Boost Charger™

DC Fast Charging Station

Installation Guide

Version 1.0

FREEWIRE

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Safety and compliance

The FreeWire Boost Charger is for Outdoor Use Only and to be mounted on a non-combustible surface such as a concrete pad that extends a minimum of 3 feet beyond the perimeter of the battery system/Boost Charger.

The Boost Charger should comply with all local and national codes and standards and only be installed by a licensed contractor and a licensed electrician.

It is the site owner's responsibility to comply with all local codes and safety laws. The most common installation method is discussed in this guide. If for any reason it is not possible to perform the installation following the guide, contact FreeWire Technologies, Inc. FreeWire Technologies, Inc. is not responsible for any damages that may occur resulting from deviations from the instructions outlined in this guide.

Lithium-Ion Battery

FreeWire Battery Pack 820-00114-01 is to be used exclusively with the Boost Charger.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, you will be required to correct the interference at your own expense.

Important: Changes or modifications to this product not authorized by FreeWire Technologies, Inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

Boost Charger

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BEFORE YOU START

This guide contains important instructions that must be followed to ensure safe installation of the FreeWire Boost Charger® DC fast charging station. Be sure to complete the steps outlined in the Boost Charger Site Preparation Guide (770-00004-01) prior to installing the Boost Charger.

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

Save these instructions, as they contain important information that must be followed during installation or used for future reference of a FreeWire Boost Charger DC fast charging station.

Grounding instructions

The FreeWire Boost Charger must be grounded. Use a grounded, metal, permanent wiring system that runs with circuit conductors and connects to the charger equipment ground on the Boost Charger. An earth ground that complies to local codes must also be used for the Boost Charger and be connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.

Symbols used in this installation guide

WARNING: This indicates a fact or feature very important for the safety of the user to prevent injury or death and/or which can cause serious hardware damage if not applied appropriately.

CAUTION: Identifies information to prevent damage to this product.

GROUND: Earth ground symbol

General Warnings

SHOCK RISK: HIGH VOLTAGE ELECTRICITY

WARNING: To reduce the risk of injury, read all instructions and caution markings before installing the FreeWire Boost Charger.

WARNING: The FreeWire Boost Charger must be installed by licensed technicians and in accordance with all instructions.

WARNING: Installation must be done in accordance with all local electrical codes and/or the National Electrical Code® (NEC®).

WARNING: Protection against lightning surges in accordance with local electric codes are the responsibility of the installer.

WARNING: To reduce the risk of injury, be sure to follow lockout/tagout practices and procedures to safeguard workers from unexpected energization.

Safety Shutdown

The FreeWire Boost Charger can be shut down to disconnect the internal battery from the rest of the system. The red safety shutdown button on the front of the Boost Charger activates the safety shutdown. An external shutdown button may also be installed, given proper labeling. See the section titled “Optional External Safety Shutdown Switch”, page 25.

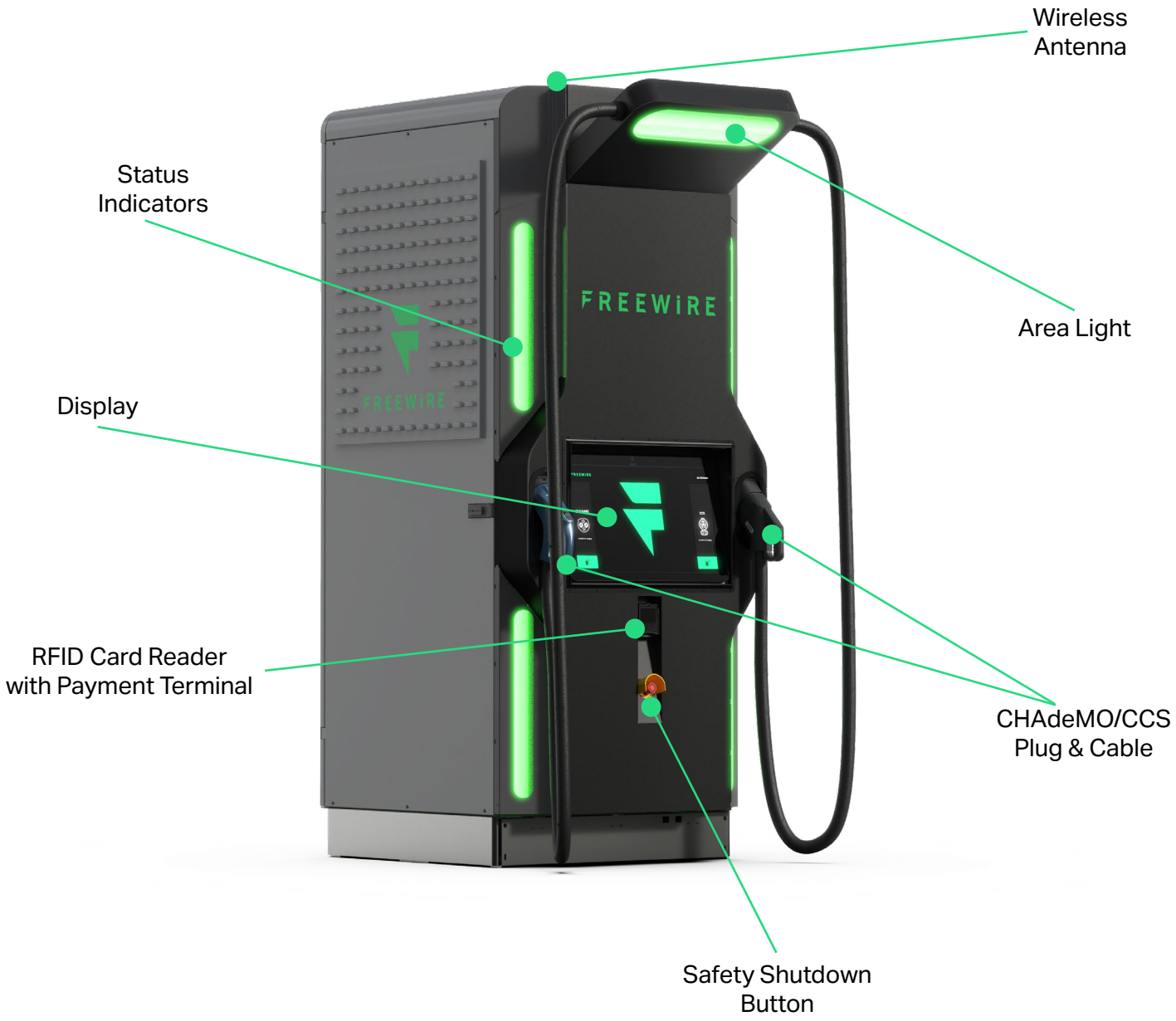
To put the system into safety shutdown mode, press the red button on the front of the charger. The user interface will then indicate that the charger is unavailable and the indicator lights will turn red.

1 Overview

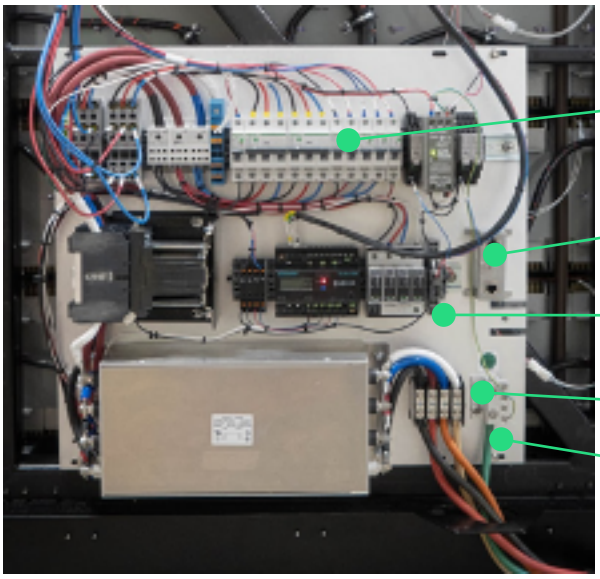
To ensure the successful installation of the FreeWire Boost Charger® DC fast charging station, please be sure to read this overview and become familiar with the Boost Charger and the necessary tools and equipment to install it.

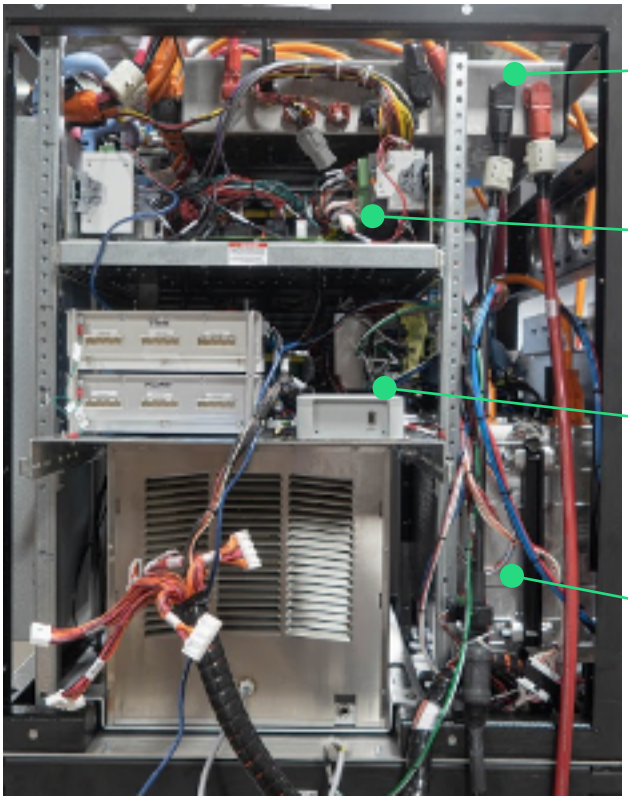
NOTE: The FreeWire Boost Charger must be installed by a licensed contractor and a licensed electrician.

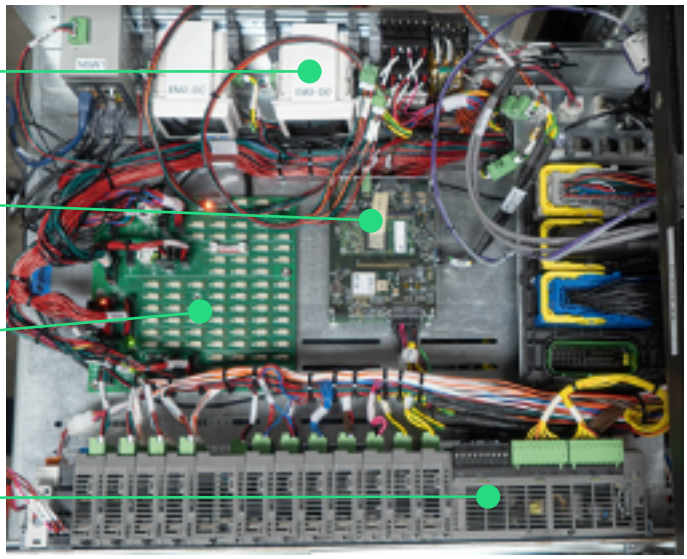
Boost Charger Components

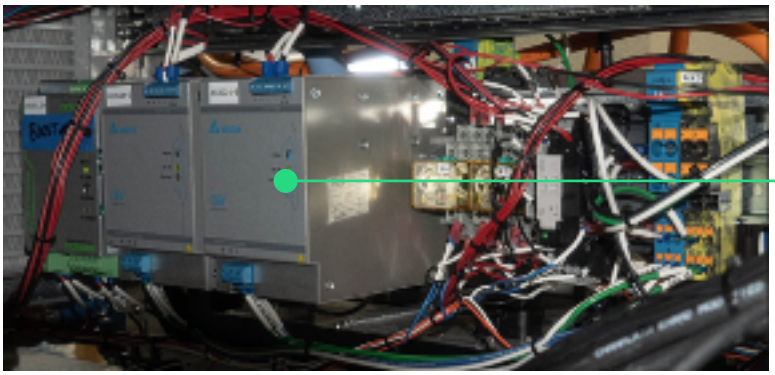


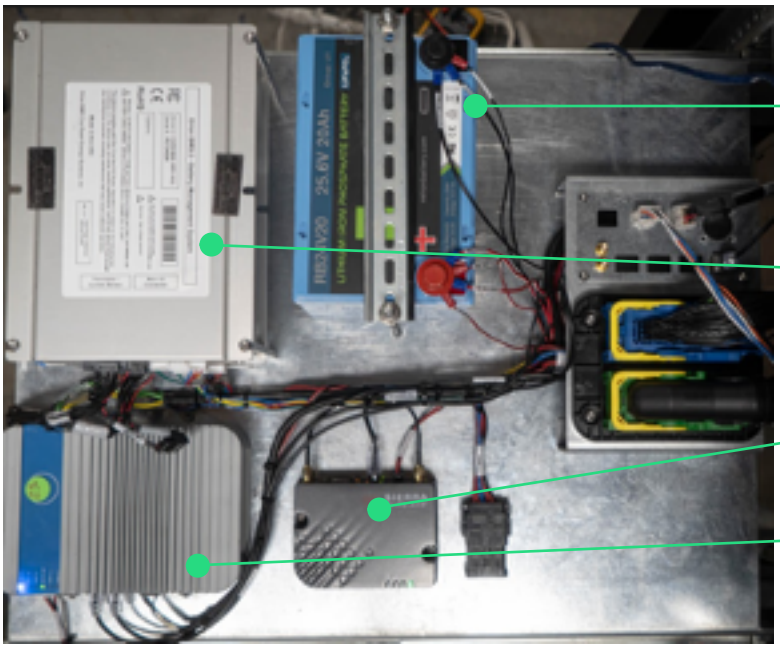
Boost Charger Main Component Overview




Contactor Box
Upper Low-Voltage Shelf
Lower Low-Voltage Shelf
AC/DC Battery Charger

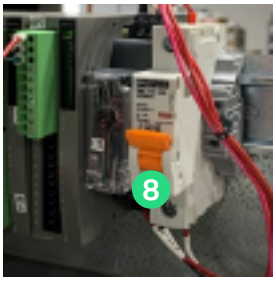

Energy Meters
CCS/CHAdeMO EV Charger Controllers
Low Voltage Fuse Board
Programmable Logic Controller


Power Supplies



Circuit Breakers

Breaker	Function
1	Main AC contactor
2	AC/DC battery charger 1
3	AC/DC battery charger 2
4	Battery air conditioning
5	Liquid cooling system pump
6	24 V system power supply
8	Computer processor power
9	Battery heaters



Located on the upper low-voltage shelf

Unlocking and Locking the Front Access Door

In order to unlock/lock the Boost Charger front access door, the locks behind the CHAdeMO and CCS charge cables must be accessible.

Step 1 Remove the CHAdeMO charge cable from its respective holder.

Step 2 Insert the key and turn to unlock.

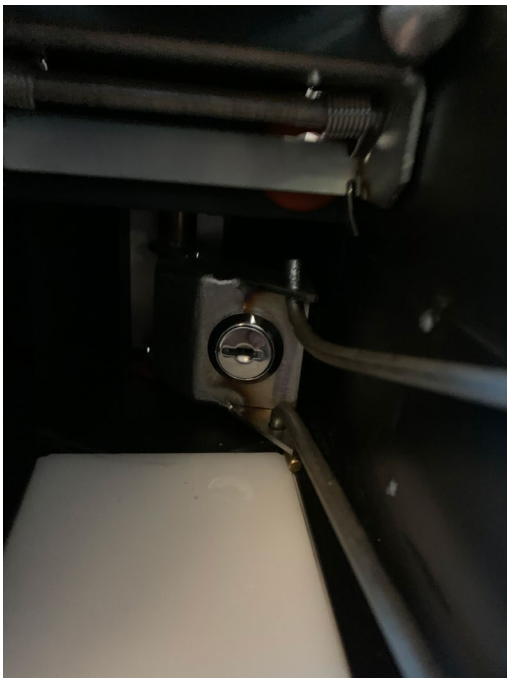
Step 3 Remove the key.

Step 4 Insert the door tool and pull open the hasp.

Step 5 Remove the door tool.

Step 6 Repeat steps 1-5 for the second lock behind the CCS charge cable.

To lock the front access door, repeat the steps in reverse order.



Installation Overview

Installing the FreeWire Boost Charger requires three people and takes approximately two hours. The following steps are required for installation:

Step 1 Schedule commissioning a week prior to installation. Please reference the section titled 'Commissioning the Boost Charger' in section 2.

Step 2 Confirm that the site is ready per the *Boost Charger Site Preparation Guide*, and all required equipment and tools are available.

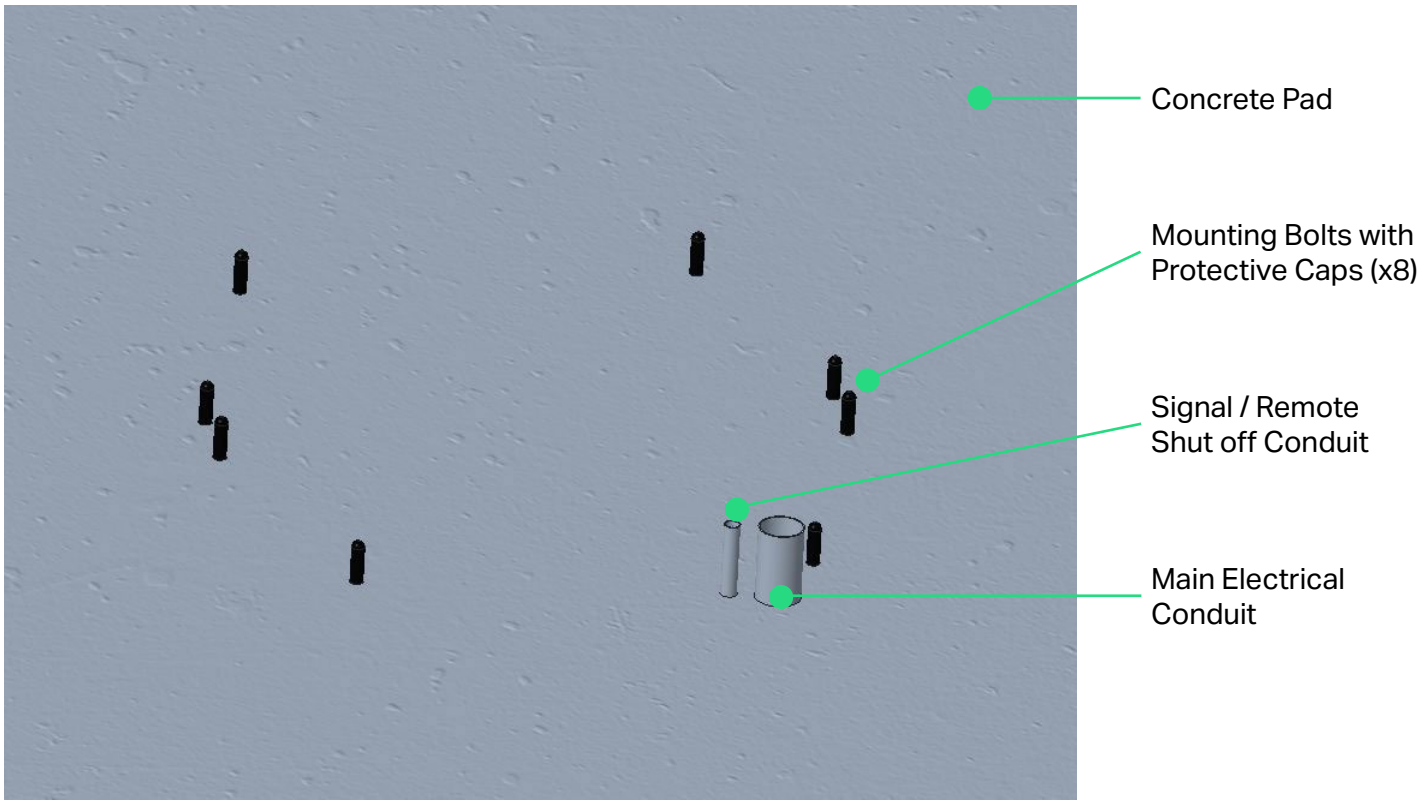
Step 3 Install the FreeWire Boost Charger as described in section 2.

Step 4 Power on and activate the FreeWire Boost Charger as described in section 2.

Note: Always check local codes and requirements to ensure that the installation is compliant.

Concrete Pad Installation

The FreeWire Boost Charger must be installed on a concrete pad. Details can be found in the FreeWire Boost Charger Site Preparation Guide (Part Number 770-00004-01). Before proceeding, make sure the conduit is plumb and the concrete pad is properly prepared, free of debris, level, and cured.



Note: Ensure that the concrete pad is level. If not, be sure to use the proper concrete grinding tools to remove any bumps in the concrete.

Preparation

Before beginning the installation:

1. Check that the concrete pad is level and cured.
2. Verify that the service wiring, circuit protection, and metering complies with local codes/regulations and is ready per the Boost Charger Site Preparation Guide (Part Number 770-00004-01)
3. Ensure the grounding conductor is properly grounded and complies with local codes.
4. Confirm there is a strong cellular signal available. The Boost Charger requires a cellular network. Install repeaters if the signal is below -110 dBm or if the signal is intermittent. A hard-wired internet connection can be used if there's no cellular signal available.
5. Check to make sure that the area is safely marked off and has enough space available for tooling, shipping crates, lifting equipment, and work trucks.
6. Confirm that all parts, tools, and equipment are available.
7. Become familiar with the entire Boost Charger installation process.

Important: In geographic areas that experience frequent thunderstorms, a supplemental surge protection breaker must be installed at the service panel.

Boost Charger Shipping Crates

Approximate Dimensions	Approximate Crated Weight	Contents
65" x 46.5" x 102"	4,100 lbs	Boost Charger
48" x 40" x 20"	100 lbs	Mounting Template

The FreeWire Boost Charger ships in one crate. The Boost Charger Mounting Template ships separately.

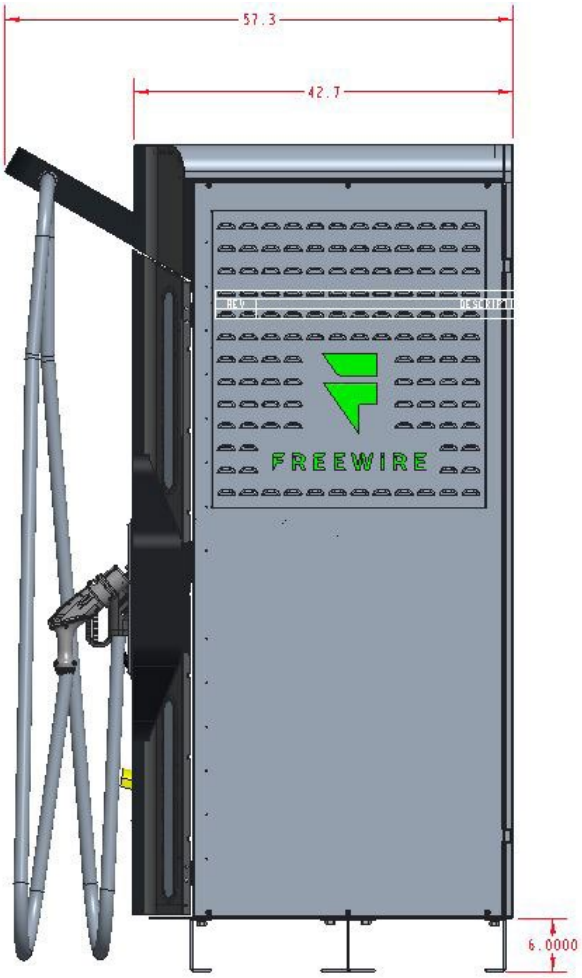
Caution: Transport and store the FreeWire Boost Charger in its original packaging. A forklift or crane must be used when handling the equipment. Ensure proper load rating of equipment before beginning.

Caution: When using a crane, make sure that the straps and cables are rated for the weight of the Boost Charger and crates.

Boost Charger Crate Packing List

- Boost Charger
- Door access keys (2x)
- Door Tool

Boost Charger Overall Dimensions



Equipment Needed

- Forklift (5,000lb capacity minimum) or crane (5,000lb capacity minimum) with nylon lifting straps and four-point lifting sling
- Forklift tyne extensions (as required)
- 15/16" wrench and socket
- #2 Phillips screwdriver
- T27 tamper proof pin-in Torx driver and bit
- 15/16" Crows foot wrench
- Torque wrench (200 ft-lbs)
- Torque wrench (100 in-lbs)
- 2 AWG lug (grounding the service wire and earth ground)
- Zip ties (as necessary)
- Standard electrical equipment such as wire cutter, wire stripper, cable ties, conduit seal, etc.
- Band cutter

2 Installation of the Boost Charger

The steps outlined in this procedure require the use of a forklift or crane to lift, move, and mount the Boost Charger. A crane setup using a four-point sling, similar to the example pictured to the right, may be used in situations when a forklift cannot be used for installation. It is recommended that the crane and four-point sling are certified and capable of carrying at least 5,000 lbs.

When using a crane, be sure to check for height restrictions and clearances around the work area. Any cables, nylon straps, hooks, and shackles should be laid out to support the Boost Charger and prevent it from swaying or tilting. Pay specific attention to the Boost Charger's center of gravity to avoid the unit from falling. Add additional nylon straps and sling pick up points around the front and back of the unit to keep it from swaying or shifting.

Warning: Improper lifting of the Boost Charger may result in severe damage or injury.

Caution: The Boost Charger is not designed to be lifted from the top or sides by a crane or lifting straps. Only lift the Boost Charger from the bottom.

As needed, add chaff protection between the straps and the Boost Charger.

Overview of Steps

- Uncrating the Boost Charger (page 17)
- Mounting the Boost Charger (page 23)
- External Safety Shutoff (page 25)
- Connecting Electrical Power (page 26)
- Installing the Kick Panels (page 27)

Uncrating the Boost Charger

Step 1 Lift the crate using a forklift or crane and place it vertically on level ground in front of the installation pad.

Warning: Due to the size and weight of the Boost Charger, care should be taken when lifting to prevent tipping.

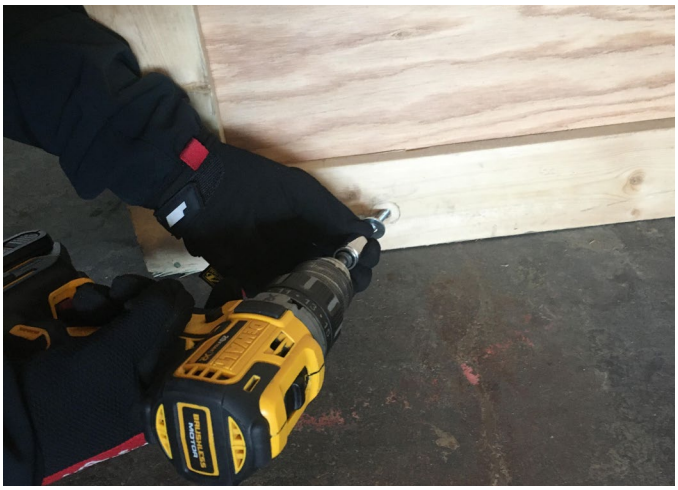
Note: If a wall is located behind the installation pad, ensure the forklift tynes don't protrude too far that they hit the wall when moving the Boost Charger onto the pad.

Uncrating the Boost Charger is a two-person job. Make sure there is ample space to safely work around the crate and remove the side panels. Follow the steps below to uncrate the Boost Charger.

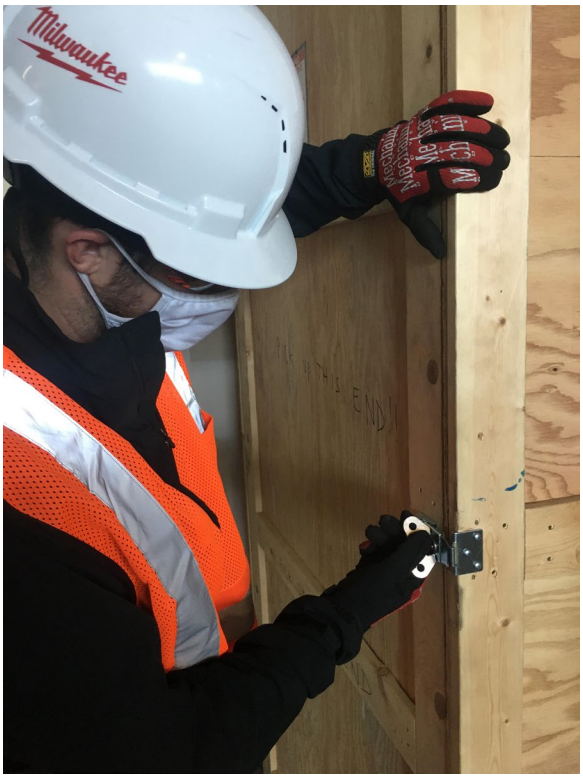
Caution: Use care when opening the crates and removing the protective plastic wrapping to avoid damaging the charger and charging cables.

Step 2 Carefully cut the steel strapping from the crate using a band cutter.

Step 3 Remove the bolts from the side panel.



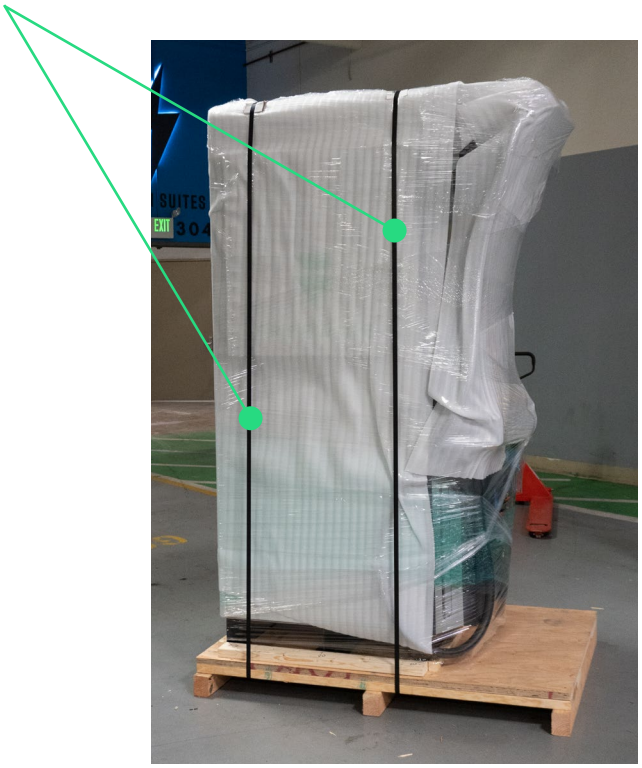
Step 4 Release the six side and two top hasps which are used to hold the side panel of the shipping crate.



Step 5 Using two people, carefully remove the side panel from the shipping crate as shown.

Step 6 Using two people, carefully slide the remaining four panel structure away from the Boost Charger.

Step 7 Carefully cut metal bands from the Boost Charger using a band cutter.

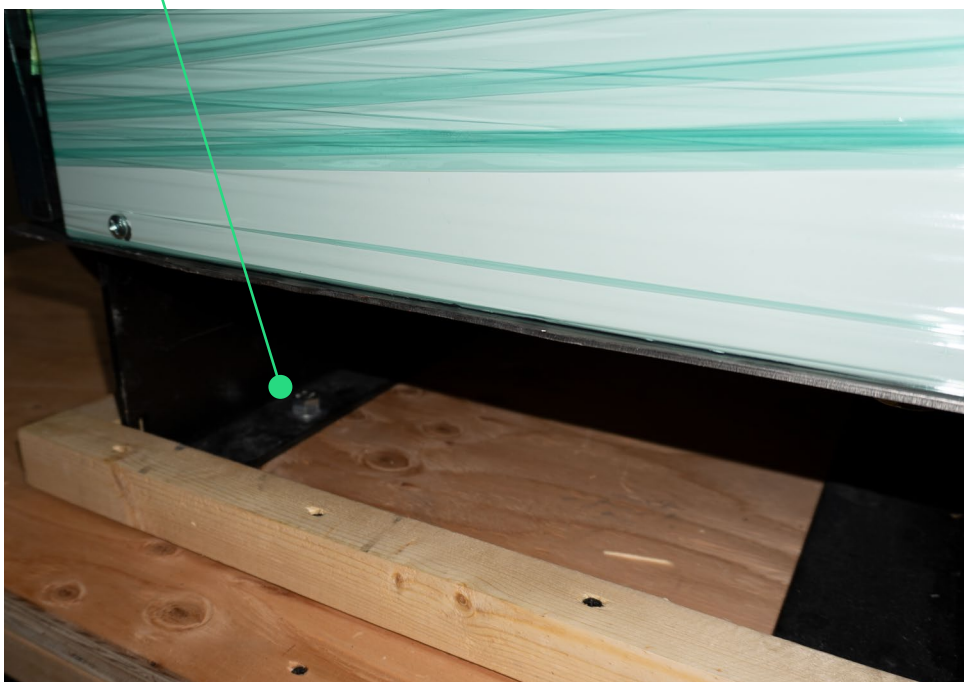


Step 8 Carefully remove the protective plastic from the Boost Charger.

Step 9 Remove the four screws that hold in the front and backside kick panels using a pin-in-torx bit. Set the hardware aside for future use.

Step 10 Remove both the front and backside kick panels and set them aside for re-installation later.

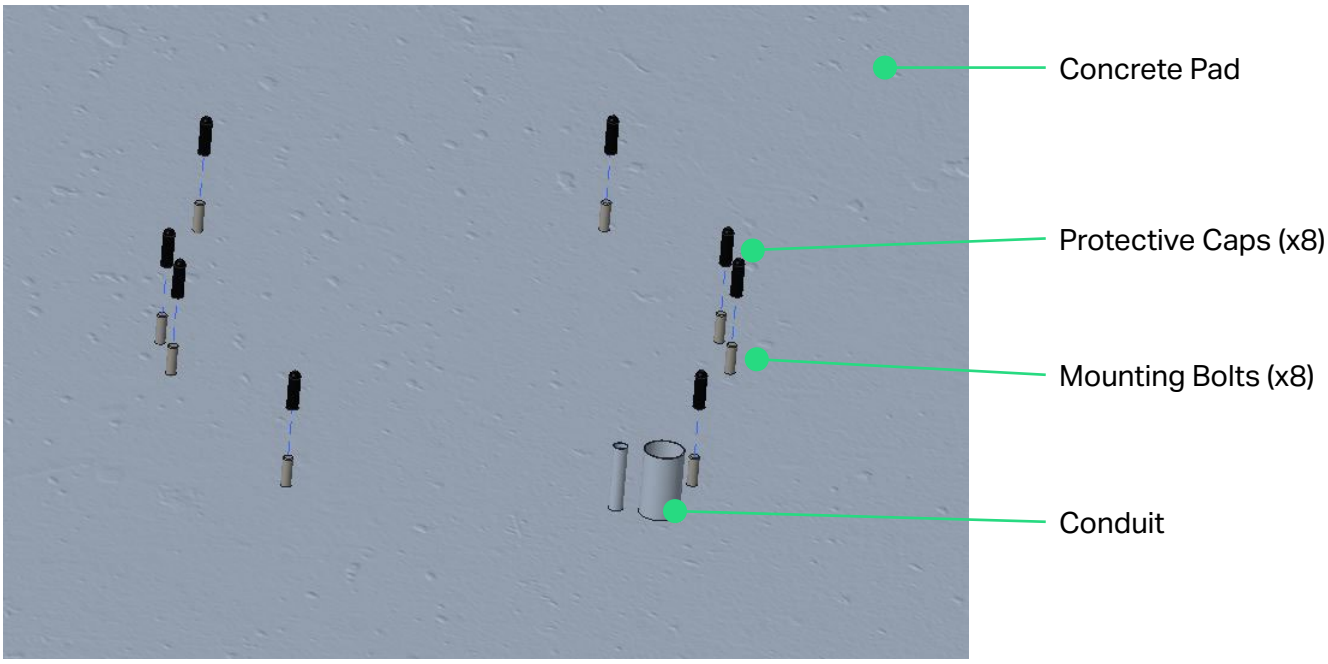
Step 11 Remove the four bolts which secure the Boost Charger to the shipping base using a 15/16 inch socket wrench.



Step 12 Using a forklift or crane, carefully lift the Boost Charger from the base of the crate and station it at the concrete foundation pad for installation.

Mounting the Boost Charger

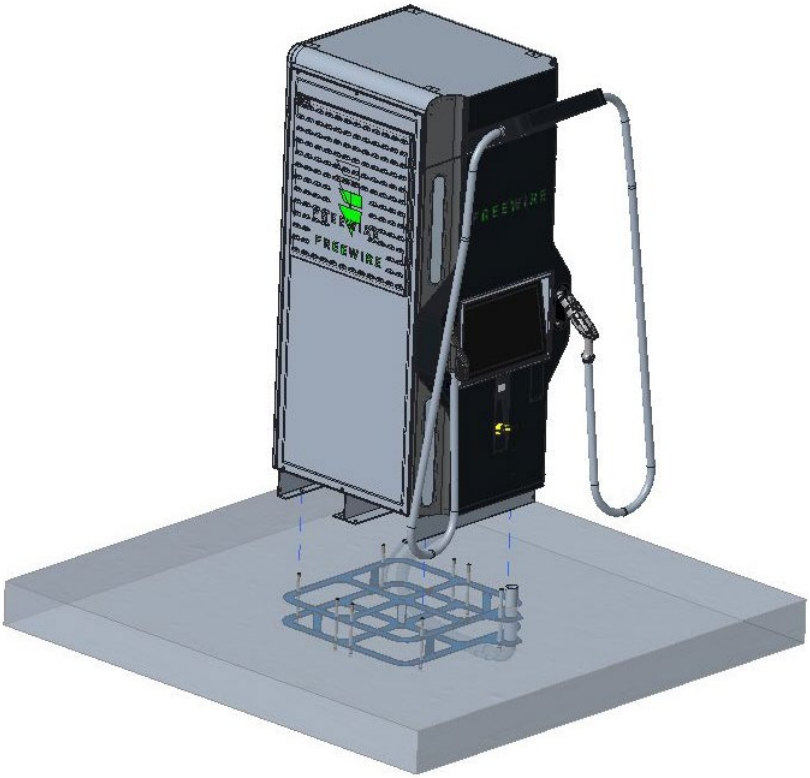
Step 1 Remove the cap from each of the 8 mounting bolts on the concrete installation pad.



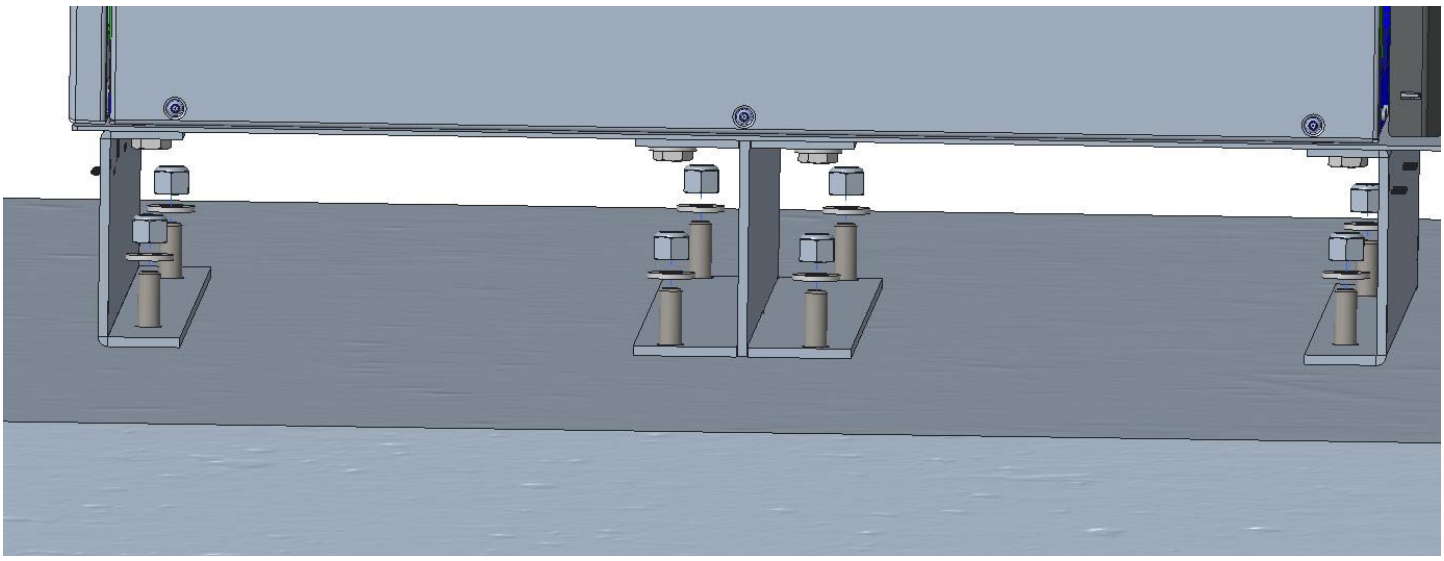
Step 2 Using a forklift or crane, slowly lift the Boost Charger over the eight mounting bolts on the installation pad, ensuring the bolts align with the corresponding holes in the bottom mounting beams, then lower the Boost Charger over the bolts.

Caution: Carefully guide the conduit into the front access door.

Caution: To ensure that the service wiring does not get pinched or trapped between the Boost Charger and the installation pad, the service wiring should not be pulled until after the Boost Charger is securely mounted.



Step 3 Use the washers and locking nuts supplied with the mounting template to install the Boost Charger. Insert a flat washer, then thread a locking nut onto each of the eight mounting bolts to secure the unit.



Step 4 Ensure you have room to maneuver around the Boost Charger.

Step 5 Tighten the outer 4 nuts first. Then tighten the center front and back nuts by hand-turning the lower nuts until they are flush against the Boost Charger frame. Finally, tighten each nut using the torque wrench to 100 ft lbs.

Step 6 Carefully re-install the front and backside kick panels and hardware previously removed during the uncrating process.

Step 7 Torque the bolts to 70 +/- 10 in-lbs.

Grounding Requirements

The FreeWire Boost Charger must be grounded. Use a grounded, metal, permanent wiring system that runs with circuit conductors and connects to the charger equipment ground on the Boost Charger. An earth ground that complies to local codes must also be used for the Boost Charger. Check the Site Preparation Guide for details.

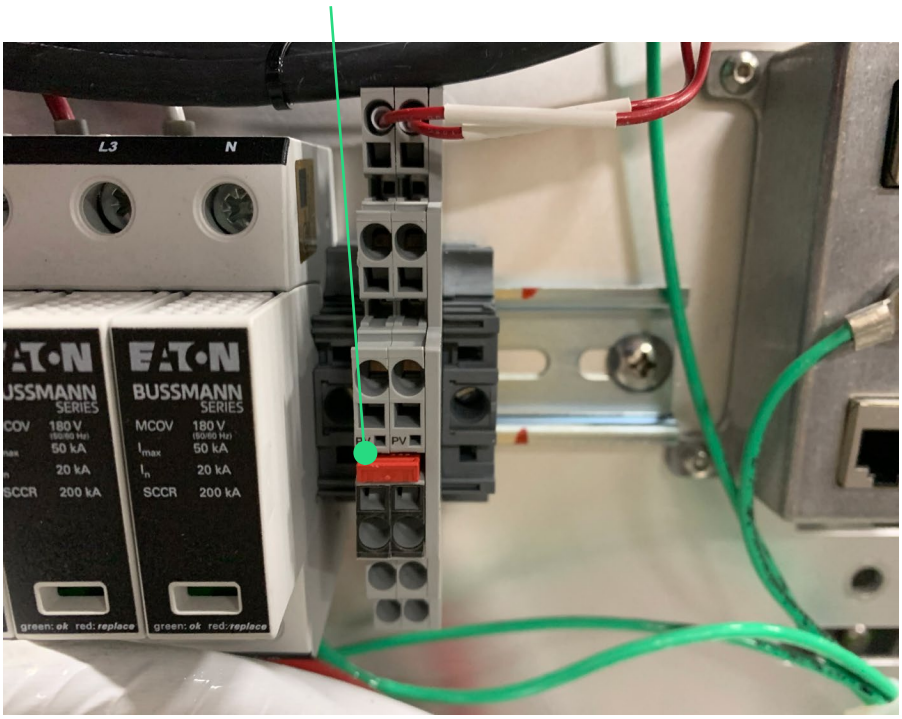
Optional External Safety Shutoff Switch

Note: Make sure to select an appropriately rated, code compliant remote shutoff switch. Your site location and local codes may require special labeling, indicators, or other features. Requirements can vary by region, so consult your local code enforcement officer for guidance.

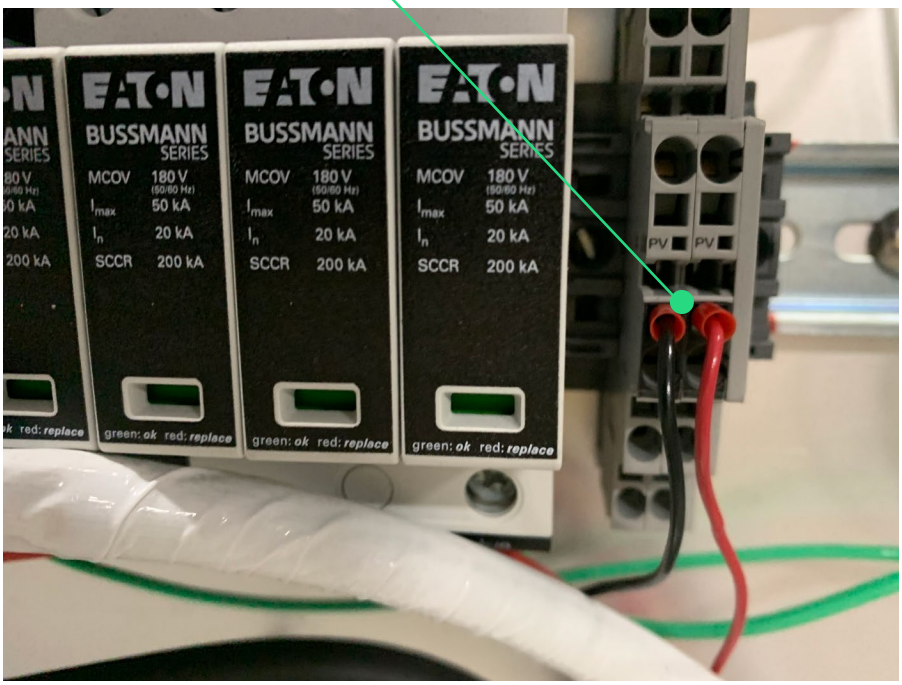
The FreeWire Boost Charger can be wired up to an optional external safety shutoff switch. Installation of an external switch does not disable the switch mounted on the front of the control panel. Either the front panel button or the external switch may be used to initiate a safety shutdown. However, once a shutdown has been initiated, you must use the front control panel to exit the shutdown. If a locking-type switch is installed, the system cannot exit the safety shutdown until the switch has been released.

Use the STOP terminals to connect an external Safety Shutdown switch. Use a normally closed (NC) type switch or button. The STOP terminals ship with a jumper installed. Remove this jumper before installing an external switch. If not using an external switch, leave this jumper in place.

Step 1 Boost Charger works with a normally closed external safety shutoff switch. In order to wire up the external safety shutoff switch, the red jumper shown below must first be removed.



Step 2 Wire up the remote shut off using 20 AWG wire as shown below.



Step 3 Be sure to test the operation of the external safety switch per local codes and regulations before putting into use.

Connecting Electrical Power

Step 1 Once the Boost Charger has been bolted to the concrete pad and torqued, open the front access door of the charger using the provided keys.

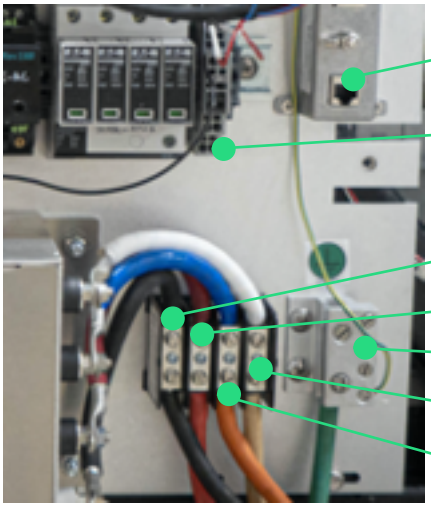
Step 2 Prepare the service wiring by making sure it has been pulled through the conduit to the installation pad.

Note: The terminal block on the Boost Charger accepts 2 AWG wires only. If using a larger gauge wire to accommodate a long run, reduce the wire size at the disconnect.

Step 3 For 208 V 3-phase, use Phases A, Phase B, Phase C, Ground, and Neutral as shown in the photo below. For 240 V split phase, use Phases A and B plus Neutral as identified in the photo below.

Step 4 Verify the length of the wire needed to connect to the Boost Charger terminal block as shown in the photo below. Trim any excess wire.

Note: Make sure the wire can reach the terminal block and ground location first, then trim any excess.



208 V 3-phase

Step 5 Strip each wire 1" (25mm).

Step 6 Connect the wires to the appropriate phase, neutral, and ground based on the supply voltage. To connect the wires, loosen up the bolts on the terminal blocks and insert the appropriate wire into its equivalent terminal.

Step 7 Torque the bolts to 50 in-lbs.

Step 8 Confirm each wire is held securely inside the connector by trying to pull the wire downward.

Step 9 Bundle the wires together using cable ties as necessary.

Step 10 Verify that the Boost Charger breakers are on.

Step 11 Seal the conduit openings using duct seal.

Step 12 Close the front access door of the Boost Charger and lock it using the provided keys.

Step 13 Unwrap the cable connectors and insert each connector into its corresponding holster.

Important: You have now completed the physical installation of the Boost Charger. Follow the steps in the next section to complete the installation. Do not leave the installation site until you have completed all steps in the next section and have verified that the Boost Charger is operating correctly.

Warning: Risk of Fire or Electric Shock. This Device is Intended for Charging Vehicles Only.

Caution: Do Not Use this Product if There is Any Damage to the Charging Cable or Charging Connectors.

Powering on the Boost Charger

There is an emergency stop button, however there is no separate on/off switch for the Boost Charger.

Note: The emergency stop button should not be used as an on/off switch.

Boost Charger is powered on during the installation by energizing the site's electrical panel. Immediately after completing installation and the electrical breaker is turned on, the system will turn on and run a series of self-tests to ensure safe operation.

These tests include:

- Electrical component safety checks
- Lighting and display checks
- Battery charging system checks
- Component operation checks (such as fans, pumps, and contactors)
- Cellular connectivity checks

If any errors are found, the display will report that the charger is not available for use and the indicator lights will turn red. Please contact FreeWire support at support@freewiretech.com or 415-484-9590.

Commissioning the Boost Charger

The FreeWire Boost Charger uses EV Connect to allow drivers to easily find, access, and securely pay for EV charging. Drivers can search for and locate electric vehicle charging stations based on location, station ID, availability, power level provided, and accessibility.

Before charging can begin, the Boost Charger fast charging station must be commissioned. The following items are needed to commission your fast charging station:

- An iPhone or Android with the mobile application downloaded (available on the App Store and Google Play).
- An electric vehicle.

A week prior to commissioning your fast charging station:

Step 1 Please complete the EV Connect Commissioning form: https://app.smartsheet.com/b/form/464378f684c543cfa4d2c7ce236a7ae4

Step 2 Please use this link to schedule an appointment: https://calendly.com/evcommission

Follow the steps below to complete the commissioning process:

Step 1 Download the free EV Connect App on your smart phone.

Step 2 Register or login to your mobile app as a guest.

Step 3 Tap the 'Charge' button and scan the QR code or type the ID# located on the fast charging station.

Step 4 Call (213) 318-4851 during your scheduled time. There is a 10 minute grace period. If you are running ahead or behind schedule, please call or email EV Connect.

Step 5 The EV Connect deployment team member will walk you through activating each charging station.

If you have any questions, please reach out to Tiffany Huang at thuang@evconnect.com or (213) 318-4851.

Important: Ensure that the Boost Charger is operating nominally before leaving the site. If you have any issues or concerns, please contact FreeWire support directly.

Complete a Test Charging Session

Before you leave the installation site, follow these steps to ensure that the Boost Charger is fully operational:

Step 1 Tap the touch screen to start a charging session.

Step 2 Use a credit card and complete payment prompts.

Step 3 Connect the charging cable to a vehicle.

Step 4 Stop the charging session and return the connector to the holster.

If the Boost Charger operates correctly and no errors exist, the installation is complete.

If the Boost Charger does not power up, or fails to begin a charging session, confirm that the wiring is properly connected. If the Boost Charger is properly wired, but is not operating correctly, contact FreeWire support at support@freewiretech.com or 415-484-9590 for assistance.

3 Boost Charger Specifications

System

Max Output Power	CHAdeMO: 100 kW CCS: 120 kW Combined: charge two vehicles up to 60 kW each
Max Output Current	CHAdeMO: 200 A CCS: 300 A
Dimensions	40 in x 43 in x 96 in
Weight	3,800 lbs
Output Voltage, Charging	200 VDC – 500 VDC

Electrical Input

Input Rating	240 (+/- 10%) VAC, split-phase, 4-Wire, 120 A, 60 Hz 208 (+/- 10%) VAC 3-phase, WYE, 5-Wire, 80 A 60 Hz
Wiring	For 240 V - 2 conductors (L1, L2) Ground For 208 V - 4 conductors (L1, L2, L3, Neutral) Ground
Required Service Panel Breaker	150 A 240 V 100 A 208 V

Interfaces

Supported Connector Types	CCS1 (SAE J1772™ Combo) CHAdeMO
Charge Cable Length	140 in
User Interaction Display	Full-color 24-inch LCD display for driver interaction
Authentication	RFID: ISO 15693, ISO 14443, NFC

Safety and Compliance

Safety Compliance	U.S.: complies with UL 2202, UL 2231-1, UL 2231-2, UL 991, UL 1973 (battery pack)
EMC Compliance	U.S.: FCC part 15 Class A

Safety: Electric Vehicle

- See the EV supplier's guide for proper care of the EV and follow directions carefully. Failure to follow EV care instructions can results in EV explosion and property damage, severe injury, or death during charging.
- Do not disconnect charger connector while the EV is charging.

Environmental Requirements

Location	Outdoor
Operating Temperature	-20° C to 55° C (-4° F to 131° F)
Storage Temperature	-20° C to 55° C (-4° F to 131° F)
Operating Humidity	Up to 95% at 55° C (131° F) non-condensing
Enclosure Rating	IP54

FREEWIRE

www.freewiretech.com

Any additional questions please contact:
(415) 484-9590
support@freewiretech.com

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