

# TECHNICAL INSTRUCTIONS

## COMFORTPRO STAND-ALONE AFCI/GFCI DEVICE RETROFIT (CTD P/N 74-01046-00)

### KIT CONTENTS

Quantity	Part Number	Part Description
1	22-02125-00	Cap, splice
3	22-03094-02	Bushing, anti-short
1	22-03142-01	AFCI/GFCI device
1	22-03144-00	Cord, heater
7.5in	22-04183-00	Heat shrink 0.75 ID
1in	22-04183-03	Heat shrink 0.375 ID
4	22-67116-25	Ferrule
1	22-03146-00	Ground pigtail
2	34-00373-58	Clamp, cushion
2	34-01361-08	Screw, pan head
4	34-01364-08	Screw, Phillips head
2	58-00065-57	Grommet
3 ft	58-01472-00	Conduit
1	58-01482-00	Box, Receptacle
25	58-04523-01	Sta-Strap
2	58-60605-00	Strain Relief
3 ft	58-60992-32	Self-closing wrap
1	62-04277-00	Label, AFCI/GFCI
1	68-08629-00	Cover, outlet
1	98-50402-00	Technical Instruction
1	62-12076 Rev B	Operator's Manual

### REQUIRED TOOLS

Quantity	Part Number	Part Description
N/A	02-00311-03	Nyogel 760G
1	07-00487-00	Heat Gun
1	Obtain Locally	Buchanan/Ideal C-24 or P-24 crimper or equivalent
1	Obtain Locally	DIN 46228 crimper hexagonal profile (14 AWG)
1	Obtain Locally	1-3/4" hole saw
1	Obtain Locally	Conduit cutter or metal snips
1	Obtain Locally	PVC solvent cement



Unit may start automatically at any time even if the Driver Control Panel (DCP) is in the APU OFF status. Before performing any work, ensure the DCP is in the APU OFF status, the negative battery cable disconnected, and any external shore power removed. Proper lock out/tag out procedures **MUST** be followed. All unit inspection/servicing by properly trained personnel only.

## INSTRUCTIONS

**Note:** This instruction supersedes the instructions listed in the installation and commissioning manual 62-12050 (Dated Sept 2017), page 1-11 and technical instruction 98-50393-00 Rev A.

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Model	Manufacturing Location
<b>PC6112</b>	Kitchener, ON
ETD22204662   ETD22228719	
<b>PC6112</b>	Athens, GA
SVV91533928   TVA91551985	
<b>210STA</b>	Athens, GA
TVB91554548   TVL91591079	

Table 1. Affected serial numbers

### Scope of Work

This instruction is intended to provide the dealer with the information necessary to perform one of three rework procedures for ComfortPro Stand-Alone APUs (listed in Table 1) equipped with the second power supply harness (also referred to as a "block heater cable"). The appropriate procedure should be selected based on customer utilization of the block heater cable feature. The three options are as follows:

1. Inspect the APU to verify that the block heater cable assembly and circuit breaker has previously been removed as outlined in this document.
2. Remove the block heater cable assembly and circuit breaker.
3. Retrofit the APU with an AFCI/GFCI receptacle device (referred to as the "device") in place of the original block heater cable assembly.

Refer to figure 1 for the typical routing of the block heater cable before the retrofit is performed. Figure 2 illustrates the new routing of the cable from the APU to the AFCI/GFCI device, and from the AFCI/GFCI device to the block heater receptacle.

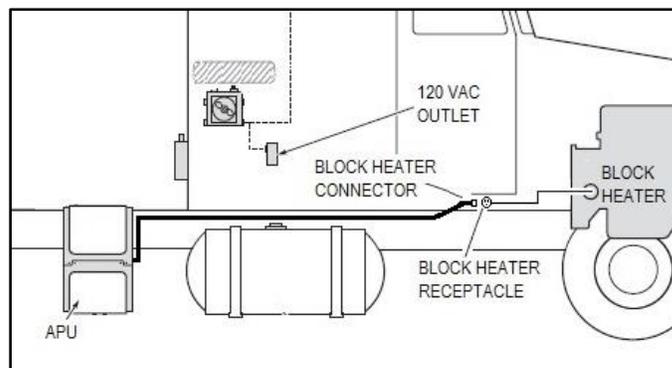


Figure 1. Block heater circuit before retrofit

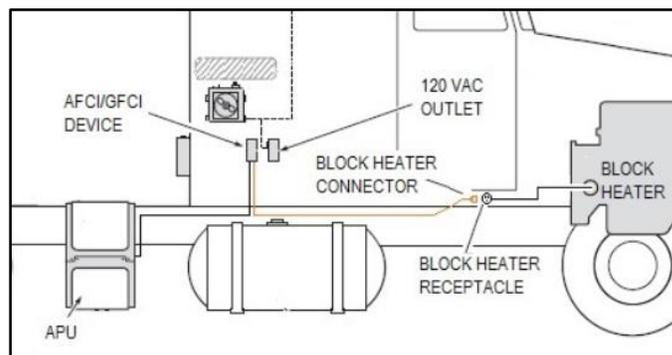


Figure 2. Block heater circuit after retrofit

### Inspect APU (Option 1)

If the Stand-Alone APU block heater was previously removed or not installed, the APU needs to be inspected.

1. Remove the top radiator cover.
2. Verify that the cable from the block heater, 15 amp breaker, and jumper wire have been removed. If any of these parts remain proceed to the block heater cable removal section of this document.
3. If the above mentioned parts have been removed, reinstall the cover for the radiator enclosure. No additional action is required.

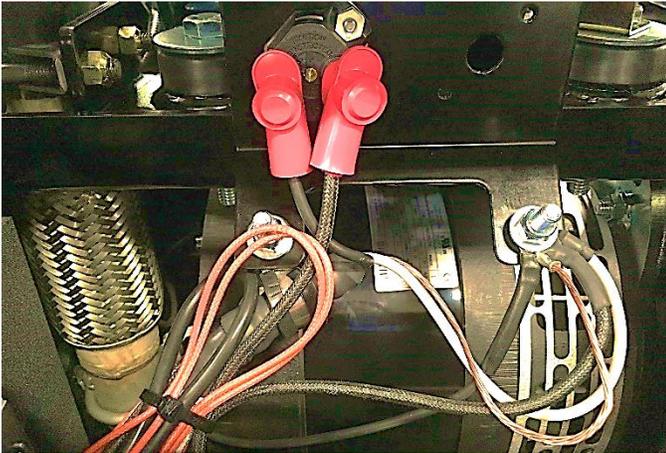


Figure 3. Breaker and Teck cable installation with block heater cable removed

## Second Power Harness Removal (Option 2)

Customer does not utilize the Stand-Alone APU second power harness (i.e. block heater cable), and does not wish to retain this feature, proceed with the removal process as follows:

1. Remove the upper enclosure and cover at the top of the radiator enclosure.

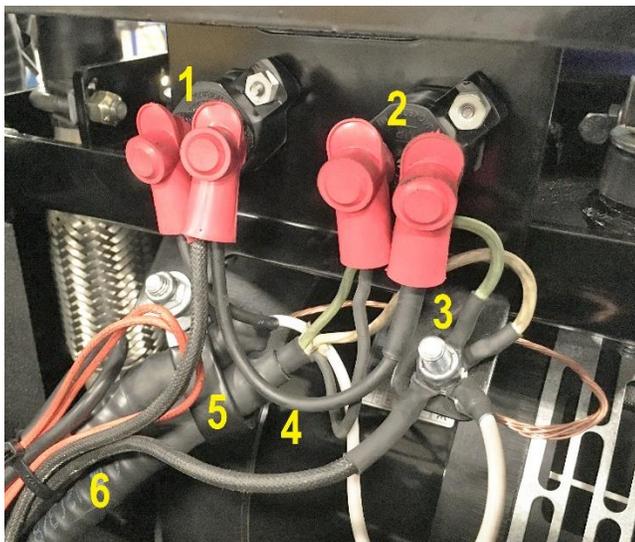


Figure 4. Stand-Alone block heater breaker components:

1. 35 amp breaker
  2. 15 amp breaker
  3. Ground/neutral stud
  4. Jumper wire
  5. Double p-clamp
  6. Block heater cable
2. Remove and discard the double p-clamp securing the liquid tight conduit for the block heater cable and Teck cable. Install a single p-clamp (44-00102-54) to secure the Teck cable to the breaker bracket.
  3. Remove the nut securing the neutral (white) and ground (green) wire for the block heater cable.

4. Remove the ring terminals for the block heater cable from the bonding stud. Adjust the remaining ring terminals if necessary to maintain even spacing. Reinstall the nut and torque to 20 ft-lbs.
5. Remove the nut securing the ring terminal for the black wire of the block heater cable to the 15 amp breaker. Remove the block heater cable from the radiator enclosure.
6. Install the 58-00616-08 plug in place of the grommet for the block heater cable in the side of the radiator enclosure.
7. Remove and retain the nut securing the terminals for the generator power wire and jumper wire to the 35 amp breaker. Remove only the jumper wire from the stud on the 35 amp breaker. Reinstall the nut on the breaker and torque to 18 in-lbs.
8. Remove the two bolts securing the 15 amp breaker to the breaker bracket. Discard the breaker and attached jumper wire.
9. Reinstall the upper APU enclosure and radiator enclosure cover.
10. Remove the remaining liquid tight conduit and block heater cable from the truck. Install new wire ties if any were cut to remove the conduit/cable.

## AFCI/GFCI Retrofit (Option 3)

Customer utilizes the Stand-Alone APU block heater option and wishes to retain the feature. Perform AFCI/GFCI retrofit as follows:

1. Determine the appropriate location for mounting the AFCI/GFCI device.

**Note: The device must be mounted inside the cab of the truck in a location that is not subject to weather or physical damage. The location must be accessible and allow sufficient clearance for the operator in the event the device trips. Under the bunk or near the existing hotel power outlet are acceptable locations.**

2. Inspect the underside of the cab of the truck to verify there are no structural members, wiring harnesses, or hoses directly under the bunk. A 1-3/4" hole will need to be drilled in the cab floor in a later step. Refer to figure 5.



Figure 5. Inspect underside of cab before drilling

3. Apply PVC cement to the outside diameter of the smooth section of both of strain relief connector body. Insert the connector body into the holes in the receptacle box. The box will be mounted later.
4. Drill a 1-3/4" hole in the floor of the truck under the bunk. The hole must be centered below where the receptacle box will be mounted. If the receptacle box will be mounted outside the bunk determine an appropriate location under the bunk to drill the hole.
5. Remove the existing APU block heater cable and route to the hole that was drilled in the floor. The existing cable connector will need to be cut off for the cable to fit into the hole.
6. Determine the length of conduit needed so that at least 6" of the conduit is inside the cab. Allow additional length under the cab for movement.
7. Cut the liquid-tight conduit to length but **do not cut the inner cable**. See figure 6 and 7.
  - a) Score the plastic covering at the desired location
  - b) Bend the conduit back and forth several times to separate the inner sheath.
  - c) Cut the inner sheath with metal snips. The cut must be even and free of burrs or sharp edges.



Figure 6. Conduit sheath separated



Figure 7. Conduit trimmed to length and free of sharp edges

8. Mount the receptacle box with supplied self-tapping screws. The box must be positioned so the strain reliefs are facing down.
9. (Receptacle box mounted outside bunk only)  
Drill two 7/16" holes below the receptacle box and centered under the two strain reliefs at the bottom of the receptacle box. Refer to figure 18. Insert the supplied grommets into the holes.
10. Route the inner cable to the location of the receptacle box. Pass the cable through the bottom of the receptacle box and cut to length allowing at least 5" of cable to extend out of the box. See figure 8.



Figure 8. APU cable and block heater cord routed to device box.

- Route the blunt end of the heater cord from the block heater receptacle location to the hole in the cab floor. The female end of the cord should extend far enough that it reaches the block heater receptacle

**Note: The heater cord must be routed so that it avoids sharp edges, pinch points, or heat sources. Secure the cord every 12" or closer as needed. Install loom as needed to protect cable from abrasion.**



Figure 9. Block heater connector

- Slide a 2.5" piece of 0.75" heat shrink tubing over the heater cord, then the supplied liquid tight conduit over the cord. Feed the conduit/heater cable through the hole in the cab floor so that at least 6.0" of conduit is inside the cab. The end of the conduit with the heat shrink tubing should remain under the cab floor
- Route the heater cord to the receptacle box. Pass the cord through the strain relief opening and cut to length. Allow at least 5.0" of cord to extend out of the box.
- Install anti-short bushing and 2.5" long piece of heat shrink over both ends of the supplied liquid tight conduit for the block heater cord, and liquid tight conduit from the APU. Position the heat shrink tubing as shown in Figure 10. Using a heat gun shrink the tubing over the cord and conduit.



Figure 10. Anti-short bushing and heat shrink tubing installation detail

- Continue to AFCI/GFCI Wiring section of this document.

### AFCI/GFCI Device Wiring

- Mark the block heater cord and APU cable 0.25" past where it enters the receptacle box. Carefully trim the outer jacket from the cord at the marked location. Do not cut or nick the wires.



Figure 11. Outer jacket trimmed to 0.25"

- Install the connector nut, 3/8" compression ring, 7/16" flexible grommet over both pieces of cord. Insert the cord into the connector body. Tighten the connector nut to 10 ft-lbs.



Figure 12. Strain relief assembly

- Trim each of the wires in the box to 4.5". Strip the insulation from the black and white wires to 0.50" and the green wires to 0.75"
- Twist the ends of the two green wires and pigtail together. Slip the supplied crimp sleeve over the bare ends of the wire but not onto the insulation. Form the crimp using the C-24 or equivalent tool. The latch on the tool should be in the "B" position. Trim any wire that extends past the crimp sleeve.



Figure 13. Twisted wire ends

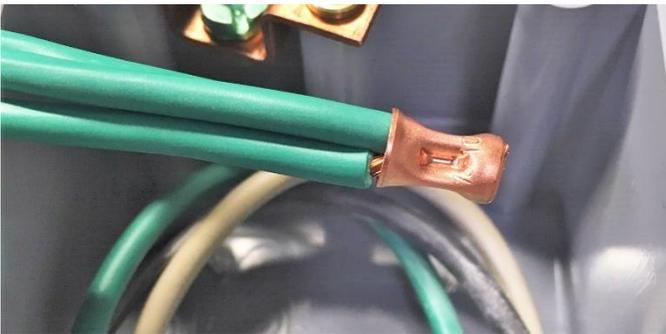


Figure 14. Crimp sleeve installed and wire trimmed

- Install the piece of 0.375" heat shrink over the crimp sleeve so that 0.25" extends beyond the end of the crimp. Using a heat gun shrink the tubing. Pinch the end of the tubing with pliers to seal.



Figure 15. Completed ground crimp

- Install the insulated ferrules over the ends of the black and white wires. Crimp the ferrule to the end of the wire using the DIN 46228 crimper. Trim any wire that extends past the ferrule tip.



Figure 16. Ferrule crimp detail

- Insert the crimp ferrules under the terminal clamps according to Table 1. The AFCI/GFCI device must be installed so that the ground screw is at the top of the box. Hand tighten the terminal screws.

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

Table 2. Wire to terminal reference

- Fold the wires into the box. Install the faceplate and receptacle using the screws supplied with the kit. Discard the longer screws supplied with the AFCI/GFCI device.
- Secure the two liquid tight conduits with supplied cushion clamps and self-tapping screws above where they come through the floor as shown in figure 17.



Figure 17. AFCI/GFCI device installed under bunk

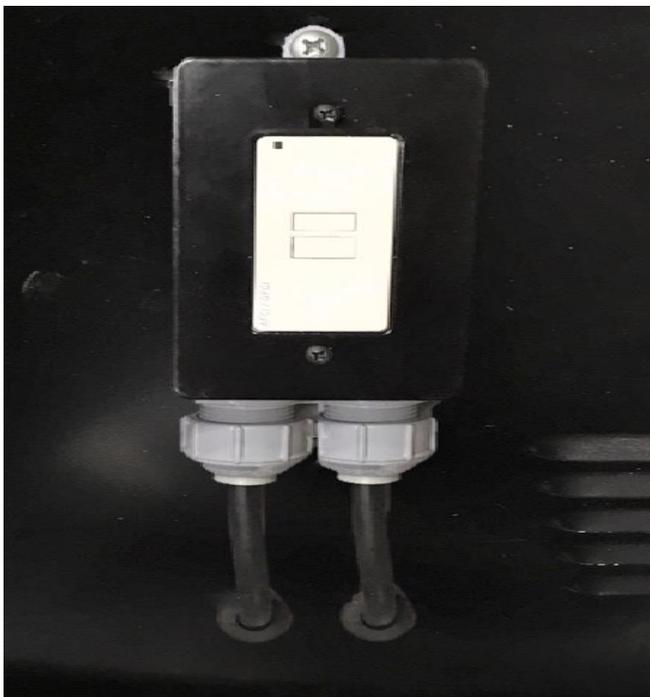


Figure 18. Receptacle box mounted outside bunk

10. Apply the supplied label as shown in figure 19

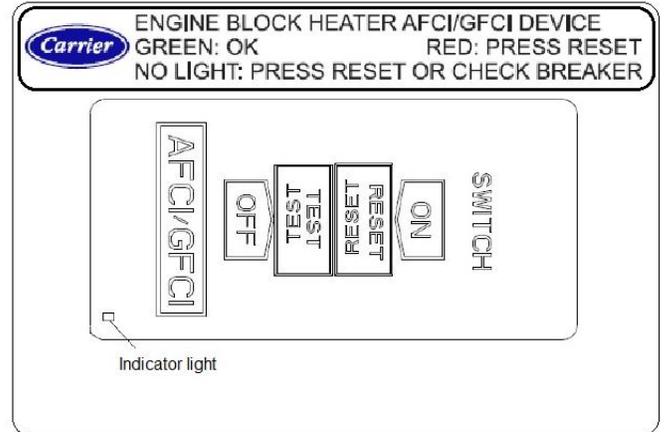


Figure 19. Label placement

11. Fill hole in floor with expanding foam or silicone.
12. Run APU to verify operation of AFCI/GFCI device.

**Note: The AFCI/GFCI device is supplied in the tripped status and will need to be reset.**

13. Apply Nyogel to the block heater cord connector.

### AFCI/GFCI Device Operation

Status Indicator	AFCI/GFCI Device Operation
Solid Green	AFCI/GFCI has power from the APU, is reset and working correctly.
Solid Red or Flashing Red	A problem may exist. Press the TEST button to trip the AFCI/GFCI. If unable to reset contact dealer.
Indicator Off	AFCI/GFCI has tripped either from a ground fault or pressing of the TEST button.
Two Red Flashes Every 5 Sec	AFCI/GFCI tripped as a result of detecting a potential arcing fault.
<p>Press the RESET button to reset the AFCI/GFCI. If the device trips and continues to indicate an AFCI trip contact dealer.</p> <p>Operation of the AFCI/GFCI device should be tested monthly. To test press the TEST button. The device should trip and the indicator turn off. Press the RESET button to reset the device.</p>	

Table 3. AFCI/GFCI Device Operation