PlugOp

EV CHARGING SOLUTIONS

INSTALLATION MANUAL

48 Amp & 80 Amp Single Port EVSE

MODEL: FR48 & FR80

Index

PRODUCT INTRODUCTION

Charger Measurements Charger 3

Specifications 4

Icon & LED Reference 5

Package Contents 6

INSTALLATION

Safety Information 7

Installation Procedure 8

A - Standard Electrical Installation Requirements 9

B - Load Management Electrical Configurations 10

C - Prepare Enclosure for Conduit Fitting 11

D - Wall Mount Installation 12

E - Ring Terminal Selection 13

F - Charger Commissioning 14

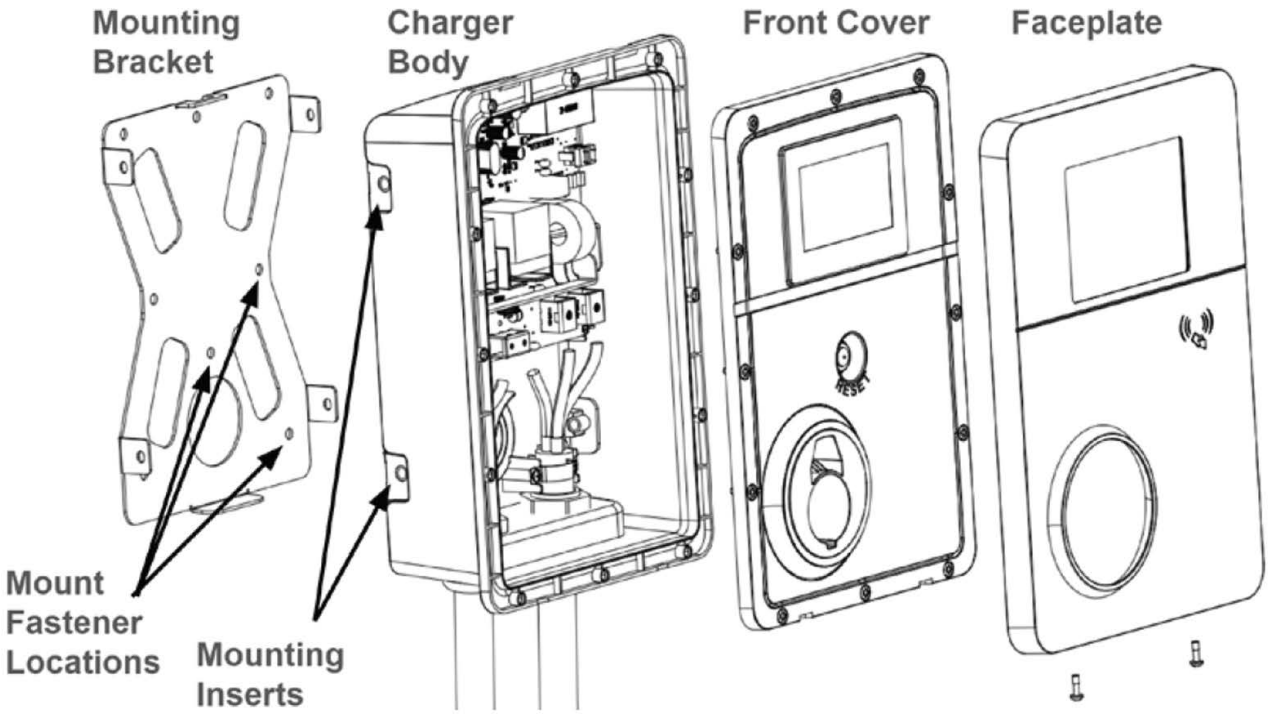
USER MANUAL WARNING

User Manual Warning Statements 15

FR48 & FR80 Charger Measurements

PRODUCT INTRODUCTION

1. Enclosure Dimensions (H x W x D) : 13.5" x 9.5" x 4-3/4"
2. Weight : 10 lbs (48A) | 15 lbs (80A)
3. Mounting : Wall or Pedestal
4. Output Cable : J1772 - 21 ft' (6.4m)



FR48 & FR80 Charger Specifications

PRODUCT INTRODUCTION

Electrical Specifications	
AC Input Rating	208 or 240 VAC / 60Hz Rear or Bottom Entry
Maximum Current Rating	FR48C: 48 Amps FR80C: 80 Amps
Maximum Amperage Settings	Remote max amp setting - NEC compliant
Metering	1% accuracy
Output Cable	J1772 - 21 foot (6.4m)

User Interfaces	
Display	4.3", outdoor-rated customizable color touch screen
Status Indicator	RBG LED Ring
RFID Reader	ISO14443A/B, ISO15693, FeliCa
Audio	Buzzer for RFID Feedback

Network Capabilities	
Cellular	3G/4G CAT1 with dual SIM cards / dual antenna.
Wifi	802.11b/g/n - 2.4Ghz
Mesh network	802.11 proprietary mesh

Mechanical Data	
Enclosure dimensions (H x W x D)	13.5" x 9.5" x 4-3/4"
Weight	10 lbs (48A) | 15 lbs (80A)
Mounting	Wall or Pedestal

Environmental Data	
Enclosure rating	IP65 IK08 (screen excepted)
Operating and storage temperature range	-22 F to 122 F (-30 C to 50 C)

Compliance
UL, FCC Park 15, ICED, EnergyStar

Features	
OCPP Support	OCPP 1.6J
Mesh Networking	Limit wifi infrastructure costs by using mesh
Authorization Modes	OCPP, Plug-in-to-Charge, PIN Code, Local RFID

FR48 & FR80 Icon & LED Reference

PRODUCT INTRODUCTION

Charger icons can be found at the top of the Driver Help Screen.
Charger State is displayed with the LED surrounding the plug holster.

Wifi Network	
	Not Connected
	Lowest Signal
	Medium Signal
	Best Signal
	Disabled

Cellular Network	
	Not Attached
	Weakest Cellular Signal
	Best Cellular Signal
	Cellular System Disabled

OCPP Connection	
	OCPP Network Connected
	OCPP Disconnect

Internet Connection	
	Internet Connected
	Internet Disconnected

Charger State Display		
LED Color	**Display Text**	**Description**
LEDs off	N/A	Charger is not yet ready or is powered off
Solid Green	Ready	Charger is available for use
Blue/Green 1 second spin	Plugged-in, or Authorized	Charge session has been authorized by user, but vehicle is not plugged in, or Vehicle is plugged in, but the charge session is not yet authorized.
Green 1 second pulse	Idle	Charger is plugged in and session is authorized, but: 1. Vehicle has not requested power yet or, 2. Vehicle has finished charging
Blue 3.5 second pulse	Charging	Charger has energized relays and may be dispensing power
Solid Red	Faulted	Charger has internal issue preventing charging

FR48 & FR80 Package Contents

PRODUCT INTRODUCTION

1. (1) Electric Vehicle Charger with charging cable and mounting bracket (FR48 or FR80 as indicated on the box - all configurations between models are the same except where specifically indicated.
2. Installation hardware kit:
    a. Wall anchors & screws
    b. Ring terminal kit
    c. Bottom entry plug
    d. 1/8" hex wrench & 4mm hex wrench
    e. 2x RFID cards
    f. Quickstart guide

Note: Installation requires a wire stripper and wire crimper for insulated terminals. Additional tools may be required for wall or pedestal mounting.

FR48 & FR80 Safety Information

INSTALLATION

WARNING - When using electric products, basic precautions should always be followed, including the following. This manual contains important instructions for Models FR48 and FR80 that shall be followed during installation, operation and maintenance of the unit. When the instructions are exactly the same for all models, specific model numbers are not required to be specified:

1. Read all the instructions before using this product.

2. This device should be supervised when used around children.

3. Do not put fingers into the electric vehicle connector.

4. Do not use this product if the flexible power cord or EV cable is frayed, has broken insulation, or any other signs of damage.

5. Do not use this product if the enclosure or the EV connector is broken, cracked, open, or shows any other indication of damage.

6. CAUTION: To reduce the risk of fire, only connect your charger to a circuit with a branch circuit overcurrent protection of 125% of the selected max amperage setting of the device following ANSI/NFPA 70 (US) C22.1 (Canada)

   SAVE THESE INSTRUCTIONS

Legal & Regulatory
Legal and Regulatory information about this product, including FCC and industry Canada Identifiers, may be accessed via the touch screen. From the main screen:

- Step 1: Press the Help Icon
- Step 2: Press 'Legal'

Grounding Instructions
This product must be connected to a grounded, metal, permanent wiring system, or an equipment-grounded conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the product.

FR48 & FR80 Install Procedure

INSTALLATION

The FR48C and FR80C are designed for indoor or outdoor conduit installations, with the option to have the AC input wiring from either the bottom or the rear.

For bottom entry installs, the entry hole is sized for 1" conduit (35mm hole size) and an M32 cable gland has been pre-installed. Reducing washers can be used to install ¾" conduit, and a step bit can be used to accommodate 1-¼" conduit.

To use the rear entry option (for wall or pedestal mounting), use a step bit to drill the pre-marked location on the rear of the enclosure. Plug the bottom cable gland with the Bottom Entry Plug. Install ¾", 1", or 1-¼" rigid PVC conduit or non-metallic liquid tight conduit. Sealing washers must be used to achieve a Nema Type 3 rating for this installation method, and are required for outdoor installations.

For wall mounted installations, the charger shall be mounted at a sufficient height from grade such that the height of the storage means for the coupling device is located between 600 mm (24 inches) outdoors and 450 mm (18 inches) indoors, and 1.2 m (4 feet) from grade.

Installation

STEP A - STANDARD ELECTRICAL INSTALLATION REQUIREMENTS

Ensure all connections are powered off before beginning installation.

Select conductor and ground wire sizes in accordance with all local regulations for the installed circuit breaker if operating at less than maximum power. For maximum power, use minimum conductors as below. Upsize conductors if needed.

Product	Circuit Breaker	Conductors
FR48C	60A	6 AWG, 90°C-rated copper stranded or solid
FR80C	100A*	3 AWG, 90 °C-rated copper stranded or solid

*This 100A circuit breaker shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.

FR48C & FR80C Chargers include a GFCI function (CCID20) as well as continuous ground connection monitoring. Do not install a GFCI circuit breaker.

Installation

STEP B - LOAD MANAGEMENT ELECTRICAL CONFIGURATIONS

Load Management is a feature offered by PlugOp which allows for several charging stations to be installed on a single branched circuit without overloading the breaker. All chargers sharing this power source are denoted as a 'Charger Group'.

The PlugOp Load Management Software will ensure that the total power delivered across all chargers does not exceed the maximum allowable power of the branched circuit. Power delivered to each charger will vary depending on number of vehicles plugged in and EV owner's relative needs.

This feature is offered for two configurations:

1. Single Circuit Over Subscription - Management of power allocation for several chargers installed on a single circuit.
2. Panel Over Subscription - Management of power allocation for several chargers installed on an undersized panel (all loads must be PlugOp chargers).

Recommended Load Management Installation for Single Circuit Over Subscription:

1. Install ground and conductors (sized in accordance to STEP A from designated breaker to a junction box positioned near the charging stations.
2. Branch the circuit in a junction box using a multitap connector.
3. Install circuits from the junction box to each charging station. (sized for the maximum allowable power from the shared circuit)

Installation

STEP C - PREPARE ENCLOSURE FOR CONDUIT FITTING

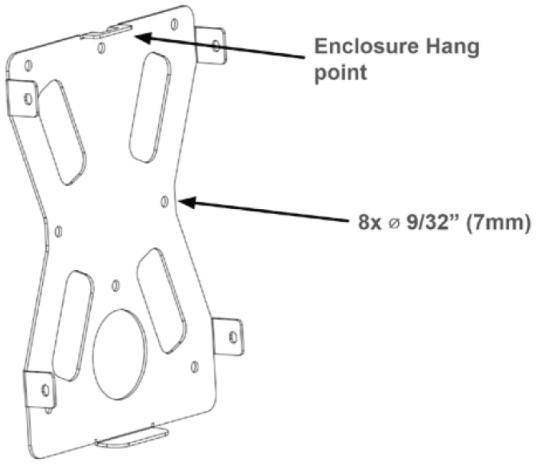
Prepare the enclosure for conduit fitting:

1. Remove faceplate using the 2 phillips screws located on the bottom of the charger
2. Remove the front cover using the 12 encapsulated hex screws around the perimeter of the cover using the ⅛" hex wrench. Once the front cover is loose, remove the white 12-conductor harness connecting the front cover board by unplugging the harness on the power board. The connector retaining clip should be depressed before gently pulling the connector away from the Power board. Set the front cover aside.
3. For bottom power entry:
    a. Remove the pre-installed input cable gland.
    b. For 1"-sized Conduit: test fit the conduit and fittings. The input hole is 35mm for direct install onto 1" conduit.
    c. For ¾"-sized Conduit: use the appropriate reducing washers along with rubber seals.
4. For rear power entry:
    a. Install the supplied "Bottom Entry Plug" into the bottom-entry cable gland, and tighten to seal it.
    b. Locate the rear entry port - The center hole is pre-marked for easy drilling.
    c. For 1"-sized Conduit: use a 1-⅜" (35mm) step bit to drill the center back location of the charger enclosure.
    d. For ¾"-sized Conduit: use a 1-⅛" (29mm) step bit to drill the center back location of the charger enclosure.
    e. Deburr the edges of the drilled power entry hole.

Installation

STEP D - WALL MOUNT INSTALLATION

Before beginning the wall mount of the charger determine the entry point for the wiring. For a rear entry, follow the above rear-wire entry instructions before continuing with wall mounting.



Prepare Surface:

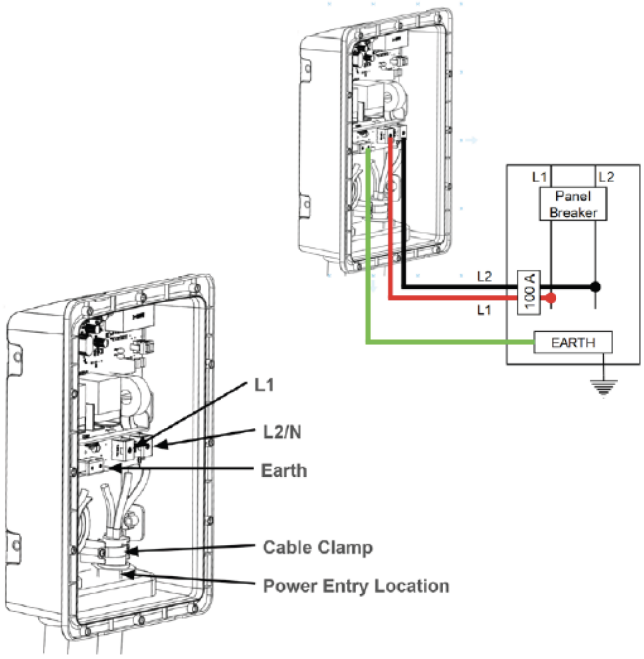
1. Select at least 4 Holes to mount the charger securely.
2. 8 wood screws and anchors are included. Use appropriate fasteners for the attachment surface.
3. Use the drilling template along with a level tool to ensure holes are drilled appropriately.

Mount the Charger:

1. Using a 4mm hex wrench, remove the Mounting Bracket from the charger.
2. At the designated location, use provided screws or suitable fasteners to affix the Mounting Bracket to the wall.
3. Hang charger from the enclosure hang point, then slide it downwards to lock into position and install the 4 charger mounting screws.
4. Use appropriate cable glands, bushings and/or fittings to secure the wiring and conduit in place as per either bottom power entry or rear power entry outlined above.

Route Wires:

1. Strip wires, terminate with supplied Ring Terminals using an appropriate crimper.
2. Pull wires into the enclosure and, if needed, use the cable clamp to secure the wires. There should be no tension in the wire where it attaches to the PCB terminal.
3. Route wires to the correct PCB terminal, and using a torque driver set between 5Nm to 8Nm (45 to 70 in-lbs), tighten ring terminals securely.



Installation

STEP E - RING TERMINAL SELECTION

AWG	Use Ring Terminal	Color	Supplied with FR48C	Supplied with FR80C
10-12	RNYM5-6	Yellow	Y	N
6-8	RNYBS8-6	Brown	Y	Y
4-6	RNYBS14-6	Blue	Y	N
2-4	RNYBS22-6	Yellow	N	Y

Ring Terminal Selection Chart

Close Charger & Apply Power:

1. Carefully reconnect the 10-wire interface harness between the front cover and the Power board, and re-install the front cover.
2. Using the ⅛" hex wrench, tighten all 12 encapsulated screws to 1.4 Nm (12 in-lbs).
3. Reinstall the faceplace, securing with the two phillips screws at the bottom of the charger.
4. Apply power to the charger.

Installation

STEP F - COMMISSIONING

BEFORE LEAVING THE SITE

The following information must be recorded during installation to allow for proper commissioning with our support team. Please do not leave the site until charger commissioning is complete.

Charger Serial Number:_____

Circuit Breaker Size (Amps):_____

Shared Circuit (y/n):_____

Circuit Number:_____

For equipment commissioning, please call us at 1 (800) 474-4184 and have this information at the ready.

To ensure prompt service, we recommend scheduling your appointment in advance by emailing us support@plugop.com. Our technicians may be assisting other clients without a prior booking.

User Manual Warning

This device complies with Part 15 of the FCC Rules / Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

MPE Requirements
To satisfy FCC / IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.
To ensure compliance, operations at closer than this distance is not recommended.

Les antennes installées doivent être situées de facon à ce que la population ne puisse y être exposée à une distance de moin de 20 cm. Installer les antennes de facon à ce que le personnel ne puisse approcher à 20 cm ou moins de la position centrale de l' antenne.
La FCC des éltats-unis stipule que cet appareil doit être en tout temps éloigné d'au moins 20 cm des personnes pendant son functionnement.

PlugOp

EV CHARGING SOLUTIONS

1275 KINNEAR ROAD, COLUMBUS OH,
43212, UNITED STATES