powercharge™

BATTERY CHARGER

XP Series

480 V Models

PCXP-xxkW-yyyA-zzV

Quick Installation Guide

power designers
innovative charging technology

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MAN-220001-00 REV A

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SAFETY PRECAUTIONS

BEFORE ATTEMPTING TO INSTALL AND OPERATE THE CHARGER, READ THIS MANUAL CAREFULLY

This manual contains important instructions for the **PowerCharge™ XP** series product line that shall be followed during installation and operation of the charger. Only qualified personnel should install, operate, or service this equipment.

SAVE THESE INSTRUCTIONS

- **High Voltages.** Lethal voltages are present within the charger enclosure whenever the AC line is energized and/or the battery/load is connected. The heat sinks and other internal components present the risk of electric shock.
- **Stored Energy.** To avoid the risk of electric shock, wait at least two minutes after de-energizing the AC line and disconnecting the battery/load before removing the cover.
- **High Current Levels.** Do not touch uninsulated battery connectors or terminals. All tools should be adequately insulated to avoid the possibility of shorting connections. Inspect cables often for damage to the insulation. Replace cracked or worn cables immediately.
- **Improper Connections.** If the charger is incorrectly wired to input or output devices or wiring is not in accordance with local safety codes and standards, the XP charger and/or its components are at risk of being destroyed.
- **Grounding.** The charger must be connected to an AC power supply incorporating an earth or ground. The grounding conductor must be of a size equal to or larger than the line (phase) conductors.
- **Explosive Gases**. Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during charge and discharge. To reduce the risk of ignition, follow these safety instructions as well as those published by the battery manufacturer. To minimize the potential for arcing and to reduce the risk of damage to the connector contacts, it is preferable to connect and disconnect a battery when the charger output is **OFF**.

- **Chemical Hazard.** Working with lead-acid batteries may result in exposure to highly corrosive acid. To protect eyes and skin, use the required **P**ersonal **P**rotective **E**quipment (**PPE**) as mandated by your employer and local regulations. At a minimum, wear safety goggles and skin protection while connecting the battery charger or working in the vicinity of lead-acid batteries.
- **Follow the battery manufacturer's published instructions when installing, charging, and servicing batteries.**
- **Use only with rechargeable batteries**. Do not attempt to charge other battery types; doing so may cause equipment damage and result in serious personal injury.
- **Do not expose the charger to rain or snow**. The charger is **NOT** designed for outdoor use.

- **Adequate Cooling Required**. To prevent damage from overheating, proper airflow must be ensured. Do not restrict fan inlets or exhaust outlets. Do not mount the charger in a confined space or where the exhaust air will recirculate.
- **No User Serviceable Parts**. If service is required, contact Power Designers USA LLC or its service representative.
- **These instructions assume a certain level of competence by the installer and/or user**. The following practices and codes contain relevant information, and should be consulted for safe installation, testing, handling, and maintenance of rechargeable lead-acid batteries. All applicable state and local codes must be followed.

  - **N**ational **E**lectric **S**afety **C**ode (**NESC**), ANSI/IEEE C2-2007 (or latest revision). Copies may be obtained by contacting: The **I**nstitute of **E**lectrical and **E**lectronics **E**ngineers, Inc. (**IEEE**), Publications Office, 10662 Los Vaqueros Circle, P.O. Box 3014, Los Alamitos, CA 90720

    www.ieee.org

  - **N**ational **E**lectrical **C**ode (**NEC**) NFPA-70 (or latest version) available from: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269

    www.nfpa.org

- **Federal Codes**

  29CFR1926.441 Batteries and Battery Chargers

  29CFR1910.305 (j) Wiring Methods, Components and Equipment for General Use

  OSHA Directive STD 01-08-002, including 29CFR1910.151(c) Medical Services and First Aid; 29CFR1926.50 and 29CFR1926.51, Medical Service and First Aid, and Sanitation, respectively; applicable to electric storage battery charging and maintenance areas.

- **EMC Compliance**

  This device complies with Part 15 section 103 of FCC Rules as a digital device used exclusively as a power system in public utilities or industrial plants.

  Operation is subject to the following two conditions:

  (1) This device may not cause harmful interference.

  (2) This device must accept any interference received, including interference that may cause undesired operation.

POWERCHARGE™ XP SPECIFICATIONS

480 V Model Numbers

PCXP-10kW-200A-48V
PCXP-20kW-400A-48V
PCXP-30kW-600A-48V
PCXP-10kW-120A-80V
PCXP-20kW-240A-80V
PCXP-30kW-360A-80V

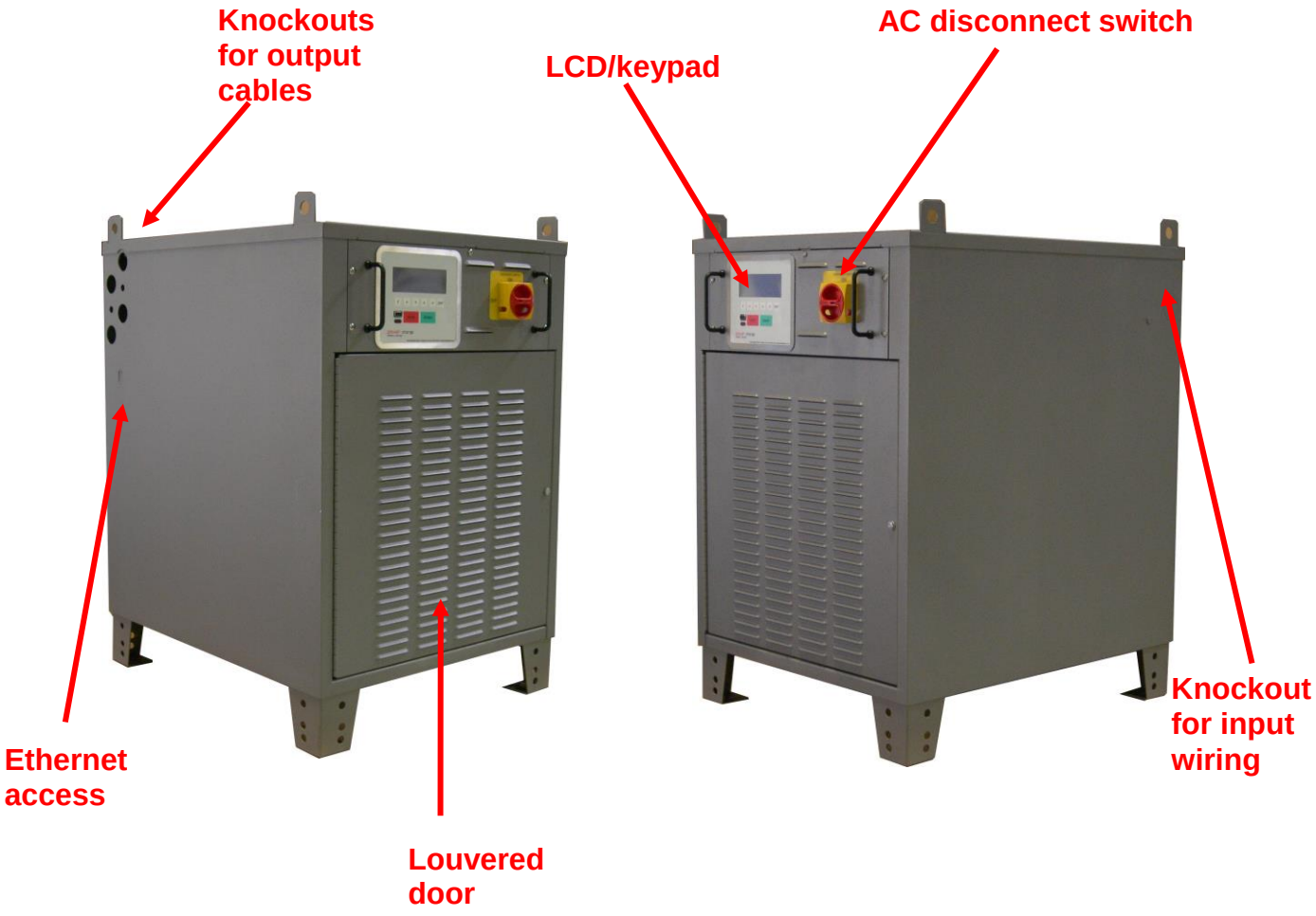


Figure 1: PowerCharge™ XP Battery Charger external features

Specifications of the **PowerCharge™ XP 480 VAC** models.

Specifications	PCXP-10kW-200A	PCXP-20kW-400A	PCXP-30kW-600A
Nominal VA Ratings	48 V / 200 A 80 V / 120 A	48 V / 400 A 80 V / 240 A	48 V / 600 A 80 V / 360 A
Input Specifications			
Voltage	400–480 VAC, ± 10%, 3-phase with earth ground		
Current	13.8 Arms @480 V 16.7 Arms @400 V	27.6 Arms @480 V 33.4 Arms @400 V	41.4 Arms @480 V 50.1 Arms @400 V
AC Circuit Size	20 A/25 A	35 A/45 A	60 A/70 A
Power Factor	0.96 nominal		
Output Specifications			
Voltage	24 V–48 V nominal, 62.5 V max.		
Current	250 A max.	500 A max.	600 A max.
Voltage	72 V80 V nominal, 110 V max.		
Current	120 A max.	240 A max.	360 A max.
Power	10 kW	20 kW	30 kW
Overload	110%		
Peak-to-Peak Voltage Ripple	< 1%		
Efficiency	92%		
Protection			
Input	➢ Under voltage ➢ Over voltage transients		
Output	➢ Over current ➢ Over voltage ➢ Over temperature ➢ Battery reverse polarity protection		
Operating Conditions			
Temperature	0–40ºC		
Humidity	10–90% RH noncondensing		
Interface			
Communication	Isolated RS-232 (Ethernet optional)		
User Interface	LCD/keypad, RS-232, IR with PDA (Palm Pilot or Pocket PC)		
Cooling	Forced air (fans)		
Mechanical			
Dim. WxDxH	23" x 28" x 34"		
Weight	~ 160 lb	~ 290 lb	~ 350 lb
Output Cabling	4/0 cables	2 sets of 4/0 cables	2 sets of 4/0 cables
Output Connectors	SBX w/ aux. contacts or Euro connector		
Auxiliary Contacts	Interface with 5kΩ battery thermistor (optional)		
Certifications	UL and cUL Listed		

INSTALLATION PROCEDURE

Charger Installation

The following procedure describes proper installation of **PowerCharge™ XP** series chargers.

Charger Unpacking and Inspection

Upon receipt of the **PowerCharge™**, ensure that there is no physical damage to the chassis, the LCD/keypad, the AC disconnect switch, or the DC cables. If any damage is apparent, contact the shipping carrier.

Do not install or operate the XP charger if it has any visible damage.

1. **Charger Physical Installation**

   Ensure that the charging area is well ventilated, dry, and clean.

   There must be at least two feet of spacing between the front and back of the charger and any adjacent walls or barriers.

Do not restrict airflow to the air filter at the front of the charger or from the vents in the rear cover.

There are two mounting options available for the XP charger: floor mount and optional stand mount.

a. Floor Mount Option

i. Use the bolt pattern (Figure 2) to install mounting hardware in the floor. Use 3/8-16 fasteners with lock and fender washers to secure the charger to the floor through the holes in the feet.

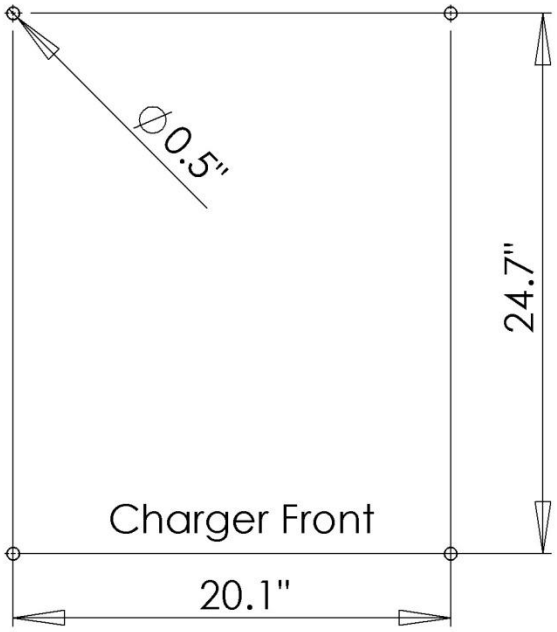


Figure 2: Floor-mounting bolt pattern

b. Stand Mount Option

i. The stand mount raises the charger above the floor.

ii. Assemble the stand as shown (Figure 3).

iii. Bolt the stand to the floor using the bolt pattern (Figure 4). Use 3/8- to ½-inch anchor hardware.

iv. Place the charger on the stand and secure with the hardware provided (Figure 5).

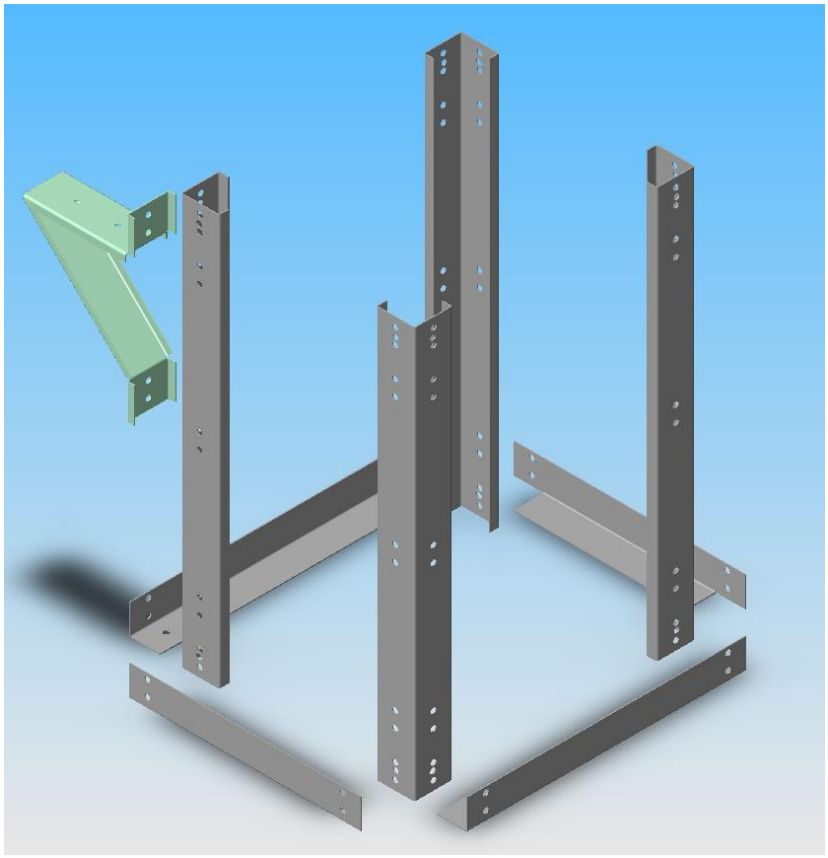


Figure 3: Assembling stand mount

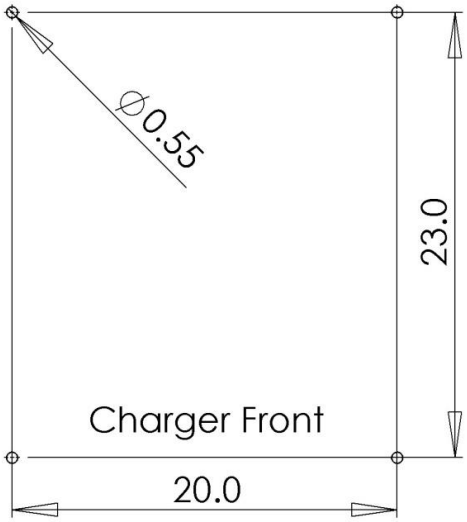


Figure 4: Stand-mount floor-bolt pattern

Figure 5: XP Series on stand mount

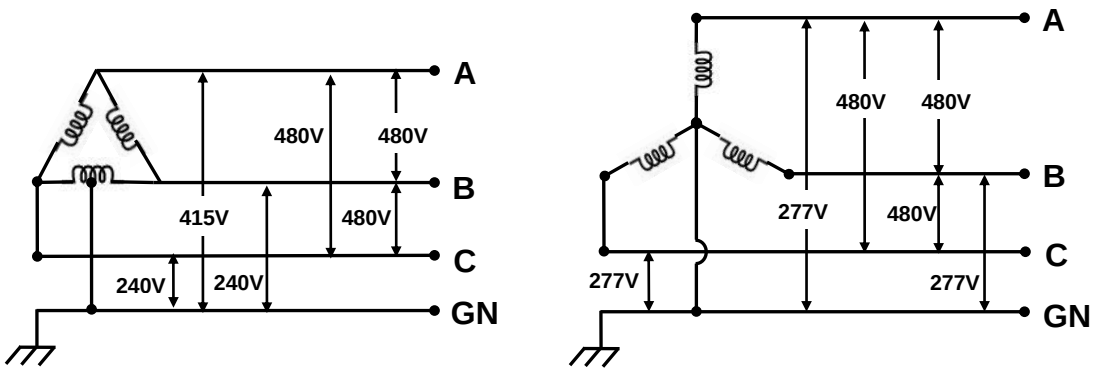
Charger Electrical Installation

WARNING

DANGEROUS VOLTAGES AND CURRENTS ARE PRESENT IN THE AC MAINS WHEN ENERGIZED. ONLY TRAINED PERSONNEL SHOULD PERFORM THE INSTALLATION, USING PROPER EQUIPMENT AND PROCEDURES.

VERIFY THAT INPUT AND OUTPUT WIRING ADHERES TO ALL LOCAL SAFETY CODES AND STANDARDS.

1. **PowerCharge™ XP** chargers require a **balanced 400–480 VAC 3∅, four-wire Wye or Delta electrical supply with a separate ground (Figure 6). The supply circuit wiring and disconnect should be rated with reference to Table 1.**



Typical Delta circuit **Wye circuit**

Figure 6: AC input wiring diagrams

Table 1: AC Line Ratings for 10 kW, 20 kW, and 30 kW Chargers

Charger Model	AC Voltage	AC Current	Disconnect Circui (@125%)
PCXP-10kW-200A-48V	480 VAC 3∅ nom.	14 A nom.	20 A
PCXP-10kW-120A-80V	400 VAC 3∅ nom.	17 A nom.	25 A
PCXP-20kW-400A-48V	480 VAC 3∅ nom.	28 A nom.	35 A
PCXP-20kW-240A-80V	400 VAC 3∅ nom.	34 A nom.	45 A
PCXP-30kW-600A-48V	480 VAC 3∅ nom.	42 A nom.	60 A
PCXP-30kW-360A-80V	400 VAC 3∅ nom.	51 A nom.	70 A

2. **Verify that the source circuit is locked and tagged out before connecting power to the charger.**
3. Verify that the AC disconnect switch on the XP charger is in the **OFF** position (Figure 7).

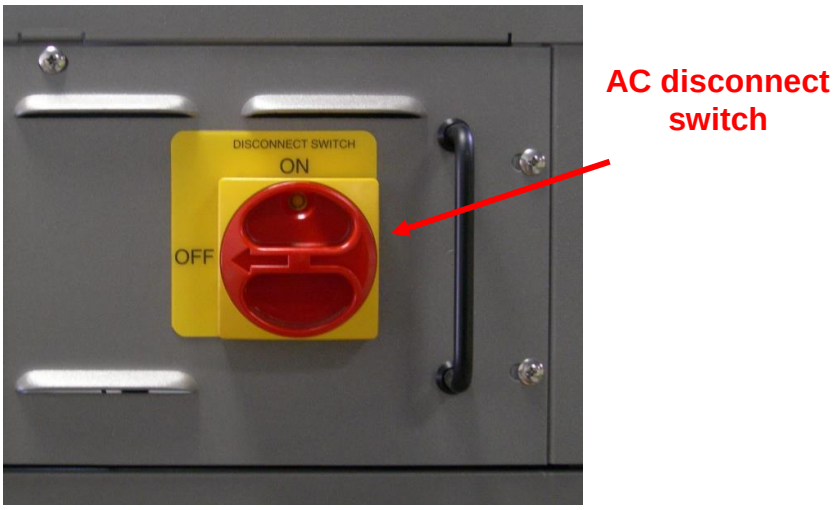


Figure 7: AC disconnect switch

4. Open the rear panel of the charger by removing the eight cover screws (Figure 8).

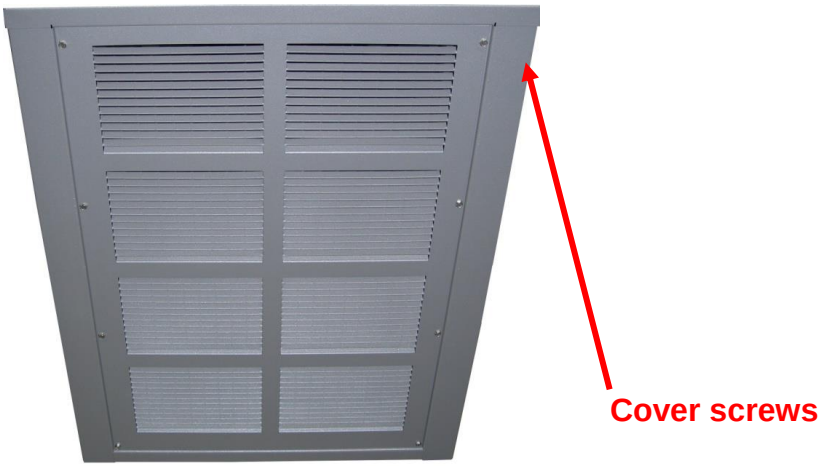


Figure 8: Rear panel

5. Push out the appropriate knockout (Figure 9) and pass the 480 VAC input power wires through, using the appropriate conduit or strain relief fittings per local and national codes.

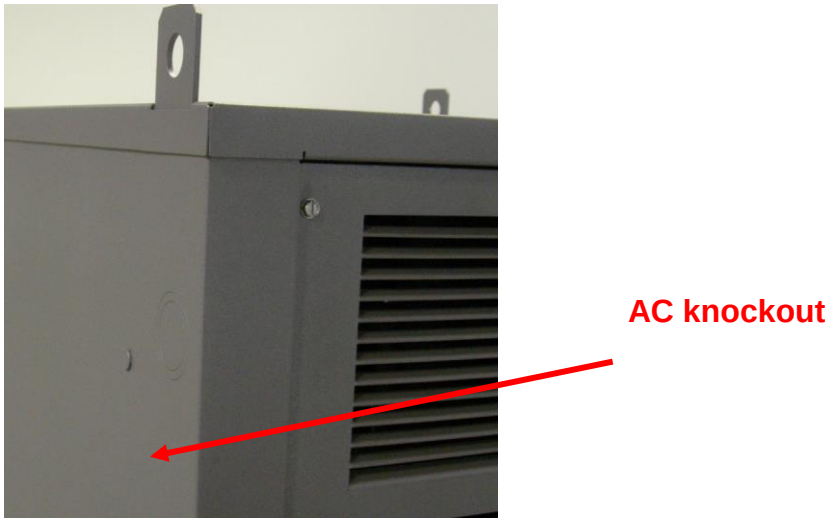


Figure 9: AC knockout

6. Strip the ground (**GND**) wire back 0.5 inch (12 mm) and connect it to the GND terminal (Figure 10). **Torque the terminal screw to 35 in-lb minimum, 40 in-lb maximum.**

7. Strip the conductors back 0.5 inch (12 mm) and connect them to the three-pole AC terminal block marked ABC (Figure 10). Torque the terminal screws to 35 in-lb minimum, 40 in-lb maximum. The charger is not phase rotation-sensitive.

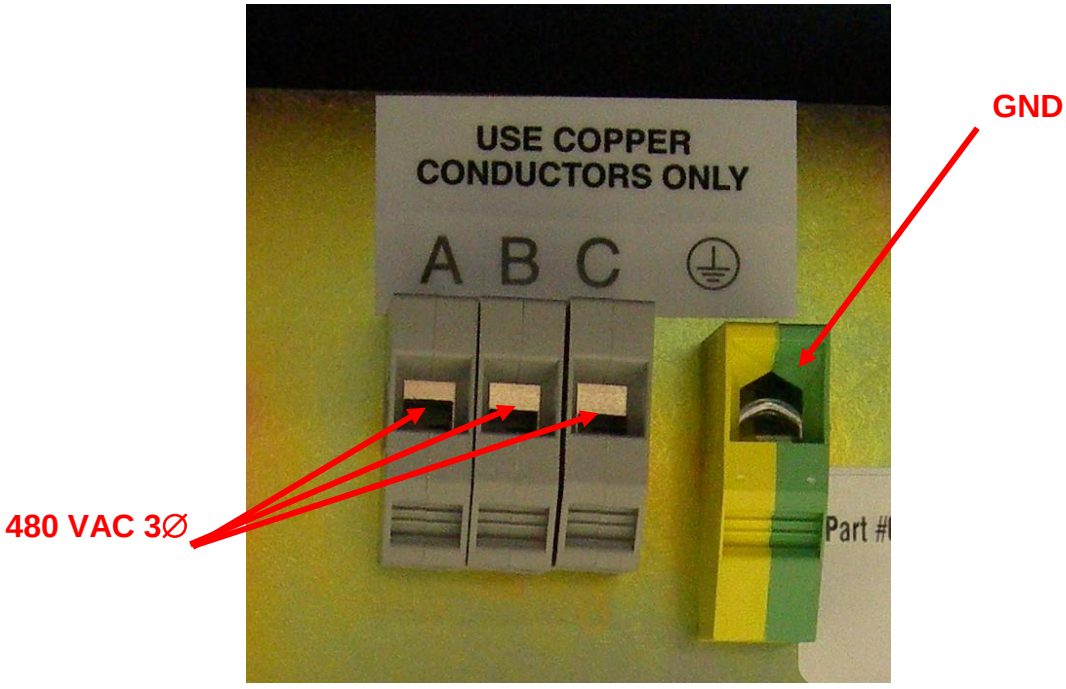


Figure 10: Charger electrical connection points

8. Verify the line and ground connections of the outlet or junction box/disconnect.

9. With the charger switch **OFF**, energize the source circuit and verify proper AC voltage at the input terminals. All line-to-line voltages should be 400–480 VAC ± 10% and matched within 10 VAC. De-energize the source circuit.

10. Replace the rear cover of the charger, securing it with the eight cover screws.

THE CHARGER IS NOW READY FOR OPERATION