# EV22 SERIES

**EV Smart Charger - User Manual**

# OVERVIEW

OZEV Approved

SMART

Type 2 Connector

IP54 & IK10 Protection

The charger range are SMART AC chargers designed for residential and commercial installations (e.g., fleet buyers) that are available in single or three-phase options.

They come ready out of the box and support a variety of additional features, such as LCD displays, sockets with actuator locks or tethered charging cables. For security and safety, NFC authorization and built-in RCD type A with DC leakage fault protection features are included as standard on all models.

The chargers are designed with a robust enclosure made of recycled plastic (up to 100% post-industrial and post-consumer feedstock), providing protection from the weather conditions and accidental impact. Easy setup and maintenance are guaranteed by a modular front cover which enables servicing essential connections without exposing the entire unit.

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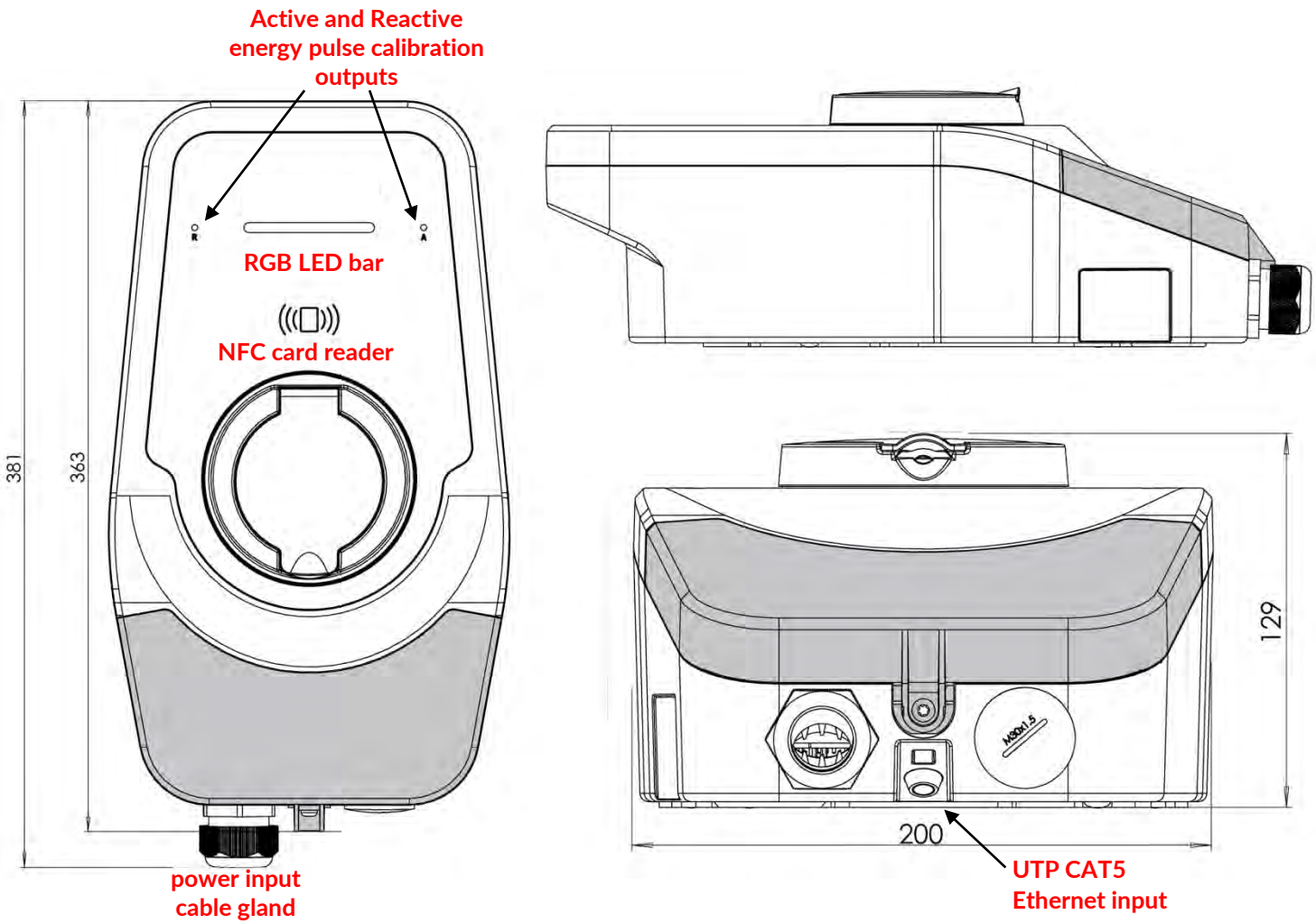
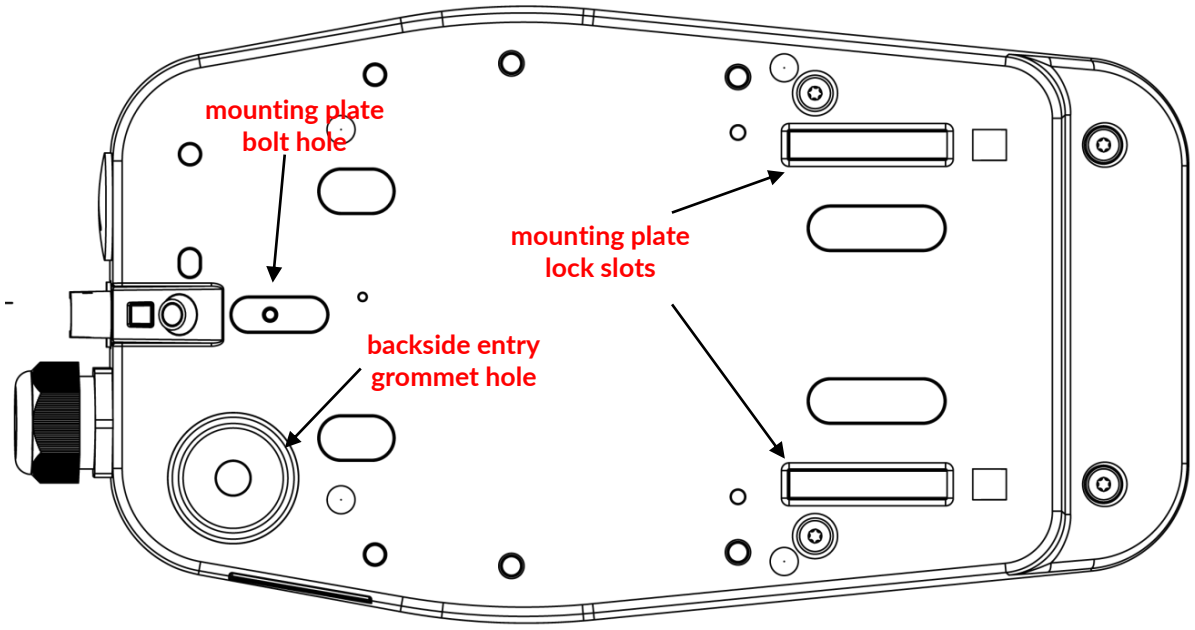
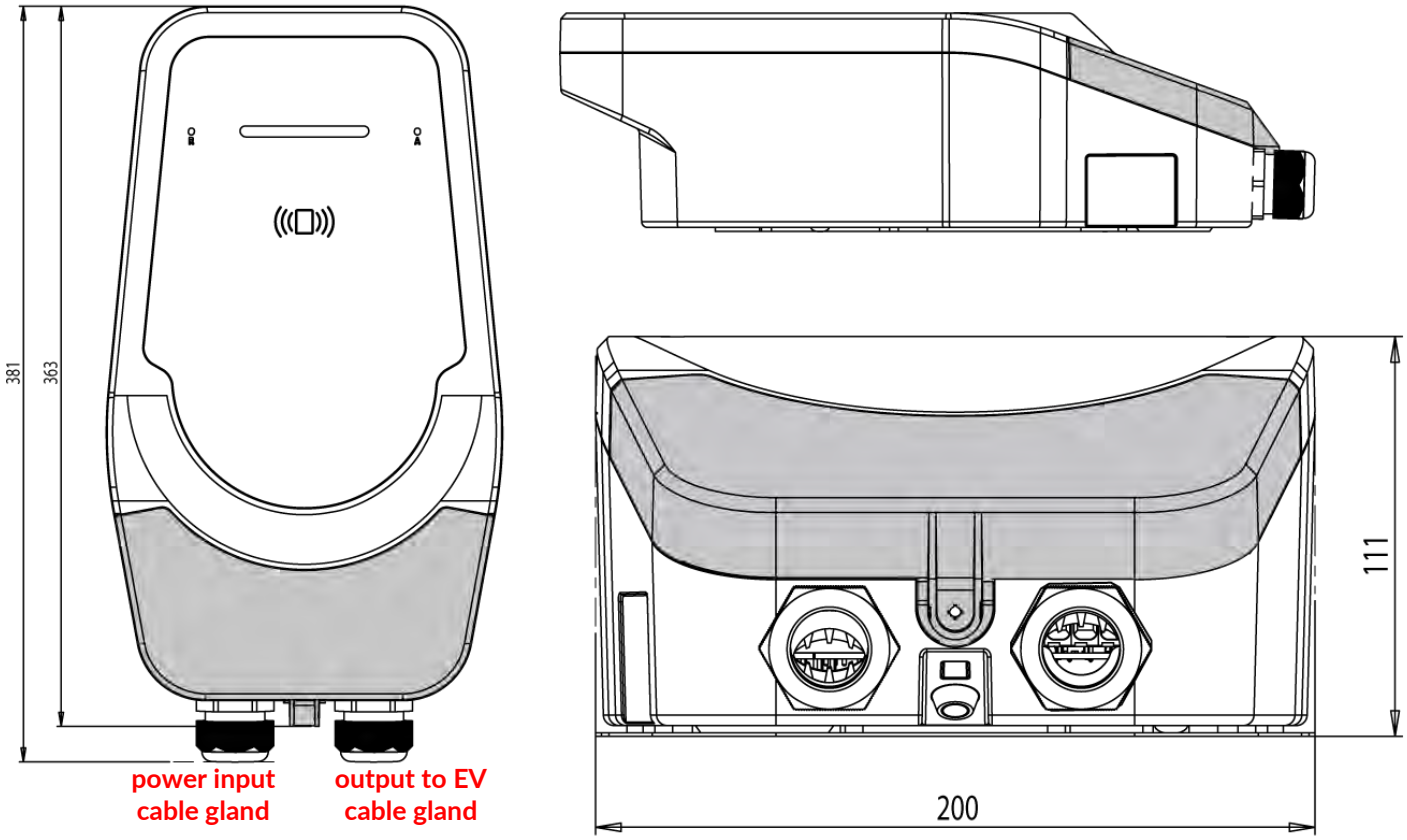



**Socket model technical drawing with dimensions. All units in mm. Grey area denotes the service cover. This acts as a modular design allowing for quick access to the power and data cable section without accessing the rest of the unit.**






**Tethered model technical drawing with dimensions. All units in mm. Grey area denotes the service cover. Note the absence of a socket and the presence of a second power port for the tethered cable.**

# PRODUCT HIGHLIGHTS

- Easy to install and service
- Multiple connectivity options
- Compact and modular design allows for separate power/data connections
- NFC-compatible access control
- Full control with the Smart App (via local Wi-Fi)
- BLE functionality (Wi-Fi access point provisioning function via mobile app)
- Integrated open PEN conductor protection on all models (no auxiliary grounding necessary)
- Integrated Type A 30mA RCD with 6mA DC protection
- Type 2 socket with automatic electromechanical lock
- Available as tethered or untethered (socketed) models

# FEATURES AND SPECIFICATIONS

***Smart and efficient charging***

The charger series belongs to a class of EVSE called smart chargers, because its entire functionality can be controlled remotely and automatically. This is enabled by the OCPP 1.6J protocol support embedded in the charger. This is a universally accepted control protocol for charging stations, meaning that any OCPP-based server can talk to, control, and remotely update the charger, independent of service provider and other factors.

The main benefits of smart charging are the ease of use and flexibility it offers, because it enables the user to control the time, duration, and amount of charging that is delivered to their EVs. In locations where electricity rates are variable throughout the day, this translates into substantial energy bills savings, as the charger can be configured to take advantage of lower energy prices during off-peak periods. Additionally, the charger has been designed to function with home solar installations. Thus, it can be set to provide charging only when excess energy is being generated, providing a very efficient utilization of energy resources. Smart charging also enables multiple chargers in a location to communicate with each other, and best utilize the available power to optimally charge several EVs.

The charger requires an internet connection to execute its smart functions. It can be configured to support a primary and secondary network interface for redundancy. For example, it can maintain a wireless network connection, but fall back to GSM in case of poor connectivity or router failure. If no network connection can be established, the charger is capable of operating in a configurable “offline plug-in charge” mode, whereby it works as a simple EVSE, providing the maximum permissible charging power when an EV is connected.

charger series of chargers are fully configurable via a web interface client, which is accessible from any Wi-Fi-enabled device. An integrated BLE interface permits the user to provision the wireless access by setting the SSID and password from the mobile app.

***Access control***

As the charger range is intended for both residential and public applications, it has a number of access control functionalities, such as NFC (“smart card”) authorization, mobile app authorization, and full control by the OCPP server backend. Thus, a user can configure the access to their charger(s) from basic unrestricted, to higher levels of control, based on their application.

***Rugged compact design***

The charger is designed to have a small footprint and to be easily installed in various locations, both indoors and outdoors. The charger series is available in multiple variants that use the same enclosure, as a universal platform. Models are available as either socket- or tethered-type, giving clients flexibility in customizing their EV charging experience.

***Built with safety in mind***

The charger series is designed with multiple safety interlocks in order to prevent the hazards associated with high-current, high-power devices, such as electrical shocks, fires, and equipment damage. The device monitors the state of the electrical network, and using a CT clamp, can monitor total installation consumption. All models in the range have a built-in AC/DC RCD, and will prevent leakage currents from causing damage to people and devices. The chargers utilize both sound and light signaling to report their state and possible faults, enabling quick and safe detection of problems. Socket-type charger chargers come with a standard actuator locking mechanism, which prevents charging cable disconnection while powered, effectively minimizing the risk of arcing and related damage. All chargers are equipped with a tamper sensor, which can detect and report unauthorized opening of the charger body. Additional security features are implemented at the software and firmware level in order to safeguard the device from malicious code and external attacks.

***Dynamic load management***

Thanks to their OCPP compatibility, chargers can be configured in groups of 2 or more chargers sharing the same electrical infrastructure. By monitoring their individual and total consumption, the chargers can automatically balance the load they require from the mains supply to provide optimal charging capacity without straining the electrical network. Dynamic load management features are configurable and ideally suited for fleet and public applications.

# TECHNICAL SPECIFICATION

| Main Features | | | |
|---|---|---|---|
| Electrical | Power | 7.4kW max | 22kW max |
| | Voltage | 230VAC, 50 Hz, 1-Phase | 3 x 230 / 400VAC, 50 Hz, 3-Phase |
| | Current | 1 x 32A max | 3 x 32A max |
| | Power Level Control | 6-32A (software control) | |
| | Socket Type | IEC 62196 Type 2 | |
| | Standby power | <8 VA, 5.2 W | |
| | Protection | • RCD Type A (30mA)/ DC (6mA), IEC 61008-1 compliant<br>• Neutral voltage (70 $V_{rms}$)<br>• Overcurrent (Overcurrent protection trip when $I_L$> 1.2 x $I_{max}$)<br>• Temperature (limiting 72°C -78°C, fault at 79°C)<br>• Undervoltage (software fault at 90% $V_{nom}$ with configurable offset, hardware shutdown at 115$V_{rms}$ ±10 $V_{rms}$)<br>• Overvoltage (software fault at 110% $V_{nom}$ with configurable offset, hardware shutdown at 300$V_{rms}$ ±10 $V_{rms}$)<br>• Reverse phase or phase-to-phase: the hardware can handle mains misconnection<br>• Tamper sensor: detects unauthorized opening of the charger body | |
| | Certification | CE (IEC 61851-1, IEC 61851-2, IEC 60950-1, IEC 60950-22) | |
| Mechanical | Material | PC Plastic (up to 100% recycled feedstock)<br>V-2 UL94 Flame retardant | |
| | Lock mechanism | Servo-type actuator lock (socketed models) | |
| | Dimension (WxDxH) | 200 x 129 x 350 mm (socketed) ; 200 x 108 x 350 mm (tethered) | |
| | Color | Matt Black | |
| | Weight, approx: | 3.10 kg (tethered model w/ bracket, no cable)<br>3.50 kg (socketed model w/bracket)<br>Package weight: 1.5 kg | 3.20 kg (tethered model w/ bracket, no cable)<br>3.60 kg (socketed model w/ bracket)<br>Package weight: 1.5 kg |
| | Type | 3 elements: modular front panel, top cover and body mount | |
| | Mounting | Included metal mounting bracket | |
| Connectivity | Access Type | Ethernet: wired LAN via RJ45 port (10/100Mbps)<br>GSM:2G (3G, LTE, CAT M1, CAT NB-1 on request)<br>WLAN: 2.4 GHz (802.11 b/g/n/e/i)<br>Bluetooth LE: for configuration of wireless access point | |
| | Protocol | OCPP 1.6 JSON | |
| | Wireless capabilities | **Access Point:** integrated web server for settings and diagnostics (web client)<br>**Station:** for backend connectivity<br>**Note:** Supports simultaneous Access point and Station functionality | |

| | | |
|---|---|---|
| Authorization/ Status Indicator | Reader | Integrated NFC reader, 13.56 MHz, MIFARE compatible |
| | App | Android & IOS |
| | LED | RGB horizontal bar light (9 states) |
| Measurement | Metering | Internal: corresponds to accuracy class 2% |
| | CT Clamp | External current monitoring via dedicated CT clamp device. Wired communication via RS-485 up to 30m. |
| | External MID meter compatibility | Yes, on request. Can be configured for operation with Eastron DIN rail MID electricity meters via RS-485 wired communication up to 30m. |

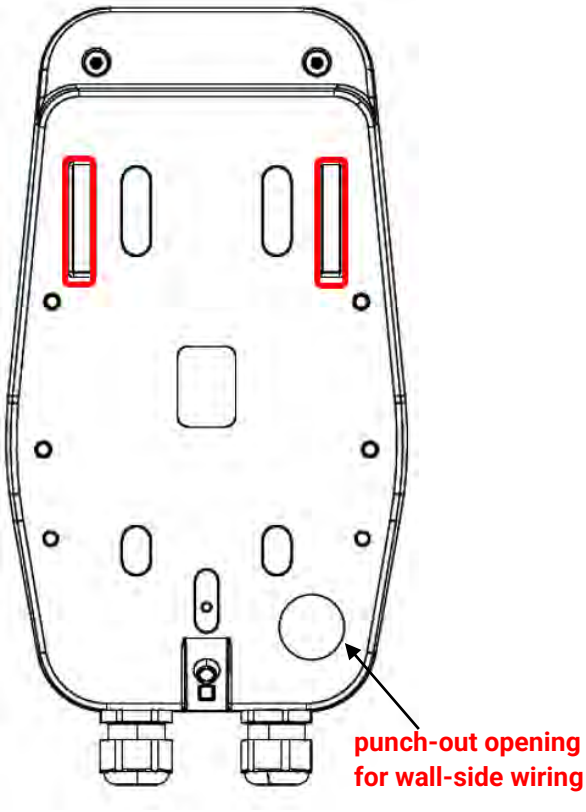
| 3TLC Features | |
|---|---|
| Built in Cable | Tethered cable; Type 2 plug |
| Cable | 5m tethered cable |

| Remote Diagnostic and Management Features |
|---|
| Error detection and auto restore |
| Remote Reset |
| Remote Recalibration |
| Remote Firmware Update |

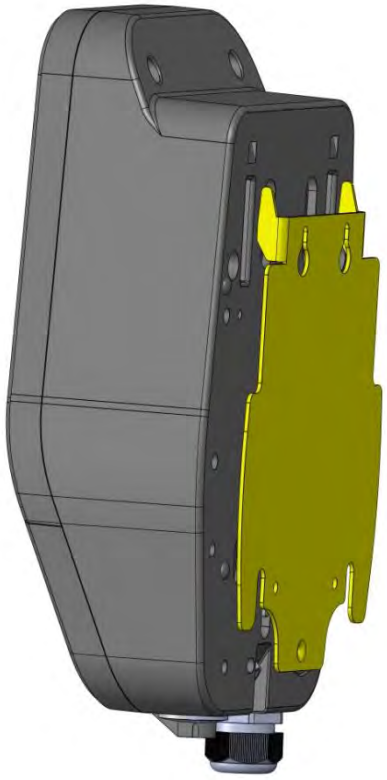
| Compliance |
|---|
| **General:** IEC 61851-1:2017 Part 1, BS 7671:2018 |
| **EMC:** Directive 2014/30/EU<br>IEC 61851-21-2:2018 Part 21-2 (Emissions Class B, Immunity – Residential Environments); Class B for EN 55032:2015, EN 61000-3-2: 2014, EN 61000-3-3: 2013, EN 61000-4-2: 2009, EN 61000-4-4: 2004, EN 61000-4-5:2014; EN 61000-4-8: 2009, EN 61000-4-11: 2004 |
| **Safety:** Directive 2014/35/EU<br>IEC 60950-1:2005, IEC 61508, IEC61810-1 (contactors),EN 60947-2:2017/A1:2020, ISO 13849-1:2015, IEC60364-4-41, IEC 61008-1:2012 (RCD) |
| **Radio equipment:** Directive 2014/53/EU<br>EN 62311:2008; GSM module - EN 60950-1:2006 & A11:2009 & A1:2010 & A12:2011 & A2:2013, ETSI EN 301 489-1 V2.2.0, EN 301 511 V12.5.1 (2017-03); WiFi module - EN 301 489-1 V2.2.0 (2017-03), EN 301 489-17 V3.2.0 (2017-03), EN 60950-1: 2006 & A11: 2009 & A1: 2010 & A12: 2011 & A2: 2013, EN 300 328 V2.1.1 (2016-11) |

| Working and Storage Environment | |
|---|---|
| Electrical | OVC III, PD2 |
| IP Rating | IP54 |
| IK Rating | IK08 (base model) |
| Temperature | Operational: -25°C ÷ +55°C (3K6)<br>Transportation: -40°C ÷ +85°C (2K4 modified) |
| Cooling | Natural air cooling |
| Storage Temperature | -40°C to 70°C (1K5) |
| Humidity | 10% ÷100% Relative humidity, non-condensing |
| Altitude | -50 to +2000 m |

# charger Wall Mounting Plate




Back of unit



Unit resting on mounting plate (yellow)

# What's in the box

| No | Item | Quantity |
|---|---|---|
| 1 | charger 3(S/T)LC **Rev 1.0** with installed wall mounting bracket | 1 |
| 2 | NFC MIFARE card with printed CP credentials | 1 |
| 3 | Cable gland AIO-CSM-30 | 1 |
| 4 | Kinglok grommet – KCGN-M32 | 1 |
| 5 | Mounting screws DIN7981 4.8x32 | 4 |
| 6 | Expansion plug Fischer SX 6x30 | 4 |
| 7 | User manual | 1 |
| 8 | Quick installation guide with drill holes template | 1 |
| 9 | EU Declaration of conformity | 1 |
| 10 | Warranty card | 1 |

# INSTALLATION GUIDE

## 1. Before installation: Pre-requisites

### 1.1. Safety and precautions

**Intended use:** This product is solely designed and approved for use as an Electric Vehicle Supply Equipment (EVSE), used to supply charging current to EVs and PHEVs that do not require ventilation. It is intended to be used within specifications and only with the appropriate auxiliary equipment and adequate wiring. It is not intended to be repurposed or reconfigured for any application or use not within its specification. Failure to operate the device as intended may result in severe damage to equipment and personnel and poses a fire and explosion hazard.

**Risk of electric shock**: This device utilizes voltages that pose an immediate threat to life. It shall be installed only by a licensed or experienced electrician. The device and auxiliary equipment shall be carefully inspected for signs of damage (cracked case, frayed or exposed conductors, and compromised insulation) before installation or use. Any installation or servicing activities shall be executed only after the mains supply has been disconnected from the main breaker or by physically disconnecting the supply conductors at the main distribution board.

This device is intended to be connected to a centrally grounded system. The PE conductor shall be adequately sized and grounded to earth at the service equipment. The EVSE has a built-in RCD, which protects the downstream conductors from earth leakage events. To protect upstream conductors, **an RCD Type A– AC: 30mA/ DC: 6mA must be used at the supply equipment.**

**Risk of fire or explosion**: This device handles high voltages and currents. Use of improperly rated conductors can result in excessive heating, leading to a risk of fire and damage to the mechanical integrity of the system. AC grid connection shall be made in accordance with the device technical requirements to ensure that the installation is sufficient to supply the rated maximum current and power. The product uses relays, which can cause arcs during switching. **The device shall be installed in a location free from flammable gases and liquids to avoid an explosion hazard.**

**Mechanical**: The product is intended for wall or panel mounting. It shall not be installed on ceilings, floors, or inclined walls. To avoid mechanical damage, the product shall be mounted as described in the installation guide, and using the specified tools and materials.

Proper Personal Protective Equipment is recommended, including but not limited to: eye protection, electrical shock protection, gloves, and other appropriate protection.

### 1.2. Tools and materials

#### *1.2.1. Tools*

- A set of Torx, Phillips, and Flathead screwdrivers with insulated handles, set of hex keys
- Torque limited drill or cordless screwdriver, drill bits for masonry (8 mm)
- Hammer drill and bits
- Electrician kit, including pliers, strippers, ferrule and RJ-45/11 crimping tools

#### *1.2.2. Materials*

- Conductors (insulated single-core or stranded), conduit, cable tie-downs, cable clamps
- Signal cables (UTP5 cable)
- Connectors (RJ-45/11) and ferrules
- Insulation materials
- Wall anchors for mounting the charger body

#### 1.2.3. Site survey and selection

The charger can draw up to 32A per phase at 230VAC and **shall be installed on a dedicated circuit**(s). The entire building electrical installation must be adequately sized to accept this load under peak loading conditions. Ensure that all elements of the electrical installation, from the utility connection, through to the dedicated charger circuit are adequate for the rated power.

Ensure that the distribution panel has a position for 1/3 dedicated circuit breakers (CBs). Although the charger has overcurrent protection, each phase **must** be protected with an individual CB. Details are provided in the following sections regarding its rating and possibilities to derate.

The charger is designed for indoor and outdoor installation. To ensure a long service life, select a location that is not exposed to harsh elements, such as direct sunlight and rainfall, has proper ventilation and normal humidity.

Consideration about connectivity must also be made. For example, if the charger is to be connected online via Wi-Fi, select a site within range of the wireless network to ensure a steady connection. Alternatively, select a site with easy access to a wired network connection or mobile network coverage. Consider that CT clamps, which are installed at the main distribution panel, need a wired connection to the charger. If a MID meter is to be installed, allocate space which is compliant with the manufacturer's requirements.

**ELECTRICAL CIRCUIT PROTECTION**

A type 2 surge protection device should be installed according to the guidance on requirements in BS7671:2018 section 443.

All installations must comply with current wiring regulations (**18th Edition Wiring Regulations BS767) and be carried out by a qualified electrician**.

### 1.2.4. Electrical wiring and breaker requirements

#### 1.2.4.1. Calculating circuit voltage drop and sizing circuit wiring and breaker

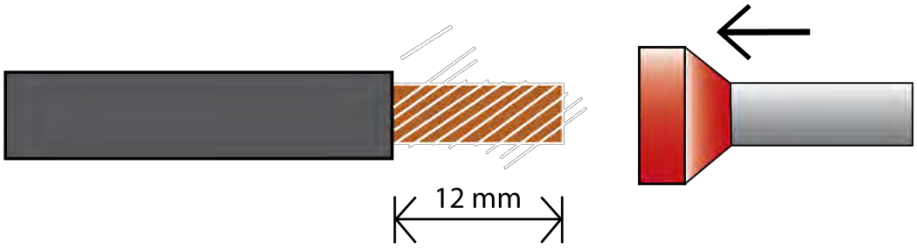
| Installed length, m | Voltage drop in copper conductor at 40A, VAC | | | |
|---|---|---|---|---|
| | Area, $mm^2$ | | | |
| | **4*** | **6**** | **10** | **16** |
| **5** | 1.7 | 1.2 | 0.7 | 0.4 |
| **10** | 3.4 | 2.3 | 1.4 | 0.9 |
| **15** | 5.2 | 3.5 | 2.0 | 1.3 |
| **20** | 6.9 | 4.6 | 2.7 | 1.8 |
| **25** | 8.6 | 5.8 | 3.4 | 2.2 |
| **30** | 10.3 | 7.0 | 4.1 | 2.6 |
| **35** | 12.0 | 8.1 | 4.8 | 3.1 |

**Note: Shaded areas indicate excessive voltage drop**
***recommended minimal conductor area for 16A charging**
**** recommended minimal conductor area for 32A charging**

| Installed length, m | Voltage drop in aluminium conductor at 40A, VAC | | | |
|---|---|---|---|---|
| | Area, $mm^2$ | | | |
| | **4** | **6*** | **10**** | **16** |
| **5** | 2.6 | 1.8 | 1.1 | 0.7 |
| **10** | 5.3 | 3.5 | 2.2 | 1.4 |
| **15** | 7.9 | 5.3 | 3.2 | 2.0 |
| **20** | 10.6 | 7.0 | 4.3 | 2.7 |
| **25** | 13.2 | 8.8 | 5.4 | 3.4 |
| **30** | 15.8 | 10.6 | 6.5 | 4.1 |
| **35** | 18.5 | 12.3 | 7.6 | 4.8 |

**Note: Shaded areas indicate excessive voltage drop**
***recommended minimal conductor area for 16A charging**
**** recommended minimal conductor area for 32A charging**

In order for the charger to provide full charging power, it must be supplied through a dedicated circuit capable of handling the full 32A of **current per phase** with less than 10 VAC voltage drop. The circuit's nominal rating should be no less than 40A. The circuits can be implemented with solid or stranded copper wire, or copper-clad aluminum wire. Stranded conductors shall be connected to the device only after a ferrule is installed.



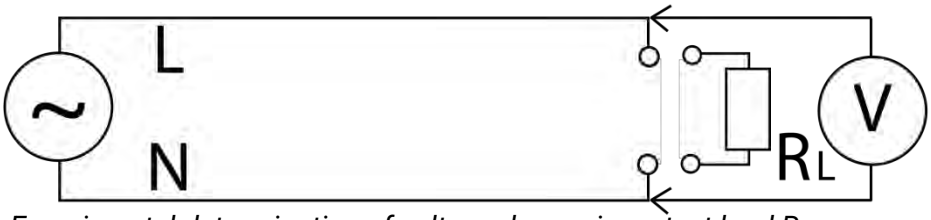

*Ferrule installation for stranded power conductors*

The tables above can be used to determine the approximate voltage drop at peak currents **per phase**. **The installed length is the running distance from the source panel to the charger** (the table takes into account resistance in **both legs** of the circuit).

For single-phase chargers, the following table can be used to determine the maximum power an existing circuit can provide, if there is no provision for a new installation:

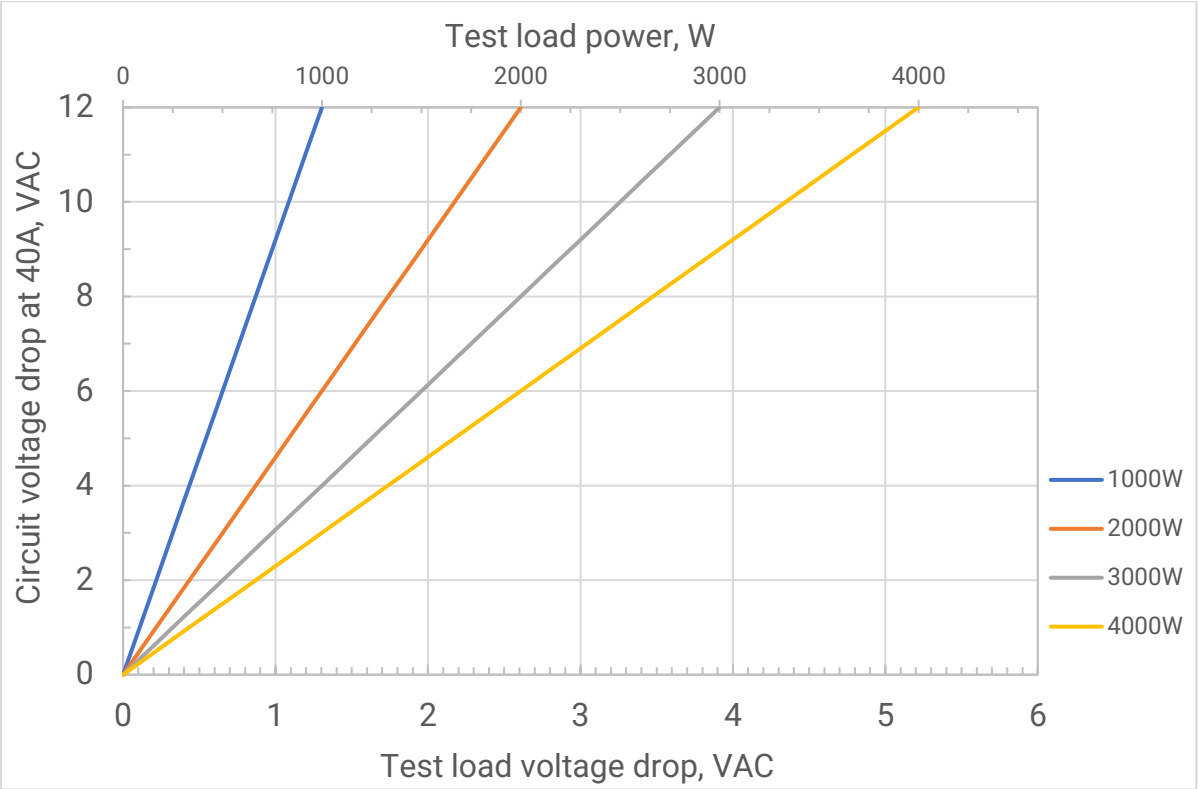
| **Derating guideline for single-phase charger** | | |
|---|---|---|
| Circuit Capacity*, A | Max Charging Current, A | Max Delivered Power, kW |
| 40 | 32 | 7.4 |
| 32 | 25 | 5.8 |
| 25 | 20 | 4.6 |
| 20 | 16 | 3.7 |
| 16 | 13 | 3.0 |
| * C-curve rating of circuit breaker | | |

The circuit voltage drop at peak load can also be determined using a test load $R_L$ of lower power rating. The voltage drop is calculated from the difference between the open-circuit and loaded voltage at the circuit load side: **Voltage drop = $V_{open\text{-}circuit}$ - $V_{Load}$**




*Experimental determination of voltage drop using a test load $R_L$ - measurement*

The nomograph below can be used to calculate the circuit voltage losses at peak current. For a given test power load, a line can be drawn from the origin to the corresponding value on the upper horizontal axis. Then, the measured voltage drop can be matched to the corresponding peak current drop by reading out the left vertical axis. The nomograph includes sample plots for 1-4 kW test loads and assumes nominal 230V at which the test load is specified.




*Calculation of voltage drop at 40A based on test load of known power*

In circumstances where the supply installation is inadequate for the full charging output of the charger, refer to the derating guideline and set the maximum output current accordingly when comissioning a single phase charger.

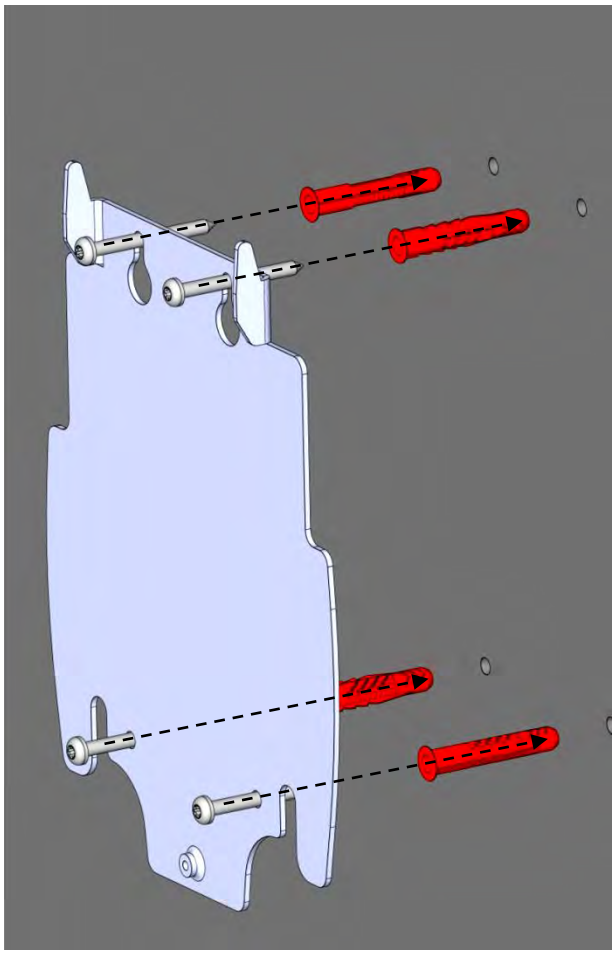
# 2. Installation: Mechanical

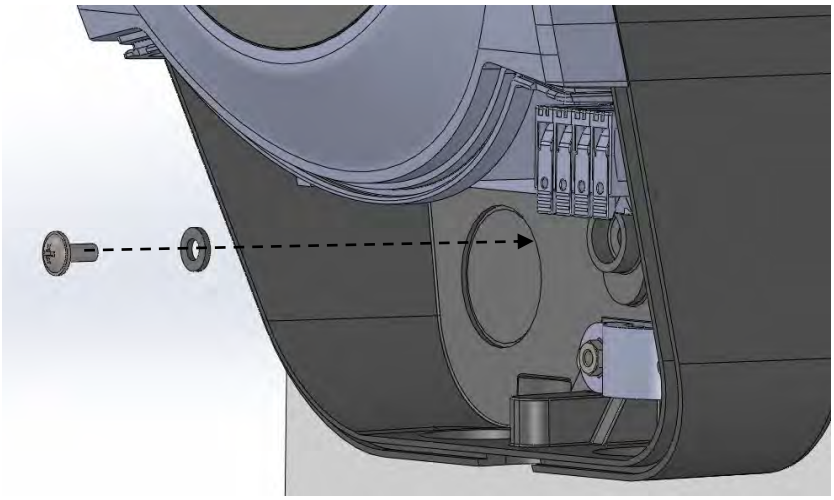
## 2.1. Installing the mounting plate

The charger comes with a mounting accessory to facilitate installation and servicing. The charger locks into the mounting bracket and is secured with a single screw, located under the service hatch.

The bracket is wall-mounted via four anchor bolts provided in the kit. A drill template is available on the back of the quick installation manual, which can be used to correctly locate the holes for the anchoring bolts.

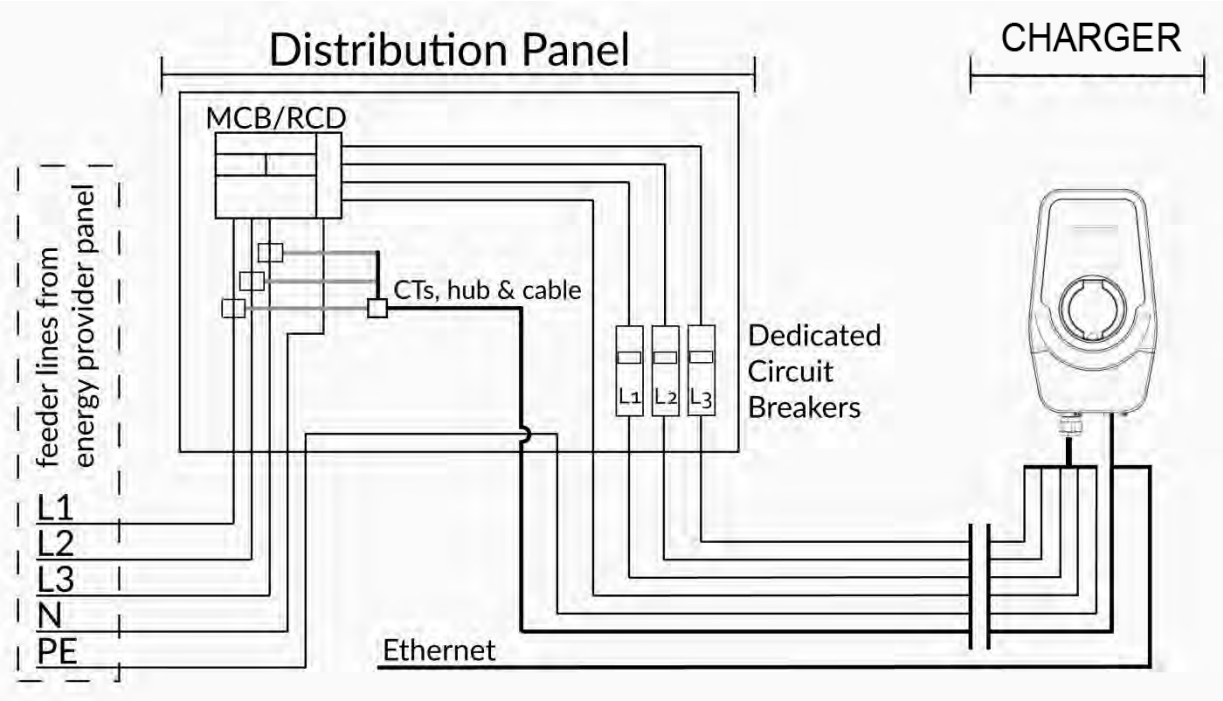
The charger body is attached to the mounting plate by locking its upper side onto the metal hooks and then securing the bottom as shown below.

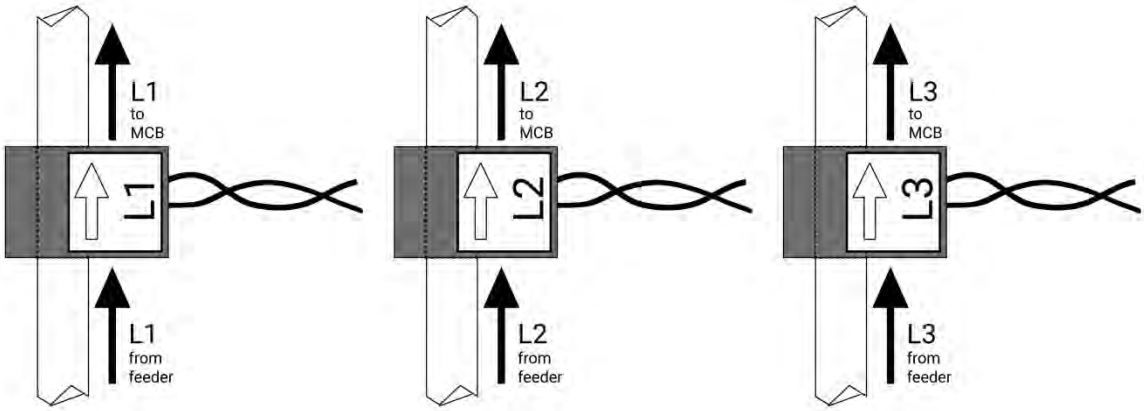




# 3. Installation: Electrical

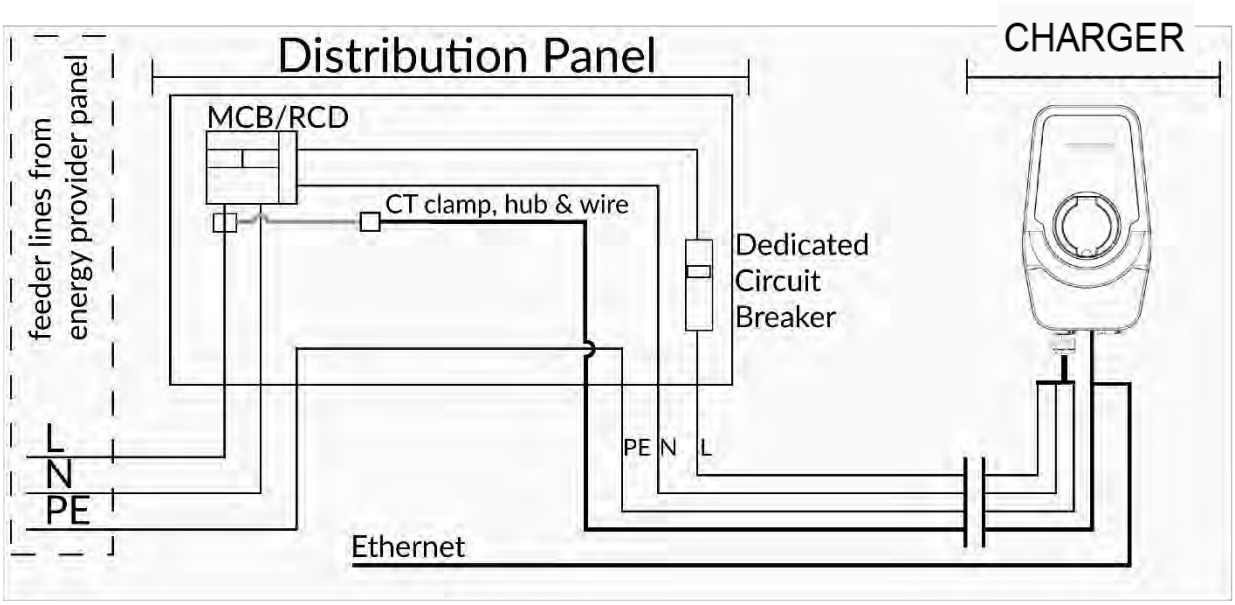
## Overall system wiring diagram: 3-phase with CT clamps

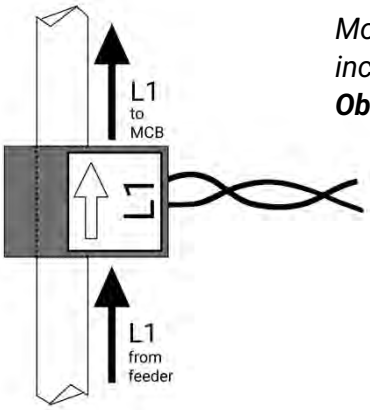



*Mounting and orientation of current transformers (CTs) on the incoming supply cables of the electrical mains installation.* ***Observe arrow directions and line markings!***

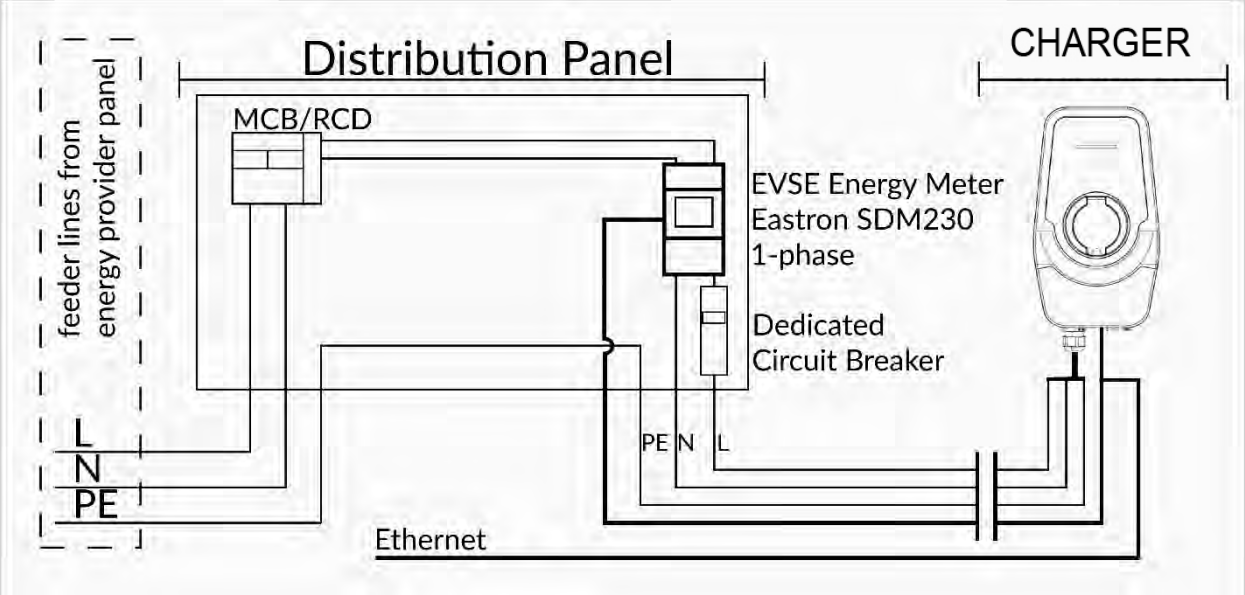
## Overall system wiring diagram: 1-phase with CT clamp

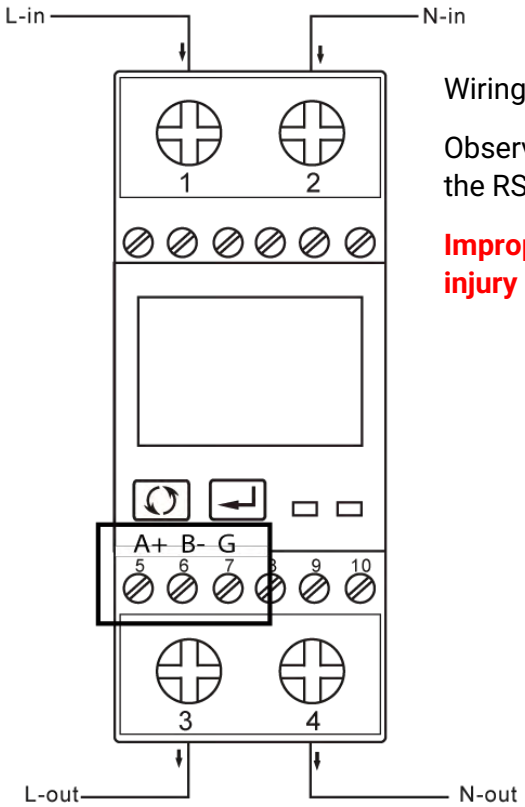



*Mounting and orientation of current transformers (CTs) on the incoming supply cables of the electrical mains installation.*
***Observe arrow directions and line markings!***

## Overall system wiring diagram: 1-phase with MID meter



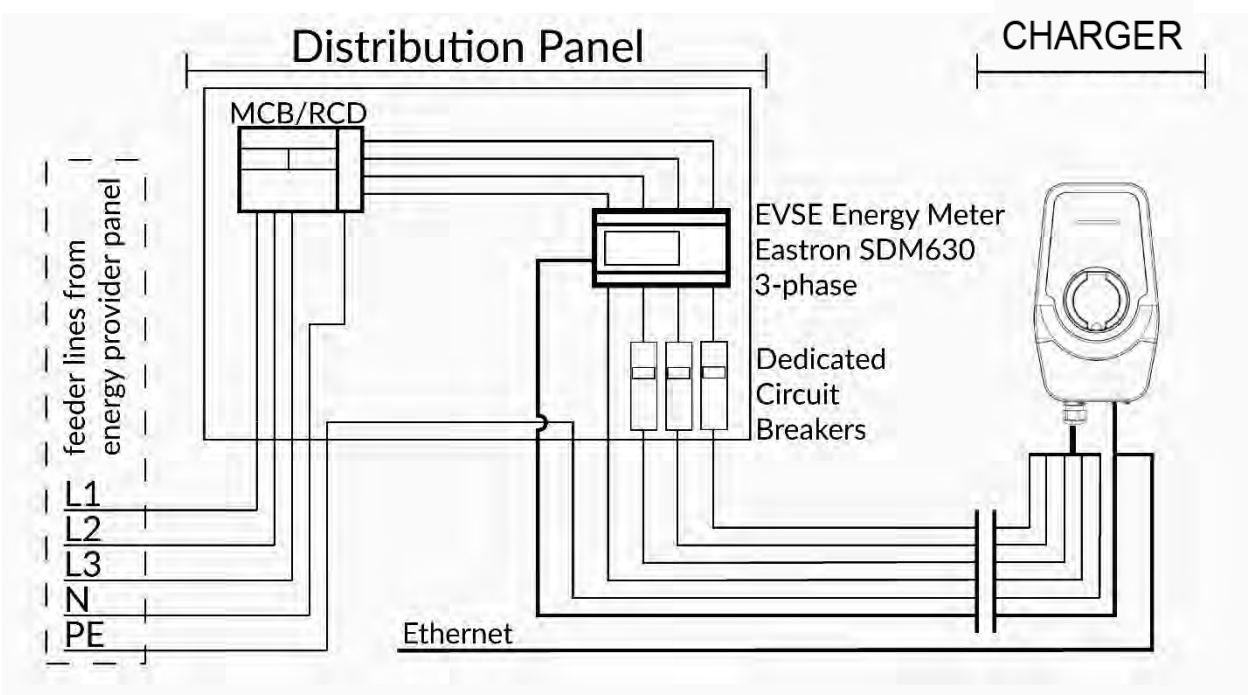



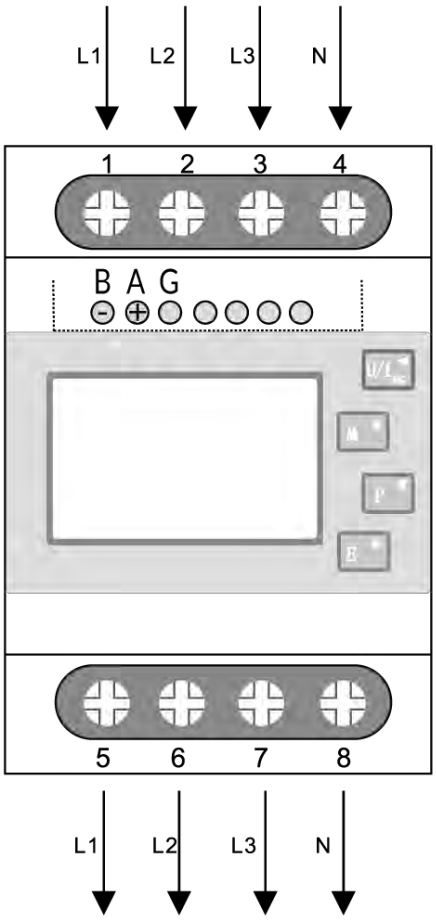

Wiring diagram for the **EASTRON SDM230 Modbus V2**

Observe the direction of power line wiring and the pinout for the RS-485 communication bus (G=GND).

**Improper connection may result in serious damage and/or injury hazards!**

## Overall system wiring diagram: 3-phase with MID meter

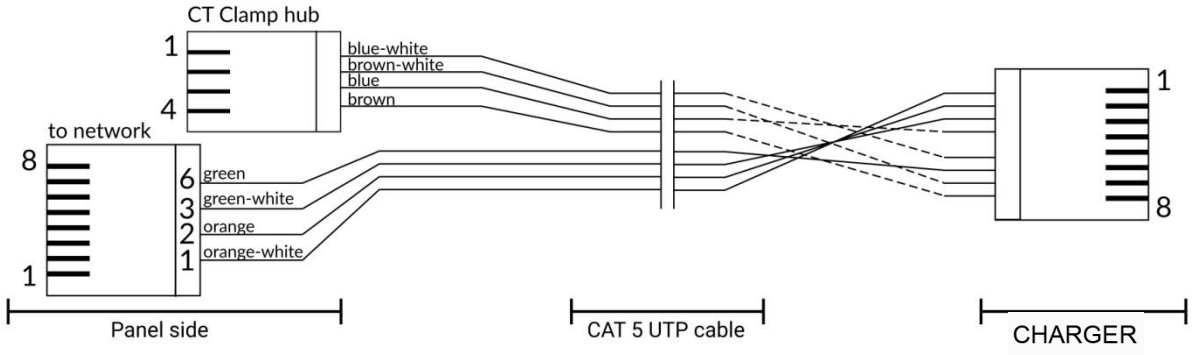



Wiring diagram for the **EASTRON SDM630 Modbus V2**

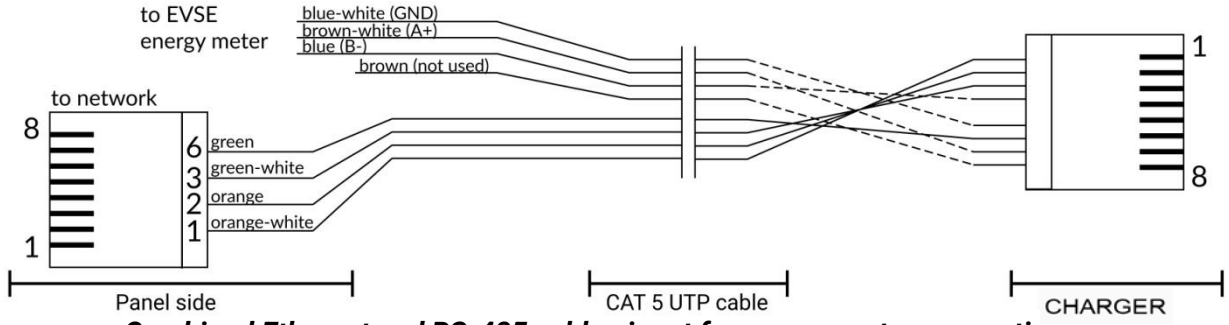
Observe the direction of power line wiring and the pinout for the RS-485 communication bus (G=GND).

**Improper connection may result in serious damage and/or injury hazards!**




***Combined Ethernet and RS-485 cable pinout for CT clamp connection***

In installations without RS-485 peripherals (CT clamps or energy meter) and with Ethernet connectivity, a standard Ethernet patch cable can be used to connect the charger and a router. For installations with 485 communication, the wiring connects to the charger via the same RJ-45 port on the device by means of 4 unoccupied connections (2 twisted pairs) on the connector. Since every installation will have custom lengths of cable runs, the installers will determine the appropriate lengths of signal cables to use (**up to 30 m for both Ethernet and CT clamp/energy meter connections**).




***Combined Ethernet and RS-485 cable pinout for energy meter connection***

Due to the universal availability of CAT5 UTP cable, it can be used as a combined cable for the Ethernet and CT clamp connections, avoiding a second run of signal wires. Two twisted pairs are used for the CT clamp connection and two for the Ethernet Tx and Rx lines. The following table summarizes a suggested connection scheme, consistent with RJ-45B wiring scheme.

| Interface | | Interface Pin # | charger RJ-45 Pin # | Wire Color |
|---|---|---|---|---|
| RS-485 4P4C | GND | 1 | 5 | blue-white |
| | A | 2 | 7 | brown-white |
| | B | 3 | 4 | blue |
| | VCC | 4 | 8 | brown |
| Ethernet RJ-45* | Tx+ | 1 | 1 | orange-white |
| | Tx- | 2 | 2 | orange |
| | Rx+ | 3 | 3 | green-white |
| | Rx- | 6 | 6 | green |
| * Pins 4,5,7,8 must not be connected! | | | | |

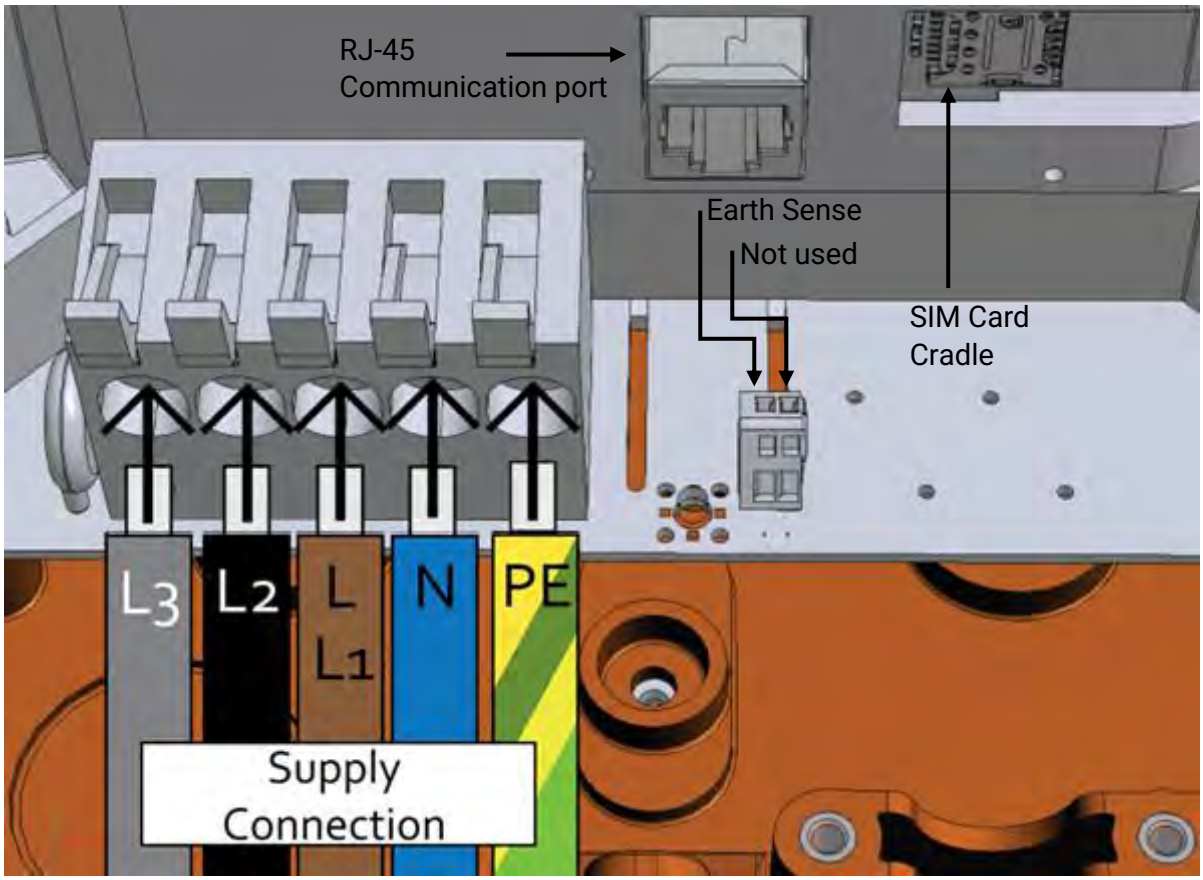
## 3.1. charger wiring scheme

The power and signal conductors can be connected to the device after the charger body has been mounted to the wall and the cable glands have been installed. The conductors are pulled through the gland with enough slack to make the connections without strain. The charger uses lever terminal blocks for all connections except for the output PE terminal for tethered models, which requires a round cable terminal lug.

charger series 3SLC/3TLC can be configured as either single or three-phase models. Observe the respective wiring procedure and subsequent commissioning steps to ensure proper operation.

**Safety note:** before working with bare conductors, ensure that the power is disconnected and the circuit is not live!

### 3.1.1. Socketed

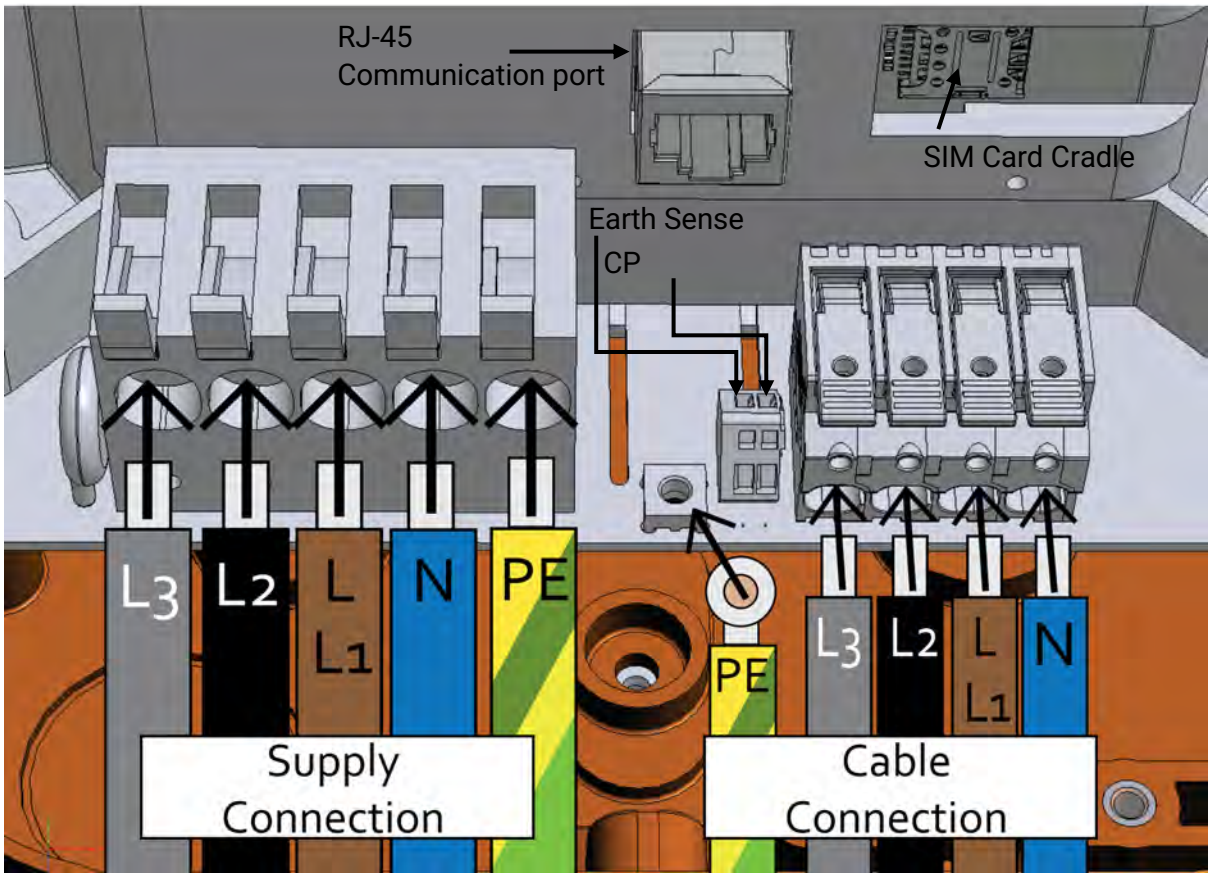



Socketed charger models need the following setup:

- Communication cable (Ethernet and/or RS-485 connection) – to RJ-45 Port
- SIM Card for network connection
- Power:
    - Single-phase models – L/N/PE connection from distribution board
    - Three-phase models – R/S/T (L1/L2/L3) + N + PE connection from distribution board

- Earth sense connection (for diagnostic use only, not configured in installations)

### 3.1.2. Tethered




Tethered charger models need the following setup:

- Communication cable (Ethernet and/or RS-485 connection) – to RJ-45 Port
- SIM Card for network connection
- Power:
    - Single-phase models – L(L1)/N/PE connection from distribution board
    - Three-phase models – R/S/T (L1/L2/L3) + N + PE connection from distribution board
- Output:
    - Single-phase models – L(L1)/N/PE connection to tethered cable
    - Three-phase models – R/S/T (L1/L2/L3) + N + PE connection to tethered cable
    - CP connection from tethered cable
- Earth sense connection (for diagnostic use only, not configured in installations)

***Note:** the charger tethered chargers use a dedicated PE output terminal. Connection to the terminal is made using a secure cable lug and M4 screw.*

## 3.2. Installation: RS-485 peripherals (CT clamp/E-meter)

The charger series 3SLC/3TLC support peripheral devices on an RS-485 bus (wired twisted pair connection extending up to 30m). Currently supported devices are CT clamps and Eastron MID meters ("Modbus V2" series, #230 for single-phase and #630 for three-phase). The charger supports **one** device on the RS-485 bus per unit.

CT clamps are intended to be installed on the current-carrying live conductors ahead of the MCB. They monitor the total installation power (e.g., of an entire house or parking lot) and relay the values to the charger unit, which can then regulate its output power to prevent the MCB from tripping.

CT clamp kits consist of a split-core current transformer hard-wired to a CT transmitter hub, which measures and converts the reading of the transformer into digital signals for the charger. Ensure that the CT clamps are secured to their designated phase in three-phase installations. Failure to do so may result in incorrect current readings and charging malfunction. If a charger is configured as a single-phase charger, it may use a single-phase CT clamp kit or a 3-phase kit where only the L1 current transformer is connected to the feeder line supplying the charger.

When an external MID energy meter is used on the RS-485 bus, the EVSE will obtain the voltage, current, and power measurements from the device and store them in its internal memory. The MID meter is intended to be installed immediately upstream of the charger, so that it will only monitor and measure the power for charging EVs. As noted, the charger series is guaranteed to work with Eastron Modbus DIN rail meters. Other meters that use the **Modbus RTU** protocol can be used, provided that the following required parameters are met:

- Baud rate: 9600bps.
- Start bit: 1
- Data bits: 8
- Parity: None
- Stop bits: 1
- MDBUS device address: 0x01

The following table provides the register set that must be implemented in a compatible MID meter (parameters marked with an asterix * are required for three-phase measurements):

| Address (Register) | Parameter Number | Modbus Input Register Parameter | Units | Hi Byte Addr | Lo Byte Addr |
|---|---|---|---|---|---|
| 30073 | 37 | Total Import kWh | kWh | 00 | 48 |
| 30075 | 38 | Total Export kWh. | kWh | 00 | 4A |
| 30001 | 1 | Phase 1 line to neutral volts | Volts | 00 | 00 |
| 30003 | 2 | Phase 2 line to neutral volts* | Volts | 00 | 02 |
| 30005 | 3 | Phase 3 line to neutral volts * | Volts | 00 | 04 |
| 30007 | 4 | Phase 1 current | Amps | 00 | 06 |
| 30009 | 5 | Phase 2 current * | Amps | 00 | 08 |
| 30011 | 6 | Phase 3 current * | Amps | 00 | 0A |
| 30013 | 7 | Phase 1 power | Watts | 00 | 0C |
| 30015 | 8 | Phase 2 power * | Watts | 00 | 0E |
| 30017 | 9 | Phase 3 power * | Watts | 00 | 10 |

## 3.3. Installation: Commissioning

**Only commission the charger after all electrical and mechanical prerequisites have been fulfilled.**

Before switching on the power to the charger circuit, ensure that all electrical connections have been made securely and that no conductors remain exposed or touching. Ensure that the two sections of the device have been firmly secured with the mounting bolts.

On power-up, the charger will provide visual and sound indication. It will beep briefly and the RGB light ring will light in yellow. The device can then be configured via the web client. Until it is configured, it will remain in the same state, indicated by a constant yellow light. If the product has been preconfigured to connect to a backend server and has an accessible internet network, it will connect and indicate an available status by a constant green light.

### 3.3.1. Connecting the charger to an OCPP backend

To function as a smart charger, the charger must connect to the Internet and access an OCPP-based backend. It can achieve this via three physical interfaces: cellular (GSM), WiFi, or Ethernet. For uninterrupted operation, the device is able to switch between interfaces, automatically falling back to a functional connection. Internet connectivity is configured in the charger's web client or the installer's mobile app as further described in the commissioning steps. The following information must be considered:

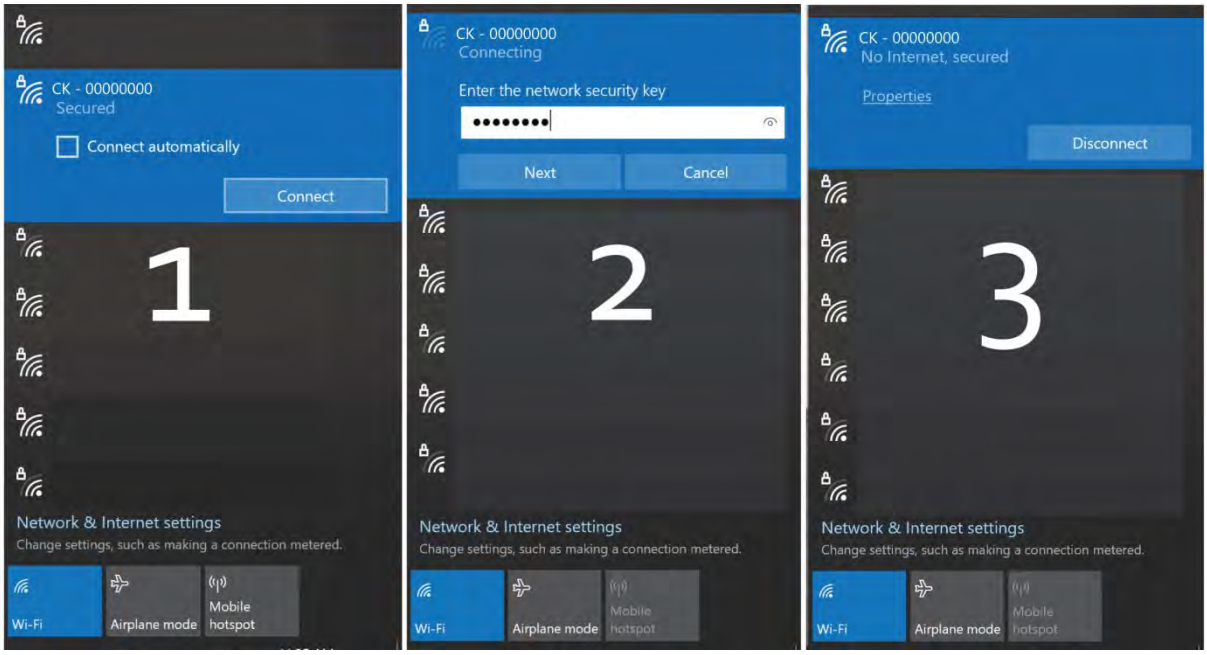
- **Cellular/GSM:** to enable as either a main or fallback interface, a SIM card (mini-SIM) **must** be installed! The SIM card cradle is located under the service cover as indicated in the electrical installation graphics. If the SIM card does not have the APN pre-loaded, it must be manually entered via the web client as explained below.
- **WiFi:** can only be enabled as a main interface. In the web client or installer's app, the relevant SSID and PSK (password) of the access point to be used, are entered.
- **Ethernet:** can only be enabled as a main interface. Requires a wired connection from a network switch connected to the Internet to the charger's RJ-45 receptacle, located under the service cover. Ethernet connectivity works through an integrated DHCP client, which must obtain an IP address from the local DHCP server on the connected LAN network.

***Note:*** *To ensure that the charger is correctly configured and connected to the internet, please check the "Network status" in "Device Status and Control" page from the charger's web client!*

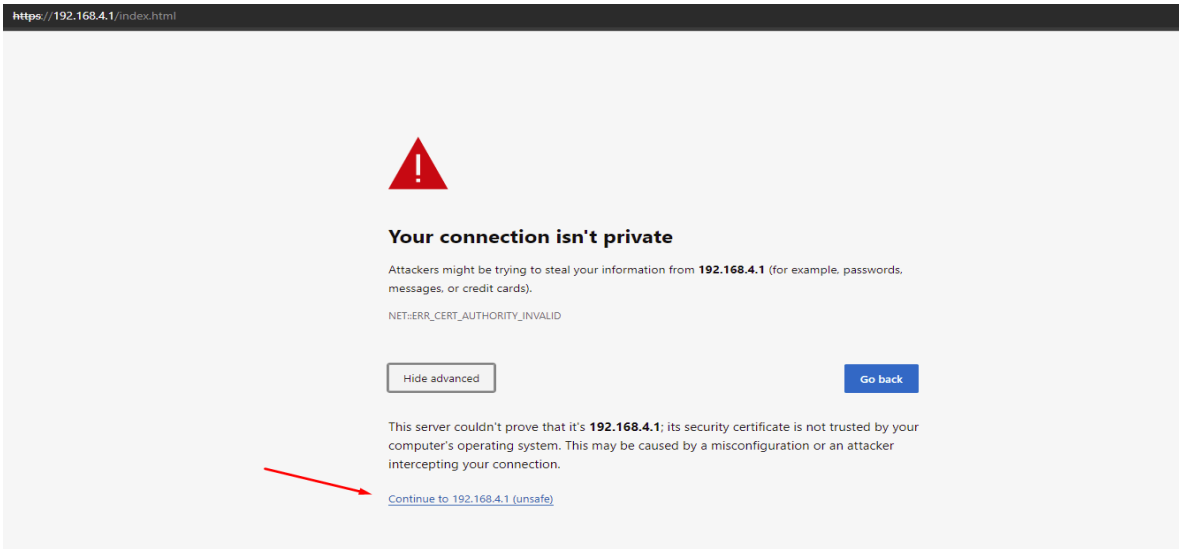
## 3.3.2. Accessing the web client (web UI) and configuration

The charger has a backend that is accessible via a web interface. The web client can be accessed from any HTML browser on a Wi-Fi enabled device, such as a smartphone, tablet, or laptop. On startup, the charger broadcasts its name and serial number as a Wi-Fi network (e.g., CK-0000000). After entering its network pass code (credentials can be found on the factory NFC card supplied with the device), the device will be connected.

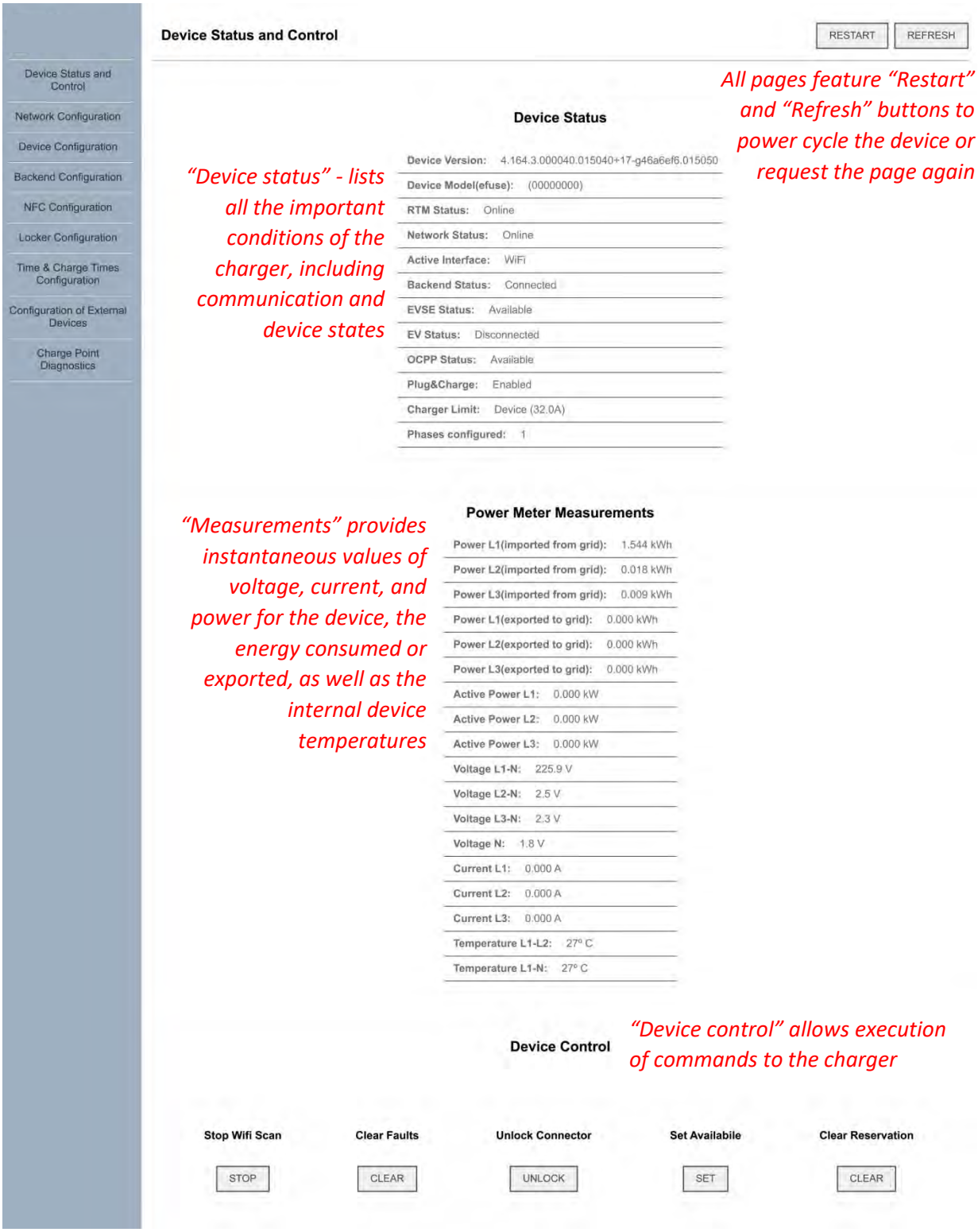
**Note: some mobile devices may notify that they are connected to a network but have no internet access. Such warnings can be waived and the device allowed to go through with the connection.**



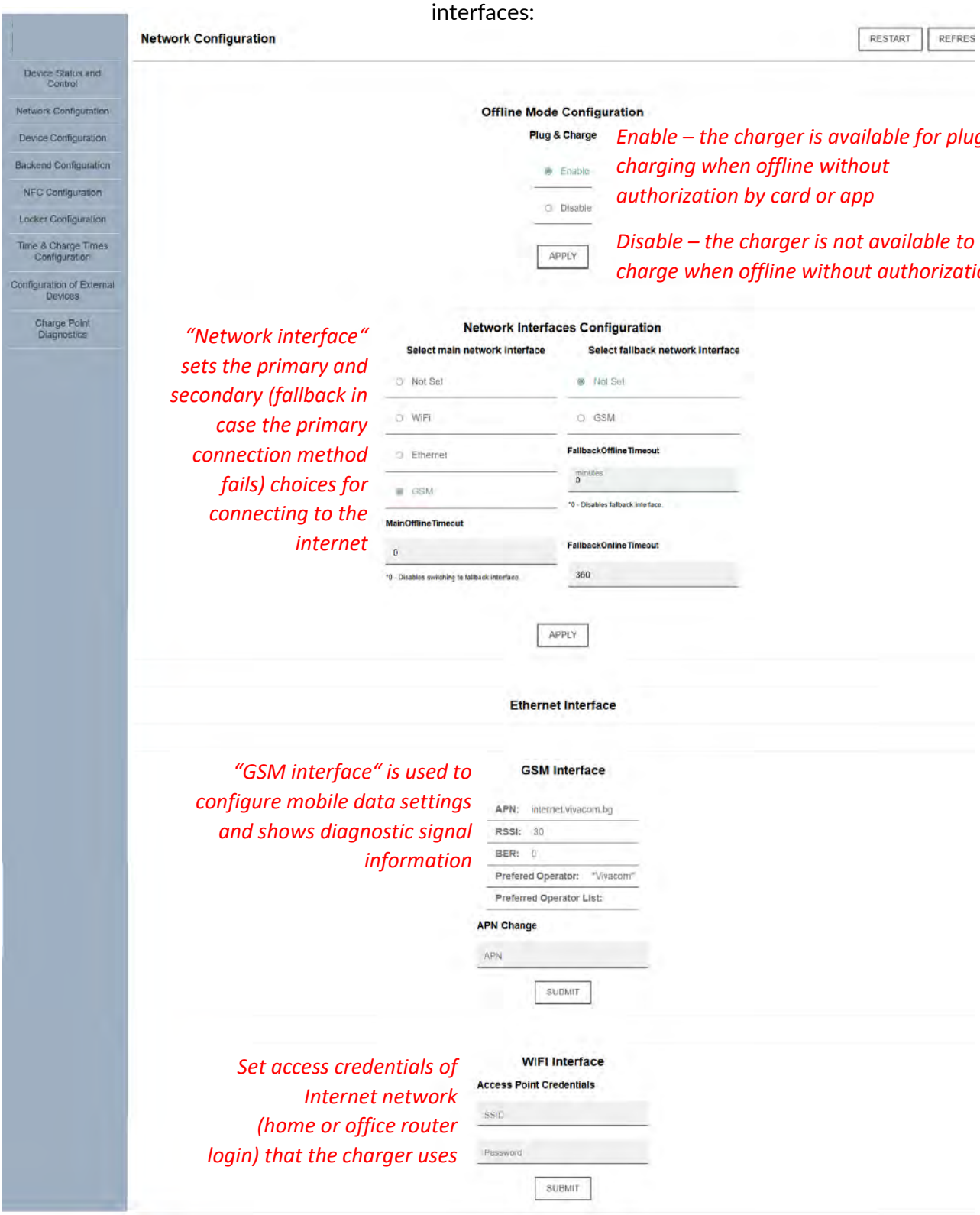

In a web browser, enter the index IP address (https://192.168.4.1/index.html). Ignore certificate warnings, if any arise; if certificate validation warnings persist, switch to a different browser (recommended – Firefox, Edge, Chrome, Safari):

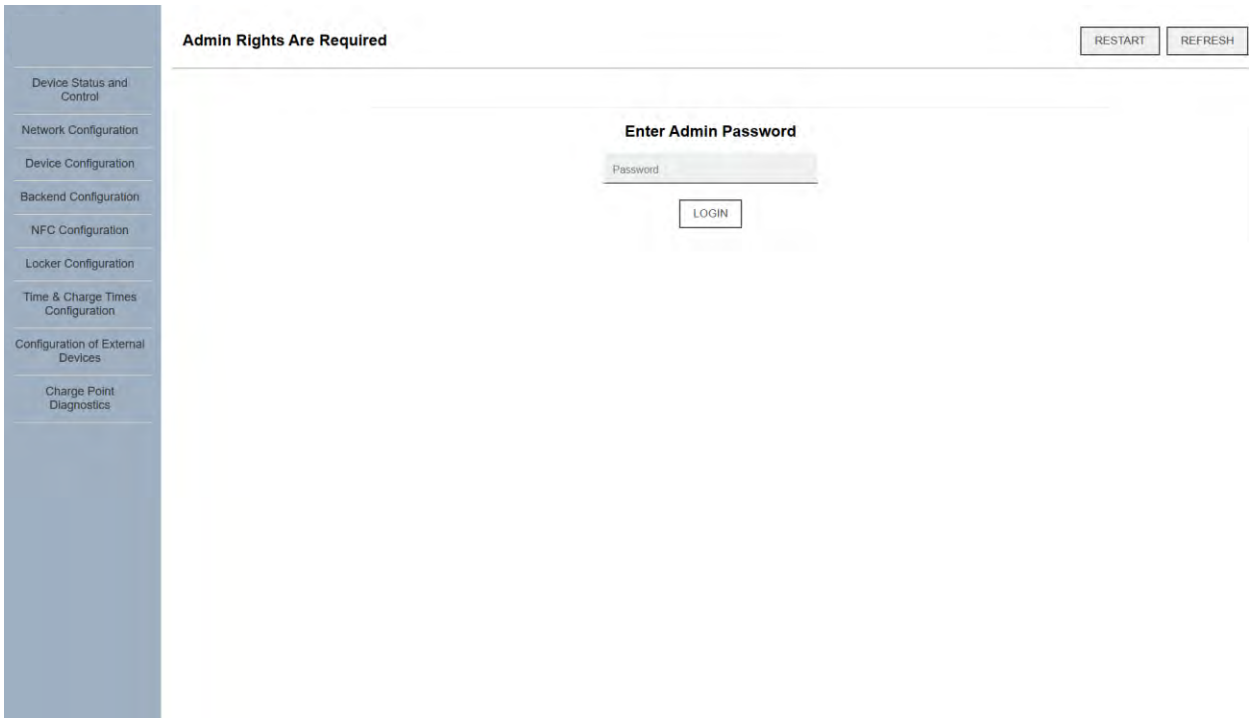


This will afford the main page of the EVSE web client - **Device Status and Control** – and a navigation bar on the left:



**Network Configuration** has important settings that are to be configured when deploying the charger, such as the internet network interface and possible fallback (secondary) interfaces:

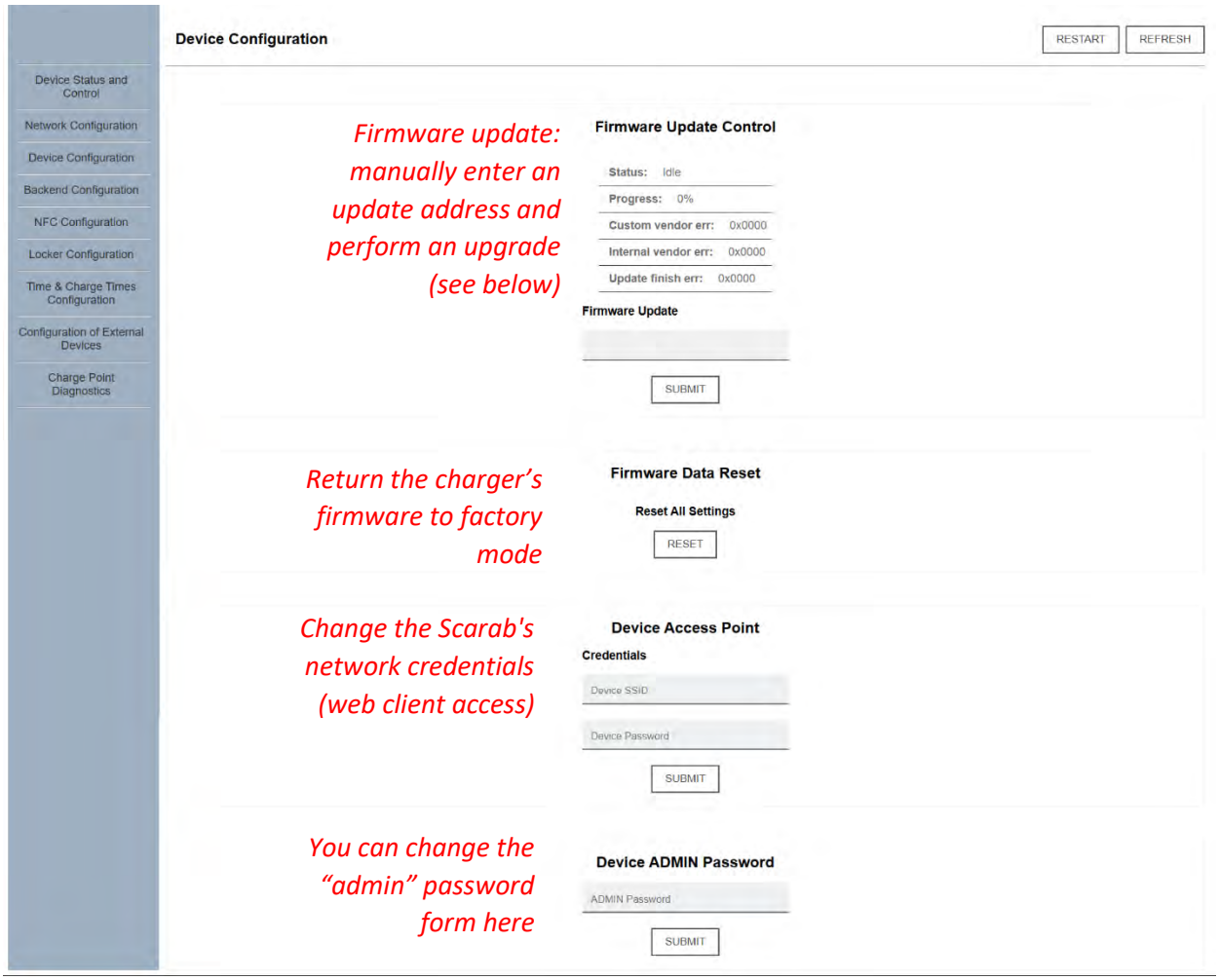





**Further configuration:**

*All settings after the "Network Configuration" tab in the web UI require an administrator password to be accessed and set. The "admin" password can be found on the factory NFC card provided with the charger. The devices comes preconfigured with default settings and parameters, some of which may have to be modified based on user requirements and installation specifics.*

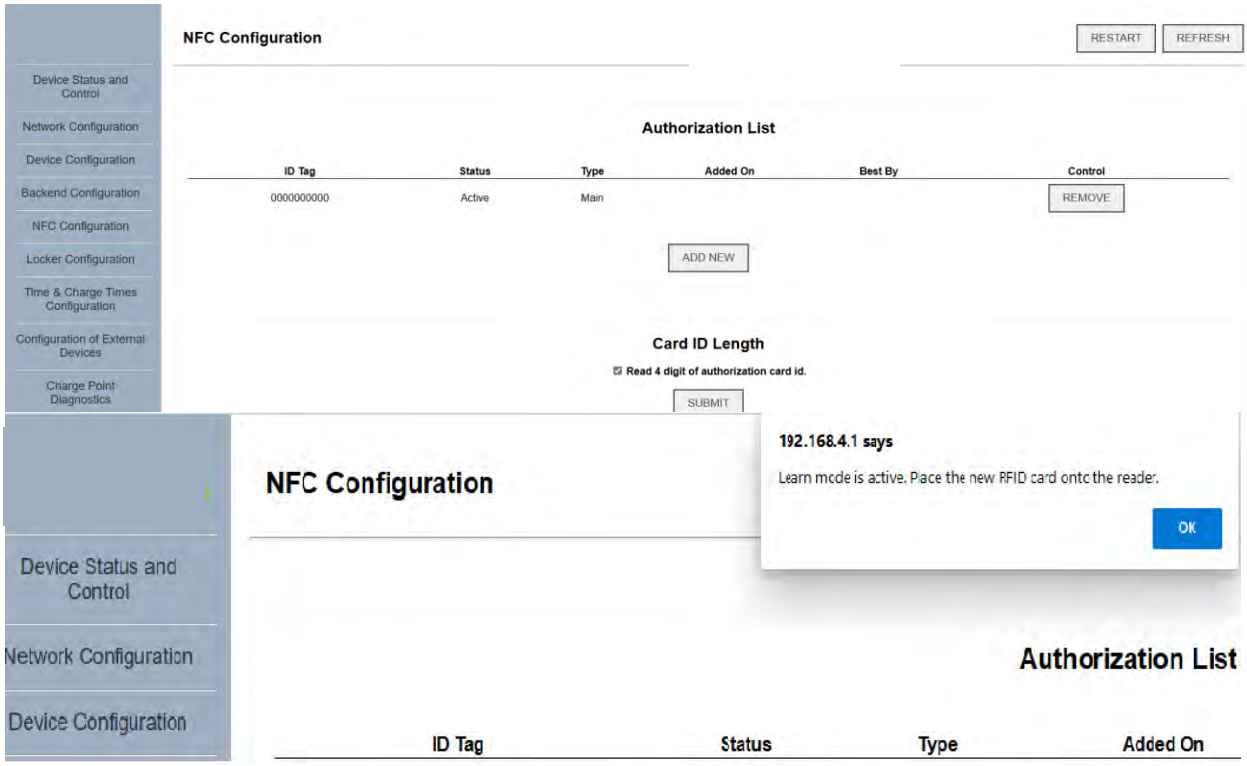
***Note:** it is **mandatory** to verify that the charger is correctly configured for the available electrical installation, i.e., for single- or three-phase operation and whether a CT clamp or MID meter is installed. These settings are found in the "Configuration of external devices" menu and are further explained in the following pages. Incorrectly configured external devices and/or number of phases will result in a fault state and/or diminished charging capacity!*



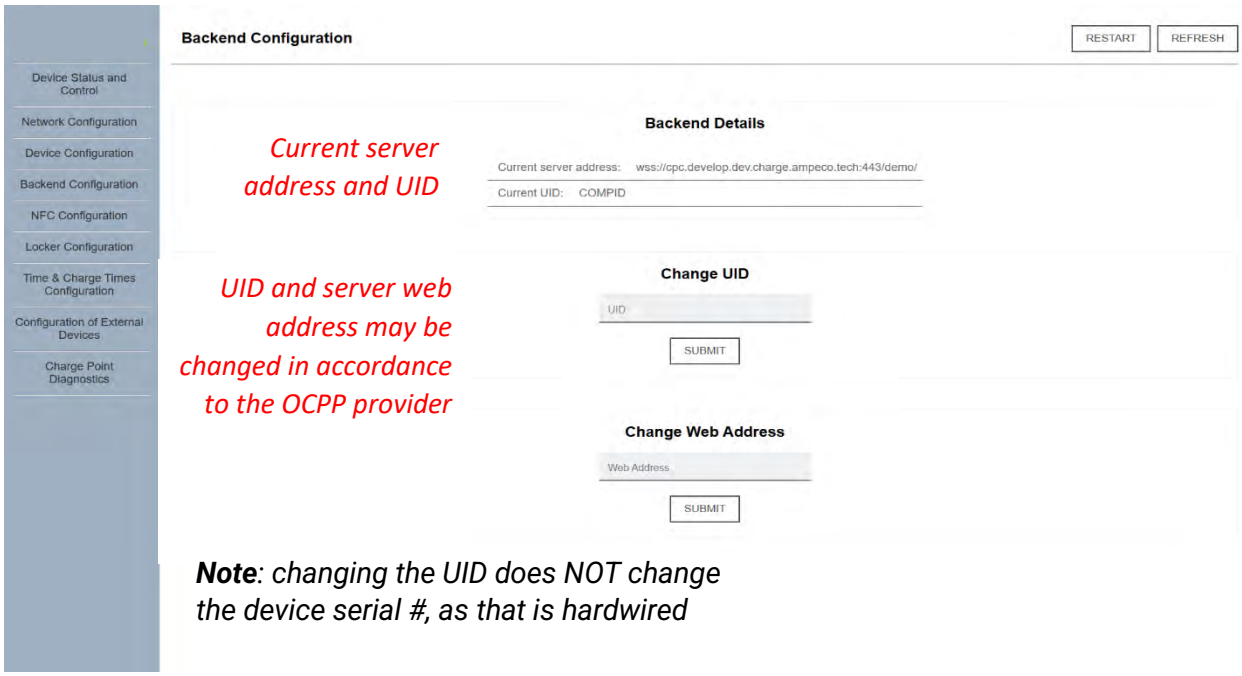

The "**Update**" section allows the configurator to set a firmware update via an Internet address pointing to a firmware update package. The address is set in the address text box and "Submit" is clicked. The update details are monitored above. Note that the charger will enter one or more several reset states while the update is being executed and the web client may become unresponsive at these times. Updates are usually done remotely via the OCPP server but may need to be executed locally for troubleshooting and diagnostics.

**Hint:** to verify that the firmware update URL is valid, it can be copied into an HTML browser and accessed, whereby a download should automatically begin of a ".bin" file type. If either the download does not begin or the downloaded file is not consistent with a firmware upgrade file, the user should verify that the address is valid and correct.

To add or remove NFC access cards, open the “**NFC Configuration**” tab. Here, the charger can be set into a “Learn” mode via the “ADD NEW” button, whereby tapping an access card on the reader section of the device will cause it to be entered and memorized. Listed cards can be deleted from the "REMOVE" button.

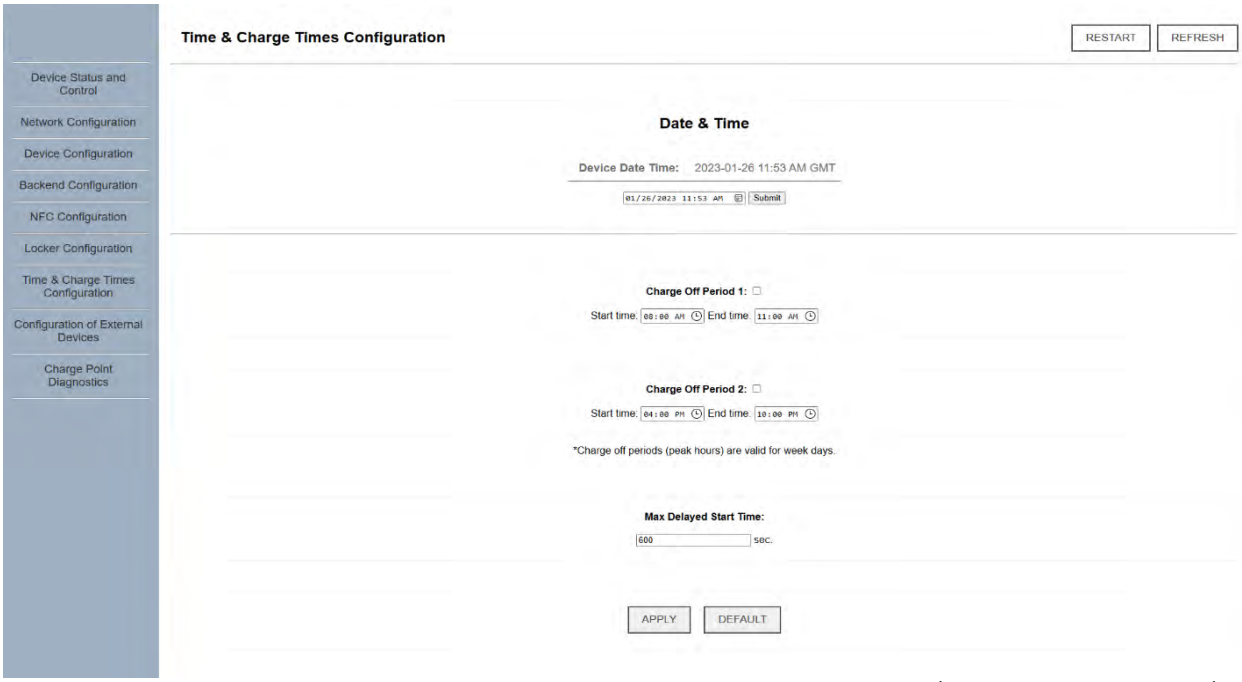


The charger comes with a preconfigured backend server address and UID, which can be found and, if necessary, changed, in the "**Backend Configuration**" tab:



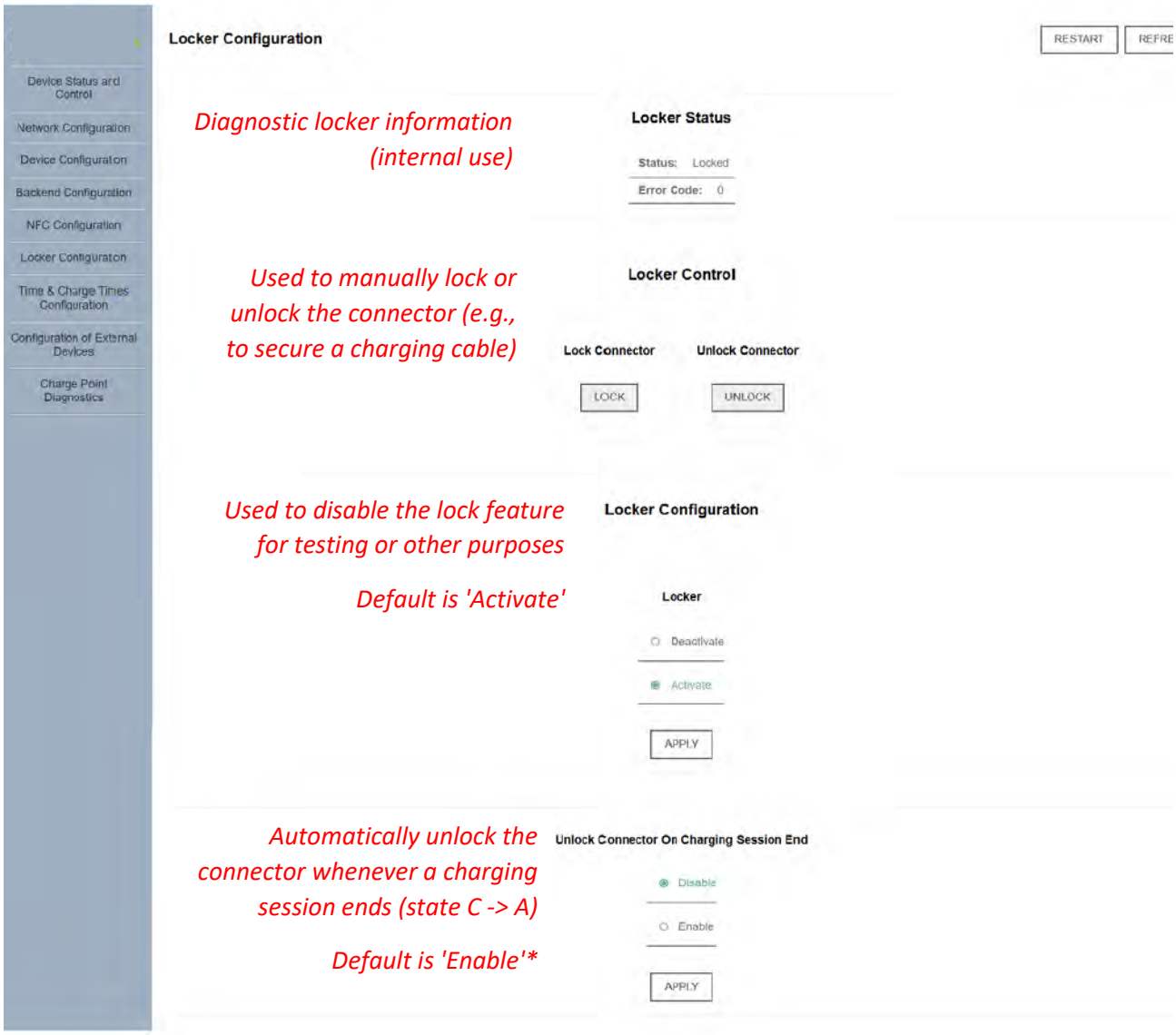

***Note**: changing the UID does NOT change the device serial #, as that is hardwired*

In the "**Date & Charge Times Configuration**" tab, the device local time can be adjusted, the default charging profile times can be set for offline use, and the randomized delay time value can be configured. Note that the charger will automatically set its date and time when online:



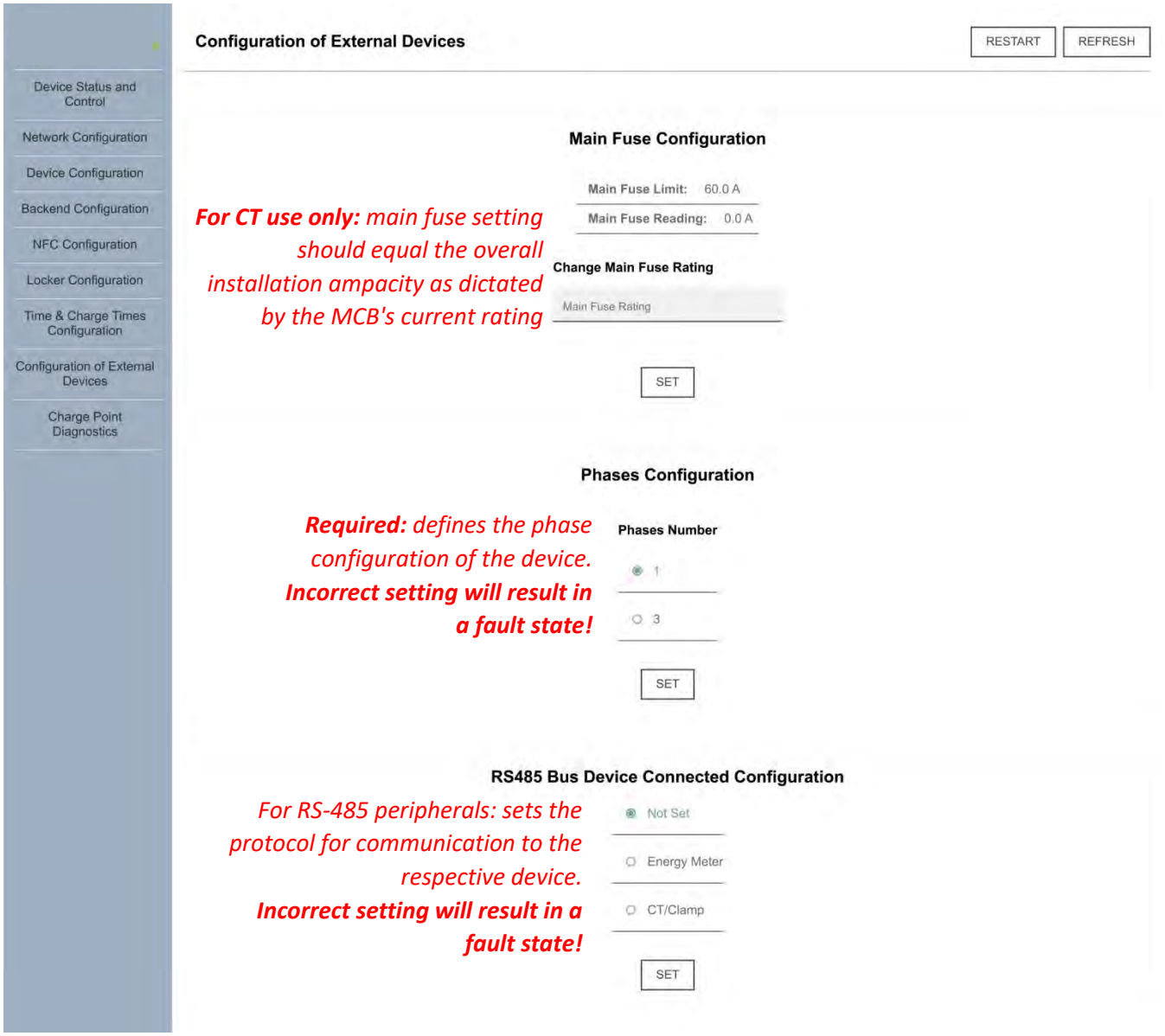

**Important note: the charger is compliant with the UK Electric Vehicles (Smart Charge Points) Regulations 2021 and includes the charging times and randomized delayed start (RDS) specifications of Pt. 2/art 10/p-ph 4(a)(b) and Pt. 2/art 11/p-ph 2(a). In its default configuration, the charger will comply to those time profiles and will not permit charging as specified by the periods. Likewise, in offline mode, it will apply RDS. These features can be modified or disabled in the "Date and Charge Times Configuration" window.**

All charger models with socket connections come equipped with an electromechanical lock mechanism and the "**Locker Configuration**" tab is available for the lock status and settings:




***Note: when enabled, the locker automatically disengages if the charger loses power. If a charging cord is to be permanently affixed, the recommended setting is 'Disable'. The user must then manually lock and unlock the cable via the app.***

To set-up RS-485 peripherals, such as CT clamps or energy meters, and to correctly set the SCARAB's power configuration use the **"Configuration of external devices"** tab:

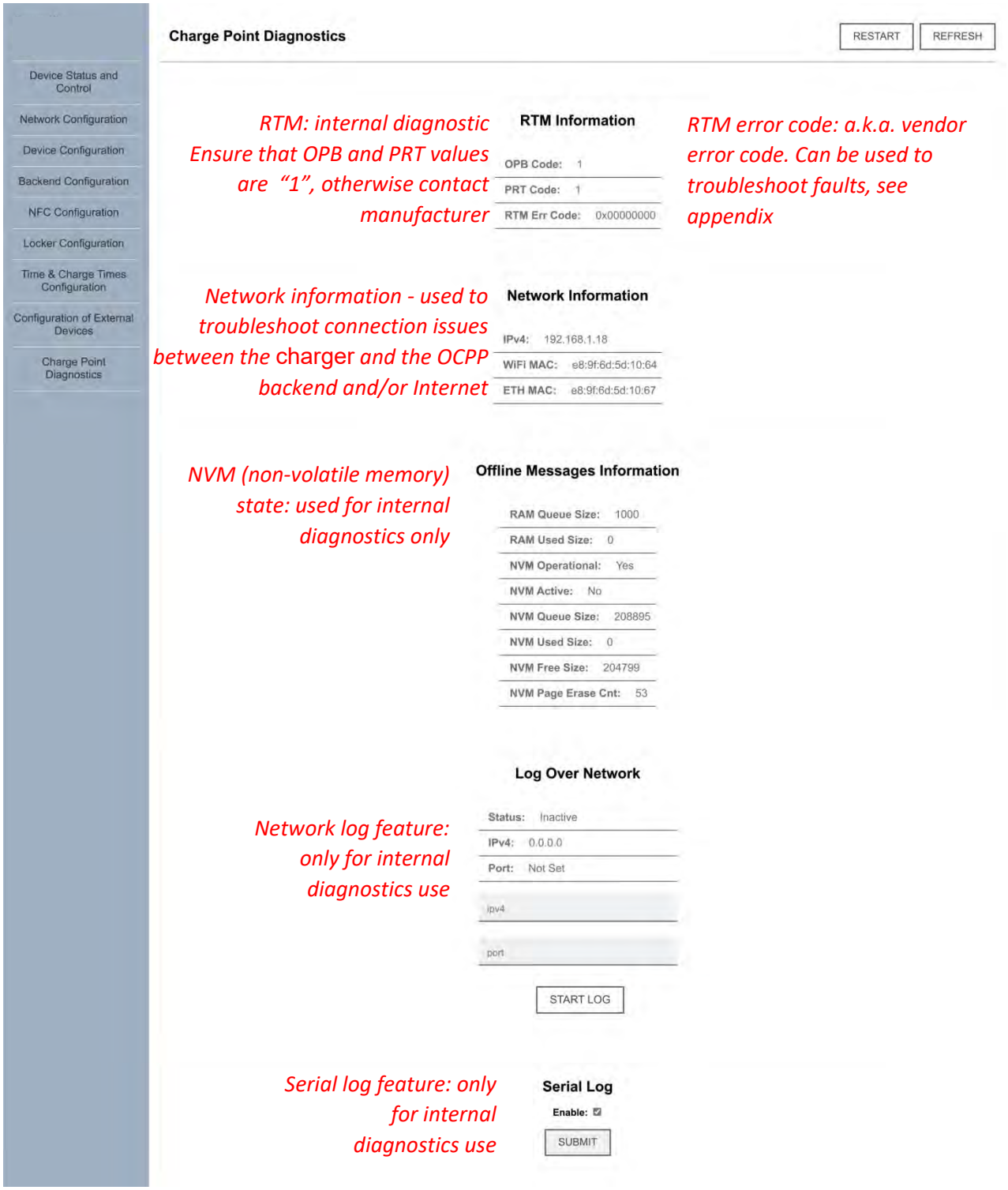



***Important note:*** *If a CT clamp is used as a peripheral, the charger will continuously monitor the RS-485 bus. If it loses connection with the clamp, charging will be automatically limited to* ***6A****. This applies both to single and three-phase configurations. A 3-phase CT clamp can be used with a single-phase charger, but not vice-versa!*

*When an energy meter is used as peripheral, the charger uses the meter's voltage, current, and power measurements to calculate and store energy. If communication between the meter and the EVSE is lost or a meter is not present, the charger will enter a fault state, which can be cleared by reconnecting or by disabling the RS-485 peripherals in the web UI.*

*With an energy meter in use, the charger can no longer monitor the total installation consumption.* ***Therefore, only a CT clamp peripheral should be used where power limiting may be necessary or desirable.***

The "**Charge Point Diagnostics**" tab contains useful troubleshooting information:




*RTM: internal diagnostic Ensure that OPB and PRT values are "1", otherwise contact manufacturer*

*RTM error code: a.k.a. vendor error code. Can be used to troubleshoot faults, see appendix*

*Network information - used to troubleshoot connection issues between the* charger *and the OCPP backend and/or Internet*

*NVM (non-volatile memory) state: used for internal diagnostics only*

*Network log feature: only for internal diagnostics use*

*Serial log feature: only for internal diagnostics use*

## 3.4. Installation: Troubleshooting

### 3.4.1. Verifying charger functionality:

At power on, the charger has default settings and configuration, which allow it to work as a basic charger in the offline state. It is possible to verify its basic functionality by plugging in an EV and observing that the charger starts a charging session. ***The web client main page can be used to verify that the charger is properly measuring electrical values and is online and connected to an OCPP backend***.

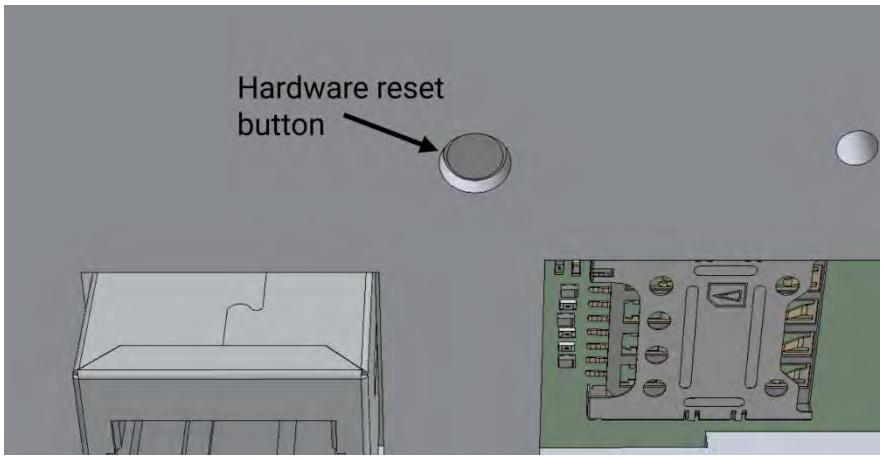
### 3.4.2. Common issues during commissioning:

1. No sound or light indication at power-on: the charger is designed to always beep and light its RGB strip at power on, to indicate that all components of the device are functional. The most common cause of missing indication is that there is a bad connection along the circuit and the SCARAB's power terminals are not receiving mains voltage. Verify that the circuit is properly connected and that the "L" (L1) terminal is receiving 230VAC nominal from the phase conductor for single-phase devices and that all phases are properly connected for three-phase devices. Check that mains supply parameters are adequate regarding RMS voltage, voltage fluctuations, spikes and noise.
2. The LED ring lights up red/blinking red: The charger is indicating a fault. This means that all components of the device are functional, but there is an issue that prevents the overall device from proper operation.
   a. The most common hardware cause of faults when commissioning is a phase reversal. The charger is incorrectly connected to mains and the neutral, live, or earth conductors are switched. Verify that the charger is correctly wired to the grid.
   b. Another common case is overvoltage due to incorrect supply wiring. In single-phase units on 3-phase installations, verify that the device is not across two phases of the grid, but between a phase and neutral. Verify that there are no excessive voltages present on the power line. Check the circuit voltage drop to verify that the voltage is within nominal range.
   c. Verify that the charger is correctly set up for the respective mains and earthing system (number of phases, phase order, etc.). If RS-485 peripherals are used, check their connection and configuration. For socket-type devices, check that the plug is fully inserted and that there is no debris preventing the locker form operating.
   d. Any specific fault can be identified and reset via the web client's main and diagnostics pages. Note that clearing a fault without removing the underlying problem will result in the charger to enter the same fault state after the reset.
   e. Software errors may be cleared by a power-cycle (hard reset) of the device. Disconnect it from power and after a short period, power it on again. Note that this does not work on every fault and is reserved as a simple troubleshooting step.
3. Connectivity problems may arise due to improper network setup. Ensure that the chosen network interfaces are correctly configured.

   For cellular connections, check that the SIM card is correctly installed and the APN is configured. For WiFi connections, verify that the correct access point is selected and its SSID and PSK credentials are correctly entered and that the wireless network is not behind a proxy. For wired Ethernet connections, check the pinout and connection of the cable and verify that the network switch has direct access to the internet since proxy authentication is not supported. If the LAN network is configured through a proxy, an exception for the chargers IP or MAC address can be configured in the network's settings. The MAC/IP can be found via the web client installer's mobile app.

### 3.4.3. Hardware reset

The configurator may determine that a factory reset of the device is necessary. A factory reset returns the device to its original software at the point of manufacture. Any firmware updates are not rolled back. The hardware reset button is located in a recessed hole between the SIM card cradle and the RJ-45 connector as indicated in the diagram below.




**To reset the device, it must be connected to mains power and operating in idle state. Any vehicle connected to the device must be detached.** The “reset” button is depressed for at least 60 seconds. The charger is then reconnected and powered on.

**Only perform a hardware reset if so, instructed by customer support. As the charger must be powered when resetting, take proper safety precautions when accessing the service panel to avoid electrical hazards.**

### 3.4.4. Tamper sensor

Depending on the specific hardware configuration, the charger comes equipped with either one or two tamper sensors, which are set to detect access to the charger's terminal panel (optional) and the main electronics compartment (included on all models). The device will alert the OCPP backend server via a status notification in the event that a tamper sensor is triggered.

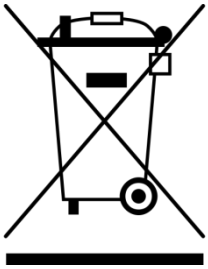
The normal procedures of installation and commissioning do not involve opening the charger main body; thus, no tamper events are expected to be generated from the main body sensor (unauthorized access to the main electronics compartment may render the charger warranty void!).

As the terminal block lid must be removed during installation and troubleshooting, models which include a terminal panel tamper sensor will generate a tamper event. This "soft" fault does not preclude the charger from operating and may be cleared via the web client or a power cycle (hard reset) of the charger. Further tamper events will be reported to the OCPP backend at every occurrence.

# 4. Maintenance, decommissioning, and disposal

The charger is designed to be maintenance-free during its lifetime. It is not indented to be repaired or serviced by the end user and any defects or issues should be addressed to the installers and manufacturer technicians.

The charger should be regularly cleaned with a dry or damp cloth by wiping the surfaces. Do not use soaps or solvents, such as petroleum or methylated spirits, acetone, etc., to clean the surfaces, because they can damage the surface finish and compromise the structural integrity of the device. Do not use pressure or steam washers to clean the charger, as it is not designed to withstand high-pressure water jets, which could result in water ingress and internal damage or short-circuits.



For disposal and decommissioning, the charger is designated as electronics waste and must be properly handled and disposed of as per national, regional, and local regulations.

To prevent hazardous electric shocks and the risk of arcing and fire, before decommissioning, ensure that power to the device is disconnected and it is not wired to any active systems.

# 5. Appendix I: Light state description with error codes and light indication explained

| charger RGB Light Status Indicators | | | | | |
|---|---|---|---|---|---|
| **Status** | **Online Illumination** | | **Offline Illumination** | | **Description** |
| Available | | | | | Device is available to start a charging session. In the online state, it is connected to the OCPP backend. Offline, it may be set up as Plug-in Charge" |
| Preparing | | OFF | | OFF | The charger is preparing to start a charging session. Occurs when an EV is plugged in and the charger is waiting for authorization to being charging. |
| Charging | | | | | The charger is charging the EV as per app settings. |
| SuspendedEV | | OFF | | OFF | The EV has caused the charger to stop the charging session. |
| SuspendedEVSE | | | | | The charger has stopped the charging session. |
| Finishing | | OFF | | OFF | The charger is preparing to terminate the charging session. |
| Reserved | | OFF | | OFF | The charger has been reserved for a user (public chargers) |
| Unavailable | OFF | OFF | OFF | OFF | The charger is not available. This may have been set by the OCPP backend for diagnostic or service purposes. |
| Faulted | | | | OFF | The charger has encountered a problem and is in a fault state. More information can be accessed via the web client (see 3.3.1). |

Note: The two adjacent patches indicate whether the status lights are constantly lit (identical colors) or blinking - switching between the two different colors

| **Temperature Current Limit Thresholds**<br><br>The charger monitors its internal temperature at two locations. If the temperature exceeds values considered to be dangerous to the electronics and safety, the charger will first limit its maximum charging current to lower its power dissipation. If the temperature still increases beyond that set-point (79°C), the charger will stop the session and enter a “Fault” state. | |
|---|---|
| Temperature≤, °C | Current limit, A per phase |
| 72 | 31.8 |
| 73 | 29.4 |
| 74 | 26.8 |
| 75 | 24 |
| 76 | 20.8 |
| 77 | 17 |
| 78 | 12 |
| 79 | 6 |

| VendorID1 : EVSE Limits<br>EVSE Limits are generated by the charger to define the maximum permissible charging current. The device will offer charging current based on the lowest-value limit. 3-phase models have global current limits (i.e., the currents offered on the three phases are always | | | |
|---|---|---|---|
| **Code** | **Name** | **Description** | **Detailed Description** |
| 0 | DeviceCurrentLimit | Max device limit | Default principal current limit, defined by the charger's hardware and set to 32A per phase |
| 1 | ProximityPilotLimit | Limit set due to cable's proximity pilot | Type II charging cables have a built-in resistor between the PE and PP terminals, which encodes the maximum current the cable can handle. The limit is enacted if the cable is rated for less than 32A charging current. |
| 2 | DeviceTemperatureLimit | Limit set due to high temperature | See "TemperatureCurrent Limits" above. The charger derates the current offered when its internal temperature reaches certain thresholds. |
| 3 | ExtTransformerCurrentLimit | Limit set by external transformer | Current limit set by the CT clamp(s) on the mains feeder line based on the rating of the installation's MCB. |
| 4 | OCPPGridLimit | Limit set by OCPP grid operator | The limit is enacted when a smart charging profile such as "Charge Point Max Current (A)" is sent by the backend. |
| 5 | FuseLimit | Limit set by fuse | The limit is defined by the current rating of the circuit breaker(s) for the charger's mains circuit. Enacted when the charger needs to be derated in installations which cannot provide 32A per phase. |

| VendorID2 :RTM Errors<br>RTM errors are generated by the charger when an error occurs and the charging is stopped. They can be found as “RTM err code” in the Diagnostics tab of the web client. | | | |
|---|---|---|---|
| **Code** | **Name** | **Description** | **Detailed Description** |
| 0x0001 | EVSE_FAULT_ RCD | RCD protection error | This error code is sent when the AC RCD protection is triggered. RCD or “Residual Current Device” is a fault current protection hardware used in chargers to protect the user from current leakage. |
| 0x0002 | EVSE_FAULT_ NEUTRAL | Neutral line error | This error code is sent when one of the following occurs: |
| | | | The line terminal and the N terminal are swapped |
| | | | There is more than 70VAC between the N line and the earth |
| | | | There is a missing earth or bad earth connection |
| 0x0004 | EVSE_FAULT_ OVERCURRENT | Overcurrent error | This error code is sent when the car decides to import higher current than charge point offers. If the current demand is 10% above the set current limit and lasts more than 6 seconds, the fault is generated. Note that the threshold is 10% of the present current limit, not the absolute maximum. |
| | | | This fault can be cleared by power cycling the system, by unplugging the charging cable or via the web client |
| 0x0010 | EVSE_FAULTS_P OWER_RELAY | Output RELAYS state error | This fault can be cleared by system power cycle, by the charger’s web client |
| 0x0008 | EVSE_FAULT_ RCD_DC | RCD DC protection error | This error code is sent when the DC RCD protection is triggered. |
| | | | Note that when the DC RCD is triggered the error code 0x0001 is also sent! |
| 0x0020 | EVSE_FAULT_ ACT_LOCK_FAUL T | Actuator lock malfunction | On models with a safety electromechanical lock, the charger monitors the lock position. A fault occurs if the actuator fails to lock its pin when a command is sent |
| 0x0040 | EVSE_FAULT_ACT_UNLOCK_FAUL T | Actuator unlock malfunction | On models with a safety electromechanical lock, the charger monitors the lock position. A fault occurs if the actuator fails to unlock its pin when a command is sent |
| 0x0080 | EVSE_FAULT_CP_ STATE | Control pilot error | |
| 0x0100 | EVSE_FAULT_ DIODE_UNPRESE NT | EV diode error - diode in EV not detected | EVs have a diode on the CP line as part of the charging standard. This error code is sent if the charger cannot detect the diode in the EV. The fault is in a problematic EV diode and is cleared by removing the faulty device |
| 0x0200 | EVSE_FAULT_ PP_UNPRESENT | Proximity pilot not detected | This error code is sent when a charging cable is plugged in and an attempt is made to start a session, but the charging station cannot read the PP resistor of the charging cable. The charging session will not start. |
| 0x0400 | EVSE_FAULT_ MISSING_HOST | Internal host error | For internal use only |
| 0x0800 | EVSE_FAULT_ TEMPERATURE | Overheating error | This error code is sent when the temperature of the charging station reaches more than 79 degrees. At this point the charging station will stop charging at all. This fault is cleared when the charging station is power cycled or through the web client. |
| 0x1000 | EVSE_FAULT_ OVERVOLTAGE | Overvoltage error | This error code is sent when the power supply voltage rises by more than 10% of nominal |

| | | | |
|---|---|---|---|
| 0x2000 | EVSE_FAULT_UNDERVOLTAGE | Undervoltage error | This error code is sent when the power supply voltage drops by more than 10% of nominal |
| 0x4000 | EVSE_FAULTS_AUTO_RECOVERY | Auto Recovery | The charger is designed to automatically recover from noncritical faults. This is an auto-recovery flag, sent together with another fault flag to indicate that the charger will attempt to recover from the fault. For example, in over/undervoltage situations, the charger will recover once the supply voltage falls back within its nominal value. |
| 0x8000 | EVSE_FAULT_CAL | EVSE calibration data error | The RTM has calibration data such as Voltage, Current, Power, Energy and RCD as well as the device Serial Number. The fault indicates that the MCU cannot access these data. The fault may be cleared by an authorized technician by reloading the calibration data |
| 0x10000 | EVSE_FAULT_VN_OUT_OPEN | Power Relay | Stuck power relay fault: the charger monitors its relay contacts and has detected that the neutral contact has failed to open and remains closed |
| 0x20000 | EVSE_FAULT_VN_OUT_CLOSE | Power Relay | Stuck power relay fault: the neutral contact has failed to close and remains open |
| 0x40000 | EVSE_FAULT_VL_OUT_OPEN | Power Relay | Stuck power relay fault: the line contact has failed to open and remains closed |
| 0x80000 | EVSE_FAULT_VL_OUT_CLOSE | Power Relay | Stuck power relay fault: the line contact has failed to close and remains open |
| 0x100000 | EVSE_TAMPER_EVENT | Device open cover detected by tamper switch | This status flag is set to “1”, when the device detects the opening of the main cover. At time of detecting of this event the timestamp is recorded into NVM. The flag is cleared at power cycle. |

| **VendorID3 : Main MCU errors<br>Debugging information related to the SCARAB's main CPU.** | | | |
|---|---|---|---|
| **Code** | **Name** | **Description** | **Detailed Description** |
| 0 | CC_RST_UNKNOWN | Reset reason cannot be determined | The CPU cannot determine the cause of the reset. |
| 1 | CC_RST_POWERON | Reset due to power-on event | The CPU was reset by a power cycle situation. |
| 2 | CC_RST_EXT | Reset by external pin | The main CPU was reset by an external trigger, such as a debugging tool or another MCU in the Compact. |
| 3 | CC_RST_SW | Software reset via esp_restart | Reset triggered via an OCPP command (Soft Reset) or via the web client / installer's app.<br><br>Reset can also be triggered following a firmware upgrade. |

| | | | |
|---|---|---|---|
| 4 | CC_RST_PANIC | Software reset due to exception/panic | Reset triggered by a critical error in the CPU (stack overflow, memory corruption, etc.). |
| 5 | CC_RST_INT_WDT | Reset (software or hardware) due to interrupt watchdog | Reset triggered by the watchdog timer due to a timeout at an interrupt. |
| 6 | CC_RST_TASK_WDT | Reset due to task watchdog | Reset triggered by the watchdog timer due to a hung task (timeout based on task's priority). |
| 7 | CC_RST_WDT | Reset due to other watchdogs | Reset triggered by a custom watchdog timers. For internal troubleshooting only. |
| 8 | CC_RST_DEEPSLEEP | Reset after exiting deep sleep mode | For internal use only. |
| 9 | CC_RST_BROWNOUT | Brownout reset (software or hardware) | Reset triggered by an UVLO event at the CPU core power supply. |
| 10 | CC_RST_SDIO | Reset over SDIO | Triggered by an internal system bus event. |

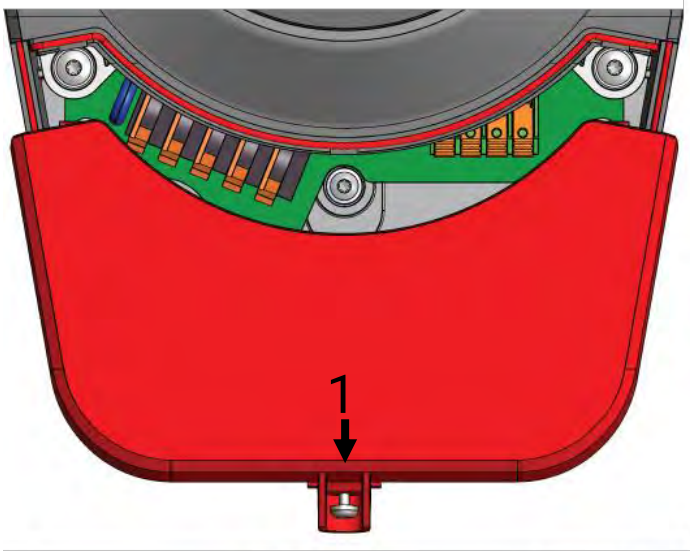
# 6. Appendix II: OCPP and Manufacturer Configuration Keys

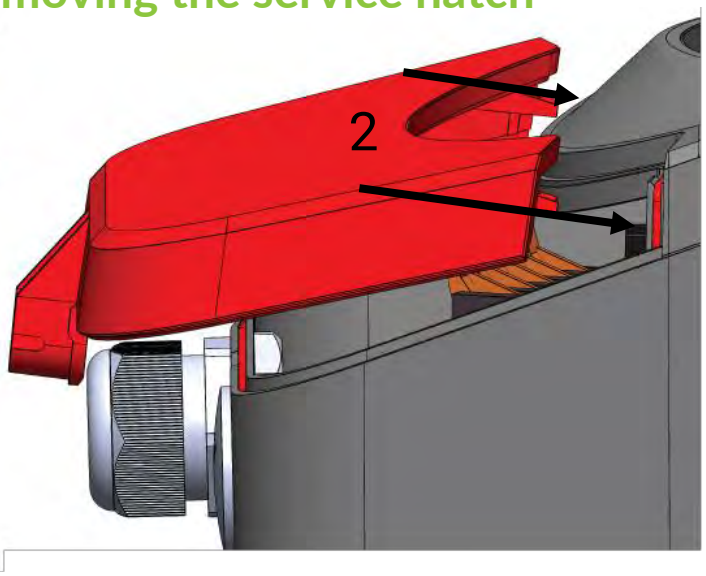
| Configuration Key | Custom Key | In use | Example Value | Description |
|---|---|---|---|---|
| AllowOfflineTxForUnknownId | | **yes** | TRUE | When offline, the device can be set to allow automatic authorization of any "unknown" identifiers that cannot be explicitly authorized by Local Authorization List or Authorization Cache entries. |
| AuthorizationEnabled | | | TRUE | |
| AuthorizeRemoteTxRequests | | | TRUE | |
| ChargeProfileMaxStackLevel | | | 100 | |
| ChargingScheduleAllowed ChargingRateUnit | | **yes** | A,W | Configures the units of "charge power" to be used in a charging schedule. |
| ChargingScheduleMaxPeriods | | | 60 | |
| ClockAlignedDataInterval | | | 0 | |
| ConnectionTimeOut | | | 90 | Interval of time from status “Preparing” until the transaction is automatically canceled, due to failure of the EV driver to insert the charging cable into the charger or vehicle. The charger will revert to the original state. |
| ConnectorSwitch3to1PhaseSupported | | | FALSE | Configures the three phase chargers to work on a single-phase grid as single-phase charger. |
| c_ChargingVentilatedEnabled | **yes** | **yes** | FALSE | Allows the charger to offer charge when the vehicle enters in state "D" |
| c_DeviceLimit_I | **yes** | **yes** | 320 | Sets a hard limit on the maximum current the device will offer in 1/10ths of an ampere. The limit cannot be overridden by profiles. |
| c_MainFuseLimit | **yes** | **yes** | 600 | CT clamp current limit, fuse set in 1/10ths of an ampere |
| c_RCDProtectionType | **yes** | **yes** | 0 | Configures RCD protection type. Permitted states:<br><br>0 - Both AC + DC protection is on<br><br>2 - Only AC protection is on |
| c_VoltageProtectionOffset | **yes** | **yes** | 0 | Enables configuration of expanded voltage protection limits. The default range with the key |

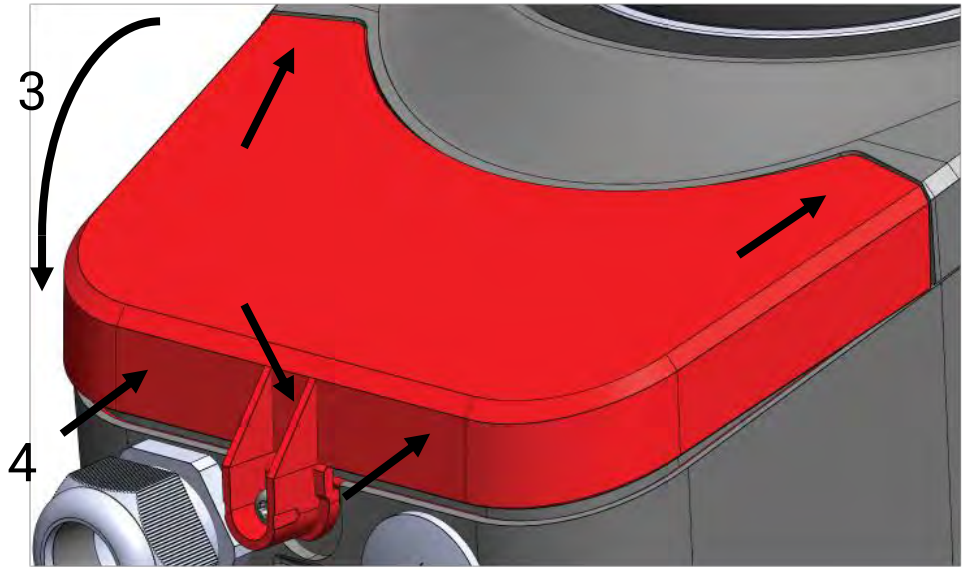
| | | | | |
|---|---|---|---|---|
| | | | | set to "0" is +-10% of the nominal supply (207-253VAC). Values of 1-23 are allowed, which expand both lower and upper threshold by the respective amount in VAC. |
| GetConfigurationMaxKeys | | **yes** | 5 | The number of OCPP configuration keys that can be acquired from a single get configuration command. |
| HeartbeatInterval | | **yes** | 60 | The interval between each heartbeat PDU. |
| LightIntensity | | **yes** | 100 | The light intensity of the LED ring of the charger in % of maximum. |
| LocalAuthListEnabled | | | FALSE | |
| LocalAuthListMaxLength | | | 0 | |
| LocalAuthorizeOffline | | | TRUE | |
| LocalPreAuthorize | | | FALSE | |
| MaxChargingProfilesInstalled | | | 10 | |
| MeterValueSampleInterval | | **yes** | 60 | The time interval between each meter value during a session. |
| MeterValuesSampledData | | **yes** | Voltage.L1-N,Voltage.N,Temperature,Current.Offered.L1,Current.Import.L1,Power.Active.Import.L1,Energy.Active.Import.Register.L1 | A list of measurands sent for each meter value during a session. |
| NumberOfConnectors | | | 1 | |
| SendLocalListMaxLength | | | 0 | |
| StopTransactionOnEVSideDisconnect | | | TRUE | |
| StopTransactionOnInvalidId | | | TRUE | |
| UnlockConnectorOnEVSideDisconnect | | **yes** | TRUE | When set to TRUE the Charge Point SHELL unlock the connector on Charge Point side when the cable is unplugged at the EV |
| c_MainOfflineTimeout | **yes** | **yes** | null | Defines the timeout value for the main communication network interface |
| c_FallbackOfflineTimeout | **yes** | **yes** | null | Defines the timeout value for the fallback communication network interface |
| c_FallbackOnlineTimeout | **yes** | **yes** | null | Defines the duration for which the fallback network interface is active before reverting to the main network interface |
| C_OCPPNetLog | **yes** | **yes** | FALSE | Configures whether |

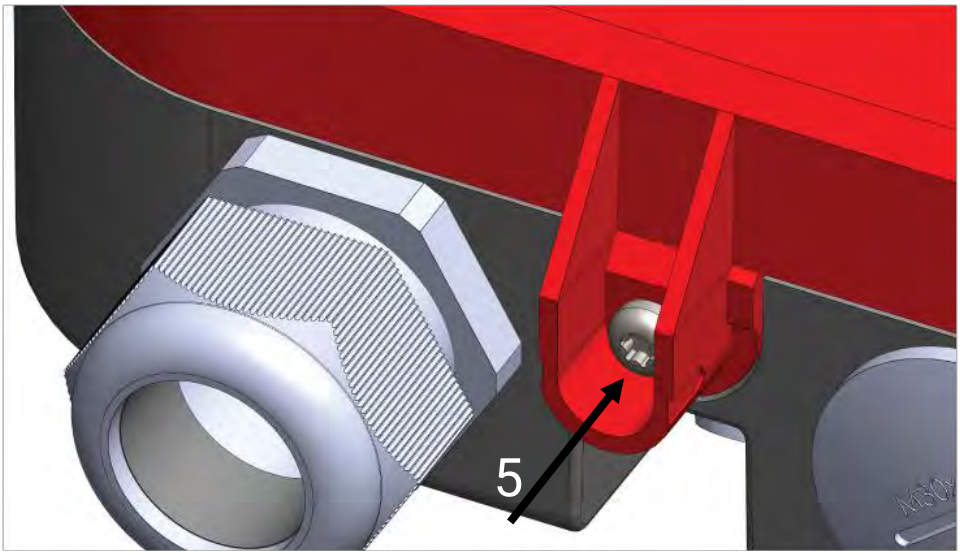
| | | | | |
|---|---|---|---|---|
| | | | | diagnostic network data logs are sent via OCPP |
| c_ChargeOffPeriod1 | **yes** | **yes** | enable,08:00,11:00 | Defines the first standard period for offline charging |
| c_ChargeOffPeriod2 | **yes** | **yes** | enable,16:00,22:00 | Defines the second standard period for offline charging |
| c_MaxStartDelay | **yes** | **yes** | 600 | Defines the maximum value for the randomized delay functionality for offline charging |
| c_LockerDisengage | **yes** | **yes** | TRUE | Defines whether the built-in locker is enabled or disabled. |
| c_CTClamp | **yes** | **yes** | FALSE | Presence or absence of a CT clamp |
| c_CTClampValue | **yes** | **yes** | 65535 | Defines the value range of the CT clamp measurand data |
| c_MainNetworkInterface | **yes** | **yes** | 0 | Defines the main network interface |
| c_FallbackNetworkInterface | **yes** | **yes** | 0 | Defines the fallback network interface |
| c_APN | **yes** | **yes** | 0 | Sets or gets the APN used for cellular network interface |

# 7. Appendix III: Installing/Removing the service hatch




**1. Ensure that the panel captive screw is fully retracted into the hatch body.**

**2. Place the cover on the main body by first guiding the upper rim and hooks into the charger**

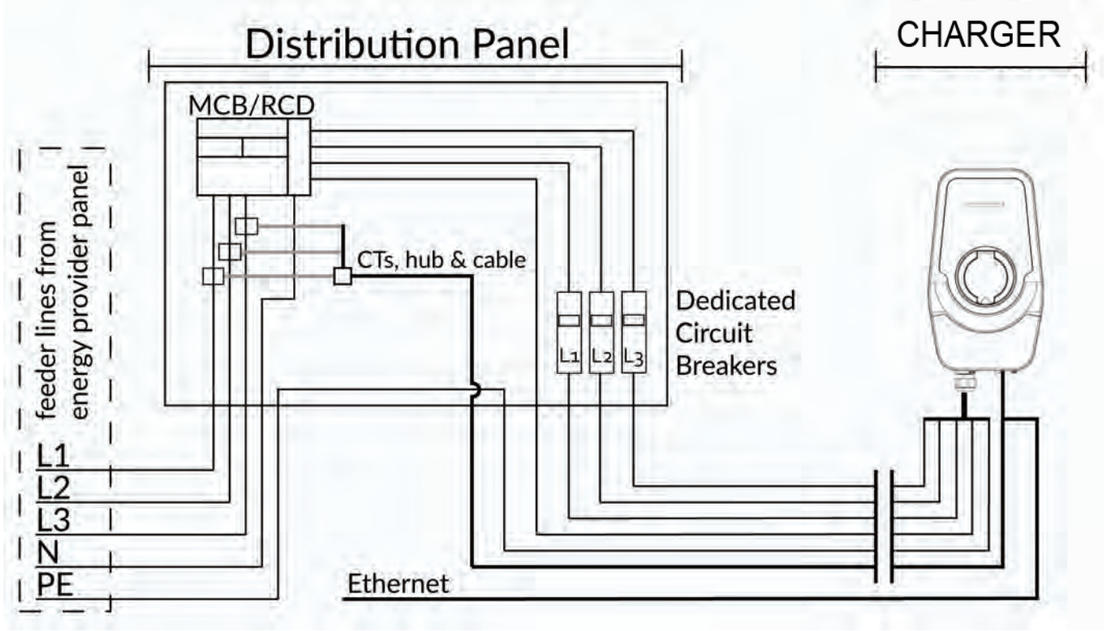
**3. Swing the service hatch into position, ensuring that the sealing rim is correctly seated. A small gap will remain.**

**4. Push the lower edge of the service lid firmly forward and down until the lid locks into place with an audible click and the gap disappears.**

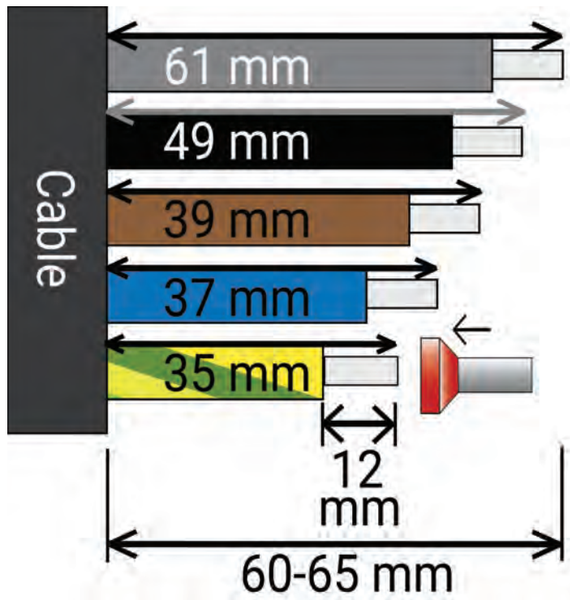
**5. Use a Torx screwdriver to fasten the panel captive screw and lock the service hatch in place.**

**6. To remove the service hatch, execute steps 1-5 in reverse order.**

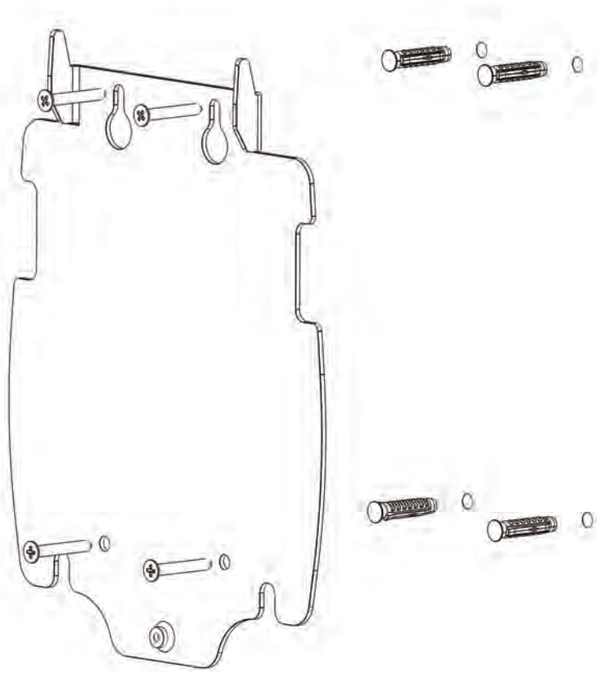
Overall electrical wiring diagram, including optional CT connection



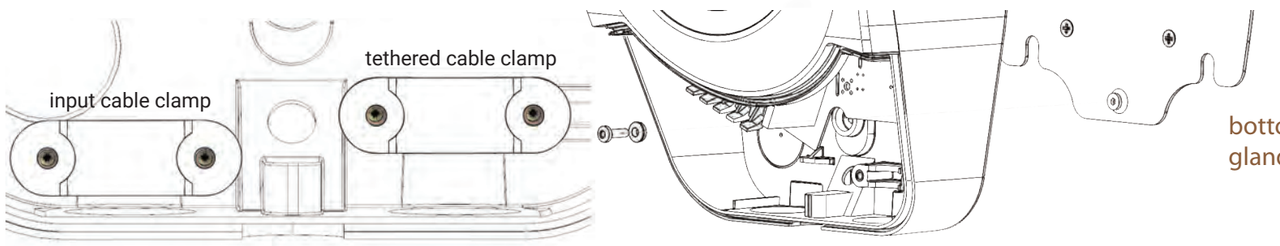

Power cable stripping lengths.
Stranded conductors require ferrules




Mounting plate installation and securing the charger 3



Cable clamp locations. The input cable clamp is not fixed to the body.




# charger 3 Quick Installation Guide

## Tools

- A set of Torx, Phillips, and flathead screwdrivers with insulated handles
- Torque limited drill or cordless screwdriver, drill bit for masonry (8 mm)
- Hammer drill and bits
- Electrician kit, including pliers, strippers, ferrule and RJ-45/22 crimping tools

## Materials

- Conductors (insulated single-core or stranded), conduit, cable tie-downs
- Signal cables (UTP5 cable)
- Connectors (RJ-45/22) and ferrules
- Insulation materials
- Wall anchors and screws (included)
- Hole template for wall anchors (see back)

## 1. Locate and drill anchor holes

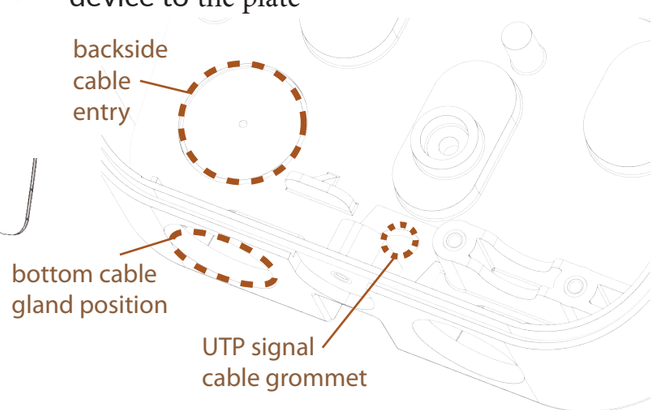
- Select a suitable location for the station as described in the User Manual
- Prepare an 8 mm masonry drill and the hole template by flipping this sheet over
- Ensure that the hole template is level on its centreline
- Drill the holes to a depth >50 mm and clear the debris
- Tap the anchors into place with a mallet until they are flush with the wall

## 2. Install the mounting plate

- Locate and prepare 4 4.8x50mm screws
- Unscrew the mounting plate from the charger via the service opening and orient it as shown
- Insert and drive the screws through the mounting plate and into the anchors until the plate is tightly pressed to the wall

## 3. Mount the charger

- Slide the charger body onto the mounting plate fins and lever it down
- Locate the mounting screw from step 2 and place it back into the charger service opening. Tighten to firmly secure the device to the plate




## 4. Complete the electrical installation (breaker OFF!)

- The charger supply can be routed from the bottom (via a cable gland) or from the back via a punch-out hole, for which a rubber grommet is provided. See the diagram below.
- Route and secure the power/signal cables to the device and feed them through their respective glands. Fasten the cable clamp(s).
- Strip the power cable and the individual conductors to the correct lengths
- Crimp the power cable ferrules (stranded wires) and the signal cable RJ-45 if used
- Insert the power conductors and signal cable into the charger motherboard
- Locate and install the SIM card if used

## 5. Power and configure the charger 3

- Check and verify that the installation follows the wiring diagram (see next page)
- Re-set the circuit breakers feeding the charger to power the device
- Connect to the charger using the installer app or web client
- Follow the instructions for the respective configuration tool to activate the station and customize its smart features
- Test the charger with an EV or dedicated EVSE tester tool. Troubleshooting tips are listed in the User Manual.

## 6. Enjoy your Smart charger!