



EverCharge

Design and Install Specifications - USA
October 2016

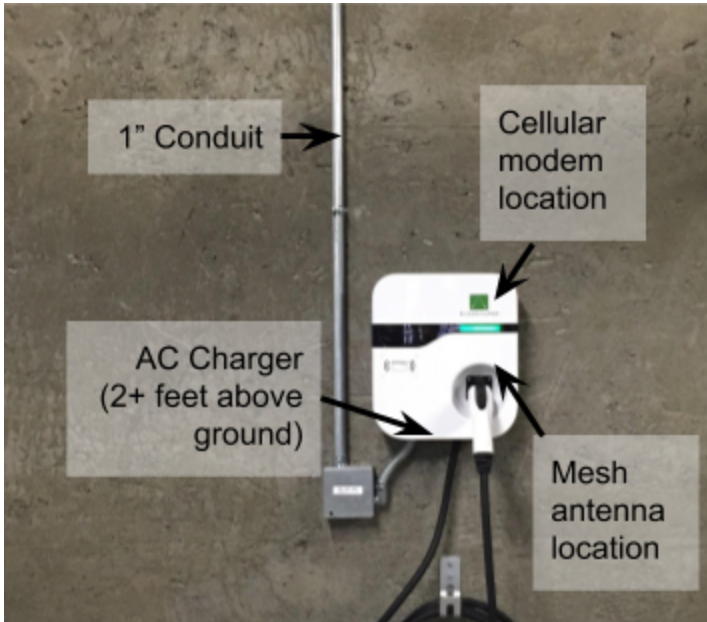
install@EverCharge.net

415.429.2971

Single-page install guidelines

This page is designed to serve as a quick overview of the full EverCharge system install specifications. Do not solely use this page for installation, as required system configuration and testing is not covered on this page. Contact EverCharge at install@EverCharge.net or 415.429.2971 if you have any questions, comments, concerns, or need clarification on anything in this document.

This document was **last updated October 4, 2016**. Installing? Check the four-page [Install-Only Specs](#) instead!



Example installation image

AC Charger requirements

- 208-240V @ 40 amps (110-120V NOT OK)
- Cellular signal required for Primary only
- 50A-rated copper conductors
- Individual 40A OCPD for each AC Charger
- 1" trade size conduit
- Mount at least 18 inches (450 mm) above floor inside, 24 inches (600 mm) outdoors
- Included charge cable (18 feet / 5.5 m) reaches vehicle plug and does not block walkway

Shopping list / required tools

- 1" fitting for AC charger knockout
- 1" trade size conduit
- 50A-rated (e.g #6 THHN 75°C or #8 THHN 90°C) copper conductors
- Torx T30 and T20 bits
- 40A 2-pole breaker / local disconnect

After the install (including configuration and testing) is complete, before leaving the site, make sure to contact EverCharge so we can update our records and check on the unit. Please email/text a photo of the install too.

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1. How the EverCharge system works

1.1. Power management

The EverCharge system is a network of Level 2 30 amp AC Electric Vehicle (EV) chargers that takes advantage of the fact that not all vehicles are charging at the same time, allowing more vehicle chargers to be installed at a given site. By using patented power management technology to regulate the power to vehicles based on their needs, **the EverCharge system can allow up to 10x as many vehicles to charge at any site** and reduce the need for more prohibitively expensive electrical upgrades.

The EverCharge system is listed for and complies with:

- [UL 916 Energy Management Equipment](#)
- [NEC 2014 Article 625 Electric Vehicle Charging System](#)

1.2. Wireless communication

The EverCharge system communicates in a wireless mesh network to regulate power. Should a charger's connection fail, it will automatically stop active charging and/or prevent charging from taking place. Chargers can reach about 150 feet with near line-of-sight on the same level of a parking garage, or vertically through one floor. Relay network boxes can help bridge gaps.

1.3. Cellular data

The Primary charger, which is installed in the location with the best cellular network connectivity, is designed to send data back over a cellular network. The primary charger will be marked on the shipping box if more than one charger will be installed. A cellular signal is **REQUIRED** for installation. This data is used for billing, analytics and maintenance. Any other chargers in the installation connect through the Primary.

Alternative cellular setups are possible if no cell service is available at any parking location. Contact EverCharge for more information at install@EverCharge.net.

2. Making a site plan

2.1. Determine the number of vehicles

First, determine how many vehicles will be charging at the site. EverCharge recommends individual EverCharge AC Chargers for each vehicle at a site, however it is possible to enable multiple vehicles to share a single AC Charger station via additional assigned EverCharge Access Cards, such as in a valet setup.

2.2. Determine the recommended capacity for the system

The chart on the next page shows the power needed to supply a Charge Group. A Charge Group (see [Section 2.5](#)) is a group of vehicles that are all drawing power from the same panel or breaker. Each AC Charger requires an individual 40A overcurrent protective device (circuit breaker, fuse disconnect, etc.).



The following table has LOOSE guidelines. EverCharge written approval is required for all infrastructure design. install@EverCharge.net

AC Chargers	Capacity	Voltage	kW
1-2	40A	208V	6.6
2-5	70A	208V	11.6
5-12	100A	208V	16.6
12-18	150A	208V	25.0
20-45	225A	208V	37.4

2.3. Determine the available capacity

Use this checklist to note the nominal ratings for the building, starting at the main feeder and switchgear:

- ☐ Main Feeder: _____ amps
- ☐ Switchgear: _____ amps
- ☐ Panel Board: _____ amps
- ☐ Meter Demand Reading: _____ amps (observed at time of visit)
- ☐ Main Breaker: _____ amps (at the meter)
- ☐ 480 / 208V Transformer: _____ (if applicable)
- ☐ Panel Breaker Rating: _____ amps
- ☐ # of Phases on the Panel: _____
- ☐ Line Voltage: _____ Volts
- ☐ Panel Rating: _____ amps
 - ☐ Existing Loads on the Panel: _____ amps
 - ☐ Estimated Available Panel Capacity: _____ amps
- ☐ Subpanel Rating: _____ amps (if applicable)
 - ☐ Existing Loads on the Subpanel: _____ amps
 - ☐ Estimated Available Subpanel Capacity: _____ amps

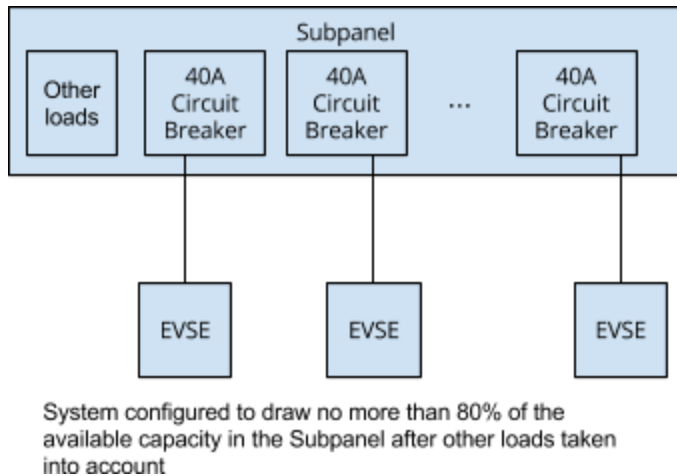
Connect the EverCharge system to an existing 208V or 240V subpanel if electrical capacity and physical space is available. If there is capacity but no available space, the installation will require a new subpanel. In sites where there is not sufficient capacity on an existing 208V/240V panel, it may be necessary to install a new 45kVa, 75kVA, 112.5kVA, or 150kVa 480/208V transformer.

2.4. Standard layouts

There are two standard configurations for the EverCharge system, shown in Figures 2.4.1 and 2.4.2. When possible, always upsize the wire gauge to support future additional charger installs. AC Chargers must be protected with an over-current protective device. Contact EverCharge for site-specific layout approval at install@EverCharge.net.

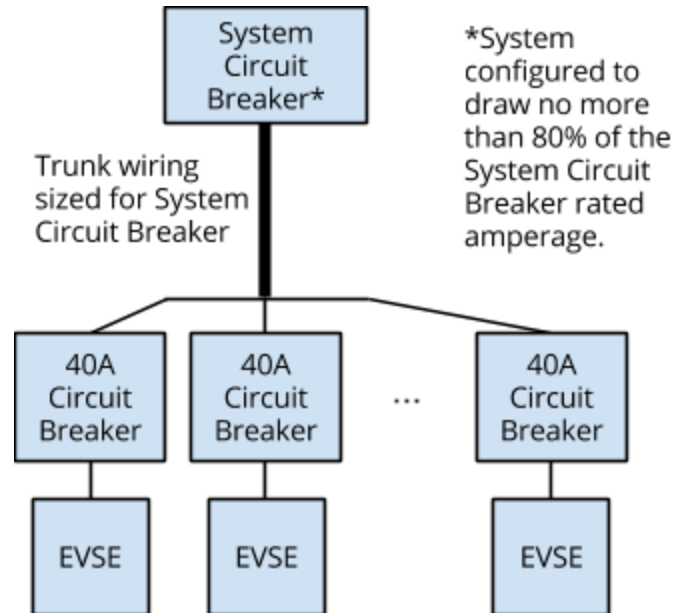
Case 1 - Figure 2.4.1

In Case 1, all AC Chargers are connected to individual circuit breakers in a subpanel that is shared with other non-EverCharge loads. Refer to [Section 2.2](#) to suggest a possible panel size for available capacity on the subpanel. The EverCharge system will be configured in [Section 4](#) to not exceed 80% of this available capacity regardless of the number of EverCharge 40A circuit breakers in the panel.



Case 2 - Figure 2.4.2

In Case 2, all AC Chargers are connected to a larger circuit breaker. Each has a 40A breaker box installed adjacent to the AC charger. In this configuration the larger circuit breaker should be rated to meet the recommended available capacity from [Section 2.2](#). The EverCharge system will be configured in [Section 4](#) to not exceed 80% of the rating of the larger circuit breaker.



2.5. Charge Groups

In larger EverCharge system installations, groups of AC Chargers can draw power from independent power sources. The set of AC Chargers drawing from the same power source is called a Charge Group. Nearly all installations require only one Charge Group, but the system supports many. The amount of power that the EverCharge system will draw is set at the Charge Group level, which is then shared by individual AC Chargers.

- In Case 1, the available power for the Charge Group is **80% of the available capacity on the subpanel**, after other loads on the subpanel have been taken into account.
- In Case 2, the available power for the Charge Group is **80% of the rating of the larger circuit breaker**.

2.6. Confirm cellular service

Cellular service at the install location needs to be determined by the installer. A simple test is to check for data on your mobile phone at the parking spot. If no service exists at the parking space, relay network boxes in the garage will be needed to relay the signal.

2.7. Best practices for expandability

2.7.1. Consolidate and upsize wiring

As much as possible, consolidate feeders to supply charging. Try to use higher-gauge wire when possible to make future expandability easier.

2.7.2. Subpanels in large garages

In large-dimension garages, EverCharge suggests installing centrally-located subpanels to deliver power to distant vehicles. To reduce installation costs, EverCharge does not recommend trunk wiring rated over 200A.

2.7.3. Install junction boxes

Junction boxes should be installed every 20-50 feet (6-15 meters) and on every level of the garage to provide easy expandability for future vehicles.

3. Installing the EverCharge AC Charger

3.1. Before installing

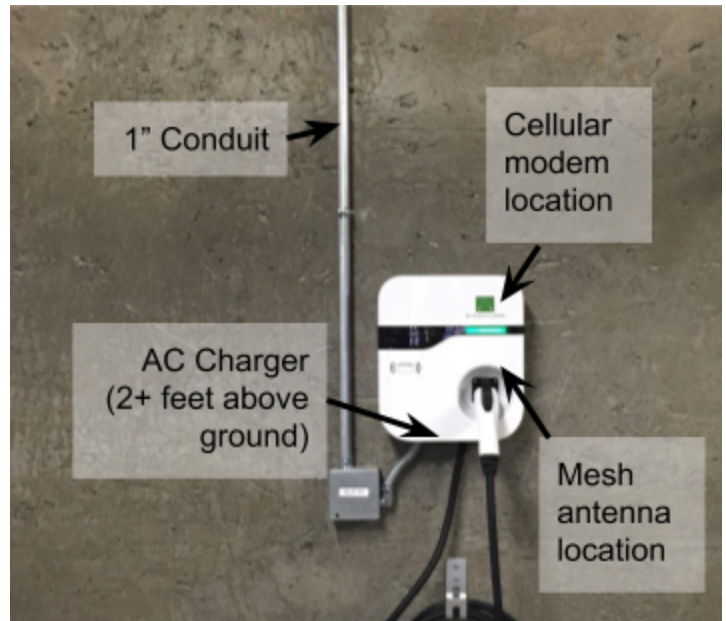
Refer to the example installation image on the right.

3.1.1. Choose an appropriate mounting location

The EverCharge AC Charger should be mounted on a wall or column adjacent to the electric vehicle parking space. Make sure that:

- The distance to the vehicle charge port is not longer than the included charge cord length of 18 feet (5.5 meters)
- The charge cord will not obstruct a walkway
- The AC Charger is in a location protected from a vehicle collision
- The AC Charger MUST be positioned such that the charging cord receptacle is at least 18-24 inches (450-600 mm) above the ground [NEC Article 625.50]
- If more than one charger is shipped, the charger marked “Primary” must have cell service
- Chargers must be within 150 feet of each other on the same level

3.1.2. Power and grounding requirements



⚠ Attach the provided “Power Managed” warning sticker to the panel where the charger is supplied!

The AC charger requires 208-240V across two legs. The AC Charger must be connected to a grounded, metal, permanent wiring system via the equipment grounding terminal on the charger.

Attach the provided “Power Managed” warning sticker in an obvious location on the panel (not on the charger itself!) where the charger is powered. This is to help prevent overloads when other non-managed loads are added to the panel after the charger installation.

3.1.3. Mounting and installation parts

EverCharge recommends the following parts for an AC Charger installation:

EverCharge-supplied components:

- Mounting bracket
- Torx T30 bolts (x3) for securing the AC charger to the mounting bracket
- Cable hanger bracket (optional)
- Torx T20 ¼" expansion bolts (x2) for concrete mounting
- No. 8 wood screws (x2) for wood mounting

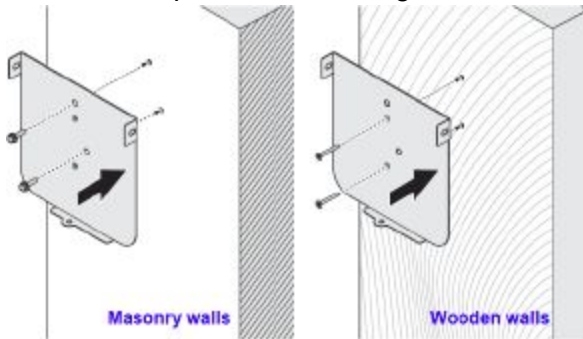
Installer-supplied components:

- Conduit of trade size 1" (27mm)
- 1" fitting for conduit knockout on AC Charger
- Enough junction boxes to comply with the Expandability Best Practices in [Section 2.7.3](#)
- Copper THHN #6 75°C or #8 90°C conductors
- 40 Amp 2-pole circuit breaker

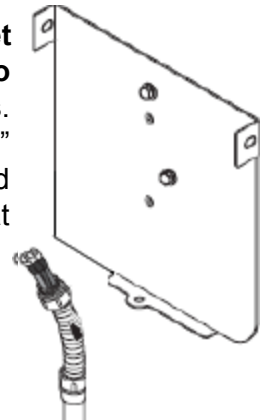
3.2. Step-by-Step AC Charger installation instructions

⚠ Disconnect electrical power prior to installing the AC Charger. Failure to do so may cause physical injury or damage to the electrical system and charging unit.

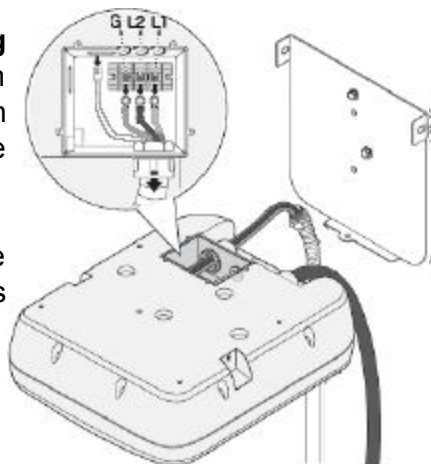
1. **Drill bolt holes** in the wall for the mounting bracket and optional cable hanger.



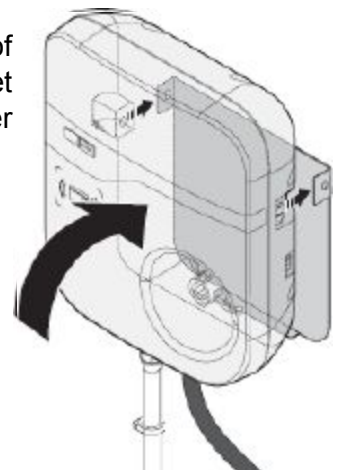
2. **Secure mounting bracket and optional cable hanger to wall** using appropriate bolts. For masonry, use ¼" expansion bolts. For wood studs, use #8 wood screws at least 2 inches in length.



3. **Connect wiring to charger** in accordance with local codes. Use 50A-rated copper conductors. The charger requires 208-240V.

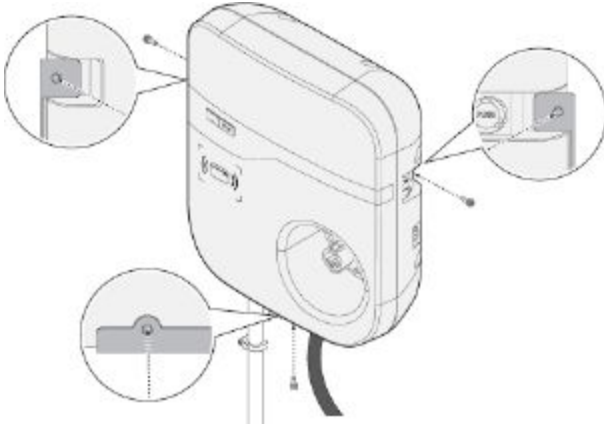


4. **Align screw holes** of the mounting bracket with the AC Charger holes.

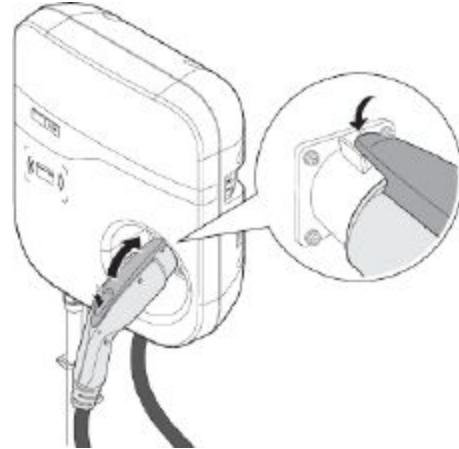


(continued on next page)

5. **Install and secure** with three screws to the support bracket.



6. **Attach charge cable to plug** and hang the rest of the cable on the cable hanger if installed.



With the charger powered on, after initialization (which can take up to a minute), the charger should display a solid green LED. If it keeps flashing red for more than a minute, check the Ethernet connection to the built-in network board

3.3 Code authority

In electrical codes prior to NEC 2014, intermittent EVSE charging loads were considered to be continuous, requiring overcurrent protection at 125% of the combined max load of each charger unit, whether or not any load management system was operating. In NEC 2014, a provision was added that specifically allows for the EverCharge system of power management:

NEC 2014 625.41 Rating

Electric vehicle supply equipment shall have sufficient rating to supply the load served. Electric vehicle charging loads shall be considered to be continuous loads for the purposes of this article. **Where an automatic load management system is used, the maximum electric vehicle supply equipment load on a service and feeder shall be the maximum load permitted by the automatic load management system.**

This language was also adopted in [TIA 11-3](#), which took effect in all NEC 2011 territories on November 8, 2011, and a [California supplement](#) that went into effect on July 1, 2015. The EverCharge system is designed to operate in accordance with the above code requirement, and presence of language substantially similar to the above in code requirements is assumed throughout.

4. System configuration and testing



After installing all of the AC Chargers and Network Boxes, before users can charge their cars, the system must be configured so that at no point does the system ever try to draw more power than is safe. **EverCharge preconfigures most systems, so install-day configuration is generally not required!**

Required tools:

- The serial numbers and locations of all EverCharge AC Chargers
- A laptop computer with an Ethernet port (or a USB-Ethernet adapter)
- Ethernet cable of appropriate length to temporarily connect the laptop to the Primary charger
- EverCharge Access Cards (2x for each AC Charger)

Make sure that each charger is displaying a solid green LED before starting configuration and testing. If a charger blinks red, it does not have a connection to its internal network board. Resolve that before attempting to configure. Chargers require roughly a minute to initialize after getting power.

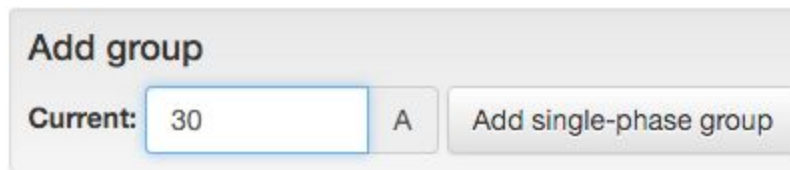
4.1. Configuration instructions

1. Plug in to Ethernet to configure

With all EverCharge hardware powered on, use an Ethernet cable to connect to the Primary Charger and navigate to 192.168.0.1. Enter the username 'root' and the password 'passwd'.

2. Create charge groups

Navigate to the 'Circuits' page. For single installations, type '30' (or 80% of the circuit breaker feeding the charger) into the 'Current' box and click 'Add single-phase group'. For more complicated installations, see the attached 'Configuration instructions', unique to each building.



Click on the new '30A' box that has just appeared, then in the popup window, check the checkbox next to the charger serial number and click 'Save changes'.

Chargers directly belonging to this group

☒ HWT142600160W0

3. Assign and test access cards

Navigate to the 'Chargers and Tags' page. Each AC Charger comes with an envelope containing two access cards. To assign the cards to the AC Charger: first tap each card, one at a time, to the image of a card on the front of the charger. The AC Charger should immediately beep twice, followed by another beep (and red LED flash) within 10 seconds.

After both cards have been tapped to the charger, click the underlined 'None' to view the cards that have been tapped recently.

Charger	Tags
HWT142600160W0	<u>None</u>

A window pops up. Click the checkboxes to assign cards to the charger, then click 'Save changes'. Each card has a unique serial number, and cards can be distinguished with an app on any NFC-equipped smartphone, such as [NFC Reader](#) for Android.

Assigned tags:

Recently scanned on this charger:

Other tags:

☒ 44bb9385 ☐

☒ 44bbcc90 ☐

4.2 Testing instructions

Test an assigned card by tapping it to the Charger. The charger should beep twice, then within 10 seconds, it should beep twice again and the LED should cycle between green/orange for two minutes, indicating the card was authorized and the system is ready to charge.

If the Charger flashes red or takes longer than 10 seconds to respond after tapping a card, it does not have a good connection with the Primary Charger or the card was not assigned to the tested charger.

Make there is no conduit/metal pipe near the antenna side of any Charger. EverCharge can provide relay Network Boxes if necessary to help connect chargers to each other.

4.3. Installation summary checklist

Use the following checklist to make sure that everything has been installed and configured correctly:

- ☐ Transformer, Main Breaker, Panel, subpanel have available capacity
- ☐ Junction Boxes along the entire electrical run for future expandability
- ☐ If applicable, trunk infrastructure wiring sized for the system breaker size
- ☐ AC Chargers are securely and safely mounted on the wall, column, or pedestal adjacent to the electric vehicle parking space
- ☐ AC Chargers are connected to 208V-240V via an OCPD with 50A-rated conductors
- ☐ Charger marked "Primary" is installed in a location with cellular reception
- ☐ Power Managed warning stickers applied on panel feeding chargers (not to the chargers!)
- ☐ Access cards tested with assigned chargers, in envelopes for customers
- ☐ **Call 415.429.2971 before you leave.** Send EverCharge the site configuration including locations of each charger and it's serial number at install@EverCharge.net. Be sure to include photos of the install!

5. Indicator LEDs and troubleshooting

AC CHARGER INDICATOR LIGHT	STATUS	TROUBLESHOOTING INSTRUCTIONS
SOLID GREEN	OK: Ready / Idle	N/A
FLASHING GREEN / YELLOW	OK: Card authenticated / In queue to charge	Plug in vehicle, wait for charging to begin.
FLASHING GREEN	OK: Charging	This is the appropriate indication that the vehicle is plugged in and charging properly
SOLID RED	ERROR: Wiring / ground fault	Check wiring. Charger needs 208V-240V. If problem persists contact EverCharge
FLASHING RED	ERROR: check Network Box	The charger will flash red until a connection with the network board is established. If light continues to flash red, check the Ethernet cable. If problem persists contact EverCharge.
SINGLE RED FLASH (within 10 seconds of tapping card)	ERROR: Card not authenticated	Assign card to charger via configuration interface
SINGLE RED FLASH (more than 10 seconds after tapping card)	ERROR: Network timeout	Charger does not have good connection with Primary charger. Relay Network Boxes may be required to resolve

6. Specifications

Charging Interface	SAE J1772 compliant charging plug
Input Rating	208-240 Vac, single phase, 40 A, 60 Hz
Connections and Wiring	L1, L2, and grounded, hardwired with terminal block
Standby Power	< 5 W
Output Rating	208-240 Vac, single phase, 30 A maximum, 60 Hz, 7.2 kW max.
Internal Residual Current Detection	20 mA CCID per UL 2231
Upstream Breaker	2-pole breaker, non-GFCI type
Electrical Protection	over current, short circuit, over voltage, under voltage, ground fault, surge protection, over temperature
Status Indicators	standby, charging, fault, warning
Buttons/Switches	charger on/off, stop charging
Operating Temp.	-22 F to +122 F (-30 C to +50 C)
Humidity	95% relative humidity, non-condensing
Charging Cable Length	18ft (5.5 m) straight cable
Ingress Protection	NEMA 3R
Cooling	Natural cooling
Dimensions (W x H x D)	13.8 x 15.7 x 5.0 inches (350 x 400 x 126 mm)
Net Weight	15.4 lbs (7kg)
Certificate	UL, cUL

Questions, comments, or suggestions about this document? Please contact us so we can improve it!