RENON

User Manual

EBrick-IND

A05 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 ensured 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 (42-24 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 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 void the warranty.
- During long 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.

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.

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 carbon dioxide, FM-200 or ABC dry powder 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.

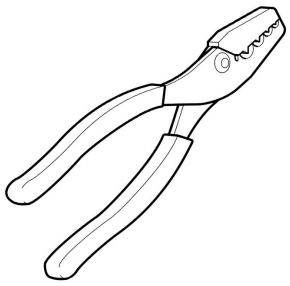
2.1.2 Precautions

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.

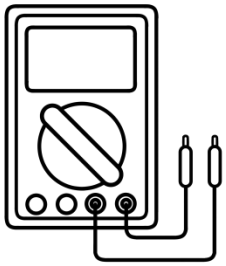
2.1.3 Tools

The following tools are required to install the product:

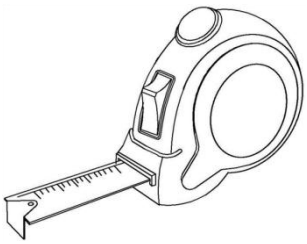
Hammer Drill



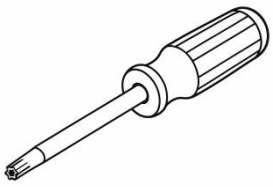
Crimping Pliers



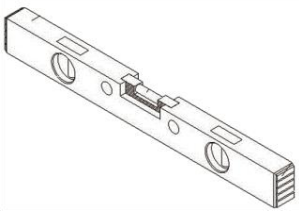
Multimeter



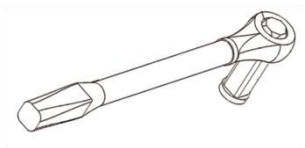
Measuring Tap



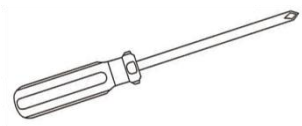
Hex Wrench



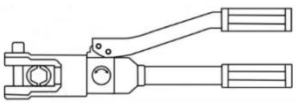
Spirit Level



Torque Wrench



Phillips Screwdriver



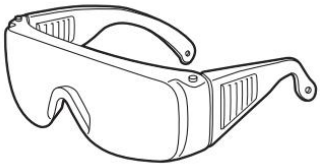
Hydraulic Clamp

Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover all 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 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.

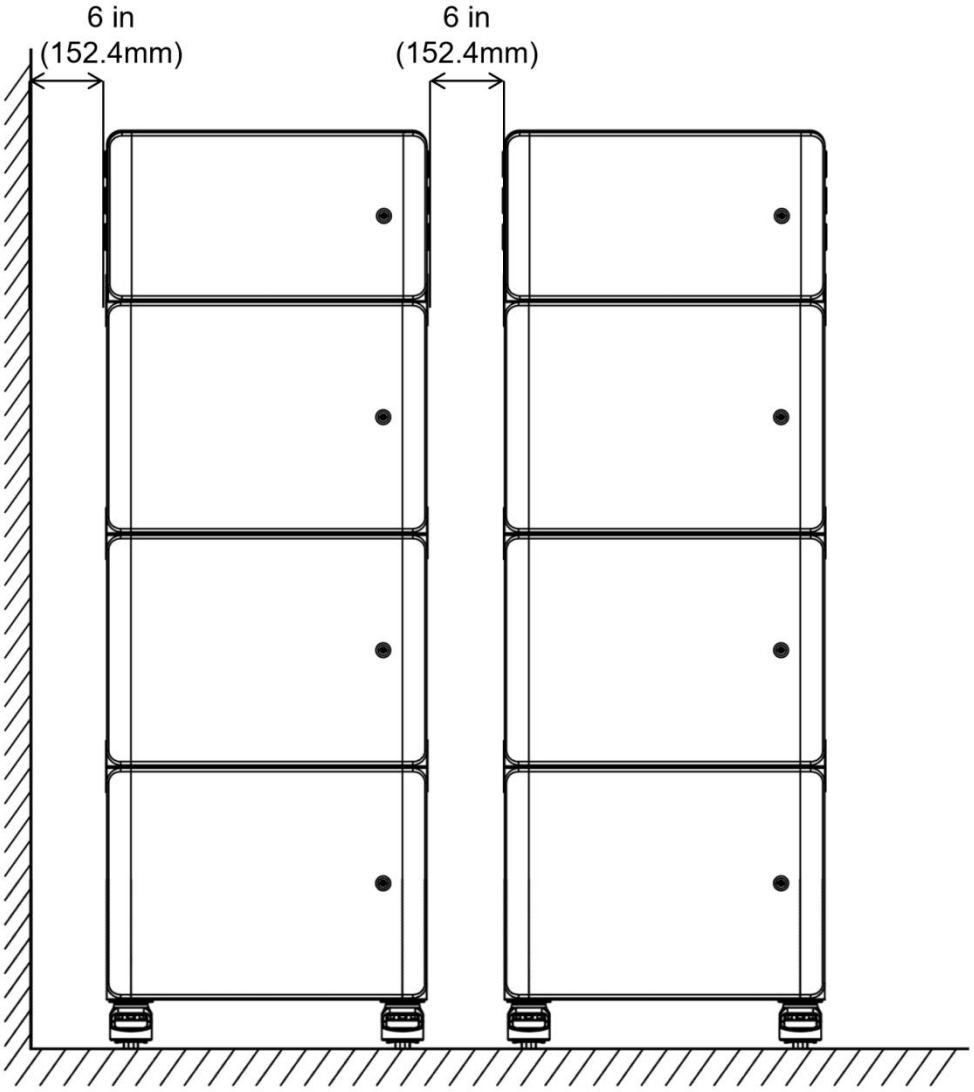


Figure 2.2.1. Installation distance

2.3 Installation Location

Make sure that the installation location meets the following conditions:

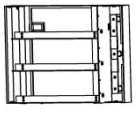
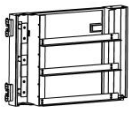
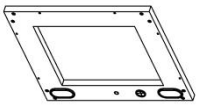
- The floor is flat and level.
- The surface of the wall is smooth and perpendicular to the ground, which can bear the weight.
- The area is completely water proof.
- The area shall avoid direct sunlight.
- There are no flammable or explosive materials.
- The distance from heat source is more than 80 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.

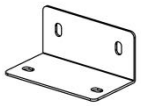
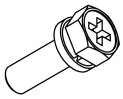
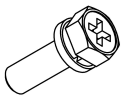
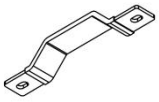
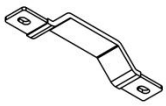
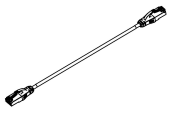
2.4 Package Items

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.

Packing List is shown in the following table:

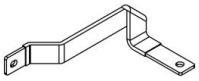
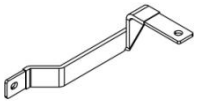
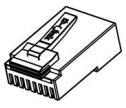
1) Battery Cabinet:

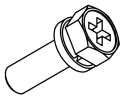
No.	Item	Specification	Qty	Usage	Diagram
1	Front door	F	1	Cabinet components	
2	Back frame	E	1	Cabinet components	
3	Right side panel	B	1	Cabinet components	
4	Left side panel	A	1	Cabinet components	
5	Bottom frame	D	1	Cabinet components	

6	Top frame	C	1	Cabinet components	
7	Connecting bracket	G	2	Fixing the cabinet	
8	Screw	M8x16	12	Fixing the cabinet	
9	Screw	M8x53	4	Fixing the cabinet	
10	Screw	M6x16	10	1．Fixed battery cabinet 2．Grounding	
11	Screw	M5x12	12	Module fixation	
12	Busbar	Black	1	Use for negative power cable connection	
13	Busbar	Orange	1	Use for positive power cable connection	
14	Key	/	1	Lock or unlock battery cabinet	
15	Communication cable	L = 7.87 in (200 mm)	2	Use for communication	
16	Communication cable	L = 13.78 in (350 mm)	1	Use for communication	
17	Grounding cable	12 AWG, L = 5.91 in (150 mm)	3	Use for grounding	

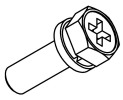
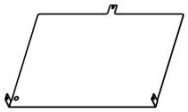
18	Grounding cable	4 AWG, L = 7.09 in (180 mm)	1	Use for grounding	
19	Positive power cable	L = 8.66 in (220 mm), Red	3	Use with Connector	
20	Negative power cable	L = 8.66 in (220 mm), Black	3	Use with Connector	

2) Main control:

No.	Item	Specification	Qty	Usage	Diagram
1	Main control	R-MC300-PRO	1	/	
2	Busbar	Black	1	Use for negative power cable connection	
3	Busbar	Orange	1	Use for positive power cable connection	
4	OT terminal	SC70-10	4	Use for wiring	
5	Communication cable	RJ45; L = 16.93 in (430 mm)	1	Connect to pack	
6	Network cable connector	8P8C	2	Use for communication cable	
7	OT terminal	SC120-10	2	Use for wiring	

8	Key	/	1	Lock or unlock main control	
9	Ground cable	L = 5.91 in (150 mm)	1	Use for grounding	
10	Screw	M6x16	3	Fixed battery cabinet	
11	Strip	Φ6-6.5, L = 6.77 in (172mm)	7	Fixed cable	

3) Casters:

No.	Item	Specification	Qty	Usage	Diagram
1	Caters	80F	4	Installed at the bottom of the battery cabinet	
2	Screw	M6x16	19	1. Fixed caster wheel 2. Fixed cover	
3	User Manual	EBrick-IND	1	User Manual	
4	Quick Installation Manual	EBrick-IND	1	Installation Manual	
5	WiFi antenna	L = 39.37 in (1m), KH-2400-1M-XP	1	Connects with internet	
6	Cover	26.12x21.19x2.05 in (663.4x538.3x52 mm), T=0.06 in (1.5 mm)	1	Install at the top of cabinet	

3 Installation

3.1 Cabinet Installation

1. Align panels A, B, C, and D, then interlock them and secure with screws.

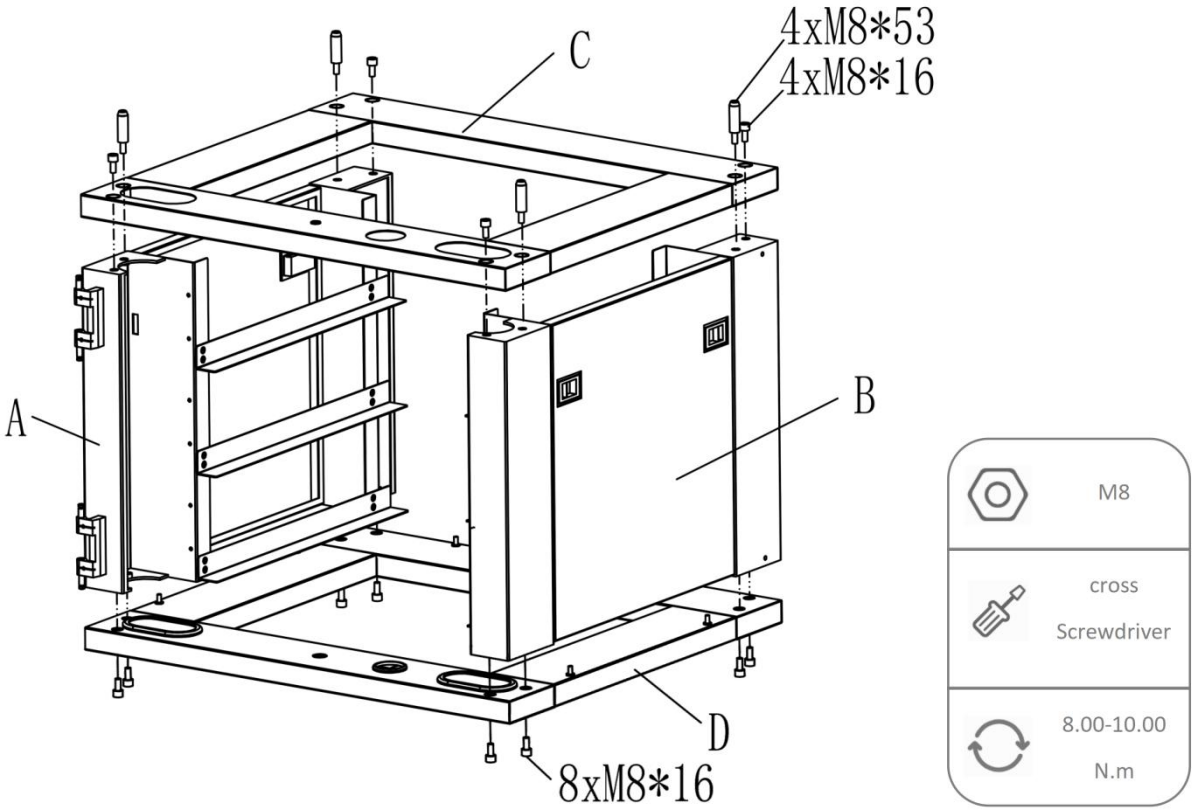


Figure 3.1.1. Install A, B, C and D panels

2. Place the back cover panel E on back frame and fix by using guidepost.

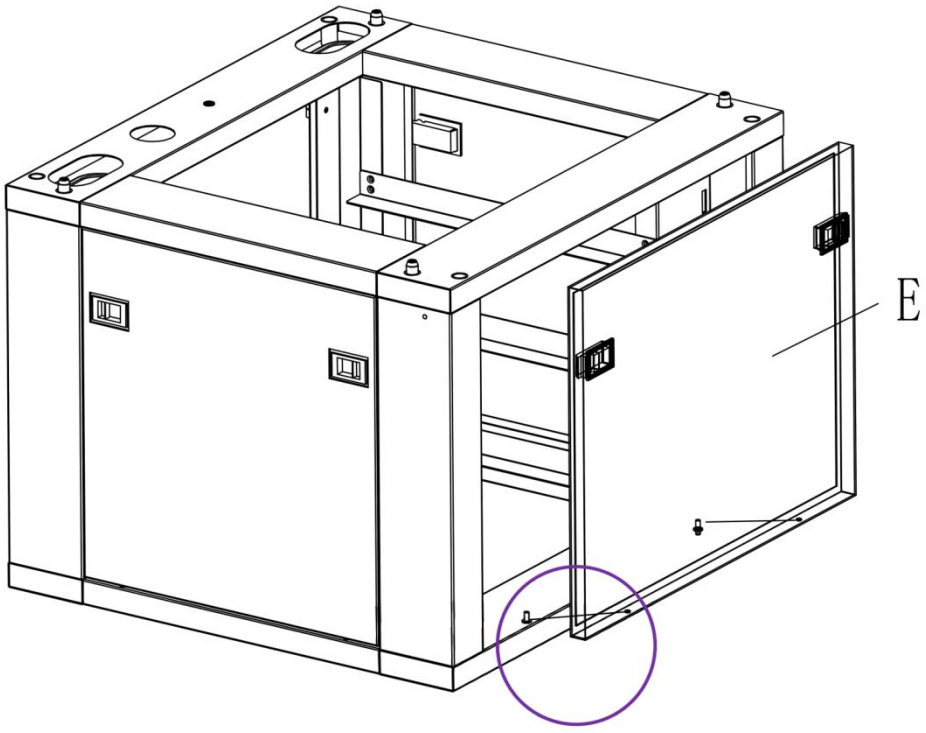


Figure 3.1.2. Install back panel

3. Fasten each wheel to rack by 4*M6 screws with a socket wrench. 4 Wheels and 16*M6 screws provided in package.

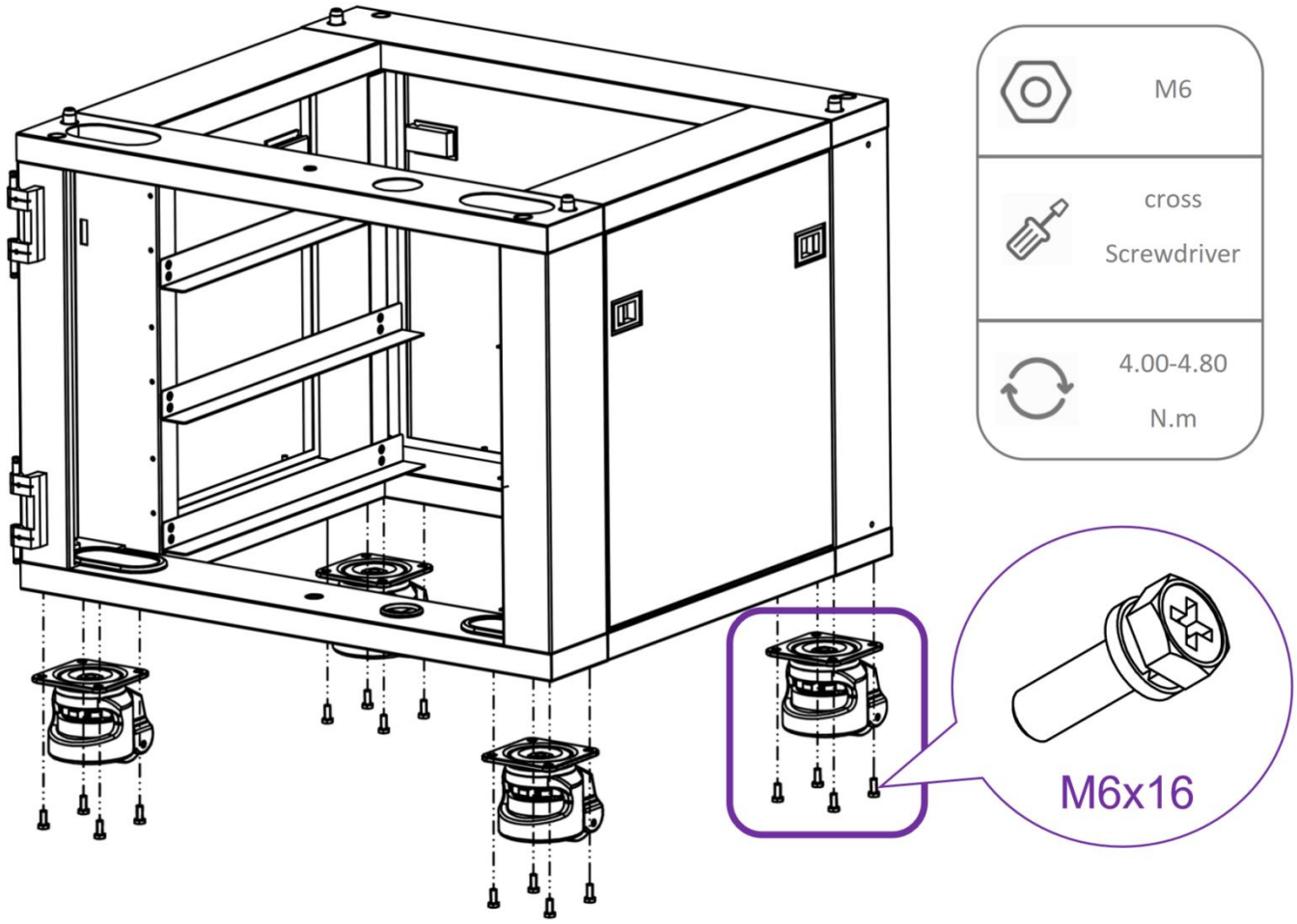


Figure 3.1.3. Install universal wheel

4. Fix the door to cabinet with 2 hinges and guidepost.

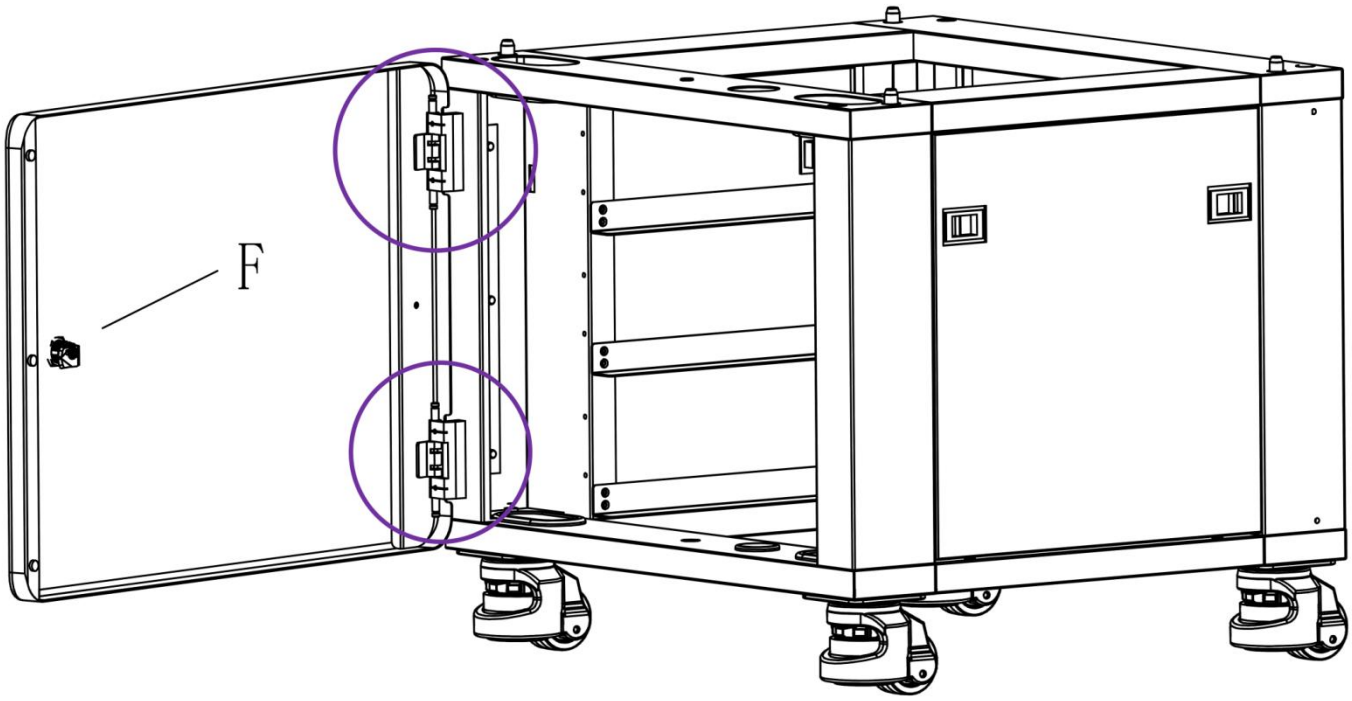


Figure 3.1.4. Fix the door

5. Rotate the universal wheel horizontal regulating valve counterclockwise to fix it and make the bottom close to the ground. Use a spirit level to measure and ensure it is placed horizontally.

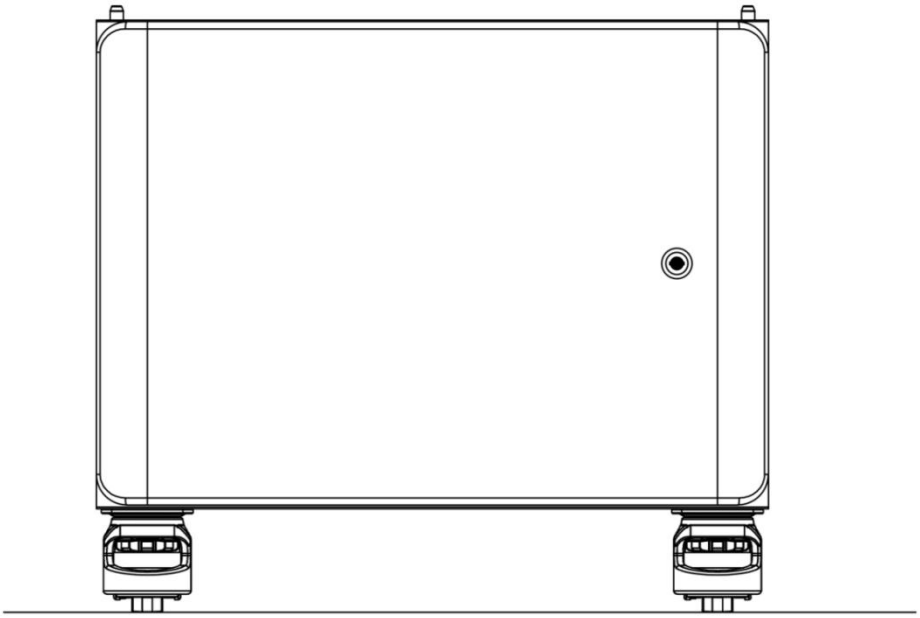


Figure 3.1.5. Adjust universal wheel

3.2 Device Installtaion

1. Following the above steps, sequentially stack three battery cabinets and the main control cabinet.

Note: *The maximum number of battery cabinets that can be stacked is 4.*

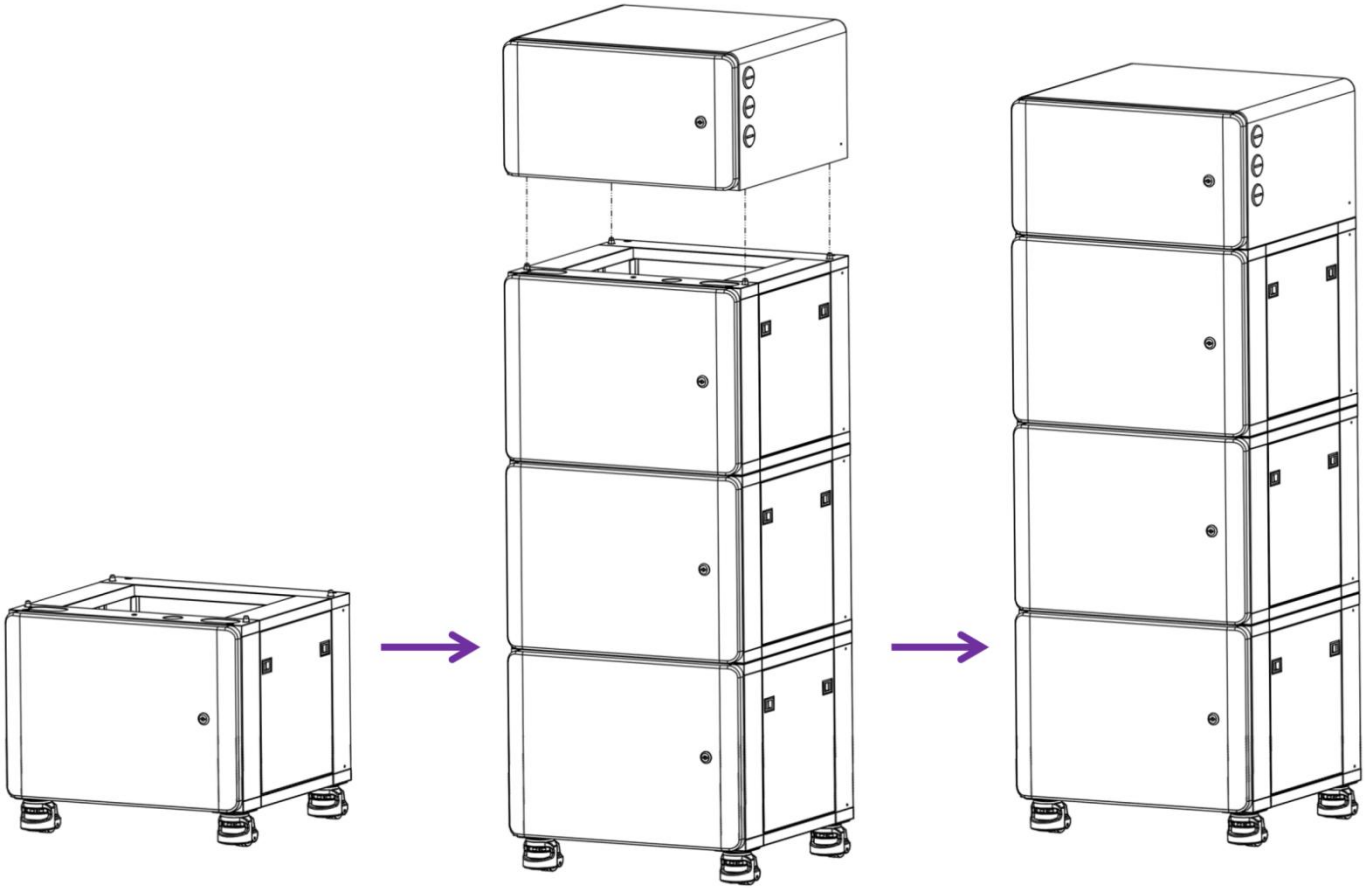


Figure 3.2.1. Stack cabinets

2. Install the connecting brackets on both sides, securing each bracket with 2*M6 screws. And secure the vertically stacked cabinets using M6 screws.

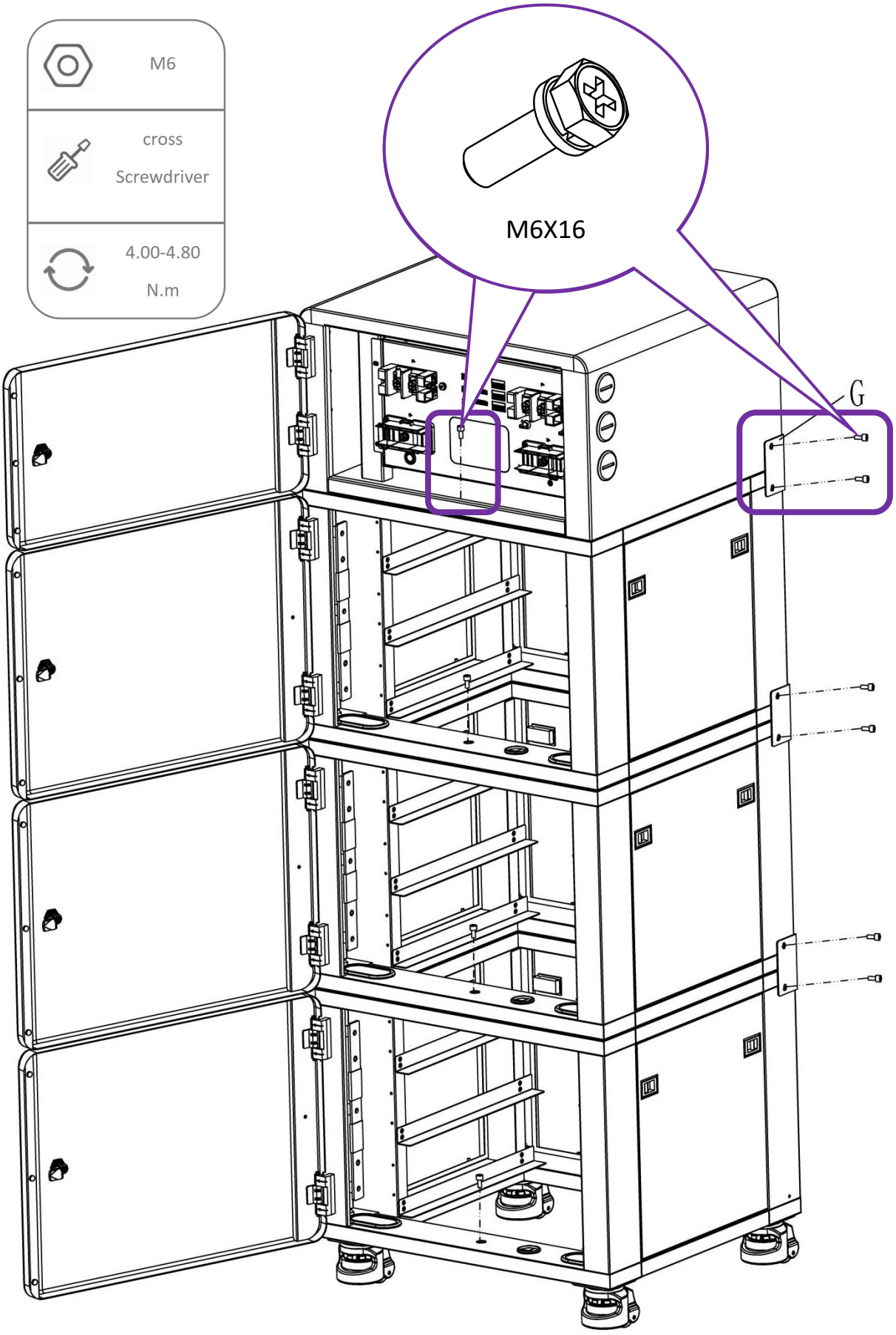


Figure 3.2.2. Install connecting brackets

3. After installing the cabinet, install the internal modules in sequence and secure the modules using M5 screws.

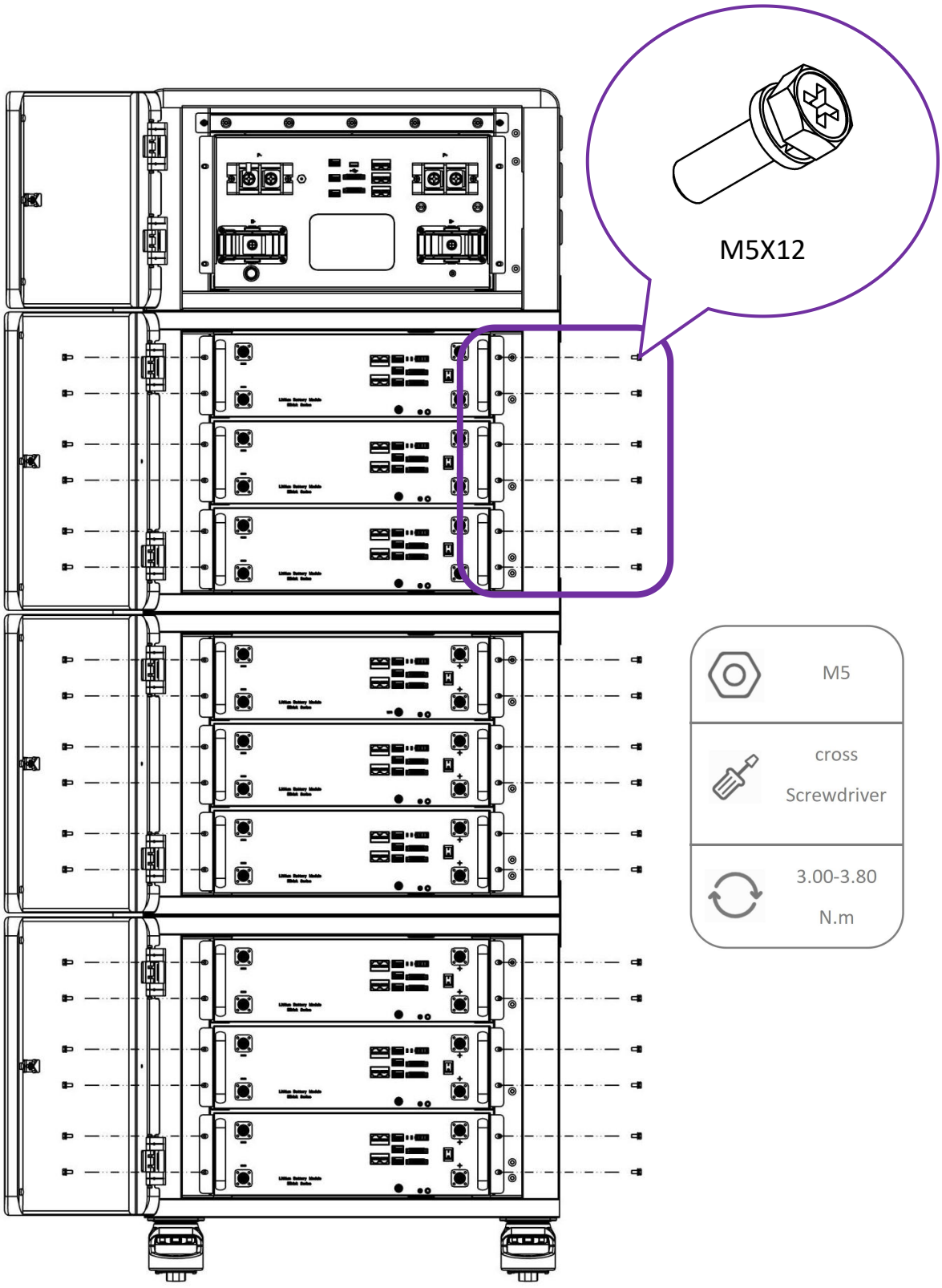


Figure 3.2.3. Fasten module

4. Pay attention to the knockout before using.

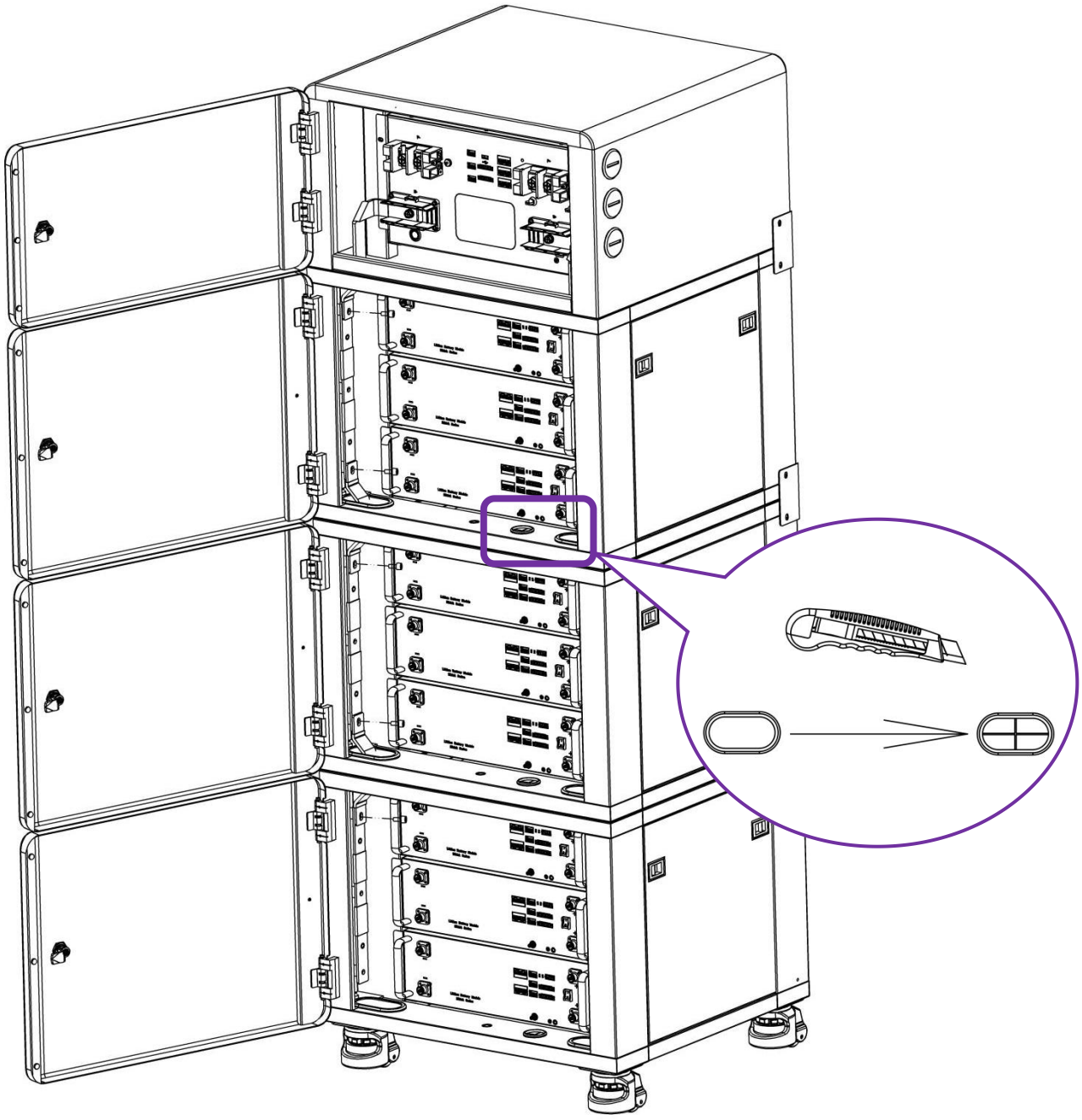


Figure 3.2.4. Knockout

5. Install the side power cable busbar and fix it with M8 screws. Install the main control busbar and fix it with M10 screws.

Note: *Please refer to the 5.5.14 for the torsion value.*

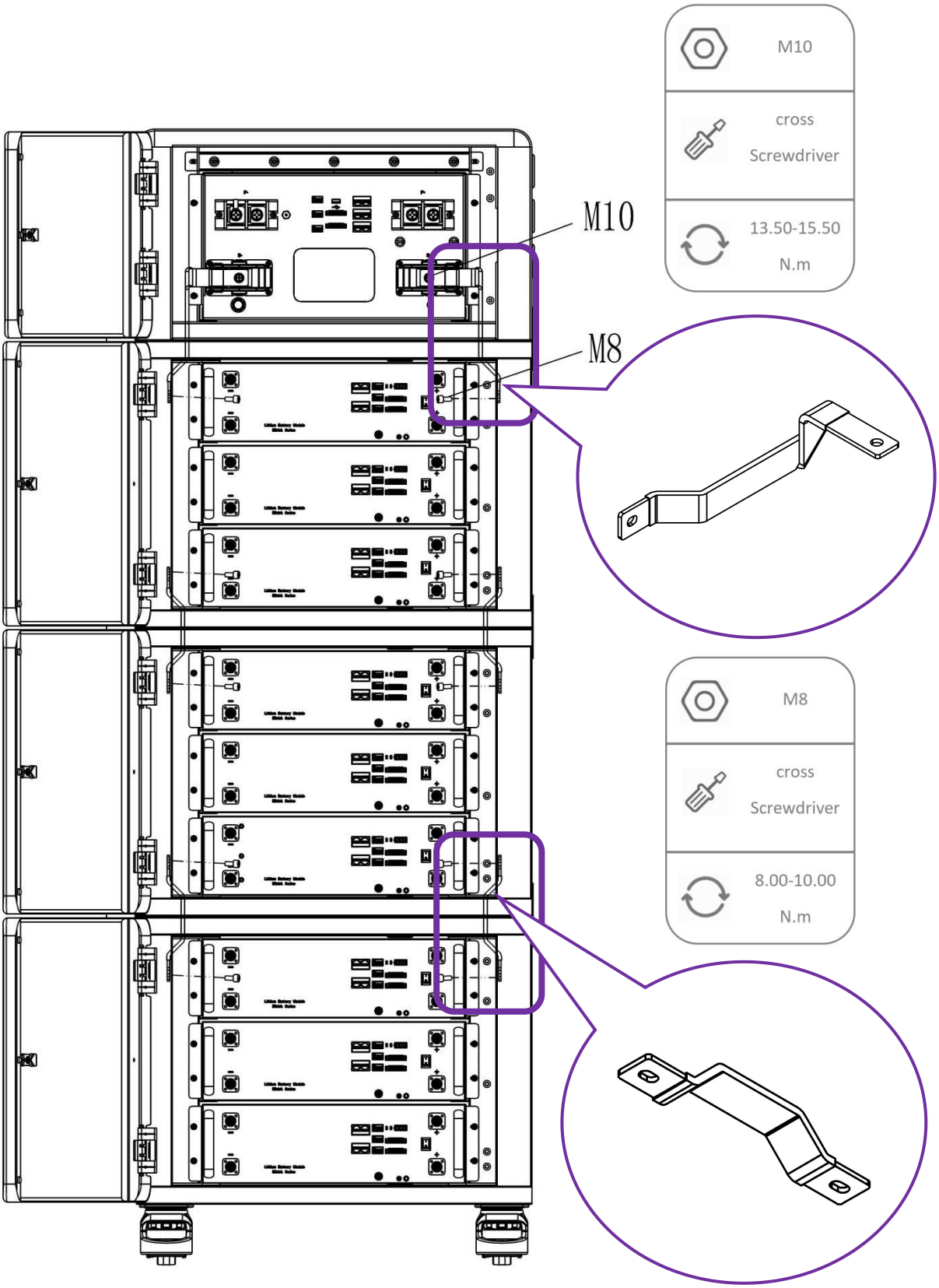


Figure 3.2.5. Install busbar

3.3 Device Installation (No main control)

1. Following the above steps, sequentially stack three battery cabinets.

Note: *The maximum number of battery cabinets that can be stacked is 4.*

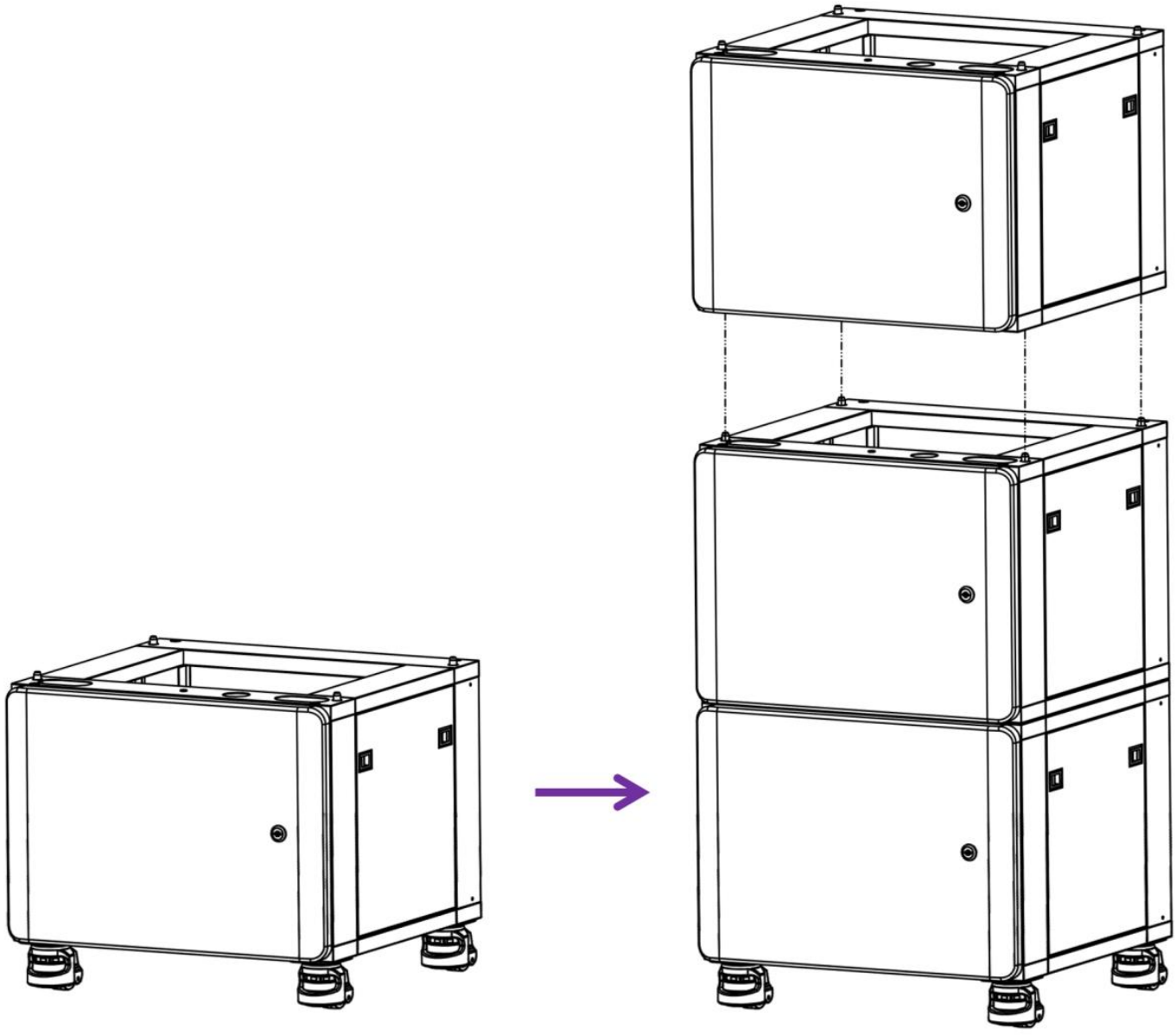


Figure 3.3.1. Stack cabinets

2. Install the cover plate on the top of cabinet.

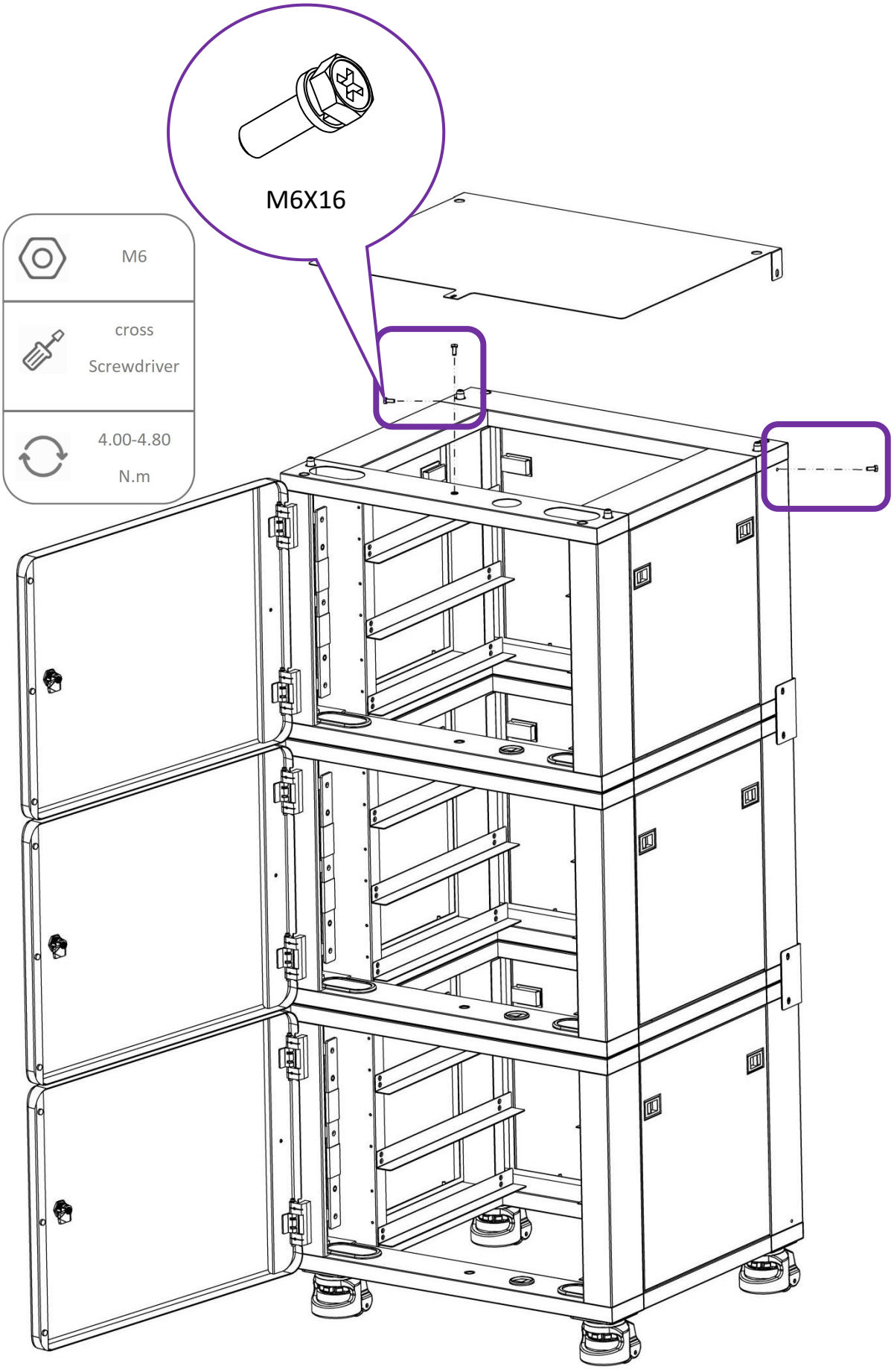


Figure 3.3.2. Cover plate

3. Install the connecting brackets on both sides, securing each bracket with 2*M6 screws. And secure the vertically stacked cabinets using M6 screws.

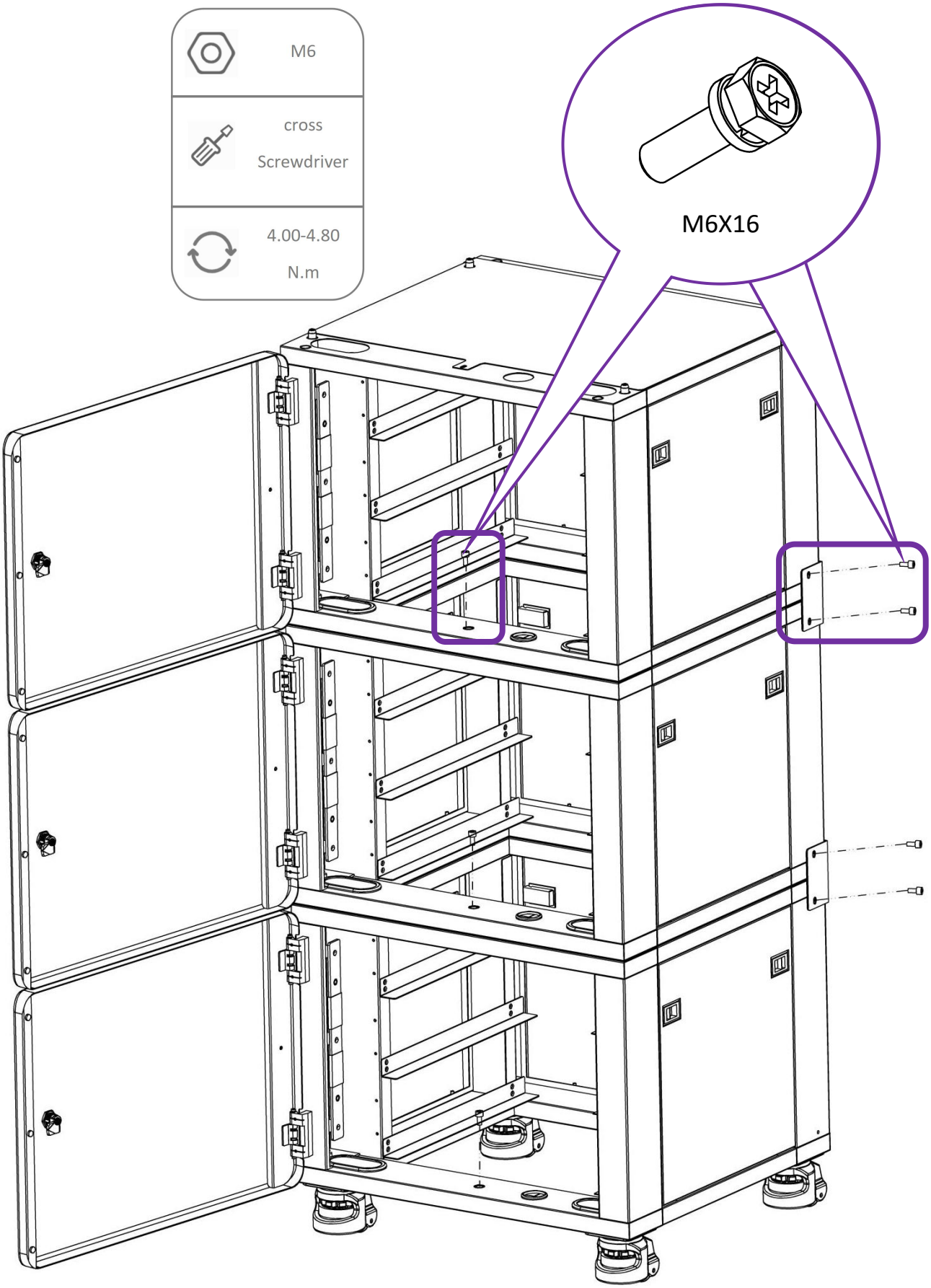


Figure 3.3.3. Install connecting brackets

4. After installing the cabinet, install the internal modules in sequence and secure the modules using M5 screws.

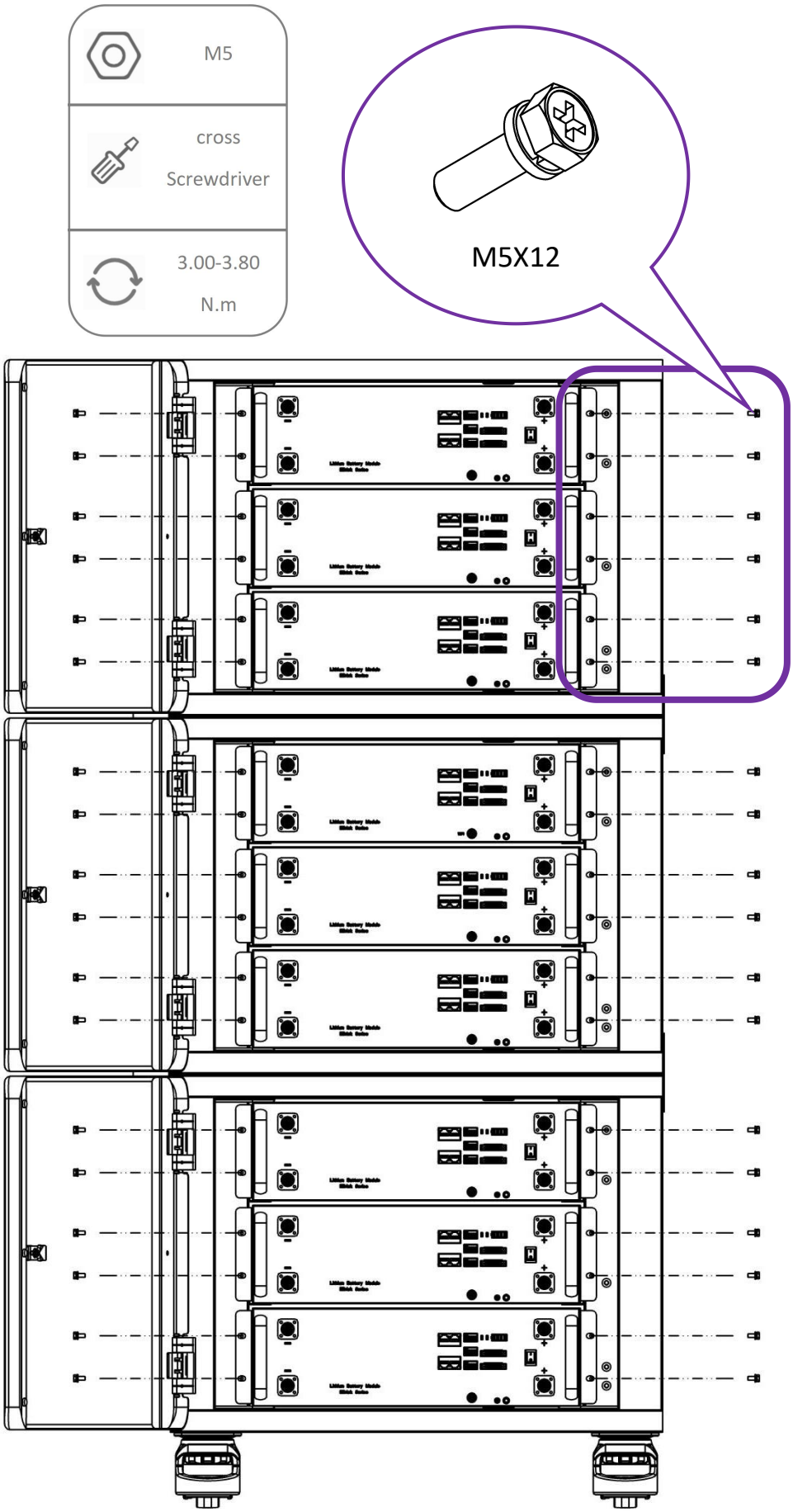


Figure 3.3.4. Fasten module

5. Pay attention to the knockout before using.

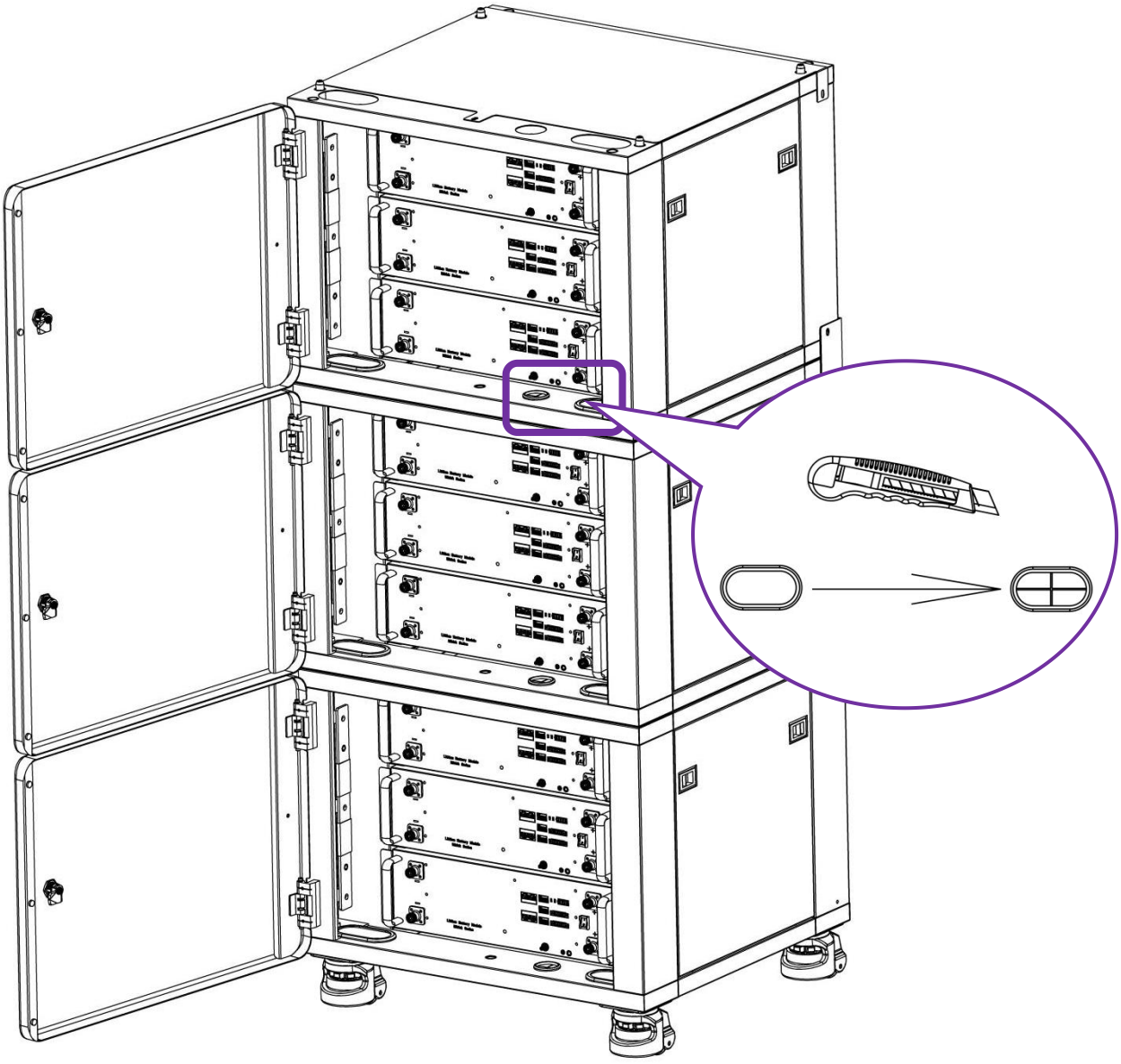


Figure 3.3.5. Knockout

6. Install the side power cable busbar and fix it with M8 screws.

Note: *Please refer to the 5.5.14 for the torsion value.*

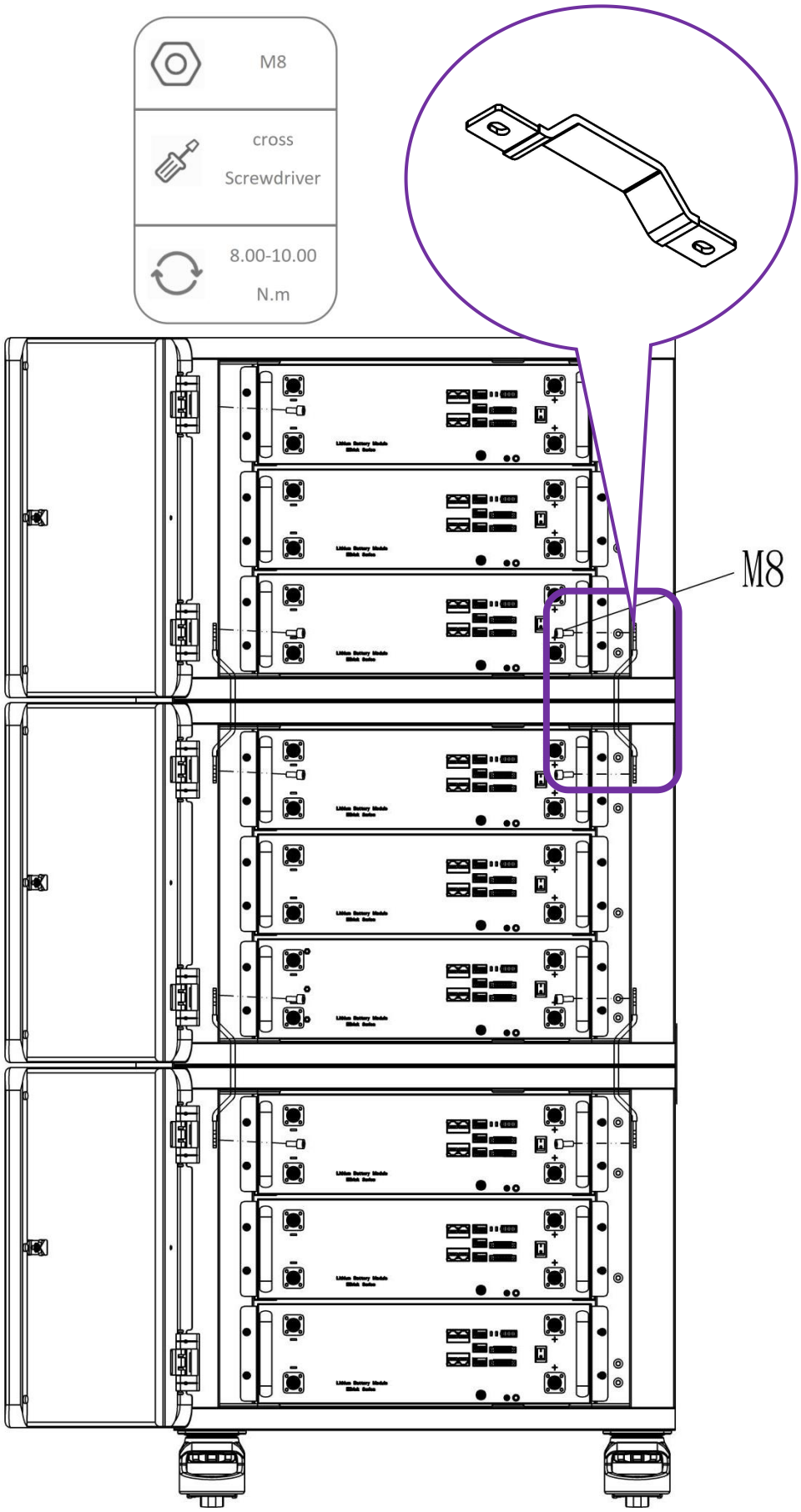


Figure 3.3.6. Install busbar

3.4 Connection

1. Connect the communication cables in sequence.

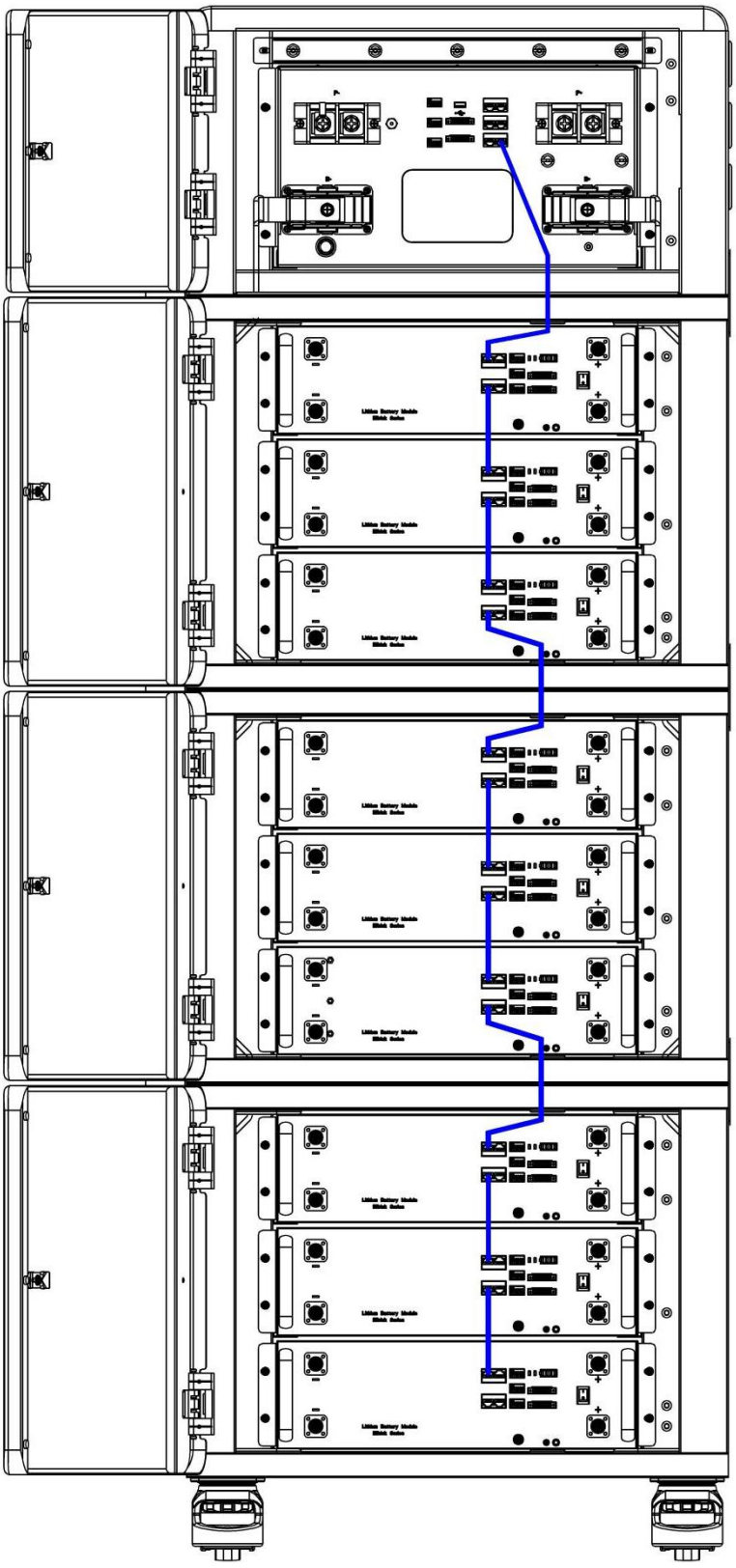


Figure 3.4.1. Connects with communication cable

2. Secure both ends of the grounding wire to the module and cabinet upright using M6 combination screws. Establish the grounding connection between the upper and lower cabinets simultaneously.

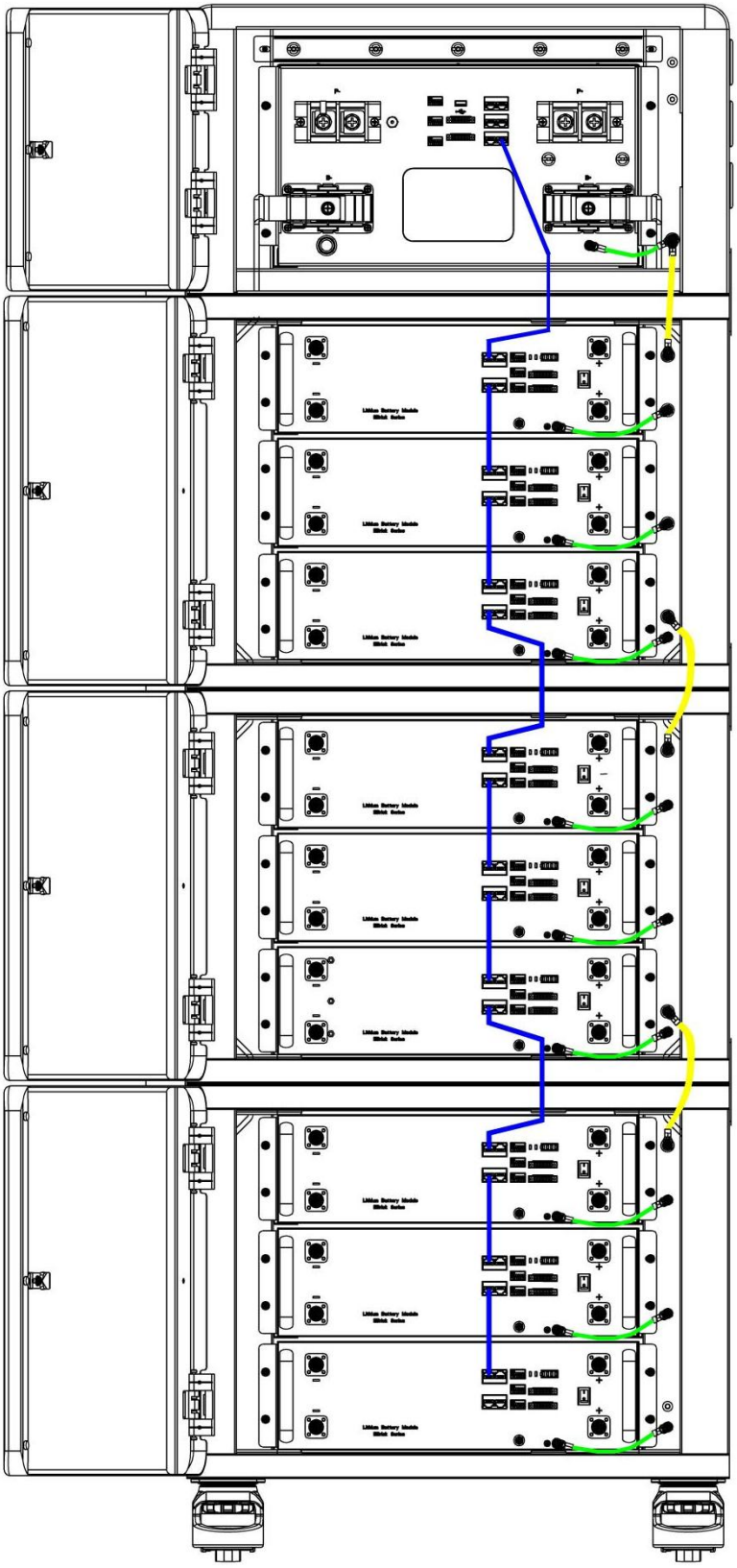


Figure 3.4.2. Grounding

3. Positive & Negative power cable: On one end, connect to the module using OT terminals and secure the busbar with M8 screws; on the other end, make direct plug-in connection through the power cable. Firmly insert the plug into the socket until you hear a 'click' sound, indicating secure connector engagement.

Power cable operation steps:

Step 1: Remove the original power cable terminal, and cut the cable to the actual required length, leaving an appropriate additional length for subsequent crimping.

Step 2: Strip the insulating outer sheath from the end of the power cable, strictly controlling the stripping length within the range of 13±0.5 mm.

Step 3: Insert the prepared wire core into the terminal head for crimping, applying a pressure range of 9.4–10.6. Ensure that the exposed wire core length after crimping does not exceed 0.5 mm to guarantee waterproof performance.

Note: Match polarity (+/-) and confirm cable color compliance.

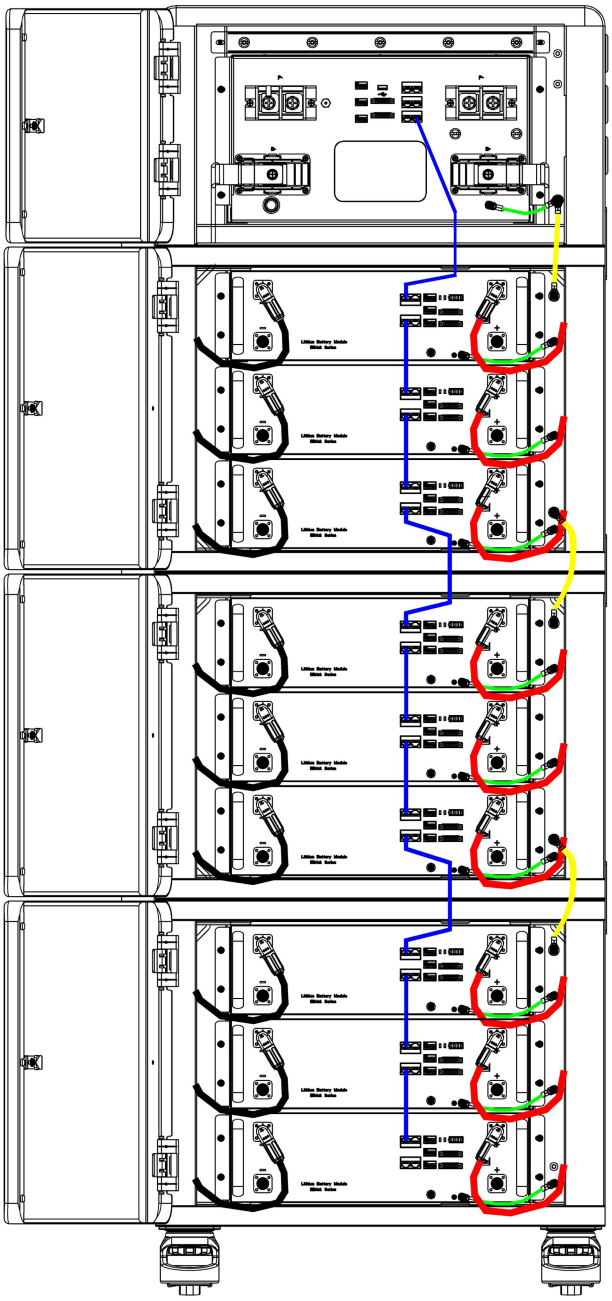


Figure 3.4.3. Connects with the power cable

4. Dial the function code of the first and last module according to the diagram.

Note: Only the dial code of the labeling module needs to be dialed.

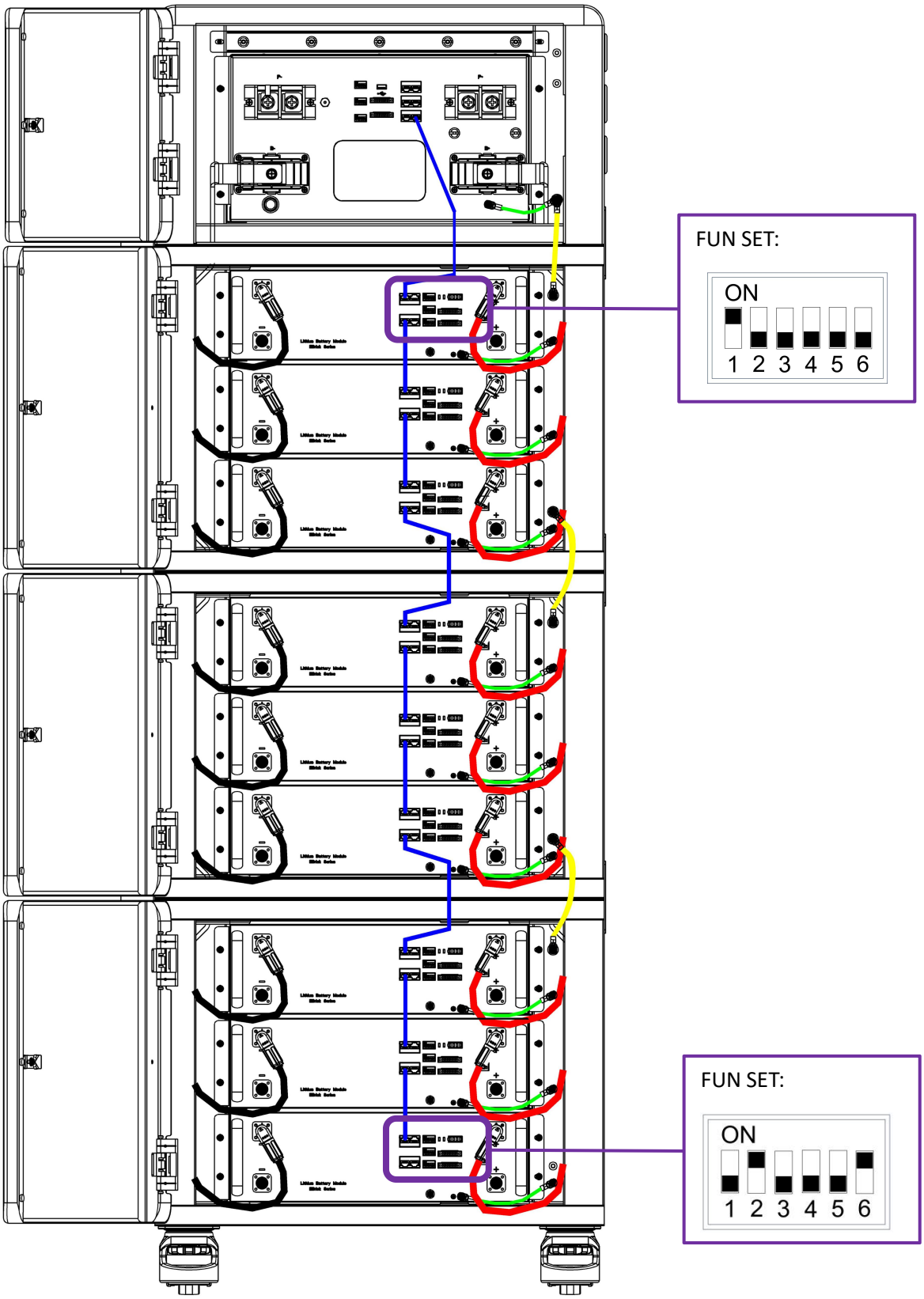


Figure 3.4.4. Module dial code

5. Dial the address code of the first to the last module according to the diagram.

Note: Please refer to the 5.6.2. for details.

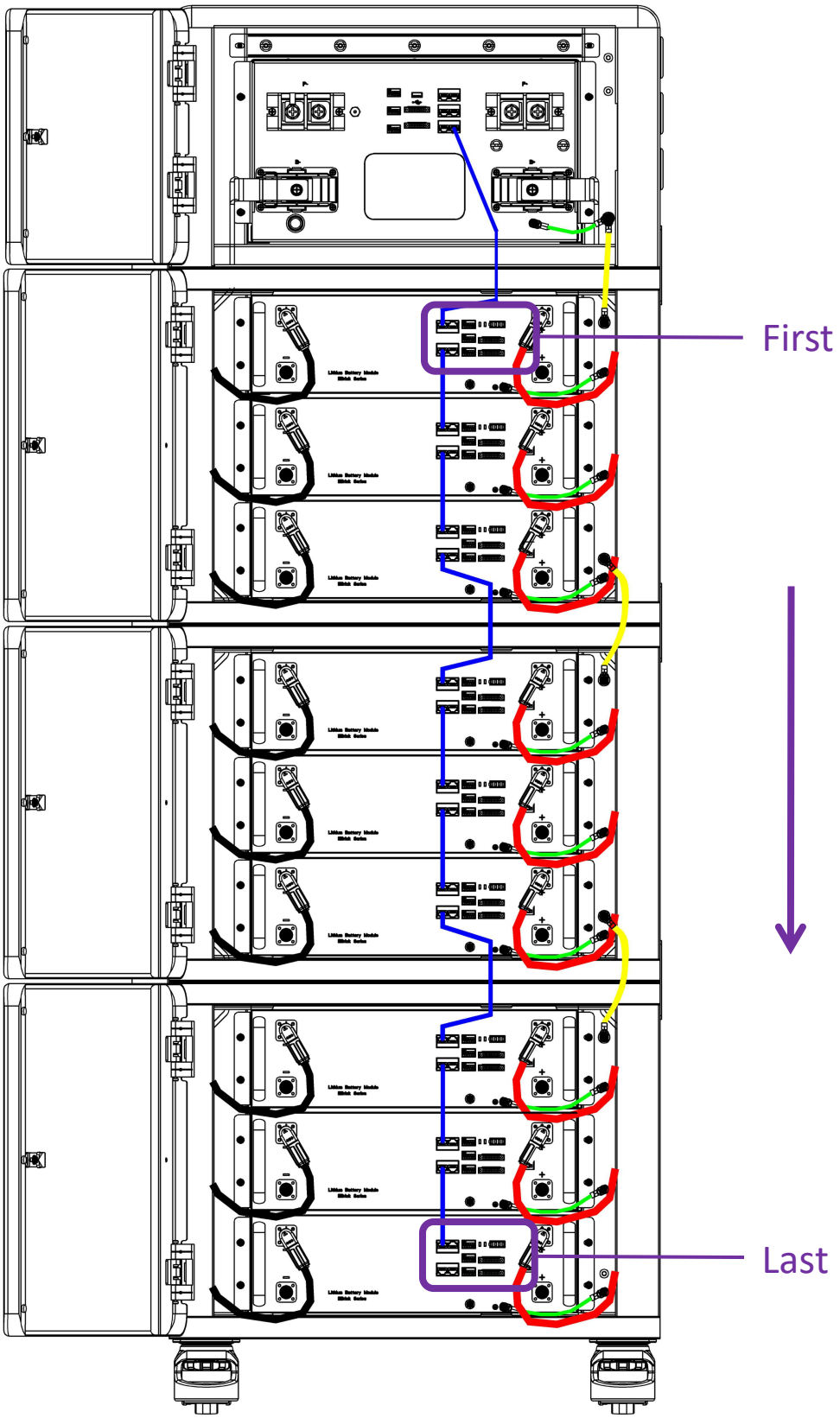


Figure 3.4.5. Module dial code

6. Connect the main control power cables and communication cables to the inverter.

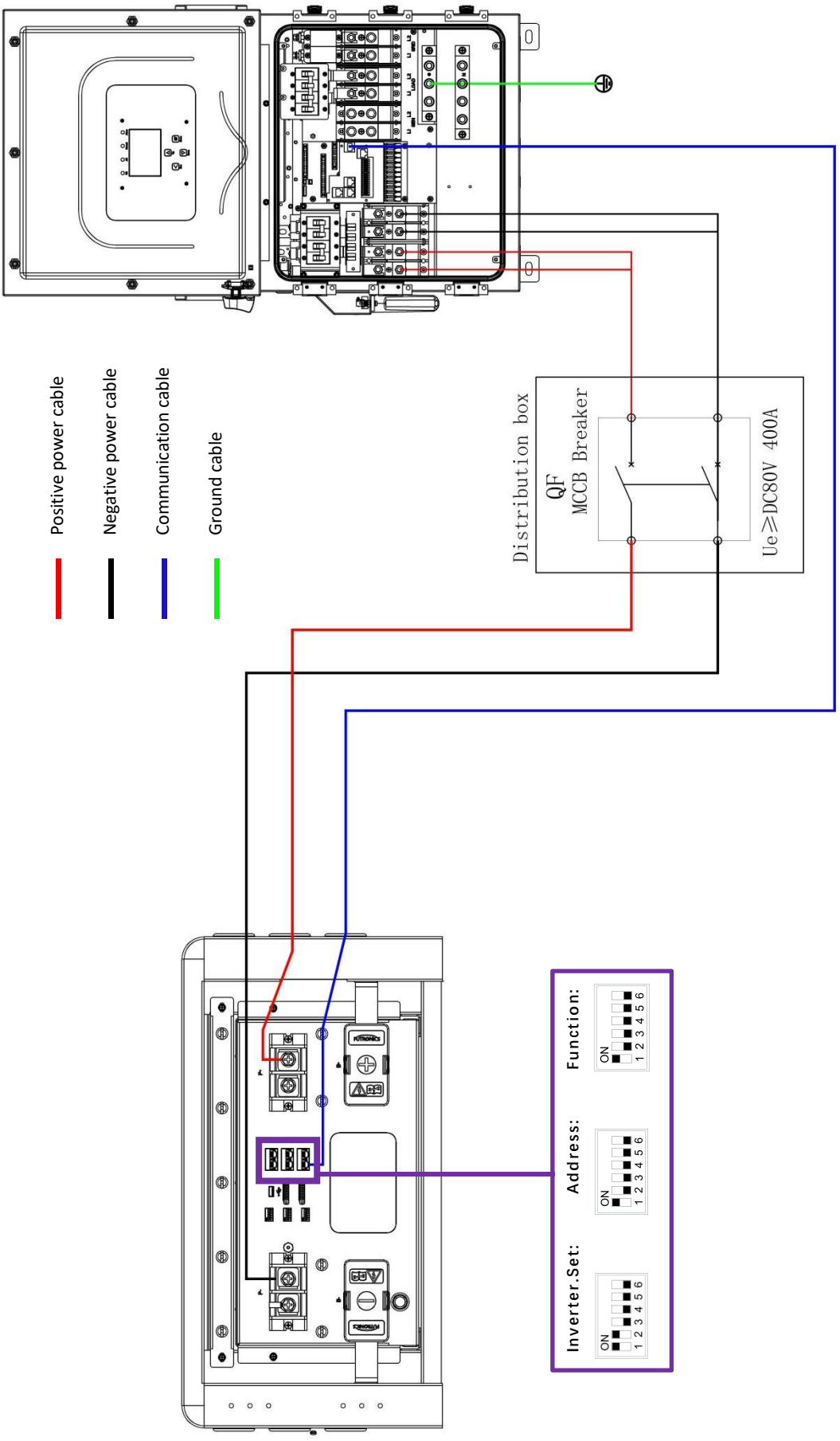


Figure 3.4.6. Single stack

7. Install the WiFi antenna on the top of the cabinet and connect to the main control.

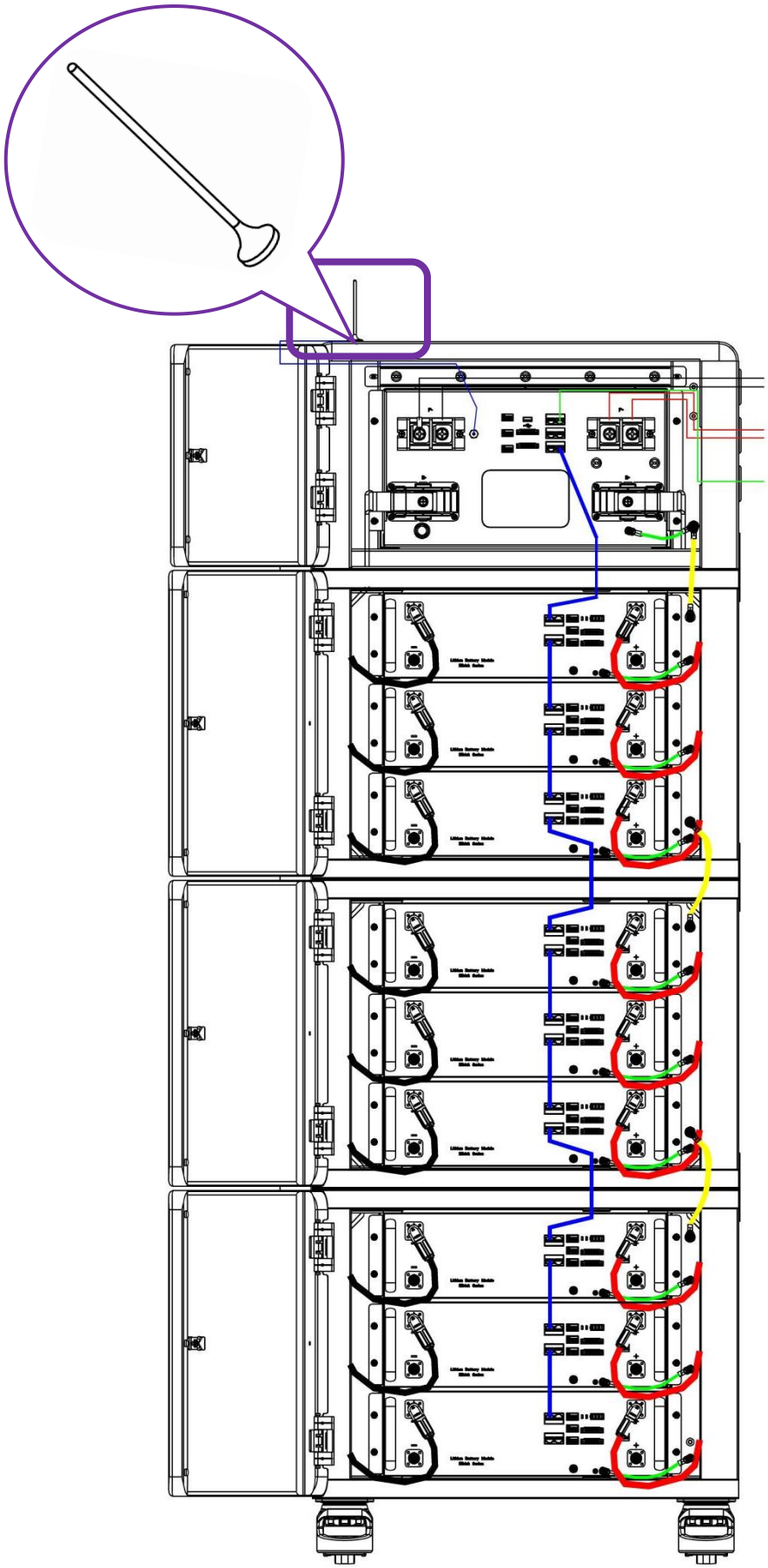


Figure 3.4.7. WiFi antenna

8. The cabinet should be grounded as shown for safety.

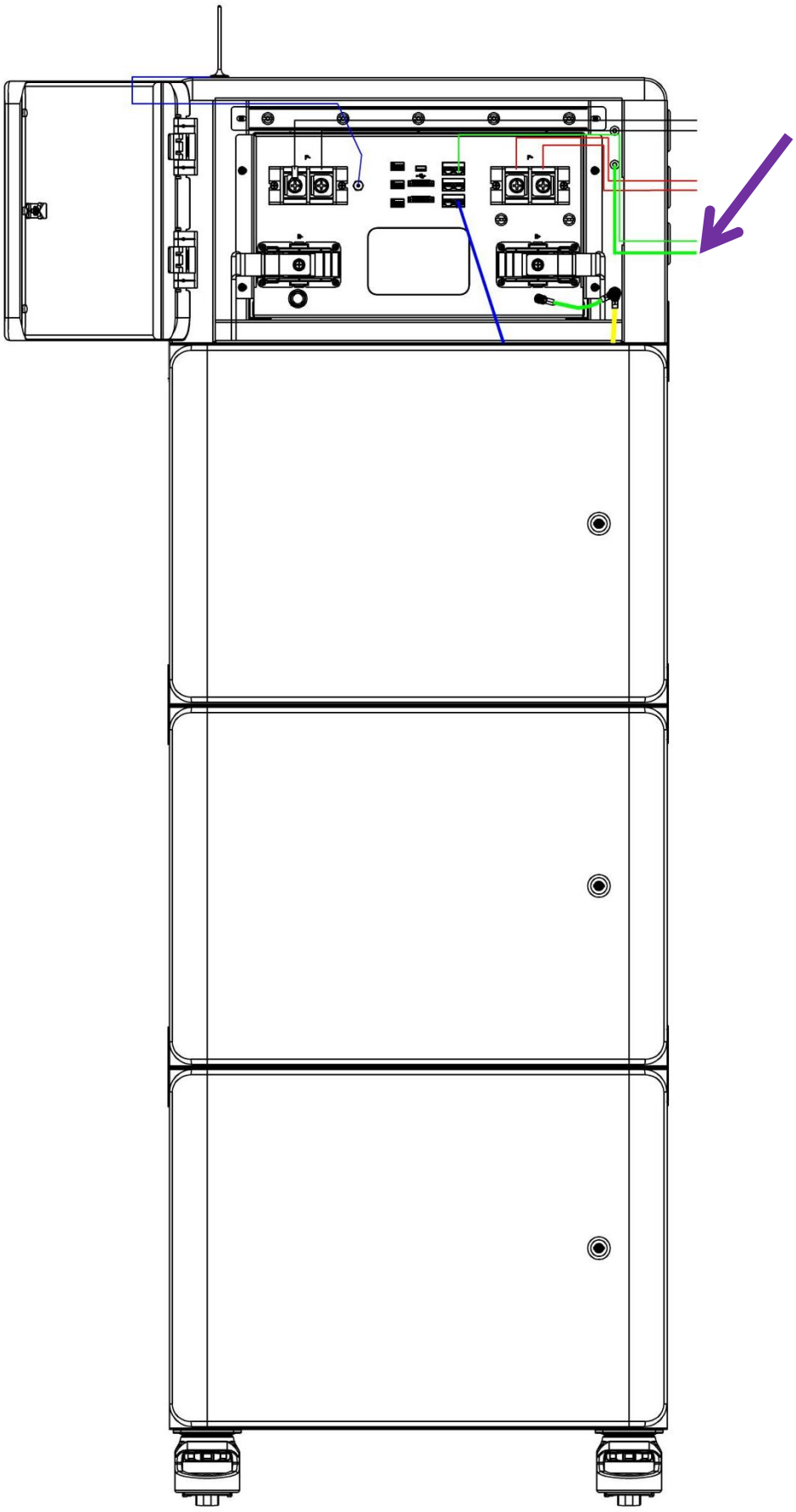


Figure 3.4.8. Cabinet grounding

3.5 Connection (No Main Control)

1. Connect the communication cables in sequence.

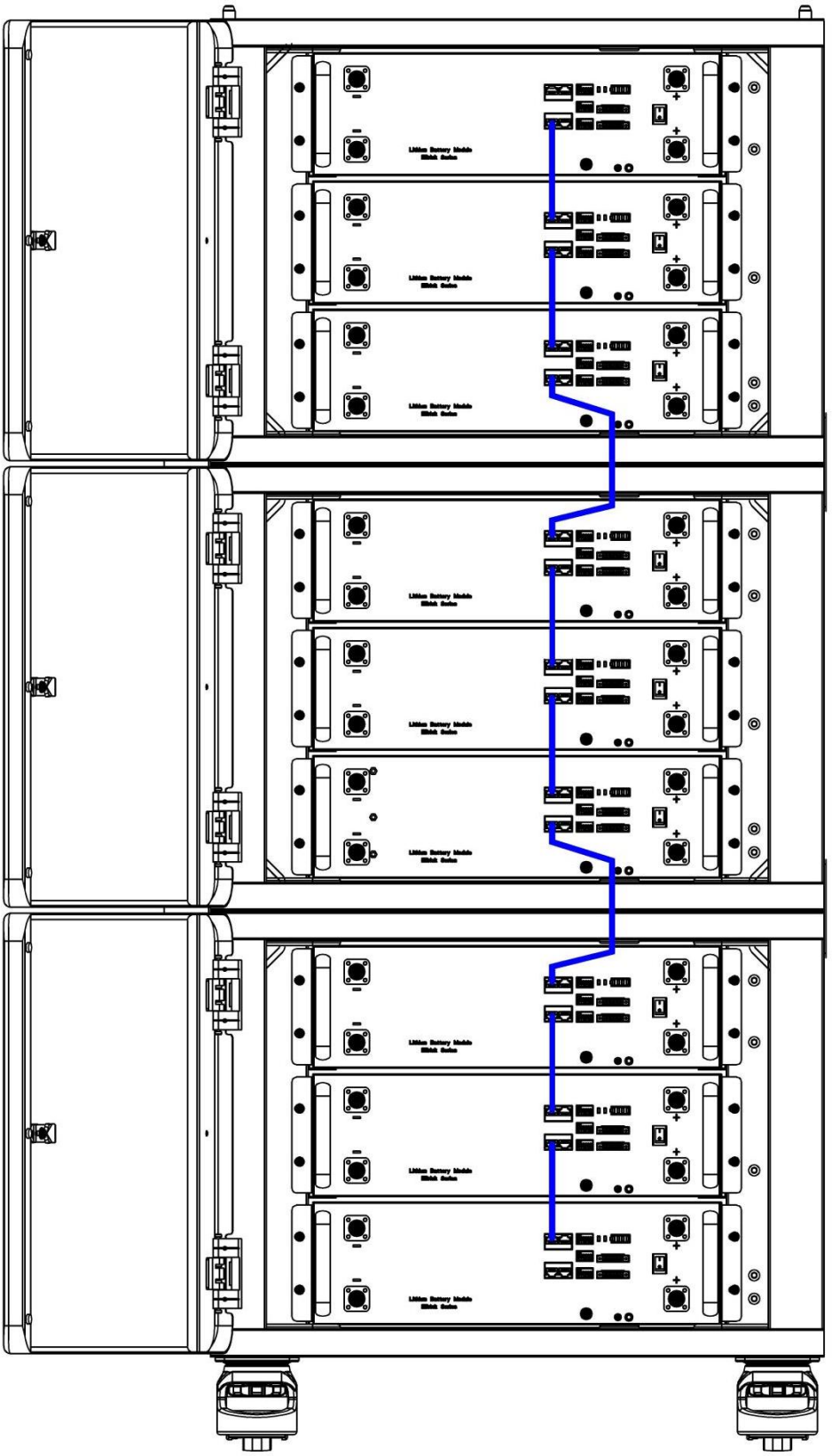


Figure 3.5.1. Connects with communication cable

2. Secure both ends of the grounding wire to the module and cabinet upright using M6 combination screws. Establish the grounding connection between the upper and lower cabinets simultaneously.

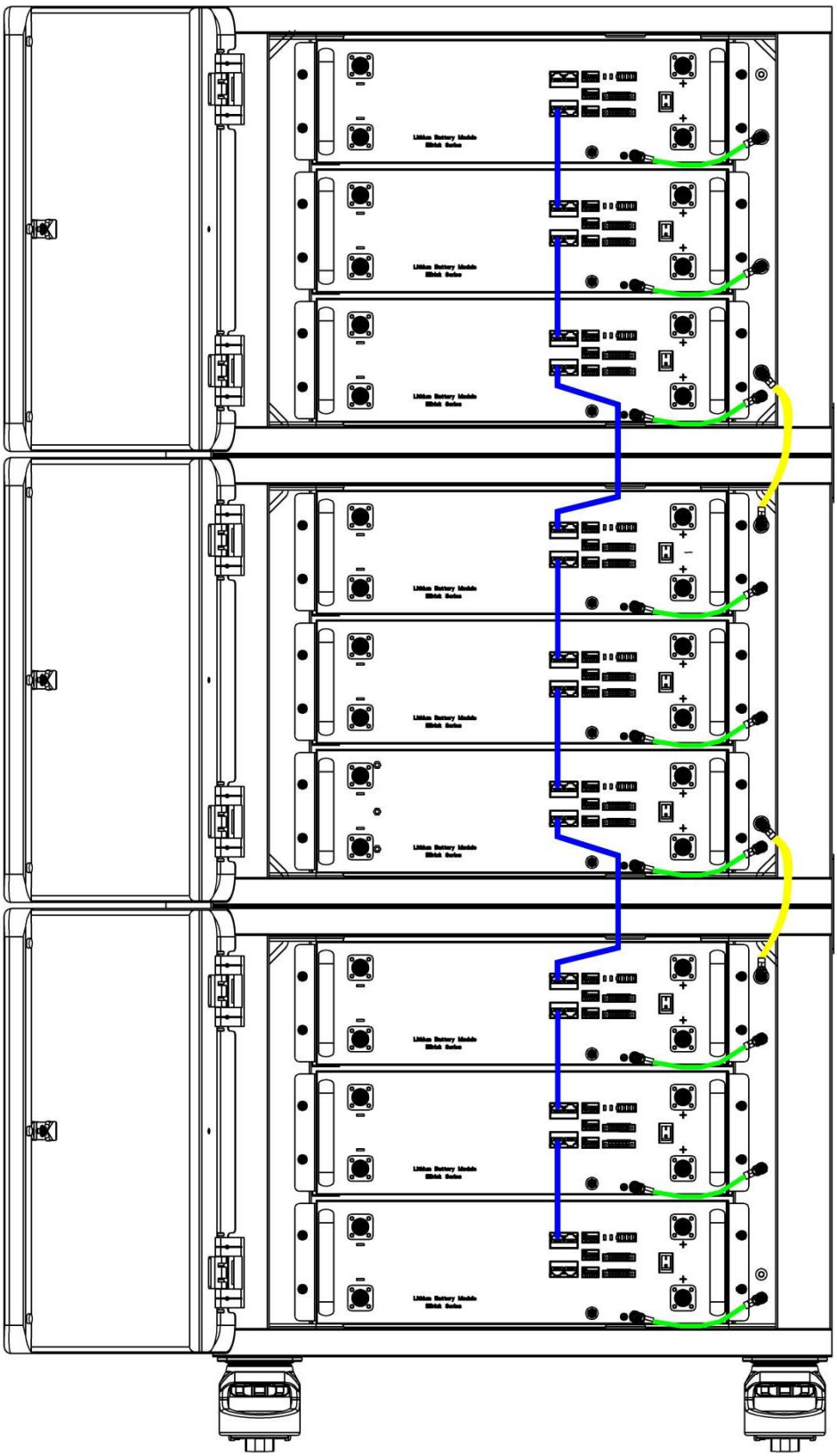


Figure 3.5.2. Grounding

3. Positive & Negative power cable: On one end, connect to the module using OT terminals and secure the busbar with M8 screws; on the other end, make direct plug-in connection through the power cable. Firmly insert the plug into the socket until you hear a 'click' sound, indicating secure connector engagement.

Power cable operation steps:

Step 1: Remove the original power cable terminal, and cut the cable to the actual required length, leaving an appropriate additional length for subsequent crimping.

Step 2: Strip the insulating outer sheath from the end of the power cable, strictly controlling the stripping length within the range of 13±0.5 mm.

Step 3: Insert the prepared wire core into the terminal head for crimping, applying a pressure range of 9.4–10.6. Ensure that the exposed wire core length after crimping does not exceed 0.5 mm to guarantee waterproof performance.

Note: Match polarity (+/-) and confirm cable color compliance.

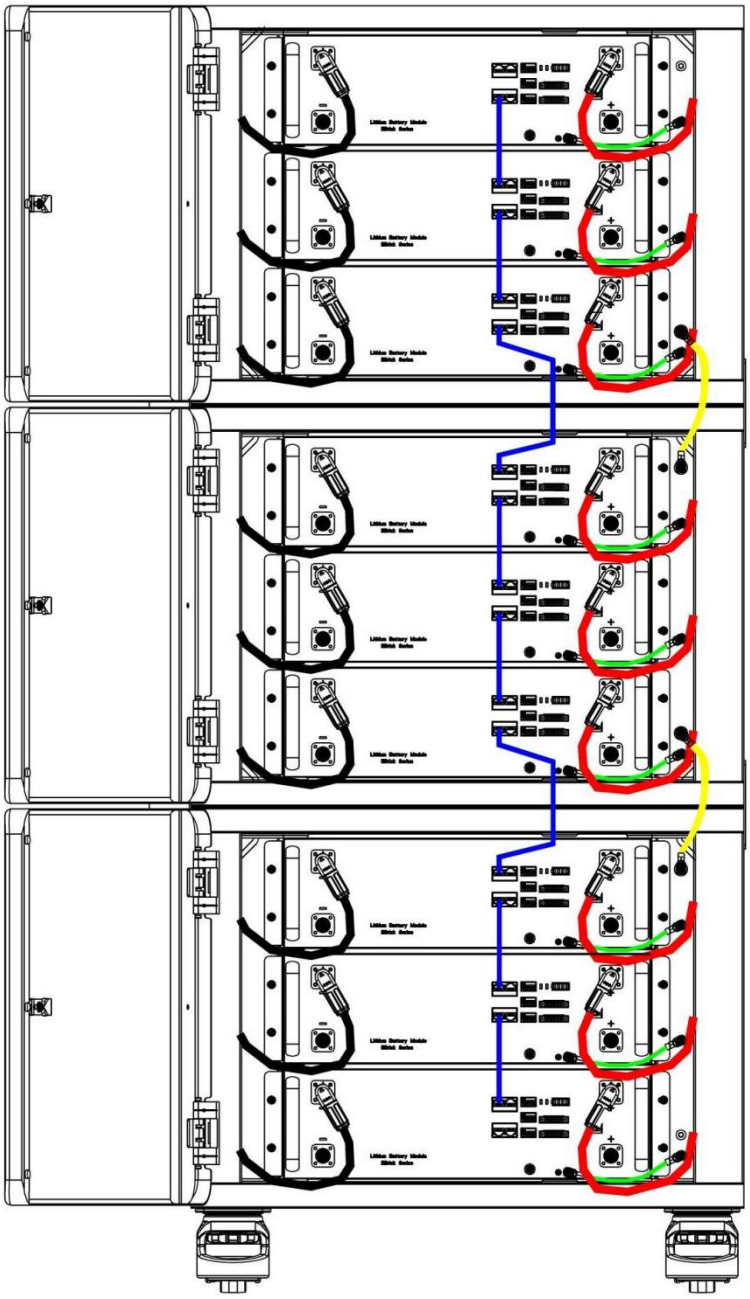


Figure 3.5.3. Connects with the power cable

4. Dial code setting.

Note: Please refer to the 5.6.2. for details.

	INV.SET	ADDR.SET	FUN.SET
First			
Middle		...	
Last			

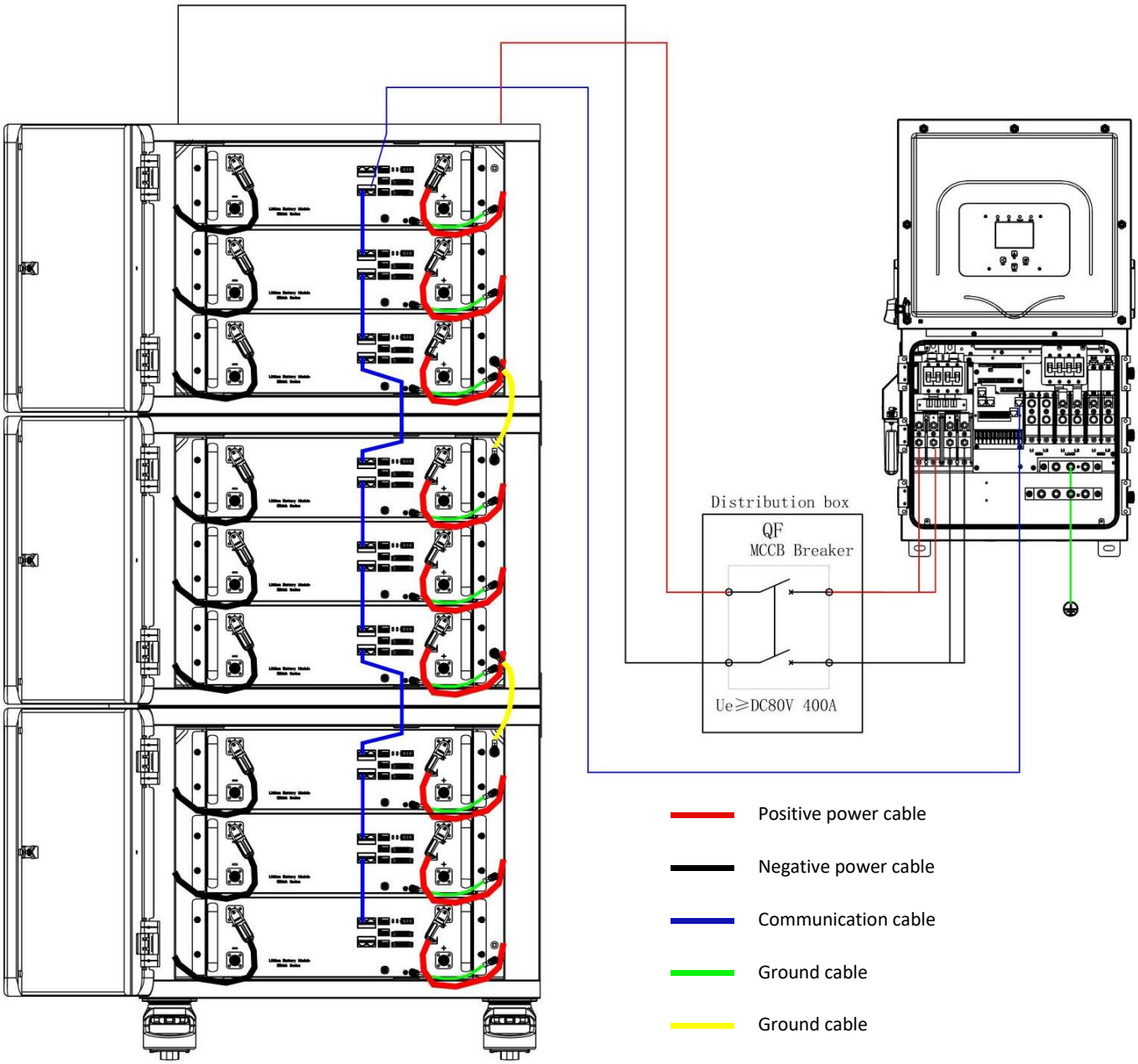


Figure 3.5.4. Module dial code

5. Install the WiFi antenna on the top of the cabinet and connect to the main control.

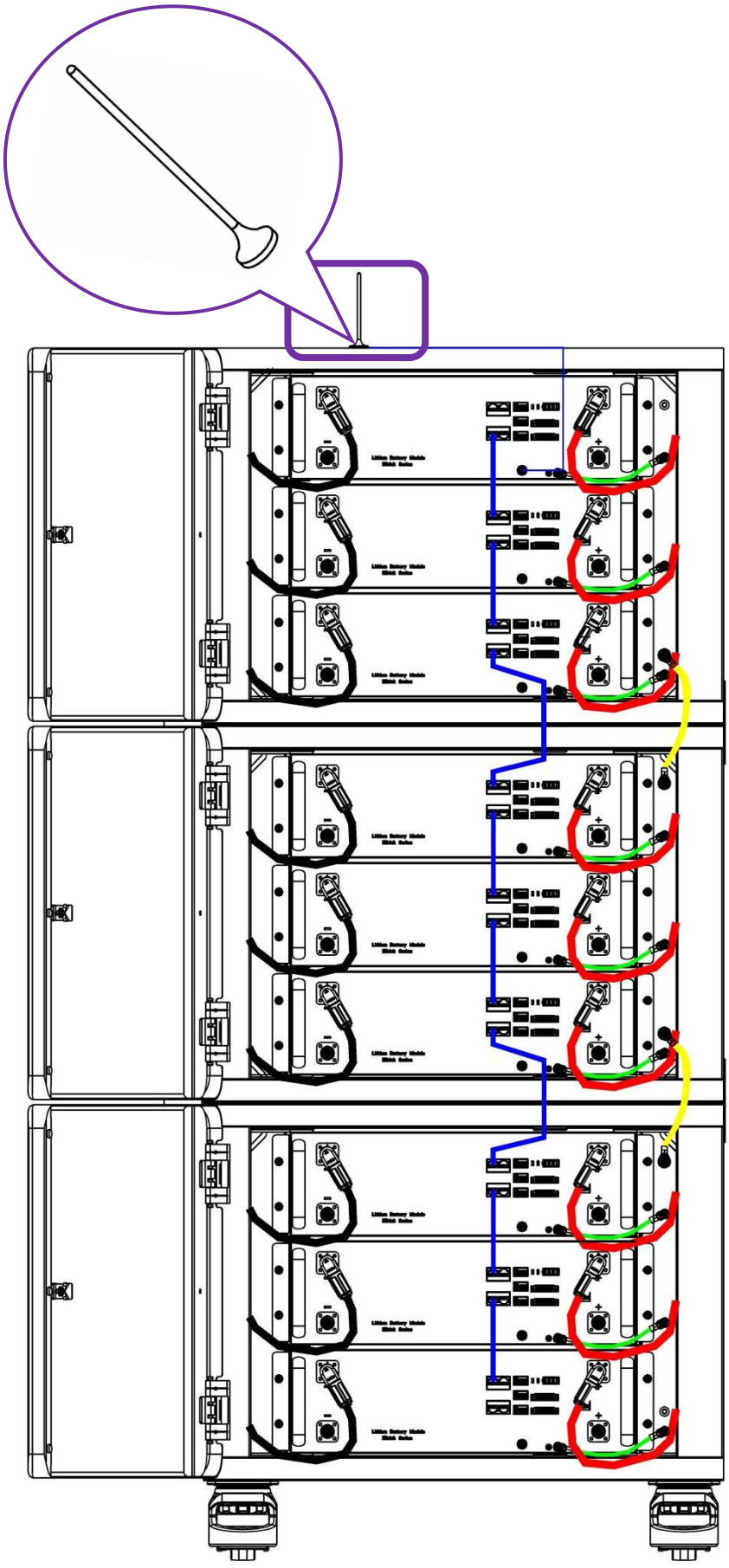


Figure 3.5.5. WiFi antenna

6. The cabinet should be grounded as shown for safety.

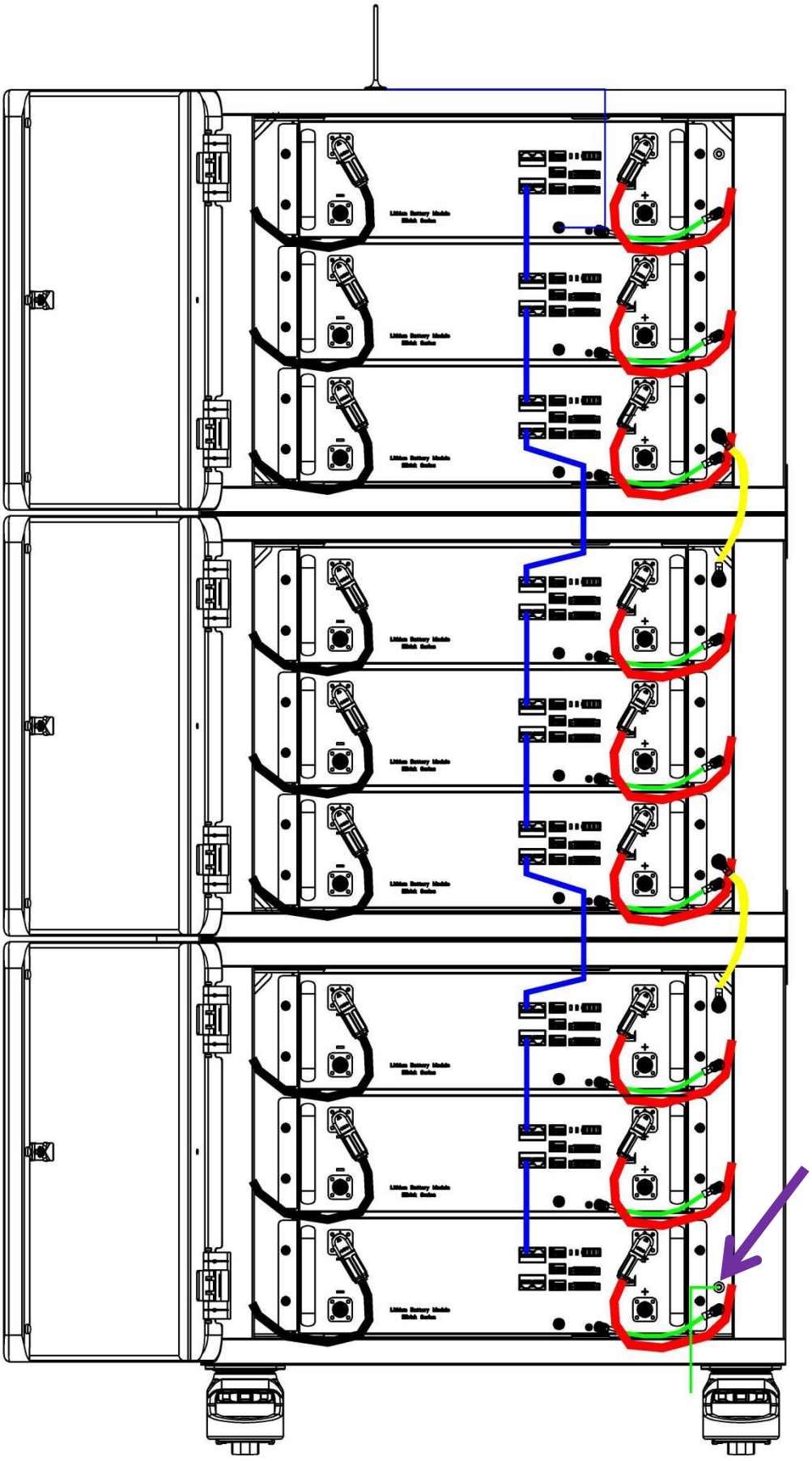


Figure 3.5.6. Cabinet grounding

3.6 Power On

Note: To ensure proper power-up of the equipment, strictly follow the operating steps below.

Step 1: Turn on the DC switch of inverter.

The DC breaker position shown in the diagram is specific to Sol-Ark 15K-2P-N inverter. For other brands or models, refer to the respective product's user manual.

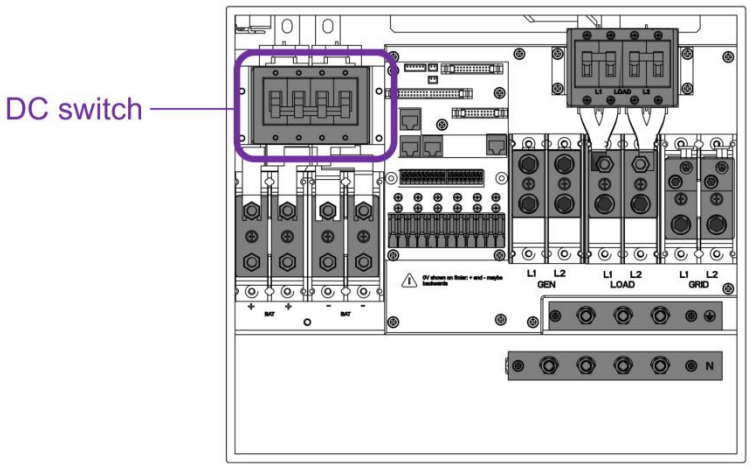


Figure 3.6.1. DC breaker

Step 2: Press the power button of all modules.

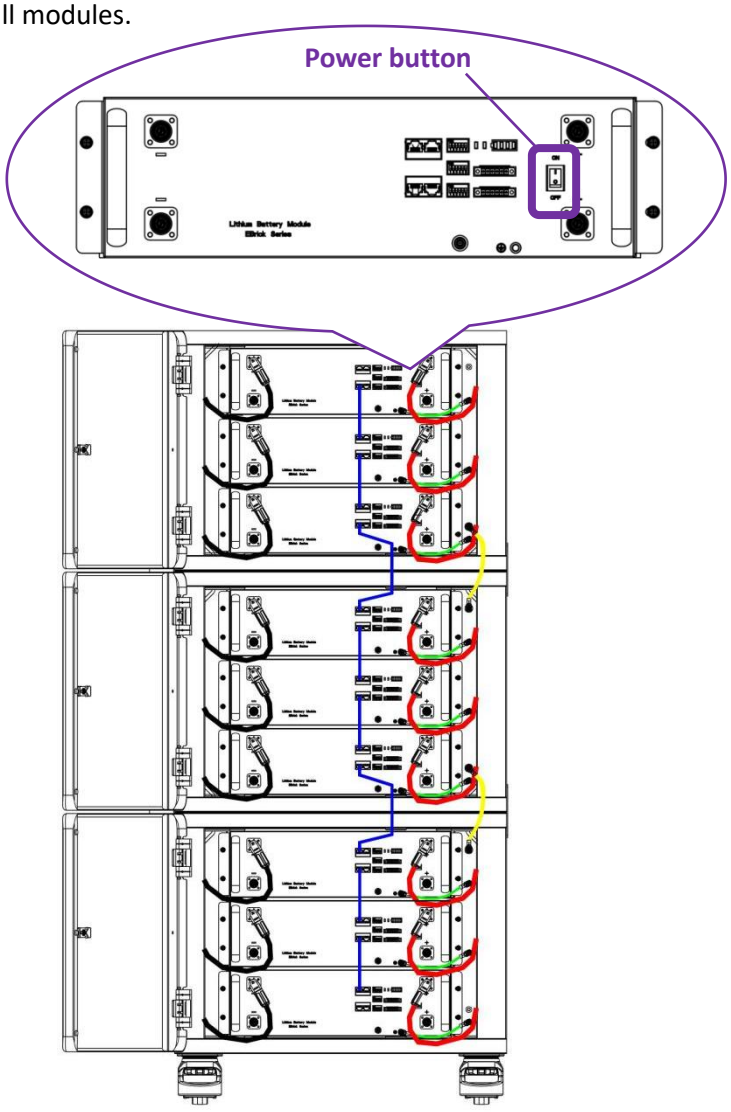


Figure 3.6.2. Module power button

Step 3: Press the power button of main control. (Main device only)

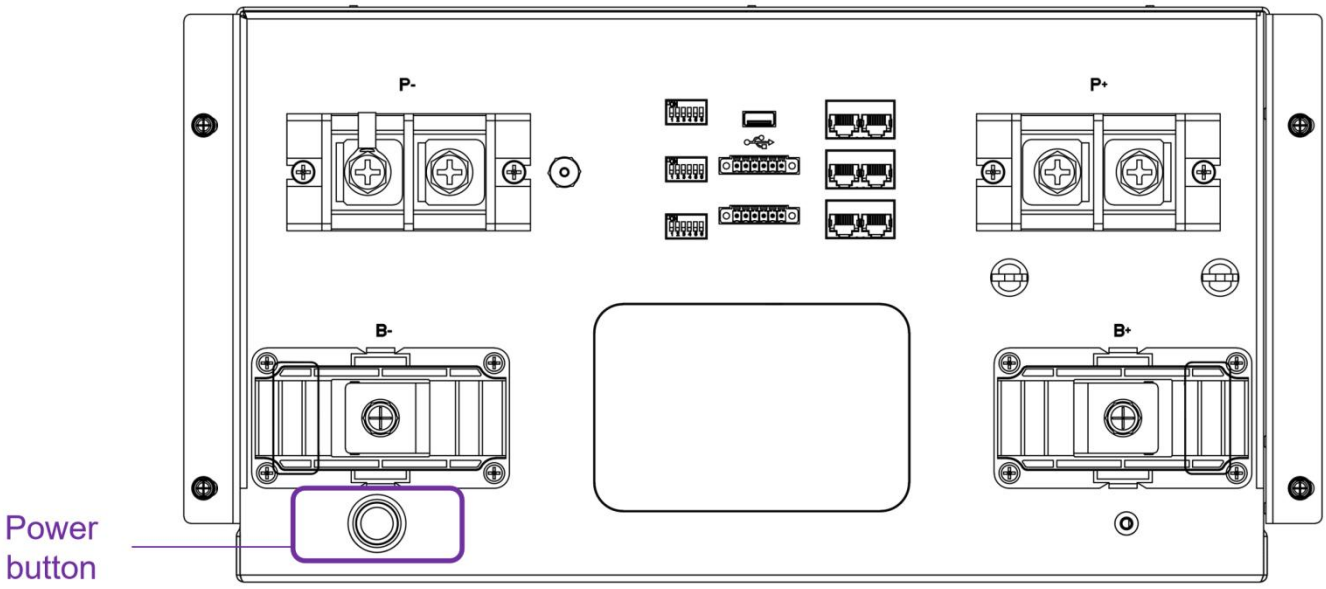


Figure 3.6.3. Main control power button

3.7 Application Scenarios

Note: The modules require no dial switch settings. Only the main control needs configuration. For parallel operation, configure the dial switches between interconnected main control.

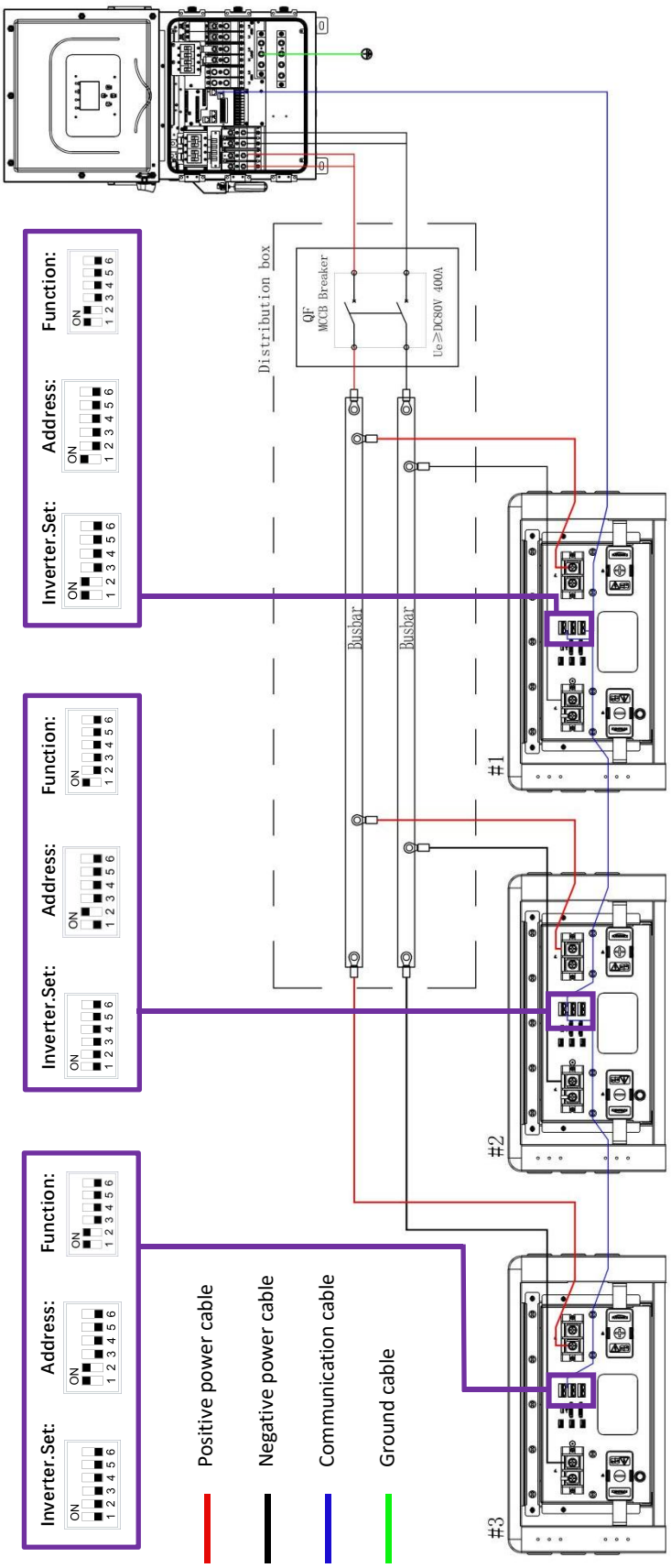
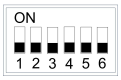
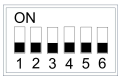
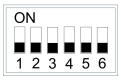
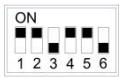


Figure 3.6.1. Multiple batteries

Multiple batteries in parallel (No main control)

	INV.SET	ADDR.SET	FUN.SET
First			
Middle		...	
Last			

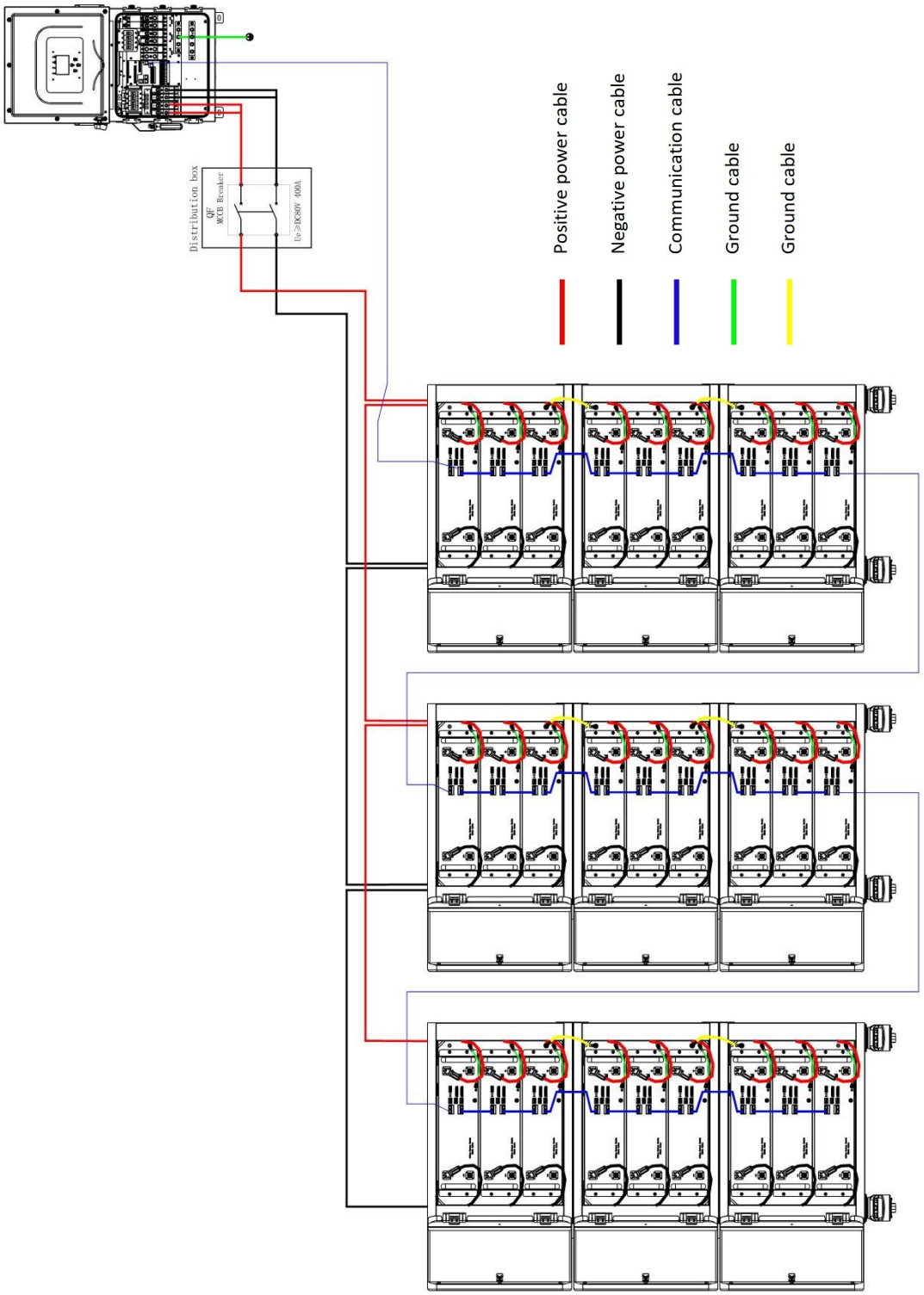


Figure 3.6.2. Multiple batteries

4 Cloud Platform Configuration

1) Download App

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

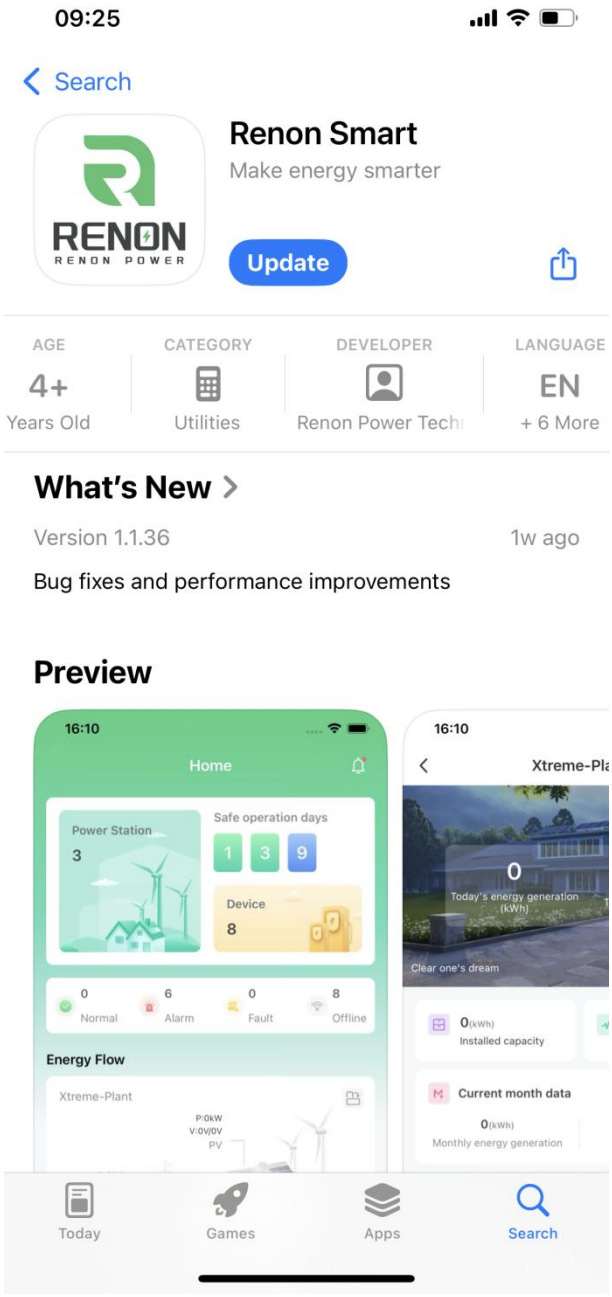


Figure 4.1.1. Install Renon App

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.

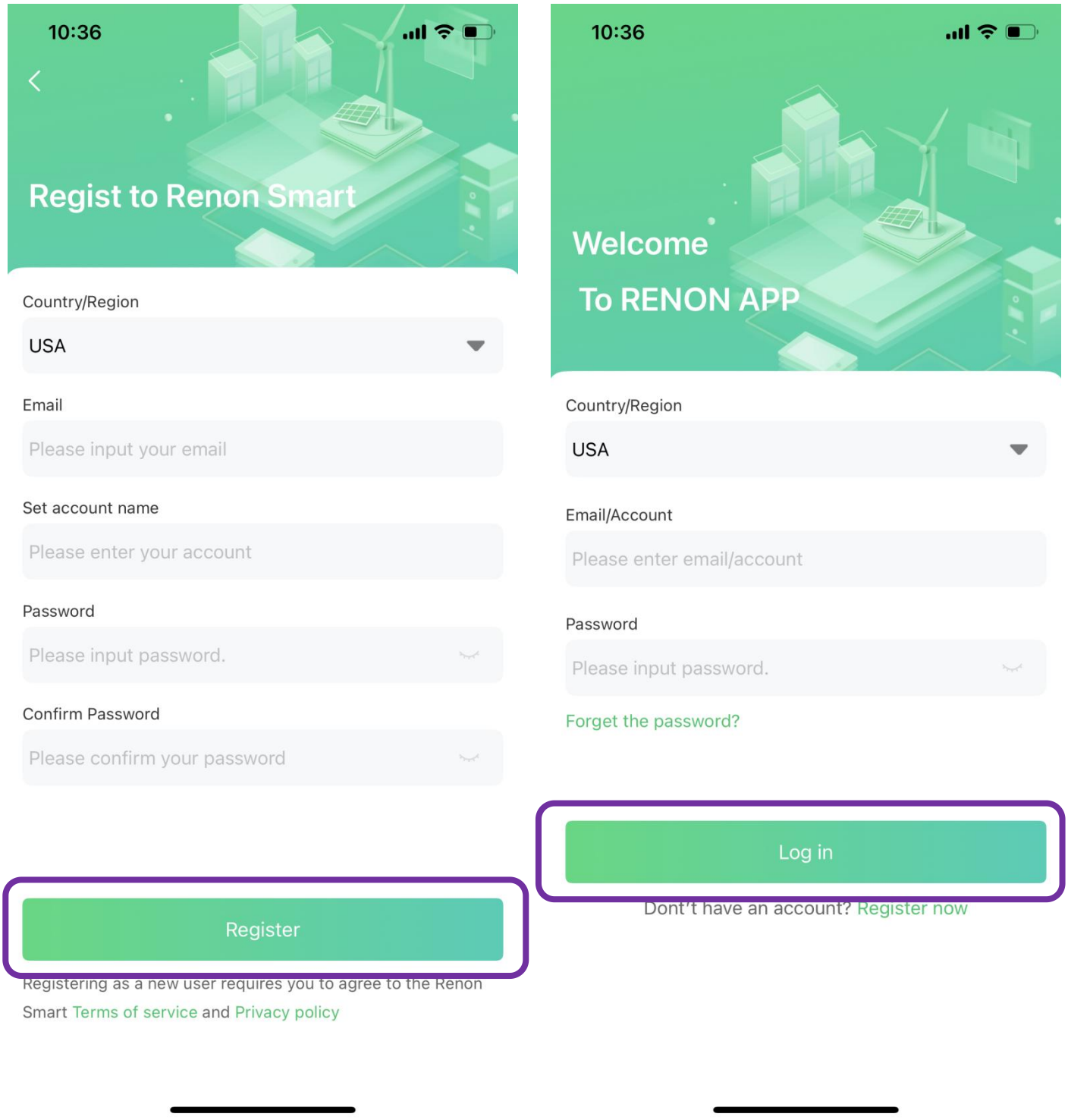


Figure 4.1.4. Register & Log in

3) Log in

This is a general user account.

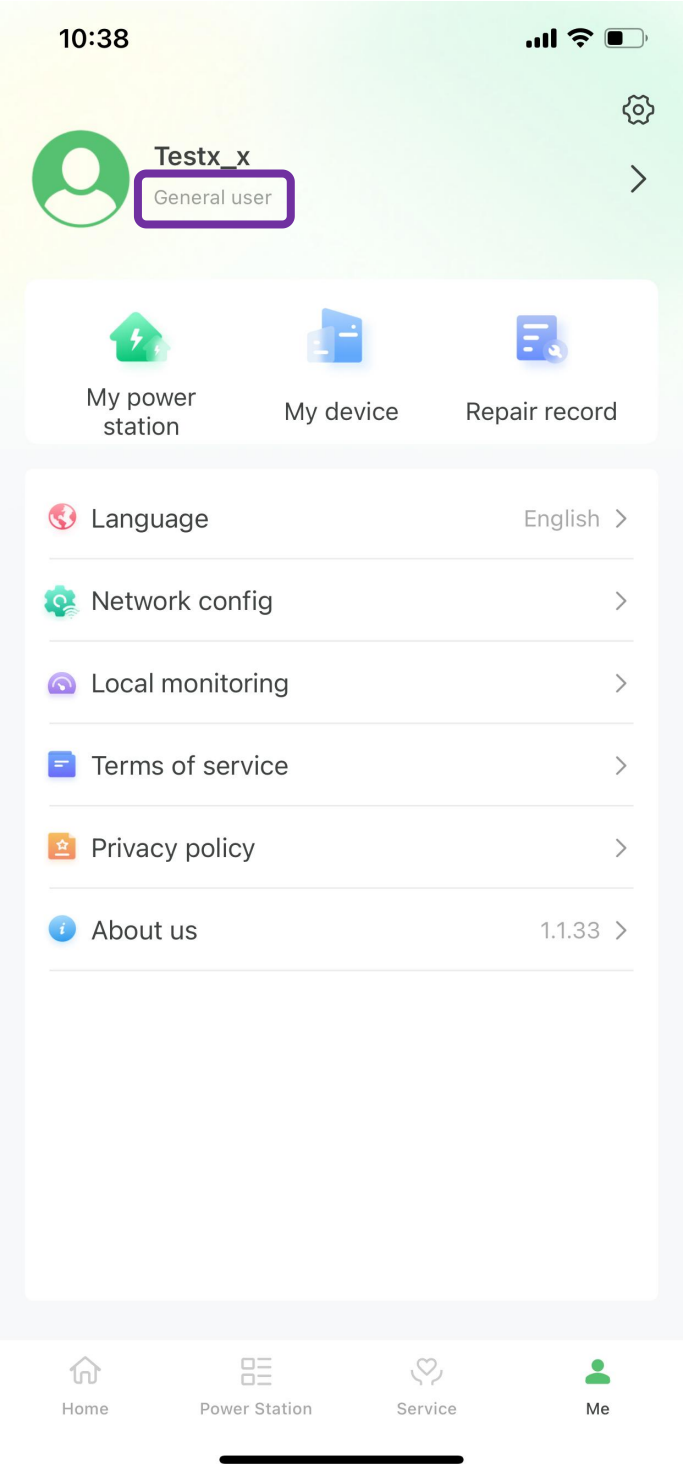


Figure 4.1.5. General user

4) Binding

Step 1:

a. Manually bind

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

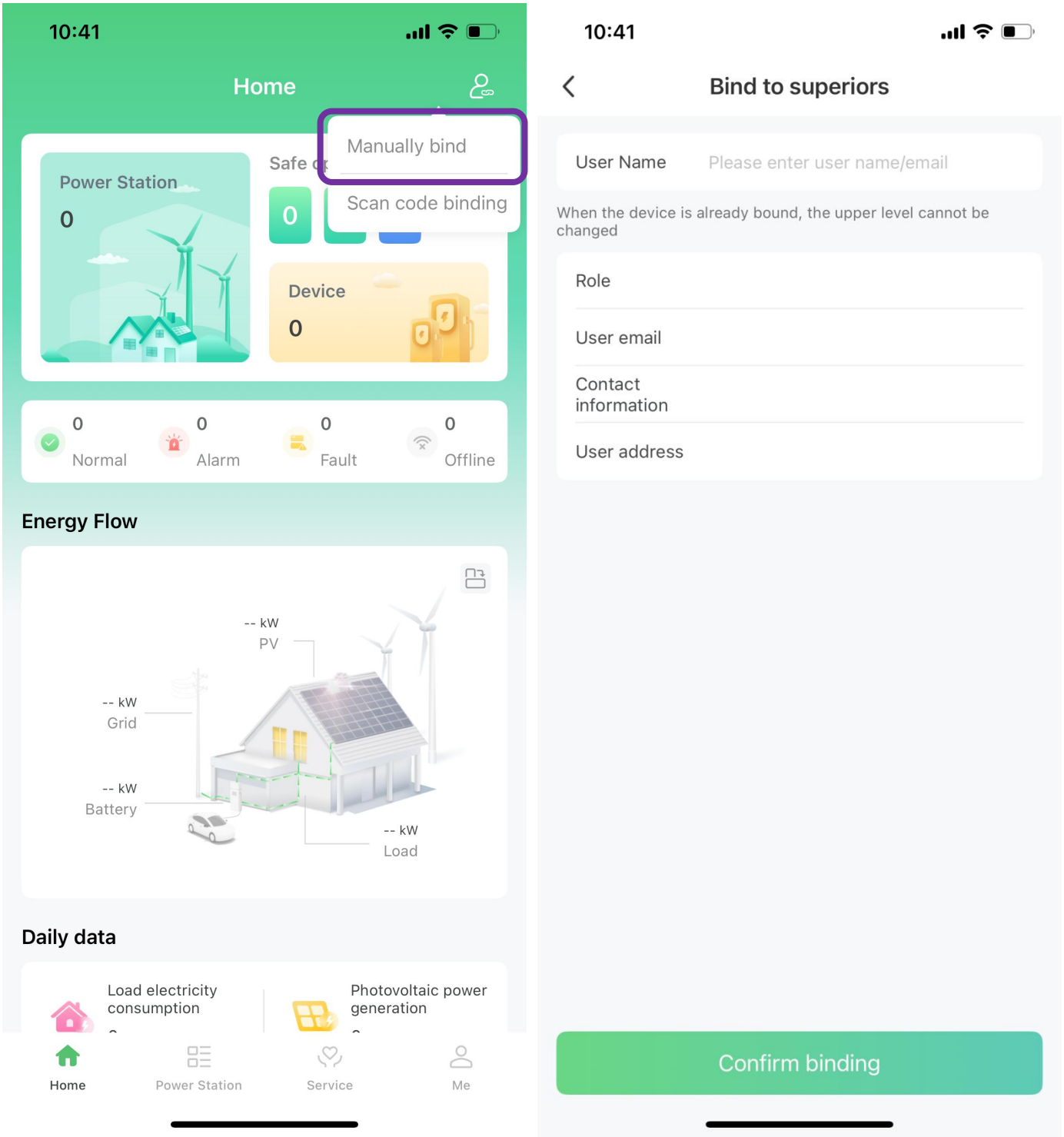


Figure 4.1.6. Bind to superiors

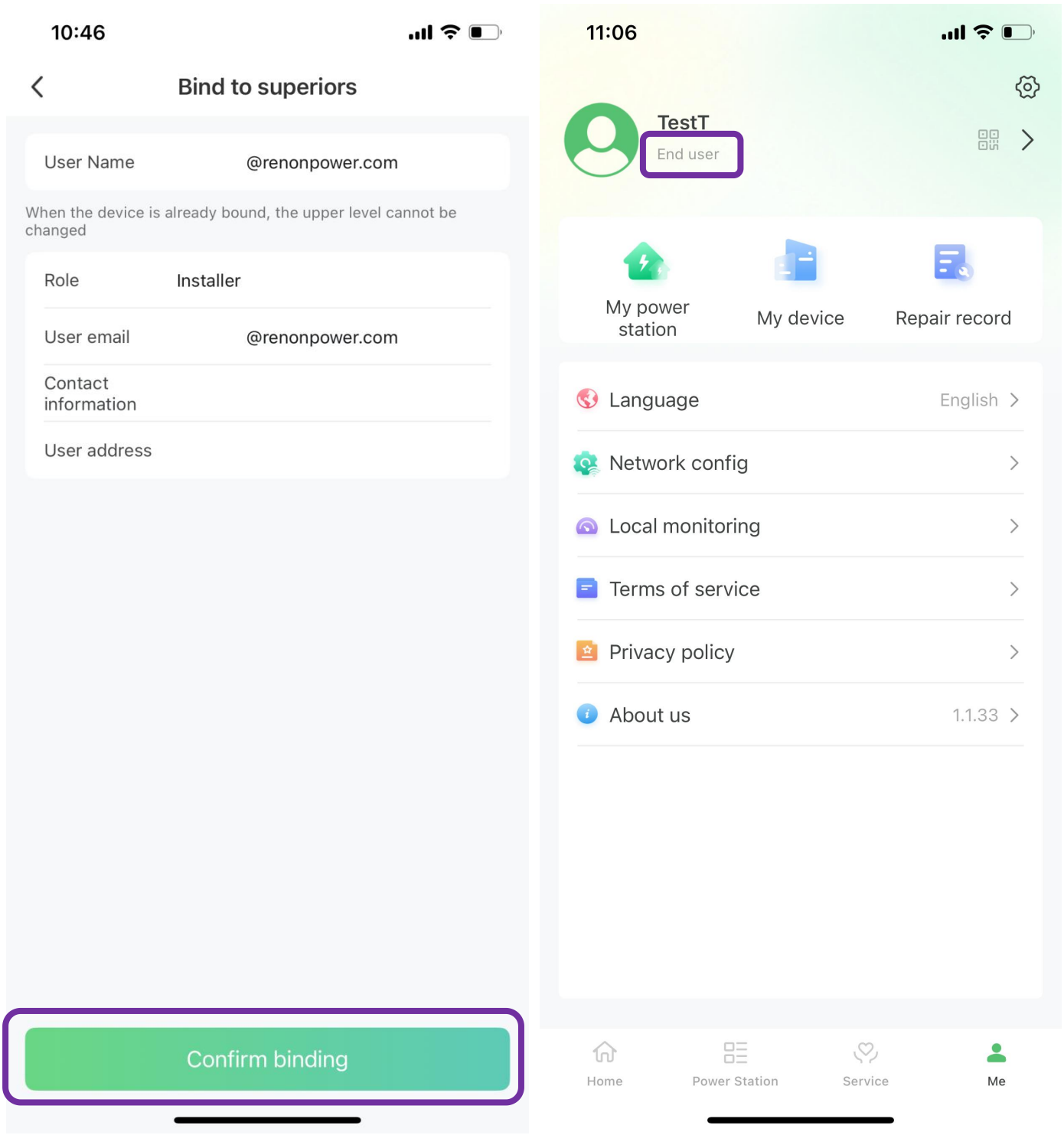


Figure 4.1.7. Confirm binding and become end user

b. Scan QR code

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

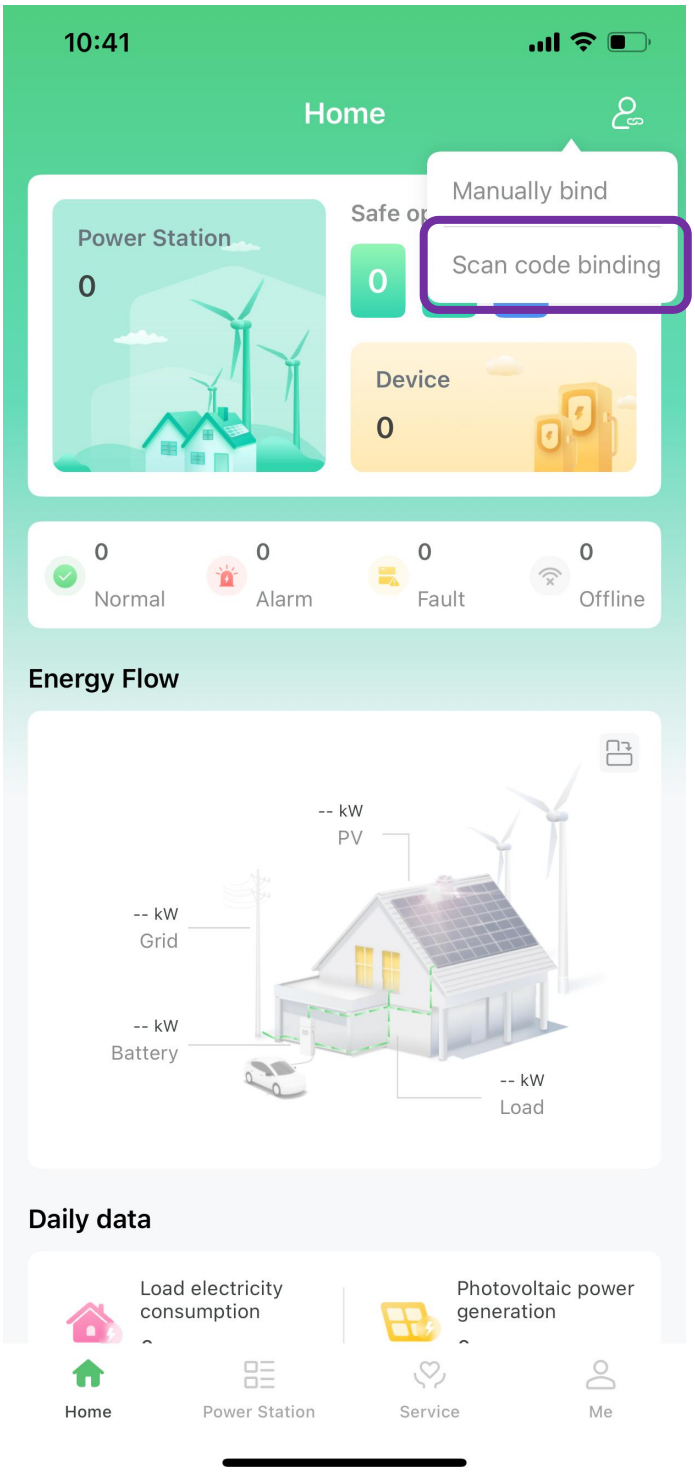


Figure 4.1.8. Scanning QR code

Step 2:

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

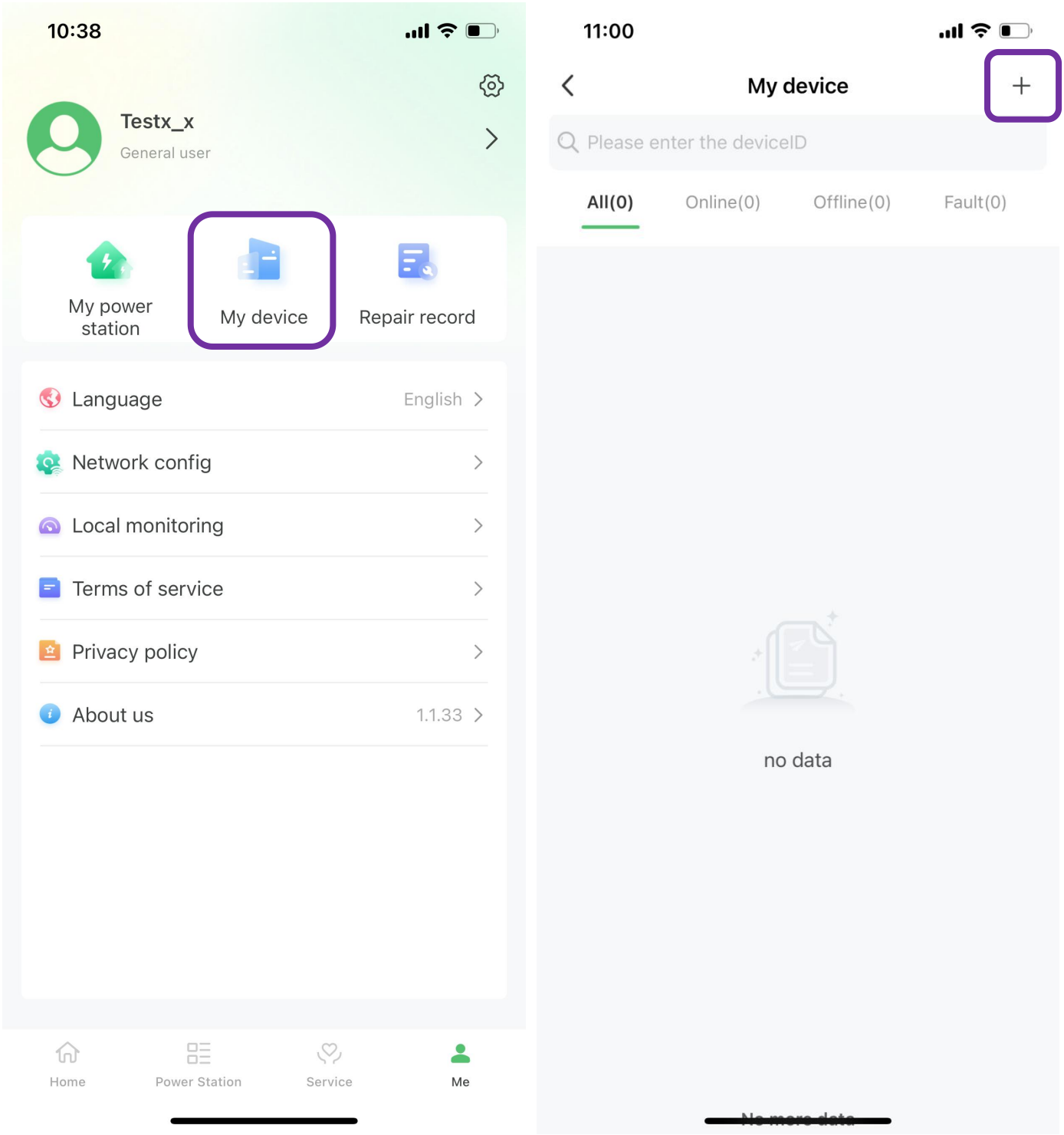


Figure 4.1.9. My device and add device

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

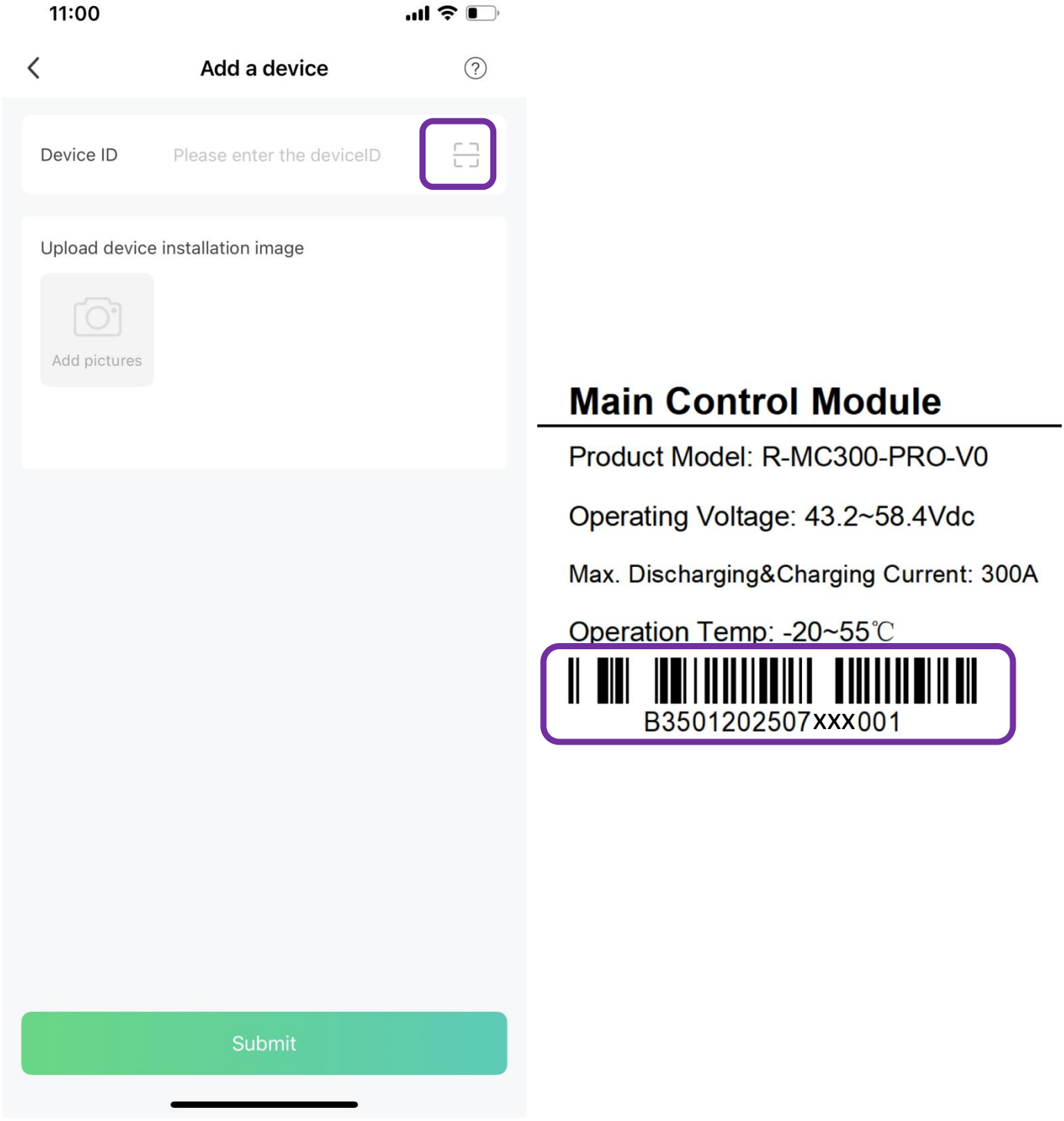


Figure 4.1.10. Scanning

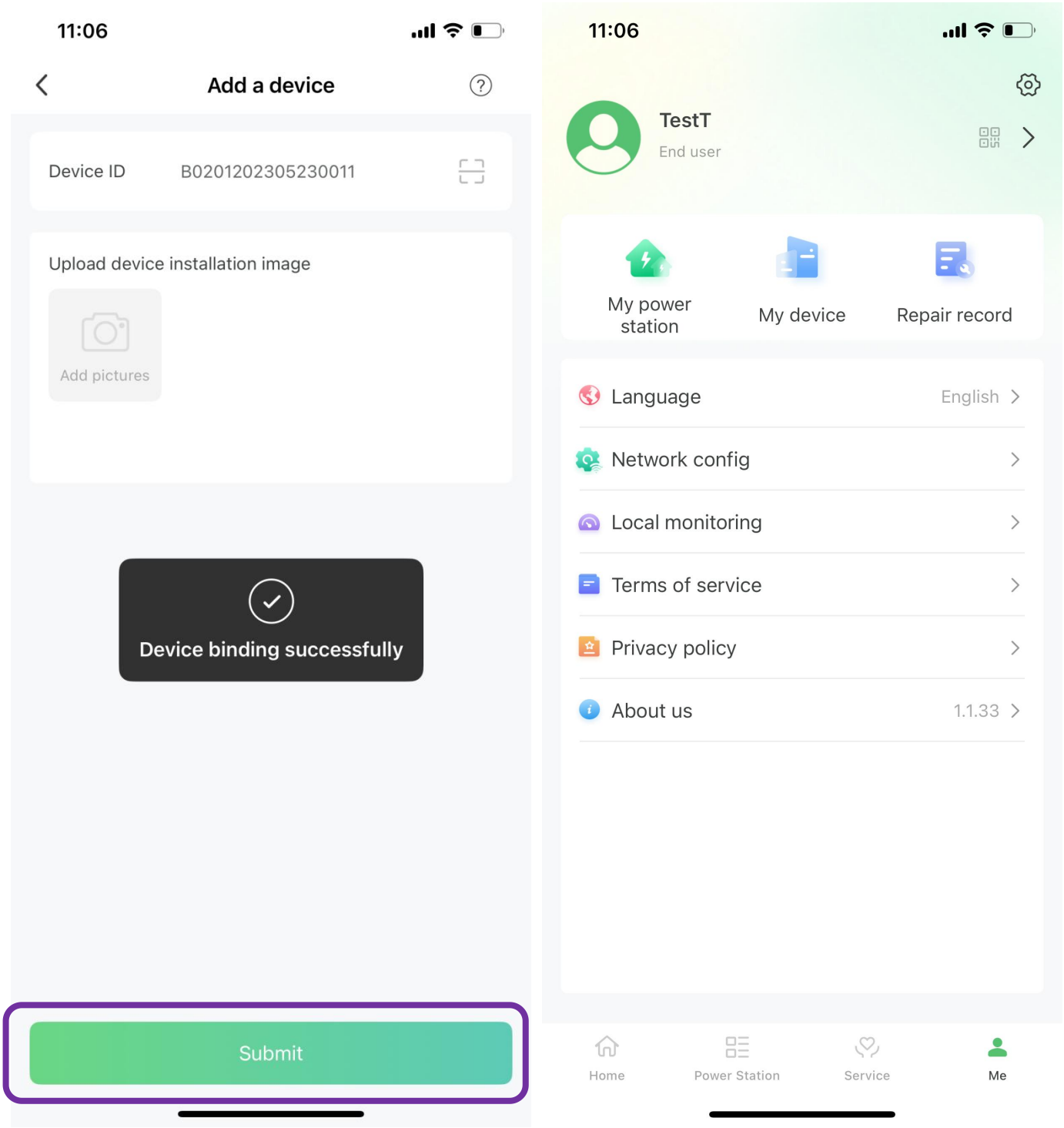


Figure 4.1.11. Binding successfully and become end user

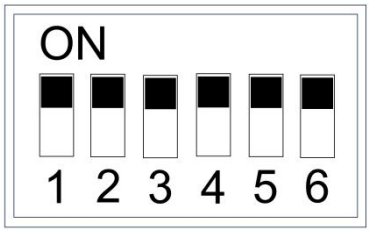
If the above methods are not successful, please contact Renon, email address: support@renon-usa.com, Renon Power Support: +1 (833) 736-6687. Be sure to write your account name/email address and device serial number clearly.

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.

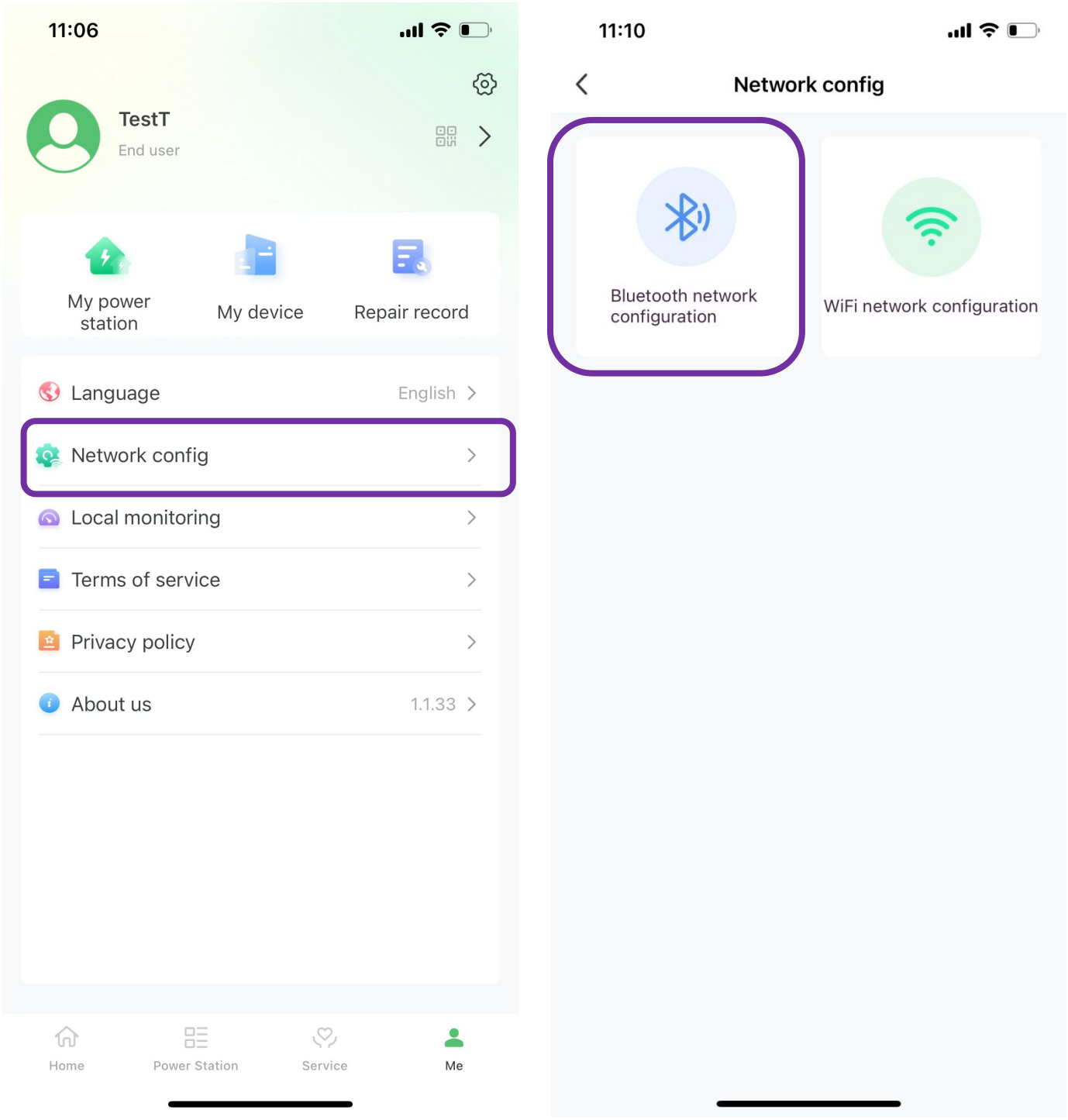


Figure 4.1.12. Bluetooth network setting

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

Note: The WiFi signal will be turned off after five minutes and needs to be re-dialed.

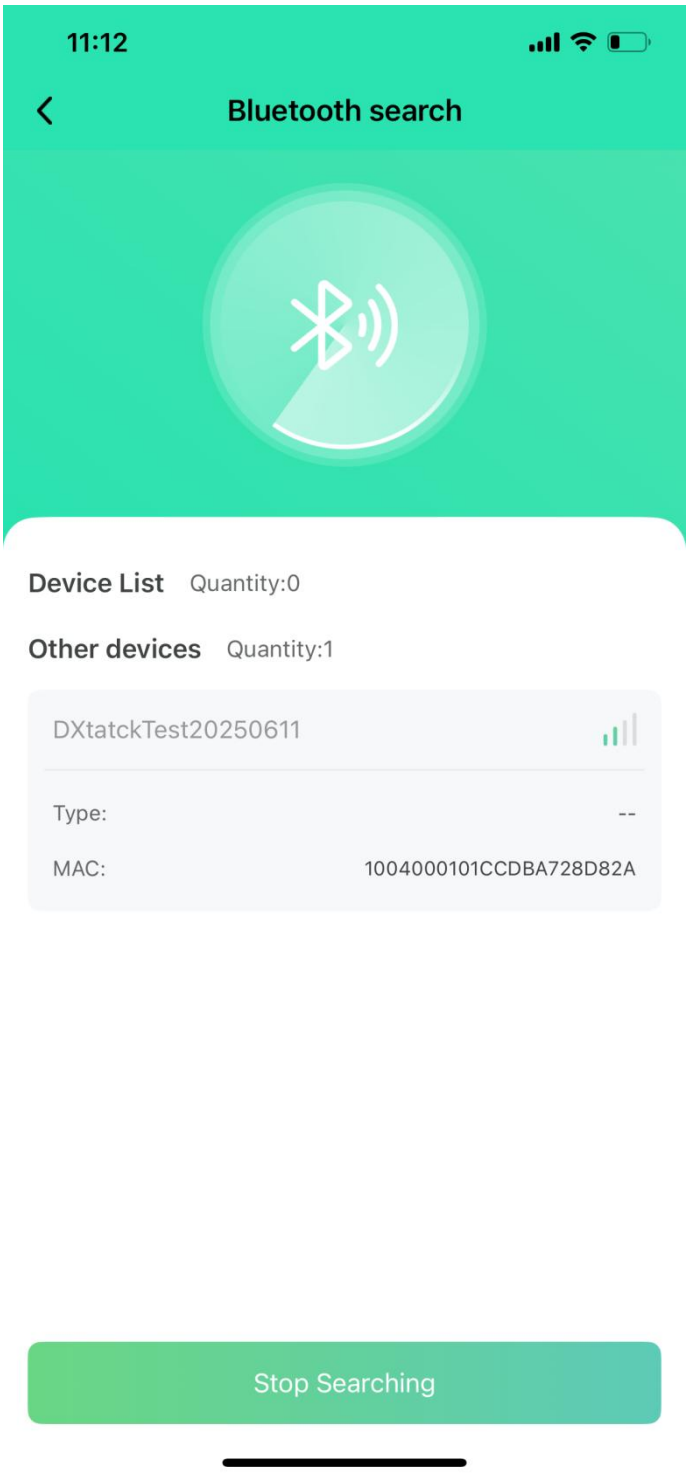


Figure 4.1.13. Connect battery Bluetooth

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.

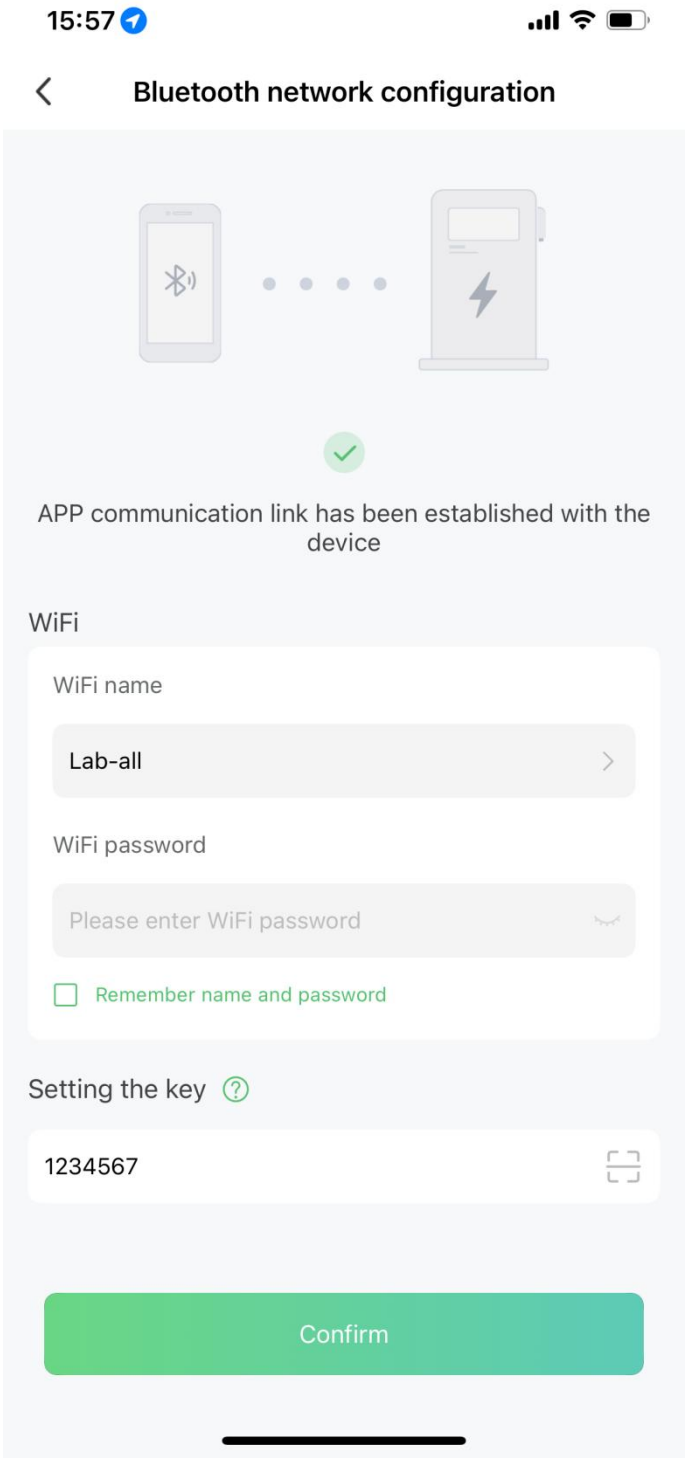


Figure 4.1.14. Connecting private WiFi

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.

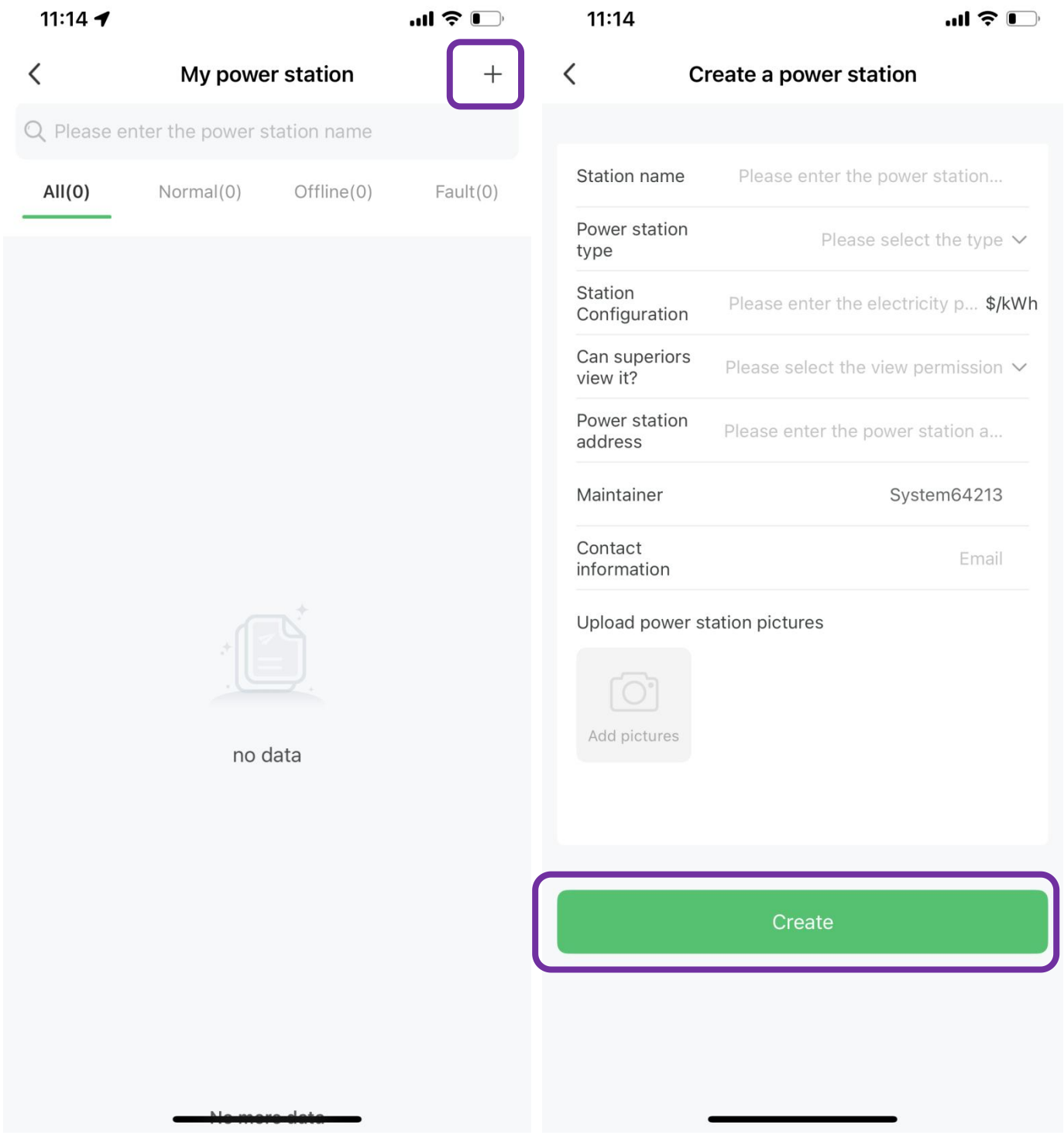


Figure 4.1.15. Create a new power station

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.

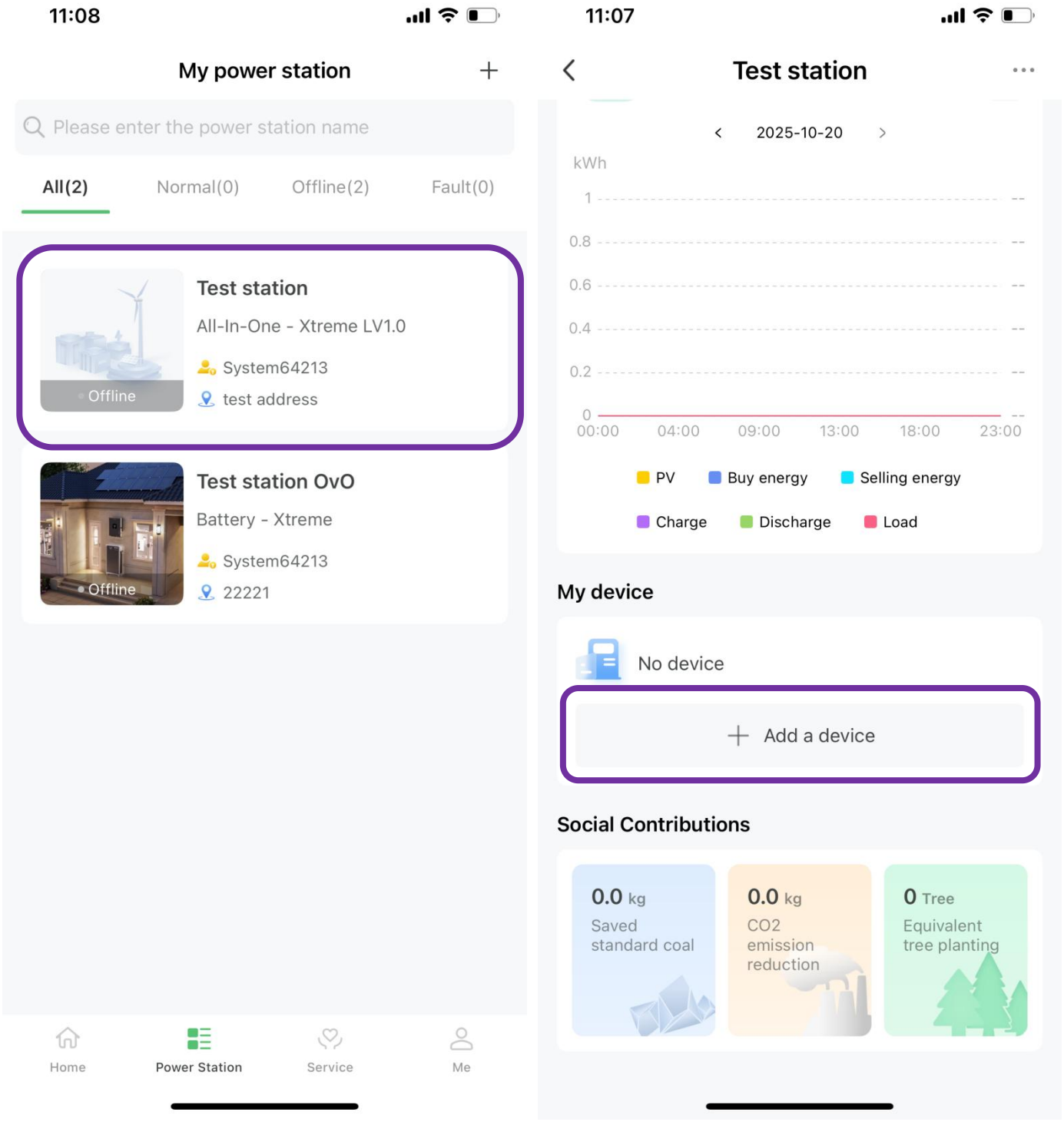


Figure 4.1.16. Add a devive in my power station

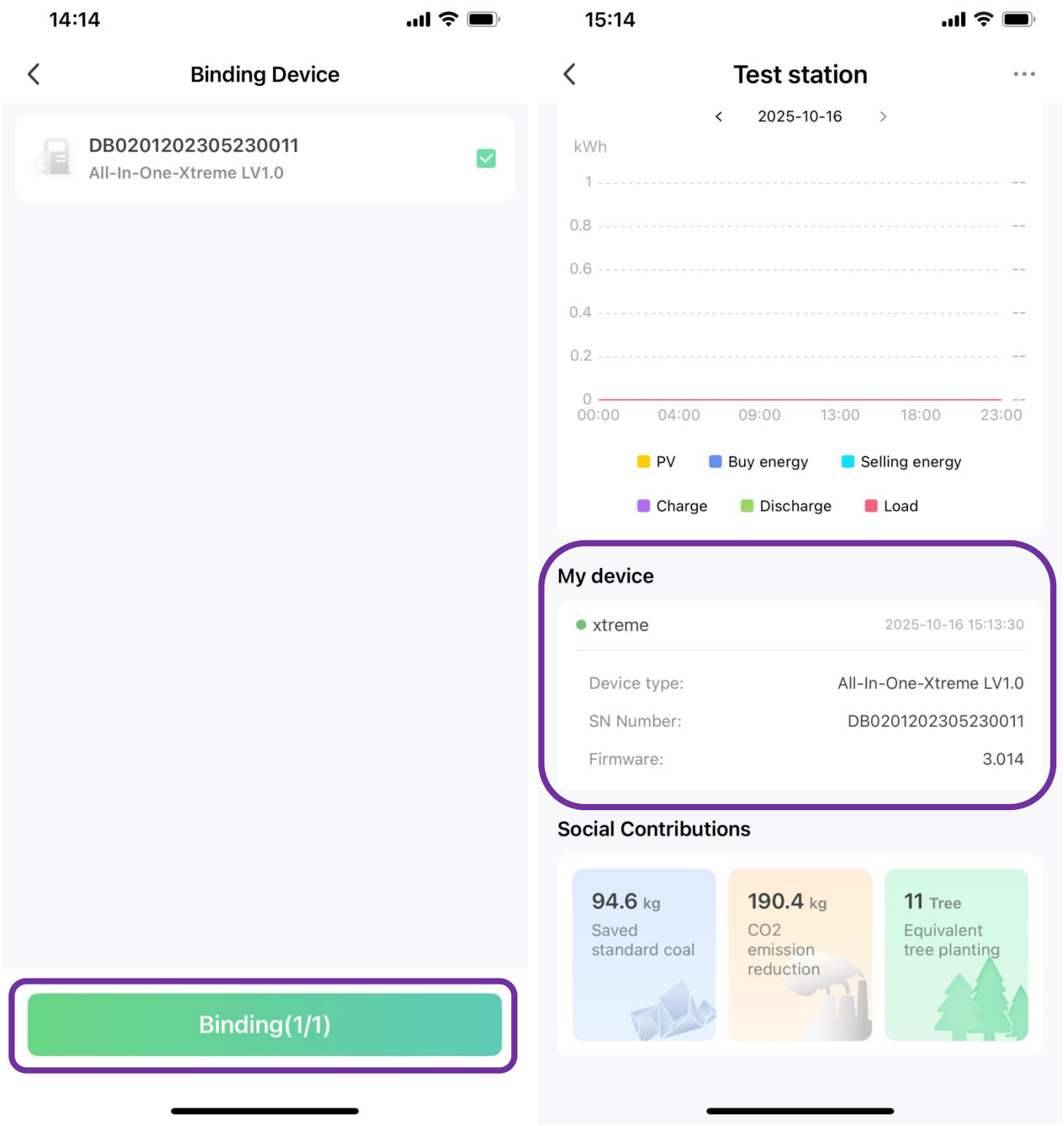


Figure 4.1.17. Manage your power station & Confirm your device

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

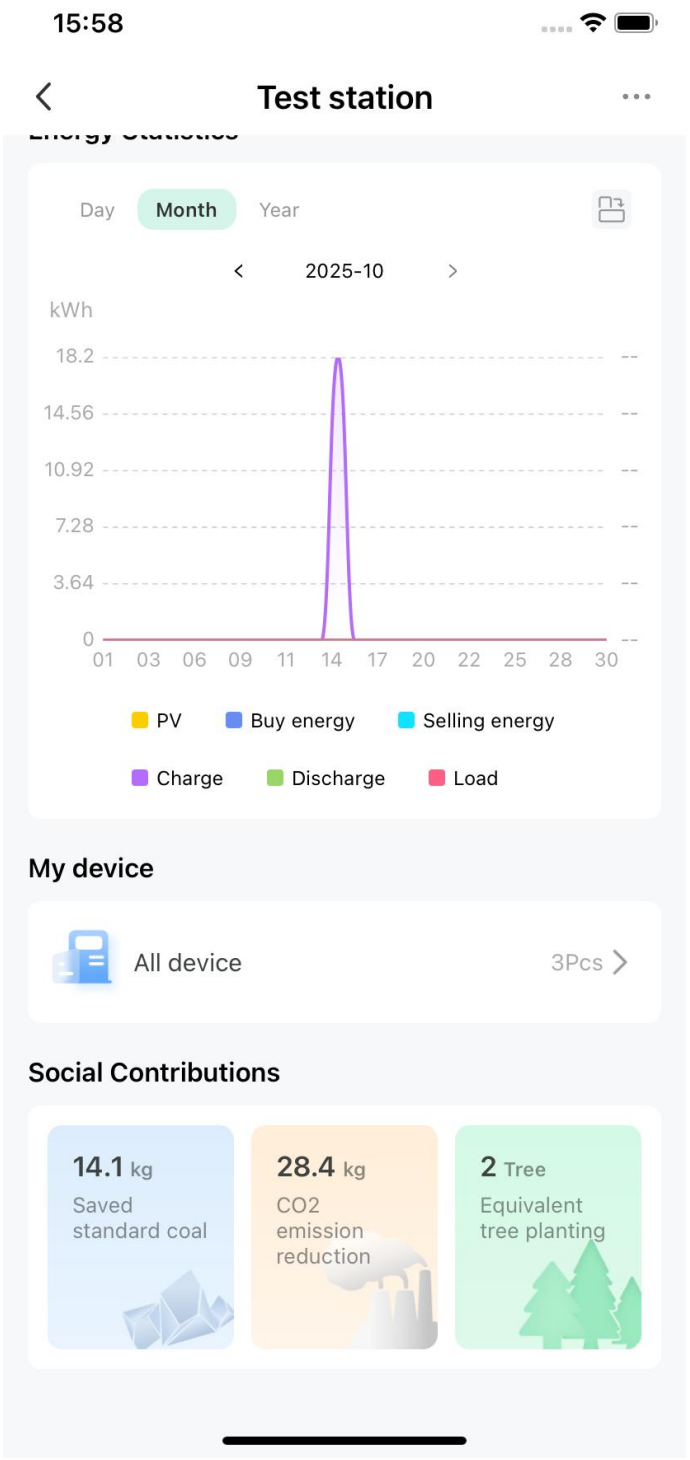


Figure 4.1.18. Manage your device

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.

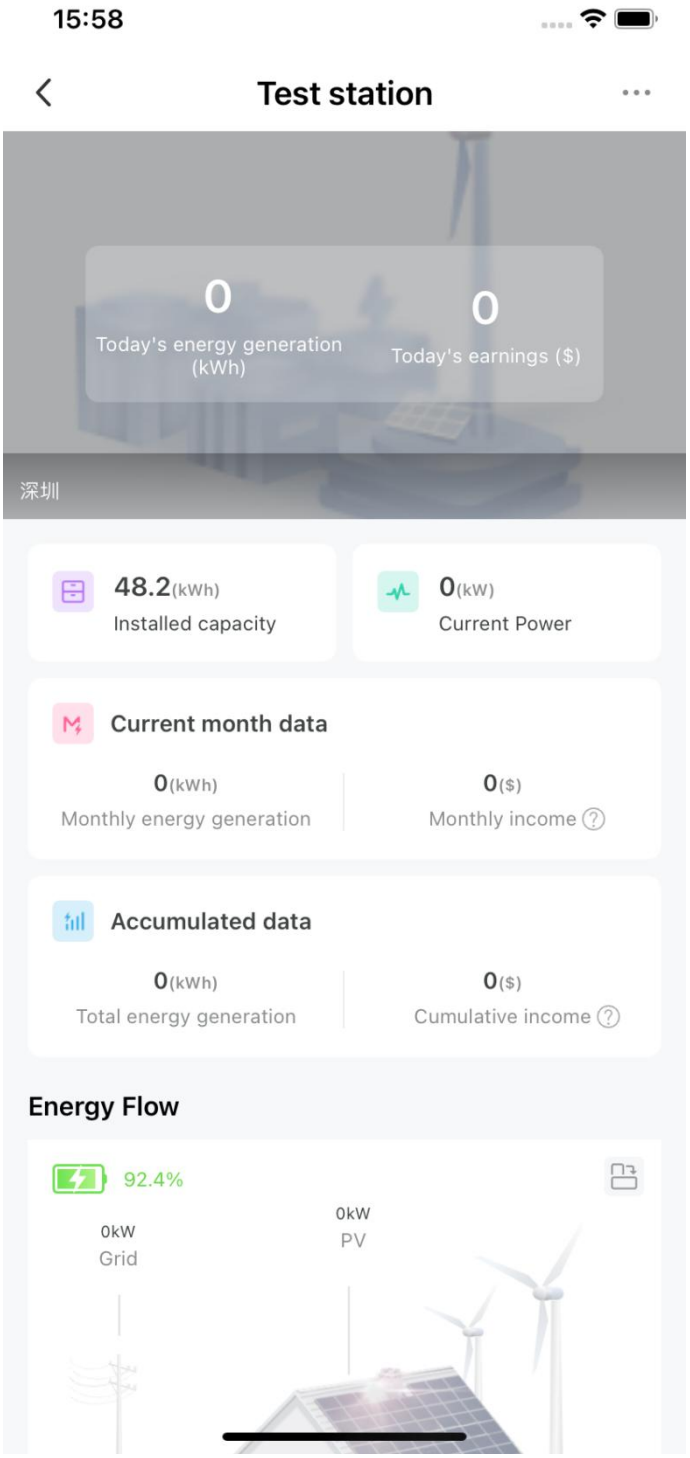


Figure 4.1.19. Monitoring device

Set the inverter dial code to match the inverter brand after WiFi configuration is complete (Please refer to the chapter **5.6.3 Inverter Dial Switch**).

5 Introductions

The EBrick 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 EBrick series consists of a built-in BMS battery management system, which can manage and monitor cells information including voltage, current and temperature, used to limit the balance current between different batteries when parallel use.

Multiple battery stacks are allowed to be connected to expand capacity and power to meet the requirements of longer power supporting duration and higher power consumption.

5.1 Product Features

- The whole product is non-toxic, pollution-free and environmentally friendly.
- Cathode material is made from LiFePO4 with safety performance and long cycle life.
- The battery is small in volume, has light weight, plug-in embedded design module, and is easy to install and maintain.
- Working temperature range is from -4℉ and 122℉ (-20℃to 50℃) with excellent discharge performance and cycle life.
- Battery management system (BMS) has protection functions including 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

1) Main control

Item	Main control
Max. Charging/Discharging Current (A)	300
Operating voltage range (V)	40-60
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
Maximum parallel clusters	Maximum 15
Communication	RS485/CAN/WiFi
Weight (lbs/kg) (Approx.)	99/45
Physical Dimensions (inches/mm) (W*D*H)	17.4*17.7*9.7/441*450*245.5
Designed Calendar Life	10 Years
Altitude	≤4000m
Maximum stacked modules per cluster	12

2) Battery

Item	EBrick-IND1 / EBrick-IND1-H
Parallel Capacity	Maximum 31
Weight (lbs/kg) (Approx.)	68/31
Physical Dimensions (inches/mm) (W*D*H)	17.3*16.5*5.2/440*420*132

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, overcurrent protection during charging/discharging, and short circuit protection, ensuring the safety and stability of the battery under various usage conditions.

5.3.2 Heating

When the battery is equipped with a heating film, the system will continuously monitor cell temperature. If the lowest cell temperature is below 5°C, the system will automatically activate the heating function to enhance battery performance. The heating function requires the inverter to be connected to the grid for continuous operation; otherwise, heating will only operate for 5 minutes. Once the highest cell temperature exceeds 15°C, the heating function will automatically deactivate to prevent overheating.

5.3.3 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.

5.3.4 Full Charge

To ensure long-term battery health, the system monitors the battery's charging status. If the system detects that the battery has not reached a full charge for 30 consecutive days, it will automatically initiate a full charge process, charging the battery to its maximum capacity to maintain optimal performance.

5.3.5 Charging Self-Adaptation Control

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

5.3.6 Safety Lock

This device is equipped with a safety lock function. If the lock is triggered and cannot be resolved after self-attempts, promptly contact technical support personnel for unlocking assistance.

5.4 Main Control

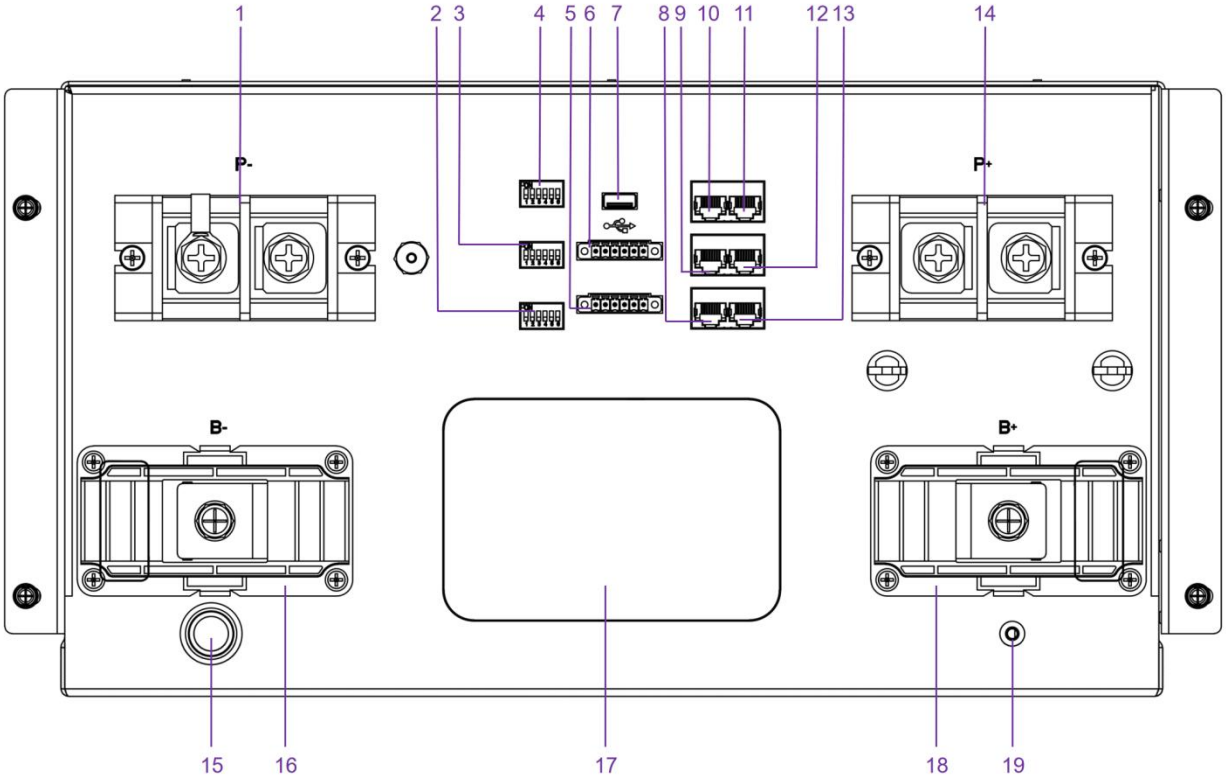


Figure 5.4.1 Main control

No.	Instructions	No.	Instructions
1	P- (Inverter)	11	LINK-B
2	Function.Set	12	Console
3	Addr.Set	13	EMS.LAN
4	Invert.Set	14	P+ (Inverter)
5	INV COMM.	15	Power button
6	LED COMM.	16	B- (Battery)
7	USB	17	Screen
8	INV	18	B+ (Battery)
9	COM.	19	Grounding
10	LINK-A		

5.5 Pack Interface Introduction

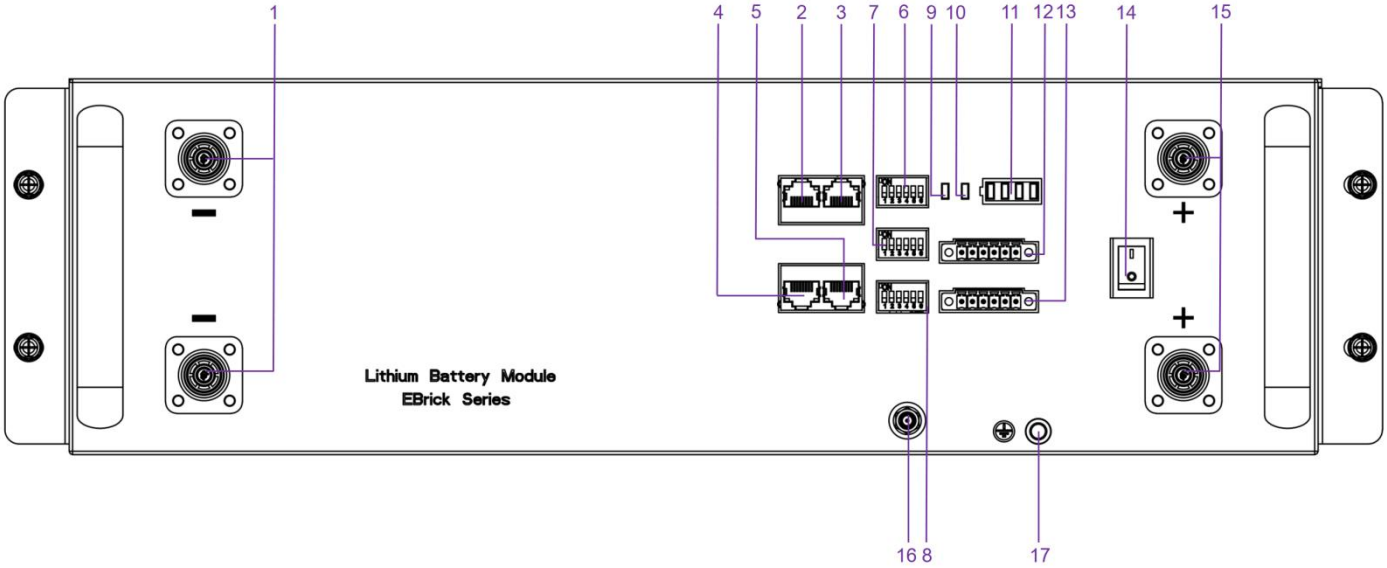


Figure 5.5.1 Battery ports from the front view

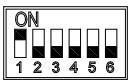
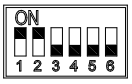
No.	Instructions	No.	Instructions
1	Power Negative	10	ALM
2	Link.IN	11	SOC
3	Debug	12	INV.CON
4	Link.OUT	13	Dry Contact
5	INV.COM.	14	On/Off
6	FUN.SET	15	Power Positive
7	INV.SET	16	WiFi Antenna port
8	ADDR.SET	17	Grounding Connection Port
9	RUN		

5.6 Main Control Interface

5.6.1 Function Dial Switch

Use this dial switch to match the communication impedance:

Optimize and enhance the communication between the master control unit and the battery so as to communicate between paralleled clusters.

Code	Dial Code Switch Position	Definition
1		① When used as single cluster; ② When used in a parallel system and not being the first or last cluster.
3		① When used as the first or last cluster in a parallel system.

5.6.2 Address Dial Switch

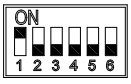
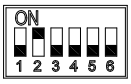
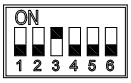
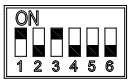
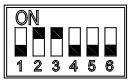
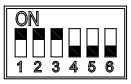
1) Use this Dial Switch to set the address of each battery, and then turn on to activate the system when it needs to be in parallel with other stacked units.

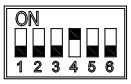
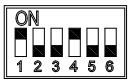
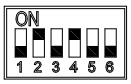
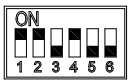
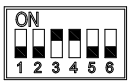
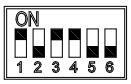
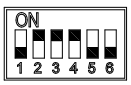
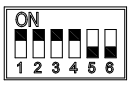
2) When the system only has one battery, dial the address to 1.

3) When the system is used in parallel mode, set the address start from 1, and increase by the number of stacked units in order to communicate with other battery.

4) Only the battery with address of 1 is able to communicate with the inverter.

The illustration of dialing shown below:

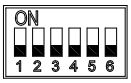
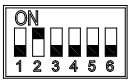
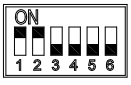
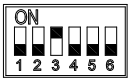
Code	Dial Switch Position	Definition
1		Set as battery 1 (communicate with inverter by this battery)
2		Set as battery 2
3		Set as battery 3
4		Set as battery 4
5		Set as battery 5
6		Set as battery 6
7		Set as battery 7

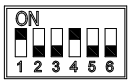
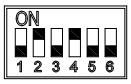
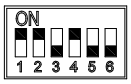
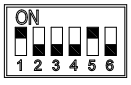
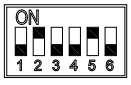
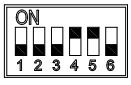
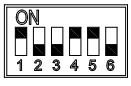
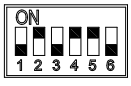
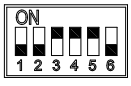
8		Set as battery 8
9		Set as battery 9
10		Set as battery 10
11		Set as battery 11
12		Set as battery 12
13		Set as battery 13
14		Set as battery 14
15		Set as battery 15

5.6.3 Inverter Dial Switch

Code 0~26 of this Dial Switch is used to match which brand of inverter is using.

The definitions of code 0 ~ 26 are shown as below table.

Code	Dial Switch Position	Brand	Logo
0		APP setting (Default: Renon Flex)	
2		Schneider Gateway	
3		Sol-Ark	
4		Solis	
6		Studer Xtender	
7		Victron	

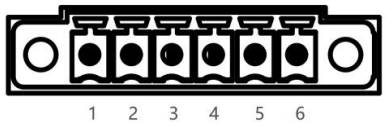
8		SMA	
9		Sermatec	
10		Sofar	
11		DEYE	
12		Growatt SPF	
13		Growatt SPH	
14		Must	
15		MEGAREVO	
16		SAJ	
17		Aiswei	
18		Phocos	
22		Voltronic Power	
24		Afore	
25		Lux Power	
26		CHISAGE ESS	
28		Senergy	

5.6.4 INV port

Terminal type: 6-Pin terminal block

This is for General-purpose input & output (GPIO) 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 input or output, or both, and is controllable by software.

Defined as bellow:

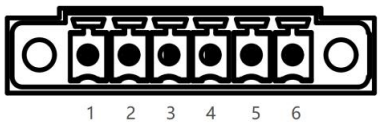
6pin Terminal	Pin	Usage
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	CAN2L
	5	CAN2H
	6	CAN2GND

5.6.5 LED Port

Terminal type: 6-Pin terminal block

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

Defined as below:

6pin Terminal	Pin	Usage
	1	12V
	2	GND
	3	485A
	4	485B
	5	CAN1H
	6	CAN1L

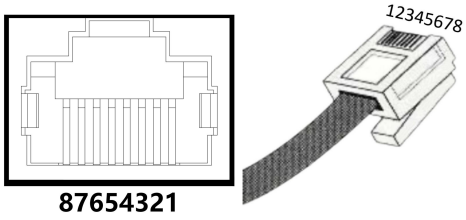
5.6.6 INV Communication Port

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 ensure communication.

Illustration of battery connection port shown below:

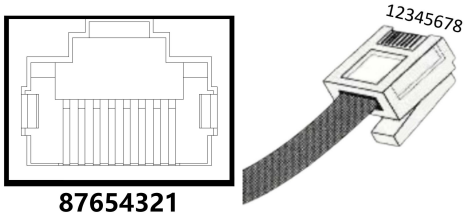
Port definitions	RJ45 Pin	Function
	1	RS485_2B
	2	RS485_2A
	3	SGND
	4	SGND
	5	SGND
	6	SGND
	7	CAN2H
	8	CAN2L

5.6.7 COM. Communication Port

Terminal type: RJ45

Usage: Communicates with inverter, PCS or other equipment.

Illustration of battery connection port shown below:

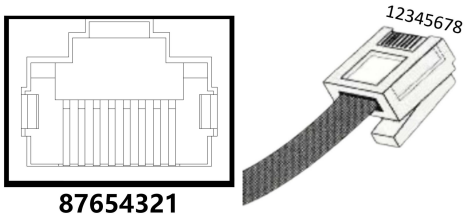
Port definitions	RJ45 Pin	Function
	1	RS232RIN1
	2	RS232OUT1
	3	RS485_2B
	4	Reserved
	5	RS485_2A
	6	Reserved
	7	Reserved
	8	SGND

5.6.8 Link-A/B Parallel Communication Port

Terminal type: RJ45

Usage: Connect this port with LINK.OUT port of the previous battery when parallel use.

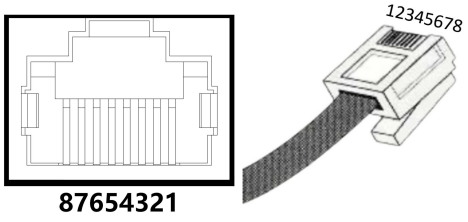
Defined as follows:

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

5.6.9 Console Port

Terminal type: RJ45

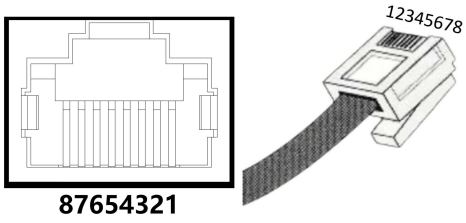
Usage: Debug port of the system which used by technician only.

Port definitions	RJ45 Pin	Function
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	Reserved
	5	Reserved
	6	RS485_2GND
	7	Reserved
	8	Reserved

5.6.10 EMS.LAN Port

Terminal type: RJ45

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

Port definitions	RJ45 Pin	Function
	1	CAN1L
	2	CAN1H
	3	CAN1GND
	4	BAT_SW-
	5	BAT_SW+
	6	CAN1GND
	7	BAT1_GND
	8	XUNZOUT+

5.6.11 Power Switch

This switch allows you turn the battery on or off.

1) The battery is on when the switch in the up position.

2) The battery is off when the switch in the down position.

5.6.12 Power Positive & Negative

Usage	OT terminal	Screw	Torsion	Wire diameter
Module to busbar	/	M8	11 ± 1.2 N.m	4 AWG
Main control to inverter or main control	SC70-10 / DT120-10	M10	22 ± 2.0 N.m	4/0 AWG or 2*2/0 AWG

5.6.13 Grounding Connection Port

This port is used to ground wire connection for safety reason, please refer to chapter of Installation.

5.6.14 WiFi Antenna Port

Connect the WiFi antenna to the port in order to get the APP and WEB connection.

5.6.15 Connections of Cable and Power

EBrick has two pairs of power terminals, that makes EBrick quite easy when parallel use to expand the capacity of batteries, but when used to expand the system power, busbar is necessary.

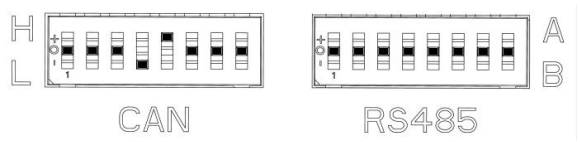
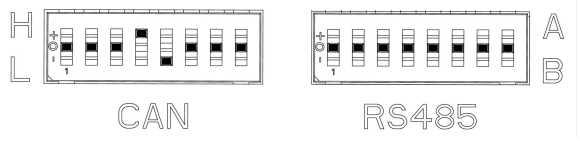
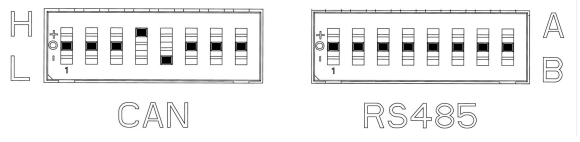
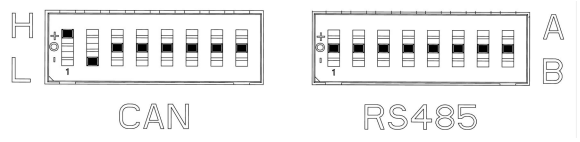
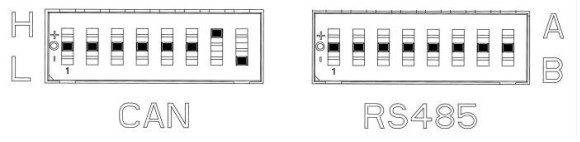
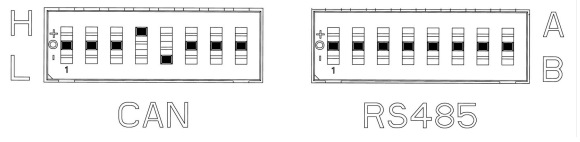
1) Set the address dial code (**Address**) of each battery as 1, 2, 3, … in order. Regarding the battery with address code 1, set the inverter dial code (**Inverter. Set**) to the corresponding inverter's code.

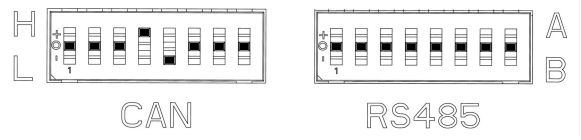
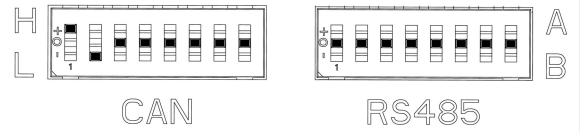
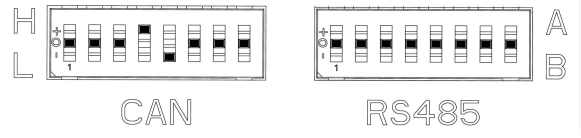
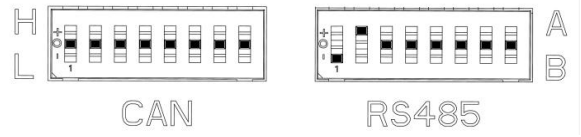
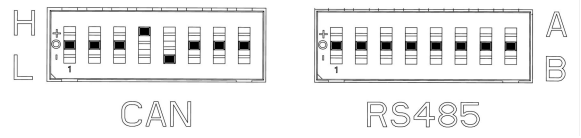
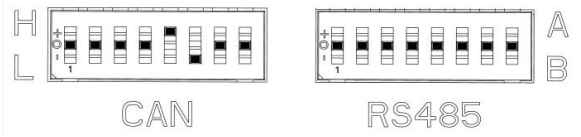
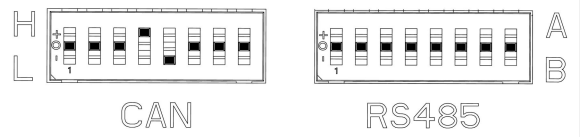
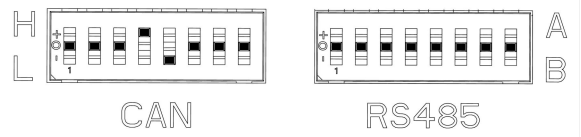
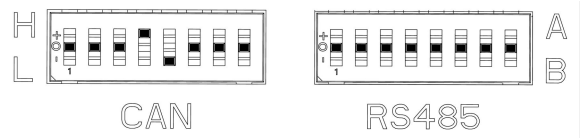
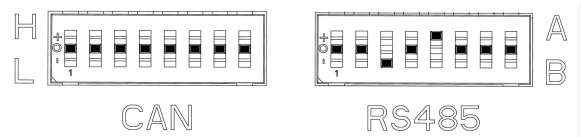
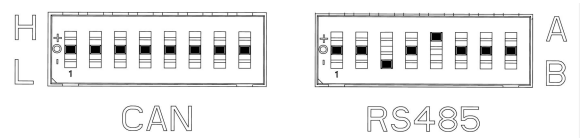
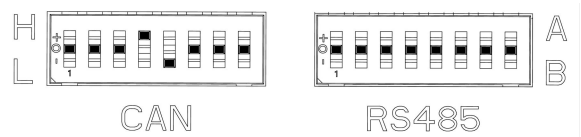
2) Set the first battery and the last battery of the system's Function dial code (**Function**)as code 32 and set Function dial code of the rest of batteries as code 0. The Function dial code (**Function**) is supposed to be set as code 0 in single battery usage.

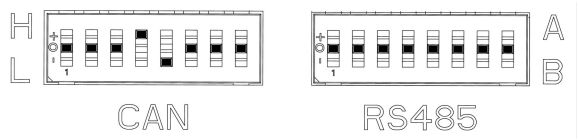
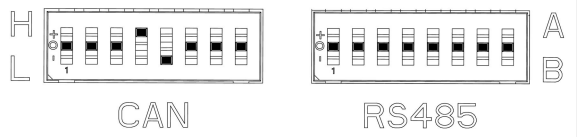
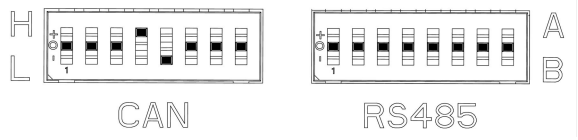
3) Connect first battery positive and negative to the corresponding inverter corresponding positive and negative, the battery has two pairs of power terminal, just use any one of them.

4) Connect CAN/RS485 wire to the inverter port of the master controller and inverter's CAN/RS485 port.

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
	Schneider Gateway	CAN
	Sol-Ark	CAN
	Solis	CAN
	Studer	CAN
	Victron	CAN
	SMA	CAN

	Sermatec	CAN
	Sofar	CAN
	DEYE	CAN
	Growatt SPF	RS485
	Growatt SPH	CAN
	Must	CAN
	MEGAREVO	CAN
	SAJ	CAN
	Aiswei	CAN
	Phocos	RS485
	Voltronic Power	RS485
	Afore	CAN

	Lux Power	CAN
	CHISAGE ESS	CAN
	Senergy	CAN

5.7 LCD Screen

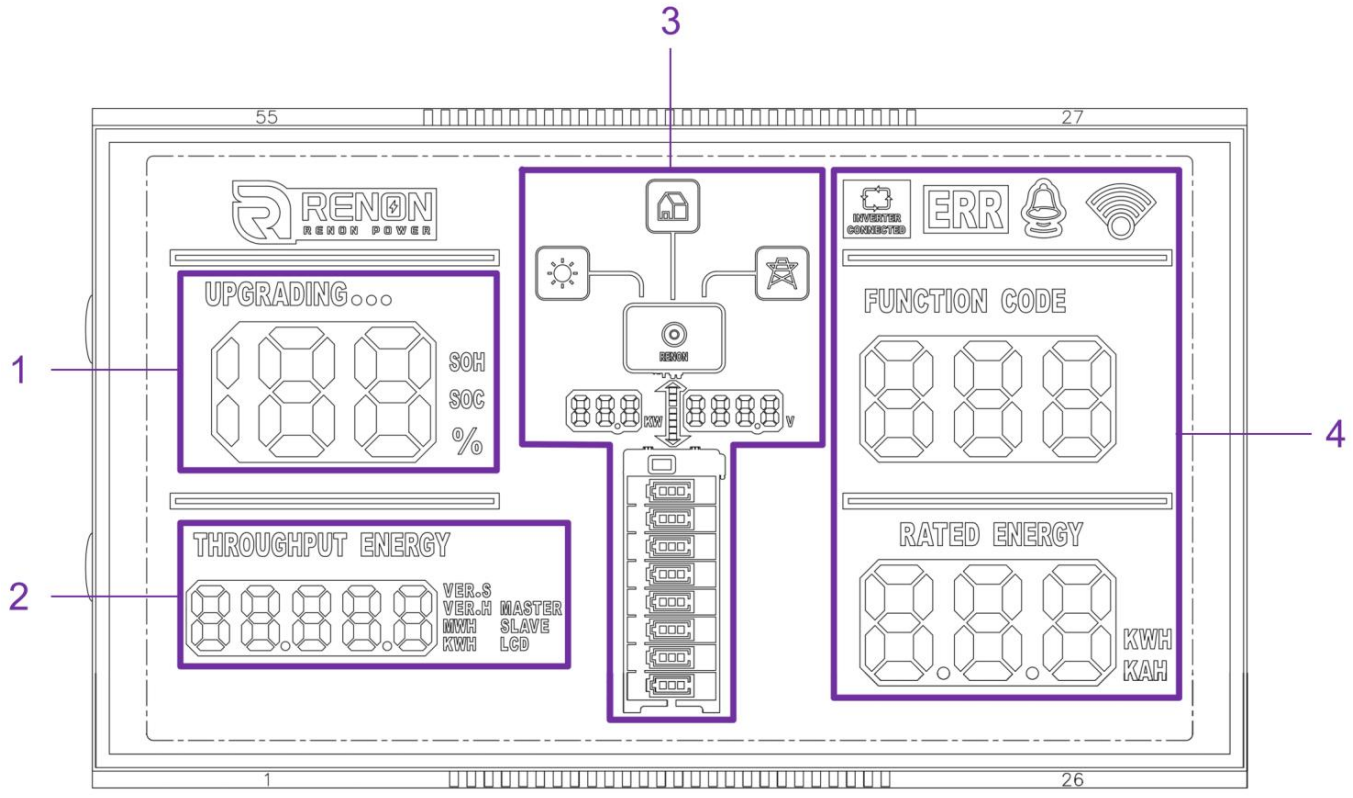


Figure 5.6.1 LCD Screen introduction

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

5.7.1 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.

5.7.2 Version and Accumulated Discharge Energy

The number show 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.

5.7.3 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.

5.7.4 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 there 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.

3) WiFi Connection Symbol

The WiFi icon will display as long as the WiFi connection is 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.

5.7.5 Screen Display Code

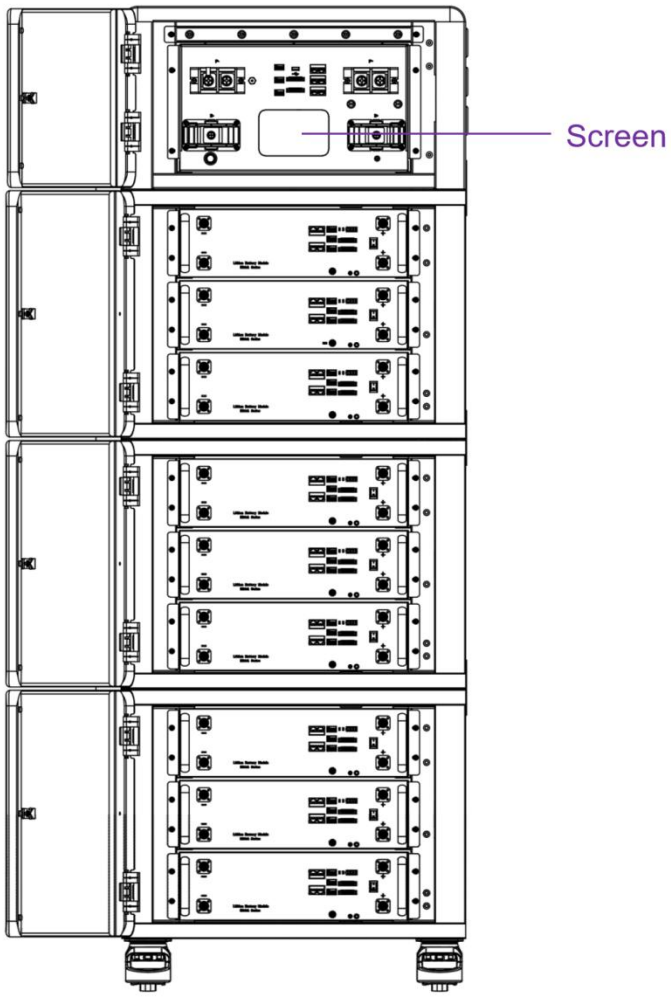


Figure 5.6.2 Screen

Note: If the following fault codes are not displayed on the screen, the device will operate as intended.

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
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	Error 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
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	Relay voltage fault
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 that the operating parameters are normal and 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.
The symbol of battery modules on the screen is rapid blinking (frequency of 2s) 	1. Try to charge and discharge the battery system for a cycle.
Unable to turn on the battery	1. Try to charge the battery by the activation charging function of the inverter when power is on.

No output after power on.	1. Make sure the address dial code setting is correct, refer to the chapter of address dial code; 2. No lights on SOC LED Indicators and steady red on alarm LED, which indicates SOC is 0% and charged the battery please; 3. Green lights on SOC LED Indicators and steady red on alarm LED, which indicates something wrong with and check the ambient temperature of the battery please.
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. Check whether inverter has faults; 2. Make sure the battery is allowed to be charged by inverter; 3. Make sure Time of Use of inverter setting is correct; 4. Make sure charging voltage and charging current setting of the inverter match the parameters of the battery; 5. Make sure there is no alarm (No light on alarm LED indicator); 6. Make sure power cable connection is correct.
Unable to discharge while SOC is not zero.	1. Check whether inverter has faults; 2. Make sure the connection of cables and circuit breaker is correct; 3. Make sure the inverter setting is back up model; 4. Check whether SOC shut down value setting is over high; 5. Make sure there is no alarm (No light on alarm LED indicator).
Unable to find the battery on the app or the Cloud	1. Make sure the WiFi antenna is tightened properly; 2. Make sure the SSID & PASSWORD of your private WiFi is correct, please enter information case-sensitively without space; 3. Make sure the signal is strong enough; 4. Make sure it's working; 5. Make sure installer has added your products to your account; 6. Try to restart the router.

6.3 Status Codes

The following status codes are displayed on the cloud platform.

6.3.1 Waring 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 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	Main control DC busbar overtemperature 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.
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	High relay 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.
W31	Heating film activation failure fault	1. Restart the battery, and if error code W31 still remains or reappears, contact your installer.
W32	Heating film deactivation failure fault	1. Restart the battery, and if error code W32 still remains or reappears, contact your installer.
W400	PCS disconnection	1. When the battery is in normal communication with the inverter and the battery is connected to the Cloud Computing 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.

6.3.2 Error Codes

Code	Error Type	Investigation & troubleshooting
F100	Main control discharge relay fault	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	Main control charge relay fault	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. The battery's cell capacity has decreased due to long-term non-use. When the cell voltage is below 1.8V, we do not recommend recharging and continuing to use it. Please contact our technical support or your installer. 2. During battery operation, a sudden cell failure may occur, possibly due to abnormal BMS cell voltage acquisition. 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. 2. NTC acquisition quantity configuration is incorrect. The main control program needs to reconfigure the NTC acquisition quantity; 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 promptly for handling. 2. The battery actually has current, but the reading is 0, which may be due to an abnormal Hall sensor. If it is necessary to replace the Hall or the main controller, please contact our technical support or your installer for handling.
F105	Pack lost	1. A certain PACK of the battery has shut down due to under-voltage, resulting in the loss of communication between the Master and it, and 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 will cause PACK disconnection, and the battery needs to be stacked again and turned on again. 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 lines of the battery's positive and negative poles are incorrectly connected. Please check the power line connections. 2. The circuit breaker between the battery and the inverter. When the battery is fully turned on and the circuit breaker is closed, there is a large current impact that triggers the short circuit protection. After restarting the battery, it is released, but the correct operation process should be: close the circuit breaker first and then start the battery.

F109	Battery module conflict	1. When the battery is used in parallel, the battery address dial is not configured according to the manual instructions, resulting in the same address triggering battery module conflict in the system; please dial the correct address dial according to the manual instructions and restart all battery modules 2. The battery address DIP switch settings are consistent with the manual instructions, but the issue persists after restarting. Please contact our technical support or your installer for assistance.
F110	Cluster address conflict	1. When batteries are used in parallel connection between clusters, the system has more than two batteries with the same address 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. Please contact our technical support or your installer for handling.
F111	Charge MOS fault	1. The MOS tube of the PACK charging main circuit is damaged. Please contact our technical support or your installer for processing.
F112	Discharge MOS fault	1. The MOSFET in the PACK discharge main circuit is damaged. Please contact our technical support or your installer for handling.
F113	Addressing failure	1. When the battery is first installed, the impedance matching of the base fails. Check whether the gap between the battery base and the battery module is reasonable. If it is unreasonable, please re-stack it. 2. When the battery is initially installed, the stacking gap between the battery main controller and the PACK is too large, resulting in poor contact of the communication cable between the main controller and the PACK and preventing addressing. Please restack.
F114	Precharge fault	1. Battery connection: During the startup process of the inverter, due to the large capacitance of some inverters, the battery closed the main circuit and failed to trigger the precharge fault. It is recommended to use the mains power to power the inverter before activating the battery. 2. The battery reports a pre-charge fault when powered on without being connected to any device. Please contact our technical support or your installer for handling.
F115	Cluster lost	1. When installing the battery in parallel between clusters, the function dialing was not performed according to the manual, resulting in abnormal communication between clusters. Please dial according to the function dialing method described in the manual; 2. During the use of the battery system and the machine, the communication cable is loose or aged. Please check the communication cable connection. If the problem cannot be solved, please contact our technical support or your installer for handling.
F116	Battery reverse connection fault	1. Battery positive and negative power cable wiring error, please check the power cable connection, if your problem cannot be solved, please contact our technical support or your installer for processing.
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 the battery is used in parallel, the battery address dialing is not configured according to the manual instructions, resulting in a battery module conflict triggered by the lack of consecutive addresses in the system; please dial the correct address dialing according to the manual instructions and restart all battery modules 2. The battery address DIP switch settings are consistent with the manual instructions, but the issue persists after restarting. Please contact our technical support or your installer for assistance.
F126	Master relay temp NTC short circuit	1. Host relay temperature NTC sampling resistor short circuit, please contact our technical support or your installer for processing.
F127	Master relay temp NTC open circuit	1. Host relay temperature NTC sampling resistor open circuit, please contact our technical support or your installer for processing.
F128	Master DC busbar temp NTC short circuit	1. The NTC sampling resistor for the DC busbar temperature of the host is short-circuited. Please contact our technical support or your installer for handling.
F129	Master DC busbartemp NTC open circuit	1. The sampling resistor of the NTC for the DC busbar temperature of the host is open. Please contact our technical support or your installer for handling.
F130	Master and EMS communication lost	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. When the battery is connected to the Cloud Computing Platform and the battery EMS_SN is detected as empty, the cloud will report an EMS_SN empty fault. You need to write the EMS_SN number. Please contact our technical support or your installer for handling. This fault does not affect battery operation, but it will cause abnormal data upload to the Cloud Computing Platform.
F133	Master SN is empty	1. When the battery is connected to the Cloud Computing Platform and the battery Mater_SN is detected as empty, the cloud will report a Master_SN empty fault. You need to write the Mater_SN number. Please contact our technical support or your installer for handling. This fault does not affect battery operation, but it will cause abnormal data upload to the Cloud Computing Platform.
F134	Pack SN is empty	1. The battery is connected to the Cloud Computing Platform and detects that the battery BMS_SN is empty. The cloud will report the BMS is empty fault, and the BMS_SN number needs to be written. Please contact our technical support or your installer for processing. This fault does not affect the battery operation, but it will cause abnormal data uploading to the Cloud Computing Platform.

F136	Relay voltage fault	1. Restart the battery, y, and if error code F136 still remains or reappears, contactyour installer.
F153	Device has locked 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 spontaneously protects and triggers device locking. Please contact our technical support or your installer for processing.
F200	Battery cell undervoltage safety lock	1. Due to long-term non-use, the battery cells self-discharge to a single voltage below 1.9V, triggering a single undervoltage safety lock. Please contact our technical support or your installer for processing. 2. The actual cell voltage of the battery is inconsistent with the sampled value due to abnormal collection, and the cell with collected voltage lower than 1.9V triggers the single undervoltage safety lock; please contact our technical support or your installer for processing.
F201	Battery cell high voltage safety lock	1. Due to abnormal data collection, the actual cell voltage does not match the sampled value, and 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, the temperature of the battery cell reaches 58 ℃, triggering the high-temperature safety lock for charging. Let the battery stand and wait for the temperature of the battery cell to drop. At the same time, contact our technical support or your installer for processing.
F203	Charge low temp safety lock	1. The battery temperature reaches -8 ℃, triggering a low-temperature safety lock for charging. Please contact our technical support or your installer for processing
F204	Discharge high temp safety lock	1. During the battery discharge process, the temperature of the battery cell reaches 58 ℃, triggering the discharge high-temperature safety lock. Let the battery stand and wait for the temperature of the battery cell to drop. At the same time, contact our technical support or your installer for processing.
F205	Discharge low temp safety lock	1. The cell temperature has reached -28°C, triggering the low-temperature discharge safety lock. Please contact our technical support or your installer for handling.
F206	Charge overcurrent safety lock	1. If the battery repeatedly reports the charging overcurrent protection for more than 10 times before reporting the charging overcurrent safety lock, and the battery enters the charging overcurrent safety lock, please contact our technical support or your installer for processing.
F207	Discharge overcurrent safety lock	1. If the battery repeatedly reports the discharge overcurrent protection for more than 10 times before reporting the discharge overcurrent safety lock, and the battery enters the discharge overcurrent safety lock, please contact our technical support or your installer for processing.

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 period, 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 in a timely manner for handling.
P2	Overcurrent charge protection	1. The system charging power is greater than the rated charging power of the battery. If the PACK charging current is greater than 98A or the system charging current is greater than 310A 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 a current that the battery or the system itself can bear to the inverter for charging. If the communication is abnormal, overcurrent protection may occur. 2. If the PACK charging current is less than 95A or the system charging current is less than 300A, and there is overcurrent protection for charging, please contact our technical support or your installer for processing in time.
P3	Overcurrent discharge protection	1. When the system discharge power exceeds the rated discharge power of the battery, if the PACK discharge current exceeds 98A or the system discharge current exceeds 310A 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 discharging. If the communication is abnormal, overcurrent protection may occur. 2. PACK discharge current is less than 95A and/or system discharge current is less than 300A, and there is 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 a lower-temperature environment to install the battery; 3. If the temperature of one cell in the battery differs significantly from that of other cells (which can be viewed on the Cloud Computing Platform), it may indicate an abnormal temperature reading of the cell by the BMS; please contact our technical support or your installer in a timely manner.
P5	High discharge temp protection	1. The battery cell temperature rises due to long-term high-power consumption, and the cell temperature exceeds the set threshold (55 ℃) to trigger the overcharging temperature protection; please stop using the battery and wait for the cell temperature to drop 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 a lower-temperature environment to install the battery; 3. If the temperature of a battery cell is significantly different from that of other cells (which can be viewed by the Cloud Computing Platform), it may be abnormal for the BMS to collect the cell temperature; please contact our technical support or your installer in time.
P6	Low charge temp protection	1. If the ambient temperature at the installation location is below 0°C, it is necessary to purchase a battery with a heating film. If the battery does not have a heating function, it cannot be used. If the battery has a heating function, a DC power supply or an inverter is required to charge the battery to maintain the power required for the heating film to heat. If the battery thermal management is not working properly, please contact our technical support or your installer. 2. Abnormal cell temperature collection: one or more cells have temperatures lower than the normal ambient temperature, triggering low-temperature charging protection. Please contact our technical support or your installer promptly for handling.

P7	Low discharge temp protection	1. If the ambient temperature at the installation site is below -20°C, you need to purchase a battery with a heating film. If the battery does not have a heating function, it cannot be used. If the battery has a heating function, you need to use a DC power supply or an inverter to charge the battery to maintain the power required for the heating film to heat. If the battery thermal management is not working properly, please contact our technical support or your installer. 2. Abnormal cell temperature collection: one or more cells have temperatures lower than the normal ambient temperature, triggering low-temperature charging protection. Please contact our technical support or your installer promptly for handling.
P8	High ambient temp protection	1. Please upgrade all battery software to the latest version. If it cannot be solved, please contact our technical support or your installer for processing in a timely manner.
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, and 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, and wait for the cell voltage difference to recover on its own. 2. During the battery's standing process, overvoltage protection occurs, which may be caused by abnormal BMS cell acquisition, abnormal cells, abnormal BMS acquisition power consumption, etc. Please contact our technical support or your installer promptly for handling.
P10	Main control relay overtemperature	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	Main control DC busbar overtemperature protection	1. During the battery charging and discharging process, due to loose connection of the power cable at the battery port, the internal resistance increases, the temperature of the power cable and copper busbar rises, triggering the high-temperature protection of the copper busbar. Please check the connection of the power cable. 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 it cannot be solved, please contact our technical support or your installer for processing in a timely manner.
P13	Low total voltage protection	1. The total battery voltage is below the set threshold, please use the inverter to charge the battery
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 promptly for assistance.
P15	High MOS temp protection	1. During long periods of high-current charging or discharging, the temperature of the main battery circuit rises. When the temperature reaches 110°C, the MOS high-temperature protection is triggered, and the battery can only continue to be used after the temperature drops below 100°C. 2. If the battery reports MOS high-temperature protection when there is no charging or discharging, please contact our technical support or your installer.
P16	Battery cell overvoltage protection	1. At the end of battery charging, the inverter charges the battery with a small current (usually when batteries are used in parallel), charging the cell voltage to 3.7V and triggering the single cell overvoltage protection; single cell overvoltage protection does not affect battery discharge, and if the battery discharges, the single cell overvoltage protection will be released 2. When there is DC coupling and parallel operation within the system, overvoltage protection of battery cells is also likely to occur, which does not affect battery discharge and will be lifted during the discharge process.
P17	High total voltage protection	1. When the total voltage of the battery exceeds the set threshold (59.2V) at the end of charging, it triggers the overvoltage protection, which will be released when the battery is discharged and used.

P18	Low SOC protection	1. When the battery SOC is 0%, the SOC under protection is triggered, and at this time, the battery needs to be charged.
P19	Overcurrent discharge 2 protection	1. Battery PACK discharge current exceeds 120A, triggering overcurrent 2 protection. Please check if other PACKs are faulty or reduce the inverter load power
P22	Positive connector high temp protection	1. The battery power cable not being installed properly causes an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises. When the temperature of the battery power cable collected is greater than 110°C, protection is triggered; please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper busbar of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.
P23	Negative connector high temp protection	1. The battery power cable not being installed properly causes an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises. When the temperature of the battery power cable collected is greater than 110°C, protection is triggered; please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper busbar of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.
P24	High relay temp protection	1. The battery power cable not being installed properly or the screws on the inverter side not being tightened securely causes an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises, and through heat transfer, the temperature of the relay exceeds the set threshold (110°C); please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper bars of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.

P25	Positive high temp protection for docking terminal	1. The battery power cable not being installed properly causes an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises. When the temperature of the battery power cable collected is greater than 110°C, protection is triggered; please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper busbar of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.
P26	Negative high temp protection for docking terminal	1. The battery power cable not being installed properly causes an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises. When the temperature of the battery power cable collected is greater than 110°C, protection is triggered; please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper busbar of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.
P27	Positive high temp protection for discharge port	1. The battery power cable not being installed properly or the screws on the inverter side not being tightened securely leads to an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises. When the temperature of the battery power cable collected exceeds 110°C, protection is triggered; please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper bars of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.
P28	Negative high temp protection for discharge port	1. The battery power cable not being installed properly or the screws on the inverter side not being tightened securely leads to an increase in the internal resistance of the power cable. As time passes and the current increases, the temperature of the power cable rises. When the temperature of the battery power cable collected exceeds 110°C, protection is triggered; please check the connection of the battery power cable and ensure that the power cable can meet the ampacity required for battery charging or discharging. 2. The screws on the internal copper bars of the battery are not tightened (probability is very low). You can open the battery cover to check if the internal screws are loose. If you need to disassemble the battery for inspection, please contact our technical support or your installer.
P30	Charger overvoltage protection	1. Restart the battery, y, and if error code P30 still remains or reappears, contactyour installer.

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