
TELTONIKA | Energy
EVC2
Quick user guide

Agenda:

- **Charging station**

- **First installation**
  - Pairing and installers menu
  - Load balancing
  - Phase balancing
  - Modbus RTU meter
  - Network meter
  - CT clamps
  - Solar integration
  - Dynamic load management (Modbus RTU)
  - Dynamic load management (Modbus TCP/IP)

- **App and additional features**
  - Connectivity & OCPP
  - Authorization via NFC
  - Updating
  - Charging sessions
  - Schedule
  - Diagnostics
  - Troubleshooting
  - Potential free contact
  - Power selector switch

- **Accessories**
  - Mounting poles
  - Smart meters / CT clamps

EVC2

Box contents:

NFC card + tag
x 1

Mounting
bracket
x 1

NFC mark
sticker
x 1

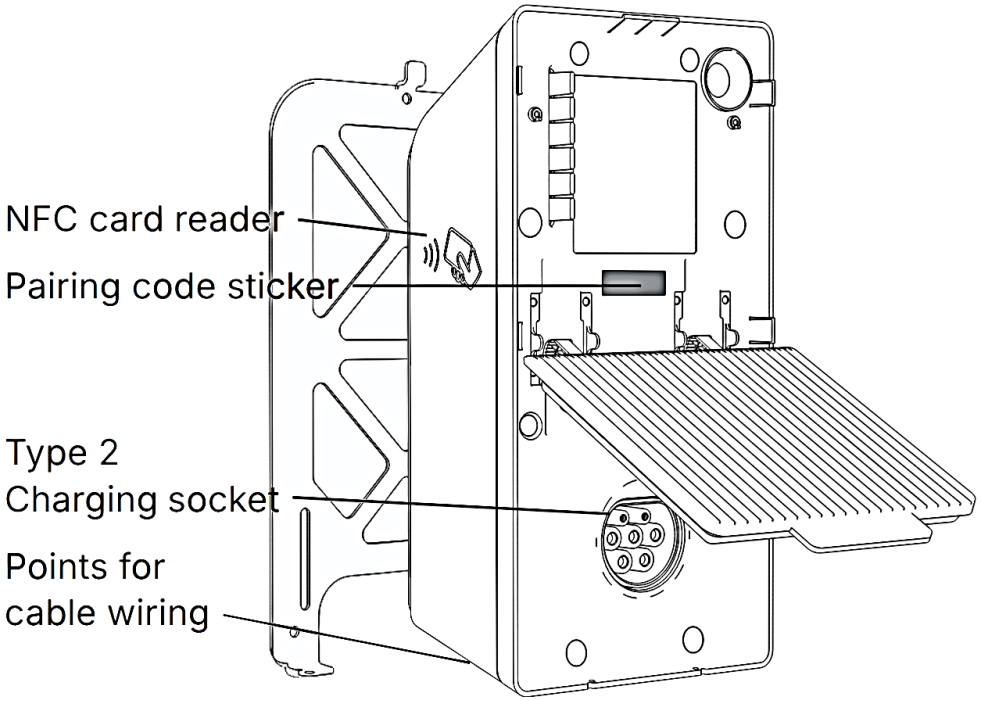
Installation
manual
x 1

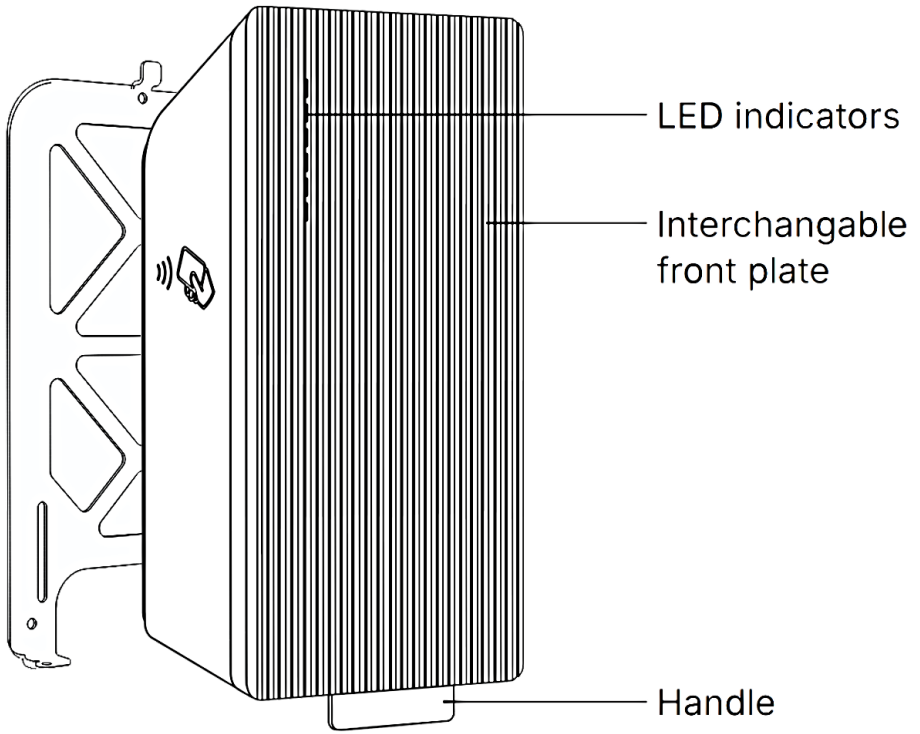
Box with parts
x 1

Box contains wall plugs, screws and cable glands

EVC2

Basic installation:

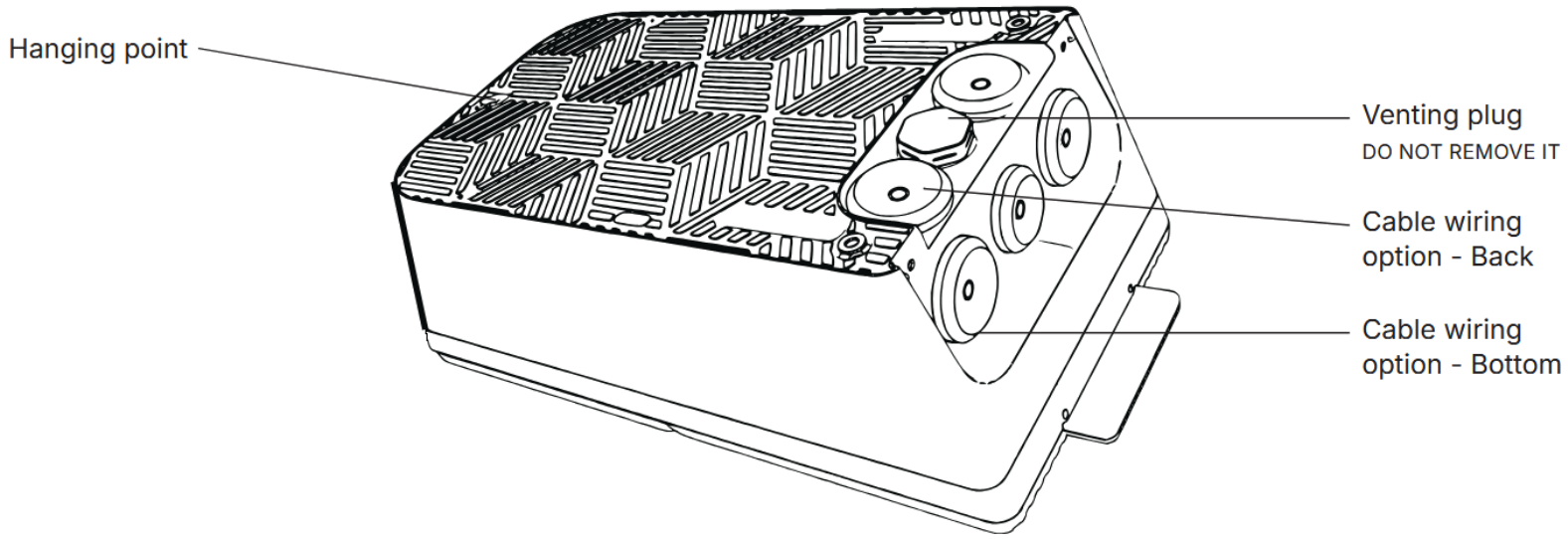




EVC2

Basic installation:

Back view

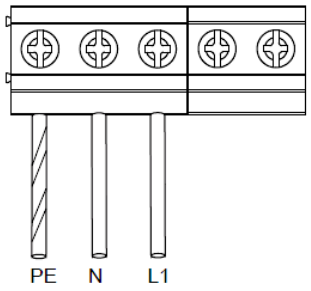


EVC2

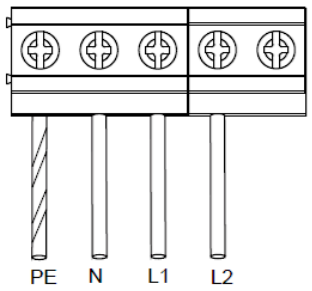
Wiring:

Standard grid

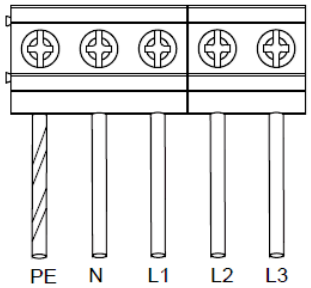
Single phase 1L+N+PE
L-N 230V ± 10%



Bi phase 2L+N+PE
L-N 230V ± 10%
L-L 400V ± 10%

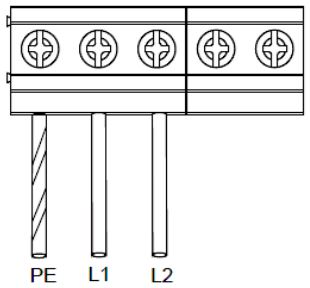


3 phase 3L+N+PE
L-N 230V ± 10%
L-L 400V ± 10%

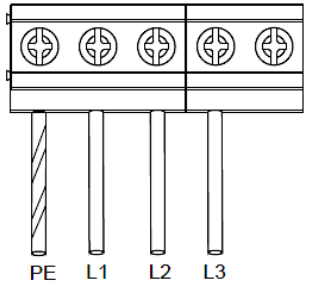


Delta grid

Bi phase L2+L1+PE
L-L 230V ± 10%



3 phase 3L+PE
L-L 230V ± 10%



Maximum wire cross section 10 mm^2

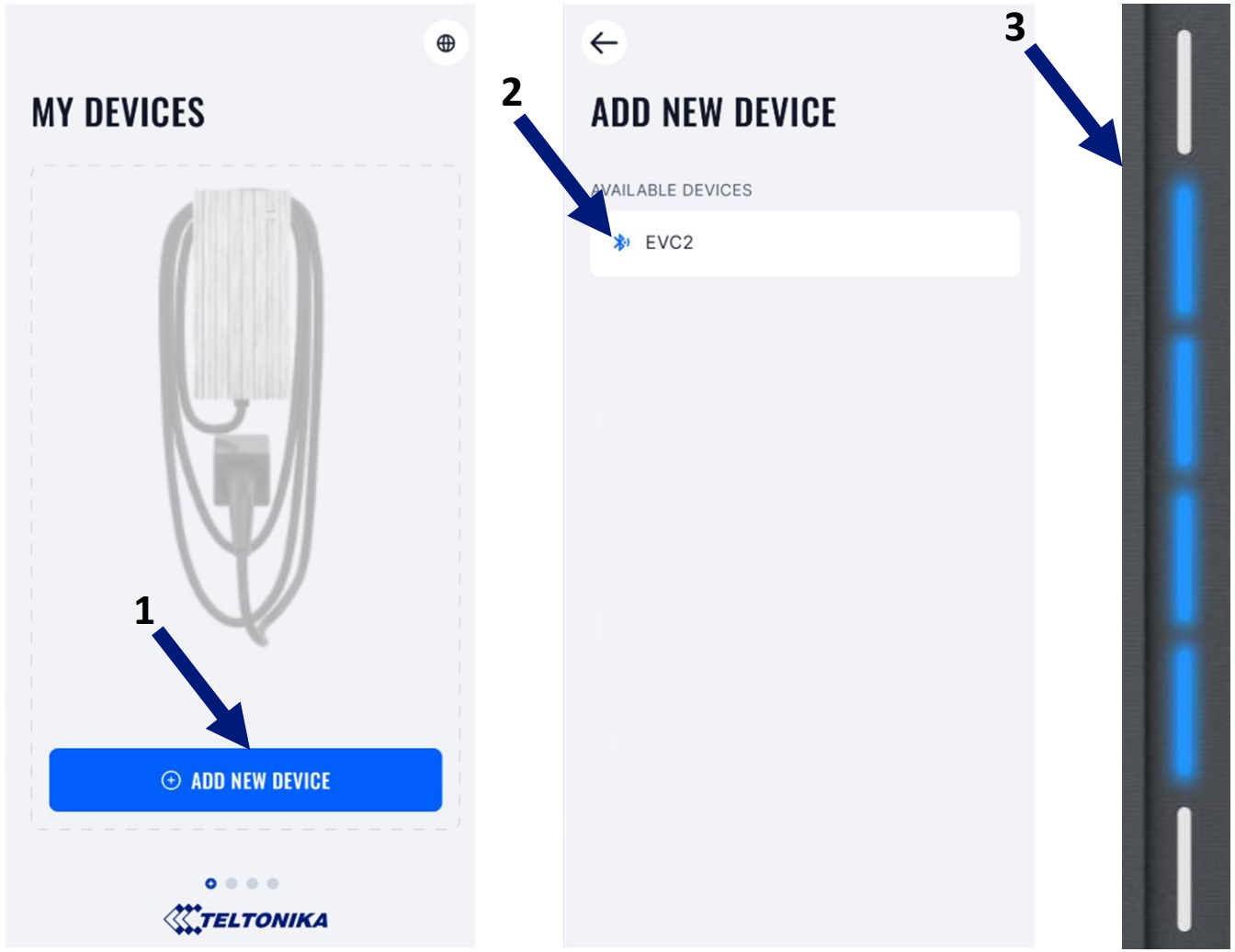
“EV charging” mobile application

Android application

iPhone application

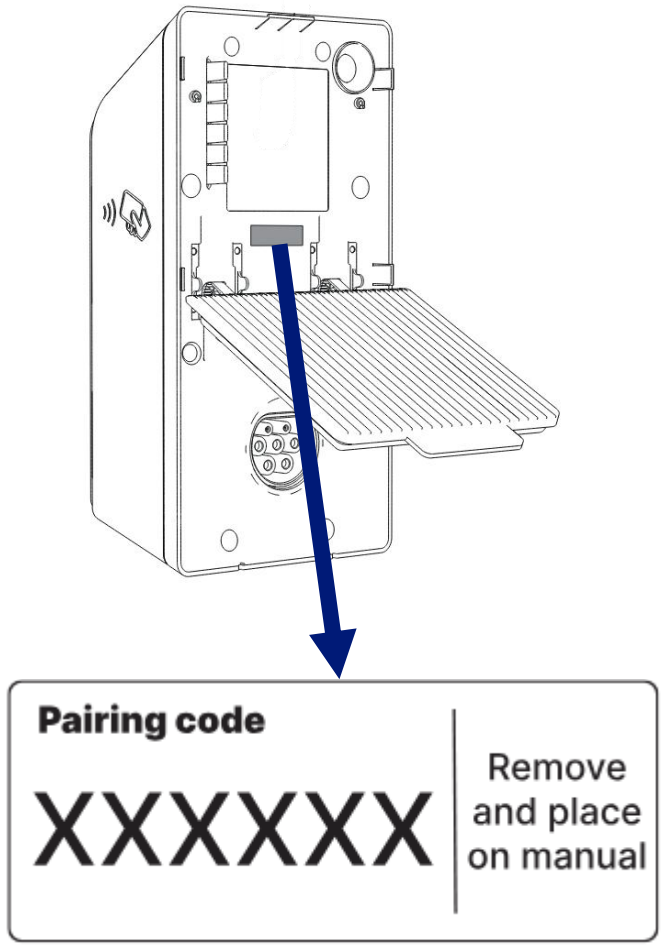
Pairing with the station

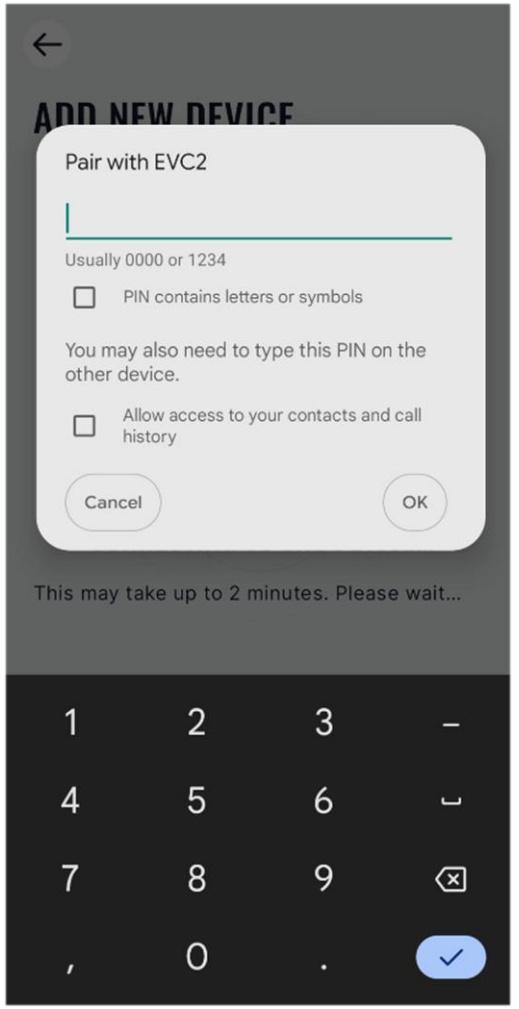
- Press Add new device
- Select the device from the list
- EVC2 will lit up with BLUE leds



User code and where to find it

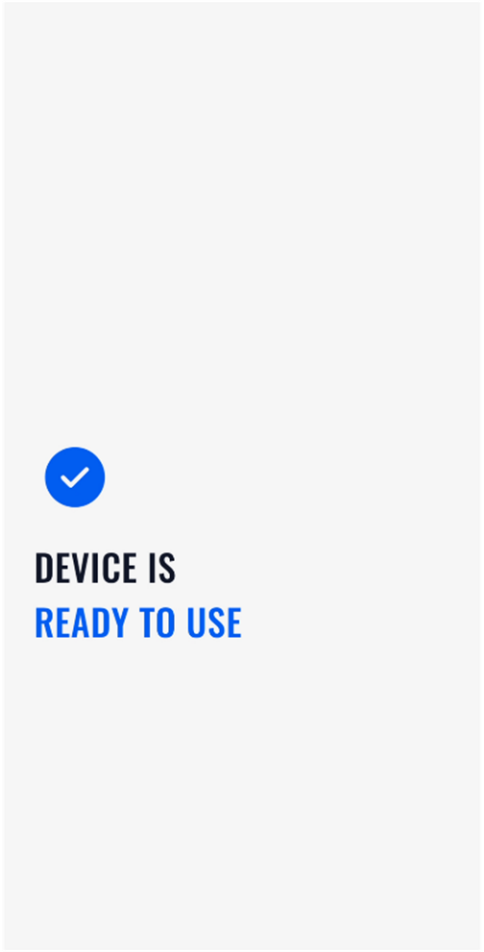
- After a few seconds pairing table pops up. It requires code to complete pairing process.
- Insert the given pairing code from the label.

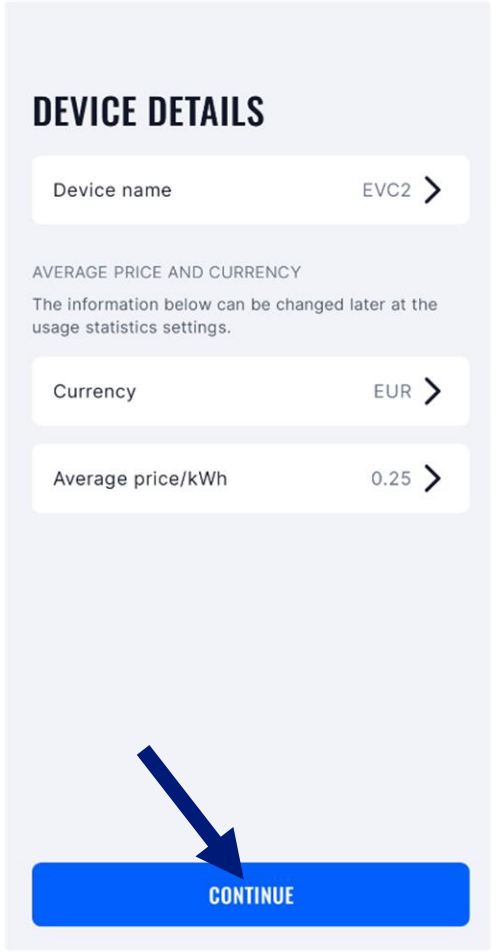


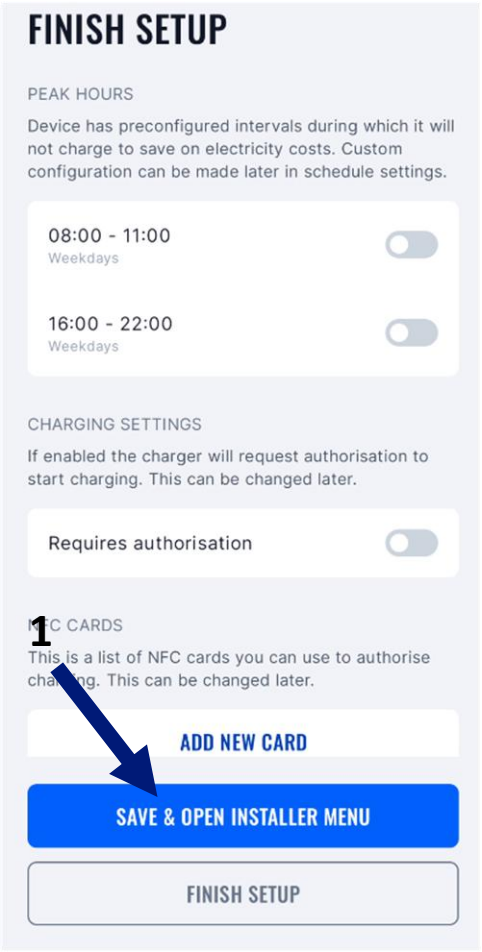


Initial device settings

- After pairing with the device, we can set initial settings like currency, electricity price, default schedules or NFC authorization
- User can set these settings later if he wants to, we can continue going to the installer menu







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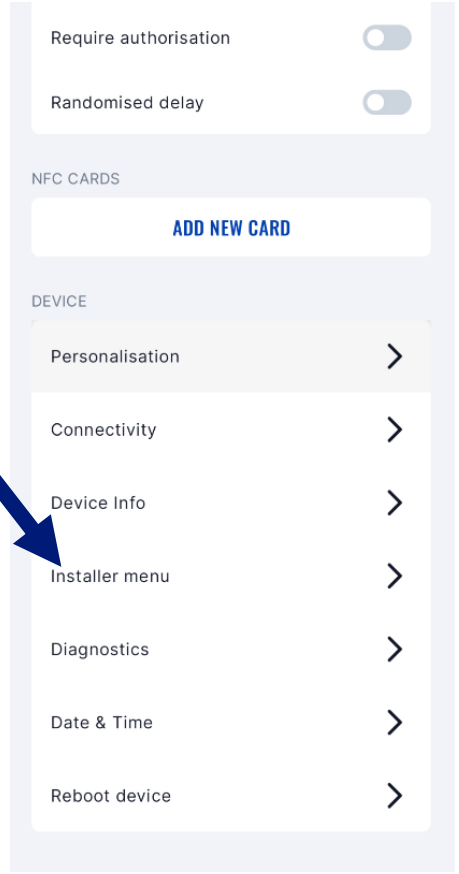
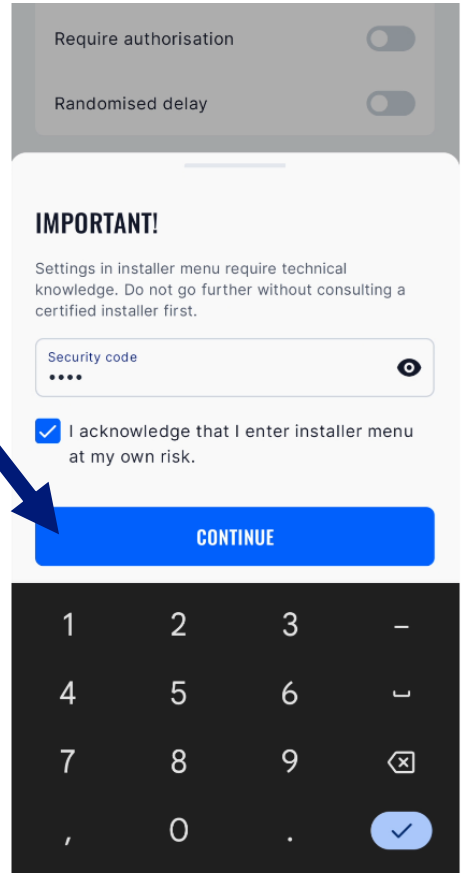
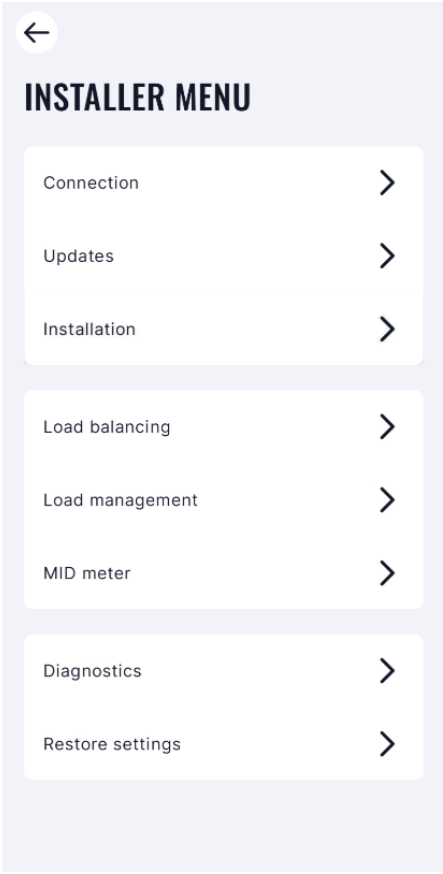
Installer menu

- Access installers menu by entering the installers password

1998 is the default code for every EVC2

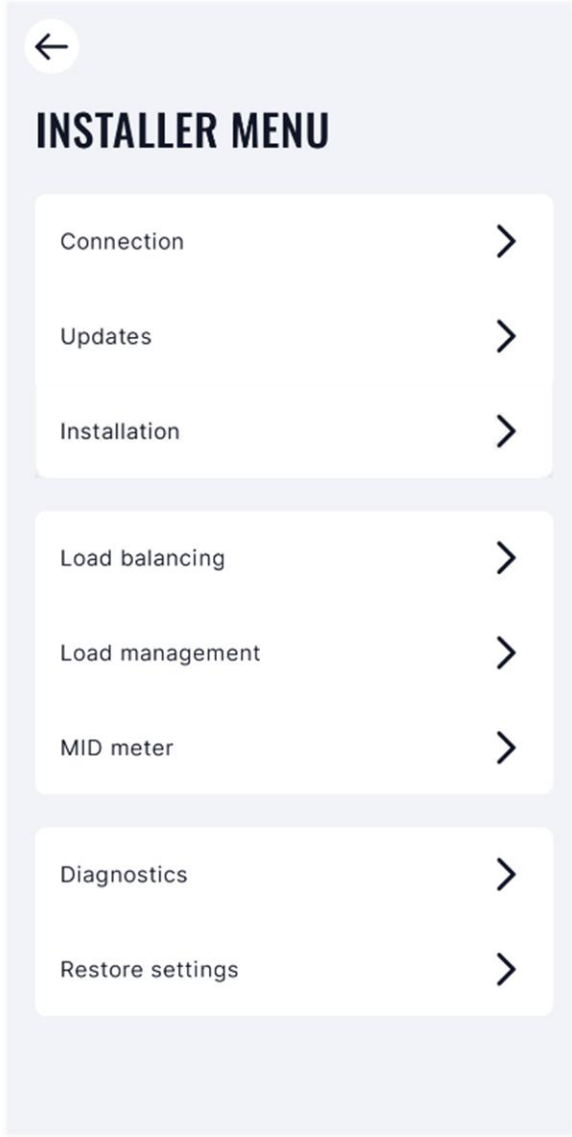






Installer menu

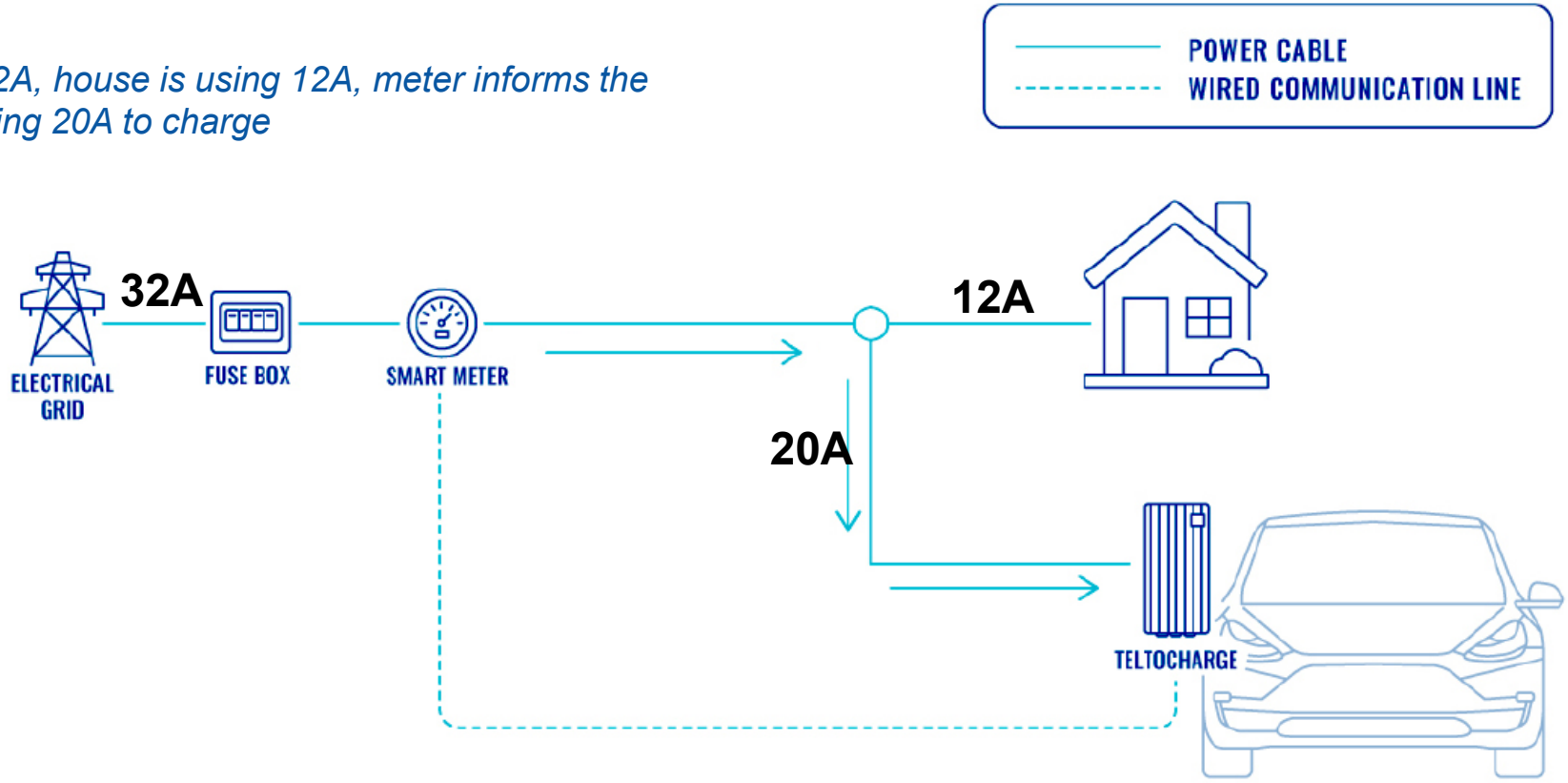
- Connection – menu to configure internet connection
- Updates - menu to check available updates
- Installation – menu for main limitation settings
- Load balancing – menu to enable dynamic load balancing and solar functionality
- Load management – menu to enable current distribution for a group of chargers
- MID meter – menu to enable separate smart meter for MID calculations
- Diagnostics – status of EV chargings tation
- Restore settings – restoration to default values



Dynamic Load Balancing

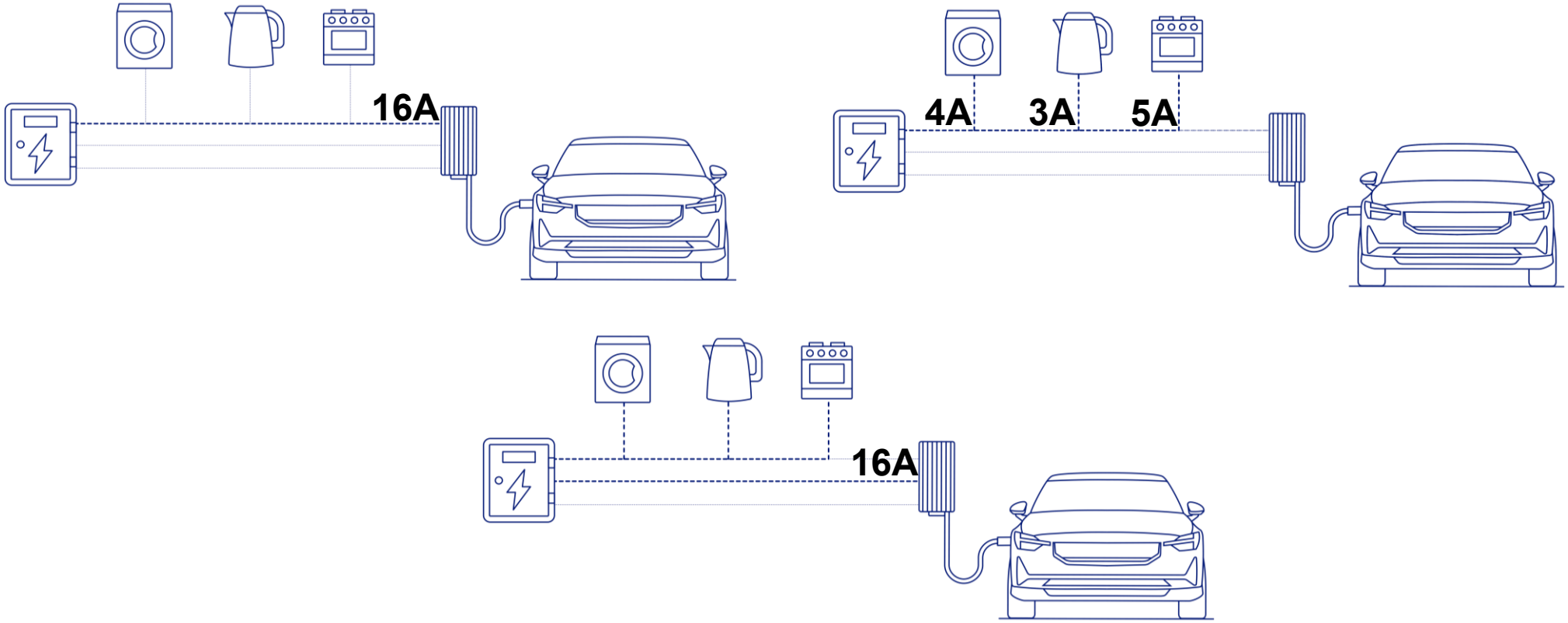
Load balancing enables communication with a dedicated smart energy meter and adjusts charging power according to grid measurements

In the picture – grid has 32A, house is using 12A, meter informs the charger to use the remaining 20A to charge



Phase balancing

Using a three-phase station while charging on one phase allows us to take advantage of the least used phase. In this example we see that charger automatically chooses 2nd phase when it detects load on 1st phase.

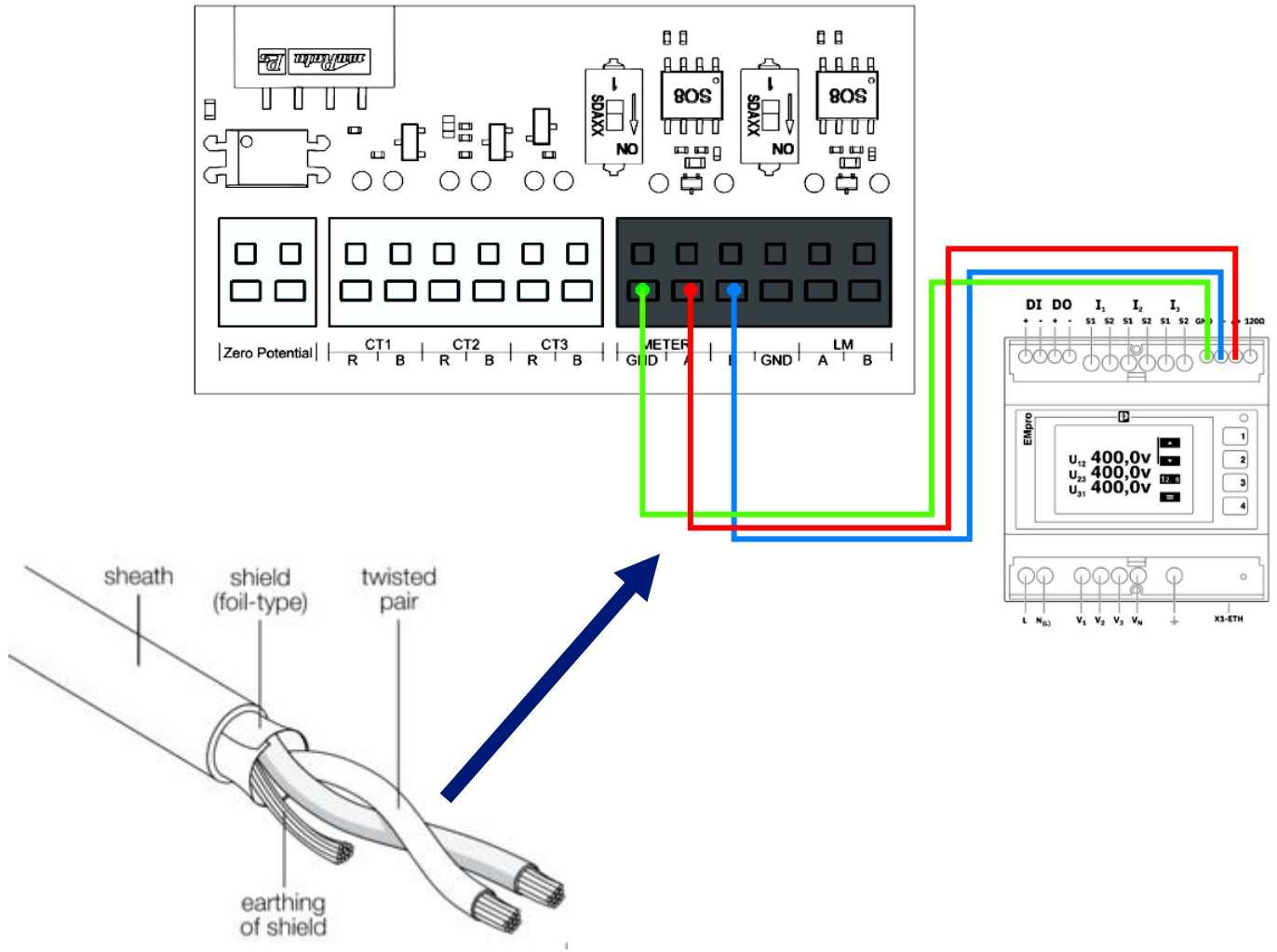


Load balancing using Modbus RTU meters

Supported Modbus RTU Smart Meters:

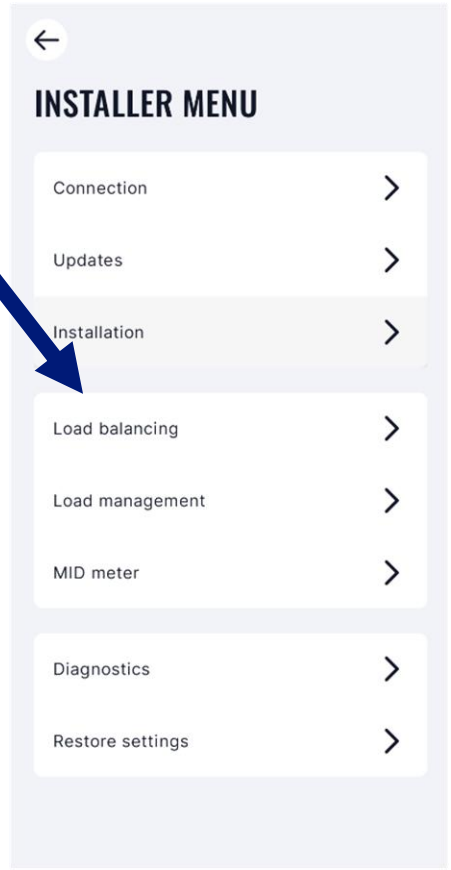
- Carlo Gavazzi series 1-3
- Siemens PACxxxx
- ABB A4x ; B2x
- Eastron SDMxx
- Inepro PRO380
- Chint
- Entes
- Acrel
- P1 smartstuff meter

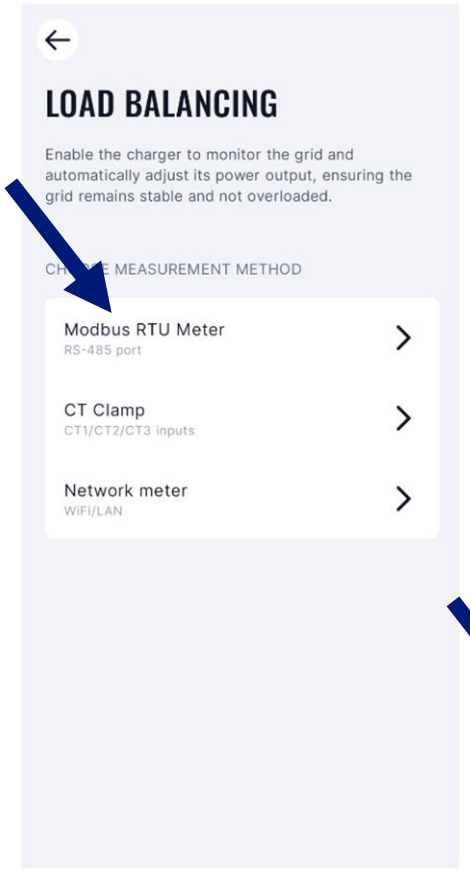
and more…

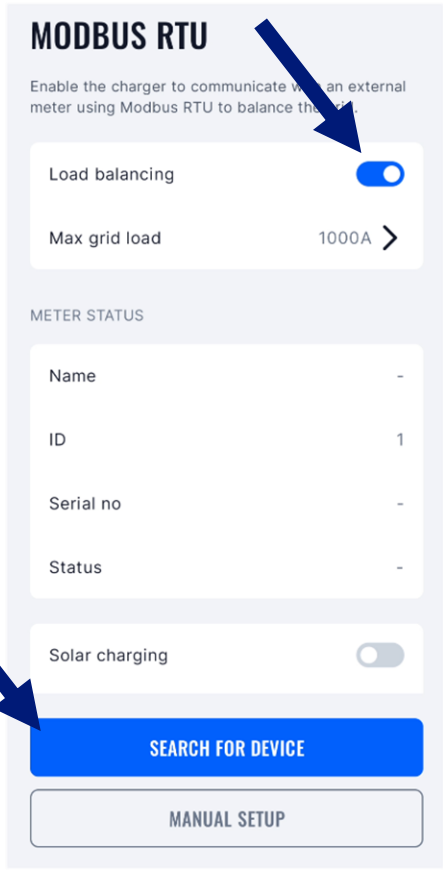


Modbus RTU Setup

- To enable the mode: go to Load balancing tab
- Select the Modbus RTU meter
- Enable load balancing
- Search for a meter, or manually set it up

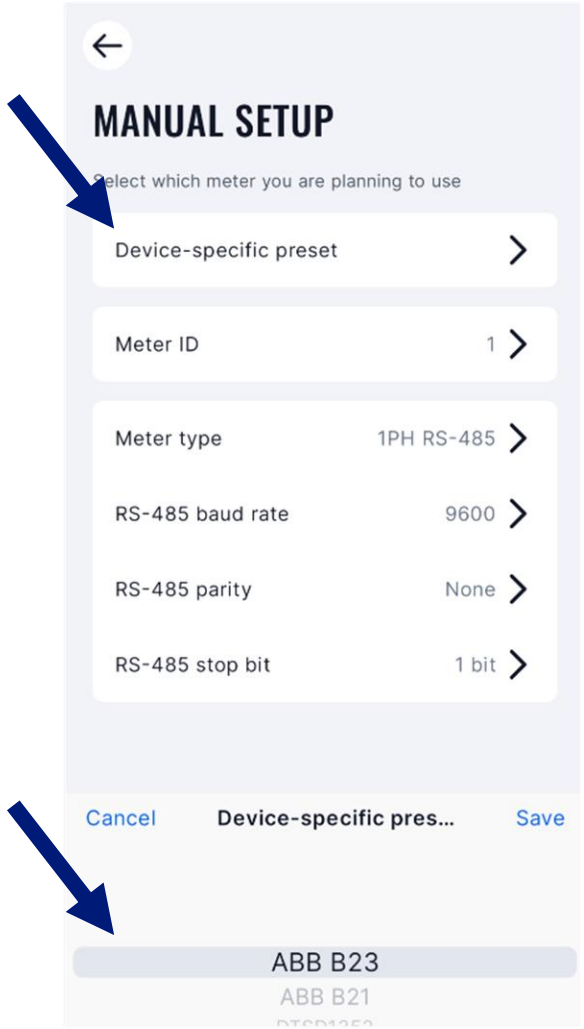






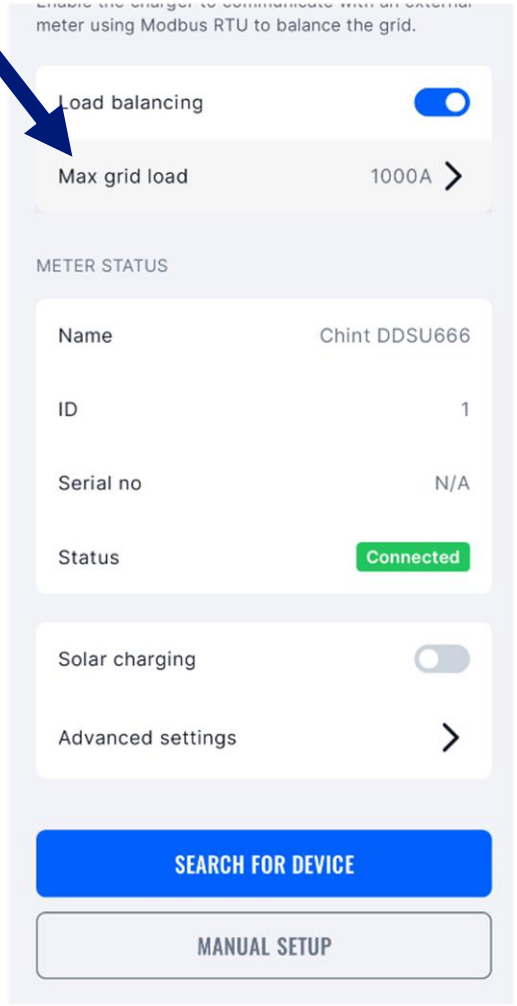
Modbus RTU Setup

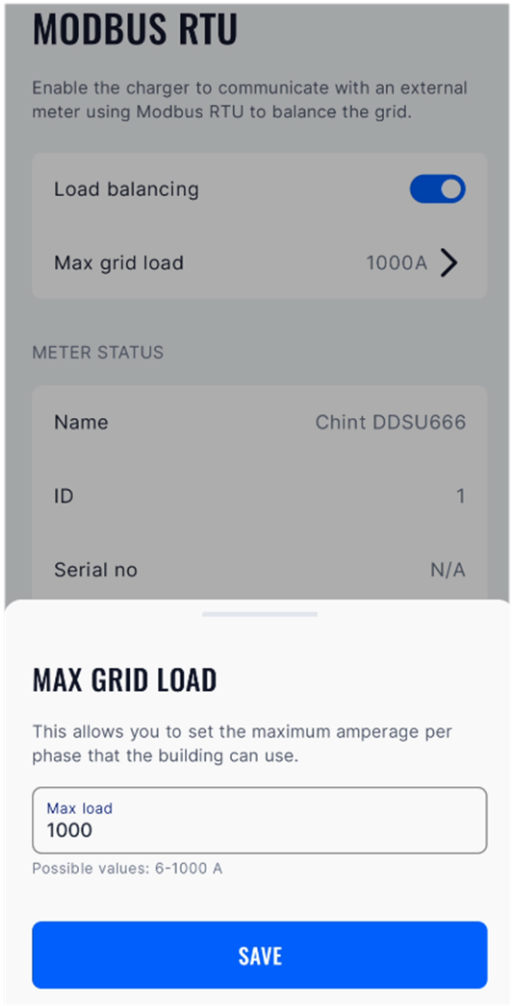
- By going to default preset selection you can choose any of the supported meter models.
- However, if the supported meters settings are different from default, it's possible to adjust them manually.



Modbus RTU Setup

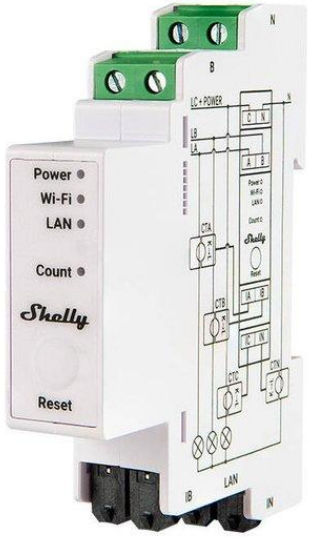
- Upon having a successful connection to the meter, adjust max grid load according to your own grid or breaker.





Network meters / Modbus TCP/IP

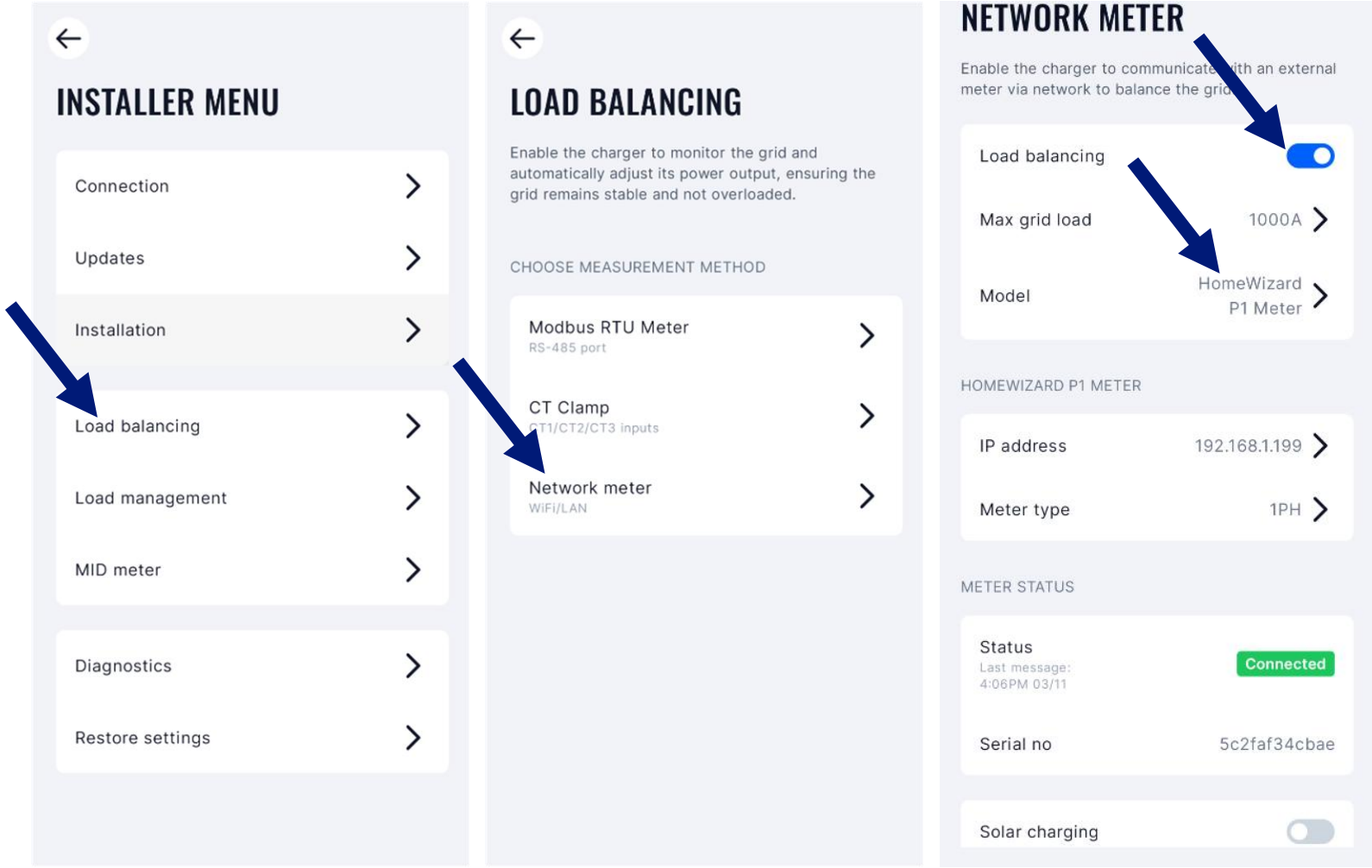
Having the charger in the same network as these meters allows us to use their data and accomplish dynamic load balancing.



Shelly and HomeWizard P1

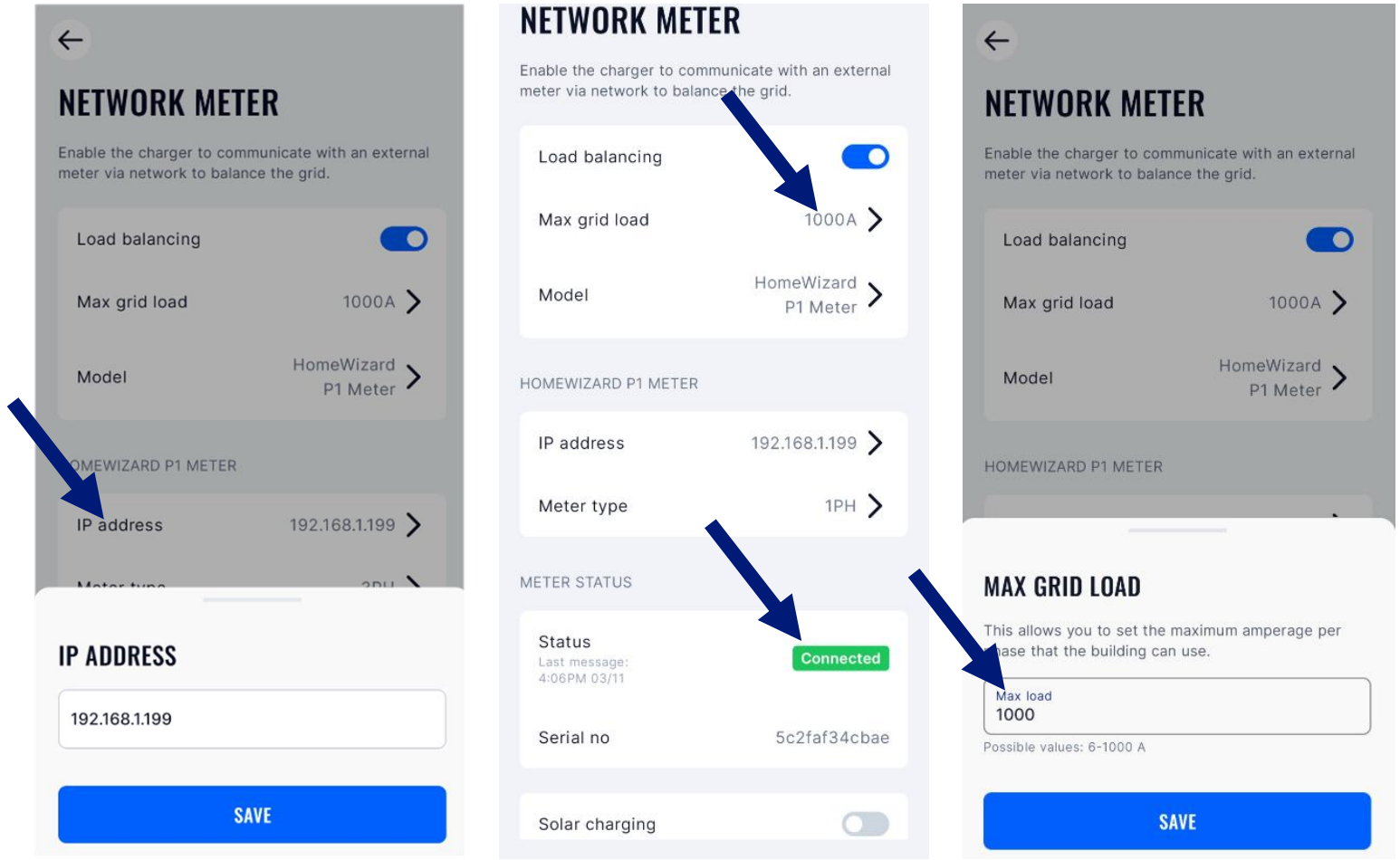
Network meters / Modbus TCP/IP

- To enable the mode: go to load balancing tab
- Select the network meter option
- Enable load balancing
- Search for a supported model. For example: HomeWizard P1 or Shelly Pro meter



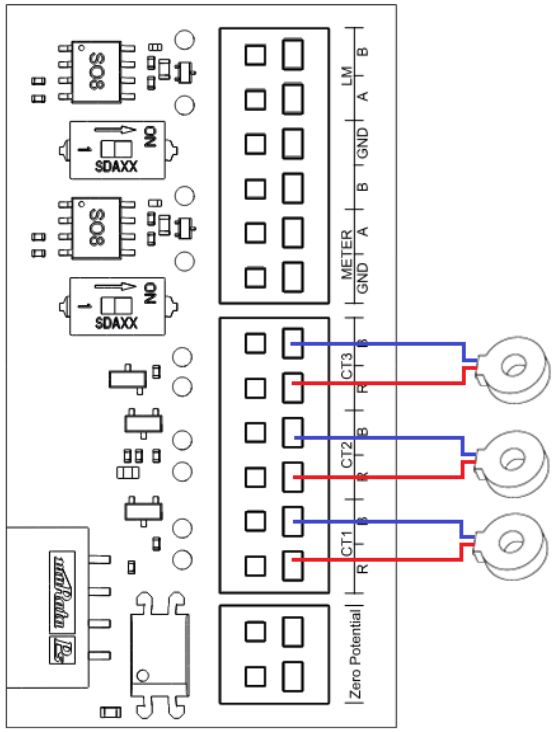
Network meters / Modbus TCP/IP

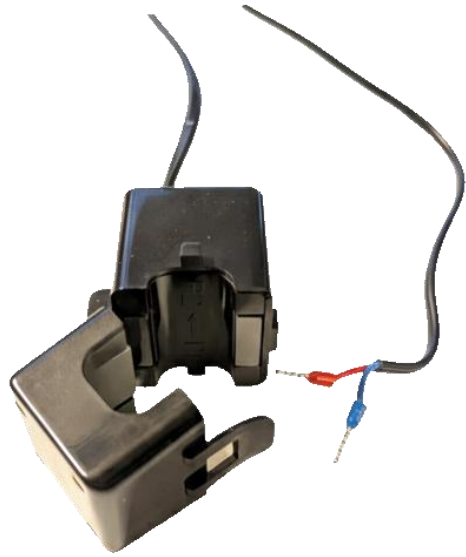
- By knowing the meters IP address configure the charger to connect to it
- Upon successful connection adjust max grid load according to your own grid.

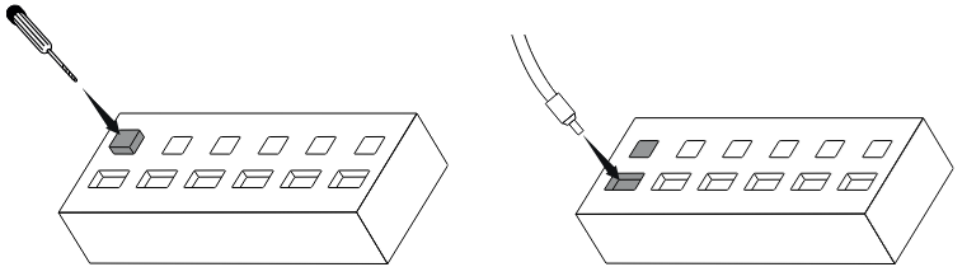


CT clamps

- Current transformer (CT) clamps allow for a fast and easy installation when the electric distribution panel is close to the EV charger install location.
- The CT clamps are put on the entry power lines in the distribution box and measure the total house load going through them, providing the direct info to the EV charger.
- EVC2 has a dedicated terminal for each CT clamp.





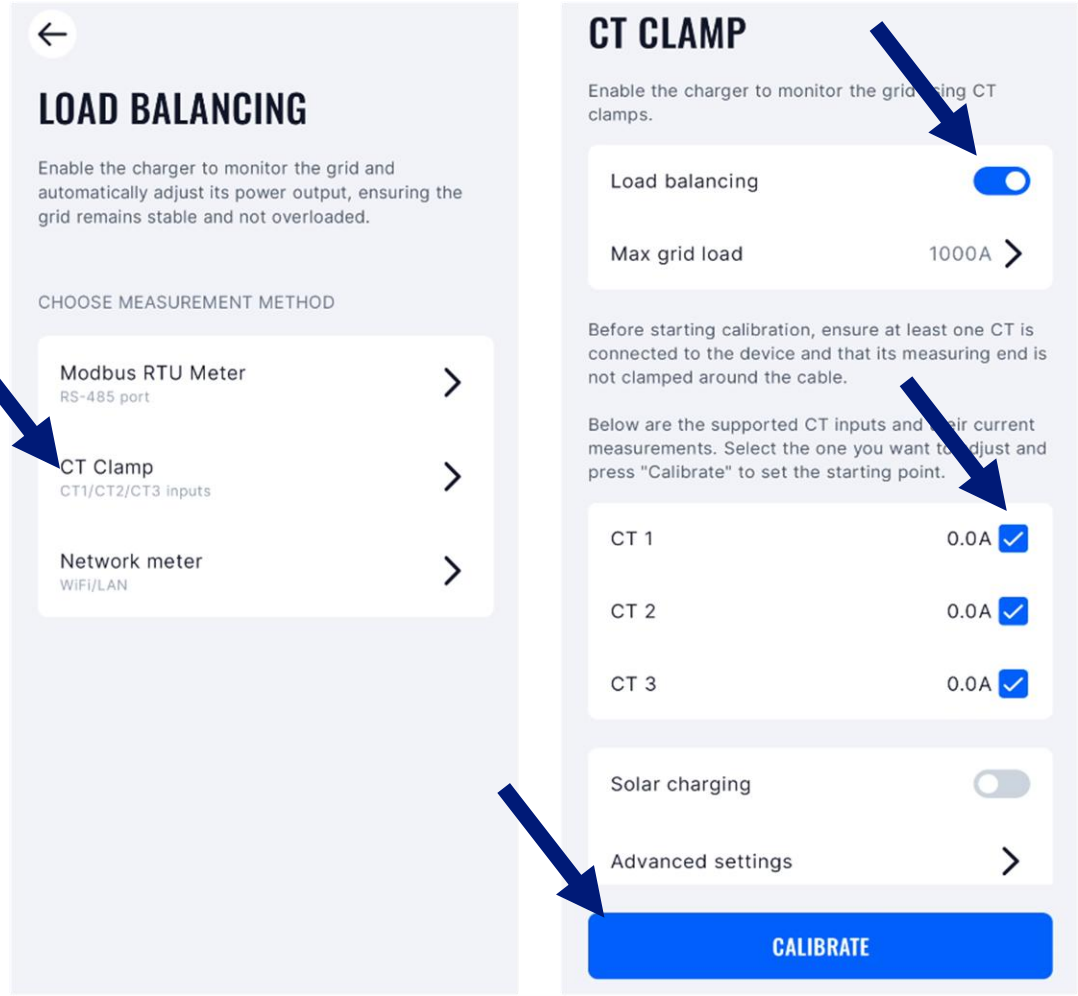


To insert the wire, keep the lock button pressed with a screwdriver

CT clamps

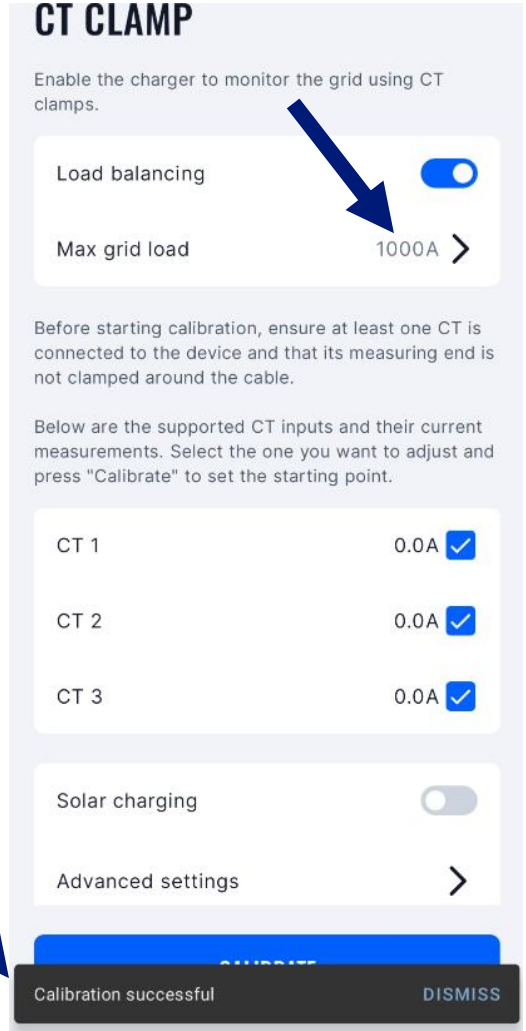
- To enable the mode: go to load balancing tab
- Select the CT clamp feature
- Enable load balancing
- Select all CT clamps that the charger will use and click calibrate.

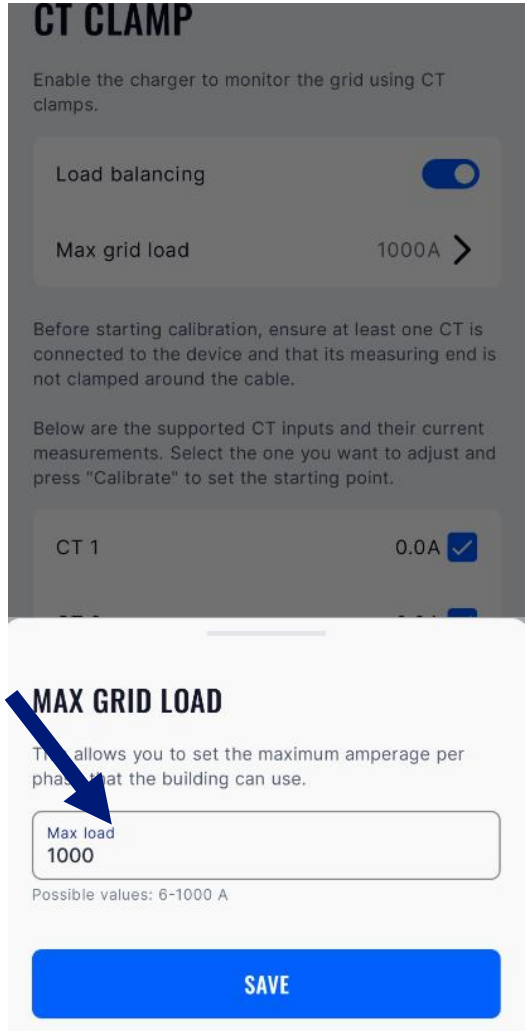
Before calibration, CT clamp must be connected to the port, but not clamped around the cable yet



CT clamps

- Upon successful calibration, set the max grid load according to your own grid.

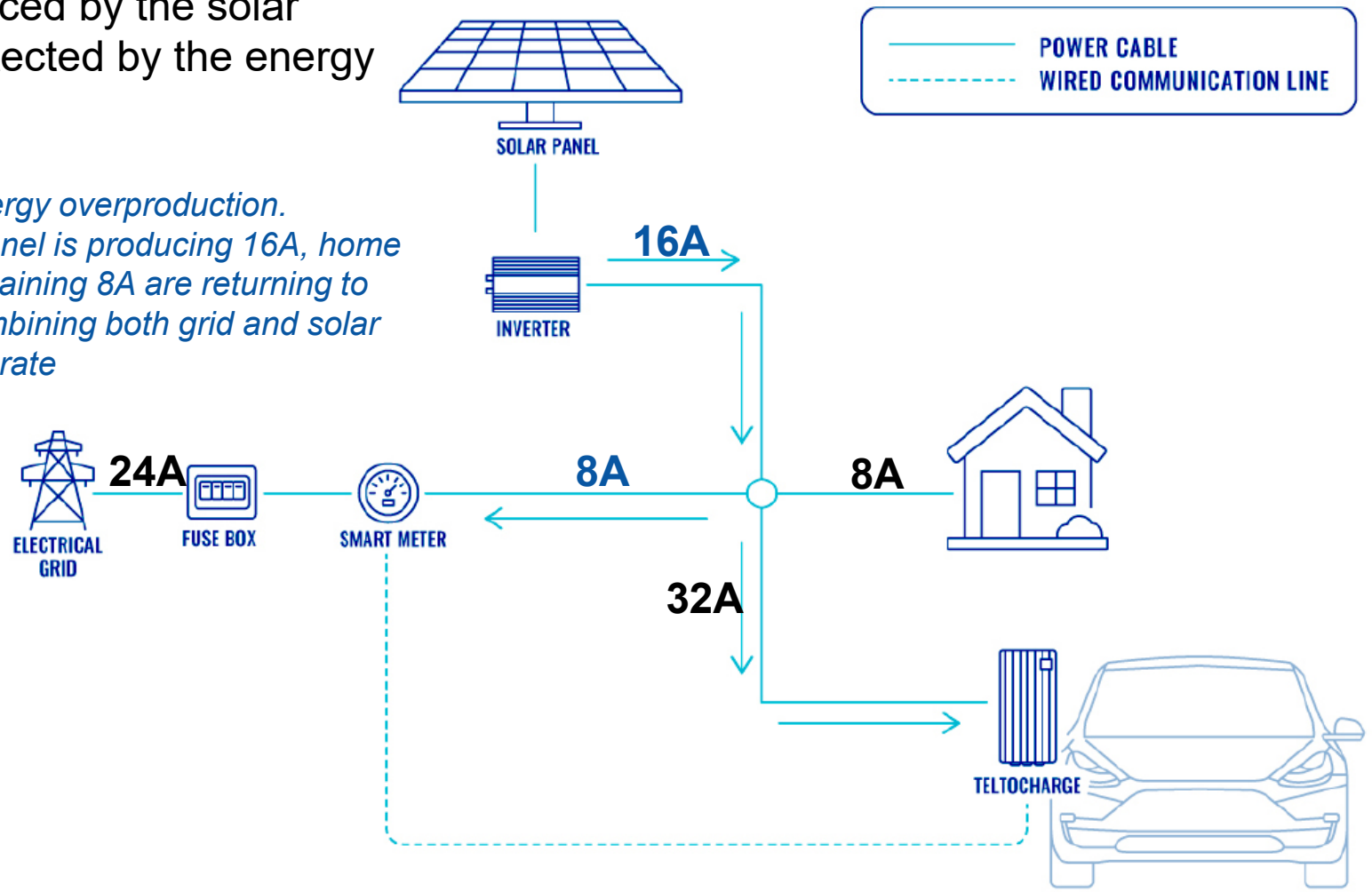




Dynamic Load Balancing using solar energy

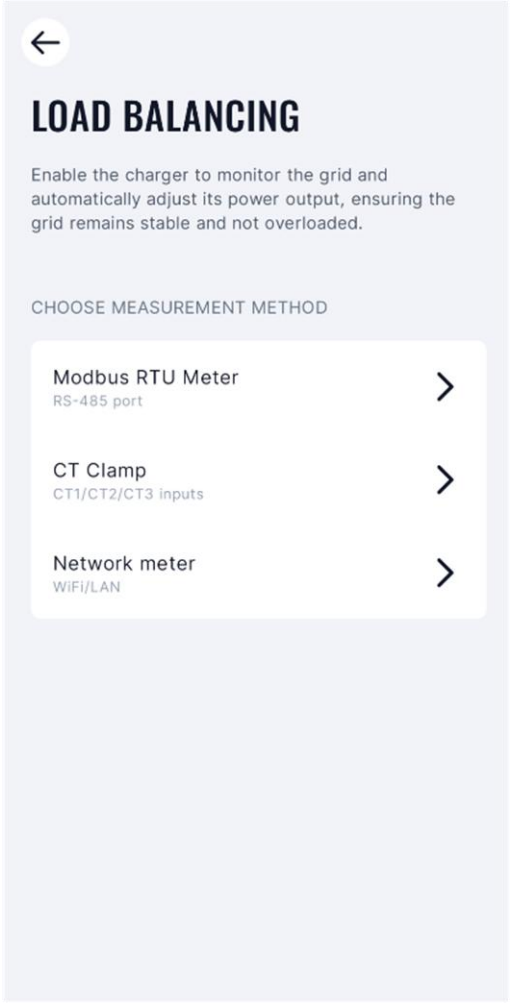
- The energy produced by the solar panel must be detected by the energy meter.

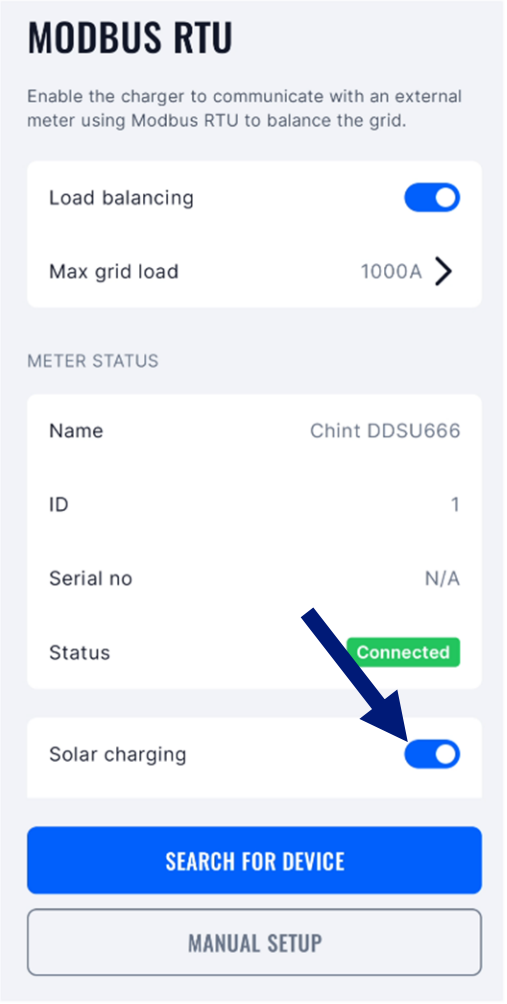
We work with solar energy overproduction.
In the picture - solar panel is producing 16A, home uses 8A, therefore remaining 8A are returning to grid and charger is combining both grid and solar to achieve 32A charge rate



Solar charging

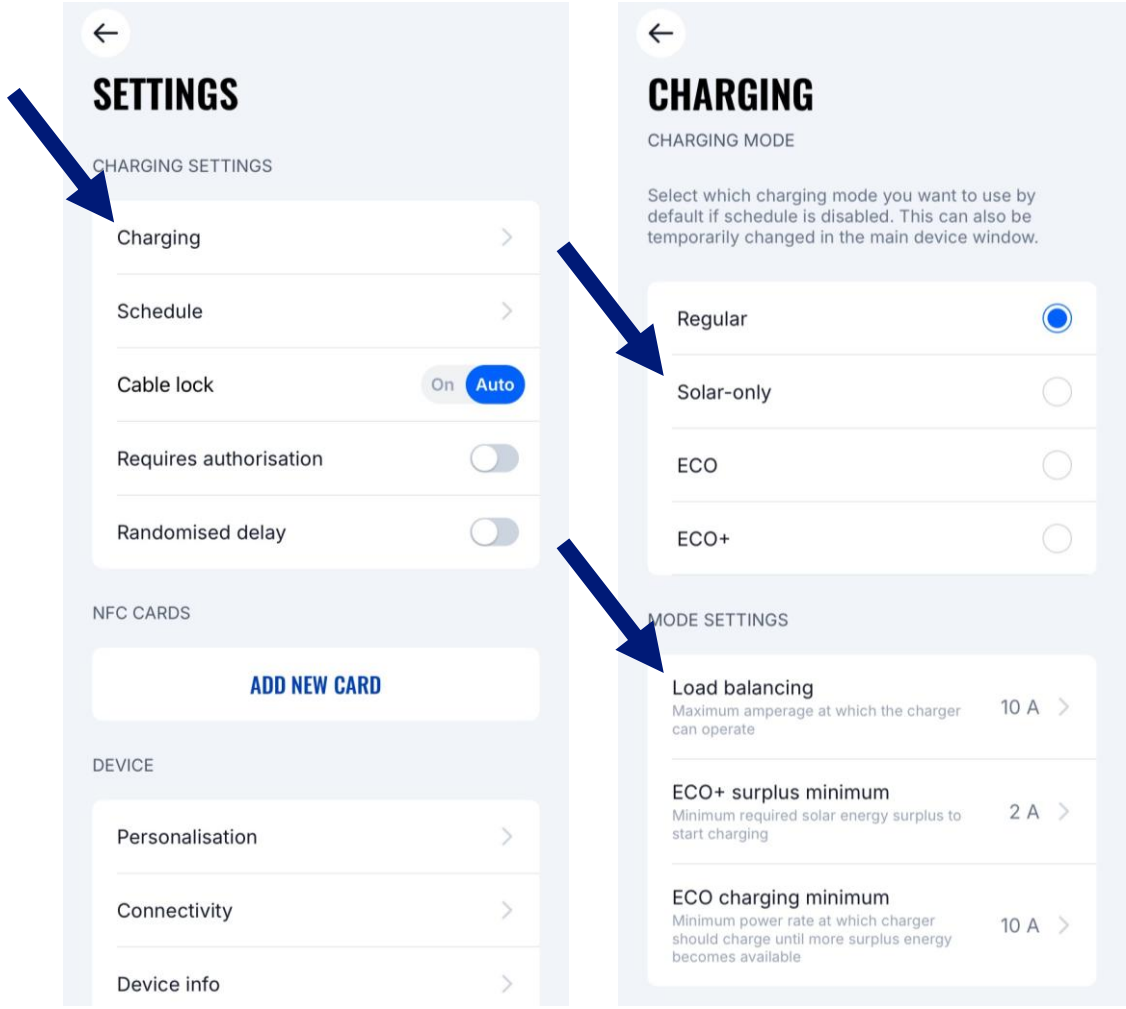
- Upon successfully connecting one of the meters go to its settings
- Turn the Solar charging option on



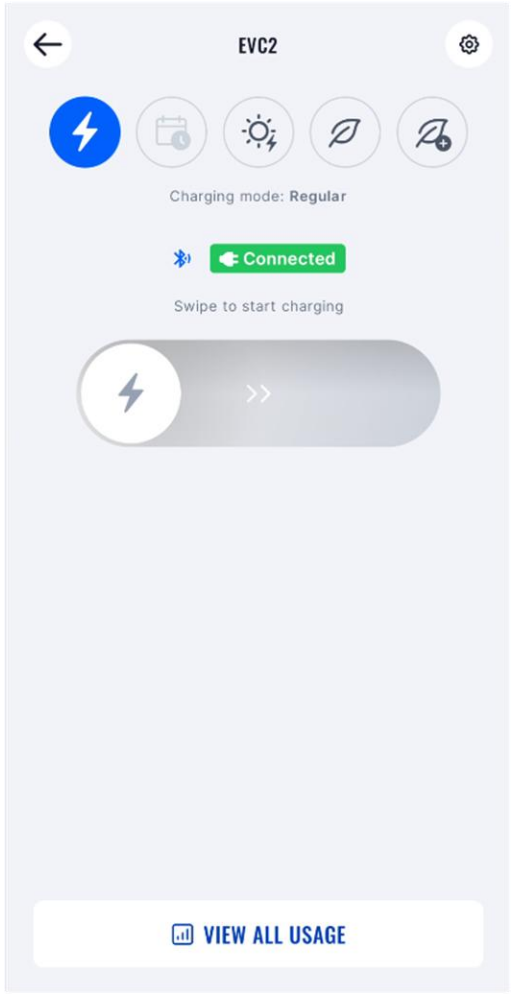


Solar charging modes

- Solar charging modes can be switched and configured in the settings menu
- Choose one of the desired modes and adjust its settings accordingly



Solar charging modes



Solar only charging - In this profile, the charging is using only solar power. The minimum required value from solar is 6A. If there is less than 6A on solar production, the charger will be “on hold”

ECO charging profile - In this profile, we’re charging using solar energy but supplement it with grid energy. The user sets the ECO charging minimum value, which determines the minimum charging current. It will still charge using grid if there is no solar available, and if solar generation exceeds minimum value – it will charge at more.

Example:
ECO charging minimum value set to 10 A
If 5 A (from solar) + 5 A (from grid) = 10 A charging current
If 16 A (from solar) + 0 A (from grid) = 16 A charging current

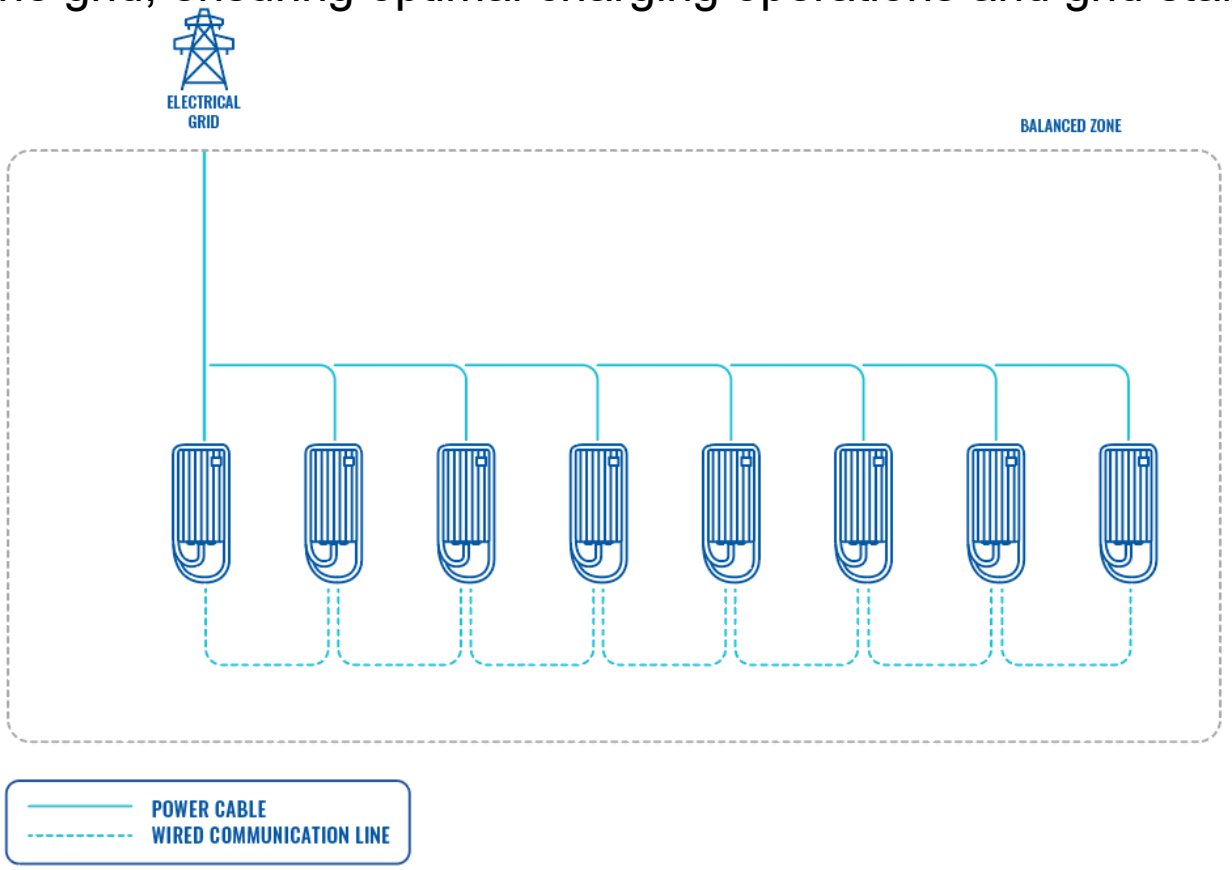
ECO+ charging profile – only difference is that it wont charge at all if solar power is not meeting the required configured minimum value.

Example:
ECO+ surplus minimum value set to 1 A
0 A (from solar) = charging process is not initiated
1 A (from solar) + 5 A (from grid) = 6 A charging current
10 A (from solar) + 0 A (from grid) = 10 A charging current

Dynamic Load Management using Modbus RTU

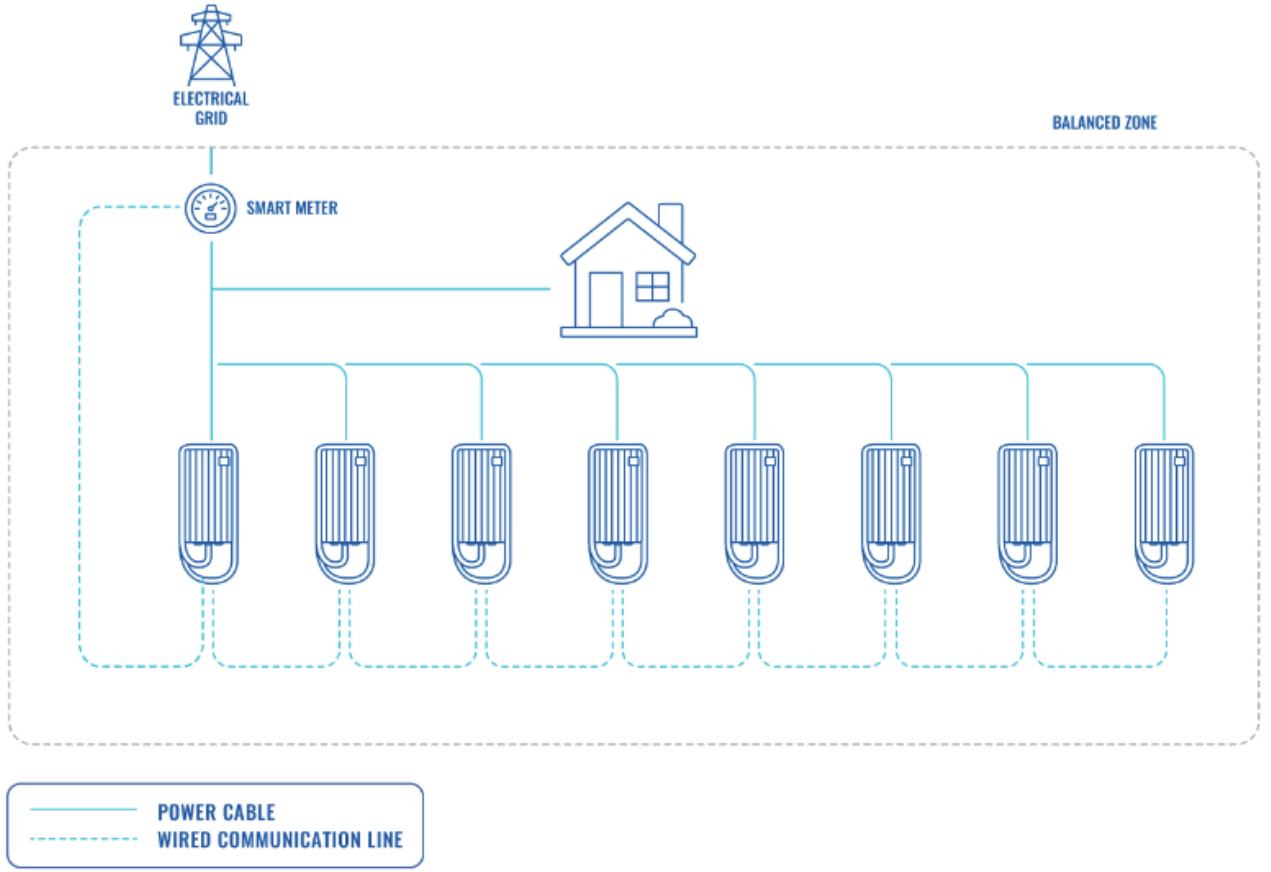
Dynamic load management is a sophisticated feature that empowers users to efficiently control electric load by managing a group of chargers installed within a single circuit.

Through Modbus communication, the group dynamically adjusts their charging power in response to the load on the grid, ensuring optimal charging operations and grid stability.



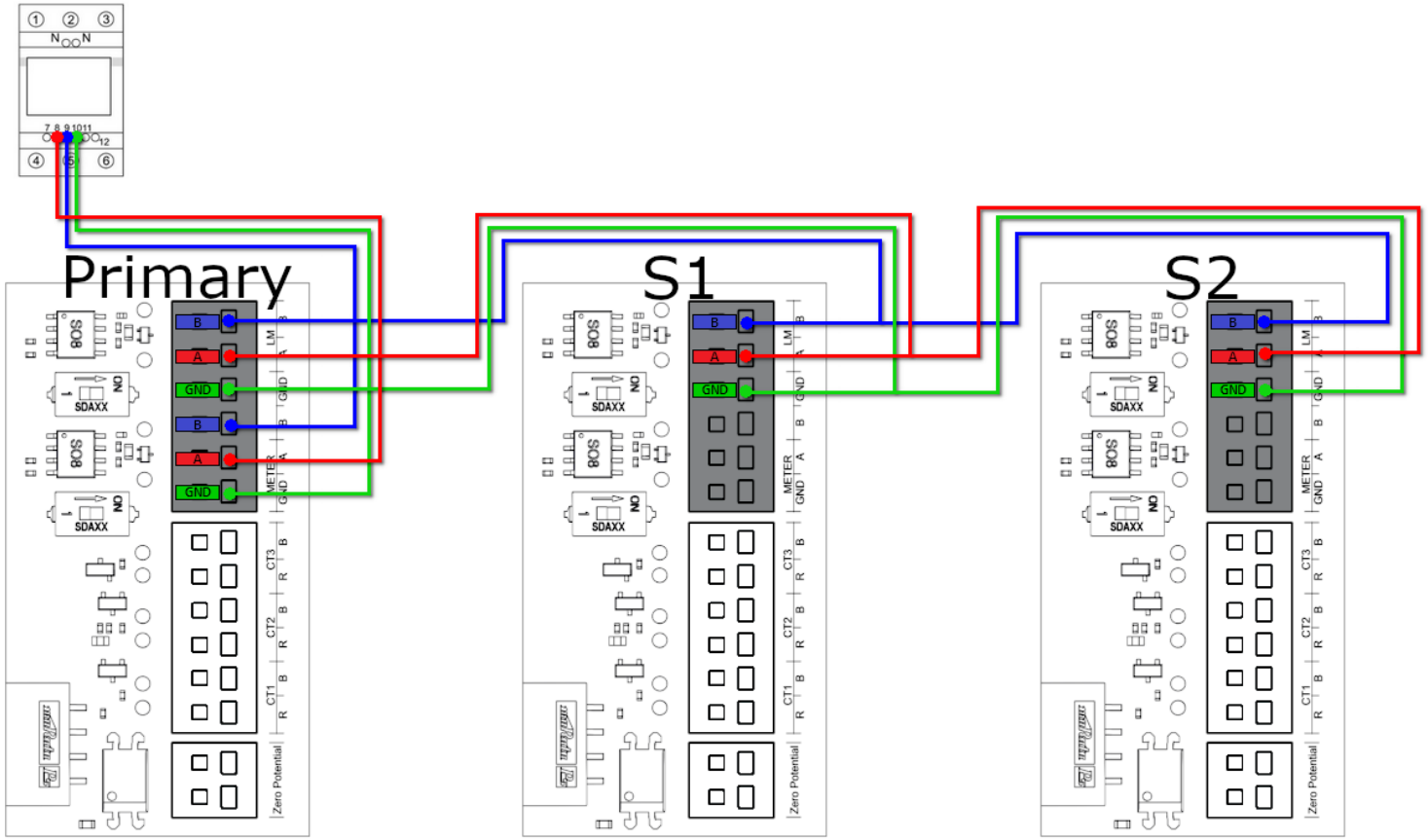
Dynamic Load Management using Modbus RTU

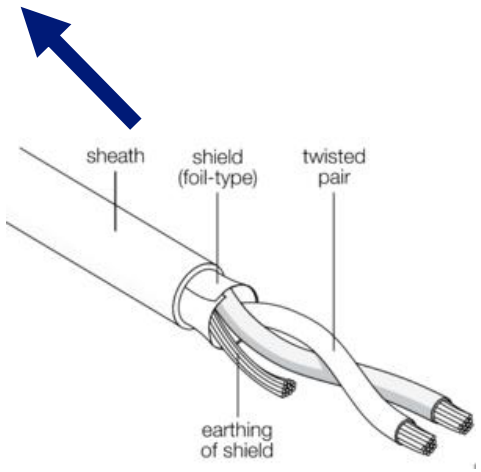
This configuration enables users to efficiently manage the electric load between chargers and other appliances. By leveraging the capabilities of a smart meter, precise control and optimization of the overall load can be achieved.



Dynamic Load Management using Modbus RTU

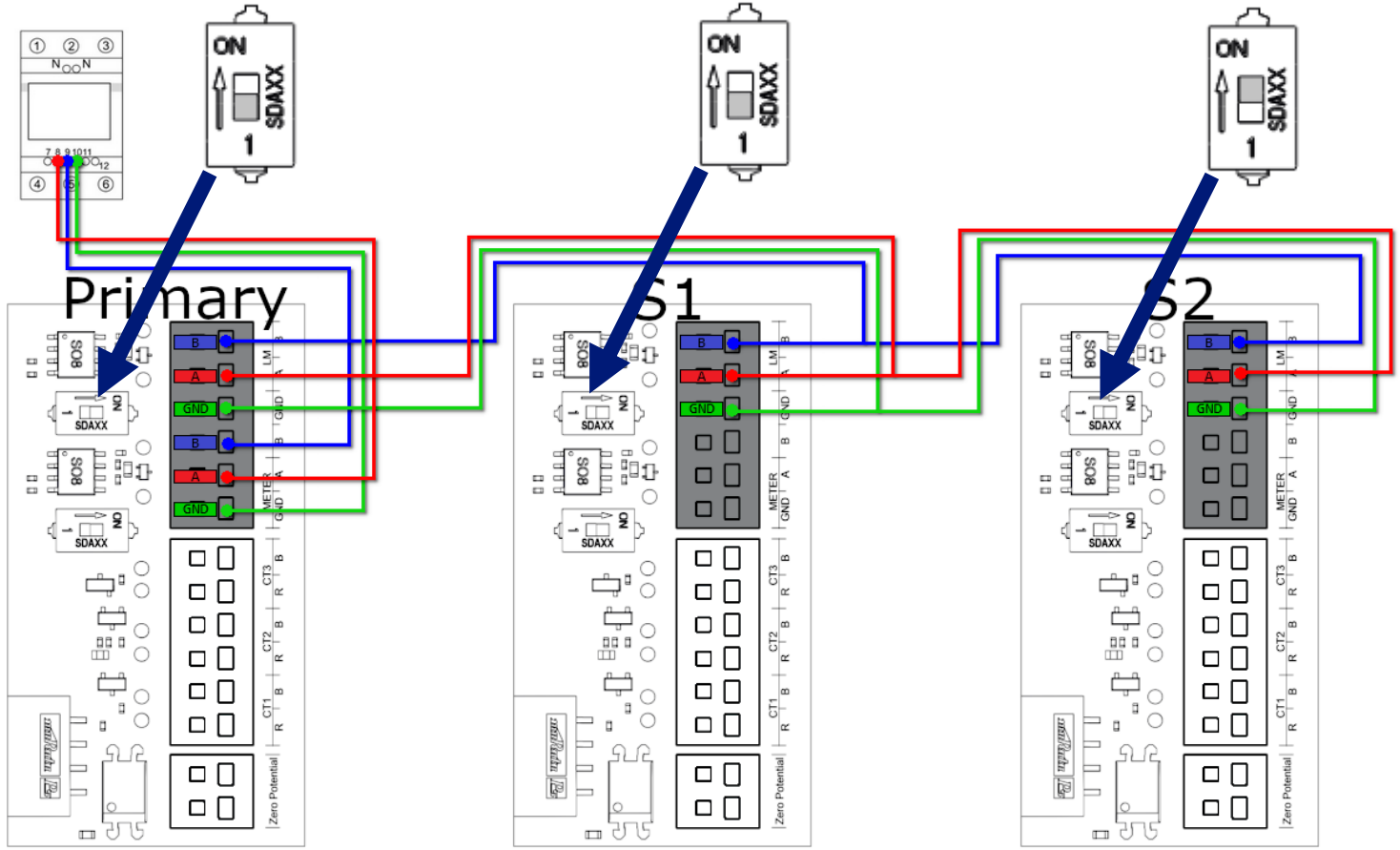
Communication is governed by a designated **"Primary"** charger, dictating instructions to the remaining **"Secondary"** chargers. These chargers must be interconnected serially (daisy chained), each requiring the use of UTP twisted pair cables for communication via the A and B pins.





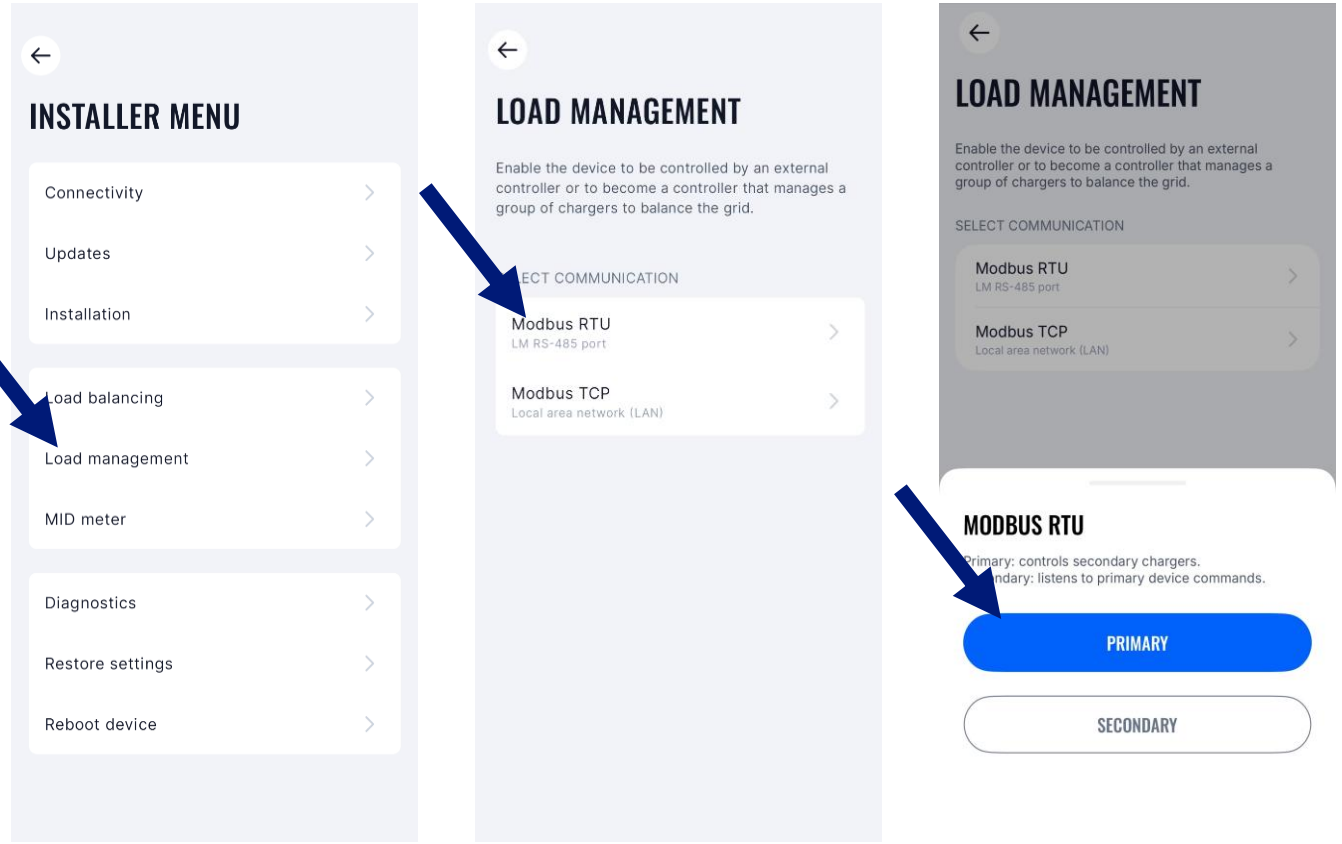
Dynamic Load Management using Modbus RTU

Tip: when multiple devices are connected in daisy chain configuration. Make sure that the first and the last device in the line have their designated RS485 switches switched to **“ON”** position, while all other devices be switched **“OFF”.** In this example, first device on the line is a meter – primary station switch is set to “**OFF**”. Setups with no meter would require the primary device switch to be set as “**ON**”.



Dynamic Load Management using Modbus RTU

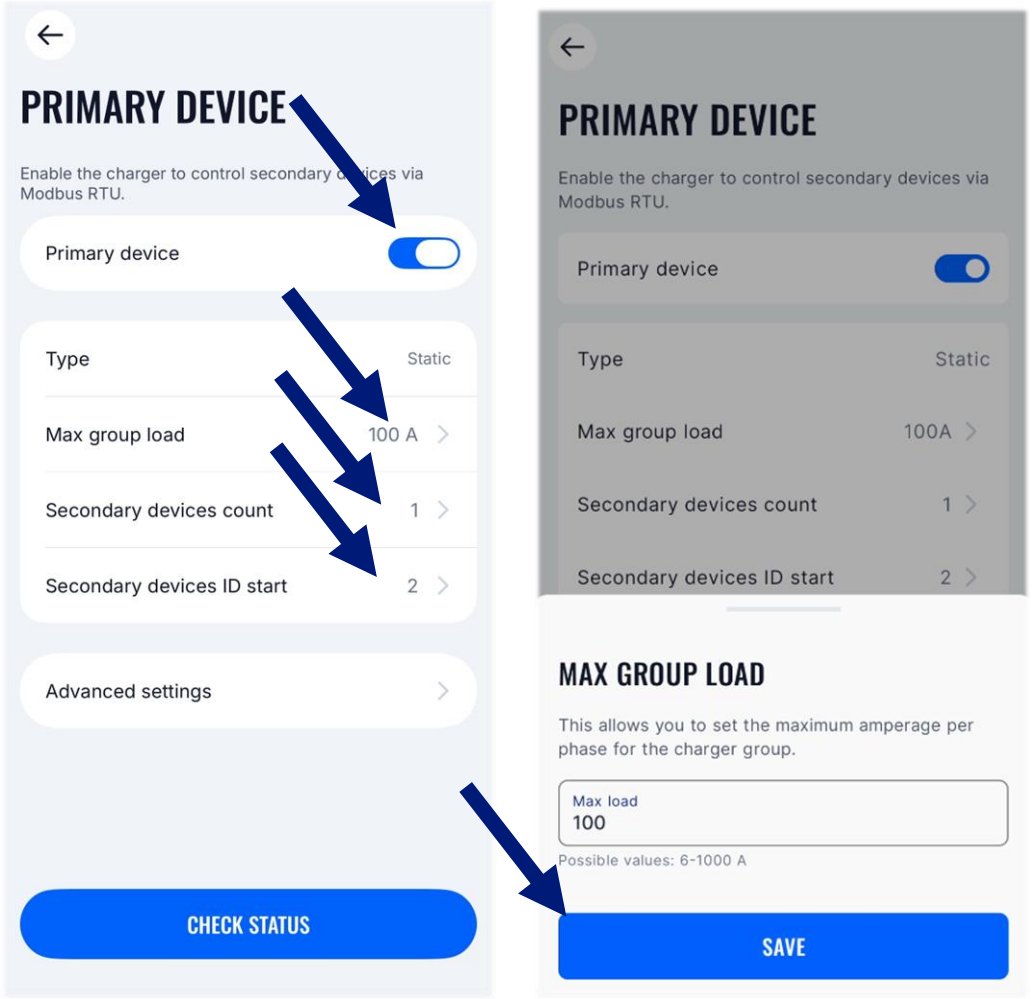
- This setting designates the charger as the primary charger
- It should only be enabled for one charger, which will handle all the calculations for the group



Dynamic Load Management using Modbus RTU

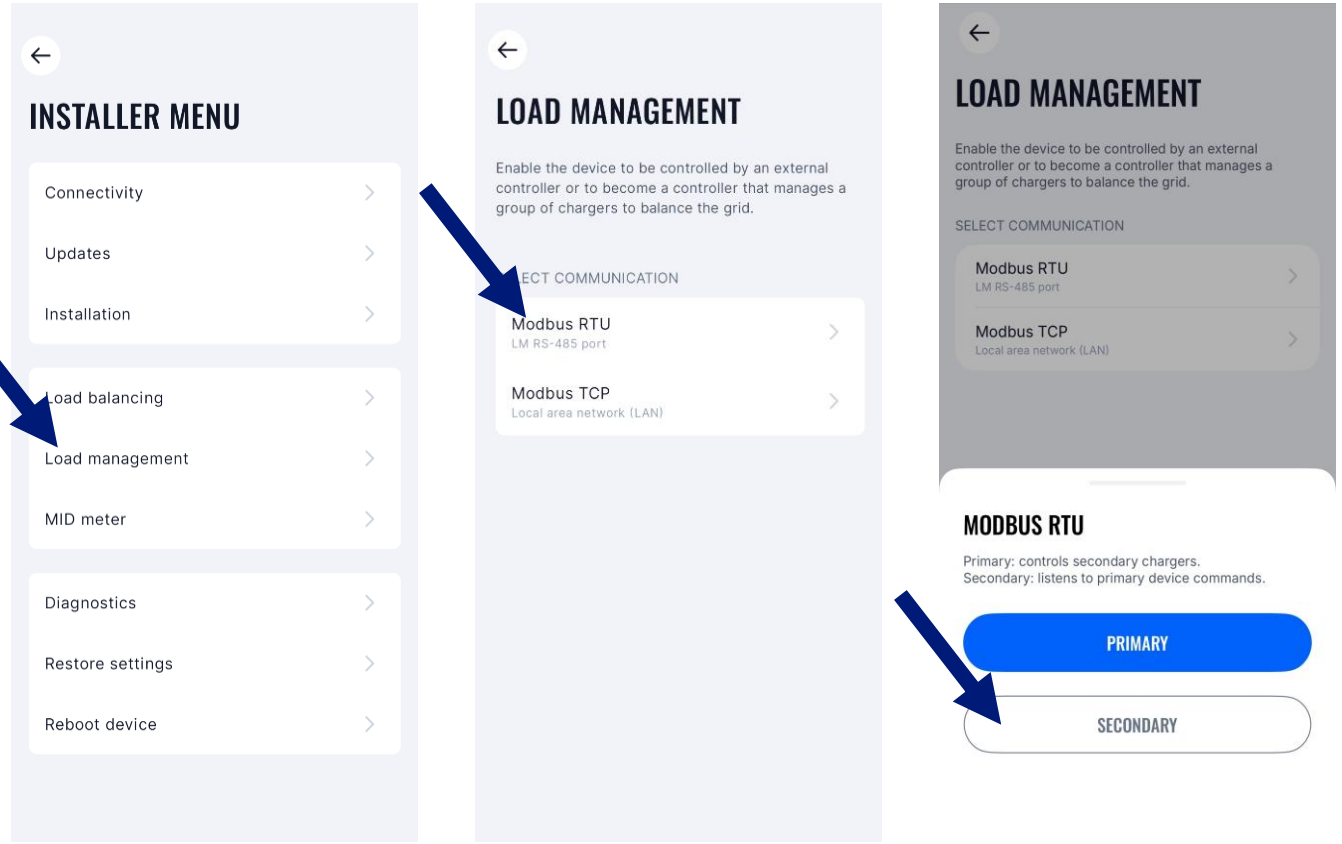
- Enable the primary device function
- Set the Max group load according to the rating input of power allocated to the group
- Secondary devices count – how many chargers are connected to the primary?
- Secondary devices ID start – set the Modbus device ID starting digit

note: if a meter is connected to the primary device, secondary device start IDs must not include meters address on Modbus line



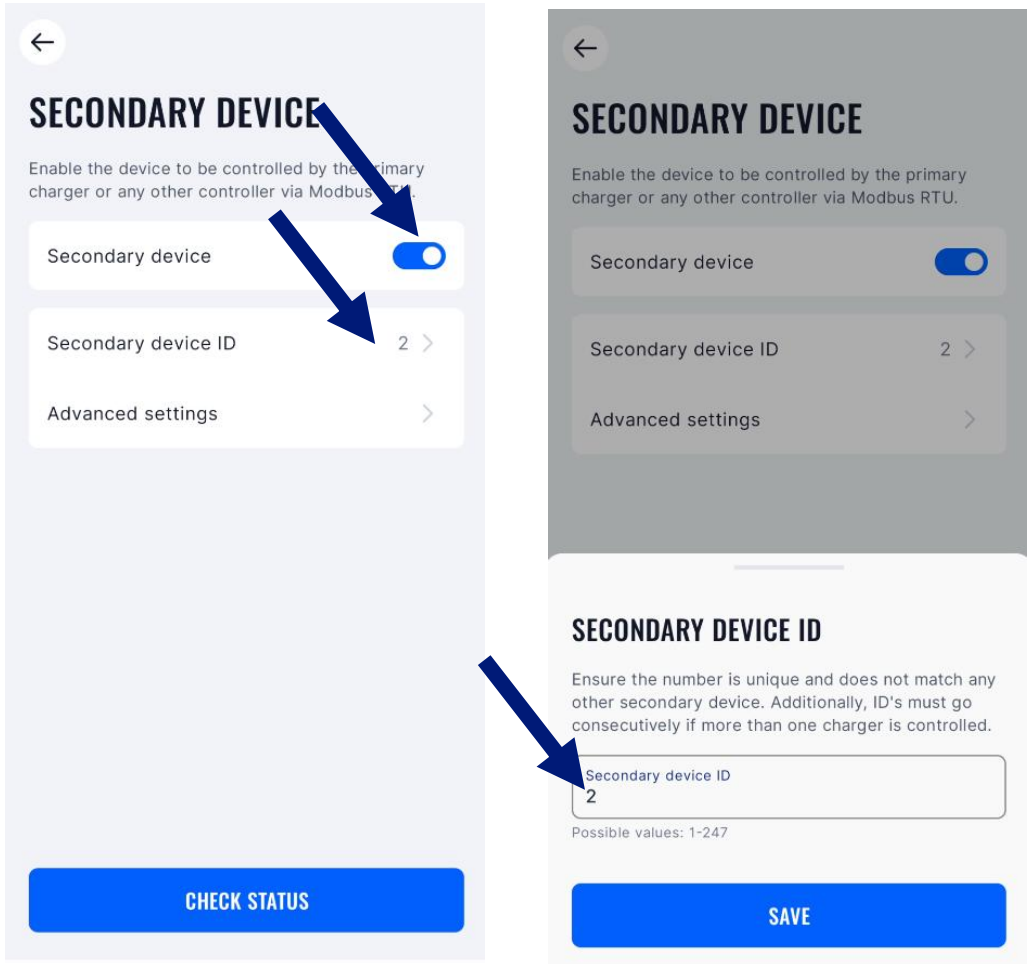
Dynamic Load Management using Modbus RTU

- After setting the primary device, configuration must be done for every secondary device
- This setting designates the charger as the secondary charger



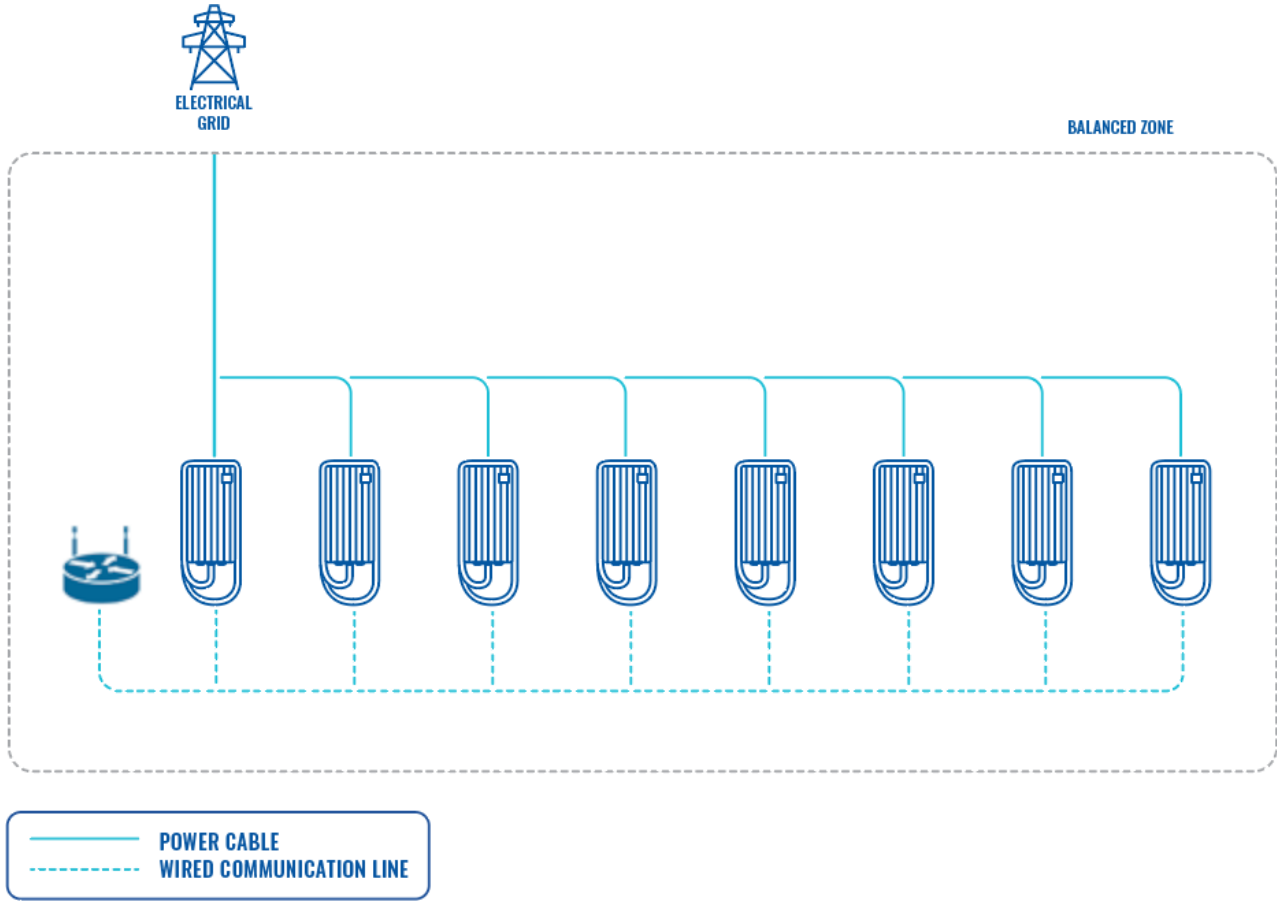
Dynamic Load Management using Modbus RTU

- Set the device as secondary
- Check its device ID
- Increment every other devices ID by 1 so the primary device can differentiate between secondary devices



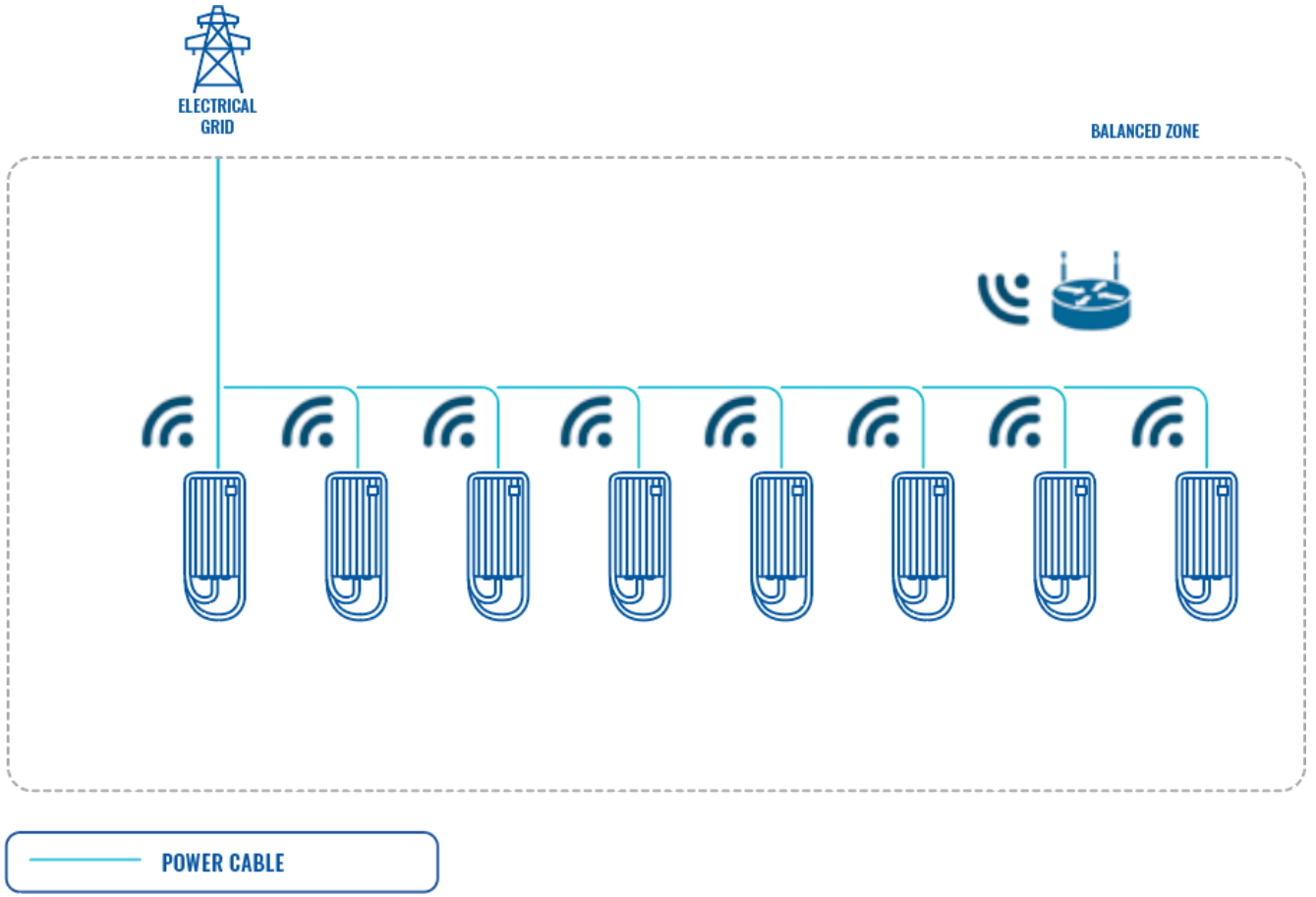
Dynamic Load Management TCP over LAN

Dynamic load management can be done using LAN connection by having the group of chargers connected to the same network



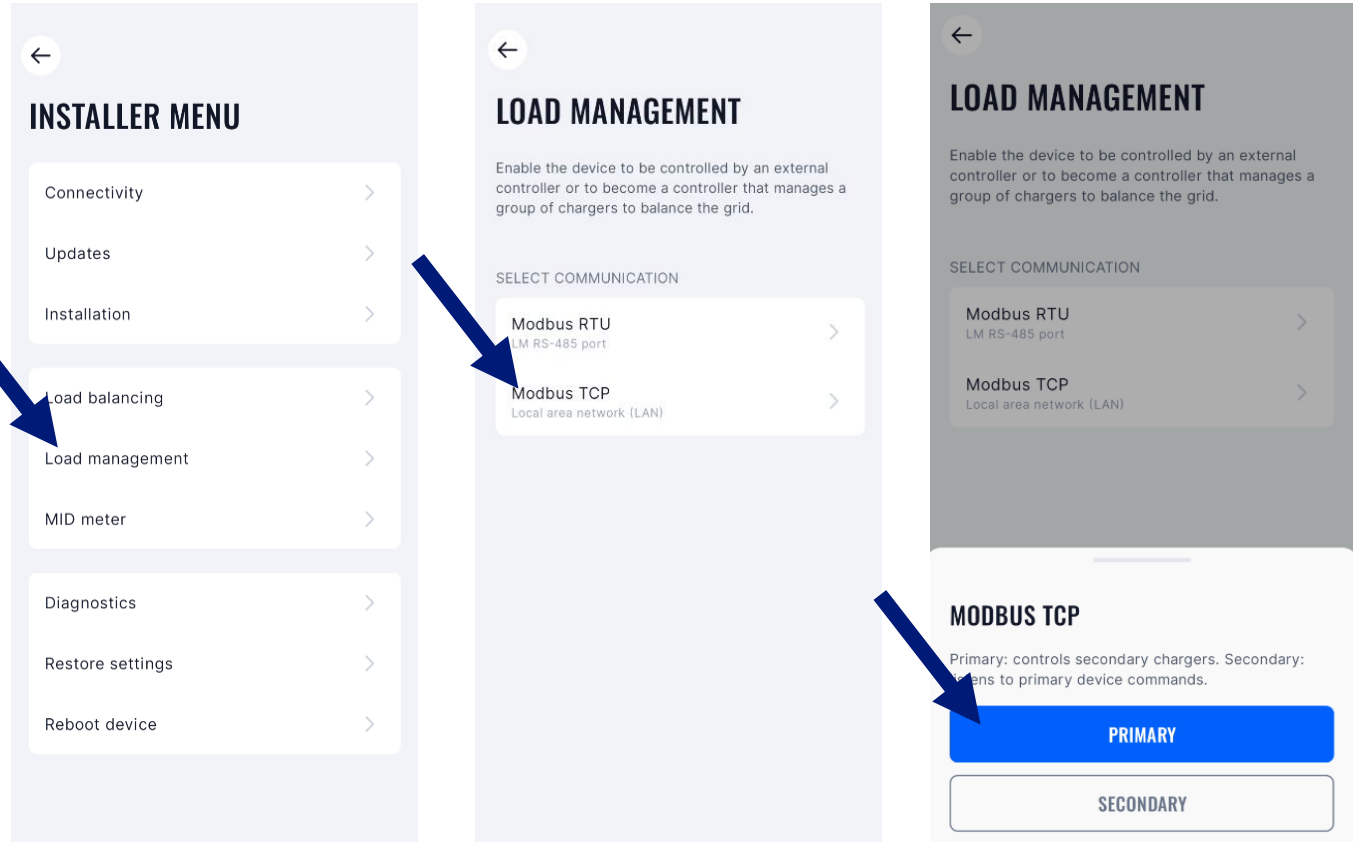
Dynamic Load Management TCP/IP over WiFi

The group can also be connected over WiFi



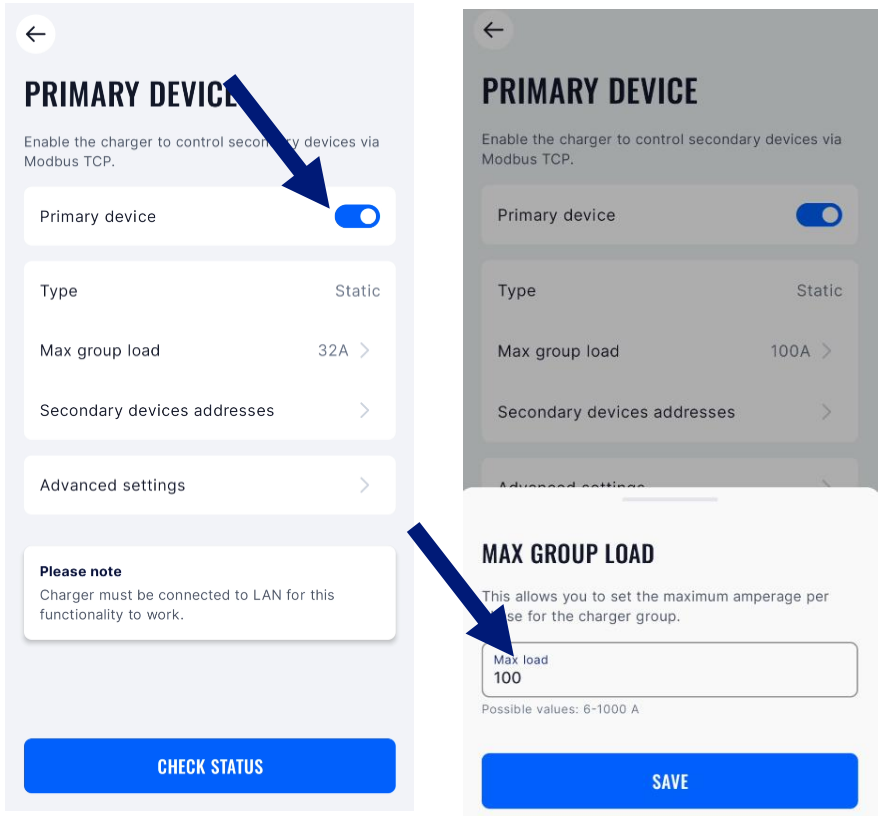
Dynamic Load Management using Modbus TCP/IP

- This setting designates the charger as the primary charger
- It should only be enabled for one charger, which will handle all the calculations for the group



Dynamic Load Management using Modbus TCP/IP

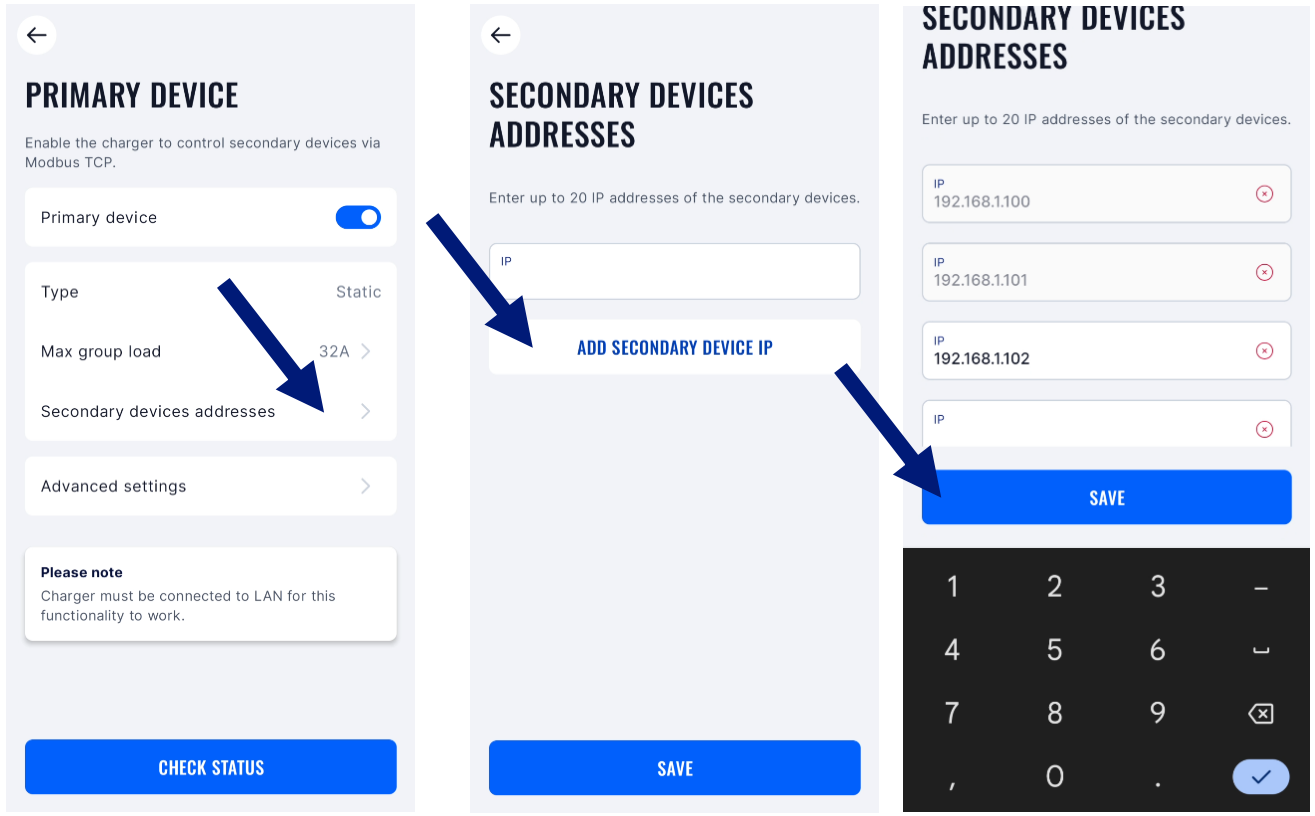
- Enable the primary device function
- Set the Max group load according to the rating input of power allocated to the group



Dynamic Load Management using Modbus TCP/IP

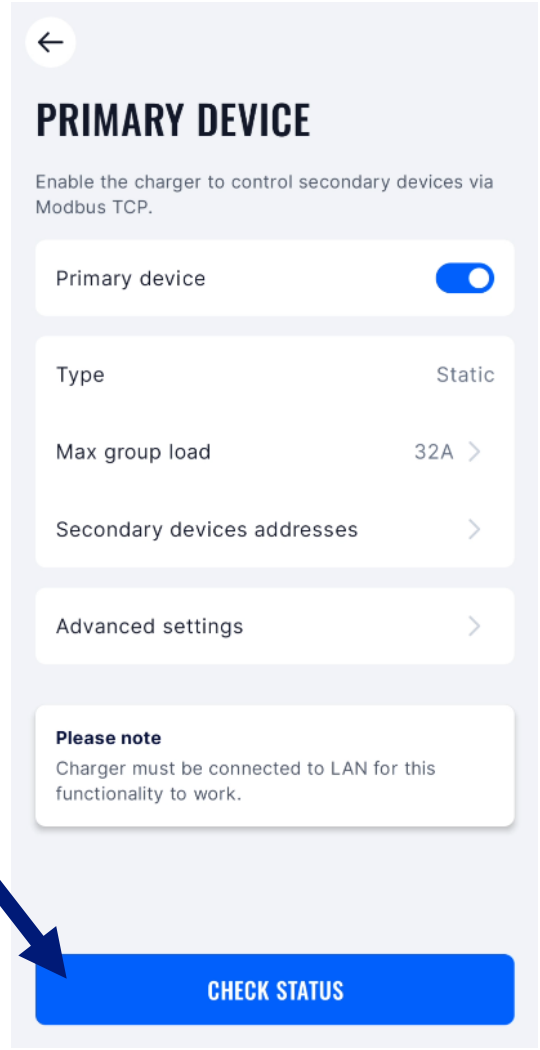
- Start adding secondary devices by their IP address and save configuration

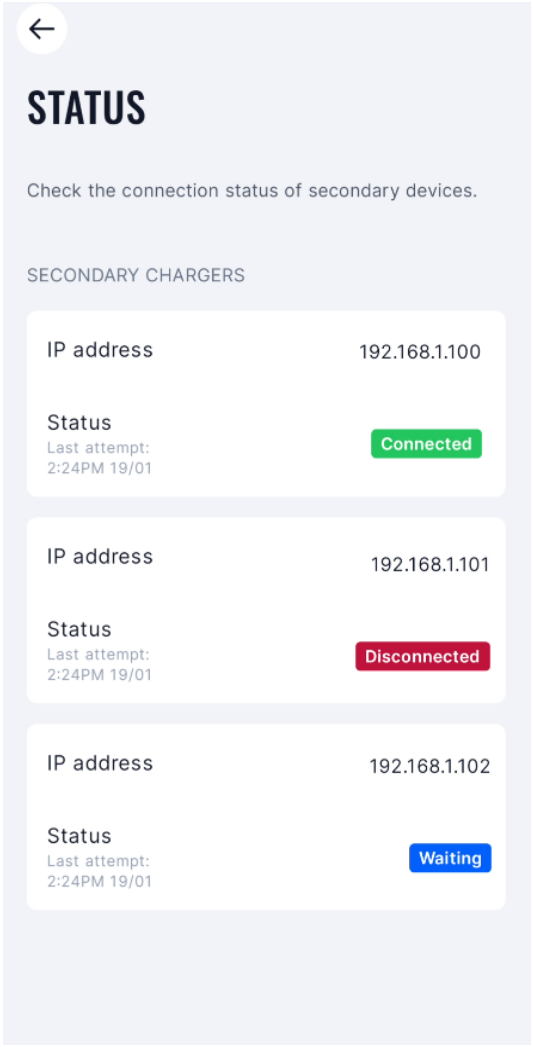
note: IP addresses must be set as static in your router settings



Dynamic Load Management using Modbus TCP/IP

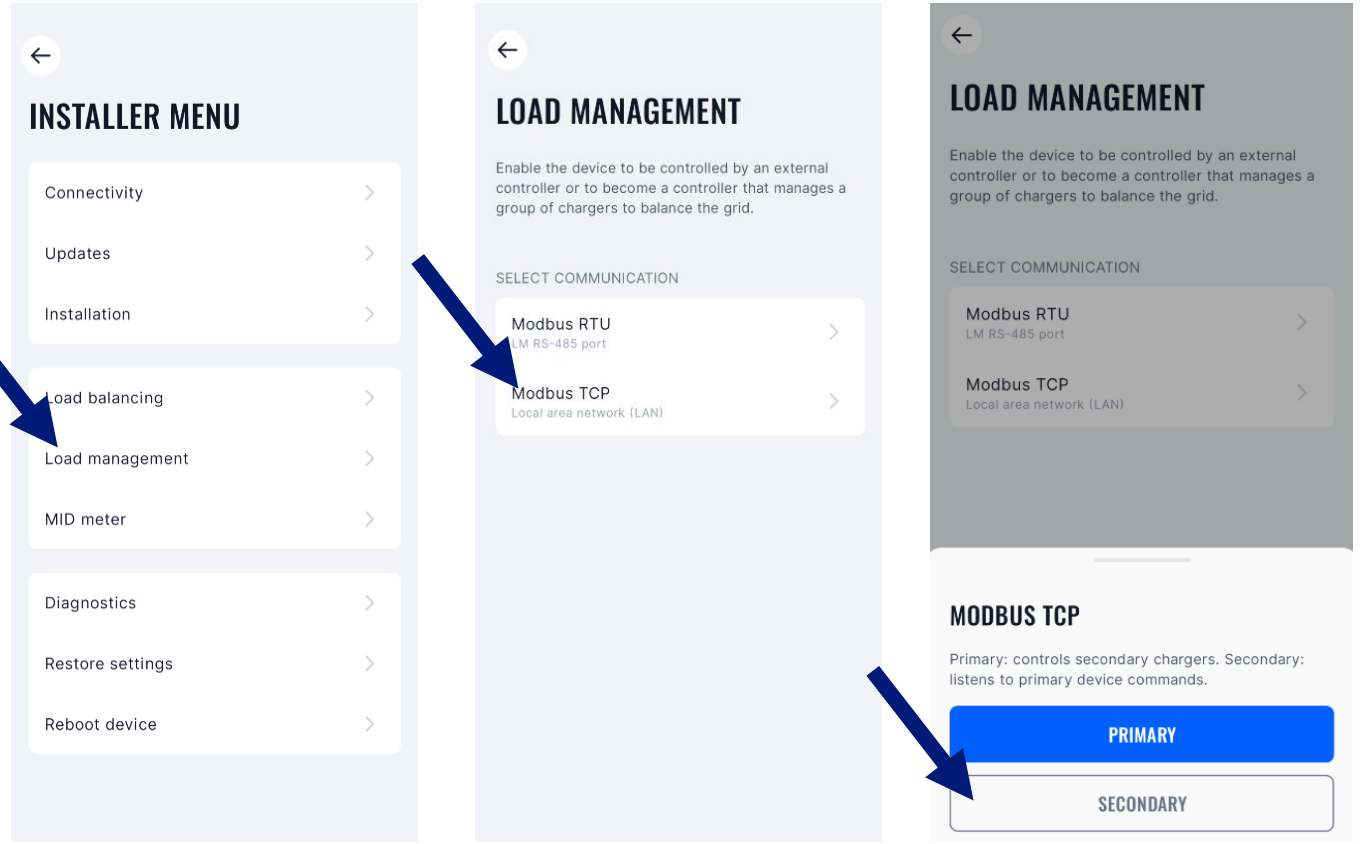
- Upon successfully adding IP addresses check status to confirm connection





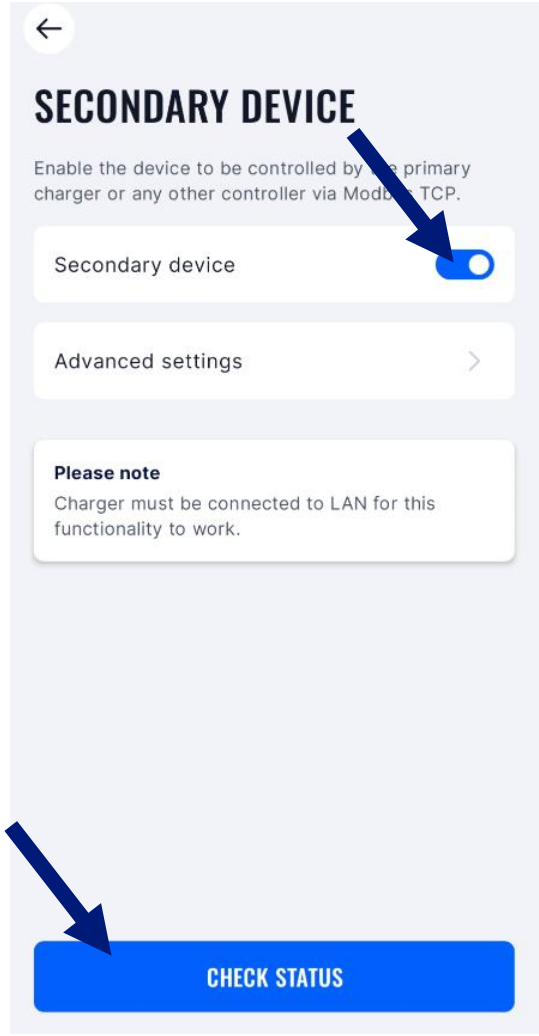
Dynamic Load Management using Modbus TCP/IP

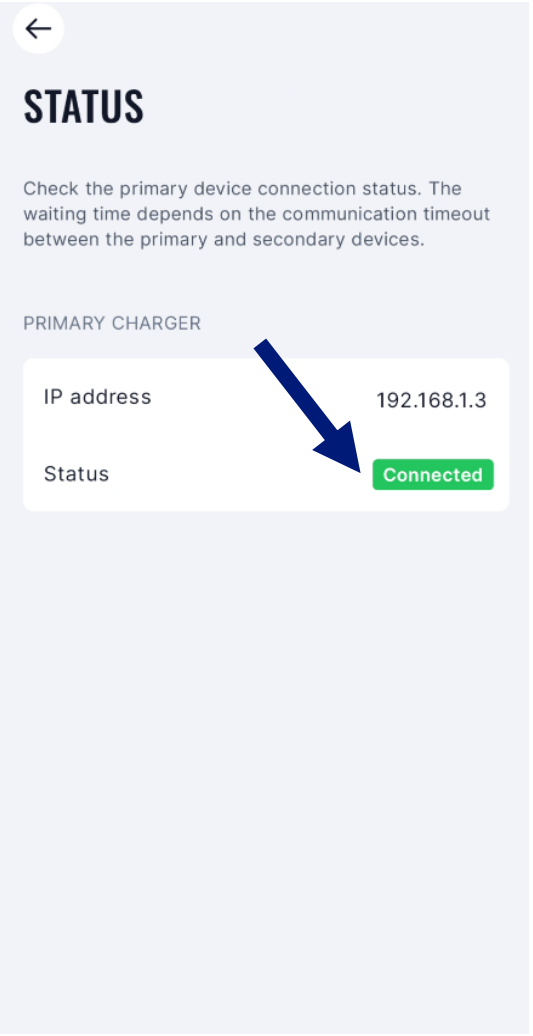
- After setting the primary device, configuration must be done for every secondary device
- This setting designates the charger as the secondary charger



Dynamic Load Management using Modbus TCP/IP

- Enable device as secondary
- Check status to see if secondary device sees the primary



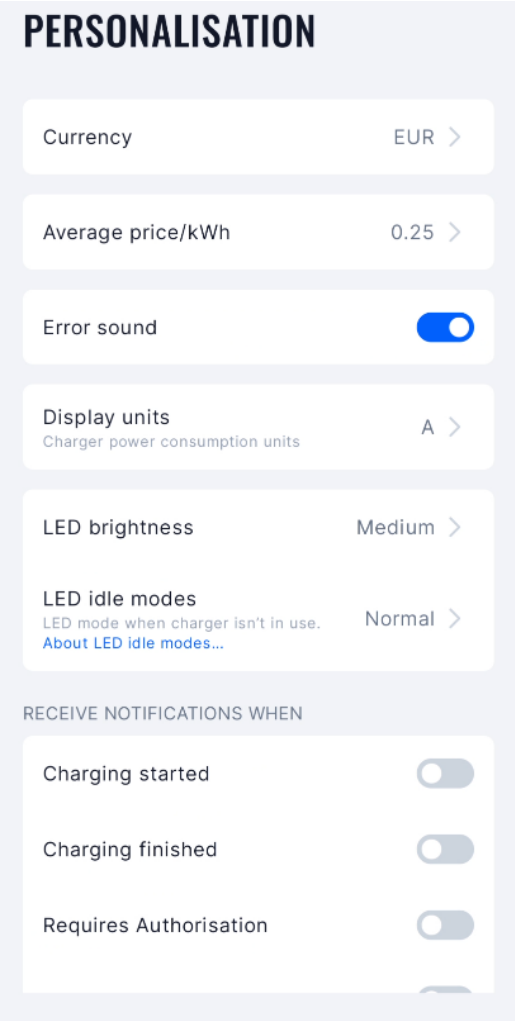


Application and additional features:

- Personalisation
- Connectivity & OCPP
- Authorization via NFC
- Updating
- Charging sessions
- Schedule
- Diagnostics
- Troubleshooting
- Potential free contact
- Power selector switch

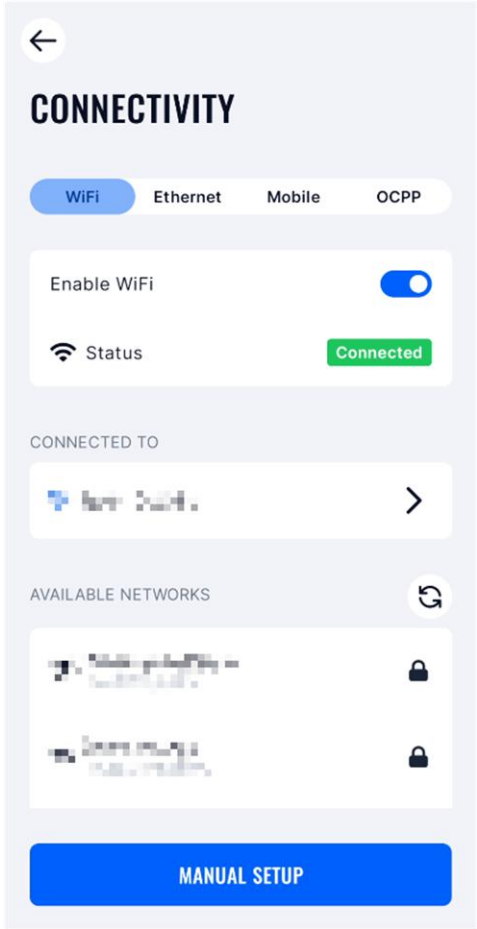
Personalisation

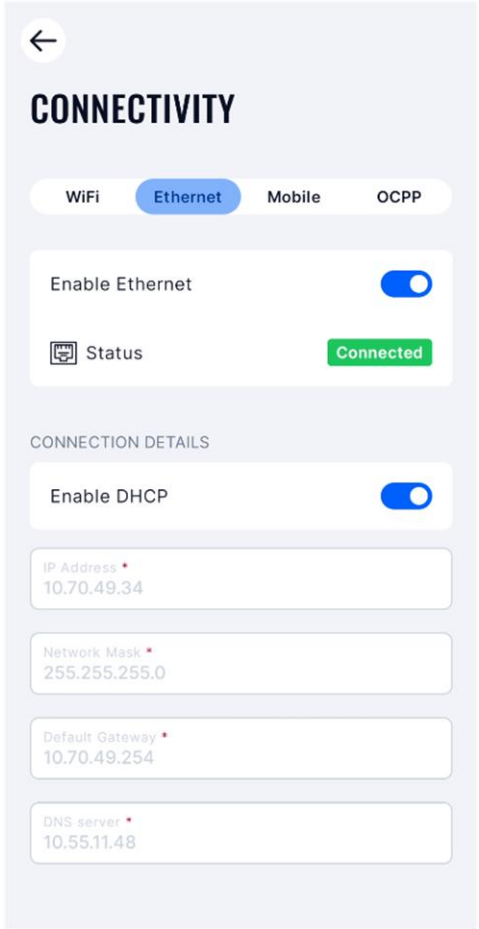
- App allows the user to personalise options to his own needs
- Personalisation includes setting currency, setting average price, silencing the error sound, managing LED brightness and setting whether to receive notifications about charger's state on the user's phone

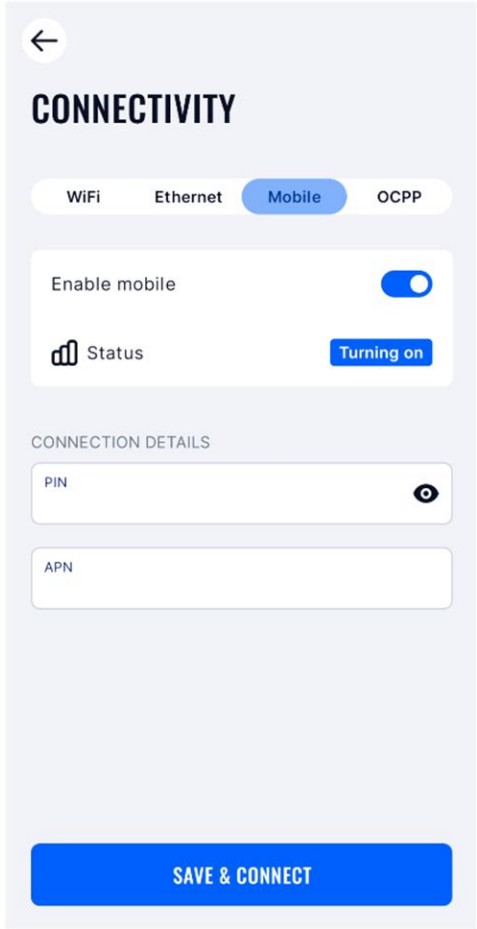


Connectivity and OCPP

- App allows the user to choose between connectivity options like WiFi, Ethernet and Mobile



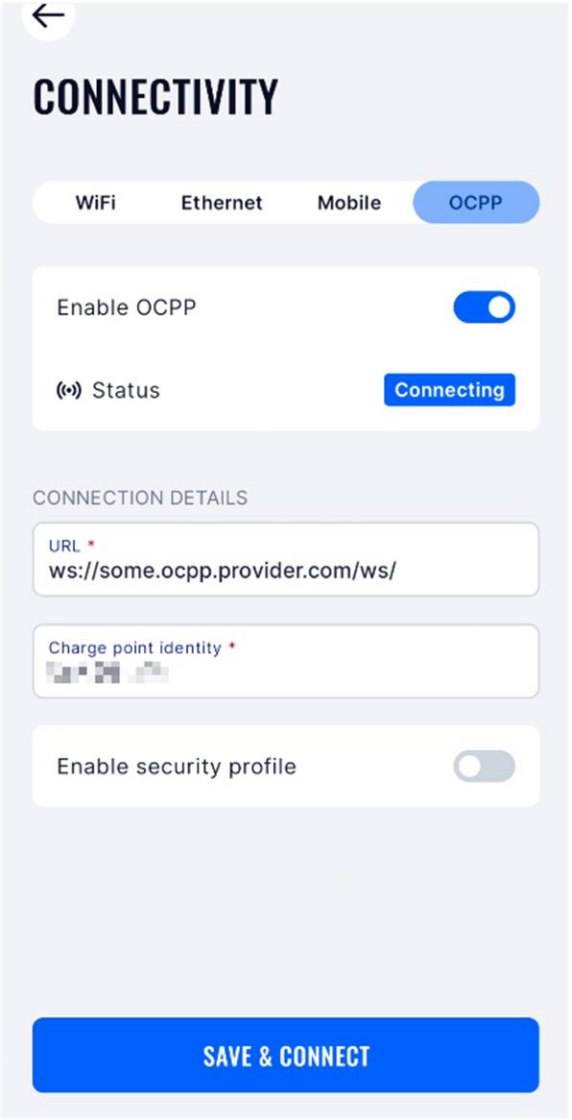




Connectivity and OCPP

- Connection to a 3rd party charge point management system is available through OCPP tab
- To connect – write down the given providers URL details. Note that address must end with a “/” symbol
- Charge point identity information is given by the provider or usually can be written down manually as chargers serial number

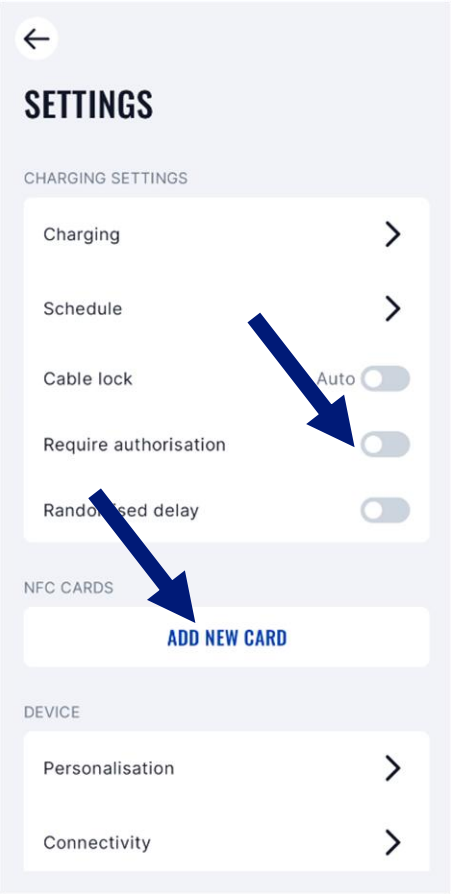
if required, application provides option to include Root and Client certificates

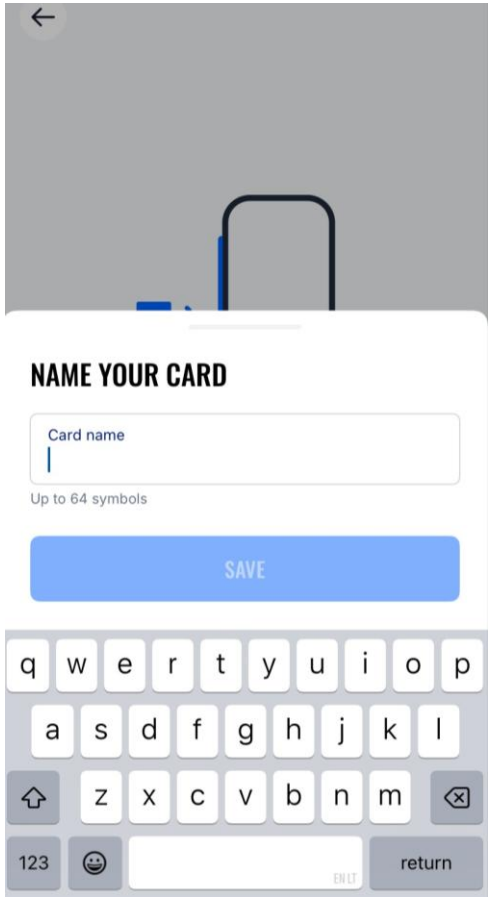


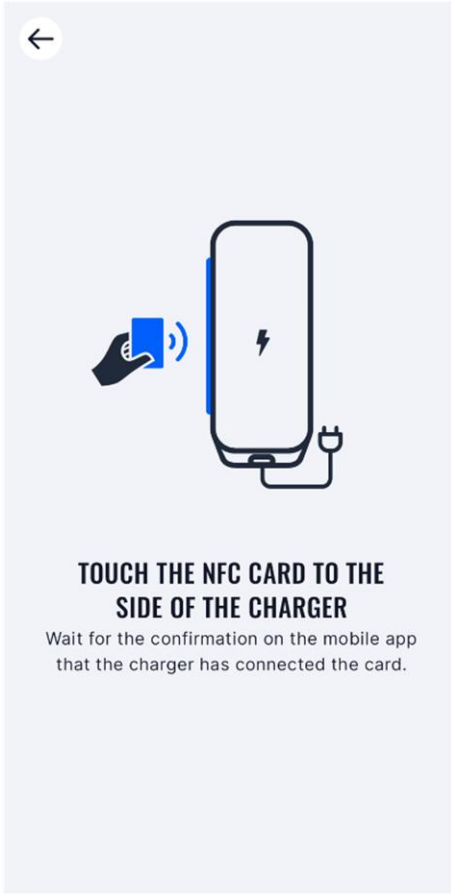
Authorization via NFC

- To enable NFC cards press on Require authorisation tab
- Press add new card
- Give it a name and touch the card to the charger's side to identify it

NFC card specifications that work with our charger
•ISO 14443 A
•UID max size 10 bytes
•13.56MHz



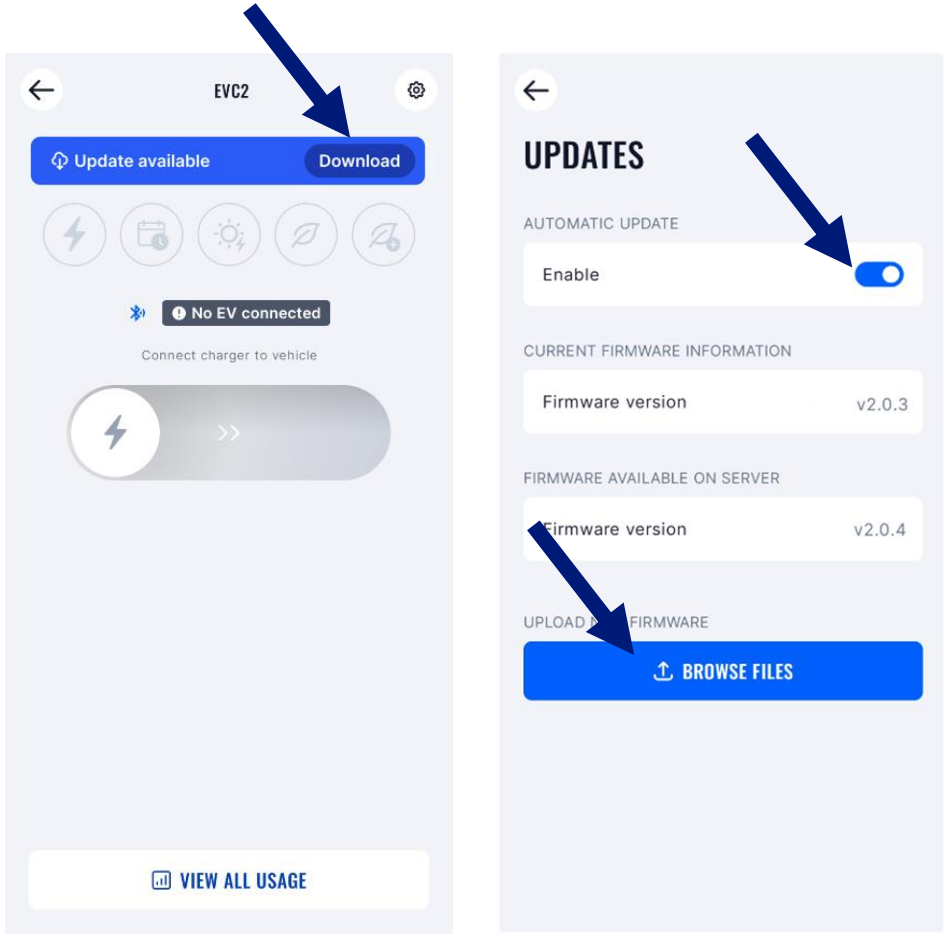




Updating

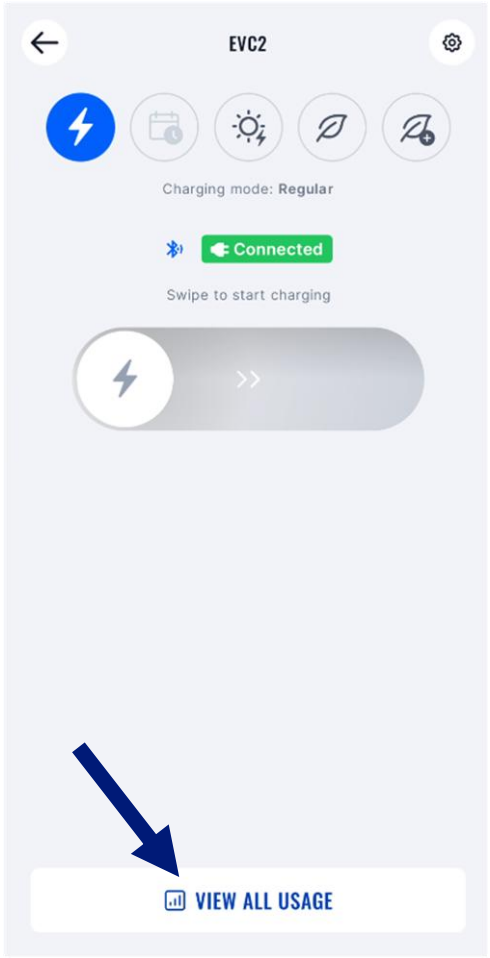
- Update can be done automatically through our server or manually downloaded from our wiki page to the phone and added as a file

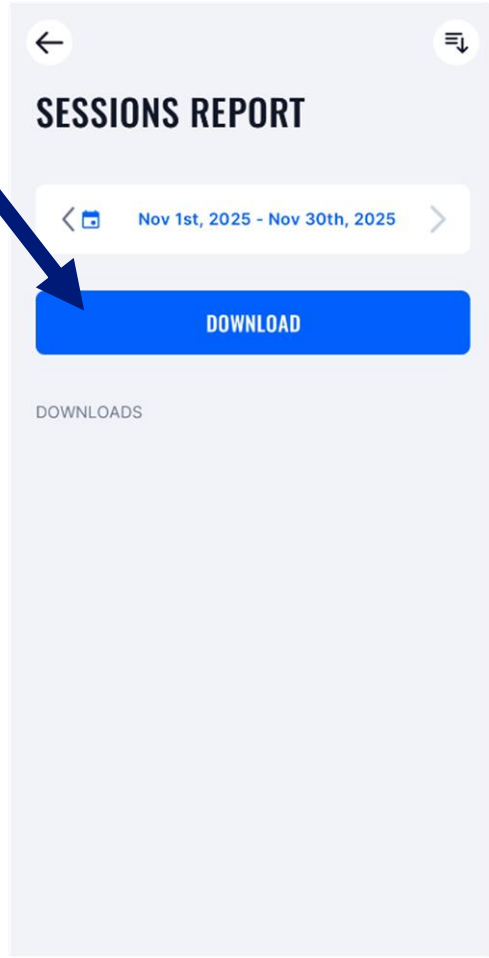
it's also possible to turn off automatic updates



Session and usage

- All charging sessions are recorded in the charger's memory and can be viewed or downloaded as an excel file

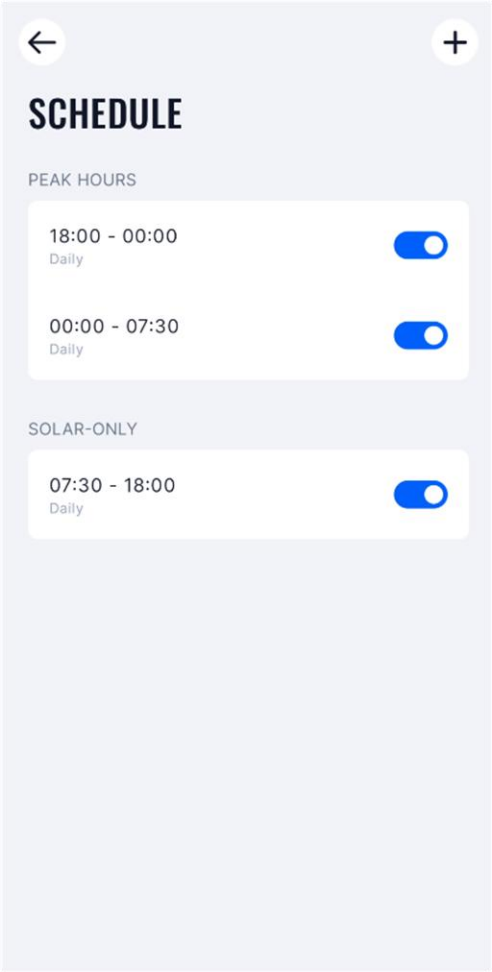




Scheduler

- It’s possible to create multiple schedules for the charger
- In this example the schedule is created to charge in solar only mode in daytime, while limiting charging during evening and nighttime

07:30 to 18:00 charging on solar only
18:00-07:30 don’t charge at all



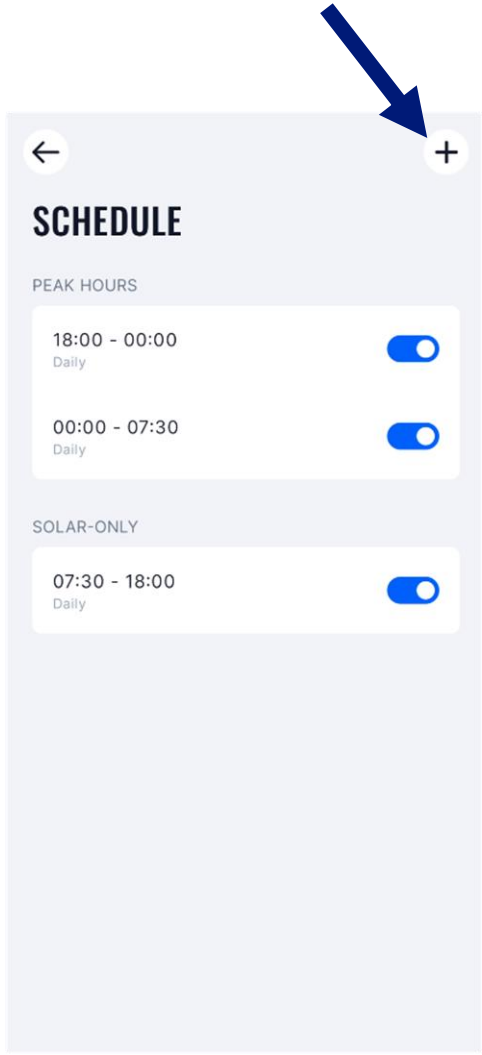
Scheduler

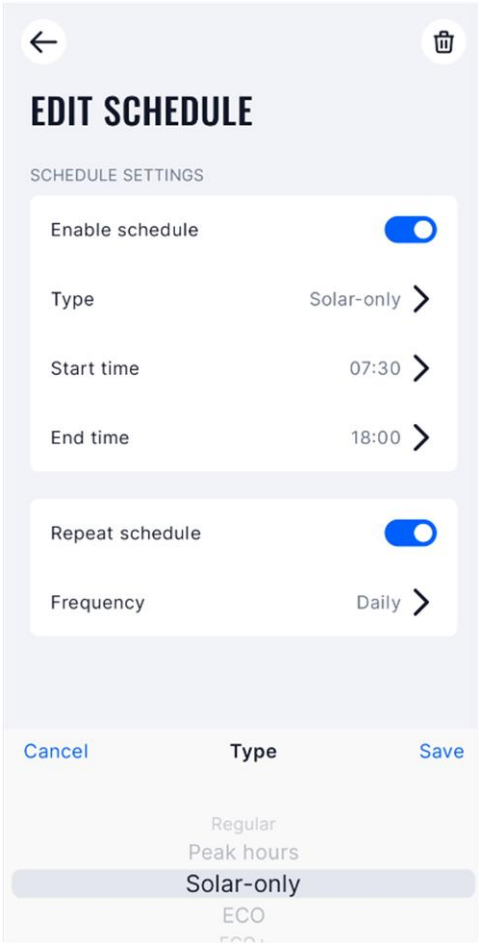
- To create your own schedule, press the “+” button
- If Solar charging functionality is disabled users will only be able to create 2 types of schedules:

1. For the time periods when the car should not be charged, select the ‘Peak hours’ section.

2. For time periods when the car should be charged, select the ‘Regular‘ section

3. If Solar charging functionality is enabled users will only be able to create 3 additional modes
– Solar-only
– ECO+
– ECO

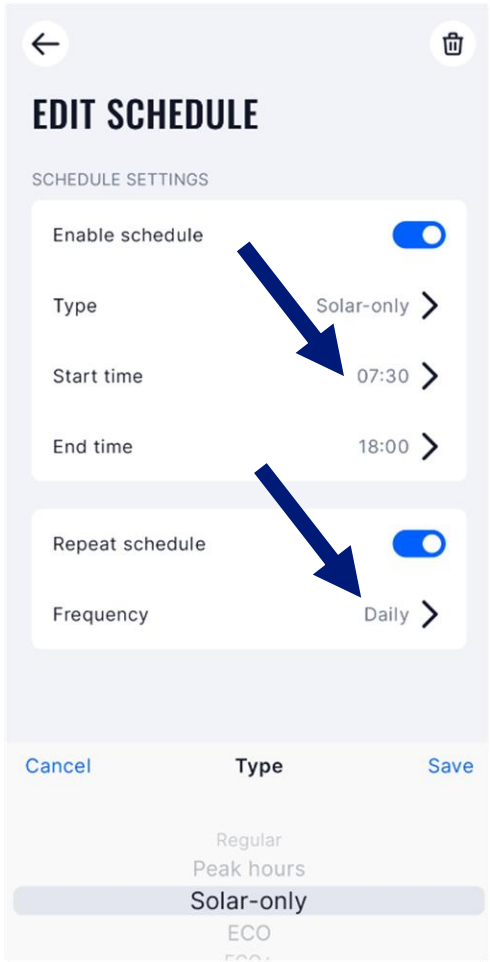


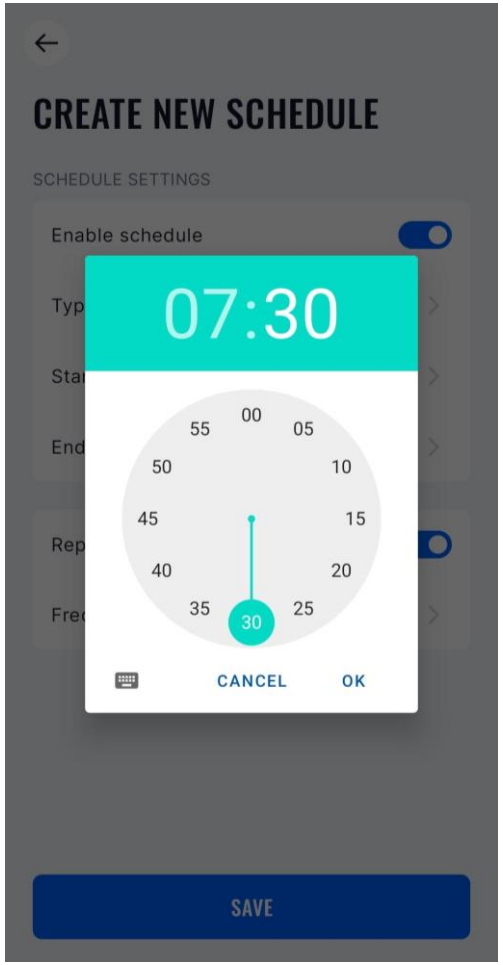


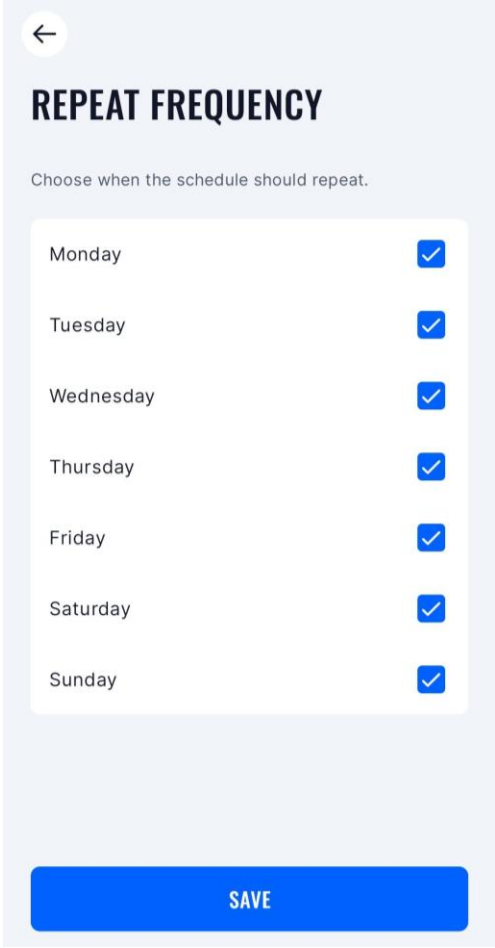
Scheduler

- To set charging schedules, choose the desired hours and minutes on the provided clock.

- In order to plan on which days schedule should be active, select weekdays from the list

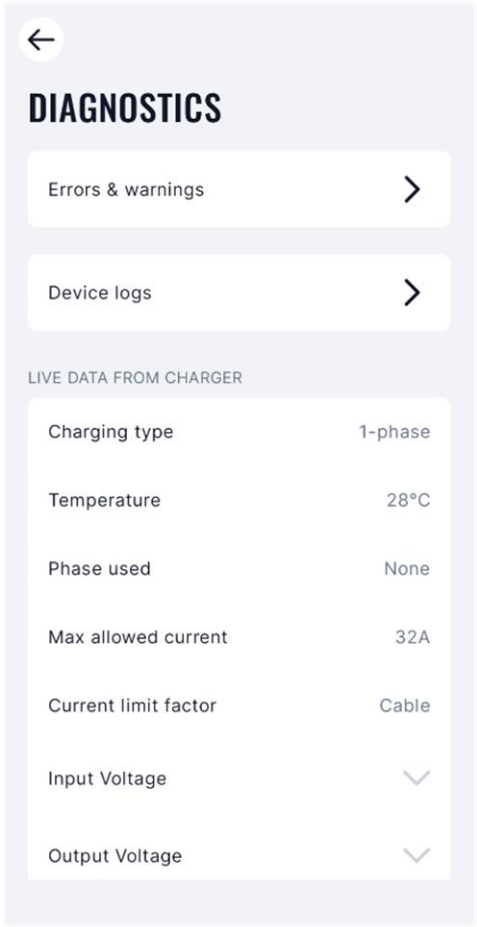


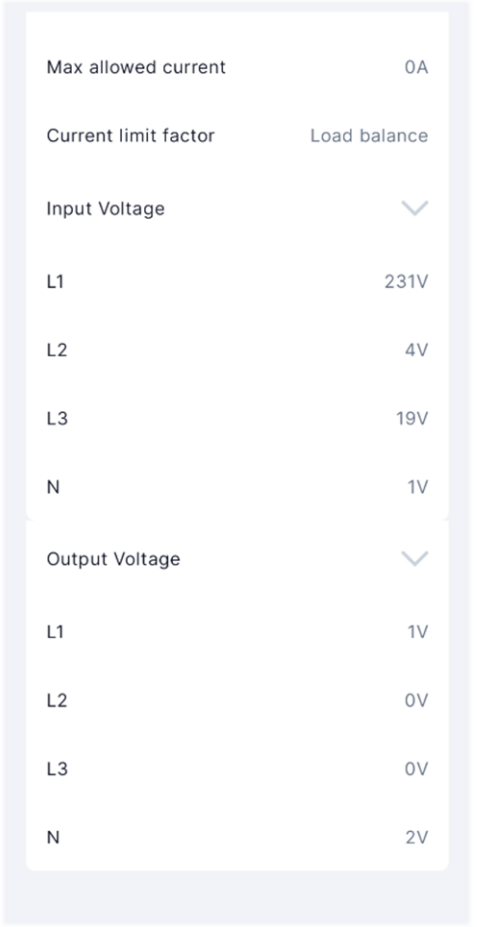


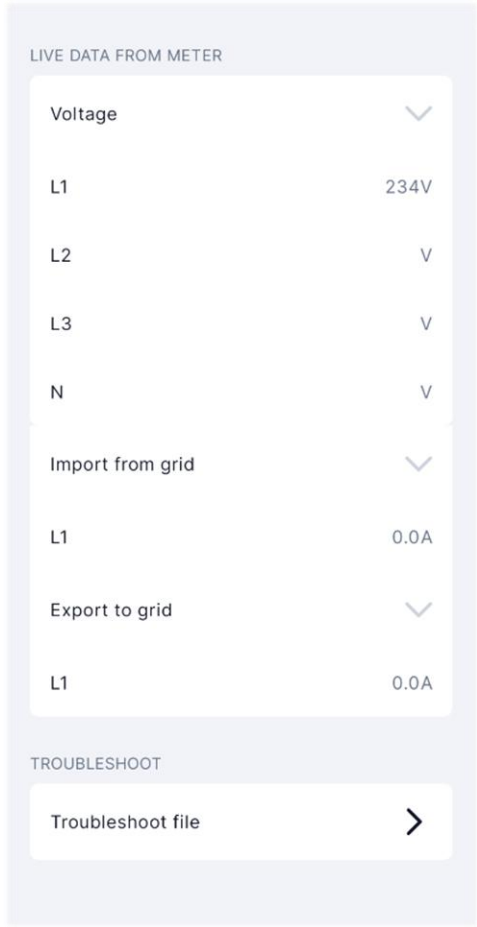


Diagnostics

- Users can check their charging statistics
- If a meter is connected, it also shows how much current is being drawn already
- If solar is enabled – export to grid is also seen in the tab

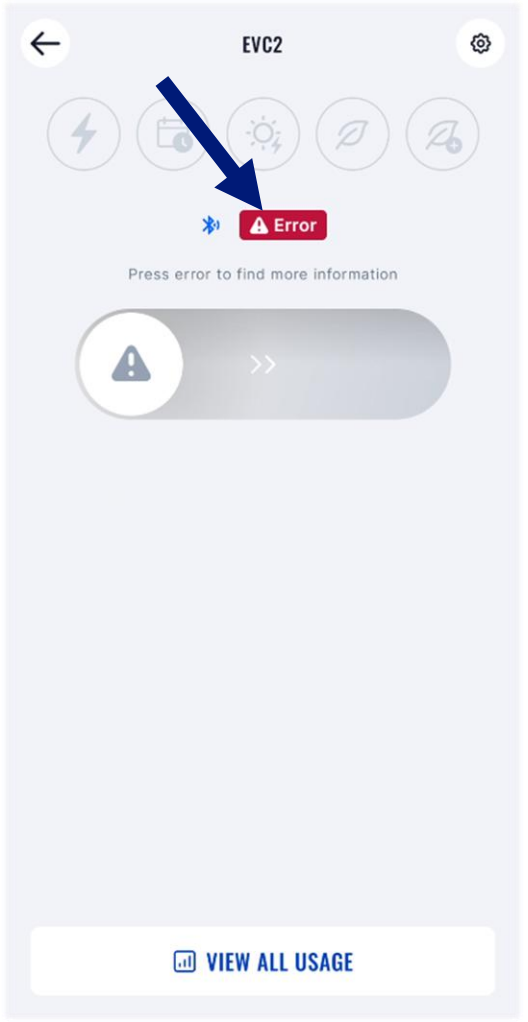


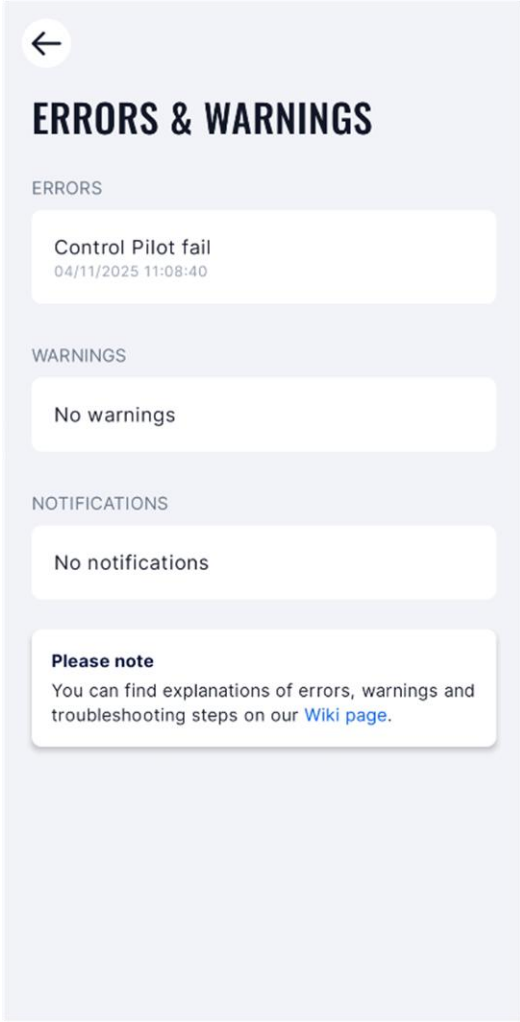




Diagnostics

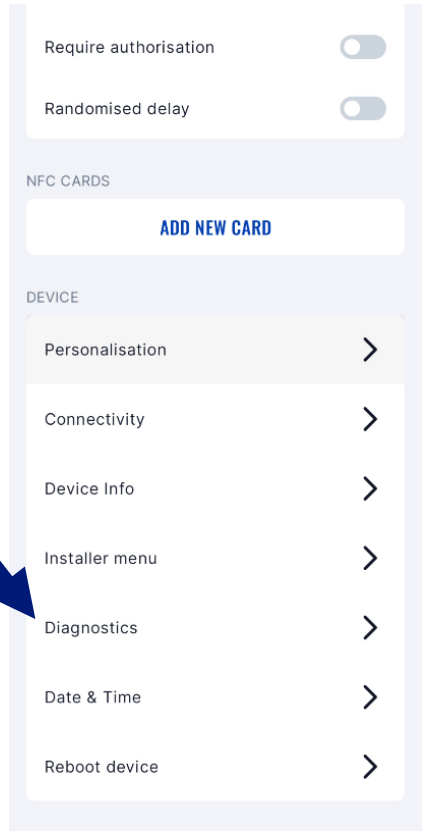
- Upon receiving a warning or an error user can check for himself or navigate to download a log file for further analysis

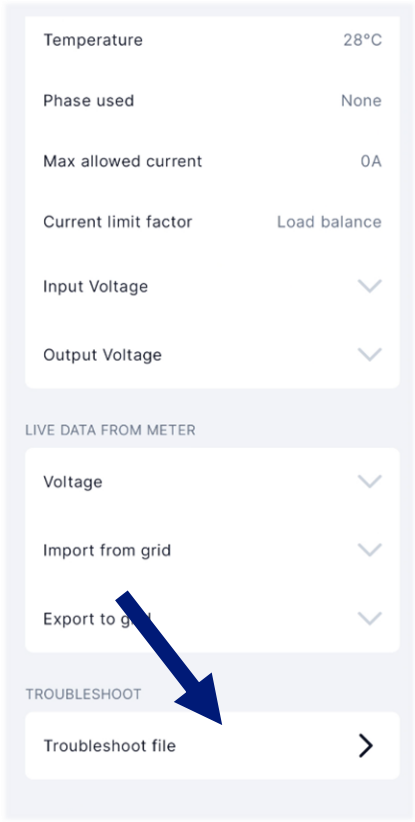


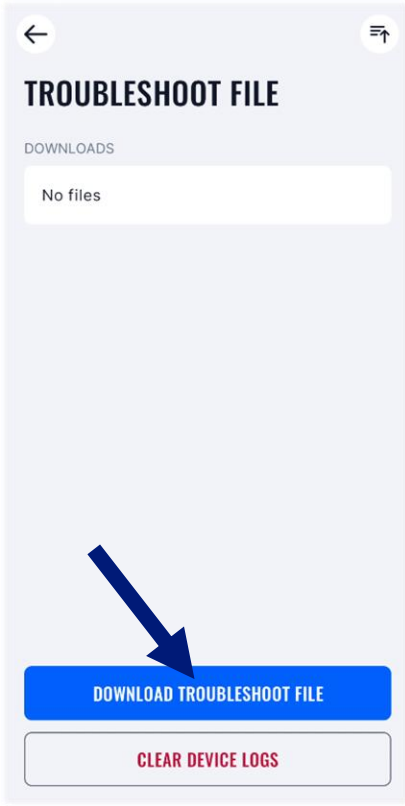


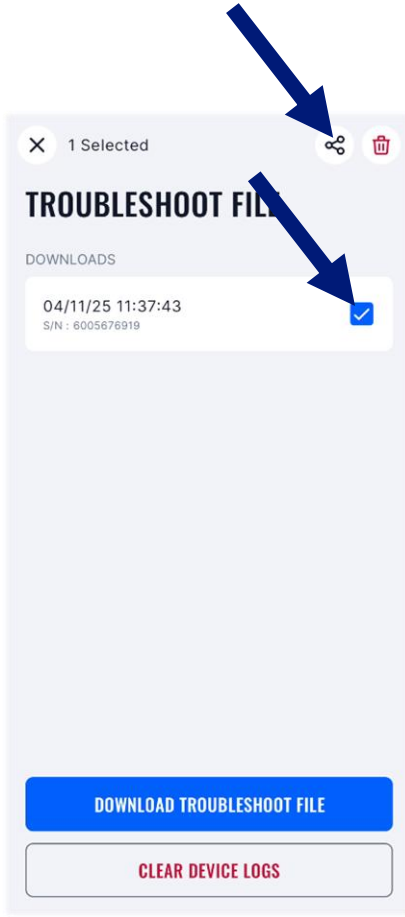
Troubleshooting

- Troubleshoot file is critical for an engineer to understand the issue better



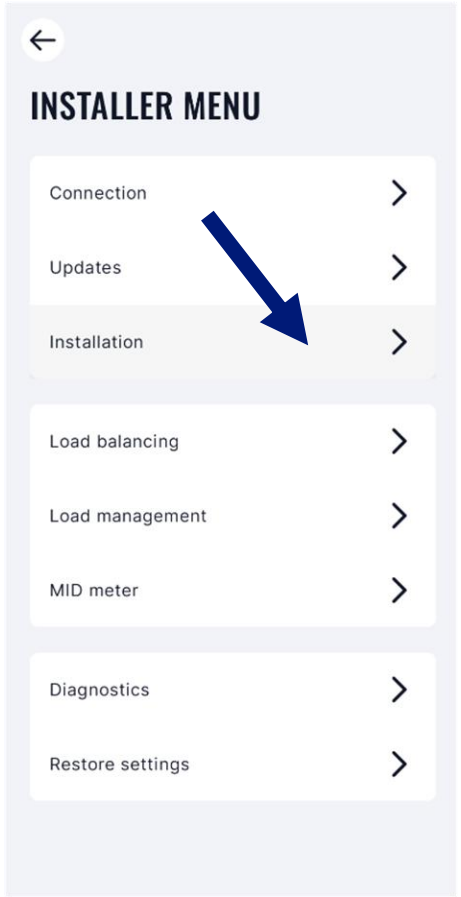


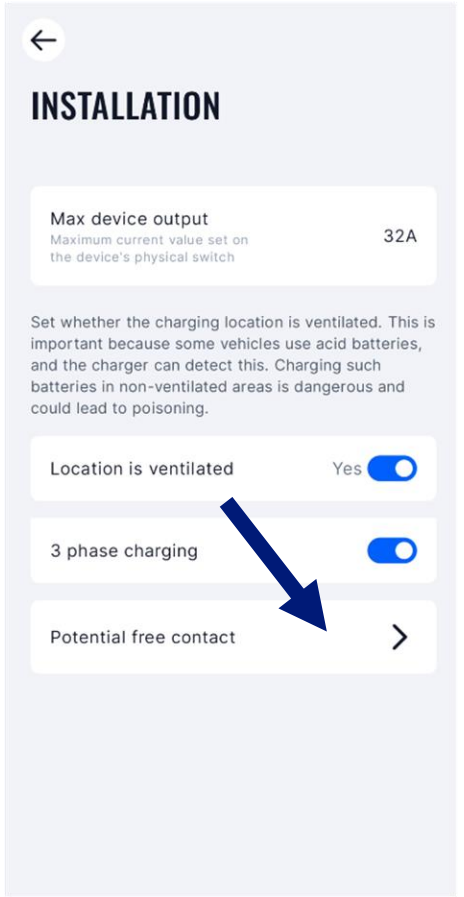


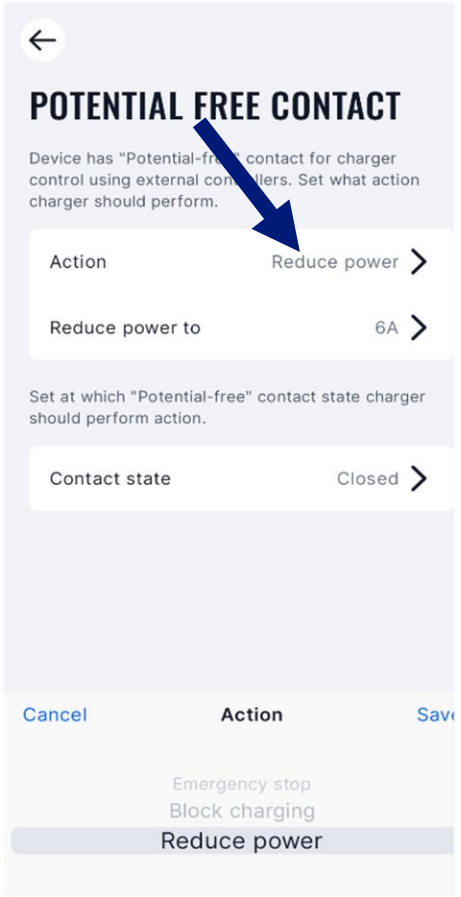


Potential free contact

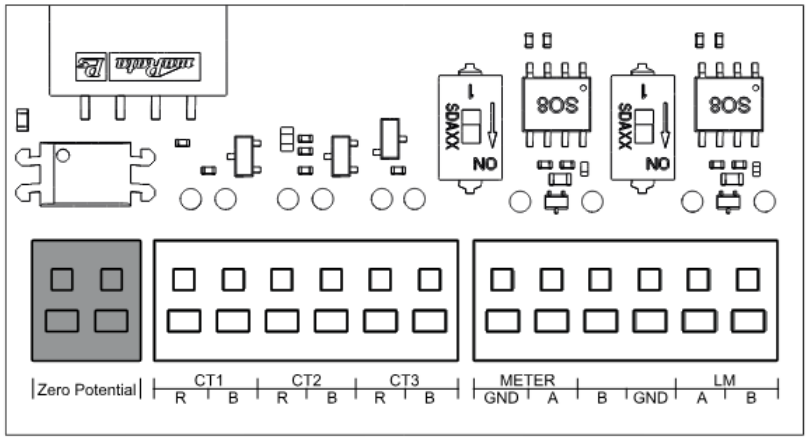
- Potential free contact allows to control the charger via a special relay
- Depending on its state (open/closed) the charger can behave differently
- The relay can be controlled by a signal wire

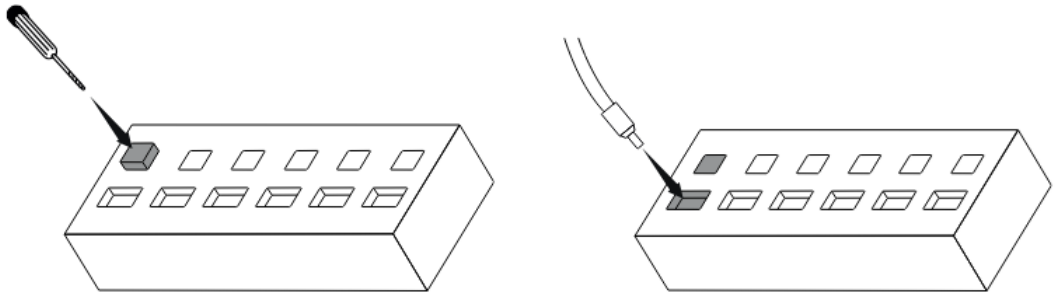






Potential free contact





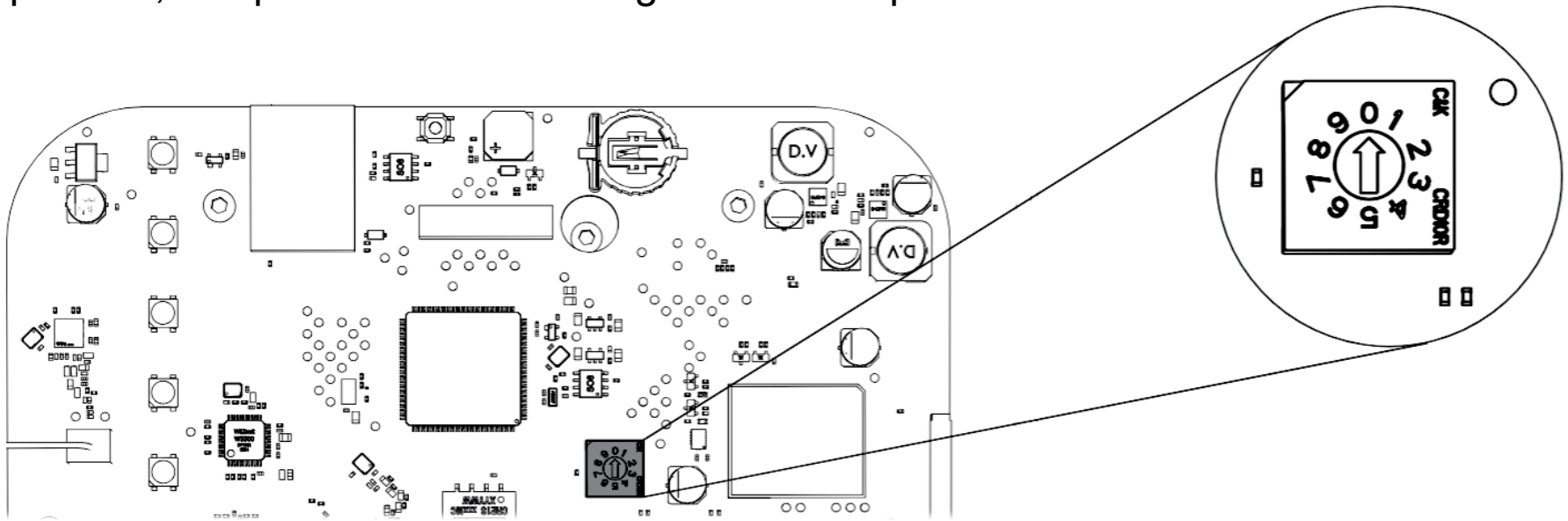
To insert the wire, keep the lock button pressed with a screwdriver

- Option 1: Emergency stop
- Option 2: Block or allow charging
- Option 3: Reduce charging rate

Power selector switch

- This switch can be found on the interface board. It could be turned to limit Maximum device output.
- By changing the rotary switch position, it is possible to limit charger's max output to the car without using the app

Screwdriver
(flat head)



	0	1	2	3	4	5	6	7
Current, A	32	6	10	13	16	20	25	28

Accessories

- We offer single, double and quad mounting poles

Double mounting pole is a slim and elegant mounting pole for two EV chargers. Great for side-by-side parking configurations in houses, apartment complexes, company parking. Allows to fully hide wiring when entry from back of charger is used

Quad mounting pole is large and sturdy and is made for industrial application. Has an internal IP 55 rated 36 module size electrical mounting panel with din rail for mounting all electronic components such as smart meters or protective devices internally

Accessories

- For load balancing we also offer Shelly for metering over network, Eastron meters and CT clamps as physical wired and Modbus