

INSTALLATION GUIDE

A. PRE CHECK INSPECTION OF YOUR TRUCKS FRAME RAIL

The PowerCube™ is designed to bolt directly to the frame rail of your truck. {Do not cut or weld the PowerCube™ chassis to the tractors frame rail.} Bolting the unit directly onto the frame rail is the only acceptable installation method that does not void the product warranty.

Primary PowerCube™ location: **Trucks passenger side.**

Secondary PowerCube™ location: **Trucks driver side.**

Select a location for your PowerCube™ with at least 28" of clear frame rail space.

1. Different model trucks require a different installation process. Before beginning the installation, measure out the space and make sure you have a clear determination of each kit component that is required for installation.
2. Determine if the included 5/8" mounting spacers are needed to clear any bolts on the truck frame or to clear items like headache racks and exhaust/muffler mounting brackets. These can interfere with attaching the PowerCube™ case /chassis.
3. Concerning fiberglass wind fairings on some models of truck, identify whether or not the fairing is at least 24" (inside space) away from the frame rail, and/or if the fairing needs to be modified or repositioned. Make sure to have a plan for adjustments to fairing bracket positions and how they will function to access the PowerCube™ for service.



B. APU Main Unit Installation to the Truck Frame Rail

1. **It is required that the unit be mounted using Grade 8 Hardware.** Refer to Appendix I for Torque Specification on mounting bolts and other APU fasteners.
2. The main unit is mounted to the truck frame using four (4) sets of Grade 8 Hardware. The installation kit includes four each of; Hex Cap Screws 5/8 -11 x 2.0", 5/8 " Hardened Flat Washer, 5/8 " Lock washer and Hex Nylon 5/8" Lock Nuts. If you determine that the provided mounting hardware is not of sufficient length make certain that all the mounting hardware you purchase is **Grade 8 hardware.**
3. After choosing a location for the PowerCube™, place the unit up to the desired location on the frame rail for a visual fit.
 - a. Lift unit into place with a forklift, transmission jack, pallet cart or similar device to make sure the PowerCube™ has appropriate clearance of 11" or more from the ground up.
 - b. Check clearance from the rear tires to avoid damage from mud flaps and road debris or potential clearance issues that can happen with long wheelbases.
 - c. Remove the APU lid to verify opening clearance.

* Modification of existing truck structures is occasionally required for installation and is the responsibility of the installer.

NOTE: The primary air inlet for the PowerCube is through the screen mesh located on the left side of the case. To allow free airflow with no obstructions, make sure that this side has enough clearance to enable the fan to draw unrestricted airflow through the main engine case.

C. POSITION THE MOUNTING TEMPLATE & MARK HOLES ONTO FRAME

The PowerCube™ mounting kits come with all standard hardware required for minimum installation requirements of the APU unit.

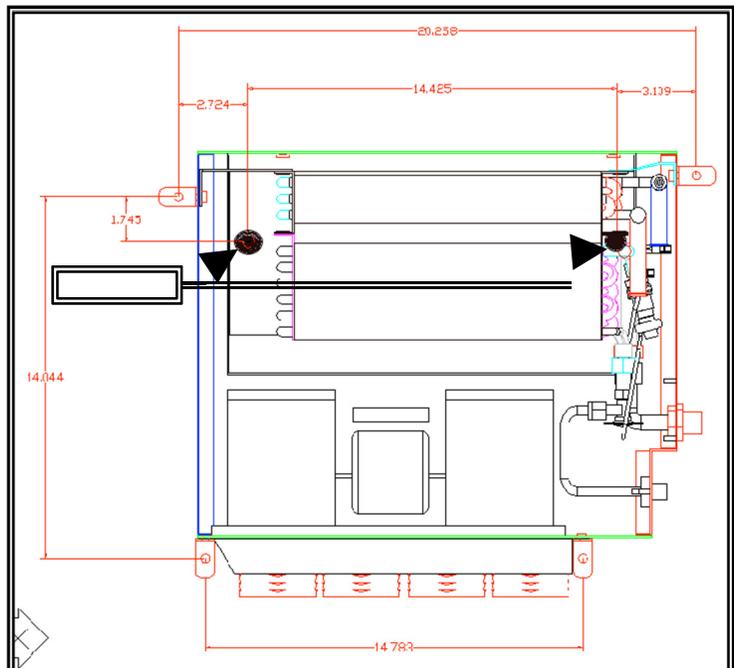
1. Inspect the truck frame rail structure and existing cross member for appropriate mounting clearances (*occasionally it is possible to use some of the existing holes*).
2. After making sure the unit is secure on the jack or lift, move the APU to the appropriate position on the frame rail, then mark the four (4) mounting holes onto the frame.
3. If the mounting side of the APU chassis does not dry fit flush to the rail because of bolts or other hardware, determine if spacers (and how many) will be required for mounting the unit, (*1.0" thick spacers can be purchased through PowerCube™ Parts*). If spacers are made, please fabricate to the proper hole pattern and dimensions. (*See illustration at right*)
4. Drill the (4) 5/8" diameter mounting holes in the truck frame using a magnetic base drill (*Take note of any hole drilling restrictions noted by the truck manufacturer*).
5. Starting with the top holes insert the 4, Grade 8 bolts, 2 per side through the holes in the chassis and backing plate to attach. **IMPORTANT:** Be sure one of these bolts includes attachment of the green ground wire for the 110 V AC generator. The large ring terminal located on the end can identify this wire.
6. Torque the 4 bolts to 115 ft-lbs (dry). **ONLY** after all nuts are torqued should you remove the lifting device.

D. EVAPORATOR UNIT INSTALLATION

The PowerCube™ Evaporator Unit should be placed in a breathable area located underneath the bunk inside the cab. After negotiating the proper location, please do the following:

1. Drill 2- (.750-1") holes for the drain tubes. *See dimensions for the mounting holes and the drain tube locations relative to the following orientation according to the following diagram. (**Note: the drain tube holes are highlighted in black in the following diagram.*) Use (4) 1/4" x 1.5", grade 8 fastener to install the unit to the ground (cab floor).

Evaporator Unit Diagram

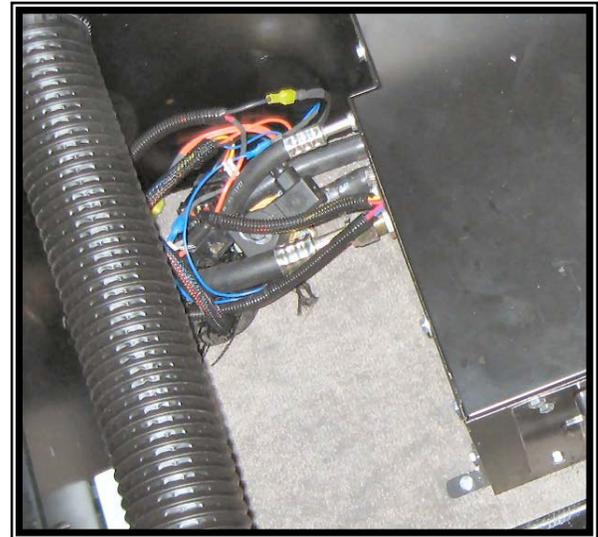


2. Routing of hoses and air ducts is important. (right) It is recommended that the HVAC unit be turned so the 4 circular air vents are facing the rear of the cab. This is proper positioning allowing for easy access to filters. The ducting is routed toward the back and into the OEM heating/AC ducts as well as directed forward toward the driver compartment. (The front louvers and filter / brackets are kit options.) Applicators may find other suitable locations. Just keep in mind that the filter has to be serviced.



3. Various style and sized of vent louvers and mounting components are available through PowerCube™ Parts.

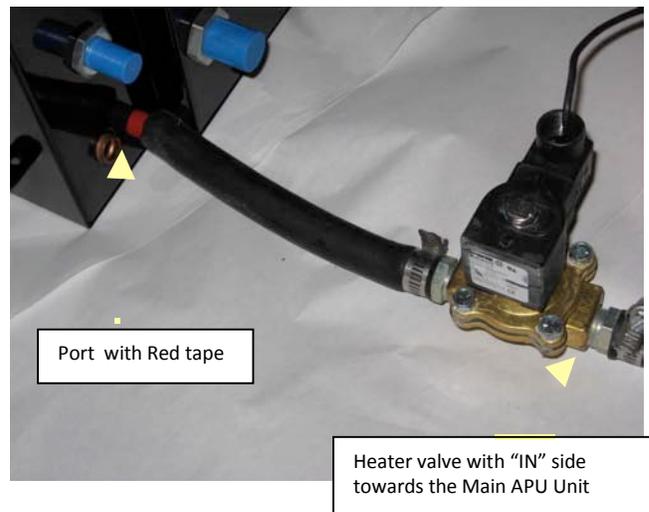
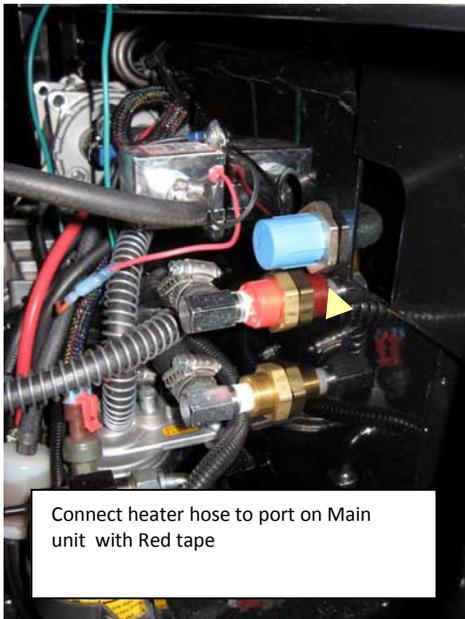
4. Notice the orientation of wiring harness and hoses as they come into the box. AC hoses come with one pre-crimped end and an end without a fitting. Determine the proper hose routing from the main unit to the bunk. Measure the hose in place, cut and crimp the other end with an AC hose crimp system.



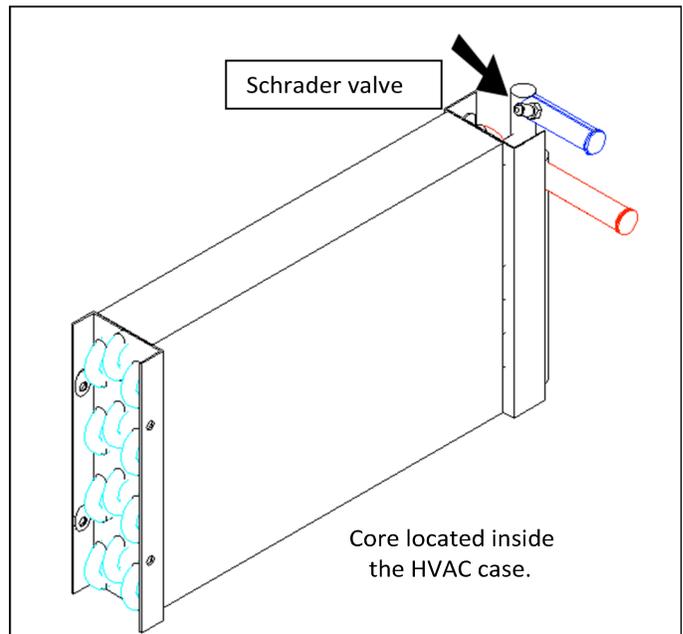
5. **Note:** Both ends of the hoses are taped-off to keep impurities from entering into the AC system. Keep all hoses sealed off during installation and pre-measurement.

6. Next begin routing the electrical and heater line hoses in to the HVAC system. It is recommended that the heater control solenoid valve be mounted in this same area as the HVAC unit.

a. **NOTE:** Connect heater hose with heater valve from bunk unit to main unit using the red-taped ports. The valve "in port" is pointed toward the main APU unit and the "out port" side pointed to the heater evaporator unit. (See 2 photos)

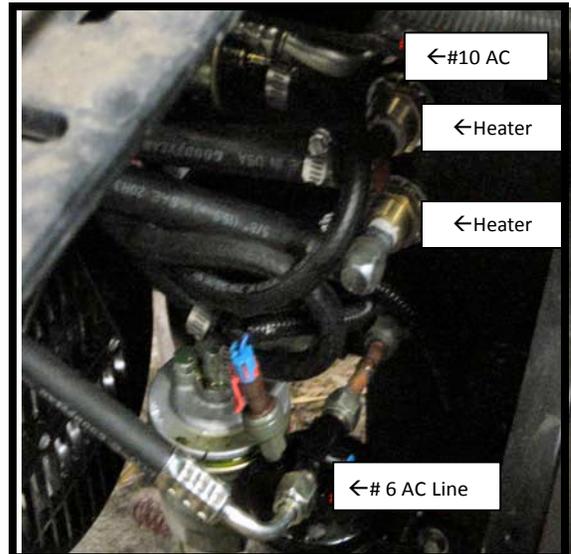


7. **IMPORTANT:** It is critical to operation of the heating system on the APU that all air is removed from the coolant system. The recommended procedure is to use a vacuum system for charging coolant systems. There is the additional option to remove air through the Schrader valve. Remove the rubber cap on top of the evaporator housing. Since the HVAC unit is highest point of the system, the air within the system will accumulate there. To remove that air, start the APU engine. While the engine is running, depress the Schrader valve on the heater core to bleed the air out of the system. When air escape is complete, release valve immediately to avoid coolant spray. (*Valve location shown by black arrow at right.*)



E. HOSE ROUTING AND ASSEMBLY

1. Hoses are attached to back side of the main APU chassis as shown at right. Access the line hookup area by removing the back cover panel.
2. **NOTE: When determining hose attachment; Take care to keep all hoses and fittings capped and closed. Moisture and dirt in the system will cause a failure in the system.**
3. The AC and heater hoses are routed through the hole on the rear of the APU and along the truck frame into the hole you drilled in the bottom of the sleeper cab closest to the HVAC unit. To avoid the sleeper cab crushing or pinching the bundle, DO NOT MOUNT WIRE HARNESS OR HOSES ON TOP OF SLEEPER MAIN BEAM SUPPORTS. To accommodate routing the hoses and wiring bundle into the sleeper cab, the obround opening in the floor can be made with a hole saw and should be approximately 4" x 5" obround.



4. In your PowerCube™ installation kit there is trim strip (*similar to the back hose exit on the APU*) to line the edges of the sleeper cab floor hole. This helps keep from damaging any rubbing hoses or wires. Again, it is important to route hoses and wires on the sides of frame rails. Failure to do this will subject these components to being crushed by the trucks air ride stroke, which can sever your harness and hoses.

F. FUEL LINE INSTALLATION

1. The PowerCube™ fuel system is designed to function independently from the vehicles main engine. The APU has 2 fuel lines: 1 is a feed (large) line and the other is a smaller return line. Please route accordingly.
2. Caution must be used when routing the fuel lines from the main tank to the APU. Keep the fuel line as short as possible while maintaining adequate clearance from the exhaust

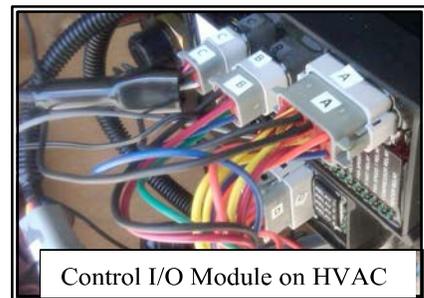
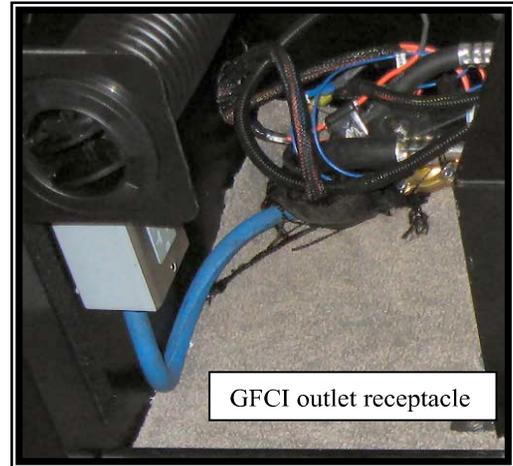


system and moving components. Fuel lines must be run along the frame side rails or under carriage.
IMPORTANT: Never run fuel lines inside the cab.

3. Route the PowerCube™ fuel lines by installing the stand-pipe included in the installation kit. Installation instructions are in the package with the stand-pipe.
 - i. **Be careful when drilling into any fuel tank. Sparks from an electric drill or a drill bit can ignite fuel and cause an explosion.**
 - ii. **VERY IMPORTANT!!** Check fuel tank for baffles and gauge arms before drilling into fuel tank. A fuel standpipe could interfere with the floats and not allow customer's fuel gauge to work properly.

G. ELECTRICAL WIRE HARNESS

1. The PowerCube™ wire harness is “plug and play”. Every male end is matched with a corresponding female fastener.
2. A/C electrical outlets from the PowerCube™ generator are routed into the supplied GFCI outlet receptacle, which can be mounted anywhere on the truck according to one or more location(s) selected by the truck owner/operator. Optimal placement for one 110VAC outlet should be located near the trucks engine block heater wire plug-in.
3. **NOTE: To avoid the possibility of Electrical shock: Make sure the 110VAC wiring is connected and seated inside the duplex plug-in receptacle box prior to starting the APU. Always follow local / public electric code where applicable.**
4. Connecting electrical to the control I/O module on the HVAC unit, relay and evaporator is done by matching the letters on the harnesses, A-A, B-B etc. SAFETY NOTE: Do NOT connect the Cube Control to the I/O module until ready to start the unit.
5. If the GFIC outlet does not work at any time while the APU motor is running, make sure to first press the reset button on the duplex receptacle box.
6. The PowerCube™ Control panel location should be mounted close to the operator within reach during any time of truck operation or bunk rest. It can be mounted using the 2 keyholes or Velcro.
7. The control harness has a generous length, so location anywhere in the cab or bunk is possible. Again, all DC harnesses have a specific connectors that each match to. No additional wiring is needed.
8. **NOTE: Apply dielectric grease to all electrical connections external to the truck cab on install and when Servicing as needed. Inform the Operator of this Service requirement.**
9. Two battery cable cords are also provided with the PowerCube™. Routing these with the existing bundle through the cab compartment is suggested. The cables are designed to attach directly to the main tractor batteries with 250 amp fuse.



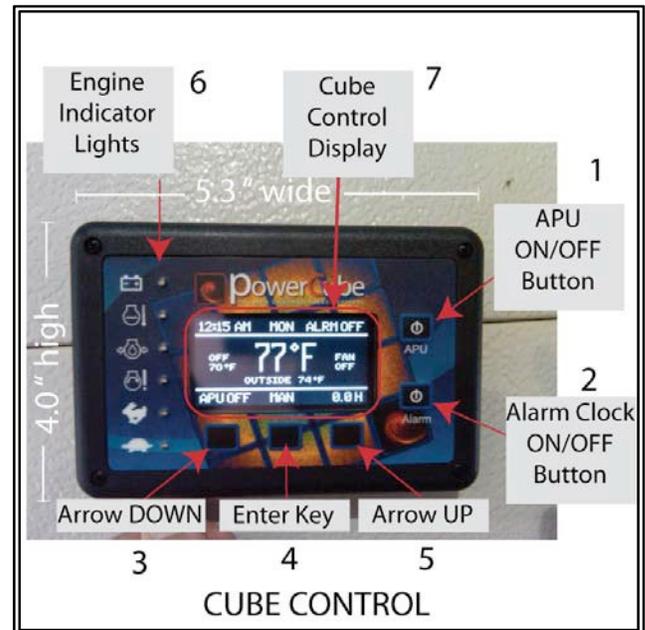
H. FIRST TIME START-UP OF APU. **WARNING: Be careful of moving parts!**

1. Fill the radiator with 50/50 glycol and half-fill the radiator recovery bottle before the first start. Maintain a half-fill of glycol in the radiator recovery bottle at all times. Use of a radiator fill station is preferred as this pulls a vacuum on the heater system and fills it completely.

2. Check engine oil. Make sure that the oil level is correct in your PowerCube™. If the motor does not have the proper amount be sure to fill with **SAE 10W-30 or SAE 10W-40 motor oil**.
3. Charge the HVAC using an approved charge/recovery station to fill your system with R-134A refrigerant. First charge the system with **1oz of L100 PAG oil (for compressor lubrication)** and then charge the HVAC system with R-134A refrigerant. Use **1.43 – 1.54 kg / 3.25 -3.5 lbs of R-134A refrigerant*** (For additional information see Appendix III or visit our HVAC service guide on the web**)

*** IMPORTANT NOTE:** For PowerCube™ APU systems with standard hose length do not exceed 3.5 LBS of R-134A refrigerant. If an alternate mount positioning requires added hose length, more R-134A will be needed to charge the system.

4. After installation and before starting the system, check the motor to see that all moving parts are free of any loose obstructions (i.e.: tools) that could become projectiles.
5. Make sure all electrical connections are secured and fuel lines are connected and free of kinks and pinches.
6. It is a good practice to prime the fuel system; using a 12v power source directly on the fuel pump can do this. By disconnecting the bullet terminal, and adding power we can pump the fuel until there is an audible change in the fuel pump sound.
7. The controls for the system are as follows.
 - a. Item 1 is the **Start** button for the APU
 - b. Item 2 is the Alarm clock on/off
 - c. Item 3 is the Arrow down key
 - d. Item 4 is the Enter key
 - e. Item 5 is the Arrow up key
 - f. Item 6 are indicator lights for the APU
 - g. Item 7 is the is the Cube Control display area.



8. The motor will NOT start immediately at the push of the button. The system utilizes an automatic glowplug starting procedure which takes 15-30 seconds to execute each time. Relays will audibly kick in and the starter will begin. **Stay clear of the main unit when the start mode is activated.**
9. Be sure the PowerCube™ lid is closed, and that guards and shields in the main engine case are in place before operating the engine.
10. Keep children or animals away from the APU while in operation.
11. DO NOT start the engine by shorting across starter terminals.
12. Refer to the **Cube Control User's guide** to activate the heat, AC and fan controls of the APU as well as the Low Battery and Low Temperature control functions.
13. After the engine has started for the first time, check the PowerCube™ for coolant, fuel, oil, and exhaust leaks. Wait 15 minutes and check them again.
14. Check Generator 120VAC output by plugging in a minimum of 1500 Watt Resistive load to the GFCI plug. Run the unit under this load for 15-20 minutes to make sure the generator field Magnetism is built up. Check the alternator for generation, 13.5 – 14.2 volt range.

Note: It is good practice to run the unit at least monthly under a resistive load to prevent the loss of the generator field magnetism.

I. FINISHED THE INSTALL? NOW CHECK THESE:

- ✓ Main unit is securely mounted to the truck frame rail.
- ✓ All fasteners are torqued to specification.
- ✓ Cables / Fuel lines are properly secured and away from fuel lines & moving components.
- ✓ Battery cables are properly secured.
- ✓ Power cable is properly secured.
- ✓ Fuel lines are double clamped and all clamps are tight.
- ✓ All AC power connections are complete and tight.
- ✓ Driver control panel installation is complete.
- ✓ Power outlet box(s) installation is complete.
- ✓ Heating and Air conditioner installation is complete.