Bias Supply Replacement in a 30 kW EV Quick Charger

Introduction

In order to remove and replace the Bias Supply installed deep in the Rack Controller in this 30 kW EV Quick Charger, several installed parts in this charger must first be uninstalled.

To maintain the charger's listing, you must purchase replacement parts for this charger from Pii only and installers must be qualified and trained electricians who install the parts according to these instructions.

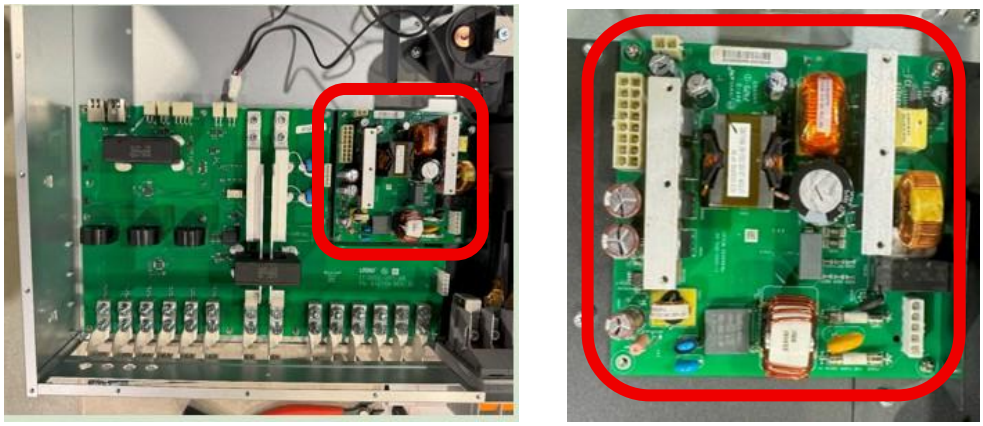


Figure 1: Bias Supply (left highlight) is a board installed next to L-shaped Meter Board deep in the bottom layer of Rack Controller under the MCU Board in this charger; (right hightlight) uninstalled enlargement

CAUTION! Replacement parts used must be purchased from Power Innovations International to maintain the charger's listing.

Replacement Bias Supply Part Number

Part #	Description	Supported Pii Charger Models
Bias Supply Part #: E1-0000-0PI5	Bias Supply installed in this charger's Rack Controller	EVQC030 (30 kW EV Quick Charger)

Tools Needed

- PPE
- Diagonal cutters
- Fresh Sharpie
- Masking tape
- Headlamp
- Magnetic dish (for fasteners)
- Socket wrench and extension, 8 & 10 mm
- Phillips screwdriver, 0, 1 and 2 gauge
- Cable ties: min. length 6 in. (152.4 mm); max. width .14 in. (3.6 mm)

IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS

ELECTRICAL WARNINGS – WARNING! RISK OF ELECTRIC SHOCK!

WARNING! RISK OF ELECTRIC SHOCK! ONLY QUALIFIED ELECTRICAL PERSONNEL FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF THIS TYPE OF EQUIPMENT AND THE HAZARDS INVOLVED SHOULD ADJUST, MODIFY, AND SERVICE THIS EQUIPMENT, WHICH IS REQUIRED TO MAINTAIN THE CHARGER'S INTERTEK LISTING. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE INJURY OR DEATH.

WARNING! RISK OF ELECTRIC SHOCK! SHUT OFF POWER SUPPLY BEFORE BEGINNING INSTALLATION ACTIVITIES OR MAINTENANCE WORK. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SEVERE INJURY OR DEATH.

WARNING! RISK OF ELECTRIC SHOCK! THIS EV QUICK CHARGER CONTAINS HIGH VOLTAGE POWER THAT IS POTENTIALLY DANGEROUS IF NOT HANDLED PROPERLY.

CAUTION! The installer is responsible for conforming to all local and national electrical codes and standards applicable in the jurisdiction this equipment is installed in, including providing suitable wire sizes per NEC for the input configuration.

Notice: Before Beginning Replacement

Note:

1. **Wire/cable count and placement vary, by model number**. Not all connections are specified here, so take note of positioning and be methodical when disassembling. Clear, lighted photographs, from varied angles, and labeling with tape and or Sharpie is recommended.
2. **Take care to keep track of fasteners**. If any fasteners are lost, they must be replaced--or else damage or liability may result.
3. **Avoid cross-threading.** Thread nuts and screws first by hand, then with power tools (if desired), to avoid cross-threading. This may seem minor, but it can have major ramifications if not observed.
4. **Recommissioning the unit is not necessary**, as that process will have been completed in the factory.

Replace Bias Supply in a 30 kW EV Quick Charger

1. Turn Off EV Quick Charger's AC Main Switch.

a. Remove the lower-front panel on the 30 kW or 60 kW charger using a T25 Torx driver.

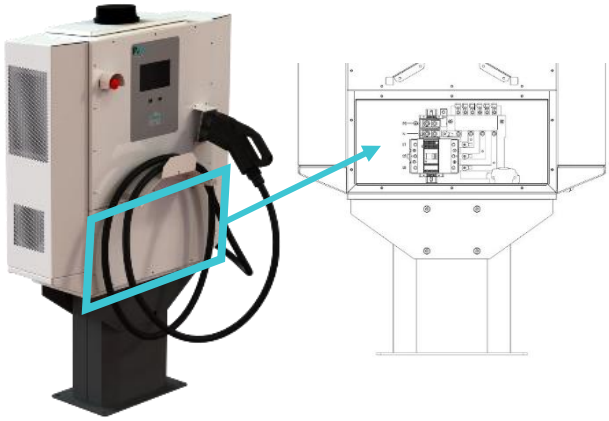
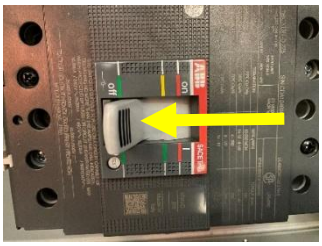


Figure 2: EV quick chargers' lower- front panel of 30kW charger

b. Turn OFF chargers AC main switch inside the 30 kW charger.

Figure 3: 30 kW charger's AC Main Switch inside charger in OFF position



OFF

2. Be mindful that charger's AC input wires are still live.

WARNING! RISK OF ELECTRIC SHOCK! THIS EV QUICK CHARGER CONTAINS HIGH VOLTAGE POWER THAT IS POTENTIALLY DANGEROUS IF NOT HANDLED PROPERLY.

The **input** wires inside the open lower-front panel coming up from the bottom remain **live**—Do not touch!

The remainder of the system is without power and can be handled safely.

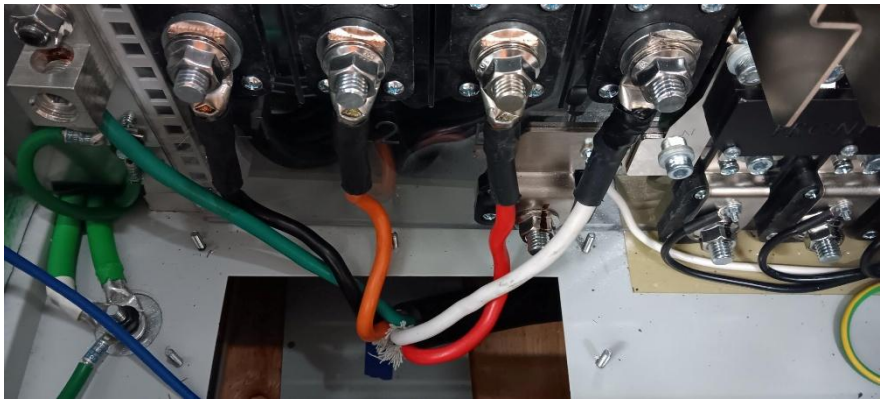


Figure 4 – WARNING! Don't touch Input wires inside right-side door if they are live live

3. Disconnect all wires connected to Rack Controller (Figures 5-7).

a. At the top of the opened lower-front panel (Figure 5), locate the wires connected to the rack controller.

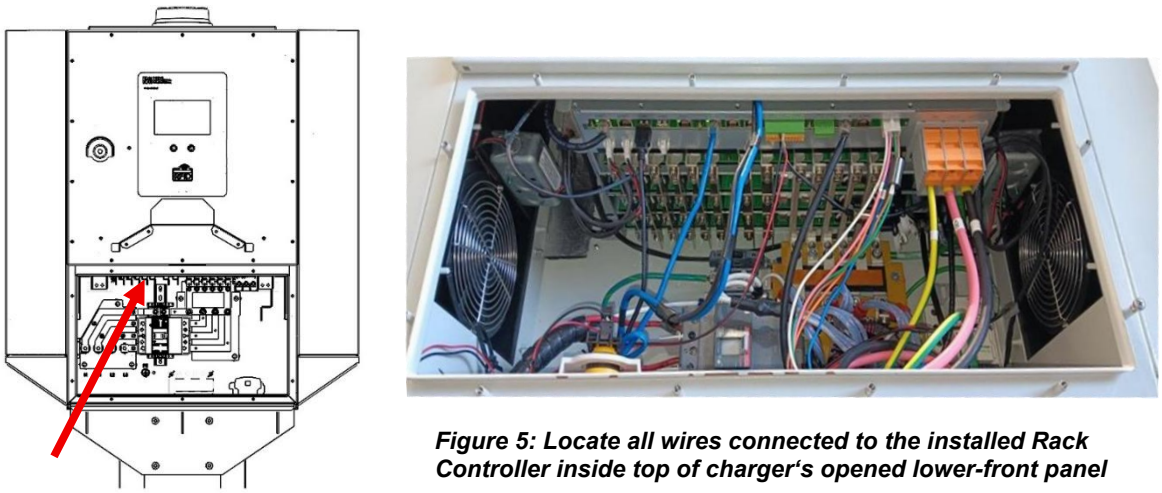


Figure 5: Locate all wires connected to the installed Rack Controller inside top of charger's opened lower-front panel

b. Label and/or photograph all labels with the dashed line area in Figure 6.

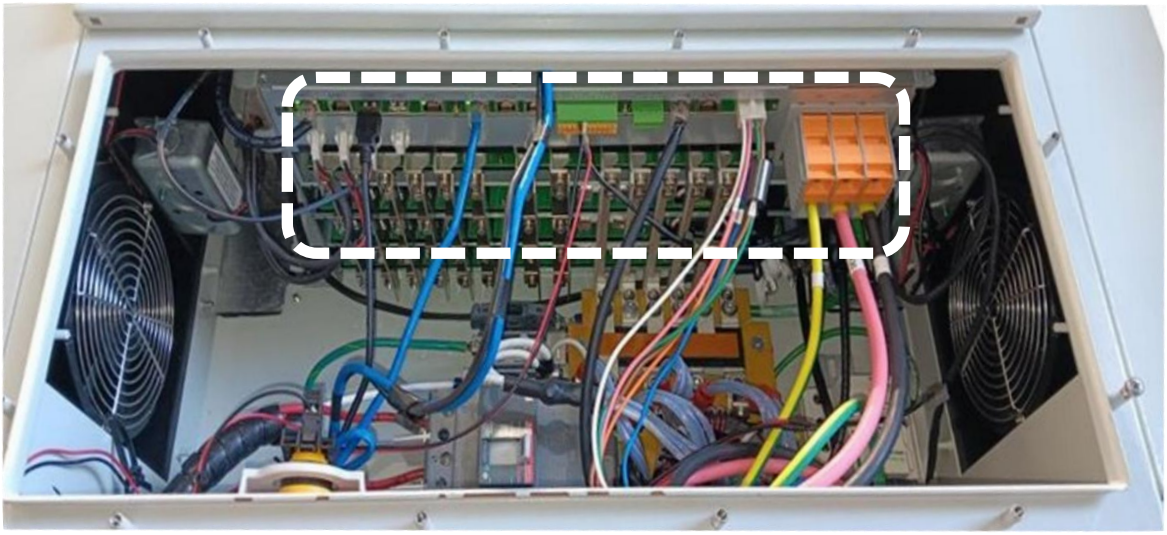
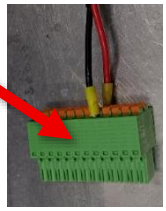


Figure 6 – Wires and connectors to be disconnected before uninstalling Rack Controller

c. Remove all cables/wires within the dashed line area in Figure 6 as follows:
(1) Depress retaining latches and then pull cables.
(2) Insert a lever into quick-connect holes and pivot to release PE, L1, L2.
(3) Gently wriggle-out connectors with multiple pins, if necessary.
(4) Unplug green and orange connector, rather than its red/black wires.



4. Remove 28 bus screws from the front of the rack controller.

a. Still inside the opened lower-front panel, use #2 Phillips bit to remove the 28 bus screws -- or 2 rows of 14 screws, nearest to the front of the charger.

Figure 7 – The 28 bus screws (or 2 rows of 14 screws) closest to the front of the charger must be removed before rack controller can be pulled from charger

b. Set the 28 screws aside for re-installation later.

5. Remove left-side and right-side Heat Exchanger (HX) (Figure 7).

a. Remove bottom socket cap screws (2 on each Heat Exchanger) with a 6 mm hex driver and extension.
b. Lift heat exchanger (HX) cover vertically to remove.
c. If HX cover is sticking, you may be required to strike this surface with rubber mallet.
d. Set each cover aside.

Figure 8 – Removing Heat Exchangers from both sides of the charger

e. Use an M8 socket to remove the 20 fasteners from each heat exchanger (HX), (20 from left-side HX and 20 from right-side HX. This will also require an extension on your drill (Figure 9).

Figure 9 – Removing 20 fasteners from each heat exchanger (HX) (left-side HX and right-side HX

f. Remove the heat exchanger(s), carefully guiding attached wires out through the opening (Figure 10).

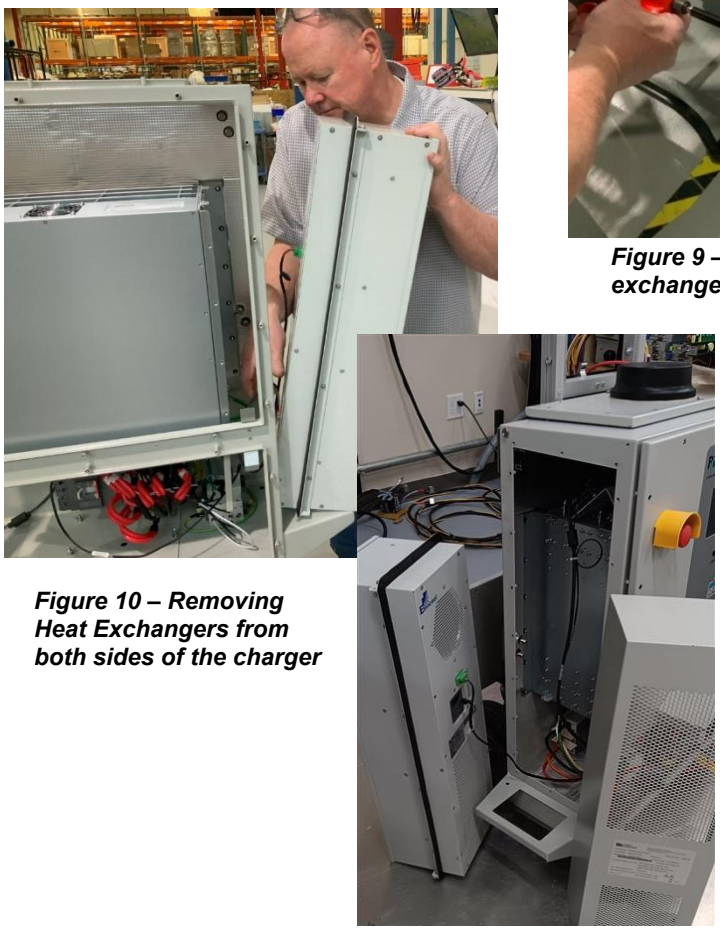


Figure 10 – Removing Heat Exchangers from both sides of the charger

g. Remove 8 forward screws from each side of the charger (Figure 11).

Figure 11 – Eight forward screws on each side of the charger are accessible once HX covers are removed

6. Detach Charger's Upper-front Panel.

a. Using a T25 Torx driver, remove the 14 M5 screws securing the upper-front panel to the charger (Figure 12).

b. While supporting the bottom of the upper-front panel (which has cables attached), tip the top of the panel away from the charger, then carefully guide the cables out from behind the charger's front bracket (Figure 13).

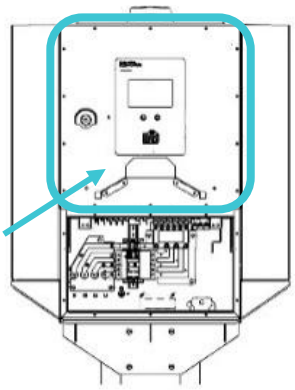


Figure 12: Upper-front panel on charger is secured with 14 screws

Figure 13: Guide cables out from behind charger's front bracket

c. Move the upper-front panel (with RFID circuit board, display screen, and cable hanger still attached) and place it face down on a table. (Note: Cardboard or cloth on the table will help you avoid scuffing any part of the panel face or cable hanger face).

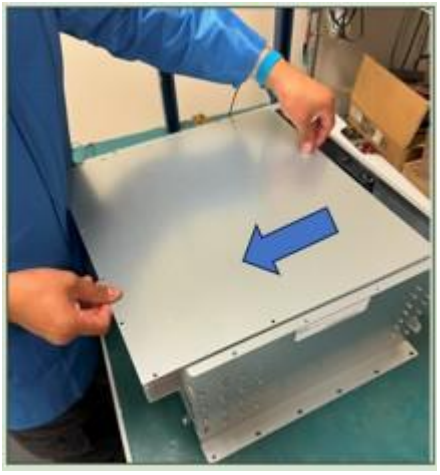
Figure 14: EV quick chargers' upper-front panel face down on table

7. Extract rack controller (approx. 23 lbs) with top cover still on.

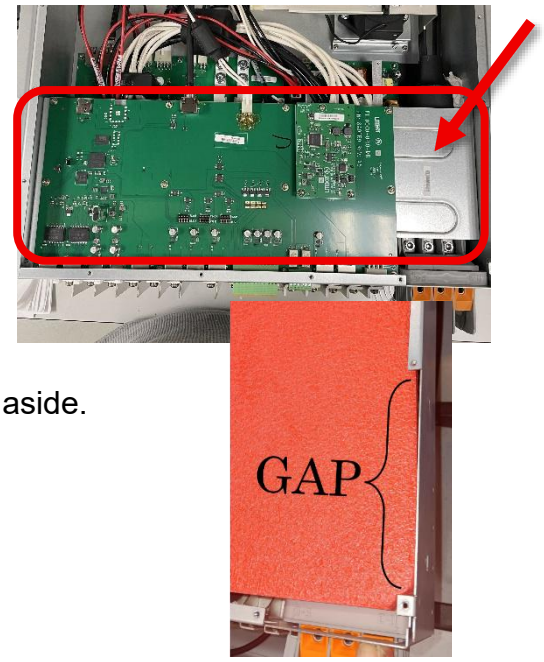
- **a.** Lift the rack controller with its top cover still secured out the front of the opened upper-front.
- **b.** Place on a raised surface (e.g. table) for working ease.
- **c.** Connector designators face you, reading upright and horizontally.

8. Remove rack controller's top cover.

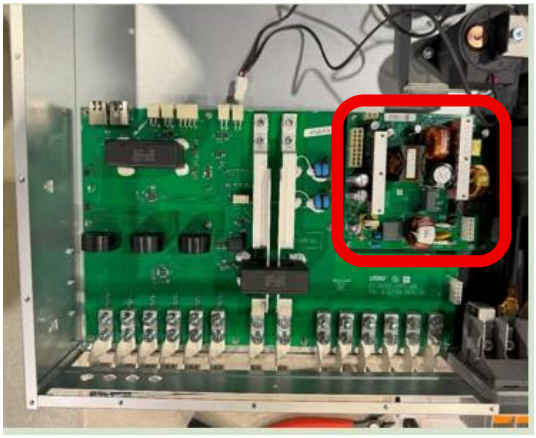
- **a.** Remove 16 screws securing the rack controller's top cover in place.
- **b.** Slide the top cover out the front.

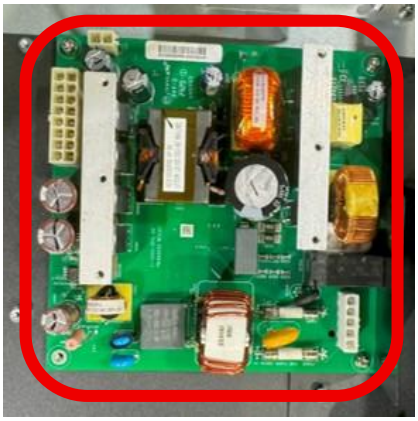


9. **Remove MCU Shelf/Board Unit.**
   a. Consists of MCU Board (larger) + CP Board (smaller) attached to the silver shelf. There is no need to remove screws from either board to access Bias Supply. Instead, plan to remove shelf/board unit.
   b. Photograph (to recall cable positions later) and then disconnect the cables.
   c. Remove 4 side screws (2 on left and 2 of right) and 1 front screw using a #1 bit driver.
   d. Lift out (first through gap in enclosure lip) and set aside.



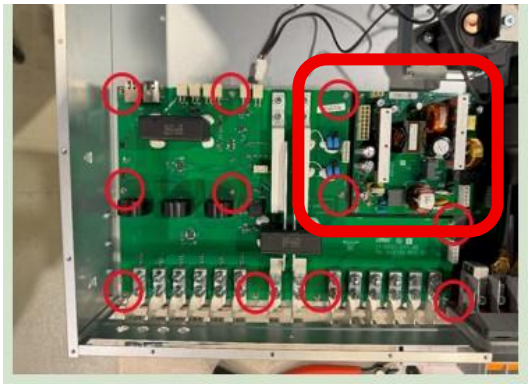
10. **Remove Bias Supply board.**
   a. Bias supply is the smaller PCB of two mounted in bottom of rack controller (under the silver shelf).



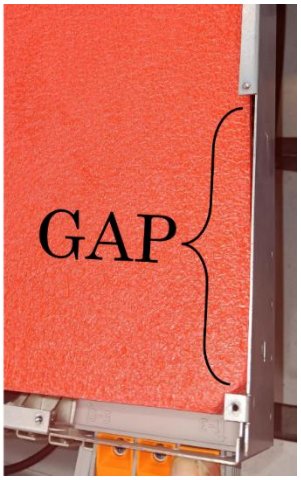


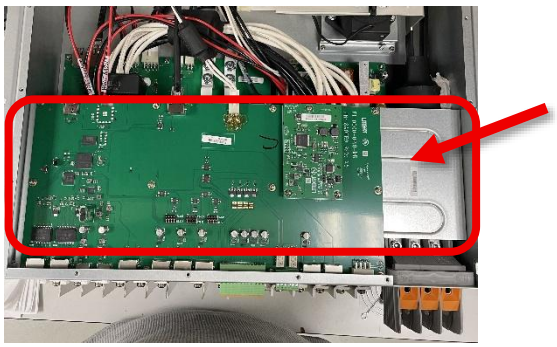
   b. Take a picture, if necessary, so you can restore current cabling later.
   c. Remove cable ties with diagonal cutters, taking care not to harm wires.
   d. Disconnect all cables from Bias Supply board.
   e. Remove 4 mounting screws from the Bias Supply board's 4 corners.
   f. Lift Bias Supply board out of the bottom of the rack controller and set aside, taking care not to confuse it with the new one.

11. **Install New Bias Supply board.**
    a. Mount Bias Supply board (highlighted) to bottom of enclosure with 4 screws in the corners (tighten, not overly).
    b. Connect all cables. Refer to photos and Sharpie marks for aid.
    c. Cable-tie all loose wires.



12. **Re-install Silver Shelf/MCU Board Unit into Rack Controller**
    a. Narrow end last (through side gap in enclosure lip).
    b. Edge with connectors goes into front enclosure slot.
    c. Fasten with 5 screws (2 on ea. side, one in front)

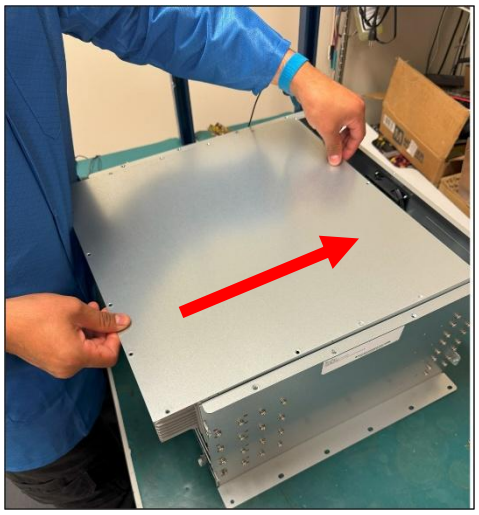




13. Re-install Rack Controller's top cover.

a. Slide the top cover back into place on the top of the rack controller

b. Restore 16 screws to top cover to secure the top cover in place.



14. Reinstall rack controller into charger

a. In upper-front opening (connectors downward, place rack controller with wiring connectors facing down and top cover facing outward.

b. Fasten 16 side screws (8 on each side).

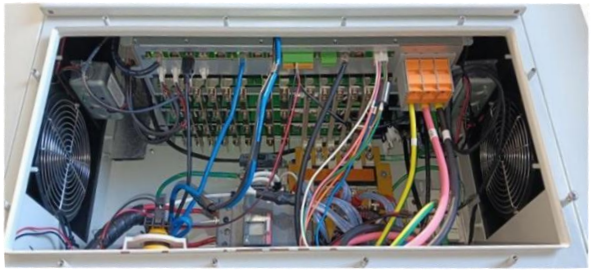
c. Reconnect cables/wires through opened lower-front opening.

i. Ensure retaining latches are engaged.

ii. Terminati PE, L1, L2 at Quick Connect

iii. Take care that these are each inserted fully

iv. Insert a lever into hole above each wire and torque until fully closed

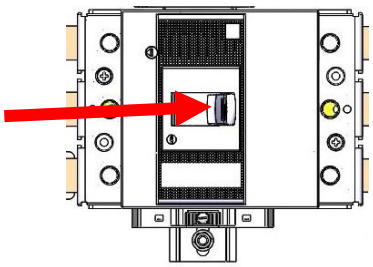


15. Replace heat exchangers and covers to charger

- **a. Terminate their wiring at +48V connectors on rack controller.**
- **b. Hang HX on both sides of 30 kW charger and secure with original screws.**

16. Close the internal breaker (power “on”).

- **a.** In the open lower-front panel, turn chargers AC main switch to the ON position (Figure U).



17. Reinstall upper and lower-front panels.

- **a.** Reinstall lower-front panel and secure with the original screws using a T25 Torx driver and torque screws to 142±10 in-lbs (16±5 N-m).
- **b.** Turn ON upstream power to the unit.