

# Installation Manual

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## **Aspen 200INT, AspenSTA, AspenPWR, AspenSKY** Auxiliary Power Unit (APU)





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# 1 Safety

## 1.1 Warnings, Cautions and Notice Statements

Read these instructions carefully before operating the system. Safety alerts labeled DANGER, WARNING, and CAUTION alert to special instructions or precautions concerning procedures that would be hazardous if performed incorrectly or carelessly.

The safety alerts alone cannot eliminate all hazards. Strict compliance with these special instructions and common sense are major accident prevention measures.



**Immediate hazards that will result in severe injury or death.**



**Hazards or unsafe practices that could result in severe personal injury or death.**



**Hazards of unsafe practices that could result in minor injury or product or property damage.**



**Information that is important to proper installation or maintenance but is not hazard related.**

## 1.2 Safety Considerations

**Installation, service, and repairs on all systems must be performed by properly trained and qualified personnel. Some areas may require certification for servicing some equipment. Always follow the rules of the authority having jurisdiction and normal shop practice.**

**Use caution when working around machinery. An APU may start without notice. Always ensure equipment is locked out or disabled to prevent unexpected operation.**

**Unit may start automatically at any time even if the Aspen Interface (AI) is in the APU OFF status. Before performing any work, ensure the AI is in the APU OFF status, both battery cables disconnected, and any external shore power removed. Proper Lockout/Tagout procedures MUST be followed. All unit inspection/servicing by properly trained personnel only.**



**Do not lift the APU by the lower skid plate. Damage to the APU will result and the APU may fall off the lifting device.**

**DO NOT work under APU or lifting device when APU is not secured to frame**

**DO NOT use the lifting eye on the air cleaner bracket (3) for lifting the APU. The air cleaner lifting eye is for engine lifting only.**

**DO NOT stand under APU when suspended from lifting device**

**Diesel Fuel. Refer to Table 1**  
**Exercise safety precautions when working near flammable fuel.**

**The seal or foam gasket must be replaced each time the heater is removed and re-installed**

**Under no circumstances may the combustion air be taken from areas occupied by people. The combustion air intake opening must not point in the direction of travel. It must be located so that it cannot become clogged with dirt.**

**Low Voltage. Refer to Table 1**

**Do not attach battery connections until installation is complete and unit is ready for commissioning**

**Do not cut, drill, or modify any structural member of the truck cab or chassis**

**HOT PARTS. Refer to Table 1**

**MOVING PARTS. Refer to Table 1**

**HIGH Voltage. Refer to Table 1**

**When tightening the TB1 screws the appropriate slotted bit size (3.5x0.6mm) and torque screwdriver must be used. Incorrect bit size may damage the connector/screws and prevent proper torquing.**

**Climate Control Module, power outlet, and block heater must be installed by qualified personnel**

**Always perform these steps before connecting the APU to the battery**

**Once Automatic functions are set the system could start at any time. Before servicing the unit be sure to disconnect the unit from the batteries to prevent injury should the unit attempt to start while servicing. All presets will remain once battery cable is reconnected.**

**Do not start or run the APU prior to purging the entire cooling system of air. Failure to do so will result in APU engine failure**

**Do not operate the engine without the enclosure cover in place. Failure to do so may result in injury**

**Ensure holes in cab floor are properly sealed and cables, harnesses, and hoses protected from abrasion, heat sources, and pinch points. Maintain minimum 0.5" (13mm) between edge of hole and cables, harnesses, and hoses.**

**DO NOT apply foam or sealant to opening for air heater**



**Vehicles with longer wheelbases should have the APU mounted closer to the sleeper unit to avoid obstacles such as railway crossings, speed bumps, curbs, etc.**

**Before beginning installation of the Aspen APU system, disconnect the vehicle's batteries.**

**INTEGRATED APU ONLY-If truck is equipped with a coolant valve, valve must be fully opened before starting the APU.**

**Do not bottom mount APU. APU must be connected to side of truck frame.**

**When the APU is in transit or storage the shipping supports must be installed and secured to the pallet. Damage to the covers and/or frame may result if not installed.**

**Engine and exhaust system components may be hot**

**The fused end of the interlock harness must be connected to the ignition switched power source. DO NOT connect the fused end to the APU harness as this will not provide appropriate short circuit protection to the interlock harness.**

**Covers must be secure, and knob installed while vehicle is moving**

**Do not open cooling system when hot**

**When heater is in use, the surface of the hot air inlet may become hot to the touch.  
Contact with skin may cause burns**

**DO NOT use heater to heat hazardous substances**

**When using the optional mounting plate and closed cell foam gasket, do not over tighten the mounting bolts. Doing so will cause the mounting plate to warp and result in stress damage to the heater and fan motor.**

**The heater must not be integrated into the vehicle or CCU air system.**

**Route fuel lines away from sharp edges, pinch points, and moving parts.**

**Fuel lines must be protected from abrasion**

**Keep fuel lines away from exhaust pipes or other heat sources**

**The CCU is heavy (78 lbs. kg). Do not drop.  
Use lifting device or team lift when lifting the CCU.**

**Metal jacket edge is sharp. Wear appropriate hand protection.**

**Route cord away from excessive heat and possible chafing or mechanical damage.  
To prevent electric shock, ensure good metal to metal electrical contact of crimped end to vehicle chassis.**



# NOTICE

**Read before starting installation. Each truck is unique and will require a different approach. Plan the placement of ALL components before beginning the installation.**

**The APU requires periodic maintenance. Ensure there is access to internal components (i.e., oil filter, air filter, fuel filter and the oil filler).**

**The APU does NOT come filled with coolant.**

**Consult the truck owner prior to altering the vehicle in any way.**

**Consult truck OEM for frame drilling requirements**

**DO NOT use the mounting bolts to pull the APU frame to the tractor frame, damage to APU may result**

**DO NOT cut, drill, or modify APU frame or hardware**

**Improper torquing of the mounting bolts may result in APU frame damage**

**The large diameter of the compression limiter must be installed so that it faces the frame insert. If installed incorrectly damage to the cover and frame insert may result. Do not install cover bolts without the compression limiter installed, damage to the grommets and cover may result.**

**Condenser assembly weights 26 lbs. (11.8 kg)**

**Keep condenser and filter drier capped until refrigerant lines are installed**

**Perform the following steps AFTER completing the rest of the APU installation**

**Fuel pickup must enter from top of tank**

**After installation, check that the heater casing is not in contact with any parts of the vehicle body. Failure to do this may result in the hot air fan binding internally**

**Do not allow debris to enter tank while drilling.**

**Debris in the tank may interfere with the operation of the APU and tractor engine.**

**An intake silencer must be fitted if the intake hose length is shorter than 0.6 m.**

**The combustion air must be extracted using a combustion air line from a position that is as cool as possible and protected from splashing water. Do not use an exhaust line as the combustion air line, as it may result in damage to the fuel pump harness.**

**The combustion air opening must not be under the minimum water drive-through level for the vehicle. See the statutory regulations for the installation for further regulations.**

**The CCU may temporarily be positioned with the CCU air filter facing up to allow it fit in the truck cab. The CCU must be mounted flat on the cab floor using the supplied brackets**

**Avoid connecting the ductwork to the OEM system. If the system is connected to the OEM system, it is the responsibility of the installer to ensure correct airflow throughout the system and limit back flow**

through either the Aspen or the OEM system. Make sure supply air is not directed at the CAT sensor.

**Return air to CCU is essential.**

**DO NOT remove caps until ready to make connections**

**DO NOT over tighten connections**

**DO NOT twist or stress tubes when tightening hoses.**

**DO NOT bend tubes to adjust alignment/fit**

**Use backing wrench**

**P-clamps must capture the hose to eliminate any pre-loading of the hose assembly on the fitting connection points.**

**If the condenser and the CCU are not mounted to the same part of the truck (i.e. bunk and frame), ensure there is enough slack in the condenser fan harness.**

**DO NOT force the AI into the panel opening as damage may occur. If the AI does not easily snap into place the opening is too small. Remove the AI and trim the panel to fit**

**DO NOT trim the AI to fit the panel opening**

**While in Shore Power mode, the battery charger supplies DC power for the condenser fan. Drawing in excess of 10A DC (including the fan) may eventually lead to depleted batteries.**

**For existing installations, if the generator cable is not long enough to reach the SPM then it must be disconnected from the APU and removed. Replace from the supplied 20-foot length. Do not discard the original cable as it must be re-used in the next step.**

**Ensure all electrical connections are correct and secure.**

**If refrigerant connections at the CCU require adjustment/disassembly after foam/sealant has been applied, the foam/sealant must be removed and reapplied. Failure to remove and reseal may result in refrigerant leaks.**






**Use 12 AWG shore power extension cord for distances of 0 to 50 feet and 10 AWG from 50 to 100 feet.**

Hazard	Cautions	Preventative Actions
<b>Diesel Fuel</b>	<ul style="list-style-type: none"> <li>• Combustible liquid.</li> <li>• May cause cancer.</li> <li>• Irritating to eyes and skin.</li> </ul>	<ul style="list-style-type: none"> <li>• Use personal protective equipment.</li> <li>• Ensure adequate ventilation.</li> <li>• Material can create slippery conditions.</li> <li>• Avoid contact with skin, eyes, and clothing.</li> <li>• Do not ingest.</li> <li>• Keep away from heat and sources of ignition.</li> </ul>
<b>Coolant</b>	<ul style="list-style-type: none"> <li>• Contact can cause slight irritation of skin, eyes, and respiratory tract. Extremely dangerous in case of ingestion.</li> <li>• Do NOT induce vomiting, call doctor/physician or poison center</li> <li>• Do not breathe mist, spray, vapors</li> </ul>	<ul style="list-style-type: none"> <li>• Coolant may be very hot and under pressure, allow the engine to cool before opening the cooling system.</li> <li>• Avoid contamination with reactive substances. After handling, always wash hands thoroughly with soap and water.</li> </ul>
<b>Hot Parts</b>	Avoid contact with the engine or exhaust components.	Allow the engine to cool before working on it. The engine cooling system may be connected to some components. See coolant warnings.
<b>Moving Parts</b>	Avoid working inside the APU enclosure when the engine is running. The APU may start at any time. Fans in the CCU and on the condenser may start without warning.	Before performing any work, turn OFF the Aspen Interface, disconnect the battery cables, lockout both battery ends, and remove shore power if equipped. Proper lockout/tagout procedures must be followed.
<b>High Voltage</b>	System contains high voltage circuits at levels that can cause serious injuries or death	
<b>Low Voltage</b>	<ul style="list-style-type: none"> <li>• Low voltage battery connections have sufficient current capabilities to weld tools if they cross the battery terminals. This may result in sever sparks, heat, and possible explosions.</li> <li>• The hydrogen gas produced when charging is very explosive Avoid heat, sparks, and open flame while charging batteries. Avoid contact with internal acid May form explosive air/gas mixture during charging. Contact with internal components may cause irritation or severe burns Irritating to eyes, respiratory system, and skin.</li> <li>• Prolonged inhalation or ingestion may result in serious damage to health.</li> </ul>	<ul style="list-style-type: none"> <li>• Always disconnect the battery prior to working on the APU.</li> <li>• EYES: Direct contact of internal electrolyte liquid with eyes may cause severe burns or blindness.</li> <li>• SKIN: Direct contact of internal electrolyte liquid with the skin may cause skin irritation or damaging burns.</li> <li>• INGESTION: Swallowing this product may cause severe burns to the esophagus and digestive tract and harmful or fatal lead poisoning. Lead ingestion may cause nausea, vomiting, weight loss, abdominal spasms, fatigue, and pain in the arms, legs, and joints.</li> <li>• INHALATION: Respiratory tract irritation and possible long- term effects.</li> </ul>
<b>Heavy Objects</b>	Components may be of sufficient weight to cause personal injuries or death if they fall or are dropped.	Always wear proper personal protective equipment to prevent injuries from falling objects. Always use proper equipment when moving heavy objects and ensure that they are stable. Get assistance if required.
<b>R-134a Refrigerant</b>	<ul style="list-style-type: none"> <li>• Contact with liquid or refrigerated gas can cause cold burns and frostbite.</li> <li>• May cause skin irritation.</li> <li>• May cause: Discomfort, itching, redness, or swelling.</li> <li>• May cause eye irritation.</li> </ul>	<ul style="list-style-type: none"> <li>• Use personal protective equipment including safety glasses and protective gloves.</li> <li>• Ensure adequate ventilation.</li> <li>• Avoid contact with skin, eyes, and clothing.</li> <li>• Do NOT allow the release of R-134a to the atmosphere</li> <li>• Misuse or intentional inhalation abuse may cause death without warning symptoms.</li> <li>• Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.</li> <li>• Eye contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.</li> </ul>

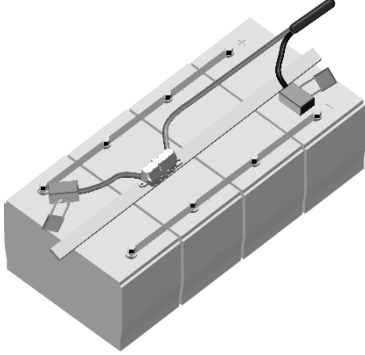



**Table 1 Hazards and Preventative Actions**

## Lockout-Tagout Equipment

The following equipment is required to perform lockout-tagout (LOTO) on the Aspen APU

Battery Cable Lockout		<ul style="list-style-type: none"> <li>• Battery cable lockout is used on the APU battery cables and disables the 12 VDC power source for the APU.</li> <li>• In some applications there may be potential ground path through the APU and truck frames so BOTH the B+ and B- cables must be disconnected and locked out.</li> <li>• Use battery cable lockout that has interior post that keeps the cable lug in place.</li> <li>• Use separate lockouts for the B+ and B- cables</li> </ul>
Starter Lockout		<ul style="list-style-type: none"> <li>• Starter lockout is used on the starter solenoid disconnect.</li> <li>• Use to prevent engine from starting during inspections or troubleshooting</li> <li>• Use lockout that has appropriately sized opening to keep starter solenoid disconnect in place.</li> </ul>
Lockout Hasp		<ul style="list-style-type: none"> <li>• Hasp is used to lockout the shore power receptacle.</li> <li>• Use hasp that does not rotate on receptacle cover when installed</li> </ul>
Lockout Lock		<ul style="list-style-type: none"> <li>• Secures lockouts and hasps</li> </ul>
Plug Lockout		<ul style="list-style-type: none"> <li>• Secure vehicle keys</li> </ul>

## Lockout/Tagout locations for Aspen APU

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Battery Cables</p>		<ul style="list-style-type: none"> <li>• Disconnect the APU B+ and B- battery cables from the truck batteries.</li> <li>• Apply battery cable lockout to each of the battery cable ends</li> <li>• Refer to truck OEM and local regulations for additional battery cable lockout requirements</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Shore Power</p>		<ul style="list-style-type: none"> <li>• Lift shore power receptacle cover and apply hasp at the hinge point.</li> <li>• Lock hasp with lockout lock</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Starter Solenoid Disconnect</p>		<ul style="list-style-type: none"> <li>• The starter solenoid disconnect (SSD) is located at the front of the engine near the front engine mount and below the fuel pump</li> <li>• Depress the locking tab to separate the connector</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Starter Solenoid Disconnect</p>		<ul style="list-style-type: none"> <li>• Insert the larger end of the SSD into opening at the end of the lockout</li> <li>• Close lockout and apply lockout lock</li> </ul>

## 2. Components

The Aspen is a fully featured diesel-powered Auxiliary Power Unit (APU) that provides air conditioning, heating, cab power, truck engine warming, battery charging, and the ability to connect to shore power. The Aspen consists of four main components: power unit, condenser, Climate Control Unit (CCU), and Aspen Interface (AI). Attached to the frame of truck is the power unit. It consists of a two-cylinder diesel engine, 70A 12 VDC alternator, and a belt-driven 120VAC (watts) generator. The condenser is attached to the rear of the truck cab, it works in combination with the CCU to provide cab air conditioning. The CCU is mounted under the bunk inside the cab of the truck. The CCU is responsible for providing cooling, heating, and 120 VAC power inside the cab. All the components of the Aspen APU are controlled by the Aspen Interface (AI). The AI allows the driver to start/stop the APU, as well as control cooling and heating function.

### NOTICE

**Read before starting installation. Each truck is unique and will require a different approach.**

**Plan the placement of ALL components before beginning the installation.**

**The APU requires periodic maintenance. Ensure there is access to internal components (i.e., air filter, air filter, fuel filter and the oil filler).**

**Consult the truck owner prior to altering the vehicle in any way.**

### CAUTION

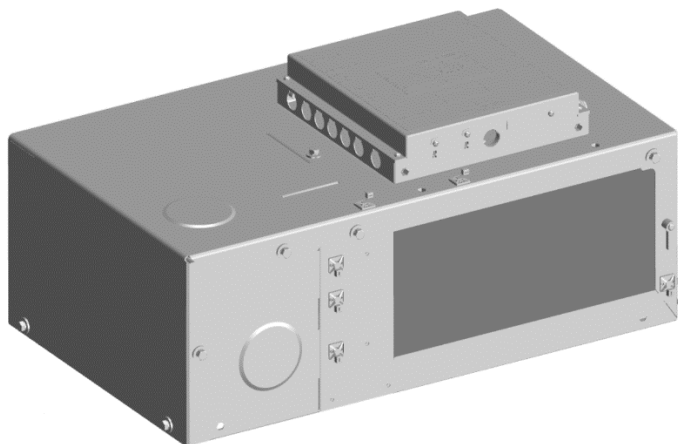
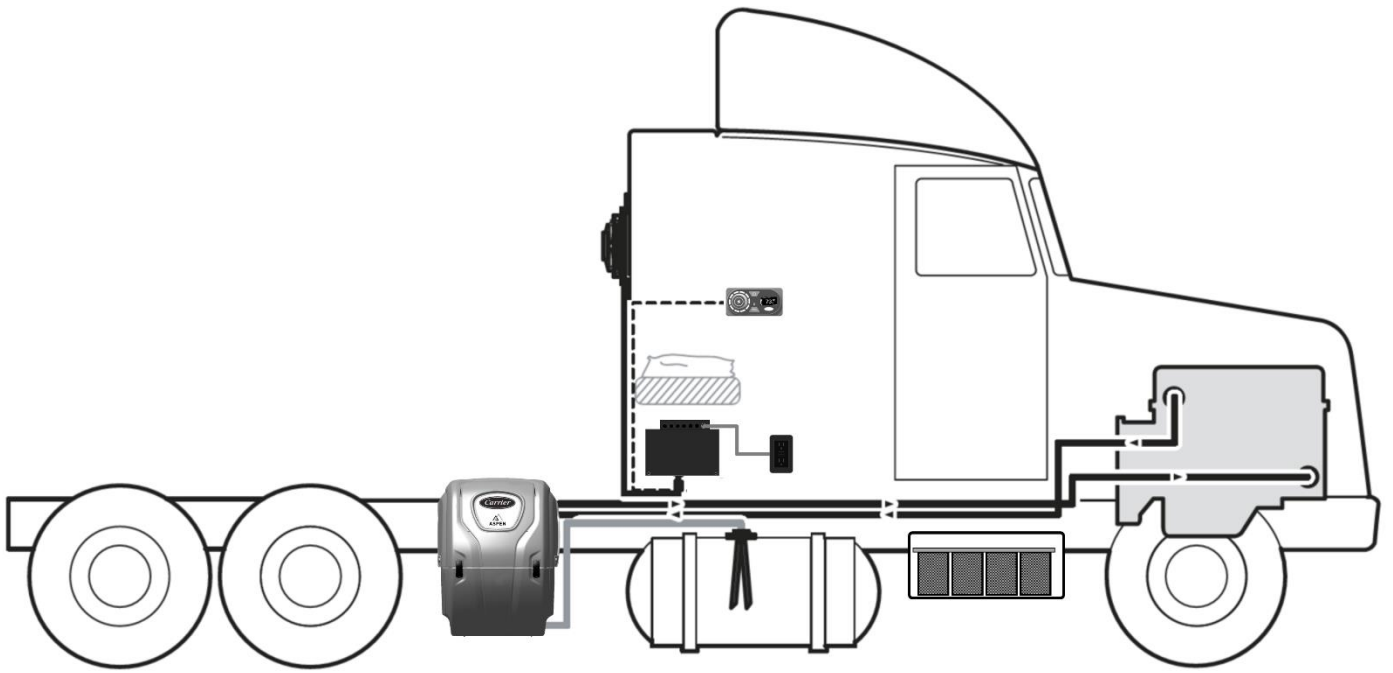
**Vehicles with longer wheelbases should have the APU mounted closer to the sleeper unit to avoid obstacles such as railway crossings, speed bumps, curbs, etc.**

**Before beginning installation of the Aspen APU system, disconnect the vehicle's batteries.**

**INTEGRATED APU ONLY-If truck is equipped with a coolant valve, valve must be fully opened before starting the APU.**

### Aspen Models

- **Aspen-INT** – Provides air conditioning and heating to the truck cab. The 120 VAC outlet is available to power most 120 VAC appliances and electronics. Cooling system is integrated into the truck cooling system, allowing the APU to warm the truck engine.
- **Aspen-STA** – Features the same heating and cooling features as integrated models. The AspenSTA cooling system is independent of the truck cooling system. When truck engine warming is required, an optional electric block heater is available.
- **Aspen-PWR** - Provides two 120VAC 15A circuits for powering hotel loads when climate control is not required.
- **Aspen-SKY**- Includes all the same features of the AspenINT plus the ClearSky emissions control system.



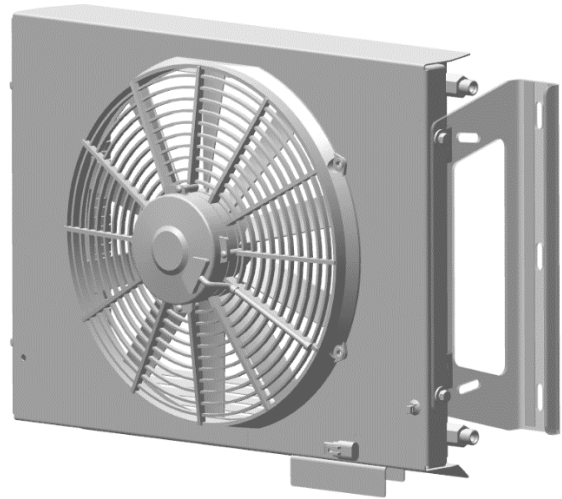
**Climate Control Unit (CCU)  
and  
Climate Control Module (CCM)**



**Auxiliary Power Unit (APU)**



Aspen Interface (AI)



Condenser (APU)



Power Outlet



Coolant Surge Tank (Stand-alone)

Component	Weight (lbs)	Weight (kg)
Power Unit Integrated	400	181
Power Unit Stand-Alone	425	193
Condenser Assembly	25	11
CCU Assembly	80	36
Add for Aspen SKY	32	15



## Required Tools

Part Number	Description
07-00176-11	Pump, Vacuum
07-00294-00	Gauges, Refrigerant R-134a
07-00295-00	Detector, Leak
07-00315-00	Charging/Recovery Meter (Scale)
07-00414-00	Gauge, Micron
07-00447-00	Rivnut installation tool
07-00487-00	Heat Gun
TK9002	Flow Meter, Coolant

## Additional Required Tools

Tool Description	
Cable jacket stripper	Lifting sling, 3 point
Center punch	Marker, Permanent
Conduit cutter or metal snips	Pliers, (diagonal, flush cut, needle nose)
Crimper, Battery Lug	Regulator and hose (Nitrogen)
Crimper, Buchanan/Ideal C-24, P-24, or equivalent	Saw, Reciprocating
Crimper, DIN 46228 hex profile AWG 12/14 (outlet/block heater)	Screwdriver bits (#2 Phillips, 1/4 slotted, 3.5x0.6mm slotted)
Crimper, DIN 46228 square profile AWG 10/12 (generator cable)	Screwdriver, torque
Crimper, Non-insulated	Sockets ( 10mm, 13mm, 3/8, 5/16, 7/16, 1/2, 1-1/8)
Deburring tool	Tank, Nitrogen
Drill	Tape measure
Drill bits (3/16, 1/4, 7/16, 17/32)	Transmission jack, forklift, or other suitable lifting device
Eye, Lifting	Vacuum
Hammer	Wire stripper (10-18 AWG)
Hole Saw (1.0, 2.0, 2.25, 3.0)	Wrench, Allen 2.5mm
Hose cutter	Wrench, Torque 100 ft-lb
Knife, Utility	Wrench (10mm, 13mm, 3/4, 7/8, 1.0, 1-1/8)

## Additional Required Parts List

Part Number	Description
02-00137-00M25	Tape, Harness Black
07-00345-00	Sealant, Pipe
22-00252-02	Clamps, Hose (3/4")
22-03154-00	Varnish, Red Insulating
R134A-030	Refrigerant, R-134a
Acquire Locally	Connectors, Electrical
	Coolant
	Coolant hose, 3/4"
	Fittings, Coolant
	Foam, Expanding or sealant
	Hardware
	Shut-off valve(s), coolant

## Installation Kit Parts

The following tables are representative of the parts that are included in the installation kits. Parts and quantities included will vary by model and are subject to change. The parts contained within each kit are packaged so that the parts required for each section contained within the same bag/box.

	NAME	PART QUALIFIER	QTY
3. APU MOUNTING	<b>POWER UNIT</b>	<b>ASPEN, APU</b>	<b>1</b>
	<b>PACKAGING KIT</b>	<b>APU MOUNTING</b>	<b>1</b>
	SCREW,CAP HEXHD	3/4-10 X 6.50	4
	NUT,SELF LOCK	3/4-10	4
	WASHER,FLAT	M18	8
	CLAMP,MOUNTING	FRAME GRIPPER	4
	WASHER,PLATE	0.25 THK	2
	<b>PACKAGING KIT</b>	<b>EXHAUST</b>	
	PIPE,EXHAUST	TAIL PIPE	1
	CLAMP,MUFFLER	1.50 OD PIPE	2
	WASHER,PLAIN	5/16 SAE .065 THK	2
	NUT,SELF LOCK	5/16-18	2
	SCREW,CAPT WHSR	M6 X 30MM	4
	BRACKET	FRAME	1
BRACKET, MUFFLER SUPPORT	APU EXHAUST	1	
HARNESS	FUSE INTERLOCK	1	
WIRE HARNESS	APU	1	
4. CONDENSER MOUNTING	<b>CONDENSER ASSY</b>		<b>1</b>
	<b>PACKAGING KIT</b>	<b>CONDENSER</b>	
	CLAMP,TUBE	.56 DIA CUSHION	7
	CLAMP,TUBE	.69 DIA CUSHION	7
	WASHER,PLAIN	5/16 MEDIUM .062THK	6
	WASHER,LOCK	5/16 SPRING	6
	SCREW,CAP HXHD	5/16-18 X 1.00	6
	SCREW,CAPT WHSR	M6 X 20MM	2
	SCREW,SHEET METAL	1/4 X 1.00 LG , TYPE AB	7
	RIVNUT	5/16-18, LARGE HEAD	6
	RIVET, PUSH-IN	APU .188" DIA , 0.062"-0.75" GRIP	1
	CLIP,HARN RTNR	TICK1-3MM DIAM 45	1
	BRACKET,CONDENSER	APU	1
	WIRE HARNESS	APU CONDENSER	1
5. COOLING SYSTEM	TANK ASSY	RAD EXPANSION	1
	<b>INSTL KIT</b>	<b>COOLANT TANK</b>	<b>1</b>
	WASHER,PLAIN	5/16 MEDIUM .062THK	4
	WASHER,LOCK	5/16 SPRING	4
	SCREW,CAP HXHD	5/16-18 X 1.00	4
	RIVNUT	5/16-18, LARGE HEAD	4
	CLAMP,HOSE	.69-1.25 WORM TYPE	2

	NAME	PART QUALIFIER	QTY
6. AIR HEATER	PACKAGING KIT	AUXILLARY HEATER OPTION KIT	1
	HEATER ASSY	SD AT2000STC D 12V	1
	HARNESS ASSY	EXT 2M DP 42 AT EVO	1
	TUBE,FLEXIBLE	22MM X 1M W CAP	1
	TUBE,FLEXIBLE	PAK 60MM X 1M	2
	TUBE,FLEXIBLE	AA 22MM X 0.5M	1
	PIPE	4.76X828MM 0.25 IN	1
	MANUAL INSTALL AIR TOP 2000 STC		1
	MOUNTING PLATE	BOX AT 2000 ST STC	1
	MOUNTING PLATE	MOUNTING PLATE AIRTOP SERIES	1
	GASKET	GASKET MOUNTING PLATE AIRTOP SERIES	1
	SEAL	SEALING	1
	BAG-HARDWARE	BAG-HARDWARE	1
	PUMP ASSY,FUEL	DP42 AT2000STC	2
	BAG	BAG DOSING PUMP DP42 WITH DAMPER	1
	PUMP FIXATION	DOSING PUMPFIXATION	1
	STECKERGEHAEUSE	2.8 2 POL	1
	BOLT	BOLT HEX HD M6-1.0 6G X 25 SS A2 70	1
	NUT	NUT M6 W/FREE SPINNING WASHER ZP	1
	FUEL LINE	FUEL LINE PA12 5 X 1.5 MM x 5.5 METERS	1
	HARDWARE KIT	AT 2000ST STC	1
	CABLE TIE	CABLE TIE 7.563 INCH NYLON 66 WHITE	10
	BOLT	BOLT .25-20 UNC X 2 GRP2 ZP FULL THREAD	6
	NUT	NUT KEP .25-20 UNC ZP	6
	ADAPTER	ADAPTER D 60	2
	PROTECTIVE GRID	PROTECTIVE GRID ADAPTER D_60	1
	CLAMP	CLAMP HOSE 50-70 WGEO 9 mm WIDE ZP	4
	SCREW PAN CR8-18 ST X 75 ZO SELF DRILL		6
	AIR OUTLET	AIR OUTLET BALL SHAPE D60 ROTATBLE	1
	FUEL SYSTEM KIT	EVAPORATIVE HEATER	1
	FUEL HOSE	FUEL HOSE 4.5 X 10.5 mm 9 mm BAND ZIP	1
	CLAMP HOSE	CLAMP HOSE 905-10.5 mm - 9 mm WIDE ZP	1
	FILTER FUEL	FILTER FUEL 25-30 MICRONS	1
	FUEL HOSE	FUEL HOSE 4.5 X 10.5 mm	1
	EXHAUST SYS KIT	INTAKE, EVAP HEATER	1
	CLAMP	TUBE CLAMP D24-26	1
	P-CLAMP 25 DIA 15W W5 DIN 3016	DIESEL APU WEBASTO	3
	CLAMP HOSE 13-32 0.4635 INCH SS BAND	DIESEL APU WEBASTO HEATER	1
	BOLT HEX M6-1.0 6g X 20 8.8 ZP DIN933	DIESEL APU WEBASTO	3
	NUT HEX W WASHER ASY M6-1.0 6H ZP	DIESEL APY WEBASTO	3
	DECAL BUNDLE	WEBASTO	1
	DECAL	WARNING	1
	DECAL	CAUTION	1
	DECAL	HEATER OFF	1
	DECAL	HEATER OFF	1
	BAG-POLY	BAG-POLY ZIP SEAL 9 X 12 2 MILS CLEAR	1
	TEMPLETE	MOUNTING A2000, 3500, 5000	1
	HARNESS ASSY	ELECTRICAL KIT DIESEL ASPEN	1
	WIRE HARNESS	HEATER HARNESS, WEBASTO	1

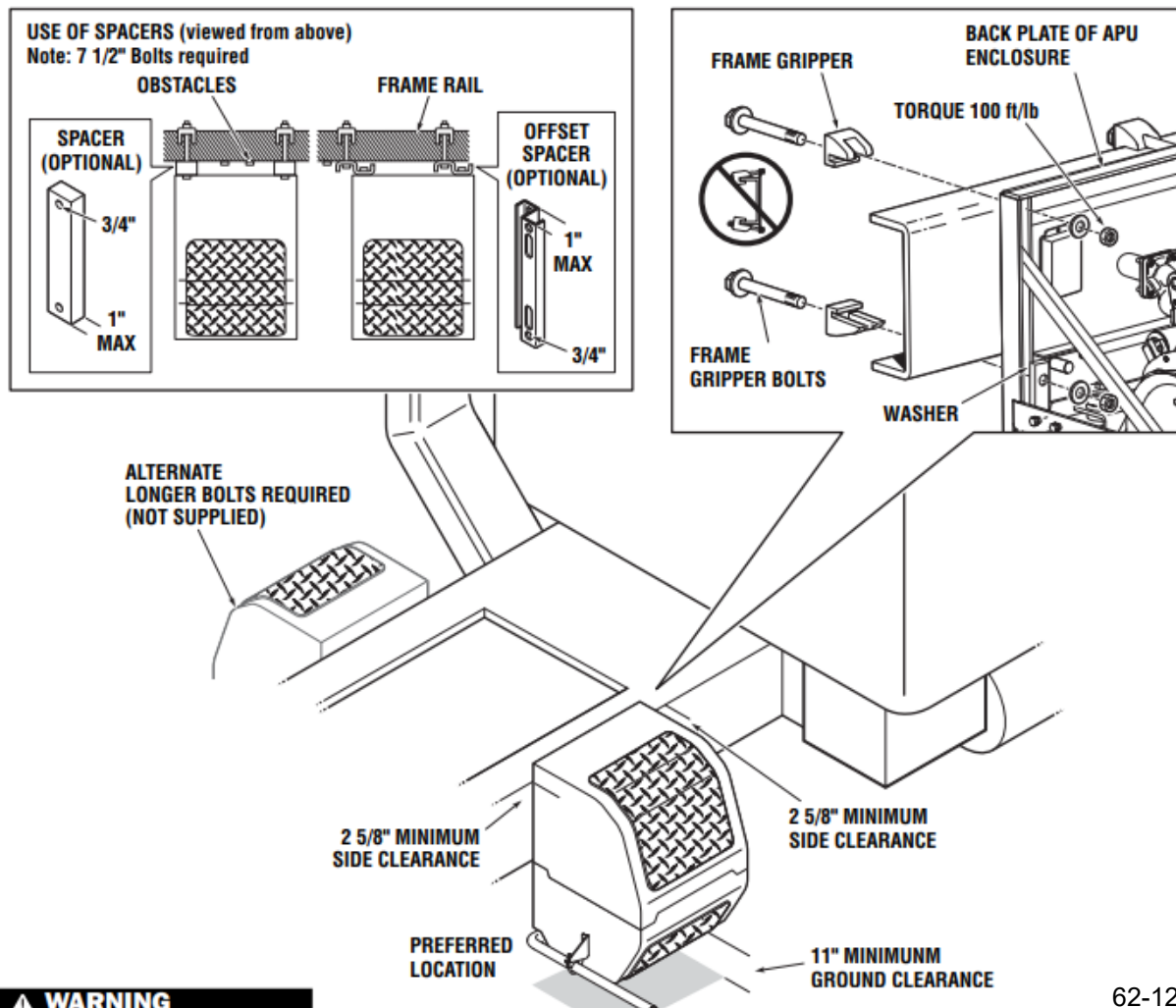
	NAME	PART QUALIFIER	QTY
7. FUEL SYSTEM	TUBE,PICKUP	FUEL TANK	1
	CLAMP,HOSE	0.28-0.60 ID,	2
8. BATTERY CABLE	<b>PACKAGING KIT</b>	<b>BATTERY FUSE</b>	
	FUSE	200A	1
	FUSE HOLDER	MEGA FUSE/COVER	1
	LUG, TERMINAL	4AWG, 5/16 HOLE	2
	LOG, TERMINAL	4AWG, 3/8 HOLE	2
	HEAT SHRINK	0.50 ID (BLK)	1
	HEAT SHRINK	0.50 ID RED X 2.0 L	3
	STA-STRAP	0-4.00 DIA CABLE	25
STA-STRAP	MAX BUNDLE 4.00 OD	25	
9. CCU INSTALLATION	<b>CLIMATE CONTROL UNIT</b>	<b>APU</b>	<b>1</b>
	<b>PACKAGING KIT</b>	<b>CCU MOUNTING</b>	<b>1</b>
	CONNECTOR	1/2 NPT 90 .17-.45 DIA	1
	CLAMP,TUBE	.69 DIA CUSHION	4
	SCREW,HX WASHHD	1/4 X 2.00 SELF TPG	4
	NUT,FLANGED	M6 X 1.0	5
	SCREW,CAPT WHSR	M6 X 20MM	12
	KAZOO	DRAIN HOSE FITTING	1
	CLAMP,HOSE	.985-1.135 O.D.SNAP	1
	GROMMET		1
	HOSE,DRAIN	EVAPORATOR	1
	TEMPLATE, CCU	ASPEN	
10. DUCTING	<b>PACKAGING KIT</b>	<b>AIR DUCT</b>	
	SCREW,FLAT HEAD	#8-18 X 1.0, CS, SD	8
	SCREW,PHILLIPS	#8-18 X 1.0 BLK SD	8
	CLAMP,HOSE	2.56-3.50 WORM TYPE	6
	LOUVER ASSY	3", 60 DEG	1
	LOUVER ASSY	3" ROUND	2
	BAG,RECLOSABLE	8.00 X 8.00	1
	VENT	12.38 X 5.50 GRILL	2
	DUCT	3" ID X 30' L	30
11. REFRIGERANT HOSE	<b>HOSE KIT</b>	<b>AC GROUP 134A</b>	<b>1</b>
	HOSE ASSY	COND/FILT DRIER	1
	HOSE ASSY		1
	HOSE ASSY	DISCHARGE	1
	O-RING	0.31 ID X 0.44 OD	1
	OIL	POE68, 5mL TUBE	1
	<b>FILTER ASSY</b>	<b>FILTER DRIER ASSY</b>	
	FILTER DRIER		1
	CLAMP,HOSE	2.56-3.50 WORM TYPE	2
	BRACKET		1
12. CCU WIRING	<b>CONTROLLER ASSY</b>	<b>CCU DIESEL APU</b>	<b>1</b>
	<b>PACKAGING KIT</b>	<b>TECK CABLE</b>	
	BUSHING	#2 ANTI-SHORT	1
	HEAT SHRINK	1.00 ID (BLK)	2.25
	FERRULE	10 AWG	2
	FERRULE	12 AWG	1
	BRACKET	COVER, HARNESS	1

	NAME	PART QUALIFIER	QTY
13. ASPEN INTERFACE	ASPEN INTERFACE	APU	1
	MOUNT	ASPEN INTERFACE	1
	BRACKET	ASPEN INTERFACE	1
	WIRE HARNESS	ASPEN INTERFACE	1
14. SHORE POWER	BATTERY CHARGER	10 AMP	1
	HARNESS	SHORE POWER GND	1
	SELECTOR SWITCH	SHORE POWER	1
	CABLE	SHORE POWER	1
	HARNESS	SHORE POWER Y	1
	HARNESS	SHORE POWER DC	1
	HARNESS	SHORE POWER AC	1
	CABLE	10 AWG 2C, TECK 90	20
	BUSHING	ANTI-SHORT	2
	TUBE	HEAT SHRINK 1"	0.45
	TIE	CABLE	1
	HHCS	1/4 NC X 3/4 ZP	4
	NUT	1/4-20 NC NYLOCK	4
	NUT	10-24 NYLOC	4
	WASHER	1/4 FLAT	8
	NUT	8-32 NYLOC	4
	HHCS	10-24 X 1.0 SS	4
	WASHER	#10 FLAT	8
	PHMS	8-32 X 1.0 SS	4
	TERMINAL	FORK 14-8 LOCKING	4
	TERMINAL	FORK PV10-8LFD	12
	TERMINAL	RING 12-10G #10	4
	STRAIN RELIEF	0.295-.353"	2
	BRACKET	RECEPTACLE CHROME	1
BUSHING	PLASTIC 2.5"	1	
DECAL	RECEPTACLE CHROME	1	
HOUSING	AC RECEPTACLE	1	
TERMINAL	RING 16-14G #10	1	
15. POWER OUTLET	<b>PACKAGING KIT</b>	<b>OUTLET</b>	1
	CONNECTOR	1/2-14 NPT	1
	BUSHING	.087ID X .472 14AWG	1
	RECEPTACLE	AFCI/GFCI BLACK	2
	FERRULE		2
	SCREW,PAN HEAD	#6-32 X 0.50 LG	8
	SCREW,PHILLIPS	#8-18 X 1.0 BLK SD	1
	BAG,RECLOSABLE	8.00 X 10.00	1
	BOX, RECEPTACLE	APU ASPEN	1
	COVER	120 VAC GFCI OUTLET	1
	HARNESS	POWER OUTLET	1
16. COMMISSIONING	<b>PACKAGING KIT</b>	<b>DOCUMENTS, APU</b>	1
	DECAL	COOLANT NOTICE	1
	WARRANTY REGISTRATION	APU ASPEN	1
	OPERATING INSTRUCTION	ASPEN	1
	WARRANTY STATEMENT/MATRIX	ASPEN	1
	INSTALLATION/PDI FORM	ASPEN	1
APPENDIX	<b>PACKAGING KIT</b>	<b>HARNESS/HOSE PROTECTION</b>	
	WRAP	NU-GUARD BLK DIAM10	2.84
	WRAP	NU-GUARD BLK DIAM13	2.79
	WRAP	NU-GUARD BLK DIAM16	7.92
	WRAP	NU-GUARD BLK DIAM25	9.14

### 3. Power Unit

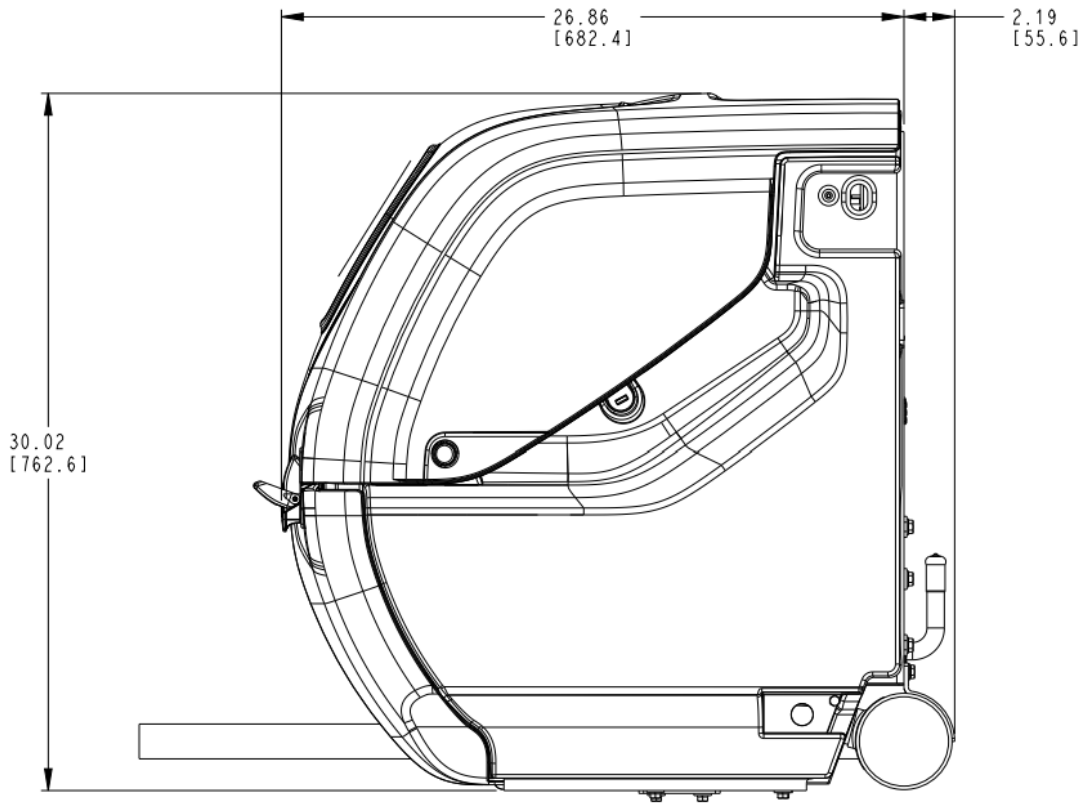
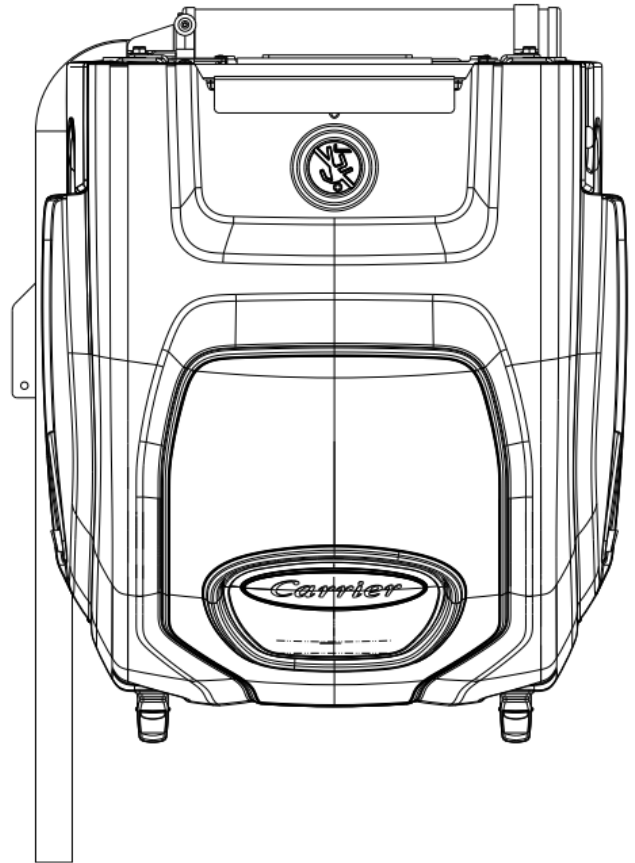
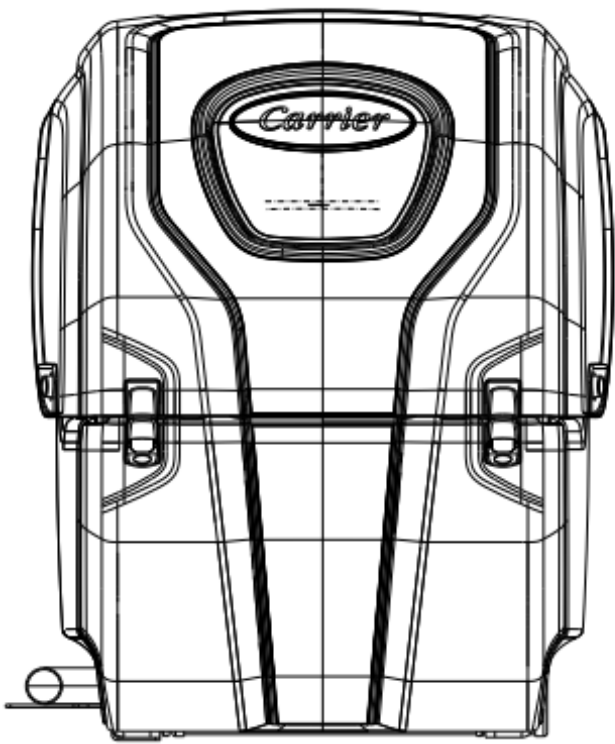
The location and how the APU is mounted is critical to a successful installation. Before selecting a mounting location review the mounting requirements listed in Table 3. Consider how the coolant and fuel lines as well as electrical wiring will be routed and secured prior to beginning the installation. Refer to the appropriate sections within this manual for additional requirements for these components.

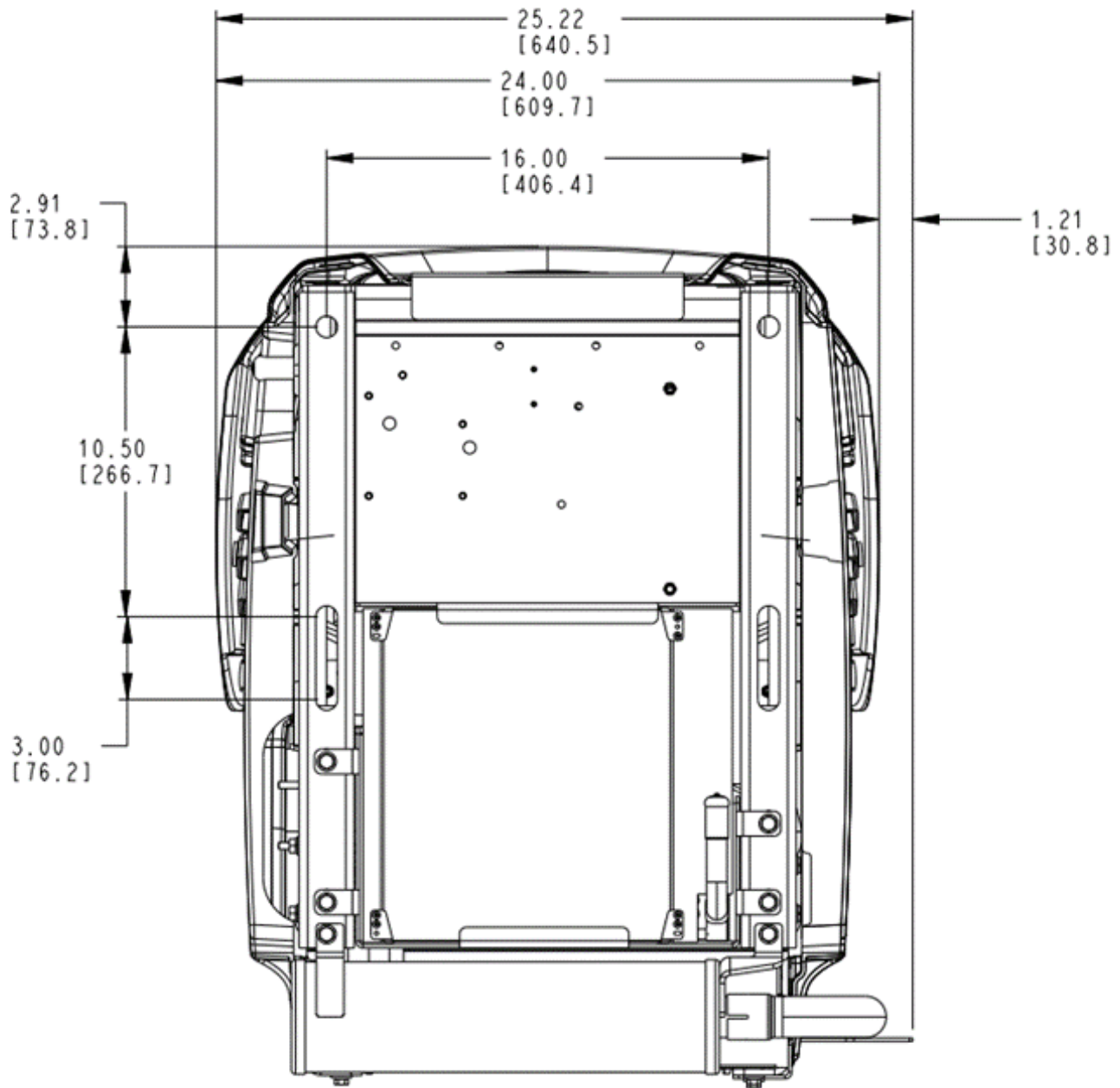
Component	Requirement
APU	Mounted to tractor frame rail
	Minimum side clearance (2.75)
	Minimum top clearance (5.00)
	Minimum distance to heat source (4.00)
	Minimum bottom distance (11.00)
	Mounting location accessible for service
	Not located in direct path of truck exhaust
	Radiator not obstructed
	Not mounted to bottom of power unit
Hardware	Does not interfere with mounting of APU
	Does not interfere with truck brackets, hoses, or wiring
Fairings	Removable for service



**WARNING**  
 is heavy. Do not drop it! Use a

### 3.1 Power Unit Dimensions

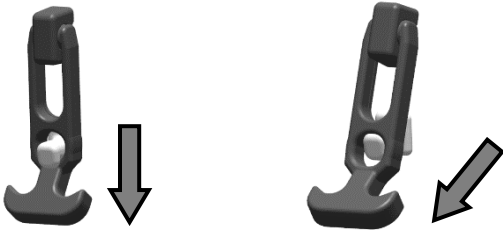
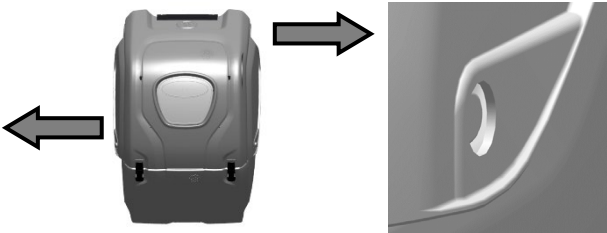
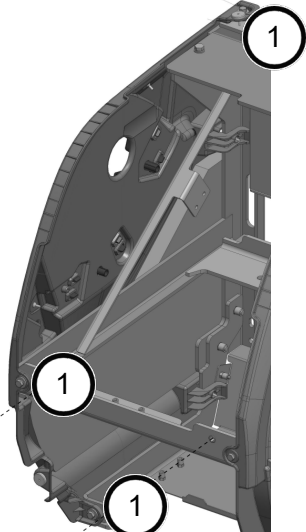






## 3.2 Cover Removal

Removing the covers from the power unit will aid in installation.

1		Unscrew the knob located on the top of the APU
2		Pull the latch handles down and out to release
3		Grab both sides of the cover and pull out to clear posts
4		Once the cover holes are clear of the posts, slide the cover out until it is past the flange bracket
5		Remove the three bolts (1) securing the side covers to the frame  Remove the covers by pulling toward the front of the APU frame.

10


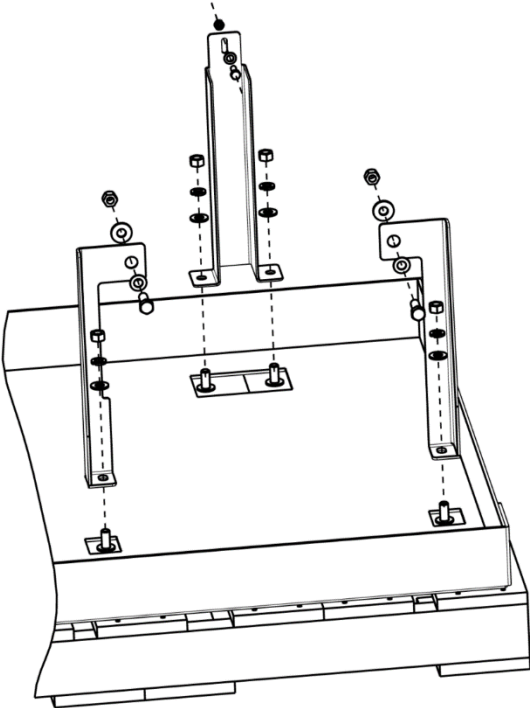

### 3.3 Power Unit Installation

**⚠ CAUTION**

Do not bottom mount APU. APU must be connected to side of truck frame.

**NOTICE**

Consult truck OEM for frame drilling requirements

<p>1</p>		<p>Determine the location on the truck frame where the APU will be mounted.</p> <p>Refer to Figure 2 for mounting clearance requirements.</p>
<p>2</p>		<p>Remove the front and rear shipping supports from the APU frame and shipping pallet.</p> <p><b>⚠ CAUTION</b></p> <p>When the APU is in transit or storage the shipping supports must be installed and secured to the pallet. Damage to the covers and/or frame may result if not installed.</p> <p></p>

### 3

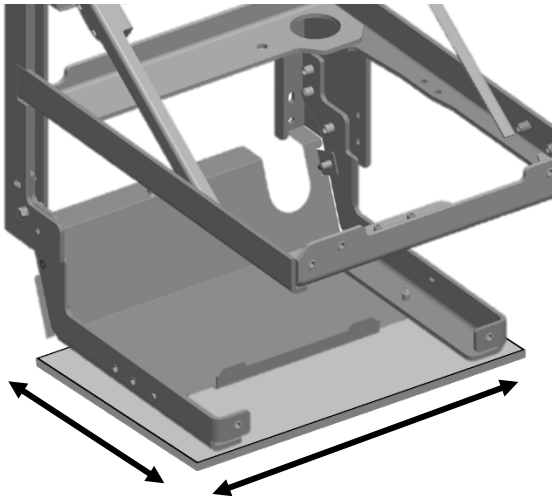
Lift the APU off the shipping pallet using one of the following methods

3a Bottom Lift – APU lower legs supported and lifted with jack/forklift

3b Overhead Lift – Lifting sling attached to APU lift points and lifted with overhead lifting device

When supported, the APU must be positioned so that:

- The back of the APU frame will be flush with the side of the tractor frame
- The top of the APU frame is parallel to the top of the tractor frame



Bottom lifting the APU requires that the full depth and width of the lower legs are supported.

If using an ATV/transmission jack for lifting an additional plate may need to be added to provide the required support.

If using a forklift, adjust the forks so that each fork is centered under the legs

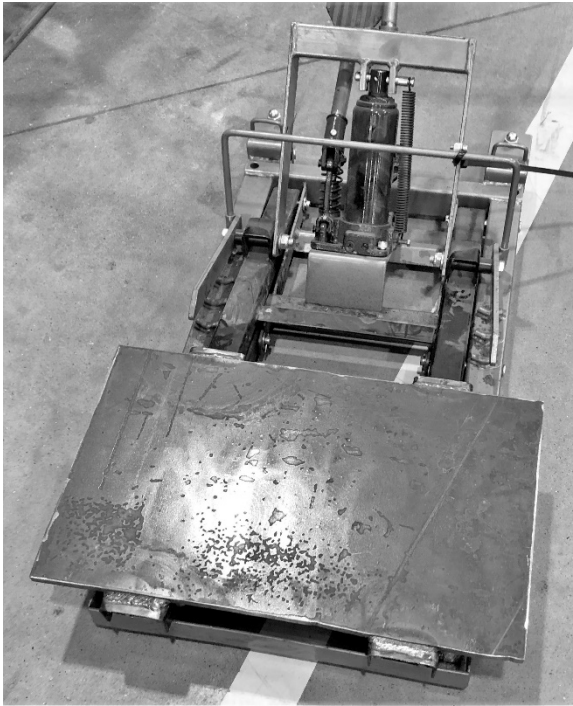


**WARNING**

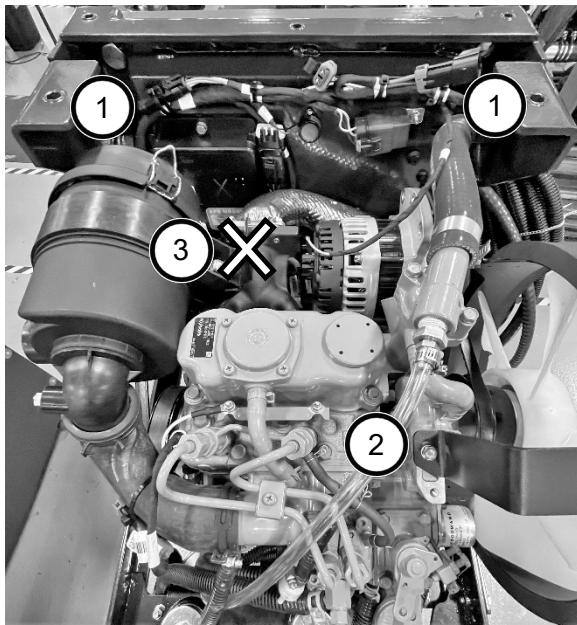
Do not lift the APU by the lower skid plate. Damage to the APU will result and the APU may fall off the lifting device.

**DO NOT** work under APU or lifting device when APU is not secured to frame

### 3a



3b



Remove the two bolts securing the step plate

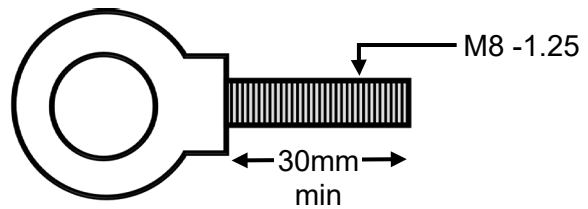
Install lifting eyes into step plate frame inserts (1)

Using 3-point lifting sling, secure hooks to lifting eyes and the engine lifting eye (2) closest to the fan

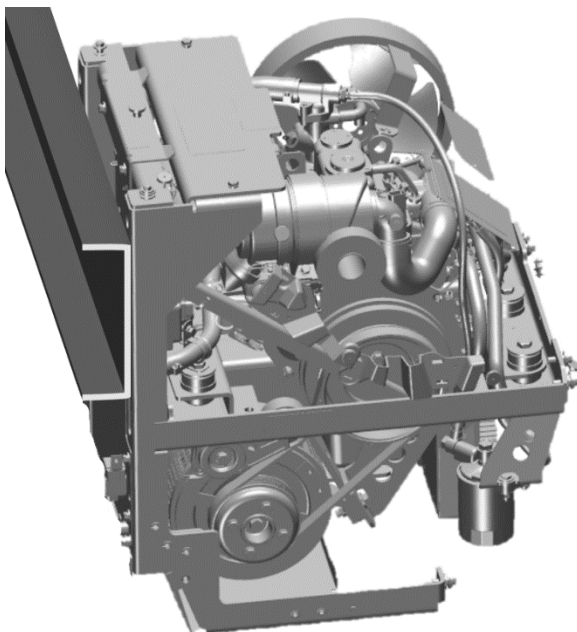
**WARNING**

**DO NOT** use the lifting eye on the air cleaner bracket (3) for lifting the APU. The air cleaner lifting eye is for engine lifting only.

**DO NOT** stand under APU when suspended from lifting device



4



Position the APU on the frame of the tractor.

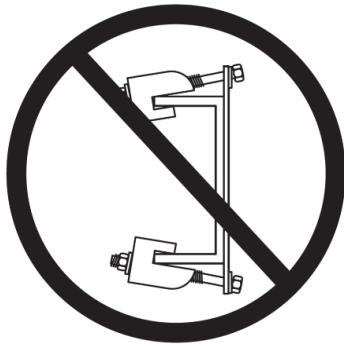
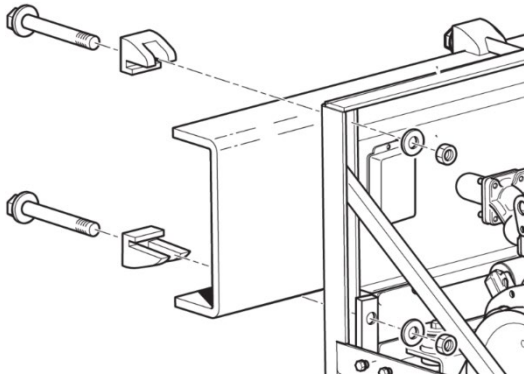
Check for gaps between the APU frame and the tractor frame. If gaps are present, adjust the position of the APU frame.

**NOTICE**

**DO NOT** use the mounting bolts to pull the APU frame to the tractor frame, damage to APU may result

**DO NOT** cut, drill, or modify APU frame or hardware

5



Position the frame grippers on the truck frame rail.

Insert the mounting bolts/washers into the frame grippers and then into the back of the APU frame through the mounting holes.

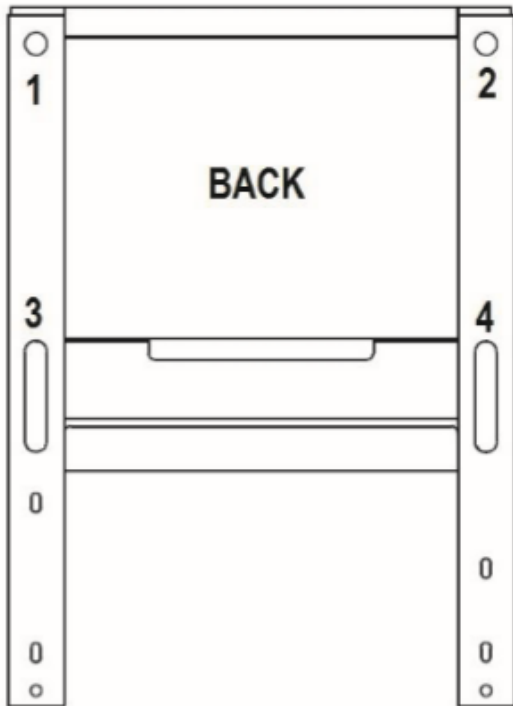
Upper hole: Install washers and nuts on the mounting bolts from the inside of the APU frame.

Lower slot: Install spacers, washers, and nuts on the mounting bolts from the inside of the APU frame

Adjust the position of the mounting hardware and/or the APU so that:

- The bolts sit flat on the top and bottom of the tractor frame.
- The bolts are perpendicular to the back of the APU frame.

6



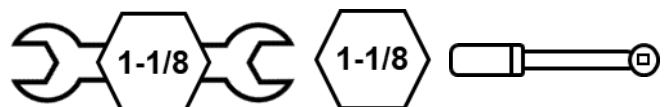
1. Torque the APU mounting bolts using 1-4 stepped torque sequence

**Note: Thick-walled impact sockets may not allow socket to properly engage hardware inside frame. Use appropriately sized deep well socket**

2. Remove the lifting device

### NOTICE

**Improper torquing of the mounting bolts may result in APU frame damage**



- Torque bolts 1-2-3-4 to 30 ft-lbs
- Torque bolts 1-2-3-4- to 70 ft-lbs
- Torque bolts 1-2-3-4 to 100 ft-lbs
- Re-torque bolts 1-2-3-4 to 100 ft-lbs

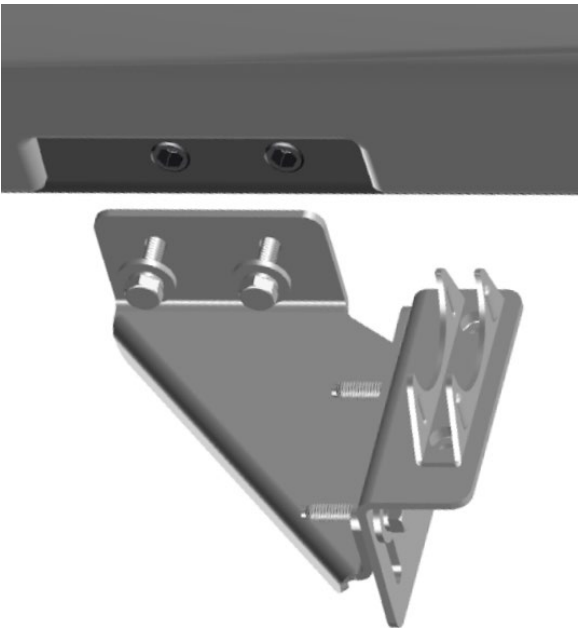

### 3.4 Exhaust

Exhaust from the engine exits the APU through the tailpipe mounted to the left side of the lower frame. The tailpipe and mounting hardware are shipped loose and must be installed. Depending on the model, the tail pipe will connect to the DPF or muffler outlet.

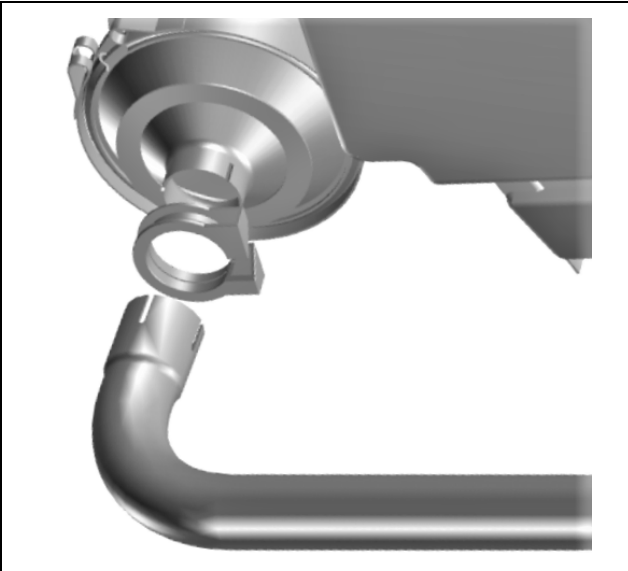
Component	Requirement
Exhaust pipe	Outlet not located under truck cab
	Support required
	Not connected to truck exhaust



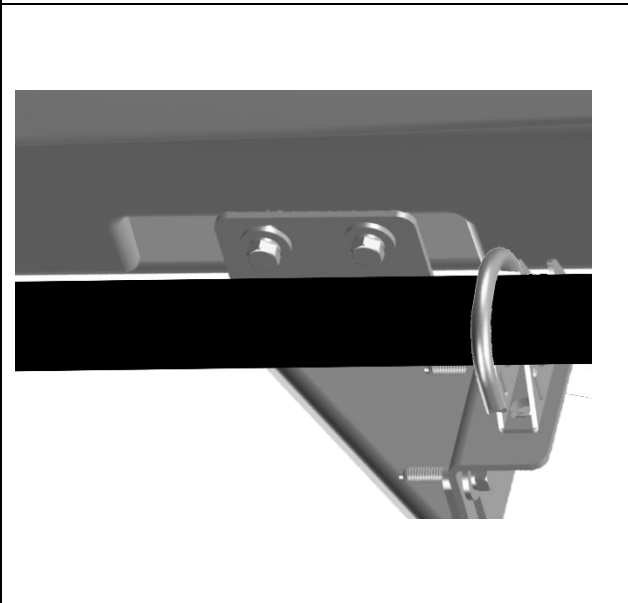
**Engine and exhaust system components may be hot**

1		<p>Attach exhaust pipe adjustment bracket to exhaust support. Tighten bolts finger tight</p> <p>Attach the exhaust support to the APU frame.</p>
	 <p><b>13</b> 4 ft-lb</p>	
2		<p>Slide exhaust clamp over bell end of exhaust pipe.</p> <p>Connect the exhaust pipe to the muffler or DPF outlet. Verify pipe slopes slightly downward.</p> <p>Tighten clamp</p>

3



11 ft-lb

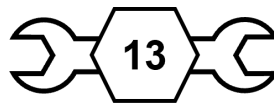


Secure the exhaust pipe to the exhaust support with exhaust clamp.

Adjust exhaust support and tighten bolts



4 ft-lb



19 ft-lb

## 3.5 APU Wiring

The 12VDC/CAN and interlock harnesses must be connected to the APU. The 12 VDC/CAN harness provides 12 volt power to the CCM as well as the CAN communication circuit that connects the CCM and APU module. The interlock prevents the tractor engine and APU from running at the same time. Installation of the interlock harness is required for the automatic operation of the APU.

Connect fused end of harness to ignition switched power source using the appropriate connector/terminal

### **WARNING**

**1** The fused end of the interlock harness must be connected to the ignition switched power source. **DO NOT** connect the fused end to the APU harness as this will not provide appropriate short circuit protection to the interlock harness.

Route engine interlock harness from ignition switched power source on tractor to the APU.

Secure harness every 12.0" (300mm)

**2**

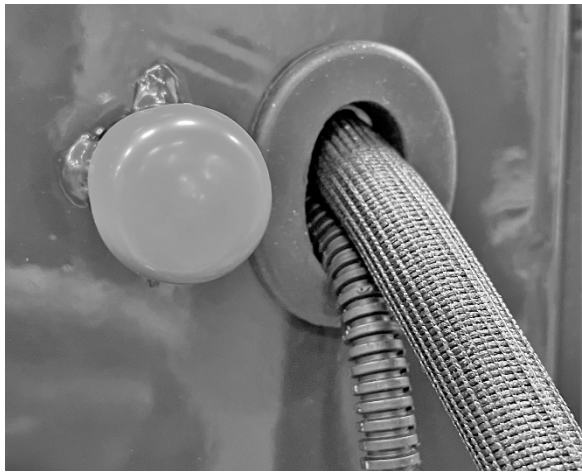
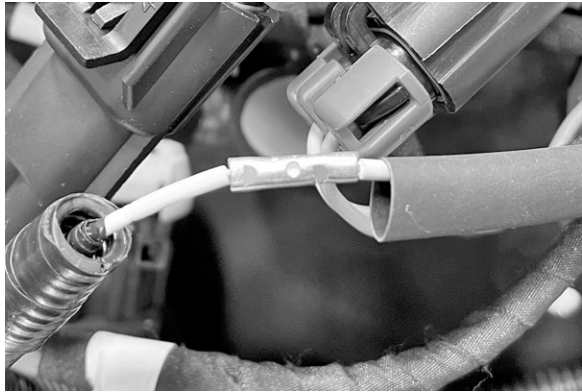

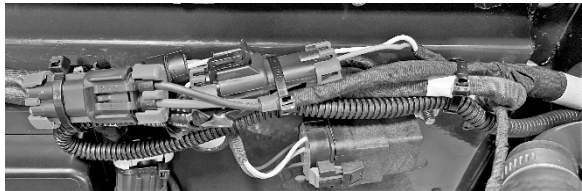


Remove the grommet from the frame near the coolant outlet.

Insert the 12 VDC/CAN harness connectors one at a time through the grommet.

Reinstall the grommet into the frame.



3		<p>Insert the non-fused end of the interlock harness through the grommeted opening in the APU frame</p> <p>Locate the interlock wire (yellow) in the APU engine harness</p> <p>Trim interlock harness length as required</p>
4		<p>Position heat shrink tubing over the end of the interlock wire</p> <p>Crimp butt splice to the interlock wire</p> <p>Strip end of interlock harness to 0.25" (6.35mm)</p> <p>Crimp interlock harness to the other end of the butt splice</p> <p>Apply heat to shrink tubing</p>
5		<p>Remove the 3 cable ties securing the APU engine harness to the back of the frame.</p> <p>Connect the 12 VDC (oval) and CAN (rectangular) connector to the corresponding connector on the APU engine harness</p>
6		<p>Secure the APU engine harness, 12 VDC/CAN harness, and interlock harness to the cable tie inserts in the APU frame with cable ties</p> <p>The harness tape markers should align with the position of the cable ties</p>

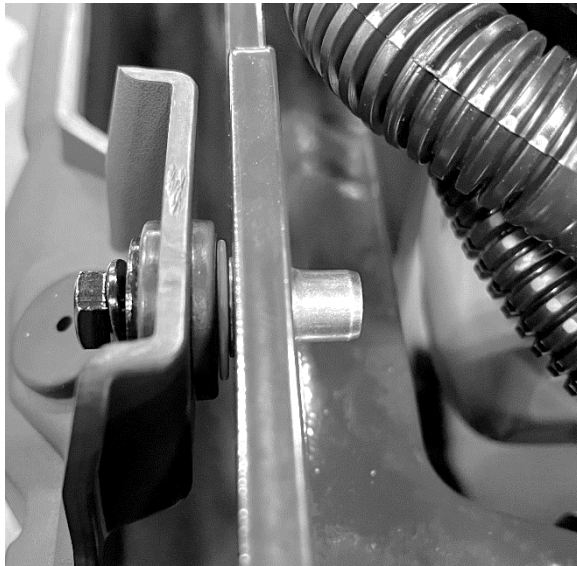
7

Route the 12 VDC/CAN harness from the APU to the opening in the cab floor (Section 9) for the wiring harnesses.

Secure harness every 12.0" (300mm)

### 3.6 Cover Installation

1



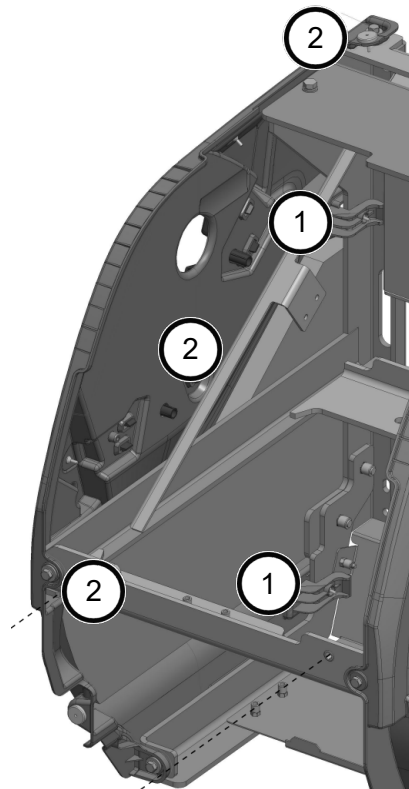
Inspect that the air cleaner and fan foam rings are in place and not damaged

Inspect the side cover and verify that the bumpers, grommets, and compression limiters are present and in good condition.

#### NOTICE

The large diameter of the compression limiter must be installed so that it faces the frame insert. If installed incorrectly damage to the cover and frame insert may result. Do not install cover bolts without the compression limiter installed, damage to the grommets and cover may result.

2



Slide the side covers along the frame, ensuring the tabs (1) are inside the frame and fully seated.

Insert the bolts (2) through the bushing/sleeve verifying the gap between the frame and busing is less than 0.10" (2.5 mm).

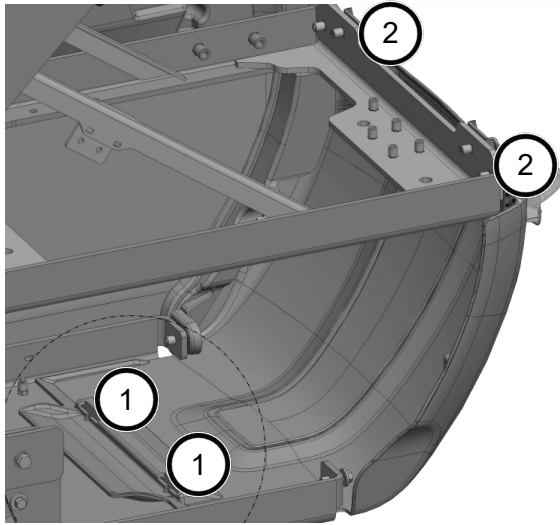
If the gap is greater than 0.10" (2.5mm) remove the cover and adjust

Tighten bolts



89 ± 2 in-lb

3



Verify the lower cover grommets and compression limiters are in place.

**Note: The compression limiters for the lower cover are attached to the front of the APU frame**

Hold the lower cover flat and fit the cover slots over the skid plate tabs (1).

Rotate the cover up the to front the frame.

Insert the bolts through the compression limiter verifying the gap between the frame and grommet is less than 0.10" (2.5mm).

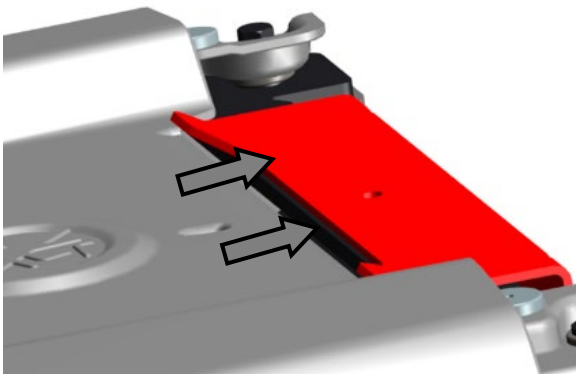
If the gap is greater than 0.10" (2.5mm) remove the cover and adjust.

Tighten the bolts



89 ± 2 in-lb

4





**The top cover will need to be removed to perform the cooling system bleed and other PDI inspections. When the unit is operating the covers should be installed.**

Grab the sides of the top cover and insert the back edge between the flange bracket and APU frame.

5



Push the cover toward the back of the APU until the posts extend past the cover on both sides.

6		<p>Insert the knob through the hole in the flange bracket and cover.</p> <p>Tighten by hand until secure.</p>
7		<p>Pull latch handles down and over the keeper.</p> <p>Grab cover and pull out to verify it is secure</p>

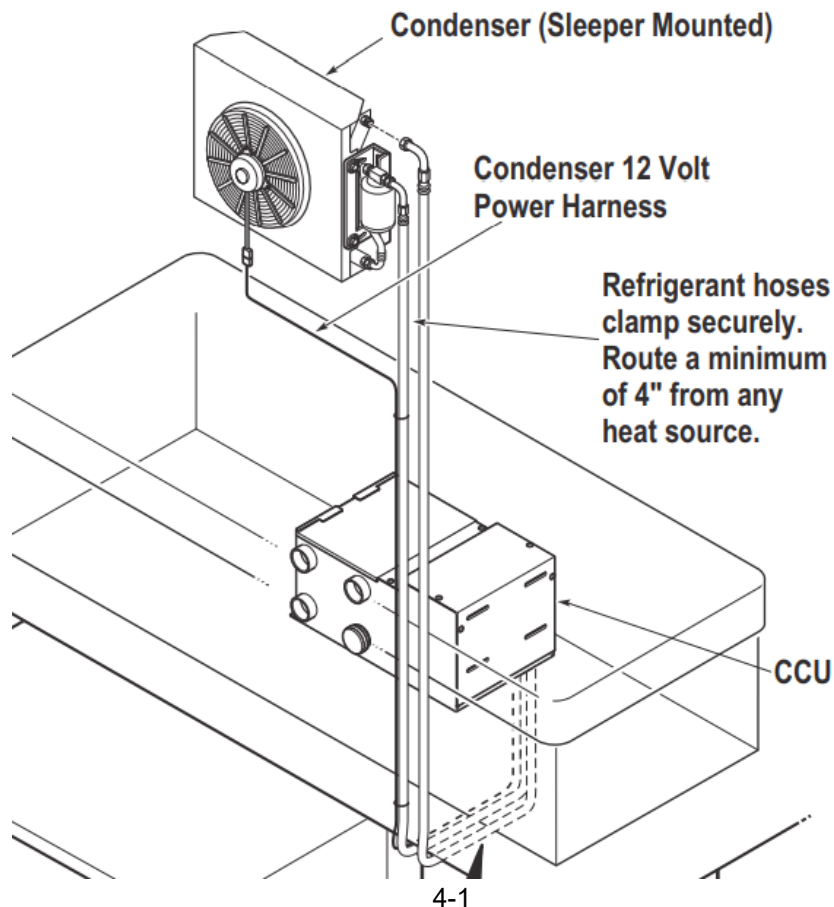
 **CAUTION**

**Covers must be secure, and knob installed while vehicle is moving**

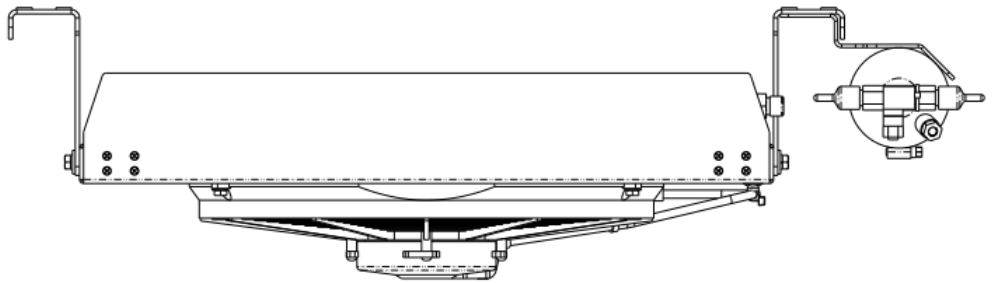
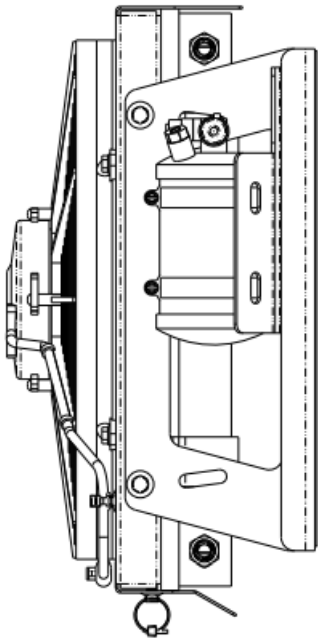
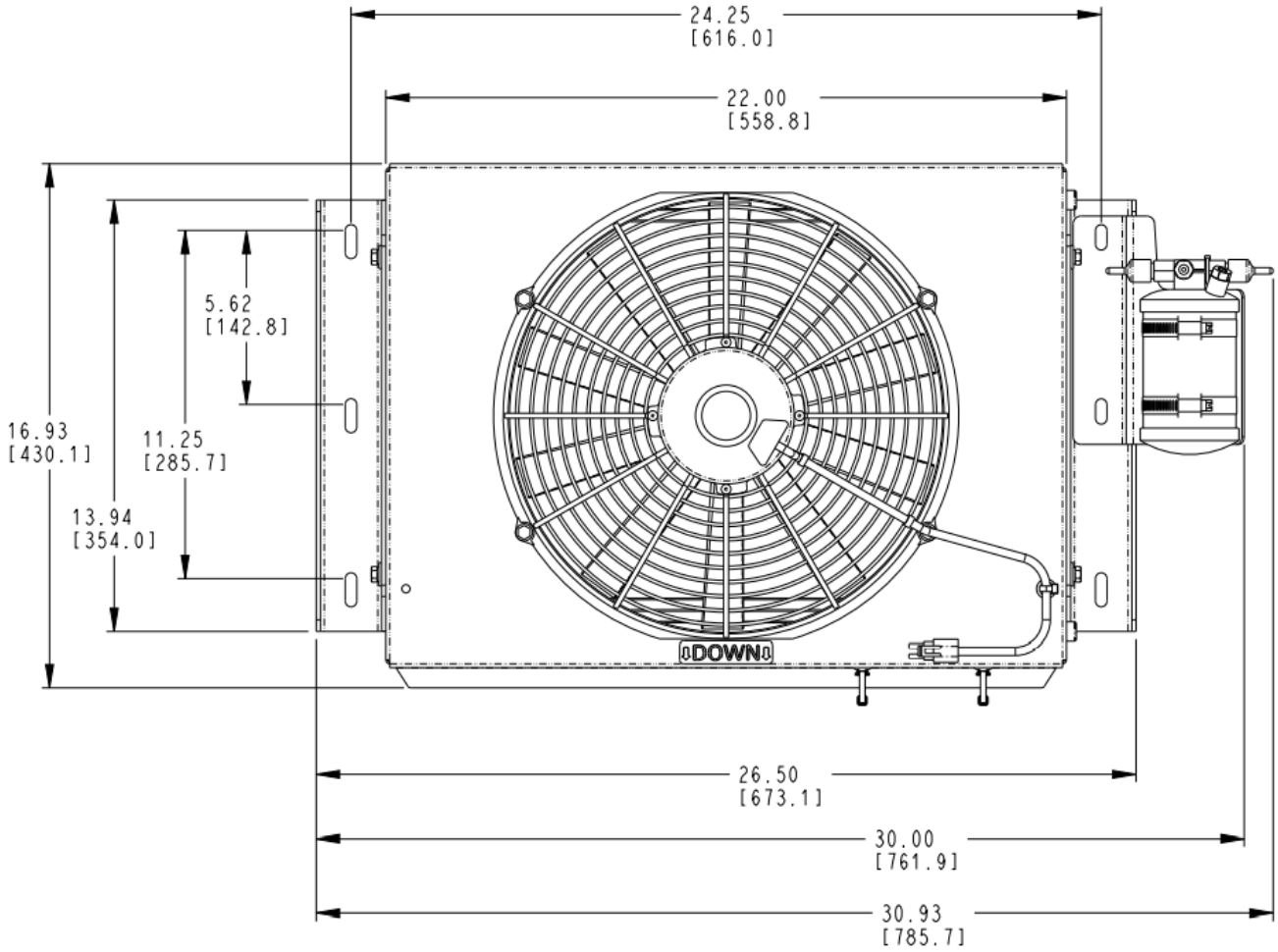
## 4. Condenser

The function of the condenser is to remove heat from the refrigerant before returning to the CCU. A filter/drier is also included to keep the refrigeration system clean and free of moisture. The condenser assembly and filter drier mount to the rear of the truck cab. Before selecting the condenser mounting location review the mounting requirements listed in Table 3. Consider how the refrigerant lines and condenser harness will be routed and secured prior to beginning the installation. Refer to the appropriate sections within this manual for additional requirements for these components.

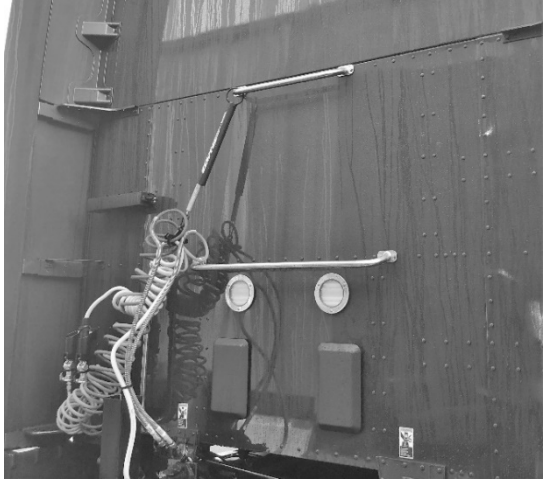
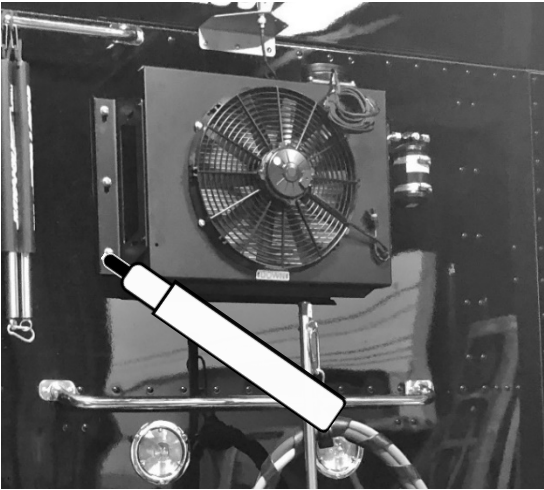
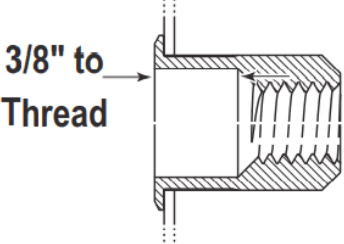
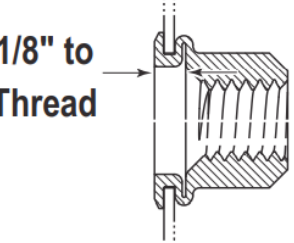

Component	Requirement
<b>Condenser</b>	Mounted with DOWN decal at bottom
	Condenser must be mounted to outside of rear of tractor cab
	Airflow around the condenser must not be obstructed
	Mounted within 8 feet of CCU
	Mounted vertically (refrigerant lines connections in-line)
	Hose connection side of condenser minimum 5.0" clearance to nearest obstruction
	Condenser, harness, and refrigerant lines minimum 4.0" from truck exhaust
	Condenser, condenser harness, and refrigerant lines not in direct path of exhaust.
	Located out of direct path of road debris/spray
<b>Rivnut</b>	Does not interfere with tractor wiring or interior panels
	Minimum one of upper Rivnut less than 1.0 from cab crossmember
	Remaining rivnuts located within 2.0" of cab crossmember
<b>Tool</b>	Use 07-00447-00 Rivnut installation tool (imperial) or equivalent



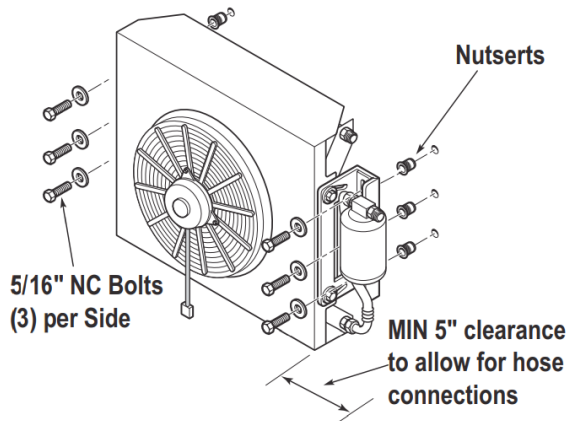
# 4.1 Condenser Dimensions



## 4.2 Condenser Installation

<p style="text-align: center; font-size: 2em; font-weight: bold;">1</p>		<p>Determine the location on the truck frame where the APU will be mounted.</p> <p>Refer to Figure 2 for mounting clearance requirements.</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">2</p>		<p>Hold the condenser at mounting location and mark the location of the mounting holes.</p> <div style="text-align: center; background-color: #0056b3; color: white; padding: 5px; font-weight: bold; font-size: 1.2em; margin: 10px 0;"> <b>NOTICE</b> </div> <p><b>Condenser assembly weights 26 lbs. (11.8 kg)</b></p> <p>Drill 17/32" holes at mounting hole locations</p>
<p style="text-align: center; font-size: 2em; font-weight: bold;">3</p>	<div style="text-align: center;"> <p><b>Nutsert Before Installation</b></p>  <p><b>Nutsert After Installation</b></p>  </div>	<p>Tap rivnuts into the hole.</p> <p>Use tool to install rivnuts into holes</p> <div style="text-align: center; margin-top: 20px;">  <p><b>07-00447-00</b></p> </div>

4



Position condenser and filter/drier assembly over mounting holes.

Secure with bolts, lock washers, and flat washers.

The receiver drier bracket attaches to the condenser assembly using the top two condenser mounting bolts.

Tighten bolts



11 ft-lb

## NOTICE

Keep condenser and filter drier capped until refrigerant lines are installed




## 5. Cooling System

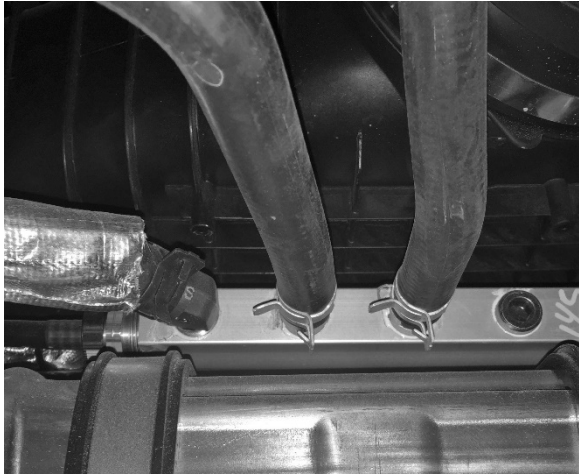
Prior to installing the cooling system components, carefully plan how the coolant lines will be routed and connected. The preferred installation method has the APU draw coolant from the truck engine below the thermostat and coolant returns near the truck water pump. Locate these connections as far apart as possible on the engine. When a direct connection to the truck is not possible, it may be necessary to connect into the truck heater lines using coolant Tees or Ys. It is the installer's responsibility to verify that enough coolant flows through the truck engine and to the APU under all operating conditions. Improper cooling system installation may result in damage to the APU.

Component	Requirement
Coolant hose	Routed to avoid sharp edges, pinch points, and areas subject to physical damage
	Not kinked, form traps, or loops
	Self-closing wrap or equivalent applied to areas subject to abrasion
	Secured every 12-16"
	Minimum 0.75" ID
	Strain relief located within 14.0" of heater hose connection to tractor engine
Coolant flow	Same direction regardless of APU or tractor engine operation
	Does not flow through OEM heater core
	Heater valve position
APU Coolant Connections	Outlet connected to suction point on engine
	Inlet connected to pressure point below tractor engine thermostat
Coolant	Make-up coolant compatible with OEM fill
Surge tank	Highest point in cooling system
	Accessible for service
Component	Recommendation
Shut-off valve	Installed to allow APU/Tractor cooling system to be isolated for service/repair
Fittings	Connected directly to engine

### 5.1 Cooling System Installation (Integrated)

1	Slowly remove the truck radiator cap to release pressure from coolant system.
	<div style="background-color: yellow; border: 1px solid black; padding: 5px; display: inline-block;">  <b>CAUTION</b> </div> <p><b>Do not open cooling system when hot</b></p>
	Drain the truck coolant system (if necessary).

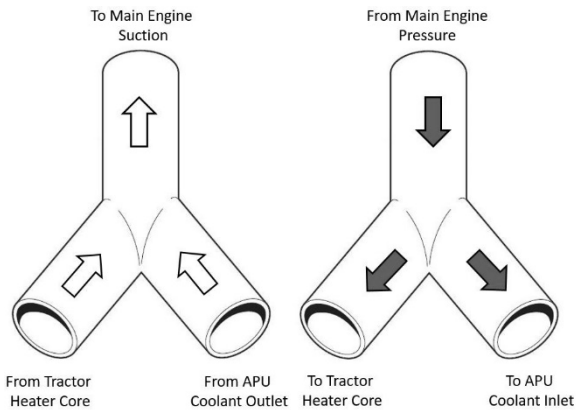
2



Install adapter fittings/valves in the main truck engine.

If using Y-fittings, ensure they are oriented correctly

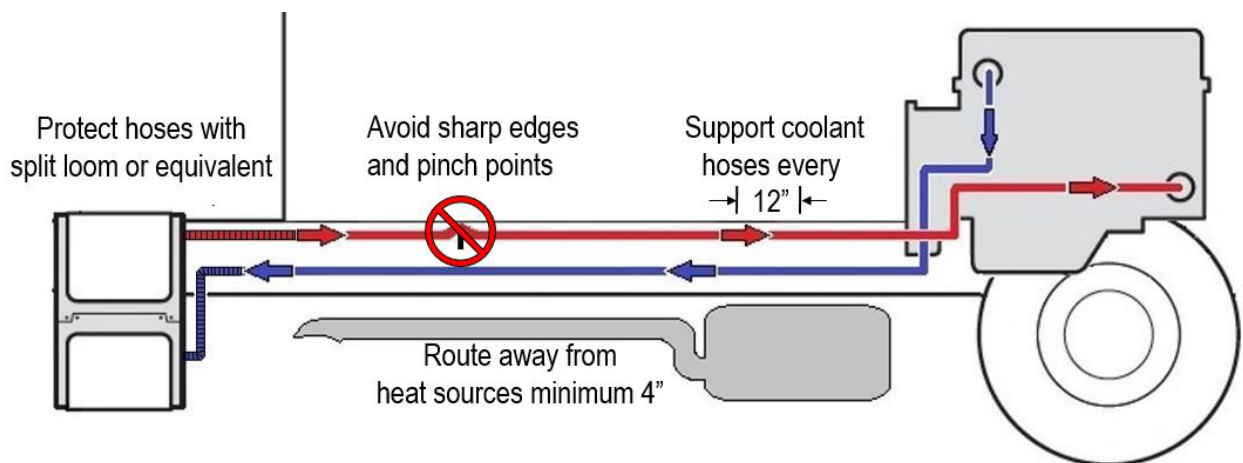
Consult truck OEM for appropriate pressure and suction connection locations.


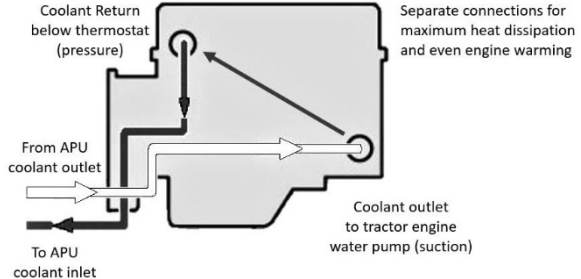


3

Apply self-closing wrap or equivalent on coolant hoses.

Route and secure coolant hoses from truck engine to APU. Avoid sharp bends and kinking the heater hose. Secure so that the hose does not droop.



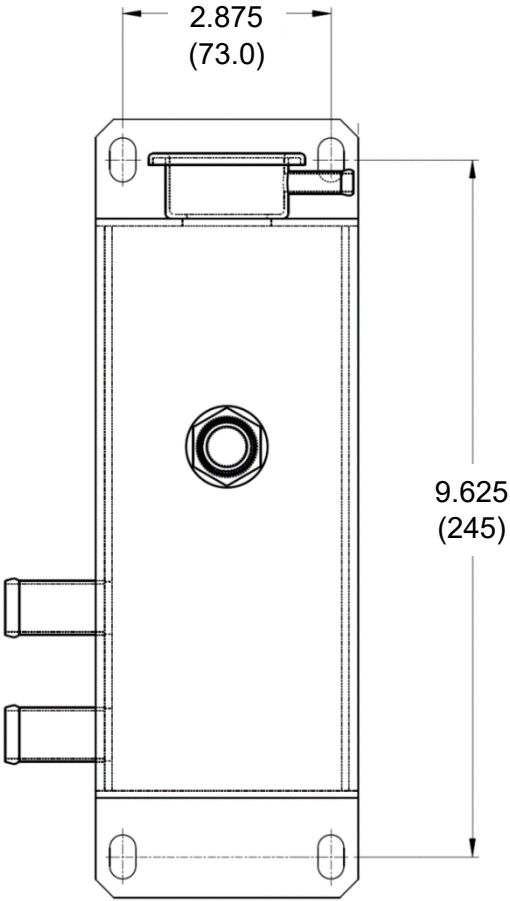
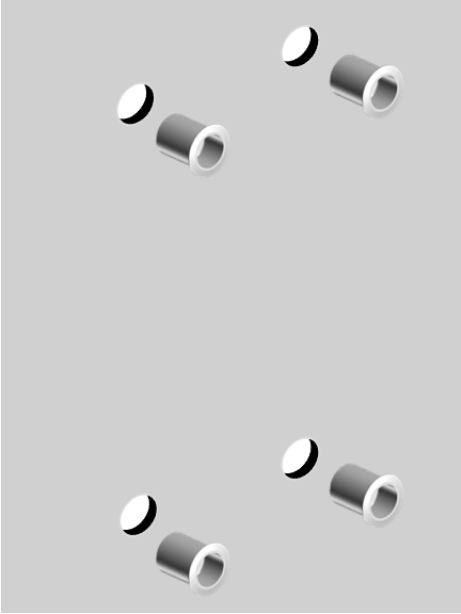

4		<p>Install coolant flow meter in-line with the coolant hoses between the APU and tractor engine.</p>
5		<p>Connect coolant hose to APU coolant outlet, and the other end to suction fitting on truck engine.</p> <p>Connect coolant hose to APU coolant inlet, and the other end to pressure fitting on truck engine.</p> <p>Install coolant hose strain relief at APU and truck engine connections.</p>
6	<p>Refill the engine coolant in the system according to the specific engine manufacturer's recommendations (additional coolant will be required).</p>	

**NOTICE**

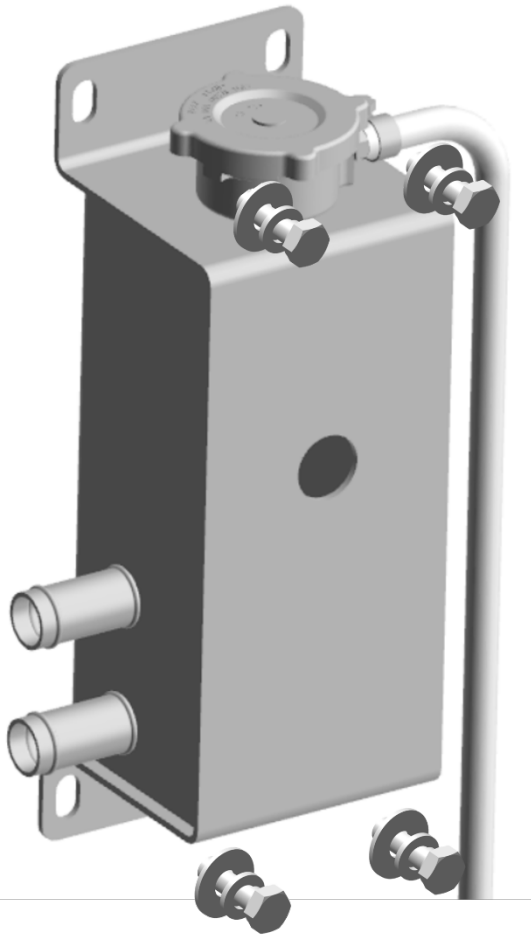
**Perform the following steps AFTER completing the rest of the APU installation**

7	<p>Purge the APU and tractor cooling system (Refer to section 16).</p> <p>Refer to truck OEM for purge procedure.</p>	
8	<p>Verify coolant flow and direction. If OK remove the flow meter.</p> <p>If NOT OK reevaluate coolant hose connections.</p> <p>Add make-up coolant (as required)</p>	

## 5.2 Cooling System Installation (Stand-alone) Surge Tank Installation

<b>1</b>		<p>Hold the surge tank at mounting location and mark the location of the mounting holes.</p> <p>Drill 17/32" holes at mounting hole locations</p>
<b>2</b>		<p>Tap Rivnuts into the hole</p> <p>Use 07-00447-00 to install Rivnuts into holes</p>  <p><b>07-00447-00</b></p>

3



Secure tank with supplied bolts, lock washers, and flat washers.

Tighten bolts



11 ft-lb

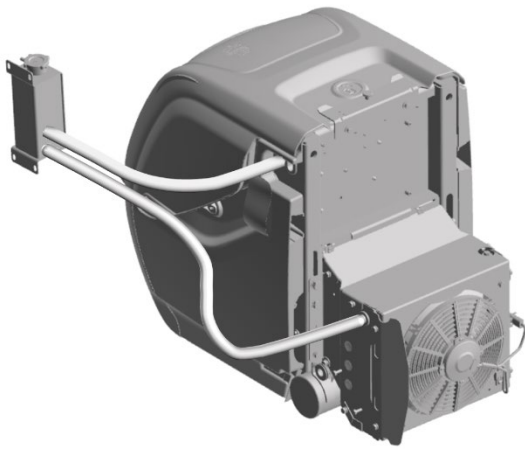
### 5.3 Coolant Connections (Stand-alone)

1

Apply self-closing wrap or equivalent to coolant hoses

Route and secure coolant hoses from surge tank to APU. Avoid sharp bends and kinking the heater hose. Secure so that the hose does not droop.

2



Connect coolant hose to APU coolant outlet to top barb on the surge tank.

Connect coolant hose to APU coolant inlet to bottom barb on surge tank.

Install coolant hose strain relief at APU and surge tank connections.

3



Slowly fill the surge tank until coolant is visible in the sight glass.

## NOTICE

**Perform the following steps AFTER completing the rest of the APU installation**

Purge the APU cooling system (Refer to section 16).

Add make-up coolant (as required)

## 6. Air Heater Option

When installed, the air heater option is used as the heating source in place of the electric heater in the CCU. The air heater is powered by diesel fuel that is drawn from the truck fuel tank. Fuel for the heater is supplied through a pickup tube that is independent of the APU fuel pick-up. The Aspen Interface is used to control the air heater option. Refer to section for air heater operating instructions. The heater and associated components must be installed according to the requirements listed in Table 6.

Component	Requirement
<b>Control Unit</b>	Mounted inside truck
	Securely attached to cab floor
	Minimum clearance requirements according to Figure 6.0
	Gasket installed on bottom of heater
	Parts of the vehicle body and other components in the immediate vicinity of the heater must be protected against excessive heat and the danger of contamination by fuel or oil.
	The internal combustion heater must not pose a fire hazard even when overheated. This requirement is deemed to have been met if care is taken during installation to ensure an adequate distance from all parts, as well as adequate ventilation and if fire-resistant materials or heat shields are used.
	The model/serial plate or a duplicate thereof (duplicate model/serial plate) must be fitted in such a way that it is still clearly legible when the heater has been installed in the vehicle.
	When positioning the heater, all reasonable precautions must be taken to minimize the risk of personal injury or damage to items in the vehicle.
<b>Hot Air Line/Vent</b>	Use only hot air ducting included in kit or engineering approved equivalent
	DO NOT connect hot air ducting to CCU, or CCU/OEM ductwork.
	Position vent so that it does not blow on parts that cannot withstand 120 °C continuously.
	Air outlet opening is to be directed at least 20 cm away from body parts
	Maximum pressure drop between the inlet and outlet side of the hot air ducting: 1.5 hPa (1mbar) or 10mm WC
	Hot air ducting within the vehicle must be positioned or protected in such a way as to exclude all risk of injury or damage caused by direct contact.
	The air outlet must be positioned/protected so that it cannot be obstructed by other objects.
<b>Combustion Air Line</b>	Installed falling away from heater
	Located so it may not become clogged with dirt or other objects
	Supported every 12.0" (300mm)
	Not connected to exhaust pipe
	The air for the combustion chamber of the heater must not be extracted from the passenger cabin of the vehicle
<b>Exhaust Line</b>	Installed falling away from heater
	Located so it may not become clogged with dirt or other objects
	Supported every 12.0" (300mm)
	Outlet positioned within 10° of vertical
	The exhaust outlet must be positioned in such a way that exhaust fumes cannot get into the interior of the vehicle through ventilation devices, hot-air inlets or open windows.
	The exhaust system as well as the exhaust pipes shall be so directed or protected to avoid any danger to the load through heating or ignition.
	Parts of the exhaust system situated directly below the fuel tank must have a minimum clearance of 4.0" (100mm) or be protected by a heat shield.
<b>Fuel Filter</b>	Installed between fuel tank and fuel pump

<b>Fuel Pump</b>	Install according to section 6.5 and secured with supplied clamp
<b>Fuel pickup</b>	Enter from top of tank
	Allow for connection of fuel lines
	Not subject to physical damage
	Does not interfere with any truck fuel connection, baffles, or fuel level sensor
	Drilling debris not allowed to enter tank
	Minimum 1.0" above bottom of fuel tank
	12.0" (300mm) minimum distance between supply and return tubes
	End of tube cut at 45° angle
<b>Fuel Lines</b>	Routed away from sharp edges, pinch points, or subject to physical damage
	Does not kink, form traps, or loops
	5.00 (125) minimum distance to heat source
	Secured every 12.0" (300mm)
	Line length and height requirements according to Table 6.1
	Not routed along with high/low voltage cables or harnesses
	Minimum 2.5" spacing between fuel lines and electrical cables/harnesses
<b>Wiring</b>	Routed away from sharp edges, pinch points, or subject to physical damage
	Secured every 12.0" (300mm)

Table 6 Fuel System Installation Requirements

## NOTICE

**Fuel pickup must enter from top of tank**



## WARNING

**Diesel Fuel. Refer to Table 1  
Exercise safety precautions when working near flammable fuel.**

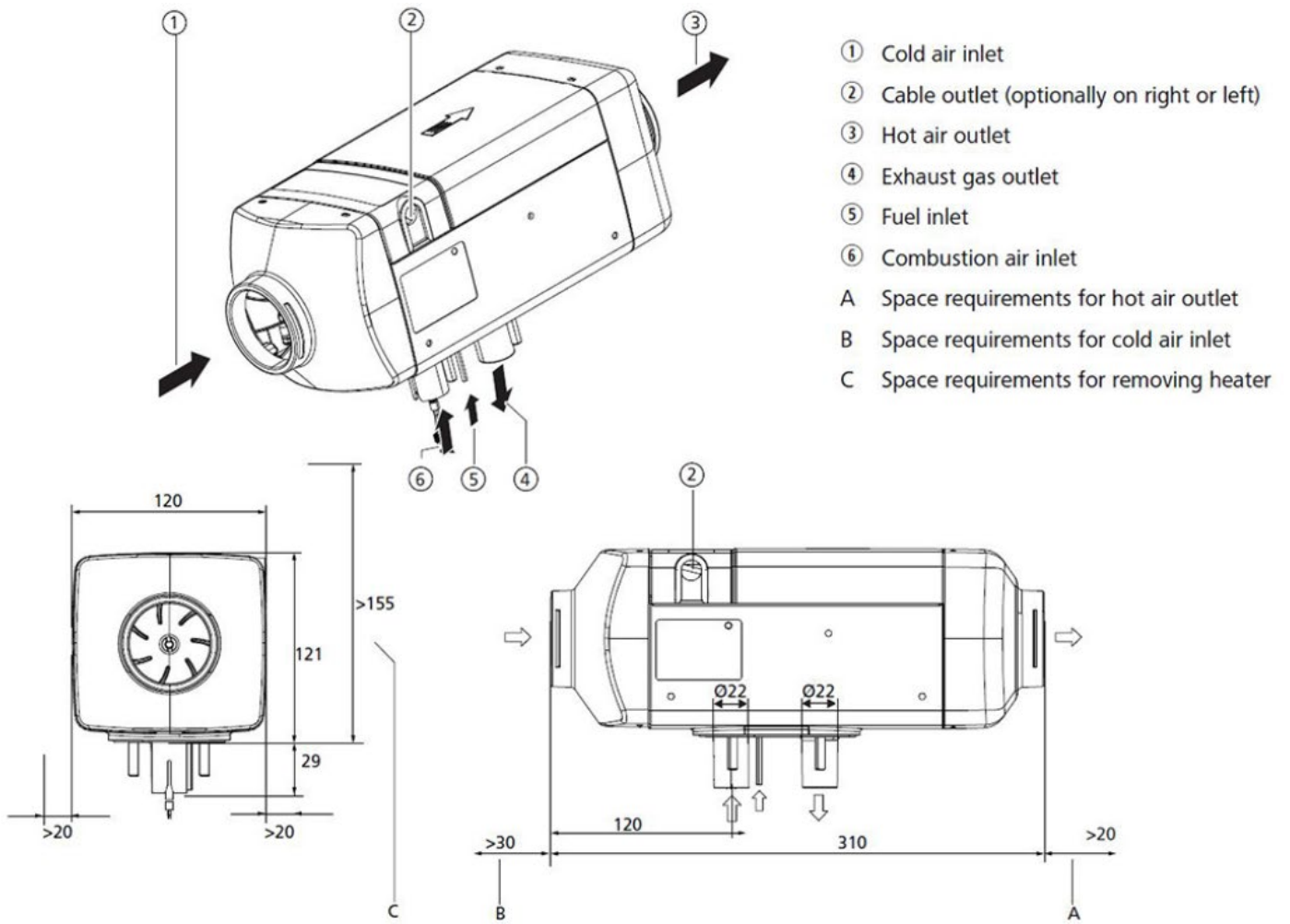


## CAUTION

**When heater is in use, the surface of the hot air inlet may become hot to the touch.  
Contact with skin may cause burns**

**DO NOT use heater to heat hazardous substances**



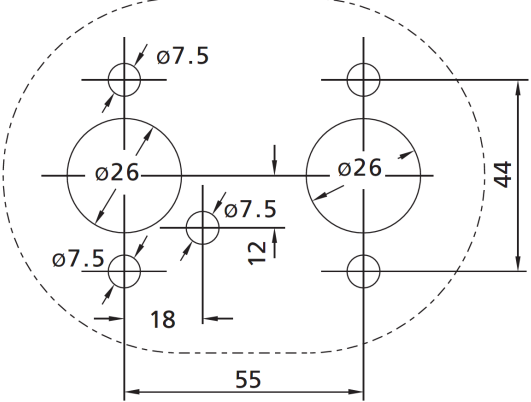


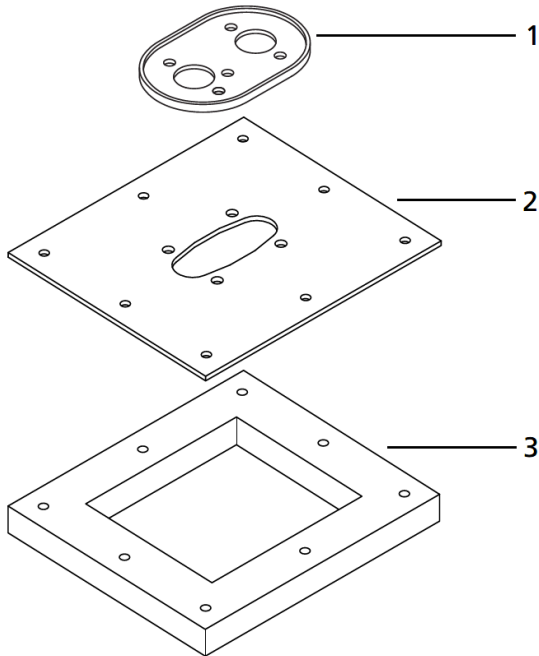





**Figure 6.0 Heater Dimensions**

## 6.1 Control Unit (Heater) Mounting

The heater can be mounted using one of two methods

- Direct mount – Heater mounted directly to cab floor
- Plate mount – Heater attached to mounting plate and plate attached to floor

1	<p>Determine the location for heater installation</p> <p>The heater must be installed with the minimum space requirements shown in Figure 6</p>	
2a		<p>Drill the cab floor according to the template as shown</p> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p><b>0.295" (7.5mm)</b></p> </div> <div style="text-align: center;">  <p><b>1.00" (26mm)</b></p> </div> </div>
2b		<p>Alternatively the heater can be mounted using the optional mounting plate</p> <div style="background-color: #FF8C00; padding: 5px; text-align: center; margin: 10px 0;">  <b>WARNING</b> </div> <p><b>The seal or foam gasket must be replaced each time the heater is removed and re-installed</b></p> <p>Mark hole locations for plate using plate as template</p> <p>Mark center of plate location</p> <p>Drill holes for mounting plate</p> <p>Drill hole for center opening</p> <ol style="list-style-type: none"> <li>1. Seal – Heater to vehicle floor or optional mounting plate</li> <li>2. Mounting Plate – facilitates installation on corrugated cab floors</li> <li>3. Gasket – Seals area between mounting plate and cab floor</li> </ol> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p><b>0.275" (7.0mm)</b></p> </div> <div style="text-align: center;">  <p><b>4.00" (100mm)</b></p> </div> </div>

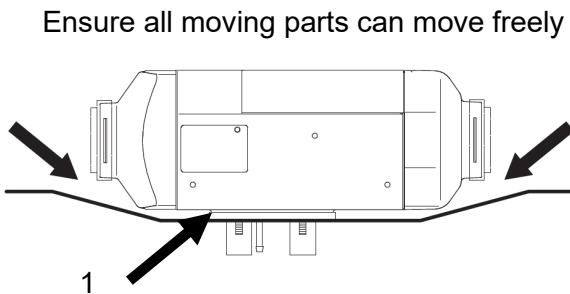
3



Install the hot air inlet grille

Align the tabs on the air inlet with the openings in the grille

4



Install the (1) mounting gasket on the bottom of the heater

Install the heater to the cab floor.

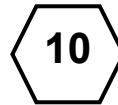
Tighten the mounting nuts

**CAUTION**

When using the optional mounting plate and closed cell foam gasket, do not over tighten the mounting bolts. Doing so will cause the mounting plate to warp and result in stress damage to the heater and fan motor.

**NOTICE**

After installation, check that the heater casing is not in contact with any parts of the vehicle body. Failure to do this may result in the hot air fan binding internally

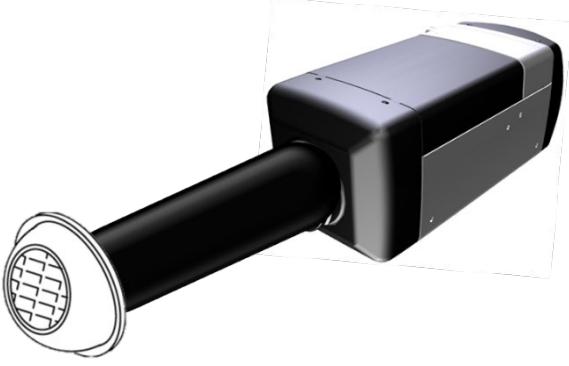
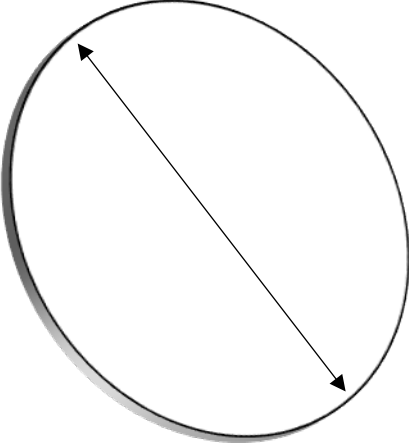

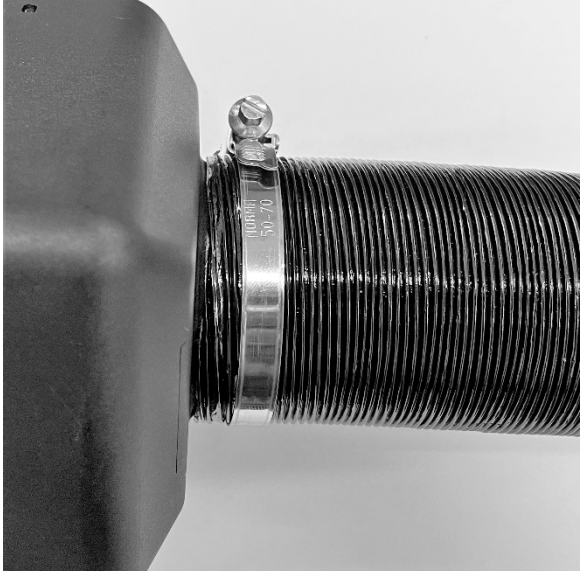


6Nm ±1Nm

## 6.2 Hot Air Ducting



The heater must not be integrated into the vehicle or CCU air system.

1	 A black rectangular heater unit with a long black cylindrical duct extending from one end. The duct ends in a circular mesh grille. The unit is shown from a three-quarter perspective.	Determine the location for the hot air vent and duct routing
2	 A diagram of a circular hole with a double-headed arrow indicating its diameter.	Drill hole for hot air vent  2.375" (60mm)
3	 A close-up photograph of a metal clamp being tightened onto a corrugated metal duct. The clamp is a silver-colored metal band with a screw and nut. The duct is connected to a black rectangular component.	Install clamps on the hot air duct Connect hot air duct to the heater and outlet Tighten clamps

### 6.3 Fuel System Components and Locations

The air heater fuel system components must be installed in the configuration shown in Figure 6.1 and be located within the height/length requirements given in Table 6.1. Additional installation requirements are provided in Table 6.0

1	Maximum suction height	3'-3" (1m)
2	Maximum suction length	16'-4" (5m)
3	Maximum delivery length	32'-9" (10m)
4	Maximum delivery height	9'-9" (3m)

A	Fuel Pickup Tube
B	Fuel Line Connector
C	Fuel Line
D	Fuel Filter
E	Fuel Metering Pump

Table 6.1 Air Heater Fuel System Components and Height/Length Requirements

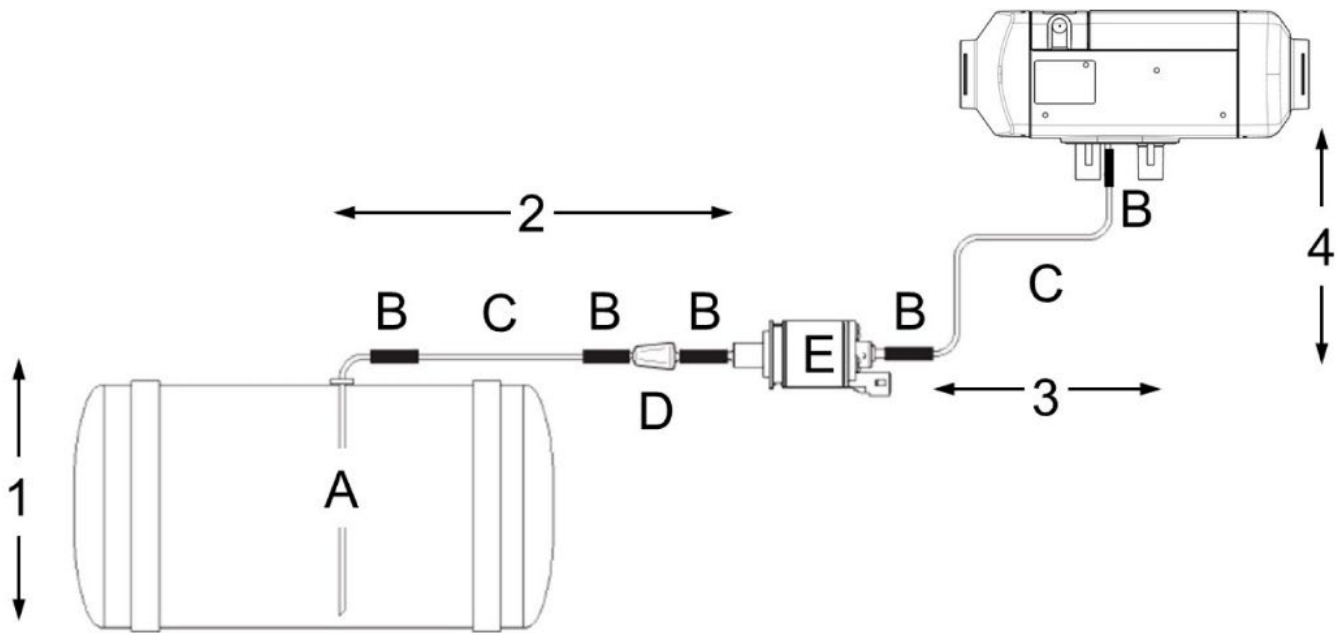


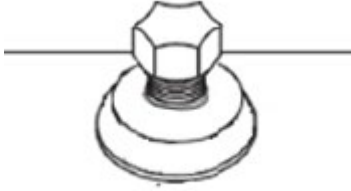
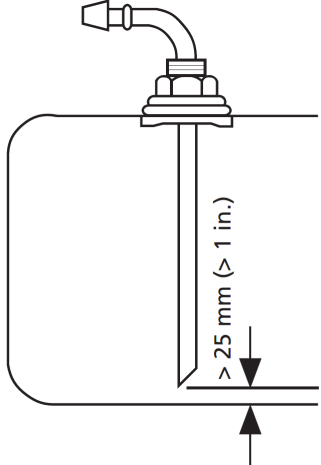
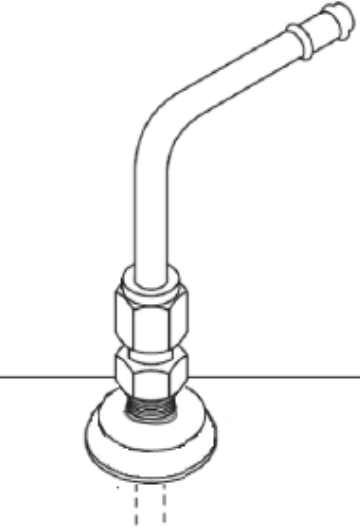

Figure 6.1 Air Heater Fuel System Components and Locations

## 6.4 Fuel Pickup Installation

The fuel pickup can be installed using one of two methods

- Fuel tank plug (Preferred Method) – Existing ¼” NPT plug in tank removed and fuel pickup installed
- Drill fuel tank – 1.00 (25.4) hole drilled in top of fuel tank

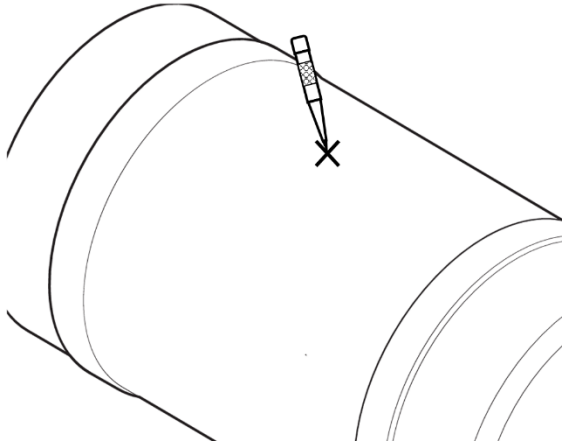
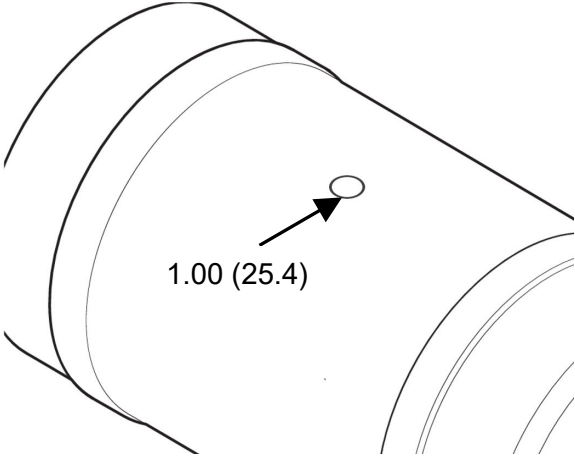

### 6.4.1 Fuel Tank Plug (Preferred Method)

1		Remove existing ¼” NPT plug from fuel tank
2		Determine length of pickup tube when installed. Cut end of standpipe at 45° angle. Deburr end of tube
		 Apply thread sealant to external threads on pickup tube Insert pickup tube assembly into tank port Tighten lower nut until snug

## 6.4.2 Drill Fuel Tank (Alternate Method)



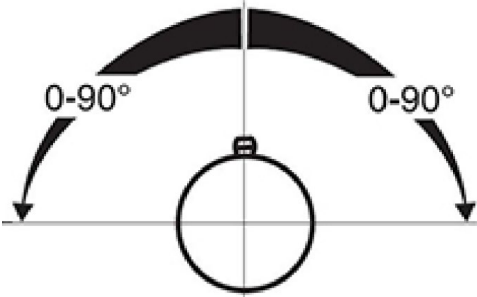
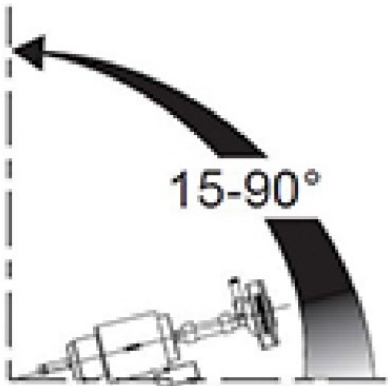
Care must be taken to prevent debris from entering the fuel tank during the drilling process. The following best practices will reduce the likelihood of debris entering the tank.

- Remove any dirt/debris from exterior of tank before drilling
- Use hole saw instead of step-bit
- Apply grease to the pilot bit and hole saw to catch debris
- Vacuum metal shavings while drilling

1		Mark drill location with center punch.
2	 <p>1.00 (25.4)</p>	<p>Drill 1.00" (25.4mm) hole in the top of the fuel tank. Deburr edge</p>  <p>1.00" (25.4mm)</p> <p><b>NOTICE</b></p> <p>Do not allow debris to enter tank while drilling. Debris in the tank may interfere with the operation of the APU and tractor engine.</p>

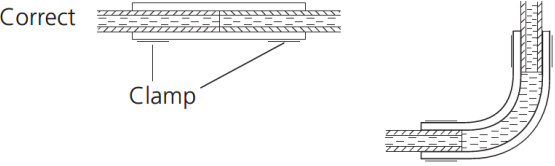
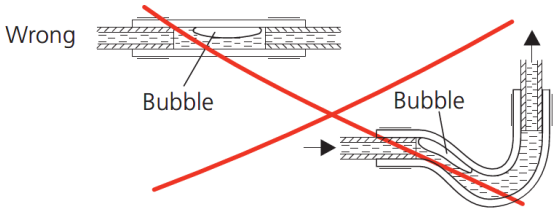
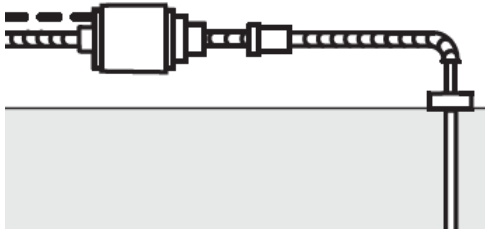
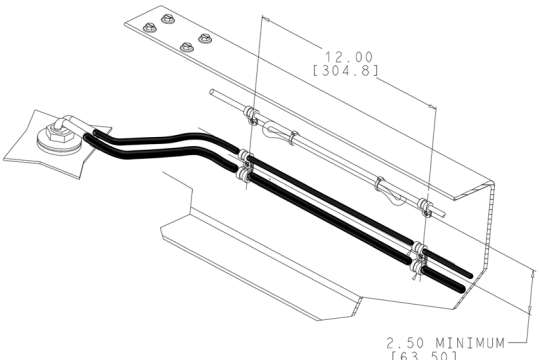

## 6.5 Fuel Metering Pump Installation

The metering pump must be installed in a cool place as close as possible to the tank (see Figure 8). The metering pump and fuel lines must not be installed within range of the radiated heat from hot vehicle parts. A heat shield must be used if necessary.

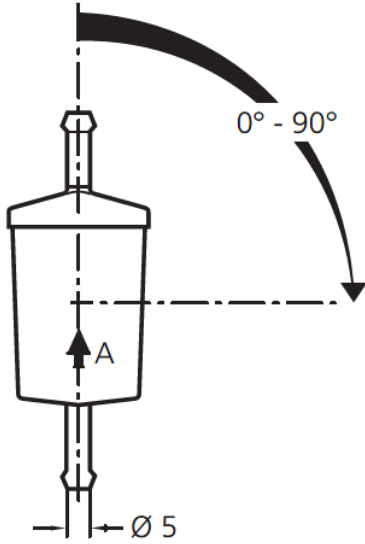
<p>1</p>		<p>Drill mounting hole for fuel metering pump on solid surface.</p>  <p><b>0.25" (6.0mm)</b></p>
<p>2</p>	  <p>Damper Orientation</p>	<p>Install the metering pump in the vibration dampening clamp</p> <p><b>Note: The metering pump inlet is opposite the electrical connection</b></p> <p>Rotate so that the damper is oriented as shown</p>
<p>3</p>	 <p>Metering Pump Angle</p>	<p>Position metering pump at mounting location and adjust angle as shown</p> <p>Secure clamp with hardware</p>



## 6.6 Fuel Line/Filter

<p>1</p>	<p>Correct </p> <p>Wrong </p>	<p>Install fuel line coupler on the fuel pickup tube</p> <p>Insert fuel line into the fuel line coupler and secure both ends of the coupler with clamps</p> <p><b>Note: Tighten fuel clamps until the two tabs are touching each other. Failure to do so will result in air leaking into the fuel system and poor performance of the heater, or a no-start condition.</b></p>
<p>2</p>	 	<p>Route fuel line to the fuel filter location</p> <p>Cut fuel line to length</p> <p><b>Note: Only use blade type cutter when cutting fuel lines. DO NOT use diagonal cutters or similar tools to cut fuel line as it will cause the line to collapse and result in fuel restriction.</b></p> <p>Support fuel line every 12.00" (305mm)</p> <p>Route fuel lines below electrical wiring</p> <p>Maintain minimum 2.50" (63.5mm) separation between fuel line and wiring</p> 

3



Attach fuel line coupler to the inlet and outlet of the fuel filter

Connect the fuel line from the tank to the fuel filter inlet coupler. Secure with clamp

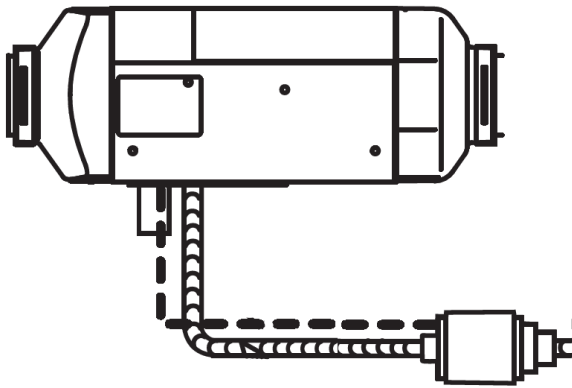
**Note: Tighten fuel clamps until the two tabs are touching each other. Failure to do so will result in air leaking into the fuel system and poor performance of the heater, or a no-start condition.**

Connect fuel line to fuel filter outlet coupler. Secure with clamp.

Orient fuel filter as shown. Position vertically if possible

Route fuel line to fuel metering pump

4



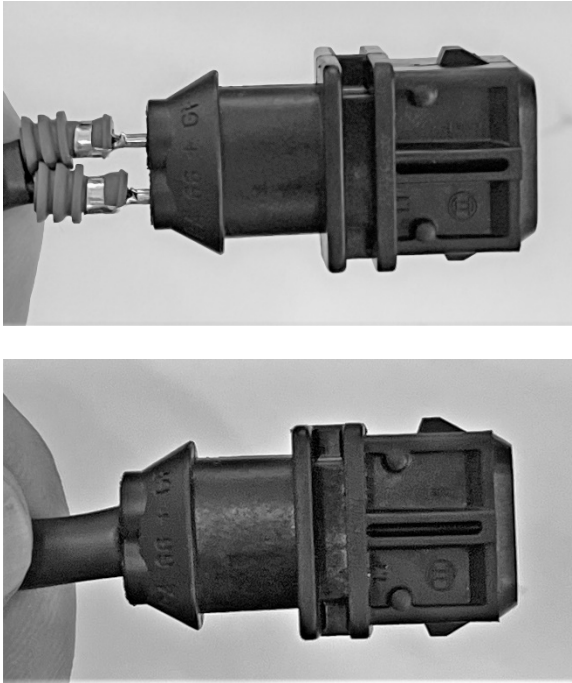
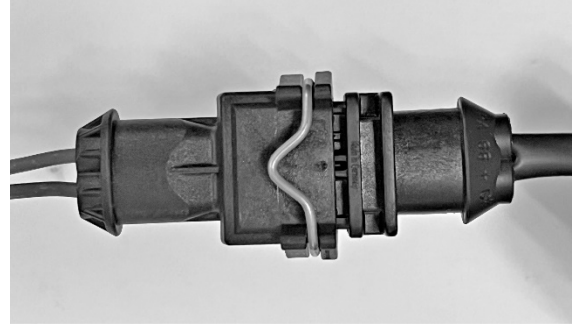
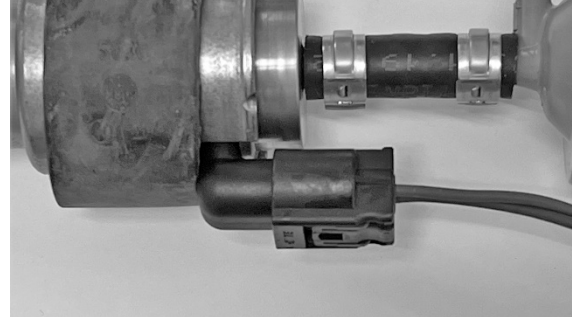
Attach fuel line couplers to metering pump inlet and outlet

Connect fuel line from the tank to the metering pump inlet. Secure with clamp

Connect fuel line to metering pump outlet (damper)  
Attach fuel line coupler to fuel inlet on the heater

Connect fuel line from metering pump to the coupler on the heater. Secure both ends of the coupler with clamps

## 6.7 Fuel Pump Harness

1		<p>Install the connector on the terminals that come out of the heater</p> <p><b>Note: Wires are not polarity sensitive</b></p> <p>Push the wires into the connector until an audible click is heard</p> <p>Pull on the connector/wire to verify installation</p>
2		<p>Connect the fuel pump harness to the fuel pump connector on the heater</p> <p>Route harness from the heater to the metering pump</p> <p>Secure harness every 12.00" (305mm)</p>
3		<p>Connect the metering pump connector to the metering pump</p>

## 6.8 Combustion Air/Exhaust

**! WARNING**

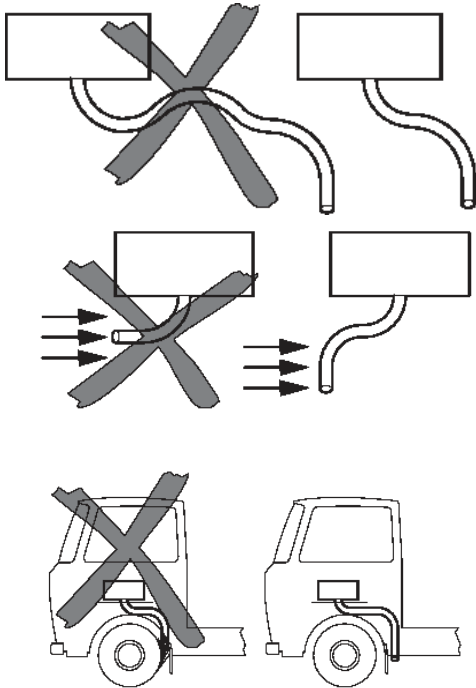
**NOTICE**

An intake silencer must be fitted if the intake hose length is shorter than 0.6 m.

The combustion air must be extracted using a combustion air line from a position that is as cool as possible and protected from splashing water. Do not use an exhaust line as the combustion air line, as this may result in damage to the fuel pump harness.

The combustion air opening must not be under the minimum water drive-through level for the vehicle. See the statutory regulations for the installation for further regulations.

1

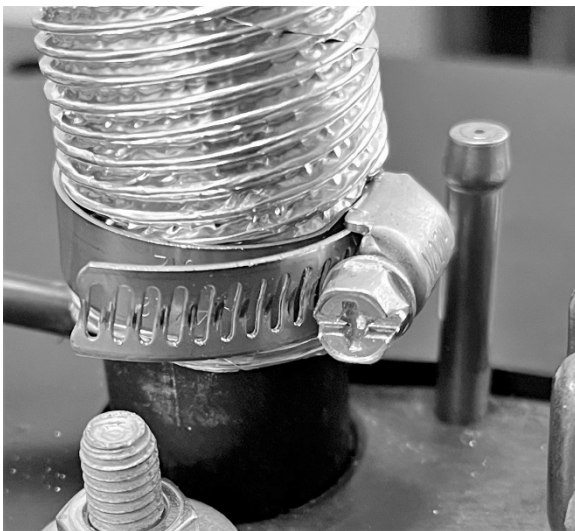


Determine how the combustion air and exhaust lines will be routed

Both lines are to be installed falling away from the heater. If this is not possible, a condensate drain hole with a diameter of 4 mm must be made at its lowest point.

The lines must be located so that they cannot become clogged with dirt.

2

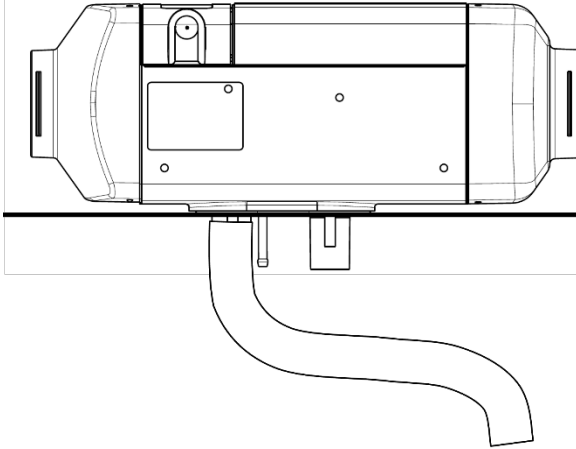


Install clamp on the combustion air line in the orientation shown.

Install combustion air line on the combustion air inlet tube on the bottom of the heater (plastic)

Tighten the clamp

3



Route the combustion air line from the heater to the intake point.

Cut line to length as required

Secure line every 12.00" (305mm)

4

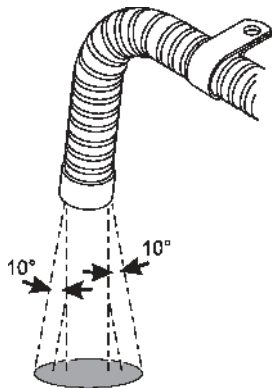


Install clamp on the exhaust line in the orientation shown

Install exhaust line on the exhaust outlet tube on the bottom of the heater (metal)

Tighten the clamp

5



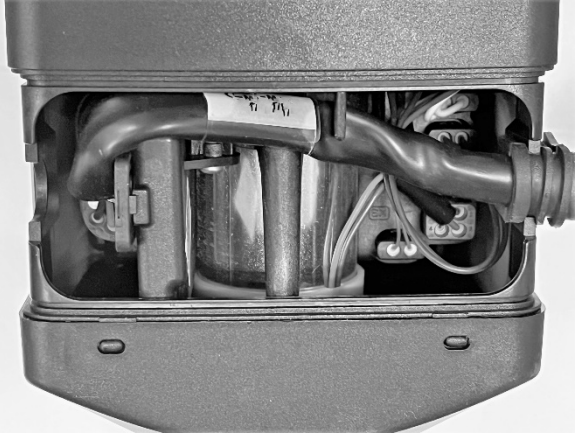

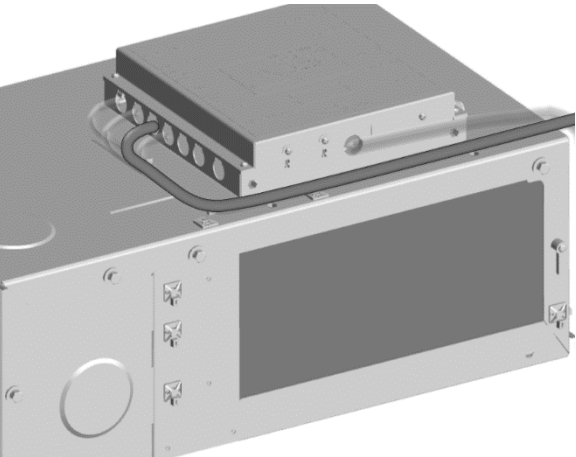
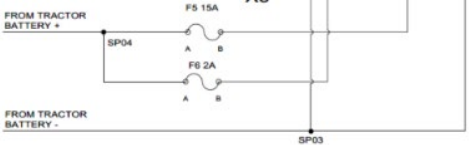
Route the exhaust line from the heater to the intake point.

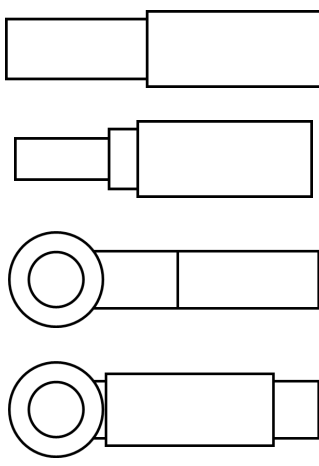
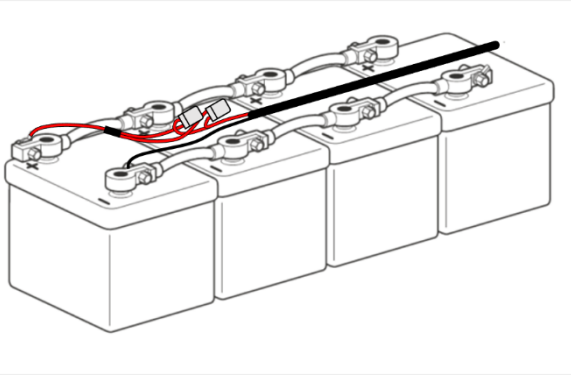
Cut line to length as required

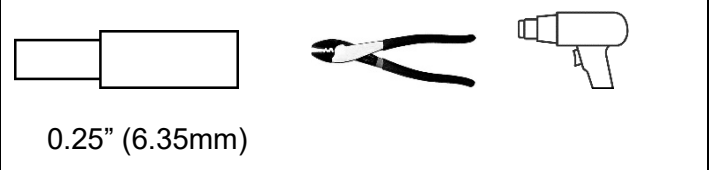
Orient end of exhaust line as shown

Secure line every 12"

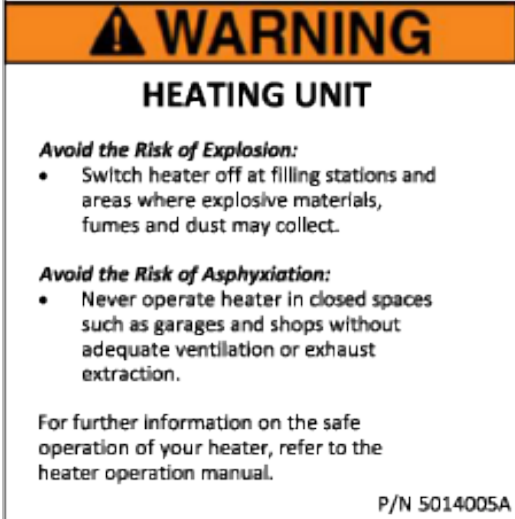
## 6.9 Electrical Connections

1		<p>Remove the control unit cover on the heater, and connect the wiring harness plug to the control unit.</p> <p><b>Note: Before using the heater for the first time install the control unit cover to prevent the escape of hot air (heater overheating).</b></p>
2		<p>Adjust the cable grommet position on the wiring harness to ensure that it seals properly against the control unit and cover.</p> <p><b>Note: The cable passage can be placed at either the left or right side of the control unit</b></p> <p>Before using the heater for the first time fit the control unit cover to prevent the escape of hot air (heater overheating).</p>
3		<p>Route the leg of the harness containing the J9 connector to the left side of the CCM</p> <p>Connection to the CCM will be made in a later section</p>
4		<p>Route the leg of the harness containing the B+ and ground wires to the tractor battery box.</p> <p>Secure the harness every 12.00"</p>

5		<p>Install heat shrink tubing on the end of the B+ (red) and ground (brown) wires</p> <p>Strip the ends of the wires to 0.25"(6.35)</p> <p>Crimp ring terminal on the end of the wires</p> <p>Position heat shrink over the barrel portion of the terminal.</p> <p>Apply heat to shrink tubing</p>
6		<p>Remove the nuts from the tractor battery B+ and B- connections.</p> <p>Clean the connection</p> <p>Install the red wire/ring terminal on the B+ post</p> <p>Install the black wire/ring terminal on the B- post</p> <p>Tighten nuts to battery manufacturer/OEM specification</p> <p>Apply corrosion protection to battery connections</p> <p>Secure fuse holders/harness with cable ties.</p>



## 6.10 Heater Caution Labels

1		<p>Clean area near filler neck on fuel tank</p> <p>Apply heater warning decal to fuel tank next to filler neck</p>
---	---	--

2



**▲ CAUTION**

When heater is in use, the surface of the hot air outlet may become hot to the touch. Contact with skin may cause burns

Clean area near hot air outlet

Apply hot air outlet caution label near hot air outlet



## 7. Fuel System

The APU uses the same fuel tank as the truck. Fuel is drawn from the tank using the fuel pick-up tube supplied in the kit. Fuel lines from the APU engine connect to the pick-up tube. The location of the fuel pick-up and routing of the fuel lines should be made according to the installation requirements in Table 7

Component	Requirement
Fuel pickup	Enter from top of tank
	Allow for connection of fuel lines
	Not subject to physical damage
	Does not interfere with any truck fuel connection, baffles, or fuel level sensor
	Drilling debris not allowed to enter tank
	Minimum 1.0" above bottom of fuel tank
	12.0" minimum distance between supply and return tubes
	End of tube cut at 45° angle
Fuel Lines	Routed away from sharp edges, pinch points, or subject to physical damage
	Does not kink, form traps, or loops
	Minimum distance to heat source
	Secured every 12.0"
	Not routed along with high/low voltage cables or harnesses
	Minimum 2.5" spacing between fuel lines and electrical cables/harnesses
Component	Recommendation
Fuel Pickup	Located at center of fuel tank
	Above tractor fuel pickup
	Installed in tractor OEM block-off plate

Table 7 Fuel System Installation Requirements

### NOTICE

Fuel pickup must enter from top of tank

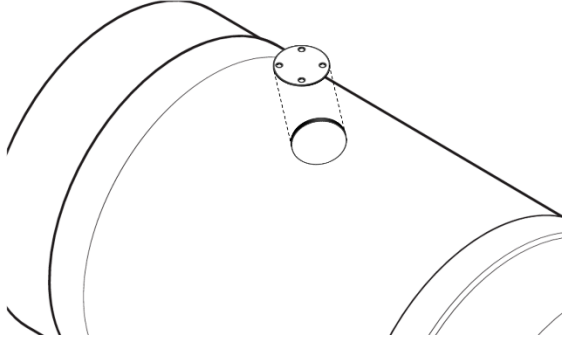
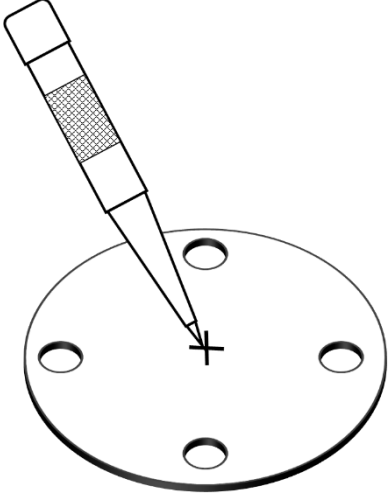
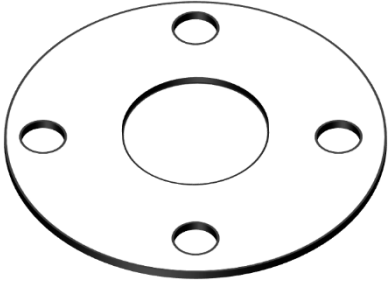



### WARNING

**Diesel Fuel. Refer to Table 1**  
**Exercise safety precautions when working near flammable fuel.**

## 7.1 Fuel Tank Preparation

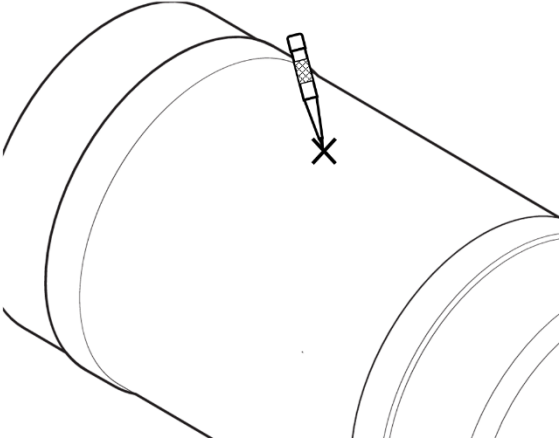
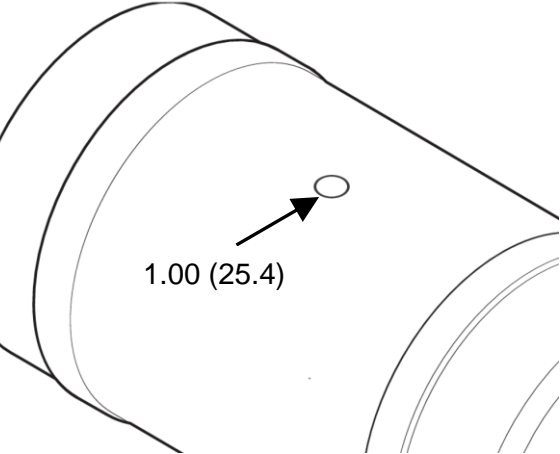

### 7.1.1 Fuel Tank Plate (Preferred Method)

1		Remove block-off plate from fuel tank
2		Mark center of plate with punch.
3		Drill hole 1.00 (25) with hole saw. Deburr hole
		

### 7.1.2 Drill Fuel Tank (Alternate Method)

Care must be taken to prevent debris from entering the fuel tank during the drilling process. The following best practices will reduce the likelihood of debris entering the tank.

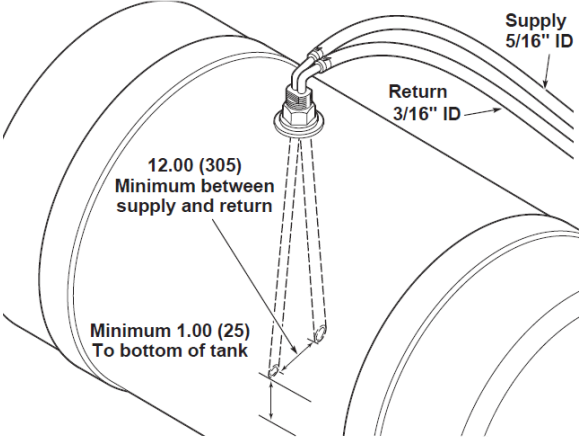
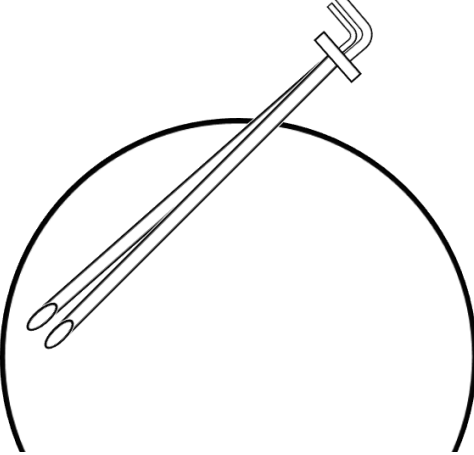
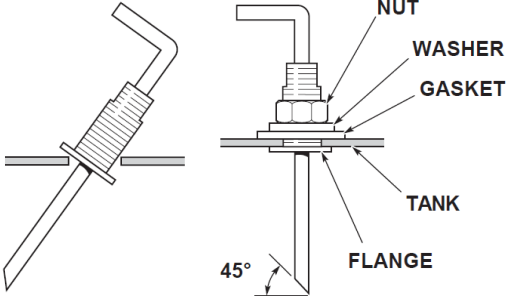
- Remove any dirt/debris from exterior of tank before drilling
- Use hole saw instead of step-bit
- Apply grease to the pilot bit and hole saw to catch debris
- Vacuum metal shavings while drilling

1		Mark the desired location on the tank with center punch
2		Drill hole using 1" hole saw. Deburr hole 

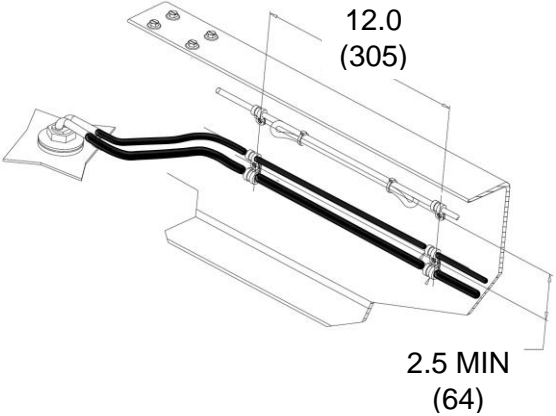

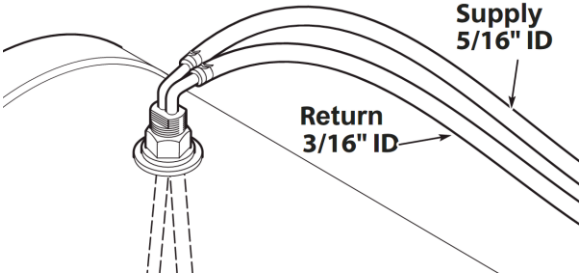
## NOTICE

**Do not allow debris to enter tank while drilling.  
Debris in the tank may interfere with the operation of the APU and tractor engine.**

## 7.2 Fuel Pick-up Installation

<p>1</p>	 <p>Supply 5/16" ID</p> <p>Return 3/16" ID</p> <p>12.00 (305) Minimum between supply and return</p> <p>Minimum 1.00 (25) To bottom of tank</p>	<p>Measure the depth of the fuel tank</p> <p>Cut the fuel pickup tubes to requirement in table 7</p>
<p>2</p>		<p>Separate supply and return tubes</p> <p>Squeeze fuel tube together and insert into tank</p>
<p>3</p>	 <p>NUT</p> <p>WASHER</p> <p>GASKET</p> <p>TANK</p> <p>FLANGE</p> <p>45°</p>	<p>Install the gasket, washer, and nut on the outside of the tank. Refer to Figure 7.3</p> <p>Tighten the nut until secure without distorting the gasket</p> <p>Re-install block-off plate if removed</p>

## 7.3 Fuel Lines

1		<p>Route and secure fuel lines from APU to the fuel pickup.</p>	<p><b>CAUTION</b></p> <p>Route fuel lines away from sharp edges, pinch points, and moving parts. Fuel lines must be protected from abrasion</p> <p>Keep fuel lines away from exhaust pipes or other heat sources</p>
2		<p>Cut fuel lines to length</p> <p><b>Note: Keep fuel lines capped until ready to make connection to pickup tube</b></p>	
3		<p>Position hose clamps over the ends of the fuel lines</p> <p>Insert the fuel pickup tubes into the end of the fuel lines.</p> <p>Connect the larger line to the larger tube, and the smaller line to the smaller tube.</p> <p>Secure fuel lines to fuel pickup using supplied hose clamps. Torque to in-lbs</p>	

## 8. CCU Installation

The CCU assembly is typically installed under the bunk in the sleeper. Before selecting the mounting location, consideration needs to be made for how the supply air ducts will be routed, and return air provided. There are several wiring harnesses that must be connected to the CCU, plan how these harnesses will be routed and secured prior to installation. The refrigerant hoses and evaporator drain connect to the CCU through openings in the bottom of the CCU. The electrical harnesses from the APU/condenser enter the cab through an opening that is external to the CCU. Refer to the corresponding sections in the manual as well as Table 8.0 for CCU mounting requirements

Component	Requirement
CCU	Installed inside the vehicle
	Mounted to solid floor. Do not mount to carpet.
	Refrigerant hoses must exit through the hole on the bottom of the CCU.
	Locate return air side of CCU as close as possible to return air vents
	Allow space for servicing CCU air filter and compressor section
	May not interfere with structural member of cab
	Minimum 7.00 (178) clearance for ducts
	Avoid tractor fuel and electrical lines
	Minimum vertical clearance from floor 12.00 (CCM top mount)
	Minimum vertical clearance from floor 9.50 (CCM remote mount)
	Minimum four mounting brackets to secure CCU to floor
Evaporator drain	Drain must be installed and exit through cab floor
	Locate away from electrical connectors and openings in fuel tanks

Table 8.0

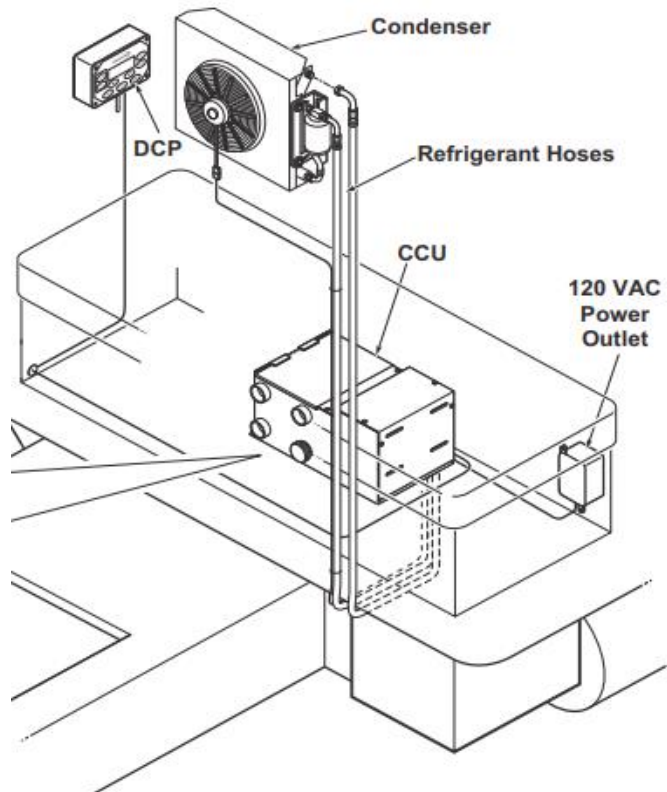


Figure 8.0 Typical CCU Installation

# 8.1 CCU Dimensions

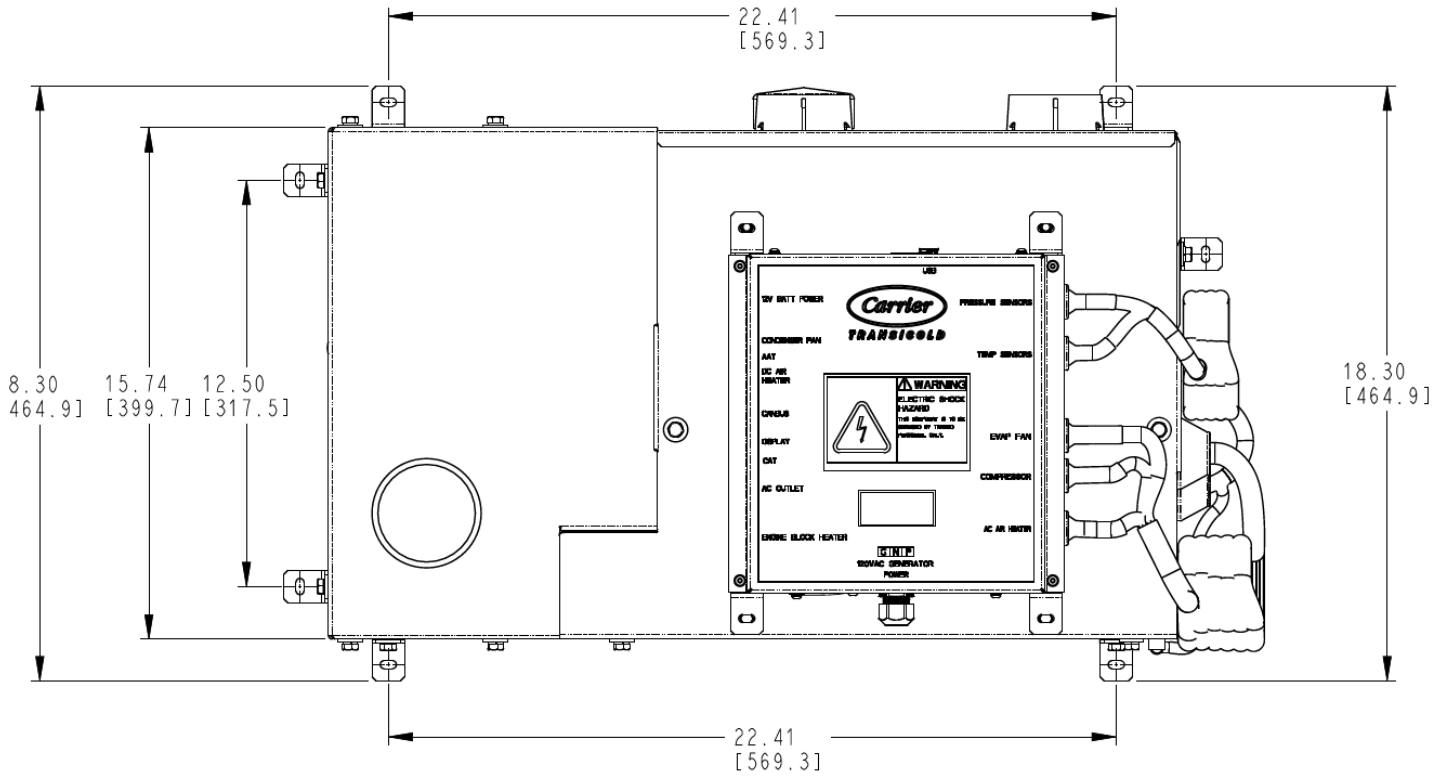


Figure 8.1 CCU Top Dimensions

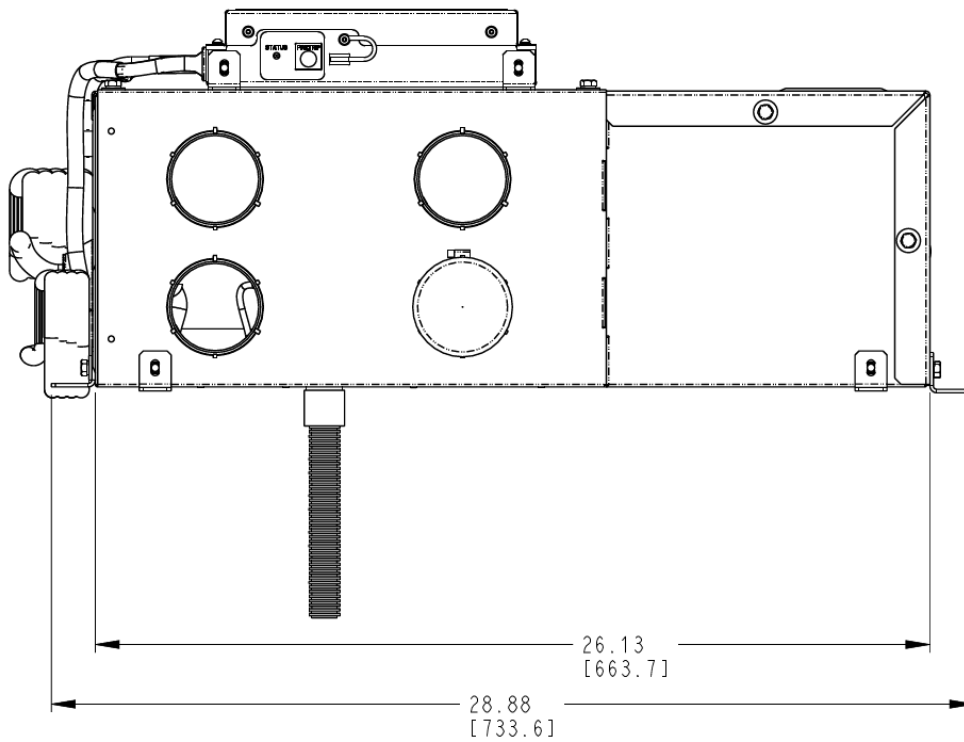
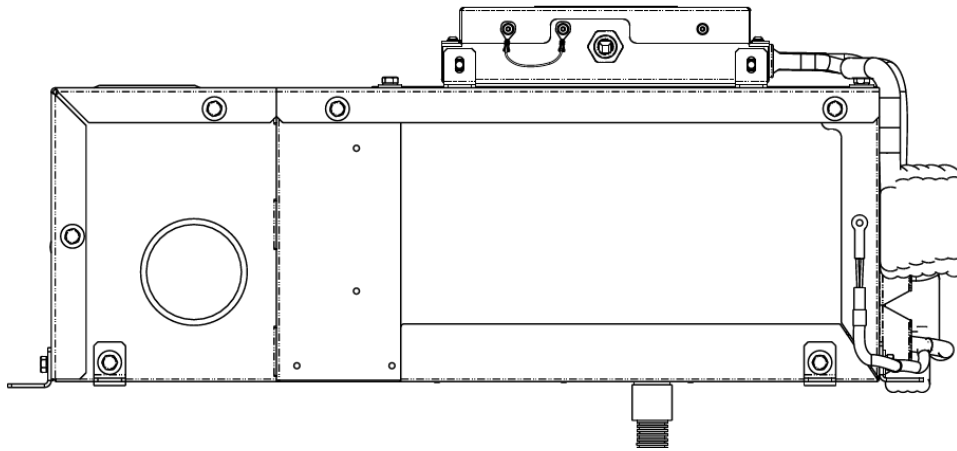
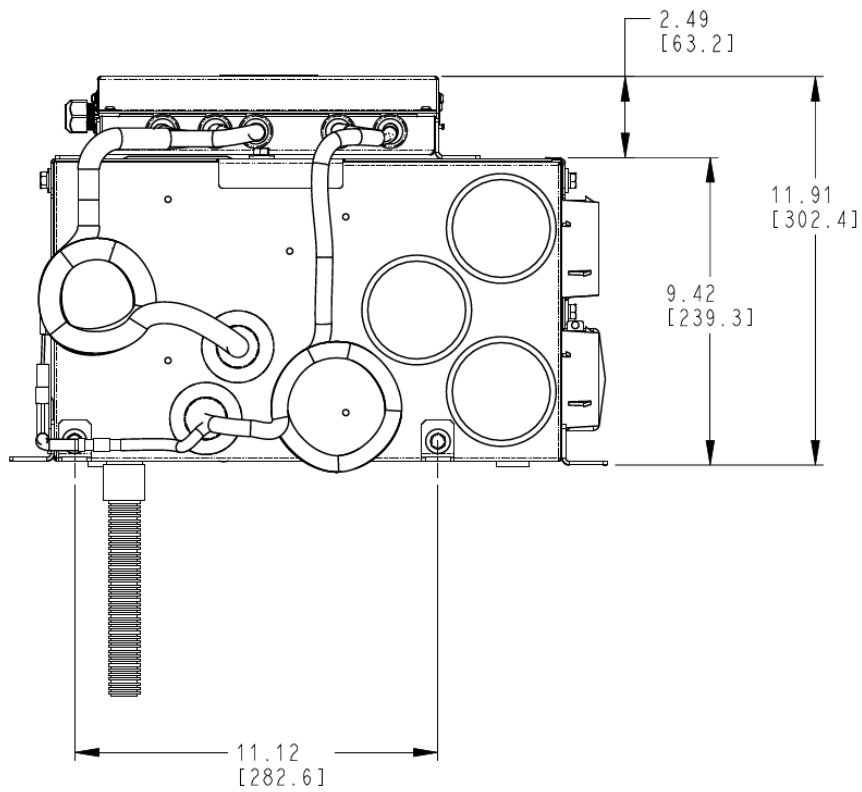


Figure 8.2 CCU Duct Side Dimensions



**Figure 8.3 CCU Air Intake Side Dimensions**



**Figure 8.4 CCU Alternate Duct Side Dimensions**



## 8.2 CCU Installation

### **WARNING**

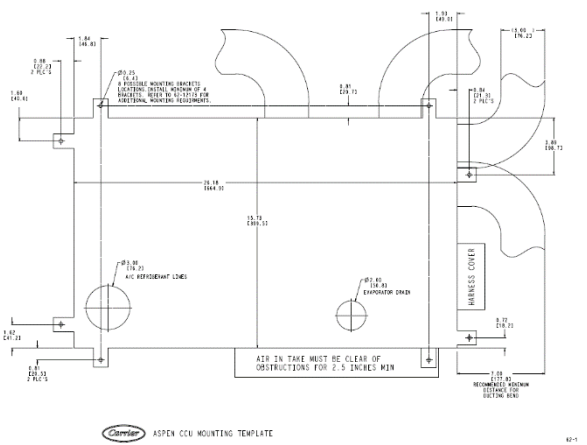
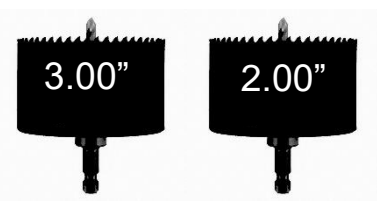
Do not cut, drill, or modify any structural member of the truck cab or chassis

### **CAUTION**

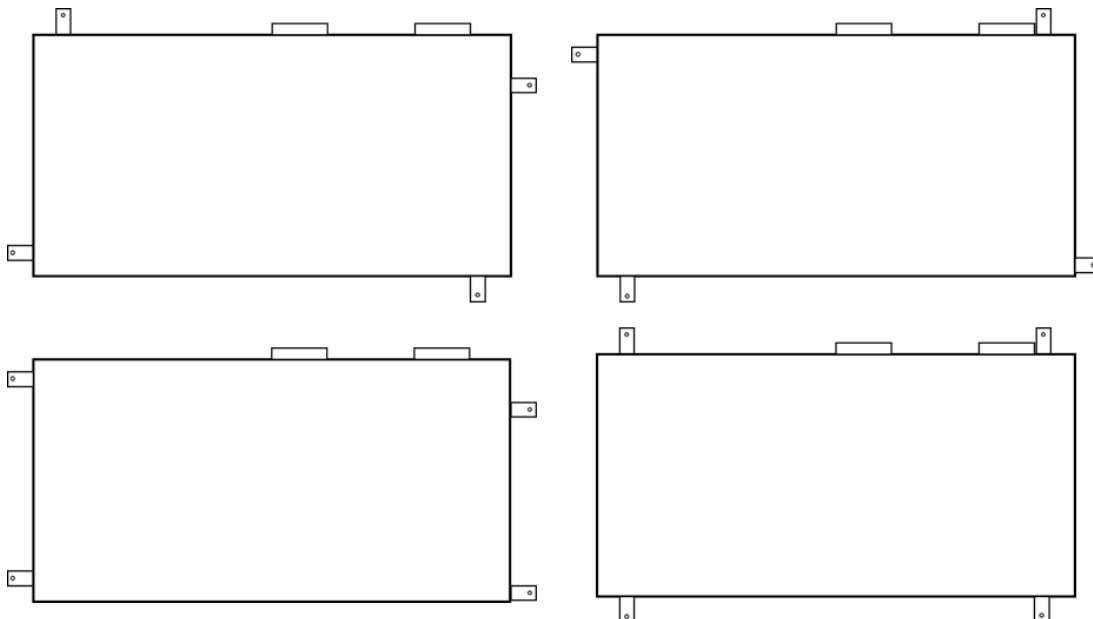
The CCU is heavy (78 lbs. kg). Do not drop.  
Use lifting device or team lift when lifting the CCU.

### **NOTICE**

The CCU may temporarily be positioned with the CCU air filter facing up to allow it fit in the truck cab.  
The CCU must be mounted flat on the cab floor using the supplied brackets.  
**DO NOT** drill additional holes in the CCU to attach the CCU to the cab floor.

1	 <p style="font-size: small;">Chrysler ASPEN CCU MOUNTING TEMPLATE</p>	<p>Determine CCU mounting location. Use the installation template included in the installation kit as a guide. Location must meet requirements listed in table 9.0</p> <p>If required remove carpet/padding under the CCU footprint</p> <p>Mark location for mounting locations, hoses, and drain openings</p>
2		<p>Drill holes in cab floor for electrical cables, evaporator drain and refrigerant lines</p> <div style="text-align: center;">  </div>

<p style="text-align: center; font-size: 24pt; font-weight: bold;">3</p>		<p>Install clamp and kazoo on evaporator drain hose</p> <p>Insert evaporator drain hose on evaporator drain tube on the bottom of CCU</p> <p>Secure clamp</p> <p>Pass the evaporator drain hose through the hole in the floor and position the CCU on the floor.</p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">4</p>		<p>Install the mounting brackets (4) to CCU leaving bolts loose.</p> <p>Vertical slot attaches to CCU</p> <p>Secure the CCU to the floor using the provided self-tapping screws</p> <p>Tighten mounting bolts</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><b>10</b></p> </div> <div style="text-align: center;">  <p><b><math>\frac{7}{16}</math></b></p> </div> </div> <p><b>4 ft-lb</b></p>



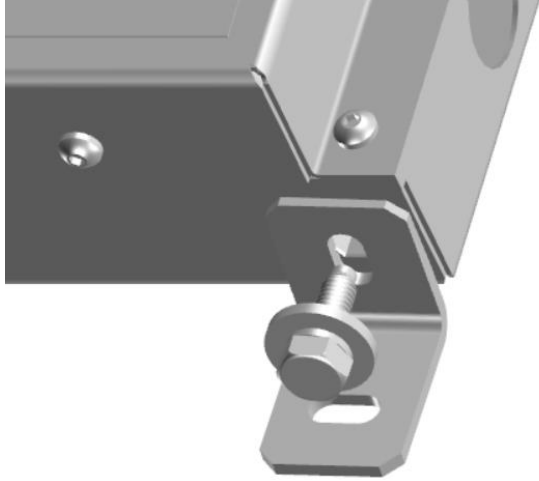

**Figure 8.5 CCU Mounting Bracket Location Options**

## 8.3 CCM Installation

The standard mounting location for the CCM is on the top of the CCU. The CCM can also be remotely mounted for applications with reduced bunk height. When remotely mounting the installer is responsible for selecting a location that meets the requirements listed in table 9.1. Consider how the module will be attached and harnesses routed/secured when selecting the location. Mounting dimensions are given in Figure 9.6.

Component	Requirement
CCM	Installed inside the vehicle
	USB Port, status indicator, and pre-trip button accessible
	Strain relief required for all cables and harnesses
	Mounted to solid surface. Do not mount to carpet.
	May not interfere with structural member of cab
	Avoid tractor fuel and electrical lines
	Do not modify, shorten, or lengthen harnesses that connect to the CCM
	Minimum four mounting brackets to secure CCM

### 8.3.1 Top Mount (Standard)

<b>1</b>		<p>Install the mounting brackets to CCM leaving bolts loose</p> <p>Note: Vertical slot attaches to CCM</p>
		 <p><b>4 ft-lb</b></p>
<b>2</b>		<p>Position CCM so that generator cable opening faces return air filter</p> <p>Secure the CCM brackets to the top of the CCU.</p>



10

4 ft-lb

## 9. Ducting

The way the supply and return air components are installed affects cooling and heating performance. Before installing any of the ducts or vents consideration must be given to where they will be located and routed. Refer to Table 9 for supply and return air installation requirements. The preferred method for supply air installation is to use the ducts and diffusers supplied in the kit. If the supply air ducts will be connected to the OEM system, it is the installer's responsibility to provide a means of preventing backflow through both the CCU and OEM system. Connections to the OEM system may not interfere with operation of the OEM HVAC system.

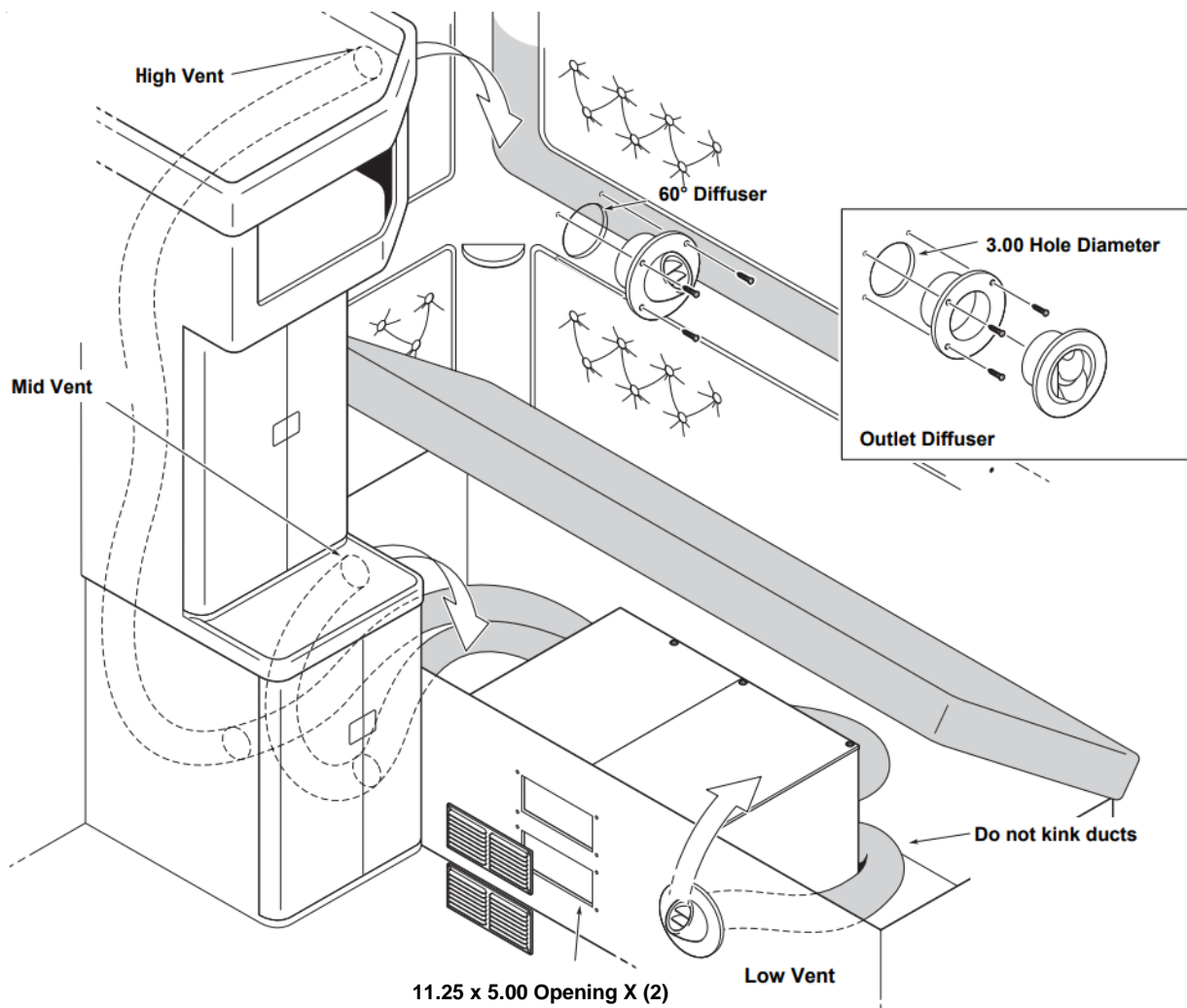


Figure 9.0

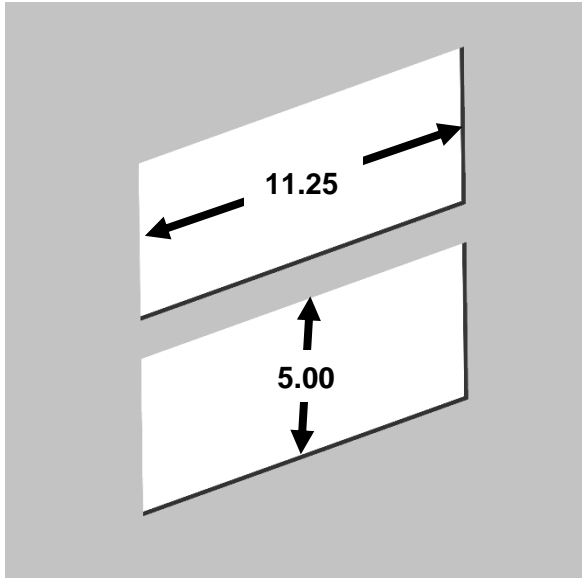

Component	Requirement
Return Air	Two return air vents required
	Minimum opening size behind vents 11.25x 5.00 (286x127)
Supply Air	Three CCU outlet ports/vents must be used
	Cap unused outlets on the CCU
	Outlets not pointed directly at the AI
	Low – Locate vent near the floor
	Mid - Locate vent 30.00-36.00 (762-914) above floor
High - Locate vent as close as possible to bunk roof	
Duct	Minimum duct bend radius 7.00 (178)
	Support every 12.00-16.00 (305-406)
	No loops, sags, or traps

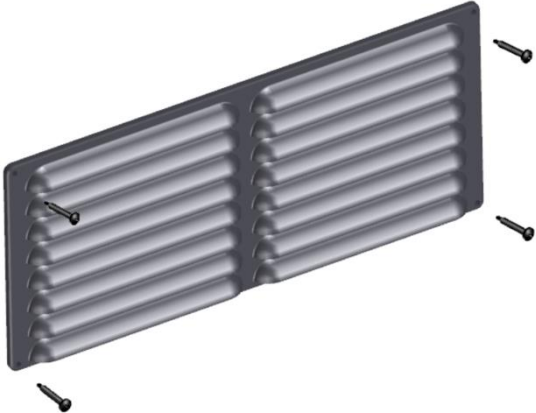

**NOTICE**

Return air to CCU is essential.

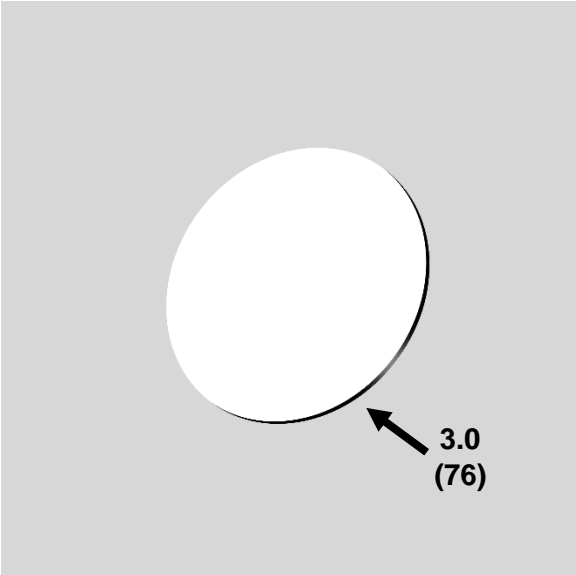

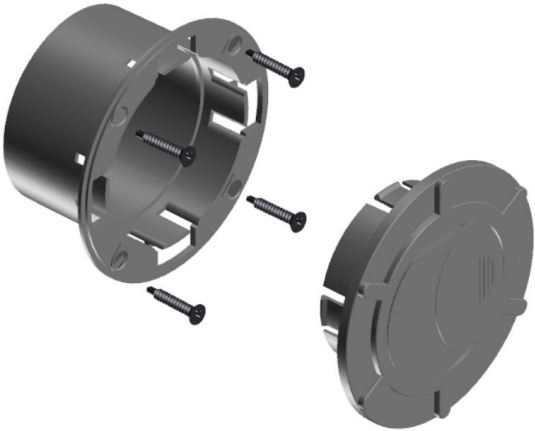

Avoid connecting the ductwork to the OEM system. If the system is connected to the OEM system, it is the responsibility of the installer to ensure correct airflow throughout the system and limit back flow through either the ComfortPro or the OEM system. Make sure supply air is not directed at the CAT sensor.

Return Air

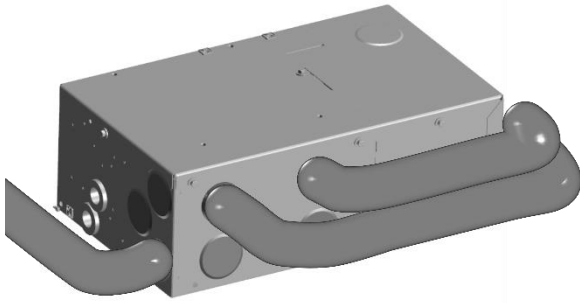
1		<p>Determine location for return air vents</p> <p>Cut (2) 11.25 x 5.00 openings for return air</p>
		

2		<p>Attach return air vents using supplied self-tapping screws (black)</p>
	<p>#2 </p>	

## Supply Air

1		<p>Determine location for supply air vents</p> <p>Cut 3.00" holes at vent locations using hole saw</p> <p>Debur hole.</p>
		
2		<p>Attach supply air collar with self-tapping screws (silver).</p> <p>Insert diffuser into collar and snap in place.</p>
	<p>#2 </p>	

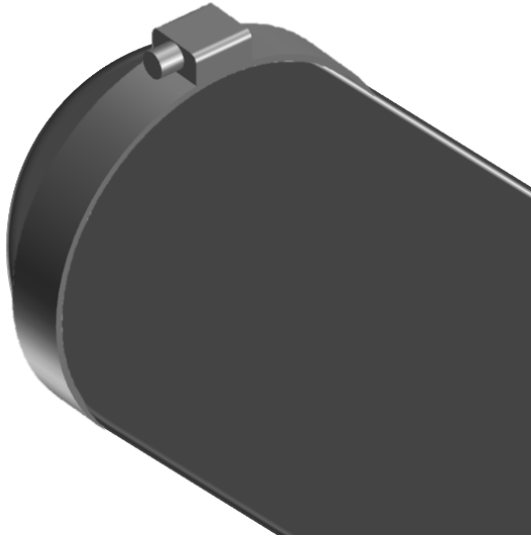
3



Route the ducts from CCU to the supply air vents

Support ducts as required

4



Install band clamps on ends of supply air ducts

Connect the supply air ducts to the outlets at the CCU and supply air collars

Tighten band clamps



35 in-lbs



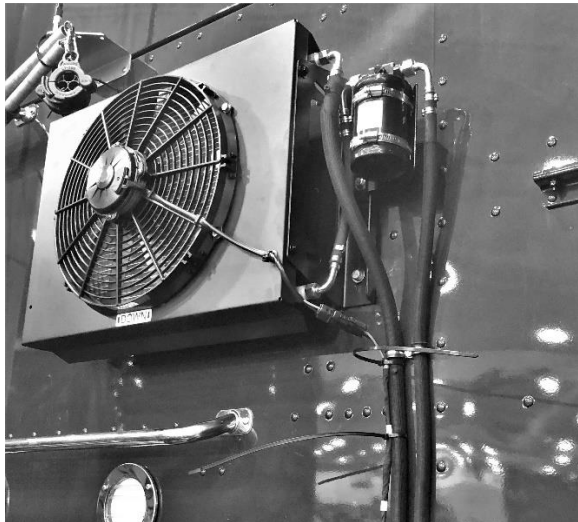
## 10. Refrigerant Hose

Refrigerant hoses connect the condenser assembly on the outside of the truck to the CCU under the bunk. The hoses are pre-formed for ease of installation. Install of the hoses should be made according to requirements in Table 10.0.

Component	Requirement
<b>Refrigerant Hose</b>	5.0" minimum hose bend radius
	Self-closing wrap or equivalent applied to hoses to prevent abrasion
	Avoid installing hoses over sharp edges, pinch points, or areas subject to damage
	Hoses installed 4" (min) from truck exhaust or other heat source
	Discharge and liquid lines separated
	Allow slack in hoses to allow for movement of the truck cab
	Loops or traps not permitted
<b>Clamp Installation</b>	16" along length of hose (minimum)
	1-2" from each end of hose bend radius
	6-8" of hose fitting connections
<b>AAT Sensor/Bracket</b>	Bracket secured to bottom of condenser frame
	AAT orientation
<b>Condenser Harness</b>	Secured every 12.00" (300)

Table 10.0

1



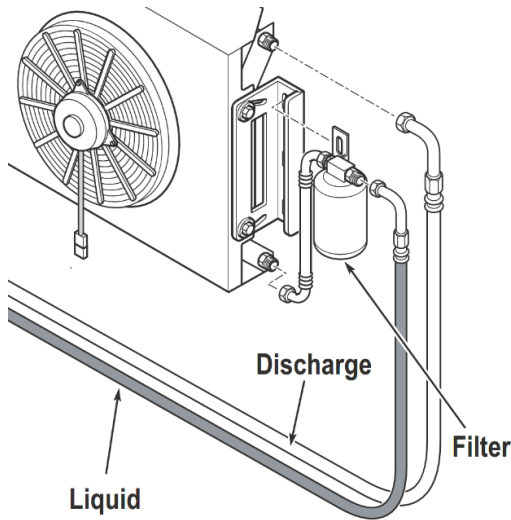
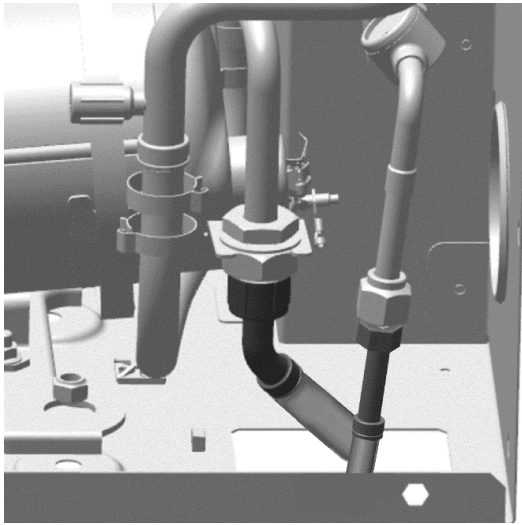
Determine hose routing from the CCU to the condenser

Apply self-closing wrap to hoses (Section 17)

Route hoses from CCU to condenser

Hose	From	To
Discharge	Compressor	Condenser inlet (top)
Drier	Condenser outlet (bottom)	Filter drier inlet (left)
Liquid	Filter drier outlet (right)	Sight glass/strainer

2



Remove the plastic cap for the line being installed

**NOTICE**

**DO NOT** remove caps until ready to make connections

**DO NOT** over tighten connections

**DO NOT** twist or stress tubes when tightening hoses.

**DO NOT** bend tubes to adjust alignment/fit

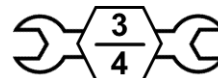
**Use backing wrench**

Lubricate the O-ring with oil

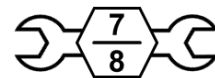
Install hose fitting on connection at the CCU/Condenser

Tighten fittings

Backing wrench must be used when tightening fittings



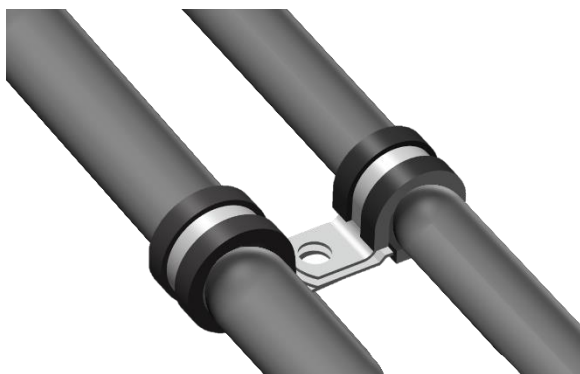
11-13 ft-lb



15-20 ft-lb



3



Secure hoses with P clamps as shown

Drill pilot holes

Attach clamps with screws

**Notice**

**P-clamps must capture the hose to eliminate any pre-loading of the hose assembly on the fitting connection points.**



Liquid (-9)

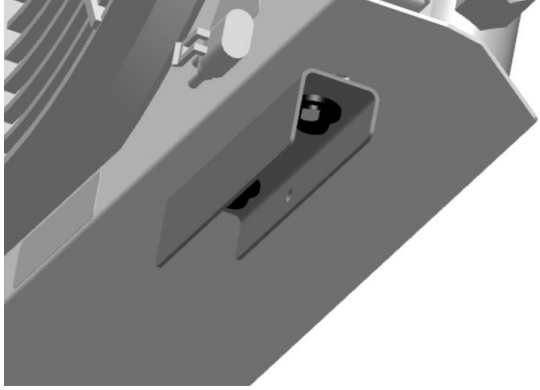
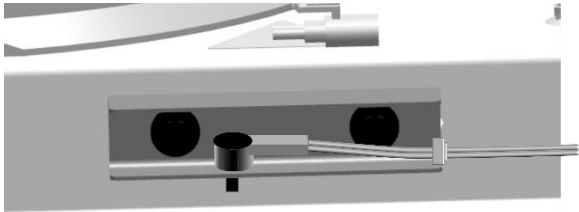



Discharge (-11)

3/16



## Ambient Air Temperature (AAT) Sensor Bracket/Harness

1		<p>Attach the AAT bracket to the bottom of the condenser frame. The longer leg of the bracket faces outward</p>
2		<p>Secure the AAT to the AAT bracket with push-on connector. Orient the sensor as shown.</p> <p>Secure the AAT wires to the bracket with edge clip and cable tie</p>
3		<p>Connect CDM connector to the condenser fan motor connector.</p> <p>Secure condenser harness to refrigerant lines with cable ties</p> <p>Position/secure CDM connector so that drip loop is formed on both ends of the connector</p> <p>Secure CDM connector to condenser bracket slot with cable tie</p>

# 11. Climate Control Module Wiring

## Routing Generator Cable

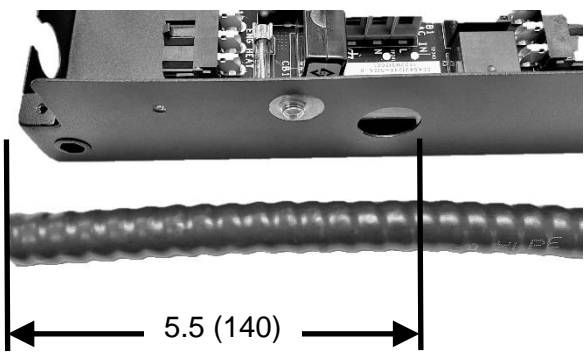






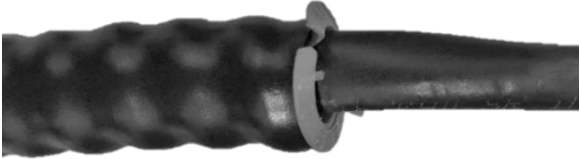

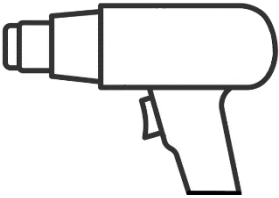
### High Voltage

**Climate Control Module, power outlet, and block heater must be installed by qualified personnel  
Always perform these steps before connecting the APU to the battery**

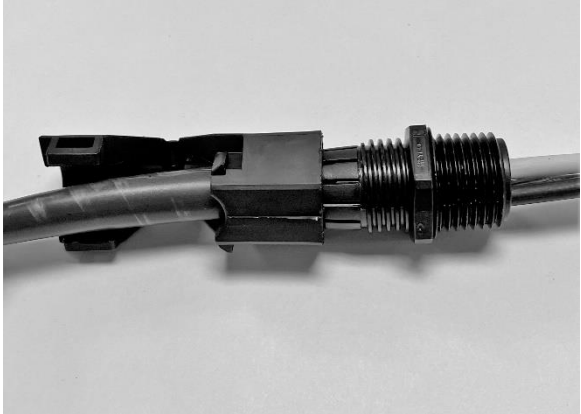

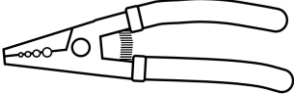
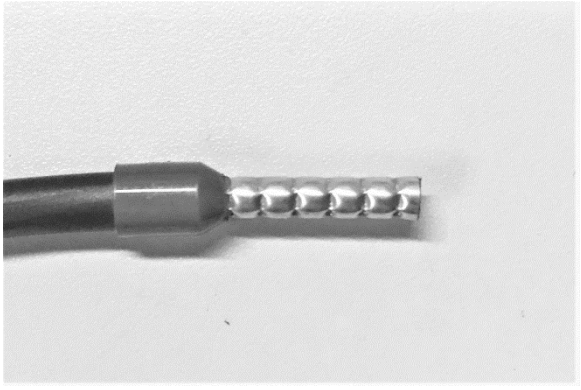


<b>1</b>	<p>Route the Generator cable from the power unit and through the hole in the floor.</p> <p>If shore power option is being installed, refer to Section 13 for Generator cable routing and installation.</p>
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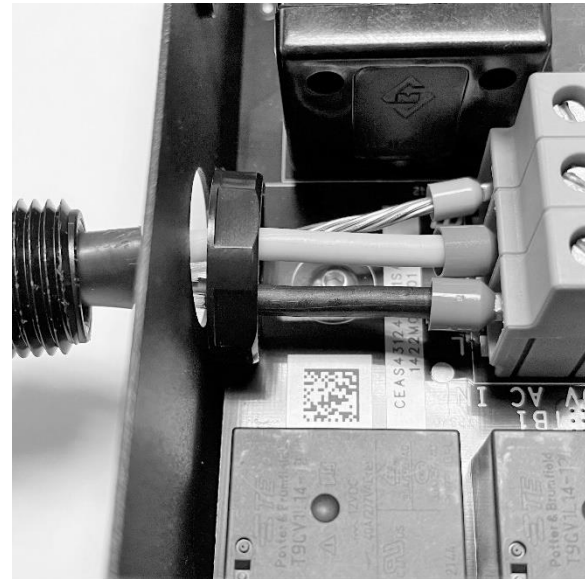
## 11.1 Inner Cable Preparation

<b>1</b>		<p>Route generator cable in front CCM generator cable opening (1)</p> <p>Mark cable 5.5 (140) past the right edge of cable opening</p> <p>Cut cable to length at mark</p>
<b>2</b>		<p>Mark outer covering 5.5 (140) from end of cable</p> <p>Score outer covering circumference at mark</p> <p>Bend cable at score line to separate metal jacket</p> <div style="text-align: center;"><p><b>Metal jacket edge is sharp. Wear appropriate hand protection.</b></p></div>
<b>3</b>		<p>Trim metal jacket ensuring it is free of sharp edges</p>

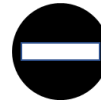
5		
4	<p>Mark inner cable 3.00 (75) from end of metal jacket</p> <p>Trim inner cable cover</p> <p>Do not cut inner wire insulation</p>	
5		<p>Insert Anti-Short Bushing (ASB)</p>
6		<p>Install heat shrink and apply heat to shrink</p> 

## 11.2 Generator Cable Connection

4		<p>Insert wires through 90° connector</p> <p>Insert wires through strain relief</p>
5		<p>Strip black and white wire ends to 0.56 (14)</p> 
6		<p>Crimps ferrules on wire ends. Refer to section x</p> <p>Pull on ferrule to verify crimp</p> 
7		<p>Insert wires through CCM opening</p> <p>Position nut over wires</p> <p>Insert ferrule into TB1 connector</p> <p>Tighten set screws</p> <div data-bbox="841 1579 1490 1663" style="background-color: #e67e22; color: white; padding: 5px; display: flex; align-items: center;">  <span style="font-weight: bold; font-size: 1.2em;">WARNING</span> </div> <p>When tightening the TB1 screws the appropriate slotted bit size (3.5x0.6mm) and torque screwdriver must be used. Incorrect bit size may damage the connector/screws and prevent proper torquing.</p>



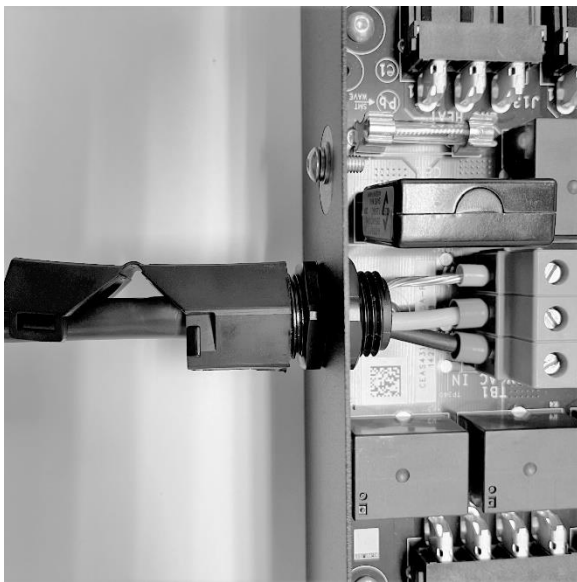
3.5x0.6mm



10.6 – 13.3 in-lb  
(1.2-1.5 Nm)

Position		N	L
Wire	Bare	White	Black

8



Tighten jam nut

Tighten 90 degree strain so that inner cable is secure and routes toward floor opening when locked.

9

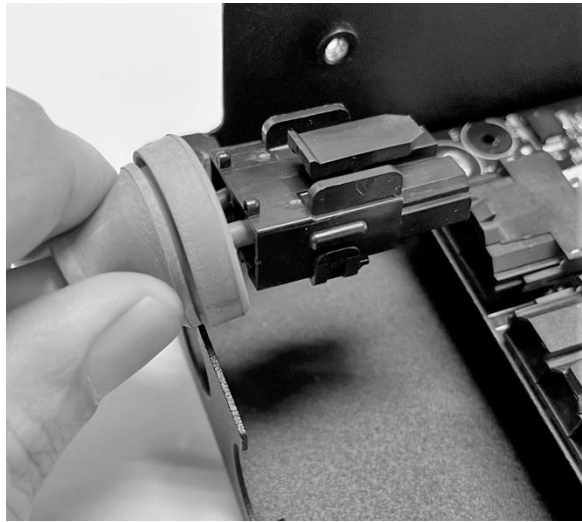
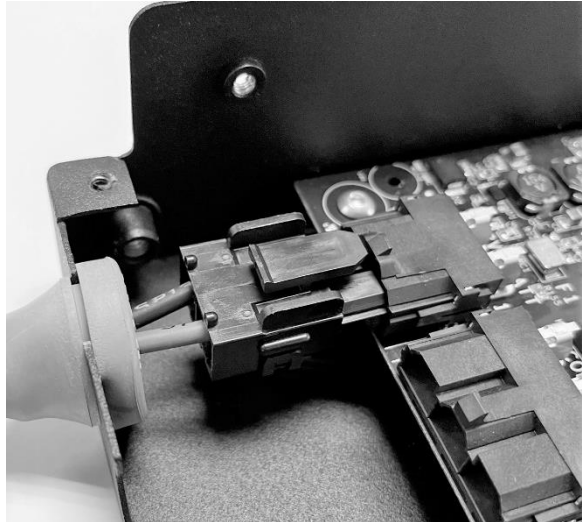
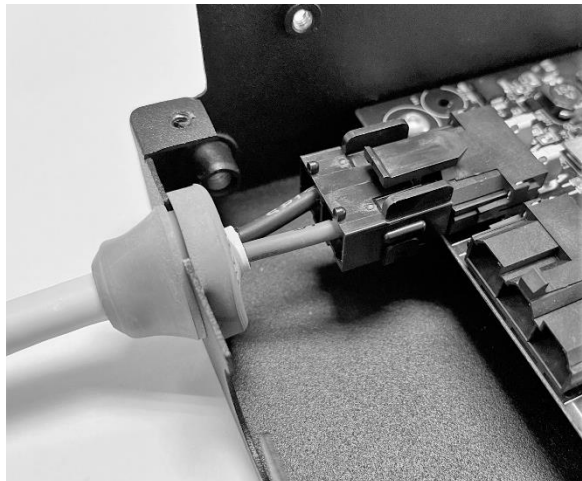


Lock angle connector

**Note: When locked the end of heat shrink should be flush with connector**

## 11.3 CCM Board Connections

The procedure for connecting the high and low voltage harnesses is the same for each connector.

1		<p>Pinch the cone portion of the grommet and insert into the slot in the CCM housing</p>
2		<p>Align the harness connector with the board connector</p>
3		<p>Grab the harness behind the grommet and push the harness to seat harness to the board connector. The harness connector will click when seated</p> <p>Pull back on harness to verify that the connector and grommet are properly seated</p>



## 11.4 2 VDC/CAN Harness

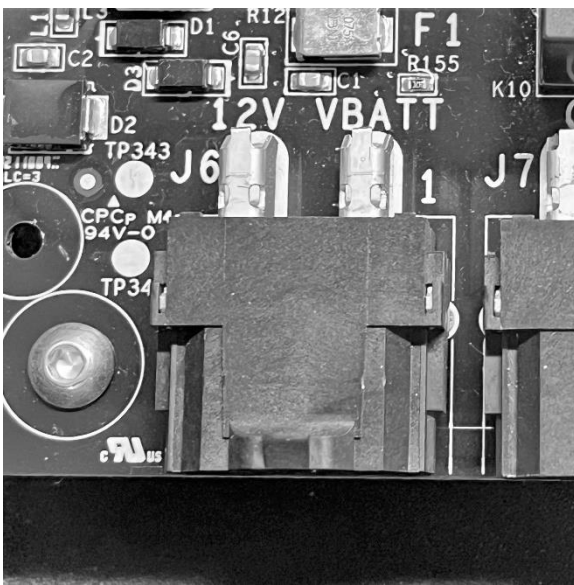
1



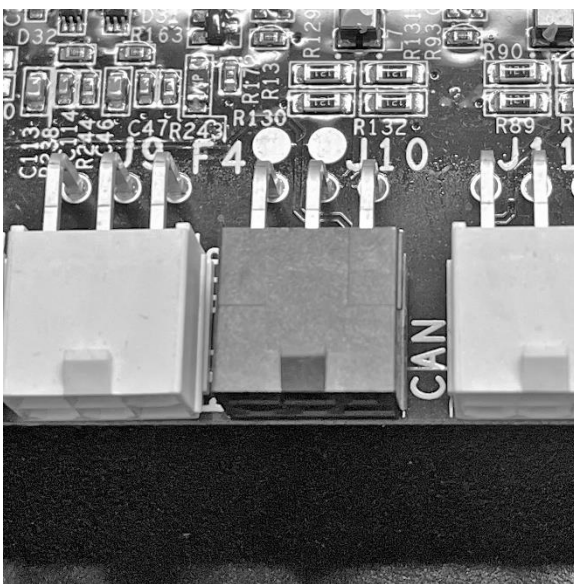
Route 12VDC harness from the APU to the hole in the cab floor for the Generator cable

Route harness along generator cable and to the left side of the CCM

2

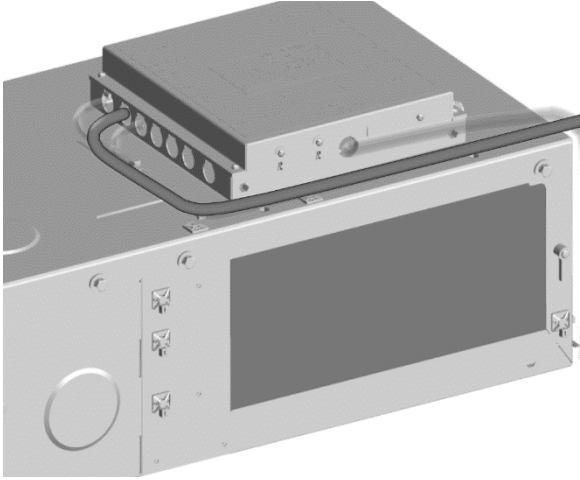
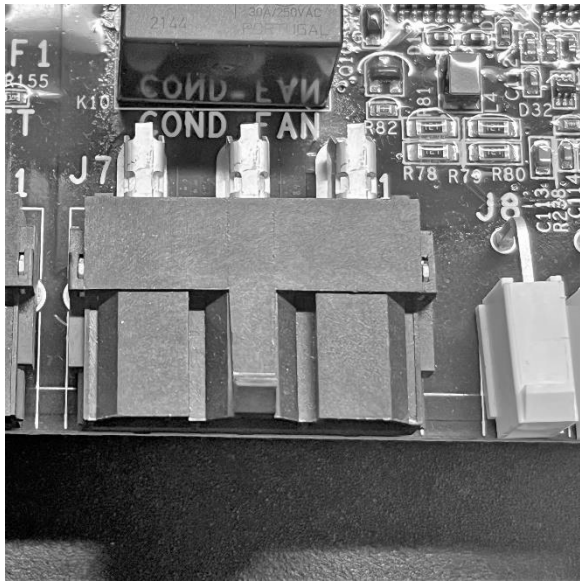


Connect the 12 VDC connector to J6

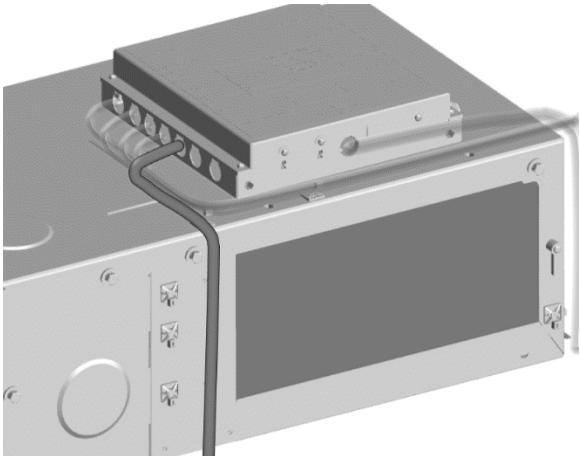


Connect the CAN connector to J10

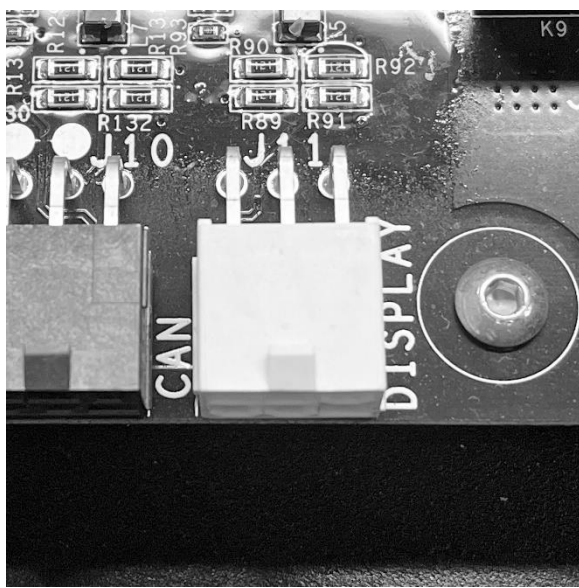
## 11.5 Condenser Fan/AAT

1		<p>Route condenser fan/AAT harness from the condenser to hole in the cab floor for the Generator cable</p> <p>Route harness along generator cable and to the left side of the CCM</p> <div data-bbox="886 411 1451 485" style="background-color: #0056b3; color: white; text-align: center; padding: 5px;"><b>NOTICE</b></div> <p><b>If the condenser and the CCU are not mounted to the same part of the truck (i.e. bunk and frame), ensure there is enough slack in the condenser fan harness.</b></p>
2		<p>Connect the condenser fan connector to J7 and the AAT connector to J8</p>

## 11.6 Aspen Interface

1		<p>Route the AI harness from the AI mounting location (Section 12) to the CCM</p> <p>Harness can be routed along generator cable or front face of CCU Route harness along generator cable and to the left side of the CCM</p>
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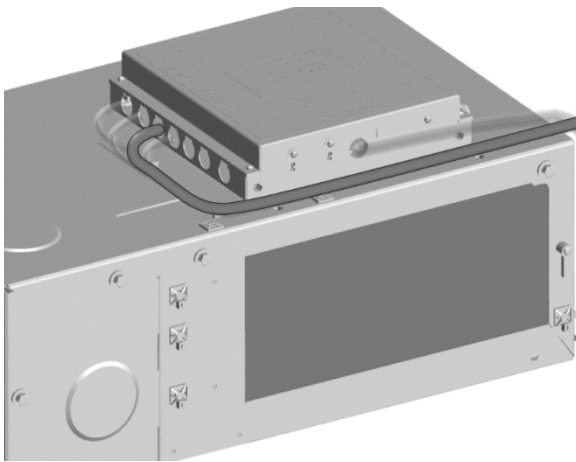
2



Connect the AI connector to J11

## 11.7 Heater Option

1

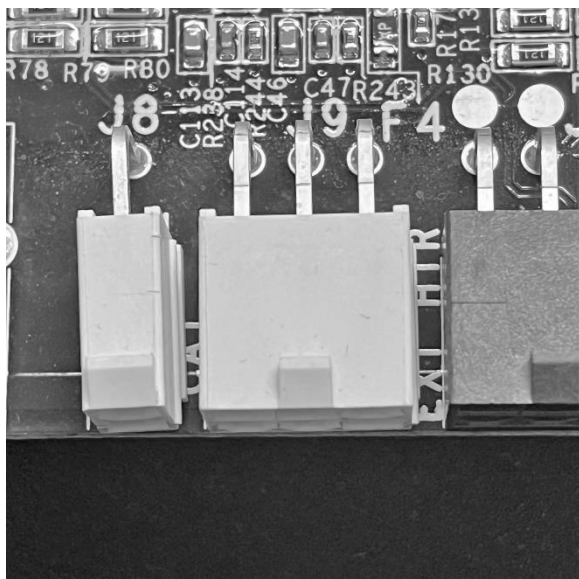


Route the heater harness from the heater to (Section?) to the CCU

Harness can be routed along generator cable or front face of CCU

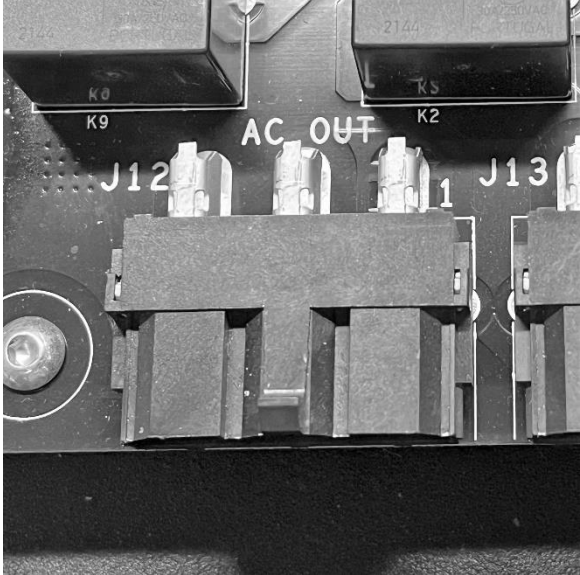
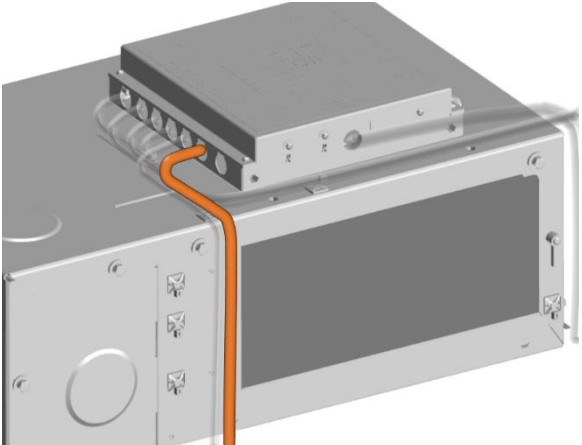
Route harness along generator cable and to the left side of the CCM

2

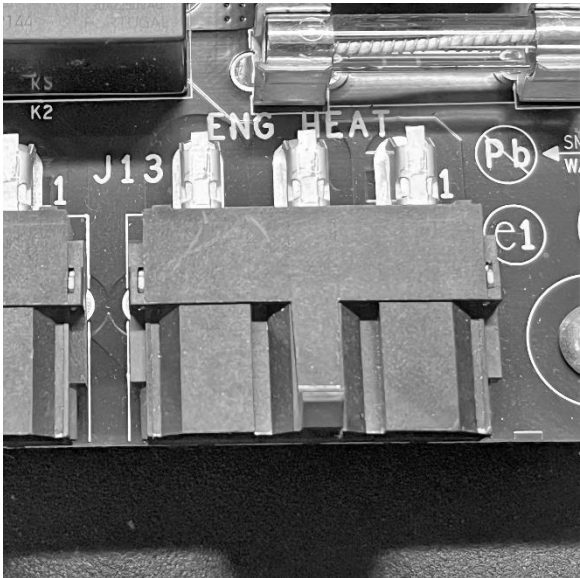


Connect the heater connector to J9

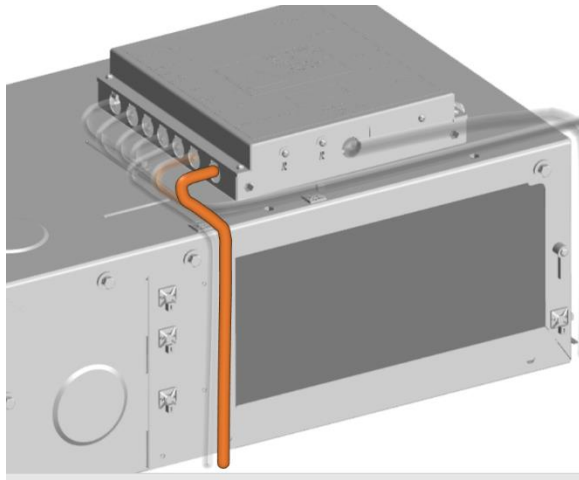
## 11.8 Power Outlet

1	 <p>A close-up photograph of the CCM connector panel. The panel is dark grey with several white plastic connectors. The central section is labeled 'AC OUT' and contains two main connector blocks, J12 on the left and J13 on the right. Above J12, there are labels 'K9' and 'K0'. Above J13, there are labels 'K2' and 'K5'. A small '2144' is visible on a component above J13. The connectors are mounted on a metal base.</p>	<p>Connect the power outlet harness to the J12 connector on the left side of the CCM.</p>
2	 <p>A 3D CAD model of the CCM unit. An orange power outlet harness is shown routed along the front face of the unit. The harness starts from the left side of the CCM and extends towards the front. The CCM unit is shown in a perspective view, highlighting its rectangular shape and various ports.</p>	<p>Harness can be routed along generator cable or front face of CCU</p> <p>Route harness from left side of CCM to oper outlet location</p>

## 11.9 Block Heater (Option)

1	 <p>A close-up photograph of the CCM connector panel, focusing on the 'ENG HEAT' section. The panel is dark grey with several white plastic connectors. The central section is labeled 'ENG HEAT' and contains two main connector blocks, J13 on the left and J14 on the right. Above J13, there are labels 'K2' and 'K5'. Above J14, there are labels 'K1' and 'K2'. A small '2144' is visible on a component above J14. The connectors are mounted on a metal base.</p>	<p>Connect the block heater harness to the J13 connector on the left side of the CCM.</p>
---	--	---

2

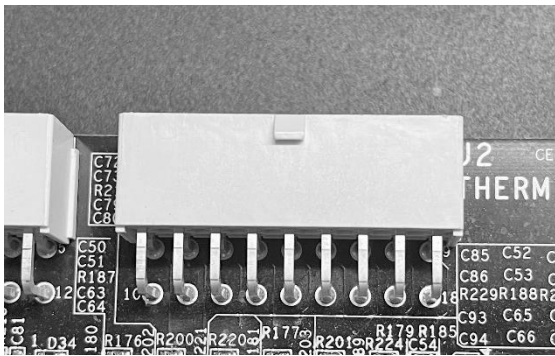
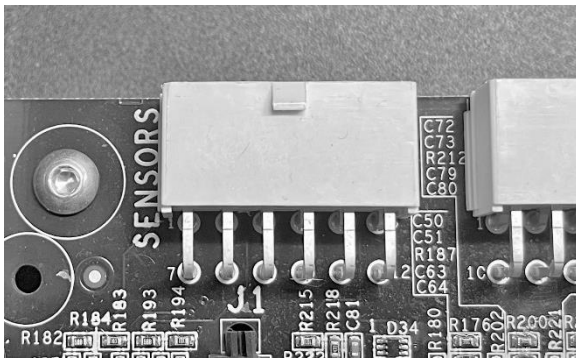


Harness can be routed along generator cable or front face of CCU

Route harness from left side of CCM to AFCI/GFCI device.


### 11.10 Low voltage sensor/thermistor harness

1

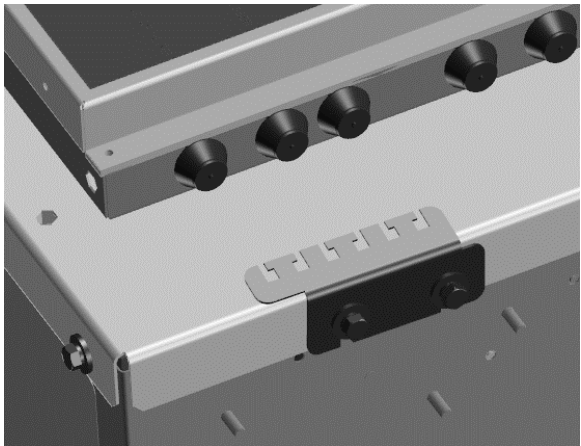

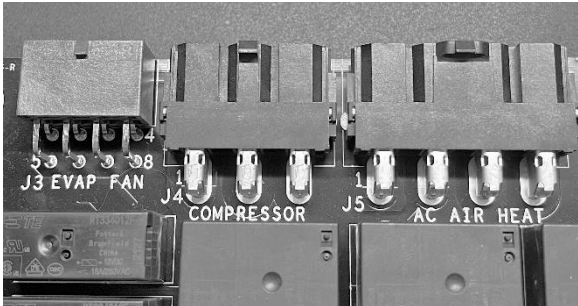


Connect the sensor harness connector to J1

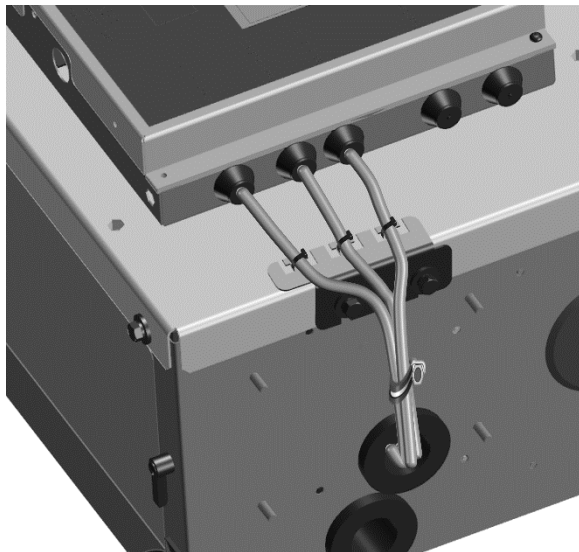
Connect the thermistor connector to J2

2		<p>Coil the excess low voltage harness</p>
---	---	--

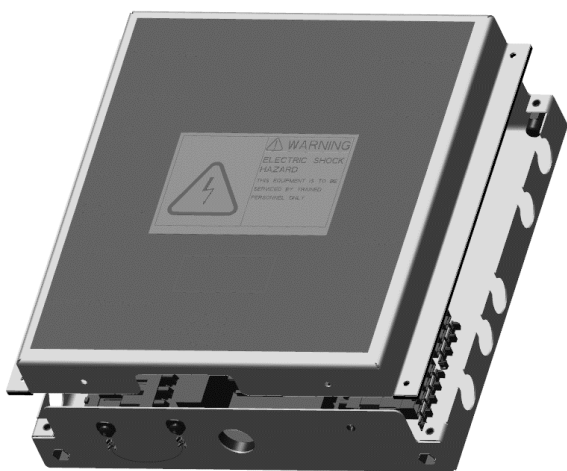
### 11.11 High voltage output harness

1		<p>Install HV harness support bracket</p> <div style="text-align: center;">  <p><b>10</b></p> <p>4 ft-lb</p> </div>
2		<p>Connect evaporator fan connector to J3</p> <p>Connect compressor connector to J4</p> <p>Connect heater connector to J5</p>
3		<p>Install cushion clamp on HV cables above grommet</p> <p>Secure cushion clamp to stud with nut</p> <p>Secure HV cables to support bracket with wire ties</p>

4



**10**  
4 ft-lb

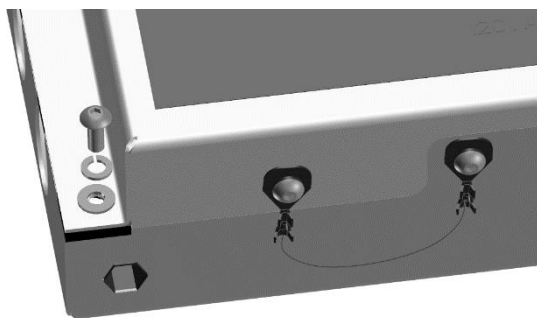


Install CCM cover

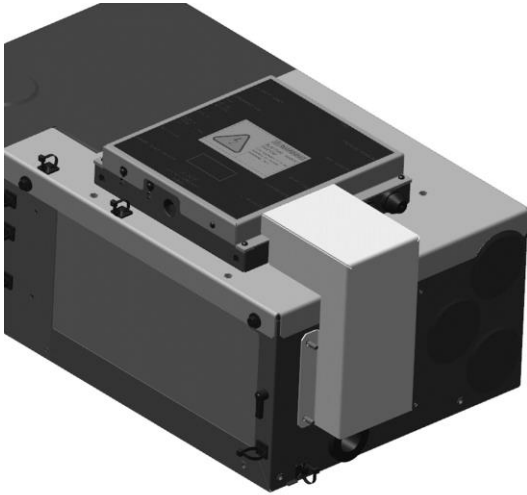
Secure cover with hardware (screw, lock washer, washer)

Install ground wire, screw, and lock washer

**2.5**  
12 in-lb



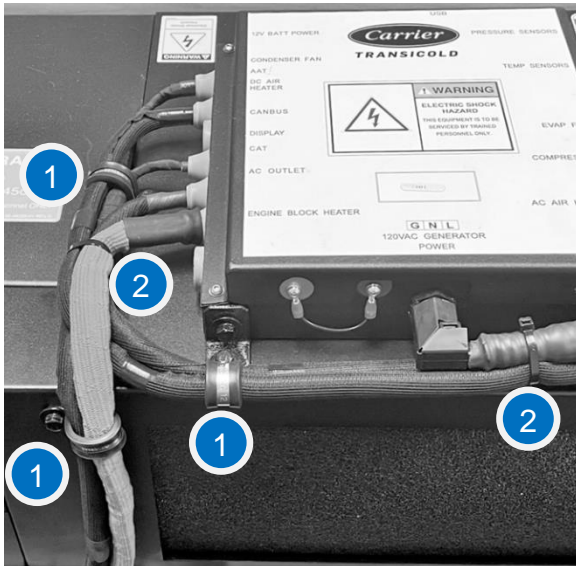
5



Install HV harness cover over studs

### 11.12 Securing cables

1

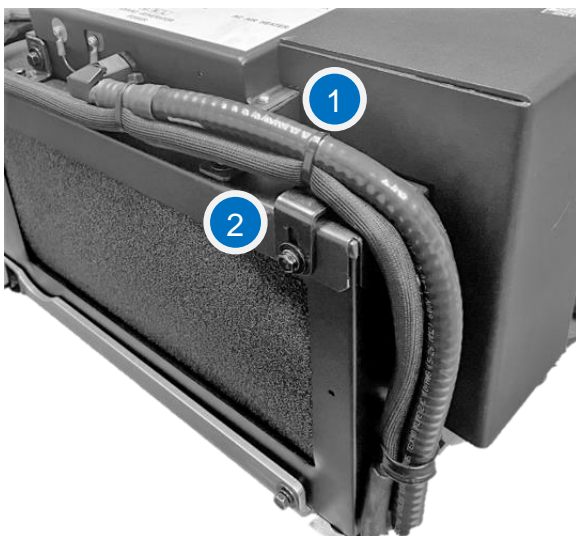


Secure cables on left side of CCM as shown

Secure cushion clamps with CCU cover bolts

- 1. Cushion clamp
- 2. Cable tie

2



Secure Generator cable bundle to front of CCU with mounting bracket and cable tie

Mounting bracket is secured with cover bolt

Secure bundle to side of CCU with cushion clamp

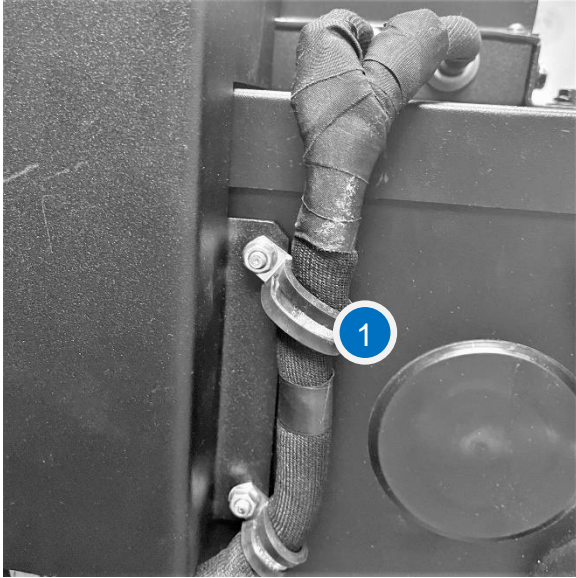
Clamp secured using HV cover stud/nut

- 1. Cable tie
- 2. CCU/CCM mounting bracket
- 3. Cushion clamp





3



Secure low voltage harness to the high voltage cover using cushion clamps

Tighten high voltage cover nuts

1. Cushion clamp

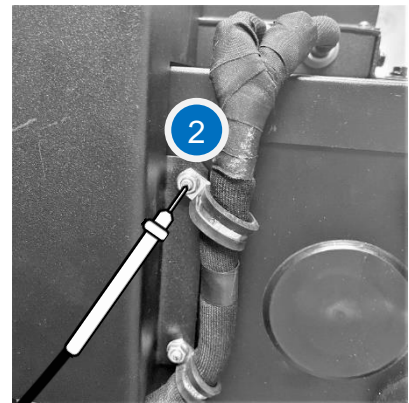
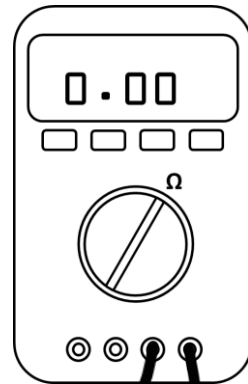
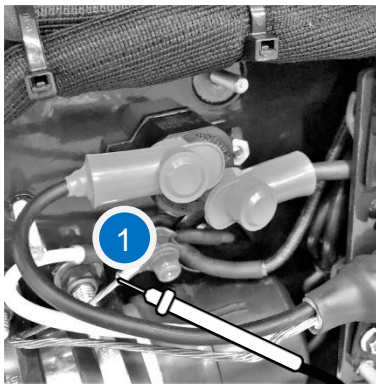


4 ft-lb

### 11.13 High Voltage Ground Validation



The CCU compressor, evaporator fan, and heater as well as the CCM contain high voltage components. Each of these components are grounded to reduce the likelihood of electrical shock. In order to provide adequate protection from electrical shock, the CCU must be grounded through the APU generator cable. To validate that the system is grounded the following procedure must be completed on every installation.



Connect test leads to multimeter

Validate low resistance in test leads.

Connect one end to unpainted part of generator ground ring terminal at the ground/neutral stud (1)

Connect second lead to HV harness cover stud (2)

Measure resistance between generator ground and HV harness cover stud

If resistance is less than  $5.0\Omega$  the ground is OK. If resistance is greater than  $5.0\Omega$  inspect ground connections at the APU, CCM, and CCU.

## 12. Aspen Interface

The Aspen Interface (AI) is the user control for the system. The AI turns the unit on/off and allows the user to select the mode of operation. The AI should be installed in an easily accessible location in the bunk area of the truck. Before installing the AI, determine how the cable will be routed and secured between the CCM and AI. Refer to table 12.0 for installation requirements. Locating the AI in a location other than specified may affect system performance.

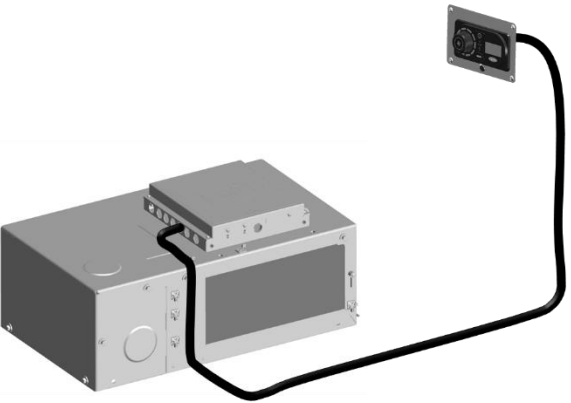

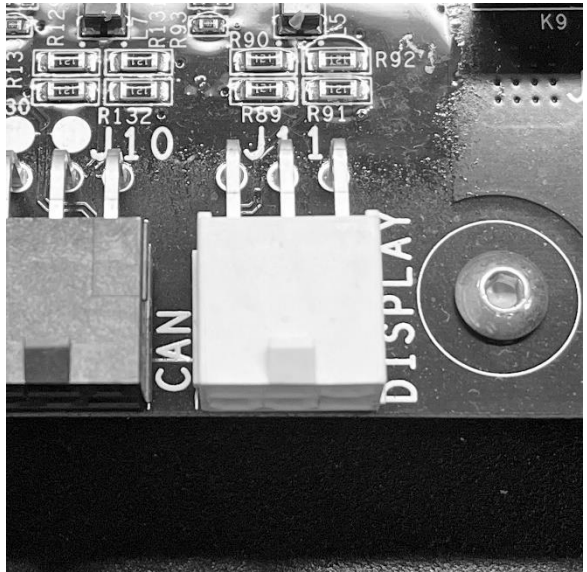


Figure 12.0 Aspen Interface

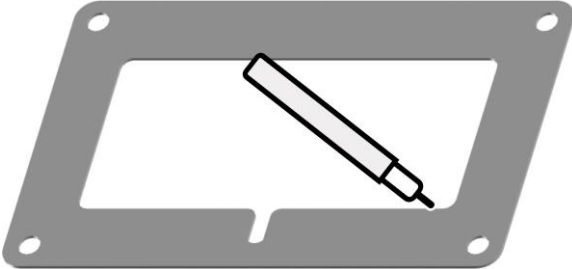
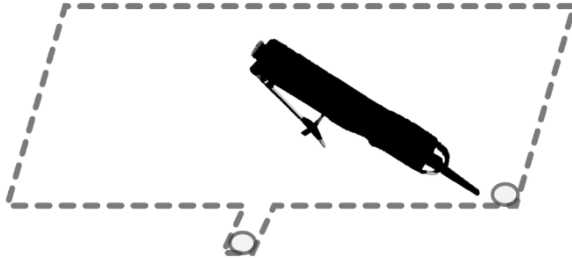
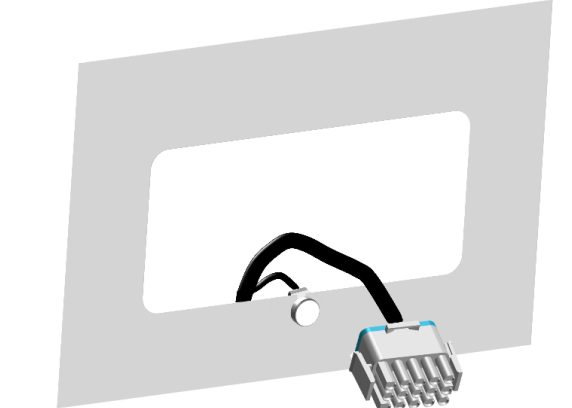
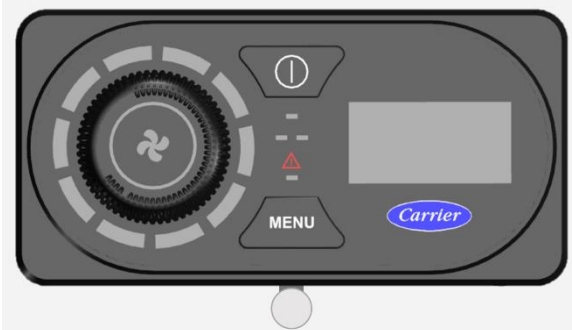
Component	Requirement
Aspen Interface/Bracket	Must be secured to solid surface
	Not located inside compartment or cabinet
	Not located near heat source or direct path of APU or tractor vent
	Not located to direct sunlight
Aspen Interface Harness	Routed away from sharp edges, pinch points, or heat sources
	Secured every 12.0"
	Grommet installed where cable passes through cabinet/panel
	Strain relief within 8.0 from the AI
Cabin Temperature Sensor (CAT)	Not touching wall or located behind panel

Table 12.0 Aspen Interface Installation Requirements

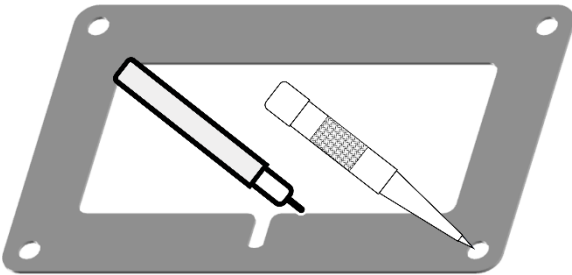
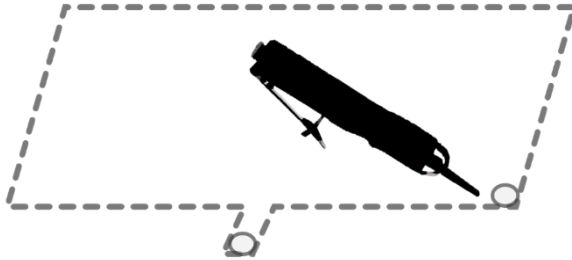
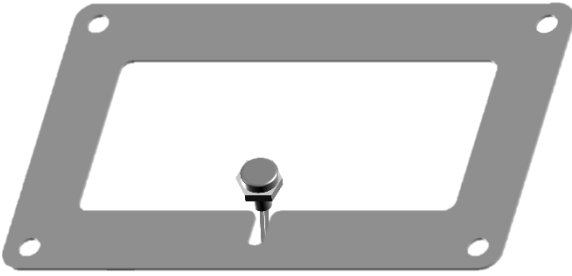

## 12.1 Mounting Preparation and Harness Routing

1		<p>Determine the AI location and mounting method:</p> <ul style="list-style-type: none"><li>• Flush – Rectangular hole cut in OEM panel. Has “factory installed” appearance and requires greatest care/precision during installation</li><li>• Panel – AI attaches to flat bracket. Allows mounting to variety of surfaces and can cover existing openings. Requires less installation precision.</li><li>• Surface – Adapter is surface mounted and spaces the AI above the mounting surface. Least complex installation method.</li></ul> <p>Determine CCM to AI harness routing. Avoid sharp edges, pinch points, and heat sources.</p>
2		<p>Route the AI harness from the AI mounting location to the CCM</p> <p><b>Note: The AI connector size and CAT can cause harness routing difficulty. It is recommended to route the CCM connector end (smaller) from the AI to the CCM. Care must be taken during installation to prevent damage to the CAT sensor/wiring.</b></p> <p>Secure harness and install grommets as required</p> <p>Coil and secure excess harness (min 8.0 (200) diameter)</p>
		<p>Connect the AI cable to the J11 connector on the CCM</p>

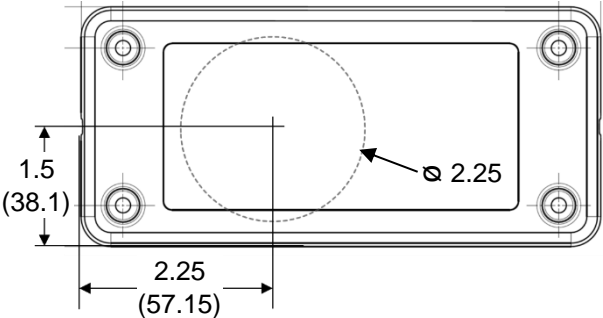
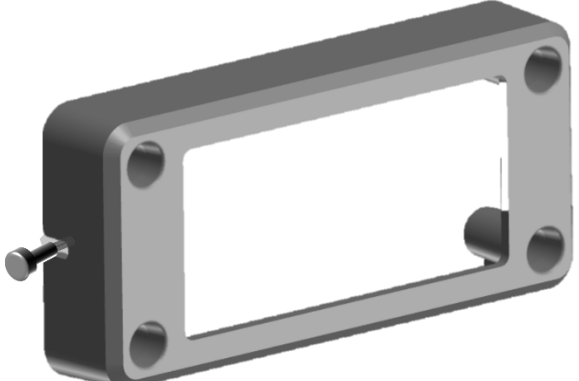

## 12.2 Flush Mount

1		<p>Apply masking tape to the surface where the AI will be installed</p> <p>Using the panel mount plate as a template, mark the opening for the AI with a permanent marker</p>
2		<p>Drill a 0.25 (6.5) hole in one corner of the opening and at the CAT slot.</p> <p>Cut the opening (cut just outside of the marked line) using a compact reciprocating or jig saw</p> <p>Note: Accuracy of this cut is important for proper fit as flush mount method.</p> <p>Debur the opening</p>
3		<p>Insert the CAT in the mounting slot and tighten nut</p> <p><b>Note: Locking washer goes on the nut side of the panel</b></p> <p>Insert DM connector into the back of the AI</p> <p>Engage the connector locking tabs by pulling away from connector. Audible click will be heard when locked.</p>
4		<p>Insert AI into the opening</p> <div data-bbox="886 1549 1451 1625" style="background-color: #0056b3; color: white; text-align: center; padding: 5px;"><b>NOTICE</b></div> <p><b>DO NOT</b> force the AI into the panel opening as damage may occur. If the AI does not easily snap into place the opening is too small. Remove the AI and trim the panel to fit</p> <p><b>DO NOT</b> trim the AI to fit the panel opening</p> <p>Reinstall any OEM panels if removed</p>

## 12.3 Panel Mount

1		<p>Position the panel mount plate at the desired location</p> <p>Mark the opening with a permanent marker</p> <p>Center punch the hole locations</p>
2		<p>Drill a 0.25 (6.5) hole in one corner of the opening and at the CAT slot.</p> <p>Cut the opening (cut just outside of the marked line) using a compact reciprocating or jig saw</p> <p>Note: Accuracy of this cut is not as important as flush mount method.</p> <p>Debur the opening</p>
3		<p>Insert the CAT in the slot so that the disc is on the outside of the mount and the nut on the inside</p> <p><b>Note: Locking washer goes on the nut side of the mount</b></p> <p>Tighten the nut</p> <p>Insert DM connector into the back of the AI</p> <p>Engage the connector locking tabs by pulling away from connector. Audible click will be heard when locked</p>
4		<p>Insert the AI into the opening</p> <p>Install screws through the plate holes and into the panel</p>

## 12.4 Surface Mounting

<b>1</b>		<p>Verify there is minimum 2.0 (50) behind the mounting surface and the mounting hole will not interfere with wiring harnesses, supports, etc.</p> <p>Mark the location for the AI harness passthrough</p> <p>Drill hole at marked location</p> <p>Deburr hole</p>
<b>2</b>		<p>Insert the CAT in the slot so that the disc is on the outside of the mount and the nut on the inside.</p> <p><b>Note: Locking washer goes on the nut side of the mount</b></p> <p>Tighten the nut</p> <p>Connect to the AI</p>
<b>3</b>		<p>Insert AI into opening</p> <p>Locking tabs will click when fully seated</p>

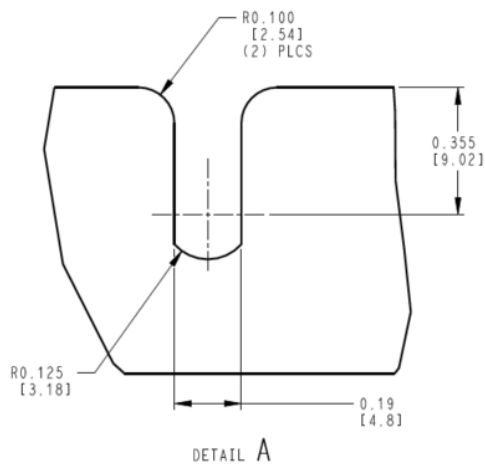
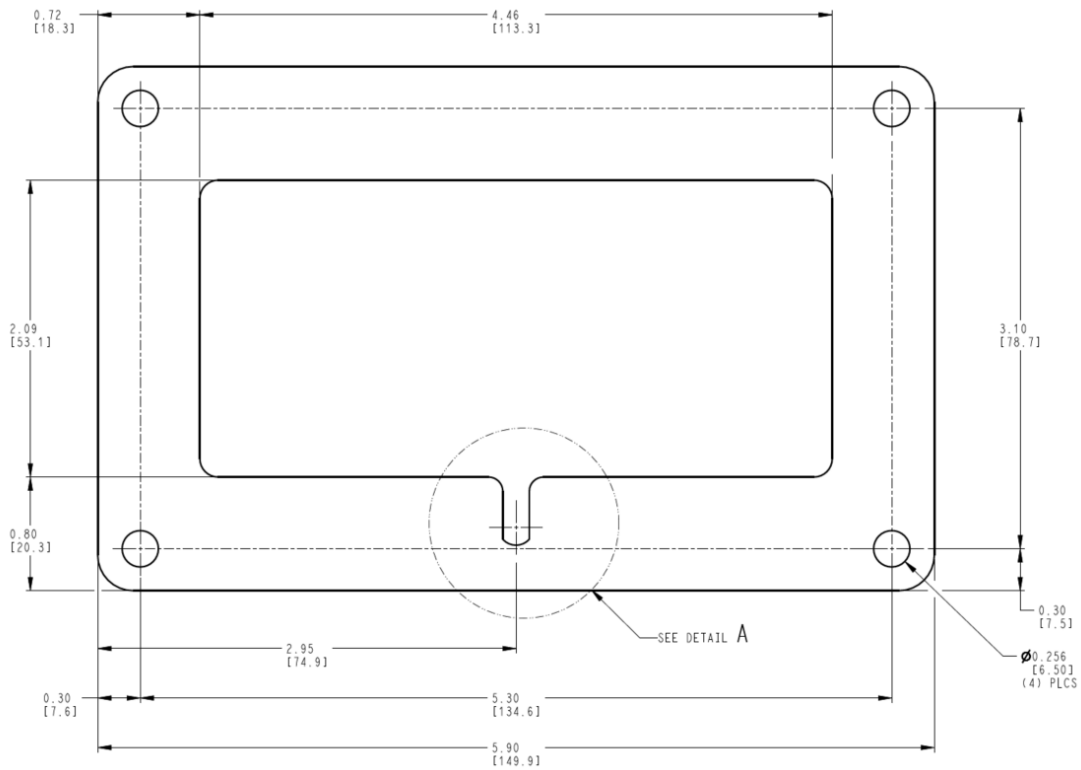
4



Insert DM connector into the back of the AI

Engage the connector locking tabs by pulling away from connector. Audible click will be heard when locked

Install self-tapping screws to secure the AI





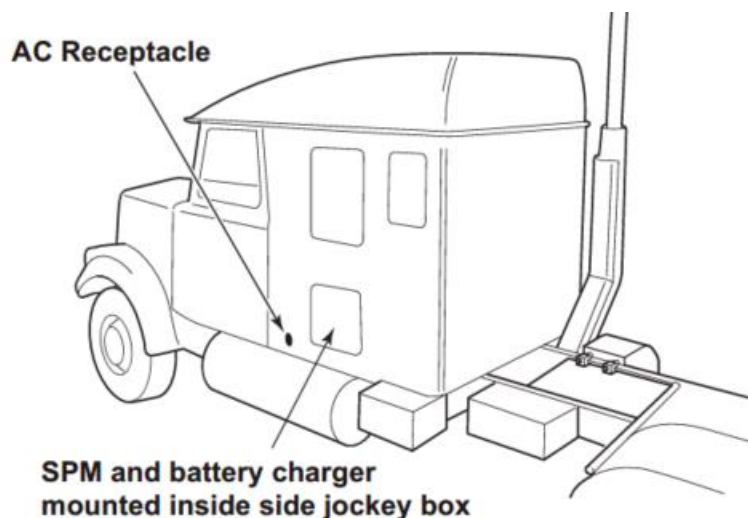
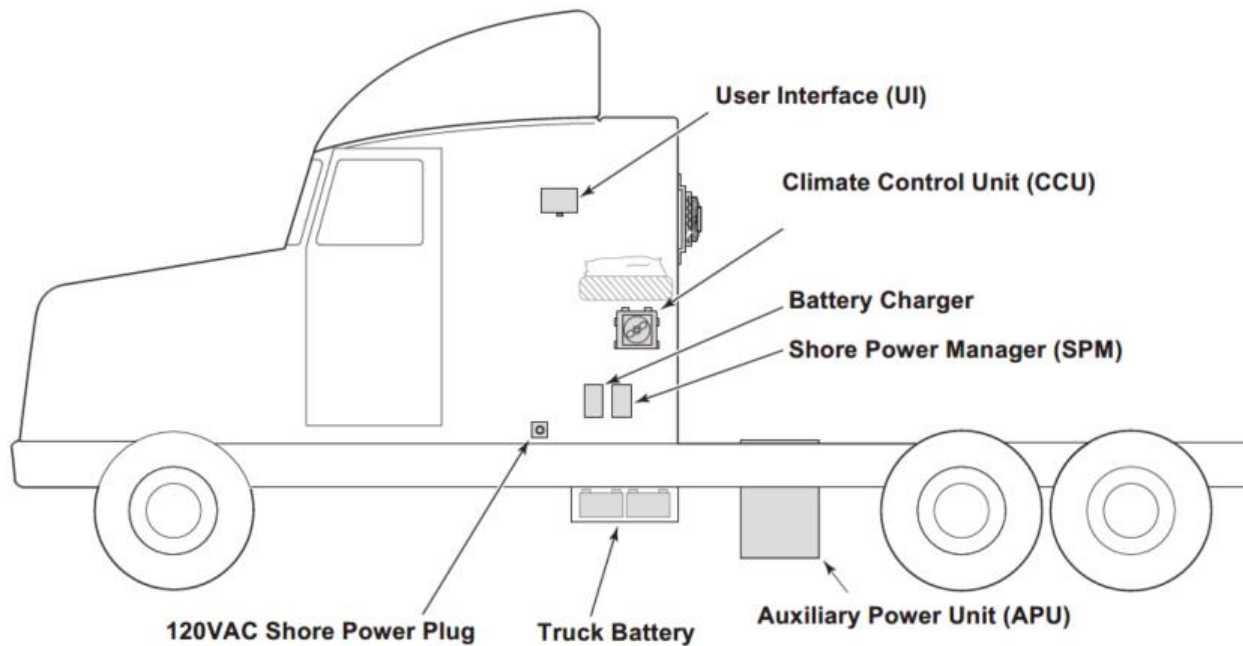
## 13. Shore Power

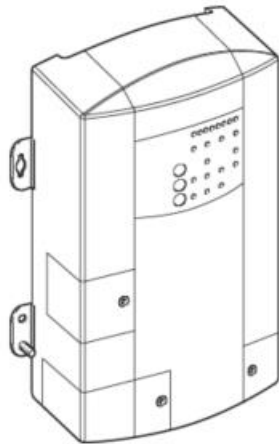
The shore power option allows HVAC functions to operate off an external 120 VAC power source instead of running the diesel engine. When operating in shore power mode, the 120 VAC power source is automatically switched between the APU and shore power connection. The default power source is the APU. The APU engine does not run in shore power mode.

The shore power option consists of the following:

- Shore Power Manager (SPM): Controls incoming power source from the APU or shore power.
- Battery Charger: Maintains DC power drawn from the truck batteries.
- Shore Power Receptacle (120 VAC/15A): Allows connection to shore power.

For existing installations, if the Teck cable is not long enough to reach the SPM then it must be disconnected from the APU and removed. Replace from the supplied 20-foot length. Do not discard the original cable as it must be re-used in the next step.

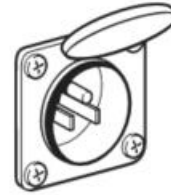




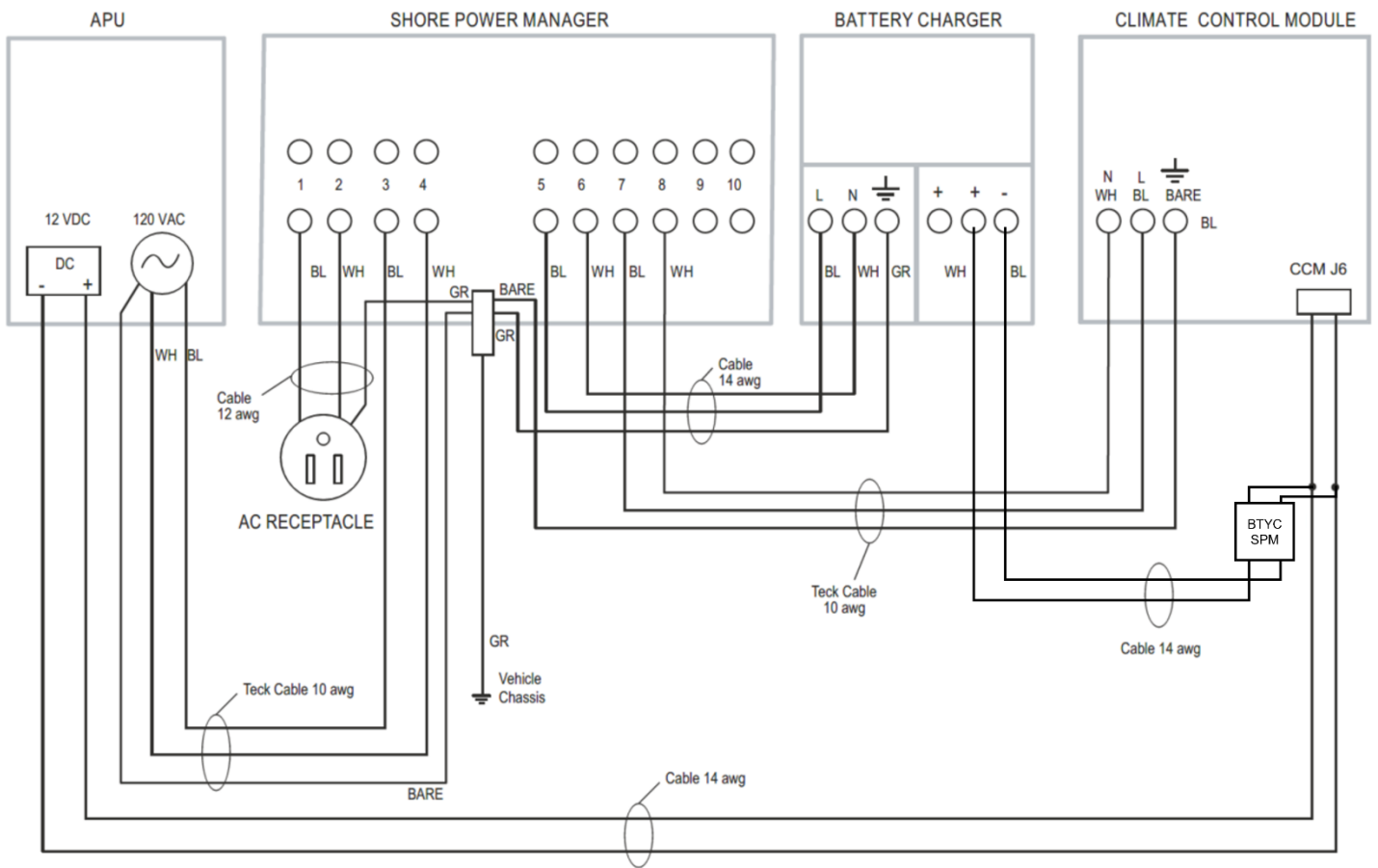
**Battery Charger**



**Shore Power Manager (SPM)**


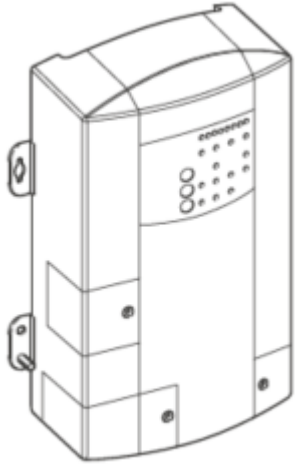


**120VAC Plug**

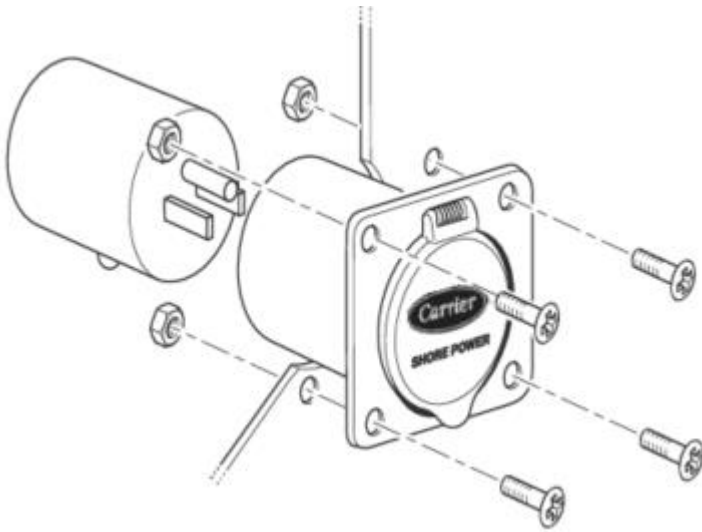


## 13.1 Shore Power Components

Install the Shore Power Manager and battery charger under-bunk in one of the side jockey boxes and the AC receptacle on the driver's side of the vehicle. Install the Shore Power Manager so that the existing AC Teck cable connected from the APU to the CCU can be disconnected from the CCU and re-connected to the Shore Power Manager. If this is not possible, then the Teck cable from the APU must be replaced with the supplied length

1	 A rectangular metal enclosure for the Shore Power Manager. The front panel is dark grey with a silver handle at the top. Below the handle, the text "SHORE POWER MANAGER" is printed. There is a warning label on the front panel with a lightning bolt symbol and the word "WARNING".	<p>Locate mounting position for the SPM.</p> <p>The SPM must be mounted vertically with the cables exiting downward. Use the template supplied</p> <p>Drill four 17/64" inch mounting holes. Attach with four 1/4-20 x1.0 bolts, nuts, and washers</p> <p>Drill a 2.5" hole in the floor directly under the Shore Power Manager to allow cable access.</p>
2	 A rectangular metal enclosure for the battery charger. The front panel is light grey with a silver handle on the left side. The top of the enclosure is slightly curved. There are several circular ports or indicators on the front panel.	<p>Locate mounting position for the battery charger.</p> <p>The battery charger must be mounted vertically with the cables exiting downwards, and adjacent</p> <p>Drill four 7/32" mounting holes.</p> <p>Attach with four 10-24 x 1" bolts, nuts, and washers.</p>

3



Locate mounting position for plug housing. Mount to a metal panel or use the supplied bracket for under-cab mounting.

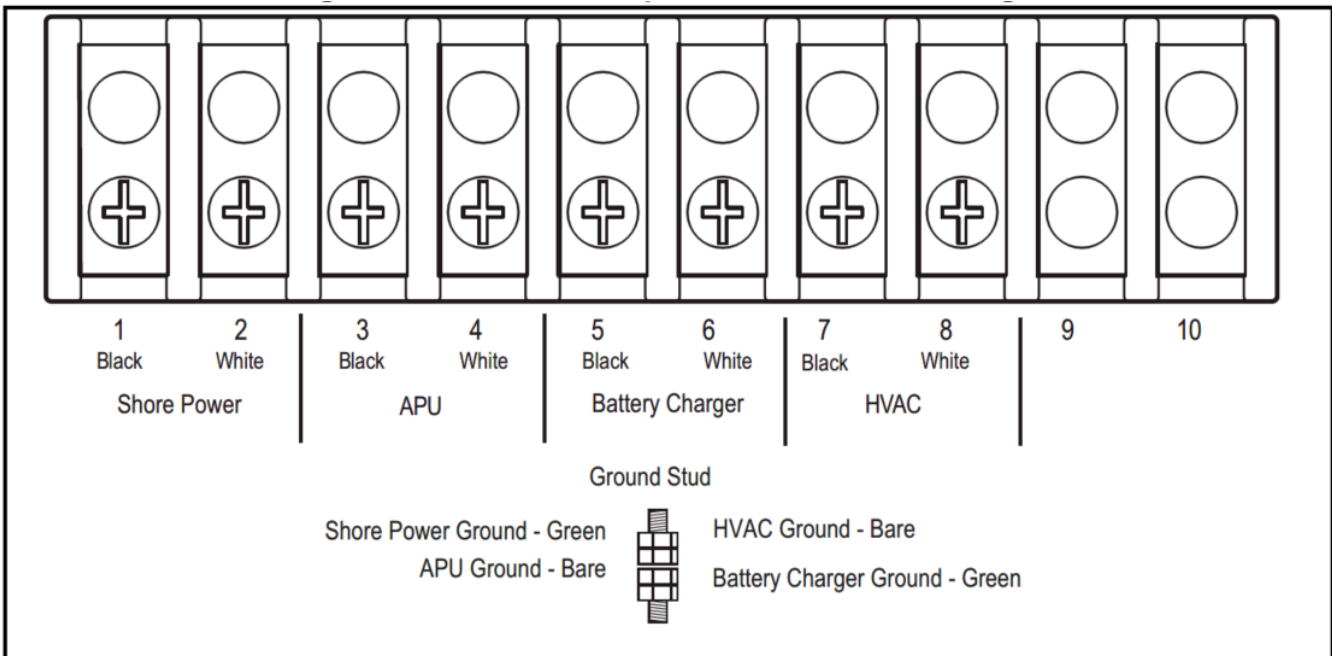
Drill 1-11/16" diameter hole.

Drill four 3/16" mounting holes. Install housing into panel and bolt into place using 8-32 bolts and nuts.

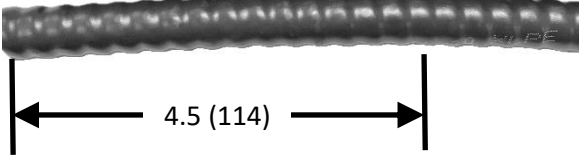





Install molded male plug into the rear of the housing. Depress spring plunger. Insert plug into housing with plunger lined up with small hole on bottom of tube. Rotate plug until spring plunger pops into hole.

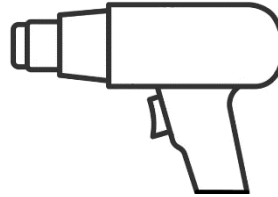
Push rubber boot over the rear of the housing

### 13.2 Shore Power Manager Connections



### 13.3 Teck Cable Preparation (SPM)

1		<p>Route SPM cable in front SPM cable opening</p> <p>Mark cable 4.5 (114) past the right edge of cable opening/strain relief</p> <p>Cut cable to length at mark</p>
2		<p>Mark outer covering 4.5 (114) from end of cable</p> <p>Score outer covering circumference at mark</p> <p>Bend cable at score line to separate metal jacket</p> <div data-bbox="886 617 1446 688" style="background-color: yellow; border: 1px solid black; padding: 5px; text-align: center;">  <b>CAUTION</b> </div> <p><b>Metal jacket edge is sharp. Wear appropriate hand protection.</b></p>
3		<p>Trim metal jacket ensuring it is free of sharp edges</p>
4		<p>Mark inner cable 0.5 (13) from end of metal jacket</p> <p>Trim inner cable cover</p> <p>Do not cut inner wire insulation</p>
5		<p>Insert Anti-Short Bushing (ASB)</p>
6		<p>Install heat shrink and apply heat to shrink</p>



### 13.4 Connecting SPM (HVAC) to CCM

Route the Teck cable included in the shore power kit from the Shore Power Manager to the CCM. Secure cable as required.

Terminate and connect the CCM end of the cable according to section ?

Cut the Teck cable to length. Allow 4.5" (114 mm) to extend into the SPM past the strain relief.

Prepare the end of the CCM end of the cable following the "Inner Cable Preparation" procedure found in section 11

At the SPM crimp the yellow fork terminals provided to the black and white wires. Use Panduit crimping tool #CT-1550 or equivalent.

Crimp the large barrel non- insulated ring terminal provided to the bare ground wire. Use Panduit crimping tool #CT-1570 or equivalent. Connect the wires to the HVAC terminal in the SPM.

### 13.5 Connecting APU to SPM

Route the Teck cable from APU to the Shore Power Manager. Secure cable as required.

Cut the Teck cable to length. Allow 4.5" (114 mm) to extend into the SPM past the strain relief.

Prepare the cable end per Teck Cable Preparation (SPM) in this section

Crimp the yellow fork terminals provided to the black and white wires. Use Panduit crimping tool #CT-1550 or equivalent.

Crimp the large barrel non- insulated ring terminal provided to the bare ground wire. Use Panduit crimping tool #CT-1570 or equivalent. Connect the wires to the HVAC terminal in the SPM.

### 13.6 Connecting AC Plug to SPM

Route the AC shore power cable through the floor hole and into the SPM strain relief. Carefully route the cable to afford maximum protection. It is recommended to mount the AC receptacle so that it enters directly into the jockey box.

Cut cable to length and strip away 4" of outer jacket and cable filler. Feed the cable through the strain relief. Hand tighten the strain relief nut. Strip the individual wires back 5/16"

Crimp the yellow fork terminals provided to the black and white wires. Use Panduit crimping tool #CT-1550 or equivalent.

Crimp the large barrel non-insulated ring terminal provided to the green ground wire. Use Panduit crimping tool #CT-1570 or equivalent. Connect the wires to the shore power terminals

## 13.7 Connecting SPM to Battery Charger

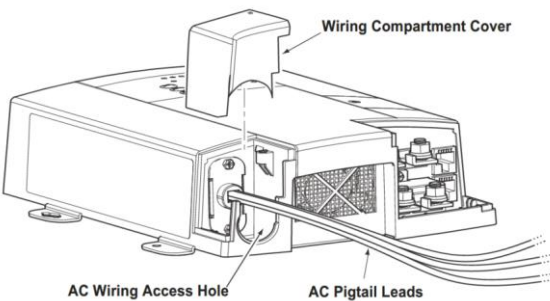
1

Insert pre-crimped end of the AC battery charge cable through the shore power strain relief and connect wires as shown in Figure 58.

Hand tighten the strain relief nut.

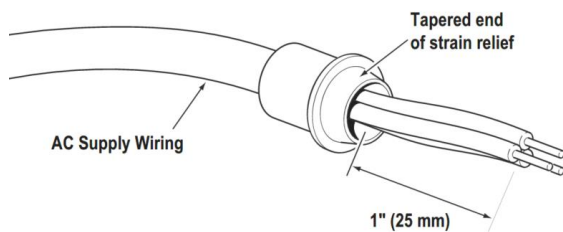
Route the cable to the battery charger and cut to length.

2



Unscrew the wiring compartment cover from the left rear of battery charger to access the AC wiring access hole and AC pigtail leads

3

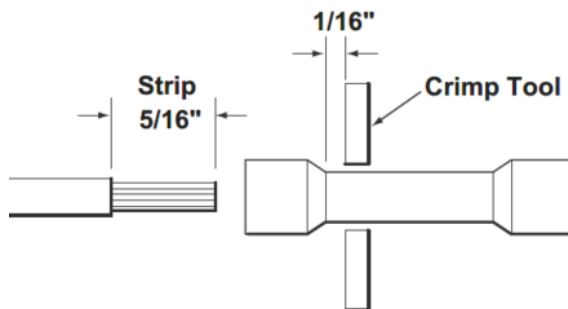


Slide strain relief on the end of the AC supply harness

Carefully remove 50-75 mm (2"-3") of the outer jacket from the battery charger AC cable. Do not cut or nick the insulation on the individual conductors.

Extend the charger AC (L, N, GND) pigtail leads from the AC wiring compartment.

4



Strip 5/16" (8.0mm) from the ends of the battery charger and battery charger AC cable.

Insert one wire into one end of the butt-splice, until the insulation hits the internal metal crimp section, insert the butt-splice into the crimper, and crimp firmly.

The proper location for the crimp is approximately 1/16" (1.6 mm) past where the butt splice insulation tapers down as shown.

Conductor	Charger Wire Color	Battery Charger AC Cable
Line	Black	Black
Neutral	White	White
Ground	Green/Yellow	Green

## 13.8 Connecting Battery Charger to 12 VDC Harness

Route the battery charger 12 VDC cable from the SPM to the CCM

Remove the cap from the SPM connector located on the 12VDC harness near the CCM

Connect the battery charger cable to the SPM

Secure harness as required

## 13.9 Ground Harness

Connect the ground wire from the SPM ground stud to vehicle chassis.

Route wire, cut to length and crimp supplied ring terminal. Use Panduit crimping tool #CT-1570 or equivalent.

Connect ground wire to the vehicle chassis. Ensure good metal to metal contact is made.

The battery negative terminal may alternatively be used if a chassis location is not convenient.



**CAUTION**

**To prevent electric shock, ensure good metal to metal contact of crimped end to vehicle chassis.**



## 14. Power Outlet and AFCI/GFCI Device

Power outlet(s) are included with all models and provide 120VAC power to operate various loads. All outlets are protected by combination Arc Fault/Ground Fault Circuit Interrupter (AFCI/GFCI). The configuration and functionality varies by model.

- Aspen-INT – Single 120 VAC/15A outlet provides power for hotel loads when the APU is running
- Aspen-STA – Same functionality as Aspen-INT. Engine block heater option provides power to truck engine block heater in low temperature conditions.
- Aspen-PWR – Two 120 VAC/15A outlets provide power on separate circuits to power hotel loads. Power is available to the outlets when the APU is running
- Aspen-SKY – Same configuration as the Aspen-INT. During DPF filter regeneration, outlet power is unavailable.

The power outlet(s) and engine block heater AFCI/GFCI device must be mounted inside the cab of the truck or a weatherproof enclosure. Refer to table for power outlet/AFCI requirements

Component	Requirement
<b>Power Outlet AFCI/GFCI Device</b>	Installed inside the cab or weatherproof enclosure
	Mounted to solid surface
	Located where outlet/device can easily be accessed
	Outlet may NOT be installed so that the face points up
	Provided AFCI/GFCI device/outlet must be installed
<b>Outlet Cable</b>	Secured every 12.00
	Routed away from heat sources, pinch points, or sharp edges
	Cable braid must be installed
	Crimp ferrules installed on the end of wires



### WARNING

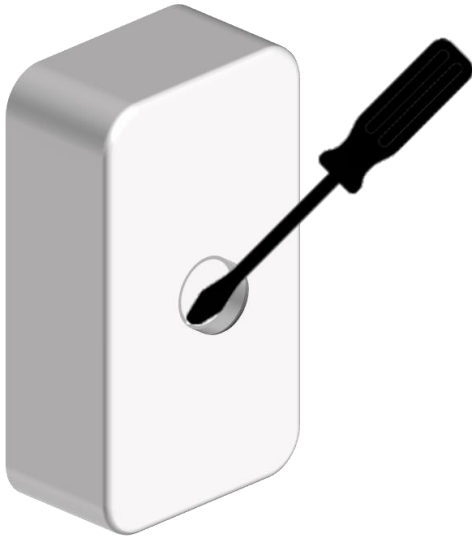
#### High Voltage

The power outlet must be installed by qualified personnel

### 14.1 Outlet Box

1		<p>Determine the location in the cab where the outlet box will be mounted and how the outlet cable will be routed</p> <p>Refer to Figure 2 for mounting clearance requirements.</p>
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2a



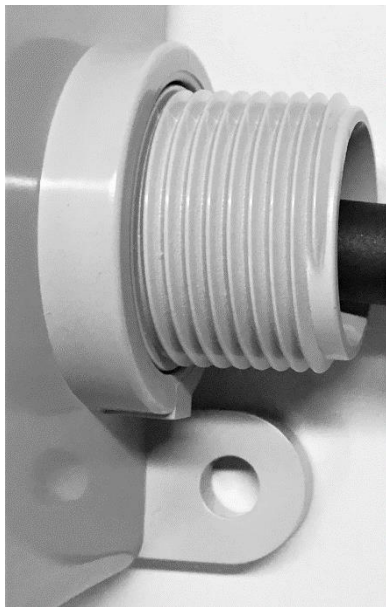
**Power Outlet**

Remove the knockout for the location where the harness will enter the box

**Note: For applications where the box will be mounted to the bunk wall, using the rear knockout is preferred. This eliminates the need to route the outlet cable outside the bunk and reduces the chance that it will be damaged in use.**

Deburr the edges of the knockout

2b

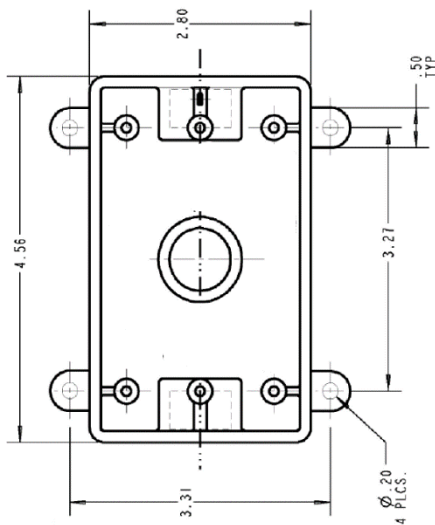


**Block Heater Option**

Apply PVC cement to the outside diameter of the smooth side of the strain relief connector body

Insert the connector body into the holes in the receptacle box

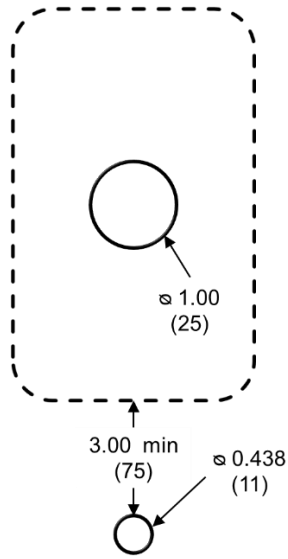
3



Mark mounting hole locations

Mark cable location(s)

4



Drill holes for cable  
Install grommet(s) if required

If using rear knockout



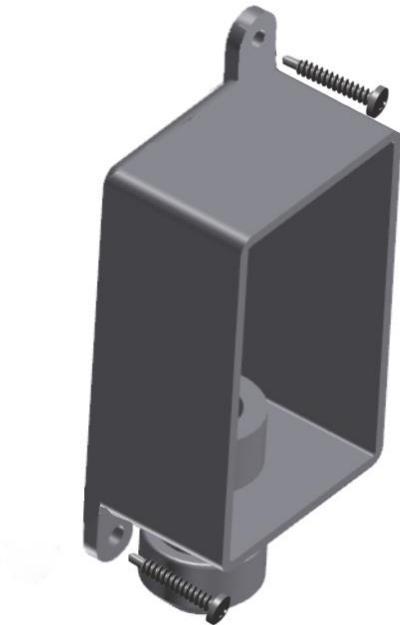
1.00 (25)

If outlet cable is externally routed



7/16 (11)

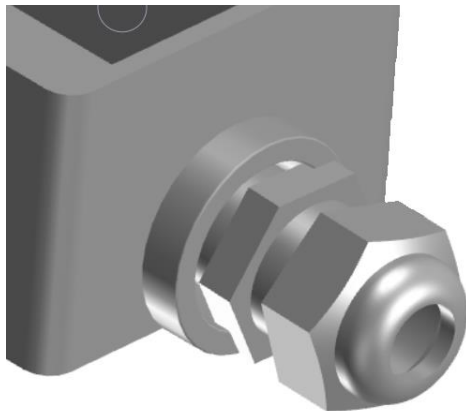
5



Attach outlet box with self-tapping screws

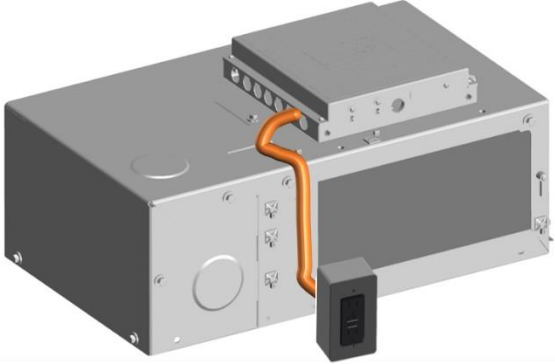

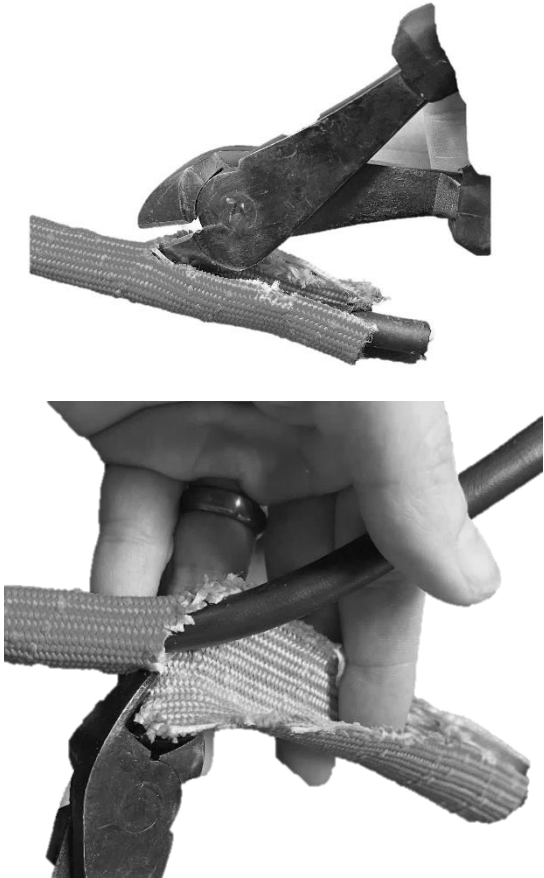



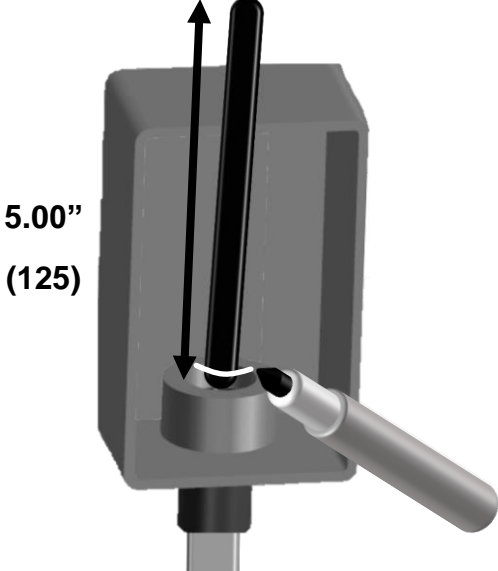

#2



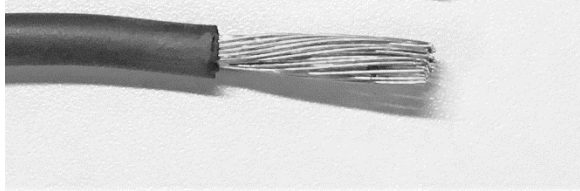
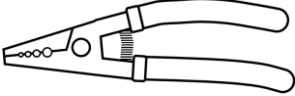

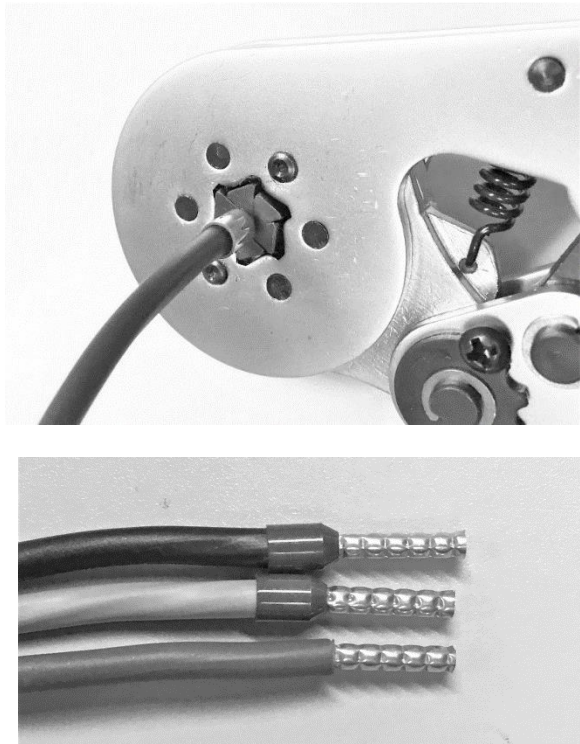

Insert threaded strain relief into box  
Do not tighten compression nut at this time

## 14.2 Cable preparation

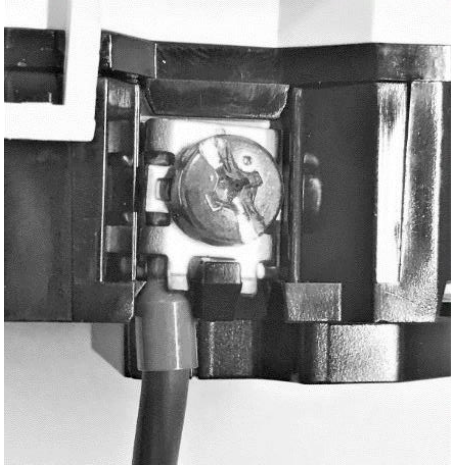
1		<p>Route the power cable(s) from the CCM to the outlet location</p> <p>Route the block heater cable from the block heater location to the AFCI/GFCI device</p>
2		<p>Mark outer braiding where cable will enter outlet box and 12.0 (300) past the first mark</p> <p>Cut braiding/cable to length at the second mark</p>
3		<p>Insert utility scissors in braid and cut along length of braid to the mark</p> <p>Trim braid perpendicular to the first cut</p>

<p>4</p>		<p>Install cable tie 0.5 (13) from the end of the braid</p>
<p>5</p>	 <p>5.00" (125)</p>	<p>Insert cable through strain relief and into box</p> <p>Cut cable jacket 5.00" (125) past where it enters the box</p> <p>Mark cable 0.25" (6) past where it enters the box</p>
<p>6</p>		<p>Trim jacket to length so that 0.25" (6) extends into the box.</p> <p>Tighten compression nut</p>


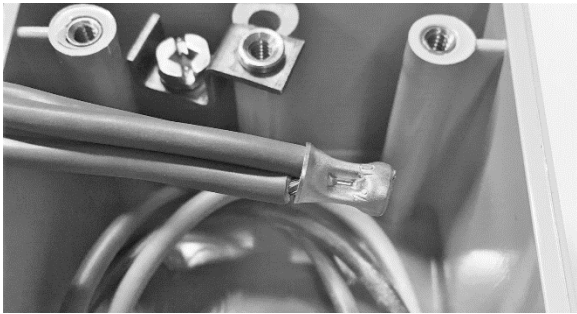

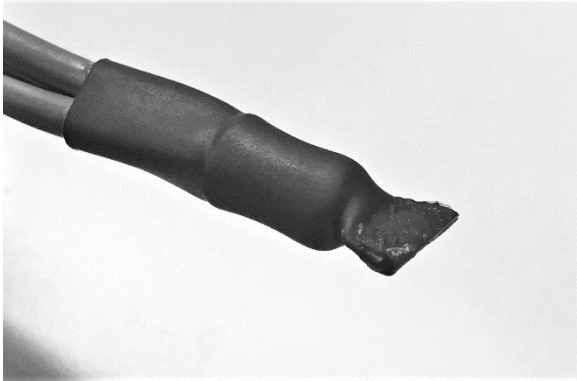
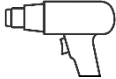
## 14.3 Ferrule Installation

1		<p>Strip the end of the wires to 0.50 (13)</p> 
2		<p>Position the insulated ferrules on the black and white wires</p> <p>Position the bare ferrule on the green wire (Power outlet only)</p> <p>Ferrule should bottom out on wire insulation and conductors flush with end of ferrule.</p>
3		<p>Insert the ferrule/wire in the crimp tool</p> <p>Crimp the ferrule</p> <p>Trim any wire that extends beyond the tip of the ferrule</p> <p>Pull on the metal portion of the ferrule to verify crimp</p>  <p><b>DIN 46228 HEX</b></p>

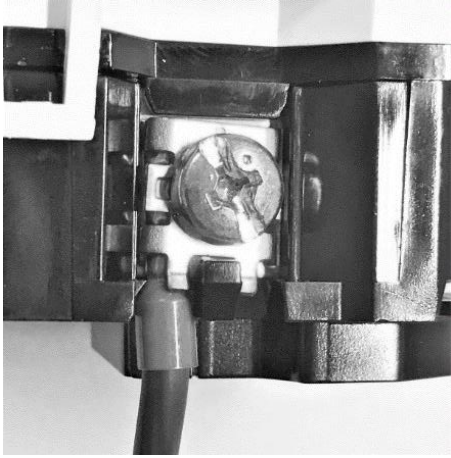
## 14.4 Outlet Wiring

1		<p>Insert the ferrules under the line terminal clamps according to the table</p> <p>Tighten screw terminals</p>								
		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold;">Wire</td> <td>Black</td> <td>Gold line</td> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold;">Terminal</td> </tr> <tr> <td>White</td> <td>Silver line</td> </tr> <tr> <td>Green</td> <td>Device ground</td> </tr> </table>			Wire	Black	Gold line	Terminal	White	Silver line
Wire	Black	Gold line	Terminal							
	White	Silver line								
	Green	Device ground								

## 14.5 AFCI/GFCI Device Wiring (Engine Block Heater)

1		<p>Twist the ends of the two green wires and the pigtail together</p>
2		<p>Install the crimp sleeve over the wire ends</p> <p>Crimp sleeve using tool</p> <p>Trim any wire that extends past the crimp sleeve</p>
 <p><b>Buchanan/Ideal C-24/P24</b></p>		
3		<p>Place heat shrink over the crimp sleeve so that 0.25 (6) extends beyond the end of the crimp</p> <p>Apply heat to shrink</p> <p>Pinch the end of the tubing with pliers to seal</p>
		

4



Insert the ferrules under the terminal clamps according to table

AFCI/GFCI device must be installed so that the ground screw is at the top of the box

Tighten the terminal screws

<b>Wire</b>	Black from CCM	Gold line	<b>Terminal</b>
	White from CCM	Silver line	
	Green from CCM	Ground splice	
	Black to heater	Gold load	
	White to heater	Silver load	
	Green to heater	Ground splice	
	Green from splice	Device ground	

### 14.6 Outlet Installation

1



Remove the long screws supplied with the outlet/AFCI/GFCI device

Fold the wires into the box

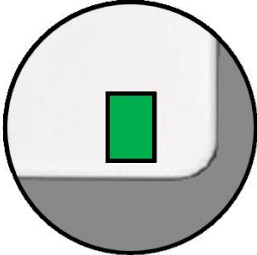
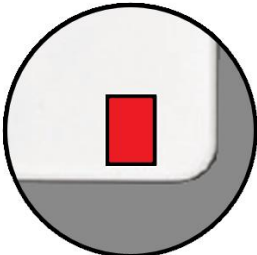
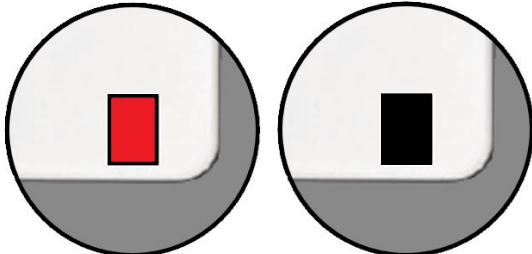
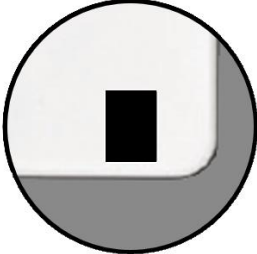
Install the face plate on the outlet and the outlet in the box

Secure the faceplate with short screws included in the installation kit





## 14.7 AFCI/GFCI Status Indicator

Status Indicator Light	Outlet Power	Status/Action	Reset Button Status
 Solid Green	ON	Device is working normally	SET – Button in
	OFF	Line and Load wires are reversed; reinstall with corrected line and load connections	Tripped – Button out
 Solid or Constant Flashing RED	ON	Press TEST button and RESET button. If RED indicator light continues or will not RESET, Replace device	Tripped – Button out
	OFF	Device has tripped and the self-test function detects a potential problem, press RESET. If RED indicator light continues or will not RESET, replace device	
 OFF and flashes RED 2X every 5 seconds	OFF	AFCI trip – press RESET, if device continues to trip there is a problem with the load connected to the outlet. Determine	Tripped – Button out
 OFF	OFF	GFCI trip – Press RESET, if Device will not reset there is no power on the circuit	Tripped – Button out

# 15. Battery Cable

The APU battery cables connect to the truck battery pack. The truck batteries provide 12 VDC power to start the APU engine. When the APU is running, the batteries are charged by the APU alternator. Determine the location and routing of the battery cables and fuse/fuse holder according to the installation requirements in Table 15.0

Component	Requirement
Battery Cables/Terminals	Do not connect until installation complete
	Connect only to 12 VDC electrical system
	Routed away from sharp edges, pinch points, or subject to physical damage
	4.00 (100) minimum distance from heat source
	Secured every 12.00 (300)
	Installed opposite ends of truck battery pack
	Apply varnish (PX)
	Tool T8 to crimp
Fuse/Fuse Holder	Installed in-line with positive battery cable
	Locate as close as possible to positive battery terminal
	Located in battery box
	Secured inside battery box

Table 15.0 Battery Cable Installation Requirements



**Low Voltage. Refer to Table 1**



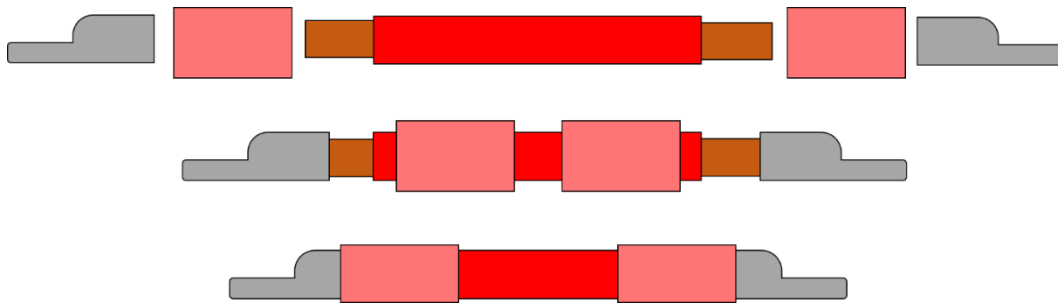
**Do not attach battery connections until installation is complete and unit is ready for commissioning**

## 15.1 Battery Cable

1. Route and secure the battery cable harness from the APU to the battery box.

### 15.1.1 Fuse Cable

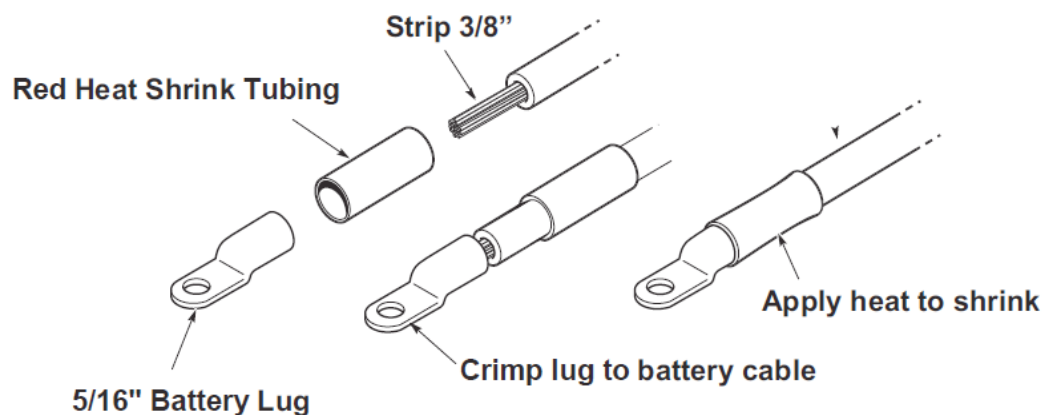
#### Fuse Cable



1. Measure the length from the positive battery terminal to the desired fuse holder location. Maximum 12.00 (300)
2. Cut a piece of cable off the end of the positive (red) battery cable. The length should be the same as measured in the previous step.
3. Position a piece of red heat shrink tubing over each end of the short cable.
4. Strip both ends of the short cable to 3/8"
5. Install 3/8" battery lug on battery end of the short cable. Crimp with tooling
6. Install 5/16" battery lug on fuse end of short cable. Crimp with tooling
7. Apply heat to shrink heat shrink tubing.

### 15.1.2 B+ Cable

#### B+ Battery Cable

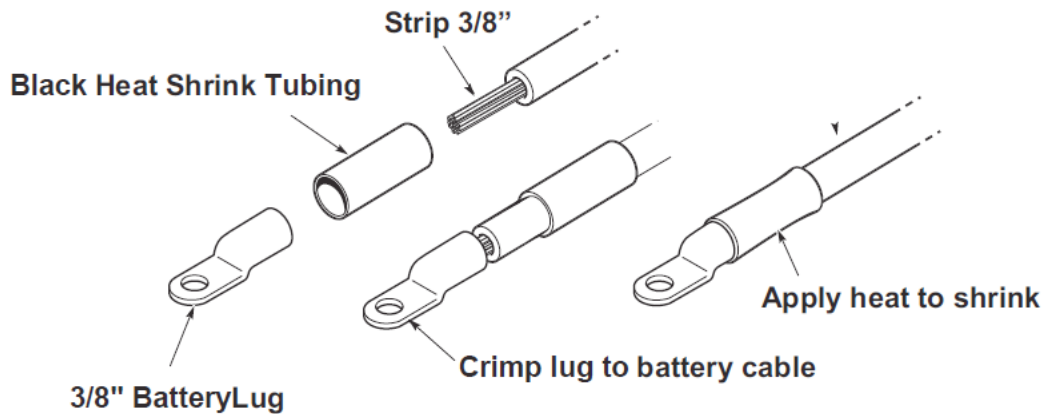


**! WARNING**

**Do not attach battery connections until installation is complete and unit is ready for commissioning**

1. Cut positive battery cable to length
2. Strip end of cable to 3/8"
3. Position one piece of red heat shrink tubing over the stripped end
4. Install 5/16" battery lug on end of positive battery cable. Crimp with tooling.
5. Apply heat to shrink heat shrink tubing.

### 15.1.3 Negative Cable

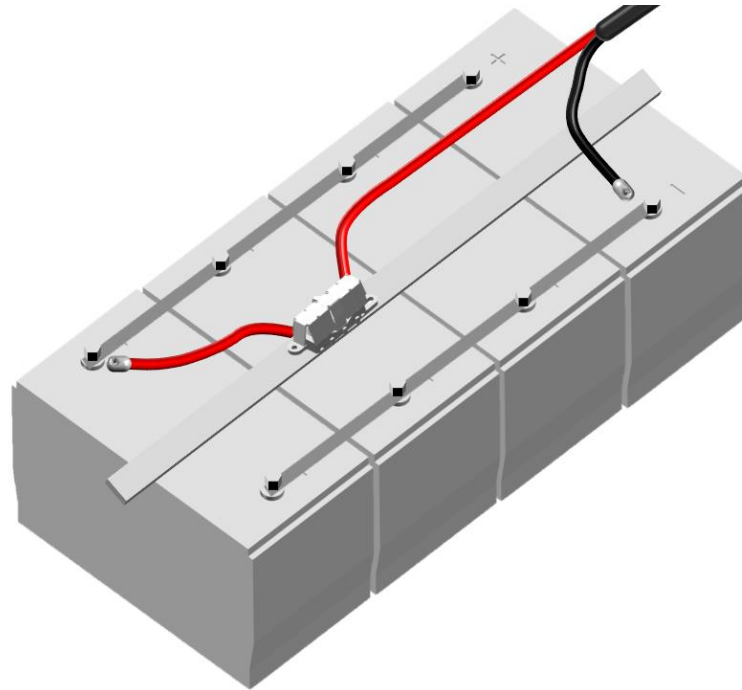


**! WARNING**

**Do not attach battery connections until installation is complete and unit is ready for commissioning**

1. Cut negative battery cable to length
2. Strip end of cable to 3/8"
3. Position one piece of black heat shrink tubing over the stripped end
4. Install 3/8" battery lug on end of negative battery cable. Crimp with tooling.
5. Apply heat to shrink heat shrink tubing.

## 15.1.4 Fuse Holder



### **WARNING**

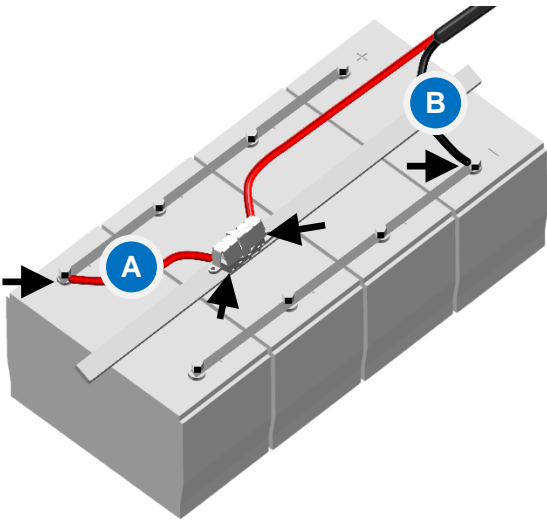
**Do not attach battery connections until installation is complete and unit is ready for commissioning**

#### **Fuse/fuse holder must be installed**

1. Secure fuse holder in the battery box using M6 bolts or wire ties using the wire tie mount slots
2. Position the 200 amp fuse in the fuse holder.
3. Install the fuse cable over one of the studs. Install nut on the stud torque to 12-18Nm
4. Install positive battery cable over the other stud. Install nut and torque to 12-18Nm
5. Apply insulating varnish to the terminals and hardware.

## 16. Commissioning

### 16.1 Battery Cable Connections

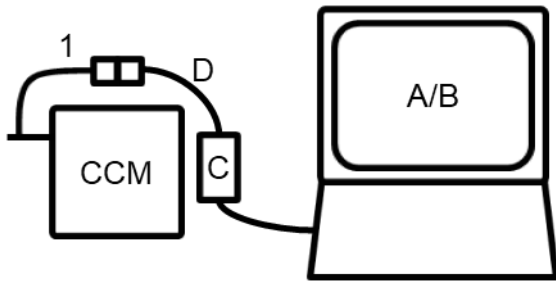
Battery Cable Connections		<p>Separate the Starter Solenoid Disconnect (SSD) located at the front of the APU engine.</p> <p>Connect positive (A) and negative (B) battery cables</p> <p>Apply corrosion protection to battery cable connections →</p> <p>Reconnect the SSD after completing the configuration steps in section 16.2</p>

### 16.2 Configuration

The model number, software, and configurations must be set for the Aspen APU to function properly. Perform the configuration process before completing the other commissioning steps.

Required Tools	The tools listed are required to perform the configuration process.			
	Item	Tool	Part Number	Part Description
	A	Windows Based PC	Obtain Locally	Windows 10 or later, minimum 4 GB RAM
	B	CabinTech	07-00814-44	CabinTech Software USB
	C	CAN BUS Interface	07-68002-00	USB CAN BUS Interface
	D	Harness	07-00524-00	CAN Interface to CAN Service Adapter
	E	APX USB Flash Drive	07-00814-00	Configuration/Download/Program USB
F	CAN BUS Interface Drivers	Obtain Locally	Interface Drivers for 07-68002-00	

1

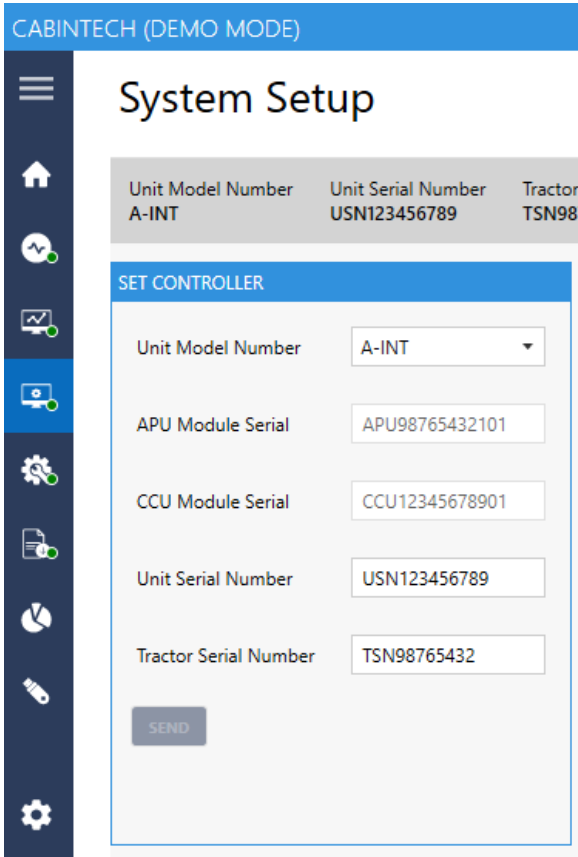


Connect harness (D) to CAN BUS Interface (C)

Connect CAN BUS Interface (C) to USB A port on PC (A)

Connect harness (D) to CAN SERVICE connector located on 12 VDC/CAN harness near the CCM

2



Launch Cabin Tech program

Select System Setup Menu

3

**SET CONTROLLER**

Unit Model Number: A-INT

APU Module Serial: APU98765432101

CCU Module Serial: CCU12345678901

Unit Serial Number: USN123456789

Tractor Serial Number: TSN98765432

SEND

Set the following controller data

Unit Model Number – Select from drop down

- A-INT Integrated with CCU
- A-STA Standalone with CCU
- A-PWR Integrated without CCU
- A-SKY Intergrated with CCU and DPF

APU Module Serial Number – Auto populated

CCU Module Serial Number – Auto populated

Unit Serial Number – Unit serial number printed on APU/CCU data tag

Tractor Serial Number – Last 8 digits of tractor VIN

Press SEND button

4

**SET DATE TIME**

Parameter	Date	Time
APU Date Time	03/10/2023	12:59
<input checked="" type="radio"/> PC Date Time	03/10/2023	12:59
<input type="radio"/> User Date Time	03/10/2023	12:59

SET

Check the APU date and time, if it is not correct it needs to be updated

Select PC Date Time or User Date Time and then press SET to update the date and time setting

5

**SOFTWARE UPGRADE**

**Attention:** Please ensure the controller remains connected and powered during the upgrade. Failure to do so may require additional upgrade attempts.

Software Location: Select Folder

	File Version	Controller Version
CCU Main	xx.xx.xxx	60.00.01
CCU I/O	xx.xx.xxx	60.00.01
APU	xx.xx.xxx	60.00.01

Upgrade Status:

UPGRADE

Check for software update

Download the latest Aspen APU software from the SolutionsCenter

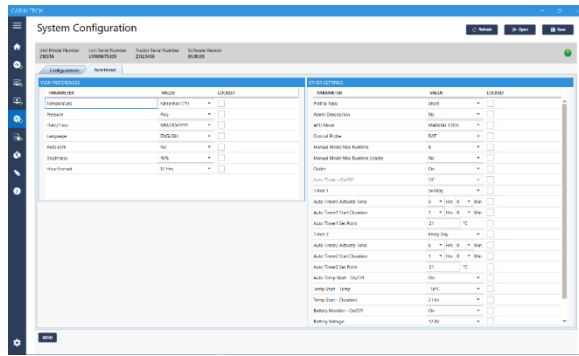
Select software location

Click Upgrade

Upgrade status is indicated on the status bar



6

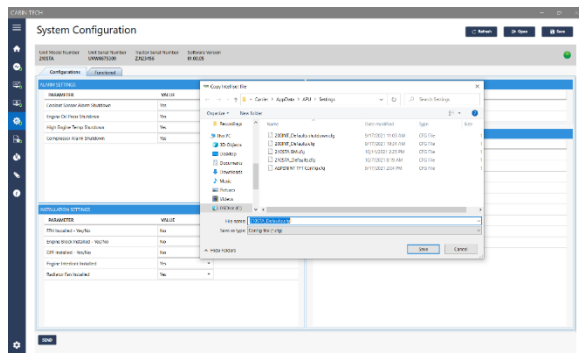


Select System Configuration menu

Set system configuration and functional settings using one of the following methods

- a. Configuration file – Customer specific configuration parameters are loaded from file
- b. Manual entry – Individual configuration parameters are selected and sent to controller

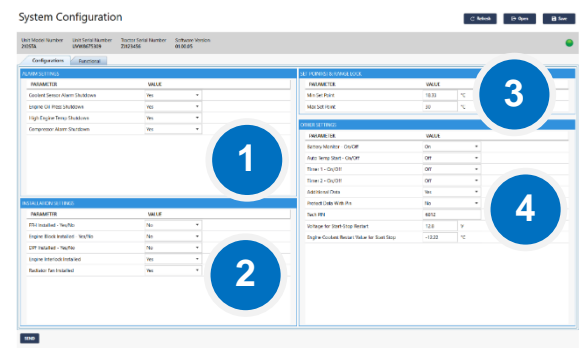
6a



To open existing configuration files, click the open (2) button at the top right part of the system configuration screen. Highlight the desired file and click open.

After the configuration file has been opened, the Send button must be pressed before changes will take effect.

6b



Set the system configuration parameters per the customer preferences in table 16.

Configuration

- 1) Alarm: Enables and disables alarm shutdown parameters
- 2) Installation: Configure installed options
- 3) Set-point/Range lock: Sets minimum and maximum set point temperature
- 4) Other: Enables and disables automatic operation modes and start-stop parameters

After making system configuration changes the Send button must be pressed before changes will take effect.

Functional

- 5) View Preferences: Aspen Interface display settings (C/F, Date Format, Brightness)
- 6) Other Settings: Automatic mode (Battery Monitor, timers, Temp Start) operational settings, enable/disable power outlet

After making system configuration changes the Send button must be pressed before changes will take effect.

## 16.3 System Configuration (Table 16)

### Alarm Settings

Parameter	Default	Description
Coolant Sensor Alarm Shutdown	YES	APU engine shutdown if coolant temp sensor is detected open/short
Engine Oil Pressure Shutdown	YES	APU engine shutdown if low oil pressure is detected
High Engine Temp Shutdown	YES	APU engine shutdown if coolant temperature is high
Compressor Alarm Shutdown	NO	APU/CCU shutdown if compressor alarm is detected. If set to NO APU, heater, and evaporator fan will continue to operate.

### Installation Settings

Parameter	Default	Description
Cabin Air Heater	NO	Optional air heater installed and electric heat disabled
Tractor Engine Block Heater	NO	Optional tractor engine block heater (A-STA only)
DPF Installed	NO	For non Aspen-SKY units with DPF installed
Engine Interlock Installed	YES	Allows engine interlock to be temporarily disabled for service/testing
Radiator Fan Installed	NO	Enables radiator fan output

### Set Point(s) & Range Lock

Parameter	Default	Description
Min Set Point	64.4F (18.0)	Minimum set point
Maximum Set Point	86 F (30)	Maximum set point

### Other Settings

Parameter	Default	Description
Battery Monitor Configured	OFF	Enables battery monitor if configured in functional settings
Auto Temp Start	OFF	Enables temp start if configured in functional settings
Timer 1	OFF	Enables timer 1 if configured in functional settings
Timer 2	OFF	Enables timer 1 if configured in functional settings
Additional Data	NO	
Protect Data With Pin	NO	
Tech PIN	7435	
Voltage for Start-Stop Reset	12.2	Battery voltage that APU will restart if unit is OFF during Comfort Monitor operation
Engine Coolant Restart Value for Start-Stop	10F (-12.23)	Engine coolant temperature that APU will restart if unit is OFF during Comfort Monitor operation

### View Preferences

Parameter	Options	Default	Description
Temperature	C or F	F	Temperature units displayed on AI
Pressure	PSIG or BAR	PSIG	Pressure units displayed on AI
Date/Time	MM/DD/YYYY or DD/MM/YYYY	MM/DD/YYYY	Date and time format displayed on the AI
Language	English, Spanish, or French	English	Language displayed on the AI
Auto Dim	YES or NO	YES	AI backlight dims when not in use
Brightness	10-100% in 10% increments	50%	AI backlight
Hour Format	12 or 24	12 Hrs	Hour format displayed on AI

### Other Settings

<b>Parameter</b>	<b>Options</b>	<b>Default</b>	<b>Description</b>
Pretrip type	Short or Long	Short	Length of pretrip test
Alarm Description	YES or NO	YES	Alarm descripton displayed in service menu
APU Mode	OFF, Cool, Heat, Fan, Comfort Monitor	OFF	Sets APU run mode
Control Probe	Cabin, Return, Supply	Cabin	Sets temperature sensor input that system will use for set point control
Manual Mode Max Runtime	2-24 Hours in 1 hour increments	8	Maximum number of hours APU will run in manual mode of operation
Manual Mode Max Runtime Enable	YES or NO	NO	Enables/Disables maximum runtime
Outlet	YES or NO	YES	Enables/Disables power outlet. Note: Must be set to NO to enable start/stop operation in Comfort Monitor
Auto Timer	ON or OFF	OFF	Enables Timer 1 and Timer 2 configuration
Timer 1	Everyday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday	Everyday	Day(s) timer will operate
Auto Timer 1 Activate Time	0-23 Hours 0-60 Minutes	8 Hours 0 Minutes	Timer 1 activation time
Auto Timer 1 Start Duration	0-9 Hours 0-60 Minutes	1 Hour 0 Minutes	Run duration for Timer 1
Auto Timer 1 Set point	64.4 to 86F	69.8F (21)	Cabin air set point for Timer 1
Timer 2	Everyday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday	Everyday	Day(s) timer will operate
Auto Timer 2 Activate Time	0-23 Hours 0-60 Minutes	8 Hours 0 Minutes	Timer 2 activation time
Auto Timer 2 Start Duration	0-9 Hours 0-60 Minutes	1 Hour 0 Minutes	Run duration for Timer 2
Auto Timer 2 Set Point	64.4 to 86F	69.8F (21)	Cabin air set point for Timer 2

Auto Temp Start	ON or OFF	OFF	Enables temp start configuration
Temp Start Temp	41 to -4 5C to -20C	14F (-10C)	Temperature where temp start is activated
Temp Start Duration	1 to 4 Hours in 1 hour increments	2 Hours	Duration that APU will run when temp start is activated
Auto Battery Monitor Enabled	ON or OFF	OFF	Enables/Disable battery monitor
Battery Voltage	11.0 to 13.5	11.8 Volts	Voltage where battery monitor is activated

## 16.4 Cooling System Bleed

Before starting the APU for the first time, the cooling system must have the air bleed from the system. Failure to completely remove air from the system may cause damage to the APU engine.



**HOT PARTS. Refer to Table 1**  
**COOLANT. Refer to Table 1.**

**Do not start or run the APU prior to purging the entire cooling system of air. Failure to do so will result in APU engine failure**

**Do not operate the engine without the enclosure cover in place. Failure to do so may result in injury**

Integrated

<b>Cooling System Bleed (Integrated)</b>	<p>Fill tractor cooling system</p> <p>Start the tractor engine and run until the tractor thermostat opens.</p> <p>Open the APU engine bleeder valve ½ turn until coolant starts to flow</p> <p>Remove the interlock fuse or temporarily disable interlock configuration setting</p> <p>Start APU engine and run both engines simultaneously until all air is purged from the cooling system.</p> <p>Close the bleeder valve on the APU engine</p> <p>Continue to run the APU for an additional hour to verify system operation and no coolant leaks are present</p> <p>Allow the tractor engine cool, recheck coolant level and add coolant as needed.</p>
--	--

## Stand-Alone

### Cooling System Bleed (Stand-alone)

Fill the stand-alone surge tank

Open the APU engine bleeder valve ½ turn, allow coolant to gravity feed into the APU.

Before starting the engine verify the coolant level is still full.

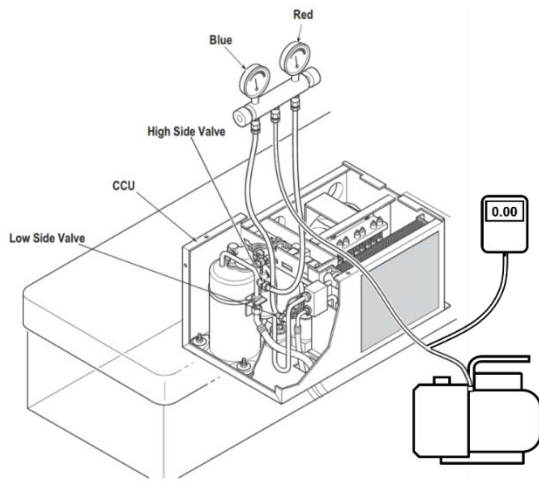
Start the APU engine. Run the engine until all air is purged from the bleed line and coolant begins to flow.

Close the bleeder valve

## 16.5 Refrigerant Charge

### Evacuation and Charging

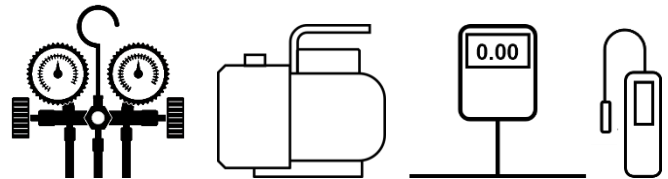
1



Connect manifold gauge set

Vacuum system to 500 microns and verify system holds for minimum 15 minutes.

**Note: If system did not hold pressure perform leak check. Scan code to access leak check procedure 98-50398**



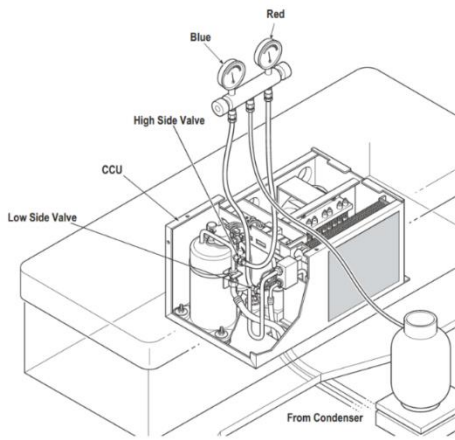
2

Zero refrigerant scale

Open low and high side valves and vapor charge with R-134a to break vacuum

Close high side valve when scale stabilizes and low/high side pressures match.

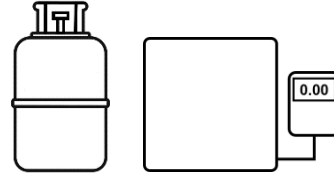
Continue adding refrigerant until scale reads 40-45oz.



**Note: If system did not fully charge with unit OFF proceed with following steps.**

Start the APU and set to Run Mode Cool, fan speed 6

Adjust the setpoint below cabin temperature.



## 16.6 Seal Cab Holes

Apply appropriate sealant or expanding foam to the following holes in the cab floor:

- Refrigerant hoses
- Evaporator drain
- Electrical cable/harness (12 VDC/CAN, condenser, generator)
- Shore power
- Block heater

Ensure cables, harnesses, and hoses are protected from abrasion, heat sources, and pinch points.

Maintain minimum 0.5" (13mm) between edge of hole and cables, harnesses, and hoses

1

**WARNING**

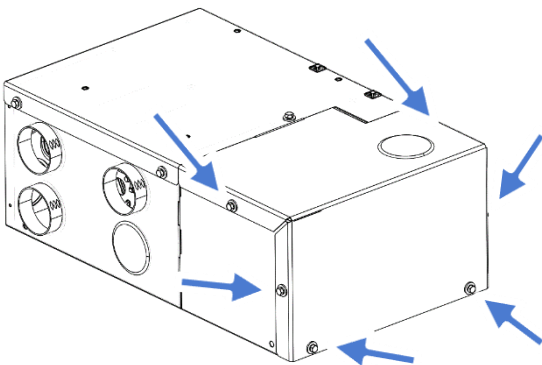
Ensure holes in cab floor are properly sealed and cables, harnesses, and hoses protected from abrasion, heat sources, and pinch points. Maintain minimum 0.5" (13mm) between edge of hole and cables, harnesses, and hoses.

DO NOT apply foam or sealant to opening for air heater

**NOTICE**

If refrigerant connections at the CCU require adjustment/disassembly after foam/sealant has been applied, the foam/sealant must be removed and reapplied. Failure to remove and reseal may result in refrigerant leaks.

2



Install compressor cover

Install 6 compressor cover bolts

10

4 ft-lb

## 16.7 Engine Break-in/ Heat Verification

### Engine Break-in/Heat Verification

Start the APU and set to Run Mode Heat

With APU running check AC Voltage and Generator Frequency. Is voltage is greater than 107? And frequency greater 60 hz

If Yes proceed to next step. If No refer to (62-12174 Aspen Operation and Service Manual - Low/No Voltage Diagnostics)

Adjust setpoint to 85F

Open tractor doors and other vents to allow air to exit the cab.

If required set-up fan to circulate hot air out of cab. The system must remain running in high heat for proper engine break-in.

Run the APU in Run mode HEAT for minimum four hours

## 16.8 Cool Verification

### Cool Verification

Close cab doors and vents.

Set to Run Mode Cool, Fan Speed 6 for minimum one hour.

Verify fan operates in speeds 1-6

## 16.9 Outlet/Block Heater Operation

### Outlet/Block Heater Operation

Reset device AFCI/GFCI device

Check AC voltage at power outlet. Does voltage match AI?

Press test button

Repeat steps 1-3 for Stand-alone units equipped with block heater option.

## 16.10 Engine Interlock

### Engine Interlock

- Start APU
- Start tractor engine and verify that the APU shuts down.
- Start APU (truck engine running). APU should not start

## 16.11 Air Heater Option

### Air Heater

- Connect heater diagnostic tool 1320920A to the heater diagnostic connector
- Connect the USB adapter cable to the diagnostic tool and the other end of the cable to a computer with the heater diagnostic test software installed
- Prime the heater fuel metering pump using the diagnostic tool
- Adjust set point to 85F
- Verify heater operation

## 16.12 Shore Power

### Shore Power

- Start the APU
- Use an AC voltmeter to measure the voltage from the SPM HVAC neutral to the ground stud. Reading should be less than three volts.
  - Measure from the HVAC hot to the ground stud. Reading should be approximately 120VAC.
  - Measure from the HVAC hot to the HVAC neutral. Reading should be approximately 120VAC.
  - Ensure the CCU operates normally.
- Turn off the APU and Plug-in Shore Power.

### NOTICE

**Use 12 AWG shore power extension cord for distances of 0 to 50 feet and 10 AWG from 50 to 100 feet.**

- Use an AC voltmeter to measure the voltage from the SPM HVAC neutral to the ground stud. Reading should be less than 3 volts.
  - Measure from the HVAC hot to the ground stud. Reading should be approximately 120VAC.
  - Measure from the HVAC hot to the HVAC neutral. Reading should be approximately 120VAC.

Ensure the CCU operates normally.  
Note that high heat is disabled in Shore Power mode.

Ensure that at least one of the battery charger indicators is activated. Note that the battery charger will proceed through a start-up routine in which the indicators flash. After a few seconds, it will settle on one of the charge modes depending on the state of charge of the batteries.



## 16.13 Final Steps

### Final Steps

Check APU and truck for leaks

Check engine oil level and adjust if needed

Check coolant level and adjust if needed

Reinstall fairings, panels, or interior panels removed during installation

Clean interior of cab

Complete PDI for and warranty registration forms

Place Operator's Manual/AI operation card in cab of truck

# 17. Appendix

## 17.1 Self-closing Wrap Installation (58-60992)

The purpose of this technical instruction is to provide the installer guidelines for installing the 58-60992 self-closing wrap. The wrap is intended to be used in place of convoluted wire loom where protection from chaffing is required. The self-closing wrap provides good drainage and superior abrasion resistance compared to other cable/harness coverings. As with any covering the self-closing wrap is not intended to be the primary method of abrasion protection, cables/harness should be routed and secured in a manner that prevents chaffing.

The self-closing wrap is available in multiple sizes to suit the application. Refer to Table 17 for wrap size selection guidelines. The color of the wrap used should reflect the voltage of the current carrying conductors contained within the cable/harness being covered. Black self-closing wrap is used with orange tape for visual clarity within this document, tape color should match the wrap used.

- Cables/harnesses that contain voltages > 50 VDC or >50 VAC must be covered with ORANGE self-closing wrap. The ORANGE color indicates that the voltage is high enough that it could result in severe personal injury or death.
- Cables/harnesses that contain voltages ≤ 50 VDC or ≤ 50 VAC should be covered with BLACK self-closing wrap. 12 VDC and 24 VDC control, power, and starting circuits used on APUs and TRUs would fall into the category of low voltage circuits that should use black self-closing wrap.



**Unit may start automatically at any time even if the Aspen Interface (AI) is in the APU Off status. Before performing any work, turn OFF the APU, disconnect the APU battery cables, and lockout the cable ends. Remove shore power if equipped. Proper lockout/tagout procedures must be followed. All unit inspection/servicing by properly trained personnel only.**



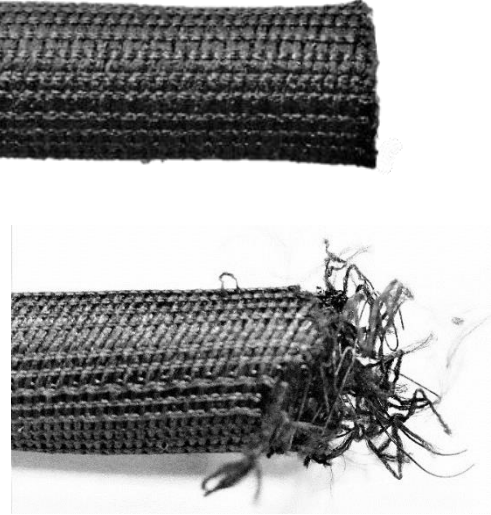
### Required Parts

Part	Quantity	Part Number	Part Description
A	1	02-00137-00M25	Tape, Harness Black
or			
B	1	02-00137-10M25	Tape, Harness Orange

### Required Tools

Part	Quantity	Part Number	Part Description
T1	1	Obtain Locally	Utility Scissors
T2	1	07-00487-00	Heat Gun


## Applying Self-closing Wrap

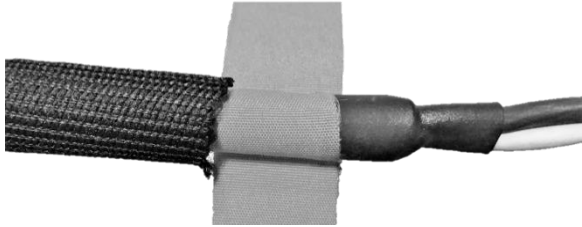
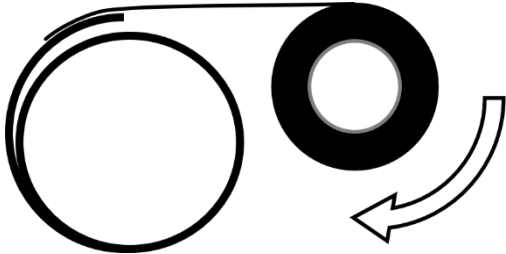
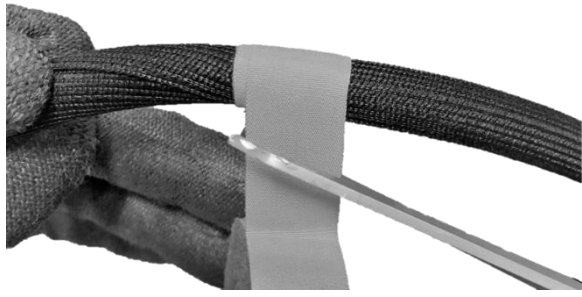

1		<p>Position the end of wrap a few inches from the end of the cable</p>
2		<p>Open the end of the wrap and begin covering the cable.</p> <p>Keep the wrap open ahead of the area being covered by inserting finger into opening in the wrap.</p> <p>Continue inserting the cable into the wrap the length of the cable</p>
3		<p>Cut the wrap to length using sharp utility scissors T1. Properly cut wrap will have clean, unbroken ends.</p> <p><b>Note: Do NOT use a utility knife to cut self/closing wrap. Cuts made with utility knife will result in frayed ends</b></p>



## Securing Self-closing Wrap Ends

The ends of the self-closing wrap must be secured using one of the following methods:

- Heat shrink tubing (preferred)
- Tape (alternate)
- Wire tie (acceptable)

Heat Shrink (Preferred)		<p>Center 40-50 mm piece of heat shrink tubing over the end of the self-closing wrap and cable.</p>
		<p>Use heat gun T2 to shrink tubing.</p>

Tape (Alternate)		<p>Wrap the cable with harness tape (A) at the end of the wrap.</p> <p>Make a minimum of two tape turns on the exposed cable.</p>
		<p>Tape should be wrapped in the same direction as the exposed edge of the wrap.</p>
		<p>Cut the tape at a 20-45° angle.</p> <p>Leave enough length to make another two turns.</p>
		<p>Press the tape end onto the tape underneath using thumb pressure</p>

Cable Tie (Acceptable)		<p>Fold 19-25mm of the end of the wrap to the inside of the wrap.</p> <p>Hold the end of the wrap closed</p>
		<p>Secure end of the wrap with wire tie. Position wire tie 6 mm from the folded end of the wrap.</p>

## Taping Cable Length

### Taping Cable Length

The self-closing wrap needs to have additional tape wraps placed along the length of the wrap to prevent the wrap from opening. Use the following best practices when adding tape and positing the wrap.

- Apply tape wraps every 150 mm (6.0) along the length of the wrap.
- Space tape closer in locations where the cable or harness bends
- Continuous taping may be required for tight bend areas
- Position the exposed edge of the wrap on the outside or center of the bend radius



### Taping Bends



Close tape spacing at bend



Continuous tape at tight bend

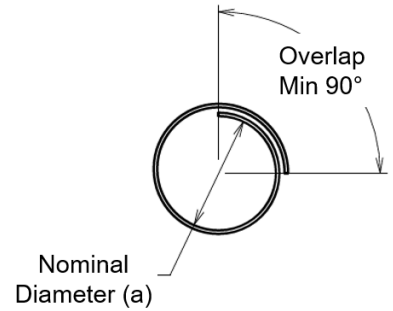


OK – Exposed edge on outside edge of bend




Not OK – Exposed edge on inside of bend

<b>Black Wrap</b>	<b>Orange Wrap</b>	<b>Diameter mm (a)</b>	<b>Harness Diameter min-max mm (in)</b>
58-60992-00	58-60992-30	5	1 - 5 (0.04 - 0.20)
58-60992-01	58-60992-31	8	6 - 8 (0.24 - 0.32)
58-60992-02	58-60992-32	10	9 - 10 (0.35 - 0.40)
58-60992-03	58-60992-33	13	11 - 13 (0.43 - 0.50)
58-60992-04	58-60992-34	16	14 - 16 (0.55 - 0.63)
58-60992-05	58-60992-35	19	17 - 19 (0.70 - 0.75)
58-60992-06	58-60992-36	25	20 - 25 (0.79 - 0.98)
58-60992-07	58-60992-37	29	26 - 29 (1.02 - 1.14)
58-60992-08	58-60992-38	32	30 - 32 (1.20 - 1.26)
58-60992-09	58-60992-39	38	33 - 38 (1.30 - 1.50)
58-60992-10	58-60992-40	42	39 - 42 (1.53 - 1.65)



**Table 17. Self-closing wrap part numbers/size reference**

 **WARNING:** Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information, go to [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel)



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