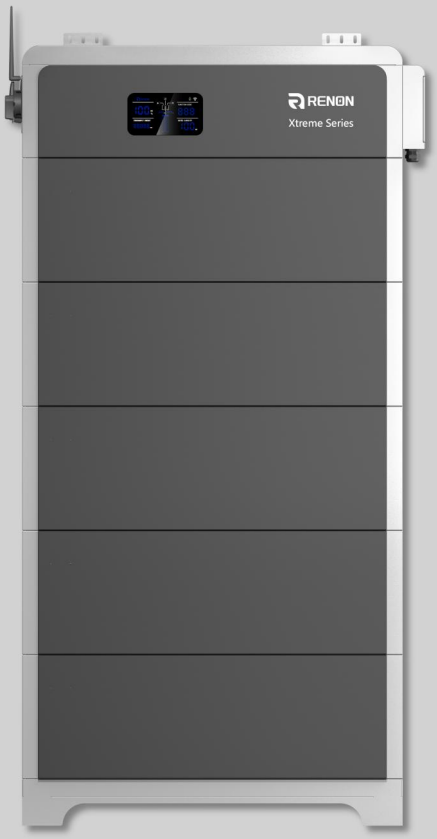
RENON

User Manual

Xtreme HV 1.0

A04 VERSION



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Renon Power USA LLC

Renon Power

We Care About Sustainability

With our own R&D team and automated production factory, we are dedicated to delivering innovative, reliable, and affordable energy storage solutions to customers globally.

At Renon, we believe that sustainable energy is the future. We are passionate about reducing carbon emissions and preserving our planet for future generations. That's why we invest heavily in research and development, leveraging the latest technologies to design and manufacture energy storage systems that are efficient, scalable, and adaptable.

Our products are designed to meet the needs of a wide range of applications, from residential and commercial buildings to industrial facilities and utility-scale projects. Whether you're looking to reduce your energy bills, increase your energy independence, or support your sustainability goals, Renon has the right solution for you.

Our commitment to quality and customer satisfaction is unwavering. We work closely with our clients to understand their unique needs and provide customized solutions that meet or exceed their expectations. We also provide comprehensive technical support, maintenance, and warranty services to ensure that our customers get the most out of their investment.

JOIN US ON OUR MISSION TO MAKE RENEWABLE ENERGY WITHIN REACH.

PROVIDE INNOVATIVE, RELIABLE, AND AFFORDABLE ENERGY STORAGE SOLUTIONS TO CUSTOMERS

Renewable · Reliable · Remarkable

Table of Contents

1. Safety Instructions

For safety reasons, installer and user are responsible for familiarizing themselves with the contents of this document and all warnings before installation and usage.

1.1. General Safety Precautions

- Please carefully read this manual before any work is carried out on the product, and keep it located near the product for future reference.
- All installation and operation must comply with local electrical standards.
- Please ensure the electrical parameters of the product are compatible to related equipment.
- Do not open or dismantle the battery module. Electrolyte is very corrosive. In normal working conditions contact with the electrolyte is impossible. If the battery casing is damaged, do not touch the exposed electrolyte or powder because it is corrosive.
- The electronics inside the product are vulnerable to electrostatic discharge.
- Do not place items or tools on the product.
- Do not damage the product by dropping, deforming, impacting, or cutting.
- Keep the product away from liquid. Do not touch the product if liquid spills on it. There is a risk of electric shock.
- Do not expose the product to flammable or harsh chemicals or vapors.
- Do not paint any part of the product, include any internal or external components.
- Do not change any part of the product, especially the battery and cell.
- Besides connection under this manual, any other foreign object is prohibited from being inserted into any part of the product.
- The warranty claims are excluded for direct or indirect damage due to items above.
- Batteries must not be mixed with domestic or industrial waste.
- Batteries marked with the recycling symbol must be processed via a recognized recycling agency. By agreement, they may be returned to the manufacturer.

1.2. Transportation and Storage Precautions

- The batteries must be transported according to UN3480, they must be packed according to packaging requirements of Special Regulation 230 of IMDG CODE (40-20 Edition) for maritime transport, and P965 IA for air transport (SOC less than 30%). The original packaging complies with these instructions.
- If the product needs to be moved or repaired, the power must be cut off and completely shut down.
- The product must be transported in its original or equivalent package; the battery module must be placed at upright position.
- The modules are heavy. Ensure adequate and secure mounting and always use suitable handling equipment for transportation.
- If the product is in its package, use soft slings to avoid damage.

- Do not stand below the product when it is hoisted.
- During transportation, severe impact, extrusion, direct sunlight, and rain should be avoided.
- Store in a cool and dry place.
- Store the product in clean environment, free of dust, dirt, and debris.
- Store the product out of reach of children and animals.
- Don't store the battery under 50% SOC for over one month. This may result in permanent damage to the battery and violet the warranty.
- During lpng term storage, it is required to charge the battery module every 3 months, and the SOC should be no less than 90%.

1.3. Installation Precautions

- Do not install the product in an airtight enclosure or in an area without ventilation.
- Do not install the product in living areas of dwelling units or in sleeping units other than within utility closets and storage or utility spaces.
- If the product is installed in a garage or carport, ensure there is adequate clearance from vehicles.
- While working on the product wear protective eyeglasses and clothing.
- Handle the battery wearing insulated gloves.
- Use insulated tools. Do not wear any metallic items such as watches, bracelets, etc.
- Turn-off related circuit breakers before and during the installation to avoid electric shock.
- Do not connect any AC conductors or photovoltaic conductors directly to the battery pack. These are only to be connected to the inverter.
- Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.
- Over-voltages or wrong wiring could damage the battery pack and cause combustion which can be extremely dangerous.
- Make sure the product is well grounded, and complies with local specifications. The recommended grounding resistance is less than 1Ω.
- Handle with care because Li-ion Battery is sensitive to mechanical shock.

- N’installez pas le produit dans une enceinte hermétique ni dans un espace non ventilé.
- N’installez pas le produit dans les pièces d’habitation ni dans les chambres, sauf s’il est placé dans un local technique, un placard de service ou un espace de stockage/utilitaire.
- Si le produit est installé dans un garage ou un abri pour voiture, assurez-vous qu’il y ait un dégagement suffisant par rapport aux véhicules.
- Lors de toute intervention sur le produit, portez des lunettes de protection et des vêtements appropriés.
- Manipulez la batterie en portant des gants isolants.

- Utilisez des outils isolés. Ne portez aucun objet métallique tel que montre, bracelet, etc.
- Coupez les disjoncteurs concernés avant et pendant l'installation afin d'éviter tout risque de choc électrique.
- Ne connectez aucun conducteur AC ni conducteur photovoltaïque directement au pack batterie. Ceux-ci doivent être raccordés uniquement à l'onduleur.
- Le câblage doit être correct : ne confondez pas les câbles positif et négatif et assurez-vous qu'il n'y ait aucun court-circuit avec un équipement externe.
- Les surtensions ou un mauvais câblage peuvent endommager le pack batterie et provoquer une combustion, ce qui peut être extrêmement dangereux.
- Assurez-vous que le produit est correctement mis à la terre et conforme aux réglementations locales. La résistance de mise à la terre recommandée est inférieure à 1 Ω.
- Manipulez avec précaution, car la batterie Li-ion est sensible aux chocs mécaniques.

1.4. Usage Precautions

- Before starting the system, the operator should strictly check the connection terminals to ensure that the terminals are firmly connected.
- If there's a circuit breaker between battery and inverter, the breaker is supposed to be on before powering on the battery.
- Do not open the product, connect, or disconnect any wires when it's working to avoid electric shock.
- Battery needs to be recharged within 12 hours after fully discharging.
- The default temperature range over which the battery can be discharged is -4℉ (-20℃) to 122℉ (50℃). Frequently discharging the battery in high or low temperature may deteriorate the performance and life of the battery pack.
- The default temperature range over which the battery can be charged is 32℉(0℃) to 122℉ (50℃). Frequently charging the battery in high or low temperature may deteriorate the performance and life of the battery pack.
- Do not charge or discharge a damaged battery.
- Please contact the supplier within 24 hours if there is something abnormal.

- Avant de démarrer le système, l'opérateur doit vérifier rigoureusement les bornes de connexion afin de s'assurer qu'elles sont solidement fixées.
- S'il existe un disjoncteur entre la batterie et l'onduleur, celui-ci doit être en position marche avant la mise sous tension de la batterie.
- N'ouvrez pas le produit et ne connectez ni ne déconnectez aucun câble lorsqu'il est en fonctionnement afin d'éviter tout risque de choc électrique.
- La batterie doit être rechargée dans les 12 heures suivant une décharge complète.
- La plage de température par défaut pour la décharge de la batterie est de -4 ℉ (-20 ℃) à 122 ℉ (50 ℃). Des décharges fréquentes à des températures élevées ou basses peuvent détériorer les performances et la durée de vie du pack batterie.

- La plage de température par défaut pour la charge de la batterie est de 32 ℉ (0 ℃) à 122 ℉ (50 ℃). Des charges fréquentes à des températures élevées ou basses peuvent détériorer les performances et la durée de vie du pack batterie.
- Ne chargez ni ne déchargez une batterie endommagée.
- Veuillez contacter le fournisseur dans les 24 heures en cas d'anomalie.

1.5. Response to Emergency Situations

- Damaged batteries are dangerous and must be handled with extreme care. They are not suitable for use and may cause danger to people or property. If the battery pack appears to be damaged, place it in the original container and return it to an authorized dealer.
- If the battery pack is wet or submerged in water, do not allow anyone to touch the water, and then contact authorized dealer for technical support.
- In case of fire, use Fluoroketone Fire Extinguisher, Water Mist Fire Extinguisher or CO_2 Fire Extinguisher; If possible, move the battery pack to a safe area before it catches fire.
- If a user happens to be exposed to the internal materials of the battery cell due to damage on the outer casing, the following actions are recommended.
- In case of inhalation: Leave the contaminated area immediately and seek medical attention.
- In case of contact with eyes: Rinse eyes with running water for 15 minutes and seek medical attention.
- In case of contact with skin: Wash the contacted area with soap thoroughly and seek medical attention.
- In case of ingestion: Induce vomiting and seek medical attention.

1.6. Qualified Personnel

The installation guide part described herein is intended for use by skilled staff only. Skilled staff is defined as a trained and qualified electrician or installer who has all the following skills and experience:

- Knowledge of battery specification and properties.
- Knowledge of the installation of electrical devices.
- Knowledge of torsion and screwdrivers for different types of screws.
- Knowledge of local installation standards.
- Electrical license for battery installation required by the country or state.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of and adherence to this guide and all safety precautions and best practices.

For safety reasons, installers are responsible for familiarizing themselves with the contents of this document and all warnings before performing installation and usage.

2. Preparation before Installation

2.1. Safe Handling Guide

2.1.1. Familiarize Yourself with the Battery

Be careful when unpacking the system. Every module of the product is heavy. Don't lift them with a pole. The weight of the modules can be found in the chapter "**Specifications**".

Familiarize yourself with the battery. The battery poles are located on the top and bottom sides of the battery module. It's designed of fast mounting and simplicity, no need to recognize the positive and negative poles, but take care of them especially the bottom one.

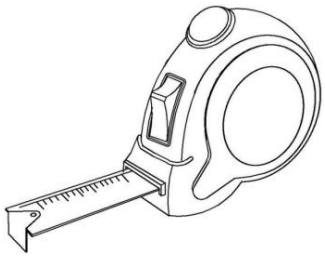
2.1.2. Precautions

Before installation, be sure to read the contents in chapter "**Safety Precautions**", which is related to the operation safety of installation personnel, please pay attention to it.

2.1.3. Tools

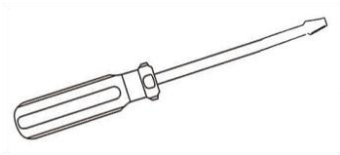
The following tools are required to install the product:

Cordless Drill

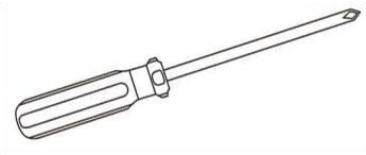


Measuring Tape

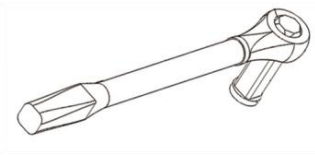
Pencil or Marker



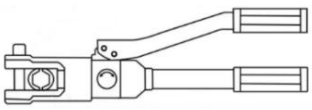
Flathead Screwdriver



Phillips Screwdriver



Torque Wrench



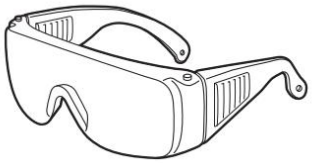
Hydraulic Clamp

Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.

2.1.4. Safety Gear

It is recommended to wear the following safety gear when dealing with the product:

Insulated gloves



Safety goggles

Safety shoes

2.2. System Premeasurement

The battery requires adequate clearance for installation, cabling and airflow. The minimum clearance for system configuration is given below. The cable connected between battery pack and inverter should be in accordance with the installation guide or manual of the inverter.

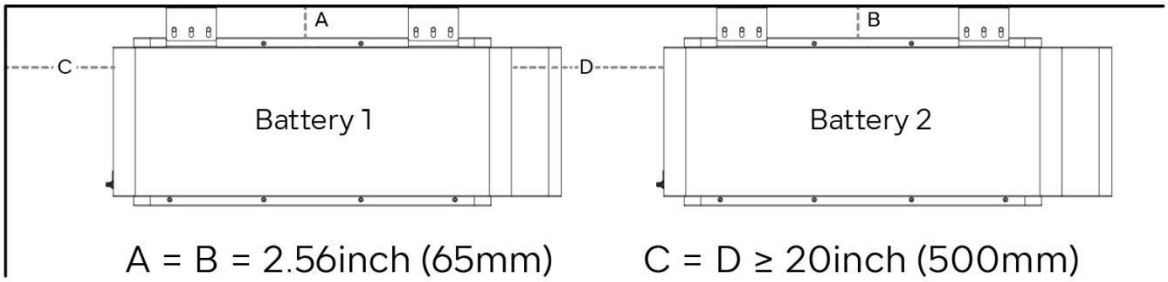


Figure 2.2.1. System clearance

2.3. Installation location

Make sure that the installation location meets the following conditions:

- The floor is flat and level.
- The surface of the wall is smooth and perpendicular to the ground, which can bear the weight.
- The area is completely water proof.
- The area shall avoid direct sunlight.
- There are no flammable or explosive materials.
- The distance from heat source is more than 80 in (2m).
- The ambient temperature should not exceed the range of battery usage temperature.
- The humidity should not exceed the range of battery usage humidity.
- There is minimal dust and dirt in the area.
- Avoid installation in an area confined or with high salinity.

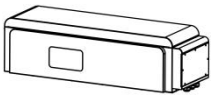
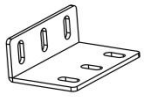
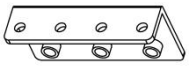
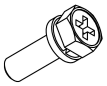
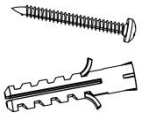
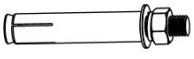
- Do not install outside directly.
- Do not place in an area accessible to children or pets.

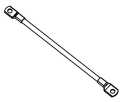
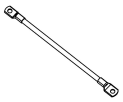
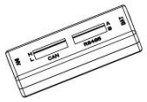
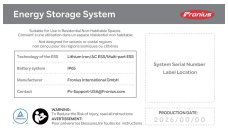
2.4. Package Items

After receiving the product, please unpack the boxes, and check product and packing list first. If product is damaged or lacks parts, please contact the local retailer.

Here is the Xtreme HV Packing List:

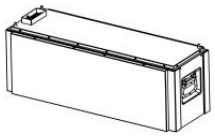
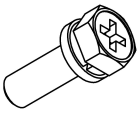
(1) Main controller:

No.	Item	Specification	Qty	Usage	Diagram
1	Main controller	32.3*10.6*9 in /820*270*229 mm	1	Controller of the battery cluster	
2	Base	30.5*9.4*4.8 in /775*238*121.5 mm	1	Bottom base of the battery cluster	
3	Mounting bracket A	3.1*2.2*1.2 in /80*55*30 mm	2	Mounted at the rear of the controller, used to stabilize the cluster	
4	Mounting bracket B	3.1*1.6*0.9 in /80*40*22 mm	2	Combine the mounting bracket A to wall, used to stabilize the cluster	
5	Screw	Stainless steel M4*12 triple combination	8	Fasten mounting bracket A to controller， fix the side panel connector to the bottom base	
6	Screw	Stainless steel M6*16 triple combination	6	Fasten mounting bracket B to A	
7	Screw	Stainless steel M4*10	8	Side plate fixing screws	
8	Screw	Plastic expansion screw 10*60	6	Fasten mounting bracket B to wall	
9	Screw	Stainless steel expansion screw M8*80	4	Fasten base to floor	
10	WIFI antenna	2.4GHz L-type	1	Connect with internet	

11	User manual	Xtreme HV series	1	User manual	
12	Quick installation manual	Xtreme HV series	1	Installation manual	
13	Positive power cable (customizable)	Red, 6AWG, with RNB14-6S terminals on both side, 59.06 in (1.5m)	1	Connect positive pole of battery and inverter	
14	Negative power cable (customizable)	Black, 6AWG, with RNB14-6S terminals on both side, 59.06 in (1.5m)	1	Connect negative pole of battery and inverter	
15	Communication cable(optional)	Standard RJ45 network cable, 7.87 in (200mm)*1, 78.74 in (2000 mm)*1	2	Connect the communication pole of battery and inverter	
16	Pin order select box (optional)	3.3*1.0*0.9 in /85*26*22 mm	1	Set the pin order of the communication cable of battery and inverter, cooperate with 2 standard network cable	
17	Allen key	M4	1	Tighten the screws on the side cover of the main controller	
18	Pedestal layer	163x15, SPCC, T=2	2	Under aluminum side panel	
19	Main control layer	163x26, Aluminum, T=4.5	2	Main control sides	
20	Communication cable	RJ45, L = 78.74 in (2m)	1	Parallel communication cable	
21	OT terminal	RNB14-6	2	Use for power cable	
22	Label	5.12 x 3.15 in (130 x 80 mm)	1	Sticks on the actual corresponding position of battery	
23	Label	1.58 x 1.58 in (40 x 40 mm)	1	Sticks on the master side panel cover	

24	Communication cable(optional)	2C*22AWG, 157.48 in (4000mm)	1	Connect the communication pole of battery and inverter	

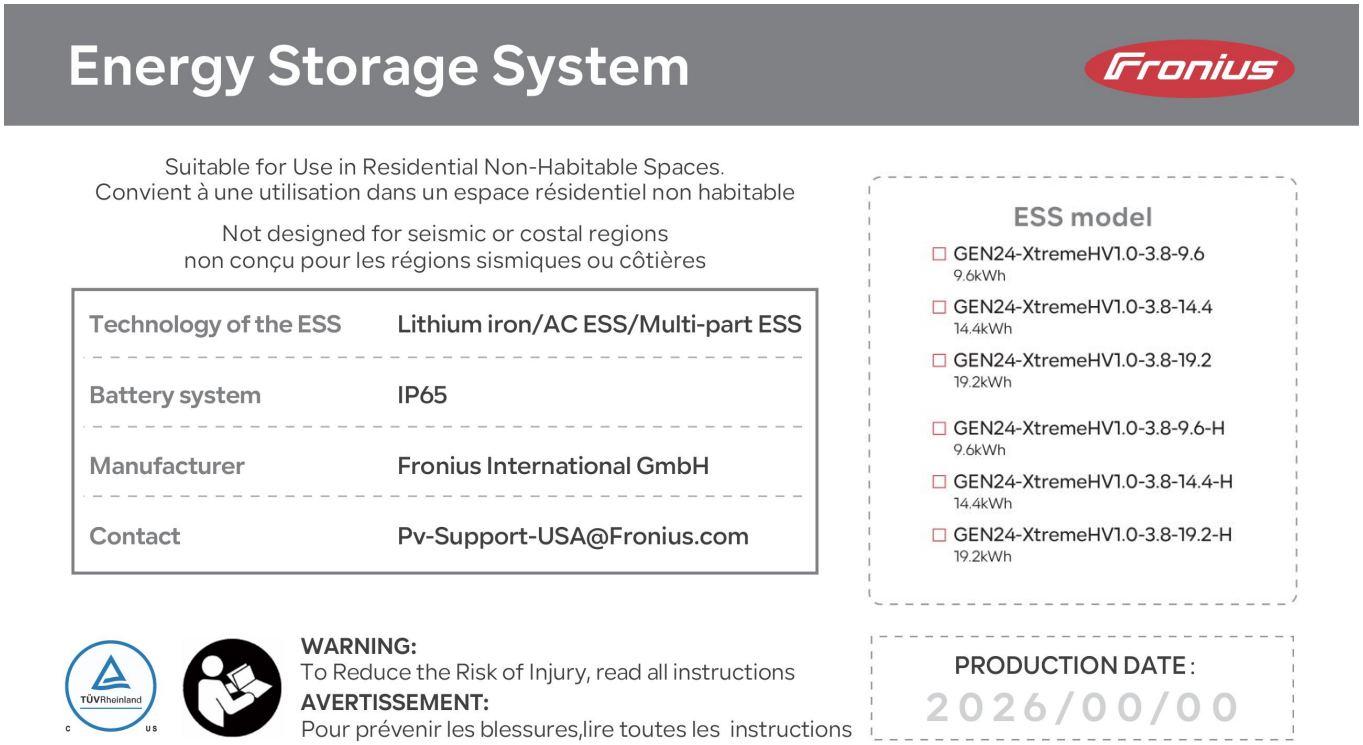
(2) Battery module:

No.	Item	Specification	Qty	Usage	Diagram
1	Battery module	30.5*10.6*11 in /775*270*279 mm	1	Storage of cells	
2	Screw	M4*10 screws with collar	4	Side plate fixing screws	
3	Side plate	10.4*6.5*0.2 in /264.8*164*4.5 mm	2	To fix the battery modules	

2.5. Label

Inverter label: Select the corresponding small labels for the model, affix and check them in the designated areas on the system label, and finally attach the system label to an appropriate location on the inverter.

Note: The inverter system label and the multiple small labels of the inverter system must be used in combination.



3. Installation

3.1. Device Installation

1) Preparation of main control: Fastened 2 mounting brackets A to the top back of the controller and screw those properly.

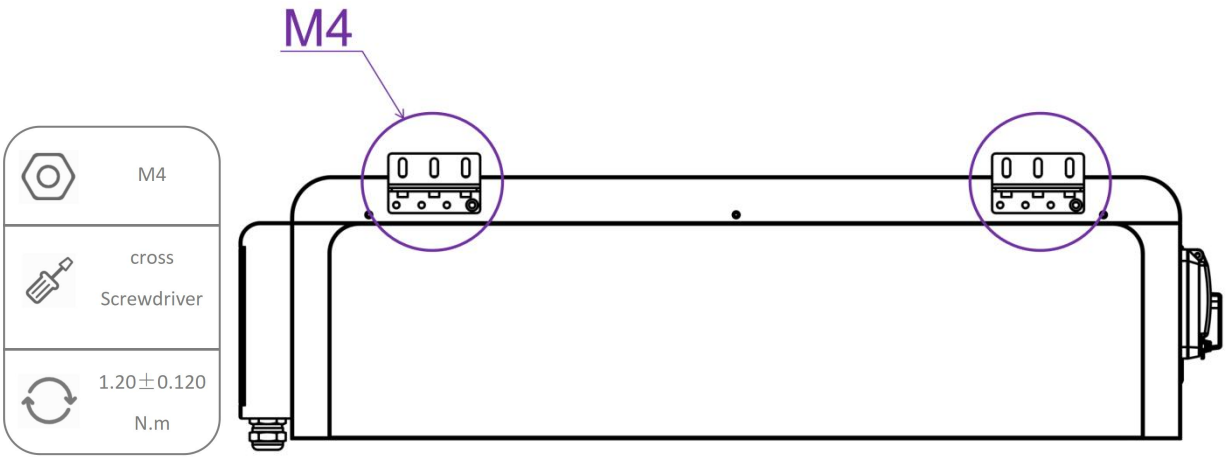


Figure 3.1.1. Fasten the mounting bracket A

Preparation of the module: Fastened 2 mounting brackets B to mounting bracket A and screw those properly.

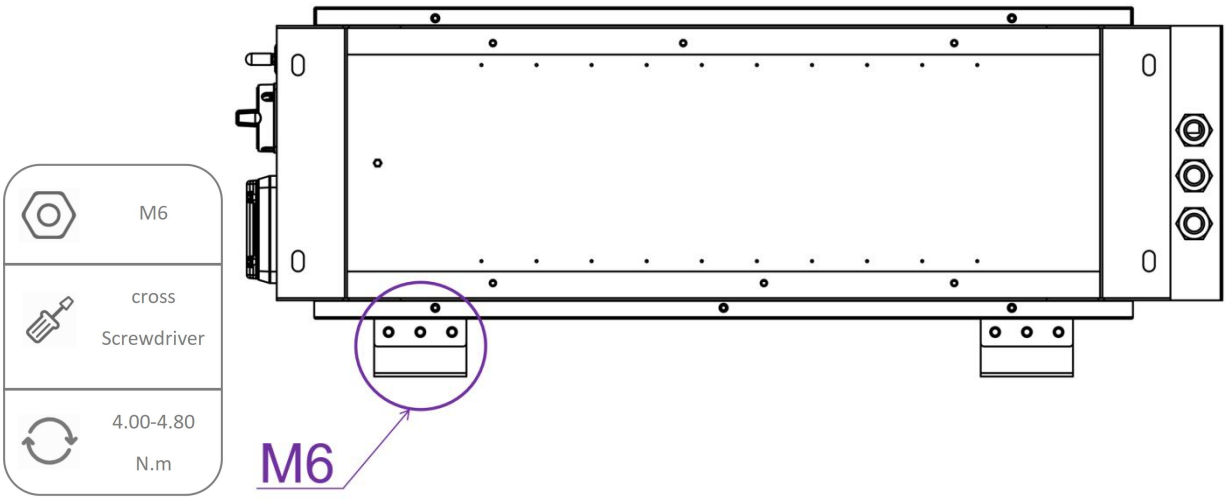


Figure 3.1.2. Fasten the mounting bracket B

2) Place the base on the floor be close to the wall 2.08 in (53mm), the connector of the base should be placed at the left side.

Figure 3.1.3. Put the base on the floor

3) Fasten the 4 mounting holes of the base on the floor in a stable condition.

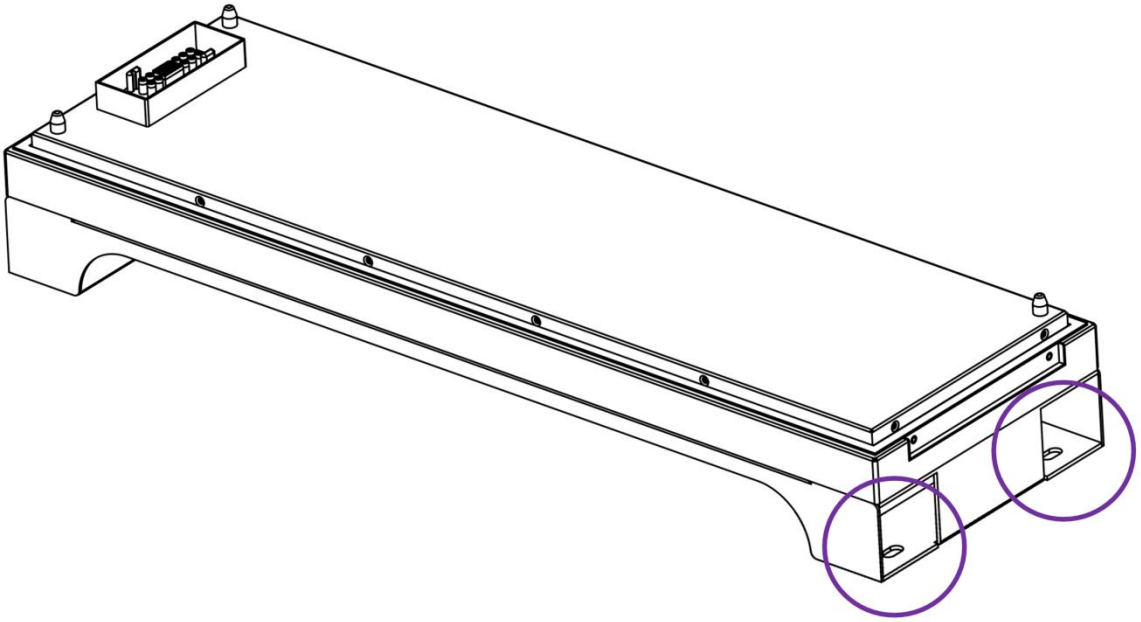


Figure 3.1.4. Mounting holes of the base

4) Stack up the battery modules, and then place the main control on the top finally. There are protective patches on both top and bottom of the connectors, please tear off them before stack.

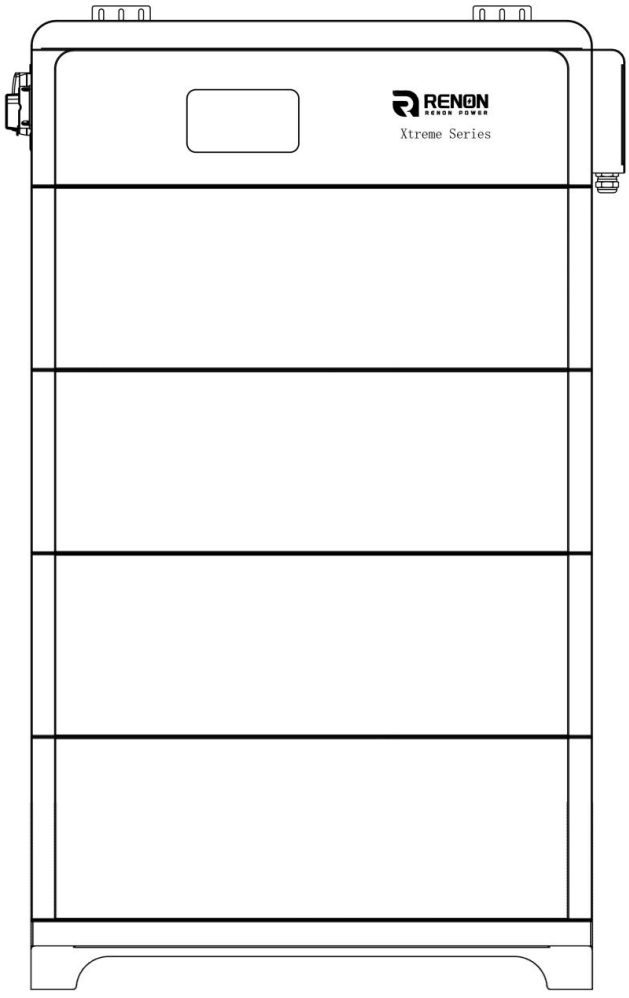


Figure 3.1.5. Stacked product (4 modules)

5) Fasten the 6 mounting holes of the mounting bracket B on the wall in a stable condition.

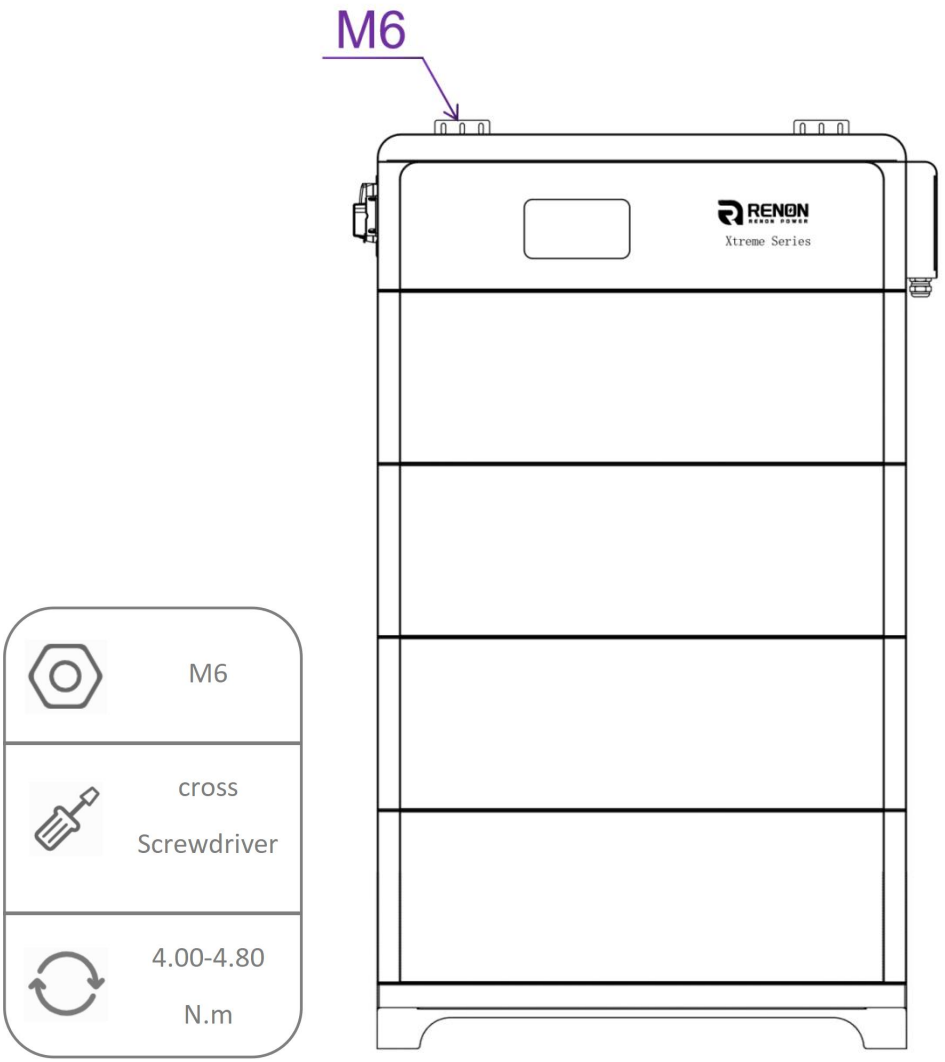


Figure 3.1.6. Mounting battery to the wall

6) Install the pedestal layer between the bottom battery module and the base.

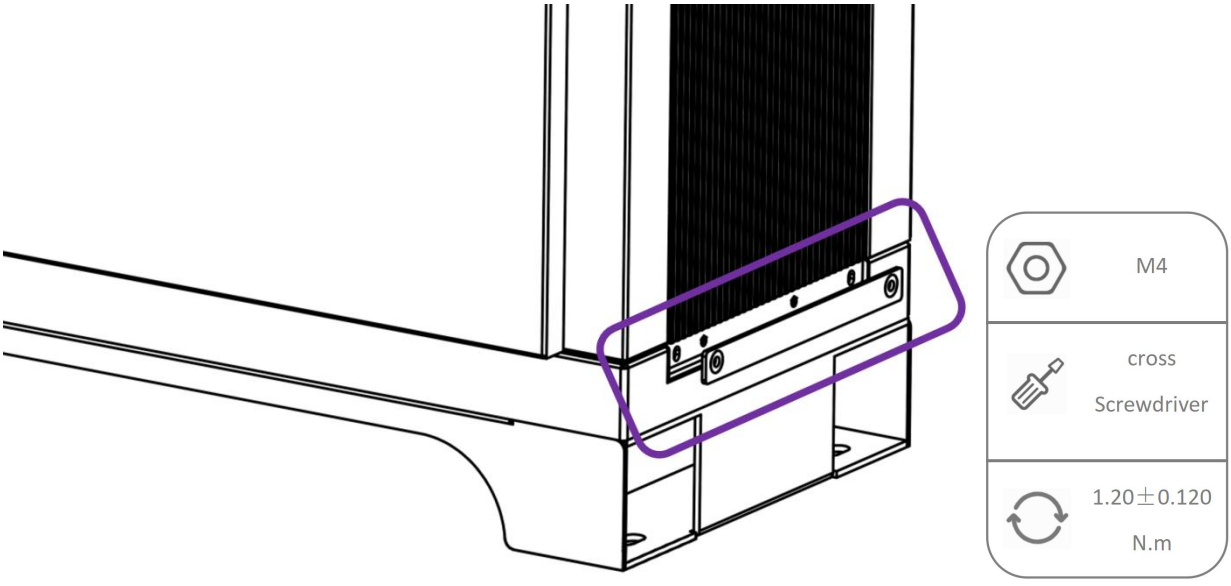


Figure 3.1.7. Mounting side panel connector

7) Screw the side plate to the side of each battery modules and make sure it is attached and screw properly.

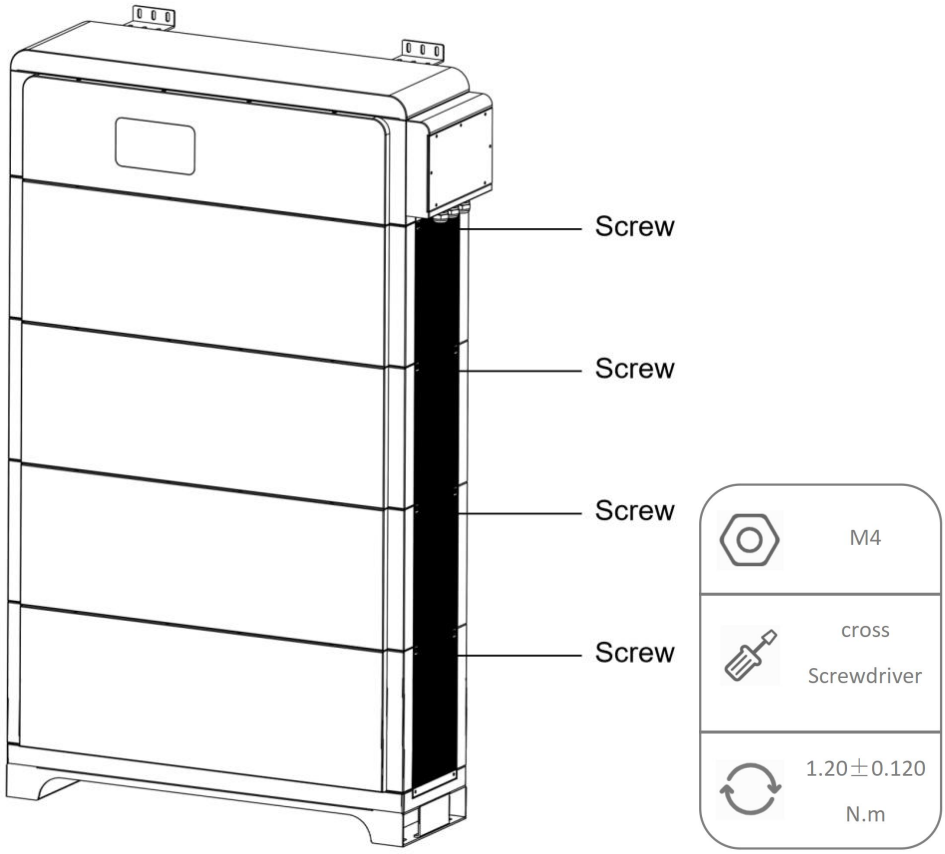


Figure 3.1.8. Install diagram of the mounting brackets

8) Install WiFi antenna

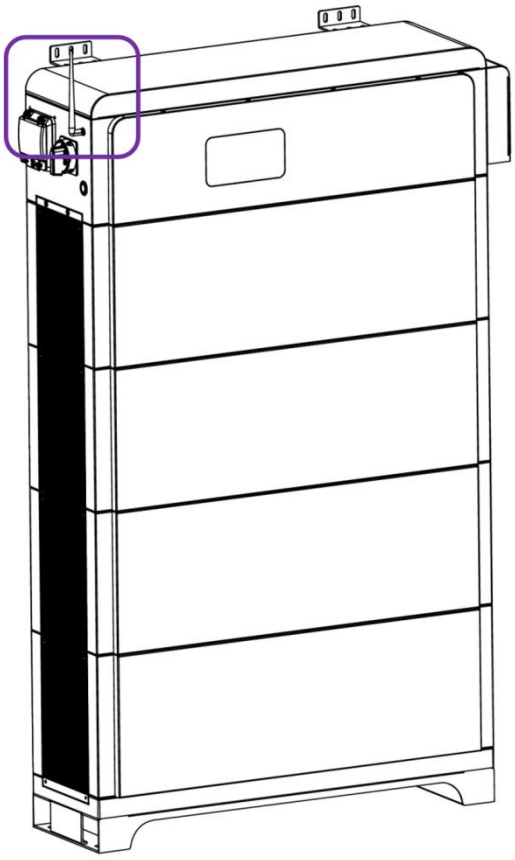


Figure 3.1.9. Install WiFi antenna

3.2. Connections of Cable and Power

1) Remove the side panel.

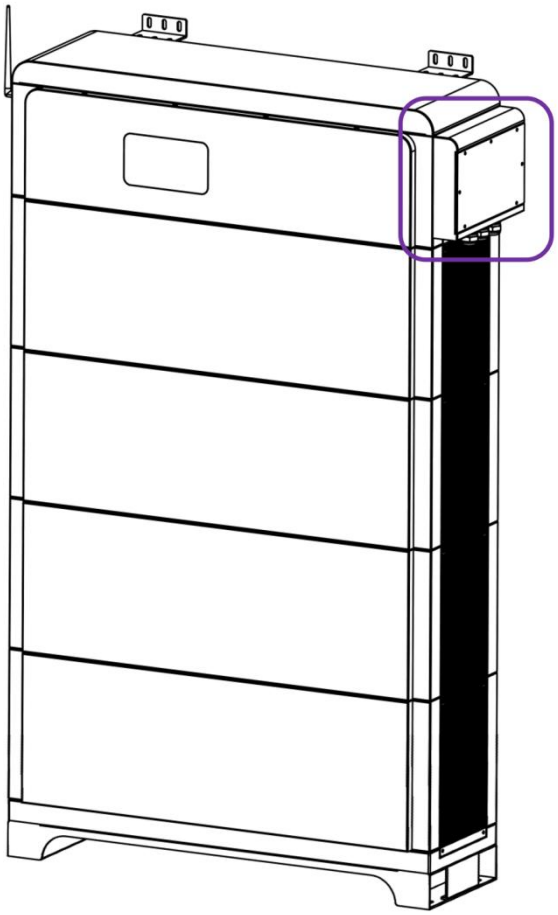


Figure 3.2.1. Side panel

2) Connect the ground wire as the diagram shown below.

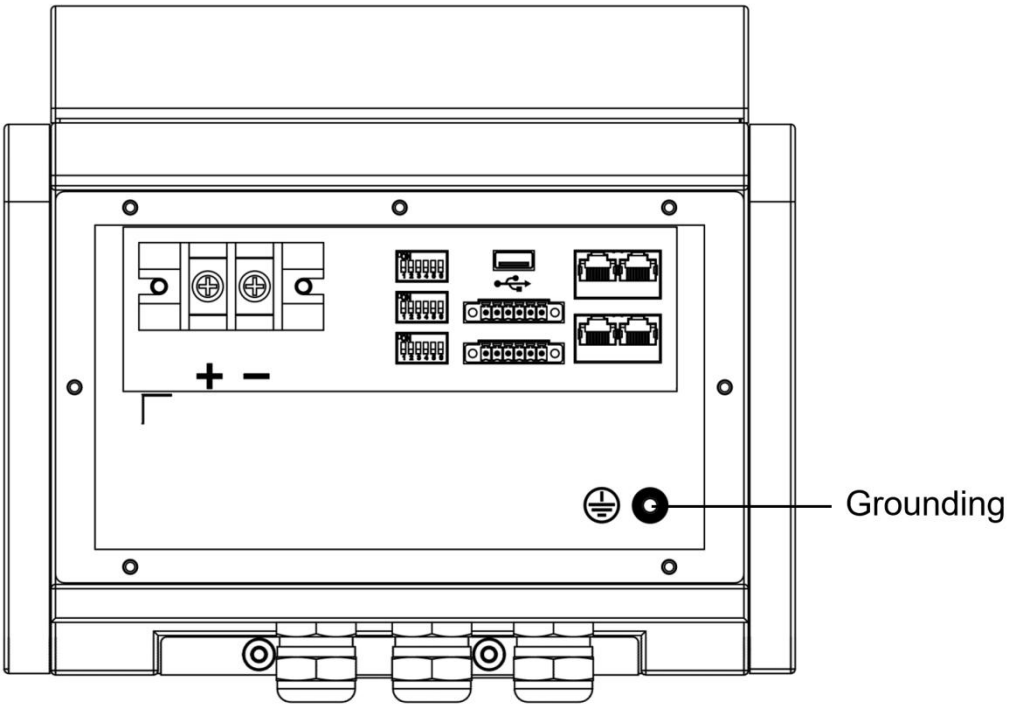


Figure 3.2.2. Ground cable connection

3) Connect to inverter’s negative and positive terminals.

Terminal type: 6 AWG

Torsion: 10N.m

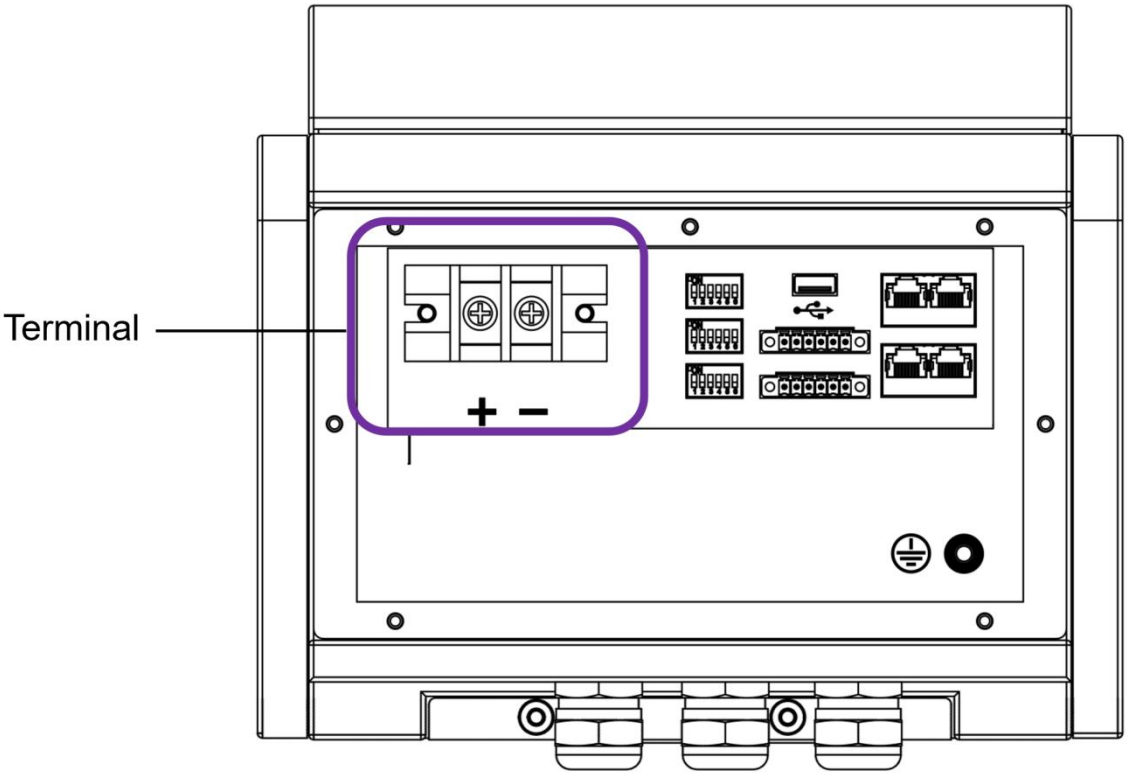


Figure 3.2.3. Positive & Negative

4) Communication cable connection

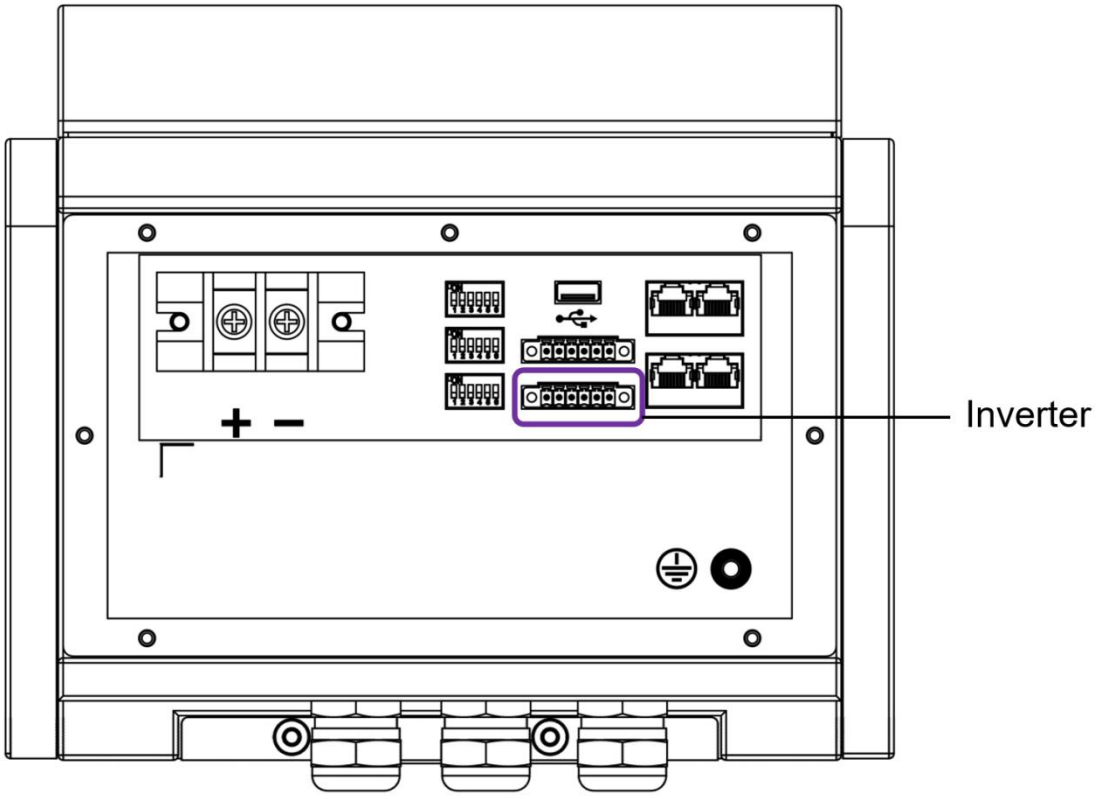


Figure 3.2.4. Inverter port

5) Dial code setting

Step 1: Please refer to the 5.4.1 Inverter Dial Switch for inverter configuration.

Step 2: Please refer to the 5.4.3 Address Dial Switch for address configuration.

Step 3: Please refer to the 5.4.2 Function Dial Switch for function configuration.

Note: The parameters of the circuit breaker are for reference only for a single inverter operating at 20°C and below 2000m altitude. If used in other environments or with multiple inverters in parallel, it is recommended to reselect the model based on actual requirements.

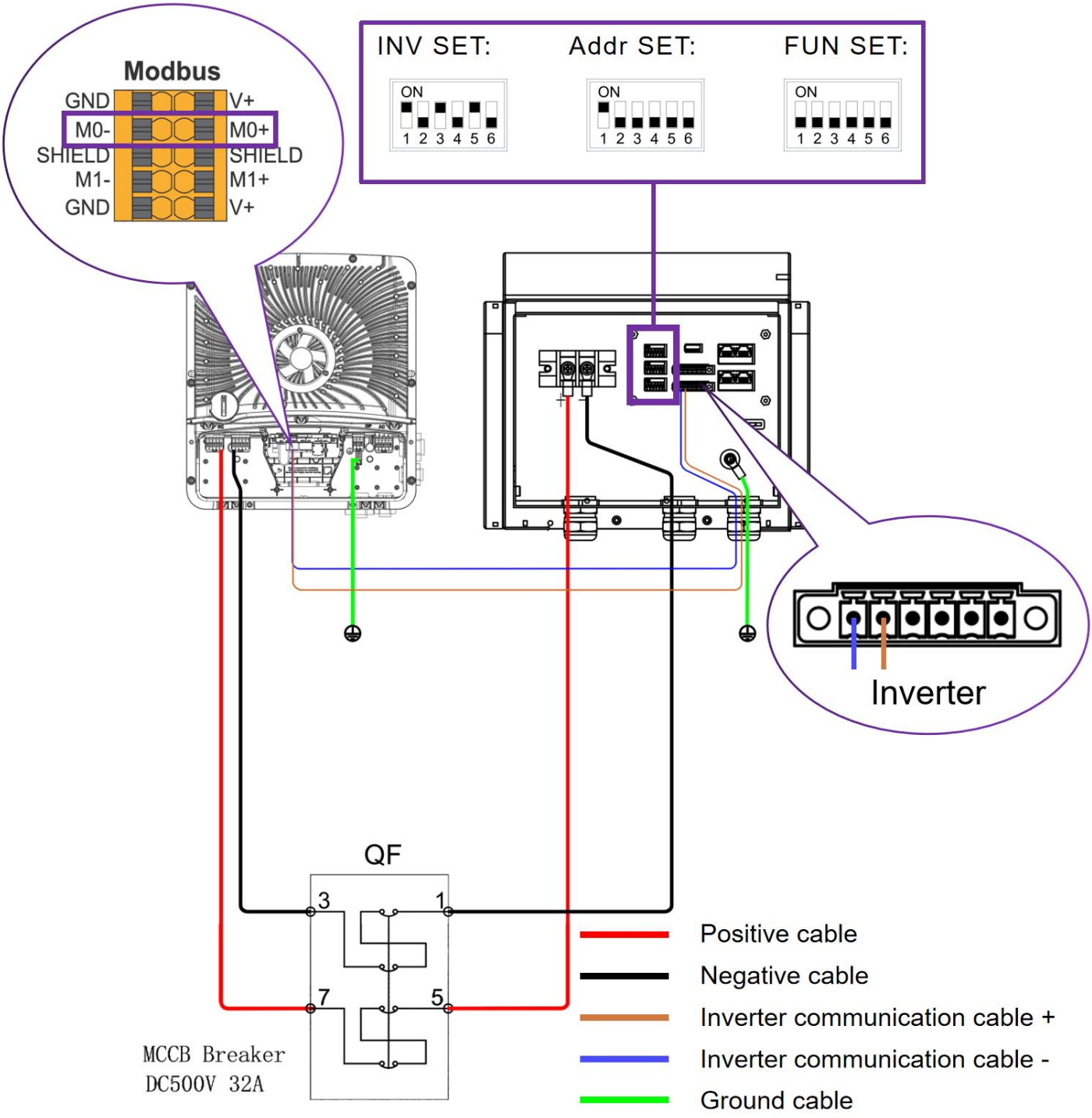


Figure 3.2.5. Dial code setting

3.3. Parallel

3.3.1. Two Batteries

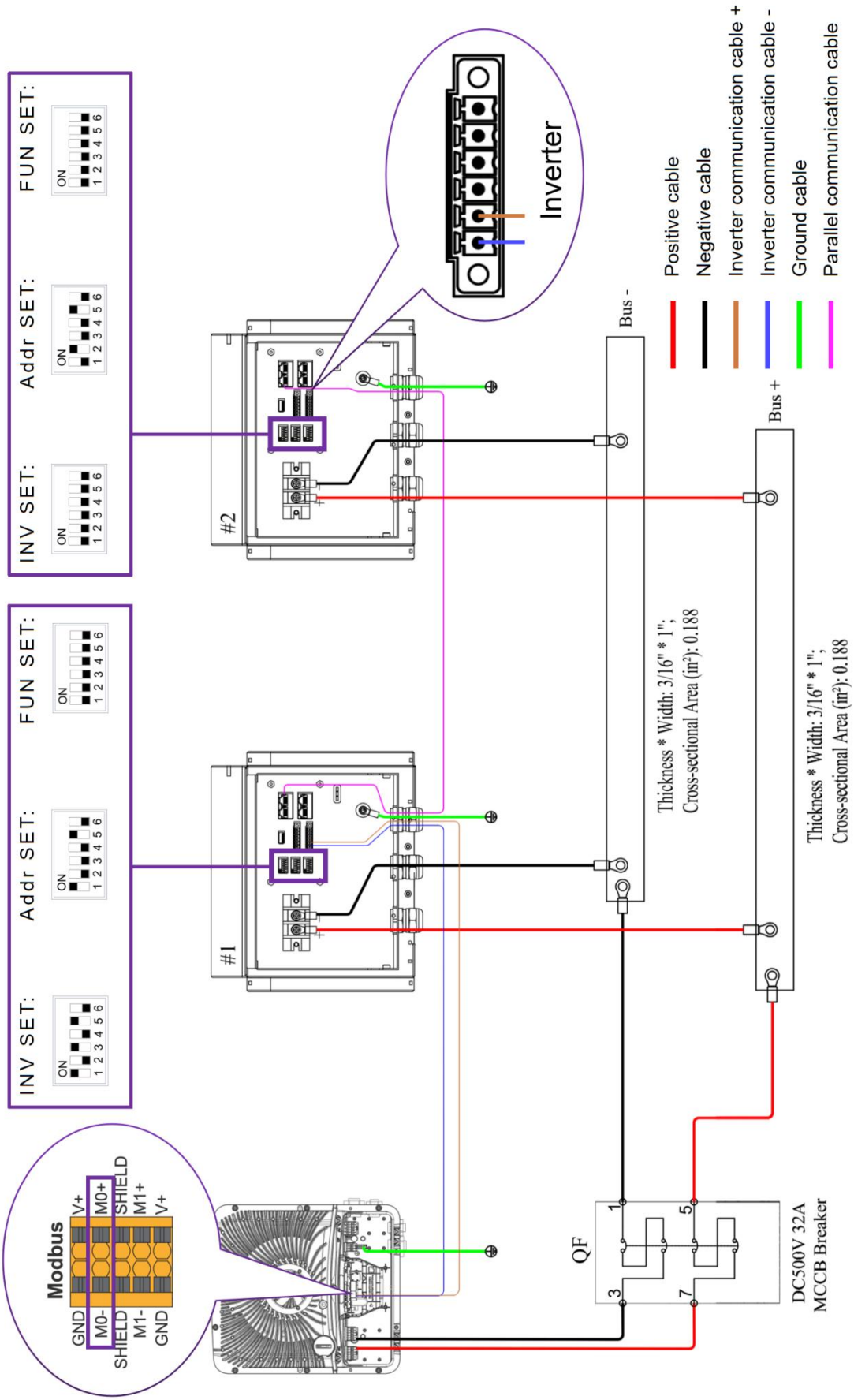


Figure 3.3.1. Two batteries in parallel

3.3.2. Three Batteries

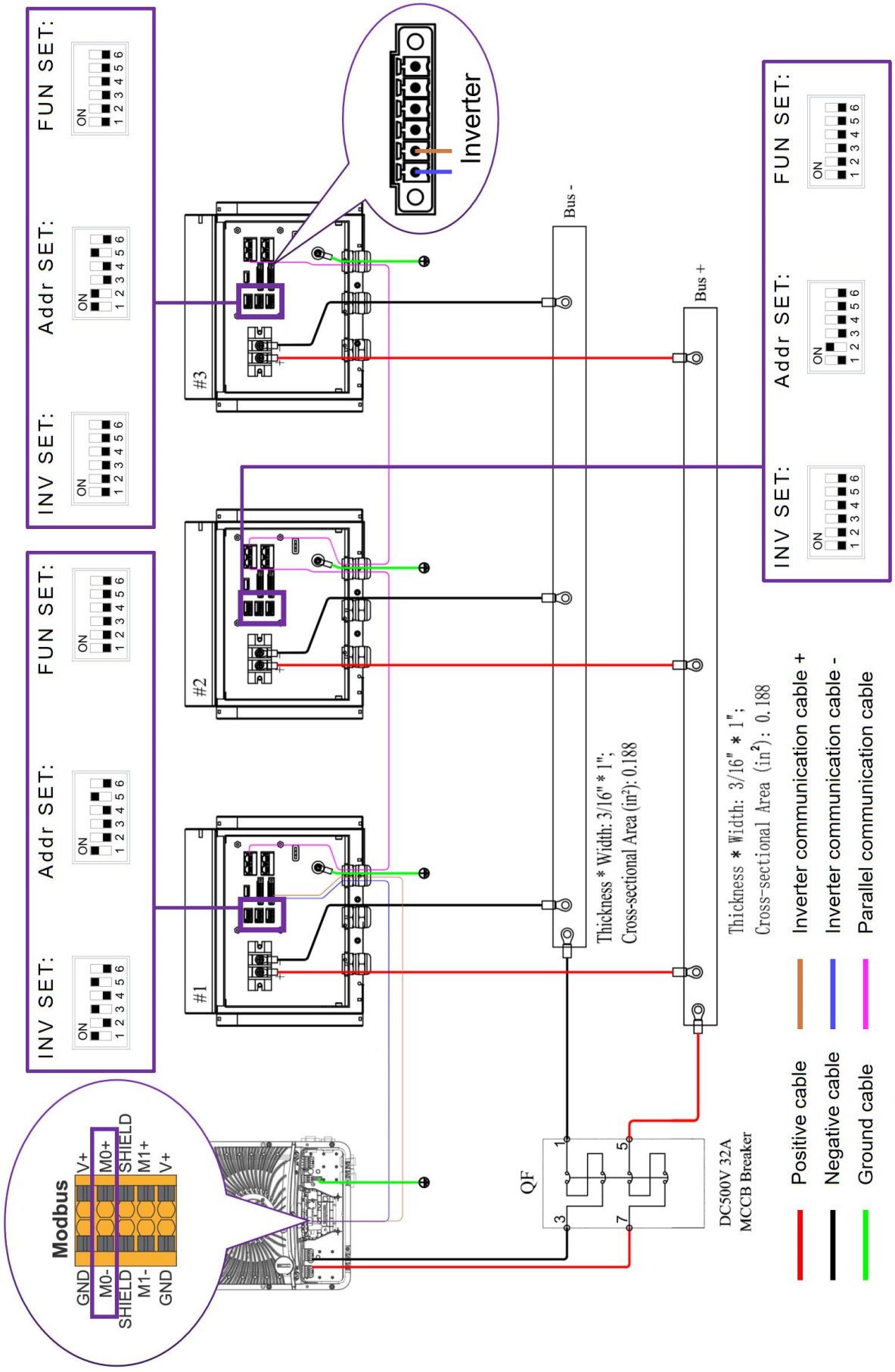


Figure 3.3.2. Three batteries in parallel

3.3.3. Four Batteries

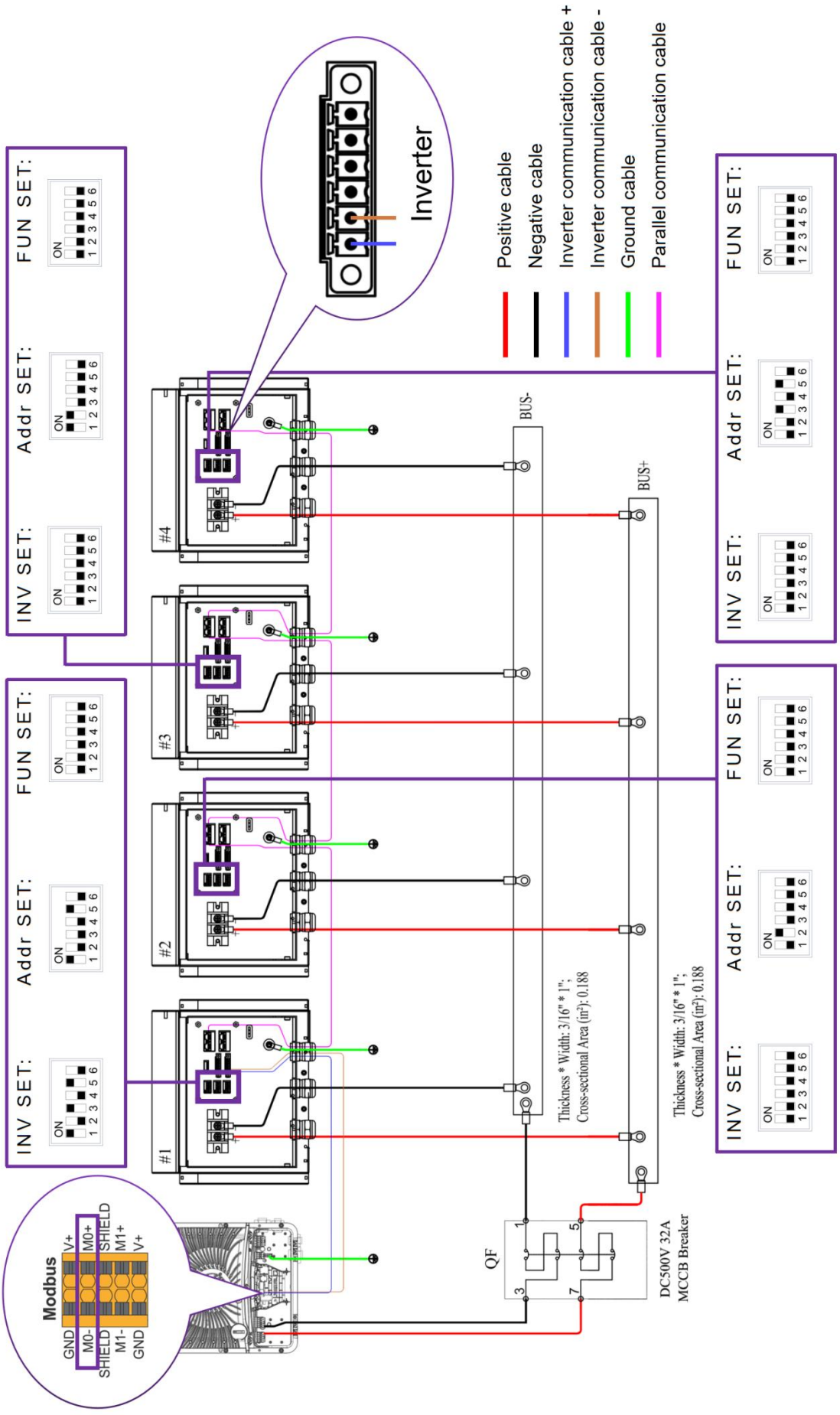


Figure 3.3.3. Multiple batteries in parallel

3.4. Power On

Please turn on the DC breaker of the inverter if it has one, then turn on the power switch, rotate the active switch to the “ON” position, press the power button, wait for the beeper sound occurred, and then rotate the active switch back to the “OFF” position.

No.	Operation
1	Turn on the power switch.
2	Rotate the active switch to the “ON”.
3	Press the power button.
4	Rotate the active back to the “OFF”.

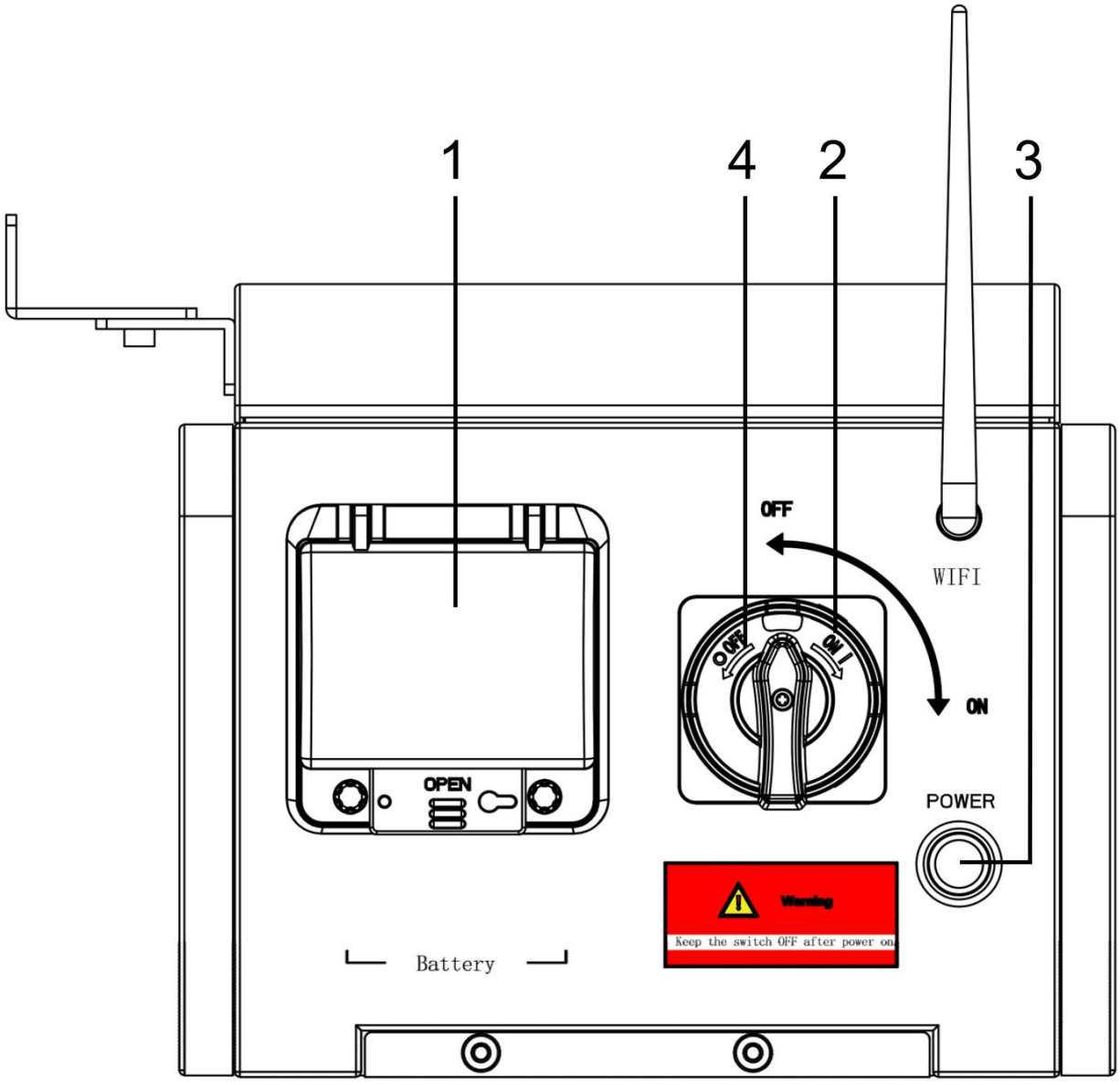


Figure 3.4.1. Side of the battery

4. Cloud Platform Configuration

1) Download App

Download and install Renon app from Google play or App Store by searching “Renon Smart”.

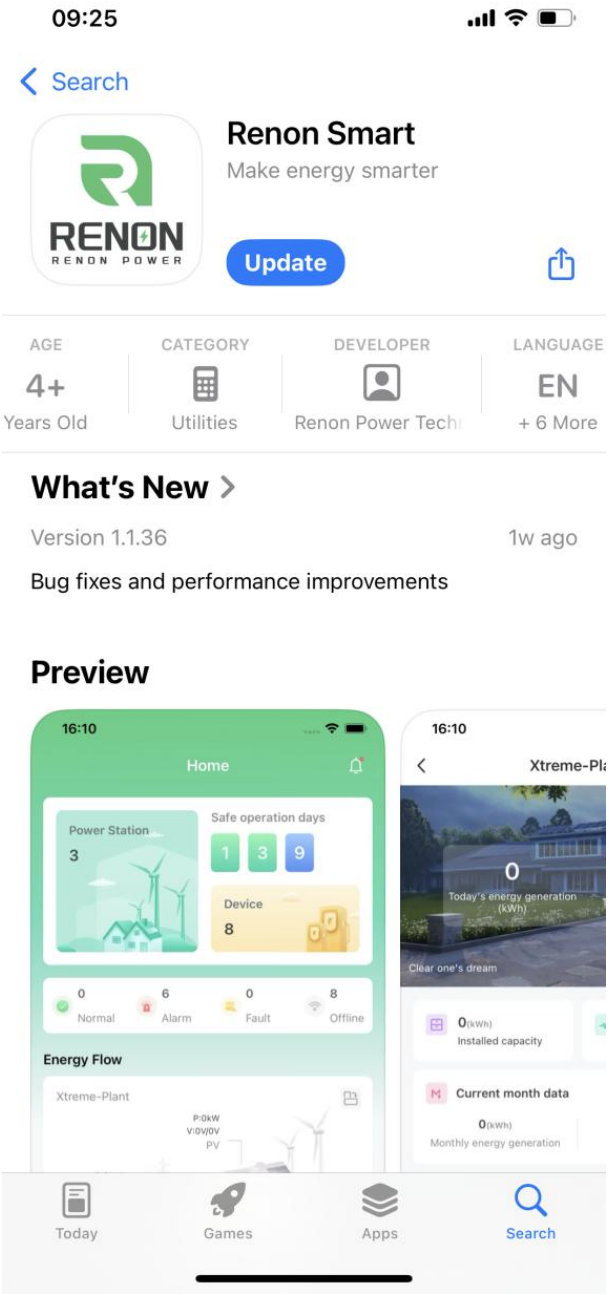


Figure 4.1.1. Install Renon App

Figure 4.1.2. Android QR code

GET IT ON Google Play

Figure 4.1.3. IOS QR code

Download on the App Store

2) Register

For new account registration, please retrieve the Registration Code from your installer. Existing users may log in directly, while new users must create an account.

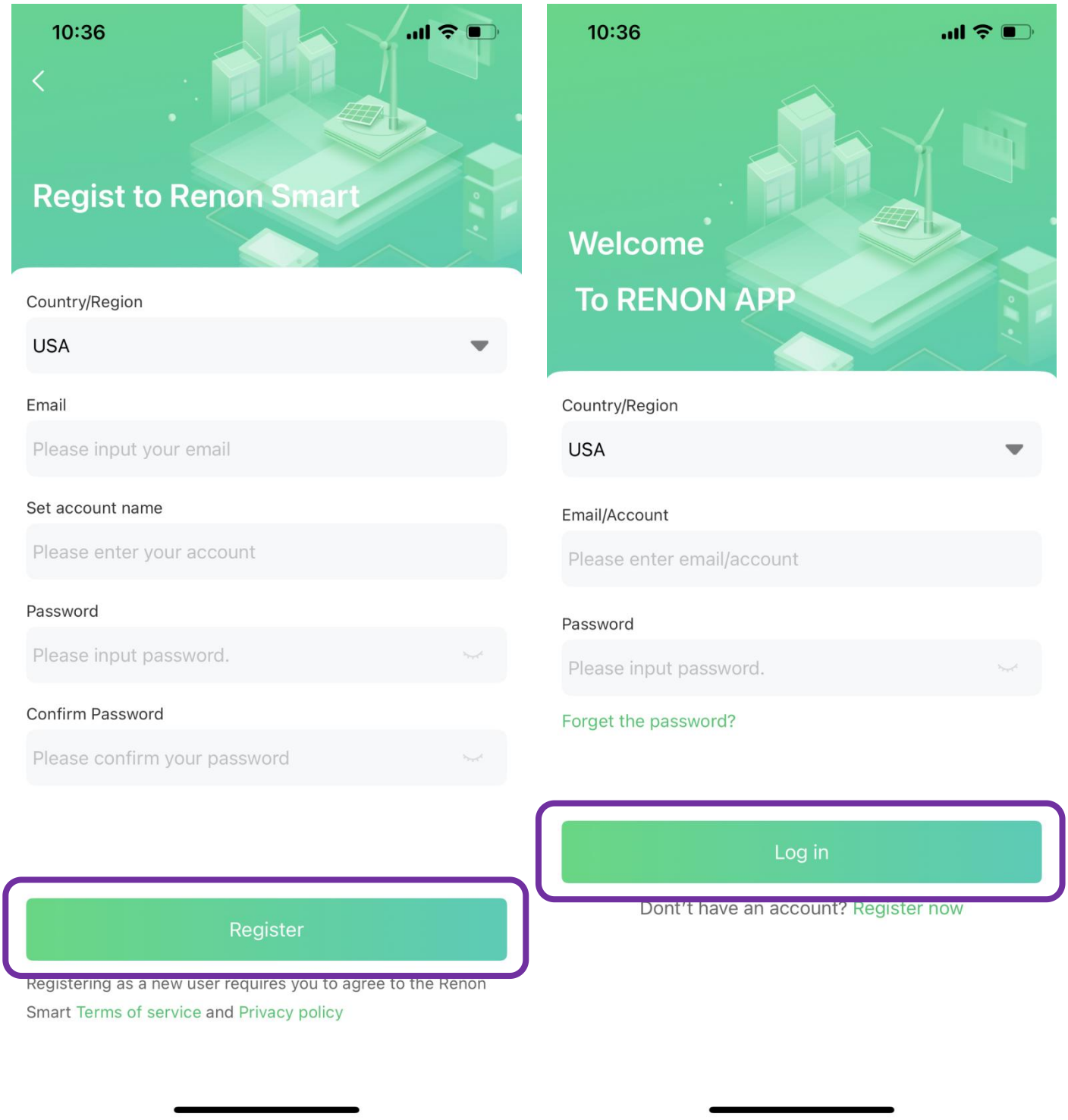


Figure 4.1.4. Register & Log in

3) Log in

This is a general user account.

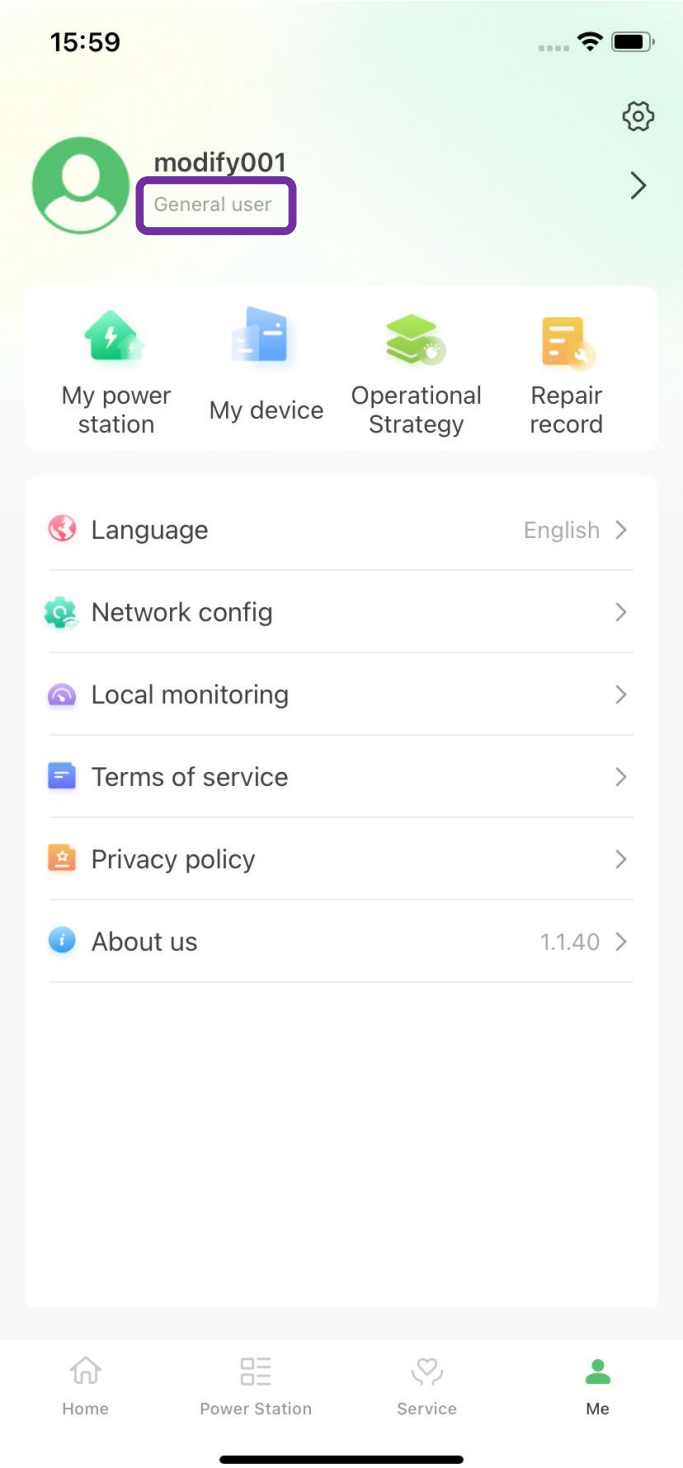


Figure 4.1.5. General user

4) Binding

Method 1: Manually bind

Step 1: To register as an end user, enter the superior user name, then request device assignment to your account.

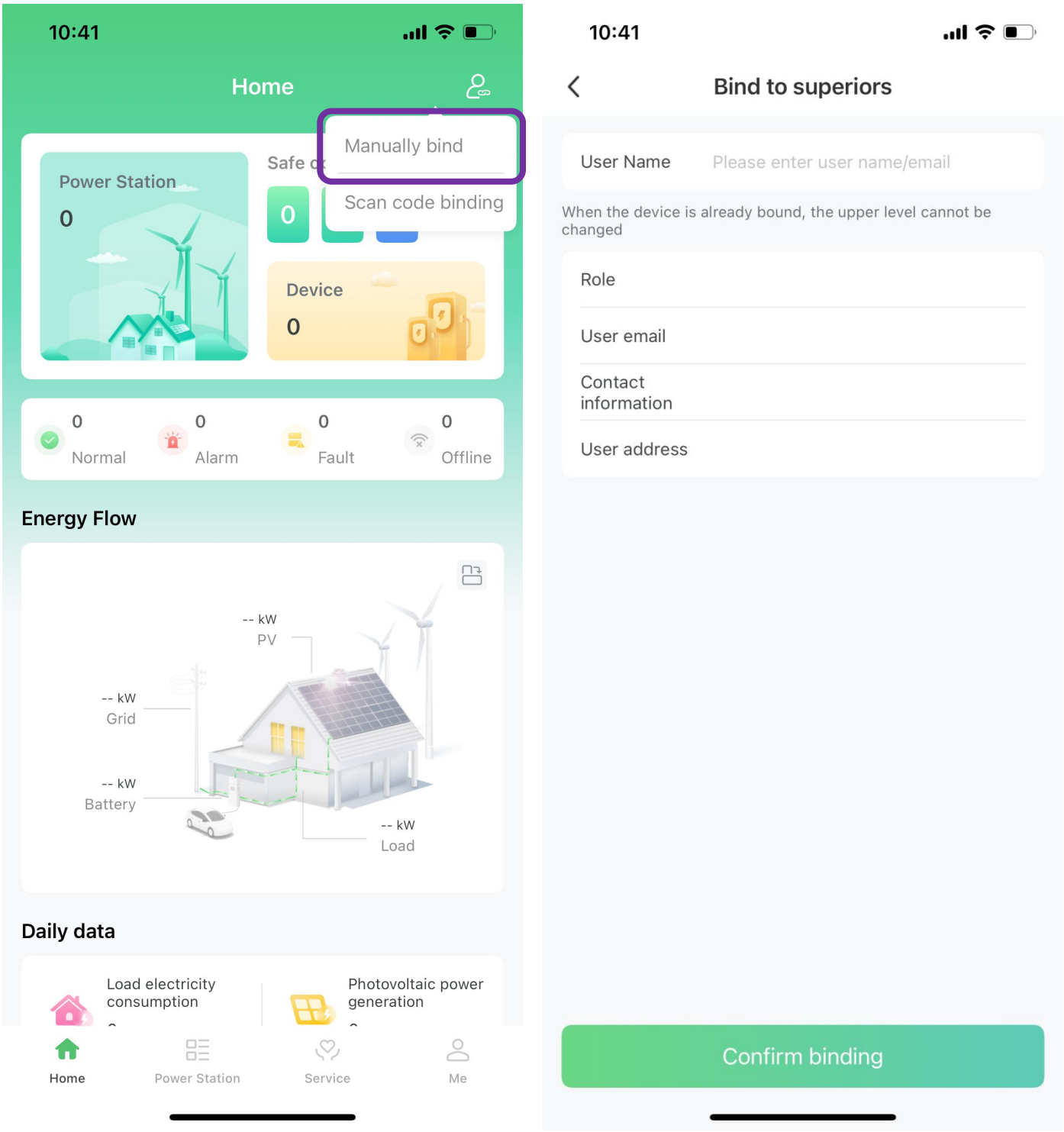
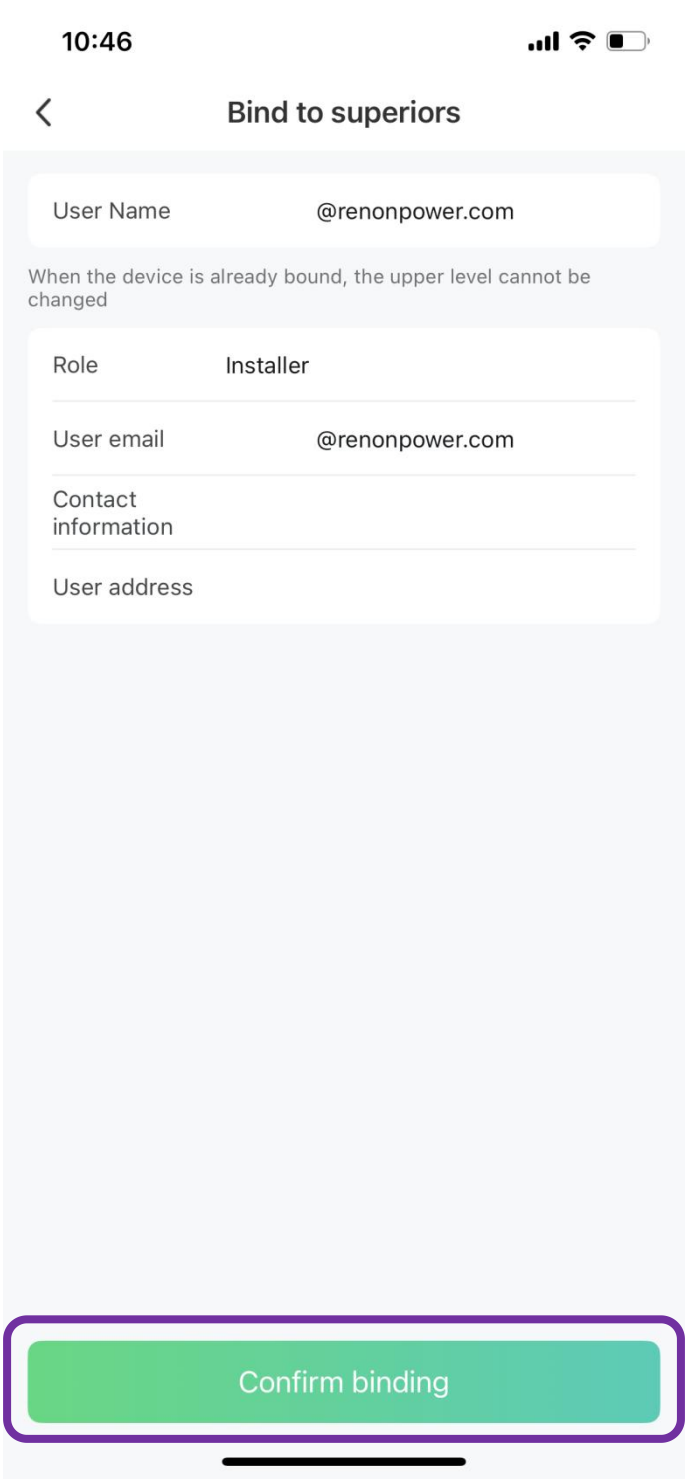


Figure 4.1.6. Bind to superiors



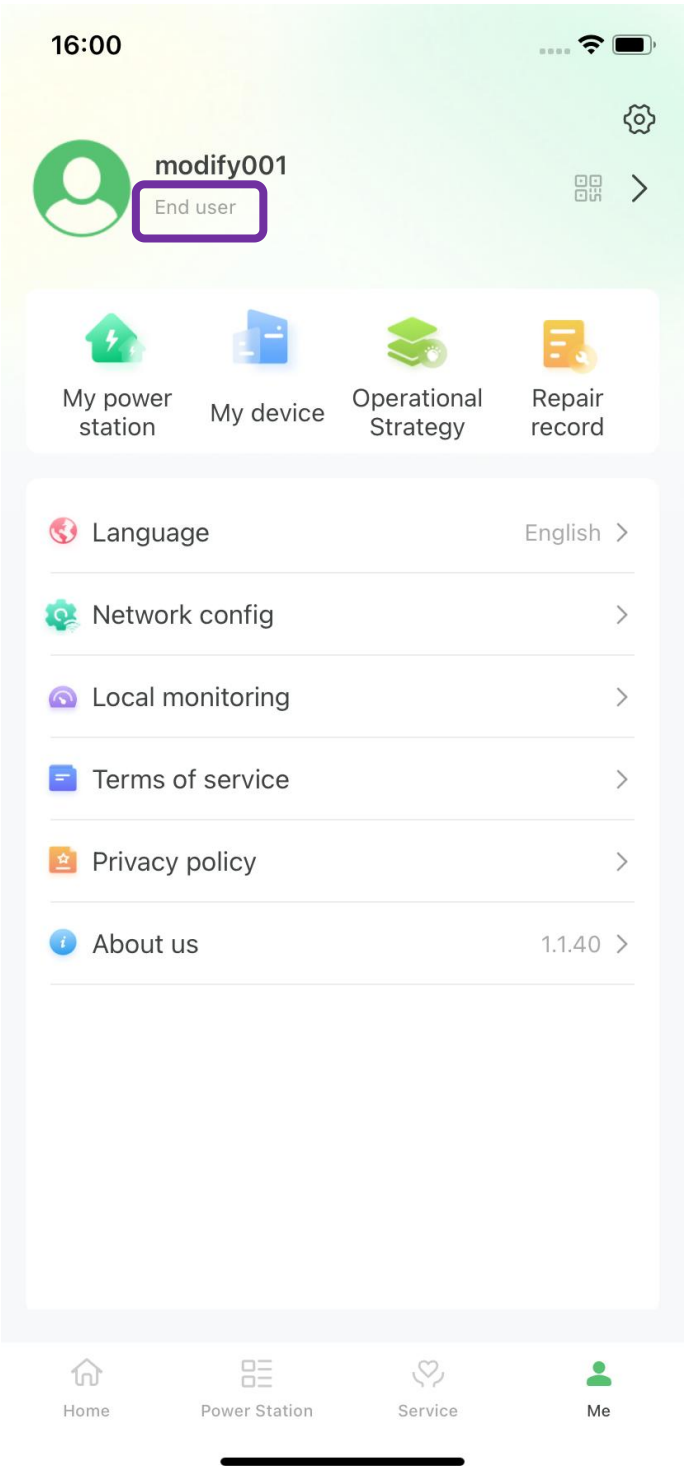


Figure 4.1.7. Confirm binding & Become end user

Step 2: Scan QR code

Select "Scan code binding" and scan the QR code using your device camera. Contact the installer if unsuccessful.

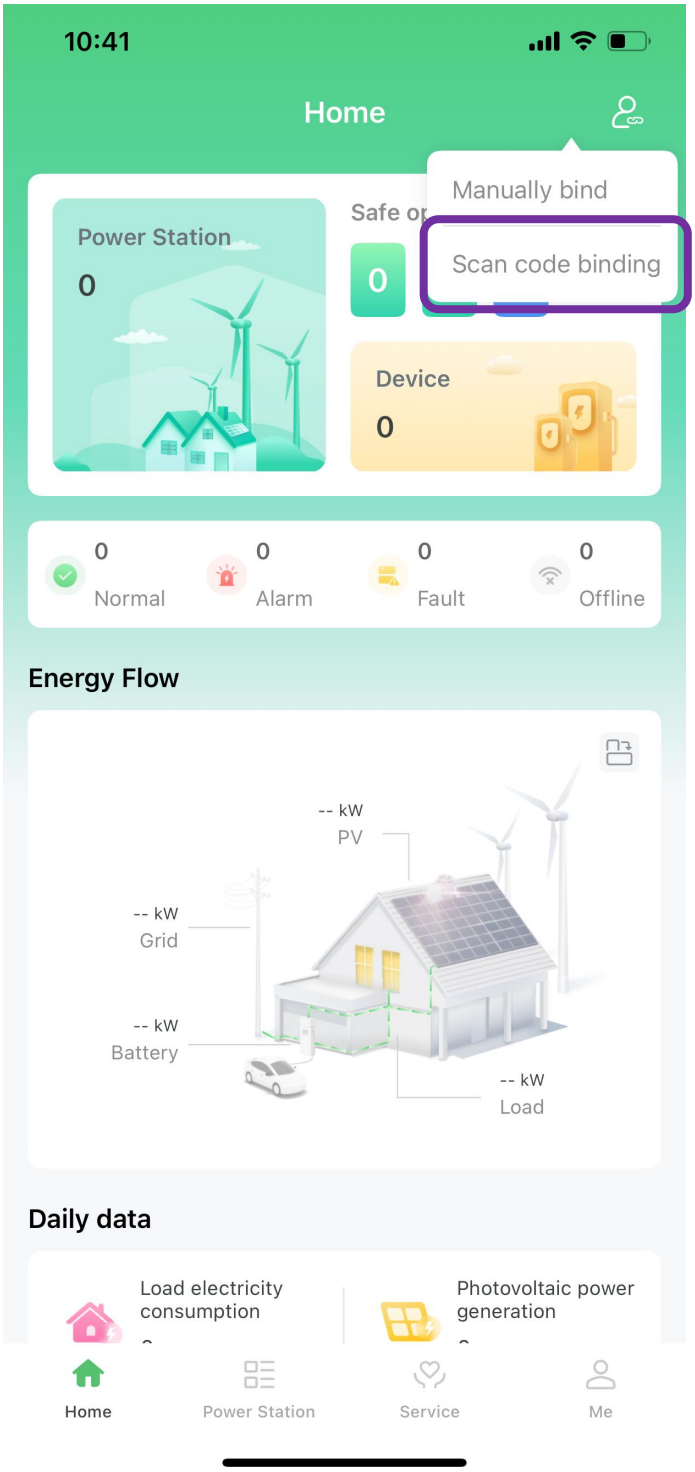


Figure 4.1.8. Scanning QR code

Method 2:

Step 1: Click "My device" to enter the “Add a device” page, scan the QR code as illustrated, then select device to complete binding.

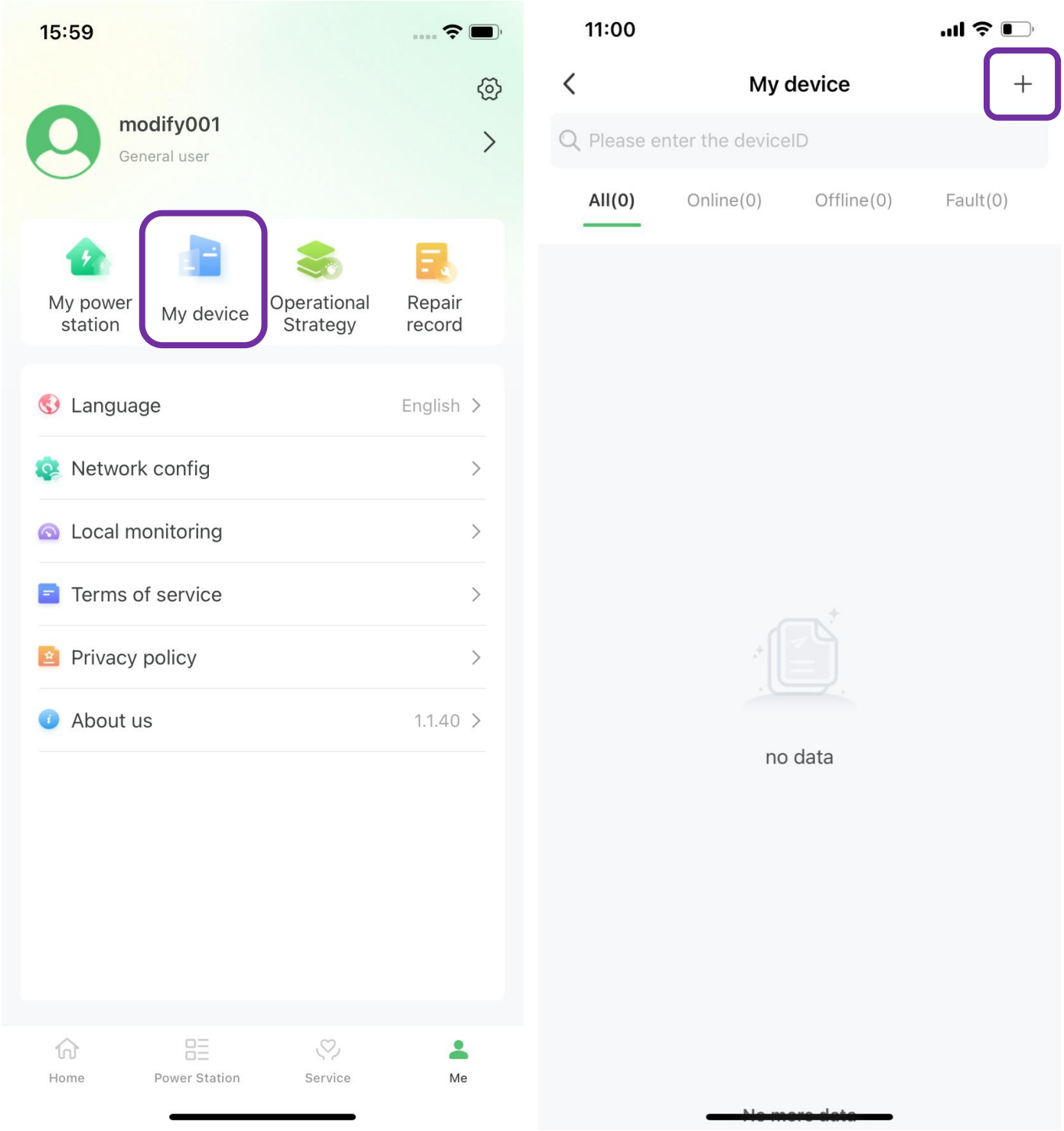


Figure 4.1.9. My device & Add device

Note: When adding a device, please note using the camera to scan the serial number on the label on the side of the device.

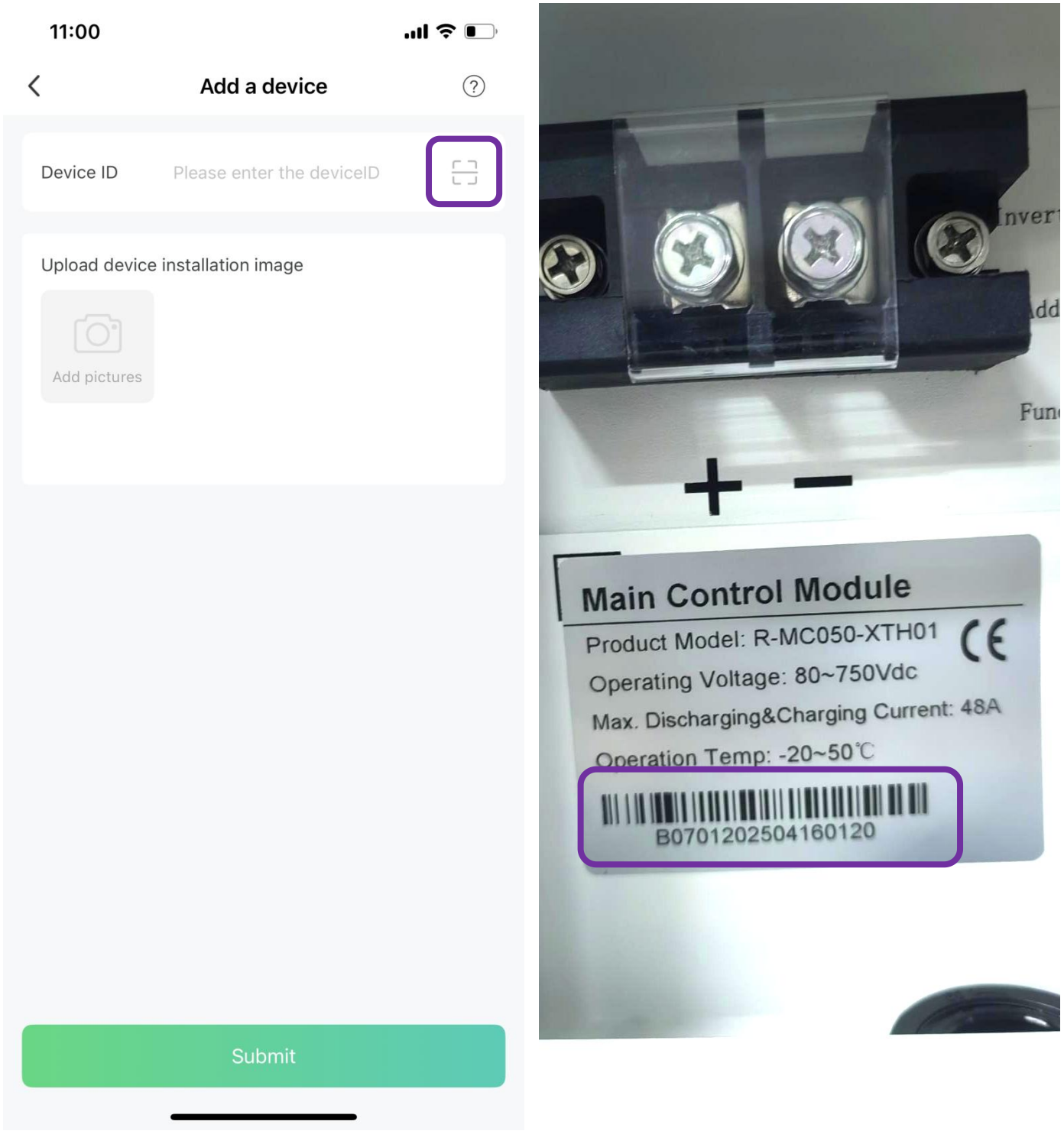


Figure 4.1.10. Scanning

Step 2: Choose the way to become an end user based on the actual situation.

a. Installer level binding:

When the device is at a level higher than the installation company, during device binding via scanning, you can choose the account level (Installer or End User). The system will automatically generate a virtual link, and later, adjustments can be made by scanning the upper-level QR code.

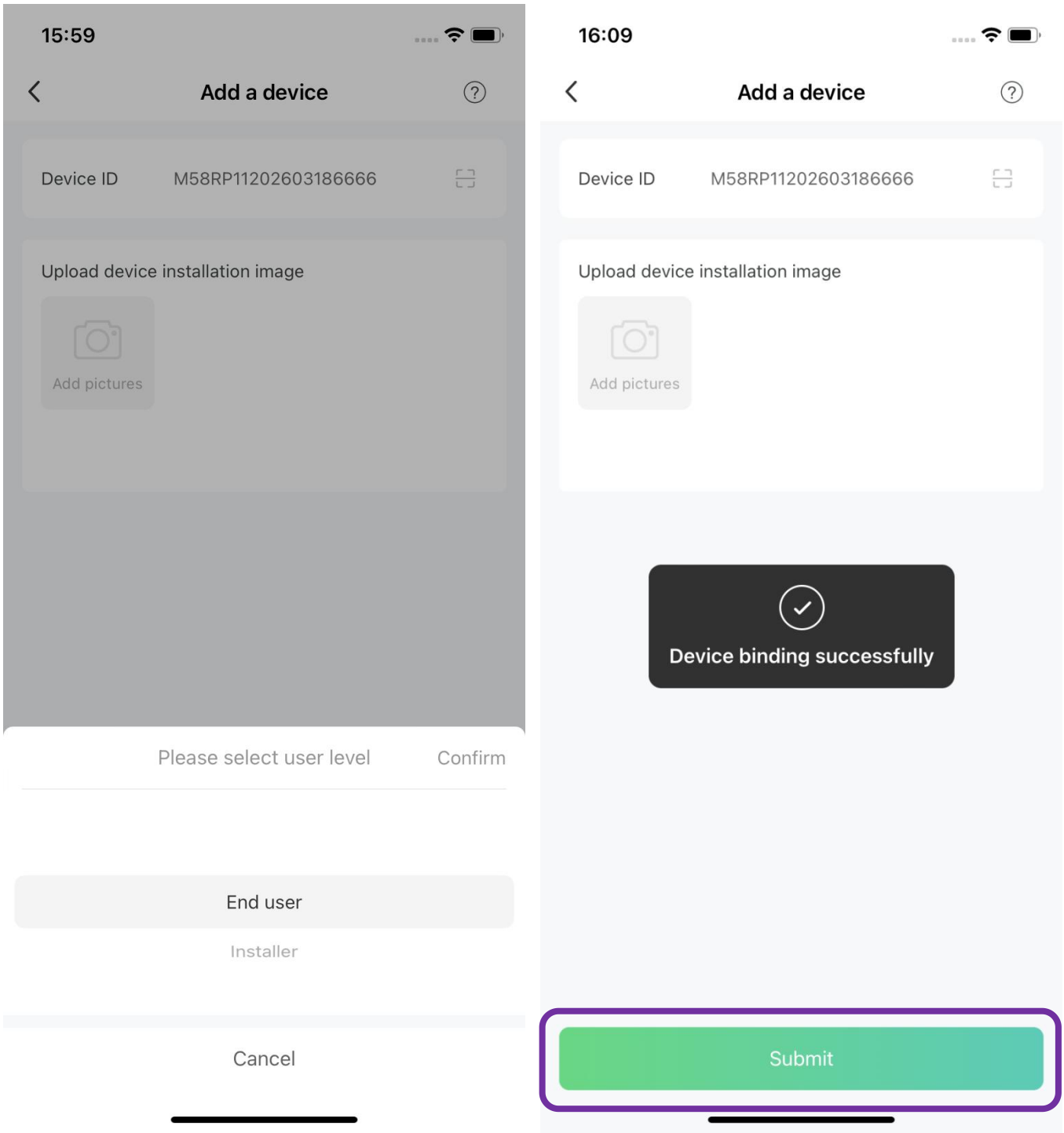


Figure 4.1.11. Select level

b. Installation company level binding:

When the device is at the installation company level, during device binding via scanning, you can choose the account level (Installer or End User):

- If you choose to become the Installer, the guest account will be upgraded to an Installer-level account.
- If you choose to become the End User, you will need to further select an Installer account as the superior (if unknown, a virtual account can be bound), thus becoming a subordinate End User.

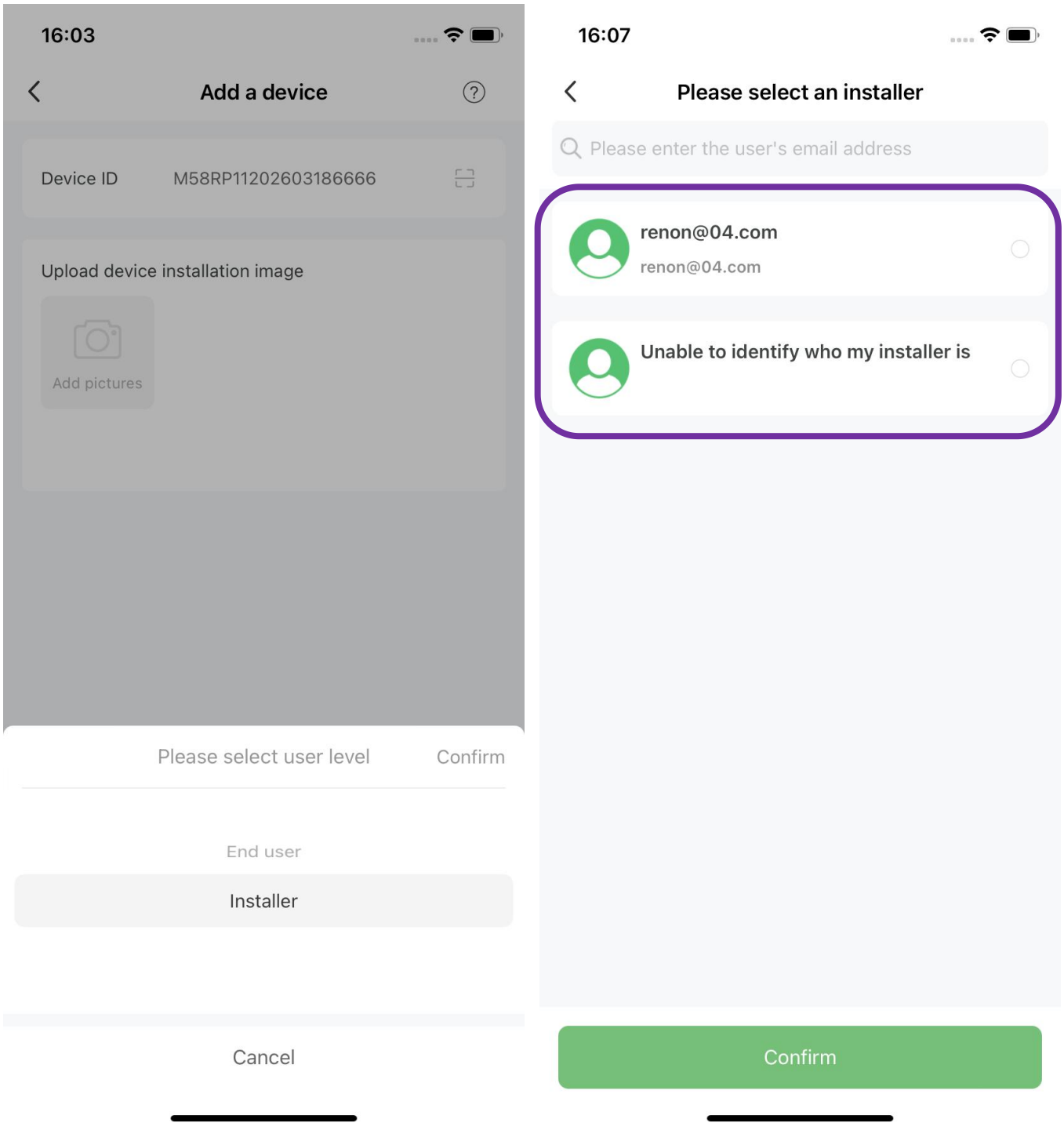


Figure 4.1.12. Select level & Superior account

c. Installer level:

When the device is at the Installer level, it will directly bind as an End User upon scanning.

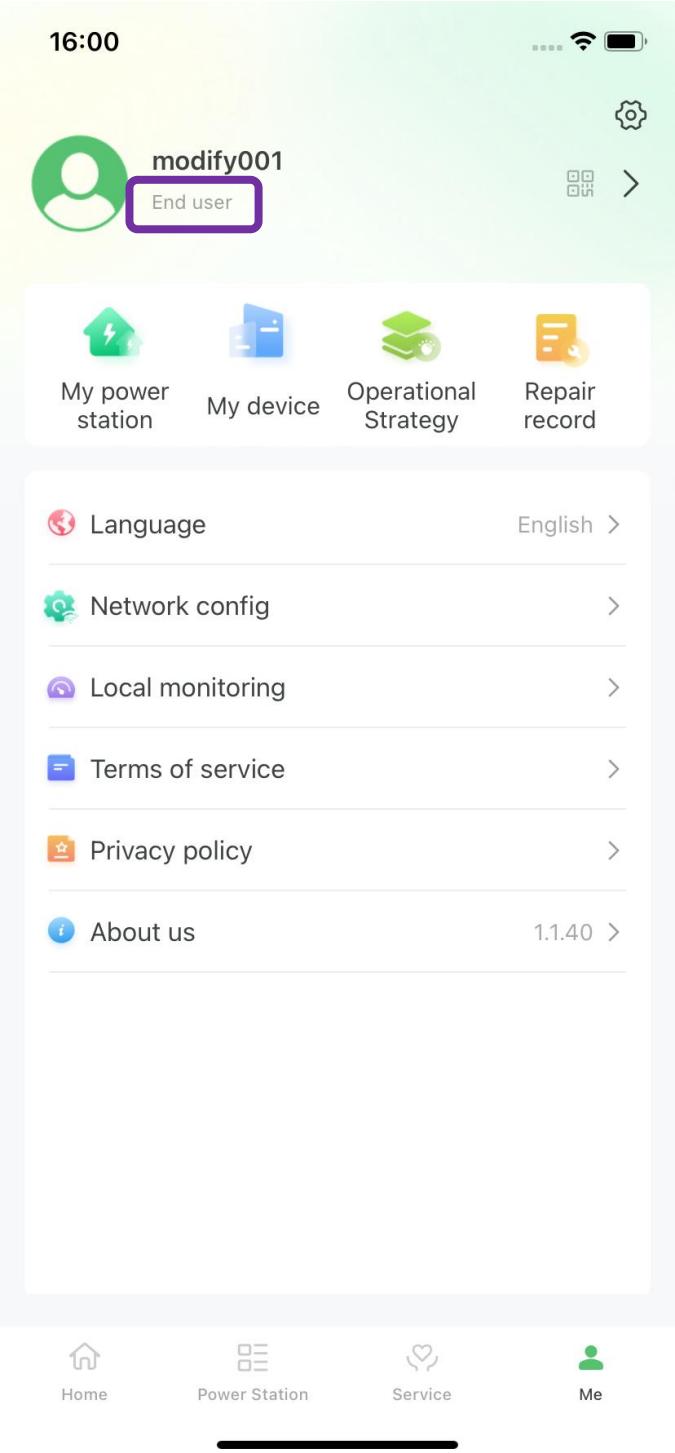


Figure 4.1.13. Become end user

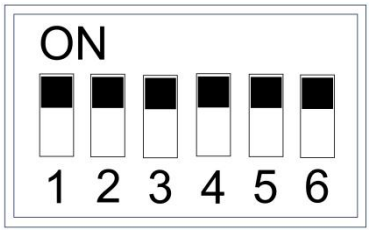
If the above methods are not successful, please contact Renon, email address: support@renon-usa.com, Renon Power Support: +1 (833) 736-6687. Be sure to write your account name/email address and device serial number clearly.

5) WiFi configuration

Set the inverter dial code to 63 (111111) as shown below before WiFi configuration.

Note: In a system with multiple batteries operating in parallel, you only need to configure the master battery unit (set to Address 1). Once configured, all other units will automatically retrieve network settings and connect seamlessly without manual intervention.

After setting the inverter dial code to 111111, the WiFi or Bluetooth signal will be activated. If the network configuration is not completed within five minutes, the signal will turn off. In this case, reset the inverter address dial code to 100000, wait for five seconds, and then set the inverter dial code to 111111 again. Please use the APP to complete the network configuration within five minutes.



Turn to the “Me” page, click Network Configuration, then click Bluetooth, followed by WiFi configuration.

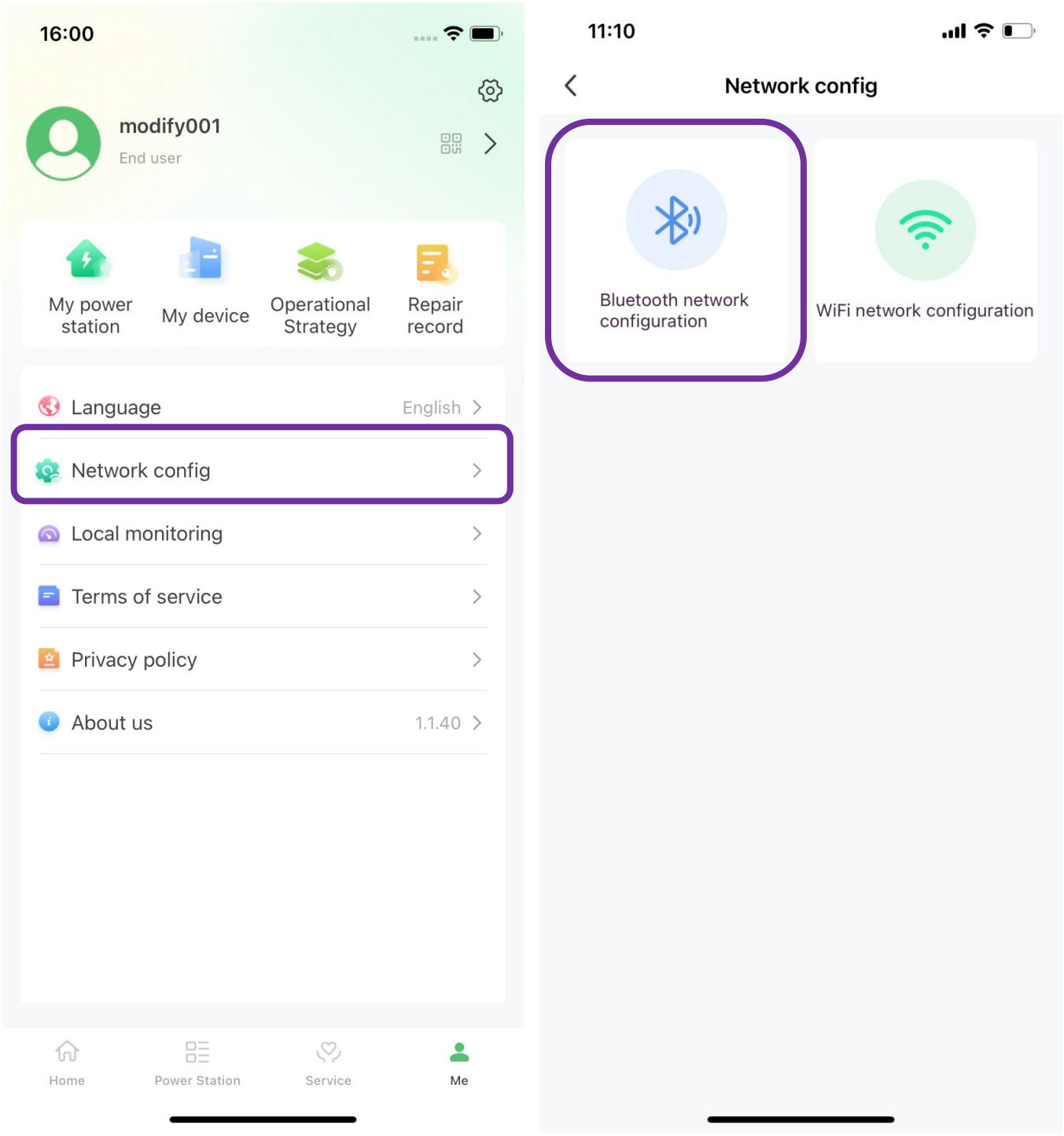


Figure 4.1.14. Bluetooth network setting

Enable Bluetooth on your mobile device, then select the detected device to access its Bluetooth network configuration page.

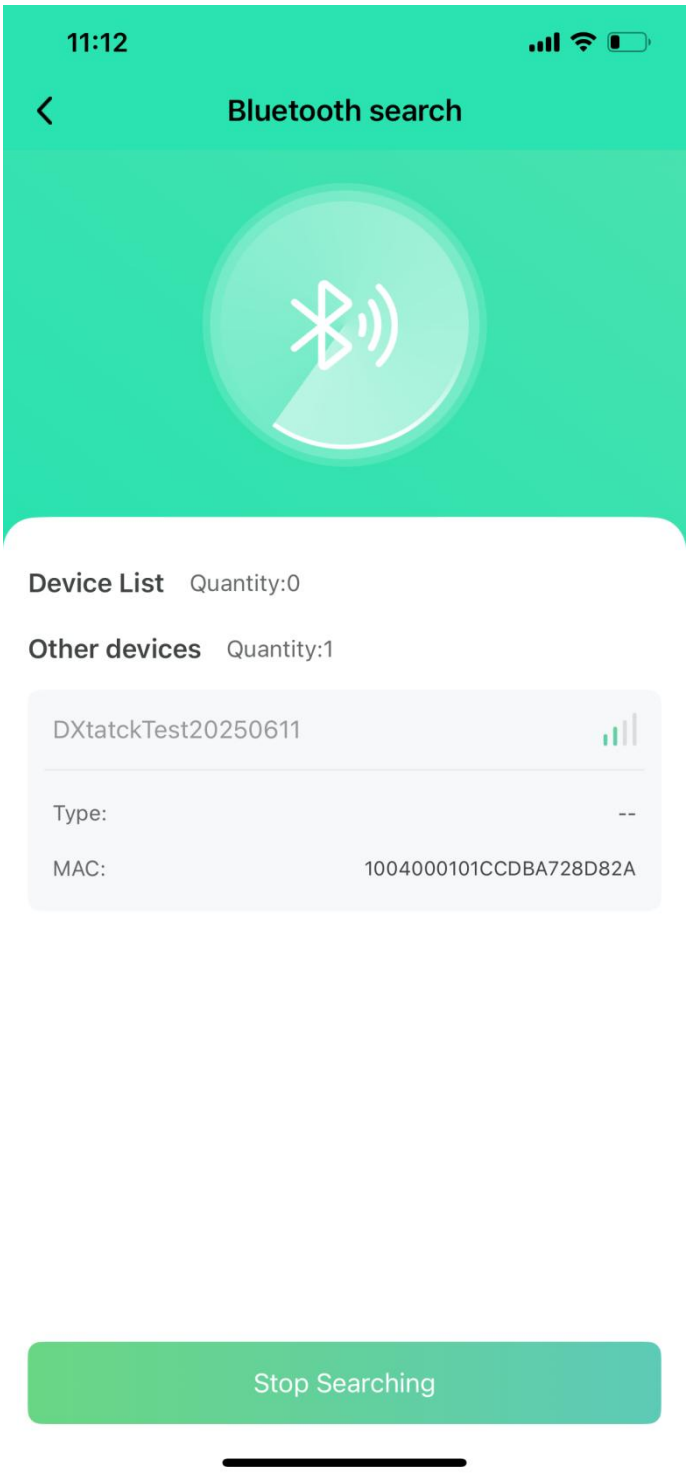


Figure 4.1.15. Connect battery Bluetooth

Enter your private WiFi credentials (SSID and password) to connect the master controller.

Note: Devices assigned to end users will auto-populate the authentication key.

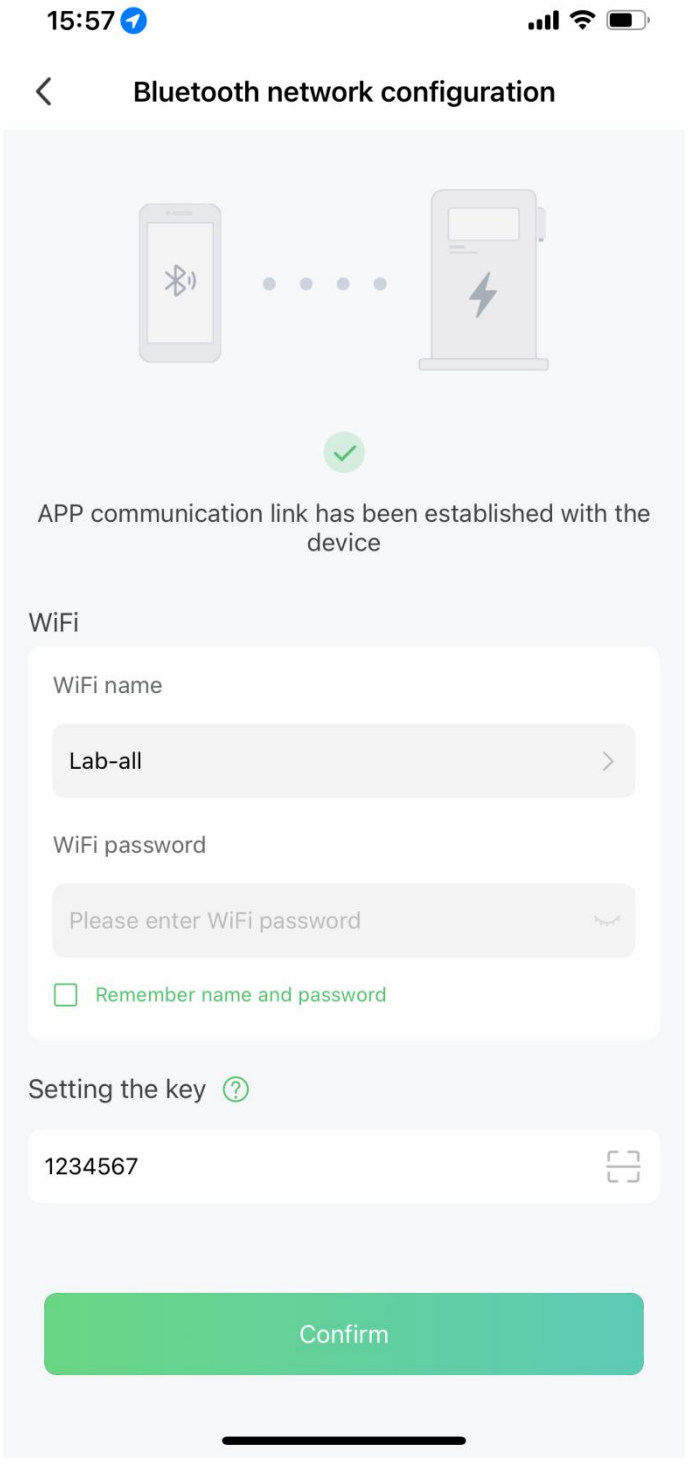


Figure 4.1.16. Connecting private WiFi

6) Create a power station

Navigate to the Power Station page on the app, create a new station by setting its name, type, pricing, superior view, address, and uploading station images.

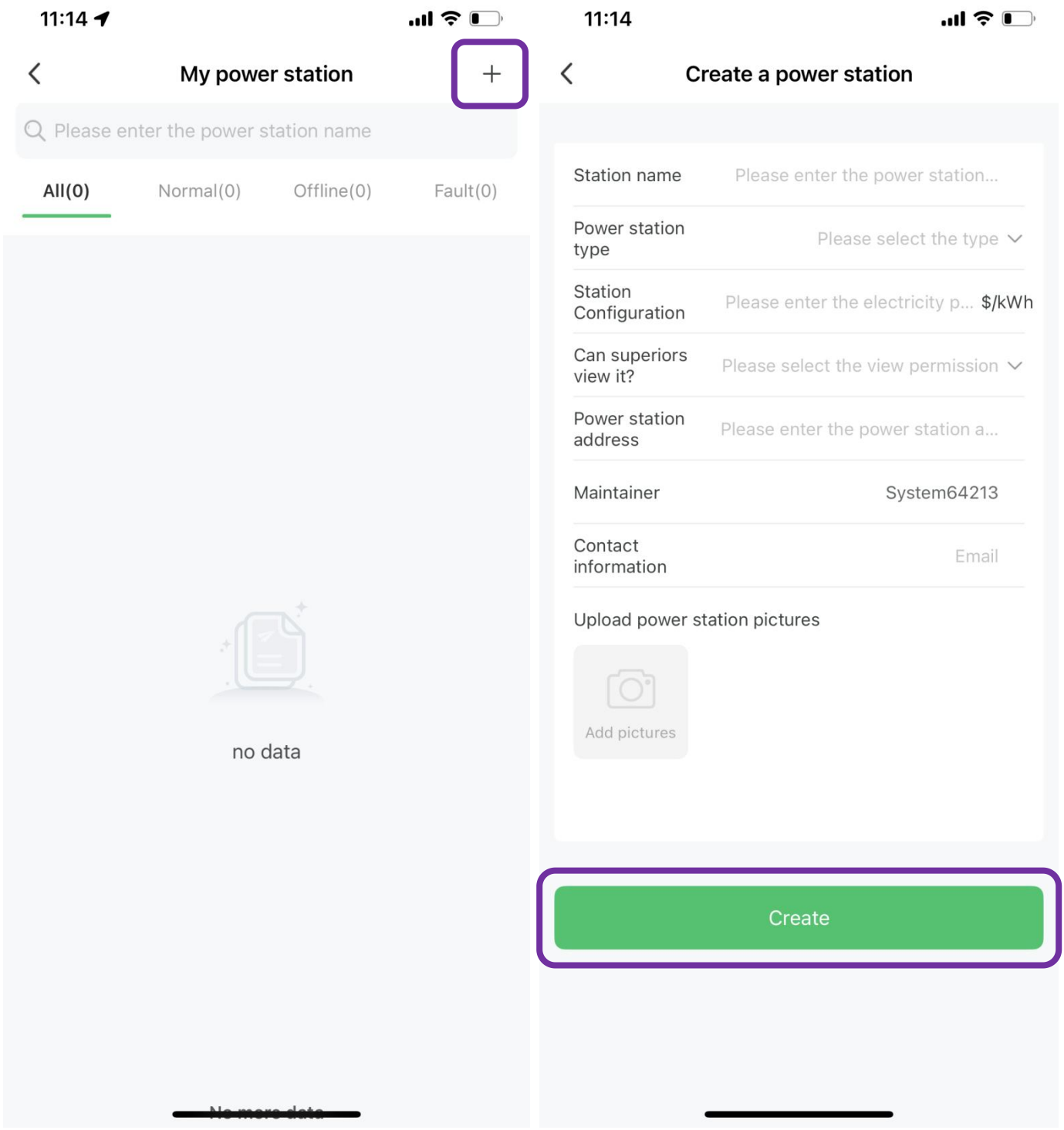


Figure 4.1.17. Create a new power station

After successful power station creation, select the newly created station to view its details, then tap "+" on the Binding Device page to add your desired device.

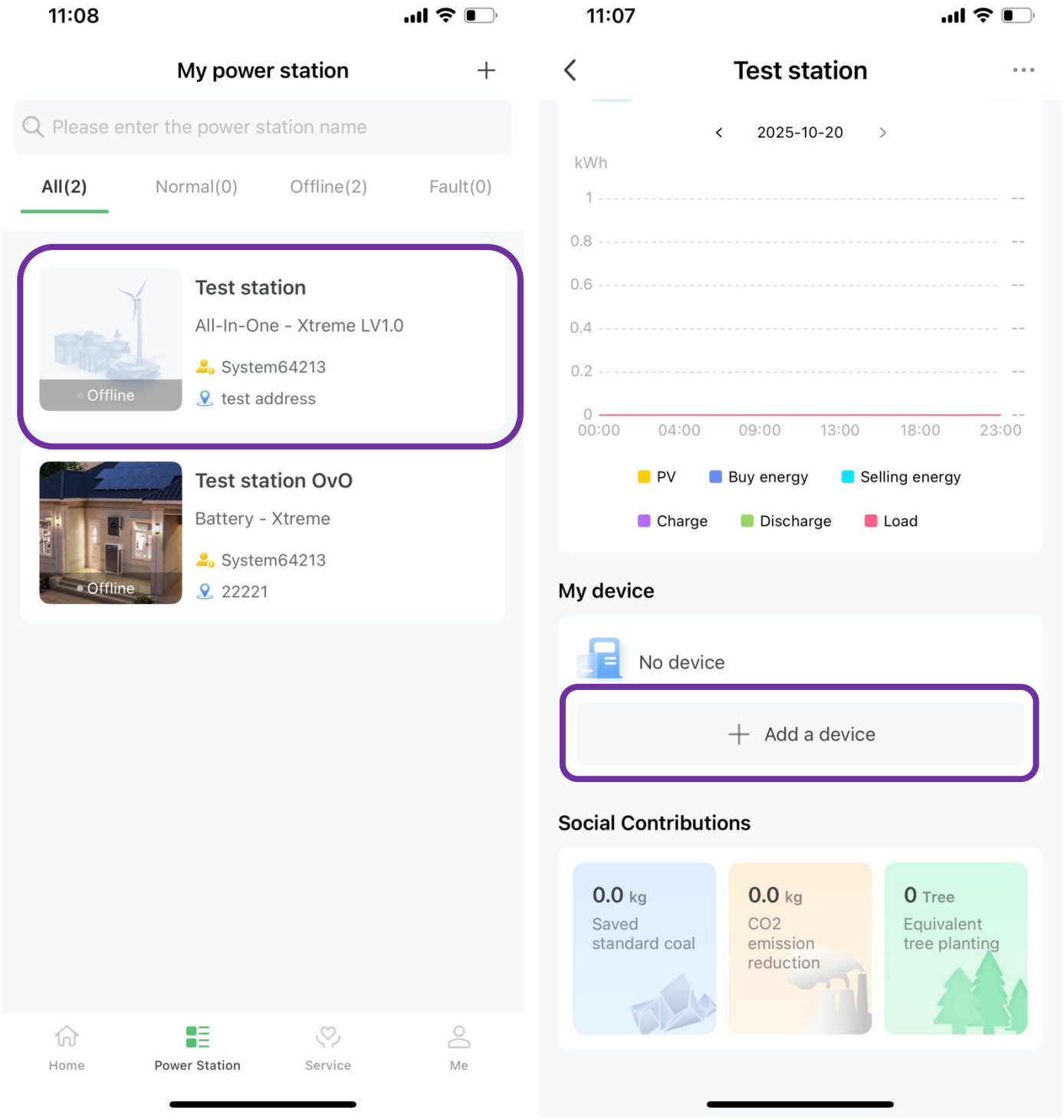


Figure 4.1.18. Add a device in my power station

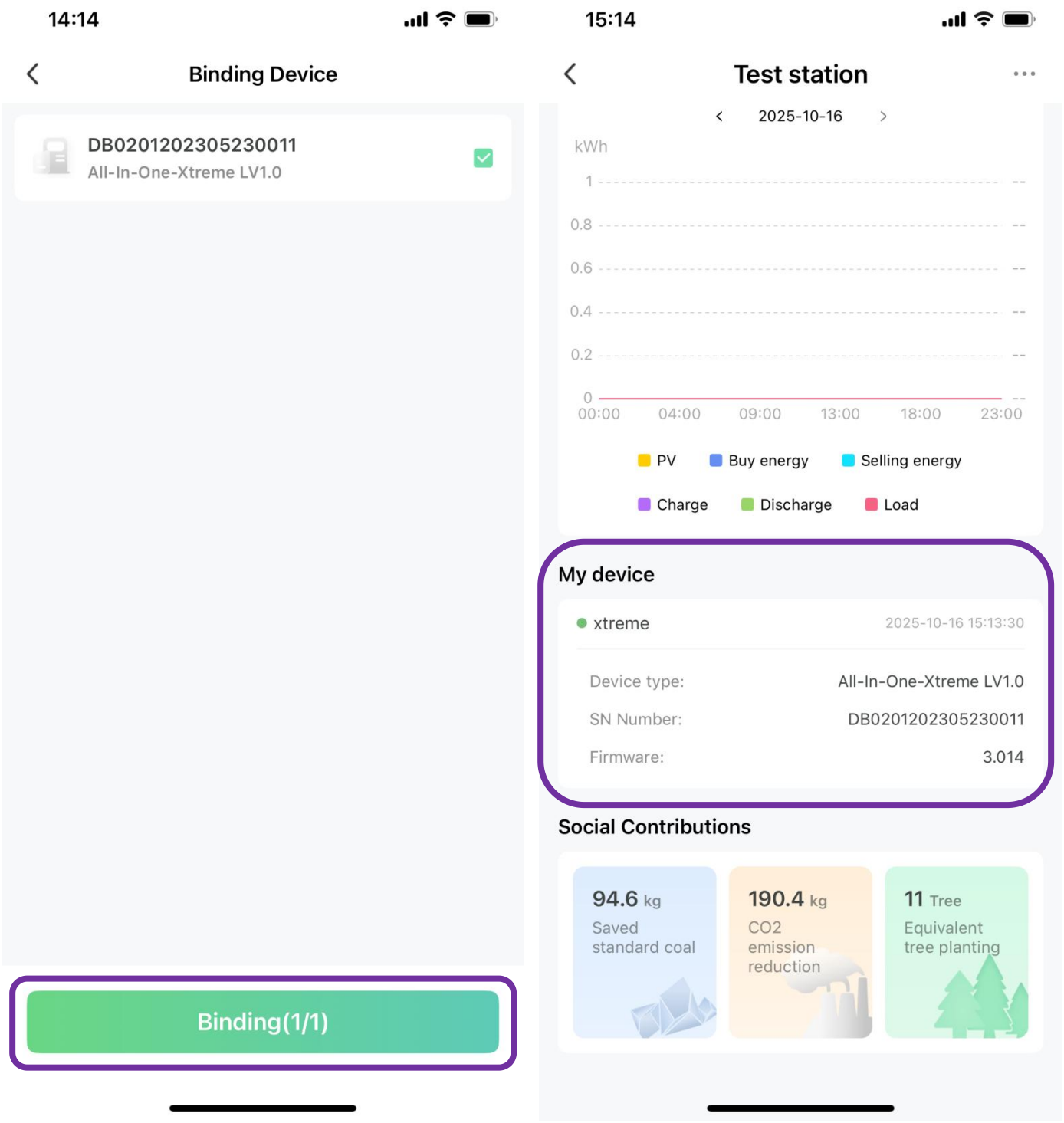


Figure 4.1.19. Manage your power station & Confirm your device

The device can be managed both through the app and the web portal (contact your installer for the website URL).

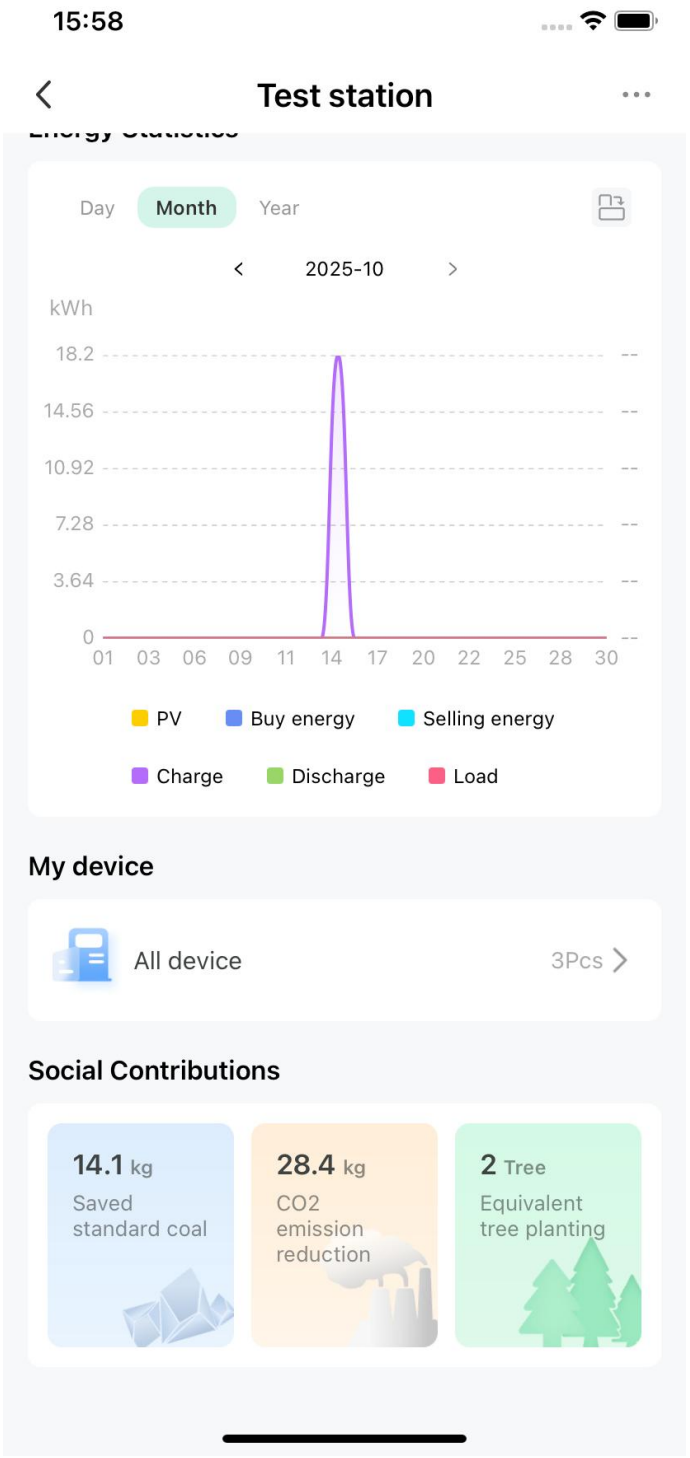


Figure 4.1.20. Manage your device

Once WiFi is connected, the device enables real-time monitoring of operational status, instantaneous power, and energy consumption (daily/cumulative) via the network platform or mobile app, while also supporting remote parameter configuration.

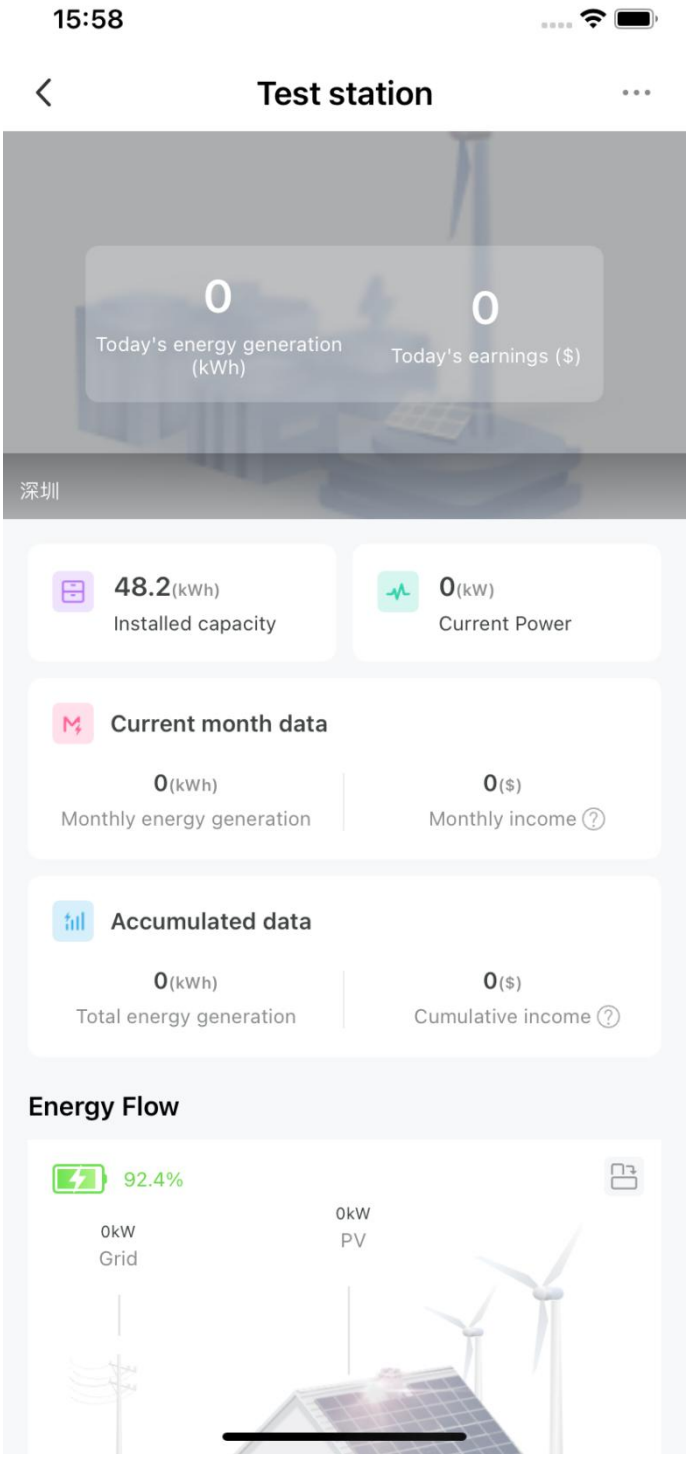


Figure 4.1.21. Monitoring device

Set the inverter dial code to match the inverter brand after WiFi configuration is complete (Please refer to the chapter **5.4.1 Inverter Dial Switch**).

5. Battery Specifications

The Xtreme HV series is a lithium iron phosphate (LFP) battery-based energy storage product developed and produced by RENON, it can supply reliable power for nearly all kinds of household appliances and equipment.

The Xtreme HV series consists of a main controller and several battery modules, each battery module has a battery information collection unit, which can monitor cells information including voltage and temperature. The main controller can sense the total voltage and current, communicate with all battery modules, manage and protect the battery.

The Xtreme HV series is very easy to install, and has a well-designed exterior suitable for indoor use.

Supports up to 6 battery modules to extend the energy of a single stack.

5.1. Product Features

- The whole product is non-toxic, pollution-free and environment-friendly.
- The battery chemistry is made from LiFePO4 with safety, performance, and a long cycle life.
- The battery is small in volume, has plug & play embedded design module, and is easy to install and maintain.
- Working temperature range is between -4℉ and 122℉ (-20℃to 50℃) with excellent discharge performance.
- The battery management system (BMS) has protection functions for over-discharge, over-charge, over-current, and high/low temperature.
- The battery can self-discharge up to 3 months without charging and offers excellent performance of shallow charge and discharge.
- The system can automatically manage battery charge and discharge state and save energy costs with various automation options.

5.2. Specifications

Item	R-XH096021 (-H)	R-XH014031 (-H)	R-XH019041 (-H)
Controller Model	R-MC050-XTH01(-H)		
Battery Module Model	R-EM096050-XTH01 (-H)		
Battery Chemistry	LiFePO4		
Module Quantity	2	3	4
Nominal Energy (kWh)	9.6	14.4	19.2
Nominal Capacity (Ah)	50		
Max. Charging Current (A)	45		
Max. Discharging Current (A)	48		
Nominal Voltage (V)	192	288	384
Recommend Charging Voltage (V)	213	319.5	426
Discharge Cut-off Voltage (V)	162	243	324
Heating Film Resistance (Ω)	56 per module (-H model only)		
Heating Start Temperature (℉/℃)	Reserved		
Operation Temperature (℉/℃)	Discharge: -4~122 / -20~50 Charge: 32~122 / 0~50		
Safety Function	Over-charge, Over-discharge, Over-current, Low/High-temperature, Short-circuit Protections		
Communication	RS485/CAN/Wi-Fi		
Weight (lbs/kg) (Approx.)	331/150	460/208.5	589/267
Physical Dimensions (inches/mm) (W*D*H)	32.3*10.6*32.6 /820*270*829	32.3*10.6*42.6 /820*270*1082	32.3*10.6*52.5 /820*270*1334
Level of Protection	IP65		
Altitude	≤4000m		

Note: *-H indicates that this product contains a heating film and has a heating film function.*

The system can achieve an IP65 protection rating after it is fully assembled.

5.3. Function Introduction

5.3.1. Protection

The battery system is equipped with comprehensive protection features, including but not limited to overcharge/overdischarge protection, high/low temperature protection during charging/discharging, and overcurrent protection during charging/discharging, ensuring the safety and stability of the battery under various usage conditions.

5.3.2. Forced Discharge

When the system enters sleep mode due to undervoltage, users can manually activate the forced discharge mode by pressing the power button. Additionally, the system will automatically wake up at scheduled intervals to enter forced discharge mode, thereby activating the charger or inverter (the inverter requires grid connection) to provide necessary supplemental charging to the battery, ensuring its continued availability.

5.3.3. Charging Self-Adaptation Control

The system will automatically reduce charging power when the battery is in low/high temperature conditions or low/high SOC.

5.3.4. Emergency Stop

The first battery (Address 1)'s Dry Contact port (Pins 5-6) can be connected to the normally open (NO) contacts of an external emergency stop button. When activated, this will disconnect all battery outputs.

When multiple batteries are connected in parallel, the ESS disconnect only needs to be connected to the master battery.

If the inverter is equipped with Rapid Shutdown (RSD) capabilities, the emergency stop feature can initiate this function. It is recommended to check with the local Authority Having Jurisdiction (AHJ) and the National Electrical Code (NEC) for compliance.

5.4. Interface Information

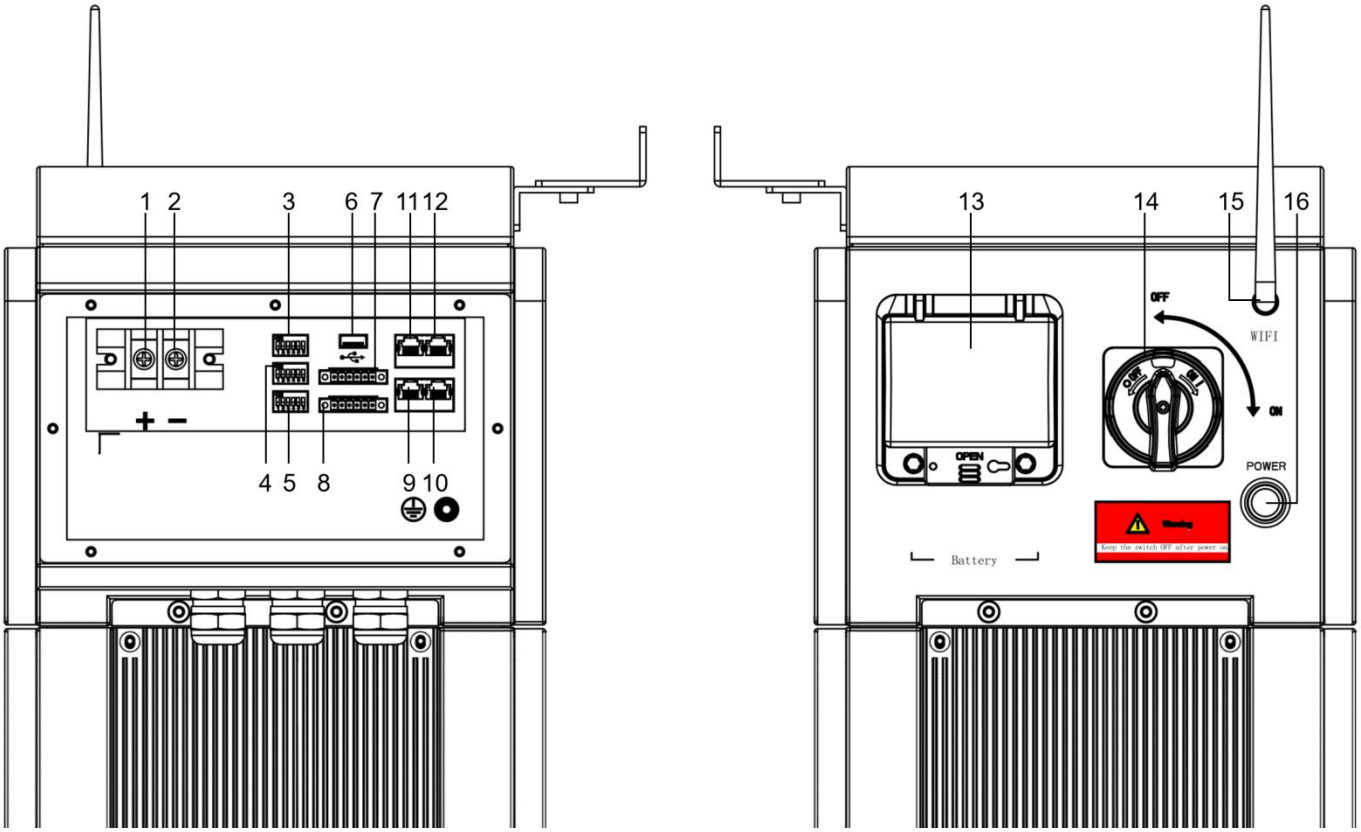


Figure 5.3.1. Interface definition of Controller module

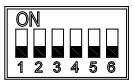
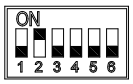
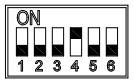
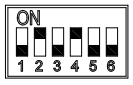
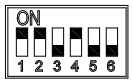
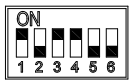
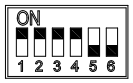
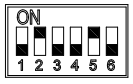
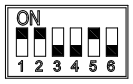
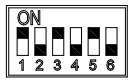
No.	Instructions	No.	Instructions
1	Power Positive	9	Inverter Communication Port (RJ45)
2	Power Negative	10	Debug Port
3	Inverter Dial Switch	11	Link A
4	Address Dial Switch	12	Link B
5	Function Dial Switch	13	Power Switch
6	USB Port for Upgrade	14	Active Switch
7	Dry Contact	15	WiFi Antenna
8	Inverter Communication Port (connector)	16	On/Off

5.4.1. Inverter Dial Switch

Code 0 ~ 21 of this Dial Switch are used to match which brand of inverter is using.

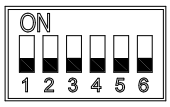
The definitions of code 0 ~ 21 are shown as below table.

Note: For a detailed and comprehensive inverter list, please contact our sales team or download it form our website or app.

Code	Dial Switch Position	Brand	Logo
0		Renon	
2		Sol-Ark	
6		ThinkPower	
8		Deye	
10		Solis	
11		Growatt	
13		MEGAREVO	
14		Sofar	
15		Renac	
18		SINENG	
20		Solinteg	
21		Fronius	

5.4.2. Function Dial Switch

Use this dial switch to match the communication impedance:

Code	Dial Code Switch Position	Definition
0		When used as single cluster

5.4.3. Address Dial Switch

Note: Under normal circumstances, the main control can achieve automatic addressing without any manual switch settings. If addressing abnormalities occur, please perform manual addressing according to the following steps.

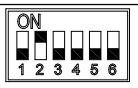
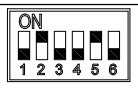
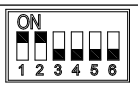
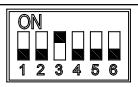
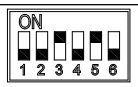
①For first time installation and startup, set the first and last bits of the address dial switch to "1".

②Wait for the buzzer to sound continuously for 5 seconds, indicating that addressing is complete.

③After confirming no faults on the screen, reset the last bit of the dial switch. For parallel unit operation, please refer to the manual for address dial switch settings.

Use this Dial Switch to set the address of master controller and then turn on to activate the system.

The illustration of dialing as shown below:

Code	Dial Switch 1	Dial Switch 2	Definition
1			Set as Cluster 1 (communicate with inverter by this cluster)
2			Set as Cluster 2
3			Set as Cluster 3
4			Set as Cluster 4

Note: Use dial code 2 for parallel connection, and dial code 1 for non-parallel connection .

5.4.4. USB Port

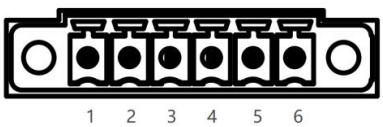
USB Port for firmware upgrade and storage log data, leave it open if not used.

5.4.5. Dry Contact

Terminal type: 6-Pin terminal block

This is for General-purpose output which reserved for future communication and used for an uncommitted digital signal pin on an integrated circuit or electronic circuit (e.g. MCUs/ MPUs) board which may be used as an output, and is controllable by software.

Defined as below:

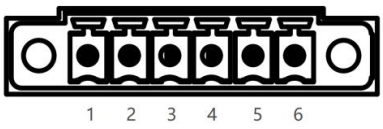
6pin Terminal	Pin	Usage
	1	DRY1_NO
	2	DRY1
	3	DRY1_NC
	4	DRY2_NO
	5	DRY2 / Emergency stop node 1
	6	DRY2_NC / Emergency stop node 1

5.4.6. Inverter Communication Port (connector)

Terminal type: 6-Pin terminal block

Usage: Reserved for direct connection with inverter, same function as the RJ45 port (chapter "**Inverter Communication Port (RJ45)**"), either one of these two will be used.

Defined as below:

6pin Terminal	Pin	Usage
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	CAN2L
	5	CAN2H
	6	CAN2GND

5.4.7. Inverter Communication Port (RJ45)

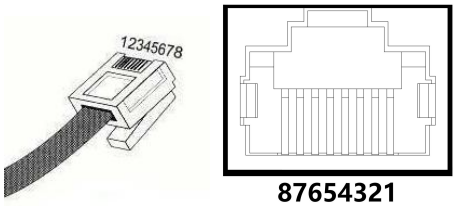
Terminal type: RJ45

Usage: Communicates with inverter, PCS or other equipment.

Installer needs to check the cable pin out before connecting inverter to the battery in order to gain the communication.

For the general information or technical matters in regarding to inverter, please refers to user manual.

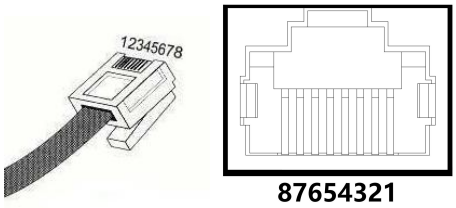
Illustration for battery connection port as shown below:

Port definitions	RJ45 Pin	Function
	1	RS485_2B
	2	RS485_2A
	3	SGND
	4	SGND
	5	SGND
	6	SGND
	7	CAN2H
	8	CAN2L

5.4.8. Debug Port

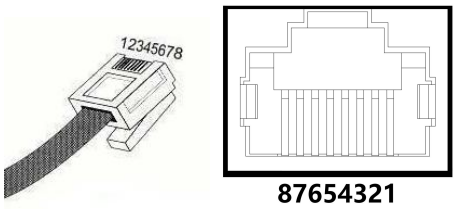
Terminal type: RJ45

Usage: Debug port of the system which used by technician only.

Port definitions	RJ45 Pin	Function
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	CAN1GND
	5	CAN2GND
	6	RS485_2GND
	7	CAN1H
	8	CAN1L

5.4.9. Link A and Link B

Link A and Link B is reserved, leave them open.

Port definitions	RJ45 Pin	Function
	1	CAN2L
	2	CAN2H
	3	CAN2GND
	4	CAN2GND
	5	CAN2GND
	6	CAN2GND
	7	CAN2H
	8	CAN2L

5.4.10. Power Positive & Negative

OT terminal	Screw	Torsion	Wire diameter
RNB14-6	M6	6.0-6.5 N.m	6 AWG

5.4.11. Power Switch

Power switch: Power on/off the main circuit of the battery.

5.4.12. Active Switch

Twist the switch right to active the main controller circuit, after power on, please twist it to upside, otherwise the output will be disable.

5.4.13. On/Off

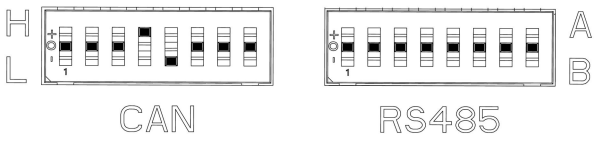
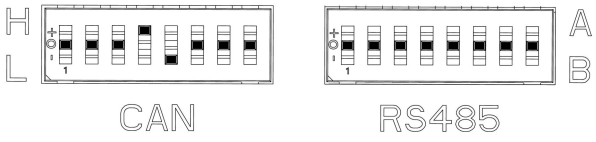
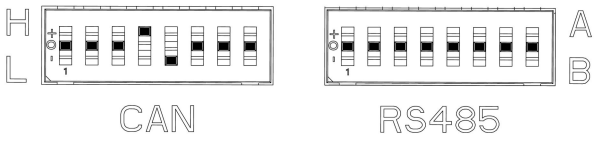
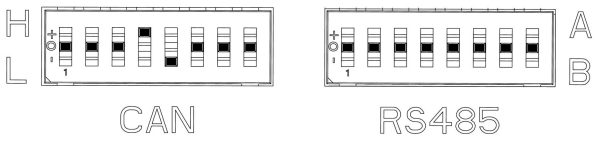
Press this button once to power on the system, and press it again to power off.

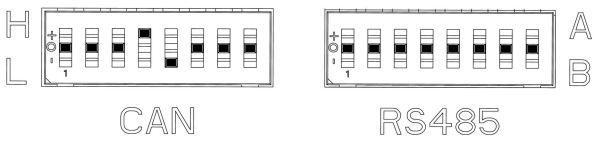
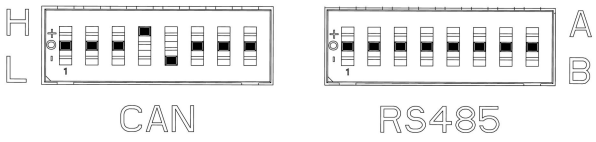
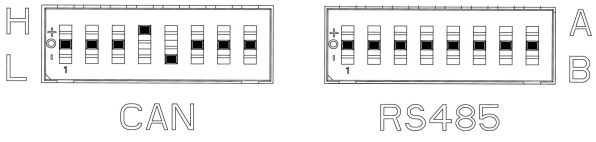
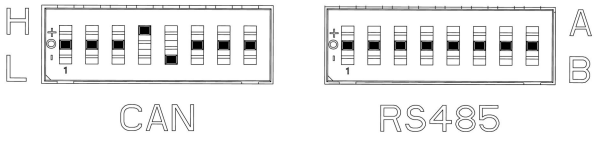
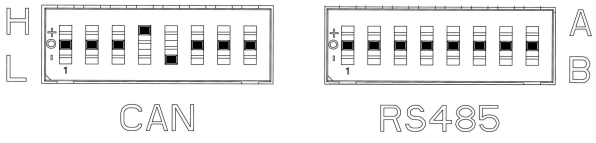
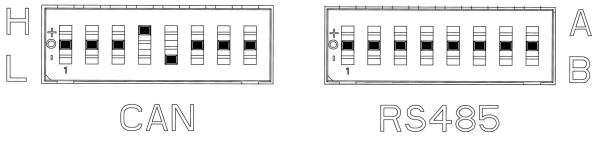
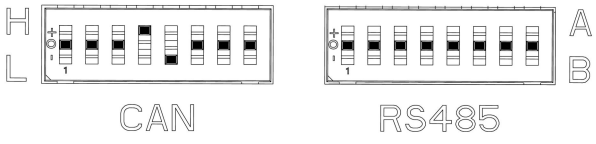
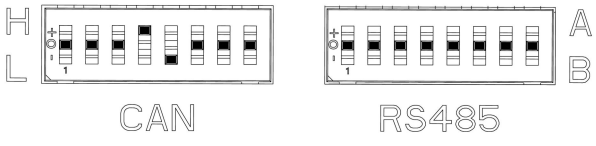
5.4.14. WiFi Antenna

Connect the WIFI antenna to the port in order to get the APP and WEB Function.

5.4.15. Dial Code Switch

If you are using the pin order select box, please refer to the table below to set the dial switch, according to the inverter brand. If the inverter brand is not shown in the table, please refer to the inverter manual or consult Renon's engineer.

Dail switch position	Inverter brand	Comm Mode
	Renon	CAN
	Sol-Ark	CAN
	ThinkPower	CAN
	Deye	CAN

	Solis	CAN
	Growatt	CAN
	MEGAREVO	CAN
	Sofar	CAN
	Renac	CAN
	SINENG	CAN
	Solinteg	CAN
	Fronius	CAN

5.5. Monitoring Screen

5.5.1. LCD Screen Introduction

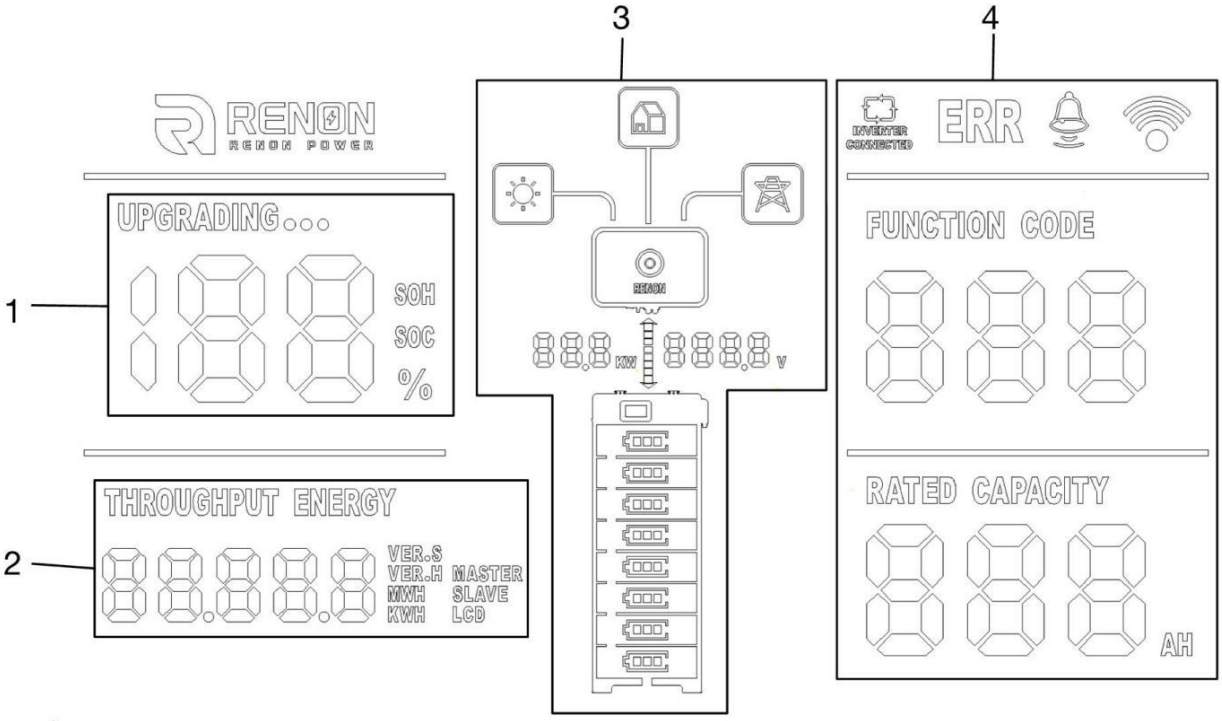


Figure 5.4.1 LCD Screen Introduction

No.	Instructions
1	SOC, SOH and Upgrading State
2	Version and Accumulated Discharge Energy
3	ESS status, Power, and Voltage
4	Battery Operation State

5.5.2. SOC, SOH and Upgrading State

1) The SOC percentage displays when the SOC symbol displays a light underneath, and the current SOH when there is a blinking light underneath SOH. The SOC lights up in 60 second intervals, and the SOH lights up in 3 second intervals.

2) The “UPGRADING…” icon will show up when the battery is performing an upgrade. The percentage indicates the progress of the upgrade.

5.5.3. Version and Accumulated Discharge Energy

The number shows the version of software and hardware for LCD, master, slave, and accumulated discharged energy in kWh or MWh, respectively. Each item will be displayed in 3 second intervals.

5.5.4. ESS status, Power, and Voltage

1) This number displays current power and voltage of the complete battery stack. Direction of the arrow between those two numbers indicates if it's charging or discharging.

2) The battery module icons will indicate the number of battery modules. Online modules will have lights on constantly while offline modules will blink periodically.

5.5.5. Battery Operation Status

1) Indication Code

If there is any error or warning sign, the Indication Code will show up. When the Indication Code displays "ERR", it means an error has occurred. The Indication Code displays "🔔" as a warning reminder. When there is no warning or error, the function code will show as 0.

2) Inverter Connection

"INVERTER CONNECTION" indicates the status of the connection between inverter and battery. It will display when proper connection is detected. Otherwise, it will be off. Some inverters do not feedback signal to battery, this symbol may always off.

3) WiFi Connection Symbol

The WiFi icon will display as long as the WiFi connection id sufficient. It will blink periodically when the WiFi configured for the battery cannot connect to the server. Off means the battery is waiting for WiFi configuration.

No.	Status	Instructions
1	Cloud platform connection	Light on
2	WiFi connection	Flashing
3	Not connection	Light off

4) Rated Capacity

Rated Capacity indicates the nominal capacity of current cluster.

5.6. Screen Display Code

Warning Code (Sign like “ 🔔 ”)

Code	Warning Type
1	Battery cell undervoltage protection
2	Overcurrent charge protection
3	Overcurrent discharge protection
4	High charge temp protection
5	High discharge temp protection
6	Low charge temp protection
7	Low discharge temp protection
8	High ambient temp protection
9	Excessive voltage difference protection
10	Excessive temp of main control relay
11	Overtemp protection of master DC busbar
12	Low insulation resistance protection
13	Low total voltage protection
14	Low ambient temp protection
15	High MOS temp protection
16	Battery cell overvoltage protection
17	High total voltage protection
18	Low SOC protection
19	Overcurrent discharge 2 protection
21	Excessive temp difference protection
22	Positive connector high temp protection
23	Negative connector high temp protection
24	Relay high temp protection
25	Positive high temp protection for docking terminal
26	Negative high temp protection for docking terminal
27	Positive high temp protection for discharge port
28	Negative high temp protection for discharge port
30	Charger overvoltage protection
400	PCS disconnect (All-in-one only)

Error Code (Display as: “ERR”)

Code	Warning Type
100	The main control discharge relay is faulty
101	The main control charge relay is faulty
102	Battery cell fault
103	NTC fault
104	Current sensor fault
105	Pack disconnection
106	Short circuit fault
107	Internal total voltage detection fault
108	Heating fault
109	Battery module conflict
110	Cluster address conflict
111	Charge MOS fault
112	Discharge MOS fault
113	Addressing failure
114	Precharge fault
115	Cluster disconnection
116	Battery reverse connection fault
117	External total voltage detection fault
118	Address non-1 fault
119	Address break-sign failure
121	The faulty of power on switch is not turned off

123	Microelectronic fault
124	Smoke sensor fault
125	The number of slave voltage strings does not match
126	Temp NTC short circuit of master relay
127	Temp NTC open circuit of master relay
128	Temp NTC short circuit of master DC busbar
129	Temp NTC open circuit of master DC busbar
130	Master drop-off fault
132	EMS SN is empty
133	Master SN is empty
134	Pack SN is empty
136	High voltage relay fault
137	DC breaker disconnect
138	Overcurrent charge 2 protection
200	Battery cell undervoltage safety lock
201	Battery cell high voltage safety lock
202	Charge high temp safety lock
203	Charge low temp safety lock
204	Discharge high temp safety lock
205	Discharge low temp safety lock
206	Charge overcurrent safety lock
207	Discharge overcurrent safety lock

6. Troubleshooting & Maintenance

6.1. Regular Maintenance

1) Check the battery modules every 3 months to verify whether there are damages.

2) Check the battery modules every 3 months to verify whether the operating parameter is normal or there is no abnormal heating.

3) Fully charge and discharge the battery system every 3 months.

4) Clean the battery modules with a dry rag once a month.

6.2. Troubleshooting

Phenomenon	Investigation & troubleshooting
The number of battery module symbol is incorrect. 	1. Make sure the whole battery system is stacked neatly. 2. Try to restart the battery system.
The symbol of battery modules on the screen is blinking (frequency of 1s) 	1. Make sure the whole battery system is stacked neatly. 2. Make sure the function dial switch code setting is correct, please refer to chapter “function dial switch”. 3. Try to restart the battery system.
Unable to turn on the battery	1. Try to charge the battery with the activation charging function on the inverter when power is on.
Unable to find the battery on the app or the Cloud	1. Make sure the antenna is tightened properly. 2. Make sure the WiFi configuration is correct. 3. Make sure the SSID & PASSWORD of your private WiFi is correct, please enter information case-sensitively without space. 4. Make sure the frequency of the WiFi connected to the product is not 5GHz (2.4GHz and 2.4GHz / 5GHz is acceptable). 5. Make sure the signal is strong enough. 6. Make sure is working. 7. Make sure installer has added your products to your account. 8. Try to restart the WiFi router.

No output after power on.	1. Make sure the address dial code setting is correct, refer to the chapter of address dial code. 2. Make sure SOC is not 0%, otherwise charge battery. 3. Make sure the activate switch is rotate to “OFF” (upside).
Unable to communicate with inverter	1. Make sure the connection of communication cable and power cable is correct, refer to the chapter of connection of cable and power. 2. Make sure the address dial code of the master controller connected to inverter is 1. 3. Make sure the inverter dial code of the master controller connected to inverter is correct, refer to the chapter of inverter dial code. 4. If you are using a pin order select box, please verify that the dialing switch is configured correctly.
Unable to be charged by inverter	1. Make sure power cable connection is correct. 2. Check whether inverter has faults. 3. Check whether grid or PV is available. 4. Make sure Time of Use of the inverter setting is correct. 5. Make sure charging voltage and charging current setting of the inverter match the parameters of the battery. 6. Check the battery low or high temperature protection alarm. 7. Check the over current protection alarm. 8. Make sure the SOC value is below 96% (default value).
Unable to discharge while SOC is not zero	1. Make sure the connection of cables is correct and circuit breaker is ON. 2. Check whether inverter has faults. 3. Make sure the inverter setting is not in back up mode. 4. Check whether SOC is lower than the shutdown value of the inverter. 5. Check the battery low or high temperature protection alarm. 6. Check the over current protection alarm.
SOC value change instantly.	1. It is normal that the SOC value will be calibrated when the battery has been fully charged, or deeply discharged.
Error or Alarm shown on the screen	1. Check the battery. Refer to the definition of the error or warming codes. If you cannot determine the cause of the error.

6.3. Status Codes

The following status codes are displayed on the cloud platform.

6.3.1. Warning Codes

Code	Warning type	Investigation & troubleshooting
W1	Battery cell undervoltage alarm	1. Low voltage level and needs to be charged.
W2	Charge overcurrent alarm	1. Restore to factory setting; 2. Make sure the inverter's setting of max current does not exceed the max charge current of the battery.
W3	Discharge overcurrent 1 alarm	1. Make sure the power of load does not exceed the power of battery.
W4	High charge temp alarm	1. Make sure the battery temperature shown on the inverter or the app is below 131℉ (55℃), otherwise turn off the battery until the temperature is below 131℉ (55℃), and then try to charge battery.
W5	High discharge temp alarm	1. Make sure the battery temperature shown on the inverter or the app is below 131℉ (55℃), otherwise turn off the battery until the temperature is below 131℉ (55℃), and then try to discharge battery.
W6	Low charge temp alarm	1. Make sure the battery temperature shown on the inverter or the app is above 32℉ (0℃), otherwise turn off the battery until the temperature is above 32℉ (0℃), and then try to charge battery.
W7	Low discharge temp alarm	1. Make sure the battery temperature shown on the inverter or the app is above -4℉ (-20℃), otherwise turn off the battery until the temperature is above -4℉ (-20℃), and then try to charge battery.
W8	High ambient temp alarm	1. Make sure the ambient temperature of the battery is below 122℉ (50℃).
W9	High voltage difference alarm	1. Restart the battery, and if error code W9 still remains or reappears, contact your installer.
W11	High main DC busbar temp alarm	1. Restart the battery, and if error code W11 still remains or reappears, contact your installer.
W12	Low insulation resistance alarm	1. Restart the battery, and if error code W12 still remains or reappears, contact your installer.
W13	Low total voltage alarm	1. Low voltage level and needs to be charged

W14	Low ambient temp alarm	1. Make sure the ambient temperature of the battery is above -13℉ (-25℃).
W15	High MOS temp alarm	1. Reduce the ambient temperature and restart the battery.
W16	Battery cell overvoltage alarm	1. High voltage level and needs to be discharged.
W17	High total voltage alarm	1. High voltage level and needs to be discharged.
W18	Low SOC alarm	1. Low SOC and needs to be charged.
W21	High temp difference alarm	1. Restart the battery, and if error code W21 still remains or reappears, contact your installer.
W22	Positive connector high temp alarm	1. Restart the battery, and if error code W22 still remains or reappears, contact your installer.
W23	Negative connector high temp alarm	1. Restart the battery, and if error code W23 still remains or reappears, contact your installer.
W24	Relay high temp alarm	1. Restart the battery, and if error code W24 still remains or reappears, contact your installer.
W25	Positive high temp alarm for docking terminal	1. Restart the battery, and if error code W25 still remains or reappears, contact your installer.
W26	Negative high temp alarm for docking terminal	1. Restart the battery, and if error code W26 still remains or reappears, contact your installer.
W27	Positive high temp alarm for discharge port	1. Restart the battery, and if error code W27 still remains or reappears, contact your installer.
W28	Negative high temp alarm for discharge port	1. Restart the battery, and if error code W28 still remains or reappears, contact your installer.
W400	PCS disconnection	1. Restart the battery, and if error code W400 still remains or reappears, contact your installer.

6.3.2. Error Codes

Code	Error Type	Investigation & troubleshooting
F100	The main control discharge relay is faulty	1. This fault is reported because the main circuit switch of the main control charging and discharging is damaged or due to current deviation when the main circuit switch is not closed. Please contact our technical support or your installer for handling.
F101	The main control charge relay is faulty	1. This fault is reported because the main circuit switch of the main control charging and discharging is damaged or due to current deviation when the main circuit switch is not closed. Please contact our technical support or your installer for handling.
F102	Battery cell fault	1. Battery capacity may decrease due to self-discharge from prolonged disuse. When the cell voltage drops below 1.5V, a cell malfunction is triggered (we do not recommend recharging and continuing use when the cell voltage is below 1.8V). Please contact our technical support or your installer. 2. If a cell malfunction suddenly occurs during battery use, it may be due to abnormal cell voltage monitoring by the BMS. Please contact our technical support or your installer.
F103	NTC fault	1. NTC fault triggered due to open circuit or short circuit of PACK_NTC sampling resistor; please contact our technical support or your installer.
F104	Current sensor fault	1. The current reading of the battery is not 0 when there is no actual current, indicating a current offset. Please contact our technical support or your installer in a timely manner for handling. 2. The battery actually has current, but the reading is 0, which may be due to an abnormal Hall sensor. If a Hall replacement or main controller replacement is required, please contact our technical support or your installer for handling.
F105	Pack disconnection	1. A certain PACK of the battery has shut down due to under-voltage, causing the Master to lose communication with it, reporting a PACK disconnection fault. If restarting the battery fails to resolve the issue, please contact our technical support or your installer for handling. 2. Poor battery stacking may cause PACK disconnection; restack the batteries and then restart the device; 3. 3. When installing the battery, the absence of a base or an abnormal base causes the addressing action not to be performed. After correctly installing the base, turn on the device again.
F106	Short circuit fault	1. The power wires of the battery's positive and negative poles are incorrectly connected. Please check the power wire connections. 2. The circuit breaker between the battery and the inverter experiences a large current surge that triggers short-circuit protection when the circuit breaker is closed immediately after the battery is fully powered on. This protection is released after restarting the battery, but the correct operating procedure should be: close the circuit breaker first, then start the battery.
F107	Internal total voltage detection fault	1. The difference between the number of battery cells configured by the battery master controller and the cumulative value of the battery cells is greater than 5%. Please correctly install the battery and the base, then manually set the battery address DIP switch to "100001". Wait for the master controller buzzer to sound continuously, then the addressing is completed. Set the DIP switch back to "100000" and restart the battery to resolve the fault. If the master controller buzzer sounds 5 times during the addressing process, it indicates that the addressing is unsuccessful. Please check if the battery stack is properly installed

F108	Heating fault	1. When the battery activates the heating film in a low-temperature environment, if the cell temperature rises to 15°C but the heating film does not stop working, and after continuous heating, the cell temperature exceeds 55°C, the battery reports a heating fault. After restarting the battery, it can continue to be used. Meanwhile, please contact our technical support or your installer in a timely manner.
F109	Battery module conflict	1. Two PACKs with the same address are detected within a single cluster battery system. Please correctly install the battery and base, then manually set the battery address DIP switch to "100001". Wait for the main control buzzer to sound a long beep, indicating the end of address search. Then set the DIP switch back to "100000" and restart the battery to clear the fault. If the main control buzzer beeps 5 times during the address search, it means the address search was unsuccessful. Please check if the battery stack is properly installed.
F110	Cluster address conflict	1. When batteries are used in parallel connection between clusters, two or more batteries with the same address appear in the system due to failure to perform address DIP switch settings as instructed in the installation manual, triggering an address conflict. Please perform DIP switch settings according to the address DIP switch method marked in the manual and restart all batteries. If this issue cannot be resolved, please contact our technical support or your installer for assistance.
F113	Addressing failure	1. The battery module is not stacked in place. Please restack the battery, turn on the battery, manually set the battery address DIP switch to "100001", wait for the main control buzzer to sound a long beep, and then set the DIP switch back to "100000" after the addressing is completed; 2. The base addressing end is abnormal. Please correctly install the battery and the base, then manually set the battery address DIP switch to "100001". Wait for the main control buzzer to sound continuously, and after the addressing is completed, set the DIP switch back to "100000". If the problem cannot be resolved, please contact our technical support or your installer for handling.
F114	Precharge fault	1. During the startup process of the battery connected to the inverter, due to the large capacitance of some inverters, the battery fails to close the main circuit, triggering a pre-charge fault. It is recommended to use the mains power to supply the inverter before activating the battery; 2. When the battery is powered on without being connected to any device and reports a pre-charge fault, it may be due to an abnormal port voltage correction. Please contact our technical support or your installer for handling.
F115	Cluster disconnection	1. When installing the batteries in parallel between clusters, the Function DIP switch was not set according to the manual, resulting in abnormal communication between clusters. Please set the Function DIP switch according to the method specified in the manual; 2. During the parallel operation of the battery system, the communication cable may be loose or aged. Please check the connection of the communication cable. If the problem cannot be resolved, please contact our technical support or your installer for handling.
F116	Battery reverse connection fault	1. Check if the external wiring of the battery is correct. If the wiring is correct, please contact our technical support or your installer for handling.

F117	External total voltage detection fault	1. When the battery is turned on without being connected to any device, the external total voltage detection may indicate an abnormal port voltage correction. Please check if there is any software available for upgrade on the Cloud Computing Platform. If not, please contact our technical support or your installer for handling.
F118	Address non-1 fault	1. When using a single battery cluster, if the DIP switch address is not set to address 1, a fault indicating an address other than 1 will be reported after power-on. After setting the battery address DIP switch to the correct position, restart the battery; if this does not resolve your issue, please contact our technical support or your installer for assistance.
F119	Address break-sign failure	1. When using batteries in parallel, if the battery address DIP switches are not configured according to the manual, a battery module conflict may occur due to a lack of consecutive addresses. Please configure the correct address DIP switches according to the manual and restart all batteries. 2. If the battery address DIP switches are consistent with the manual, but the problem persists after restarting, please contact our technical support or your installer for assistance.
F121	The faulty of power on switch is not turned off	1. After the battery is turned on, the rotary switch is not reset to (OFF). Please follow the startup sequence instructions in the battery manual to turn it on.
F125	The number of slave voltage strings does not match	1. Restart the battery, and if error code F125 still remains or reappears, contact your installer.
F130	Master drop-off fault	1. Master has lost communication with the display and the display shows abnormal values. Please contact our technical support or your installer for handling.
F132	EMS SN is empty	1. Restart the battery, and if error code F132 still remains or reappears, contact your installer.
F133	Master SN is empty	1. Restart the battery, and if error code F133 still remains or reappears, contact your installer.
F134	Pack SN is empty	1. Restart the battery, and if error code F134 still remains or reappears, contact your installer.
F137	DC breaker disconnect	1. Restart the battery, and if error code F137 still remains or reappears, contact your installer.
F138	Overcurrent charge 2 protection	1. Restart the battery, and if error code F138 still remains or reappears, contact your installer.
F150	Cluster quantity overrun fault	1. The maximum number of parallel-connected high-voltage batteries allowed is 4 units. If the number of parallel-connected units exceeds 4, it will trigger a fault indicating that the number of clusters has exceeded the limit. Please reduce the number of parallel-connected battery clusters for use.
F151	Fault of inconsistent number of series-connected cells in the module	1. When using a single cluster battery, if the number of cells in one module is 32 strings and the number of cell strings in the remaining modules is 30 strings, a fault indicating inconsistent number of cell strings in the modules will be triggered. Please

		check whether the number of battery strings and the voltage platform shown on the nameplate of the battery module are consistent with those of other modules. If they are consistent, please contact our technical support or your installer for handling.
F152	Fault of inconsistent number of multi-cluster modules	1. When performing cluster parallel operation of batteries, if a one-to-five battery and a one-to-four battery are paralleled, it will trigger a fault due to inconsistent numbers of multi-cluster modules. Please ensure that the number of stacked battery modules in each cluster is consistent before performing parallel operation.
F153	Device has locked up due to a fault	1. The battery has not been connected to the Cloud Computing Platform for a long time, and the actual operating status of the battery is unknown. For safety reasons, the battery has spontaneously initiated protection, thereby triggering device lock. Please contact our technical support or your installer for handling.
F200	Battery cell undervoltage safety lock	1. The battery has triggered the cell under-voltage safety lock because the cell self-discharged to a cell voltage below 1.9V due to long-term non-use. Please contact our technical support or your installer for handling. 2. Due to abnormal data collection, the actual cell voltage does not match the sampled value, and when the voltage of the cell being sampled is below 1.9V, it triggers the single cell under-voltage safety lock; please contact our technical support or your installer for handling.
F201	Battery cell high voltage safety lock	1. Due to abnormal data collection, the actual cell voltage does not match the sampled value. When the voltage of the cell being sampled exceeds 3.95V, the single-cell high-voltage safety lock is triggered; please contact our technical support or your installer for handling.
F202	Charge high temp safety lock	1. During the battery charging process, when the cell temperature reaches 58°C, the high-temperature safety lock for charging is triggered. Leave the battery to stand and wait for the cell temperature to drop, and simultaneously contact our technical support or your installer for handling.
F203	Charge low temp safety lock	1. The battery cell temperature has reached -8°C, triggering the low-temperature charging safety lock. Please contact our technical support or your installer for handling.
F204	Discharge high temp safety lock	1. During the battery discharge process, when the cell temperature reaches 58°C, the high-temperature safety lock for discharge is triggered. Leave the battery to stand and wait for the cell temperature to drop, and simultaneously contact our technical support or your installer for handling.
F205	Discharge low temp safety lock	1. The cell temperature has reached -28°C, triggering the low-temperature safety lock for discharging. Please contact our technical support or your installer for handling.
F206	Charge overcurrent safety lock	1. The battery repeatedly reported overcurrent charging protection more than 10 times before reporting the overcurrent charging safety lock. The battery has entered the overcurrent charging safety lock. Please contact our technical support or your installer for handling.
F207	Discharge overcurrent safety lock	1. The battery repeatedly reported overcurrent discharge protection more than 10 times before reporting the overcurrent discharge safety lock. The battery has entered the overcurrent discharge safety lock. Please contact our technical support or your installer for handling.

6.3.3. Protection Codes

Code	Error Type	Investigation & troubleshooting
P1	Battery cell undervoltage protection	1. Due to the battery being in a long-term shutdown and stationary state, or being turned on and connected to an inverter but not charged for a long time, the battery voltage drops due to self-discharge or powering the inverter's standby mode. Generally, protection is triggered and the battery shuts down when the voltage of the lowest cell drops below 2.7V. After restarting, it will enter a 5-minute charging window, during which the battery can be charged using an inverter or a DC power supply. It is recommended to use an inverter to fully charge the battery. 2. When the battery cell voltage is below 2.5V, the battery will not be able to charge at this time. To prevent the cell voltage from continuously decreasing, please contact our technical support or your installer for prompt handling.
P2	Overcurrent charge protection	1. When the system charging power is greater than the rated charging power of the battery, if the charging current is greater than 49A and persists for more than 5 seconds, the battery will trigger the protection mechanism; please check the communication between the battery and the inverter or reduce the inverter power. When the communication between the battery and the inverter is normal, the battery will send the current that the battery or the system itself can withstand to the inverter for charging. If the communication is abnormal, overcurrent protection may occur. 2. The battery charging current is always less than 49A, and there is over current protection. Please contact our technical support or your installer promptly for handling.
P3	Overcurrent discharge protection	1. When the system discharge power is greater than the rated charging power of the battery, if the discharge current is greater than 49A and persists for more than 5 seconds, the battery will trigger the protection mechanism; this is usually due to excessive load power or excessive power sold; please check the communication between the battery and the inverter or reduce the discharge power. When the communication between the battery and the inverter is abnormal, the operating state between them is often uncontrollable; if the communication between the inverter and the battery is normal and the battery experiences overcurrent protection, please confirm whether the battery output power meets your daily usage. 2. The battery discharge current is always less than 49A, and the power required by the load is less than the rated output power of the battery, which has triggered the overcurrent protection for discharging. Please contact our technical support or your installer promptly for handling.
P4	High charge temp protection	1. The battery cell temperature rises due to charging after long-term high-power usage, and at this time, the cell temperature exceeds the set threshold (55°C), triggering the over-temperature protection for charging; please pause charging and wait for the cell temperature to decrease before charging again. 2. The ambient temperature at the battery installation location is relatively high, and during battery operation, the increase in cell temperature can easily trigger the over-temperature protection of the battery; please lower the ambient temperature at the battery installation location or reselect an environment with a lower temperature to install the battery;

		3. 3. If there is a significant difference in temperature between one cell and other cells in the battery (which can be viewed on the Cloud Platform), it may indicate an abnormal temperature reading of the cell by the BMS. Please contact our technical support or your installer promptly.
P5	High discharge temp protection	1. The battery cell temperature rises due to long-term high-power electricity consumption, and at this time, the cell temperature exceeds the set threshold (55°C), triggering the over-temperature protection for charging; please suspend using the battery and wait for the cell temperature to decrease before using it again. 2. The ambient temperature at the battery installation location is relatively high, and during battery operation, the increase in cell temperature can easily trigger the over-temperature protection of the battery; please lower the ambient temperature at the battery installation location or reselect an environment with a lower temperature to install the battery; 3. If there is a significant difference between the temperature of a certain cell in the battery and that of other cells (which can be viewed on the Cloud Platform), it may indicate an abnormal temperature collection of the cell by the BMS;Please contact our technical support in a timely manner or your installer.
P6	Low charge temp protection	1. If the ambient temperature at the installation location is below 0℃, a battery with a heating film must be purchased. Batteries without heating functionality cannot be used. If the battery has a heating function, a DC power supply or inverter is required to charge the battery to maintain the power needed for the heating film. If the battery's thermal management is malfunctioning, please contact our technical support or your installer. 2. If the cell temperature monitoring is abnormal, and one or more cells are found to be below the normal ambient temperature, triggering the low-temperature protection during charging, please contact our technical support or your installer immediately for assistance.
P7	Low discharge temp protection	1. If the ambient temperature at the installation location is below -20℃, a battery with a heating film must be purchased. Batteries without heating functionality cannot be used. If the battery has a heating function, a DC power supply or inverter is required to charge the battery to maintain the power needed for the heating film. If the battery's thermal management is malfunctioning, please contact our technical support or your installer. 2. If the cell temperature monitoring is abnormal, and one or more cells are found to be below the normal ambient temperature, triggering the low-temperature protection during charging, please contact our technical support or your installer immediately for assistance.
P8	High ambient temp protection	1. Please upgrade all battery software to the latest version. If the issue cannot be resolved, please contact our technical support or your installer in a timely manner for handling.

P9	Excessive voltage difference protection	1. At the end of charging and discharging, the voltage difference increases due to the characteristics of lithium batteries. When the cell voltage difference reaches 500mV, protection will be triggered. This alarm is only applicable to the battery in a static state. If the voltage difference protection is triggered at the end of charging and discharging, it can be ignored,wait for the cell voltage difference to recover on its own. 2. During the battery's standing process, over-large voltage difference protection is triggered, which may be caused by abnormal BMS single cell acquisition, abnormal cells, abnormal BMS acquisition power consumption, etc. Please contact our technical support or your installer promptly for handling.
P10	Excessive temp of main control relay	1. During the battery charging and discharging process, due to loose connections of the power cables at the battery ports, the internal resistance increases, causing the temperature of the power cables and copper bars to rise, which triggers the high-temperature protection of the relay. Please check the connections of the power cables. If you have any questions, please contact our technical support or your installer in a timely manner for handling.
P11	Overtemp protection of master DC busbar	1. During the battery charging and discharging process, the internal resistance increases due to loose connections of the power cables at the battery ports, causing the temperature of the power cables and copper busbars to rise, which triggers the high-temperature protection of the copper busbars. Please check the connections of the power cables. If you have any questions, please contact our technical support or your installer in a timely manner for handling.
P12	Low insulation resistance protection	1. Please upgrade all battery software to the latest version. If the issue cannot be resolved, please contact our technical support or your installer in a timely manner for handling.
P13	Low total voltage protection	1. The total battery voltage is below the set threshold. Please use the inverter to charge the battery. 2. If the battery is being installed for the first time, set the first and last digits of the battery address DIP switch to "1", wait for the battery buzzer to sound continuously for 5 seconds, confirm that there are no fault alarms on the battery display screen, and then reset the address DIP switch.
P14	Low ambient temp protection	1. Please upgrade all battery software to the latest version. If the issue cannot be resolved, please contact our technical support or your installer in a timely manner for handling.
P15	High MOS temp protection	1. When the battery is in normal communication with the inverter and the battery is connected to the Cloud Platform, but the inverter data fails to be uploaded to the Cloud Computing Platform, it will trigger the PCS disconnection alarm. Please check the communication line connection or re-dial the inverter address.

P/N: 118.601.00.0144

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