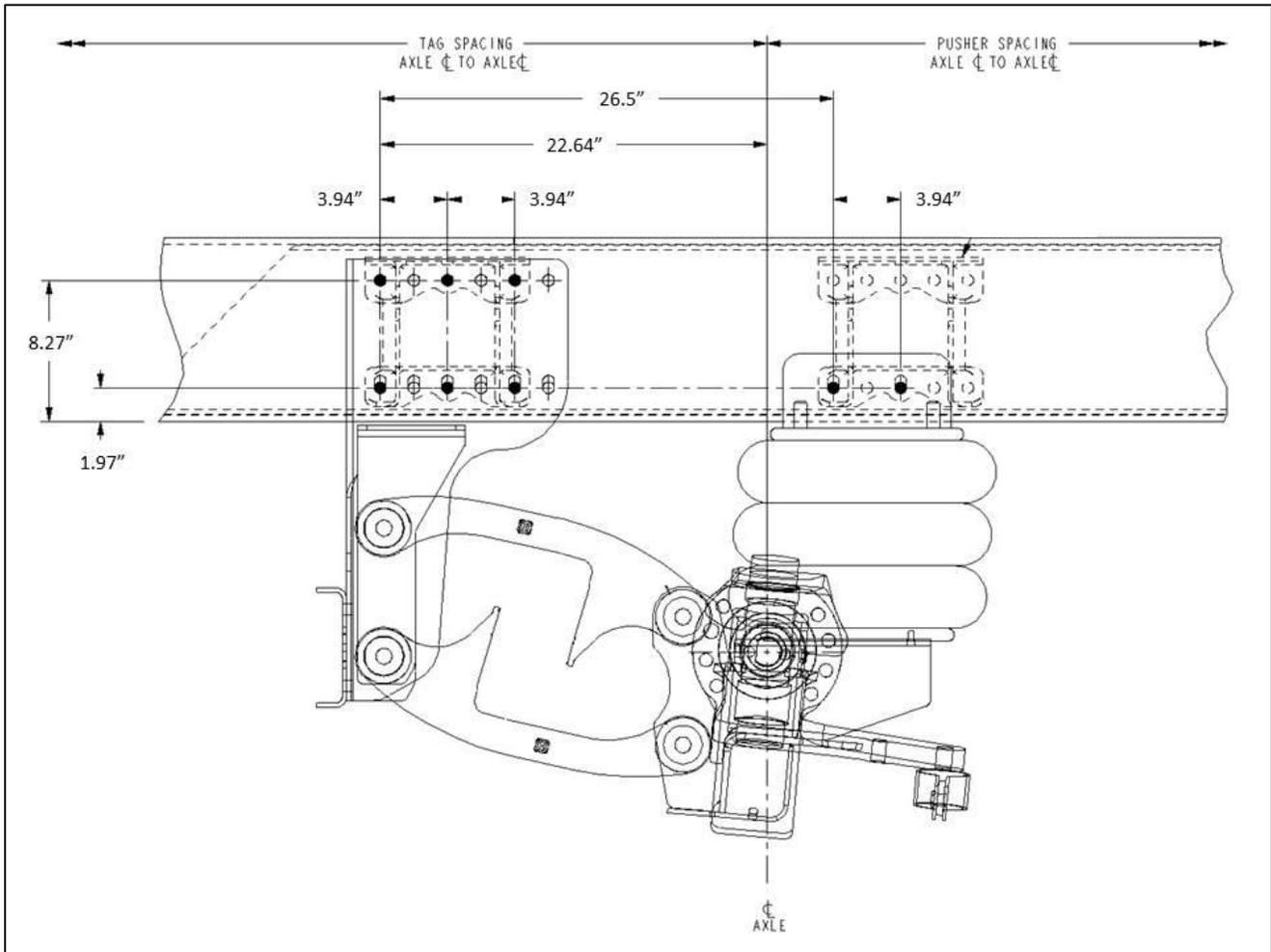


FIGURE 3-29. Hendrickson SC20 Pusher or Tag

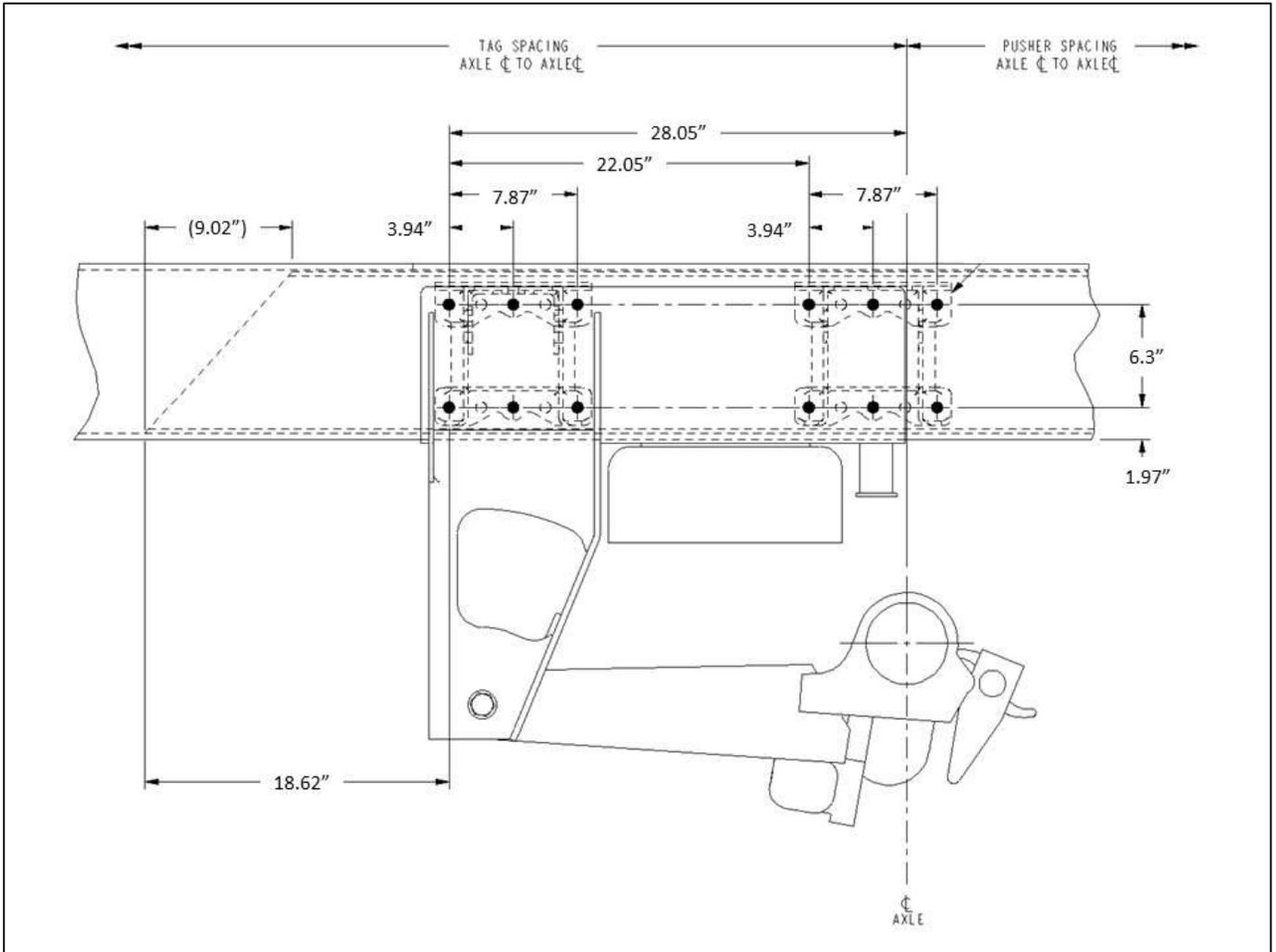


FIGURE 3-30. Hendrickson HLR2 Pusher

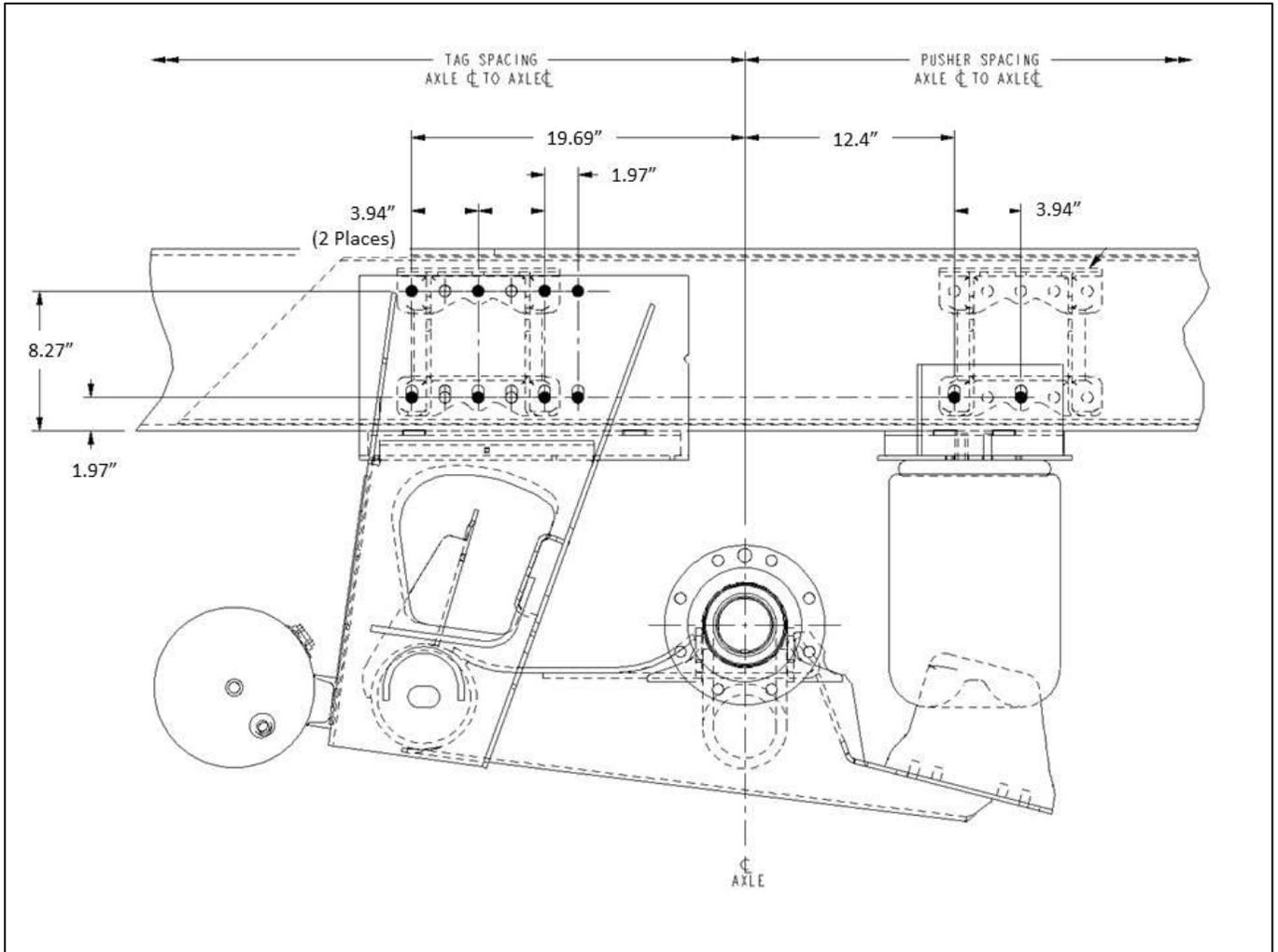


FIGURE 3-31. Hendrickson HLM Pusher or Tag

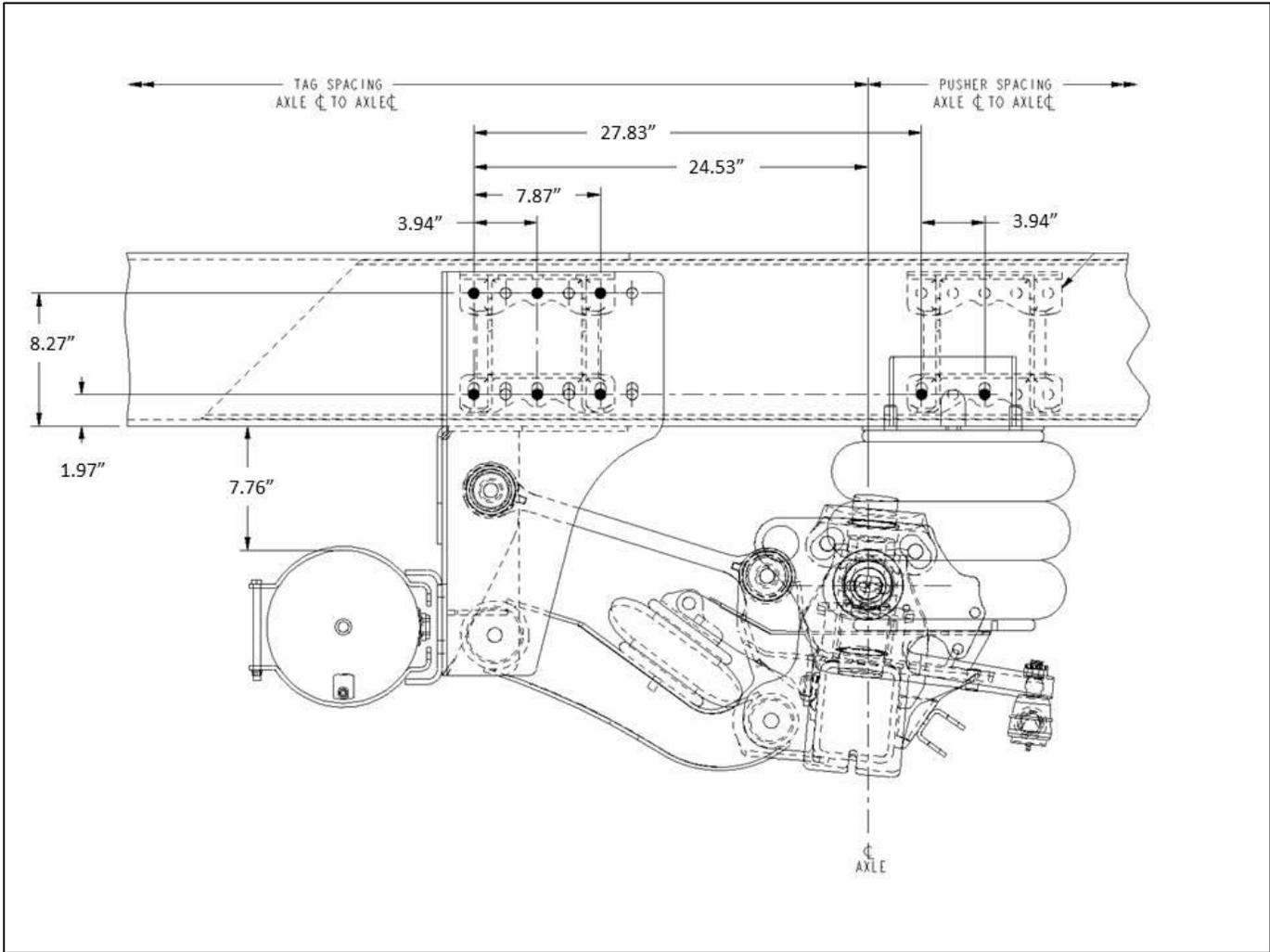


FIGURE 3-32. Watson-Chalin SL2065 Pusher or Tag

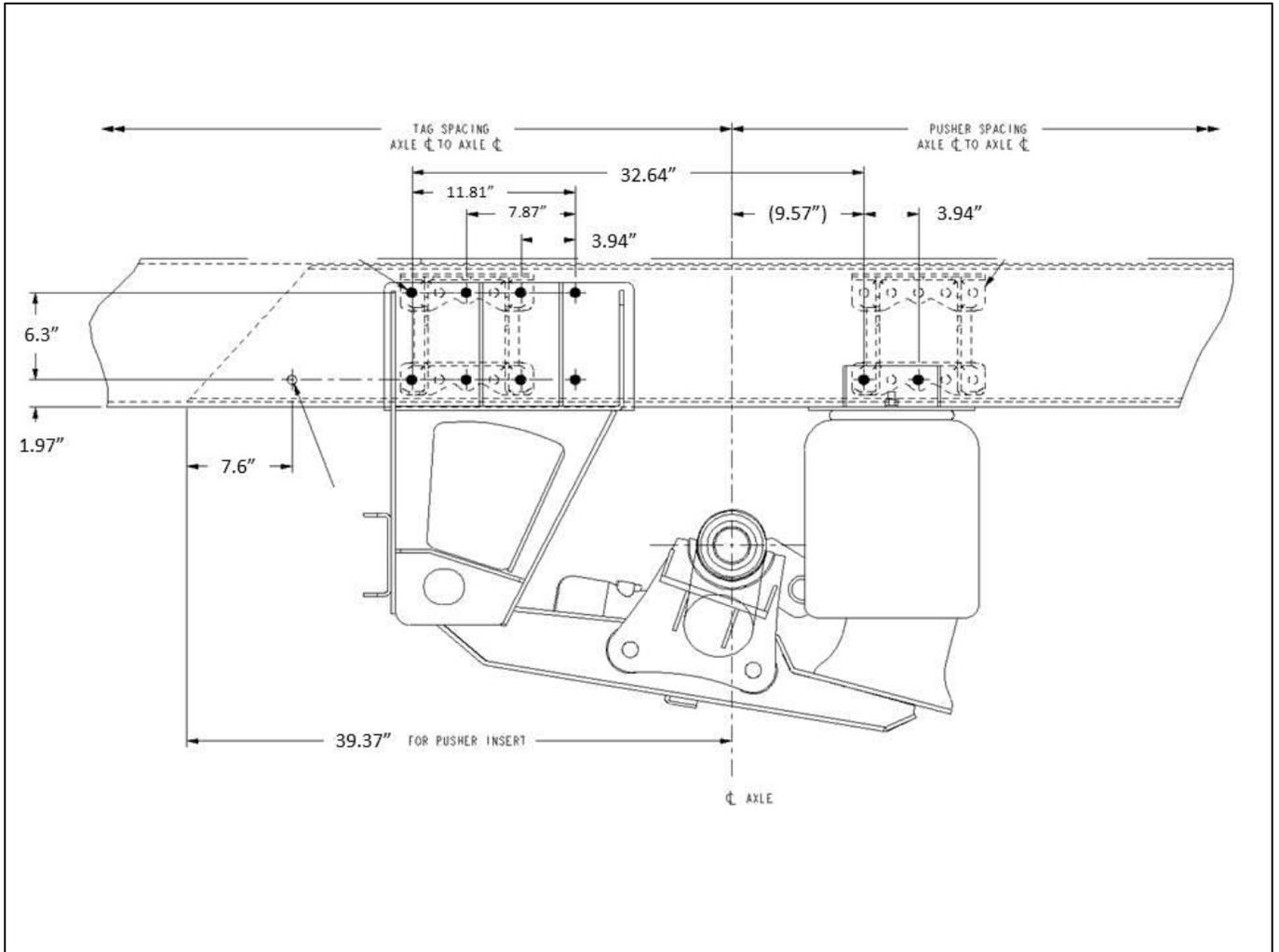


FIGURE 3-33. Watson-Chalin AL2200 Pusher or Tag

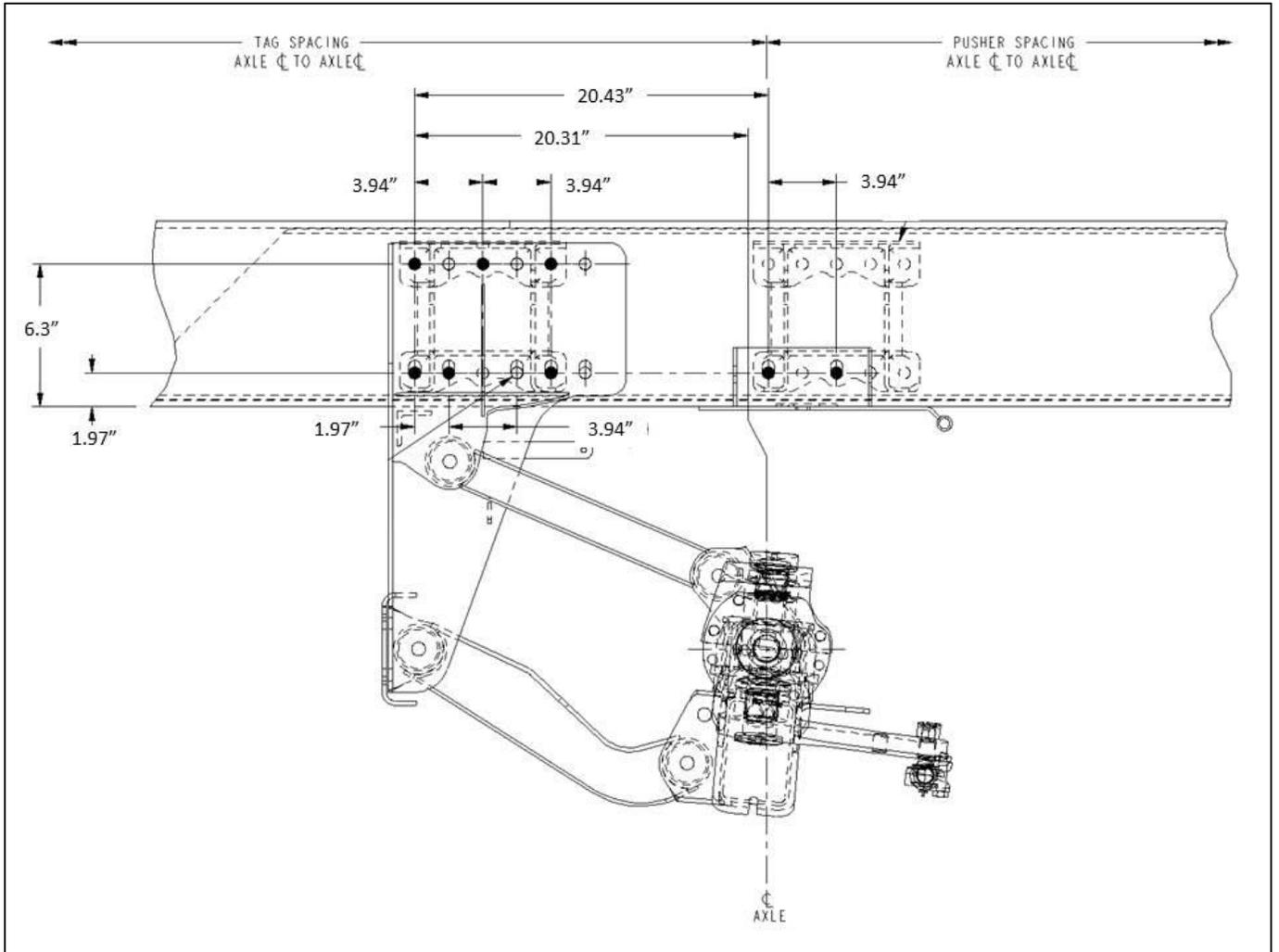


FIGURE 3-34. Watson-Chalin SL0893SSR or SL1093SSR Pusher or Tag

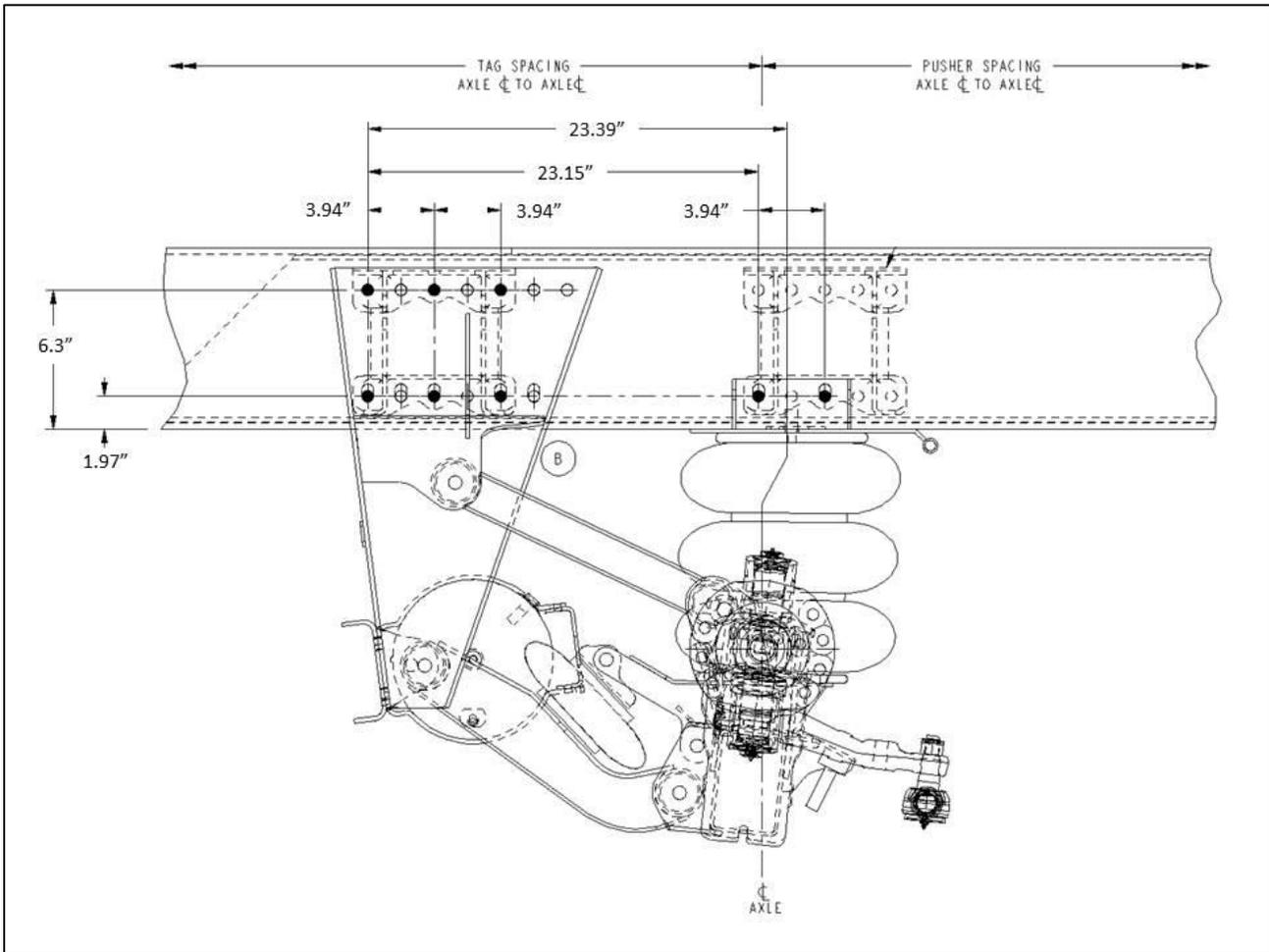


FIGURE 3-35. Watson-Chalin SL1190SSR Pusher or Tag

**EXHAUST HEIGHT CALCULATIONS**

The exhaust height calculations are provided as a tool to help layout bodies prior to arrival as well as aid in exhaust configuration selection.

Please work with the local Peterbilt Dealer to request additional information if required.

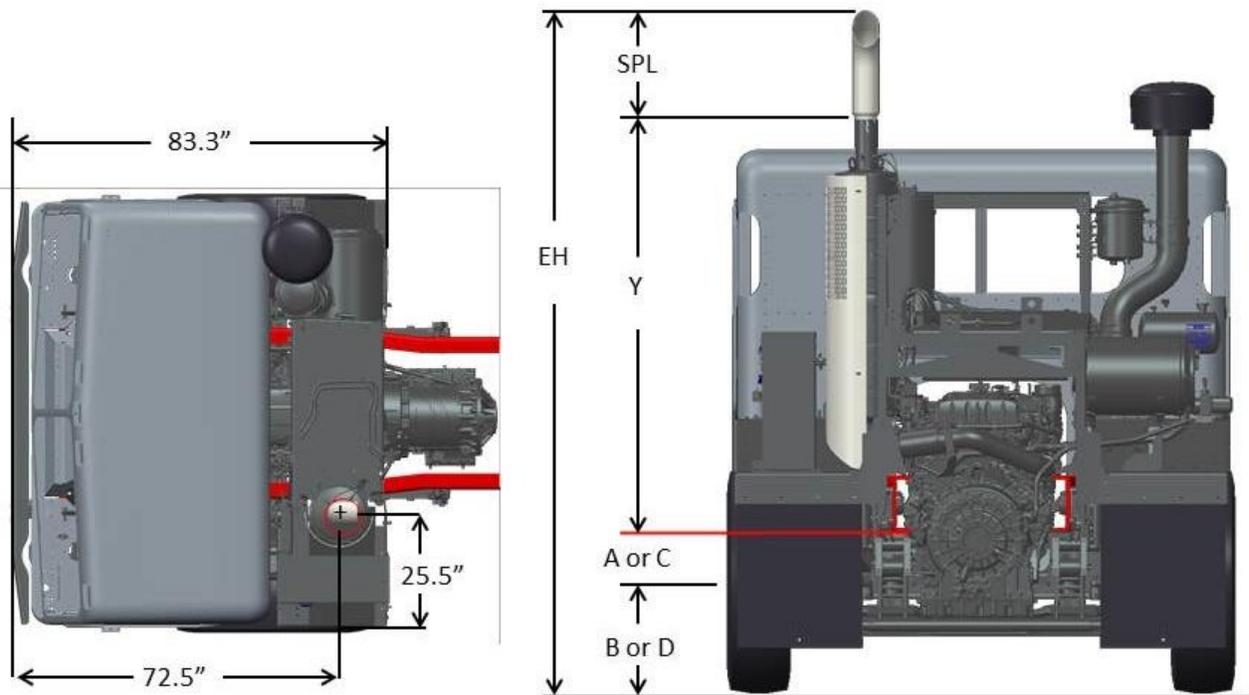
The overall exhaust height (EH) can be estimated based on the following formula:  $EH = Y + SPL + (A + B + C + D) / 2$

**TABLE 3-10. Exhaust Heights**

"Y" Dimension			
Exhaust Location	L9N	MX-11	PX-9 HHP PX-9 MHP
BOC Vertical	74.2"	84.4"	81.2" 79.7"

**NOTES:**

- 6) For "A" and "C" values, reference the FRAME HEIGHTS section for front or rear suspension height.
- 7) For "B" and "D" values, reference the tire manufacturer's website or catalog for static loaded radius (SLR).
- 8) For Standpipe Length (SPL) values, reference the truck sales order. NOTE: SPL value for 90-degree exhaust diffuser is 4.3"
- 9) Not applicable to horizontal exhaust.



**FIGURE 3-36. Exhaust Height Calculations**

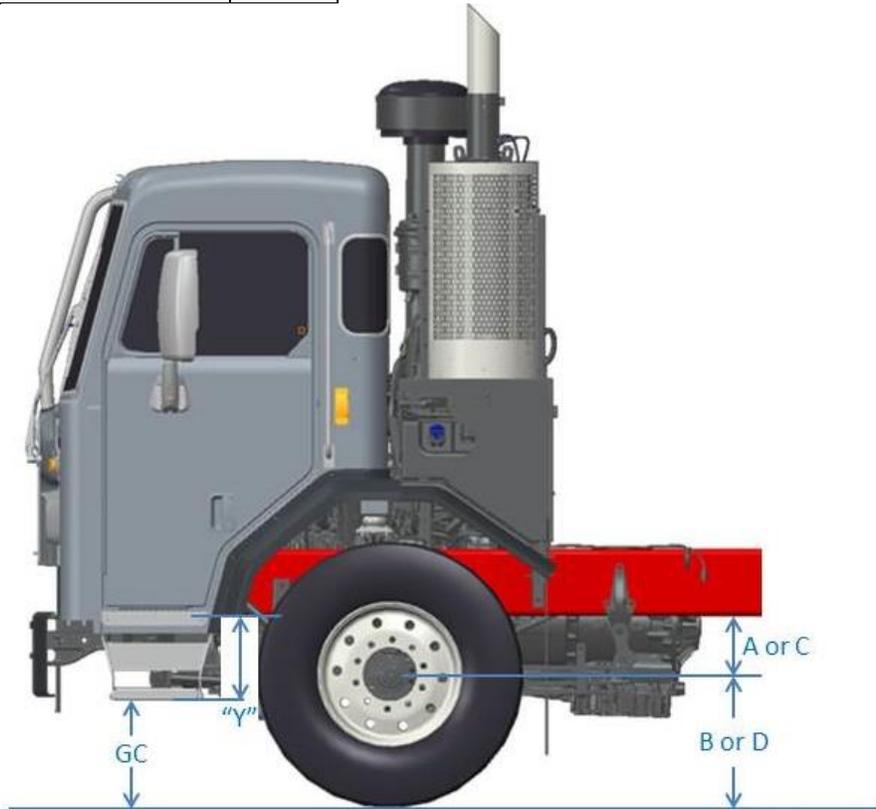
**GROUND CLEARANCE CALCULATIONS**

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

The ground clearance (GC) can be estimated based on the following formula:  $GC = (A + B + C + D) / 2 - Y$

**TABLE 3-11.** Ground Clearance

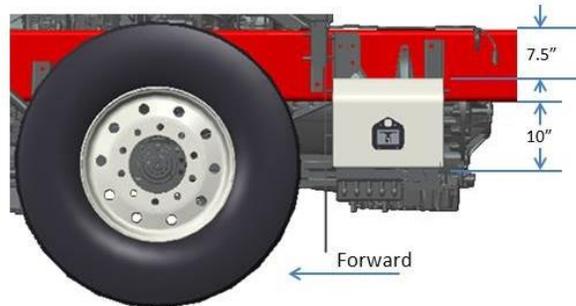
<b>Y = DISTANCE FROM BOTTOM OF FRAME TO BOTTOM OF COMPONENT</b>	
<b>Component</b>	<b>Y</b>
Cab Access Step	14.7"
Alum Space Saver (Shown Below)	10.0"
Steel Space Saver Battery Box	11.8"
Narrow Space Saver Battery Box	11.9"
Fender Mounted Battery Box	4.4"
20" Diameter Fuel Tank	12.4"
23" Diameter Fuel Tank	15.2"
26" Diameter Fuel Tank	18.0"



**FIGURE 3-37.** Ground Clearance Calculations

**NOTES:**

- 1) For "A" and "C" values, reference the FRAME HEIGHTS section for front suspension height or rear suspension height.
- 2) For "B" and "D" values, reference the tire manufacturer's website or catalog for overall diameter or static loaded radius (SLR).

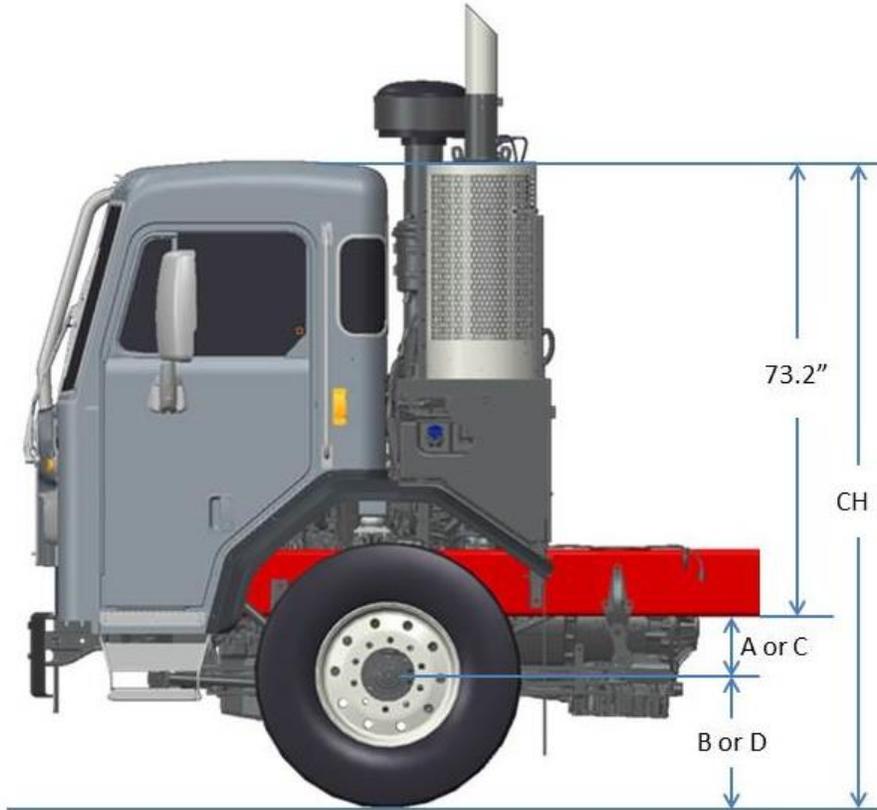


**FIGURE 3-38.** Space Saver Battery Box

**OVERALL CAB HEIGHT CALCULATIONS**

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

The overall cab height (CH) can be estimated based on the following formula:  $CH = (A + B + C + D) / 2 + 73.2"$



**FIGURE 3-39.** Overall Cab Height Calculations

**NOTES:**

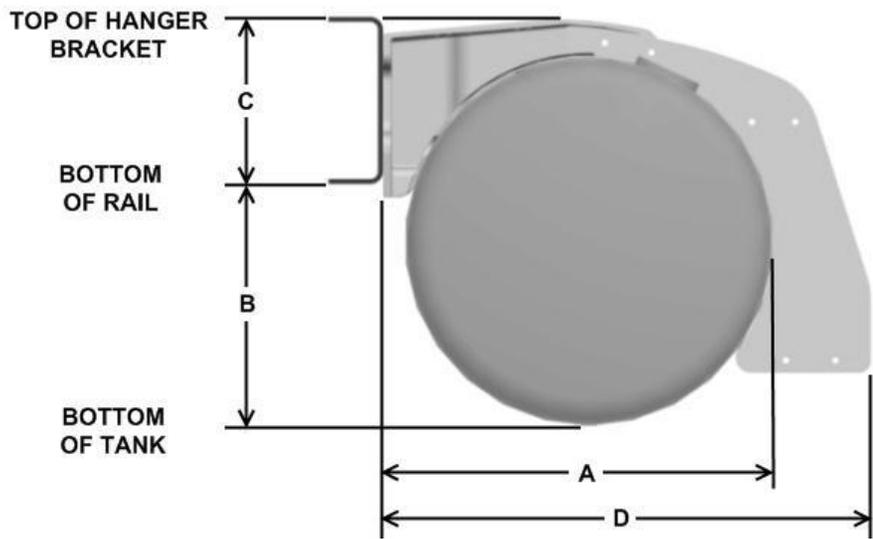
- 1) For “A” and “C” values, reference the FRAME HEIGHTS section for front suspension height or rear suspension height.
- 2) For “B” and “D” values, reference the tire manufacturer’s website or catalog for overall diameter or static loaded radius (SLR).
- 3) Roof mounted content such as horns and antennas are not included.

**FRAME COMPONENTS**

This section includes drawings and charts related to common frame mounted components. Optional equipment may not be depicted.

Please work with the local Peterbilt Dealer to request additional information if required. At the dealer's request, Peterbilt can provide frame layouts for individual vehicles prior to delivery.

**FUEL TANKS**



**FIGURE 3-40.** Fuel Tanks

**TABLE 3-12. Fuel Tank Dimensions**

	DIMENSIONS			
	A	B	C	D
20" TANK	22.7	12.4	10.3	27.5
23" TANK	24.5	15.2	10.5	31.0
26" TANK	27.2	18.0	10.6	33.7

**TABLE 3-13. Fuel Tank Data**

GALLONS		TANK LENGTH		
USEABLE	TOTAL	20"	23"	26"
40	46	33.3	N/A	N/A
50	57	43.2	34.5	26.7
60	67	51.3	40.7	31.5
70	78	57.3	46.8	36.2
80	89	65.3	52.9	41.0
90	99	N/A	59.0	45.7
100	110	N/A	*65.1	50.5
110	121	N/A	N/A	55.2
120	131	N/A	77.3	60.0
135	147	N/A	N/A	66.8
150	163	N/A	N/A	*74.0

**NOTES:**

- 1) \* Largest capacity without a weld seam

This page is intentionally left blank.

---

# SECTION 4 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.

## NOTE



*Note: An alignment and any necessary adjustment are a requirement after body installation. It is the final assembler's responsibility to complete front and rear alignments and verify height and pinion angles are correct 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 in Table 4-1 and Table 4-2.

**TABLE 4-1.** 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 3/4	3.50	0.375	17.8	2,136,000	1.74

**TABLE 4-2.** Built-up Frame Rails

Main Rail Height (in.)	Insert	Outsert	Section Modulus (cu. In.)	RBM (per rail) (in.-lbs)	Weight (per rail) (lbs/in.)
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	11.63 x 3.87 x .375	45.7	5,484,000	4.67 <sup>(1)</sup>

<sup>(1)</sup>Weight per inch in the outserted area only. (Outsert starts behind the rear front spring hanger)

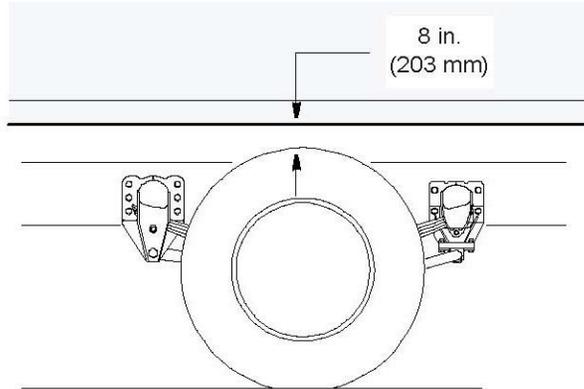
**CRITICAL CLEARANCES**

**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 4-1.**



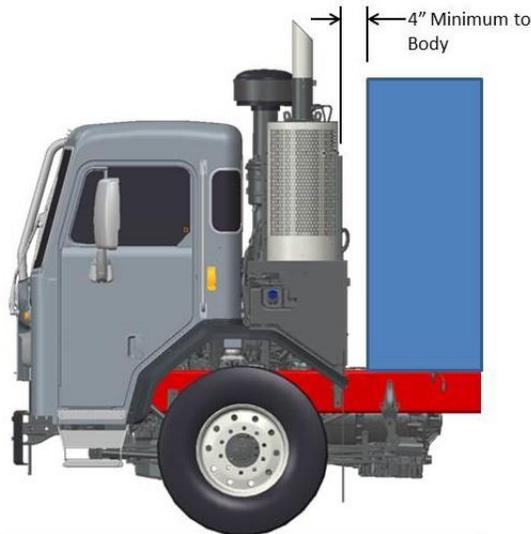
**FIGURE 4-1.** Minimum Clearance Between Top of Rear Tires and Body Structure Overhang



**CAUTION:** *Maintain adequate clearance between 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. **See Figure 4-2.***



**NOTE:** *Be sure to provide access to all maintenance and service components.*



**FIGURE 4-2.** Minimum Back of Cab Clearance

## BODY MOUNTING USING BRACKETS



**CAUTION:** Always install a spacer between the body subframe and the top flange of the 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.

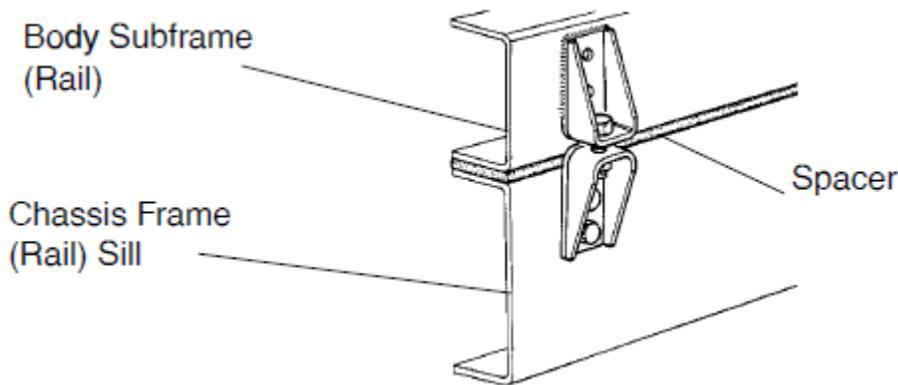


**WARNING!** When mounting a body to the chassis, DO NOT drill holes in the upper or lower flange of the frame rail. If the frame rail flanges are modified or damaged, the rail could fail prematurely and cause an accident. Mount the body using body mounting brackets or U-bolts.

### 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.

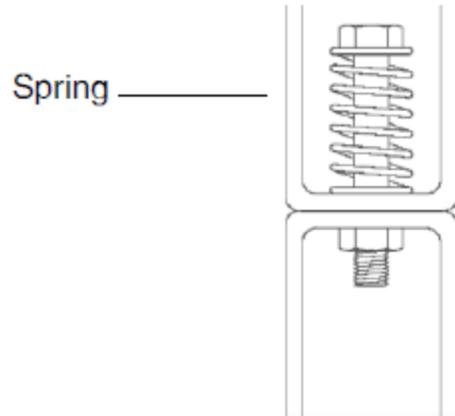
See Figure 4-3.



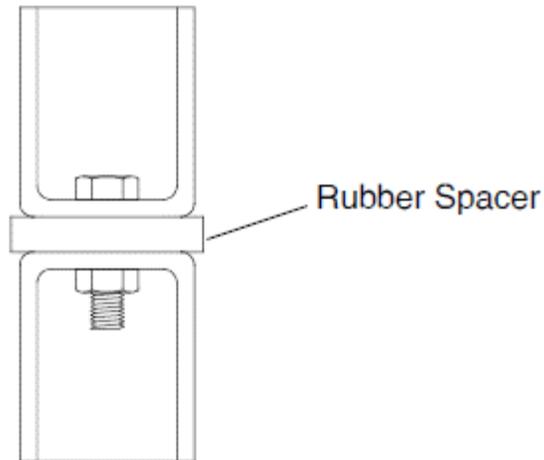
**FIGURE 4-3.** Spacer Between Frame Sill and Body Rail – Rubber or Plastic

**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 4-4** shows a high compression spring between the bolt and the bracket, and **Figure 4-5** 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.



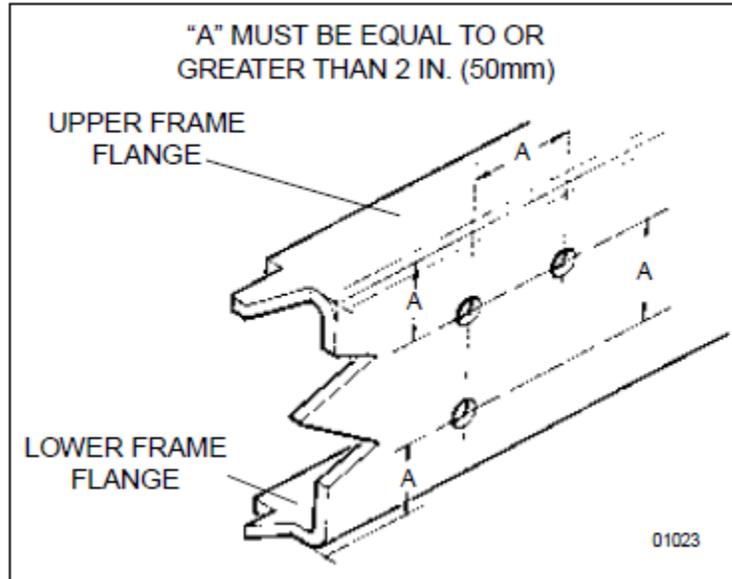
**FIGURE 4-4.** Mounting Brackets



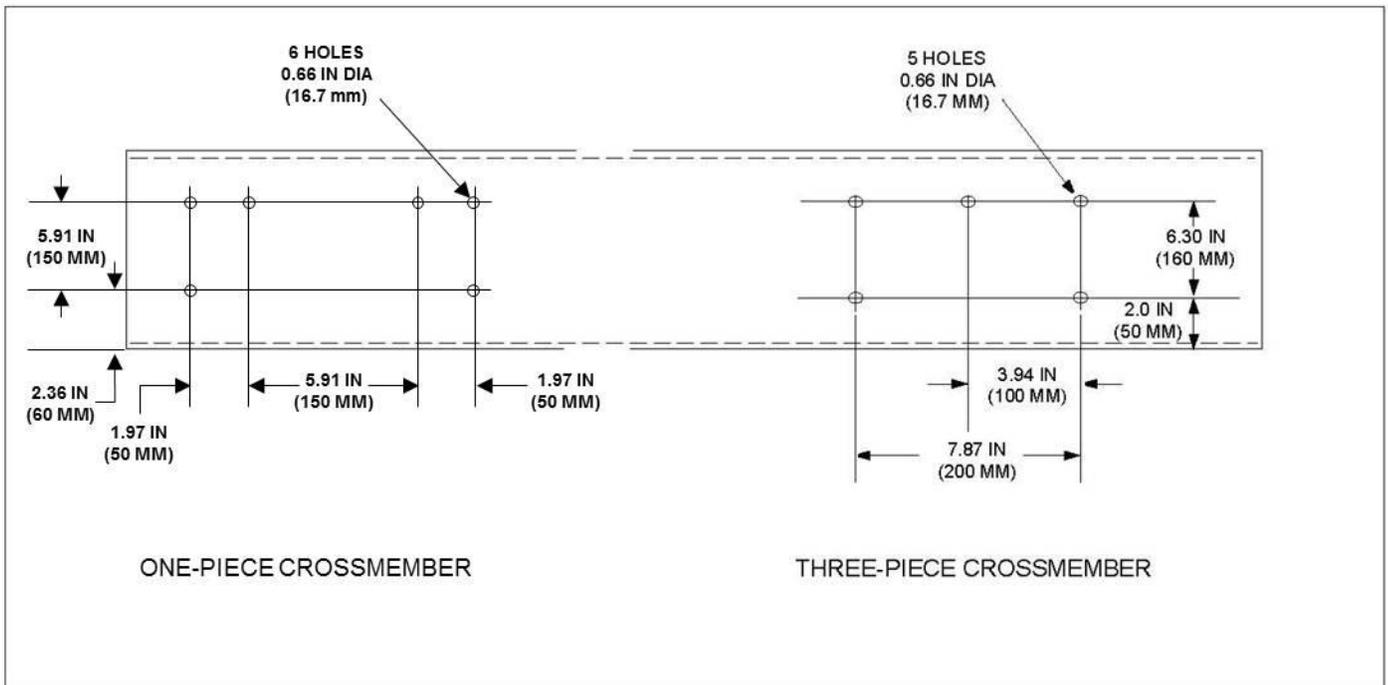
**FIGURE 4-5.** Mounting Brackets

**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 4-6**.



**FIGURE 4-6.** Hole Location Guidelines for Frame Rail and Bracket

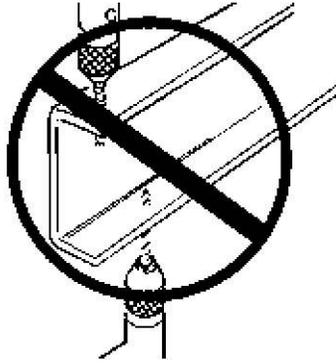


**FIGURE 4-7.** Crossmember Gusset Hole Patterns (Additional Holes Available in 50 mm Horizontal Increments)

**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 4-8.** Frame Rail Flange Drilling Prohibited



**WARNING!** **DO NOT** drill closely spaced holes in the frame rail. Frame 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 frame hole diameter should not exceed the bolt diameter by more than 0.060 inches (1.5mm).

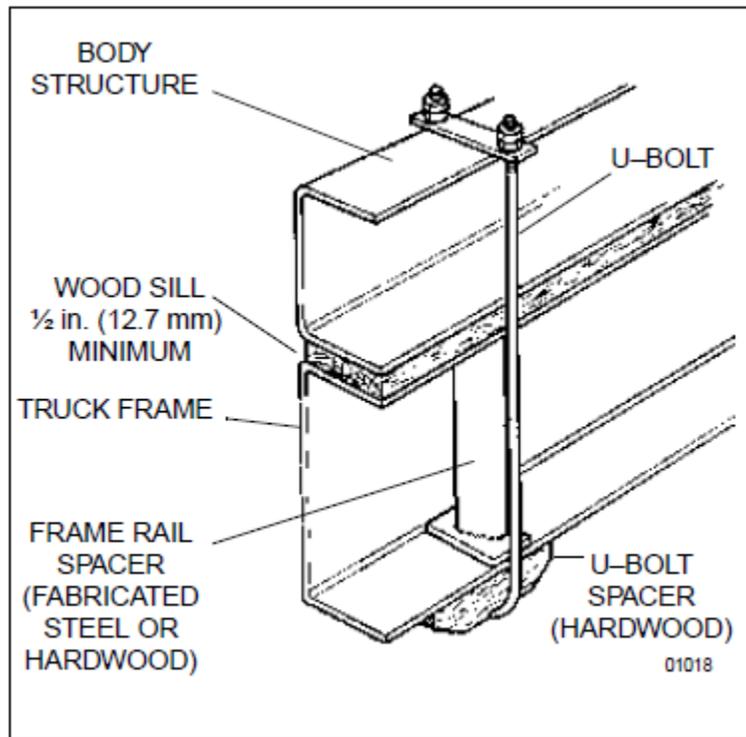
## BODY MOUNTING USING U-BOLTS

If the body is mounted to the frame with U-bolts, use a hardwood sill (minimum 1/2 inch 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.

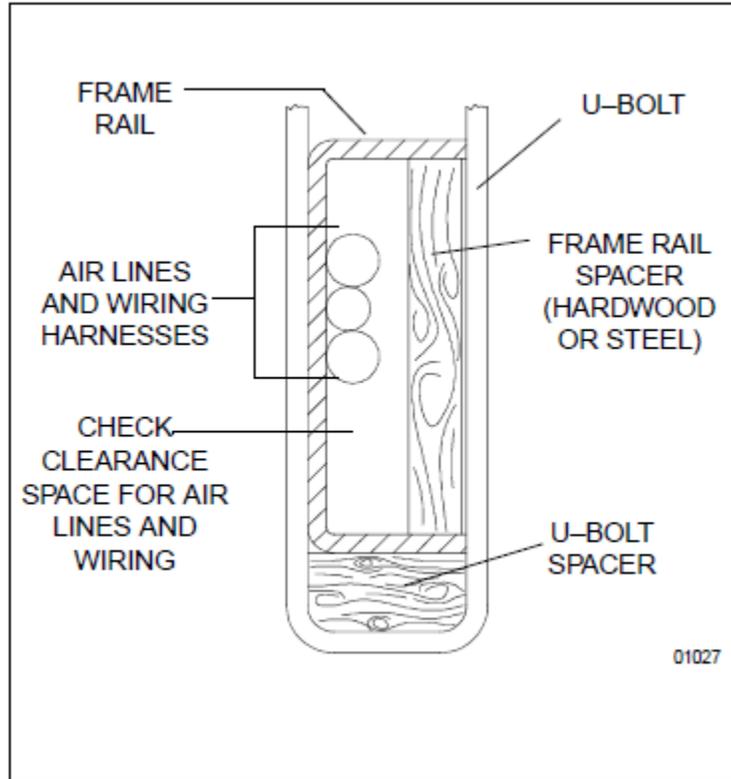
Use a hardwood spacer between the bottom flange and the U-bolt to prevent the U-bolt from notching the frame flange. See Figure 4-9.



**FIGURE 4-9.** Acceptable U-Bolt Mounting with Wood and Fabricated Spacers



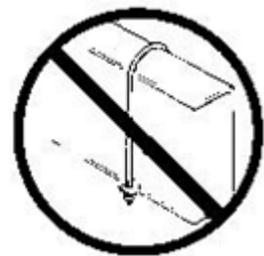
**WARNING!** Do not allow spacers and other body mounting parts to interfere with brake lines, fuel lines, or wiring harnesses routed inside the frame rail. Crimped or damaged brake lines, fuel lines, or wiring could result in loss of braking, fuel leaks, electrical overload, or a fire. Carefully inspect the installation to ensure adequate clearances for air brake lines, fuel lines, and wiring. See Figure 4-10.



**FIGURE 4-10.** Clearance Space for Air Lines and Cables



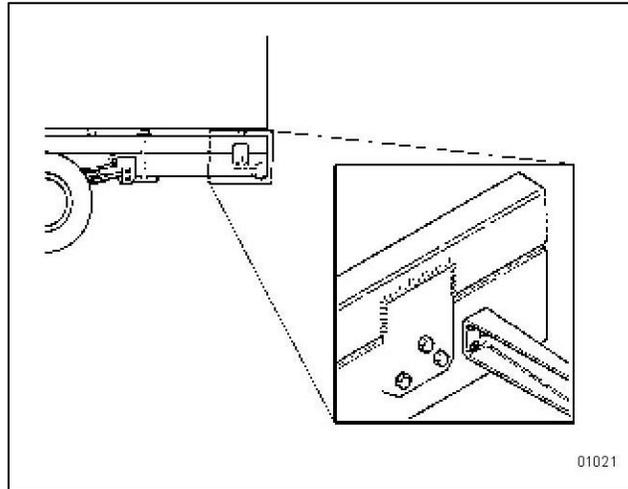
**WARNING!** Do not notch frame rail flanges to force a U-bolt fit. Notched or damaged frame flanges could result in premature frame failure. Use a larger size U-bolt.



**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 4-11**. 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 4-6**.



**FIGURE 4-11.** Fishplate Bracket at Rear End of Body

This page is intentionally left blank.

---

# SECTION 5 FRAME MODIFICATIONS

## INTRODUCTION

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

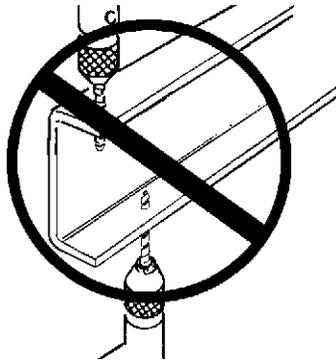
However, some body installations may require slight modifications, while other installations will require extensive modifications. Sometimes an existing dealer stock chassis may need to have the wheelbase changed to better fit a customer's application. The modifications may be as simple as modifying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

## DRILLING RAILS

If frame holes need to be drilled in the rail, see SECTION 4 BODY MOUNTING for more information.



**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.



**WARNING!** Do not drill new holes any closer than 2 inches (50mm) to existing holes. Frame drilling affects the strength of the rails. If the holes are too close together, the rail could fail prematurely and cause an accident.



**CAUTION:** Use care when drilling the frame web so the wires and air lines routed inside the rail are not damaged.



**WARNING!** Never use a torch to make a hole in the rail. Use the appropriate diameter drill bit.

### 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 or lengthened. Before this is done there are a few guidelines that should be considered.



**WARNING!** *When changing the wheelbase, or making any changes to the drivelines, be sure to follow the driveline manufacturer's recommendations for driveline length or angle changes. Incorrectly modified drivelines can fail prematurely due to excessive vibration. This can cause an accident and severe personal injury.*



**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.*

Before changing the wheelbase, or making any changes to the drivelines, the new driveline angles need to be examined to ensure no harmful vibrations are created. Consult with the driveline manufacturer for appropriate recommendations.

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 on the original rail. The rail behind the suspension can then be cut to achieve the desired frame overhang. **See Figure 5-1.**

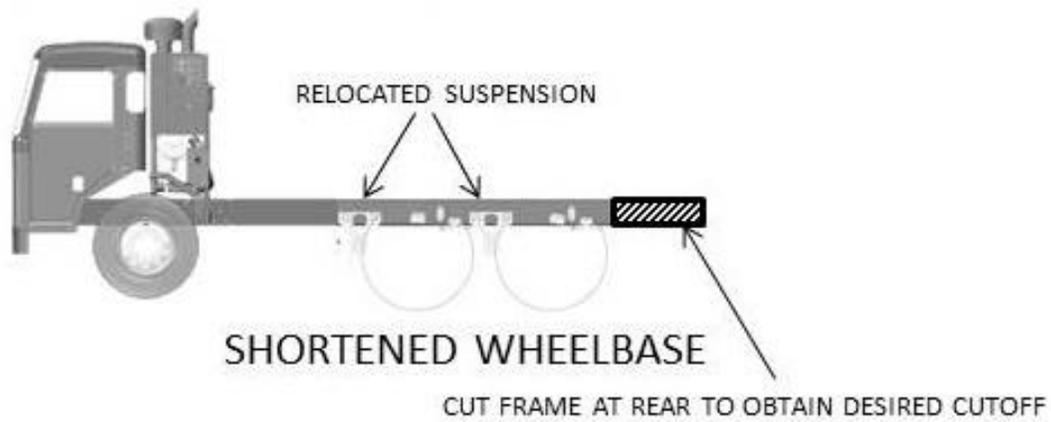
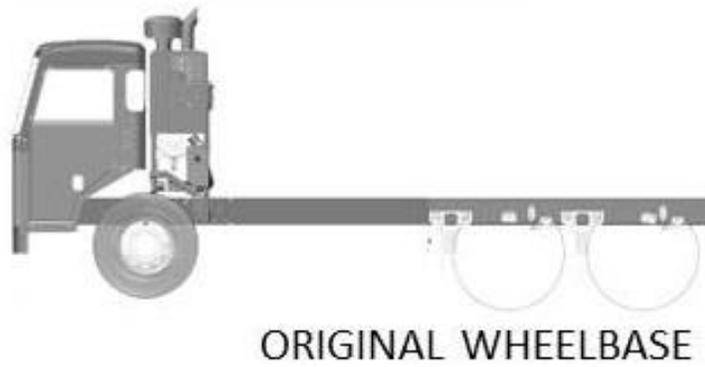
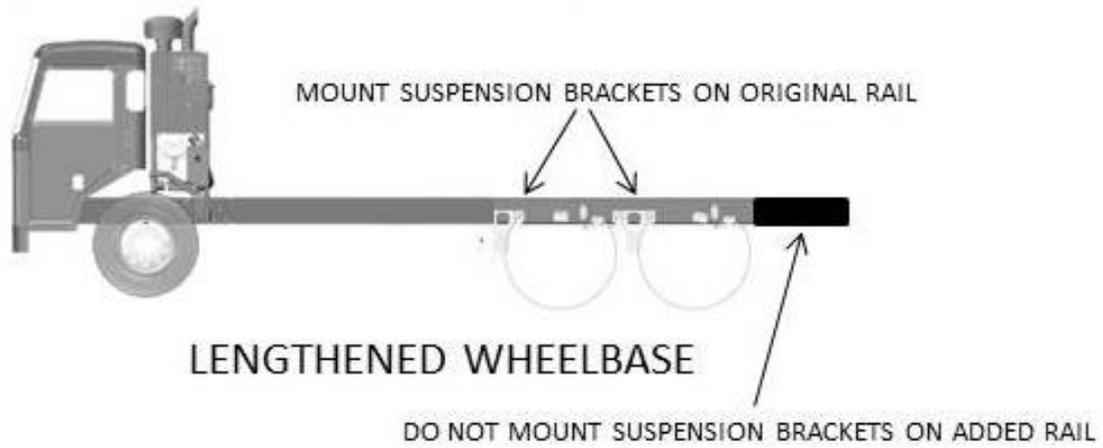
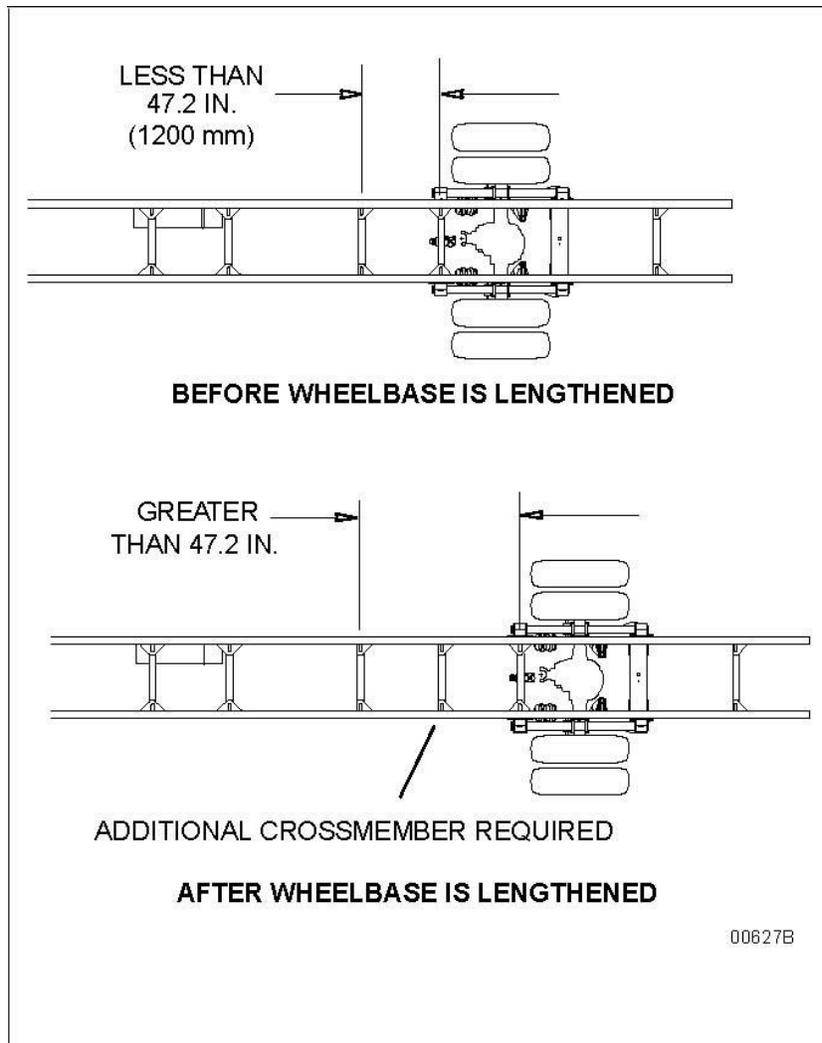


FIGURE 5-1. Wheelbase Customization

**CROSSMEMBERS**

After lengthening a wheelbase, an additional crossmember may be required to maintain the original frame strength. Contact Dealer for crossmember locations.

The maximum allowable distance between the forward suspension crossmember and the next crossmember forward is 47.2 inches (1200 mm). If the distance exceeds 47.2 inches (1200 mm) after the wheelbase is lengthened, add a crossmember between them. See Figure 5-2. See Section 4 for crossmember hole patterns.



**FIGURE 5-2.** Crossmember Spacing Requirements

**TORQUE REQUIREMENTS**

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

**TABLE 5-1.** Customary Grade 8 UNF or UNC.

Fastener Size	Torque	
	Nm	lb-ft
5/16	27–34	20–25
3/8	47–60	35–44
7/16	76–96	56–71
1/2	117–148	86–109
9/16	167–214	123–158
5/8	235–296	173–218
3/4	411–523	303–386
7/8	654–846	482–624
1	973–1268	718–935

**TABLE 5-2.** U.S. Customary - Grade 8 Metric Class 10.9

Fastener Size	Torque	
	Nm	lb-ft
M6	9–11	7–8
M8	24–27	18–20
M10	47–54	35–40
M12	83–95	61–70
M14	132–150	97–111
M16	206–235	152–173
M20	403–458	297–338

**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, 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.

The following information is provided for temporary emergency repair. Prior to welding a cracked frame rail, the area should be beveled (V'd out) to allow for a better weld. To prevent spreading of the crack, a 7 to 9 mm (1/4 in. to 3/8 in.) dia. hole should be drilled at the end of the crack. Widen the crack along its full length by using two hack saw blades together. When welding steel frames use the shielded arc method. Be sure to obtain full weld penetration along the entire length of the crack.

**PRECAUTIONS**

**CAUTION**



*Before welding, disconnect the alternator terminals. Failure to do so could result in damage to the voltage regulator and/or alternator.*

**CAUTION**



*To prevent damage to electrical equipment, disconnect battery cables before arc-welding on a truck, and be sure that the welding ground lead is connected to the frame. Bearings and other parts will be damaged if current must pass through them to complete the circuit.*

**WELDING PRECAUTIONS: ALL ELECTRONIC ENGINES**

Before welding on vehicles with electronic engines, the following precautions should be observed.

**CAUTION**



1. *Disconnect all electrical connections to the vehicle batteries.*
2. *Disconnect all ECM, TCM, and VECU connectors.*
3. *Do not use the ECM, TCM, VECU, or engine ground stud for the ground of the welding probe.*
4. *Ensure that the ground connection for the welder is as close to the weld point as possible. This ensures maximum weld current and minimum risk to damage electrical components on the vehicle.*
5. *Turn off key.*

**NOTE:**



*Bendix ABS and WABCO ABS: Disconnect ECU, TCM, & VECU.*

---

# SECTION 6 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

CAN bus information is available for VMUX and EMUX electrical architectures. Please reference the "Introduction" page of "Section 7 Electrical" to learn about the differences and to determine if your Peterbilt vehicle was built from the factory with the VMUX or EMUX electrical architecture.

## EMUX – ECU Installation Notes

- A minimum of one additional ECU or other 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.
- If adding two or more ECUs per truck that need to communicate with each other, install them on the same CAN network.
- If adding 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.

## CAN COMMUNICATIONS

---

### VMUX CAN COMMUNICATIONS ACRONYM LIBRARY

Acronym	Definition
CAN	Controller Area Network
J1939	SAE CAN Communication Standard
PGN	Parameter Group Number
PTO	Power Take Off
SPN	Suspect Parameter Number
SCR	Selective Catalytic Reduction
DPF	Diesel Particulate Filter
TSC1	Torque Speed Commands

### EMUX CAN COMMUNICATIONS ACRONYM LIBRARY

Acronym	Definition
CAN	Controller Area Network
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
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
SPN	Suspect Parameter Number
Tx	Transmit

## 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 the 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)
- Peer-to-peer and broadcast communication
- Network management
- Definition of parameter groups for commercial vehicles and others
- Manufacturer specific parameter groups are supported
- 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 the Parameter Group Number.

## CAN COMMUNICATIONS

### VMUX - CAN MESSAGES AVAILABLE ON BODY CONNECTIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
38	Fuel Level 2	65276, DD1	39	Broadcast	KCAN, SCAN, BCAN
46	Pneumatic Supply Pressure	65198, AIR1	48	Broadcast	KCAN, SCAN, BCAN
51	Engine Throttle Valve 1 Position 1	65266, LFE1	00	Broadcast	KCAN, SCAN, BCAN
52	Engine Intercooler Temperature	65262, ET1	00	Broadcast	KCAN, SCAN, BCAN
69	Two Speed Axle Switch	65265, CCVS1	00	Broadcast	KCAN, SCAN, BCAN
70	Parking Brake Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
74	Maximum Vehicle Speed Limit	65261, CCSS	39	Broadcast	KCAN, SCAN
81	Aftertreatment 1 Diesel Particulate Filter Intake Pressure	65270, IC1	00	Broadcast	SCAN,KCAN,BCAN
84	Wheel-Based Vehicle Speed	65265, CCVS1	00	Broadcast	KCAN, SCAN, BCAN
86	Cruise Control Set Speed	65265, CCVS1	00	Broadcast	KCAN, SCAN, BCAN
86	Cruise Control Set Speed	65265, CCVS1	39	Broadcast	KCAN, SCAN
90	Power Takeoff Oil Temperature	65264, PTO	7, 33	Broadcast	KCAN, SCAN, BCAN
91	Accelerator Pedal Position 1	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
92	Engine Percent Load At Current Speed	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
94	Engine Fuel Delivery Pressure	65263, EFL/P1	00	Broadcast	KCAN, SCAN, BCAN
96	Fuel Level 1	65276, DD1	39	Broadcast	KCAN, SCAN, BCAN
97	Water In Fuel Indicator 1	65279, OI	00	Broadcast	KCAN, SCAN, BCAN
98	Engine Oil Level	65263, EFL/P1	00	Broadcast	SCAN,KCAN,BCAN
100	Engine Oil Pressure 1	65263, EFL/P1	00	Broadcast	KCAN, SCAN, BCAN
101	Engine Crankcase Pressure 1	65263, EFL/P1	00	Broadcast	KCAN, SCAN, BCAN
102	Engine Intake Manifold #1 Pressure	65270, IC1	00	Broadcast	KCAN, SCAN, BCAN
105	Engine Intake Manifold 1 Temperature	65270, IC1	00	Broadcast	KCAN, SCAN, BCAN
106	Engine Intake Air Pressure	65270, IC1	00	Broadcast	SCAN,KCAN,BCAN
108	Barometric Pressure	65269, AMB	00	Broadcast	KCAN, SCAN, BCAN
110	Engine Coolant Temperature	65262, ET1	00	Broadcast	KCAN, SCAN, BCAN
111	Engine Coolant Level 1	65263, EFL/P1	00	Broadcast	KCAN, SCAN, BCAN
117	Brake Primary Pressure	65274, B1	39	Broadcast	KCAN, SCAN, BCAN
118	Brake Secondary Pressure	65274, B1	39	Broadcast	KCAN, SCAN, BCAN
158	Key Switch Battery Potential	65271, VEP1	39	Broadcast	KCAN, SCAN
161	Transmission 1 Input Shaft Speed	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
162	Transmission Requested Range	61445, ETC2	03	Broadcast	KCAN, SCAN, BCAN
163	Transmission Current Range	61445, ETC2	03	Broadcast	KCAN, SCAN, BCAN
168	Battery Potential / Power Input 1	65271, VEP1	39	Broadcast	KCAN, SCAN, BCAN
168	Battery Potential / Power Input 1	65271, VEP1	39	Broadcast (255)	SCAN,KCAN,BCAN
168	Battery Potential / Power Input 1	VEP1, 65271	00	Broadcast	SCAN,KCAN,BCAN
171	Ambient Air Temperature	65269, AMB	00	Broadcast	KCAN, SCAN, BCAN
173	Engine Exhaust Temperature	65270, IC1	00	Broadcast	SCAN,KCAN,BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
174	Engine Fuel Temperature 1	65262, ET1	00	Broadcast	SCAN,KCAN,BCAN
175	Engine Oil Temperature 1	65262, ET1	00	Broadcast	KCAN, SCAN, BCAN
177	Transmission Oil Temperature 1	65272, TRF1	03	Broadcast	KCAN, SCAN, BCAN
182	Engine Trip Fuel	65257, LFC1	00	Broadcast	KCAN, SCAN, BCAN
183	Engine Fuel Rate	65266, LFE1	00	Broadcast	KCAN, SCAN, BCAN
184	Engine Instantaneous Fuel Economy	65266, LFE1	00	Broadcast	KCAN, SCAN, BCAN
185	Engine Average Fuel Economy	65266, LFE1	23	Broadcast	KCAN, SCAN, BCAN
187	Power Takeoff Set Speed	65264, PTO	39	Broadcast	KCAN, SCAN, BCAN
187	Power Take Off Set Speed	65264, PTO	00	Broadcast	KCAN, SCAN, BCAN
190	Engine Speed	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
191	Transmission 1 Output Shaft Speed	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
235	Engine Total Idle Hours	65244, IO	00	Broadcast	KCAN, SCAN, BCAN
236	Engine Total Idle Fuel Used	65244, IO	00	Broadcast	KCAN, SCAN, BCAN
237	Vehicle Identification Number	65260, VI	00	Broadcast	KCAN, SCAN, BCAN
244	Trip Distance	65248, VD	00	Broadcast	KCAN, SCAN, BCAN
245	Total Vehicle Distance	65248, VD	00	Broadcast	KCAN, SCAN, BCAN
247	Engine Total Hours of Operation	65253, HOURS	00	Broadcast	KCAN, SCAN, BCAN
248	Total Power Takeoff Hours	65255, VH	00	Broadcast	KCAN, SCAN, BCAN
249	Engine Total Revolutions	65253, HOURS	00	Broadcast	KCAN, SCAN, BCAN
250	Engine Total Fuel Used	65257, LFC1	00	Broadcast	KCAN, SCAN, BCAN
512	Driver's Demand Engine - Percent Torque	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
513	Actual Engine - Percent Torque	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
518	Engine Requested Torque/Torque Limit	0, TSC1	39	249 (DA specific)	KCAN, SCAN, BCAN
518	Engine Requested Torque/Torque Limit	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
523	Transmission Current Gear	61445, ETC2	03	Broadcast	KCAN, SCAN, BCAN
524	Transmission Selected Gear	61445, ETC2	03	Broadcast	KCAN, SCAN, BCAN
525	Tranmission Requested Gear	256, TC1	03	255 (DA specific)	KCAN, SCAN, BCAN
525	TransRequestedGear	256, TC1	7, 33	03 (DA specific)	KCAN, SCAN, BCAN
526	Transmission Actual Gear Ratio	61445, ETC2	03	Broadcast	KCAN, SCAN, BCAN
527	Cruise Control States	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
527	Cruise Control States	65265, CCVS1	00	Broadcast	KCAN, SCAN
558	Accelerator Pedal1 Low Idle Switch	EEC2, 61443	00	Broadcast	SCAN,KCAN,BCAN
559	Accelerator Pedal Kickdown Switch	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
560	Transmission Driveline Engaged	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
561	ASR Engine Control Active	61441, EBC1	39	Broadcast	KCAN, SCAN, BCAN
562	ASR Brake Control Active	61441, EBC1	39	Broadcast	KCAN, SCAN, BCAN
563	Anti-Lock Braking (ABS) Active	61441, EBC1	39	Broadcast	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
573	Transmission Torque Converter Lockup Engaged	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
574	Transmission Shift In Process	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
590	Engine Idle Shutdown Timer State	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
590	Engine Idle Shutdown Timer State	65252, SHUTDN	39	Broadcast	KCAN, SCAN, BCAN
591	Engine Idle Shutdown Timer Function	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
591	Engine Idle Shutdown Timer Function	65252, SHUTDN	39	Broadcast	KCAN, SCAN, BCAN
592	Engine Idle Shutdown Timer Override	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
593	Engine Idle Shutdown has Shutdown Engine	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
594	Engine Idle Shutdown Driver Alert Mode	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
595	Cruise Control Active	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
595	Cruise Control Active	65265, CCVS1	00	Broadcast	KCAN, SCAN, BCAN
596	Cruise Control Enable Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
597	Brake Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
598	Clutch Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
599	Cruise Control Set Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
600	Cruise Control Coast (Decelerate) Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
601	Cruise Control Resume Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
602	Cruise Control Accelerate Switch	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
606	Engine Momentary Overspeed Enable	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
607	Progressive Shift Disable	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
684	Requested%ClutchSlip	256, TC1	7, 33	03 (DA specific)	KCAN, SCAN, BCAN
695	Engine Override Control Mode	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
696	Engine Requested Speed Control Conditions	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
897	Override Control Mode Priority	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
898	Engine Requested Speed/Speed Limit	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
899	Engine Torque Mode	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
917	Total Vehicle Distance (High Resolution)	65217, VDHR	39	Broadcast	KCAN, SCAN, BCAN
969	Remote Accelerator Enable Switch	61441, EBC1	00	Broadcast	KCAN, SCAN, BCAN
970	Engine Auxiliary Shutdown Switch	61441, EBC1	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
974	Remote Accelerator Pedal Position	61443, EEC2	7, 33	Broadcast	KCAN, SCAN, BCAN
974	Remote Accelerator Pedal Position	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
975	Engine Fan 1 Estimated Percent Speed	65213, FD1	00	Broadcast	KCAN, SCAN, BCAN
976	PTO Governor State	65265, CCVS1	39	Broadcast	KCAN, SCAN, BCAN
976	PTO Governor State	65265, CCVS1	00	Broadcast	KCAN, SCAN, BCAN
976	PTO Governor State	65265, CCVS1	7, 33	Broadcast	KCAN, SCAN, BCAN
977	Fan Drive State	65213, FD1	00	Broadcast	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
979	Engine Remote PTO Governor Preprogrammed Speed Control Switch	65264, PTO	7, 33	Broadcast	KCAN, SCAN, BCAN
979	Engine Remote PTO Governor Preprogrammed Speed Control Switch	65264, PTO	00	Broadcast	KCAN, SCAN, BCAN
980	Engine PTO Governor Enable Switch	65264, PTO	7, 33	Broadcast	KCAN, SCAN, BCAN
980	Engine PTO Governor Enable Switch	65264, PTO	00	Broadcast	KCAN, SCAN, BCAN
982	Engine PTO Governor Resume Switch	65264, PTO	7, 33	Broadcast	KCAN, SCAN, BCAN
984	Engine PTO Governor Set Switch	65264, PTO	7, 33	Broadcast	KCAN, SCAN, BCAN
985	A/C High Pressure Fan Switch	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1028	Total Engine PTO Governor Fuel Used	65203, LFI1	00	Broadcast	KCAN, SCAN, BCAN
1040	Total Fuel Used (Gaseous)	65199, GFC	00	Broadcast	KCAN, SCAN, BCAN
1081	Engine Wait to Start Lamp	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1087	Service Brake Circuit 1 Air Pressure	65198, AIR1	39	Broadcast	KCAN, SCAN, BCAN
1087	Service Brake Circuit1 Air Pressure	65198, AIR1	11	Broadcast	KCAN, SCAN, BCAN
1087	Service Brake Circuit1 Air Pressure	65198, AIR1	48	Broadcast	KCAN, SCAN, BCAN
1088	Service Brake Circuit 2 Air Pressure	65198, AIR1	39	Broadcast	KCAN, SCAN, BCAN
1090	Air Suspension Supply Pressure 1	65198, AIR1	23	Broadcast	KCAN, SCAN, BCAN
1107	Engine Protection System Timer State	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1108	Engine Protecion System Timer Override	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1109	Engine Protection System Approaching Shutdown	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1110	Engine Protection System Approaching Shutdown	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1111	Engine Protection System Configuration	65252, SHUTDN	00	Broadcast	KCAN, SCAN, BCAN
1172	Engine Turbocharger1 Compressor Intake Temperature	65178, TCI2	00	Broadcast	KCAN, SCAN, BCAN
1184	Engine Turbocharger1 Turbine Outlet Temperature	TCI5, 65175	00	Broadcast	SCAN,KCAN,BCAN
1214	Suspect Parameter Number	65226, DM1	39	Broadcast	KCAN, SCAN
1215	Failure Mode Identifier	65226, DM1	39	Broadcast	KCAN, SCAN
1216	Occurrence Count	65226, DM1	39	Broadcast	KCAN, SCAN
1437	Road Speed Limit Status	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
1482	Source Address of Controlling Device for Transmission Control	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
1483	Source Address of Controlling Device for Engine Control	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
1487	Illumination Brightness Percent	53248, CL	39	74 (DA specific)	KCAN, SCAN
1639	Fan Speed	65213, FD1	00	Broadcast	SCAN,KCAN,BCAN
1675	Engine Starter Mode	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
1706	SPN Conversion Method	65226, DM1	39	Broadcast	KCAN, SCAN
1761	Aftertreatment 1 Diesel Exhaust Fluid Tank Volume	65110, AT1T1I1	00	Broadcast	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
1807	Steering Wheel Angle	61449, VDC2	11, 62	Broadcast	KCAN, SCAN, BCAN
1854	TransMode3	256, TC1	7, 33	03 (DA specific)	KCAN, SCAN, BCAN
1856	Seat Belt Switch	57344, CM1	39	255 (DA specific)	KCAN, SCAN
2347	High Beam Head Light Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2347	High Beam Head Light Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2349	Low Beam Head Light Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2349	Low Beam Head Light Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2367	Left Turn Signal Lights Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2367	Left Turn Signal Lights Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2369	Right Turn Signal Lights Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2369	Right Turn Signal Lights Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2371	Left Stop Light Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2371	Left Stop Light Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2373	Right Stop Light Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2373	Right Stop Light Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2385	Rotating Beacon Light Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2385	Rotating Beacon Light Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2387	Tractor Front Fog Lights Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2387	Tractor Front Fog Lights Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2391	Back Up Light and Alarm Horn Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2391	Back Up Light and Alarm Horn Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2403	Running Light Command	65089, LCMD	39	Broadcast	KCAN, SCAN, BCAN
2403	Running Light Command	65089, LCMD	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2432	Engine Demand – Percent Torque	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
2538	TransMode3Indicator	65098, ETC7	03	Broadcast	KCAN, SCAN, BCAN
2540	Parameter Group Number (RQST)	59904, RQST	251	255 (DA specific)	KCAN, SCAN
2540	Parameter Group Number (RQST)	59904, RQST	7, 33, 160	00 (DA specific)	KCAN, SCAN, BCAN
2609	Cab A/C Refrigerant Compressor Outlet Pressure	64993, CACI	25	Broadcast	KCAN, SCAN, BCAN
2641	Horn Switch	64980, CM3	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2863	Front Operator Wiper Switch	64973, OWW	39	Broadcast	KCAN, SCAN, BCAN
2873	Work Light Switch	64972, OEL	39	Broadcast	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
2873	Work Light Switch	64972, OEL	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2875	Hazard Light Switch	64972, OEL	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
2876	Turn Signal Switch	64972, OEL	39	Broadcast	KCAN, SCAN
2979	Vehicle Acceleration Rate Limit Status	61443, EEC2	39	Broadcast	KCAN, SCAN, BCAN
2979	Vehicle Acceleration Rate Limit Status	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
3026	Transmission Oil Level 1 Measurement Status	65272, TRF1	03	Broadcast	KCAN, SCAN, BCAN
3027	Transmission Oil Level 1 High / Low	65272, TRF1	03	Broadcast	KCAN, SCAN, BCAN
3028	Transmission Oil Level 1 Countdown Timer	65272, TRF1	03	Broadcast	KCAN, SCAN, BCAN
3031	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature 1	65110, AT1T1I1	00	Broadcast	KCAN, SCAN, BCAN
3246	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature	64947, AT1OG2	00	Broadcast	KCAN, SCAN, BCAN
3349	TSC1 Transmission Rate	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
3350	TSC1 Control Purpose	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
3357	Actual Maximum Available Engine - Percent Torque	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
3363	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater	65110, AT1T1I1	00	Broadcast	KCAN, SCAN, BCAN
3447	Remote PTO Governor Preprogrammed Speed Control Switch #2	65264, PTO	7, 33	Broadcast	KCAN, SCAN, BCAN
3462	EngagementStatus	64932, PTO	7, 33	Broadcast	KCAN
3462	EngagementStatus	64932, PTO	7, 33	03 (DA specific)	SCAN, BCAN
3543	Engine Operating State	64914, EOI	00	Broadcast	KCAN, SCAN, BCAN
3606	Engine Controlled Shutdown Request	64914, EOI	00	Broadcast	KCAN, SCAN, BCAN
3607	Engine Emergency (Immediate) Shutdown Indication	64914, EOI	00	Broadcast	KCAN, SCAN, BCAN
3609	Aftertreatment 1 Diesel Particulate Filter Intake Pressure	64908, AT1GP	00	Broadcast (255)	SCAN, KCAN, BCAN
3610	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure	64908, AT1GP	00	Broadcast	KCAN, SCAN, BCAN
3673	Engine Throttle Valve2 Position	65266, LFE1	00	Broadcast	KCAN, SCAN, BCAN
3695	Aftertreatment Regeneration Inhibit Switch	57344, CM1	7, 33, 160	255 (DA specific)	KCAN, SCAN, BCAN
3695	Aftertreatment Regeneration Inhibit Switch	57344, CM1	39	255 (DA specific)	KCAN, SCAN, BCAN
3696	Aftertreatment Regeneration Force Switch	57344, CM1	7, 33, 160	255 (DA specific)	KCAN, SCAN, BCAN
3696	Aftertreatment Regeneration Force Switch	57344, CM1	00	255 (DA specific)	KCAN, SCAN, BCAN
3696	Force Regen	57344, CM1	39	255 (DA specific)	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
3697	Diesel Particulate Filter Lamp Command	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3698	Exhaust System High Temperature Lamp Command	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3700	Aftertreatment Diesel Particulate Filter Active Regeneration Status	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3701	Aftertreatment Diesel Particulate Filter Status	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3702	Diesel Particulate Filter Active Regeneration Inhibited Status	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3703	Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3704	Diesel Particulate Filter Active Regeneration Inhibited Due to Clutch Disengaged	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3705	Diesel Particulate Filter Active Regeneration Inhibited Due to Service Brake Active	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3706	Diesel Particulate Filter Active Regeneration Inhibited Due to PTO Active	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3707	Diesel Particulate Filter Active Regeneration Inhibited Due to Accelerator Pedal Off Idle	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3708	Diesel Particulate Filter Active Regeneration Inhibited Due to Out of Neutral	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3709	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Above Allowed Speed	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3710	Diesel Particulate Filter Active Regeneration Inhibited Due to Parking Brake Not Set	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3711	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Temperature	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3712	Diesel Particulate Filter Active Regeneration Inhibited Due to System Fault Active	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3713	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3716	Diesel Particulate Filter Active Regeneration Inhibited Due to Engine Not Warmed Up	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3717	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Below Allowed Speed	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3718	Diesel Particulate Filter Automatic Active Regeneration Initiation Configuration	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN
3719	Aftertreatment 1 Diesel Particulate Filter Soot Load Percent	64891, AT1S1	00	Broadcast	KCAN, SCAN, BCAN
3721	Aftertreatment 1 Diesel Particulate Filter Time Since Last Active Regeneration	64891, AT1S1	00	Broadcast	KCAN, SCAN, BCAN
3948	At least one PTO engaged	64932, PTODE	39	Broadcast	KCAN, SCAN, BCAN
4154	Actual Engine - Percent Torque (Fractional)	61444, EEC1	00	Broadcast	KCAN, SCAN, BCAN
4175	Diesel Particulate Filter Active Regeneration Forced Status	64892, DPFC1	00	Broadcast	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
4191	Engine Requested Torque (Fractional)	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
4206	Message Counter	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
4207	Message Checksum	0, TSC1	7, 33	00 (DA specific)	KCAN, SCAN, BCAN
4765	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature	64800, A1DOC1	00	Broadcast	KCAN, SCAN, BCAN
4816	Transmission Torque Converter Lockup Transition in Process	61442, ETC1	03	Broadcast	KCAN, SCAN, BCAN
5078	Engine Amber Warning Lamp Command	64775, DLCC1	00	Broadcast	KCAN, SCAN, BCAN
5079	Engine Red Stop Lamp Command	64775, DLCC1	00	Broadcast	KCAN, SCAN, BCAN
5082	Engine Oil Pressure Low Lamp Command	64775, DLCC1	00	Broadcast	KCAN, SCAN, BCAN
5083	Engine Coolant Temperature High Lamp Command	64775, DLCC1	00	Broadcast	KCAN, SCAN, BCAN
5084	Engine Coolant Level Low Lamp Command	64775, DLCC1	00	Broadcast	KCAN, SCAN, BCAN
5086	Engine Air Filter Restriction Lamp Command	64775, DLCC1	23	Broadcast	KCAN, SCAN, BCAN
5087	Vehicle Battery Voltage Low Lamp Command	64774, DLCC2	23	Broadcast	KCAN, SCAN, BCAN
5088	Vehicle Fuel Level Low Lamp Command	64774, DLCC2	23	Broadcast	KCAN, SCAN, BCAN
5245	Aftertreatment Diesel Exhaust Fluid Tank Low Level Indicator	65110, AT1T1I1	00	Broadcast	KCAN, SCAN, BCAN
5246	Aftertreatment SCR Operator Inducement Severity	65110, AT1T1I1	00	Broadcast	KCAN, SCAN, BCAN
5398	Estimated Pumping - Percent Torque	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
5399	DPF Thermal Management Active	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
5400	SCR Thermal Management Active	61443, EEC2	00	Broadcast	KCAN, SCAN, BCAN
5466	Aftertreatment 1 Diesel Particulate Filter Soot Load Regeneration Threshold	64891, AT1S1	00	Broadcast	KCAN, SCAN, BCAN
5676	Forward Collision Advanced Emergency Braking System State	61487, AEBS1	42	Broadcast	KCAN, SCAN
5825	Driver Warning System Indicator Status	65279, OI	00	Broadcast	KCAN, SCAN, BCAN
8484	Demanded Brake Application Pressure	61712, B2	39	Broadcast	KCAN, SCAN, BCAN
12308	Headlamp Emergency Flash Switch	64972, OEL	7, 33	Broadcast	SCAN
12308	Headlamp Emergency Flash Switch	64972, OEL	7, 33	Broadcast	KCAN
12308	Headlamp Emergency Flash Switch	64972, OEL	7, 33	Broadcast	BCAN
12964	Auxiliary Lamp Group Switch	64972, OEL	39	Broadcast	KCAN, SCAN, BCAN
12964	Auxiliary Lamp Group Switch	64872, OEL	7, 33, 160	Broadcast	KCAN, SCAN, BCAN
13105	Engine Oil Temperature High Lamp Command	64775, DLCC1	23	Broadcast	KCAN, SCAN, BCAN
13108	Primary Air Pressure Low Lamp Command	64774, DLCC2	23	Broadcast	KCAN, SCAN, BCAN
13109	Secondary Air Pressure Low Lamp Command	64774, DLCC2	23	Broadcast	KCAN, SCAN, BCAN
13116	Transmission Oil Temperature High Lamp Command	64775, DLCC1	23	Broadcast	KCAN, SCAN, BCAN

## CAN COMMUNICATIONS

---

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
13132	Air Suspension Supply Pressure 2	64195, AIR3	23	Broadcast	KCAN, SCAN, BCAN

## EMUX - CAN MESSAGES AVAILABLE ON BODY CONNECTIONS (sorted by ascending PGN value)

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	518	Engine Requested Torque/Torque Limit
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	518	Engine Requested Torque/Torque Limit
Rx	0x0C00FF27	0000	Torque/Speed Control 1	SCAN;KCAN	39	518	Engine Requested Torque/Torque Limit
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	695	Engine Override Control Mode
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	695	Engine Override Control Mode
Tx	0x0C000021	0000	Torque/Speed Control 1	KCAN;SCAN	33	696	Engine Requested Speed Control Conditions
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	897	Override Control Mode Priority
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	897	Override Control Mode Priority
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	898	Engine Requested Speed/Speed Limit
Tx	0x0C000021	0000	Torque/Speed Control 1	KCAN;SCAN	33	898	Engine Requested Speed/Speed Limit
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	3349	TSC1 Transmission Rate
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	3349	TSC1 Transmission Rate
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	3350	TSC1 Control Purpose
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	3350	TSC1 Control Purpose
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	4191	Engine Requested Torque (Fractional)
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	4191	Engine Requested Torque (Fractional)
Tx	0x0C000021	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	33	4206	Message Counter
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	4206	Message Counter
Tx	0x0C000007	0000	Torque/Speed Control 1	BCAN;KCAN;SCAN	7	4207	Message Checksum
Tx	0x0C000021	0000	Torque/Speed Control 1	KCAN;SCAN	33	4207	Message Checksum
Rx	0x0C04FF2A	01279	External Brake Request	SCAN;KCAN	42	2914	XBR EBI Mode
Rx	0x0C04FF2A	01279	External Brake Request	SCAN;KCAN	42	2915	XBR Priority
Rx	0x0C04FF2A	01279	External Brake Request	SCAN;KCAN	42	2916	XBR Control Mode
Rx	0x0C04FF2A	01279	External Brake Request	SCAN;KCAN	42	2920	External Acceleration Demand
Rx	0x0C04FF2A	01279	External Brake Request	SCAN;KCAN	42	3188	XBR Message Checksum
Rx	0x0C04FF2A	01279	External Brake Request	SCAN;KCAN	42	3189	XBR Message Counter
Tx	0x0C01FF21	511	Transmission Control 1	BCAN;KCAN;SCAN	33	525	Transmission Requested Gear
Tx	0x0C01FF07	511	Transmission Control 1	BCAN;KCAN;SCAN	7	525	Transmission Requested Gear
Tx	0x0C01FF21	511	Transmission Control 1	BCAN;KCAN;SCAN	33	684	Requested Percent Clutch Slip
Tx	0x0C01FF07	511	Transmission Control 1	BCAN;KCAN;SCAN	7	684	Requested Percent Clutch Slip
Tx	0x0C01FF21	511	Transmission Control 1	BCAN;KCAN	33	1854	Transmission Mode 3
Tx	0x0C01FF07	511	Transmission Control 1	BCAN;KCAN	7	1854	Transmission Mode 3
Tx	0x0C01FF21	511	Transmission Control 1	SCAN	33	1854	Transmission Mode 3
Tx	0x0C01FF07	511	Transmission Control 1	SCAN	7	1854	Transmission Mode 3
Tx	0x0C01FF07	511	Transmission Control 1	BCAN;KCAN	7	7695	Transmission Auto-Neutral (Manual Return) Request
Rx	0x18D0FF27	53503	Cab Illumination Message	BCAN;KCAN;SCAN	39	1487	Illumination Brightness Percent
Rx	0x1CD3FF00	54271	Calibration Information	KCAN	0	1634	Calibration Verification Number
Rx	0x1CD3FF00	54271	Calibration Information	KCAN	0	1635	Calibration Identification
Rx	0x18DFFF9	57343	Stop Start Broadcast	KCAN	249	639	J1939 Network #1, Primary Vehicle Network

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18DFFF9	57343	Stop Start Broadcast	KCAN	249	1230	Current Data Link
Rx	0x18DFFF9	57343	Stop Start Broadcast	KCAN	249	1236	Hold Signal
Rx	0x18E0FF27	57599	Cab Message 1	SCAN;KCAN	39	986	Engine Fan 1 Requested Percent Speed
Rx	0x18E0FF19	57599	Cab Message 1	SCAN;KCAN	25	1691	Cab Interior Temperature Command
Rx	0x18E0FF27	57599	Cab Message 1	KCAN;SCAN	39	1856	Seat Belt Switch
Tx	0x18E0FF21	57599	Cab Message 1	BCAN;KCAN;SCAN	33	2596	Selected Maximum Vehicle Speed Limit
Tx	0x18E0FF07	57599	Cab Message 1	BCAN;KCAN;SCAN	7	2596	Selected Maximum Vehicle Speed Limit
Tx	0x18E0FFA0	57599	Cab Message 1	KCAN;SCAN;BCAN	160	2596	Selected Maximum Vehicle Speed Limit
Rx	0x18E0FF27	57599	Cab Message 1	BCAN;KCAN;SCAN	39	3695	Aftertreatment Regeneration Inhibit Switch
Tx	0x18E0FF21	57599	Cab Message 1	BCAN;KCAN;SCAN	33	3695	Aftertreatment Regeneration Inhibit Switch
Tx	0x18E0FF07	57599	Cab Message 1	BCAN;KCAN;SCAN	7	3695	Aftertreatment Regeneration Inhibit Switch
Tx	0x18E0FFA0	57599	Cab Message 1	KCAN;SCAN;BCAN	160	3695	Aftertreatment Regeneration Inhibit Switch
Rx	0x18E0FF27	57599	Cab Message 1	BCAN;KCAN;SCAN	39	3696	Aftertreatment Regeneration Force Switch
Tx	0x18E0FF07	57599	Cab Message 1	BCAN;KCAN;SCAN	7	3696	Aftertreatment Regeneration Force Switch
Tx	0x18E0FFA0	57599	Cab Message 1	KCAN;SCAN;BCAN	160	3696	Aftertreatment Regeneration Force Switch
Rx	0x18E0FF00	57599	Cab Message 1	KCAN;SCAN	0	3696	Aftertreatment Regeneration Force Switch
Tx	0x18EAFF21	60159	Request	BCAN;SCAN;KCAN	33	2540	Parameter Group Number (RQST)
Tx	0x18EAFF07	60159	Request	BCAN;SCAN;KCAN	7	2540	Parameter Group Number (RQST)
Tx	0x18EAFFA0	60159	Request	BCAN;SCAN;KCAN	160	2540	Parameter Group Number (RQST)
Tx	0x18EAFF4A	60159	Request	KCAN;SCAN	74	2540	Parameter Group Number (RQST)
Tx	0x18EAFFFB	60159	Request	SCAN;KCAN	251	2540	Parameter Group Number (RQST)
Tx	0x18EAFFEE	60159	Request	SCAN;KCAN	238	2540	Parameter Group Number (RQST)
Tx	0x18EAFFF9	60159	Request	SCAN;KCAN	249	2540	Parameter Group Number (RQST)
Tx	0x18EA00FF	60159	Request	SCAN;KCAN	255	2540	Parameter Group Number (RQST)
Tx	0x18EAFF11	60159	Request	SCAN;KCAN	17	2540	Parameter Group Number (RQST)
Tx	0x18EAFFFA	60159	Request	SCAN;KCAN	250	2540	Parameter Group Number (RQST)
Tx	0x18EEFF21	61183	Address Claimed	BCAN;KCAN	33	2848	NAME of Controller Application (for address claimed)
Tx	0x18EEFF07	61183	Address Claimed	BCAN;KCAN	7	2848	NAME of Controller Application (for address claimed)
Tx	0x18EEFFA0	61183	Address Claimed	BCAN;KCAN;SCAN	160	2848	NAME of Controller Application (for address claimed)
Rx	0x18F0005B	61440	Electronic Retarder Controller 1	KCAN;SCAN	91	520	Actual Retarder - Percent Torque
Rx	0x18F00000	61440	Electronic Retarder Controller 1	SCAN;KCAN	0	520	Actual Retarder - Percent Torque
Rx	0x18F0000F	61440	Electronic Retarder Controller 1	SCAN;KCAN	15	571	Retarder Enable - Brake Assist Switch
Rx	0x18F00000	61440	Electronic Retarder Controller 1	SCAN;KCAN	0	900	Retarder Torque Mode
Rx	0x18F00000	61440	Electronic Retarder Controller 1	SCAN;KCAN	0	1715	Drivers Demand Retarder - Percent Torque
Rx	0x18F0000F	61440	Electronic Retarder Controller 1	SCAN;KCAN	15	1715	Drivers Demand Retarder - Percent Torque
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	521	Brake Pedal Position
Rx	0x18F00127	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	39	561	ASR Engine Control Active
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	561	ASR Engine Control Active
Rx	0x18F00127	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	39	562	ASR Brake Control Active

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	562	ASR Brake Control Active
Rx	0x18F00127	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	39	563	Anti-Lock Braking (ABS) Active
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	563	Anti-Lock Braking (ABS) Active
Tx	0x18F00121	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	33	969	Remote Accelerator Enable Switch
Tx	0x18F00107	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	7	969	Remote Accelerator Enable Switch
Tx	0x18F001A0	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	160	969	Remote Accelerator Enable Switch
Rx	0x18F00100	61441	Electronic Brake Controller 1	SCAN;KCAN	0	969	Remote Accelerator Enable Switch
Tx	0x18F00121	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	33	970	Engine Auxiliary Shutdown Switch
Tx	0x18F00107	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	7	970	Engine Auxiliary Shutdown Switch
Tx	0x18F001A0	61441	Electronic Brake Controller 1	BCAN;KCAN;SCAN	160	970	Engine Auxiliary Shutdown Switch
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	1438	ABS/EBS Amber Warning Signal (Powered Vehicle)
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	1793	ATC/ASR Information Signal
Rx	0x18F0010B	61441	Electronic Brake Controller 1	SCAN;KCAN	11	1836	Trailer ABS Status
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	SCAN;KCAN	3	161	Transmission Input Shaft Speed
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	SCAN;KCAN	3	191	Transmission Output Shaft Speed
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	SCAN	3	560	Transmission Driveline Engaged
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	SCAN;KCAN	3	573	Transmission Torque Converter Lockup Engaged
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	SCAN;KCAN	3	607	Progressive Shift Disable
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	BCAN;KCAN;SCAN	3	1482	Source Address of Controlling Device for Transmission Control
Rx	0x0CF00203	61442	Electronic Transmission Controller 1	SCAN;KCAN	3	4816	Transmission Torque Converter Lockup Transition in Process
Rx	0x0CF00300	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	0	91	Accelerator Pedal Position 1
Rx	0x0CF0035B	61443	Electronic Engine Controller 2	KCAN;SCAN	91	91	Accelerator Pedal Position 1
Rx	0x0CF00300	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	0	92	Engine Percent Load At Current Speed
Rx	0x0CF00300	61443	Electronic Engine Controller 2	SCAN;KCAN	0	559	Accelerator Pedal Kickdown Switch
Tx	0x0CF00321	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	33	974	Remote Accelerator Pedal Position
Tx	0x0CF00307	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	7	974	Remote Accelerator Pedal Position
Tx	0x0CF003A0	61443	Electronic Engine Controller 2	BCAN;KCAN;SCAN	160	974	Remote Accelerator Pedal Position
Rx	0x0CF00300	61443	Electronic Engine Controller 2	SCAN;KCAN	0	974	Remote Accelerator Pedal Position
Rx	0x0CF00300	61443	Electronic Engine Controller 2	SCAN;KCAN	0	2979	Vehicle Acceleration Rate Limit Status
Rx	0x0CF00300	61443	Electronic Engine Controller 2	SCAN;KCAN	0	5399	DPF Thermal Management Active
Rx	0x0CF00300	61443	Electronic Engine Controller 2	SCAN;KCAN	0	5400	SCR Thermal Management Active
Rx	0x0CF00400	61444	Electronic Engine Controller 1	BCAN;KCAN;SCAN	0	190	Engine Speed
Rx	0x0CF0045B	61444	Electronic Engine Controller 1	KCAN;SCAN	91	190	Engine Speed
Rx	0x0CF00400	61444	Electronic Engine Controller 1	SCAN;KCAN	0	512	Drivers Demand Engine - Percent Torque
Rx	0x0CF0045B	61444	Electronic Engine Controller 1	KCAN;SCAN	91	513	Actual Engine - Percent Torque
Rx	0x0CF00400	61444	Electronic Engine Controller 1	SCAN;KCAN	0	513	Actual Engine - Percent Torque
Rx	0x0CF00400	61444	Electronic Engine Controller 1	BCAN;KCAN;SCAN	0	899	Engine Torque Mode
Rx	0x0CF00400	61444	Electronic Engine Controller 1	SCAN;KCAN	0	1483	Source Address of Controlling Device for Engine Control
Rx	0x0CF00400	61444	Electronic Engine Controller 1	SCAN;KCAN	0	1675	Engine Starter Mode
Rx	0x0CF00400	61444	Electronic Engine Controller 1	SCAN;KCAN	0	2432	Engine Demand - Percent Torque

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x0CF0045B	61444	Electronic Engine Controller 1	KCAN;SCAN	91	4154	Actual Engine - Percent Torque (Fractional)
Rx	0x18F00503	61445	Electronic Transmission Controller 2	SCAN;KCAN	3	162	Transmission Requested Range
Rx	0x18F00503	61445	Electronic Transmission Controller 2	SCAN;KCAN	3	163	Transmission Current Range
Rx	0x18F00503	61445	Electronic Transmission Controller 2	BCAN;KCAN;SCAN	3	523	Transmission Current Gear
Rx	0x18F00503	61445	Electronic Transmission Controller 2	SCAN;KCAN	3	524	Transmission Selected Gear
Rx	0x18F00503	61445	Electronic Transmission Controller 2	SCAN;KCAN	3	526	Transmission Actual Gear Ratio
Rx	0x10F007E8	61447	Forward Lane Image 1	SCAN;KCAN	232	1700	Lane Departure Imminent, Left Side
Rx	0x10F007E8	61447	Forward Lane Image 1	SCAN;KCAN	232	1701	Lane Departure Imminent, Right Side
Rx	0x10F007E8	61447	Forward Lane Image 1	SCAN;KCAN	232	3565	Lane Departure Left
Rx	0x10F007E8	61447	Forward Lane Image 1	SCAN;KCAN	232	3566	Lane Departure Right
Rx	0x18F0090B	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	11	1807	Steering Wheel Angle
Rx	0x18F0093E	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	62	1807	Steering Wheel Angle
Rx	0x18F0090B	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	11	1808	Yaw Rate
Rx	0x18F0093E	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	62	1808	Yaw Rate
Rx	0x18F0090B	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	11	1809	Lateral Acceleration
Rx	0x18F0093E	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	62	1809	Lateral Acceleration
Rx	0x18F00927	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	39	1810	Longitudinal Acceleration
Rx	0x18F0093E	61449	Vehicle Dynamic Stability Control 2	SCAN;KCAN	62	1811	Steering Wheel Turn Counter
Rx	0x0CF00A00	61450	Engine Gas Flow Rate	SCAN;KCAN	0	132	Engine Intake Air Mass Flow Rate
Rx	0x0CF00A00	61450	Engine Gas Flow Rate	SCAN;KCAN	0	2659	Engine Exhaust Gas Recirculation 1 Mass Flow Rate
Rx	0x18F00E00	61454	Aftertreatment 1 Intake Gas 1	SCAN;KCAN	0	3216	Aftertreatment 1 SCR Intake NOx
Rx	0x18F00E00	61454	Aftertreatment 1 Intake Gas 1	SCAN;KCAN	0	3217	Aftertreatment 1 Intake Percent O2
Rx	0x18F00F00	61455	Aftertreatment 1 Outlet Gas 1	SCAN;KCAN	0	3226	Aftertreatment 1 Outlet NOx
Rx	0x0CF02903	61481	Slope Sensor Information 2	SCAN;KCAN	3	4979	Pitch Angle Figure of Merit (Extended Range)
Rx	0x0CF02FA0	61487	Advanced Emergency Braking System 1	SCAN;KCAN	160	5676	Forward Collision Advanced Emergency Braking System State
Rx	0x0CF02F2A	61487	Advanced Emergency Braking System 1	SCAN;KCAN	42	5676	Forward Collision Advanced Emergency Braking System State
Rx	0x0CF02F00	61487	Advanced Emergency Braking System 1	SCAN;KCAN	0	5676	Forward Collision Advanced Emergency Braking System State
Rx	0x08F11027	61712	Brakes 2	BCAN;KCAN;SCAN	39	8484	Demanded Brake Application Pressure
Rx	0x0CF13D13	61757	Active Steering System Controls 1	KCAN;SCAN	19	9755	Lane Keeping Assist Indication Enable Status
Rx	0x0CF13D13	61757	Active Steering System Controls 1	KCAN;SCAN	19	9756	Lane Keeping Assist System State
Rx	0x0CF13D13	61757	Active Steering System Controls 1	KCAN;SCAN	19	12855	Hands Off Detection Status
Rx	0x18F34350	62275	Electric Park Brake Controller 1	KCAN;SCAN	80	21171	Electronic Park Brake Occupancy Anti-Roll-Away Status
Rx	0x18F34350	62275	Electric Park Brake Controller 1	KCAN;SCAN	80	21172	Electronic Park Brake Trailer Brake Release Status
Rx	0x18F34350	62275	Electric Park Brake Controller 1	KCAN;SCAN	80	21174	Electronic Park Brake Operating Mode
Rx	0x18F34350	62275	Electric Park Brake Controller 1	KCAN;SCAN	80	21180	Electronic Park Brake Exhaust-at-Speed Status
Rx	0x18FA6227	64098	Lighting Data 2	BCAN;KCAN;SCAN	39	20800	Tractor Hazard Lights
Tx	0x0CFA6321	64099	Lighting Command 2	BCAN;KCAN;SCAN	33	20798	Lighting Data 2 Request Command
Tx	0x0CFA6307	64099	Lighting Command 2	BCAN;KCAN;SCAN	7	20798	Lighting Data 2 Request Command
Rx	0x0CFA6327	64099	Lighting Command 2	BCAN;KCAN;SCAN	39	20798	Lighting Data 2 Request Command
Tx	0x0CFA63A0	64099	Lighting Command 2	BCAN;KCAN;SCAN	160	20798	Lighting Data 2 Request Command

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Tx	0x0CFA6321	64099	Lighting Command 2	BCAN;KCAN;SCAN	33	20799	Tractor Hazard Lights Command
Tx	0x0CFA6307	64099	Lighting Command 2	BCAN;KCAN;SCAN	7	20799	Tractor Hazard Lights Command
Rx	0x0CFA6327	64099	Lighting Command 2	BCAN;KCAN;SCAN	39	20799	Tractor Hazard Lights Command
Tx	0x0CFA63A0	64099	Lighting Command 2	BCAN;KCAN;SCAN	160	20799	Tractor Hazard Lights Command
Rx	0x18FABB17	64187	Direct Lamp Control Command 3	BCAN;KCAN;SCAN	23	13116	Transmission Oil Temperature High Lamp Command
Rx	0x18FAC330	64195	Air Supply Pressure 3	KCAN;SCAN	48	13073	Air Dryer Cartridge Life Remaining
Rx	0x18FAC317	64195	Air Supply Pressure 3	BCAN;KCAN;SCAN	23	13132	Air Suspension Supply Pressure 2
Rx	0x18FB6B5B	64363	High Voltage Bus Information	SCAN	91	20804	High Voltage Bus ePTO Availability
Tx	0x14FC3612	64566	Gaseous Fuel Supply Valve Information	SCAN	18	7081	Gaseous Fuel Supply Shutoff Valve 1 Position
Rx	0x18FCC25B	64706	Hybrid System Status 1	SCAN	91	7895	Stored Energy Source Level
Rx	0x18FCD000	64720	Engine Particulate Sensor Information	SCAN;KCAN	0	5835	Aftertreatment 1 Particulate Sensor
Rx	0x10FCFD00	64765	Electronic Engine Controller 9	SCAN;KCAN	0	5313	Commanded Engine Fuel Rail Pressure
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	0x18FD0600	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	0	5088	Vehicle Fuel Level Low Lamp Command
Rx	0x18FD0617	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	23	5089	Vehicle Air Pressure Low Lamp Command
Rx	0x18FD06A7	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	167	5089	Vehicle Air Pressure Low Lamp Command
Rx	0x18FD0617	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	23	5091	Vehicle Battery Charging Lamp Command
Rx	0x18FD06A7	64774	Direct Lamp Control Command 2	BCAN;KCAN;SCAN	167	5091	Vehicle Battery Charging 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	0x18FD0700	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	0	5078	Engine Amber Warning Lamp Command
Rx	0x18FD0700	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	0	5079	Engine Red Stop Lamp Command
Rx	0x18FD0700	64775	Direct Lamp Control Command 1	SCAN;KCAN	0	5080	OBD Malfunction Indicator Lamp Command
Rx	0x18FD0700	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	0	5082	Engine Oil Pressure Low Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	5082	Engine Oil Pressure Low Lamp Command
Rx	0x18FD07A7	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	167	5082	Engine Oil Pressure Low Lamp Command
Rx	0x18FD0700	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	0	5083	Engine Coolant Temperature High Lamp Command
Rx	0x18FD0717	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	23	5083	Engine Coolant Temperature High Lamp Command
Rx	0x18FD07A7	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	167	5083	Engine Coolant Temperature High Lamp Command
Rx	0x18FD0700	64775	Direct Lamp Control Command 1	BCAN;KCAN;SCAN	0	5084	Engine Coolant Level Low 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	0x18FD0900	64777	High Resolution Fuel Consumption (Liquid)	SCAN;KCAN	0	5054	Engine Total Fuel Used (High Resolution)
Rx	0x14FD1727	64791	Beltlock and Airbag Deactivation Switch Information	KCAN;SCAN	39	4952	Driver Beltlock Status
Rx	0x14FD1727	64791	Beltlock and Airbag Deactivation Switch Information	KCAN;SCAN	39	4953	Passenger Beltlock Status
Rx	0x18FD2000	64800	Aftertreatment 1 Diesel Oxidation Catalyst	BCAN;KCAN;SCAN	0	4765	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature
Rx	0x18FD2000	64800	Aftertreatment 1 Diesel Oxidation Catalyst	SCAN;KCAN	0	4766	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Temperature

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x14FD3E00	64830	Aftertreatment 1 SCR Exhaust Gas Temperature 1	SCAN;KCAN	0	4360	Aftertreatment 1 SCR Intake Temperature
Rx	0x14FD3E00	64830	Aftertreatment 1 SCR Exhaust Gas Temperature 1	SCAN;KCAN	0	4363	Aftertreatment 1 SCR Outlet Temperature
Rx	0x18FD6E00	64878	Aftertreatment 1 SCR Service Information 1	SCAN;KCAN	0	4364	Aftertreatment 1 SCR Conversion Efficiency
Rx	0x18FD6E00	64878	Aftertreatment 1 SCR Service Information 1	SCAN;KCAN	0	5463	Aftertreatment SCR Operator Inducement Active Traveled Distance
Rx	0x18FD7B00	64891	Aftertreatment 1 Service 1	BCAN;KCAN;SCAN	0	3719	Aftertreatment 1 Diesel Particulate Filter Soot Load Percent
Rx	0x18FD7B00	64891	Aftertreatment 1 Service 1	SCAN;KCAN	0	5466	Aftertreatment 1 Diesel Particulate Filter Soot Load Regeneration Threshold
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN;SCAN	0	3697	Diesel Particulate Filter Lamp Command
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN	0	3698	Exhaust System High Temperature Lamp Command
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN	0	3698	Exhaust System High Temperature Lamp Command
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN	0	3698	Exhaust System High Temperature Lamp Command
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	KCAN;SCAN	0	3698	Exhaust System High Temperature Lamp Command
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN;SCAN	0	3700	Aftertreatment Diesel Particulate Filter Active Regeneration Status
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN;SCAN	0	3701	Aftertreatment Diesel Particulate Filter Status
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	BCAN;KCAN;SCAN	0	3702	Diesel Particulate Filter Active Regeneration Inhibited Status
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3703	Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3704	Diesel Particulate Filter Active Regeneration Inhibited Due to Clutch Disengaged
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3705	Diesel Particulate Filter Active Regeneration Inhibited Due to Service Brake Active
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3706	Diesel Particulate Filter Active Regeneration Inhibited Due to PTO Active
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3707	Diesel Particulate Filter Active Regeneration Inhibited Due to Accelerator Pedal Off Idle
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3708	Diesel Particulate Filter Active Regeneration Inhibited Due to Out of Neutral
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3709	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Above Allowed Speed
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3710	Diesel Particulate Filter Active Regeneration Inhibited Due to Parking Brake Not Set
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3711	Diesel Particulate Filter Active Regeneration Inhibited Due to Low Exhaust Temperature
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3712	Diesel Particulate Filter Active Regeneration Inhibited Due to System Fault Active
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3713	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3714	Diesel Particulate Filter Active Regeneration Inhibited Due to Temporary System Lockout
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3716	Diesel Particulate Filter Active Regeneration Inhibited Due to Engine Not Warmed Up
Rx	0x18FD7C00	64892	Diesel Particulate Filter Control 1	SCAN;KCAN	0	3717	Diesel Particulate Filter Active Regeneration Inhibited Due to Vehicle Speed Below Allowed Speed
Rx	0x18FD8C00	64908	Aftertreatment 1 Gas Parameters	BCAN;KCAN;SCAN	0	3609	Aftertreatment 1 Diesel Particulate Filter Intake Pressure
Rx	0x18FD8C00	64908	Aftertreatment 1 Gas Parameters	BCAN;KCAN;SCAN	0	3610	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure
Rx	0x0CFD9200	64914	Engine Operating Information	SCAN;KCAN	0	3543	Engine Operating State
Rx	0x0CFD9200	64914	Engine Operating Information	SCAN;KCAN	0	3544	Time Remaining in Engine Operating State
Rx	0x0CFD9200	64914	Engine Operating Information	SCAN;KCAN	0	3606	Engine Controlled Shutdown Request
Rx	0x0CFD9200	64914	Engine Operating Information	SCAN;KCAN	0	3607	Engine Emergency (Immediate) Shutdown Indication
Rx	0x0CFD9200	64914	Engine Operating Information	SCAN;KCAN	0	6807	Engine Desired Torque Request
Rx	0x18FD9400	64916	Electronic Engine Controller 7	SCAN;KCAN	0	27	Engine Exhaust Gas Recirculation 1 Valve Position
Rx	0x18FD9800	64920	Aftertreatment 1 Historical Information 1	SCAN;KCAN	0	3522	Aftertreatment 1 Total Fuel Used
Rx	0x18FD9B00	64923	Aftertreatment 1 Diesel Exhaust Fluid Information 1	SCAN;KCAN	0	3516	Aftertreatment 1 Diesel Exhaust Fluid Concentration
Rx	0x18FD9B00	64923	Aftertreatment 1 Diesel Exhaust Fluid Information 1	SCAN;KCAN	0	3518	Aftertreatment 1 Diesel Exhaust Fluid Conductivity
Rx	0x18FD9B00	64923	Aftertreatment 1 Diesel Exhaust Fluid Information 1	SCAN;KCAN	0	3519	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Preliminary FMI

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FD9B00	64923	Aftertreatment 1 Diesel Exhaust Fluid Information 1	SCAN;KCAN	0	3520	Aftertreatment 1 Diesel Exhaust Fluid Properties Preliminary FMI
Rx	0x18FD9B00	64923	Aftertreatment 1 Diesel Exhaust Fluid Information 1	SCAN;KCAN	0	3521	Aftertreatment 1 Diesel Exhaust Fluid Property
Rx	0x18FD9F00	64927	Aftertreatment 1 Air Control 1	SCAN;KCAN	0	3490	Aftertreatment 1 Purge Air Actuator
Rx	0x10FDA300	64931	Electronic Engine Controller 6	SCAN;KCAN	0	641	Engine Variable Geometry Turbocharger Actuator #1
Tx	0x18FDA421	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	33	3462	Engagement Status - Transmission output shaft PTO
Tx	0x18FDA407	64932	PTO Drive Engagement	BCAN;KCAN;SCAN	7	3462	Engagement Status - Transmission output shaft PTO
Rx	0x18FDA427	64932	PTO Drive Engagement	SCAN;KCAN	39	3948	At least one PTO engaged
Rx	0x18FDB200	64946	Aftertreatment 1 Intermediate Gas	SCAN;KCAN	0	3251	Aftertreatment 1 Diesel Particulate Filter Differential Pressure
Rx	0x18FDB300	64947	Aftertreatment 1 Outlet Gas 2	BCAN;KCAN;SCAN	0	3246	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature
Rx	0x18FDB400	64948	Aftertreatment 1 Intake Gas 2	SCAN;KCAN	0	3241	Aftertreatment 1 Exhaust Temperature 1
Rx	0x18FDB400	64948	Aftertreatment 1 Intake Gas 2	SCAN;KCAN	0	3242	Aftertreatment 1 Diesel Particulate Filter Intake Temperature
Rx	0x18FDB800	64952	Diagnostic Readiness 3	SCAN;KCAN	0	3301	Time Since Engine Start
Rx	0x18FDB800	64952	Diagnostic Readiness 3	SCAN;KCAN	0	3302	Number of Warm-Ups Since Diagnostic Trouble Codes Cleared
Rx	0x18FDB800	64952	Diagnostic Readiness 3	SCAN;KCAN	0	3303	Continuously Monitored Systems Enabled/Completed Status
Rx	0x18FDB800	64952	Diagnostic Readiness 3	SCAN;KCAN	0	3304	Non-Continuously Monitored Systems Enabled Status
Rx	0x18FDB800	64952	Diagnostic Readiness 3	SCAN;KCAN	0	3305	Non-Continuously Monitored Systems Complete Status
Rx	0x0CFDCC27	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	39	2873	Work Light Switch
Tx	0x0CFDCC21	64972	Operators External Light Controls Message	BCAN;KCAN	33	2873	Work Light Switch
Tx	0x0CFDCC07	64972	Operators External Light Controls Message	BCAN;KCAN	7	2873	Work Light Switch
Tx	0x0CFDCCA0	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	160	2873	Work Light Switch
Tx	0x0CFDCCA0	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	160	2875	Hazard Light Switch
Rx	0x0CFDCC27	64972	Operators External Light Controls Message	KCAN;SCAN	39	2876	Turn Signal Switch
Tx	0x0CFDCC21	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	33	12308	Headlamp Emergency Flash Switch
Tx	0x0CFDCC07	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	7	12308	Headlamp Emergency Flash Switch
Tx	0x0CFDCCA0	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	160	12308	Headlamp Emergency Flash Switch
Tx	0x0CFDCC21	64972	Operators External Light Controls Message	BCAN;KCAN	33	12964	Auxiliary Lamp Group Switch
Tx	0x0CFDCC07	64972	Operators External Light Controls Message	BCAN;KCAN	7	12964	Auxiliary Lamp Group Switch
Rx	0x0CFDCC27	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	39	12964	Auxiliary Lamp Group Switch
Tx	0x0CFDCCA0	64972	Operators External Light Controls Message	BCAN;KCAN;SCAN	160	12964	Auxiliary Lamp Group Switch
Rx	0x18FD27	64973	Operator Wiper and Washer Controls Message	BCAN;KCAN;SCAN	39	2863	Front Operator Wiper Switch
Rx	0x18FD27	64973	Operator Wiper and Washer Controls Message	BCAN;KCAN;SCAN	39	2866	Front Operator Washer Switch
Rx	0x18FDD000	64976	Intake/Exhaust Conditions 2	SCAN;KCAN	0	3563	Engine Intake Manifold #1 Absolute Pressure
Rx	0x18FDD300	64979	Turbocharger Information 6	SCAN;KCAN	0	2629	Engine Turbocharger 1 Compressor Outlet Temperature
Tx	0x18FDD421	64980	Cab Message 3	BCAN;KCAN;SCAN	33	2641	Horn Switch
Tx	0x18FDD407	64980	Cab Message 3	BCAN;KCAN;SCAN	7	2641	Horn Switch
Tx	0x18FDD4A0	64980	Cab Message 3	BCAN;KCAN;SCAN	160	2641	Horn Switch
Rx	0x18FDD500	64981	Electronic Engine Controller 5	SCAN;KCAN	0	2791	Engine Exhaust Gas Recirculation 1 Valve 1 Control 1
Rx	0x18FDD500	64981	Electronic Engine Controller 5	SCAN;KCAN	0	2795	Engine Variable Geometry Turbocharger (VGT) 1 Actuator Position
Rx	0x18FDD500	64981	Electronic Engine Controller 5	SCAN;KCAN	0	5323	Engine Fuel Control Mode
Rx	0x18FDD500	64981	Electronic Engine Controller 5	SCAN;KCAN	0	5457	Engine Variable Geometry Turbocharger 1 Control Mode

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FE4027	65088	Lighting Data	BCAN;KCAN;SCAN	39	2360	Tractor Rear Low Mounted Work Lights
Rx	0x18FE4027	65088	Lighting Data	BCAN;KCAN;SCAN	39	2362	Tractor Rear High Mounted Work Lights
Rx	0x18FE4027	65088	Lighting Data	BCAN;KCAN;SCAN	39	2378	Tractor Marker Light
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2347	High Beam Head Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2347	High Beam Head Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2347	High Beam Head Light Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2347	High Beam Head Light Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2349	Low Beam Head Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2349	Low Beam Head Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2349	Low Beam Head Light Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2349	Low Beam Head Light Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2359	Tractor Rear Low Mounted Work Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2359	Tractor Rear Low Mounted Work Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2359	Tractor Rear Low Mounted Work Lights Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2359	Tractor Rear Low Mounted Work Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN	39	2361	Tractor Rear High Mounted Work Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN	7	2361	Tractor Rear High Mounted Work Lights Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2363	Tractor Side Low Mounted Work Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2363	Tractor Side Low Mounted Work Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2363	Tractor Side Low Mounted Work Lights Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2363	Tractor Side Low Mounted Work Lights Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2365	Tractor Side High Mounted Work Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2365	Tractor Side High Mounted Work Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2365	Tractor Side High Mounted Work Lights Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2365	Tractor Side High Mounted Work Lights Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2367	Left Turn Signal Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2367	Left Turn Signal Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2367	Left Turn Signal Lights Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2367	Left Turn Signal Lights Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2369	Right Turn Signal Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2369	Right Turn Signal Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2369	Right Turn Signal Lights Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2369	Right Turn Signal Lights Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2371	Left Stop Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2371	Left Stop Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2371	Left Stop Light Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2371	Left Stop Light Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2373	Right Stop Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2373	Right Stop Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2373	Right Stop Light Command

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2373	Right Stop Light Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2377	Tractor Marker Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2377	Tractor Marker Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2377	Tractor Marker Light Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2377	Tractor Marker Light Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2385	Rotating Beacon Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2385	Rotating Beacon Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2385	Rotating Beacon Light Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2385	Rotating Beacon Light Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2387	Tractor Front Fog Lights Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2387	Tractor Front Fog Lights Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2387	Tractor Front Fog Lights Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2387	Tractor Front Fog Lights Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2391	Back Up Light and Alarm Horn Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2391	Back Up Light and Alarm Horn Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2391	Back Up Light and Alarm Horn Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2391	Back Up Light and Alarm Horn Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2393	Lighting Data Request Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2393	Lighting Data Request Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2393	Lighting Data Request Command
Tx	0x0CFE4121	65089	Lighting Command	BCAN;KCAN;SCAN	33	2403	Running Light Command
Tx	0x0CFE4107	65089	Lighting Command	BCAN;KCAN;SCAN	7	2403	Running Light Command
Rx	0x0CFE4127	65089	Lighting Command	BCAN;KCAN;SCAN	39	2403	Running Light Command
Tx	0x0CFE41A0	65089	Lighting Command	BCAN;KCAN;SCAN	160	2403	Running Light Command
Rx	0x18FE4A03	65098	Electronic Transmission Controller 7	BCAN;KCAN;SCAN	3	2538	Transmission Mode 3 Indicator
Rx	0x18FE4B03	65099	Transmission Configuration 2	SCAN;KCAN	3	1845	Transmission Torque Limit
Rx	0x18FE4F3E	65103	Vehicle Dynamic Stability Control 1	SCAN;KCAN	62	1814	VDC Fully Operational
Rx	0x18FE5600	65110	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Information 1	BCAN;KCAN;SCAN	0	1761	Aftertreatment 1 Diesel Exhaust Fluid Tank Volume
Rx	0x18FE5600	65110	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Information 1	SCAN;KCAN	0	3031	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature 1
Rx	0x18FE5600	65110	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Information 1	SCAN;KCAN	0	3363	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater
Rx	0x18FE5600	65110	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Information 1	BCAN;KCAN;SCAN	0	5245	Aftertreatment Diesel Exhaust Fluid Tank Low Level Indicator
Rx	0x18FE5600	65110	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Information 1	SCAN;KCAN	0	5246	Aftertreatment SCR Operator Inducement Severity
Rx	0x18FE5BE8	65115	Forward Lane Image 2	SCAN;KCAN	232	1702	Lane Departure Indication Enable Status
Rx	0x18FE5BE8	65115	Forward Lane Image 2	SCAN;KCAN	232	1710	Lane Tracking Status Left Side
Rx	0x18FE5BE8	65115	Forward Lane Image 2	SCAN;KCAN	232	1711	Lane Tracking Status Right Side
Rx	0x18FE6900	65129	Engine Temperature 3	SCAN;KCAN	0	1637	Engine Coolant Temperature (High Resolution)
Rx	0x18FE6900	65129	Engine Temperature 3	SCAN;KCAN	0	2630	Engine Charge Air Cooler 1 Outlet Temperature
Rx	0x10FE6F2A	65135	Adaptive Cruise Control 1	SCAN;KCAN	42	1586	Speed of forward vehicle
Rx	0x10FE6F2A	65135	Adaptive Cruise Control 1	SCAN;KCAN	42	1587	Distance to forward vehicle
Rx	0x10FE6F2A	65135	Adaptive Cruise Control 1	SCAN;KCAN	42	1590	Adaptive Cruise Control Mode

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x10FE6F2A	65135	Adaptive Cruise Control 1	SCAN;KCAN	42	1796	ACC Distance Alert Signal
Rx	0x10FE6F2A	65135	Adaptive Cruise Control 1	SCAN;KCAN	42	5022	Forward Collision Warning
Rx	0x18FE700B	65136	Combination Vehicle Weight	SCAN;KCAN	11	1760	Gross Combination Vehicle Weight
Rx	0x1CFE8C00	65164	Auxiliary Analog Information	SCAN;KCAN	0	354	Relative Humidity
Rx	0x1CFE9200	65170	Engine Information 1	SCAN;KCAN	0	1209	Engine Exhaust Pressure 1
Rx	0x18FE9700	65175	Turbocharger Information 5	SCAN;KCAN	0	1184	Engine Turbocharger 1 Turbine Outlet Temperature
Rx	0x18FE9800	65176	Turbocharger Information 4	SCAN;KCAN	0	1180	Engine Turbocharger 1 Turbine Intake Temperature
Rx	0x18FE9900	65177	Turbocharger Information 3	SCAN;KCAN	0	1176	Engine Turbocharger 1 Compressor Intake Pressure
Rx	0x18FE9A00	65178	Turbocharger Information 2	SCAN;KCAN	0	1172	Engine Turbocharger 1 Compressor Intake Temperature
Rx	0x18FEA400	65188	Engine Temperature 2	SCAN;KCAN	0	412	Engine Exhaust Gas Recirculation 1 Temperature
Rx	0x1CFEAC9A	65196	Wheel Brake Lining Remaining Information	SCAN;KCAN	154	1099	Brake Lining Remaining, Front Axle, Left Wheel
Rx	0x1CFEAC9A	65196	Wheel Brake Lining Remaining Information	SCAN;KCAN	154	1100	Brake Lining Remaining, Front Axle, Right Wheel
Rx	0x1CFEAC9A	65196	Wheel Brake Lining Remaining Information	SCAN;KCAN	154	1101	Brake Lining Remaining, Rear Axle #1, Left Wheel
Rx	0x1CFEAC9A	65196	Wheel Brake Lining Remaining Information	SCAN;KCAN	154	1102	Brake Lining Remaining, Rear Axle #1, Right Wheel
Rx	0x1CFEAC9A	65196	Wheel Brake Lining Remaining Information	SCAN;KCAN	154	1103	Brake Lining Remaining, Rear Axle #2, Left Wheel
Rx	0x1CFEAC9A	65196	Wheel Brake Lining Remaining Information	SCAN;KCAN	154	1104	Brake Lining Remaining, Rear Axle #2, Right Wheel
Tx	0x18FEAE21	65198	Air Supply Pressure	BCAN;KCAN	33	1087	Service Brake Circuit 1 Air Pressure
Rx	0x18FEAE27	65198	Air Supply Pressure	BCAN;KCAN;SCAN	39	1087	Service Brake Circuit 1 Air Pressure
Tx	0x18FEAE21	65198	Air Supply Pressure	BCAN;KCAN	33	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	0x18FEAE30	65198	Air Supply Pressure	KCAN;SCAN	48	1351	Air Compressor Status
Rx	0x1CFEAF00	65199	Fuel Consumption (Gaseous)	SCAN;KCAN	0	1039	Trip Fuel (Gaseous)
Rx	0x1CFEAF00	65199	Fuel Consumption (Gaseous)	SCAN;KCAN	0	1040	Total Fuel Used (Gaseous)
Rx	0x1CFEB100	65201	ECU History	SCAN;KCAN	0	1033	Total ECU Run Time
Rx	0x1CFEB300	65203	Fuel Information 1 (Liquid)	BCAN;KCAN;SCAN	0	1028	Total Engine PTO Governor Fuel Used
Rx	0x1CFEB300	65203	Fuel Information 1 (Liquid)	SCAN;KCAN	0	1029	Trip Average Fuel Rate
Rx	0x18FEBD00	65213	Fan Drive #1	SCAN;KCAN	0	975	Engine Fan 1 Estimated Percent Speed
Rx	0x18FEBD00	65213	Fan Drive #1	SCAN;KCAN	0	977	Fan Drive State
Rx	0x18FEBD00	65213	Fan Drive #1	SCAN;KCAN	0	1639	Fan Speed
Rx	0x18FEBF0B	65215	Wheel Speed Information	SCAN;KCAN	11	904	Front Axle Speed
Rx	0x18FEC000	65216	Service Information	SCAN;KCAN	0	911	Service Component Identification
Rx	0x18FEC000	65216	Service Information	SCAN;KCAN	0	912	Service Component Identification
Rx	0x18FEC000	65216	Service Information	SCAN;KCAN	0	914	Service Distance
Rx	0x18FEC127	65217	High Resolution Vehicle Distance	SCAN;KCAN	39	917	Total Vehicle Distance (High Resolution)
Rx	0x18FEC100	65217	High Resolution Vehicle Distance	SCAN;KCAN	0	918	Trip Distance (High Resolution)
Rx	0x1CFEC203	65218	Electronic Retarder Controller 2	KCAN;SCAN	3	4055	Transmission Retarder Enable Switch
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	623	Red Stop Lamp
Rx	0x18FECA0B	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	11	623	Red Stop Lamp
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	623	Red Stop Lamp

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	623	Red Stop Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	623	Red Stop Lamp
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	623	Red Stop Lamp
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	624	Amber Warning Lamp
Rx	0x18FECA0B	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	11	624	Amber Warning Lamp
Rx	0x18FECAE8	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	232	624	Amber Warning Lamp
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	624	Amber Warning Lamp
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	624	Amber Warning Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	624	Amber Warning Lamp
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	624	Amber Warning Lamp
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	987	Protect Lamp
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	987	Protect Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	987	Protect Lamp
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	987	Protect Lamp
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	1213	Malfunction Indicator Lamp
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	1213	Malfunction Indicator Lamp
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	1213	Malfunction Indicator Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	1213	Malfunction Indicator Lamp
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	1213	Malfunction Indicator Lamp
Rx	0x18FECA0B	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	11	1214	Suspect Parameter Number
Rx	0x18FECAE8	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	232	1214	Suspect Parameter Number
Rx	0x18FECA27	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	39	1214	Suspect Parameter Number
Rx	0x18FECA17	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	23	1214	Suspect Parameter Number
Rx	0x18FECAA0	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	160	1214	Suspect Parameter Number
Rx	0x18FECA2A	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	42	1214	Suspect Parameter Number
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	1215	Failure Mode Identifier
Rx	0x18FECA0B	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	11	1215	Failure Mode Identifier
Rx	0x18FECAE8	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	232	1215	Failure Mode Identifier
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	1215	Failure Mode Identifier
Rx	0x18FECA27	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	39	1215	Failure Mode Identifier
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	1215	Failure Mode Identifier
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	1215	Failure Mode Identifier
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	1215	Failure Mode Identifier
Rx	0x18FECA17	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	23	1215	Failure Mode Identifier
Rx	0x18FECAA0	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	160	1215	Failure Mode Identifier
Rx	0x18FECA2A	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	42	1215	Failure Mode Identifier
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	1216	Occurrence Count
Rx	0x18FECA0B	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	11	1216	Occurrence Count
Rx	0x18FECAE8	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	232	1216	Occurrence Count
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	1216	Occurrence Count

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FECA27	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	39	1216	Occurrence Count
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	1216	Occurrence Count
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	1216	Occurrence Count
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	1216	Occurrence Count
Rx	0x18FECA17	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	23	1216	Occurrence Count
Rx	0x18FECA33	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	51	1706	SPN Conversion Method
Rx	0x18FECA0B	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	11	1706	SPN Conversion Method
Rx	0x18FECAE8	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	232	1706	SPN Conversion Method
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	1706	SPN Conversion Method
Rx	0x18FECA27	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	39	1706	SPN Conversion Method
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	1706	SPN Conversion Method
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	1706	SPN Conversion Method
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	3038	Flash Malfunction Indicator Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	3038	Flash Malfunction Indicator Lamp
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	3039	Flash Red Stop Lamp (RSL)
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	3039	Flash Red Stop Lamp (RSL)
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	3039	Flash Red Stop Lamp (RSL)
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	3039	Flash Red Stop Lamp (RSL)
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	3039	Flash Red Stop Lamp (RSL)
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	3040	Flash Amber Warning Lamp (AWL)
Rx	0x18FECA03	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	3	3040	Flash Amber Warning Lamp (AWL)
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	3040	Flash Amber Warning Lamp (AWL)
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	3040	Flash Amber Warning Lamp (AWL)
Rx	0x18FECA00	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	0	3041	Flash Protect Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	3041	Flash Protect Lamp
Rx	0x18FECA47	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	71	3041	Flash Protect Lamp
Rx	0x18FECA50	65226	Active Diagnostic Trouble Codes	SCAN;KCAN	80	3041	Flash Protect Lamp
Rx	0x18FEDA27	65242	Software Identification	SCAN;KCAN	39	234	Software Identification
Rx	0x18FEDA03	65242	Software Identification	SCAN;KCAN	3	234	Software Identification
Rx	0x18FEDA00	65242	Software Identification	SCAN;KCAN	0	234	Software Identification
Rx	0x18FEDA27	65242	Software Identification	SCAN;KCAN	39	965	Number of Software Identification Fields
Rx	0x18FEDA03	65242	Software Identification	SCAN;KCAN	3	965	Number of Software Identification Fields
Rx	0x18FEDA00	65242	Software Identification	SCAN;KCAN	0	965	Number of Software Identification Fields
Rx	0x18FEDB00	65243	Engine Fluid Level/Pressure 2	SCAN;KCAN	0	157	Engine Injector Metering Rail 1 Pressure
Rx	0x18FEDC00	65244	Idle Operation	SCAN;KCAN	0	235	Engine Total Idle Hours
Rx	0x18FEDC00	65244	Idle Operation	SCAN;KCAN	0	236	Engine Total Idle Fuel Used
Rx	0x18FEDD00	65245	Turbocharger	SCAN;KCAN	0	103	Engine Turbocharger 1 Speed
Rx	0x18FEDF00	65247	Electronic Engine Controller 3	SCAN;KCAN	0	514	Nominal Friction - Percent Torque
Rx	0x18FEDF00	65247	Electronic Engine Controller 3	SCAN;KCAN	0	2978	Estimated Engine Parasitic Losses - Percent Torque
Rx	0x18FEDF00	65247	Electronic Engine Controller 3	SCAN;KCAN	0	3236	Aftertreatment 1 Exhaust Gas Mass Flow Rate

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FEDF00	65247	Electronic Engine Controller 3	SCAN;KCAN	0	3237	Aftertreatment 1 Intake Dew Point
Rx	0x18FEDF00	65247	Electronic Engine Controller 3	SCAN;KCAN	0	3238	Aftertreatment 1 Exhaust Dew Point
Rx	0x18FEE000	65248	Vehicle Distance	SCAN;KCAN	0	244	Trip Distance
Rx	0x18FEE000	65248	Vehicle Distance	SCAN;KCAN	0	245	Total Vehicle Distance
Rx	0x18FEE203	65250	Transmission Configuration	SCAN;KCAN	3	581	Transmission Gear Ratio
Rx	0x18FEE203	65250	Transmission Configuration	SCAN;KCAN	3	957	Number of Forward Gear Ratios
Rx	0x18FEE203	65250	Transmission Configuration	SCAN;KCAN	3	958	Number of Reverse Gear Ratios
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	188	Engine Speed At Idle, Point 1
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	528	Engine Speed At Point 2
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	529	Engine Speed At Point 3
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	530	Engine Speed At Point 4
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	531	Engine Speed At Point 5
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	532	Engine Speed At High Idle, Point 6
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	539	Engine Percent Torque At Idle, Point 1
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	540	Engine Percent Torque At Point 2
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	541	Engine Percent Torque At Point 3
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	542	Engine Percent Torque At Point 4
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	543	Engine Percent Torque At Point 5
Rx	0x18FEE35B	65251	Engine Configuration 1	KCAN;SCAN	91	544	Engine Reference Torque
Rx	0x18FEE300	65251	Engine Configuration 1	SCAN;KCAN	0	544	Engine Reference Torque
Rx	0x18FEE300	65251	Engine Configuration 1	SCAN;KCAN	0	1846	Engine Default Torque Limit
Rx	0x18FEE400	65252	Shutdown	SCAN;KCAN	0	592	Engine Idle Shutdown Timer Override
Rx	0x18FEE400	65252	Shutdown	SCAN;KCAN	0	593	Engine Idle Shutdown has Shutdown Engine
Rx	0x18FEE400	65252	Shutdown	SCAN;KCAN	0	985	A/C High Pressure Fan Switch
Rx	0x18FEE400	65252	Shutdown	BCAN;KCAN;SCAN	0	1109	Engine Protection System Approaching Shutdown
Rx	0x18FEE400	65252	Shutdown	SCAN;KCAN	0	1110	Engine Protection System has Shutdown Engine
Rx	0x18FEE500	65253	Engine Hours, Revolutions	BCAN;KCAN;SCAN	0	247	Engine Total Hours of Operation
Rx	0x18FEE500	65253	Engine Hours, Revolutions	SCAN;KCAN	0	249	Engine Total Revolutions
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	959	Seconds
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	960	Minutes
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	961	Hours
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	962	Day
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	963	Month
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	964	Year
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	1601	Local minute offset
Rx	0x18FEE6FF	65254	Time/Date	KCAN	255	1602	Local hour offset
Rx	0x18FEE700	65255	Vehicle Hours	SCAN;KCAN	0	246	Total Vehicle Hours
Rx	0x18FEE700	65255	Vehicle Hours	BCAN;KCAN;SCAN	0	248	Total Power Takeoff Hours
Rx	0x18FEE900	65257	Fuel Consumption (Liquid)	SCAN;KCAN	0	182	Engine Trip Fuel
Rx	0x18FEE900	65257	Fuel Consumption (Liquid)	SCAN;KCAN	0	250	Engine Total Fuel Used

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FEEB00	65259	Component Identification	KCAN	0	233	Unit Number (Power Unit)
Rx	0x18FEEB00	65259	Component Identification	KCAN	0	586	Make
Rx	0x18FEEB00	65259	Component Identification	KCAN	0	587	Model
Rx	0x18FEEB00	65259	Component Identification	KCAN	0	588	Serial Number
Rx	0x18FEEB03	65259	Component Identification	SCAN;KCAN	3	588	Serial Number
Rx	0x18FEEC00	65260	Vehicle Identification	SCAN;KCAN	0	237	Vehicle Identification Number
Rx	0x18FEED27	65261	Cruise Control/Vehicle Speed Setup	KCAN;SCAN	39	74	Maximum Vehicle Speed Limit
Rx	0x18FEED00	65261	Cruise Control/Vehicle Speed Setup	SCAN;KCAN	0	74	Maximum Vehicle Speed Limit
Rx	0x18FEEE00	65262	Engine Temperature 1	BCAN;KCAN;SCAN	0	110	Engine Coolant Temperature
Rx	0x18FEEE00	65262	Engine Temperature 1	SCAN;KCAN	0	174	Engine Fuel Temperature 1
Rx	0x18FEEE00	65262	Engine Temperature 1	SCAN;KCAN	0	175	Engine Oil Temperature 1
Rx	0x18FEEF00	65263	Engine Fluid Level/Pressure 1	SCAN;KCAN	0	94	Engine Fuel Delivery Pressure
Rx	0x18FEEF00	65263	Engine Fluid Level/Pressure 1	SCAN;KCAN	0	98	Engine Oil Level
Rx	0x18FEEF00	65263	Engine Fluid Level/Pressure 1	BCAN;KCAN;SCAN	0	100	Engine Oil Pressure
Rx	0x18FEEF00	65263	Engine Fluid Level/Pressure 1	SCAN;KCAN	0	101	Engine Crankcase Pressure 1
Rx	0x18FEEF00	65263	Engine Fluid Level/Pressure 1	SCAN;KCAN	0	111	Engine Coolant Level 1
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN	33	90	Power Takeoff Oil Temperature
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN	7	90	Power Takeoff Oil Temperature
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN	33	187	Power Takeoff Set Speed
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN	7	187	Power Takeoff Set Speed
Rx	0x18FEF027	65264	Power Takeoff Information	BCAN;KCAN;SCAN	39	187	Power Takeoff Set Speed
Rx	0x18FEF000	65264	Power Takeoff Information	SCAN;KCAN	0	187	Power Takeoff Set Speed
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	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
Rx	0x18FEF000	65264	Power Takeoff Information	SCAN;KCAN	0	979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	980	Engine PTO Governor Enable Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	980	Engine PTO Governor Enable Switch
Rx	0x18FEF000	65264	Power Takeoff Information	SCAN;KCAN	0	980	Engine PTO Governor Enable Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	981	Engine PTO Governor Accelerate Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	981	Engine PTO Governor Accelerate Switch
Tx	0x18FEF0A0	65264	Power Takeoff Information	BCAN;KCAN;SCAN	160	981	Engine PTO Governor Accelerate Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	982	Engine PTO Governor Resume Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	982	Engine PTO Governor Resume Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	983	Engine PTO Governor Coast/Decelerate Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	983	Engine PTO Governor Coast/Decelerate Switch
Tx	0x18FEF0A0	65264	Power Takeoff Information	BCAN;KCAN;SCAN	160	983	Engine PTO Governor Coast/Decelerate Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	984	Engine PTO Governor Set Switch
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	984	Engine PTO Governor Set Switch
Tx	0x18FEF021	65264	Power Takeoff Information	BCAN;KCAN;SCAN	33	3447	Remote PTO Governor Preprogrammed Speed Control Switch #2

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Tx	0x18FEF007	65264	Power Takeoff Information	BCAN;KCAN;SCAN	7	3447	Remote PTO Governor Preprogrammed Speed Control Switch #2
Rx	0x18FEF127	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	0x18FEF100	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	0	86	Cruise Control Set Speed
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	86	Cruise Control Set Speed
Rx	0x18FEF100	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	0	527	Cruise Control States
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	527	Cruise Control States
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	595	Cruise Control Active
Rx	0x18FEF100	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	0	595	Cruise Control Active
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	596	Cruise Control Enable Switch
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	KCAN;SCAN	39	597	Brake Switch
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	598	Clutch Switch
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	599	Cruise Control Set Switch
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	600	Cruise Control Coast (Decelerate) Switch
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	601	Cruise Control Resume Switch
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	39	602	Cruise Control Accelerate Switch
Tx	0x18FEF121	65265	Cruise Control/Vehicle Speed 1	BCAN;KCAN;SCAN	33	976	PTO Governor State
Tx	0x18FEF107	65265	Cruise Control/Vehicle Speed 1	BCAN;KCAN;SCAN	7	976	PTO Governor State
Rx	0x18FEF127	65265	Cruise Control/Vehicle Speed 1	BCAN;KCAN;SCAN	39	976	PTO Governor State
Rx	0x18FEF100	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	0	976	PTO Governor State
Rx	0x18FEF100	65265	Cruise Control/Vehicle Speed 1	SCAN;KCAN	0	1237	Engine Shutdown Override Switch
Rx	0x18FEF200	65266	Fuel Economy (Liquid)	SCAN;KCAN	0	51	Engine Throttle Valve 1 Position 1
Rx	0x18FEF200	65266	Fuel Economy (Liquid)	SCAN;KCAN	0	183	Engine Fuel Rate
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	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	241	Tire Pressure
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	242	Tire Temperature
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	929	Tire Location
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	1697	Tire Sensor Electrical Fault
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	1698	Tire Status
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	1699	Tire Sensor Enable Status
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	2586	Tire Air Leakage Rate
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	2587	Tire Pressure Threshold Detection
Rx	0x18FEF433	65268	Tire Condition Message 1	SCAN;KCAN	51	6990	Extended Tire Pressure Support
Rx	0x18FEF500	65269	Ambient Conditions	SCAN;KCAN	0	108	Barometric Pressure
Rx	0x18FEF519	65269	Ambient Conditions	SCAN;KCAN	25	170	Cab Interior Temperature
Rx	0x18FEF500	65269	Ambient Conditions	SCAN;KCAN	0	171	Ambient Air Temperature
Rx	0x18FEF600	65270	Intake/Exhaust Conditions 1	BCAN;KCAN;SCAN	0	102	Engine Intake Manifold #1 Pressure
Rx	0x18FEF600	65270	Intake/Exhaust Conditions 1	SCAN;KCAN	0	105	Engine Intake Manifold 1 Temperature
Rx	0x18FEF600	65270	Intake/Exhaust Conditions 1	SCAN;KCAN	0	106	Engine Intake Air Pressure

Direction	HexID	PGN	Message Name	Network	SA	SPN	Signal Name
Rx	0x18FEF600	65270	Intake/Exhaust Conditions 1	SCAN;KCAN	0	173	Engine Exhaust Temperature
Rx	0x18FEF727	65271	Vehicle Electrical Power 1	SCAN;KCAN	39	158	Key Switch Battery Potential
Rx	0x18FEF727	65271	Vehicle Electrical Power 1	BCAN;KCAN;SCAN	39	168	Battery Potential / Power Input 1
Rx	0x18FEF700	65271	Vehicle Electrical Power 1	SCAN;KCAN	0	168	Battery Potential / Power Input 1
Rx	0x18FEF803	65272	Transmission Fluids 1	BCAN;KCAN;SCAN	3	177	Transmission Oil Temperature 1
Rx	0x18FEFA0B	65274	Brakes	SCAN;KCAN	11	116	Brake Application Pressure
Rx	0x18FEFA27	65274	Brakes	BCAN;KCAN;SCAN	39	117	Brake Primary Pressure
Rx	0x18FEFA27	65274	Brakes	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
Tx	0x18FEFD12	65277	Alternate Fuel 1	SCAN	18	159	Engine Gaseous Fuel Supply Pressure 1
Rx	0x18FEFD00	65277	Alternate Fuel 1	SCAN;KCAN	0	159	Engine Gaseous Fuel Supply Pressure 1
Rx	0x18FEFF00	65279	Operator indicators	SCAN;KCAN	0	97	Water In Fuel Indicator 1
Rx	0x18FEFF00	65279	Operator indicators	BCAN;KCAN;SCAN	0	5825	Driver Warning System Indicator Status
Rx	0x18FF0E27	65294	PropB_VECU_03	BCAN;KCAN;SCAN	39	520910	PTOActiveTelltale
Rx	0x18FF0E27	65294	PropB_VECU_03	BCAN;KCAN;SCAN	39	521279	PTO Mode Active Telltale
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521098	Net Following Distance Interval
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521099	Audible Following Distance Alerts
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521100	Visual Following Distance Alerts
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521101	ACB Disabled Due to Excessive Brake Use
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521102	Vehicle Following Distance
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521103	Vehicle Following Interval
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521104	Vehicle Cruise Control Set Speed
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521106	Wingman Target Detect Lamp
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521107	Wingman Sensor Blocked or No Objects Detected
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521108	Fusion Available Flag
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521162	Bendix Power On Self Test
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521164	CMT Intervention Status
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521165	CMT Foundation Brake Request
Rx	0x18FF102A	65296	PropB_FLR_Warn	SCAN;KCAN	42	521167	CMT Installed and Enabled
Rx	0x18FF9147	65425	PropB_SCM_AI1	BCAN;KCAN	71	520561	Secondary Fuel Level Sensor
Rx	0x18FF9147	65425	PropB_SCM_AI1	BCAN;KCAN	71	520562	Primary Fuel Level Sensor
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524149	TPMS Tyre / wheel identification
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524150	TPMS Tyre Temperature
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524151	TPMS Tyre Pressure
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524152	TPMS Wheel Unit Battery Status
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524153	TPMS Fast Pressure Loss Status Flag
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524154	TPMS Temperature Compensated Target Nominal Pressure
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524155	TPMS Tyre Pressure Status
Rx	0x18FFE633	65510	Truck High Line TPMS data message	SCAN;KCAN	51	524157	TPMS Tyre Over Temperature Status

## CAN COMMUNICATIONS

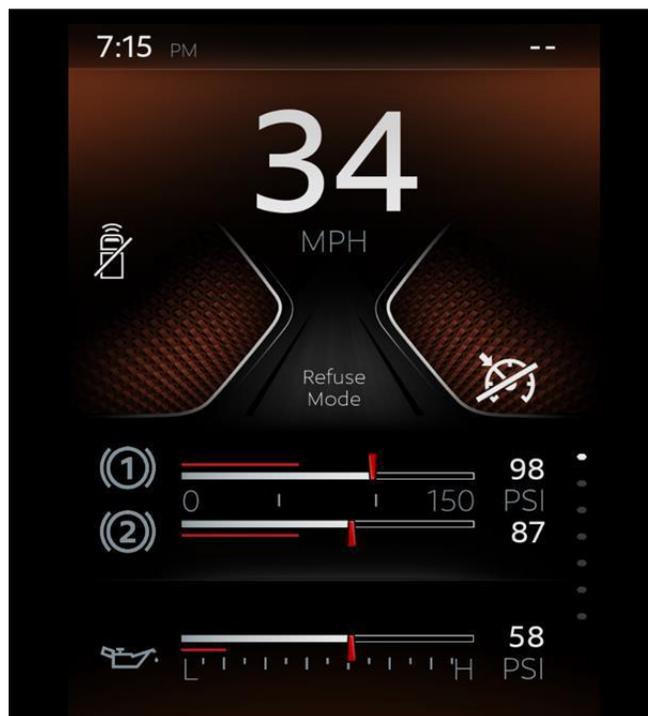
---

### MODEL 520 FRONT END LOADER WITH BENDIX FUSION

The next few pages are instructions intended for body builders working on Model 520 trucks with the Bendix Fusion collision mitigation system option. These steps only apply to trucks that will be getting front end loader refuse bodies installed. Specific steps are needed to ensure proper functionality of the Bendix Fusion system while taking into account the position of the front end loader body arms that swing out in front of the windshield mounted camera and bumper mounted radar.

#### Refuse Mode Activation

Refuse mode is activated when the Front End Loader (FEL) arm is positioned below the cab roof.



When the feature is active, Refuse Mode message is displayed, and **the following features are disabled:**

- Autonomous Emergency Braking (AEB) - **Disabled**
- Adaptive Cruise Control (ACC) - **Disabled**
- Fusion Radar Icon - **Disabled**
- Cruise Control - **Disabled**

The system will revert to normal operation once the FEL arms are raised above the top of the windshield.

# CAN COMMUNICATIONS

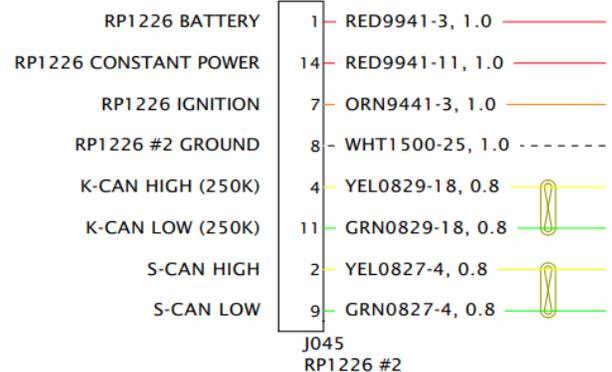
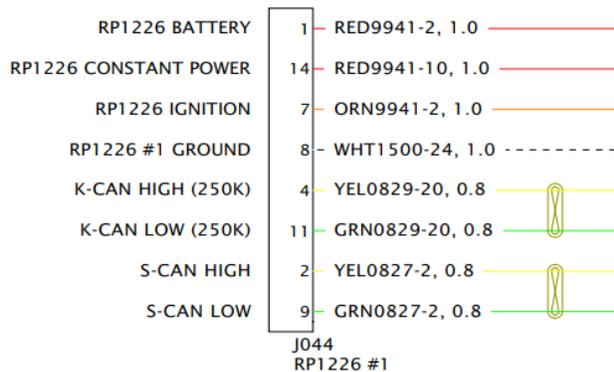
## Refuse Mode Fault



If a refuse mode fault occurs, it may indicate an issue with the Body Builder Module (BBM) connection or that the Front End Loader (FEL) message is not being transmitted on the CAN bus.

### - Verify BBM Connection:

- Ensure the BBM is connected to the KCAN.
- KCAN Available Connectors:
  - RP1226 #1 and #2



# CAN COMMUNICATIONS

## - Confirm BBM Configuration:

- The K-CAN baud rate should be set to 250 kbps.
- **Ensure that the BBM has been updated to transmit the correct CAN message.**
- REFUSE message is detailed below.

## CAN Message Details

SPN	CAN Signal Name	PGN, Message	Tx SA	Rx SA	CAN Bus
522403	ArmForkPosition	65468, REFUSE	33	Broadcast	KCAN
522402	ArmPosition	65453, REFUSE2	33	Broadcast	KCAN

## Signal Enumeration:

- 0 - Arm below cabin, Refuse mode on
- 1 - Arm above cabin, Refuse mode off
- 2 - Error
- 3 - Not Available

## Message Layout

Message 'Refuse\_BodyController\_21 (0x18FFBC21x)

Definition Signals Transmitters Receivers Layout Attributes Comment

Multiplexer Signal: Multiplexer Multiplex Value

	7	6	5	4	3	2	1	0
0							msb	lsb
1	15	14	13	12	11	10	9	8
2	23	22	21	20	19	18	17	16
3	31	30	29	28	27	26	25	24
4	39	38	37	36	35	34	33	32
5	47	46	45	44	43	42	41	40
6	55	54	53	52	51	50	49	48
7	63	62	61	60	59	58	57	56

Arrange  
To Front  
To Back  
Add...  
Remove  
Bit index  
 Inverted

OK Cancel Apply Help

# CAN COMMUNICATIONS

---

## KCAN Log Review

To ensure proper functionality and communication within the system, it is crucial to verify the following:

### 1. KCAN Log:

- Ensure that the KCAN log reflects the correct messages implemented for optimal performance.
- Carefully review the log for any discrepancies or errors that may affect system operation.

### 2. BBM ECU Message Verification:

- Confirm that all other messages broadcasted by the BBM ECU are utilizing the correct source address of **0x21 (33 decimal)** as the engine is configured to look for that source address.
- Make sure unused bits are set as 1, to avoid transmitting wrong data. Per J1939, maximum values equal Not Available signals, but 0 is valid data.
- Verify that the correct messages are being transmitted on KCAN to prevent any potential issues.

0x18FFBC21	
Byte	Data
0	1111 11XX
1	1111 1111
2	1111 1111
3	1111 1111
4	1111 1111
5	1111 1111
6	1111 1111
7	1111 1111

\*where XX is the Arm position signal

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Refuse Fault pop-up	BBM module wired to wrong CAN bus or has the wrong baud rate configured	Connect the BBM module to the RP1226 connector, on KCAN (250 kbps)
Refuse Fault pop-up	Wrong source address	Make sure messages are using SA as 33d/0x21
Refuse mode active at all times	Wrong signal value sent	Double check the enumeration definition of the arm position

Thank you for your attention to these important details. Your diligence in following these steps helps maintain the integrity and reliability of the system. If you have any questions or need further clarification, please send an email to the Service Engineering group at [PB.Service.Engineering@PACCAR.com](mailto:PB.Service.Engineering@PACCAR.com).

# SECTION 7 ELECTRICAL 520

## INTRODUCTION

This section is written to provide information to the body builder when installing equipment into vehicles built with multiplexed instrumentation. The technology presented by VECU level instrumentation integrates J1939 CAN data communications between controllers and equipment on the vehicle. This section is intended to address how to work in aftermarket equipment while still maintaining full functionality of the OEM vehicle.

These topics apply to Model 520 chassis built with Vehicle Multiplexed (VMUX) or Ethernet Multiplexed (EMUX) architecture. VMUX was introduced on Model 520 in June 2021 and EMUX replaced VMUX in September 2024. VMUX architecture eliminated the original cab ECU required for CVMUX (which was the CECU) and updated the VECU from VECU1 to VECU2. The major change going into 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 again from VECU2 to VECU3 with EMUX among other changes to increase the security of vehicle data. In addition to the dates mentioned, please check the option codes on the sales order for the truck to see which electrical architecture was installed on the vehicle from the factory.

Option Codes:

2091130 VMUX ELECTRONICS ARCHITECTURE

2091120 EMUX ELECTRONICS ARCHITECTURE

## ELECTRICAL ACRONYM LIBRARY

Acronym	Definition
AI	Analog Input
BOC	Back of Cab
BOS	Back of Sleeper
CAN	Controller Area Network
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
LIN	Local Interconnect Network
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
TCM	Transmission Control Module
VECU	Vehicle Electronic Control Unit

## 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

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

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

## MULTIPLEXED SYSTEM

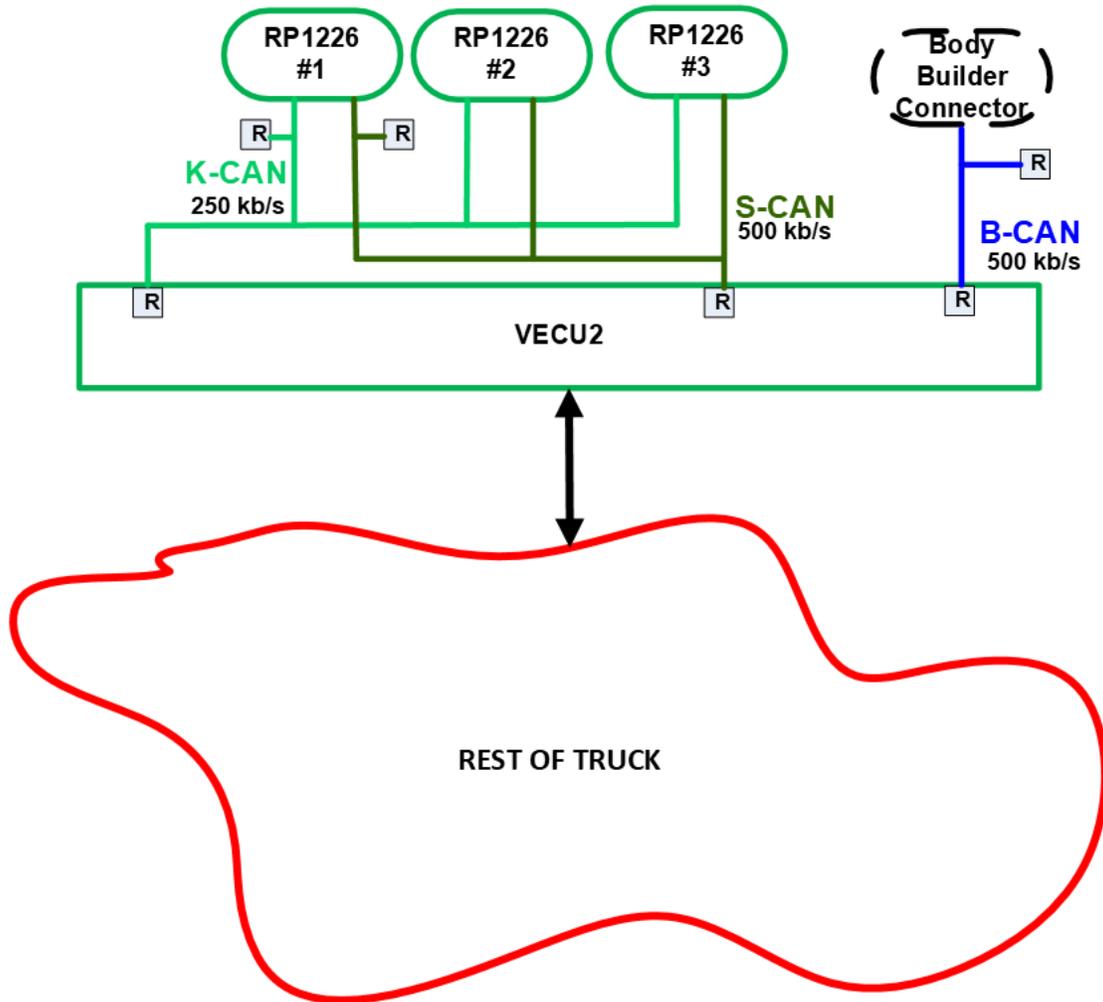
The VMUX and EMUX electrical architectures utilize a multiplexed system. Multiplexing can be defined as the process of sending multiple digital signals on the same shared medium at the same time. These signals are introduced into the multiplexed system through data connection points which are defined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

### CAN BUS SPEEDS AND CIRCUIT DESIGNATION

<b>VMUX ARCHITECTURE</b>	
<b>J1939-14 (500 kbps)</b>	<b>J1939-15 (250 kbps)</b>
B-CAN – 0813 Body Builder	K-CAN – 0829 Customer Installed Devices
S-CAN – 0827 Sleeper	

<b>EMUX ARCHITECTURE</b>	
<b>J1939-14 (500 kbps)</b>	<b>J1939-15 (250 kbps)</b>
B-CAN – 0813 Body Builder	K-CAN – 0829 Customer Installed Devices
S-CAN – 0827 Customer Installed Devices	

VMUX Customer Connector Databus Diagram



Key:



Cab mounted ECU



Standard Cab mounted RP1226 connector

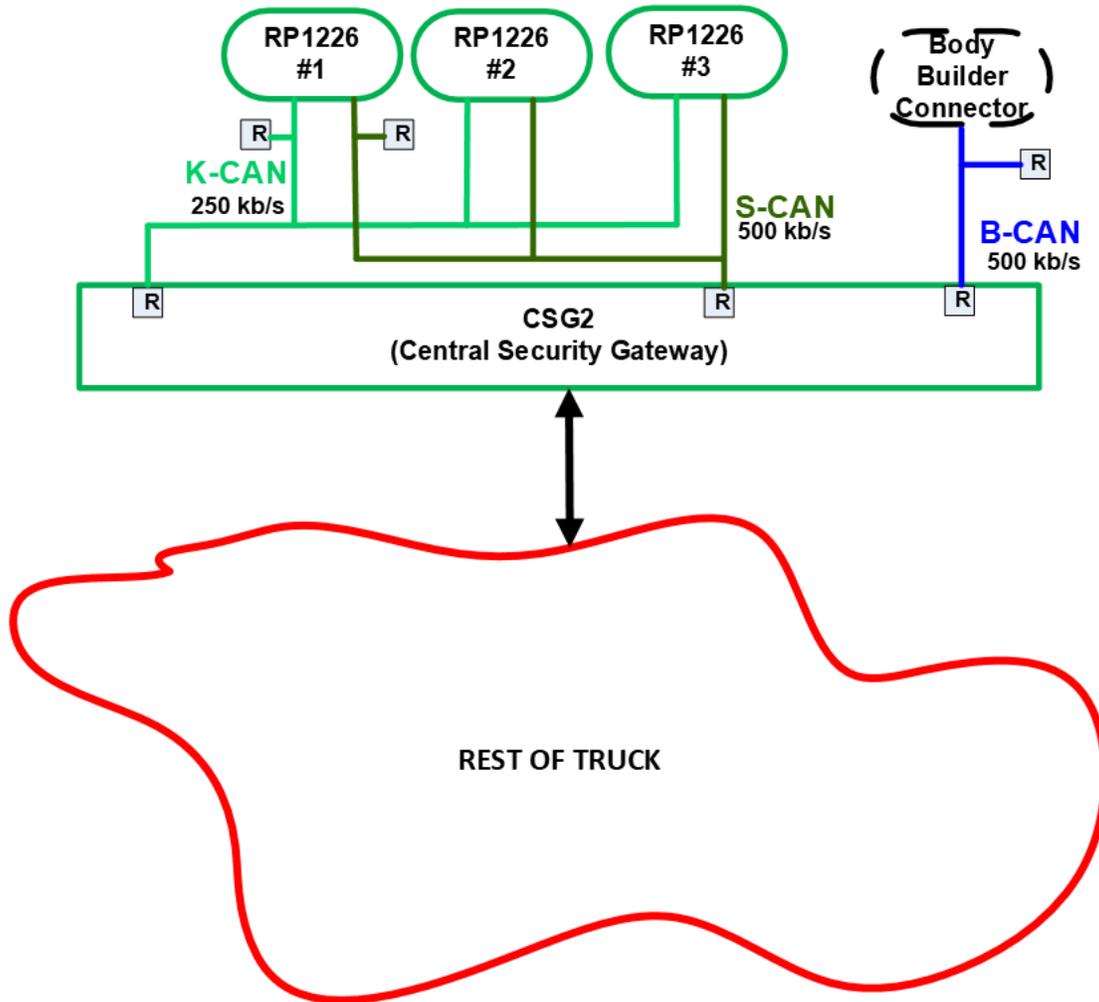


Optional Frame mounted Body Builder/RP170 connector



Provided Terminating Resistor

EMUX Customer Connector Databus Diagram



Key:



Cab mounted ECU



Standard Cab mounted RP1226 connector



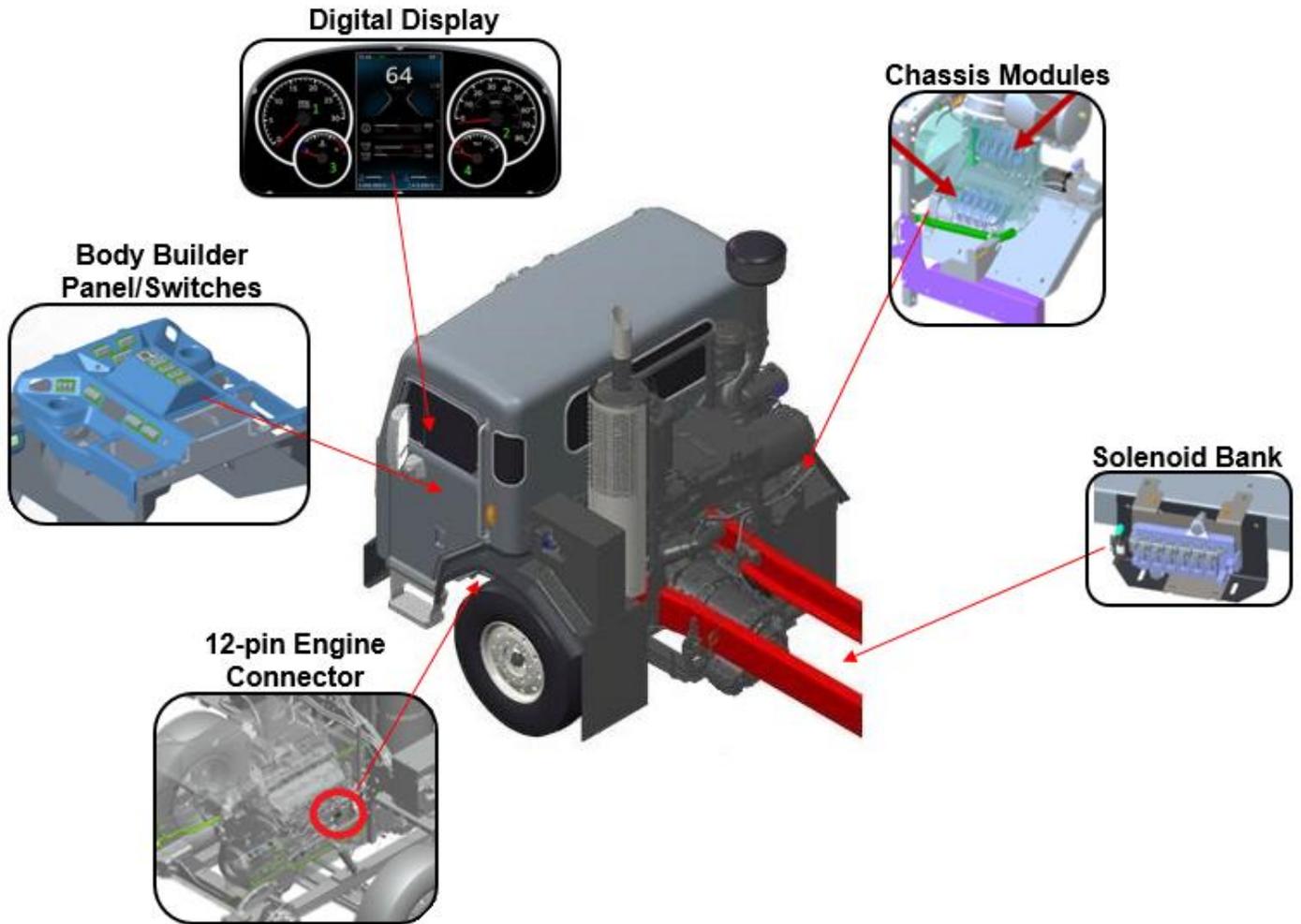
Optional Frame mounted Body Builder/RP170 connector



Provided Terminating Resistor

**ELECTRICAL COMPONENT OVERVIEW**

OVERVIEW DIAGRAM OF ELECTRICAL COMPONENT LOCATIONS  
(component locations may vary by truck model)

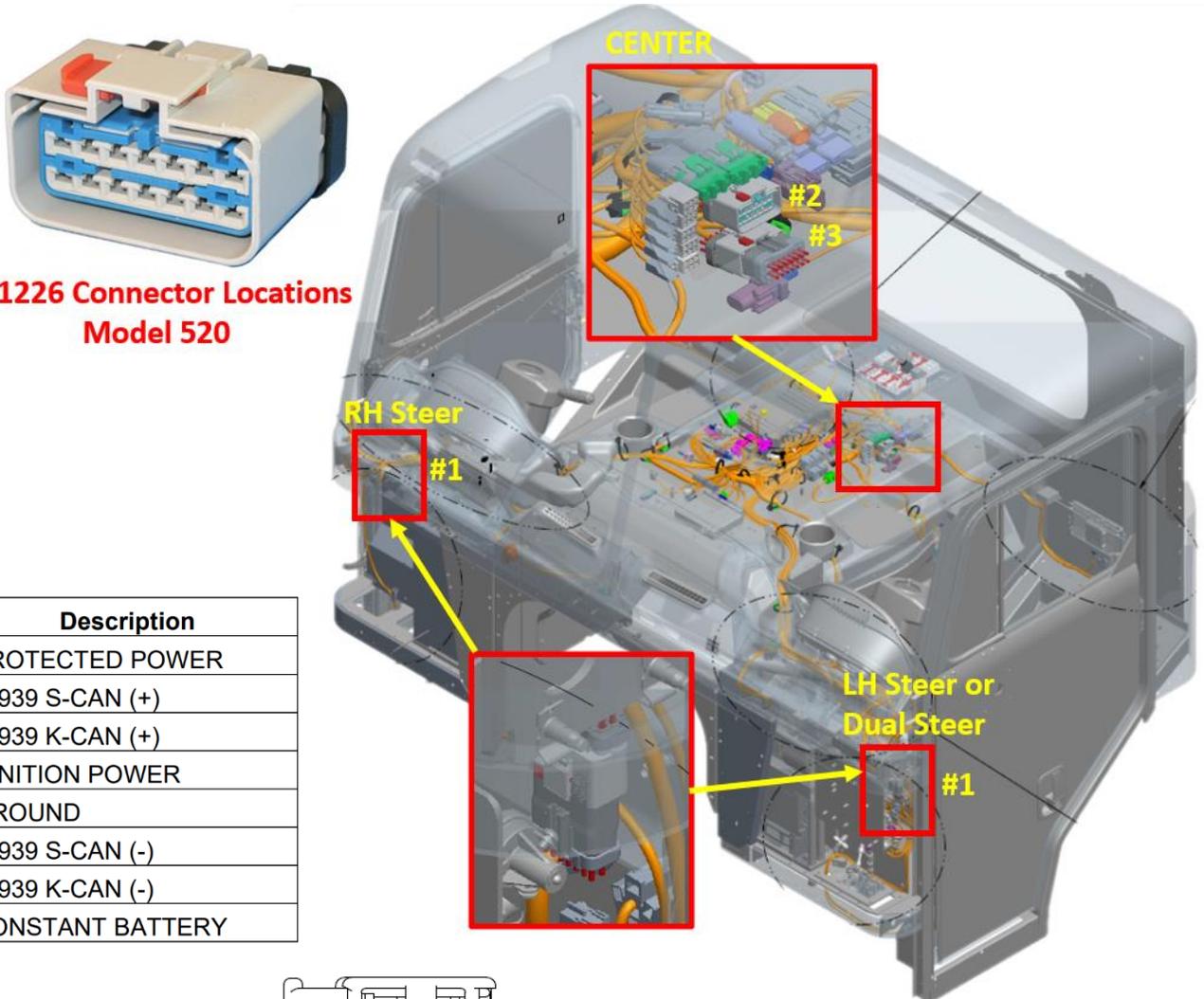


**IN-CAB CAN BASED MESSAGING CONNECTOR**

**RP1226 CONNECTOR**

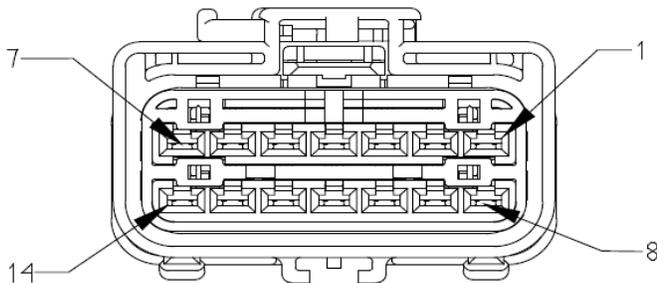
There are multiple RP1226 connectors located inside the cab (total 2 connectors for VMUX and total 3 connectors for EMUX). The first RP1226 connector is located behind the driver side kick panel (which is LH side for LH steer and dual steer ... or ... RH side for RH steer). The remaining RP1226 connectors are located under the body builder panel in the middle of the cab near the PDC (in this location, only 1 for VMUX and 2 for EMUX). 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.



**RP1226 Connector Locations  
Model 520**

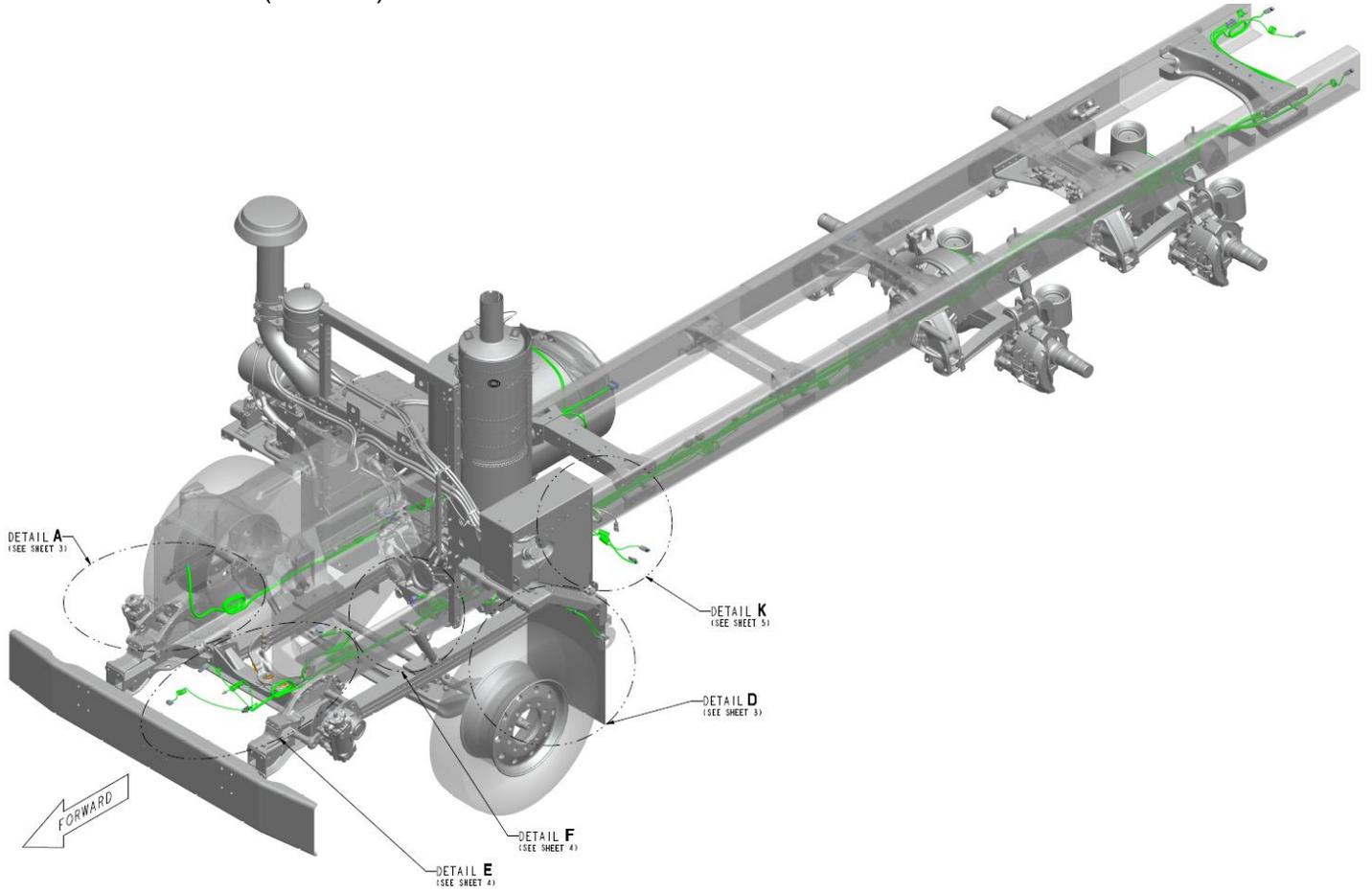
Pin	Description
1	PROTECTED POWER
2	J1939 S-CAN (+)
4	J1939 K-CAN (+)
7	IGNITION POWER
8	GROUND
9	J1939 S-CAN (-)
11	J1939 K-CAN (-)
14	CONSTANT BATTERY



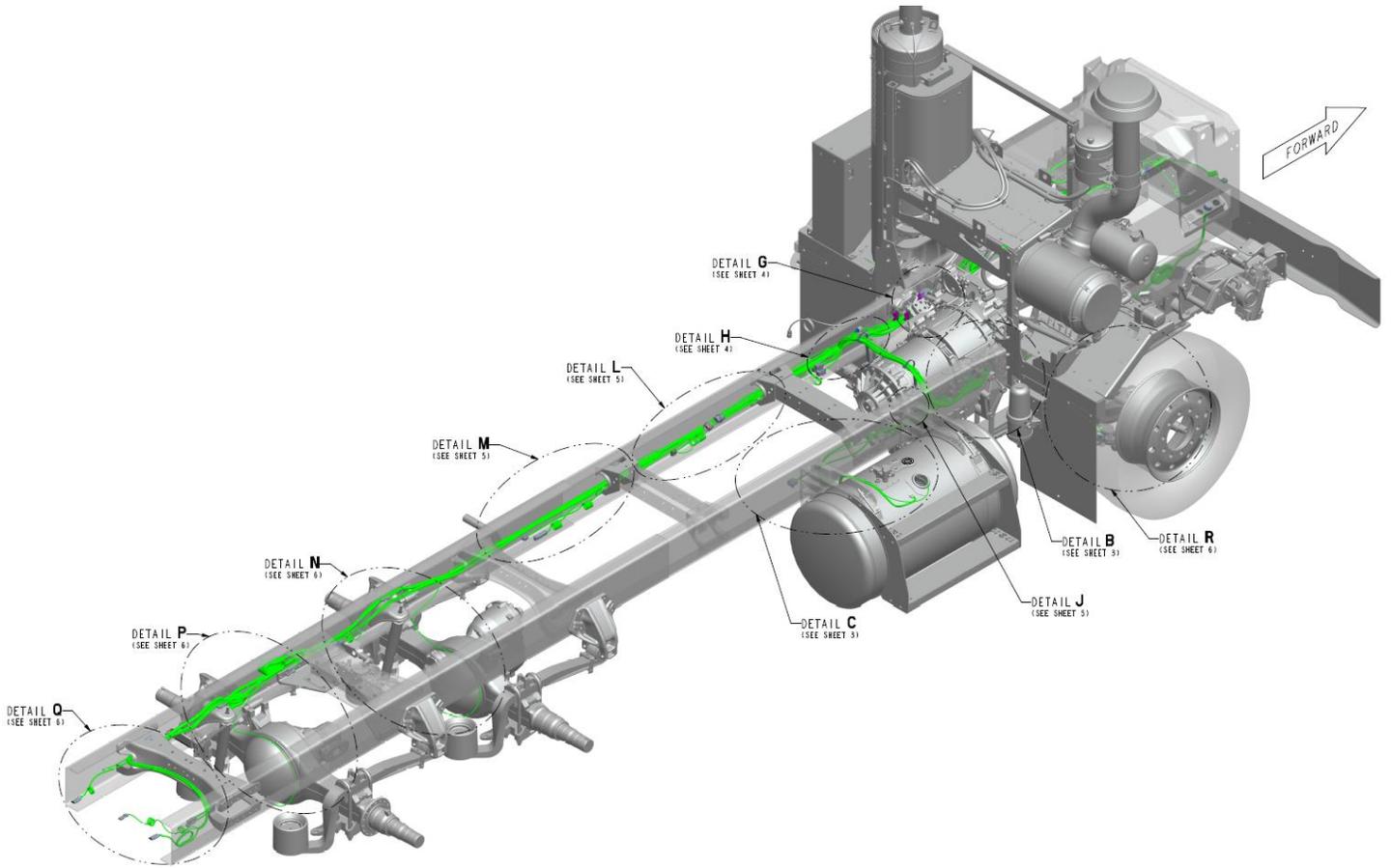
BODY CONNECTION POINTS – MODEL 520

LOCATION DIAGRAMS FOR BODY CONNECTIONS ON THE MAIN CHASSIS HARNESS

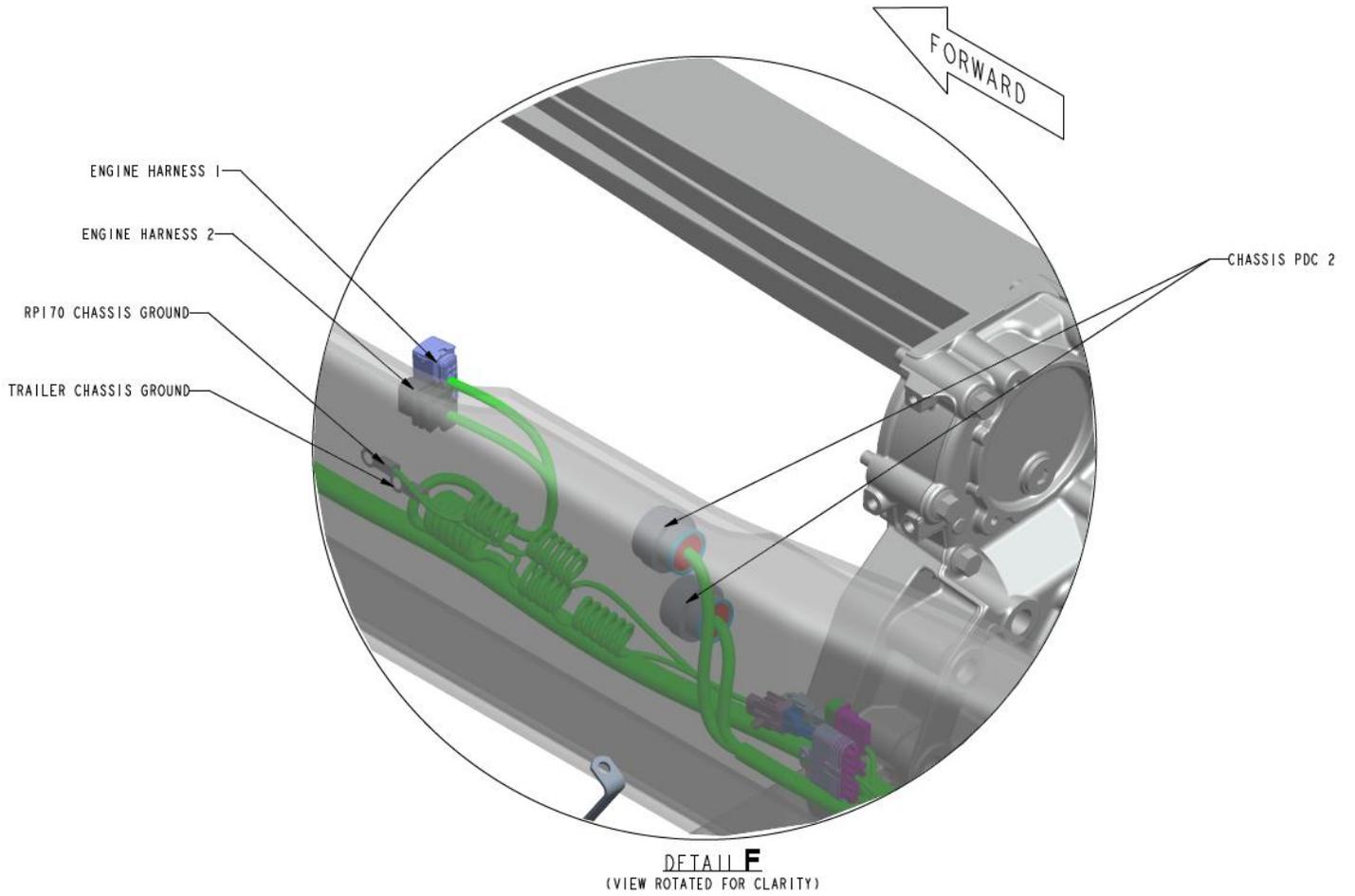
ISOMETRIC VIEW (FRONT)



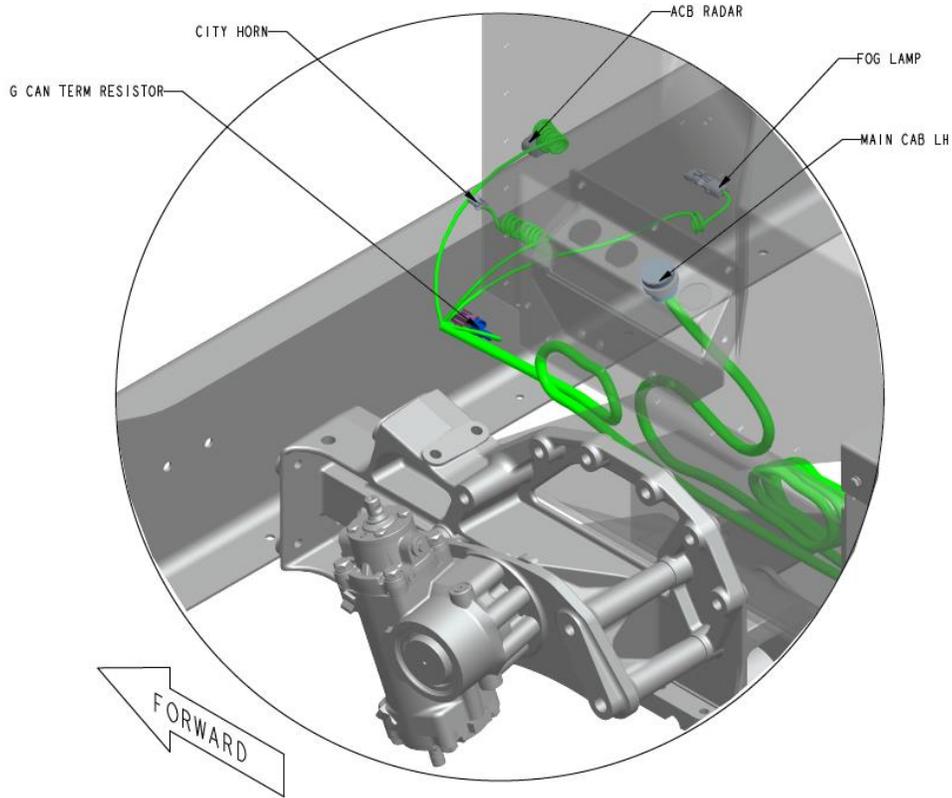
ISOMETRIC VIEW (REAR)



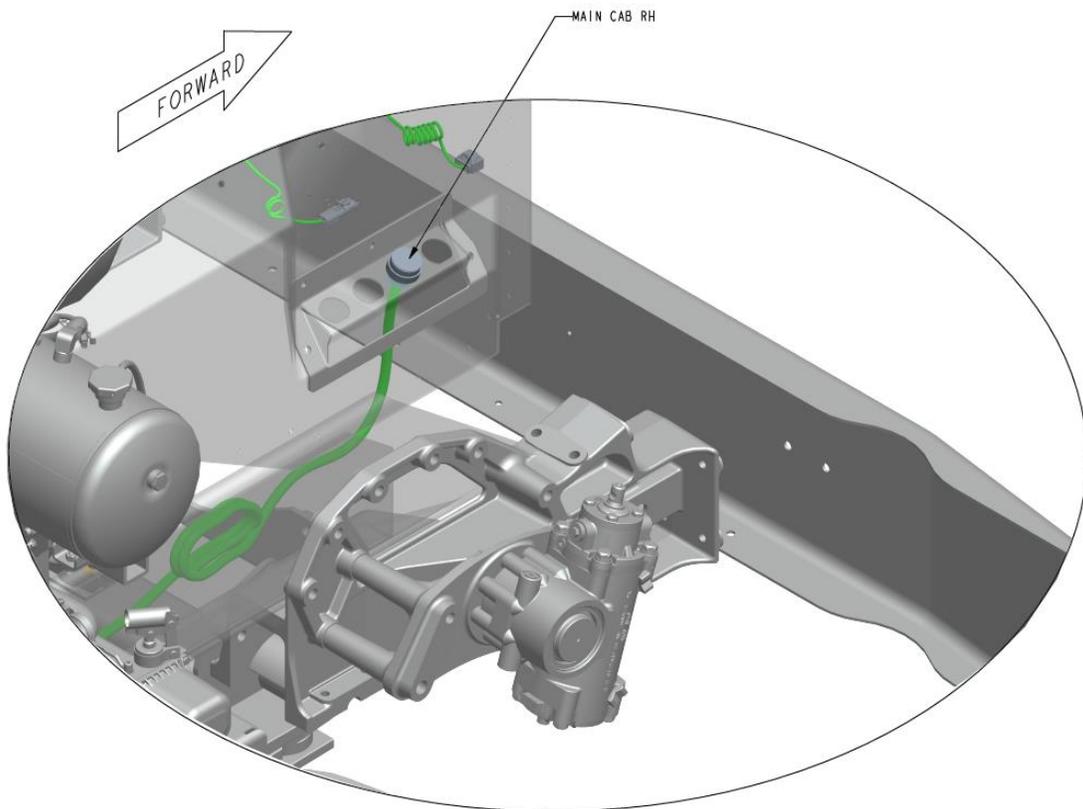
**DETAIL VIEW OF ENGINE COMPARTMENT BODY CONNECTIONS**



DETAIL VIEW OF FOF (FRONT OF FRAME) BODY CONNECTIONS

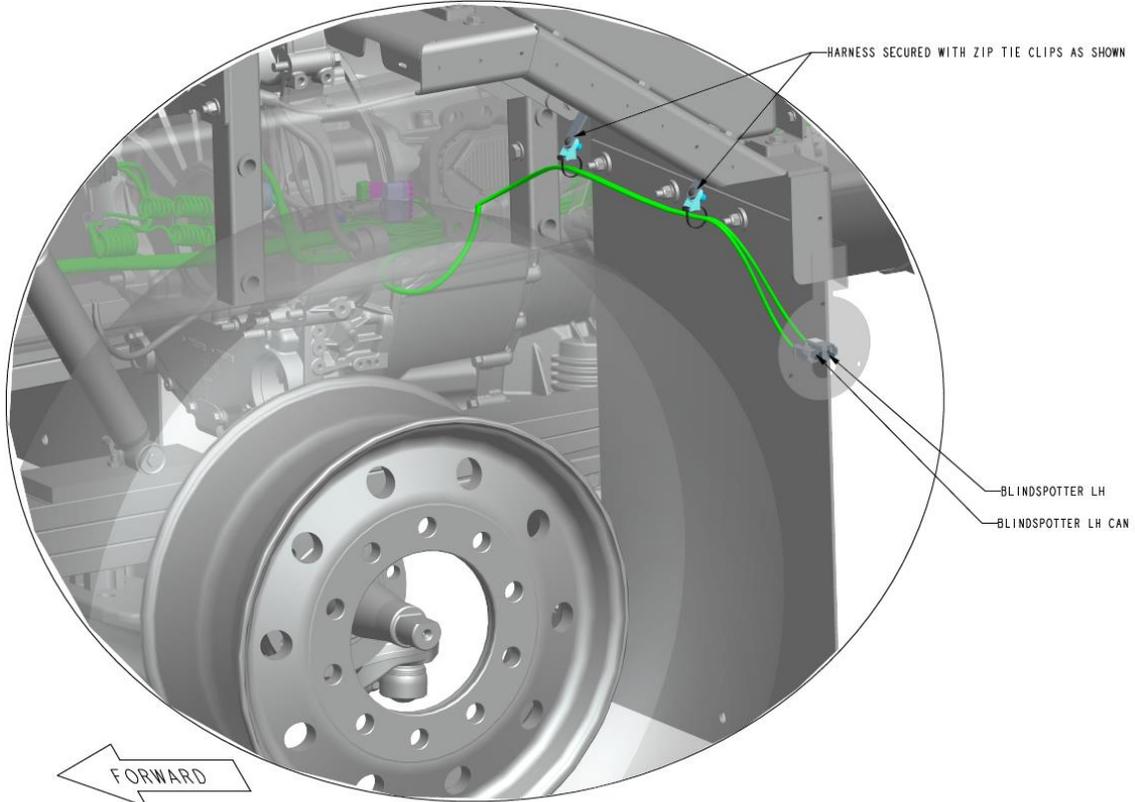


DETAIL E  
(VIEW ROTATED FOR CLARITY)

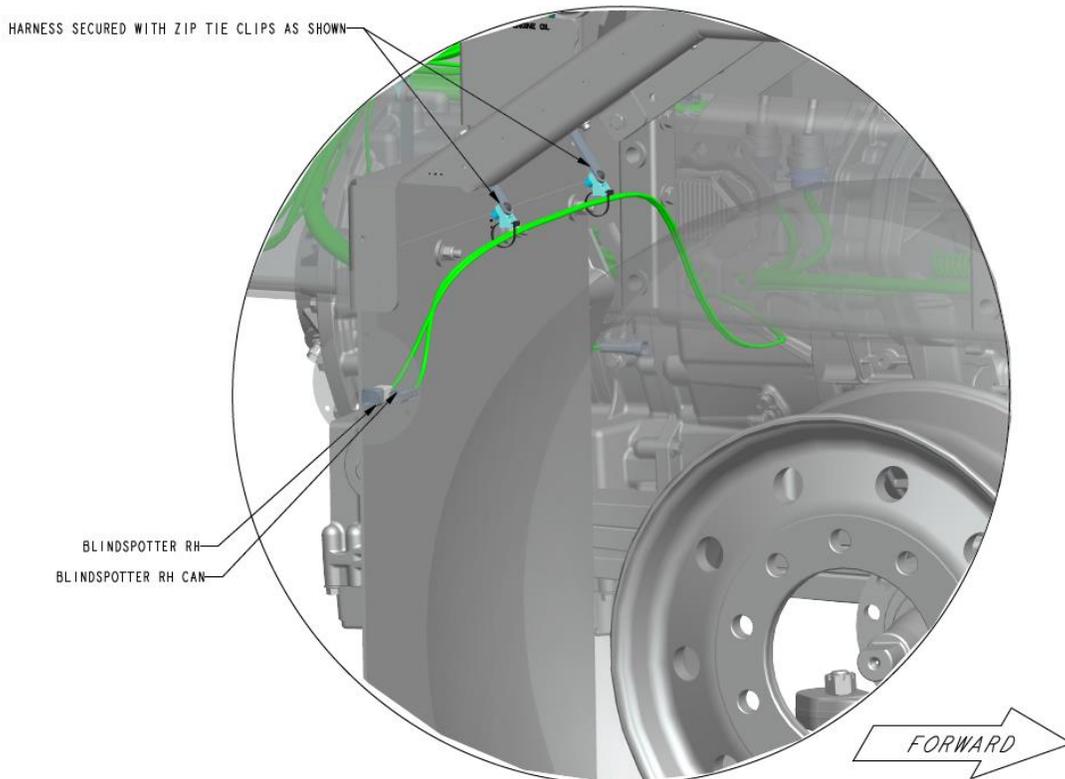


DETAIL A  
(VIEW ROTATED FOR CLARITY)

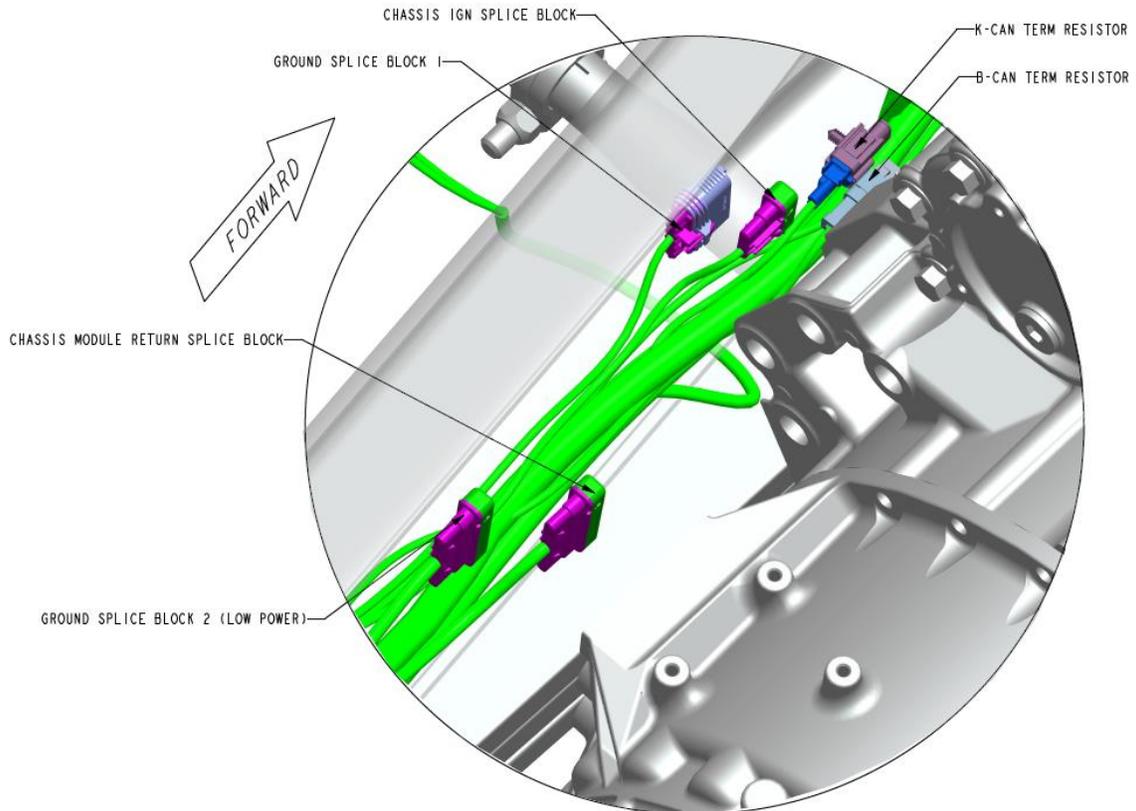
DETAIL VIEW OF BOC (BACK OF CAB) BODY CONNECTIONS



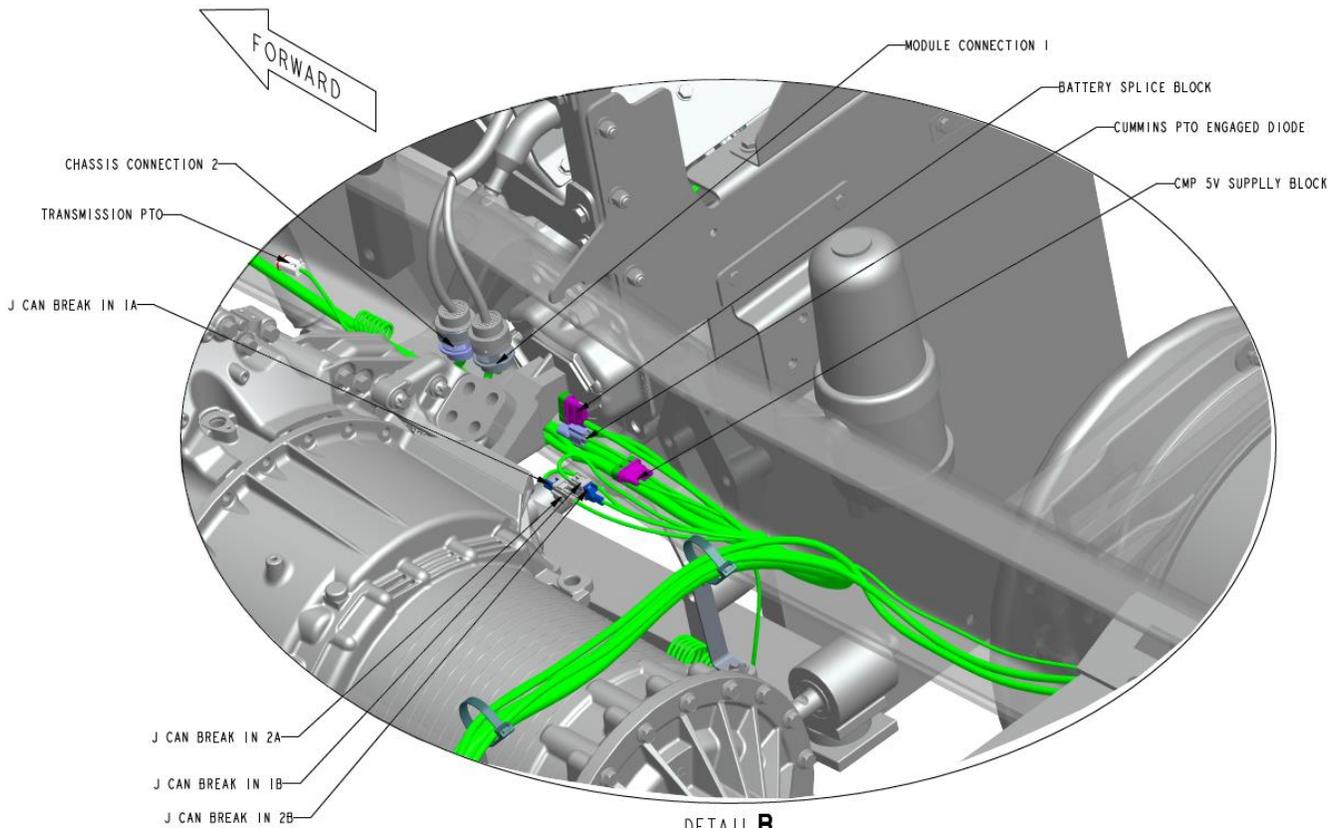
DETAIL D  
(VIEW ROTATED FOR CLARITY)



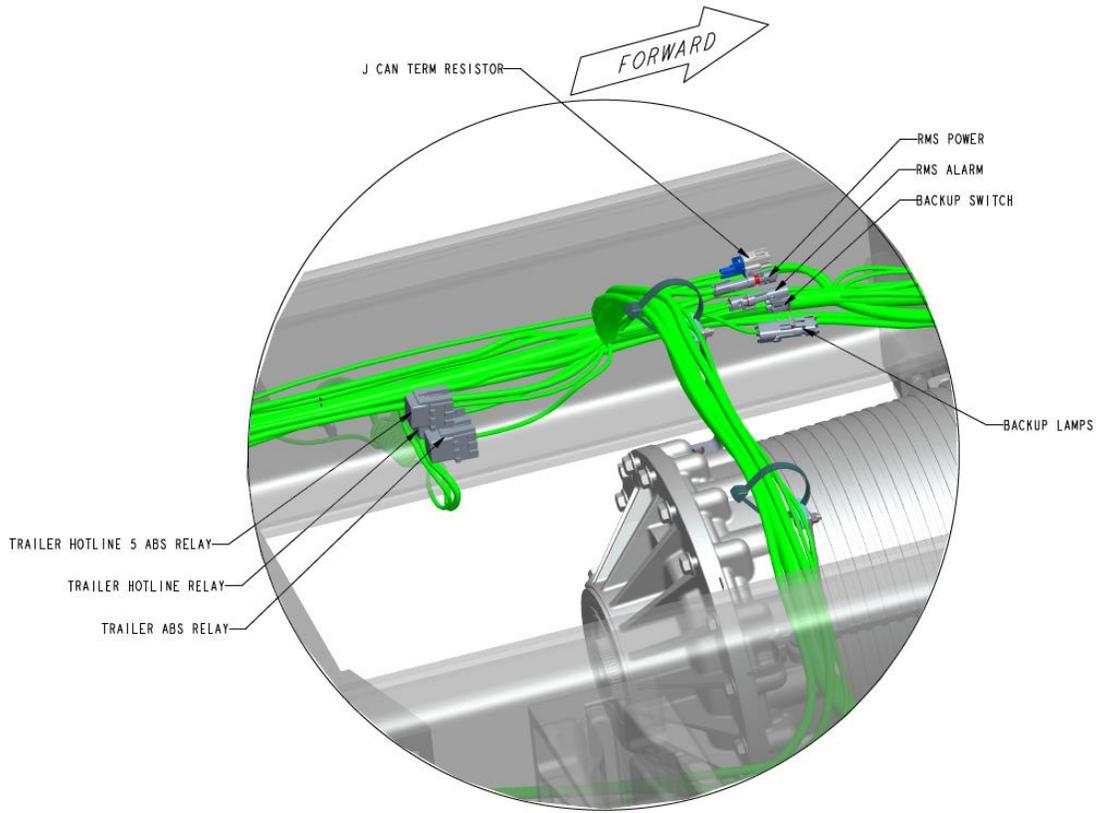
DETAIL R  
(VIEW ROTATED FOR CLARITY)



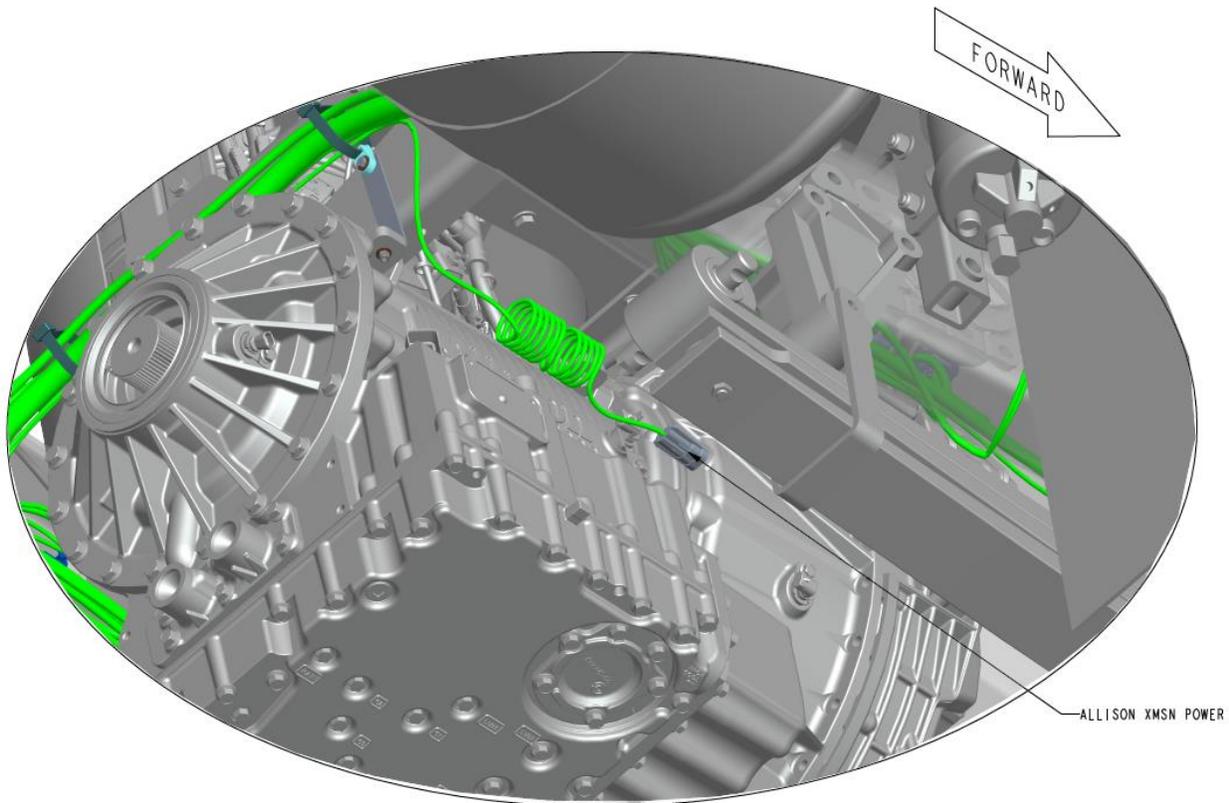
**DETAIL G**  
(VIEW ROTATED FOR CLARITY)



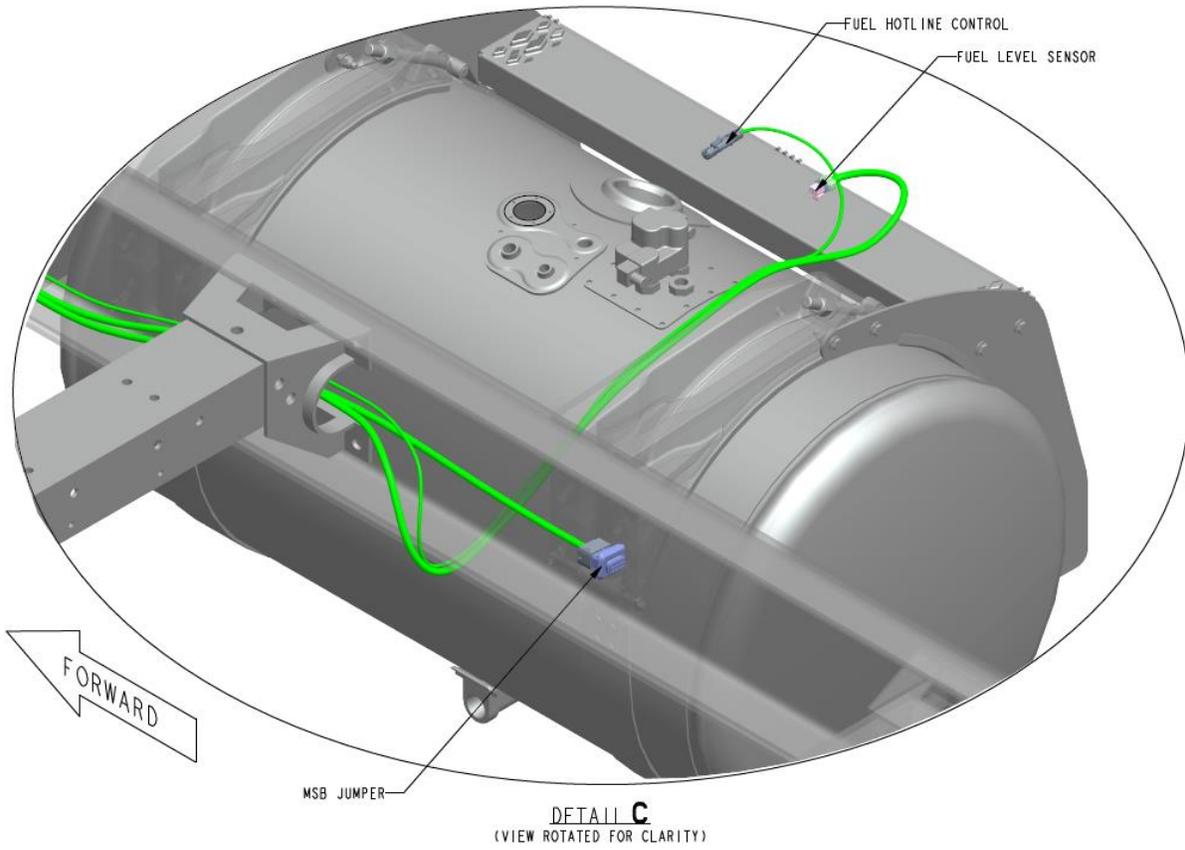
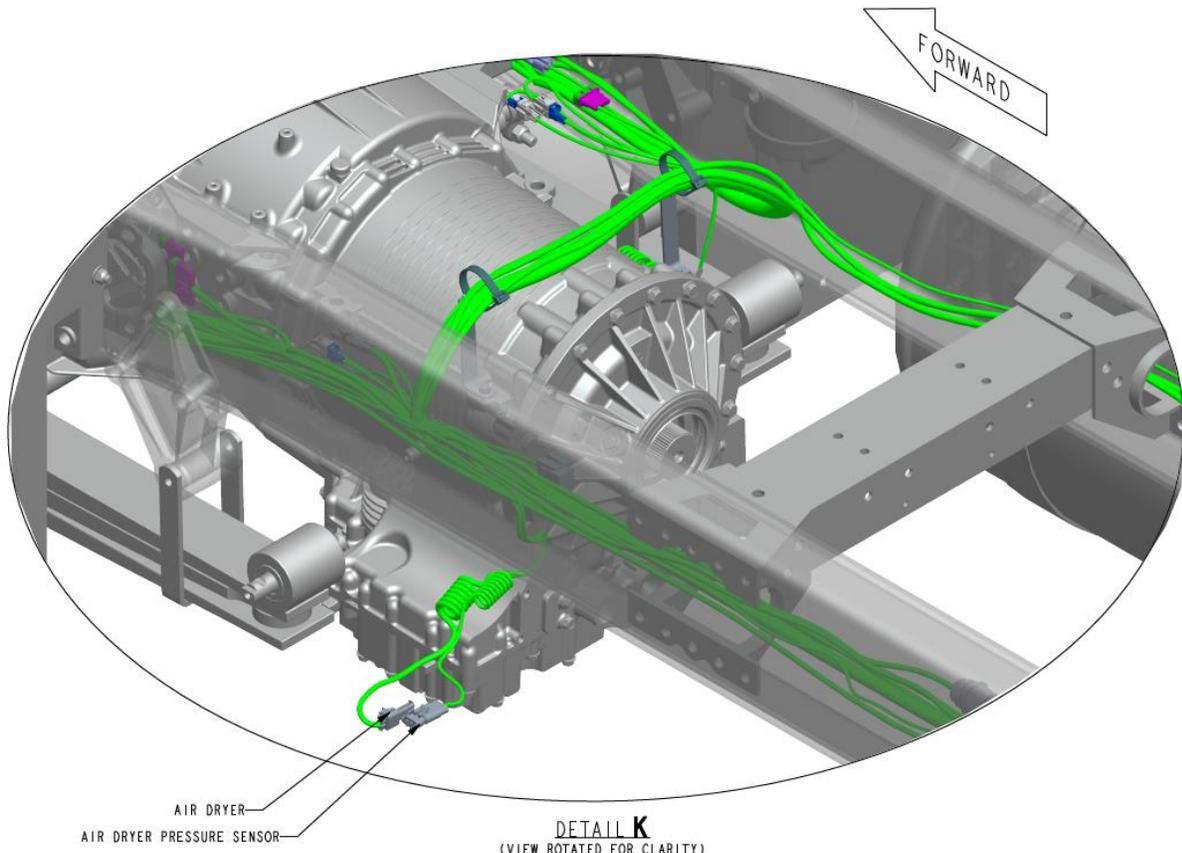
**DETAIL B**  
(VIEW ROTATED FOR CLARITY)

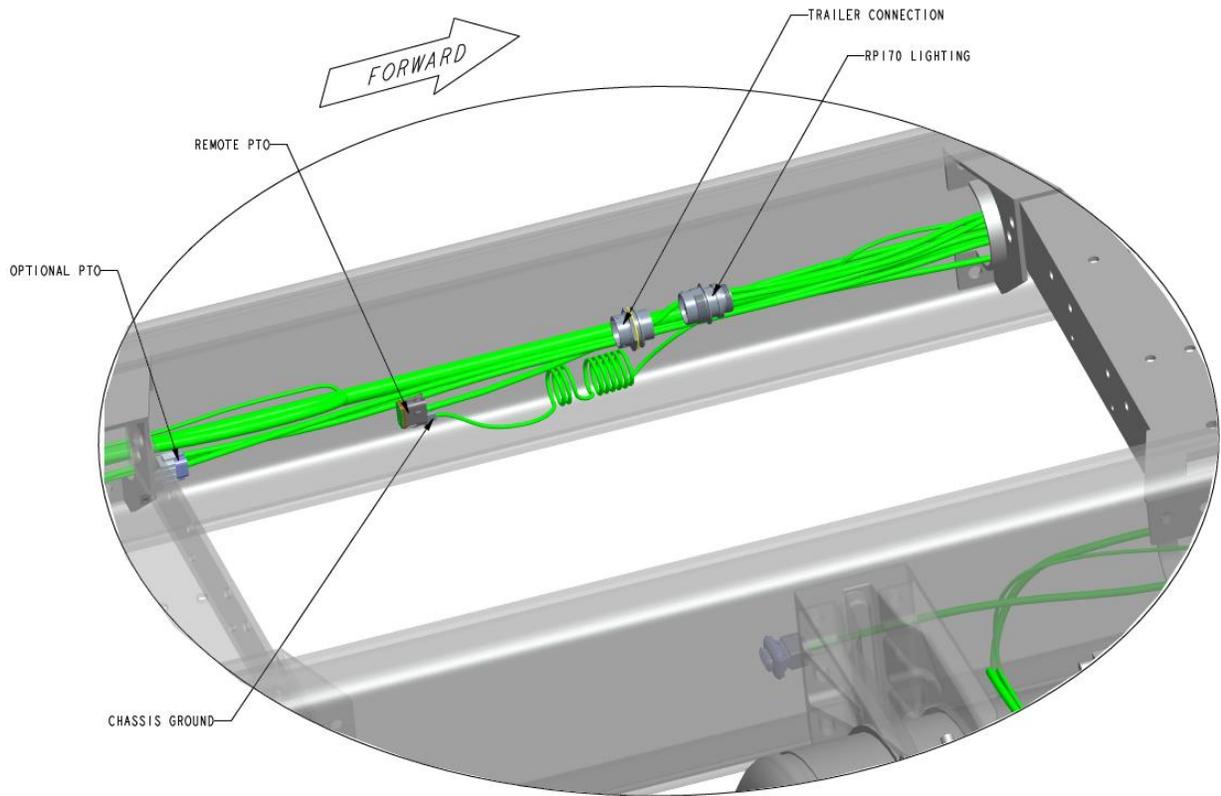


DETAIL H  
(VIEW ROTATED FOR CLARITY)

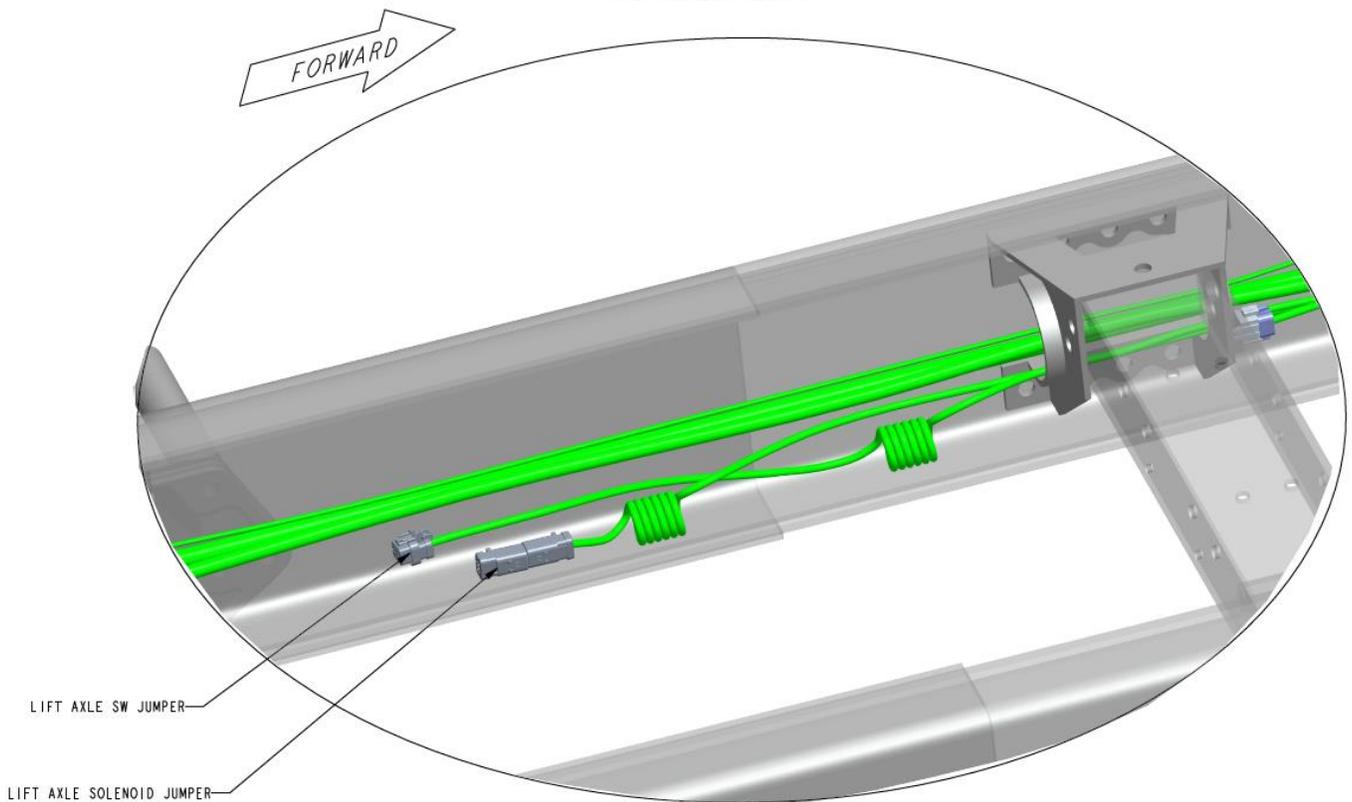


DETAIL J  
(VIEW ROTATED FOR CLARITY)



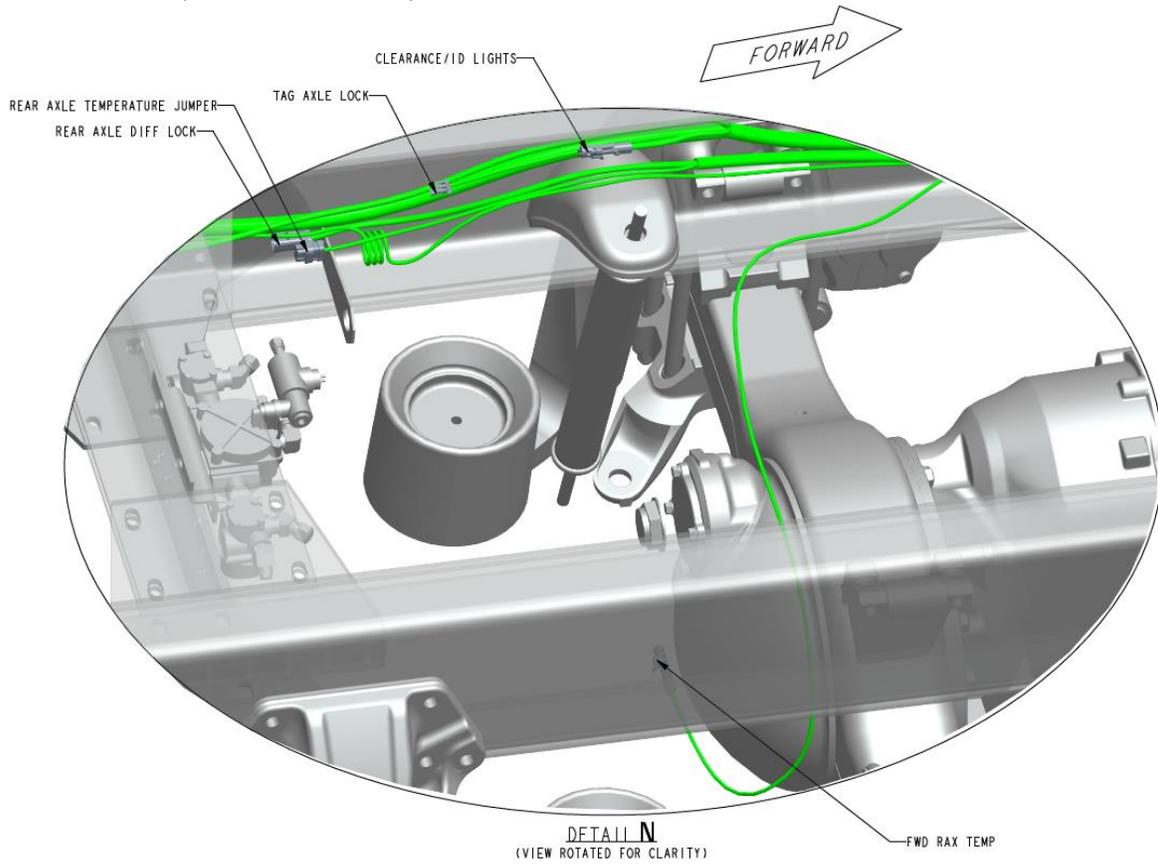


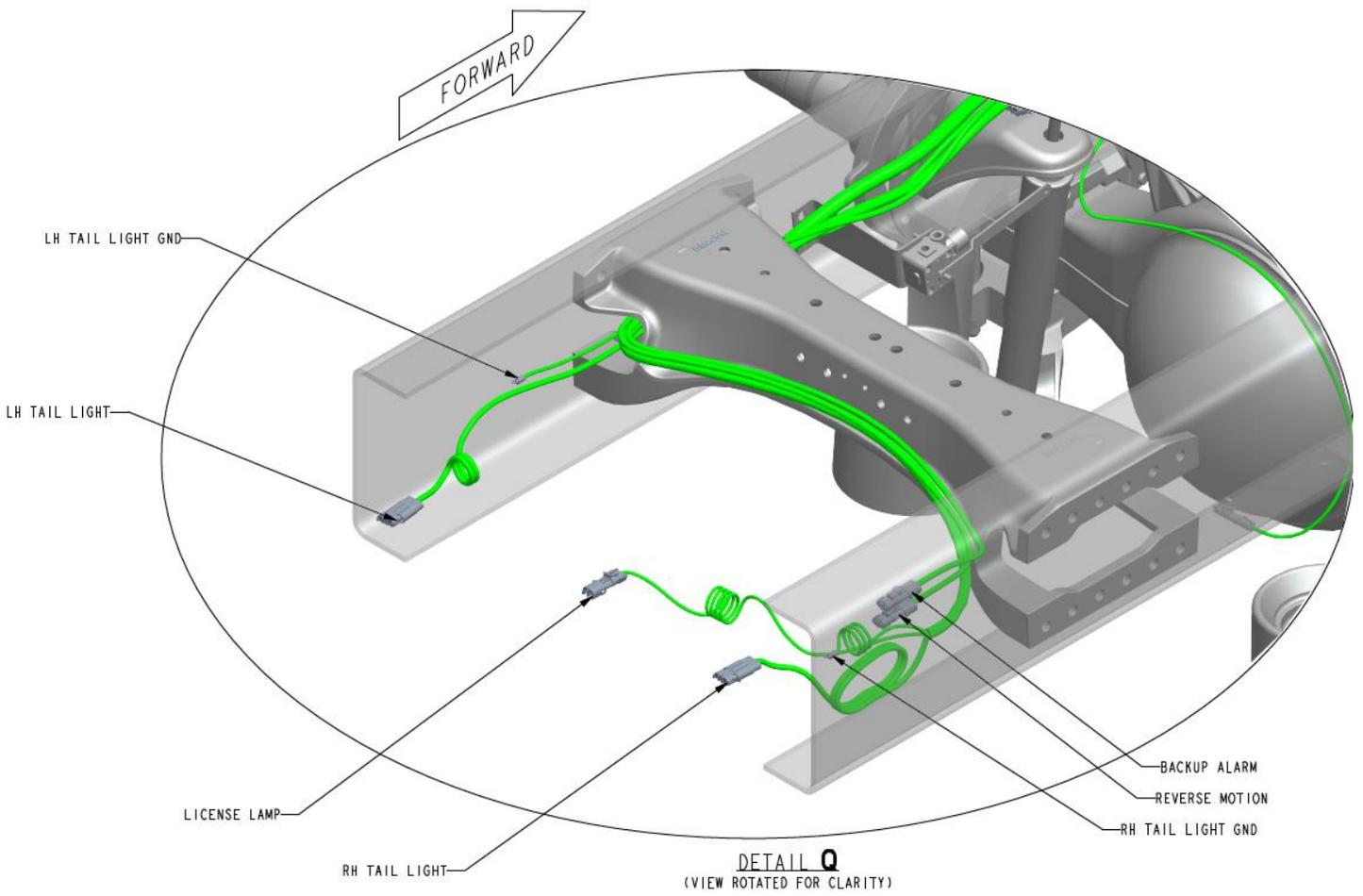
DETAIL L  
(VIEW ROTATED FOR CLARITY)



DETAIL M  
(VIEW ROTATED FOR CLARITY)

DETAIL VIEW OF EOF (END OF FRAME) BODY CONNECTIONS



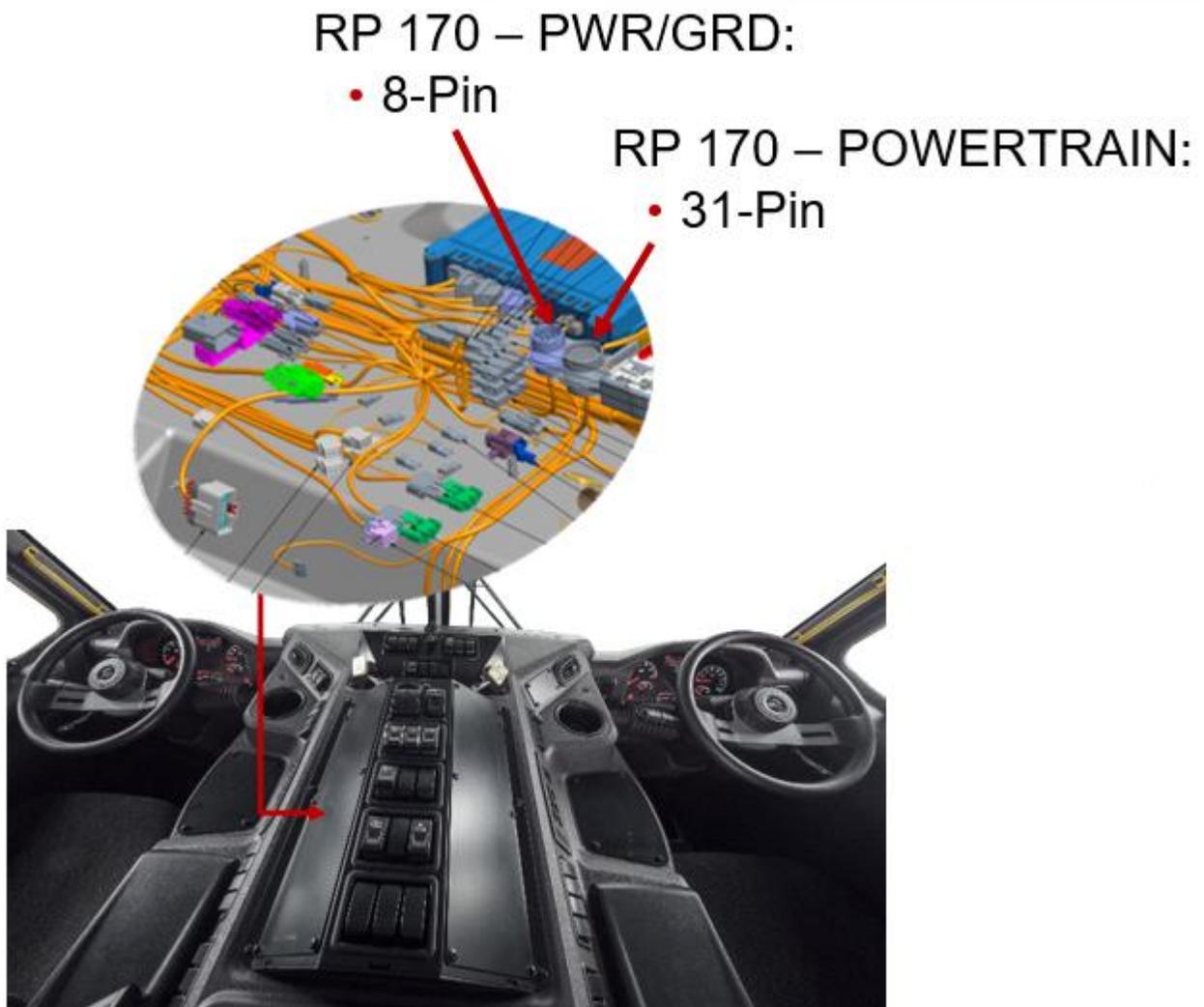


## ELECTRIC ENGAGED EQUIPMENT

## RP170 CONNECTOR

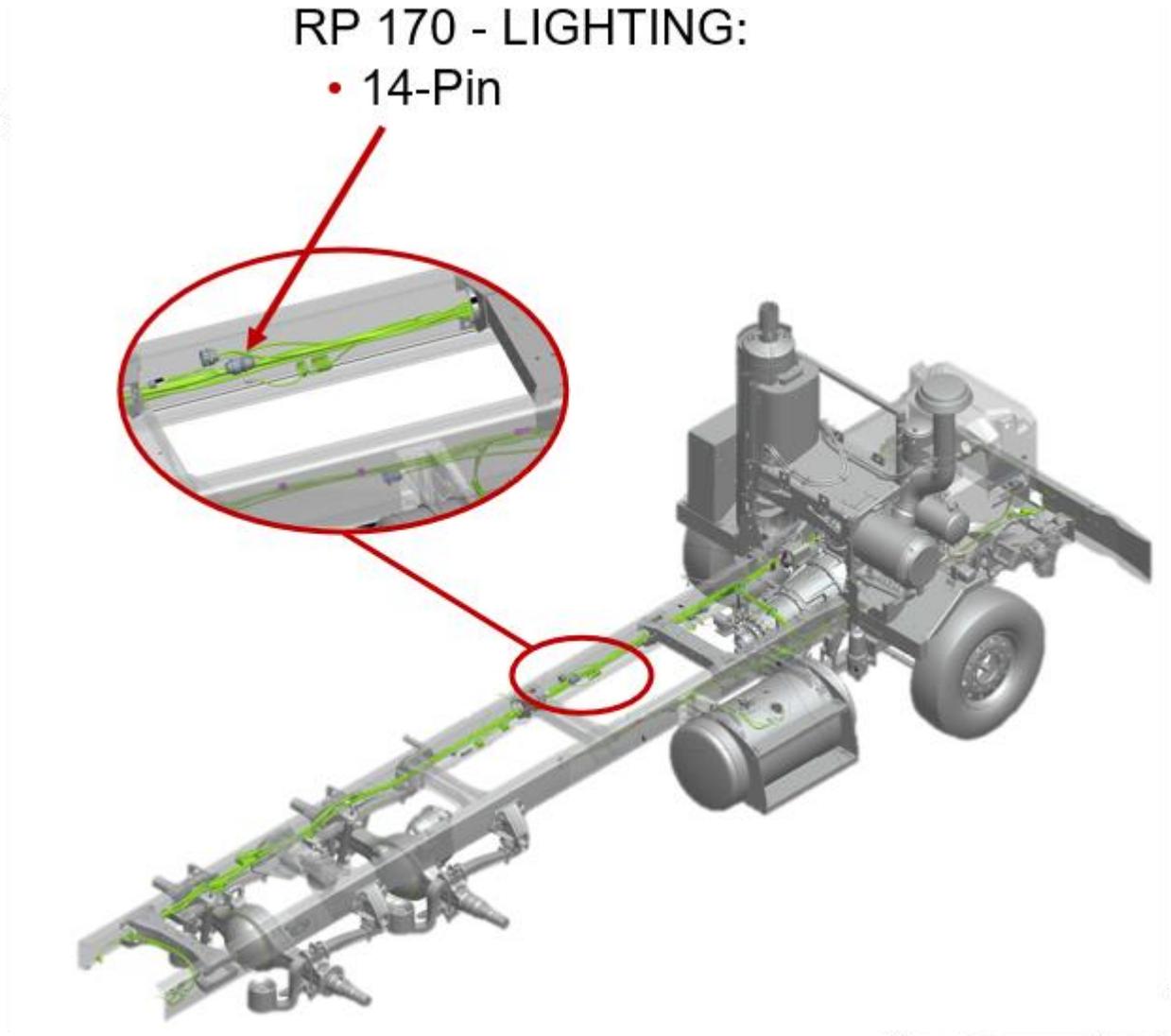
The RP170 connector is the standard chassis to body electrical interface and is used for various powertrain and body lighting signals. There are three RP170 connectors total on the truck. The 8-pin (power & ground) and 31-pin (powertrain) connectors are located inside the cab under the body builder panel in the middle of the cab near the PDC. The 14-pin (lighting) connector is located inside the left-hand frame rail of the chassis after the BOC.

## RP170 CONNECTOR LOCATIONS (8-PIN &amp; 31-PIN)



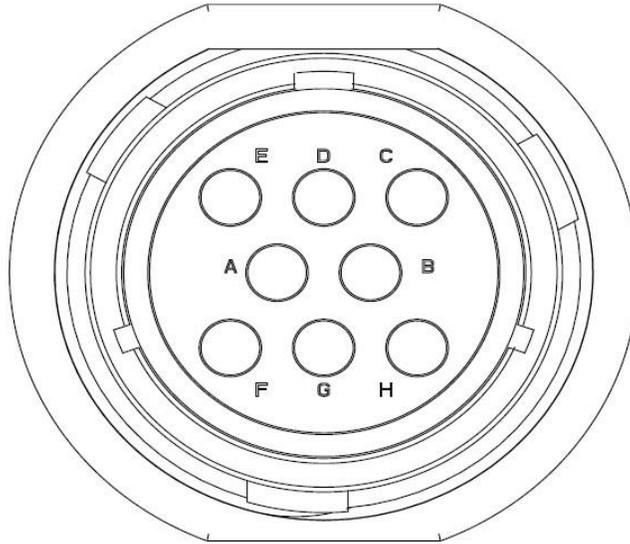
RP170 8-Pin &amp; 31-Pin Connector Locations

RP170 CONNECTOR LOCATIONS (14-PIN)



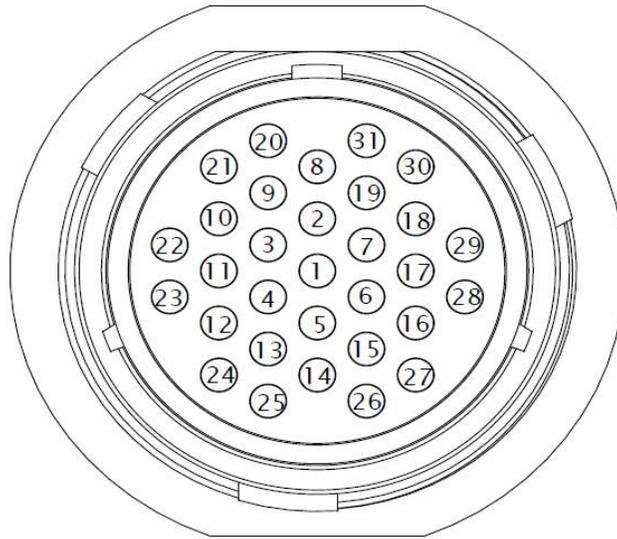
RP170 14-Pin Connector Location

## RP170 8-PIN CONNECTOR (POWER/GROUND)



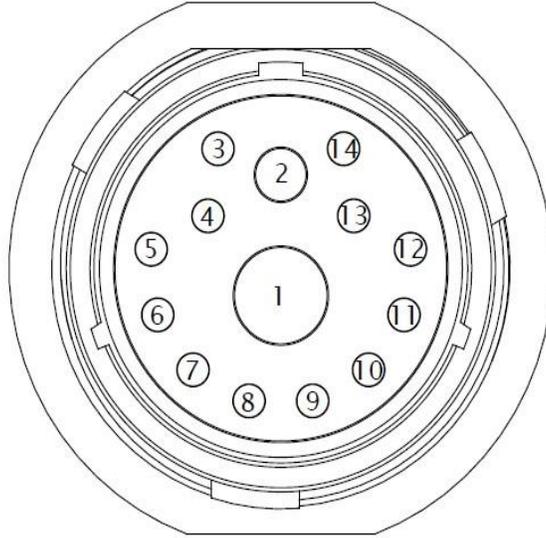
PIN	DESCRIPTION
A	BATTERY (20A)
B	IGNITION (20A)
C	IGNITION (20A)
D	CONSTANT BATTERY (15A)
E	IGN THRU REV CIRCUIT (25A)
F	GROUND
G	GROUND
H	GROUND

## RP170 31-PIN CONNECTOR (POWERTRAIN)



PIN	DESCRIPTION	PIN	DESCRIPTION
FROM ENGINE		FROM TRANSMISSION	
1	TACH (DIESEL) DIAG TEST SWITCH (NG)	15	TCM IGNITION POWER (12V)
2	ABS RETARDER	16	ROAD SPEED SIGNAL
3	THROTTLE LIMIT	17	TCM SIGNAL RETURN
4	THROTTLE ADVANCE	18	AT123 INPUT
5	K-CAN HIGH (250K)	19	PTO CONTROLS INPUT
6	K-CAN LOW (250K)	20	PUMP MODE ENABLED INPUT
7	THROTTLE INTERLOCK (MX) TORQUE LIMIT (CUMMINS)	21	AUTO NEUTRAL INPUT
8	APPLICATION SPEED LIMITER (MX) BLANK (CUMMINS)	22	SHIFT SELECTOR TRANSMISSION INPUT
9	GROUND (MX) ECM COMMON (CUMMINS)	23	SERVICE BRAKE STATUS INPUT
10	REMOTE PTO ENABLE	24	AUTO NEUTRAL INPUT
11	REMOTE PTO SET	25	PTO DRIVE INTERFACE OUTPUT
12	REMOTE PTO RESUME	26	NEUTRAL INDICATOR OUTPUT
13	PARK BRAKE APPLIED	27	OUTPUT SPEED INDICATOR OUTPUT
14	BLANK	28	SUMP/RETARDER TEMP INDICATOR OUTPUT
		29	NEUTRAL START SIGNAL
		30	IGNITION (10A)
		31	DUAL STEER RH ACTIVE SIGNAL

## RP170 14-PIN CONNECTOR (LIGHTING)



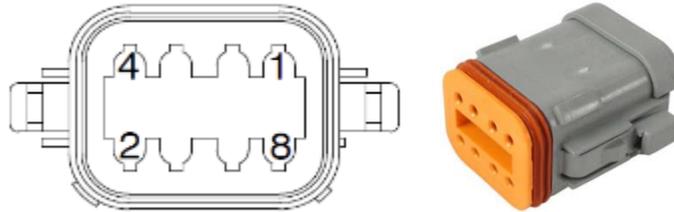
PIN	DESCRIPTION
1	GROUND
2	BACKUP LIGHTS
3	LH TURN/STOP
4	RH TURN/STOP
5	TAIL LAMPS
6	CLEARANCE LAMPS
7	STOP LAMPS
8	BLANK
9	BLANK
10	BLANK
11	BLANK
12	BLANK
13	LH MARKER TURN LAMPS
14	RH MARKER TURN LAMPS

## ELECTRIC ENGAGED EQUIPMENT (CONTINUED)

## OPTIONAL 8-PIN PTO INPUT CONNECTOR

The 8-pin PTO connector is only present when the chassis is ordered with the appropriate PTO option(s). The 8-pin PTO connector will be located BOC in the RH frame rail for VMUX electrical architecture and will be located BOC in the LH frame rail for EMUX electrical architecture. This optional PTO connector is equipped with various input signals to provide remote PTO interlock and presets.

**Note: This 8-pin PTO body connector is only available with PACCAR MX engines.**



Pin	Description
1	12V IGNITION SIGNAL
2	PTO INTERLOCK INPUT (Active Low)
3	REMOTE PTO PRESET 3 (Active High)
4	REMOTE PTO PRESET 2 (Active High)
5	REMOTE PTO PRESET 1 (Active High)
6	REMOTE PTO PRESET INCREMENT + (Active High)
7	REMOTE PTO PRESET DECREMENT - (Active High)
8	VEHICLE GROUND

## REMOTE THROTTLE AND REMOTE PTO CONTROLS

## OPTIONAL 12-PIN PTO CONNECTOR - PACCAR MX Engines

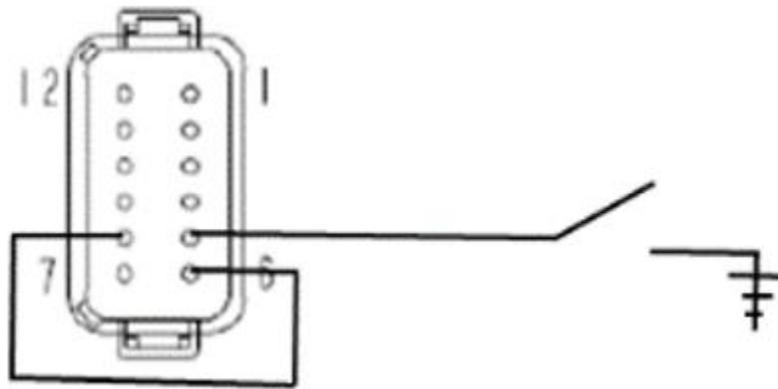
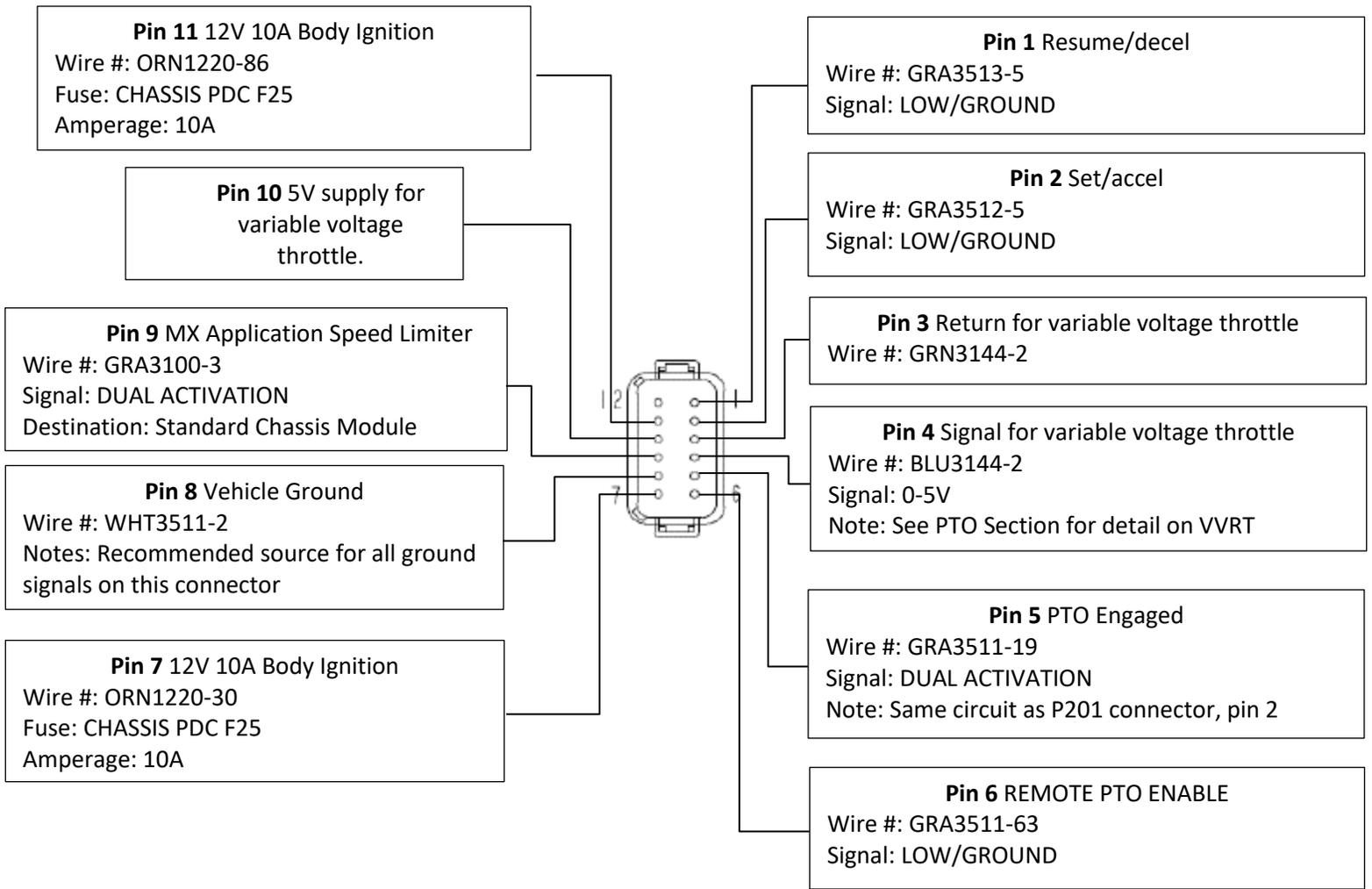
The 12-pin PTO connector (P197) is only present when the chassis is ordered with the appropriate PTO option(s). When equipped with MX engines, the 12-pin PTO connector will be located BOC.

Wiring Function Description:

Connect pin 5 and pin 6 to pin 8 to activate PTO Mode Control (PMC) and Enable PTO Speed Control (PSC).

- "Bump up" Engine Speed: connect pin 2 to pin 8 momentarily
- "Accelerate" Engine Speed: connect pin 2 to pin 8 until desired RPM is reached, then disconnect
- "Bump down" Engine Speed: connect pin 1 to pin 8 momentarily
- "Decelerate" Engine Speed: connect pin 1 to pin 8 until desired RPM is reached, then disconnect
- "0-5v Variable Voltage Remote Throttle (VVRT)": see PTO section

	<p><b>P197 - Remote PTO Chassis</b></p>
<p>TRUCK CONNECTOR</p>	<p>Equipped: Optional Available Locations: BOC Supplier: Deutsch-DT Series</p>
	<p>Mating Connector: PACCAR P/N: P20-1372-2112H TE P/N: DT06-12SA-CE06</p> <p>Terminals: 16-20 AWG: 0460-202-16141 14 AWG: 0460-215-16141 Plugs: 0413-217-1605</p>
<p>MATING CONNECTOR</p>	<p>Note: cap installed from factory</p>



PACCAR Recommended PTO Wiring

## REMOTE THROTTLE AND REMOTE PTO CONTROLS (CONTINUED)

## OPTIONAL 12-PIN PTO CONNECTOR - CUMMINS Engines

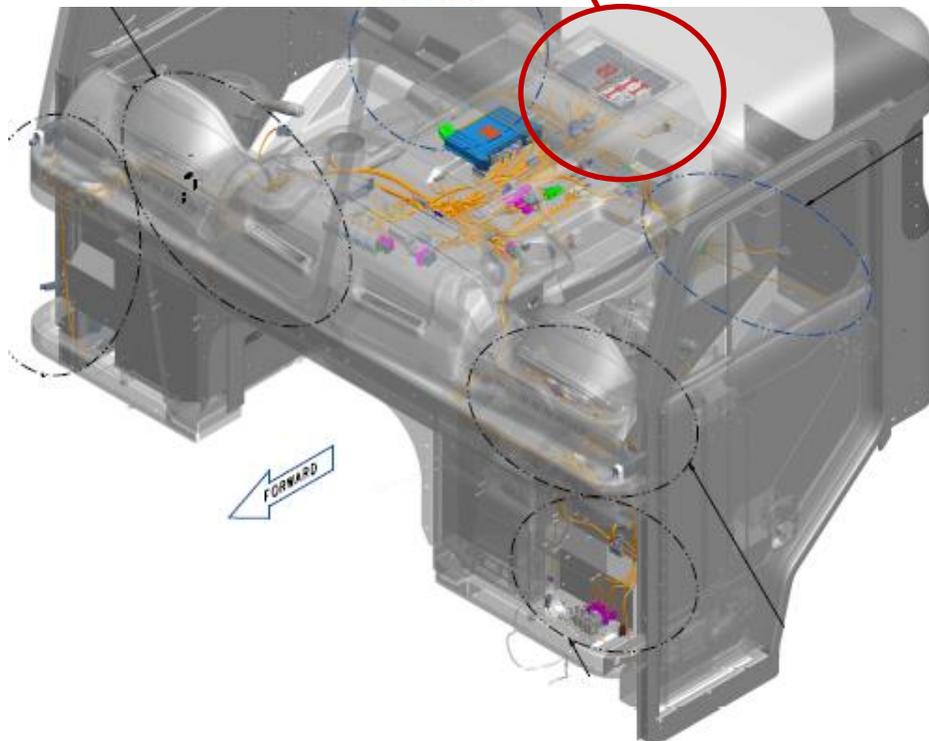
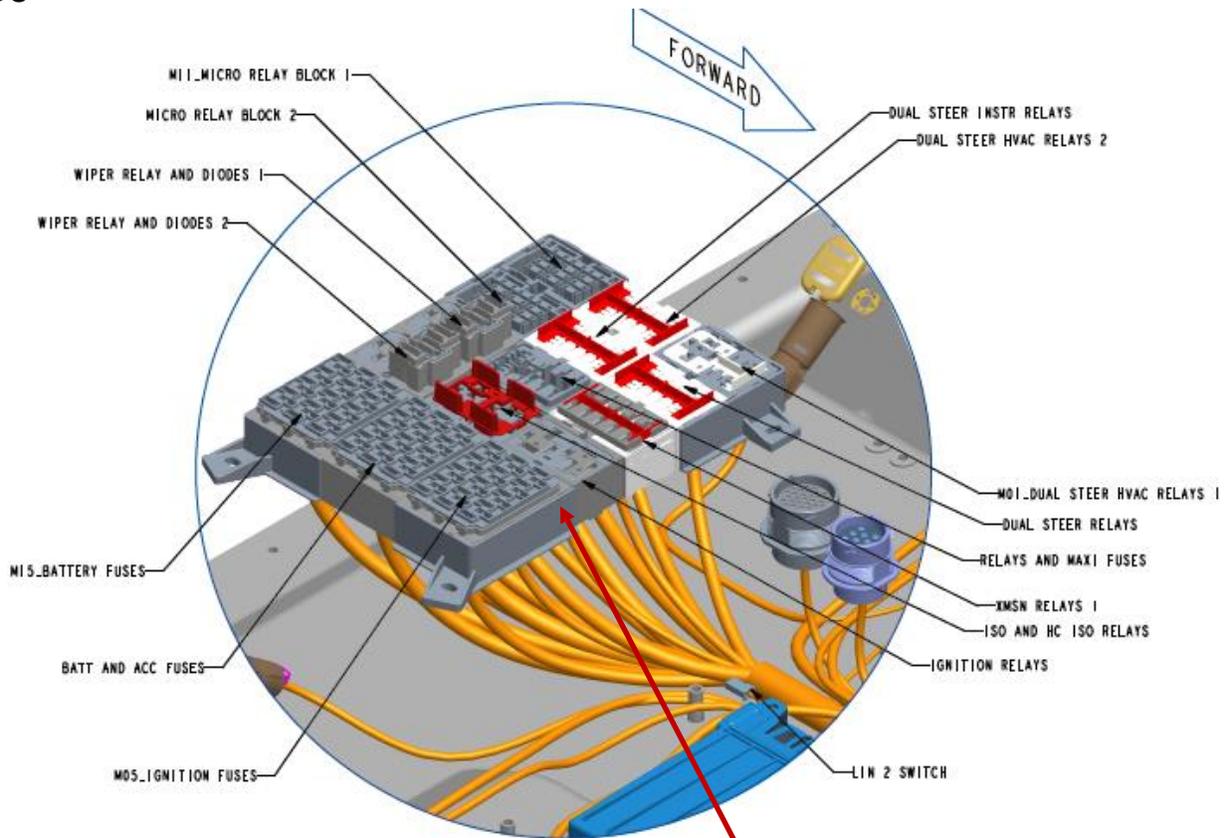
The 12-pin PTO connector is only present when the chassis is ordered with the appropriate PTO option(s). When equipped with Cummins engines, the 12-pin PTO connector will be located in the engine bay on the Cummins Engine harness. The Body IGN signal was moved off the engine harness connector, so for Cummins, the Chassis Harness will include the PTO layer to insert the Body IGN signal back into the 12-pin connector. Signals that feed directly to the engine ECM typically will be active low signals. Connect pin 3 and pin 5 for simple PTO ON/OFF signal. For remote throttle bump, you must connect pin 3 & pin 6. Having a momentary switch to signal ground on pin 2 and pin 1 will then increase/decrease engine speed. Engine speed will depend on how the engine is programmed. Unless otherwise specified, the engine is set by default for incremental speed increase. Full remote throttle control can be achieved with a twisted triple to pin 4, pin 10, and pin 11.



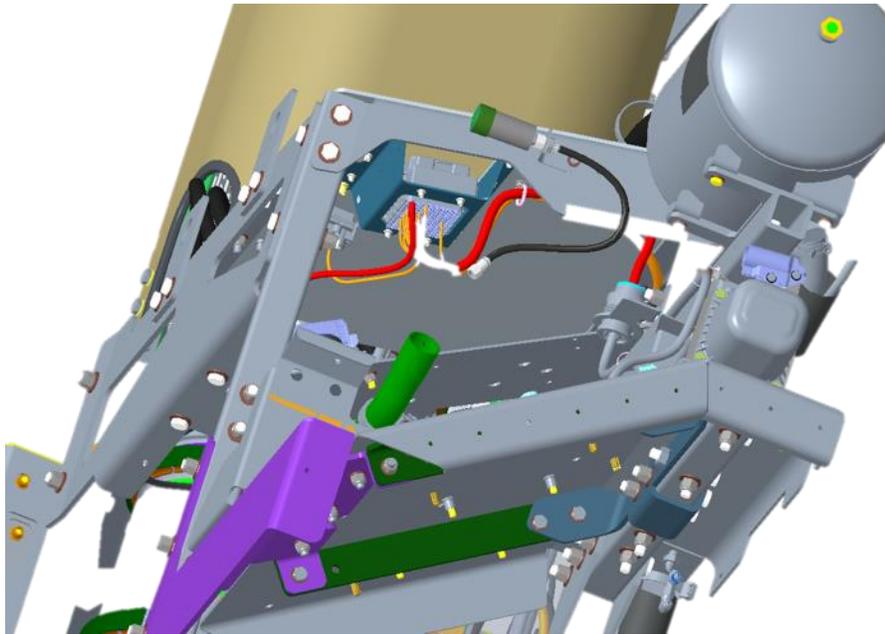
Pin	Description
1	INPUT FOR REMOTE PTO RESUME (Active Low)
2	INPUT FOR REMOTE PTO SET (Active Low)
3	SWITCH RETURN FOR CUMMINS ENGINE
4	INPUT FOR REMOTE THROTTLE SENSOR CIRCUIT (TWISTED TRIPLE)
5	PTO ENGAGED SIGNAL (LOW = ENGAGED)
6	CRUISE ON/OFF (Active Low)
7	+12V 10A BODY IGN CHASSIS PDC F25
8	VEHICLE GROUND
9	TORQUE LIMIT INPUT (Active Low)
10	PWR SUPPLY +5V (TWISTED TRIPLE)
11	ANALOG RETURN (TWISTED TRIPLE)
12	REMOTE ACCELERATOR ENABLE (Active Low)

POWER DISTRIBUTION CENTERS

CAB PDC



CHASSIS PDC

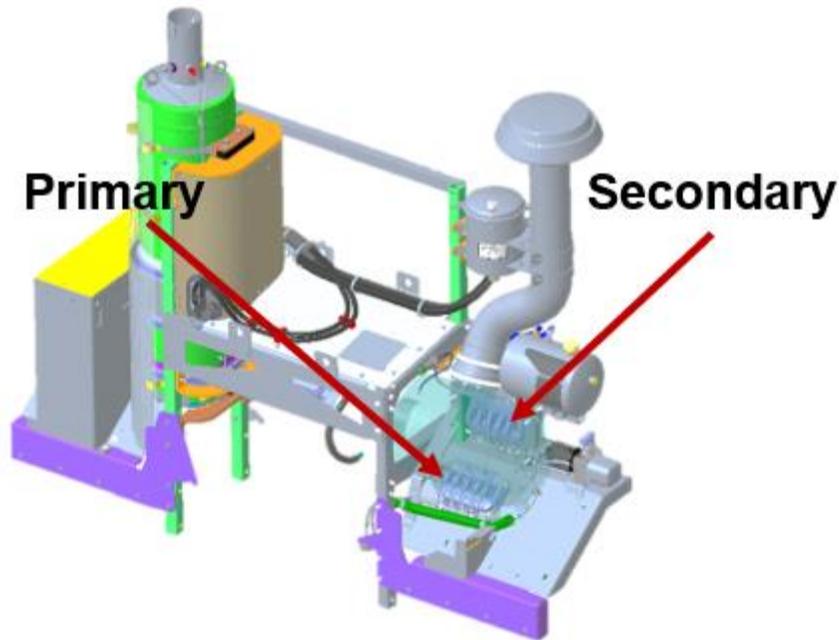


Chassis PDC Location on Stanchion BOC

## CHASSIS MODULE – MODEL 520

There are two chassis modules available, with one primary chassis module standard on all trucks and a secondary chassis module for optional content. The primary and secondary chassis modules will be mounted behind the cab on the stanchion. There are hardware and software based protections to prevent damage to the chassis modules. The chassis modules will generate and store faults to free up space for the VECU. The chassis modules can be diagnosed through the DAVIE service tool.

## CHASSIS MODULE LOCATIONS



Chassis Modules Located on Stanchion BOC

**CHASSIS MODULE FUNCTION DESIGNATIONS****PRIMARY CHASSIS MODULE**

- Exterior Lighting: Headlamps, Park/Tail, Turn, Brake, DRL, Fog Lights, Reverse etc.
- Axle Temperature Sensor Inputs Front Rear and Rear
- Kingpin Release Solenoid Control
- Primary Fuel Level Sensors
- Lift Axle Air Solenoid Controls 1st, 2nd
- Primary Transmission Neutral Position Switch
- Remote PTO/Throttle Control Inputs
- F-CAN Multiplexed EOA Solenoid Bank Control
- Main Transmission Oil Temp

**SECONDARY CHASSIS MODULE**

- Axle Temperature Gauges Center Rear
- Lift Axle Air Solenoid Controls 3rd , Tag
- Tag Axle Lockout

## 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	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
	Tractor Direction Indication Hazard Side Turn Indicator RH Front
	Dipped Beam (aka Low Beam) - RH
F4	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	Lift Axle #1 Solenoid
	(Rear) Direction Indication and Hazard Lights - RH Trailer

## SECONDARY CHASSIS MODULE

Fuse Group	Function
F2	Tag Axle Lockout
F4	Lift Axle #3 Solenoid
F5	Lift Axle #4 (Tag) Solenoid

## VECU

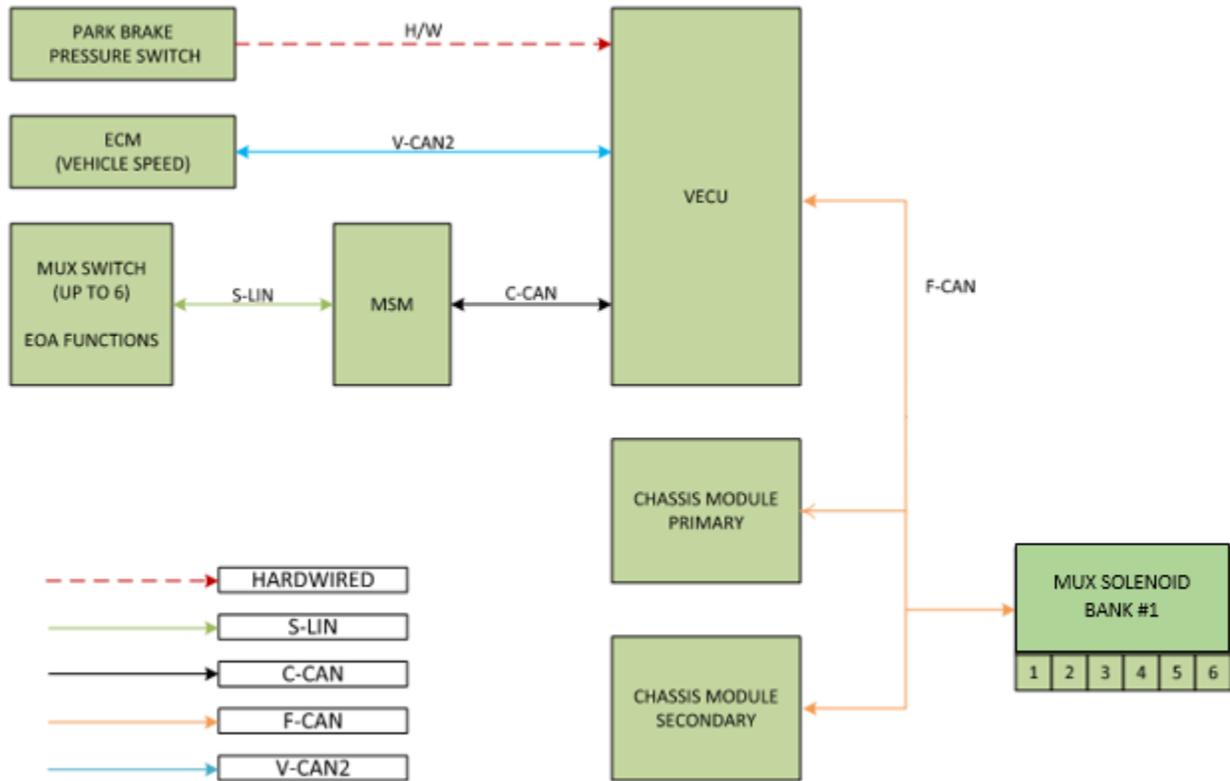
Fuse Group	Function
G1	Starter Interrupt / Start Enable Relay Control
	Cab Dome Lamp
	Trailer Marker/Clearance Lamps
G2	Recirculating Header Fan - Low Speed
	Trailer Hotline Relay
	Allison MTD PTO Controls - PTO 1
	Spot Lamp
	Work Lights (Flood Lamps) 1
	Beacon/Strobe
	Trailer Brake Lamps
	Trailer/Cab Park Lamps
	Recirculating Header Fan - High Speed
	Right Hand Steer
G3	Cab Marker/Clearance Lamps Relay Output
	Washer Pump Control
	Windshield Wiper Control
G4	Dash PWM Backlighting
	Dash Illumination 2

### ELECTRIC OVER AIR SOLENOIDS

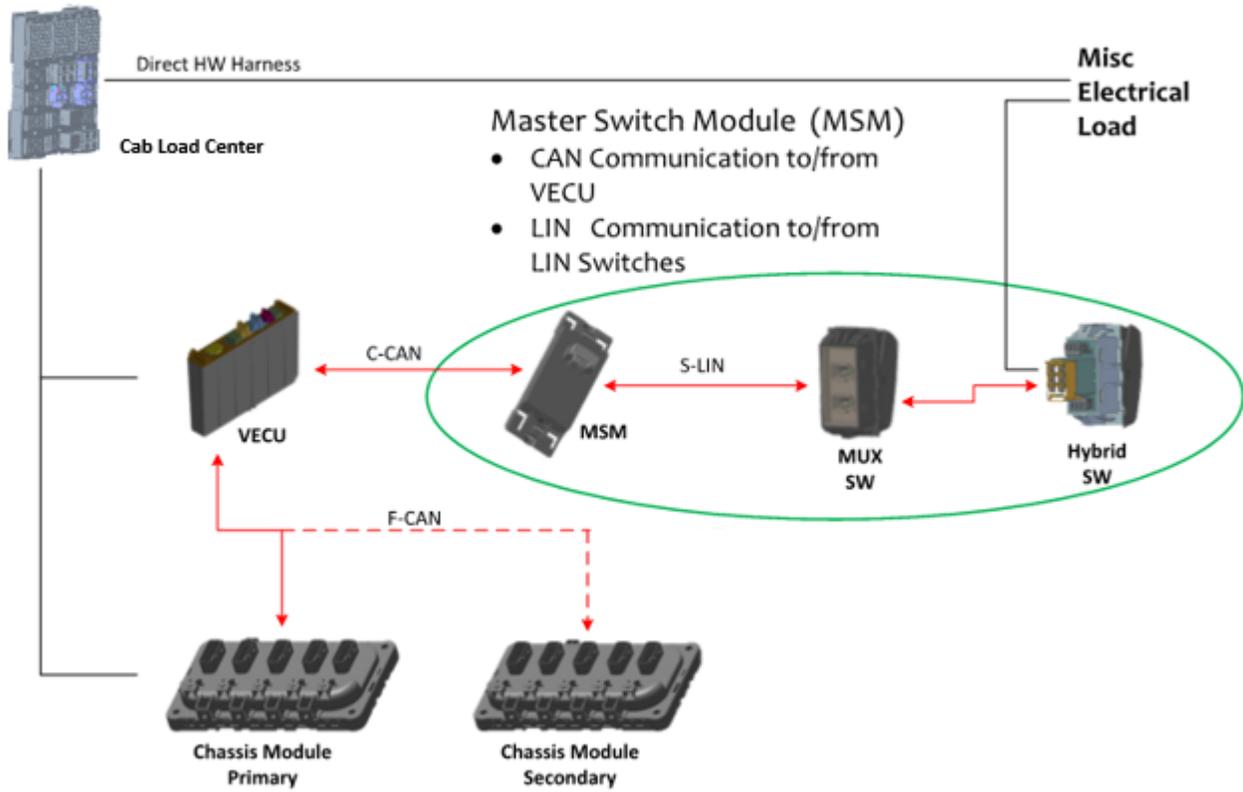
Air solenoids are devices that translate the electrical signal into physical functions that controls the air pressure in various circuits. The air solenoids are mounted to a bracket outside the cab. The solenoids are designed to stack on each other so that they share a common air supply which reduces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

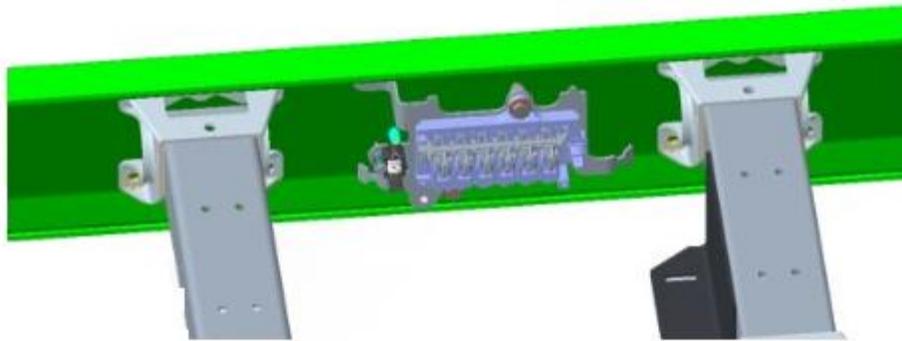
### SOLENOID BANK DIAGRAM



SOLENOID OVERVIEW LAYOUT

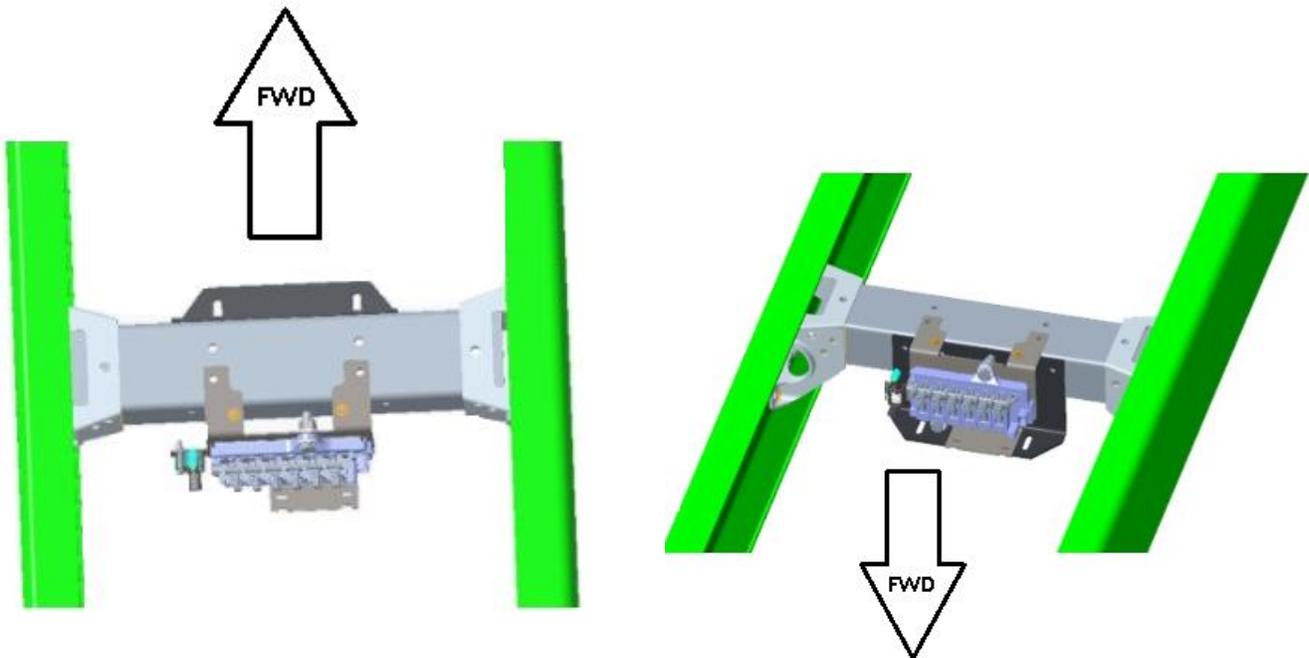


MUX SOLENOID BANK - FRAME RAIL MOUNTING LOCATION



inside RH frame rail between 1<sup>st</sup> and 2<sup>nd</sup> crossmember in the BOC area

MUX SOLENOID BANK - CROSSMEMBER MOUNTING LOCATION

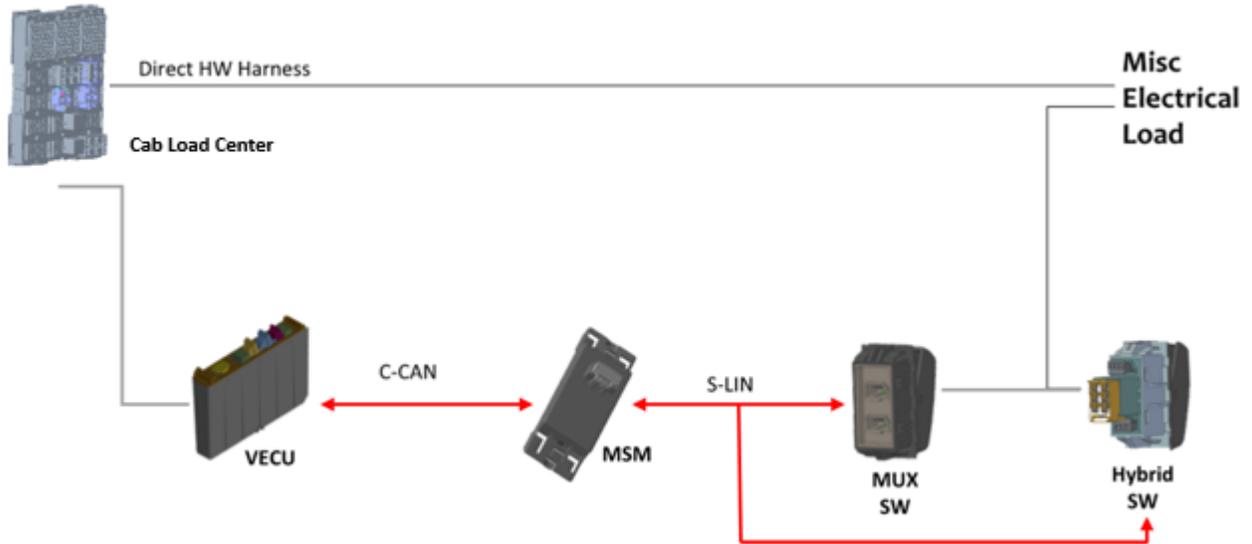


on the front or rear side of the crossmember in the BOC area\*

\*NOTE: mounting location is determined by engineering and the configuration of the vehicle

SWITCHES

SWITCH OVERVIEW LAYOUT



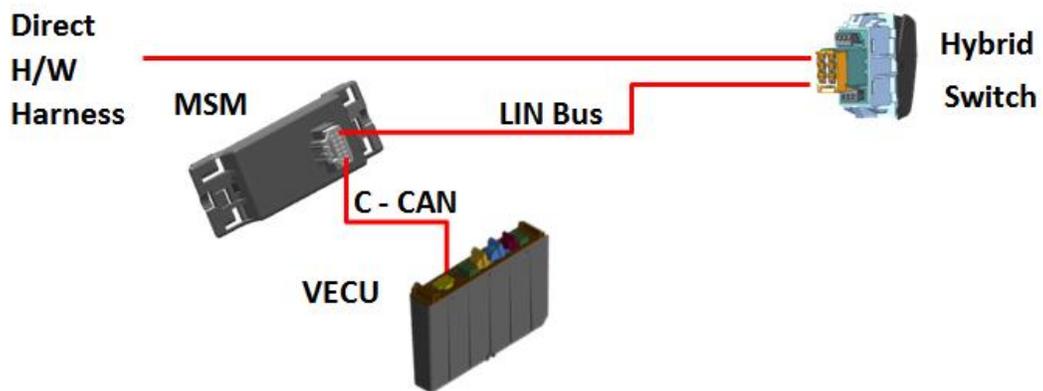
Multiplexing = shorter wire bundles, improved diagnostics, and greater driver feedback. Safety critical switches use hybrid switch with hardwire for redundancy. The switches are less expensive with fewer wires behind the dash and on the chassis. The switches are self-diagnosable to improve troubleshooting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

Master Switch Module (MSM)

LIN Communication to/from Switches

CAN Communication to/from VECU

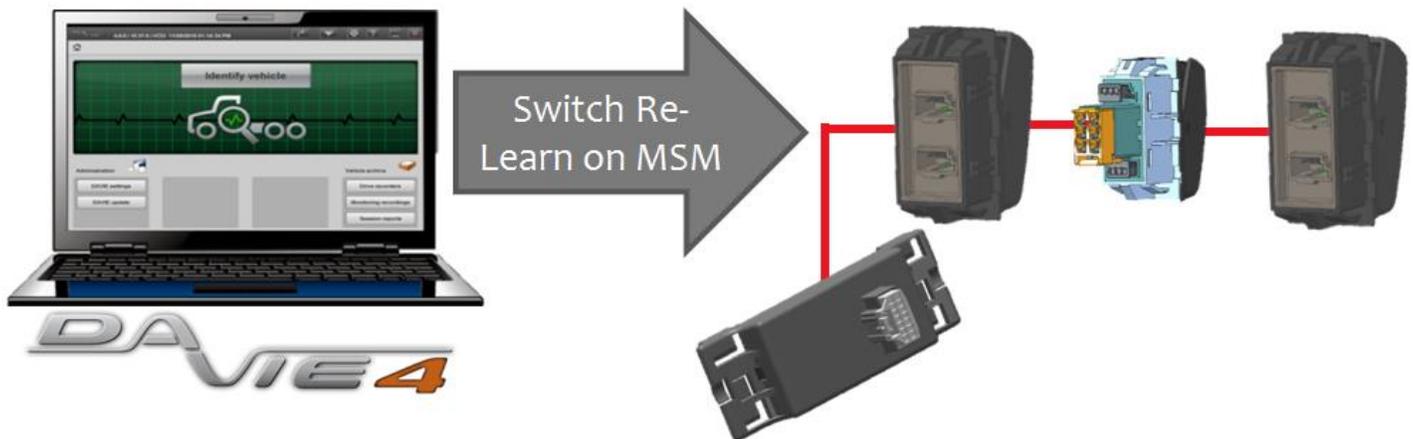
SPARE SWITCHES



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. The spare switches, along with all hybrid switch variants, are rated to 15A of current.



## SWITCH RELEARN PROCESS



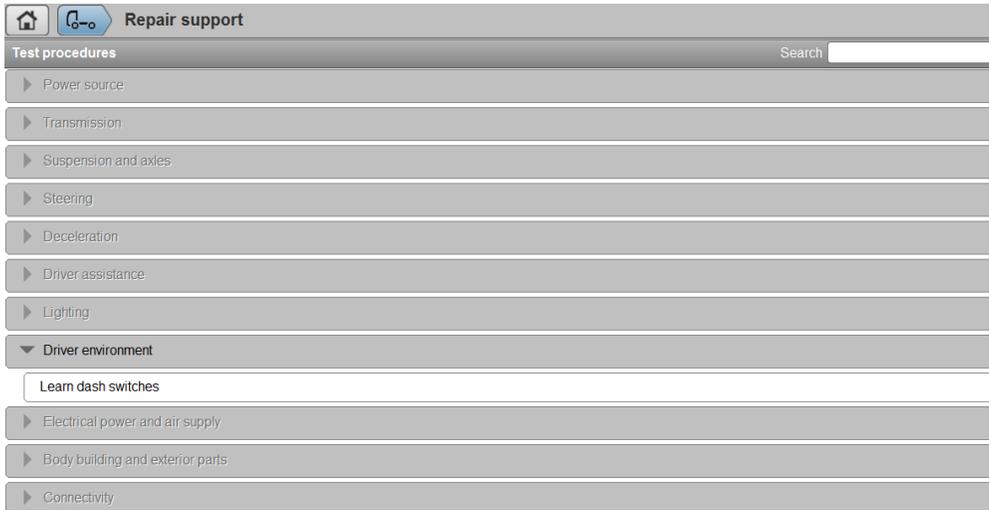
Switch replacement installation instructions:

1. Turn off the engine 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 engine 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

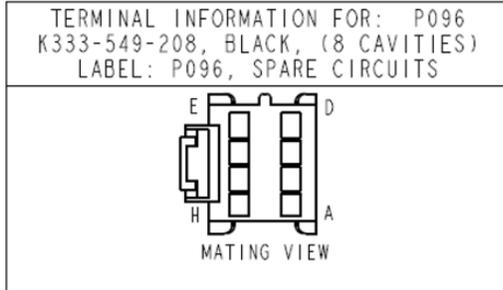


**SPARE POWER**

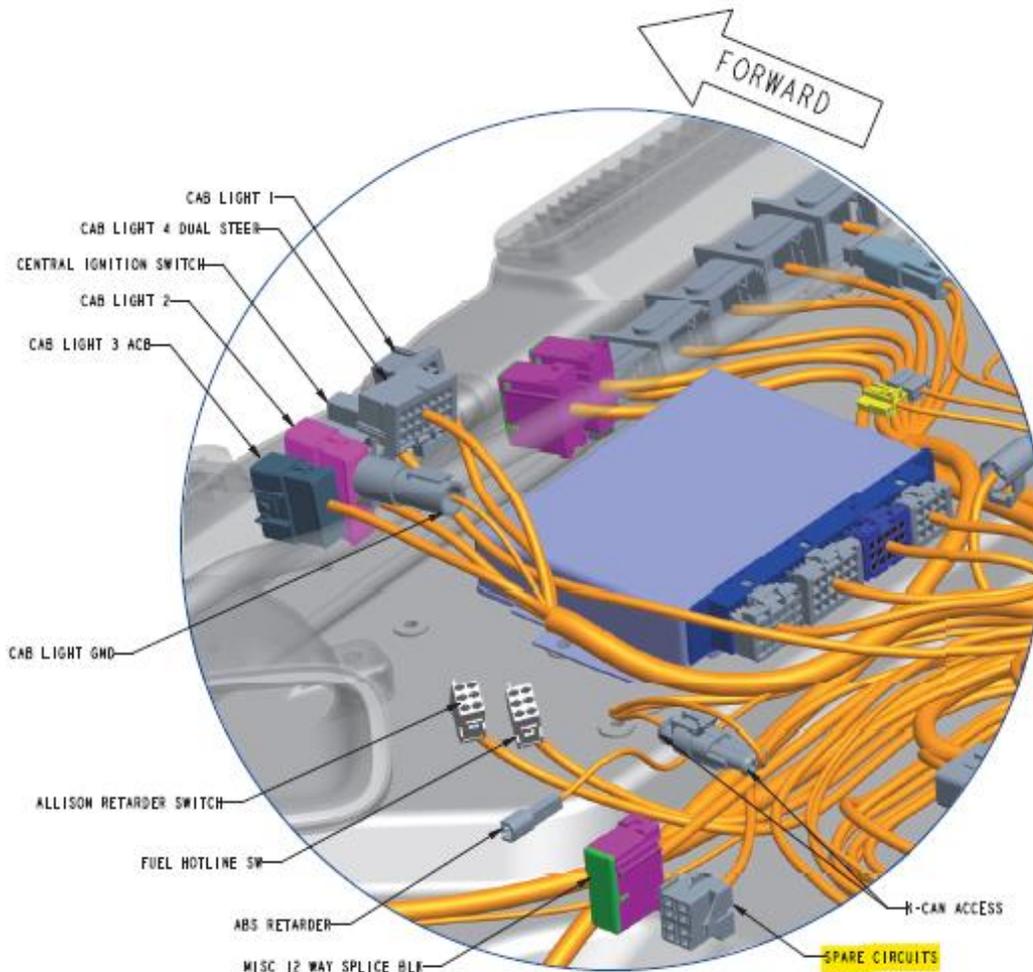
Spare power connector J096 is located under the body builder panel towards the front on the right side. The mating harness is available from PACCAR parts with pre-labeled pigtails, S92-1250-1000.

**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



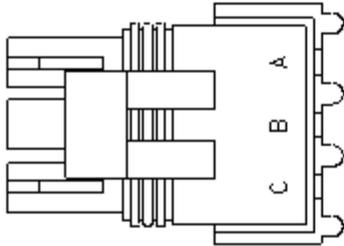
Pin	Spare Circuit No.	Designation	Fuse Max Rating
A	RED0710-2	Spare Battery #2	20A
B	RED0710-5	Spare Battery #1	20A
C	ORN0752-4	Spare Accessory #1	20A
D	WHT1500-102	Spare Ground	
E	ORN0730-1	Spare Ignition #1	20A
F	ORN0730-6	Spare Ignition #2	20A
H	BRN2620-8	Backlight	



**DETAIL P**  
(VIEW ROTATED AND SOME COMPONENTS HIDDEN FOR CLARITY)  
SCALE 9:10

**TRANSMISSION BACK-UP SIGNALS**

The transmission back-up signal can be accessed from pin C of the 3-pin taillight connector (P791 or P792) located in the chassis harness at the end of the frame. But it is recommended to use the standard RP170 14-pin lighting connector as the preferred access point for the back-up signal. See earlier pages in this section for details about the RP170 connector.



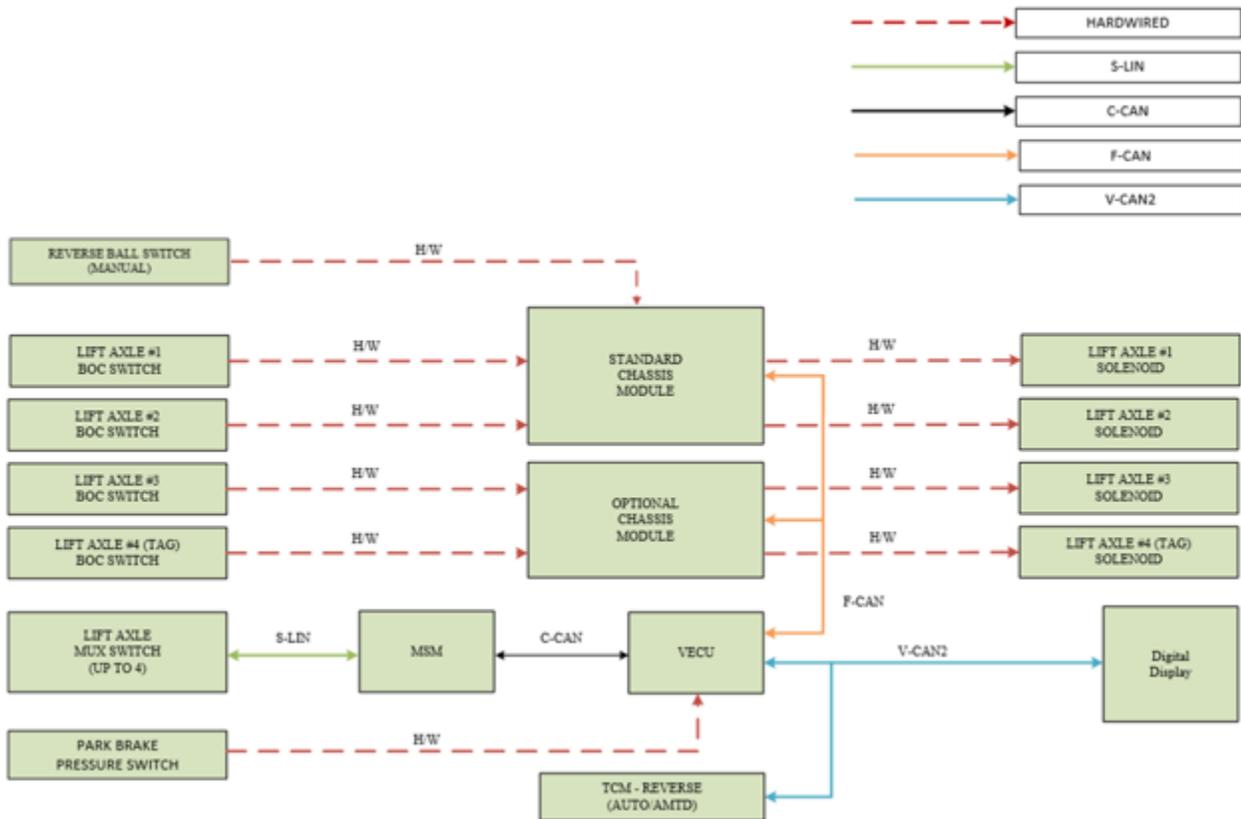
PIN	CIRCUIT DESCRIPTION
A	Stop/Turn Lamp (LH for P791, RH for P792)
B	Tail Lamp
C	Backup Lamp

Mating Connector: Packard PN 12015713

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 direct to the axle mounted solenoid. This is 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 is a total of four lift axle controls available: 3 pushers and 1 tag axle, or 4 pushers and no tag. These are controlled with separate switches by default. 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 regulator valve.

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

### 7-INCH DIGITAL DISPLAY IN DASH

The instrument cluster comes with a standard set of analog and digital gauges. A limited number of additional gauges can be configured on the digital display after the initial truck build using PVP (PACCAR Vehicle Pro). Please contact your local Peterbilt dealership for assistance.



Gauges on the 7" Digital Display

### TELLTALE ICONS

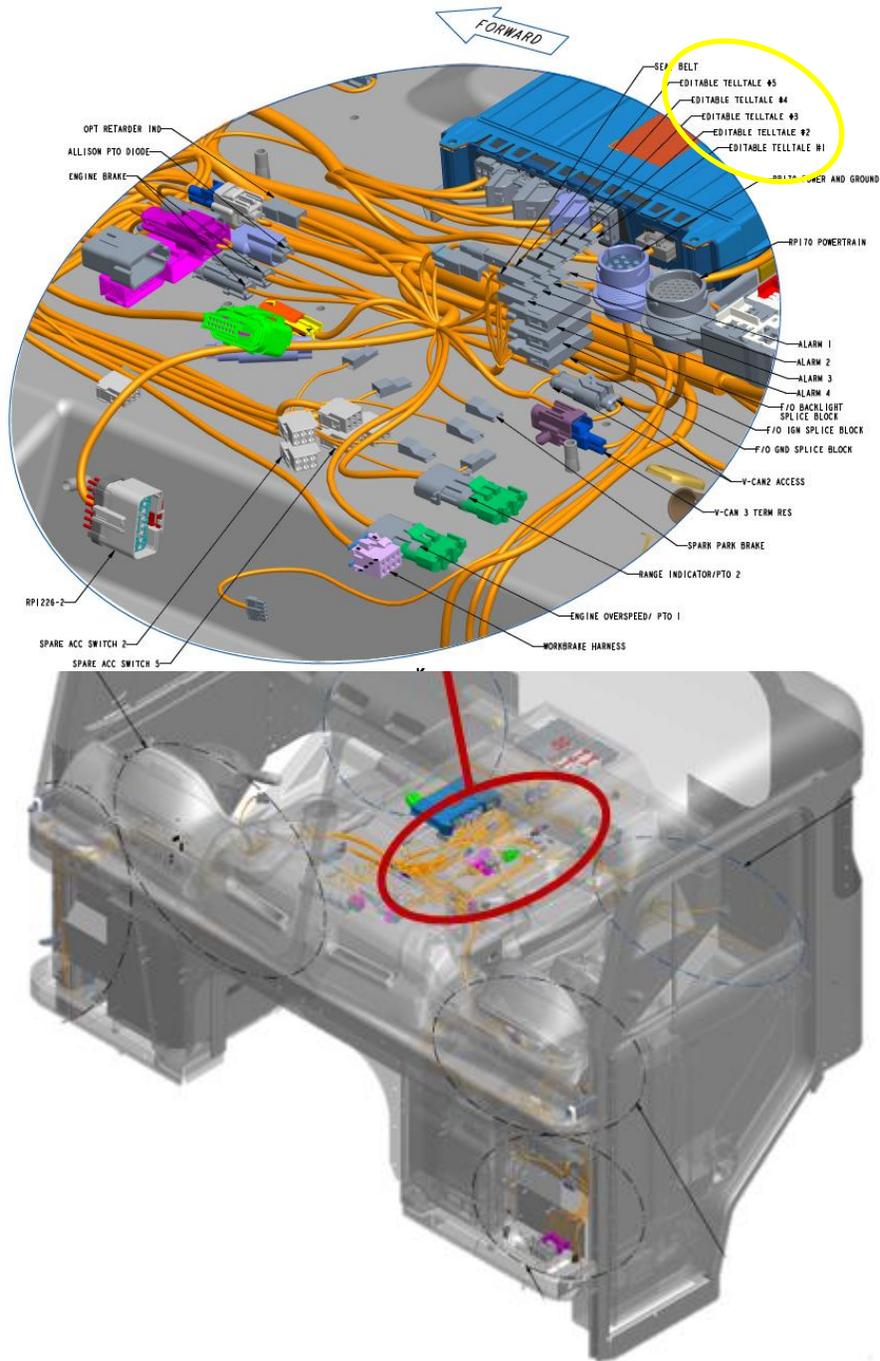
Custom Telltales are no longer available with a physical card inserted into the dash instrument cluster. Instead, the body builder telltales will populate on the digital portion of the display from a limited list and can be reconfigured using PVP (PACCAR Vehicle Pro) at your local Peterbilt dealership. 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.



Body Builder Editable Telltale Positions

### TELLTALE CONNECTOR LOCATIONS UNDER THE BODY BUILDER PANEL

Remove the center body builder panel in the cab to access the wiring for the telltale connectors. The digital display is capable of receiving up to 5 hardwired inputs to trigger the body builder (editable) telltales on the Model 520 product. Each editable telltale has a designated analog connector located on the cab harness.



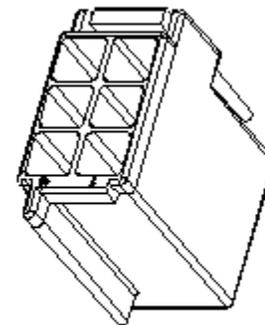
COMMON TERMINALS AND PINS FOR BODY BUILDER CONNECTIONS

HYBRID SWITCHES – NON-WIRED

Mating Connector Number	
P20-1413	
Terminal Number	
20-18 AWG	1-968849-1
16-14 AWG:	1-968851-1
11 AWG	1-968853-1

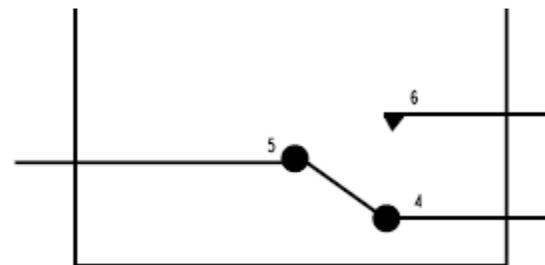
Lin Jumpers
S92-1127-0350
S92-1127-0125
S92-1127-1350
(Last 4 digits are the length in mm)

Two Position	
P27-6252-131-01	Spare A
P27-6252-132-01	Spare B
P27-6252-133-01	Spare C
P27-6252-134-01	Spare D
P27-6252-135-01	Spare E
P27-6252-136-01	Spare F
P27-6252-137-01	Spare G
P27-6252-138-01	Spare H
P27-6252-139-01	Spare I
P27-6252-140-01	Spare J
P27-6252-141-01	Spare K



ISO VIEW

Momentary	
P27-6252-151-01	Spare
P27-6252-152-01	Spare 2
P27-6252-153-01	Spare 3
P27-6252-154-01	Spare 4



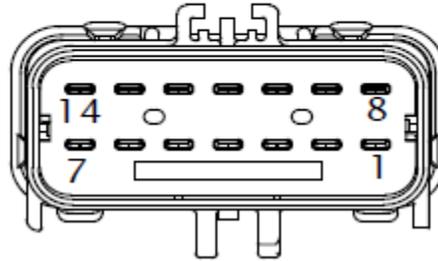
CIRCUIT C

RP1226

Mating Connector Number	
P20-6280-22142120	
Terminal Number	
20-18 AWG	54001801
16-14 AWG:	54001401
Plug	54200005
Note: Cap Installed from Factory	

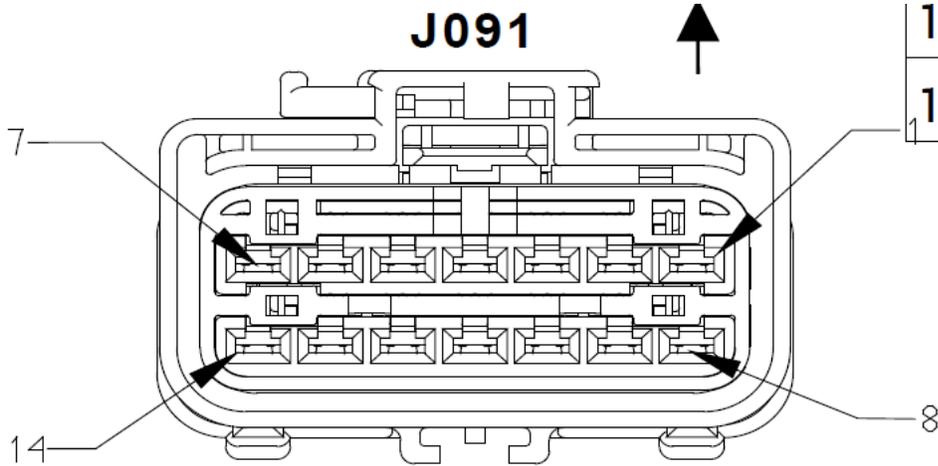
MATING CONNECTOR

**P091**



TRUCK HARNESS CONNECTOR

**J091**

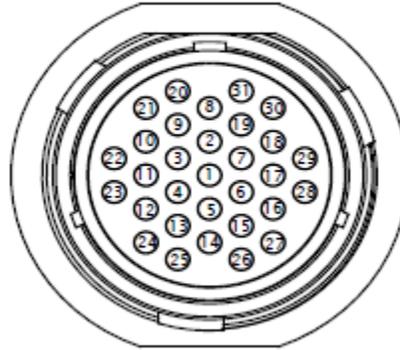


RP170 31-PIN

TRUCK HARNESS CONNECTOR

**J070**

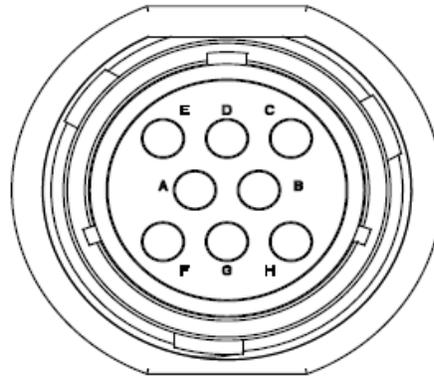
Mating Connector Number	
P20-6386-3130	
Terminal Number	
18-14 AWG	1060-16-0122
Plug	114017



RP170 8-PIN

TRUCK HARNESS CONNECTOR

Mating Connector Number	
P20-6386-0810	
Terminal Number	
12-14 AWG	1060-12-0122
Plug	114017



12-PIN



TRUCK CONNECTOR

**P197 - Remote PTO Chassis**

Equipped: Optional  
Available Locations: BOC  
Supplier: Deutsch-DT Series



MATING CONNECTOR

**Mating Connector:**

PACCAR P/N: P20-1372-2112H  
TE P/N: DT06-12SA-CE06

**Terminals:**

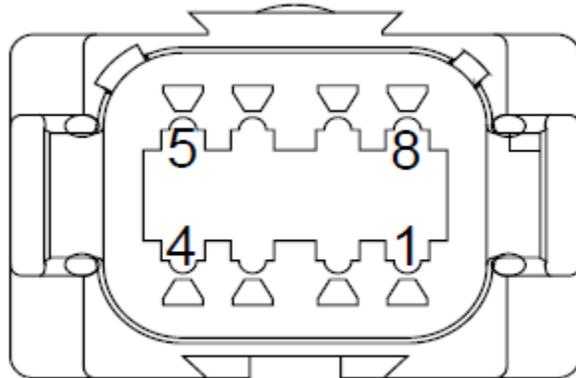
16-20 awg: 0460-202-16141  
14 awg: 0460-215-16141  
Plugs: 0413-217-1605

Note: cap installed from factory

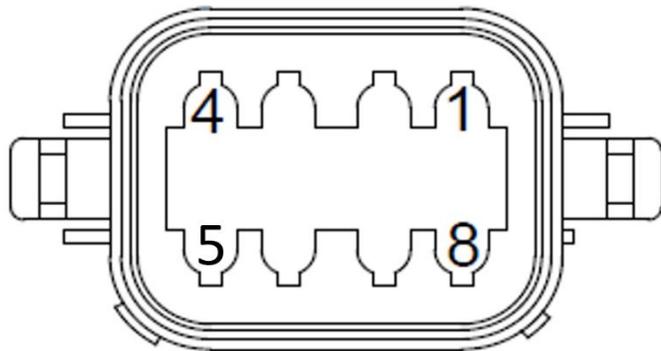
8-PIN

Mating Connector Number	
P20-1372-2108H	
DT06-08SA-CE06	
Terminal Number	
16-20 AWG	0460-202-16141
14 AWG	0460-215-16141
Plugs	0413-217-1605
Note: Cap Installed from Factory	

MATING CONNECTOR



TRUCK HARNESS CONNECTOR

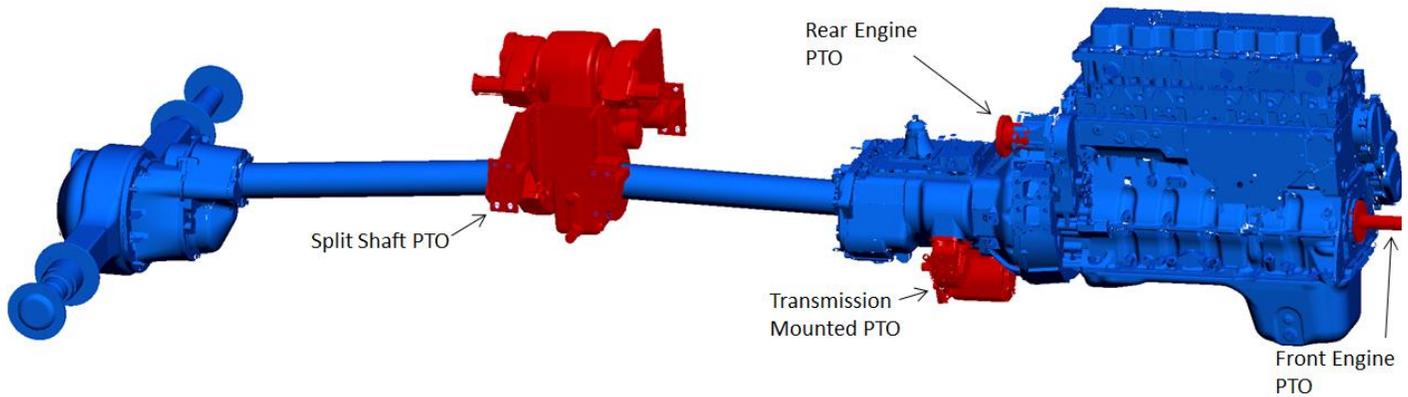


This page is intentionally left blank.

# SECTION 8 POWER TAKE-OFF (PTO)

## INTRODUCTION

A Power Take Off (PTO) provides a way to divert some or all of the truck's engine power to another component. There are a wide variety of PTO options available.



## PTO Acronym Library

Acronym	Definition	Acronym	Definition
ABS	Anti-Lock Braking System	PMC	PTO Mode Control
CAN	Controller Area Network	PSC	PTO Speed Control
CC	Cruise Control	PTO	Power Take Off
DEF	Diesel Exhaust Fluid	PVP	PACCAR Vehicle Pro
DTC	Diagnostics Trouble Code	RP1226	TMC Messaging Standard
ECM	Engine Control Module	SCM	Standard Control Module
ECU	Electronic Control Unit	SCR	Selective Catalyst Reduction
EIST	Engine Idle Shutdown Timer	SPN	Suspect Parameter Number
EOA	Electric Over Air	TCM	Transmission Control Module
EOH	Electric Over Hydraulic	TSC1	Torque Speed Control (request)
FIC	Fast Idle Control	VECU	Vehicle Electronic Control Unit
J1939	SAE CAN Communication Standard		
LIN	Local Interconnect Network		
MSB	Multiplexed Solenoid Bank		
MSM	Master Switch Module		
MUX	Multiplexed		
OBD	On-Board Diagnostics		
OCM	Optional Control Module		
OEM	Original Equipment Manufacture		
PCC	Predictive Cruise Control		
PDC	Power Distribution Center		
PGN	Parameter Group Number		

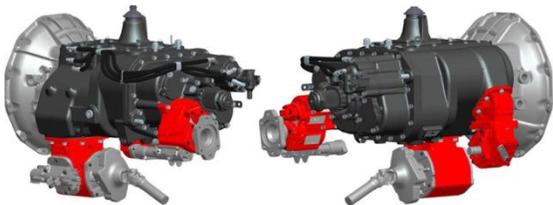
**TRANSMISSION MOUNTED PTO**

**MANUAL TRANSMISSIONS**

On a manual transmission, there are two locations for PTO's, with a potential for a third location depending on model. There is a 6-bolt PTO on the right and an 8-bolt PTO on the bottom left. When a third PTO location is available, it will be a 4-bolt thru shaft or extended countershaft PTO on the rear side of the transmission. When using a thru shaft PTO, the vehicle must be spec'd with the correct option as not all transmissions will be set up for use with thru shaft PTO's. For more information, go to [www.roadranger.com](http://www.roadranger.com) and enter "PTO Installation Guide" in the search bar in the upper right corner.



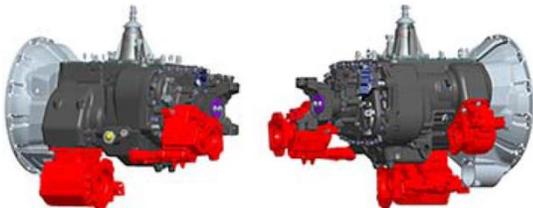
HD Manual Transmission - RT



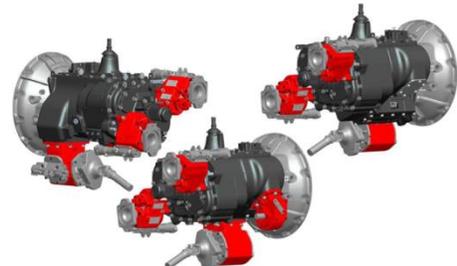
HD Manual Transmission – RT Vocational



HD Manual Transmission – RT Performance



HD Manual Transmission – Fuller Advantage

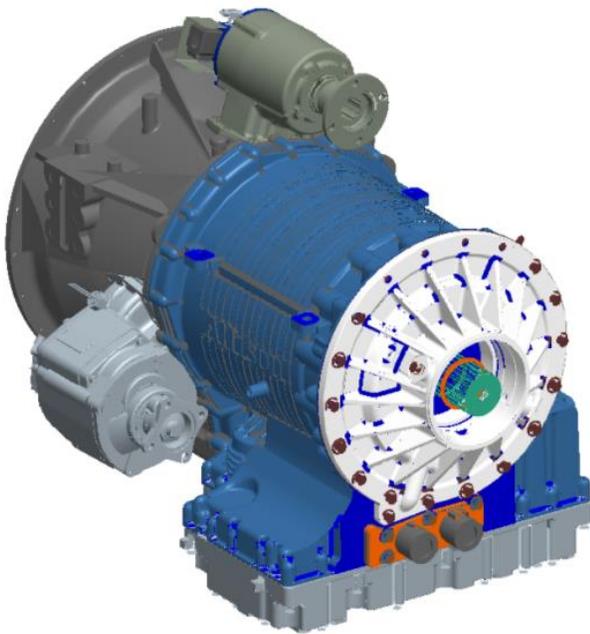


HD Manual Transmission – FR Series

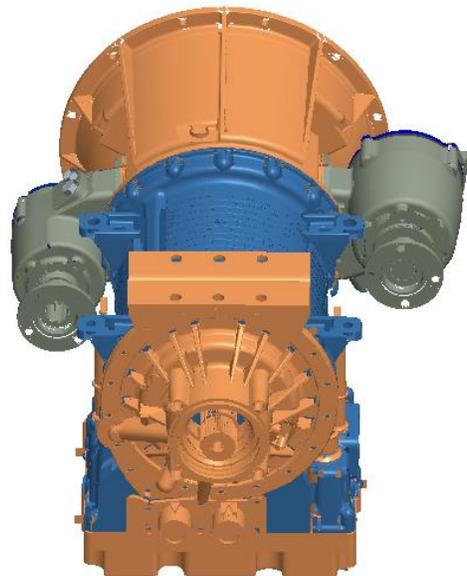
**AUTOMATIC TRANSMISSIONS**

On Allison automatic transmissions, there can be no more than two PTO's at once. The Allison 4000RDS-P series has PTO locations at 1 o'clock and 8 o'clock, when viewed from the back of the transmission. The Allison 4000HS transmissions do not have any PTO locations. The Allison 3000RDS-P series transmissions have PTO locations at 4 o'clock and 8 o'clock. For more information on using PTO's with an Allison transmission, go to [www.allisontransmission.com](http://www.allisontransmission.com) and refer to the "Rugged Duty Series Brochure" and "PTO Request Flyer" which is available in a 1000/2000 version and a 3000/4000 version.

On Allison 4000RDS-P series transmissions, most PTO's will fit in the 1 o'clock position without interfering with the cab. If a wet kit is used here, the dipstick housing will most likely need to be modified as it runs over the top of the transmission to the driver side of the vehicle. The PTO in the 8 o'clock position is typically ok. There are some scenarios where the PTO will be very close to or could interfere with the rear spring shackle on the front suspension. This problem can occur on vehicles with a set-back front axle and the problem is amplified on the short hood truck models.



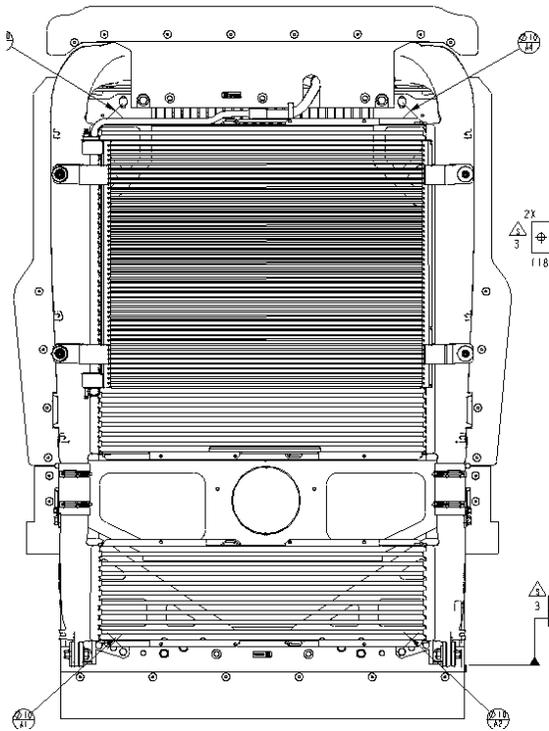
Allison 4000 Series



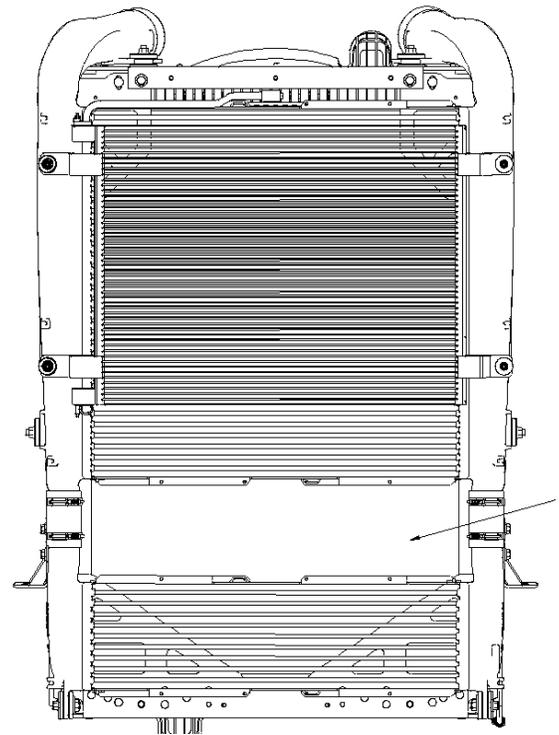
Allison 3000 Series

FRONT ENGINE MOUNTED PTO

Front engine PTO (FEPTO) is sometimes used in vocational applications. When a FEPTO is spec'd on a truck, the cooling module has a pass-thru to allow for a shaft to be bolted to the front of the engine crankshaft and extend out to the front of the chassis. The bumper will be extended out to mount the customer installed aftermarket device. Bumper extensions available are 9", 4-7/8", or no extension. See pictures below for radiator installations with and without FEPTO provisions.



Cooling Module **with** FEPTO Provision



Cooling Module **without** FEPTO Provision

**REAR ENGINE MOUNTED PTO**

Rear Engine PTO (REPTO) is also sometimes used in vocational applications. The REPTO is driven off the rear gear train on the engine. There is a 1350/1410 flange on the bell housing in the 1 o'clock position that can be used to attach a hydraulic pump or driveshaft.

The REPTO flange will always be turning when the engine is running and the output rotation is the same as the engine.

Engine	REPTO Ratio (vs Engine Speed)
PACCAR PX-9	1.15:1 RATIO
CUMMINS ISX12N	1.32:1 RATIO
PACCAR MX-11	1.3:1 RATIO



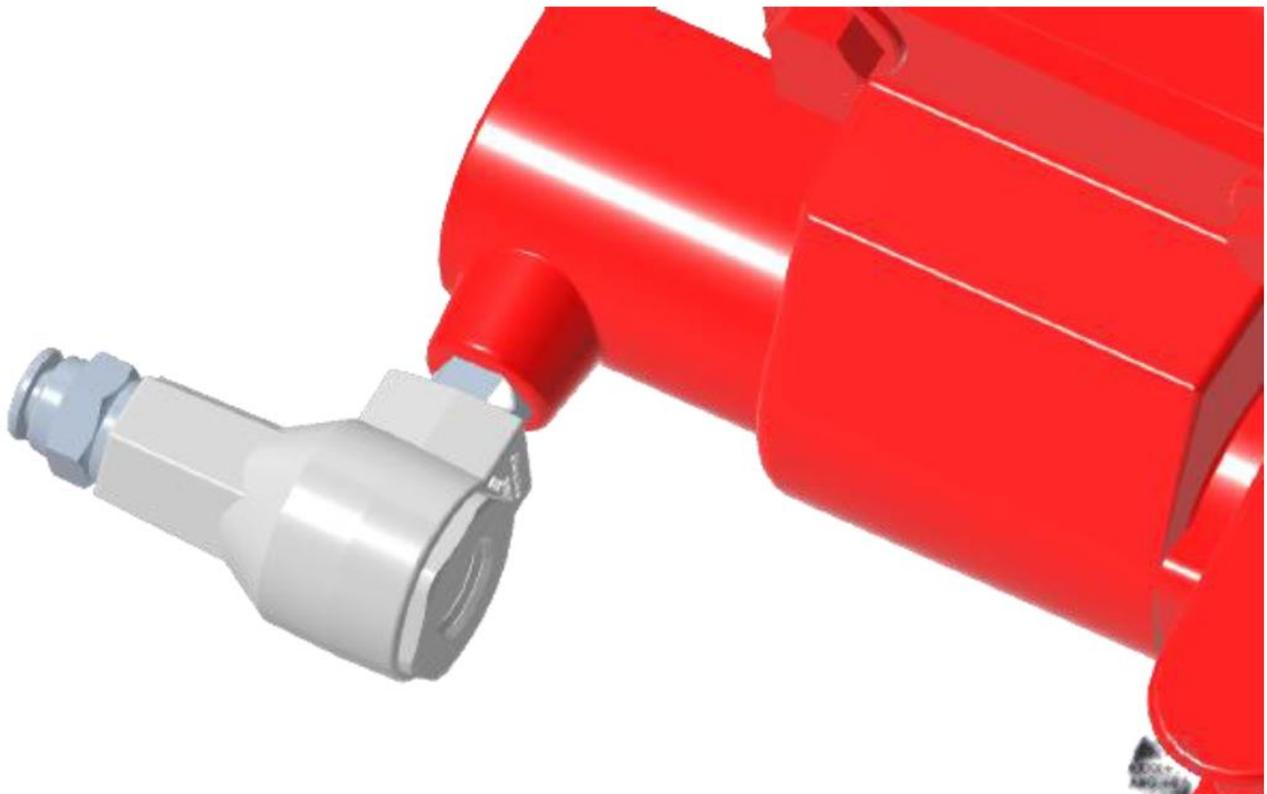
REPTO Flywheel Housing

**PTO QUICK EXHAUST VALVE**

Depending on the PTO being used, it may be beneficial to include a quick exhaust valve onto the air fitting of the air-shift cover. The quick exhaust valve will prevent any backflow of air experienced by the PTO, preventing any oil contamination that may enter the EOA solenoid air line. It is recommended to install a quick exhaust valve if there is any notice of oil present in the solenoid or if there is evidence of oil making its way in the air line. Oil intrusion into the solenoid may cause improper actuation of the internal armature, preventing the PTO from turning on.

**Usage Notes:**

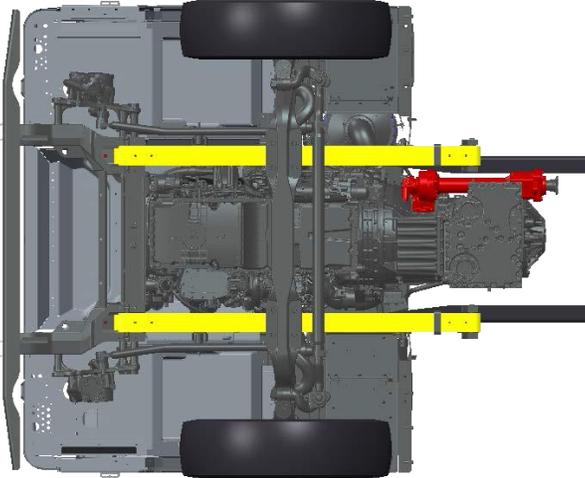
1. This application guide is only applicable to PTOs with an air shift option.
2. Inspection of the EOA solenoid and corresponding air line should be made before installation of the quick exhaust valve. If there is evidence of oil contamination, the air line should be flushed, and the solenoid should be replaced before installation of the valve.
3. Orientation of the valve does not have a defined angle.
4. The suggested quick exhaust valve for this application is Humphrey SQE2VAI. Other valves might not have the same properties and may not operate as intended.
5. Depending on location of the PTO, a breather vent may need to be added onto the exhaust port of the quick exhaust valve. This will prevent any road contaminants from entering the exhaust side.
6. It is suggested to only use a quick exhaust valve within its normal operating temperature range of -25°F to 180°F.



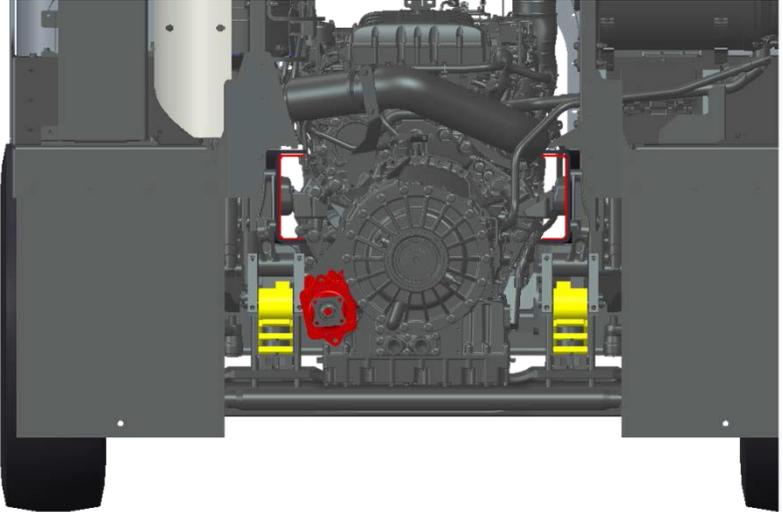
PTO INSTALLATION EXAMPLE

CHELSEA 890

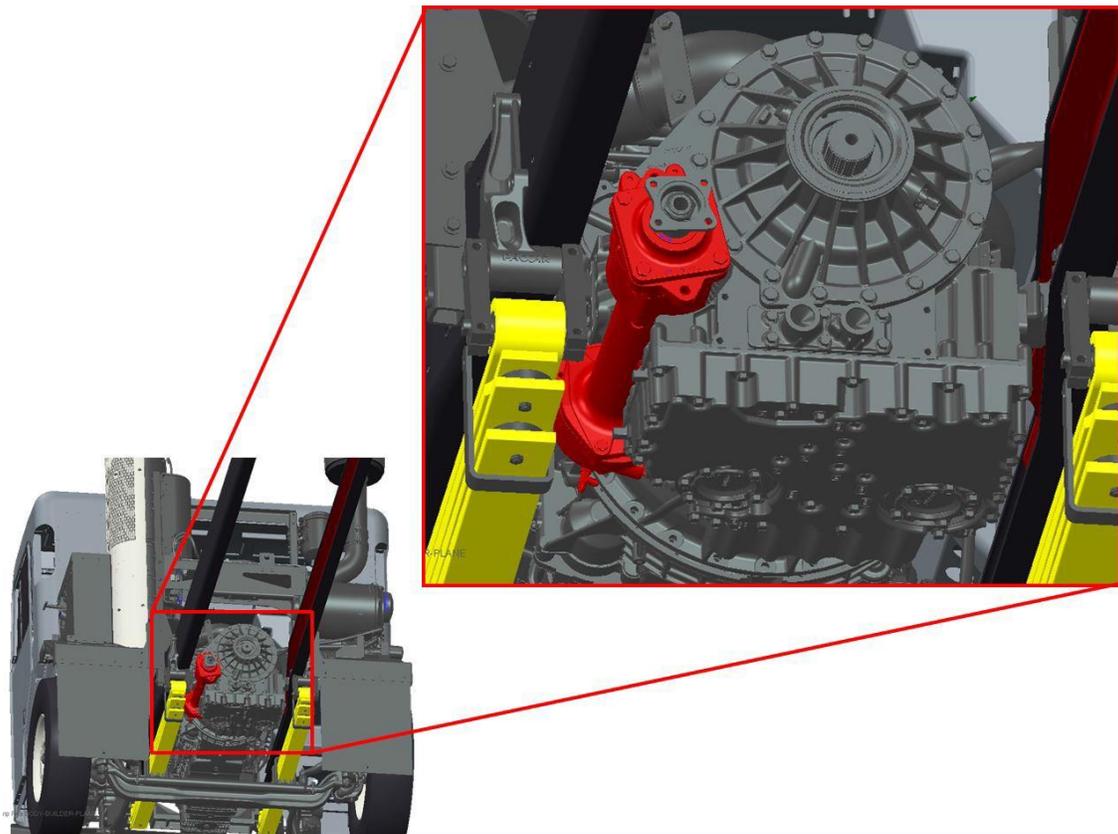
The installation shown below is of a Model 520 with a Chelsea 890 PTO.



Bottom View



Rear View



Isometric View with Enhanced View

### MX PTO MODE CONTROL (PMC)

MX PTO Mode Control (PMC) includes features, limits, and protections that are active in PTO Mode. It also includes PTO Speed Control (PSC) functionality that includes a variety of useful ways to control engine speed during PTO operation.

Reference the VECU Programming Guide for detailed information on PTO Mode Control configuration, functionality, and usage.

### MX PTO MODE ACTIVATION

There are three ways to activate PTO Mode. PMC parameter(s) must be enabled on the vehicle in order for PTO Mode to activate.

- Active feedback of physical PTO engagement
  - Trucks with factory installed PTOs or that are coded for Customer Installed PTOs will come prewired to receive the PTO engaged signal.
- Active PTO Mode Switch
  - The PTO Mode Switch can be configured at the time of order or in the aftermarket. The PTO Mode switch can be used to activate PTO Mode independent of PTO engagement and may be useful for trucks with FEPTOs or REPTOs that need the ability to use PMC features.
- PTO Mode Request over the CAN bus



PTO Mode Switch

### MX PTO MODE CONTROL LOCATION

Vehicles can be configured to control PTO functionality from a cab location and/or a remote location (outside the cab). Most PTO Mode Features and Interlocks have a cab station option and a remote station option. This allows a vehicle to be configured for two unique jobs. For example, a vehicle could be configured for mobile cab station operation with one set of limits and stationary remote station operation with a different set of limits.

If a vehicle is configured for both cab and remote PTO control, a PMC Location Switch must be installed on the dash. This switch will determine which set of PTO Mode Features to apply and which control location to use.



PMC Location Switch

### MX PTO MODE FEATURES

The following features and configurations are available when PTO Mode is active.

- Cab Accelerator Configurations
  - Disable in PTO Mode
  - Torque Control (Automotive Style)
  - Speed Control
  - Enable in Remote PTO Mode
- Log Time and Fuel in PTO Mode
- Disable Engine Idle Shutdown Timer (EIST) in PTO Mode
- PTO Mode Specific Engine Idle Shutdown Timer (EIST)
- Fan On in PTO Mode
- Adjustable PTO Engine Speed Governor Responsiveness (for light or heavy varying loads)

### MX PTO MODE PROTECTIONS AND LIMITS

The following protections and limits are available when PTO Mode is active. Protections and limits are active when PTO Mode is active and will continue to be active until PTO Mode is no longer active.

- Max Vehicle Speed
- Max Engine Torque
- Max Engine Speed – Accelerator Controlled
- Max Engine Speed – Switch Controlled
- Min Engine Speed
- Max Rate of Engine Speed Change

## MX PTO SPEED CONTROL (PSC) FEATURES

PTO Mode must be active prior to using PTO Speed Control (PSC) to control engine speed. PSC is available from both the cab station and remote station (see PTO Mode Control Location Section above). In the cab location, cruise control switches and PSC specific switches are used to control engine speed. Equivalent remote station inputs are available (Reference Remote PMC Connections section below).

- + / -
  - Configurable to either command one unique preset when “+” is pressed and a second unique preset when “-” is pressed OR toggle through up to 6 presets.
  
- Preset 1, 2 & 3
  - 3 Dedicated Presets with the following configuration options.
    - Latch: Hold Preset Speed When Switch is Released
    - Cancel: Cancel PSC When Switch is Released
  - The Remote PTO Inputs for Presets 1, 2 & 3 can be configured to function when Cab PTO Mode is active
  - In some applications, it may be useful to connect the Remote PTO Inputs for Presets 1, 2 & 3 to something other than a hand-operated switch. For example, the inputs can be configured to activate based off PTO engagement, hydraulic pressure, or equipment movement.



Dash Switches



Dedicated Preset Switches

## MX PTO SPEED CONTROL INTERLOCKS

PTO Speed Control Interlocks cancel PSC when active. There is an option to disable the accelerator when a PSC interlock is active. When a PSC interlock is active the engine speed will return to the Minimum Engine Speed in PTO Mode, or the engine speed commanded by the accelerator if applicable. An active PSC interlock does not disable PMC protections and limits.

The configurable PSC interlocks are listed below.

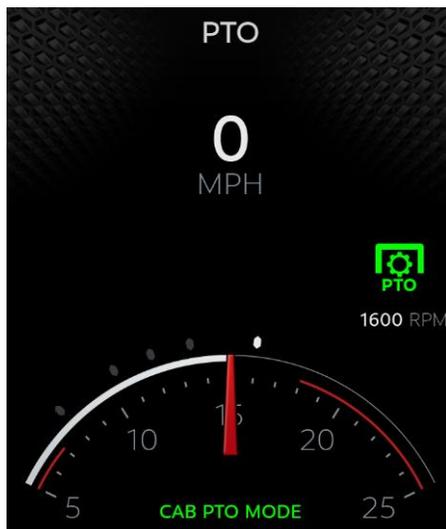
- Clutch Pressed
- Park Brake NOT Set
- Transmission NOT in Neutral
- Service Brake (Configurable for Pressed or NOT Pressed)
- Custom Hardwired Interlock (Configurable Polarity)

A custom hardwired interlock input is available that will allow a body builder to create a customized interlock for their specific application. This interlock functions for both Cab and Remote Station PSC. Many types of switches such as hand-operated switches, hydraulic pressure switches, equipment position switches, or pressure plate switches can activate the interlock. The switch polarity is configurable which allows the body builder to choose the interlock state if the circuit fails.

## PTO SPEED CONTROL ICONS

During PSC operation there will be icons on the digital display that indicate:

- PSC Enabled (white icon) or Active (green icon)
- PSC Control Location (designed by “Cab” or “Remote”)
- PSC target engine speed when active



**Cab PTO Active**



**Remote PTO Active**



**Cab PTO Enabled**

### REMOTE PMC CONNECTIONS

There are options to control PTO functionality from the following locations.

- Engine Bay – Hardwired option only
- RP1226 Connection in the Cab – CAN bus connection only
- BOC/BOS – Hardwired and CAN bus connections
- EOF – Hardwired and CAN bus connections

There are options available for the body builder to specify controller speeds of 250 kbps or 500 kbps.

MX PTO CAN functionality may be accessed in the cab through the RP1226 connector and remotely through the body connectors K-CAN (E-3375-021) and B-CAN (DTM06-2S-EP10) Connectors.

MX PTO hardwired functionality may be accessed in the engine bay or on the frame through optional 12-pin and 8-pin connectors.



**12-pin Deutsch  
Connector**



**8-pin Deutsch  
Connector**

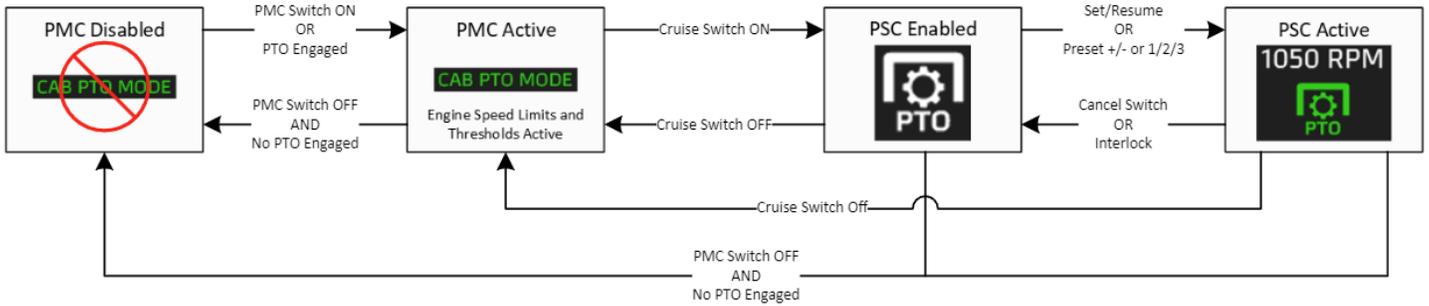


**RP1226 Delphi  
Connector**

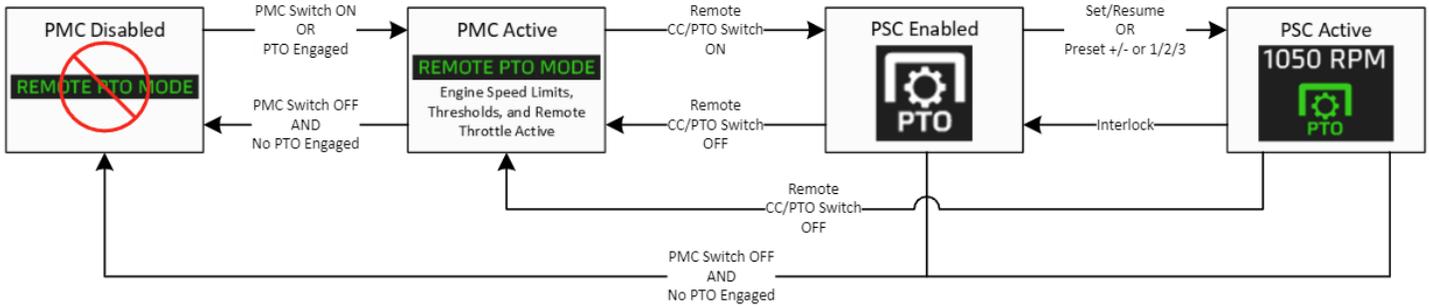
Pin-out and location information for the PTO connectors can be found in “Section 7 Electrical”

PTO MODE CONTROL FLOW CHARTS

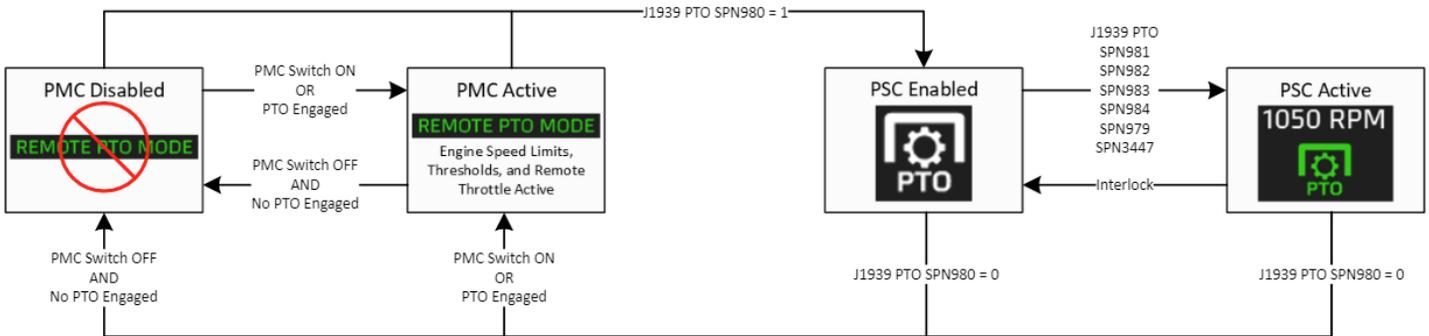
Cab Controls



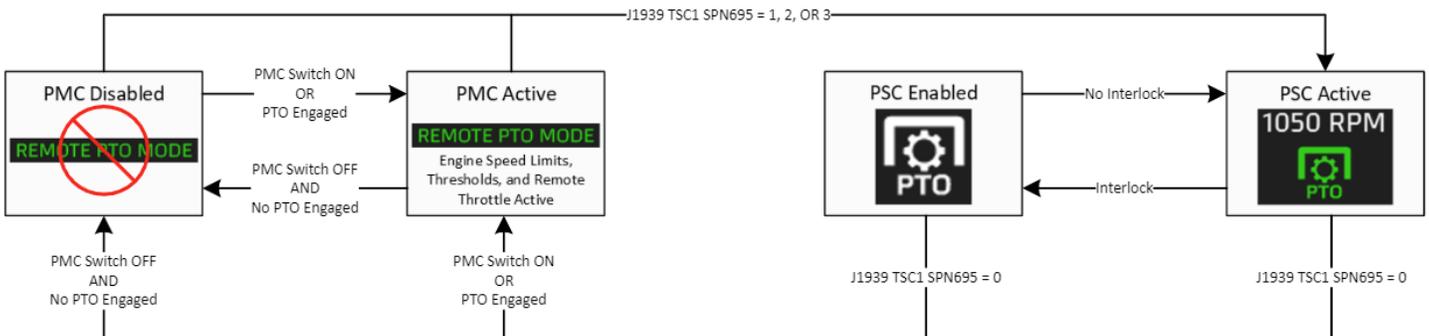
Remote Hardware Controls



Remote CAN Controls

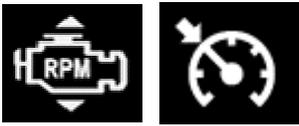


Remote TSC1 CAN Controls



**MX PTO TROUBLESHOOTING GUIDE**

The following table is a trouble shooting guide for MX PTO functionality.

SYMPTOM	POSSIBLE CAUSE	SOLUTION
<p>No PTO Active Indication (PMC is not active)</p> 	<p>PTO Mode Switch is not installed</p>	<p>Install and apply PTO Mode Switch</p>
	<p>PTO engagement feedback is not provided to standard/optional chassis module</p>	<p>Provide PTO engagement feedback to SCM (PTO#1) and/or OCM (PTO#2)</p>
	<p>PTO ball switch is faulty</p>	<p>Check that PTO ball switch is providing power or ground</p>
	<p>PTO device is not engaging due to air supply solenoid or electric signal not active</p>	<p>*Check EOA parameter settings in PVP                      *EOH PTOs are configured with parameter P816                      *Check popups on driver display for interlock conditions (PTO engagements may be configured with park brake or PTO interlocks dependent on EOA parameter settings, these will result in popups on driver display)</p>
<p>PTO Active Indication blinks intermittently</p> 	<p>PTO engagement feedback connection is faulty</p>	<p>Check PTO engagement feedback to SCM/OCM</p>
	<p>PMC switch connection is intermittent</p>	<p>Verify PMC switch connection (LIN jumper)</p>
<p>FIC or Cruise Control appears instead of PTO Speed Control on driver display</p>  <p>(when PTO Engaged Indication is present)</p> 	<p>Both Cab and Remote control locations are configured in PVP, but PMC location switch is not installed</p>	<p>Install PMC location switch, or select Cab <u>or</u> Remote control location in PVP</p>
	<p>CAB and/or Remote PMC is not configured</p>	<p>Enable CAB and/or Remote PMC in PVP and re-flash the VECU (PMC location switch is required if both control locations are configured)</p>

<p>White PTO icon appears, but no green PTO Speed Control icon on driver display</p> 	<p>PTO Speed Control is not active</p>	<p>Activate PTO Speed Control using cab or remote Set/Resume, +/-, Dedicated Preset, or J1939 PTO inputs. See PTO Mode Control Flowcharts in this section.</p>
	<p>PTO Speed Control switches are not enabled</p>	<p>Enabled PTO Speed Control switches P543 (Cab +/-), P610 (Cab Set/Resume), PXXX (Cab Dedicated Preset), P576 (Remote +/-), P611 (Remote Set/Resume, or P568/P569 (Remote Dedicated Preset)</p>
	<p>PTO Speed Control interlock is violated</p>	<p>Check that enabled PTO Speed Control interlocks are satisfied for cab and/or remote controls:</p> <ul style="list-style-type: none"> <li>*Park brake</li> <li>*Service brake active or inactive</li> <li>*Neutral position</li> <li>*Custom interlock</li> <li>*SCR/DEF Level Inducement</li> <li>*Adaptive Cruise Control fault</li> <li>*ABS Braking Event</li> <li>*Stop Engine Lamp</li> </ul>
	<p>Current PTO Speed Control location is not selected (when configured for Cab AND Remote control)</p>	<p>Select CAB or REMOTE control location using PMC location switch</p>
<p>Green PTO Speed Control icon on driver display appears, but engine speed will not change</p> 	<p>PMC engine speed slew rates are zero</p> <p>PMC engine torque limit is too low</p> <p>PSC Increment and/or decrement intervals are zero</p> <p>PSC Presets are not enabled or are programmed to the Min Engine Speed in PTO Mode</p>	<p>Change engine speed slew rates to non-zero values</p> <p>Increase engine torque limit</p> <p>Configure increment and/or decrement to non-zero values</p> <p>Enable PSC Presets and program preset values greater than the Min Engine Speed in PTO Mode</p>
<p>Cab accelerator pedal does not control engine speed</p>	<p>Cab accelerator control is not enabled</p>	<p>Enable the accelerator in Cab Control (P545), and/or Remote Control (P577) in PVP and re-flash the VECU</p>

Remote accelerator pedal does not control engine speed	PTO Mode Control is not active	Activate PTO Mode Control using PMC switch, provide PTO engagement feedback, or over the CAN bus
	Remote accelerator control is not enabled	Enable the remote accelerator control (P578) in PVP and re-flash the VECU
	PTO Speed Control interlock is violated	Check that enabled PTO Speed Control interlocks are satisfied: *Park brake *Service brake *Neutral position *Clutch position *Custom interlock *SCR/DEF Level Inducement *Adaptive Cruise Control *ABS Braking Event *Stop Engine Lamp
	Remote accelerator pedal has not returned to the fully released/zero position after entering PTO Mode Control	Calibrate/release remote accelerator to zero position
J1939 PTO CAN message does not affect PTO Speed Control	Remote controls are not configured and/or selected	Configure Remote PTO Mode Control and ensure it is selected using PMC Location switch (if Cab and Remote are both enabled)
	Body controller source address is not equal to 7d or 33d (0x21)	Configure body controller source address equal to 7d or 33d (0x21)
	J1939 PTO SPN980 (PTO Governor Enable Switch) is not equal to 1 (enabled)	Send J1939 PTO SPN 980 equal to 1
J1939 TSC1 CAN message does not affect PTO Speed Control	Remote controls are not configured and/or selected	Configure Remote PTO Mode Control and ensure it is selected using PMC Location switch (if Cab and Remote are both enabled)
	Body controller source address is not equal to 7d or 33d (0x21)	Configure body controller source address equal to 7d or 33d (0x21)
	J1939 TSC1 SPN695 (Override Control Mode) is equal to zero	Send J1939 TSC1 SPN695 equal to 1, 2 or 3
	J1939 TSC1 SPN3350 (TSC1 Control Purpose) is not 2 (PTO Governor)	Send J1939 TSC1 SPN3350 equal to 2

---

# SECTION 9 AFTERTREATMENT

## INTRODUCTION

The following section is designed to give you information regarding the aftertreatment systems on Peterbilt chassis.

All Peterbilts equipped with 2024 emission level engines will utilize Selective Catalyst Reduction (SCR). SCR is a process in which Diesel Exhaust Fluid (DEF) is injected into the exhaust downstream of the engine. DEF is converted to ammonia by the heat of the exhaust system. Inside of the SCR canister, a catalyst causes a chemical reaction to occur between the ammonia and NO<sub>x</sub>, turning it into water and nitrogen. For more information on the specific details of how SCR works, please contact your local Peterbilt dealer.

## GENERAL GUIDELINES FOR DEF SYSTEM

The installation of the DEF tank is a critical component of the Aftertreatment system. While Peterbilt does not recommend relocating the DEF tank, there are applications and body installations that will require it. The guidelines below must be strictly followed by any entity relocating the tank. Failure to follow the guidelines completely and accurately may result in engine shut-down situations.

PACCAR-approved DEF hoses are required when retrofitting for system to function properly. The use of unapproved hoses for DEF lines will void warranty and may cause engine shut-down situations. The DEF pump (or Supply Module) cannot be relocated from the DEF tank.

Peterbilt offers a variety of DEF tank sizes to meet every application. The DEF tank volume is regulated by the EPA. Peterbilt advises against modifying the tank volume after the truck has been delivered from the factory. These are estimated nominal (published) maximum fuel capacities for various DEF tanks, engines, and fill ratios.

TABLE 9-1. DEF Fuel Ratios

		FUEL VOLUME ALLOWED (USABLE GALLONS)	
DEF Tank	Capacity	Standard DEF - Fuel Ratio	Optional DEF-Ratio
520	7.4 gal	<b>(2:1 or greater)</b>	<b>(1.25:1-1.99:1)</b>
PACCAR MX-11		68 gal	106 gal
PACCAR PX-7, PX-9		74 gal	116 gal

DEF SYSTEM SCHEMATICS

On most Peterbilt chassis, the DEF Supply Module (or pump) is integrated into the DEF tank assembly. See page 9-3 for assembly relocation requirements.

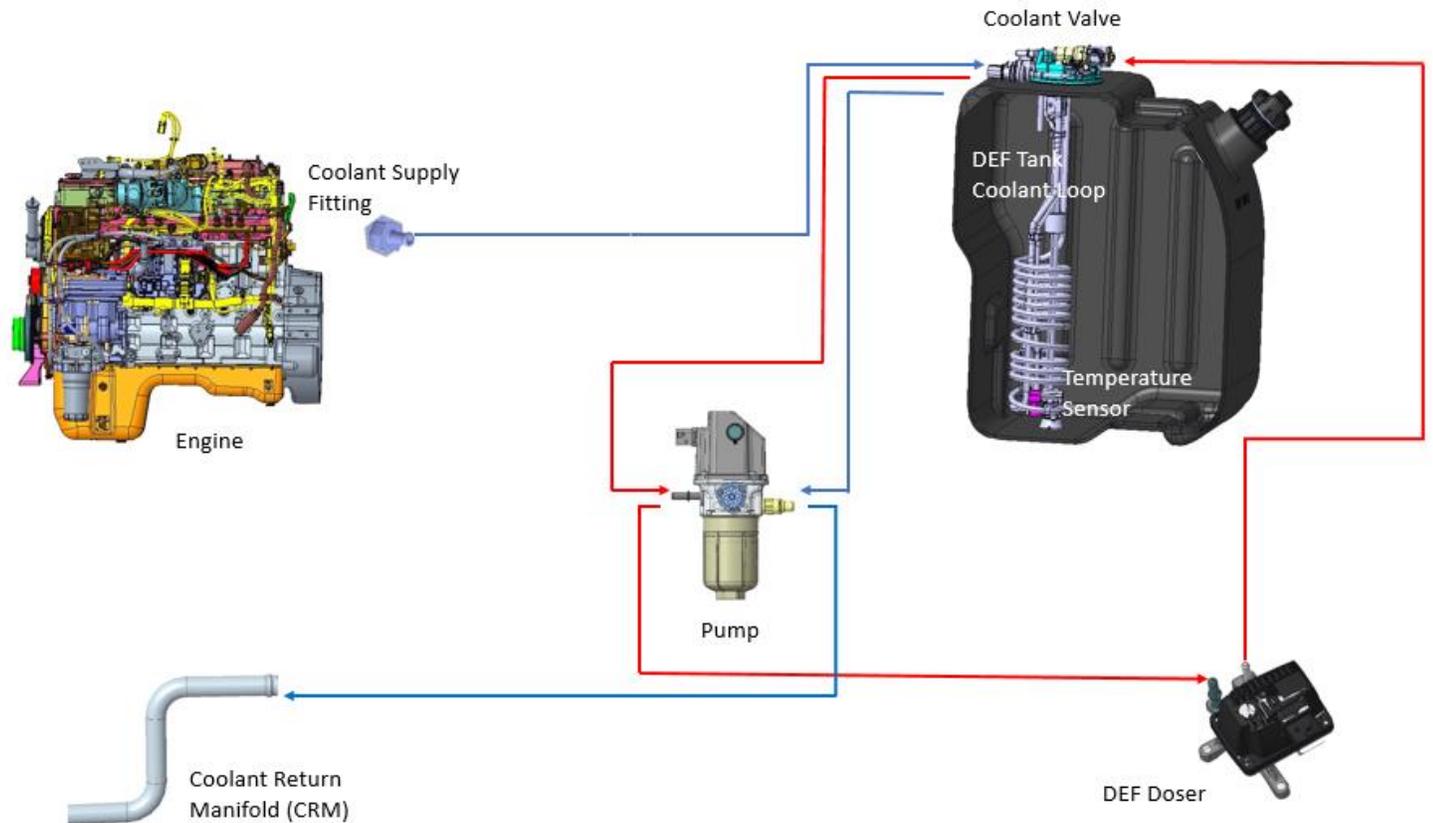


FIGURE 9-1. DEF System Schematic

DEF will freeze at approximately 11° F. To keep DEF from freezing, all tanks will be heated with engine coolant. The following schematic shows the routing of these lines. It is critical that the system is not compromised in any manner.

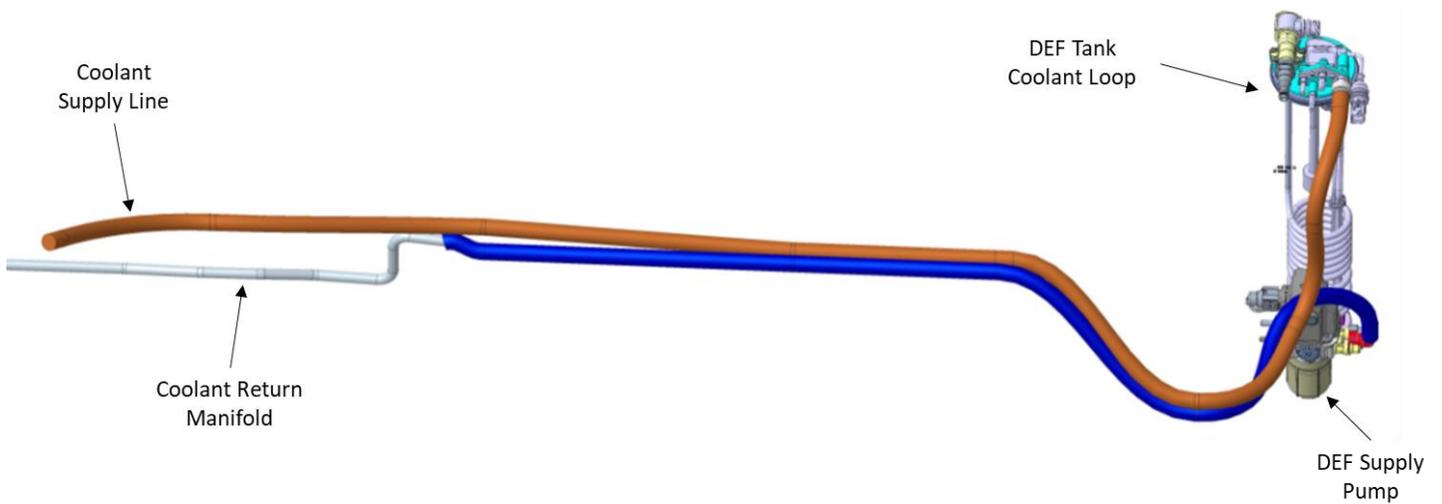


FIGURE 9-2. DEF Coolant Routing Schematic

## INSTALLATION REQUIREMENTS AND DIMENSIONS FOR DEF SYSTEM

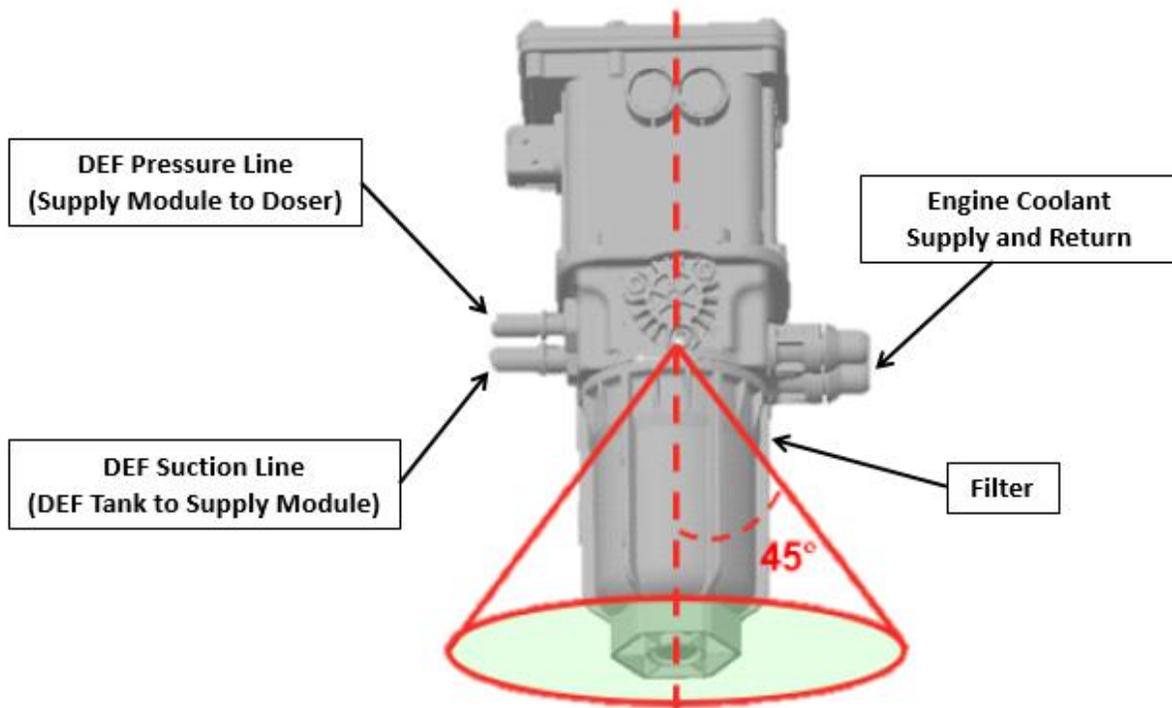
When relocating any DEF system component, the locations must meet all guidelines described below. Failure to comply may result in non-conformance to EPA standards and engine shutdown.

General clearances, routing guidelines, and installation requirements must be followed. See section 10 of this manual for general routing guidelines and clearances. The maximum DEF hose line length is 5.5 meters (216.5").

If the DEF tank is relocated, the coolant lines will need to be modified. During this process if the tank is moved forward on the chassis (closer to the engine) it is necessary to remove excess coolant lines and maintain the original routing path. If the tank is moved rearward on the chassis the additional length of cooling line required to complete the installation must be installed in a straight section of the existing coolant routing lines. This process minimizes the change in coolant flow and mitigates the risk of increased flow restriction. Changes in flow restriction are added with excessive line length and hose bends. Work with your local Peterbilt dealer if you are unsure about coolant line modifications.

### DEF ASSEMBLY RELOCATION - SUPPLY MODULE REQUIREMENTS

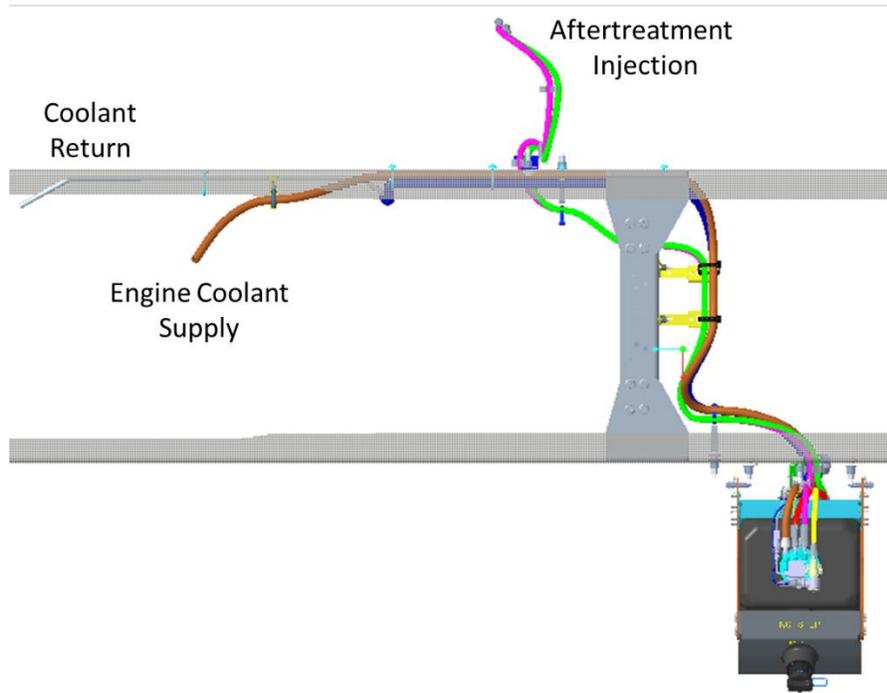
The Supply Module (or Pump) standard mounting location is on the DEF tank assembly. The pump cannot be removed from the DEF tank assembly. However, the assembly may be relocated. Body builders should follow the location and length restrictions above. Additionally, the supply module must be mounted with the filter cap oriented downwards within  $\pm 45^\circ$  of vertical (or a  $90^\circ$  inverted cone as shown in figure 9-3). The supply module should be located in a space that will minimize its vulnerability to road debris. Serviceability of the supply module filter should be considered, and adequate space for filter access and removal should be given (at least 5").



**FIGURE 9-3.** Supply Module Mounting Angle Limits

**ROUTING TO THE DOSING MODULE (INJECTOR)**

A DEF pressure line “trap” is not required for EPA 2017 and later emissions level engines. The dosing module (injector) no longer needs to be purged and relative heights of components are no longer critical. See Figure 9-4 below for typical routing with RHUC exhaust and LH DEF tank shown. Figure below shows a typical coolant line routing.



**FIGURE 9-4.** Routing for DEF and Coolant Lines

---

# SECTION 10 ROUTING

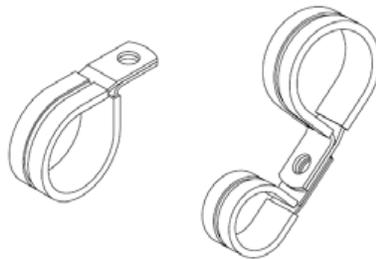
## INTRODUCTION

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 compressor 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.



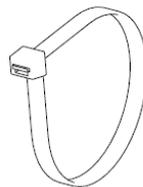
**FIGURE 10-1.** Clamp and Butterfly Clamp

**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 10-2.** 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. Straps must be UV stable.



**FIGURE 10-3.** Tie Strap

**Button Tie Strap:** A tough plastic (nylon or equivalent) locking strap used to secure lines to the frame or other structural support. Straps must be UV stable.

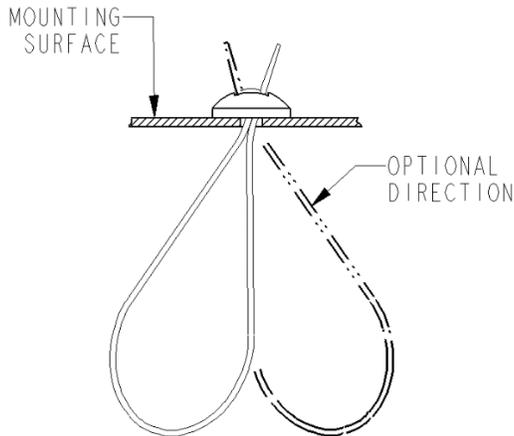


FIGURE 10-4. Button Tie Mount.

**Fir Tree Mount:** A tough plastic mount, inserted into a bracket or other intended support structure, used for securing routed bundles via a tie strap. Mounts must be UV stable.

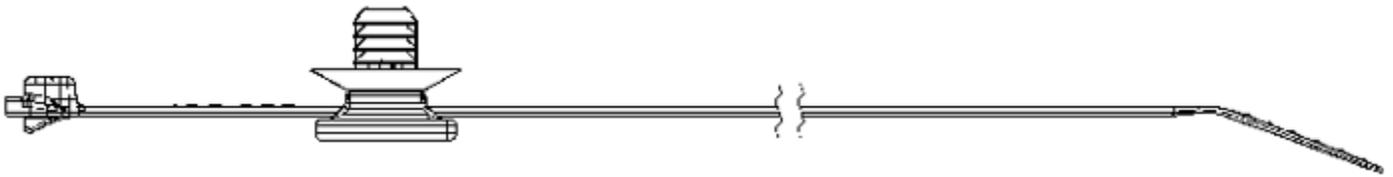


FIGURE 10-5. Fir Tree Mount

**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°).

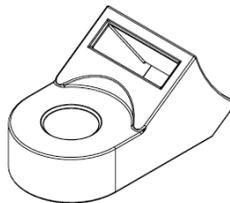


FIGURE 10-6. Heavy Duty (HD) Mount.



**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 18-inch section of hose routing, except for air conditioner hoses.

**Shortness of material:** Less than 1 inch of slack on an 18-inch section of hose routing.

## ROUTING REQUIREMENTS

### ELECTRICAL WIRING

- Do not bend wires or use tie straps within 75 mm (3 inches) of (connected) wire connectors or plugs.
- 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 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 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 have a covering of convoluted tubing, PSA tape, or must be separated from the component with a standoff or butterfly 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:

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). Battery strap (W84-1000) tie down shall be used without exception to secure battery cables to frame mounted or other major component (e.g., engine, 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.

110/220-volt wires for engine heaters, oil pan heaters, transmission oil heaters, and battery pad warmers shall not be included in any hose/wire bundle with a fuel hose. Individual heater wires not in a bundle shall be separated from other components by using butterfly clamps or butterfly ties at intervals not exceeding 14 inches (356 mm). Heater wires with a secondary covering shall be covered with convoluted tubing whether they are in bundles or not.

### **WIRES CROSSING OTHER COMPONENTS**

Electrical wires crossing over other components, such as lines, bolt heads, fittings, engine components lifting eyes, engine block, cylinder head, etc., close enough to rub shall be isolated with a covering of convoluted tubing and separated from the component by using butterfly clamps, butterfly ties, or plastic sheathing. 110/220-volt engine heater wiring shall be installed with butterfly ties or butterfly clamps.

### **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 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 (13 mm) clearance when the component is operating at its maximum travel limits.

A minimum clearance of 1.0 inch (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.

ROUTING OF WIRES AND HOSES NEAR EXHAUST SYSTEM

TABLE 10-1. Exhaust – System Clearance

Description	Shielded	Unshielded
Coolant hoses (Silicone, colored)	1" minimum	2" minimum
DEF hose (EPDM)	6" minimum	7" minimum
HVAC hoses, tubing, and hard lines	5" minimum	7" minimum
Electrical wires	6" minimum	8" minimum
Fuel hoses within 15" of the turbo over 15" from the turbo	n/a 2" minimum	4" minimum 3" minimum
Fuel tanks and hydraulic tanks crossing tank parallel to tank end of tank aluminum/ceramic-coated exhaust pipe crossing tank	n/a n/a n/a n/a	2" minimum 2" minimum 1" minimum 1.5" minimum
Air hose nylon wire braid	6" minimum 6" minimum	8" minimum 7" minimum

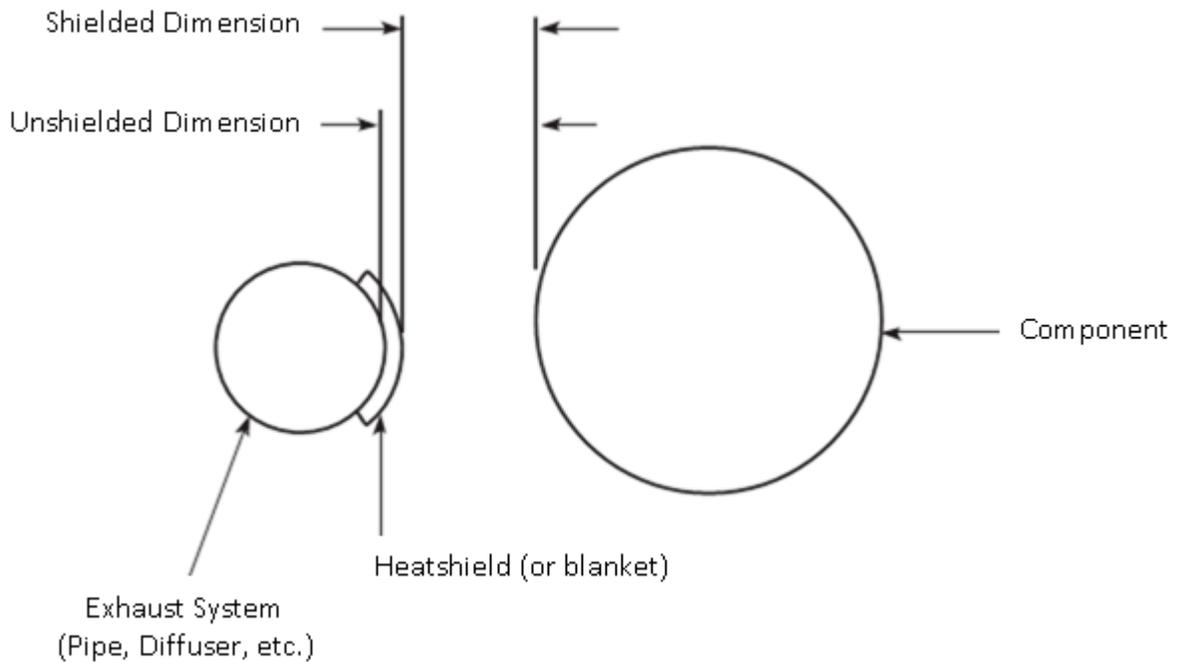


FIGURE 10-7. Definition of measurements.

This page is intentionally left blank.

# APPENDICES

## Revision Log

<b>Revision Log – 520 Builder Manual</b>				
<b>Revision</b>	<b>Author</b>	<b>Date of Publication</b>	<b>Pages #</b>	<b>Description of Changes</b>
000	Bob Bostetter	February 23, 2024	n/a	Initial Release
A	Jigar Prajapati	October 9, 2024	Various	Updated Sections 6 & 7 to include EMUX, Updated Section 8
B	Jigar Prajapati	April 17, 2025	6-29 through 6-32	Added body builder instructions from Service Engineering for enabling Bendix Fusion with Front End Loader bodies