

Peterbilt Heavy Duty Body Builder Manual 2017



A **PACCAR** COMPANY

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SECTION 1 INTRODUCTION



The Peterbilt Heavy 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 Heavy Duty Body Builder Manual can be very useful when specifying a vehicle, particularly when the body builder is involved in the vehicle selection and component 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 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

We've put 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 lift-gate amperage requirements. An incorrectly specified circuit breaker could result in an electrical overload or fire situation. Follow the lift-gate 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 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. See next section and Appendix A for additional information.

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.

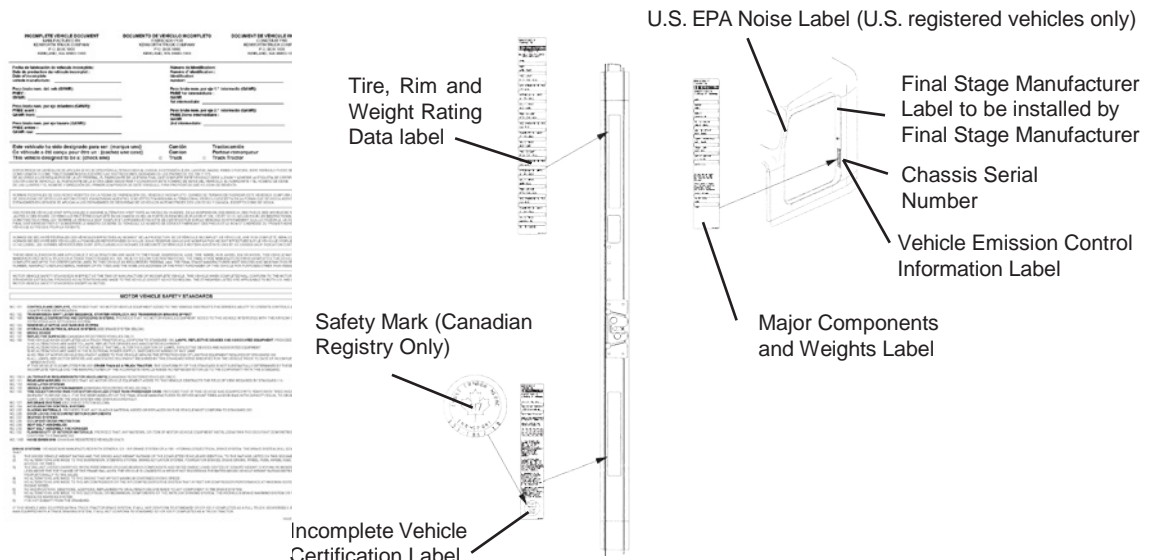


FIGURE 2-1.
Incomplete Vehicle Certification Document

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 variance 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.

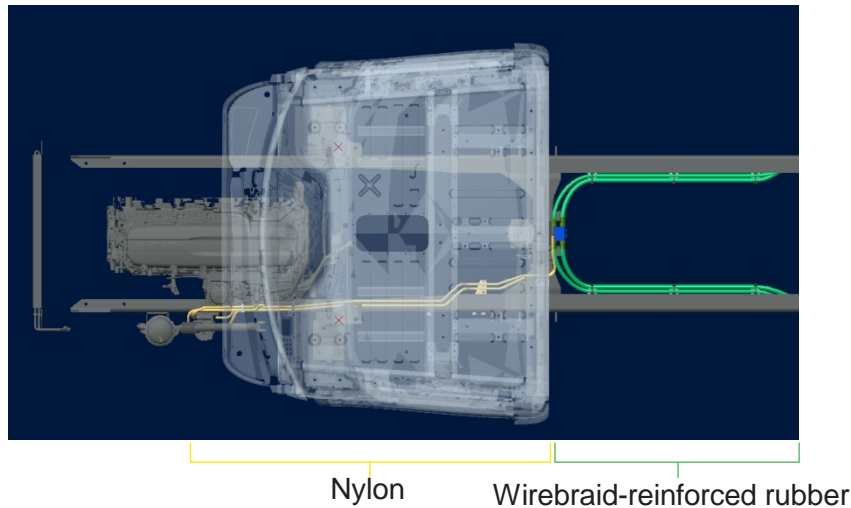
To ensure compliance to emissions regulations, the final configuration of certain features of the completed vehicle must meet specific requirements. This section describes requirements relevant for only the most common or critical modifications done by body builders. For a complete description of acceptable 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
- Formed nylon fuel lines with quick-connects are installed underneath the cab and hood along the frame rail. Behind the cab from the fuel tee to tanks are wirebraid-reinforced rubber lines. Supply and return fittings are poka-yoked to prevent incorrect assembly.



COMPRESSED AIR SYSTEM

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

- Air system modification must meet applicable FMVSS regulations
- Compressed Air tank may not be modified (exception – addition or removal of fittings or relocation of the tank)
- 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_x 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 NOx sensor may not be relocated or altered in any way; this includes re-clocking the after-treatment 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

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 emission system requires an accurate Outside Air Temperature (OAT) reading in order to properly run its control algorithms. The OAT sensor is located in the driver's side mirror assembly on Peterbilt trucks and is shown in the figures below. If the body builder needs to modify the mirror assembly in any way, it is important the OAT sensor stay positioned on the mirror assembly. Running the vehicle without the OAT sensor connected will cause the MIL lamp to illuminate. If needed, a replacement sensor can be ordered from your Peterbilt dealer.



FIGURE 2-3: Aerodynamic Mirror OAT Sensor Location

- Coolant Sensor considerations are given in the Cooling section above
- The OBD/Diagnostic connector port is located below the dash to the left of the steering wheel. This connector and its location may not be changed.
- All vehicles equipped with EPA 2013 compliant diesel and bi-fueled engines must be equipped with a Malfunction Indicator Lamp (MIL) lamp. This lamp is required to be an engine outline symbol as defined by ISO (International Standards Organization). The figure below shows the instrument cluster and MIL lamp position. Note this lamp location is fixed with respect to the controls and its location may not be changed if you are updating the warning lamp cards.

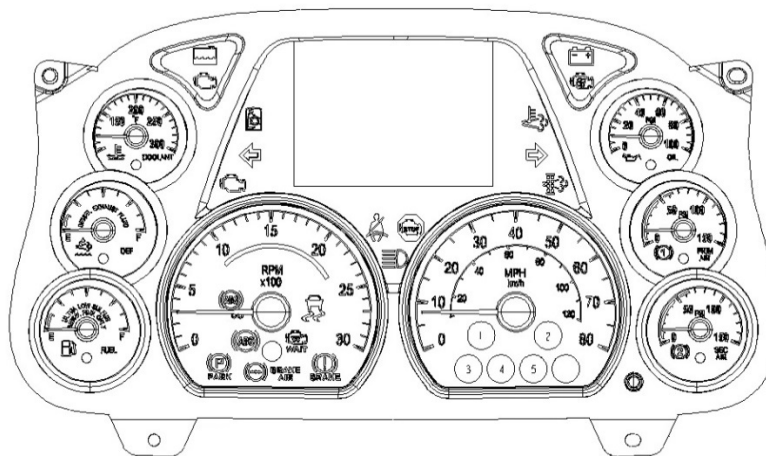




FIGURE 2-4: Instrument Cluster for 579/567 used with EPA 2013 Emission compliant engines. The Check Engine lamp  and/or the MIL  will appear in the Driver Information Display. See 579/567 Operator's Manual for more information.

- In addition to the sensors and lamps above, the emission system also depends on signals from the exhaust DPF (Diesel Particulate Filter), SCR (Selective Catalytic Reduction), and NOx sensor. Wiring between these devices, the Dosing Control Unit (DCU) and engine ECM should not be tampered with or altered in any way.

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 over-speed shutdown devices must not introduce restriction in the intake system
- All plumbing associated with the charge air cooler may not be modified

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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 in 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).
EOF	Frame rail overhang behind rear axle--measured from the centerline of tandems
FOF	Front of frame
FAX	Front Axle
BOC	Back of cab
SOC	Side of cab
WB	Wheelbase
BFA	Bumper to front axle. Measured from front of bumper centerline of front axle.
BBC	Bumper to back of cab Measured from front of bumper to back of cab.

OVERALL DIMENSIONS

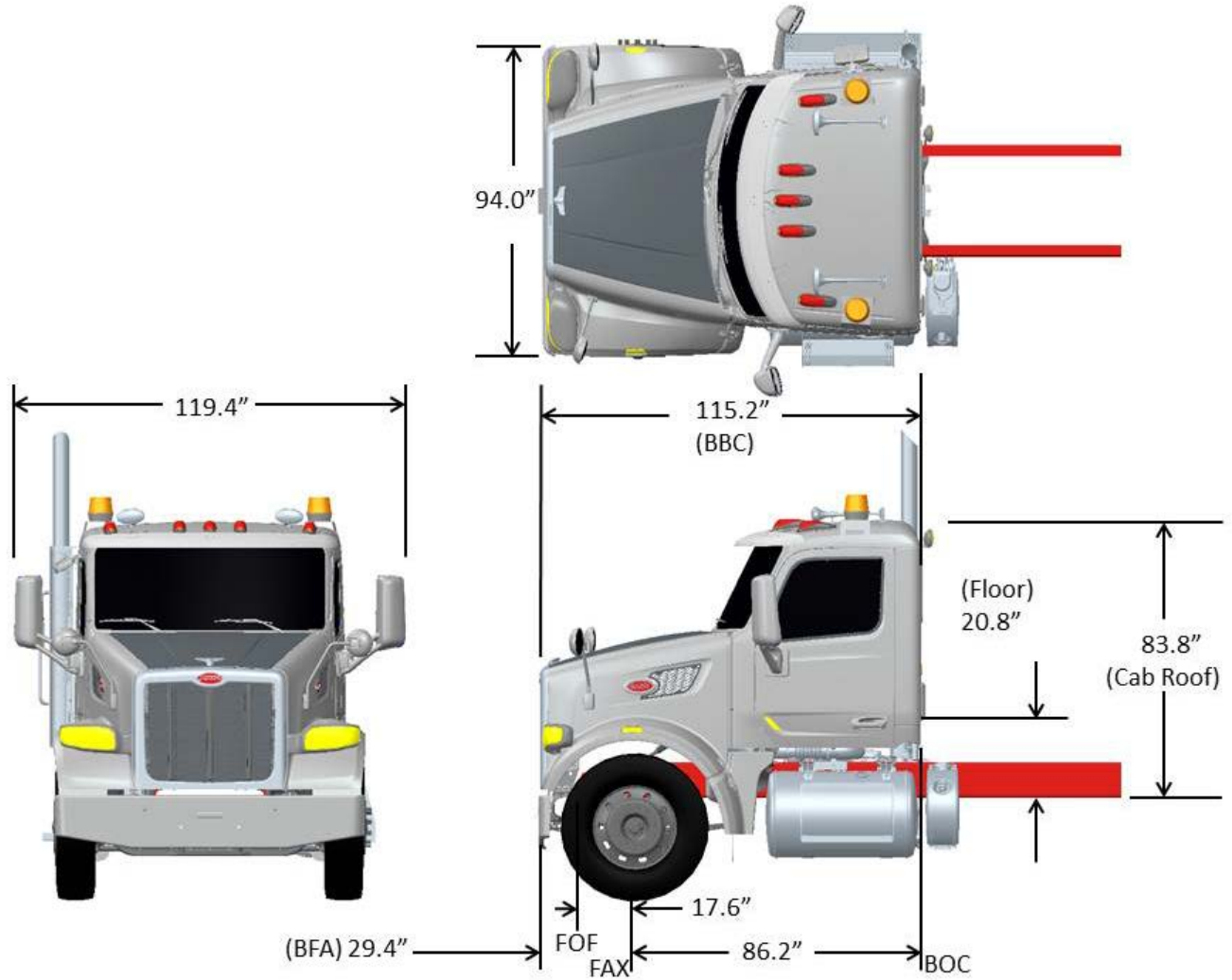
This section includes drawings and charts of the following Peterbilt Models: 389, 367, 365, 567 and 579. The Extended Rear Window, Extended Cab and Unibilt sleepers are also included.

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 "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.

567-115 SFFA

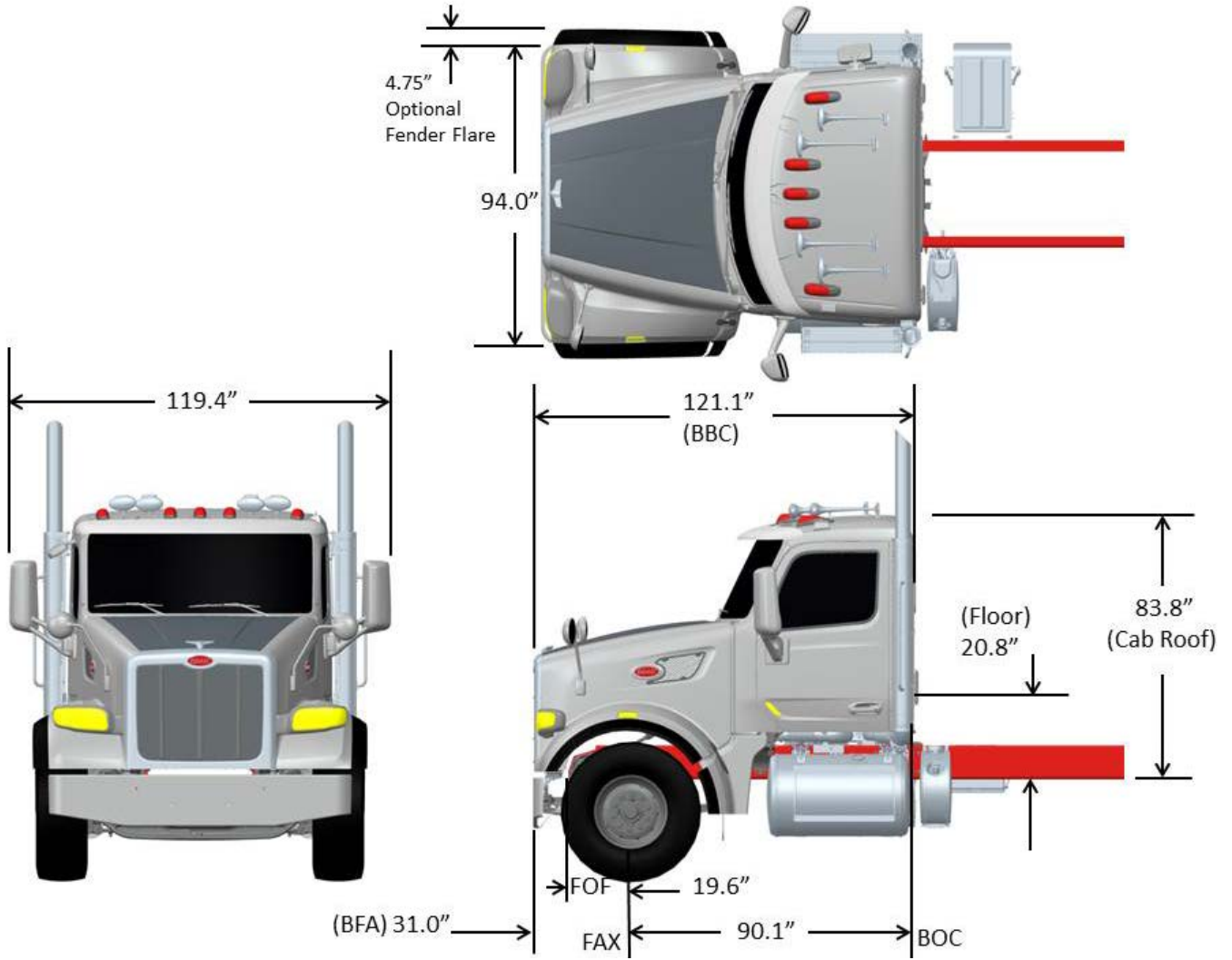


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-1. Model 567-115 SFFA – Overall Dimensions

567-121 SFFA

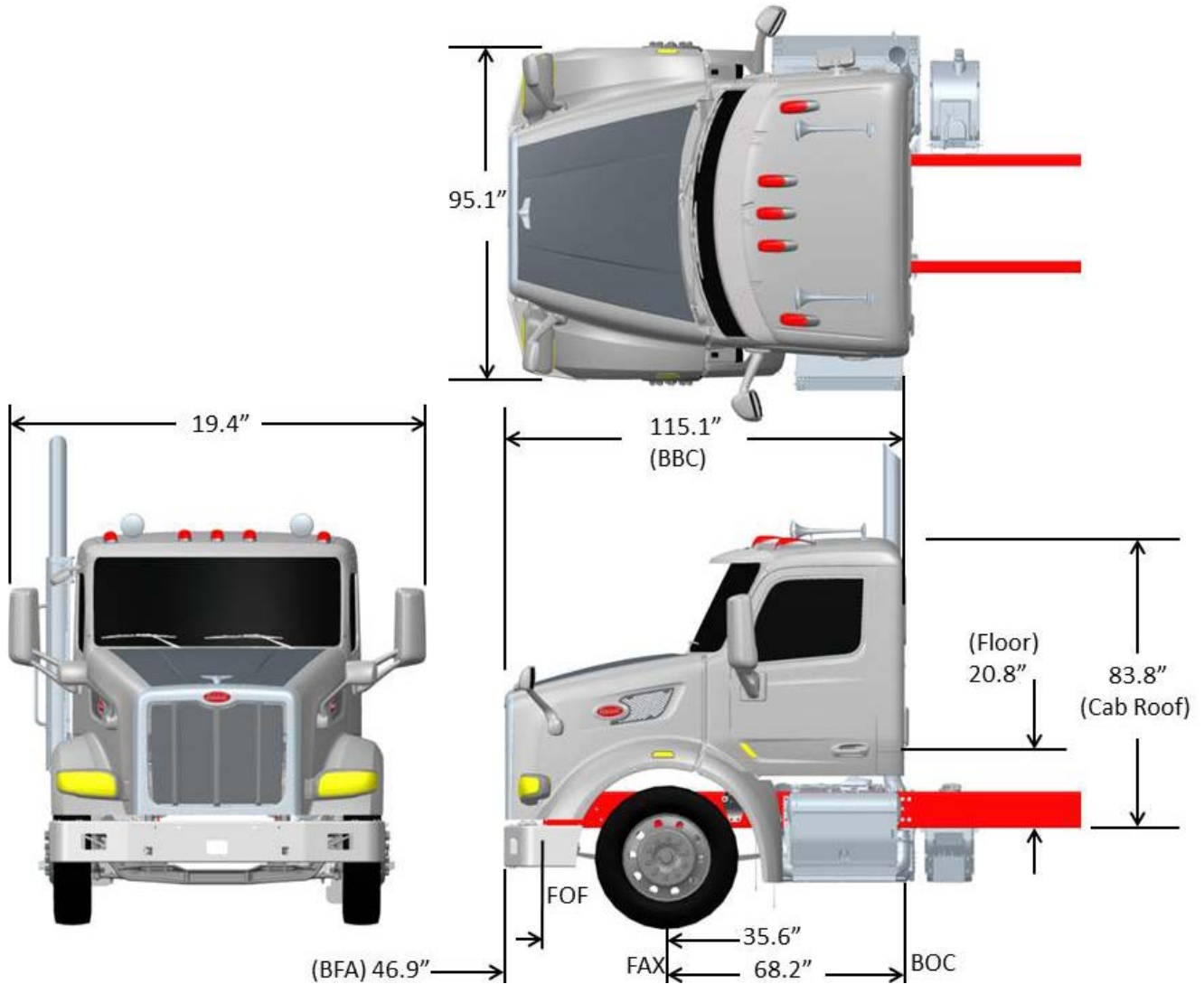


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-2. Model 567-121 SFFA – Overall Dimensions

567-115 SBFA

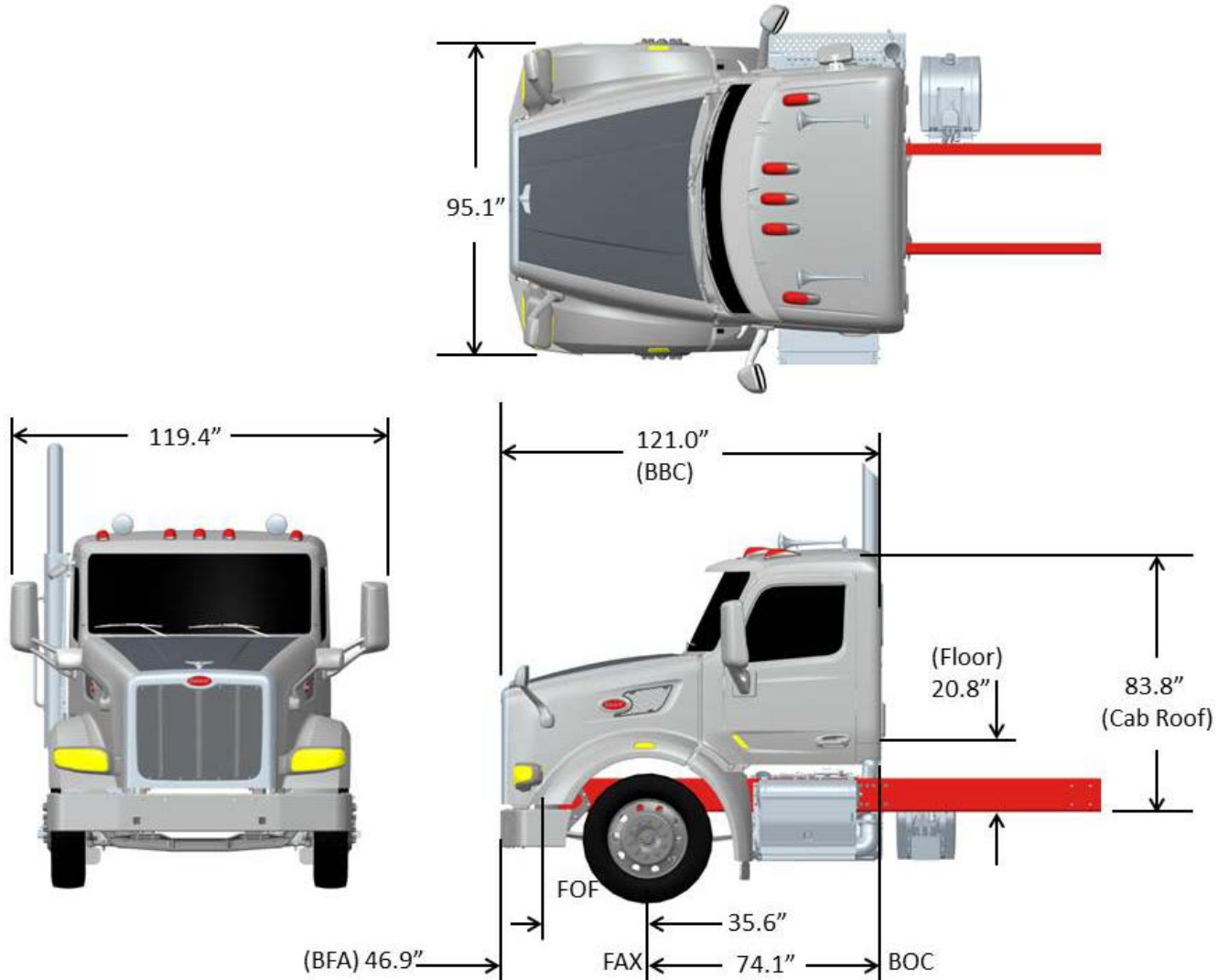


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-3. Model 567-115 SBFA – Overall Dimensions

567-121 SBFA

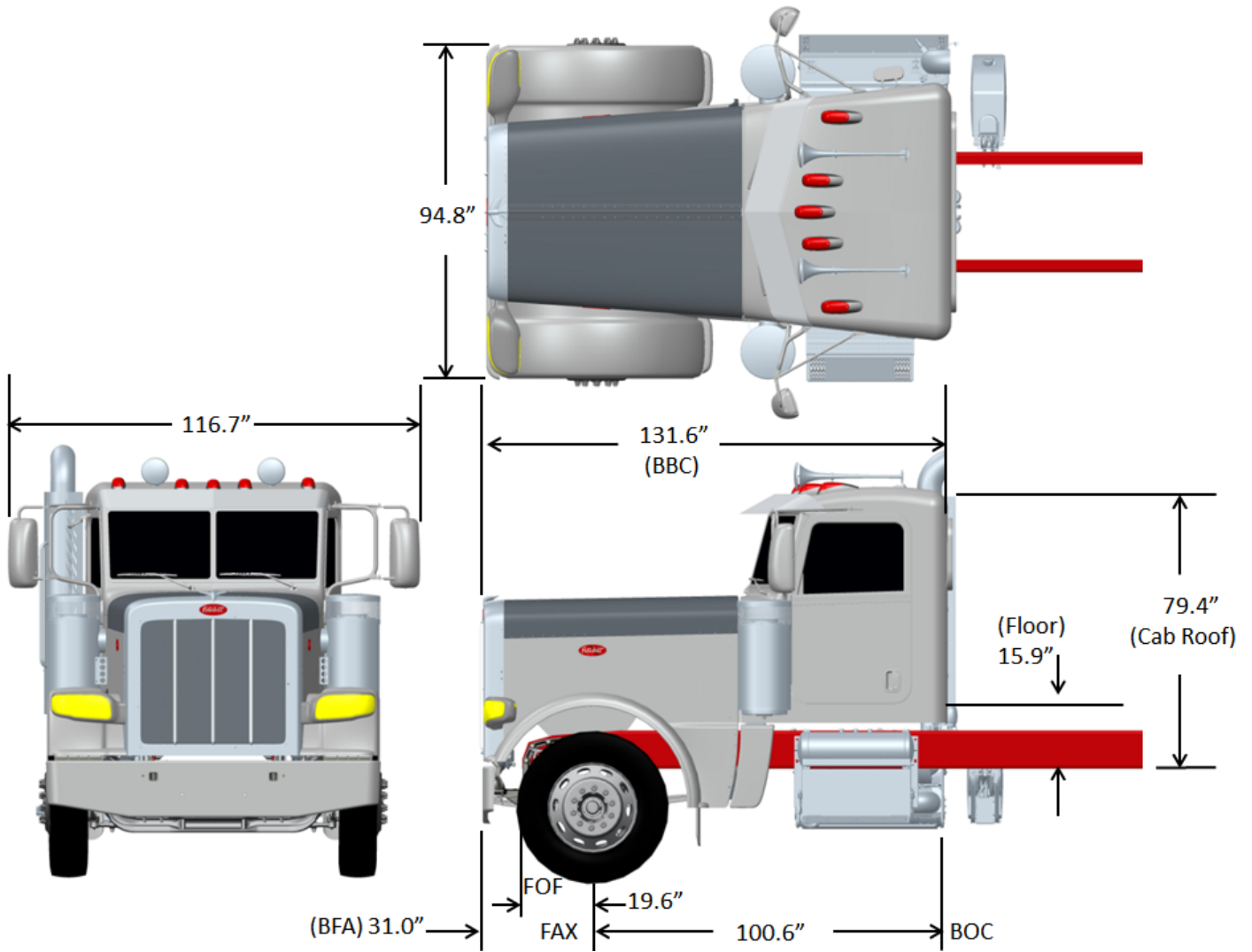


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-4. Model 567-121 SBFA – Overall Dimensions

MODEL 389-131

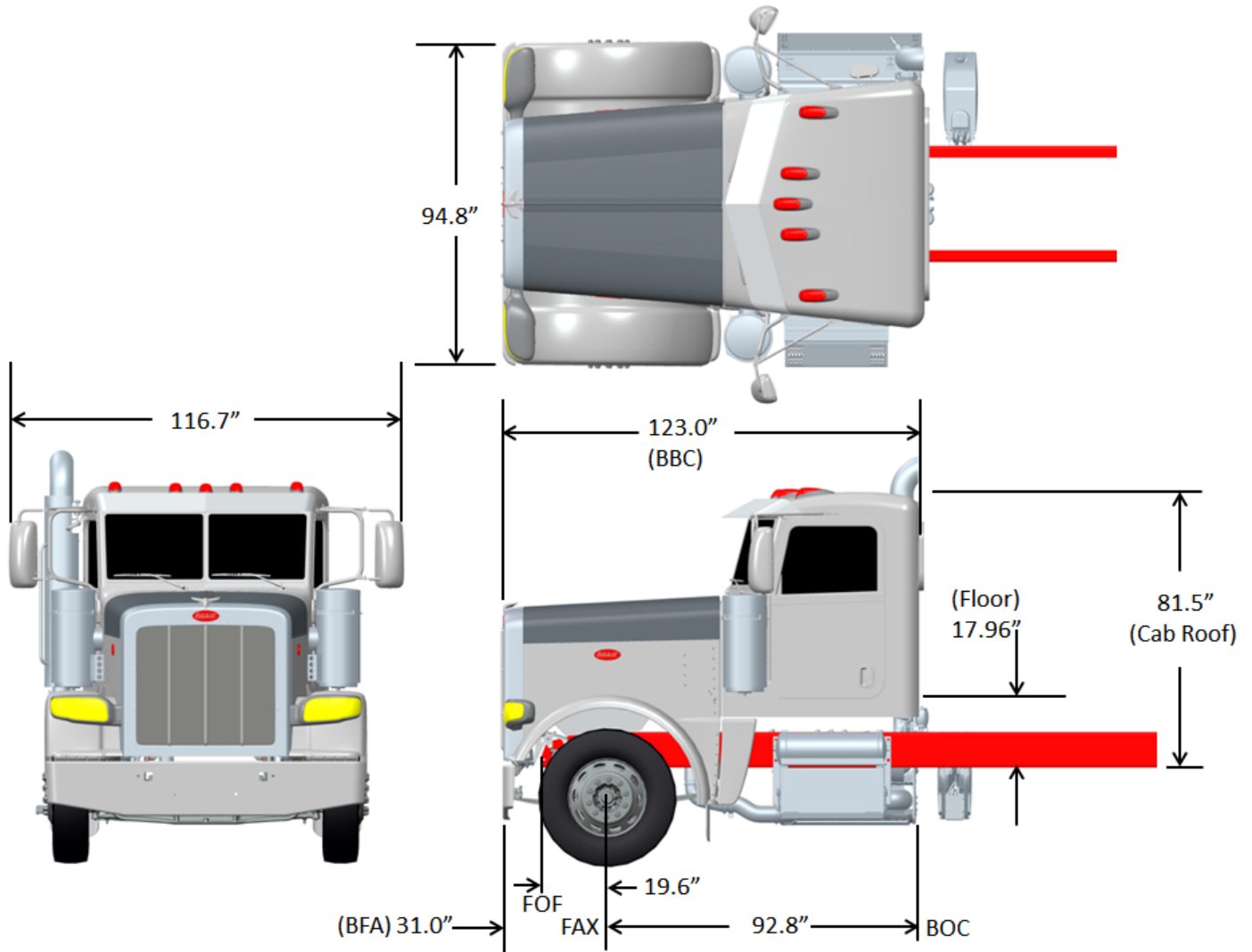


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-5. Model 389-131 Top & LH View – Overall Dimensions

MODEL 389-123

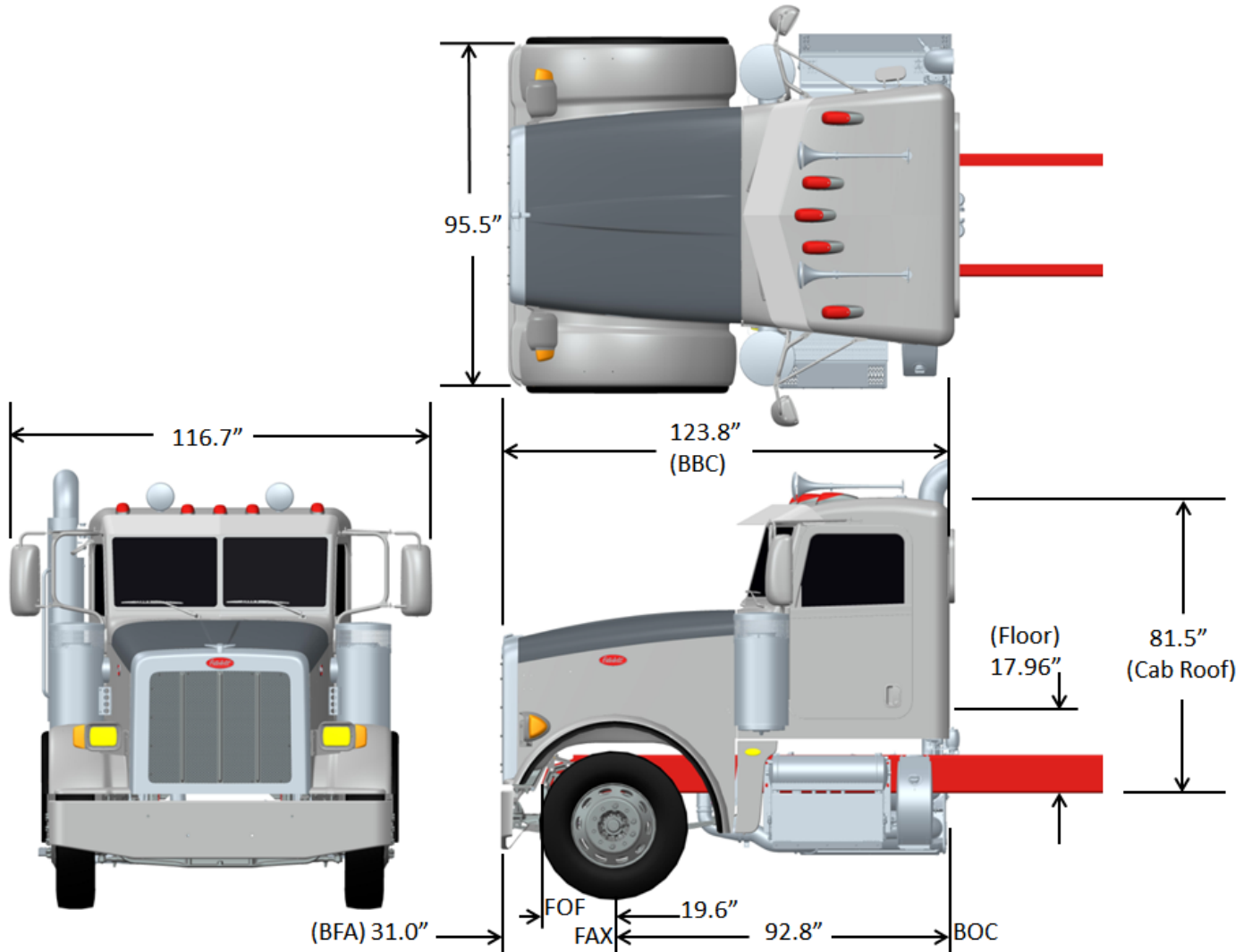


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-6. Model 389-123 Top & LH View – Overall Dimensions

Model 367-123 SFFA

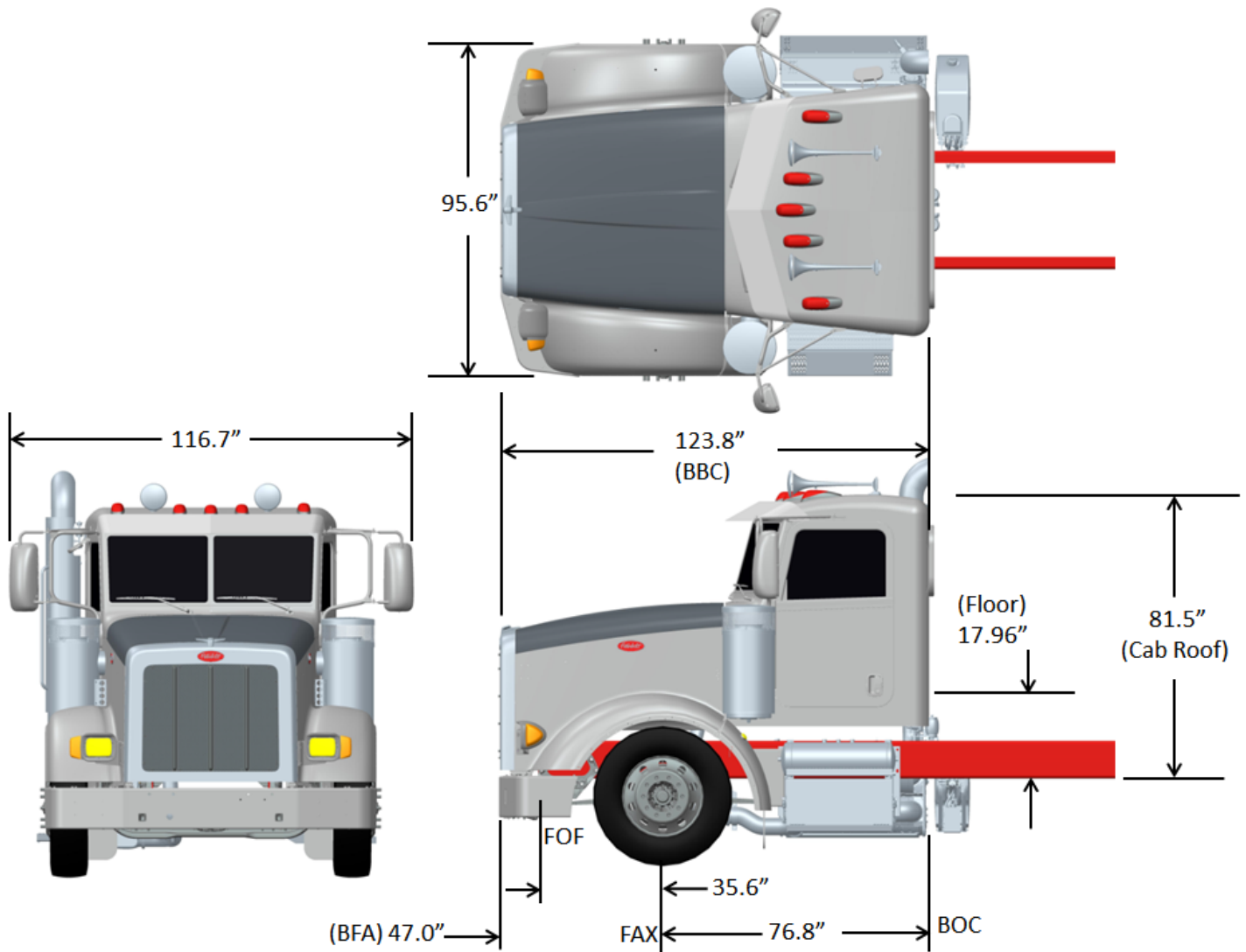


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-7. Model 367 SFFA Top & LH View – Overall Dimensions

Model 367-123 SBFA

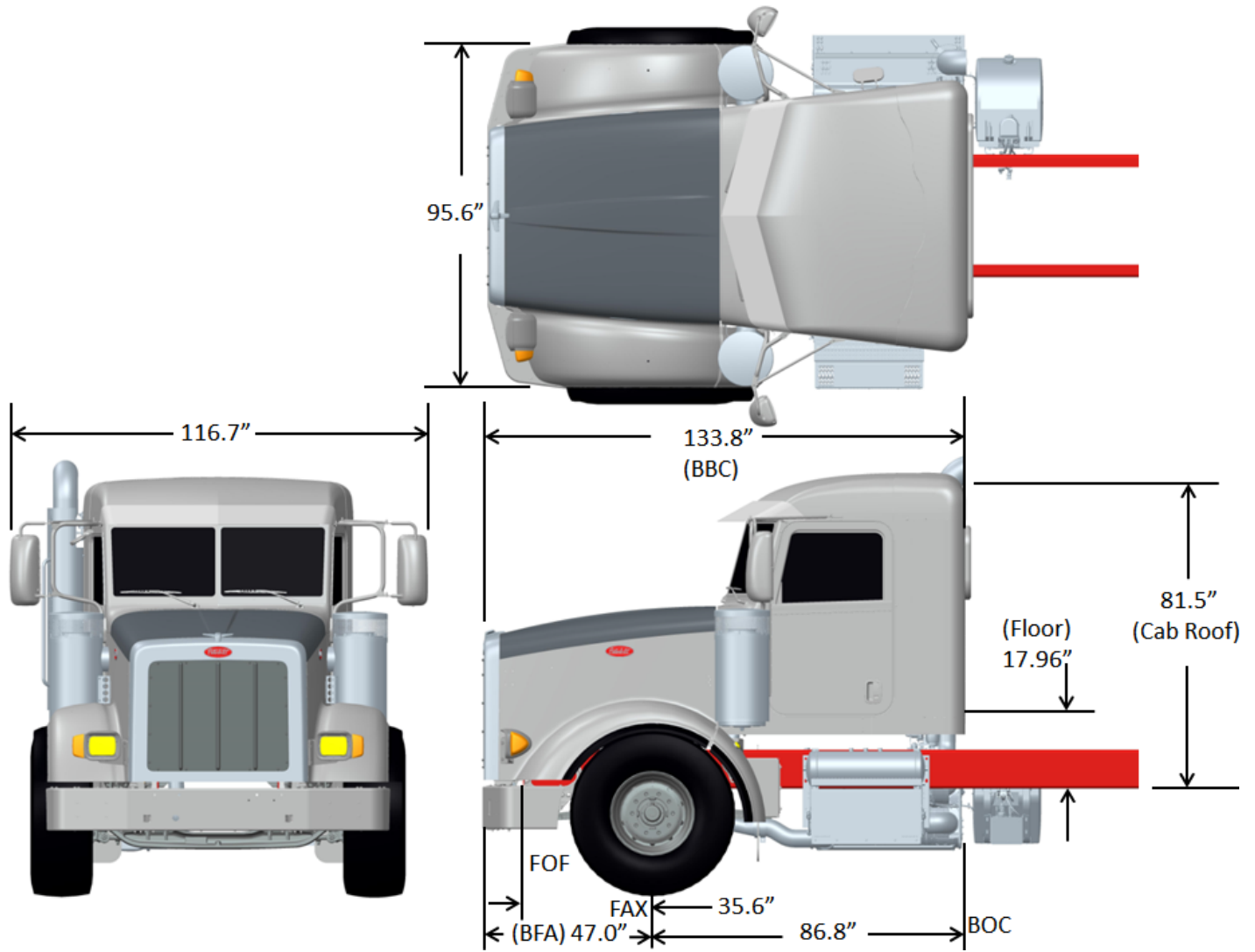


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-8. Model 367 SBFA Top & LH View – Overall Dimensions

Model 367-123 SBFA 10" Extended Day Cab

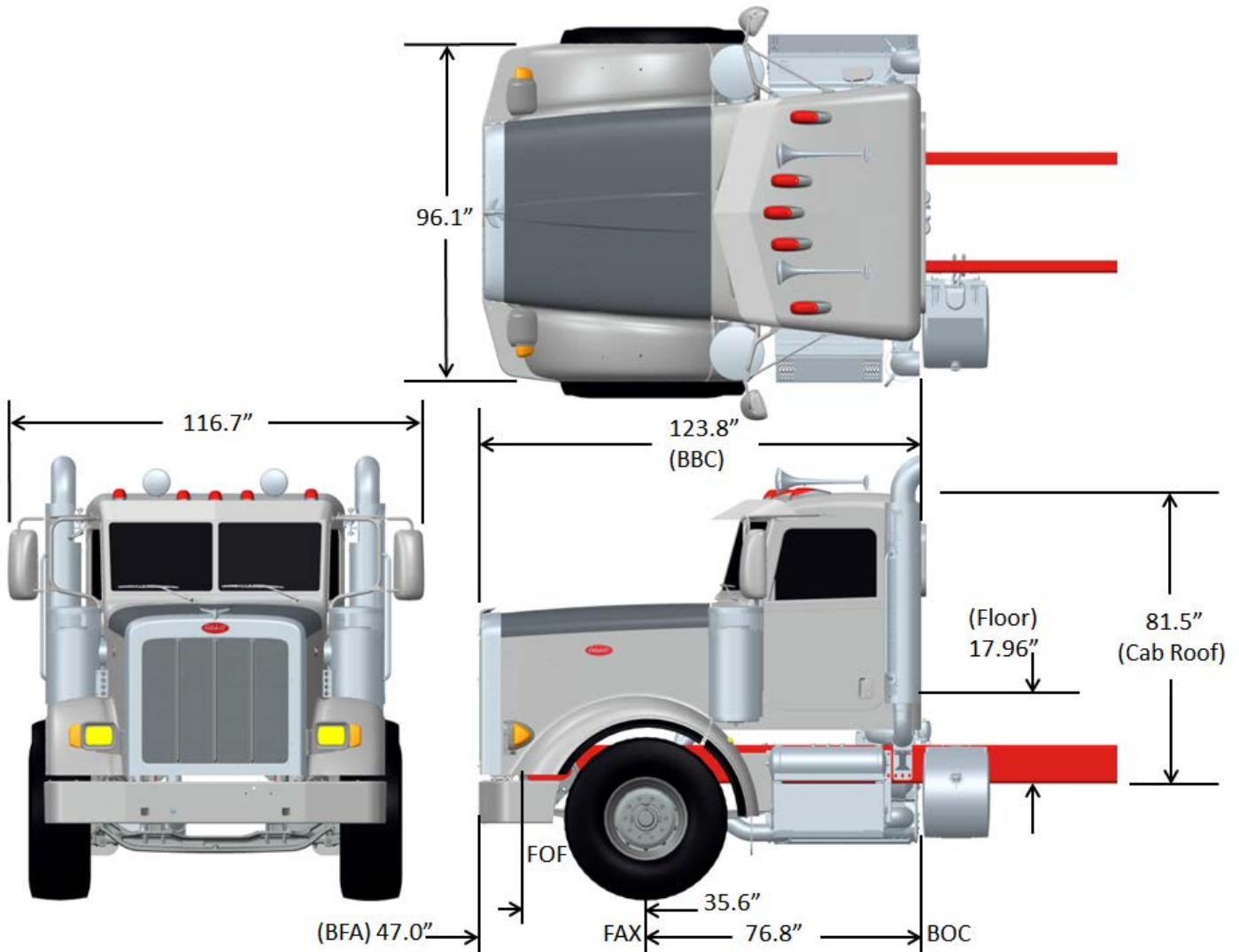


NOTES:

- 3) DIMENSIONS ARE FOR REFERENCE ONLY
- 4) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-9. Model 367 SBFA 10" Extended Day Cab Top & LH View – Overall Dimensions

Model 367-123 SBFA HH

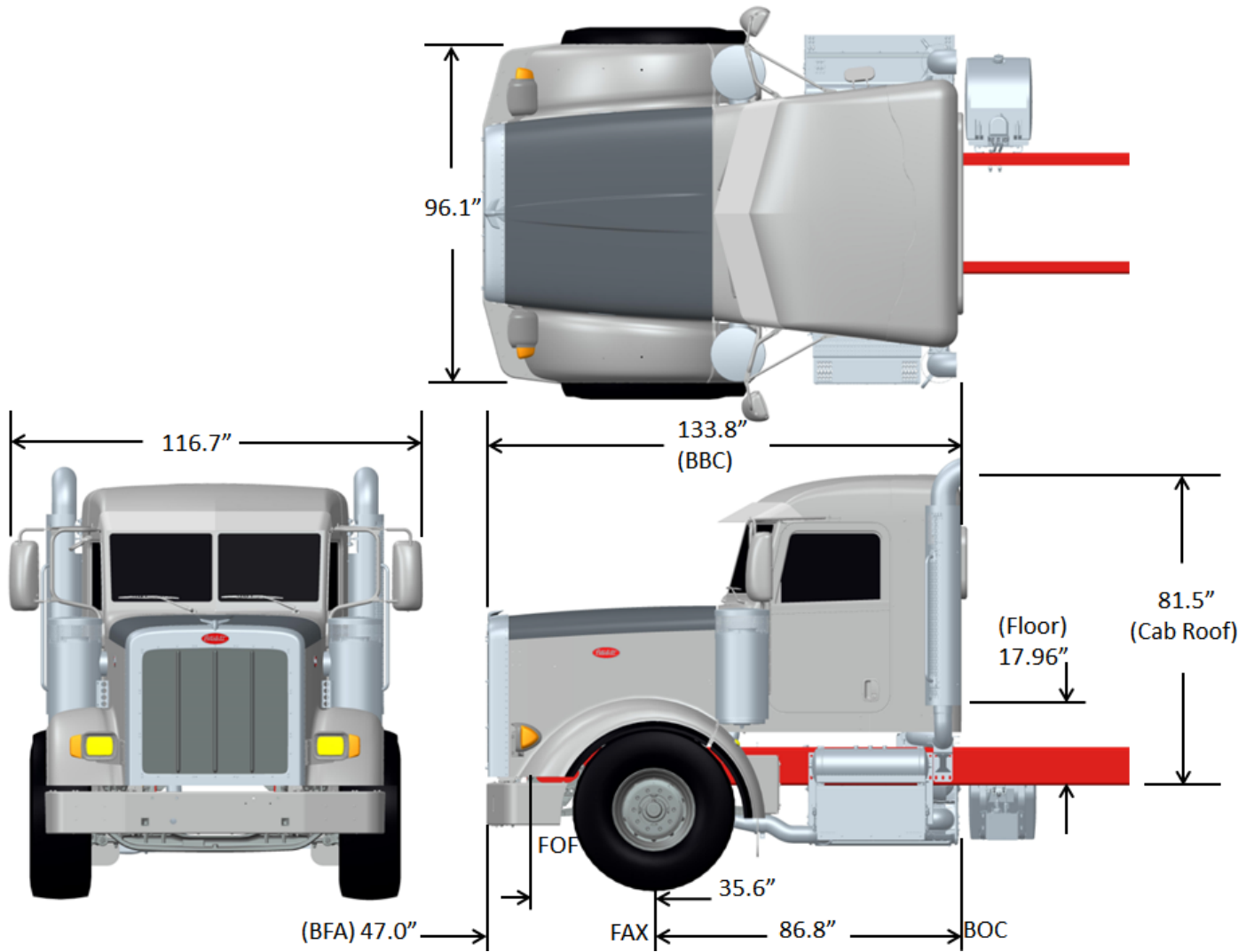


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-10. Model 367 SBFA Heavy Haul Hood Top & LH View – Overall Dimensions

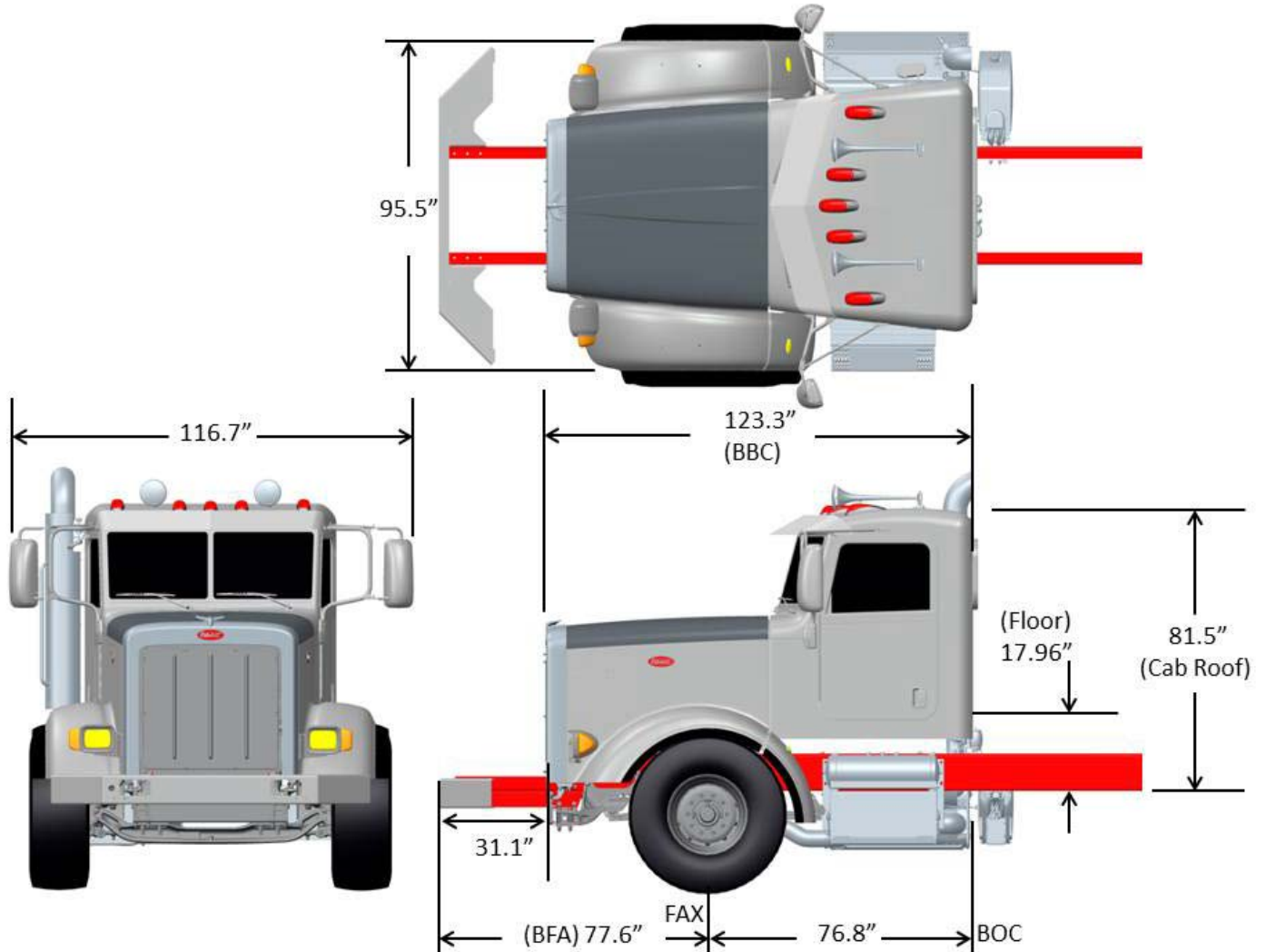
Model 367-123 SBFA HH 10" Extended Day Cab



- NOTES:
 3) DIMENSIONS ARE FOR REFERENCE ONLY
 4) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-11. Model 367 SBFA Heavy Haul Hood 10" Extended Day Cab Top & LH View – Overall Dimensions

Model 367-123 SBFA HH FEPTO

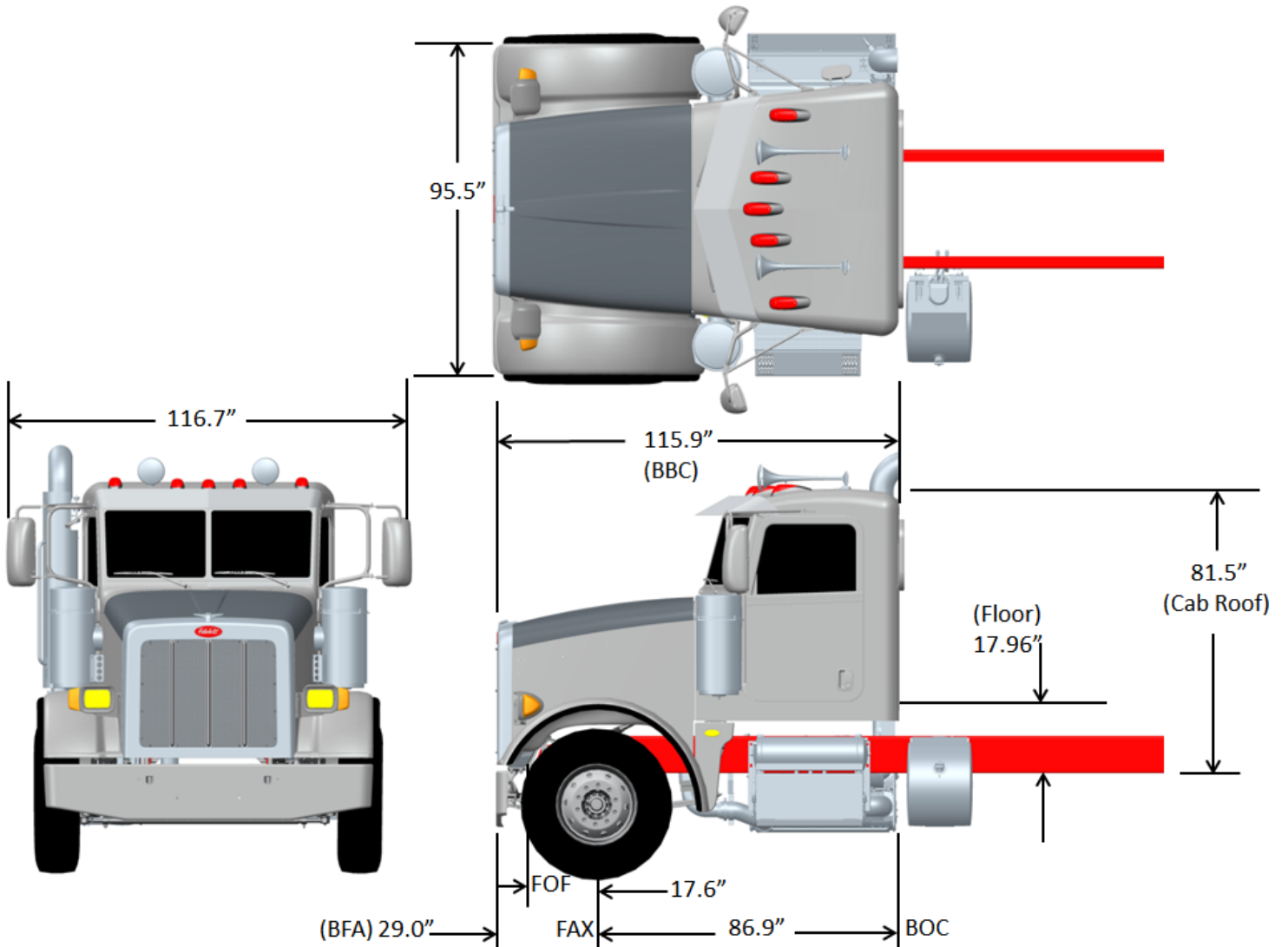


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-12. Model 367 SBFA FEPTO Heavy Haul Hood – Overall Dimensions

Model 365-115 SFFA

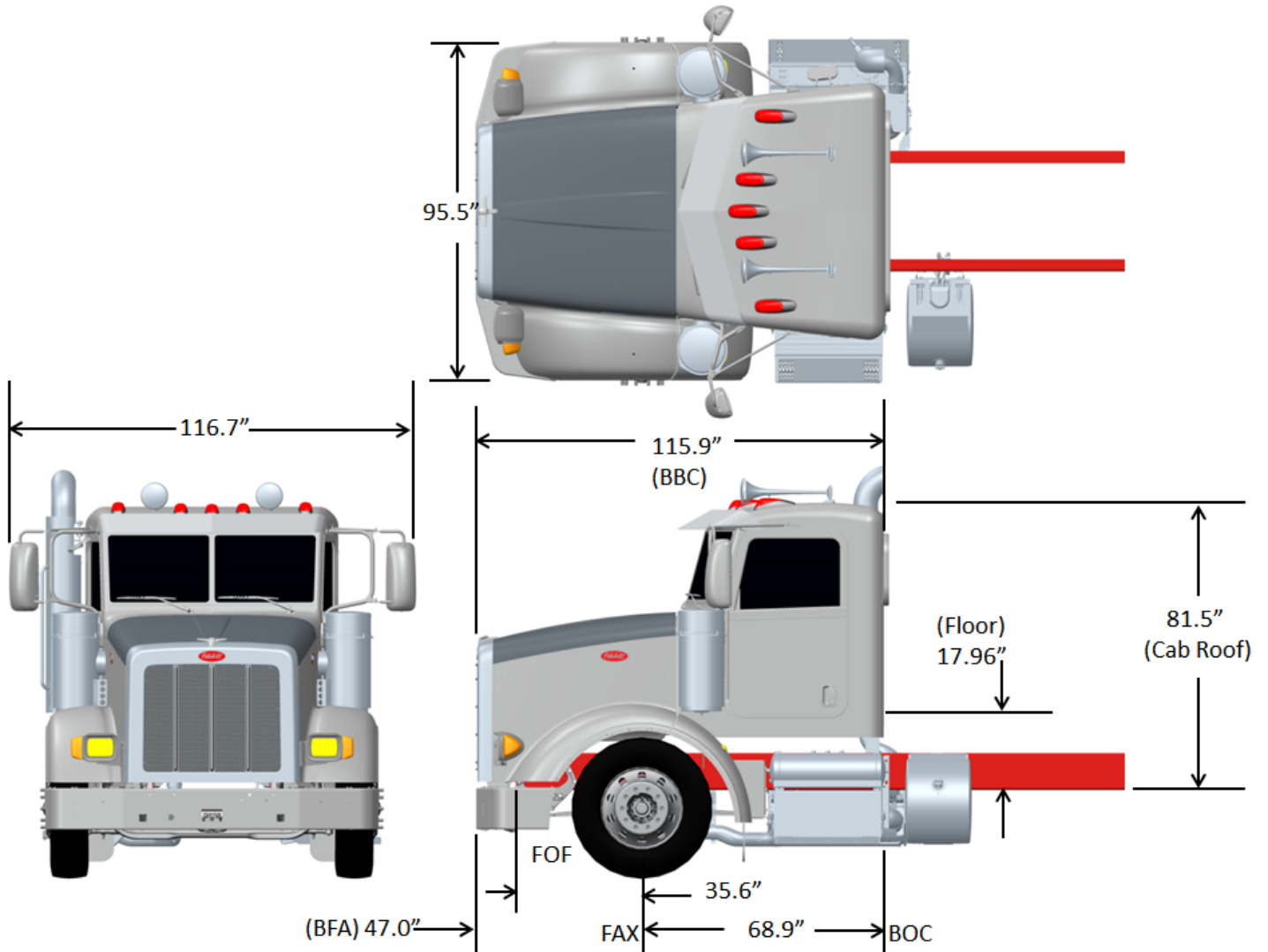


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-13. Model 365 SFFA Top & LH View – Overall Dimensions

Model 365-115 SBFA

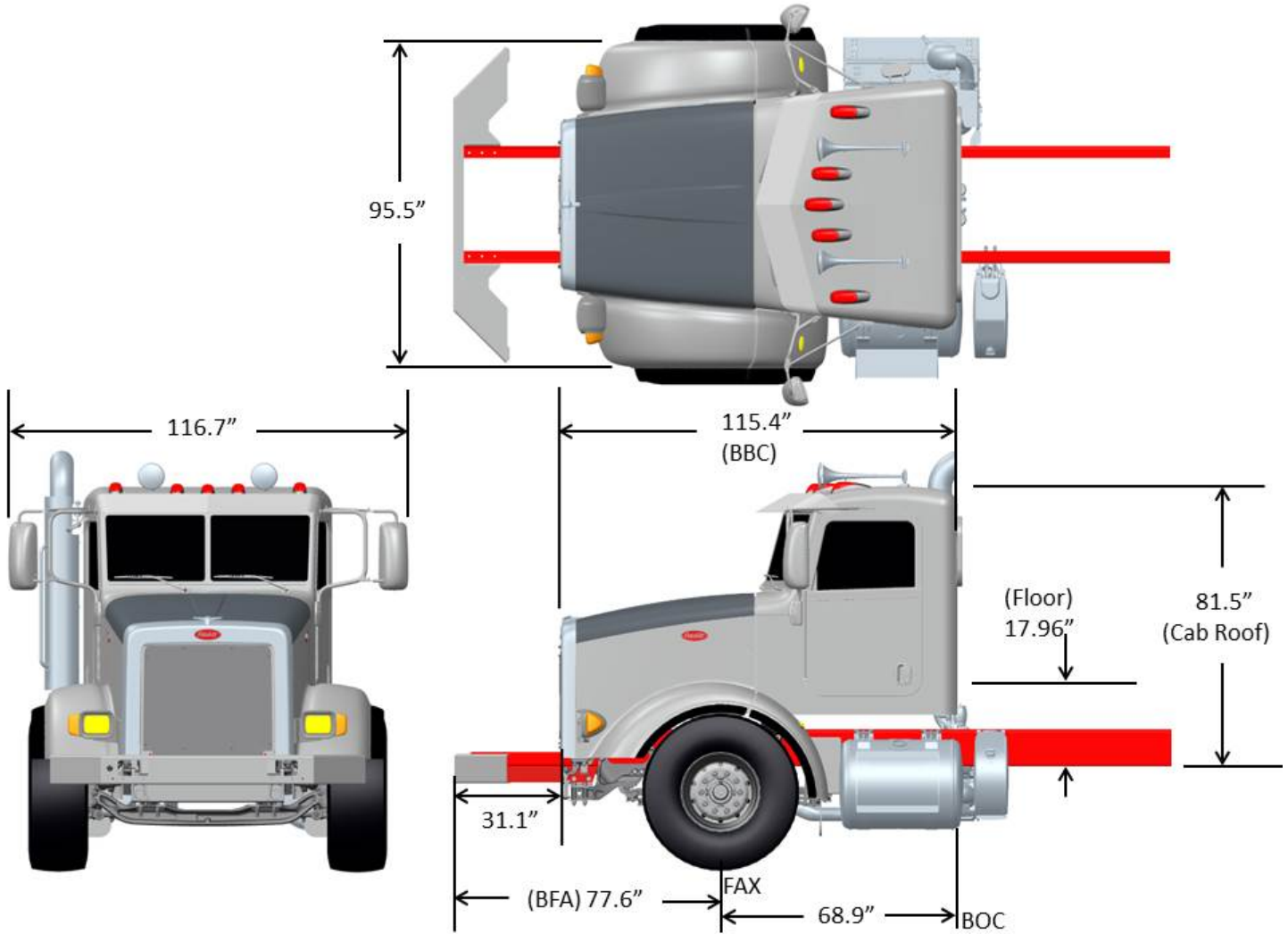


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-14. Model 365 SBFA Top & LH View – Overall Dimensions

Model 365-115 SBFA 31" FEPTO

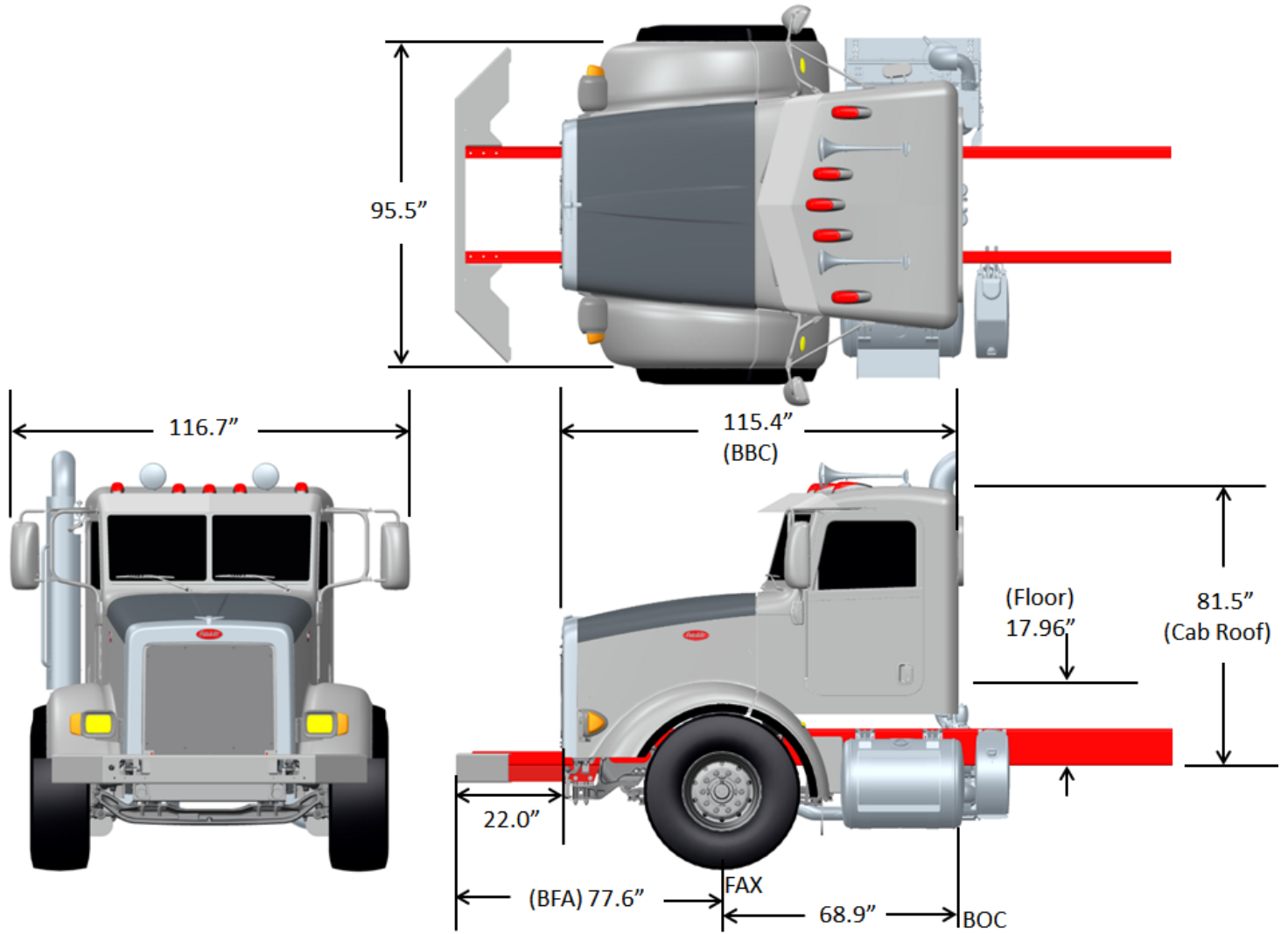


NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-15. Model 365 SBFA 31" FEPTO Hood – Overall Dimensions

Model 365-115 SBFA 22" FEPTO

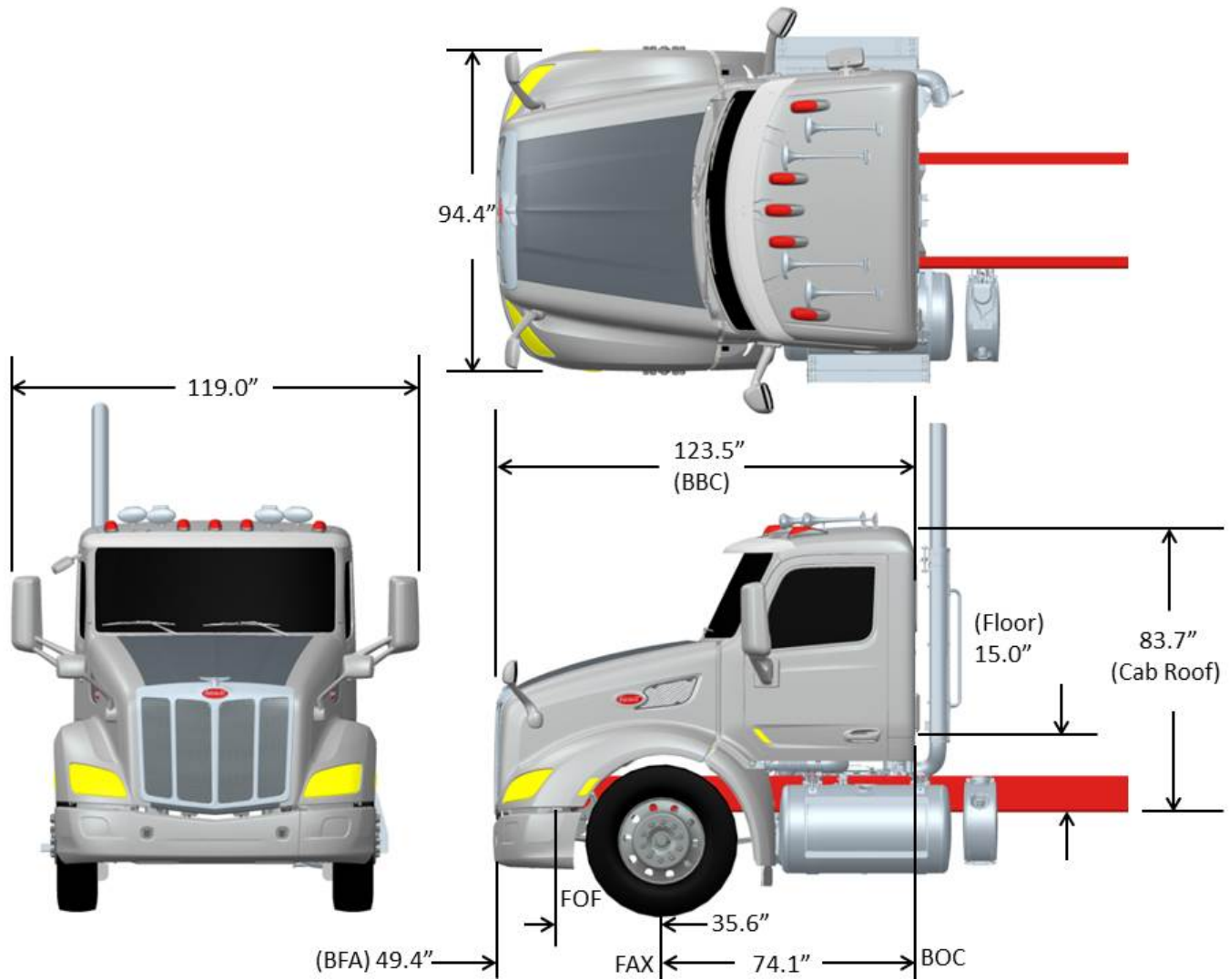


NOTES:

- 3) DIMENSIONS ARE FOR REFERENCE ONLY
- 4) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-16. Model 365 SBFA 22" FEPTO Hood – Overall Dimensions

Model 579-123 SBFA

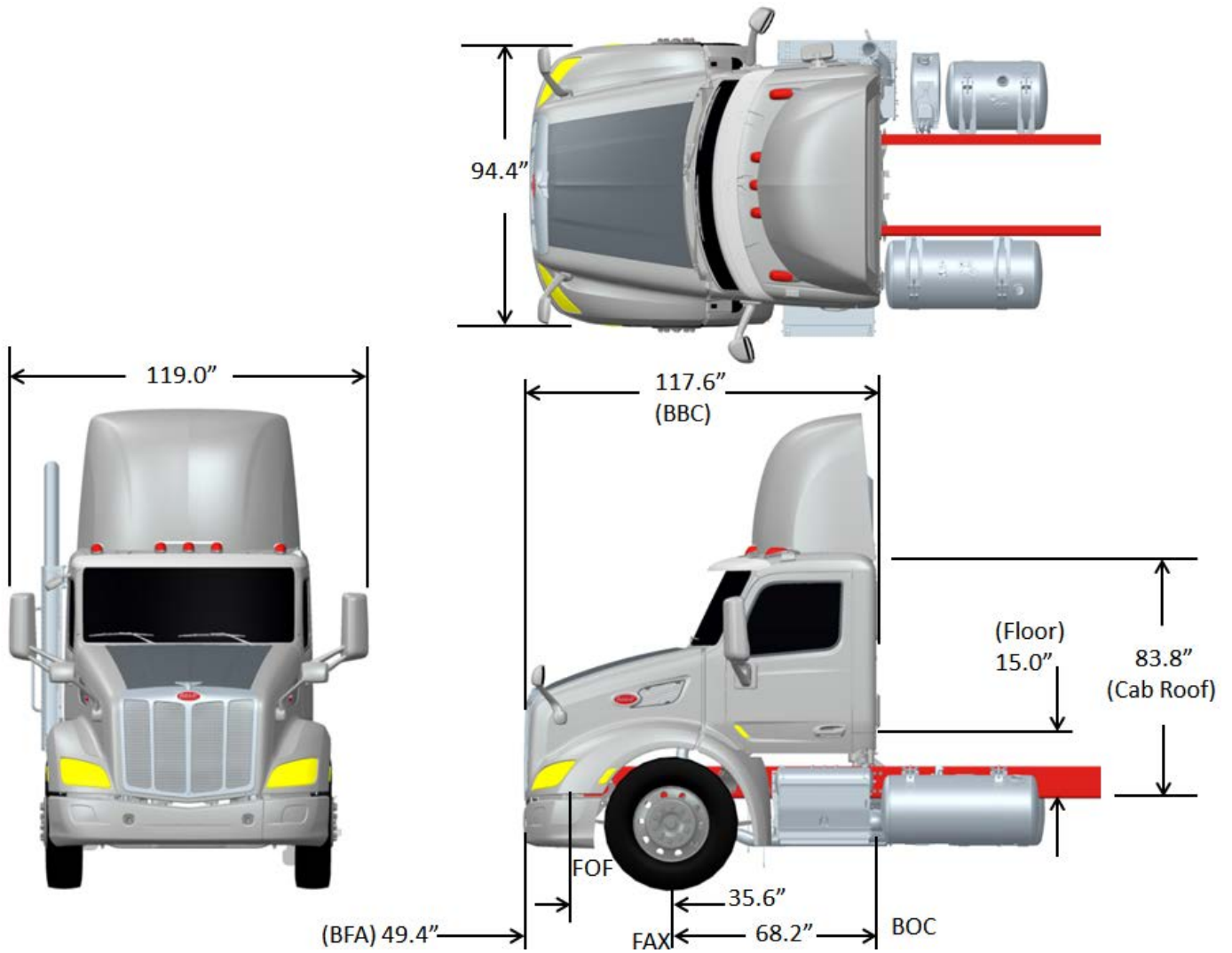


NOTES:

- 3) DIMENSIONS ARE FOR REFERENCE ONLY
- 4) DIMENSIONS ARE TO FRONT OF BUMPER

FIGURE 3-17. Model 579-123 SBFA – Overall Dimensions

Model 579-117 SBFA



NOTES:

- 1) DIMENSIONS ARE FOR REFERENCE ONLY
- 2) DIMENSIONS ARE TO FRONT OF BUMPER
- 3) OPTIONAL ROOF FAIRING SHOWN

FIGURE 3-18. Model 579-117 SBFA Top & LH View – Overall Dimensions

SLEEPERS

TABLE 3-2. Sleeper Dimensions

MODEL	CAB TO SLEEPER OPENING				SLEEPER DIMENSIONS								CAB TO SLEEPER GAP
	STD CAB		ULTRACAB		D = DISTANCE FROM BTM OF FRAME RAIL TO TOP OF ROOF								
	"A"	"B"	"A"	"B"	44"	58" LOW	58" HIGH	72" LOW	72" HIGH	78"	80"		
389-131	49.0	59.0	59.0	59.0	81.7	83.5	99.3	83.3	99.4	101.6	N/A	2.3	
389-123, 386, 384, 367, 365	49.0	59.0	59.0	59.0	83.7	85.5	101.4	85.3	101.5	103.7	N/A	2.3	
579, 567	49.0	68.1	66.5	68.1	83.7	85.5	N/A	N/A	101.8	N/A	106.3	1.8	
SLEEPER LENGTH "C" =					36.0	48.0	48.0	63.0	63.0	70.0	70.0		

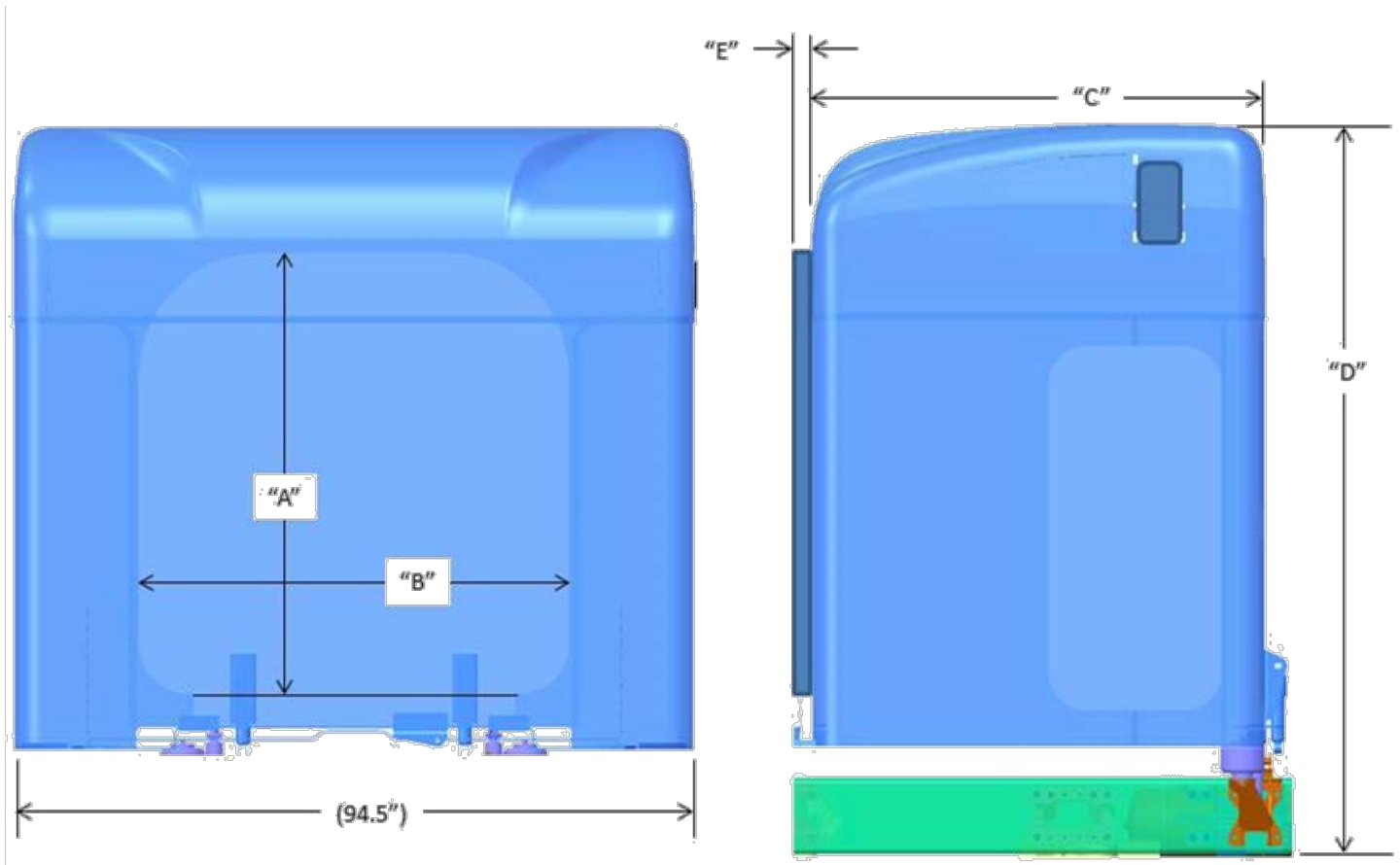


FIGURE 3-19. Sleeper Dimensions – Front & LH View

CAB- 1.9M CAB FAMILY

Models 389, 388, 386, 384, 367, 365

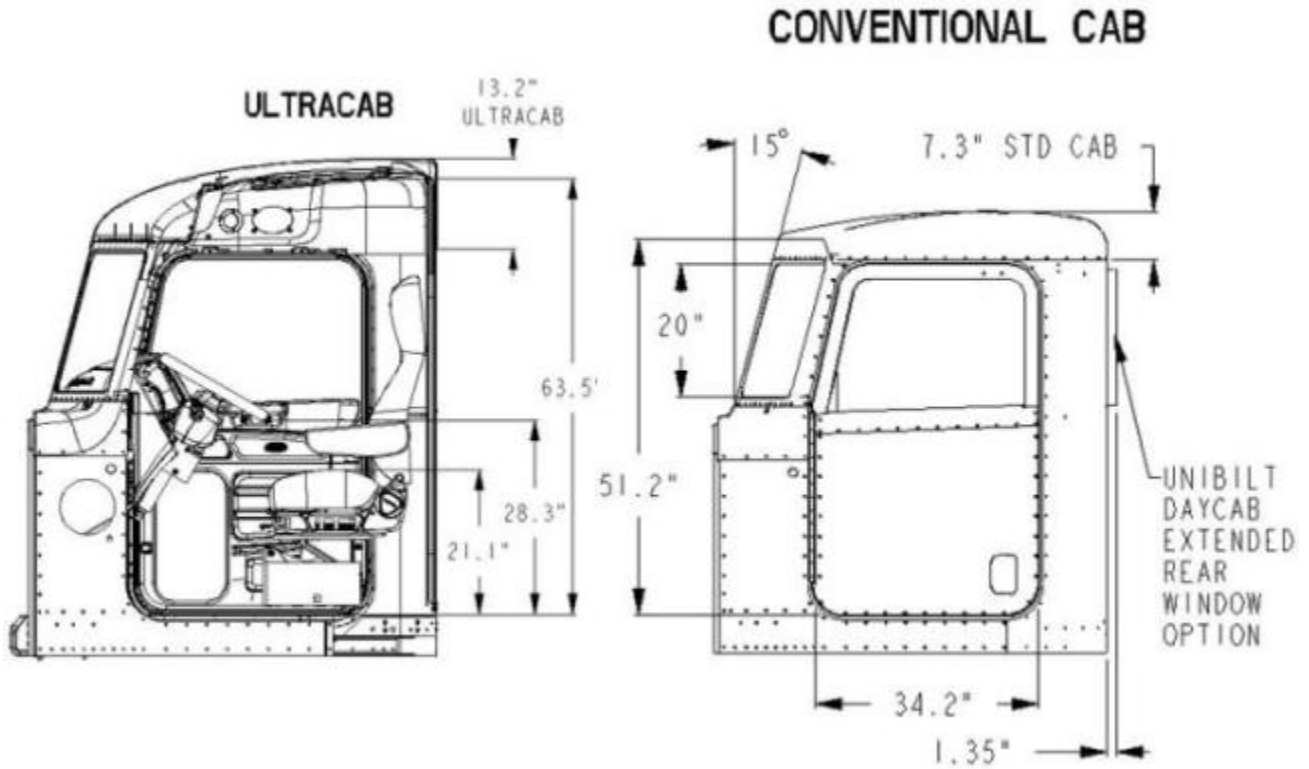


FIGURE 3-20. Cab Dimensions 1.9 m Cab Family

EXTENDED CAB – 1.9M CAB FAMILY

Models 389, 388, 386, 384, 367, 365

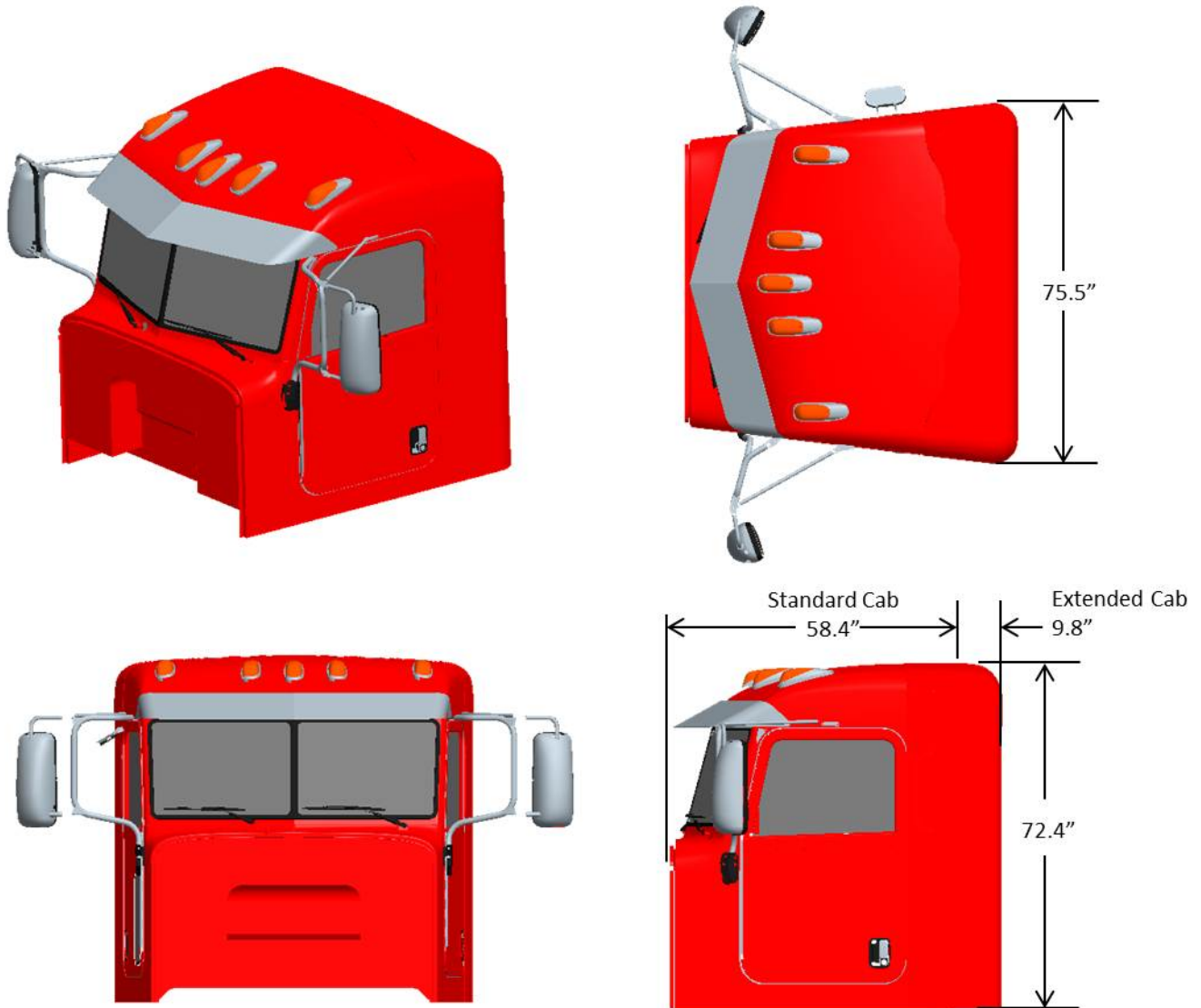


FIGURE 3-21. Extended Cab

FRAME RAILS

Frame rail configurations are shown in FIGURE 3-22. Rail height, flange and structural values can be found in the Body Mounting Section.

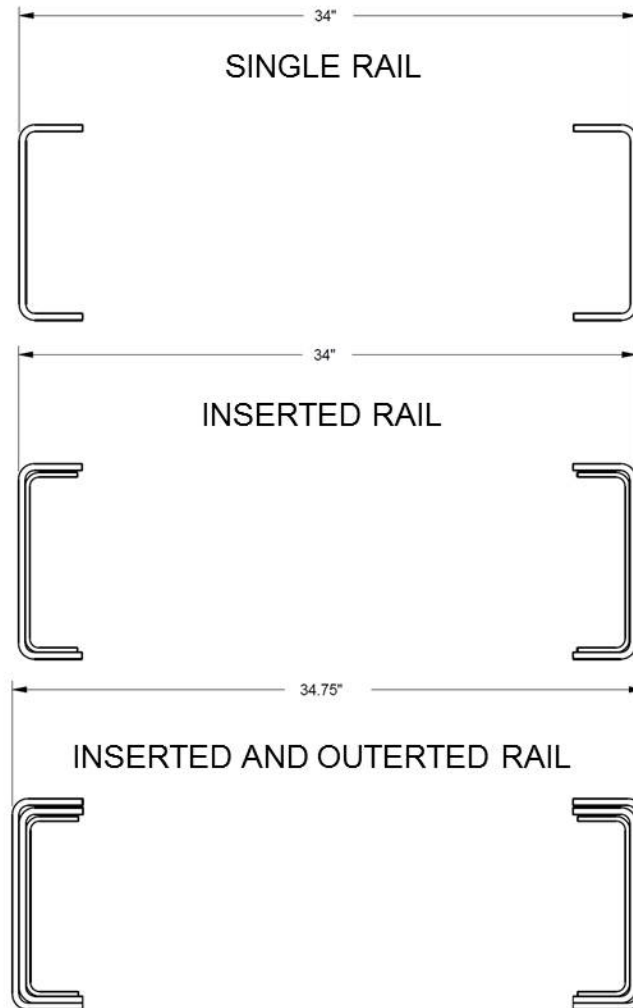


FIGURE 3-22. Frame Rail Configurations



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

FRAME HEIGHT CHARTS

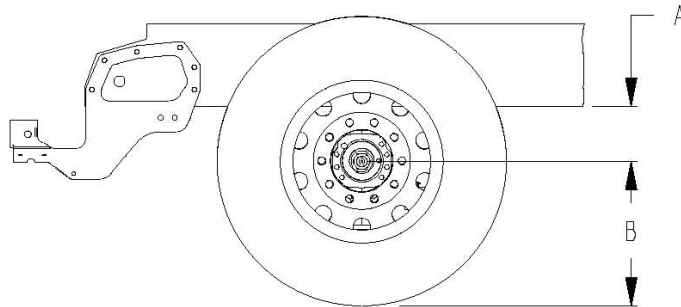
THE FOLLOWING FRAME HEIGHT CHARTS MAY BE USED FOR FINDING APPROXIMATE FRONT AND REAR FRAME HEIGHTS.

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.

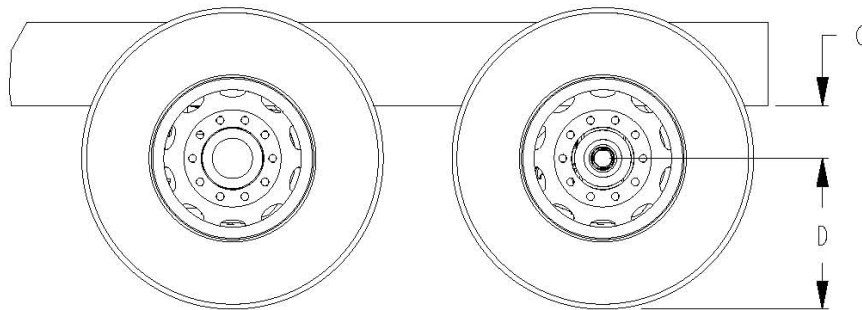
LOADED VALUES ARE QUOTES FOR REPRESENTATIVE LOADS AT THE GROUND FOR THE PARTICULAR SPRING AND AXLE COMBINATION, AND, AS SUCH, CAN VARY WITH LOADING VARIATIONS.

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 3-23. Frame Height

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

SFFA SUSPENSION			SPACER (mm)	LIGHT	LOADED
12,000 lbs. ³	TAPERLEAF	SFFA	10	9.3	8.9
			20	9.7	9.3
			30	10.1	9.7
			40	10.5	10.1
			50	10.9	10.5
			60	11.3	10.9
			70	11.7	11.2
			80	12.1	11.6
13,200 lbs. ³	TAPERLEAF	SFFA	10	9.3	8.9
			20	9.7	9.3
			30	10.1	9.7
			40	10.5	10.1
			50	10.9	10.5
			60	11.3	10.9
			70	11.7	11.3
			80	12.1	11.5
14,600 lbs.	TAPERLEAF	SFFA	10	9.3	8.9
			20	9.7	9.3
			30	10.1	9.7
			40	10.5	10.1
			50	10.9	10.5
			60	11.3	10.9
			70	11.7	11.3
			80	12.1	11.7
16,000 lbs.	TAPERLEAF	SFFA	10	10.5	10.0
			20	10.9	10.3
			30	11.3	10.7
			40	11.7	11.1
			50	12.1	11.5
			60	12.5	11.9
			70	12.9	12.3
			80	13.3	12.7
18,000 - 20,000 lbs. ¹	TAPERLEAF	SFFA	10	10.6	9.5
			20	11.0	10.0
			30	11.4	10.4
			40	11.8	10.8
			50	12.2	11.2
			60	12.6	11.6
			70	13.0	12.0
			80	13.4	12.4
22,000 - 24,000 lbs. ²	TAPERLEAF	SFFA	10	12.4	10.9
			20	12.8	11.3
			30	13.2	11.7
			40	13.6	12.1
			50	14.0	12.5
			60	14.3	12.9
			70	14.7	13.3
			80	15.1	13.6

NOTES:

- 1) Shown with 20K load for laden dim. Add 0.3" to laden dim. if 18K load.
 - 2) Shown with 23K load for laden dim. Add 0.1" to laden dim. if 22K load. Subtract .01" from unladen dim if 24K load.
- Note: Standard 3-1/2" drop axle heights shown, for 5" drop axles, subtract an additional 1-1/2".
 Spacer blocks are used by Engineering to obtain level frame and are not options.
 "A" dimension shown is to bottom of frame rail. Add frame rail height dimension for frame height.

TABLE 3-4. Front Frame Height "A" - SBFA

SBFA Suspension			Spacer (Mm)	Unladen (In.)	Laden (In.)
12,000 lbs.	TAPERLEAF	SBFA	30	9.7	8.5
			40	10.1	8.9
			50	10.5	9.3
			60	10.9	9.7
			70	11.3	10.1
			80	11.7	10.5
13,200 lbs.	TAPERLEAF	SBFA	30	9.8	8.5
			40	10.2	8.9
			50	10.6	9.3
			60	11	9.7
			70	11.4	10.1
			80	11.8	10.5
14,600 lbs.	TAPERLEAF	SBFA	30	10.1	8.5
			40	10.5	8.9
			50	10.9	9.3
			60	11.3	9.7
			70	11.7	10.1
			80	12.1	10.5
16,000 lbs.	TAPERLEAF	SBFA	30 ³	11.4	9.5
			40 ³	11.8	9.9
			50	12.2	10.3
			60	12.6	10.7
			70	13	11.1
			80	13.4	11.5
18,000-20,000 ¹	TAPERLEAF	SBFA	50	11.9	10
			60	12.3	10.4
			70	12.7	10.8
			80	13.1	11.2
22,000 - 24,000 lbs. ²	TAPERLEAF	SBFA	OMIT	12.3	9.4
			30	13.4	10.5
			40	13.8	10.9
			50	14.2	11.3
			60	14.6	11.7
			70	15	12.1
			80	15.4	12.5

NOTES:

- 1) Shown with 20K load for laden dim. Add 0.3" to laden dim. if 18K load. S
- 2) Shown with 23K load for laden dim. Add 0.1" to laden dim. if 22K load. Subtract 0.1" from laden dim. if 24K load.
- 3) 16K springs with 12K to 14.6K axle minimum spacer block is 30 mm. With 16K springs and 20K axle minimum spacer block is 50 mm.

Note: Standard 3-1/2" drop axle heights shown, for 5" drop axles, subtract an additional 1-1/2".

Spacer Blocks are used by Engineering to obtain level frame and are not options.

"A" dimension shown is to bottom of frame rail. Add frame rail height for frame height.

REAR FRAME HEIGHTS "C"

TABLE 3-5. Single Drive Suspension Heights

Suspension	Rating	Version	Unladen Height	Laden Height
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 3-6. Tandem Peterbilt Suspension Heights

Suspension	Rating	Version	Unladen Height	Laden Height
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
QUADRAFLEX	38,000 lbs.	Taperleaf	10.6	8.7

TABLE 3-7. Tandem Neway Suspension Heights

Suspension	Rating	Version	Unladen Height	Laden Height
NEWAY AD	52,000 lbs.		10.0	10.0
NEWAY ADZ	46K-52K lbs.		10.0	10.0

TABLE 3-8. Tandem Reyco Suspension Heights

Suspension	Rating	Version	Unladen 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
REYCO 102AR (Air)	34K-40K	STD LOW	8.3	8.3

TABLE 3-9. Tandem Chalmers Suspension Heights

Suspension	Rating	Version	Unladen Height	Laden Height ¹
CHALMERS 854/860	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 854/860	46,000 lbs	LOW	11.3	8.9
		HIGH	12.5	10.1
		X-HIGH	14.7	12.2
		XX-HIGH	17.3	14.9
CHALMERS 854/860	50K-52K	LOW	11.3	8.9
		HIGH	12.5	10.1
		X-HIGH	14.7	12.1
		XX-HIGH	17.3	14.8
CHALMERS 872	46,000 lbs	LOW	11.2	8.8
		HIGH	12.5	10.3
		X-HIGH	14.7	12.2
		XX-HIGH	17.3	14.9
CHALMERS 872	50,000 lbs	LOW	11.2	8.8
		HIGH	12.5	10.3
		X-HIGH	14.7	12.1
		XX-HIGH	17.3	14.8

NOTES:

- 1) Laden dimension shown with standard restrictor cans. Add 0.7" for #29 High Stability Restrictor Cans.
- 2) * With Meritor 70K axles frame height is 22.5" for R650.

TABLE 3-10. Tandem Hendrickson Suspension Heights

Suspension	Rating	Version	Unladen Height	Laden Height
RT-403	40,000 lbs	6.00 saddle	9.9	8.9
		7.188 saddle (std)	11.2	10.1
RTE-403	40,000 lbs	6.00 saddle	9.9	8.4
		7.188 saddle (std)	11.2	9.6
R-403	40,000 lbs	12.80 saddle	5.9	5.9
		15.81 saddle (std)	8.9	8.9
		17.60 saddle	10.6	10.6
RS-403	40,000 lbs	12.25 saddle	9.7	8.9
		14.00 saddle (std)	11.5	10.6
		15.25 saddle	12.7	11.9
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
HN462	46,000 lbs	20.25 saddle (high)	15	13.3
R-463	46,000 lbs	15.75 saddle (std)	8.8	8.8
		20.50 saddle	13.5	13.5
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
		7.188 saddle (std)	13	11.4
		11.00 saddle	16.3	15.2
RTE-463	46,000 lbs	7.188 saddle (std)	11.6	10.2
		11.00 saddle	15.4	14
RS-503	50,000 lbs	14.00 saddle (std)	11.5	10.6
		15.25 saddle	12.7	11.9
RT-503	50,000 lbs	7.188 saddle (std)	12.2	11.2
		11.0 ¹ saddle	6.4	15.4
RTE-503	50,000 lbs	7.188 saddle (std)	11.6	10.2
		11.00 saddle	15.4	14
RS-523	52,000 lbs	14.0 saddle (std)	11.5	10.6
RT-523 , RT-650	52K-65K	7.188 saddle (std)	12.2	11.2
		11.00 saddle	16.4	15.4
HN522	52,000 lbs	18.50 saddle (std)	12.6	11.5
RS650	65,000 lbs	15.00 saddle (std)	12.0 ¹	11.0 ²
		19.00 saddle	16.0 ²	15.1 ²
R650 ³	65,000 lbs	20.25 saddle (std)	12.5	12.5
R850 w/70K Meritor	85,000 lbs	20.25 saddle	12	12
R850 w/SISU 70K		20.25 saddle	12.1	12.1
RS850 w/SISU 70K	85,000 lbs	16.75 saddle	14.5	13.8

NOTES:

- 1) With SISU 70K axle subtract .39" from light/laden.
- 2) With SISU 70K axle subtract .28 from light and .39 from laden.
- 3) With Meritor 70K axles frame height is 22.5" for R650.

REAR SUSPENSION LAYOUTS

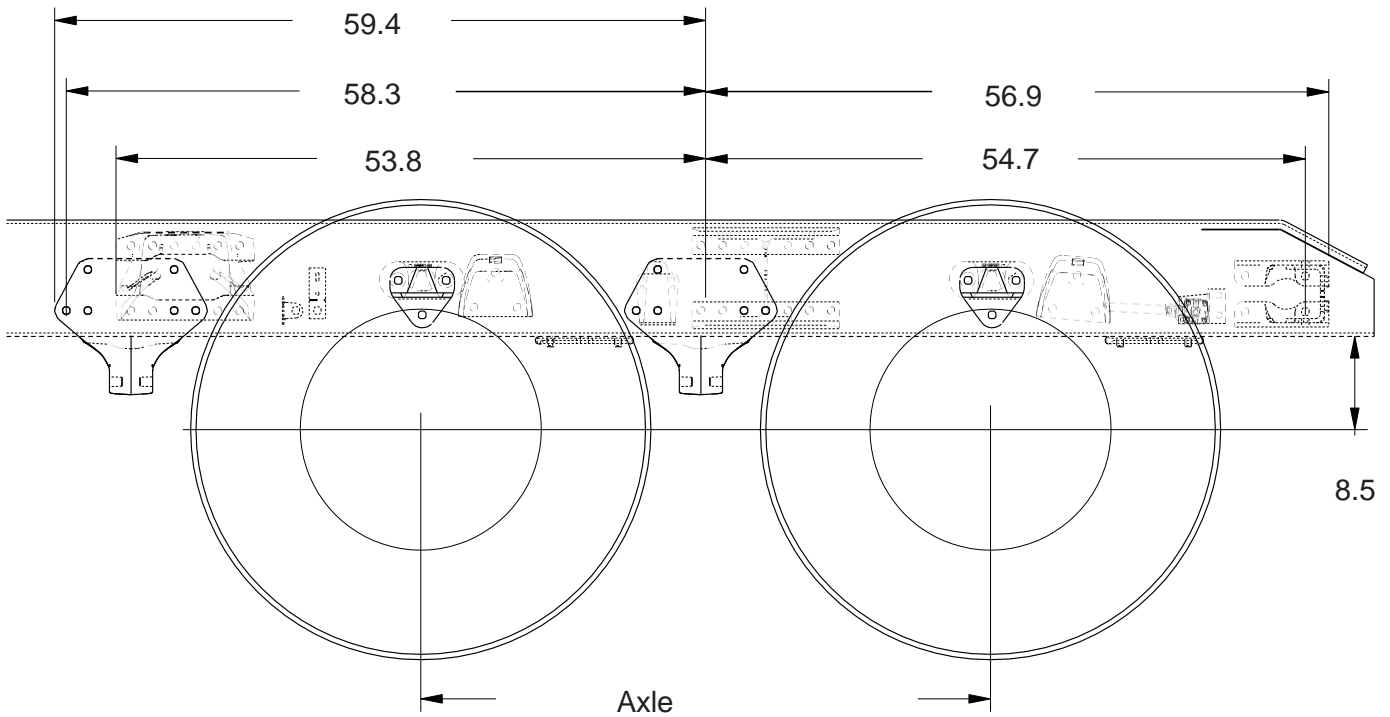
The rear suspension layouts are provided as a tool to help layout bodies prior to arrival. The applicable dimensions are shown. Be sure to check the axle spacing that is shown, as alternate spacing may exist and could change some of the dimensions. The dimensions shown are the most typical installations, in special cases some hole locations will move. If you are planning on using the holes shown for your body installation, please confirm with your local Peterbilt dealer that the drawing below will be the installation used on your specific truck. Ensure that proper torque is used to reinstall any suspension components. It would be a good idea in this case to order the frame layout of your chassis along with your truck order. This can be done on any Peterbilt truck, and will be provided ahead of the build schedule.

If there are hole locations that are not detailed please work with your local Peterbilt Dealer to request that information.

Additionally optional axle spacing are shown in the charts, if you would like details on the frame drilling with optional spacing, please contact your local Peterbilt dealer.

NOTE: Actual axle spacing can depart from nominal due to axle slant requirements. Final axle spacing can vary by more than an inch from nominal in some cases. If precise axle spacing is critical due to body installation or state/local regulatory requirements please contact Peterbilt Applications/Technical Support for assistance.

PB LOW AIR LEAF TANDEM AXLE



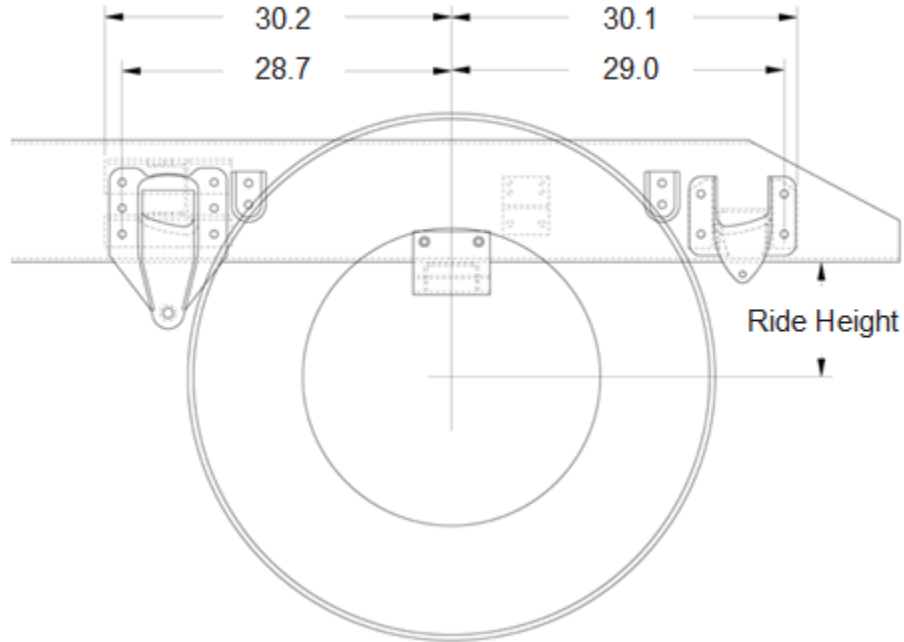
PB Low Air Leaf Suspensions

Note: "54" Axle Spacing dimensions shown

TABLE 3-11. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
PB Low Air Leaf Tandem	40K	52"	8.5"	8.5"
PB Low Air Leaf Tandem	40K	54"	8.5"	8.5"

REYCO 79KB SINGLE REAR AXLE



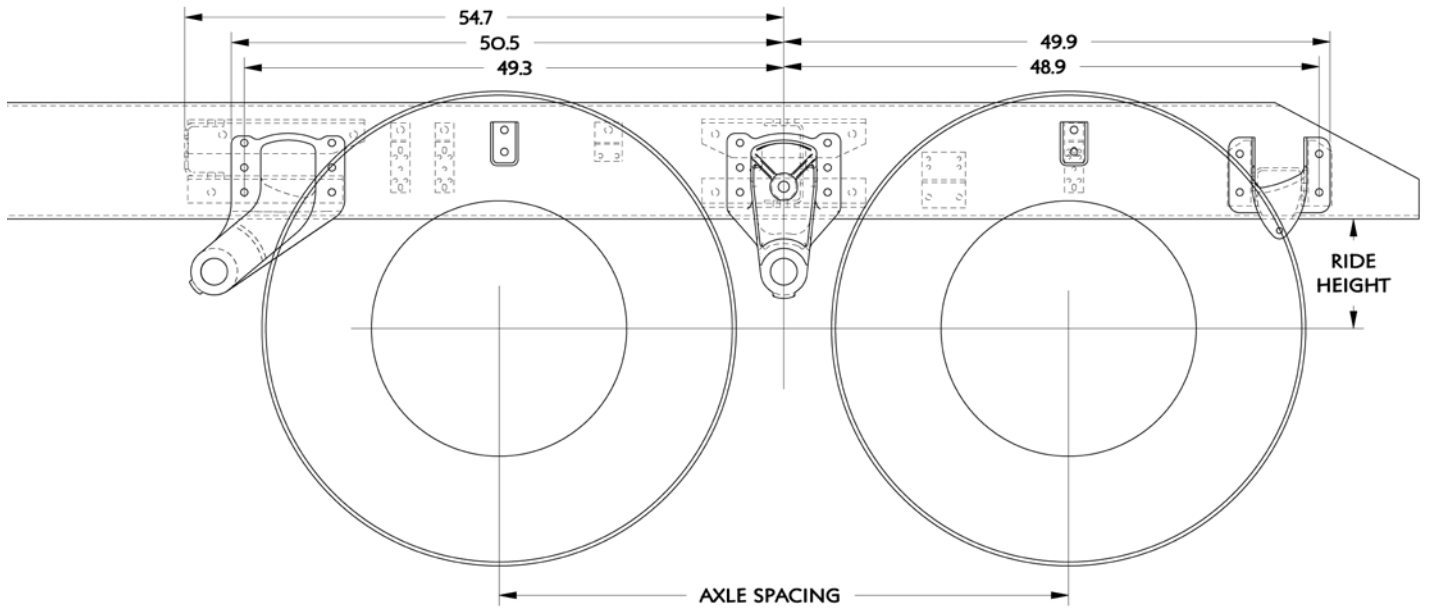
Optional Reyco 79KB Suspensions

TABLE 3-12. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Reyco 79KB single	20K	-	8.3"	10.8"
Reyco 79KB single	23K	-	8.3"	10.8"
Reyco 79KB single	26K	-	8.2"	11.3"
Reyco 79KB single	31K	-	9.6"	12.2"

REYCO 102 TANDEM REAR AXLE

Shown with a 52" Axle Spacing

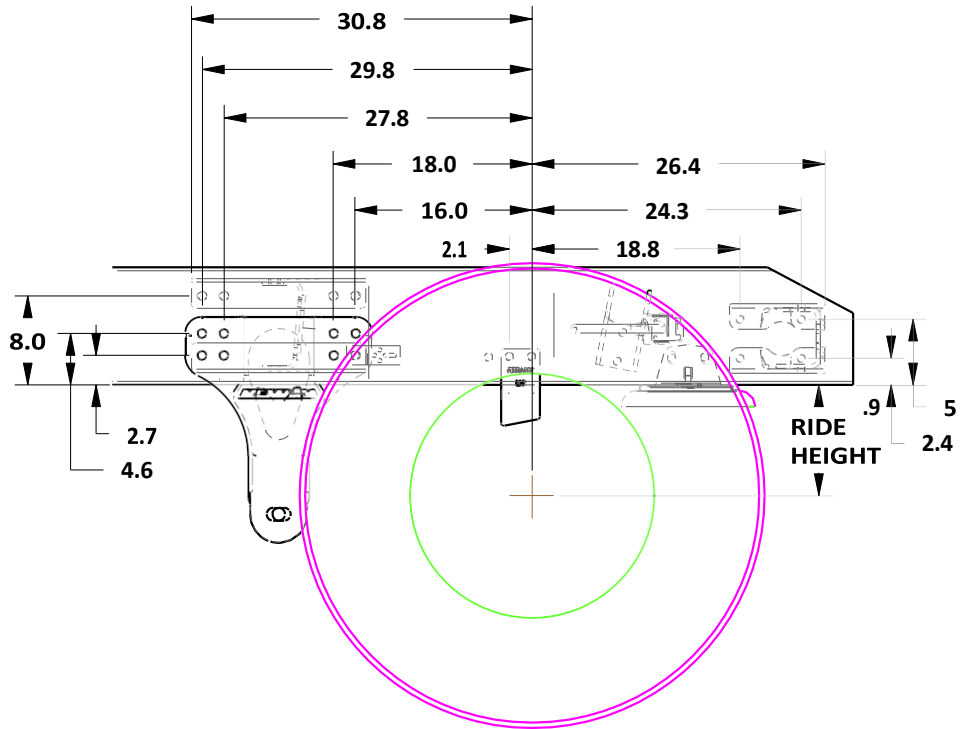


Reyco 102 Suspension

TABLE 3-13. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Reyco 102 Tandem	40K	52"	9.2"	10.8"

NEWAY ADZ 123 SINGLE REAR AXLE



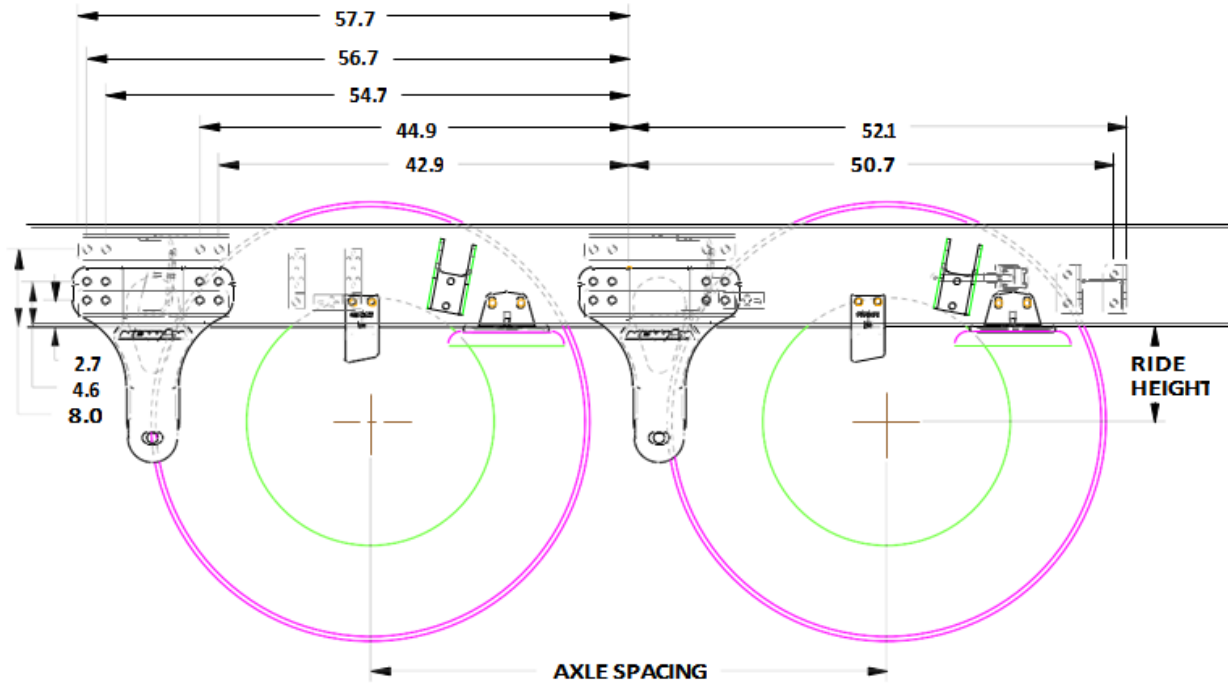
Optional Neway ADZ Single Suspensions

TABLE 3-14. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Neway ADZ123 single	23K	-	10"	10"
Neway ADZ126 single	26K	-	10"	10"

NEWAY ADZ 246 TANDEM SUSPENSION

Shown with a 54" Axle Spacing



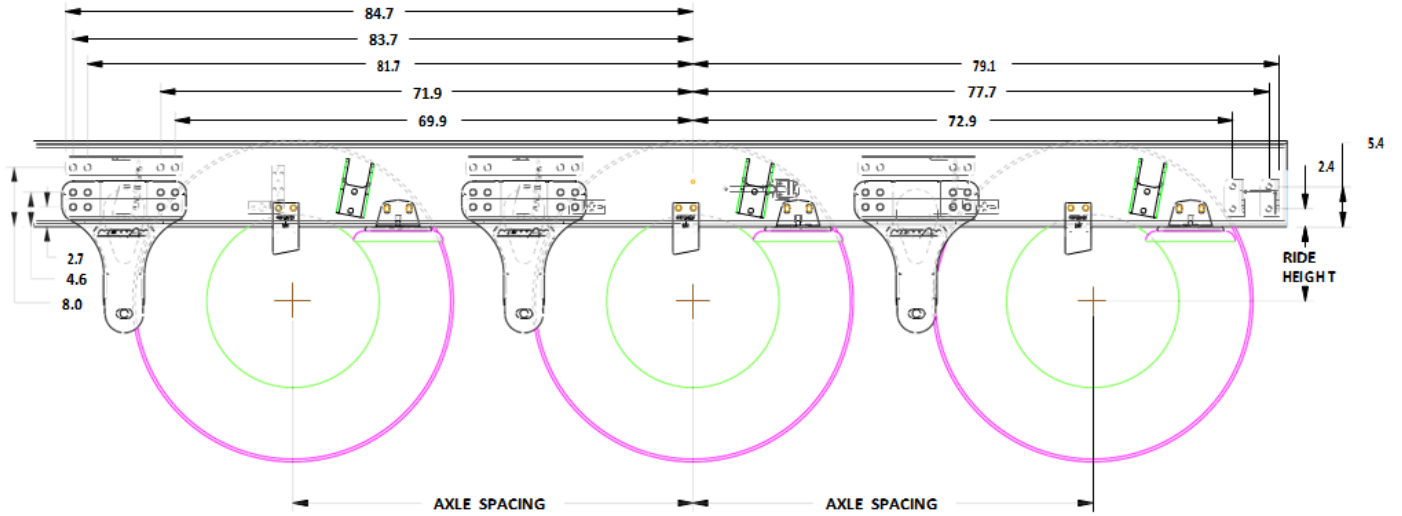
Optional Neway ADZ Tandem Suspensions

TABLE 3-15. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Neway ADZ246 tandem	46K	54"	10"	10"
Neway ADZ246 tandem	46K	60"	10"	10"
Neway ADZ252 tandem	52K	54"	10"	10"
Neway ADZ252 tandem	52K	54"	12"	12"
Neway ADZ252 tandem	52K	60"	10"	10"
Neway ADZ252 tandem	52K	60"	12"	12"

NEWAY ADZ 369 SUSPENSION

Shown with 54" Axle Spacing



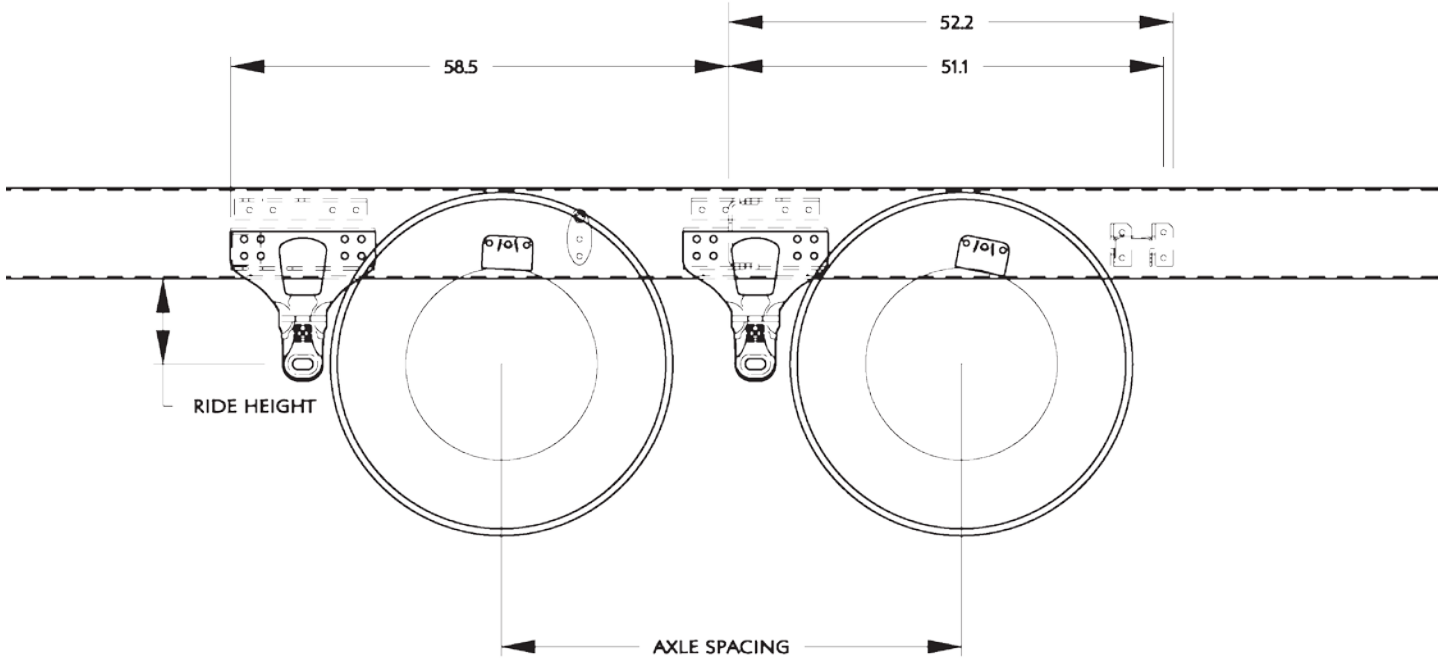
Optional Neway ADZ Suspensions

TABLE 3-16. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Neway ADZ369	69K	54"	10"	10"
Neway ADZ369	69K	54"	12"	12"
Neway ADZ369	69K	60"	12"	12"
Neway ADZ378	78K	54"	10"	10"
Neway ADZ378	78K	60"	10"	10"

HENDRICKSON PRIMAAX TANDEM SUSPENSION

Shown with 54" Axle Spacing



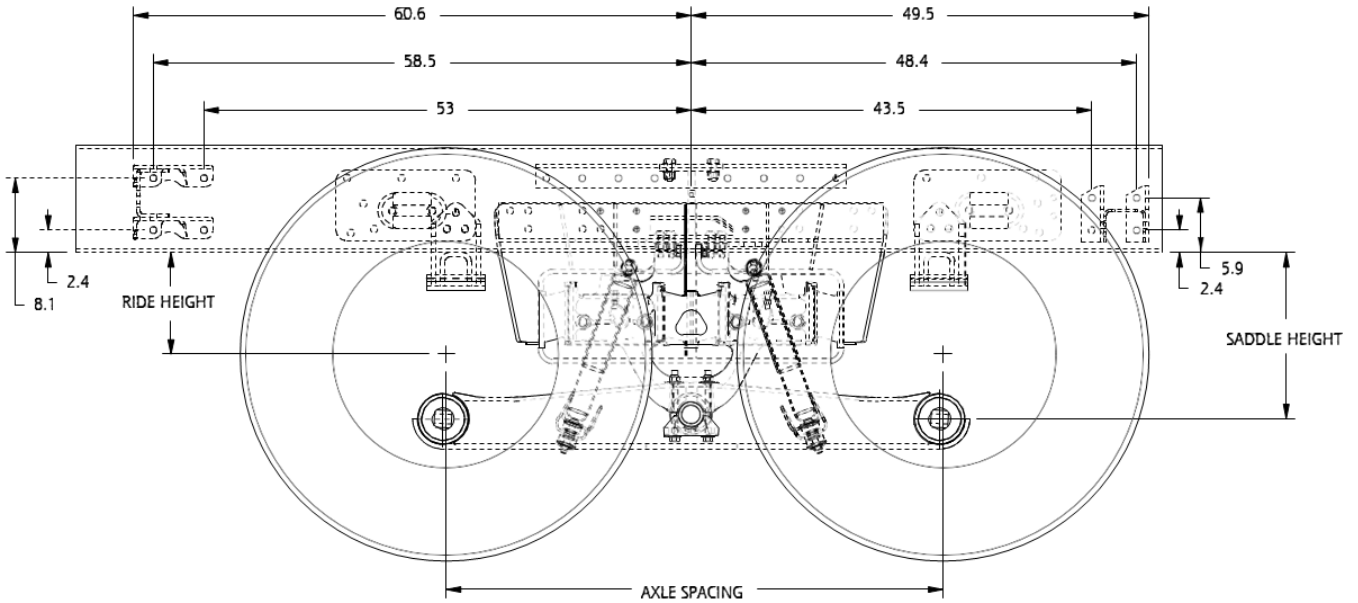
Optional Hendrickson Primaax Tandem Suspensions

TABLE 3-17. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Hendrickson Primaax Tandem	46K	54"	10"	10"
Hendrickson Primaax Tandem	46K	60"	10"	10"
Hendrickson Primaax Tandem	46K	72"	10"	10"

HENDRICKSON HMX TANDEM SUSPENSION

Shown with 54" Axle Spacing



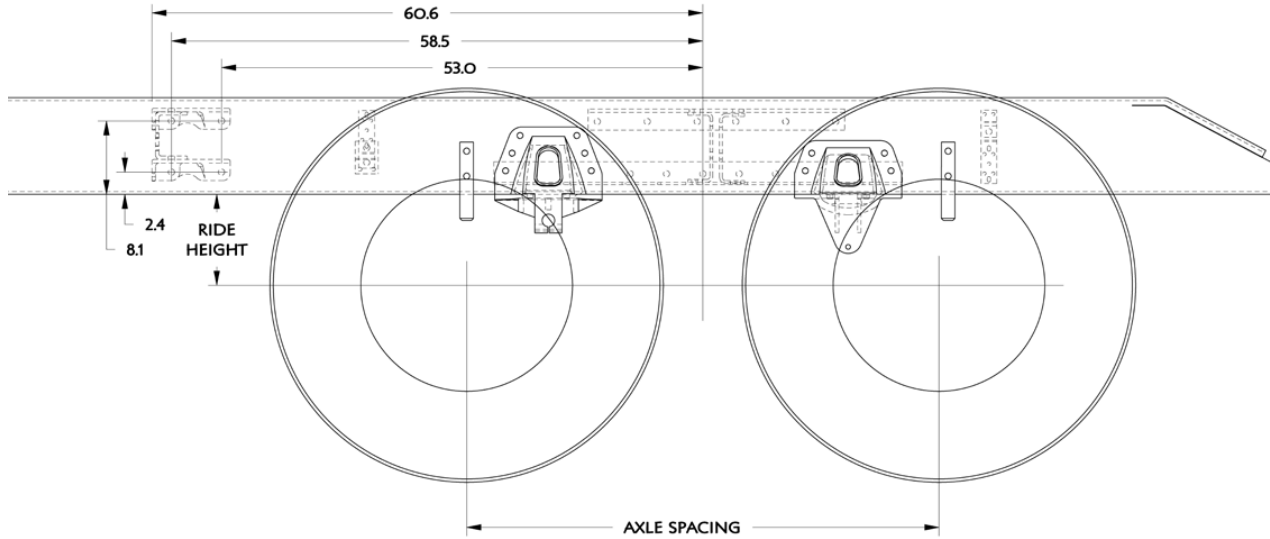
Optional Hendrickson HMX Tandem Suspensions

TABLE 3-18. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Hendrickson ULTIMAAX 460 17.5" Saddle Height	46K	54"	11"	12.5"
Hendrickson ULTIMAAX 460 18.25" Saddle Height	46K	54"	11"	12.5"
Hendrickson ULTIMAAX 460 17.5" Saddle Height	46K	60"	11"	12.5"
Hendrickson ULTIMAAX 460 18.25" Saddle Height	46K	60"	11"	12.5"
Hendrickson ULTIMAAX 520 17.5" Saddle Height	52K	54"	11"	12.5"
Hendrickson ULTIMAAX 520 18.25" Saddle Height	52K	54"	11"	12.5"
Hendrickson ULTIMAAX 520 17.5" Saddle Height	52K	60"	11"	12.5"
Hendrickson ULTIMAAX 520 18.25" Saddle Height	52K	60"	11"	12.5"

HENDRICKSON RT TANDEM SUSPENSION

Shown with a 54" Axle Spacing without Track Rods



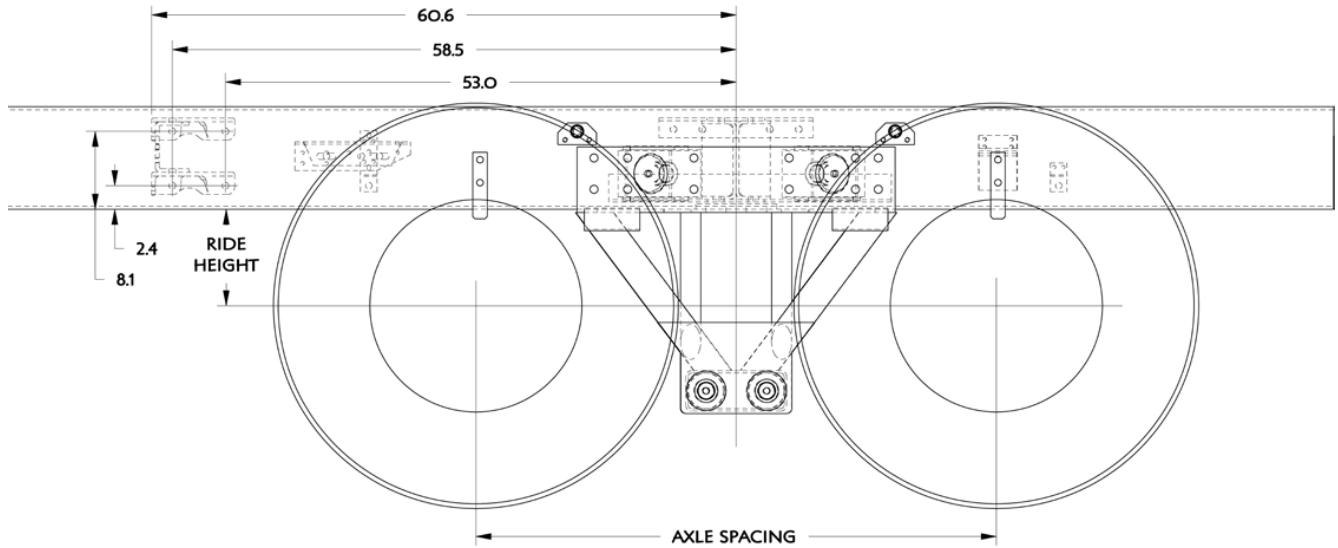
Optional Hendrickson RT Tandem Suspensions

TABLE 3-19. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Hendrickson RT463 6" saddle	46K	52"	10.0"	11.1"
Hendrickson RT463 6" saddle	46K	54"	10.0"	11.1"
Hendrickson RT463 7.19" saddle	46K	54"	11.2"	12.5"
Hendrickson RT463 7.94" saddle	46K	54"	11.9"	13.3"
Hendrickson RT463 6" saddle	46K	60"	10.0"	11.1"
Hendrickson RT463 7.94" saddle	46K	60"	11.9"	13.0"
Hendrickson RTE463 7.19" saddle	46K	52"	10.5"	11.6"
Hendrickson RT523 6" saddle	52K	52"	9.9"	11.0"
Hendrickson RT523 6" saddle	52K	54"	9.9"	11.0"
Hendrickson RT523 7.19" saddle	52K	54"	11.1"	12.2"
Hendrickson RT523 11" saddle	52K	54"	14.9"	16.0"
Hendrickson RT523 6" saddle	52K	60"	9.9"	11.0"
Hendrickson RT523 7.19" saddle	52K	60"	11.1"	12.2"

CHALMERS 854 TANDEM SUSPENSION

Shown with a 54" Axle Spacing



Optional Chalmers Tandem Suspensions

TABLE 3-20. Rear Suspension Options

Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Chalmers 854-40-L	40K	54"	8.9"	11.1"
Chalmers 854-40-L-HS	40K	54"	9.6"	11.1"
Chalmers 854-40-H	40K	54"	10.2"	12.4"
Chalmers 854-40-H-HS	40K	54"	10.9"	12.4"
Chalmers 854-46-L	46K	54"	8.9"	11.3"
Chalmers 854-46-L-HS	46K	54"	9.6"	11.3"
Chalmers 854-46-H	46K	54"	10.1"	12.5"
Chalmers 854-46-H-HS	46K	54"	10.9"	12.5"
Chalmers 854-50-L	50K	54"	8.9"	11.3"
Chalmers 854-50-L-HS	50K	54"	9.6"	11.3"
Chalmers 854-50-H	50K	54"	10.1"	12.5"

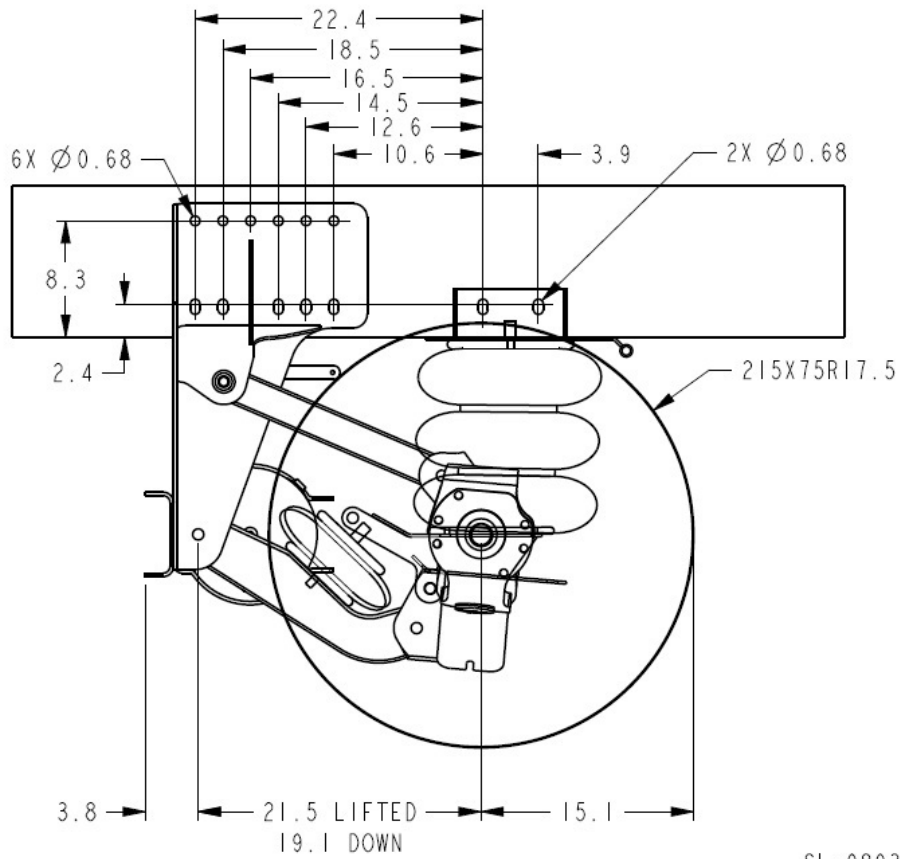
Suspension Type	Rating	Axle Spacing	Laden Ride Height	Unladen Ride Height
Chalmers 854-50-H-HS	50K	54"	10.9"	12.5"
Chalmers 854-52-L-HS	52K	54"	9.6"	11.3"
Chalmers 854-52-H-HS	52K	54"	10.9"	12.5"
Chalmers 860-40-L	40K	60"	8.9"	11.1"
Chalmers 860-46-L	46K	60"	8.9"	11.3"
Chalmers 860-46-L-HS	46K	60"	9.6"	11.3"
Chalmers 860-46-H	46K	60"	10.1"	12.5"
Chalmers 860-46-H-HS	46K	60"	10.9"	12.5"
Chalmers 860-52-H	52K	60"	10.9"	12.5"
Chalmers 872-46-H-HS	46K	72"	11.0"	12.5"

LIFT AXLES (PUSHERS AND TAGS)

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

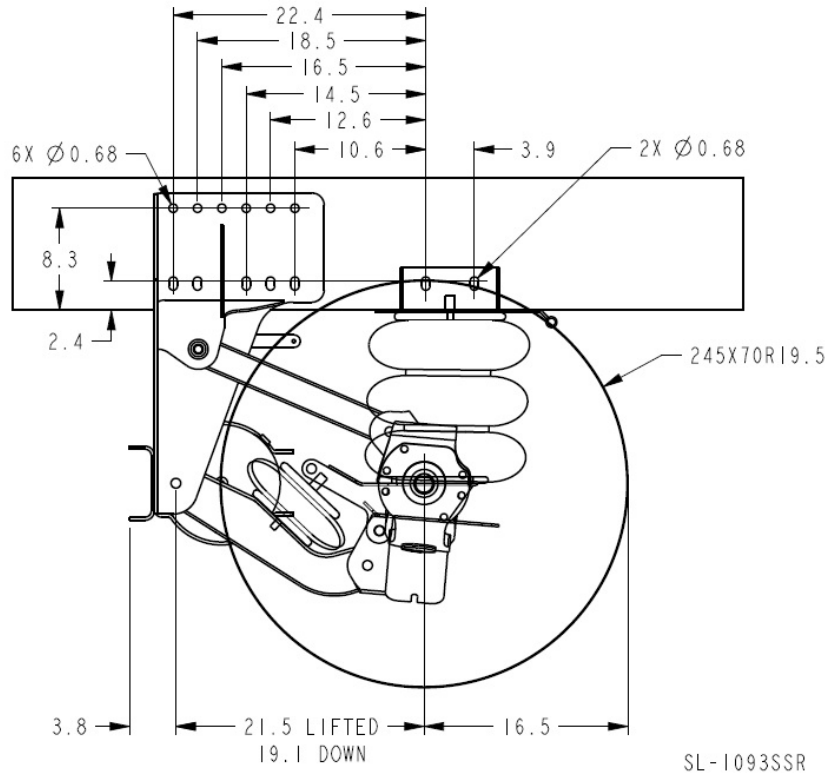
Peterbilt will automatically install highest lift axle kit as applicable based on chassis frame height and loading conditions. Lift axle available run range it utilized, along with frame height and lift axle tire size to identify applicable kits that can be installed. Installing highest lift axle kit will maximize ground clearance when axle is in lifted state. If needed, kit may be lowered in order to clear driveline when in lifted state.

Watson & Chalin 8K Steerable (SL0893SSR)

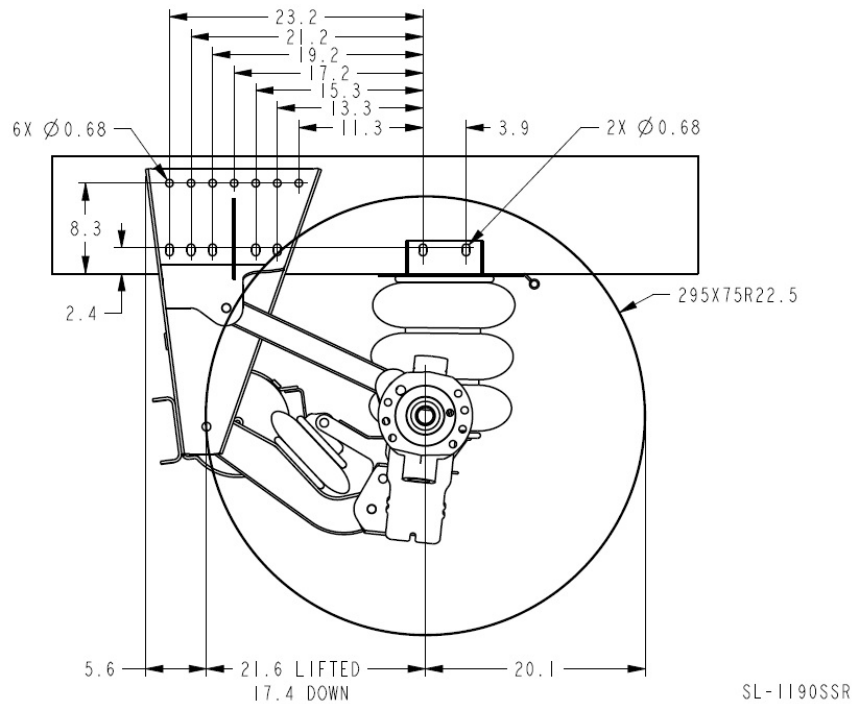


SL-0893SSR

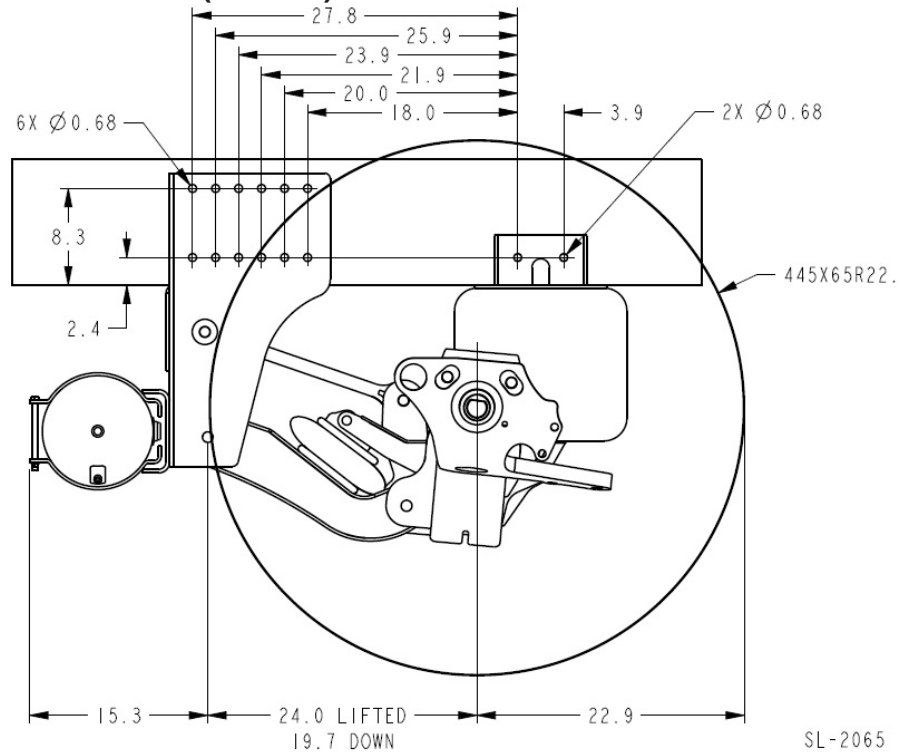
Watson & Chalin 10K Steerable (SL1093SSR)



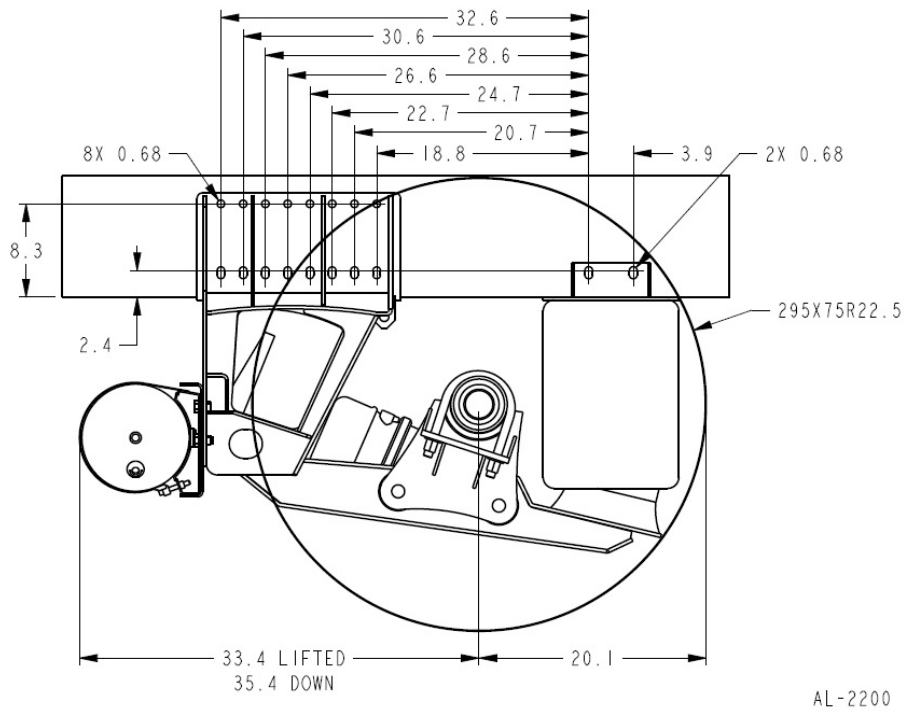
Watson & Chalin 13.5K Steerable (SL1190SSR)



Watson & Chalin 20K Steerable (SL2065)



Watson & Chalin 23K Non-Steerable (AL2200)



AXLE TRACK AND TIRE WIDTH

The dimensions provided in this section are representative of some typical product combinations. The purpose of this section is to demonstrate some of the typical dimensions.

- Axle Track: The distance between the dual tire centerlines on a dual tire arrangement or the distance between the tire centerlines on a single tire arrangement.
- Width: The distance over the outermost tire sidewall to sidewall.

These dimensions may be significant to the following:

- Appearance relative to other tires and chassis mounted equipment.
- Load carrying capacity. Different wheel disc offset can have a positive or negative impact on the axle carrying capacity of the axle.

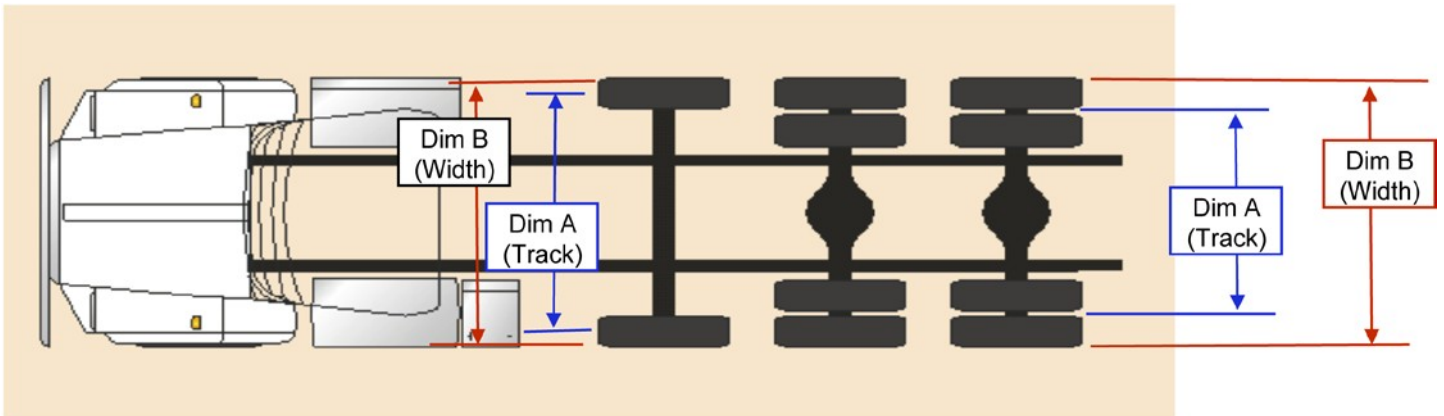


TABLE 3-21. Axle Width Calculation.

Axle - Drive	Wheel	Tire	Configuration	Track Dim "A"	Overall Width Dim "B":
Meritor RT46-160(P)(EH) 46K Dual Dana Spicer D46-170(H)(P) 46K Dual	Alcoa 88367 22.5X8.25	11R22.5	4-4	73.3"	97.8"
Meritor RT46-160(P)(EH) 46K Dual Dana Spicer D46-170(H)(P) 46K Dual	Alcoa 98363 24.5X8.25	11R24.5	4-4	73.6"	98.0"
Meritor RT46-160WT(P)(EH) 46K Dual Wide Track Dana Spicer D46-170W(H)(P) 46K Dual Wide Track	Alcoa 88367 22.5X8.25	11R22.5	4-4	79.2"	103.7"
Meritor RT46-160WT(P)(EH) 46K Dual Wide Track Dana Spicer D46-170W(H)(P) 46K Dual Wide Track	Alcoa 98363 24.5X8.25	11R24.5	4-4	79.5"	103.9"
Dana Spicer D46-170(H)(P) 46K Dual Meritor RT46-160(P)(EH) 46K Dual	Alcoa 82262 22.5X12.25	425/65R22.5	2-4	72.7	88.9"
Meritor RT46-160WT(P)(EH) 46K Dual Wide Track Dana Spicer D46-170W(H)(P) 46K Dual Wide Track	Alcoa 82262 22.5X12.25	425/65R22.5	2-4	78.7"	94.9"

Axle - Steer	Wheel	Tire	Brake Drum Type	Track Dim "A"	Overall Width Dim "B:"
Meritor MFS13 Std Track Dana Spicer E-1322I 13.2K	Alcoa 98363 24.5X8.25	11R24.5	CAST	80.2"	91.0"
Meritor MFS13 Wide Track Dana Spicer E-1322W 13.2K	Alcoa 98363 24.5X8.25	11R24.5	CAST	82.2"	93.0"
Meritor MFS20 Std Track Dana Spicer D2000 20K	Alcoa 82362 22.5X12.25	425/65R22.5	CAST	86.5"	102.7"
Meritor MFS20 Std Track Dana Spicer D2000 20K	Alcoa 82462 22.5X12.25	425/65R22.5	CAST	82.6"	98.8"

Lift Axle Model	Wheel	Tire	Wheel Orientation	Track Dim "A"	Overall Width Dim "B"
W&C SL0893SSR 8K Steerable	Alcoa 66480 17.5x6	215/75R17.5	Same as FR	77.3"	85.8"
W&C SL1093SSR Steerable 10K	Alcoa 77349 19.5x7.5	265/70R19.5	Same as FR	78.5"	88.5"
W&C SL1190SSR Steerable 13.5K	Alcoa 88367 22.5x8.25	255/70R22.5	Same as FR	80.4"	90.7"
W&C SL2065 Steerable 20K	Alcoa 82362 22.5x12.25	425/65R22.5	Same as FR	83.6"	99.8"
W&C SL2200 Steerable 23K	Alcoa 88367 22.5x8.25	295/75R22.5	Same as RR, dual	78.2"	102.8"
W&C AL2200-STD Track Non-Steerable 23K	Alcoa 88367 22.5x8.25	11R22.5	Same as RR, dual	72.2"	96.6"
W&C AL2200-STD Track Non-Steerable 23K	Alcoa 82362 22.5x12.25	425/65R22.5	Same as RR, single	78.4"	94.7"
W&C AL2200-Wide Track Non-Steerable 23K	Alcoa 89465 22.5x9	315/80R22.5	Same as FR, single	64.7"	77.3"
W&C AL2200-Wide Track Non-Steerable 23K	Alcoa 84362 22.5x14	445/50R22.5	Same as RR, single	80.6"	97.7"

FRONT DRIVE AXLE, PTO'S AND AUXILIARY TRANSMISSIONS

The front drive axle, PTO and auxiliary transmission layouts are provided as a tool to help layout bodies prior to arrival. For information not detailed in these drawings, work with the local Peterbilt dealer to request that information.

EXAMPLES

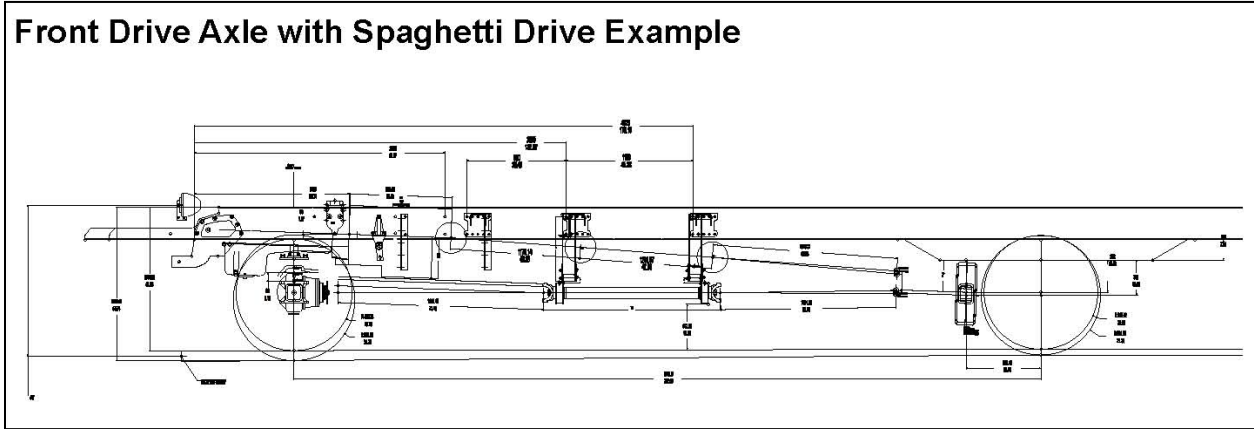


FIGURE 3-24. Front Drive Axle with Spaghetti Drive Example

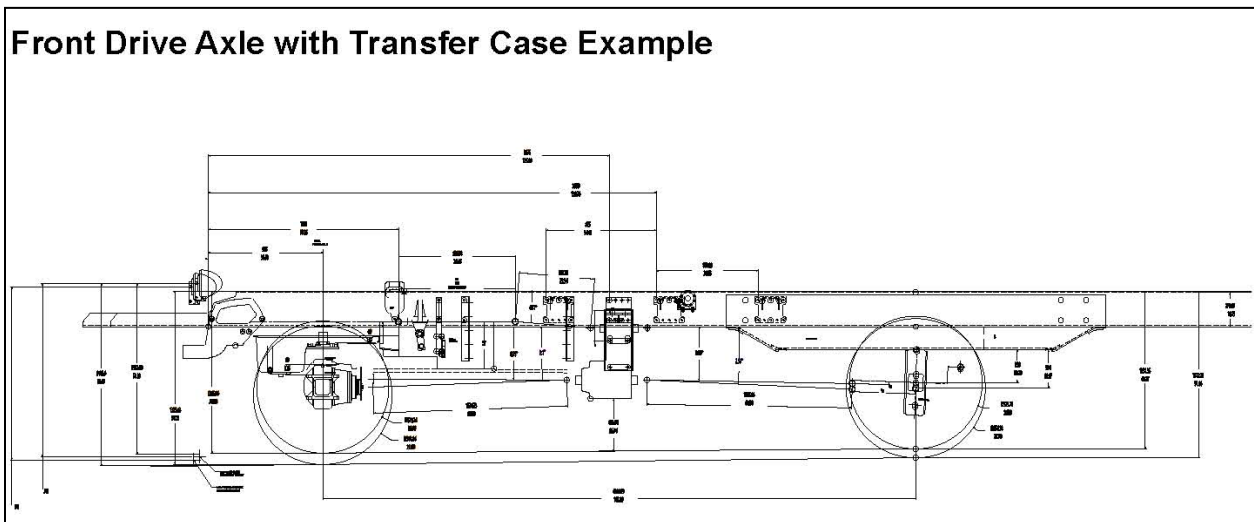


FIGURE 3-25. Front Drive Axle with Transfer Case Example

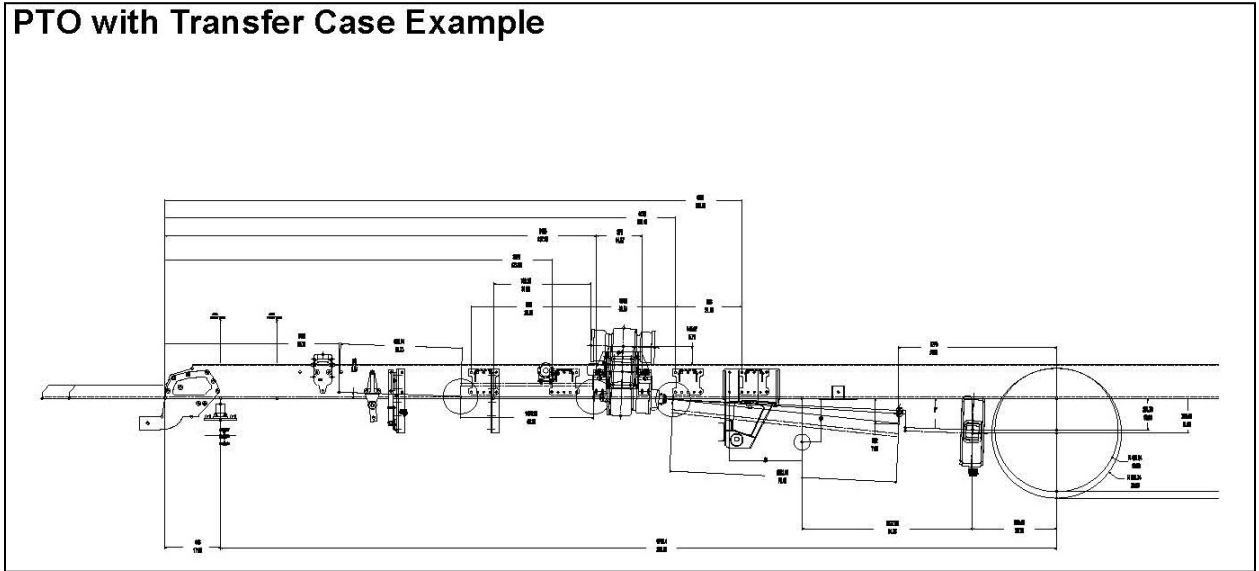


FIGURE 3-26. PTO with Transfer Case Example

Auxiliary Transmission, AT1202, Example

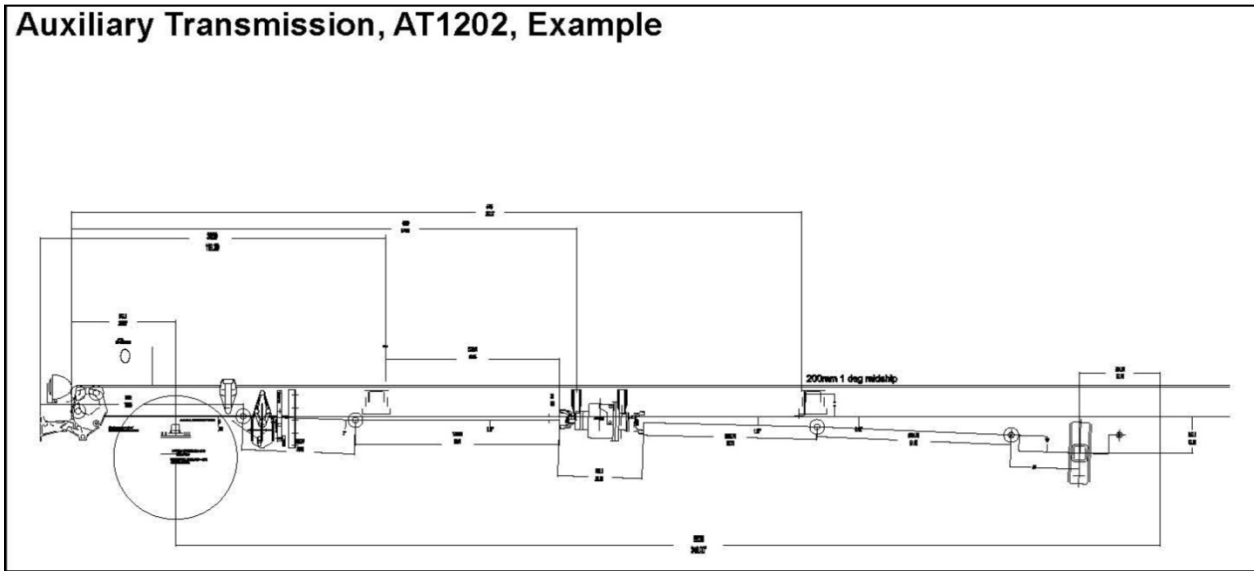


FIGURE 3-27. PTO with Transfer Case Example

Auxiliary Transmission, AT1750-4C, Example

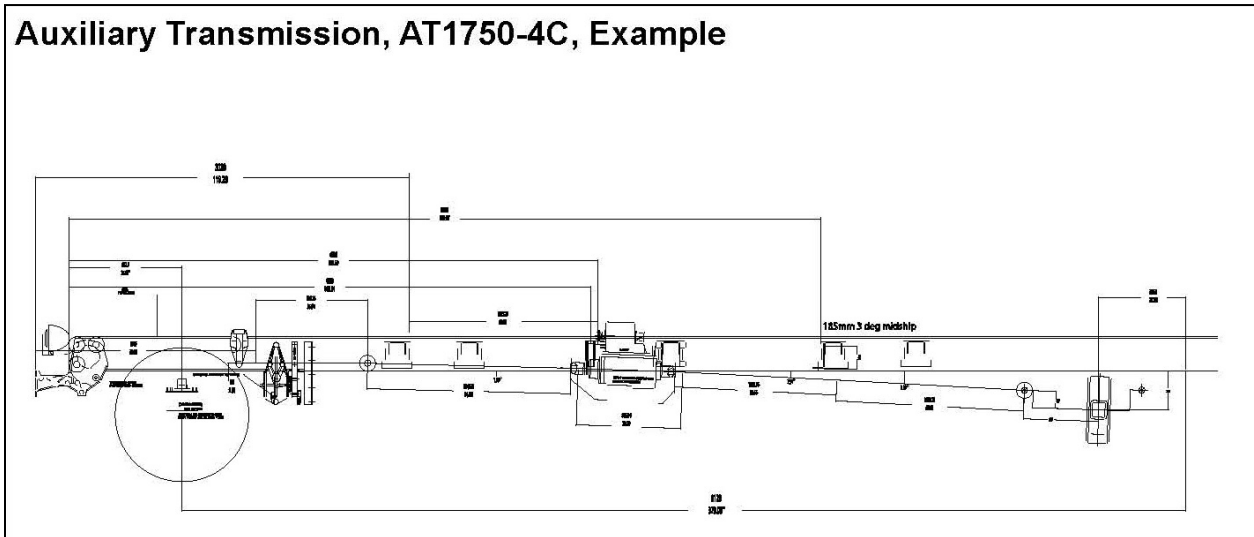


FIGURE 3-28. PTO with Transfer Case Example

GUPPY OUTSERTS

The rear suspension guppy outsert layouts are provided as a tool to help layout bodies prior to arrival. For information not detailed in these drawings, work with the local Peterbilt dealer to request that information.

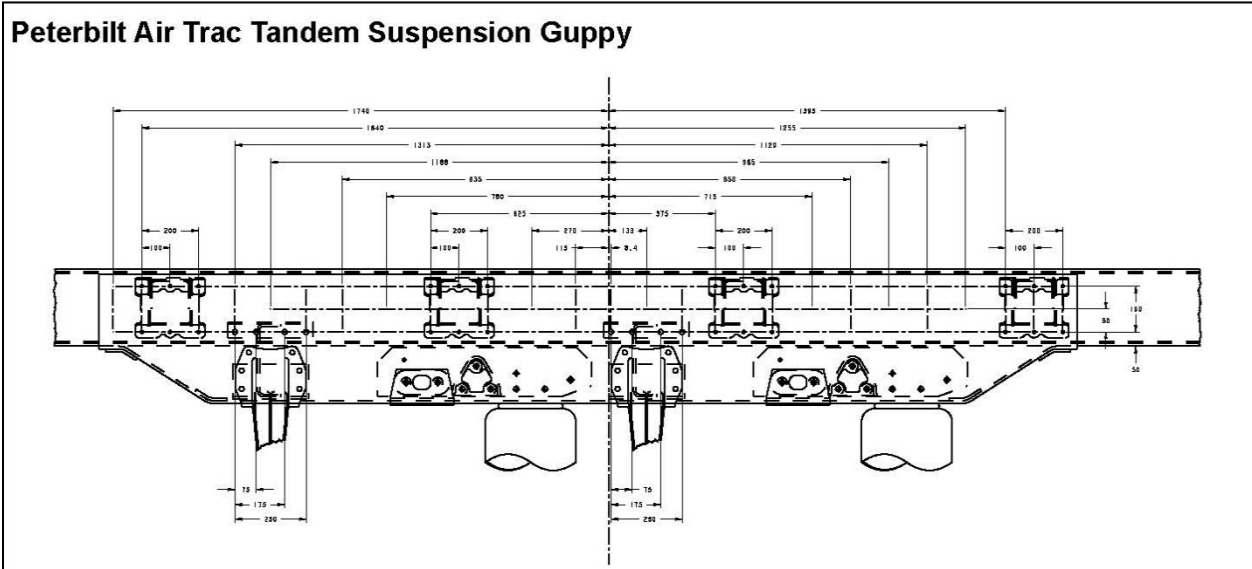


FIGURE 3-29. Peterbilt Air Trac Tandem Suspension Guppy

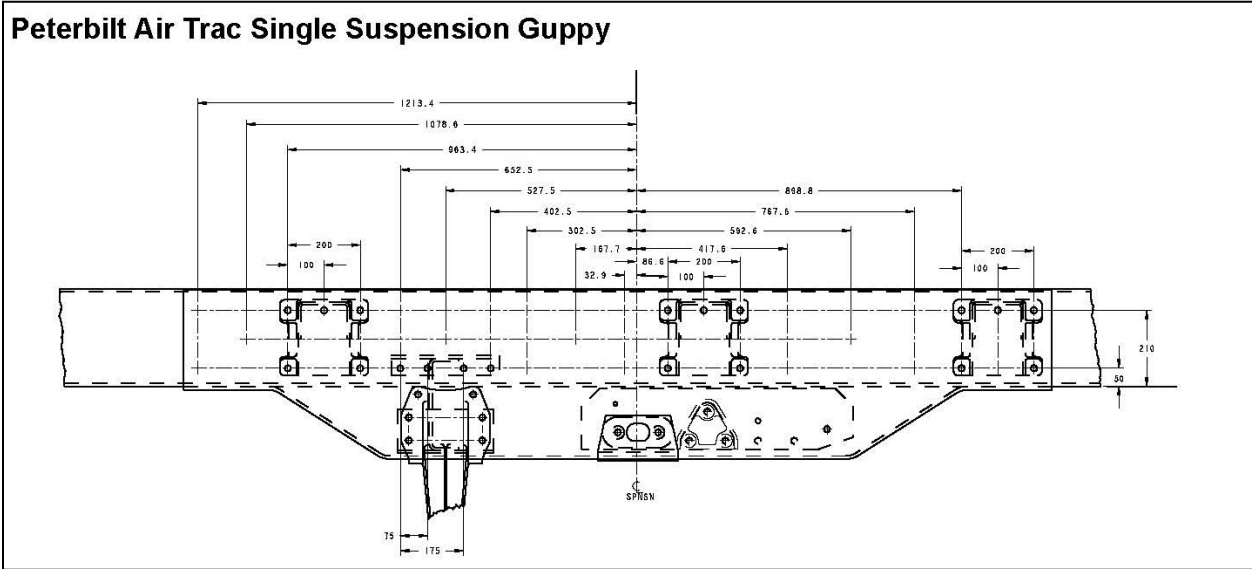


FIGURE 3-30. Peterbilt Air Trac Single Suspension Guppy

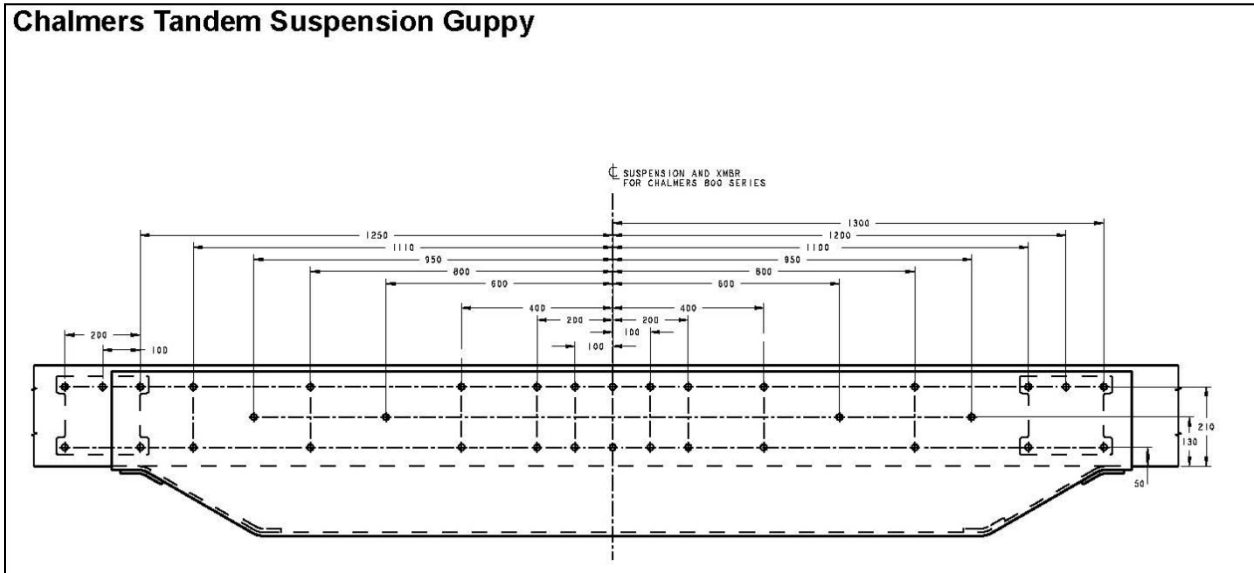


FIGURE 3-31. Chalmers Tandem Suspension Guppy

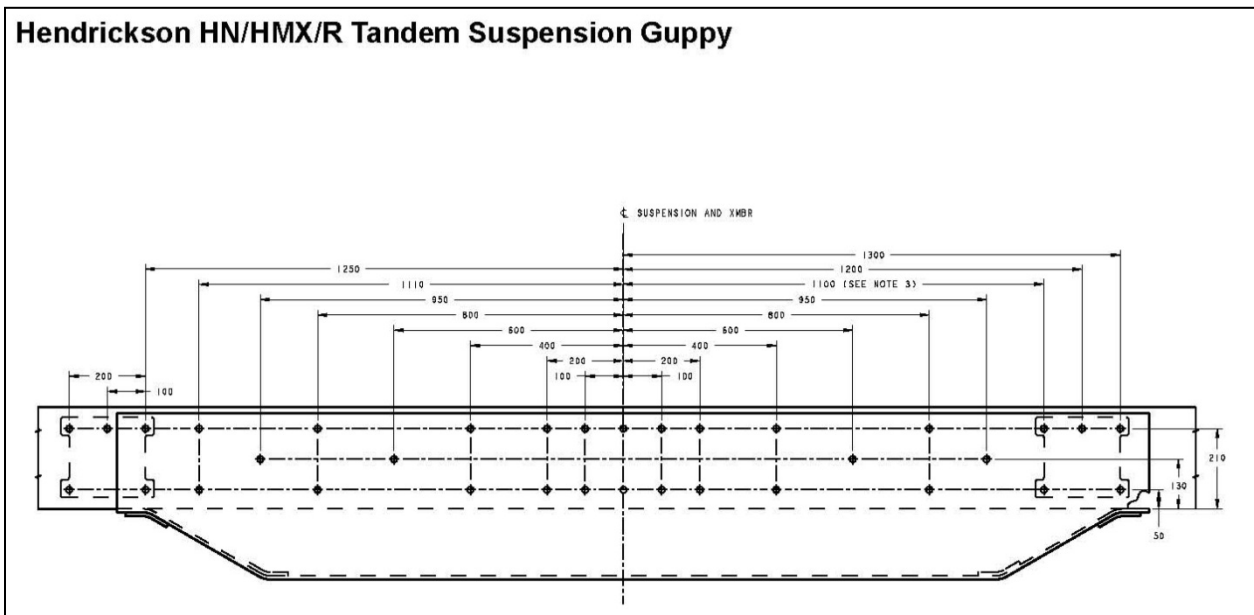


FIGURE 3-32. Hendrickson HN/HMX/R Tandem Suspension Guppy

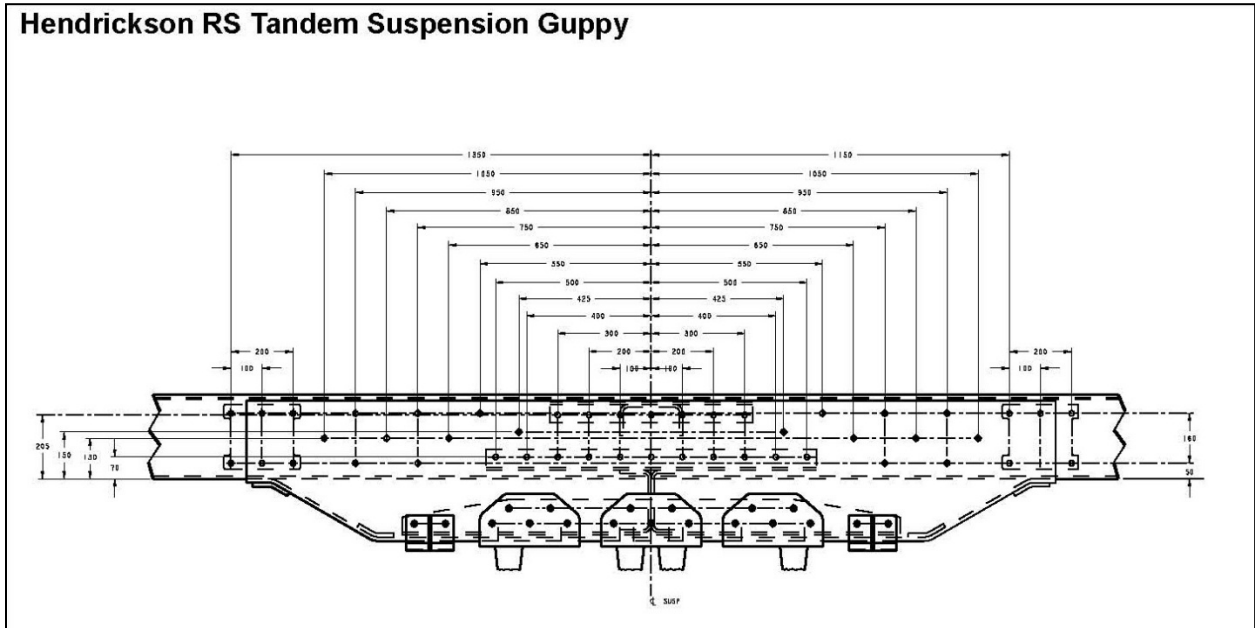


FIGURE 3-33. Hendrickson RS Tandem Suspension Guppy

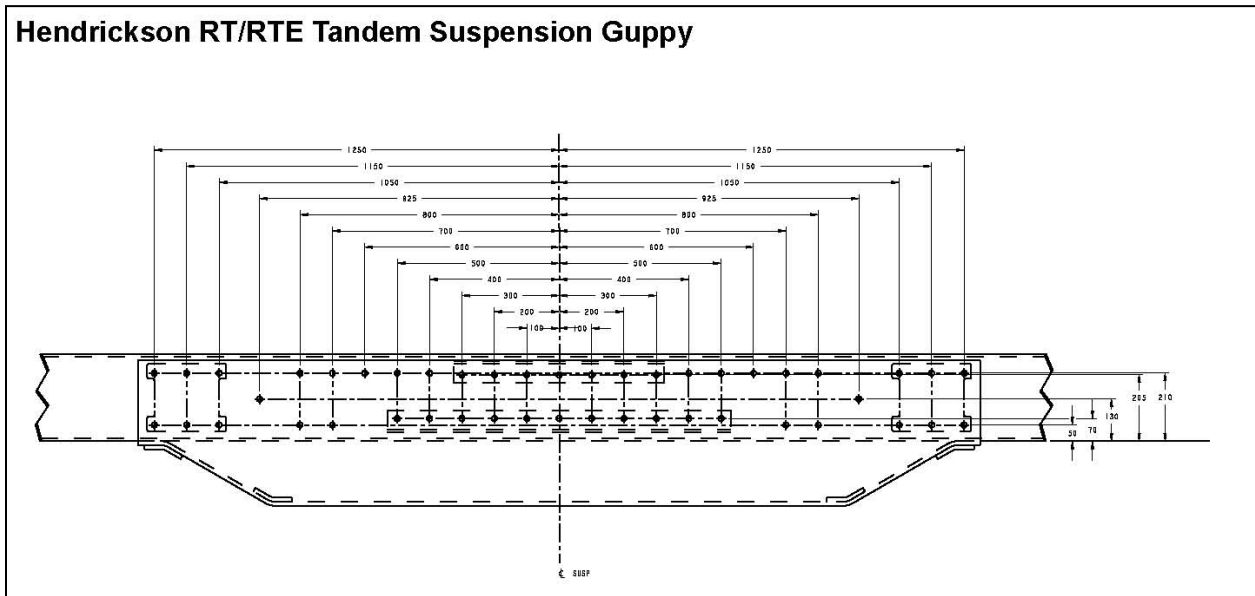


FIGURE 3-34. Hendrickson RT/RTE Tandem Suspension Guppy

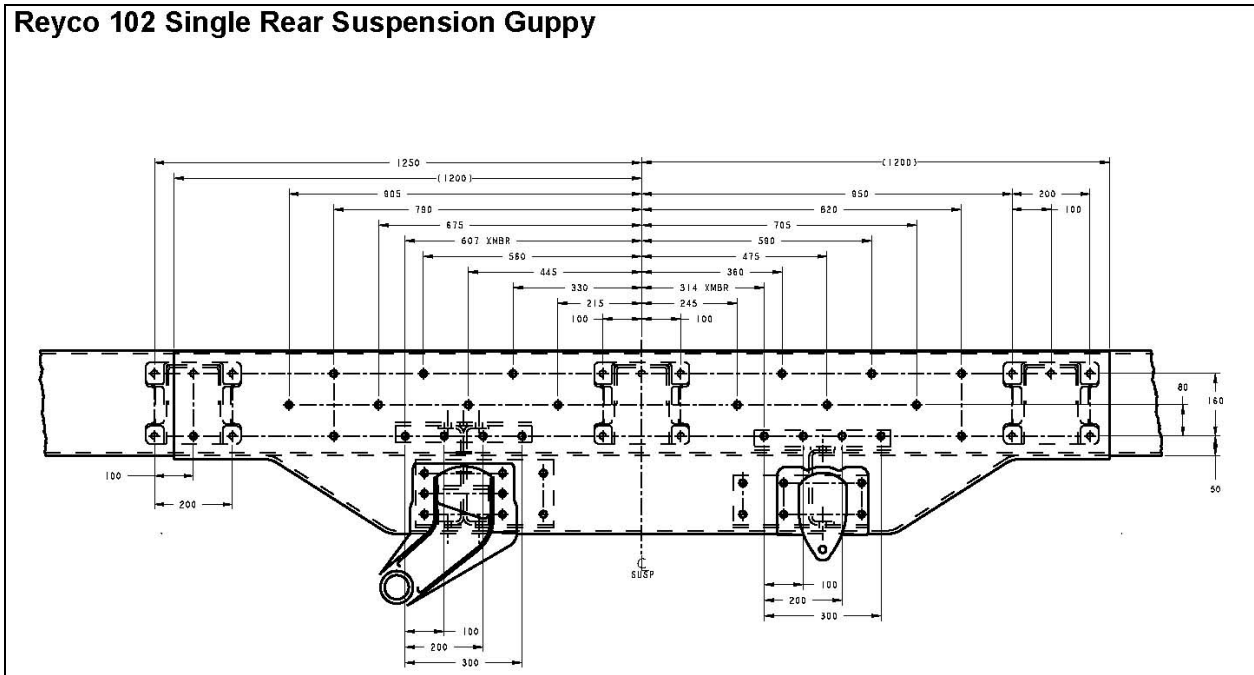


FIGURE 3-35. Reyco 102 Single Drive Suspension Guppy

EXHAUST HEIGHT CALCULATIONS

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

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

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

TABLE 3-22. Exhaust Heights

Y = DISTANCE FROM BTM OF FRAME RAIL TO BTM OF STANDPIPE					
Exhaust Location	389-131	389-123, 386, 384, 367, 365	579, 567	587	388 w/ Low Profile Alum Hood
SOC Mounted (Day Cab)	67.2	69.2	70.2	N/A	67.2
SOC Mounted (Sleeper)	67.2	69.2	67.6	N/A	67.2
BOC Mounted	N/A	70.7	69.2	N/A	68.7
Frame Mounted	N/A	84.9	86.0	84.9	N/A
Vertical-Vertical EPA 2013	N/A	ISX/MX=77.3, ISL=75	ISX/MX=78.3, ISL=75.7	N/A	N/A

NOTES:

- 1) For "A" and "C" values, reference the FRAME HEIGHTS section for front or rear suspension height.
- 2) For "B" and "D" values, reference the tire manufacturer's website or catalog for static loaded radius (SLR).
- 3) For Stand Pipe Length (SPL) values, reference the truck sales order.

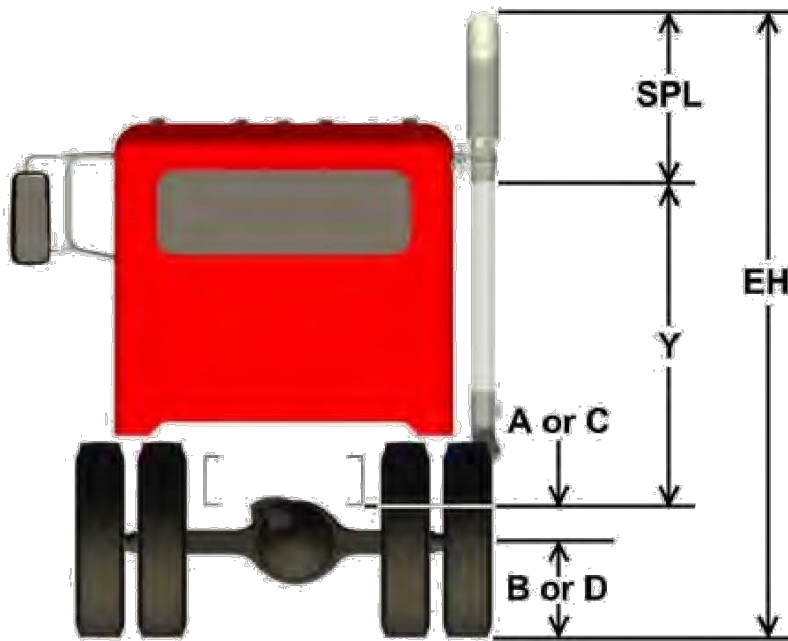


FIGURE 3-36. Exhaust Height Calculations

GROUND CLEARANCE CALCULATIONS

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

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

TABLE 3-23. Ground Clearance

Y = DISTANCE FROM BOTTOM OF FRAME TO BOTTOM OF COMPONENT	
Component	Y
RHUC DPF/SCR	16.7
Horizontal (Series or X-Over) DPF/SCR	16.5
Battery/Tool Box	15.4
Space Saver Battery Box (w/o Air Tanks or Step)	3.9
Space Saver Battery Box (w/ Air Tanks or Step)	12.7
Frame Mounted Ladder Step	13.9
20" Diameter Fuel Tank	12.4
23" Diameter Fuel Tank	15.2
26" Diameter Fuel Tank	18.0
DEF Tank	15.4

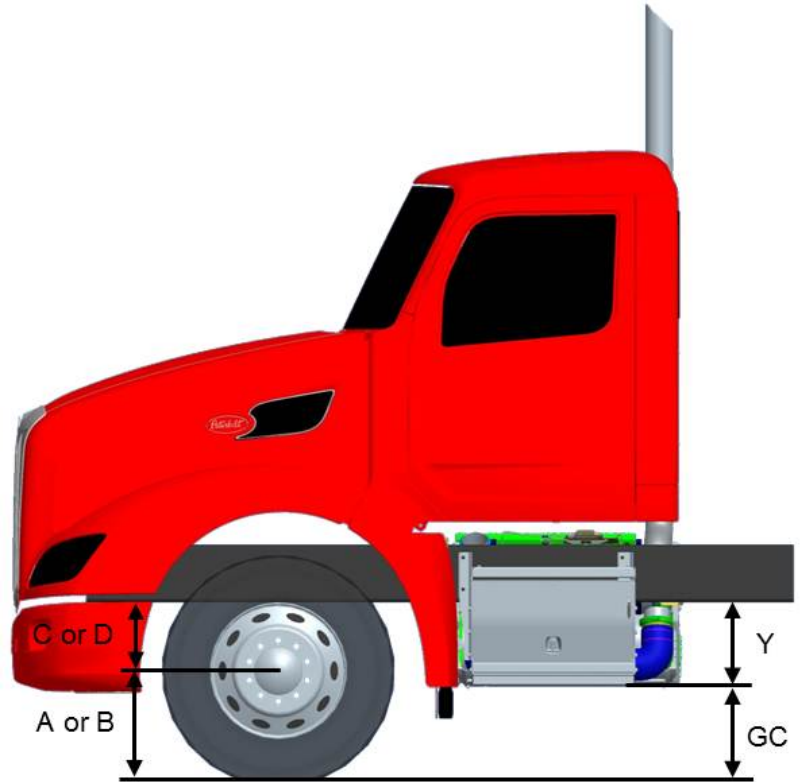


FIGURE 3-37. Ground Clearance Calculations

NOTES:

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

OVERALL CAB HEIGHT CALCULATIONS

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

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

TABLE 3-24. Overall Cab Height

Y = DISTANCE FROM BTM OF FRAME TO TOP OF STANDARD CAB ROOF

Model	Y
389-131, 389-123 Low Profile Hood	79.4
389-123, 386, 384, 367, 365	81.5
365 Full Profile Frame Extensions	85.5
587 Day Cab	85.2
579/567	83.7

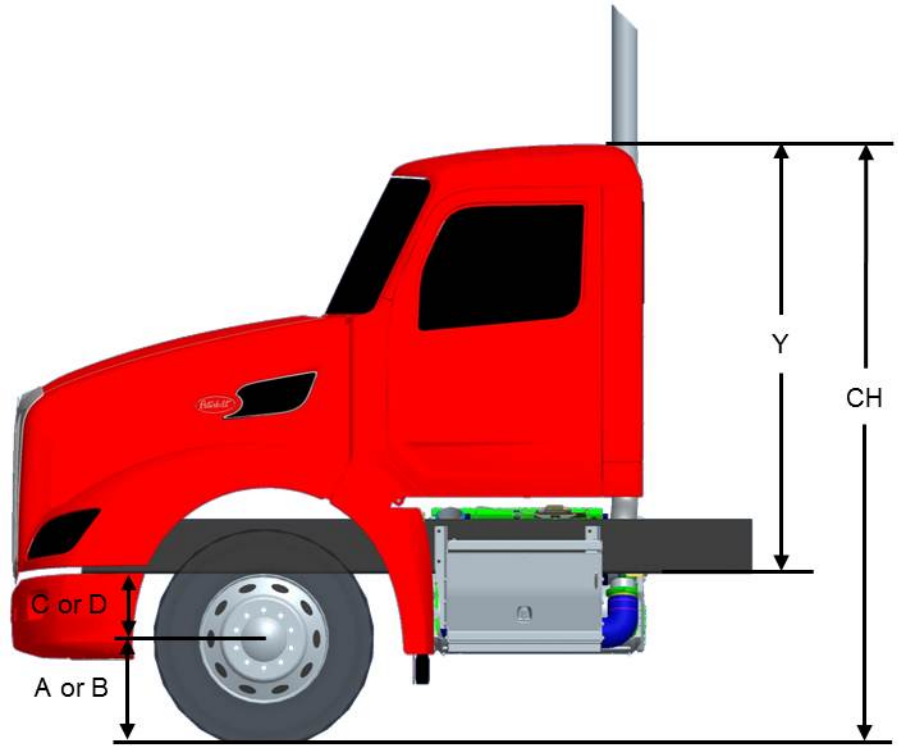


FIGURE 3-38. Overall Cab Height Calculations

NOTES:

- 1) For "A" and "C" values, reference the FRAME HEIGHTS section for front suspension height or rear suspension height.
- 2) For "B" and "D" values, reference the tire manufacturer's website or catalog for overall diameter or static loaded radius (SLR).
- 3) Roof mounted content such as horns and antennas are not included.
- 4) For extended day cab configurations, add 5.8" to overall cab height.

FRAME COMPONENTS

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

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

FUEL TANKS

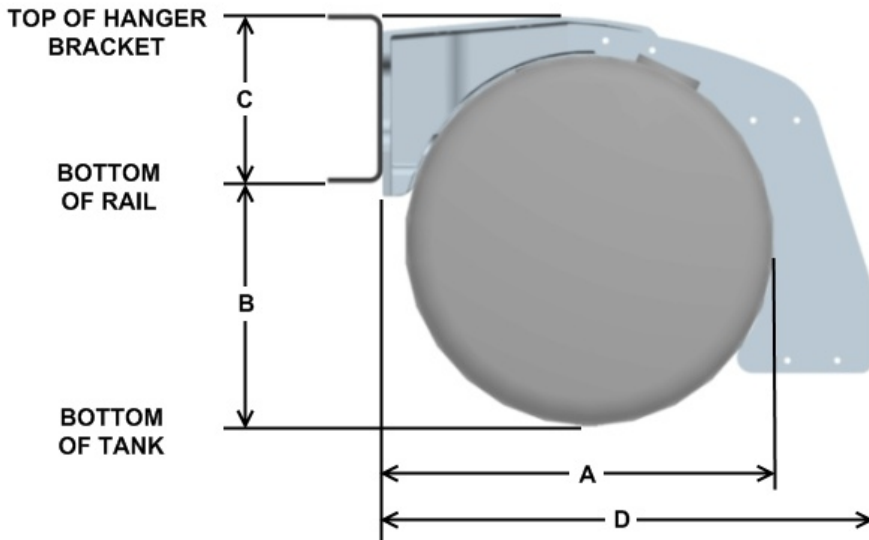


FIGURE 3-39. Fuel Tanks

TABLE 3-25. Fuel Tank Dimensions

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

TABLE 3-26. Fuel Tank Data

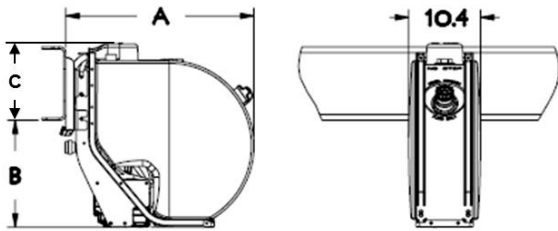
GALLONS		TANK LENGTH		
USEABLE	TOTAL	20"	23"	26"
40	46	33.3	N/A	N/A
50	57	43.2	34.5	26.7
60	67	51.3	40.7	31.5
70	78	57.3	46.8	36.2
80	89	65.3	52.9	41.0
90	99	N/A	59.0	45.7
100	110	N/A	*65.1	50.5
110	121	N/A	N/A	55.2
120	131	N/A	77.3	60.0
135	147	N/A	N/A	66.8
150	163	N/A	N/A	*74.0

NOTES:

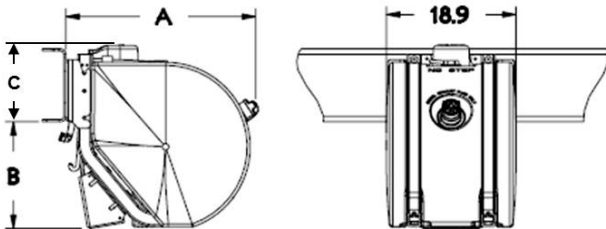
- 1) * Largest capacity without a weld seam.

DEF TANKS

SMALL DEF TANK



MEDIUM DEF TANK



LARGE DEF TANK

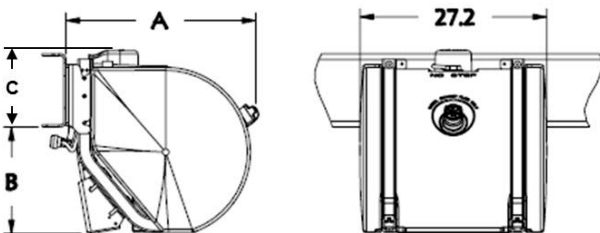


FIGURE 3-40. DEF Tanks



FIGURE 3-41. DEF Tank Isometric View

TABLE 3-27. DEF Tank Dimensions and Data

DESCRIPTION	GALLONS	A	B	C
SMALL DEF TANK	11.0	27.7	15.4	10.5
MEDIUM DEF TANK	20.7	27.7	15.4	10.5
LARGE DEF TANK	31.1	27.7	15.4	10.5

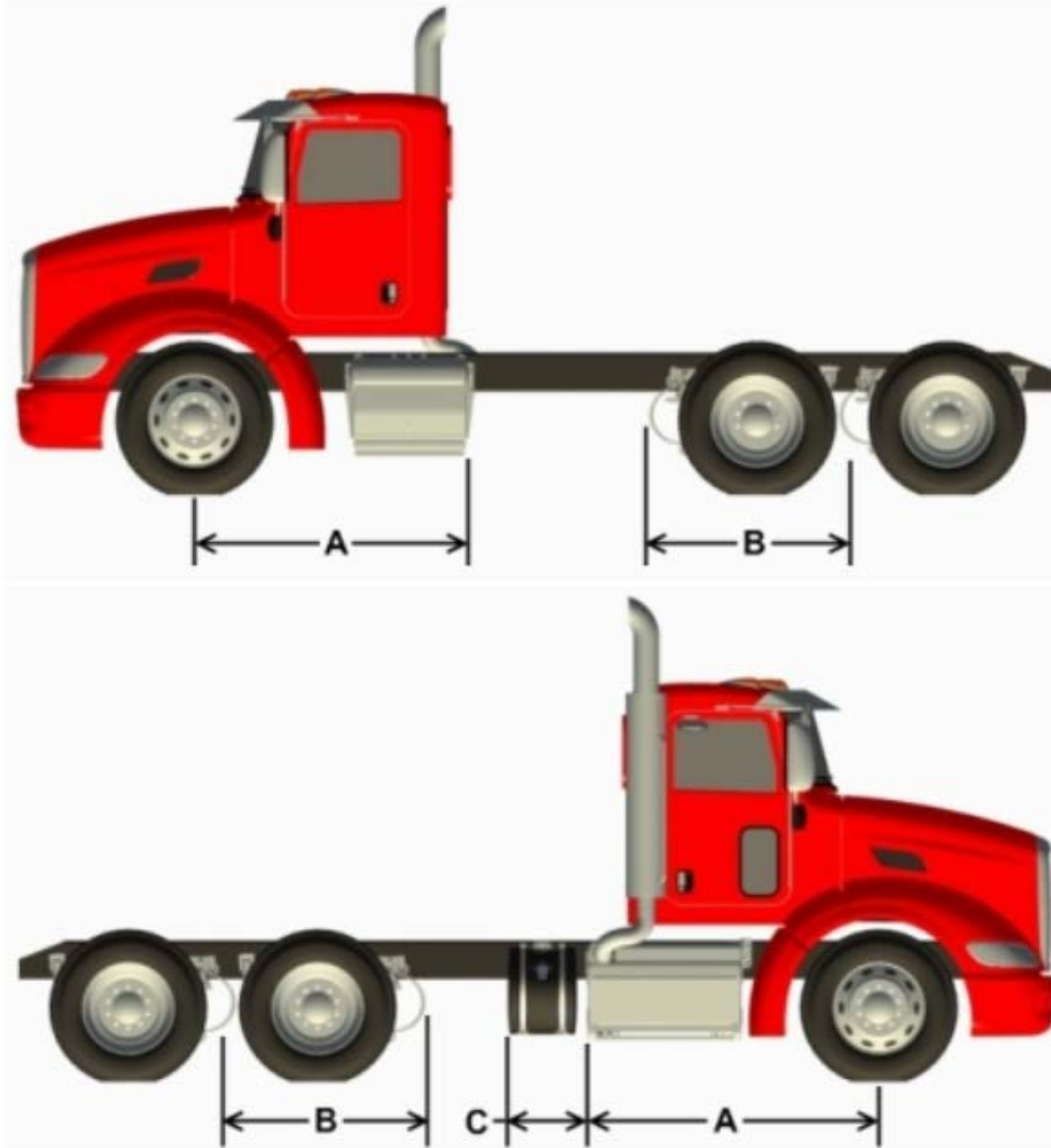
OTHER FRAME COMPONENTS

TABLE 3-28. Other Frame Component Dimensions

DESCRIPTION	LENGTH
STANDARD BOC BATTERY BOX	40.9
STANDARD BOC TOOL BOX	31.6
SPACE SAVER BATTERY BOX W/ STEP	28.2
SPACE SAVER BATTERY BOX W/O STEP	25.1
FRAME MOUNTED LADDER STEP	12.8

FRAME SPACE REQUIREMENTS

This section includes drawings and charts related to frame space components 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.



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.

REAR SUSPESION

TABLE 3-29. Rear Suspension Frame Space Requirements

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	8
CHALMERS 800 (54" SPACING)	49.0	52.0	4
HENDRICKSON HLM / AL	26.6	N/A	6, 7
HENDRICKSON HLR2	30.5	N/A	6, 7
HENDRICKSON HMX, HN	53.0	54.0	
HENDRICKSON R/RS/RT/RTE	53.0	53.0	3
HENDRICKSON SC20	25.6	15.0	6, 7
HENDRICKSON SC8/10/13, FX, FXO, SCO	23.6	13.8	5, 6, 7
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, 7
WATSON-CHALIN SL0893SSR	27.6	11.8	5, 6, 7
WATSON-CHALIN SL1093SSR	27.6	11.8	6, 7
WATSON-CHALIN SL1190SSR	26.0	12.8	6, 7
WATSON-CHALIN SL2065	28.8	14.4	6, 7

Notes:

1. Overhang for tractor taper EOF and standard mudflap hangers on suspensions; Square EOF w/o Crossmember for Lift Axles.
2. Add 2.0" to "B" dimension with quarter fenders.
3. Add 1.5" to "B" dimension with quarter fenders.
4. Add 0.6" to "B" dimension with quarter fenders.
5. Add 2.8" to "B" dimension with quarter fenders.
6. Add 3.0" to "B" dimension if pusher is mounted behind sleeper. The suspension bracket protrudes 3" BOS.
7. "B" dimension is from axle centerline (or bogie for tandem) to clear frame forward.
8. Extended Tractor Taper requires 58.0" overhang.

DIMENSIONS

Model: 579-123" BBC SBFA and 567-121" BBC SBFA w/o Chassis Fairings
 FAX to BOC= 74.1"

Under Cab Component "A" Dim					DEF Tank Dimension "C" LH DEF Tank W/RHUC DPF/SCR		
Fuel Tank Diameter	Capacity in Gallons	DC and xx" Slpr	Exhaust	"A" LH, RH Rail	Small	Medium	Large
23"	50	DC, 58", 72", 80"		71.1	16.1	23.5	32.1
	60	DC, 58", 72", 80"		74.9 (RH 75.4)	12.3	21.7	32.3
	70	DC, 58", 72", 80"	W/O DSOC	81.1	14.0	21.4	32.0
		DC, 58", 72", 80"	W/DSOC	84 (RH 81.1)	13.0	22.4	31.0
	80	DC, 58", 72", 80"		87.3	13.7	21.1	31.7
	90	58"	W/O DSOC	93.5 (RH N/A)	13.4	22.8	
		DC, 72", 80"	W/O DSOC	93.5 (RH N/A)	13.4	22.8	30.3
	100	58"		99.4	13.4		
		DC, 72", 80"		99.4	13.4	22.8	31.4
	120	72"		111.7	12.9	22.3	
DC, 80"			111.7	12.9	22.3	30.9	
26"	70	DC, 58", 72", 80"	W/O DSOC	70.5 (RH 71.9)	12.8	24.1	32.7
		DC, 58", 72", 80"	W/DSOC	70.5 (RH 71.9)	16.7	24.1	32.7
	80	DC, 58", 72", 80"		75.2	13.9	21.4	31.9
	90	DC, 58", 72", 80"	W/O DSOC	80.0	13.2	22.5	31.1
		DC, 58", 72", 80"	W/DSOC	83.9 (RH 80)	13.2	22.5	31.1
	100	DC, 58", 72", 80"		84.8	12.3	21.7	30.2
	110	DC, 58", 72", 80"		89.4	13.5	20.9	30.5
	120	58"		94.2	12.6	22.0	
		DC, 72", 80"		94.2	12.6	22.0	30.6
	135	58"		101.1	13.7		
		DC, 72", 80"		101.1	13.7	21.1	31.7
	150	72"		108.1	12.6	22.0	
DC, 80"			108.1	12.6	22.0	30.6	
Under Cab Boxes					DEF Tank Dimension "C" w/ Under Cab Boxes W/RHUC DPF/SCR		
RHUC Box	Engine	Fairings	"A"	RH Small	RH Medium	RH Large	
RHUC DPF/SCR HD Low HP	MX-11, MX-13, ISX15-1	NO	76.8	16.3	27.7	36.3	
RHUC DPF/SCR HD High HP	ISX15-3	NO	77.3	15.8	27.2	35.7	
RHUC DPF/SCR Aero w/o BOC	All	YES	78.8	18.2	27.6	38.1	
RHUC DPF/SCR Aero W/BOC	All	YES	78.8	24.1	33.5	42.1	
RH Batt/Tool Box			66.1				
Under Cab Component					LH Small	LH Medium	LH Large
LH Batt/Tool Box W/O DSOC		NO	66.1	21.1	28.5	37.1	
LH Batt/Tool W/DSOC		NO	66.1	21.1	30.5	39.1	
LH UnderCab Fairings To BOC		Yes	A+C	A+C=97	A+C=106.4	A+C=117.0	

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 74.1" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 579-117" BBC SBFA and 567-115" BBC SBFA w/o Chassis Fairings
 FAX to BOC= 68.2"

Under Cab Component "A" Dim					DEF Tank Dimension "C" LH DEF Tank W/RHUC DPF/SCR		
Fuel Tank Diameter	Capacity in Gallons	DC and xx" Slpr	Exhaust	"A" LH, RH Rail	Small	Medium	Large
23"	50	DC, 58", 72", 80"		68.7	12.6	22.0	30.6
	60	DC, 58", 72", 80"	W/DSOC	76.8 (RH 74.9)	12.4	23.7	34.2
		DC, 58", 72", 80"	W/O DSOC	74.9	12.3	21.7	32.2
	70	DC, 58", 72", 80"		81.1	14.0	21.4	31.9
	80	58"		87.3 (RH 88.3)	13.7	20.1	
		DC, 72", 80"		87.3 (RH 88.3)	13.7	20.1	30.6
	100	58"		99.4	13.4		
		72"		99.4	13.4	22.8	
		DC, 80"		99.4	13.4	22.8	31.3
	120	72"		111.7	12.9	22.3	
DC, 80"			111.7	12.9	22.3	30.9	
26"	50	DC, 58", 72", 80"		63.9	17.4	24.8	33.4
	60	DC, 58", 72", 80"		65.7	15.6	23.0	31.6
	70	DC, 58", 72", 80"		70.5	12.8	22.1	32.7
	80	DC, 58", 72", 80"	W/DSOC	76.2 (RH 75.2)	13.0	23.4	31.9
		DC, 58", 72", 80"	W/O DSOC	75.2	14.0	21.4	31.9
	90	DC, 58", 72", 80"		80.0	13.1	22.5	31.1
	100	58"		84.8 (RH 86.3)	12.2	20.1	
		DC, 72", 80"		84.8 (RH 86.3)	12.2	20.1	28.7
	110	58"		89.4	13.6	20.9	
		DC, 58", 72", 80"		89.4	13.6	20.9	31.5
	120	58"		94.2	12.7		
		DC, 72", 80"		94.2	12.7	22.1	30.6
	135	58"		101.1	13.7		
		72"		101.1	13.7	21.1	
		DC, 80"		101.1	13.7	21.1	31.6
	150	72"		108.1	12.6		
DC, 80"			108.1	12.6	22.0	30.5	
Under Cab Boxes					DEF Tank Dimension "C" w/ Under Cab Boxes W/RHUC DPF/SCR		
Box	Engine	Fairings	"A"	RH Small	RH Medium	RH Large	
RHUC DPF/SCR MD MHP	PX-9	NO	70.9	16.3	25.7	36.3	
RHUC DPF/SCR MD HHP	PX-9	NO	73.3	17.8	27.2	35.8	
RHUC DPF/SCR HD Low HP	MX-13, MX-11	NO	70.9	16.3	25.7	36.3	
RHUC DPF/SCR HD AERO W/O BOC EXH		Yes	78.8	12.3	21.7	32.2	
RHUC DPF/SCR HD AERO W/BOC EXH		Yes	78.8	24.1	33.5	42.1	
RH Batt/Tool Box		NO	66.1				
Under Cab Component					LH Small	LH Medium	LH Large
LH Batt/Tool Box		NO	66.1	17.2	24.6	35.1	
LH UnderCab Fairings To BOC		Yes	A+C	A+C = 91.1	A+C = 100.5	A+C = 111.1	

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 68.2" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 567-121" BBC SFFA w/o Chassis Fairings
 FAX to BOC=90.1"

Under Cab Component "A" Dim				DEF Tank Dimension "C" w/ Under Cab Fuel Tanks					
Fuel Tank Diameter	Capacity DC and xx" Slpr	Dual SOC W/ or W/O	"A" LH, RH Rail	DEF Tank Behind UC FT W/RH U/C DPF/SCR.			LH & RH DEF Tank W/Vertical DPF/SCR		
				Small	Medium	Large	Small	Medium	Large
23"	50 gal, 44"	W/ or W/O	86.8	14.4	23.8	32.4	16.4	23.8	32.4
	50 gal, DC, 58", 72", 80"	W/ or W/O	86.8	14.4	23.8	32.4	24.3	41.5	52.1
	70 gal, 44"	W/ or W/O	88.2	13.0	22.4	31.0	15.0	22.4	31.0
	70 gal, DC, 58", 72", 80"	W/ or W/O	88.2	13.0	22.4	31.0	22.9	40.1	50.7
	80 gal, 44"	W/ or W/O	92	13.2	22.5	68.5	13.2	22.5	31.1
	80 gal, DC, 58", 72", 80"	W/ or W/O	92	13.2	22.5	31.1	19.1	36.3	46.9
	100 gal, 44"	W/ or W/O	104.1	38.5	45.9	56.4	12.9	59.6	68.2
	100 gal, DC, 58, 72", 80"	W/ or W/O	104.1	12.9	24.2	32.8	18.8	24.2	34.8
	120 gal, 44"	W/ or W/O	116.4	26.2	33.6	44.1	30.1	47.3	55.9
120 gal, 58"	W/ or W/O	116.4	14.3	47.3	55.9	14.3	23.7	34.3	
120 gal, DC, 72, 80"	W/ or W/O	116.4	14.3	21.8	32.3	14.3	23.7	34.3	
26"	50 gal, 44"	W/ or W/O	81.1	14.2	21.6	32.2	14.2	21.6	32.2
	50 gal, DC, 58", 72", 80"	W/ or W/O	81.1	14.2	21.6	32.2	16.2	47.2	57.8
	60 gal, 44"	W/ or W/O	85.9	13.4	24.7	33.3	13.4	24.7	33.3
	60 gal, DC, 58", 72", 80"	W/ or W/O	85.9	13.4	24.7	33.3	25.2	42.4	53.0
	70 gal, 44"	W/ or W/O	88.4	14.8	22.2	30.8	14.8	22.2	30.8
	70 gal, DC, 58", 72", 80"	W/ or W/O	88.4	14.8	22.2	30.8	22.7	39.9	50.5
	80 gal, 44"	W/ or W/O	86.3	13.0	24.3	32.9	16.9	24.3	32.9
	80 gal, DC, 58", 72", 80"	W/ or W/O	86.3	13.0	24.3	32.9	24.8	42.0	52.6
	90 gal, 44"	W/ or W/O	89	14.2	21.6	32.1	14.2	21.6	32.1
	90 gal, DC, 58", 72", 80"	W/ or W/O	89	14.2	21.6	32.1	22.1	39.3	49.9
	100 gal, 44"	W/ or W/O	89.5	13.7	23.1	31.6	13.7	23.1	31.6
	100 gal, DC, 58", 72", 80"	W/ or W/O	89.5	13.7	23.1	31.6	21.6	38.8	49.4
	110 gal, 44"	W/ or W/O	94.2	12.9	22.3	66.3	12.9	22.3	30.9
	110 gal, DC, 58", 72", 80"	W/ or W/O	94.2	12.9	22.3	30.9	16.9	34.1	44.7
	120 gal, 44"	W/ or W/O	99	14.0	23.4	61.5	14.0	23.4	73.3
	120 gal, DC, 58", 72", 80"	W/ or W/O	99	14.0	23.4	32.0	23.9	29.3	39.9
	135 gal, 44"	W/ or W/O	105.8	13.1	22.5	31.1	17.1	24.5	33.1
135 gal, 58"	W/ or W/O	105.8	13.1	22.5	66.5	17.1	24.5	33.1	
135 gal, DC, 72", 80"	W/ or W/O	105.8	13.1	22.5	31.1	17.1	24.5	33.1	
150 gal, 44"	W/ or W/O	112.8	29.8	37.2	47.7	33.7	50.9	59.5	
150 gal, 58"	W/ or W/O	112.8	14.0	23.4	59.5	16.0	25.4	33.9	
150 gal, DC, 72", 80"	W/ or W/O	112.8	14.0	23.4	32.0	16.0	25.4	33.9	

Under Cab Boxes				DEF Tank Dimension "C" w/ Under Cab Boxes					
Box	Exhaust	Fairing	"A"	LH DEF			RH DEF		
				Small	Medium	Large	Small	Medium	Large
LH UC B/T Box W / RH UC Exhaust	W/O Dual SOC	No	82.1	21.1	28.5	37.1			
LH UC B/T Box W / RH UC Exhaust	W/ Dual SOC	No	82.1	21.1	30.5	39.0			
LH UC B/T Box W / 44"	Vertical DPF/SCR	No	82.1	15.2	24.6	33.1			
LH UC B/T Box W /DC, 58", 72" 80"	Vertical DPF/SCR	No	82.1	15.2	44.2	54.8			
RH U/C DPF/SCR w/ HD LHP engines	W/ or W/O DSOC	No	90.3				18.8	20.8	22.7
RH U/C DPF/SCR w/ HD HHP engines	W/ or W/O DSOC	No	90.8				18.3	20.3	22.2

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 90.1" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 567-115" BBC SFFA w/o Chassis Fairings
 FAX to BOC=86.2"

Under Cab Component "A" Dim				DEF Tank Dimension "C" w/ Under Cab Fuel Tanks					
Fuel Tank Diameter	Capacity DC and xx" Slpr	Dual SOC W/ or W/O	"A" LH / RH Rail	LH DEF Tank W/RH U/C DPF/SCR.			LH & RH DEF Tank W/Vertical DPF/SCR		
				Small	Medium	Large	Small	Medium	Large
23"	50 gal w/ 44"	W/ or W/O	81.3	16.0	23.4	32.0	16.0	23.4	32.0
	50 gal w/DC, 58", 72", 80"	W/ or W/O	81.3	16.0	23.4	32.0	23.9	43.1	51.6
	70 gal w/44"	W/ or W/O	82.3	15.0	22.4	31.0	15.0	22.4	31.0
	70 gal w/DC, 58", 72", 80"	W/ or W/O	82.3	15.0	22.4	31.0	22.9	42.1	50.6
	80 gal, 44"	W/ or W/O	88.5	12.7	22.1	66.1	12.7	22.1	79.9
	80 gal, DC, 58", 72", 80"	W/ or W/O	88.5	12.7	22.1	30.7	16.7	35.9	79.9
	100 gal, 44"	W/ or W/O	100.6	14.4	43.5	54.0	14.4	59.2	67.8
	100 gal, 58"	W/ or W/O	100.6	14.4	21.8	32.3	16.4	23.8	34.3
	100 gal, DC, 72", 80"	W/ or W/O	100.6	14.4	21.8	32.3	16.4	23.8	34.3
	100 gal, DC, 58", 72", 80"	W/ or W/O	100.6	14.4	21.8	32.3	16.4	23.8	34.3
	120 gal, 44"	W/ or W/O	112.9	23.8	31.2	41.7	27.7	46.9	55.5
	120 gal, 58"	W/ or W/O	112.9	13.9	21.3	53.5	15.9	23.3	33.8
26"	120 gal, DC, 72, 80"	W/ or W/O	112.9	13.9	21.3	31.9	15.9	23.3	33.8
	50 gal w/44"	W/ or W/O	75.1	12.3	21.7	32.3	12.3	21.7	32.3
	50 gal w/DC, 58", 72", 80"	W/ or W/O	75.1	12.3	21.7	32.3	14.3	49.3	57.8
	60 gal, w/44"	W/ or W/O	80.0	13.3	24.7	33.3	17.3	24.7	33.3
	60 gal w/DC, 58", 72", 80"	W/ or W/O	80.0	13.3	24.7	33.3	25.2	44.4	52.9
	70 gal w/44"	W/ or W/O	82.5	14.8	22.2	30.8	14.8	22.2	30.8
	70 gal w/DC, 58", 72", 80"	W/ or W/O	82.5	14.8	22.2	30.8	22.7	41.9	50.4
	80 gal w/44"	W/ or W/O	80.4	12.9	24.3	32.9	16.9	24.3	32.9
	80 gal w/DC, 58", 72", 80"	W/ or W/O	80.4	12.9	24.3	32.9	24.8	44.0	52.5
	90 gal w/44"	W/ or W/O	83.1	14.2	23.6	32.1	14.2	21.6	32.1
	90 gal w/DC, 58", 72", 80"	W/ or W/O	83.1	14.2	23.6	32.1	22.1	41.3	49.8
	100 gal w/44"	W/ or W/O	86.0	13.3	22.6	31.2	13.3	22.6	31.2
	100 gal w/DC, 58", 72", 80"	W/ or W/O	86.0	13.3	22.6	31.2	31.0	38.4	46.9
	110 gal, 44"	W/ or W/O	90.7	12.5	21.9	63.9	14.5	21.9	77.7
	110 gal, DC, 58, 72, 80"	W/ or W/O	90.7	12.5	21.9	30.4	26.3	33.7	42.2
	120 gal, 44"	W/O DSO	95.5	13.6	21.0	59.1	13.6	64.3	72.9
	120 gal, DC, 58, 72, 80"	W/O DSO	95.5	13.6	21.0	31.5	21.5	28.9	37.4
	120 gal, 44"	W/DSOC	98.0 / 95.5	13.1 / 15.6	46.1 / 48.6	56.6 / 59.1	11.1 / 13.6	61.8 / 64.3	70.4 / 72.9
	120 gal, DC, 58", 72", 80"	W/DSOC	98.0 / 95.6	13.1 / 15.6	22.4 / 24.8	31.0 / 33.4	19.0 / 21.4	26.4 / 28.8	34.9 / 37.3
	135 gal, 44"	W/ or W/O	102.3	12.7	41.8	52.3	12.7	24.0	66.1
135 gal, 58"	W/ or W/O	102.3	12.7	22.1	64.1	14.7	24.0	34.6	
135 gal, DC, 72, 80"	W/ or W/O	102.3	12.7	22.1	30.6	14.7	24.0	34.6	
150 gal, 44"	W/ or W/O	109.3	27.4	34.8	45.3	31.3	24.9	59.1	
150 gal, 58"	W/ or W/O	109.3	13.6	23.0	57.1	15.5	24.9	33.5	
150 gal, DC, 72", 80"	W/ or W/O	109.3	13.6	23.0	31.5	15.5	24.9	33.5	

Under Cab Boxes				DEF Tank Dimension "C" w/ Under Cab Boxes					
Box	Exhaust	Fairing	"A"	LH DEF			RH DEF		
				Small	Medium	Large	Small	Medium	Large
LH U/C B/T Box, DC, 44", 58", 72", 80"	W/O Vertical DPF/SCR	No	76.2	17.1	24.6	35.1			
LH U/C B/T Box, 44"	W / Vertical DPF/SCR	No	76.2	27	46.2	54.8			
LH U/C B/T Box, DC, 58", 72", 80"	W / Vertical DPF/SCR	No	76.2	16.8	36	44.6			
RH U/C with LHP Engines	W/ or W/O	No	86.4				20.7	30.1	38.7
RH U/C with MHP rated PX-9	W/ or W/O	No	84.9				22.2	31.6	40.2
RH U/C with HHP rated PX-9	W/ or W/O	No	87.4				19.7	29.1	37.7

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 86.2" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 389-131”

FAX to BOC=100.6”

Under Cab Component "A" Dim				DEF Tank Dimension "C" w/UC Fuel Tanks		
Dia.	Capacity / DC, Sleeper	"A"	LH DEF, LH Fuel Tank W/RH U/C DPF/SCR.			
			Small	Medium	Large	
Fuel Tank Under Cab	20"	50	93.5	19.5	26.9	35.5
		50 Dual SOC	93.5	25.4	32.9	43.4
		60	101.6	13.4	22.8	31.3
	23"	60 Dual SOC	101.6	17.3	24.7	35.3
		50	96.8	16.2	23.6	32.2
		50 Dual SOC	96.8	22.1	29.5	40.0
		70	100.0	13.0	20.4	29.0
		70 Dual SOC	100.0	18.9	26.4	36.9
		80	103.3	9.8	23.1	31.7
		80 Dual SOC	103.3	15.7	23.1	33.6
		100/44"	109.4	13.4	22.8	62.9
		100/DC, 58, 72, 80	109.4	13.4	22.8	31.4
	120/44"	122.7	13.9	39.1	49.6	
	26"	120/DC, 58, 72, 80	122.7	13.9	21.3	31.9
		50	93.1	20.0	27.4	36.0
		50 Dual SOC	93.1	25.9	33.3	43.8
		60	96.5	16.5	24.0	32.5
		60 Dual SOC	96.5	22.4	29.9	40.4
		70	96.3	16.7	24.1	32.7
		70 Dual SOC	96.3	22.6	26.1	40.6
		80	96.1	16.9	24.3	32.9
		80 Dual SOC	96.1	22.8	30.2	40.8
		90	98.9	14.1	21.6	30.1
		90 Dual SOC	98.9	20.0	27.5	38.0
		100	94.8	18.2	25.6	34.2
		100 Dual SOC	94.8	24.1	31.5	42.1
		110	101.5	13.5	22.9	31.5
		110 Dual SOC	101.5	17.4	24.9	35.4
	120	104.3	12.6	22.0	32.6	
	135/44"	111.1	13.7	23.1	61.2	
	135/DC, 58, 72, 80	111.1	13.7	23.1	31.7	
	150/44"	118.1	14.6	43.6	54.2	
	150/58"	118.1	14.6	22.0	66.0	
150/DC, 72, 80	118.1	14.6	22.0	32.5		
Undercab box			"A"	DEF Tank Dimension "C" Located Rearward of Under Cab Component		
				Small	Medium	Large
RHUC DPF/SCR MD HHP/MHP	PX-9					
RHUC DPF/SCR HD Low HP	ISX-15-1, MX-13, MX-11		97.6	19.3	28.7	39.2
RHUC DPF/SCR HD High HP	ISX-15-3		97.7	19.3	28.7	39.2
LH U/C B/T Box			90.1	22.9	30.3	38.9
LH U/C B/T Box (Dual Exh)			90.1	28.8	36.2	46.8

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 100.6" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 389-123"
 FAX to BOC=92.8"

Under Cab Component "A" Dim				DEF Tank Dimension "C" w/ Under Cab Fuel Tanks						
				LH DEF, LH Fuel Tank W/RHUC DPF/SCR			LH/RH DEF, UC Fuel Tank W/Vertical DPF/SCR			
	Dia.	Capacity DC, Sleeper	"A"	Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"
Fuel Tank Under Cab	20"	50	91.5	13.6	21.0	29.6	TBM	TBM	42.7	42.7
		60	95.7	TBM	20.8	TBM	17.3	TBM	38.5	38.5
	23"	50	89.0	16.2	23.6	32.2	TBM	TBM	45.3	45.3
		70	92.1	13.0	22.4	31.0	20.9	TBM	42.1	42.1
		80	95.4	13.7	23.1	31.7	17.6	13.7	38.8	38.8
		100/44"	101.6	13.4	22.8	62.9		19.3		32.7
		100/DC, 58,72,80	101.6	13.4	22.8	31.4	25.2		32.7	
		120/44"	114.9	13.9	39.1	49.6		32.6		29.2
		120/58"	114.9	13.9	21.3	61.4				
	120/DC,72,80	114.9	13.9	21.3	31.9	19.8		29.2		
	26"	50	87.2	12.1	21.5	30.0	12.1	TBM	47.1	47.1
		50 Dual SOC Exh	87.2	18.0	25.4	34.0				
		60	88.6	12.6	24.0	32.5	TBM	TBM	45.6	45.6
		60 Dual SOC Exh	88.6	16.5	24.0	32.5				
		70	88.4	12.8	24.1	32.7	TBM	TBM	45.8	45.8
		70 Dual SOC Exh	88.4	16.7	24.1	32.7				
		80	88.3	13.0	24.3	32.9	TBM	TBM	46.0	46.0
		80 Dual SOC Exh	88.3	16.9	24.3	32.9				
		90	91.0	14.1	21.6	32.1	22.0	TBM	43.2	43.2
		100	87.0	20.2	27.6	38.1	26.1	20.2	47.3	47.3
		110	93.6	13.5	22.9	31.5	19.4	17.4	40.6	40.6
		120	96.4	12.6	22.0	32.6	30.4	20.5	37.8	37.8
		135/44"	103.3	13.7	23.1	61.2		19.6		31.0
	135/58"	103.3	13.7	23.1	31.7					
	135/DC,72,80	103.3	13.7	23.1	31.7	23.6		31.0		
	150/44"	110.3	14.6	43.6	54.2		18.5		29.9	
	150/58"	110.3	14.6	22.0	66.0					
	150/DC,72,80	110.3	14.6	22.0	32.5	20.5		29.9		
Undercab box			"A"	DEF Tank Dimension "C" Located Rearward of Under Cab Component			DEF Tank Dimension "C" W/Vertical DPF/SCR			
				Small	Medium	Large	Sm	Sm W/44"	Medium	Med W/44"
RHUC DPF/SCR MD HHP/MHP	PX-9									
RHUC DPF/SCR Low HP	ISX-15-1, MX-13, MX-11	90.3		16.9	26.2	34.8				
RHUC DPF/SCR High HP	ISX-15-3	92.8		16.3	25.7	35.3				
LH U/C B/T Box		82.3		19.0	26.4	34.9	19.0	19.0	52.0	26.4
LH U/C B/T Box (Dual Exh)		82.3		22.9	30.3	38.9				
LH U/C B/T Box Clear BOC			A+C = 93.3							
RH U/C Batt/Tool Box		82.3					19.0	19.0	52.0	26.4

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 92.8" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 367 SFFA”

FAX to BOC=92.8”

Under Cab Component "A" Dim				DEF Tank Dimension "C" w/ Under Cab Fuel Tanks						
				LH DEF, LH Fuel Tank W/RH U/C DPF/SCR			LH/RH DEF, UC Fuel Tank W/Vertical DPF/SCR			
				Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"
Fuel Tank Under Cab	20"	50	91.5				TBM	TBM	42.7	TBM
		60	95.7				17.3	TBM	38.5	TBM
	23"	50	89.0	14.2	21.6	32.2	TBM	TBM	45.3	TBM
		70	92.1	13.0	22.4	31.0	20.9	TBM	42.1	20.4
		80	95.4	13.7	23.1	31.7	17.6	13.7	38.8	23.1
		100/44"	107.5	13.4	46.4	57.0		13.4		22.8
		100/DC,58,72,80	107.5	13.4	22.8	31.4	19.3		26.7	
		120/44"	119.8	12.9	34.1	44.7		27.7		49.9
		120/58"	119.8	12.9	22.3	56.5				
	120/DC,72,80	119.8	12.9	22.3	30.9	14.9		24.3		
	26"	50	87.2	14.1	21.5	32.0	12.1	TBM	47.1	21.5
		50 Dual SOC Exh	87.2	16.0	23.4	34.0				
		60	88.6	12.6	22.0	32.5	TBM	TBM	45.6	TBM
		60 Dual SOC Exh	88.6	14.6	22.0	32.5				
		70	88.4	12.8	22.2	30.8	TBM	TBM	45.8	TBM
		70 Dual SOC Exh	88.4	14.8	22.2	32.7				
		80	88.3	13.0	22.3	30.9	TBM	TBM	46.0	TBM
		80 Dual SOC Exh	88.3	14.9	22.3	32.9				
		90	91.0	14.1	21.6	32.1	22.0	TBM	43.2	TBM
		100	92.9	12.3	21.7	32.2	20.2	14.3	41.4	21.7
		110	97.6	13.5	22.9	31.5	15.5	13.5	36.7	22.9
		120/44"	105.3	13.6	23.0	59.1		11.7		TBM
		120/DC,58,72,80	105.3	13.6	23.0	31.6	21.5		28.9	
	135/44"	109.2	13.7	44.7	55.3		13.7		60.5	
	135/DC,58,72,80	109.2	13.7	23.1	31.7	17.6		25.1		
	150/44"	116.2	30.3	37.7	48.3		12.6		53.5	
	150/58"	116.2	14.6	22.0	60.1					
	150/DC,72,80	116.2	14.6	22.0	32.5	14.6		24.0		
Undercab box			"A"	DEF Tank Dimension "C" Located Rearward of Under Cab Component			DEF Tank Dimension "C" W/Vertical DPF/SCR			
				Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"
RHUC DPF/SCR MD HHP/MHP		PX-9								
RHUC DPF/SCR Low HP		ISX-15-1, MX-13, MX-11	92.2	14.9	24.3	32.8				
RHUC DPF/SCR High HP		ISX-15-3	94.7	14.4	23.8	33.3				
LH U/C B/T Box			82.3	19.0	26.4	34.9	19.0	19.0	52.0	26.4
LH U/C B/T Box (Dual Exh)			82.3	22.9	30.3	38.9				
RH U/C Batt/Tool Box			82.3				19.0	19.0	52.0	26.4

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 92.8" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 367 SBFA”

FAX to BOC=76.8”

Under Cab Component "A" Dim				DEF Tank Dimension "C" w/ Under Cab Fuel Tanks						
				LH DEF, LH Fuel Tank W/RH U/C DPF/SCR			LH/RH DEF, UC Fuel Tank W/Vertical DPF/SCR			
				Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"
Dia.	Capacity DC, Sleeper	"A"								
Fuel Tank Under Cab	20"	50	91.5				TBM	TBM	42.7	TBM
		60	95.7				17.3	TBM	38.5	TBM
	23"	50	89.0	14.2	21.6	32.2	TBM	TBM	45.3	TBM
		70	92.1	13.0	22.4	31.0	20.9	TBM	42.1	20.4
		80	95.4	13.7	23.1	31.7	17.6	13.7	38.8	23.1
		100/44"	107.5	13.4	46.4	57.0		13.4		22.8
		100/DC,58,72,80	107.5	13.4	22.8	31.4	19.3		26.7	
		120/44"	119.8	12.9	34.1	44.7		27.7		49.9
		120/58"	119.8	12.9	22.3	56.5				
	120/DC,72,80	119.8	12.9	22.3	30.9	14.9		24.3		
	26"	50	87.2	14.1	21.5	32.0	12.1	TBM	47.1	21.5
		50 Dual SOC Exh	87.2	16.0	23.4	34.0				
		60	88.6	12.6	22.0	32.5	TBM	TBM	45.6	TBM
		60 Dual SOC Exh	88.6	14.6	22.0	32.5				
		70	88.4	12.8	22.2	30.8	TBM	TBM	45.8	TBM
		70 Dual SOC Exh	88.4	14.8	22.2	32.7				
		80	88.3	13.0	22.3	30.9	TBM	TBM	46.0	TBM
		80 Dual SOC Exh	88.3	14.9	22.3	32.9				
		90	91.0	14.1	21.6	32.1	22.0	TBM	43.2	TBM
		100	92.9	12.3	21.7	32.2	20.2	14.3	41.4	21.7
		110	97.6	13.5	22.9	31.5	15.5	13.5	36.7	22.9
		120/44"	105.3	13.6	23.0	59.1		11.7		TBM
		120/DC,58,72,80	105.3	13.6	23.0	31.6	21.5		28.9	
		135/44"	109.2	13.7	44.7	55.3		13.7		60.5
	135/DC,58,72,80	109.2	13.7	23.1	31.7	17.6		25.1		
	150/44"	116.2	30.3	37.7	48.3		12.6		53.5	
	150/58"	116.2	14.6	22.0	60.1					
	150/DC,72,80	116.2	14.6	22.0	32.5	14.6		24.0		
Undercab box			"A"	DEF Tank Dimension "C" Located Rearward of Under Cab Component			DEF Tank Dimension "C" W/Vertical DPF/SCR			
				Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"
RHUC DPF/SCR MD HHP/MHP		PX-9								
RHUC DPF/SCR Low HP		ISX-15-1, MX-13, MX-11	92.2	14.9	24.3	32.8				
RHUC DPF/SCR High HP		ISX-15-3	94.7	14.4	23.8	33.3				
LH U/C B/T Box			82.3	19.0	26.4	34.9	19.0	19.0	52.0	26.4
LH U/C B/T Box (Dual Exh)			82.3	22.9	30.3	38.9				
RH U/C Batt/Tool Box			82.3				19.0	19.0	52.0	26.4

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 76.8" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 365 SFFA”

FAX to BOC=86.9”

Under Cab Component "A" Dim			DEF Tank Dimension "C" w/ Under Cab Fuel Tanks							
Dia.	Capacity DC, Sleeper	"A"	LH DEF, LH Fuel Tank W/RHUC DPF/SCR			LH/RH DEF, UC Fuel Tank W/Vertical DPF/SCR				
			Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"	
Fuel Tank Under Cab	20"	50	85.6				TBM	TBM	44.7	TBM
		60	89.8				17.3	TBM	40.5	20.8
	23"	50	81.7	13.6	23.0	31.6	11.7	TBM	48.6	21.0
		50 Dual SOC Exh	81.7	15.6	23.0	33.6				
		70	85.2	14.0	21.4	32.0	21.9	12.1	45.1	TBM
		80	91.4	13.7	23.1	31.7	15.7	11.7	38.8	21.1
		100/44"	103.5	13.4	44.5	55.0		TBM		68.1
		100/DC, 58, 72, 80	103.5	13.4	22.8	31.4	17.4		26.7	
		120/44"	115.8	24.8	32.2	42.7		25.7		47.9
		120/58"	115.8	12.9	44.0	54.5				
		120/DC, 72, 80	115.8	12.9	22.3	30.9	12.9		22.3	
		50	79.3	14.1	21.5	32.0	53.4	12.1	51.0	23.4
	26"	50 Dual SOC Exh	79.3	18.0	25.4	36.0				
		60	80.7	12.6	22.0	30.6	12.6	TBM	49.5	22.0
		60 Dual SOC Exh	80.7	16.5	24.0	34.5				
		70	82.5	12.8	22.2	30.8	TBM	TBM	47.8	TBM
		70 Dual SOC Exh	82.5	14.8	22.2	32.7				
		80	82.4	13.0	22.3	30.9	TBM	TBM	47.9	TBM
		80 Dual SOC Exh	82.4	14.9	22.3	32.9				
		90	85.1	14.1	21.6	32.1	22.0	TBM	45.2	TBM
100		88.9	14.3	21.7	32.2	18.2	12.3	41.4	TBM	
110/44"		93.6	13.5	22.9	64.9		TBM		20.9	
110/DC, 58, 72, 80	93.6	13.5	22.9	31.5	13.5		36.7			
120/44"	98.4	12.6	22.0	60.1		12.6		TBM		
120/DC, 58, 72, 80	98.4	12.6	22.0	30.6	22.5		31.9			
135/44"	105.2	13.7	42.8	53.3		11.7		58.5		
135/58"	105.2	13.7	23.1	65.1						
135/DC, 72, 80	105.2	13.7	23.1	31.7	15.7		25.1			
150/44"	112.2	28.4	35.8	46.3		TBM		51.5		
150/58"	112.2	12.6	22.0	58.1						
150/DC, 72, 80	112.2	12.6	22.0	32.5	14.6		22.0			
Undercab box		"A"	DEF Tank Dimension "C" Located Rearward of Under Cab Component			DEF Tank Dimension "C" W/Vertical DPF/SCR				
			Small	Medium	Large	Small	Sm W/44"	Medium	Med W/44"	
RHUC DPF/SCR MD MHP		PX-9	86.3	18.8	65.6	36.8				
RHUC DPF/SCR MD HHP		PX-9	88.8	16.4	63.2	34.3				
RHUC DPF/SCR Low HP		ISX-15-1, MX-13, MX-11	86.3	14.9	22.3	32.8				
RHUC DPF/SCR High HP		ISX-15-3								
LH U/C B/T Box			76.4	17.0	30.3	38.9	19.0	19.0	52.0	26.4
LH U/C B/T Box (Dual Exh)			76.4	19.0	30.3	38.9				
RH U/C Batt/Tool Box			77.4				17.9	17.9	50.9	25.3

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 86.9" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

DIMENSIONS

Model: 365 SBFA”

FAX to BOC=68.9”

Under Cab Component "A" Dim			DEF Tank Dimension "C" w/ Under Cab Fuel Tanks							
Dia.	Capacity DC, Sleeper	"A"	LH DEF, LH Fuel Tank W/RHUC DPF/SCR			LH/RH DEF, UC Fuel Tank W/Vertical DPF/SCR				
			Small	Medium	Large	Small	Sm/44"	Medium	Med/44"	
20"	50	79.5	13.6	23.0	29.6	23.5	11.7	32.9	21.0	
	60/44"	87.6	13.4	42.5	53.0		TBM		TBM	
	60/DC,58,72,80	87.6	13.4	22.8	TBM	15.4		24.7		
	50	70.6	14.6	22.0	32.6	18.6	14.6	41.7	22.0	
	70/44"	81.1	16.0	23.4	59.5		16.0		25.4	
	70/DC,58,72,80	81.1	16.0	23.4	33.9	21.9		31.3		
	80/44"	87.3	15.7	42.8	53.3		15.7		58.5	
	80/58"	87.3	15.7	25.1	65.1					
	80/DC,72,80	87.3	15.7	25.1	33.6	17.6		27.0		
	100/44"	99.4	23.3	30.7	41.2		25.2		46.4	
	100/58"	99.4	15.4	42.5	53.0					
	100/DC,72,80	99.4	15.4	24.8	33.4	17.4		26.7		
23"	120/44"	111.7	14.9	24.3	32.9		24.8		34.1	
	120/58"	111.7	22.8	30.2	40.7					
	120/72"	111.7	14.9	45.9	56.5					
	120/DC,80	111.7	14.9	24.3	32.9	16.9		26.3		
	26"	50	63.3	14.1	21.5	34.0	14.1	14.1	49.0	27.4
		50 Dual SOC Exh	63.3	25.9	33.3	41.9				
		60	67.7	13.6	24.9	31.5	21.5	13.6	44.6	23.0
		60 Dual SOC Exh	67.7	21.5	28.9	37.4				
		70	70.5	14.8	24.1	32.7	18.7	16.7	41.9	24.1
		70 Dual SOC Exh	70.5	18.7	26.1	34.7				
		80/44"	75.2	15.9	25.3	65.4		15.9		25.3
		80/DC,58,72,80	75.2	15.9	25.3	33.9	27.7		37.1	
		90/44"	80.0	15.1	24.5	60.6		15.1		24.5
		90/DC,58,72,80	80.0	15.1	24.5	33.1	23.0			
		100/44"	84.8	16.2	45.3	55.8		16.2	27.6	61.0
		100/58"	84.8	16.2	23.6	67.6				
		100/DC,72,80	84.8	16.2	23.6	34.2	18.2		27.6	
		110/44"	89.4	15.5	40.6	51.1		15.5		56.4
		110/58"	89.4	15.5	24.9	63.0				
		110/DC,72,80	89.4	15.5	24.9	33.4	17.4		26.8	
		120/44"	94.2	28.4	35.8	46.3		29.4		51.6
		120/58"	94.2	14.6	24.0	58.2				
		120/DC,72,80	94.2	14.6	24.0	34.5	18.6		26.0	
		135/44"	101.1	21.6	29.0	39.5		22.6		44.7
135/58"		101.1	15.7	40.8	51.3					
135/72"		101.1	15.7	25.1	67.1					
135/DC,80		101.1	15.7	25.1	33.6	17.6		27.0		
150/44"		108.1	16.5	24.0	34.5		15.6		37.7	
150/58"	108.1	26.4	33.8	44.3						
150/72"	108.1	16.5	24.0	60.1						
150/80"	108.1	16.5	24.0	66.0						
150/DC	108.1	16.5	24.0	34.5	18.5		25.9			
Undercab box		"A"	DEF Tank Dimension "C" Located Rearward of Under Cab Component			DEF Tank Dimension "C" W/Vertical DPF/SCR				
			Sm	Med	Lrg	Sm	Sm/44"	Med	Med/44"	
RHUC DPF/SCR MD MHP	PX-9	76.3	36.8	46.2	54.7					
RHUC DPF/SCR MD HHP	PX-9	78.7	34.3	43.7	52.3					
RHUC DPF/SCR Low HP	ISX-15-1, MX-13, MX-11	68.4	24.7	34.1	42.7					
RHUC DPF/SCR High HP	ISX-15-3									
LH U/C B/T Box		68.3	18.9	26.3	34.9	20.9	17.0	42.1	24.4	
LH U/C B/T Box (Dual Exh)		68.3	20.9	28.3	36.9					
RH U/C Batt/Tool Box		68.3				20.9	17.0	42.1	24.4	

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 68.9" (front axle to BOC dimension)

Notes:

- 1) DEF tank locations are sometimes dependent on sleeper box length, noted in column "capacity/DC, slpr", otherwise DEF tank location is good for 44/58/72/80" sleepers as shown.
- 2) DEF tanks not available on RH rail with Under Frame exhaust.

EXHAUST SYSTEMS

389 FAMILY ISX-12 2013 EMISSIONS

EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB 2013 EMISSIONS

(Reference option code 3365040)

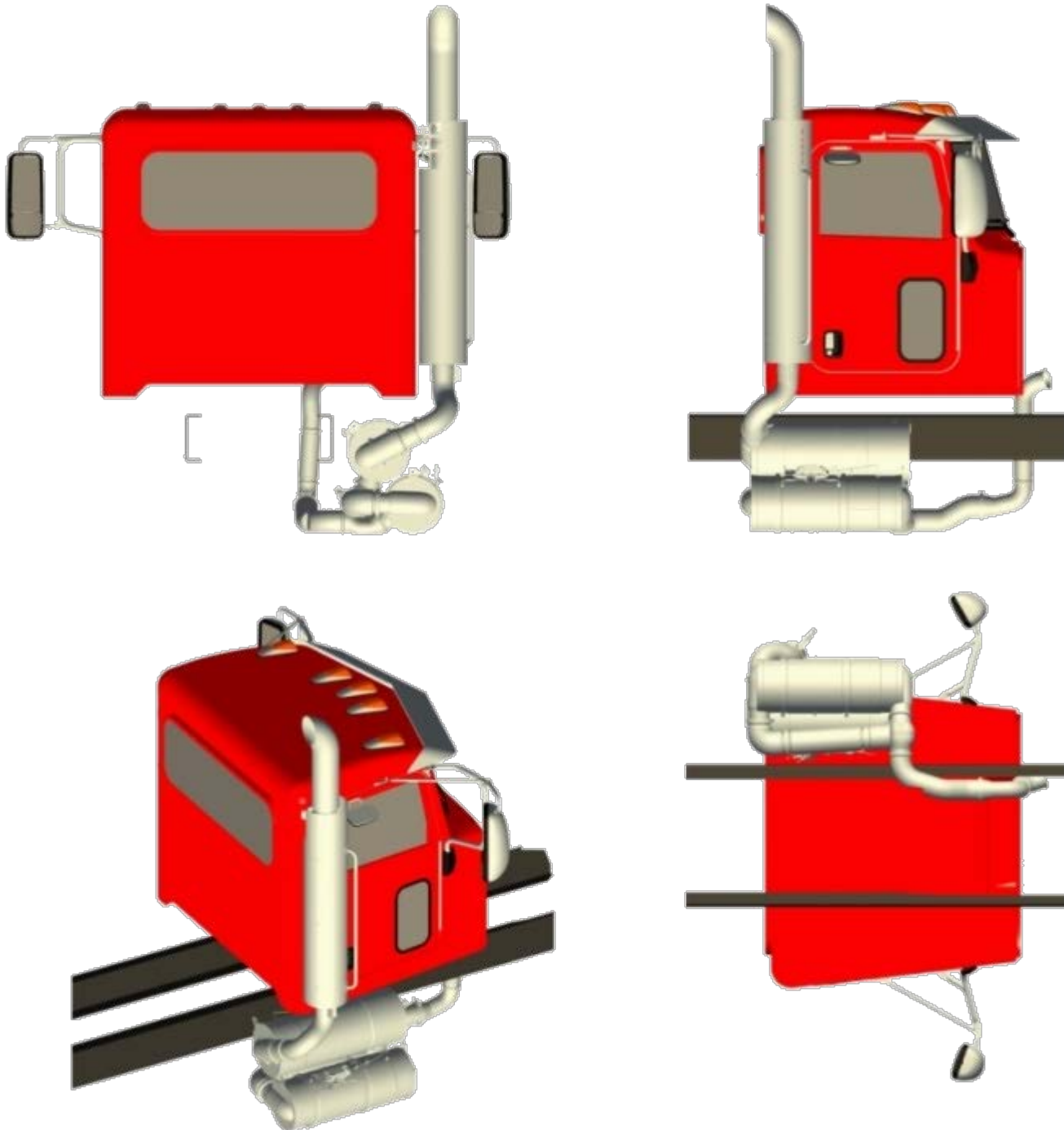


FIGURE 3-42. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

EXHAUST DUAL SIDE OF CAB DPF/SCR RH UNDER CAB
2013 EMISSIONS
 (Reference option code 3365090)

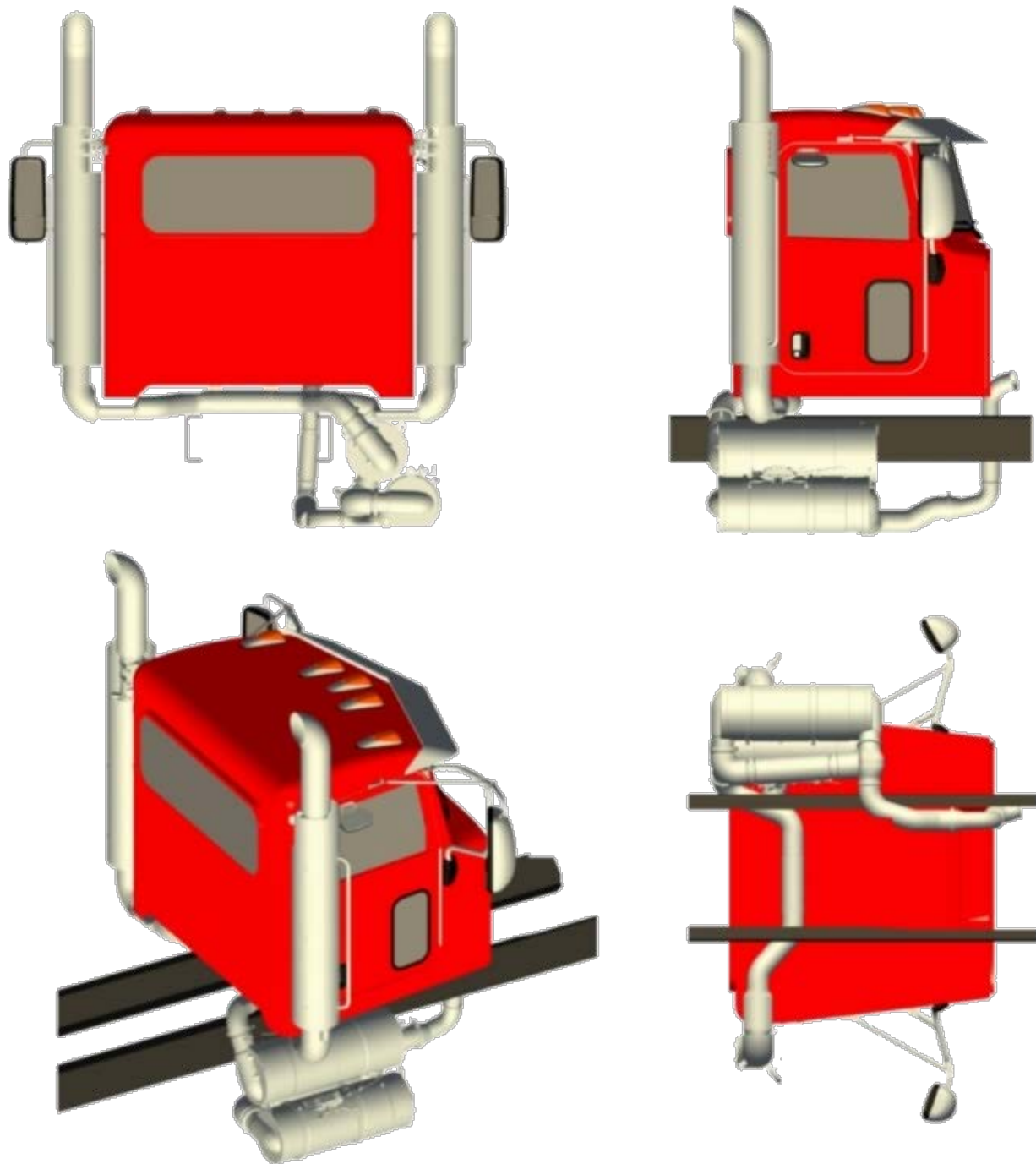


FIGURE 3-43. Exhaust Dual Side of Cab DPF/SCR RH Under Cab

Notes:

- 1) 11 5/8" frame rails or outserts are not available with dual side of cab exhaust configuration.
- 2) Dual side of cab exhaust is not available with Models 384 or 365 SBFA.
- 3) Dual side of cab exhaust is not available with an PX-9.
- 4) Dual side of cab exhaust on Model 389-131 will be low route configuration, not the high route shown above.

EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2013 EMISSIONS
(Reference option code 3365020)

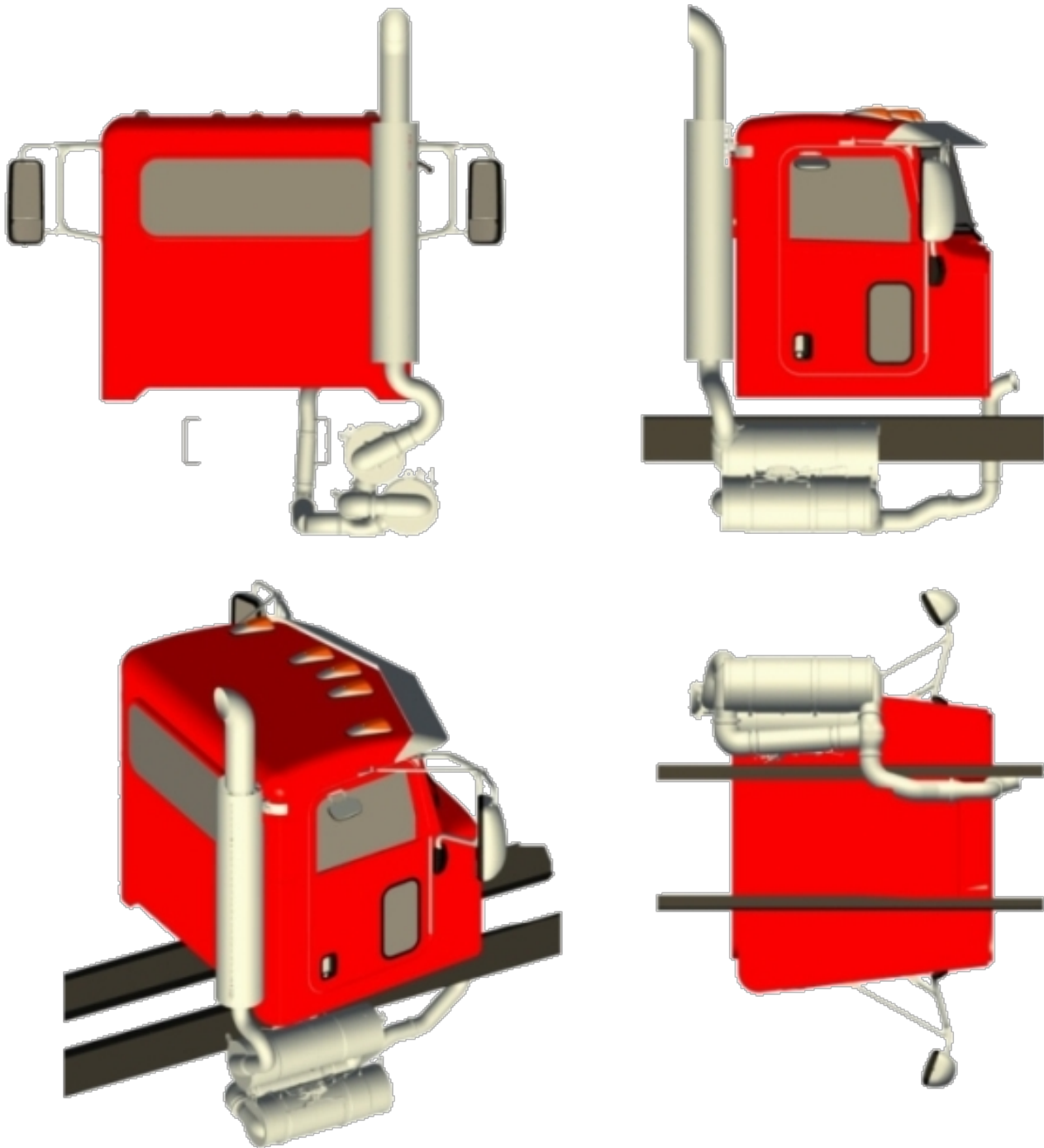


FIGURE 3-44. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

EXHAUST SINGLE HORIZONTAL DPF/SCR RH UNDER CAB
2013 EMISSIONS
(Reference option code 3365050)

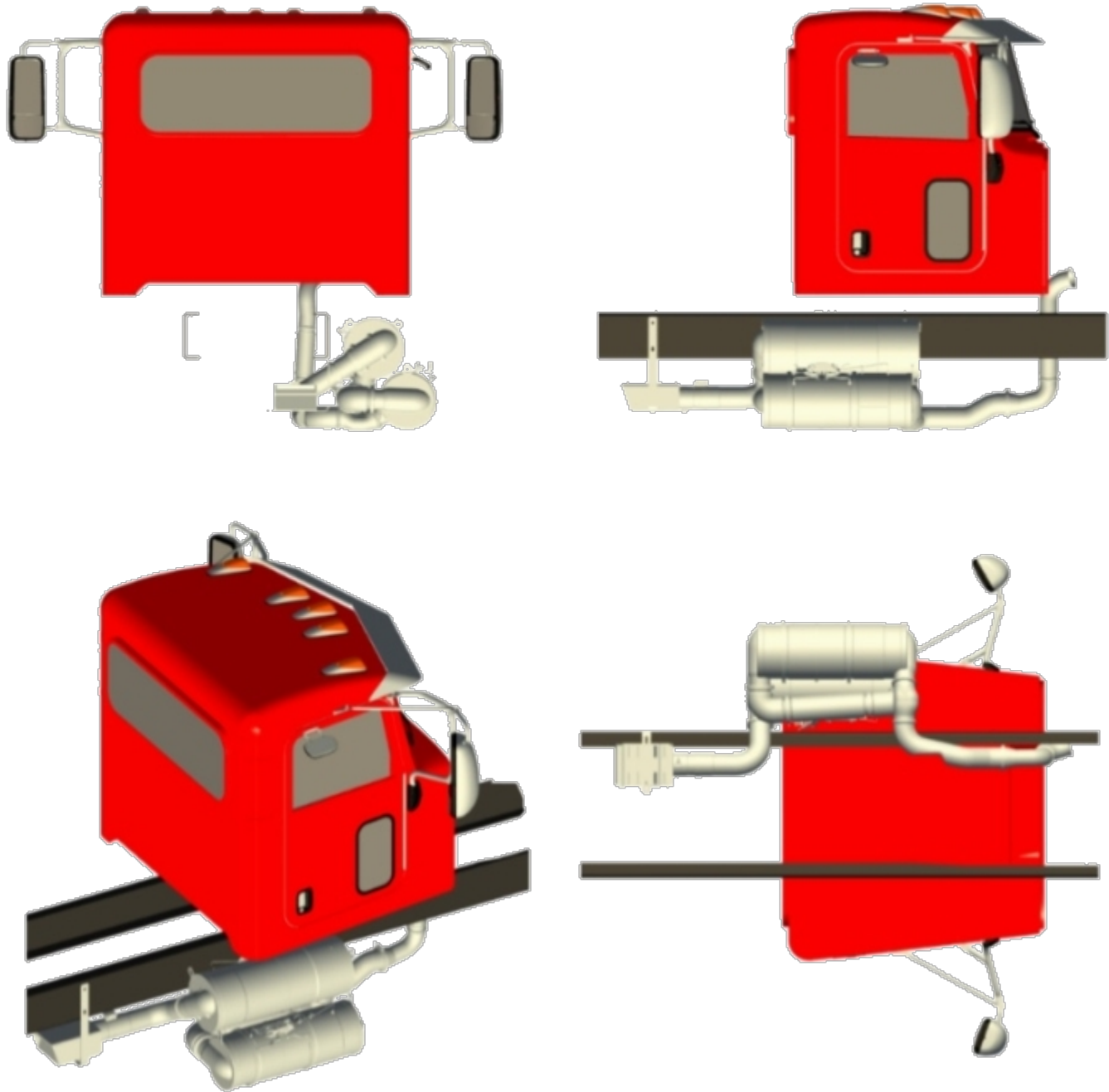


FIGURE 3-45. Exhaust Single Horizontal DPF/SCR RH Under Cab

EXHAUST SINGLE RH BACK OF SLEEPER DPF/SCR RH UNDER CAB
2013 EMISSIONS
(Reference option code 3365030)

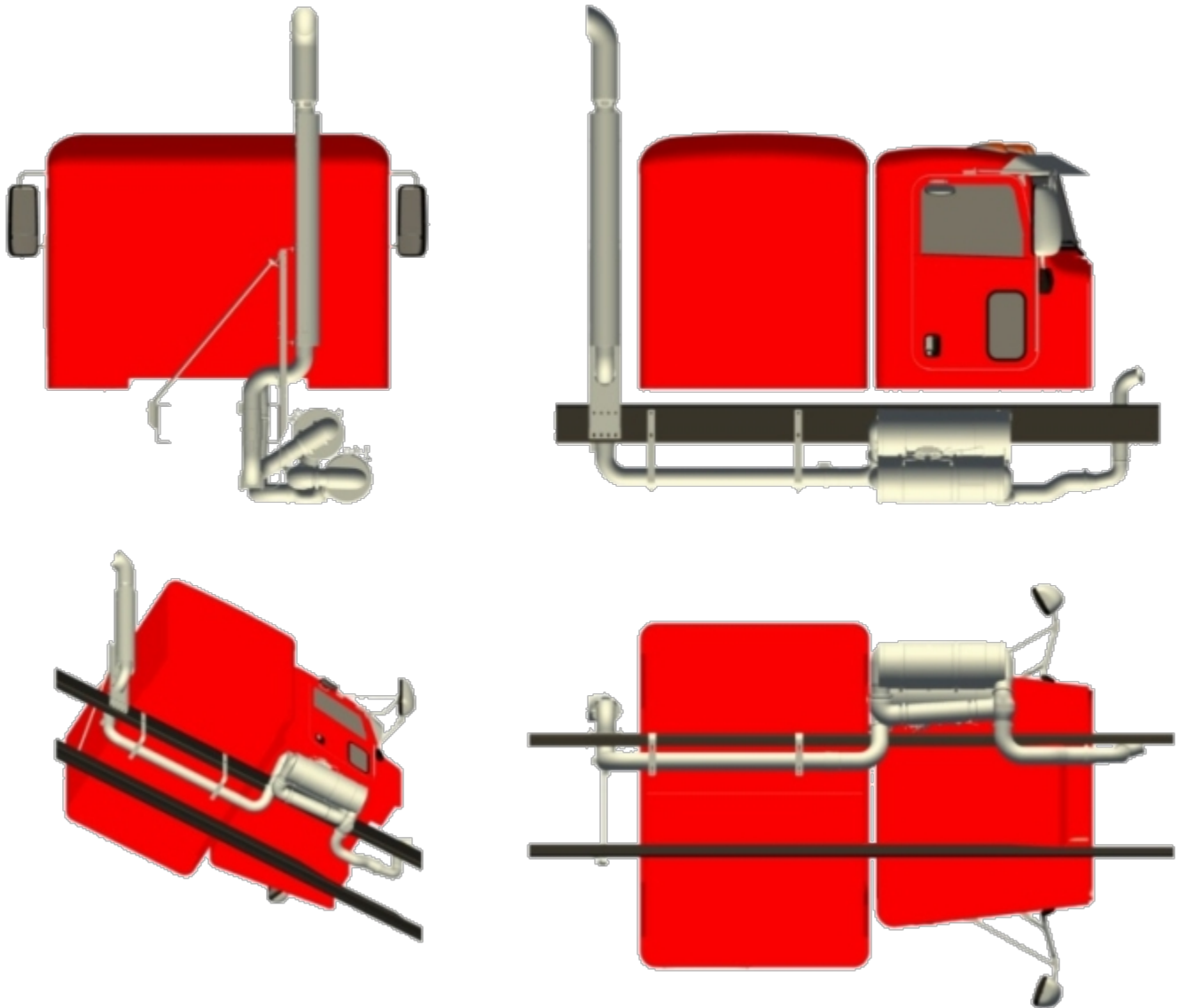


FIGURE 3-46. Exhaust Single RH Back of Sleeper DPF/SCR RH Under Cab

EXHAUST DUAL BACK OF SLEEPER DPF/SCR RH UNDER CAB
2013 EMISSIONS
(Reference option code 3365100)

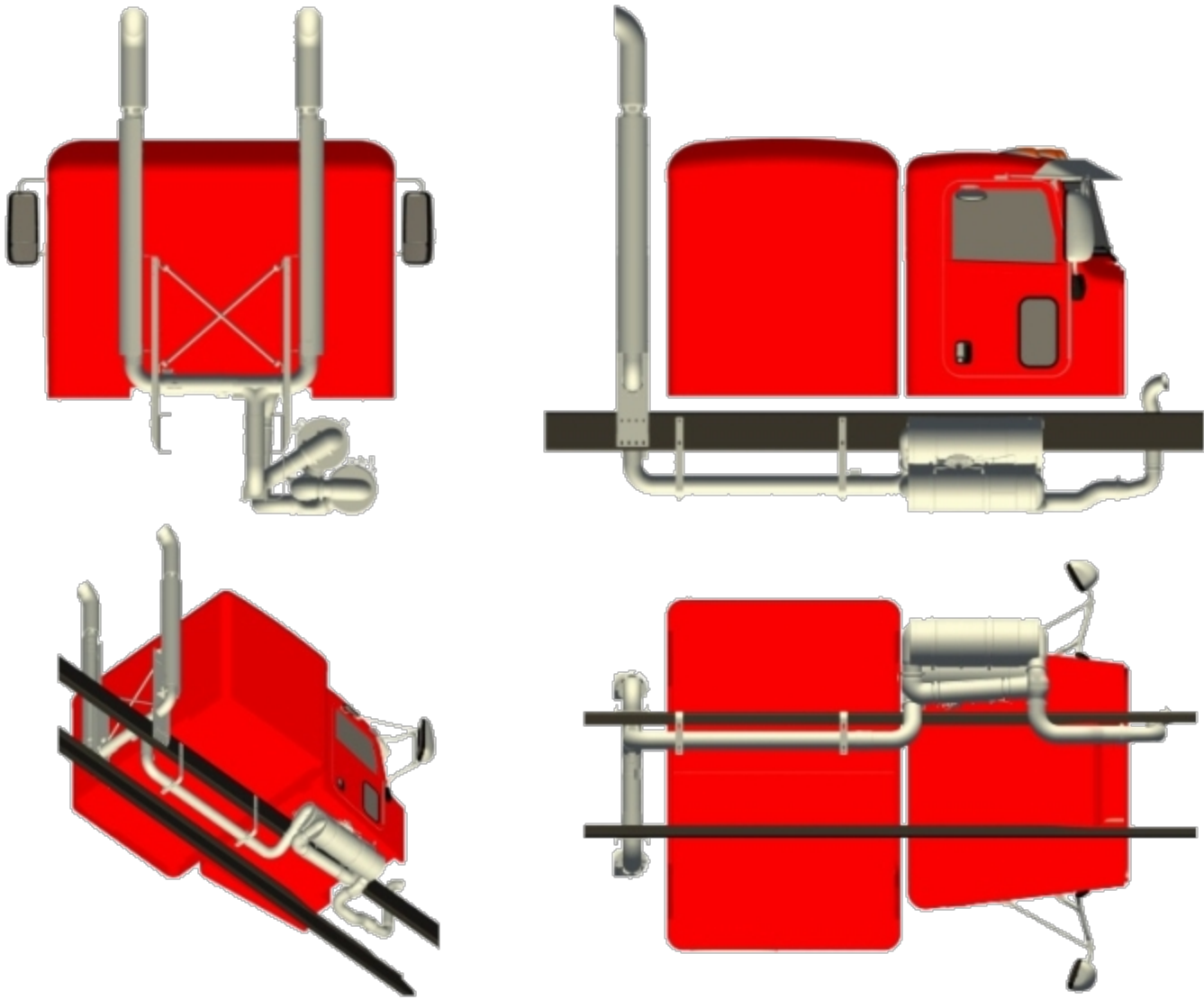


FIGURE 3-47. Exhaust Dual Back of Sleeper DPF/SCR RH Under Cab

EXHAUST SINGLE RH BACK OF SLEEPER DPF/SCR CROSS OVER UNDER FRAME
2013 EMISSIONS
(Reference option code 3365000)

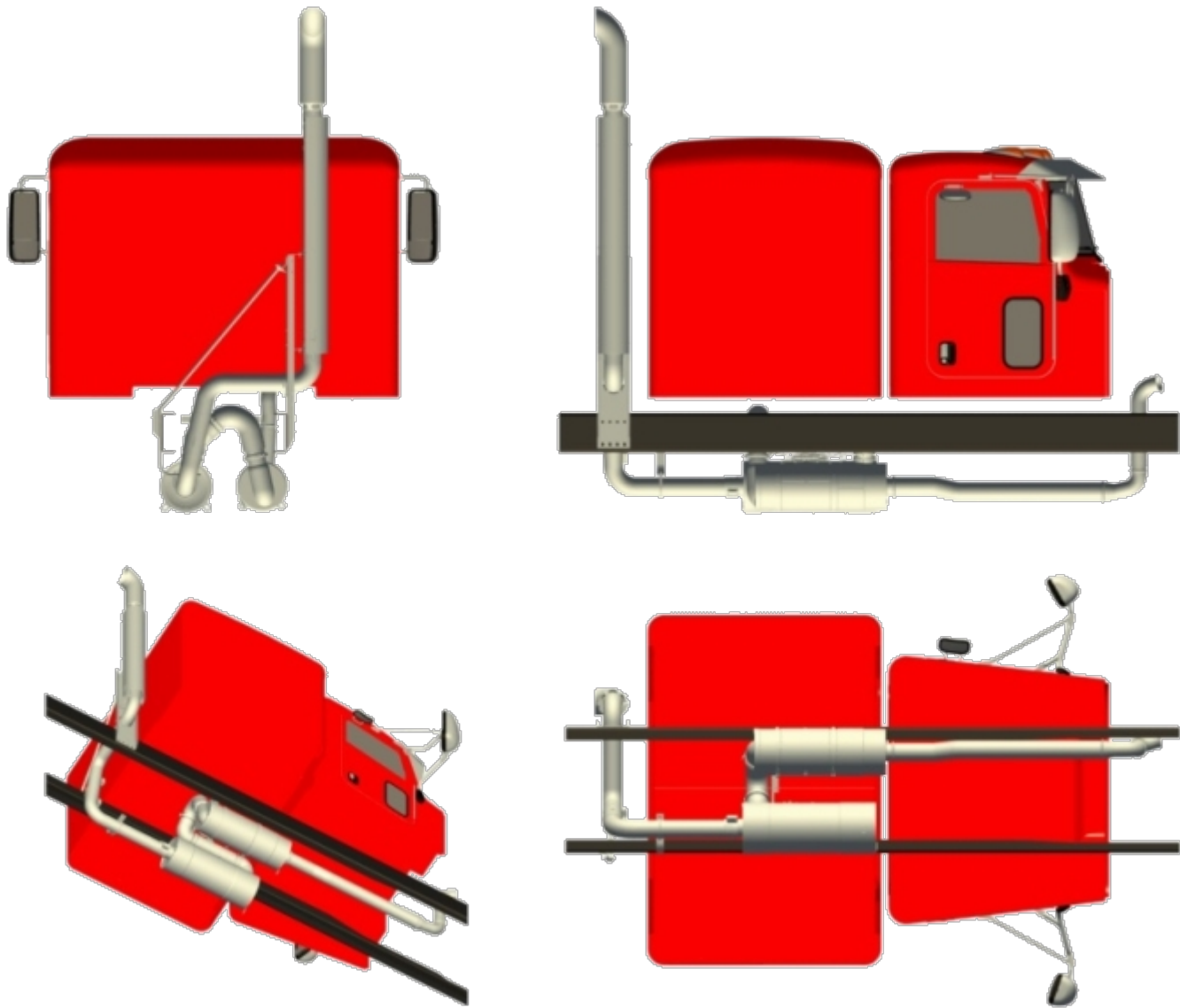


FIGURE 3-48. Exhaust Single RH Back of Sleeper DPF/SCR Cross Over Under Cab

EXHAUST DUAL BACK OF SLEEPER DPF/SCR CROSS OVER UNDER FRAME
2013 EMISSIONS
(Reference option code 3365110)

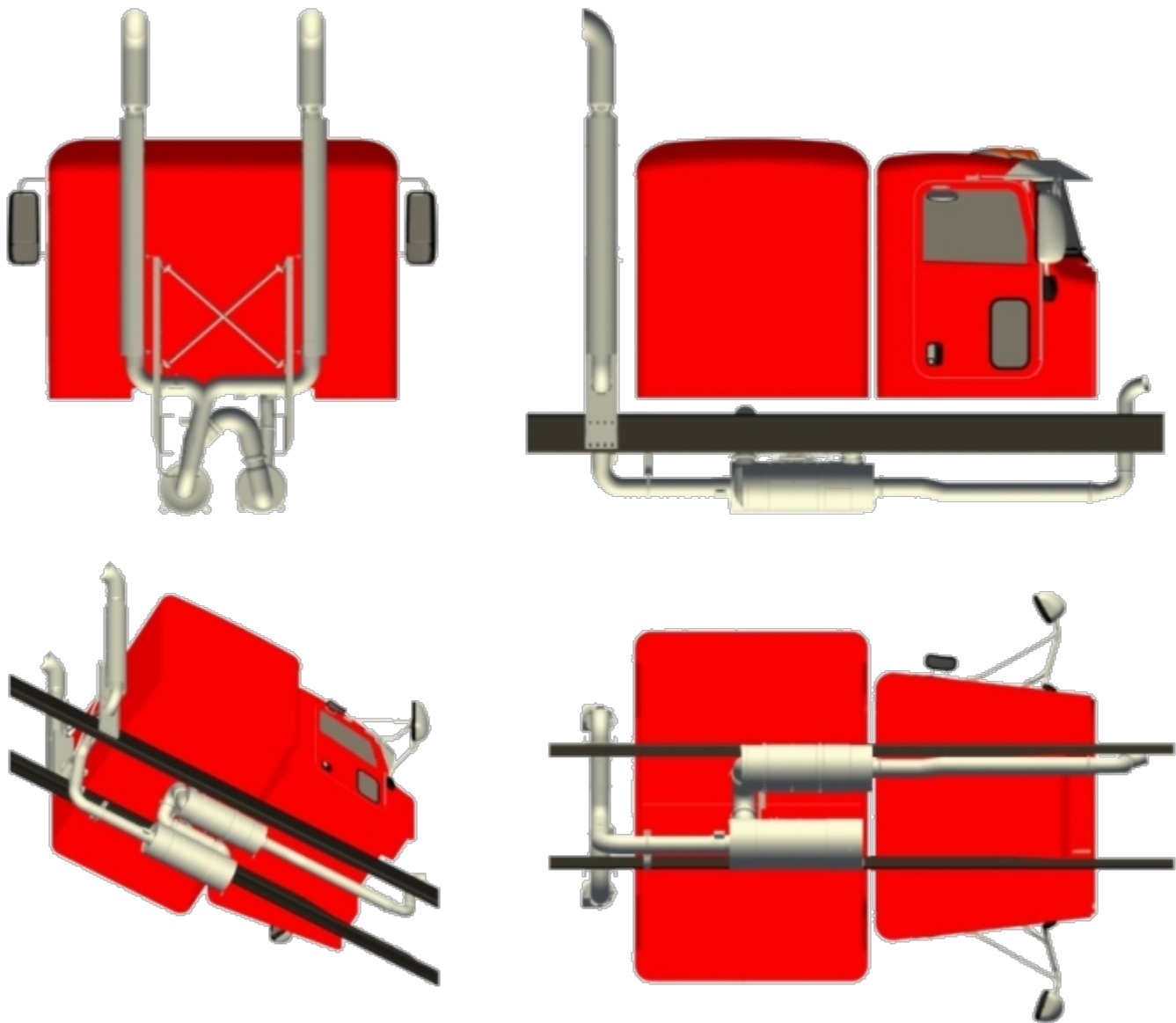


FIGURE 3-49. Exhaust Dual Back of Sleeper DPF/SCR Cross Over Under Cab

EXHAUST SINGLE HORIZONTAL LH DPF/SCR CROSS OVER UNDER FRAME
2013 EMISSIONS
 (Reference option code 3365070)

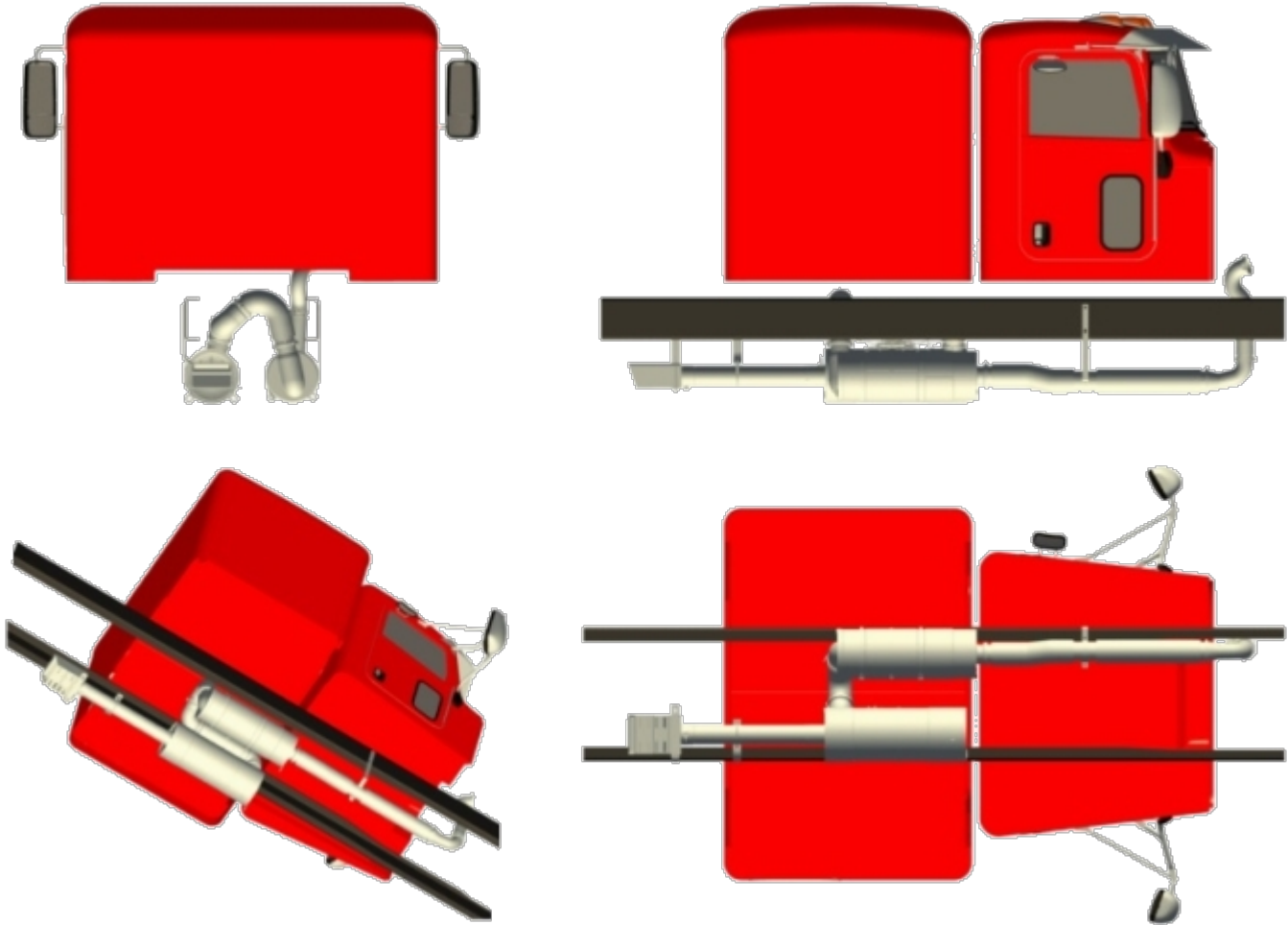


FIGURE 3-50. Exhaust Single Horizontal DPF/SCR Cross Over Under Cab

Notes:

- 1) Day cabs require LH under cab battery box or in-cab battery box and omit hose tenna option. DEF injector and coolant lines will be routed above the rails.
- 2) The piping between the DPF and SCR protrudes 1.2" above the 10-5/8" frame rail.

**EXHAUST SINGLE LH BACK OF CAB/SLEEPER DPF/SCR VERTICAL – DAY CAB
2013 EMISSIONS**

(Reference option code 3365010)

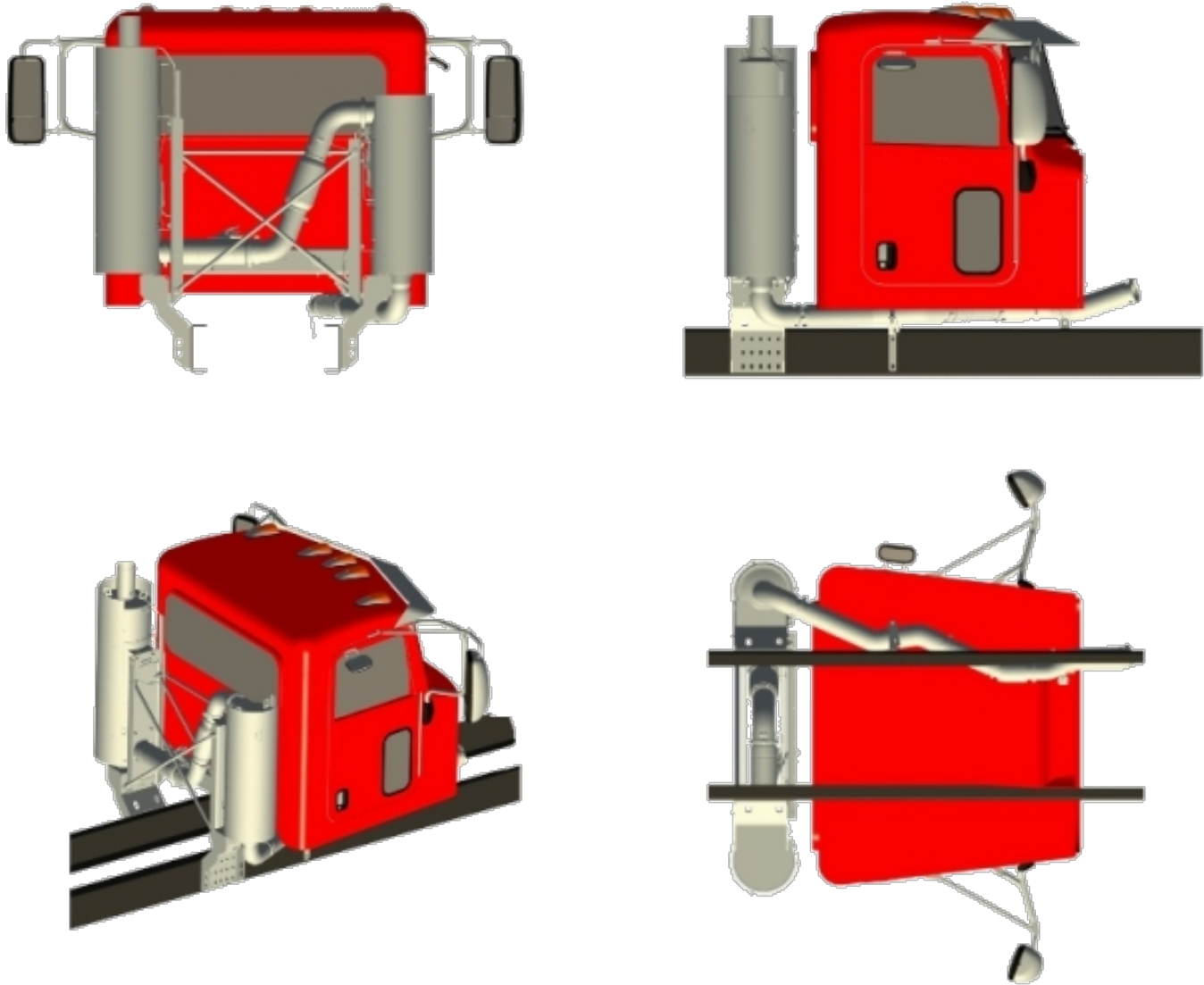


FIGURE 3-51. Exhaust Single LH Back of Sleeper DPF/SCR Vertical – Day Cab

Notes:

- 1) With Model 365 or 384 and an MX engine, the piping will route below the frame rails similar to EXHAUST SINGLE LH BACK OF SLEEPER DPF/SCR VERTICAL – 44" SLEEPER.

EXHAUST SINGLE LH BACK OF SLEEPER DPF/SCR VERTICAL – 44" SLEEPER
2013 EMISSIONS
(Reference option code 3365010)

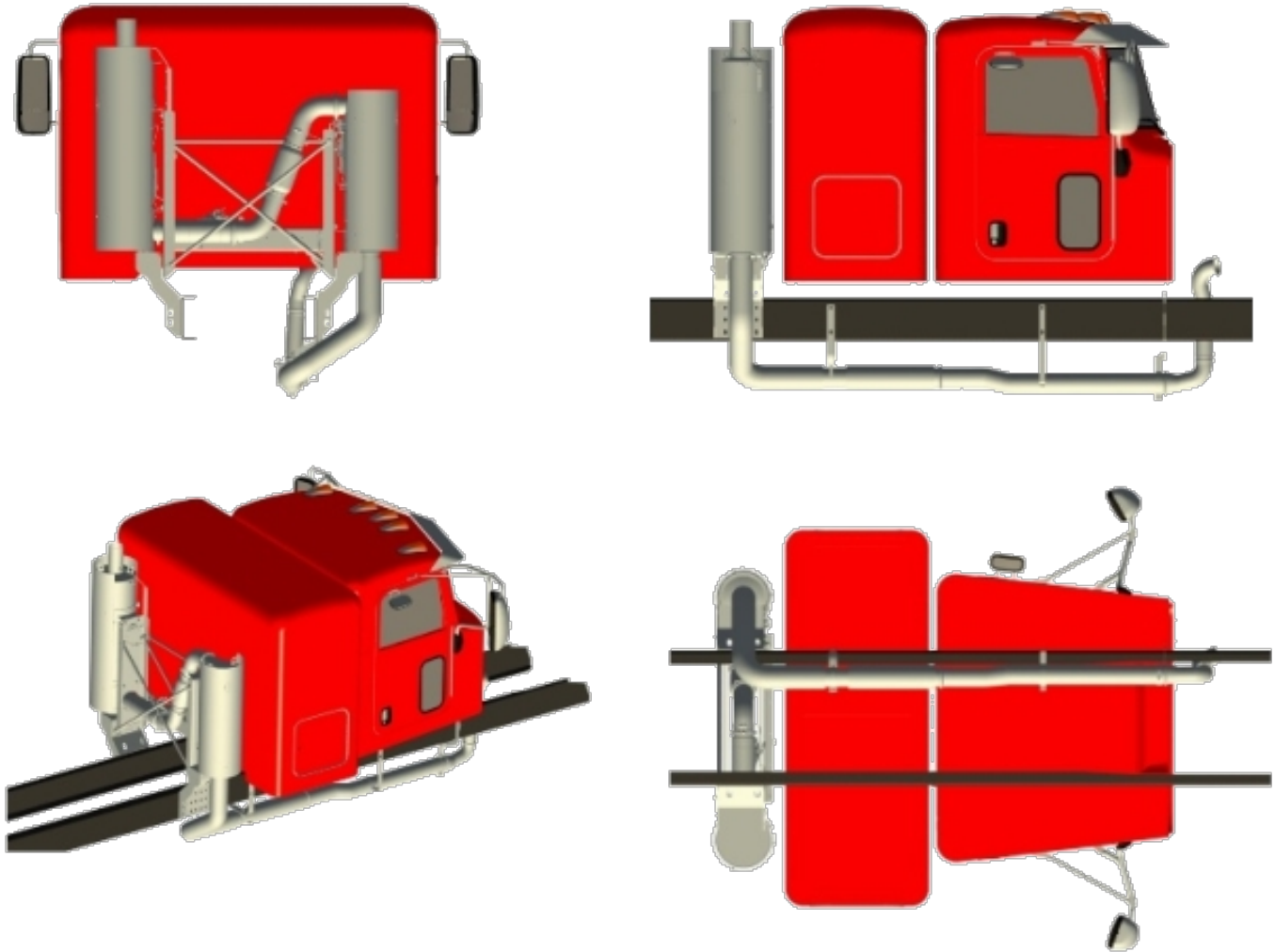


FIGURE 3-52. Exhaust Single LH Back of Sleeper DPF/SCR Vertical – 44" Sleeper

389 FAMILY ISL-G 2013 EMISSIONS
EXHAUST SGL RH SIDE OF CAB ISL-G ONLY
2013 EMISSIONS
(Reference option code 3365130)

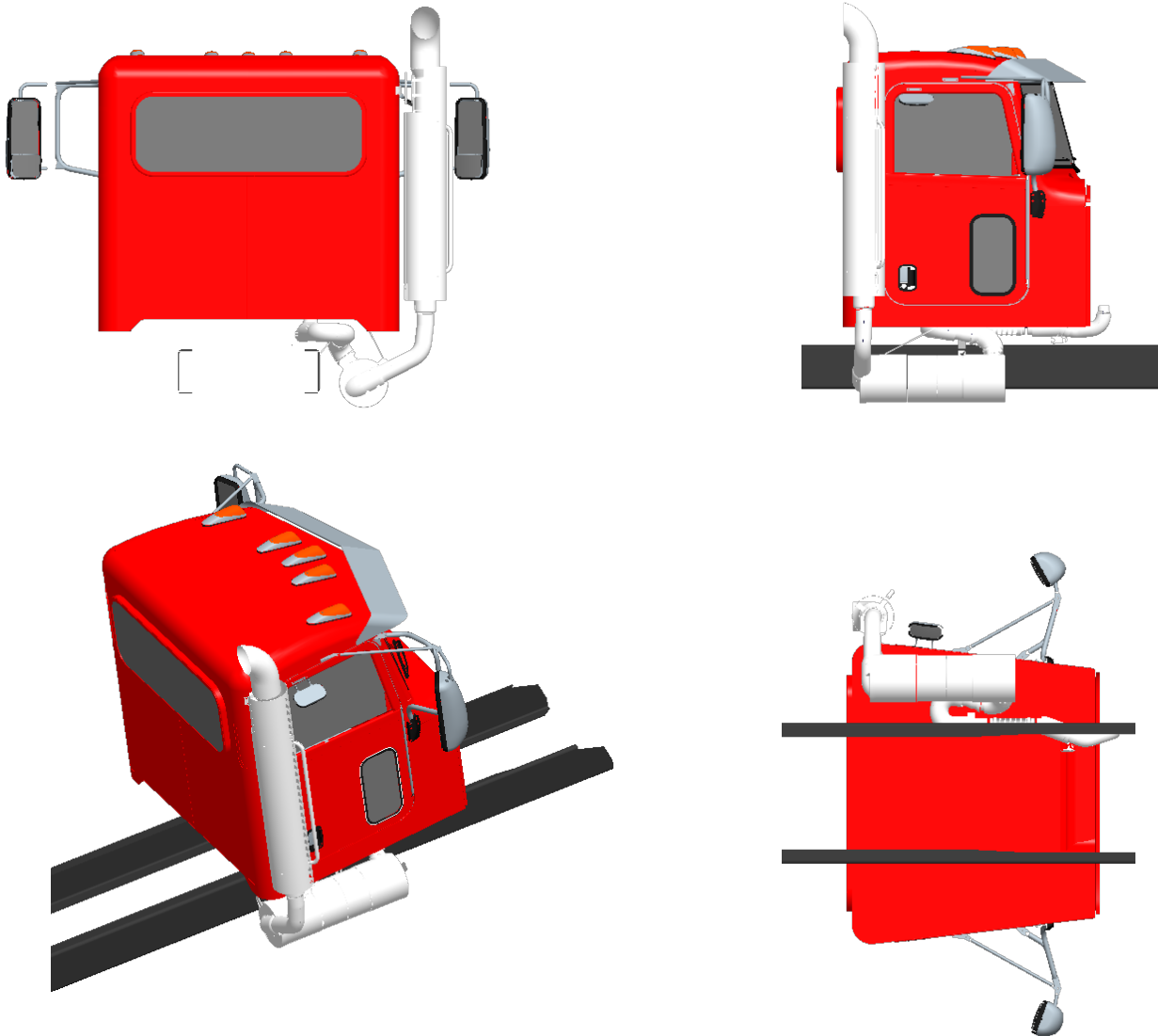


FIGURE 3-53. Exhaust Single RH Side of Cab ISL-G Only

EXHAUST SINGLE RH BACK OF CAB ISL-G ONLY
2013 EMISSIONS
(Reference option code 3365200)

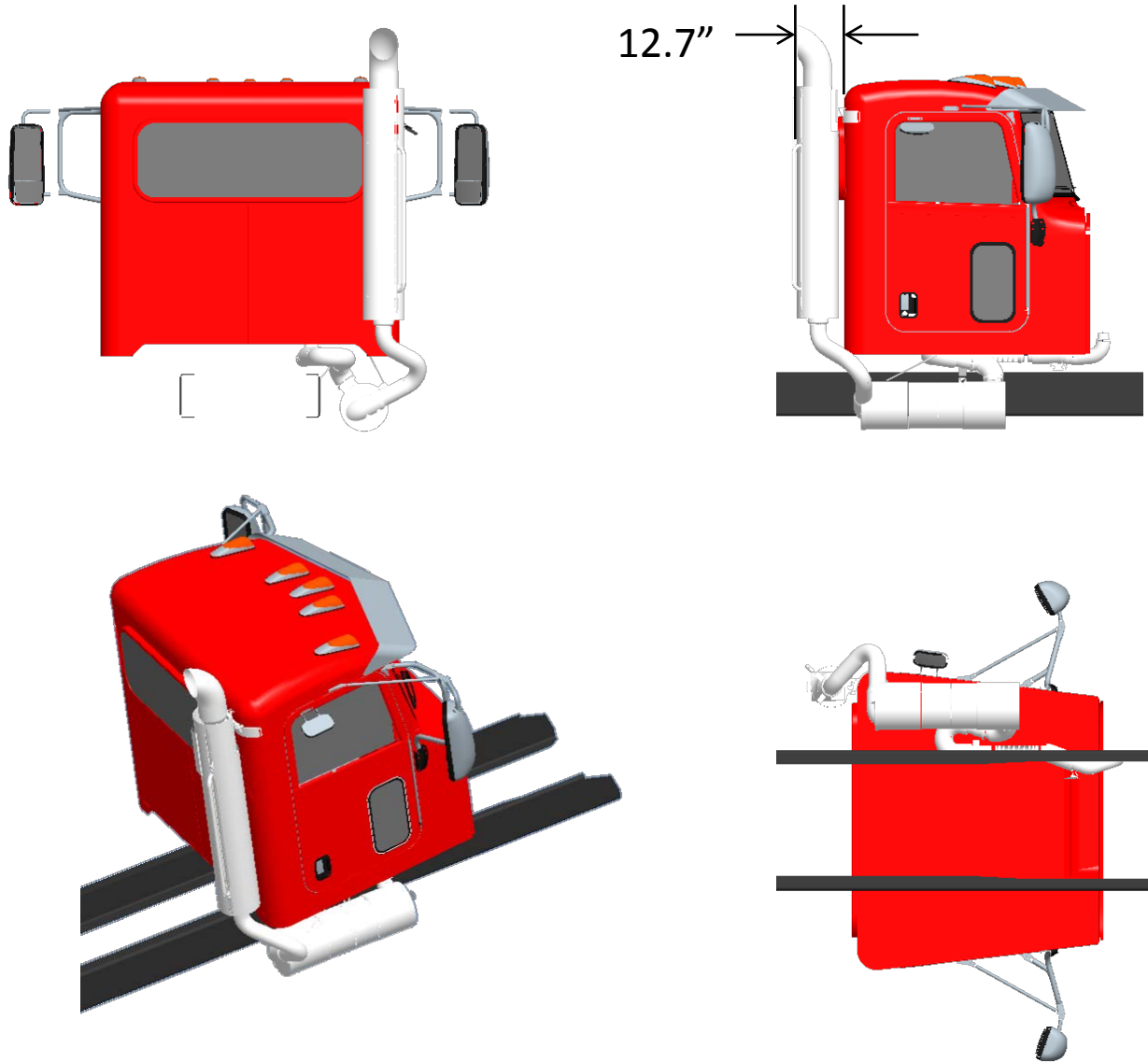


FIGURE 3-54. Exhaust Single RH Back of Cab ISL-G Only

EXHAUST SINGLE HORIZONTAL ISL-G OR ISX12-G ONLY
2013 EMISSIONS
(Reference option code 3366650)

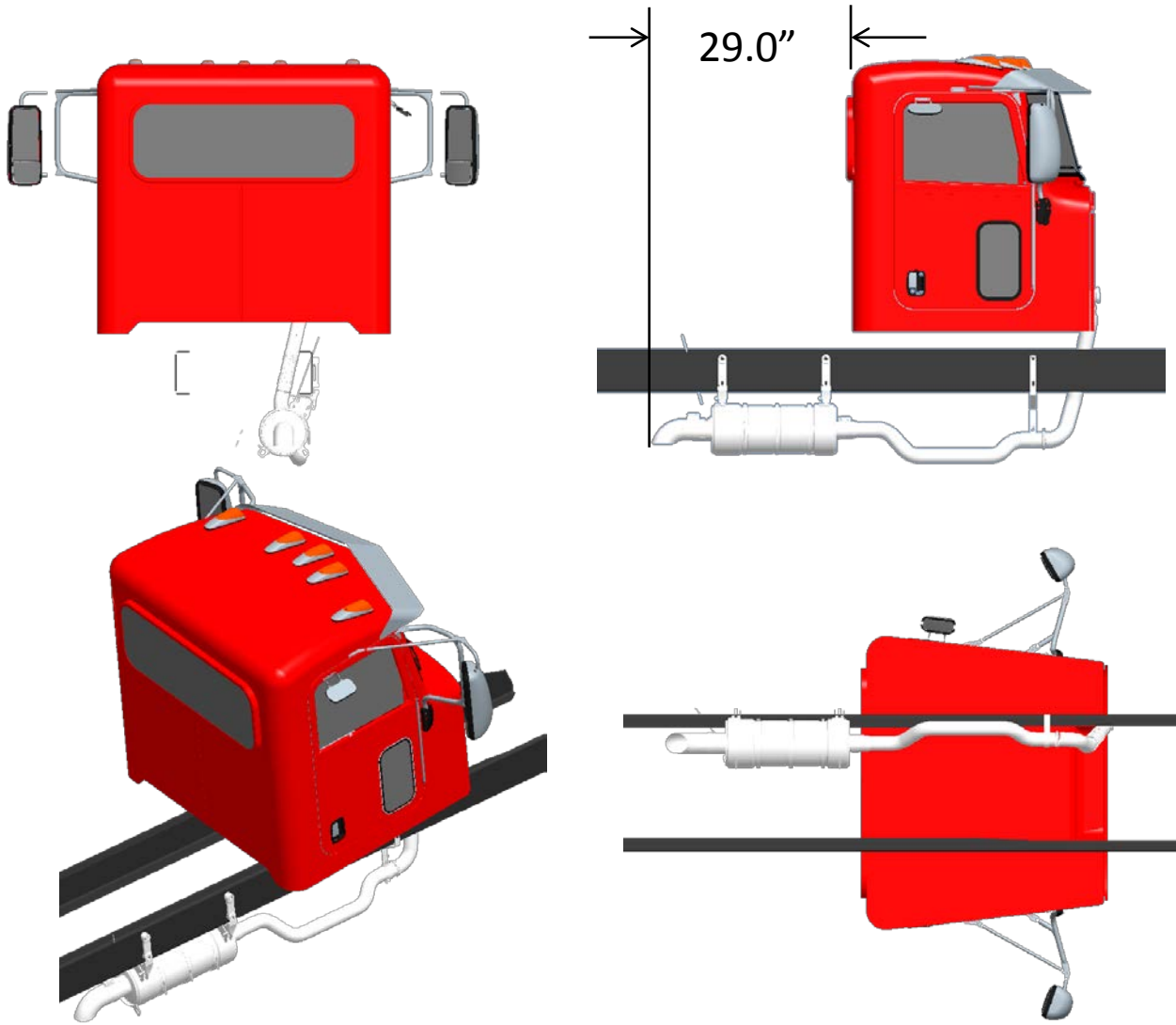


FIGURE 3-55. Exhaust Single Horizontal ISL-G or ISL12-G Only

DIMENSIONS

3

EXHAUST SINGLE RH FRAME MTD ISL-G OR X12-G ONLY
2013 EMISSIONS
(Reference option code 3365140)

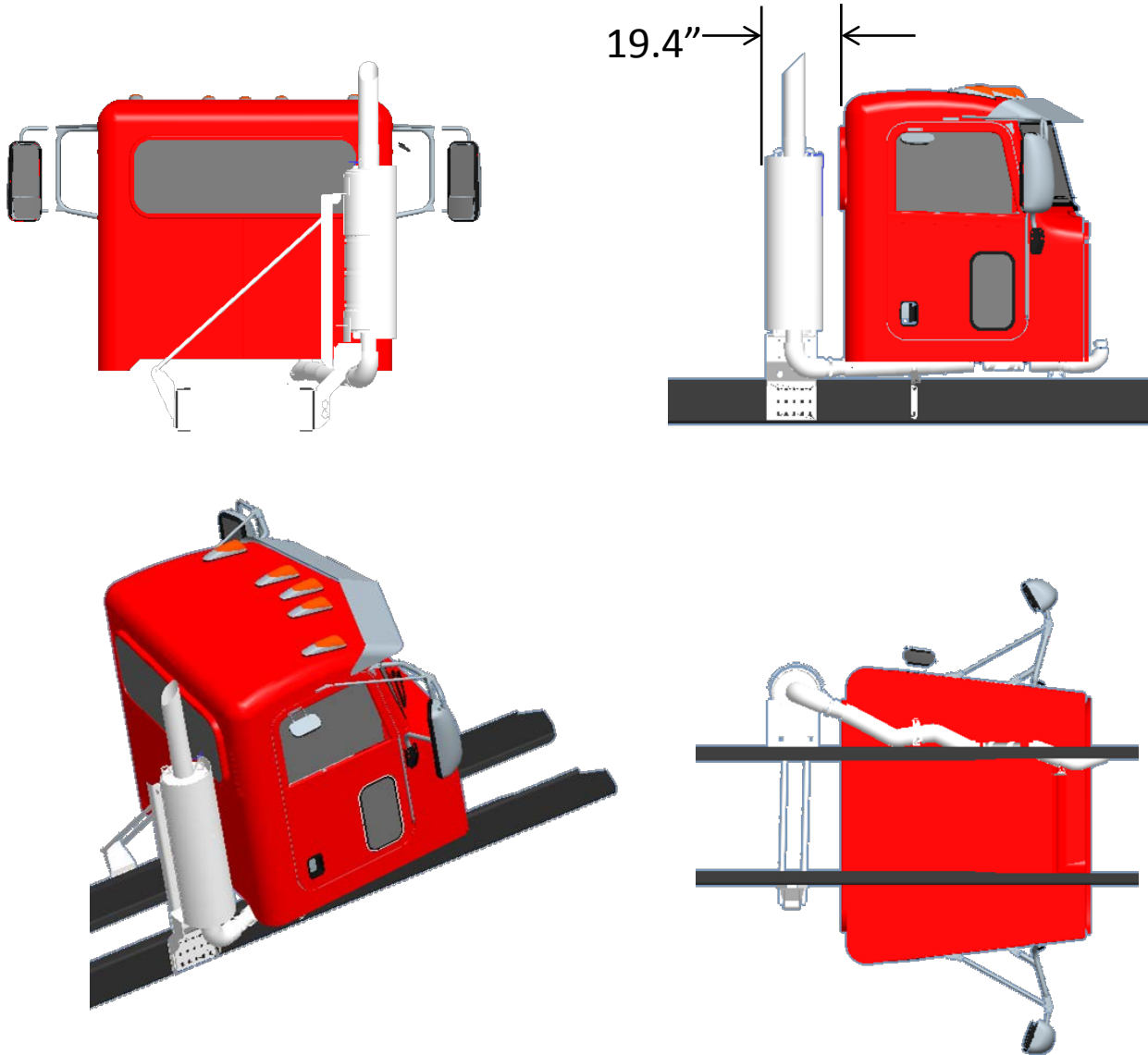


FIGURE 3-56. Exhaust Single Vertical ISL-G or ISL12-G Only

389 FAMILY 2017 EMISSIONS

MODEL 389-123 EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS

(Reference option code 3365250)

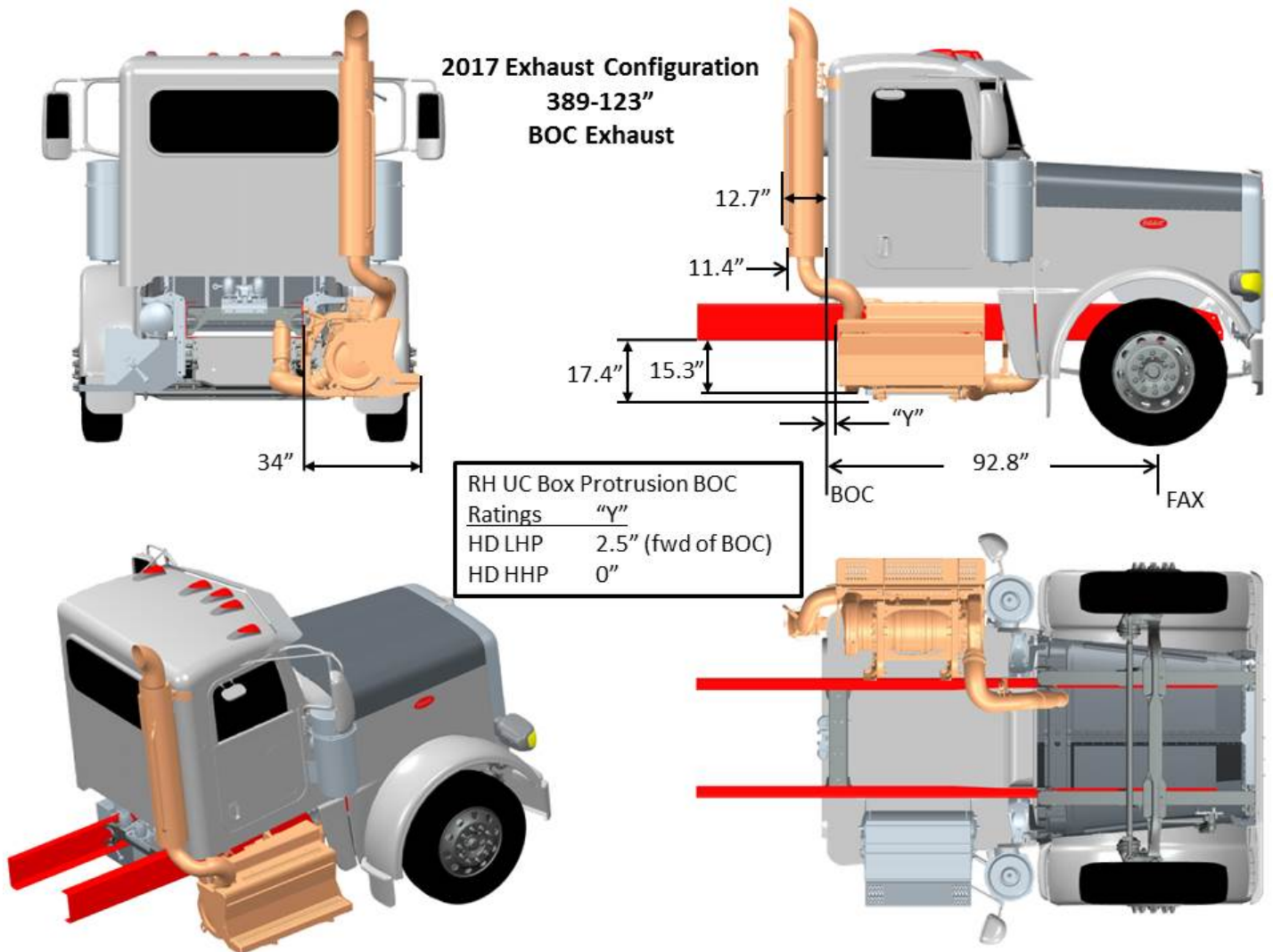


FIGURE 3-57. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 389-123 EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

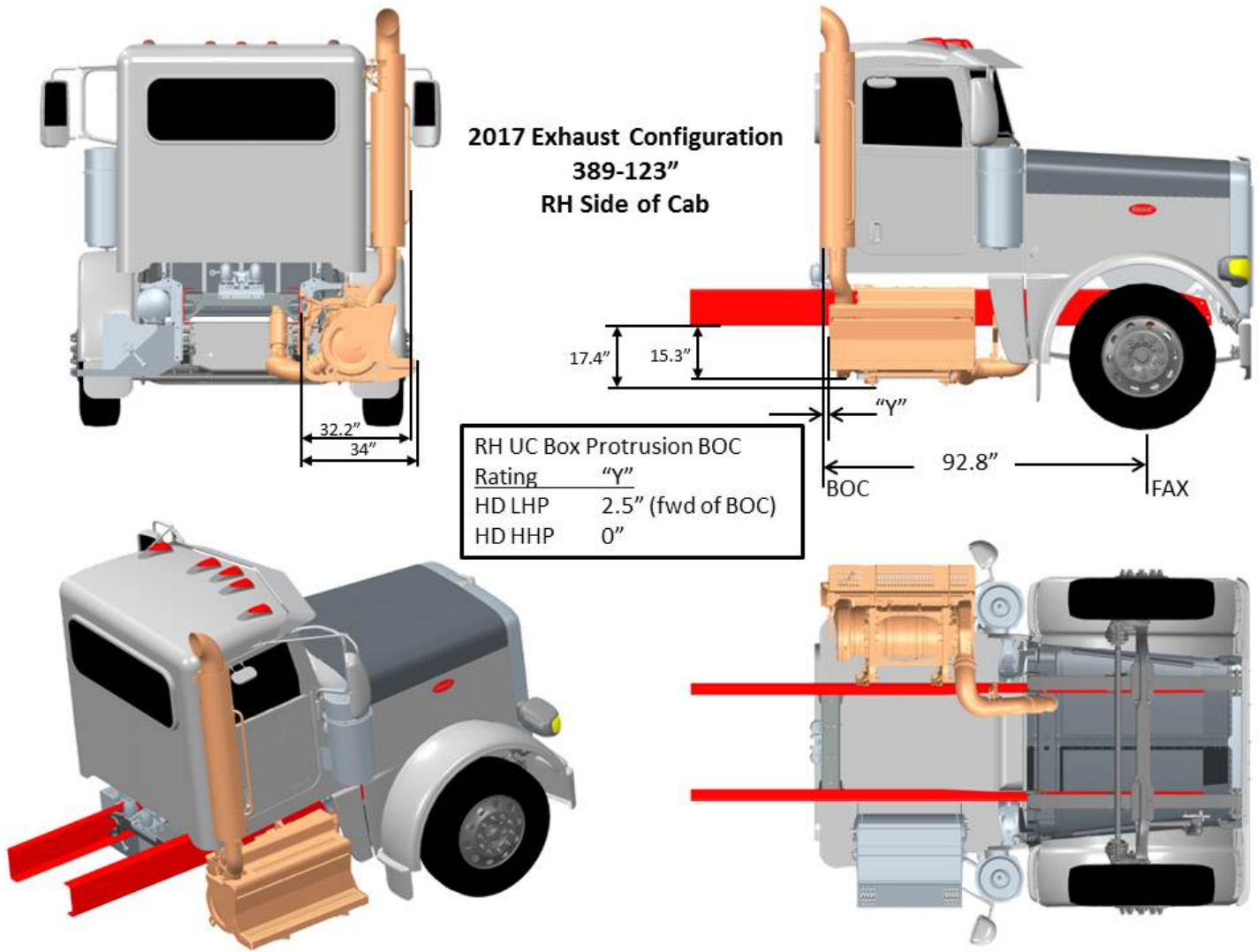


FIGURE 3-58. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 389-123 EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

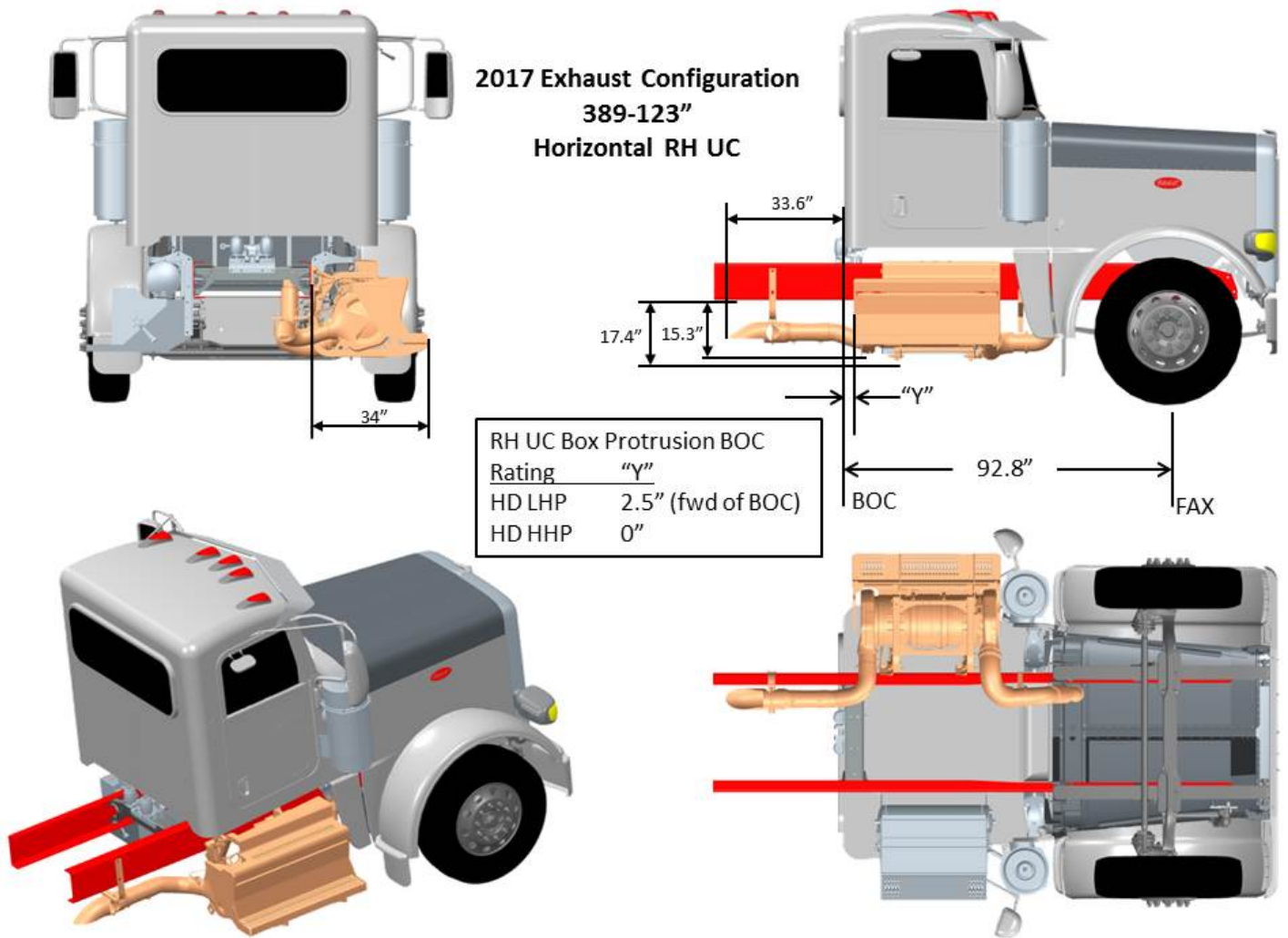


FIGURE 3-59. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 389-123 EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

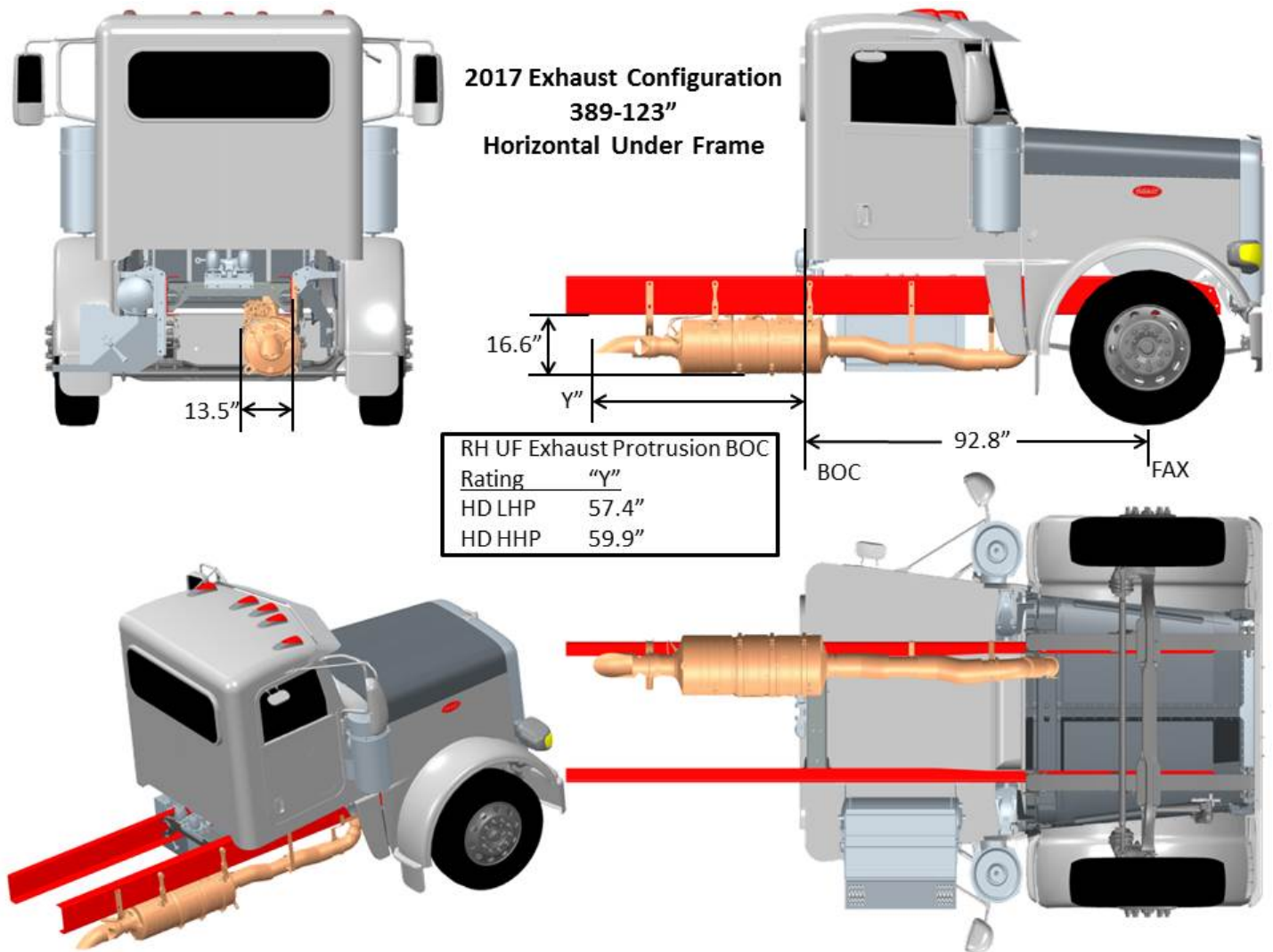


FIGURE 3-60. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

MODEL 389-131 EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS
 (Reference option code 3365250)

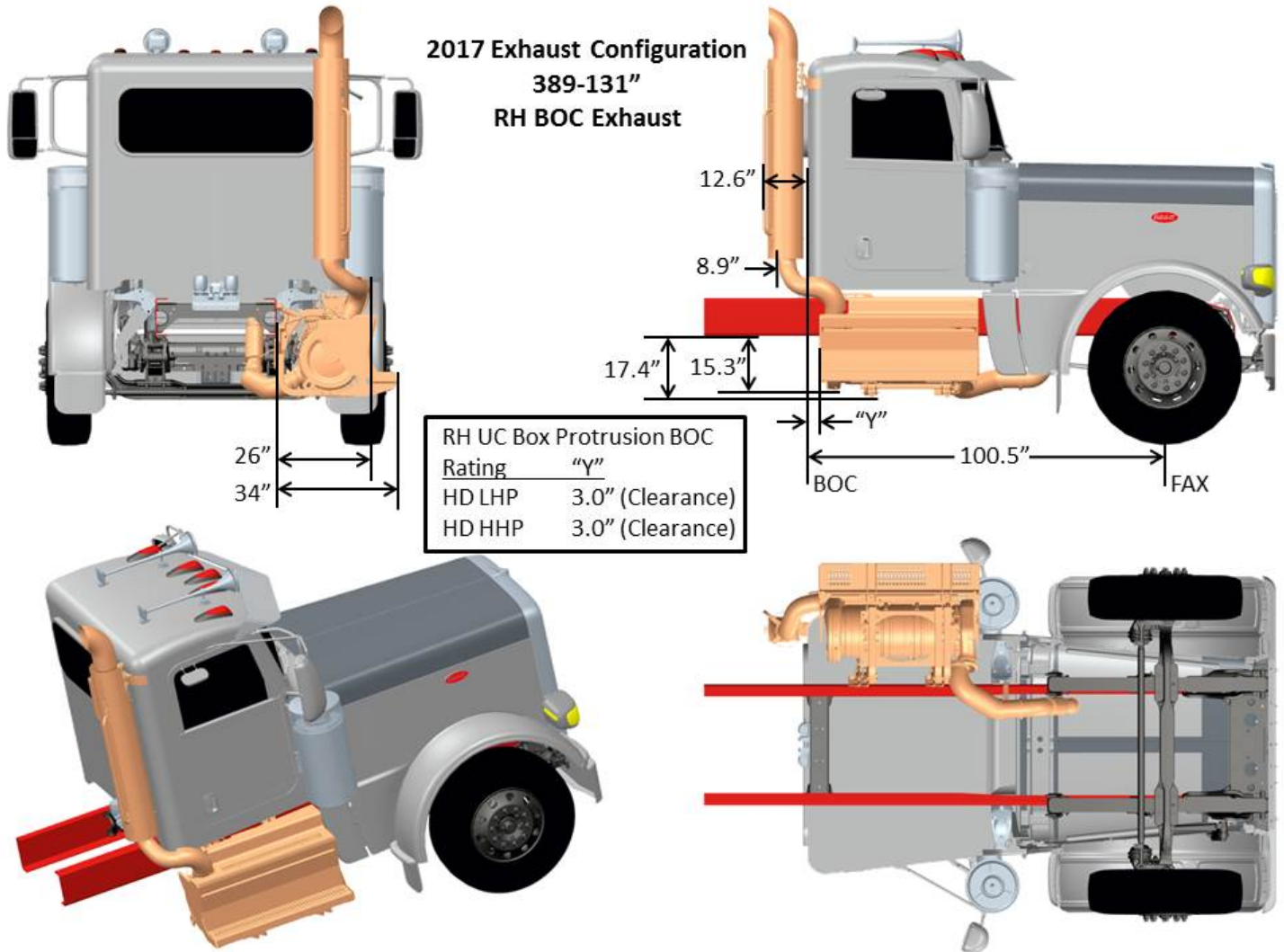
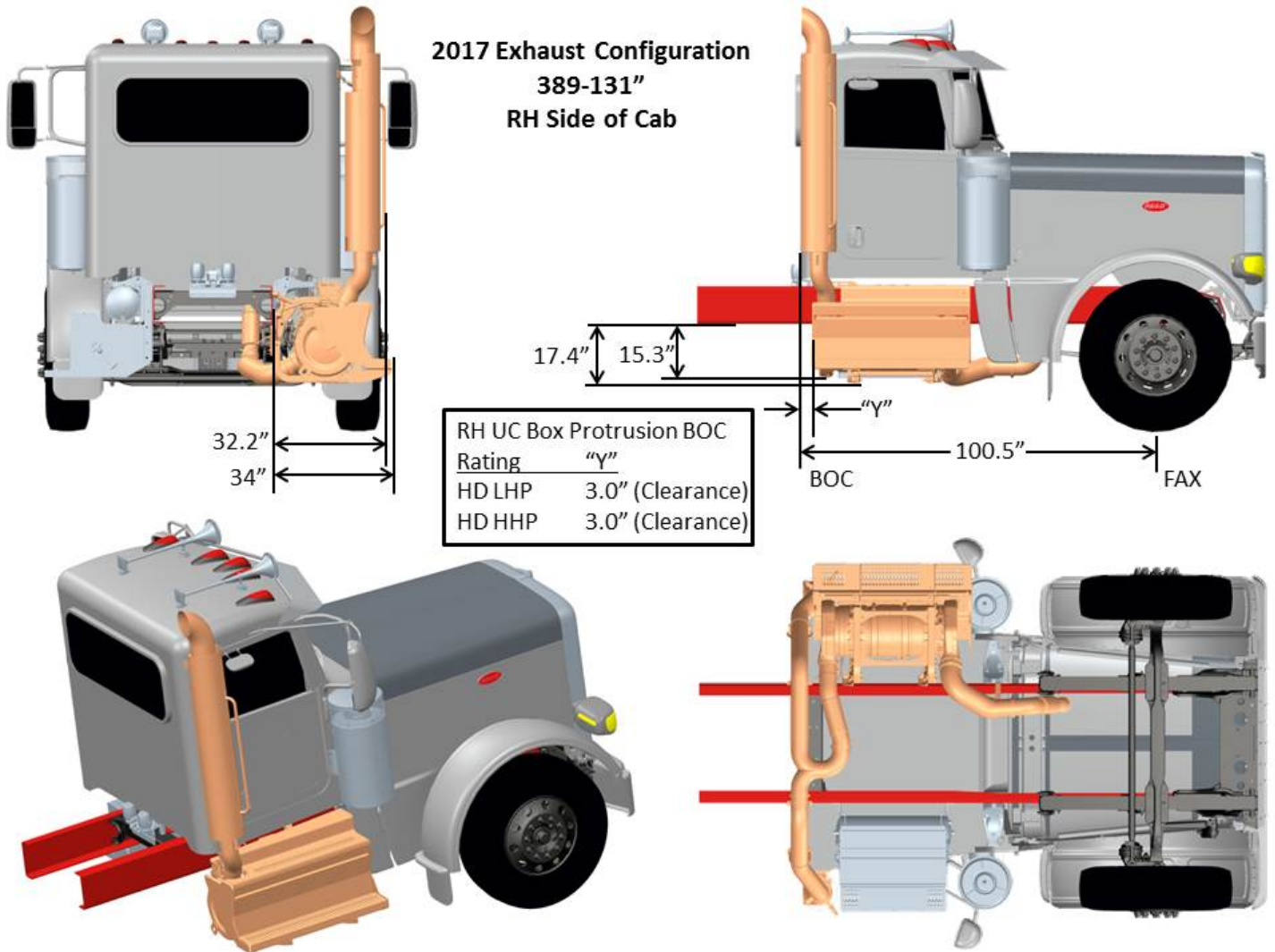


FIGURE 3-61. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 389-131 EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)



MODEL 389-131 EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS
 (Reference option code 3365280)

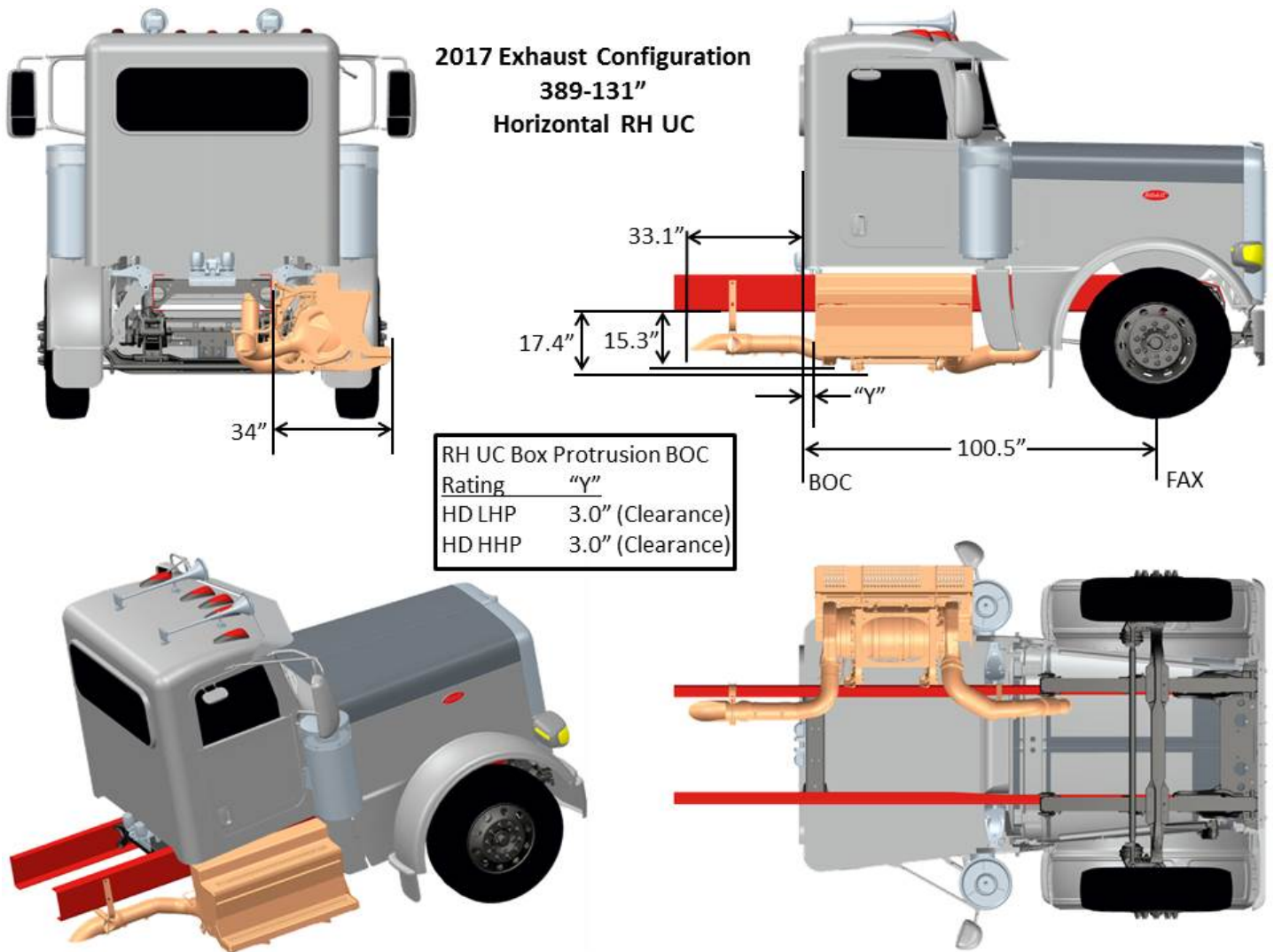


FIGURE 3-63. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 389-131 EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

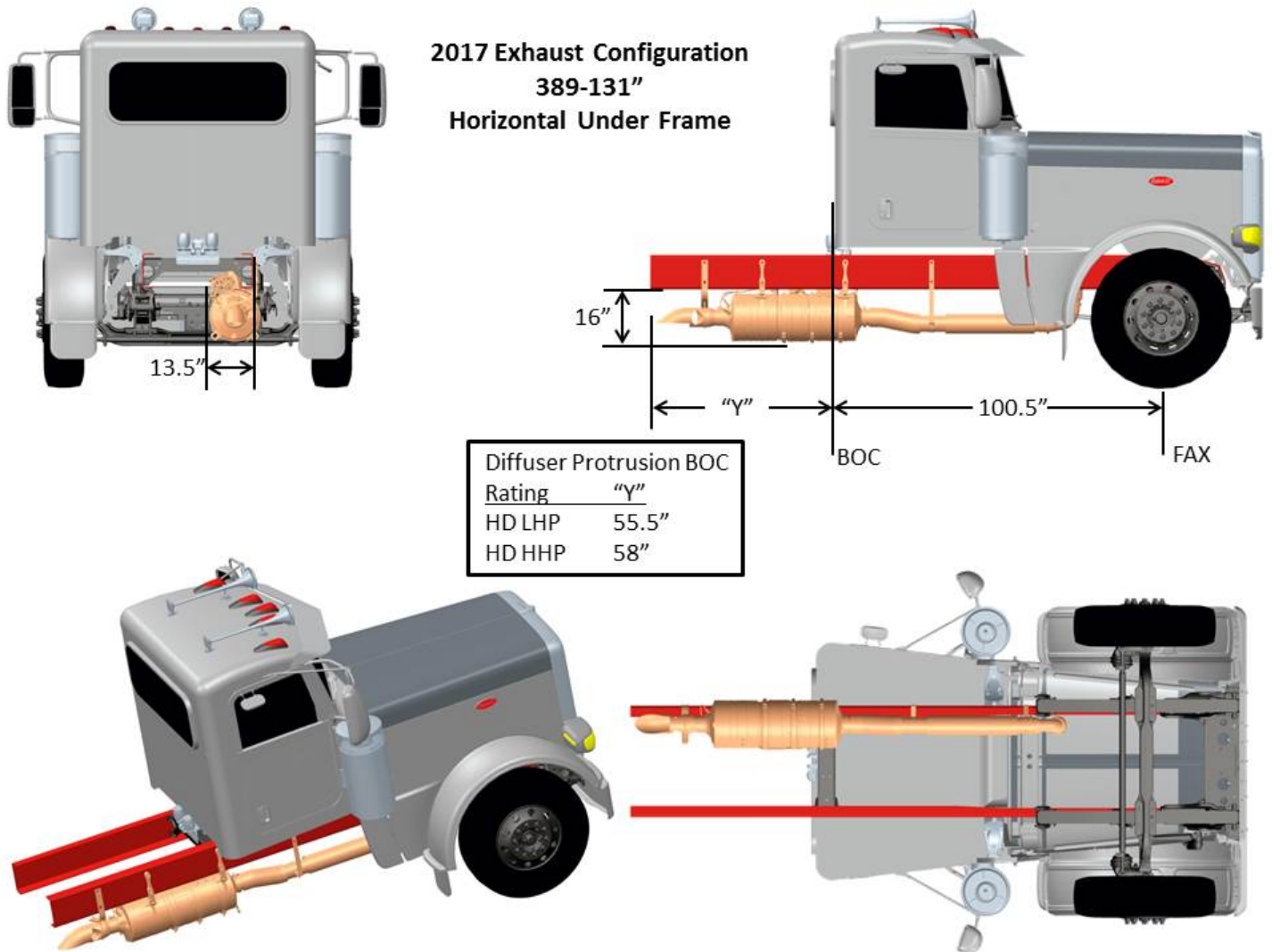


FIGURE 3-64. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

**MODEL 389-131 EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365320)

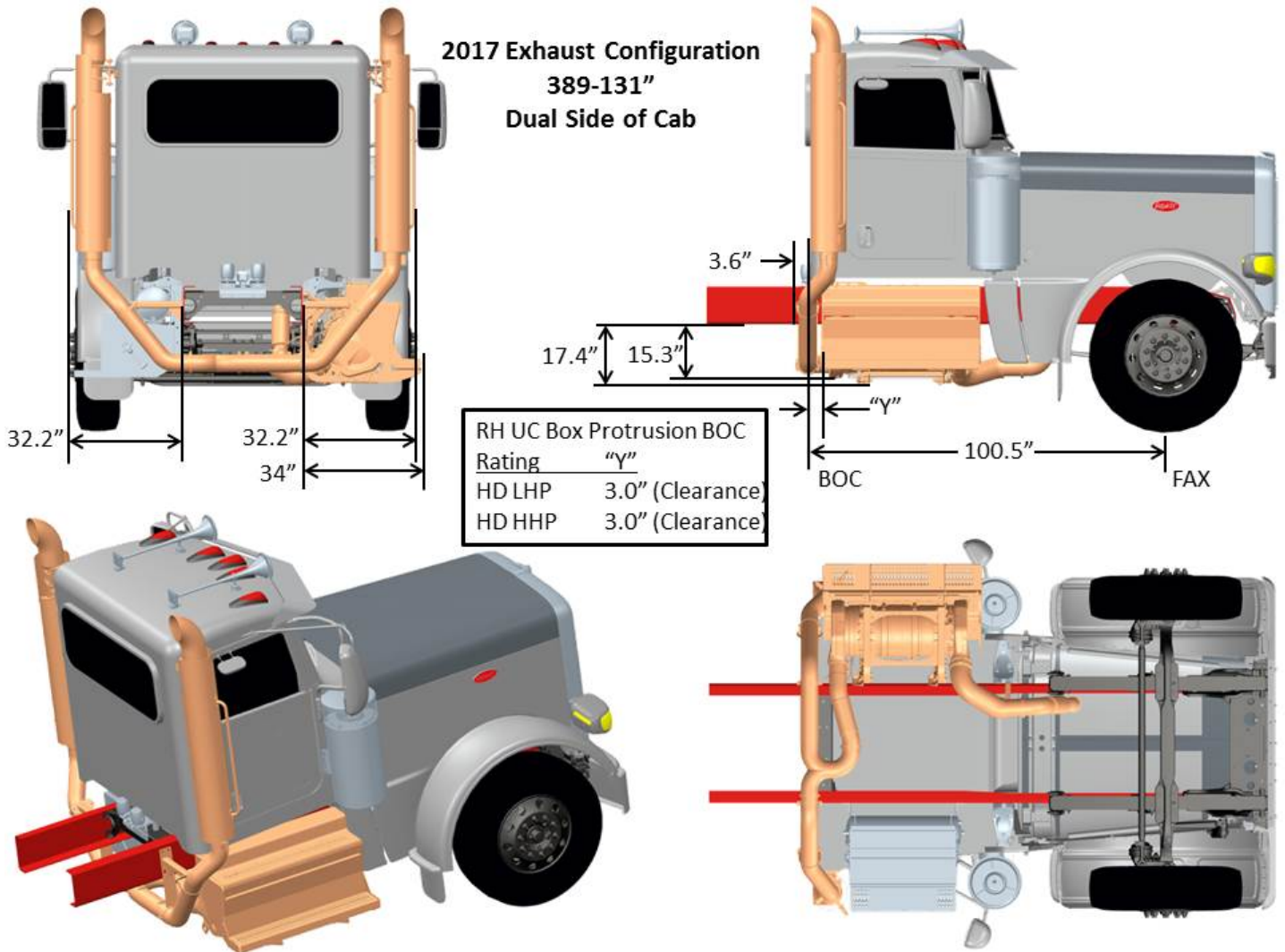


FIGURE 3-65. Exhaust Dual SOC DPF/SCR RH CAB

**MODEL 365-115 SFFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365250)

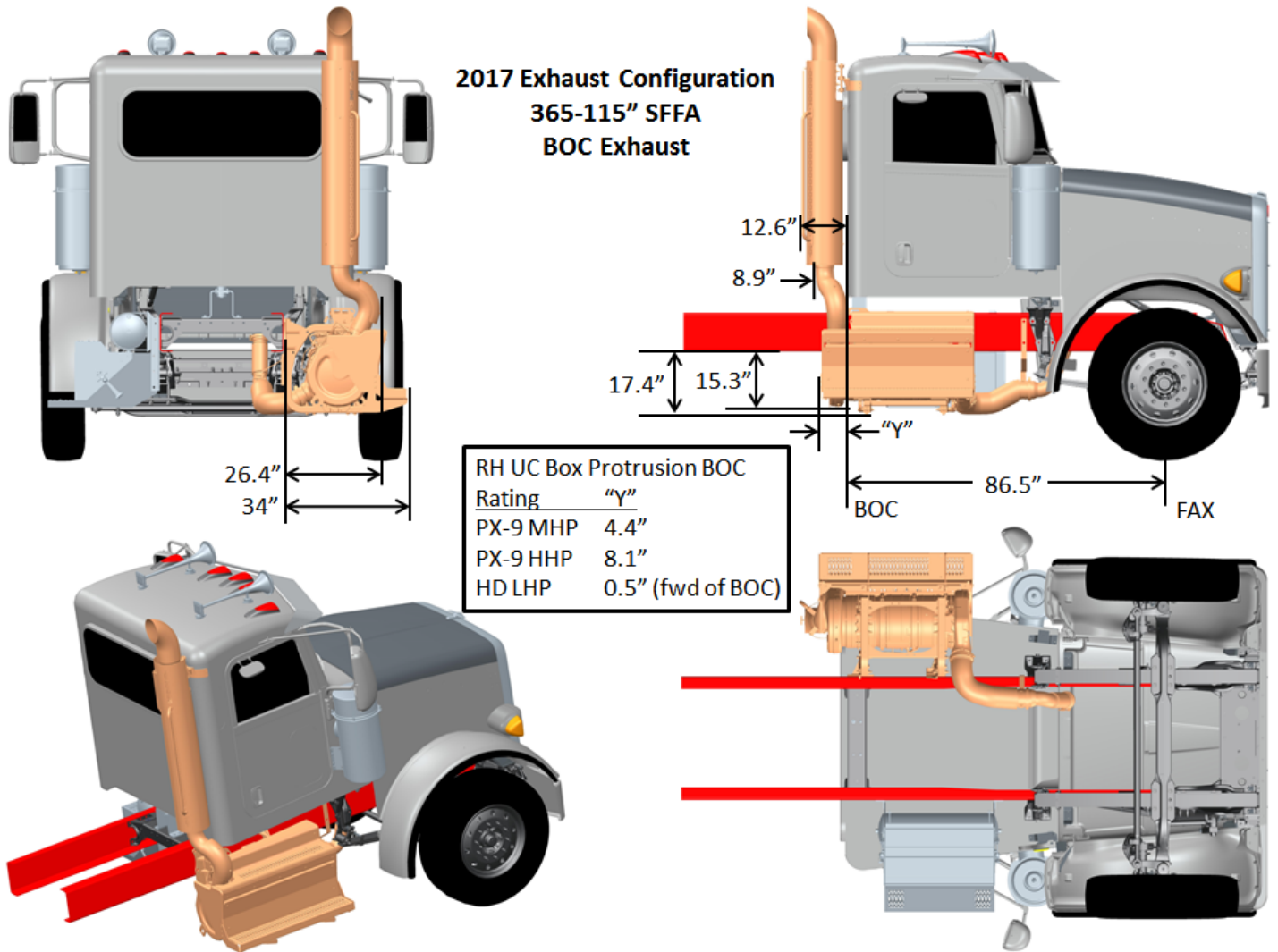


FIGURE 3-66. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 365-115 SFFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

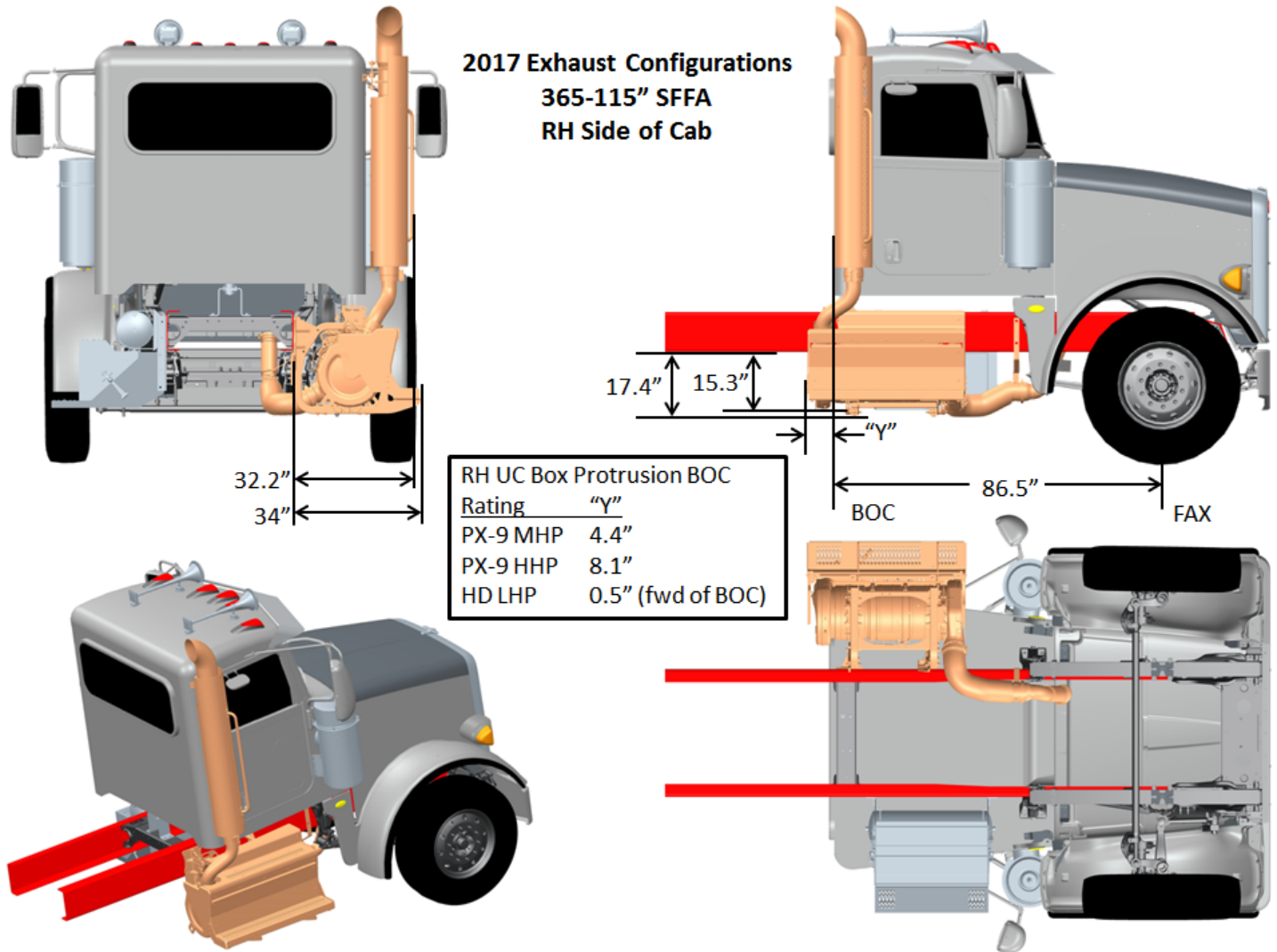


FIGURE 3-67. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 367-123 SBFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

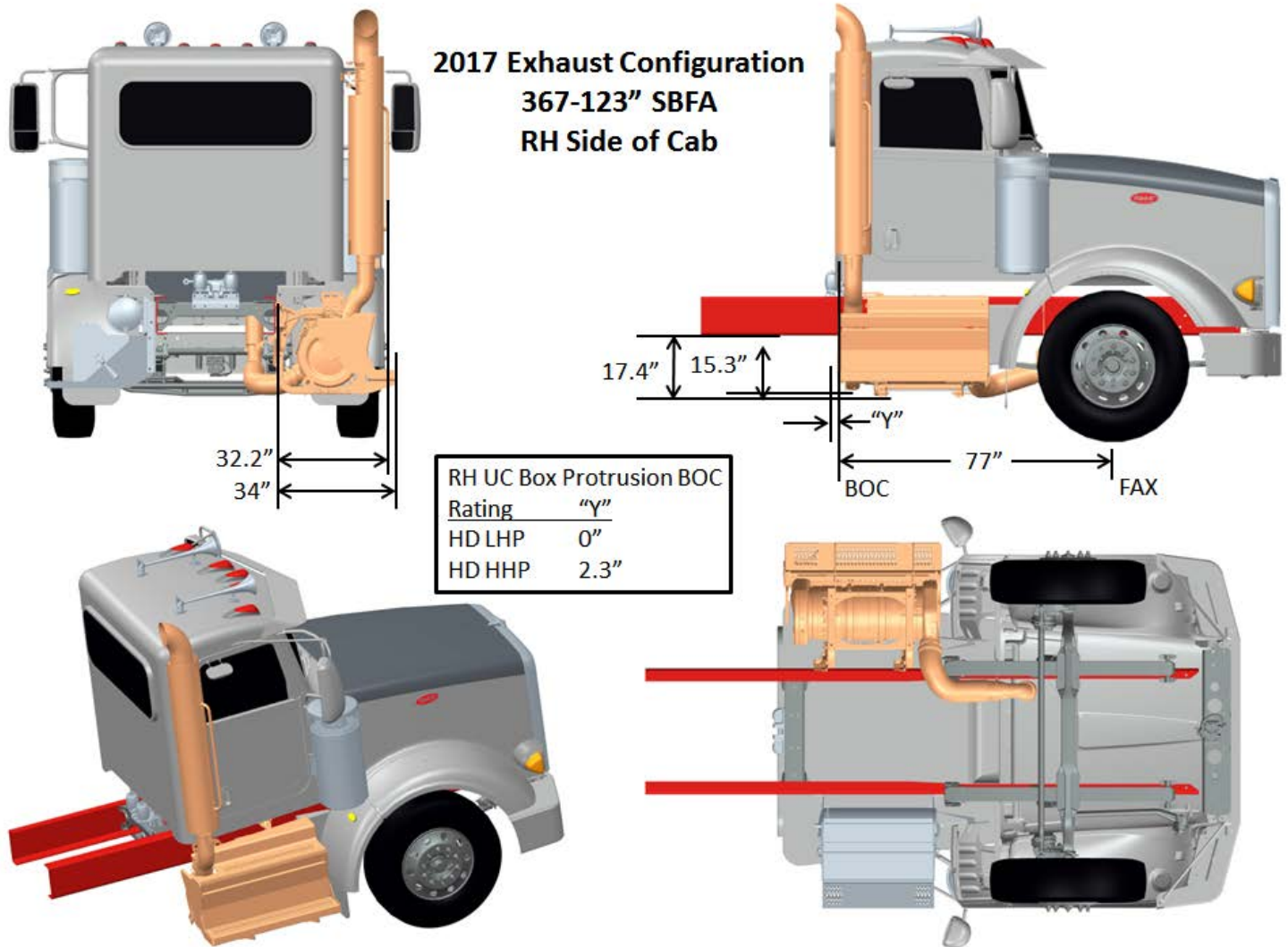


FIGURE 3-68. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 365-115 SBFA FEPTO EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**

(Reference option code 3365250)

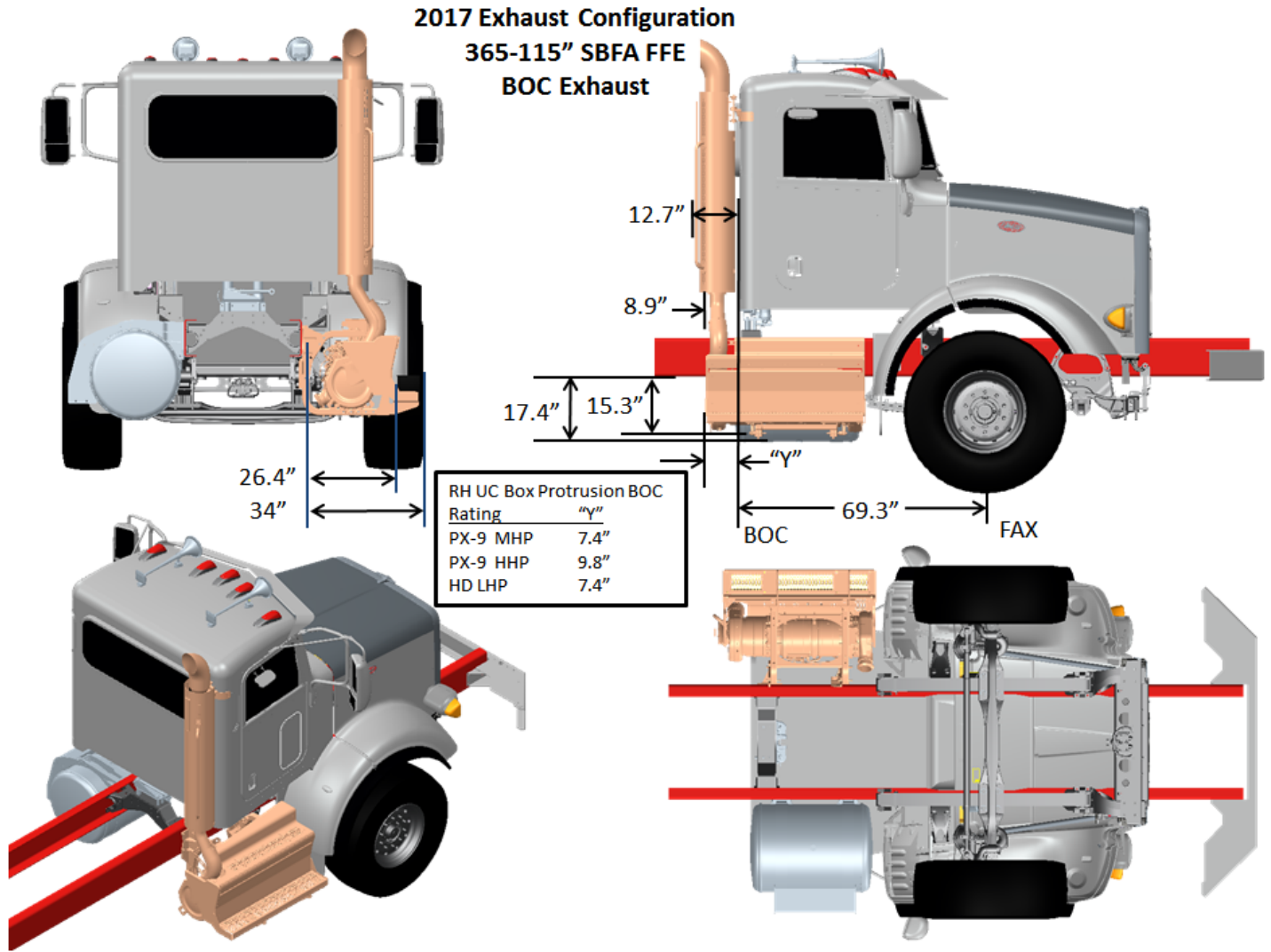


FIGURE 3-69. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

MODEL 365-115 SBFA FEPTO EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
 2017 EMISSIONS
 (Reference option code 3365270)

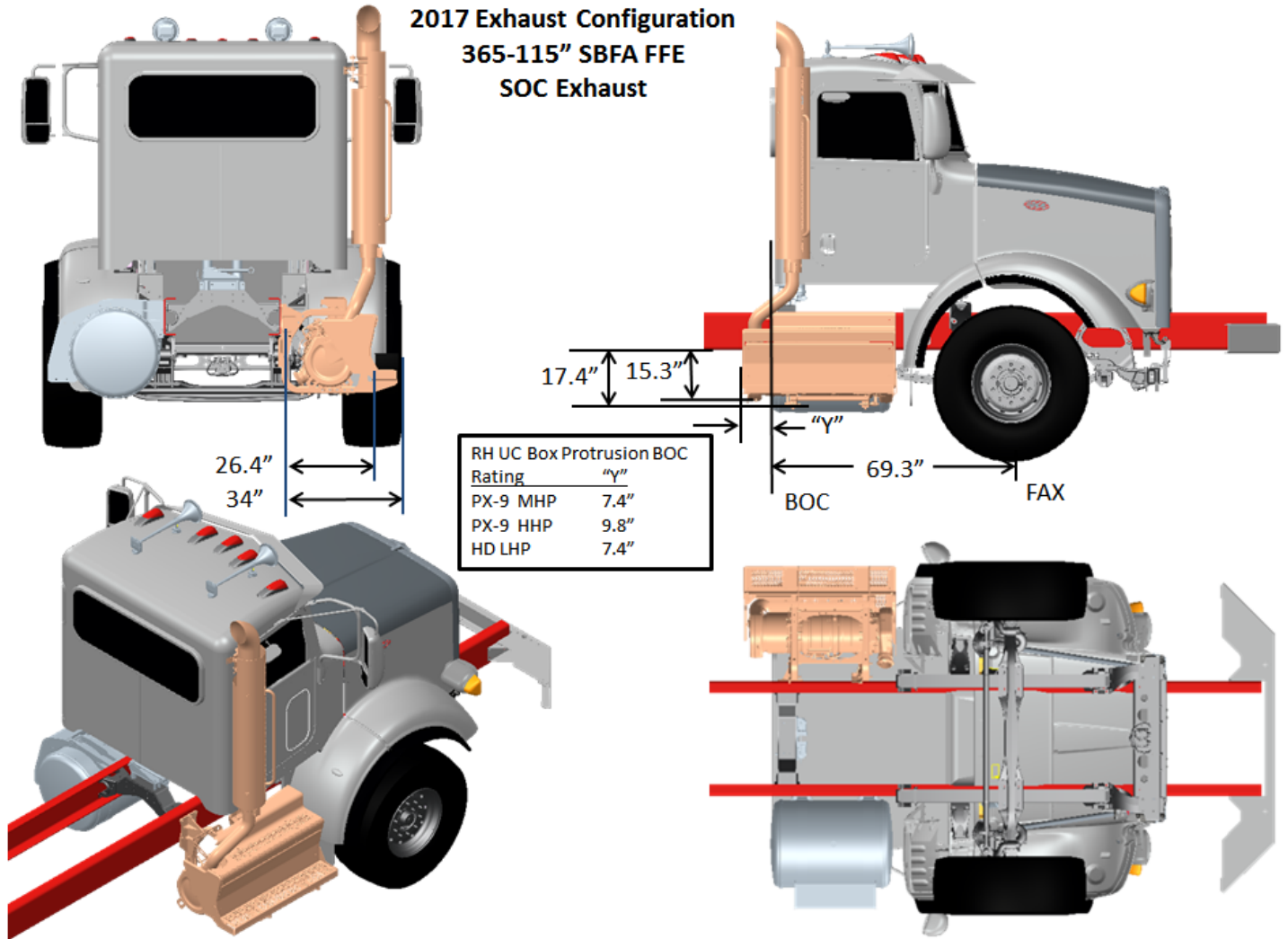


FIGURE 3-70. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 365-115 SBFA FEPTO EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

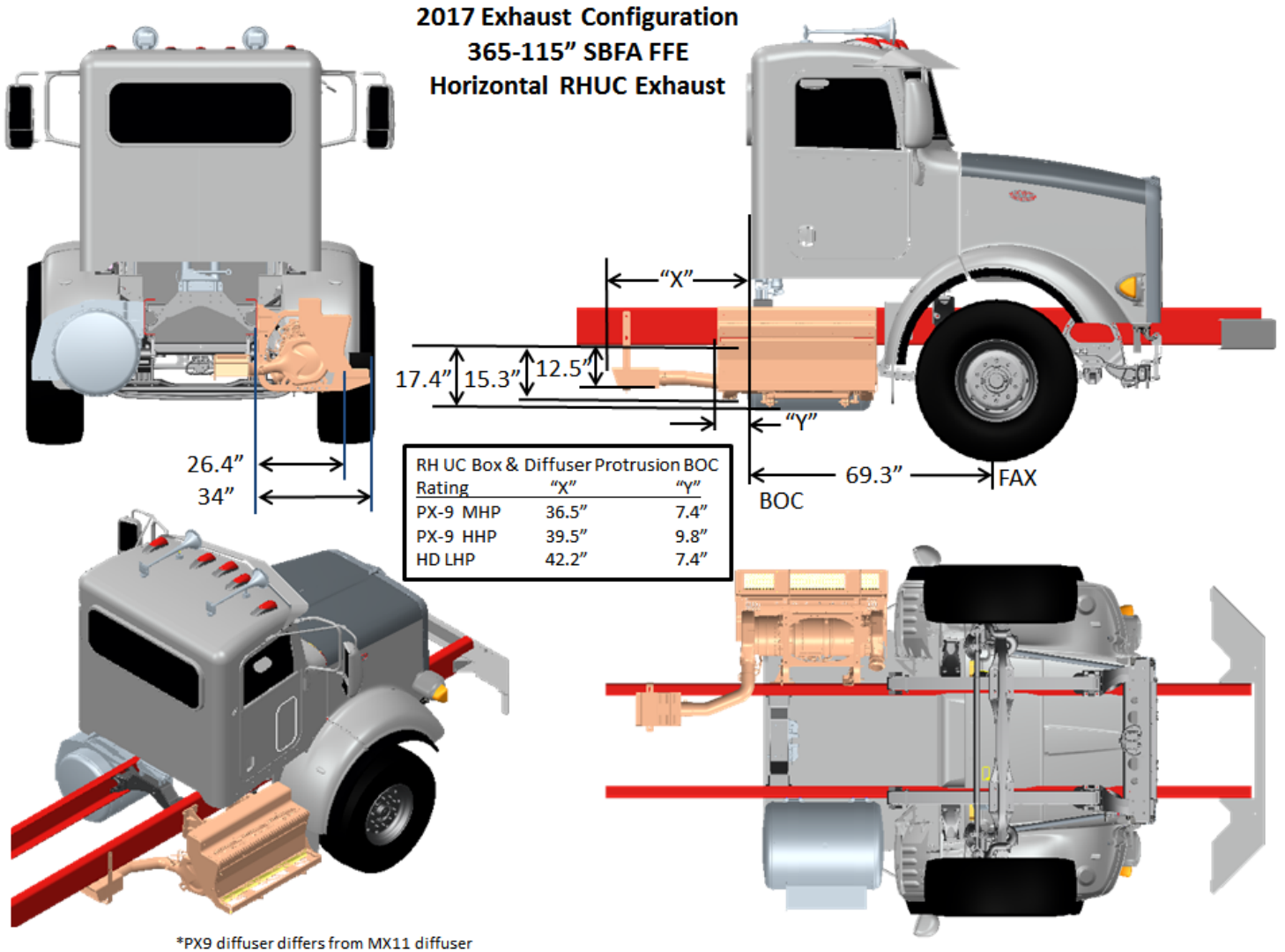


FIGURE 3-71. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

MODEL 367-123 SBFA HH EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
 2017 EMISSIONS
 (Reference option code 3365250)

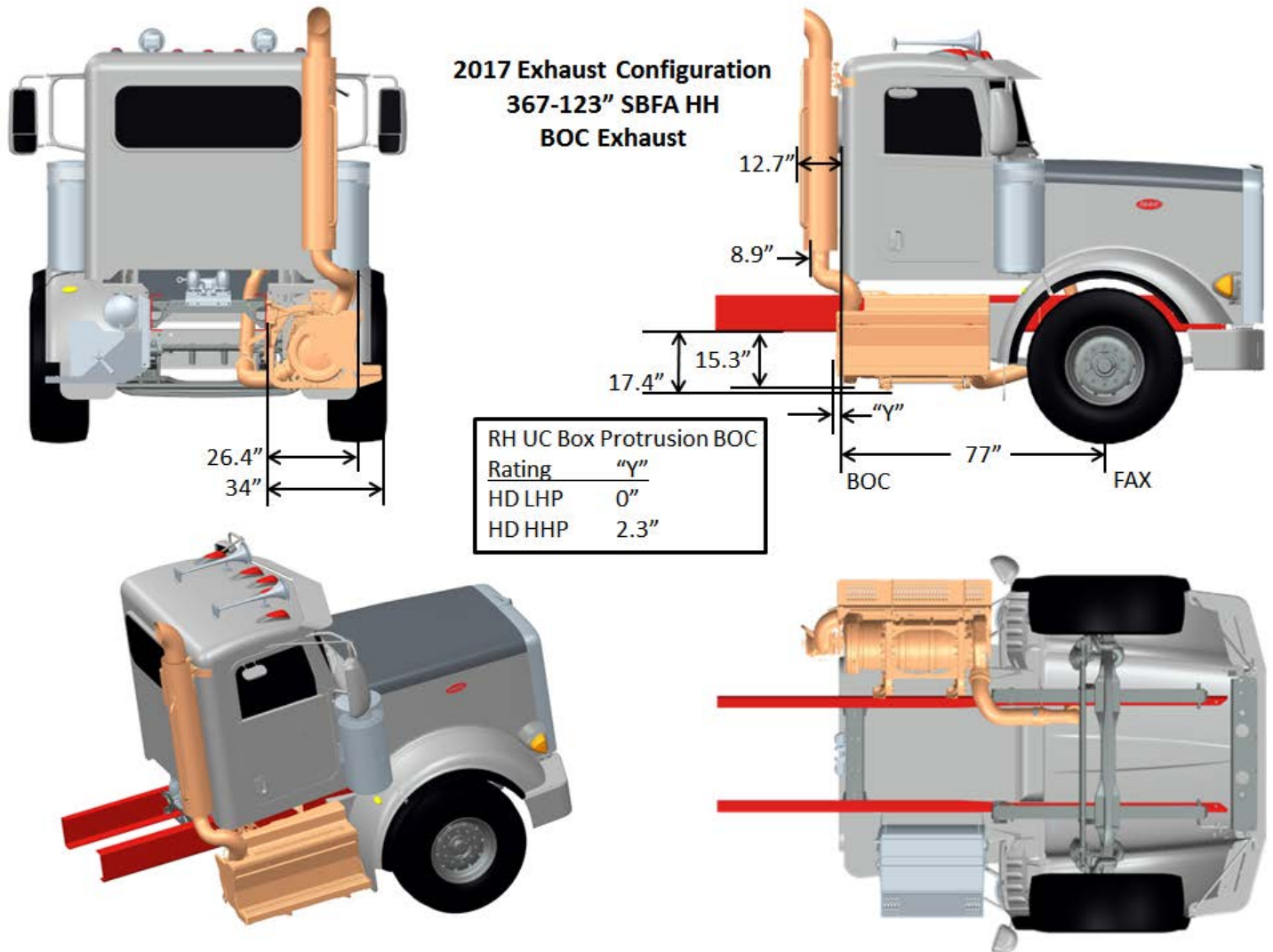


FIGURE 3-72. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 367-123 SBFA HH EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

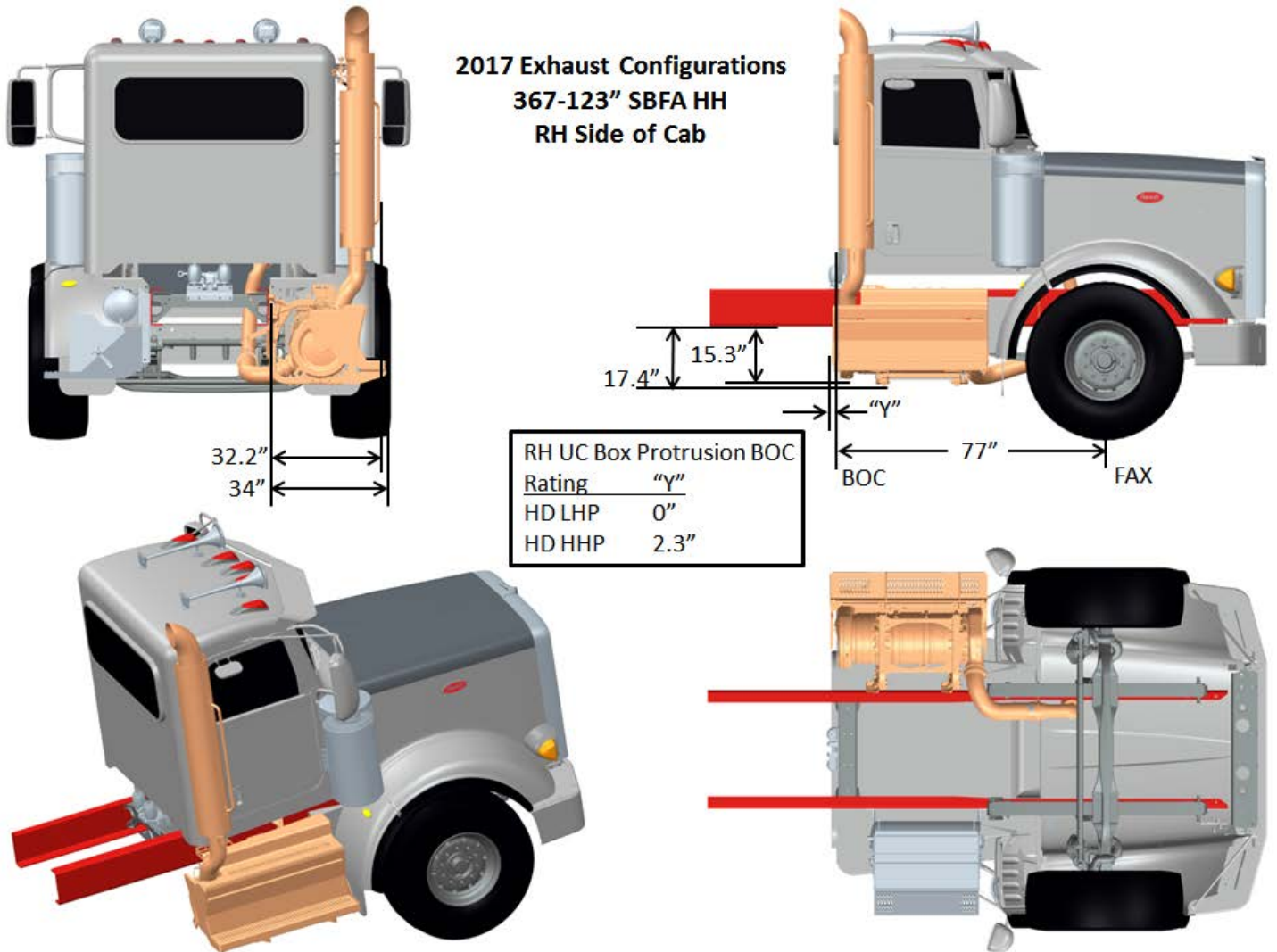


FIGURE 3-73. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 367-123 SBFA HH EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**

(Reference option code 3365280)

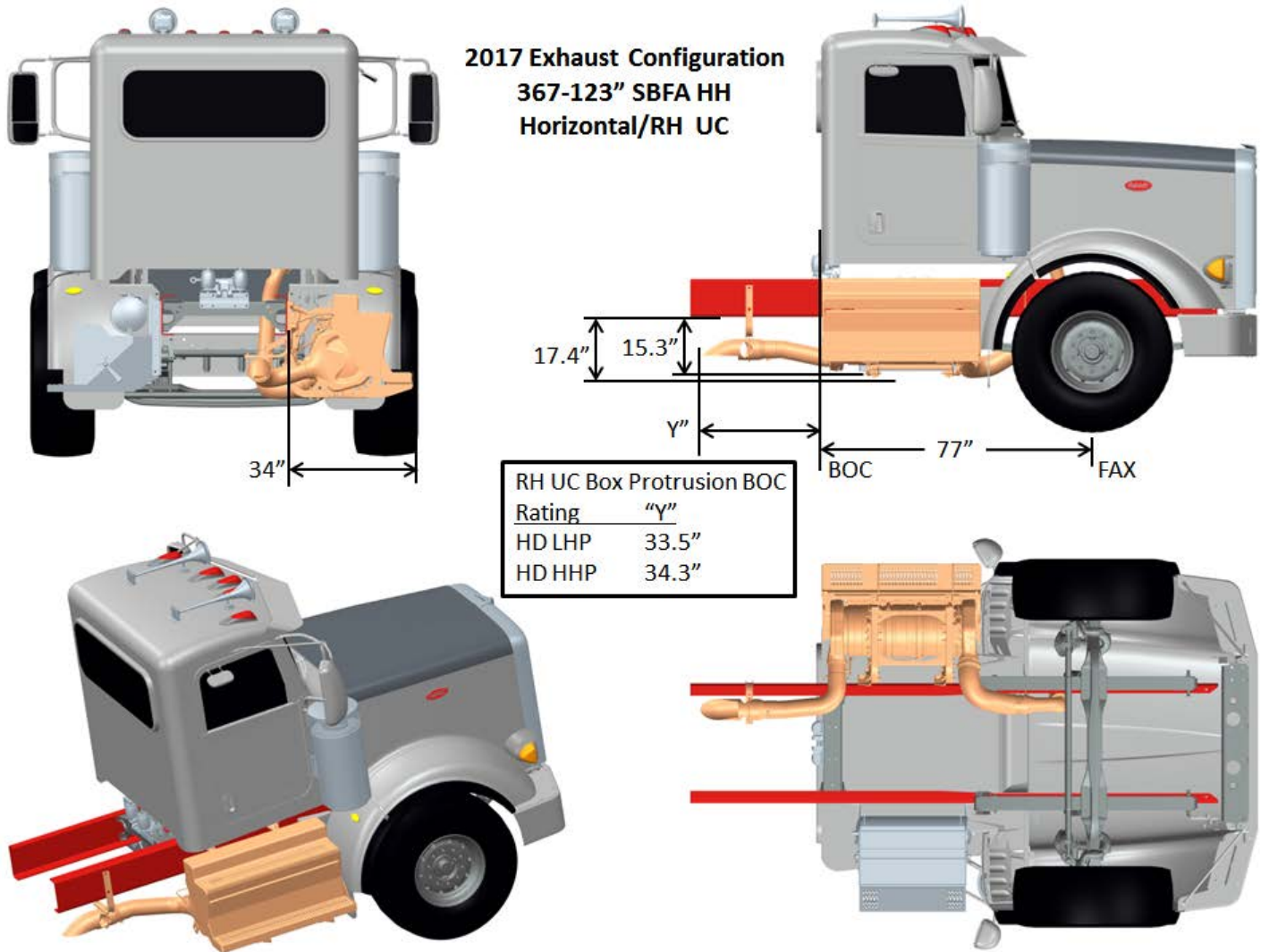


FIGURE 3-74. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 367-123 SFFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

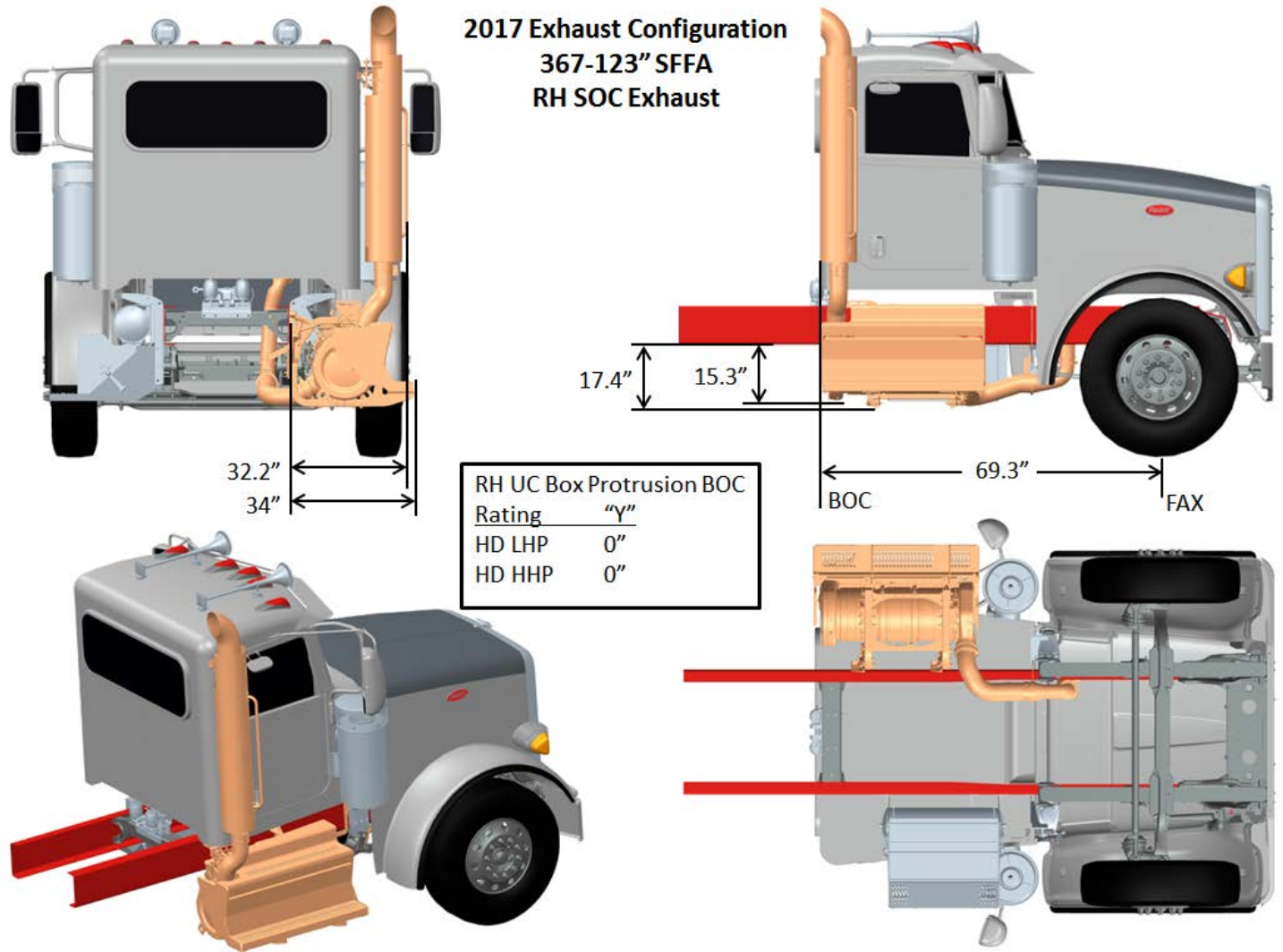


FIGURE 3-75. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

567/579 FAMILY 2017 EMISSIONS

MODEL 567-115 SBFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS

(Reference option code 3365250)

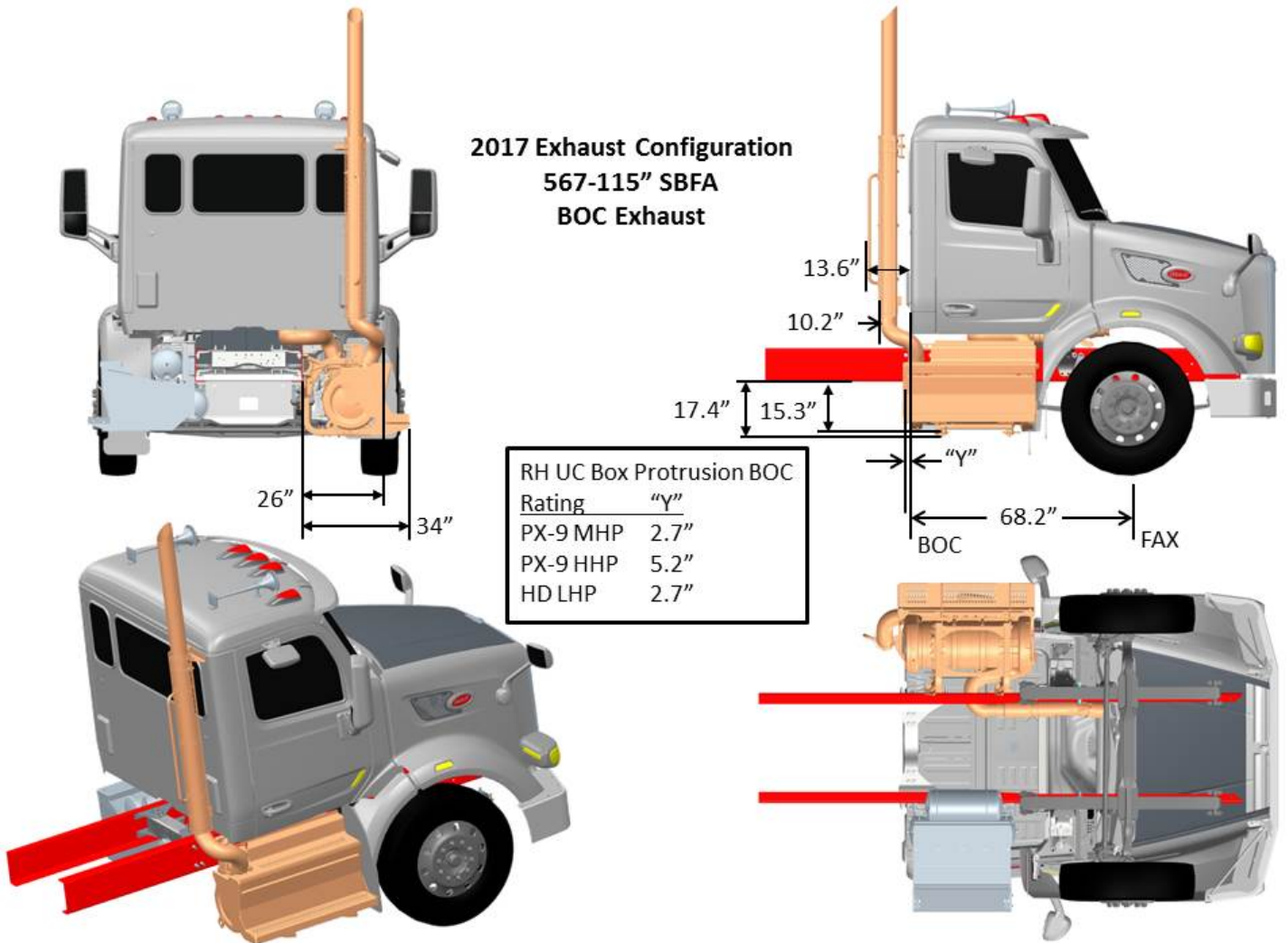


FIGURE 3-76. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 567-115 SBFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

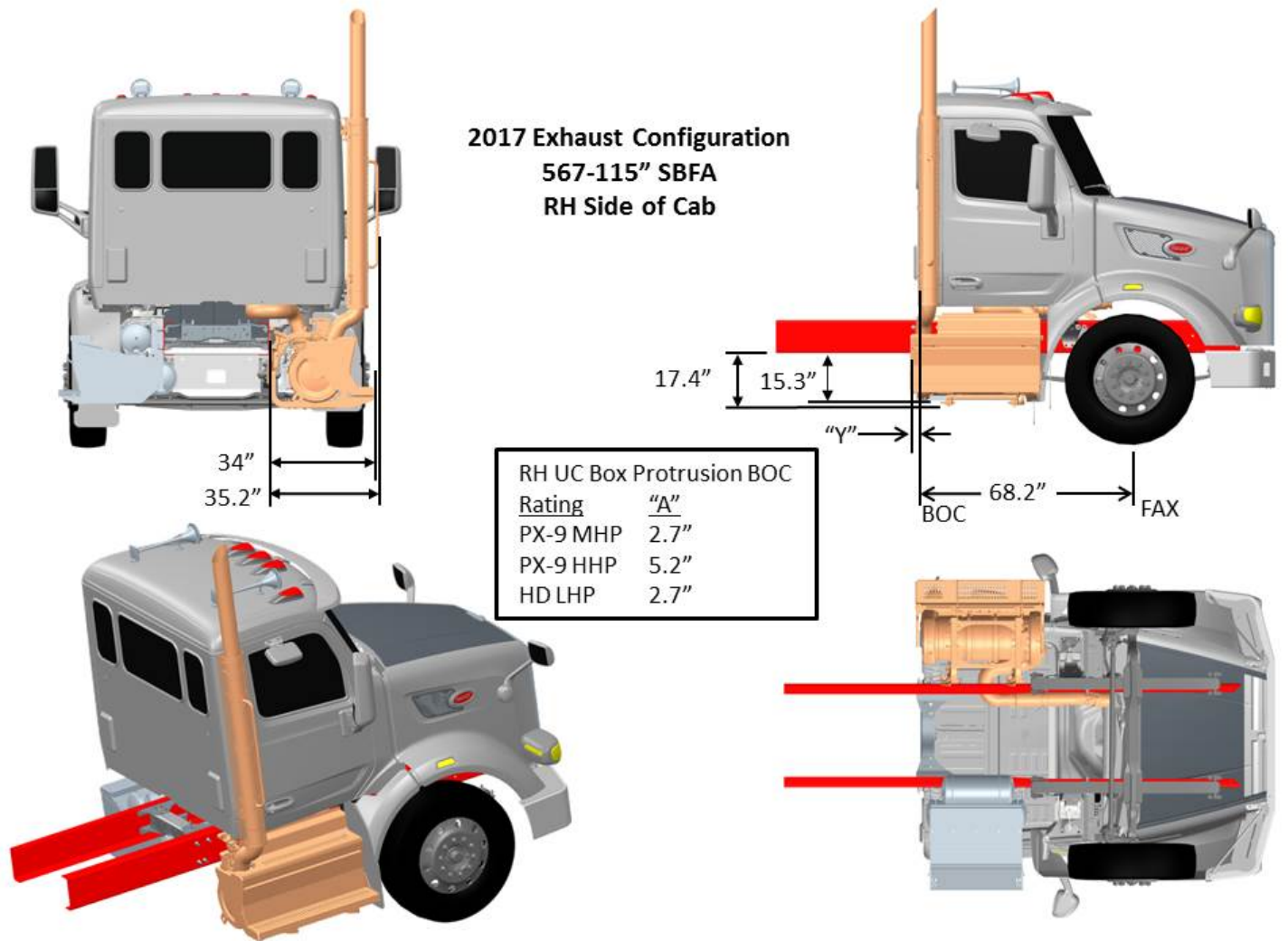


FIGURE 3-77. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 567-115 SBFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

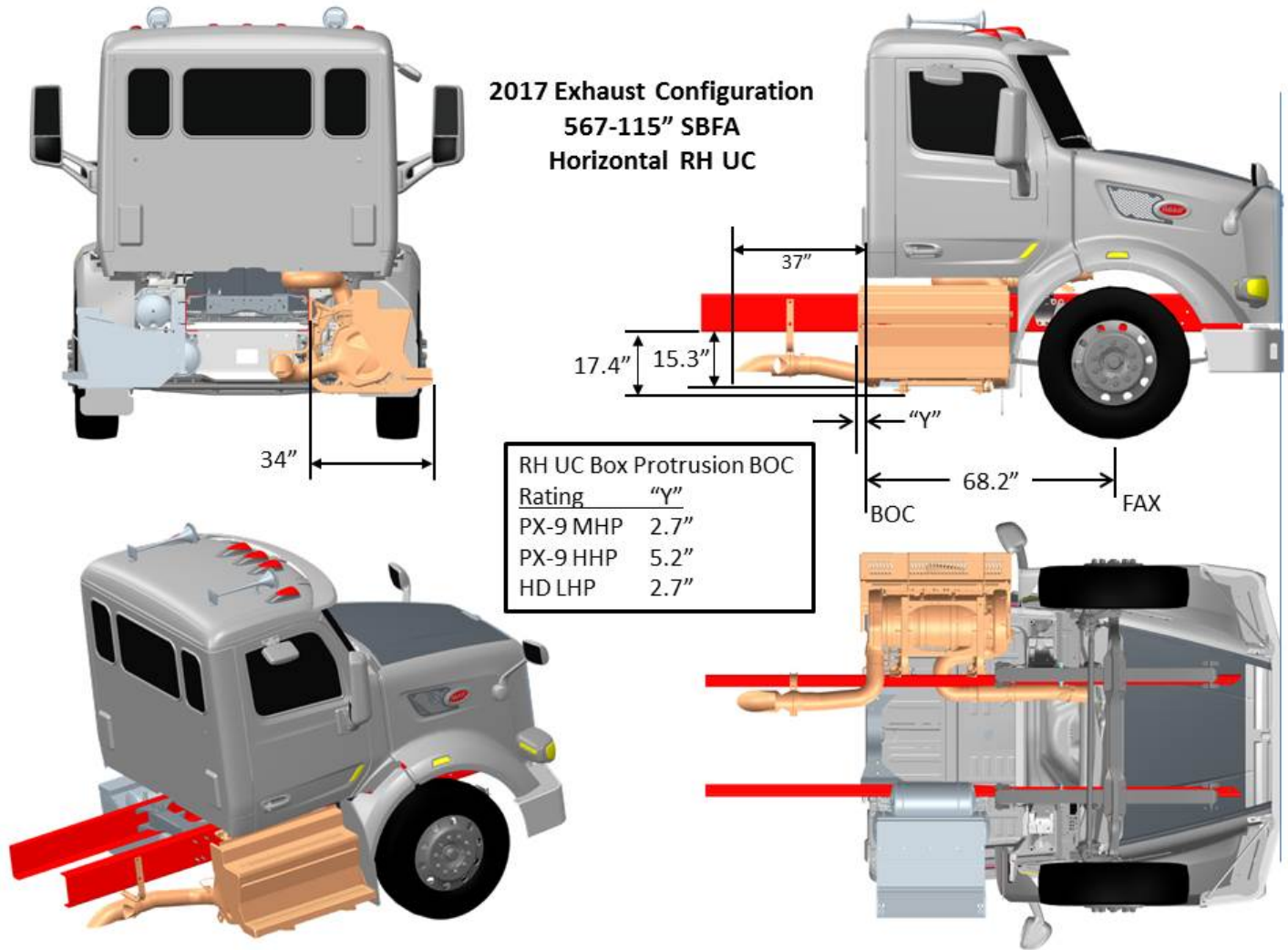


FIGURE 3-78. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 567-115 SBFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

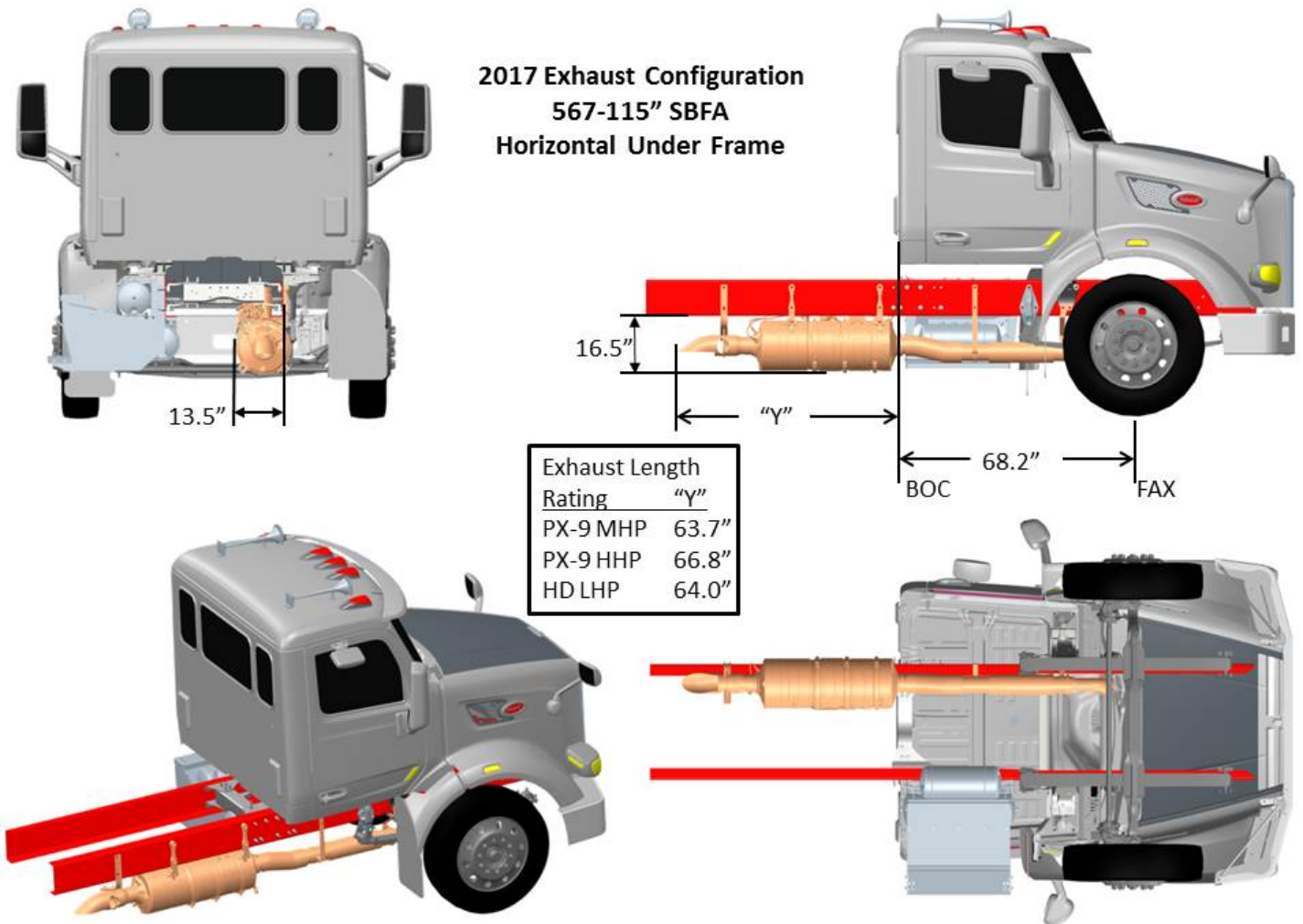


FIGURE 3-79. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

**MODEL 567-115 SBFA EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365340)

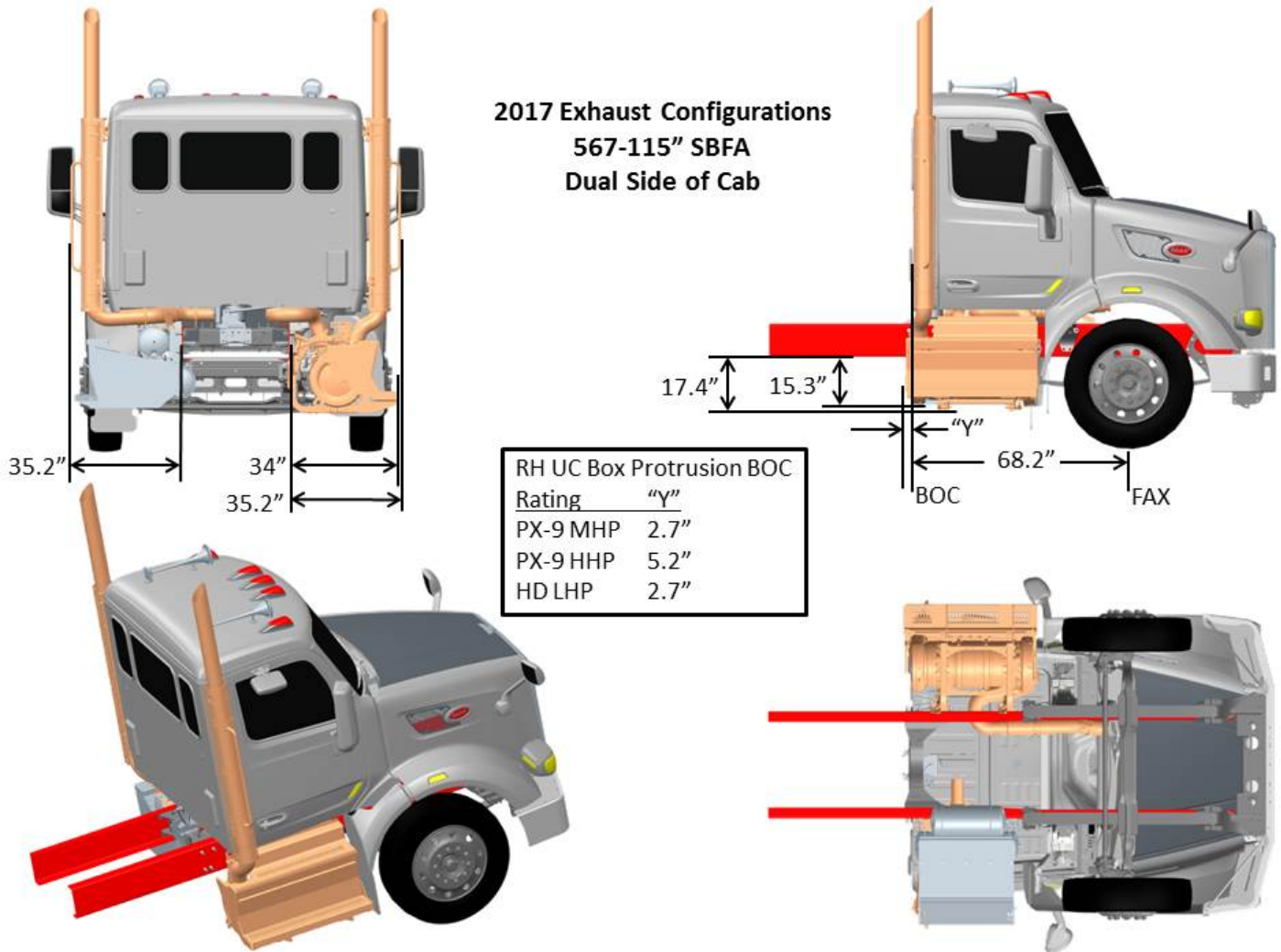


FIGURE 3-80. Exhaust Dual SOC DPF/SCR RH Under Cab

**MODEL 567-115 SFFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365250)

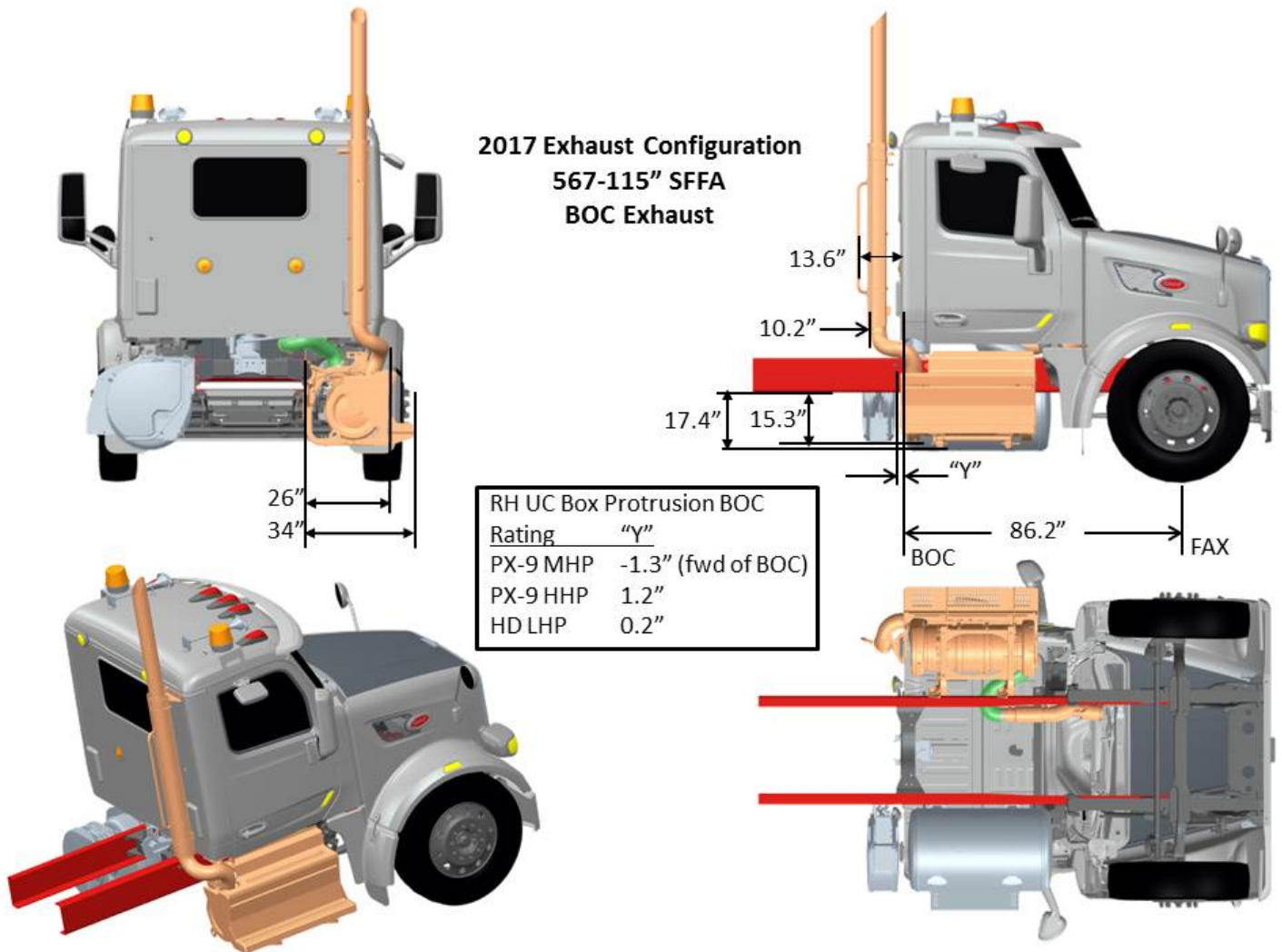


FIGURE 3-81. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 567-115 SFFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

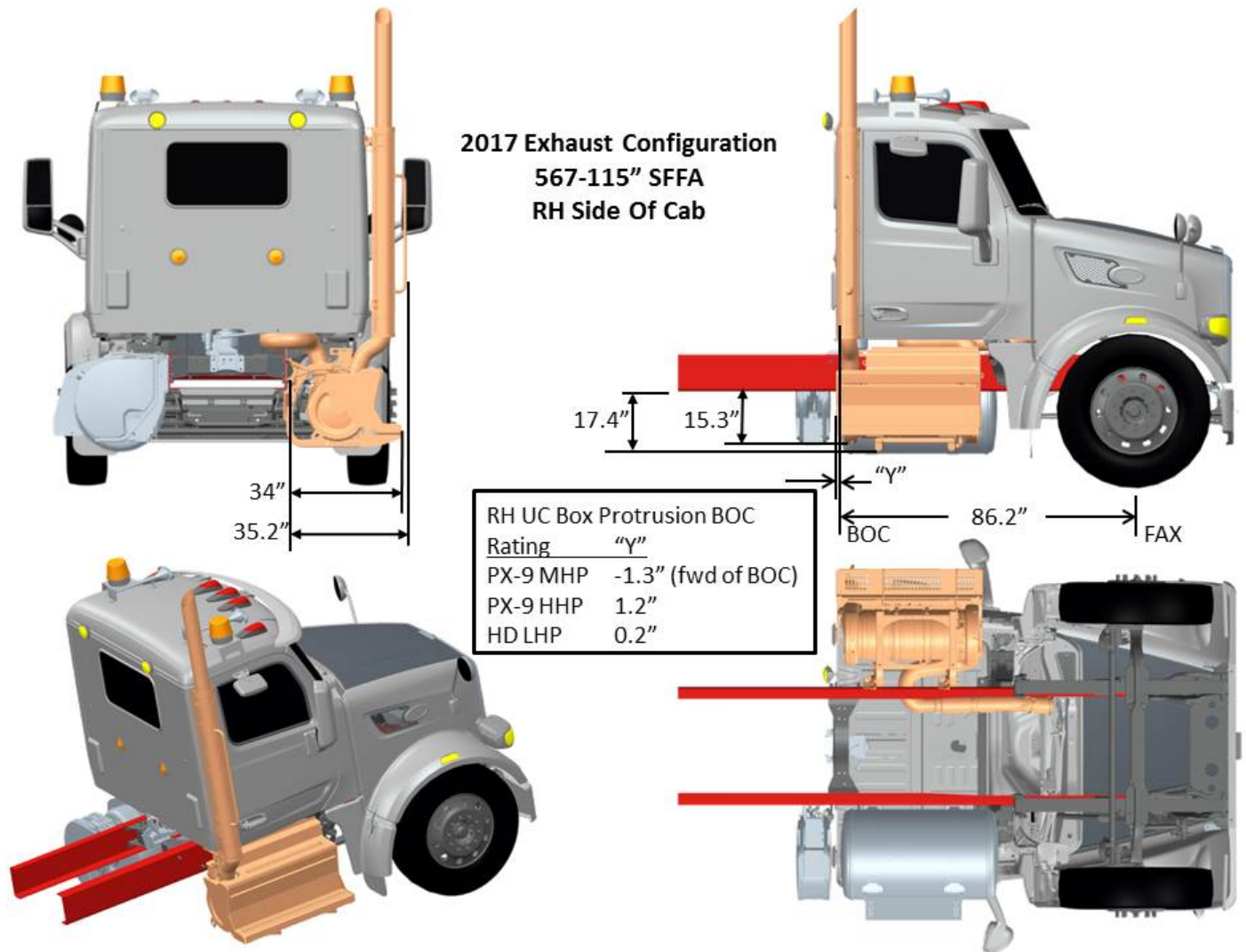


FIGURE 3-82. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 567-115 SFFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

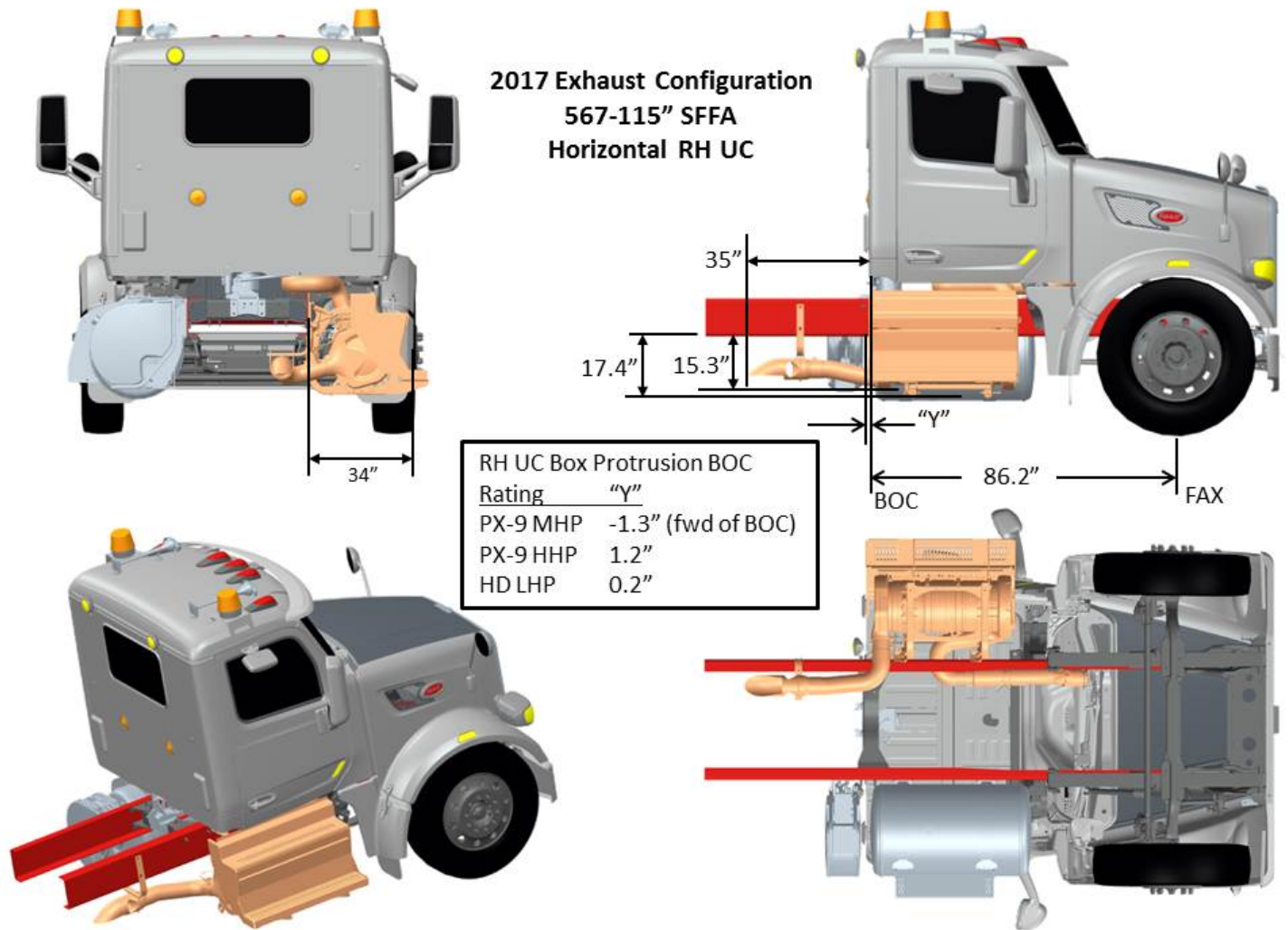


FIGURE 3-83. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 567-115 SFFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

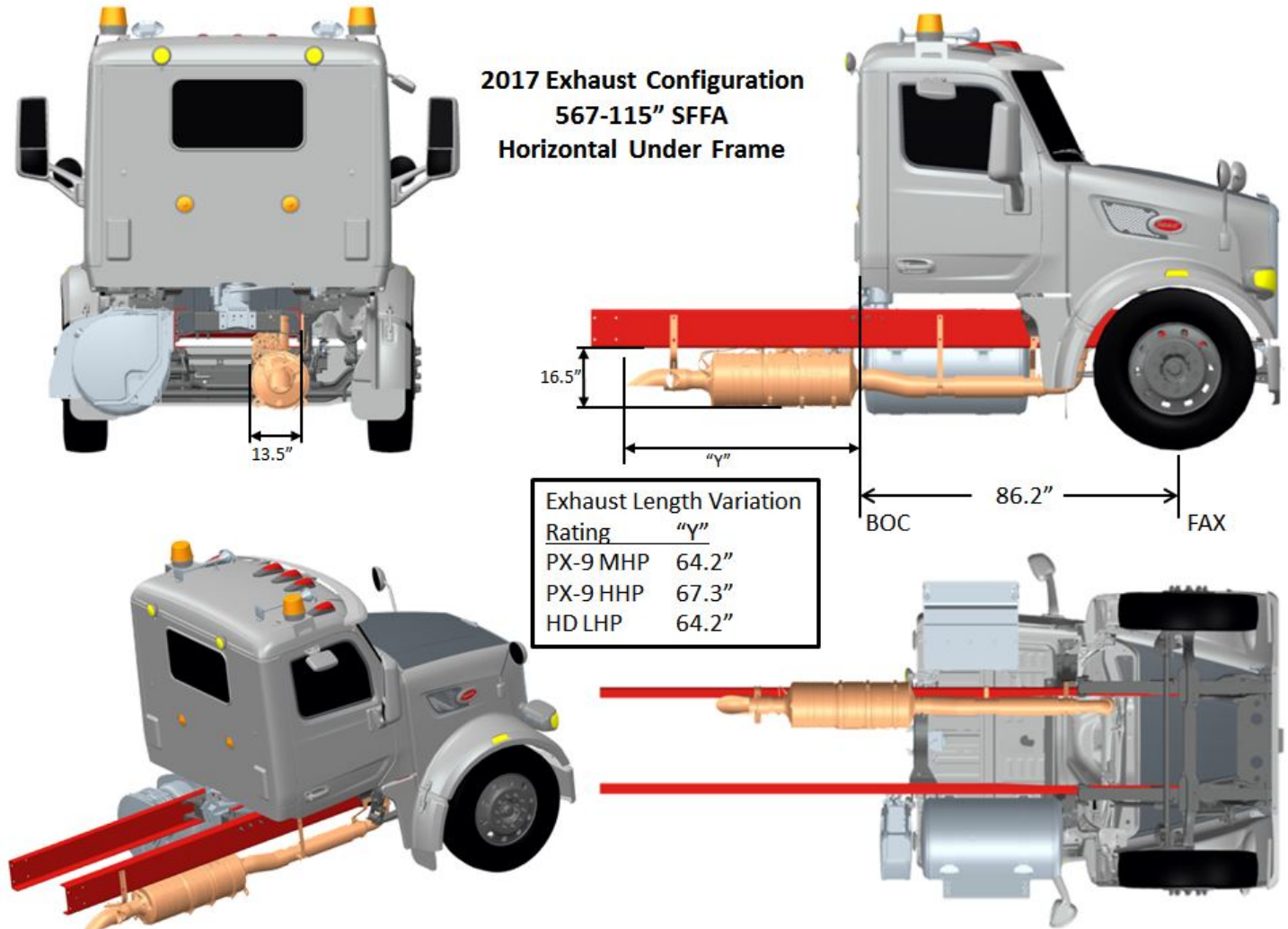


FIGURE 3-84. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

**MODEL 567-115 SFFA EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365340)

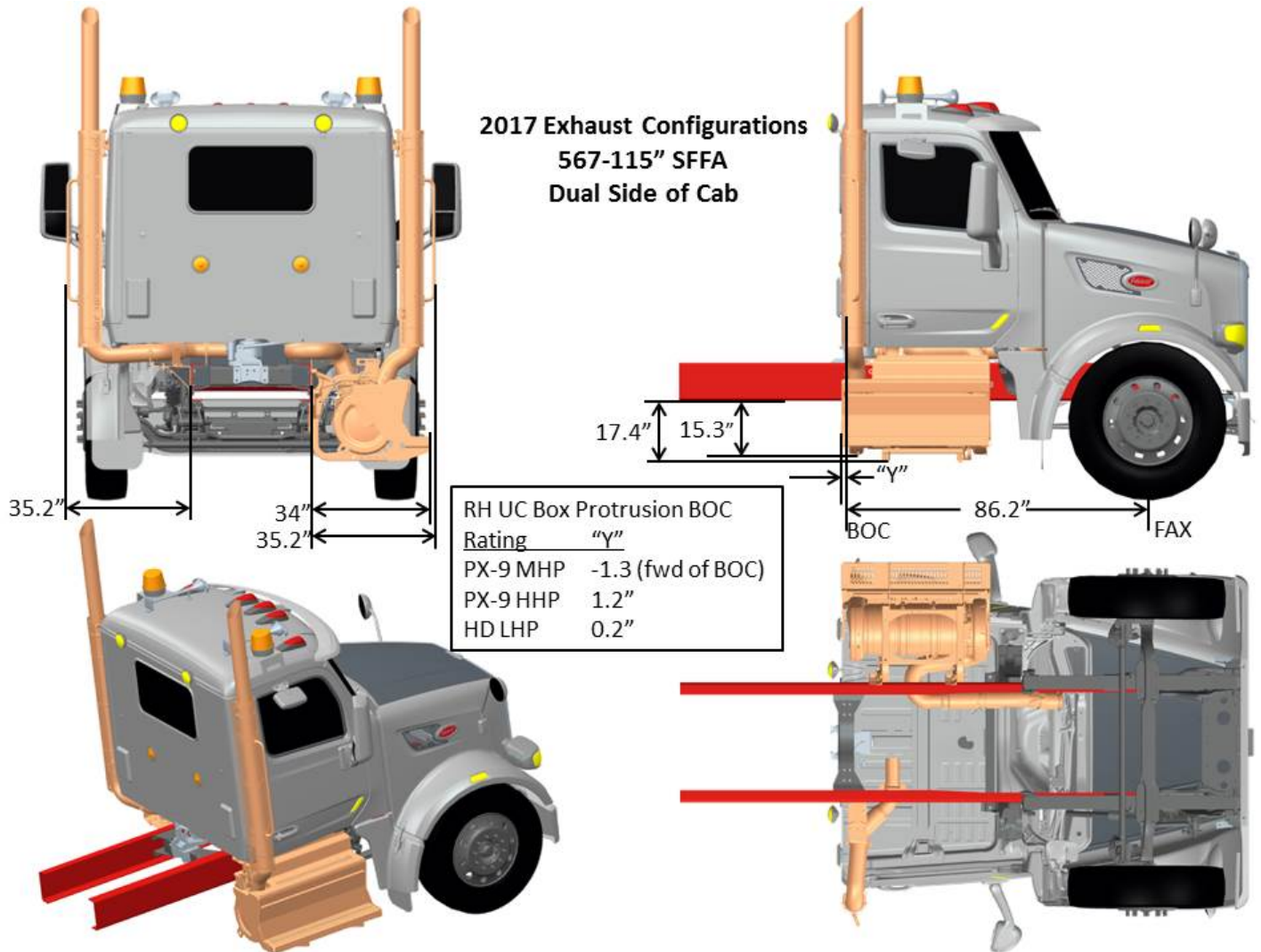


FIGURE 3-85. Exhaust Dual SOC DPF/SCR RH Under Cab

**MODEL 567-121 SBFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365250)

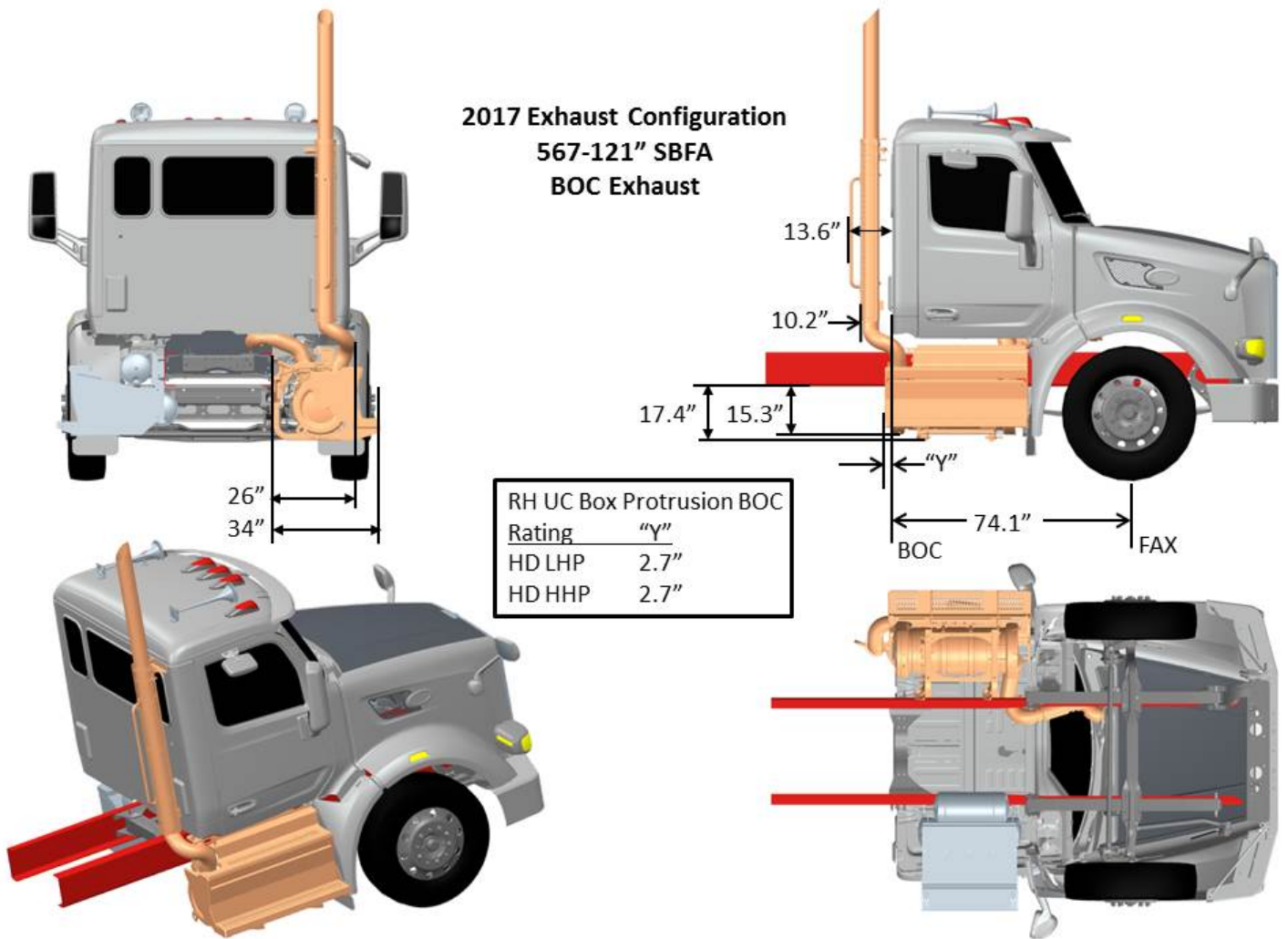


FIGURE 3-86. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 567-121 SBFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS
(Reference option code 3365270)**

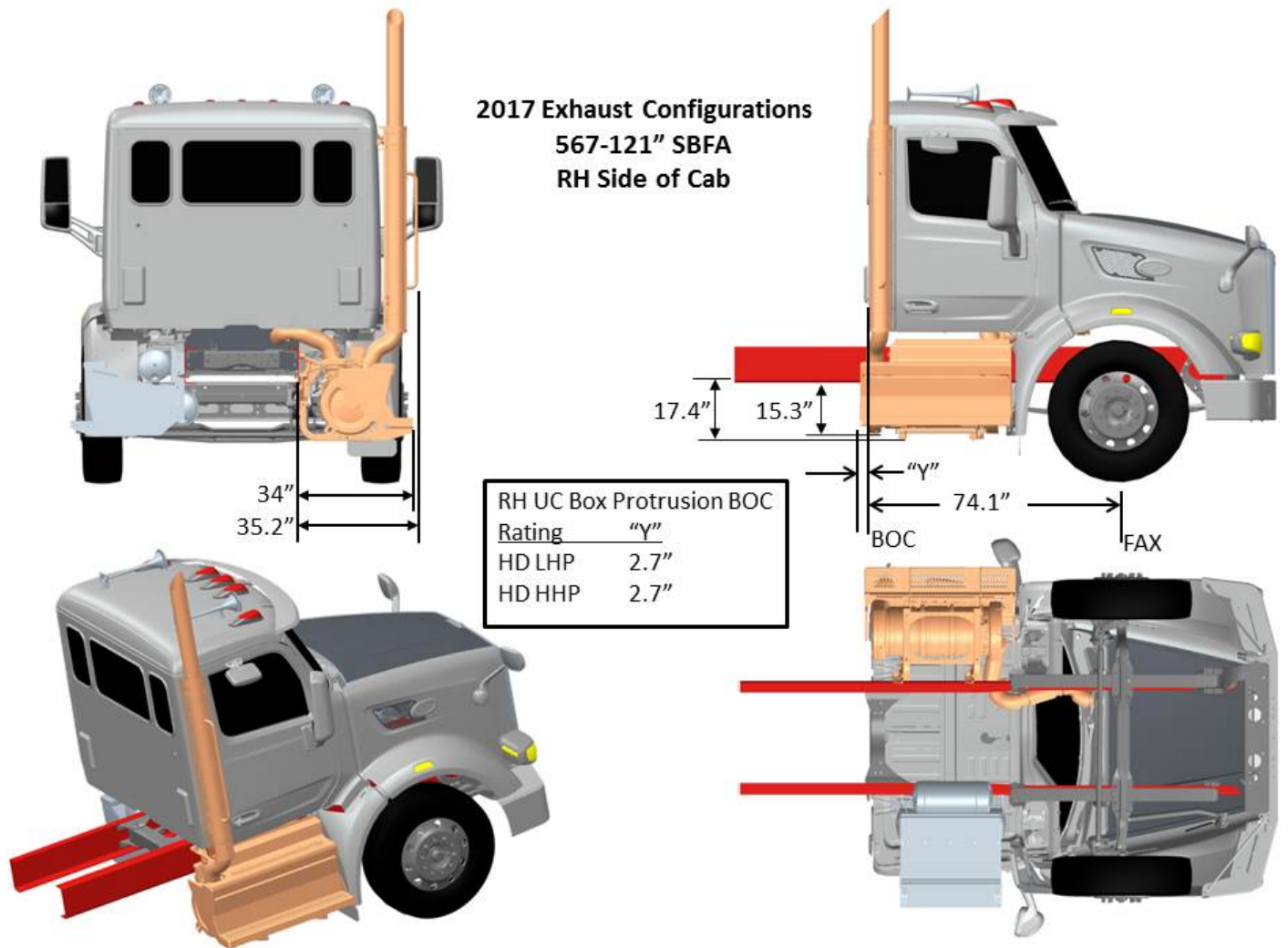


FIGURE 3-87. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 567-121 SBFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

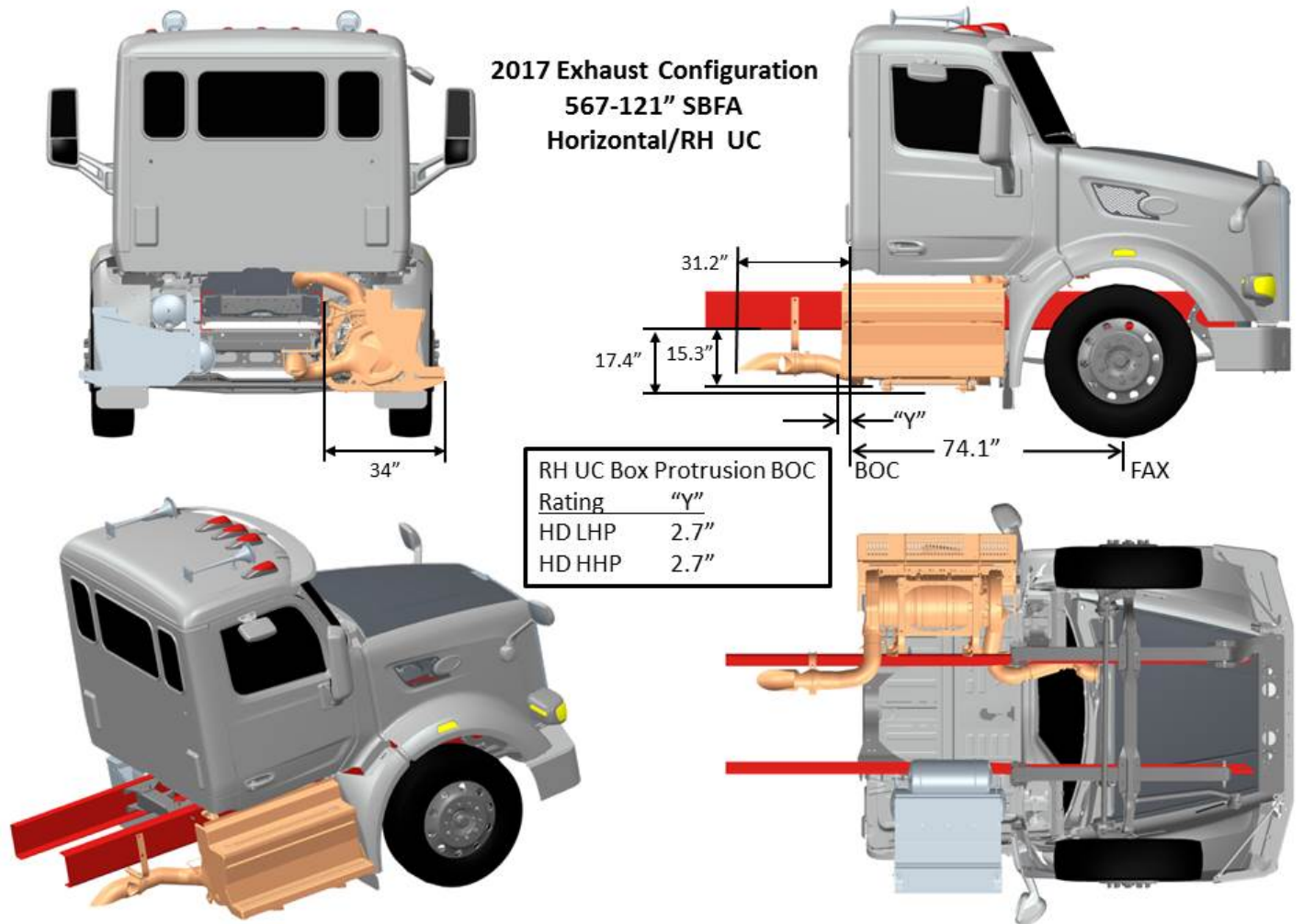


FIGURE 3-88. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 567-121 SBFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

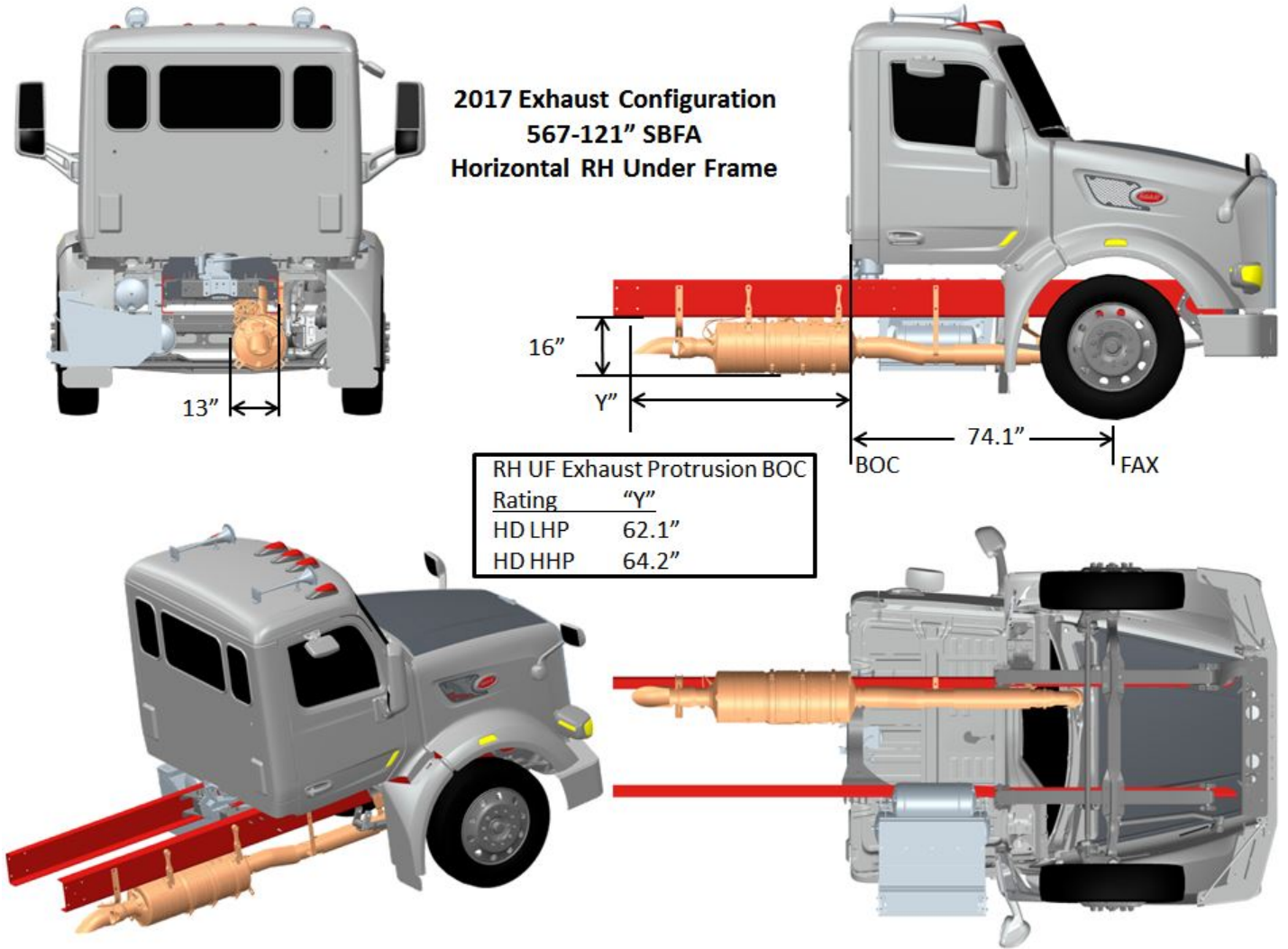


FIGURE 3-89. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

MODEL 567-121 SBFA EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS
 (Reference option code 3365340)

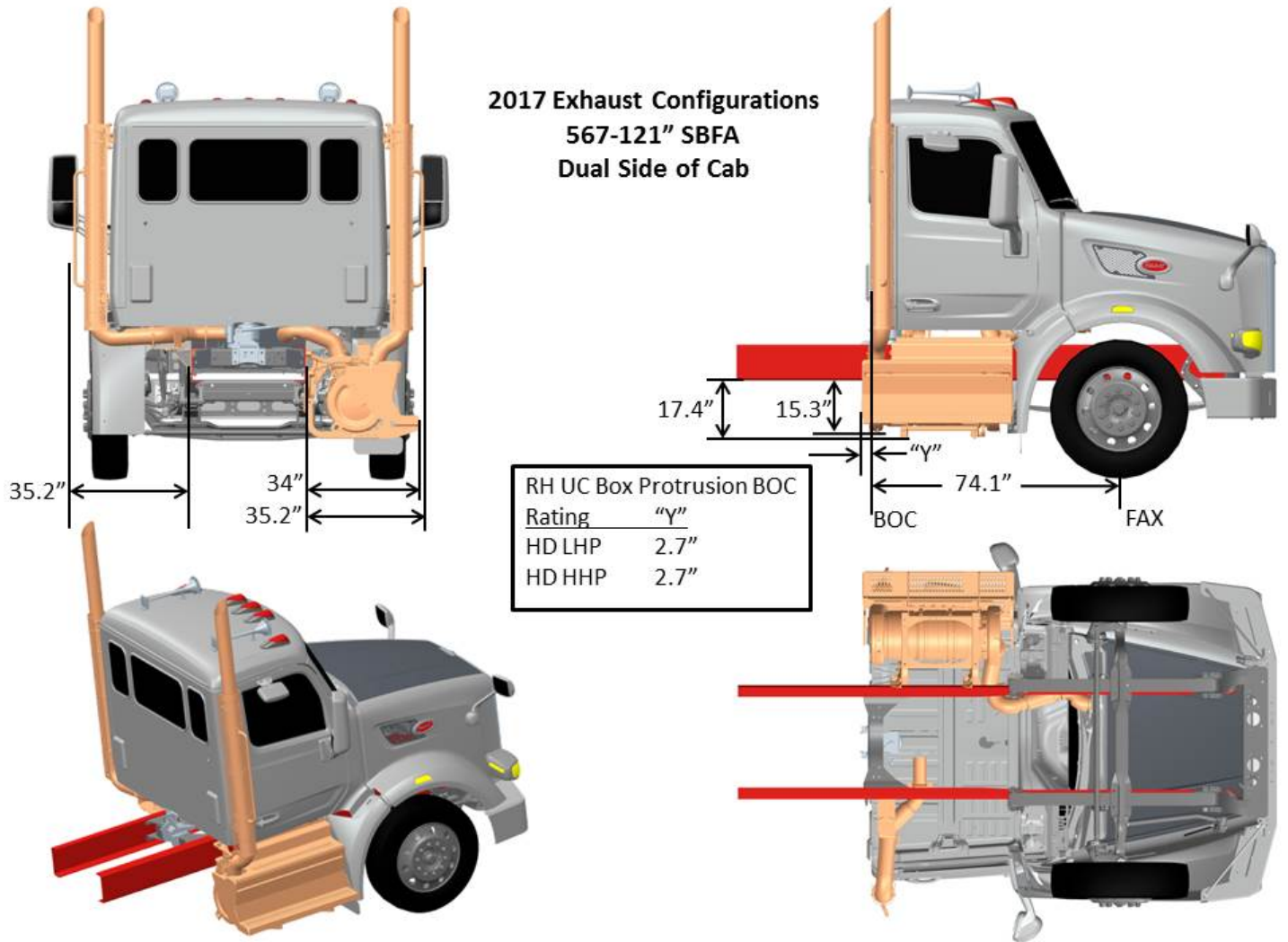


FIGURE 3-90. Exhaust Dual SOC DPF/SCR RH Under Cab

**MODEL 567-121 SFFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365250)

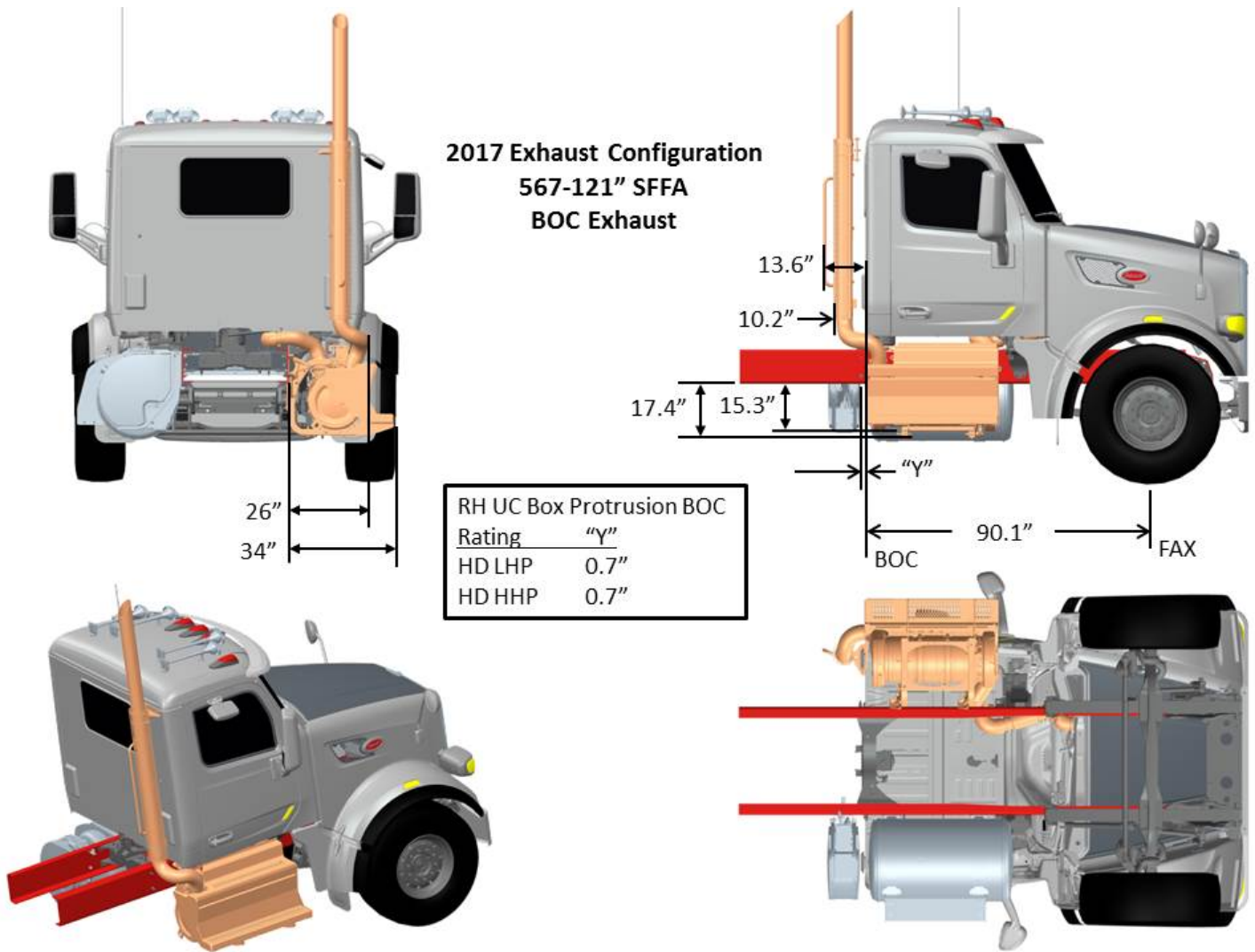


FIGURE 3-91. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 567-121 SFFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

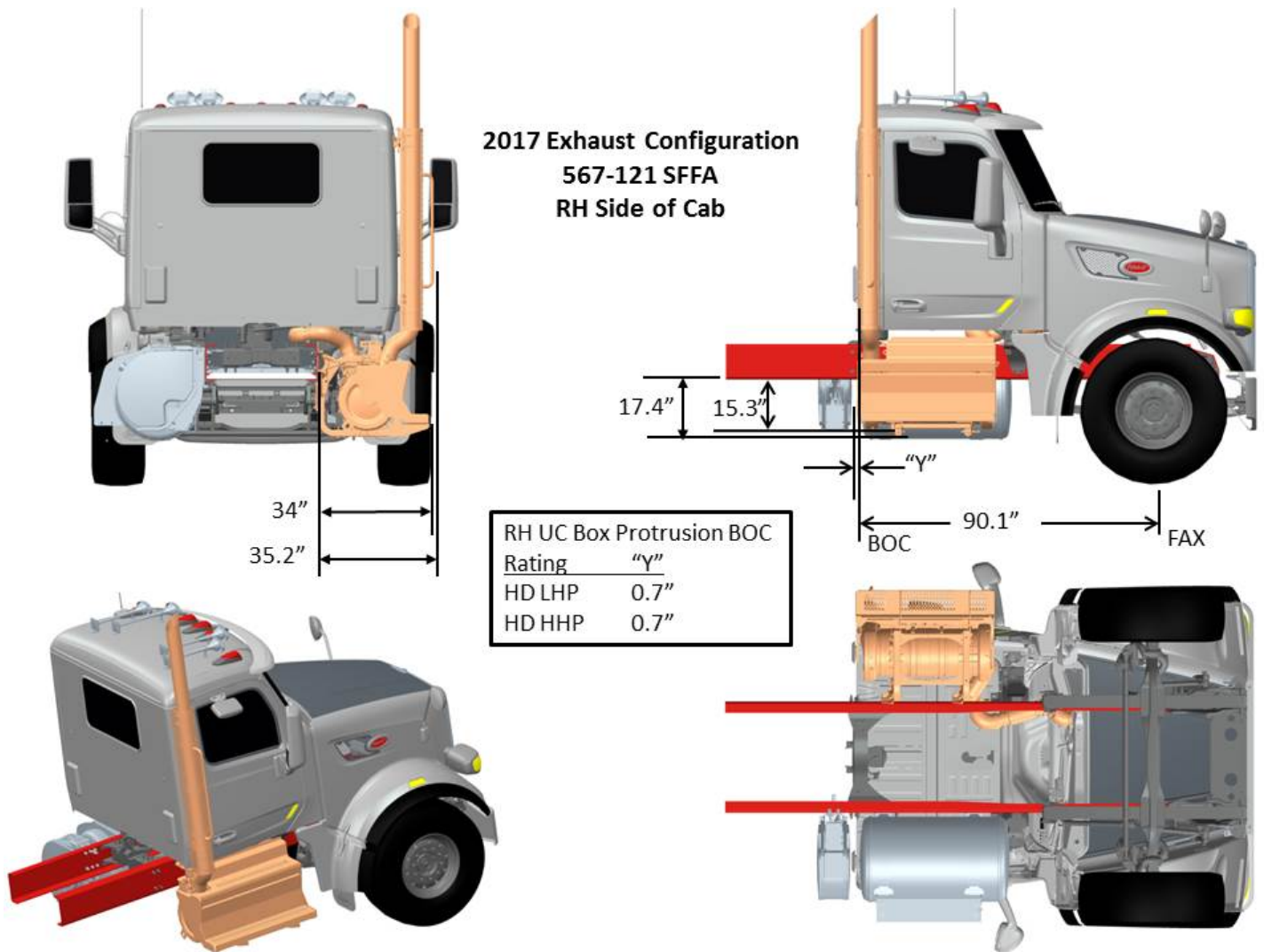


FIGURE 3-92. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 567-121 SFFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

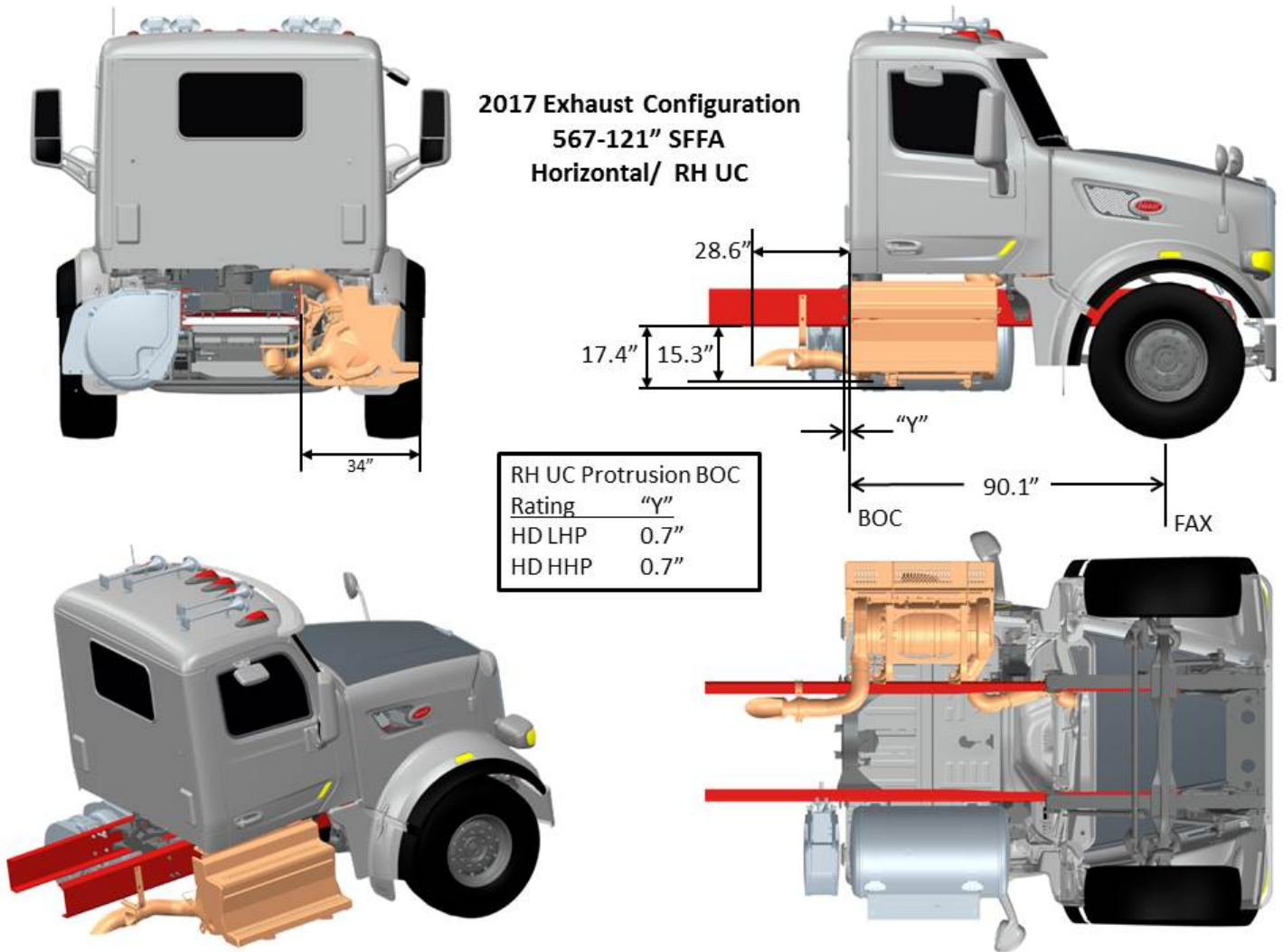


FIGURE 3-93. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 567-121 SFFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

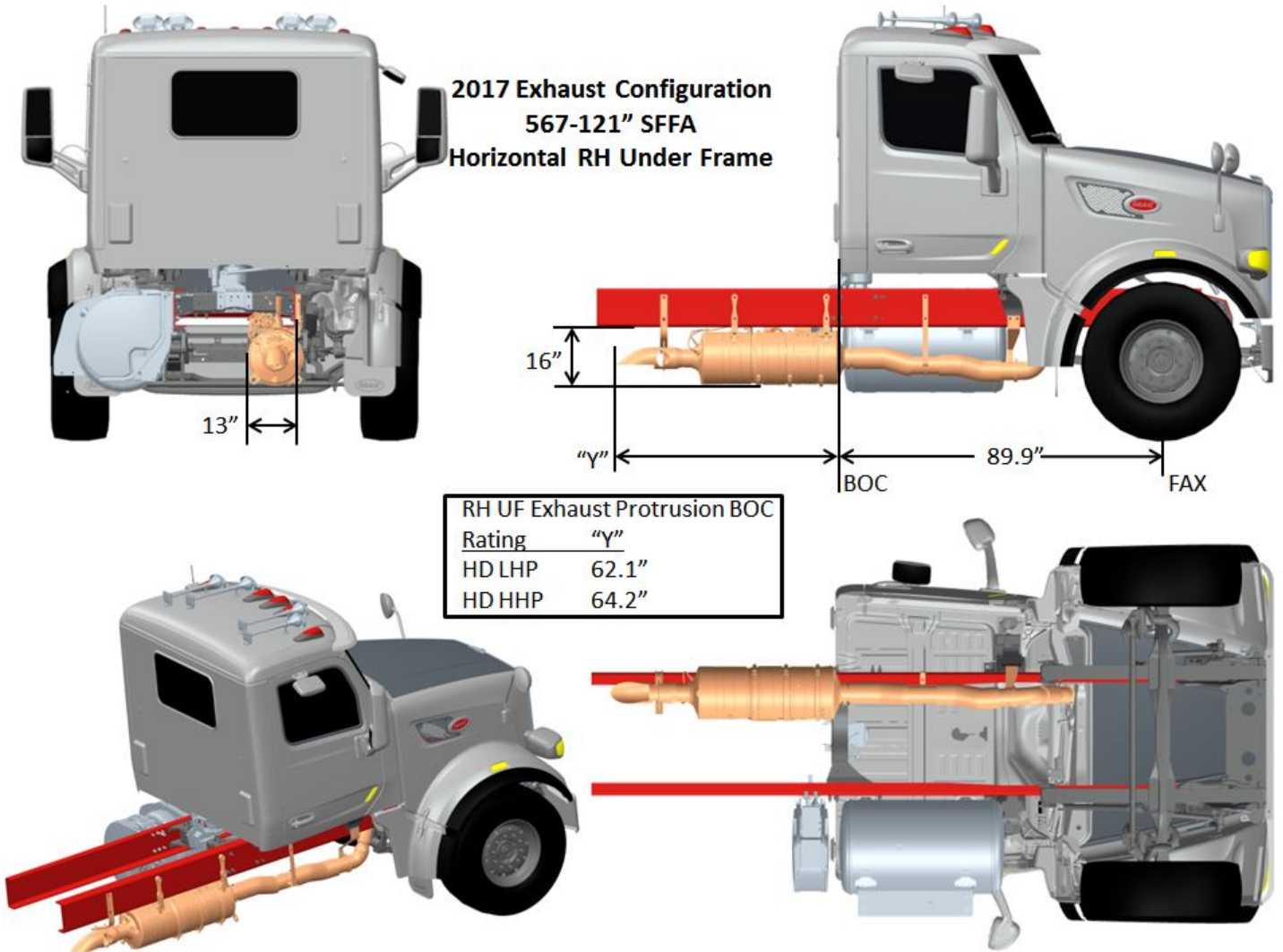


FIGURE 3-94. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

**MODEL 567-121 SFFA EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365340)

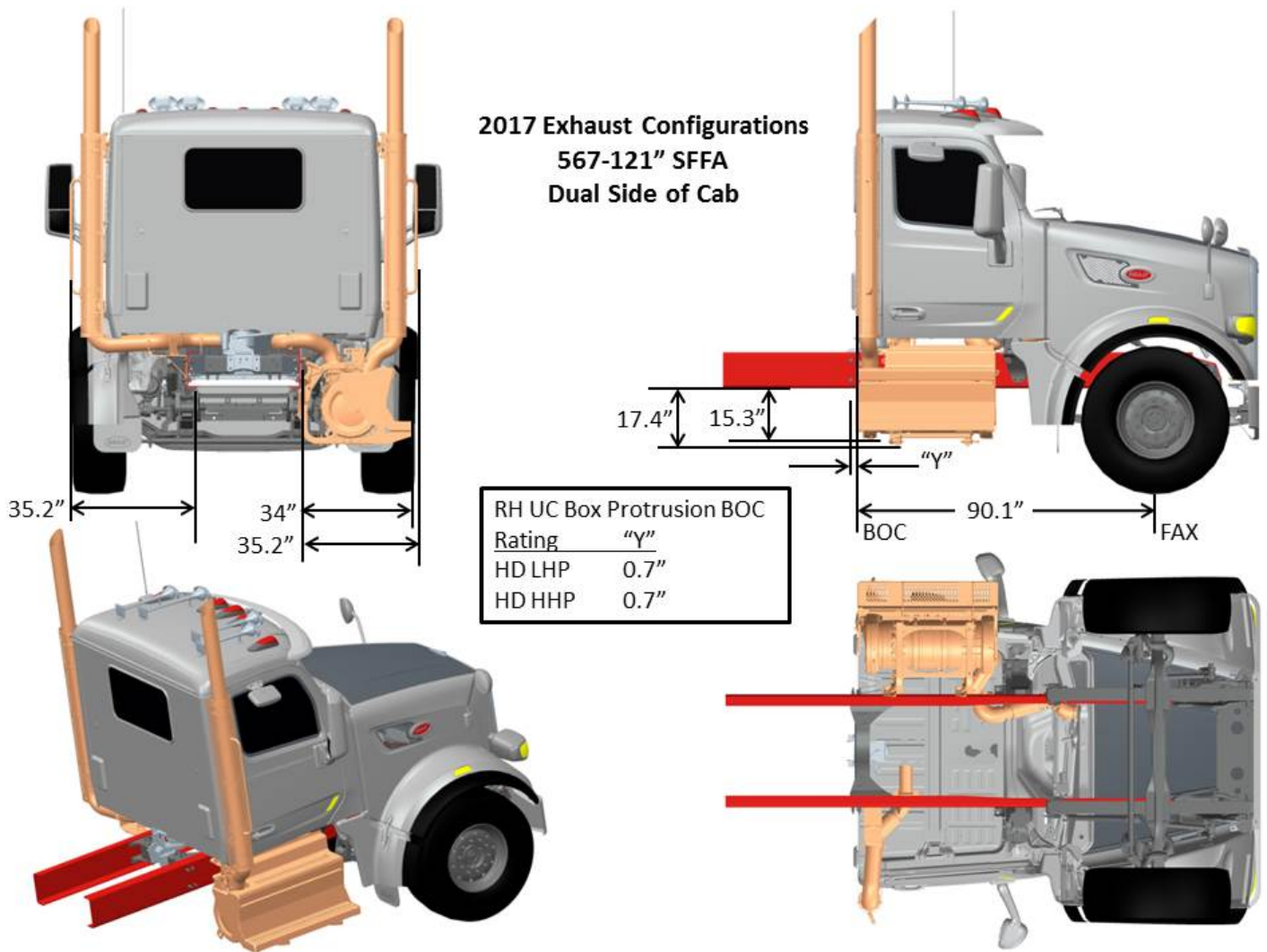


FIGURE 3-95. Exhaust Dual SOC DPF/SCR RH Under Cab

MODEL 579-117 SBFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS
 (Reference option code 3365250)

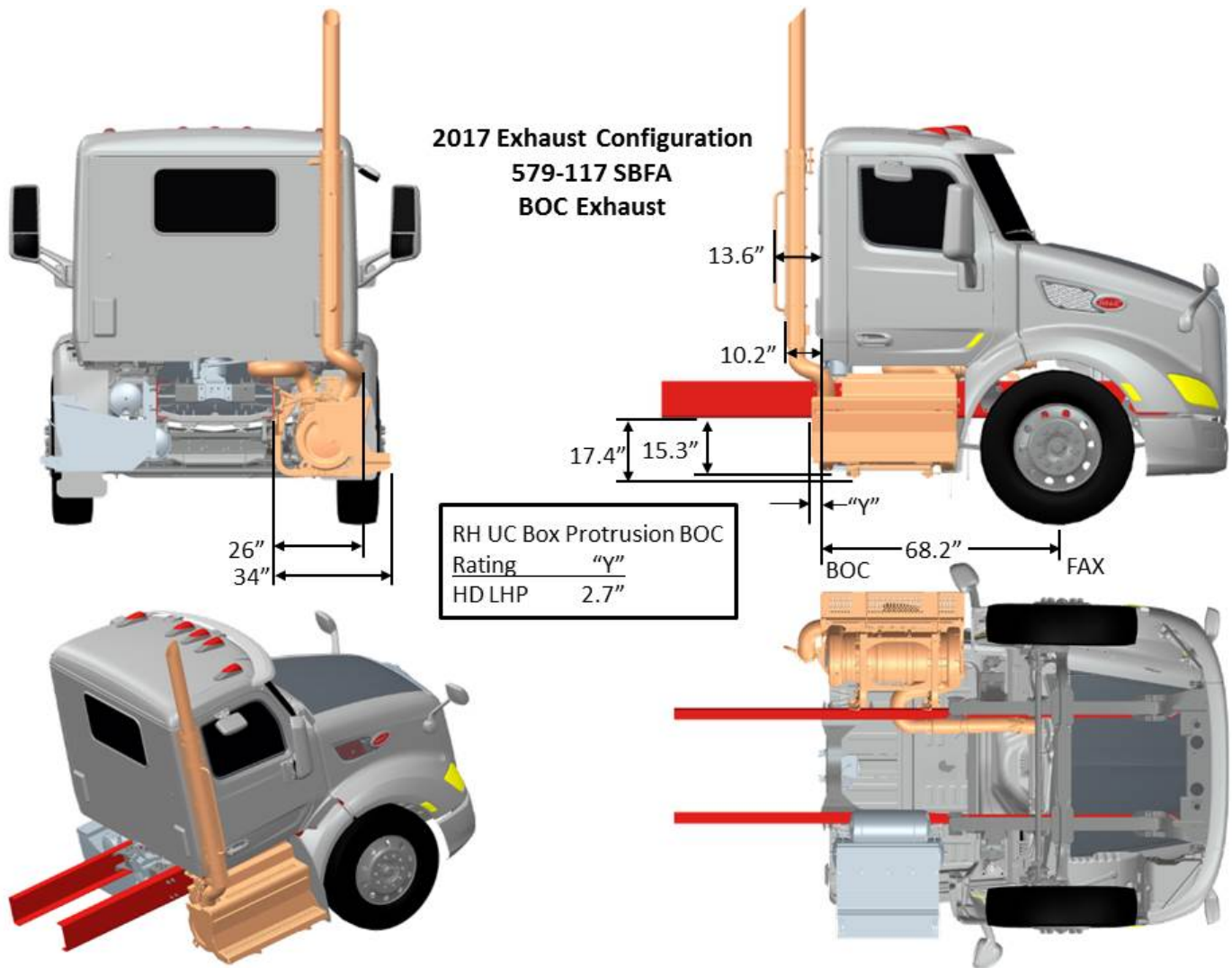


FIGURE 3-96. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 579-117 SBFA EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

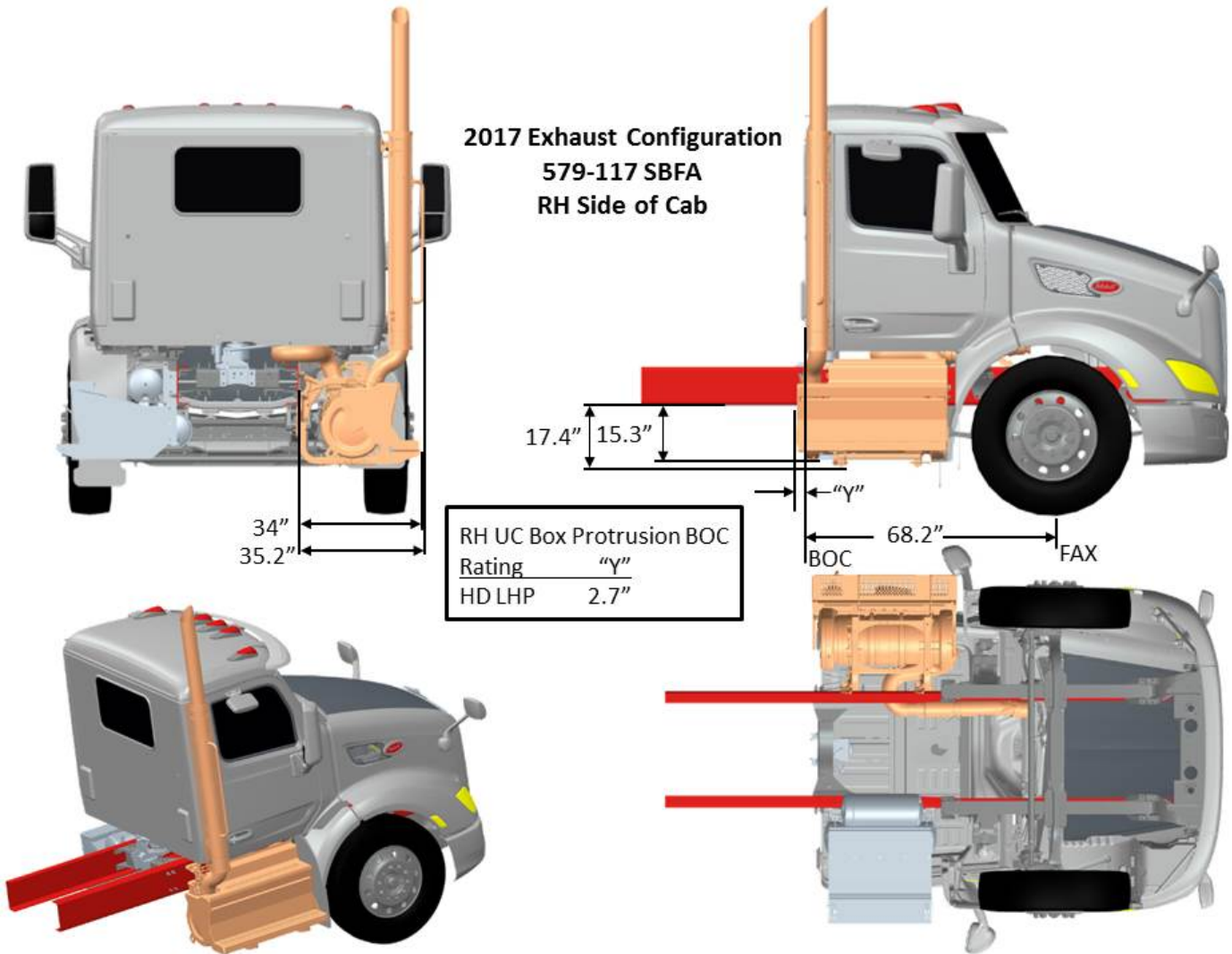


FIGURE 3-97. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 579-117 SBFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

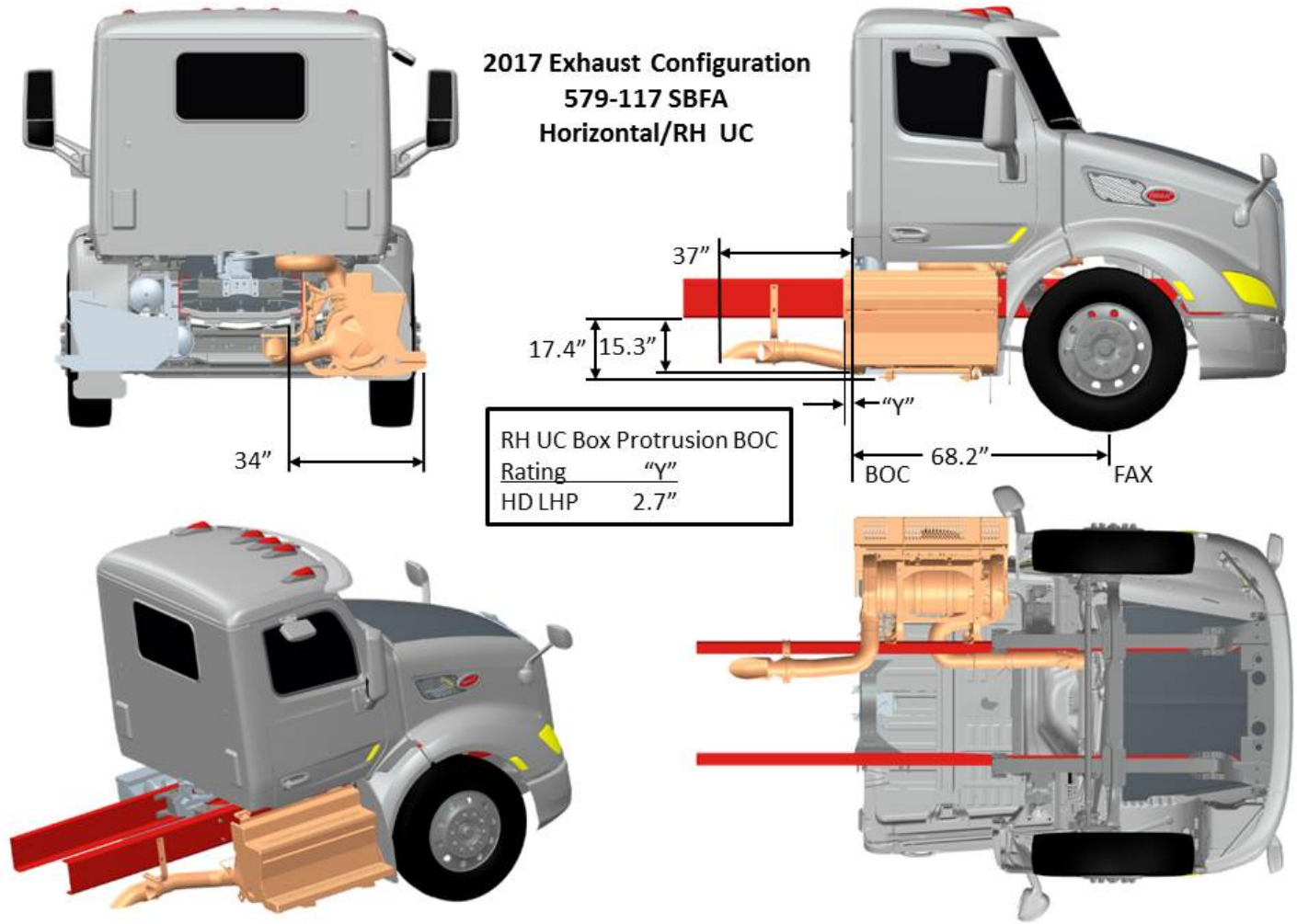


FIGURE 3-98. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 579-117 SBFA EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

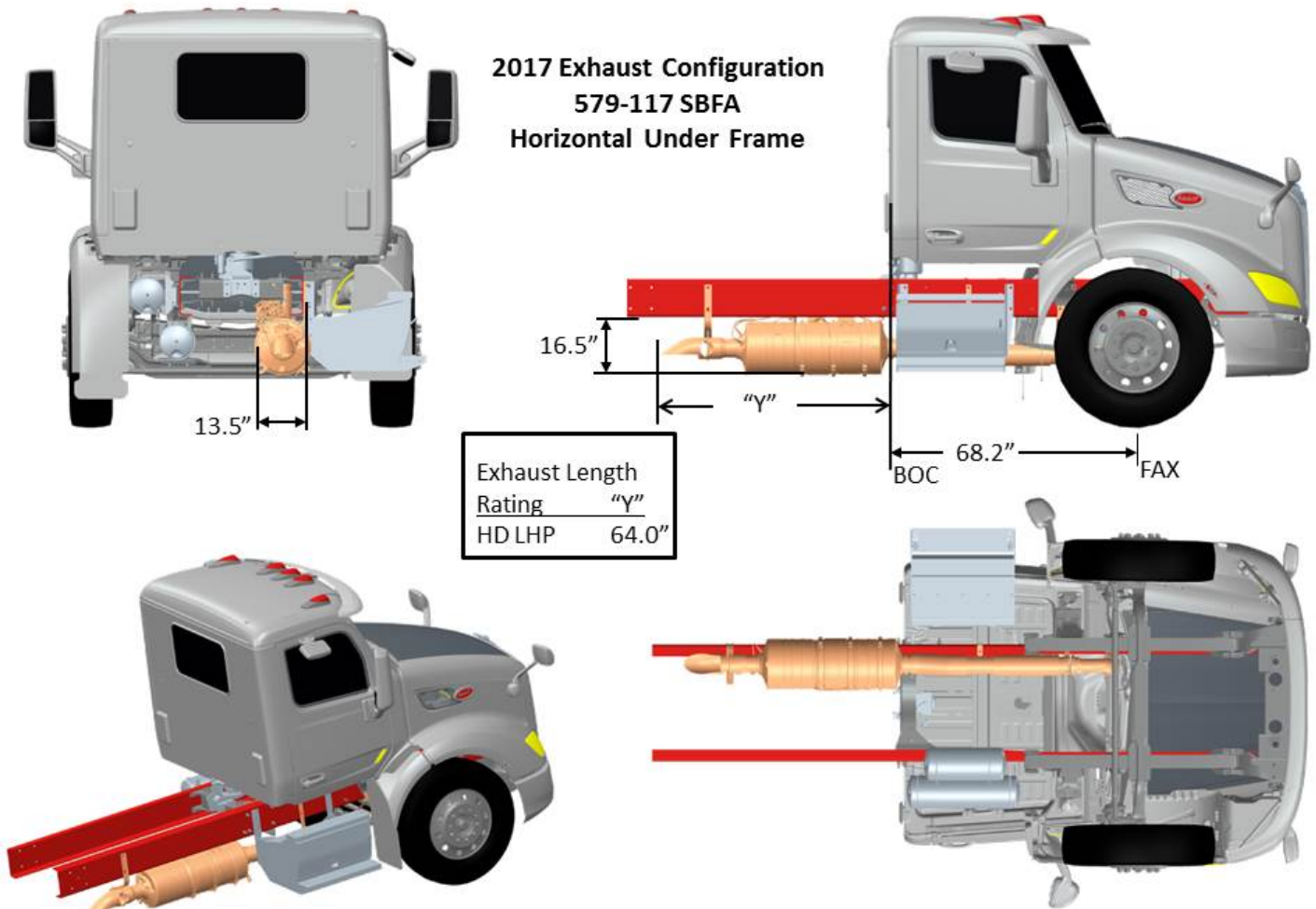


FIGURE 3-99. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

**MODEL 579-117 SBFA EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365340)

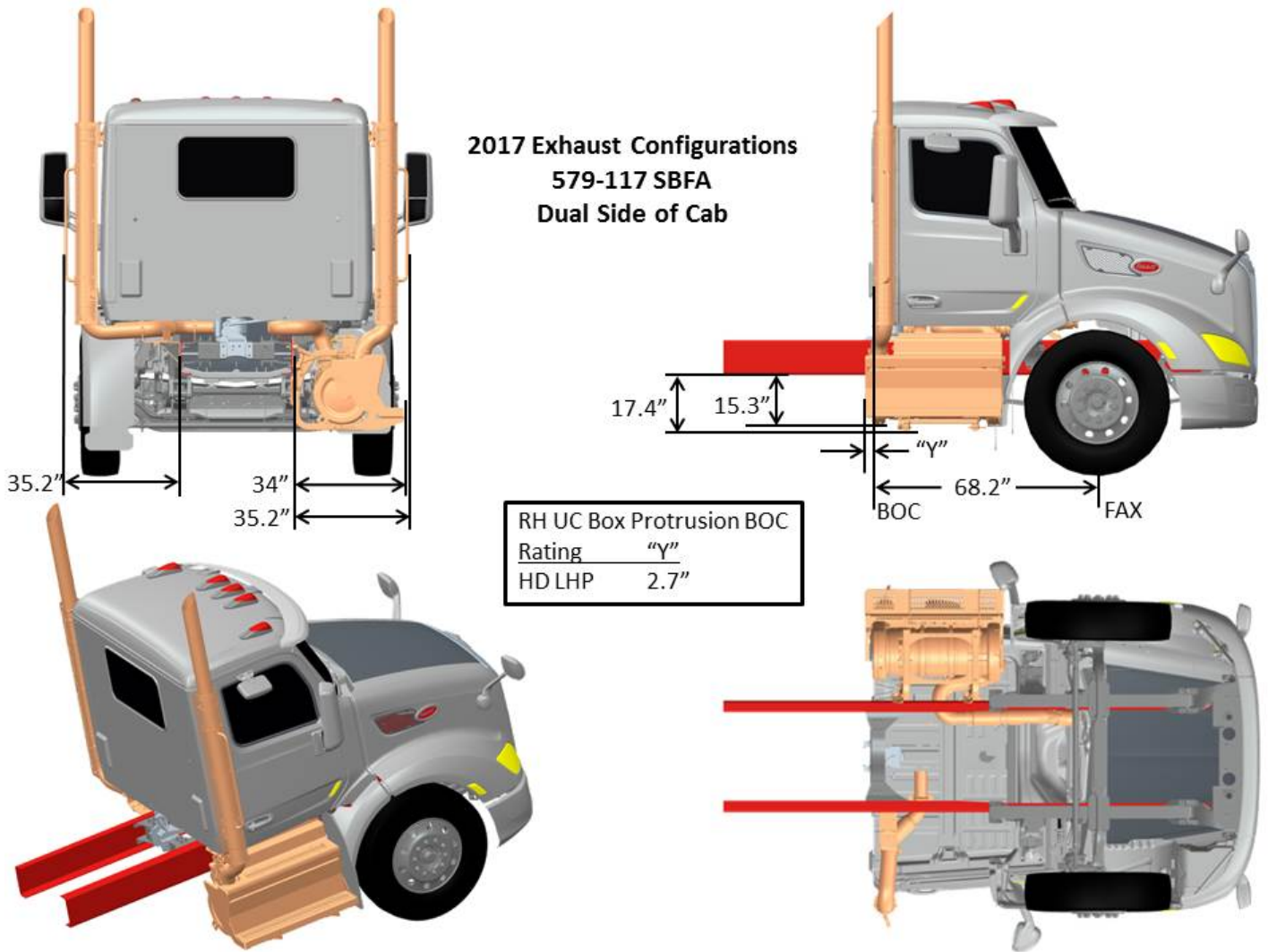


FIGURE 3-100. Exhaust Dual SOC DPF/SCR RH Under Cab

**MODEL 579-123 SBFA EXHAUST SINGLE RH BACK OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365250)

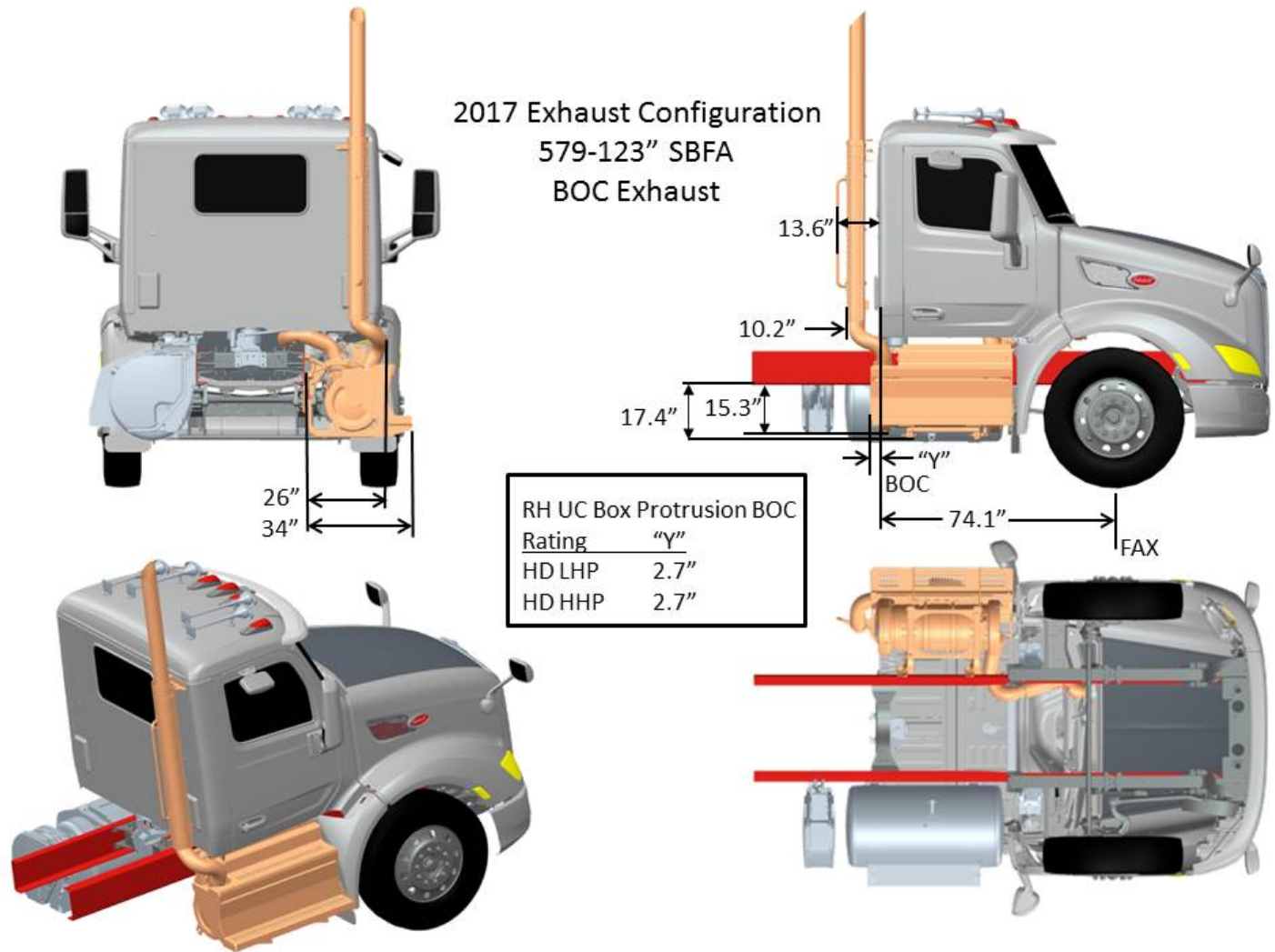


FIGURE 3-101. Exhaust Single RH Back of Cab DPF/SCR RH Under Cab

**MODEL 579-123 EXHAUST SINGLE RH SIDE OF CAB DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365270)

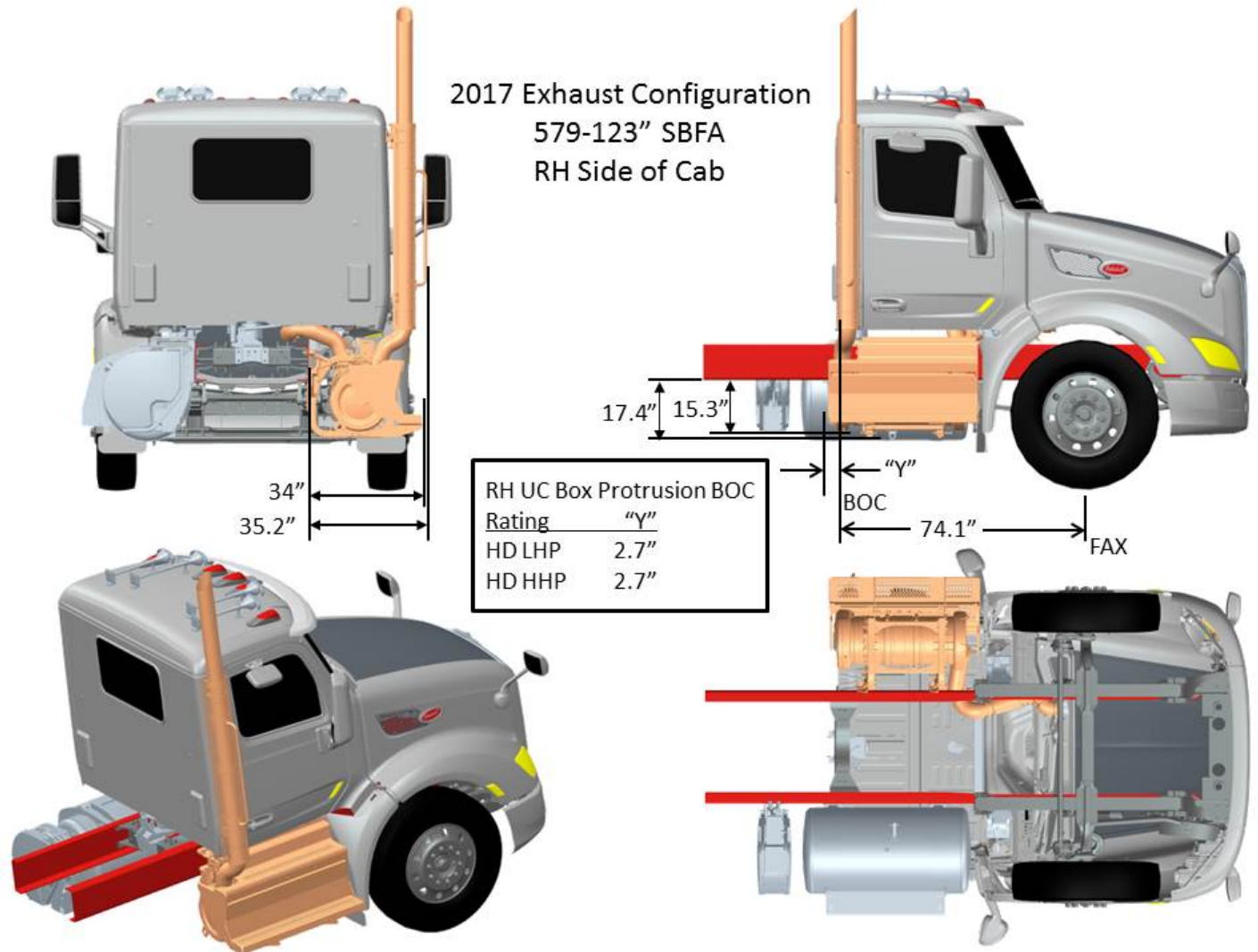


FIGURE 3-102. Exhaust Single RH Side of Cab DPF/SCR RH Under Cab

**MODEL 579-123 EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER CAB
2017 EMISSIONS**
(Reference option code 3365280)

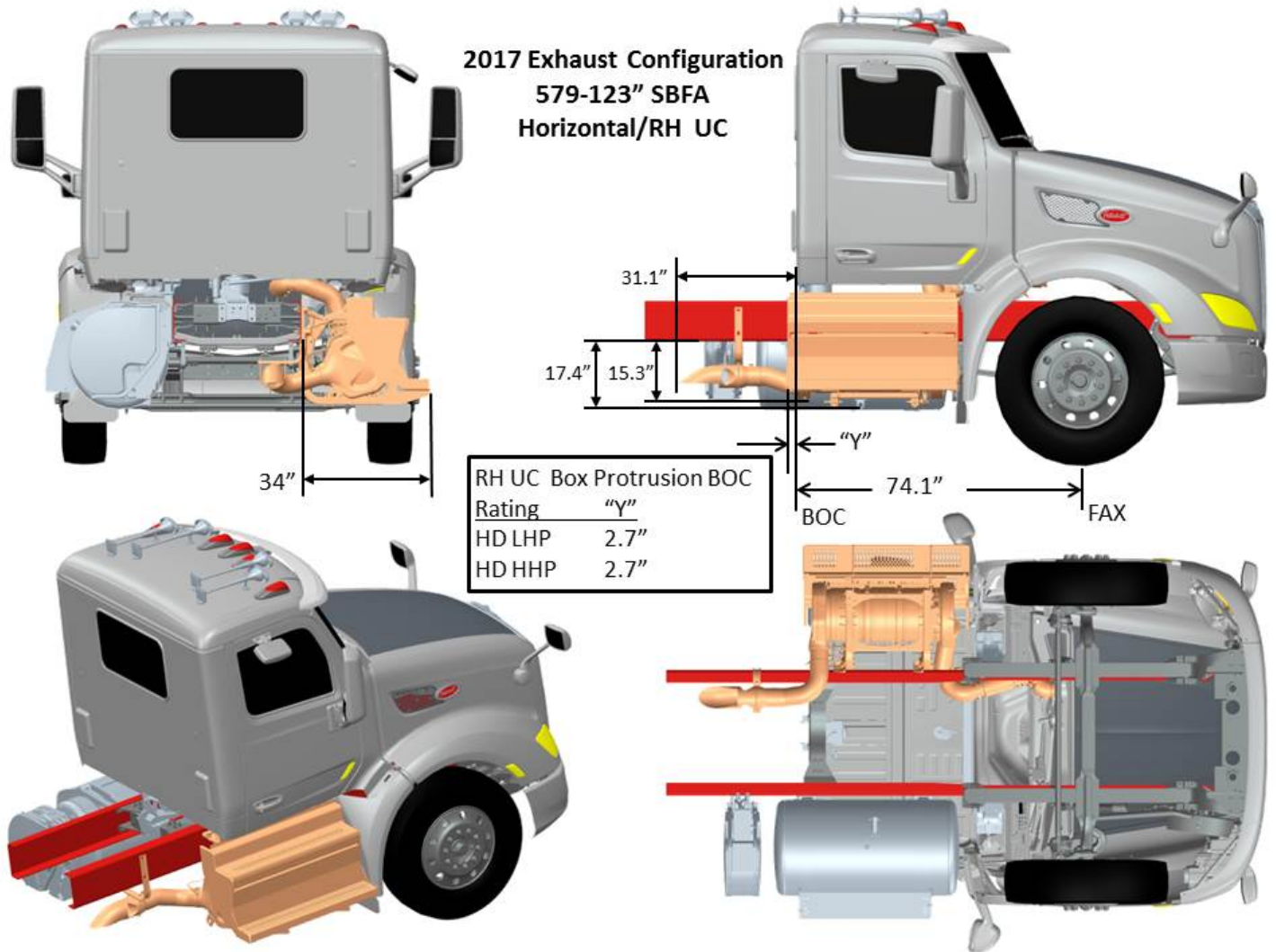


FIGURE 3-103. Exhaust Single RH Horizontal DPF/SCR RH Under Cab

**MODEL 579-123 EXHAUST SINGLE RH HORIZONTAL DPF/SCR RH UNDER FRAME
2017 EMISSIONS**
(Reference option code 3365290)

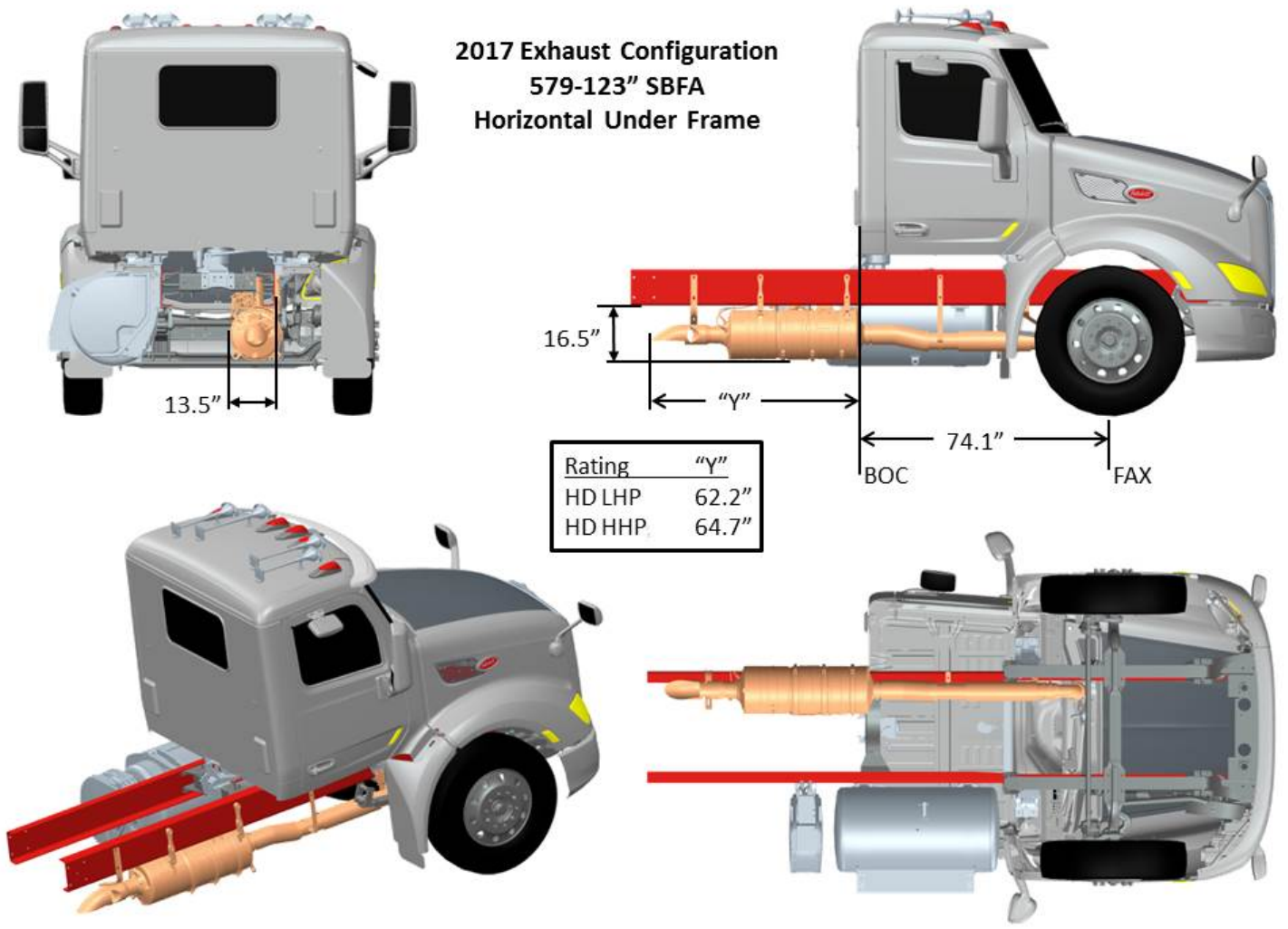


FIGURE 3-104. Exhaust Single RH Horizontal DPF/SCR RH Under Frame

MODEL 579-123 EXHAUST DUAL SOC DPF/SCR RH UNDER CAB
2017 EMISSIONS
 (Reference option code 3365340)

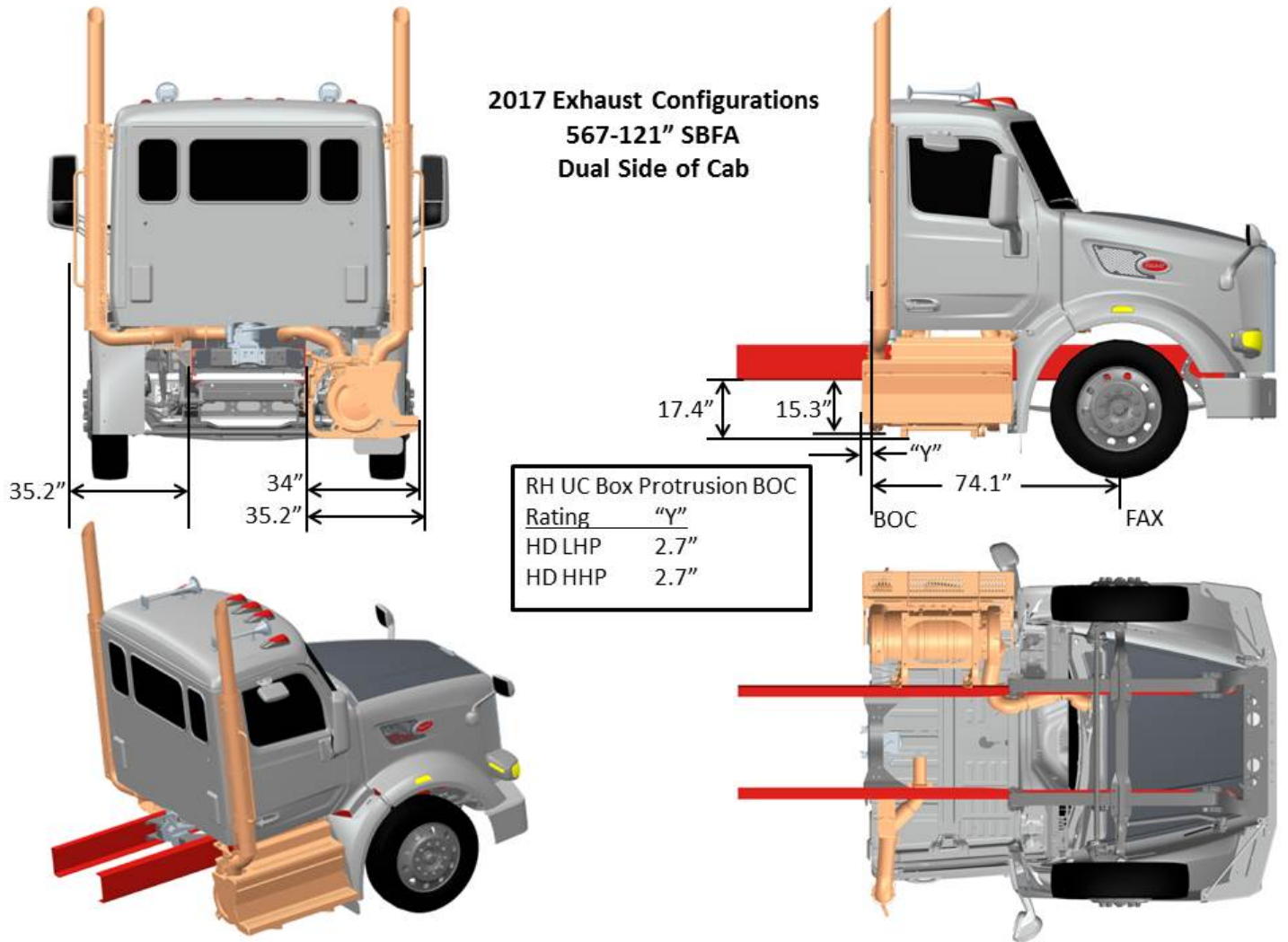


FIGURE 3-105. Exhaust Dual SOC DPF/SCR RH Under Cab

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.)
10 5/8	3.45	0.313	14.8	1,776,000	1.44
10 3/4	3.50	0.375	17.8	2,136,000	1.74
10 11/16	3.50	0.500	22.35	2,683,000	2.35
11 5/8	3.875	0.375	21.4	2,568,000	1.91
13 3/8 ⁽¹⁾	3.625	0.375	18.2 25.1	2,184,000 3,012,000	1.78 2.05

⁽¹⁾The 13 3/8 rail has a front rail height of 10 3/4. The front rail height values are listed on top of the 13 3/8 values.

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
11 5/8	10.75 x 3.50 x .375	None	37.7	4,524,000	3.65

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**.

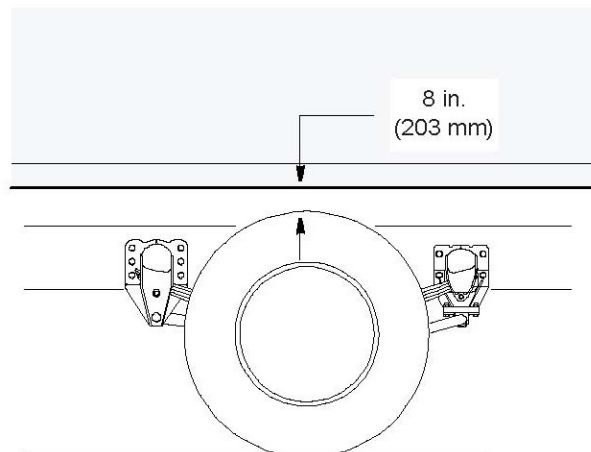


FIGURE 4-1. Minimum Clearance Between Top of Rear Tires and Body Structure Overhang



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.*

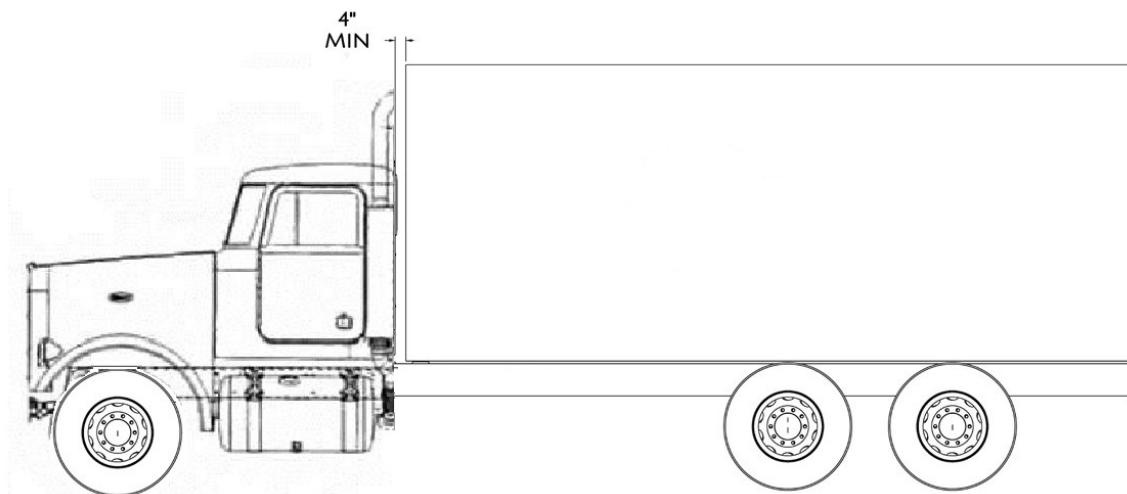


FIGURE 4-2. Minimum Back of Cab Clearance

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**.

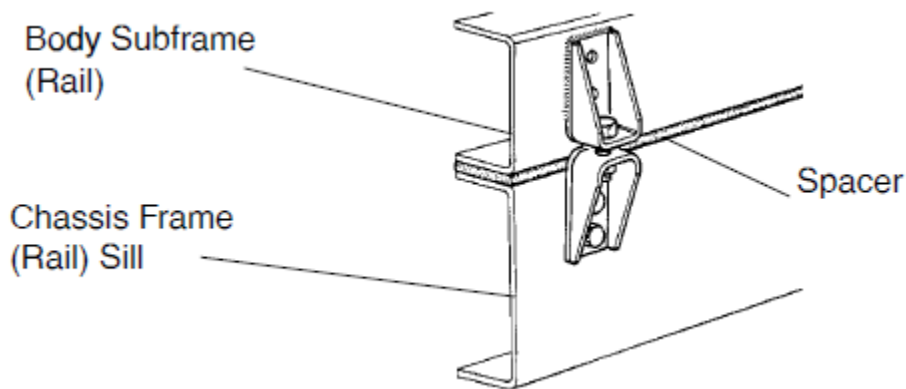


FIGURE 4-3. Spacer Between Frame Sill and Body Rail – Rubber or Plastic

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.

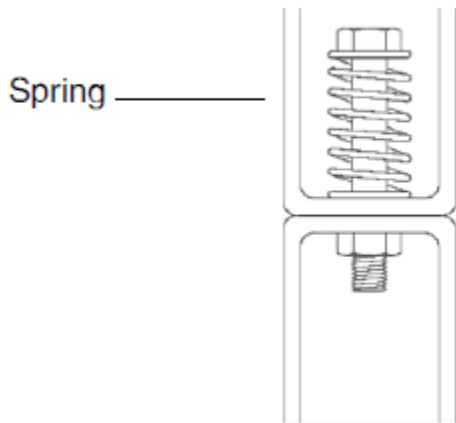


FIGURE 4-4. Mounting Brackets

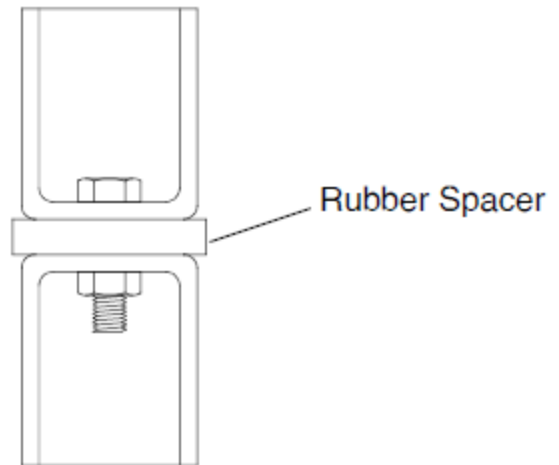


FIGURE 4-5. Mounting Brackets

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**.

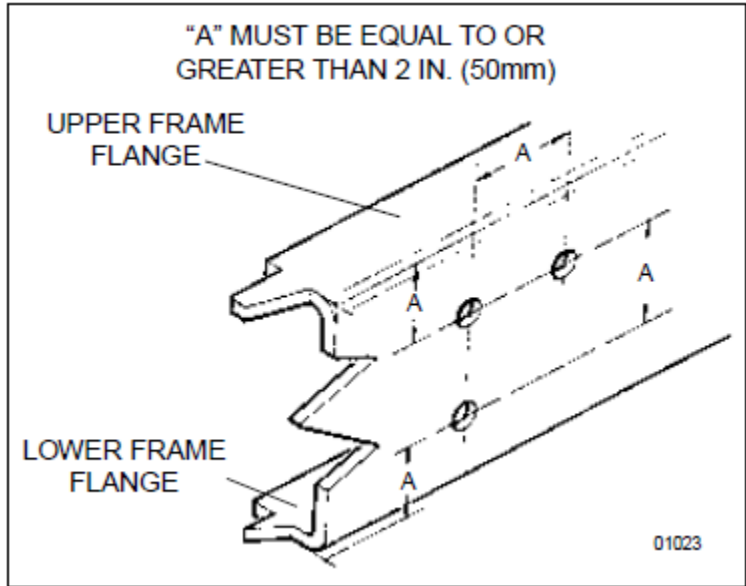


FIGURE 4-6. Hole Location Guidelines for Frame Rail and Bracket

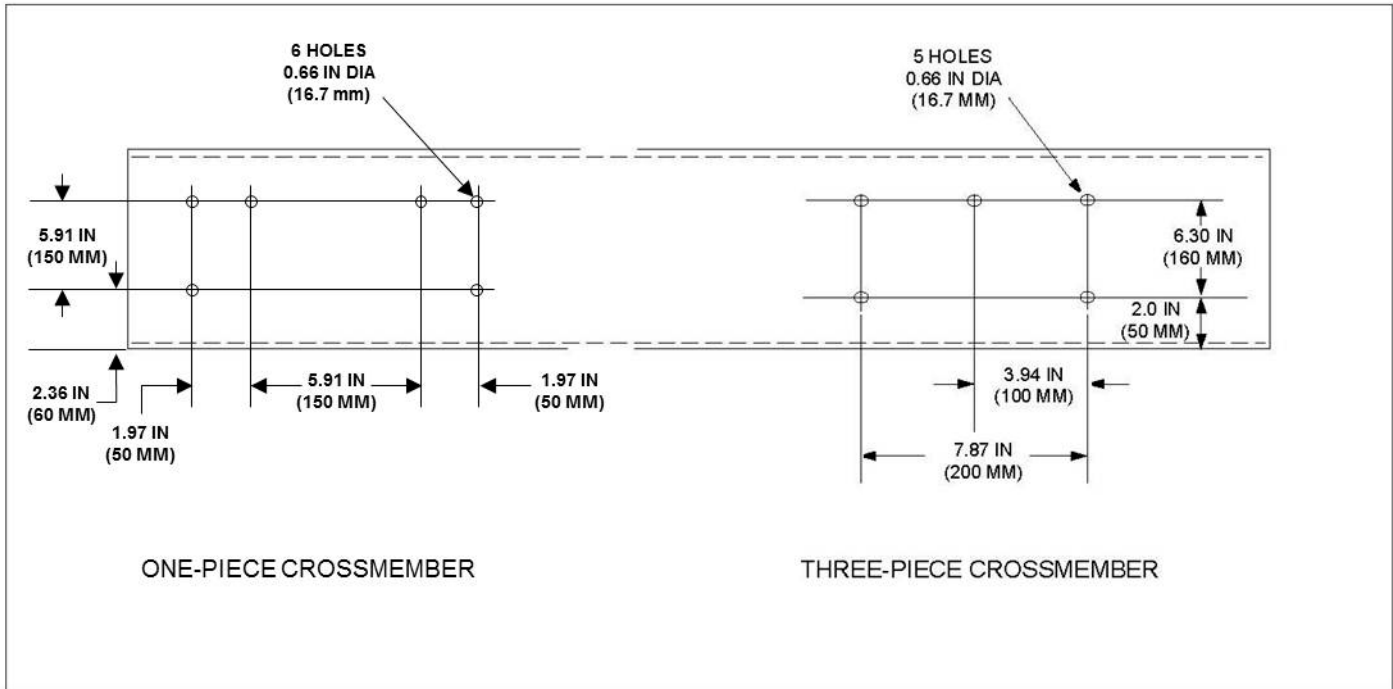


FIGURE 4-7. Crossmember Gusset Hole Patterns (Additional Holes Available in 50 mm Horizontal Increments)

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.

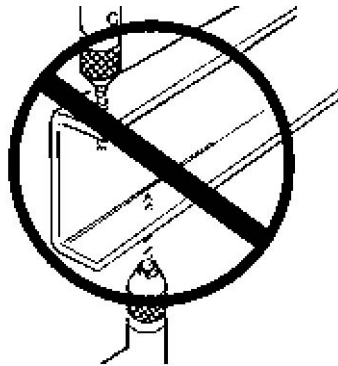


FIGURE 4-8. Frame Rail Flange Drilling Prohibited



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**.

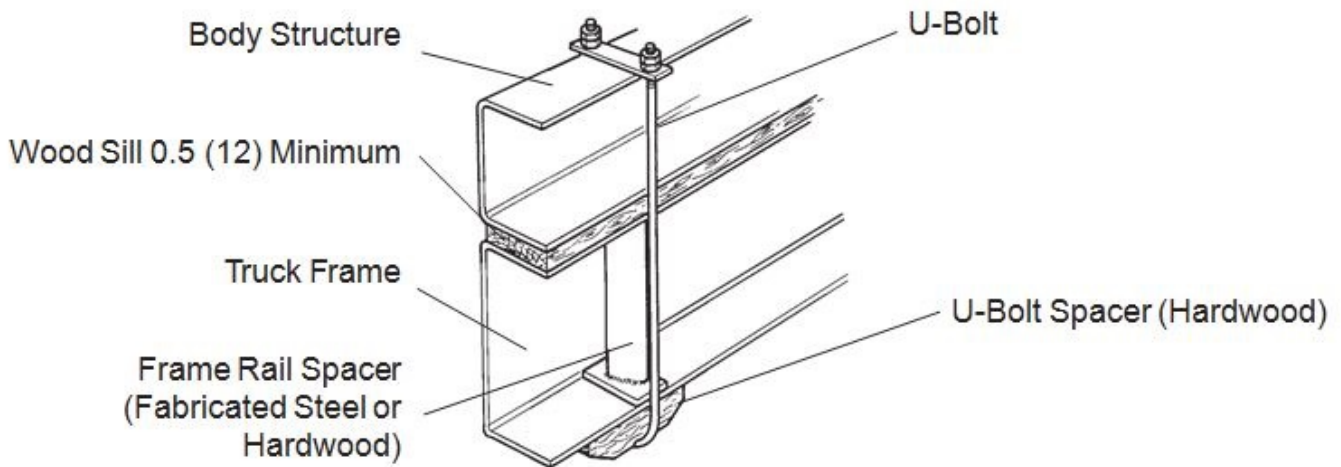


FIGURE 4-9. Acceptable U-Bolt Mounting with Wood and Fabricated Spacers



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**.

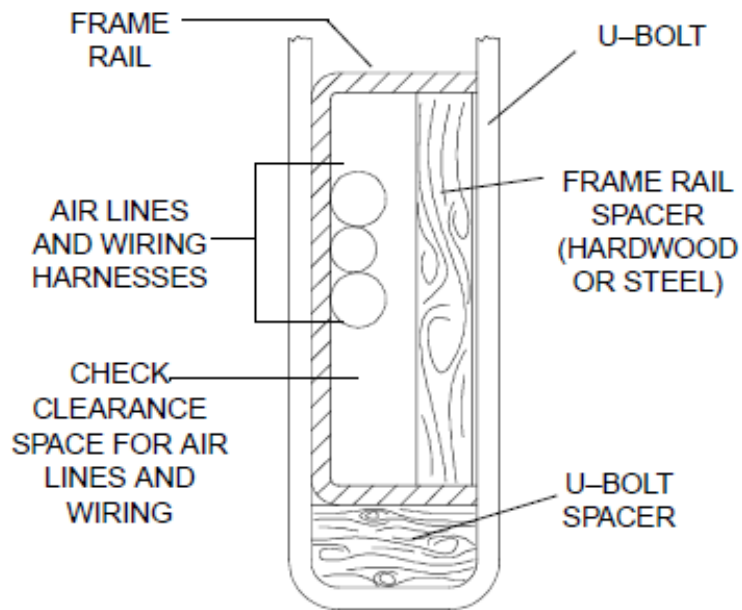
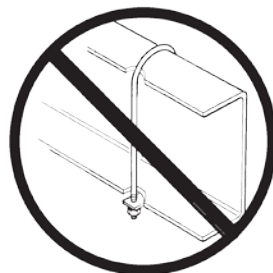


FIGURE 4-10. Clearance Space for Air Lines and Cables



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 4-7**.

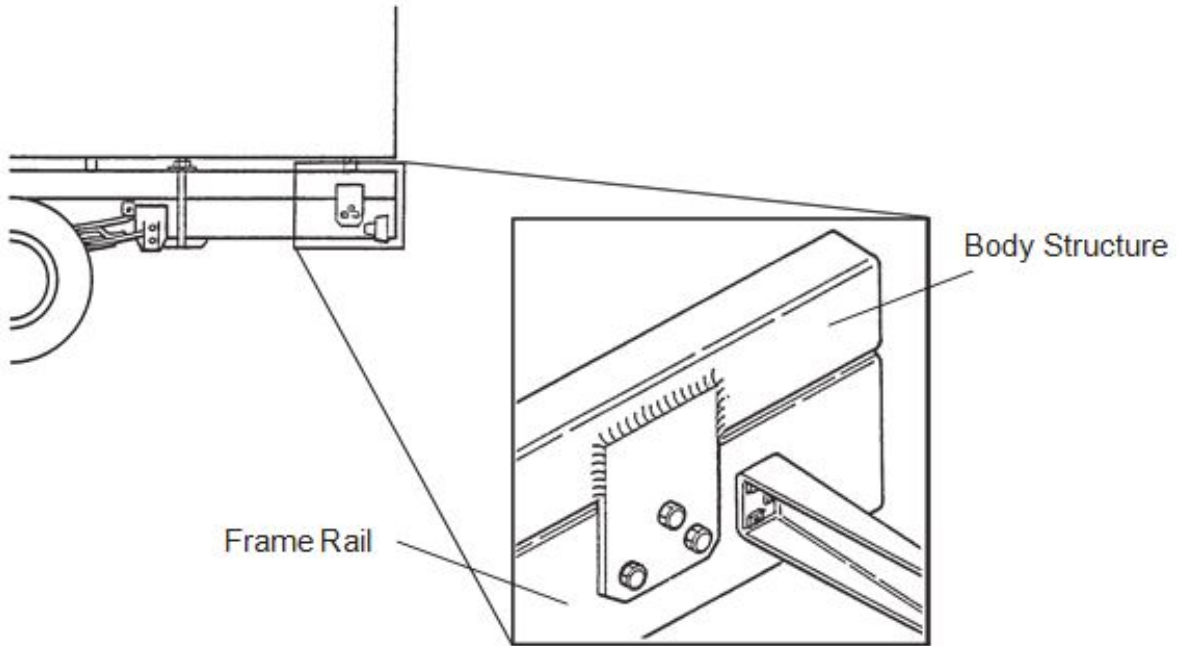


FIGURE 4-11. Fishplate Bracket at Rear End of Body

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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.

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**.

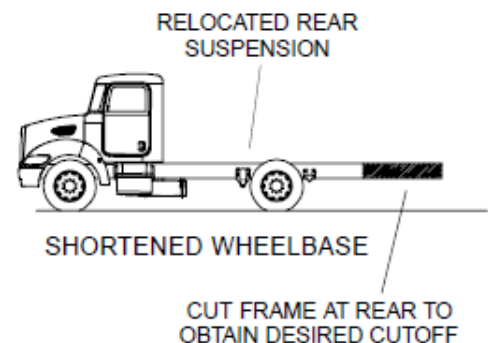
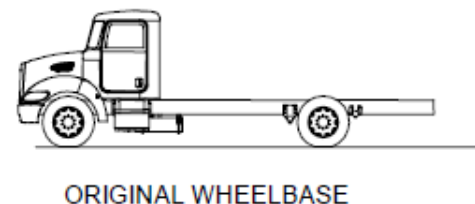
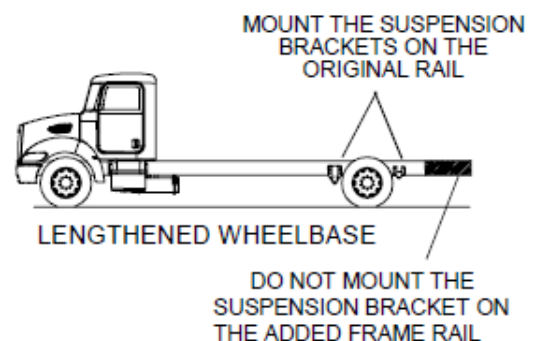


FIGURE 5-1. Wheelbase Customization

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.

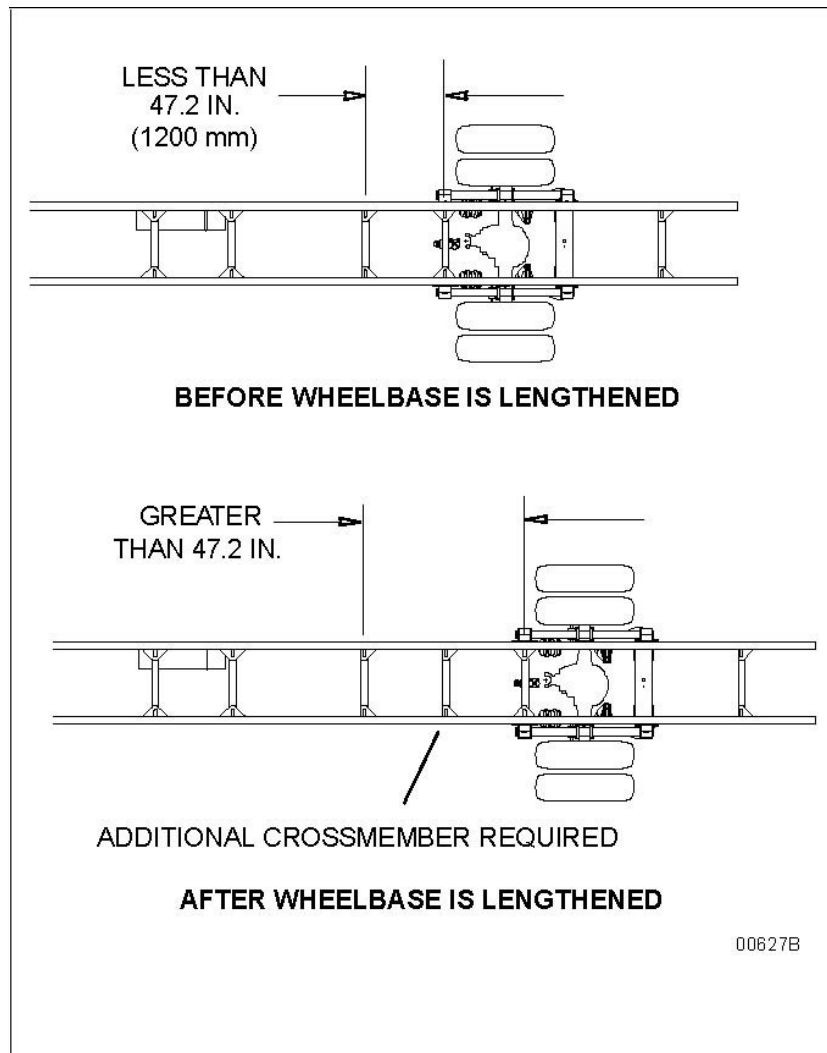


FIGURE 5-2. Crossmember Spacing Requirements

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 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 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.

SECTION 6 ELECTRICAL 389 FAMILY

CONTROL UNIT IDENTIFICATION

This manual provides service information covering models equipped with the multiplexed instrumentation system. Before attempting to make service repairs, the technician should be knowledgeable about the system design, components, operation and troubleshooting procedures for diagnosing instrumentation problems.

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

When used in conjunction with the Electronic Service Analyst (ESA) diagnostic software tool, the technician can review fault codes stored in the ICU/CECU, verify whether the instrumentation is working properly and diagnose the root cause of the problem more easily.

FUNCTIONAL DESCRIPTION-INSTRUMENTATION CONTROL UNIT CAB ELECTRONIC CONTROL UNIT (ICU/CECU)

The heart of the multiplexed instrumentation system is the ICU/CECU. The ICU/CECU is located behind the radio at the center of the dash. See **FIGURE 6-1**.

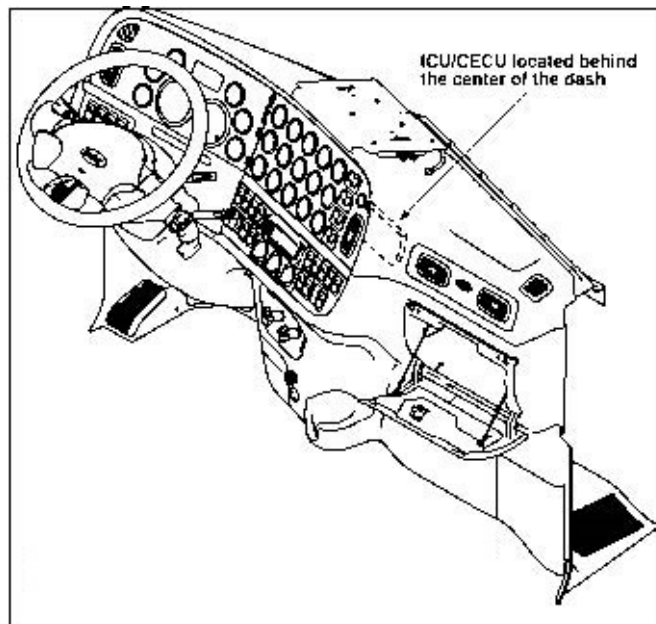


FIGURE 6-1. Instrument Control Unit and Electronic Control Unit (ICU/ECU)

This manual provides service information covering trucks equipped with the multiplexed instrumentation system. Before attempting to make service repairs, the technician should be knowledgeable about the system design, components, operation and troubleshooting procedures for diagnosing multiplexed instrumentation problems.

ELECTRONIC SERVICE AGENT (ESA)

Introduced in 2005, the Electronic Service Analyst (ESA) is the diagnostic software tool that is used to simplify the troubleshooting of the new multiplexed instrumentation.

Early multiplexing in Peterbilt trucks was for the instrumentation system only. The module was known as the Instrumentation Control Unit (ICU).

Now, as multiplexing from this control module is being used for systems other than just the instrumentation, the module has been renamed the Cab Electronic Control Unit (CECU).

The CECU is an updated ICU. It is still located behind the center console, but now includes a few more circuits to incorporate the new features. ESA 2.0 is the tool for both.

Identifying which control module is in the vehicle helps determine what features are present and also aids in troubleshooting.

MODELS–BUILD DATES IDENTIFICATION

TABLE 6-1. Control Module

Control Module	Models	Production Build Dates
ICU	357, 378, 379, 385, 386	Vehicles built with new conventional interiors from April 2005 to January 2007
CECU	365, 367, 384, 386, 387, 388, 389, 567, 579, 587	Vehicles built with EPA compliant engines beginning January 2007

IDENTIFICATIONS

Control module identification can be made using a few methods:

- Searching using the Electronic Catalog (ECAT)
- Connecting using the Electronic Service Analyst (ESA) 2.0
- Dome light function

ECAT Identification

Using ECAT or ESA 2.0 are the easiest and most exact ways of determining the type of control module in the truck.

ECAT provides a parts list “as built” and Bill of Materials in formation for each specific truck. The catalog is searchable, and contains the part number and identification of the truck’s instrument panel control module.

- ICU Part Number Q21-1029-X-XXX
- CECU Part Number Q21-1055-X-XXX

ESA Identification

Connecting using ESA 2.0 brings up a control module information window. In this window, the fourth line item is the Control Unit Type and identifies whether the truck has an ICU or CECU.



FIGURE 6-2. ESA Identification, Programming Date and Module Software Version

Dome Light Identification

The CECU system has an updated feature that delays turning the dome light off when you close the door. The previous ICU system did not have this function so the light turns off as soon as the door is shut. Therefore, if the dome light does not turn off immediately after all doors are shut, then the vehicle has a CECU system. If the dome light does turn off immediately, then the vehicle may be ICU OR CECU with this function disabled. In these cases, you will need to refer to ECAT for verification.

Comparison Chart

The following charts show the differences between the ICU and CECU.

The first chart provides an alphabetical listing of the features available for either an ICU or CECU. Since the CECU is an updated ICU, almost all of the features of an ICU are found in a CECU, except a few out dated options such as the pyrometer.

The similarity of the modules is easily seen in the second chart as well. This chart is an abbreviated connector pinout of each module. Since the same wiring connections are used for both modules, it's easy to see that the CECU has more circuits to handle the increase in multiplexed features.

TABLE 6-2. Dome Light Identification

Supported Features	ICU	CECU
Air filter restriction	x	x
Air pressure transducer	x	x
Ammeter	x	x
Axle temperature 1	x	x
Axle temperature 2	x	x
Axle temperature 3	x	x
Backlighting -auxiliary	x	x
Brakesaver oil temperature	x	
Cab dome lamp		x
Check engine telltale	x	x
Clutch switch		x
Courtesy lights - left door	x	x
Courtesy lights -right door		x
Cruise control		x
CVSG data/power	x	x
Dash buzzer	x	x
Dash/panel illumination	x	x
Dimmer input	x	x
Dome lamp		x
Editable telltale 1, position 4	x	x
Editable telltale 2, position 7	x	x
Editable telltale 3, position 8	x	x
Editable telltale 4, position 9	x	x
Editable telltale 5, position 10	x	
Editable telltale 6, position 12	x	x
Editable telltale 7, position 13	x	
Editable telltale 8, position 14	x	x
Editable telltale 9, position 16	x	x
Engine fan override		x
Fifth wheel lock telltale	x	x
Fuel filter restriction	x	x
Fuel level sensor 1	x	x
Fuel level sensor 2	x	x
General oil temperature	x	x
Hazard	x	x
Headlamps active		x
High beam active	x	x
I-CAN high	x	x
I-CAN low	x	x
Idle timer relay		x
Interaxle lock telltale	x	x
K-line	x	x
Left turn	x	x
Message display		x
Outside air temperature	x	x
Park brake active	x	x
Power -accessory	x	x
Power -battery	x	x
Power -ignition	x	x
Power supply +5V sensors	x	x
Pyrometer	x	

Supported Features	ICU	CECU
Regeneration switch enable		x
Retarder select		x
Right turn	x	x
Seat belt telltale		x
Spare analog input 2R		x
Spare analog input 3V		x
Spare digital input 1H		x
Spare digital input 1L		x
Stop engine telltale	x	x
Tail & park lamps active	x	x
Tractor ABS telltale	x	x
Trailer ABS telltale	x	x
Transfer case oil temp	x	x
Transmission oil temp -aux	x	x
Transmission oil temp - main	x	x
V-CAN high	x	x
V-CAN low	x	x

Con nector	Pin Number	Circuit Function	ICU	CECU
A	1	CVSG power	x	x
	2	Power - battery	x	x
	3	Cab dome lamp		x
	4	Menu control switch power		x
	5	Ground	x	x
	6	Menu control switch ground		x
	7	Dash/panel illumination	x	x
	8	Auxiliary backlighting	x	x
	9	Power -battery		x
B	1	Menu control switch encode A		x
	2	Menu control switch encode B		x
	3	Menu control switch enter		x
	4	Courtesy lights - right door jamb switch		x
	5	Spare digital input 1H		x
	6	Dome lamp input		x
	7	Seat belt telltale		x
	8	Cruise set		x
	9	Cruise resume		x
	10	Spare digital input 1L		x
	11	Retarder select 1		x
	12	Retarder select 2		x
	13	Clutch switch		x
14	Headlamps active		x	
15	PTO set (future provision)		x	
16	PTO resume (future provision)		x	
17	Engine fan override		x	
18	Regen enable		x	
19	Spare digital input 3L (future prov)		x	
20	Spare digital input 4L (future prov)		x	
21	Spare digital input 5L (future prov)		x	
22	Spare digital input 2H (future prov)		x	

Con nector	Pin Number	Circuit Function	ICU	CECU	
C	1	Power supply +5V sensors	x	x	
	2	Analog return	x	x	
	3	PTO oil temp (future provision)		x	
	4	K-line	x	x	
	5	Dimmer input	x	x	
	6	Air pressure transducer - primary	x	x	
	7	Air pressure transducer - secondary	x	x	
	8	Air pressure transducer - application	x	x	
	9	Ammeter	x	x	
	10	Air filter restriction	x	x	
	11	Fuel filter restriction	x	x	
	12	Fuel level sensor 1	x	x	
	13	Fuel level sensor 2	x	x	
	14	CVSG data	x	x	
	15	CVSG return	x	x	
	16	Outside air temperature	x	x	
	17	Axle temperature 1	x	x	
	18	Axle temperature 2	x	x	
	19	Axle temperature 3	x	x	
	20	General oil temperature	x	x	
	21	Transmission oil temperature - main	x	x	
	22	Transmission oil temperature - aux	x	x	
	23	Pyrometer	x		
	24	Brakesaver oil temperature	x		
	25	Analog return	x	x	
	26	Transfer case oil temperature	x	x	
	27	Remote throttle signal (future provision)		x	
	28	Spare analog input 1V (future provision)		x	
	29	Spare analog input 2V (future provision)		x	
	30	Spare analog input 3V		x	
	31	Spare analog input 2R		x	
	32	Spare analog input 1R (future provision)		x	
	39	Spare relay output 8 (future provision)		x	
	D	1	Power - ignition	x	x
		2	Courtesy lights -left door jamb switch	x	x
		3	Power - accessory	x	x
		4	Hazard	x	x
		5	Tail & park lamps active	x	x
		6	High beam active	x	x
7		Park brake active	x	x	
8		Left turn	x	x	

Con nector	Pin Number	Circuit Function	IC U	CECU	
D (cont.)	9	Right turn	x	x	
	10	Cruise on/off		x	
	11	Interaxle lock telltale	x	x	
	12	Fifth wheel lock telltale	x	x	
	13	Tractor ABS telltale	x	x	
	14	Trailer ABS telltale	x	x	
	15	Check engine telltale	x	x	
	16	Stop engine telltale	x	x	
	17	Spare digital input 6L (future provision)		x	
	19	Editable telltale 1 - position 4	x	x	
	20	Editable telltale 2 - position 7	x	x	
	21	Editable telltale 3 - position 8	x	x	
	22	Editable telltale 4 - position 9	x	x	
	23	Editable telltale 5 - position 10	x		
	24	Editable telltale 6 - position 12	x	x	
	25	Editable telltale 7 - position 13	x		
	26	Editable telltale 8 - position 14	x	x	
	27	Editable telltale 9 - position 16	x	x	
	28	Dash buzzer 1A	x	x	
	29	Dash buzzer 1B	x	x	
	30	Dash buzzer 1C	x	x	
	31	Dash buzzer 2	x	x	
	32	M-CAN high (future provision)		x	
	33	M-CAN low (future provision)		x	
	34	I-CAN high	x	x	
	35	I-CAN low	x	x	
	37	V-CAN high	x	x	
	38	V-CAN low	x	x	
	E	1	Idle timer relay		x
		2	Spare relay output 1 (future provision)		x
		3	Spare relay output 2 (future provision)		x
		4	Spare relay output 3 (future provision)		x
		5	Ground		x
		6	Spare relay output 4 (future provision)		x
		7	Spare relay output 5 (future provision)		x
		8	Spare relay output 6 (future provision)		x
		9	Spare relay output 7 (future provision)		x

HOW MULTIPLEXED INSTRUMENTS WORK

Multiplexed gauges receive signals through the Instrumentation Control Unit/Cab Electronic Control Unit (ICU/CECU) located behind the center console. The ICU/CECU receives sensor signals either through the J1939 data bus or via conventional wiring sending signals from sensors that read actual pressures or temperatures. The ICU/CECU interprets this data and monitors or controls vehicle operation through the ICU/CECU software. The ICU/CECU then sends data to the gauges, warning lamps, audible alarms, and displays located inside the gauge clusters. The central instrument cluster (Figure 6-3) includes the speedometer (including odometer and trip meter) and tachometer (including engine hour meter and outside temperature display), plus pre-installed standard and/or editable warning light symbols called “telltale decals” mounted on the “Icon Tray.”

The Icon Tray slides into the bottom of the cluster. The standard Icon Tray covers most warning light requirements; editable icon lenses can be added for less common components that also require warning lights.

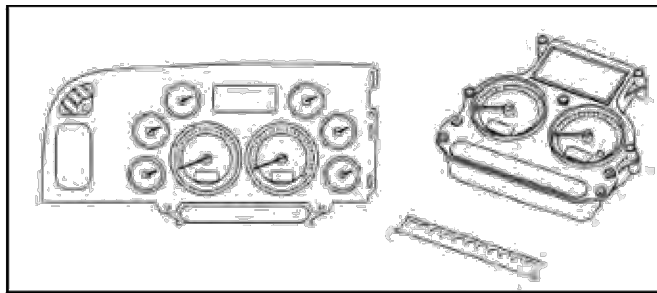


FIGURE 6-3. Central Instrument Cluster

INTRODUCTION

This section provides service information covering Peterbilt Conventional Models equipped with the multiplexed instrumentation system. Before attempting to make service repairs, the technician should be knowledgeable about the system design, components, operation and troubleshooting procedures for diagnosing instrumentation problems.

Vehicle component inputs are sent to the ICU/CECU through the J1939 data bus or conventional wiring. The ICU/CECU interprets the various inputs and monitors/controls the functions for each input through the ICU/CECU software. Output signals from the ICU/CECU provide data for the gauges, warning lamps, audible alarms, and displays inside the cluster. See Figure 6-5.

When used in conjunction with the Electronic Service Analyst (ESA) diagnostic software tool, the technician can review fault codes stored in the ICU/CECU, verify whether the instrumentation is working properly and diagnose the root cause of the problem more easily.

CENTRAL INSTRUMENT CLUSTER

The central instrument cluster includes:

- driver information display
- speedometer (including odometer and trip meter)
- tachometer (including engine hour meter and outside temperature display)
- pre-installed standard and/or editable warning light symbols called “telltale decals” mounted on the “Icon Tray.”

The Icon Tray slides into the bottom of the cluster. The standard Icon Tray covers most warning light requirements; editable icon lenses can be added for less common components that also require warning lights.

The Driver Information Display, located at the top of the instrument cluster, displays vehicle information and warnings through a constant monitoring of the vehicle systems. The various functions may be accessed by navigating through menu screens using the menu control switch (rotational knob).

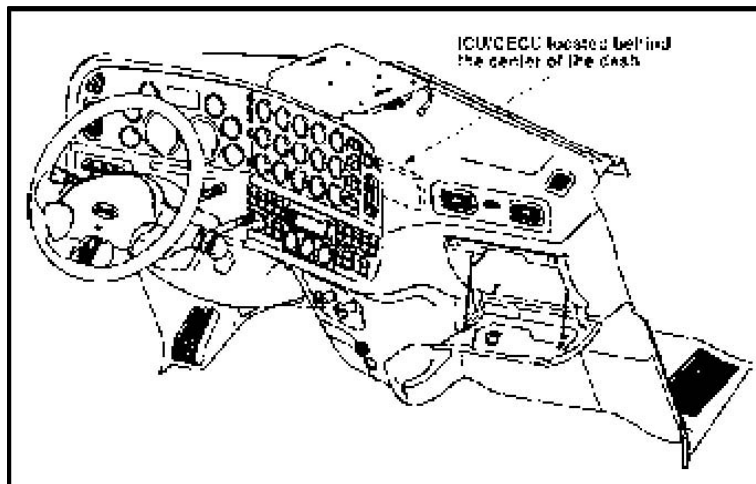


FIGURE 6-4. ICU/CECU Access

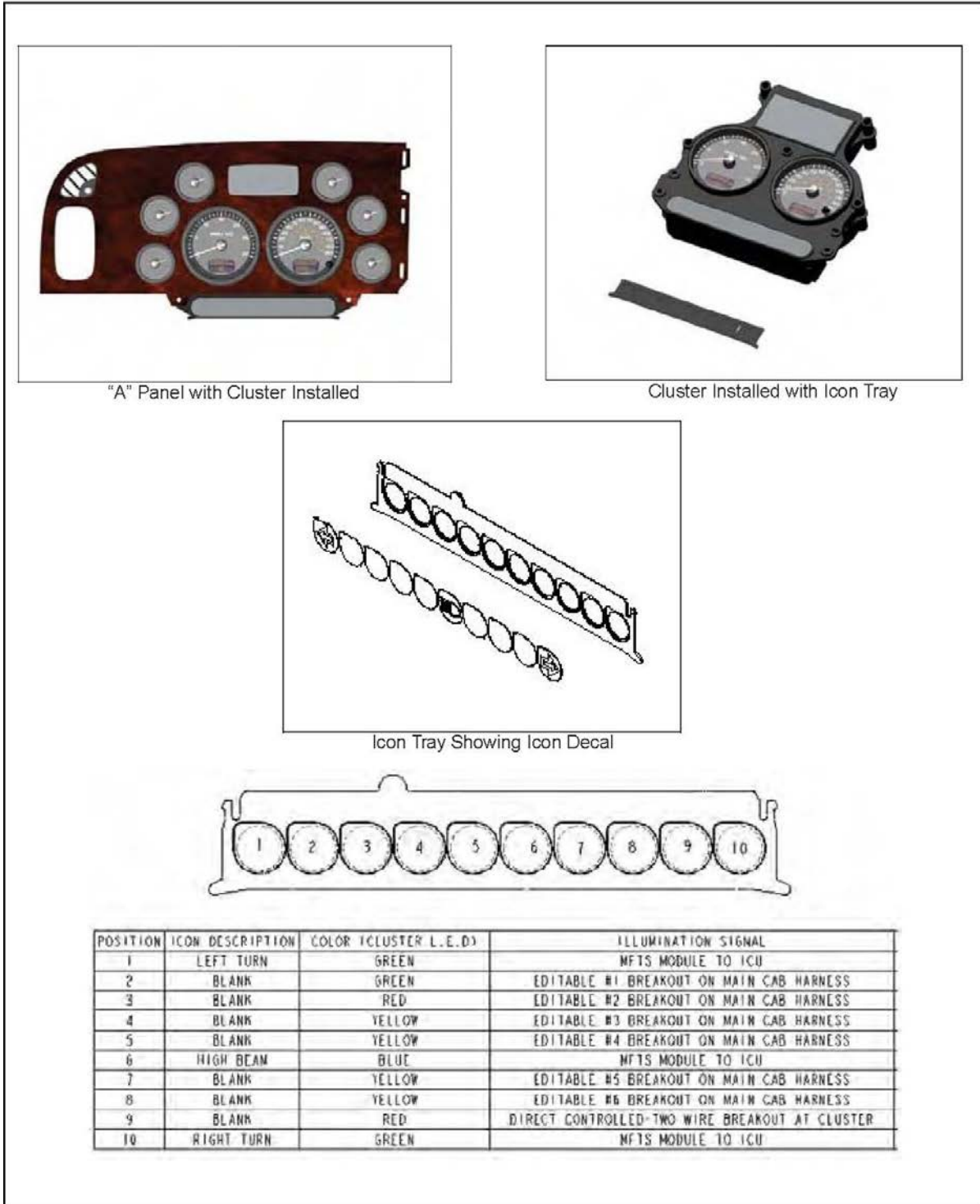


FIGURE 6-5. Telltale

ICU/CECU ARCHITECTURE

The software programming of the control module can be grouped into three main types:

- Run Time (RT) - which acts as the operating system where all communication takes place.
- Programmable Logic Controller (PLC) Code - manufacturer specific programmed code and software that is developed, accessible and editable.
- Vendor Module - blocks of code that are developed for specific manufacturers to allow other features to be implemented more efficiently.

See Multiplexed Instrumentation Block Diagram (Figure 6-6).

To better understand how Electronic Service Analyst (ESA) functions and why there are current limitations on some of the multiplexed features, by explaining what ESA can see. Currently ESA can look at all information that is communicated between the RT and PLC Code portions of the programming. Any signals, be they inputs, outputs, or dataline signals, sent between the RT and PLC Code are visible to ESA. These are the signals that may be monitored and simulated using ESA.

Limitations with the ESA program are found in the communications that go to the pre-developed Vendor Modules. Currently this information is not available for ESA to look at. That is why some features that have Vendor Module programming, such as the odometer and the message display, are not available to monitor and/or simulate through ESA.

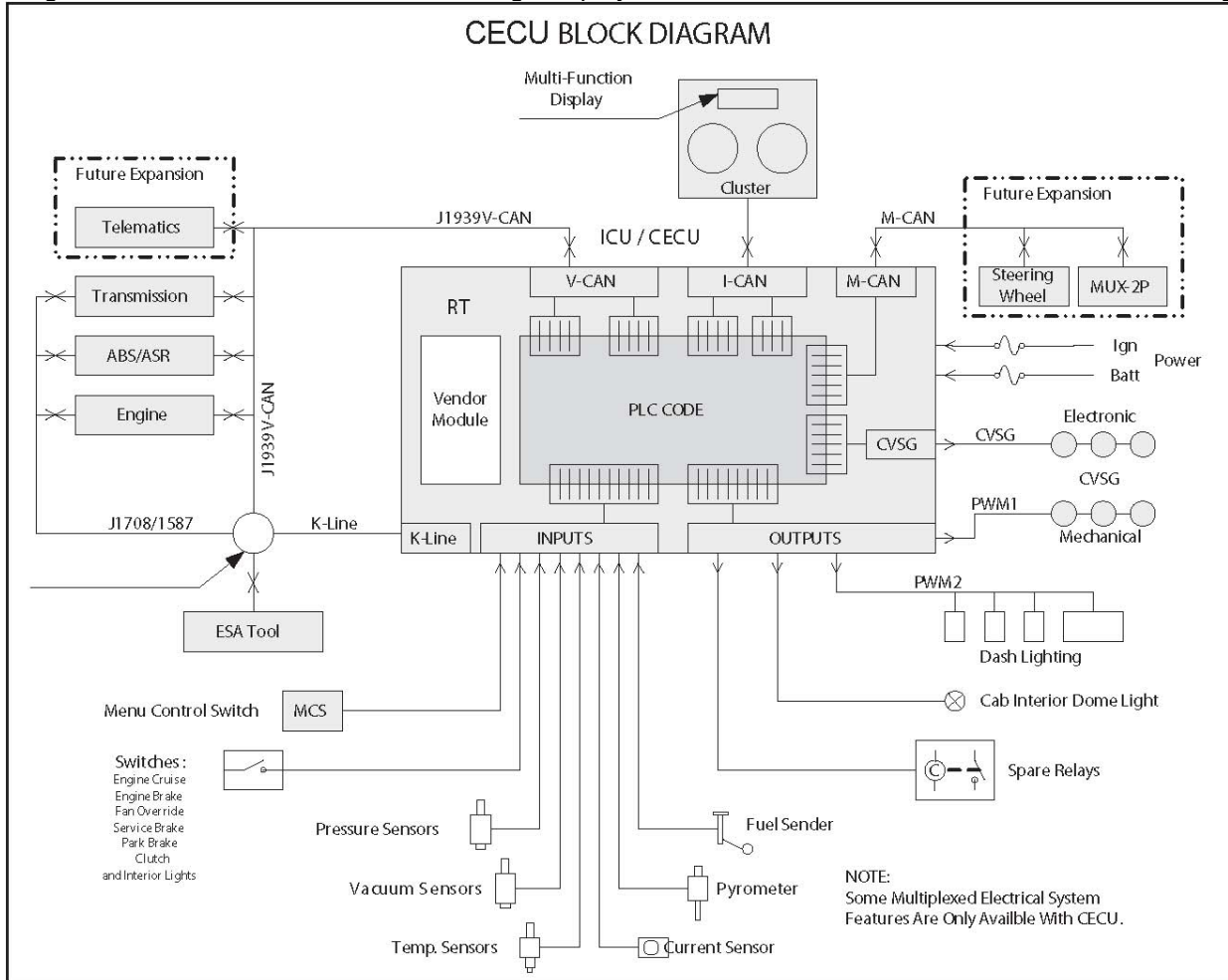


FIGURE 6-6. CECU Block Diagram

The central instrument cluster receives input data from the ICU/CECU via the I-CAN data bus. When the ignition key is first turned ON, the cluster performs a calibration power on self-test.

POWER ON SELF-TEST

- Ignition key turned ON.
- The speedometer and tachometer gauge pointers move from pointing at zero, counter-clockwise to their mechanical limit (approx. -8°), remain there for 1 second and return to pointing at zero.
- At the same time, all LED indicators and telltales are switched on together, and then switched off together.
- A warning sound sequence is also activated five times without a break.
- The warning lamps in the cluster are all activated by the ICU/CECU, Three screens will sequentially display warning icons on the Driver Information Display. The ICU/CECU receives direct wire inputs for all warning lamps with the exception of the Low Coolant Level warning and the Traction Control/Stability Control lamp. These lamp inputs are received via the J1939 (vehicle CAN) data link. The ICU/CECU typically receives the Trailer ABS warnings via the J1939 (Vehicle CAN) data link, however it can also be direct wired to the ICU/CECU from the ABS unit on the trailer, if required.

NOTE: Before replacing the ICU/CECU or any gauges, check the wiring and fuses, and perform the diagnostic tests using ESA to verify that you are not replacing a good component.

COMMERCIAL VEHICLE SMART GAUGES (CVSG)

The right and left instrument panel gauges used with the multiplexed instrumentation 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 ICU/CECU. CVSG's are electronic and mechanical. The electronic CVSG's receive digital data from the ICU/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 input signals from the ICU/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."

POWER ON SELF-TEST

- Ignition key turned ON.
- The gauge pointers move from pointing at zero, counterclockwise to their mechanical limit (approx. -5°), remain there for 1 second and return to pointing at zero.
- At the same time, all LED indicators are switched on together, and then switched off together.

Additional CVSG gauge information service technicians should be aware of:

- 2-inch electronic gauges receive their power from the ICU/CECU.
- Yellow = Power wire (9-16 volts)
- Green = Ground (Return) wire
- The ICU/CECU sends 2-inch electronic gauges information over a data link (blue wire) between the ICU/CECU and the gauge.
- 4-way jumper harnesses link each 2-inch gauge together.
- Yellow = Power wire
- Green = Ground (Return)
- Blue = Data link
- Brown = Backlighting (used for mechanical gauges only)
- Backlighting for 2-inch electronic gauges is sent from the ICU/CECU to the gauges via the data link (Blue wire).
- If the headlamps are on and the dimmer is turned to bright, you can scan the panel and tell which electronic gauges are wired and functioning correctly.

- If part of the panel has gauges backlit and some of the gauges are not backlit, the jumper harness wire between the gauges is probably not connected properly.
- If a 2-inch electronic gauge has power (yellow wire) and ground (green wire) but is not receiving data (blue wire), then the red indicator lamp at the 6 o'clock position of the gauge blinks after 30 seconds of waiting for data. This indicates there is an open or short in the blue wire between the gauge and the ICU/CECU.
- If the red indicator lamp is on but the gauge is operational, it indicates the value is out of normal range.
- If a 2-inch electronic gauge has a short or open in the sensor wiring, the gauge needle moves 5° below the first tick mark (approximately one needle thickness).
- Optional mechanical gauge (such as air suspension) needles are driven mechanically with air pressure. There is no red warning lamp and the backlighting is through the brown wire from the ICU/CECU (a PWM input). The 4-way jumper harness is still used to pass all 4 circuits through the gauge to the next gauge in the chain.
- Specialty CVSG gauges (such as the clock, PTO hour meter, and transmission display) are stand-alone gauges and are independent of the ICU/CECU.

INSTRUMENTS AND CONTROLS OPERATION

Before attempting to repair any instrumentation problems, the technician should have a complete understanding of how the instruments and controls operate.

Speedometer The Speedometer indicates the vehicle speed in miles per hour (mph) and in kilometers per hour (km/h).

Tachometer The Tachometer measures the engine speed in revolutions per minute (rpm).

Air Filter Restriction Pressure The Air Filter Restriction Pressure gauge indicates the condition of the engine air cleaner and is measured by inches of water (H₂O). A clean filter should register 7 in. H₂O (may vary with system design) and a filter whose life is over registers approximately 25 in. H₂O.

Air Starter Pressure The Air Starter Pressure Gauge indicates the amount of air pressure in the air start reservoir.

Ammeter The Ammeter monitors the vehicle's electrical system and makes sure the system is in balance and operating normally. If not, it may be drawing power from the alternator (positive reading) or from the batteries (negative reading). Under normal conditions the ammeter will read nearly "zero."

Axle, Drive Oil Temperature The Drive Axle Oil Temperature gauges (front, rear, and center) indicate the temperature of the lubricant in the vehicle's axles.

Axle, Pusher Air Pressure, #1, #2, #3 The Pusher Axle Air Pressure gauges indicate the air pressure in each of the pusher axles suspension air bags.

Axle, Tag Air Pressure The Tag Axle Air Pressure gauge indicates the amount of air pressure in the tag axle suspension air bags.

Brake, Application Air Pressure The Brake Application Air Pressure gauge indicates how much air pressure is being applied from the foot brake valve or trailer brake hand valve to the air brakes.

BrakeSaver Application Air Pressure (Export vehicles only) The BrakeSaver Application Air Pressure gauge indicates the amount of air pressure applied to the BrakeSaver hand control valve.

BrakeSaver Oil Temperature (Export vehicles only) The BrakeSaver Oil Temperature gauge indicates the temperature in the BrakeSaver. If the oil temperature exceeds the maximum limits, a red warning lamp in the gauge turns on.

Engine Coolant Temperature The Engine Coolant Temperature gauge indicates the temperature of the engine coolant. If the coolant temperature exceeds the maximum limits, a red warning lamp in the gauge illuminates and an audible warning sounds. If the coolant temperature continues to rise, the Check Engine and/or Stop Engine lights illuminate. Under normal operating conditions the water temperature gauge should register between 165 and 205°F (74 and 90°C). Under certain conditions, somewhat higher temperatures may be acceptable. The maximum allowable temperature is 220°F (104°C) with the cooling system pressurized, except for certain engines.

Engine, Oil Pressure If the oil pressure drops below the minimum pressure a red warning light in the gauge illuminates, the Stop Engine light illuminates and an audible alarm tone sounds.

Engine Oil Temperature The Engine Oil Temperature gauge indicates the engine oil temperature. If the oil temperature exceeds the maximum limits, a red warning light in the gauge illuminates.

Fuel Filter Restriction Pressure This gauge tells you the condition of the fuel filter by indicating the restriction from the fuel filter to the fuel pump. The restriction is measured by inches of mercury (in-Hg).

Fuel Level, Primary/Secondary (if equipped) The Primary Fuel gauge and Secondary Fuel gauge (if equipped) indicate the approximate amount of fuel in each fuel tank. In addition to indicating empty and full, the gauge(s) also indicate the fuel level in graduated increments. When the fuel level for each tank is below 1/4 full, a red warning light in the gauge illuminates.

General Air Pressure #1, #2 The General Air Pressure gauge(s) are used for customer installed component applications.

General Oil Temperature The General Oil Temperature gauge(s) are used for customer installed component applications.

Manifold Pressure (Boost) The Manifold Pressure (Boost) gauge indicates the power the engine is putting out by showing the amount of turbo boost. If the pressure indicated by the manifold pressure gauge goes down, there may be something wrong with the engine

Primary and Secondary Air Pressure Gauge The Primary Air Pressure gauge indicates pressure in the rear braking system. The Secondary gauge indicates pressure in the front braking system. Each gauge indicates the amount of air pressure in each system in pounds per square inch (psi). On vehicles equipped with metric air pressure gauges, the gauge faceplate includes a kPa (major) scale and psi (minor) scale. If the pressure in either or both circuits falls below 65 psi, a red warning light in the gauge illuminates and an audible alarm tone sounds when the engine is running.

Suspension Load Air Pressure, #1, #2 The Suspension Load Air Pressure gauge indicates the amount of air pressure in the air suspension air bags. When the vehicle is equipped with a second Suspension Load Air pressure gauge, the #1 gauge indicates the air pressure in the driver's side air bags. The #2 gauge indicates the air pressure in the passenger's side air bags.

Tractor Brake Application Air Pressure The Tractor Brake Application Air Pressure gauge indicates the amount of air pressure applied to the tractor brakes.

Trailer Brake Application Air Pressure The Trailer Brake Application Air Pressure gauge indicates the amount of air pressure applied to the trailer brakes during brake foot valve and/or hand brake control valve applications.

Trailer Reservoir Air Pressure The Trailer Reservoir Air Pressure gauge indicates the amount of air pressure in the trailer brake reservoir.

Transfer Case Oil Temperature The Transfer Case Oil Temperature gauge indicates the temperature of the oil in the transfer case. If the oil temperature exceeds maximum limits, a red warning light in the gauge illuminates.

Transmission Oil Temperature, Main The Main Transmission Oil Temperature Gauge indicates the temperature of the oil in the transmission.

Transmission Oil Temperature, Auxiliary The Auxiliary Transmission Oil Temperature gauge indicates the temperature of the oil in the auxiliary transmission.

Transmission Retarder Oil Temperature The Transmission Retarder Oil Temperature gauge indicates the temperature of the oil in the transmission retarder.

Voltmeter The Voltmeter displays the battery voltage. Normally, it shows 12 to 14V (volts). A red warning light in the gauge illuminates when an out of range condition exists.

TABLE 6-3. Gauge Input Sources

Standard / Optional Input Source	Input Source	Sensor Type *
Air Filter Restriction Pressure	Sensor	Active
Air Starter Pressure	Mechanical	
Ammeter	Sensor	Active
Auxiliary Transmission Oil Temperature	Sensor	Passive
Brake Application Pressure	Sensor	Active
Brake Saver Application Air Pressure	Mechanical	
Brake Saver Oil Temperature <i>(Not available with CECU instrumentation)</i>	Sensor	Passive
Drive Axle Oil Temperature	Sensor	Passive
Engine Coolant Temperature	V-CAN (J1939)	
Engine Oil Pressure	V-CAN (J1939)	
Engine Oil Temperature	V-CAN (J1939)	
Fuel Filter Restriction Pressure	Sensor	Active
Fuel Level	Sensor	Passive
General Air Pressure	Mechanical	
General Oil Temperature	Sensor	Passive
Main Transmission Oil Temperature	Sensor	Passive
Manifold Pressure (Boost)	V-CAN (J1939)	
Primary & Secondary Air Pressure	Sensor	Active
Pusher Axle Air Pressure	Mechanical	
Pyrometer (Exhaust Temperature) <i>(Not available with CECU instrumentation)</i>	Sensor	Passive
Speedometer	V-CAN (J1939)	
Suspension Load Air Pressure	Mechanical	
Tachometer	V-CAN (J1939)	
Tag Axle Air Pressure	Mechanical	
Trailer Brake Application Air Pressure	Mechanical	
Trailer Reservoir Air Pressure	Mechanical	
Transfer Case Oil Temperature	Mechanical	
Voltmeter	Battery Voltage	

* Sensor Types:

Active - Has 3 wires and requires power to operate. Output is a linear voltage.

Passive - Has 2 wires and does not require power to operate. Output is a change in resistance.

TRANSMISSION BACK UP SIGNALS

The back-up signal can be accessed from pin A of the 5-way tail light connector located at the end of frame.

The tail light connector is a 5-way connector located in the chassis harness at the end of frame. It will either be connected to a tail light, a jumper harness, or tied up in the rail if no tail lights are provided.

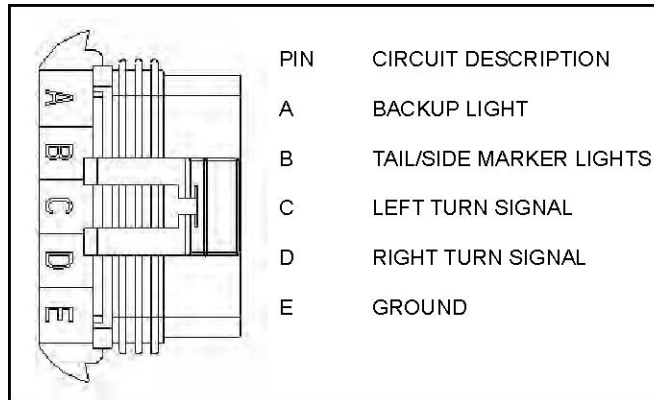


FIGURE 6-7. Mating Connector: Packard PN 12186400

JUNCTION BOX

The junction box easy access to various signals as outlined in Figure 6-8.



Wire Color	Description
Red	Stop Lights
Yellow	LH Turn Lamp
Green	RH Turn Lamp
Brown	Marker Lamp
Black	Clearance Lamp
White	Ground

FIGURE 6-8. Junction Box BOC or EOF

J1939



Warning! The J1939 databus is the communication link between the engine and the Anti-Lock Braking System (ABS). Only J1939 compatible devices should be added to the databus. Some J1939 compatible aftermarket devices may disrupt the ability of the databus to communicate. If the databus is disrupted by an aftermarket device, it must be removed from the databus.

GUIDELINES - J1939 CIRCUIT REQUIREMENTS

- Circuits added must be a twisted pair consisting of a minimum of 1 twist per inch.
- Individual breakout length of circuits added cannot exceed 118 inches.
- Do not splice into existing J1939 circuits. Use the connection points provided.
- J1939 circuits are for data transmission only and are not to be used for power or ground circuits.
- Any modifications must conform to SAE J1939-15.

J1939 ACCESS

All Peterbilt vehicles equipped with 2007 Emissions compliant engines include J1939-15 circuitry. The J1939 circuit can be accessed in two locations. The first access is located inside the dash near the diagnostic connector. The second access is at the driver side toward the rear of the engine.

1. Dash Access - Connector located in dash behind key switch panel approximately 1 foot down the harness



FIGURE 6-9. Dash Access

2. Engine Access - Connector located on OEM engine harness on driver's side of engine toward the rear of engine



FIGURE 6-10. Engine Access

J1939 ACCESS PROCEDURES

1. Identify J1939 Access Connector (note long blue shell)
2. Disconnect connection (note terminating resistor from inside blue connector)

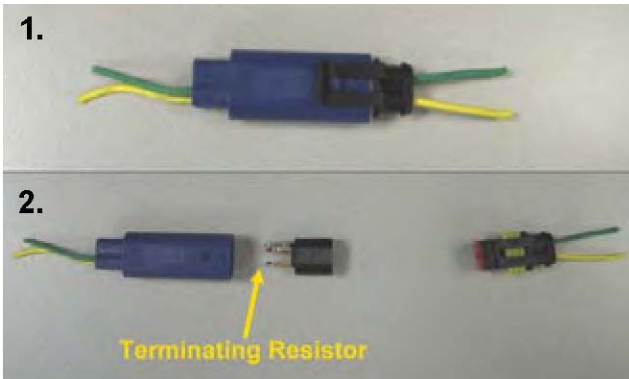


FIGURE 6-11. J1939 Access

3. Make connection in between original connection (tin).
4. Ensure terminating resistor is inserted in blue connector shell (arrow).



FIGURE 6-12. J1939 Access

SECTION 7 ELECTRICAL 579 FAMILY

INTRODUCTION

This section is written to provide information to the body builder when installing equipment into vehicles built with Multiplexed instrumentation. The new technology presented by NAMUX 4 level instrumentation integrates J-1939 CAN data communications to various equipment on the vehicle. This book is intended to address how to work in aftermarket equipment while still maintaining full functionality of the OEM vehicle.

The most important advancement of NAMUX 4 instrumentation is the implementation of the Cab ECU controlling air operated aftermarket devices. While it is still possible to wire completely outside of the Cab ECU system, utilizing the CECU functions will make a cleaner installation and will maintain OEM functionality. NAMUX 4 expands controls to air operated devices by receiving input from dash switches, remote (aftermarket) switches, sensors mounted to the aftermarket equipment and other vehicle parameters (engine speed, transmission status etc.) With the proper programming, the CECU will then process the inputs and will create a J-1939 Data instruction which is communicated to another controller outside the cab called the Chassis Node. This chassis node receives the instruction and connects 12V power to an air solenoid. 12V power will open the solenoid and supply air pressure to that air circuit.

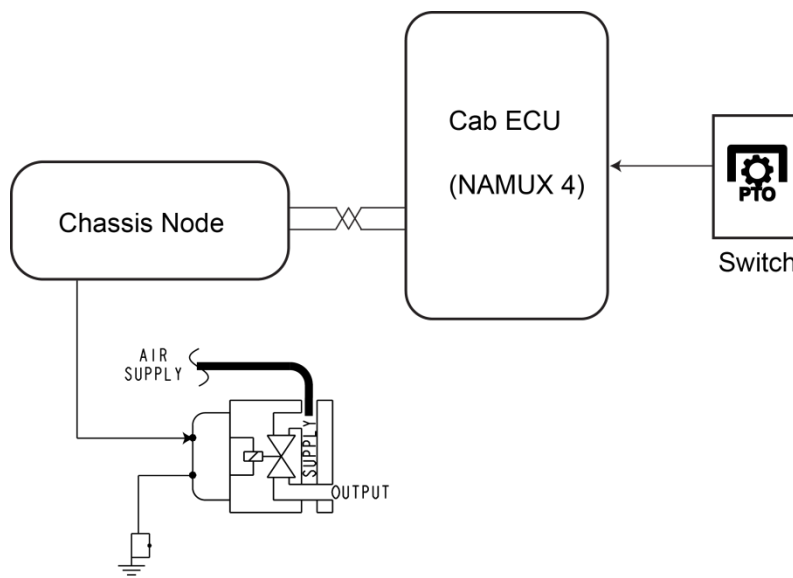


FIGURE 7-1. NAMUX 4 System Diagram

In addition to NAMUX 4 technology, the vehicle electrical harness has been redesigned to minimize weight and reduce various connectors (which have been proven to increase the opportunity for electrical malfunctions which also increase the amount of time to troubleshoot). What this means for the aftermarket installer is that there is a limitation to modifying a vehicle with aftermarket equipment if the vehicle was not originally specified for those options from the factory. To the aftermarket installer, more time will be spent installing pins and routing wires instead of simply installing jumper harnesses if the vehicle was not specified with 'customer installed' equipment from the factory. For example, vehicles ordered with a 'customer installed' PTO will have connectors on the vehicle for aftermarket connectors. A vehicle specified with standard radio will not have a pigtail for premium sound speakers.

DIAGNOSTICS CONNECTOR

For Model Year 2017 (Calendar Year 2016) engines, Peterbilt utilizes a faster connection for diagnostics. Before this time frame, a 250 kbps baud rate was utilized with a black Type 1 diagnostics connector. After this timeframe, U.S. and Canadian market chassis (not export engines or natural gas engines) will utilize a new green Type 2 connector at 500 kbps band rate. This new connection will utilize the faster connection specifically for OBD CAN diagnostics on the C and D terminals, while still broadcasting the Vehicle CAN on the F and G terminals (see figure below for comparison). In order to connect properly, a “Y” adapter cable is required to connect various service tools (DAVIE, ESA, Eaton ServiceRanger, Allison DOC, Wabco Toolbox). On the “Y” adapter, both green (new) and black (old) connections are provided to allow compatibility with 2016 and later as well as pre-2016 chassis without the need to remove the adapter.

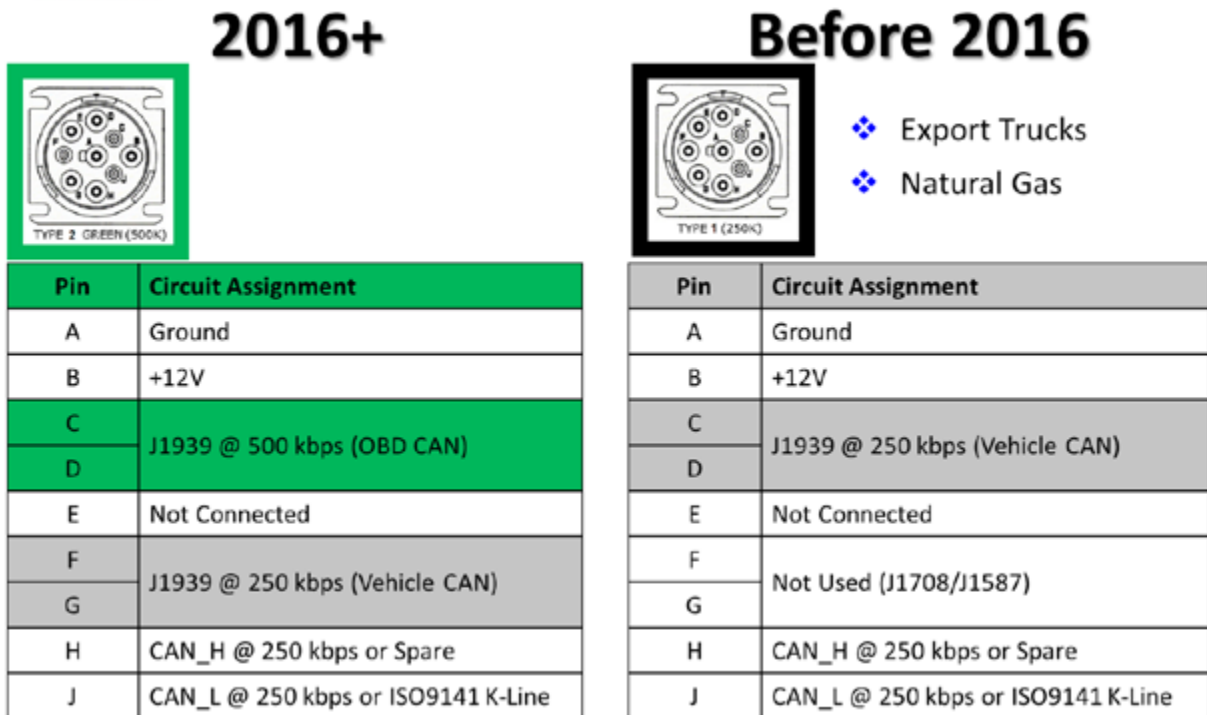


FIGURE 7-2. Diagnostic Connector Comparison

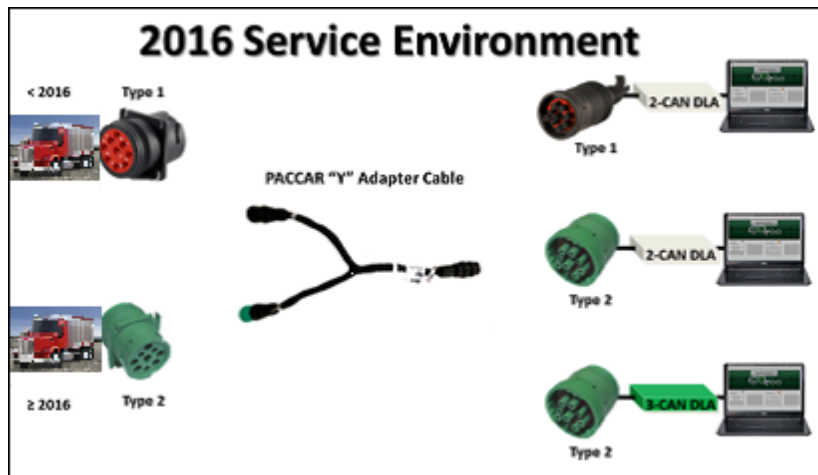


FIGURE 7-3. 2016+ Service Environment

BODY BUILDER CONNECTION POINTS

Becoming familiar with the various connectors available to the aftermarket installer is important. This section contains reference information for the connectors that are used to add equipment.

HARNESS DESIGN

The 579 and the vocational 567 are designed and manufactured with a cab harness that is chassis specific. The new design minimizes the number of connectors which improves routing, reduces electrical problems and reduces diagnostic time when servicing. The new design, however, changes the way electrical components are added to the vehicle for final use customers. The after-market installer will have several options available:

1. Ensure that the vehicle is ordered and specified with the equipment installed or at least have 'furnish by owner' provision.
2. Install electronic accessories outside of the CECU network, direct power from the power distribution center and no splicing into the cab harness.
3. Route new wires and install pins to the designated pin location on all connectors.

It is imperative that the installer never splice into a cab harness for signal or power purposes.

Remote Throttle and Remote PTO Control

The body builder will need to find the 12-pin remote throttle connector, located in the engine compartment on the engine harness. See the PTO Section for additional information

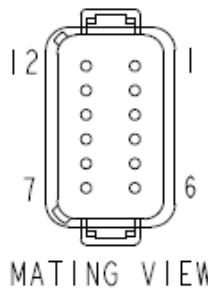


FIGURE 7-4. 12 Pin Connector

SPARE POWER

Spare power connector P096 is located on lower left side of dash behind key switch or kick panel. The mating harness is available from PACCAR parts with pre-labeled pigtails, P92-8916-00000001. Any spare power requiring more than 20 amps must go directly to the battery box, not this spare circuit.

TERMINAL INFORMATION FOR: P096
K333-549-208, BLACK, (8 CAVITIES)
LABEL: P096, SPARE CIRCUITS

MATING VIEW

Pin	Spare Circuit No.	Designation	Fuse Location and Max Rating
F	ORN0731-001	Spare Ignition #2	Cab Side M13 - 20A
C	ORN0752-001	Spare Accessory #1	Cab Side R10 - 20A
E	ORN0731-002	Spare Ignition #1	Cab Side K13 - 20A
B	RED0712-002	Spare Battery #1	Cab Side G10 - 20A (Not Available on Chassis Built Between 12/1/14 and 6/1/16)
G	ORN0791-001	Spare LVD #1	Cab Side E7 - 20A
A	RED0711-001	Spare Battery #2	Engine Side E10 - 20A (Not Available on Chassis Built After 12/1/14)

FIGURE 7-5. Spare Circuit Connector and Pinout Details

GROUNDING

Grounding any post-OEM component/device/apparatus/etc. to the metal cab structure or frame is not acceptable. Failure to properly ground add-on components can result in vehicle damage and possibly bodily injury.

Ground all post-OEM component/device/apparatus/etc. with combined current draw of less than 30A to the firewall ground buss bar with appropriately sized wire/cable for the load required.

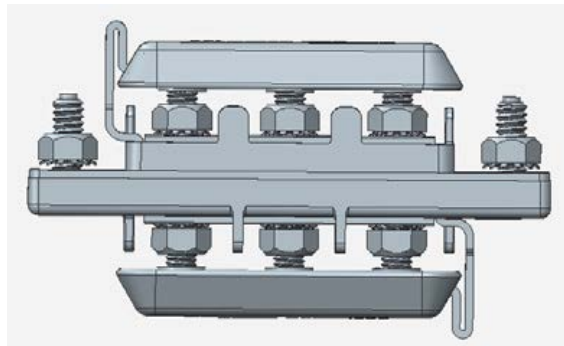


FIGURE 7-6. Grounding Buss Bar Design

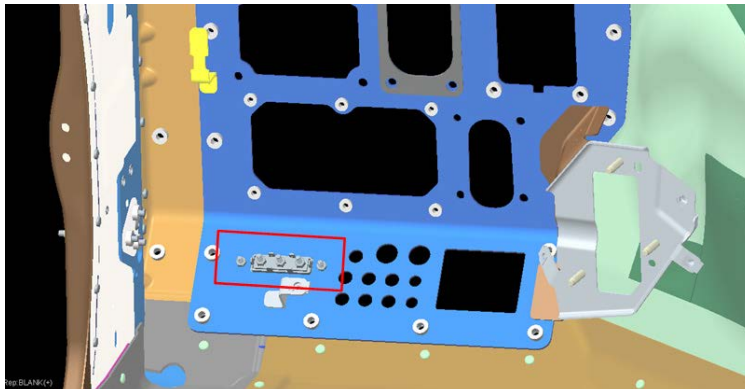


FIGURE 7-7. Grounding Point - Cab Interior Behind Driver's Side Kick Panel

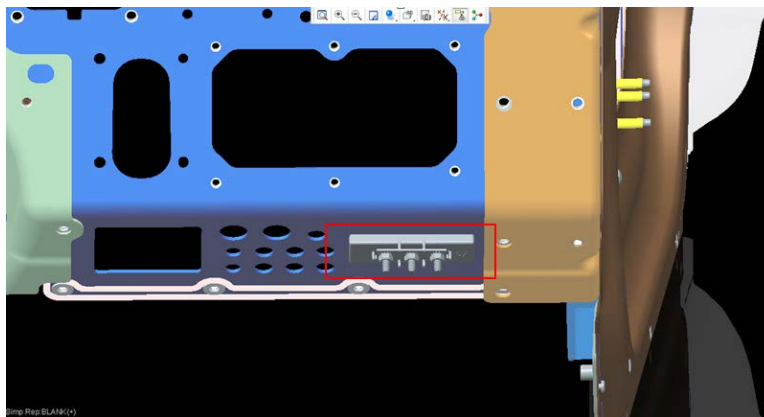


FIGURE 7-8. Grounding Point - Cab Exterior LH Side of Firewall

Post OEM components/devices/apparatus/etc. with combined current draw in excess of 30A, ground must be attained from vehicle batteries directly with appropriately sized wire/cable for the load required.

ELECTRICAL WIRE NUMBER AND COLOR

Peterbilt will continue to use the wiring scheme that was employed on legacy trucks. The wire system uses 10 different colors and only on striped wire color. Each wire has a minimum of seven characters, with the first three characters as the wire color. The remaining four characters are related to the wire services. The colors determine the circuits function as follows:

TABLE 7-1. Wire Number General Categories

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

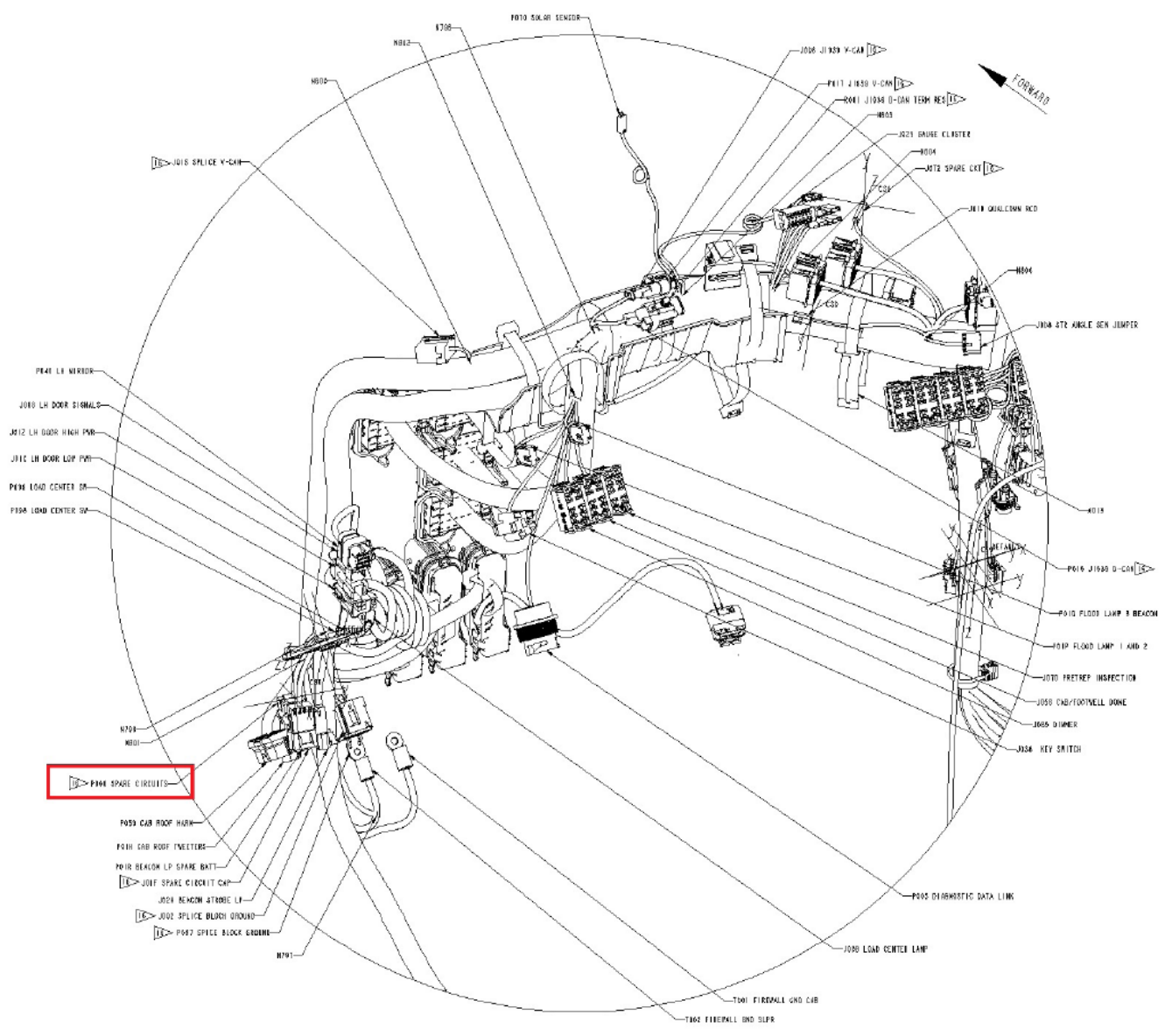


FIGURE 7-9. Spare circuit location under-dash (P096)

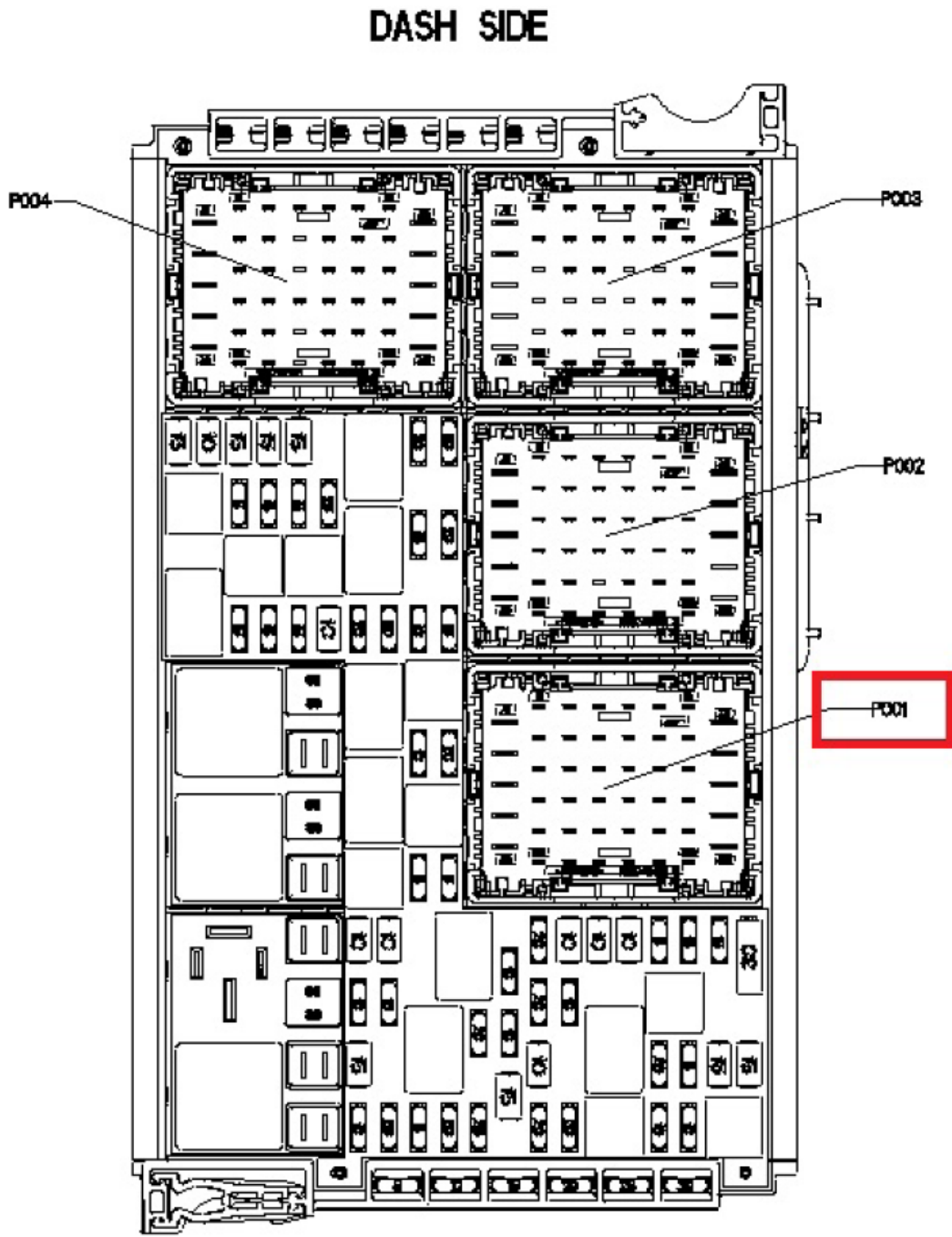


FIGURE 7-10. Spare circuit location on Power Distribution Center (Dash-Side, P001)

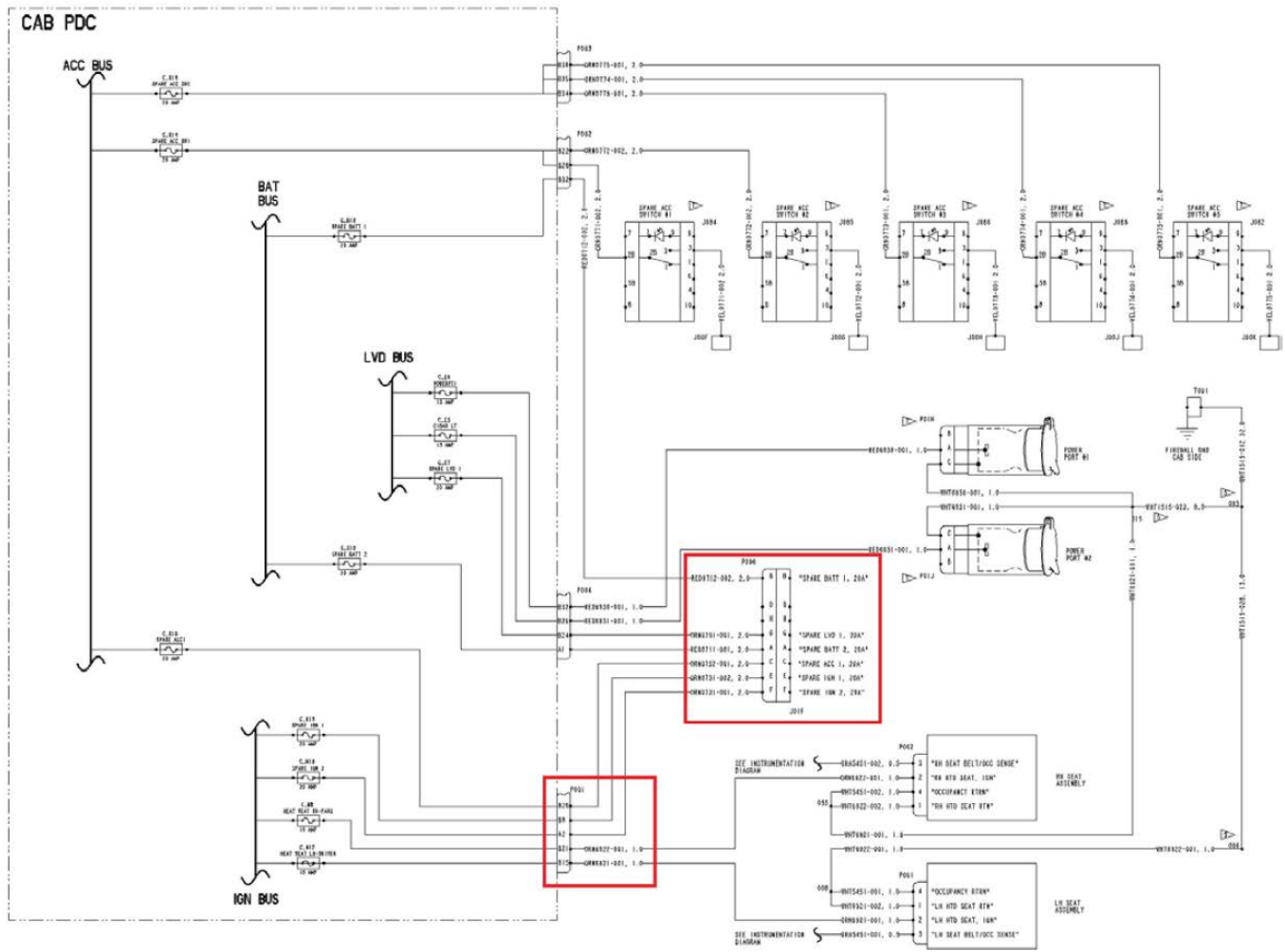


FIGURE 7-11. Spare circuit diagram (P001 and P096)

AIR SOLENOID GROUND

Air solenoids are grounded to connectors P157 and P185 which are located behind the overbell between the air manifold and the chassis node.

CAB SWITCH BACKLIGHTING

Splice blocks P010 and P011 provide power and ground for switch lighting. These are located behind the panel to the right of the steering column. In some instances, you may need to remove the instrument cluster.

ELECTRIC ENGAGED EQUIPMENT (OPPOSED TO AIR OPERATED)

At the left hand forward cab mount, P198 is available for PTO controls that are electrically engaged via 12V DC power. Located under cab.

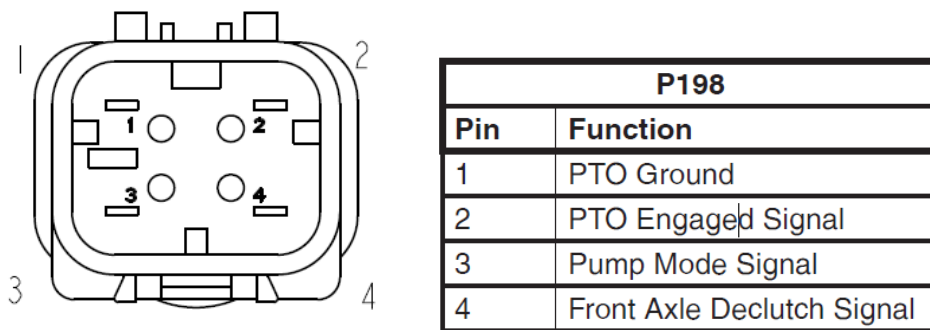


FIGURE 7-12. Electric Engaged Equipment Connector

AIR SOLENOID BANK AND CHASSIS NODE

The installer needs to identify where these two components are located.

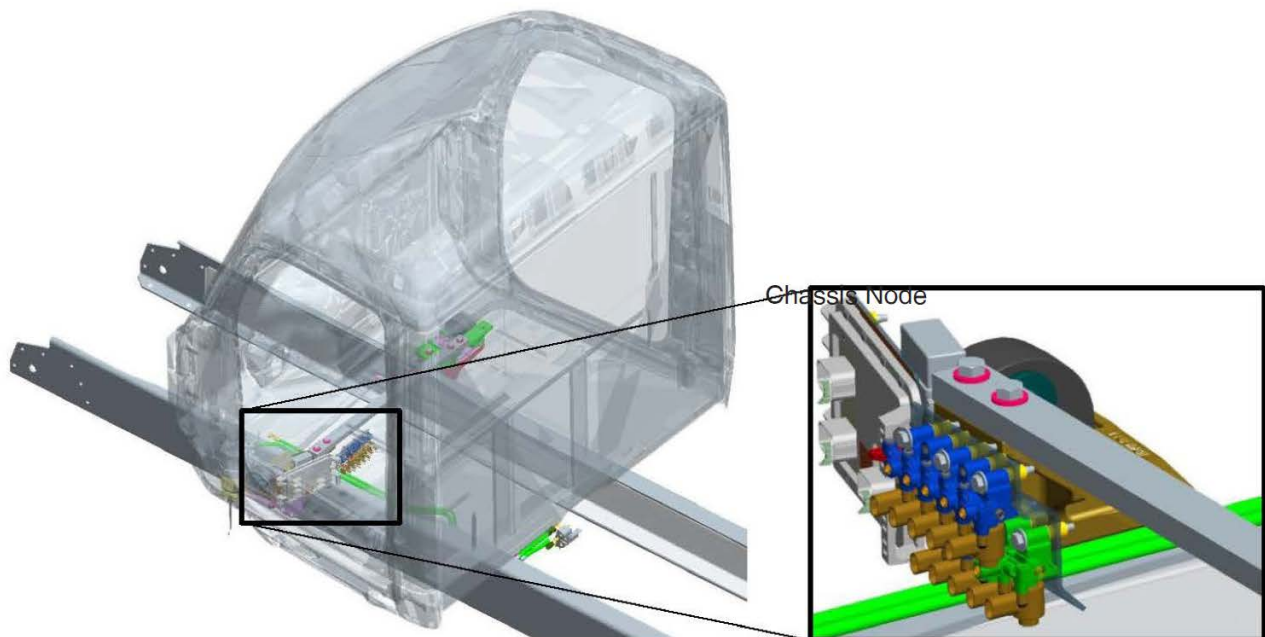


FIGURE 7-13. Air Solenoid Bank and Chassis Node

REAR AXLE CONTROLS AND SENSORS

Two connectors are located on the left hand frame rail forward of the forward rear drive axle (approximately 3 feet forward Bogie Centerline).

P803 is to install axle temperature sensors and J803 is to connect differential lock mechanisms.

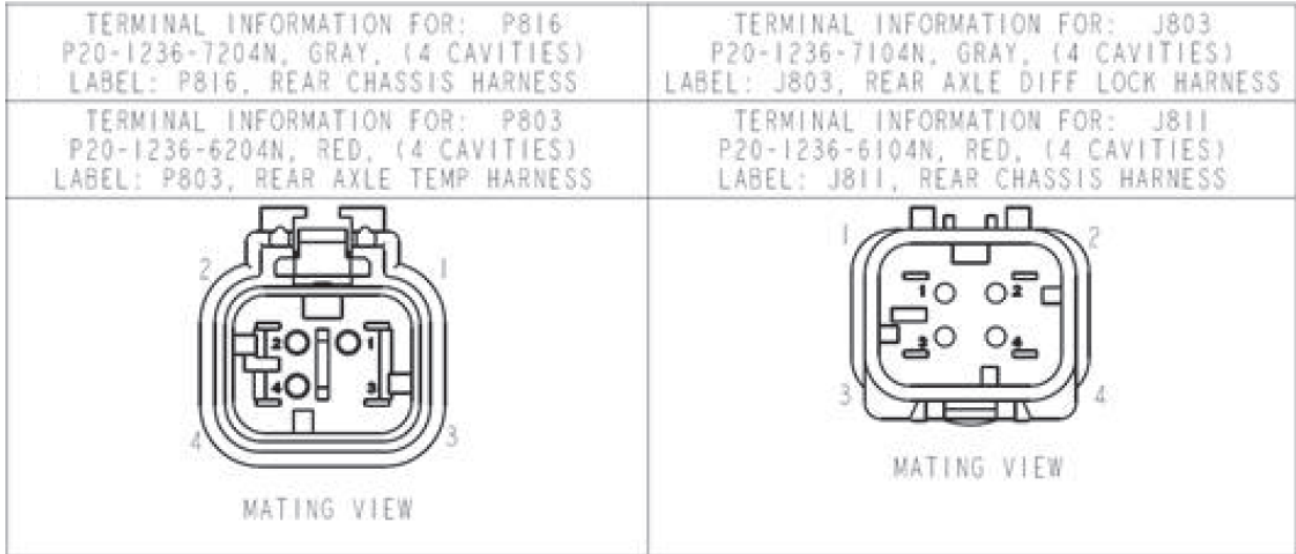


FIGURE 7-14. Rear Axle Controls and Sensors Connector

B-CAN INTERFACE

One connector is located at the EOF for the BCAN interface.



2
 J1939 B-CAN
 P20-1285-102
 [BCAN01]
 P170

FIGURE 7-15. B-CAN Connector

LOCATION DIAGRAMS FOR VARIOUS CONNECTORS ON THE FRAME

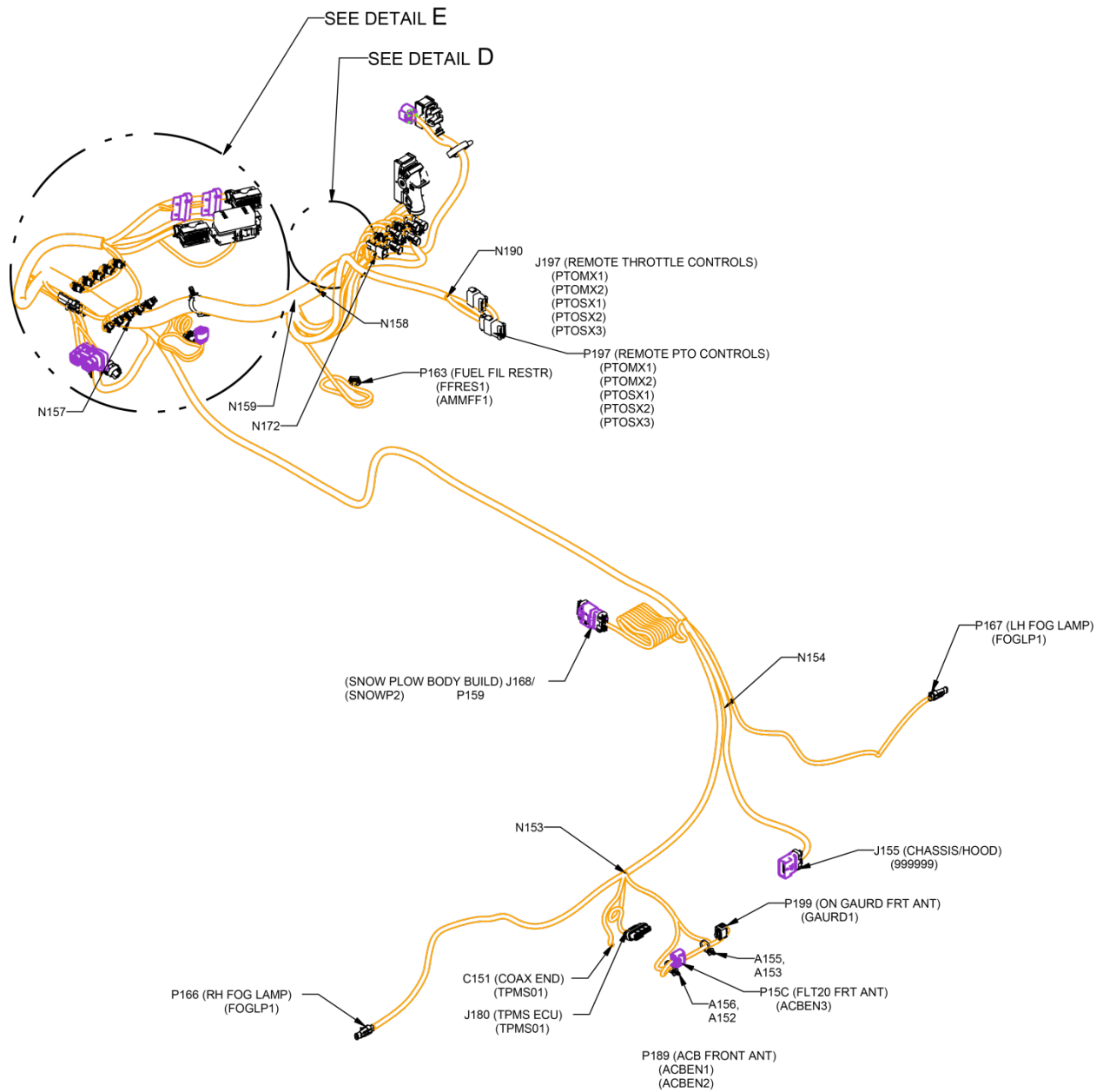


FIGURE 7-16. Chassis Harness From Cab Mount to Front of Frame

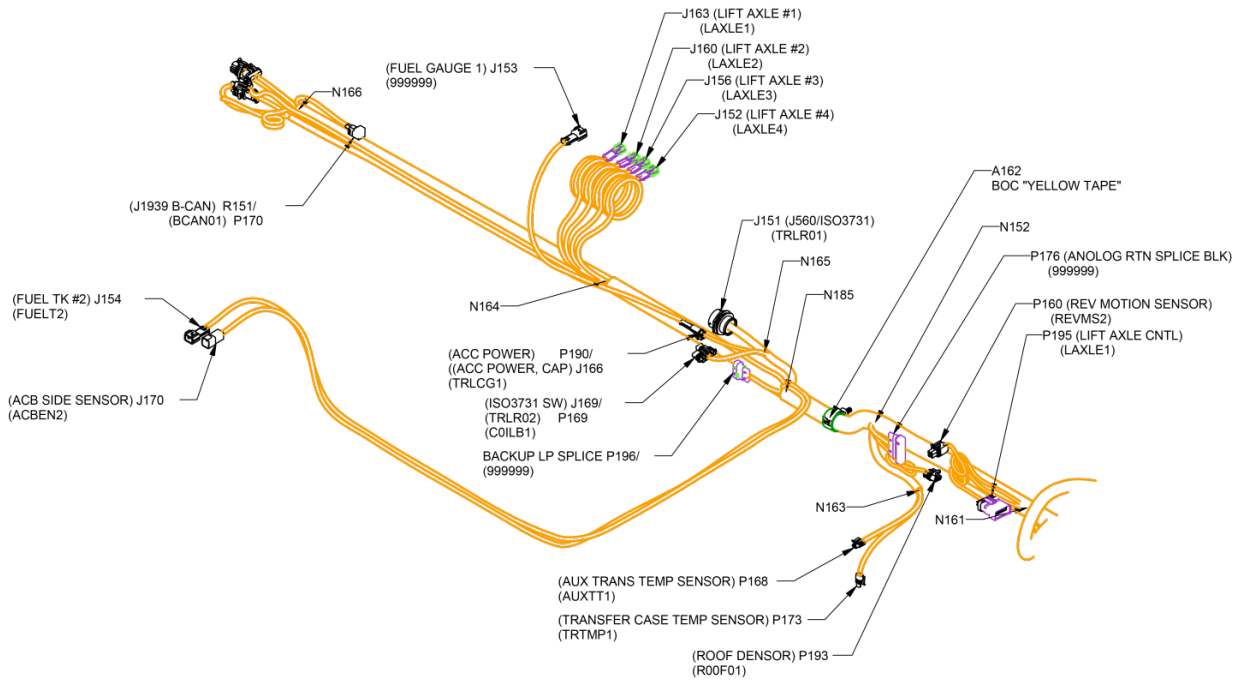


FIGURE 7-17. Chassis Harness From Cab Mount to BOC

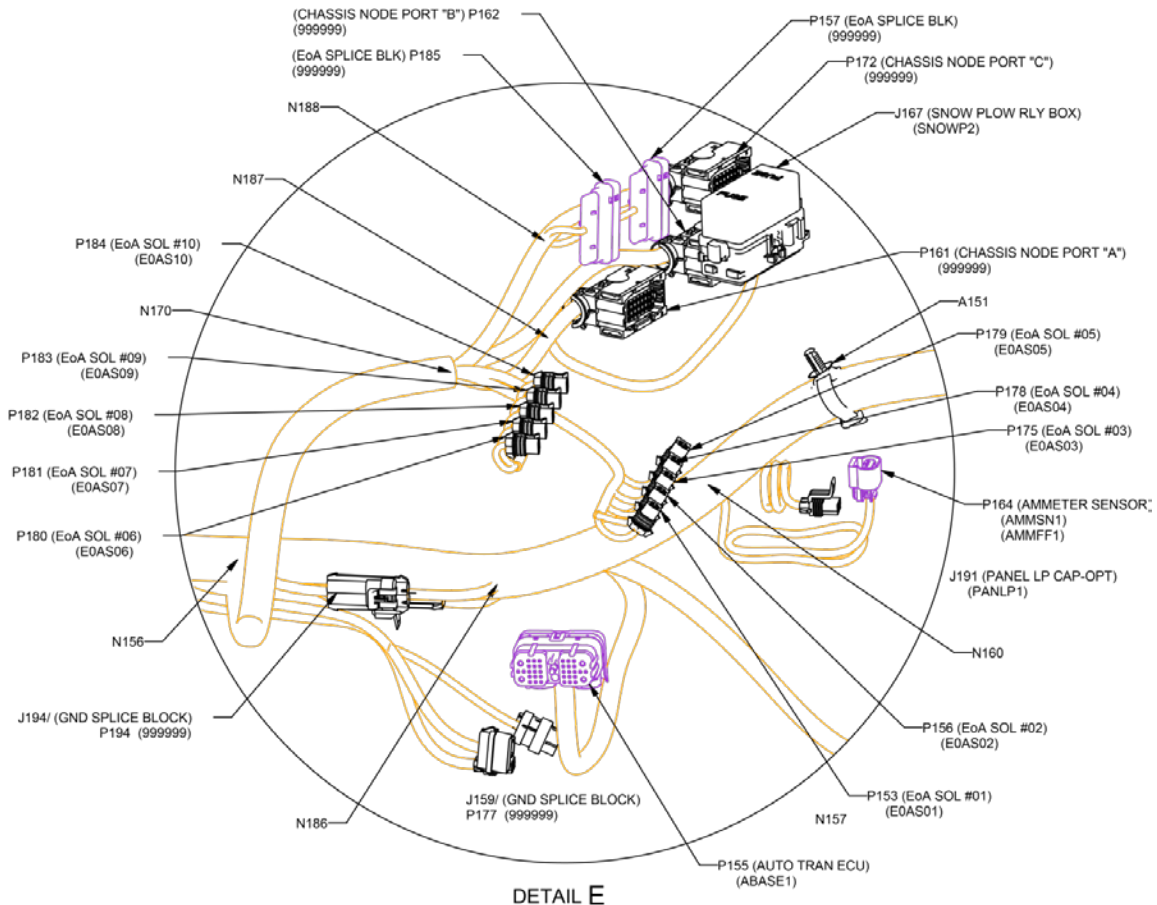


FIGURE 7-18. Connectors Near Front Cab Mount

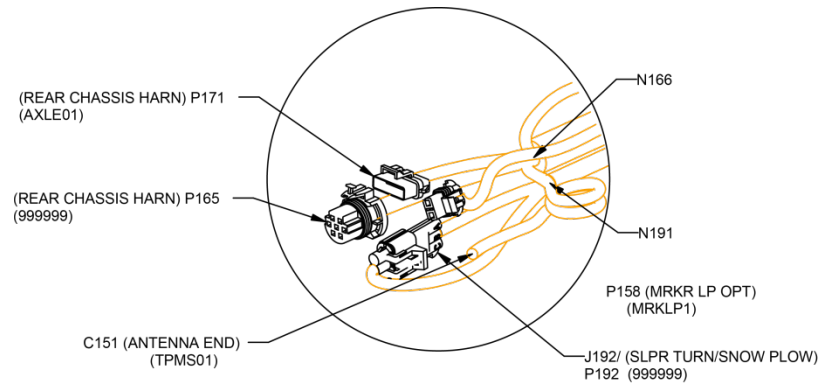
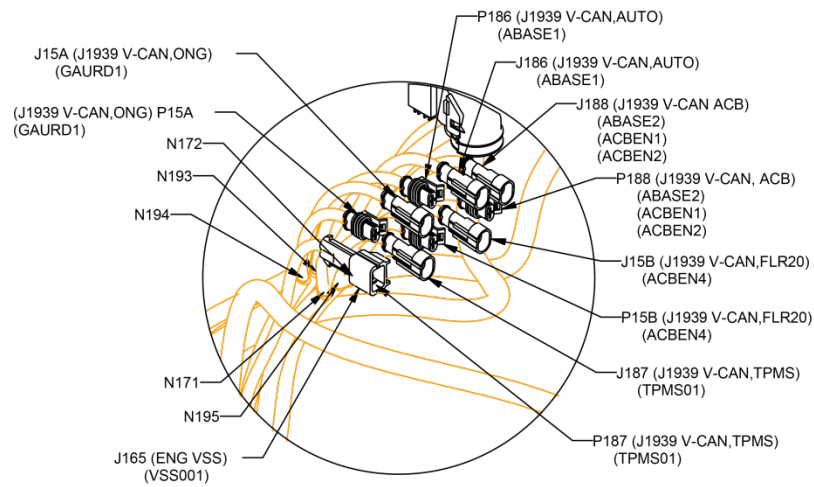


FIGURE 7-19. Connector Near BOC



DETAILD

FIGURE 7-20. VCAN Connectors

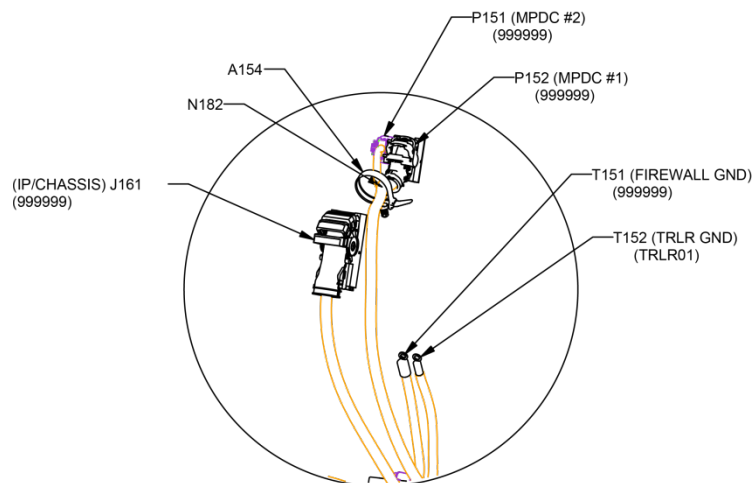


FIGURE 7-21. Firewall Connectors

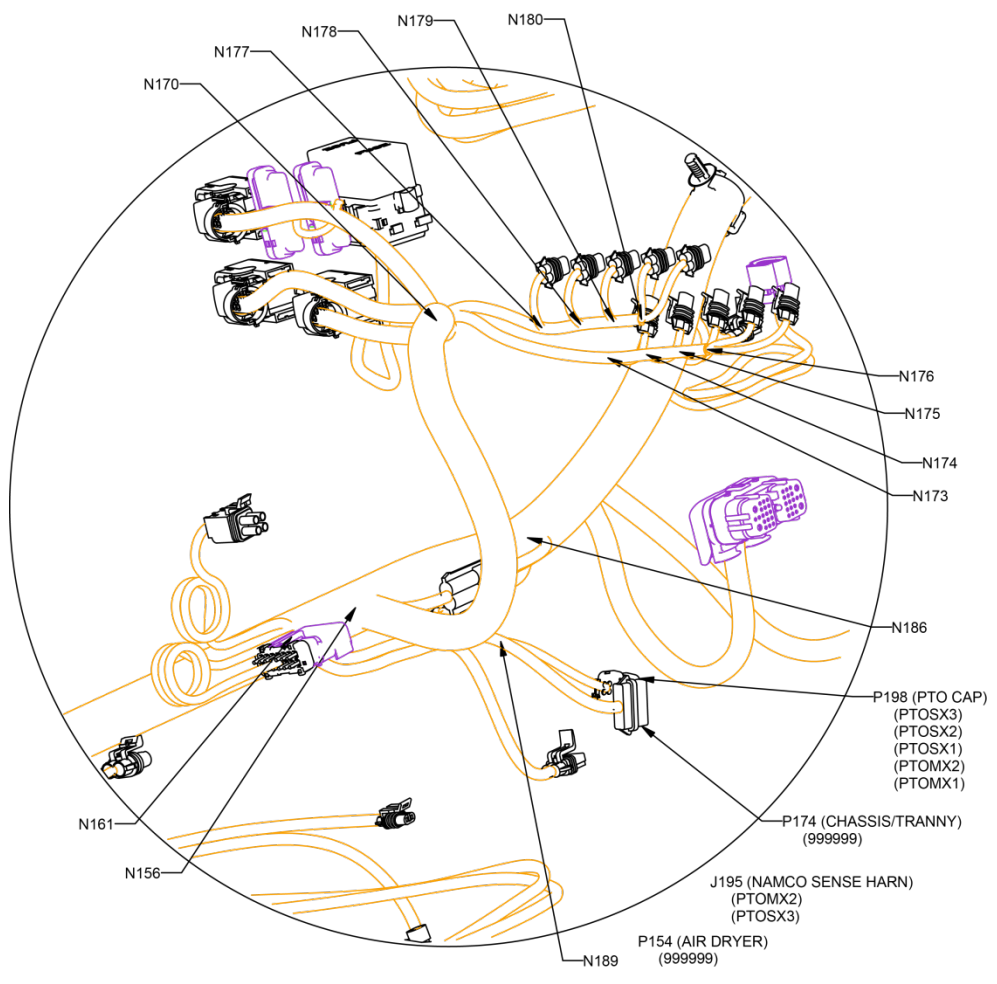


FIGURE 7-22. Chassis Node and Electric Over Air Solenoid Bank

INSTALLING ADDITIONAL SWITCHES ONTO THE CHASSIS

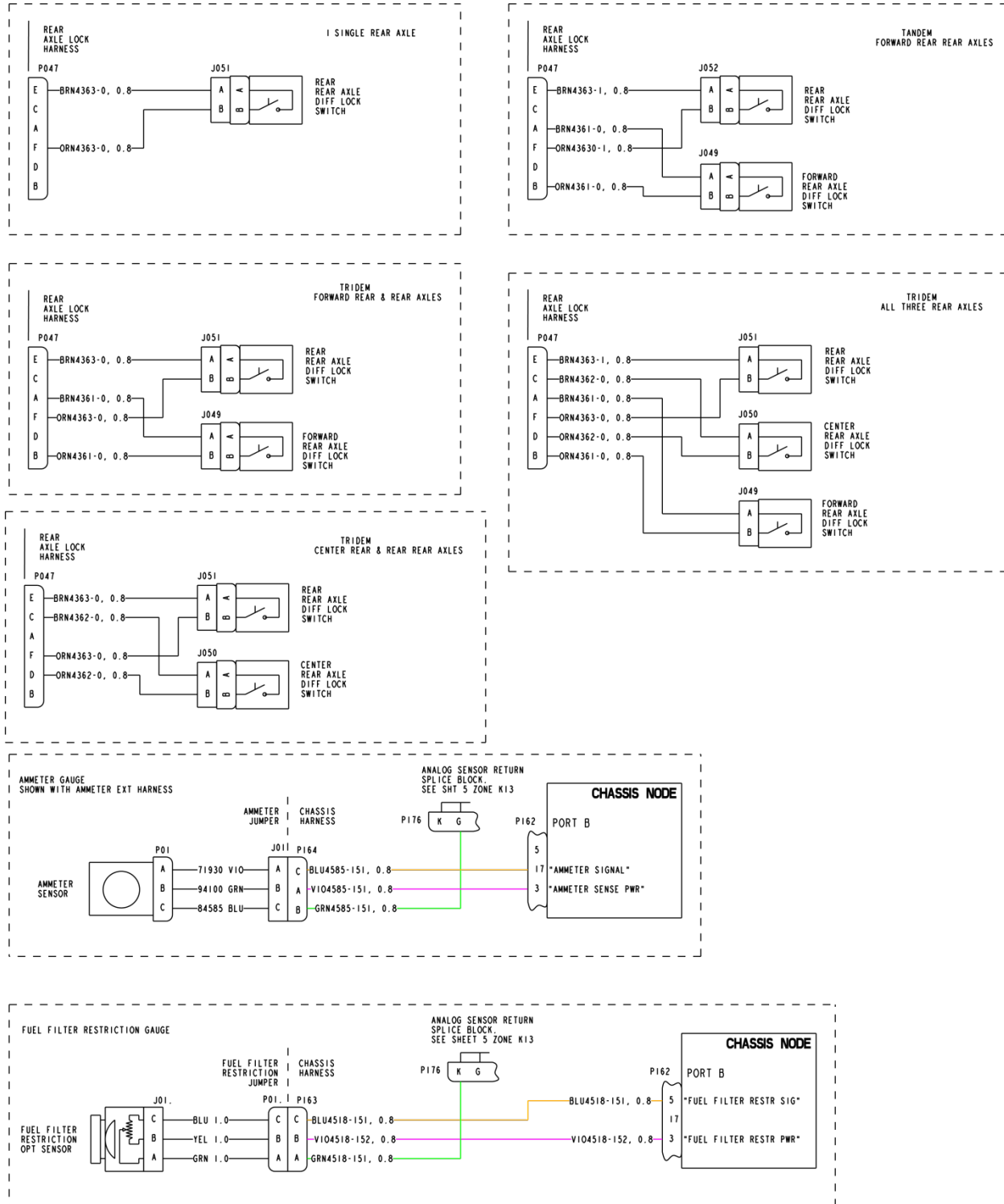


FIGURE 7-23. Installing Additional Switches onto the Chassis Side

INSTALLING ADDITIONAL GAUGES ON THE DASH

Optional gauges may be installed and connected to the CECU via a jumper harness. See the Dash section below for additional information.

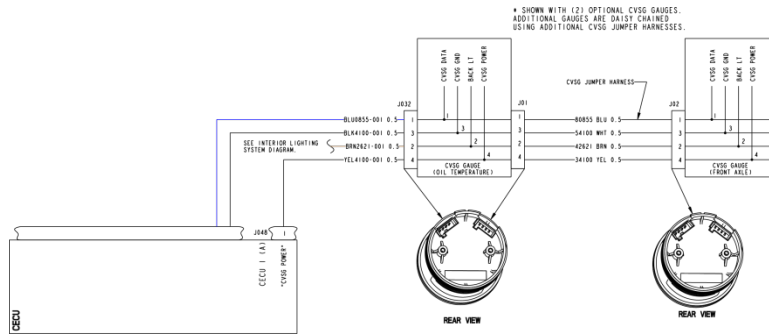


FIGURE 7-24. Installing Additional Gauges on the Dash

INSTALLING SENSORS ON THE CHASSIS FOR GAUGES

TYPICAL INSTALLATION OF ADDITIONAL SENSORS FOR GAUGES

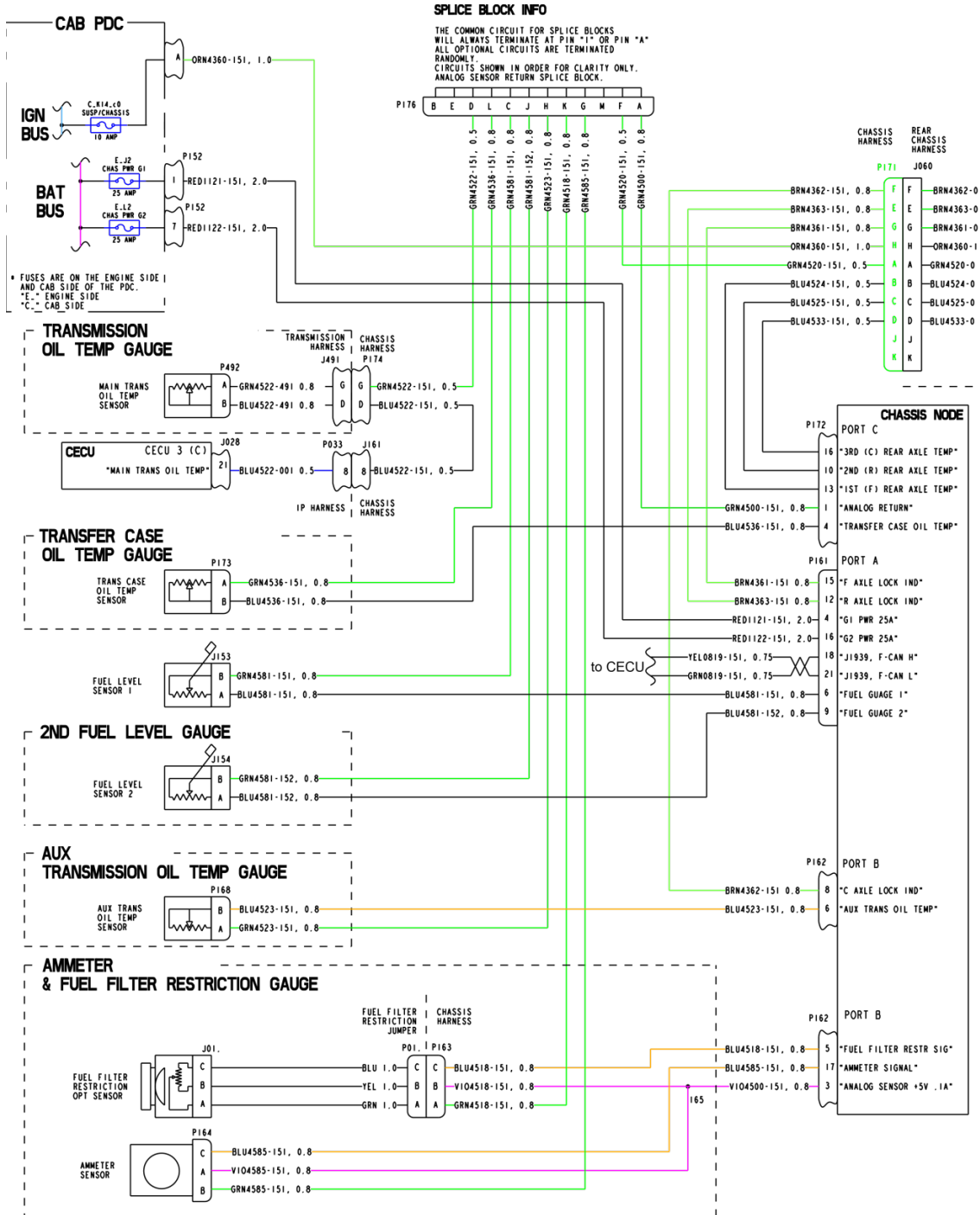


FIGURE 7-25. Installing Sensors on the Chassis Side for Gauges

TYPICAL INSTALLATION OF SENSORS

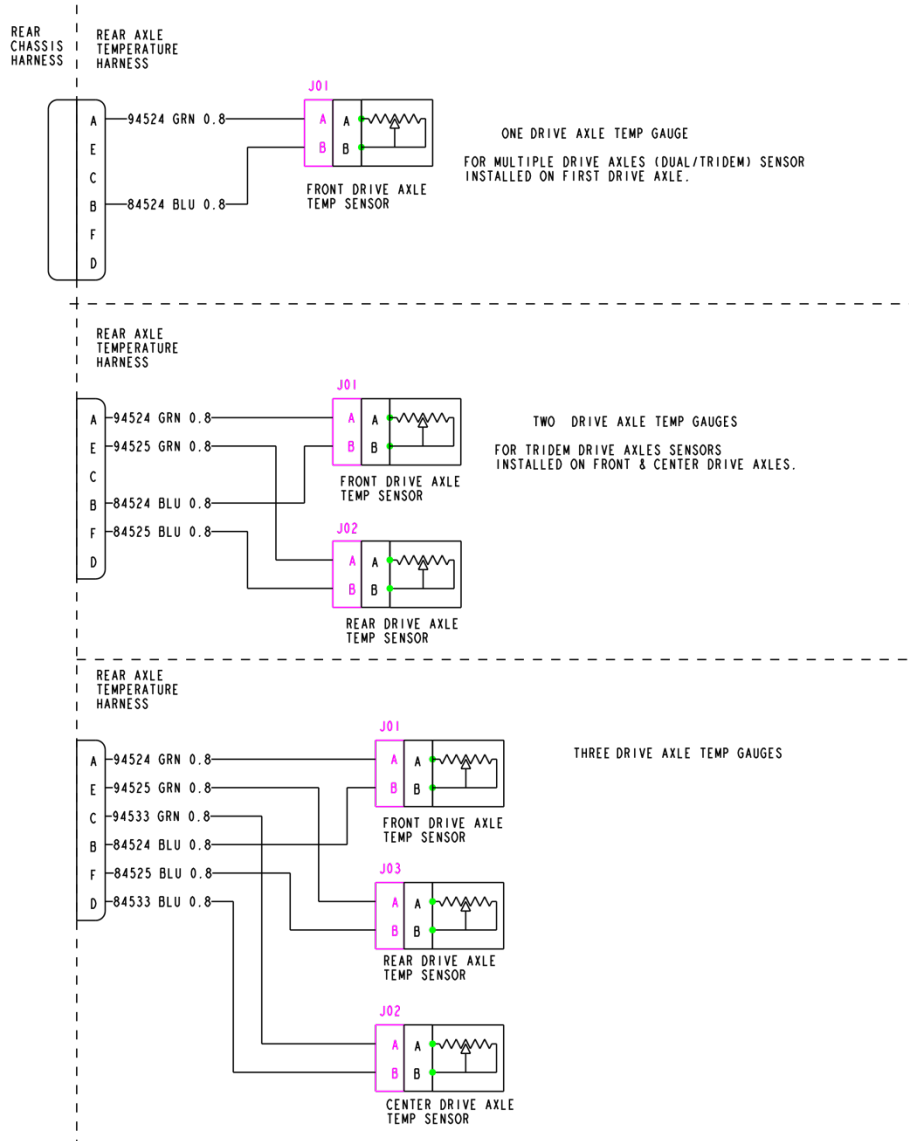


FIGURE 7-26. Typical Installation of Sensors Diagram

Spare power is found via a connector behind the fuse panel cover (left hand side of the dash, below the ignition switch). This connector is labeled P096.

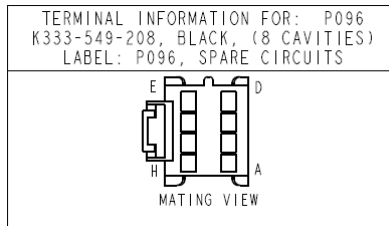


FIGURE 7-27. Spare Power Connector

LIFT AXLES (PUSHERS & TAG)

TRUCK LIFT AXLES

All truck lift axles (pushers and tag), are direct wire Electric-Only from the switch to the axle mounted solenoid. This is not from the EoA Solenoid Bank. There are a total of four lift axle controls available; 3 pushers and 1 tag axle. These are controlled with separate switches by default.

The customer can order the following configurations; steerable, non-steerable, with auto-reverse, and with park brake interlock. A lift axle comes with a control switch (single or separate), a gauge, and a regulator valve.

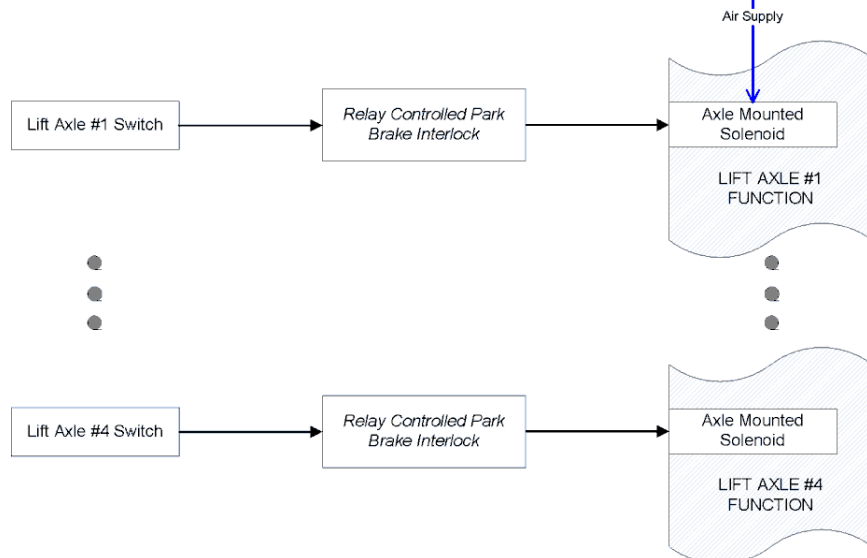


FIGURE 7-28. Truck Lift Axles (Separate Switches)

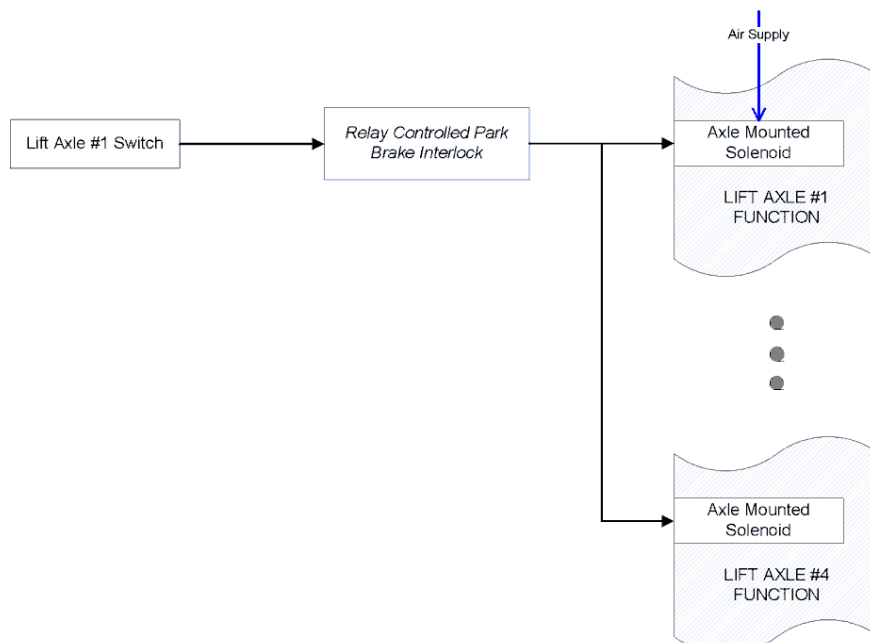


FIGURE 7-29. Truck Lift Axles (Single Switch)

TABLE 7-2. Truck Lift Axle Logic

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

TRAILER LIFT AXLES

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

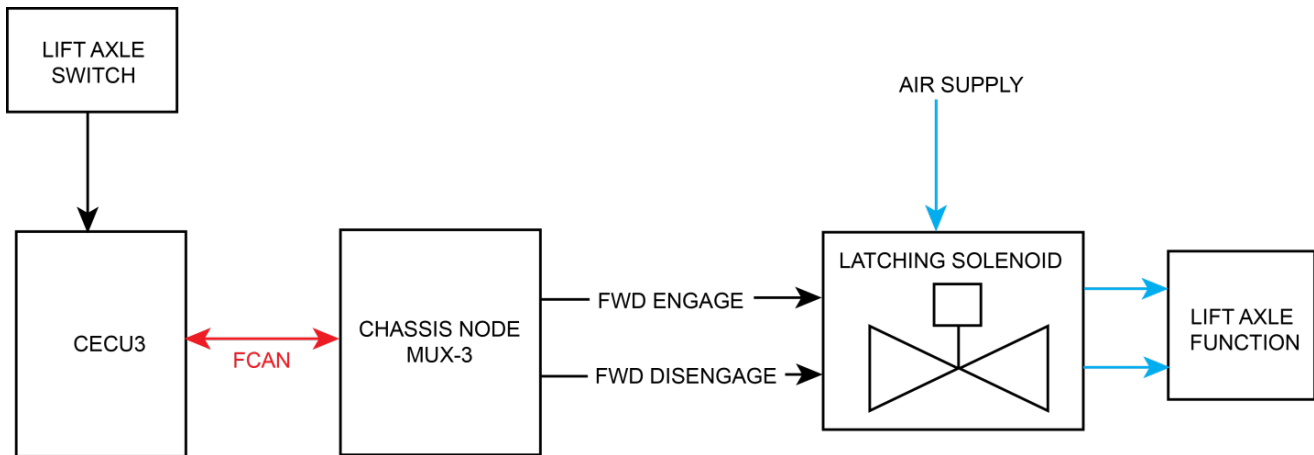


FIGURE 7-30. EoA Trailer Lift Axles

AIR SOLENOIDS

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

Air solenoids used on the vehicle are both of Latching and Non Latching types.

TABLE 7-3. Air Solenoid Types

Latching	Requires a signal voltage to close or open a solenoid. Will remain in position if power is disconnected. Physically, these require 2 spots on the bank compared to a non-latching valve.
Non-latching	Requires 12v to change a valve from its normal position. Will revert back to its normal position if power is disconnected.

For safety reasons, certain circuits are designed with latching type solenoid valves. These circuits include but are not limited to:

1. Air suspension dump (tractor and trailer)
2. 2 speed rear axle control
3. Lifiable axle controls (both on the vehicle and on the trailer)
4. Workbrakes for winches

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



NOTE: General air accessory, when ordered from the factory, is wired to a non-latching solenoid. Therefore, general air accessory options will reset when the ignition is turned off. If a latching solenoid is installed on a “furnish by owner” air accessory, the installer will need to document how the system operates.

REMOTE THROTTLE

Remote control of the PTO is performed through the 12-pin remote throttle connector on the engine harness. These are pins 1, 2, and possibly 6 (depending on engine) on J111_.

The 2010 and 2013 MX engine controller port (J2 pin 21) will report a PTO active when driven high (+12V DC). Since PTO and pump mode signals are low when active a relay is needed to convert the low signal to a high signal. When a PTO is specified on a chassis the MX engine harness will contain the optional remote throttle/PTO 12-way connector and cap (P111C/J111C).

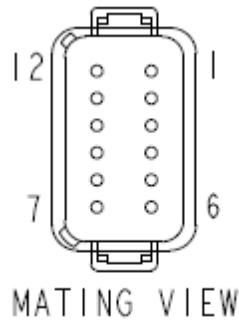


FIGURE 7-31. 12 Pin Connector

TABLE 7-4. MX engine (P111C/J111C)

Pin	Function
1	CECU INPUT FOR REMOTE PTO RESUME
2	CECU INPUT FOR REMOTE PTO SET
3	CECU INPUT FOR NAMUX ANALOG RETURN (TWISTED TRIPLE)
4	CECU INPUT FOR NAMUX PWR SUPPLY +5V (TWISTED TRIPLE)
10	CECU INPUT FOR REMOTE THROTTLE SENSOR CIRCUIT (TWISTED TRIPLE)
5	PTO ENGAGED SIGNAL (LOW = ENGAGED)
6	PUMP MODE ENGAGED SIGNAL (LOW = ENGAGED)
7	+12V 10A BODY IGN FUSE E_E9
8	VEHICLE GROUND
9	NOT USED
11	+12V 20A ENG PWR (MX) FUSE E_N9
12	NOT USED

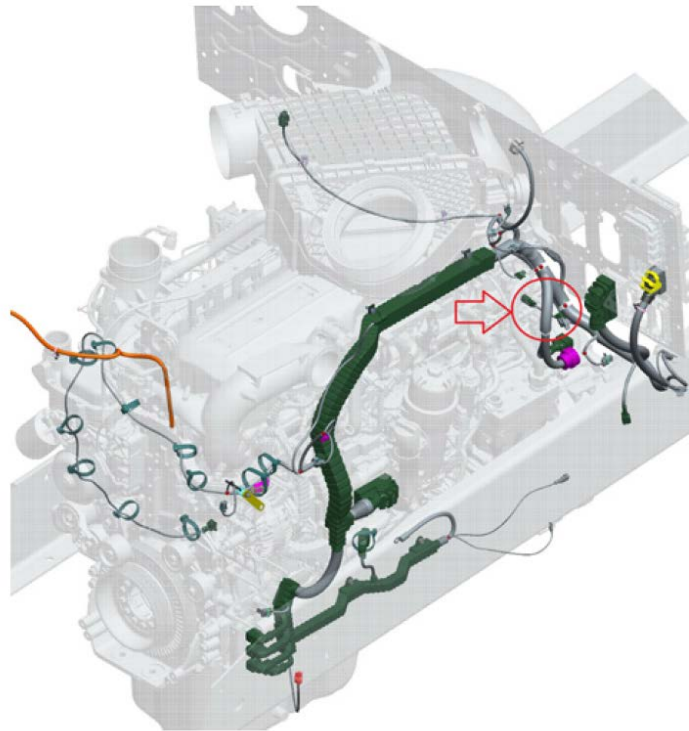


FIGURE 7-32. MX-13 Connection location.

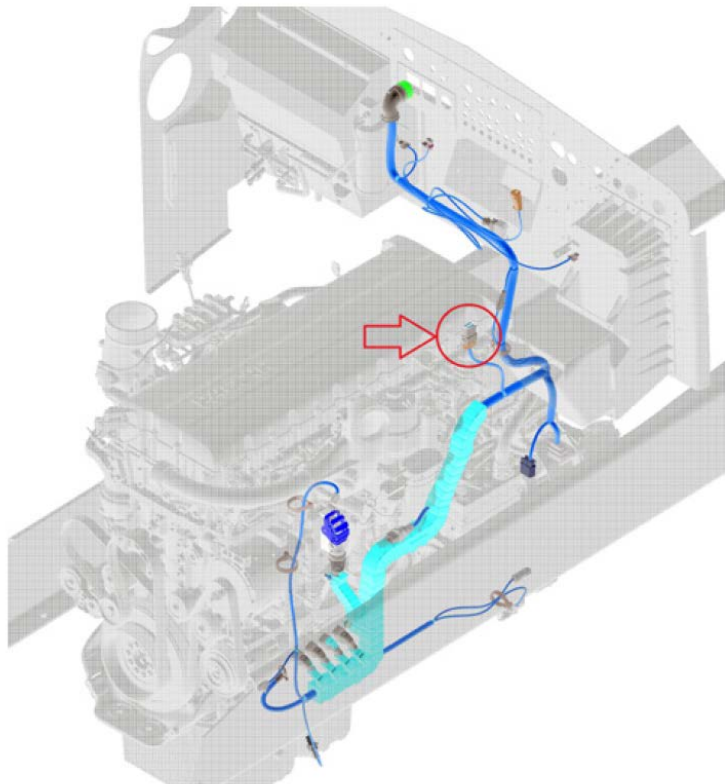


FIGURE 7-33. MX-11 Connection location.

The 2010 ISX engine controller port (J3 pin 39) and the 2013 ISX engine controller port (J2 pin 94) will report a PTO active when driven low (Ground). When a PTO is specified on a chassis the ISX engine harness will contain the optional remote throttle/PTO 12-way connector and cap (P111A/J111A).

TABLE 7-5. ISX Remote Throttle/PTO Connector P111A/J111A:

Pin	Function
1	CC/REMOTE PTO RESUME SWITCH
2	CC/REMOTE PTO SET SWITCH
3	COMMON RTN #1 (SW)
4	REMOTE THROTTLE SENSOR CIRCUIT (TWISTED TRIPLE)
10	SENSOR SUPPLY +5V (TWISTED TRIPLE)
11	COMMON RTN #3 (SENSOR) (TWISTED TRIPLE)
5	PTO ENGAGED SIGNAL (LOW = ENGAGED)
6	CC/PTO ON/OFF SWITCH
7	+12V 10A BODY IGN FUSE E_E9
8	VEHICLE GROUND
9	TORQUE LIMIT SWITCH
12	REMOTE THROTTLE ON/OFF

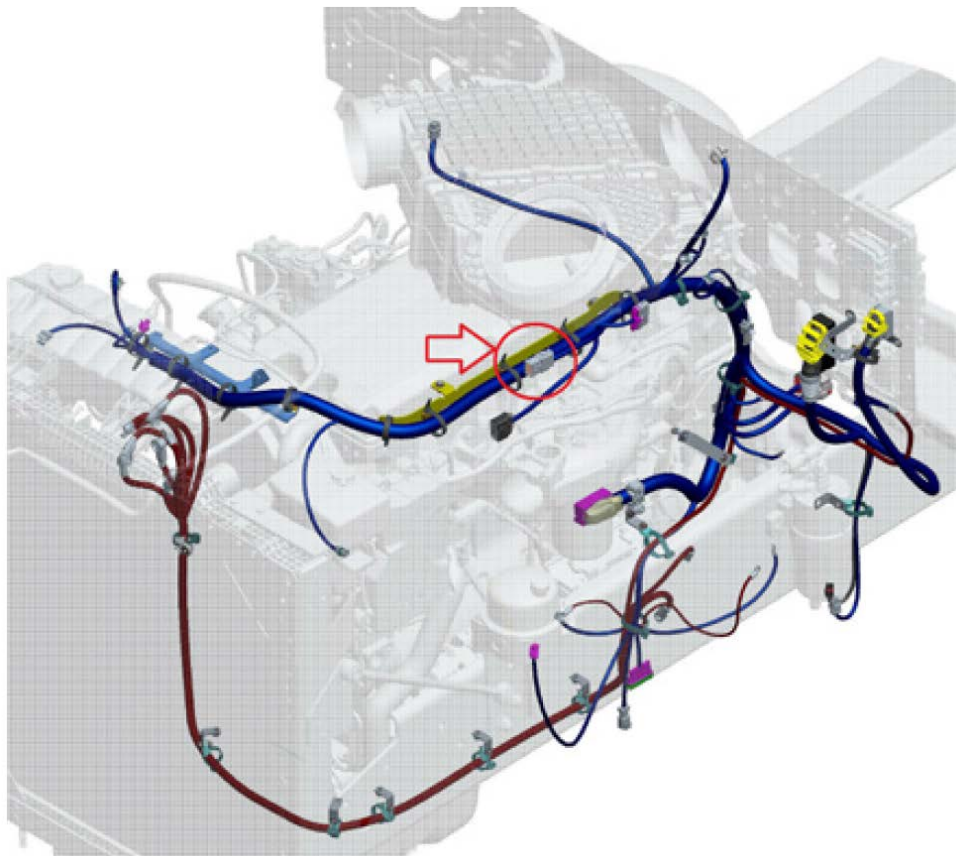


FIGURE 7-34. ISX15 Connection location

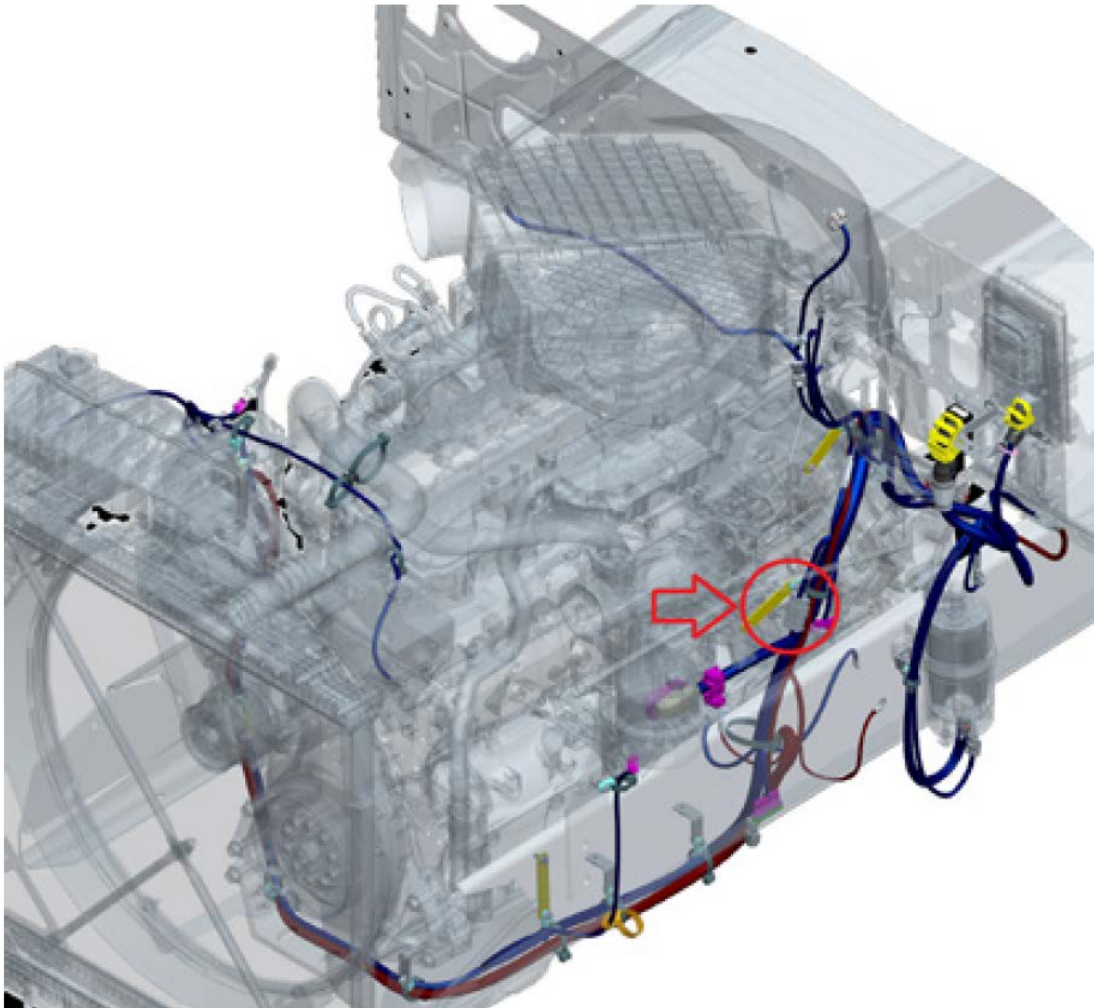


FIGURE 7-35. ISX12 Connection location.

Focusing on the PACCAR MX-13, the electrical design requires an additional relay to turn the normally LOW PTO engage signal into a 12V HIGH signal to the engine ECU.

Chassis node connector pin reference (Port C).

The label 'C' will be in raised lettering on the chassis node.

TABLE 7-6. EoA Chassis Node Guide

EoA switch number	Port C Pin location
1	2
2	3
3	5
4	6
5	8
6	9
7	11
8	12

CECU input locations for EOA Switches from the dash.

This connector is the center most connector and has 52 pins.

TABLE 7-7. EoA CECU Guide

EoA switch number	CECU (connector C) Pin location
1	3
2	26
3	17
4	18
5	19
6	20
7	22
8	24

CAB ECU PARAMETER REFERENCE TABLE

Cab ECU parameters are used to define whether a function is turned on in the system. Control hardware may be installed, however it will not function until the software is programmed to use it.

TABLE 7-8. CECU Parameters

Q30-1024-005	Cruise Control Set Switch Accel or Decel	0	1	Parameter is used to define the cruise control set/resume switch functionality. Value 0/Disabled means set switch is used for accelerate, and resume switch is used for decelerate. Value 1/Enabled means set switch is used for decelerate, and resume switch is used for accelerate.
Q30-1024-006	Cruise Control Present	0	1	Parameter is used to determine if cruise control is installed and controls the cruise control messages to the engine. Value 0/Disabled means cruise control switches are not installed. Value 1/Enabled means cruise control switches are installed.
Q30-1024-039	PTO Oil Temperature Gauge Installed	0	1	Valve 0/Disabled means gauge is not installed. Valve 1/Enable means gauge is installed.
Q30-1024-042	Transfer Case Oil Temperature Gauge Installed	0	1	Parameter controls the functionality (output on CVSG bus and DTC's) of the transfer case oil temperature gauge. Value 0/Disabled means Transfer Case Oil Temperature Gauge is not installed. Value 1/Enabled means Transfer Case Oil Temperature Gauge is installed.
Q30-1024-047	Engine Fan Override Present	0	1	Parameter is used to determine if the fan override switch is installed. Value 0/Disabled means engine fan override switch is not installed. Value 1/Enabled means engine fan override switch is installed.
Q30-1024-058	Transfer Case Temperature Sensor Type	0	1	Parameter is used to determine which type of transfer case temperature sensor is installed for the transfer case temperature gauge. This determines the input range. Value 0 means Transfer Case Temperature Sensor Type = Delphi. Value 1 means Transfer Case Temperature Sensor Type = Siemens (or Continental).
Q30-1024-060	PTO Control Present	0	1	Parameter is used to determine the presence of PTO controls. (For CUMMINS engine, default value is 1 -Cruise Control PTO idle bump). Value 0/Disabled means PTO Control functionality is disabled. Value 1/Enabled means PTO Control functionality is enabled.
Q30-1024-063	Remote PTO Present	0	1	Parameter is used to determine if the remote PTO switches are installed (PACCAR engines only). Value 0/Disabled means Remote PTO switches are not installed. Value 1/Enabled means Remote PTO switches are wired to CECU and functionality is enabled.
Q30-1024-075	Engine Fan With Park Brake Installed	0	1	Parameter is used to determine if an engine fan override is available to the operator. This override will allow the operator to turn the engine fan on when the park brakes are set and the engine ECU permits the fan to turn on. Value 0/ Disable means that this function is not enabled and the operator cannot control when the engine fan turns on. Value 1/Enabled means that the operator may turn the engine fan on when the park brakes are on and the engine ECU permits the fan to be on.
Q30-1024-132	Engine Fan on with AC and Park Brake	0	1	Parameter is used to determine if an engine fan override is available to the operator. This override will allow the operator to turn the engine fan on when the park brakes are set, A/C is ON and the engine ECU permits the fan to turn on. Value 0/ Disable means that this function is not enabled and the operator cannot control when the engine fan turns on. Value 1/Enabled means that the operator may turn the engine fan on when the park brakes are on, A/C is ON and the engine ECU permits the fan to be on.
Q30-1024-156	PTO Total Fuel Fault Enabled	0	1	Parameter is used to determine if the PTO total fuel fault message is enabled. Value 0/Disabled means the PTO total fuel fault message is disabled. Value 1/Enabled means the PTO total fuel fault message is enabled.
Q30-1024-160	Electric Over Air Function 1			Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-161	Electric Over Air Function 2			Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-162	Electric Over Air Function 3			Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-163	Electric Over Air Function 4			Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-164	Electric Over Air Function 5			Parameter is used to set the function that is installed to this EOA switch-output pair

Q30-1024-165	Electric Over Air Function 6	Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-166	Electric Over Air Function 7	Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-167	Electric Over Air Function 8	Parameter is used to set the function that is installed to this EOA switch-output pair
Q30-1024-168	Electric Over Air Function 1 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-169	Electric Over Air Function 2 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-170	Electric Over Air Function 3 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-171	Electric Over Air Function 4 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-172	Electric Over Air Function 5 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-173	Electric Over Air Function 6 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-174	Electric Over Air Function 7 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair
Q30-1024-175	Electric Over Air Function 8 Speed Cutoff	Parameter is used to set the interlock speed cutoff for the corresponding EOA switch-output pair

INTERLOCK PROGRAMMING DETAILS

- * = Latching Type Solenoid, requires two MUX3P outputs to control on/off.
- ¹ = Dual Single Type Solenoid, function is called twice to achieve two inputs and two outputs.
- ² = Dual Single Type Solenoid, function must called as a pair with the Main and Opposite direction to achieve two input and two outputs.
- ³ = Momentary switch input.

TABLE 7-9. Interlocks

#	Function	Interlock	Default	Range	Options for Interlock
1 *	Air Suspension Dump w/ Park Brake Interlock	Under Speed Threshold & Park Brakes Set	7	0-10	Optional Add
2 *	Air Suspension Dump	Under Speed Threshold & Park Brakes Set	7	0-10	Standard
3 *	Trailer Suspension Dump	Under Speed Threshold & Park Brakes Set	7	0-10	Standard
4 *	Trailer Suspension Dump w/ Park Brake Interlock	Under Speed Threshold & Park Brakes Set	7	0-10	Optional Add
5	Trailer Lift Axle (single)	None			Standard
6	Trailer Lift Axle (Forward)	None			Standard
7	Trailer Lift Axle (Rear)	None			Standard
8	Air Suspension Over-Inflation	Under Speed Threshold	25	0-40	Standard Non-Configurable
9	Two-Speed Rear Axle w/ Park Brake Interlock	Inter-Axle Diff. Lock Switch Off & Park Brakes Set			Optional Add
10	Two-Speed Rear Axle	Inter-Axle Diff. Lock Switch Off			Standard

#	Function	Interlock	Default	Range	Options for Interlock
11	Fifth Wheel Slide	Under Speed Threshold	7	0-10	Standard
12	Front-Axle Declutch	Under Speed Threshold	25	0-70	Standard
13	Inter-Axle Differential Lock	Under Speed Threshold	25	0-70	Standard Non-Configurable
14 ³	Kingpin Release (Momentary)	Park Brakes Set			Standard
15	Rear Axle Declutch (aka. Transfer Case Engage)	Under Speed Threshold & Transmission In Neutral	7	0-10	Standard Non-Configurable
16	Transfer Case Hi/Low	Under Speed Threshold & Transmission In Neutral	7	0-10	Standard Non-Configurable
17 ¹	Aux Trans 3-Position Control (AT1202) w/ Park Brake Interlock	Park Brakes Set			Optional Add
18	Front Axle Declutch <i>(not currently used)</i>	Under Speed Threshold	25	0-70	Standard
19 ¹	PTO 2-Position (Fwd/Rev) w/ Park Brake Interlock	Park Brakes Set			Optional Add
20	PTO #1 w/ Park Brake Interlock	Park Brakes Set			Optional Add
21	PTO #2 w/ Park Brake Interlock	Park Brakes Set			Optional Add
22	Trailer Dump Gate (single) w/ Speed Interlock (EoA version - KW ONLY)	Under Speed Threshold	25	0-40	Optional Add
23	Trailer Belly Dump (Center) w/ Speed Interlock <i>(not currently used)</i>	Under Speed Threshold	25	0-40	Optional Add
24	Trailer Belly Dump (Forward) w/ Speed Interlock (EoA version - KW ONLY)	Under Speed Threshold	25	0-40	Optional Add
25	Trailer Belly Dump (Rear) w/ Speed Interlock (EoA version - KW ONLY)	Under Speed Threshold	25	0-40	Optional Add
26	Truck Dump Gate w/ Speed Interlock (EoA version - KW only)	Under Speed Threshold	25	0-40	Optional Add
27	Wheel Diff. Lock Axle (Single Rear) w/ Speed Interlock	Under Speed Threshold	25	0-40	Optional Non-Configurable
28	Wheel Diff. Lock Axle (Forward Rear) w/ Speed Interlock	Under Speed Threshold	25	0-40	Optional Non-Configurable
29	Wheel Diff. Lock Axle (Center Rear) w/ Speed Interlock	Under Speed Threshold	25	0-40	Optional Non-Configurable

#	Function	Interlock	Default	Range	Options for Interlock
30	Wheel Diff. Lock Axle (Rear Rear) w/ Speed Interlock	Under Speed Threshold	25	0-40	Optional Non-Configurable
31	Wheel Diff. Lock Axle (Dual Rear) w/ Speed Interlock	Under Speed Threshold	25	0-40	Optional Non-Configurable
32	Wheel Diff. Lock Axle (Front Drive) w/ Speed Interlock	Under Speed Threshold	25	0-40	Optional Non-Configurable
33	Air Accessory (Non-Latching) w/ Park Brake Interlock	Park Brakes Set			Optional Add
34	Air Accessory (Non-Latching)	None			Standard
35 ¹	Aux Trans 3-Position Control (AT1202)	None			Standard
36 ¹	PTO 2-Position (Fwd/Rev)	None			Standard
37	PTO #1	None			Standard
38	PTO #2	None			Standard
39	Trailer Dump Gate (single)	None			Standard
40	Trailer Belly Dump (Center) <i>(not currently used)</i>	None			Standard
41	Trailer Belly Dump (Forward)	None			Standard
42	Trailer Belly Dump (Rear)	None			Standard
43	Trailer Tow / Pintle Hook	None			Standard
44	Truck Dump Gate	None			Standard
45	Wheel Diff. Lock Axle (Single Rear)	None			Standard
46	Wheel Diff. Lock Axle (Forward Rear)	None			Standard
47	Wheel Diff. Lock Axle (Center Rear)	None			Standard
48	Wheel Diff. Lock Axle (Rear Rear)	None			Standard
49	Wheel Diff. Lock Axle (Dual Rear)	None			Standard
50	Wheel Diff. Lock Axle (Front Drive)	None			Standard
51	Winch Clutch	None			Standard
52 *	All Brakes/ Work Brakes w/ Speed Interlock (a.k.a Winching Brake)	Under Speed Threshold	7	0-10	Standard
53 *	All Brakes/ Work Brakes (a.k.a Winching Brake)	None			Standard
54 *	Double Acting PTO <i>(not currently used)</i>	None			Standard
55 *	Double Acting PTO	Park Brake			Optional Add

#	Function	Interlock	Default	Range	Options for Interlock
	<i>(not currently used)</i>				
56 ²	Reversible PTO – Main Direction Switch Input <i>(not currently used)</i>	None			Standard
57 ²	Reversible PTO – Opposite Direction Switch Input <i>(not currently used)</i>	None			Standard
58 ²	Reversible PTO – Main Direction Switch Input <i>(not currently used)</i>	Park Brake			Optional Add
59 ²	Reversible PTO – Opposite Direction Switch Input <i>(not currently used)</i>	Park Brake			Optional Add
60	Interlock Only – Park Brake	Park Brake			Standard
61	Interlock Only - Speed	Under Speed Threshold	25	0-70	Standard

TRANSMISSION BACK UP SIGNALS

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

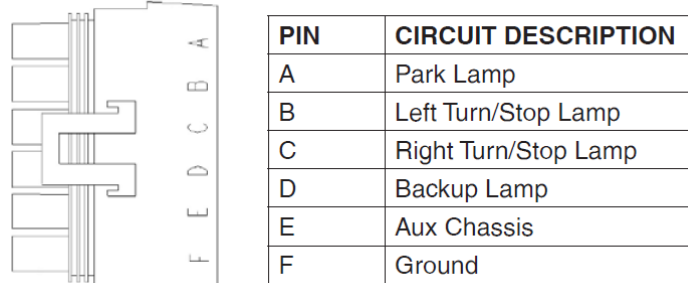


FIGURE 7-36. Mating Connector: Packard PN 12020786

JUNCTION BOX

The junction box provides easy access to various signals.

Connection diagram

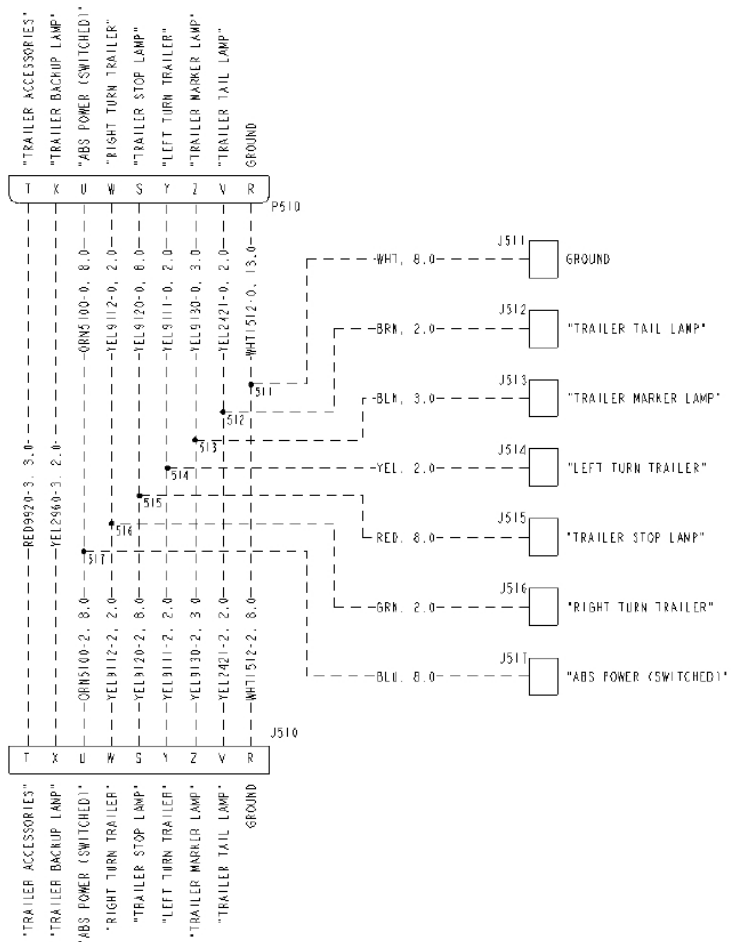
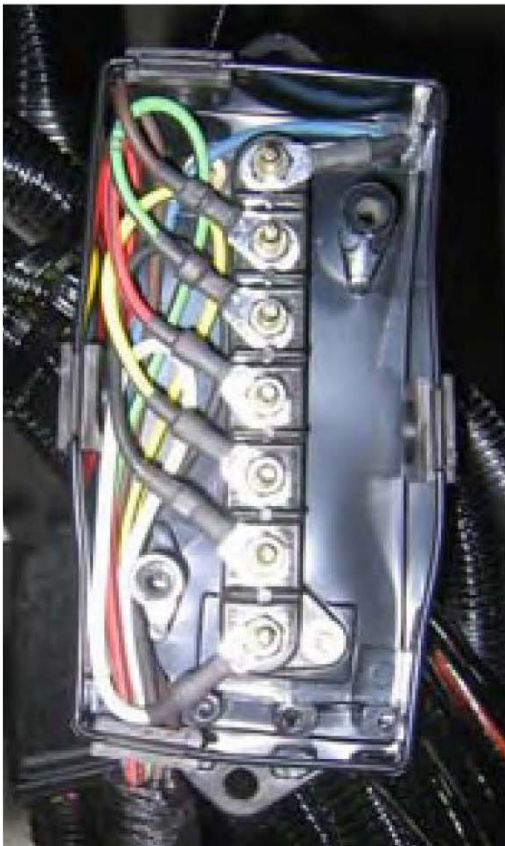


FIGURE 7-37. Junction Box BOC or EOF

SNOW PLOW LIGHTING

When the optional switch and wiring for snow plow lights are ordered, the truck will include a switch on the dash to control the snow plow lights and a body builder connection at the front of the chassis.

The body builder connection will provide electrical support for:

- LH TURN/FRONT DAYTIME RUNNING LIGHT
- RH TURN/FRONT DAYTIME RUNNING LIGHT
- LH SIDE TURN LIGHT
- RH SIDE TURN LIGHT
- CAB PARK LAMP
- LH LOW BEAM
- RH LOW BEAM
- LH HIGH BEAM
- RH HIGH BEAM
- GROUND

J1939



Warning! The J1939 databus is the communication link between the engine and the Anti-Lock Braking System (ABS). Only J1939 compatible devices should be added to the databus. Some J1939 compatible aftermarket devices may disrupt the ability of the databus to communicate. If the databus is disrupted by an aftermarket device, it must be removed from the databus.

Guidelines - J1939 Circuit Requirements

- Circuits added must be a twisted pair consisting of a minimum of 1 twist per inch.
- Individual breakout length of circuits added cannot exceed 118 inches.
- Do not splice into existing J1939 circuits. Use the connection points provided.
- J1939 circuits are for data transmission only and are not to be used for power or ground circuits.
- Any modifications must conform to SAE J1939.

J1939 Access

All Peterbilt vehicles include J1939 circuitry. The J1939 circuit can be accessed in two locations. The first access is located inside the dash near the diagnostic connector. The second access is at the driver side toward the rear of the engine.

1. Dash Access - Connector located in dash behind key switch panel approximately 1 foot down the harness



FIGURE 7-38. Dash Access

2. Engine Access - Connector located on OEM engine harness on driver's side of engine toward the rear of engine



FIGURE 7-39. Engine Access

J1939 Access Procedures

1. Identify J1939 Access Connector (note long blue shell)
2. Disconnect connection (note terminating resistor from inside blue connector)

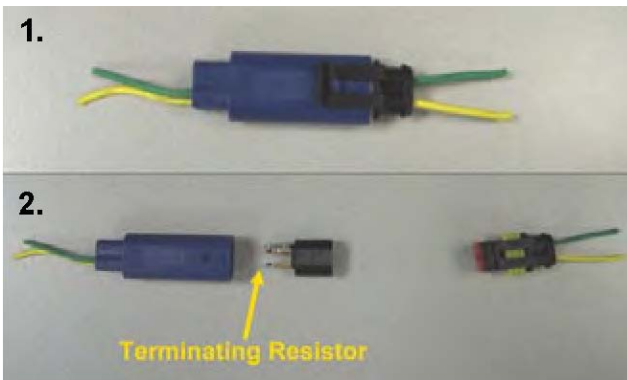


FIGURE 7-40. J1939 Access

3. Make connection in between original connection (tin).
4. Ensure terminating resistor is inserted in blue connector shell (arrow).



FIGURE 7-41. J1939 Access

The following pigtails are available at PACCAR parts for J1939:

- | | |
|---------------|---|
| 1. PB-H-1006 | Connector pigtail with terminating resistor |
| 2. PB15171 | Connector pigtail without terminating resistor |
| 3. 1-968849-1 | Terminal for Model 579 splice pack (18-20 gauge wire) |

HOW DO I...

This section is created to provide specific instructions to completing the installation. Please refer to the section for dash board to access dash panels for switches and gauges.

INSTALL A MULTIPLEXED INSTRUMENT

Generally, installing gauges and switches into the dash board will require installing pins in a connector of the CECU if a connector is not present. The CECU will then need to be re-programmed to accept the new instruments.

INSTALL AND AIR OPERATED EXTERNAL DEVICE

After installing the instruments in the cab, and before re-programming the CECU, the electric over air solenoid will need to be installed onto the solenoid bank. These instructions do not apply to vehicles that have all spaces on the solenoid bank already in use by some device.

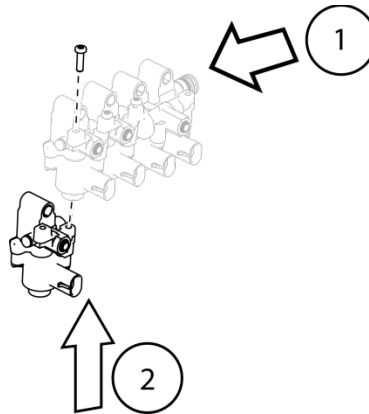


FIGURE 7-42. Install Solenoid

Once the solenoid is installed, wiring must be installed between the chassis node and the solenoid. Then the ground wire should be installed between the solenoid and the ground splice. Air supply to the solenoid bank is already in place, but air lines from the output of the solenoid to the air operated device will need to be installed.

RE-PROGRAM THE CECU

The CECU may be programmed by using the software Electronic Service Application (ESA). The engine will need to be programmed using the engine specific software.

INSTALL NEW TELLTALE ICONS INTO THE INSTRUMENT CLUSTER

To install new telltales into the instrument cluster, the cluster will need to be removed from the dash. The instrument panel trim is removed after removing the panel immediately to the right of the instrument cluster. Then 4 fasteners hold the instrument cluster to the dash structure. Refer to the Dash removal chapter to identify the location of the telltale icon tray.

ACCESS THE SOLENOID BANK AND CHASSIS NODE

Accessing these two items will require opening the hood and removing the fairings. After the fairings are removed, the battery box/batteries will need to be removed from the frame rail. This process will provide open access to the chassis node, solenoid bank and all electrical connectors.

The solenoid bank and chassis node may be removed without removing the battery box, however this will not provide access to the splice block needed for ground connection.

GET THE SUSPENSION AIR BAGS TO DEFLATE WHEN THE PTO IS ON

Dump body applications will be able to utilize a function such that when the PTO is active (and the dump body is being lifted), the body is sitting on the suspension bump stops. This provides a more stable platform than the airbag.

EE_PAR_EOA_bool_SuspensionDumpWithPTOActivation enables this functionality. If any switch is configured to be a PTO switch and any switch is configured to be Suspension Dump, the Suspension Dump switch shall be considered as active. All existing Suspension Dump interlocks must still pass for the suspension to be dumped.

INSTALL ELECTRIC OVER AIR SOLENOIDS

The models 567 and 579 utilize electric solenoids to control air supply to various air operated functions and equipment on the chassis. The solenoids will be located either under the cab just behind the driver's side front cab mount for chassis built prior to 1/1/2016 as shown in Figure 7-44, or behind the back of cab crossmember for chassis built after 1/1/2016 as shown in Figure 7-45. The solenoid bank consists of two types of solenoids, latching and non-latching. An example of both can be seen below in Figure 7-43. Latching solenoids take up two spots on the solenoid bank and require a 12V signal to close or open and will remain in the position it is in if power is disconnected. Latching solenoids are typically used where the circuit requires a built in safety mechanism that would require the air supply to stay connected even with the ignition key in the off position. Non-latching solenoids require a 12V signal to change the valve from its normal position and will revert back to its normal position if power is disconnected. Some examples of circuits that will always be on a latching type solenoid include the air suspension dump, 2 speed rear axle control, liftable axle controls, and workbrakes for winches.

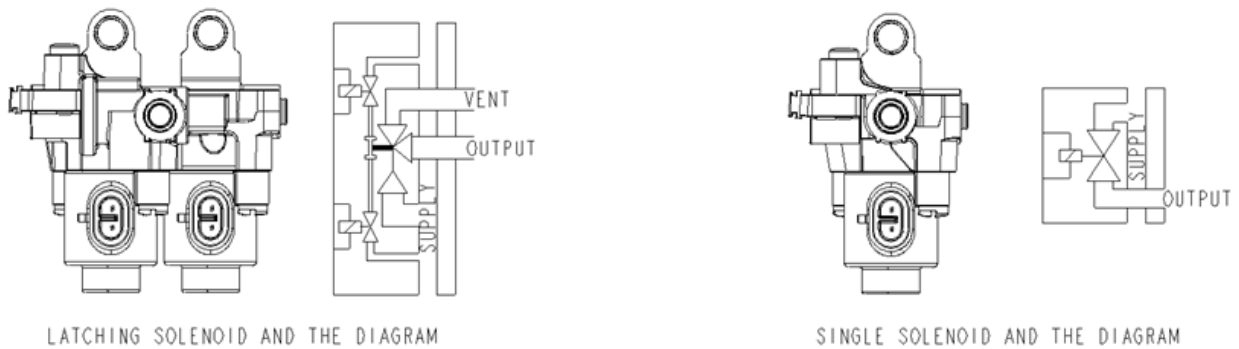


FIGURE 7-43. Diagrams of Latching and Non-Latching Solenoids

The solenoid bank contains up to 10 solenoid positions. Latching solenoids will occupy 2 spaces while non-latching solenoids occupy only one position. Positions 1-8 are controlled by multiplexed signals and are wired directly to the chassis node control unit. Position 9 and 10 are hard wired and can be controlled directly by a dash switch. Latching solenoids may only occupy positions 1 & 2, 3 & 4, or 6 & 7. Non-latching solenoids may be placed in any position available.

EOA Solenoid Location on chassis built before 1/1/2016. Located under cab, drivers side above frame rail.

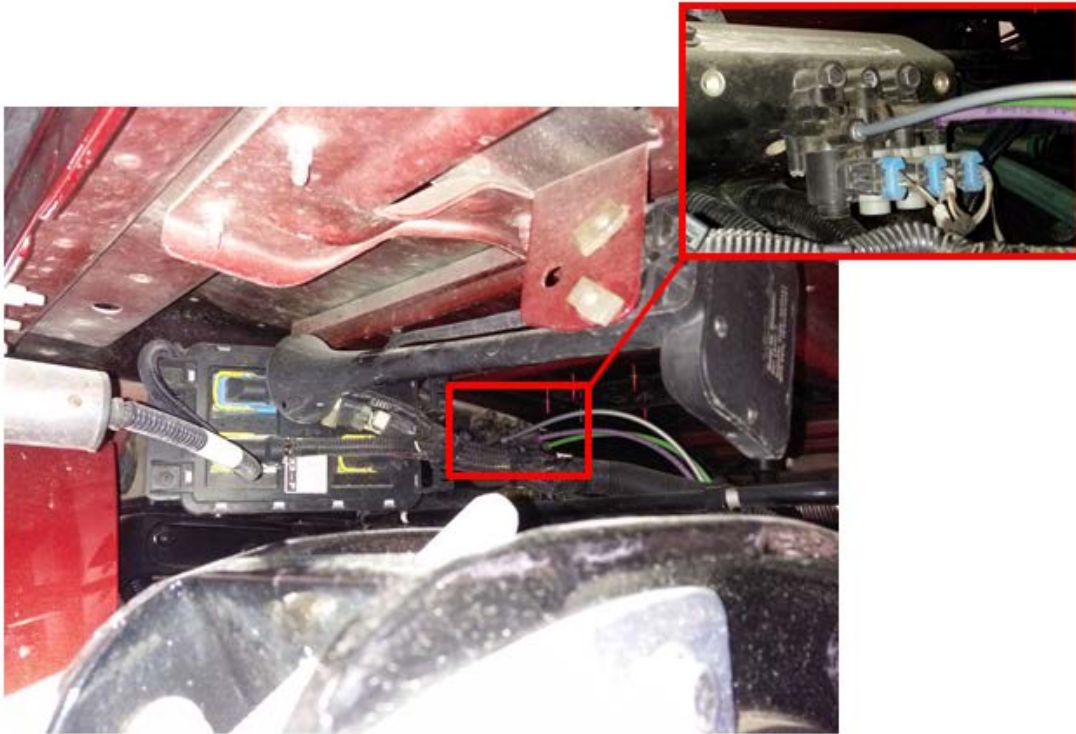


FIGURE 7-44. EOA Solenoid Location for Chassis Built Prior to 1/1/2016

EOA Solenoid Location on chassis built after 1/1/2016



FIGURE 7-45. EOA Solenoid Location for Chassis Built After 1/1/2016

Sample solenoid layout and solenoid part numbers. Location shown for chassis built before 1/1/2016.

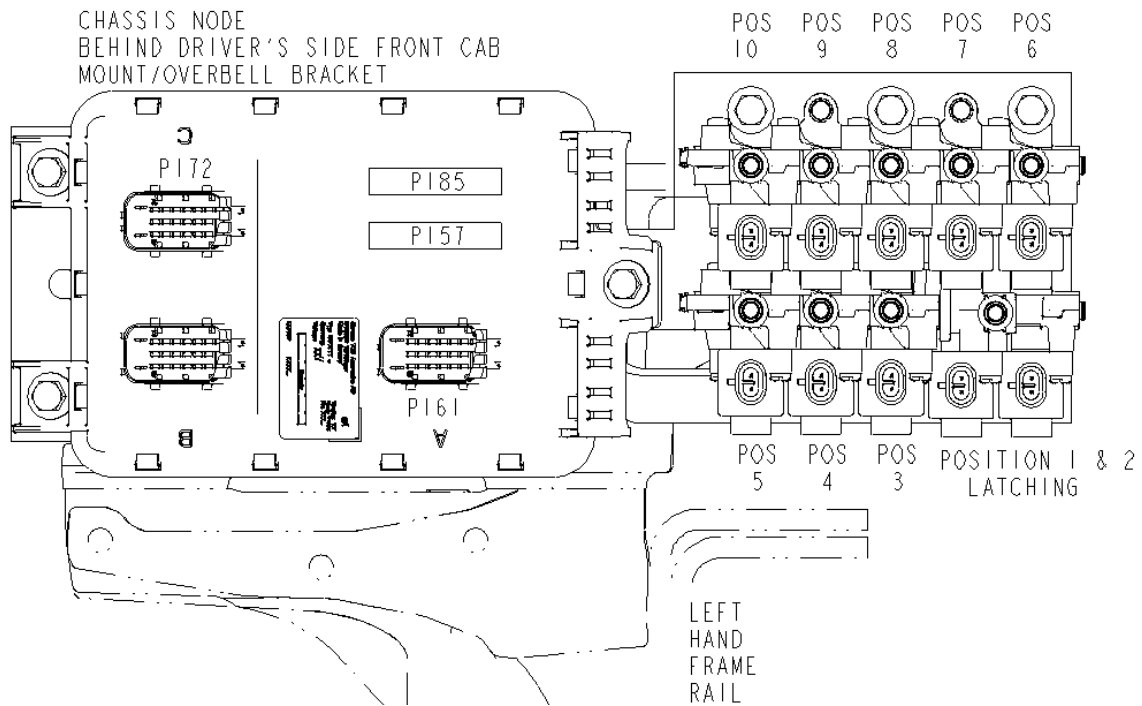


FIGURE 7-46. EOA Solenoid Layout and Positions for Chassis Built Prior to 1/1/2016

Sample solenoid layout and solenoid part numbers. Location shown for chassis built before 1/1/2016.

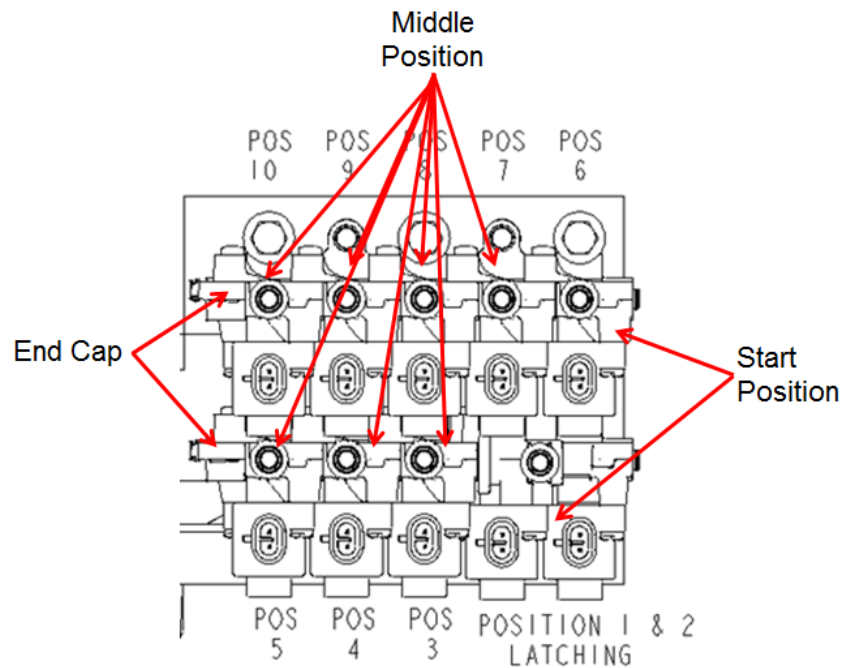


FIGURE 7-47. EOA Solenoid Position Example

Table 7-10. EOA Solenoid Part Numbers By Position

Position	Latching	Hose fitting	Part Number
Start	No	Nylon	K073056BXW
Start	No	Flare Fitting	K073057BXW
Middle	No	Nylon	K073055BXW
Middle	No	Flare Fitting	K073221BXW
Start	Yes	Nylon	K073062BXW
Start	Yes	Flare Fitting	K073063BXW
Middle	Yes	Nylon	K073061BXW
Middle	Yes	Flare Fitting	K073223BXW
End Cap	NA	NA	K073091BXW

INSTALL AND REMOVE SOLENOID BANK ASSEMBLY

Disassembly of the solenoid bank to add or remove solenoids is simple. Remove any bolts holding the solenoid bank to the mounting location. Remove the two screws from the end cap, and the screws from in between the solenoid(s) you want to remove. Twist the solenoid to unlock it and solenoid should be free as shown in Figures 7-48 and 7-49.



FIGURE 7-48. 23 EOA Solenoid Disassembly



FIGURE 7-49. Disassembled EOA Solenoid

PROGRAM SOLENOID

When programming a non-latching solenoid, the parameter in ESA will match the position that the solenoid is located in and the pigtail that solenoid is connected to. In the example shown in Figure 7-50, a non-latching solenoid is connected to the pigtail for “EOA SOL #1” and corresponds to the parameter “Electric Over Air Function 01” to control an interaxle diff lock with a speed interlock. The pigtail for “EOA SOL #2” and corresponds to the parameter “Electric Over Air Function 02” and is set to control PTO #1 without an interlock.

Description	Locked	Value
Electric Over Air Function 01		Interaxle Differential Lock w/ Speed Interlock
Electric Over Air Function 01 Speed Cutoff		Default
Electric Over Air Function 02		PTO #1
Electric Over Air Function 02 Speed Cutoff		Default

FIGURE 7-50. Example of EOA Solenoid Programming

When programming a latching solenoid, it will require two pigtail connectors per solenoid. In the example shown in Figure 7-51 an air suspension dump latching solenoid with a speed interlock is in positions 1 & 2 on the solenoid bank and connected to the pigtails for “EOA SOL #1” and “EOA SOL #2”. The lowest position of the pigtails will be programmed as the latching function, while the higher number pigtail will be programmed as “None”.

Description	Locked	Value
Electric Over Air Function 01		Air Suspension Dump w/ Speed Interlock
Electric Over Air Function 01 Speed Cutoff		Default
Electric Over Air Function 02		None
Electric Over Air Function 02 Speed Cutoff		Default

FIGURE 7-51. Example of EOA Solenoid Programming

OPERATE PTO EOA

For chassis equipped with manual or Eaton automated transmission the PTO air supply will be EOA controlled. The PTO EOA solenoid is a non-latching solenoid and may be placed in various solenoid positions depending on chassis options. If the PTO option ordered is a double acting PTO, the PTO air supply will still use a single non-latching EOA solenoid, but an inversion valve will be included on the chassis. The inversion valve will be mounted on the transmission. Plugs will be used on most F/O PTO plumbing.

Typical Plumbing for Single Acting PTO

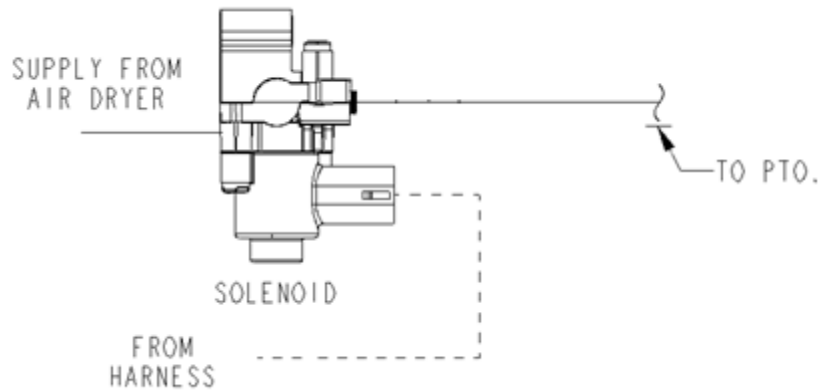


FIGURE 7-52. Single Acting PTO EOA Solenoid Schematic

Typical Inversion Valve Plumbing for Double Acting PTO

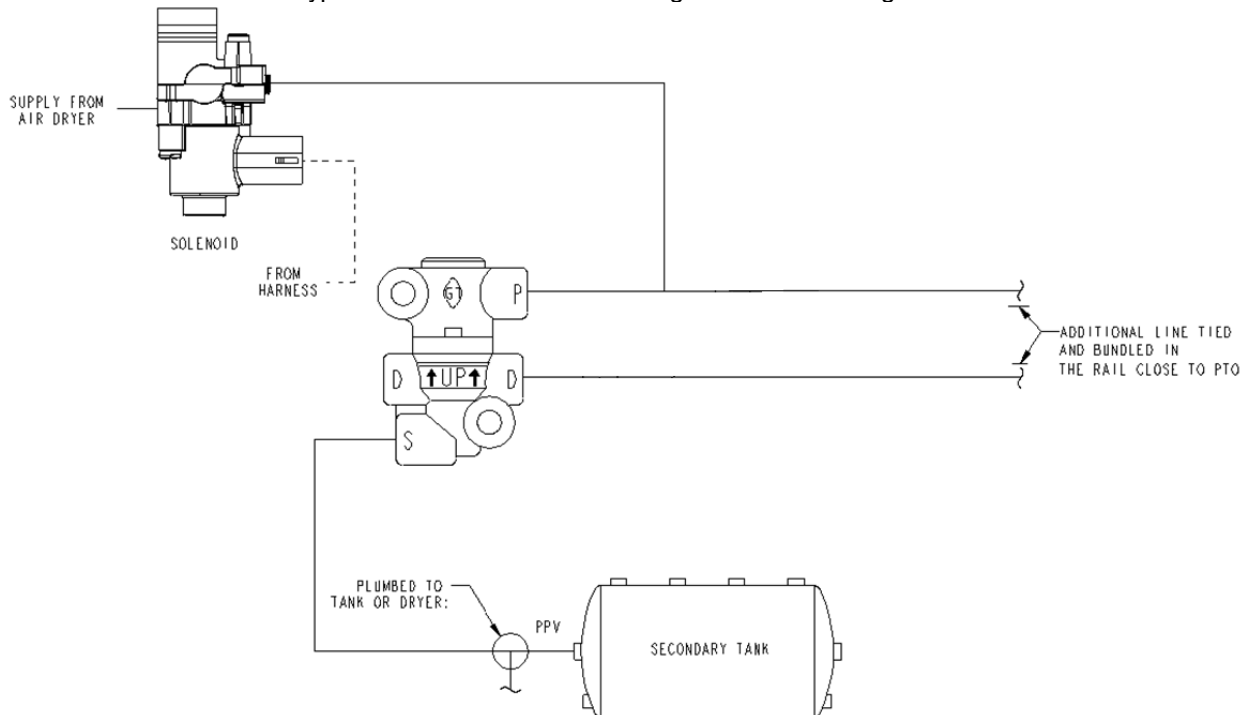


FIGURE 7-53. Double Acting PTO EOA Schematic

ALLISON TRANSMISSION EOH FUNCTIONALITY AND CONNECTION

Chassis equipped with an Allison transmission that will be fitted with a transmission driven PTO will use electric over hydraulic control for the PTO. When ordered properly, the Allison transmission harness will have one of two connectors to plug into the PTO solenoid. Referencing Figure 7-54 on the next page, connector P623 will be on chassis ordered with a furnished by owner Muncie PTO, and connector P621 will be on chassis ordered with a furnished by owner Chelsea PTO. If neither of these options is specified, the PTO chassis side wiring will have to be added by the body builder. The cab side wiring will be tied to the option code for the electric over hydraulic (EOH) dash mounted switch.

Explanation of Circuit Functionality

Please reference the diagram on the following page shown in Figure 7-54. The dash switch when switched to the PTO ON position, sends a 12V (+) signal out to the TCU pin 43 as well as pin 30 of the Allison 130 relay. This 12V signal is also sent out to the pin 33 of the cab harness to the transmission harness connector. Pin 33 is not used for anything as configured from the factory. The Allison TCU will trigger pin 85 to close the Allison 130 relay, thus sending a 12V (+) signal out via pin 87 to pin B on connector P621 or P623 on the Allison transmission harness. If neither of these connectors was optioned on the chassis (see above), then the PTO up fitter will need to pick this signal up at pin 34 of the firewall connector J620. Pin A of connector P621/P623 is a permanent ground signal. This is fed from pin 55 of the J620 firewall connector.

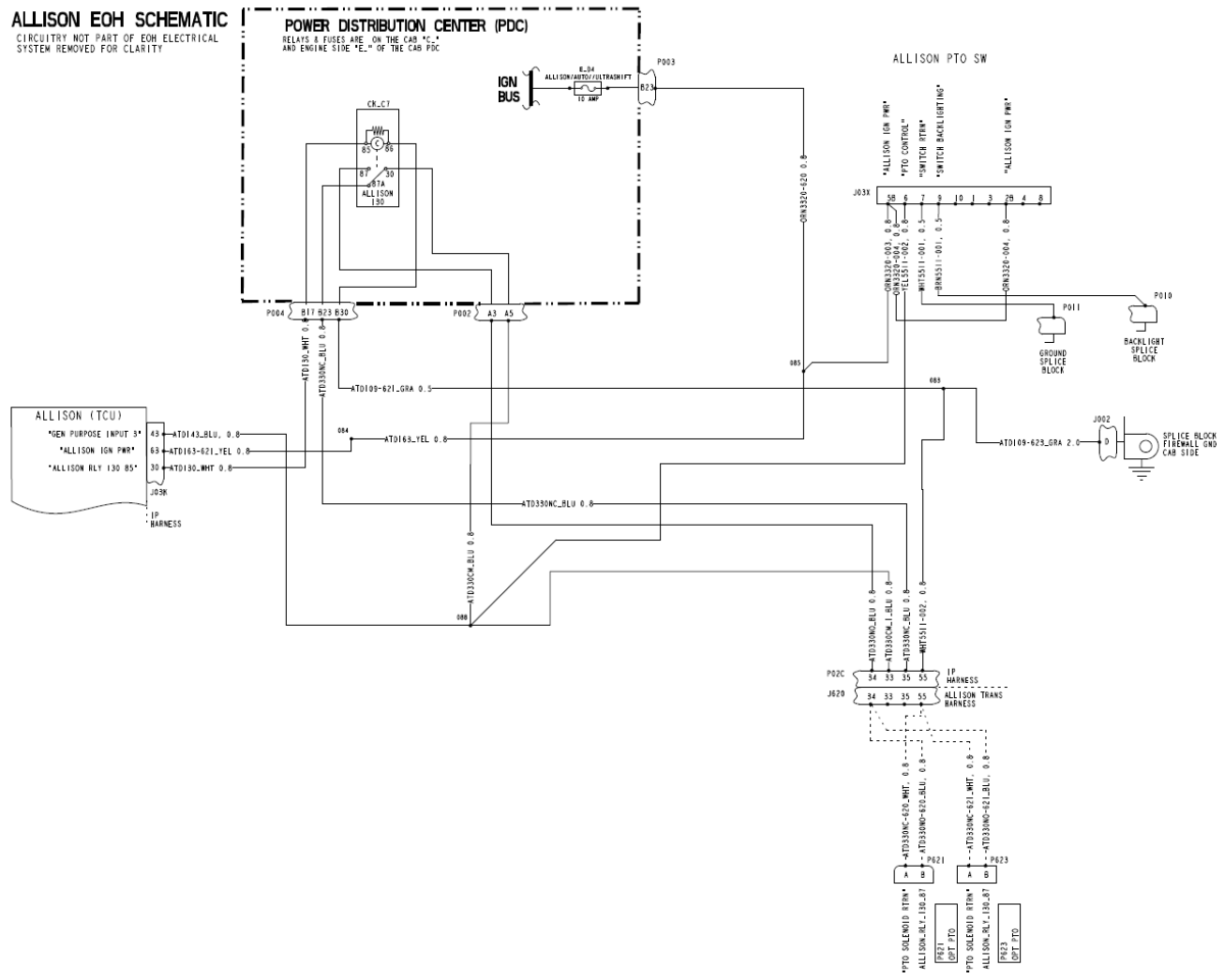


FIGURE 7-54. Allison EOH Electrical System Typical Schematic

DASH

The following section identifies ways to access the dash to install or modify the vehicle for aftermarket devices.

GAUGE AND SWITCH INSTALLATION

The first step to accessing the dash instruments is to remove the trim. The panel immediately to the right is the first panel to come off. These panels are held in by snap fasteners. Be sure that the metal retaining clips are not lost otherwise the panel will not install snug.

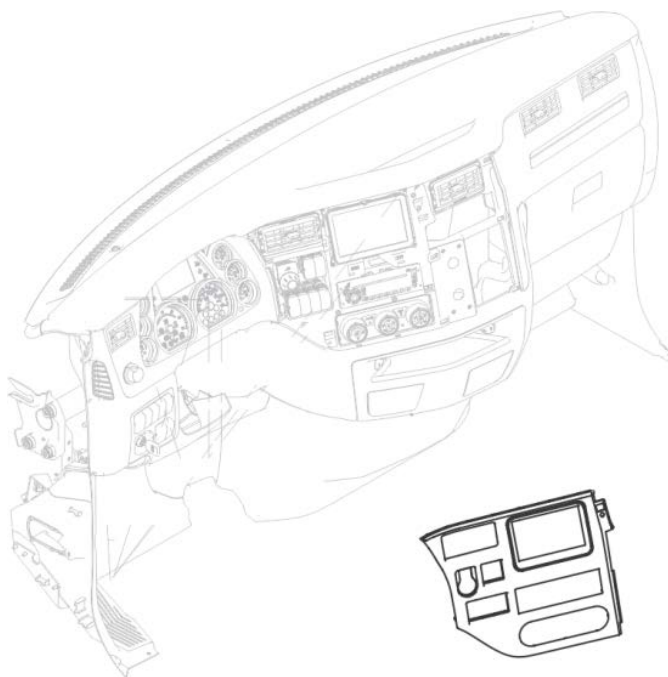


FIGURE 7-55. Trim Panel Removal

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

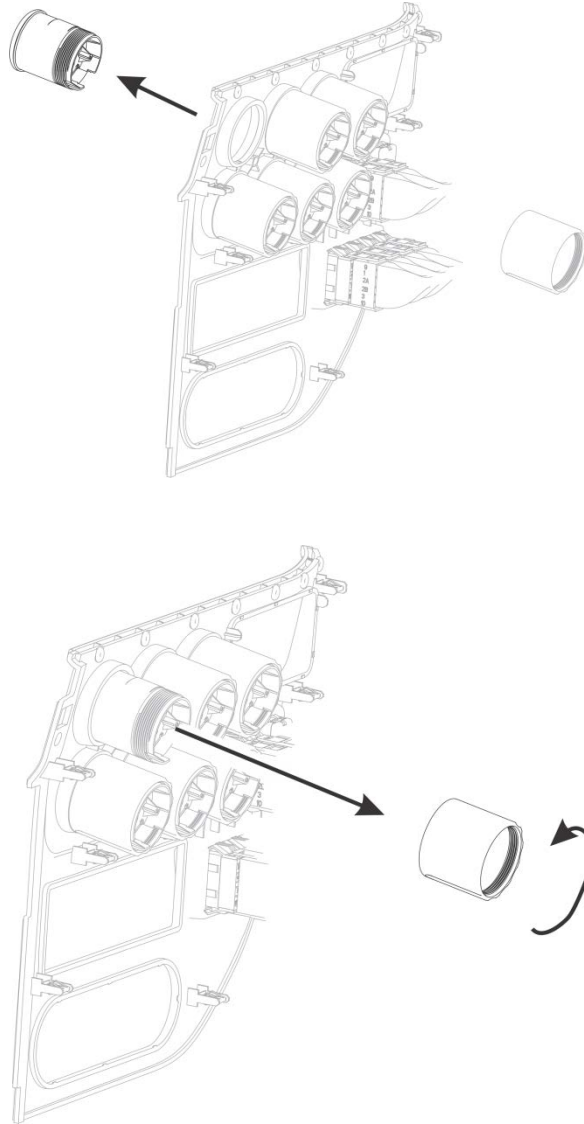


FIGURE 7-56. Gauge Installation

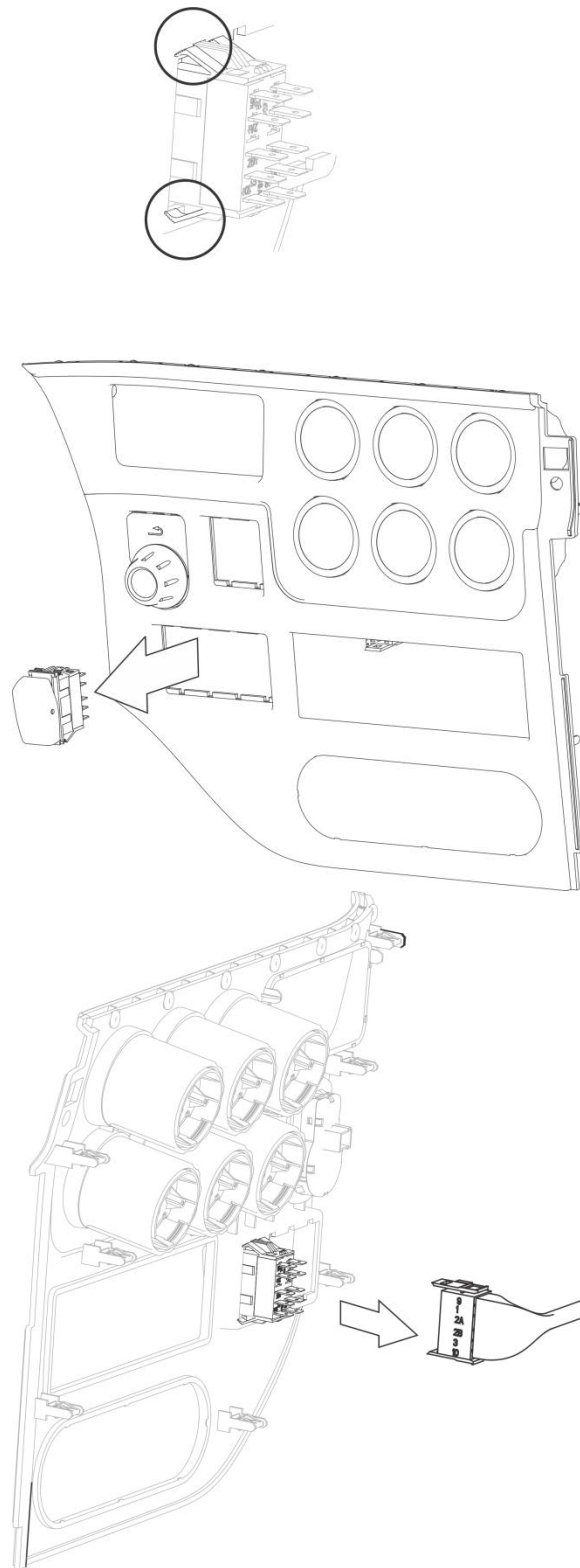


FIGURE 7-57. Switch Installation

TELLTALE ICONS INSTALLATION

Removing the first panel will allow the panel covering the instrument cluster to be removed. Removing the cluster is necessary to install telltale symbols or access other connectors to complete the installation.

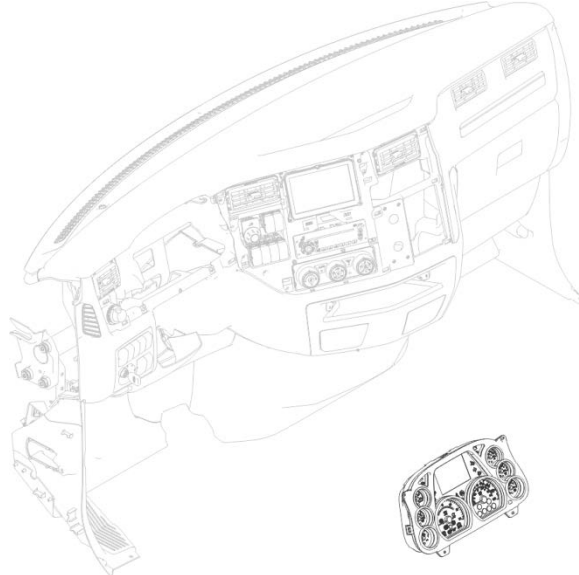


FIGURE 7-58. Cluster Removal

To install new telltales into the instrument cluster, the cluster will need to be removed from the dash. The instrument panel trim is removed after removing the panel immediately to the right of the instrument cluster. Then 4 fasteners hold the instrument cluster to the dash structure.

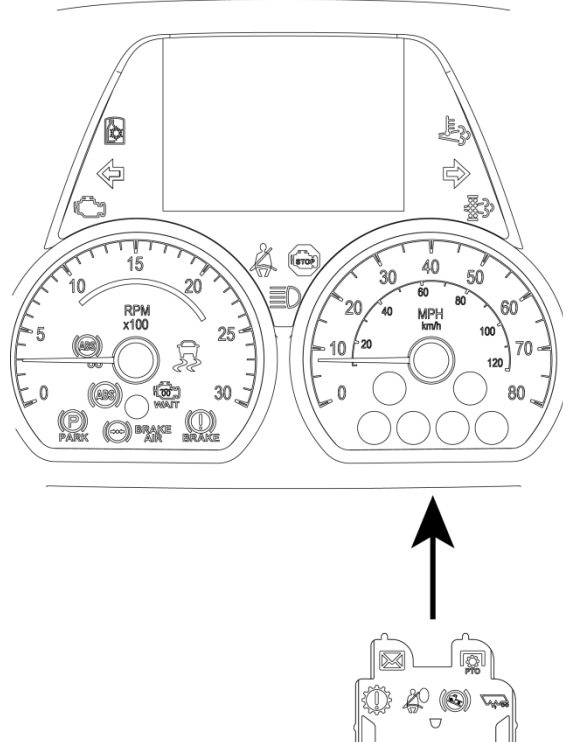


FIGURE 7-59. Telltale Installation

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SECTION 8 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.

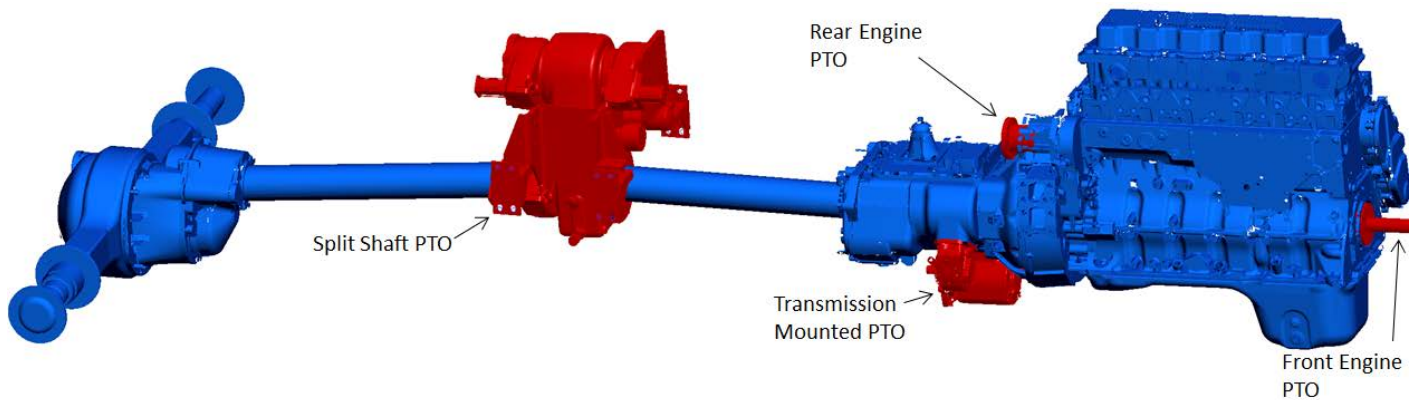


FIGURE 8-1. Power Take-Off Locations

TRANSMISSION MOUNTED PTO – GENERAL

MANUAL TRANSMISSIONS

This is the most common type of PTO that is used. On a manual transmission there are two locations for PTO's. On medium duty transmissions there are 6 bolt PTO locations on the right and left (Figure 8-2). On heavy duty manual transmissions there is a 6 bolt PTO on the right and an 8 bolt PTO on the bottom left (Figure 8-3). There are also some options for a thru shaft or extended countershaft PTO. On a thru shaft PTO, the counter shaft extends out through the back of the transmission which can be used to power a PTO (Figure 8-4). When using a thru shaft PTO the vehicle must be spec'd with the correct option as not all transmissions will be set up for use with thru shaft PTO's. For more information go to www.roadranger.com and enter "PTO Installation Guide" in the search bar in the upper right corner.



FIGURE 8-2. MD Manual Transmission

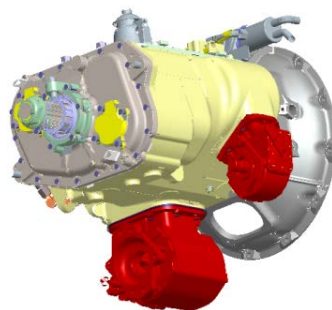


FIGURE 8-3. HD Manual Transmission

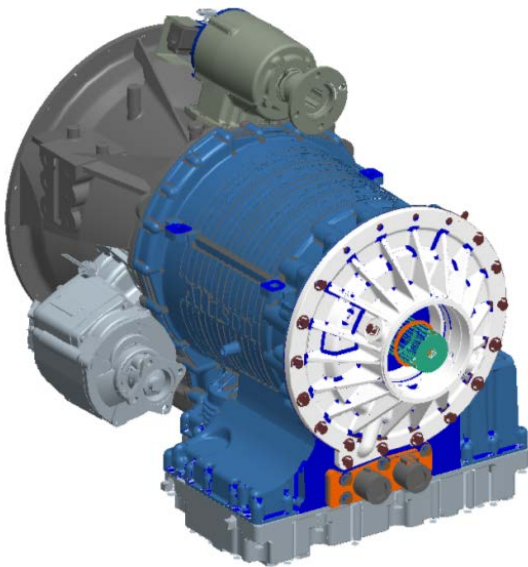
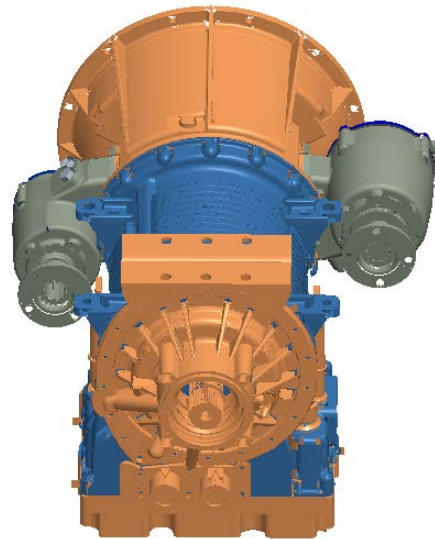


FIGURE 8-4. Thru Shaft PTO

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 8-5. The 4000HS transmissions do not have any PTO locations. The 3000 series Allison transmissions have PTO locations at 4 and 8 o'clock (Figure 8-6). For more information on using PTO's with an Allison transmission go to 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 8-5.** Allison 4000 Series**FIGURE 8-6.** Allison 3000 Series

TRANSMISSION MOUNTED PTO – 579 FAMILY

This application guide indicates if a PTO has sufficient clearance to truck components in various mounting configurations. A green "ok" indicates that there is sufficient clearance to other truck components. A red "x" indicates that there minimal or no clearance and the application is not recommended. The truck components investigated in this guide include frame rails, Set Back Front Axle (SBFA) rear shackle, SBFA Front Air Suspension (FAS) rear shackle, over-bell frame brace, coolant return manifold, transmission clutch actuator, and exhaust system components.

Usage Notes:

- 1) This application guide is only applicable to 579/567 trucks.
- 2) Only the specified PTO configurations have been analyzed.
- 3) Horizontal crossover exhaust limits access behind PTO's for shaft drives and other PTO attachments.
- 4) Eaton FR transmissions require the use of a 30° adapter when installing Chelsea or Muncie transmission PTO's in the right hand position.
- 5) Eaton RT & Ultrashift Plus transmissions require the use of a 49° adapter when installing Chelsea transmission PTO's in the right hand position.
- 6) Eaton RT & Ultrashift Plus transmissions require the use of a 55° adapter when installing Muncie transmission PTO's in the right hand position.
- 7) Eaton transmissions require the use of a 6 to 8 Bolt adapter when installing a 6 bolt PTO in the bottom position.

PTO CONTROLS

The 579/567 models have been designed to use electric in-dash switches to control air solenoids which engage/disengage transmission PTOs. This system allows for increased control and interlock opportunities. This also keeps air lines for transmission PTO controls from routing inside the cab. In cab air valve actuators for transmission PTO control are still available and are located on the cab floor on the LH side of the driver's seat. Air valve style transmission PTO actuators should not be installed on the dash due to the difficulty of air-line routing. Customer installed transmission PTO controls for use with customer installed transmission PTO's include a chassis and dash harness pre-wire to ease the installation of in-dash transmission PTO controls at the body builder. It is strongly recommended that the truck be coded for this if transmission PTO(s) could be installed after initial in-service date.

TRANSMISSION CLEARANCE CHARTS – 579 FAMILY

10-Bolt PTO's for Allison Transmissions			4000 Series		3000 Series - 1 & 8		3000 Series - 4 & 8	
Brand	PTO	Truck Model	Housing		Housing		Housing	
			1 o'clock	8 o'clock	1 o'clock	8 o'clock	4 o'clock	8 o'clock
Chelsea	267-M3XK	All	x	x	ok	x	x	x
	267-M5XK	All	ok	ok	ok	X	ok	ok
	277-B5XS	579-123/567-121	ok	ok	ok	x	ok	ok
		579-117/567-115	ok	x	ok	x	ok	ok
	859-B5XS	All	ok	x	x	x	x	x
	870X-B3RS	All	ok	x	ok	x	x	x
	870X-B5RS	All	ok	x	ok	x	x	x
890-B5XS	All	ok	x	ok	x	x	ok	
Muncie	CD05-M3CX	All	ok	ok	ok	ok	ok	ok
	CD10-M1CX, DX	579-123/567-121	ok	x	ok	x	ok	ok
		579-117/567-115	ok	x	ok	x	x	ok
	CD10-M3CX, DX	579-123/567-121	ok	x	ok	x	ok	ok
		579-117/567-115	ok	x	ok	x	x	ok
	CS10-H1CX, EX	All	x	x	x	x	x	x
	CS10-H3CX, EX	All	x	x	x	x	x	x
	CS24-H1KX	All	ok	x	ok	x	x	x
	CS24-H3BX, KX	579-123/567-121	ok	ok	ok	x	ok	ok
		579-117/567-115	ok	ok	ok	x	x	ok
	CS24-X1BX	All	ok	x	ok	x	x	ok
	CS41-H1EX, CX	All	ok	x	x	x	x	x
CS41-H3CX, EX	All	ok	x	x	x	x	x	
HS24-H1BX, KX	579-123/567-121	ok	x	x	x	ok	x	
	579-117/567-115	ok	x	x	x	ok	ok	
HS24-H3BX, KX	All	ok	ok	ok	x	x	ok	

FIGURE 8-7. 10-Bolt PTO's for Allison Transmissions

6 & 8 Bolt PTO's for Eaton Transmissions

Brand	Style	PTO	FR		RT		Ultrashift Plus	
			Bottom	Right	Bottom	Right	Bottom	Right
Chelsea	6-Bolt	230-V3XD/XK	ok	ok ^{1,2,3}	ok	ok ^{1,2,3}	ok	ok ^{1,2,3}
		236-V3XD/XK	Recomend 238	ok ^{1,2,3}	Recomend 238	ok ^{1,2,3}	Recomend 238	ok ^{1,2,3}
		270-B3XD/XK	ok	ok ^{1,2,3}	ok	ok ^{1,2,3}	ok	ok ^{1,2,3}
		340-V5XD	ok	ok ^{1,2,3}	ok	ok ^{1,2,3}	ok	ok ^{1,2,3}
		442-V3XK	Recomend 489	ok ^{1,2,3}	Recomend 489	ok ^{1,2,3}	Recomend 489	ok ^{1,2,3}
		660-V3XK	Recomend 680	ok ^{1,2,3}	Recomend 680	ok ^{1,2,3}	Recomend 680	ok ^{1,2,3}
	8-Bolt	238-V3XD/XK	ok	n/a	ok	n/a	ok	n/a
		489-V3XK	ok	n/a	ok	n/a	ok	n/a
		680-V3XK	ok	n/a	ok	n/a	ok	n/a
		823-V3XS	ok	n/a	ok	n/a	ok	n/a
		880-V3XS/XV ⁴	ok	n/a	ok	n/a	ok	n/a
		885-V3XS ⁴	ok	n/a	ok	n/a	ok	n/a
Muncie	6-Bolt	CS6-P1BX/KX	Recomend CS8	ok ^{1,2,3}	Recomend CS8	ok ^{1,2,3}	x	ok ^{1,2,3}
		SH6-P1BX/KX	Recomend SH8	ok ^{1,2,3}	Recomend SH8	ok ^{1,2,3}	x	ok ^{1,2,3}
		TG6-P1BX/KX	Recomend TG8	ok ^{1,2,3}	Recomend TG8	ok ^{1,2,3}	Recomend TG8	ok ^{1,2,3}
	8-Bolt	828S-U1CX/EG	ok	n/a	ok	n/a	x	n/a
		CS8-P1BX/KX	ok	n/a	ok	n/a	ok	n/a
		SH8-P1BX/KX	ok	n/a	ok	n/a	ok	n/a
		TG8S-P1BX/KX	ok	n/a	ok	n/a	ok	n/a

FIGURE 8-8- 6 and 8-Bolt PTO's for Eaton Transmissions

Notes:

- 1) Not available with Front Air Leaf Suspension.
- 2) Not available with Horizontal Crossover or Right Hand behind Fairing Exhaust Systems.
- 3) Restricted PTO access with RH Cab Step Assembly DPF-SCR exhaust systems with Vertical BOS tailpipes or RH Horizontal Tailpipe below rail.
- 4) The Optional Hydraulic Clutch Orientation must be used with this PTO.

Dual PTO Compatibility for Eaton Transmissions

		Chelsea							Muncie							
		RH (6-Bolt) PTO's														
Model	RT			FR			Ultrashift+		Model	RT		FR		Ultrashift+		
	230/236-V3	340X-A5	442/660-V3	230/236-V3	340X-A5	442/660-V3	340X-A5	442/660-V3		CS/SH6-A1	TG6-A1	CS/SH6-A1	TG6-A1	CS/SH6-A1	TG6-A1	
LH (6 & 8-Bolt) PTO's	230/236-V3	S	S	S	S	S	S	ok	ok	828S-Q1	S	S	S	S	ok	ok
	238-V3	S	S	S	S	S	S	ok	ok	CS/SH8-A1	S	S	S	S	ok	ok
	340X-A5	S	S	S	S	S	S	ok	ok	TG8S-A1	S	S	S	S	ok	ok
	442/660-V3	S	S	S	S	S	S	ok	ok							
	489/680-V3	S	S	S	S	S	S	ok	ok							
	823-V3	S	S	S	S	S	S	ok	ok							
	880-V3	x	x	O	x	O	x	ok	ok							
	885-V3	x	x	O	x	O	x	ok	ok							

S = Standard Hydraulic Clutch Actuator Configuration
 O = Optional Hydraulic Clutch Actuator Configuration

FIGURE 8-9. Dual PTO Compatibility for Eaton Transmissions

HYDRAULIC CLUTCH ACTUATOR CONFIGURATIONS

(Only used with 579/567 with Eaton FR or RT transmissions)

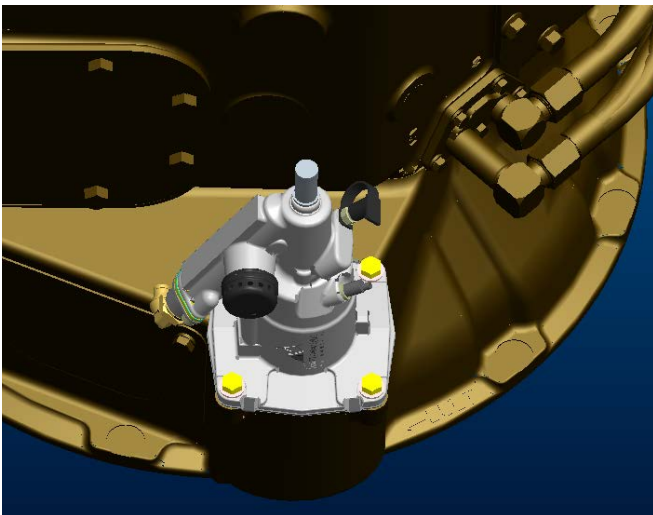


FIGURE 8-10. Standard Configuration
 Air assist connection faces driver's side
 Used with all but Chelsea 880 and 885 PTOs

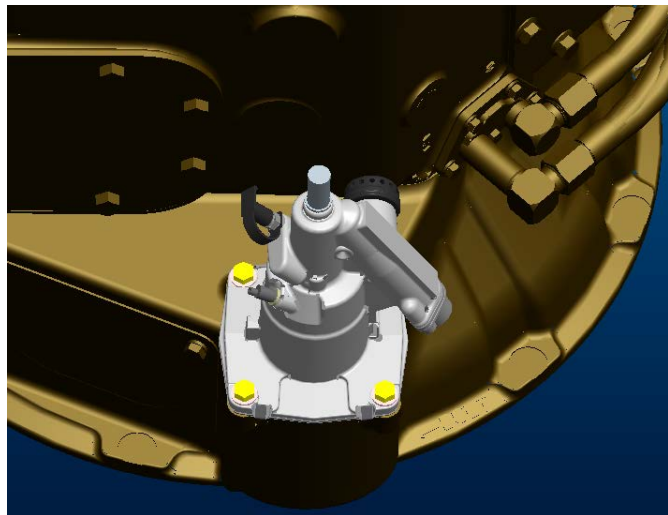


FIGURE 8-11. Bottom Mount PTO Provisions
 Air assist connection faces passenger's side
 Used with Chelsea 880 and 885 PTOs

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 22.4" frame extension. See Figures 8-12 to 8-14 for frame extension dimensions.

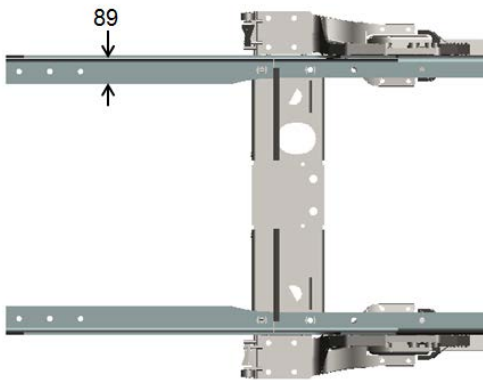


FIGURE 8-12. Frame Extension Top View

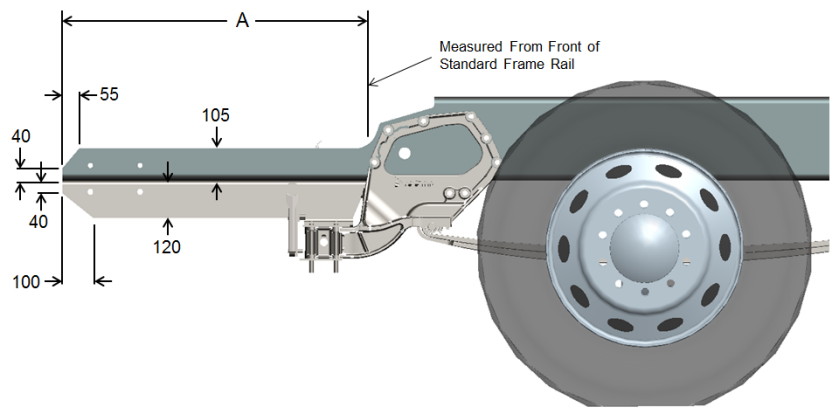


FIGURE 8-13. Frame Extension Left Hand View

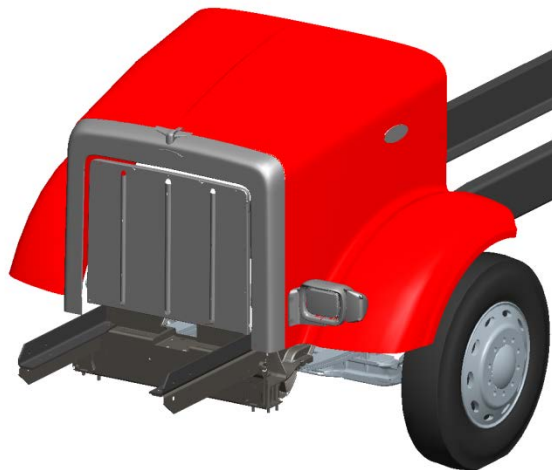


FIGURE 8-14. Frame Extension

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 8-15 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. The Cummins ISX-12 REPTO turns at a rate of 1.32:1. The Paccar MX-13 REPTO turns at a rate of 1.2:1. The Paccar MX-11 REPTO turns at a rate of 1.3:1.

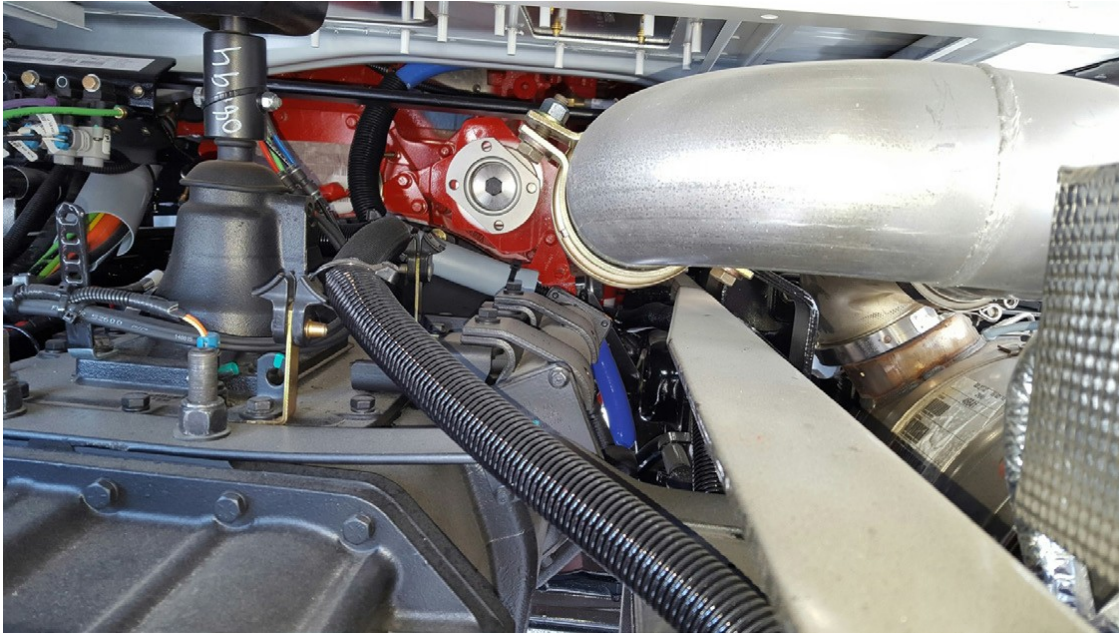


FIGURE 8-15. REPTO Flywheel Housing

PTO INSTALLATIONS – 389 FAMILY

Standard PTO operation is also called cab PTO. With this feature, the operator can set the engine to pre-programmed set speed(s) and ramp the engine speed 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 7 for PTO dash switch plumbing and firewall bulkhead locations. With the MX engine when the PTO dash switch is engaged a pressure switch on the air lines under the dash will send a signal to the engine to go into PTO mode. On Cummins 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 Cummins engines and DAVIE on all MX 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.

On Allison transmissions, the PTO's will require an electric signal. We do not currently offer an electric PTO switch for the 389 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.

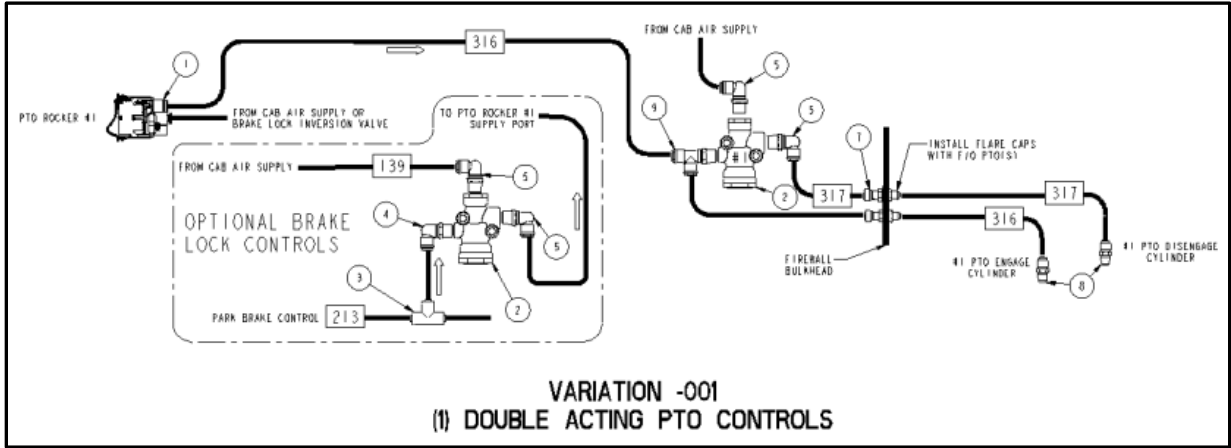


FIGURE 8-16. (1) Double acting PTO Controls Diagram

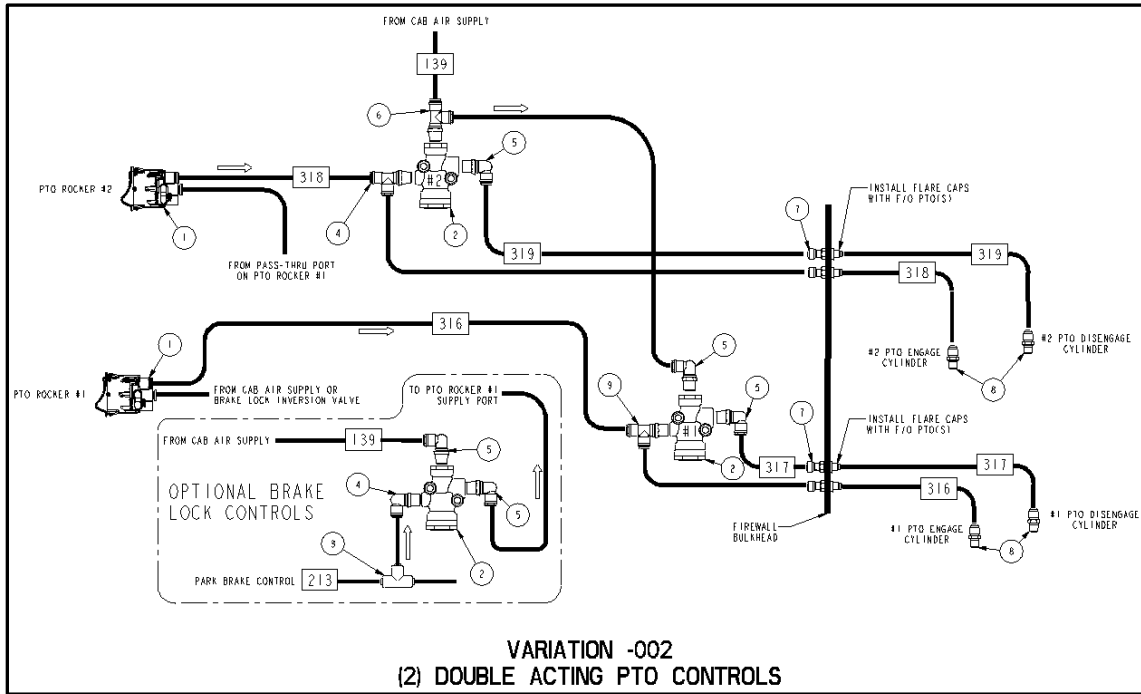


FIGURE 8-17. (2) Double acting PTO Controls Diagram

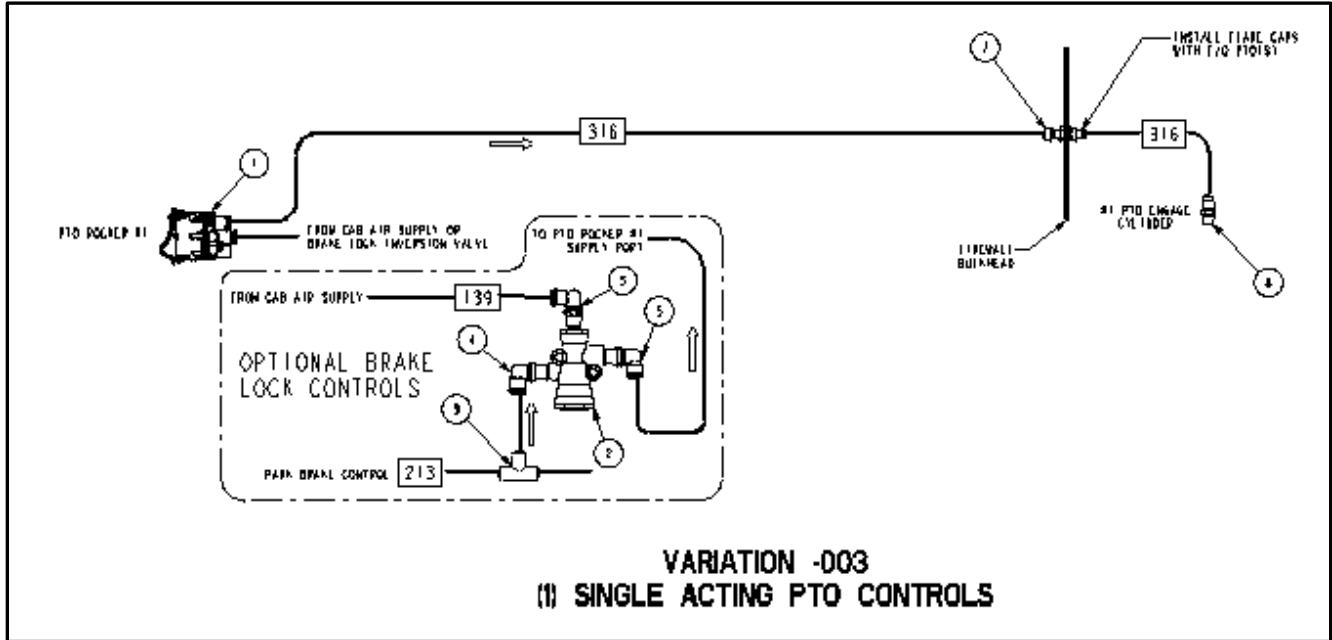


FIGURE 8-18- (1) Single acting PTO Controls Diagram

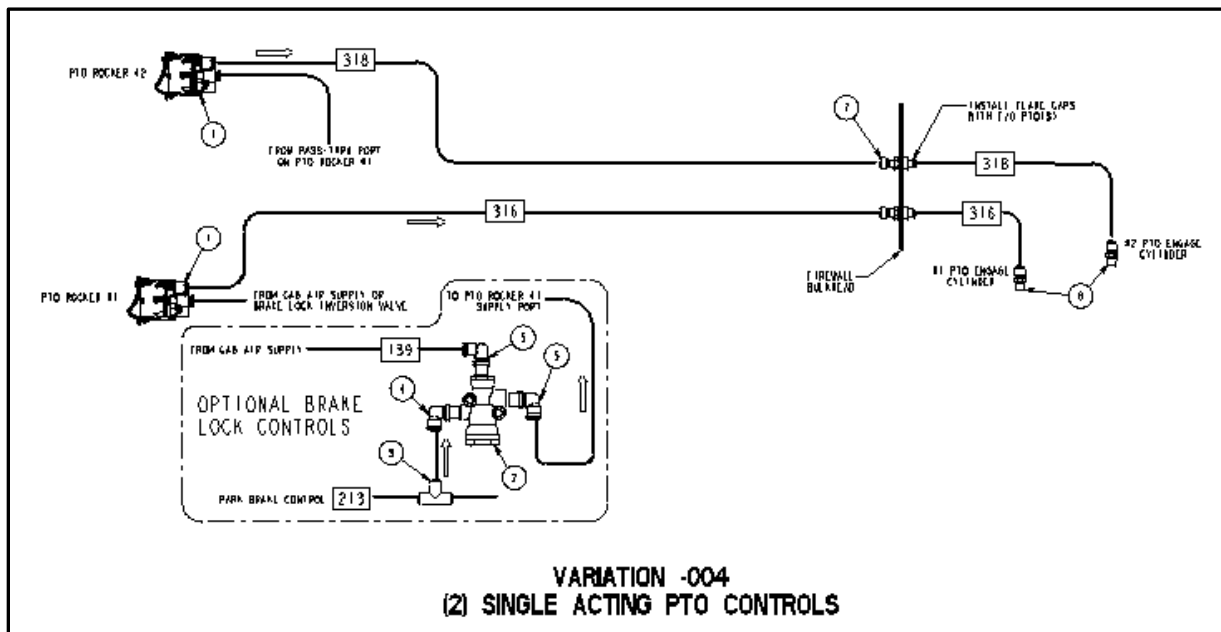


FIGURE 8-19. (2) Single acting PTO Controls Diagram

PTO INSTALLATION – 579 FAMILY

PTO CONTROLS

The 579/567 models use Electric Over Air (EOA) or Electric Over Hydraulic (EOH) controls to supply the signal to activate the PTO. The EOA controls are recommended for manual or automated transmissions. The EOH controls are recommended for automatic transmissions.

The EOA controls feature a valve that is located under the left hand side of the cab as shown in Detail “B” of Figure 8-20. The valve converts an electrical signal from the PTO dash switch into an air supply. This air supply is then plumbed to the PTO activation port for manual transmissions, or a pressure switch for automatic transmissions (automatic transmissions require an electrical signal for PTO engagement).

The EOH controls will send an electrical signal from the PTO dash switch to the transmission harness that will activate the PTO function of the transmission.

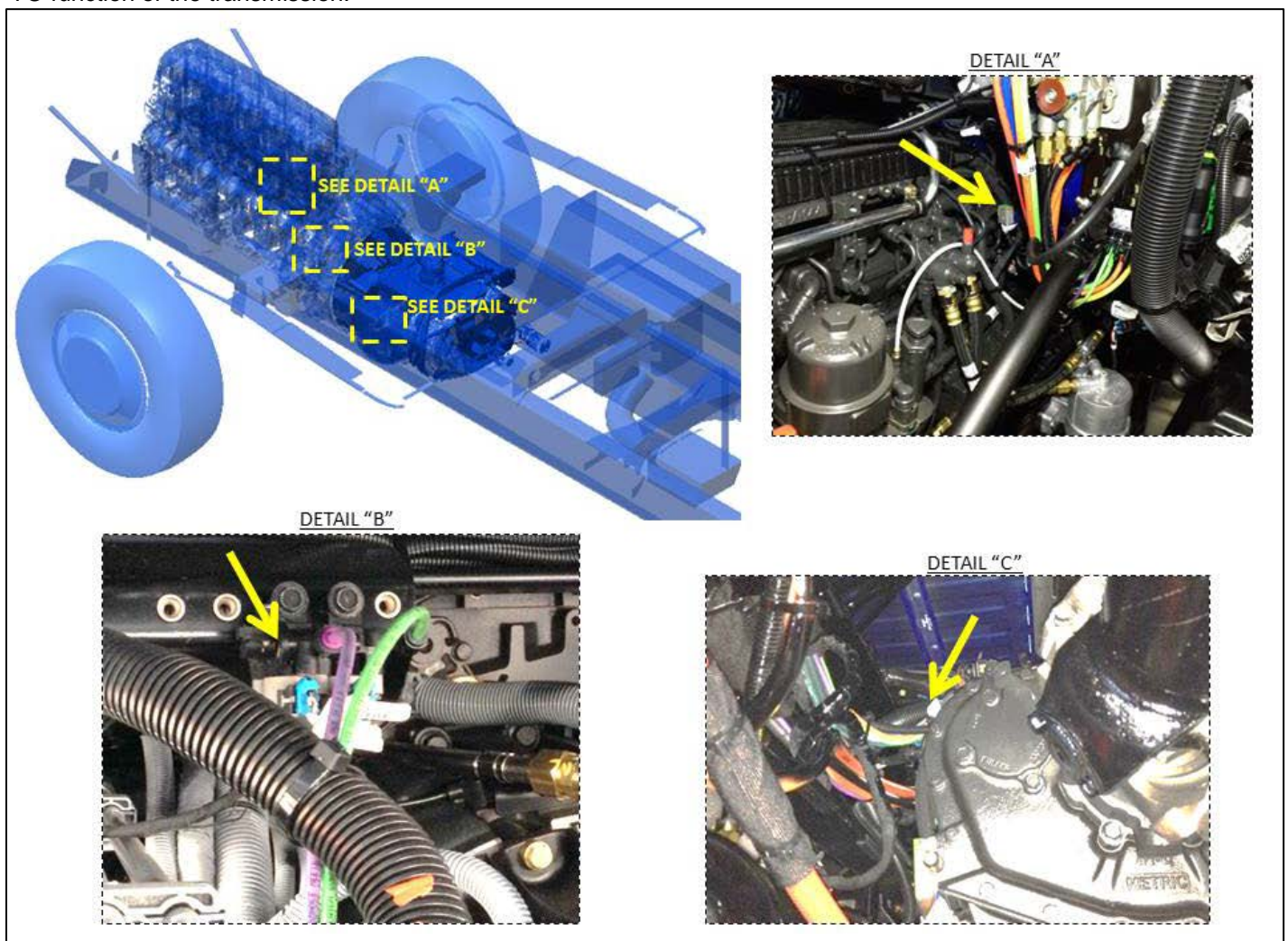


FIGURE 8-20.

The EOA controls are used to engage the PTO, but to get the engine to go in to PTO mode a signal must be sent from the PTO to the engine. When pin 2 (PTO engaged signal) of the chassis PTO connector is grounded, the engine will go to PTO mode. This can be done by using the PTO activation switch on the PTO to close a circuit between pin 2 and pin 1 (chassis ground) of the chassis PTO connector. This will also activate the dash icon to notify the operator PTO mode is engaged. The chassis PTO connector is located inside the rail adjacent to the transmission as shown in Detail “C” of Figure 8-20.

PTO OPTIONS

Single acting PTOs have a single air control. A single chassis node output controls the air solenoid, and the air pressure engages the PTO, and the lack of air pressure at the control port disengages the PTO from the driveline.

Double acting PTOs have a dual air control. One air controls the engagement, and one air control controls the disengagement. This can be achieved one of two ways:

- 1) A Single Acting PTO is configured. The engage air control port is connected to the chassis node output and a pilot inversion valve in the chassis air plumbing is connected to the second disengage air control port
- 2) Two chassis node outputs control the PTO. One chassis node output and solenoid is connected to the engage air control port of the PTO, and one chassis node output and solenoid is connect to the disengage air control port.

Reversible PTOs have three different operational states:

- 1) Inactive, not engaged to driveline, no air control ports active
- 2) Main Direction, engaged to driveline, Main air control port pressurized
- 3) Opposite Direction, engaged to driveline, Opposite air control port pressurized

The CECU software is written as part of 3-position switch design strategy. This 3 position switch prevents the possibility that both inputs are active at the same time.

CECU INTERFACE WITH PTO CONTROLS

If the vehicle is specified with a PTO installation from the factory a protected PTO on/off switch will be present in the dash. If the truck has the option for EOA PTO controls, it will connect to the instrument panel harness with a switch connector labeled "EOA x" x being a number between 1 and 10. If numbered between 1 and 8, the switch will be connected to the Cab ECU.

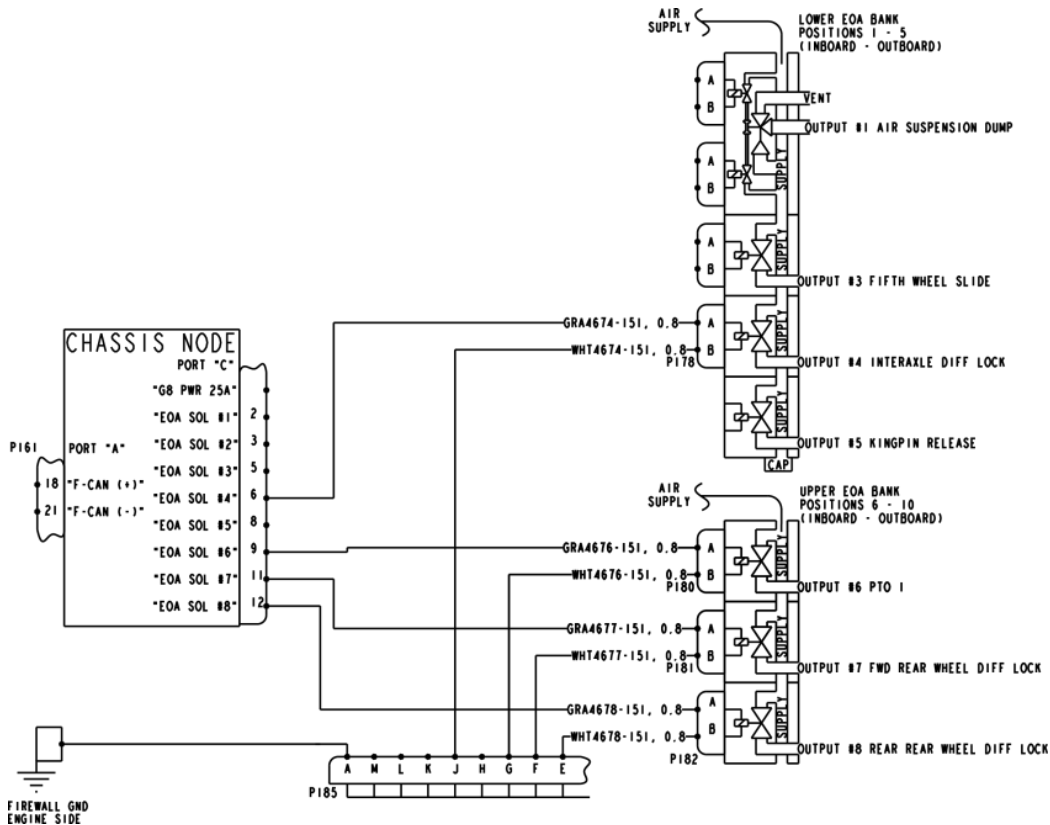


FIGURE 8-21. Chassis Node / EoA Diagram

If numbered 9 or 10 the switch will be wired directly to EOA valve 9 or 10.

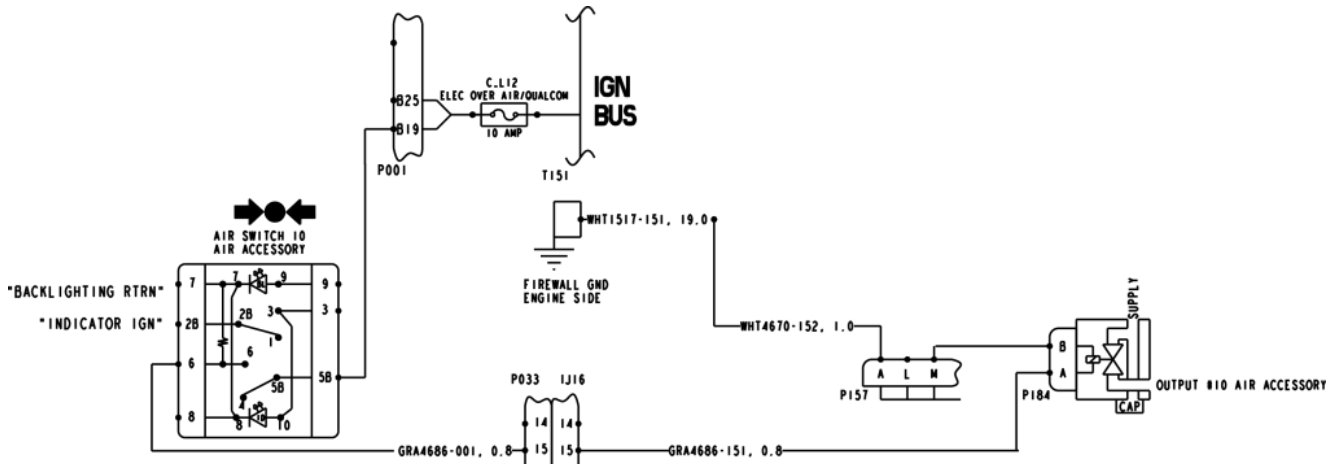


FIGURE 8-22. Interlock Example Diagram

If the Cab ECU detects the switch in the on position and if applicable, the park brake interlock is validated by the Cab ECU, the Cab ECU will send a mux signal to the chassis node via F-CAN. The EOA valve will be the same number as on the dash switch. Electronic Service Application (ESA) can be used to add or remove the PTO engage park brake interlock. Depending on the application and the PTO type, the switches and wiring may differ.

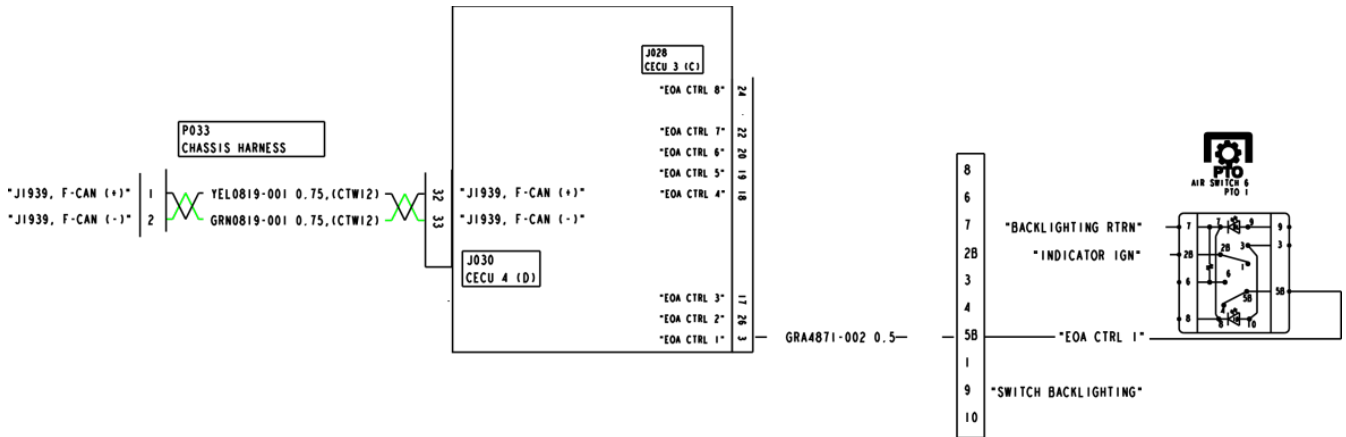


FIGURE 8-23. PTO Control Example Diagram

For single acting PTO, the chassis node will energize the coil on the EOA valve allowing air to engage the PTO.

For dual acting PTO, the PTO's pilot valve will provide the air function to switch the air between engage and dis-engage.

If the PTO is a forward/reverse PTO:

A protected PTO forward and a protected PTO reverse switch will be present in the dash. Each switch controls a separate EOA solenoid, each solenoid is dedicated to either forward or reverse.

If the Cab ECU detects both the forward and reverse switches in the on position the Cab ECU will ignore the switch input for the second switch thrown and provide a message in the cluster display informing the operator of the non-valid switch configuration.

PTO AND PUMP MODE WARNING

Instrument panel wiring:

Pump mode warning lamp is an editable telltale and requires a diode.

PTO engaged warning lamp Peterbilt is an editable telltale and requires a diode.

The diodes prevent relay coil back feed from driving the CECU input high which could activate the warning lamp (bi-stable input) giving false indications.

CK_K10 spare relay #3 is used to power the PTO hour meter whenever the PTO engaged warning lamp is on.

ENGINE PTO SIGNAL

The ISX engine controller port (J2 pin 94) will report a PTO active when driven low (grounded). When a PTO is specified on a chassis the ISX engine harness will contain the optional remote throttle/PTO 12-way connector and cap (P111A/J111A). The chassis harness will also contain a 4-way P198 connector in the chassis harness, as noted in Detail "C" of Figure 8-20.

The MX engine controller port (J2 pin 21) will report a PTO active when driven high (+12V DC). Since PTO and pump mode signals are low (grounded) when active, a relay is needed to convert the low (ground) signal to a high (+12V DC) signal. This relay is installed below the left hand side of the cab near the chassis node. When a PTO is specified on a chassis the MX engine harness will contain the optional remote throttle/PTO 12-way connector and cap (P111C/J111C).

The remote throttle/PTO 12-way connector is located on the back, left hand side of the engine as shown in Detail "A" of Figure 8-20. See Figure 8-24 for pin out information of the 12-way connector. There are also 16-way and 23-way connectors available for setting up dual station controls or other high content applications. See Figure 8-27 for the 16-way pin out information and Figure 8-28 for the 23-way pin out information. The CECU parameters for REMOTE PTO CONTROL and REMOTE THROTTLE CONTROL may need to be enabled.

There are two common methods of utilizing remote engine speed controls:

- 1) A 5V variable signal can be used to control the engine speed via a potentiometer. For this configuration the CECU parameter for REMOTE THROTTLE may need to be activated.

-For the MX engine, pins 3, 4 and 10 can be connected to the potentiometer to convert the 5V signal to a remote throttle signal.

-For Cummins engines, pins 4, 10 and 11 can be used the same way as described above for the MX engine.

- 2) The engine speed can be bumped up or down using momentary switches or preset speeds. For this configuration the CECU parameter for REMOTE PTO may need to be activated.

-For the MX engine, momentarily connecting pin 8 to pin 2 will increase the engine speed. Momentarily connecting pin 8 to pin 1 will decrease the engine speed.

-For Cummins engines, the engine will go to the first set speed when PTO mode is initially activated by applying ground from pin 3 to PTO ON/OFF pin 5. If this connection is broken and reapplied within 0.5 seconds, the engine will go to set speed 2. If this is done again, the engine will go to set speed 3 and so on. There are up to 5 preset speeds that can be modified using INSITE. If the connection is broken longer than 0.5 seconds and then reapplied, the engine will go back to set speed 1.

PIN	CUMMINS	MX
1	REMOTE PTO RESUME	REMOTE PTO RESUME
2	REMOTE PTO SET	REMOTE PTO SET
3	COMMON RETURN #1 (SWITCH)	NAMUX ANALOG RETURN
4	REMOTE THROTTLE SIGNAL	REMOTE THROTTLE SIGNAL
5	PTO ON/OFF	PTO ON/OFF
6	REMOTE PTO ENABLE	NOT USED
7	10A IGNITION POWER	10A IGNITION POWER
8	GROUND	GROUND
9	TORQUE LIMIT SWITCH	NOT USED
10	5V SUPPLY	NAMUX POWER (+5V)
11	COMMON RETURN #3 (SENSOR)	20A ENGINE POWER
12	REMOTE THROTTLE ON/OFF	NOT USED

FIGURE 8-24. 12 Pin Connector

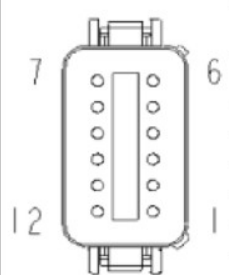
Mating View	Contact	Function
	1	REMOTE PTO RESUME
	2	REMOTE PTO SET
	3	COMMON RTN #1 (SWITCH)
	4	REMOTE THROTTLE SIGNAL
	5	PTO ON / OFF
	6	
	7	IGNITION POWER
	8	GROUND
	9	
	10	POWER SUPPLY (5V)
	11	COMMON (+12VDC)/ ENGINE SYSTEM POWER
	12	

FIGURE 8-25. 2013+ MX-11 and MX-13 Pin-Out

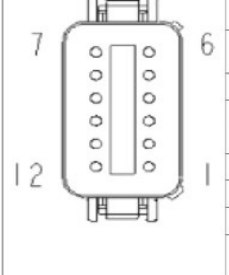
Mating View	Contact	Function
	1	PTO RESUME
	2	PTO SET
	3	COMMON RTN #1 (SWITCH)
	4	REMOTE THROTTLE SIGNAL
	5	PTO ON / OFF
	6	REMOTE THROTTLE ENABLE
	7	IGNITION POWER
	8	GROUND
	9	TORQUE LIMIT SWITCH
	10	REMOTE THROTTLE SUPPLY 5V
	11	REMOTE THROTTLE RETURN
	12	REMOTE THROTTLE ON / OFF

FIGURE 8-26. 2013+ ISX15, ISX12, PX-9 Pin-Out

DUAL STATION CONTROLS

When equipped, dual station controls allow extra controls from a remote station outside of the cab. The option will either include a 16 way connector (P665), or a 23 way connector (P664). When the in-cab PTO control switch is switched to the “on” position with the park brake applied, the engine will turn off unless the dual station remote run input is properly powered via the 16 or 23 way connector. To power the remote run input, terminal K of the 23 way connector (P664) or terminal B of the 16 way connector (P665) will be powered with a 12V+ input which will power terminal 87 of the remote run relay. To operate the remote start input, terminal F of the 23 way connector (P664) will be powered with a 12V+ input which will power terminal 85 of the remote run relay and terminal 85 of the remote start relay.

Following is a list of pin descriptions, and the required input or supplied output signal type for both the 23 way (P664) and the 16 way (P665) connectors for both PACCAR MX and Cummins engines. Also following are examples of wiring connections for common items used.

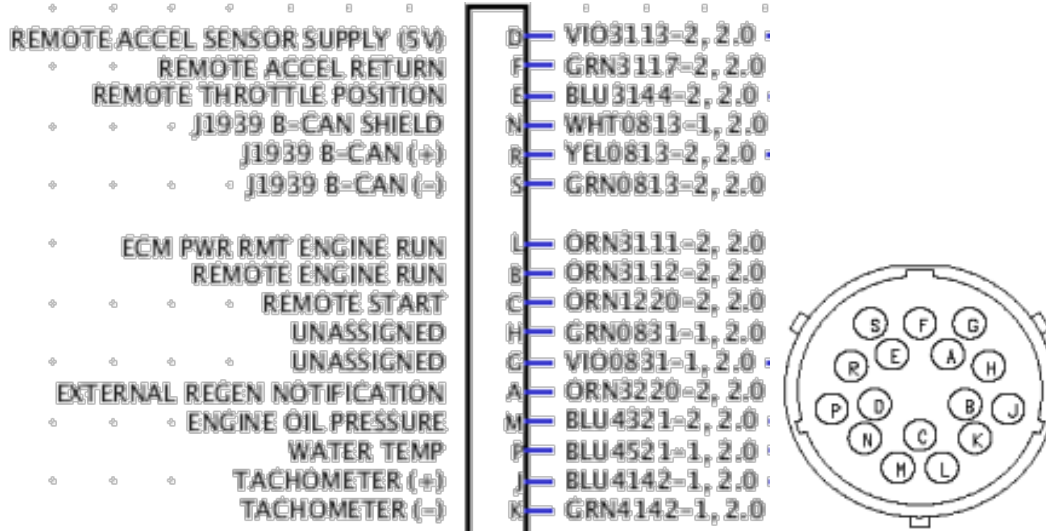


FIGURE 8-27. 16 Pin Connector (MX and Cummins)

TABLE 8-1. Cummins Engine 16 Way Connector Descriptions and Functions

Pin	Description	Input/Output	Destination/Source
A	External Regeneration Notification	Output, Active High	Pin C18 From Chassis Node
B	Remote Run	Input 12V (+)	Pin 87A of Remote Run Relay
C	Remote Start	Input 12V (+)	Pin 87 of Remote Start Relay.
D	Remote Throttle Sensor Supply	Output, 5V (+) Supply	Pin 8 Engine ECM
E	Remote Throttle Position	Input Variable 0-5V	Pin 63 of Engine ECM
F	Remote Throttle Return	Analog Sensor Ground	Pin 32 of Engine ECM
G	DEF Lamp Return	Output Active Low	Pin 2 of Engine ECM
H	Regeneration Lamp Return	Output Active Low	Pin 23 of Engine ECM.
J	tachometer (+)	Tachometer Output (+)	Body Builder Supplied Sensor, Input on P669 Pin 1
K	tachometer (-)	Tachometer Output (-)	Body Builder Supplied Sensor, Input on P669 Pin 2
L	Remote ECM Power Engine Run	Input 12V (+)	Pin 87 of Remote Run Relay
M	Engine oil Pressure	Output	Body Builder Supplied Sensor, Input on J668
N	NOT USED	NOT USED	
P	Water Temp	Output	Body Builder Supplied Sensor, Input on J667
R	J1939 B-CAN (+)	B-CAN (+)	Pin 43 of CECU
S	J1939 B-CAN (-)	B-CAN (-)	Pin 44 of CECU

TABLE 8-2. PACCAR Engine 16 Way Connector Descriptions and Functions

Pin	Description	Input/Output	Destination/Source
A	External Regeneration Notification	Output, Active High	Pin C18 from Chassis Node
B	Remote Run	Input 12V (+)	Pin 87A Remote Run Relay
C	Remote Start	Input 12V (+)	Pin 87 of Remote Start Relay.
D	Remote Throttle Sensor Supply	Output, 5V (+) Supply	Pin C1 of CECU
E	Remote Throttle Position	Input Variable 0-5V	Pin C27 Of CECU
F	Remote Throttle Return	Analog Sensor Ground	Pin C25 of CECU
G	DEF Lamp Return	Not Used, Cummins ONLY	
H	Regeneration Lamp Return	Not Used, Cummins ONLY	
J	tachometer (+)	Tachometer Output (+)	Body Builder Supplied sensor, Input on P669 Pin 1
K	tachometer (-)	Tachometer Output (-)	Body Builder Supplied sensor, Input on P669 Pin 2
L	Remote ECM Power Engine Run	Input 12V (+)	Pin 87 Remote Run relay, supplies Pin 1 Engine ECM When Relay Active.
M	Engine oil Pressure	Output	Body Builder Supplied sensor, Input on J668
N	NOT USED	NOT USED	
P	Water Temp	Output	Body Builder Supplied sensor, Input on J667
R	J1939 B-CAN (+)	B-CAN (+)	Pin 43 of CECU
S	J1939 B-CAN (-)	B-CAN (-)	Pin 44 of CECU

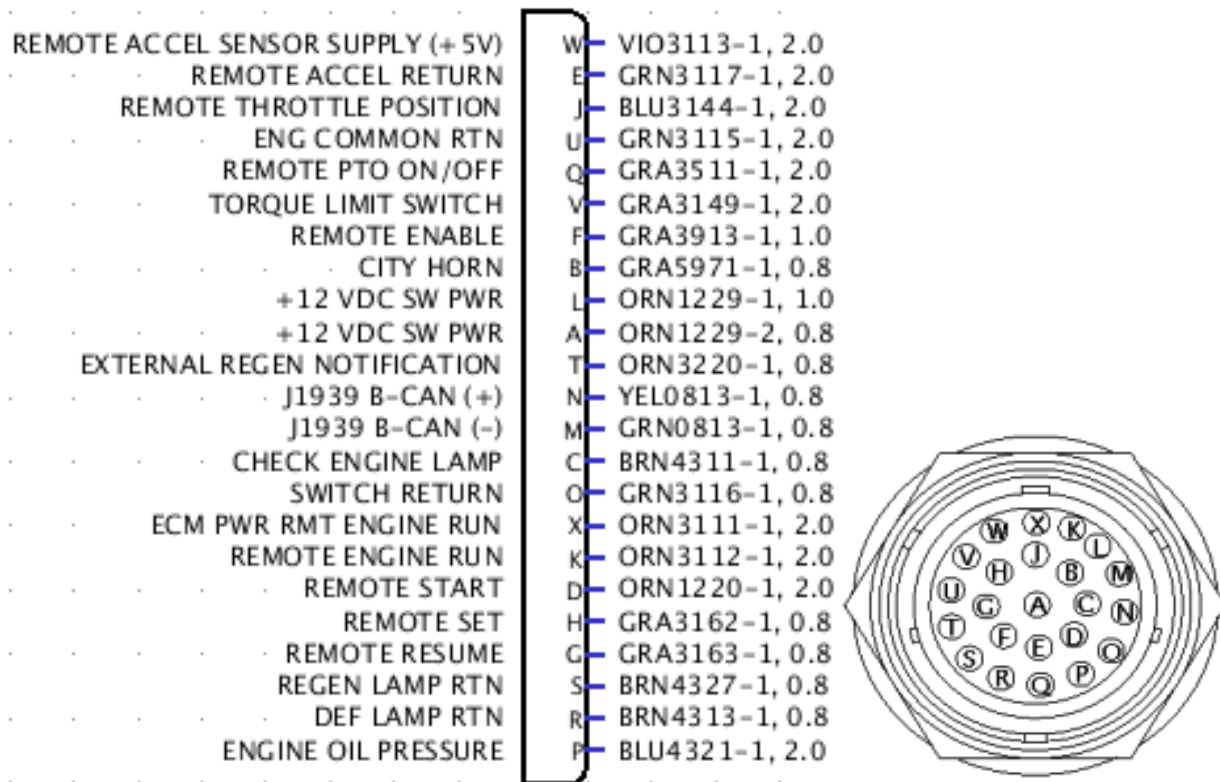


FIGURE 8-28. 23 Pin Connector (MX and Cummins)

TABLE 8-3. Cummins Engine 23 Way Connector Descriptions and Functions

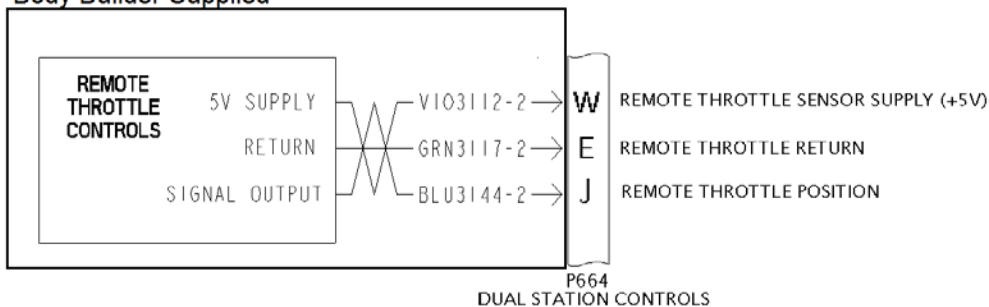
Pin	Description	Input/Output	Destination/Source
A	12 VDC IGN Power	Output 12V (+)	Tied To Pin L of 23 Way Connector. Engine PDC Fuse E9. 10A Fused
B	City Horn	Input 12V (+)	Pin 85 of Horn Relay
C	Check Engine Lamp	Output Active Low	Pin 72 of Engine ECM
D	Remote Start	Input 12V (+)	Pin 87 of Remote Start Relay.
E	Remote Throttle Return	Analog Sensor Ground	Pin 32 of Engine ECM
F	Remote Enable	Input 12V (+)	Pin 85 of Remote Start Relay. Pin 85 of Remote Run Relay
G	Remote Resume	Input Active Ground	Pin 19 of Engine ECM
H	Remote Set	Input Active Ground	Pin 12 of Engine ECM
J	Remote Throttle Position	Input, Variable 0-5V	Pin 63 of Engine ECM
K	Remote Run	Input 12V (+)	Pin 87A of Remote Run Relay
L	12 VDC IGN Power	Output 12V (+)	Tied To Pin A of 23 Way Connector. Engine PDC Fuse E9. 10A Fused
M	J1939 B-CAN (-)	B-CAN (-)	Pin 44 of CECU
N	J1939 B-CAN (+)	B-CAN (+)	Pin 43 of CECU
O	Common Return (General)	Common Ground	Pin 57 of Engine ECM
P	Engine Oil Pressure	Output	Body Builder Supplied sensor, Input on J668
Q	Remote PTO ON/OFF	Input, Active Low	Pin 94 Engine ECM. Pin 85 of Eaton PTO Relay. Pin 85 of PTO Hour Meter Relay
R	DEF Lamp Return	Output, Active Low	Pin 2 of Engine ECM
S	Regeneration Lamp Return	Output, Active Low	Pin 23 of Engine ECM.
T	External Regeneration Notification	Output, Active High	Pin C18 of Chassis Node
U	Common Return (Switch)	Common Switch Ground	Pin 62 of Engine ECM
V	Torque Limit Switch	Input Ground	Pin 93 Engine ECM
W	Remote Throttle Sensor Supply (+5V)	Output 5V (+)	Pin 8 Engine ECM
X	Remote ECM Power Engine Run	Input 12V (+)	Pin 87 Remote Run relay

TABLE 8-4. PACCAR Engine 23 Way Connector Descriptions and Functions

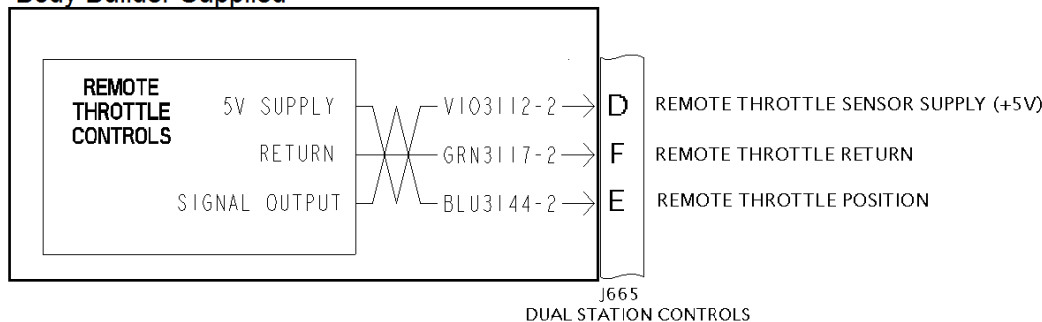
Pin	Description	Input/Output	Destination/Source
A	12 VDC IGN Power	Output 12V (+)	Tied To Pin L Of 23 Way Connector. Engine PDC Fuse E9. 10A Fused
B	City Horn	Input 12V (+)	Pin 85 of Horn Relay
C	Check Engine Lamp	Output Active Low	Pin 4 of Engine ECM
D	Remote Start	Input 12V (+)	Pin 87 of Remote Start Relay
E	Remote Throttle Return	Analog Sensor Ground	CECU Pin C25
F	Remote Enable	Input 12V (+)	Pin 85 of Remote Start Relay. Pin 85 of Remote Run Relay
G	Remote Resume	Input Active Ground	Pin B16 of CECU
H	Remote Set	Input Active Ground	Pin B15 of CECU
J	Remote Throttle Position	Input, Variable 0-5V	Pin C27 of CECU
K	Remote Run	Input 12V (+)	Pin 87A Remote Run relay
L	12 VDC IGN Power	Output 12V (+)	Tied To Pin A of 23 Way Connector. Engine PDC Fuse E9. 10A Fused
M	J1939 B-CAN (-)	B-CAN (-)	Pin 44 of CECU
N	J1939 B-CAN (+)	B-CAN (+)	Pin 43 of CECU
O	Common Return (General)	Common Ground	Firewall Ground
P	Engine Oil Pressure	Output	Body Builder Supplied sensor, Input on J668
Q	Remote PTO ON/OFF	Input, Active low.	Pin 85 MX PTO relay. Pin 85 Eaton PTO Relay. Pin 85 of PTO hour Meter Relay
R	DEF Lamp Return	Not Used, Cummins ONLY	
S	Regeneration Lamp Return	Not Used, Cummins ONLY	
T	External Regeneration Notification	Output, Active High	Pin C18 of Chassis Node
U	Common Return (Switch)	Common Switch Ground	Firewall Ground
V	Torque Limit Switch	Not Used, Cummins ONLY	
W	Remote Throttle Sensor Supply (+5V)	Output, 5V (+)	Pin C1 of CECU
X	Remote ECM Power Engine Run	Input 12V (+)	Pin 87 Remote Run relay

EXAMPLE OF TYPICAL CUSTOMER INSTALLED CONTROLS

Remote Throttle Controls Using 23 way Connector
Body Builder Supplied

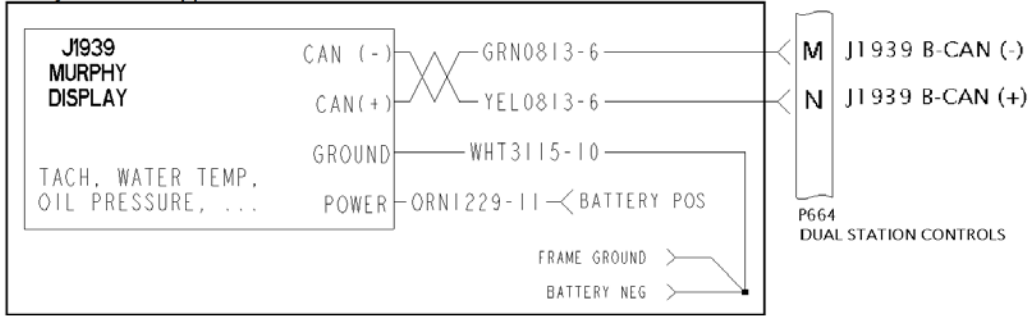


Remote Throttle Controls Using 16 way Connector
Body Builder Supplied



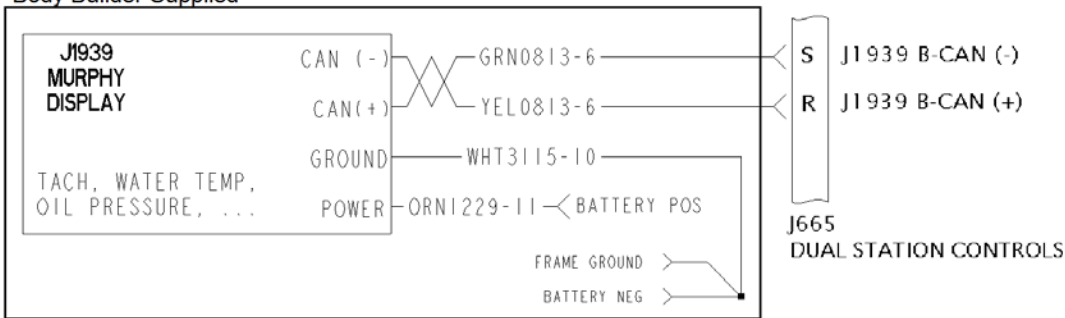
Murphy Control Box using 23 way connector

Body Builder Supplied



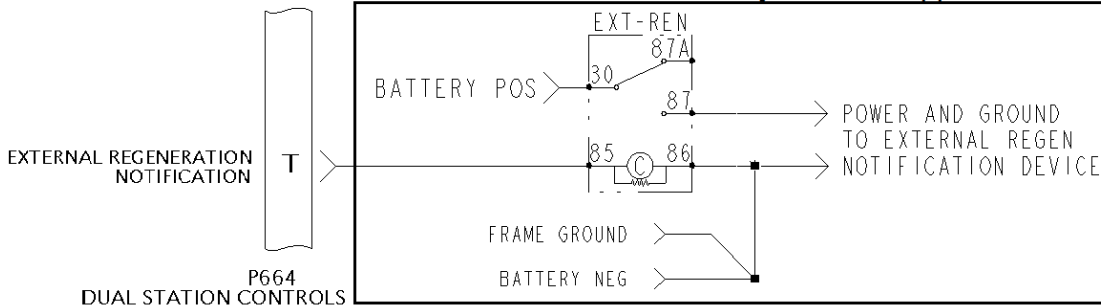
Murphy Control Box using 16 way connector

Body Builder Supplied



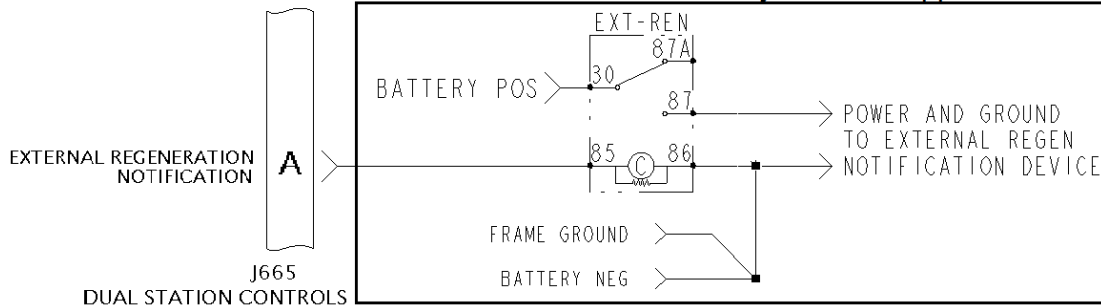
External Regeneration Notification using 23 way connector

Body Builder Supplied



External Regeneration Notification using 16 way connector

Body Builder Supplied



RELAY BOX CONFIGURATION

MODELS 567/579

Models 567 and 579 use a relay box to transfer signals to the engine ECM and the Eaton Transmission ECU if equipped with an Eaton automated transmission. The 12 pin connector (P111A) will be connected to the chassis harness PTO connector which will move the 12 pin connector towards the rear of the frame.

PACCAR MX ENGINES

Typical relay set up pictured in Figure 8-29 for models equipped with PACCAR engines. The chassis harness may be equipped with connector P198 and the engine harness may be equipped with connector P197 if the chassis is optioned accordingly. See Figure 8-30 on the following page for system schematic. For the PTO engaged signal, a ground signal can be connected to Pin 5 of the P197 connector, or pin 2 of the P198 connector. This signal will activate the MX Engine PTO relay, the Eaton PTO relay, the dash warning telltale, and the hour meter if equipped.

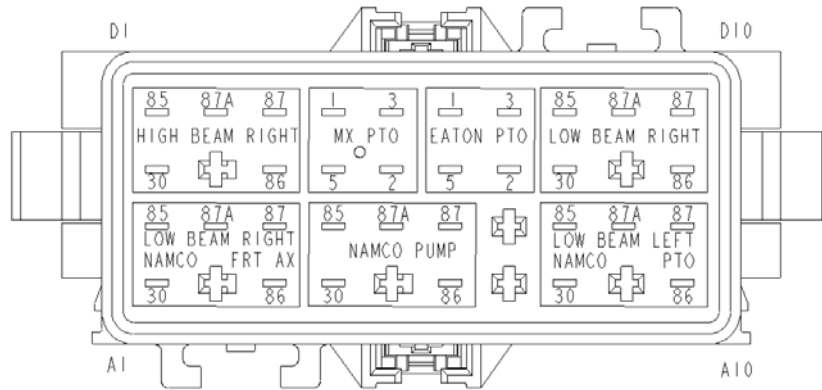


FIGURE 8-29. PACCAR Engine Relay Box Typical Configuration

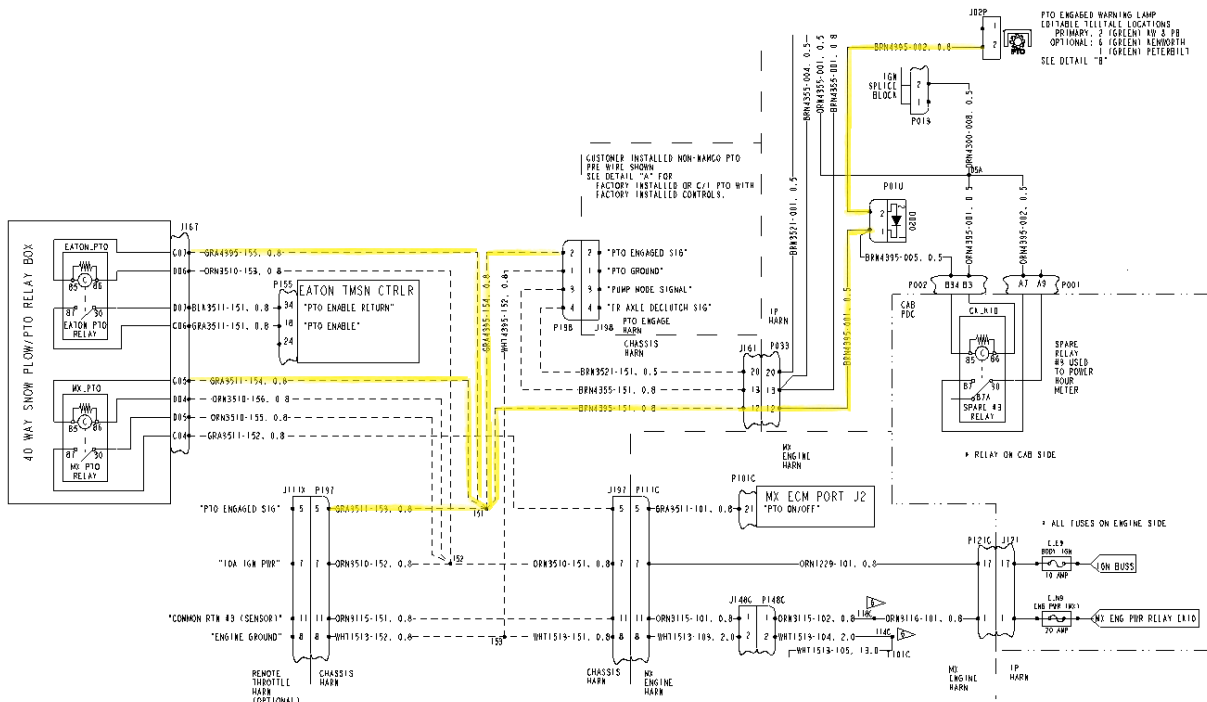


FIGURE 8-30. Electrical Schematic for PACCAR Engine and Eaton Transmission Equipped Chassis

CUMMINS ENGINES

Typical relay set up pictured below in Figure 8-31 for models equipped with Cummins engines. The chassis harness may be equipped with connector P198 and the engine harness may be equipped with connector P197 if the chassis is optioned accordingly. See Figure 8-32 on the following page for system schematic. For the PTO engaged signal, a ground signal can be connected to Pin 5 of the P197 connector, or pin 2 of the P198 connector. This signal will activate the Eaton PTO relay, the dash warning telltale, and the hour meter if equipped.

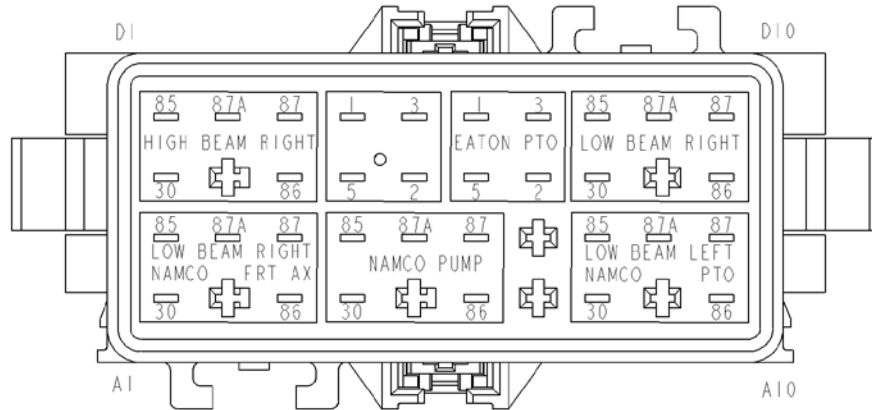


FIGURE 8-31. Cummins Engine Relay Box Typical Configuration

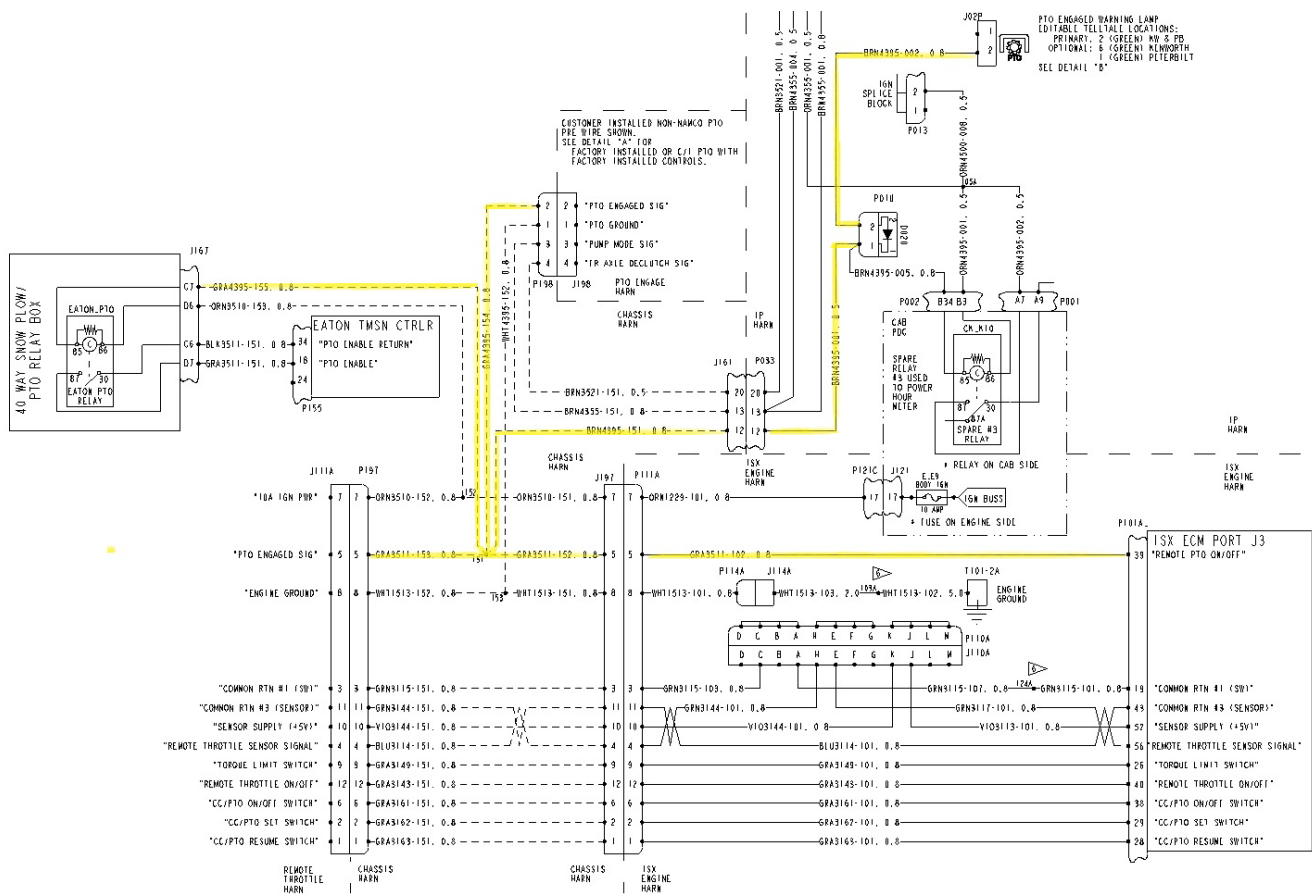


FIGURE 8-32. Electrical Schematic for Cummins Engine and Eaton Transmission Equipped Chassis

CHASSIS HARNESS WIRING

MX ENGINES

The MX PTO relay is required to convert the low PTO engaged signal to a high signal for the MX ECU. The MX PTO relay (P27-1151) is used to convert this signal. The MX PTO relay coil receives 12V IGN power from fuse E_E9 body IGN from pin 7 of the MX engine harness PTO/remote throttle connector (P111). When a PTO engages the PTO engage circuit has a path to ground. This ground path allows current to flow through the MX PTO relay coil. When the MX PTO relay is active the MX ECU receives a high input signaling that the PTO is engaged.

EATON AUTOMATED TRANSMISSIONS:

For Eaton Ultrashift Plus and Advantage automated transmissions, the transmission ECU requires an isolated PTO engaged signal. The Eaton PTO relay (P27-1151) is used to isolate the PTO engaged signal to the transmission ECU. The Eaton PTO relay coil receives 12V IGN power from fuse E_E9 body IGN from pin 7 of the engine harness PTO/remote throttle connector (P111). PTO engage circuit has a path to ground. This ground path allows current to flow through the Eaton PTO relay coil. When the relay is active pins 34 and 18 on the transmission controller are shorted providing the PTO engaged signal to the transmission ECU.

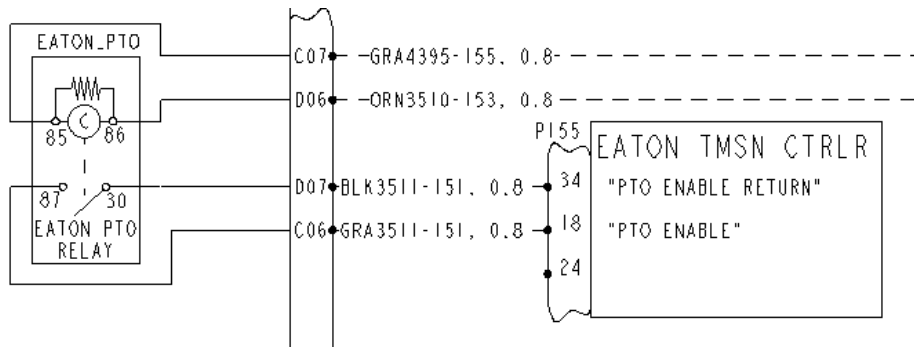


FIGURE 8-33. Relay Wiring Diagram

NAMCO SPLIT SHAFT PTO/TRANSFER CASE UNITS

Note: since the Namco option uses relays in the same position as the snow plow option these options cannot be called out together. For chassis with a Namco split shaft PTO/transfer case several configurations are available which require up to three relays to convert the engaged signal to drive the PTO, pump mode and front axle declutch warning lamps. The three possible clutch configurations: rear axle & front axle, rear axle & PTO, rear axle, PTO and front axle.

PTO:

When the PTO is not engaged the Namco sensor sends a high signal on pin 2 (J195) energizing the Namco PTO relay coil (P27-1150). When the Namco PTO relay is energized no signal leaves the relay. When the PTO is engaged the sensor output goes low. The Namco PTO relay coil de-energizes and the PTO warning lamp is grounded.

Pump mode: (rear axle declutch)

When the Namco axle clutch is in road mode the Namco sensor sends a high signal on pin 4 (J195) energizing the Namco pump relay coil (P27-1150). While the Namco pump relay is energized no signal leaves the relay.

When the rear axle is declutched for pump mode the sensor output goes low. The Namco pump relay coil de-energizes and the pump mode circuit is grounded.

Front axle clutch:

When the Namco front axle clutch is not engaged the Namco sensor sends a high signal on pin 5 (J195) energizing the Namco front axle clutch relay coil (P27-1150). While the Namco pump relay is energized no signal leaves the relay. When the front axle is clutched for front axle power the sensor output goes low. The Namco pump relay coil de-energizes and the front axle clutch circuit is grounded.

Chassis with a Namco split shaft PTO will also be provided with a 6-way connector to connect to the Namco sensor jumper harness (J195).

Three circuits are passed to the IP harness, PTO, pump mode sense, front axle clutch via the chassis to IP connection (J161/P033).

Two 12-way connectors are provided to connect to the MX or ISX engine harness remote throttle/PTO connector (P197/J197).

The Eaton PTO relay, MX PTO relay, Namco PTO relay, Namco pump relay and Namco front axle clutch relay are located in a 40-way sealed relay box mounted behind the chassis node.

Fabco split shaft PTO/transfer case jumper harness:

There are 4 different split shaft PTO/transfer case jumper harnesses. They account for, rear & front axle, rear & one PTO, rear & two PTO's, rear & front & one PTO configurations.

PTO sensor to chassis harness connector (P198/J198):

The chassis harness provides for a 4-way connector to connect to a PTO sensor harness. It will always be capped for shipment to the plant (P198/J198).

Pin 1 - wht4395, provides vehicle ground for 2-pin PTO engagement switches

Pin 2 - gra4395, PTO engaged signal. When low activates the PTO engaged warning lamp.

Pin 3 - gra4355, pump mode engaged signal - When low activates the pump mode warning lamp.

Pin 4 - gra3521, rear axle clutch engaged signal - When low activates the front axle clutch warning lamp.

ELECTRICALLY ENGAGED PTO'S

TYPICAL WIRING ARRANGEMENTS FOR
PTO ENGAGEMENT SENSOR JUMPER AND SENSOR SWITCHES

PTO SENSOR HARNESS
WITH FABCO SPLIT SHAFT PTO OR TRANSFER CASE

PTO SENSOR HARNESS
WITHOUT FABCO SPLIT SHAFT PTO OR TRANSFER CASE

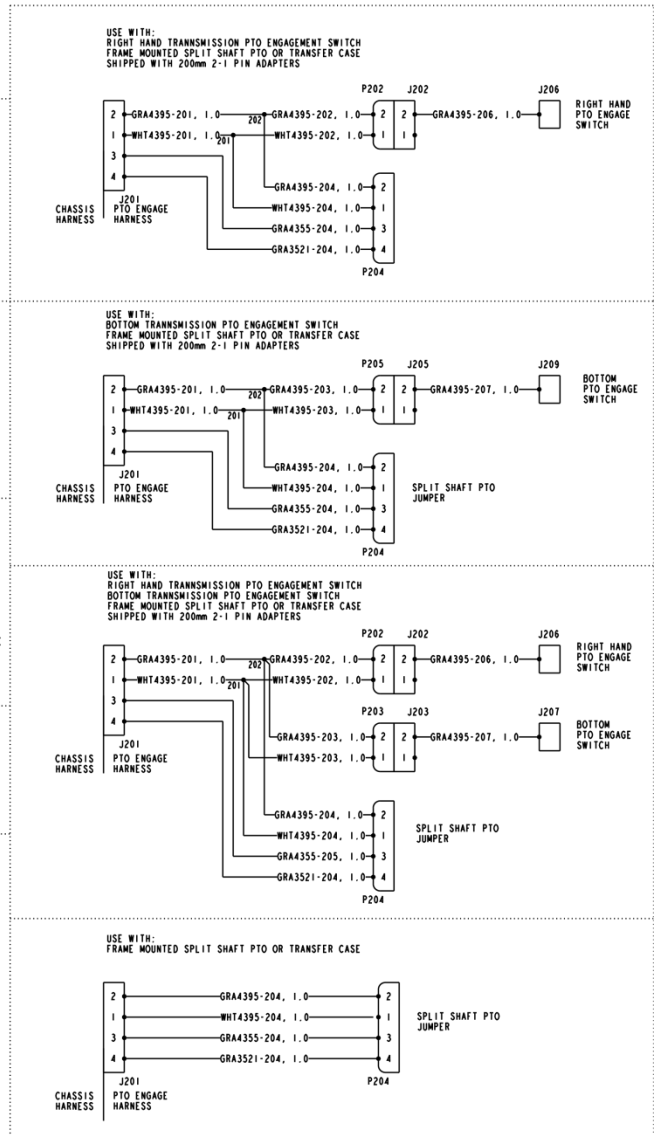
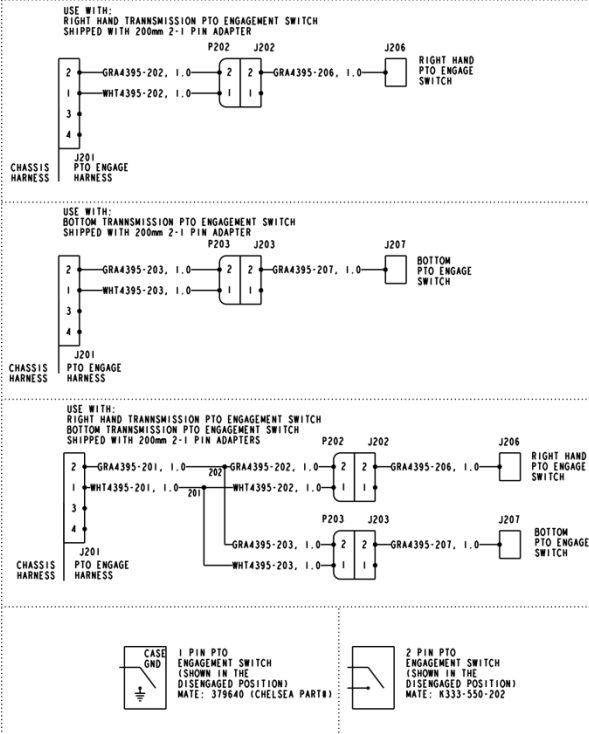


FIGURE 8-34. Electric Engaged PTO Diagrams

TYPICAL WIRING ARRANGEMENTS FOR
PTO ENGAGEMENT SENSOR JUMPER
AND SENSOR SWITCHES (cont.)

FABCO SPLIT SHAFT PTO OR TRANSFER CASE HARNESS

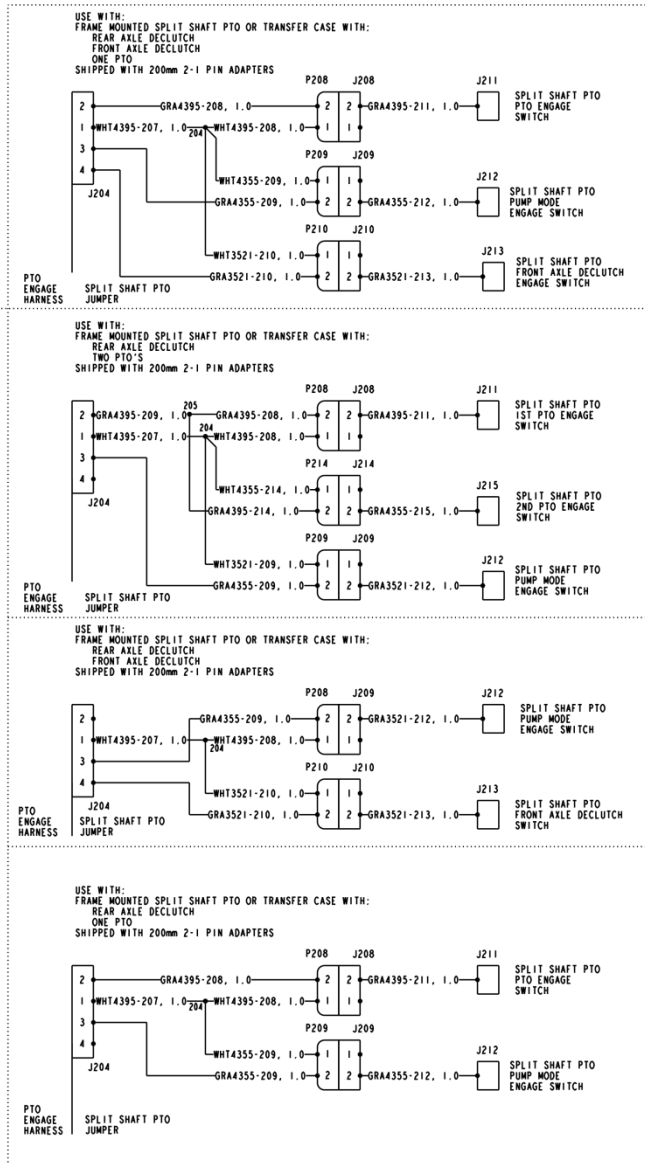


FIGURE 8-35. Additional Electric Engaged PTO Diagrams

PTO TELLTALE

With key switch to "RUN" position, all the telltale icons will turn on briefly. PTO icon below will be illuminated green to the left side of the Driver Performance Center.



FIGURE 8-36. PTO Icon

If the factory did not install the PTO or did not install the PTO pre-wire you may have to install wiring from the PTO engagement switch to the instrument panel harness to illuminate this icon. Your dealer will have access to your truck's Instrumentation diagram. That drawing will have a picture of the cluster and will help identify how to turn on the PTO ICON you saw doing the key switch test above.

MODEL 389 FAMILY

The model 389 family will have up to 5 additional telltales available for use. Some of these may be already used depending on chassis options. The pigtails will be located behind the dash behind the instrument cluster or kick panel area on the driver's side, see Figure 8-37 for the schematic. The active inputs are bi-polar, meaning the active signal can be ground or power. These will have to be programmed to specific applications in the Electronic Service Analyst (ESA) tool if they are to be changed from the default settings. The ESA screen shot in Figure 8-47 shows the default settings. There are also up to 4 additional alarms that can be used. These inputs will also use a bipolar signal for activation.

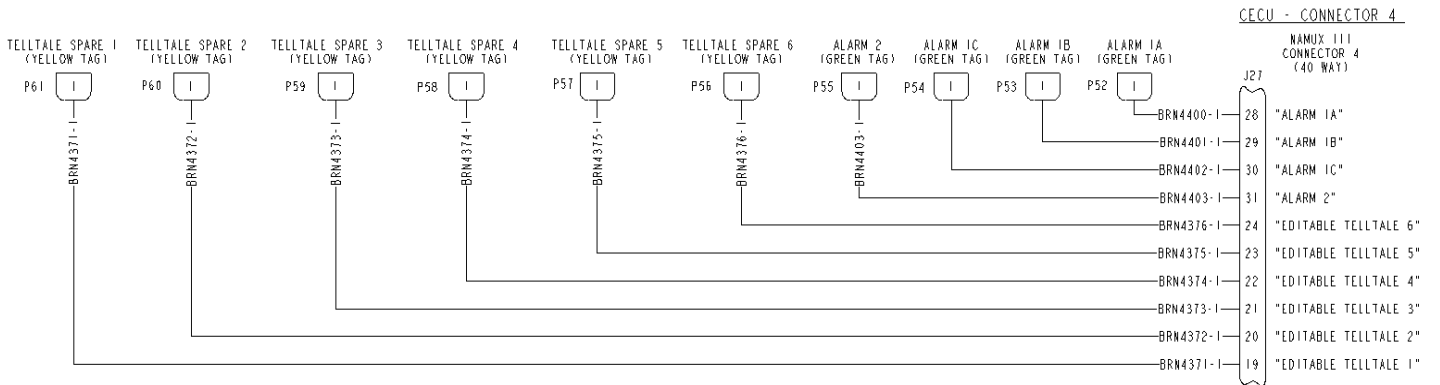


FIGURE 8-37. Model 389 Family Schematic for Telltale Input Pigtails

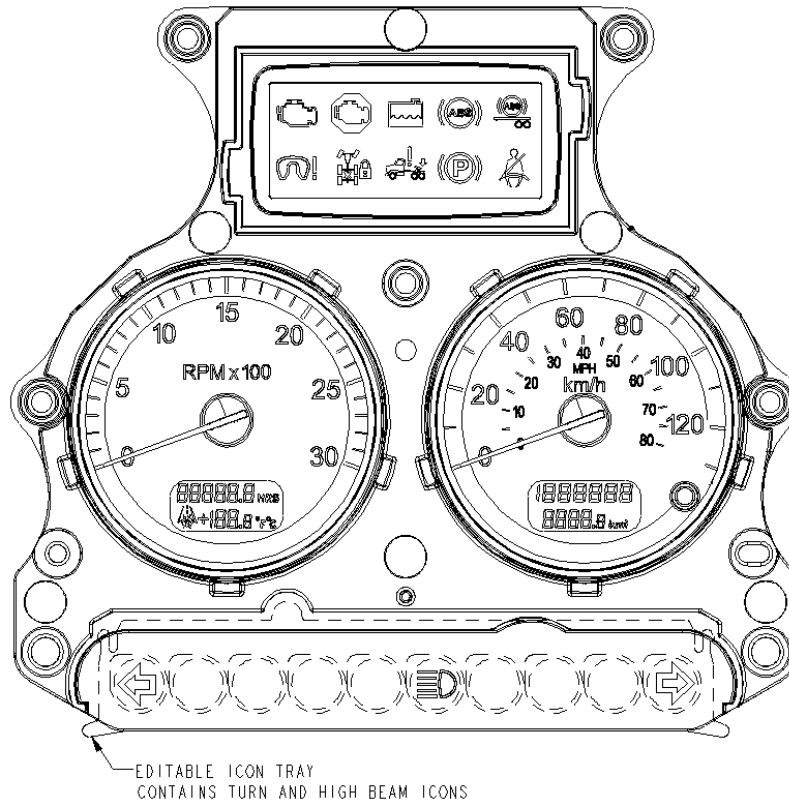


FIGURE 8-38. Model 389 Family Instrument Cluster Telltale Icon Locations

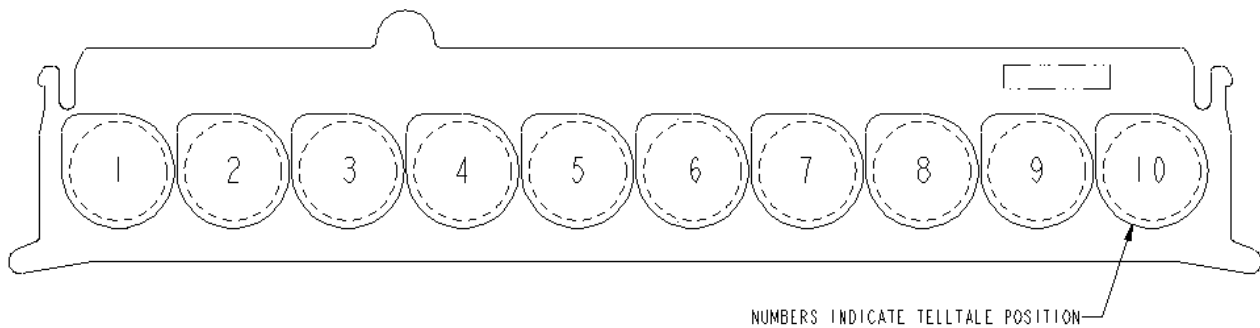


FIGURE 8-39. Model 389 Family Telltale Icon Tray

Table 8-5. Model 389 Family Telltale Icon Location and Default Icons

Position	Icon Description	Color	Signal Source
1	Left Turn	Green	MFTS Module to CECU
2	Blank	Green	Editable #1 Breakout on Cab Harness
3	Blank	Red	Editable #2 Breakout on Cab Harness
4	Blank	Yellow	Editable #3 Breakout on Cab Harness
5	Blank	Yellow	Editable #4 Breakout on Cab Harness
6	High Beam	Blue	MFTS Module to CECU
7	Blank	Yellow	Editable #5 Breakout on Cab Harness
8	Wait To Start	Yellow	Direct Controlled (Engine ECU)
9	MLF	Yellow	Direct controlled (Engine ECU)
10	Right Turn	Green	MFTS Module to CECU

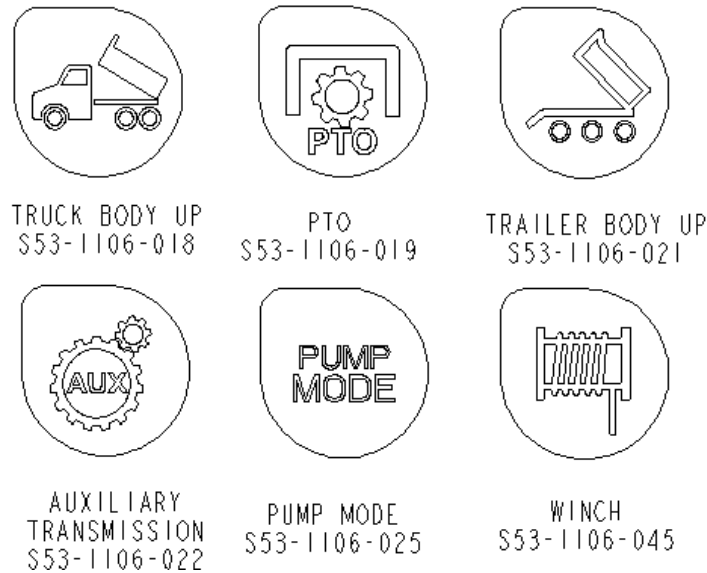


FIGURE 8-40. Model 389 Family Telltale Optional Icon Labels

Program - EMULATION MODE Print Preview Close

VIN/Chassis Number
0000000000000003 Program

All Dash Lighting Display Drivetrain Electrical Exterior Lighting Lighting Network Interface Optional Gauge Standard Gauge Telltale

Description	Locked	Value
✓ Editable Telltale 1 Icon ID		Blank
Editable Telltale 2 Icon ID		Blank
Editable Telltale 3 Icon ID		Blank
Editable Telltale 4 Icon ID		Blank
Editable Telltale 6 Icon ID		Engine Brake
Editable Telltale 8 Icon ID		Engine Brake
Editable Telltale 9 Icon ID		Engine Brake

FIGURE 8-41. Model 389 Family ESA Programming Example

MODEL 567/579 FAMILY

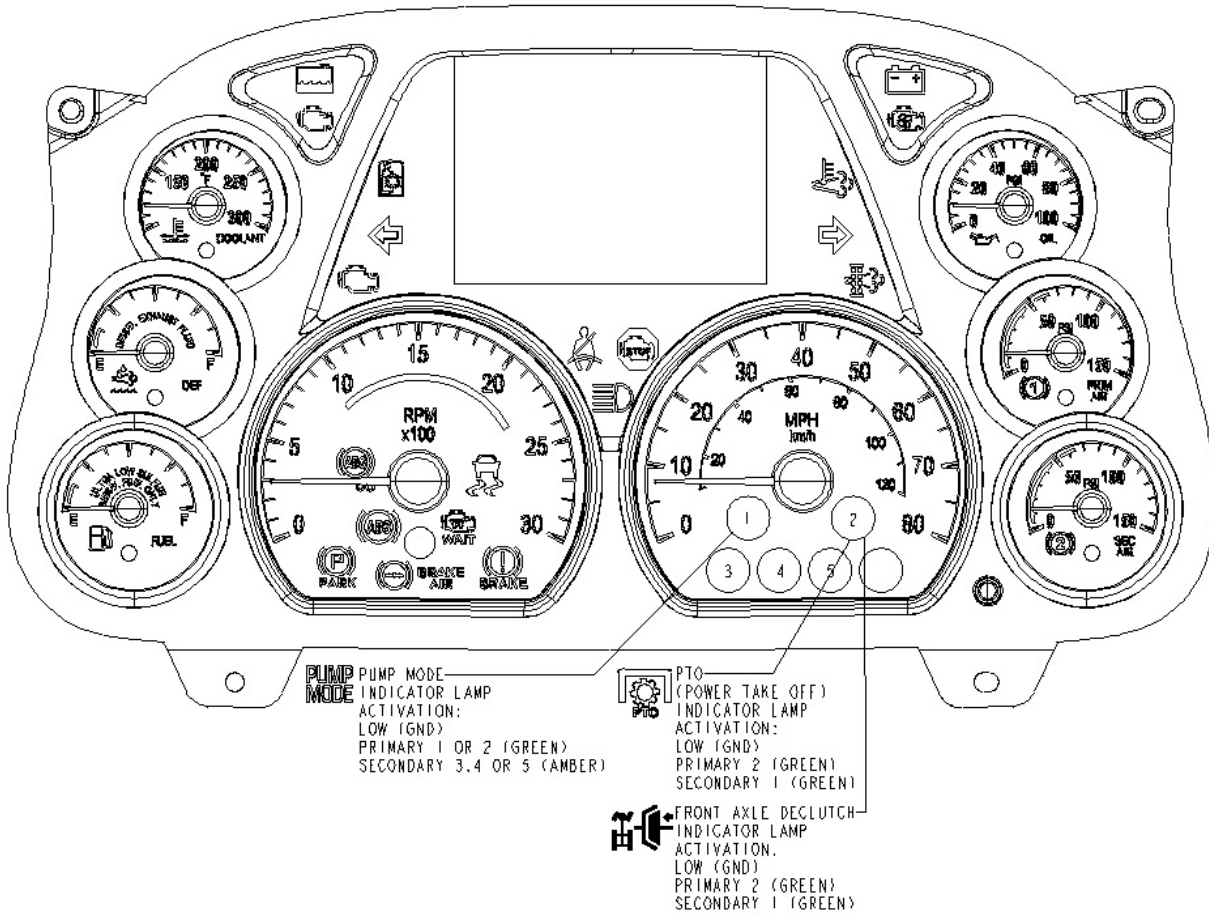


FIGURE 8-42. PTO Telltale Location

The standard telltale card has a GREEN PTO icon in position #2 (shown above). To activate this icon, locate where (6) RED, GREEN and YELLOW labeled 2-way connectors are taped to the instrument panel harness on the left side of the cup holder. One of these 2-way connectors has a GREEN label with the text "EDITABLE TELLTALE #2 P025". A gray wire goes to pin 2 of this connector. When that gray wire is grounded the PTO icon will turn on. No programming is needed, and it can be easily tested before wiring with a ground wire jumper (reference electrical section for new telltale light connector information).

ADDITIONAL TELLTALES AND ALARMS

Model 567/579 Family

The model 567/579 family will have up to 6 additional telltales available for use. Some of these may be taken up by other options already ordered on the chassis. The pigtails will be located behind the dash near the center section and will be close to the air pressure transducers. The active inputs are bi-polar, meaning the active signal can be ground or power. These will have to be programmed to specific applications in the Electronic Service Analyst (ESA) tool if they are to be changed from the default settings. The ESA screen shot in Figure 8-44 shows the default settings. Telltale positions 1 and 2 will be green illuminated color, positions 3, 4 and 5 will be amber illuminated color, and position 6 will be red. By default, the PTO mode telltale icon will be in position 2 as shown on the instrument cluster illustration in Figure 8-42. A trailer dump belly icon will be placed in position 6 by default, and a pump mode icon may be placed in position 1. There are also up to 4 additional alarms that can be used. These inputs will also use a bipolar signal for activation.

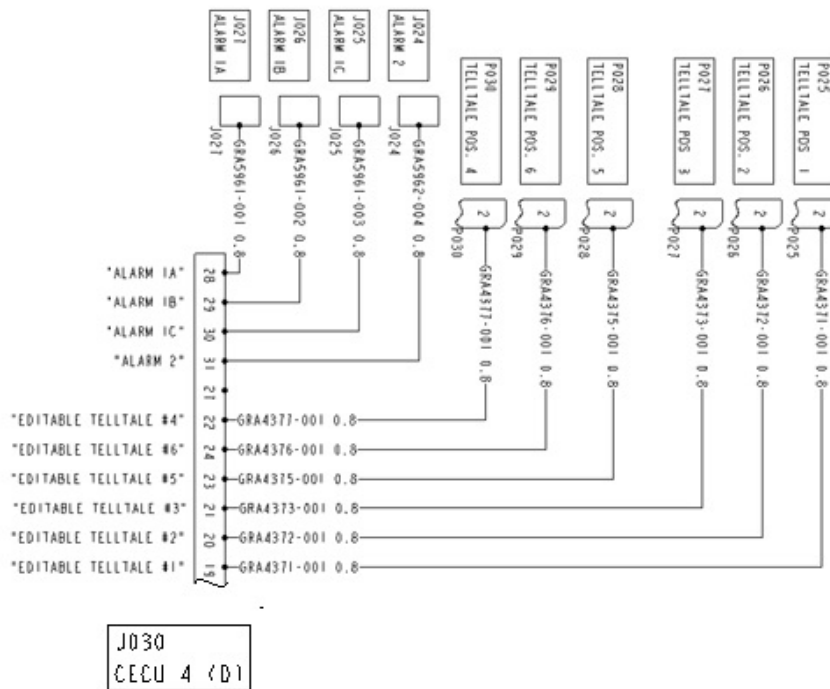


FIGURE 8-43. Model 567/579 Family Schematic for Telltale Input Pigtails

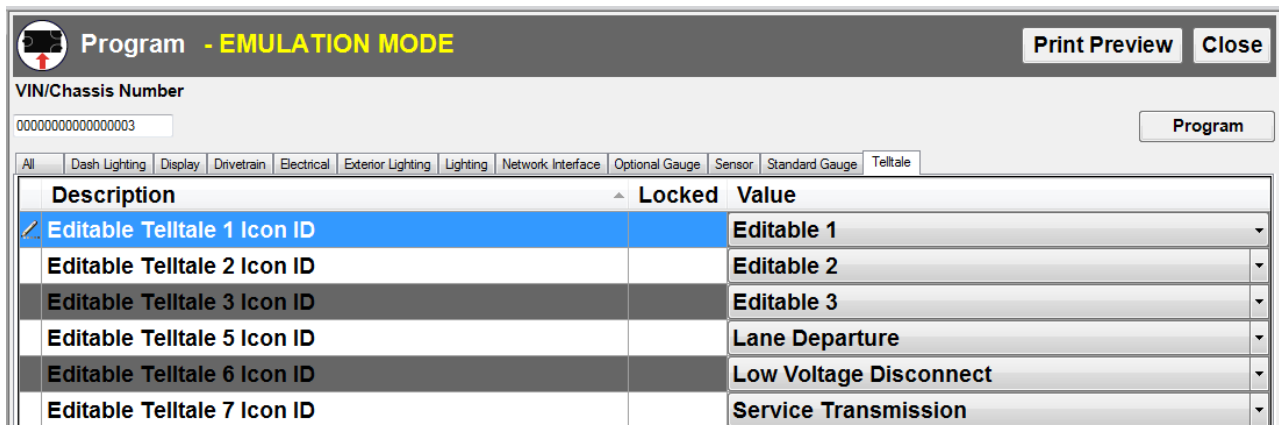


FIGURE 8-44. ESA Screen Shot Showing Telltale Programming

PTO WIRING DIAGRAM

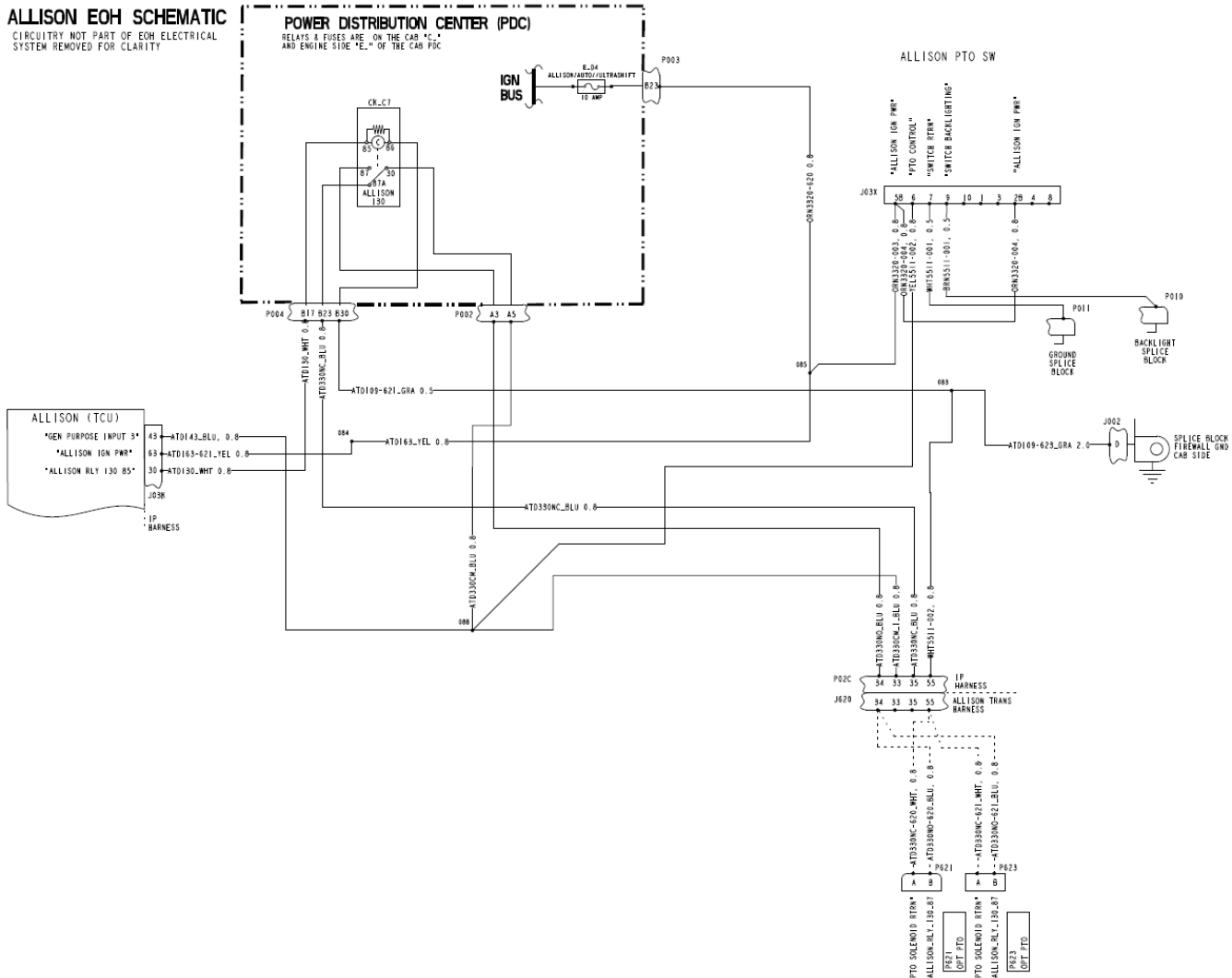


FIGURE 8-45. Allison EOH Electrical System Typical Schematic

- Application of a ground signal to pin 2 of the P198 connector will put the engine into PTO mode and illuminate the dash PTO telltale light (if equipped)
- PTO hardwired controls should be connected at the J197 or P198 connectors
- If vehicle is not equipped with P201 connector it may be necessary to make your own harness to connect to P198
- If vehicle is not equipped with J197 or P198 connectors, PTO hardwired controls should be connected directly to the P111c connector
- Layout and population of 40-Way Snow Plow/PTO Relay will differ depending upon PTO sales code, transmission type and vehicle model

Troubleshooting:

For sporadic or inconsistent PTO performance: Check and replace the 10A fuse in location "E9" and 20A fuse in location "N9" in the Power Distribution Center (PDC) on the engine side of the firewall in front of the driver. If these fuses are blown there will not be +12V power at pin 7 or 11 of the Remote Throttle Connectors (P111C or P197)

For sporadic or inconsistent PTO performance: Check that relays and fuses in the 40-Way Snow Plow/PTO Relay Box are present and not loose.

PTO PROGRAMMING FOR MX ENGINES

ACRONYMS AND ABBREVIATIONS

BBM	Body Builder Module
B-CAN	Body Builder CAN
CAN	Controller Area Network signal defined by SAE J1939
CECU	Cab Electronic Control Unit
DAVIE	DAF advanced vehicle investigation equipment
ESA	Electronic Service Analyst, a PC based diagnostic service tool for Peterbilt multiplexed cab electronics
V-CAN	Vehicle CAN
PEP	PACCAR Engine Pro
PTO	Power Take Off

INTRODUCTION

This section is intended to be used in conjunction with the PACCAR MX Programming Guide. There are a number of parameters that must be set to enable PTO functionality on PACCAR MX Engines. The MX Programming Guide explains how to set these parameters for your application in section 12 “*Power Take-Off Engine Speed Control (PTO Mode)*”.

This section explains how to configure trucks with MX engines in one of the four PTO options as listed below:

1. Stationary In-cab PTO control
2. Mobile In-cab PTO control
3. Stationary Remote PTO with hardwired control
4. Stationary Remote PTO control over BCAN
5. Stationary Remote PTO with TSC1 control

Depending on the configuration used, it may require one or more of the following:

1. Electrical Wiring Installation
2. Reprogramming of MX Engine using PEP and DAVIE
3. Reprogramming of CECU using ESA

This section explains only the parameter configurations that are specific to one of the four options listed above. There are a number of common parameters that must be configured which are explained in section 12 “*Power Take-Off Engine Speed Control (PTO Mode)*” of the MX Programming Guide.

PTO Controls Utilizing TSC1 Messaging

DISCLAIMER: PACCAR is not responsible for equipment damage or personal loss related to accidental or intentional misuse of TSC1 functionality

- TSC1 control is only available for “Remote Without Pedal” sales code
- TSC1 control is only available for stationary PTO applications
- See PACCAR MX Engine Programming Guide for necessary ECU configuration for TSC1 PTO control
- See J1939 wiring interface information under Electrical section. Both under-dash and engine locations are acceptable for customer interface

TABLE 8-6. PACCAR PTO TSC1 Message Requirements

PTO	
Priority:	0x6
PGN:	0xFEF0
SA:	0x24 hex
Destination:	Not specific
Rx Rate:	100ms
CAN bus:	VCAN (250k)
SPN:	980 (PTO on/off switch for CAN based switch operation)
-TSC1_E	
Priority:	0x3
PGN:	0x0000
SA:	0x24
Destination:	Specific (0x00)
Rx Rate:	10ms *
CAN bus:	VCAN (250k)

SPN: 695 (engine override control mode)
SPN: 696 (Engine requested controls condition)
SPN: 897 (OCM priority)
SPN: 898 (Engine requested speed limit)
SPN: 518 (Engine requested Tq. Limit)
SPN: 3349 (TSC1 transmission rate) = 0x07
SPN: 3350 (TSC1 Control purpose) = 0x02 (P3_PTO governor)
SPN:4191 (Engine requested Tq – hi res)
SPN:4206 (Message counter)
Broadcast values 0x00 – 0x07 incrementally and wrapping around back to 0x00.
SPN: 4207 (Message Checksum)

0x0F may be sent to bypass the checksum function. This may be acceptable for PACCAR, but in the event that it is decided the checksum must be used, it is calculated as follows:

- $MessageChecksum = (((Checksum \gg 6) \& 03n) + (Checksum \gg 3) + Checksum) \& 07n$
- Where Checksum is calculated as:
 - $Checksum = (Byte1 + Byte2 + Byte3 + Byte4 + Byte5 + Byte6 + Byte7 \text{ Message Counter} \& 0Fn + \text{Message Identifier byte0} + \text{Message Identifier byte1} + \text{Message Identifier byte2} + \text{Message Identifier byte3})$

*As far as message rates are concerned, PTO should always be sent from the body builder controller at 100ms. The TSC1 message must be sent at 10ms when the OCM (SPN 695) is broadcast at 0x1,0x2, or 0x3. If the last broadcast was OCM = disabled (0x00) then the message no longer needs to be sent at 10ms until the next time it is required. This is preferred to minimize bus loading.

WARNING



All configured PTO safeties, limits and interlocks will be observed if the prescribed message format is followed. Using messages or format other than the PACCAR PTO TSC1 Message Requirements may result in unexpected vehicle and equipment behavior.

If customer BBM is not powered on at ignition key on a low rate fault CECU configuration is not necessary for standalone TSC1 PTO control

REMOTE PTO CONTROL OVER VCAN WITH TSC1 CUSTOMER-INSTALLED MODULE

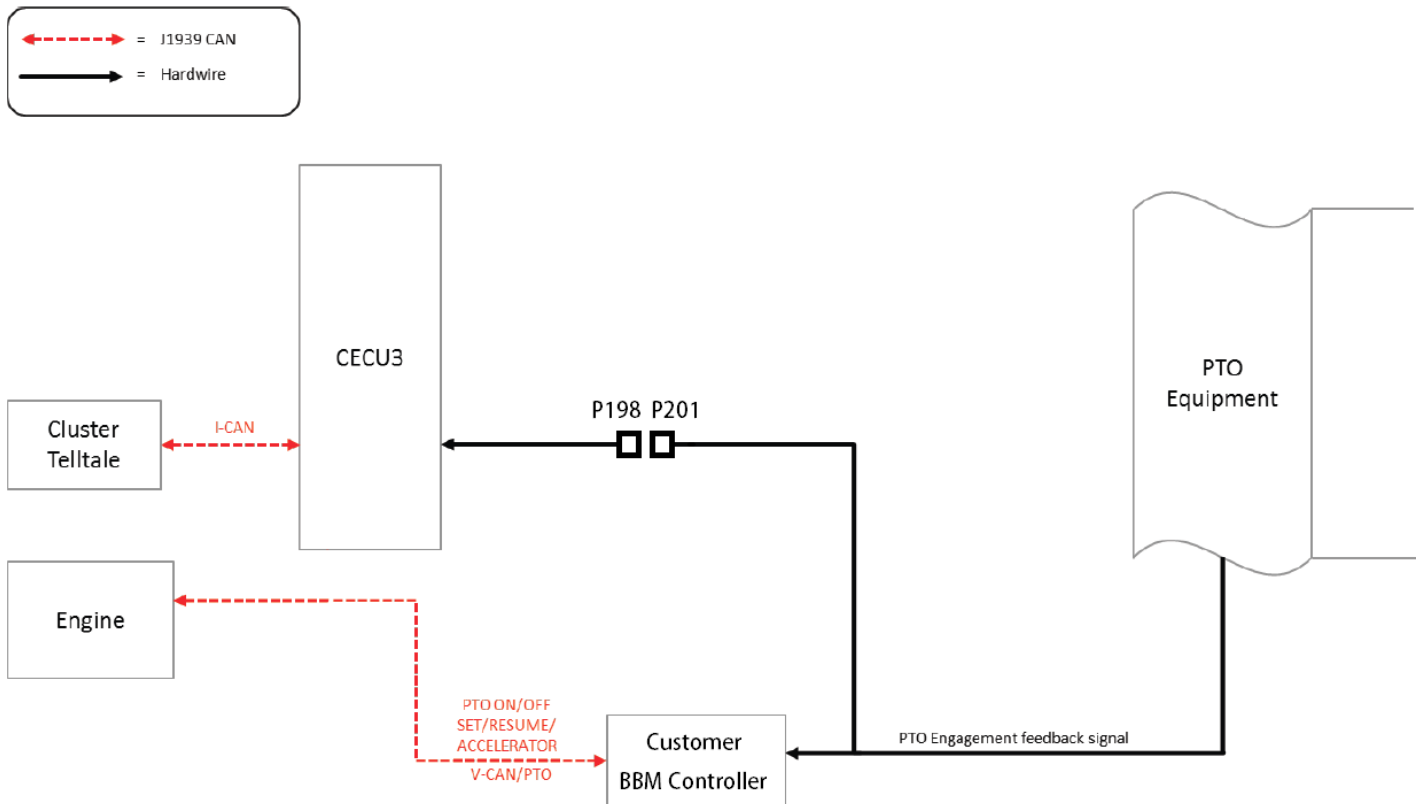


FIGURE 8-46.

- If using TSC1 PTO control and an in-cab PTO ON/OFF switch is required the CECU must be configured according to cab hardwired control
- If using an in-cab PTO ON/OFF switch it is still necessary to send the a CAN PTO ON message on VCAN to make the engine enter PTO mode

REMOTE PTO CONTROL OVER VCAN WITH TSC1 CUSTOMER-INSTALLED MODULE WITH CAB PTO SWITCH

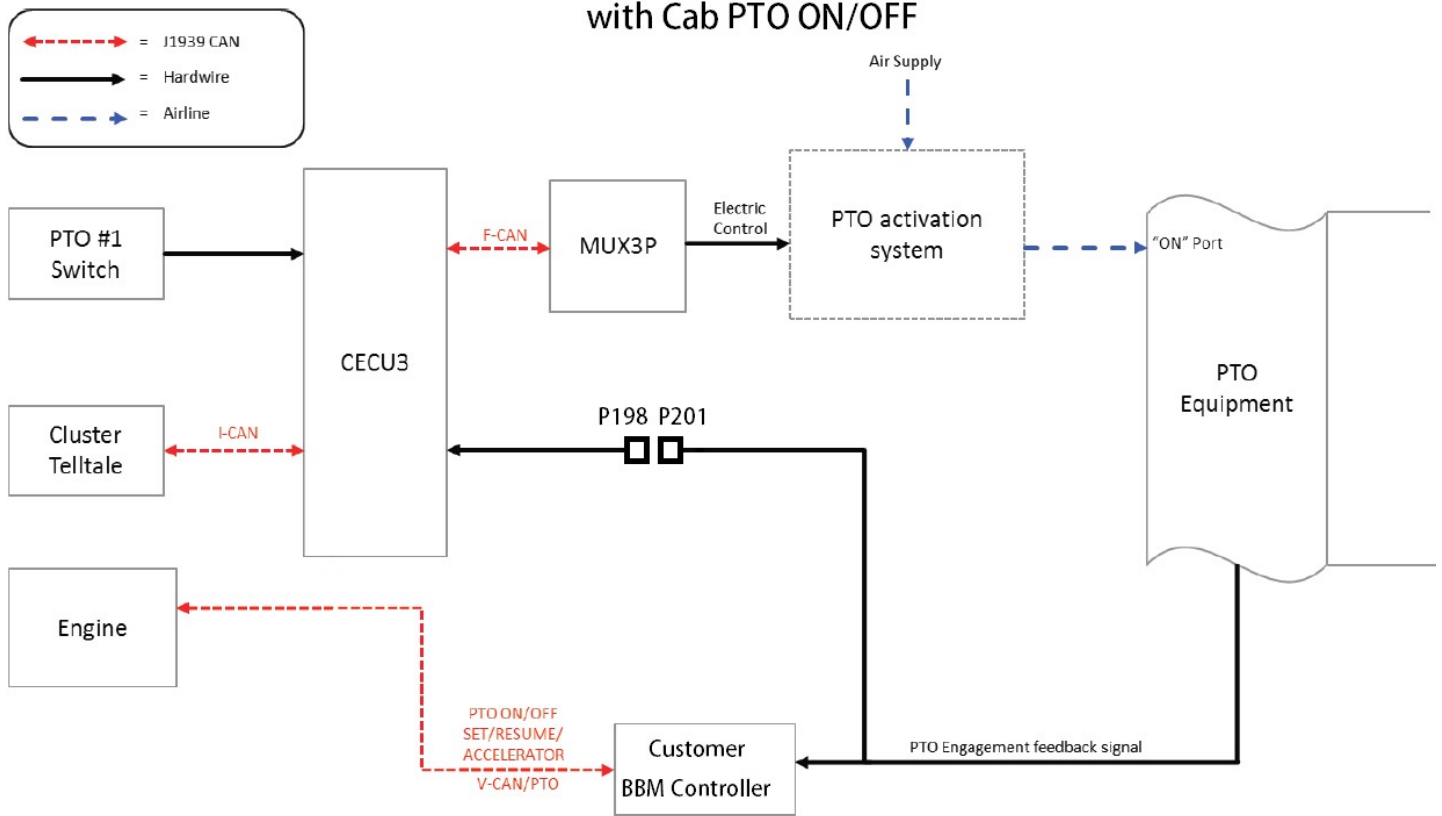


FIGURE 8-47.

- If PTO telltale light is desired, utilize the P198 connection.

IN CAB PTO CONTROL

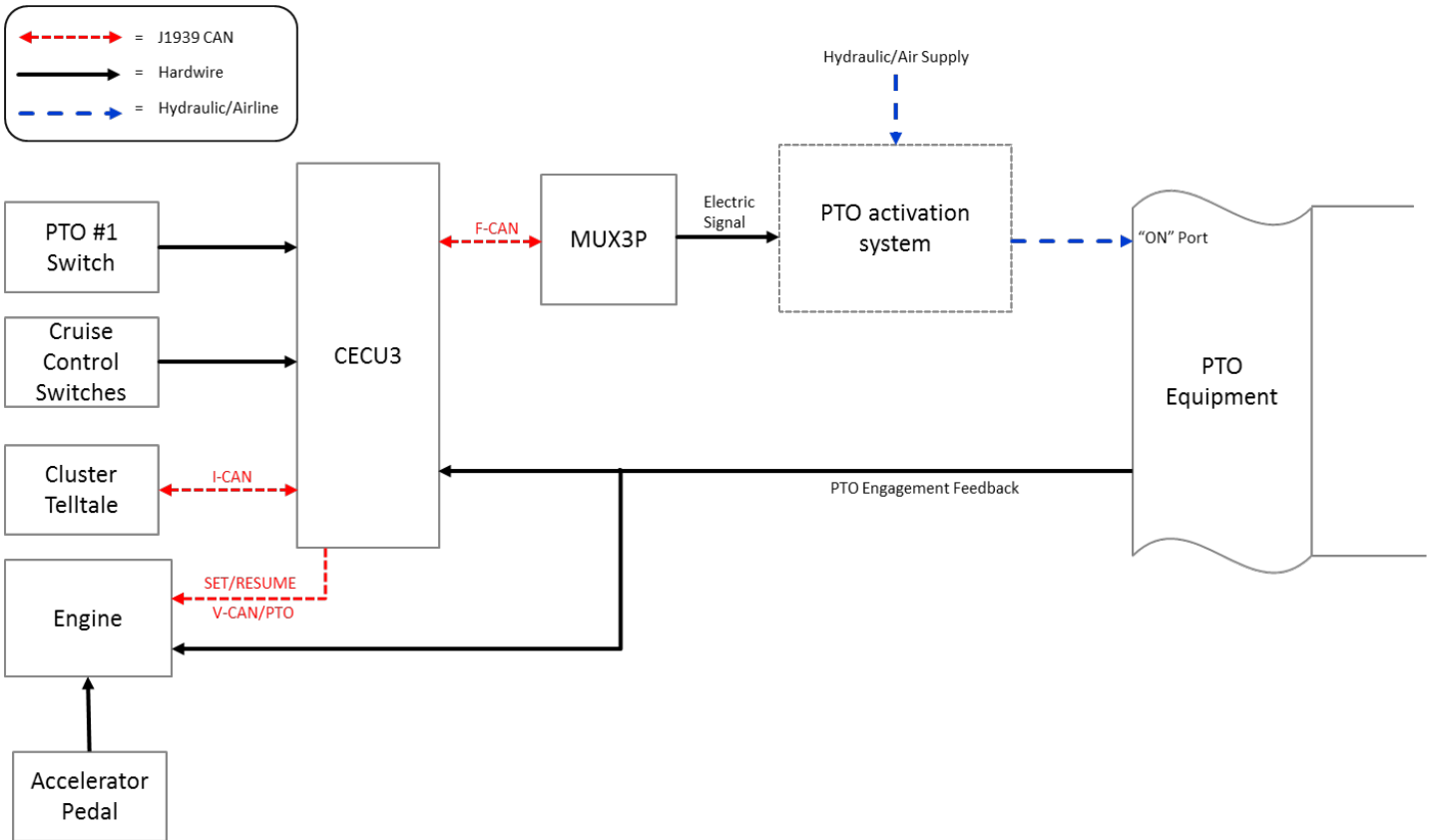


FIGURE 8-48. In-Cab PTO Control

To activate In-Cab PTO Control, there is a PTO switch in the cab that needs to be turned ON by the operator. This PTO ON/OFF switch is hardwired to the CECU which activates the PTO equipment. The PTO engagement feedback signal wire must be connected to CECU and Engine as shown in the diagram. Refer to “Electrical” section of this manual for more information on wiring.

When the PTO switch is ON and the engine receives signal that PTO is engaged, the engine changes its state to “PTO Mode” and the CECU will activate the PTO telltale on the cluster. For more information on engine behavior in PTO mode, please refer MX Programming Guide.

The engine speed in PTO Mode can be controlled by the cruise control switches or the accelerator pedal inside the cab depending on how the MX Engine is configured. This is explained in Section 1.2 in the BBM. Refer to the MX programming guide for further details on engine speed control in PTO Mode.

CECU Configuration using ESA

To configure In-Cab PTO Control, the following parameters must be set in CECU using ESA as shown:

TABLE 8-7. In cab PTO Control – ESA Settings

Parameter	Attribute
Engine Make	PACCAR
PTO Control Present	Enable

FIGURE shows the screenshot indicating where these parameters can be found in ESA.

Description	Locked	Value
Engine Fuel Type		Non-Diesel
* Engine Make		PACCAR
Engine Over Rev Warnings		Enable
Engine Retarder Present		Enable
Exterior Notification of Regen Warning		Disabled
Idle Shutdown Timer Popup Enable		Disable
Ignore Throttle Pedal When Parked		Disable
Interrupt Start of Truck With Engine RPM		Enable
Interrupt Start of Truck With In Gear		Enable
Interrupt Start of Truck With Overcranking		Enable
MX Service Call Popup Enabled		KW/PB Division Warning
Overspeed Shutdown Installed		Disable
Overspeed Shutdown Low Air Threshold (PSI)		85
Overspeed Shutdown Low Air Warning Enabled		Disable
Primary Air Pressure on V-CAN		Enable
Primary Fuel Level on V-CAN		Enable
PTO Control Present		Enable
PTO Total Fuel Fault Enable		Enable
Remote Accelerator Input Type		Not Installed
Remote PTO Input Type		Not Installed
Retarder Range Map		0/33/66/100
Secondary Air Pressure on V-CAN		Enable
Secondary Fuel Level on V-CAN		Enable
Soft Top Speed Limiter Enable		Disable
Soft Top Speed Limiter Warning Deactivation Distance		250000
Split Shaft PTO Installed		Disable
Transfer Case Temperature Sensor Type		Delphi (Q21-1002)

FIGURE 8-49. In-Cab PTO Control – ESA Settings

MX Engine Parameter Configuration using PEP

There are two ways to configure In-Cab PTO Control depending on application:

1. In-Cab PTO Control with Accelerator Pedal
2. In-Cab PTO Control without Accelerator Pedal.

For both these options, the configuration on CECU is the same as described in section 1.1. The engine should be configured differently depending on whether the accelerator pedal is needed along with the cruise control switch for In-Cab PTO control. This is done by selecting the right sales code using PEP as explained below.

In PEP, click “Edit Parameters” button to enable editing and scroll down to PTO section “PTO Mode Preferences”. Towards the end of the section, there will be an entry for “Type of PTO Controls – Enable/Disable (S074)” which can be edited by making a selection from a dropdown menu. From this dropdown menu, select one of the sales codes shown:

TABLE 8-8. In-Cab PTO Control – PEP Settings

Description	Peterbilt Sales Code
Mobile Cab Station Accelerator	2092046
Mobile Cab Station Switches And Accelerator	2092047
Stationary Cab Station Switches	2092048
Stationary Cab Station Switches And Accelerator	2092049
Stationary Remote Station Switches	2092052
Stationary Remote Station Switches And Throttle	2092053

Once the selection is made, scroll to the top of the page or to the bottom of the page to “Save” the changes. Once the changes are saved, select “Submit” and download the new file when it becomes available and program it on the engine using DAVIE.

HARD-WIRED REMOTE PTO CONTROL

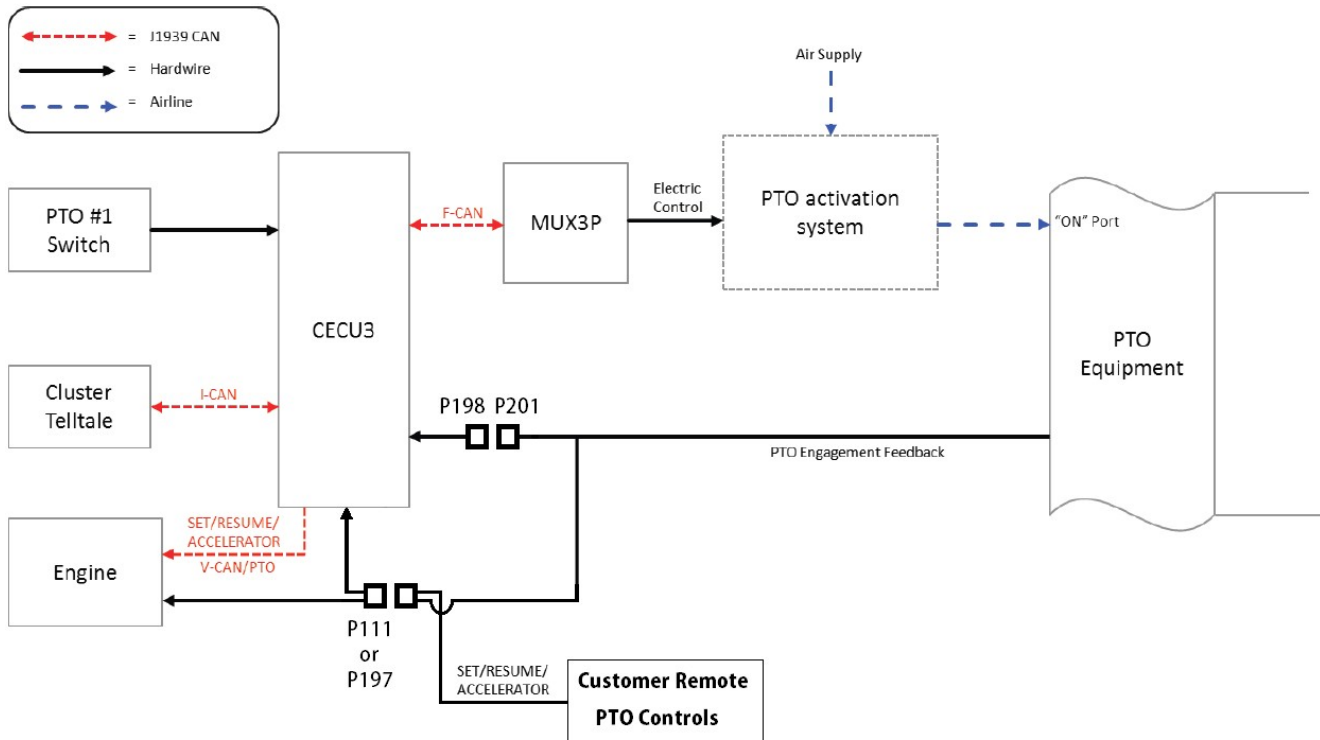


FIGURE 8-50. Hard-Wired Remote PTO Control

To activate Hard-Wired Remote PTO Control, there is a PTO switch in the cab that needs to be turned ON by the operator. This PTO ON/OFF switch is hardwired to the CECU which activates the PTO equipment. The PTO engagement feedback signal wire must be connected to CECU and Engine as shown in the diagram.

When the PTO switch is ON and the engine receives signal that PTO is engaged, the engine changes its state to “PTO Mode” and the CECU will activate the PTO telltale on the cluster. For more information on engine behavior in PTO mode, please refer MX Programming Guide.

The engine speed is controlled by the customer installed Remote PTO Controls. The Remote PTO Controls have digital Set and Resume signals and an analog Accelerator signal hardwired to the CECU. The CECU sends these inputs to the Engine via V-CAN using standard SAE messages as shown in Table 8-9. The Remote PTO Controls are hardwired to the CECU using 12-pin PACCAR connector as explained in “Electrical” section of this manual.

TABLE 8-9. J1939 signals from CECU (SA 0x31) to Engine over VCAN

Label	Description
SPN974	Remote Accelerator Pedal Position
SPN979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
SPN3447	Remote PTO Governor Preprogrammed Speed Control Switch #2
SPN982	Engine PTO Resume Switch
SPN984	Engine PTO Set Switch

.CECU Configuration using ESA

To configure Hard-Wired Remote PTO Control, the following parameters must be set in CECU using ESA as shown:

TABLE 8-10. Hard-wired Remote PTO Control – ESA Settings

Parameter	Attribute
Engine Make	PACCAR
PTO Control Present	Enable
Remote Accelerator Input Type	Analog Input
Remote PTO Input Type	Digital Input

Figure shows the screenshot indicating where these parameters can be found in ESA.

Description	Locked	Value
Engine Fuel Type		Non-Diesel
* Engine Make		PACCAR
Engine Over Rev Warnings		Enable
Engine Retarder Present		Enable
Exterior Notification of Regen Warning		Disabled
Idle Shutdown Timer Popup Enable		Disable
Ignore Throttle Pedal When Parked		Disable
Interrupt Start of Truck With Engine RPM		Enable
Interrupt Start of Truck With In Gear		Enable
Interrupt Start of Truck With Overcranking		Enable
MX Service Call Popup Enabled		KW/PB Division Warning
Overspeed Shutdown Installed		Disable
Overspeed Shutdown Low Air Threshold (PSI)		85
Overspeed Shutdown Low Air Warning Enabled		Disable
Primary Air Pressure on V-CAN		Enable
Primary Fuel Level on V-CAN		Enable
PTO Control Present		Enable
PTO Total Fuel Fault Enable		Enable
* Remote Accelerator Input Type		Analog Input
* Remote PTO Input Type		Digital Input
Retarder Range Map		0/33/66/100
Secondary Air Pressure on V-CAN		Enable
Secondary Fuel Level on V-CAN		Enable
Soft Top Speed Limiter Enable		Disable
Soft Top Speed Limiter Warning Deactivation Distance		250000
Split Shaft PTO Installed		Disable
Transfer Case Temperature Sensor Type		Delphi (Q21-1002)

FIGURE 8-51. Hardwired Remote PTO Control – ESA Settings

MX Engine Parameter Configuration Using PEP

There are two ways to configure remote PTO Control depending on application:

1. Remote PTO Control with Accelerator Pedal
2. Remote PTO Control without Accelerator Pedal.

For both these options, the configuration on CECU is the same as described in section 2.1. The engine should be configured differently depending on whether the accelerator pedal is needed along with the cruise control switch for Hardwired Remote PTO control. This is done by selecting the right sales code using PEP as explained below.

In PEP, click “*Edit Parameters*” button to enable editing and scroll down to PTO section “*PTO Mode Preferences*”. Towards the end of the section, there will be an entry for “*Type of PTO Controls – Enable/Disable (S074)*” which can be edited by making a selection from a dropdown menu. From this dropdown menu, select one of the sales codes shown:

TABLE 8-11. Hardwired Remote PTO Control – PEP Settings

Description	Peterbilt Sales Code
Remote Station with Accelerator Pedal	2092043
Remote Station without Accelerator Pedal	2092044

Once the selection is made, scroll to the top of the page or to the bottom of the page to “Save” the changes. Once the changes are saved, select “Submit” and download the new file when it becomes available and program it on the engine using DAVIE.

REMOTE PTO CONTROL OVER BCAN WITH HARDWIRED PTO ENGAGEMENT TO ENGINE

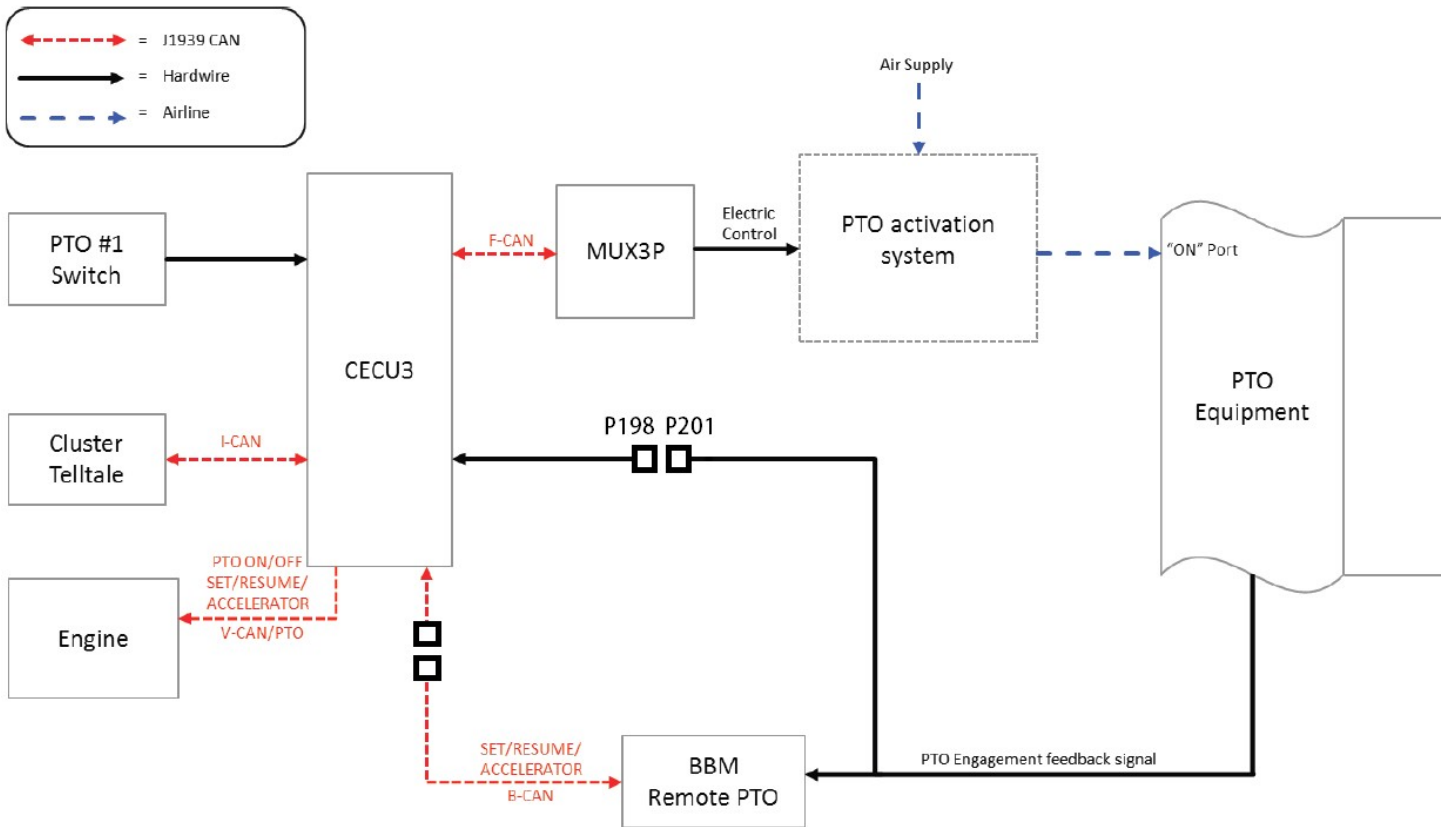


FIGURE 8-52. Remote PTO Control over BCAN with PTO ON/OFF Switch Hardwired to CECU

To activate Remote PTO Control over BCAN as shown here, there is a PTO switch in the cab that needs to be turned ON by the operator. This PTO ON/OFF switch is hardwired to the CECU which activates the PTO equipment. The PTO engagement feedback signal wire must be connected to CECU and Engine as shown in the diagram. Refer to “Electrical” section of this manual for more information on wiring.

When the PTO switch is ON and the engine receives signal that PTO is engaged, the engine changes its state to “PTO Mode” and the CECU will activate the PTO telltale on the cluster. For more information on engine behavior in PTO mode, please refer MX Programming Guide.

The engine speed is controlled by the customer installed PTO Control on the BBM. The CECU gets the “Set”, “Resume” and “Accelerator” signal from the Body Builder Module over B-CAN. The CECU sends these signals to the Engine via V-CAN using standard SAE messages as shown in Table. The PTO engagement feedback is hardwired to the CECU and the engine using 12-pin PACCAR connector as explained in “Electrical” section of this manual.

TABLE 8-12. J1939 signals from CECU (SA 0x31) to Engine over VCAN

Label	Description
SPN974	Remote Accelerator Pedal Position
SPN979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
SPN3447	Remote PTO Governor Preprogrammed Speed Control Switch #2
SPN982	Engine PTO Resume Switch
SPN984	Engine PTO Set Switch

NOTE: When the engine is configured for this PTO option, the Engine expects the J1939 messages from the BBM when- ever the key switch is in the ignition position. If the key is turned ON without having a PTO signal from BBM over B-CAN, the engine will log these active fault codes shown in Table 8-13. These codes will become inactive when the BBM starts sending signals. This can be avoided if the ignition and the BBM PTO controls are powered ON at the same time.

TABLE 8-13. Engine Fault Codes

Engine Fault Code	Description
P0221	CAN Communication – Message (EEC2) out of range – Remote accelerator pedal position
U153B	CAN Communication – Message (PTO) out of range – Engine PTO resume switch
U1837	CAN Communication – Message (PTO) out of range – Engine PTO governor preprogrammed speed.
P253B	CAN Communication – Message (PTO) out of range – Engine PTO governor set switch.

CECU CONFIGURATION USING ESA

To configure Remote PTO Control over BCAN with hardwired PTO Engagement Feedback to Engine, the following parameters must be set in CECU using ESA as shown in Table.

TABLE 8-14. Remote PTO Control over BCAN with hardwired PTO Engagement Feedback to Engine

Parameter	Attribute
Engine Make	PACCAR
PTO Control Present	Enable
Remote Accelerator Input Type	BCAN Input
Remote PTO Input Type	BCAN Input
Gateway Engine CCVS Message (PGN 65265)	Gateway or Route to BCAN
Gateway Engine EEC1 Message (PGN 61444)	Gateway or Route to BCAN
Gateway Transmission ETC2 Message (PGN 61445)	Gateway or Route to BCAN

Figure show the screenshot indicating where these parameters can be found in ESA.

Description	Locked	Value
Engine Fan With Park Brake		Disable
Engine Fuel Type		Non-Diesel
* Engine Make		PACCAR
Engine Over Rev Warnings		Enable
Engine Retarder Present		Enable
Exterior Notification of Regen Warning		Disabled
Idle Shutdown Timer Popup Enable		Disable
Ignore Throttle Pedal When Parked		Disable
Interrupt Start of Truck With Engine RPM		Enable
Interrupt Start of Truck With In Gear		Enable
Interrupt Start of Truck With Overcranking		Enable
MX Service Call Popup Enabled		KW/PB Division Warning
Overspeed Shutdown Installed		Disable
Overspeed Shutdown Low Air Threshold (PSI)		85
Overspeed Shutdown Low Air Warning Enabled		Disable
Primary Air Pressure on V-CAN		Enable
Primary Fuel Level on V-CAN		Enable
PTO Control Present		Enable
PTO Total Fuel Fault Enable		Enable
* Remote Accelerator Input Type		BCAN Input
* Remote PTO Input Type		BCAN Input
Retarder Range Map		0/33/66/100
Secondary Air Pressure on V-CAN		Enable
Secondary Fuel Level on V-CAN		Enable
Soft Top Speed Limiter Enable		Disable
Split Shaft PTO Installed		Disable
Transfer Case Temperature Sensor Type		Delphi (Q21-1002)

FIGURE 8-53. Remote PTO Control over BCAN with hardwired PTO Engagement Feedback to Engine– ESA Settings

Figure show the screenshot indicating where these parameters can be found in ESA.

Description	Locked	Value
BDS Message Control		Off (Default)
CM1 Message Control		Off (Default)
Configure Which CAN Bus to Transmit Fuel Level Message		Off (Default)
Destination for Engine Aftertreatment SCR Tank Message #1		Off (Default)
Destination for Engine DPF Control Message #1		Off (Default)
Gateway Engine AMB Message (PGN 65269)		Off (Default)
* Gateway Engine CCVS Message (PGN 65265)		Gateway or Route to BCAN
* Gateway Engine EEC1 Message (PGN 61444)		Gateway or Route to BCAN
Gateway Engine EEC2 Message (PGN 61443)		Off (Default)
Gateway Engine EFLP1 Message (PGN 65263)		Off (Default)
Gateway Engine ET1 Message (PGN 62562)		Off (Default)
Gateway Engine FD Message (PGN 65213)		Off (Default)
Gateway Engine Hours Message (PGN 65253)		Off (Default)
Gateway Engine IC1 Message (PGN 65270)		Off (Default)
Gateway Engine LFC Message (PGN 65257)		Off (Default)
Gateway Engine LFE Message (PGN 65266)		Off (Default)
Gateway Engine VD Message (PGN 65248)		Off (Default)
Gateway Refrigerant Pressure from CCAN		Off (Default)
Gateway Transmission ETC1 Message (PGN 61442)		Off (Default)
✓ Gateway Transmission ETC2 Message (PGN 61445)		Gateway or Route to BCAN
Gateway Transmission TRF1 Message (PGN 65272)		Off (Default)
Transmit CECU LC Message		Off (Default)

FIGURE 8-54. Remote PTO Control over BCAN with hardwired PTO Engagement Feedback to Engine

MX Engine Parameter Configuration using PEP

There are two ways to configure remote PTO Control depending on application:

1. Remote PTO Control with Accelerator Pedal
2. Remote PTO Control without Accelerator Pedal.

For both these options, the configuration on CECU is the same as described in section 3.1. The engine should be configured for one of the above options which are done by selecting the right sales code using PEP as explained below. In PEP, click “Edit Parameters” button to enable editing and scroll down to PTO section “PTO Mode Preferences”. Towards the end of the section, there will be an entry for “Type of PTO Controls – Enable/Disable (S074)” which can be edited by making a selection from a dropdown menu. From this dropdown menu, select one of the sales codes shown:

TABLE 8-15. Hardwired Remote PTO Control – PEP Settings

Description	Peterbilt Sales Code
Remote Station with Accelerator Pedal	2092043
Remote Station without Accelerator Pedal	2092044

Once the selection is made, scroll to the top of the page or to the bottom of the page to “Save” the changes. Once the changes are saved, select “Submit” and download the new file when it becomes available and program it on the engine using DAVIE.

Please refer to “Electrical” section of this manual for details on wiring connections to set up Remote PTO Controllers with MX engines.

REMOTE PTO CONTROL OVER BCAN WITH PTO ON/OFF SWITCH

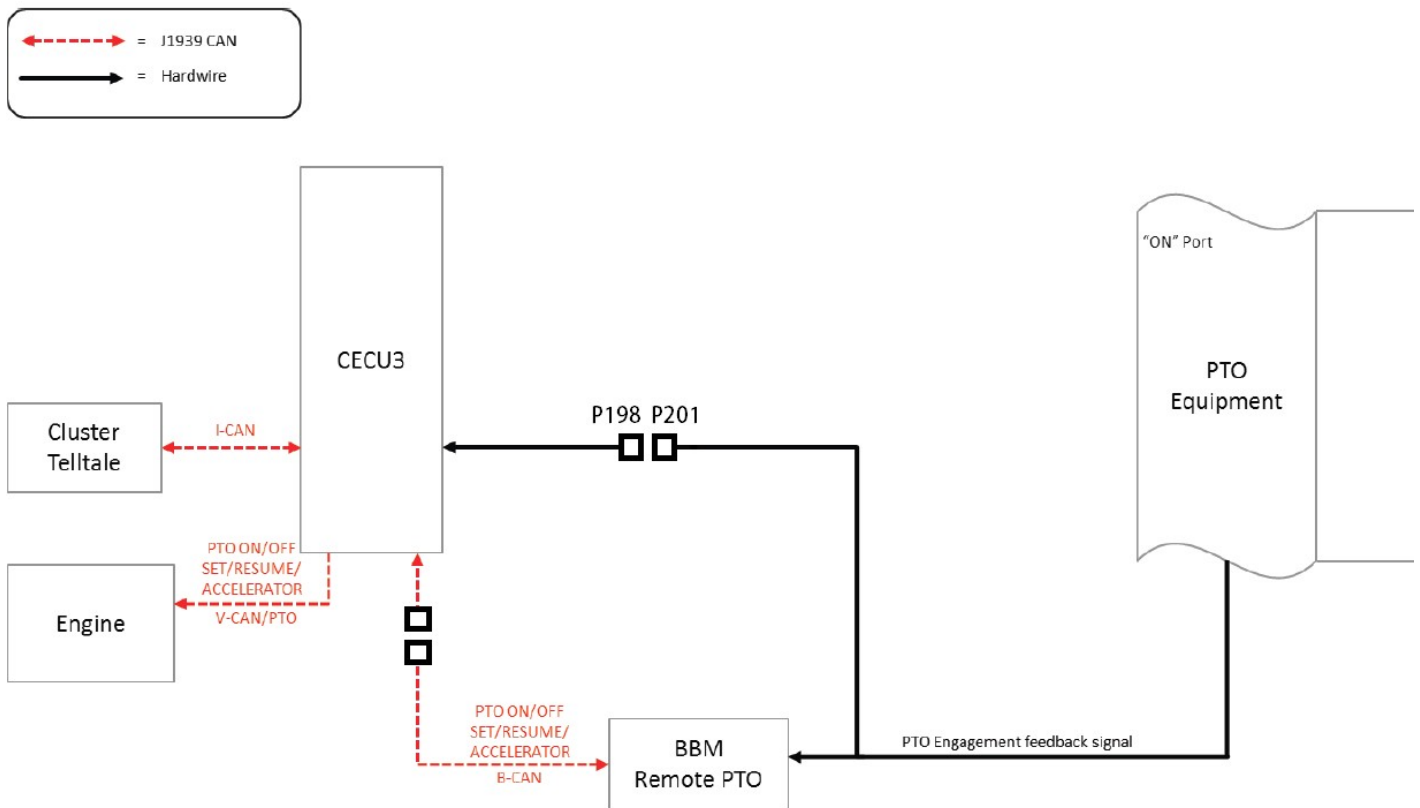


FIGURE 8-55. Remote PTO Control over BCAN with PTO ON/OFF Switch Signal over BCAN

To set up Remote PTO Control over BCAN as shown here, there is an ON/OFF switch located on the customer installed BBM. The “PTO ON/OFF” signal is sent from the BBM to the CECU over B-CAN which sends this signal to the Engine over V-CAN. The PTO engagement feedback signal wire must be connected to the CECU by the customer. Refer to “Electrical” section of this manual for more information on wiring.

When the PTO switch is ON and the engine receives signal that PTO is engaged, the engine changes its state to “PTO Mode” and the CECU will activate the PTO telltale on the cluster. For more information on engine behavior in PTO mode, please refer MX Programming Guide.

The engine speed is controlled by the customer installed PTO Control on the BBM. The CECU gets the “SET”, “RESUME” and “ACCELERATOR” signal from the BBM over B-CAN. The CECU sends them to the Engine via V-CAN using standard SAE messages as show:

TABLE 8-16. J1939 signals from CECU (SA 0x31) to Engine over VCAN

Label	Description
SPN974	Remote Accelerator Pedal Position
SPN979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
SPN3447	Remote PTO Governor Preprogrammed Speed Control Switch #2
SPN982	Engine PTO Resume Switch
SPN984	Engine PTO Set Switch

NOTE: When the engine is configured for this PTO option, the Engine expects the J1939 messages from the BBM when- ever the key switch is in the ignition position. If the key is turned ON without having a PTO signal from BBM over B-CAN, the engine will log these active fault codes shown in Table 8-17. These codes will become inactive when the BBM starts sending signals. This can be avoided if the ignition and the BBM PTO controls are powered ON at the same time.

TABLE 8-17. Engine Fault Codes

Engine Fault Code	Description
P0221	CAN Communication – Message (EEC2) out of range – Remote accelerator pedal position
U153B	CAN Communication – Message (PTO) out of range – Engine PTO resume switch
U1837	CAN Communication – Message (PTO) out of range – Engine PTO governor preprogrammed speed.
U1838	CAN Communication – Message (PTO) out of range – Engine PTO governor enable switch.
P253B	CAN Communication – Message (PTO) out of range – Engine PTO governor set switch.

CECU CONFIGURATION USING ESA

To configure Remote PTO Control over BCAN with PTO ON/OFF Switch Signal over BCAN, the following parameters must be set in CECU using ESA as shown:

TABLE 8-18. Remote PTO Control over BCAN with PTO ON/OFF Switch Signal over BCAN – ESA Settings

Parameter	Attribute
Engine Make	PACCAR
PTO Control Present	Enable
Remote Accelerator Input Type	BCAN Input
Remote PTO Input Type	BCAN Input
Gateway Engine CCVS Message (PGN 65265)	Gateway or Route to BCAN
Gateway Engine EEC1 Message (PGN 61444)	Gateway or Route to BCAN
Gateway Transmission ETC2 Message (PGN 61445)	Gateway or Route to BCAN

Figure shows the screenshot indicating where these parameters can be found in ESA.

Description	Locked	Value
Engine Fan With Park Brake		Disable
Engine Fuel Type		Non-Diesel
• Engine Make		PACCAR
Engine Over Rev Warnings		Enable
Engine Retarder Present		Enable
Exterior Notification of Regen Warning		Disabled
Idle Shutdown Timer Popup Enable		Disable
Ignore Throttle Pedal When Parked		Disable
Interrupt Start of Truck With Engine RPM		Enable
Interrupt Start of Truck With In Gear		Enable
Interrupt Start of Truck With Overcranking		Enable
MX Service Call Popup Enabled		KW/PB Division Warning
Overspeed Shutdown Installed		Disable
Overspeed Shutdown Low Air Threshold (PSI)		85
Overspeed Shutdown Low Air Warning Enabled		Disable
Primary Air Pressure on V-CAN		Enable
Primary Fuel Level on V-CAN		Enable
PTO Control Present		Enable
PTO Total Fuel Fault Enable		Enable
• Remote Accelerator Input Type		BCAN Input
• Remote PTO Input Type		BCAN Input
Retarder Range Map		0/33/66/100
Secondary Air Pressure on V-CAN		Enable
Secondary Fuel Level on V-CAN		Enable
Soft Top Speed Limiter Enable		Disable
Split Shaft PTO Installed		Disable
Transfer Case Temperature Sensor Type		Delphi (Q21-1002)

FIGURE 8-56. Remote PTO Control over BCAN with PTO ON/OFF Switch Signal over BCAN – ESA Settings

Figure shows the screenshot indicating where these parameters can be found in ESA.

Description	Locked	Value
BDS Message Control		Off (Default)
CM1 Message Control		Off (Default)
Configure Which CAN Bus to Transmit Fuel Level Message		Off (Default)
Destination for Engine Aftertreatment SCR Tank Message #1		Off (Default)
Destination for Engine DPF Control Message #1		Off (Default)
Gateway Engine AMB Message (PGN 65269)		Off (Default)
★ Gateway Engine CCVS Message (PGN 65265)		Gateway or Route to BCAN
★ Gateway Engine EEC1 Message (PGN 61444)		Gateway or Route to BCAN
Gateway Engine EEC2 Message (PGN 61443)		Off (Default)
Gateway Engine EFLP1 Message (PGN 65263)		Off (Default)
Gateway Engine ET1 Message (PGN 65262)		Off (Default)
Gateway Engine FD Message (PGN 65213)		Off (Default)
Gateway Engine Hours Message (PGN 65253)		Off (Default)
Gateway Engine IC1 Message (PGN 65270)		Off (Default)
Gateway Engine LFC Message (PGN 65257)		Off (Default)
Gateway Engine LFE Message (PGN 65266)		Off (Default)
Gateway Engine VD Message (PGN 65248)		Off (Default)
Gateway Refrigerant Pressure from CCAN		Off (Default)
Gateway Transmission ETC1 Message (PGN 61442)		Off (Default)
✓ Gateway Transmission ETC2 Message (PGN 61445)		Gateway or Route to BCAN
Gateway Transmission TRP1 Message (PGN 65272)		Off (Default)
Transmit CECU LC Message		Off (Default)

FIGURE 8-57. Remote PTO Control over BCAN with PTO ON/OFF Switch Signal over BCAN – ESA Settings

REMOTE PTO CONTROL OVER VCAN WITH TSC1 CUSTOMER-INSTALLED BODY BUILDER MODULE

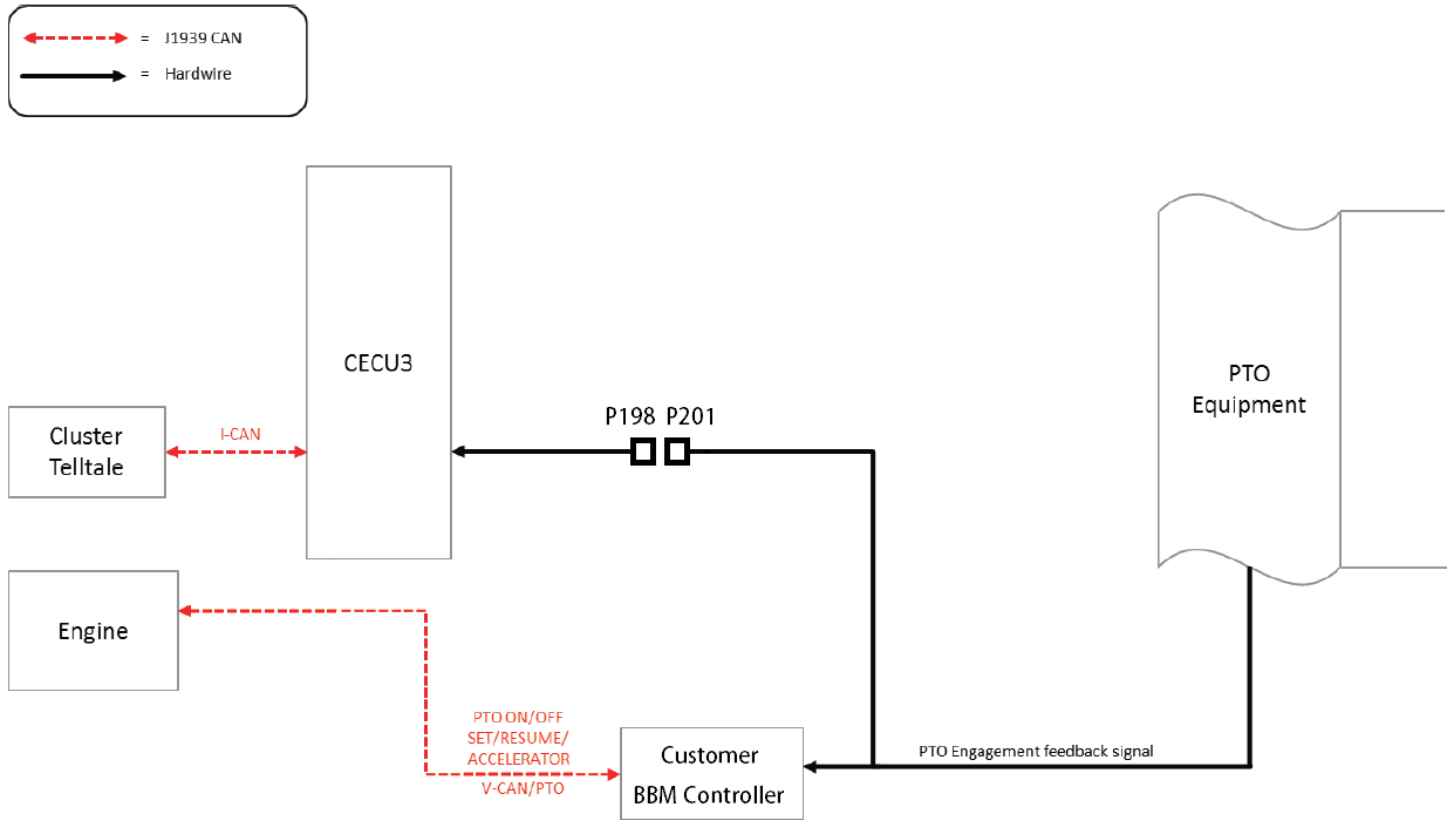


FIGURE 8-58.

- If using TSC1 PTO control and an in-cab PTO ON/OFF switch is required the CECU must be configured according to cab hardwired control
- If using an in-cab PTO ON/OFF switch it is still necessary to send the a CAN PTO ON message on VCAN to make the engine enter PTO mode (See PACCAR PTO TSC1 Message Requirements for details)

REMOTE PTO CONTROL OVER VCAN WITH TSC1 CUSTOMER-INSTALLED BODY BUILDER MODULE

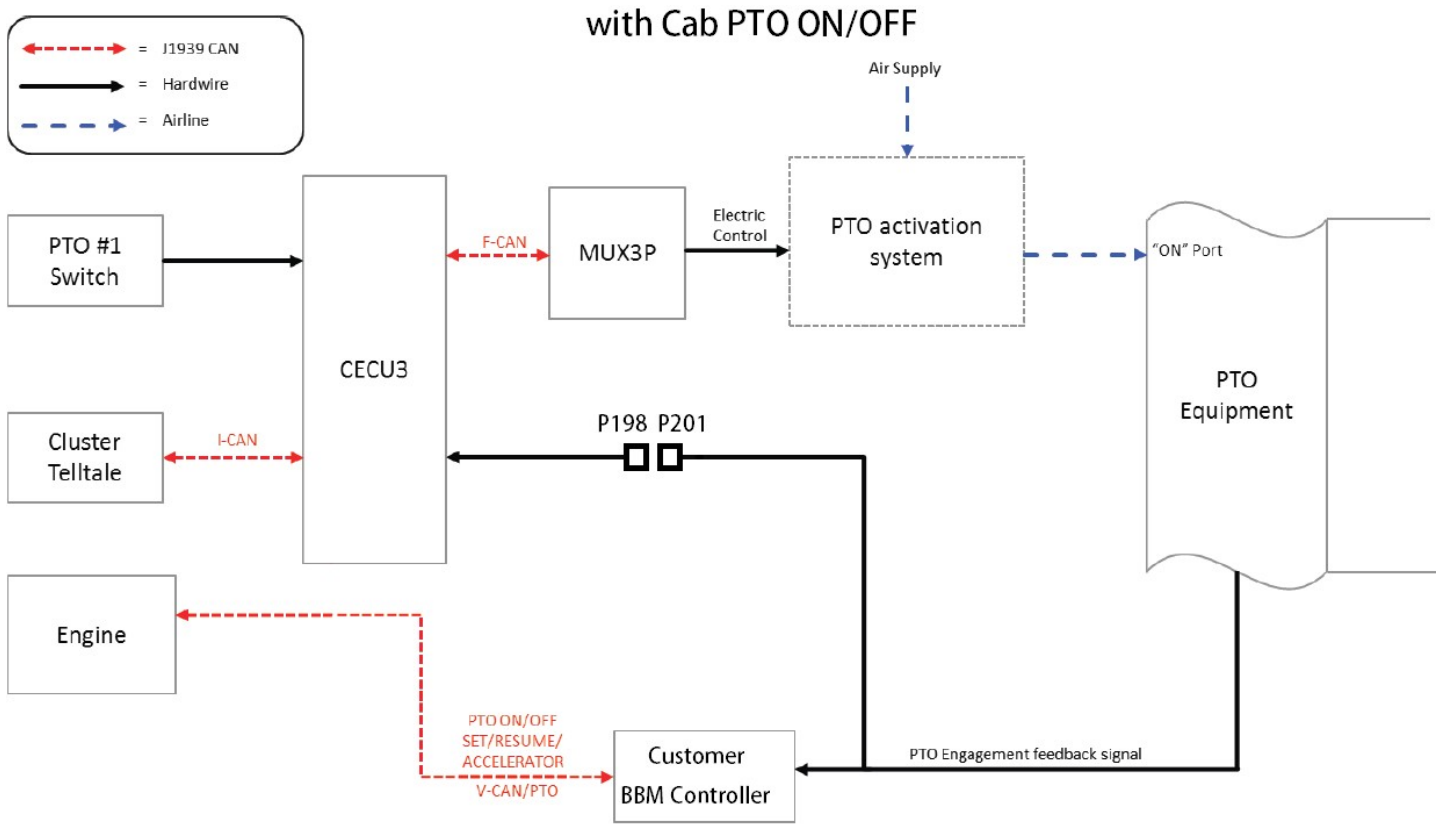


FIGURE 8-59.

•If PTO telltale light is desired, utilize the P198 connection. See Section 9 Electrical for further information

MX ENGINE PARAMETER CONFIGURATION USING PEP

To configure Remote PTO Control over B-CAN with PTO ON/OFF Switch Signal sent over B-CAN, the engine should be configured to select the correct signal source using PEP as explained below.

In PEP, click "Edit Parameters" button to enable editing and scroll down to PTO section "PTO Mode Preferences". Towards the end of the section, there will be an entry for "Signal source for PTO main switch (N102) which must be set to 1. Parameter Code: N102

Function: PTO SPEED CONTROL

Description: Signal source for PTO main switch.

Calculation: 0 = Hardwired

1 = CAN

There are two ways to configure remote PTO Control depending on application:

1. Remote PTO Control with Accelerator Pedal
2. Remote PTO Control without Accelerator Pedal.

For both these options, the configuration on CECU is the same as described in section. The engine should be configured for one of the above options which are done by selecting the right sales code using PEP as explained below.

In PEP, click “*Edit Parameters*” button to enable editing and scroll down to PTO section “*PTO Mode Preferences*”. Towards the end of the section, there will be an entry for “*Type of PTO Controls – Enable/Disable (S074)*” which can be edited by making a selection from a dropdown menu. From this dropdown menu, select one of the sales codes show: Table 8-19.

TABLE 8-19. Hardwired Remote PTO Control – PEP Settings

Description	Peterbilt Sales Code
Stationary Remote Station Switches	PB 2092052
Stationary Remote Station Switches And Throttle	PB 2092053

Once these selections are made, scroll to the top of the page or to the bottom of the page to “*Save*” the changes. Once the changes are saved, select “*Submit*” and download the new file when it becomes available and program it on the engine using DAVIE.

Please refer to “*Electrical*” section of this manual for details on wiring connections for remote PTO with MX engines.

TABLE 8-20. PACCAR BCAN Message Requirements

PTO	
Priority:	0x6
PGN:	0xFEFO
SA:	0x21 hex
Destination:	Not specific
Rx Rate:	100ms
CAN bus:	VCAN (250k)
SPN:	980 (PTO on/off switch for CAN based switch operation)

- 0x0F may be sent to bypass the checksum function. This may be acceptable for PACCAR, but in the event that it is decided the checksum must be used, it is calculated as follows:
- $MessageChecksum = (((Checksum \gg 6) \& 03n) + (Checksum \gg 3) + Checksum) \& 07n$
- Where Checksum is calculated as:
- $Checksum = (Byte1 + Byte2 + Byte3 + Byte4 + Byte5 + Byte6 + Byte7 + Message Counter \& 0Fn + Message Identifier byte0 + Message Identifier byte1 + Message Identifier byte2 + Message Identifier byte3)$

Label	Description
SPN974	Remote Accelerator Pedal Position
SPN979	Engine Remote PTO Governor Preprogrammed Speed Control Switch
SPN980	Engine PTO Governor Enable Switch
SPN3447	Remote PTO Governor Preprogrammed Speed Control Switch #2
SPN982	Engine PTO Resume Switch
SPN984	Engine PTO Set Switch

5. Reference

Paccar MX Engine can be programmed to have preset values for multiple features when operating in PTO mode. The features available when configuring PTO Mode with PACCAR MX Engines are described in the MX Programming Guide.

SECTION 9 AFTERTREATMENT

INTRODUCTION

The following section is designed to give you information regarding the exhaust and after-treatment 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.

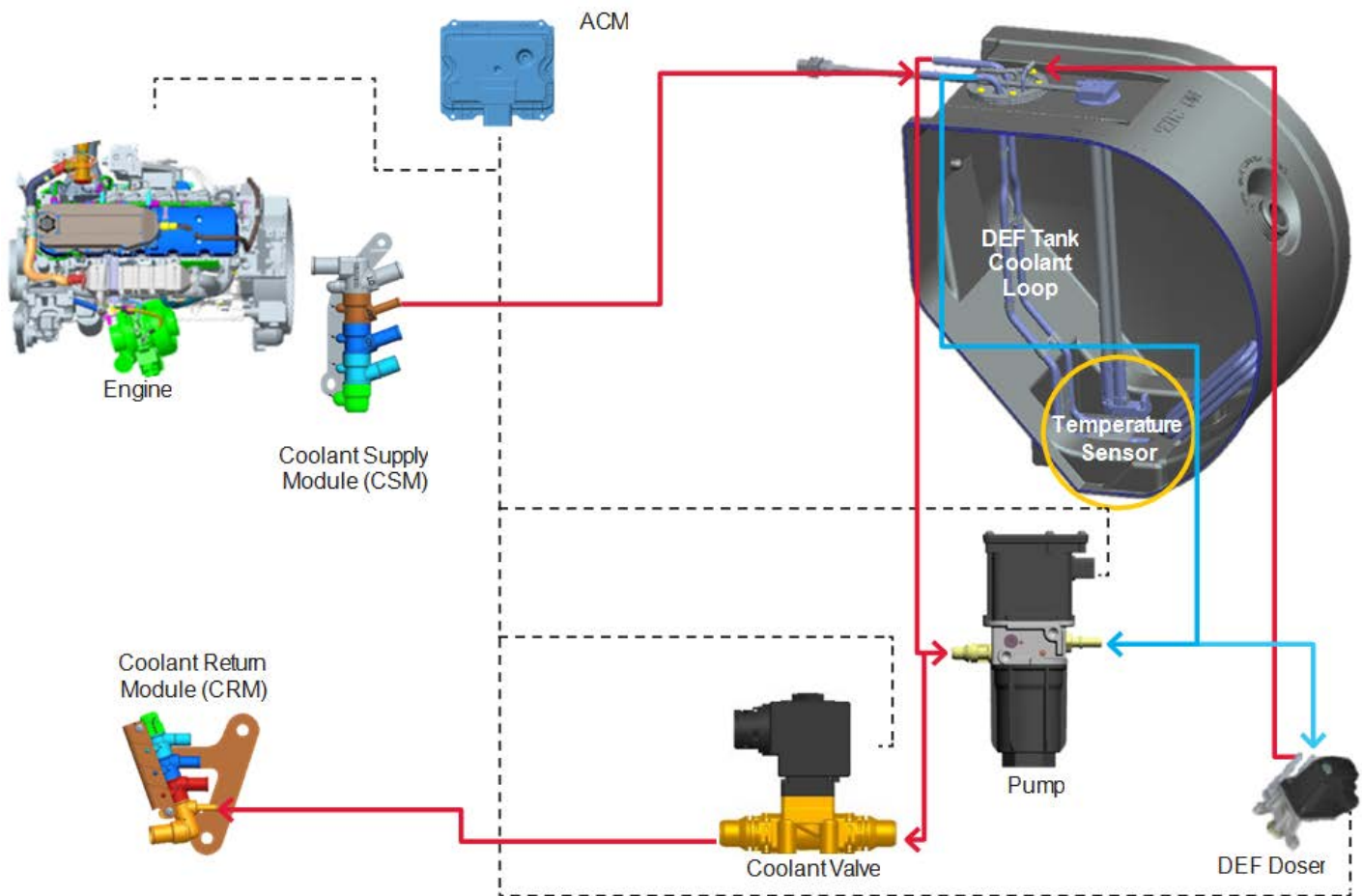


FIGURE 9-1. DEF System Schematic

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.

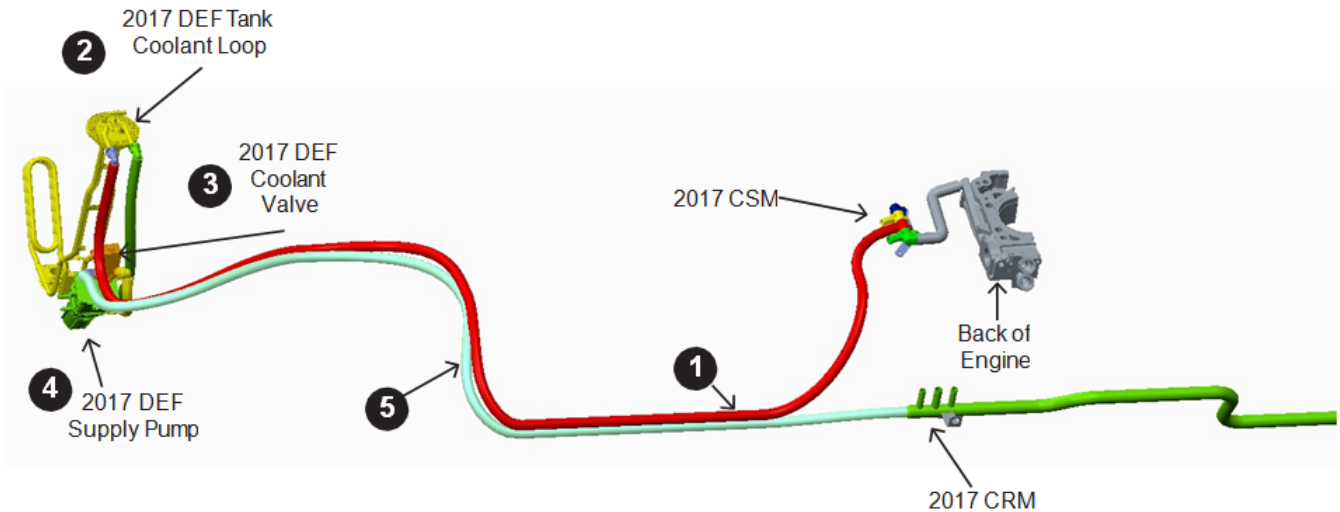


FIGURE 9-2. DEF Coolant Routing Schematic

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 9-1. 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/ ISX15	ISX12	MX-11/ MX-13	PX-9	PX-7/ ISX15	ISX12	MX-11/ 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 9.3 below for typical routing with RHUC exhaust and LH DEF tank shown. Also shown in this figure is the coolant line routing for 579 and 567 models.

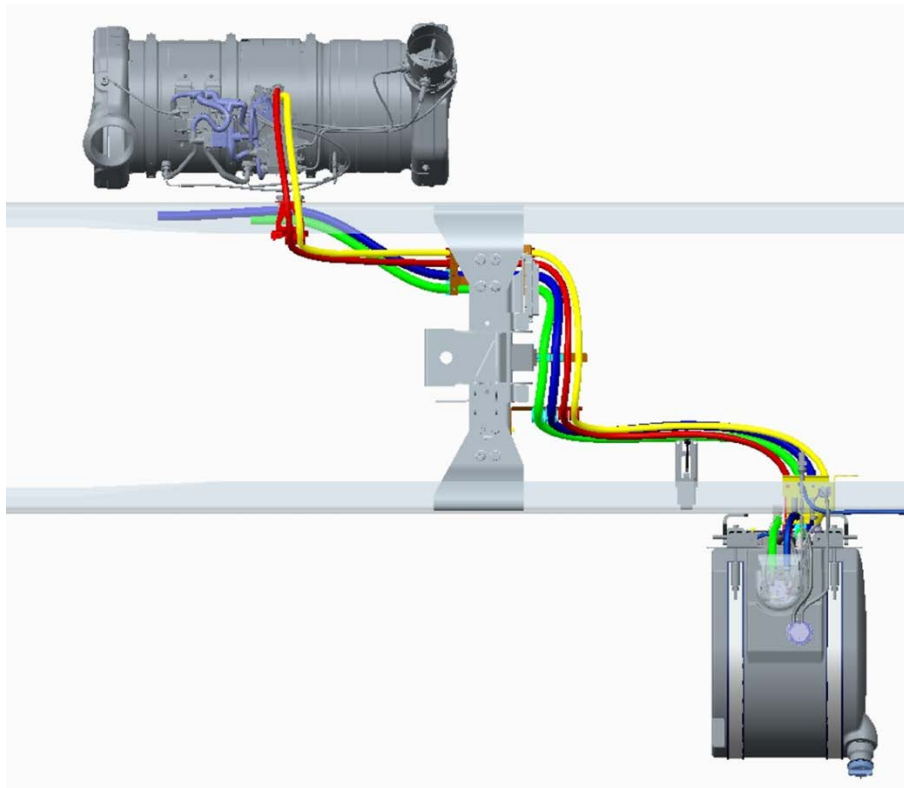


FIGURE 9-3. Routing for DEF and Coolant Lines

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.

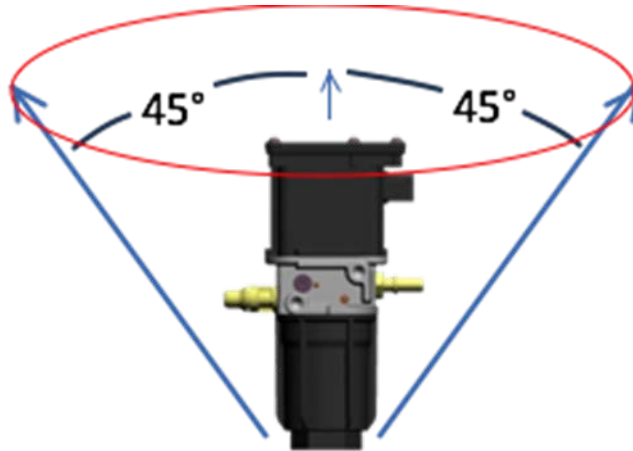


FIGURE 9-4. Supply Module Allowed Clocking Angle Limit Scribes a 90° Inverted Cone.

SECTION 10 ROUTING

INTRODUCTION

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

DEFINITIONS

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

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

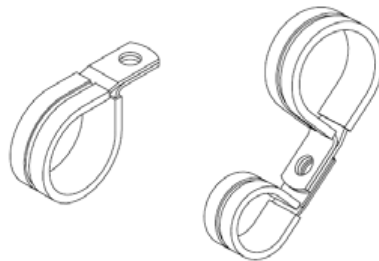


FIGURE 10-1. Clamp and Butterfly Clamp

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

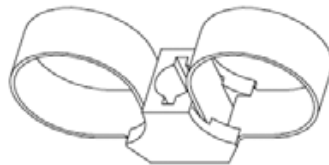


FIGURE 10-2. Butterfly Tie

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

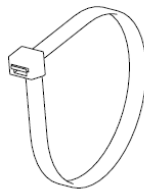


FIGURE 10-3. Tie Strap

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°).

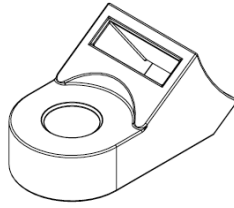


FIGURE 10-4. Heavy Duty (HD) Mount.



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 10-1. 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 within 15" of the turbo over 15" from the turbo	n/a 2" minimum	4" minimum 3" minimum
Fuel tanks and hydraulic tanks crossing tank parallel to tank end of tank aluminum/ceramic-coated exhaust pipe crossing tank	n/a n/a n/a n/a	2" minimum 2" minimum 1" minimum 1.5" minimum
Air hose nylon wire braid	3" minimum 2" minimum	8" minimum 3" minimum

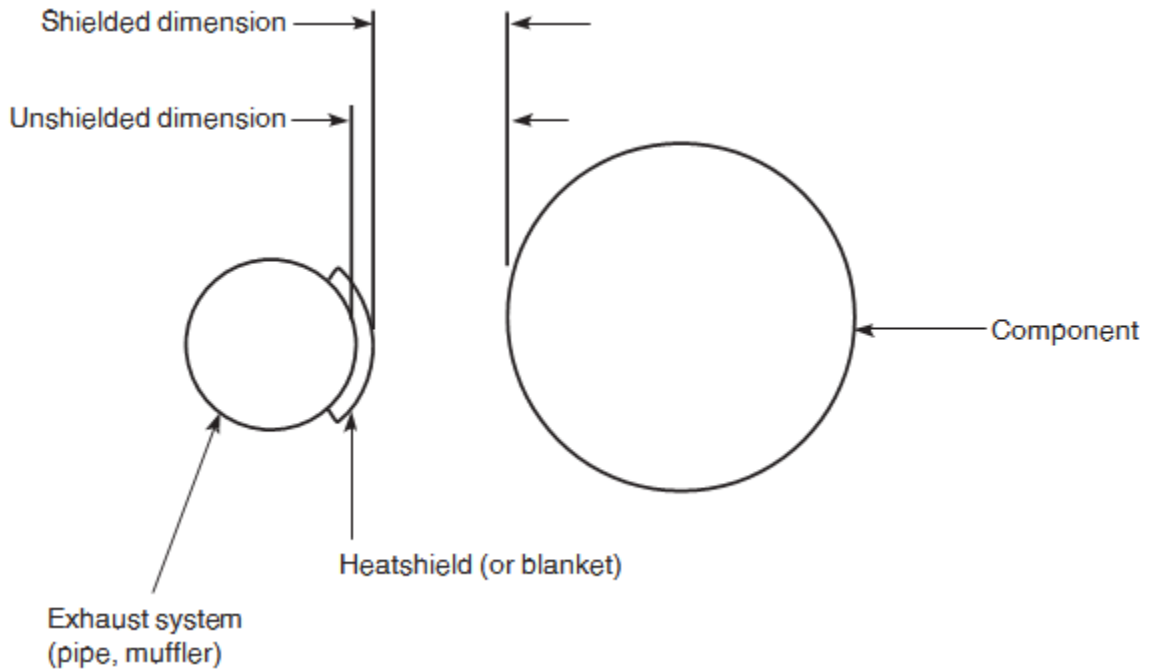


FIGURE 10-5. Definition of measurements.