



EO Smart Home Installation Guide V1.4

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1 Introduction

This document details the installation instructions for the EO Smart Home solution. The solution comprises the following components:

- EO Mini
- EO Hub
- EO Smart Home phone app

The EO Smart Home Solution allows the homeowner to remotely control the charging station. The basic topology is shown below

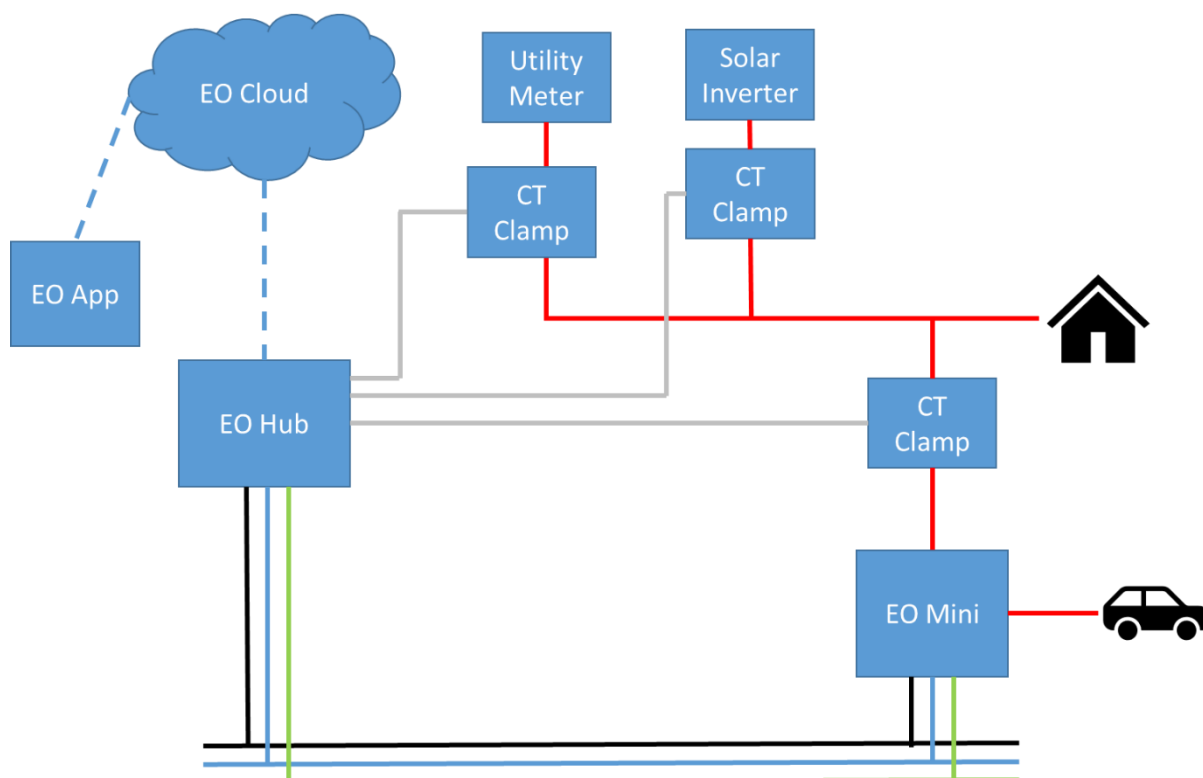


Figure 1 - Smart Home Solution overview

The Smart Home package contains the following:

- EO Mini
- EO Hub
- Power Lead for the EO Hub
- At least one CT Clamp. This is rated at 100A and is used for measuring the consumption of the EO Mini.
- Additional CT Clamps for Solar and Load Management may be included if they have been requested at the point of ordering.
 - A CT clamp for Solar is usually rated at 50A
 - A CT clamp for load management is usually rated at 100A or more

2 Installation

The EO Smart Home installation process is explained in detail in the following chapters but the high level installation process is as follows:

- 1) Installers need to have their account set to INSTALLER status which can only be done by a member of EO Support. Please contact support@eocharging.com or +44 (0) 333 77 20383
- 2) Install the EO Mini
 - a. mount to the wall
 - b. run power cables to the Mini
 - c. fit the appropriate RCD and MCB
 - d. Fit the appropriate earthing device
- 3) Install the EO Hub
 - a. Mount to a suitable internal wall where there is strong wifi signal or an ethernet socket
 - b. Supply power
- 4) Connect up the CT Clamps
 - a. One CT Clamp must be connected to the supply of the EO Mini
 - b. One CT Clamp can be connected to the output of the utility meter if ALM is required
 - c. One CT Clamp can be connected to the output of the solar array if solar charging is required
- 5) Connect the Hub and Mini together
 - a. A serial cable needs to connect the Mini to the Hub
- 6) Power Up the hub and the Mini
- 7) Connect the Smart Home to the Cloud using the EO Smart Home App
 - a. Installer – scan the hub, scan the mini and check that the hub and mini can communicate
 - b. Home Owner – scan the hub and associate the hub with their account

3 EO Mini Installation Instructions

3.1 EO Mini - Physical Installation Instructions

- 1) Install the EO Mini as per the instructions on the EO Charging Resource Centre - [EO Mini - Installation Guide](#)
- 2) Set the maximum current setting of the EO Mini as per the instructions on the EO Charging Resource Centre - [EO Mini Current Switch Values.pdf](#)

3.2 EO Mini to the EO Hub Serial Cable

NOTE – only connect the EO Mini to the EO Hub when the power is OFF at both the EO Mini and the EO Hub.

A serial cable is required to connect the EO mini to the EO Hub. Three cables are actually required and so therefore a four core cable is recommended such as below:

- Belden 9842 - LSZH 600V - [Link](#)

3.3 EO Mini Serial Connection

The Serial cable should be connected to the EO Mini using the green serial connector as shown in Figure 2

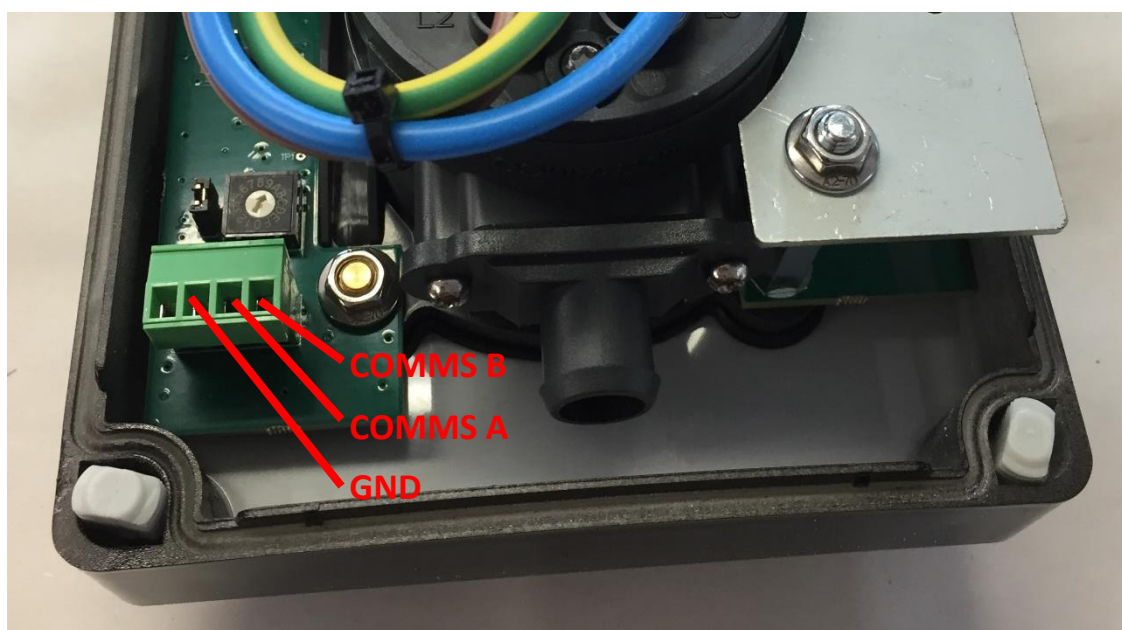


Figure 2 - EO Mini serial connector

There are four connections and from left to right they are:

- DO NO CONNECT
- GND
- Comms A
- Comms B

4 EO Hub Installation Instructions

4.1 EO Hub – Physical Installation Instructions

Install the EO Hub in a suitable location close to the output of the electricity meter. Physically mount it to the wall using the mounting holes and four appropriate screws (not included).

4.2 EO Hub Connections

The EO Hub has the following connections as shown in



Figure 3 - EO Hub connections

4.3 EO Hub Power

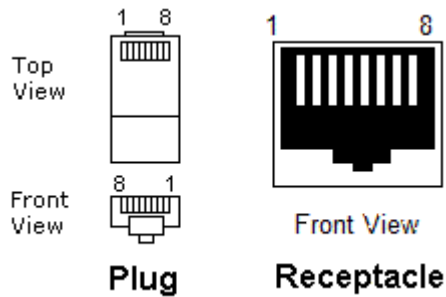
This is supplied via a standard IEC plug. It is recommended that this cable is terminated directly into a 5A fused connection unit (ie not using the 3-pin plug). This avoids the risk of it being unplugged in error.

Regulations state charging equipment must have a dedicated final radial circuit, so EO Hub must not be powered on the same radial as the charging stations. Where a dedicated EV distribution board is fitted, we recommend a single phase supply is taken from this this same board.

4.4 EO Mini Serial Comms

The EO Mini charging station needs to connect to the EO Hub via an serial bus. The serial bus connects to the hub via an RJ45 connection. The wiring of the EO Hub RJ45 connector for serial comms is as follows:

- Pin 1 – Earth
- Pin 2 – Unused but connected to GND
- Pin 3 – Unused but connected to GND
- Pin 4 – Comms A – Blue with white stripe
- Pin 5 – Comms B – White with blue stripe
- Pin 6 – Unused but connected to GND
- Pin 7 – Unused but connected to GND
- Pin 8 – Unused but connected to GND



4.4.1 Connecting the Serial cable to the RJ45 connector on the hub

The serial connector on the hub is an RJ45 socket i.e. a standard Ethernet socket. There are two ways to connect the serial cable from the Mini to the RJ45

- 1) Use the enclosed RJ45 to Serial line adaptor



Figure 4 - RJ45 to Serial cable adaptor

- 2) Take a standard CAT 5 Ethernet cable
 - a. Cut a short length with the RJ45/Ethernet plug on one end.
 - b. Strip and expose the bare wires for pins 4&5 for Comms A&B and pin 1 for earth
 - c. Connect the serial cable to the bare wires using a 3 way level connector

4.4.2 Fitting termination resistors to the RS485 Serial Bus

To ensure reliable communication on RS485 serial cable runs of greater than 25m, a 120 ohm 0.25W terminating resistor should be applied at each end of the bus. The following link provides guidance on selection of a termination resistor:

<https://maximintegratedsupport.force.com/support/s/article/RS-485-Termination-Resistor-Power-Rating>

4.5 CT Clamps

CT Clamps need to be used for a variety of functions and are required to measure

- the consumption of the house
- the power consumed by the EO Mini
- the output of the solar array

They are to be connected in the following fashion

EO Hub Pin	CT Connection	CT Function
1 (left hand terminal)	L1 – White	House Consumption
2	L1 – Black	
3	L2 – White	EO Mini
4	L2 – Black	
5	L3 – White	Solar output
6 (right hand terminal)	L3 – Black	

The EO Smart Home can be configured in the following manner

- Just the Mini
 - Mini - Connect the 100A CT Clamp to Pins 3&4
- Load Management & Mini
 - Load Management– Connect a 100A CT clamp to pins 1&2
 - Mini - Connect the 100A CT Clamp to Pins 3&4
- Load Management & Mini & Solar
 - Load Management – Connect a 100A CT clamp to pins 1&2
 - Mini - Connect the 100A CT Clamp to Pins 3&4
 - Solar – Connect a CT Clamp to pins 5&6 – rating is solar inverter dependent but for a domestic property, usually 50A is enough.

The CT clamps need to be fitted in the correct orientation – follow the instructions on the CT Clamps.

4.6 LEDs

There are three status LEDs on the EO Hub as shown in Figure 3. LED1 is on the far left, LED2 is in the middle and LED3 is on the far right. These LEDs are either illuminated green or off. The LEDs indicate different stages of operation with the principle stages being “Start Up” and “Normal Operation”

4.6.1 Start Up

Stage	LED1	LED2	LED3	Repeats	Description
1	Green	Off	Off	6 times	Start Up
	Off	Green	Off		
	Off	Off	Green		
	Off	Off	Green		

				Pause	The unit is running self checks
2				6 times	Start Up successful
3					Normal operation – LED 1 blinking, LED 2 solid

4.7 Ethernet connection & Network Security Settings

For the EO Hub to communicate to the eoCloud back office Portal, an internet connection is required. This is provided through a local Wifi connection or the local hard wired ethernet port.

As standard, the EO Hub IP address and DNS server address are assigned via DHCP. Once assigned, it is best if the IP address is reserved in the DHCP table. For sites where a fixed IP address is required please contact EO Support for advice.

It is possible to check the local connection is valid by clicking on either of the two links below

<http://porttest.eocharging.com:4455>

<http://porttest.eocharging.com:4456>

4.7.1 GPRS Modems

Rather than using a wired internet connection, it is possible to connect the EO Hub to a wireless 4G modem. Eo can supply these pre configured but if a third party modem is used then consider the following points to ensure that a connection is trouble free:

- Update the APN settings for the mobile network
- Turn off any VPN settings

4.8 Boot Up

On power up, the EO Hub performs a boot up sequence which can take around 90sec to complete. When a successful boot up sequence has completed, then the middle LED is solid green.

These LEDs can also provide diagnostic information for the support team.

5 Connecting the Smart Home to the EO Cloud

The process for connecting the EO Mini can be summarised into the following steps:

- 1) Installer - Download the EO Smart Home app onto a smart phone and create an account
- 2) Installer - Using the app, connect to the WiFi hotspot created by the EO Hub and enter site details such as Solar, ALM and site capacity.
- 3) Installer – Check that the hub can communicate to the Mini and CT Clamps i.e. check that the physical installation is correct
- 4) Home Owner - Download the EO Smart Home app onto a smart phone and create an account
- 5) Home Owner – using the app enter user details such as vehicle, location
- 6) Home Owner – join the EO Hub to the local wifi
- 7) Home Owner – Start charging!

At this point it is possible to view the status of the EO Mini using the app.

5.1 Creating an account

- 1) Install the EO Smart Home app onto your mobile device.
- 2) Log into the EO Smart Home app. If you do not have an account, create one.

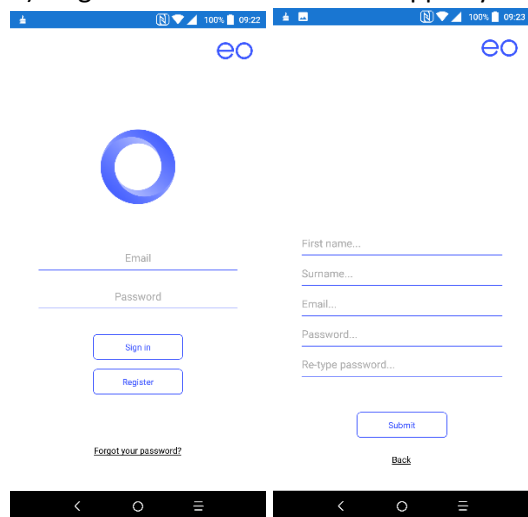


Figure 5 - Creating an account for the EO Smart Home App

IMPORTANT – Installers need to have their account set to INSTALLER status which can only be done by a member of EO Support. Please contact support@eocharging.com or +44 (0) 333 77 20383

6 Installer – Check the EO Mini and EO Hub are wired correctly

The Installer must first verify that the hub is connected to the EO Mini and the CT Clamps. This is done using the following simple steps

- 1) Select “Begin Installation” from the left hand menu

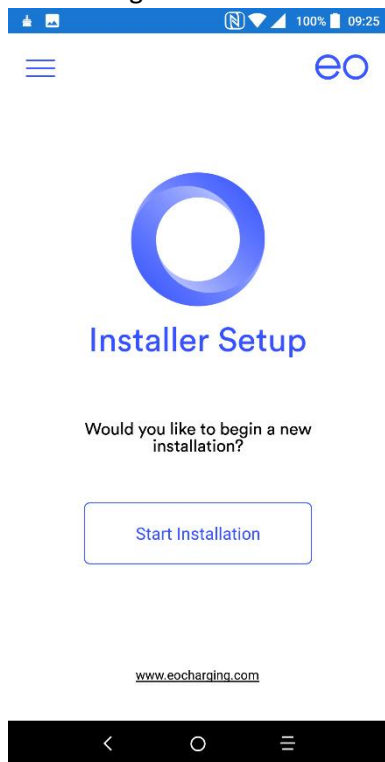
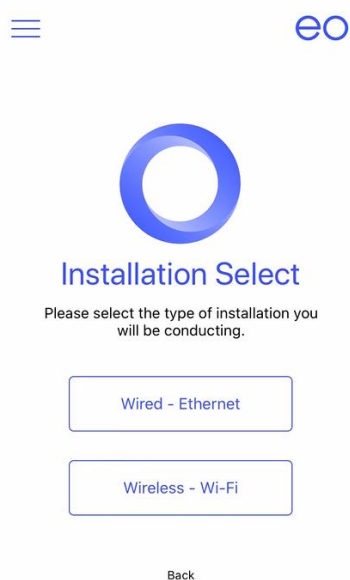


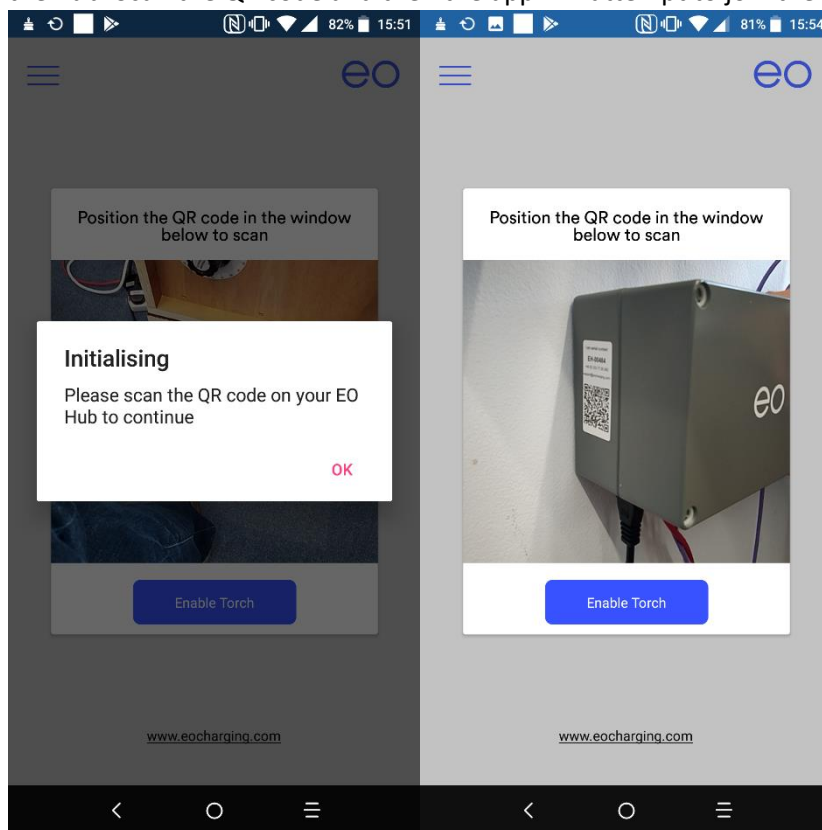
Figure 6 - Installer - starting an installation

- 2) The installer shall be asked if the installation is wired or wireless.



The wireless installation process is what is detailed below since it involves the most amount of steps for the Installer and Home Owner.

- 3) Click Start Installation and the app shall ask the installer to scan the QR code on the side of the hub. Scan the QR code and then the app will attempt to join the wifi of the hub.



- 4) If successful, then the installer will be able to configure the following options

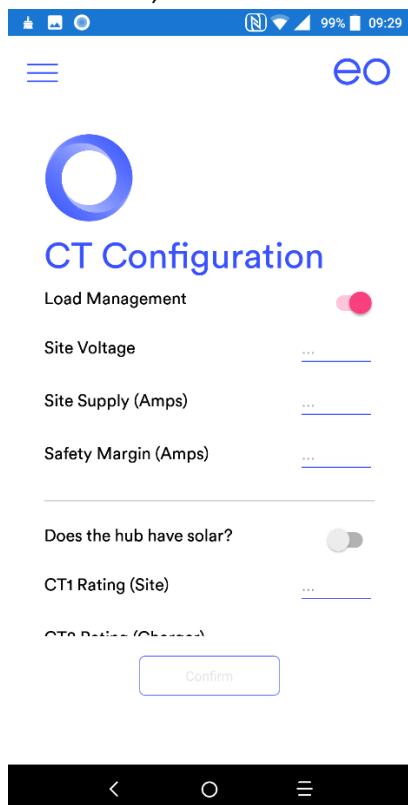


Figure 7 - Installer - adding site specific installation details

- a. Does the site need Load Management?
- b. Site Voltage
- c. Site Supply
- d. Safety Margin (a 10% value is automatically suggested)
- e. Does the site have Solar
- f. CT Rating for Site/Load Management
- g. CT Rating for the Mini
- h. CT Rating for Solar

NOTE – Load Management should NOT be selected if CT1 is not connected (set to 0)

NOTE – Solar should NOT be selected if CT3 is not connected (set to 0)

Check that the ratings on the CT clamps are entered into the app

- 5) The Installer now needs to enter the Serial Number and the Maximum current rating of the connected EO Mini.

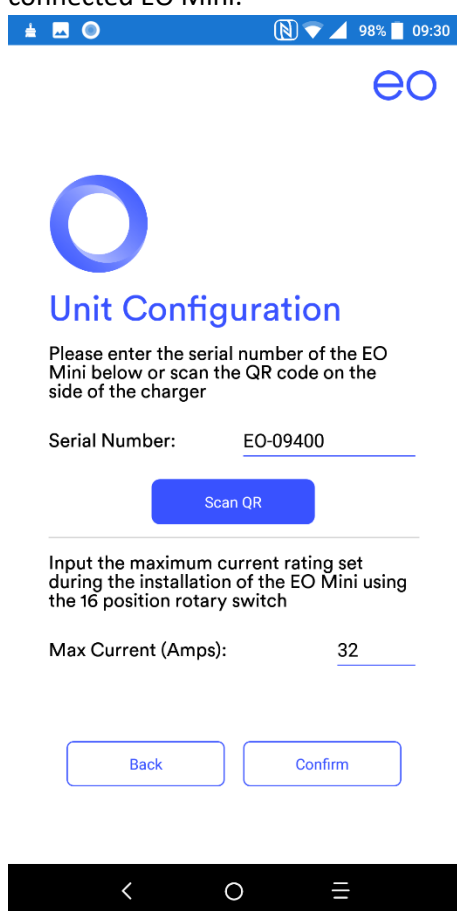


Figure 8 - Installer - Adding information about the Mini

- 6) The App will now connect to the EO Hub, send down the details and then perform a connectivity test. If everything is wired correctly then the tests shall pass.

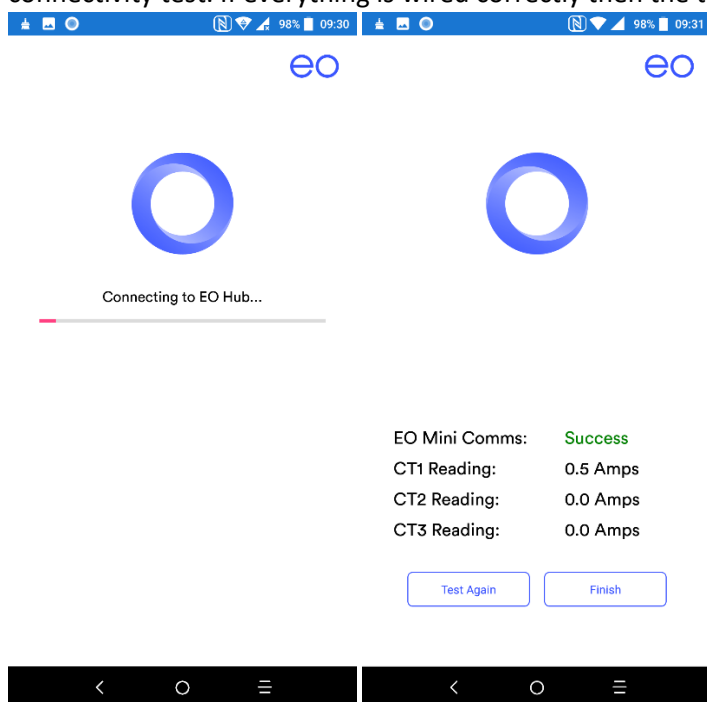


Figure 9 – Installer - Comms test between the EO Hub and EO Mini

- 7) Verify that the CT readings are correct and as expected using a Clamp Meter.

At this point the Installer's section is complete and the homeowner now needs to complete the set up with the site specific details such as wifi code.

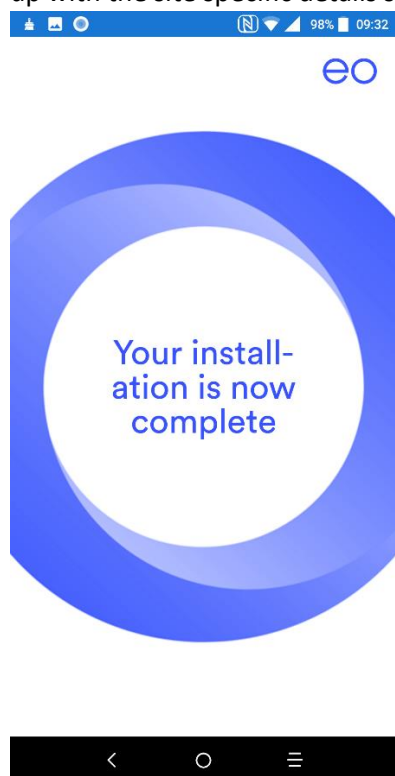
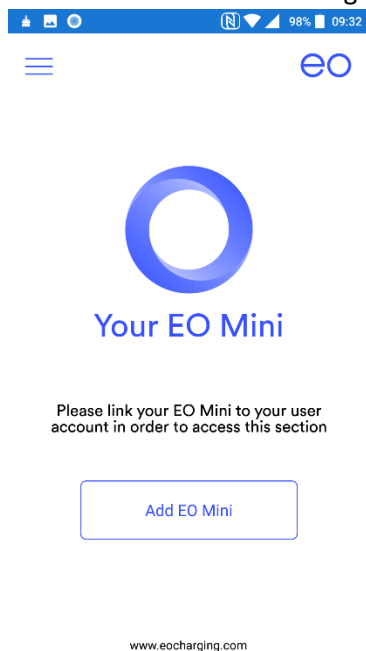


Figure 10 – Installer - First half of the installation is complete

7 Home Owner – Connect the hub to the wifi

- 1) The homeowner needs to log into their version of the app. And create their profile



- 2)



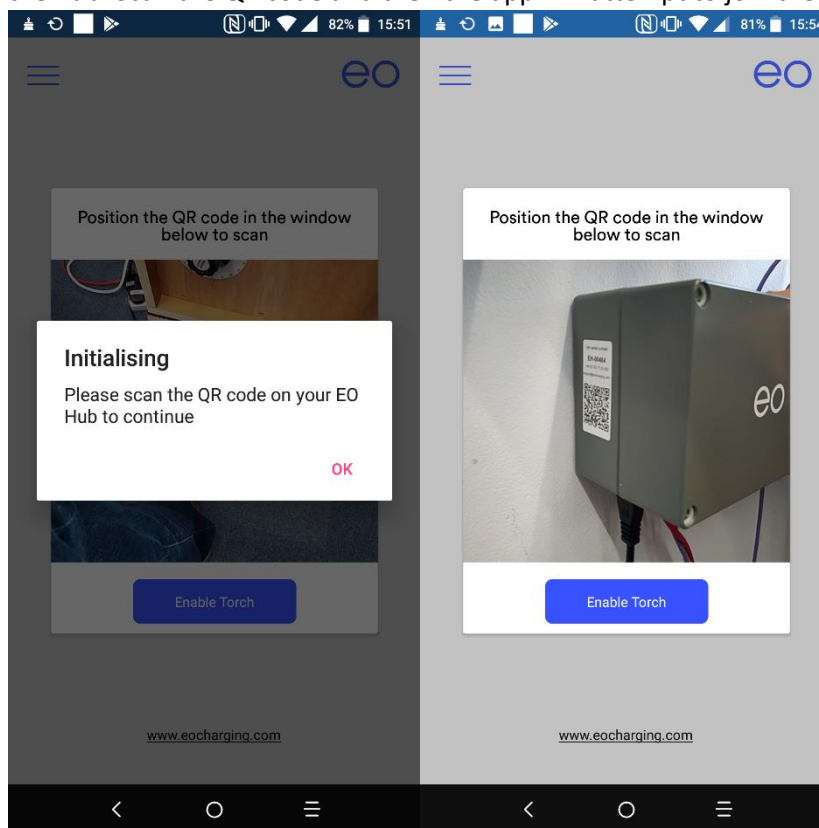
Figure 11 – Home Owner - starting to connect the hub to the wifi

- 3) Enter the site address

A screenshot of a mobile app interface for entering site information. At the top is a status bar with icons for signal, Wi-Fi, battery (98%), and time (09:33). Below the status bar is a blue header with the 'eo' logo on the right. The main content area features a large blue circular logo with a white center. Below the logo, the text 'Home charger set-up' is displayed in blue. Below this text are several text input fields containing the following information: 'Tomo House', 'Tomo Industrial Estate', 'Stowmarket', 'Suffolk', 'IP145AY', and 'UK'. Below the 'UK' field is a blue button with the text 'Submit'. Below the 'Submit' button are two links: 'Back' and 'Skip'. At the bottom of the screen is a black mobile navigation bar with three white icons: a back arrow, a circle, and a hamburger menu.

Figure 12 - Home Owner - Entering the site's address

- 4) Click Start Installation and the app shall ask the installer to scan the QR code on the side of the hub. Scan the QR code and then the app will attempt to join the wifi of the hub.



- 5) The app shall now scan for any available Wifi and ask the Home Owner which Wifi the EO Hub should join

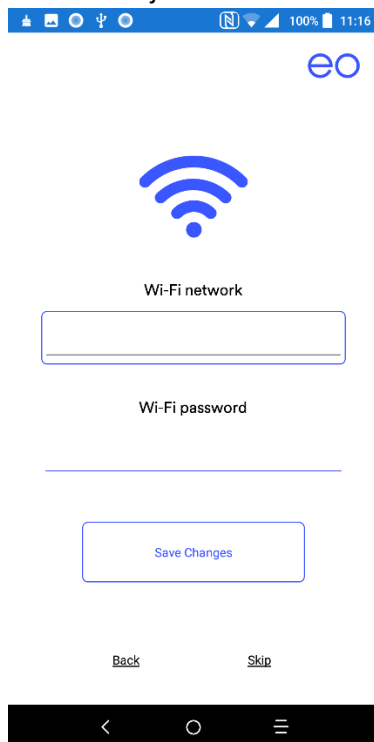


Figure 13 - Home Owner - Enter the wifi details

- 6) The hub shall now join the home owner's wifi and associate the EO Hub and the EO Mini to the Home Owner's account in the EO Cloud. Note that this process can take a few minutes.

7.1 Success

At this point all of the installation is complete and the home owner can use their new EO Smart Home solution.

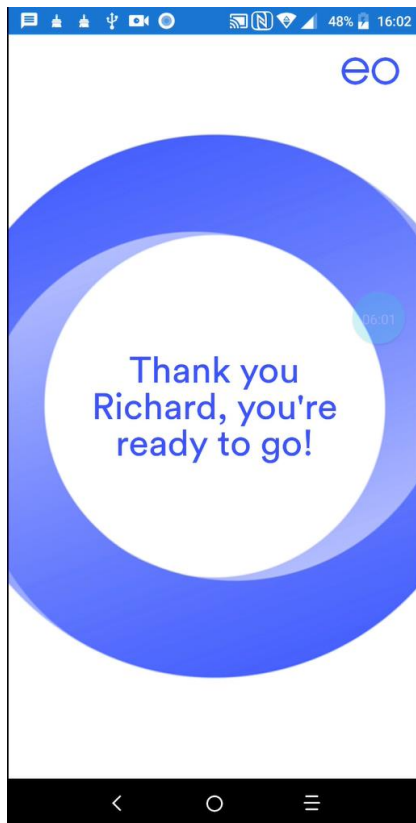


Figure 14 - Another successful installation is completed!

8 Troubleshooting Guide

- Is the WiFi working on the EO Hub?
 - Firstly, check in the app to see if the mini is connected
 - Secondly check to see if the EO Hub WiFi hotspot is emitted – eoHub-12345
- The EO Hub keeps dropping out of WiFi
 - The Signal strength of the WiFi could be too weak to maintain a steady connection
 - An alternative would be to use a hard wired ethernet connection or a wifi extender
- The EO Hub is not re-joining the WiFi
 - It could be that the EO Hub is trying to join the Phone rather than the home WiFi.
 - Turn off the EO Hub
 - Turn on the EO Hub
 - On the phone, wait for the EO Hub WiFi is displayed
 - Select “forget this network” on the phone
 - Reboot the EO Hub and check that it joins the home WiFi
 - Reboot the router

9 Further Technical Support

All EO Charging technical documentation is published in the EO Resource Centre, this is found at:
<https://www.eocharging.com/service-support/>

The EO Support team can be reached at:

- Email: support@eocharging.com
- Phone: +44 (0) 333 77 20383

9.1 Revision History

Version	Date	Change history
1.0	20 th Aug 2019	First draft
1.1 & 1.2	7 th Feb 2020	General updates
1.3	12 th Dec 2019	Added hardwired ethernet, confirmed all CT Clamps are 100A and revised the hub LEDs
1.4	18 th Sept 2020	Updated section 3.2. to state that mini and hub should only be connected together when the power is removed to both the hub and mini.