

# Peterbilt Medium Duty Body Builder Manual 2017



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A **PACCAR** COMPANY

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# SECTION 1 INTRODUCTION



The Peterbilt Medium Duty Body Builder Manual was 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 Medium Duty 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.

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# SECTION 2 SAFETY AND COMPLIANCE

## SAFETY SIGNALS

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

Key symbols and “signal words” are used to indicate what kind of message is going to follow. Pay special attention to comments prefaced by “WARNING”, “CAUTION”, and “NOTE.” Please don’t 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 don’t 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:

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

#### NOTE



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 Certification label. See Figure 2-2.

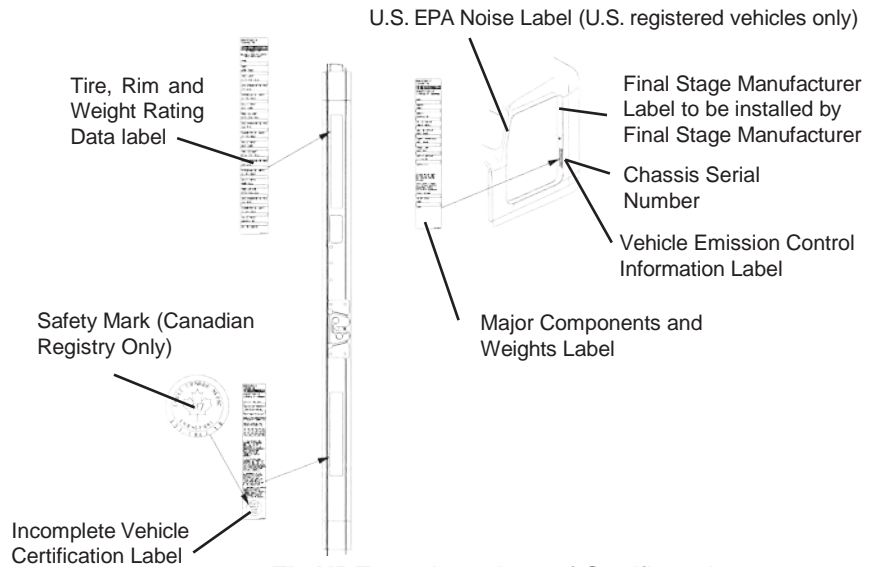
**NOTE**



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 Certification Document



**FIGURE 2-2.** Locations of Certification Labels - Driver’s Door and Frame

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

In part, if the final stage manufacturer can complete and certify the vehicle within the instruction in the incomplete vehicle document (IVD) the certification label would need a statement that reads, “This vehicle has been completed in accordance with the prior manufacturers, IVD where applicable. This vehicle conforms to all applicable Federal Motor Vehicle Safety Standards [and Bumper and Theft Prevention Standards if applicable] in effect in (month, year).”



However, if the vehicle cannot be completed and certified with in 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 manufactures 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 changes to the new certification regulation. Please refer to the Feb 15, 2005 final rule for all of the details related to this regulation. You can contact NTEA Technical Services Department at 1-800-441-NTEA for a copy of the final rule (DocID 101760).

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

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

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

Tires may be substituted provided the new tires possess a Coefficient of rolling resistance (Crr) equal to or lower than Crr of the original tires. Consult 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. Reference AEB 21.102.

It is possible to relocate the DEF tank; however the relocation requirements 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 2017 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
- There must be easy access to filter(s) and fill cap
- The tank vent may not obstructed
- Added accessories (heaters, generators) cannot introduce air into system
- Fuel tank must be located so that the full 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

**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 AFTER-TREATMENT SYSTEM**

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

- The following after-treatment and exhaust system components may not be modified:
  - DPF assembly
  - SCR Catalyst assembly
- Exhaust pipes between the engine and after-treatment devices (DPF, SCR Catalyst) and between after-treatment devices
- NO<sub>x</sub> Sensors
- PM Sensor
- The following modifications may only be done within the guidelines of the “DEF System Relocation Guide.”
  - 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
- If relocation of the DCU or ACM is necessary, use existing frame brackets and mount inside of frame flanges where necessary. Do not extend the harnesses
- The DPF, the SCR catalyst, or their 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
- The body in the vicinity of the DPF must be able to withstand temperatures up to 400°C (750°F)
- Do not add thermal insulation to the external surface of the DPF
- The SCR water drain hole may not be blocked
- Allow adequate clearance (25mm (1 inch)) for servicing the DPF sensors, wiring, and clamped joints
- Drainage may not come in contact with the DPF, SCR catalyst, sensors or wiring

- Allow sufficient clearance for removing sensors from DPF. 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 after-treatment 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 guide- lines 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 owner'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/ vehicle OBD components including datalinks may not be spliced. These emissions control/vehicle OBD components include the following:
  - throttle pedal
  - vehicle speed sensor
  - after-treatment 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 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 after-treatment wiring are available for relocating the DEF tank from your dealer via Paccar Parts. For relocation of DEF tank, refer to the after-treatment 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.

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# 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. The chart below lists the abbreviated terms used.

**TABLE 3-1.** Abbreviations Used

|       |  |
|-------|--|
| CA    | Cab to axle. Measured from the back of the cab to the centerline of the rear axle(s).        |
| FS    | Front suspension height  |
| RS    | Rear suspension height   |
| SOC   | Side of cab  |
| BOC   | Back of cab  |
| BBC   | Bumper to back of cab  |
| BFA   | Bumper to front axle   |
| FAB   | Front axle to back of cab  |
| FEPTO | Front engine PTO extension. Measured from the front of the grille to the front of the bumper |

## OVERALL DIMENSIONS

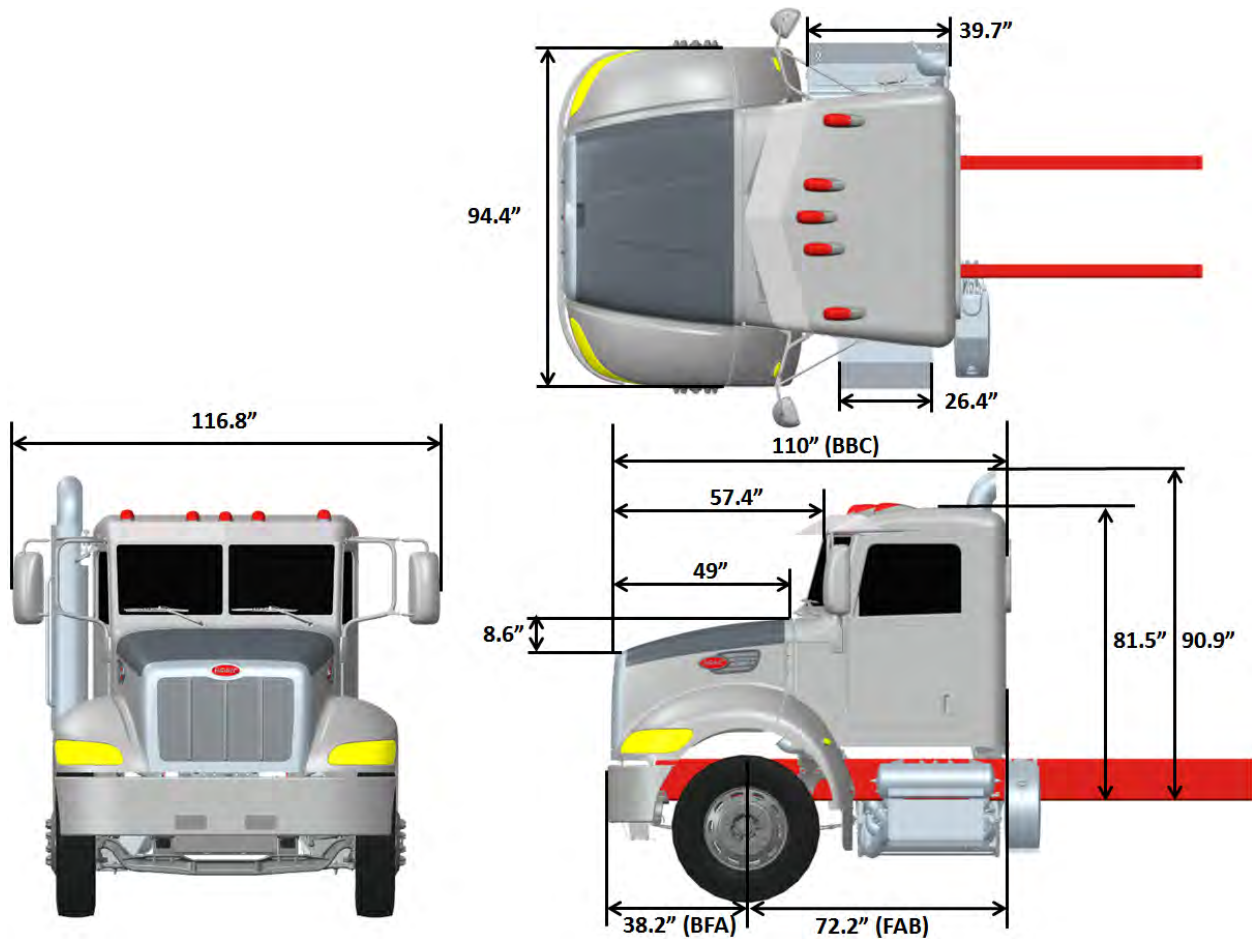
This section includes drawings and charts of the following Peterbilt Models: 348 (110" BBC), 348 (108" BBC), 337 (110" BBC), 337 (108" BBC), 330, and 325. Several optional configurations are also included.

On the pages that follow, detail drawings show particular views of each vehicle; all dimensions are in inches (in). They illustrate important measurements critical to designing bodies of all types. See the "Table of Contents" at the beginning of the manual to locate the drawing that you need.

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

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

MODEL 348, 337 (110" BBC)



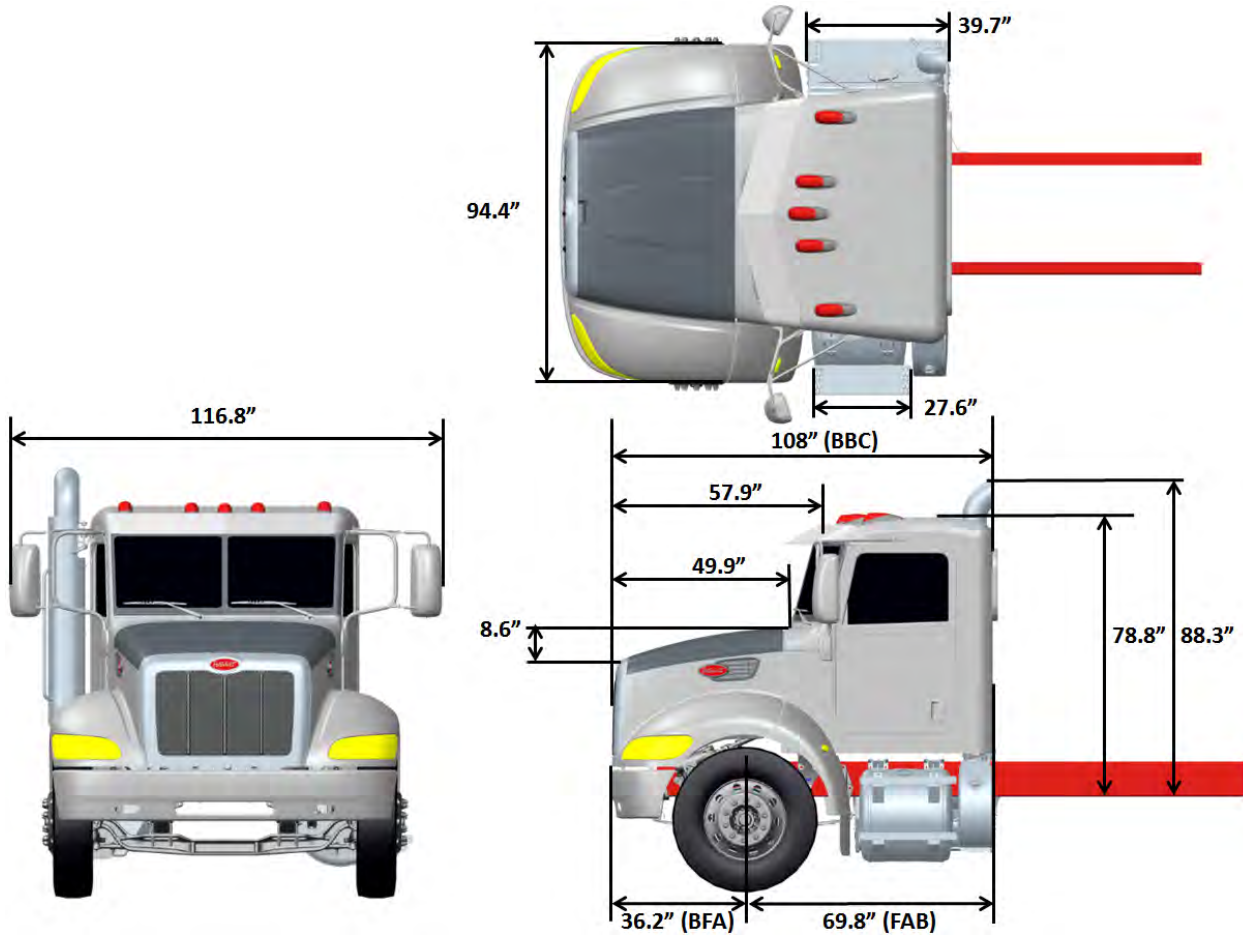
NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF 0.125" THICK BUMPER
- 3) DIMENSION FRONT AXLE TO FRONT OF FRAME (FFA) IS 36.2"
- 4) DIMENSION FRONT OF BUMPER TO FRONT OF FRAME (BFF) IS 2.1"
- 5) DIMENSIONS ARE WITH 11 5/8" RAIL

FIGURE 3-1. Model 348, 337 (110" BBC) Top, Front, & LH View – Overall Dimensions



MODEL 348, 337, 330, 325 (108" BBC)

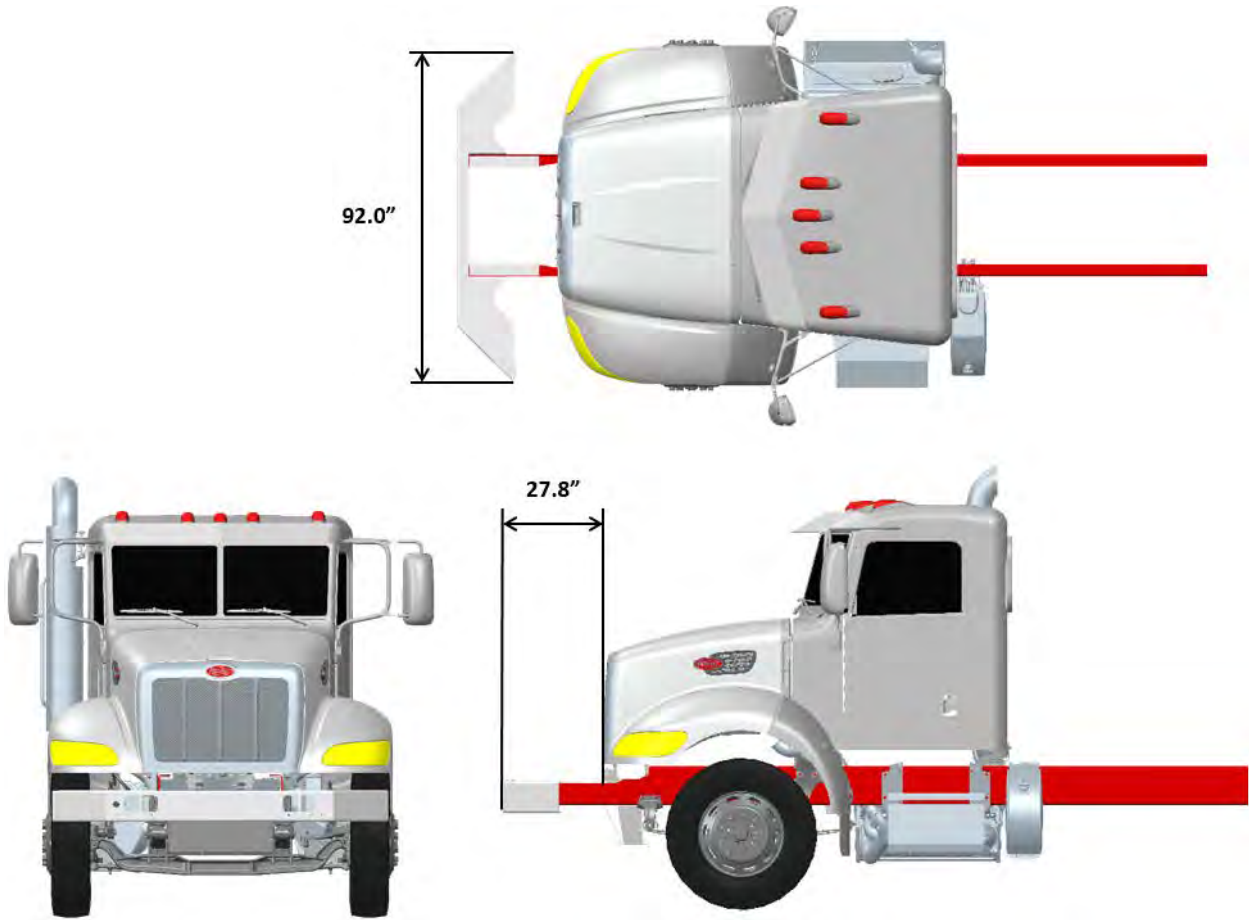


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF 0.125" THICK BUMPER
- 3) DIMENSION FRONT AXLE TO FRONT OF FRAME (FFA) IS 34.9"
- 4) DIMENSION FRONT OF BUMPER TO FRONT OF FRAME (BFF) IS 1.3"
- 5) DIMENSIONS ARE WITH 10 5/8" RAIL

FIGURE 3-2. Model 348, 337, 330, 325 (108" BBC) Top, Front & LH View – Overall Dimensions

MODEL 348, 337 (110" BBC) and 348, 337 (108" BBC) w/ 27.8" FEPTO Bumper Extension

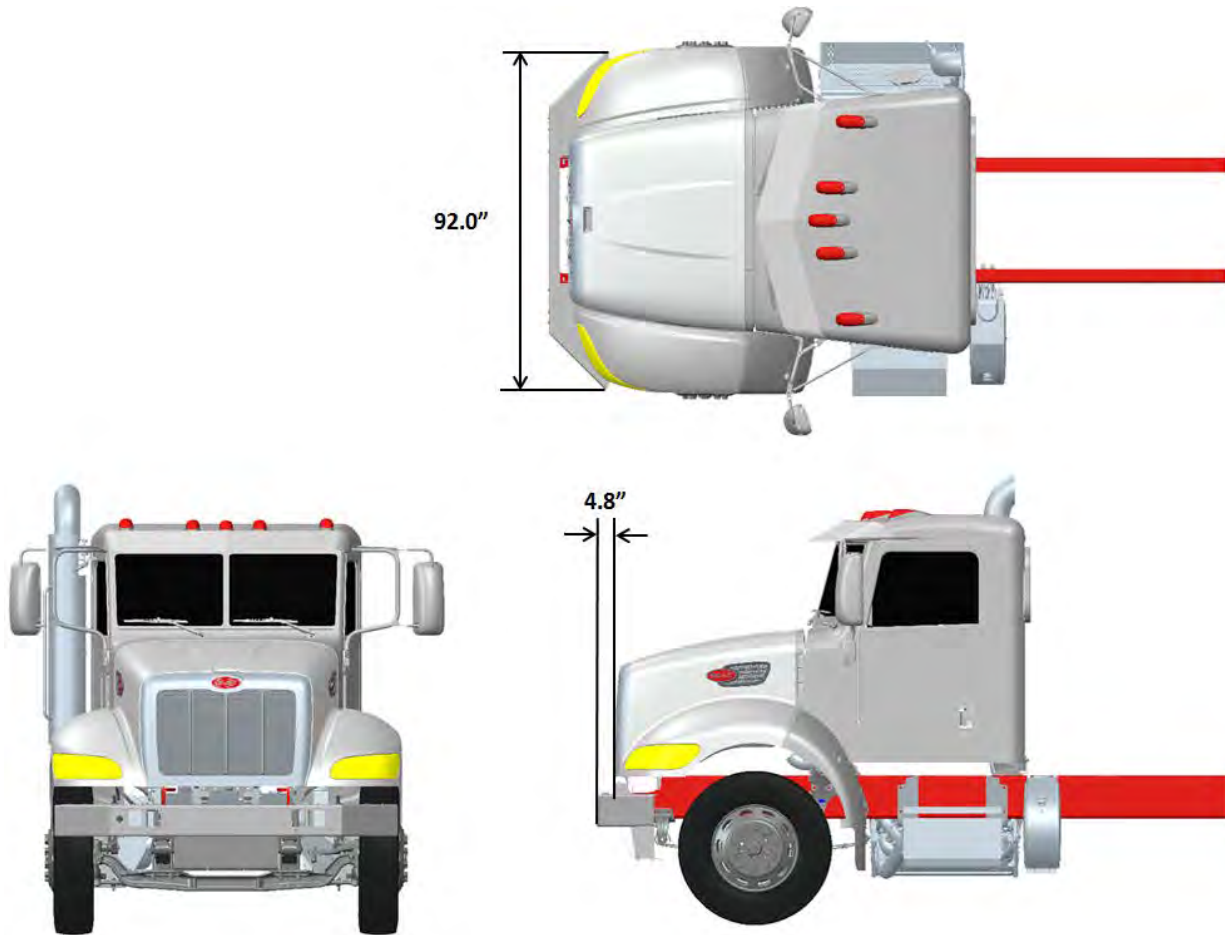


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF 0.25" THICK BUMPER
- 3) DIMENSION FRONT OF BUMPER TO FRONT OF FRAME (BFF) IS 0.92"

**FIGURE 3-3.** 348, 337 (110" BBC) and 348, 337 (108" BBC) Top, Front & LH View – Overall Dimensions

MODEL 348, 337 (110" BBC) and 348, 337 (108" BBC) w/ 3.2" FEPTO Bumper Extension



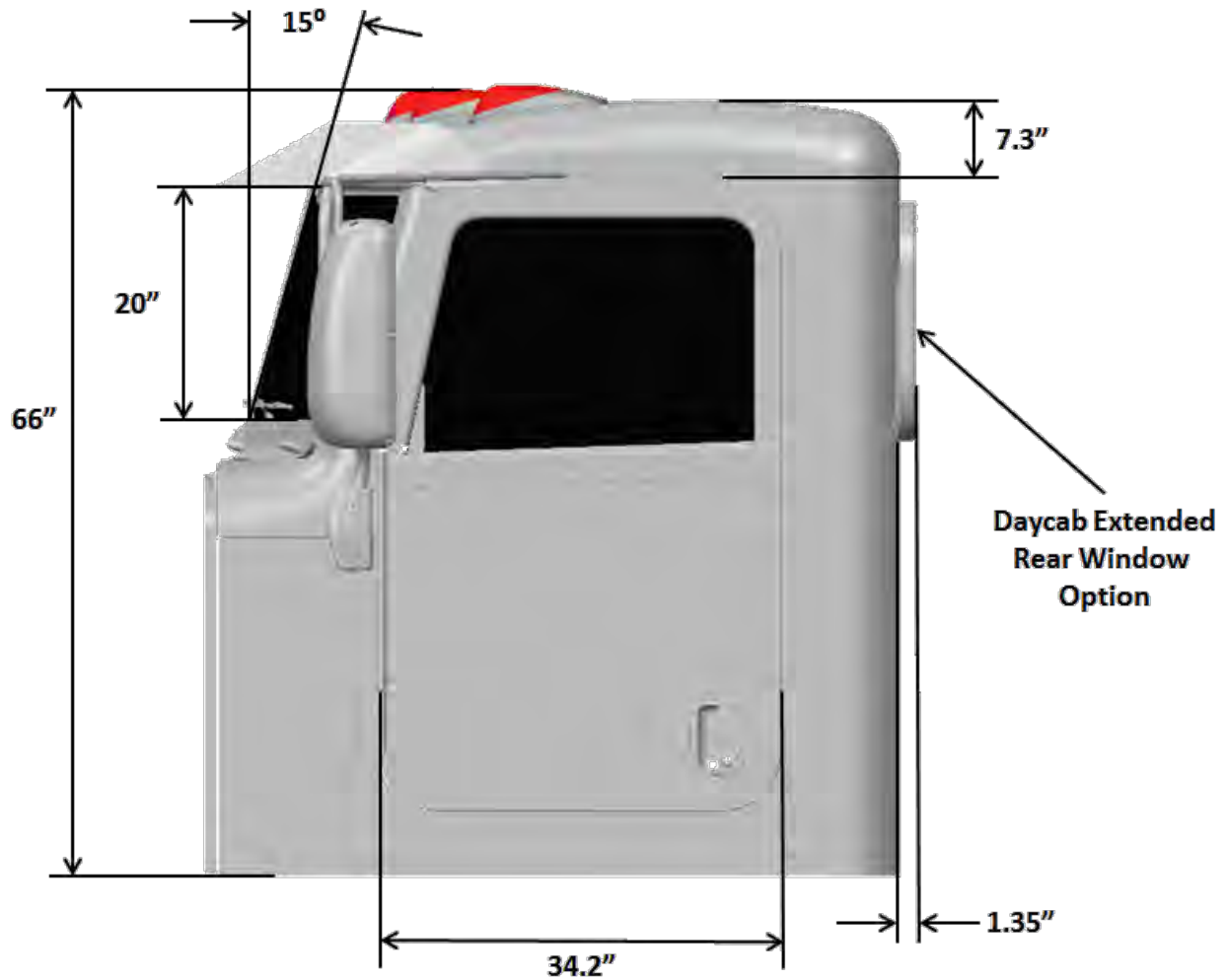
NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF 0.25" THICK BUMPER
- 3) DIMENSION FRONT OF BUMPER TO FRONT OF FRAME (BFF) IS 2.92"

FIGURE 3-4. Model 348, 337 (110" BBC) and 348, 337 (108" BBC) 337 Top, Front & LH View – Overall Dimensions

**CAB – 1.9m MEDIUM DUTY CAB FAMILY**

Models 348, 337 (110" BBC), 348 (108" BBC), 337, 330, 325



**FIGURE 3-5.** Cab Dimensions 1.9m Medium Duty Cab Family

ROOF FAIRING

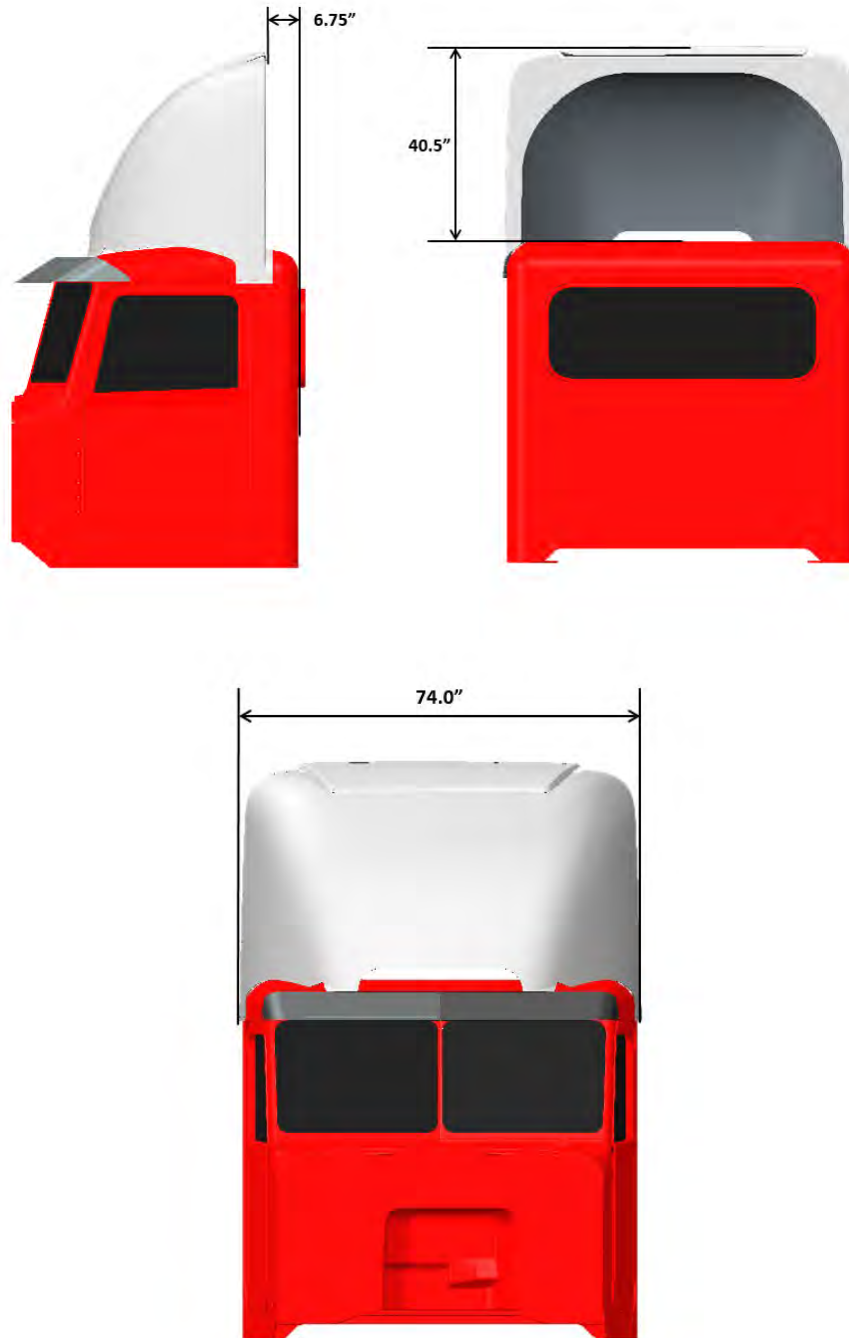


FIGURE 3-6. Roof Fairing Dimensions

REAR WINDOW

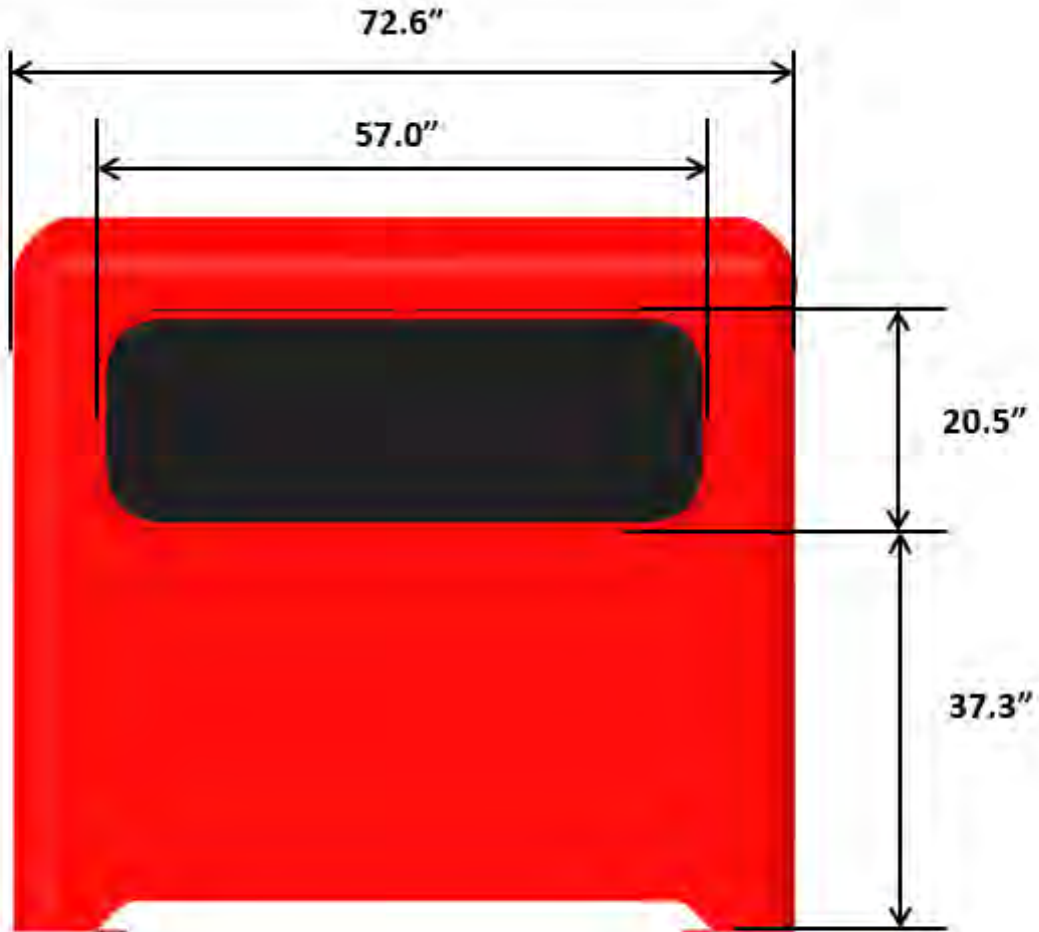


FIGURE 3-7. Rear Window Dimensions

ROOF BOW STRUCTURE

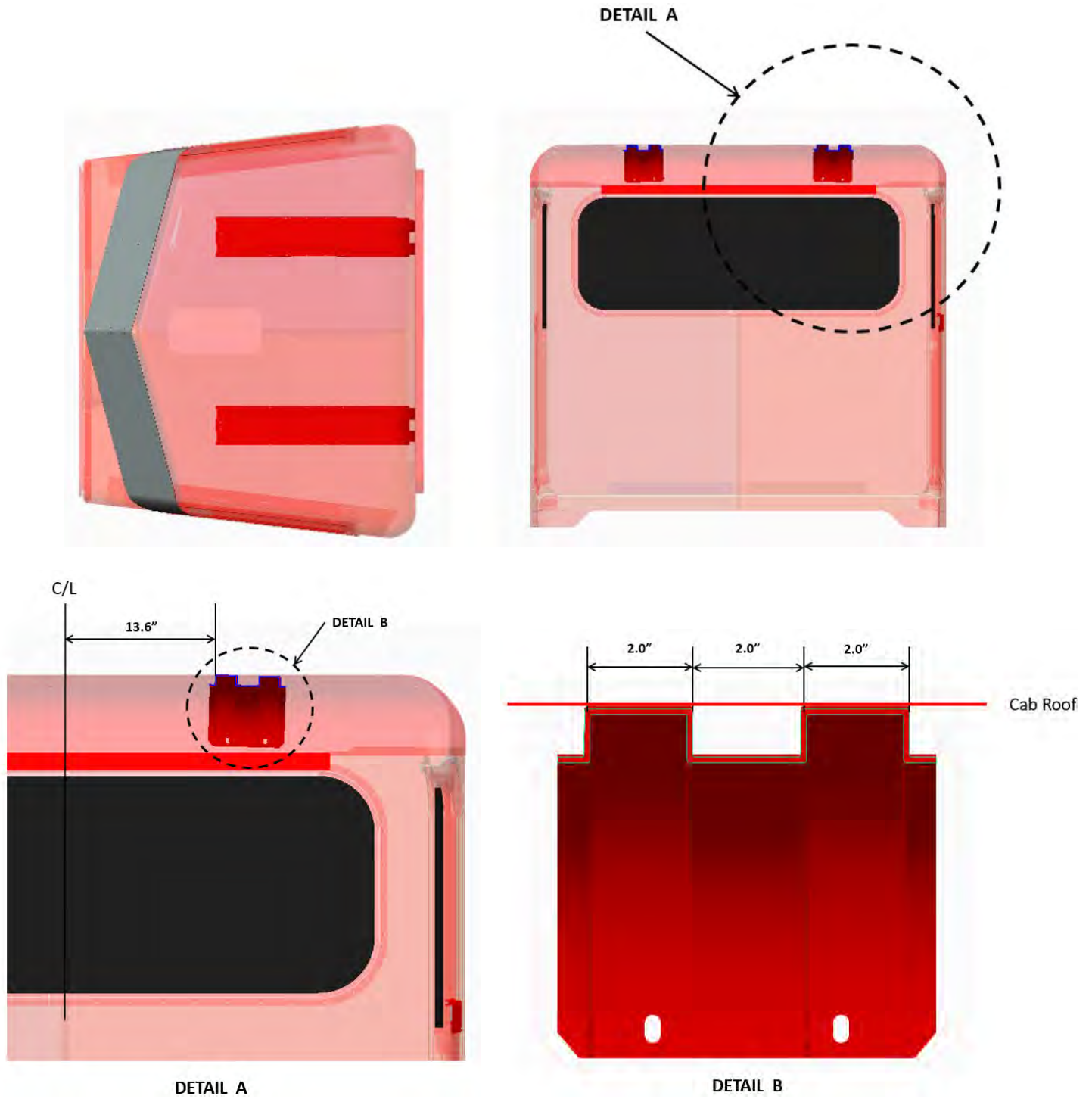


FIGURE 3-8. Roof Bow Structure

CABMATE CAB SUSPENSION

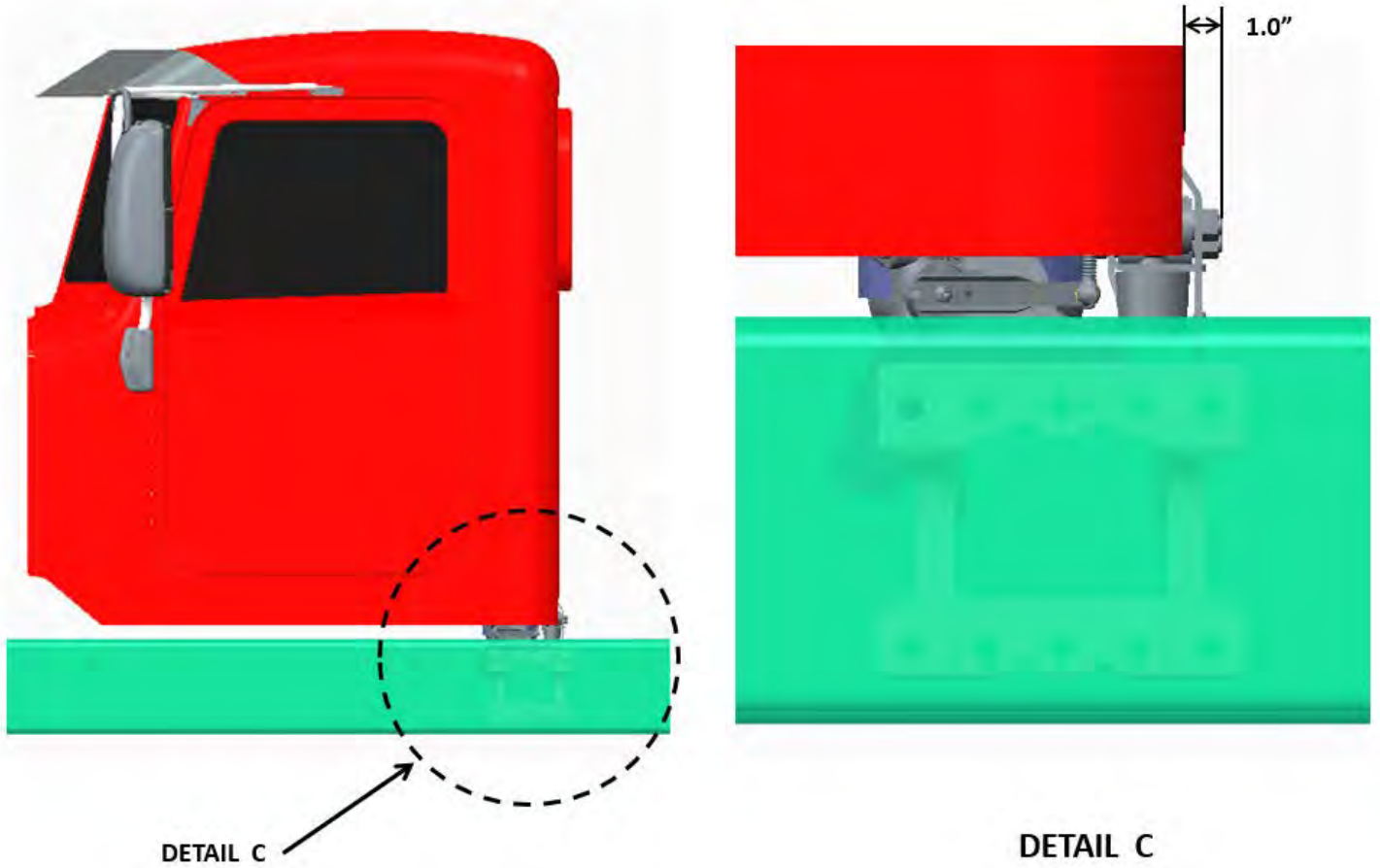


FIGURE 3-9. Cabmate Cab Suspension Dimensions



CAB STEP HEIGHT

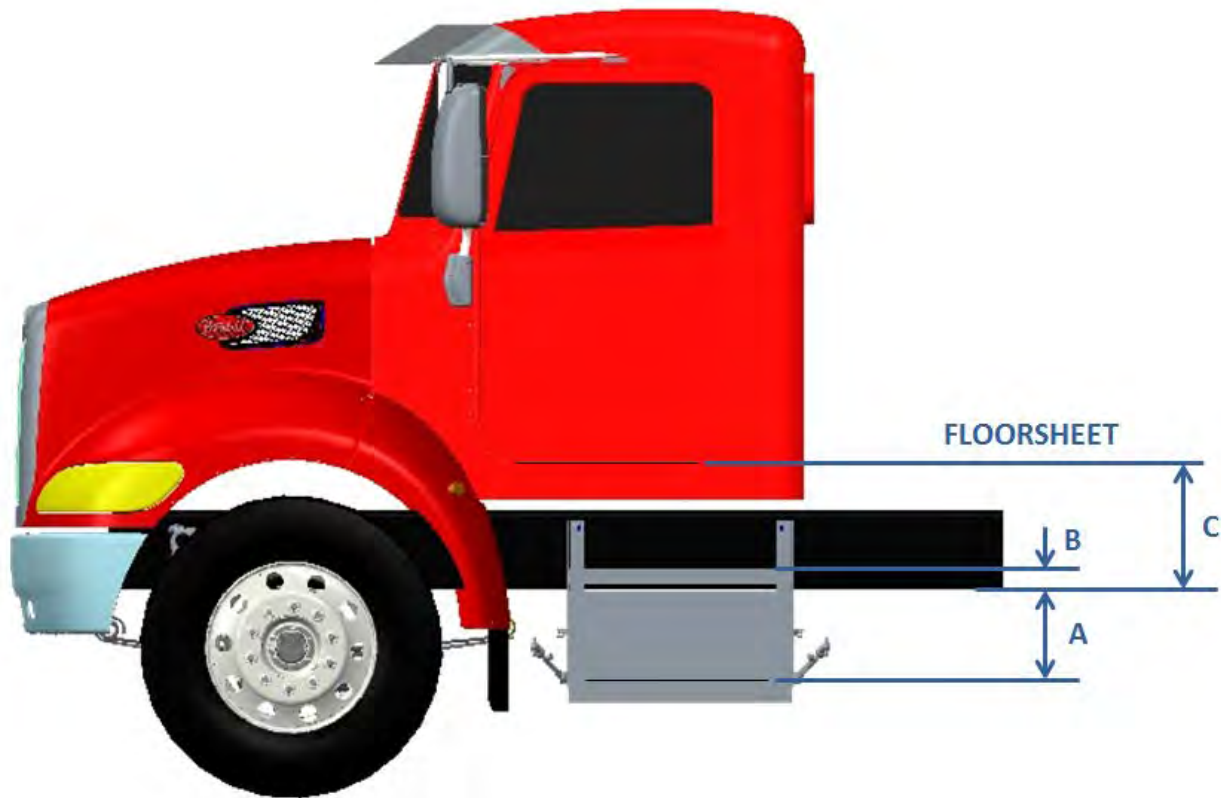


FIGURE 3-10. Cab Step Height Dimensions (Table 3-2)

Table 3-2. Cab Step Height

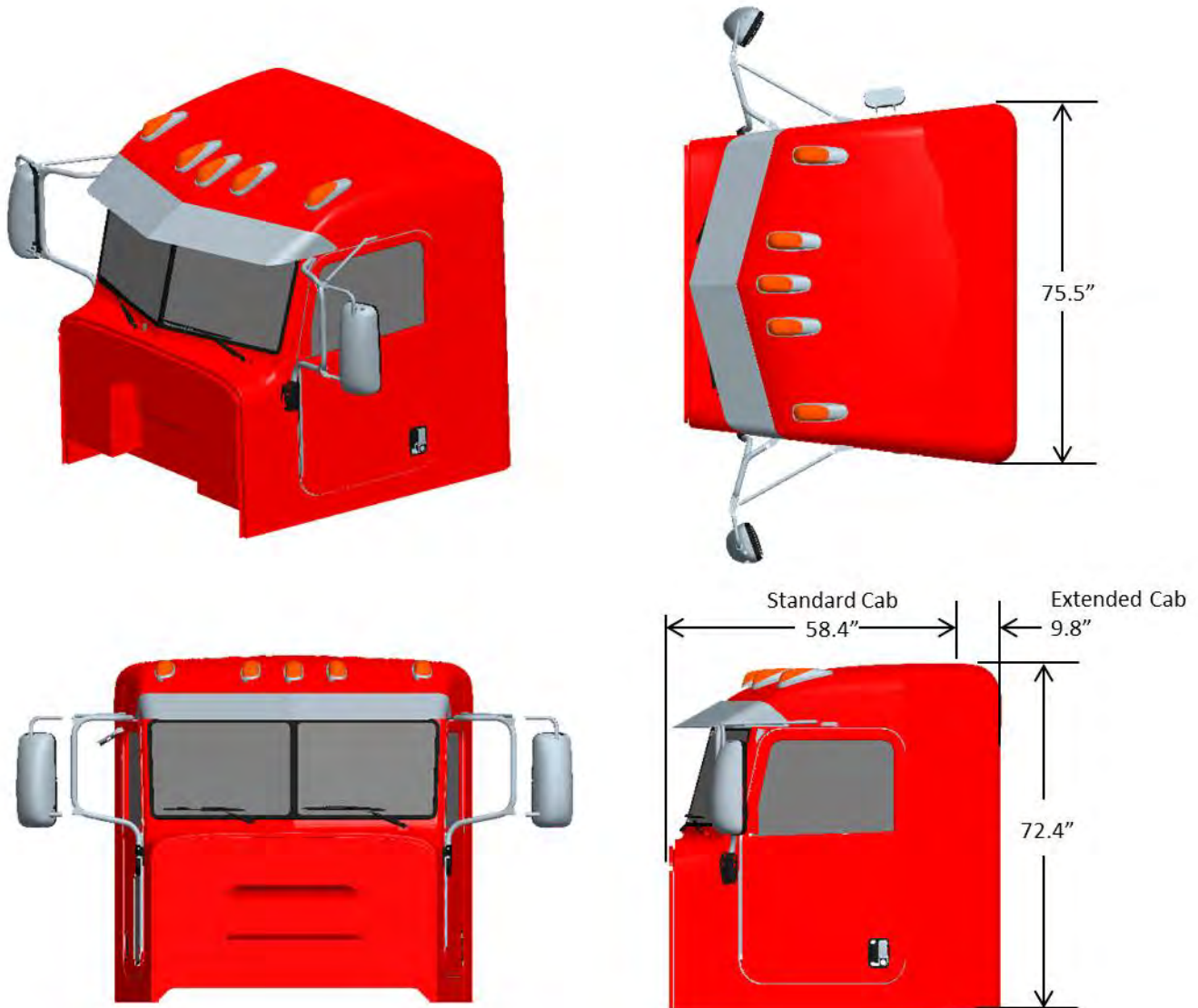
| Description (2)                | A (First Step) | B (Second Step) | C (Cab Floor) (1) |
|--------------------------------|----------------|-----------------|-------------------|
| Aluminum Battery Box           | 13.4"          | 2.75"           | 18.2"             |
| Steel Battery Box              | 10.7"          | 3.3"            | 18.2"             |
| Model 325 Battery Box          | 1"             | -               | 18.2"             |
| 23" Fuel Tank                  | 11.3"          | 6.7"            | 18.2"             |
| 26" Fuel Tank                  | 11.5"          | 4.4"            | 18.2"             |
| Rectangular Fuel Tank          | 8.6"           | 9.7"            | 18.2"             |
| RH UCAB Aftertreatment Box (3) | 10.5"          | 6"              | 18.2"             |

Notes

- 1.) Add 2.75" to the C Dimension for BBC 110" Hood or Raised Cab Option
- 2.) LH shown, RH Dimensions are equivalent
- 3.) Aftertreatment box is RH UCAB only

**EXTENDED CAB – 1.9m MEDIUM DUTY CAB FAMILY**

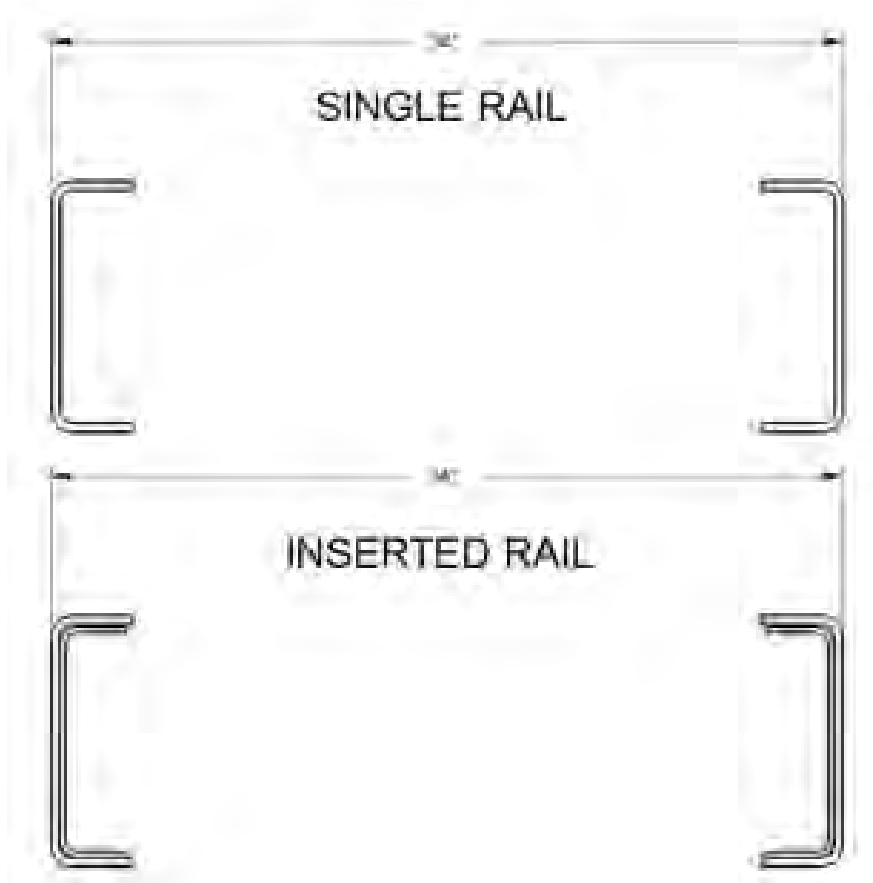
Models 348, 337 (110" BBC), 348 (108" BBC), 337, 330



**FIGURE 3-11. Extended Cab**

**FRAME RAILS**

Frame rail configurations are shown below. Frame height, flange and structural values can be found in the Body Mounting Section.



**FIGURE 3-12.** Frame Rail Configurations



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

**FRAME HEIGHT CHARTS**

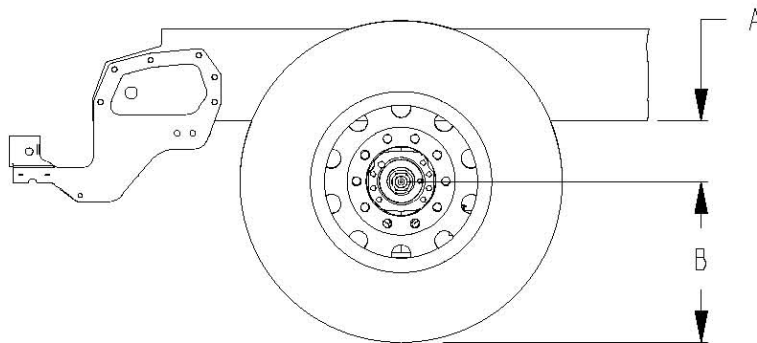
THE FOLLOWING FRAME HEIGHT CHARTS MAY BE USED FOR FINDING APPROXIMATE FRONT AND REAR FRAME HEIGHTS.

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.

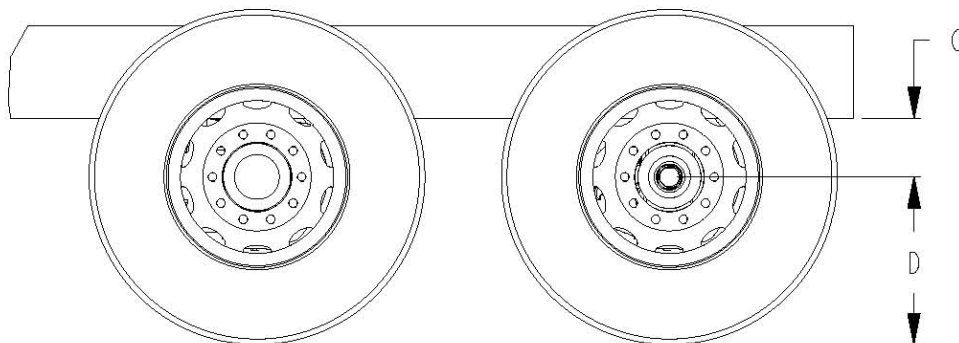
LOADED VALUES ARE QUOTES FOR REPRESENTATIVE LOADS AT THE GROUND FOR THE PARTICULAR SPRING AND AXLE COMBINATION, AND, AS SUCH, CAN VARY WITH LOADING VARIATIONS.

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 3-13. Frame Height**

**FRONT FRAME HEIGHTS "A"**

**TABLE 3-3.** Front Frame Height "A"

| <b>FRONT FRAME HEIGHT "A"</b>  |           |                       |                    |                    |                     |
|--------------------------------|-----------|-----------------------|--------------------|--------------------|---------------------|
| <b>330, 337 348 SUSPENSION</b> |           |                       |                    |                    |                     |
| <b>REAR SUSPENSION REF.</b>    |           |                       | <b>SPACER (mm)</b> | <b>LIGHT (in.)</b> | <b>LOADED (in.)</b> |
| 10,000 & 12,000 lbs.           | TAPERLEAF | 79kb, 21k @> 157 WB   | OMIT               | 6.7                | 6.1                 |
|                                |           | Low Air Leaf (single) | OMIT               | 6.7                | 6.1                 |
|                                |           | 79KB, 21K @< 157 WB   | 35                 | 8.1                | 7.5                 |
|                                |           | 79KB, 23K / 26K       | 49                 | 8.7                | 8.1                 |
|                                |           | 102, Air Trac         | 75                 | 9.7                | 9.1                 |
|                                |           | RT-403                | 75                 | 9.7                | 9.1                 |
| 14,600 lbs.                    | TAPERLEAF | 79kb, 21k @> 157 WB   | OMIT               | 8.2                | 6.4                 |
|                                |           | Low Air Leaf (single) | OMIT               | 8.2                | 6.4                 |
|                                |           | 79KB, 21K @< 157 WB   | 35                 | 9.6                | 7.8                 |
|                                |           | 79KB, 23K / 26K       | 49                 | 11.1               | 9.1                 |
|                                |           | 102, Air Trac         | 75                 | 12.1               | 10.2                |
|                                |           | RT-403                | 75                 | 12.1               | 10.2                |
| 20,000 lbs. (w/EFA20F4)        | TAPERLEAF | @16,000 lbs.          | OMIT               | 10.3               | 8.5                 |
|                                |           |                       | 30                 | 11.4               | 9.7                 |
|                                |           |                       | 40                 | 11.8               | 10.1                |
|                                |           |                       | 60                 | 12.6               | 10.9                |
|                                |           | @ 18,000 lbs.         | OMIT               | 11.5               | 9.7                 |
|                                |           |                       | 30                 | 13.0               | 10.9                |
|                                |           |                       | 40                 | 13.0               | 11.3                |
|                                |           |                       | 60                 | 13.8               | 12.1                |
|                                |           | @ 20,000 lbs.         | OMIT               | 11.5               | 9.5                 |
|                                |           |                       | 30                 | 13.0               | 10.6                |
|                                |           |                       | 40                 | 13.0               | 11.0                |
|                                |           |                       | 60                 | 13.8               | 11.8                |

**NOTES:**

- 1) Spacers are used by Engineering to obtain a level frame and are not options.
- 2) LIGHT or UNLADEN heights are calculated on the below assumptions
  - a. 12K or 14.6K springs assumes 8,000 lbs. load in LIGHT condition
  - b. 16K springs assumes 8,500 lbs. load in LIGHT condition
  - c. 18K - 20K springs assumes 9,000 lbs. load in LIGHT condition
- 3) "A" dimension shown is to bottom of frame rail. Add frame rail height dimension for frame height.

**REAR FRAME HEIGHTS "C"**

**TABLE 3-4.** Single Drive Rear Suspension Height "C"

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

**TABLE 3-5.** Tandem Peterbilt Rear Suspension Height "C"

| <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.   |                | 8.7                 | 8.5                 |
| LOW LOW AIR LEAF  | 40,000 lbs.   |                | 6.8                 | 6.5                 |
| AIR TRAC          | 40K-46K lbs.  |                | 11.4                | 11.0                |

**TABLE 3-6.** Tandem Neway Rear Suspension Height "C"

| <b>Suspension</b> | <b>Rating</b> | <b>Version</b> | <b>Light Height</b> | <b>Laden Height</b> |
|-------------------|---------------|----------------|---------------------|---------------------|
| NEWAY ADZ         | 46K lbs.      |                | 10.0                | 10.0                |

**TABLE 3-7. Tandem Reyco Rear Suspension Height "C"**

| Suspension          | Rating      | Version           | Light Height | Laden Height |
|---------------------|-------------|-------------------|--------------|--------------|
| REYCO 102 MULTILEAF | 40,000 lbs. | 1.75 saddle (STD) | 11.7         | 9.9          |
|                     |             | 1.38 saddle       | 10.2         | 8.3          |
|                     |             | 3.38 saddle       | 13.4         | 11.5         |
|                     | 44,000 lbs. | 1.75 saddle (STD) | 11.7         | 9.8          |
|                     |             | 1.38 saddle       | 11.5         | 9.7          |

**TABLE 3-8. Tandem Chalmers Rear Suspension Height "C"**

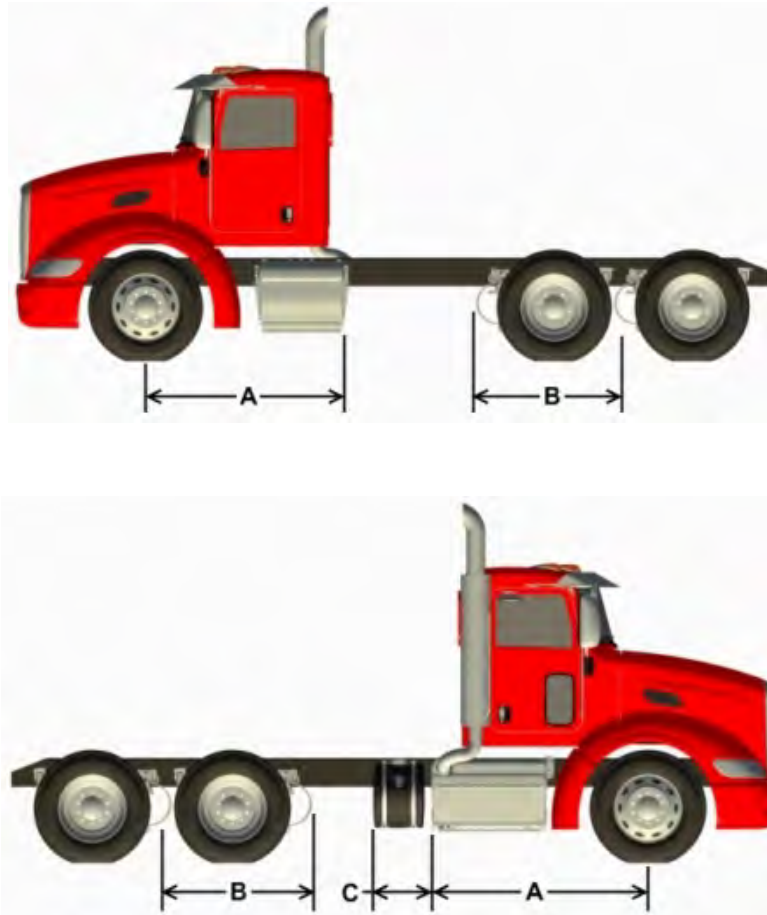
| Suspension   | Rating      | Version | Light Height | Laden Height <sup>1</sup> |
|--------------|-------------|---------|--------------|---------------------------|
| CHALMERS 854 | 40,000 lbs. | LOW     | 11.2         | 8.9                       |
|              |             | HIGH    | 12.4         | 10.2                      |
|              |             | X-HIGH  | 14.5         | 12.2                      |
|              |             | XX-HIGH | 17.2         | 14.9                      |
| CHALMERS 854 | 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                      |

**TABLE 3-9. Tandem Hendrickson Suspension Height "C"**

| Suspension | Rating      | Version             | Light Height | Laden Height |
|------------|-------------|---------------------|--------------|--------------|
| RT-403     | 40,000 lbs. | 6.00 saddle         | 9.9          | 8.9          |
|            |             | 7.19 saddle (std.)  | 11.2         | 10.1         |
| HMX        | 40,000 lbs. | 16.5 saddle (low)   | 10.6         | 9.5          |
|            |             | 18.5 saddle (std.)  | 12.6         | 11.5         |
| HMX        | 46,000 lbs. | 16.5 saddle (low)   | 10.6         | 9.5          |
|            |             | 18.5 saddle (std.)  | 12.6         | 11.5         |
| RS-463     | 46,000 lbs. | 12.25 saddle        | 9.7          | 8.9          |
|            |             | 14.00 saddle (std.) | 11.5         | 10.6         |
|            |             | 15.25 saddle        | 12.7         | 11.9         |
| RT-463     | 46,000 lbs. | 6.00 saddle         | 11.3         | 10.5         |
|            |             | 7.2 saddle (std.)   | 13           | 11.4         |
|            |             | 11.00 saddle        | 16.3         | 15.2         |

**FRAME SPACE REQUIREMENTS**

To ensure adequate space for fuel tanks, ladder steps, additional tool/battery boxes, pusher axles and other frame mounted components; the amount of available space must be calculated by using the formula below. Contact Applications Engineering for configurations not shown in this section. Examples are shown at the end of this section.



**FIGURE 3-14. Frame Space**

**BASIC FORMULA: BOC Frame Space = Wheelbase - Dimension A - Dimension C - Dimension B**

Dimension "A" (shown in charts on following pages) is the minimum clearance measured from the centerline of the front axle to the back of the under cab component (DPF/SCR exhaust, fuel tank, battery box, tool box, etc). Dimension "C" is the amount of space from the rear of the under cab component to the back of the DEF tank (can be on LH or RH rail). Dimension "B" is the amount of required suspension and quarter fender clearance from the rear axle centerline to clear rail for a given suspension.



**FRAME SPACE DIMENSION "B"**

**TABLE 3-10. Rear Suspension Dimension "B"**

| FRAME SPACE REQUIREMENTS                              |      |              |       |
|---|------|--------------|-------|
| DIMENSION "B" IN INCHES (52" Axle Spacing on Tandems) |      |              |       |
| REAR SUSPENSION                                       | "B"  | OVERHANG (1) | NOTES |
| AIR LEAF  | 53.0 | 53.0         | 2     |
| LOW/LOW LOW AIR LEAF                                  | 62.4 | 53.0         |       |
| LOW AIR LEAF SINGLE                                   | 36.5 | 27.0         |       |
| AIR TRAC SINGLE                                       | 27.0 | 27.0         | 3     |
| AIR TRAC TANDEM                                       | 53.0 | 53.0         | 3     |
| FLEX AIR  | 59.0 | 53.7         | 7     |
| CHALMERS 800 (54" SPACING)                            | 49.0 | 52.0         | 4     |
| HENDRICKSON HLM / AL                                  | 26.6 | N/A          | 6     |
| HENDRICKSON HLR2                                      | 30.5 | N/A          | 6     |
| HENDRICKSON HMX, HN                                   | 53.0 | 54.0         |       |
| HENDRICKSON R/RS/RT/RTE                               | 53.0 | 53.0         | 3     |
| HENDRICKSON SC20                                      | 25.6 | 15.0         | 6     |
| HENDRICKSON SC8/10/13, FX, FXO, SCO                   | 23.6 | 13.8         | 5, 6  |
| NEWAY ADZ (54" SPACING)                               | 61.0 | 58.3         |       |
| REYCO 102 SINGLE                                      | 30.0 | 25.8         |       |
| REYCO 102AR SINGLE                                    | 30.0 | 31.0         |       |
| REYCO 102 TANDEM                                      | 56.0 | 52.7         |       |
| REYCO 79KB  | 30.1 | 32.2         |       |
| WATSON-CHALIN AL2200                                  | 26.6 | 22.2         | 6     |
| WATSON-CHALIN SL0893SSR                               | 27.6 | 11.8         | 5, 6  |
| WATSON-CHALIN SL1093SSR                               | 27.6 | 11.8         | 6     |
| WATSON-CHALIN SL1190SSR                               | 26.0 | 12.8         | 6     |
| WATSON-CHALIN SL2065                                  | 27.6 | 14.4         | 6     |

**NOTES:**

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

**FRAME SPACE DIMENSION "A" AND "C"**

**Model: 325, 330, 337 and 348-108"**

FAX to BOC = 69.8"

Note: All dimensions are in inches

**Round UC Fuel Tanks w/Round DEF Tanks  
330, 337, 348-108"**

| RH Side |                 |           |                  |      |
|---------|-----------------|-----------|------------------|------|
| Side    | Front Axle      | Tank Dia. | Capacity Gallons | "A"  |
| RH      | w/o 20k F. Axle | 23"       | 50               | 66.1 |
|         |                 |           | 70               | 78.5 |
|         |                 |           | 100              | 96.8 |
|         |                 | 26"       | 50               | 64.2 |
|         |                 |           | 50 LH U/C DEF    | 58.7 |
|         |                 |           | 60               | 66.1 |
|         | w/ 20k F. Axle  | 23"       | 70               | 67.9 |
|         |                 |           | 90               | 80.3 |
|         |                 |           | 50               | 66.1 |
|         |                 |           | 50 LH U/C DEF    | 78.5 |
|         |                 | 26"       | 70               | 96.8 |
|         |                 |           | 100              | 64.2 |
|         |                 |           | 50               | 62.7 |
|         |                 |           | 60               | 66.1 |
|         |                 |           | 70               | 67.9 |
|         |                 |           | 90               | 80.3 |

| LH Side |                       |                |                  |      |         |        |      |
|---------|-----------------------|----------------|------------------|------|---------|--------|------|
| Side    | Front Axle            | Tank Dia.      | Capacity Gallons | "A"  | DEF "C" |        |      |
|         |                       |                |                  |      | Small   | Medium |      |
| LH      | w/o 20k F. Axle       | 23"            | 50               | 71.4 | 14.8    | 22.6   |      |
|         |                       |                | 70               | 78.5 | 13.6    | 21.4   |      |
|         |                       |                | 100              | 96.8 | 13.0    | 22.8   |      |
|         |                       | 26"            | 50               | 64.2 | 14.0    | 21.4   |      |
|         |                       |                | 50 LH U/C DEF    | 58.7 | 12.1    |        |      |
|         |                       |                | 60               | 68.5 | 13.7    | 25.1   |      |
|         |                       |                | 70               | 73.2 | 12.9    | 22.8   |      |
|         |                       |                | 90               | 80.3 | 13.7    | 21.6   |      |
|         |                       |                | 50               | 64.2 | 14.0    | 21.9   |      |
|         |                       | 20K W/RHUC Exh | 23"              | 50   | 71.4    | 14.8   | 22.6 |
|         |                       |                |                  | 70   | 78.5    | 13.6   | 21.4 |
|         |                       |                |                  | 100  | 96.8    | 13.0   | 22.8 |
|         | 26"                   |                | 50               | 64.2 | 14.0    | 21.9   |      |
|         |                       |                | 50 LH U/C DEF    | 58.7 | 12.1    |        |      |
|         |                       |                | 60               | 68.5 | 13.7    | 21.6   |      |
|         |                       |                | 70               | 73.2 | 12.9    | 22.8   |      |
|         |                       |                | 90               | 78.3 | 15.7    | 23.5   |      |
|         |                       |                | 50               | 64.2 | 14.0    | 21.9   |      |
|         | 20K W/Under Frame Exh |                | 23"              | 50   | 71.4    | 14.8   | 22.6 |
|         |                       |                |                  | 70   | 78.5    | 13.6   | 21.4 |
|         |                       |                |                  | 100  | 96.8    | 13.0   | 22.8 |
|         |                       | 26"            | 50               | 64.2 | 14.0    | 21.9   |      |
|         |                       |                | 50 LH U/C DEF    | 62.7 | 12.1    |        |      |
|         |                       |                | 60               | 68.5 | 13.7    | 21.6   |      |
| 70      |                       |                | 73.2             | 12.9 | 22.8    |        |      |
| 90      |                       |                | 78.3             | 15.7 | 23.5    |        |      |
| 50      |                       |                | 64.2             | 14.0 | 21.9    |        |      |

| Round Fuel & DEF Tanks  |      |            |          |
|---|------|------------|----------|
| 330, 337, 348 Models w/ PX7/PX9 Engines   |      |            | "C"      |
|   | "A"  | Small      | Medium   |
| LH Rail, UC DEF Tank, 26", 50 Gallon Fuel Tank, W/O Under frame exhaust (Clear BOC) | 58.7 | 12.1       |          |
| LH, Bat/Tool Box UC, Round Tks, Small DEF   |      | A+C = 88.1 | A+C = 94 |

| Rectangular Fuel & DEF Tanks |          |                                     |      |       |            |
|------------------------------|----------|-------------------------------------|------|-------|------------|
| Model                        | Engine   | Description                         | "A"  | "A+C" | "C" LH BOC |
| 325                          | PX7      | Fuel Tank & DEF Tank LH U/C         |      | 69.7  |            |
| 325                          | PX7      | Fuel Tank U/C W/O DEF Tank U/C      | 67.3 |       | 20.7       |
| 330, 337, 348                | PX7, PX9 | Fuel Tank & DEF Tank LH U/C W/O 20K |      | 69.7  |            |
| 330, 337, 348                | PX7, PX9 | Fuel Tank U/C W/O 20K               | 63.7 |       | 24.3       |
| 348                          | PX9      | Fuel Tank U/C W/20K                 | 67.9 |       | 20.1       |

CONTINUED FRAME SPACE DIMENSION "A" AND "C" FOR MODEL 325, 330, 337, 348-108"

| Under Cab Component        |          |                       |      | RH DEF Tank "C" |        |             |
|----------------------------|----------|-----------------------|------|-----------------|--------|-------------|
| Under Cab Box              |          | Description           | "A"  | Small           | Medium | Rectangular |
| RHUC DPF/SCR - LHP         |          | W/O 20K Front Axle    | 69.0 | 19.6            | 28.9   | 19.4        |
| RHUC DPF/SCR - MHP         |          | W/O 20K Front Axle    | 70.7 | 23.7            | 29.2   | 17.7        |
| RHUC DPF/SCR - HHP         |          | W/O 20K Front Axle    | 74.5 | 20.0            | 29.4   | 17.9        |
| RHUC DPF/SCR - MHP         |          | 20K W/O LH U/C DEF    | 72.7 | 21.8            | 27.2   | 15.7        |
| RHUC DPF/SCR - HHP         |          | 20K W/O LH U/C DEF    | 76.4 | 18.0            | 27.4   | 15.9        |
| RHUC DPF/SCR - MHP         |          | 20K W/ LH U/C DEF     | 70.7 |                 |        |             |
| RHUC DPF/SCR - HHP         |          | 20K W/ LH U/C DEF     | 74.5 |                 |        |             |
|                            |          |                       |      | LH DEF Tank "C" |        |             |
| Batt/Tool Box under cab    | Aluminum | W/O 20K Front Axle    | 68.2 | 19.9            | 25.8   | 19.8        |
| Batt/Tool Box under cab    | Steel    | W/O 20K Front Axle    | 66.0 | 22.0            | 27.9   | 21.9        |
| LH Batt/Tool Box under cab | Aluminum | 20K W/ RHUC Exh       | 68.2 | 19.9            | 25.8   | 19.8        |
| LH Batt/Tool Box under cab | Steel    | 20K W/ RHUC Exh       | 68.6 | 19.4            | 25.3   | 19.3        |
| Batt/Tool Box under cab    | Aluminum | 20K W/Under Frame Exh | 70.8 | 17.3            | 23.2   | 17.2        |
| Batt/Tool Box under cab    | Steel    | 20K W/Under Frame Exh | 66.0 | 22.0            | 27.9   | 21.9        |

Open Frame Space = Wheelbase - (A + B + C)

- 1) Find the Under Cab Component "A" applicable to your spec for either RH or LH rail.
- 2) Find the total fuel capacity of the vehicle to determine the DEF tank size used.
- 3) Find the DEF tank dimension "C" dependent on U/C tanks, DPF/SCR position or bat/tool boxes
- 4) Note that the "B" dimension is the rear suspension clearance.
- 5) If you want to find BOC Protrusion Subtract the A (or A+C) dimension from 69.8" (front axle to BOC dimension)

Notes:

- 1) DEF tanks not available on RH rail with Under Frame exhaust.

**Model: 348-110"**

FAX to BOC = 72.2"

Note: All dimensions are in inches

**Round UC Fuel Tanks w/Round DEF Tanks**

| RH Side |                              |           |                  |      | LH Side |                              |               |                  |      |         |        |
|---------|------------------------------|-----------|------------------|------|---------|------------------------------|---------------|------------------|------|---------|--------|
| Side    | Front Axle                   | Tank Dia. | Capacity Gallons | "A"  | Side    | Front Axle                   | Tank Dia.     | Capacity Gallons | "A"  | DEF "C" |        |
|         |                              |           |                  |      |         |                              |               |                  |      | Small   | Medium |
| RH      | W/O 20k Front Axle and REPTO | 23"       | 50               | 66.4 | LH      | W/O 20k Front Axle and REPTO | 23"           | 50               | 66.4 | 14.2    | 29.5   |
|         |                              |           | 70               | 78.7 |         |                              |               | 11.9             | 21.2 |         |        |
|         |                              |           | 100              | 96.8 |         |                              |               | 13.4             | 22.8 |         |        |
|         |                              | 26"       | 50               | 64.6 |         |                              | 50            | 64.6             | 12.1 | 23.4    |        |
|         |                              |           | 50 LH U/C DEF    | 60.7 |         |                              | 50 LH U/C DEF | 60.7             | 12.5 |         |        |
|         |                              |           | 60               | 66.1 |         |                              | 60            | 66.1             | 14.6 | 25.9    |        |
|         |                              |           | 60 LH U/C DEF    | 66.1 |         |                              | 60 LH U/C DEF | 64.1             | 12.6 |         |        |
|         | 70                           | 67.9      | 70               | 67.9 |         | 16.7                         | 26.1          |                  |      |         |        |
|         | 90                           | 77.4      | 90               | 77.4 |         | 13.2                         | 22.5          |                  |      |         |        |
|         | W/20k Front Axle and REPTO   | 23"       | 50               | 72.0 |         | 50                           | 72.0          | 14.6             | 20.1 |         |        |
|         |                              |           | 70               | 78.7 |         | 70                           | 78.7          | 11.9             | 21.2 |         |        |
|         |                              |           | 100              | 96.8 |         | 100                          | 96.8          | 13.4             | 21.8 |         |        |
|         |                              | 26"       | 50               | 64.6 |         | 50                           | 64.6          | 12.1             | 19.5 |         |        |
|         |                              |           | 60               | 68.1 |         | 60                           | 68.1          | 16.5             | 20.0 |         |        |
| 70      |                              |           | 71.4             | 70   | 71.4    | 13.2                         | 20.6          |                  |      |         |        |
| 90      |                              |           | 78.1             | 90   | 78.1    | 12.4                         | 21.7          |                  |      |         |        |

| Under Cab Component  |  |            |       |        |             |  |
|----------------------|--|------------|-------|--------|-------------|--|
| Under Cab Component  | Description                                      | "A"        | "C"   |        |             |  |
|                      |  |            | Small | Medium | Rectangular |  |
| RHUC DPF/SCR - MHP   | W/O 20K Front Axle                               | 70.7       | 23.7  | 17.7   | 29.2        |  |
| RHUC DPF/SCR - HHP   | W/O 20K Front Axle                               | 74.5       | 20.0  | 17.9   | 31.3        |  |
| RHUC DPF/SCR - MHP   | 20K W/ LH U/C DEF                                | 70.7       |       |        |             |  |
| RHUC DPF/SCR - HHP   | 20K W/ LH U/C DEF                                | 74.5       |       |        |             |  |
| RHUC DPF/SCR - MHP   | 20K W/O LH U/C DEF                               | 72.7       | 21.8  | 15.7   | 27.2        |  |
| RHUC DPF/SCR - HHP   | 20K W/O LH U/C DEF                               | 76.4       | 18.0  | 15.9   | 29.4        |  |
| LH U/C Batt/Tool Box | Aluminum   | 70.6       | 15.9  | 15.8   | 94.0        |  |
| LH U/C Batt/Tool Box | Steel  | 68.5       | 16.1  | 16.0   | 94.0        |  |
| RH U/C Batt/Tool Box | Aluminum   | 70.6       |       |        |             |  |
| RH U/C Batt/Tool Box | Steel  | 68.5       |       |        |             |  |
| Rectangular Fuel     | Fuel Tank & DEF Tank LH U/C (Clear BOC)          | A+C = 69.7 |       |        |             |  |
| Rectangular Fuel     | Fuel Tank LH U/C Repto & 20K with LH BOC DEF     | 69.6       | 18.5  | 18.4   | 24.4        |  |
| Rectangular Fuel     | Fuel Tank LH U/C W/O Repto & 20K with LH BOC DEF | 67.6       | 20.5  | 20.3   | 26.3        |  |
| Rectangular Fuel     | Fuel Tank RH U/C Repto & 20K                     | 69.6       |       |        |             |  |
| Rectangular Fuel     | Fuel Tank RH U/C W/O Repto & 20K                 | 67.6       |       |        |             |  |

Open Frame Space = Wheelbase - (A + B + C)

- 1) Find the Under Cab Component "A" applicable to your spec for either RH or LH rail.
- 2) Find the total fuel capacity of the vehicle to determine the DEF tank size used.
- 3) Find the DEF tank dimension "C" dependent on U/C tanks, DPF/SCR position or bat/tool boxes
- 4) Note that the "B" dimension is the rear suspension clearance.
- 5) If you want to find BOC Protrusion Subtract the A (or A+C) dimension from 72.2" (front axle to BOC dimension)

Notes:

- 1) DEF tanks not available on RH rail with Under Frame exhaust.

2017 MD EXHAUST CONFIGURATIONS

EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB  
 (Reference option code 3365270)

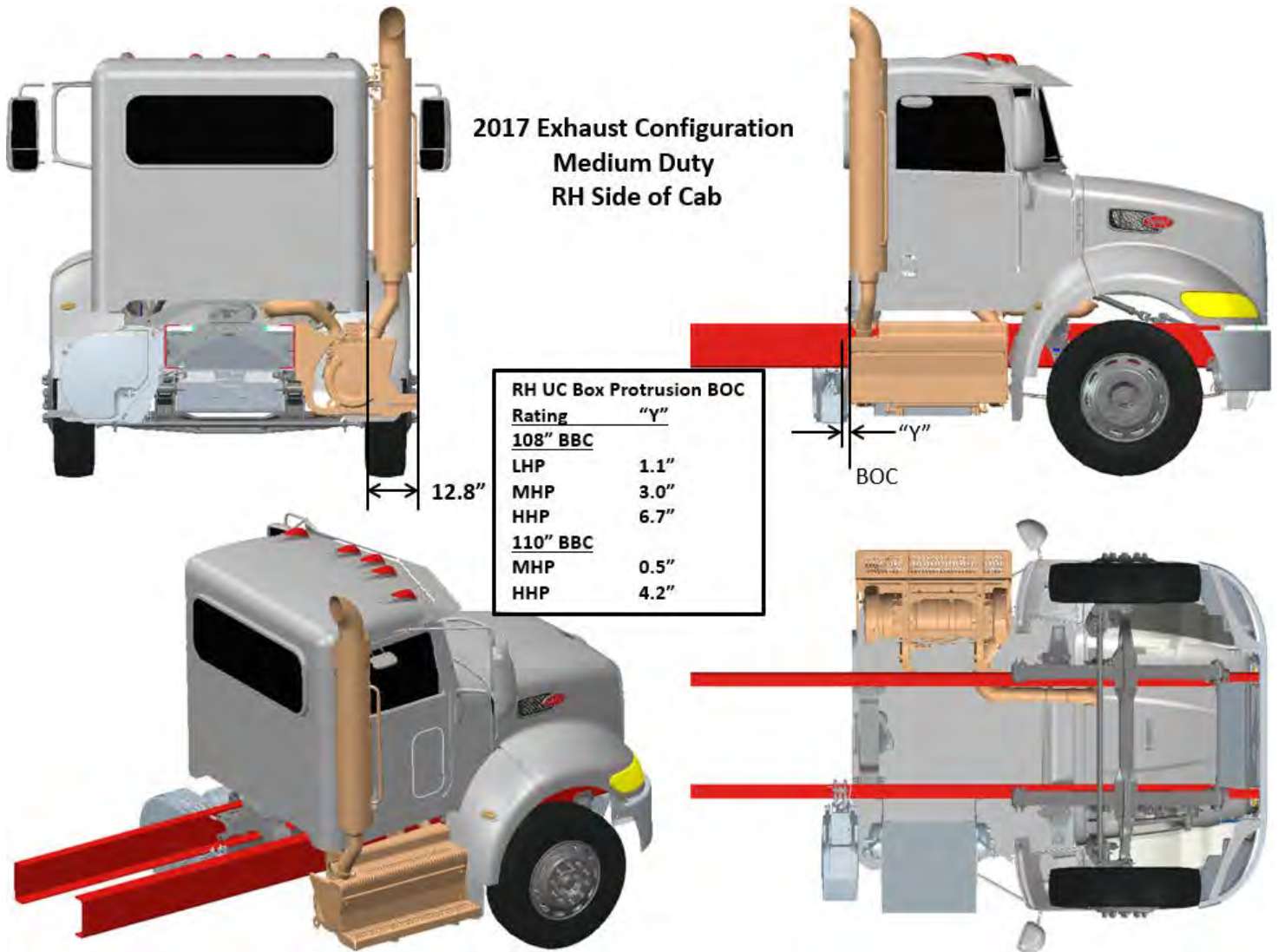
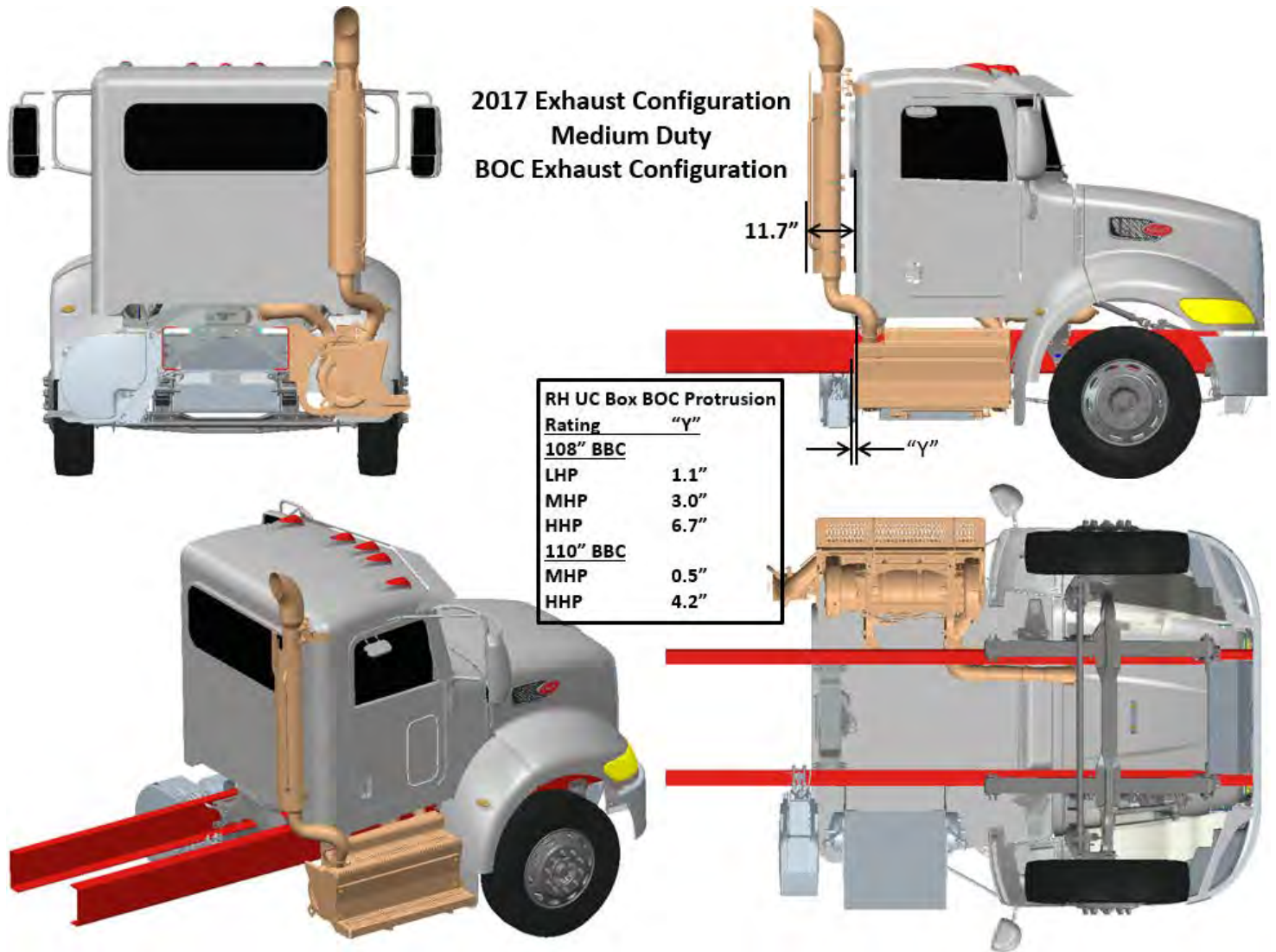


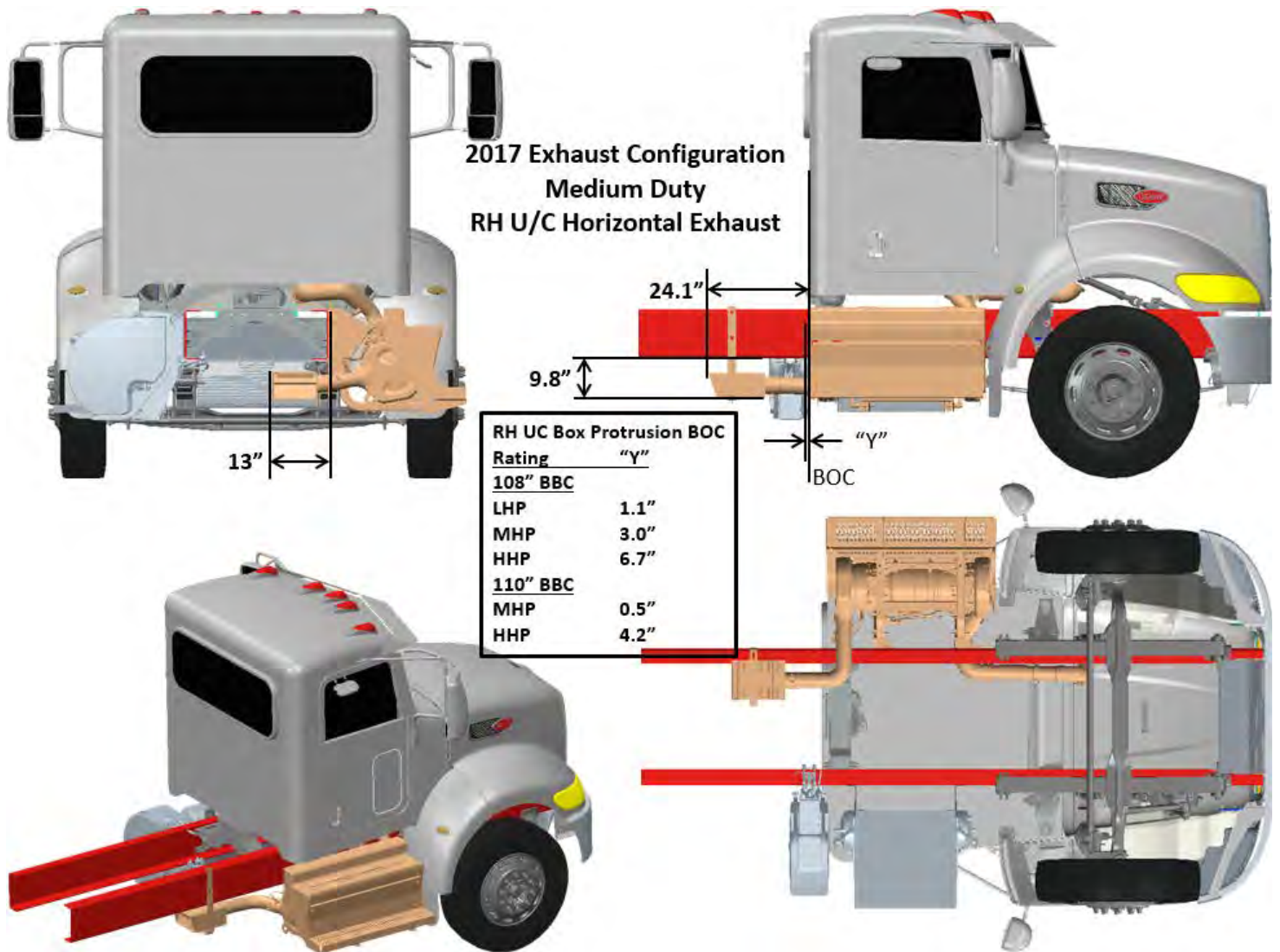
FIGURE 3-16. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB**  
 (Reference option code 3365250)



**FIGURE 3-17.** Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB**  
 (Reference option code 3365280)



**FIGURE 3-18.** Exhaust Single RH Horizontal DPF/SCR RH Under Cab

EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME  
 (Reference option code 3365290)

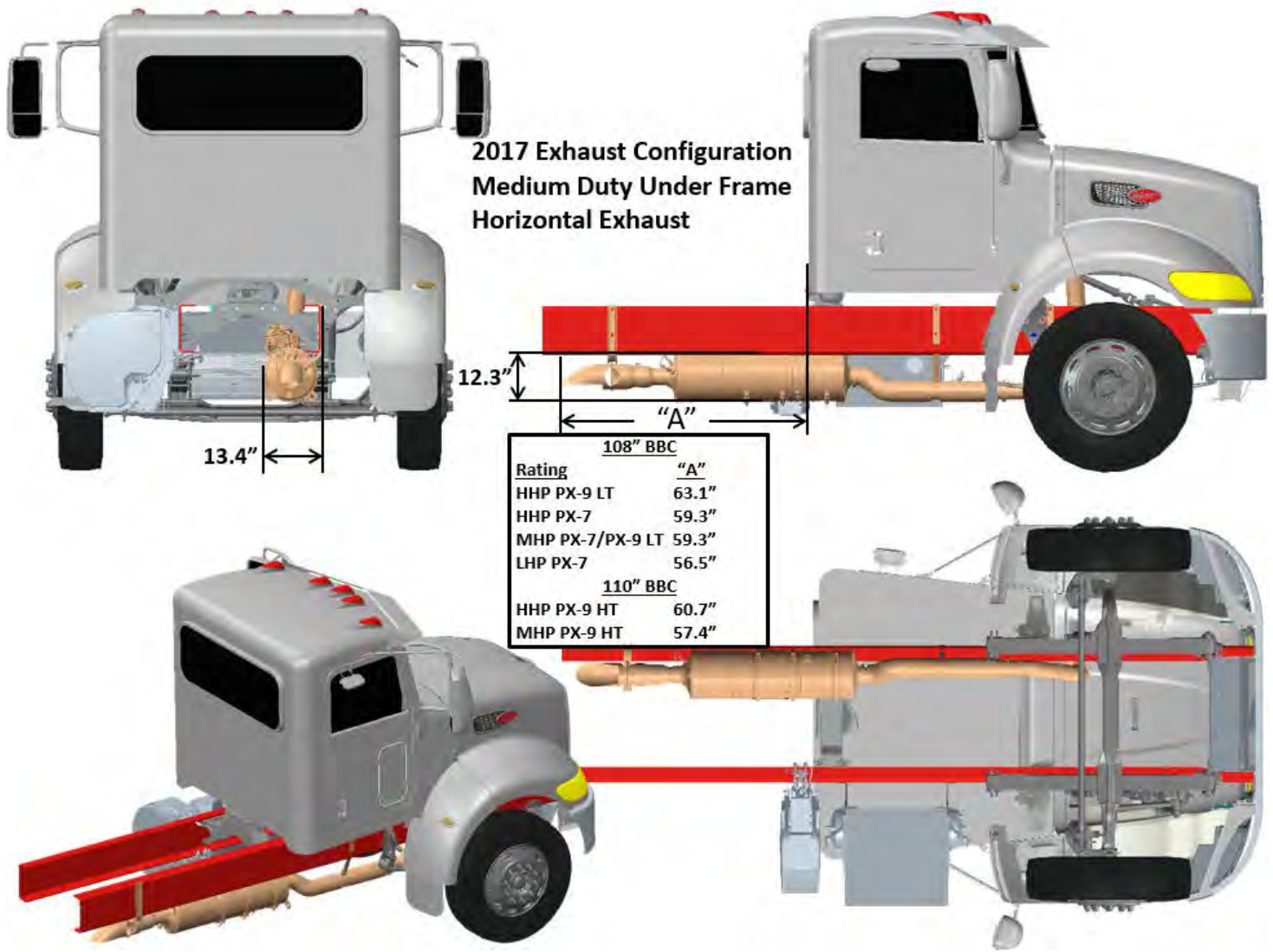
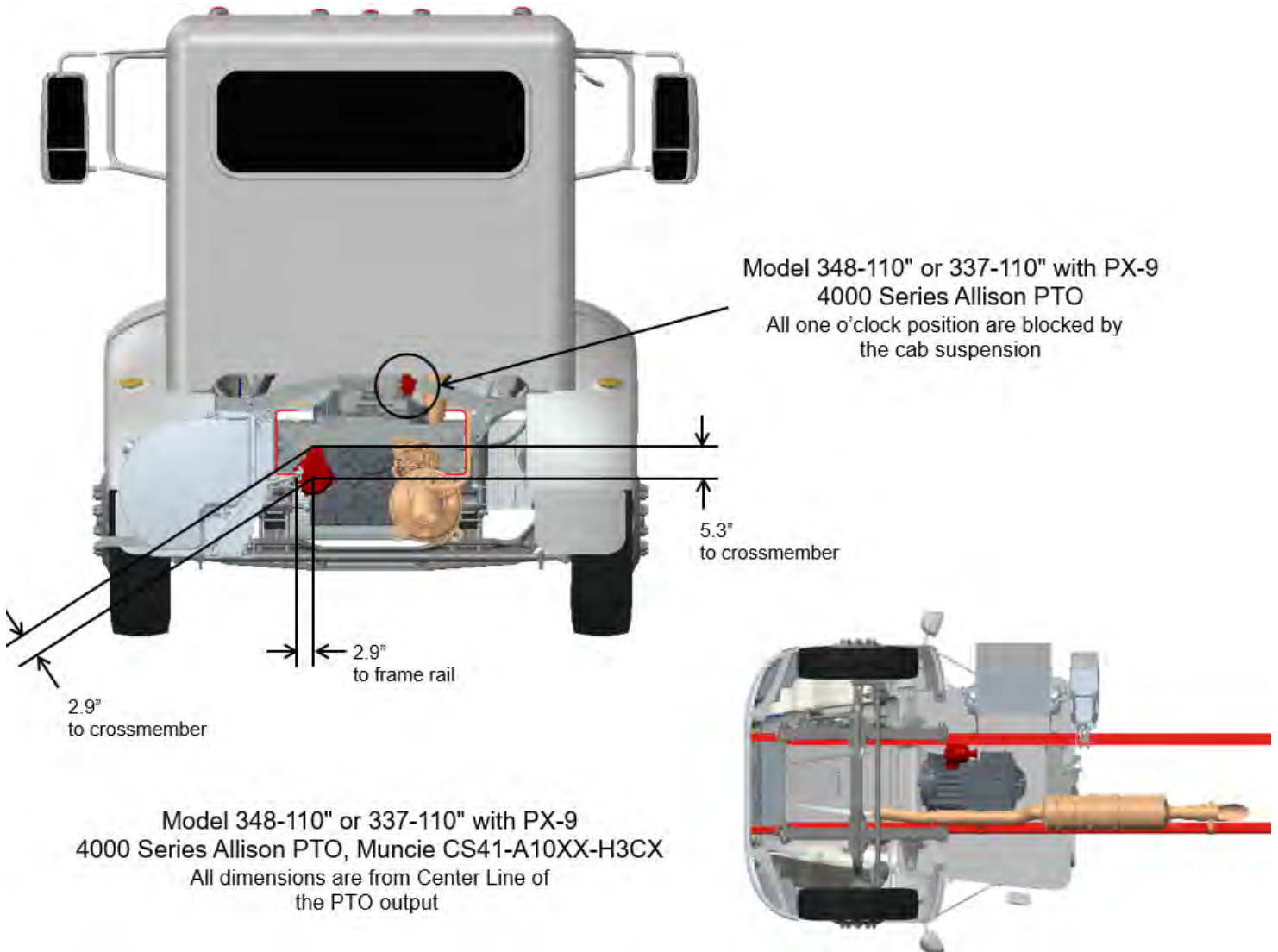


FIGURE 3-19. Exhaust Single RH Horizontal DPF/SCR RH Under Frame



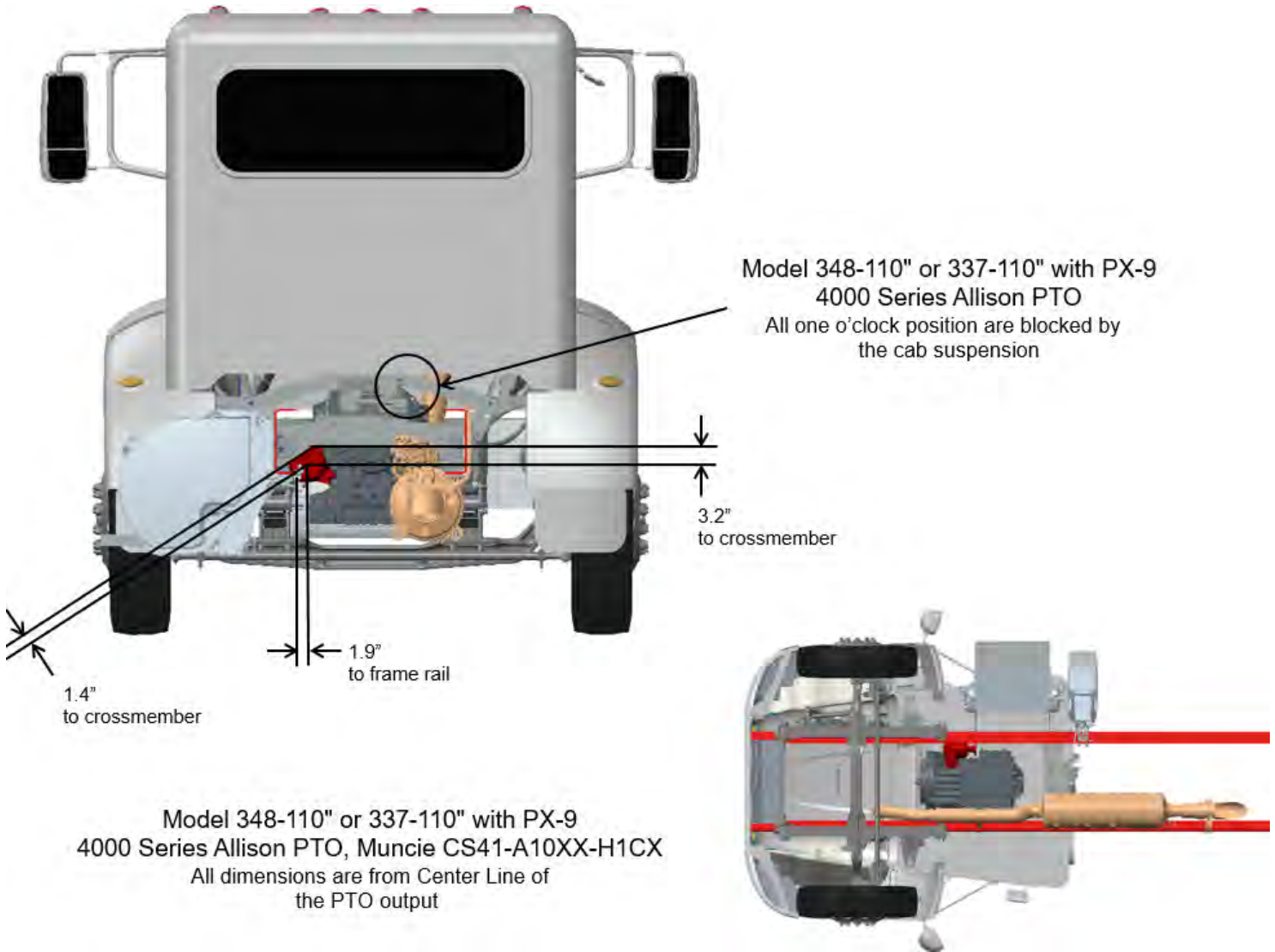
**PTO LAYOUTS**

**PTO LAYOUT MODEL 348-110" or 337-110", PX-9, 4000 SERIES ALLISON**



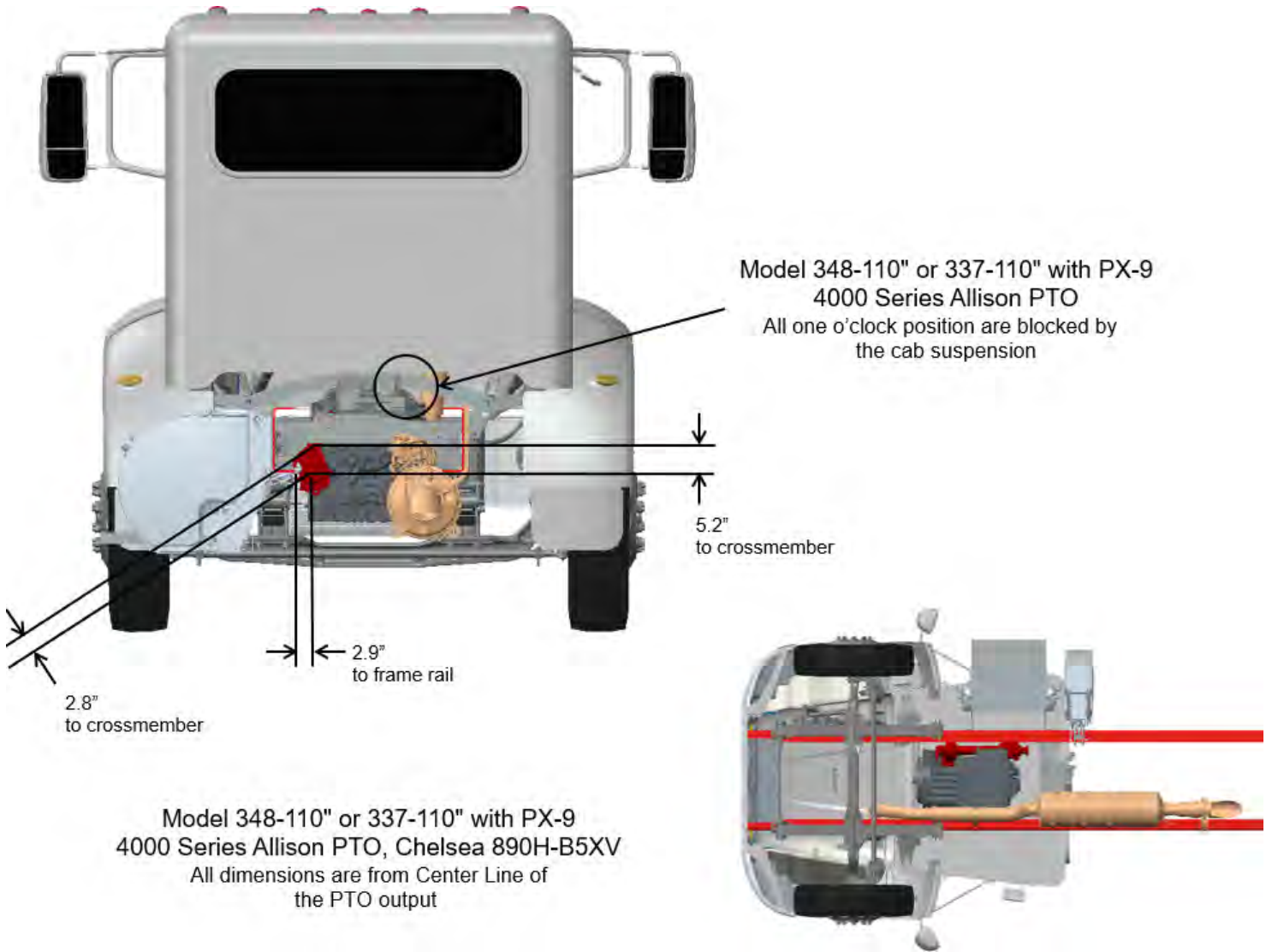
**Figure 3-20.** Model 348-110" or 337-110", PX-9 4000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 4000 SERIES ALLISON**



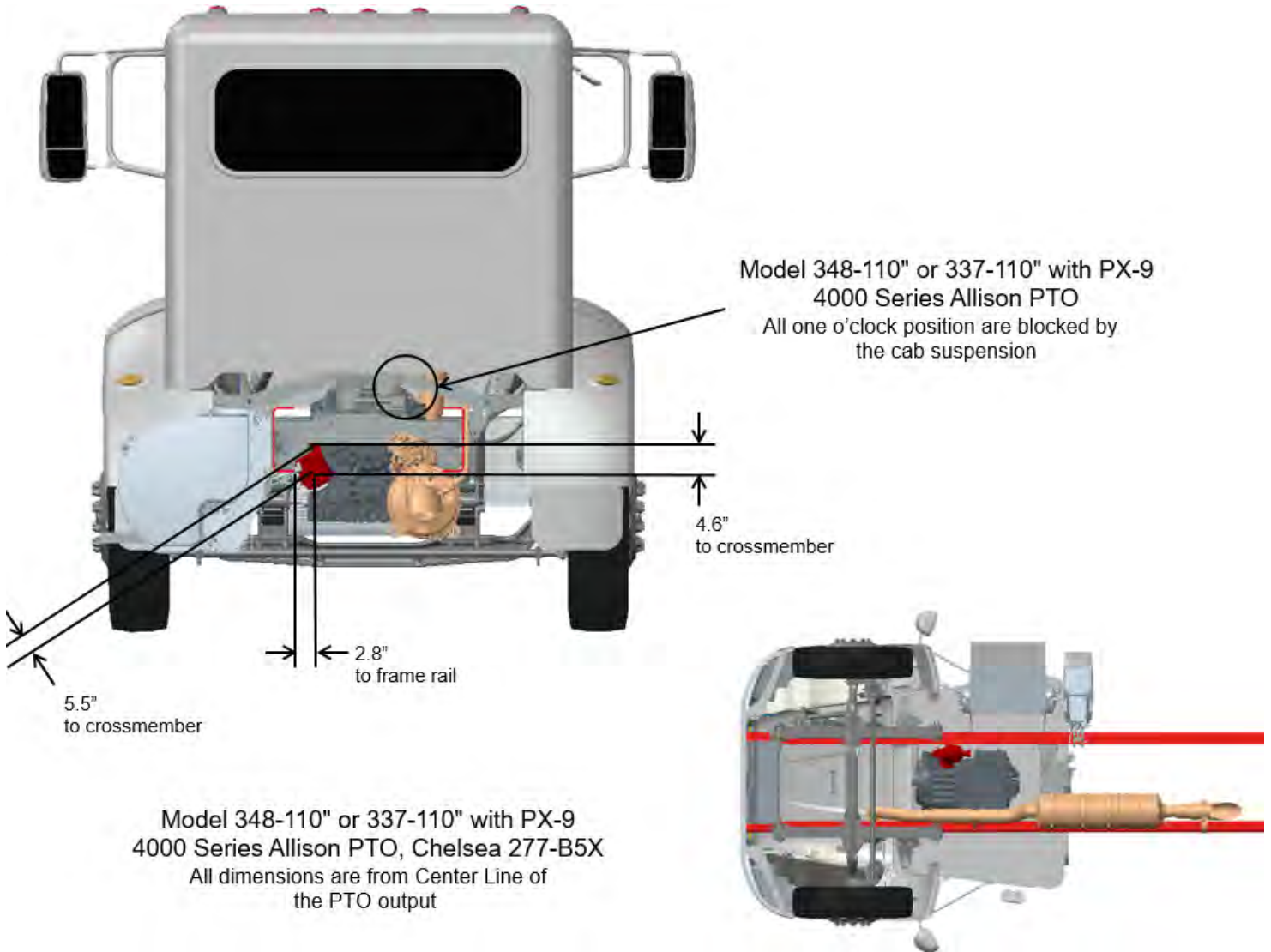
**Figure 3-21.** Model 348-110" or 337-110", PX-9 4000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 4000 SERIES ALLISON**



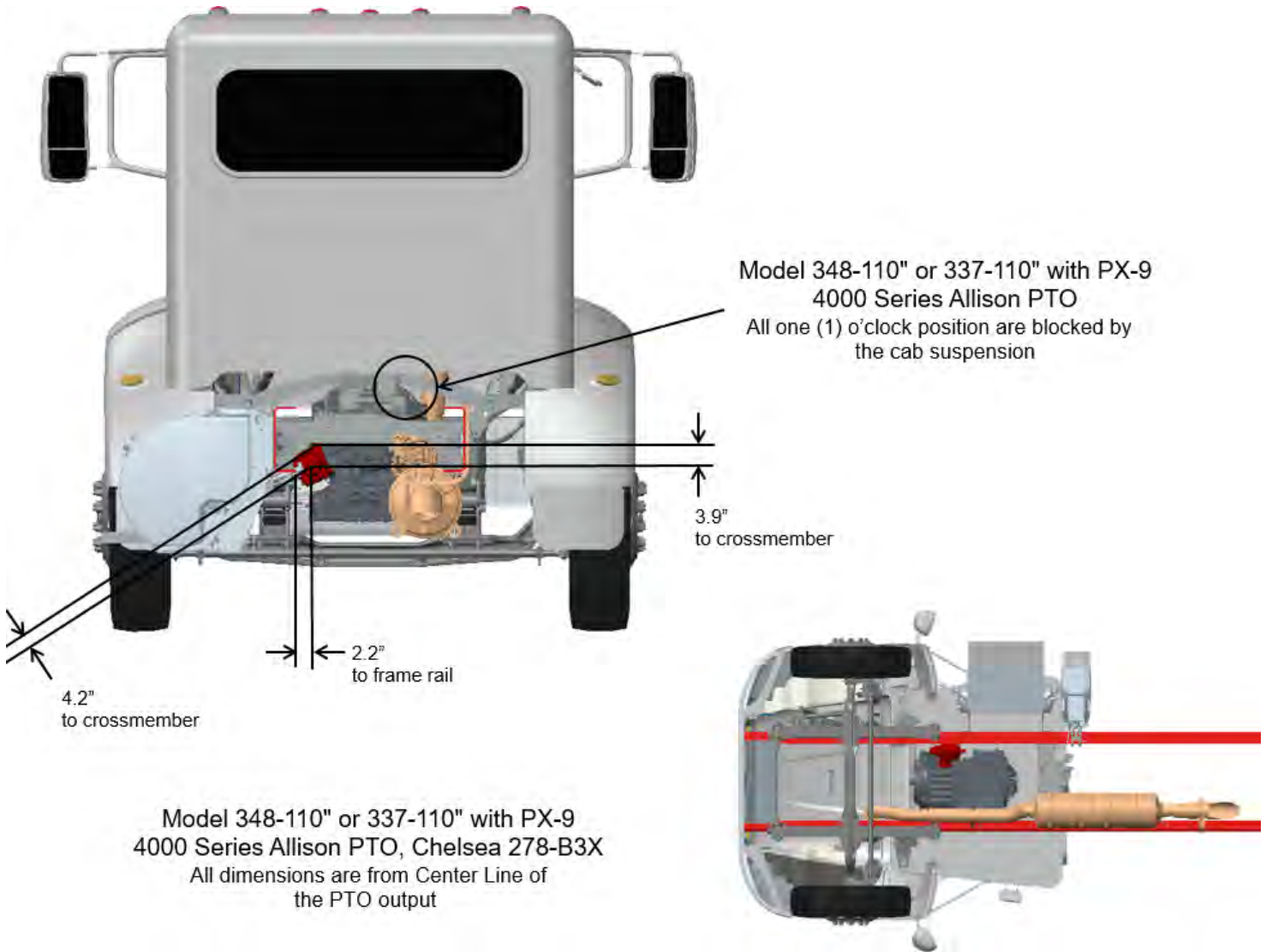
**Figure 3-22.** Model 348-110" or 337-110", PX-9 4000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 4000 SERIES ALLISON**



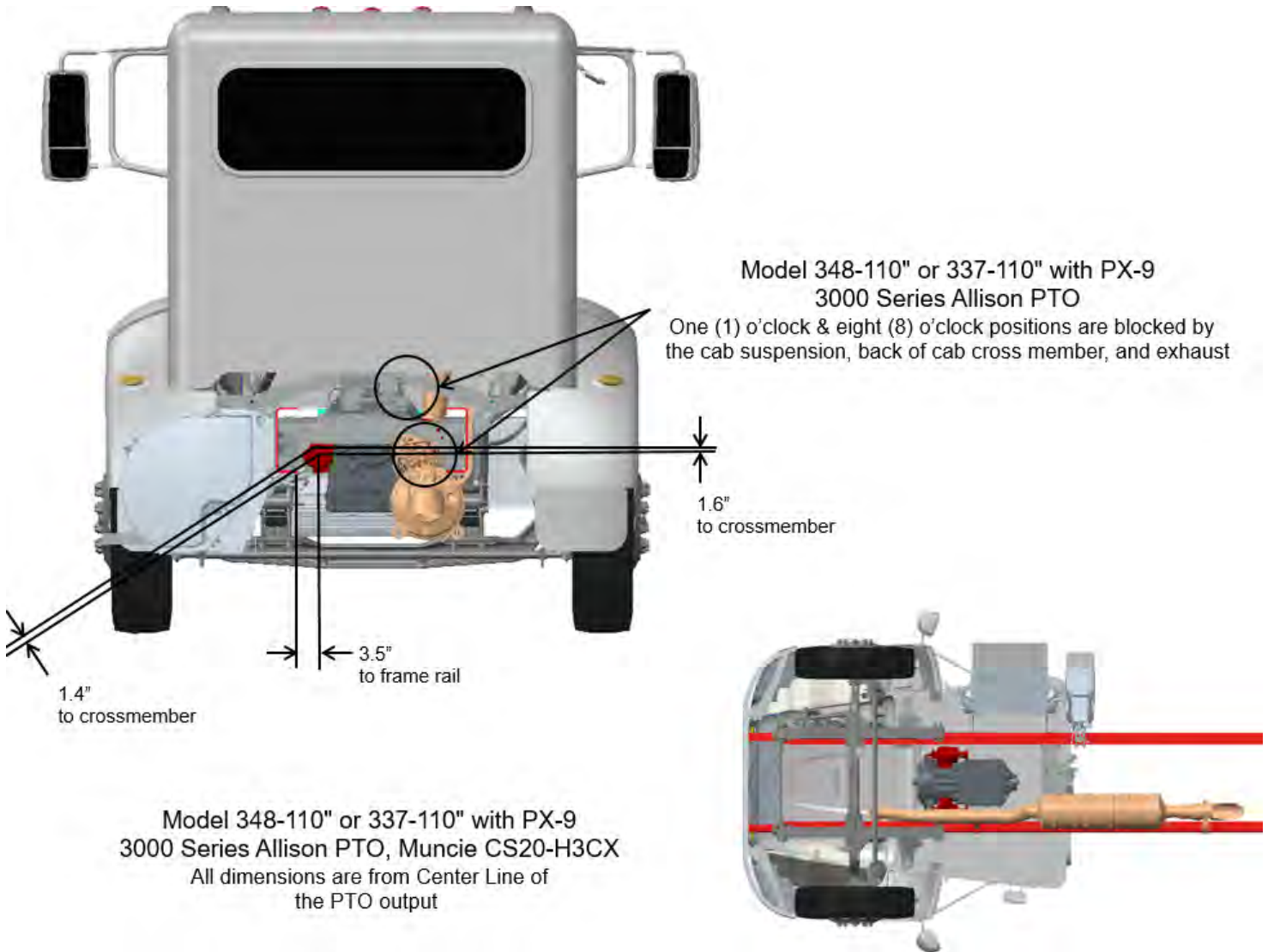
**Figure 3-23.** Model 348-110" or 337-110", PX-9 4000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 4000 SERIES ALLISON**



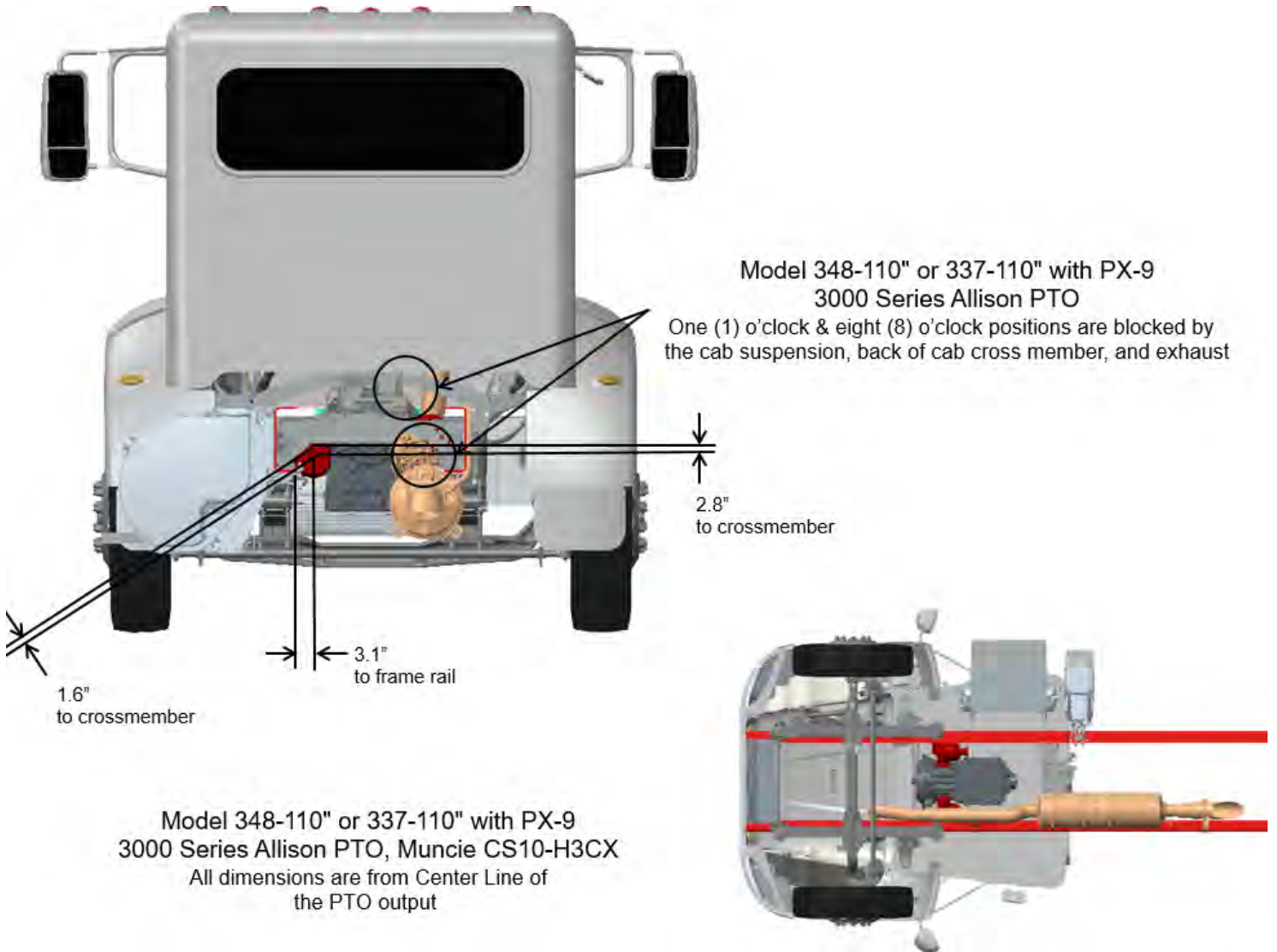
**Figure 3-24.** Model 348-110" or 337-110", PX-9 4000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



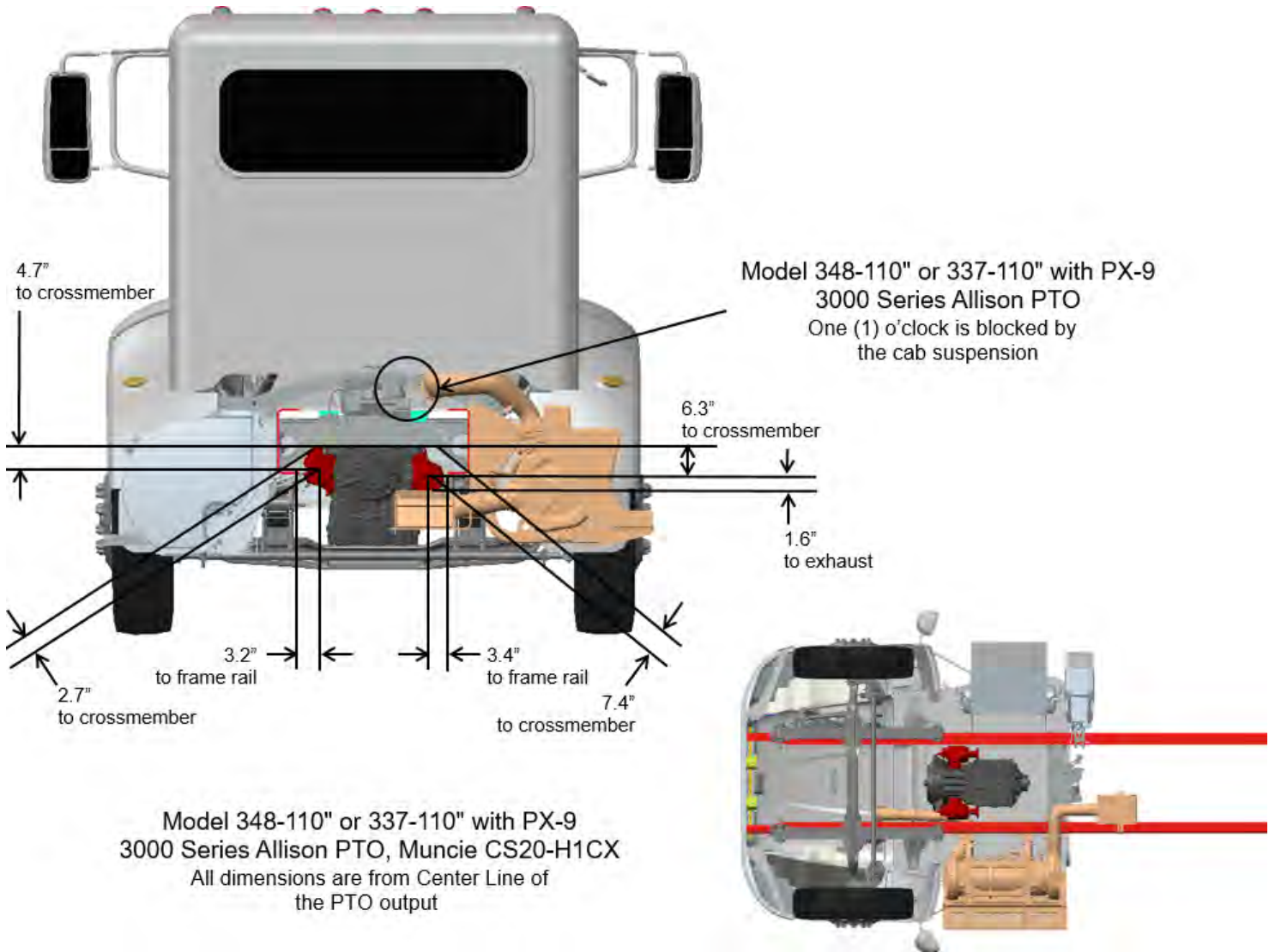
**Figure 3-25.** Model 348-110" or 337-110", PX-9 3000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



**Figure 3-26.** Model 348-110" or 337-110", PX-9 3000 Series Allison

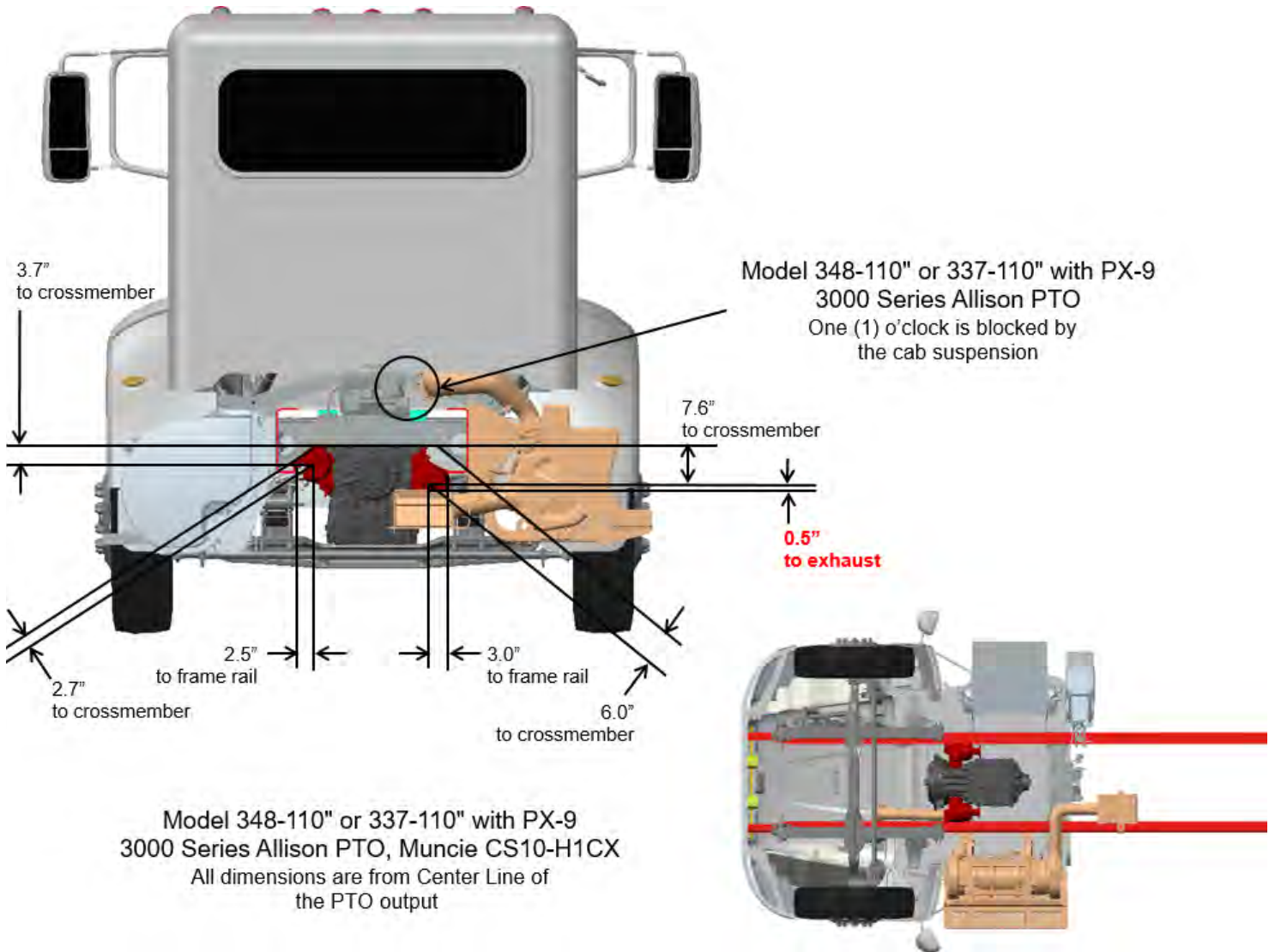
**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



**Figure 3-27.** Model 348-110" or 337-110", PX-9 3000 Series Allison

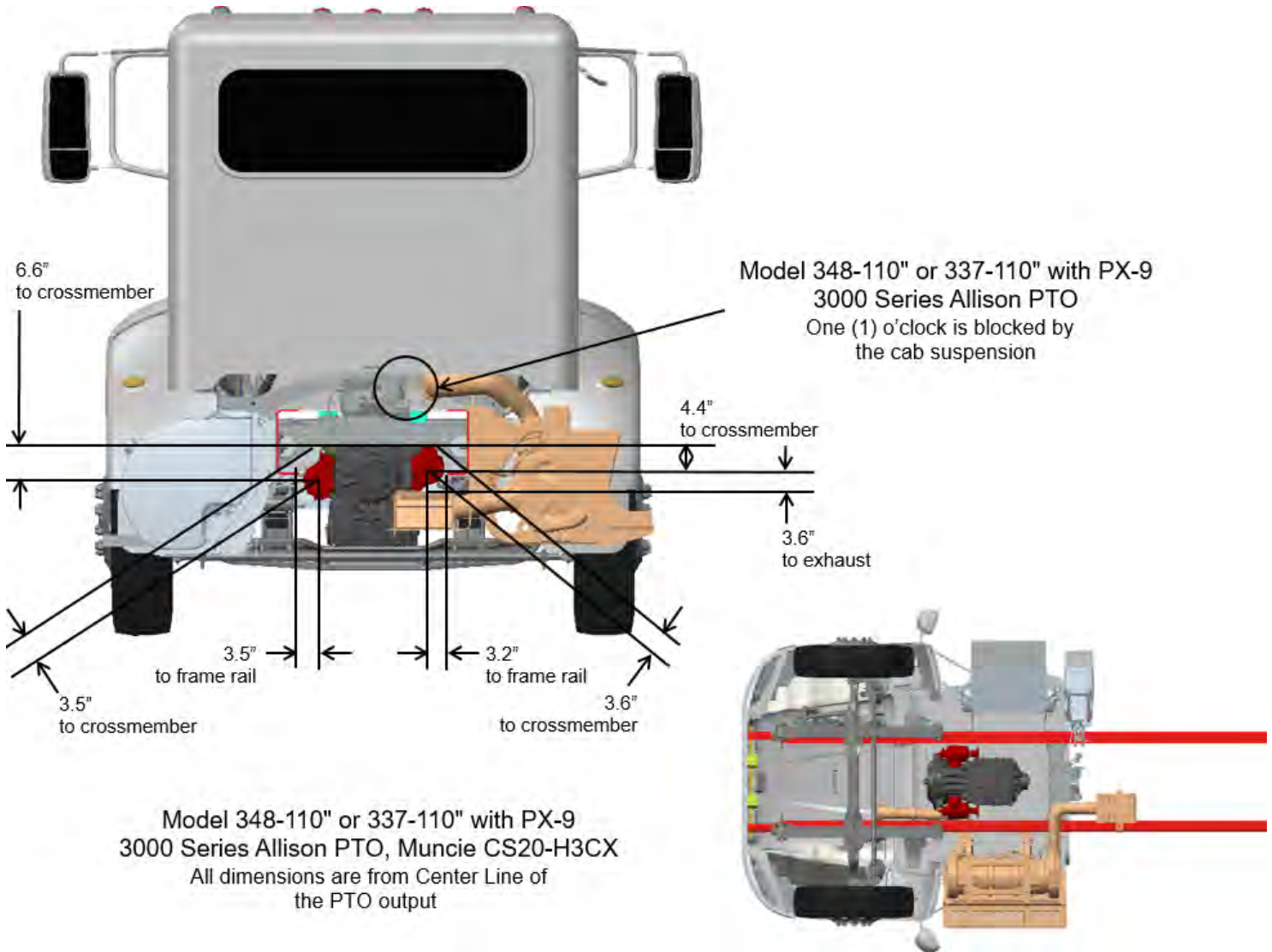


**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



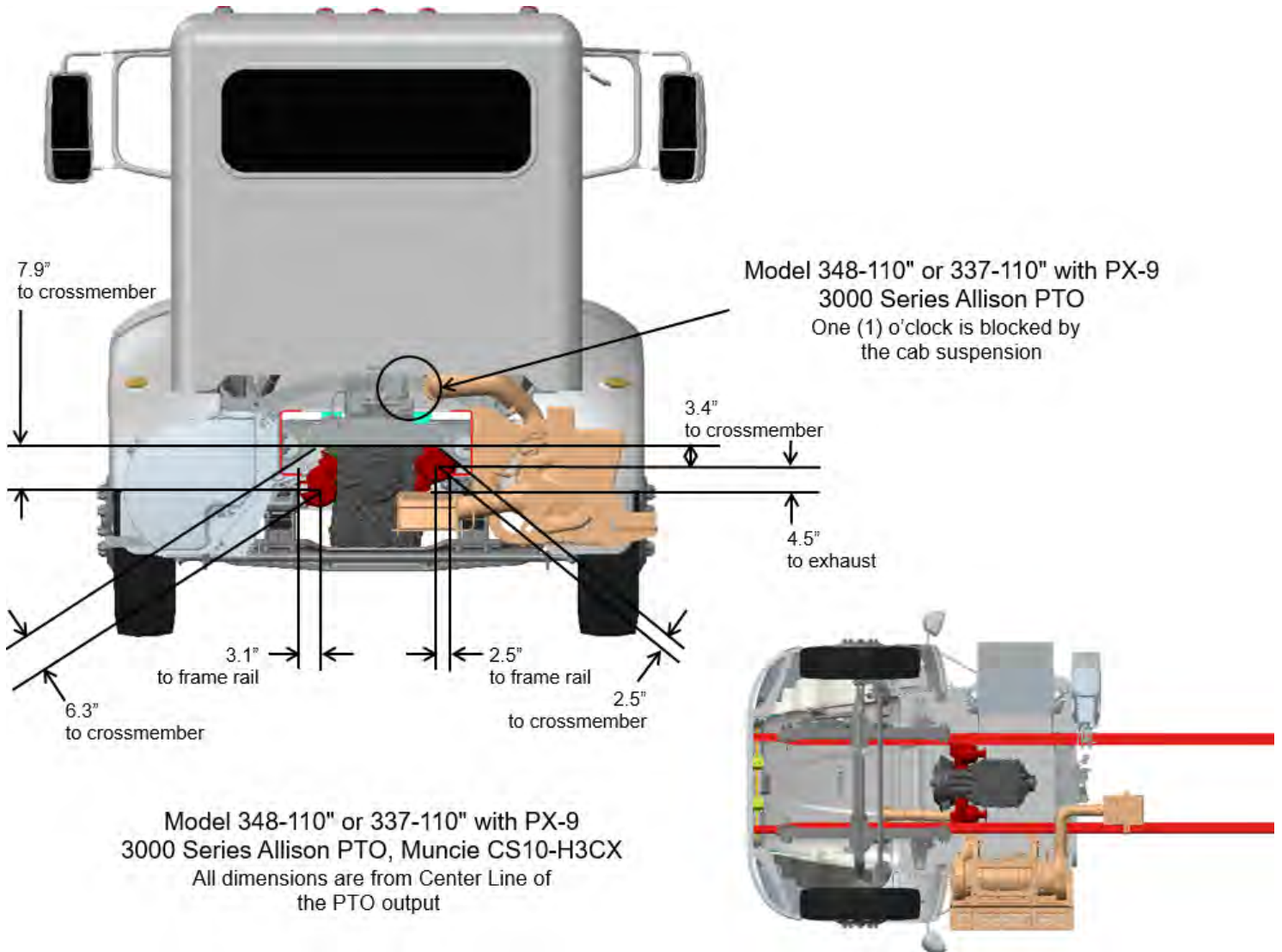
**Figure 3-28.** Model 348-110" or 337-110", PX-9 3000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



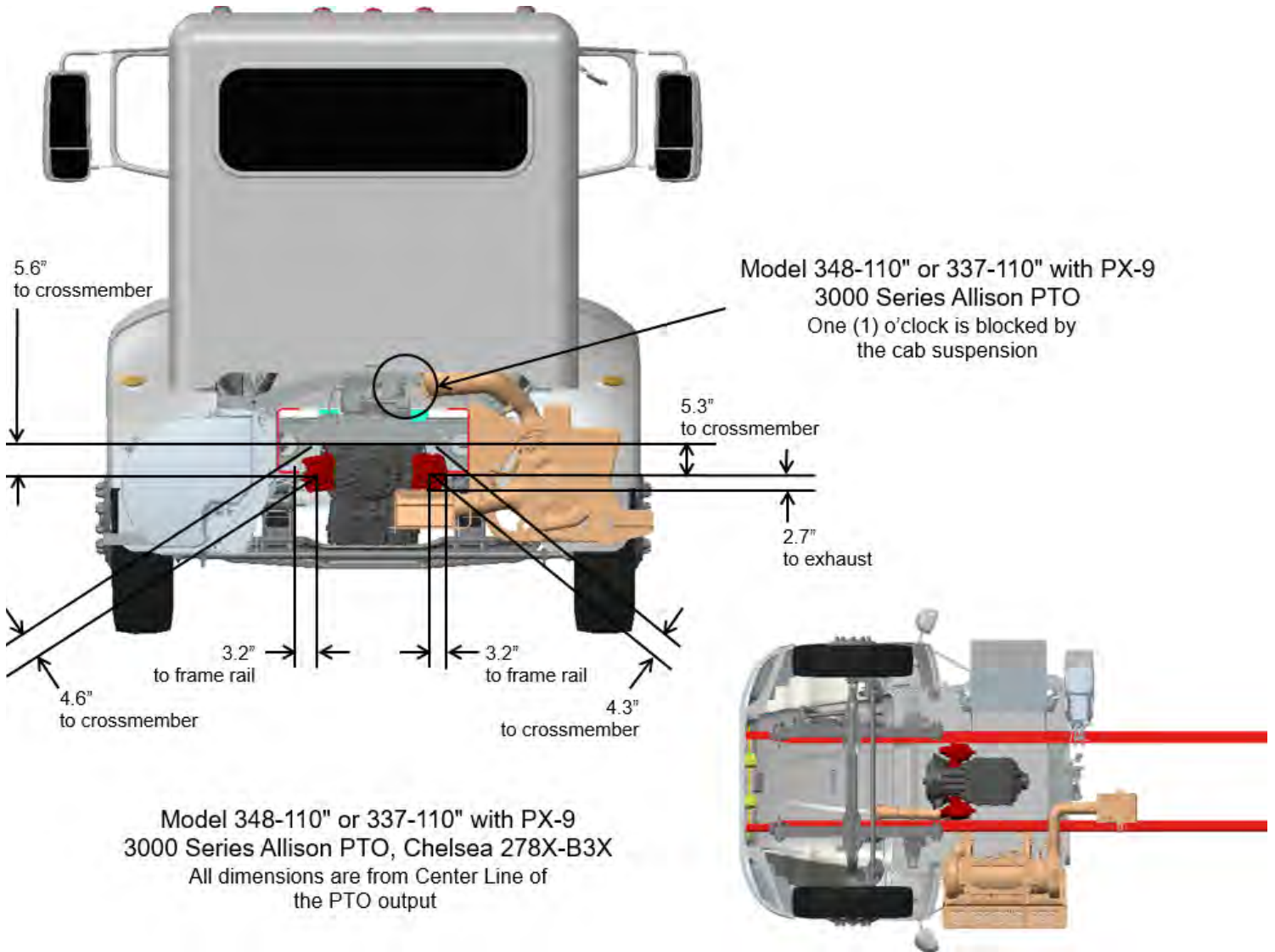
**Figure 3-29.** Model 348-110" or 337-110", PX-9 3000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



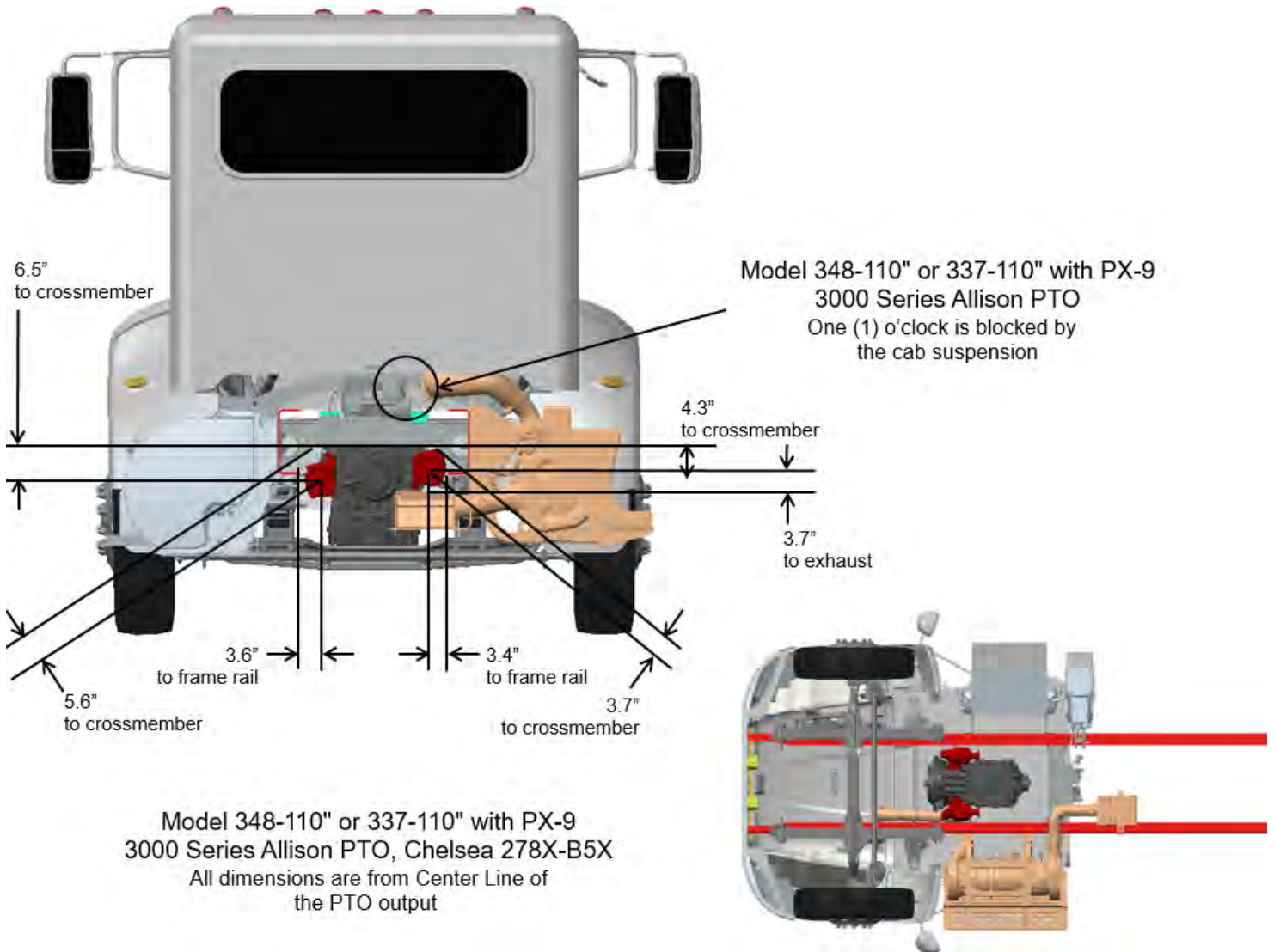
**Figure 3-30.** Model 348-110" or 337-110", PX-9 3000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



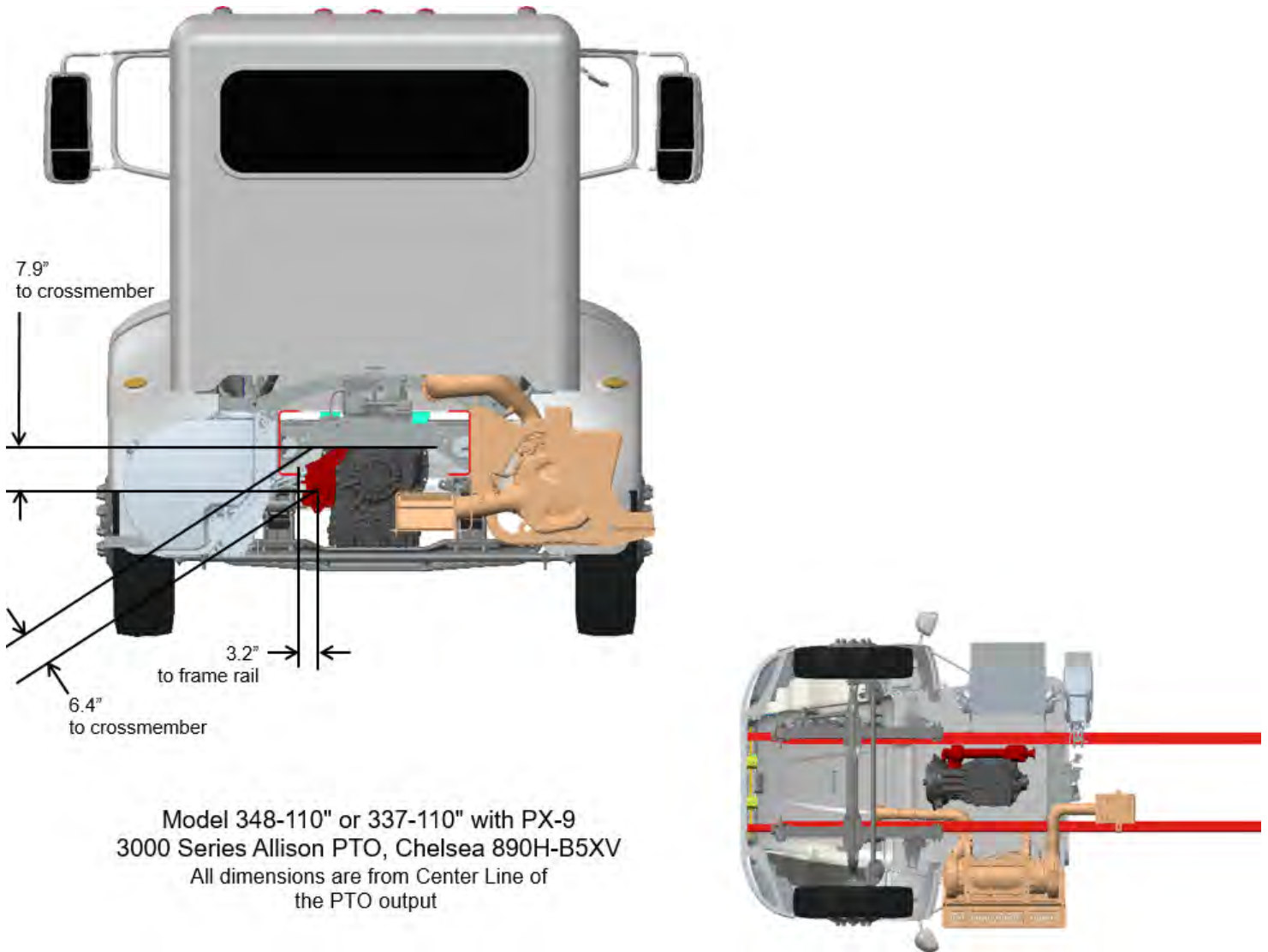
**Figure 3-31.** Model 348-110" or 337-110", PX-9 3000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



**Figure 3-32.** Model 348-110" or 337-110", PX-9 3000 Series Allison

**PTO LAYOUT MODEL 348-110" OR 337-110" WITH PX-9 AND 3000 SERIES ALLISON**



**Figure 3-33.** Model 348-110" or 337-110", PX-9 3000 Series Allison

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# 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 builder must determine the appropriate method.

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

## FRAME RAILS

Frame rail information is provided per rail.

**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.) |
|-------------------|--------------------|--------------------|---------------------------|--------------------------|-----------------------------|
| 9 7/8             | 3.50               | 0.250              | 10.5                      | 1,250,000                | 1.06                        |
| 10 1/4            | 3.50               | 0.250              | 11.7                      | 1,400,000                | 1.15                        |
| 10 5/8            | 3.45               | 0.313              | 14.8                      | 1,776,000                | 1.44                        |
| 10 3/4            | 3.50               | 0.375              | 17.8                      | 2,136,000                | 1.74                        |

**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 5/8                 | 9.875 x 2.87 x .250 | None                 | 23.6                      | 2,832,000                | 2.48                        |
| 10 3/4                 | 9.875 x 2.87 x .250 | None                 | 28.9                      | 3,468,000                | 2.78                        |
| 10 3/4                 | 9.875 x 2.87 x .250 | 11.625 x 3.87 x .375 | 45.7                      | 5,484,000                | 4.67                        |

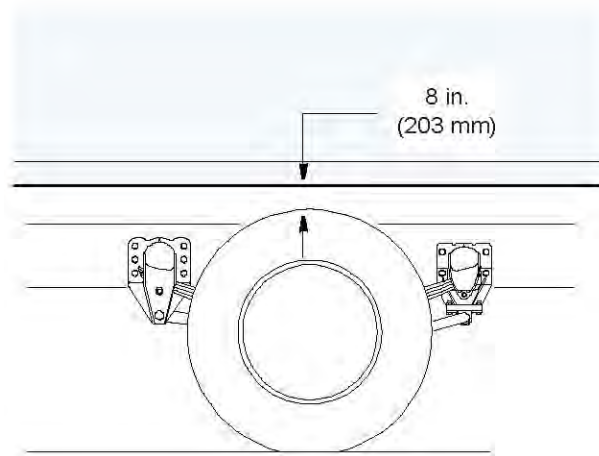
**CRITICAL CLEARANCES**

**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**.



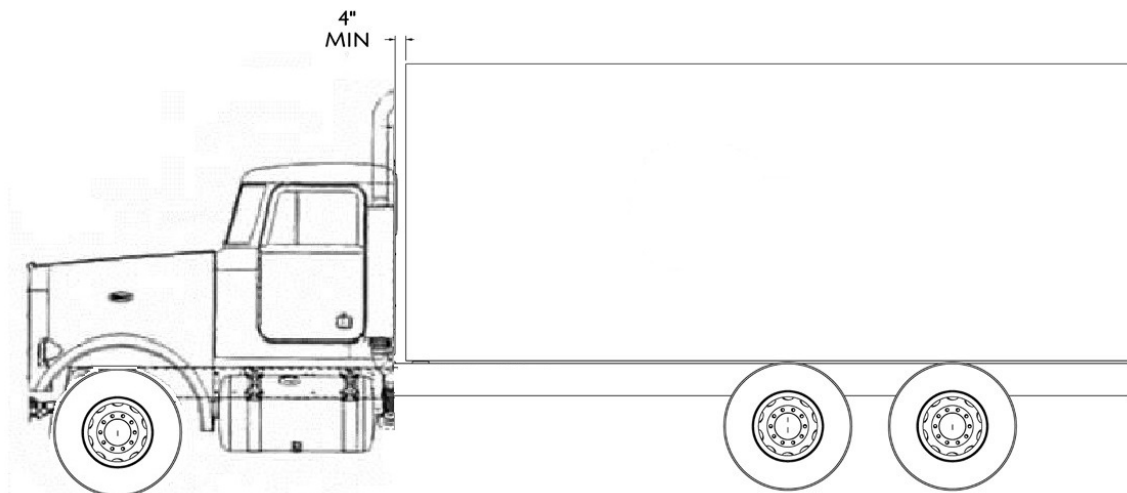
**FIGURE 4-1.** Minimum Clearance Between Top of Rear Tires and Body Structure Overhang



**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 maintenance access to the battery box and fuel tank fill neck.*



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



**BODY MOUNTING USING BRACKETS**



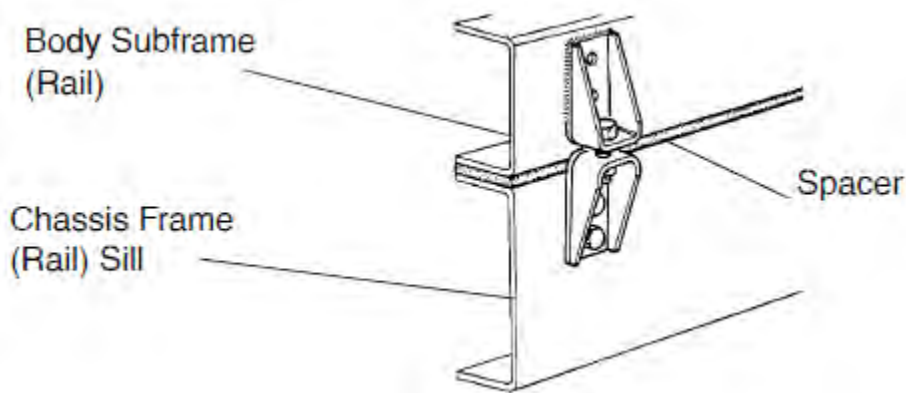
*CAUTION: Always install a spacer between the body subframe and the top flange of the frame rail. Installation of a spacer between the body subframe and the top flange of the frame rail will help prevent premature wear of the components due to chafing or corrosion.*



*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**

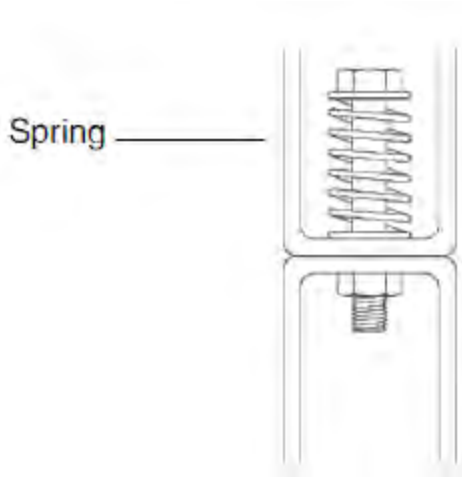
If the body is mounted to the frame with brackets, we recommend a frame sill spacer made from a strip of rubber or plastic (delrin or nylon). These materials will not undergo large dimensional changes during periods of high or low humidity. The strip will be less likely to fall out during extreme relative motion between body and chassis. See **FIGURE 4-3**.



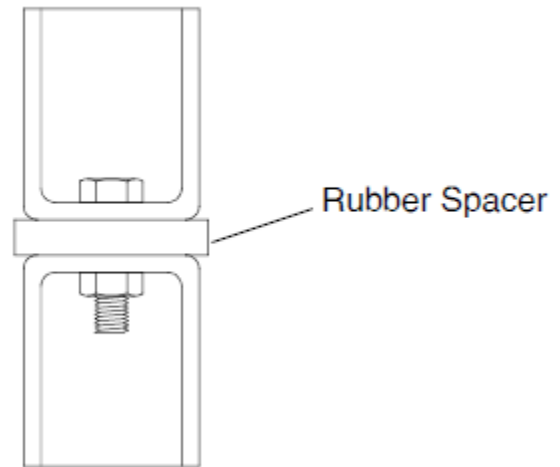
**FIGURE 4-3.** Spacer Between Frame Sill and Body Rail – Rubber or Plastic

**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.



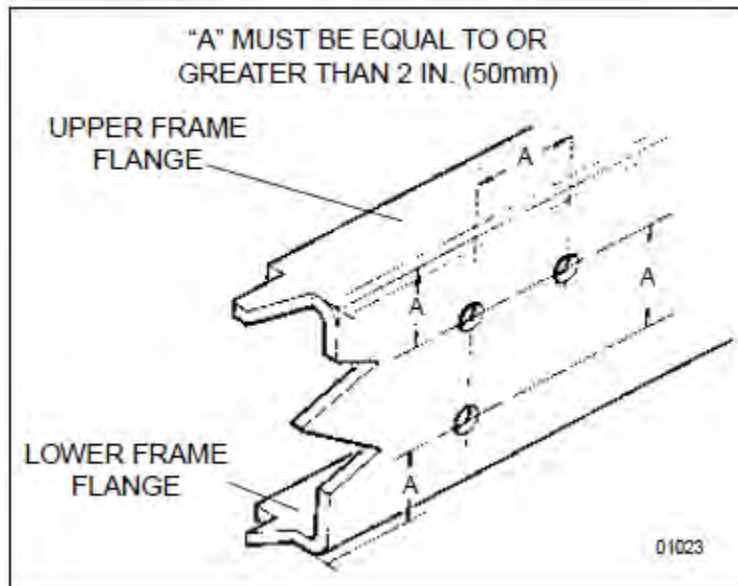
**FIGURE 4-4.** Mounting Brackets



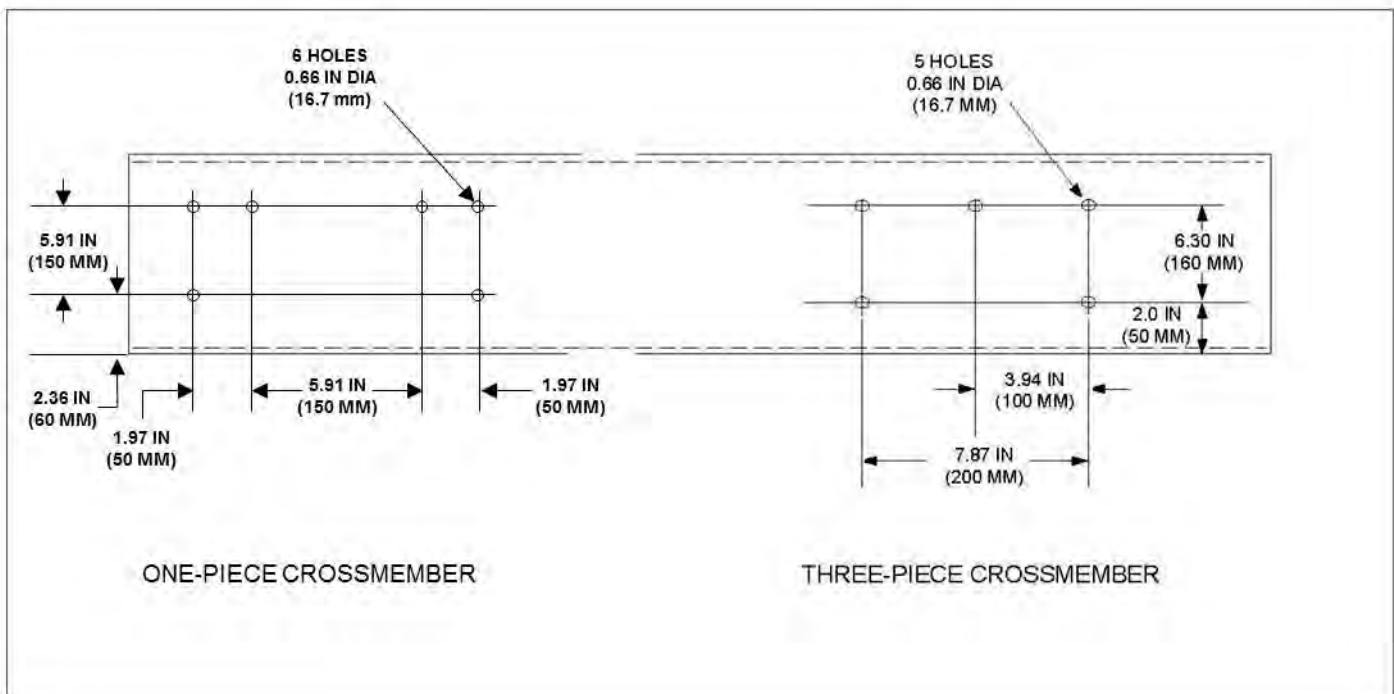
**FIGURE 4-5.** Mounting Brackets

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

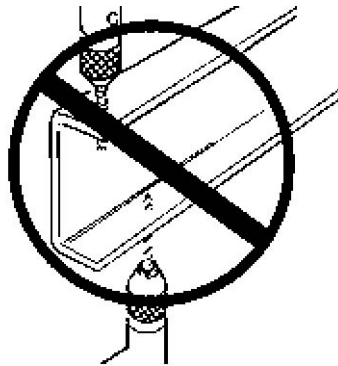


**FIGURE 4-7.** Crossmember Gusset Hole Patterns (Additional Holes Available in 50 mm Horizontal Increments)

**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. Hole centers of two adjacent holes should be spaced no less than twice the diameter of the largest hole. Closer spacing could induce a failure between the two holes.



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



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



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



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

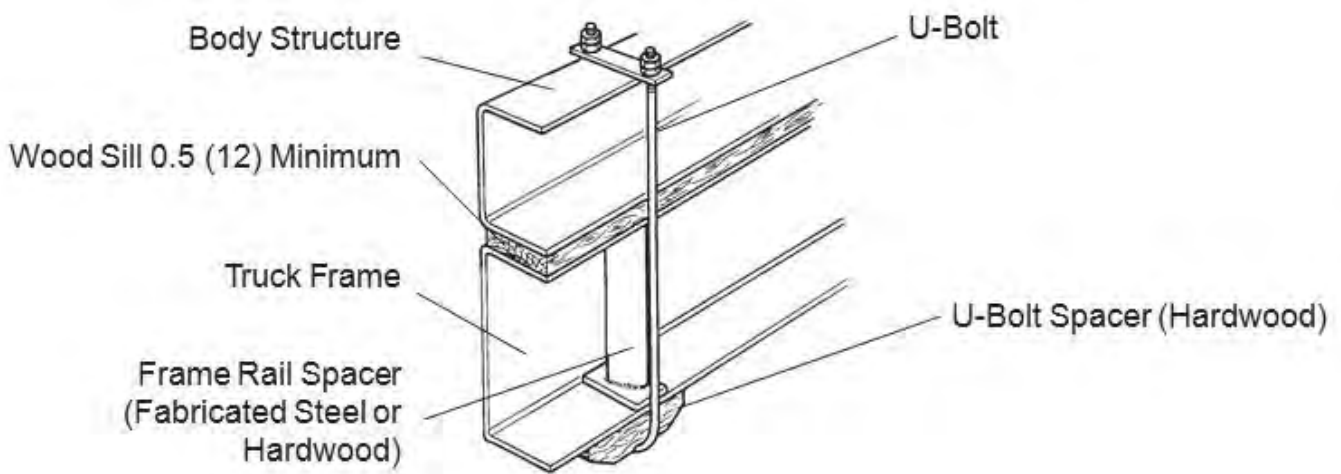
**BODY MOUNTING USING U-BOLTS**

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



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

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

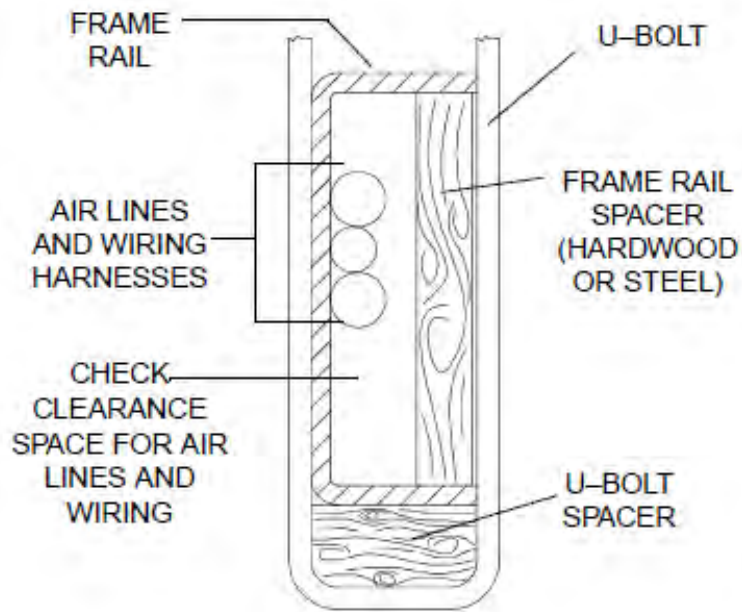
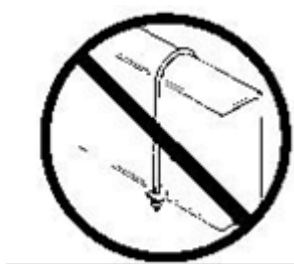


FIGURE 4-10. Clearance Space for Air Lines and Cables



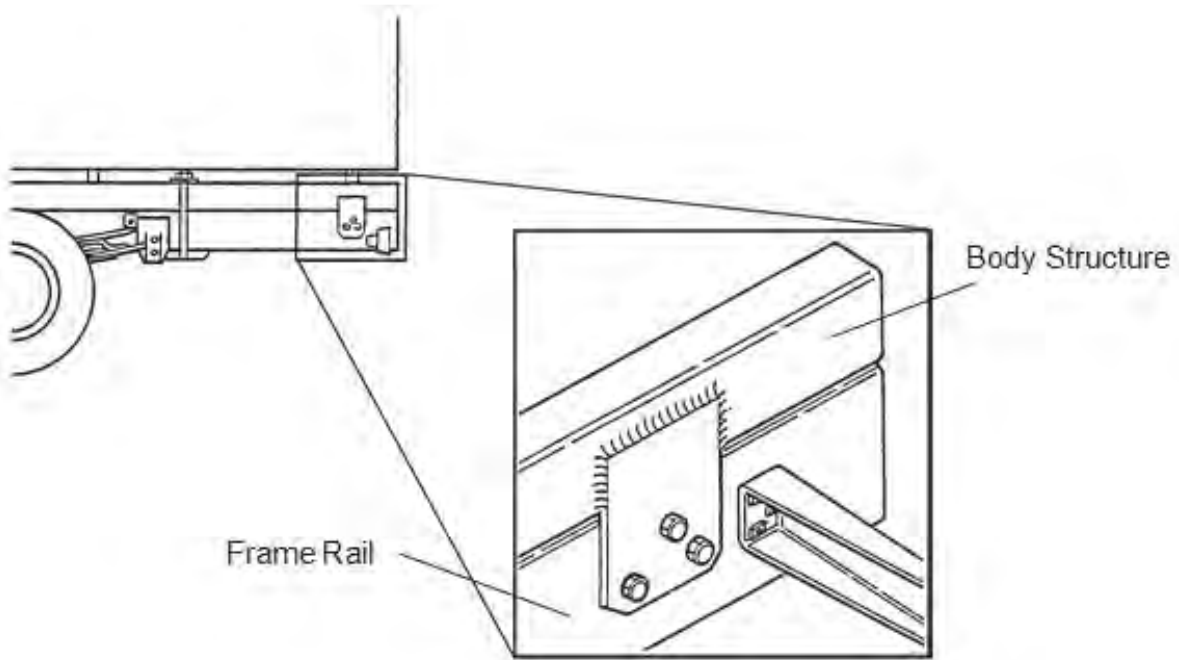
**WARNING!** Do not notch frame rail flanges to force a U-bolt fit. Notched or damaged frame flanges could result in premature frame failure. Use a larger size U-bolt.



**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

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# SECTION 5 FRAME MODIFICATIONS

## INTRODUCTION

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

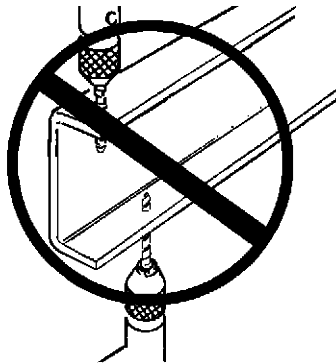
However, some body installations may require slight modifications, while other installations will require extensive modifications. Sometimes an existing dealer stock chassis may need to have the wheelbase changed to better fit a customer's application. The modifications may be as simple as modifying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

- 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.

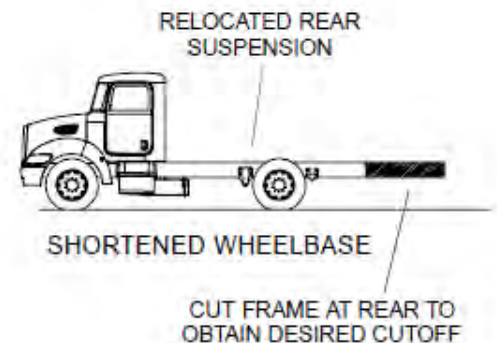
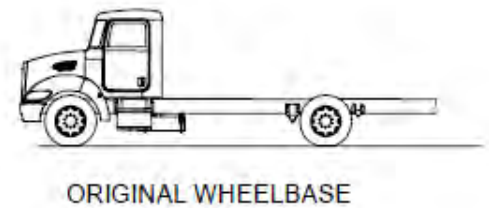
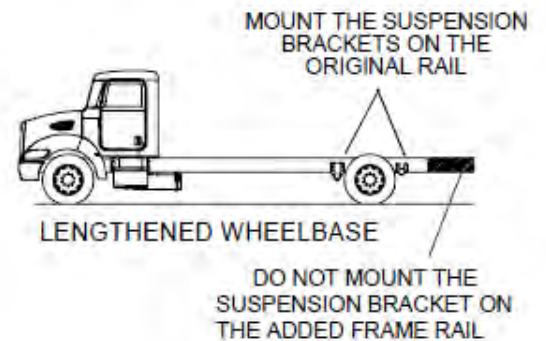


**WARNING!** *When changing the wheelbase, be sure to follow the driveline manufacturer's recommendations for driveline length or angle changes. Incorrectly modified drivelines can fail prematurely due to excessive vibration. This can cause an accident and severe personal injury.*

Before changing the wheelbase, the driveline angles of the proposed wheelbase 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.

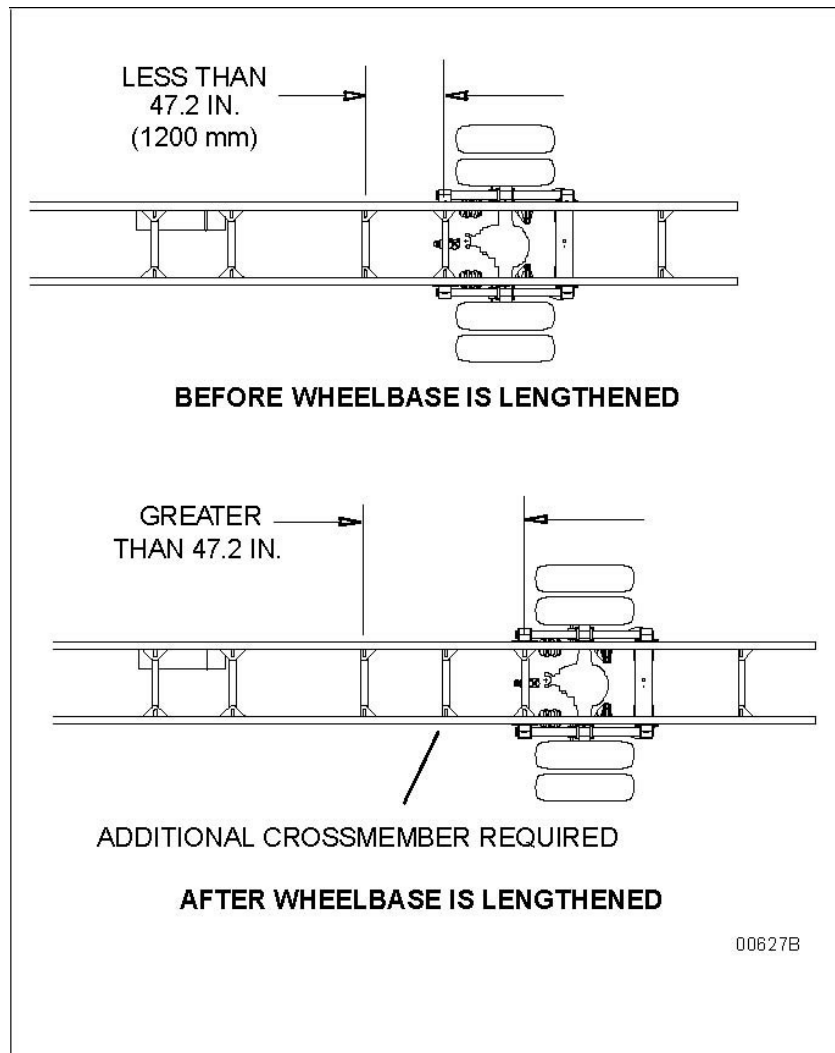
When shortening the wheelbase, the suspension should be moved forward and relocated on the original rail. The rail behind the suspension can then be cut to achieve the desired frame overhang. See **FIGURE 5-1**.



**FIGURE 5-1.** Wheelbase Customization

**CROSSMEMBERS**

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



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

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

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

**WELDING**

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

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. When welding aluminum frames use either the tungsten inert gas (TIG) or consumable electrode method. Be sure to obtain full weld penetration along the entire length of the crack.

**PRECAUTIONS****CAUTION:**

Before welding, disconnect the negative terminal battery cable.

**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 in order to complete the circuit.

**WELDING PRECAUTIONS: ALL ELECTRONIC ENGINES**

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

1. Disconnect all electrical connections to the vehicle batteries.
2. Disconnect all ECM connectors.
3. Do not use the ECM 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:**

Bosch ABS and Wabco ABS: Disconnect ECU.

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# SECTION 6 ELECTRICAL

## INTRODUCTION

This section has been designated to provide information to the body builder when installing equipment into vehicles built with Multiplexed instrumentation. The technology presented will show multiple access points for direct integration over body builder components. This section is intended to address how to work in aftermarket equipment while still maintaining full functionality of the OEM vehicle.

## MULTIPLEX INSTRUMENTATION

Peterbilt utilizes Multiplex instrumentation and wiring to continuously improve our quality and the capability of our trucks. Multiplexing utilizes the industry standard Society of Automotive Engineering (SAE) J1939 data bus to send multiple signals over a single twisted pair of wires instead of individual wires for each function. The advantages are fewer wires, sensors, and connections that provide greater consistency, improved reliability and the ability to use ESA to troubleshoot the instrumentation. The following information is provided to increase your awareness about the Peterbilt product, it may be useful in installing telltales (warning lights) and gauges and coordination with other installed equipment. Data Bus connector can be accessed on the LH side rear of engine.

## WARNING!

Don't cut or tap into green/yellow twisted pairs. Only use approved J1939 components and connectors with validated software.

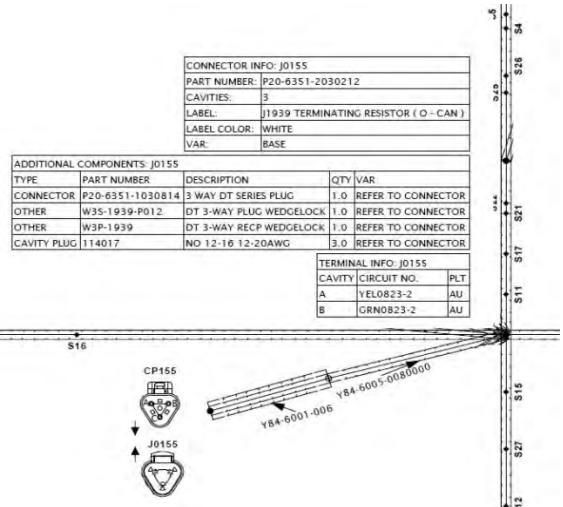
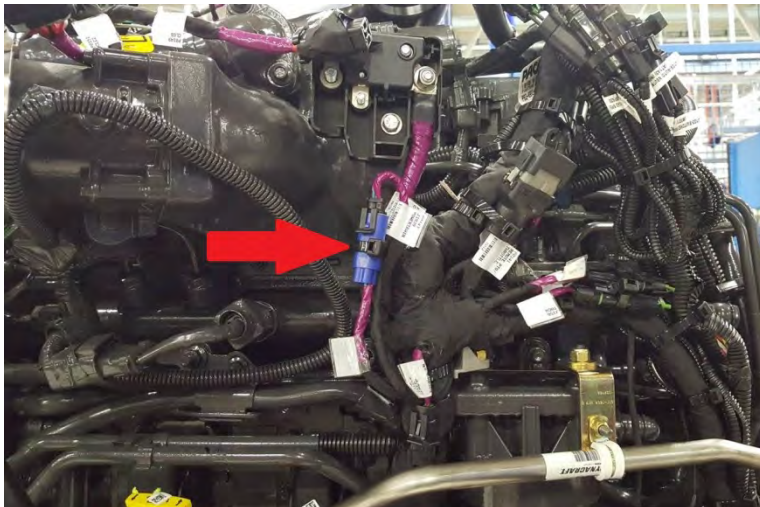


FIGURE 6-1. J1939 Data Link Wiring.

## INTERIOR IDENTIFICATION

2013 is the first year that Peterbilt has used Multiplex Wiring in our 348, 337, 330 and 325 vehicles. Chassis with this new interior can be identified by appearance shown below. All dashes that resemble the following picture will utilize multiplex wiring.



**FIGURE 6-2.** Peterbilt B-Cab Dash

A model 2013 and later diesel engine chassis can be identified by the presence of the Diesel Exhaust Fluid “DEF” gauge.



**FIGURE 6-3.** Diesel Exhaust Fluid Gauge

### Note:

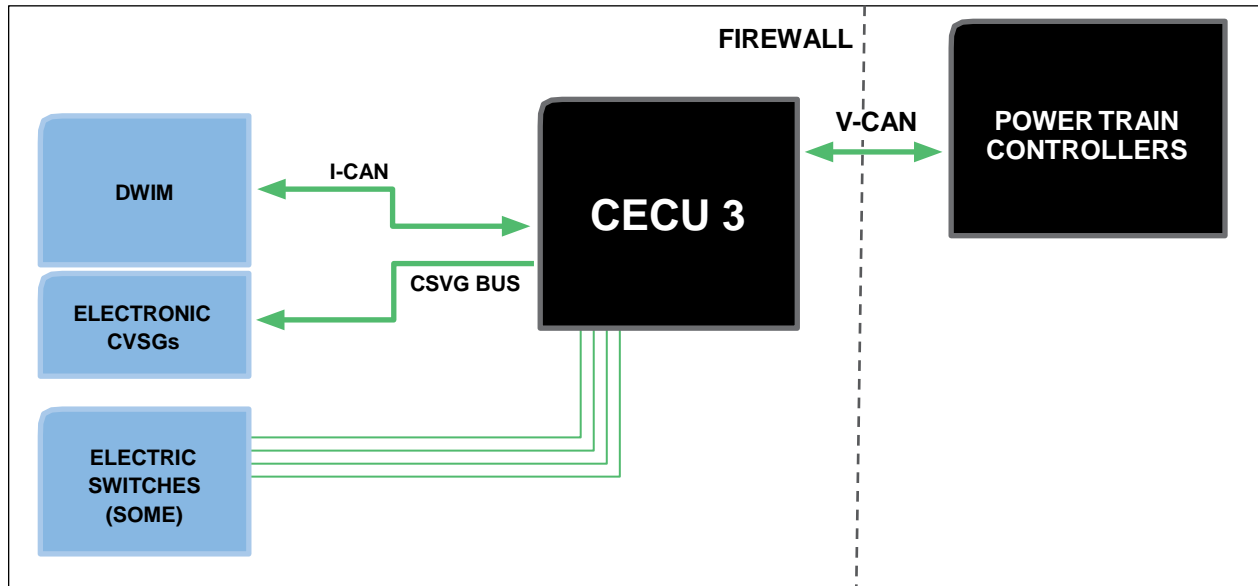


The information contained in this manual is specific to chassis with 2013 engines. For pre-2013 engines please work with your local Peterbilt dealer.



## DATA BUS COMMUNICATION

The multiplexed instrumentation system uses several different data links to transmit input/output data from other systems to the Cab Electronic Control Unit (CECU), and ultimately to the Central Instrument Cluster and CVSG Gauges.

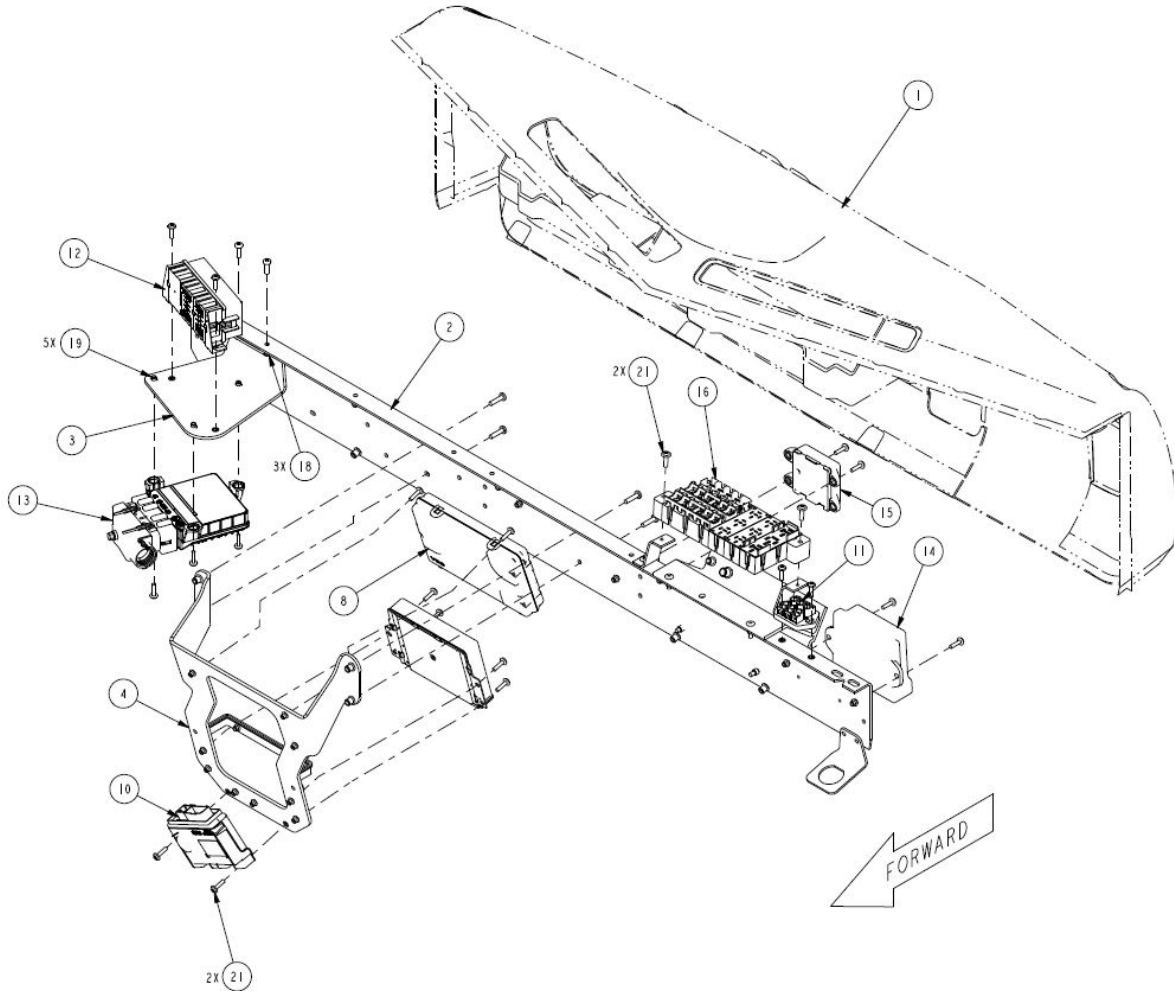


**FIGURE 6-4.** Multiplexed Instrumentation Block Diagram.

- V-CAN = Vehicle Controller Area Network  
The V-CAN, also referred to as the J1939, is used to transmit data between the transmission, ABS system, engine, etc. to the Cab Electronic Control Unit (CECU).
- I-CAN = Instrumentation Controller Area Network  
The I-CAN provides data link communication from the Cab Electronic Control Unit (CECU) to the Central Instrument Cluster.
- CVSG Bus  
The CVSG bus is a private data bus used to transmit data from the Cab Electronic Control Unit (CECU) to the individual 2-inch gauges. A series of “daisy chained” jumper harnesses link each gauge to another.

### CAB ELECTRONIC CONTROL UNIT (CECU) AND OTHER ELECTRICAL MODULES

The heart of the multiplexed instrumentation system is the Cab Electronic Control Unit (CECU). The CECU is located behind the center console. See Figure 6-5.



|     |      |  |                     |          |
|-----|------|--|---------------------|----------|
| 1   | 17   | HYDRAULIC ABS FUSE BLOCK                 |                     |          |
| 1   | 16   | RELAY MODULE - ELECTRICAL MODULE         |                     |          |
| 1   | 15   | MIRROR - ELECTRICAL MODULE               |                     |          |
| 1   | 14   | MULTI-FUNCTION TURNSTALK MODULE          |                     |          |
| 1   | 13   | TRANSMISSION - ELECTRICAL MODULE         |                     |          |
| 1   | 12   | HYBRID FUSE BLOCK                        |                     |          |
| 1   | 11   | J1587 CONNECTOR - ELECTRICAL MODULE      |                     |          |
| 1   | 10   | REMOTE KEYLESS ENTRY - ELECTRICAL MODULE |                     |          |
| 1   | 9    | AIR ABS - ELECTRICAL MODULE              |                     |          |
| 1   | 8    | CTRL - CECU CAB ELEC UNIT                |                     |          |
| QTY | ITEM | PART NUMBER                              | PRODUCT DESCRIPTION | MATERIAL |

**FIGURE 6-5.** CECU Location and Other Electrical Modules

Vehicle component inputs are sent to the CECU through the J1939 data bus or conventional wiring. The CECU interprets the various inputs and monitors/controls the functions for each input through the CECU software. Output signals from the CECU provide data for the gauges, warning lamps, audible alarms, and displays inside the cluster.

## CENTRAL INSTRUMENT PANEL

The central instrument panel includes the speedometer (including odometer and trip meter) and tachometer (including engine hour meter and outside temperature display), plus a Driver Warning and Indicator Module (DWIM) pre-installed standard and/or editable warning light symbols called “telltale” cards. Each “telltale” card slides into the left and right sides of the Driver Warning and Indicator Module (DWIM) from the bottom. The standard cards cover most warning light requirements; editable cards can be used for less common components that also require warning lights. The central instrument cluster receives input data from the CECU via the “I-CAN” data bus. When the ignition key is first turned ON, the cluster will perform a calibration “power on self-test”. The instrument panel is installed with two screws.



**FIGURE 6-6.** Main Instrument Panel

## CVSG GAUGES

The 2” gauges located to the left and right of the main instrument panel are commonly referred to as Commercial Vehicle Smart Gauges (CVSG). Like the central instrument cluster, the 2-inch gauges also receive input data directly from the CECU. CVSG’s are two types, electronic and mechanical. The electronic CVSG’s receive digital data from the CECU via the CVSG data bus. The mechanical gauges (i.e. suspension air pressure, etc.) are driven directly from the air pressure. Both types of gauges receive backlighting signals from the CECU via a 4-wire “daisy chained” jumper harness that links one gauge to another.

When the ignition key is first turned ON, all the electronic 2-inch gauges will perform a calibration “power on self-test”.

**Note:** The mechanical CVSG do not perform a power on self-test.



**POWER ON SELF-TEST**

- Ignition key turned ON
- The gauge pointers move from pointing at zero, counter-clockwise to their mechanical limit (approx. -5°), stay there for one second and go back to pointing at zero
- At the same time, all telltales in DWIM and main gauges are switched on together, and then switched off together

Additional CVSG gauge information body builders should be aware of:

- The CECU sends gauge information to CVSGs over a data link (blue wire) between the CECU and the gauge (called CVSG bus)
- CVSG gauges get their power from the CECU
- Yellow = Power wire (9-16 volts)
  - follows:

| Pin # | Color  | Function                                 |
|-------|--------|--|
| 1     | Blue   | Data, backlighting for Electronic Gauges |
| 2     | Brown  | Backlighting for Mechanical Gauges       |
| 3     | White  | Return                                   |
| 4     | Yellow | Power                                    |

- Backlighting level for CVSG electronic gauges is sent from the CECU to the gauges via the data link (blue wire).
- Optional CVSG mechanical gauges (i.e. air suspension) are driven mechanically with air pressure hoses to the fitting behind the gauge. There is no red warning lamp and the backlighting is powered through the brown wire from the CECU (a pulse-width modulated signal). The 4-way jumper harness is still used to pass all 4 circuits through the gauge to the next gauge in the chain.
- Gauges can be relocated to any 2-inch open gauge position in the dash. To relocate a gauge unhook the connector at the back and move it to the desired position. Plug the jumper wire in. (See "Accessing Gauges and Switches" section below for instructions on physically moving the gauge). The connector will require a firm pull to remove it. When reinstalling the connector ensure that it is fully inserted. Both connector sockets on the rear of the gauge are the same, either one can be used.

## ACCESSING GAUGES, SWITCHES AND FUSES

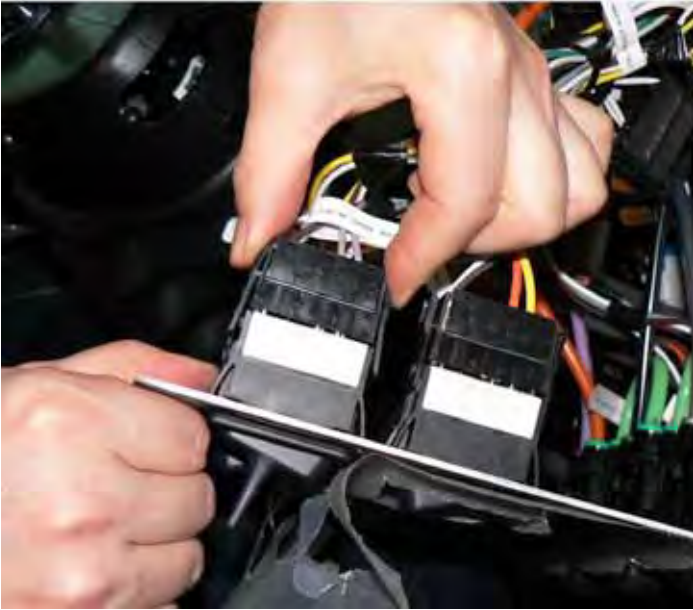
In order to access and install components described later on in the manual, you will need to know how to correctly remove the dash panels without causing damage.



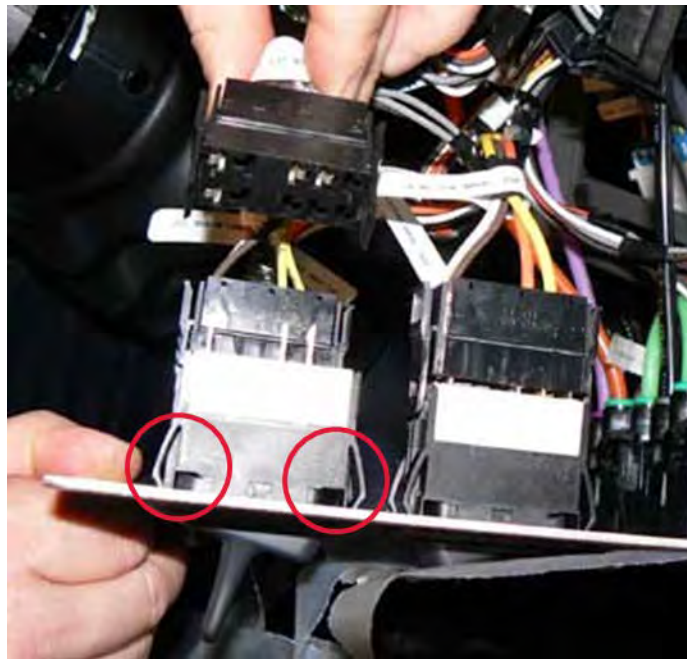
The main dash panel installs by inserting on the left side and snapping down on the right side. Removal is accomplished by gently prying the panel starting on the right as shown.



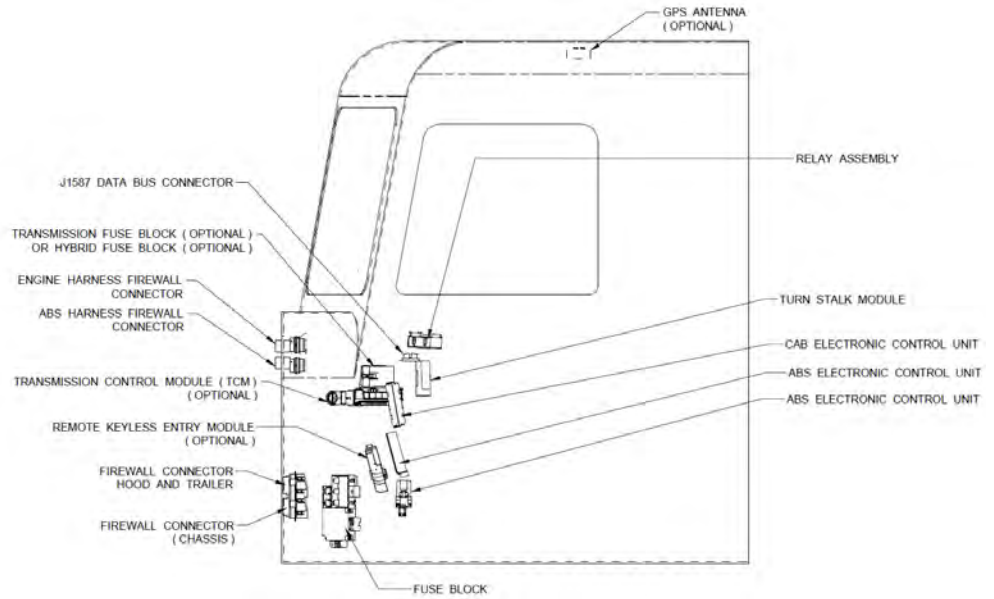
To remove a switch push in the tabs on both sides of the switch and pull out the top section to disconnect the switch.



Pinch the bottom tabs to release the switch from the panel.



The fuse box is located behind a corner cover in the left side foot well.



IN CAB FUSE BOX LAYOUT

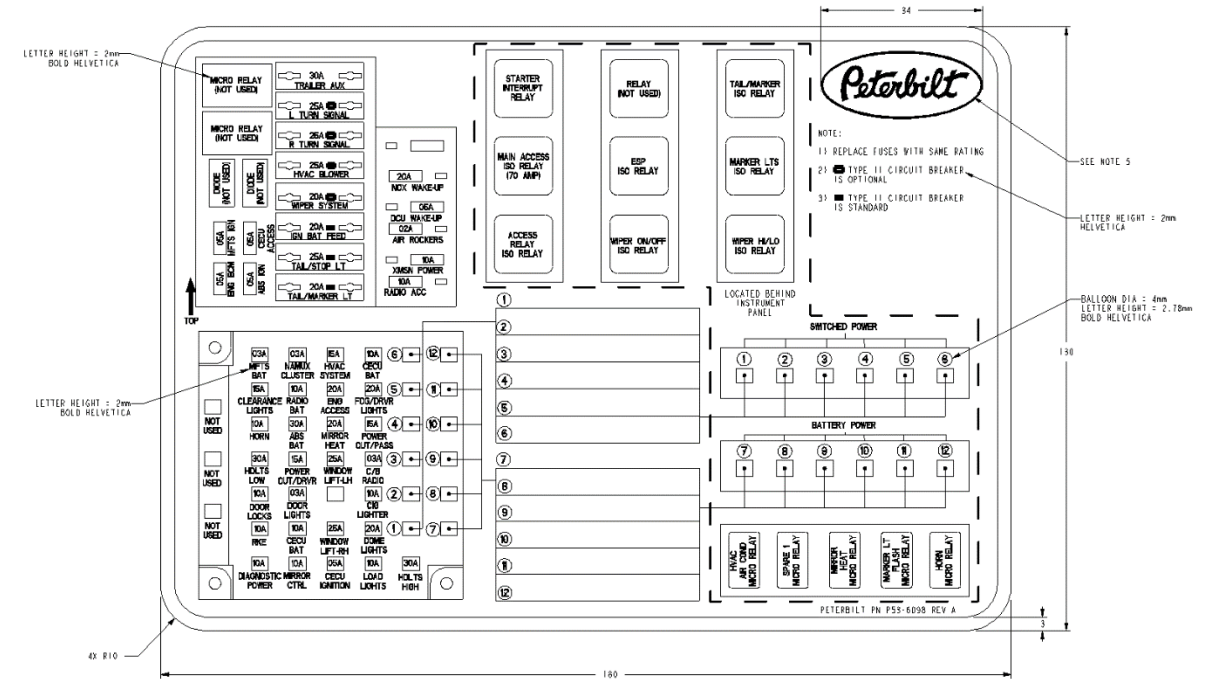


FIGURE 6-11. Cab Load Center (mPDC)

### TELLTALE SYMBOLS

Peterbilt's interior allows Body Builders to customize the dash telltale symbols (warning lights). The editable telltale symbols are located on removable cards inside the baseline cluster. This section will describe how to replace and insert editable cards, as well as how to activate the telltale lights.

Note the numbers 1 – 12 on Figure 6-12. These are how the positions are identified in Table 6-1 and on the instrument panel harness breakouts for the “editable” telltales behind the right hand cluster.

To remove the editable cards follow steps 1-3 in the instructions for accessing gauges and switches

. The access cards have a positive lock. To remove the card push inwards on the lock with your thumb and pull the card out with pliers. Figure 6-12 below details the cards. To reinstall a card slide it in either by hand or with pliers.

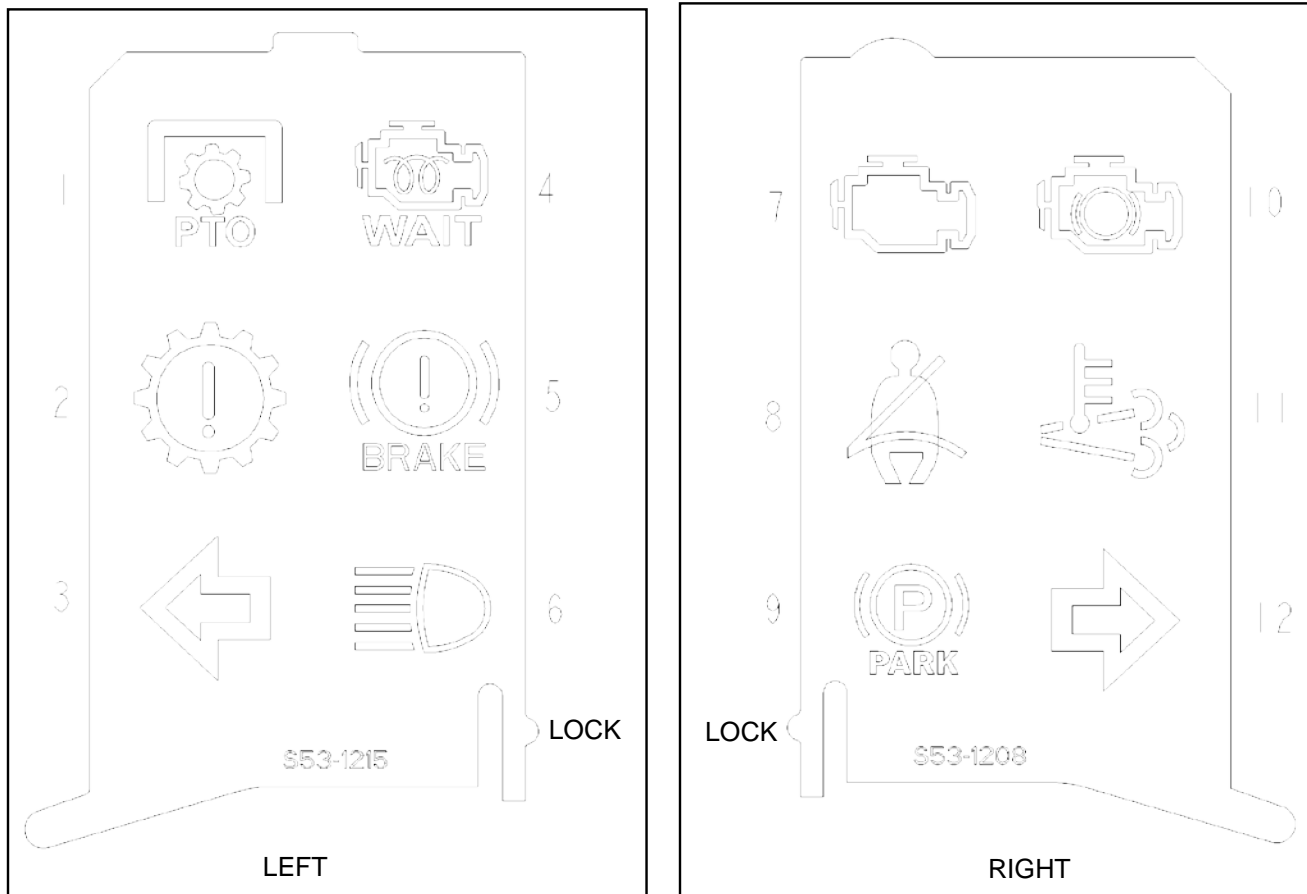


FIGURE 6-12. Telltale Symbol Standard Card

**Note:**



The numbers 1–12 on Figure 6-12. These are how the positions are identified in Table 6-1 and on the instrument panel breakouts for the “editable” telltales behind the right hand cluster.



TABLE 6-1. Telltales Position and Color

| Position | Standard Function                | Use  | Light Color | Editable or Fixed? |
|----------|----------------------------------|--|-------------|--------------------|
| 1        | PTO                              | Illuminates to Indicate PTO is Engaged                                 | Green       | Editable           |
| 2        | Check Transmission               | Illuminates During Transmission Fault                                  | Yellow      | Editable           |
| 3        | Left Turn Arrow                  | Illuminates to Indicate Left Turn Signal is Applied                    | Green       | Fixed              |
| 4        | Wait To Start                    | Illuminates when Driver needs to Wait Before Starting Engine           | Yellow      | Fixed              |
| 5        | Brake Fail                       | Illuminates When the Hydraulic Brake ECU Determines Fault              | Red         | Editable           |
| 6        | High Beam                        | Illuminates to Indicate High Beam Lights are Applied                   | Blue        | Fixed              |
| 7        | Malfunction Indicator Lamp (MIL) | Illuminates to Indicate a Malfunction in Emissions System (After 2013) | Yellow      | Fixed              |
| 8        | Fasten Seat Belt                 | Used with Seatbelt Warning Option                                      | Red         | Fixed              |
| 9        | Park Brake                       | Illuminates to Indicate the Park Brake is Applied                      | Red         | Fixed              |
| 10       | Engine Brake                     | Illuminates to Indicate Engine Brake Active                            | Green       | Fixed              |
| 11       | Hest                             | Indicates Exhaust After Treatment Filter Regeneration                  | Yellow      | Fixed              |
| 12       | Right Turn Arrow                 | Illuminates to Indicate Right Turn Signal is Applied                   | Green       | Fixed              |

**Note:**

Only the positions labeled as “editable” in the chart above can be changed. You must apply the standard icons on the editable card on all the positions that read “fixed”.

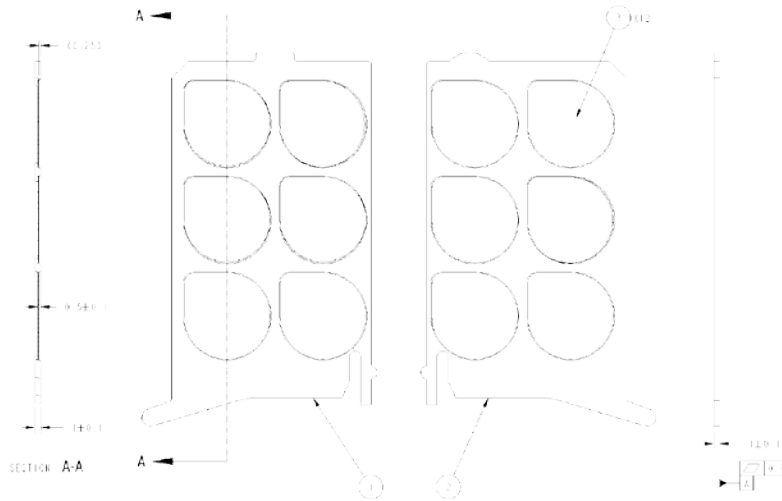
The wait to start and malfunction indicator lamp is part of the emission control system. They must not be removed or altered.

If a connector is already connected to the editable Position in the IP harness, that Position cannot be used for another function.

In order to activate the editable lights (either on the standard card or the editable card) locate the wiring connections on pigtail connectors behind the right hand side gauge panel. The wires will be labeled and tagged with position numbers. For example for position 1 the breakout label will be green and have the following text: “TELLTALE POS 1”. The color of the tag corresponds to the color of the light. When these circuits are either grounded or powered the light in the dash will turn on.

All cards come with standard editable telltale lights, even if the chassis you have was not ordered with related components.

The standard trays are shown above (in Figure 6-12). Editable trays are also available from your local Peterbilt dealer. The left and right trays are shown in below.



**FIGURE 6-13. Blank Telltale Tray**

Your local Peterbilt dealer will also sell a sheet of telltale light icons to install on the editable card. The symbols that are available are shown in below.



**FIGURE 6-14. Telltale Icons**



FIGURE 6-14 CONTINUED. Telltale Icons

The telltales can then be peeled off of the sheet and applied directly to the card. The color of the telltale is controlled by the light, all of the icons are clear. Please see Table 6-1 to determine the position and color of the telltales.

270 AMP ALTERNATOR (RECOMMENDED HOOKUP)

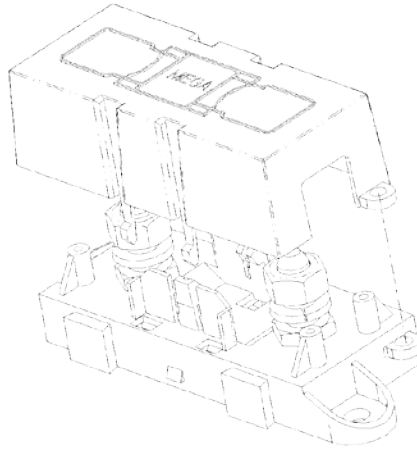


FIGURE 6-23: P27-6180 Fuse Holder.

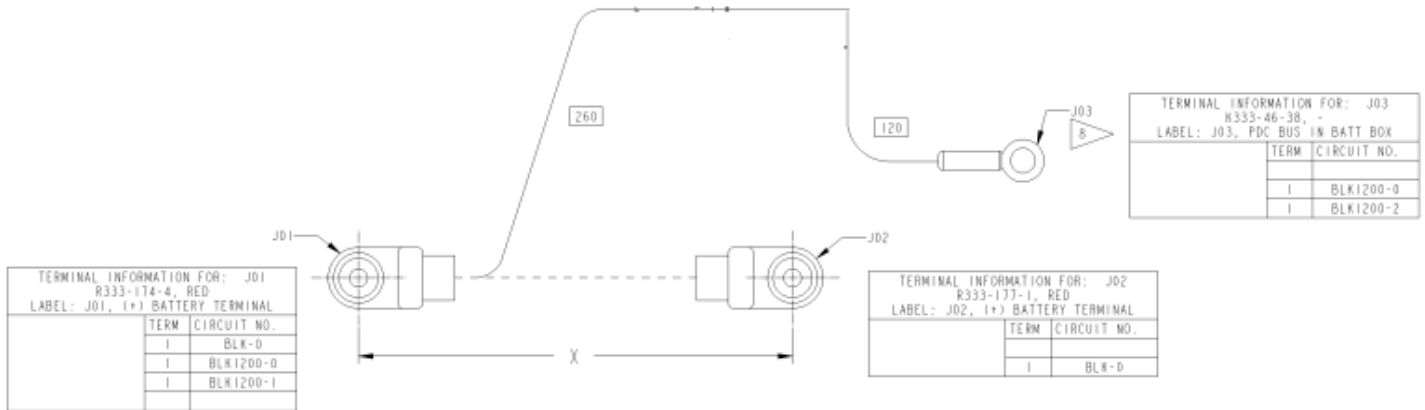


FIGURE 6-24: Battery Harness Jumper.

- Use three batteries
- Use P27-6180-150 Mega Fuse (Mount in Battery Box to provide Body Power).
- Use P92-2683-10000 to provide power from batteries to Mega Fuse.
- Tie Body Ground circuits to additional ground stud located on the lower outboard (driver side) of firewall at cover plate.

ENGINE CONNECTIONS

Electronic engines have the ability to send and receive control and warning signals from the components on the chassis and body. Consult the appropriate body builder manual before making connections to the engine electronic control unit (ECU) or to other electronic engine components.

PTO WIRING

BASIC PTO SETUP WITHOUT PTO PROVISIONS

The cab harness has a pigtail connector in the dash coming off the engine harness firewall connector. When this connector P79 PTO is grounded the PTO functionality will be activated. See Figure 6-25

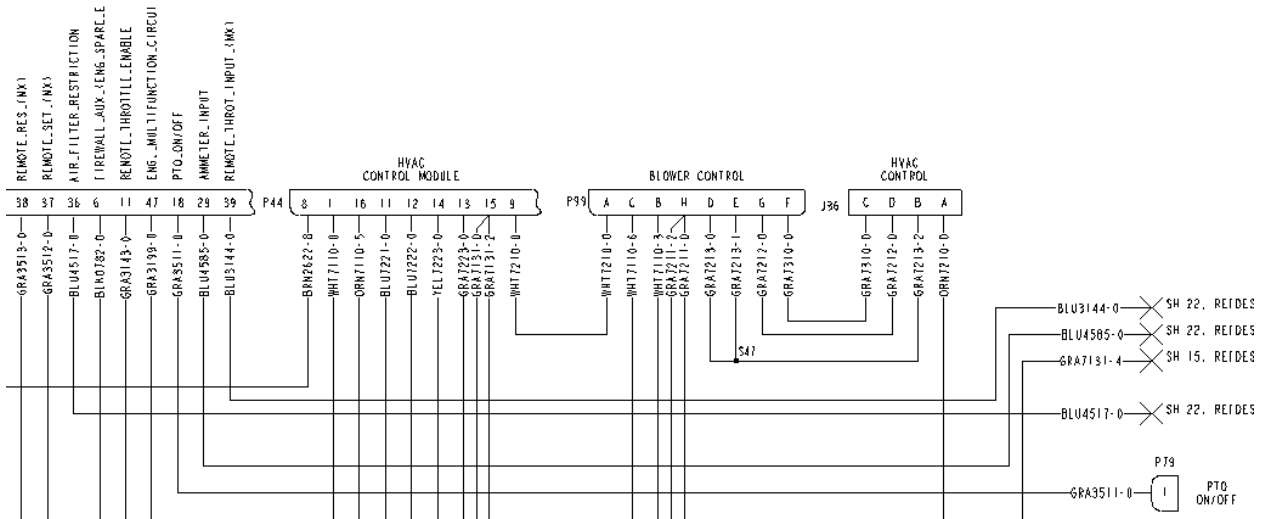


FIGURE 6-25. Basic PTO Connector

REMOTE PTO/THROTTLE HARNESS

This option provides a connection from the engine ECU for remote control of engine throttle and PTOs. Options that extend the wiring to the end of frame also exist, however controls are not provided. A 12-pin Deutsch connector (Deutsch P/N DT06-12SA-P012) is included. See Figure 6-26 below for wiring harness connector pin outs.

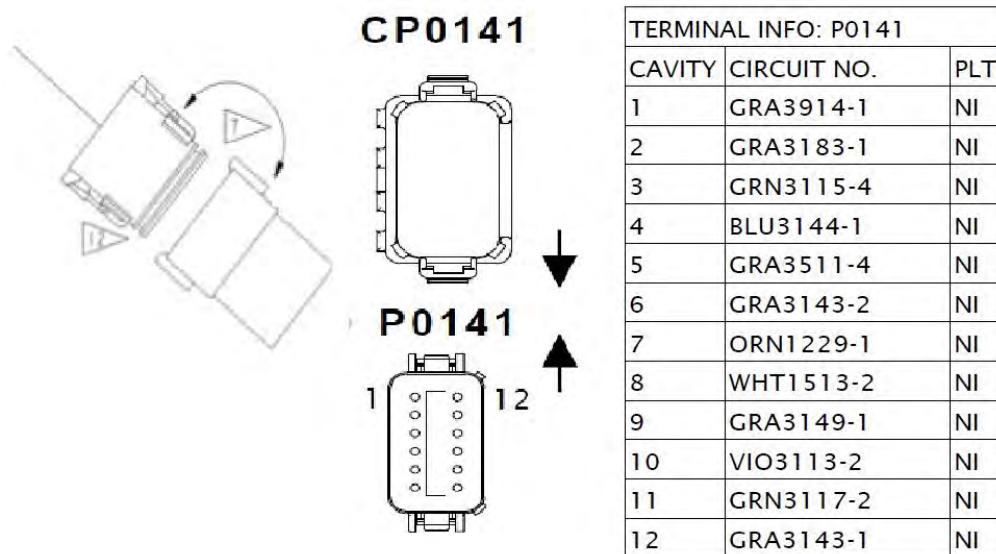


FIGURE 6-26. PACCAR PX-7 & PX-9.

TABLE 6-9. Multifunction Engine Connector

| Engine Harness – PACCAR PX-7 & PX-9 |                  |                   | PB Harn Conn Pin Outs |            |       |
|-------------------------------------|------------------|-------------------|-----------------------|------------|-------|
| Circuit Function Name               | Engine ECM Pin # | PB Circuit Number | Wire Color            | Wire Gauge | Pin # |
| Starter Lockout                     | 83               | GRA3914           | Gray                  | 18         | 1     |
| Max Speed SW                        | 66               | GRA3183           | Gray                  | 18         | 2     |
| Common Return #1                    | 62               | GRN3115           | Green                 | 18         | 3     |
| Remote Throttle Sensor Signal       | 63               | BLU3144           | Blue                  | 18         | 4     |
| PTO On/Off                          | 94               | GRA3511           | Gray                  | 18         | 5     |
| Remote Throttle Enable              | None             | GRA3143           | Gray                  | 18         | 6     |
| Power – Ignition                    | None             | ORN1229           | Orange                | 18         | 7     |
| Engine Ground                       | None             | WHT1513           | White                 | 18         | 8     |
| Torque Limit Switch                 | 93               | GRA3149           | Gray                  | 18         | 9     |
| Remote Throttle Sensor Supply (+5V) | 8                | VIO3113           | Violet                | 18         | 10    |
| Remote Throttle Sensor Return       | 32               | GRN3117           | Green                 | 18         | 11    |
| Remote Throttle On/Off              | 67               | GRA3143           | Gray                  | 18         | 12    |

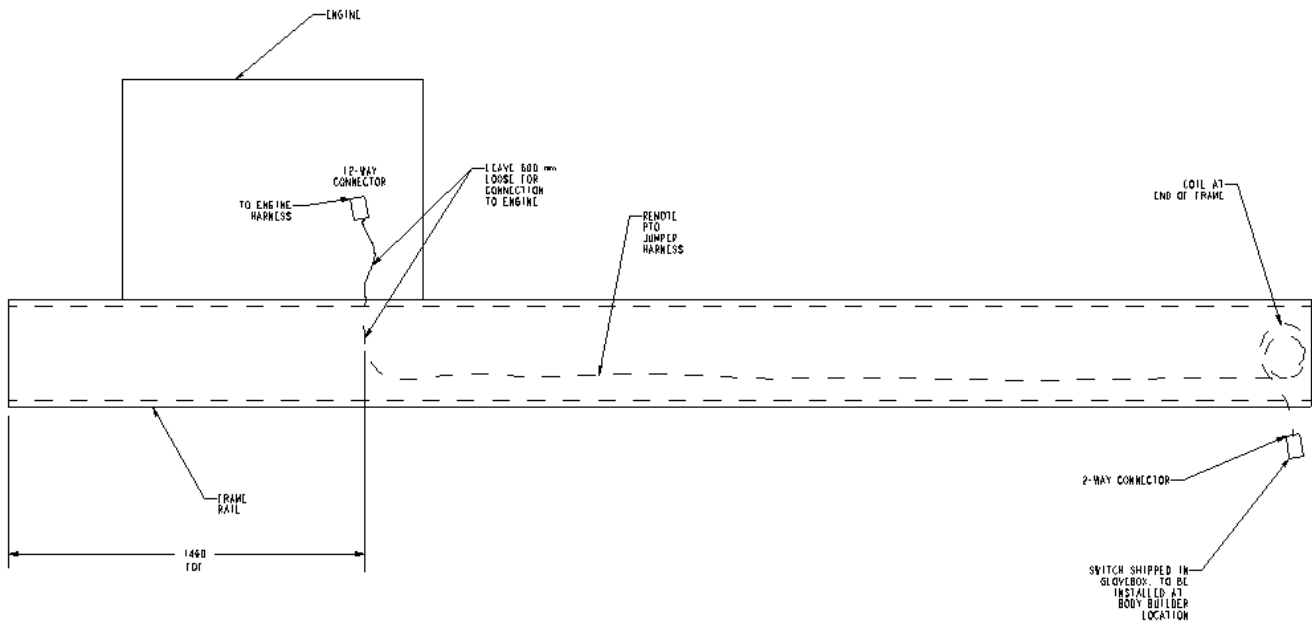


FIGURE 6-27: Wiring for Remote Throttle/PTO Control Switch EOF.

**WARNING!**



To prevent emissions functions of the engine from modifying torque or speed during PTO operation, be sure to connect the PTO sensor wire to the appropriate engine controller input.

## ELECTRICAL WIRE NUMBER AND COLOR

### GENERAL WIRE LABELS

Peterbilt introduced a new electrical wire numbering system in 2007. This wire number system uses only 10 different colors and only one striped wire color. These colors determine a circuits FUNCTION as follows:

**TABLE 6-10.** Wire Number General Categories

|            |                                      |
|------------|--------------------------------------|
| <b>R/W</b> | Direct Battery Power                 |
| <b>RED</b> | Protected Battery Power              |
| <b>ORG</b> | IGN/ACC/Start Power                  |
| <b>YEL</b> | Activated Power                      |
| <b>BRN</b> | Indicator Illumination, Backlighting |
| <b>BLK</b> | Load Return                          |
| <b>GRY</b> | Control                              |
| <b>VIO</b> | Reference Voltage                    |
| <b>BLU</b> | Sensor Signal                        |
| <b>GRN</b> | Sensor common not connected to GND   |
| <b>WHT</b> | Ground                               |

Each wire has at a minimum a 7 character label, the first three characters are the circuits color as listed above, and the remaining four are numerical which relate to the load the wire services. See Table 6-10 for the general categories.

To identify similarly labeled wires a suffix can be added.

For example: YEL2950-1 would be a yellow wire indicating it is activated power. The 2950 indicates the load, in this case fog lamps, the -1 is a suffix used to differentiate similarly labeled circuit.

### DATA BUS WIRE COLORS

Data Bus wiring has its own color scheme as follows:

#### Data-bus high-side wires

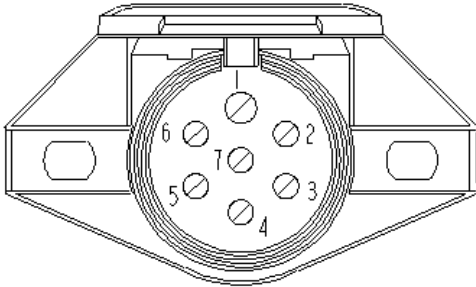
- VIO – J1587 & J1708
- ORG – J1922
- YEL – J1939
- RED – OEM
- GRY – CAN
- BLU – Single-wire bus

#### Data-bus low-side wires

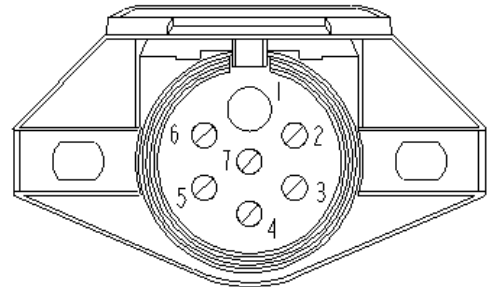
- GRN – All Data-bus low-side wires

**TRAILER CABLE CONNECTIONS**

Peterbilt offers many different trailer connection options. The SAE J560 connector is shown in Figure 6-28, the ISO 3731 connector is shown in Figure 6-29.



**FIGURE 6-28:** SAE J560 Trailer Connector



**FIGURE 6-29:** ISO 3731 Trailer Connector

There are three basic configurations for trailer connections, they are detailed below. Work with your local Peterbilt dealer to identify which setup will be ideal for your intended application. Your local dealer can also identify and provide the wiring diagrams for any chassis that has been built for the configurations below the following circuits will be dedicated pin locations:

**TABLE 6-12:** SAE J560 Connector

| SAE J560 Connector |                                      |
|--------------------|--------------------------------------|
| Pin                | Circuit                              |
| 1                  | Ground                               |
| 2                  | Clearance Lamp Trailer               |
| 3                  | Left Turn Trailer                    |
| 4                  | Stop Lamp Trailer                    |
| 5                  | Right Turn Trailer                   |
| 6                  | Marker Lamp Trailer                  |
| 7                  | Trailer ABS Power or Trailer Hotline |

**TABLE 6-13:** ISO 3731 Connector

| ISO 3731 Connector |                          |
|--------------------|--------------------------|
| Pin                | Circuit                  |
| 1                  | Ground                   |
| 2                  | -                        |
| 3                  | Trailer ABS Warning Lamp |
| 4                  | -                        |
| 5                  | -                        |
| 6                  | -                        |
| 7                  | Trailer ABS Power        |

Below is a description of how the cab ABS and trailer ABS control units interface to turn on the trailer ABS warning lamp. When there is no direct connection, the Power Line Carrier (PLC) is used to transmit the signal. PLC defines that the trailer and cab ABS controllers are communicating via signals transmitted on their power circuits.

1. J560 with Full Truck &/or Tractor Kit (standard configuration):
  - This option provides a single SAE J560 connector at the noted location(s).
  - Trailer ABS power is received on pin 7 of the SAE J560 connector.
  - Trailer ABS signal is on pin 7 of the SAE J560 via “PLC for trucks”
  - Ground is on pin 1 of the SAE J560 connector.



2. J560 & ISO 3731 with Full Truck &/or Tractor Kit:

- This option provides two connectors: SAE J560 and ISO 3731 connector at the noted location(s):
- Trailer ABS power is on pin 7 of the SAE J560 & ISO 3731 connectors.
- Trailer ABS signal can be received on pin 7 of the SAE J560 & ISO 3731 via “PLC for trucks”
- Trailer ABS warning lamp circuit can be received on pin 3 of the ISO 3731 connector.
- Ground is on pin 1 of the SAE J560 & ISO 3731 connectors.

3. J560 Hotline & ISO 3731 with Full Truck &/or Tractor Kit:

- This option provides two connectors: SAE J560 and an ISO 3731 connector at the noted location(s)
- Trailer ABS power is on pin 7 of the ISO 3731 connector.
- Trailer ABS signal is on pin 7 of the ISO 3731 via “PLC for trucks”
- Trailer ABS warning lamp circuit is on pin 3 of the ISO 3731 connector.
- Trailer Hotline is provided on pin 7 of the SAE J560 connector. This may be either battery powered or switched.
- Ground is on pin 1 of both the SAE J560 & ISO 3731 connectors.

**TRAILER/BODY BUILDER WIRE COLORS**

Trailer Wires have their own wiring scheme as follows:

**TABLE 6-11. Trailer Wire Colors**

| <b>Color</b> | <b>Circuit</b>            |
|--------------|---------------------------|
| White        | Ground                    |
| Black        | Clearance ID Marker lamps |
| Yellow       | Left turn lamps           |
| Red          | Stop lamps                |
| Light green  | Right turn lamps          |
| Brown        | Tail lamps                |
| Light blue   | ABS power Auxiliary       |

To identify specific circuits contact your local Peterbilt Dealer.

**BODY LIGHT CONNECTIONS**

In addition to these configurations an optional junction box is available mounted either behind the cab or at the end of frame. See Figure 6-30.

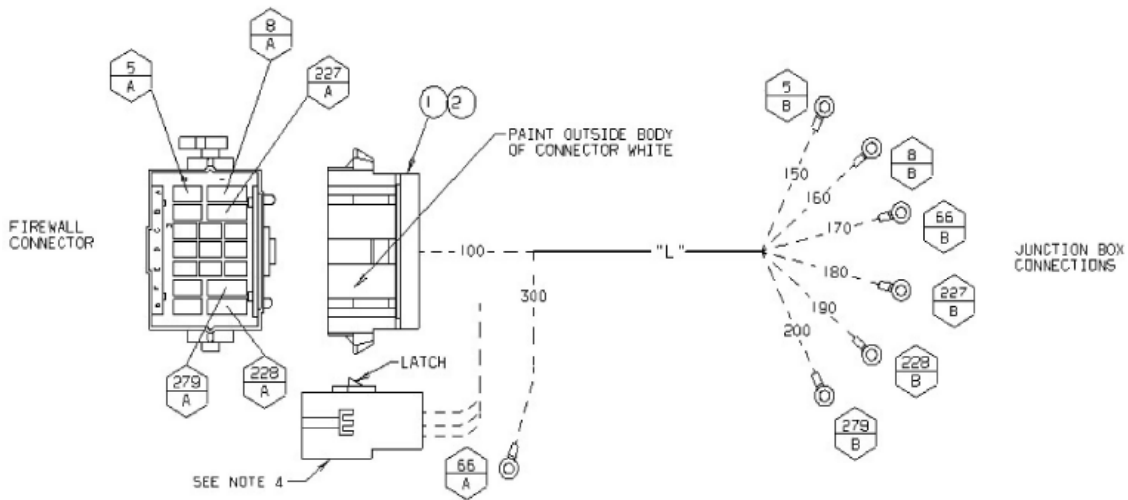


**FIGURE 6-30. Junction Box**

Circuits provided inside the junction box are:

- Ground
- Clearance Lamp Signal
- Marker Lamp Signal
- Left Turn Signal
- Brake Lights Signal
- Right Turn Signal:

These circuits are terminated with ring terminals attached to one side of a terminal strip. To connect to the circuits use a ring terminal for a #10 screw.



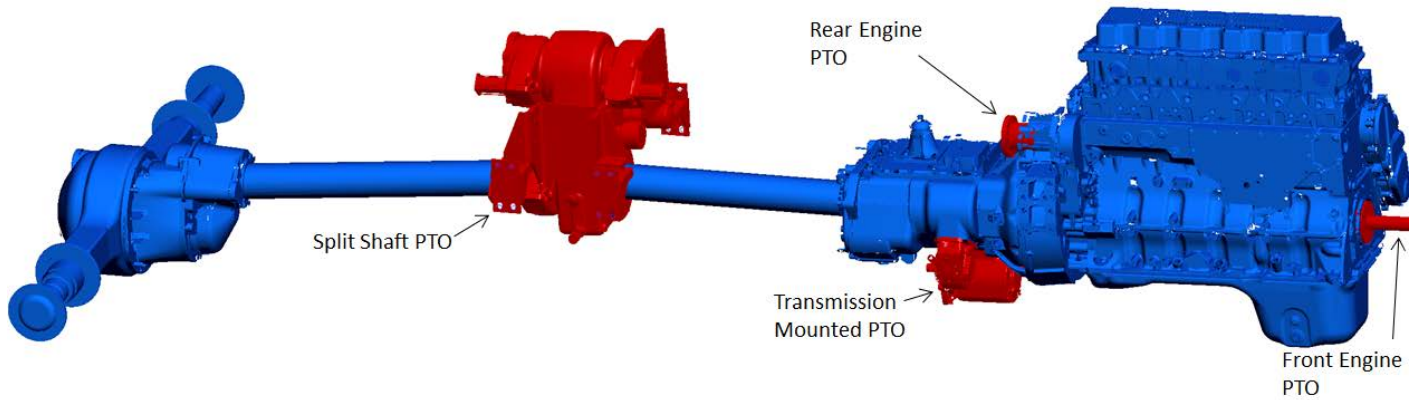
| CKT   | GA | WIRE     | LOC | TERM         | LOC | TERM     | FUNCTION          |
|-------|----|----------|-----|--------------|-----|----------|-------------------|
| 5AB   | 12 | 16-04449 | A   | 16-04260-004 | B   | 16-02113 | CLEARANCE LAMPS   |
| 8AB   | 12 | 16-04449 | A   | 16-04261-004 | B   | 16-02113 | MARKER LAMPS      |
| 66AB  | 8  | 16-04451 | A   | 16-02119     | B   | 16-02118 | GROUND            |
| 227AB | 12 | 16-04449 | A   | 16-04261-004 | B   | 16-02113 | RIGHT TURN SIGNAL |
| 228AB | 12 | 16-04449 | A   | 16-04261-004 | B   | 16-02113 | LEFT TURN SIGNAL  |
| 279AB | 10 | 16-04450 | A   | 16-04261-002 | B   | 16-02113 | BRAKE LIGHTS      |

**FIGURE 6-31. Junction Box Wiring**

# SECTION 7 POWER TAKE-OFF (PTO)

## INTRODUCTION

A Power Take Off (PTO) provides a way to divert some or all of the trucks engine power to another component. There are a wide variety of PTO options available on a Peterbilt that are described below.



**FIGURE 7-1.** Power Take-Off Locations

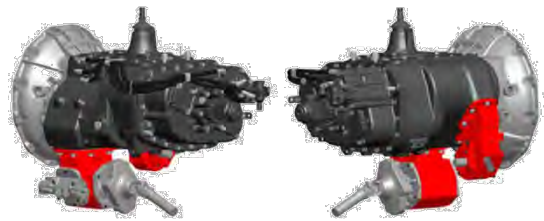
## TRANSMISSION MOUNTED PTO – GENERAL

### MANUAL TRANSMISSIONS

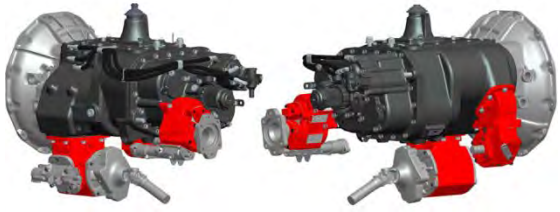
This is the most common type of PTO that is used. Figures 7-2 through 7-9 show all of the manual and automated transmissions available for Medium Duty. Reference Table 7-1 for transmission availability with the Peterbilt Medium Duty models. For more information go to [www.roadranger.com](http://www.roadranger.com) and enter "PTO Installation Guide" in the search bar in the upper right corner.



**FIGURE 7-2.** MD Manual Transmission



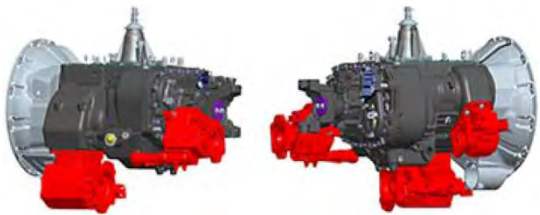
**FIGURE 7-3.** HD Manual Transmission - RT



**FIGURE 7-4.** HD Manual Transmission – RT Vocational



**FIGURE 7-5.** HD Manual Transmission – RT Performance



**FIGURE 7-6.** HD Manual Transmission – Fuller Advantage



**FIGURE 7-7.** HD Manual Transmission – FR Series



**FIGURE 7-8.** MD Automated



**FIGURE 7-9.** HD Automated – Ultrashift Plus – VCS and VMS

## AUTOMATIC TRANSMISSIONS

On Allison transmissions there are two locations for PTO's. The Allison 4000 series has PTO locations at 1 and 8 o'clock viewed from the back of the transmission. See Figure 7-10. The 4000HS and 3000HS transmissions do not have any PTO locations. The 3000 series Allison transmissions have PTO locations at 4 and 8 o'clock (Figure 7-11). 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.

Some PTO configurations will have clearance issues with other components on the truck. With manual transmissions, a 6-bolt PTO on the right will typically clear most components when the DPF and SCR are under the cab. This is also true when 30 and 45 degree adapters are used. The 8-bolt bottom mount PTO will not have any issues unless you are running a driveshaft back to another component and the truck has a crossover style exhaust. In this case, the DPF and SCR would block any routing for the driveshaft. If a wet kit is used in this scenario there is enough room to mount the PTO and the hydraulic pump without interfering with the exhaust. On Allison 4000 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. The same issue with crossover exhaust would apply here as well. 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 models.

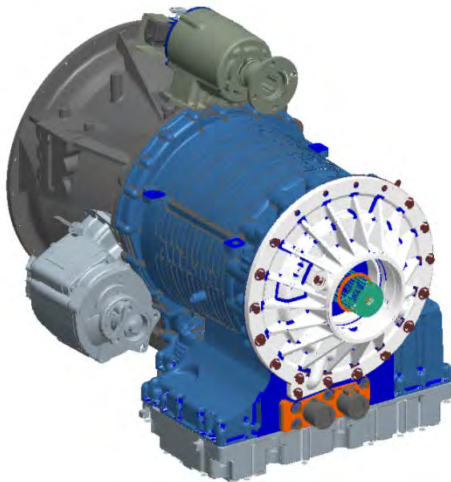


FIGURE 7-10. Allison 4000 Series

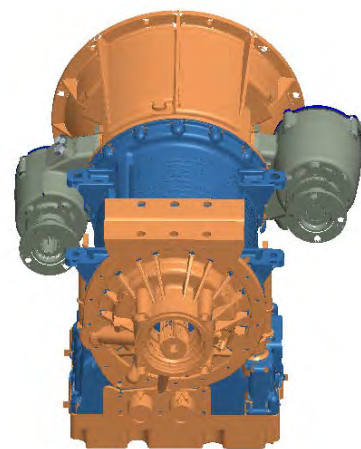
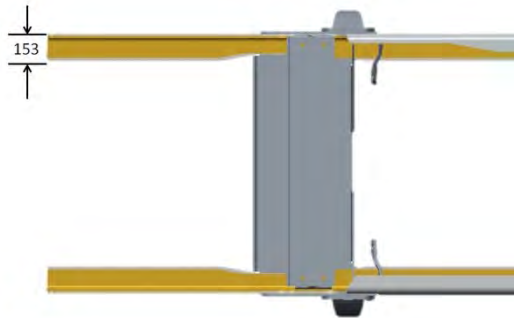
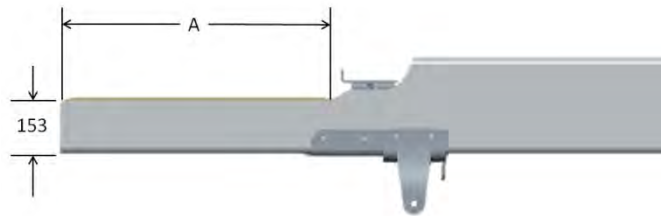
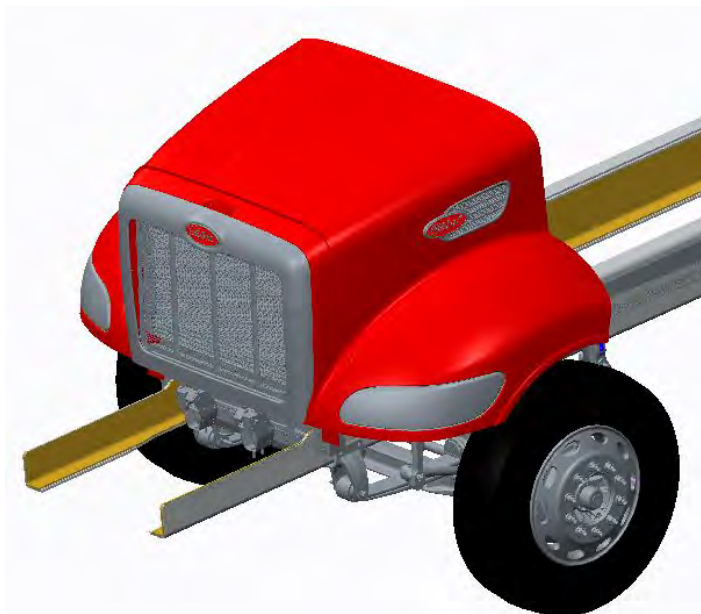


FIGURE 7-11. Allison 3000 Series

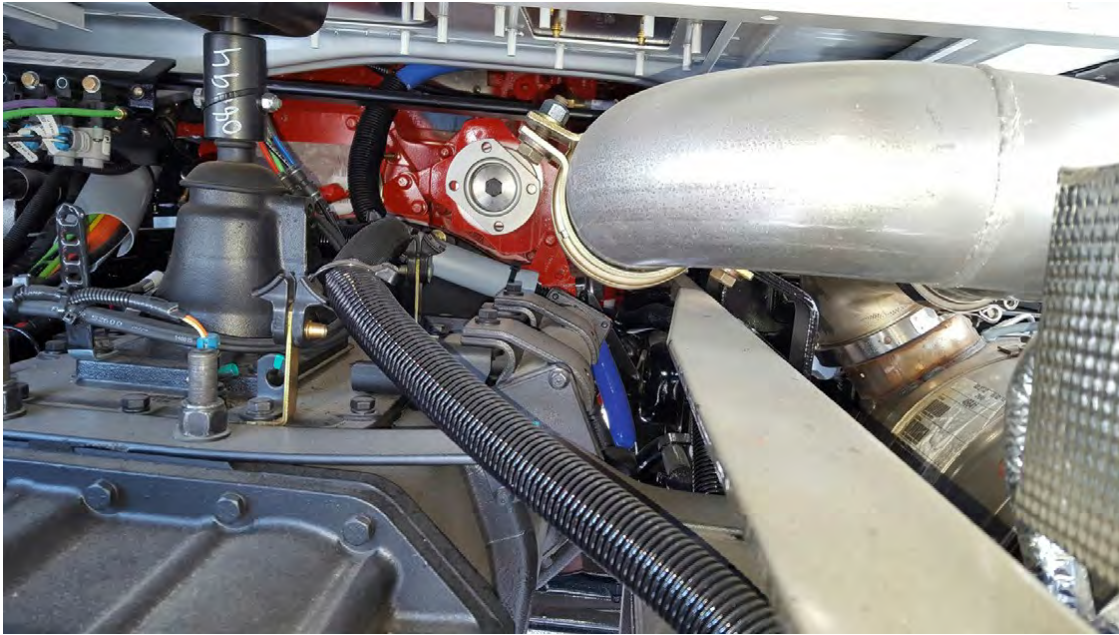
**FRONT ENGINE PTO**

Front engine PTO (FEPTO) is commonly used in mixer, snow plow, and crane applications. When a FEPTO is spec'd on a truck, the cooling module moves up to allow for a shaft to be bolted to the front of the crankshaft and extend out to the front of the truck. The vehicle can be spec'd with a 1350 flange adapter to simplify installing the FEPTO shaft. The frame rails will be extended out to mount a hydraulic pump, snow plow or outriggers. There are options for either a 27.8" or a 3.2" frame extension. See Figures 7-12 through 7-14 for frame extension dimensions.

**FIGURE 7-12.** Frame Extension Top View**FIGURE 7-13.** Frame Extension Left Hand View**FIGURE 7-14.** Frame Extension

**REAR ENGINE PTO**

Rear Engine PTO (REPTO) is commonly used in cement mixer and feed lot 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. See Figure 7-15 for an example. The REPTO flange will always be turning when the engine is running and the output rotation is the same as the engine. The Cummins ISL9 and PX-9 REPTO turns at a rate of 1.15:1.



**FIGURE 7-15.** REPTO Flywheel Housing

## **PTO INSTALLATIONS**

### **STANDARD PTO OPERATION**

Cab PTO switch can be setup by the operator to a pre-programmed engine set speed(s) and the engine speed can be ramped up and down with the set/resume switch. To control the PTO there are various dash switches that we offer. Standard with every vehicle is the Cruise Control/PTO on off switch and the Set/Resume switch. There are also several additional PTO control switches that can be used. The PTO control switch will be plumbed with air lines that will be plugged at the firewall bulkhead. See Section 6 for PTO dash switch plumbing and firewall bulkhead locations. On PACCAR engines, when the cruise control switch is activated and all parameters set in the ECM for PTO mode are met, the engine will go into PTO mode. In this mode, the engine will respond to all PTO mode parameters that have been programmed into the software. These parameters can be changed with INSITE on all PACCAR engines. There is a PTO light on the dash that should be wired to the PTO to inform the operator when the PTO has engaged or disengaged. This should be wired to the PTO output, not just a dash switch or PTO enable circuit. The wire can be found in the right hand rail in the area of the transmission. The wire is labeled WHT1513 PTO Circuit.

### **ALLISON TRANSMISSION PTO**

The PTO's will require an electric signal. We do not currently offer an electric PTO switch for the medium duty family, but there are several options available. The most common method of getting an electric signal for the PTO is to get a factory air switch and install a pressure switch on the air line. It is recommended to provide a 12 volt signal to the transmission control module (TCM) and have the TCM programmed to check for specific requirements such as engine speed, gear selection, output speed etc. before engaging the PTO. If the TCM logic is bypassed and the PTO is engaged directly it could cause damage to the PTO and the transmission. Contact your local Allison rep for more information.

### **PTO ENABLE RELAY CONNECTION WITH ALLISON TRANSMISSION**

A 3-wire pigtail is available in Allison chassis harness. The connector is labeled "J105-PTO Enable" and the pigtail is connected to the PTO Enable Relay. The relay is energized by an output from the TCM (PTO Enable Output, AT130). The PTO Enable Input to TCM is J109 – PTO (AT143) which requires 12V+. When relay is energized, pins B & C are "connected". When relay is not energized, pins B & A are "connected".

### **RANGE INDICATOR RELAY CONNECTION WITH AN ALLISON TRANSMISSION**

A 3-wire pigtail is always available in Allison chassis harness. The connector is labeled "J104-Range Indicator" and the pigtail is connected to the Range Indicator Relay. The relay is energized by an output from the TCM (for Neutral Indicator) When relay is energized, pins C & B are "connected". When relay is not energized, pins C & A are "connected".



# SECTION 8 AFTERTREATMENT

## INTRODUCTION

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

All Peterbilt's equipped with 2017 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 NOx, turning it into water and nitrogen. For more information on the specific details of how SCR works, please contact your local Peterbilt dealer.

## DEF SYSTEM SCHEMATIC

On most Peterbilt chassis the DEF Supply Module (or pump) is integrated into the DEF tank. Peterbilt does not allow relocation of this pump. The following schematic details how the DEF lines route to the after-treatment system.

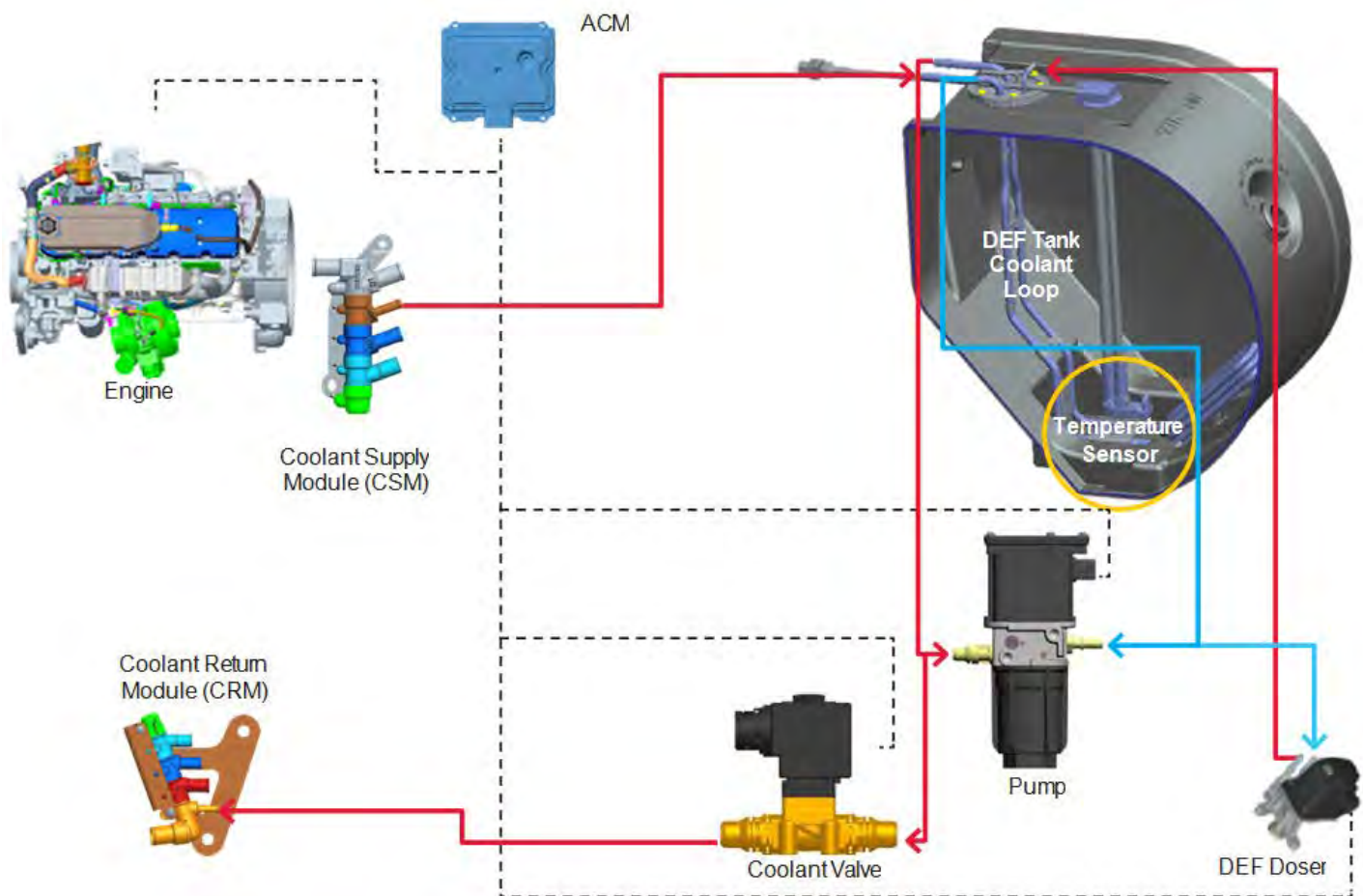


FIGURE 8-1. DEF System Schematic

DEF will freeze at approximately 11° F. In order 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. Below, numbers denote the order of the component in the flow.

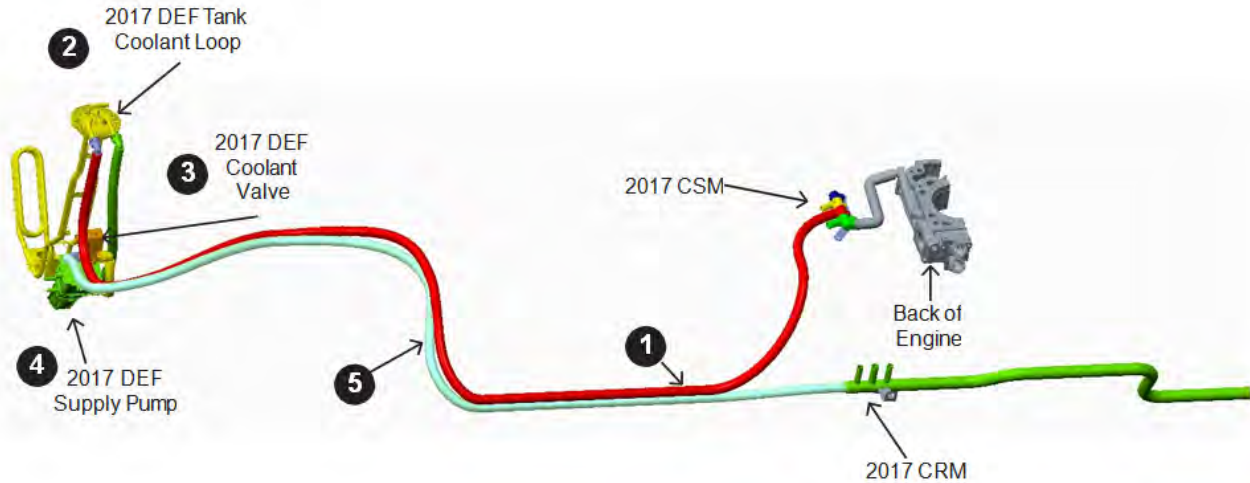


FIGURE 8-2. DEF Coolant Routing Schematic

**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 E.P.A. 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. Dosing rates for these calculations are also shown.

TABLE 8-1. DEF Fuel Ratios

| DEF Tank    | FUEL VOLUME ALLOWED (USABLE GALLONS) |       |                 |      |  |       |                 |      |
|-------------|--------------------------------------|-------|-----------------|------|--|-------|-----------------|------|
|             | Standard DEF-Fuel Ratio (2:1)        |       |                 |      | Minimum Recommended DEF-Fuel Ratio (1:1), No Derates |       |                 |      |
|             | PX-7/<br>ISX15                       | ISX12 | MX-11/<br>MX-13 | PX-9 | PX-7/<br>ISX15                                       | ISX12 | MX-11/<br>MX-13 | PX-9 |
| SMALL       | 153                                  | 162   | 113             | 189  | 193  | 204   | 152             | 238  |
| MEDIUM      | 286                                  | 303   | 212             | 353  | 387  | 409   | 286             | 477  |
| LARGE       | 431                                  | 455   | 318             | 531  | 581  | 614   | 430             | 717  |
| MEDIUM AERO | 291                                  | 307   | 215             | 358  | 393  | 416   | 308             | 485  |
| LARGE AERO  | 368                                  | 389   | 272             | 454  | 538  | 569   | 419             | 664  |
| Rectangular | 103                                  | 109   | 76              | 128  | 148  | 157   | 110             | 183  |

## INSTALLATION REQUIREMENTS AND DIMENSIONS FOR DEF SYSTEM

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

With all relocating procedures, general clearances and routing guidelines must be followed. See section 10 of this manual for general routing guidelines.

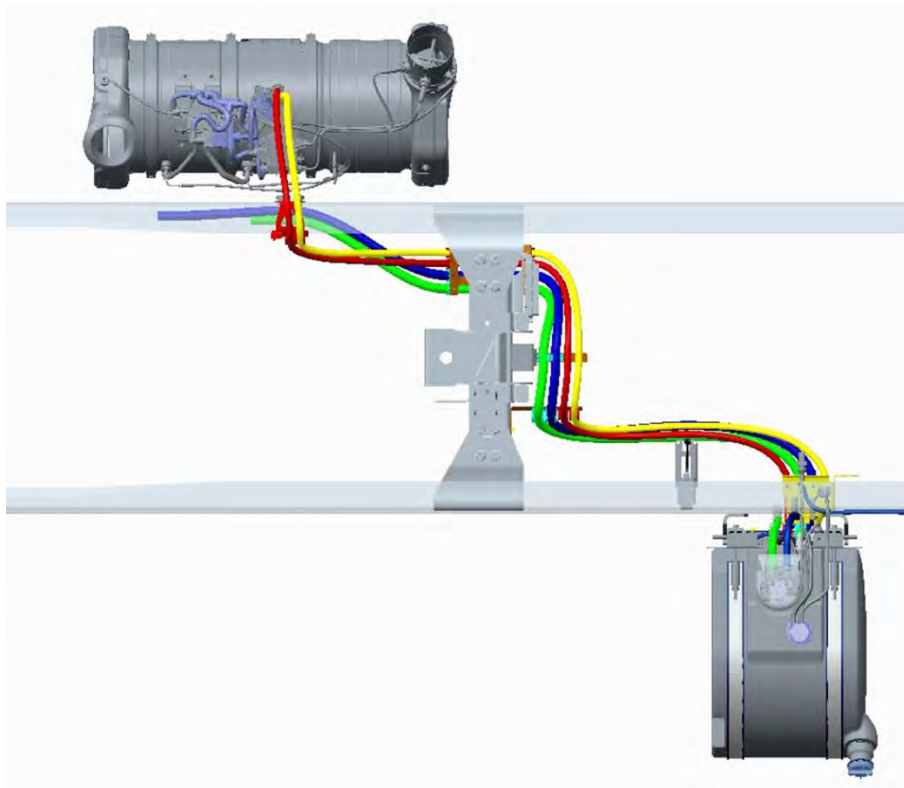
When relocating the components the maximum pressure DEF hose length, from Supply module to Dosing Module, is 5.5 meters (216.5").

Maintain a minimum of 3" clearance to shielded exhaust components when routing DEF lines to prevent possible melting.

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 by mitigating changes in restrictions. Changes in restriction are added with excessive line length and bends. Work with your local Peterbilt dealer if you are unsure about the coolant line modifications.

### ROUTING TO THE DOSING MODULE (INJECTOR)

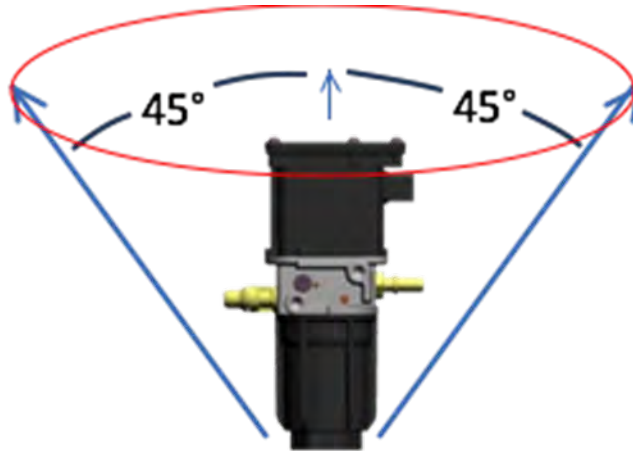
A DEF pressure line "trap" is no longer required after EPA 2013 emissions level engine. The dosing module (injector) no longer needs to be purged and relative heights of components are no longer critical. See Figure 8-3 below for typical routing with RHUC exhaust and LH DEF tank shown. Figure below shows a typical coolant line routing.



**FIGURE 8-3.** Routing for DEF and Coolant Lines

**DEF SUPPLY MODULE MOUNTING REQUIREMENTS**

The Supply Module (or Pump) standard mounting location is on the DEF tank assembly. Body builders may need to relocate this component, and should follow the location and length restrictions above. Additionally the mounting and the orientation of the Supply Module must not exceed 45° from vertical in any direction.



**FIGURE 8-4.** Supply Module Allowed Clocking Angle Limit Scribes a 90° Inverted Cone.

# SECTION 9 ROUTING

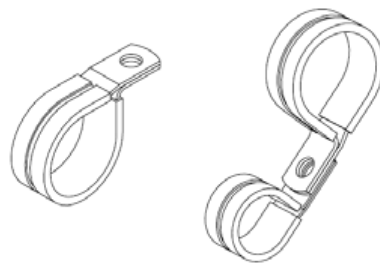
## INTRODUCTION

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.



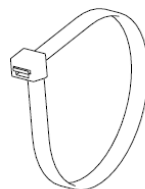
**FIGURE 9-1.** Clamp and Butterfly Clamp

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



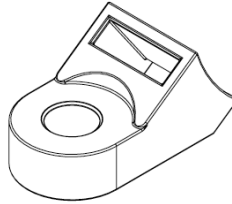
**FIGURE 9-2.** Butterfly Tie

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



**FIGURE 9-3.** Tie Strap

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



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



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

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

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

## ROUTING REQUIREMENTS

### Electrical Wiring

- Electrical ground wire terminals must be securely attached and the complete terminal surface must contact a clean bare metal surface. See R414-558 for grounding wire connection practice. Apply electrical contact corrosion inhibitor Nyogel 759G grease (made by William F. Nye, Inc., New Bedford, MA) per R414-558.
- Don't bend wires or use tie straps within 3 inches (75 mm) 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 13.0 mm (0.5 in.) of clearance exists when the component is in operation and at maximum limits of the component's travel
- Electrical wiring must be protected in the locations 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 a distance of 18 inches (457 mm) or greater from the compressor discharge port. In this case the crossing hoses and wires shall be "butterfly" clamped to the air compressor discharge hose and covered with convoluted tubing at the clamp point (use high temperature clamps on the compressor hose).

## Bundles

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

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

## Routing of Wires and Hoses near Moving Components

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

A minimum clearance of 1.0 inches (25.4) 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 9-1. Exhaust – System Clearance

| Description  | Shielded                 | Unshielded   |
|--|--------------------------|--|
| Coolant hoses, HVAC hoses and tubing, and electrical wires within 15" of the turbo and/or over 15" from the turbo                        | 2" minimum               | 3" minimum   |
| Fuel hoses<br>within 15" of the turbo<br>over 15" from the turbo   | n/a<br>2" minimum        | 4" minimum<br>3" minimum                               |
| Fuel tanks and hydraulic tanks<br>crossing tank<br>parallel to tank<br>end of tank<br>aluminum/ceramic-coated exhaust pipe crossing tank | n/a<br>n/a<br>n/a<br>n/a | 2" minimum<br>2" minimum<br>1" minimum<br>1.5" minimum |
| Air hose<br>nylon<br>wire braid  | 3" minimum<br>2" minimum | 8" minimum<br>3" minimum                               |

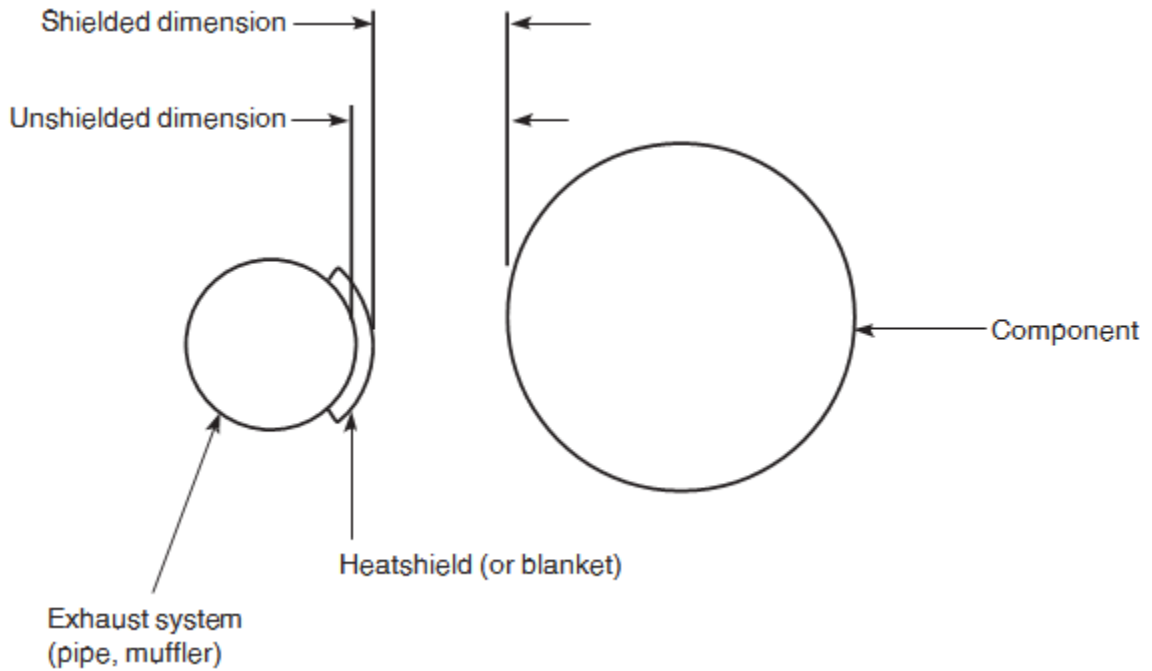


FIGURE 9-5. Definition of measurements.