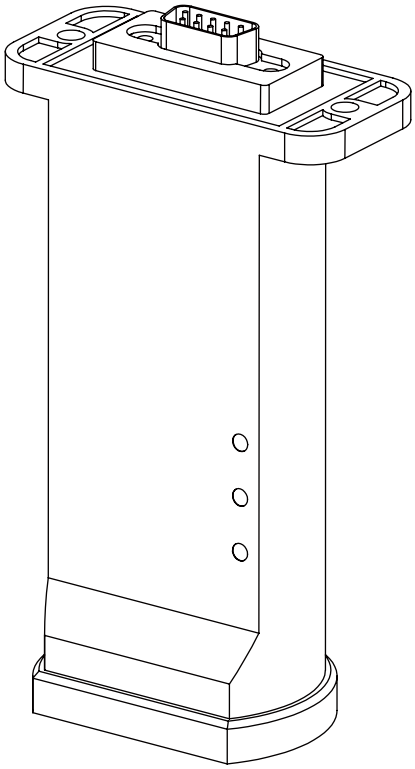


Quick Guide for DG-WF-CEB

03/26/2024

Revision 8

Table of Contents

1 Safety Precautions

NOTICE

Before performing operations, read through this manual and follow all the precautions to prevent accidents. The safety precautions provided in this document do not cover all the safety precautions. CPS shall not be liable for any consequence caused by the violation of the safety operation regulations and design, production, and usage standards.

Declaration

CPS shall not be liable for any consequence caused by any of the following events.

- Transportation
- The storage conditions do not meet the requirements specified in this document.
- Violate the operation instructions and safety precautions in this document for installation, cable connecting, and maintenance.
- Operation in extreme environments which are not covered in this document.
- Unauthorized modifications to the product or software code.
- Installation or use in environments which are not specified in related international standards.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Personal Requirements

- Only qualified electrical technicians are allowed to install and operate the FlexOM Gateway .
- Operation personnel should receive professional training.
- Operation personnel should read through this document and follow all the precautions.
- Operation personnel should be familiar with the safety specifications about the electrical system.
- Operation personnel should understand the composition and working principles of the grid-tied PV power system and local regulations.

Installation

- Ensure that the FlexOM Gateway is not connected to a power supply and is not powered on before starting installation.
- Ensure that the FlexOM Gateway is installed in a well ventilated environment.
- Do not perform any operation on other components inside the chassis except connecting AC power cables and communications cables.
- Ensure that all electrical connections comply with local electrical standards.

DANGER

High voltages may cause electric shocks and serious injuries during FlexOM Gateway operating.
Do not touch components such as AC cables, circuit breakers and connectors during FlexOM Gateway is energized.

- Maintain the FlexOM Gateway with sufficient knowledge of this document and proper tools and testing equipment.
- Before performing maintenance tasks, power off the FlexOM Gateway and perform lockout/tagout (LOTO) of the source circuit.
- For personal safety, wear personal protective equipment (PPE), including insulaed gloves and protective shoes.

2 Warranty Policy

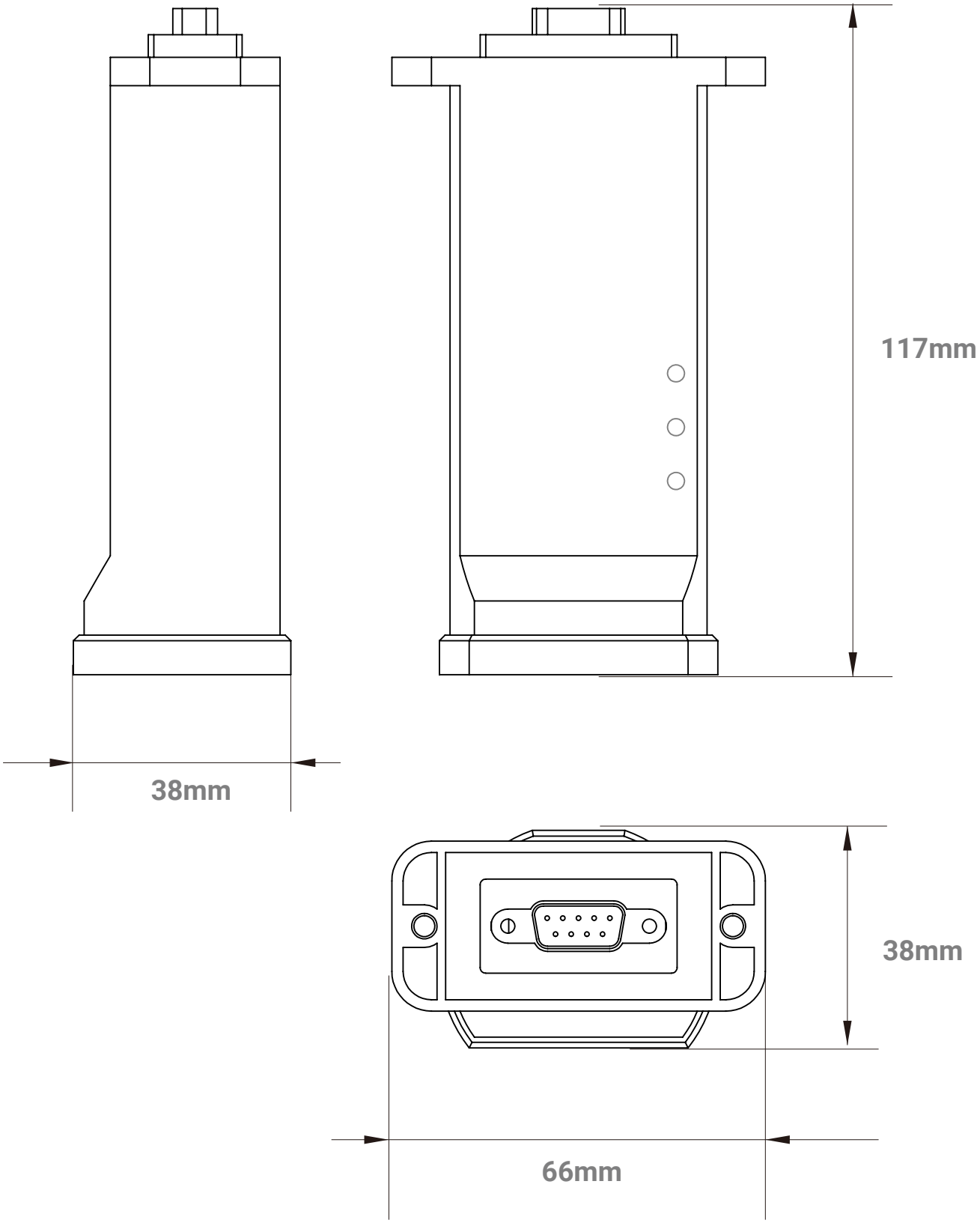
- The warranty policy of this product is specified in the contract; otherwise, the standard warranty is 2 years.
- For warranty terms, please refer to the CPS accessories warranty policy in place at time of purchase.

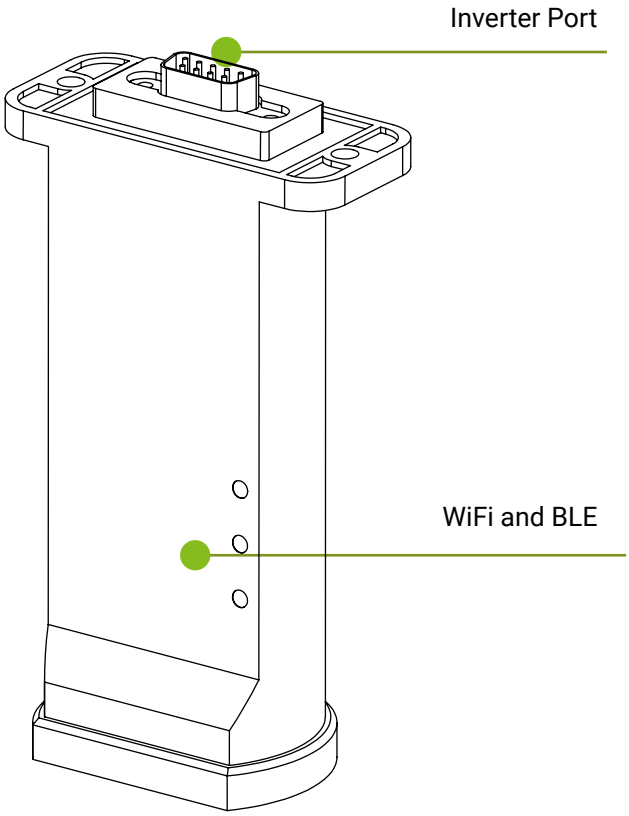
3 Gateway Specifications
3.1 Datasheet

Device Interface	
No. of Ports	1 (DB9)
Protocol	TTL
Bluetooth Interface	
Standard	BLE 4.2
Antenna	Built-in
WLAN Interface	
WLAN Standards	802.11 b/g/n
Frequency Band	2.4 GHz
Wireless Security	WEP, WPA/WPA2
Antenna	Built-in
Modbus TCP	
Mode	Server (Slave)
Max. No. of Client Connections	1

Power Parameters	
Input Voltage	4.5 to 8 Vdc
Power Consumption	1 W, Max. 2.5 W
Environment limits	
Operating Temperature	-20℃ to 60℃, Natural convection
Storage Temperature	-40 to 85°C
Ambient Relative Humidity	5 to 85% (non-condensing)
Physical Characteristics	
Housing	Plastic
IP Rating	IP65
Dimensions	117 mm / 66 mm / 38 mm
Weight	110g
Compliance	
RoHS	IEC 62321, (EU) 2015/863
CE - EMC	EN 55032 / 55035, EN 61000-3-2/-3-3
CE - RED	EN 301 908 / 300 328, EN 301 489-1/-17/-52, EN 62368-1
CE - LVD	EN 62368-1
FCC	SDoC Part 15B, ID Part 15C

3 Gateway Specifications
3.2 Dimensions





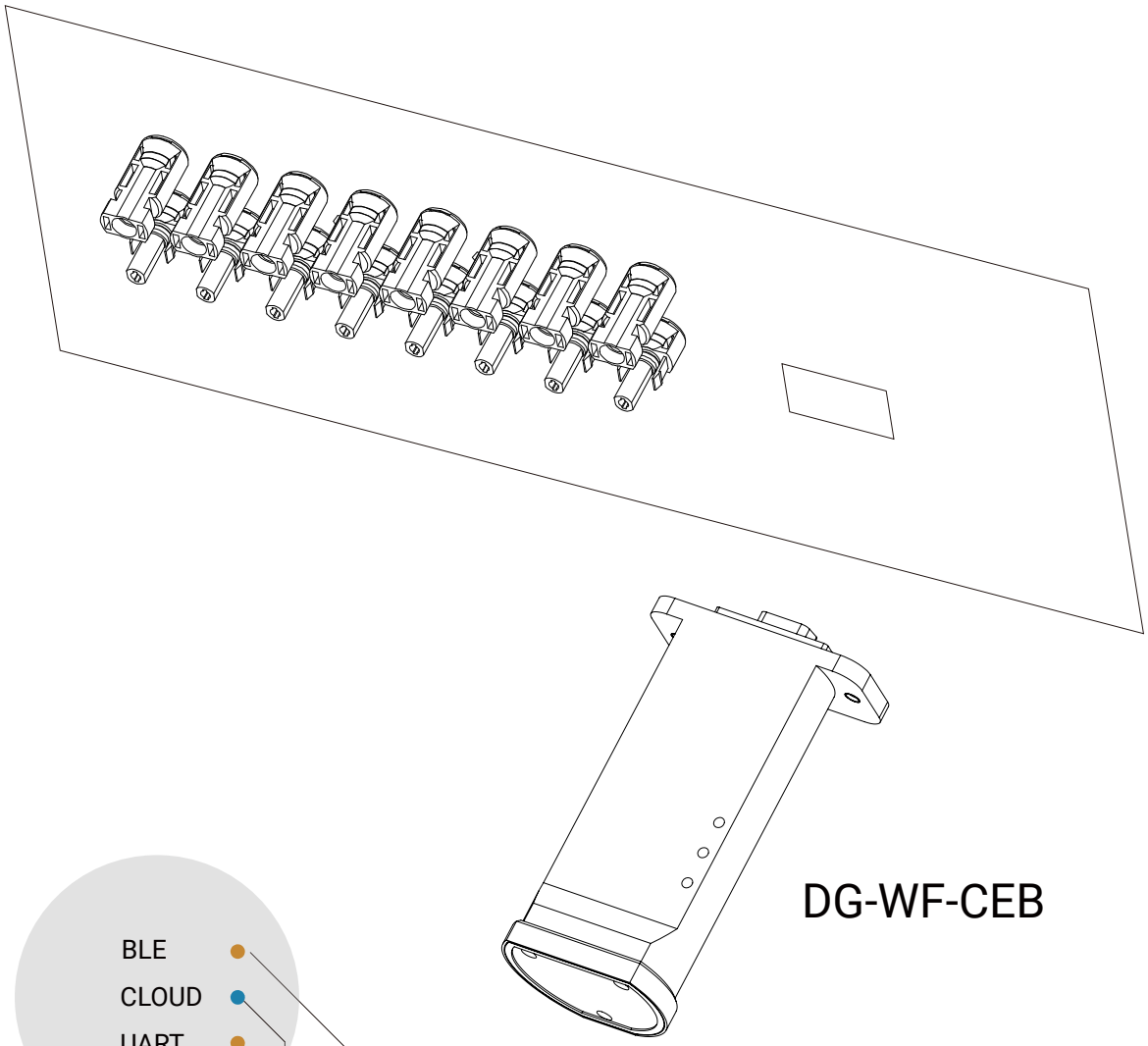
Internet interface : WiFi

If the gateway is connected to the Internet using Ethernet.

Open the LAN firewall ports before commissiong !

The following ports must be opened both ways (incoming and outgoing communications):

TCP 1883 with destination IP 139.196.138.86



DG-WF-CEB

BLE

CLOUD

UART

Light off

APP is disconnected from the gateway

Light on

APP is connected to the gateway

Light off

Gateway is disconnected from the server

Light on

Gateway is conneted to the server

Light off

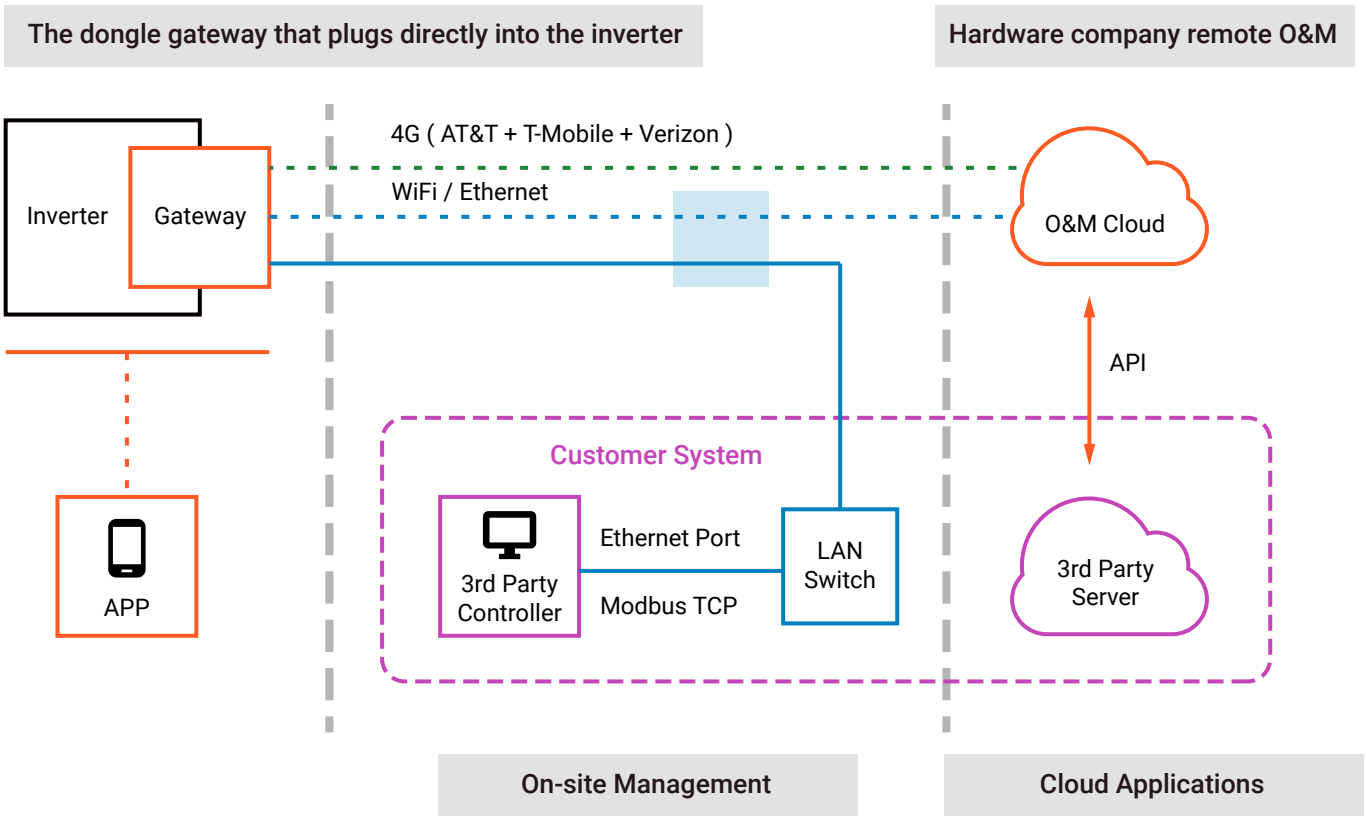
Inverter is disconnected from the gateway

Light on

Inverter is connected to the gateway

4 System design for dongle gateway (1-to-1 connection)

4.1 Setting up the inverter

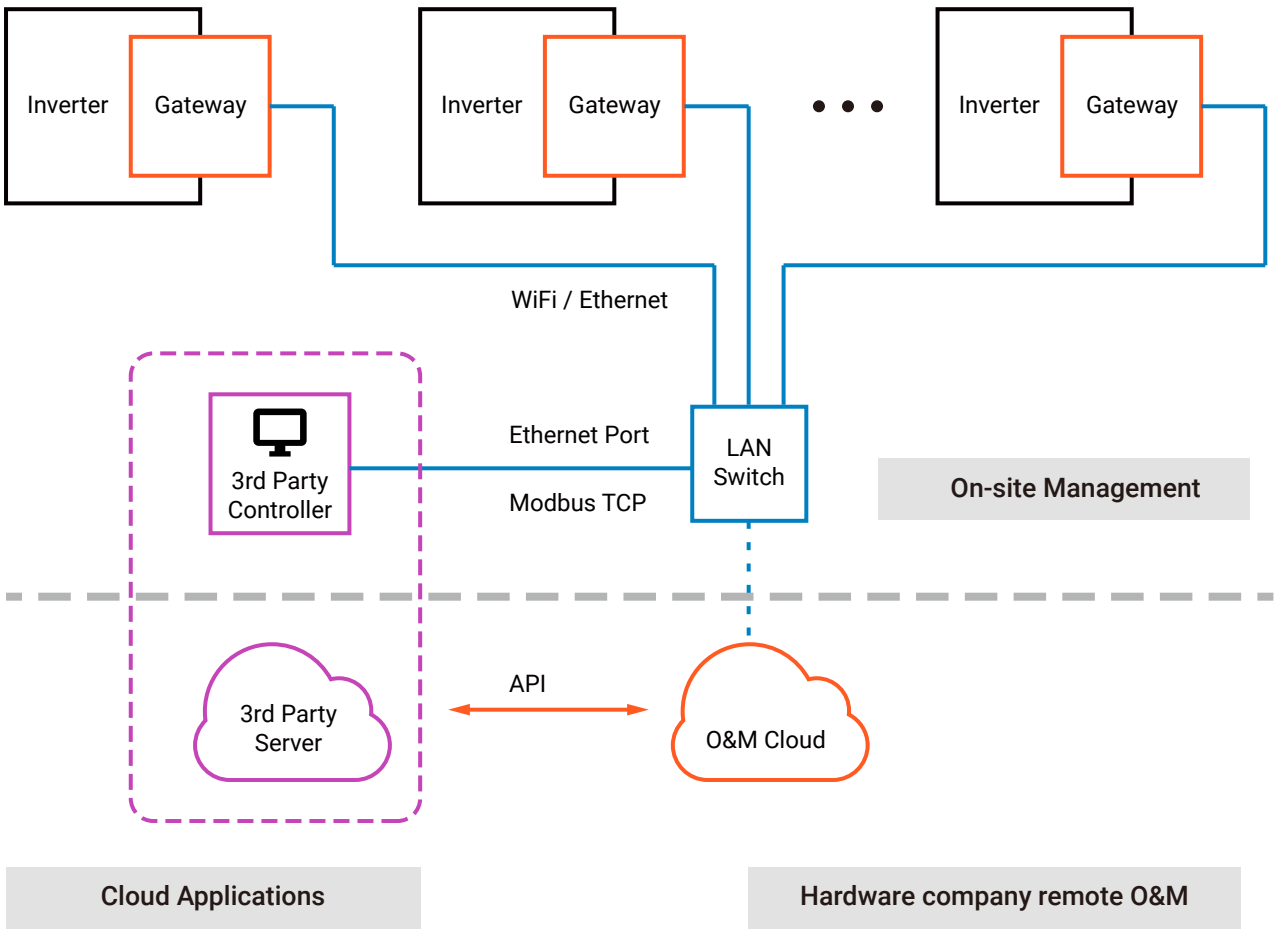


The dongle gateway one-to-one connection to a single PV inverter/hybrid inverter, connected to the cloud platform via WiFi (or Ethernet, or 4G).

The gateway is capable of storing 5 days of offline data if the Internet is disconnected.

After the APP connects to the dongle gateway, the user performs inverter initialization, troubleshooting, reading and writing registers and firmware upgrade.

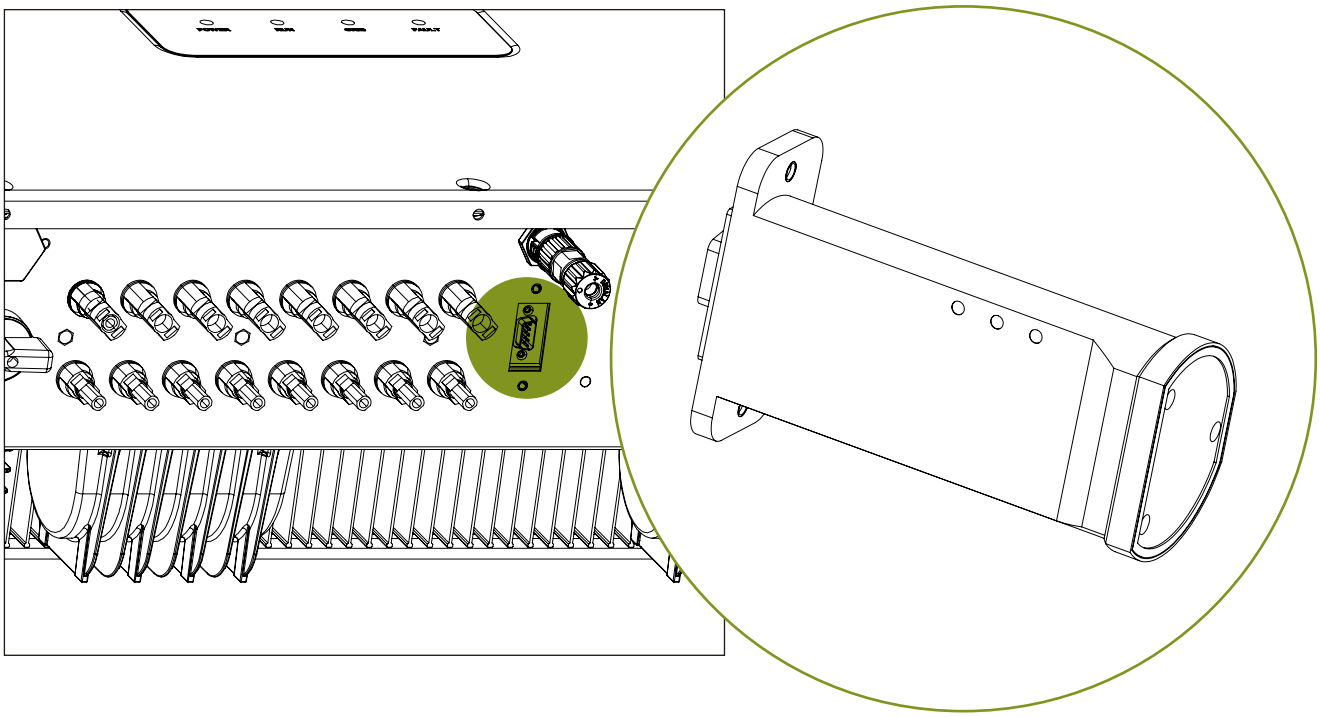
4 System design for dongle gateway (1-to-1 connection)
4.2 Modbus TCP converter



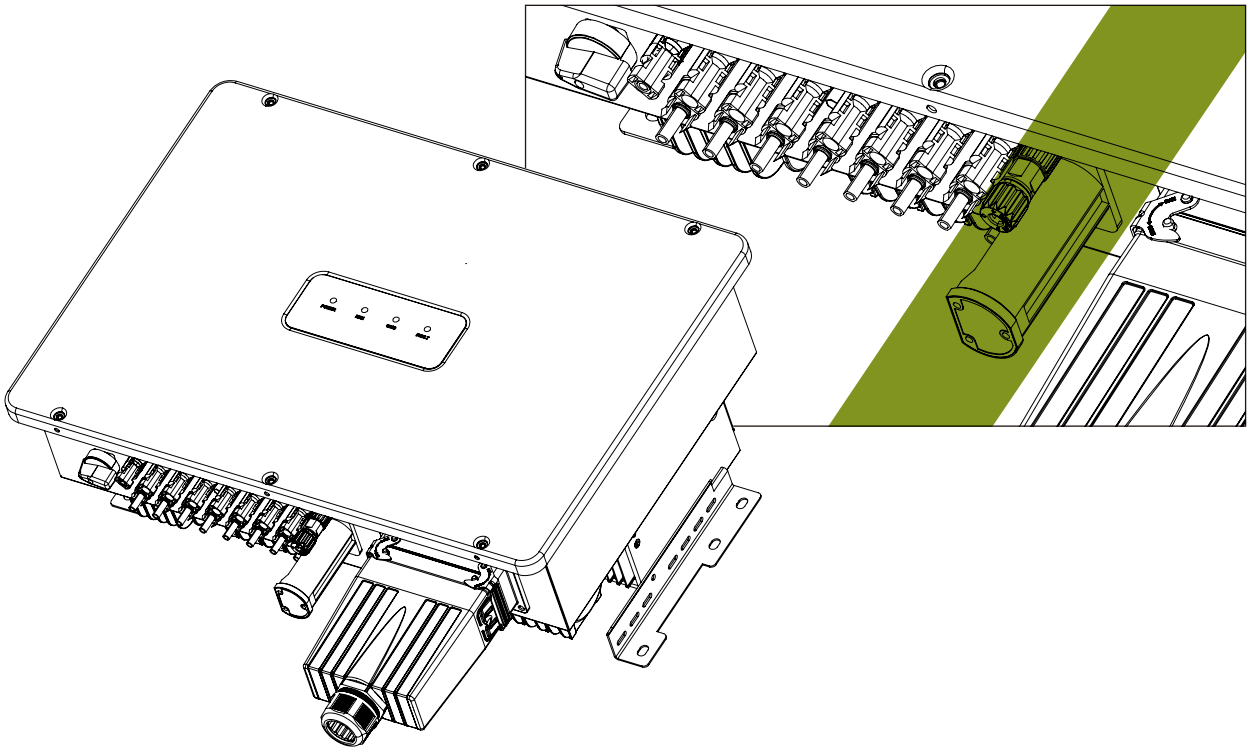
The gateway can be used as a Modbus/TCP server, connect to a third-party SCADA system, and forward various commands to the inverter.

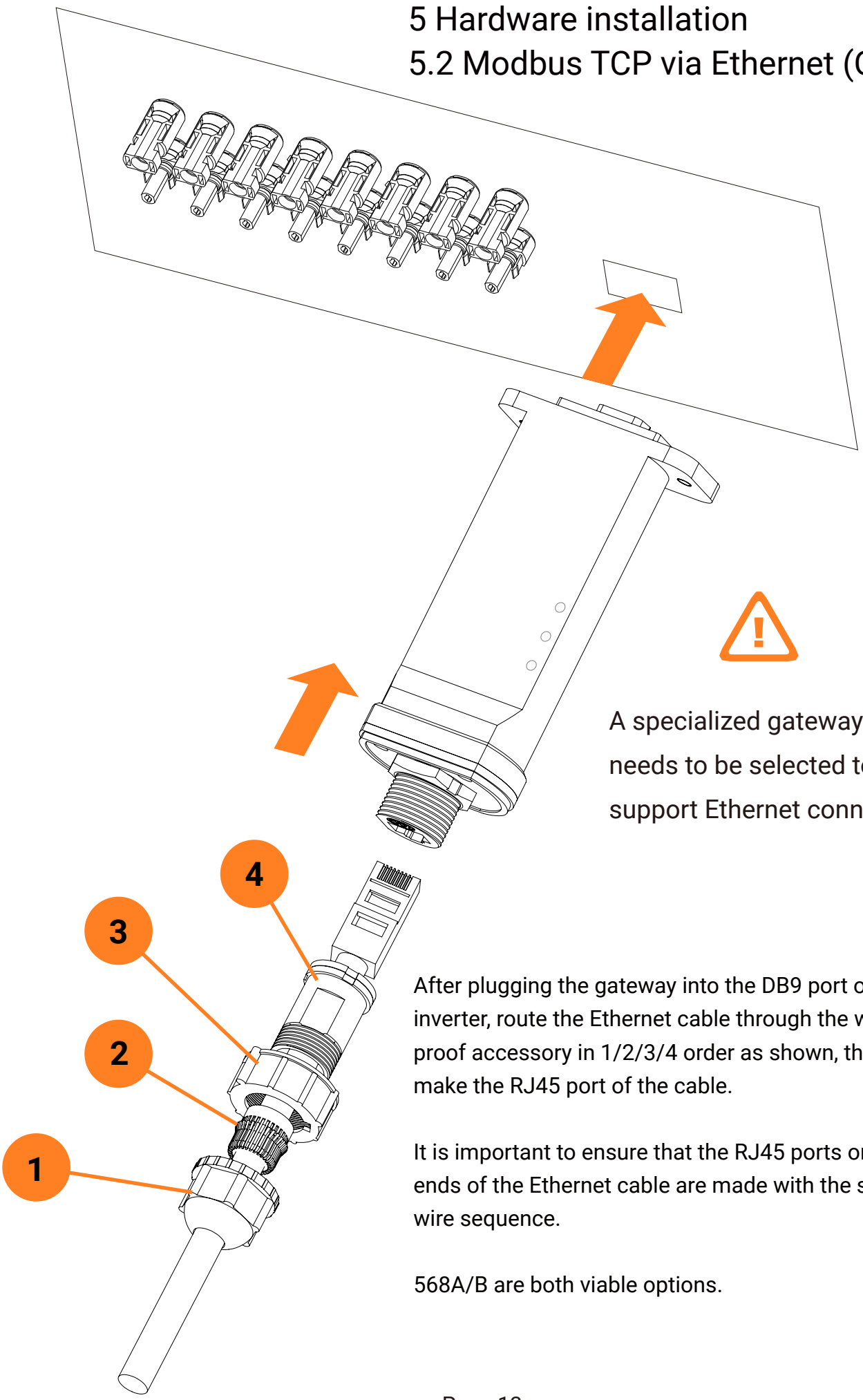
Several inverters can be connected to SCADA via Ethernet, providing both wiring flexibility and the need for SCADA to quickly control the entire site.

5 Hardware installation
5.1 Connect to inverter



Align the dongle gateway's indicator light towards the DC cable with the DB9 plug.
Caution: Screw on the screws first to avoid dropping the gateway and damaging it.





A specialized gateway model needs to be selected to support Ethernet connectivity.

After plugging the gateway into the DB9 port on the inverter, route the Ethernet cable through the water-proof accessory in 1/2/3/4 order as shown, then make the RJ45 port of the cable.

It is important to ensure that the RJ45 ports on both ends of the Ethernet cable are made with the same wire sequence.

568A/B are both viable options.

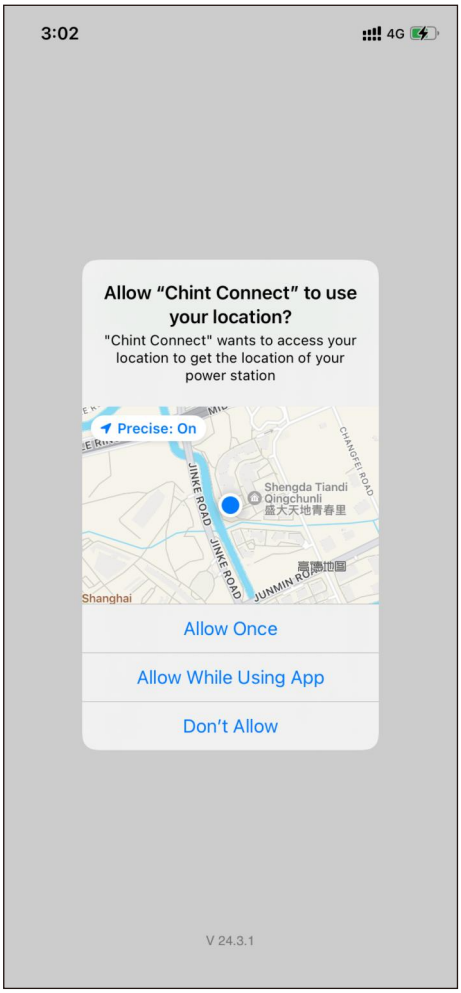
6 Non-registered User (Installer)
6.1 APP connect to gateway

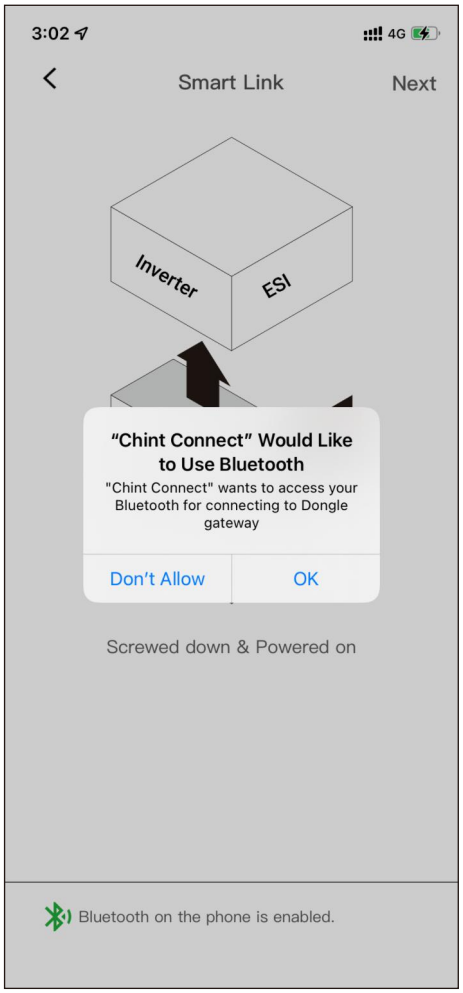
Scan the QR-code to complete APP download and installation by using the mobile phones that can access the Internet. Or search for “Chint Connect” in Apple Store and Google Play.

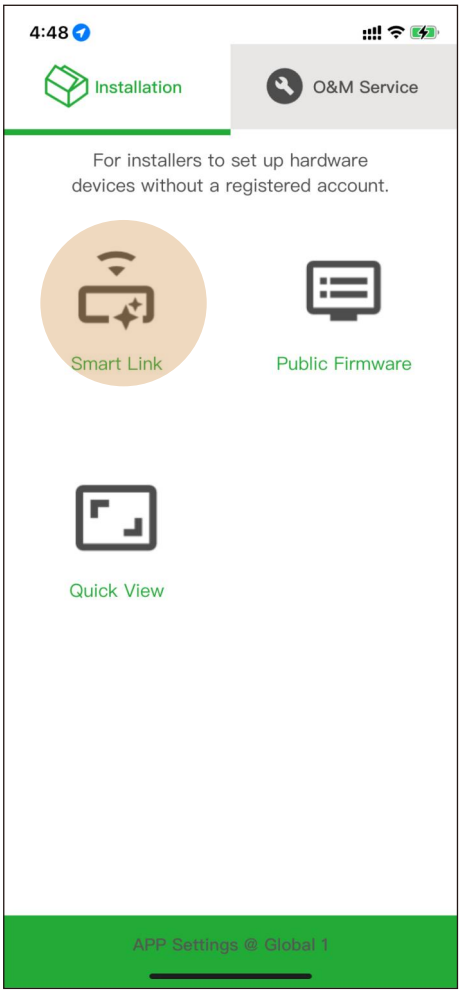
The Android/iPhone user interface may look slightly different but the setup procedure will be the same as shown.

solar.chintpower.com

“Portfolio Owner” manages the site remotely through a web console and can log in from the URL solar.chintpower.com





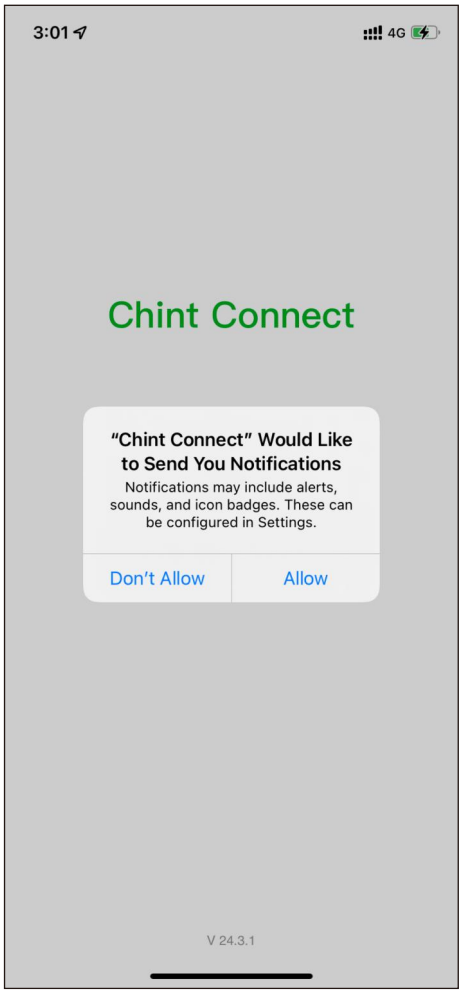


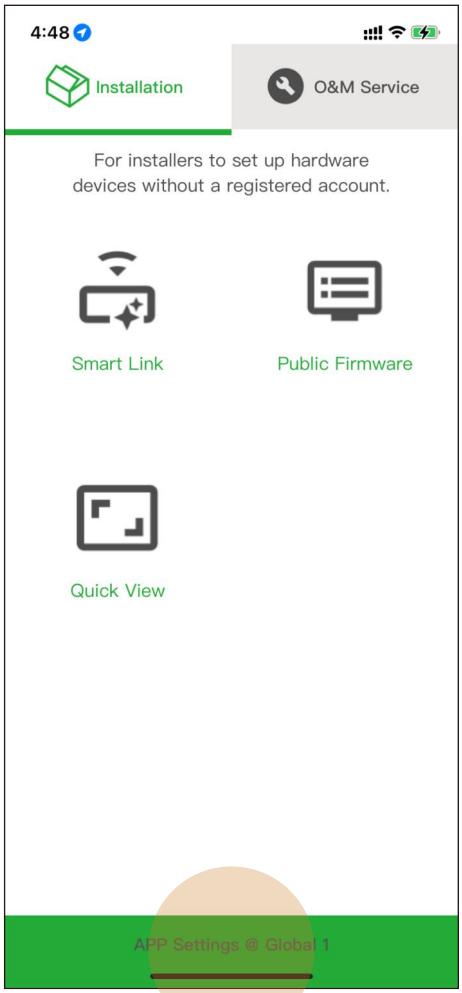
Launch the APP,

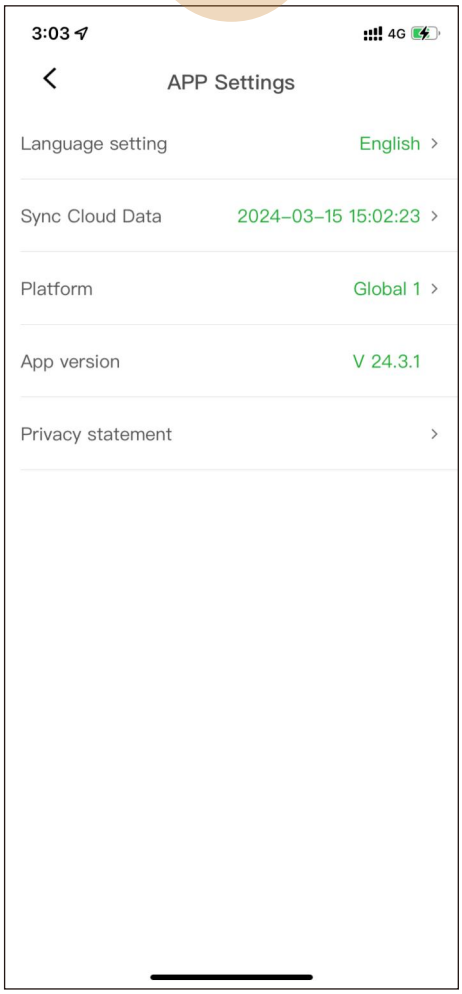
note that you must allow the APP to obtain the two mobile phone permissions of location and Bluetooth, otherwise the APP will not work properly.

By clicking "Smart link",

the APP will automatically detect the connected hardware scene and provide different interactive interfaces after connecting to the gateway.





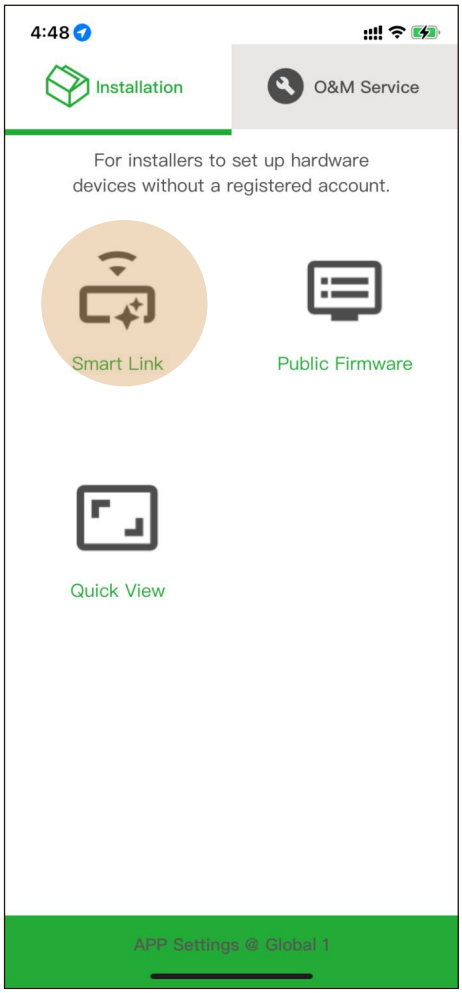


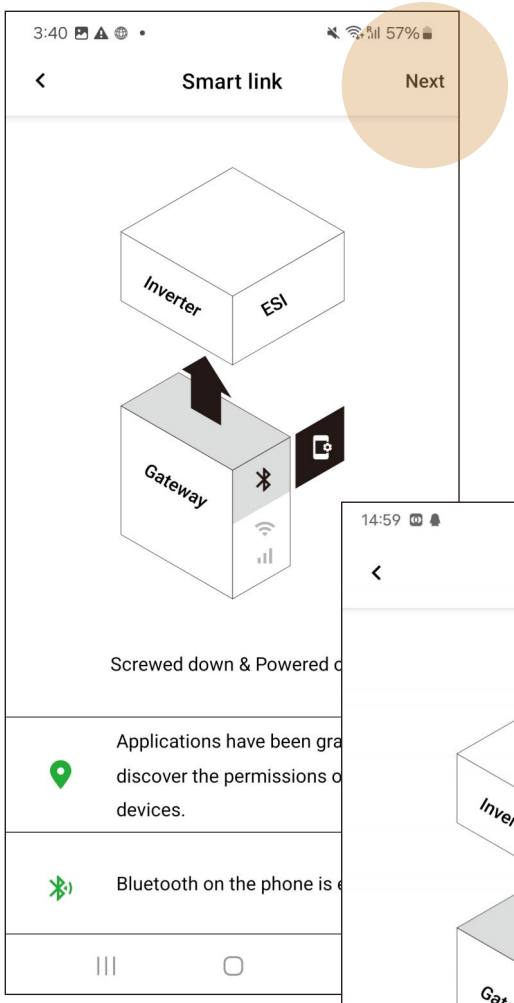
When launching an app, it is recommended to allow the app to send notifications.

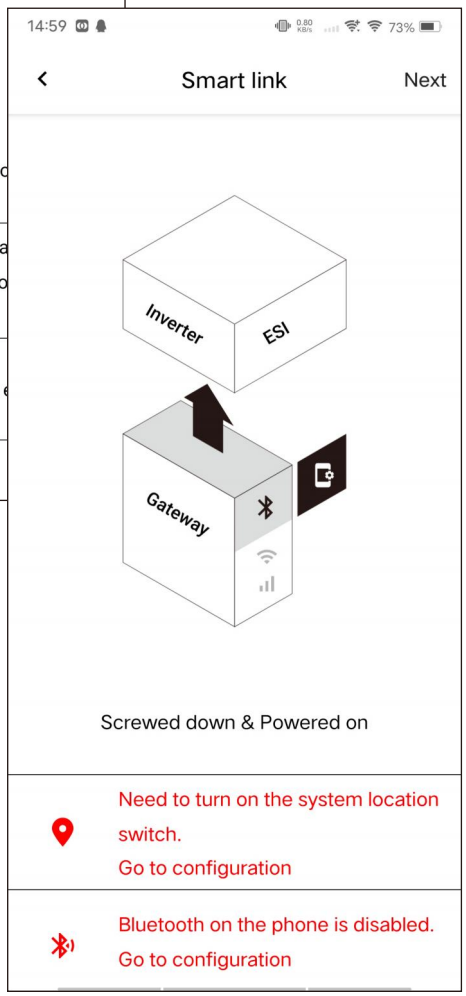
Otherwise users cannot receive subscribed real-time hardware alertsconnecting to the gateway.

In the APP settings interface, users can change the language, synchronise scene data and switch servers at any time.

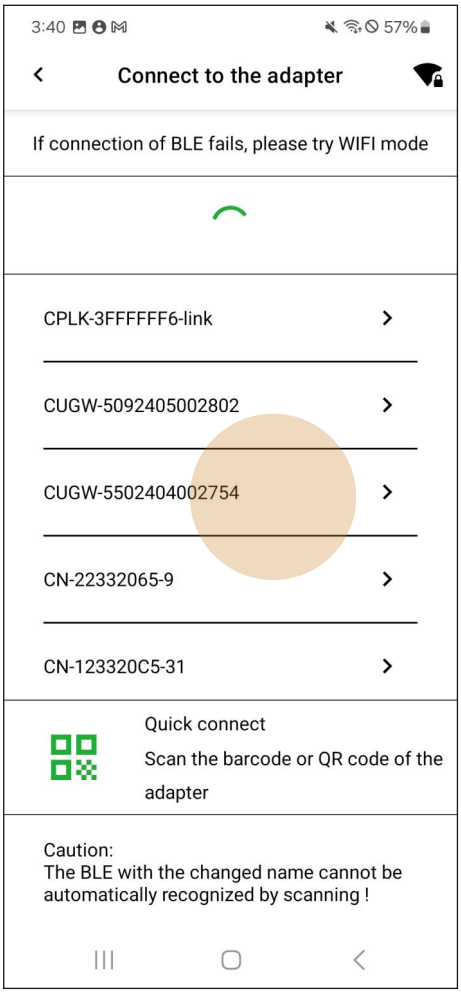
Make sure your phone can connect to the Internet when you run the app for the first time. The APP needs to sync some important data from the cloud.

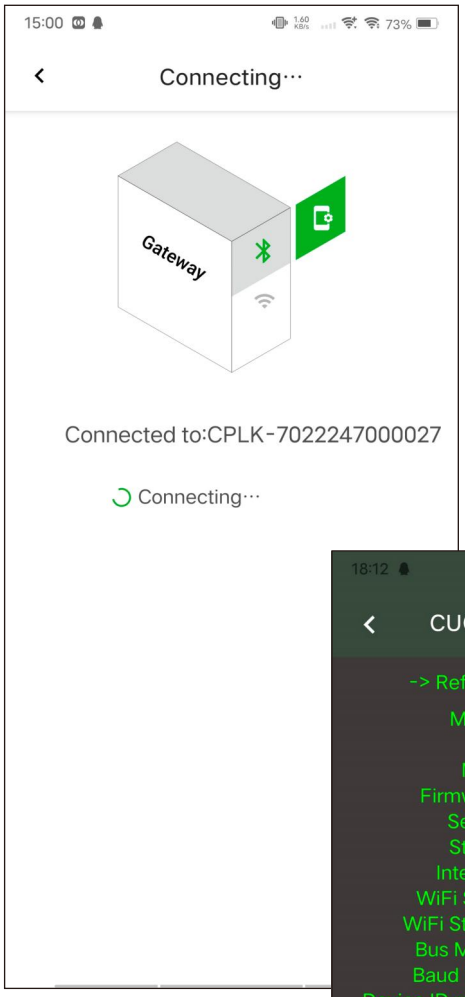


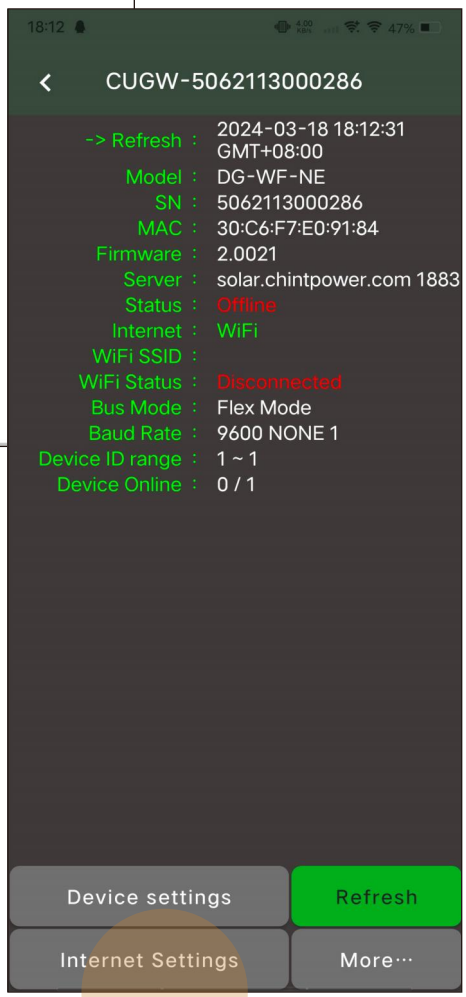




When the APP prompts for location and Bluetooth permission issues, please tap the warning area to enter the phone settings interface.







The gateway SN is included in the BLE signal name, and the APP will list the scanned signals.

Select the SN consistent with the target gateway label and click to enter.

Click on the gateway SN, when the APP connects to the gateway, if there is a problem, it will indicate a specific error.

Bluetooth troubleshooting

“ Connection failure ”

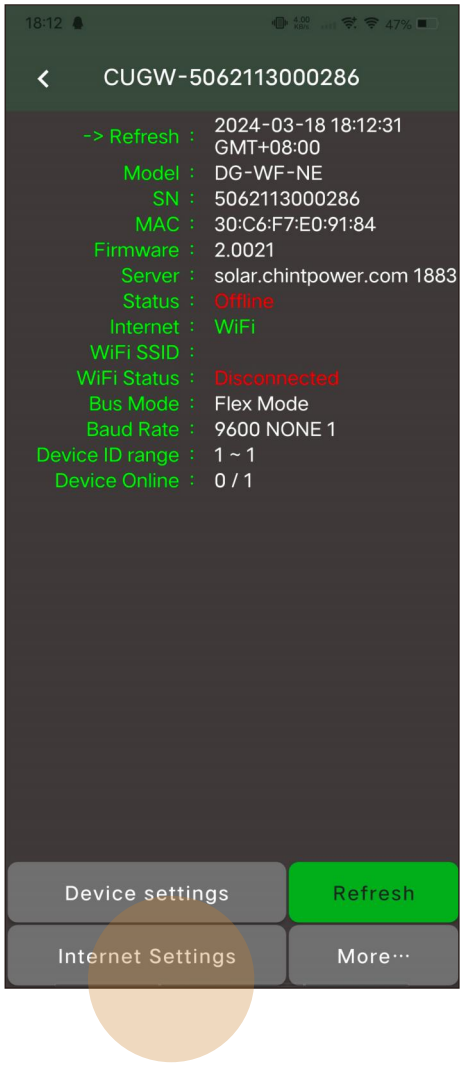
- Phone is too far away from the gateway.
- Another phone has been connected to the gateway and is communicating normally.
- Android 14 (or other versions) may have issues communicating with the gateway and will need to upgrade the gateway to the latest version.

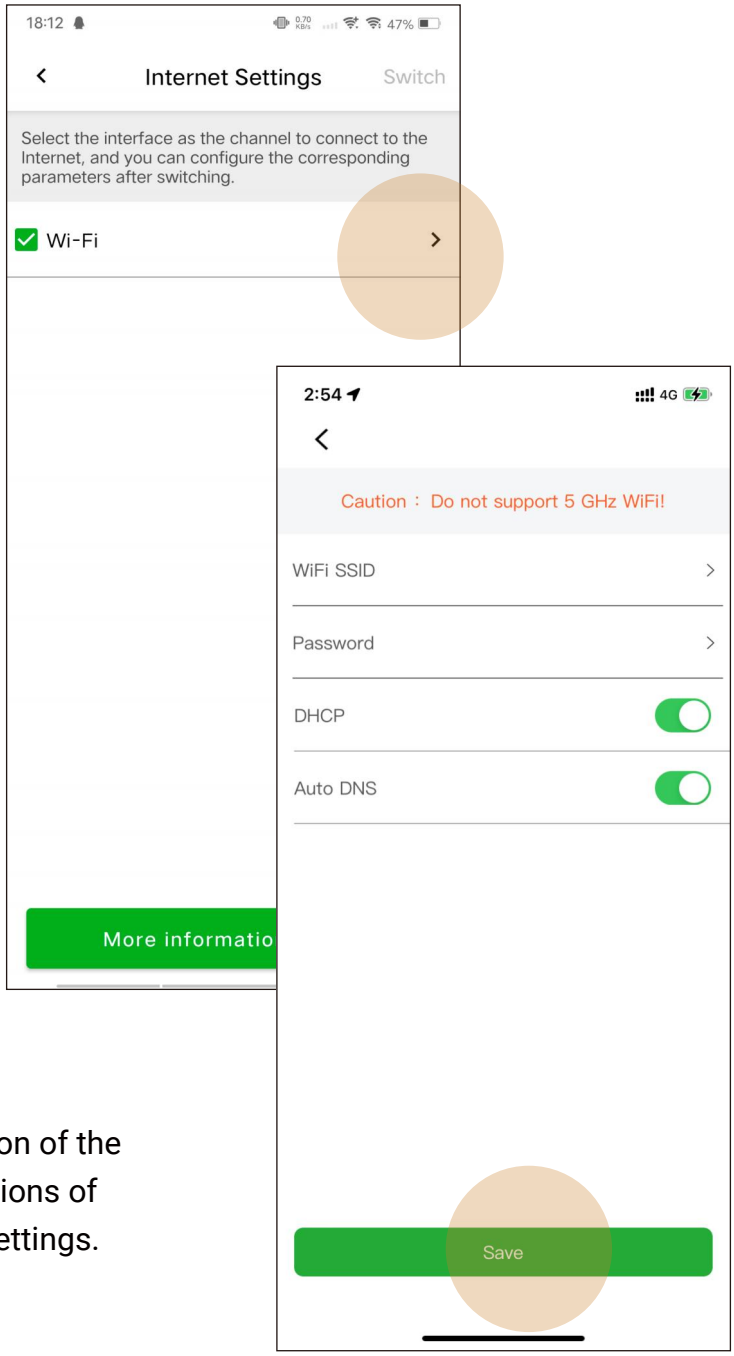
“The gateway must be upgraded with firmware to work properly, please wait for about 5 minutes”

- Unknown communication error, try to solve it by updating the firmware.

6 Non-registered User (Installer)

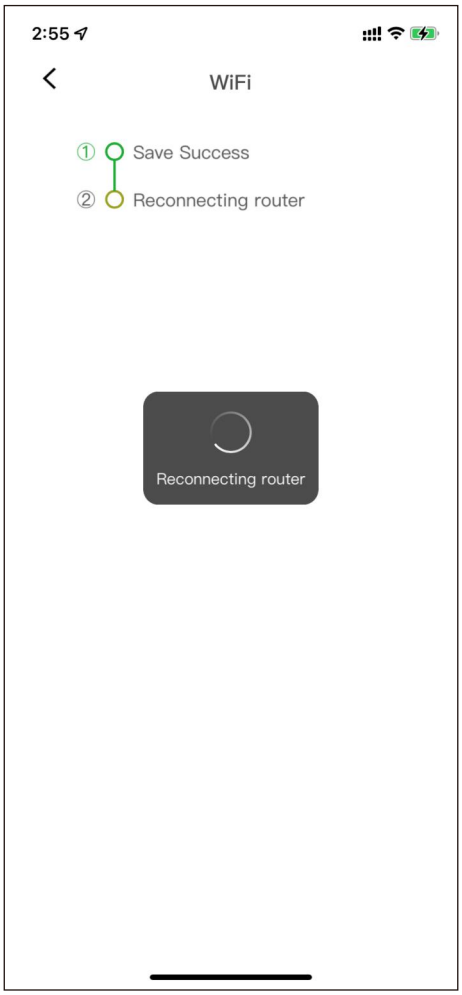
6.2 Setting up the gateway to connect to the WiFi router





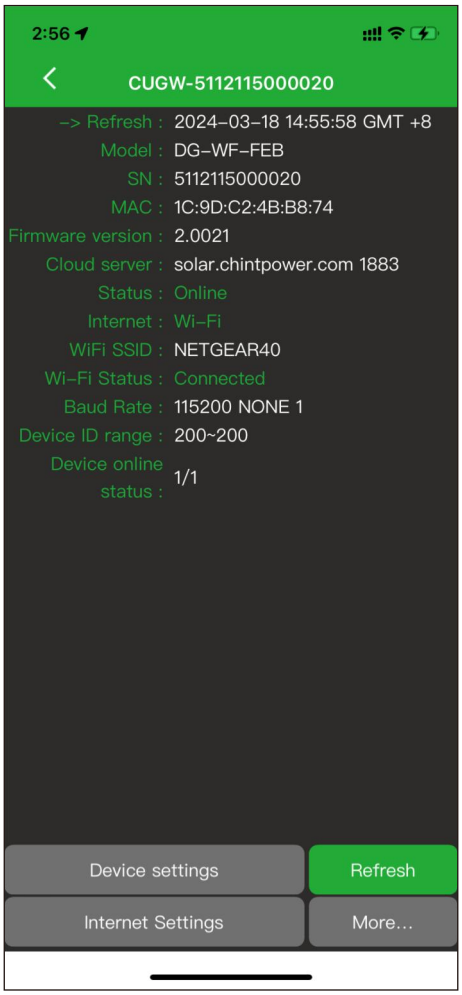
Click on "Internet Settings" , the WiFi version of the gateway only has WiFi settings, other versions of the gateway will list both Ethernet or 4G settings.

Caution : The gateway does not support 5Ghz WIFI gateways, as well as WIFI users who need to open a browser and redirect to an account-verified router.



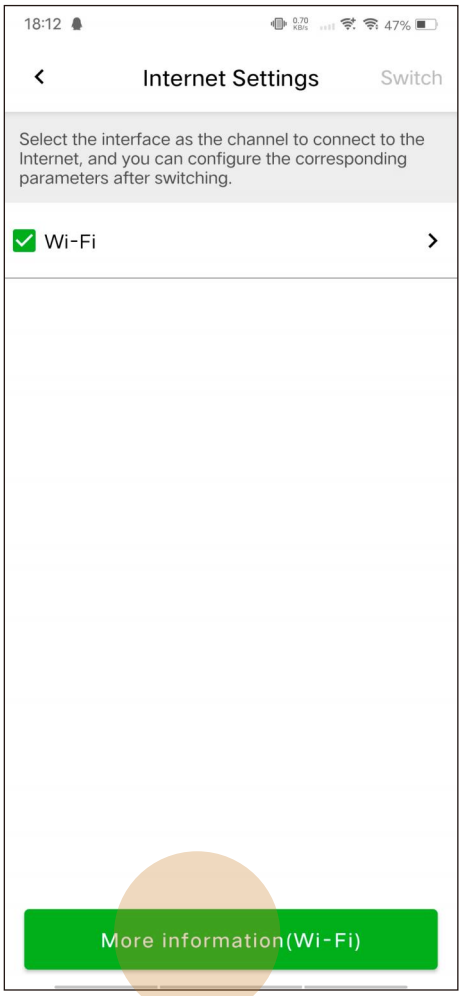
After entering the SSID and password of the WiFi, save the settings and the gateway will automatically connect to the WiFi router.

If the gateway reports an error, there is a high probability that the character input is wrong.



Caution :

If the user cannot judge the network status of the WLAN router, the user can configure the WiFi hotspot of the mobile phone to the gateway for reference.

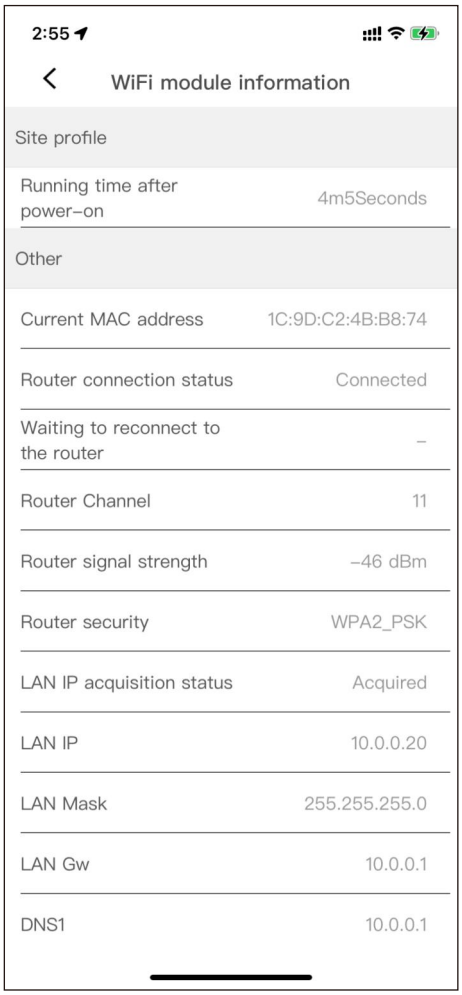


The gateway may not be able to access the Internet even if it is connected to a WiFi router, in this case, the gateway is also not working properly.

Usually there is a firewall in the LAN to which the WiFi router is connected, and you need to add a TCP access policy for the gateway.

Click "More Information" to check whether the gateway is connected to the WiFi router properly.

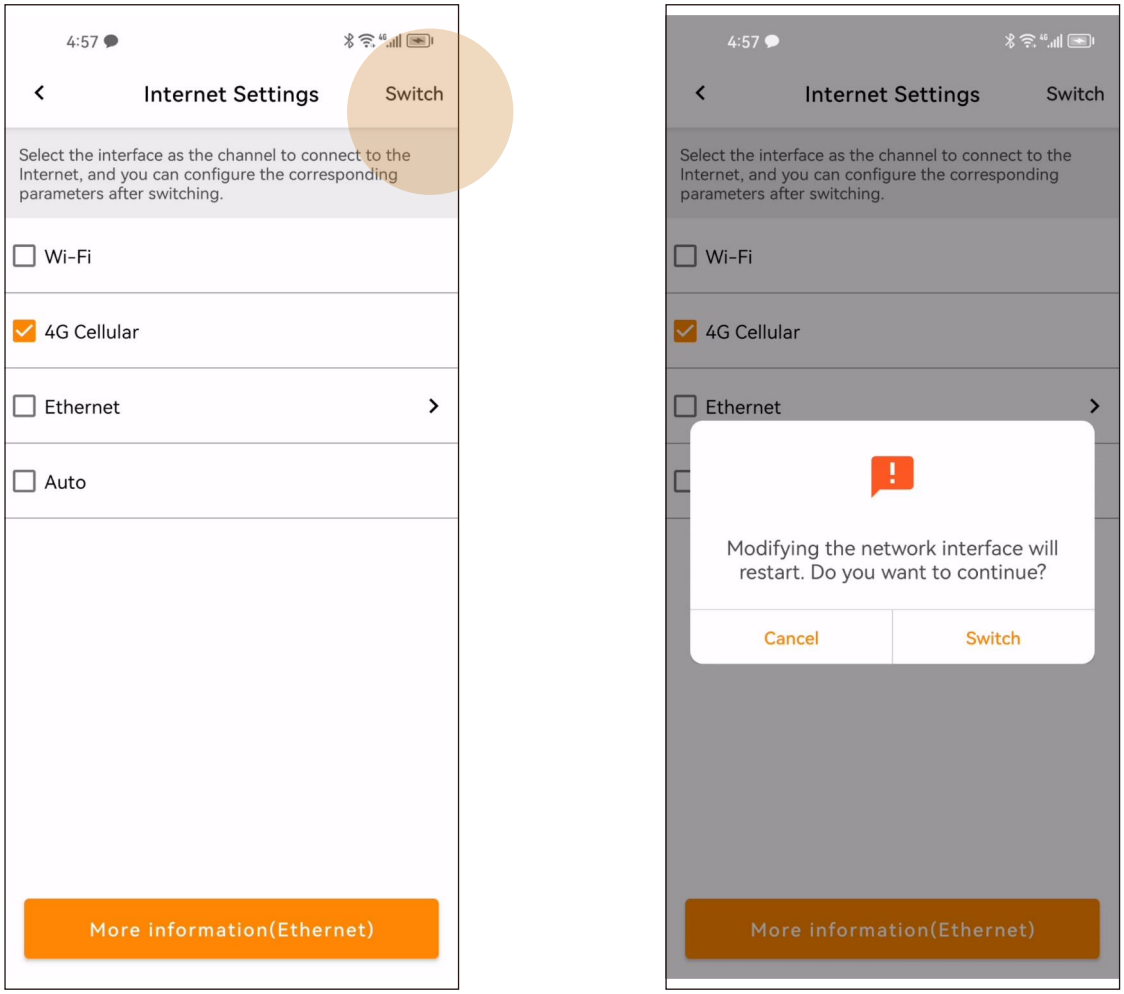
It can help to diagnose if the firewall must be found and to increase the policy.



Open the LAN firewall ports before commissiong !

The following ports must be opened both ways (incoming and outgoing communications):
TCP 1883 with destination IP 139.196.138.86

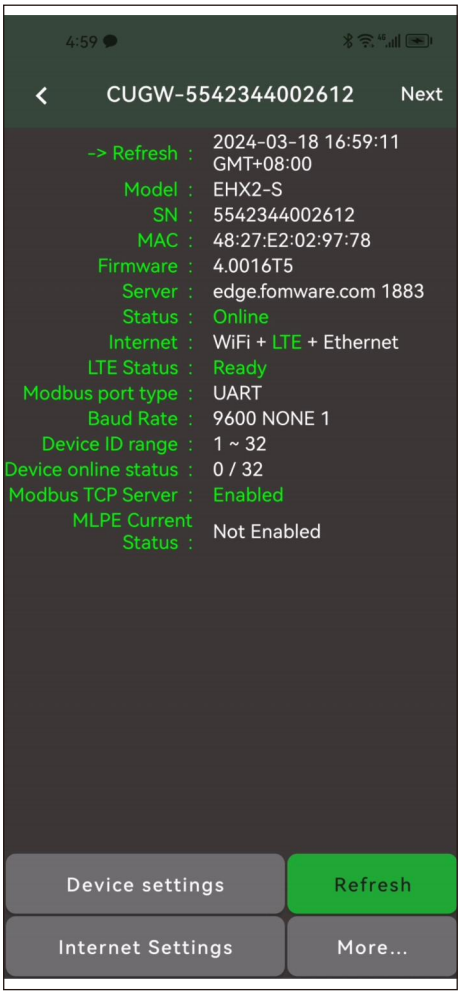
6 Non-registered User (Installer)
6.3 Gateway connects to the Internet via 4G



Different versions of the gateway have different options for connecting to the Internet. Users can select 4G and click "Switch" to change the connection options.

Changing the connection will cause the gateway to reboot and it will take about 1~5 minutes for the 4G to connect to the Internet properly.

The gateway connects to the Internet via 4G and can still connect to the Modbus TCP client via WIFI at the same time.



Cellular troubleshooting

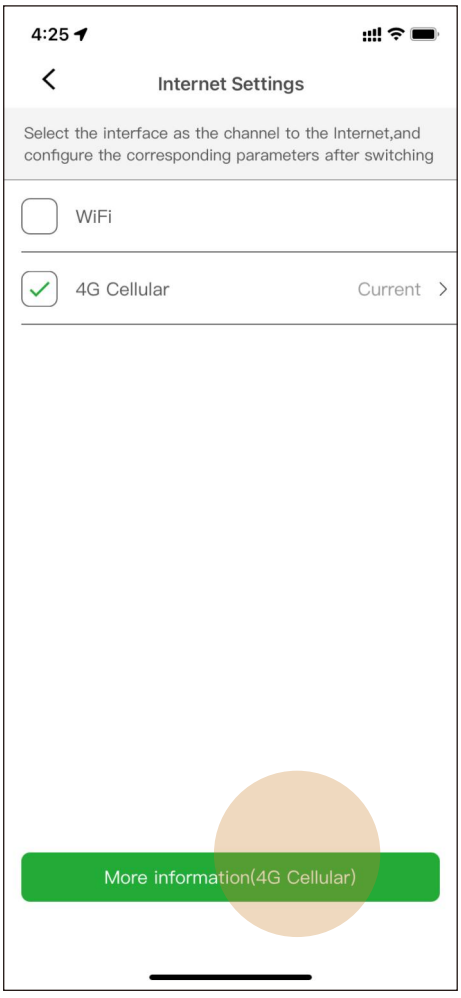
“ Not Ready ”

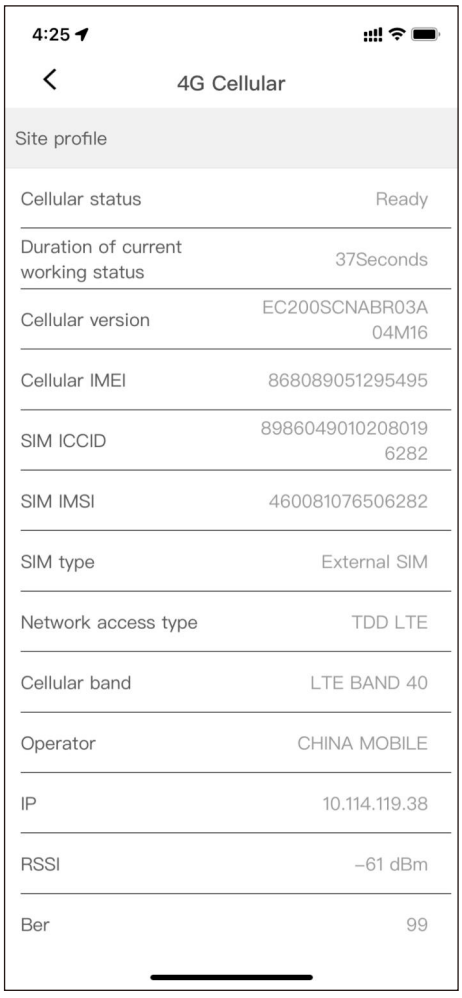
- The 4G modem is searching/registering for a cellular network, if it fails it will reboot and try again.

  Check “More Information” for networking details.

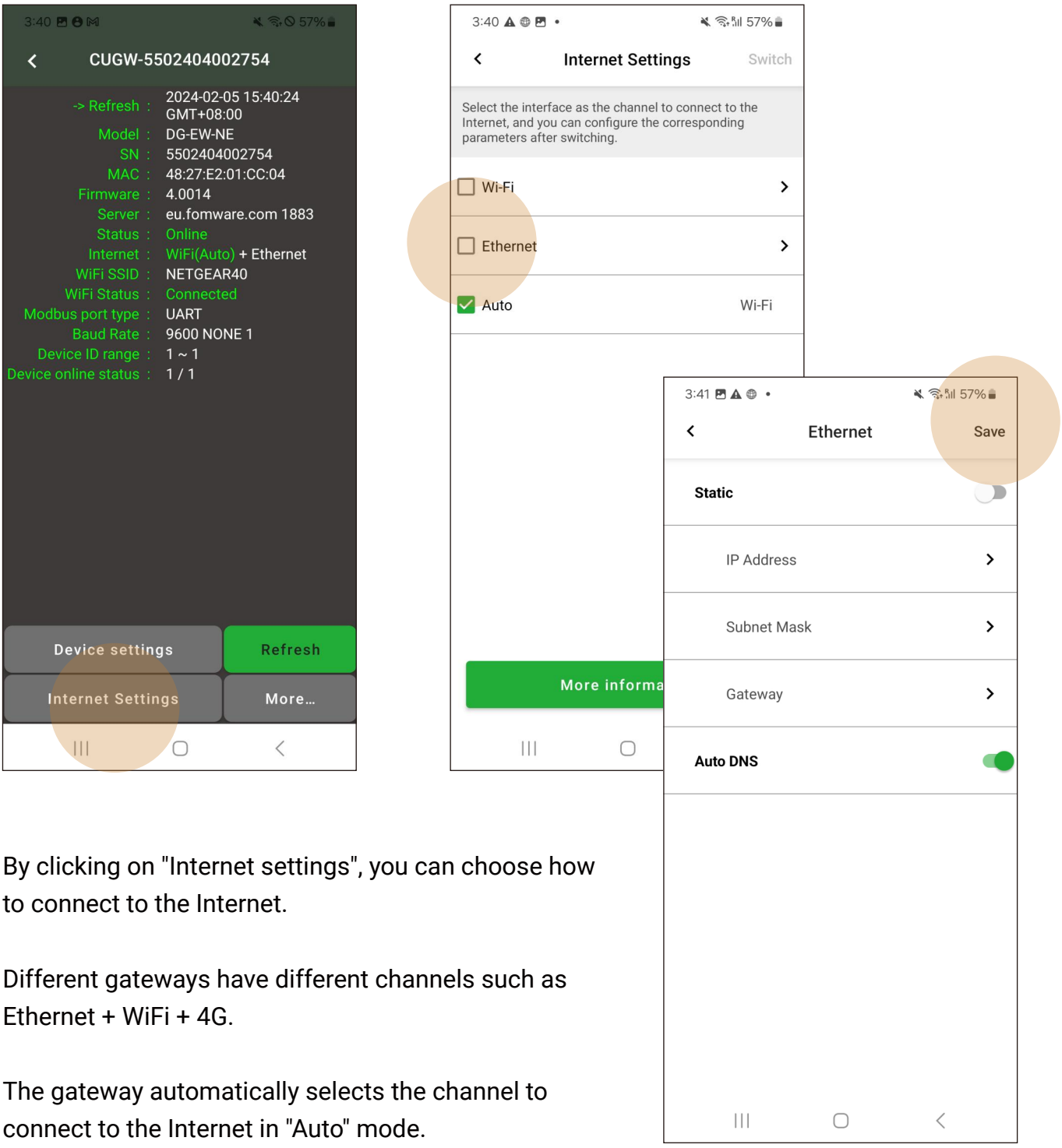
“ Ready ”

- Everything went well.





6 Non-registered User (Installer)
6.4 Gateway connects to the LAN router via Ethernet



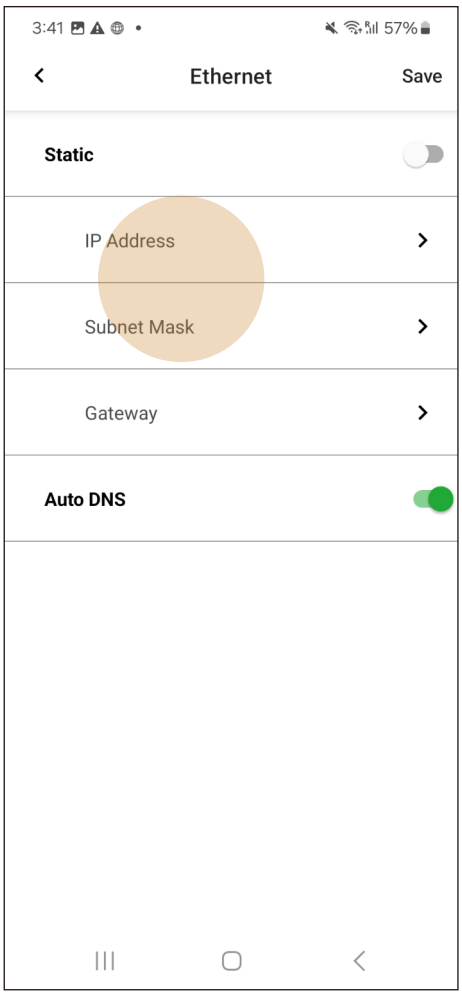
By clicking on "Internet settings", you can choose how to connect to the Internet.

Different gateways have different channels such as Ethernet + WiFi + 4G.

The gateway automatically selects the channel to connect to the Internet in "Auto" mode.

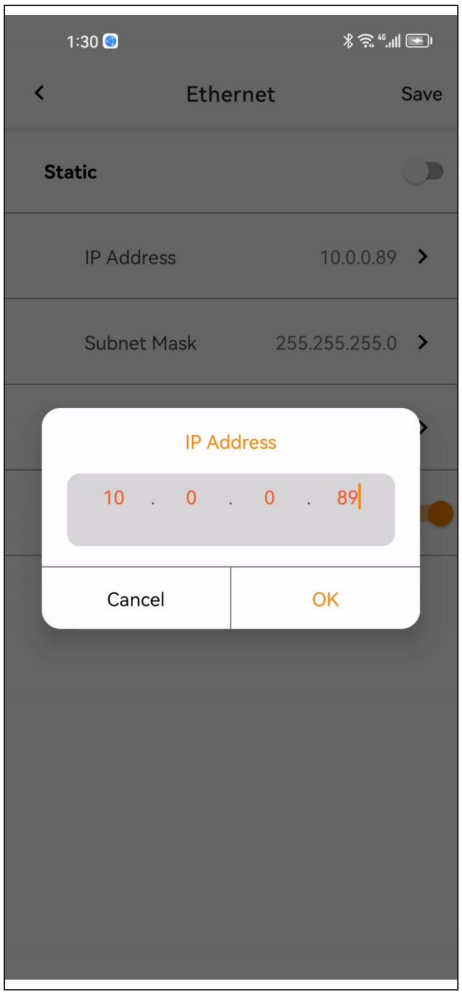
As shown in the figure, click "Save" after finishing the Ethernet parameter setting.

Then click "Switch" to make the channel selection effective.



Typical Modbus TCP applications, it is recommended to go through Ethernet and a static IP address and related parameters must be configured.

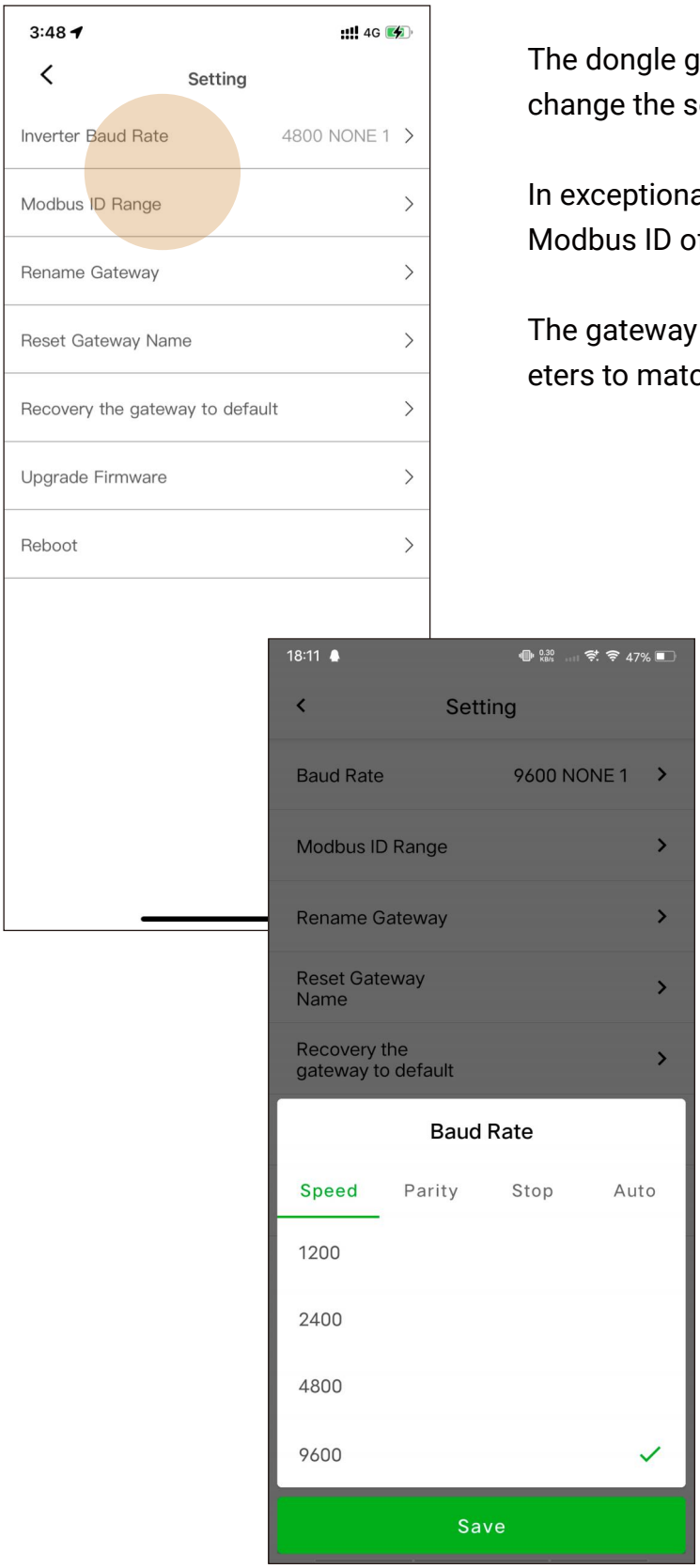
It must be ensured that the gateway is on a LAN subnet with the third party SCADA.



Open the LAN firewall ports before commissiong !

The following ports must be opened both ways (incoming and outgoing communications):
TCP 1883 with destination IP 139.196.138.86

6 Non-registered User (Installer)
6.5 Key parameters for connecting the inverter

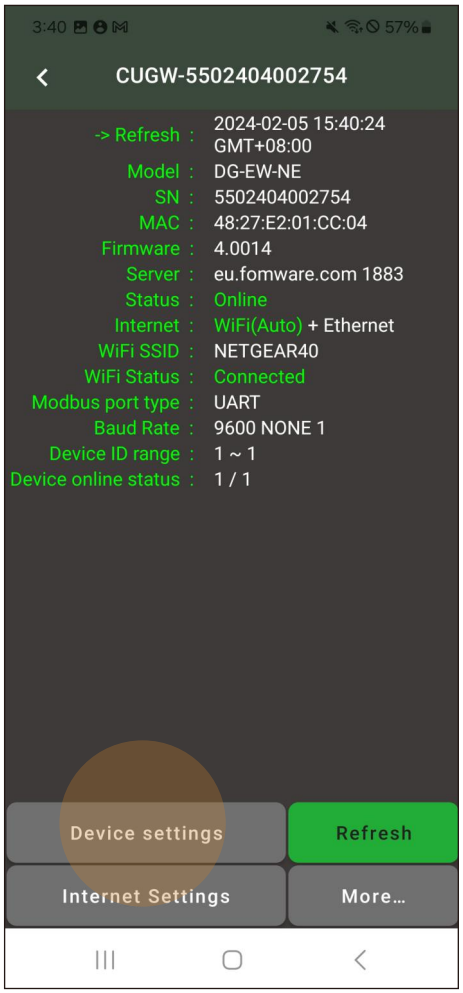


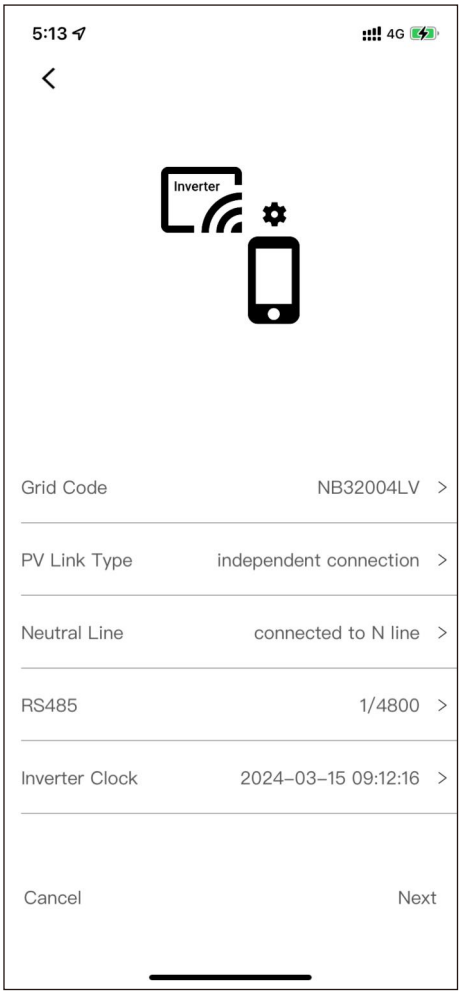
The dongle gateway usually does not need to change the settings of the connection inverter.

In exceptional cases, the default Baud Rate and Modbus ID of the inverter are modified.

The gateway needs to change the relevant parameters to match those of the inverter.

6 Non-registered User (Installer)
6.6 Initialize the inverter





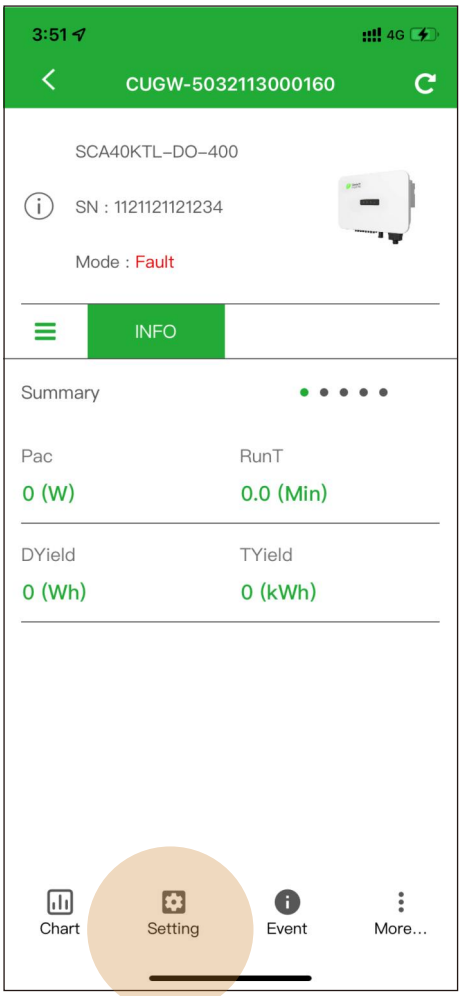
Click "device settings", the App will show the initialisation interface of the inverter.

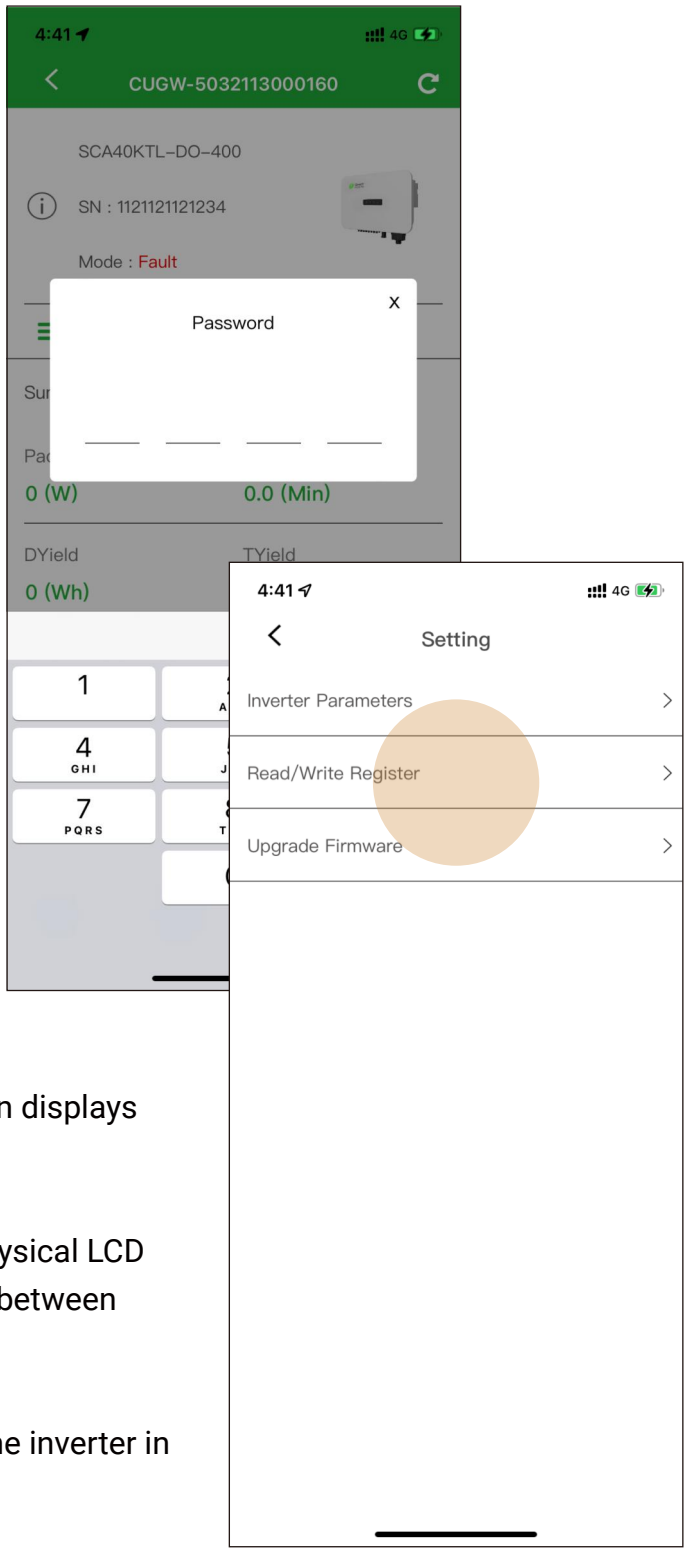
Inverters without Grid code are considered as uninitialised inverters.

The initialisation screen varies slightly from inverter to inverter, but all will ask for settings:

- Grid Code
- PV Line Type
- Neutral Line
- Inverter Clock
- RS485 Port

6 Non-registered User (Installer)
6.7 Setting inverter parameters



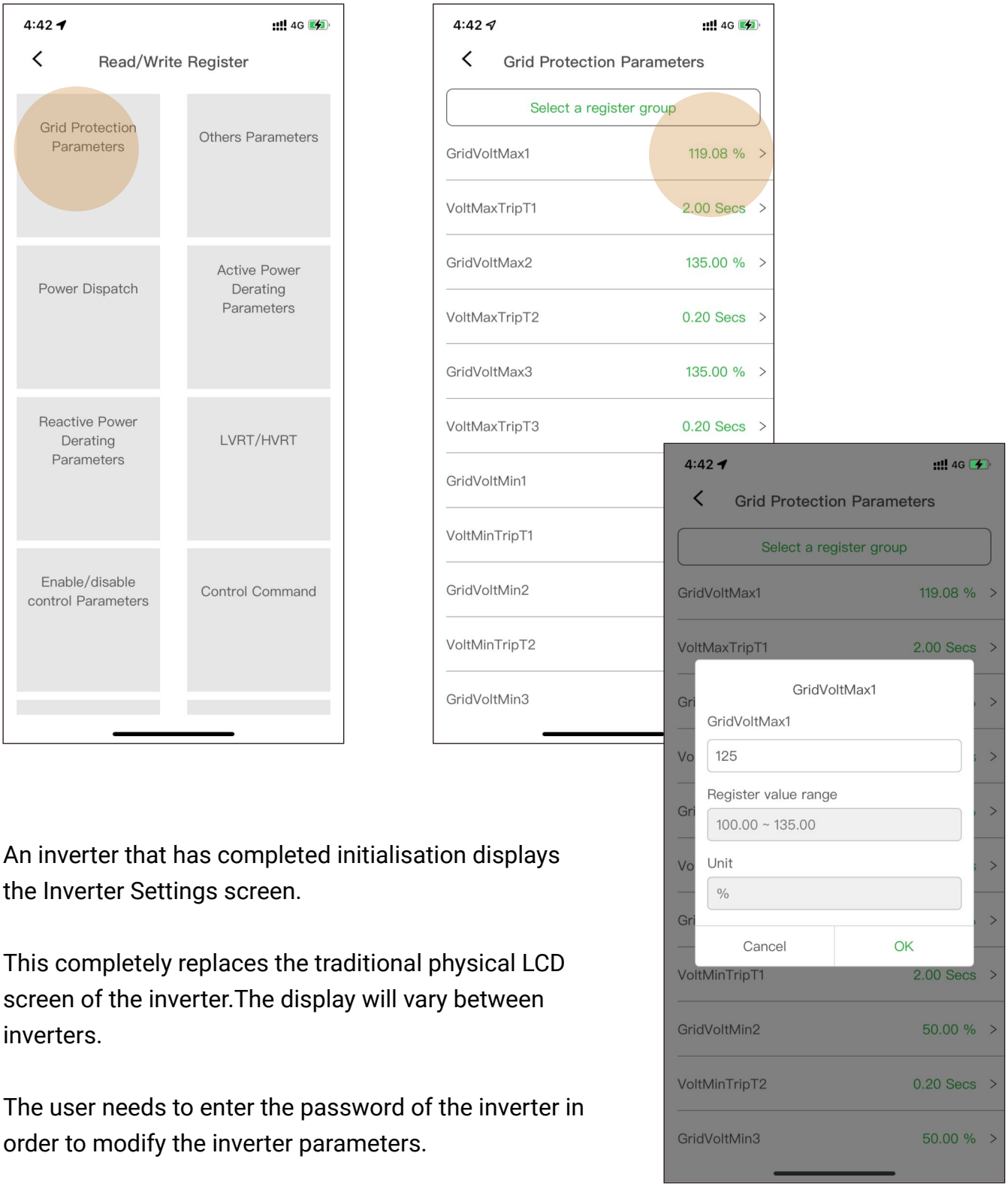


An inverter that has completed initialisation displays the Inverter Settings screen.

This completely replaces the traditional physical LCD screen of the inverter.The display will vary between inverters.

The user needs to enter the password of the inverter in order to modify the inverter parameters.

Please check the inverter manual or contact the inverter manufacturer for details.



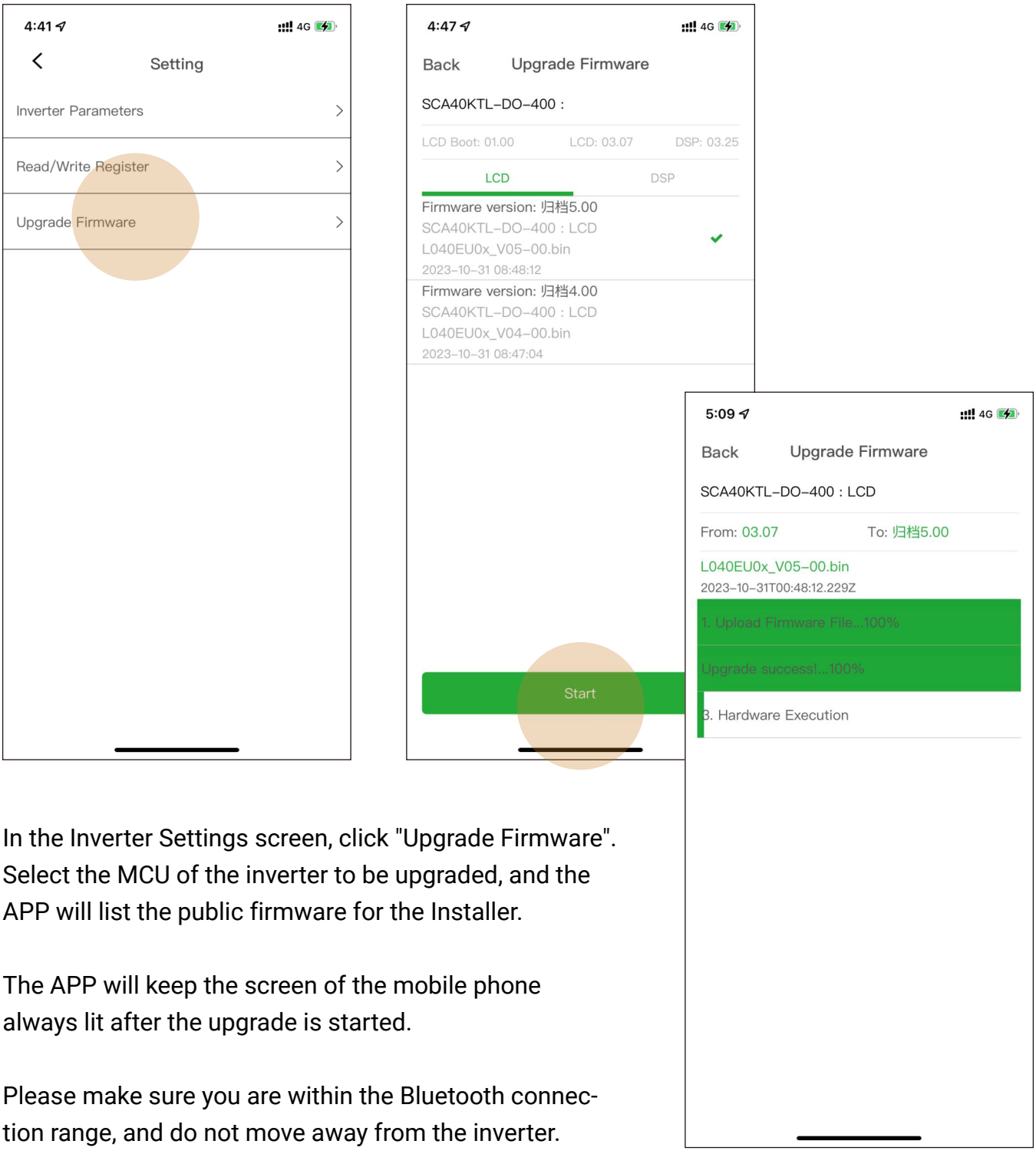
An inverter that has completed initialisation displays the Inverter Settings screen.

This completely replaces the traditional physical LCD screen of the inverter.The display will vary between inverters.

The user needs to enter the password of the inverter in order to modify the inverter parameters.

Please check the inverter manual or contact the inverter manufacturer for details.

6 Non-registered User (Installer)
6.8 Upgrade inverter firmware



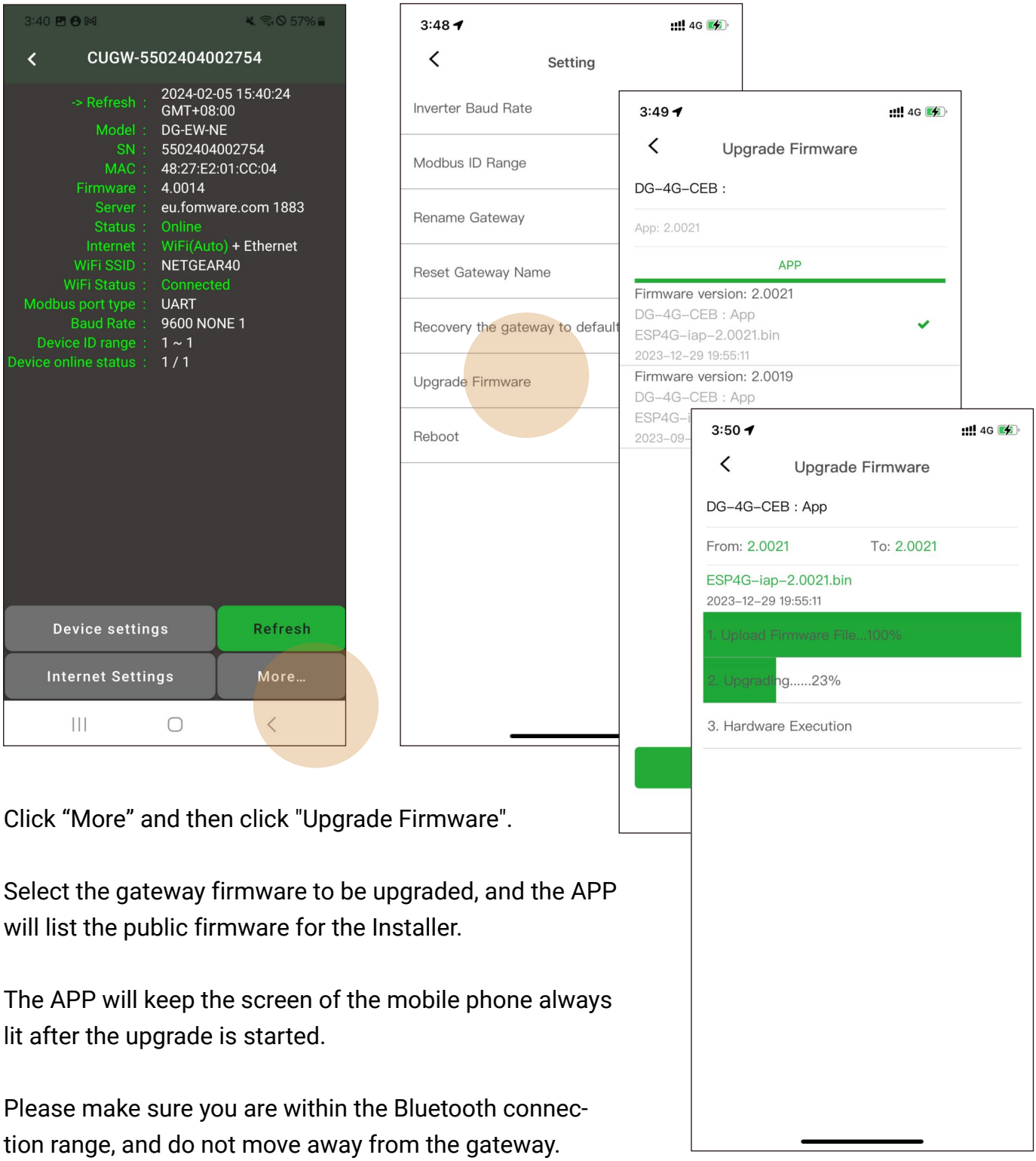
In the Inverter Settings screen, click "Upgrade Firmware". Select the MCU of the inverter to be upgraded, and the APP will list the public firmware for the Installer.

The APP will keep the screen of the mobile phone always lit after the upgrade is started.

Please make sure you are within the Bluetooth connection range, and do not move away from the inverter. Perform the firmware upgrade from your mobile phone, phone calls during the process will interrupt the upgrade process.

Firmware upgrade interruptions do not cause the inverter to fail, restarting the firmware upgrade is sufficient.

6 Non-registered User (Installer)
6.9 Upgrade gateway firmware



Click “More” and then click "Upgrade Firmware".

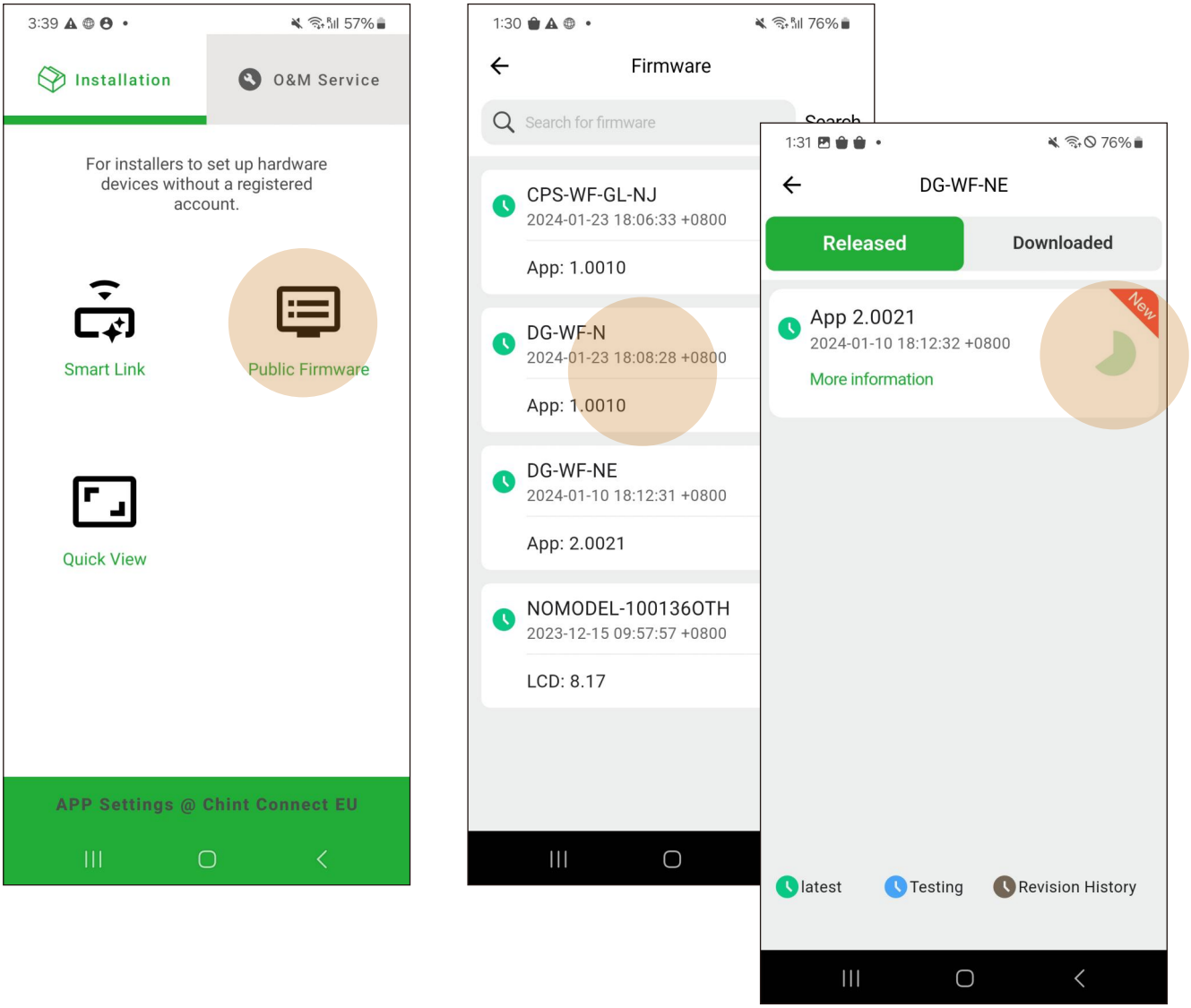
Select the gateway firmware to be upgraded, and the APP will list the public firmware for the Installer.

The APP will keep the screen of the mobile phone always lit after the upgrade is started.

Please make sure you are within the Bluetooth connection range, and do not move away from the gateway. Perform the firmware upgrade from your mobile phone, phone calls during the process will interrupt the upgrade process.

Firmware upgrade interruptions do not cause the gateway to fail, restarting the firmware upgrade is sufficient.

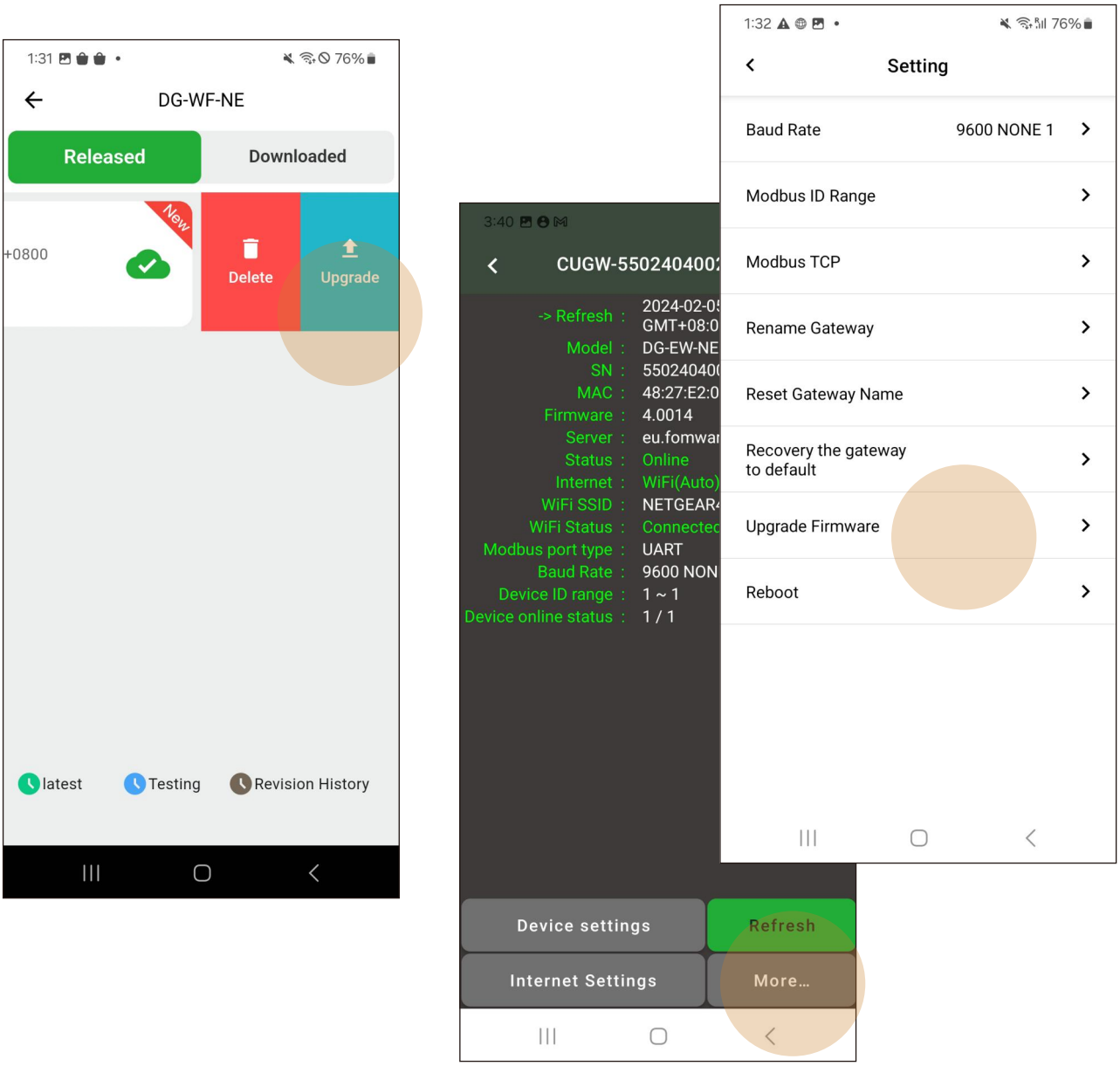
Upgrade hardware firmware



Installers can simply use the latest or most stable public version of the firmware.

Click on the desired model to get a list of firmware and then click to download.

If there is no required model, it means APP has not released the public version firmware at present, please contact the after-sales service.



There are two ways to upgrade your hardware with firmware that has been downloaded into the app.

1) Left slide the firmware name and click "Upgrade", the APP will guide you to the hardware and perform the upgrade at the same time.

2) Click "Upgrade Firmware" after entering the hardware settings interface.

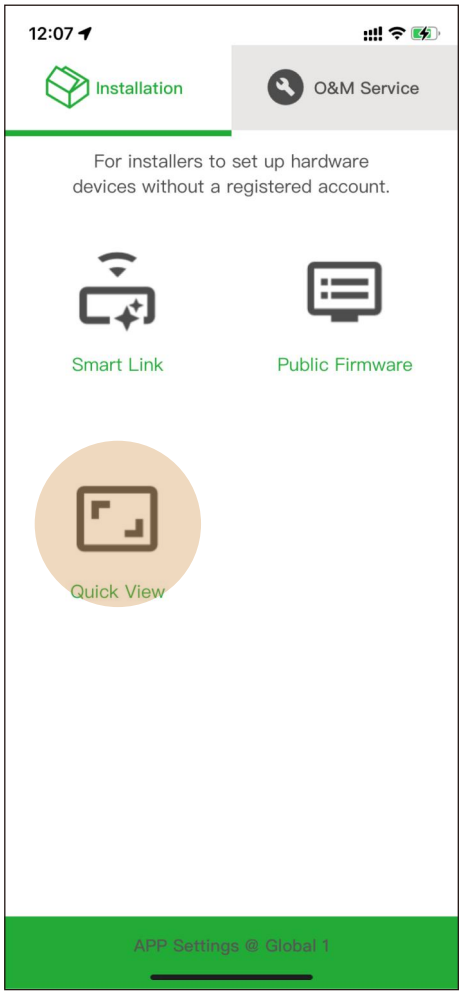
Setting the site time zone

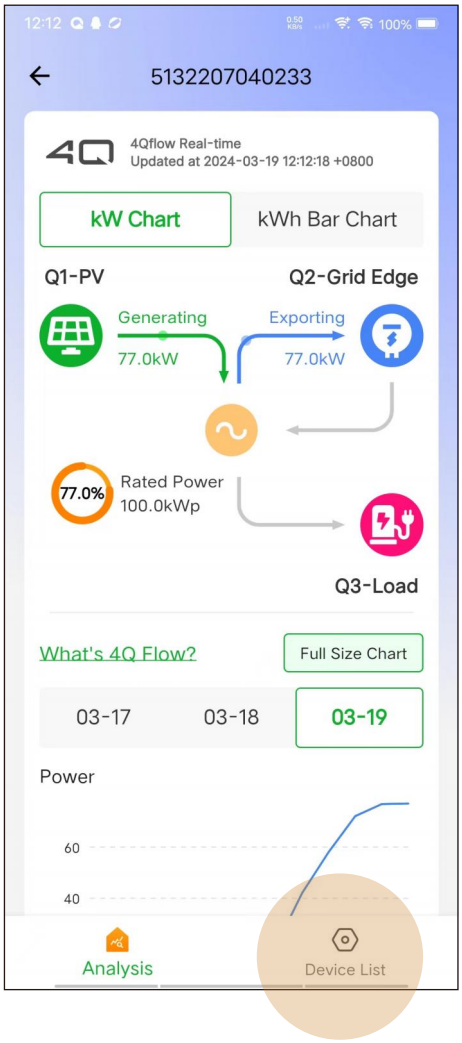
Dongle gateway related APP interactions do not have an interface to set the site's time zone.

Register an account in time to view the site via the Web/App and set the time zone correctly.

Time zone is an important factor in the accuracy of site data.

6 Non-registered User (Installer)
6.10 Quickly check hardware running status

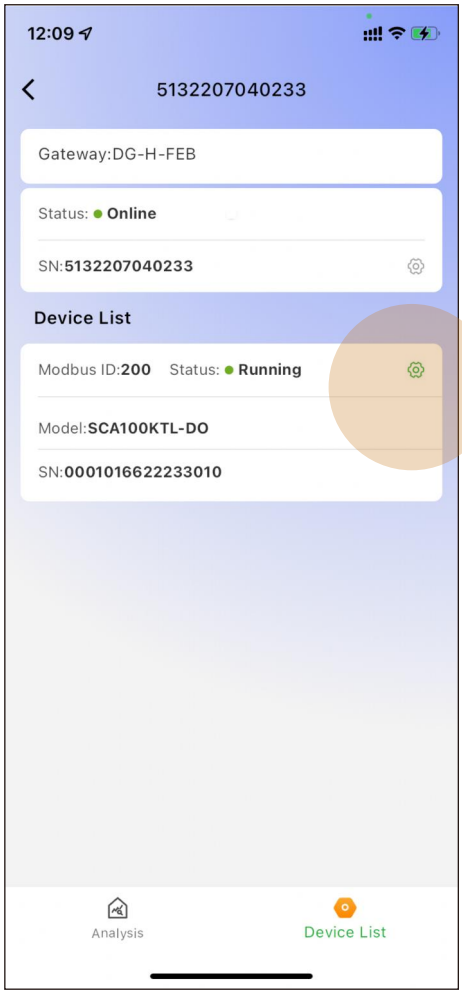


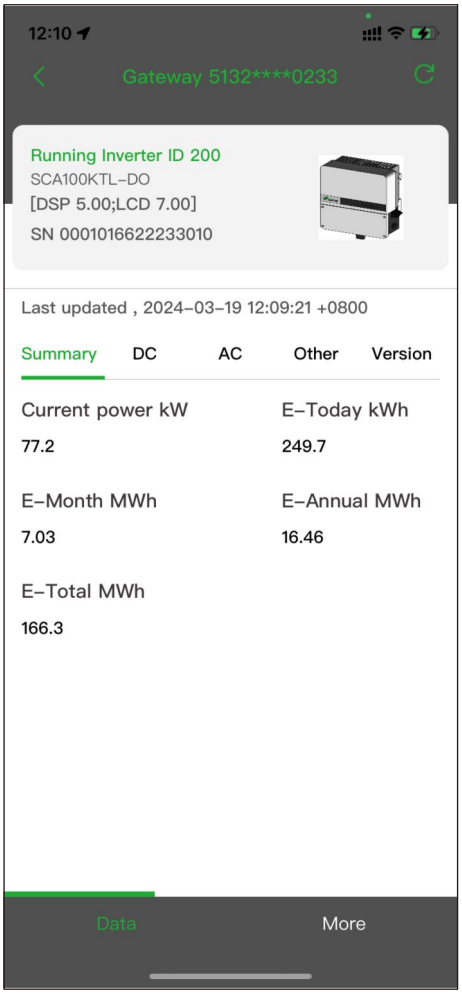


Without any account, the installer can click "Quick View" and scan the barcode of the gateway or enter the gateway SN.

The app will display the hardware's operating data.

This is a very simple way for anyone to be able to check the operation of a site, at any place and time, knowing the gateway SN.



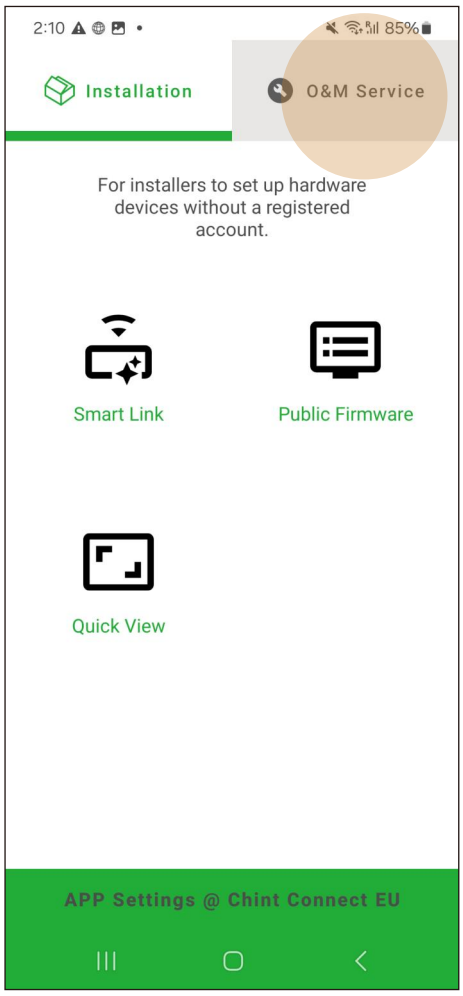


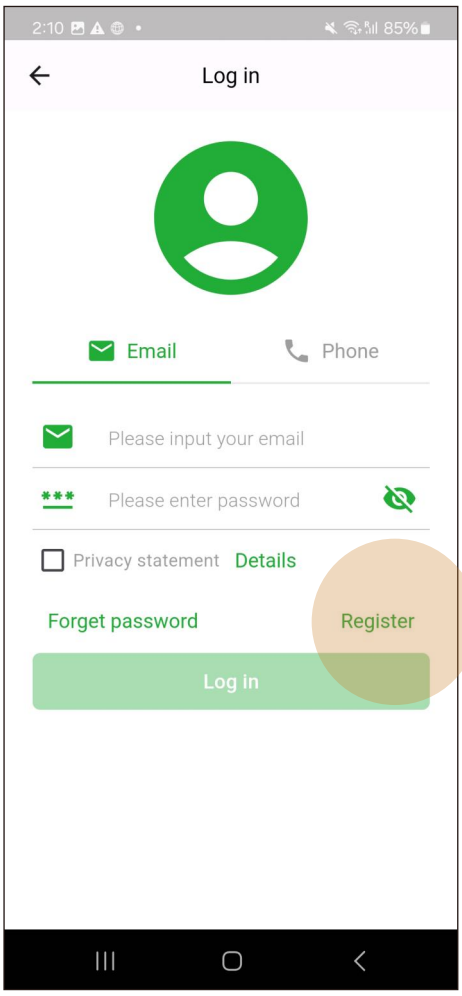
The interface displayed will be different for different gateways and inverters.

Users can only view the underlying data and cannot make any changes to the hardware.

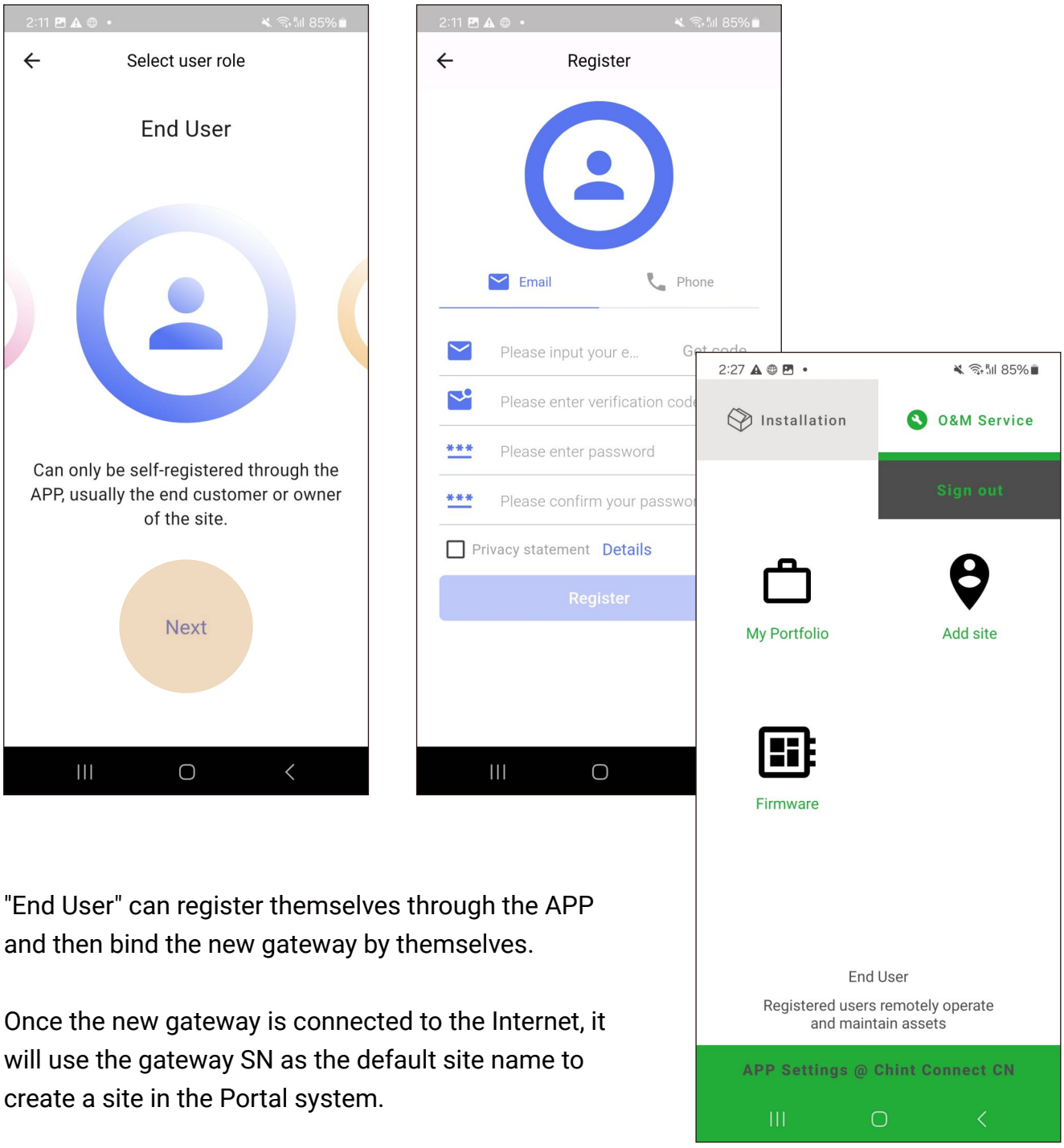
7 Portfolio Owner (End User)

7.1 Self-registered “End User” account through the APP





Click "O&M Service", APP prompts you to log in, click "Register" to self-register a new "End User" account.

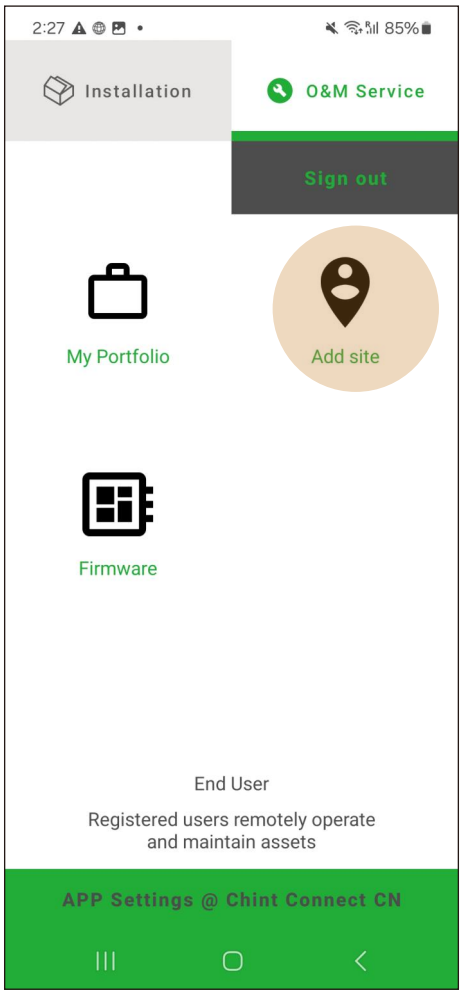


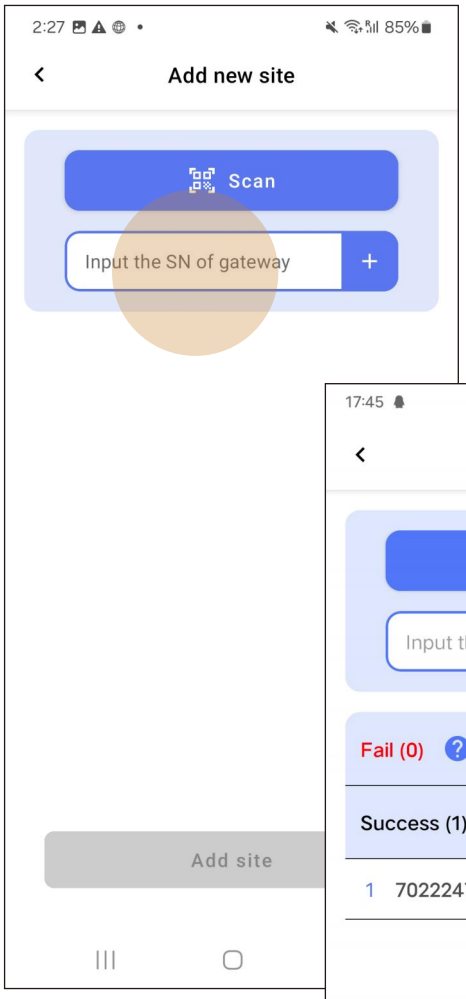
"End User" can register themselves through the APP and then bind the new gateway by themselves.

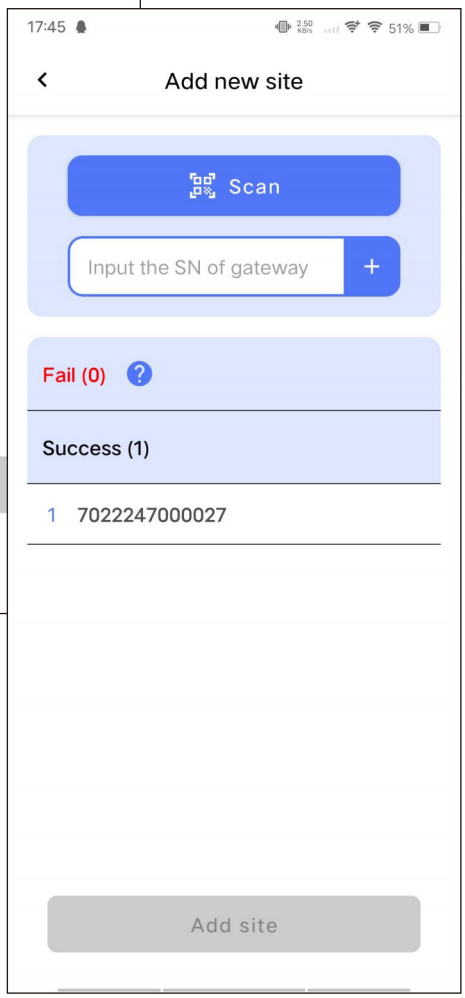
Once the new gateway is connected to the Internet, it will use the gateway SN as the default site name to create a site in the Portal system.

After binding the gateway by themselves, users can immediately view the site data via APP/Web.

7 Portfolio Owner (End User)
7.2 Bind site to account



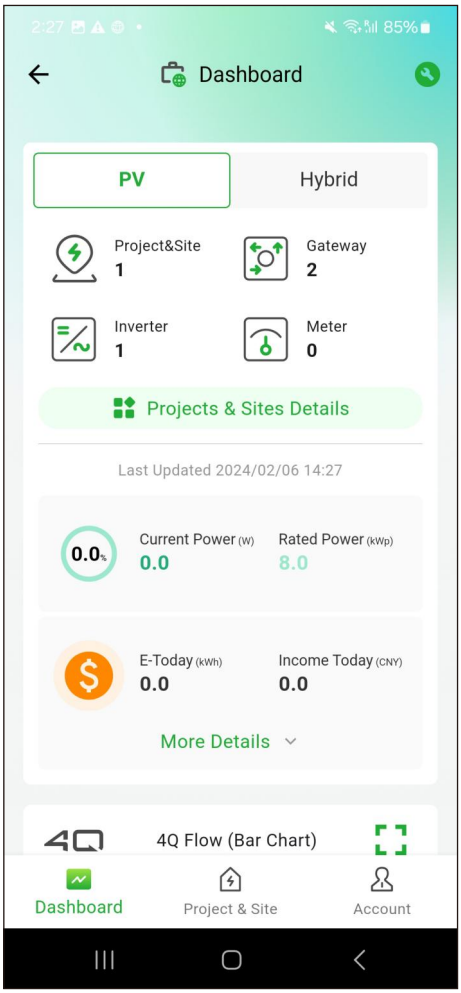


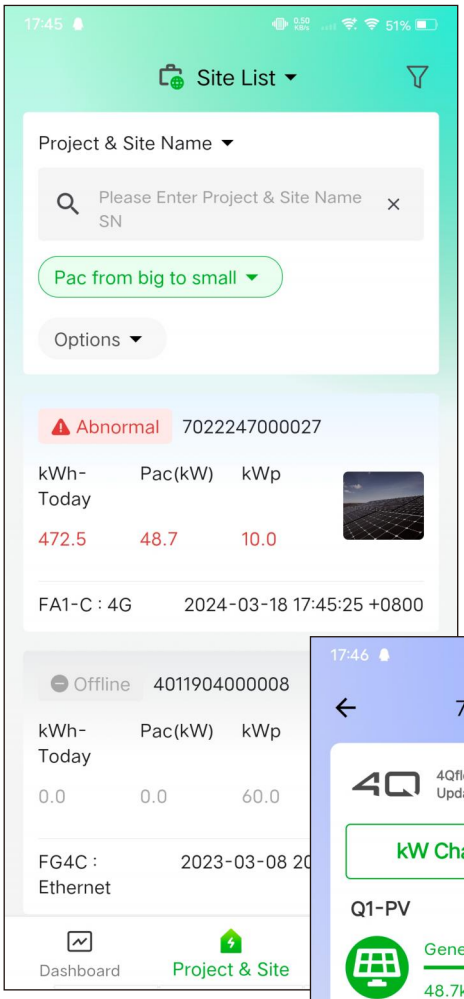


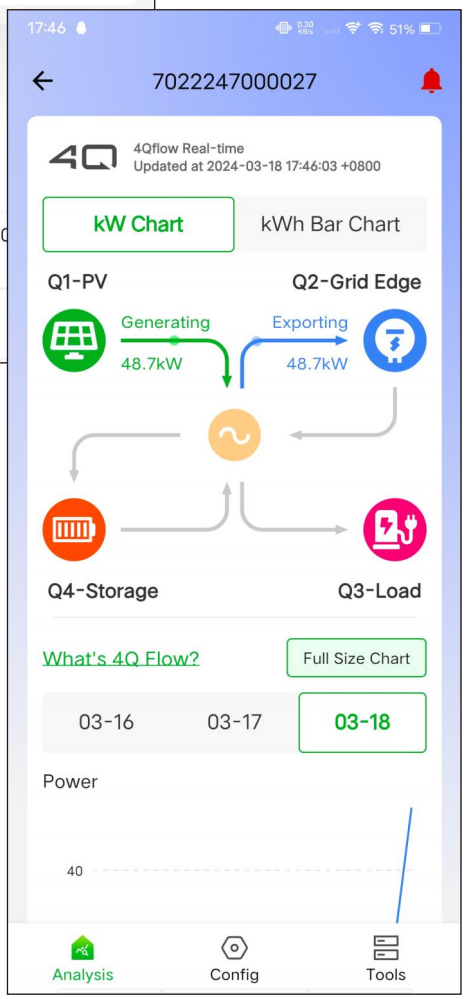
After logging in "End User", click "Add Site", and then output the gateway SN.

APP will prompt successful binding, or prompt that the current gateway has been bound by other users and other exceptions.

7 Portfolio Owner (End User)
7.3 Remote checking of hardware running status





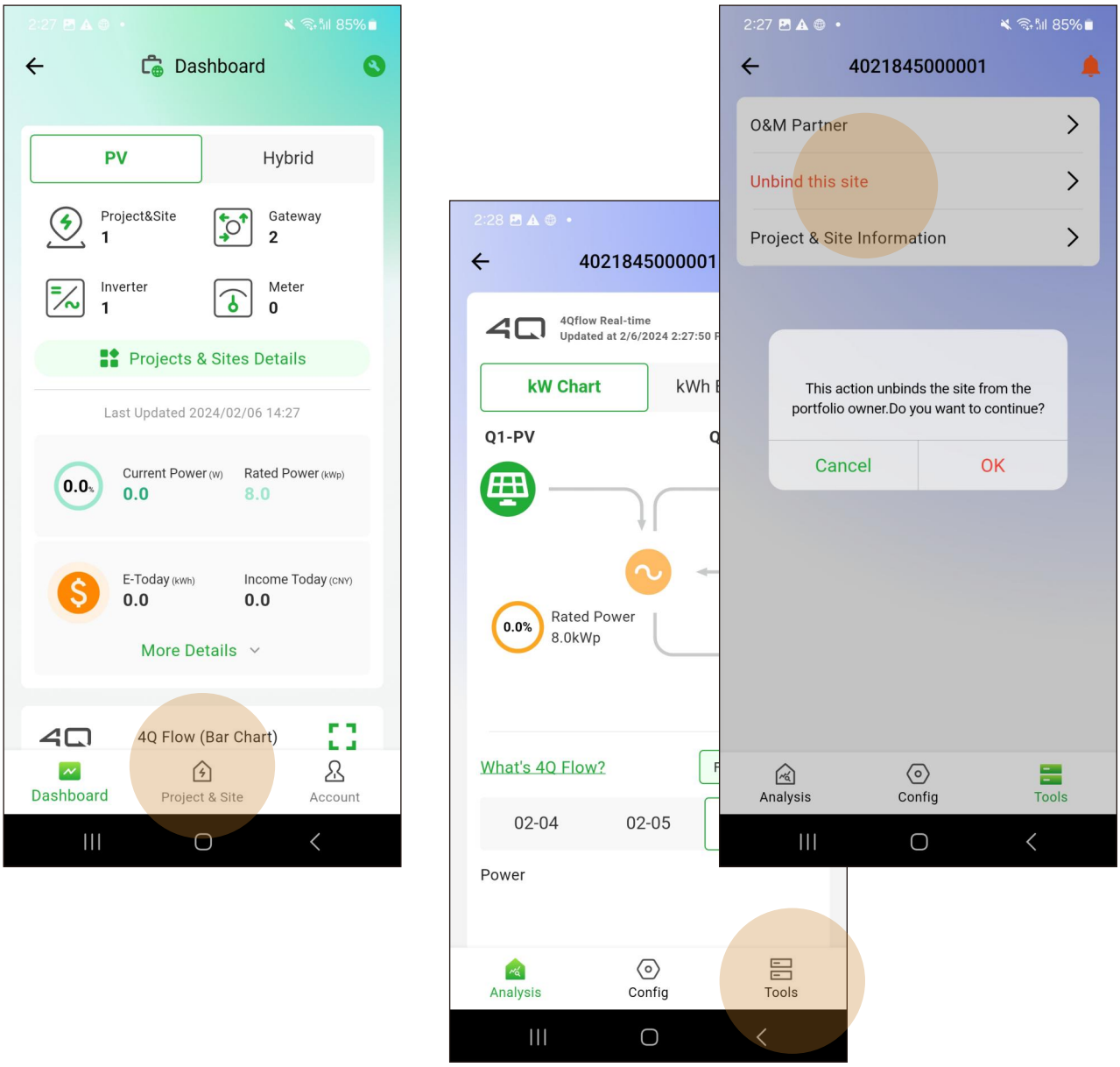


After logging in via the APP/Web, Portfolio Owner is able to view data for all sites in the account, as well as remotely modify hardware settings.

Different roles will be given different permissions, so the Portal system administrator will adjust the account permissions according to the contract.

Please check the product sales contract for details.

7 Portfolio Owner (End User)
7.4 Unbind site from account

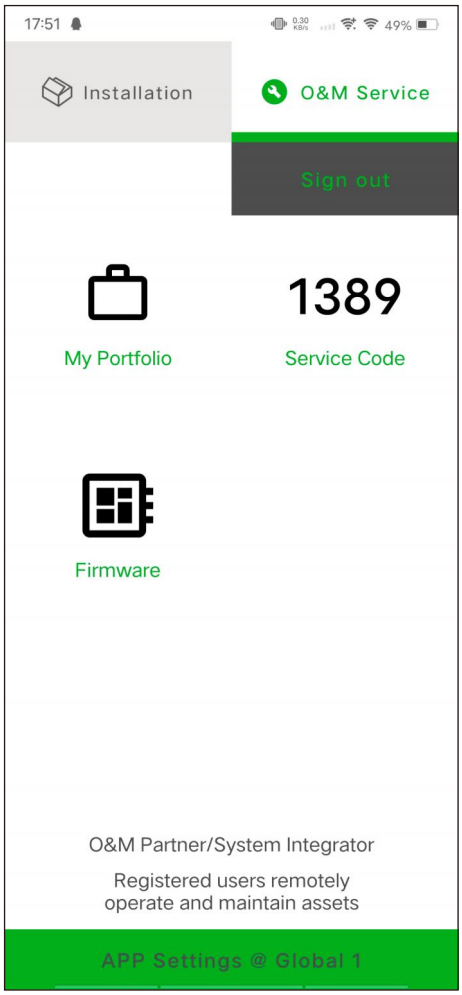


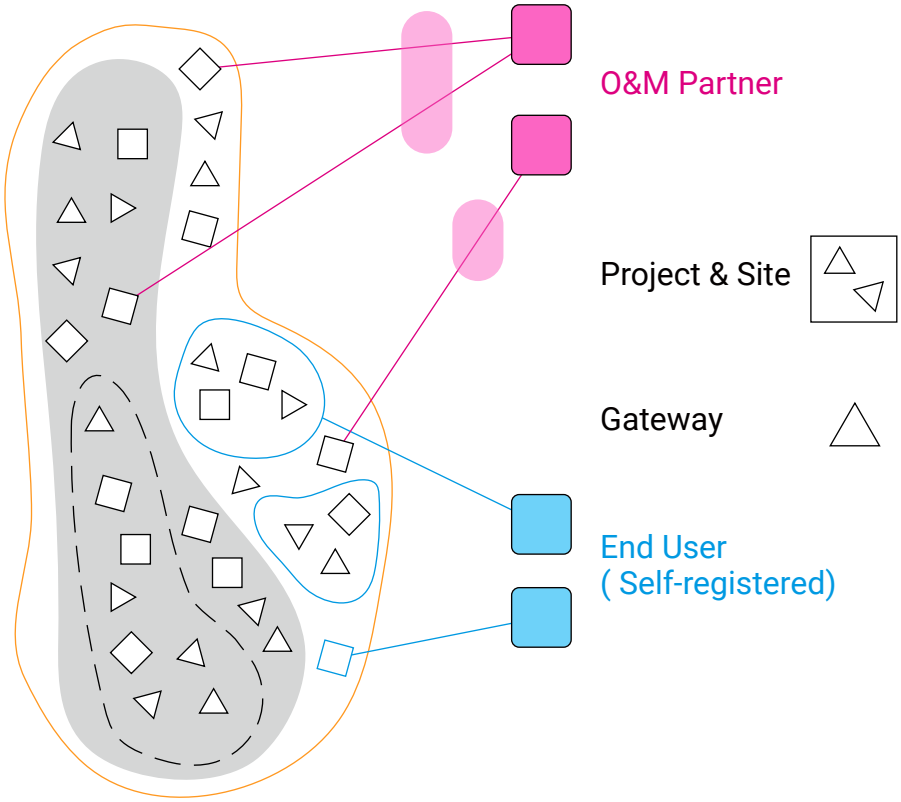
Users can enter a site from the site list, click on "Tools" and then select "Unbind this site".

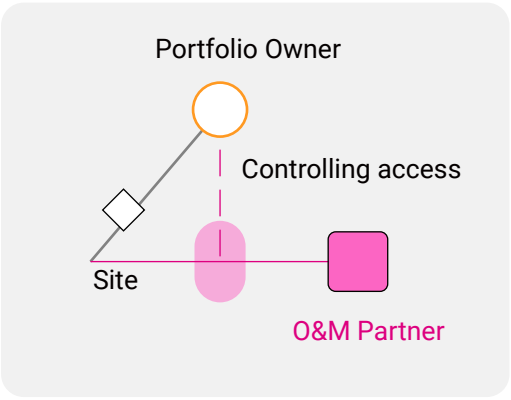
The site is unbound from the current account and the site and data are not deleted.

The Portal administrator is still able to manage the site, so in case of misuse, you can contact after-sales service.

7 Portfolio Owner (End User)
7.5 Authorize an O&M partner to control the site







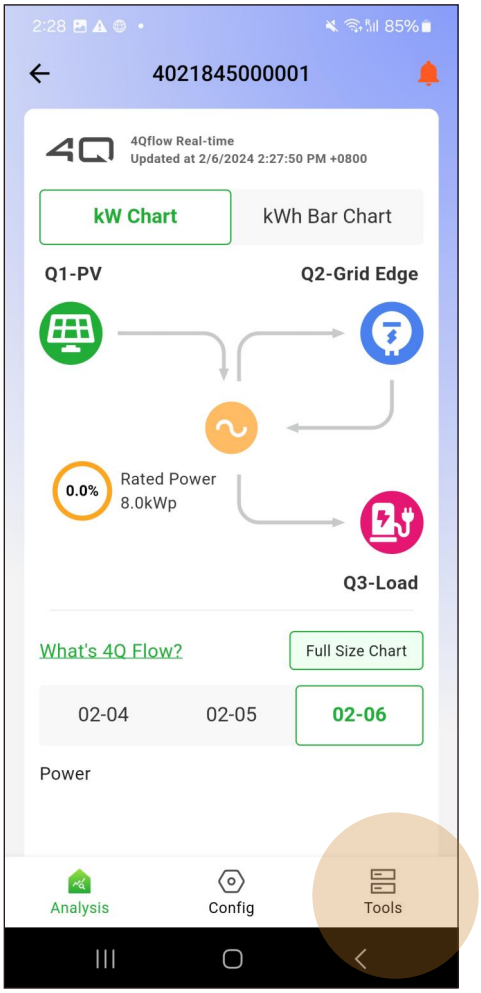
The Portal Admin can send an "Invite-to-register" self-registration URL to the target user.

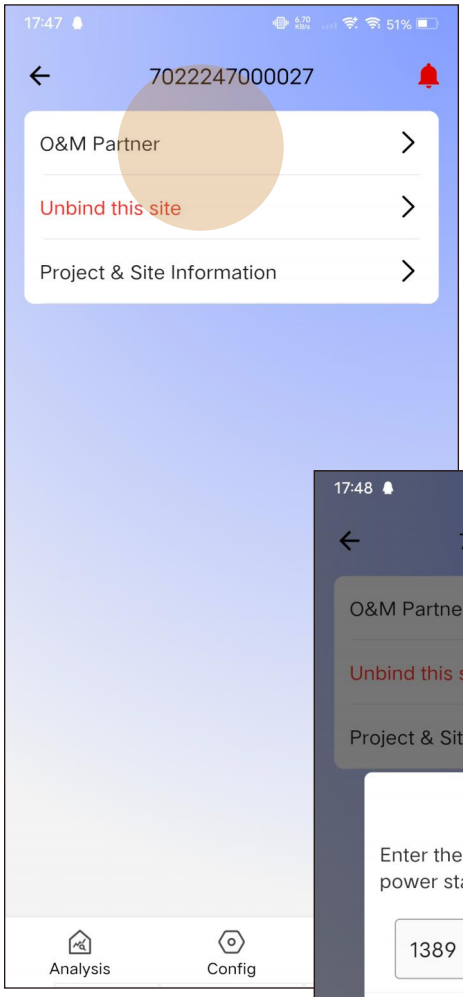
O&M Partner will receive a 4-digit "Service Code" after completing the account registration.

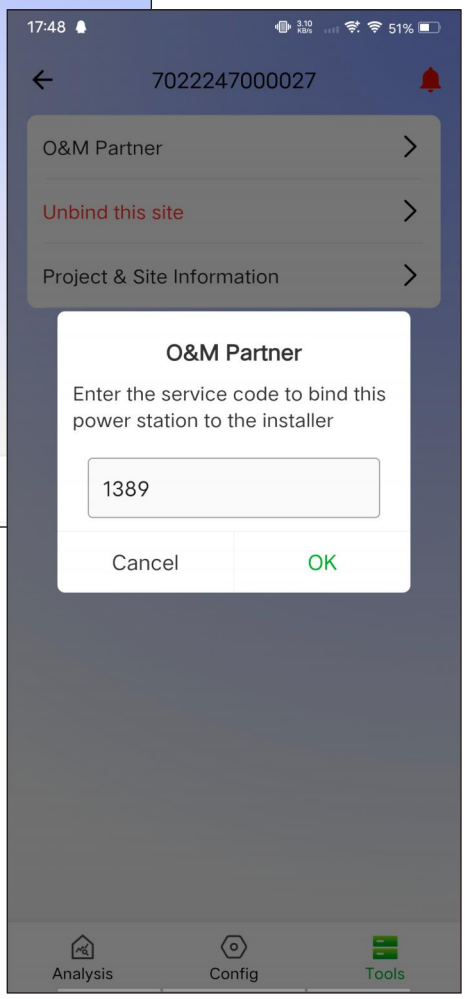
Both the "Service Code" and the O&M Partner account name can be used as elements of the Portfolio Owner's authorisation.

O&M Partner is a service or integrator account role with a cross-organizational perspective.

“Portfolio Owner” can turn on or off O&M Partner's access to sites in his account.





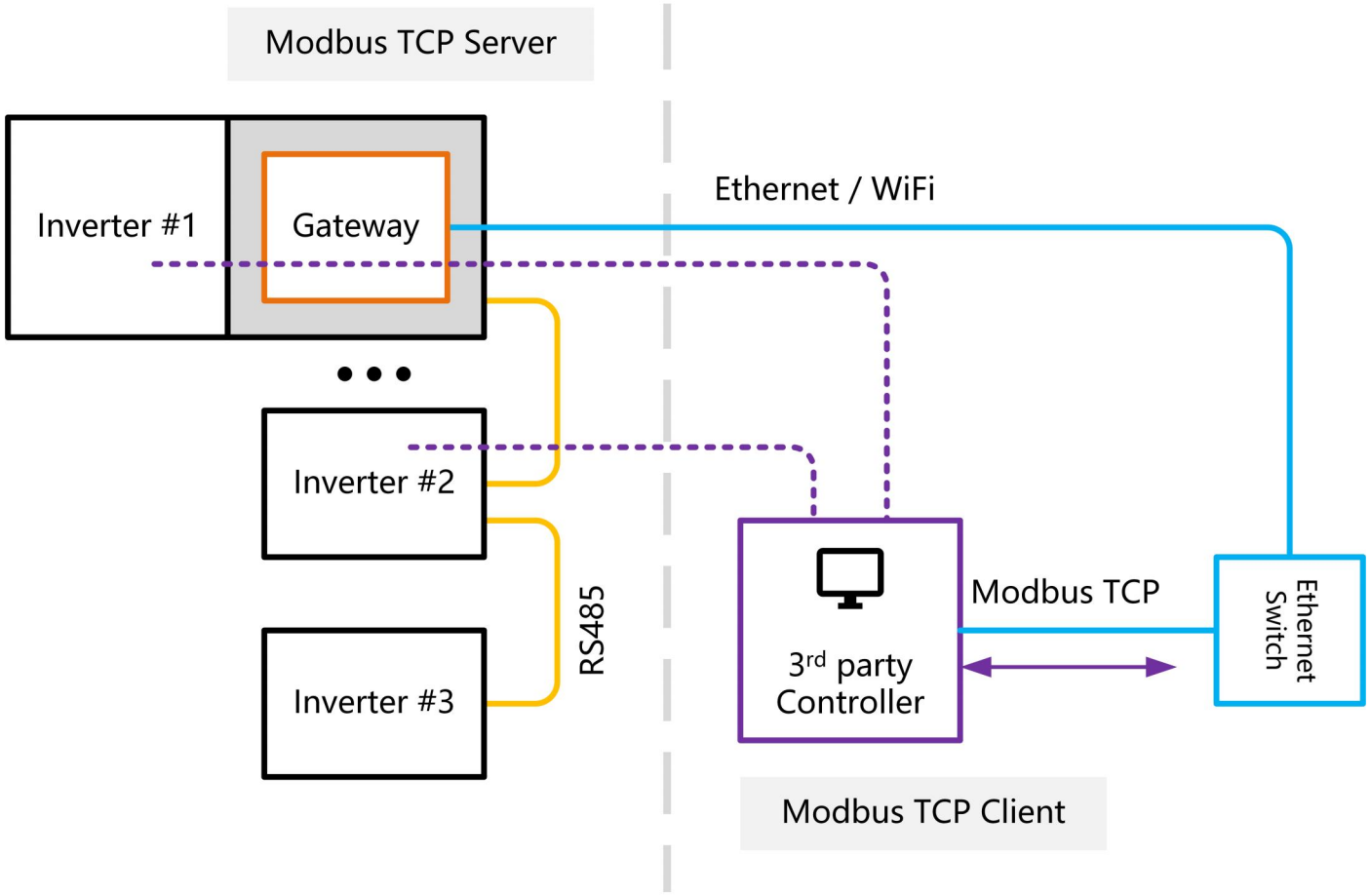


Portfolio Owner Select the target site in the site list and click "Tools".

Among the listed options, click on the "O&M Partner" option to Bind/Unbind O&M Partner to the target site.

8 Appendix

8.1 Example of Modbus TCP application

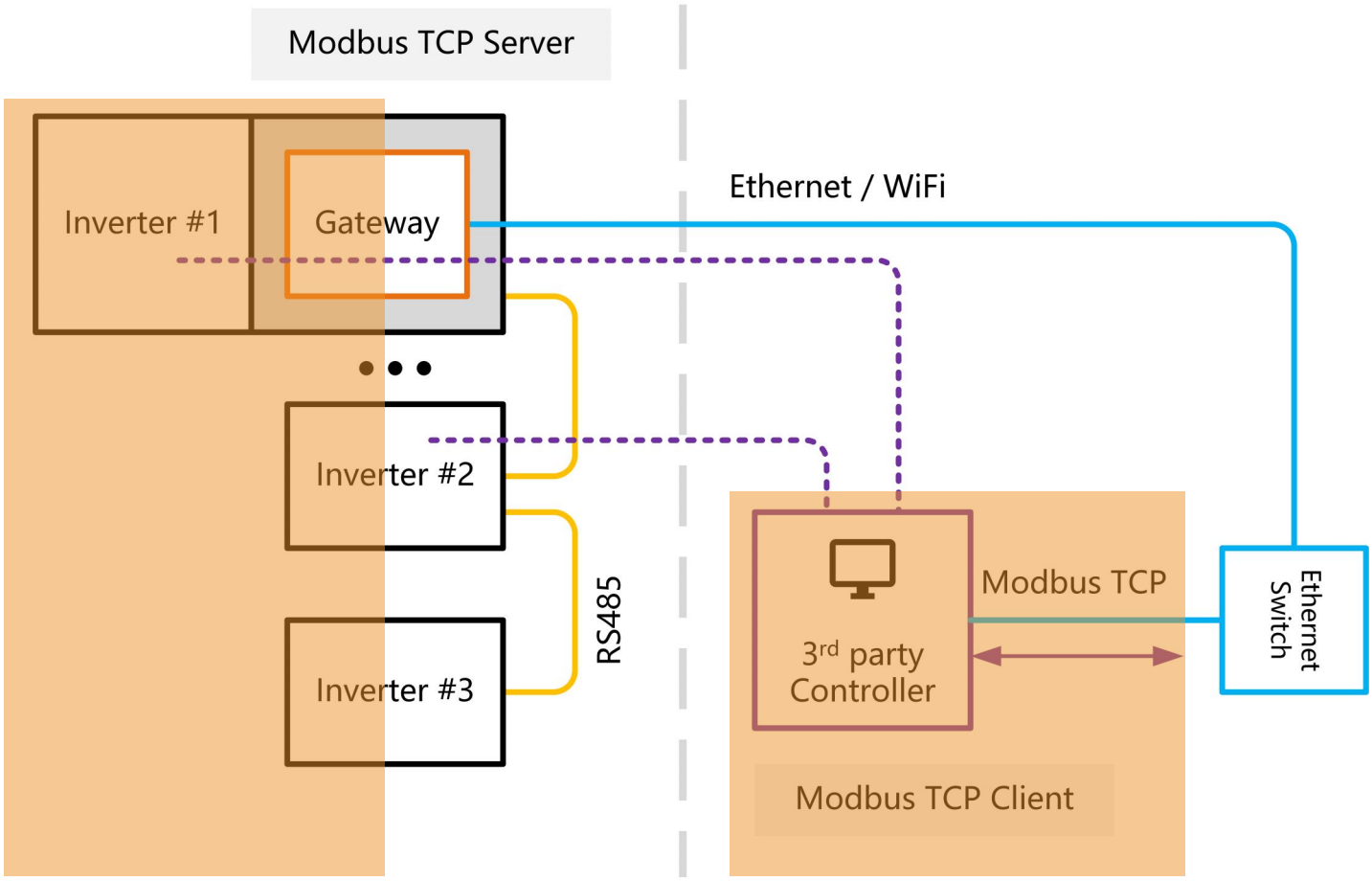


The gateway connects to the Daisy Chain and is created as a Modbus TCP server object for each device with a different Modbus ID.

A third party SCADA acts as a Modbus TCP client and connects to the target Modbus ID device via a TCP channel.

SCADA typically creates a long connection TCP channel for each Modbus ID; we recommend that SCADA reads and writes to the Modbus ID devices one at a time over a short connection TCP channel.

The advantage of this model is that only one TCP channel (Modbus TCP client) is needed to read and write multiple devices one by one.



Simulator : Modbus Slave

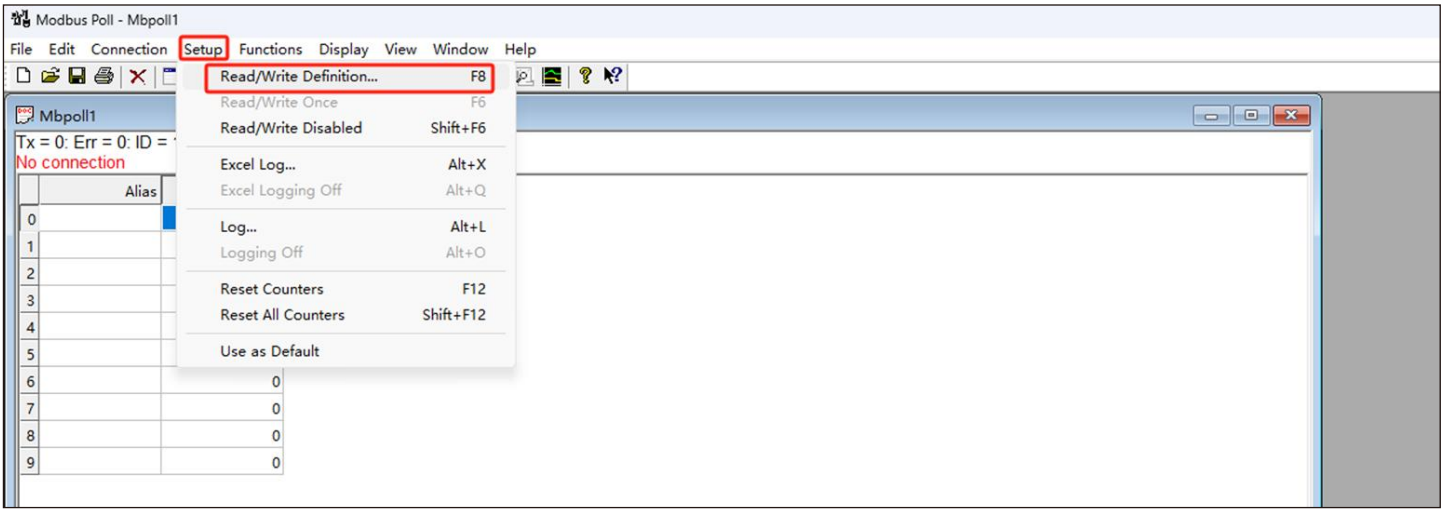
Simulator : Modbus Poll

Assuming that the user has connected two inverters using Modbus IDs 1 and 2, it is also possible to simulate the same inverters using the Modbus slave software.

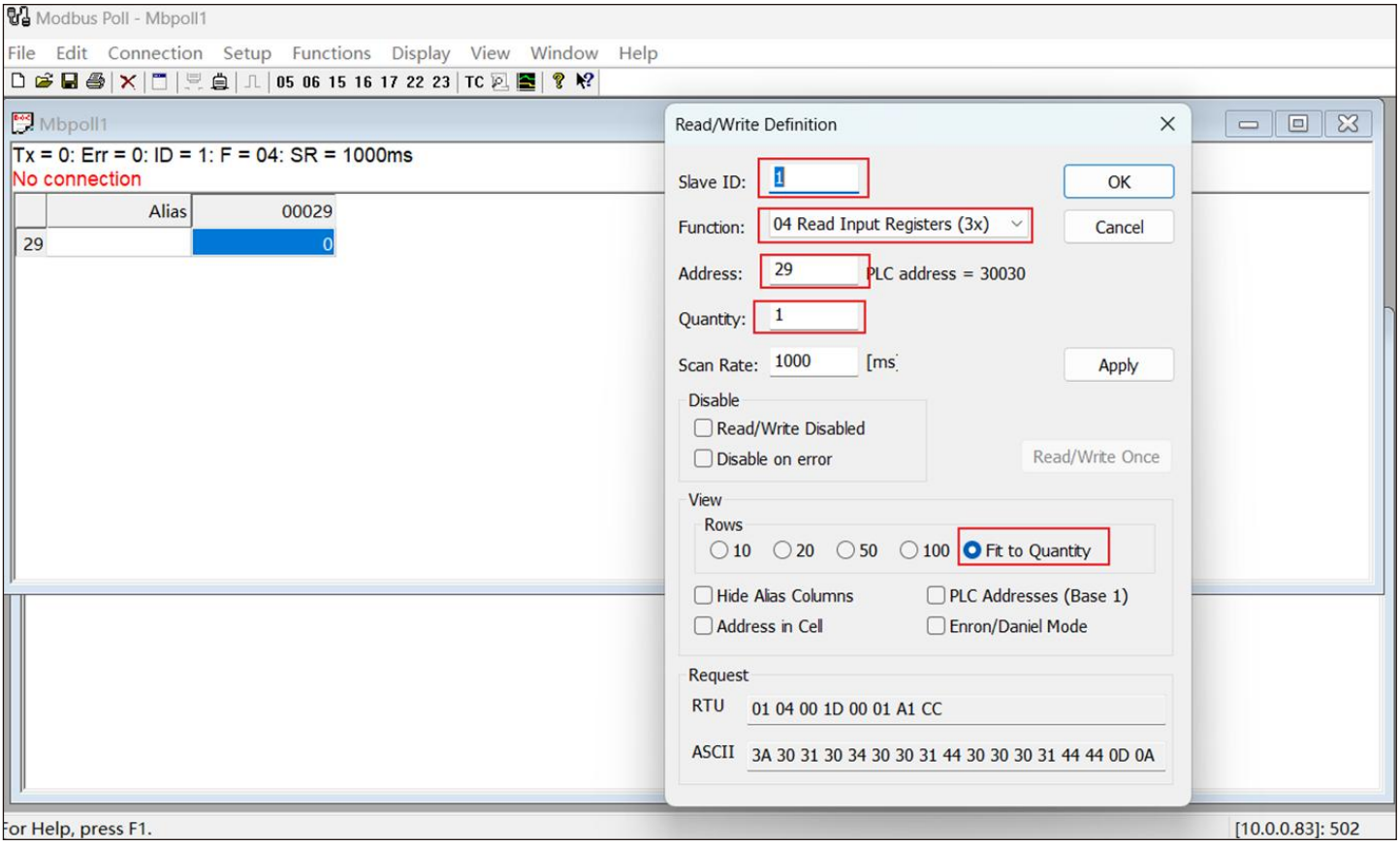
Create the register objects correctly, for example:

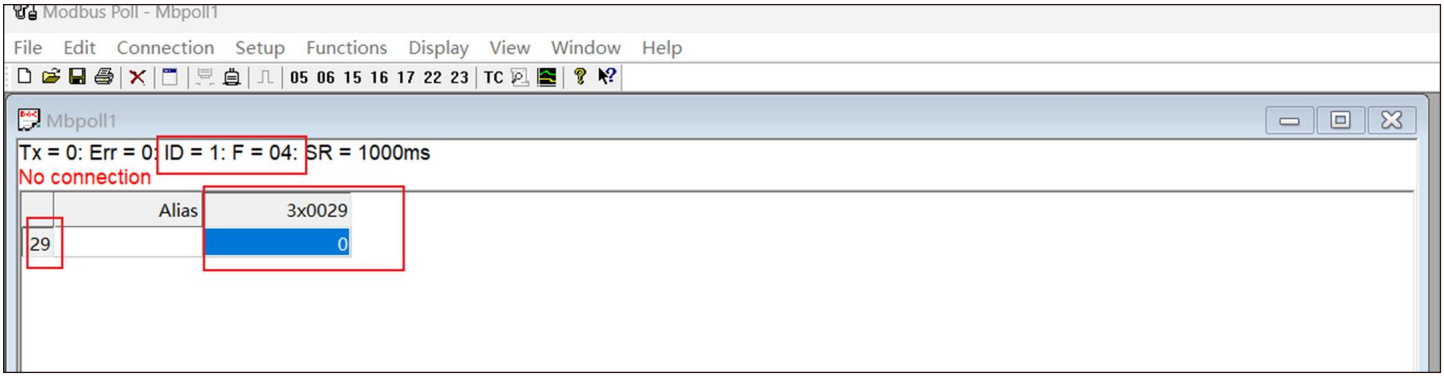
Register Name: Pac (AC active power)
Address: 0x001D (29)
R/W: RO
Type: uint16
Function Code: 0x04

Create a read/write interface for Modbus ID 1 in the Modbus Poll software.



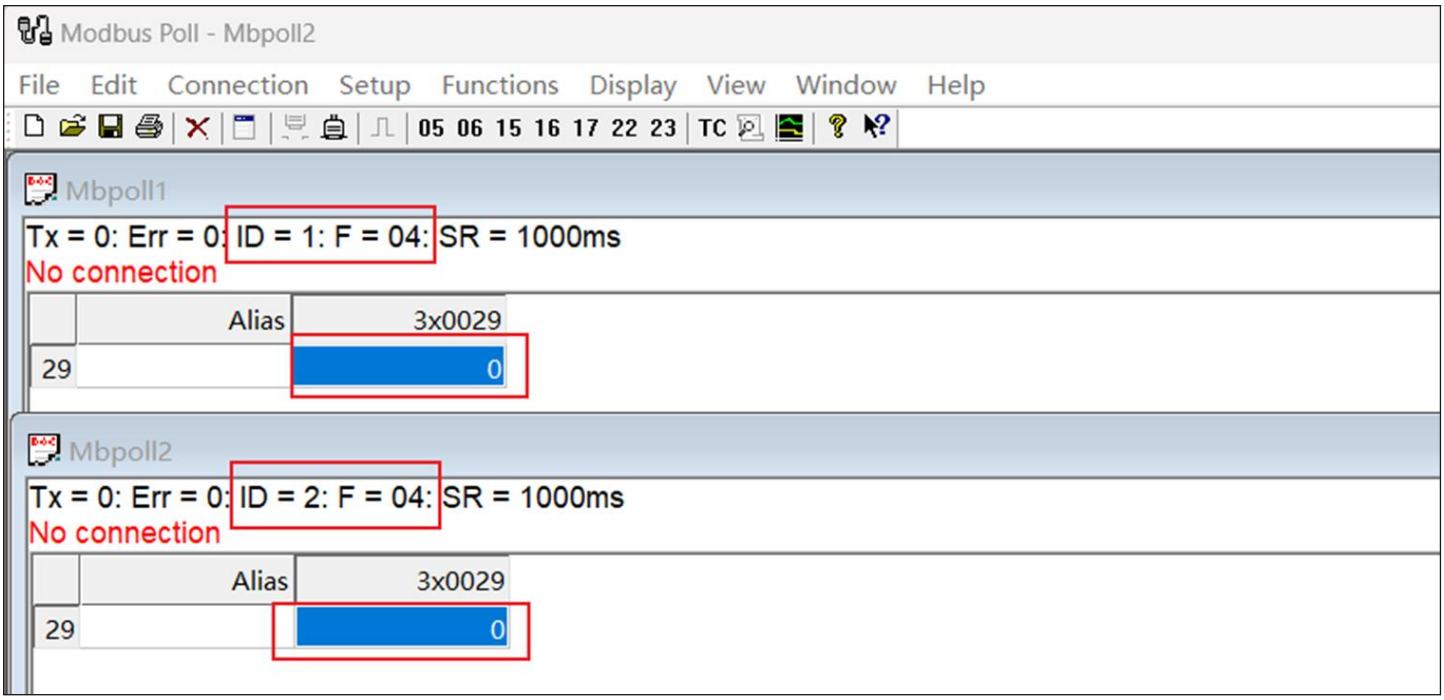
Take care to correctly define the register objects that need to be read and written to. The current illustration defines the Pac registers for the CPS inverter.

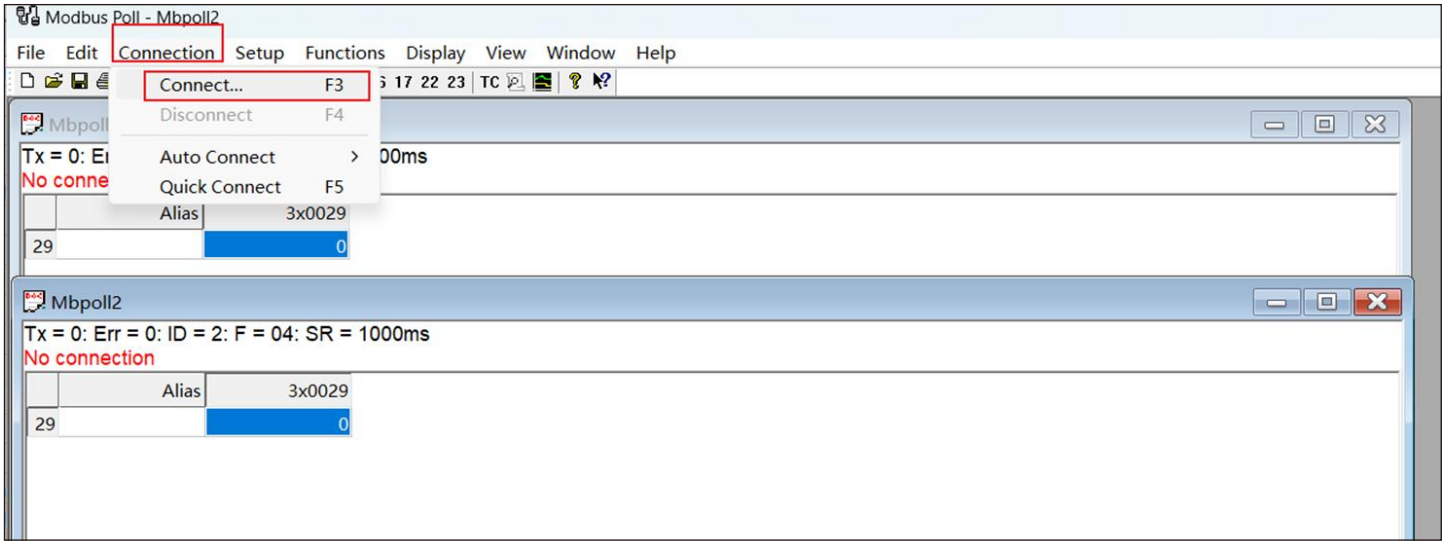




Follow the same procedure to create a read/write interface for Modbus ID 2.

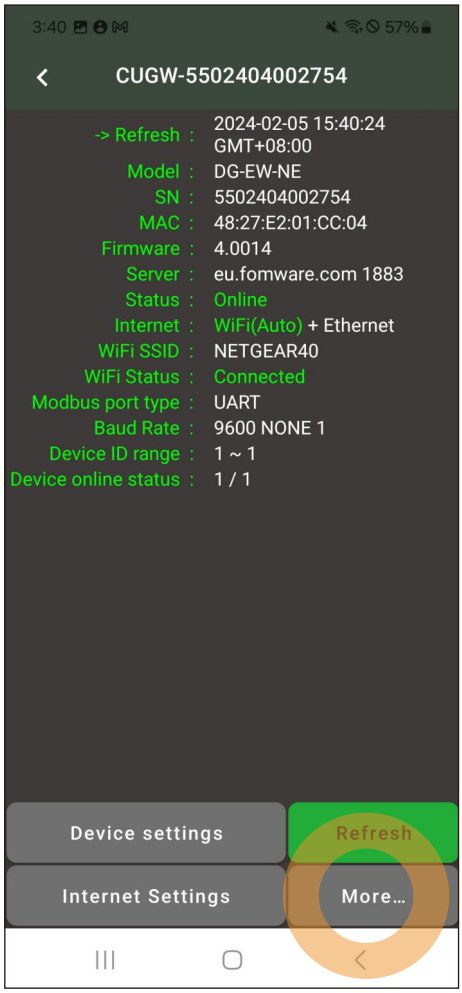
As shown in the figure, the Modbus Poll is ready to perform read and write operations to both Modbus IDs.

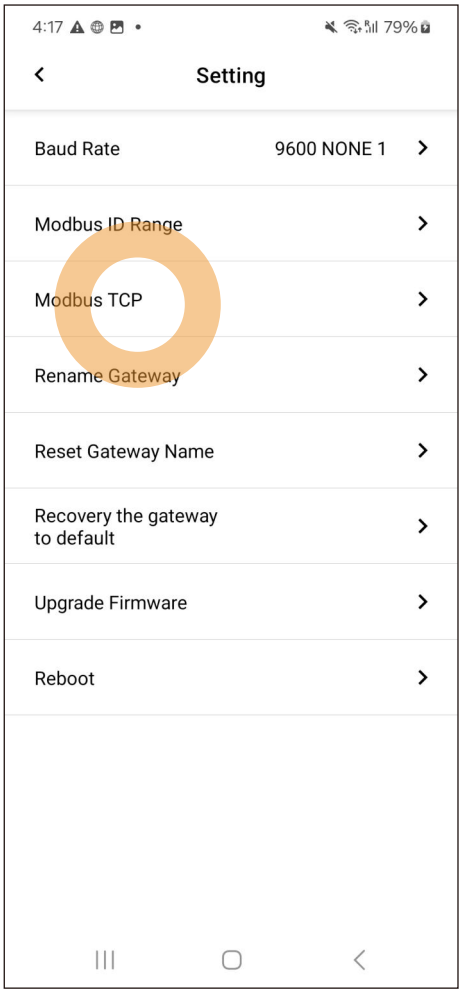


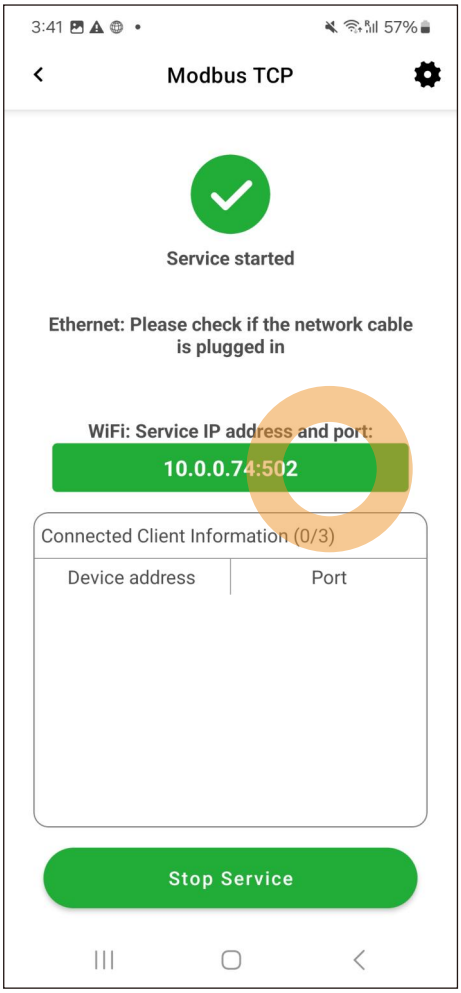


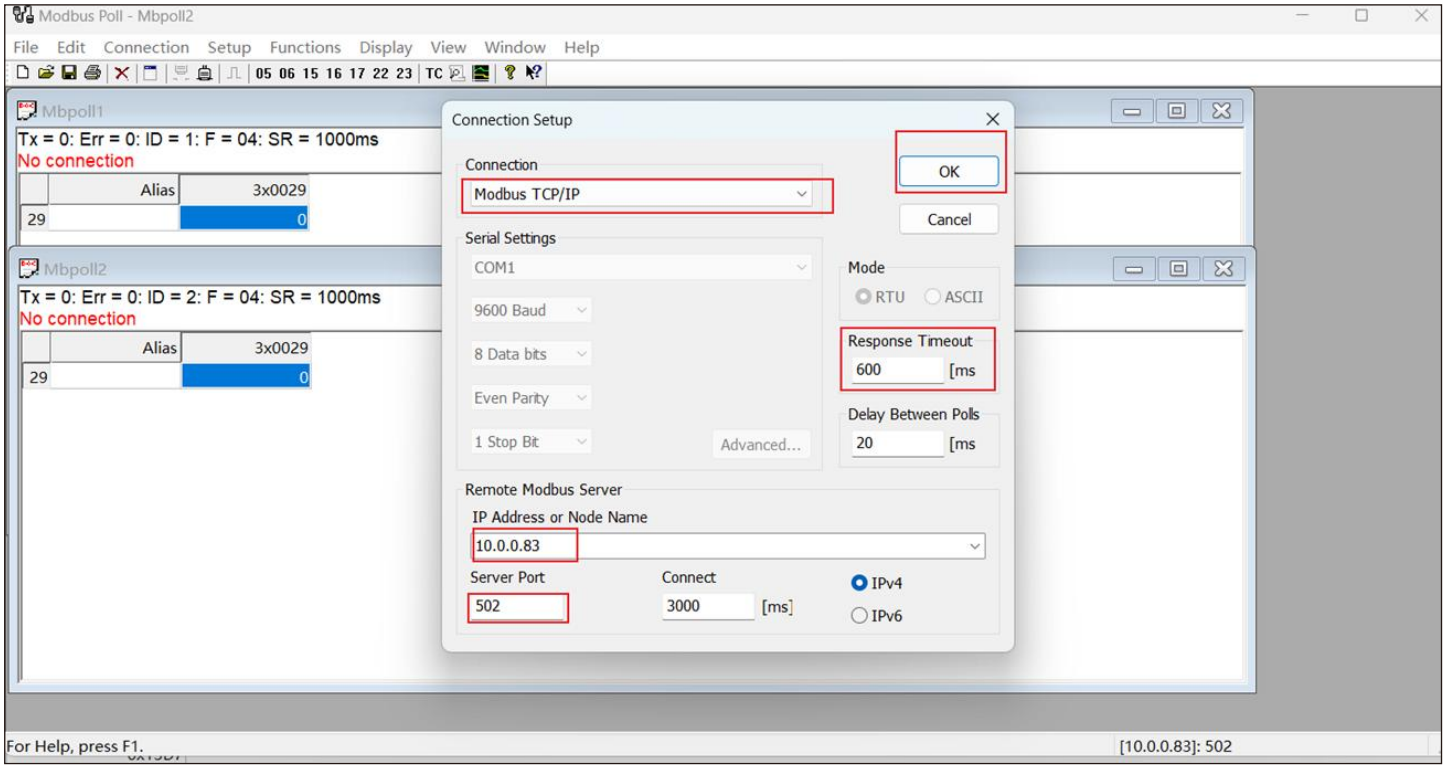
Initiate a Modbus Poll to connect to the Modbus TCP Server (gateway).

You need to know the Modbus TCP Server parameters of the target gateway, and view the operation of WiFi or Ethernet after it has been set to a static IP address via the APP.



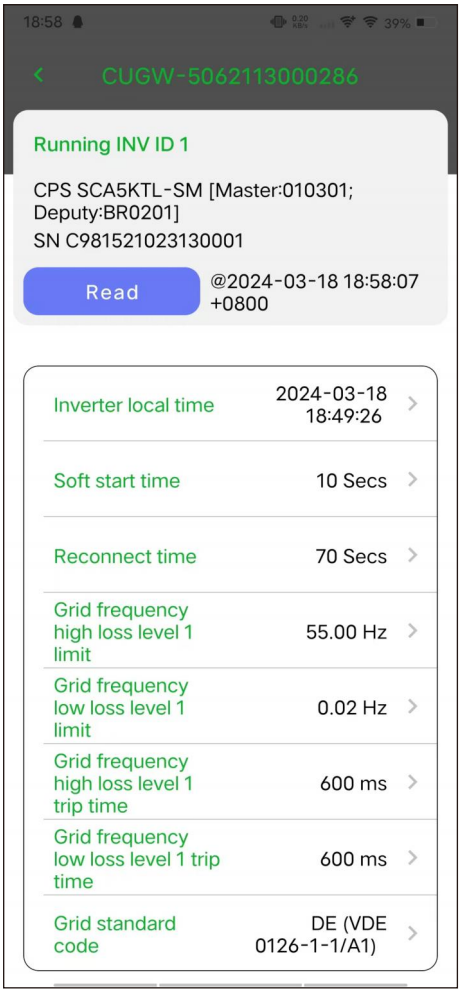


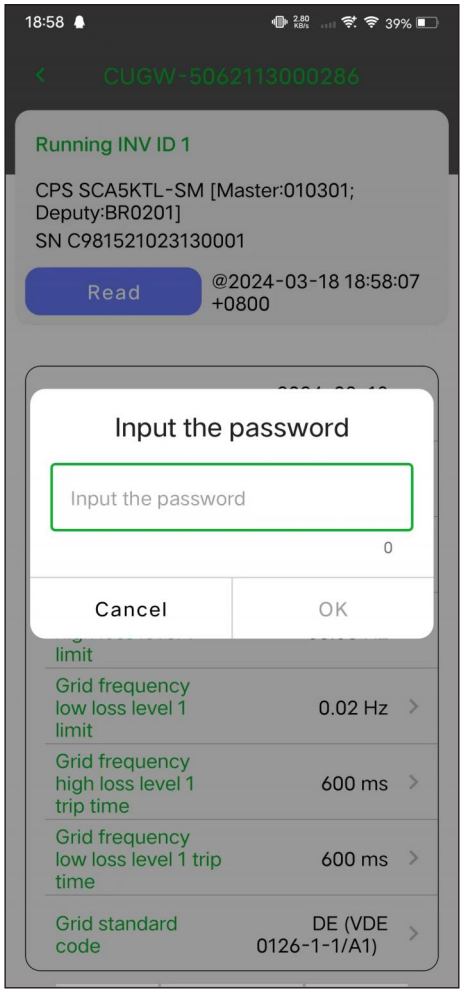




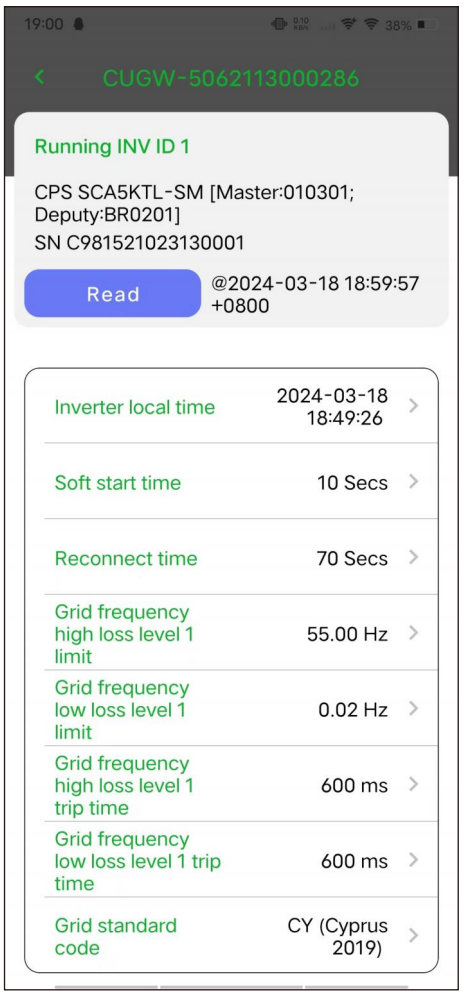
The third party SCADA or Modbus Poll successfully connects to the gateway and the Modbus TCP Client connection can also be viewed on the APP.

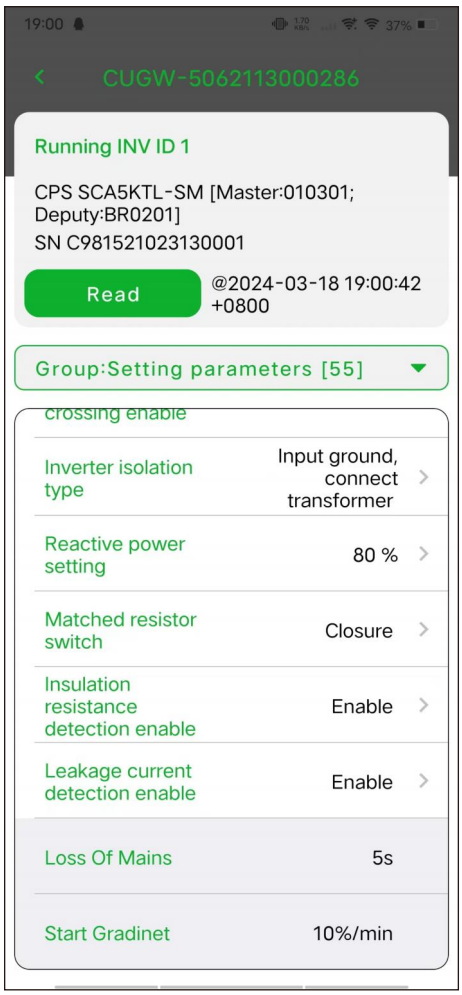
8 Appendix
8.2 Australian specification related



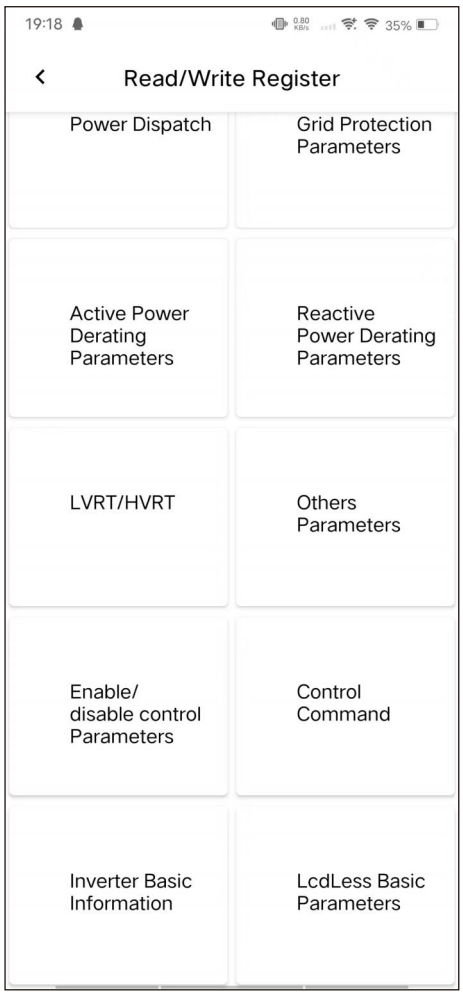


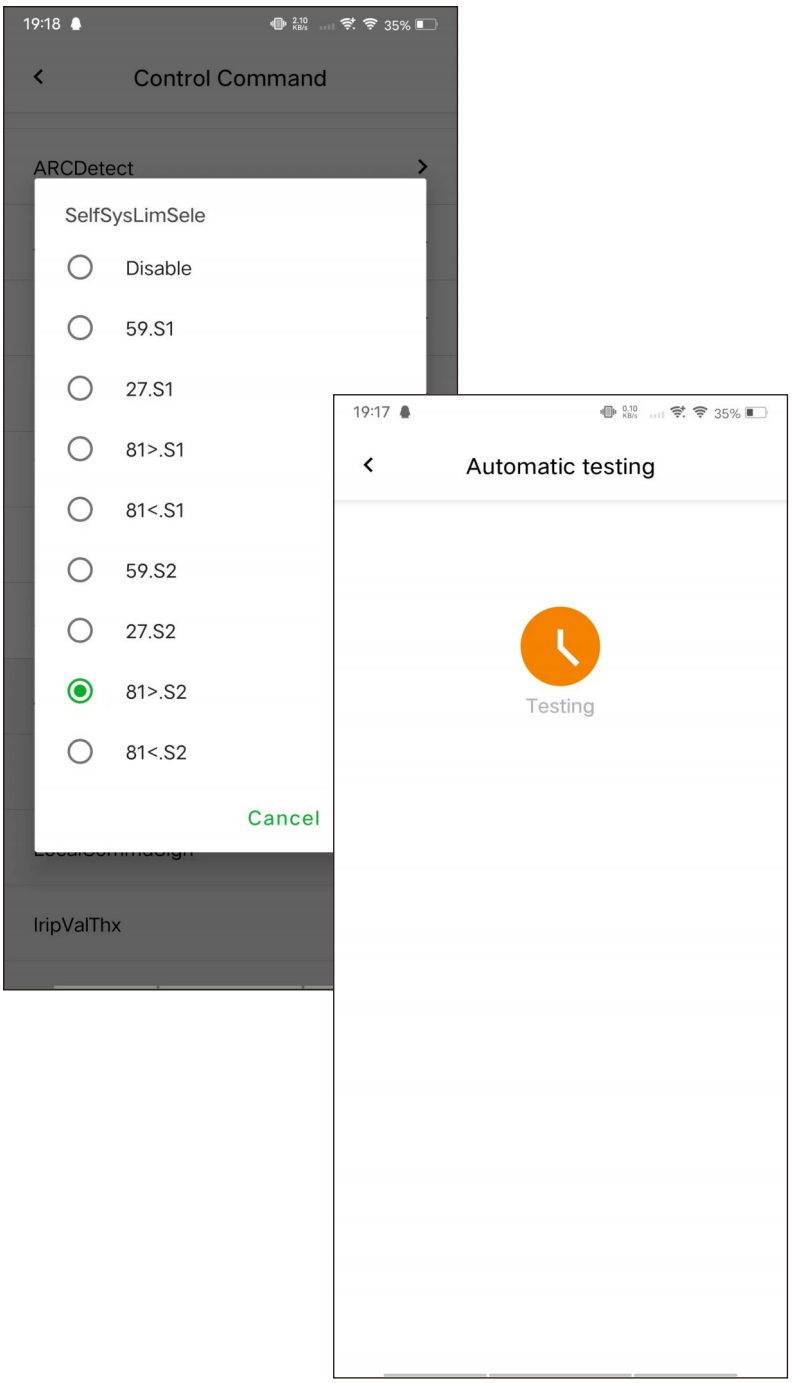
8 Appendix
8.3 Cyprus specification related





8 Appendix
8.4 Italy specification related





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