MCU Board Replacement in a 30 kW EV Quick Charger

Introduction

In order to access and replace the MCU Board installed 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.

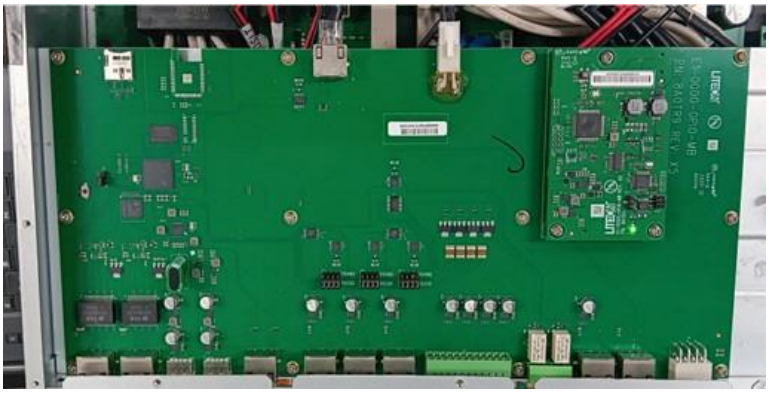


Figure 1: MCU Board is the larger board pictured here with the smaller CP Board attached to the top of MCU Board; MCU and CP Boards are installed in charger's Rack Controller just under Rack Controller's top cover

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

Replacement MCU Board and CP Board Part Numbers

Part #	Description	Supported Pii Charger Models
MCU Board Part #: E1-0000-0PI0	MCU Board installed in this charger's Rack Controller	EVQC030-3x (30 kW)
CP Board Part #: E1-0000-0PI3	CP Board installed on top of this charger's MCU Board	EVQC030-3x (30 kW)

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 MCU Board 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.

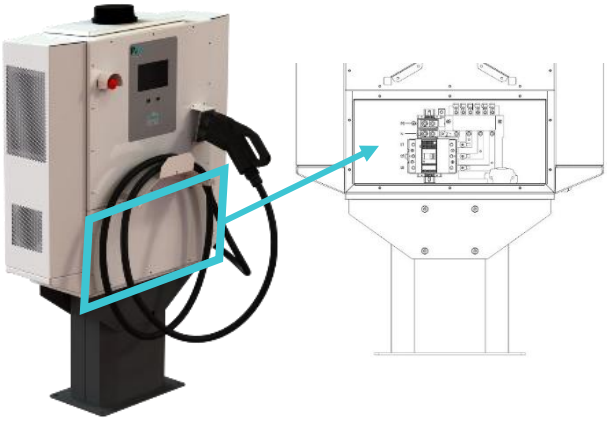
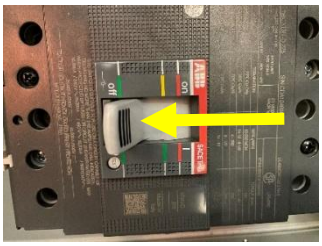


Figure 2: EV quick chargers' lower- front panel of 30kW charger

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.

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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.

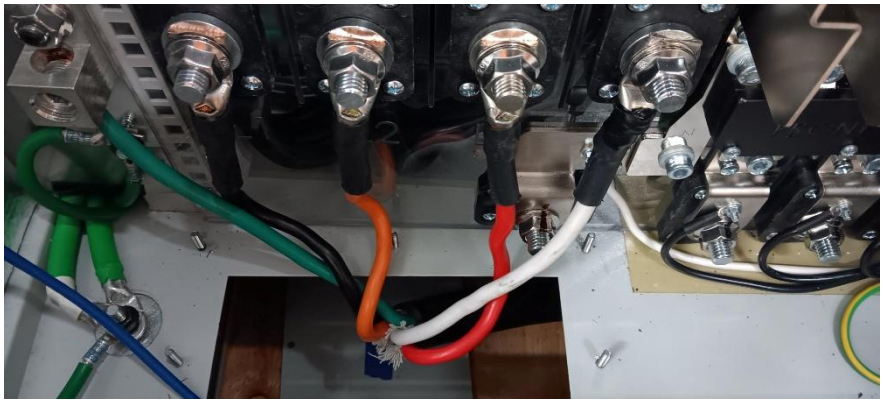


Figure 4 – WARNING! Don't touch Input wires inside right-side door if they are live live

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.

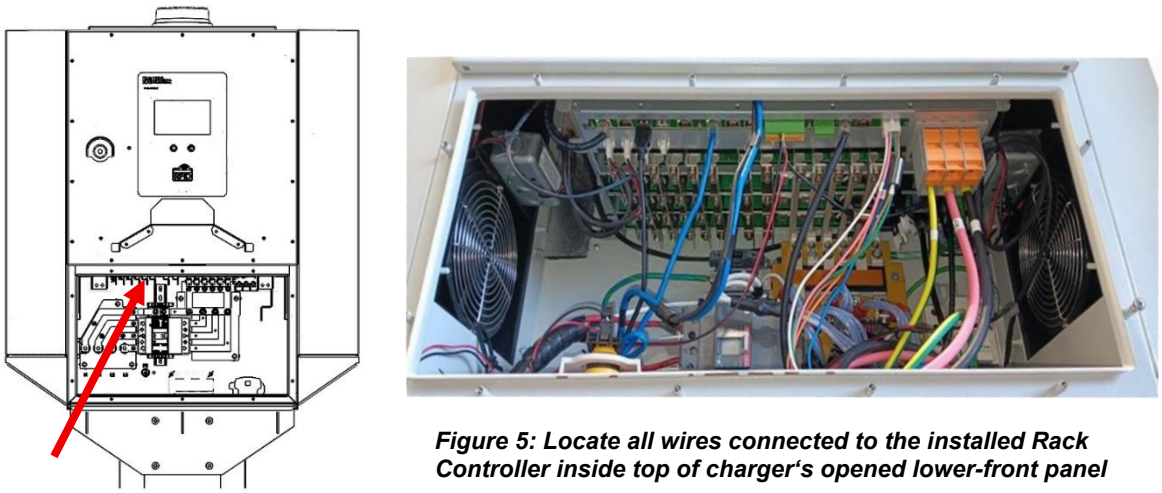


Figure 5: Locate all wires connected to the installed Rack Controller inside top of charger's opened lower-front panel

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

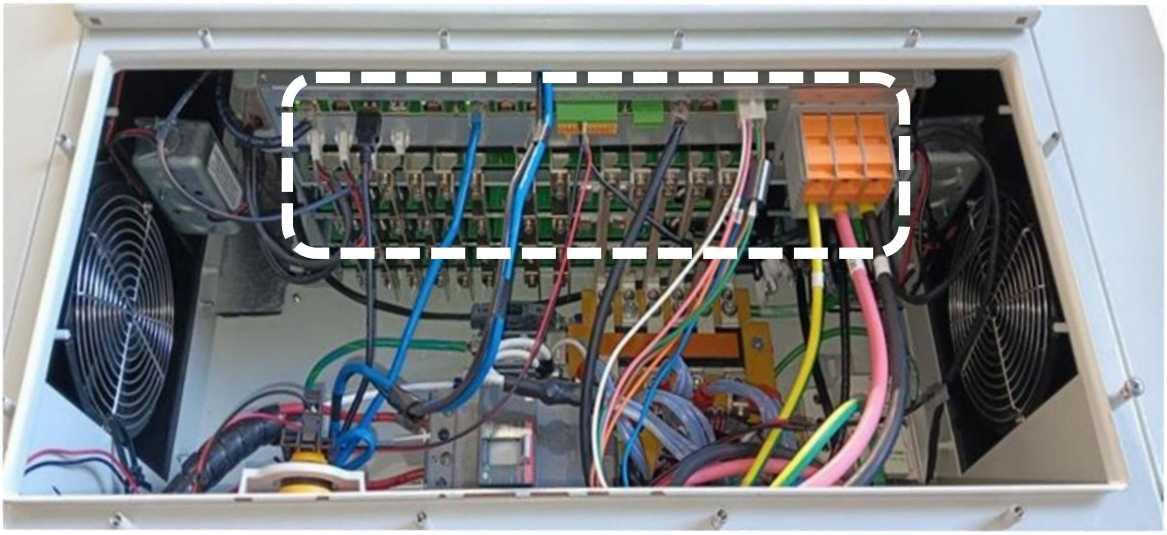
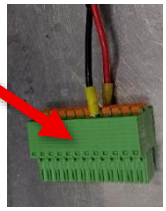


Figure 6 – Wires and connectors to be disconnected before uninstalling Rack Controller

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).

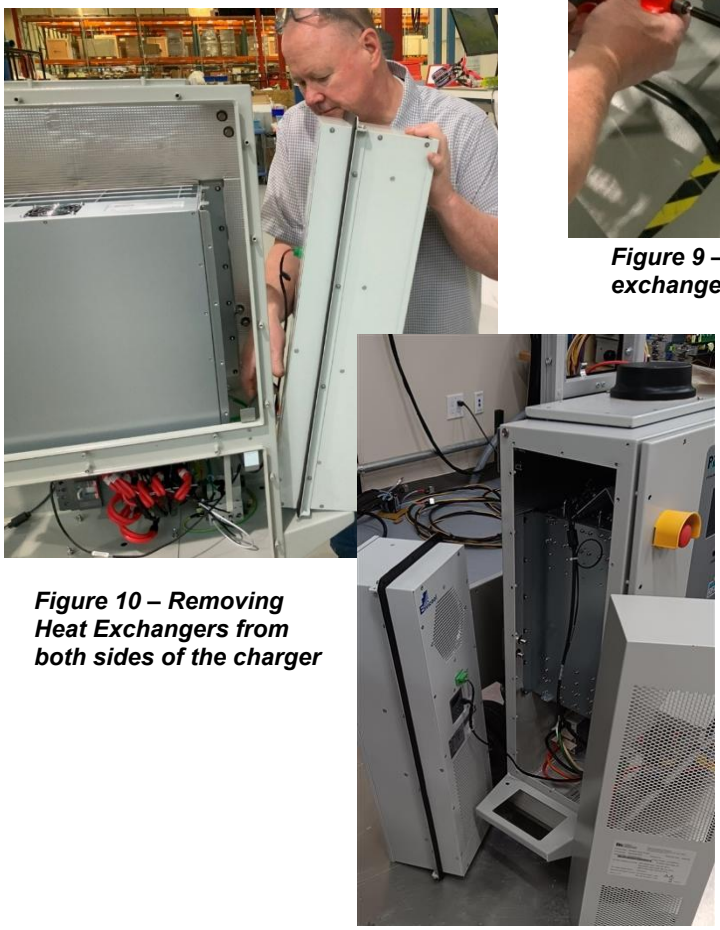


Figure 10 – Removing Heat Exchangers from both sides of the charger

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).

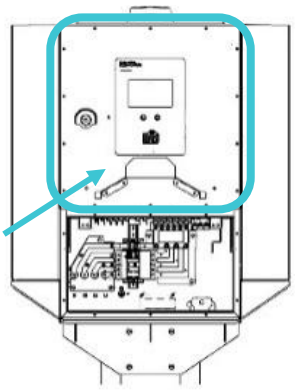


Figure 12: Upper-front panel on charger is secured with 14 screws

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).

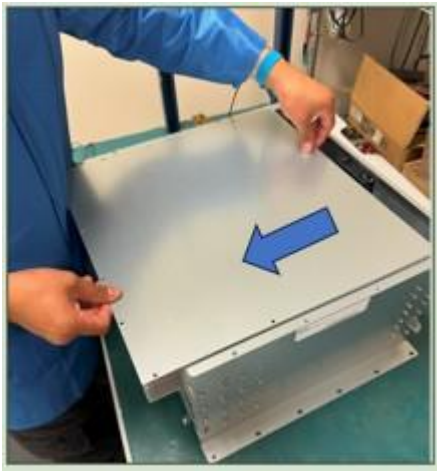
Figure 14: EV quick chargers' upper-front panel face down on table

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 board and/or CP Board

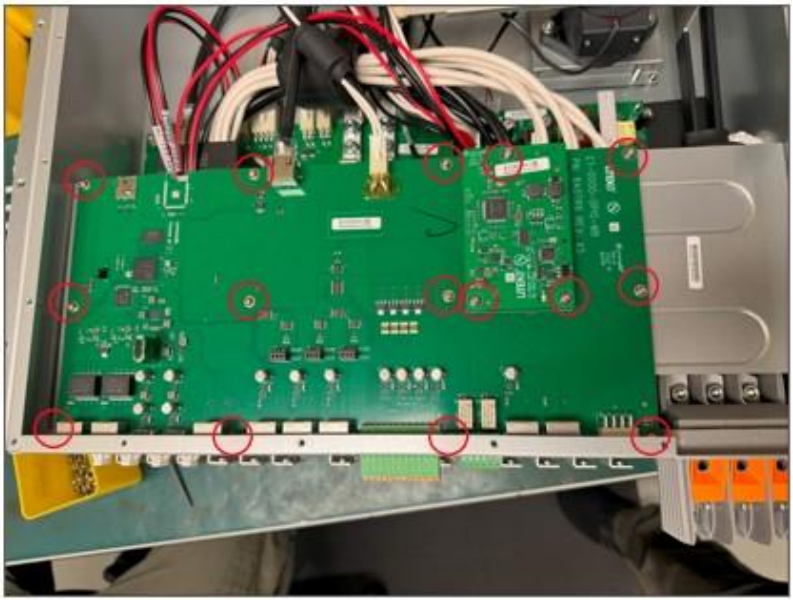
a. MCU is the Printed Circuit Board attached to small silver shelf with 12 screws and with CP Board attached on top of MCU Board with 3 screws.

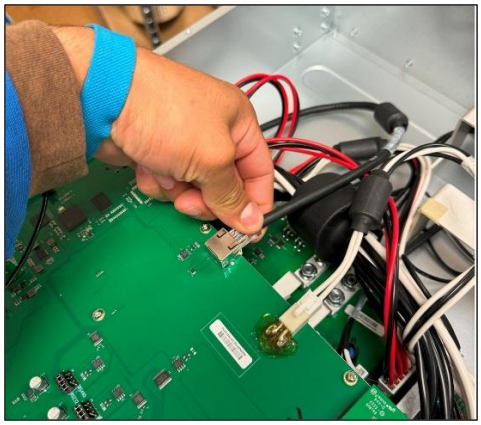
b. Note location of cables and then remove them.

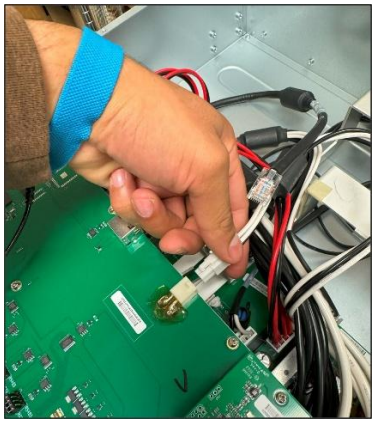
i. Take picures of cable connections to be restored.

ii. If only removing and replacing CP Board, pinch and remove the 2 cable connectors connected to CP Board only.

iii. If removing and replacing MCU board, remove all cables connected to MCU and CP Board as indicated in the following figures.





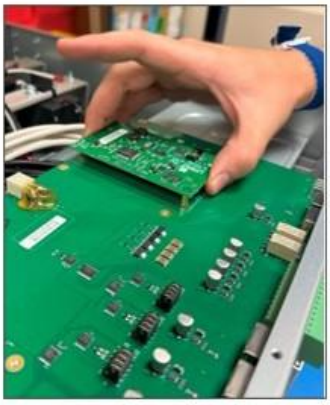


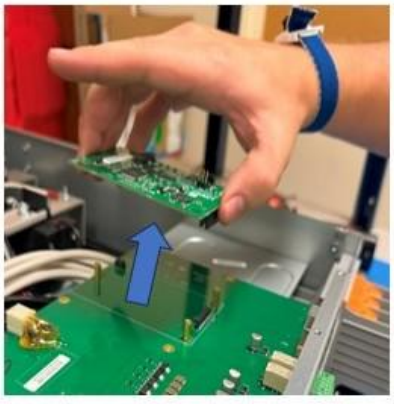
c. Remove screws holding boards in place.

i. If replacing CP Board only, remove only 3 screws securing CP Board to MCU Board.

ii. If replacing MCU board, remove all screws securing MCU Board and CP Board to silver shelf and as indicated in the figures.

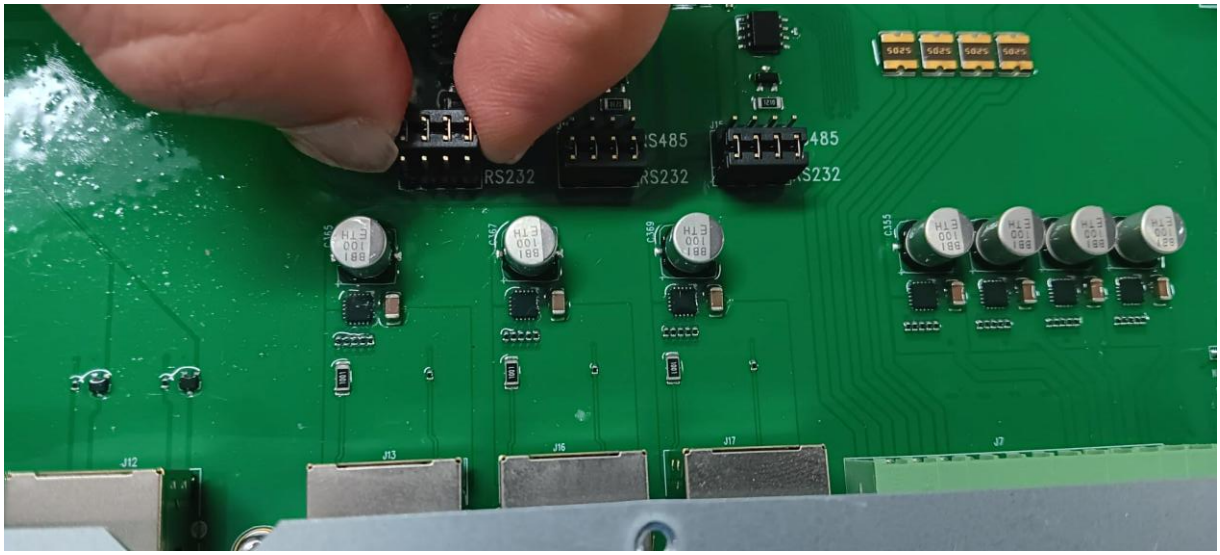
d. Lift CP Board only or MCU Board and CP Board out and set aside, taking care not to confuse old one(s) with new ones.





10. Install new MCU board and/or CP Board.

- **a.** Mount MCU and/or CP Board with 16 screws (tighten, not overly).
- **b.** Connect all cables.
- **c.** Ensure that COMS1 jumper is positioned correctly.
    - i. (factory default may need changing)
    - ii. This is a brick-shaped black plastic piece, approx. ½" by ¼"
    - iii. One of three, it sits directly behind COMS1 on the PCB
    - iv. If out of alignment with the other two, skip to step IX
    - v. Move jumper from RS232 to RS485 position
    - vi. Transfer by hand, leaving only the lower four pins exposed.



11. Replace 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.

12. Reinstall rack controller into charger

a. Through front top opening (connectors downward, cover facing outward).

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

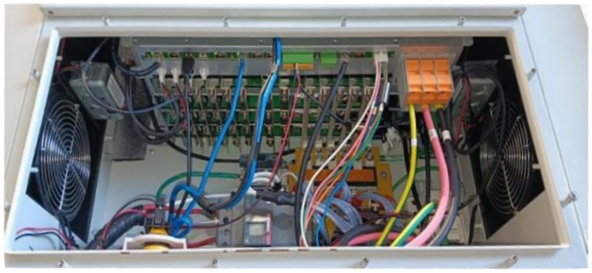
c. Reconnect cables/wires (through opened lower-front cover).

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

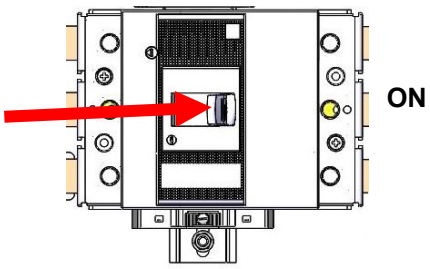


13. Replace heat exchangers and covers to charger

a. Terminate their wiring at +48V connectors on rack controller.

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

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



15. 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.