eAPU® Installation Manual
Series 1000, 2000, 3000 & 4000

PHILLIPS & TEMRO industries®

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CAUTION

These are potentially hazardous situations or actions which may result in bodily injury.

- Always wear safety glasses during all procedures
- Ensure the work area is clear of trips, slips or fall hazards prior to starting work
- Make sure you are wearing non-conductive shoes prior to working with electrical components
- Do not lift heavy objects by yourself; use a lift cart or 2-person procedures

1 Introduction

1.1 Alternator System Requirements

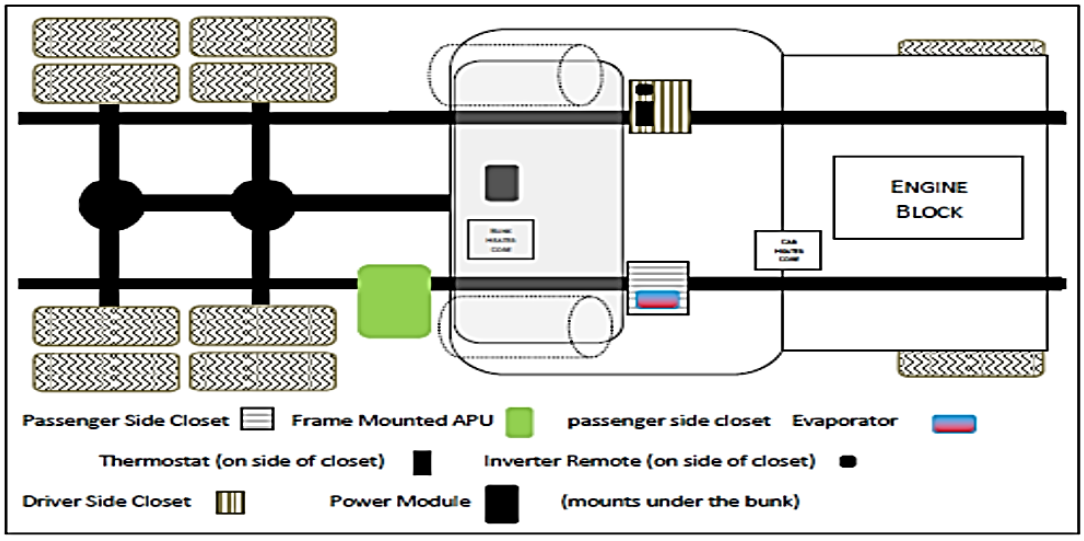
- It is **HIGHLY** recommended that 25 additional AMPs of alternator capacity is added per each AGM battery in your APU (100 amps). Idle Free Systems recommends 270 amps minimum.
- The alternator has remote voltage sensing capability.

1.2 Pallet Contents

The APU system will arrive on a pallet & include the components listed below. Please take the time to inventory the contents of the pallet & place the boxes near the area of the truck where they will be installed.

Components on Pallet

Frame Rail Unit
Under Bunk Power Module (UBB)
Installation Kit
Cables, Harnesses, Fuses & Thermostat
Evaporator
Driver's Packet
OEM Harness
Exhaust Re-Route Kit
Optional: for Freightliner Cascadia **ONLY**
Frame Bracket
Shore Power Kit



1.3 eAPU® Modules

Interior Modules

The interior modules installed in the bunk are the evaporator, thermostat, and the Under-Bunk Box, (battery charger, inverter, relay pack, and electrical connections).

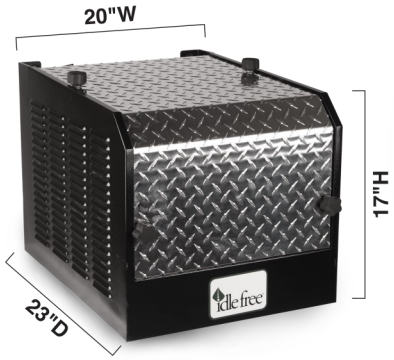
Evaporator

Thermostat

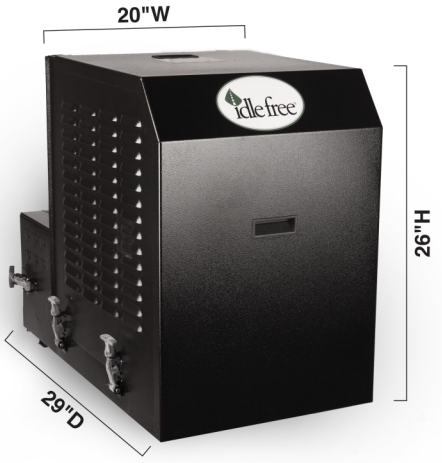
Under Bunk Box (UBB)

Exterior Modules

Series 3000 & 4000



Series 2000



Series 1000

Frame mounted APU. Location may vary depending on truck type.

1.4 Additional Kit Components

- Evaporator w/1/4" 20 X 2.5" mounting bolts (4) and lock nuts (4) (or other as specified due to installation variation)
- Evaporator power cord w/split loom
- Refrigerant lines w/split loom
- Evaporator cutout template
- 10' water drain tube w/two clamps (2) and rubber drain end attached
- Cables #1, 2, 3, 4, 5
- 250-amp Fuse holder with fuse
- Shore power outlet
- 2 ½ " floor collars (2) w/lock nut
- Power Module with Inverter, Charger, Relay Pack
- 5/8” to 3/4” hose adapters (2)
- Shore Power cord
- Water hose clamps (10)
- 3/4” Coolant hose
- 5/8” Coolant hose
- Fuel pick-up tube w/hose and clamps attached
- Fuel line
- 20’ Ignition cutout wire w/extension harness as appropriate
- Thermostat w/10-24 mounting screws (2)
- 3/4’ x 3/4” hose connectors (2)
- Long cable ties (25)
- Frame mounted APU
- APU back brackets
- Grade 8 bolt sets (4) w/5/8” bolts & washers

1.5 Tools Recommended for Installation Process

- ½” drill
- Lift cart
- 1-3/4” hole saw
- 2-1/2” hole saw
- 3” hole saw
- 3/8” ratchet
- Extension cords
- ½” socket
- 9/16” socket
- 11/16” wrench
- Water hose cutter
- Nut drivers
- Screwdrivers
- ½” drive ratchet
- 15/16” socket
- Hose pinch pliers
- Anti-corrosion spray
- Bucket
- Vacuum cleaner
- Torque wrench

2 Frame Rail Unit (FRU) Installation

2.1 Specialty Tools Needed for Installation

- Torque Wrench (212 ft/lbs.)
- Lifting Cart (600 lb. capacity)

2.2 Torque Specifications

Series	Mounting Kit	Bolts - Frame	Torque ft-lbs.	Bolts-APU	Torque ft-lbs.	
1000 Direct Mount	91706	G8 5/8”-11 x 2”	212			
2000 Back Bracket	91711	G5 5/8”-11 x 5”	150			
3000 Back Bracket	91700	G5 1/2”-13 x 6”	75	G2 ½”-13 x 1.5”	49	G8 Lock Nut, Nylon Insert
Battery Box Camlocks (2000/3000)	91715	G8 5/16”-18 x 3.5”	17	Clamp: 24223		
Battery Box (4000)	91716	G8 3/8”-16 x 2”	44	Clamp: 11045		
Side-Mount Battery Box	91902	G8 5/8”–11 X 2”	212			

WARNING

Potential personal injury, property damage, component loosening and void of warranty.

- Reference the following torque chart when installing Idle Free eAPUs.
- Torque values are also referenced in the installation instructions for each eAPU based on the values in this table.

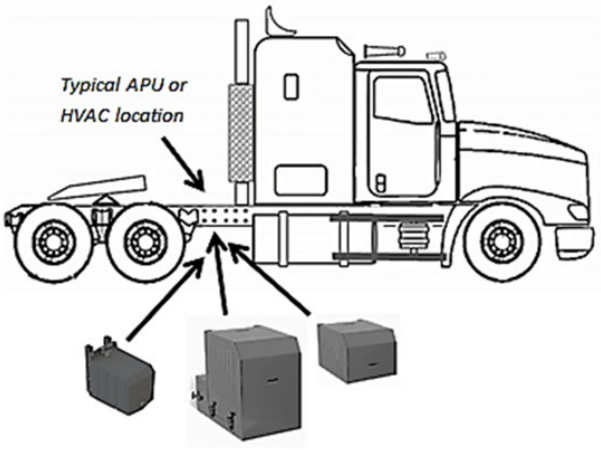
2.3 Location of FRU

Protect the frame rail unit from road spray with a quarter fender add-on. Fender installation should take place before you mount the frame rail unit to ensure that the fender does not interfere with the positioning of the APU.

Standard Mounting Location

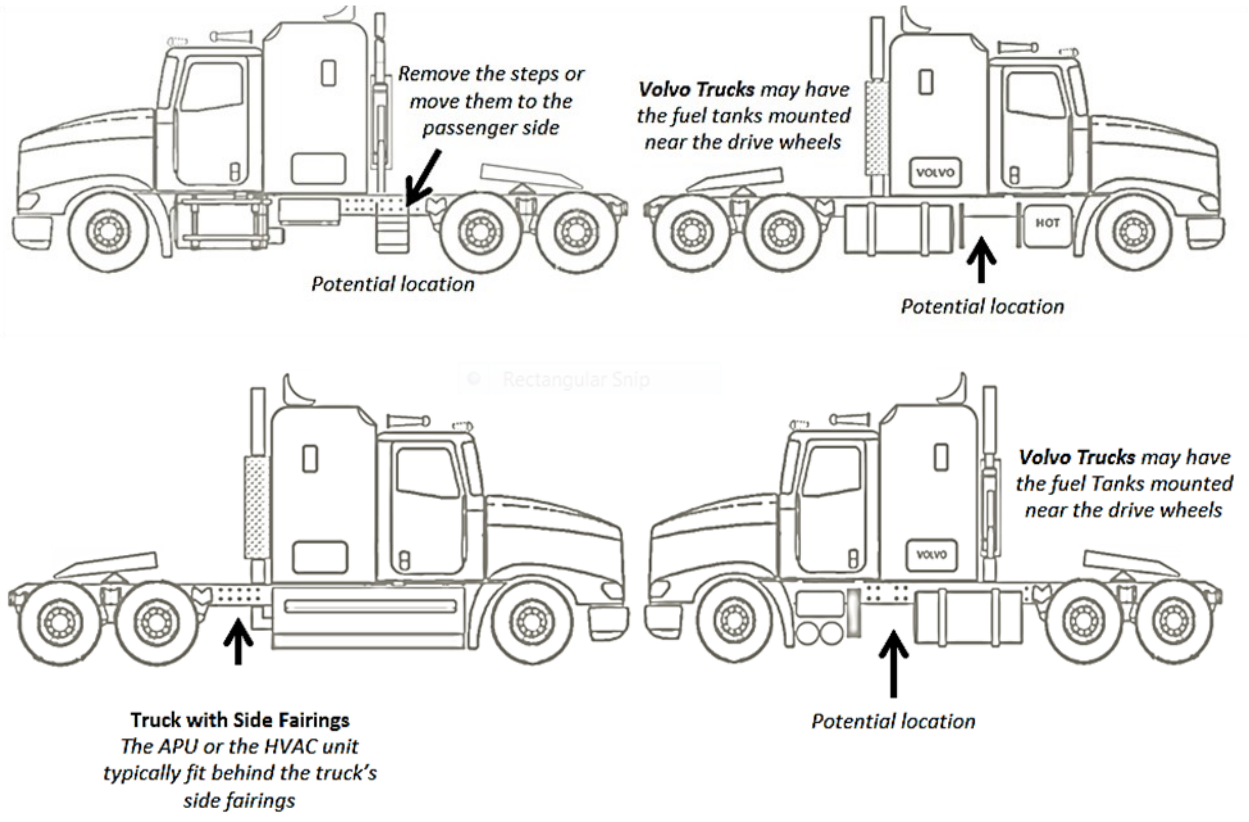
The typical location for the frame rail unit is on the passenger side of the truck, behind the fuel tank, in front of the drive wheels.

If space is not available (on the passenger side) other frame locations may be available, including on the driver's side, behind the fuel tank.



Alternative Mounting Locations

Protect the frame rail unit from road spray with a quarter fender add-on. Fender installation should take place before you mount the frame rail unit to ensure that the fender does not interfere with the positioning of the APU.



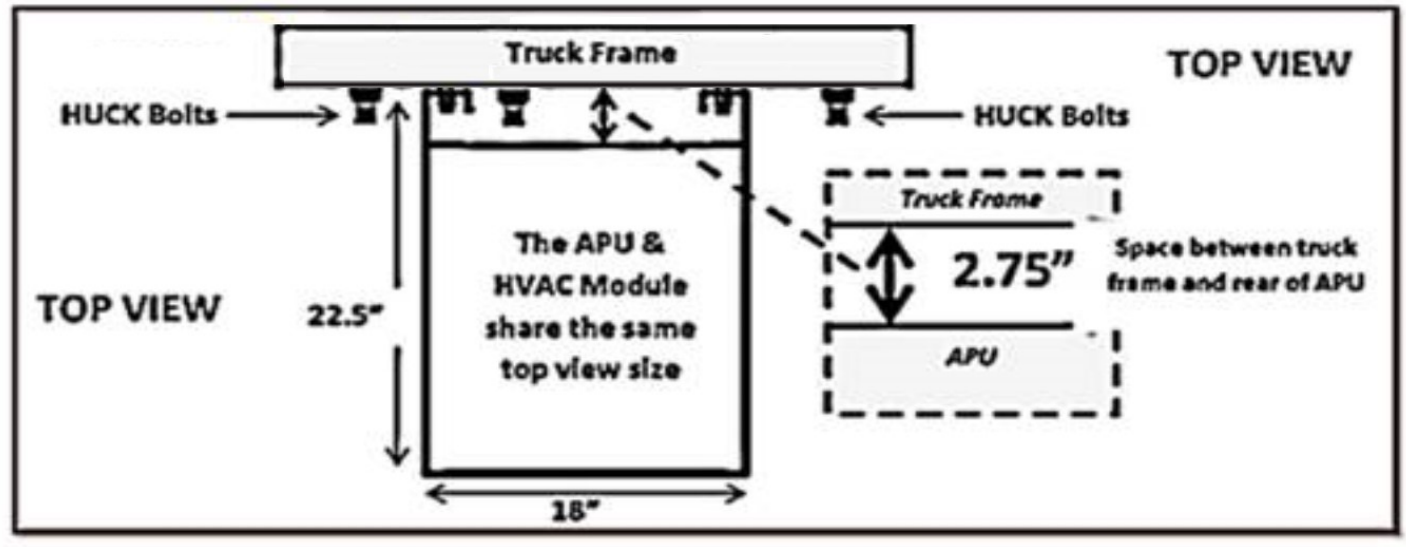
2.4 Mounting the Series 1000 Frame Rail Unit (FRU) Pre-Installation Steps & Tips

The Series 1000 Frame Rail Unit (FRU) dimensions are 30.85” x 20.24” x 26.7" and it is mounted to the truck frame rail. It weighs approximately 500 pounds and requires 24" of frame rail space.

1. Place the APU’s frame rail unit on a lifting cart or on a transmission jack. If using a lift cart, place the FRU with the back side (FRU) away from the cart handles.

> To better understand tuck frames and mounting options, refer to the descriptions in Section **2.4**.

2. Push the frame rail unit into position next to the truck’s frame to test fit.
3. Inspect FRU mounting hardware to ensure it is the correct hardware for the installation.
4. Pull the frame rail unit away from the frame and “prep” the truck & the APU, prior to mounting. Attach heater hoses to the rear of the frame rail unit if unit is equipped with heat.
5. Move air lines or other obstacles which interfere with installation of FRU
6. Add Reefer Link DC Connectors to FRU, if Reefer Link was ordered with this eAPU.
7. **If you are installing on a Freightliner Cascadia and the belly exhaust is too close to the frame rail unit, install exhaust kit and skip to next step first**.



The diagram shows a top view of the APU against the frame of the truck. The drawing also shows the APUs frame contact points and the space between the truck's frame and the APU's enclosure.

Mounting techniques include frame grippers or direct mount to truck frame.

NOTICE

- The APU is heavy and requires assistance to place it onto a lifting cart or transmission jack. The APU may have a heater exhaust tube extending from the bottom, be careful not to bend this tube.
- Make sure that the APU's cover is in place when mounting the APU to the trucks frame. This ensures that a tight fit will account for the size of the cover, being aware that there must be adequate vertical clearance to allow cover removal.

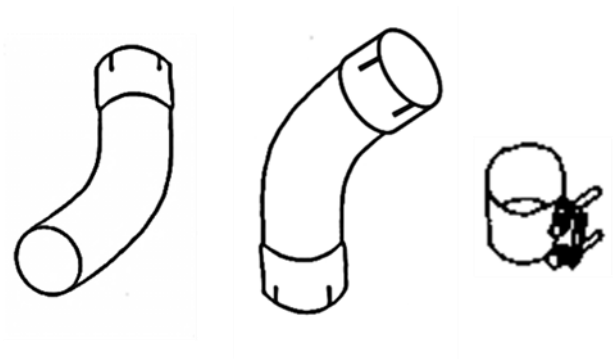
2.5 Mounting the FRU - Freightliner Cascadia

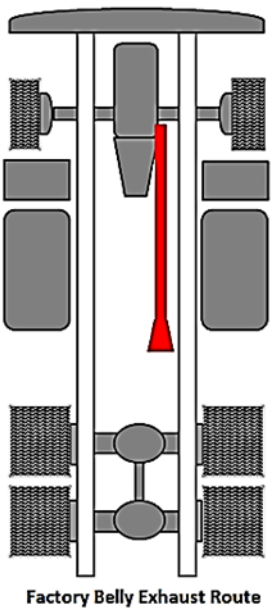
If you are installing an APU on a **Freightliner Cascadia** and there is interference from the belly exhaust, install the exhaust kit prior to mounting the FRU. ***The Freightliner Cascadia Exhaust Kit part number is 91905***.

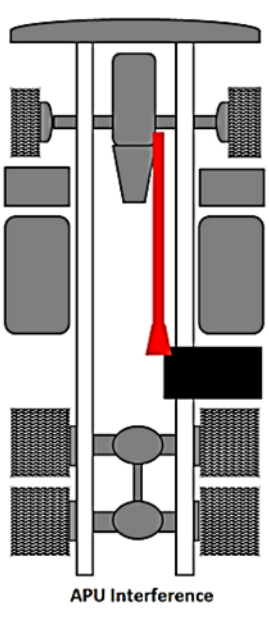
WARNING:
This kit can only be used on Freightliner Cascadia trucks. Failure to follow these important safety messages can cause overheating or fire resulting in property damage or personal injury.

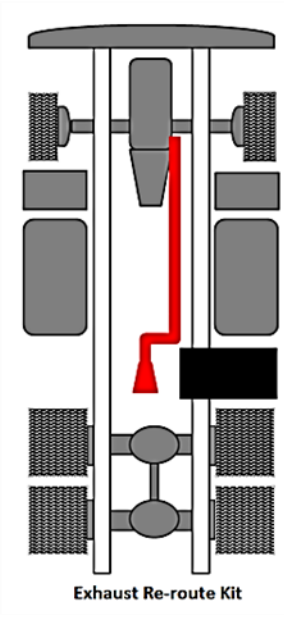
Exhaust Kit 45° Elbows

- The 45° Exhaust Kit is used on **Freightliner Cascadia trucks ONLY** with horizontal exhaust systems (belly exhaust).
- The 45° Exhaust Kit is used when the factory exhaust exits near the Series 1000 APU's frame rail unit.




Factory Belly Exhaust Route


APU Interference

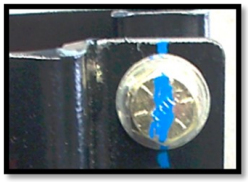

Exhaust Re-route Kit

1. Determine the frame rail location for the IFS APU.
2. Use Idle Free template #67007 to mark the location of the four truck frame holes to be drilled. The frame holes will be drilled so as to be able to utilize 5/8” bolts. Use a center punch to mark the four frame holes.
3. Drill the trucks frame using at least 2 different size drill bits. Make the first pass with a 3/8” (4 holes) drill bit. Drill the 4 holes with the second pass using a 5/8” or an 11/16” drill bit.
4. Locate IFS kit #91706 and utilize the (4 each) mounting bolts, washers, & lock nuts.
5. Push the APU into position next to the truck’s frame to confirm frame fit.
6. Confirm that clearance is available on all sides of the APU.
7. Raise the APU high enough against the truck’s frame to align the 4 frame mounting bolts.
8. Insert the four ***Grade 8*** 5/8” bolts and flat washers (included) through the APU and truck’s frame and add flat washers and ***Grade 8*** nuts to the opposite side of the bolt/nut assembly.
9. Tighten the four mounting bolts in a cross sequence and focus on keeping the APU in flush contact with the truck’s frame.
10. Tighten all four bolts to a very snug level only
11. The APU should still be supported by the lifting cart or transmission jack, at this point in the installation process.
12. Remove the APU lifting cart when the frame is flushed and constant contact is made between the APU and the truck’s frame.
13. All bolts should then be torqued to 212 foot pounds.
14. The APU should have no gaps between the truck’s frame and the APU frame guides.

WARNING: Torque must be measured as a dry torque without use of lubrication or anti-seize product. Improper torque of the mounting bolts can lead to loss of clamp force or bolt failure.

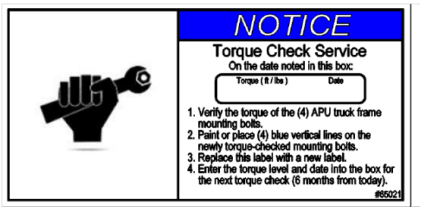
Witness Mark

15. Add a vertical witness mark to each bolt after the proper torque level (212 foot pounds) has been met.
    a. Make sure that the paint mark extends to the frame.
    b. The paint mark verifies the proper torque
    c. Paint mark is used as a visual sign of bolt head movement.



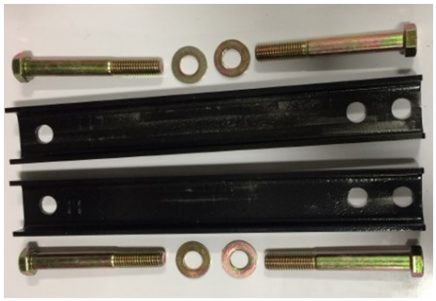
Torque Check Service Required, Label

16. Affix Service Label on the top of the APU cover.
    a. Use marker to write in the date, 6 months from installation
    b. Date entered is the next Torque Check Service Date.



2.6 Mounting the Series 2000 Frame Rail Unit (FRU)

The standard kit for mounting the Series 2000 frame rail unit to the truck frame is the 91711-kit shown below on the left. The 91706 Direct to Frame Mount Kit is also a mounting option.



91711

U-Channel Kit

NOTICE

- The 91711 kit has two holes on the bottom of the brackets. The hole on the top is used for 10-1/8 inch & 10-5/8-inch frames. The bottom hole is used for 11-inch frames.
- Did you install the coolant hoses per pre-installation instructions on page 11?

1. Push the FRU into position next to the trucks frame to confirm frame fit.
2. Confirm clearance on all sides of FRU. Insert two (Grade 5) 5/8” bolts and flat washers (included) through the top hole in the U-channel brackets, or the hole in the frame gripper. The top bolts are routed over the top of the trucks frame.
3. Leave about 1/2” clearance between the top of the frame and the two bolts. The 1/2” clearance is only used to decrease friction during the bolt tightening procedure. Make sure that the 2 top bolts are resting on top of the trucks frame after the frame clamp installation procedure has been completed.
4. Turn the bolts until they are through the APU’s welded frame nut.. The APU’s frame rail unit should still be supported by the lifting cart.
5. Lower the lifting device until the top of the APU mounting bolts contact the top of the trucks frame. It is important to make sure that the lowering of the APU (at this point) has exposed the U-Channel bolt holes on the bottom of the truck frame.
6. Place two bolts with washers (provided) through the holes closest to the bottom of the truck frame if using the U-Channel kit. The bottom holes will be the only holes exposed on large frame trucks, typically Volvo. If using frame grippers, place bolts through remaining two frame grippers into bottom holes of FRU frame.

2.6 Mounting the Series 2000 Frame Rail Unit (FRU)-Continued

7. Tighten the four mounting bolts in a cross sequence to 150 ft. lbs. insuring you maintain even contact between FRU and truck frame surfaces.

Measurements In ft. lbs.	Direct Mount	U Bracket to APU
Series 2000	N/A	150

WARNING: Property damage or personal injury—Torque must be measured as a dry torque without use of lubricant or anti-seize product. Improper torque of the mounting bolts can lead to loss of clamp force or bolt failure. The APU warranty is voided if the mounting bolts are not properly torqued, or the wrong mounting holes are used.

8. Remove the APU lift when finished.

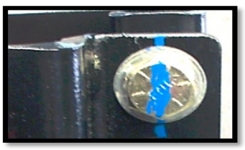
9. All bolts should show the same exposed thread count from the weld nut.

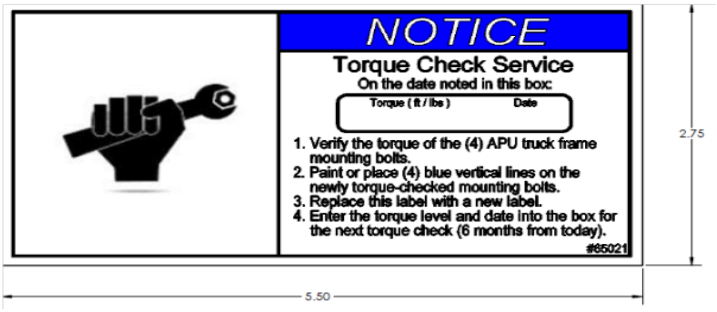
10. There should be no gaps between the truck's frame and the APU's frame guides.

11. The top mounting bolts should be resting on the top of the truck's frame.

12. Add a vertical witness mark to each bolt after the proper torque level has been met.

a. Make sure that the mark extends to the frame bracket.
b. The mark verifies proper torque (150 -foot pounds, dry torque depending upon brackets used).
c. The mark is used as a visual sign of bolt head movement.
d. Affix service label on top of the APU cover.

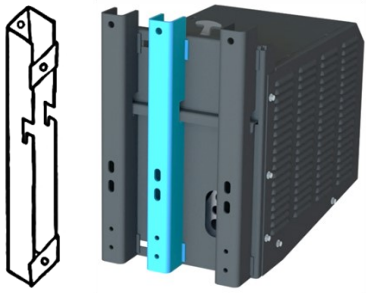




e. Use a marker to write in date, 6 months from installation date.
f. Date entered is the next Torque Check Service Date.

2.7 Mounting the Series 3000 Frame Rail Unit (FRU)

NOTICE:



- The Series 3000 (FRU) is supplied with mounting hardware used only with the Series 3000 .
- The mounting brackets for the Series 3000 FRU have two holes on the bottom of the brackets. The hole on the top is used for 10-1/8 inch & 10-5/8- inch frames. The hole on the bottom is used for 11-inch frames.

1. Push the FRU into position next to the trucks frame to confirm frame fit.
2. Confirm clearance on all sides of FRU.
3. Insert two Grade 5, 1/2” bolts and flat washers (included) through the single holes at the top of the large U-Channel back brackets. The top bolts are routed over the top of the truck’s frame into the back bracket.
4. Make sure the 2 top bolts are resting on top of the truck’s frame after the frame clamp installation procedure has been completed.
5. Place two bolts with washers (provided), through the holes closest to the bottom of the truck frame. The bottom holes will be the only holes exposed on large frame trucks (typically Volvo).
6. Snug the four bolts holding the two smaller U-Channel back brackets to the frame of the truck. THE BRACKETS SHOULD BE LOOSE ENOUGH TO ALLOW THEM TO SLIDE ON THE TRUCK FRAME.
7. Using two technicians and proper lifting techniques, lift the FRU and hang it on the brackets (hook and hang technology).
8. Install mounting bolts through FRU into brackets. Torque bolts to 49 ft. lbs.
9. ONCE THE FRU IS TIGHTENED TO THE U-CHANNELS, Tighten the four mounting bolts in a cross sequence to 75 ft. lbs. (dry torque) insuring you maintain even contact between FRU and truck frame surfaces.

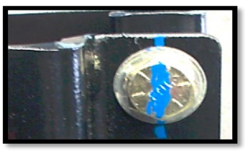
Measurements In ft. lbs.	Direct Mount	APU to Bracket	Back U Bracket
Series 3000	N/A	49	75

WARNING: Property damage or personal injury—Torque must be measured as a dry torque without use of lubricant or anti-seize product. Improper torque of the mounting bolts can lead to loss of clamp force or bolt failure. The APU warranty is voided if the mounting bolts are not properly torqued, or the wrong mounting holes are used.

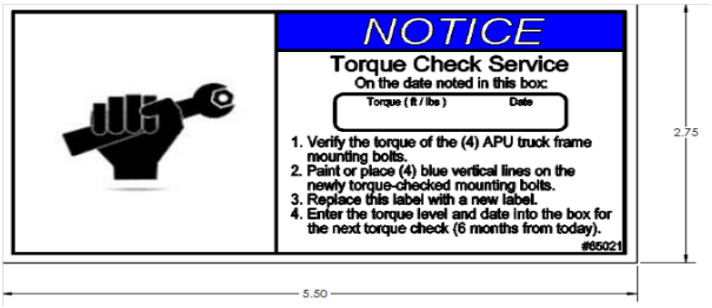
2.7 Mounting the Series 3000 Frame Rail Unit (FRU)-Continued

10. There should be no gaps between the truck's frame and the brackets.

11. Add a vertical witness mark to each bolt after the proper torque level has been met.



    a. Make sure that the mark extends to the frame bracket.
    b. The mark verifies proper torque (49 and 75-foot pounds, dry torque has been applied).
    c. The mark is used as a visual sign of bolt head movement.
    d. Affix service label on top of the APU cover.



    e. Use a marker to write in date, 6 months from installation date.
    f. Date entered is the next Torque Check Service Date.

2.8 Mounting the Series 4000 Battery Box Frame Rail Unit (FRU)

The Series 4000 eAPU® combines the in-frame battery box and FRU into one

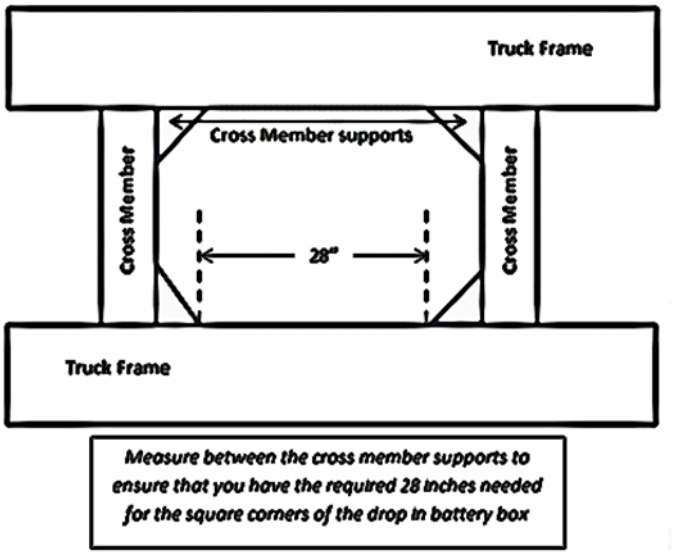
SERIES 4000
* Battery box included

CAUTION: Personal injury—The battery box contains batteries and is extremely heavy. The box must be lifted using equipment rated to lift at least 500 lbs. An overhead crane or forklift with long forks are both viable options. Chains or straps rated for at least 500 lbs. must be used. Straps or chains must be attached to all 4 corners or completely around the 2 flanges of the box.

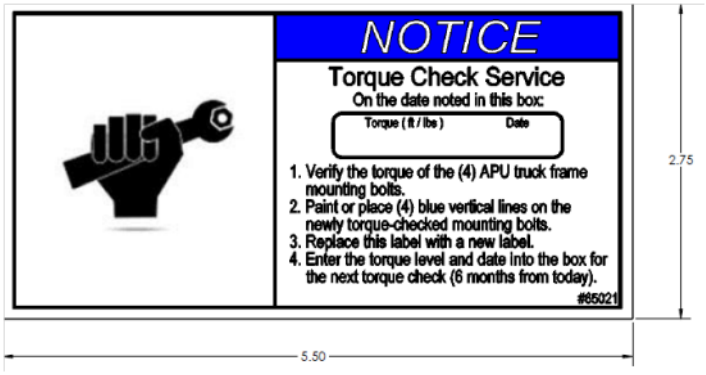
If there is no overhead crane or forklift, remove the batteries from the box and lift the box onto the truck using enough people to safely lift the box. Replace the batteries and secure the battery box.

1. Prior to installing the battery box, ensure there are no obstacles in the way such as air lines, air dryers, or other pieces of equipment.
2. Using one of the methods listed above, lift the box and lower it between the frame rails.
3. Using the provided hardware secure the battery box to the frame rails.

Measurements In ft. lbs.	Clamps
Series 4000	44



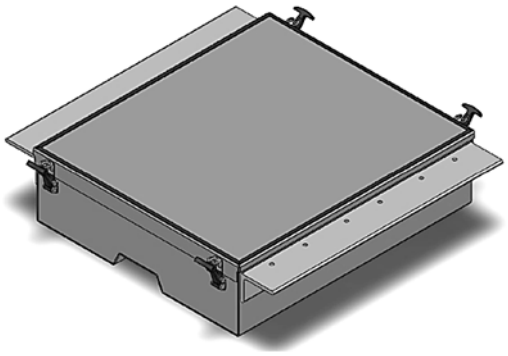
WARNING: Torque must be measured as a dry torque without use of lubricant or anti-seize product. Improper torque of the mounting bolts can lead to loss of clamp force or bolt failure.

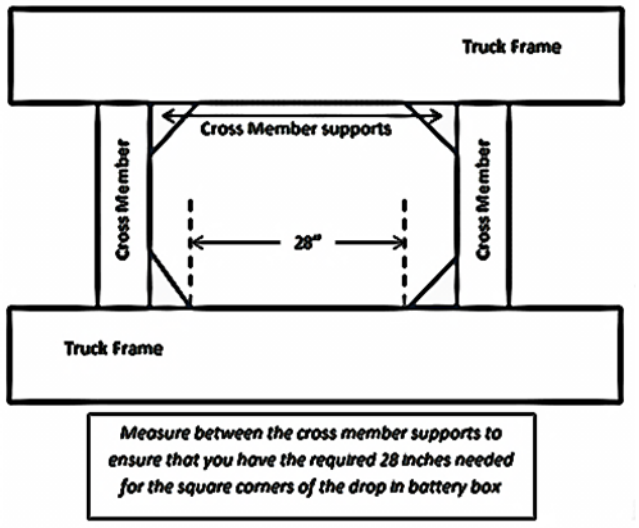


3 Battery Box Installation (Series 2000 and 3000)

3.1 Mounting the In-Frame Rail Battery Box (Series 2000 and 3000)

Your system will more than likely include one of two battery box styles. The first and most common is the between-rail battery box shown below. The battery box contains batteries and is prewired. The in-frame, low profile battery box is mounted between the truck's frame rails, behind the sleeper.



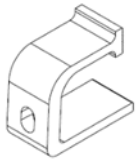


The in-frame battery box requires 28 inches of clearance between truck frame cross members. This needed space requires "square" drop in clearance to accommodate the square corners of the in-frame battery box.

CAUTION: Personal Injury.

1. The battery box weighs close to 350 pounds. An overhead crane or a large forklift with long forks is required to safely set the battery box in place between the truck's frame rails.

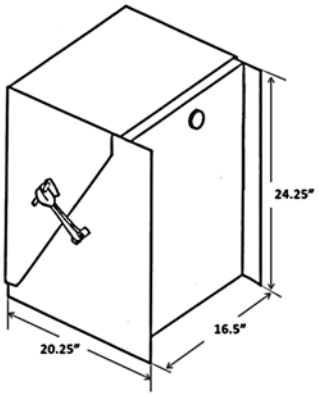
2. Use chains or large nylon straps to lift the battery box. ***Confirm the chains or straps are rated to support the weight of the box.***



Using the provided hardware secure the battery box to the trucks frame rails using C-clamp. Torque bolts to 17 ft. lbs.

3.2 Mounting the Frame Rail Battery Box (Series 2000 and 3000)

Your system will more than likely include one of two battery box styles. The first and most common is the between-rail battery box shown above. The second style is the frame rail mounted battery box shown below. The battery box contains batteries and is prewired.



CAUTION: Personal Injury**.**

1. The battery box weighs close to 350 pounds. An overhead crane or a large forklift with long forks is required to safely set the battery box in place between the truck's frame rails.

2. Use chains or large nylon straps to lift the battery box. ***Confirm the chains or straps are rated to support the weight of the box.***

Two angle irons are provided to secure the battery box to the trucks frame rails.

Mount the angle irons to the battery box first and then secure the box to the truck by drilling the truck's frame (direct mount).

Torque all bolts to 212 ft lbs.

Measurements In ft. lbs.	Brackets to Box	Brackets to Frame
Frame Rail Battery Box	212	212

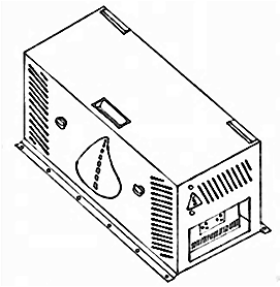
WARNING: Personal Injury, possible property damage**.**

Torque must be measured as a dry torque without use of lubrication or anti-seize product. Improper torque of the mounting bolts can lead to loss of clamp force or bolt failure.

4 Under Bunk Power Module (UBB)

4.1 UBB Installation

The UBB is the connection hub for the APU system. The UBB is installed on the bunk floor, under the bed. The side opening (show diagram) needs to be in a location so the user can see and access the inverter's face. The UBB should be visible from the storage access door.



Position the UBB on the bunk floor

- Locate the floor collar and place it where you want to create the pass-through hole to the under-side of the bunk. Check under the bunk for any obstacles prior to drilling a hole. You will need clearance for a 3" circle.
- Drill a ¼" pilot hole in the center of the spot to be used for the floor collar. Check under the bunk floor to confirm there is enough space. Use a 2-1/2" hole saw and cut the hole in the bunk floor.
- Place the floor collar into the hole and secure with the retaining nut. Bolt or screw the UBB in place with the included fasteners.

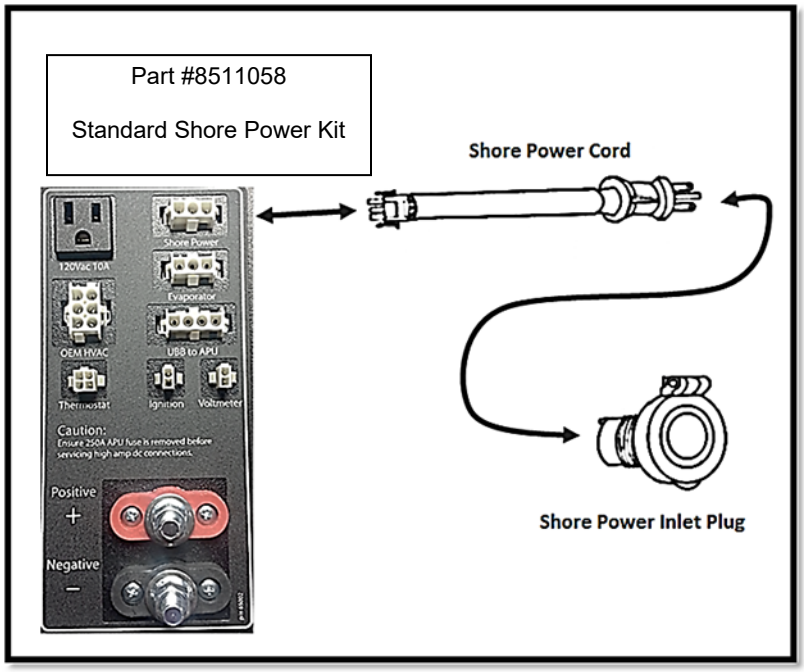
UBB With Cover Removed

Floor Collar

5 Shore Power Installation

5.1 Shore Power Installation—Truck Does NOT Have Cab Power

Shore Power Kit #8511058 includes a male, 120 V receptacle and a harness. *If a factory installed Shore Power or Cab Power is present on the truck, there are optional installation kits available.*



- Position the receptacle on the driver's side of the truck, just behind and below the driver's door. Make sure the area is free from obstacles.

- Drill a 1 7/8" hole for the receptacle. Insert the receptacle into the hole and attach with the rear mounted nut. Ensure that the inlet plug receiver's orientation is straight up and down.

- Insert the male plug into the back side of the plug receiver. Using the tab on top of the receiver, lock the plug receiver in place.

- Route the shore power harness from the receiver to the floor collar under the bunk bed. Plug the shore power harness into the back side of the UBB (marked "shore power")

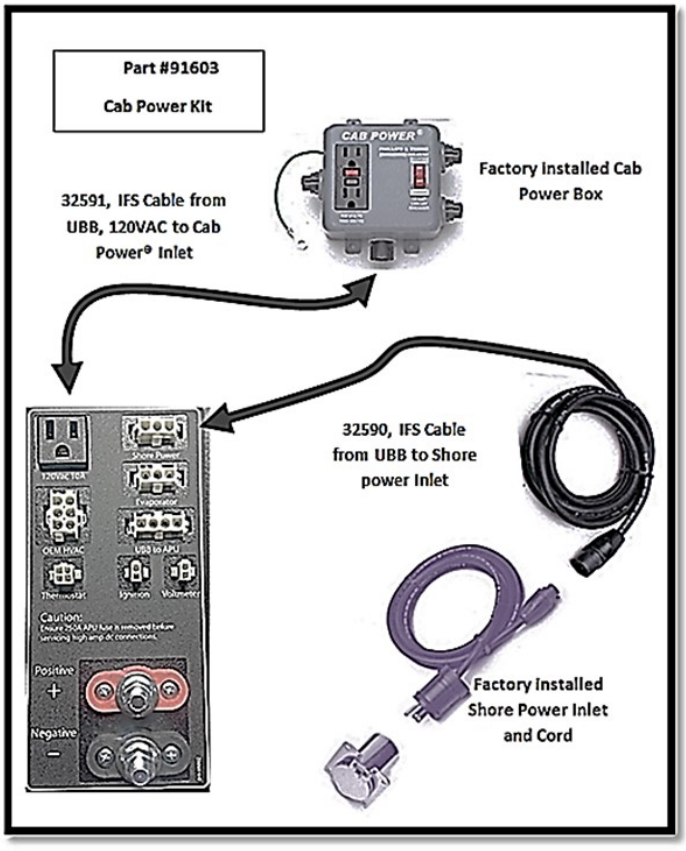
- Secure the harness to the underside of the truck sleeper section using the wire ties and p-clips.

5.2 Shore Power Installation—Truck Has Cab Power NO Truck Inverter

When a truck includes the Cab Power® option, one of two systems is present.

1. Cab Power distribution box with Bunk outlets
2. Cab Power distribution box with Bunk outlets and a Truck Inverter

- If #1 is present, then the appropriate kit is, Shore Power Kit #91603. This kit includes two cables; 32590 and 32591.
- If #2 is present, then Shore Power Kit #91602 is the appropriate kit. This kit includes two cables; 32590 and 32091. Refer to page 24
- Unplug the connector on the bottom of the Cab Power Box. The Cab Power Box is located in the driver's side box.
- Plug the male receptacle into the 120VAC outlet located on the back side of the UBB (see diagram).
- Route cable #32591 from the UBB to the Cab Power Box.
- Plug the connector end of cable #32591 into the bottom receptacle on the Cap Power Box.
- Plug the black connector end of IFS cable #32590 into the cable originally removed from the Cab Power box (see diagram).
- Route cable #32590 to the back of the UBB.
- Plug the Molex connector on the end of cable 32590 into the connector on the back of the UBB box labeled Shore Power.
- Secure the cables.



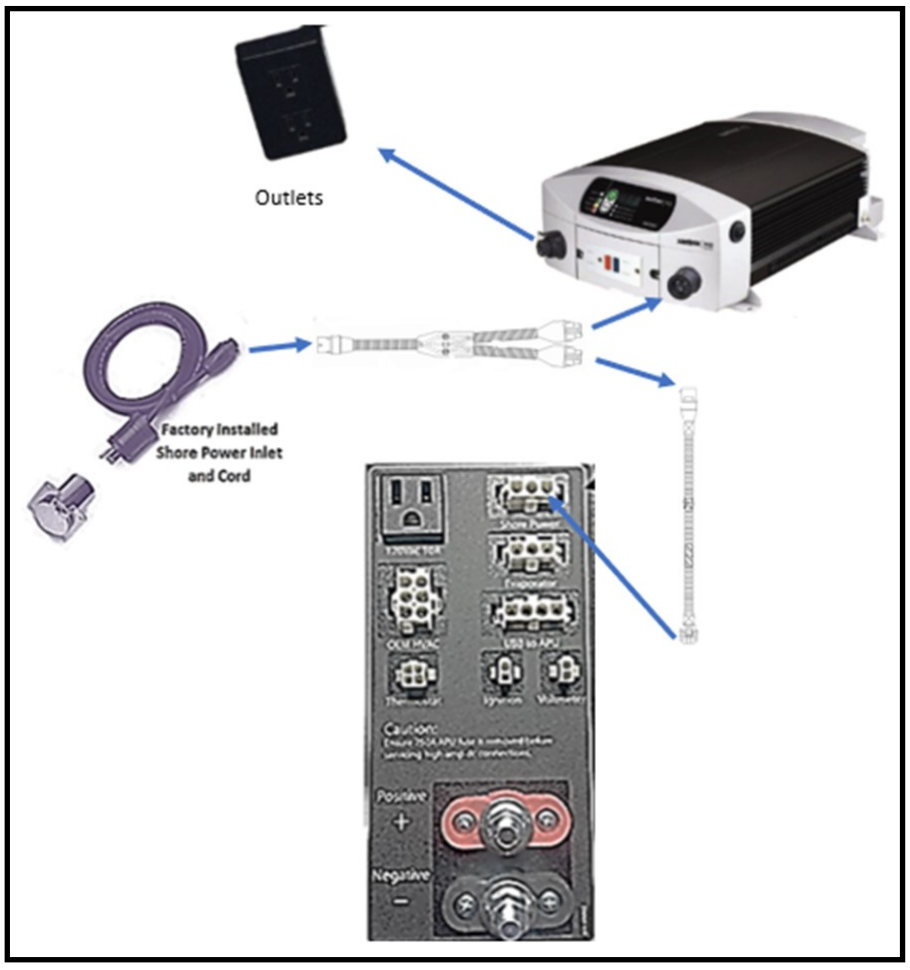
5.3 Shore Power Installation—Truck Has Cab Power with Truck Inverter

When a truck includes the Cab Power® option, one of two systems is present.

1. Cab Power distribution box with Bunk outlets
2. Cab Power distribution box with Bunk outlets and a Truck Inverter

- If #2 is present, then Shore Power Kit #91602 is the appropriate kit. This kit includes two cables; 32590 and 32091.
- If #1 is present see page 23

- Locate the Factory installed inverter.
- Unplug the Shore Power connector on the input side of the inverter.
- Plug the single end of the “Y “connector into the cord removed from the inverter.
- Plug either one of the remaining “Y” connector ends into the input receptacle on the inverter.
- Plug the black connector end of cable #32090 into the remaining connector on cable #32091.
- Route cable #32590 from the connection point to the back side of the UBB box.
- Plug the Molex connector end of cable #32590 into the Molex plug labeled Shore Power, this connector is located on the back side of the UBB.
- Secure cables.



6 Evaporator Installation

6.1 Evaporator Installation—Standard Mounting Procedure

Evaporator Overview:

Depending on the truck make and model, there are different installation instructions .

This manual will provide instructions for the following alternatives:

Standard installation

Wall Mount Bracket installation

Cascadia Installation

International installation

Kenworth 680 installation

Volvo/Mack Anthem installation

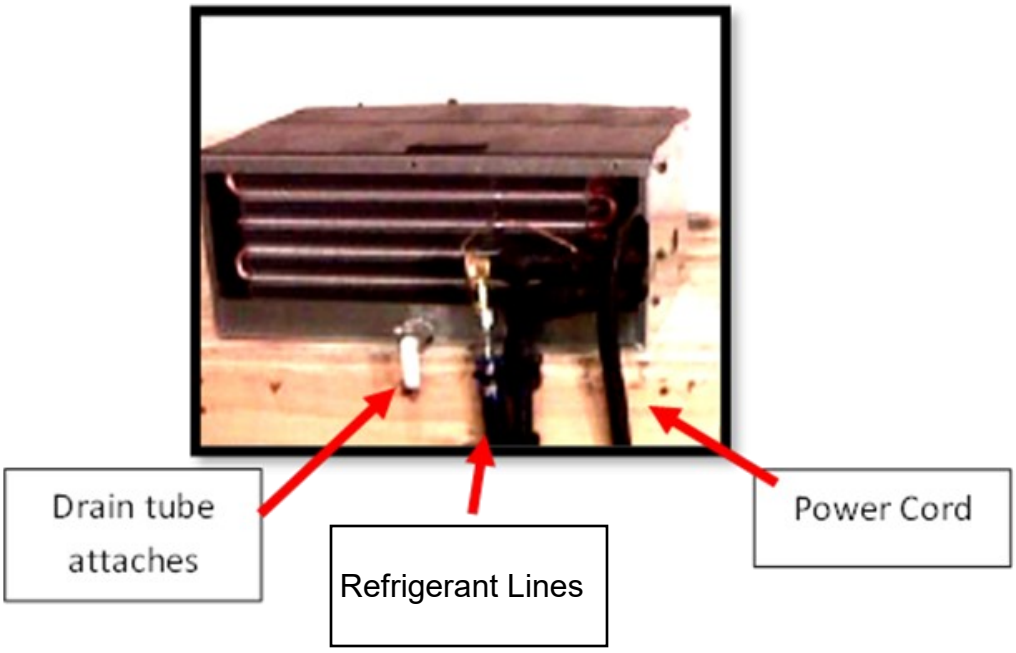
The Evaporator is installed on a high shelf in one of the bunk's closets or on the back-wall shelf; typically, on the same side of the truck as the exterior APU unit is installed. This assures that the refrigeration lines will have the length to be properly connected. The evaporator assembly includes two air conditioning refrigeration lines, a power cord and a plastic drain tube. The air conditioner is shipped with R134A refrigerant in the condensing unit.

Standard Installation:

- Confirm that the Evaporator will fit into the desired location.
- Using the evaporator template, mark the center hole location for the two cutouts.
- Using a 3.5" hole- saw, cut the 3.5" marked hole in the shelf where the evaporator will be located.
- Using a 1.75" hole-saw, cut the 1.75" marked hole in the correct hole location.
- Using a 2.5" hole-saw cut an opening through each closet shelf, in line with the 3.5-inch hole above. Cut this same hole in any shelving between the evaporator shelf and the bunk floor. Orient the holes so that they create a direct path to the compressor/condenser assembly (frame rail unit of the APU).
- Identify the desired location in the closet floor for a hose pass through. A 2.5" floor collar will be inserted into the closet floor used to protect the refrigerant lines, condensate drain tube, & the power cord as each pass though the closet floor.
- Check under the closet floor (outside) to make sure there are no restrictions or obstacles. **NOTICE: CHECK EXHAUST SYSTEM ROUTING BEFORE CUTTING HOLE**. Do not locate the pass-through hole above the truck's exhaust system.
- Using a 1/4" drill bit, mark the center for the 2.5" floor collar hole.
- Drill a pilot hole and leave drill and drill bit in place as you look at the drill bit from under the closet to make sure that the space (where the hole is to be) is big enough for the 2 ½" floor collar.
- Insert the 2.5" floor collar into the hole, on Mack Anthem, insert the collar from the bottom to allow more clearance for the cabinet floor or refrigerator.

6.1 Evaporator Installation—Standard Mounting Procedure

- Attach the floor collar ring to the bottom side of the 2 1/2" floor collar (from the outside).
- Install the evaporator drain tube (clear) onto the rear of the evaporator assembly.
- Starting at the destination location of the evaporator, feed the refrigerant lines, the evaporator's power cord, and the water drain tube (already connected to the evaporator) through the closet shelves.
- Position the evaporator in the desired location.
- Secure the evaporator into position using the included hardware.
- Install the aluminum air filter on the rear of the evaporator.
- Confirm that the evaporator's refrigerant lines and drain hose are not kinked or pinched where they pass through each closet shelf.
- Carefully pass each of these through the closet floor collar:
  Evaporator drain tube
  Large refrigerant fitting + hose
  Small refrigerant fitting + hose
- Do not pass the electric cord through the floor collar unless the route to the UBB (harness connection point) has been established. The direct route to the UBB may be easier to manage if the harness remains in the bunk.
- Secure the refrigerant hoses, drain hose and electrical harness to the back wall of the closet.
- Determine the harness route to the UBB for the evaporator's power cord.
- Secure the evaporator's power cord.



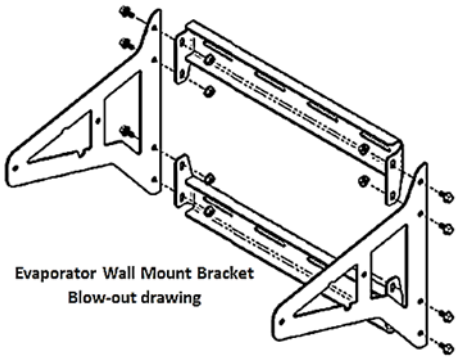
6.2 Evaporator Installation—Wall Mount Bracket

The evaporator wall mount bracket is used when no closet space is available and secured to the bunk side wall or the side of a closet.
The evaporator wall mount bracket is made up of three parts, back bracket + two side brackets.

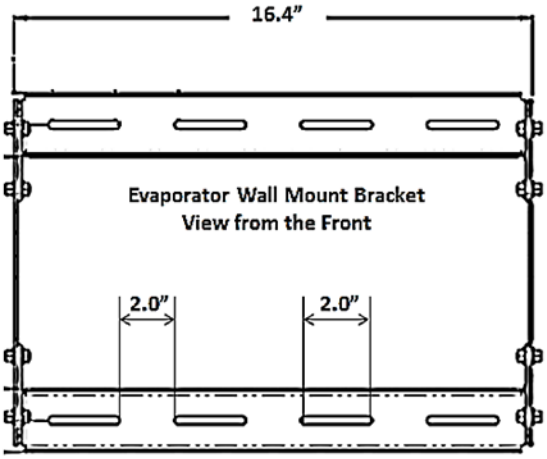
Installation Procedures:

- Remove the bunk side wall panel if the location of the evaporator wall mount bracket will be on a side wall.
- When mounting onto the bunk's side wall, the wall covering panels will need to be removed to locate/access the bunk side wall studs.
- Determine the bracket location based on the route of refrigerant hoses and evaporator drain tube's exit points. The evaporator hoses and the evaporator drain tube will exit the bunk through the floor (under the bed).
- Mark the mounting hole locations onto the bunk's wall studs.
- Drill the appropriate number and size holes needed for the Riv-nut mounting.
- Install the Riv-nuts into the bunk's wall studs.
- Install the bunk's side wall panels.
- Make the appropriate holes in the Riv-nut locations so the evaporator wall mount is secure to the bunk's side wall.
- Assemble the bracket sides onto the wall bracket base.
- Remove the top plastic cover from the evaporator (Velcro).
- Remove the center, side ¼ X 20 bolts, from each side of the evaporator.
- Place the evaporator into the bracket and insert the ¼ X 20 bolts through the bracket and into the evaporator, one on each side.
- Plan the route for the refrigerant hoses, drain hose, & power cord from the back of the evaporator to the bunk floor. NOTICE : CHECK EXHAUST SYSTEM ROUTING BEFORE CUTTING HOLE. Do not locate the pass-through hole above the truck's exhaust system.
- Cut a 2 ½" hole into the bunk's floor for the floor collar
- Install the floor collar with retaining ring.
- Route the evaporator's refrigerant lines and the evaporator's condensate drain hose through the newly installed floor collar
- Route the evaporator's power cord to the UBB
- Plug the power cord into the socket, located on the back side of the UBB, marked: Evaporator.
- Secure the refrigerant lines, condensate drain tube, & power cord to the bunk's side walls.
- Install the filter into the back of the evaporator.
- Replace the cover onto the evaporator.

6.2 Evaporator Installation—Wall Mount Bracket



Evaporator Wall Mount Bracket
Blow-out drawing



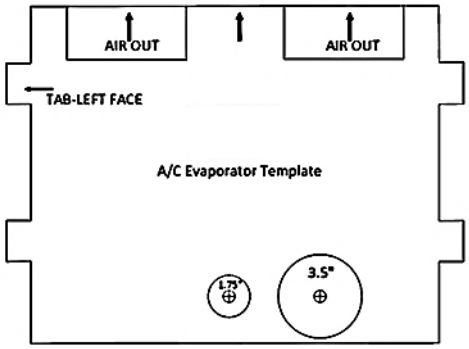
Floor Collar

6.3 Evaporator Installation—Cascadia

The recommended installation location for the Freightliner Cascadia is the bunk, passenger side, upper closet/cabinet.

Evaporator Installation:

- Remove the cabinet's front face from the upper cabinet on the passenger side
- Remove the plastic support brace and the 2 steel **L** brackets (attached to the ceiling).
- Remove the 4 screws (from the bottom side of the shelf) that hold the shelf in place.
- Remove the 2 screws holding the rear side of the shelf to the truck wall (plastic bracket).
- Mark the front of the top shelf "FRONT" and remove the top shelf. (It will be hard to tell the "front from the back" after the shelf has been removed.
- Place the shelf on a workbench and layout the Evaporator Template on the shelf. Place the Template as far to the rear of the closet shelf as possible.
- Mark the center points for the two holes needed for the refrigerant lines and the drain tube.



NOTICE: Place the IFS template as far to the rear of the shelf as possible to ensure the proper fit of the IFS evaporator onto the shelf

- Drill the two holes (3.5" & 1.75")
- Install the Freightliner evaporator kit cover plate with the outlet holes closest to the bottom of the evaporator. Turn the evaporator upside down on the bench & trim or grind a little taper to the cover plate, on both lower edges.
- Feed the refrigerant hoses and the electric harness through the 3 ½ "hole. Feed the evaporator's drain tube through the second hole (1 ¾").Secure the evaporator to the closet shelf using two self-drilling screws. Place the 2 screws near the air outlets (front & underside). Make sure that the screws do not puncture the evaporator core or the condensate drain pan.
- Place the evaporator and shelf assembly back in the cabinet. Put the shelf into position by placing the shelf assembly at a 45° angle, with the rear side higher than the front. Raise the shelf until the forward edge is over the support lugs allowing the shelf to level as the forward edge is raised. When the shelf is over the lugs, set the shelf in place.

6.3 Evaporator Installation—Cascadia

- Reassemble the cabinet.
- Drill two ¼” pilot holes needed for the evaporator’s louvers. The louvers will be located in the cabinet front (removed earlier).
- Drill the two holes for the evaporator louvers using the ¼ pilot holes as a starting point. Make sure to match the louver size with the proper hole saw size prior to drilling into the face of the evaporator.
- Push the louvers into the newly cut holes.
- Push the blue flexible duct onto the backside of each louver.
- Attach the blue flexible ducting onto the evaporator and snap the front cabinet cover into place.
- Position the foam filter into the return air opening, located on the rear wall of the cabinet.
- Attach the drain hose to the drain tube and secure in place with the hose clamp.
- Move the refrigerant lines, the electric harness, and the drain hose between the next shelf and the back wall, push these toward the floor.
- Drill a 2” hole into the bottom shelf to be used for the refrigerant hoses, drain hose and the electrical harness, as a pass through. Make sure that this 2” hole is in line with the needed hole in the bunk floor (pass through) to the bottom side of the truck.
- Remove the carpet from the floor of the closet (under the lowest shelf) and ensure that there are not any wire harnesses, air lines, or other obstructions in the way (underside or floor of the truck), prior to creating a 2 ½” hole, in the floor of the truck.
- Drill a ¼” ***pilot*** hole into the floor of the truck and check top and underside of the bunk floor to ensure that the 2 ½” hole will clear any obstacles.
- Cut the 2 ½” hole for the floor collar.
- Install the floor collar. Install the lock ring (from underneath) and tighten.
- Position the carpet over the floor collar and mark the needed opening.
- Cut the carpet to fit over the floor collar & Reinstall the carpet.
- Route the refrigerant lines and drain tube through the floor collar to the underside of the truck.
- Route the evaporator harness to the UBB.
- Seal the floor collar opening with caulk , silicone or putty.

6.4 Evaporator Installation—International

Step 1: Prep

- Remove the plastic cover from the evaporator. Peel one side of the cover and the top off and the opposite side will disconnect the Velcro connections
- Remove the 4 mounting legs, the bolts holding the legs and the Velcro strips near each leg. Save all these components as they will be used later in the process.

Step 2: Drill the holes

- Remove the bottom of the 16” closet. Place the side wall templates tight to the bottom ledge of the lowest shelf. Reinstall the feet to the sides of the evaporator facing towards the top to secure the evaporator to the shelf for support.
- Mark the location of the 3/8” holes on each side of the closet. Drill using a 1/8” bit to create a pilot hole.
- Drill out the pilot holes with a 3/8” bit

Step 3: Preparing the cover

- Score the sides of the evaporator cover with a blade, 1” from the bottom on each side.
- Remove the Velcro from the cut pieces and place 4” from the front edge of the cover. Place the opposite Velcro pieces 4” from the back side of the evaporator
- Place the plastic cover in place on the bottom of the evaporator—OR if the evaporator is inside the closet shelf, you may choose to not reinstall the cover.

Step 4: Mounting the evaporator

- Bring the evaporator into position. Thread ¾”, ¼ x 20 mounting screws and washers into one side of the mounting holes. Confirm that the evaporator assembly has a slight back tilt and tighten all four bolts.
- Connect the drain hose to the rear of the evaporator using the hose clamp
- Route the refrigerant hoses, power cord and drain hose to the floor of the bunk. Identify the desired location in the closet floor for a hose pass-through. A 2.5” floor collar will be used. Check under the closet floor to make sure there are not any restrictions or obstacles.
- Using a ¼” drill bit, mark the center of the 2.5” floor collar.
- Using a 2.5” hole saw cut through the metal floor. Insert the 2.5” floor collar into the hole. Install the evaporator drain tube unto the rear of the evaporator assembly. Starting at the destination location of the evaporator, feed the refrigerant lines, power cord and drain hose through the closet shelves.

6.4 Evaporator Installation—International

- Install the aluminum air filter on the back of the evaporator.
- Confirm that the refrigerant lines and drain hose are not kinked and carefully pass each of these through the closet floor collar. Secure the refrigerant lines, drain hose and the electrical harness to the back wall of the closet.
- Determine the harness route to the UBB for the power cord and secure the power cord.

6.5 Evaporator Installation—Kenworth T680

NOTICE: These instructions should only be used if installing an evaporator in a Kenworth T-680 truck with the swing-away table in the bunk area.

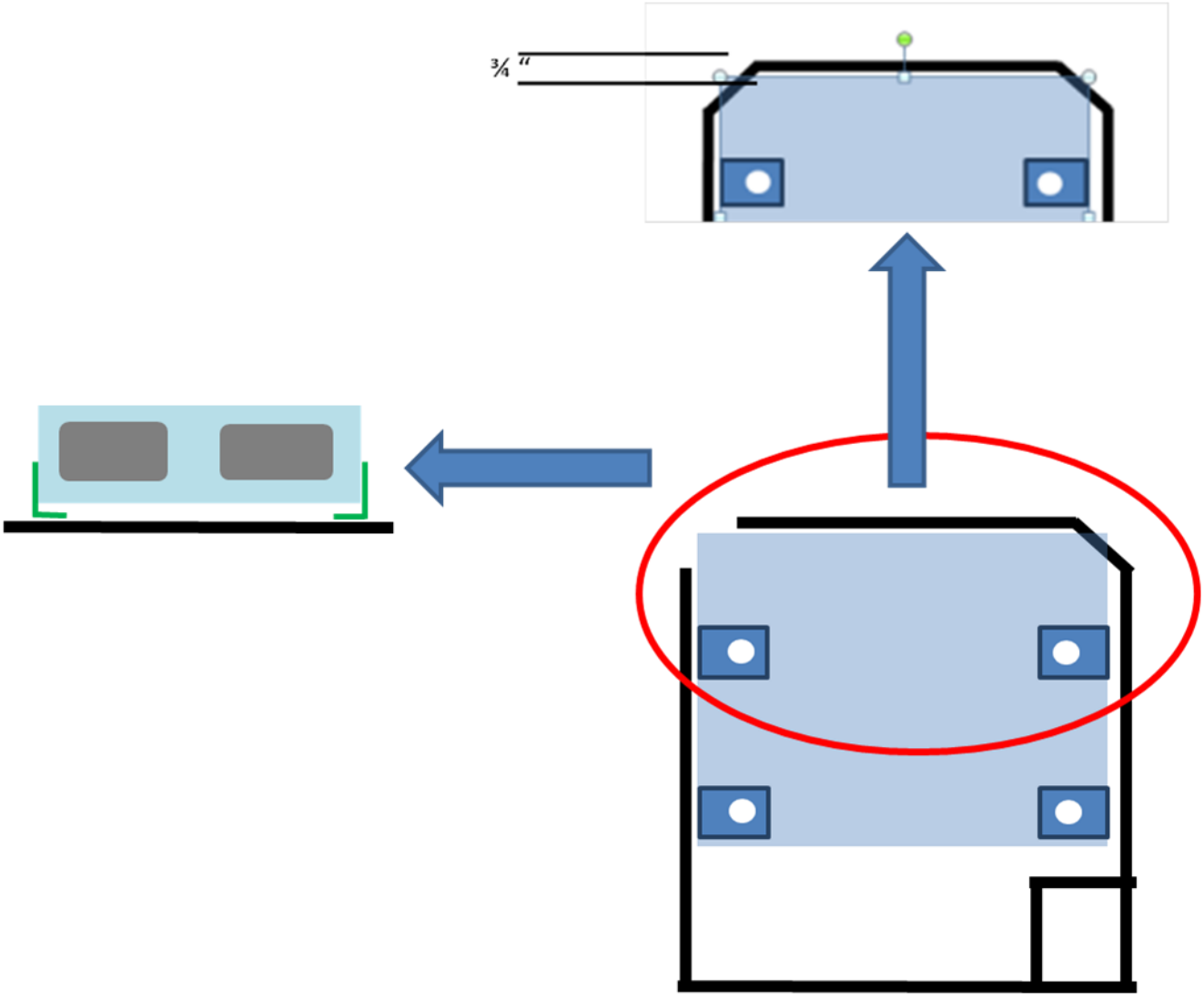
The area located under the swing-away table is the designated location for optimum performance for the evaporator to be located in a KW T-680. It provides excellent air flow for the driver while sitting at the table, or while lying down on the bed.

Preparing the Evaporator:

- Remove black plastic cover.
- Remove the metal top cover from the evaporator.
- Remove the 4 bolts that hold the legs onto the evaporator.
- Remove the 2 rear wings from the evaporator. The wings will not be reinstalled.
- Remove the Velcro strip from each leg.
- Flip all 4 legs so that the base of each leg faces inward (under the evaporator).
- Replace the Velcro back onto the sides of evaporator, where each piece came from originally.
- CUT METAL COVER AT 10¼" FROM FRONT EDGE OF THE EVAPORATOR. The front edge has 3 screw holes to hold face plate on. The NEW back edge of the evaporator should be even with the back edge of the evaporator coil itself.
- Repeat the previous step for the black plastic cover. The back edge of this cover has a cut out for the air filter placement.
- Reinstall metal cover, starting with top 3 screws, then the remaining screws.
- Reinstall the black plastic cover. Make sure the Velcro is aligned between black cover & evaporator leg assembly.
- Install 3 brackets on left, center, & right, on the topside of the evaporator, with the longer side of bracket facing forward, ¾" from the front using the hardware, provided. (These brackets will hold air filter in place.)
- Install the condensate drain line on the drain tube, coming off the back (bottom) of the evaporator.

6.5 Evaporator Installation—Kenworth T680

Light Blue: Evaporator
Black: Shelf outline & physical encumbrance
White Circles: Evaporator mounting holes with clips on legs
Green: Legs turned in to support the evaporator above the shelf edge



6.5 Evaporator Installation—Kenworth T-680

Installing the Evaporator:

- Remove the trim surrounding the two compartments, from the floor to under the swing-away table.
- Remove the aluminum bar, & its mounts from each side of the enclosure. (If the truck is equipped with cabinets, remove the upper drawer, & create a shelf for the evaporator to sit on)
- Create an opening in the cardboard on the lowest back wall of the closet. See the picture below for how to create an access panel.
- The access panel created will allow all lines to follow the route required for hoses to appear by the OEM HVAC system under bunk. See picture below for information of the hole location for lines to run outside.
- USE THE TEMPLATE TO LOCATE & DRILL THE TWO HOLES FOR HOSES; ONE FOR THE REFRIGERANT LINES & POWER CORD, THE SECOND HOLE FOR CONDENSATE DRAIN. Also drill the 4 holes for evaporator legs to be mounted on the shelf. There will be 6 holes total. 2 large (hole saws), & 4 small 3/8” for securing evaporator to shelf. (As legs are turned in, use the holes identified on evaporator template inside the perimeter of the evaporator.)
- Bring the evaporator assembly into the bunk & begin to route the hoses through the correct holes in shelf. Route the hoses behind the wall AS THE HOSES ARE FED DOWN THROUGH HOLES IN THE EVAPORATOR MOUNTING SHELF.
- After the evaporator is in place and hoses are routed, confirm there are no kinks in the hoses. Line up the holes drilled and secure the evaporator to the shelf.
- Using the hardware provided, start all 4 bolts (with the fender washers provided) through holes & tighten them to 60 (5 ft. lbs.)

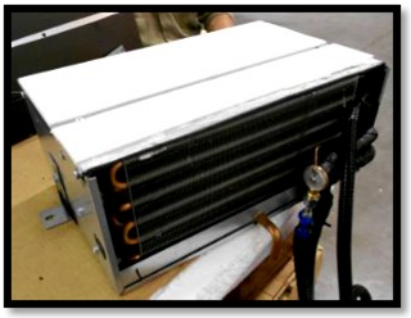
6.5 Evaporator Installation—Volvo/Mack Anthem

Installation Instructions:

- Remove the plastic cover from the evaporator. The plastic cover is held in place with Velcro strips located on each side as well as the top.
- Remove the four mounting legs & the bolts holding the legs, and the Velcro strips near each leg. None of these (removed items) will be needed.
- Place duct tape (or similar) over each of the 4 square holes for the Tinnerman clips on each side of the evaporator.
- Remove the metal evaporator cover. The cover will be used again.
- Remove the Evaporator face plate by removing the six screws that hold it in place. The face plate will be used again.
- Remove the louvers from the evaporator face plate. These will not be used again.
- Remove both evaporator rear case extensions (short piece of metal that holds filter in place on each side of evaporator as it is not needed in this install location).
- Place cover back on the evaporator & mark end of each wall on cover sides.

Screws to remove circled in red (plus 6 on front).

- Remove by cutting 2-3/8” from back of the evaporator cover. The cover will not extend past the core after this cut. **NOTE:** For Mack Anthem, you do not need to cut the cover and can leave the mounting legs on.
- Screw the face plate back onto the evaporator (without the louvers).
- Place the ***Closet Drilling Template*** on the front of the closet, & drill two holes as directed for the two louvers to be placed in the closet face. The hole saw used must match the diameter of the louver.



- Place evaporator into closet WITHOUT THE COVER INSTALLED.
- Drill two 1/8” diameter pilot holes for the two self-tapping screws. Drill these two holes approximately 1” back from the front face of the evaporator, and approximately 1” in from each side. Be sure to leave 1/16” gap between the front edge of the evaporator walls & closet to allow cover of evaporator to be installed.
- Place two of the four self-tapping screws (saved in step 2) from the underside into the two holes drilled, securing the evaporator to shelf.

6.5 Evaporator Installation—Volvo/Mack Anthem

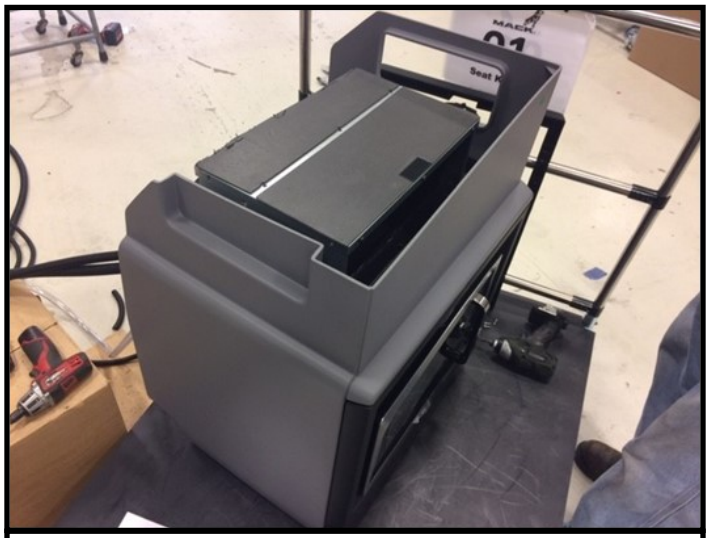
- Place a piece of foam tape on each front wall of evaporator to closet connection to seal the evaporator to the closet face. **NOTE**: For Mack Anthem use the flex tube and cover with louver.
- Put the evaporator cover in place.
- Replace the three screws in the cover of the evaporator
- Apply a piece of the foam tape to cover the gap between the evaporator cover to closet connection, and along the left wall to cover the connection. Press the foam tape against mating surfaces to ensure a leak tight fit.
- Install the two louvers for closet face.
- Install the closet back into its permanent location.
- Using a 2.5” hole-saw cut an opening through each closet shelf, in line with the 3.5-inch hole above.
- Cut this same hole in any shelving between the evaporator shelf and the bunk floor. Orient the holes so that they create a direct path to the compressor/condenser assembly.
- Identify the desired location in the closet floor for a hose pass through. A 2.5" floor collar will be inserted into the closet floor used to protect the refrigerant lines, condensate drain tube, & the power cord as each pass though the closet floor. Check under the closet floor (outside) to make sure there are no restrictions or obstacles. **NOTICE: CHECK EXHAUST SYSTEM ROUTING BEFORE CUTTING HOLE.** Do not locate the pass-through hole above the truck’s exhaust system.
- Using a 1/4" drill bit, mark the center for the 2.5" floor collar hole. Drill a pilot hole and leave drill and drill bit in place as you look at the drill bit from under the closet to make sure that the space (where the hole is to be) is big enough for the 2 ½” floor collar.

6.5 Evaporator Installation—Volvo/Mack Anthem

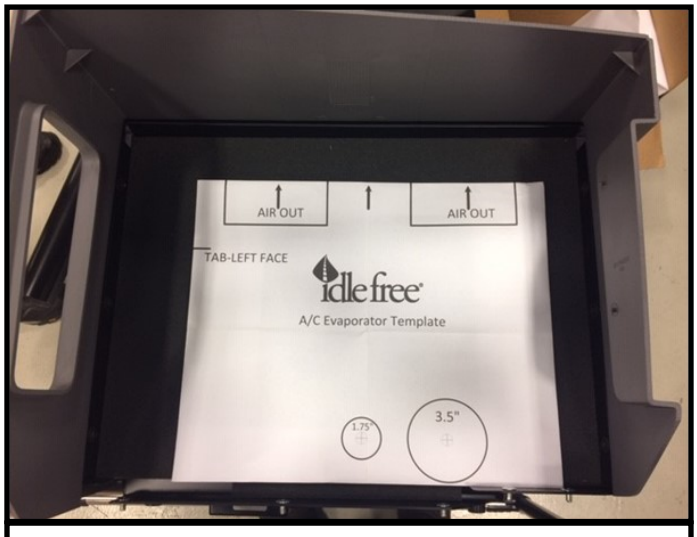
- Use a 2 ½” hole saw to cut a hole into the closet floor.
- Insert the 2.5" floor collar into the hole, **NOTE**: For Mack Anthem insert from the bottom to allow more space for the closet floor or refrigerator.
- Attach the floor collar ring to the bottom side of the 2 1/2" floor collar (from the outside).
- Install the evaporator drain tube (clear) onto the rear of the evaporator assembly.
- Starting at the destination location of the evaporator, feed the refrigerant lines, the evaporator power cord, and the water drain tube (already connected to the evaporator) through the closet shelves.
- Position the evaporator in the desired location.
- Secure the evaporator into position using the included hardware.
- Install the aluminum air filter on the rear of the evaporator.
- Confirm that the evaporator’s refrigerant lines and drain hose are not kinked of pinched where they pass through each closet shelf.
- Carefully pass each of these through the closet floor collar.—Evaporator drain tube, large refrigerant fitting + hose, small refrigerant fitting + hose.

NOTE: Do not pass the electric cord through the floor collar unless the route to the UBB (harness connection point) has been established. The direct route to the UBB may be easier to manage if the harness remains in the bunk.

- Secure the refrigerant hoses, drain hose and electrical harness to the back wall of the closet.
- Determine the harness route to the UBB for the evaporator power cord.
- Secure the evaporators power cord.

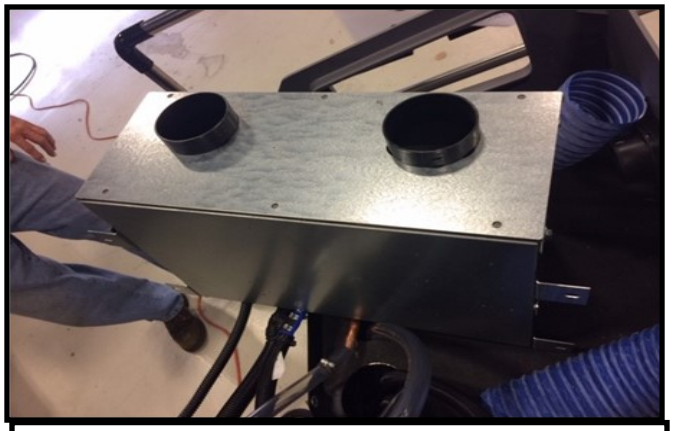


1. Remove this cabinet from the truck. The evaporator will be installed in the top shelf as shown in the following photos



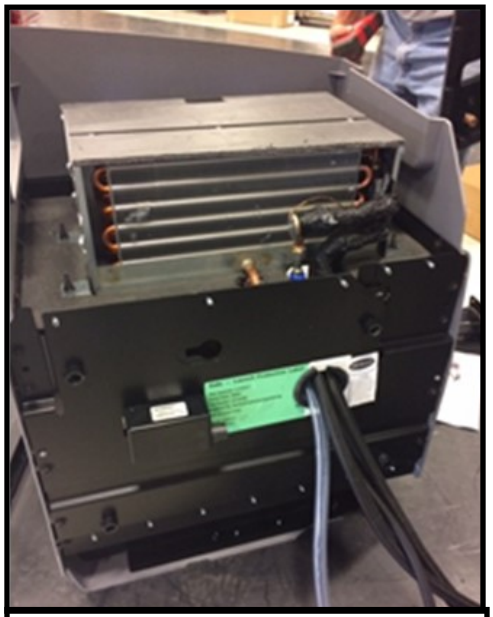
2. Locate the evaporator template and lay it on the top shelf of the cabinet. Using a hole saw drill a 3.5 inch and 1.75 inch hole in the top shelf as indicated on the template

6.5 Evaporator Installation—Volvo/Mack Anthem



3. Per the instructions in the manual remove the front of the evaporator and install the new one as shown here.

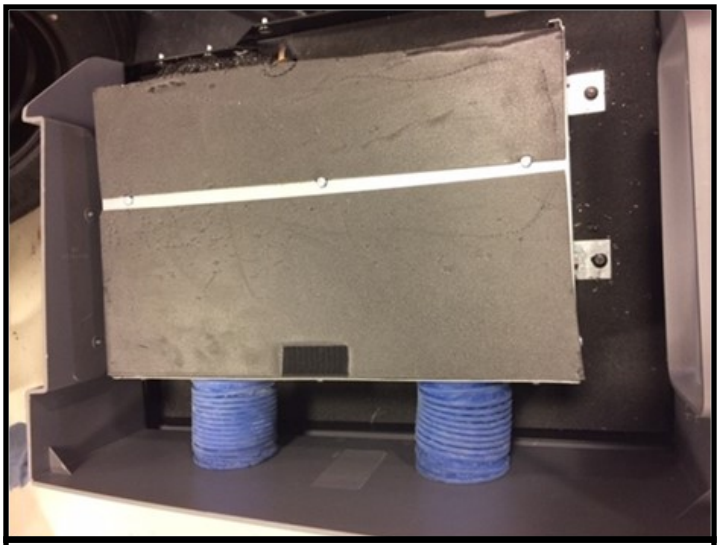
4. Per the instructions in the manual drill two holes in the front of the cabinet and insert the louvers as shown here.



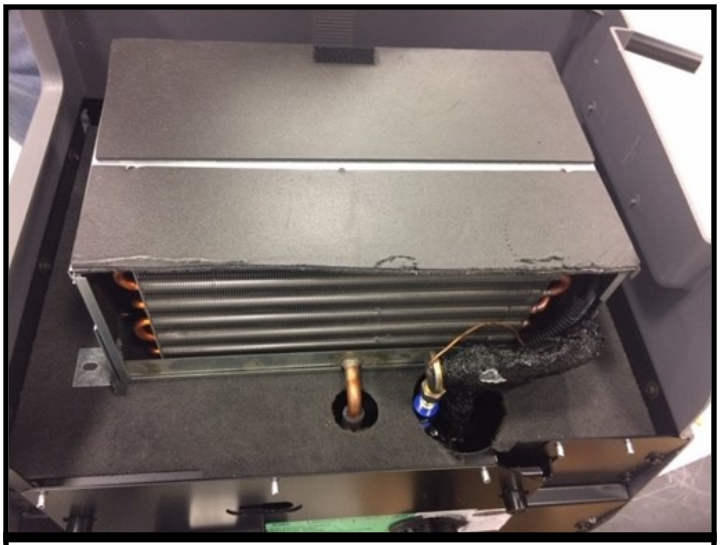
5. Install the feet on the evaporator as shown in the manual and cut a 3.5-inch hole in the steel plate as shown here. Line the hole with a grommet or wire loom to protect the refrigeration lines and wiring harness.

6. This is what the cabinet should look like from the inside after the evaporator has been secured in place. Notice the hole in the steel plate is lined with wire loom for protection.

6.5 Evaporator Installation—Volvo/Mack Anthem



7. Here is the evaporator from the top after installation. The flexible blue ducts have been installed from the louvers to the evaporator cover.



8. A view of the evaporator from the top back after installation.

9. Drill two holes in back wall behind refrigerator. The refrigeration lines, wiring harness, and drain line for evaporator will be routed into this hole behind refrigerator.

10. Remove the refrigerator from the bottom cabinet and drill a hole here per the instruction manual.

6.5 Evaporator Installation—Volvo/Mack Anthem

11. . Install the floor collar supplied with kit into hole drilled in previous step. Turn lock ring onto bottom of collar to secure in place.

12. This is what it should look like when all lines have been run from evaporator down through the floor.

7 Thermostat

7.1 Thermostat Installation

Determine the best location for the thermostat. It should be on the bunk side wall or back wall near the OEM's HVAC controls.

NOTICE: Be sure to consider the clearance necessary to open or close the bed before installing the thermostat on the side of a closet.

Installation Instructions:

- Separate the thermostat into two parts by pulling the base away from the body. Place the cover of the thermostat aside.
- Using the thermostat's back plate as a template, mark the location where the power cord will exit the back of the thermostat and pass-through the wall. Drill the ½" hole needed for the cord. NOTICE: *Use caution when drilling the power cord hole. Upholstery could get caught in the drill bit.*
- Mark the mounting hole locations for the thermostat's base mounting bolts. Drill the holes using a 1/8" drill bit.
- Place the thermostat's power cord through the ½" hole.
- Bolt the thermostat's base into position using the included mounting bolts.
- Install the batteries and attach the front panel or cover to the base. If the display lights up, the batteries were installed correctly.
- Finally, route the thermostat's power cord to the back side of the UBB. Use the connection marked "thermostat".

8 Ignition Cutout Circuit

8.1 Ignition Cutout Circuit Installation

To disable the APU when the truck's key is placed in the ON position or the truck's engine is running, the ignition cutout circuit must be installed. Take the time to test the circuit for 12VDC power with the key in the ON position and the ACCESSORY position.

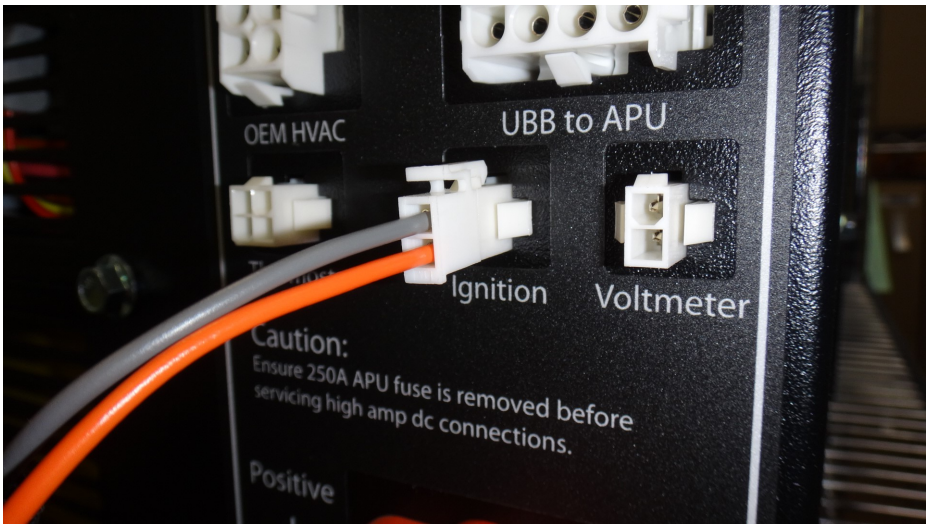
Do Not Connect to a 12 VDC <u>Accessory</u> Power Source.

The ignition harness is in two parts: a long section which is app. 20' and a shorter section.

- Attach one end of the long section to the back of the UBB. Route this section of harness to the cab of the truck and place under the dash. Connect the shorter harness (the one with the correct adaptor) to the longer one.

NOTICE: Installation Requirement **New wire harness from UBB to APU required for Condenser Fan**

There is a new single **ORANGE** wire that is part of the Ignition harness. It is plugged into the UBB Ignition port that needs to be routed down to the back of the APU. The part number for the ignition harness kit is 91802.



UBB: Insert new harness into the Ignition port.

Note: this new harness has two wires **Orange** and **Gray**.

The **Orange** Wire goes to the APU.

The **Gray** wire goes to the truck ignition source.

APU: Insert new **Orange** wire into the single **Black** wire terminal located on the back of the frame rail unit.

9 OEM Fan Harness Installation

9.1 Freightliner Cascadia (Pre 2018 Only)

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location: The bunk wire looms are located in the bunk mattress side of the driver side closet, going up the back wall of this closet, and to the OE HVAC control located on that wall. There is a second location, in the bottom of the drivers side closet where the separate set of heavier gauge wires (12GA) Red & Brown wires must be routed.

Wire Access & Location: Route the 6-pin harness & the 2-pin (red &brown) harness along the back wall of the bunk to the driver side wall, going forward with the harness to the back side of the driver side closet. There is a vertical wire harness duct located on the back side of the closet, where the wiring goes up to the OE HVAC control. At the base of the harness duct, the 2-pin harness (with the red & brown wires) must be separated, and run forward to the area under the driver side closet, near the OE HVAC system location. Once this is done, remove the control and expose wiring to gain access to connections.

Wire Numbers & Connections:

1st Pair of Wires (Blue wire, located at blower motor, lower driver side closet floor)

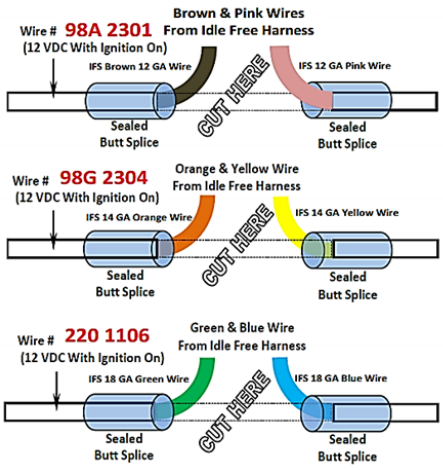
Locate and isolate wire **98A 2301**. Cut wire allowing adequate length of wire on both sides to perform a butt splice. The cut side of the wire with 12 VDC power (with ignition "On) is butt spliced with the **Brown** Idle Free wire. The other side of this cut wire will have the **Pink** wire butt spliced to it.

2nd Pair of Wires (Blue wire in Brown plug, harness located behind bunk HVAC control panel)

Locate and isolate wire **98G 2304**. Cut wire allowing adequate length of wire on both sides to perform a butt splice. Following the same sequence as shown for the 1st pair of wires, the cut side of the wire with 12 VDC power (with ignition "On) is butt spliced with the **Orange** Idle Free wire. The other side of this cut wire will have the **Yellow** wire butt spliced to it.

3rd Pair of Wires (Pink wire in brown plug, located behind bunk HVAC control panel)

Locate and isolate wire **220 1106**. Cut wire allowing adequate length of wire on both sides to perform a butt splice. Following the same sequence as shown for the 1st pair of wires, the cut side of the wire with 12 VDC power (with ignition "On) is butt spliced with the **Green** Idle Free wire. The other side of this cut wire will have the **Blue** wire butt spliced to it.



Fuse Number	Freightliner-All
1	5 amp
2	30 amp
3	10 amp
4	5 amp

9.2 OEM Fan Harness Installation—International LT

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

There are two locations that the wiring must be routed to from the Under-Bunk Box. The first pair of wires needs to be routed to the bunk HVAC unit. It is located on the passenger side, under the bunk mattress support area. The second pair of wires is connected on the driver side of the truck on the back wall of the sleeper, at the bunk HVAC control.

Wire Access & Location:

Turn ignition key to "On" position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn ignition key to "Off" position. This is to confirm the bunk HVAC operates before any work is done. See diagram on following page for specific splicing information. **BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION (confirming there is no power available at any wires.)**

Wire Numbers & Connections:

1st Pair of Wires (Located at bunk HVAC system, passenger side, under bunk)

Turn ignition key to "On" position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn ignition key to "Off" position. Locate and isolate wire **H75C**, green in color. This is a heavily insulated, 10 ga. wire. Cut wire allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to "On" position. The side of the cut wire with 12 VDC power will be butt spliced with the **Brown** Idle free wire. The other side of this cut wire will have the **Pink** wire butt spliced to it. **BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.**

2nd Pair of Wires (Top of bunk HVAC module)

The wire needed is in PIN #3 of the HVAC module. Locate and isolate wire **H12B**. At start of production (Dec 2016), it is purple in color. This may change over time, but it will always be PIN #3, & be labeled **H12B**. Cut the wire allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to "On" position. The side of the cut wire with 12 VDC power will be butt spliced with the **Orange** Idle Free wire. The other side of this cut wire will have the **Yellow** wire butt-spliced to it.

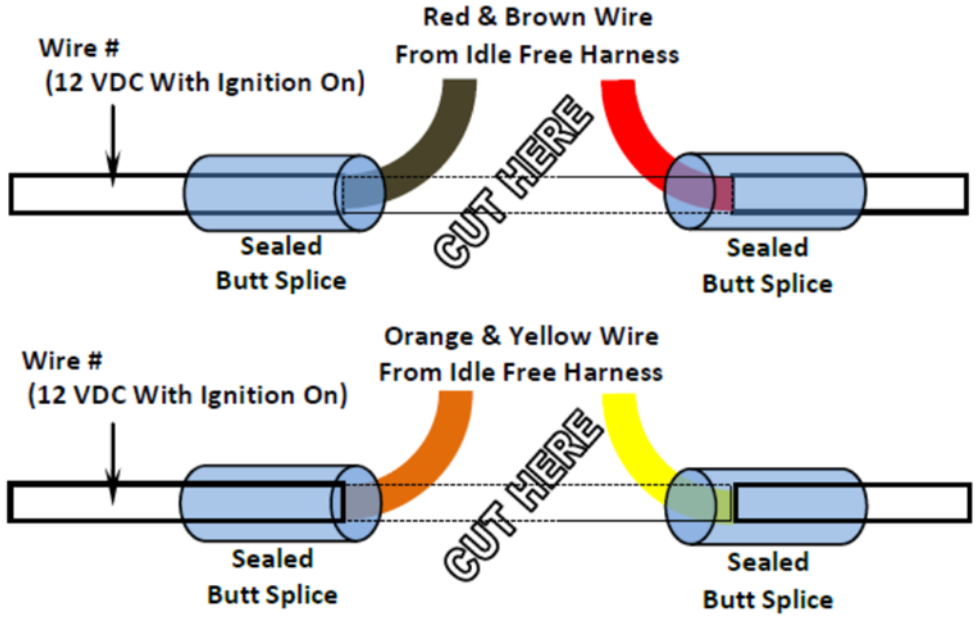
3RD Pair of Wires (NOT USED IN THIS APPLICATION)

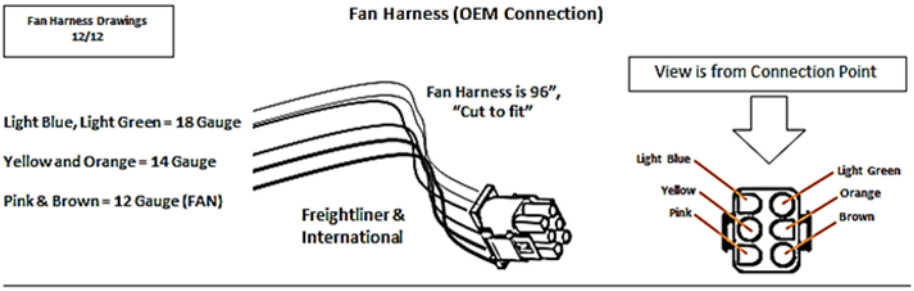
Use butt splice on end of blue wire and cover other end of splice. This wire will have 12 Volts DC when thermostat switch is in heat position.

9.2 OEM Fan Harness Installation—International LT

Installation Confirmation:

Proper wiring can be confirmed **AFTER** the exterior heater (coolant heater) has been connected electrically and plumbing is completed. The UBB must have all its necessary wiring in place. When this is complete, turn the ignition key to the "On" position and confirm bunk blower operates as normal. Turn ignition key to "Off" position and turn Idle Free thermostat to "HEAT" position. The bunk blower should operate as if the ignition key was in the "On" position; allowing blower speed control and blend door operation.





Each Heater Control Harness bag contains the necessary fuses for the truck the system is being installed in.

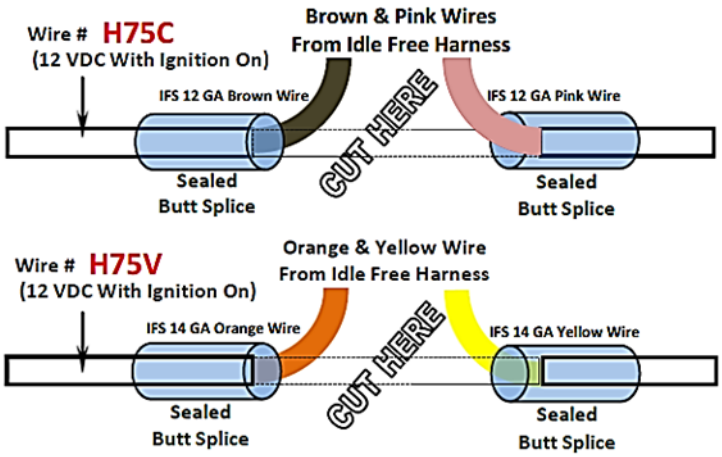
The DC fuse holder contains four openings for fuses. The top fuse is always a 2 AMP fuse that powers the voltmeter and the thermostat.

9.3 OEM Fan Harness Installation—International Prostar / Lonestar

The OEM fan harness installation allows the AGM battery bank to directly power the bunk's blower fan and manage all aspects of the bunk heater controls. (show diagram) There is a single wire location (located at the bunk HVAC system) that needs to be routed to the UBB. This varies by truck make and model. Please see instructions for each on the following pages.

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

- Locate and isolate the H75**C** (green) wire. It is a heavily insulated 10-gauge wire.
- Cut the wire allowing adequate length on both sides to perform a butt splice.
- Turn the ignition to ON position. The side of the cut wire with the 12 VDC power will be butt spliced with the **brown** APU wire. The other side of the cut wire will be butt spliced to the **pink** APU wire**. Before performing any crimp, turn the ignition to the OFF position**
- Next, locate and isolate the H75**V** (green) wire.
- Cut the wire allowing adequate length on both sides to perform a butt splice.
- Turn the ignition to ON position. The side of the cut wire with the 12 VDC power will be butt spliced with the **orange** APU wire. The other side of the cut wire will be butt spliced to the **yellow** APU wire**. Before performing any crimp, remember to turn the ignition to the OFF position**



Next, install fuses in UBB per chart below

Fuse Number	International Pro-Star 2006 - present
1	5 amp
2	30 amp
3	5 amp
4	NONE

9.4 OEM Fan Harness Installation—Kenworth T660, T800, W900

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

The single wire that needs to be spliced is located on the back wall of the driver side closet.

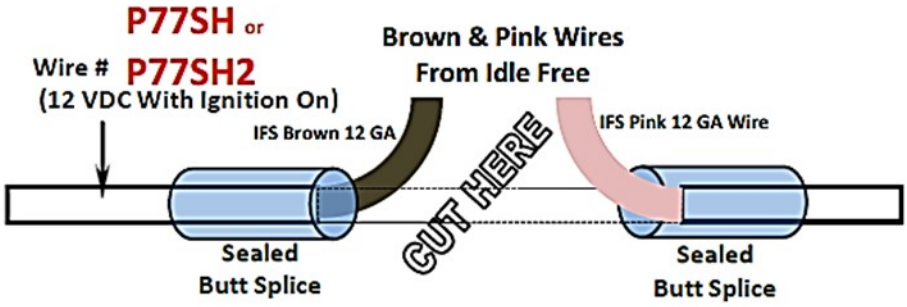
Wire Access & Location:

A pair of wires is routed from under the bunk box along the underside of the forward bunk support cross beam, to the driver side of the truck. From there it is brought up to the bunk HVAC control panel area where the splice is made.

Wire Numbers & Connections:

1st Pair of Wires (Wire is located behind bunk OE HVAC control panel)

Turn ignition key to “on” position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn ignition key to “Off” position. Locate and isolate wire number **PP77SH or P77SH2**. Cut wire, allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to “On” position. The side of the cut wire with 12 VDC power will be butt spliced to the **Brown** Idle Free systems harness wire. **NOTE: BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO “OFF” POSITION.** The other side of this cut wire will have the **Pink** wire butt spliced to it. See diagram below.



Fuse Number	Kenworth-All
1	5 amp
2	30 amp
3	NONE
4	NONE

9.5 OEM Fan Harness Installation—Kenworth T680

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

There are two wires that need to be connected to the Idle Free HVAC harness. One of these wires needs to be spliced, and the other needs to be tapped. They are located on the top of the HVAC unit, under the bunk.

Wire Access & Location:

Two pairs of wires are routed from the IFS Under Bunk Box to the KW Bunk HVAC unit. The first wire is Kenworth wire #7310-381 located near the bunk blower motor. The second Kenworth wire is wire # 7300-383. It can be found leading to the HVAC blend door actuator.

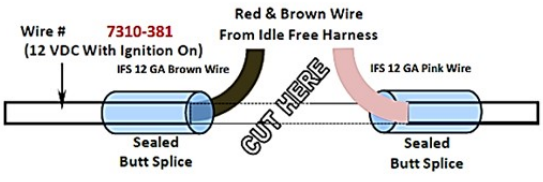
Wire Numbers & Connections:

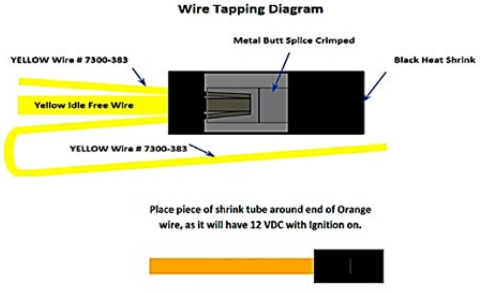
1st Pair of Wires (The wire is located on top of the HVAC unit, near the blower motor, it is a 12 gauge wire)

Turn ignition key to "On" position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn ignition key to "Off" position. Locate and isolate wire number **Yellow 7310-381**. Cut wire, allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to "On" position. The side of the cut wire with 12 VDC power will be butt spliced to the **Brown** Idle Free systems harness wire. **NOTE: BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.** The opposite end of the cut wire will have the **Pink** wire butt spliced to it. See diagram below.

2nd Pair of wires: (This wire is leading to the blend door actuator, it is an 18 gauge yellow wire)

With the ignition key "Off", locate and isolate wire number **7300-383, Yellow**. Cut wire, allowing adequate length of wire on both sides to perform a butt splice. Take the **Yellow** Idle Free wire, and join it with one end of wire number **Yellow-383.** Select a butt splice that will allow all three wires (two ends of the cut yellow wire number 7300-383 and the yellow Idle Free wire) to be crimped together in one end. Using heat shrink provided, heat tubing to create a closed seal. Take Orange Idle Free wire, and place heat shrink over end, and seal it shut. This wire will have un-used 12 volts at it when ignition key is on.





Fuse Number	Kenworth-All
1	5 amp
2	30 amp
3	5 amp
4	NONE

9.6 OEM Fan Harness Installation—Mack Pinnacle

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

The bunk fuse block is located 12” forward of driver cargo door, under bunk.

Wire Access & Identification:

To gain access to this wire, pry the center top of the fuse block out (away from the wall) and push/ slide entire fuse block assembly up. Two tabs will disengage from the bunk wall, and allow the entire harness to be accessed.

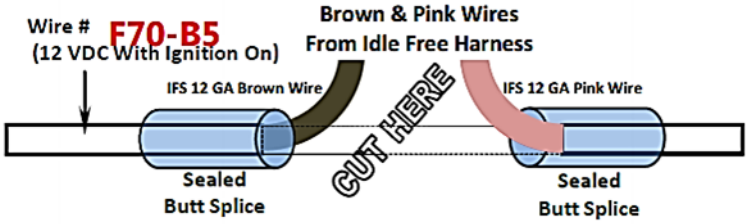
The wire necessary to splice is located in the wire harness that comes from the front of the truck, bends down and has some wires going into the bunk fuse block locate as specified above. The **SINGLE** wire necessary to splice does **NOT** go into the fuse block, but follows the wire loom (harness) down behind the fuse block, and then continues back up wall going further back, over the top of the cargo access door on drivers side. Easiest access is attained by removing electrical tape & / or split loom around the harness 4” on each side of downward bend in loom as well as any wire protection on the bend itself.

Wire Connection Colors or Numbers: (Located at the bunk fuse panel driver wall, forward of cargo door)

Turn ignition key to “ON” position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn Ignition key to “Off” position. Locate and isolate white wire with orange stripe, number **F70-85**. Cut wire allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to “On” position. The side of the wire with 12 VDC power will receive the **Brown** wire butt splice. The other side of this cut wire will have the **Pink** wire butt spliced to it. **NOTE: BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO “OFF” POSITION (confirming there is no power available at either wire end.)** See diagram below.

These are the only connections necessary. Reassemble/re-tape harness into original position, and route Idle Free two-wire harness back to Under Bunk Box (UBB). Slide fuse block assembly back into slots, and confirm it snaps into locked position.

Fuse Number	Mack - All
1	5 amp
2	30 amp
3	NONE
4	NONE



9.7 OEM Fan Harness Installation—Peterbilt 384, 386, 389

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

The bunk wire looms are located in the driver side cargo area, on the bunk side of the driver side closet, under the hinged mattress support surface.

Wire Access & Location:

To gain access to the wires, you must locate them within the loom of wires. There are two wires that need to be tapped. Identify them, and separate them from the other wires to confirm you splice into the correct wires.

Wire Numbers & Connections:

1st Pair of Wires (Driver side wall, in cargo area just forward of cargo door behind fuse box.)

Turn ignition key to "On" position. Ensure bunk (sleeper) switch is activated on dash. Confirm bunk blower engages. Turn ignition key to "Off" position. Locate and isolate wire number **7300-1**. Cut wire, allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to "On" position. The side of the wire with 12 VDC power will be butt spliced to the **Brown** Idle Free Systems harness wire. **BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.** The other side of this cut wire will have the **Pink** wire butt spliced to it. See diagram on the following page.

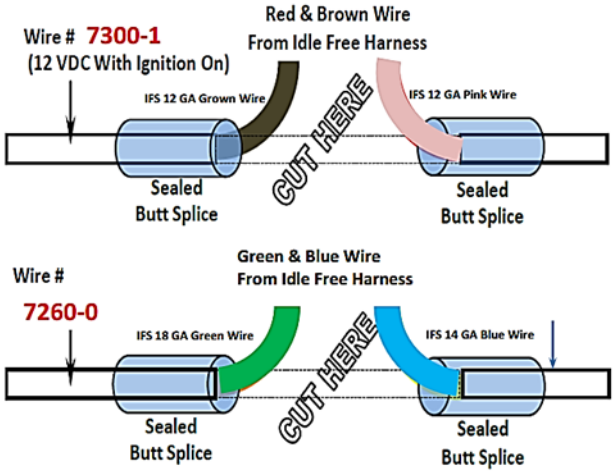
2nd Pair of Wires

Use butt splice on (Not used in this application.) end of yellow wire, and cover other end of splice. This wire will have 12 Volts DC when thermostat switch is in heat position, (Yellow & Orange are paired.)

3rd Pair of Wires (Driver side wall, in cargo area just forward of cargo door behind fuse box.)

Turn ignition key to "On" position. Ensure bunk (sleeper) switch is activated on dash. Confirm bunk blower engages. Turn ignition key to "Off" position. Locate and isolate wire number **7260-0 (THIS MUST BE A GRAY WIRE, AS THERE IS A 7260-0 YELLOW WIRE)**. Cut wire, allowing adequate length of wire on both sides to perform a butt splice. The side of the cut wire that displays a connection to GROUND will be butt spliced to the Idle Free **LT BLUE** wire. **BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.** The other side of this cut wire will not show a connection to ground. This wire will have the **GREEN** wire butt spliced to it. See diagram on the following page.

9.7 OEM Fan Harness Installation—Peterbilt 384, 386, 389



Fuse Number	Peterbilt- All
1	2 amp
2	30 AMP
3	NONE
4	NONE

9.8 OEM Fan Harness Installation—Peterbilt 579

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

The Bunk wire looms are in the driver side cargo area, on the bunk side of the driver side closet, under the hinged mattress support surface and in the driver side bunk HVAC console control.

Wire Access & Location:

To gain access to the wires, you must locate them within the loom of wires. There are three wires that need to be used. Identify them, and separate them from the other wires to confirm you splice into the correct wires. You will also need to remove the front cover on the HVAC console to gain access to the HVAC control head wiring on the back of this control.

Wire Numbers & Connections: **(Passenger side under bunk along bunk header above sleeper HVAC system.)**

1st Pair of Wires Turn ignition key to "On" position. Ensure bunk HVAC is activated. Confirm bunk blower engages and that the blend door operates. Turn ignition key to "Off" position. Locate and isolate wire number **YEL 7310-381** Cut wire, allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to "On" position. The side of the cut wire with 12 VDC power will be butt spliced to the **IFS Brown (YEL 7310-381)** Idle Free Systems harness wire. **NOTE**: **BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.** The other side of this cut wire will have the IFS **Pink (YEL 7310-381)** wire butt-spliced to it. See diagram on following pages.

2nd Pair of Wires **(Passenger side under bunk along bunk header above sleeper HVAC system.)** Turn ignition key to "On" position. Ensure bunk HVAC is activated. Confirm bunk blower engages and that the blend door operates. Turn ignition key to "Off" position. Locate and isolate wire number **YEL 7300-383** Cut wire, allowing adequate length of wire on both sides to perform a butt splice. Turn ignition key to "On" position. The side of the cut wire with 12 VDC power will be butt spliced to the **IFS Orange (YEL 7300-383)** Idle Free Systems harness wire. **NOTE: BEFORE PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.** The other side of this cut wire will have the **IFS Yellow (Yel 7300-383)** wire butt-spliced to it.

9.8 OEM Fan Harness Installation—Peterbilt 579

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires**.**

3rd Pair of Wires (located behind the driver side HVAC control panel)

Turn ignition key to "On" position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn ignition key to "Off" position. The third wire **ORANGE 7300-501** located in the HVAC enclosure behind the HVAC control head leading to the temperature control knob, cut wire to 12 VDC power will splice to **IFS Green (ORANGE 7300-501).** Turn ignition key to "On" position. The side of the cut wire with 12 VDC power will be butt spliced to the **IFS Green (ORANGE 7300-383)** harness wire. The other side will splice to the Blue IFS harness wire. **NOTE: Prior to PERFORMING ANY CRIMP, TURN IGNITION KEY BACK TO "OFF" POSITION.** The other side will splice to the **IFS Blue (ORANGE 7300-383)** harness wire. See diagram below.

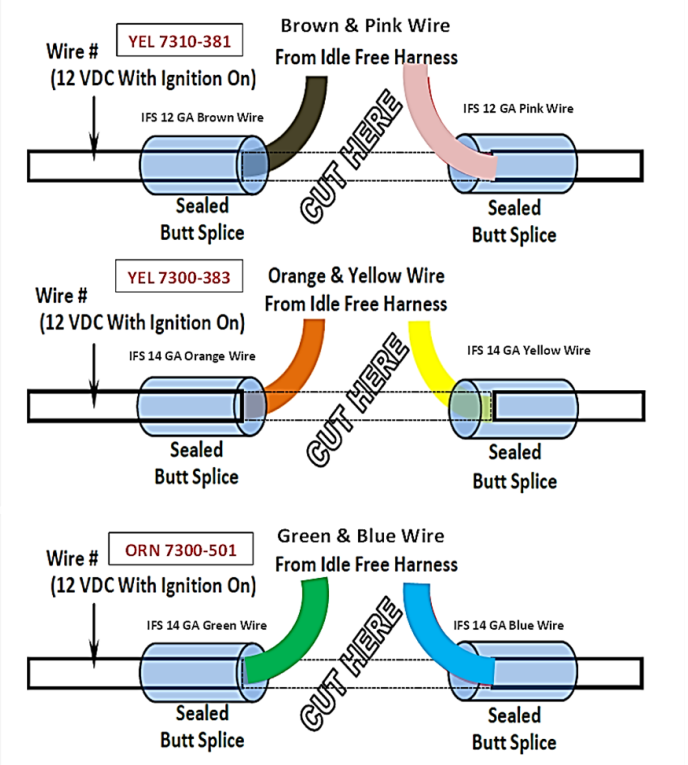
Installation Confirmation:

Proper wiring by can be confirmed **AFTER** the exterior heater (Webasto coolant heater) has been connected electrically and plumbing is completed. The UBB must have all its necessary wiring in place as well. When this is complete, turn the ignition key to the "On" position and confirm bunk blower operates as normal. Turn ignition key to "Off" position, and turn Idle Free thermostat to *Heat* position. The bunk blower should operate as if the ignition key was in the "On" position, allowing blower speed control and blend door operation.

Each Heater Control Harness bag contains a bag with the necessary fuses for the truck system being installed.

Remember, EVERY truck will have a 2 amp fuse in position #1 (top) for thermostat.

Fuse Number	Peterbilt-2016	Function	Wire Color
1	2 amp	Thermostat	Purple
2	30 amp	Blwr Mtr	Pink
3	10 amp	Blend Dr	Yellow
4	5 amp	HVAC Ctrl	Blue



9.9 OEM Fan Harness Installation—Volvo

Recommend using 8710050 plug/play harness, if not using this harness follow instructions below.

CAUTION: Personal injury, property damage—Ensure truck ignition is off before cutting and crimping wires

Wire Connection Location:

There is one location that the wiring has to be routed to from the Under the Bunk Box. The 6-Wire Idle Free harness needs to be routed to the OE HVAC bunk control panel. This panel is located in the corner where the driver side closet and wall meet.

Wire Access Location:

Route these wires up into the control panel area for connection to the truck wire harness. There is a wire raceway behind this close out panel. Use of a guide wire is sometimes necessary to get the 6-pin harness up and into this raceway. Once inside the raceway, the wires can be pulled into the control panel area.

Wire Numbers & Connections:

(Wire is behind control panel on bunk side of driver closet door **F48A1** is pin 10 in GREEN plug. Be advised the **F48A1 may look like F46A1**, but it is in pin 10 in the GREEN plug

1st Pair of Wires

Turn ignition key to “On” position. Ensure bunk HVAC is activated. Confirm bunk blower engages. Turn ignition key to the “Off” position. Locate and isolate wire number **F48A1**. Cut wire, allowing ad-

CAUTION: Personal injury, property damage—This wire has 12 Volts at all times**.**

equate length of wire on both sides to perform a butt splice.

The side of the cut wire with 12 VDC power will be butt spliced to the **Brown** Idle Free Systems harness wire. The other side of this cut wire will have the **Pink** wire butt spliced to it. See diagram on the following page.

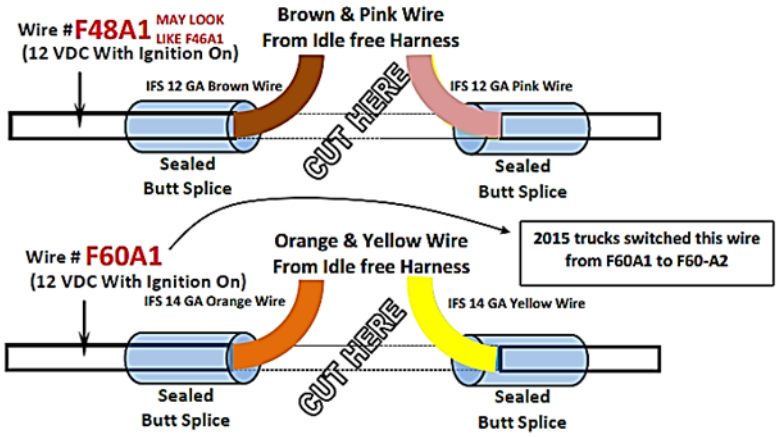
(Wire is behind control panel on bunk side of driver closet corner **F60A1** wire is in the top roof black connector, wire is in position 11 of this black plug.

2nd Pair of Wires

The second set of wires that need connection at the bunk control panel is **F60A1** **BE AWARE THAT 2015 TRUCKS SWITCHED THIS WIRE FROM F60A1 TO F60-A2**. Performing the same procedure concerning the ignition switch, determine which side has 12 volt power with the ignition switch on, and butt splice the Idle Free **Orange** wire to it. The other side of this cut wire will be butt spliced to the Idle Free **Yel-**

NOT USED ON THIS APPLICATION

9.9 OEM Fan Harness Installation—Volvo



Fuse Number	Volvo - All
1	5 amp
2	30 amp
3	10 amp
4	NONE

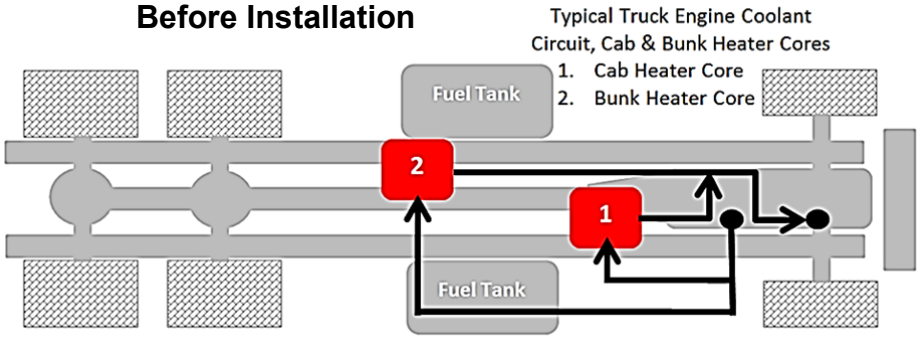
10 Coolant Connections

10.1 Coolant Heater Hose Installation

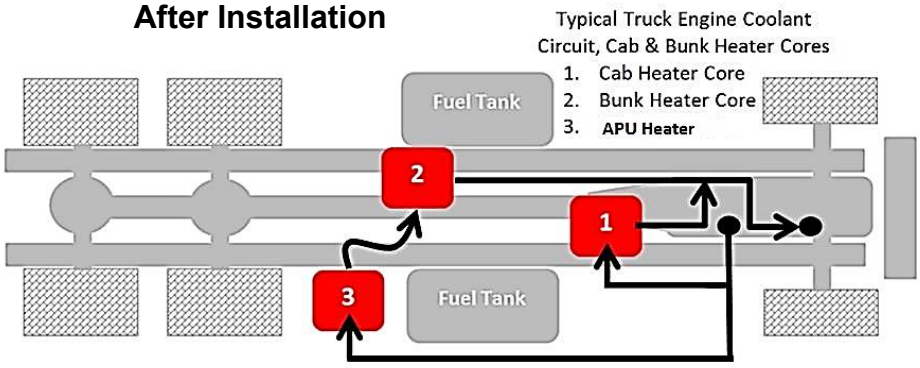
After this installation is complete, the coolant heater will supply coolant to the bunk's heater core. The installation kit will include: ¾" hose, 5/8" hose, hose clamps, hose adapters and cable ties.

- Locate the coolant hose that supplies coolant to the bunk heater's core from the truck's engine. (There are two hoses that run between the bunk's heater core and the engine. If it is not clear which of the two hoses is supplying coolant from the engine to the bunk, start the engine and hold both hoses. The hose that heats up first is the heater hose. This is the hose used in this installation)
- Place coolant dam on coolant reservoir, clamp hoses with pinch pliers on either side of the elbow to be removed, or drain the coolant from the system. Cut the coolant hose in between the pinch pliers.
- Install the supplied rubber elbows to the exposed coolant lines and angle towards the center of the truck. Elbows are 5/8" on one end and ¾" on the other. Make sure you have the 5/8" end on the exposed pipes.
- Connect the outlet heater hose from the frame rail unit of the APU to the end of the cut hose that connects to the inlet on the bunk heater core using a hose clamp
- Connect the inlet heater hose from the frame rail unit of the APU to the other end of the cut hose which is attached to the engine using a hose clamp
- Remove the pinch pliers or coolant dam

Before Installation



After Installation



11 Fuel Standpipe

11.1 Fuel Standpipe Installation

CAUTION: Personal injury, property damage—Diesel fuel is a potential source of combustion.

- Cut the fuel standpipe to app. 2” from the bottom of the fuel tank. Be sure to account for the fittings on top of the tank. Make sure you angle the cut to prevent clogging. Remove burrs from the end cut.
- Use the ¼” or ½” spare port on the fuel tank if available and install the supplied adapters in the port.
- If a spare port is not available, drill a 1” hole on the top of the tank. Assemble the tank-boss and the fuel standpipe and install. (see figure 406)
- Connect the fuel line from the fuel pump to the fuel standpipe using the rubber connectors and clamps. Route and secure the fuel line from the fuel tank to the heater.

Fuel Line Connections:

CAUTION: Personal injury, property damage—Keep away from hot components.

- Route a fuel line between the truck’s fuel pickup tube and the coolant heater’s fuel pump
- Secure the fuel lines every 12” and keep away from hot exhaust and moving parts such as the drive shaft. Use the supplied hose clamps to secure all fuel line connections. (see figure 407)

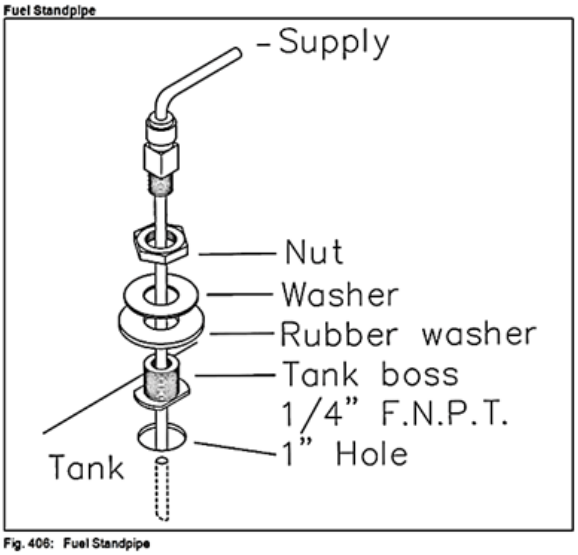


Fig. 406: Fuel Standpipe

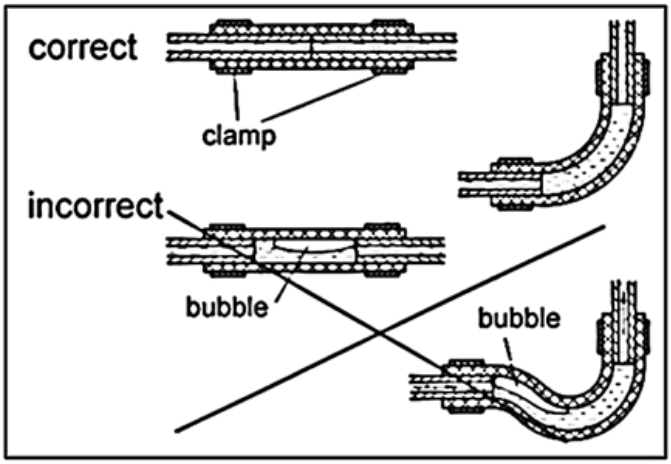


Fig. 407: Fuel Line Connection

12 DC Cables

12.1 DC Cable Installation

WARNING: Personal injury—Live battery shock hazard**.**

We will be installing 5 cables and a fuse with fuse holder in this step.

Overview:

The Connection Hub for all harnesses is the UBB or Under Bunk Box.

The UBB includes connection points on the back-rear corner of the enclosure.
The connection hub contains connection sockets for the following connectors:

1. Shore Power
2. Evaporator
3. UBB to APU Harness
4. Volt Meter
5. Ignition
6. Thermostat
7. OEM HVAC
8. 120 VAC, 10 AMP
9. DC Cables from Battery Box or APU

WARNING: Property Damage—Observe the B+ / B– Polarity**.**

Cable 1: Part number: 32041 (red cable)

Remove the fuse from the fuse holder. Bolt the 5/16th lug from cable 1 to one of the fuse holder's terminals.
Connect the 3/8th cable end to the positive post of one of the truck batteries
Secure the fuse holder in the truck's battery box.

Cable 2: Part number 32042 (red cable)

Bolt the cable end to the remaining terminal on the fuse holder. Do not insert the fuse yet.

Route cable 2 between the truck's battery box and the APU's batteries (AGM battery connection). Cut to length.
Attach the green camlock connector to the other end of cable 2.
Plug the green connector on cable 2 into the green panel mount connector on the APU's frame rail unit. Twist the connector clockwise. Ensure that the connector cannot be pulled from the panel mount.

12.1 DC Cable Installation

Cable 3: Part number 32043 (red cable)

- Attach one end of cable 3 onto the red stud on the UBB.
- Route this cable through the floor collar to the APU unit's panel mount, located on the frame rail unit
- Cut the cable to length and attach the red twist lock connector to the end of the cable.
- Plug the red camlock connector to the red panel mount connector on the APU's frame rail unit. Turn clockwise. Ensure that the connector cannot be pulled from the panel mount.

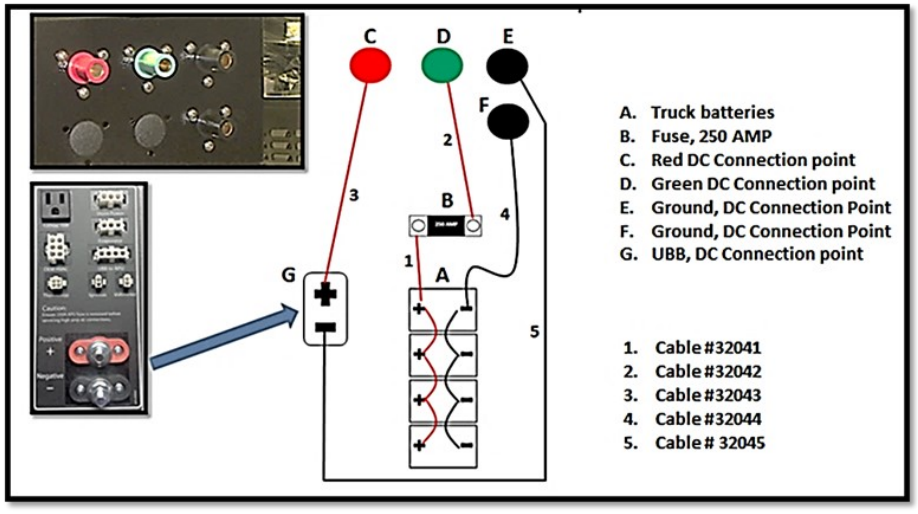
Cable 4: Part number 32044 (black cable)

- Bolt the 3/8th cable end to a negative post on one of the truck's batteries. NOTE: Volvo and Mack require the ground cable to be connected to the frame ground lug.
- Route the cable to the frame rail unit's panel mount. Cut the cable to length.
- Attach the black twist lock connector to the end of the cable.
- Plug the black camlock connector into the **bottom** black panel mount connector. Turn clockwise and ensure that the connector cannot be pulled from the mount panel.

Cable 5: Part number 32045 (black cable)

- Attach one end of cable 5 to the black stud on the UBB
- Route this cable through the floor collar to the APU's frame rail unit's panel mount. Cut the cable to length.
- Attach the black camlock connector to the end of the cable.
- Plug the twist lock connector into the **top** black panel mount connector and turn clockwise.

Finally, insert the fuse into the fuse holder. Ensure all cables are secured along their routes and that all twist lock connectors are matched to the correct color on the panel mount of the frame rail unit.

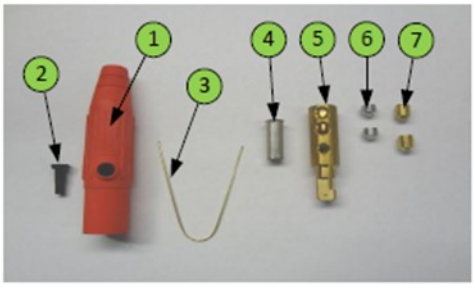


13 Camlock Connectors

13.1 Camlock Connectors Installation

1. Install cable lugs onto feeder studs or vehicle batteries and route and secure as required. When at panel mounts, expose cable from loom and determine required cable length for installation. Use cable cutter to cleanly cut cable.

2. Camlock connector (MARINCO) kit has colored body (1), securing screw (2), tension safety wire (3), zinc plated sleeve (4), connector lug (5), two short zinc plated set screws (6), and two longer brass plated set screws (7). The brass plated set screws will not be used.



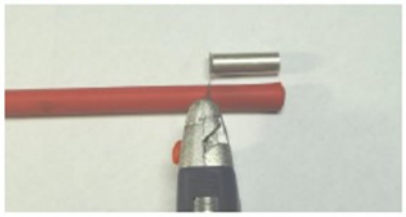
3. Because cable will not fit into body, trim the Camlock body in the middle of the "400" section, using manual shear.

4. Coat cable insulation end with silicone lube spray and slide colored body over cable end several inches for working room, making sure sure cut body end fits tight on cable.

13.1 Camlock Connectors Installation

5

Place sleeve against cable and at end to make cutting cable insulation with utility knife. Cut all around cable insulation.



6

Place tension wire 1/4 from insulation score and roll ends together to meet.

7

While holding wire position cross the wires near insulation to allow twisting room.

8

Continued holding position, make a couple complete twists by hand.

9

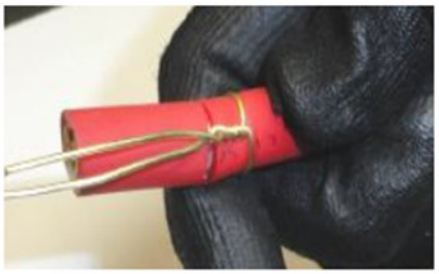
Firmly grip joint with pliers and make 3-4 more complete twists against insulation.

10

The tension wire twist should be tight enough to slightly squeeze the insulation

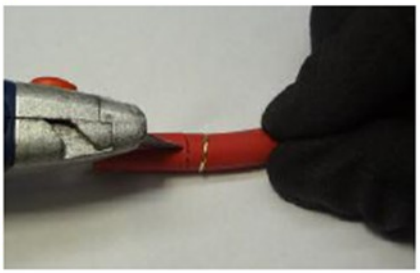
13.1 Camlock Connectors Installation

Fold the tension wire over as Shown below and force them together at end.



11

Cut insulation from score to end with utility knife and pull insulation off.



12

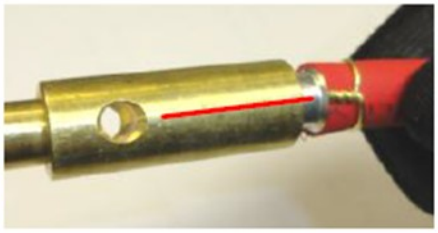
Slide sleeve over cable and tension wires, squeeze twist to allow fit.

13

Force sleeve to insulation and trim tension wires flush with sleeve end.

14

Slide lug over sleeved cable, making sure tension wires are opposite lug set screws.



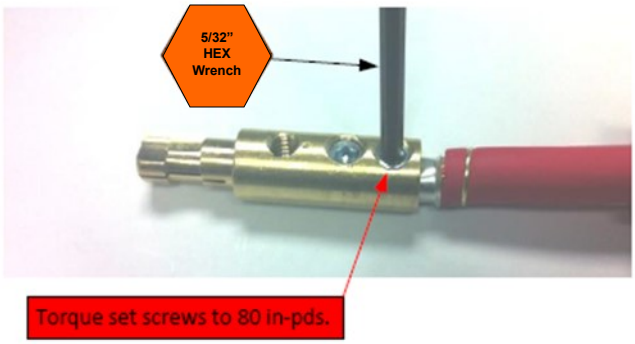
15

Install both short zinc plated sets screws into mating holes and finger tighten.

16

13.1 Camlock Connectors Installation

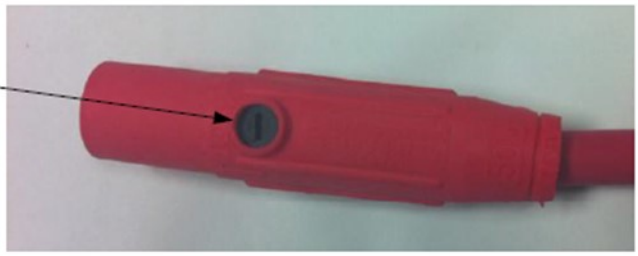
17 Making sure the tension wires are still opposite the set screws, torque each set screw to 80 in-pds without stripping screw threads and check connection.



18 Slide Camlock body over lug and align body hole with lug threaded hole below.

1/8 Straight Screw-driver

19 Install black body screw and carefully tighten.



20 Install loom over cable and trim to tightly fit body end. Carefully wrap electrical tape about tubing as shown to keep slit closed.

14 Reefer Link®

14.1 Reefer Link Installation Overview

The Reefer Link XD installation procedures include installing components onto the truck and onto a reefer trailer.

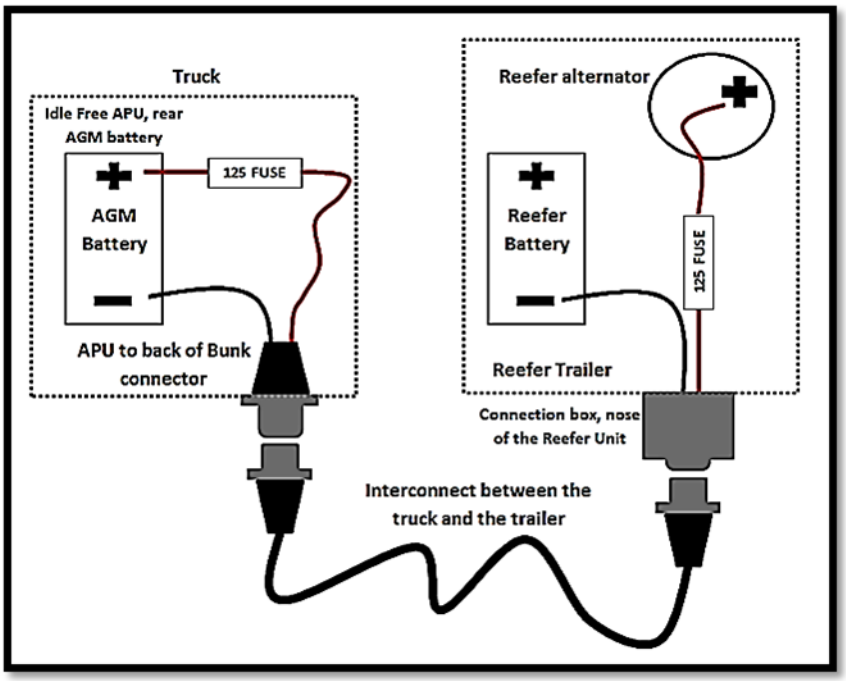
The truck's portion of the Reefer Link installation will include:

1. Hanging a connector on the back side of the bunk, near the electrical and air line connections.
2. Cutting a two-wire cable (to length) that will be connecting to the APU (battery connection) and the connector newly installed on the back side of the bunk (1.).

The trailer's portion of the Reefer Link installation will include:

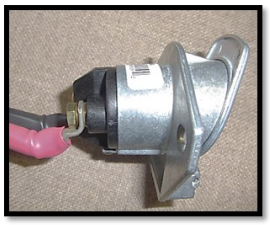
1. Hanging a connector onto the nose of the reefer unit.
2. Cutting a two-wire cable (to length) that will be connecting to the reefer's negative battery post (black cable) and the reefer's alternator, positive post (red cable).

The installation process will include crimping cable ends onto the newly fitted (cut) cables.
The installation process will also include installing an inline fuse on the positive cable between the APU and the back of bunk connection point.



14.2 Reefer Link® Truck Installation

- Open the Reefer Link Kit #91412 and lay out the parts.
- Locate the bracket and connector body.
- Determine the mounting location on the back of truck/bunk that the Reefer Link body and bracket will be located.
- Determine the orientation of the connector body int0o the bracket, based on where the assembly will be located on the back of the bunk.
- Locate the parallel red/black cables.
- Take one end of the cable and separate the black and red wires (about 10 inches) using a knife. Be careful not to separate the wires in a way that exposes the internal cable wires.
- Strip both wires back 1”.
- Place a cut piece of red heat shrink onto the red wire and place a cut piece of black heat shrink onto the black wire.
- Locate the correct size lugs (2) from the kit based on the size of the connector bolts on the back of the connector body (do no use the 3/8” battery lugs).
- Crimp the cable lugs onto the red and black cables.
- Move the heat shrink up to the spot where the new crimp is completely covered.
- Shrink the heat shrink onto the cable end using a heat gun.



- Install the RED lug onto the back of the connector body (face down) locating the red lug on the bolt that screws into the positive (+) receptacle.
- Install the BLACK lug onto the back of the connector body (face down) locating the black lug on the bolt that screws into the negative (-) receptacle.

- Install the mounting bracket onto the back of the connector body using the two bolts and nuts supplied. Route the parallel cable, attached to the rear of the connector body, to the back side of the APU’s frame rail unit.
- Remove the plug and/or enter the battery box with the parallel cable.
- Cut the parallel cable to length understanding that the positive cable needs to reach the positive post of the nearest battery. A fuse will also be installed near the positive post of this battery.
- Separate the black and red wires using a knife. Be careful not to separate the wires in a way that

14.3 Reefer Link® Truck Installation—Installing the Fuse

- Cut the red cable about 12” leaving enough cable to be able to crimp a lug onto the cut end of the cable.
- Locate the small fuse holder and fuse from kit #91412.
- Locate two lugs from the kit that fit snuggly onto the small fuse holder terminals.
- Slide a piece of red heat shrink onto the red cable that was cut (runs to the box entry point).
- Crimp the fuse lug onto the cable end, place the heat shrink over the crimp and heat/melt the heat shrink in place.
- Cut a red (positive) cable that will easily reach the battery’s positive post from the fuse terminal.
- Crimp the fuse lug onto the cable end, place the heat shrink over the crimp and heat/melt the heat shrink in place.
- Slide a piece of red heat shrink onto the “fuse to battery cable” (to the battery post positive).
- Crimp a 3/8” lug onto the opposite cable end, place the heat shrink over the crimp and heat/melt the heat shrink in place.
- Slide a piece of black heat shrink onto the black battery cable (to the battery post negative).
- Crimp a 3/8” lug onto the black cable end, place the heat shrink over the crimp and heat/melt the heat shrink in place.
- Install the fuse holder between the two red cables & install the fuse and secure with nuts. Place the cover onto the fuse holder.
- Install the red cable onto the positive post and install the black cable onto the negative post.
- Secure the added cables with tie straps between the battery connections and the connector body and bracket.

14.4 Reefer Link® Trailer Installation

CAUTION: Property Damage—Observe the B+ / B– Polarity.

- Open the kit #91413 and lay out the parts.
- Locate the box and the connector body, & the connector body faceplate.
- Determine the mounting location, under the reefer unit, that the Reefer Link connection box will be located.
- Mount the box so that the cable leaves the box on the bottom. Do not mount the box with the cable opening facing up. The parallel cable will leave the box on the bottom and will take a route up the front of the trailer to the reefers battery and the reefer's alternator.
- Locate the parallel red/black cable from the kit.
- Take one end of the cable and separate the black and red wires (about 10 inches) using a knife. Be careful not to separate the wires in a way that exposes the internal cable wires.
- Strip both wires back 1"
- Place a cut piece of red heat shrink onto the red wire and place a cut piece of black heat shrink onto the black wire.
- Locate the correct size lugs (2) from Kit #91413 based on the size of the connector bolts on the back of the connector body (do not use the 3/8" battery lugs).
- Crimp the cable lugs onto the red and black cables.
- Move the heat shrink up to the spot where the new crimp is completely covered.
- Shrink the shrink tube onto the cable end using a heat gun.
- Locate the face plate and gasket from Kit #91413 and install the connector body onto the face plate, cutting the gasket to fit.
- Install the connector body/face plate assembly (with gasket) into the box orientating the flap to lift up with the cable leaving the box at the bottom of the assembly.
- Install the rubber grommet onto the parallel cable set, about 12 inches.
- Install the RED lug onto the back of the connector body (face down) locating the red lug on the bolt that screws into the positive (+) receptacle.
- Install the BLACK lug onto the back of the connector body (face down) locating the black lug on the bolt that screws into the negative (-) receptacle.
- Install the connector body/face plate assembly into the enclosure. Position the rubber grommet up the cables to the seat in the base of the enclosure.
- Secure the enclosure to the front of the reefer trailer, under the reefer unit.
- Route the parallel cable (exiting the enclosure) to the inside of the reefer unit.

14.4 Reefer Link® Trailer Installation

- Secure the cable in place, under the reefer unit, using the P Clips (supplied in kit# 91413)
- The parallel cable should enter the reefer unit against the back wall. Once the parallel cable has entered the reefer unit, the cable can be separated into red and black cables by cutting. Be careful when splitting the cable not to cut the cable in a way that exposes the copper wire. Any exposed copper wire needs to be repaired with tape or heat shrink. The black cable will end up connecting to the negative reefer battery post. The positive cable will be routed to the reefer's alternator. About 12 inches from the reefer's alternator positive post a fuse will be located. This fuse location will require a positive (red cable) to be made from the cable left over during this process.
- Route the (split) black cable to the reefer's battery. Cut the black cable leaving enough cable to easily reach the negative battery post.
- Place a cut piece of black heat shrink onto the black cable.
- Source a 3/8" cable lug from kit #91413.
- Crimp the 3/8" cable lug onto the end of the black cable.
- Move the heat shrink up the cable to cover the crimp.
- Shrink the black heat shrink in place using a heat gun.
- Secure the black cable in place between the battery and the reefer box cable entry point.
- Route the red cable from the reefer cable entry point to the positive connection point on the reefer's alternator.
- Cut the cable, leaving plenty of cable to be able to easily reach the alternator's positive post. Keeping in mind the act of securing the cable after the installation is complete.
- Cut 12 inches from the cable. Installer will use this 12-inch cable to create an alternator connection and fuse connection.
- Locate the small fuse holder and fuse from kit# 91413.
- Locate two lugs from kit# 91413 that fit snuggly onto the small fuse holder terminals.
- Slide a piece of red heat shrink onto the red cable that was cut (runs to the box entry point).
- Crimp fuse lug onto the cable end, place the heat shrink over the crimp and heat/melt the heat shrink in place.
- Slide a piece of red heat shrink onto the "fuse to batter cable" (to the battery post positive). Crimp a #10 lug onto the opposite cable end, place the red heat shrink over the crimp and heat/melt the heat shrink in place.

14.4 Reefer Link® Trailer Installation

- Crimp a fuse lug onto the cable end, place the red heat shrink over the crimp and heat/melt the heat shrink in place.
- Install the fuse holder between the two red cables & install the fuse and secure with nuts. Place the cover onto the fuse holder.
- Install the red cable onto the alternator's positive post.
- Secure the newly installed cables with tie straps.

15 System Testing

15.1 System Testing Overview

There are 5 tests to be completed to ensure that the eAPU® system was installed correctly.

- Ignition cutout circuit
- Shore power/volt meter/battery separator
- Air conditioner
- Coolant heater
- Bunk fans

15.2 Ignition Cutout Circuit Test

- Turn the truck's ignition key switch to the OFF position
- Confirm that the inverter (located in the UBB) is turned ON. The top light on the front of the inverter will be lit if the inverter is ON.
- On the thermostat, turn the fan to the ON position.
- The evaporator fan should start running and air should be coming out of the vents.
  If the fan is not running, check the inverter to see if the GFCI light is lit. If not, assume that the outlet's GFCI is tripped. The instructions to reset the GFCI are located on the top of the UBB.
- Next, turn the truck's ignition key switch to the ON position. The evaporator fan should stop running.
  If the fan continues to operate,
  Check to see if the ignition harness is connected to the correct fuse and wire AND
  Check to see if the ignition harness is plugged into the back of the UBB
- This test is complete once you verify that the fan runs when the truck's ignition is in the OFF position and the fan stops running when the truck's ignition is in the ON position.

NOTE: If any of the following tests do not pass, please refer to the reference guide for troubleshooting tips.

15.3 Shore Power, Voltmeter, Battery Separator Test

- Plug the voltmeter into the back side of the UBB using a 6' cord. Confirm that 3-4 lights are lit on the voltmeter.
- Plug one end of an extension cord into a working shop outlet and the other end into the shore power receptacle.
- 5-6 lights should be lit on the voltmeter. This means that shore power is operating correctly
- Turn the truck's ignition to the ON position. Locate the truck's voltmeter on the dash. If it displays a voltage greater than 13 VDC, the battery separator is working correctly.
- This test is now complete and you can move on to the air conditioning test.

15.4 Air-conditioning Test

NOTE: To run this test, the temperature in the bunk must be greater than 68°F. Check the thermostat display to ensure the temperature is warmer than 68°F before you begin this test.

- Slide the System switch on the thermostat to the OFF position.
- Slide the Fan switch on the thermostat to the ON position. The evaporator fan should now be running.
- Slide the Fan switch on the thermostat to the AUTO position. The evaporator fan should stop running.
- Slide the thermostat's System switch to the COOL position and using the arrow buttons, set the temperature to 68°F. The evaporator fan should now be running.
- Inside the truck, if the air temperature being expelled by the evaporator is cooler than the bunk's air, the air conditioner is working properly.
- Go to the outside of the truck and verify that the condenser fan is also running. The condenser fan will not operate until the pressure exceeds 155 pounds. The condenser fan will continue to operate until the refrigerant pressure drops to 105 pounds.

15.5 Coolant Heater Test

- Start the truck's engine and set the idle speed to 1000 RPMs
- Place your hand onto the rear section of the coolant heater. Shut off the truck's engine once you feel that heat is present from the engine.
- Tap or shake the heater's fuel filter to ensure that there is fuel in the filter. If there is not fuel in the filter, the fuel system needs to be primed by drawing fuel through the filter with a siphon or vacuum system. The fuel filter is in the frame rail unit.
- Turn the thermostat's System switch to the HEAT position.
- If the heater continues to run for 10 minutes, it is working properly. This test is now complete.

15.6 Bunk Fans Test

- Turn the truck's ignition key to the OFF position
- Turn the Systems switch on the APU's thermostat to the HEAT position.
- Turn on the bunk's OEM fan. Try it in all speeds
- Have 1 person adjust the heat knob on the OEM controls
- Have another person view the shaft on the blend door to see if it moves when the heat knob is adjusted. This shaft is located on the HVAC unit under the bunk.