EO MINI PRO 3

↘ INSTALLATION & COMMISSIONING GUIDE

→ TABLE OF CONTENTS

Important: Read carefully before use. Keep for future reference.

→ 1.0 INTRODUCTION

This document covers the details of the EO Mini Pro 3 product.

+ Product summary.
+ Physical installation.
+ Product data.
+ Device configuration.
+ Advanced features.
+ A detailed description of each of the menu pages.

The documentation in this guide is based around 1.5.0 or later generation firmware.

1.1 PRODUCT SUMMARY

Topic	Mini Pro 3
Audience	Domestic
EO Cloud interface	ev.energy smartphone app
Switch gear	Relays
Metering	Internal
RFID	No
Power	Single Phase – 7.2kW
Load management	Dynamic and solar options available

It is important to note that the information in this document is subject to change without notice as the EO Mini Pro 3 product evolves, please download the latest version from [www.eocharging.com/support.](www.eocharging.com/support)

→ 2.0 QUICK REFERENCE GUIDE

2.1 EO MINI PRO 3 INSTALLATION

1. If you have never installed an EO Mini Pro 3 then please complete the Installer Training on the EO Academy – refer to the training academy link on the support page.
2. Open up the EO Mini Pro 3 and use the drilling template on the back of the installer guide to help mount the base on to the wall.
3. Use the cable template on the installer guide to prepare the input cables (Power and CT clamp connections).
4. Take a photo of the installer label on the inside of the base. This is required for commissioning (step 9 below).
5. Connect the power cables to the EO Mini Pro 3 (Remember to use the supplied cable restraint and stepped grommet to ensure ingress protection).
6. Connect the comms cable from the back of the EO Mini Pro 3 to the front of the EO Mini Pro 3, close the EO Mini Pro 3 (put the rubber washers on the hex bolts) and attach the fascia (insert top first).
7. Power up the EO Mini Pro 3.
8. When the LED has changed from white to blue (which can take 2 min) then join the wifi hotspot e.g. eo-01234567890 (refer to the photo taken in point 4 for login credentials).
9. Go to https://10.10.10.1 on a web browser and click through security warnings. Login with username “Installer” and the password from the photo in step 4. Then set the following as a minimum:

    A. **Smart Charging** – If you want to perform safety tests then you may want to disable the default profiles and random delay. Remember to re-enable them before handing over to the customer as per UK Smart Charging Regs.

    B. **Network** – Check the APN details for GSM enabled units (if required).

    C. **Installer** – Timezone, max current, contact details, tamper (bump=2, tilt=10) and CT clamps (if load management is required).

    D. **Load** – load management & Solar settings (if required).

    E. **CSMS URL** – This **must** be replaced to point the charger to ev.energy. Replace CSMS URL with:

    + wss://ocpp.ev.energy:443

10. Log out and the unit is ready to hand over to the customer. Also hand over the customer card as they will need this for final setup.

2.2 LEDS

LED Colour	State
White	Bootup
Flashing blue	Ready
Flashing green	Car plugged in but not charging
Green	Charging
Yellow	Paused
Cyan	Random delay
Flashing blue/green	Firmware is updating
Flashing red/green	Tamper has been activated
Red	Error state

2.3 SIMPLE OPERATION

In order to use the charging station:

+ Ensure that the charging station is powered up.
+ Plug the cable into the vehicle.
+ Plug the other end of the charging cable into the vehicle. The vehicle will start to charge immediately or as per the schedule on the CSMS or app.

→ 3.0 PREPARATION FOR INSTALLATION

3.1 EQUIPMENT

Ensure that the appropriate tools are used to mount the charging stations along with the appropriate power cables, MCB and RCDs.

3.2 NETWORK (LAN) CONNECTIVITY

When using a hard-wired connection to a LAN, make sure a working connection to the client's network is available prior to installation or the charging stations will fail to connect to the CSMS (charging station management system). When connecting to the CSMS please ensure that ports 80 and 443 are open.

3.3 WI-FI CONNECTIVITY

If the EO Mini Pro 3 is to use Wi-Fi for its internet connection to a back-office platform, before fitting the device in place, it is recommended that the strength and integrity of the Wi-Fi signal is checked. If a weak Wi-Fi signal is present, then there is a chance that the installation of the EO charging station may fail. To check that the Wi-Fi signal is strong enough please complete the following steps:

1. Ensure that a 2.4GHz wifi network is available.
2. Utilise a suitable Wi-Fi analyser mobile device app to verify signal stability, strength, and interference levels.
3. Using a mobile device connect to the premises' Wi-Fi router (if the customer grants permission).
4. Measure the data rate and signal noise. The data rate should be greater than 5mbs and using an appropriate mobile app, measure the signal noise [RSSI] value which should be less than-67dBm.

If the Wi-Fi is not suitable, a couple of options exist:

1. Install a 2.4gHz Wi-Fi booster.
2. Use the hard-wired ethernet option.
3. Request a charger with the 4G GSM internal modem assuming that a suitably strong GSM signal strength is available.

→ 4.0 INSTALLATION INSTRUCTIONS FOR THE EO MINI PRO 3

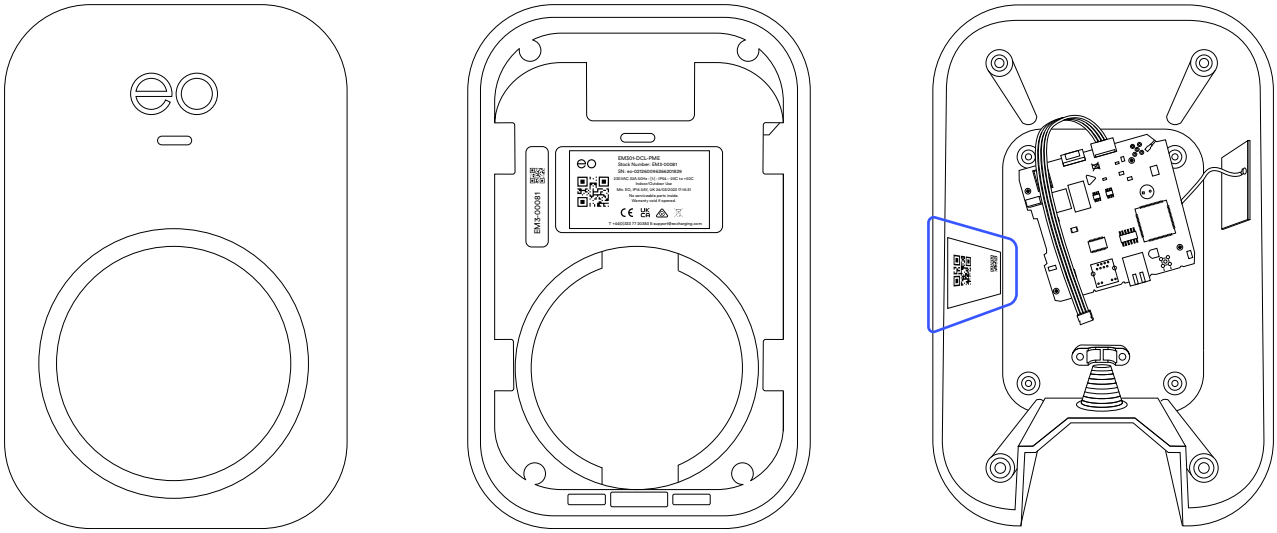
4.1 PHYSICAL INSTALLATION INSTRUCTIONS

1. Remove the EO Mini Pro 3 from the packaging.

   The fascia will be the final component to fit and it's here you will find the "Installer Access Label".

   The centre section contains the charger socket and main electrical components.

   The rear housing contains the Wi-Fi and where applicable the GSM PCB.



1. 2. 3.

Figure 1: Box contents.

1. EO Mini Pro 3 front fascia.
2. Main section.
3. Rear housing, Wi-Fi PCB and "Installer Access Label".

2. Take a photo of the Installer Label on the base as this contains the login credentials that are needed for the software configuration of the Mini Pro 3.

3. After you have verified the stability of the Wi-Fi, and found a suitable mounting location, offer the quick installer guide to the installation location; make sure the surface is flat and level.

   Level the drilling template in the correct position and drill through the template to accurately position the mounting holes for the Mini Pro 3.

Note: if the product is installed onto any conductive surface or building element, the installer must ensure connection of protective earth to that surface or element.

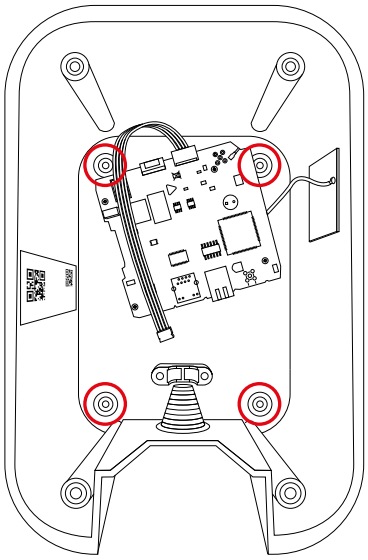


Figure 2: EO Mini Pro 3 backplate.

4. Attach the EO Mini Pro 3 base to the wall using the four screws provided. Ensure the charger is secure and flush against the wall. Use packing washers if necessary for a flush fit.

5. Strip and prepare the power cable and feed into the pre-made hole and stepped grommet. Use the supplied cable restraint or alternatively a 25mm gland can be used (not supplied).

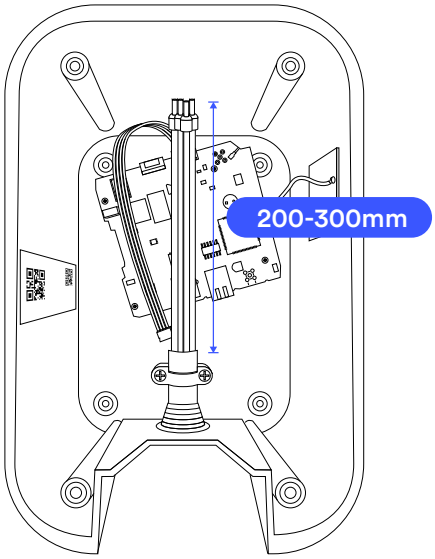


Figure 3: Stripped power cable and entry point.

6. Connect the Live, Neutral, and Earth wires to the charger connector block accordingly.

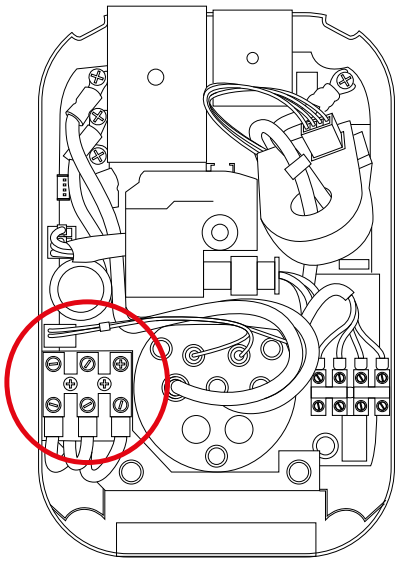


Figure 4: Connector block.

7. If using Ethernet as a means of connecting to the client router or CT clamps need to be fed into the Mini Pro 3, then the second aperture can be drilled out and a suitable gland fitted.

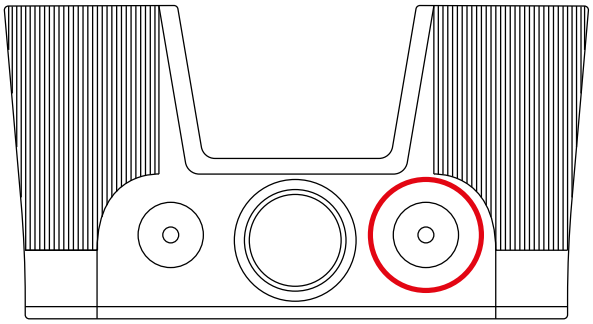


Figure 5: Ethernet cable entry point.

8. The rear charger housing allows for one rear cable entry using the position as shown on the image.

DO NOT drill into any other area of the housings as doing so will Invalidate the product warranty and could damage the rear internal PCB.

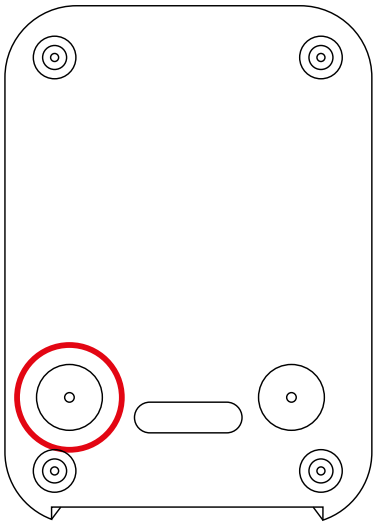


Figure 6: Rear view - cable entry point.

NOTE: Use an appropriate stuffing gland and tighten as per the manufacturer's instructions. Additionally ensure that the hole in the base of the unit is blocked using the 25mm stepped bung. Note the stuffing gland is not included in the standard fitting kit

9. If using Ethernet, connect it to the RJ45 female connector located on the Mini Pro 3 circuit board.

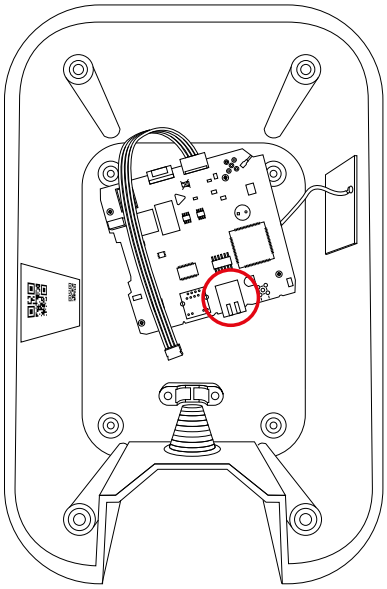


Figure 7: RJ45 female connector location.

4.2 SELECTION OF OPERATING MODE AND CT CLAMP LOCATIONS

If power management or solar modes are required, please follow section 4.2 to determine operating mode setting and the CT clamp locations required to support it.

4.2.1 INTRODUCTION

This document details the power management and solar functionality that is available on the Mini Pro 3. It consists of:

+ Description of the power management and solar modes
+ Hardware configuration
+ Software configuration
+ Advice for support

Solar operation is a sub function of the overall load management functionality of the Mini Pro 3.

To implement power management or solar mode, a number of steps should be followed during install:

1. Choose which mode is desired.
2. Determine where to put the CT clamp or clamps, and wire them up to the charger.
3. Select the solar mode and CT clamps in the charger configuration.

4.2.1.1 PRE REQUISITES

+ Mini Pro 3
+ 1.5.0 or later generation firmware
+ Latest version of the ev.energy app

4.2.2 POWER MANAGEMENT AND SOLAR MODES

The Mini Pro 3 offers the following power management and solar modes which will dictate the placement of the CT clamp (1.4.5 or later generation firmware):

1. **STATIC** mode
   + No Load management, the charger will offer charge at its maximum capacity of 32 Amps.
2. **DYNAMIC** mode
   + The charger will offer charge at its maximum capacity of 32 Amps, but this charge rate is then de-rated as the site's power consumption reaches the site limit with margin.

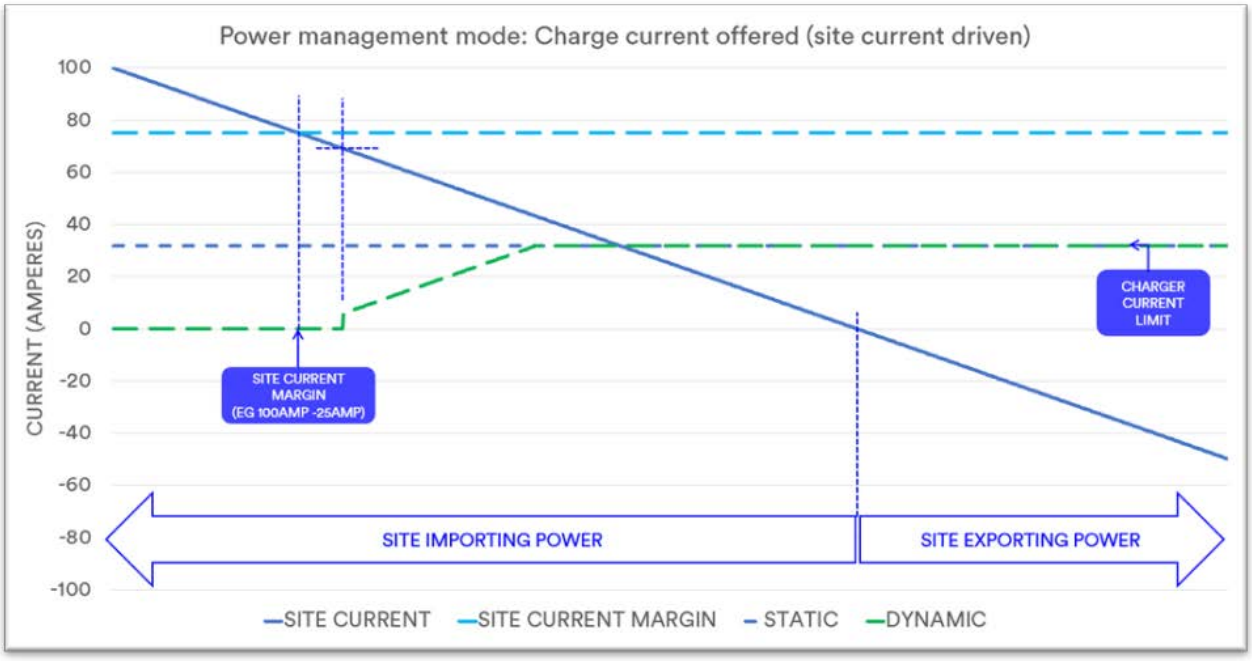


Figure 8: Power Management Mode: Charge current offered (site current driven) graph.

3. SITE EXPORT mode

In SITE EXPORT mode the CT clamp is put on the output of the site meter and configured as Site. Charge is offered at the MINIMUM CHARGE AMOUNT once the EXPORT THRESHOLD is exceeded, and then tracks the export current when this exceeds the MINIMUM CHARGE AMOUNT, up to the charger limit of 32 Amps.

We illustrate two typical usages of the SITE EXPORT mode:

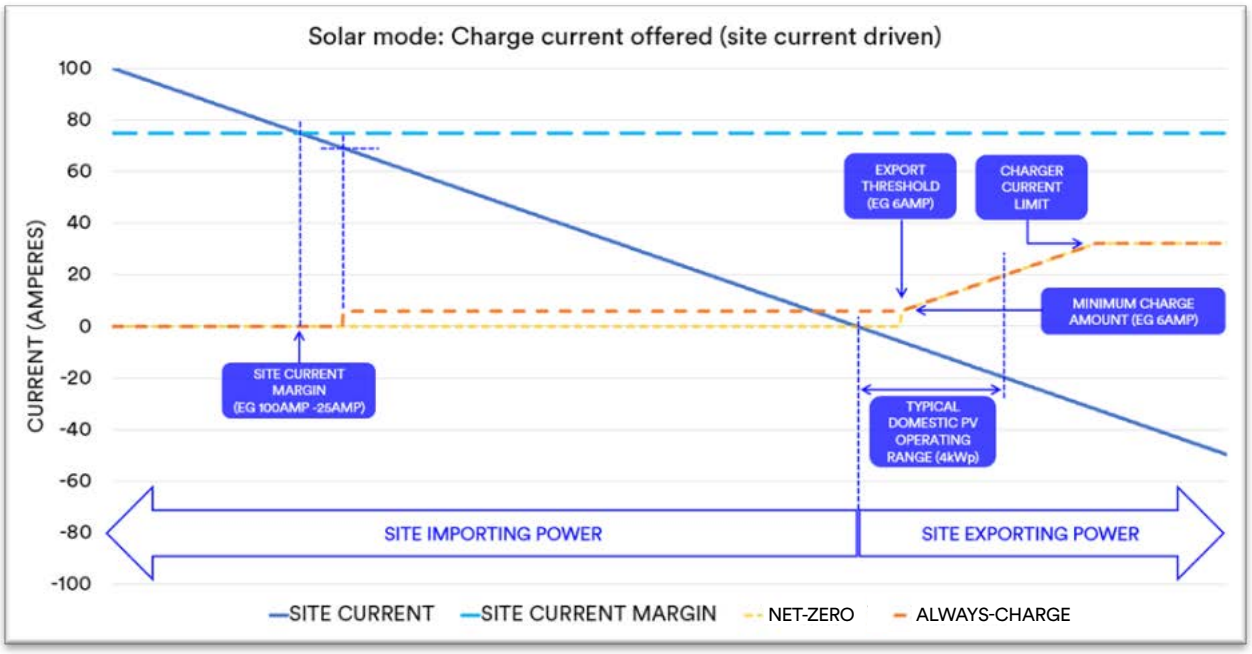


Figure 9: Solar mode: Charge current offered (site current driven) graph.

3.1. SITE EXPORT mode: NET-ZERO

If the EXPORT THRESHOLD is set to 6 Amps and MINIMUM CHARGE AMOUNT is set to 6 Amps, then the vehicle will start to charge at 6 Amps when the site is exporting more than 6 Amps, and then track the export current upwards from there, subject to the charger limit of 32 Amps.

This mode is also known at NETZERO mode, as it allows the system to minimise and/or control the amount of power imported from the grid for charging. Effectively this mode provides vehicle charging at minimised cost.

3.2. SITE EXPORT mode: ALWAYS-CHARGE

It is also possible to disable the EXPORT THRESHOLD in the charger configuration, with the result that the charger will always be able to offer at least a minimum charge rate of MINIMUM CHARGE AMOUNT, and then track the export current upwards from there, subject to site current limit and margin.

4. **SOURCE EXPORT** mode

In SOURCE EXPORT mode the CT clamp is put on the output of the solar inverter and configured as SOURCE. Charge is offered at the MINIMUM CHARGE AMOUNT once the EXPORT THRESHOLD is exceeded, and then tracks the export current when this exceeds the MINIMUM CHARGE AMOUNT, up to the charger limit of 32 Amps.

For example, if the EXPORT THRESHOLD is set to 6 Amps and MINIMUM CHARGE AMOUNT is set to 6 Amps, then the vehicle will start to charge at 6 Amps when the solar inverter is generating more than 6 Amps, and then track the generation current upwards from there, subject to the charger limit of 32 Amps.

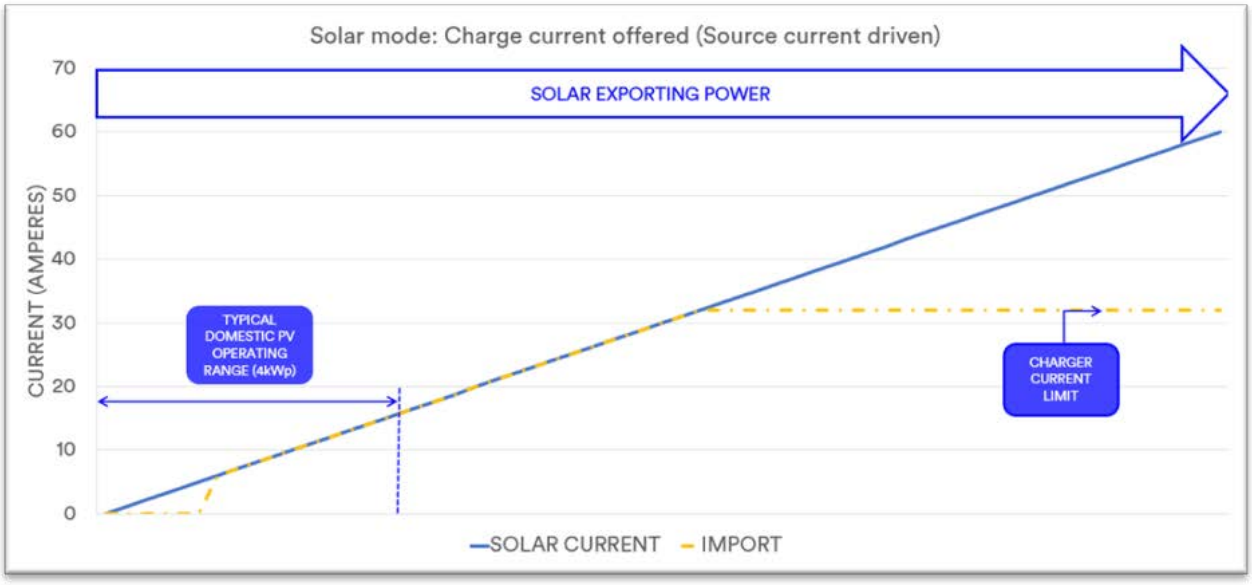


Figure 10: Solar mode: Charge current offered (Source current driven) graph.

Export mode configuration options

	Net Zero Mode	Always-charge Mode	Source Export
Export Threshold	6Amps	0Amps	6Amps
Minimum Charger Threshold	6Amps	6Amps	6Amps

4.2.3 APPLICABLE CT CLAMP LOCATIONS AND OPERATING MODE CONFIGURATIONS

The following CT clamp locations are applicable dependant on mode of operation required:

1. NC (Not connected) No CT clamp is fitted.
2. SITE The CT clamp is fitted at the output of the site meter.
3. SOURCE The CT clamp is fitted at the output of the solar inverter.

The installer should select which operating mode is required by the user, and use this to determine appropriate locations for the CT clamp/s.

Configurations highlighted in green represent preferred selections.

The selection will subsequently used by the installer to configure the charger.

	CT1	CT2	Load managment (Baseline)	Load Balancing profile enabled	Profiles Load Management (Schedule)	Operation
Baseline mode with no scheduling	NC	NC	STATIC	False	Not applicable	No Load management
						Load management at the site import limit
	SITE		DYNAMIC			**Net zero operation** Charges at or above the minimum charge amount once the export threshold is exceeded.
			EXPORT			
	SOURCE		EXPORT			**Solar matching operation** Charges at the power output of the invertor.
Combination Scheduling	SITE	NC	DYNAMIC	True	EXPORT	**Net zero operation** 1- Enables load management when in full power schedule. 2- Enables load management when in solar schedule and charges at or above the minimum charge amount once the export threshold is exceeded.
		SOURCE			EXPORT	Enables installer/home owner to view solar generation. Primary load control uses CT1

The charger will normally operate in the mode selected under LOAD MANAGEMENT.

If the charger is to be configured to allow the user to select profiles, the system will:

+ Operate in the mode selected under LOAD MANAGEMENT during full power schedule.
+ Operate in the mode selected under PROFILE LOAD MANAGEMENT during a solar schedule.

4.3 CT CLAMP LOCATING AND FITTING

The supplied CT clamps will have a dual core cable attached to them with red and white wire cores. The cable also has a shield, which should be grounded.

The CT for **load management** and **solar mode operation** should be connected to CT1.
Connect the Red wire to position A and the white wire to position B.
For the **advanced solar operation mode** with two CT Clamps, connect the second CT clamp to CT2, with the red wire to position A and white wire to position B.

Configuration and operation of the solar modes is discussed in Solar Modes.
The **majority** of installations will utilise a **single** CT clamp.

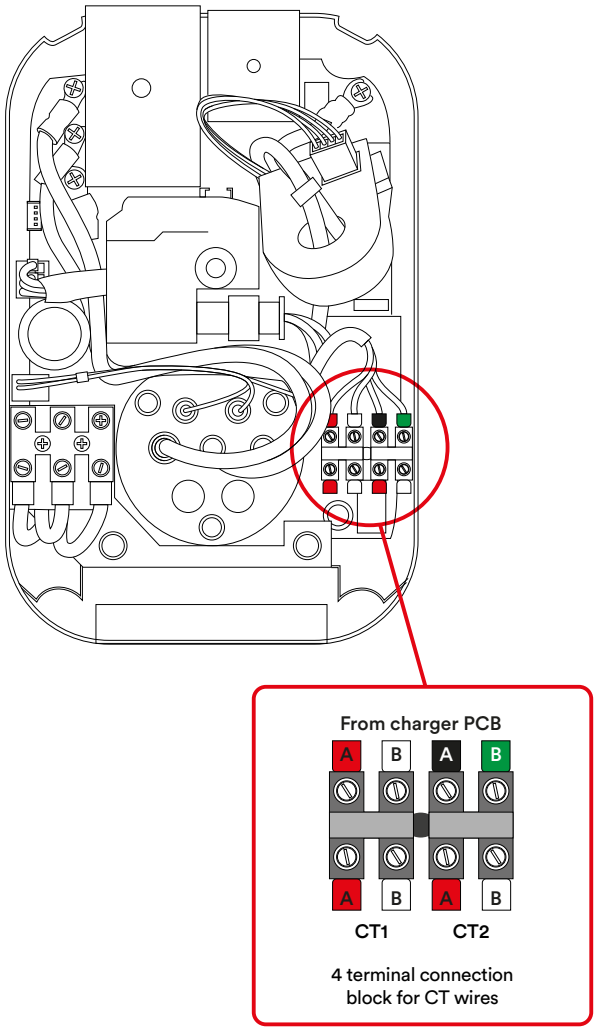


Figure 11: 4 terminal connection block.

4.3.1 CT CLAMP CONNECTIONS

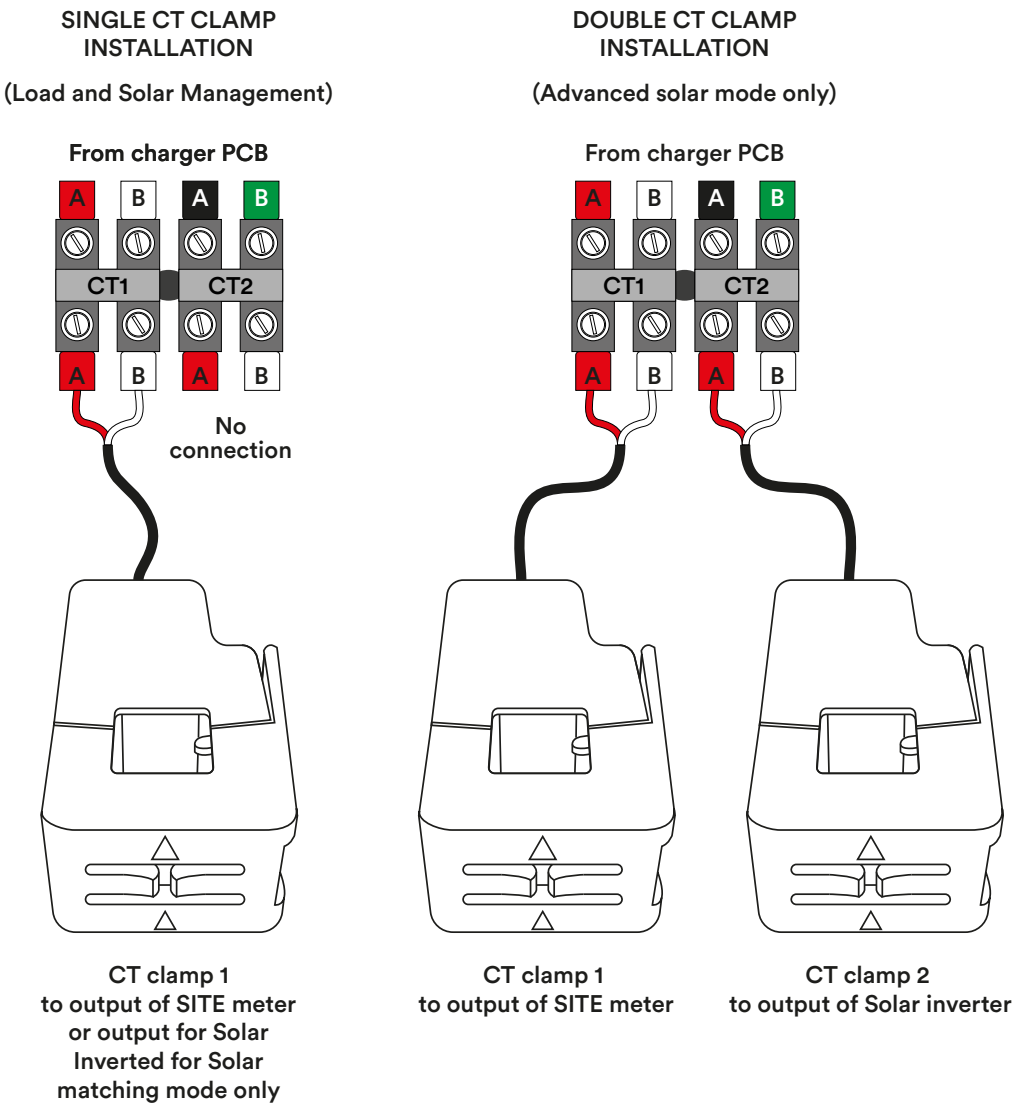


Figure 12: Single and Double CT clamp installations

4.3.2 CT CLAMP LOCATIONS AND ORIENTATION

The clamps have an arrow which should be orientated with the current flow, which is the flow from the supply.

The orientation of the CT clamps can be verified in the info page of the Charger Web Interface by observing the current readings, see section Hardware Configuration.

The location of the CT clamps will be determined by the selected mode of operation:

4.3.2.1 LOAD MANAGEMENT AND SITE EXPORT SOLAR MODE OPERATION:

CT clamp 1 should be fitted at live output of the SITE METER, pointing away from the meter.

This configuration will cover the majority of installations.

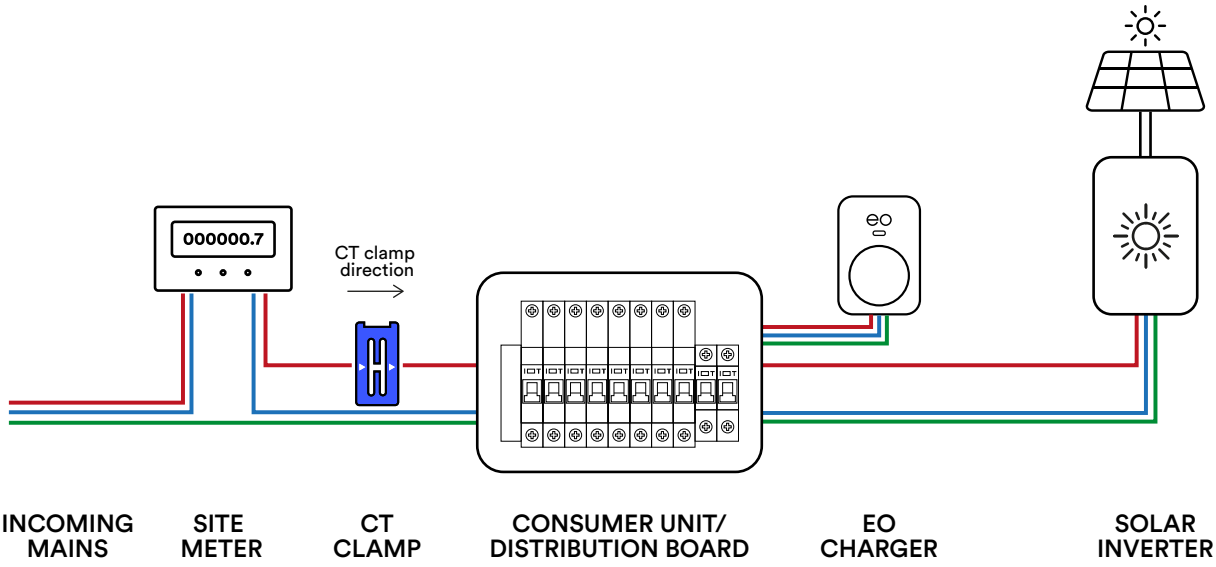


Figure 13: CT location for Load Management and Site export

4.3.2.2 SOURCE EXPORT SOLAR MATCHING MODE:

CT clamp 1 should be fitted at the live output of the SOLAR INVERTER, pointing away from the inverter.

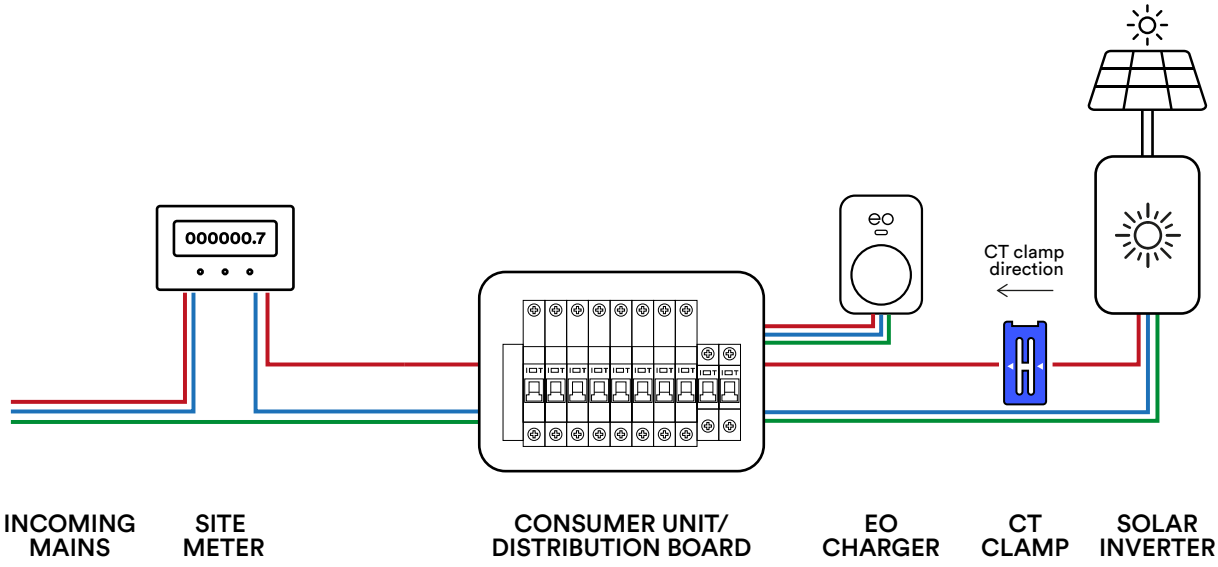


Figure 14: CT location for source export solar matching mode.

4.3.2.3 ADVANCED SOLAR MODE ONLY:

CT clamp 1 should be fitted at live output of the SITE METER, pointing away from the meter.

CT clamp 2 should be fitted at the live output of the SOLAR INVERTER, pointing away from the inverter.

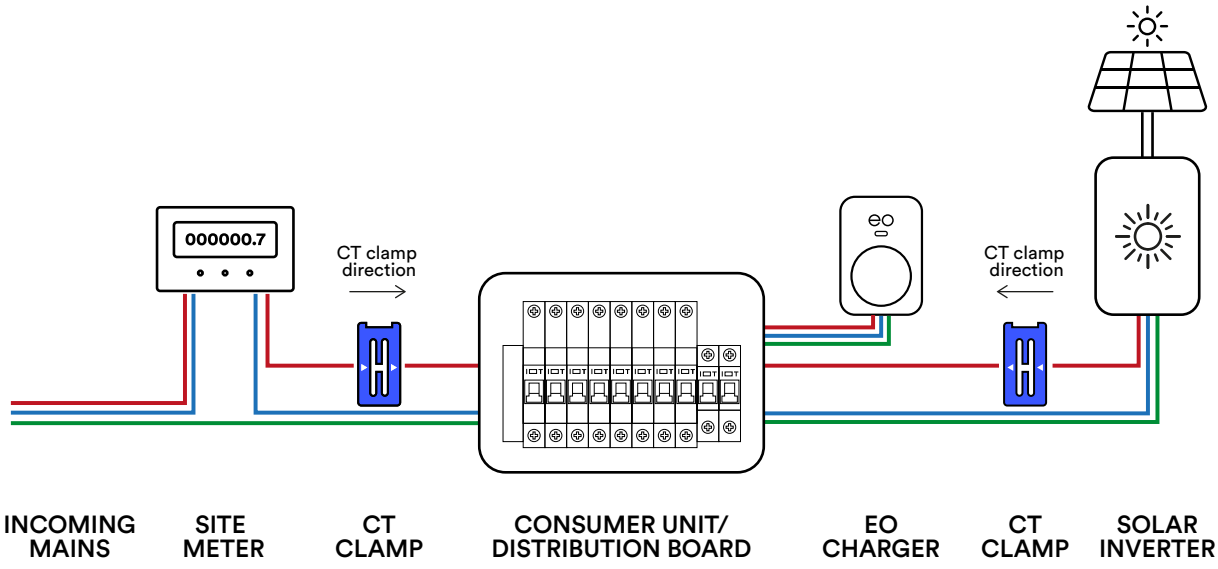


Figure 15: CT location for advanced solar mode only.

4.3.2.4 CHARGING STATION CONFIGURATION

In order for the various solar modes to operate it is important that the charging station is configured correctly. There are three main configuration items on the charging station:

1. Configuration of the CT Clamps
2. Choosing what permanent mode the charging station should be in
3. Whether to enable solar schedules or not

Please refer to section 5.9 for detailed instructions on configuring the charger for CT clamps and power/solar management modes.

4.4 COMPLETING PHYSICAL INSTALLATION

11. Before closing the charger case, make sure the PCB tethering lead is plugged in and connects both front and rear PCB boards together.

Make sure the lead is connected in the right-hand female connector of the rear case, as seen in the image.

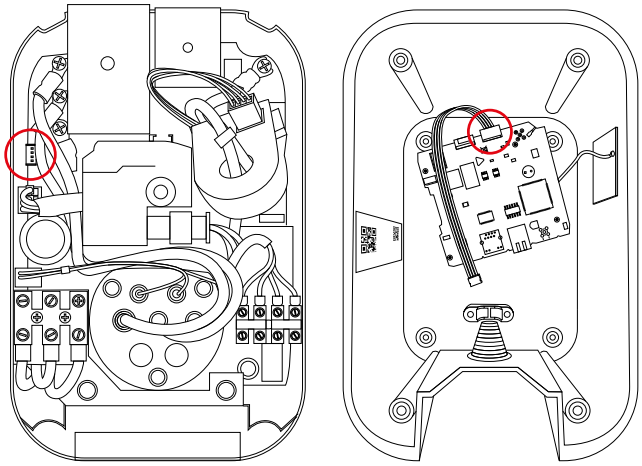


Figure 16: PCB connectors - front to rear case.

12. With all cables securely connected, close the Mini Pro 3 cases together, making sure all internal cabling is not trapped and secure the housings together with the four hex bolts and washers.

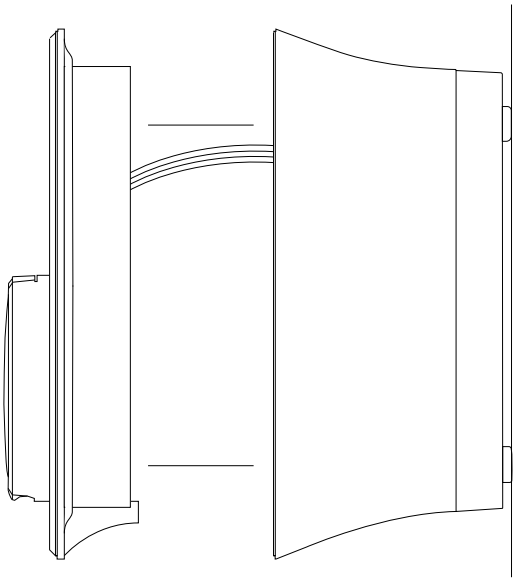


Figure 17: PCB connectors - front to rear case.

13. Attaching the fascia to the EO Mini Pro 3 should be carried out after all testing is complete.

Figure 18: EO Mini Pro 3.

4.5 CABLE HOLSTER INSTALLATION

The EO Mini Pro 3 holster is used to securely hold your EV connector when not in use. You can install the holster wherever it is convenient, be sure not to place the charging cable under any tension when in place.

1. For a secure mounting, place the holster on any vertical solid wall and mark the four screw holes.

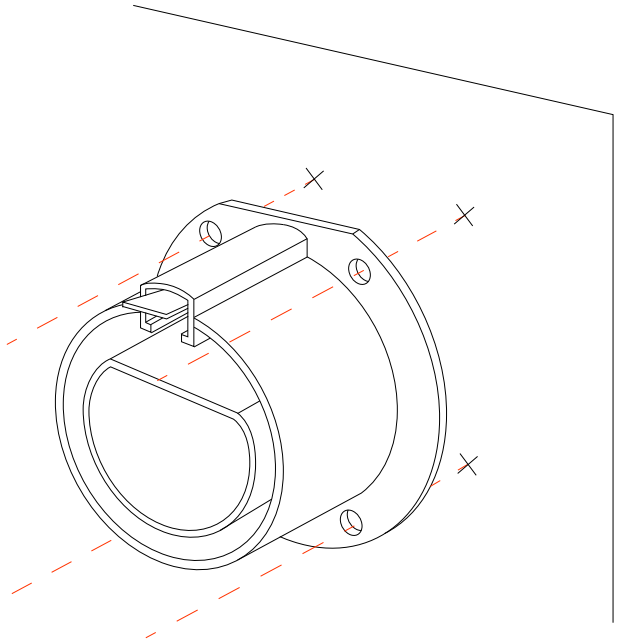


Figure 19: Mark Screw holes.

2. Drill the four holes where marked with an appropriately sized drill bit, and securely fasten the holster with the four screws provided in the holster fittings kit.

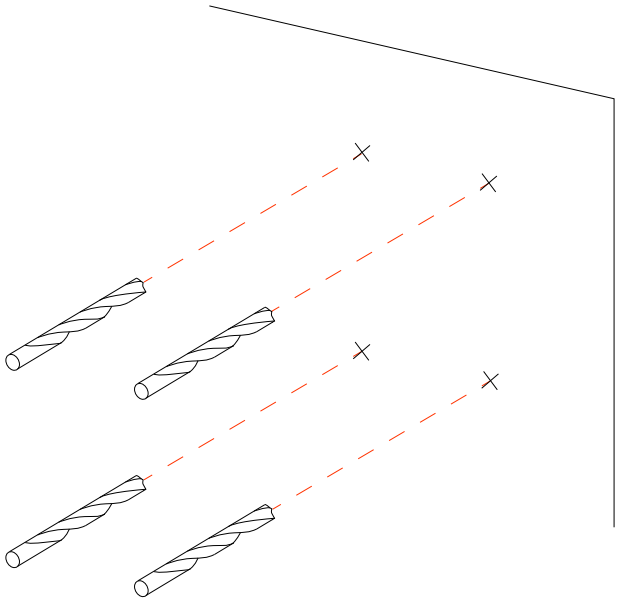


Figure 20: Drill marked drill holes

3. You may now drape your charging cable around your charger and place your EV connector into the holster.

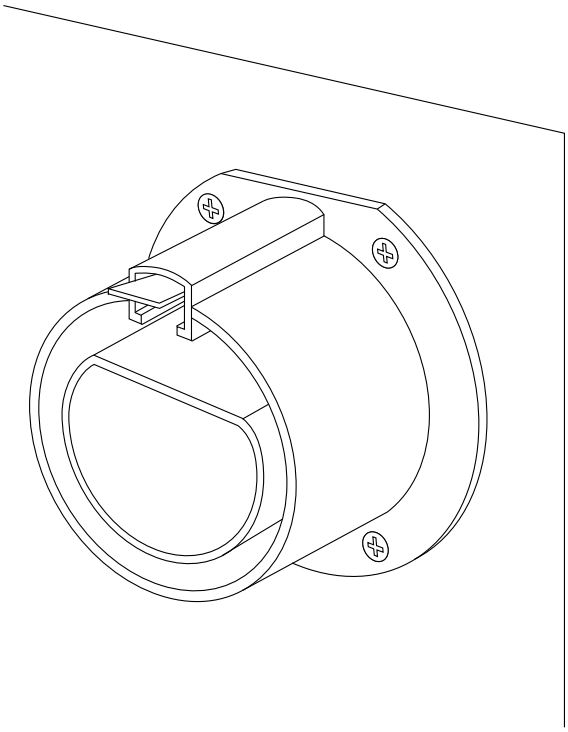


Figure 21: Holster Installed

4.6 TN/IT WIRING CONNECTIONS

It is possible to configure the EO Mini Pro 3 to connect to either TN or IT grid types which are shown in the following section.

Wiring system	Power connections on EO Mini Pro 3		
	PE	N	L1
TN/TT (230V)	PE	N	L1
IT (230V)	PE	L1	L2

PE = Protective Earth
N = Neutral
L1 = Line/Phase 1
L2 = Line/Phase 2

The phase rotation and grid selection (IT/TN) should be set as per the configuration options in the installer page

The EO Mini Pro 3 is now physically installed and the software commissioning of the charger can now begin.

4.7 MAINTENANCE

The EO Mini Pro 3 should be maintained periodically. Maintenance should include physical cleaning of the unit and the pins of the socket/plug. Additionally, the RCD/MCB should be tested as per the manufacturer's instructions.

→ 5.0 DETAILED DESCRIPTION OF WEB INTERFACE

The following section provides a detailed view of the web interface of the EO Mini Pro 3.

5.1 INFO PAGE

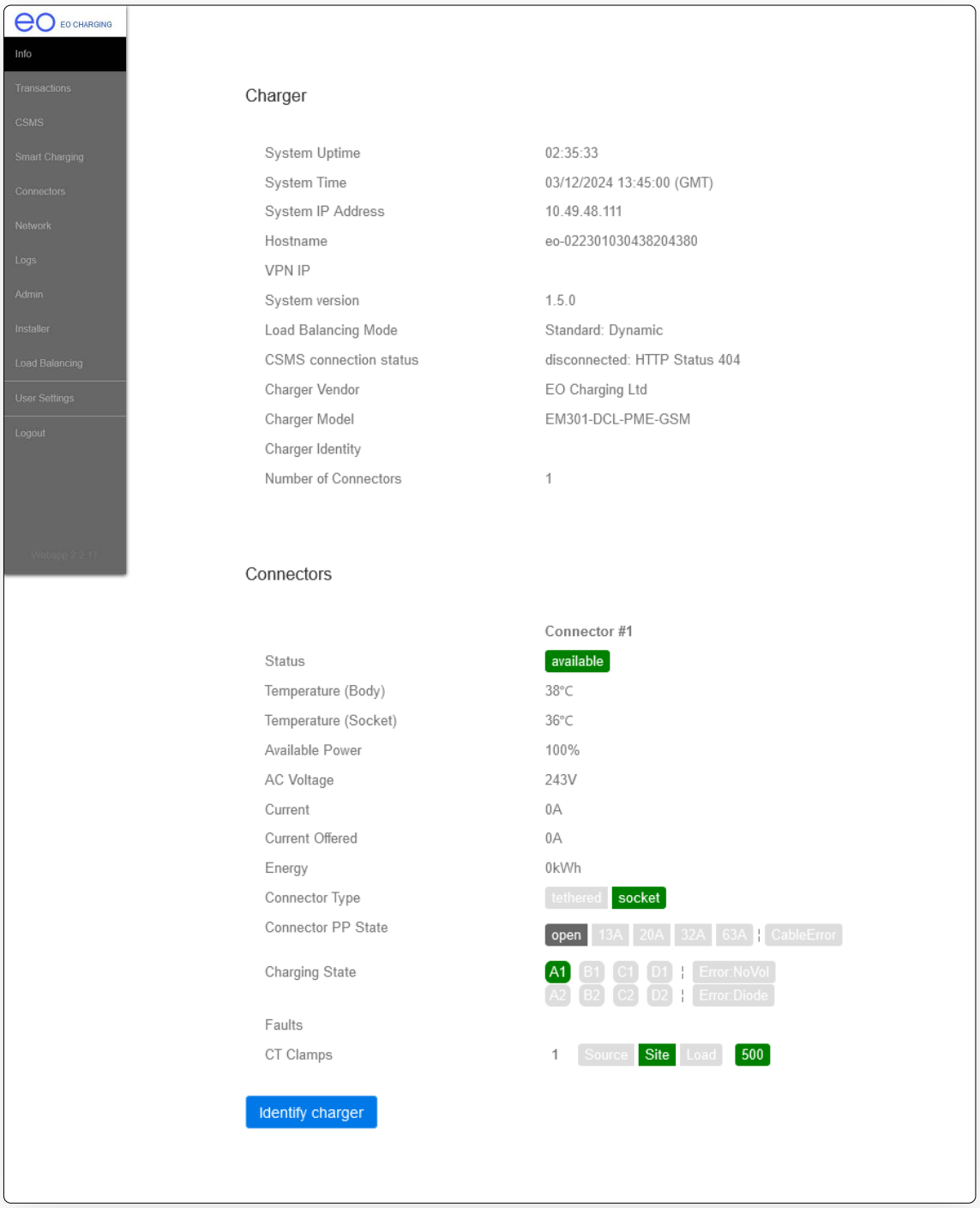


Figure 22: System information page.

This is a very useful page as it displays some important information to determine if the charging station is working as expected. This includes:

+ CSMS Connection State – is the charging station able to make a connection to the OCPP server.
+ Status – OCPP status of the charging station.
+ Current and current offered – how much current is being offered to the vehicle and how much current is being drawn by the vehicle.
+ Faults.
+ CT Clamps.
+ If CT Clamps are enabled then this will show a +VE or -VE value in mA.
    + +ve value = current import e.g. current is flowing from the grid into the house.
    + -ve value = current export e.g. current is flowing from the house into the grid.
+ In 1.4.5 there is a new button called identify that when pressed, it will flash the LED of the charging station.

5.2 TRANSACTIONS

The transactions screen is broken down into two halves.

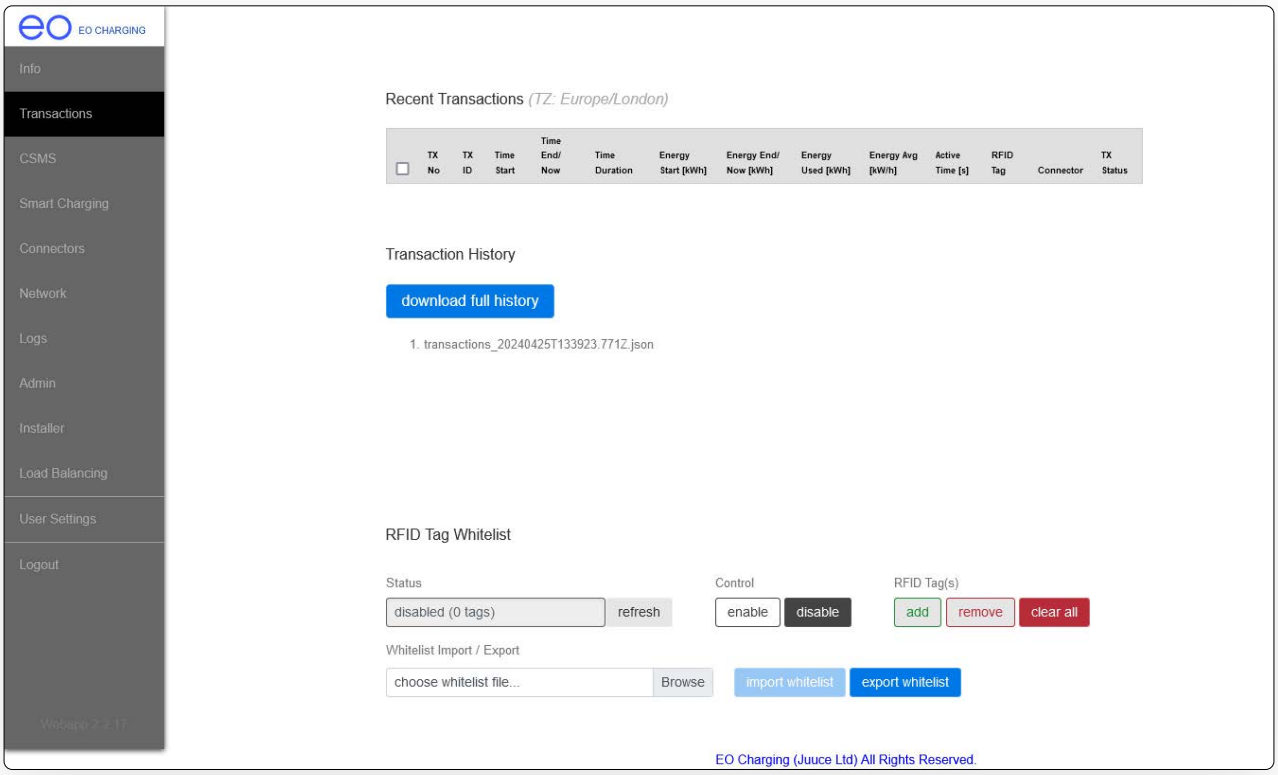


Figure 23: Transactions page. RFID only applicable to the EO Genius 2.

1. Transaction history.
    a. Here it is possible to see historic charging sessions and how much energy was drawn and for how long during the session.
2. RFID - Only applicable to EO Genius 2

5.3 CSMS

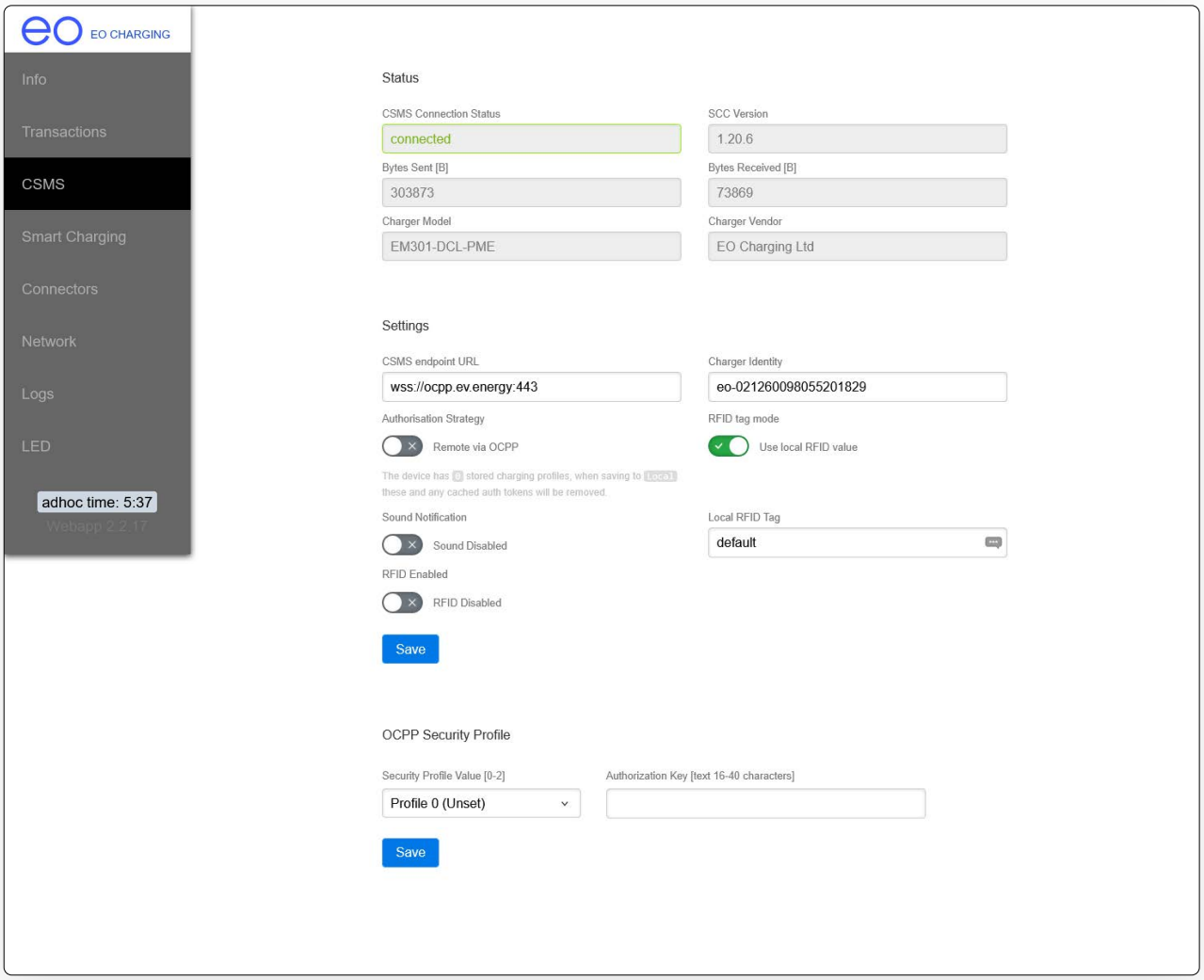


Figure 24: CSMS page.

By default the charging station is configured to connect to the EO Cloud. **This must be changed by the installer to point to ev.energy**, the following fields should be modified:

+ Authorisation Strategy – Local or Remote by OCPP server.
+ Default ID Tag mode– requires authorisation by the cloud before starting.
+ Default ID Tag – value sent up in Start Transaction message.
+ CSMS URL – This **must** be replaced to point the charger to ev.energy. Replace CSMS URL with:
    + wss://ocpp.ev.energy:443
+ Charger Identity – the OCPP ID required by the server.

5.3.1 RFID OPERATION

There are various options available for RFID which are only applicable to the EO Genius 2.

5.4 SMART CHARGING PROFILES

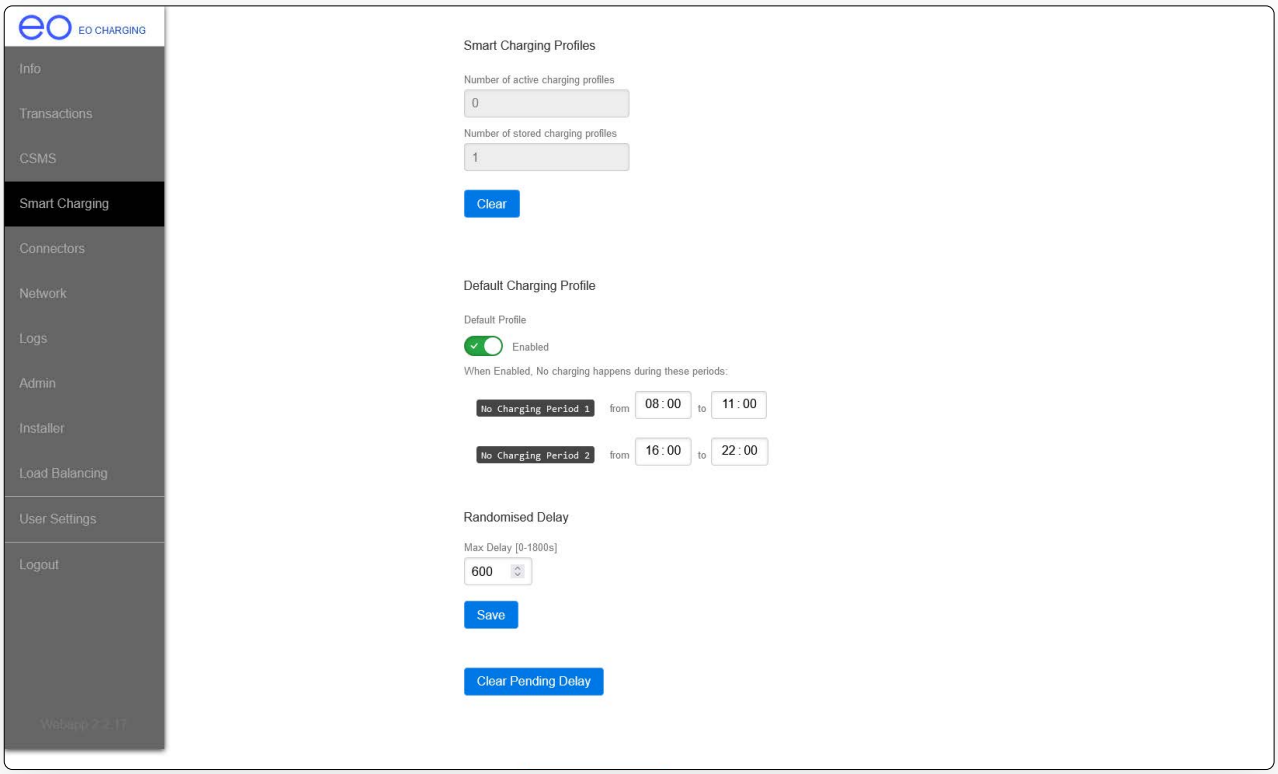


Figure 25: Smart charging page.

By default, the charging station is programmed with a default charging schedule and a random delay in accordance with the UK Smart Charging Regulations. It is important the units are handed over to the customer with both of these features enabled.

The profiles defined are OCPP Smart Charging Profiles and so can be overridden by the OCPP Server.

There is a new button on the Smart Charging web page called “Clear pending delay”. The sequence is:

+ User plugs in
+ Random delays starts and vehicle doesn’t charge
+ User presses the clear pending delay button
+ Vehicle starts to charge

5.5 CONNECTORS

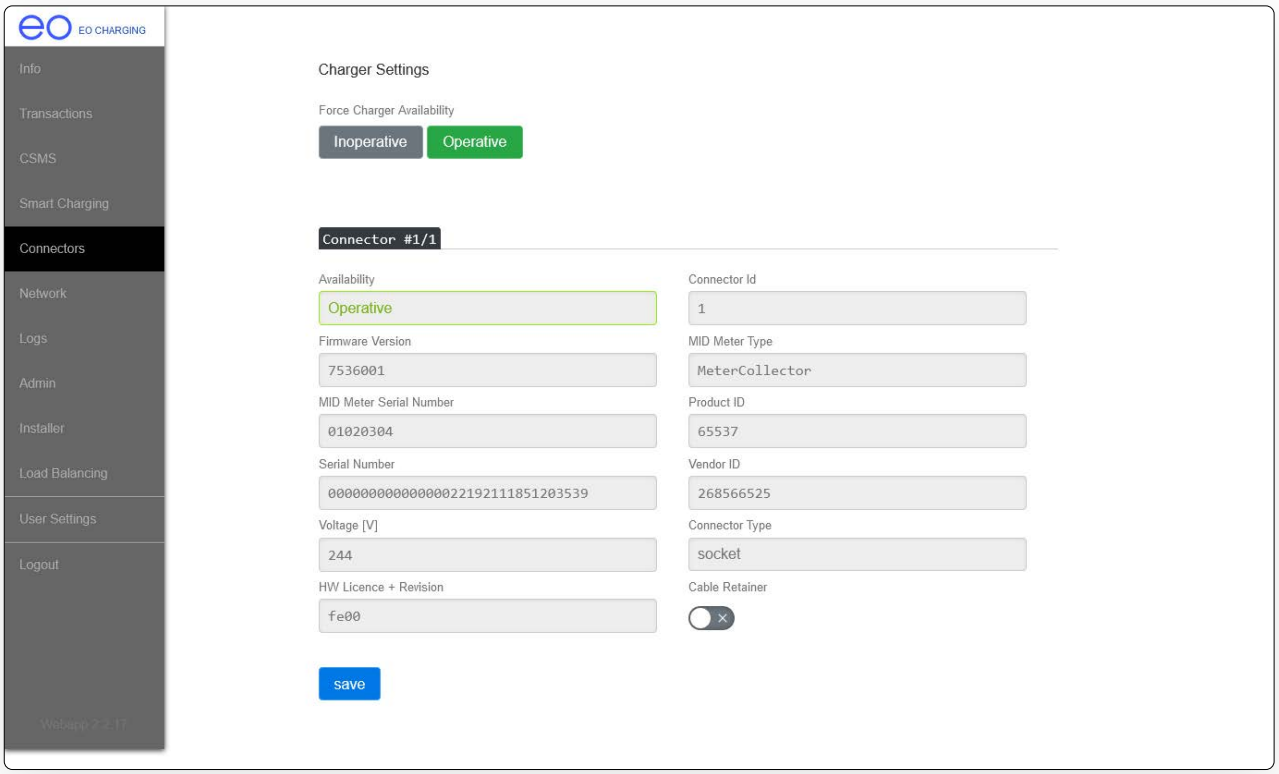


Figure 26: Connectors page.

The page contains detailed information about the firmware and configuration of the charging station. The only installer and customer actionable item is to change the OCPP. Available status of the charger:

+ Available
+ Unavailable

There is a new feature in 1.5.0 called cable retainer. It is possible to lock a charging cable inside the locking socket of the socketed charger.

+ Enabled - cable is locked inside the charging station i.e. acts like a tethered charger
+ Disabled - operates as a normal socketed charging station

5.6 NETWORK

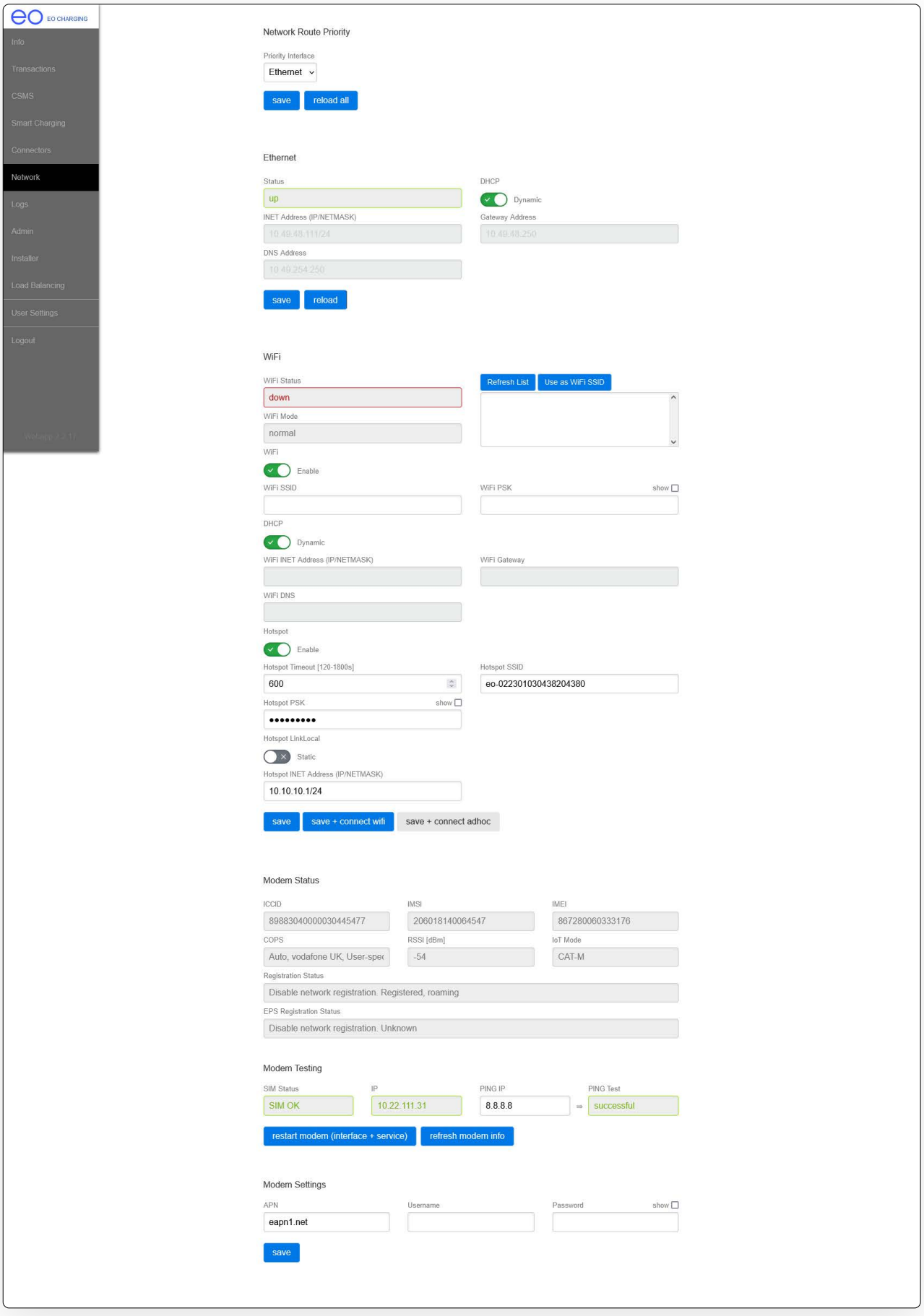


Figure 27: Network page.

This page contains three primary sections:

+ Ethernet
+ Wi-Fi
+ GSM

5.6.1 ETHERNET

Figure 28: Ethernet settings.

By default the ethernet port is enabled and set up for dynamic DHCP. If a static IP address is required then the DHCP switch should be set to Static and then IP address details should be entered.

5.6.2 WI-FI + ADHOC

The Wi-Fi device on the charging station operates in two modes:

+ Adhoc – configuration settings for the Wi-Fi hotspot. DO NOT modify these settings as it can cause the unit to power up without a Wi-Fi hotspot. If this happens then the only recovery route is to connect the charging station to a router using an ethernet cable.
+ Wi-Fi – the settings used to join the charging station to a local Wi-Fi network.

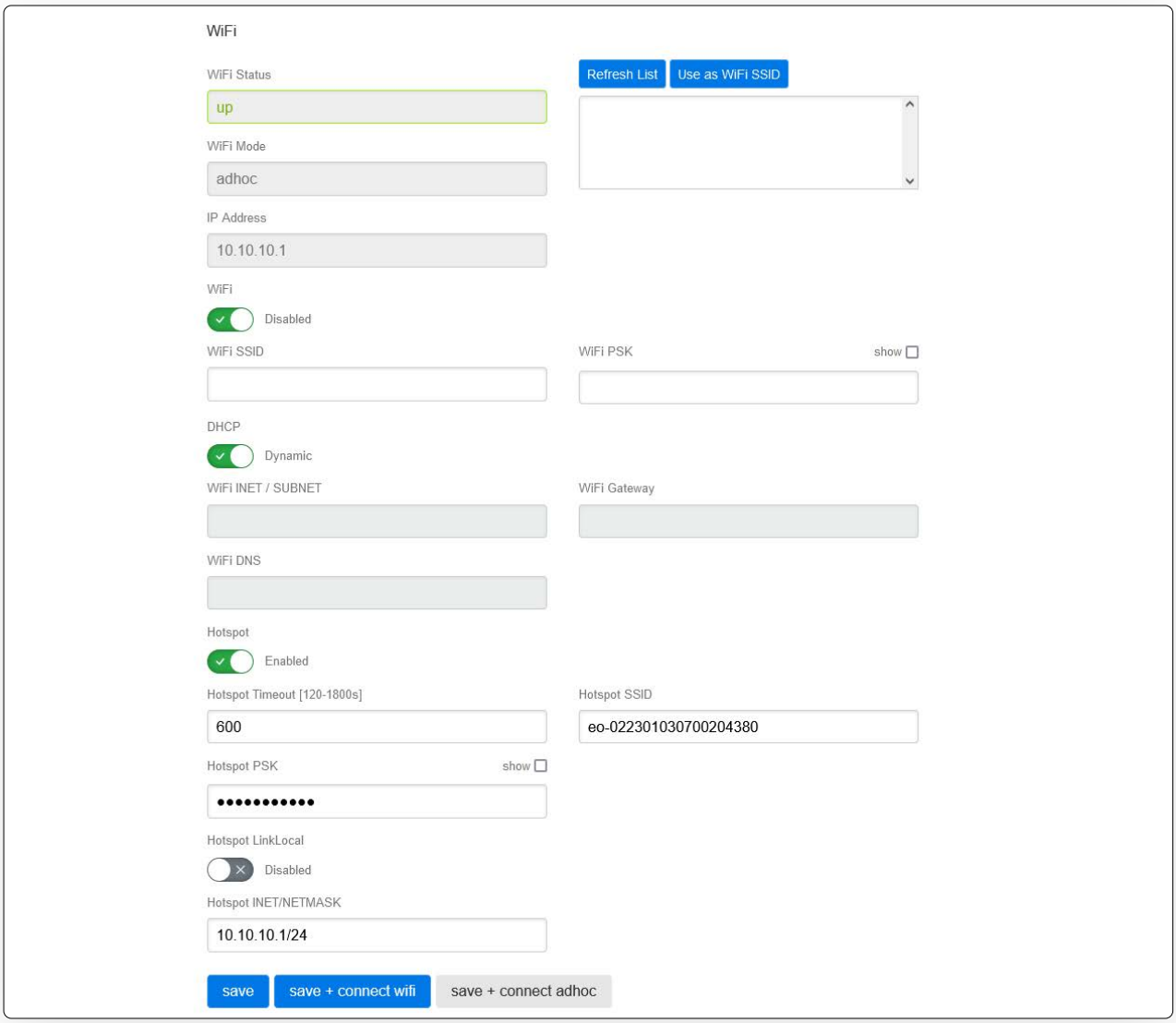


Figure 29: Wi-Fi settings.

In order to view the list of available Wi-Fi networks, then click on the “Refresh List” button. This will show the list of available networks and their associated signal strengths. Select the chosen network and then click on the “use as Wi-Fi SSID” button. This will then populate the “Wi-Fi SSID” text field allowing the installer to enter the Wi-Fi password into the Wi-Fi PSK field. Again static Wi-Fi details can be used if so desired.

5.6.3 GSM

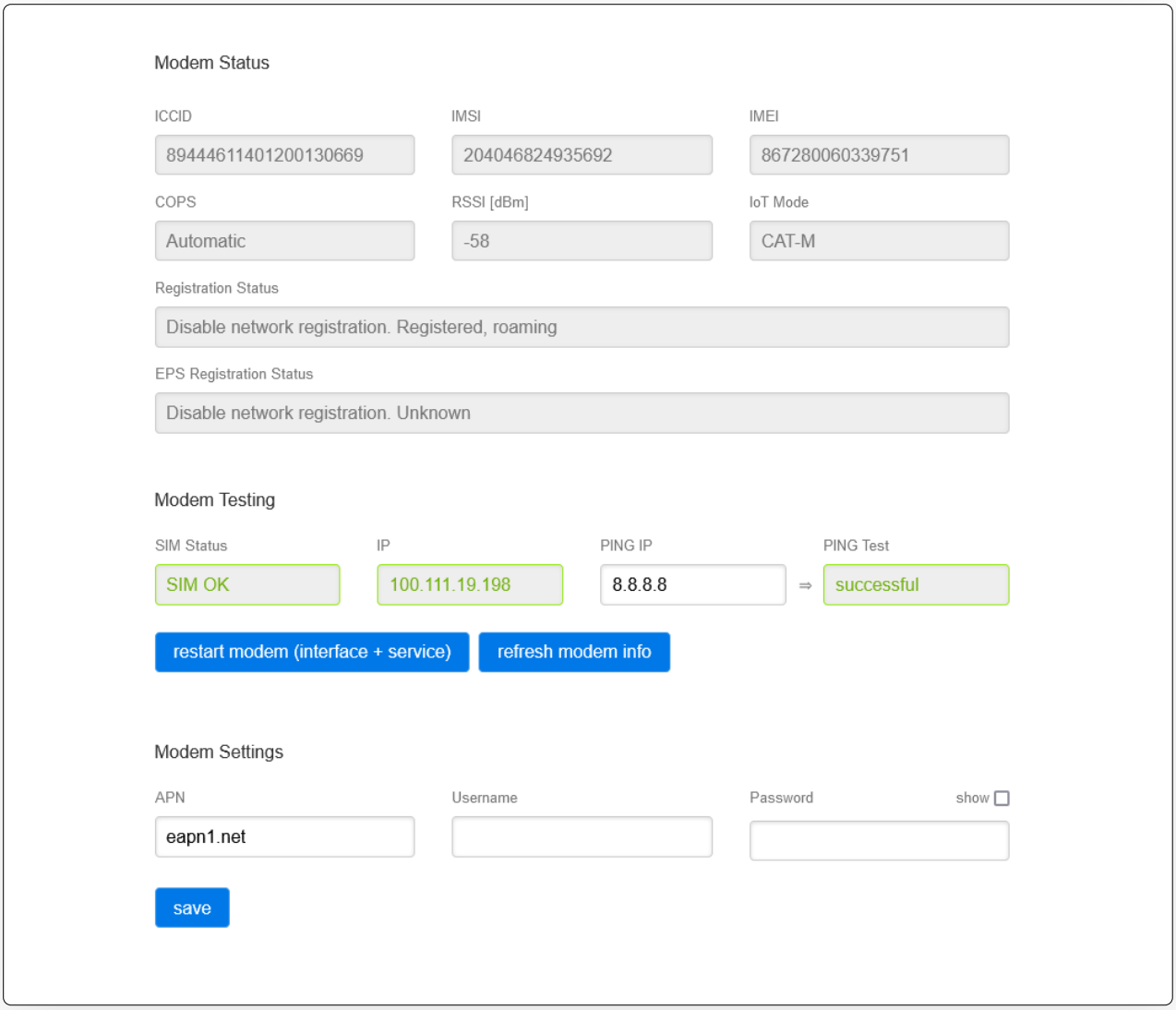


Figure 30: Modem settings.

There are three settings that the installer can enter:

+ APN URL
+ Username
+ Password

The GSM functionality works in two modes:

+ Primary – when the charging station powers up it then checks for an active Wi-Fi or ethernet connection. If neither are present then the charging station will connect to the OCPP server using the GSM as the primary connection route.
+ Backup – if an ethernet or active Wi-Fi connection is present then the GSM will act as a backup. After 20min of no connection from the Wi-Fi / ethernet then the device will swap over to GSM.

5.7 LOGS

This page shows any errors that are present in the system. This can be useful in diagnosing an issue with the charging station in the case of a fault. The Support team may request these data logs in the event of a charger malfunction.

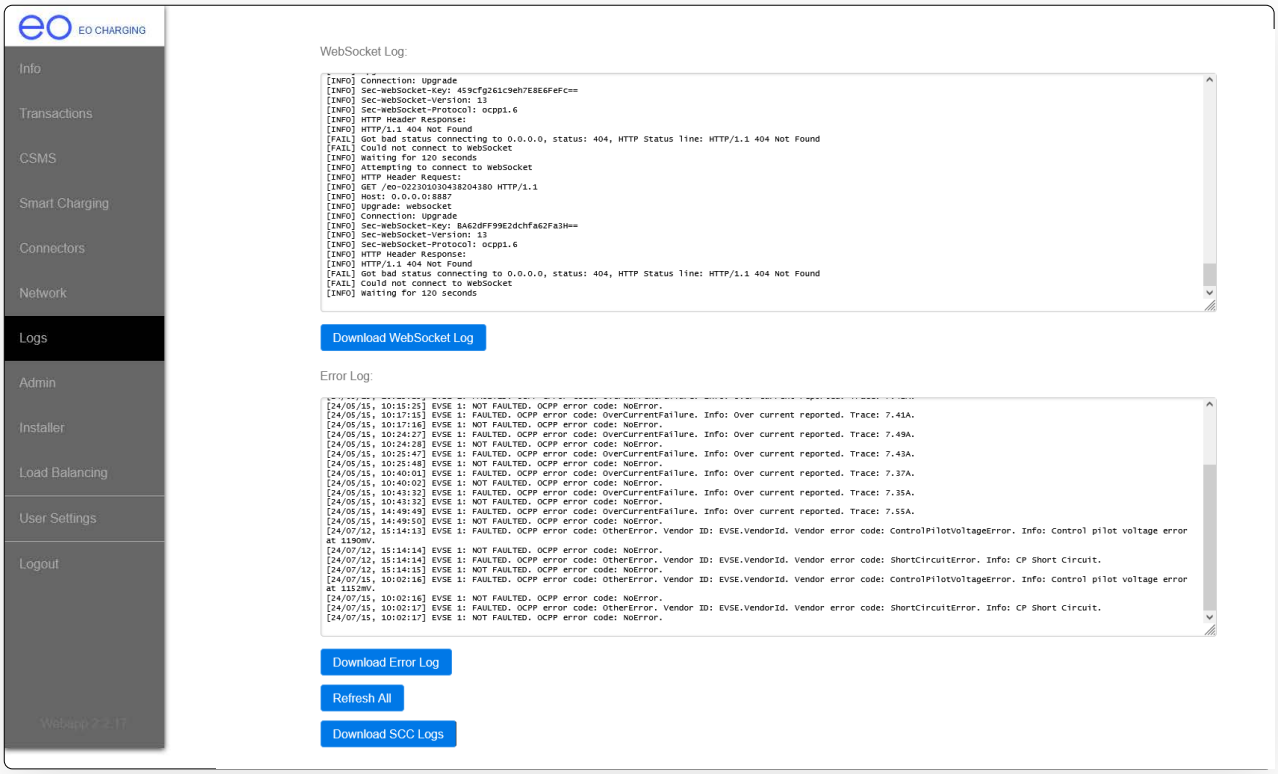


Figure 31: Logs page.

5.8 ADMIN

This page details a number of important support functions.

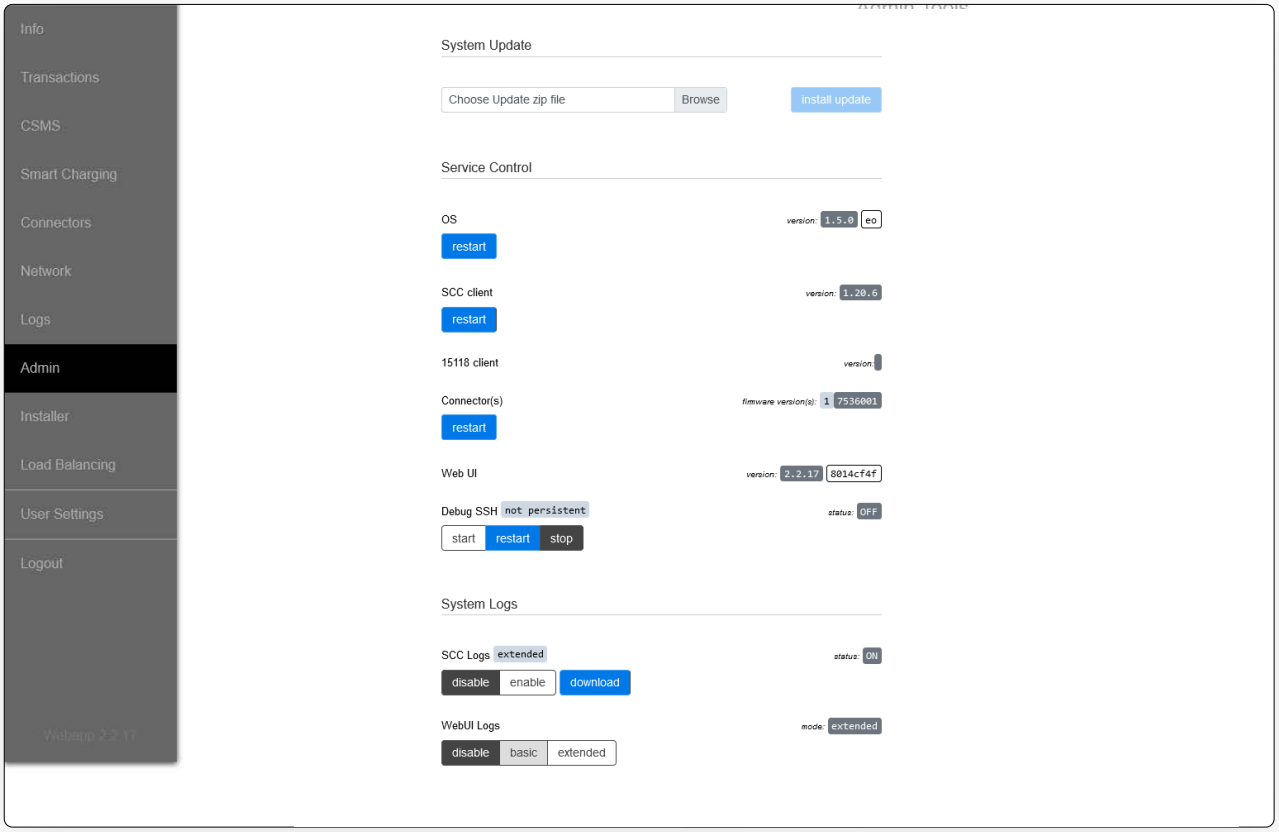


Figure 32: Admin page.

These items may be requested by support in the event of a fault:

+ System Update – support may provide the new firmware image which can then be uploaded to the charging station.
+ OS Firmware Version – e.g. 1.5.0 in the above image.
+ OS Restart – reboot the charger which takes roughly 2 min to complete.
+ SCC Logs – download the diagnostic logs. These can be analysed offline or sent to the Support team for analysis in the event of a fault.

Note: In the case of an issue, the Support team may ask for the extended logging capabilities to be enabled. This is done by enabling the extended logging toggle.

5.9 INSTALLER

This page details a number of important support functions.

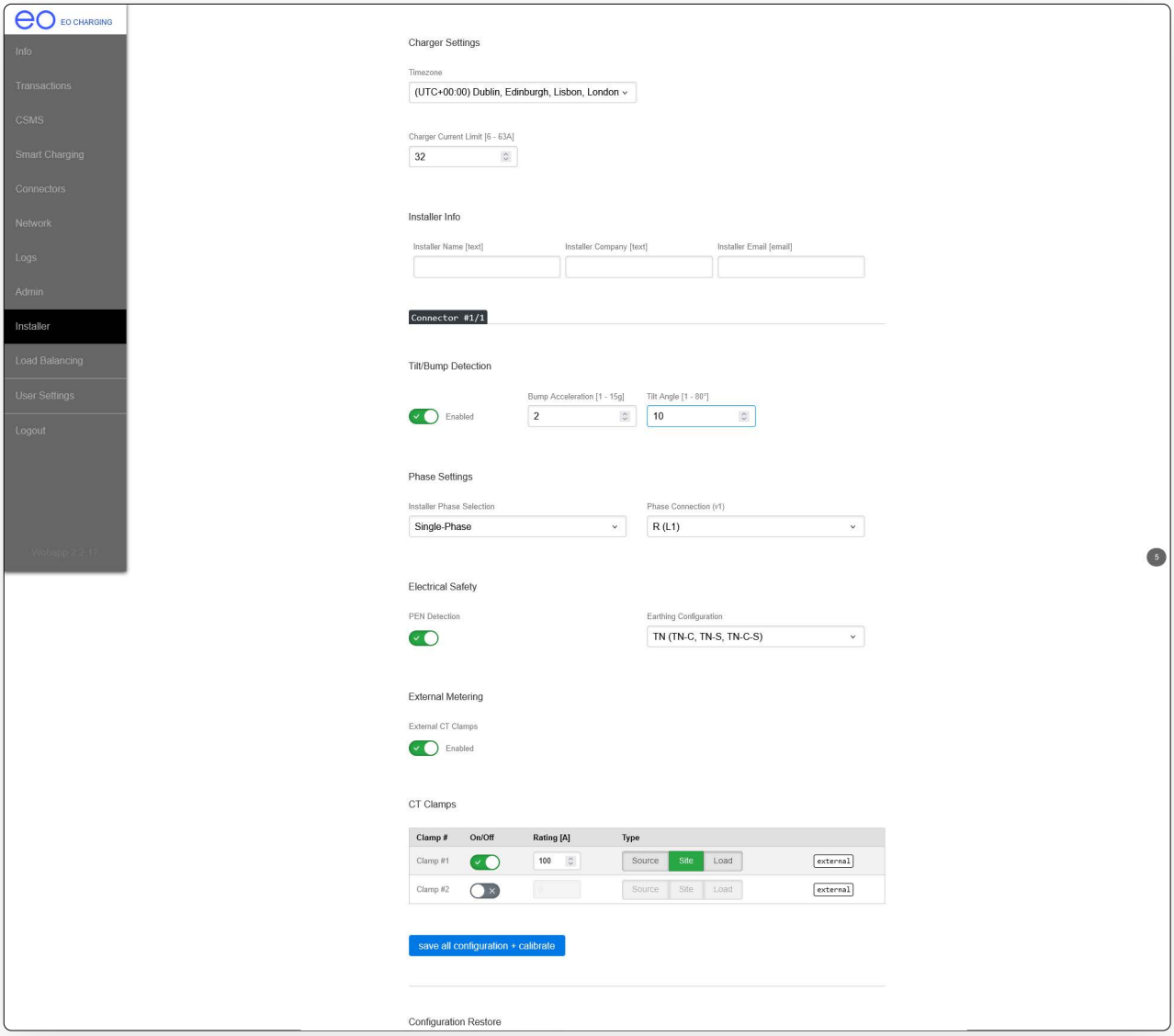


Figure 33: Installer settings page.

There are important options and fields that must be completed by the installer:

+ Timezone – set the local timezone which is important for OCPP schedules (which are sent down in UTC).
+ Charger Current Limit – the maximum current limit of the charger.
+ Installer Info – enter details of the installer so that these can be made available to the OCPP Server and hence the support team.
+ Electrical Safety - PEN Detection - turn this off if the PEN fault detection functionality is not required.
+ Electrical Safety - Earthing Configuration - select the appropriate earthing configuration.

+ Tilt - This is a multi-stage process.
  + Ensure that the charging station is in the final mounted position i.e. it is calibrated in situ.
  + Enter the recommended settings – Bump=2 and Tilt=10
  + Click “save all configuration and calibrate” at the bottom of the screen

5.9.1 CT CLAMP CONFIGURATION

On the installer menu, the CT Clamps need to be set up to correspond to the selection made from the table in section 4.2.3

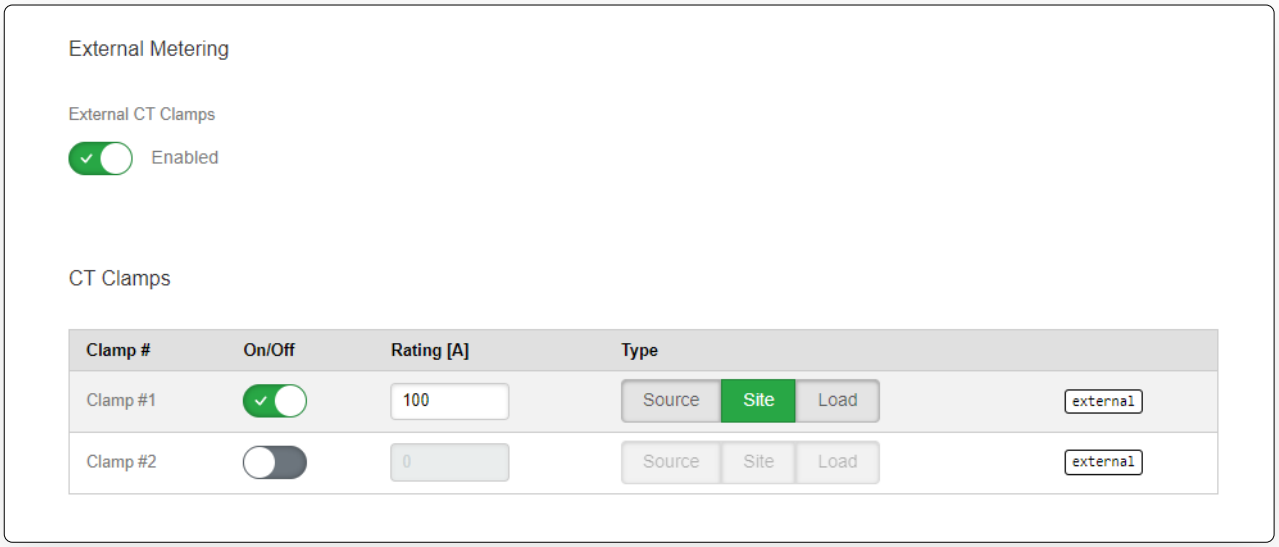


Figure 34: CT clamp configuration settings

+ CT Clamps - If any CT clamps are being used then the following must be enabled:
  + External CT Clamps Enabled - Yes / No
  + Ct Clamp 1
    + Enabled Yes / No
    + Rating e.g. 100A
    + Location – Source (e.g. output of inverter) / Site (e.g. output of site meter)
  + Ct Clamp 2
    + Enabled Yes / No
    + Rating e.g. 100A
    + Location – Source (e.g. output of inverter) / Site (e.g. output of site meter)

Do not set CT Clamp 1 or 2 to ON if EXTERNAL CT CLAMPS is set to OFF.

Do not set EXTERNAL CT CLAMPS to ON if both CT Clamps are set to OFF.

If a charging station has two CT clamps configured, then the following priority order is followed:

CT1	CT2	Load Management	Result
Site		Site Export	Site Export is used
Source		Source Export	Source Export is used
Site	Source	Site Export	Site Export is used
Site	Source	Source Export	Source Export is used

5.9.2 CT CLAMP VERIFICATION

The CT clamps must be fitted and oriented correctly to support the operation of the power management and solar modes. This allows the unit to determine if the site is importing or exporting power.

This can be verified by reading their output from the Info page of the charger. A power reading in mA is given next to each CT clamp configuration.

+ A +ve reading indicates that power is being imported by the site
+ A -ve reading indicates that power is being exported from the site

This is illustrated in the following diagrams:

Figure 35: 11.1 Amps of Import

Figure 36: 11.1 Amps of Export

5.10 LOAD MANAGEMENT

On the Load page, the installer must then select the mode that the charging station will be permanently in. Load balancing mode and Profile load management mode must correspond with the selection made from the table in section 4.2.3. Other recommended settings are shown:

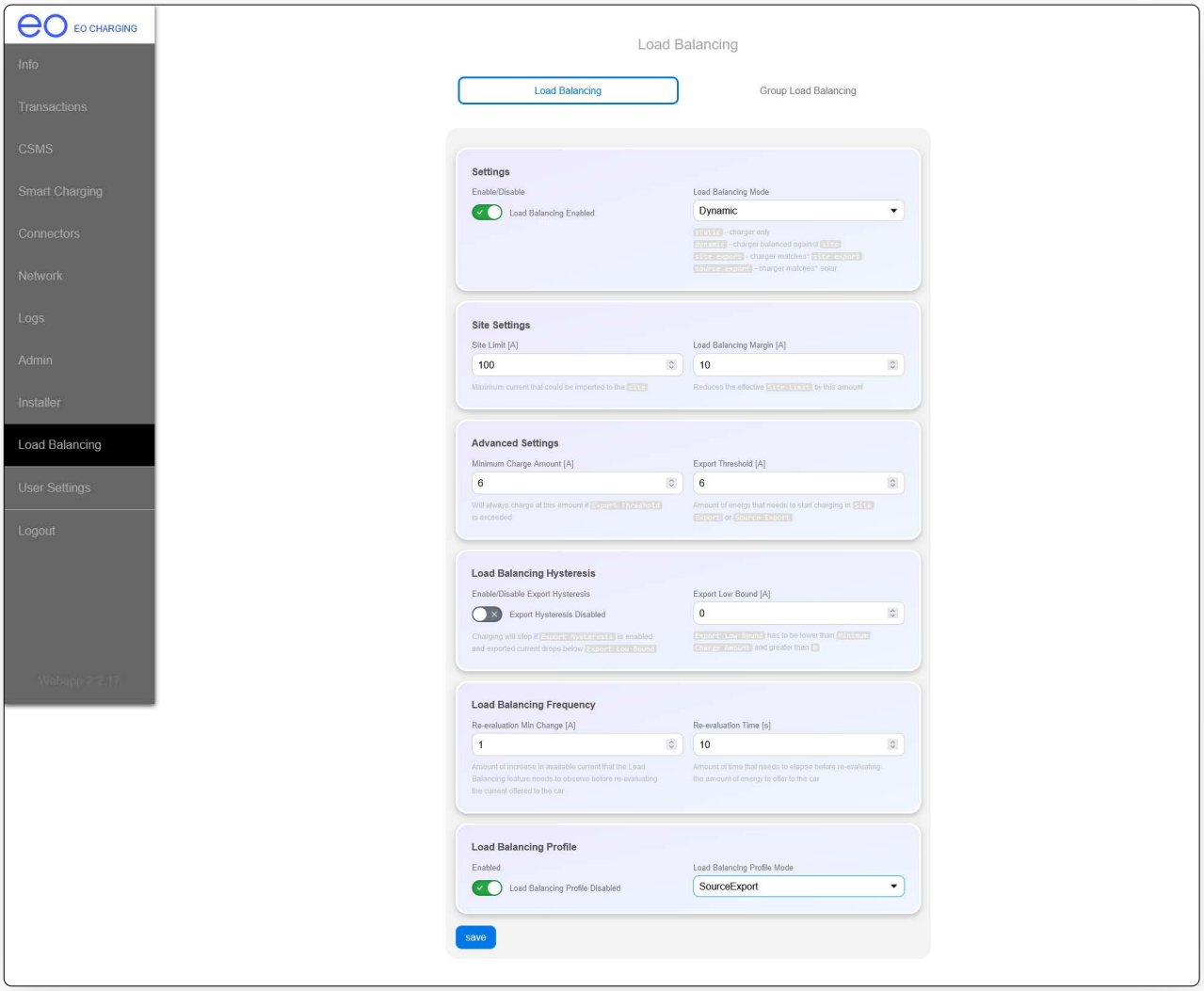


Figure 37: Load balancing page.

Setting	Recommended Value	Notes
Enabled	Yes	Turns on or off Load Balancing.
Load balancing mode	Dynamic	The permanent load management mode. To turn off load management then select Static.
Site Limit	X Amps e.g. 60Amps or 80Amps or 100Amps	The limit of the site.
Load balancing margin	10% of the Site limit in Amps	A safety margin for the load management algorithm. For example if the site limit is 100A then the Load Balancing Margin should be set to 10Amps.

Re-evaluation min charge	1Amp	The amount by which the site/import CT Clamp reading must change by before the charging station will react to the change. For example if the Load Balancing Minimum Change is set to 1A then the load management won't react if the CT reading changes by 0.1Amp. However, it will react if the CT reading changes by 1.1Amp.
Re-evaluation time	10sec	The time between changes to the advertised rate of available power to the vehicle.
Minimum Charge Amount	6A	The minimum rate of charge to be used in EXPORT modes.
Export Threshold	6A	The amount of export required before the charging station will start charging in EXPORT modes.
Load Balancing Profile Enabled	Yes	Turns on or off the ability to control the different modes by the ev.energy App.
Load Balancing Profile Mode	Site Export	The default solar mode which is used by the charging station when a solar schedule is selected by the ev.energy App.

5.10.1 SCHEDULING COMBINATIONS OF FULL POWER AND SOLAR MODES:

If the charger has been configured to allow profiles by means of "Load Balancing Profile Enabled", then solar and full power modes can be selected to work together by the ev.energy app, on a time scheduled basis. For example:

a. 10:00 to 16:00 solar mode
    i. Between these times the charger will operate in the selected solar mode
b. 23:30 to 04:30 full power mode
    ii. Between these times the charger will operate at full power, and dynamic load management will operate at the site limit
c. Outside of these time windows the charging station will be put on pause.

The user should select a solar schedule and a full power schedule through the app. The scheduled solar mode is selected by the installer in the Load Balancing Profile Mode on the Load Page.

5.10.2 SOLAR MODE ON THE EV.ENERGY APP

With the charging station set up and configured, it is possible to run solar schedules and full power schedules on the same charging station.

This means that different charging rates can be advertised by the charging station depending on the time of day.

5.10.3 INTER CHARGER LOAD MANAGEMENT

This is a BETA feature and its use is not covered by warranty.

5.11 USER SETTINGS

The customer is able to change their passwords if required. However if the passwords are forgotten then it is not possible for them to be reset without a visit by an engineer.

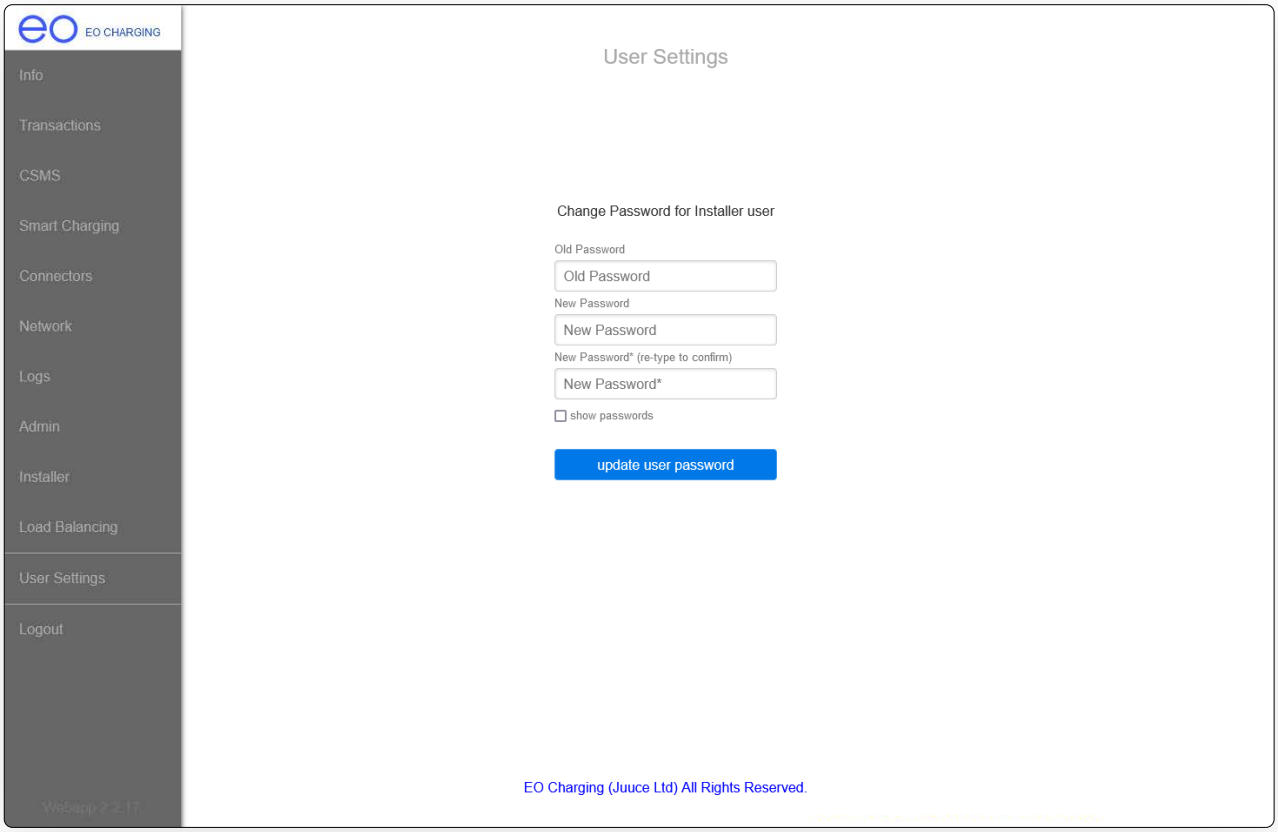


Figure 38: User Settings.

This document continues on the following page. ↘

→ 6.0 OTHER

6.1 FIRMWARE UPDATE

It is possible to upgrade the firmware of the charging station through two mechanisms:

1. Through the OCPP server.
2. Through the admin page of the web interface. The latest firmware releases can be found on the support pages of the EO Charging Website

When the EO Mini Pro 3 connects to the CSMS then the CSMS will automatically upgrade the unit to the latest firmware version.

Any security concerns can be address through the instructions at https://www.eocharging.com/security

6.2 PEN FAULT DETECTION

The PME variants of the EO Mini Pro 3 have inbuilt PEN fault detection. There are no configuration options required for this feature and it continually operates whilst the unit is powered on.

If the charging station is fitted with the PEN Fault Detection system (model designator -PME), then the charging station will detect errors in the incoming grid connection. If a PEN fault is detected then the vehicle will be fully isolated from the charging station and the LED shall illuminate solid RED. It shall not be possible to charge a vehicle in this condition. In order to restart charging:

+ The vehicle and charging cable must be unplugged from the charging station.
+ The charging station must be power cycled or remotely reset.
+ If the LED remains RED then the grid connection is still not within the defined safety limits and an installer must be contacted to inspect the incoming supply. If the normal pulsing Blue LED is shown then the system is safe to use.

Note: For PME variants, please make sure these are ordered at the point of purchase as cannot be retrofitted.

6.3 UK SMART CHARGING REGULATIONS

The EO Mini Pro 3 is compliant with the UK Smart Charging regulations. The charging stations comes programmed with a random delay (of 600sec/10min), a default charging schedule (no charging between 0800->1100 and 1600->2200) and an anti-tamper tilt switch in addition to the other requirements such as auto firmware update.

6.4 OFFLINE BEHAVIOUR

6.4.1 SCHEDULES

By default, the EO Mini Pro 3 will follow the last communicated schedule sent to the charging station by the OCPP server. If no schedule has been sent to the charging station by the OCPP server then the charging station will continue to operate according to any schedule set in the “Smart Charging” menu of the web interface.

6.4.2 LOAD MANAGEMENT

If Local Load management has been configured then this will continue to operate independently of the connection to the OCPP server.

6.5 DELETING CUSTOMER DATA

The only customer data that is stored by the EO Mini Pro 3 is the customer Wi-Fi details. These can be deleted by the customer logging into the web interface of the device and then removing them from the Network page.

6.6 FINDING THE DEVICE ON A LOCAL NETWORK

If the customer or the installer is logged into the same IP network as the charging station then it is possible for the web interface to be loaded by two mechanisms.

+ Entering the IP address of the charger into the search bar of the web browser.

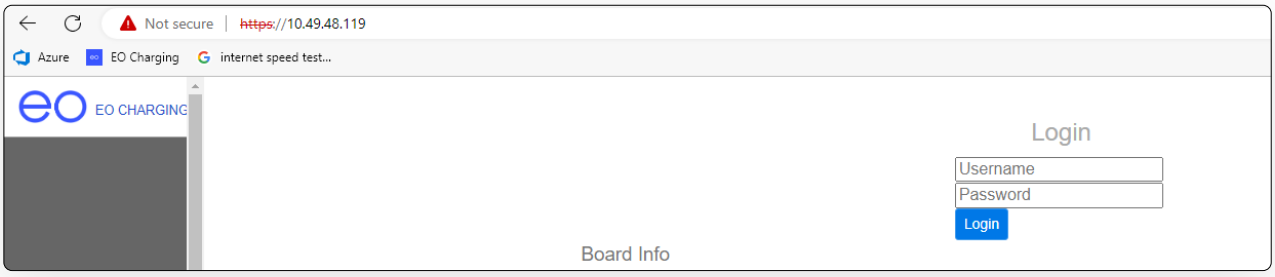


Figure 39: Installer login using IP address.

+ To find the IP address then an IP Scanning tool can be used

+ Enter the serial number of the charging station followed by .local

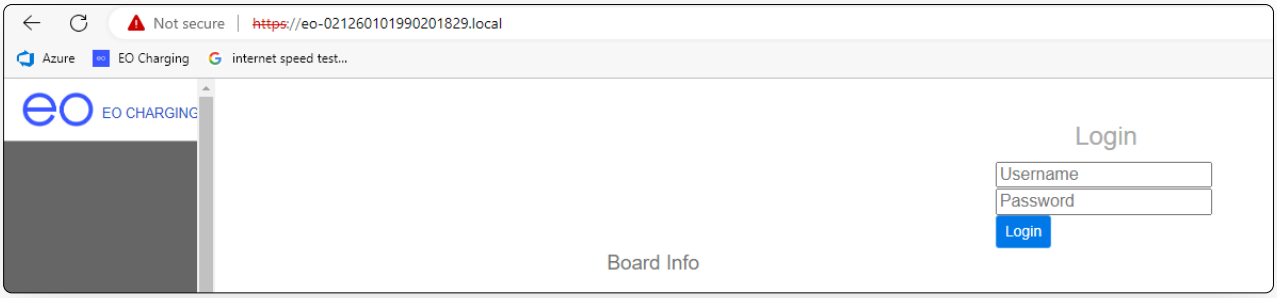


Figure 40: Installer login using charger serial number.

6.7 TEMPERATURE DERATING

The charging stations have a temperature de-rating algorithm so that the charging rate of the vehicle will be reduced if the temperatures inside the unit exceed thresholds. The charging station will start reducing the charging rate by 25% if the temperatures exceed 65°C for the EO Mini Pro 3.

→ 7.0 HINTS AND TIPS

Make use of the info page. This will indicate to the installer and the customer what the charging station is currently doing and is a good tool for fault diagnostics.

The installer should review the readings of the CT Clamps on the Info page to check the correct orientation of the CT Clamps.

The error logs on the SCC page give details of any errors shown.

In the case of an error occurring, download the diagnostic logs from the admin page as the support team will request them.

→ 8.0 CHARGING STATION SPECIFICATIONS

Topic	Note
Characteristics of power supply input	Permanently connected to 230V
Characteristics of power supply output	Supplies 230V AC to the vehicle
Normal environmental conditions	Can be installed indoors or outdoors
Access requirements	Can be installed with no access restrictions
Mounting method	Stationary equipment intended for surface or post mounting
Protection against electric shock	Class I equipment
Charging mode	Mode 3 charging equipment
Ventilation during the supply of energy	Does not support ventilation during charging
Ingress protection	IP54 (socketed) | IP56 (tethered)
Mechanical strength	IK08
Operating temperature	-25°C to +50°C
Height of installation	The charging equipment should be mounted with the bottom face of the enclosure at least 0.9m above ground level. For tethered units, the holster height should be between 0.5m & 1.5m above ground level
Usage of adaptors/cord extension sets	Adaptors and conversion adaptors sets are not permitted to be used with the equipment. Cord extension sets are not permitted to be used
Maximum altitude	2000m
Pollution degree	Pollution Degree 2
Torque setting for main input cables	1.2 Nm
Skill level	Operation by ordinary – Installation by skilled authorised electrician
Nature of Short-circuit protective device	Upstream RCD Type A required Internal: 6mA DC Leakage - internal RDC-DD as per IEC62955, PEN, LoE,LoN

↘

Topic	Note
Torque setting for main chassis screws	6Nm
Measures for protection against electric shock	Where the EO Mini Pro 3 includes internal 6mA DC leakage protection (DCL option), then a 30mA Type A RCD must be fitted at the supply. Otherwise, a Type B RCD or equivalent should be used. EO recommends a 40A supply for a 32A charging station. Overcurrent protection (e.g. MCB) should be installed upstream of the charging station. The internal RDC-DD is compliant to IEC 62955
Short circuit protection of the charging cable	40A Type B or Type C MCB with a maximum I2t of + Socket version should be ≤ 75000 A2s + Tethered version should be ≤80000 A2s
Fuse rating	3.15A, 240V time delayed cartridge fuse
Overvoltage category	Category 3
Rated Insulation Voltage	230V
Rated impulse withstand voltage Uimp	4000V
Rated peak withstand current (Ipk)	≤ 80kA2s
Rated short time withstand current (Icw)	N/A
Rated conditional short-circuit current of an ASSEMBLY (Icc)	5000A2s
Electromagnetic compatibility (EMC) classification	EN 61851-21-2;2021 Residential & Non Residential EN 55032:2015 + A1:2020 Class B ENSI EN 301 489-1 V2.2.3:2019 EN 300 328 V2.2.2:2019 EMC Directive 2014/30/EU & UK Electro magnetic compatibility Regulations 2016
Dimensions and weight	230mm x 151mm x 125mm, <2kg (socketed), <5kg (tethered)
Storage	Dry storage location in ambient temperatures between 0°C and 30°
Maximum Charging Rate	32Amps

Important: *The installer must select the RCD and earthing configuration by following the current local regulations and best practices. The installer must follow national usage guidelines to ensure the unit is installed in accordance to any local restrictions. For the UK refer to the current IET code of practice and a Type A RCD & Type B MCB are recommended.*

→ 9.0 EO SUPPORT CENTRE

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

Contact us to learn more about our products. Our charging experts offer technical support and are ready to help with any questions or issues.

Live Chat: https://www.eocharging.com/contact-us

The EO Academy Installer training can be found at:
https://www.eocharging.com/eo-academy

This document contains information that is subject to change without notice.

The latest version of this publication can be downloaded at:
https://www.eocharging.com/support/home-charging/eo-mini-pro-3

9.1 EV.ENERGY SMARTPHONE APP SUPPORT

EO Charging has partnered with ev.energy to migrate customers to the ev.energy smartphone app to ensure the best possible charging experience with the EO Mini Pro 3.

If you have trouble downloading the ev.energy smartphone app or connecting it to your charger, please use the ev.energy live support chat or reach out via the email address below.

Live support chat: https://support.ev.energy/en/support/home

Email: **support@ev.energy**

→ 10.0 APENDIX

10.1 DEBUGGING CT CLAMPS

If the guidance in sections 12 and 13 has been followed and it has not proven possible to obtain CT clamp readings as expected, it is possible to trace the connections further.

This diagram illustrates the wiring connectivity from the CT connection block, via a grey multicore cable, and on to the main board of the device. This will allow the reader to follow the connections from CT clamp to the main board, as per the table below:

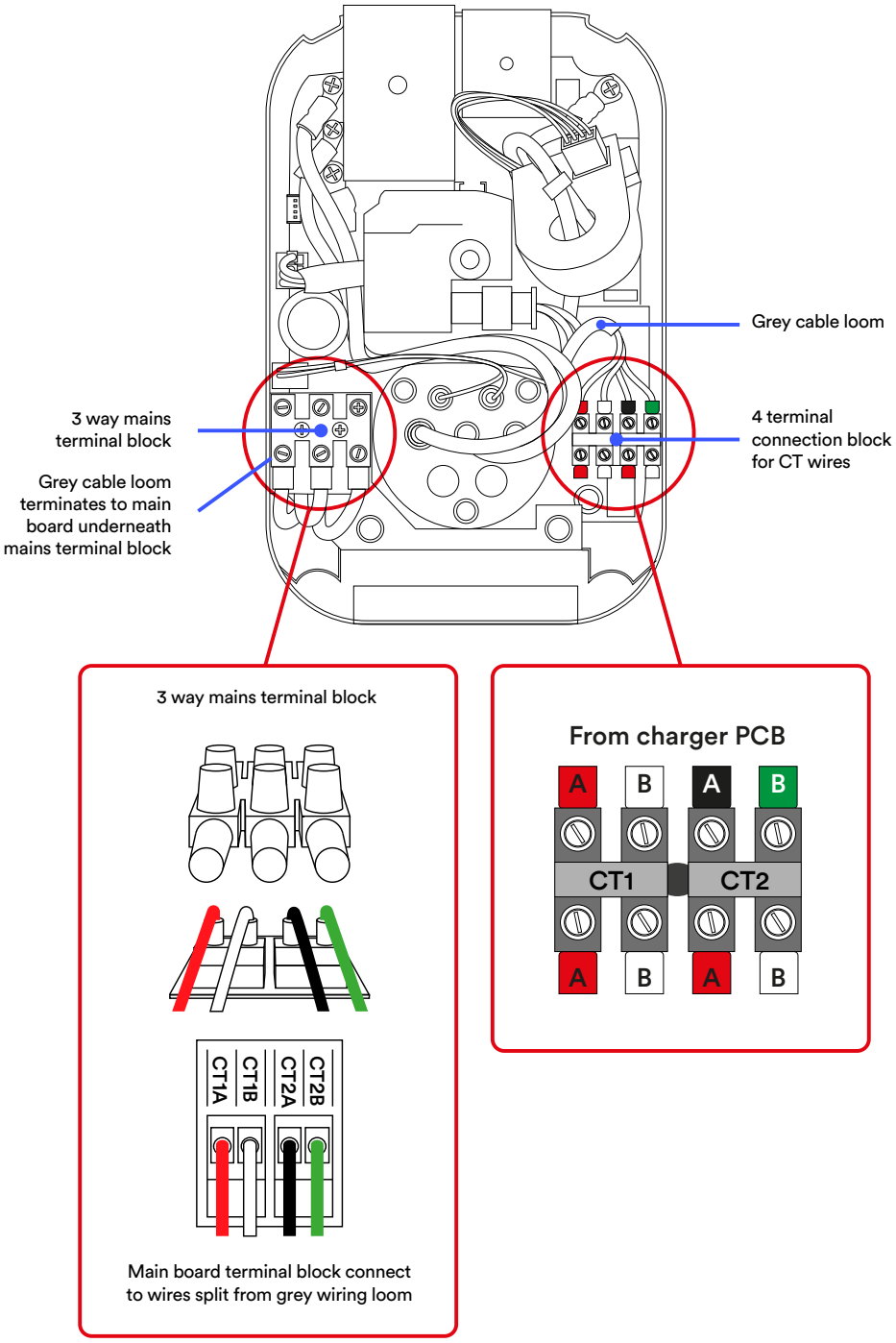
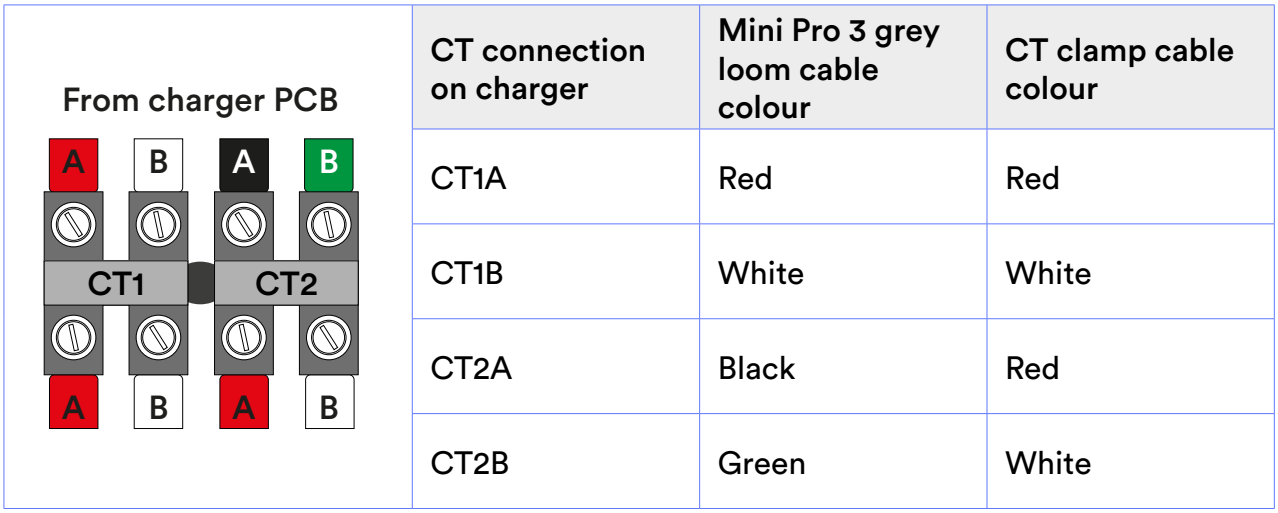


Figure 41: Debugging CT clamp configuration



CT connection on charger	Mini Pro 3 grey loom cable colour	CT clamp cable colour
CT1A	Red	Red
CT1B	White	White
CT2A	Black	Red
CT2B	Green	White

Note: The reader should ensure that each CT CLAMP CABLE COLOUR is connected to the corresponding and named CT CONNECTION on CHARGER connection point.