



Fury X-3™



**INSTALLATION AND OPERATING INSTRUCTIONS FOR
FURY X-3™ DEDICATED FAST CHARGER FOR
INDUSTRIAL BATTERIES**



NOTE

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware or software, nor to provide for every possible contingency in connection with installation, operation, or maintenance. Features may be described herein which are not present in all systems.

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FURY X-3 FEATURES AND BENEFITS

The Fury X-3 charger is a multi-voltage modular design for industrial battery fleet applications. It uses Silicon Carbide MOSFET (Metal Oxide Semiconductor Field-Effect Transistor) power technology to provide efficient high frequency power conversion to minimize infrastructure costs, reduce your carbon footprint and provide multi-shift standard, opportunity and fast charging capabilities.

Features*	Benefits
Charging capabilities	Capable of Opportunity and Fast charging (user programmable) in extended temperature industrial environments with auto finish and equalization.
Modular and stackable design	Advanced 24/36/48V Multi-Voltage Modular design allows the charger to grow with your fleet. If more power is needed, more modules can be added. If one module fails, the others continue operation. Stackable with shelf, stand and wall mounting options available.
Intelligent charging technology	Intelligent charging technology analyzes battery historical performance and charge data to provide a rapid and efficient recharge while maximizing battery life. The charger's diagnostic intelligence evaluates battery state and condition throughout the charging cycle.
Silicon Carbide MOSFET power	Ultra high-frequency silicon carbide (SiC) MOSFET power conversion to minimize charger size and weight, while maximizing efficiency and power factor.
Fully programmable	Programmable via Wi-Fi or Bluetooth® to allow wireless client configuration. Large LCD graphics display allows for clear reading of battery and charger status
Intelligent battery module	New advanced GNB battery module provides complete battery identification and operational history.
Wireless communications	Wireless communication via Wi-Fi or Bluetooth allows both on-site and remote client configuration, programming and data downloads using GNB Fleet Management software.
Battery types	Lead Acid (Flooded, VRLA, AGM, Gel); Lithium capability coming soon

*Fury X-3 chargers are field upgradeable to all capabilities as they are developed.

FURY X-3 TECHNICAL SPECIFICATIONS

Model Number	FX3M-MV48-	0603	0606	0609	0612	0615	0618	1021	1024	1027	1030
Max Output Power		3kW	6kW	9kW	12kW	15kW	18kW	21kW	24kW	27kW	30kW
Maximum Output Amperage	24V*	64A	128A	192A	256A	320A	384A	448A	512A	576A	640A
	36V*	64A	128A	192A	256A	320A	384A	448A	512A	576A	640A
	48V*	52A	104A	156A	208A	260A	312A	364A	416A	468A	520A
Number of Modules		1	2	3	4	5	6	7	8	9	10
Input Amps (480V 3Ph)		4.2	8.4	12.6	16.8	21	25.2	29.4	33.6	37.8	42
Min Circuit Breaker Size (A)		6	11	16	21	27	32	37	42	48	53
Max Circuit Breaker Size (A)		10	15	20	25	35	40	45	50	60	70
Min. AC Input Wire Size (AWG)		16	14	12	10	10	8	6	6	4	4
Min. DC Output Wire Size (AWG)		1/0	1/0	2/0	3/0	4/0	4/0	3/0 (qty 2)	3/0 (qty 2)	4/0 (qty 2)	4/0* (qty 2)
Cabinet Size		6 Bay					10 Bay				
Dimensions (HxWxD)		27"H x 18.6"W x 14.5"D					39.5"H x 18.6"W x 14.5"D				
Weight		42 lbs + (# modules * 9 lbs)					65 lbs + (# modules * 9 lbs)				
Input Voltage		480VAC ± 10% 3PH 60Hz									
Efficiency and Power Factor		Efficiency = 0.94 Power Factor = 0.95 max									
Control		Manual and fully automatic control of charge, finish, and equalization									
Environmental		0° to +40°C (32° to 104°F), NEMA1									
Display		4.3" Backlit Color Graphic									
Power Device		Silicon Carbide MOSFET									
AC Line Disconnect		Yes, Contactor									
Certifications*		CSA Certified to UL1564, CSA 22.2, CEC									
IoT Data Capability		Wireless configuration, communication, and control capabilities via Bluetooth®, Wi-Fi and PLC, USB port									
Field Repair		Module Replacement									
Installation		Wall, stand, or shelf mounting options									

* Stated output currents will require connectors and electrical cables of adequate capacity

SAFETY PRECAUTIONS

SAVE THESE INSTRUCTIONS. This manual contains important safety and operating instructions.



This danger symbol indicates that personnel must practice safety procedures to prevent equipment damage, bodily injury, or death.



CAUTION! Batteries can be dangerous.

Batteries generate explosive gases during normal charging and usage. Do not smoke, use open flame or cause sparking near the battery. To reduce risk of battery explosion always follow charging instructions and those of the battery manufacturer.



WARNING! Do not attempt to charge non-rechargeable batteries.

Fast chargers are designated to be used only for charging rechargeable batteries. Attempting to charge a non-rechargeable battery could lead to possible injury or death from exploding batteries.



WARNING! Risk of electrical shock that can cause serious injury or death.

Do not touch un-insulated battery terminals, connectors or other live electrical parts. Always make sure the charger is OFF before disconnecting it from the battery. Disconnect the charger from input power and battery before servicing. Only qualified personnel should install, use, or service the charger.



CAUTION! Never place the charger directly above or below the battery being charged.

Never place the charger directly above or below the battery being charged; gases or fluids from the battery will corrode and damage the charger. Locate the charger as far away from the battery as DC cables permit.

PRÉCAUTIONS DE SÉCURITÉ

CONSERVER CES INSTRUCTIONS. Ce manuel comporte des consignes importantes de sécurité et d'utilisation.



Ce symbol de danger indique que le personnel doit suivre les procédures de sécurité de façon à prévenir une dégradation de l'équipement, les dommages corporels ou la mort.



ATTENTION! Les batteries peuvent être dangereuses.

Les batteries génèrent des gaz explosifs lors de leur chargement et leur utilisation habituels. Ne pas fumer, utiliser de flamme nue ou provoquer d'étincelles à proximité de la batterie. Afin de réduire le risque d'explosion de la batterie, toujours suivre les instructions lors de la mise en charge et celles du fabricant de la batterie.



WARNING! Ne pas essayer de charger des batteries non-rechargeables.

Les chargeurs rapides Express sont conçus pour être utilisés uniquement pour charger des batteries plomb-acide noyées rechargeables. Essayer de charger une batterie non-rechargeable peut mener à l'explosion des batteries et donc à des blessures ou la mort.



WARNING! Risque de choc électrique qui peut causer de graves blessures ou la mort.

Ne pas toucher les bornes non-isolées des batteries, les connecteurs ou d'autres composants électriques sous tension. Toujours s'assurer que le chargeur est éteint avant de le déconnecter de la batterie. Déconnecter le chargeur de la prise et de la batterie avant d'en assurer la maintenance. Seul du personnel qualifié doit installer, utiliser ou d'assurer la maintenance du chargeur.



ATTENTION! Ne jamais placer le chargeur directement au-dessus ou au-dessous de la batterie en charge.

Ne jamais placer le chargeur directement au-dessus ou au-dessous de la batterie en charge; les gaz et les fluides de la batterie corroderaient et endommageraient le chargeur. Placer le chargeur aussi loin de la batterie que le permettent les câbles CC.

INSTALLATION

Installation must only be carried out by suitably qualified personnel and in accordance with current local and national wiring regulations. Battery leads should not be altered without prior consultation with service personnel.

The charger should be sited in a cool, dry, well-ventilated location away from corrosive fumes and humid atmospheres. Ambient temperature range must be maintained between 32°F-104°F.

Ensure ventilation is not obstructed at the left air intake and right exhaust vents.

The charger is for indoor use only.

Before installation, check that the charger has not sustained any damages during transit. Make sure the electrical ratings are suitable for both the intended AC input supply and the DC output current and voltage for the batteries to be charged. Also ensure that the connector polarity is correct and matches the polarity of the battery connector.

CAUTION – To reduce the risk of fire, use only on circuits provided with branch circuit protection consistent with the current indicated on the Factory Charger Configuration label and in accordance with the National Electrical Code, ANSI/NFPA 70 or equivalent.

The circuit breakers rating should be based on the charger's maximum input current, as stated on the Factory Charger Configuration label. (See the Technical Specifications page for more details)

Wall Mount Installation

Wall mounting hangers with a pogo are available for installation. The figure illustrates the various parts for a typical wall mount charger installation:

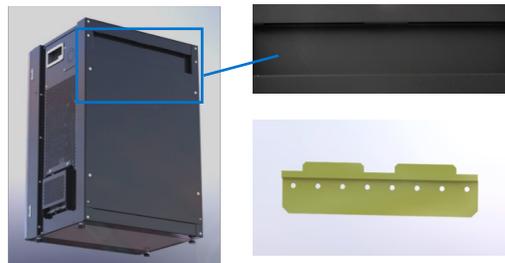
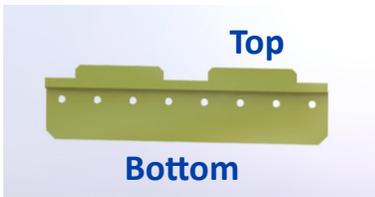


Step 1. Bolt the Wall Mount Hanger to the Wall

Secure the wall mount hanger to the concrete wall through the pre-drilled holes in the hanger. Ensure the two fins are facing up. Mount to a solid concrete wall through holes using bolts into wall anchors – check with professional installation personnel to determine proper mounting techniques for all wall types.

Step 2. Hang the Charger on the Wall Mount

Hang the charger on the wall mount hanger so that the two slits on the back of the charger line up with the two fins of the hanger.



Step 3. Mount the Bottom Brace to the Charger and Wall

Step 4. Mount the Pogo Wall Bracket to the Wall and Attach the Pogo



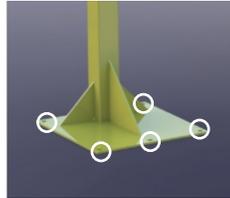
Floor Stand Installation

Floor stands with a pogo are also available for installation.



Step 1. Bolt the Stand to the Floor

Secure the stand to the concrete floor through the pre-drilled holes in the stand base. Use ½ inch diameter anchor bolts as a minimum.



Pre-drilled holes for bolting base to floor

Step 2. Attach Pogo to the Pogo Bracket

Attach the pogo to the pogo bracket with the bolts provided.



Pogo

Step 3. Hang the Charger on the Stand

Hang the charger on the floor mount hanger so that the two slits on the back of the charger line up with the two fins of the hanger.



Step 4. Mount the Bottom Brace to the Charger and Stand



CONNECTION TO MAIN POWER



CAUTION! Electrical connections are to be made by a qualified electrician only! Make sure that the service AC input voltage is OFF before wiring charger.

CAUTION! Risk of Fire! Use on circuits provided with the following branch circuit protection in accordance with the National Electric Code, NFPA 70.

VAC Input
480VAC

****Ensure AC wiring and AC plugs used meet NEC requirements. Refer to the technical specifications section of this manual to view AC input information.**

Step 1. Remove Top Panel of Charger

Remove the top panel of the charger by removing the six screws shown:

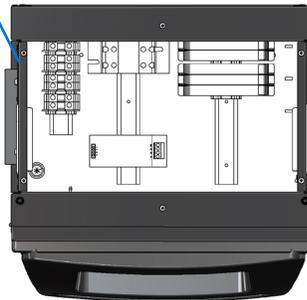


Step 2. Attach Shielded Input Cable or Conduit to Charger

Use an NEC-approved conduit or AC input cable (such as type SOOW) to connect to the charger.

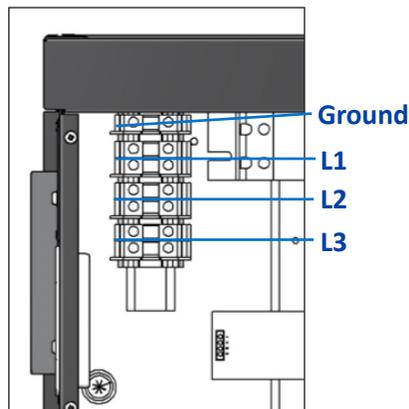
Use appropriate minimum wire size or larger for maximum kilowatt rating of charger – See Technical Specification Table (page 2): Min. AC Input Wire Size (AWG). The hole located in the top left corner of the charger must be used for the AC service entrance. Place an appropriate cable or conduit clamp in this AC service entrance hole.

AC Service Entrance Hole



Step 3. Connect 3-Phase AC Input Power Cables

Ensure ground and power cables have been properly stripped (approximately a half inch of insulation from the ends). Loosen the securing screws in the AC input block and insert the stripped ends of the ground and power cables. Retighten the screws. The 3-phase input is not phase specific, so AC line input positions are interchangeable. Ensure cable or conduit clamp has been properly tightened.



Step 4. Connect 3-Phase DC Output Power Cables

Use an NEC-approved DC output cable (if not already equipped from the factory) such as type UL 3311, UL 3279, or CSA CL 905 – battery cable, with a polarized connector appropriate for battery charging (such as REMA or Anderson Power Products Euro, SBX, or SB connectors).

Use appropriate minimum wire size or larger for maximum kilowatt rating of charger – See Technical Specification Table (page 2): Min. DC Output Wire Size (AWG).

The panel located at the bottom left of the charger must be used for the DC power output cables. There are threaded studs for the attachment of cable terminals which must be crimped or soldered to the DC cable. The positive (red) cable is attached on the right and the negative (black) cable is attached on the left. The clamps(s) at bottom are provided to secure the DC output cables.



Example Cable: Cobra Brand Battery Cable Chart

Cobra Part Number	Size (AWG)	Stranding	Insulation Thickness (mils)	Nominal OD (in)	UL Style	CSA	Amps		Cable Weight (lbs/MFT)
							*90°C	**105°C	
C9908B	8	133 x 29	0.060	0.29	UL 3311 & UL 3279	CL 905	83	92	84
C9906B	6	259 x 30	0.080	0.375	UL 3311 & UL 3279	CL 905	105	118	136
C9904B	4	420 x 30	0.080	0.43	UL 3311 & UL 3279	CL 905	140	157	189
C9902B	2	665 x 30	0.080	0.495	UL 3311 & UL 3279	CL 905	190	213	288
C9901B	1	836 x 30	0.095	0.565	UL 3311 & UL 3279	CL 905	220	246	348
C9910B	1/0	1064 x 30	0.095	0.615	UL 3311 & UL 3279	CL 905	260	291	444
C9920B	2/0	1330 x 30	0.095	0.664	UL 3311 & UL 3279	CL 905	300	336	551
C9930B	3/0	1672 x 30	0.095	0.719	UL 3311 & UL 3279	CL 905	350	392	663
C9940B	4/0	2109 x 30	0.095	0.785	UL 3311 & UL 3279	CL 905	405	454	820
C4925B	250 MCM	2451 x 30	0.095	0.806	UL 3311 only	CL 905	455	510	970

*Allowable Ampacities of Single Insulated Conductors, per NEC table 310-17 Cable manufactured in accordance with Federal EPA Rule, Title 40-part 82, (ODC's)

**The 105°C cable ampacities are adapted from ICEA P-54-440/NEMA WC51- 1986(R1991). The ampacities are provided for informational purposes only. Acceptance of these values by any governing authority is the responsibility of the end user. Ampacities are based on a single conductor, in free air, at 30°C ambient air temperature.



Example Polarized Connector: Anderson Power Products Battery Charging Connectors Selection Guide

	Primary Positions					Signal Positions	Connector Attributes
	Amps (up to)	Wire Sizes (AWG)	Wire Sizes (mm ²)	Quantity of Positions (up to)	Wire	Quantity of Positions (up to)	Touch Safe
SBE® 80 / SBO® 60	80	4 to 6	16 to 25	2	yes	8	yes
SBE®160 / SBX®175	175	10 to 1/0	5.3 to 53.5	2	yes	8	yes
SBE® 320 / SBX® 350	350	1/0 to 300 mcm	53.5 to 152	2	yes	8	yes

NOTE: Many of the mm² wire sizes are based on calculations. See the catalog for specific mm² wire sizes.

OPERATING INSTRUCTIONS

Control Panel Features

1. 4.3" Backlit Color Graphic Display
2. USB Port for Updates and Data Transfer
3. Navigation Buttons
4. Start/Stop Button



Charger Operation

Connect Battery:

If a battery is not connected, the Connect Battery Screen is displayed. To start a charge cycle, attach charger cables to the battery. The charger will initialize the battery and be ready to start charging.



Start Charging

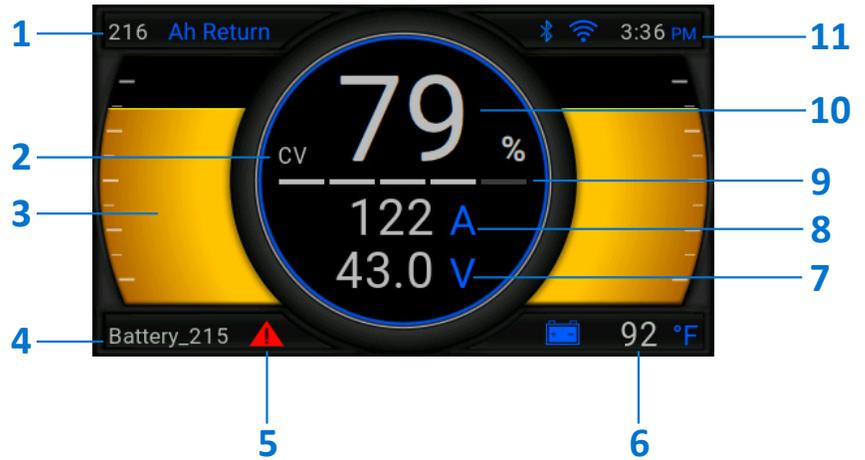
Start Charging:

If a battery is connected, the Press Start Screen is displayed. Press the START/STOP button to begin charging. If AutoStart is enabled, the charger will begin charging automatically after a 10 second countdown when a battery is connected to the unit.



Viewing Charging Information: After a charge has been started, the charger will display the following information:

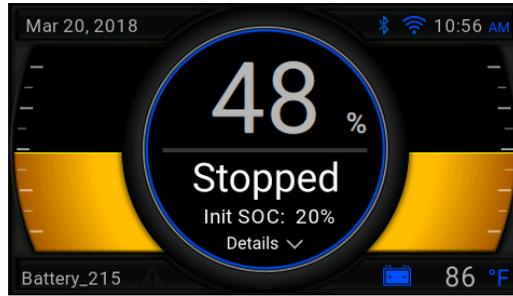
1. Amp-hours Returned to Battery
2. Charge Mode (CC, CV, FN, EQ, TK)
3. SOC Progress Bar
4. Battery ID
5. Drawer Error Warning (When Flashing)
6. Battery Temperature
7. Charge Voltage
8. Charge Current
9. Active Power Drawers Indicator
10. State of Charge
11. Time, WiFi, and Bluetooth



Stop Charging:

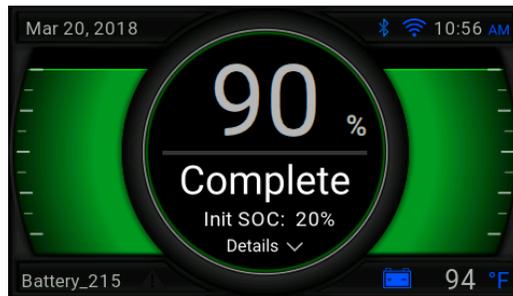
To stop charging, press the START/STOP button during a charge. If a charge cycle is stopped by pressing the START/STOP button, the User Stopped Screen is displayed.

Note: If the connection between charger and battery is disconnected while a charge cycle is underway, the charger will automatically stop.



Charge Complete:

When the charger completes a charge cycle, the Charge Complete Screen is displayed. The complete screen displays the battery's state of charge along with its initial state of charge. There is also the option to view charge details by pressing the down arrow. The details screen provides the same information as the record detail screen.



VIEWING CHARGER AND CHARGING INFORMATION

Main Menu

Press the center or right arrow to access the Main Menu from the idle or charging screen. All other menus are accessed from the Main Menu. Use the arrow keys to navigate and the center key to select options. Main Menu options include:

- Eq/Mix** – Manually select equalization or mix to occur (Note: If this feature is enabled, it is only accessible when a battery is connected)
- Actuals** – View Actuals Menu
- Records** – Browse charge records stored on the charger
- Settings** – View the Settings Menu
- Info** – View system information



Eq/Mix

Eq/Mix Menu:

If this menu is enabled, it allows a user to manually run equalization or a mixing cycle on the currently connected battery. The selected option is indicated by a checkmark. Only one option can be selected at a time. By default, the charger will follow the user defined schedule for finish and equalize. To manually begin an equalize cycle, navigate to the Main Menu and select the Eq Menu. Select the Equalize option. A check next to Equalize indicates a finish and equalize cycle will occur after the regular charge cycle.

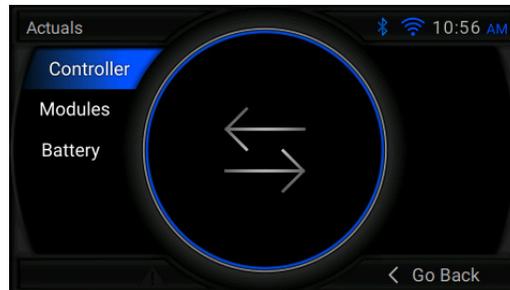
- Use Schedule** – The charger will follow its programmed schedule for equalization and mixing.
- Equalize** – The charger will finish and equalize the currently connected battery once it's fully charged.



Actuals

Actuals Menu: This menu has options to view data for each of the power modules and battery information for a connected battery.

- Controller** – Displays information about the management controller.
- Modules** – Displays status information for each power module in the charger.
- Battery** – Displays information about the currently connected battery.



Records

Records Menu:

This menu holds records of the 100 most recent charges always starting with the most recent. Select a record by using the Up and Down arrow keys. To view a selected record details, press the center key. Use the left arrow key to go back to the previous screen.

	Date	Time	Serial
1.	07/17/2018	18:09	S129763
2.	07/17/2018	18:02	S129763
3.	07/17/2018	15:00	S129763
4.	07/17/2018	13:26	S129763
5.	07/17/2018	13:13	S129763
6.	07/15/2018	01:00	S129763
7.	07/13/2018	17:19	S129763
8.	07/13/2018	16:25	S129763
9.	07/13/2018	16:11	S129763
10.	07/08/2018	01:00	S129763

Record Detail

Detail	Information
Timestamp	Date and time of charge event
Duration	Length in hh:mm:ss of the charge event
Battery ID	Battery name
Battery Serial	Battery serial number
Module Serial	Module or power logger serial number
Battery Info	Voltage and capacity of battery
SOC	Start and end SOC
Voltage	Start, end, and max battery voltages
Temperature	Start, end, and max battery temperatures
Amp Hours Returned	Amp hours returned to the battery
Charge Profile	Charge profile used during charge
OS/App Version	Operating system and application version numbers
Termination	Reason for event termination

Settings

Settings Menu: This menu allows a user to browse current user settings for the charger.

User Settings: Displays the currently configured user settings.

Schedule: Displays the Finish/Eq, Mix, and Finish Makeup schedules.

Max Amps: Displays the max ampere settings for various battery sizes.

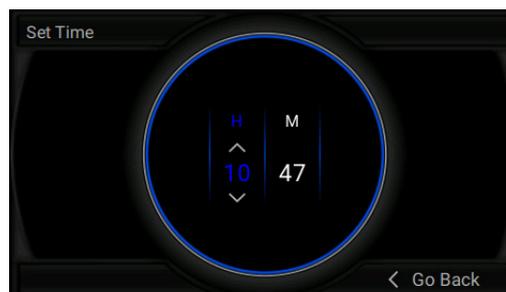
Set Date: Allows a user to set the date on the display.

Set Time: Allows a user to set the time on the display.



Set Date and Time

From the Settings Menu, select Set Date or Set Time. Use the left and right arrows to highlight a property and the up and down arrows to change that property. Note: the Set Time Menu uses a 24-hour clock.



Info (System Information)

This screen displays the following information about the charger:

Type	Kilowatt rating
Serial number	Max output current
Application version	Cable configuration
Drawer quantity	Voltage setting

USB

Download Charge Records

A charger can transfer its charge records to a USB drive. For instructions on transferring data, contact your local sales representative.

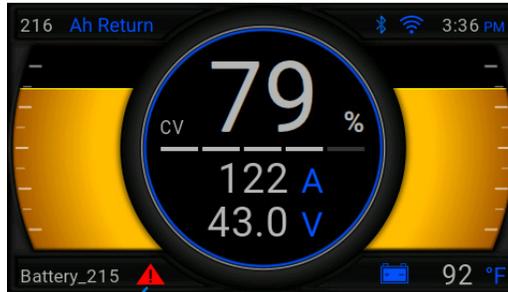
Update Software

A USB stick can be used to update the charger's software. If you need assistance with updating charger software, please contact your local sales representative.

SERVICE AND TROUBLESHOOTING

Power Module Error

If an error occurs and the charger can keep charging, the red warning symbol will flash in the bottom-left of the screen. This error indicates one or more modules has an error.



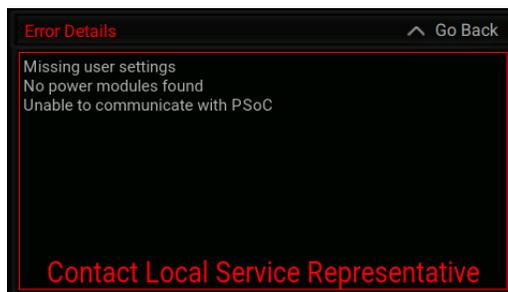
Module Error Indicator

System Error

If an error occurs that restricts the charger from running properly, the following screen will be displayed:



To find more information on the error, press the down arrow on the navigator to access the Error Details screen.



For service, please contact your local sales representative.

POWER MODULE REPLACEMENT

IMPORTANT! Make sure the charger is completely **POWERED OFF** and **NO BATTERY CONNECTED** before opening the charger's door and replacing a power module. Power module replacement should only be performed by qualified personnel.

Required Tools

1. Flat Head Screwdriver
2. 7mm Socket Wrench

Step 1. Open Charger Door

Using the flat head screw driver, turn the latch on the side of the charger clockwise to unlock the door and open it.



Step 2. Disconnect Power Cables

Disconnect the 3-phase AC input and the DC output cables from the power module you intend to replace by squeezing the clamp releases and pulling. Use a 7mm socket wrench to disconnect the ground cable.



Step 3. Disconnect Power Module Communication Cable(s)

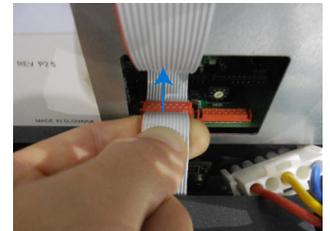
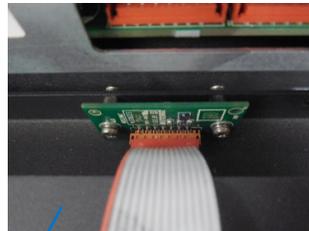
There are two possible configurations for power module communications. Directions for disconnecting each type are shown:

Single Cable Connection

For a single cable connection, start by disconnecting the end of the cable from the termination block located at the very bottom of the charger. Then, unplug the communications starting from the bottom power module until you have disconnected the module you are replacing.

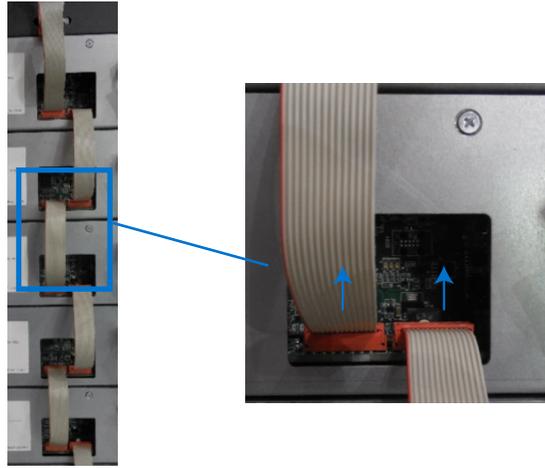


Termination Block



Multi-Cable Connection

For a multi-cable connection, you only need to disconnect the communication cables from the module you are replacing.



Step 4. Loosen Mounting Screws and Remove Power Module

Using a flat head screwdriver, turn each mounting screw counter clockwise until the spring ejects and releases the screw from the nut. Carefully pull the power module out.

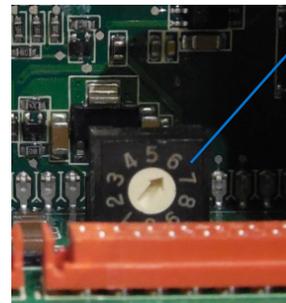


Step 5. Insert Replacement Module and Set Module Position Selector

Insert the replacement power module. Use a flat head screw driver to tighten the mounting screws by pushing in and turning clock-wise.

Using a flat head screw driver, adjust the module position selector to match the modules position. The power module positions are 1 through 6 starting at the top of the charger as shown in the following table:

Charger
Module 1
Module 2
Module 3
Module 4
Module 5
Module 6



Power Module Position Selector



Step 6. Reconnect Communication and Power Cables

Reconnect all communication cables that were disconnected in step 3. Reconnect ground , DC output, and AC input cables. Close charger door and use flat head screw driver to turn the latch counter-clockwise to lock.

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