RENON

User Manual

Xcellent Plus-US

A10 VERSION

Renon Power USA LLC

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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

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1 Safety Instructions

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

1.1 General Safety Precautions

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

1.2 Transportation and Storage Precautions

- The batteries must be transported according to UN3480, they must be packed according to packaging requirements of Special Regulation 230 of IMDG CODE (40-20 Edition) for maritime transport, and P965 IA for air transport (SOC less than 30%). The original packaging complies with these instructions.
- If the product needs to be moved or repaired, the power must be cut off and completely shut down.
- The product must be transported in its original or equivalent package;
- The modules are heavy. Ensure adequate and secure mounting and always use suitable handling equipment for transportation.
- If the product is in its package, use soft slings to avoid damage.
- Do not stand below the product when it is hoisted.

- During transportation, severe impact, extrusion, direct sunlight, and rain should be avoided.
- Store in a cool and dry place.
- Store the product in clean environment, free of dust, dirt and debris.
- Store the product out of reach of children and animals.
- Don't store the battery under 50% SOC for over one month. This may result in permanent damage to the battery and violet the warranty.
- During 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.

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

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

1.4 Usage Precautions

- Before starting the system, the operator should strictly check the connection terminals to ensure that the terminals are firmly connected.
- If here'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 for battery charging must not exceed the temperature specified in the datasheet. Frequently charging the battery in high or low temperature environments may reduce the performance and service life of the battery pack.
- Do not charge or discharge a damaged battery.
- Please contact the supplier within 24 hours if there is something abnormal.

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

- La plage de température par défaut pour la recharge de la batterie ne doit pas dépasser la température indiquée dans la fiche technique. Une recharge fréquente de la batterie dans des environnements à haute ou basse température peut réduire les performances et la durée de vie du bloc-batterie.
- Ne chargez ni ne déchargez une batterie endommagée.
- Veuillez contacter le fournisseur dans les 24 heures en cas d'anomalie.

1.5 Response to Emergency Situations

- Damaged batteries are dangerous and must be handled with extreme care. They are not suitable for use and may cause danger to people or property. If the battery pack appears to be damaged, place it in the original container and return it to an authorized dealer.
- If the battery pack is wet or submerged in water, do not allow anyone to touch the water, and then contact authorized dealer for technical support.
- In case of fire, use 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.

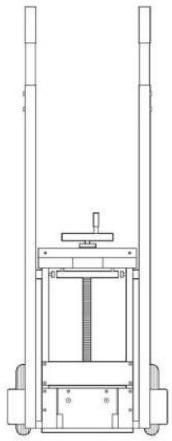
2.1.2 Precautions

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.

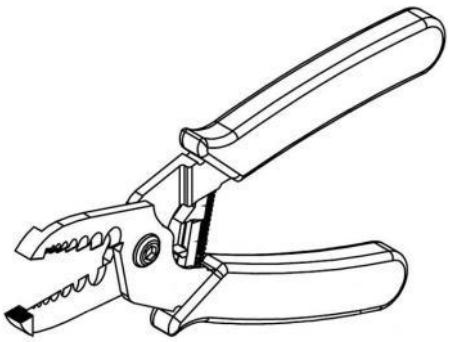
2.1.3 Tools

The following tools are required to install the product:

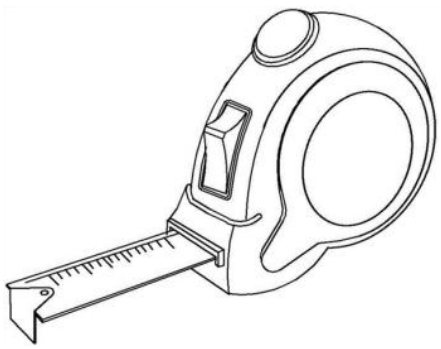
Cordless Drill



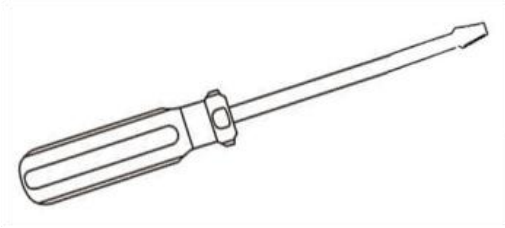
Dolly



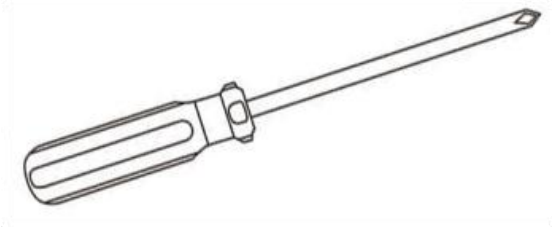
Crimping Pliers



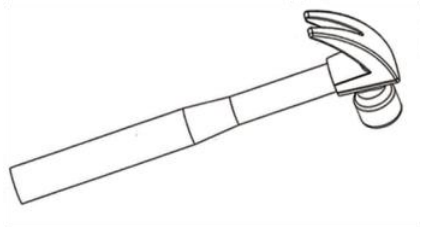
Measuring Tape



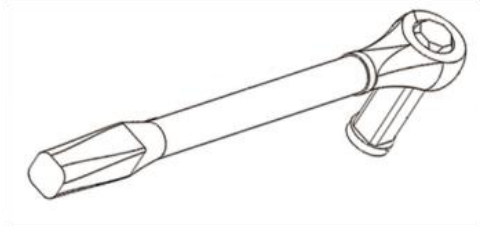
Flathead Screwdriver



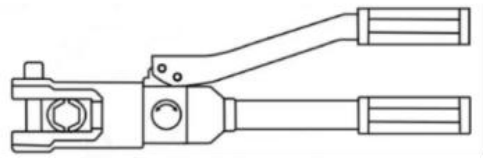
Phillips Screwdriver



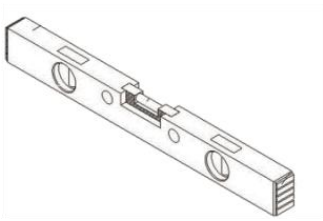
Hammer



Torque Wrench



Hydraulic Clamp



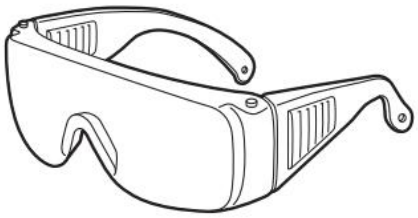
Spirit Level

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.

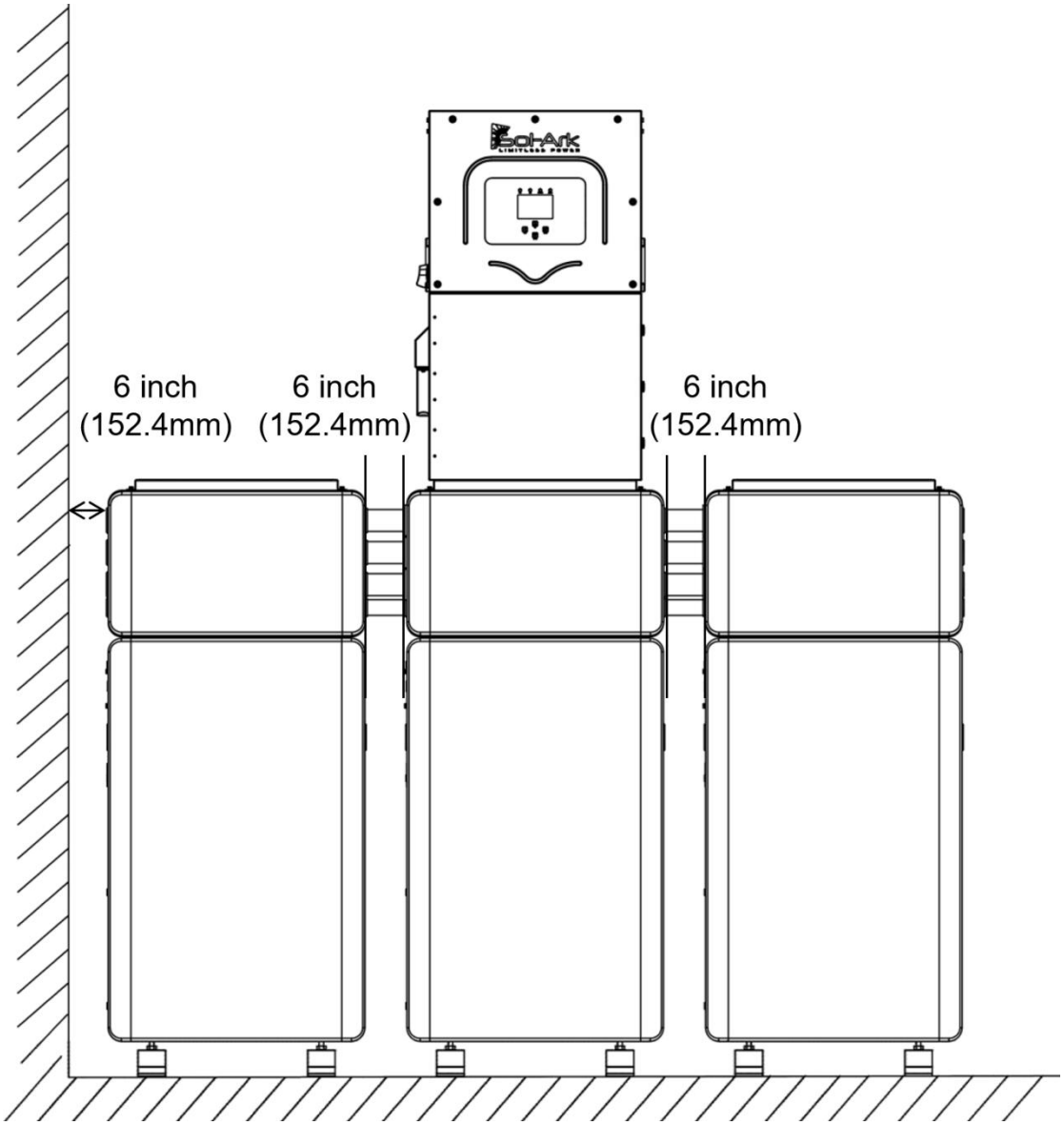


Figure 2.2.1. Installation distance

2.3 Installation Location

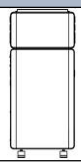
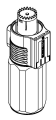
Make sure that the installation location meets the following conditions:

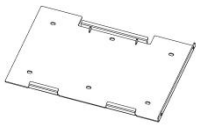
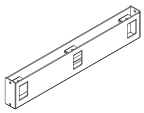
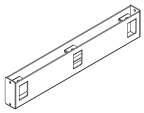
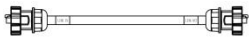
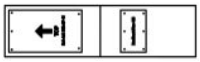
- The surface of the wall is smooth and perpendicular to the ground, which can bear the weight.
- The area is completely water proof. (Recommended)
- The area shall avoid direct sunlight. (Recommended)
- There are no flammable or explosive materials.
- The distance from heat source is more than 80 in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

1) Xcellent Plus Standard Packing List:

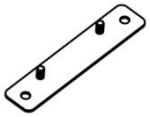
No.	Item	Specification	Qty	Usage	Diagram
1	Xcellent Plus	R-XC016161(-H)-US	1	Battery	
2	User manual	Xcellent Plus-US	1	User manual	
3	Embedded Screw	M6*16	7	Secure holder to the battery	
4	Embedded Screw	M5*16	7	Secure holder to the battery	
5	Embedded Screw	M8*80	6	Secure mounting panel on the wall	
6	Leveling Feet	∅ 60-M10-95	4	Support or use for adjusting height	
7	Connector	Connector plug, black	2	Use for wiring	
8	Connector	Connector plug, orange	2	Use for wiring	
9	Connector	RJ45	1	Use for wiring	
10	OT Terminal	RNB3.5-5	2	Use for wiring	
11	OT Terminal	SC70-10	6	Use for wiring	

12	Mounting Panel	20*12.85*0.79 in (508*326.4*20 mm), T=3.0, SGCC	1	Mounting battery on the wall	
13	Holder 1	19.69*3.65*0.24 in (500*92.7*39.6 mm), T=3.0, SPCC, SGCC	1	Install onto the battery	
14	Holder 2	19.69*3.65*0.24 in (500*92.7*39.6 mm), T=3.0, SPCC, SGCC	1	Install onto the battery	
15	Communication Cable	RJ45, 53.15 in (1350mm)	1	Parallel communication cable	
16	Communication Cable	RJ45, 39.37 in (1000mm)	1	Battery communication cable to inverter	
17	Quick Installation Manual	Xcellent Plus-US	1	Installation Manual	
18	Power cable	2/0 AWG (UL1015), Black, L = 53.15 in (1350mm)	2	Use with Connector	
19	Power cable	2/0 AWG (UL1015), Red, L = 53.15 in (1350mm)	2	Use with Connector	
20	Label	5.12 x 3.15 in (130 x 80 mm)	1	Sticks on the actual corresponding position of battery	
21	Positioning Cardboard	/	1	Use for locating the mounting hole positions	

2) Xcellent Plus Optional Packing List:

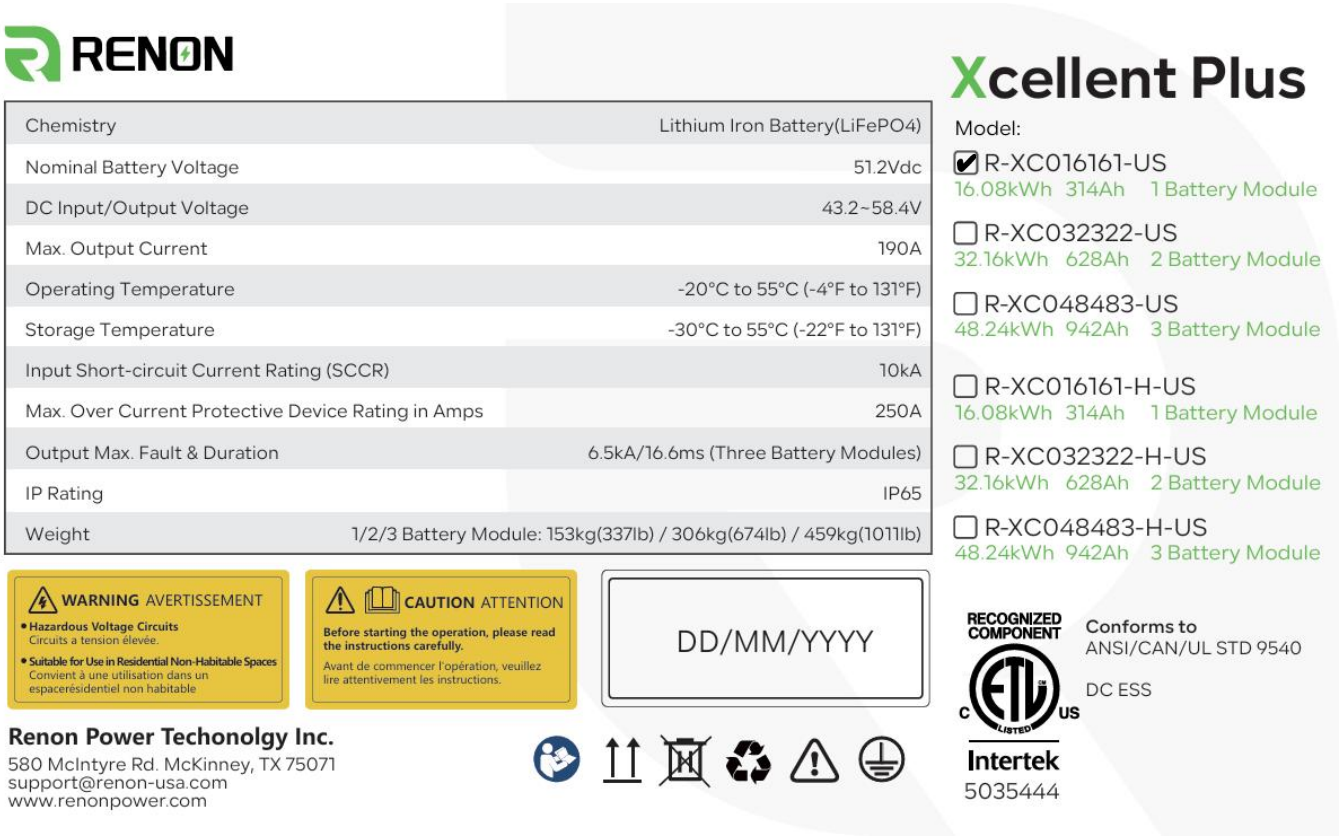
Note: The following accessories are optional and can be selected according to the inverter.

No.	Item	Specification	Qty	Usage	Diagram
1	Label	1.58 x 1.58 in (40 x 40 mm)	1	Sticks on the energy storage system label	

2	Label	4.25 x 2.44 in (108 x 62 mm)	1	Sticks on the actual corresponding position of inverter	
3	Flange Nut	M5	4	Fixed adapter bracket	
4	Adapter Bracket	4.72*0.98*0.39 in (120*25*10 mm), T=1.5mm, SPCC	2	Bracket for fixing the adapter box	
5	Adapter box	19.29*7.22*4.07 in (490*183.5*103.5 mm), T=1.5mm, SPCC	1	Installed above the junction box	
6	Embedded Screw	M5*12	4	Fixed adapter bracket	

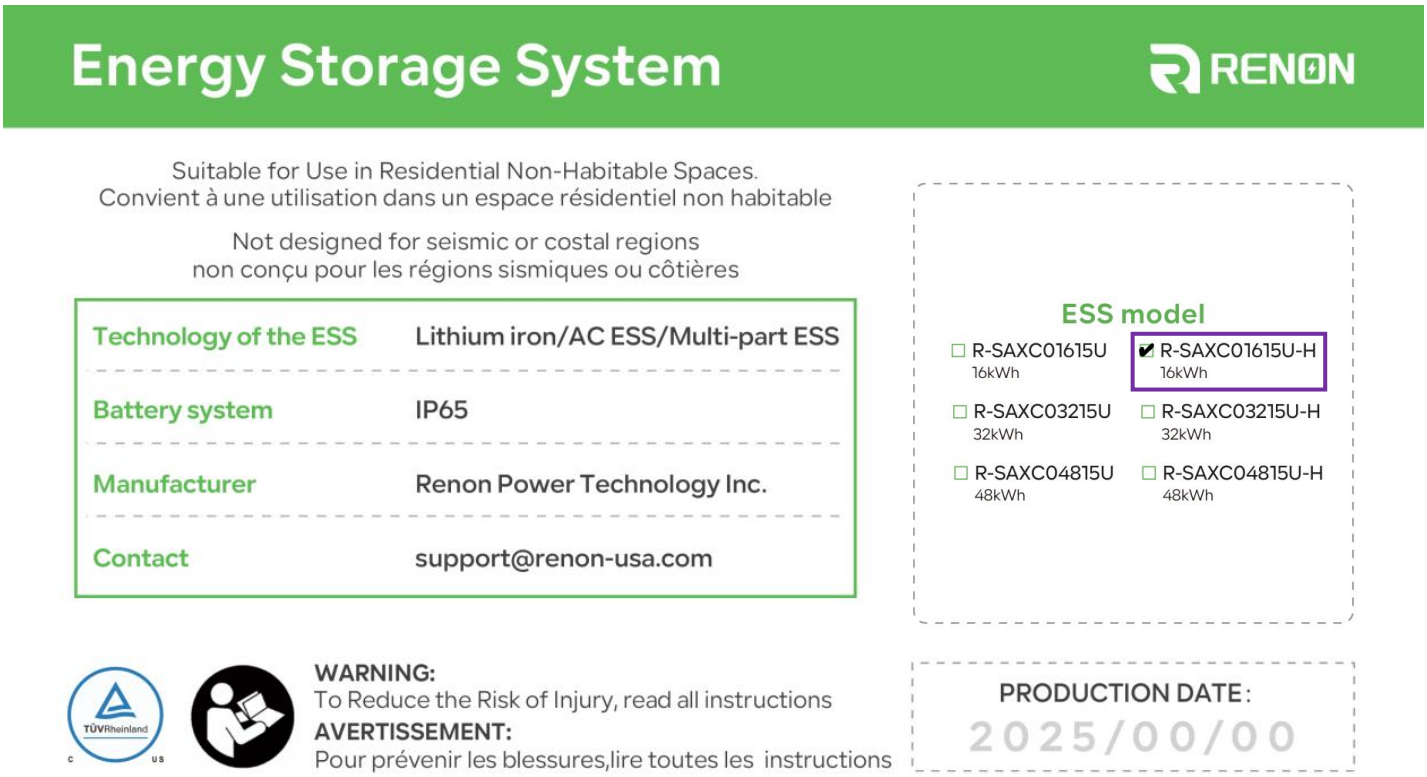
2.5 Label

DCDC system label: After the system assembly is completed, configure the settings according to the actual number of battery units, and attach the corresponding identification label to the battery system.



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

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



Inverter Label Model:

R-SAXC016 12 U -H

- H: Heating (Check the model with H if it has a heating function)
- U: Country (U = US)
- 12: Inverter power (12 = 12k, 15 = 15k)
- 016: Battery capacity

3 Installation

3.1 Device Installation

Note: To ensure installation quality, please adhere to the standard procedures described in this manual. If you plan to adopt any non-standard or unconventional methods, be sure to submit them to your installer for technical evaluation and confirmation in advance.

Method 1: On the ground

Step 1:

1) Make sure the wall is sufficient to support the installation weight of the device. For product weight, check 5.2. Specifications for detail.

2) Pre-drill the holes in the wall according to the diagram, including the locations for the battery and inverter. Before drilling, use a spirit level to make sure the drilling template is perfectly horizontal.

Note: The mounting hole locations can be identified using the marking on the lower left positioning cardboard, with detailed positions shown in right side diagram.

Option 1: This positioning cardboard is designed for use with Sol-Ark 15K-2P-N inverter.

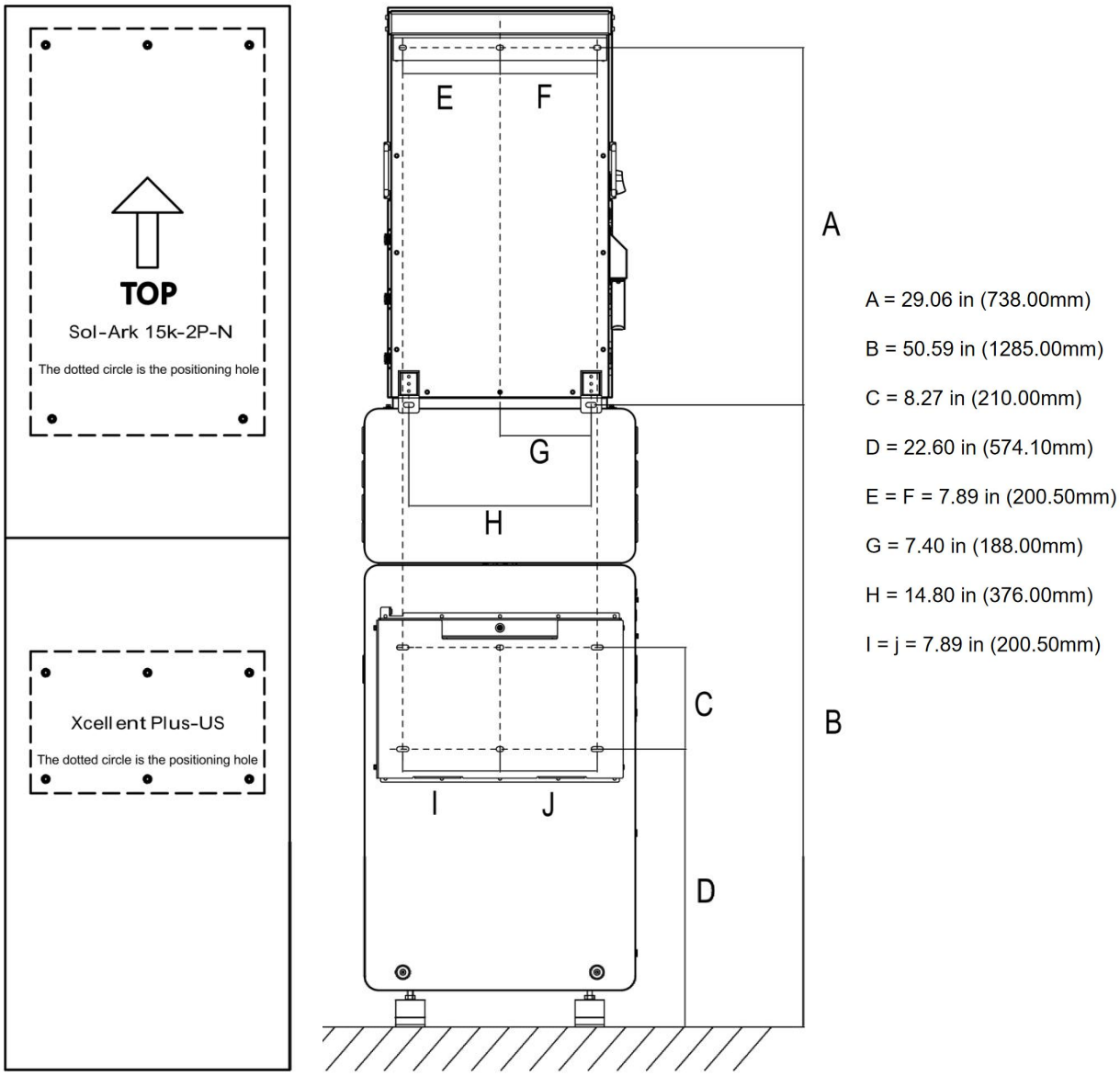


Figure 3.1.1. Positioning cardboard & Mounting hole position

Option 2: This positioning cardboard is designed for use with Solis S6-EH2P16K03-SV-YD-L-US inverter.

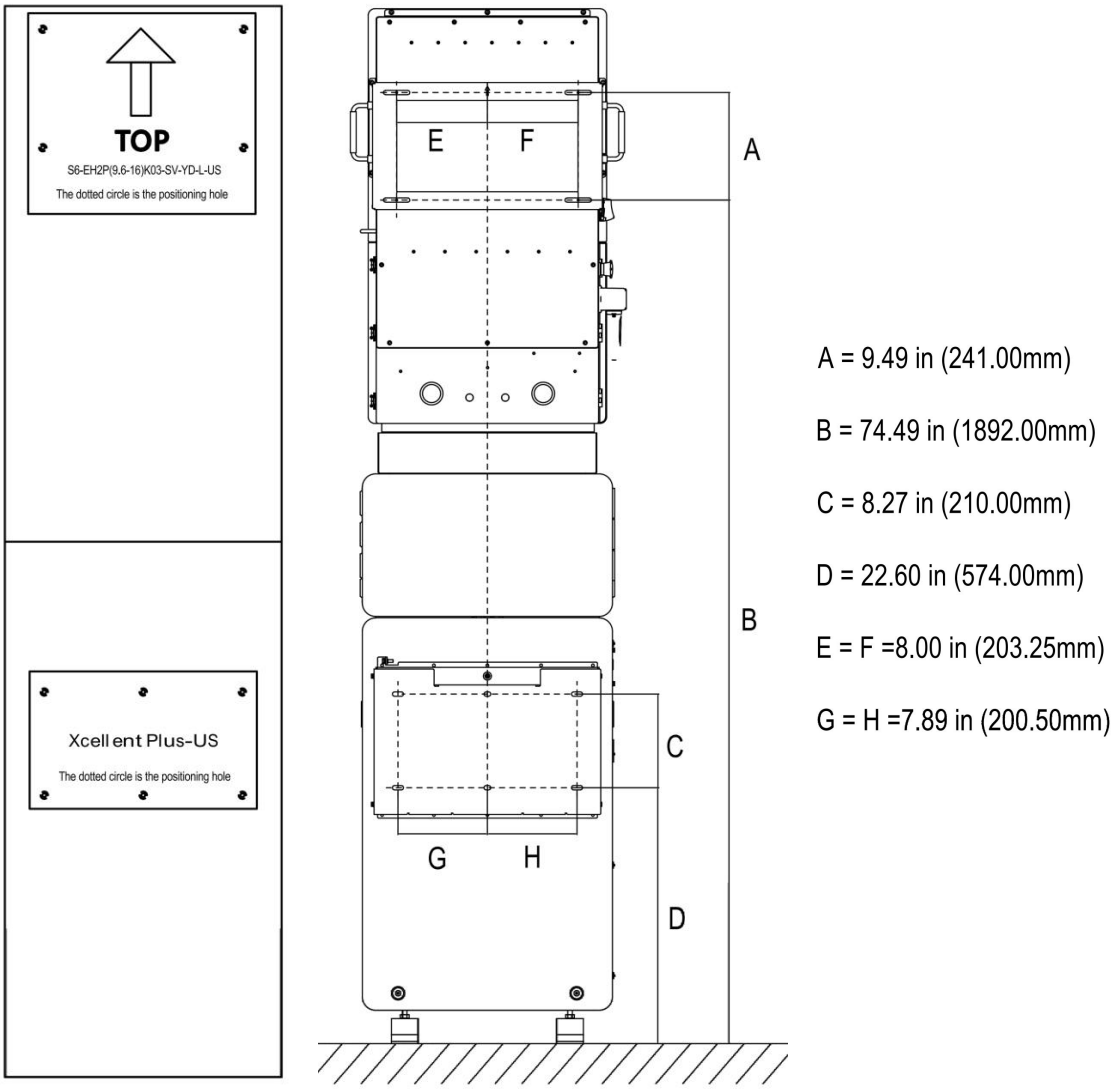


Figure 3.1.2. Positioning cardboard & Mounting hole position

3) Secure the mounting panel using 6*M8x80 expansion screws.

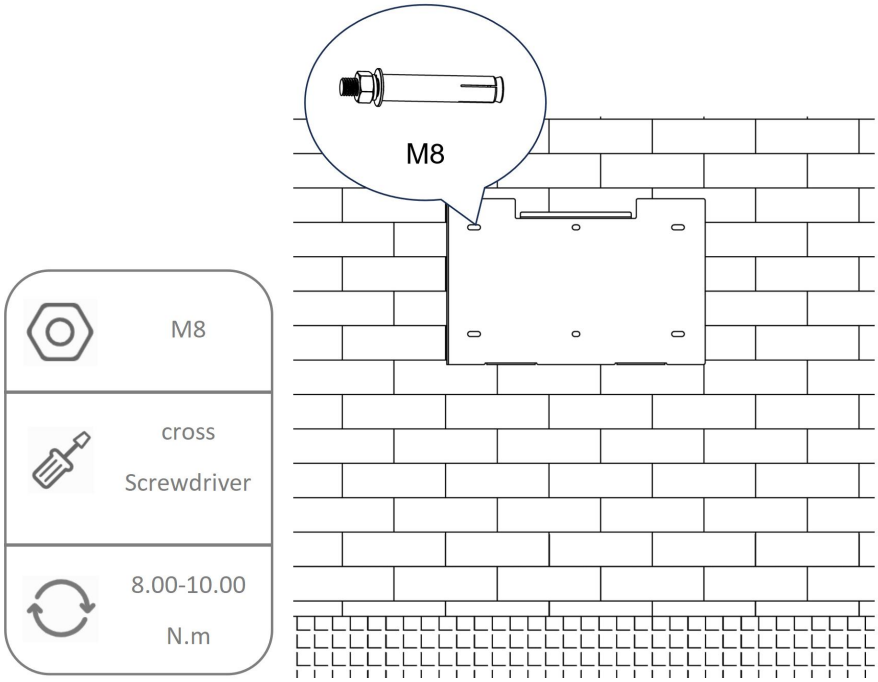


Figure 3.1.3. Mounting panel

4) Mounting leveling feet.

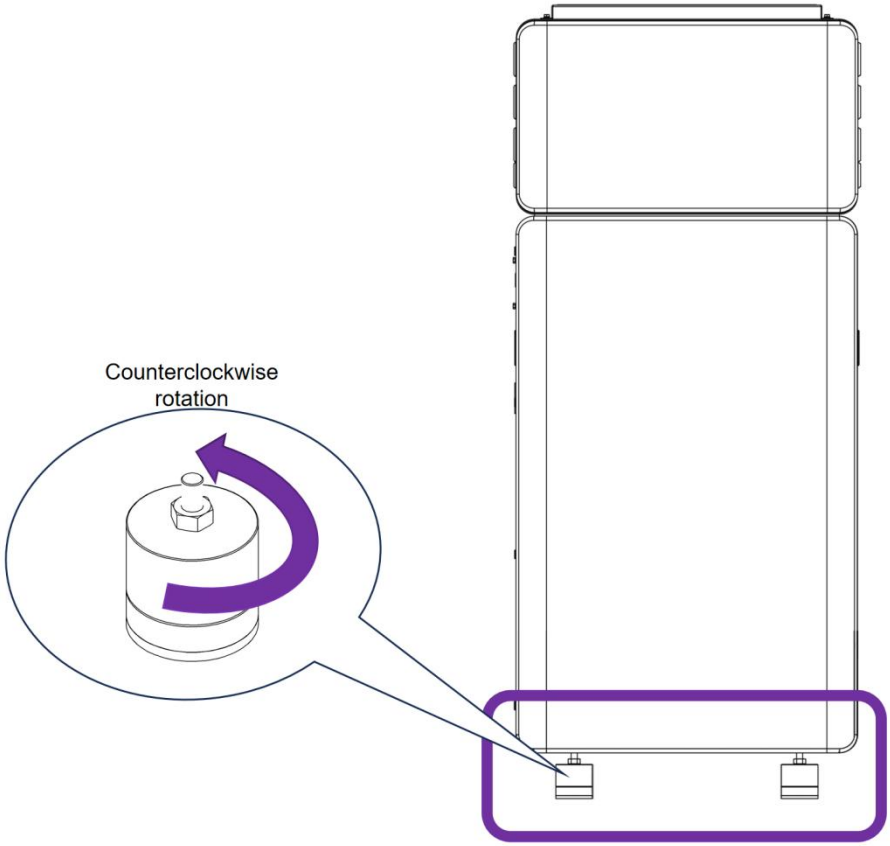


Figure 3.1.4. Leveling feet

5) Attach holder 1 and holder 2 using 6*M6x16 and 4*M5x16 screws.

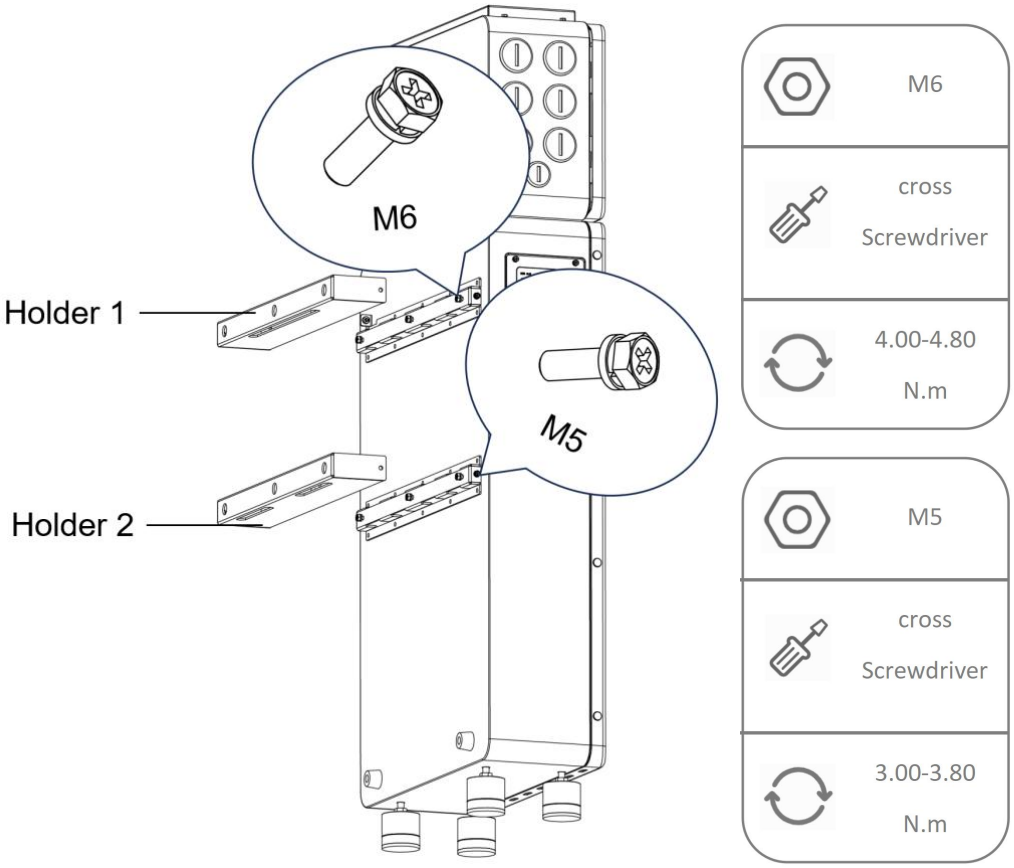


Figure 3.1.5. Holder installation

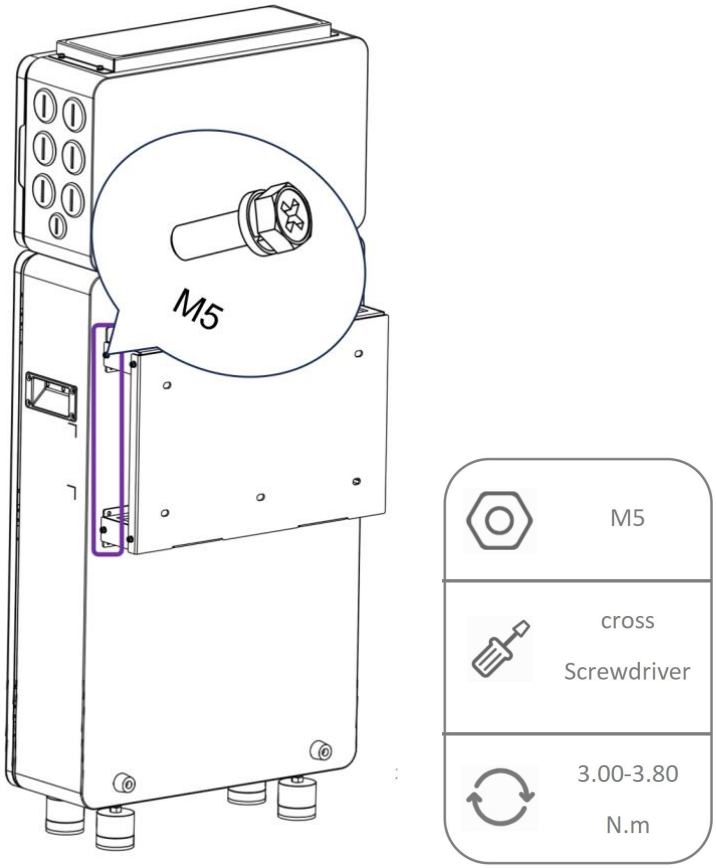


Figure 3.1.6. Left side screws

6) Mount the battery to the mounting panel using 2*M5x16 screws.

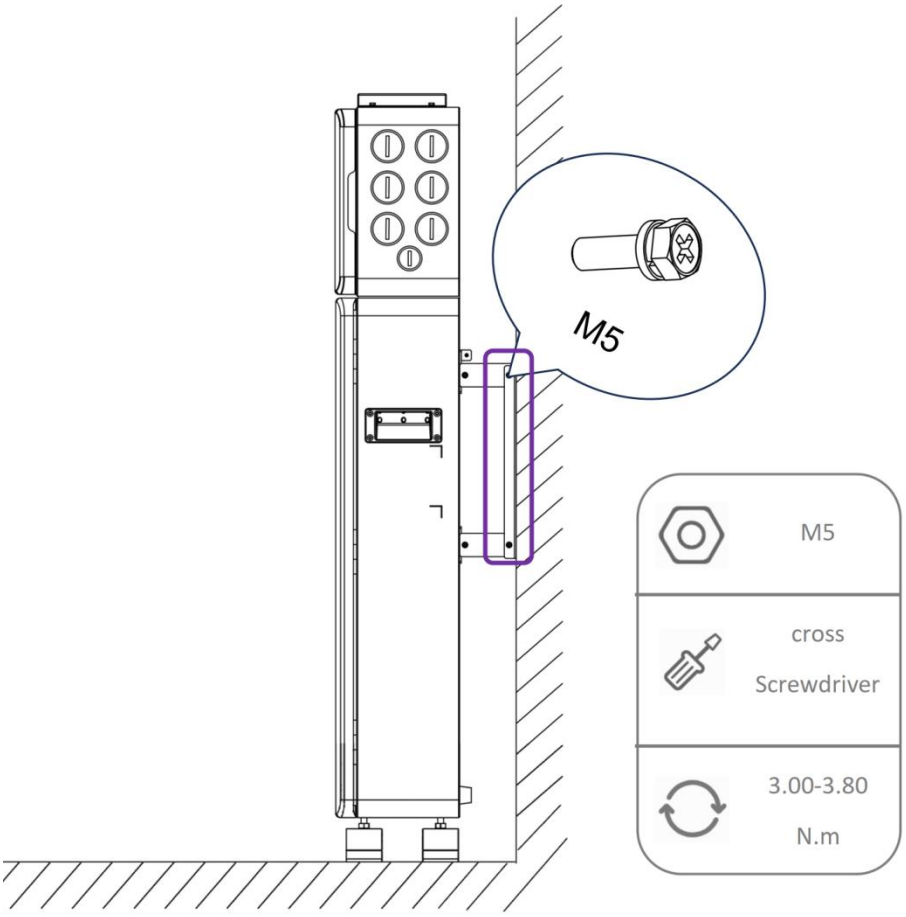


Figure 3.1.7. Install battery to the mounting panel

7) If slight misalignment is detected in the mounting holes after installation, a flush installation can be achieved by adjusting the leveling feet.

Note: The leveling feet can support the battery and be adjusted upward by 0.2 in (5mm).

Step 2:

1) Remove the cover of the junction box connected to the inverter above the battery.

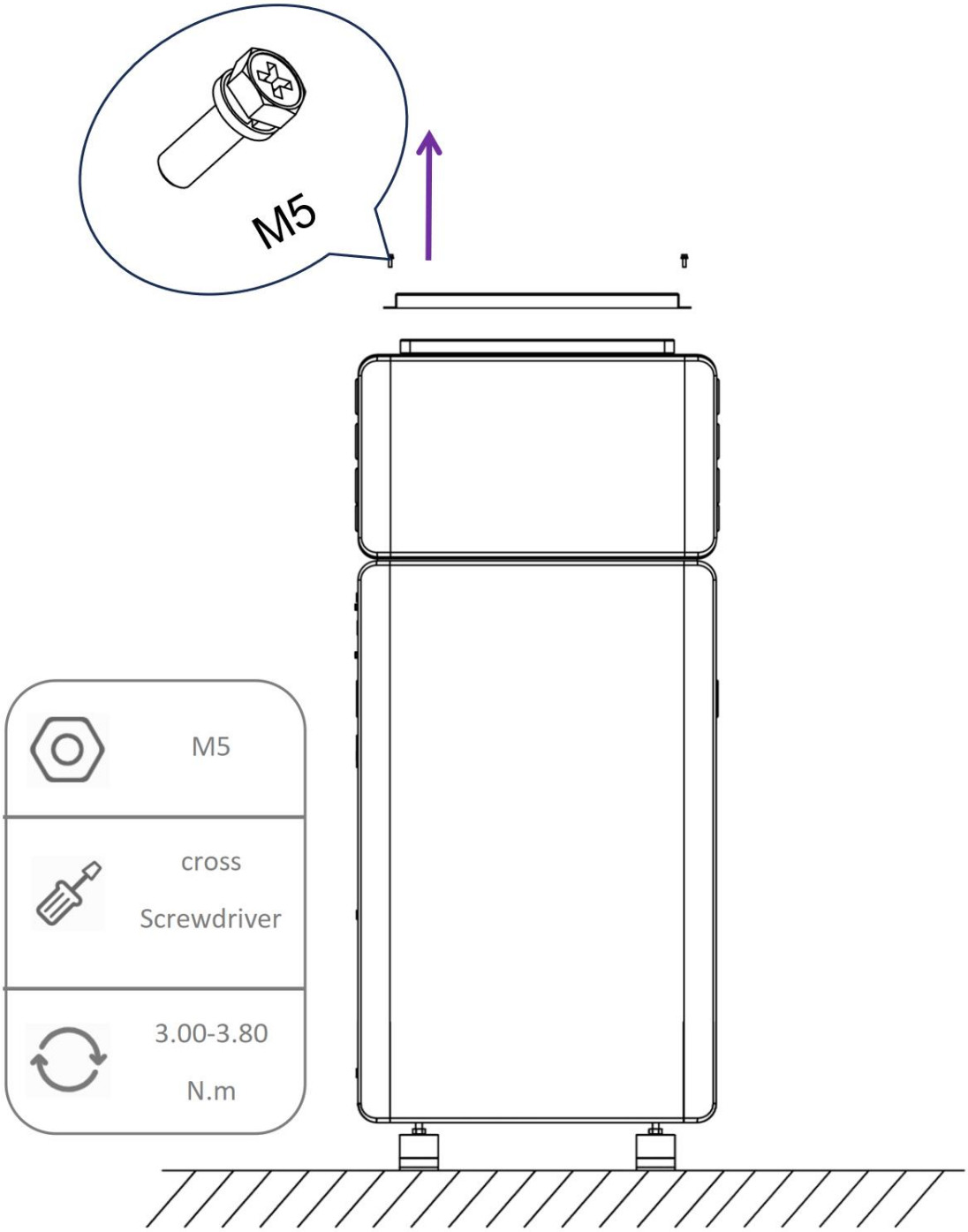


Figure 3.1.8. Remove cover of the junction box

Note: If the matched inverter requires an adapter box, follow the steps below. If not, go directly to Step 3.

2) Install the adapter bracket on both sides of the junction box and secure it with 4*M5x12 screws.

Note: The screws from the original holes will no longer be used after removal.

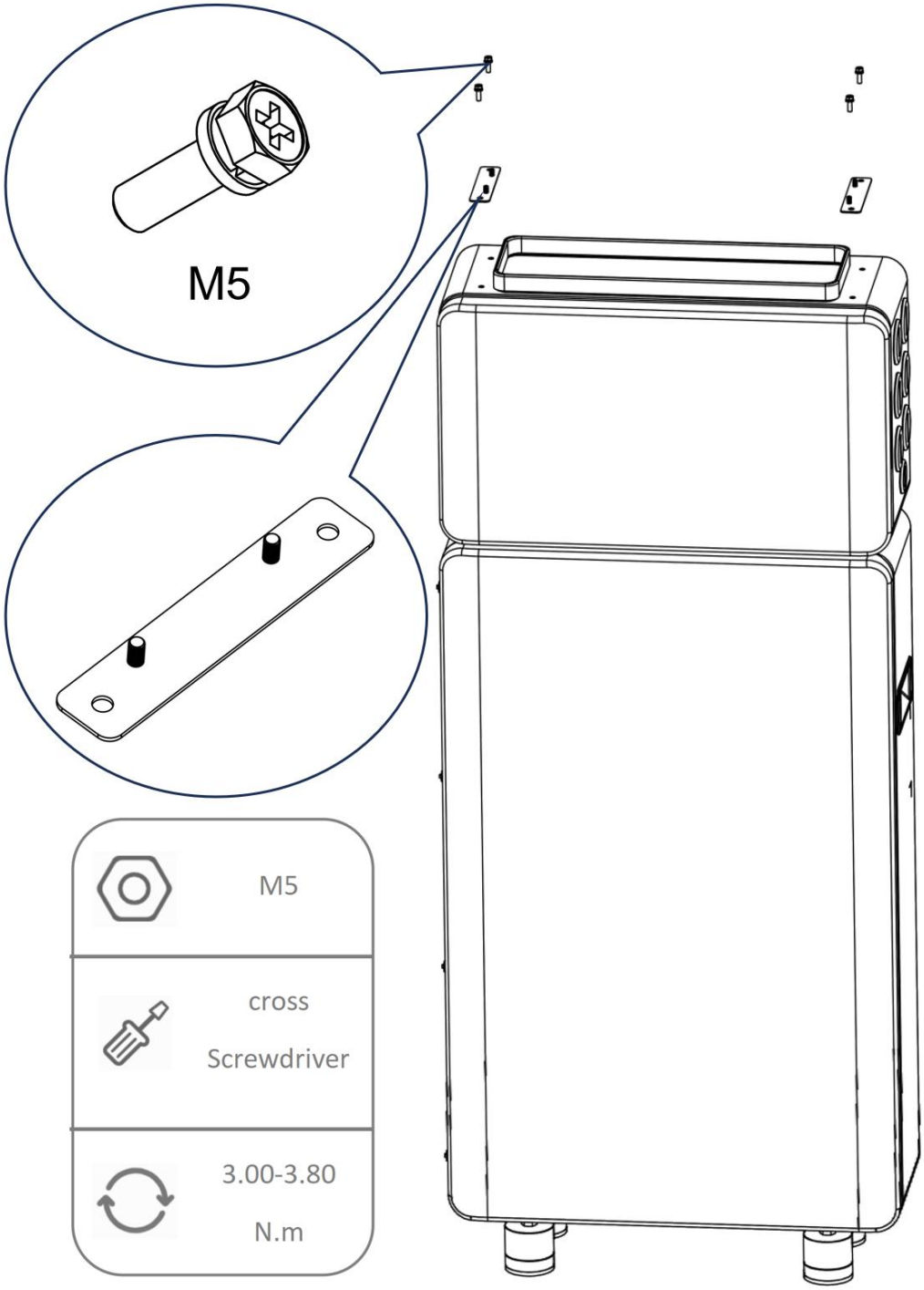


Figure 3.1.9. Fixed adapter bracket

3) Install the adapter box above the junction box and secure it with a Flange Nut. The illustration for the location as below.

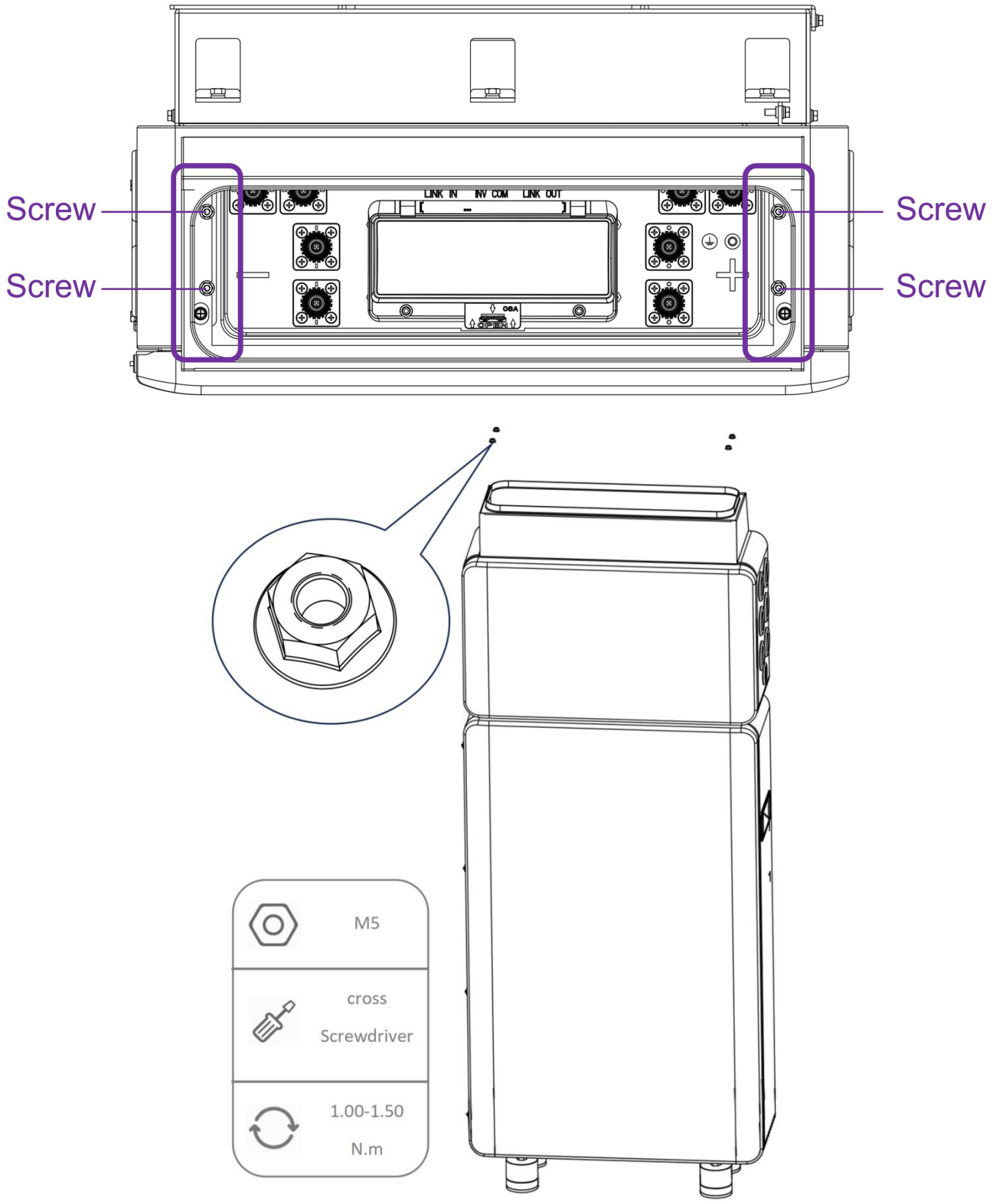


Figure 3.1.10. Fixed adapter box

Step 3:

1) Mount the inverter directly to the pre-drilled holes to ensure a secure installation.

Note: Refer to the inverter installation guide.

Method 2: On the wall

Step 1:

1) Make sure the wall is sufficient to support the installation weight of the device. For product weight, check 5.2. Specifications for detail.

2) Pre-drill the holes in the wall according to the diagram, including the locations for the battery and inverter. Before drilling, use a spirit level to make sure the drilling template is perfectly horizontal.

Note:

① The mounting hole locations can be identified using the marking on the lower left positioning cardboard, with detailed positions shown in right side diagram.

② For wall-mounted installation, measure the desired installation height from the floor. Then, adjust this measurement based on the data provided by the positioning cardboard.

Option 1: This positioning cardboard is designed for use with Sol-Ark 15K-2P-N inverter.

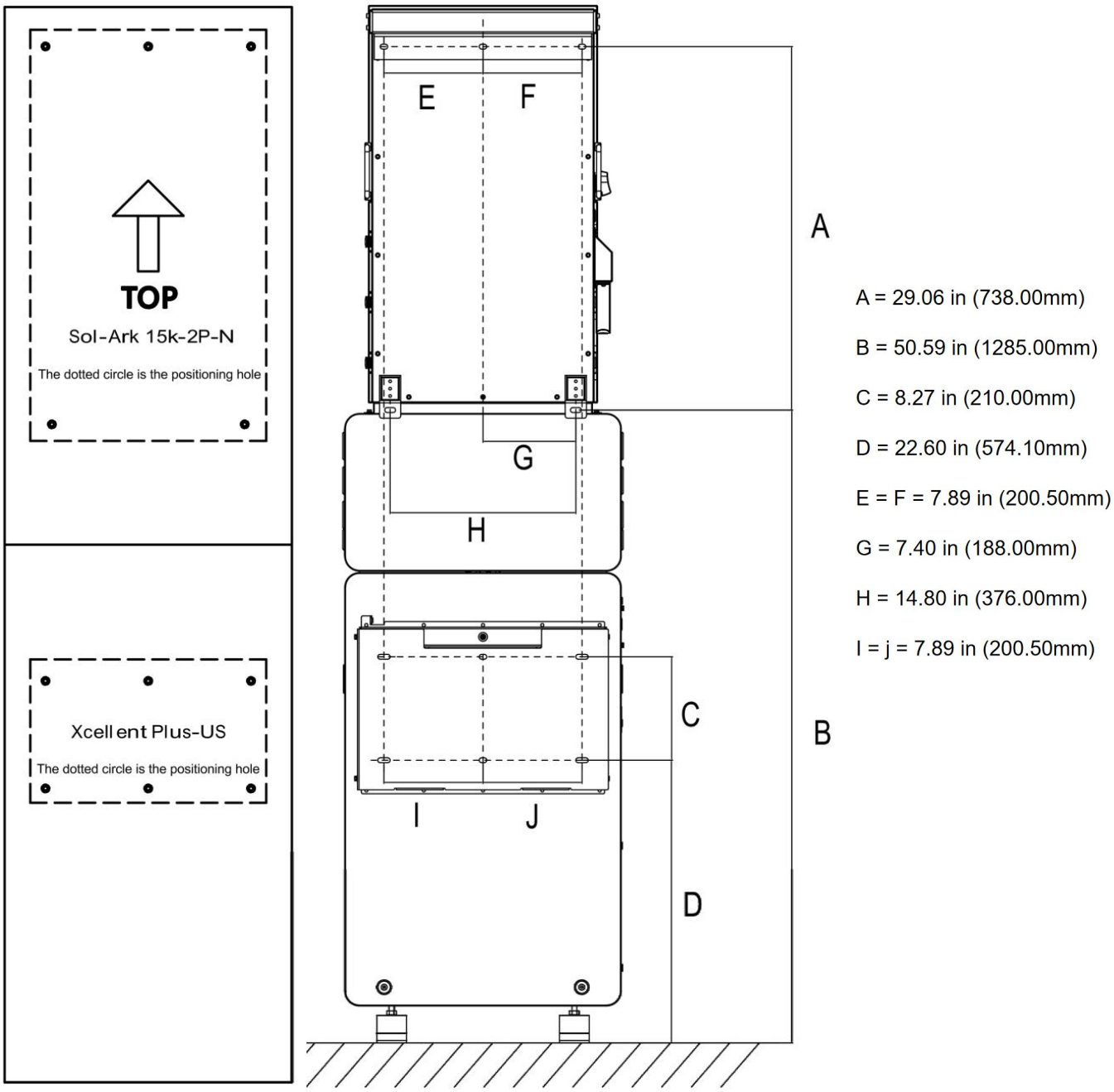


Figure 3.1.11. Positioning cardboard & Mounting hole position

Option 2: This positioning cardboard is designed for use with Solis S6-EH2P16K03-SV-YD-L-US inverter.

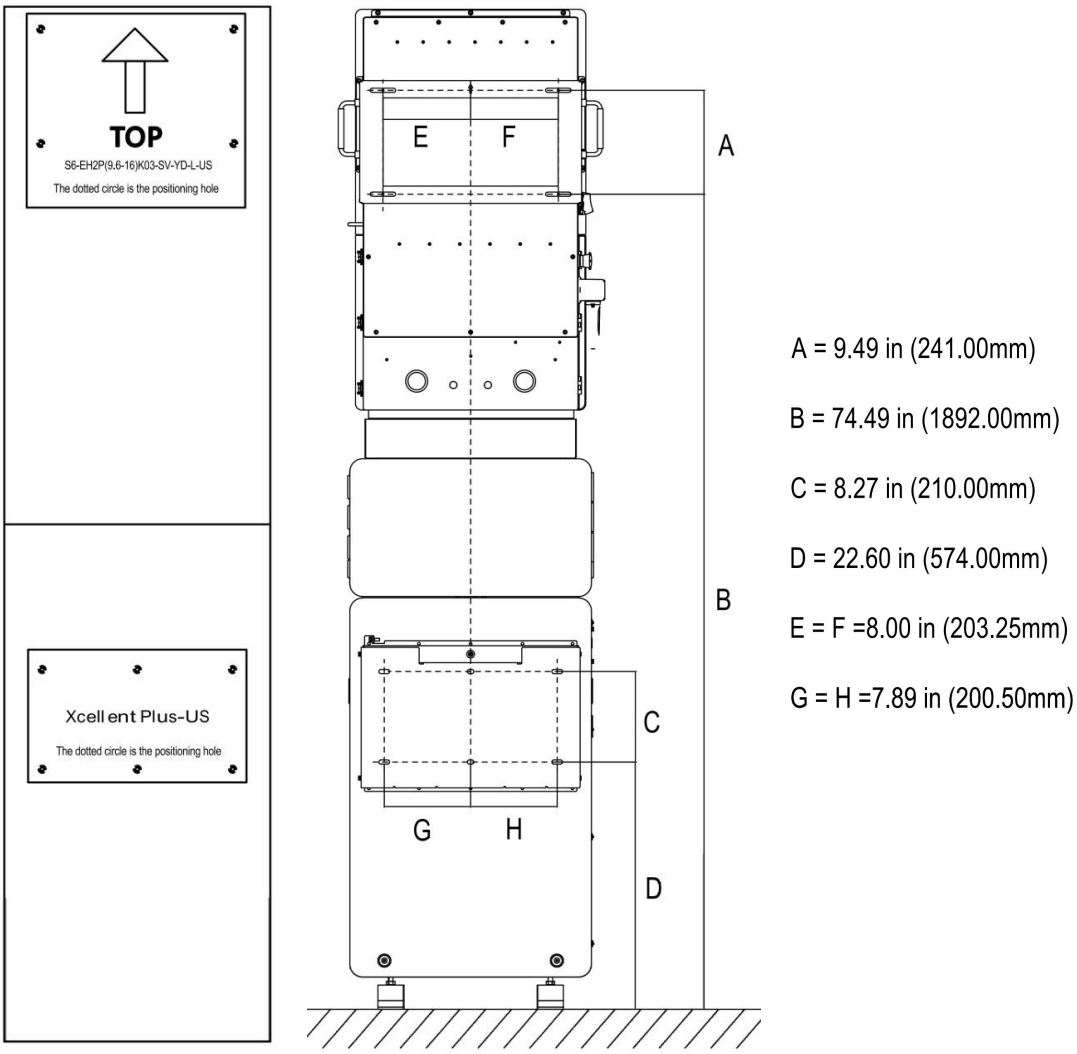


Figure 3.1.12. Positioning cardboard & Mounting hole position

3) Secure the mounting panel using 6*M8x80 expansion screws.

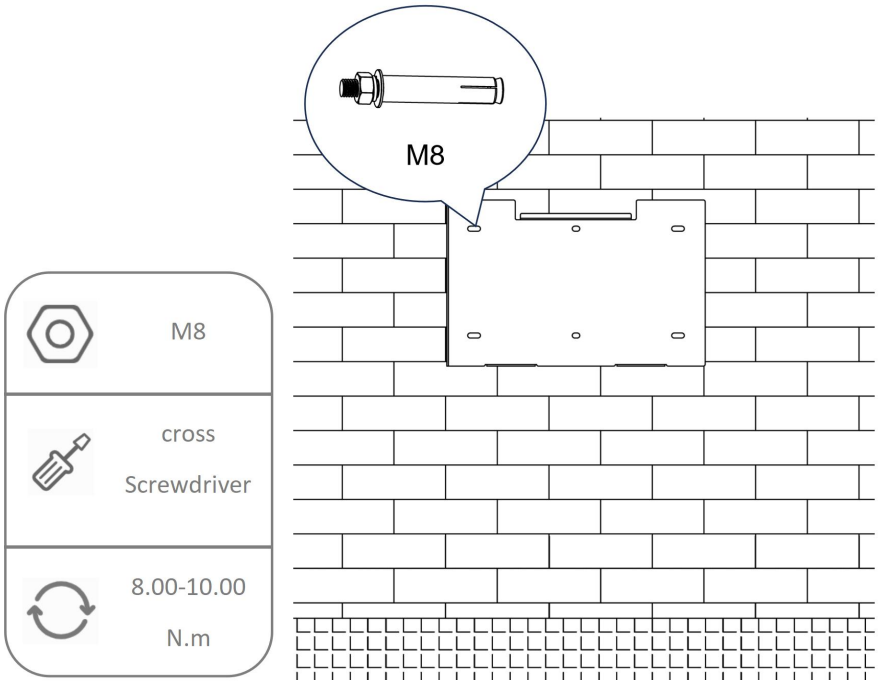


Figure 3.1.13. Mounting panel

4) Attach holder 1 and holder 2 using 6*M6x16 and 4*M5x16screws.

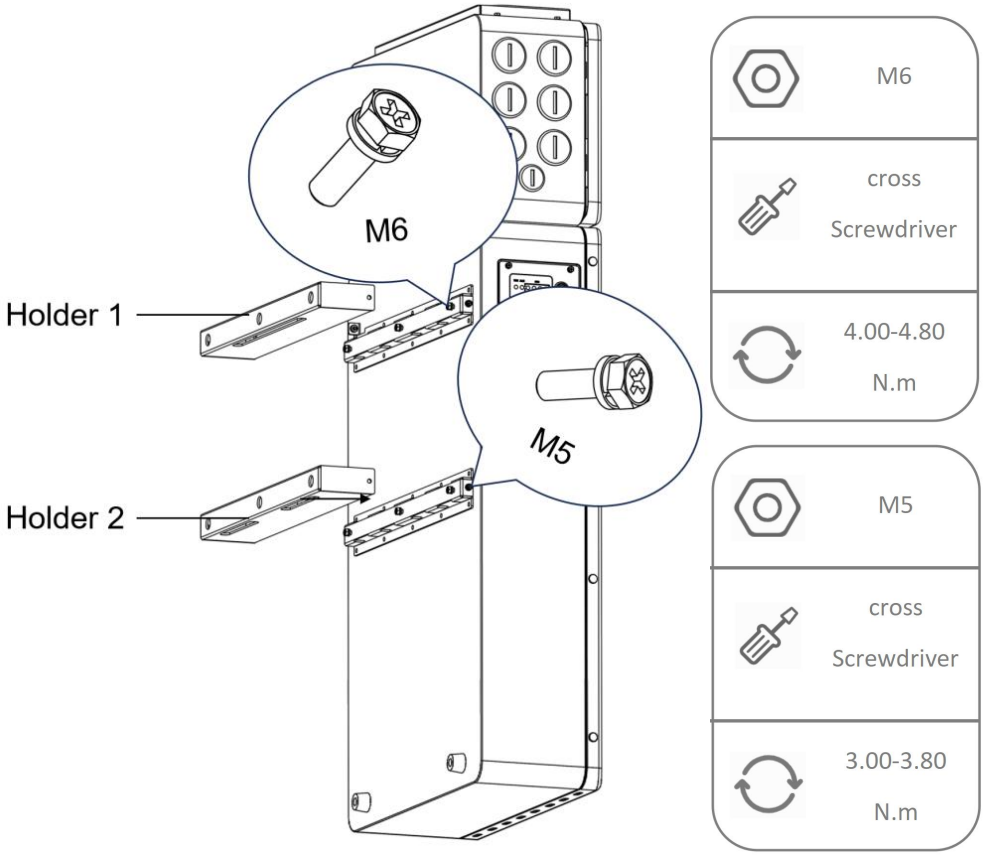


Figure 3.1.14. Holder installation

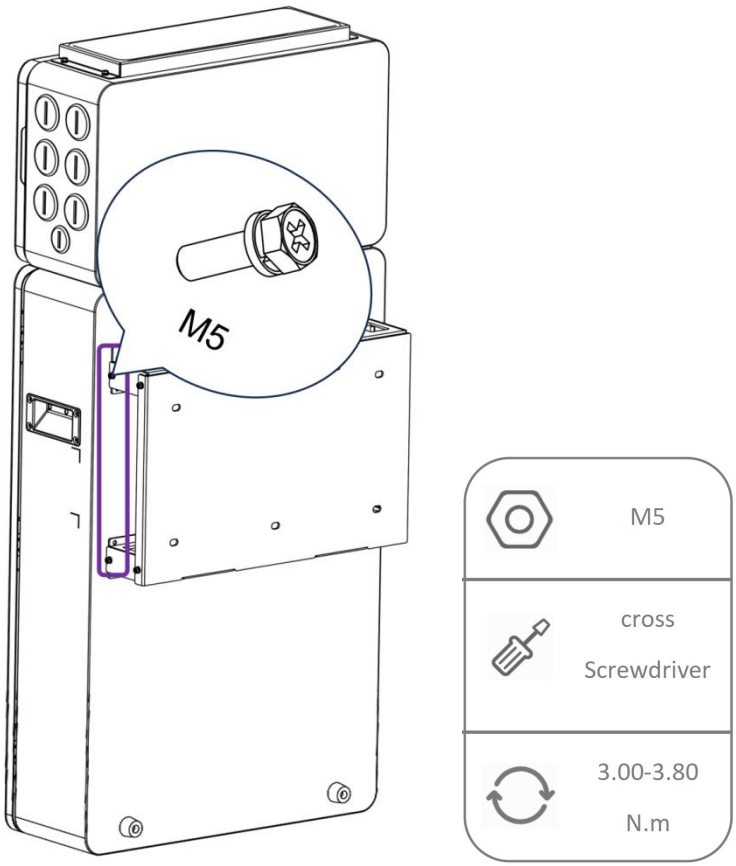


Figure 3.1.15. Left side screws

5) Mount the battery to the mounting panel using 2*M5x16 screws.

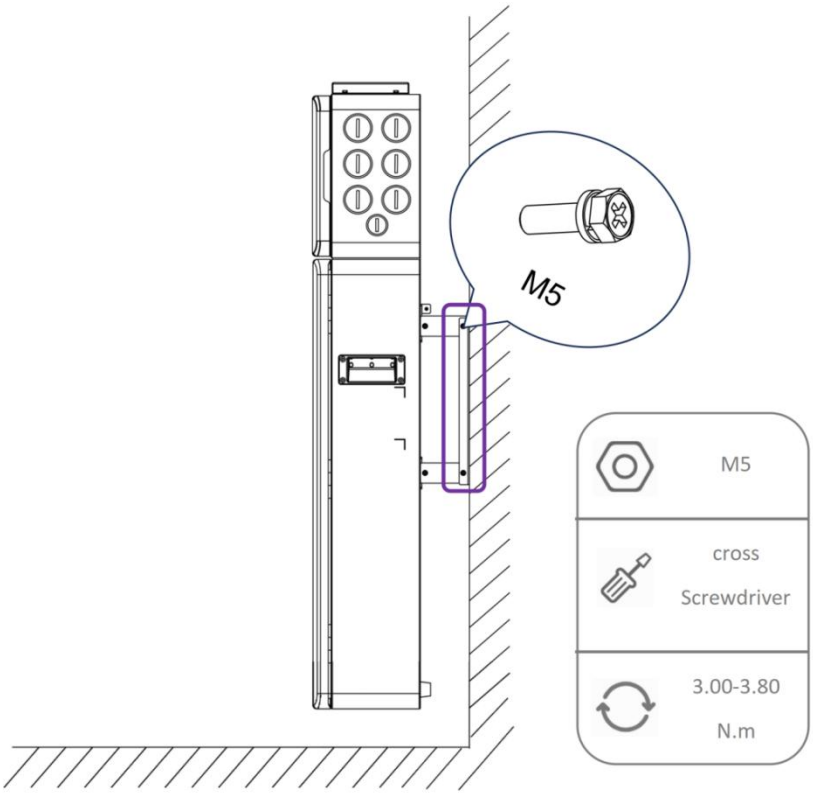


Figure 3.1.16. Install battery to the mounting panel

Step 2:

1) Remove the cover of the junction box connected to the inverter above the battery.

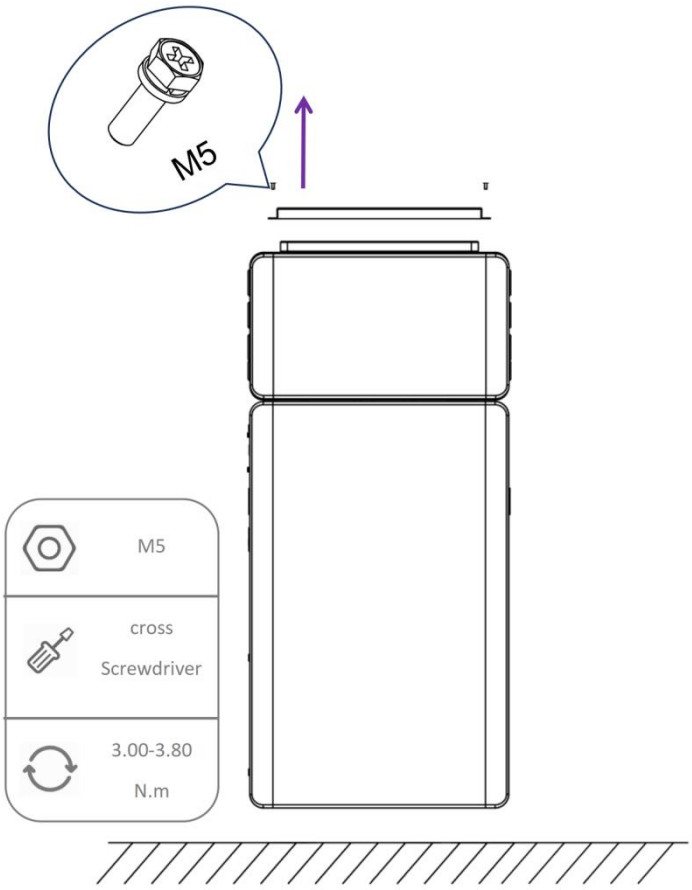


Figure 3.1.17. Remove cover of the junction box

Note: If the matched inverter requires an adapter box, follow the steps below. If not, go directly to Step 3.

2) Install the adapter bracket on both sides of the junction box and secure it with 4*M5x12 screws.

Note: The screws from the original holes will no longer be used after removal.

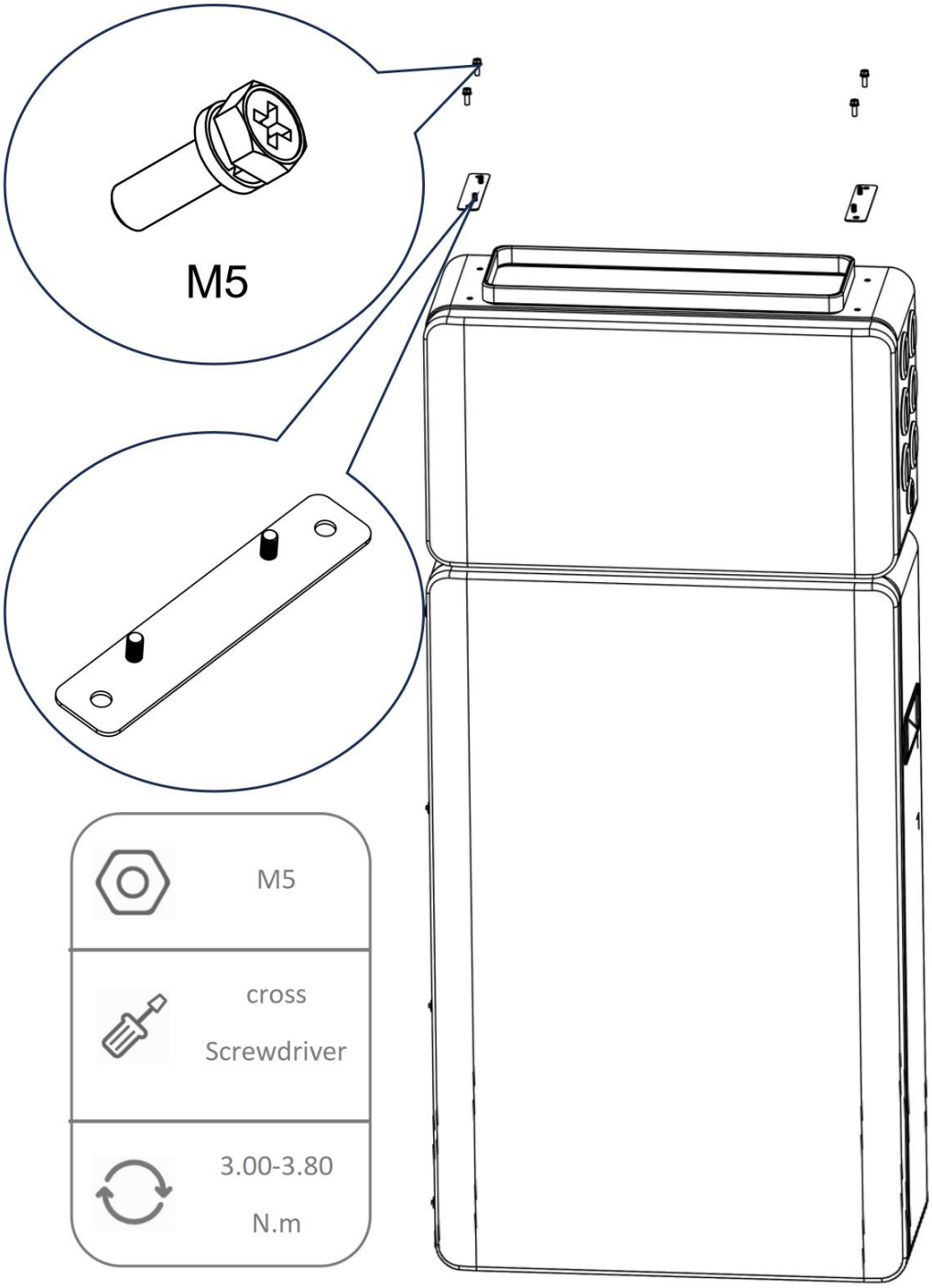


Figure 3.1.18. Fixed adapter bracket

3) Install the adapter box above the junction box and secure it with a Flange Nut. The illustration for the location as below.

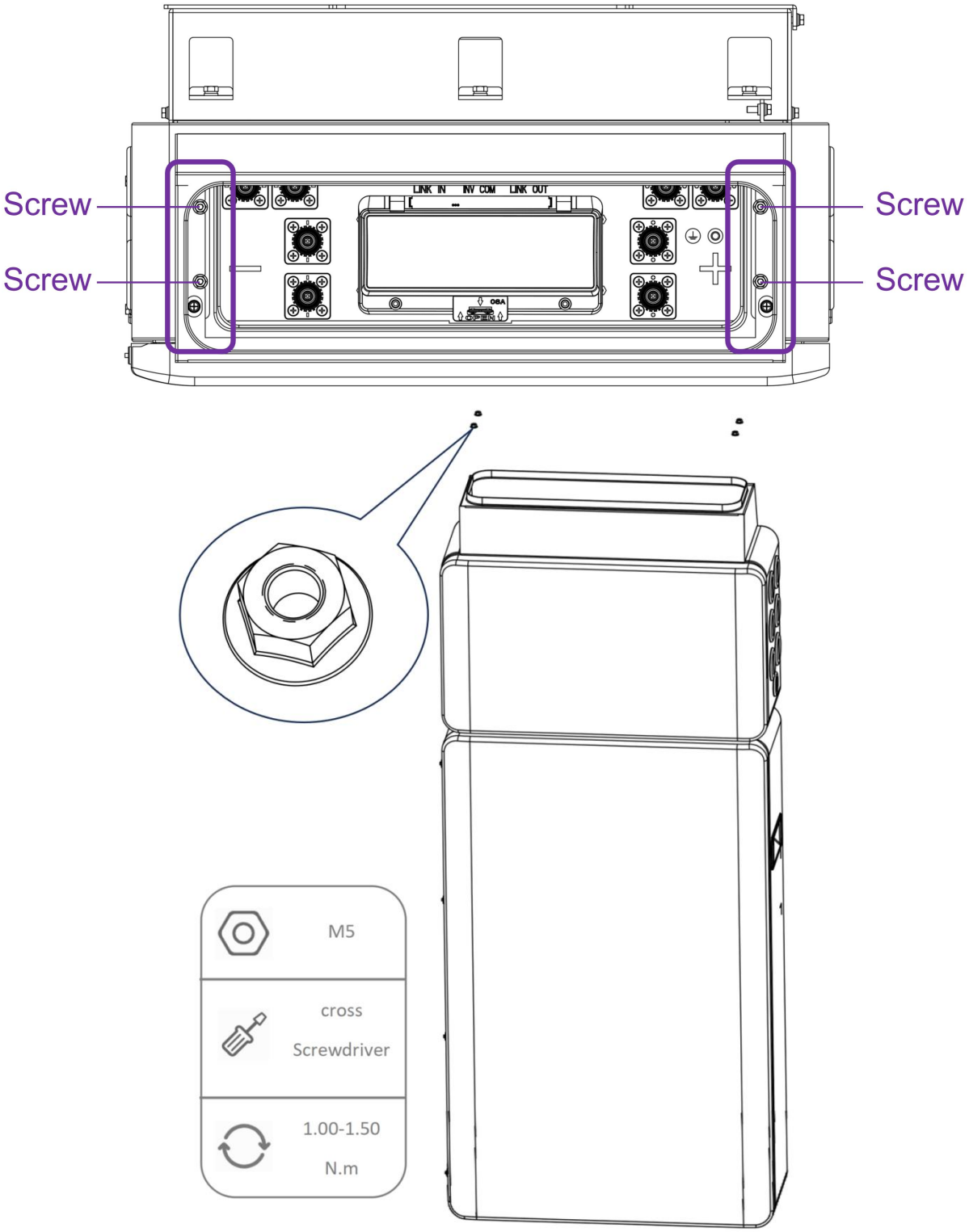


Figure 3.1.19. Fixed adapter box

Step 3:

1) Mount the inverter directly to the pre-drilled holes to ensure a secure installation.

Note: ①Refer to the inverter installation guide.

②During inverter installation, it is essential to align the bottom of the inverter precisely with the sealing strip on the junction box, as any lateral misalignment will compromise the seal.

3.2 Connection

1. Unlock waterproof cover of junction box.

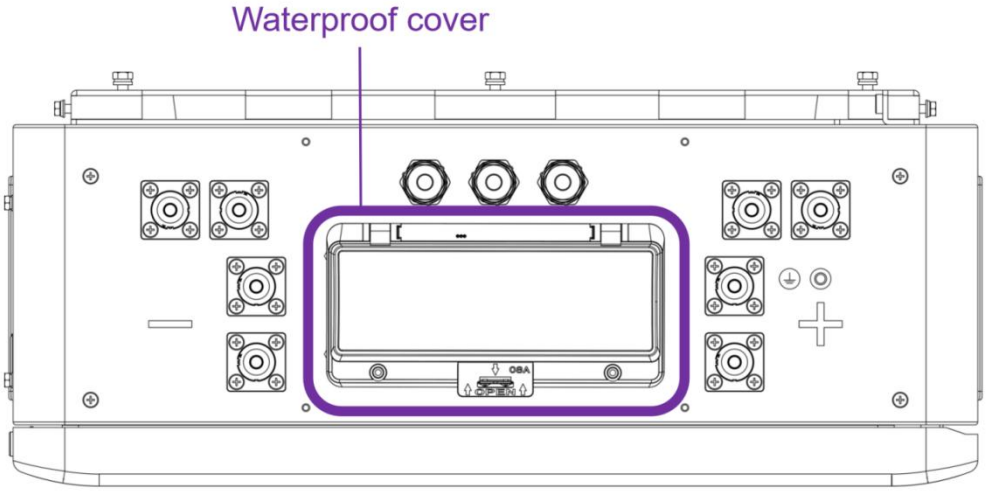


Figure 3.2.1. Unlock waterproof cover

2. Junction box

Thread the battery wires through the knockouts of junction box.

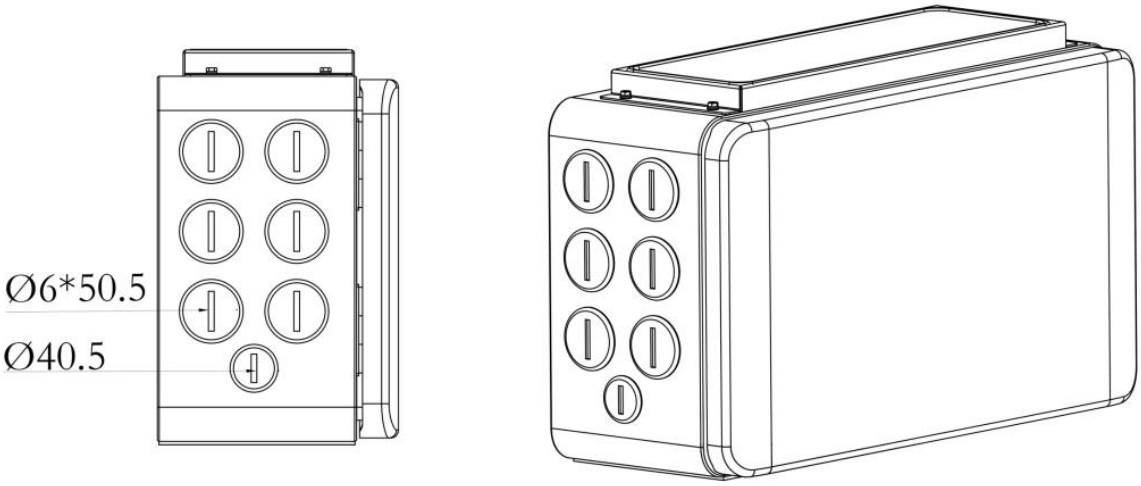


Figure 3.2.2. Knockouts

3. Connect to inverter's power cable, communication cable and ground cable.

① Power cable: 2/0 AWG

1) Strip the insulation from both ends of the power cable, ensuring the stripped length is maintained at 16.5 ± 0.5 mm.
2) Disassemble the plug and thread the stripped cable through the cable gland and plug in sequence; Thread the other end through the end cover and OT terminal sequentially.

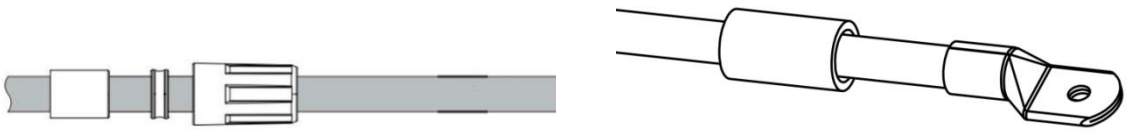


Figure 3.2.3. Strip cable

3) Crimp the prepared wire strands, controlling the hexagon flats dimension to 11.3–11.5 mm under a pressure of 3400 N ± 50 N.

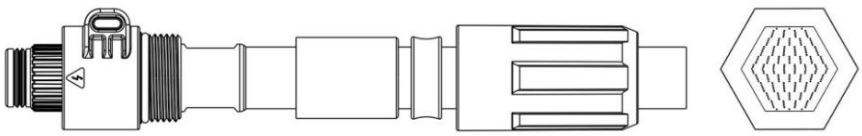


Figure 3.2.4. Crimp cable

4) Reinstall the cable gland and tighten it securely, ensuring the O-ring at the joint is not visible after assembly. And tighten the end cover on the OT terminal side to ensure it is properly seated.

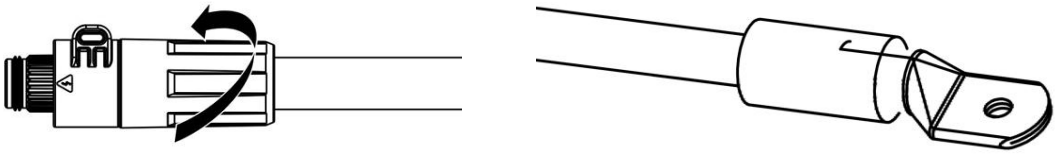


Figure 3.2.5. Reinstallation

② Ground Cable: 10-16 AWG

Note: ①This procedure applies to 150 A, 200 A, and 250 A straight energy storage connectors.

②This example uses Sol-Ark 15K-2P-N inverter for demonstration. For actual dial code settings, refer to the 5.5.6. Inverter Dial Switch.

③The negative conductor of the battery power cable is ungrounded.

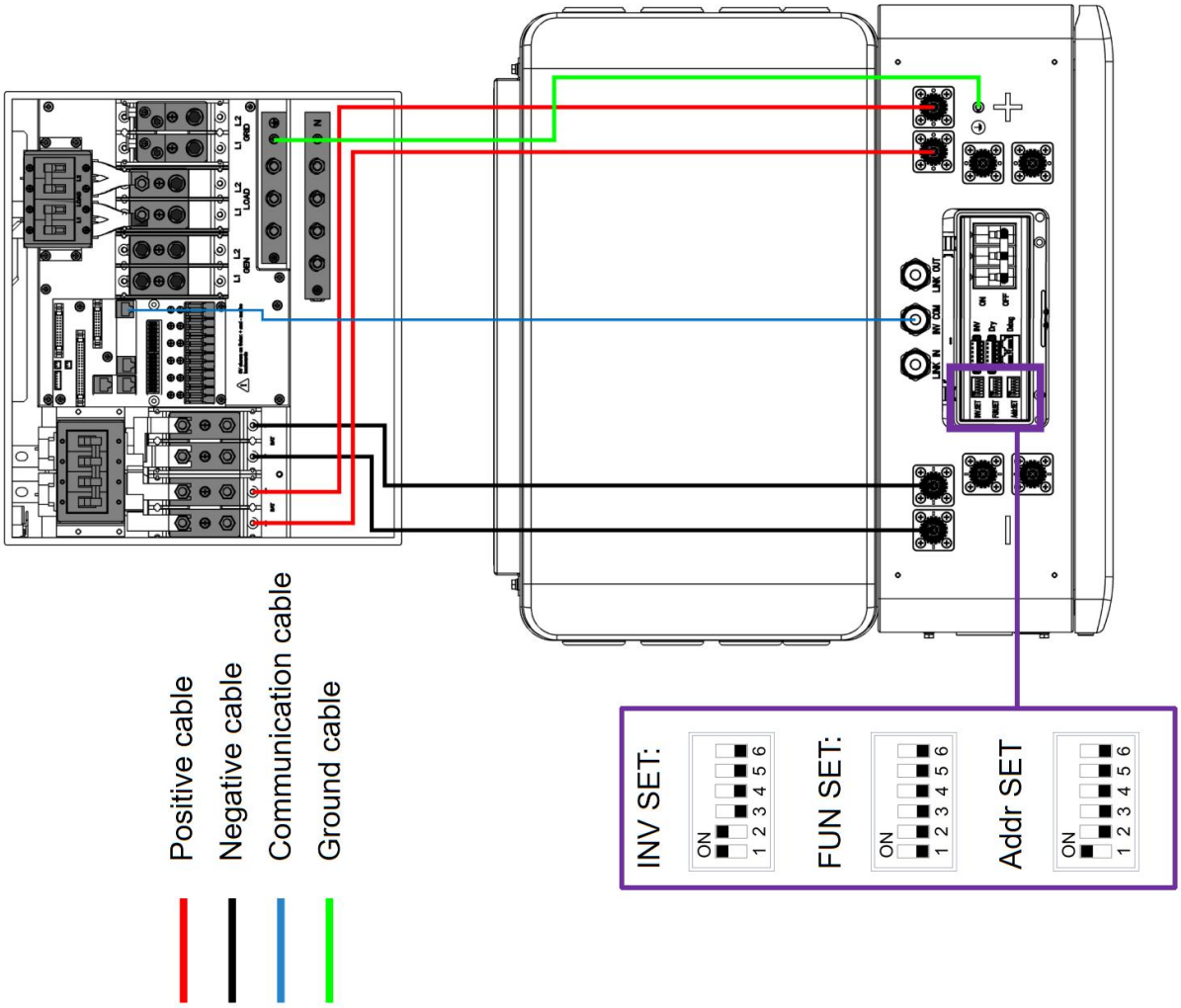


Figure 3.2.6. Single stack

4. If there is generator, load, or grid that needs to be connected, connect the inverter through the junction box to the corresponding external device directly.

5. Lock the waterproof cover of junction box and tighten the retention screws at both ends.

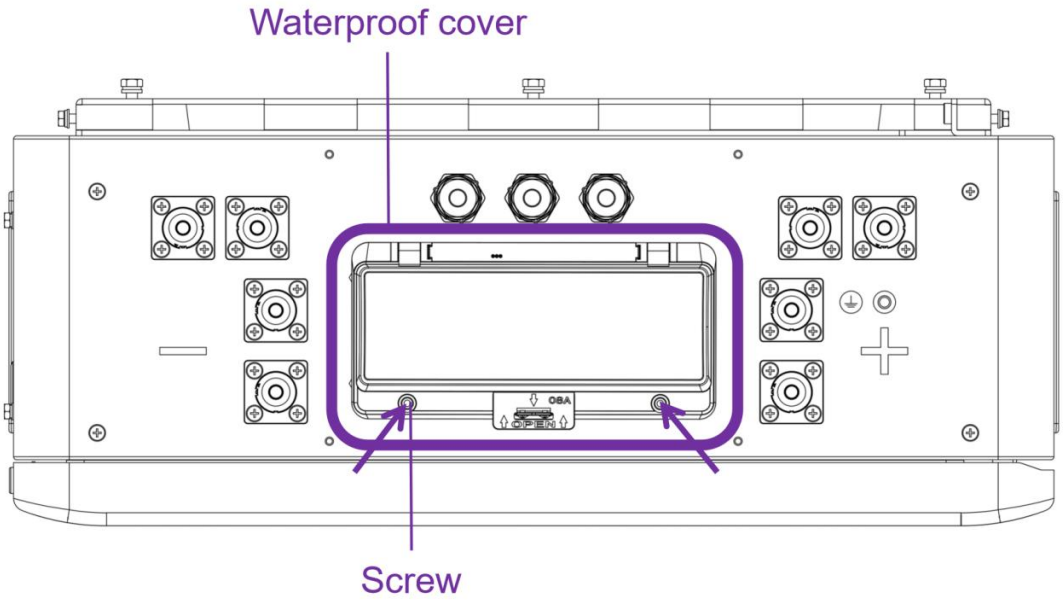


Figure 3.2.7. Lock waterproof cover of junction box

3.3 Power On

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

Step 1: Pre-power-on Check

- Polarity: Ensure the cable polarity is connected properly.
- Torque: Ensure the applied torque is within the specified tightening torque range for the screw.
- Grounding Continuity: Check that all equipment grounding points have a low-impedance connection to the grounding busbar.
- Wire Diameter: Confirm that the cable's cross-sectional area and current rating comply with system design specifications.
- Communication Cable Pinout: Verify that the communication cable pinout complies with the device interface requirements
- DIP Switch Settings: Check and verify that the DIP switches have been set according to system requirements.

Step 2: Start-up Sequence

No.	Operation
1	Rotate the inverter PV switch
2	Turn on the inverter power Button
3	Close the battery circuit breaker
4	Turn on the battery power button

Step 3: Communication Confirmation

- SOC
- Voltage
- Current
- Temperature
- Battery LED
- APP / Cloud platform online

Configure Inverter Parameters: Refer to the instructions in the inverter user manual and set the relevant parameters according to the actual site requirements. After configuration is complete, verify the inverter's current operating status to ensure it is functioning properly with no abnormal alarms.

Step 4: Functional Test

- Low-load discharge
- Grid/PV charging
- Load switching
- Parallel operation status
- Alarm / Fault check

Step 5: Recording & Archiving

- Final inverter parameters
- Firmware version
- Device SN
- Commissioning results

3.4 Application Scenarios

In multi-battery busbar parallel configurations, the overcurrent protection device (OCPD) for each individual battery branch shall be sized according to the following specifications.

Inverter Model	Rated Current (IR)	Rated Voltage (UR)
Sol-Ark 15K	400A	≥ 80 VDC
Sol-Ark 18K	500A	≥ 80 VDC

Note: If multiple battery units need to be connected in parallel, simply repeat the installation procedure described in Step 1 on both sides.

3.4.1 Two Batteries

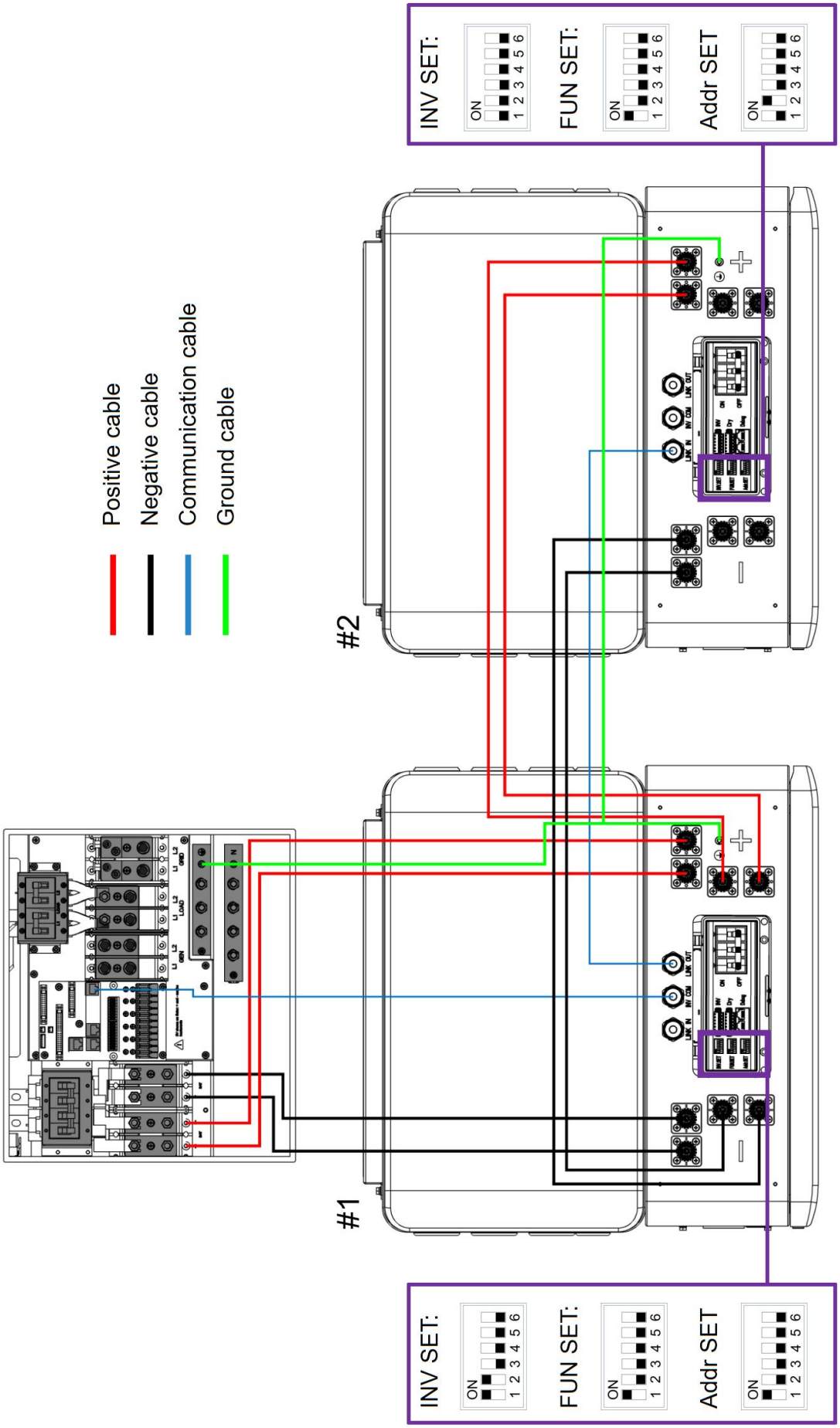


Figure 3.4.1. Two batteries in parallel connect with inverter

3.4.2 Multiple Parallel

Note: Only battery connected to the inverter need to set the inverter dial code.

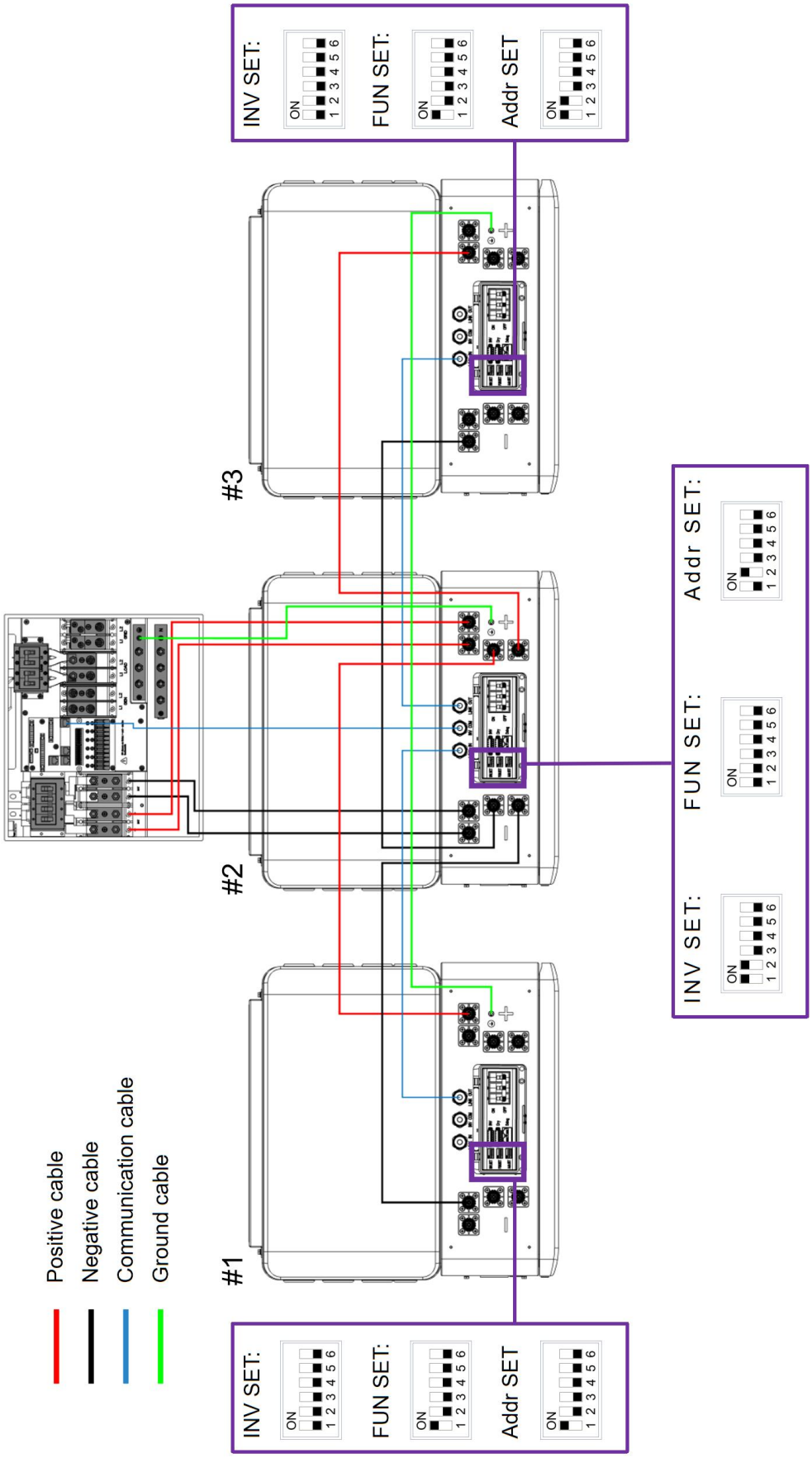


Figure 3.4.2. Multiple batteries in parallel connect with inverter

3.5 Busbar Operating Conditions

Category	Item	Requirement
Current Carrying & Overload	Current Rating	≥ Total current of all paralleled sources
	Overload Margin	≥20% reserved
	Derating Conditions	Required when: ambient temp >40℃, enclosed cabinet, altitude >2000m
	Contact Resistance	≤50μΩ (tinned/silver-plated, torque tightened)
Short-Circuit Withstand	Thermal Limit Temperature	Copper ≤200℃ / Aluminum ≤180℃
	Dynamic Stability	Supports, insulators, bolts: no deformation, no fracture
	Insulation Clearance (380V)	Clearance/To-ground ≥12mm, Creepage ≥20mm
Temperature Rise Limit	Max Perm. Temp (Bare Copper)	≤105℃ (at 35℃ ambient)
	Bolted Joint Temp Rise	≤ Conductor body temp rise +10K
Environmental Protection	Ambient Temperature	-5℃ ~ +40℃
	Humidity	≤90% at 25℃ (no condensation)
	Altitude	≤2000m (above this: increase clearance & derate)
	Corrosive/Dusty Environment	Enclosed insulated busbar required; silver-plated or coated overall
Installation & Structure	Thermal Expansion Compensation	Add expansion joints when straight length >2m
	Phase Sequence Marking	L1-Black / L2-Red / L3-Blue / N-White / PE-Green or Green-Yellow striped
	Grounding Resistance	≤4Ω
	PE Conductor Cross-section	≥ 1/2 of phase conductor section

4 Cloud Platform Configuration

1) Download App

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

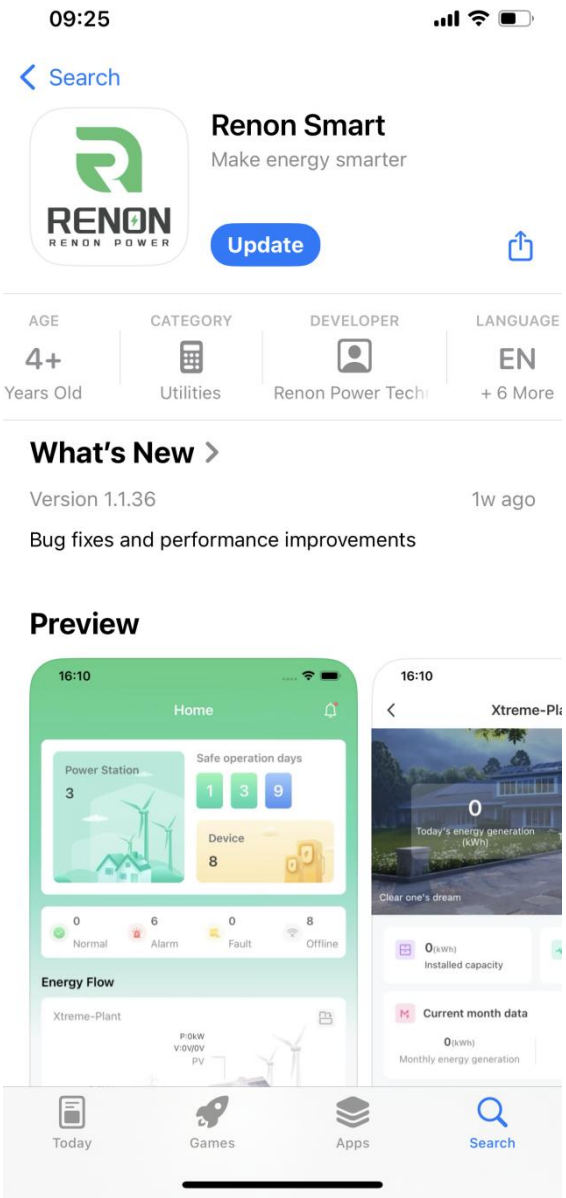


Figure 4.1.1. Install Renon App

Figure 4.1.2. Android QR code

Figure 4.1.3. IOS QR code

GET IT ON Google Play

Download on the App Store

2) Register

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

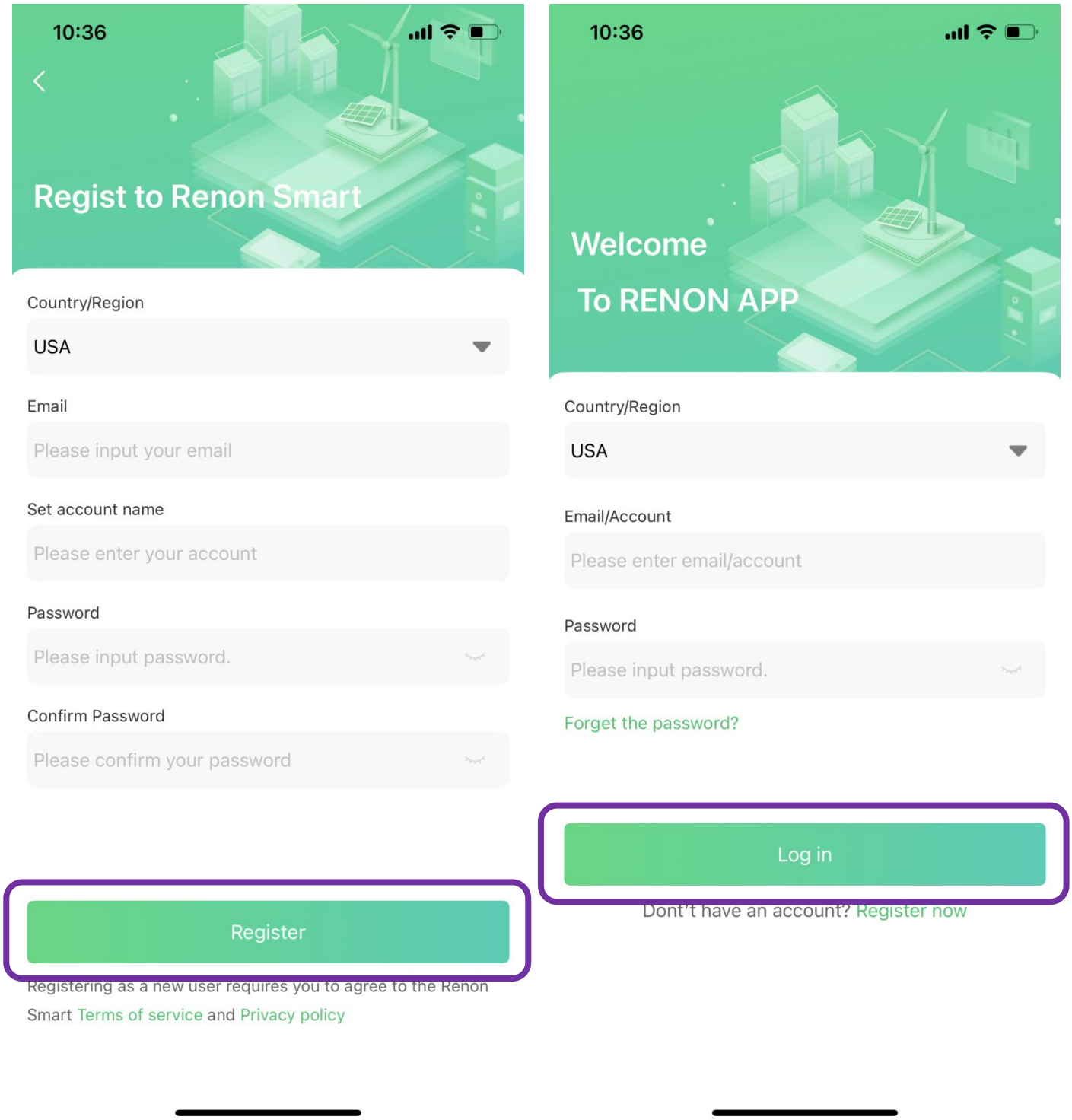


Figure 4.1.4. Register & Log in

3) Log in

This is a general user account.

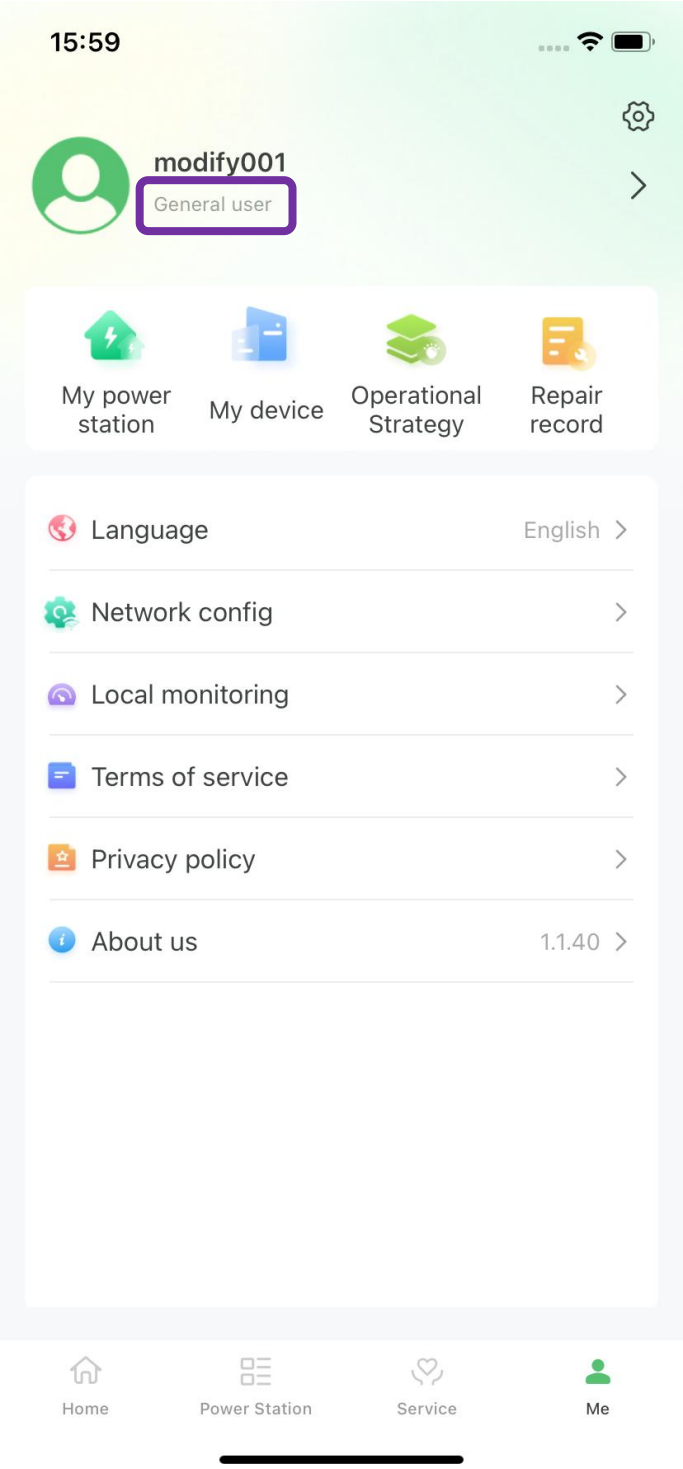


Figure 4.1.5. General user

4) Binding

Method 1: Manually bind

Step 1: To register as an end user, enter the installer's username and request the device to be assigned to your account.

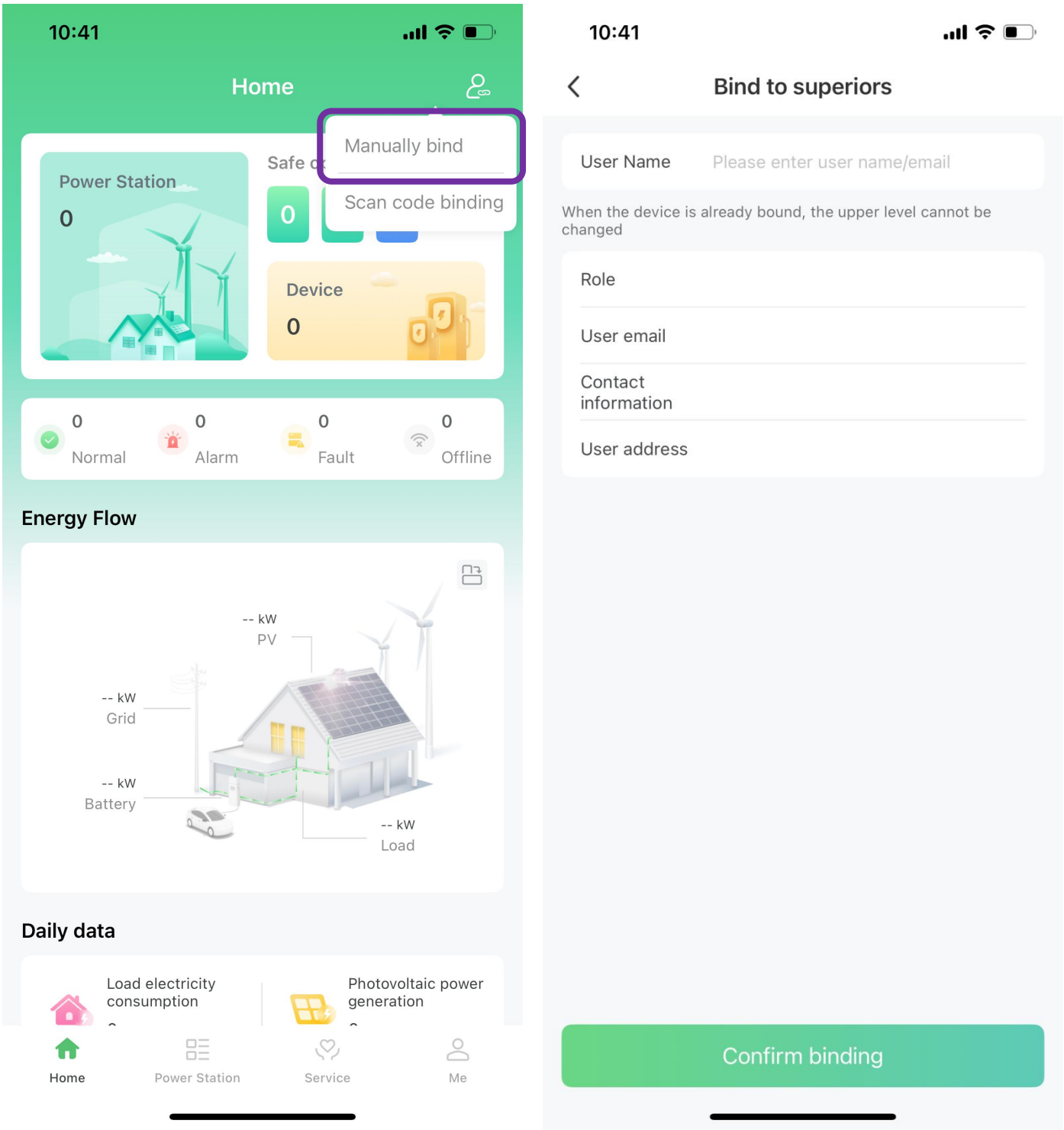


Figure 4.1.6. Bind to superiors

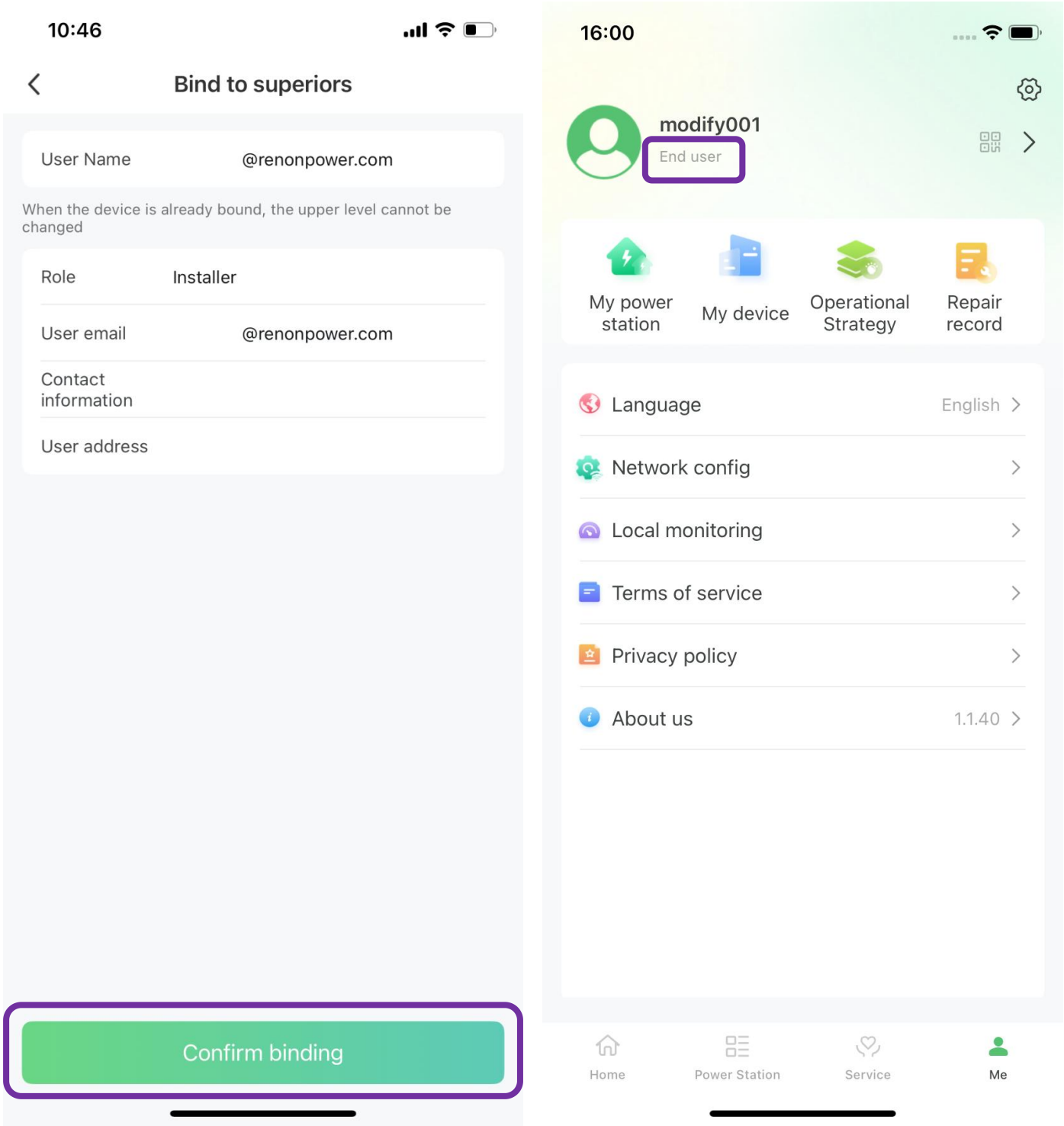


Figure 4.1.7. Confirm binding & Become end user

Step 2: Scan QR code

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

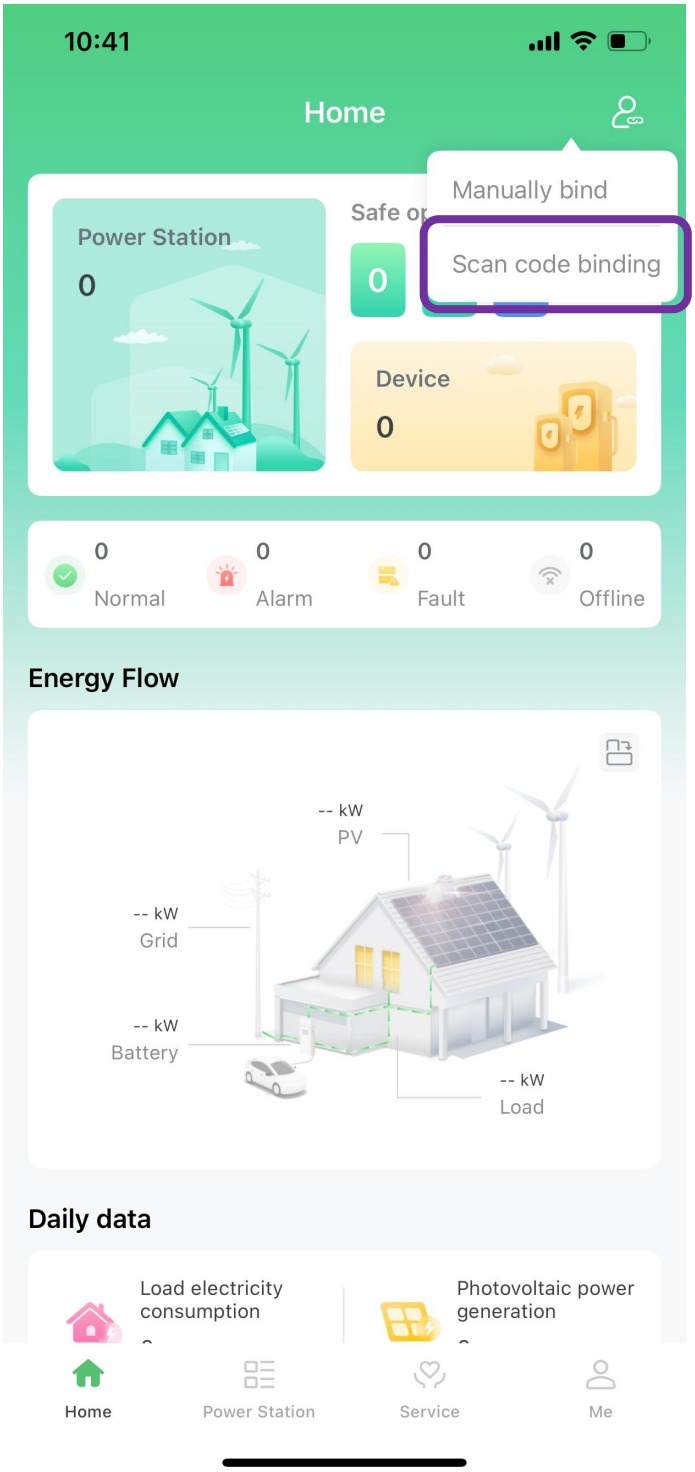


Figure 4.1.8. Scanning QR code

Method 2:

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

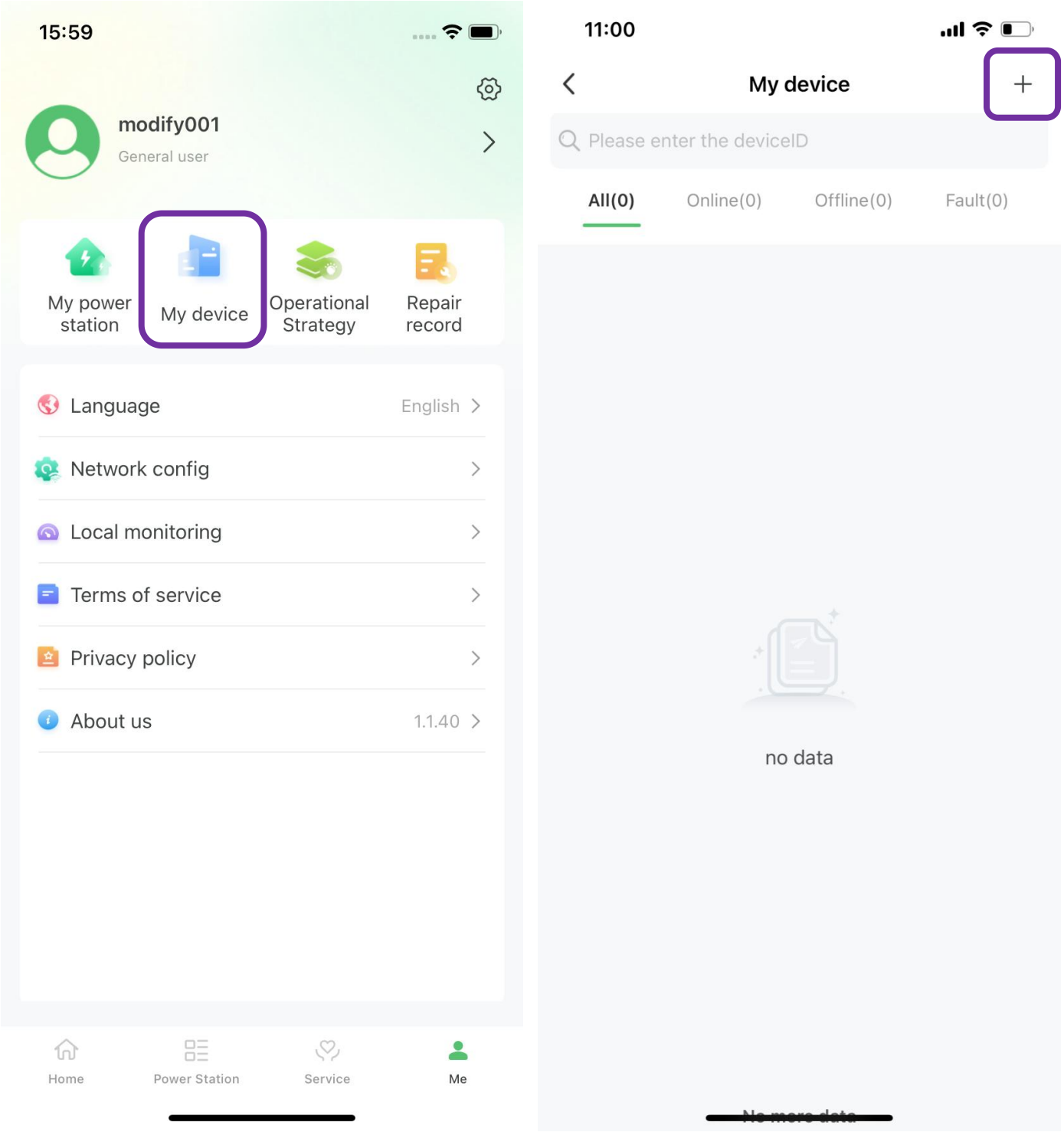
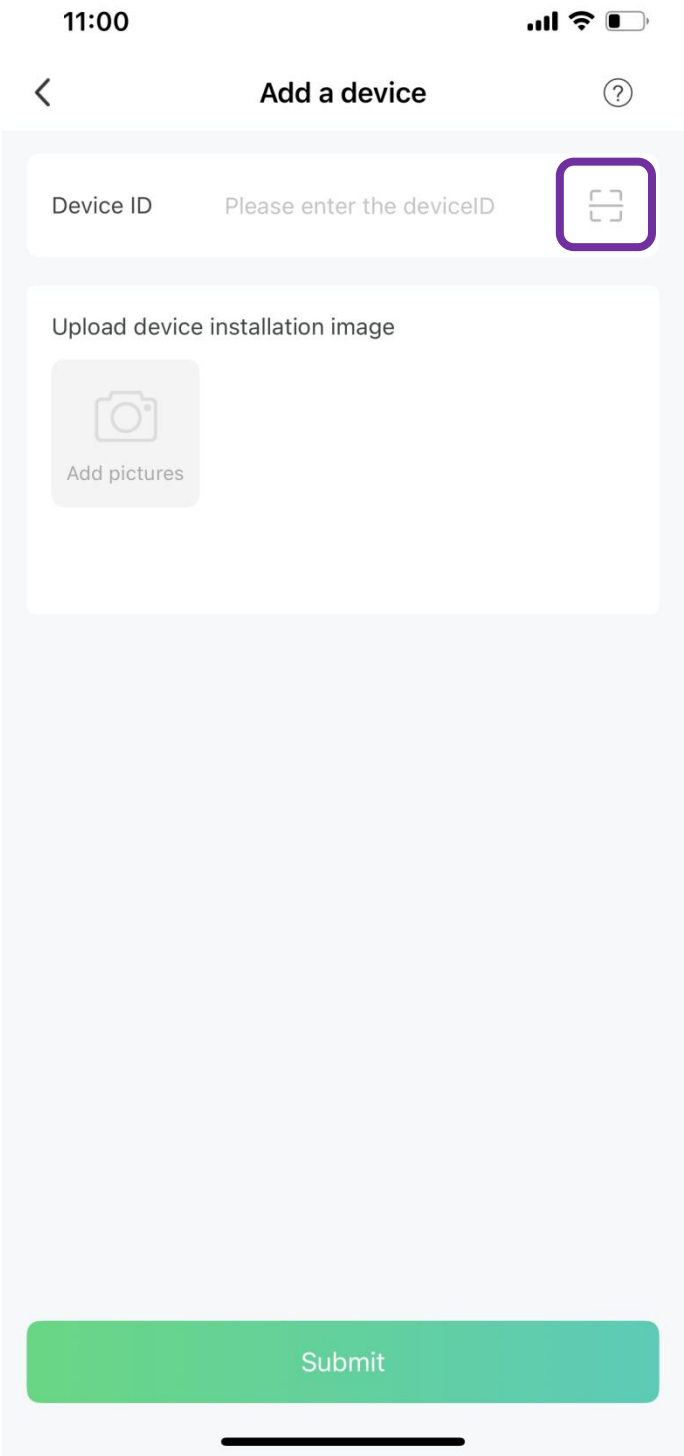


Figure 4.1.9. My device & Add device

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



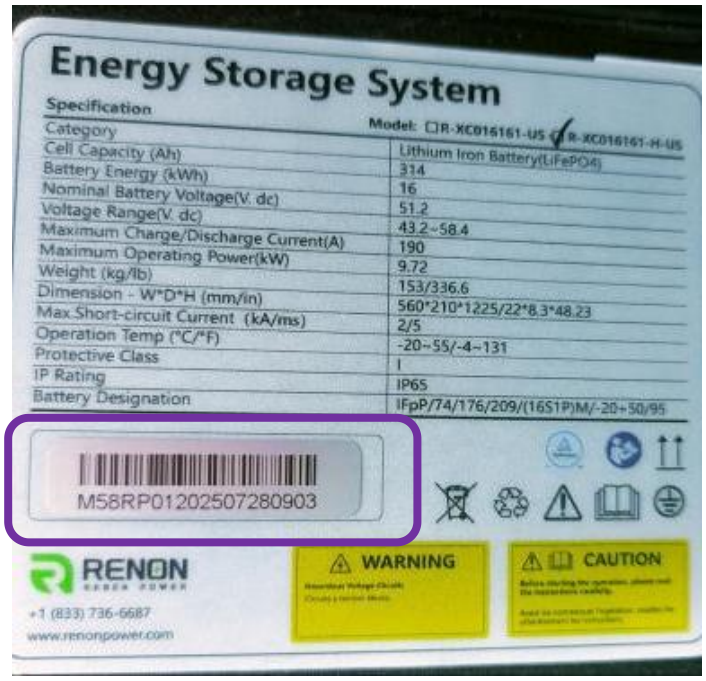


Figure 4.1.10. Scanning

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

a. Installer level binding:

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

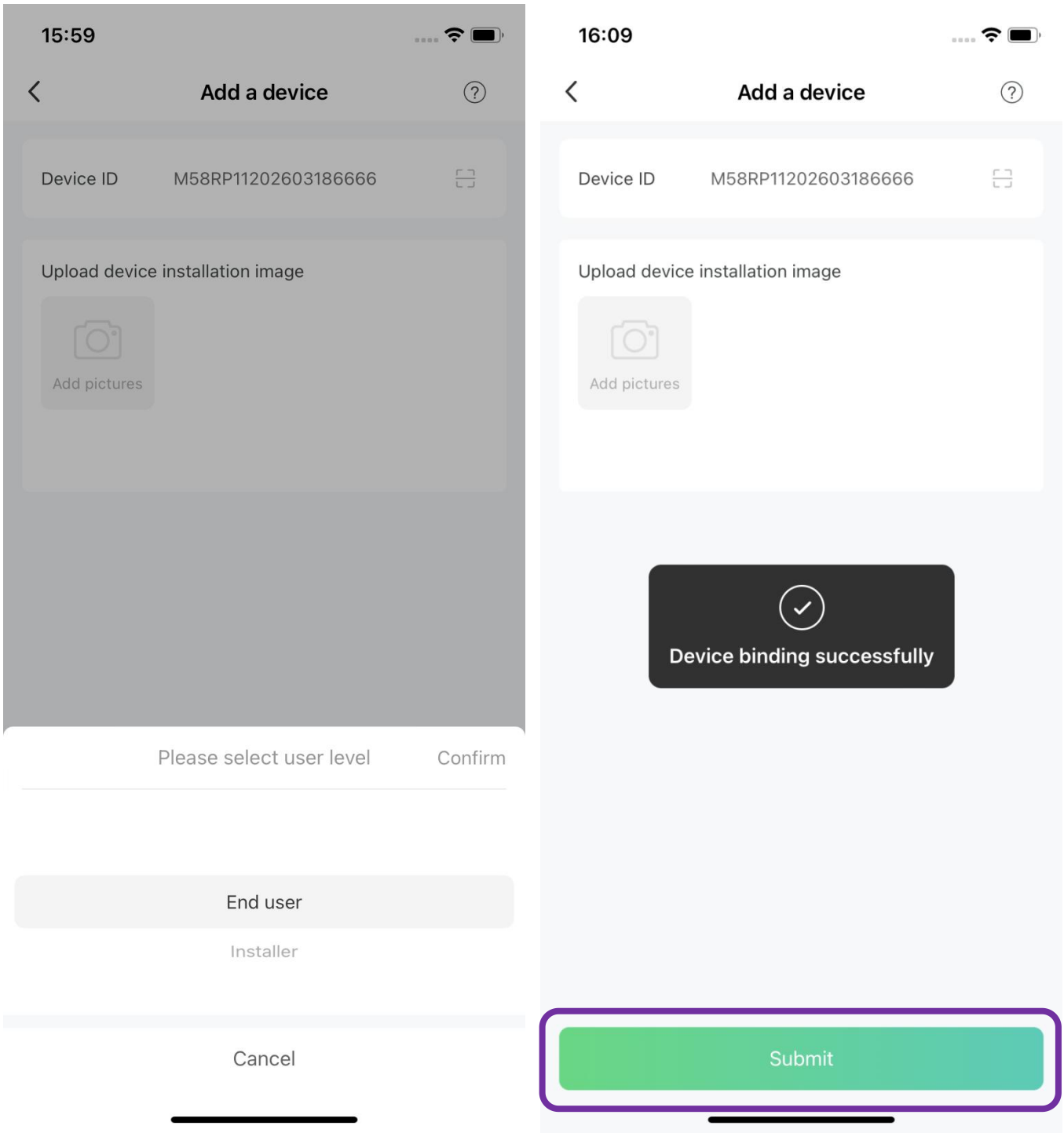


Figure 4.1.11. Select level

b. Installation company level binding:

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

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

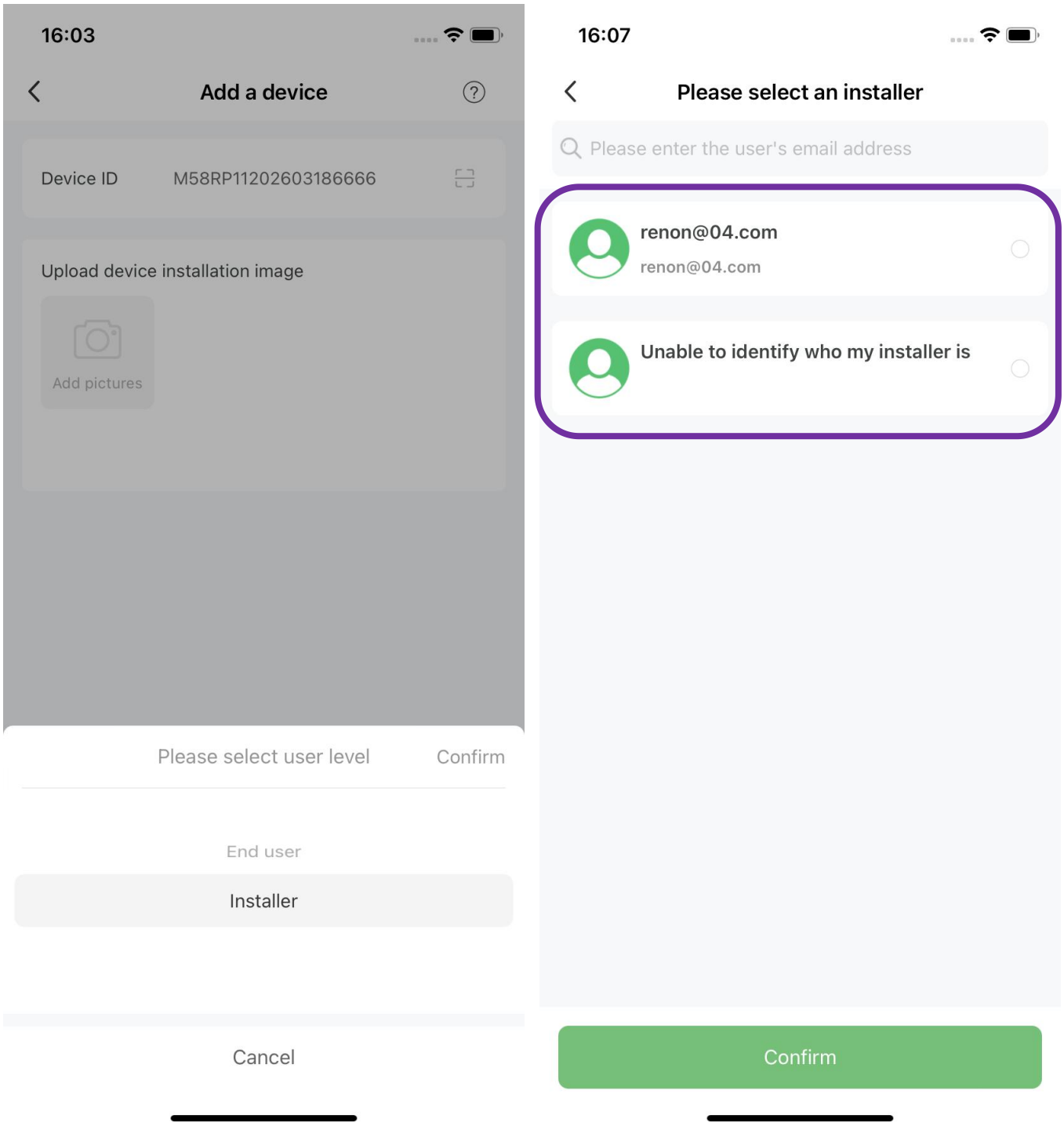


Figure 4.1.12. Select level & Superior account

c. Installer level:

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

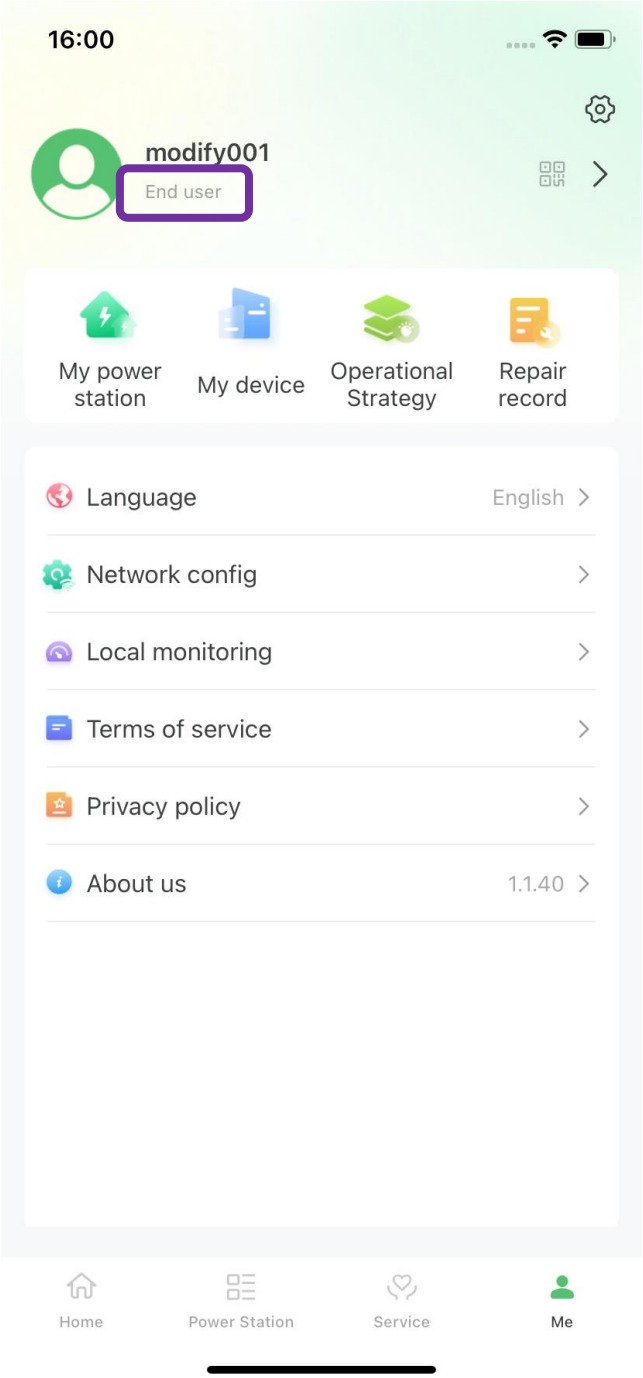


Figure 4.1.13. Become end user

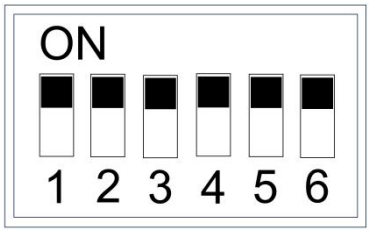
If the above methods are not successful, please contact Renon, email address: support@renon-usa.com, Renon Power Support: +1 (833) 736-6687. Be sure to write your account name/email address and device serial number clearly.

5) WiFi configuration

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

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

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



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

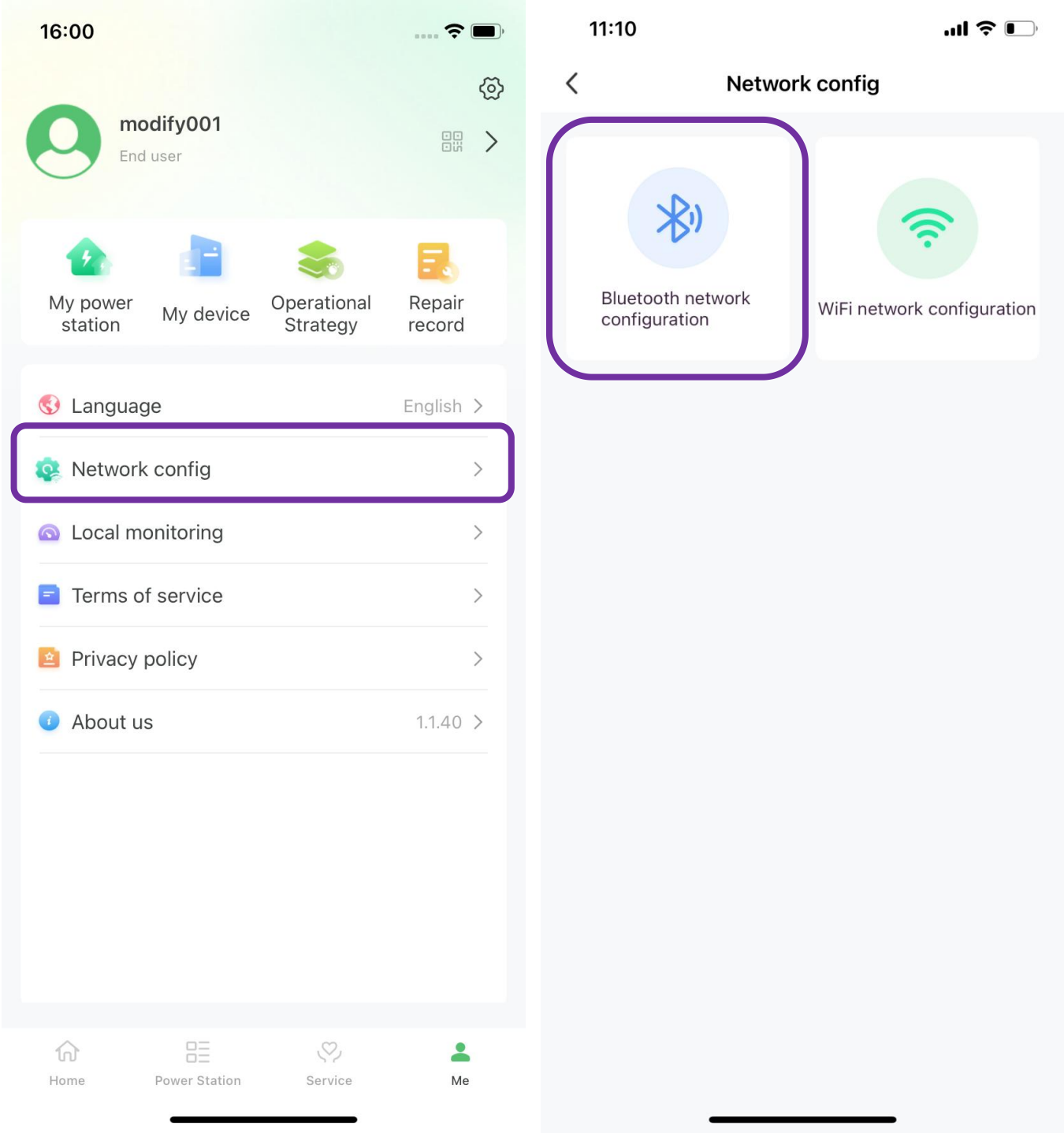


Figure 4.1.14. Bluetooth network setting

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

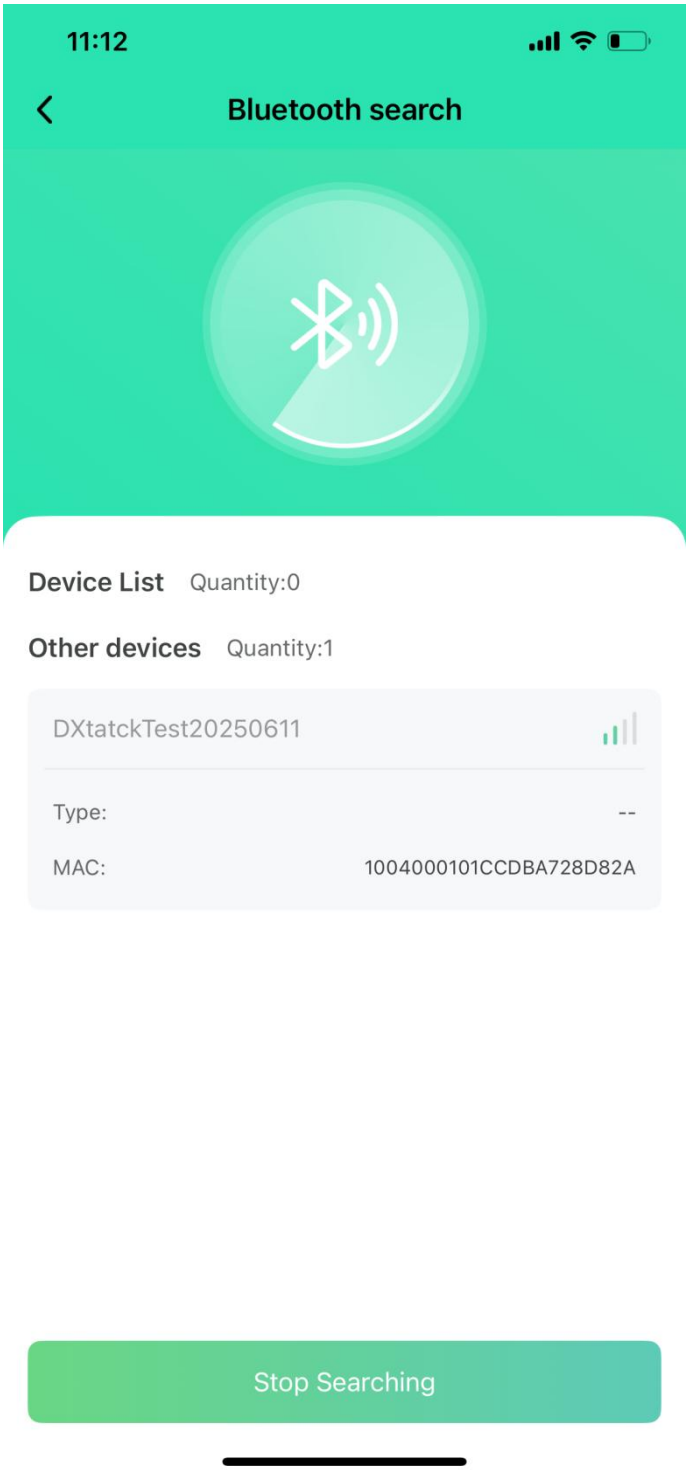


Figure 4.1.15. Connect battery Bluetooth

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

Note:

① Devices assigned to end users will auto-populate the authentication key.

② Full frequency-band WiFi coverage is supported

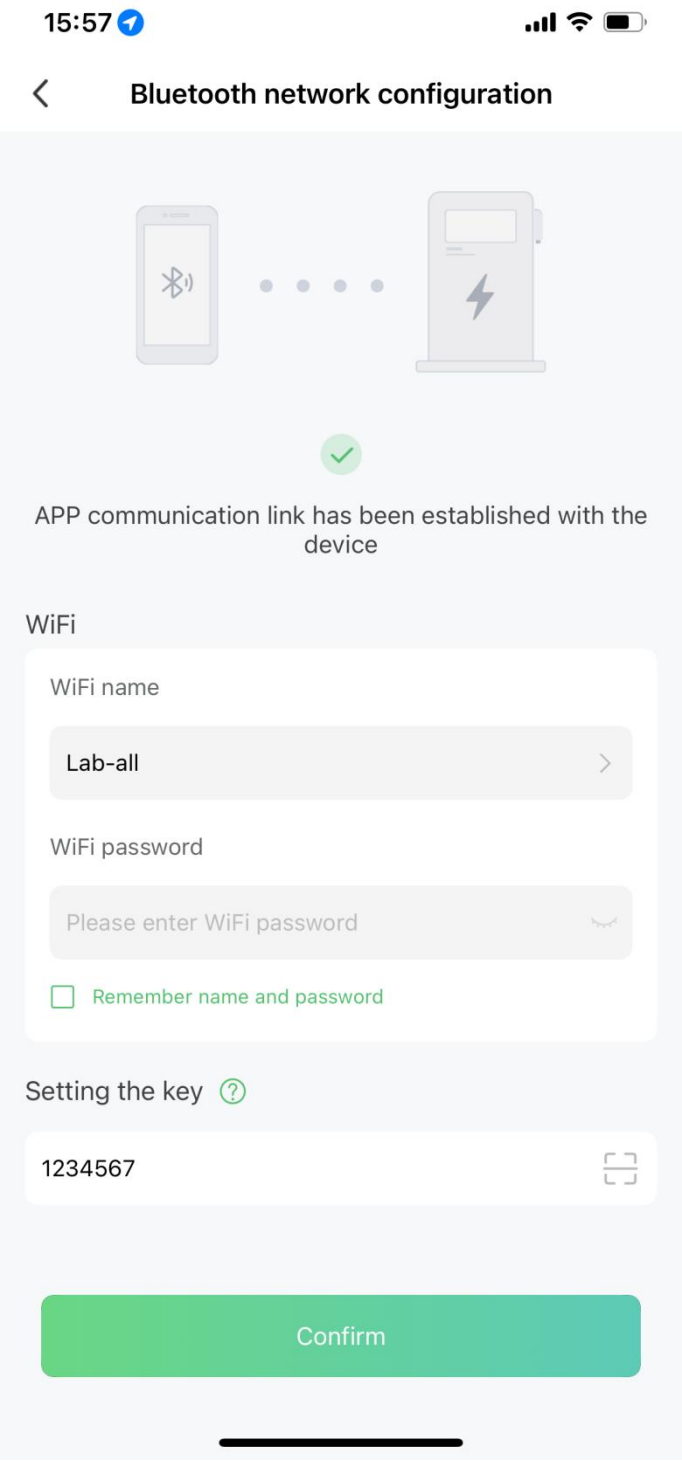


Figure 4.1.16. Connecting private WiFi

6) Create a power station

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

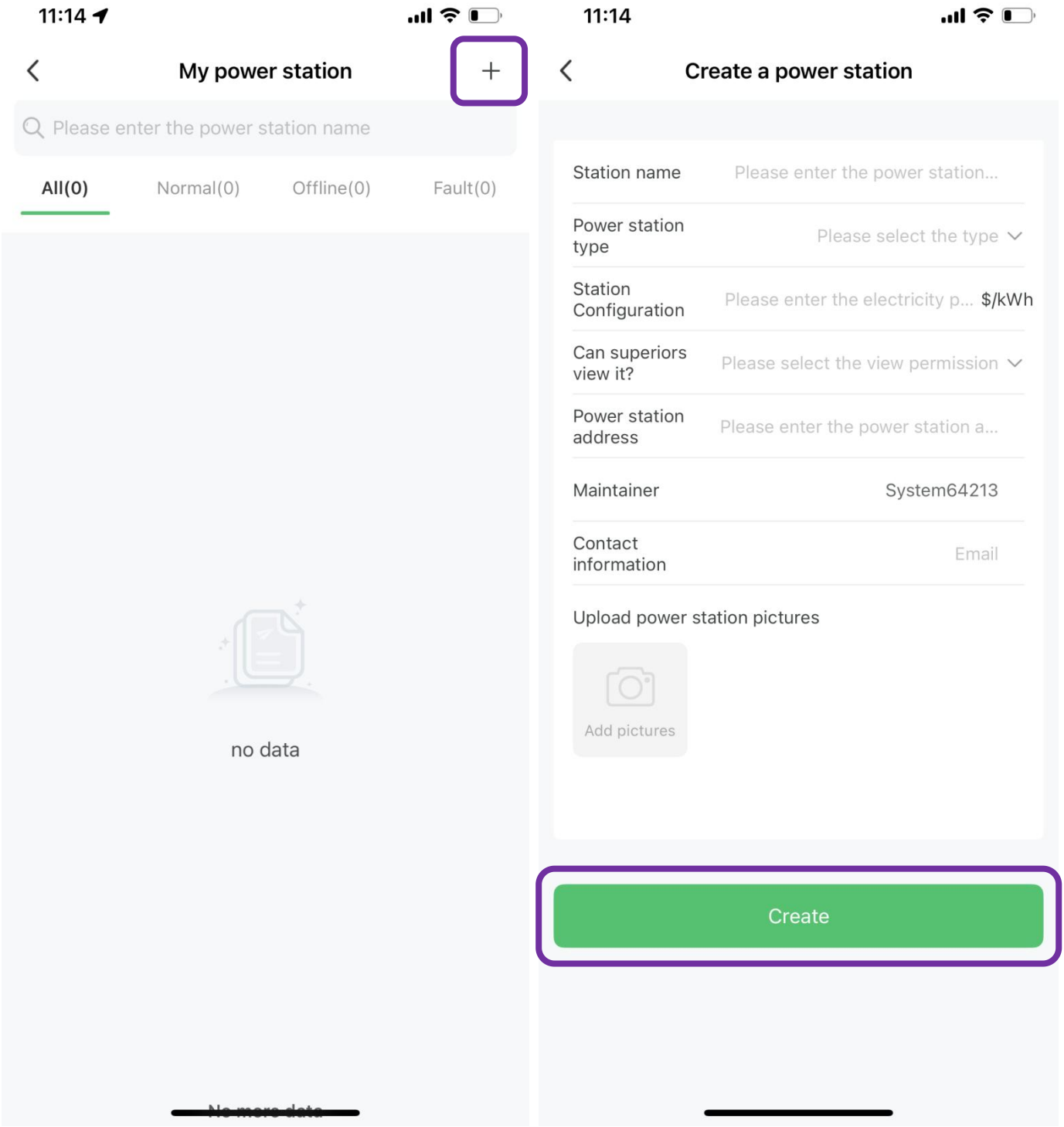


Figure 4.1.17. Create a new power station

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

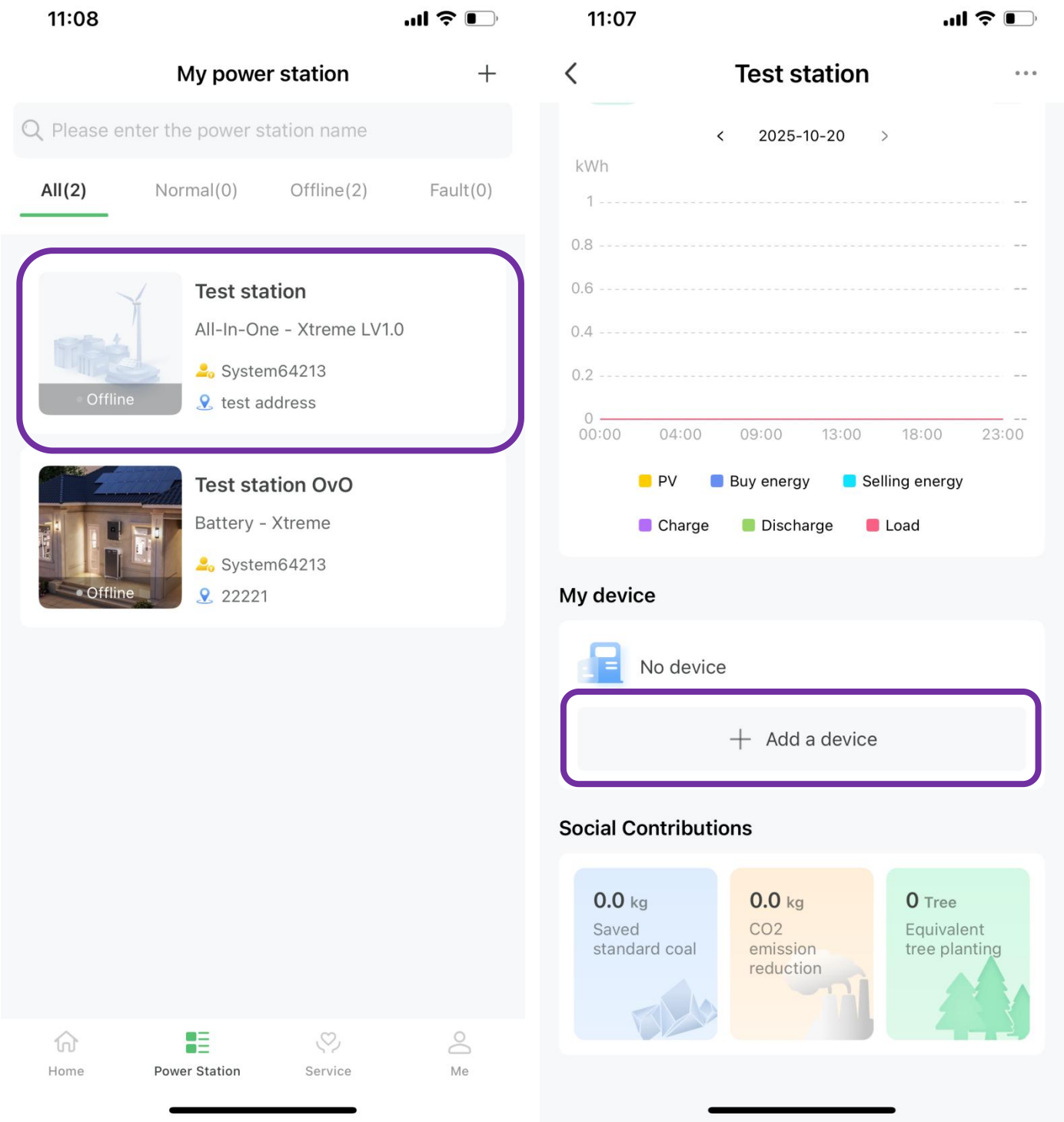


Figure 4.1.18. Add a device in my power station

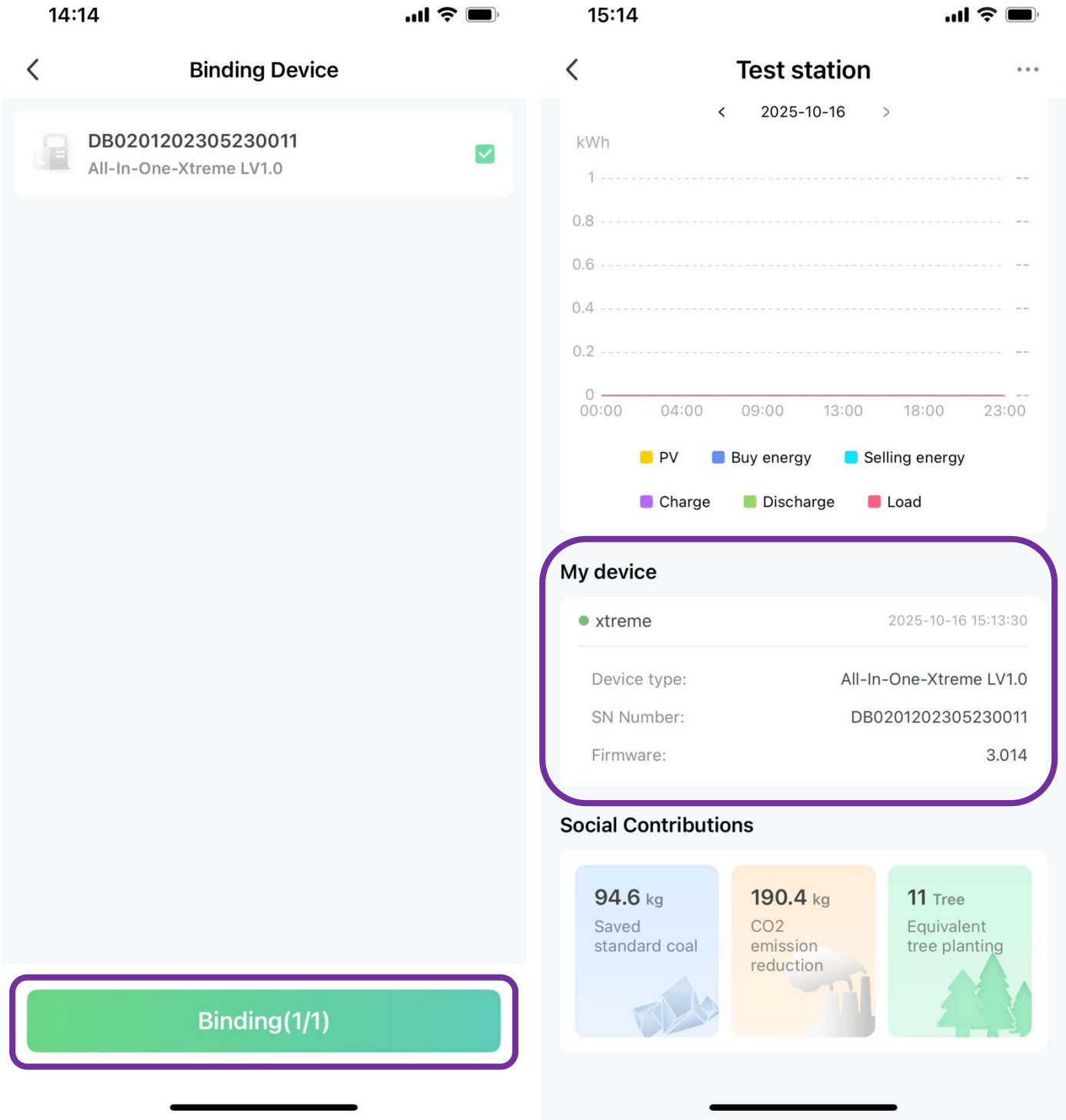


Figure 4.1.19. Manage your power station & Confirm your device

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

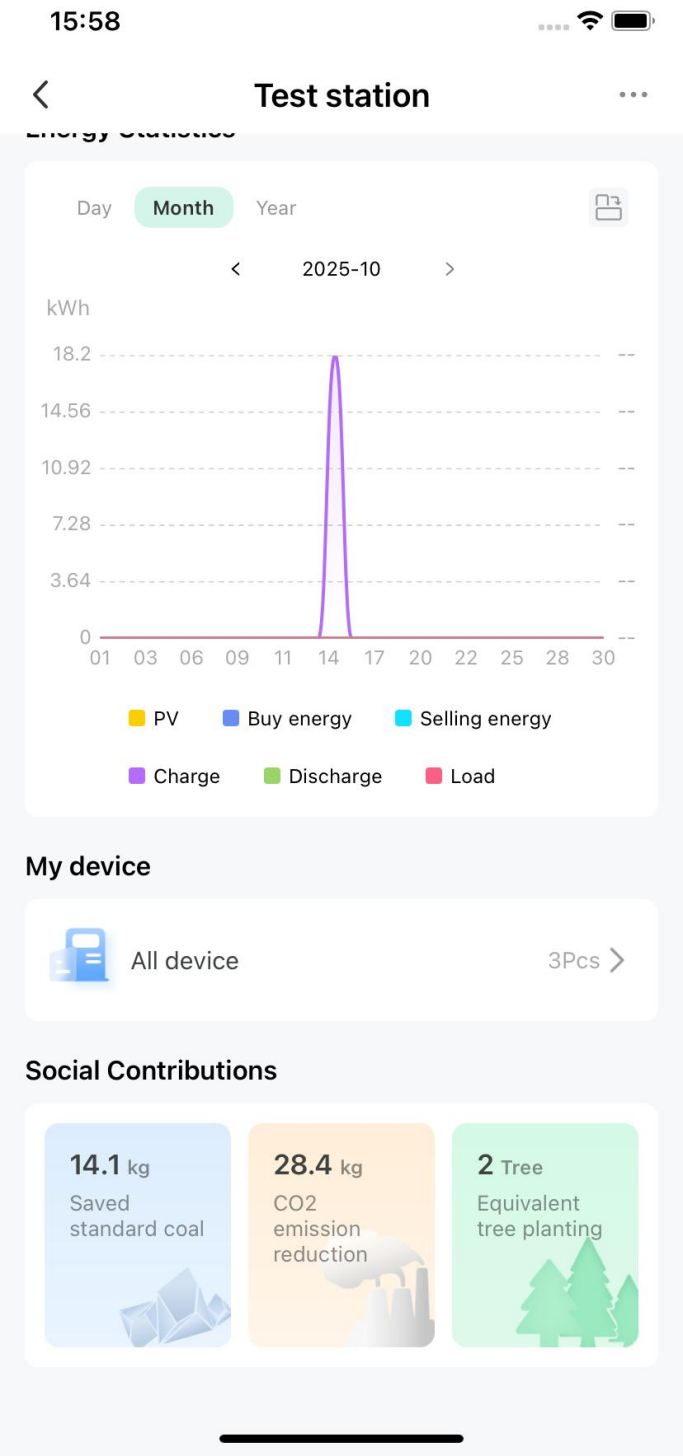


Figure 4.1.20. Manage your device

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

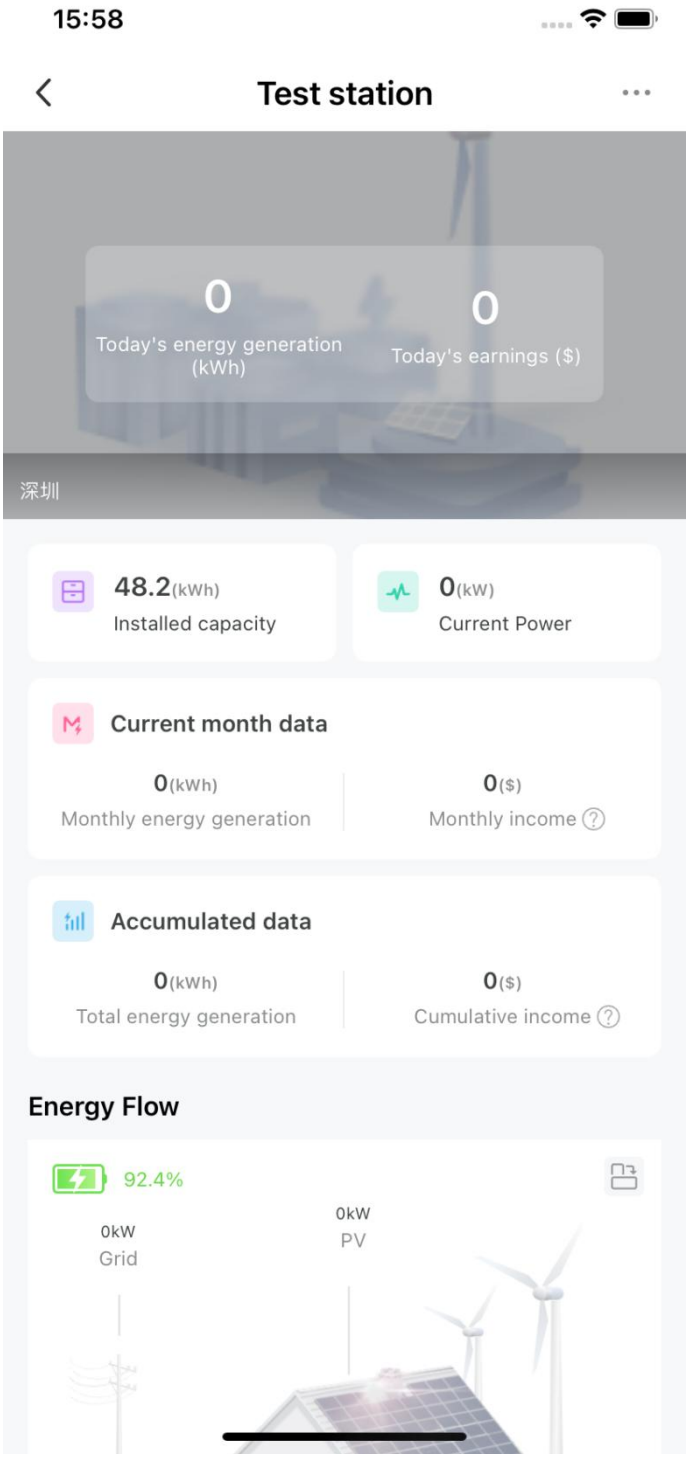


Figure 4.1.21. Monitoring device

Set the inverter dial code to match the inverter brand after WiFi configuration is complete (Please refer to the chapter **5.5.6 Inverter Dial Switch**).

7) Lock the waterproof cover

After completing the grid connection, lock and securely fasten the waterproof cover of the junction box. For detailed steps, refer to 3.2. Connection.

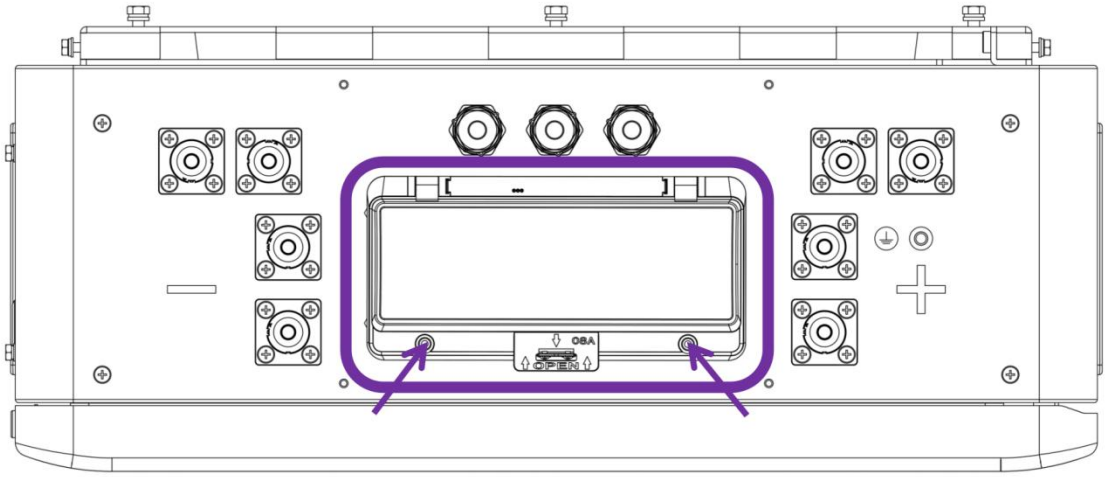


Figure 4.1.22. Lock waterproof cover of junction box

8) After the battery is successfully connected to the cloud platform, please perform the checks and confirmations listed in the table below, item by item. If any data anomalies or alarm notifications are found, please contact your installer or technical support personnel for assistance without delay.

No.	Check Item	Action
1	Firmware Version	If an update is shown on the cloud platform, update as needed
2	SOC (State of Charge)	Compare the display status of the SOC LED with the value on the Cloud Computing Platform
3	Total Voltage	Compare the multimeter reading with the cloud platform value
4	Current Reading	Observe current display during both charging and discharging states
5	Battery Cell Count (Series Number)	Verify that the cloud platform display matches the actual physical count
6	Cell Voltage Imbalance (Delta)	Check the voltage difference between the highest and lowest individual cells
7	Alarm	Check the alarm panel on the cloud platform.

5 Battery Specifications

The Xcellent Plus 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 Xcellent Plus 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 to expand capacity and power to meet the requirements of longer power supporting duration and higher power consumption.

It is suspended on the wall in daily usage.

5.1 Product Features

- With a DC-DC converter inside, users can extend or change battery modules whenever they want, no need to consider the quality or SOC of old modules.
- The whole product is non-toxic, pollution-free and environmentally friendly.
- Cathode material is made from LiFePO4 with safety, performance, and a 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.
- The battery management system (BMS) has protection functions including over-discharge, over-charge, and over-current and high/low temperature.
- The battery can self-discharge, up to 3 months without charging and offers excellent performance of shallow charge and discharge.
- The system can automatically manage battery charge and discharge state and save energy costs with various automation options.

5.2 Specifications

Item	R-XC016161-US / R-XC016161-H-US
Battery Chemistry	LiFePO4
Nominal Energy (kWh)	16
Nominal Capacity (Ah)	314
Max. Charging Current (A)	157
Max. Discharging Current (A)	190
Nominal Voltage (V)	51.2
Recommend Charging Voltage (V)	56.8
Max. Charging Voltage (V)	58.4
Discharge Cut-off Voltage (V)	43.2
Heating Power(W)	300
Heating Start Temperature (℉/℃)	42.8/6 (-H model only)
Operation Temperature (℉/℃)	Charging: 32~131 / 0~55 Discharging: -4~131 / -20~55
Safety Function	Over-charge, Over-discharge, Over-current, Low/High-temperature, Short-circuit Protections
Parallel Capacity	Maximum 31
Communication	RS485/CAN
Weight (lbs/kg) (Approx.)	337.31 ± 11/153 ± 5
Physical Dimensions (in/mm) (W*D*H)	22*8.3*48.3/560*210*1225（±2）(Leveling feet not included)
Level of Protection	IP65
Altitude	≤4000m

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

5.3 External Introduction

5.3.1 Explosion-proof Valves

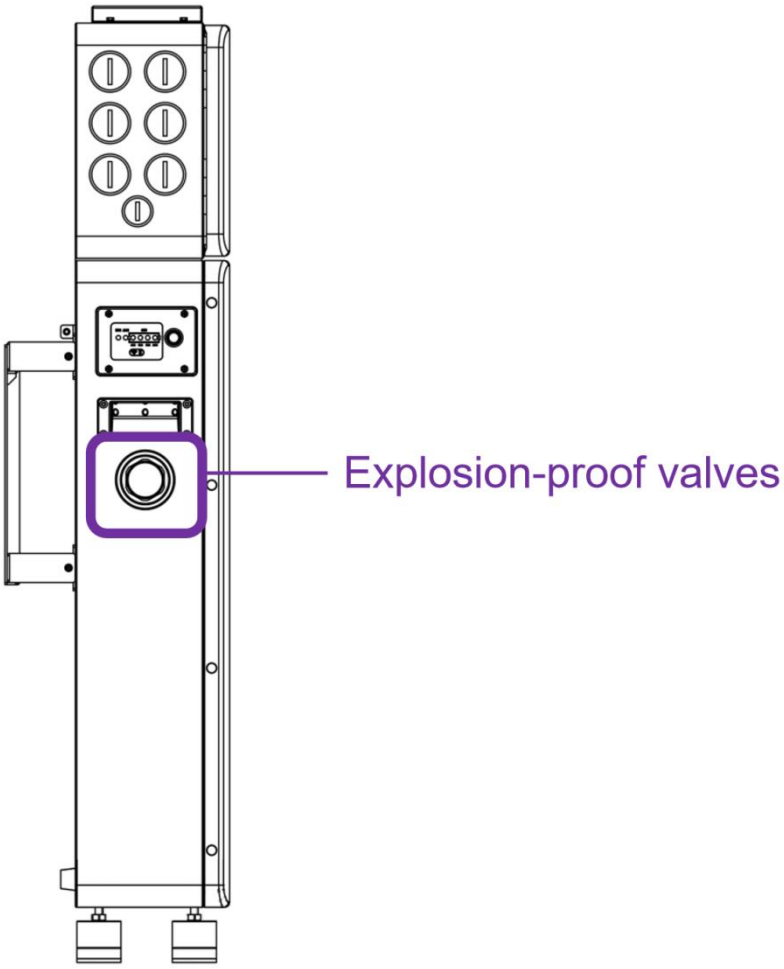


Figure 5.3.1. Explosion-proof valves

5.3.2 Power Button

The power button is used to power-on/power-off the device.

The power button is located in right corner of device.

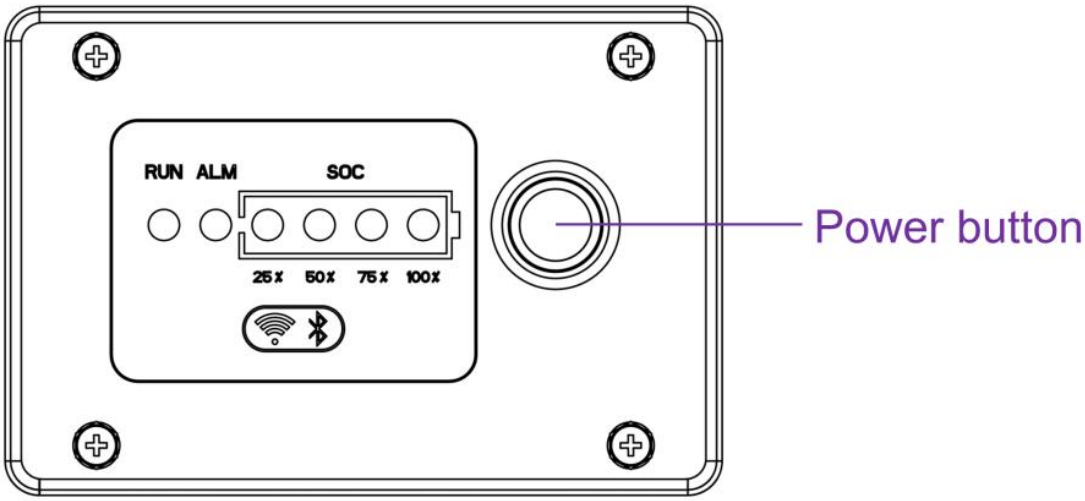


Figure 5.3.2. Button

5.3.3 LED

The LEDs are used to display current state.

The LEDs are located on the right side of device.

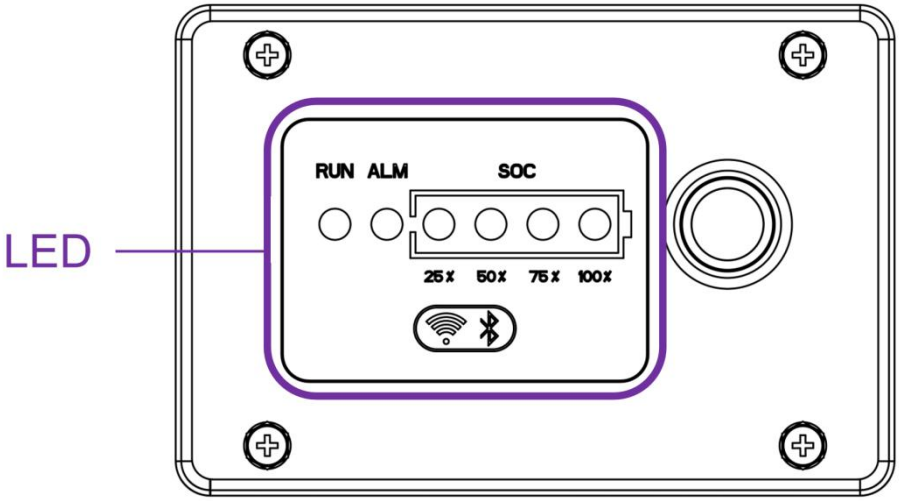


Figure 5.3.3. Light

No.	Item	Specification
1	RUN (Blue)	Shut down: Off
		WiFi disconnect router: On
		WiFi has connected router: 0.5s on, 0.5s off
		WiFi has connected cloud: 0.5s on, 1.5s off
2	ALM (Red)	No protection, alarm, fault: off
		Alarm: 0.5s on, 1.5s off
		Protection: 0.5s on, 0.5s off
		Fault: On

			Charging state				Discharging state/Idle			
		SOC (%) / LED	SOC-25%	SOC-50%	SOC-75%	SOC-100%	SOC-25%	SOC-50%	SOC-75%	SOC-100%
3	Fault (Green)	SOC=0	Blinking	Off	Off	Off	Off	Off	Off	Off
		0<SOC≤25	Blinking	Off	Off	Off	On	Off	Off	Off
		25<SOC≤50	On	Blinking	Off	Off	On	On	Off	Off
		50<SOC≤75	On	On	Blinking	Off	On	On	On	Off
		75<SOC≤100	On	On	On	Blinking	On	On	On	On

*Blinking: 0.5s on, 0.5s off

5.4 Function Introduction

5.4.1 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.

5.4.2 Heating

When the battery is equipped with a heating film, the system continuously monitors the cell temperature and operating status in real time. During charging or discharging, if the heating function is enabled and the corresponding operating conditions are met, and the minimum cell temperature falls below 6°C, the system will automatically activate heating to enhance battery performance. The heating process relies on the inverter being connected to the power grid (during charging) or continuous power supply from the high-voltage busbar (during discharging) to maintain stable operation. Once the maximum cell temperature exceeds 20°C, the heating function will automatically shut off to prevent overheating.

5.4.3 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.After wake-up from under-voltage sleep, if the minimum cell voltage is above 2.5V, the system will forcibly turn on the discharge MOSFET, and this state will be maintained for 5 minutes. And after recovery from under-voltage sleep, external voltage access is permitted.

5.4.4 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.

5.4.5 Charging Self-Adaptation Control

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

5.4.6 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.

5.5 Interface Information

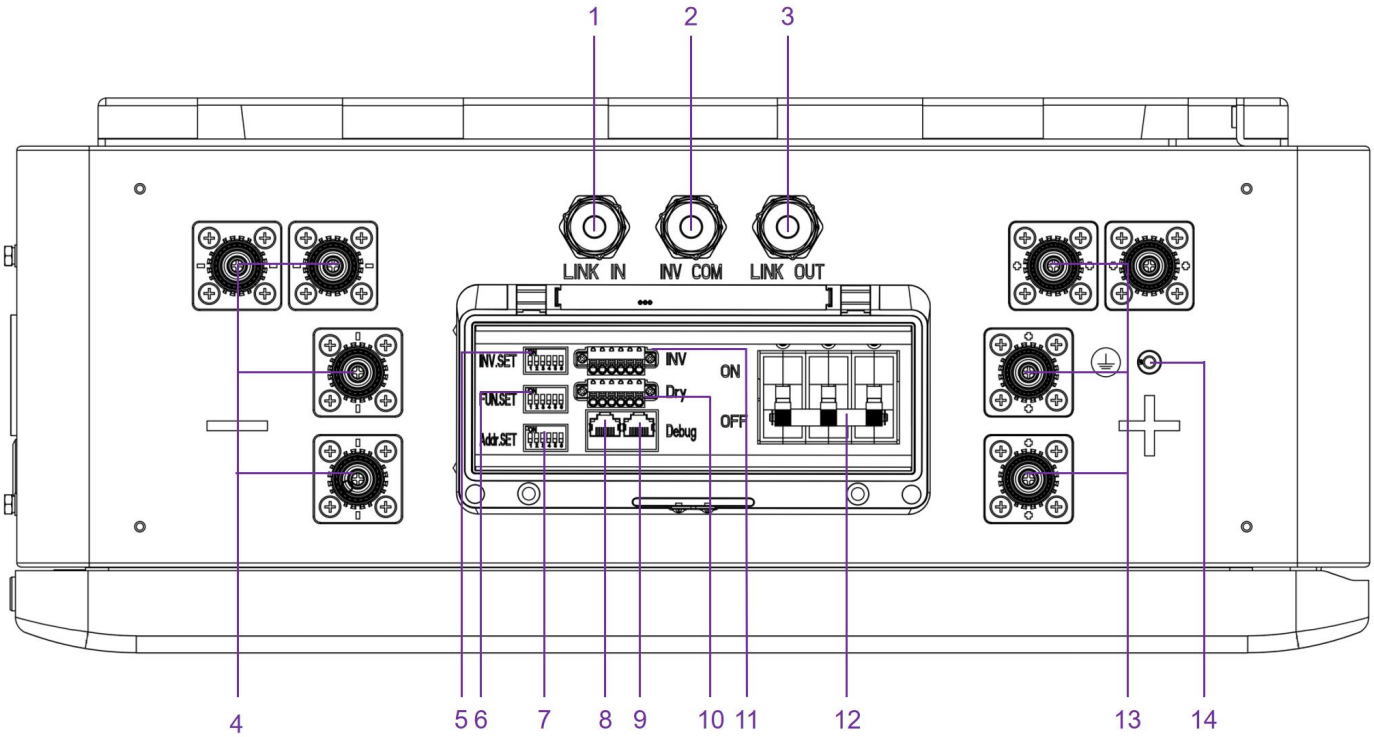


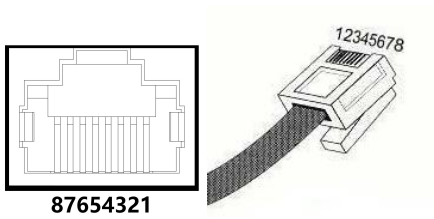
Figure 5.5.1. Battery ports

No.	Instructions	No.	Instructions
1	LINK IN	8	Inverter Port
2	INV COM	9	Debug Port
3	LINK OUT	10	Dry Contact
4	Power Negative	11	INV
5	INV.SET	12	Circuit Breaker
6	FUN.SET	13	Power Positive
7	Addr.SET	14	Ground

5.5.1 LINK IN Parallel Communication Port

Terminal type: RJ45

Usage: Communicates with the last battery when parallel used.

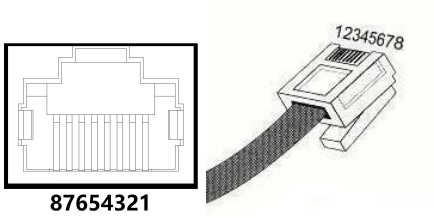
Port definitions	RJ45 Pin	Function
	1	BMS_CAN1L
	2	BMS_CAN1H
	3	BMS_CC_GND
	4	BMS_CC_GND
	5	BMS_PW_IN1
	6	BMS_CC_GND
	7	BMS_XUNZIN- /Emergency stop node 1
	8	BMS_XUNZIN+/Emergency stop node 2

5.5.2 INV COM Port

Terminal type: RJ45

Usage: Communicates with the inverter.

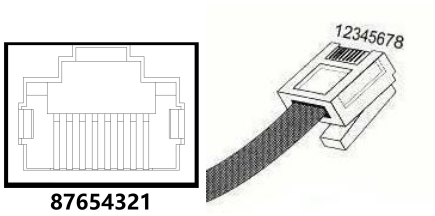
Note: If the inverter's BMS communication interface adopts the PIN4 and PIN5 wiring sequence, a standard Ethernet cable can be used directly for communication, for example, with models such as Sol-Ark, Solis, and MEGAREVO. For more inverter models, please refer to the corresponding product user manuals.

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

5.5.3 LINK OUT Parallel Communication Port

Terminal type: RJ45

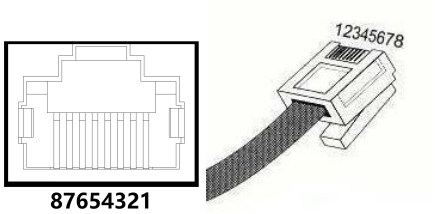
Usage: Communicates with the next battery when parallel used.

Port definitions	RJ45 Pin	Function
	1	BMS_CAN1L
	2	BMS_CAN1H
	3	BMS_CC_GND
	4	BMS_PW_OUT2
	5	BMS_PW_OUT1
	6	BMS_CC_GND
	7	BMS_XUNZOUT-
	8	BMS_XUNZOUT+

5.5.4 Inverter Communication Port

Terminal type: RJ45

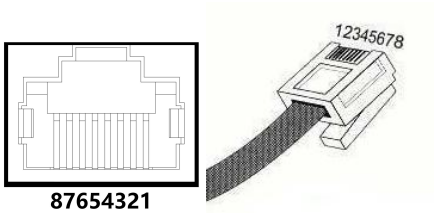
Usage: Communicate with inverter.

Port definitions	RJ45 Pin	Function
	1	RS485_2B
	2	RS485_2A
	3	COM_SGND
	4	WAKEUP +
	5	WAKEUP -
	6	COM_SGND
	7	CAN2H
	8	CAN2L

5.5.5 Debug Port

Terminal type: RJ45

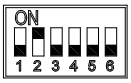
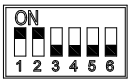
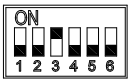
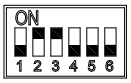
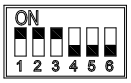
Usage: Debug port of the system which used by technician only.

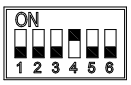
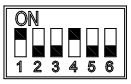
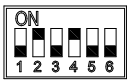
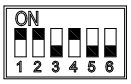
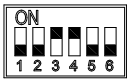
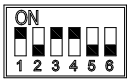
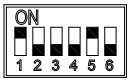
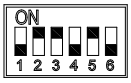
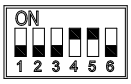
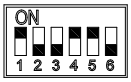
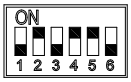
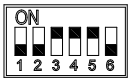
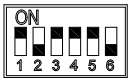
Port definitions	RJ45 Pin	Function
	1	BMS_CAN1L
	2	BMS_CAN1H
	3	BMS_RS232_RX
	4	BMS_CC_GND
	5	BMS_CC_GND
	6	BMS_RS232_TX
	7	IN_CANL
	8	IN_CANH

5.5.6 Inverter Dial Switch

Code 0~29 of this Dial Switch are used to match which brand of inverter is using.

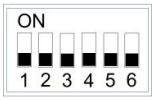
The definitions of code 0 ~ 29 are shown as Inverter dial code table.

Code	Dial Switch Position	Brand	Logo
0		APP setting (Default: Renon Flex)	RENON
2		Schneider Gateway	Schneider Electric
3		Sol-Ark	Sol-Ark LIMITLESS POWER
4		Solis	solis
6		Studer Xtender	STUDER
7		Victron	victron energy BLUE POWER

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

5.5.7 Function Dial Switch

The dial switch settings for a single are as below:

Single device	Usage
Code	

5.5.8 Address Dial Switch

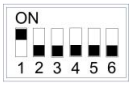
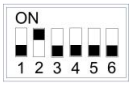
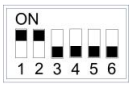
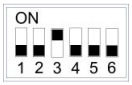
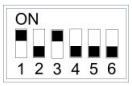
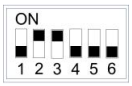
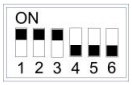
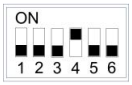
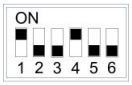
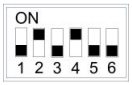
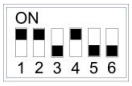
1) Use this Dial Switch to set the address of each battery and then turn on to activate the system when it needs to be in parallel with other battery units.

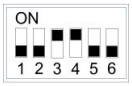
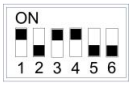
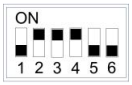
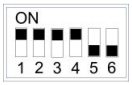
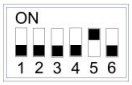
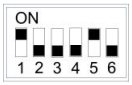
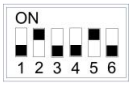
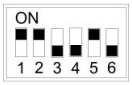
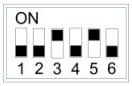
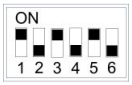
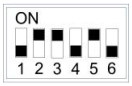
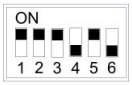
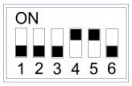
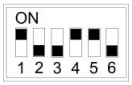
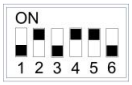
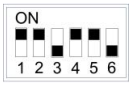
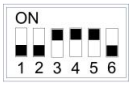
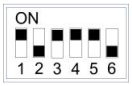
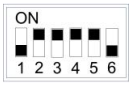
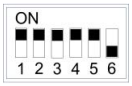
2) When the system only has one battery, dial the address to 1.

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

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

5) The illustration of dialing shown Address dial code table:

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

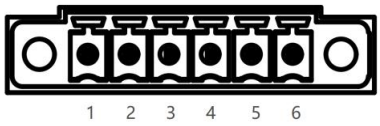
12		Set as battery 12
13		Set as battery 13
14		Set as battery 14
15		Set as battery 15
16		Set as battery 16
17		Set as battery 17
18		Set as battery 18
19		Set as battery 19
20		Set as battery 20
21		Set as battery 21
22		Set as battery 22
23		Set as battery 23
24		Set as battery 24
25		Set as battery 25
26		Set as battery 26
27		Set as battery 27
28		Set as battery 28
29		Set as battery 29
30		Set as battery 30
31		Set as battery 31

5.5.9 Dry Contact

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 below:

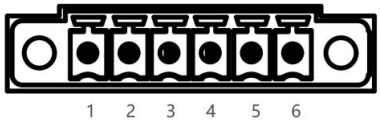
6pin Terminal	Pin	Usage
	1	BMS_NO1
	2	BMS_COM1
	3	BMS_NO2
	4	BMS_COM2
	5	WAKEUP +
	6	WAKEUP -

5.5.10 INV Communication Port

Terminal type: 6-Pin terminal block

Usage: Reserved for direct connection with inverter, same function as the RJ45 port (chapter " Inverter Communication Port (RJ45)"), only one of these two need to be used, leave it open if not used.

Defined as below:

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

5.5.11 Power Positive & Negative

Positive and negative terminals are be used with connectors.

5.5.12 Emergency Stop

The first battery (Address 1)'s LINK IN port (Pins 7-8) can be connected to the normally open (NO) contacts of an external emergency stop button. When activated, this will disconnect all battery outputs.

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

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

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	Possible Causes of Failure
Unable to turn on the battery	1. Try to charge the battery with the activation charging function on the inverter when power is on.
Unable to find the battery on the app or the Cloud	1. Make sure the 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.
No output after power on	1. Make sure the address dial code setting is correct, refer to the chapter of address dial code; 2. Make sure SOC is not 0%, otherwise charge battery.
Unable to communicate with inverter	1. Make sure the connection of communication cable and power cable is correct, refer to the chapter of connection of cable and power; 2. Make sure the address dial code of the master controller connected to inverter is 1; 3. Make sure the inverter dial code of the master controller connected to inverter is correct, refer to the chapter of inverter dial code; 4. If you are using a pin order select box, please verify that the dialing switch is configured correctly.
Unable to be charged by inverter	1. Make sure power cable connection is correct; 2. Check whether inverter has faults; 3. Check whether grid or PV is available; 4. Make sure Time of Use of the inverter setting is correct; 5. Make sure charging voltage and charging current setting of the inverter match the parameters of the battery; 6. Check the battery low or high temperature protection alarm; 7. Check the over current protection alarm; 8. Make sure the SOC value is below 96% (default value).

Unable to discharge while SOC is not zero.	1. Make sure the connection of cables is correct and circuit breaker is ON; 2. Check whether inverter has faults; 3. Make sure the inverter setting is not in back up mode; 4. Check whether SOC is lower than the shutdown value of the inverter; 5. Check the battery low or high temperature protection alarm; 6. Check the over current protection alarm.
SOC value change instantly.	1. It is normal that the SOC value will change when the number of parallel modules changes; 2. It is normal that the SOC value will be calibrated when the battery has been fully charged, or deeply discharged.

6.3 Status Code

The following status codes are displayed on the cloud platform.

6.3.1 Warning Codes

Code	Warning type	Investigation & troubleshooting
W1	Battery cell undervoltage alarm	1. Low voltage level and needs to be charged.
W2	Charge overcurrent alarm	1. Restore to factory setting; 2. Make sure the inverter 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 -4℉ (-20℃), otherwise turn off the battery until the temperature is above -4℉ (-20℃), 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.
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.
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. Restart the battery, and if error code W400 still remains or reappears, contact your installer.

6.3.2 Error Codes

Code	Error Type	Investigation & troubleshooting
F102	Battery cell fault	1. The battery cell capacity has decreased due to long-term non-use, and a cell failure is triggered when the cell voltage drops below 1.5V; when the battery cell charge is below 1.8V, we do not recommend continuing to use it after recharging. Please contact our technical support or your installer; 2. During battery operation, a sudden cell failure may occur, possibly due to abnormal voltage collection of BMS cells. Please contact our technical support or your installer.
F103	NTC fault	1. NTC fault triggered due to open circuit or short circuit of NTC sampling resistor; please contact our technical support or your installer.
F104	Current sensor fault	1. The current reading of the battery is not 0 when there is no actual current, indicating a current offset. Please contact our technical support or your installer promptly for handling; 2. The battery actually has current, but the reading is 0, which may be due to damage to the BMS device caused by variability issues. Please replace the BMS or battery and contact our technical support or your installer promptly for handling.
F106	Short circuit fault	1. The power wires of the battery's positive and negative poles are incorrectly connected. Please check the power wire connections; 2. The circuit breaker between the battery and the inverter. When the battery is fully powered on, closing the circuit breaker instantaneously causes a large current surge that triggers short-circuit protection, which is resolved after restarting the battery. However, the circuit breaker needs to be closed first before powering on.
F108	Heating fault	1. When the battery cell temperature drops below 5°C, the heating film will be activated. As the heating film operates, the cell temperature begins to rise. If the heating film does not stop working when the cell temperature reaches 55°C, a heating film fault will be reported at this time. After restarting the battery, it can continue to be used. Meanwhile, please contact our technical support or your installer for handling.
F109	Battery module conflict	1. When batteries are used in parallel, the battery address DIP switches were not configured according to the manual instructions, resulting in the same address appearing in the system and triggering a battery module conflict; please set the correct address DIP switches 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 a restart. Please contact our technical support or your installer for assistance.
F111	Charge MOS fault	1. The main charging circuit is damaged. Please contact our technical support or your installer for handling.
F112	Discharge MOS fault	1. The main discharge circuit is damaged. Please contact our technical support or your installer for handling.

F114	Precharge fault	1. During the startup process of the battery connected to the inverter, due to the large capacitance of some inverters, the battery fails to close the main circuit, triggering a pre-charge fault; 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.
F116	Battery reverse connection fault	1. The power lines of the battery's positive and negative poles are incorrectly connected. Please check the power line connections.
F118	Address non-1 fault	1. When a single battery is used, 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 setting, restart the battery.
F119	Address break-sign failure	1. When batteries are used in parallel, the battery address DIP switches were not configured according to the manual instructions, resulting in non-consecutive addresses triggering conflicts among battery modules within the system; please set the correct address DIP switches 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.
F120	Pack disconnect fault	1. When batteries are used in parallel, some batteries may lose communication due to loose communication cables. Please check if the communication cables are properly connected.
F131	Pack disconnect fault	1. Communication between the battery EMS and BMS has been lost. 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.
F135	Pack SN is empty	1. When the battery is connected to the Cloud Computing Platform and the battery BMS_SN is detected as empty, the cloud will report a BMS_SN empty fault. You need to write the BMS_SN number. Please contact our technical support or your installer for handling.
F153	Device locked fault	1. The battery has not been connected to the Cloud Computing Platform for a long time, and the actual operating status of the battery is unknown. For safety reasons, the battery has spontaneously initiated protection, thereby triggering device locking. Please contact our technical support or your installer for handling.

F200	Battery cell undervoltage safety lock	1. The battery has triggered the cell under-voltage safety lock because the cell self-discharged to a cell voltage below 1.9V due to long-term non-use. Please contact our technical support or your installer for handling; 2. Due to abnormal data collection, the actual cell voltage does not match the sampled value, and when the voltage of the cell being sampled is below 1.9V, it triggers the single cell under-voltage safety lock; please contact our technical support or your installer for handling.
F201	Battery cell high voltage safety lock	1. Due to abnormal acquisition, the actual cell voltage does not match the sampled value, and the cell with the acquired voltage higher than 3.95V triggers the single-cell under-voltage safety lock; please contact our technical support or your installer for handling.
F202	Charge high temp safety lock	1. During battery charging, when the cell temperature reaches 58°C, the high-temperature safety lock for charging is triggered. Leave the battery to stand and wait for the cell temperature to drop, and simultaneously contact our technical support or your installer for handling.
F203	Charge low temp safety lock	1. The battery cell temperature reaching -8°C triggers the high-temperature charging safety lock. Please contact our technical support or your installer for handling.
F204	Discharge high temp safety lock	1. During the battery discharge process, when the cell temperature reaches 58°C, the high-temperature safety lock for discharging is triggered. Leave the battery to stand and wait for the cell temperature to drop, and simultaneously contact our technical support or your installer for handling.
F205	Discharge low temp safety lock	1. The cell temperature has reached -28°C, triggering the discharge high-temperature safety lock. Please contact our technical support or your installer for handling.
F206	Charge overcurrent safety lock	1. The battery repeatedly reports overcurrent charging protection more than 10 times before reporting the overcurrent charging safety lock. The battery has entered the overcurrent charging safety lock. Please contact our technical support or your installer for handling.
F207	Discharge overcurrent safety lock	1. The battery repeatedly reports overcurrent discharge protection more than 10 times before reporting the overcurrent discharge safety lock, and the battery enters the overcurrent discharge safety lock. Please contact our technical support or your installer for handling.

6.3.3 Protection Codes

Code	Error Type	Investigation & troubleshooting
P1	Battery cell undervoltage protection	1. If the battery shuts down due to low voltage, it will enter a 5-minute charging window after being restarted, during which an inverter or DC power supply can be used to charge the battery. It is recommended to use an inverter to fully charge the battery. 2. If such data is found on the Cloud Computing Platform, please first fully charge the battery and let it stand for 4 hours. If the problem persists, please contact our technical support or your installer. 3. Please contact our technical support or your installer in a timely manner for handling.
P2	Overcurrent charge protection	1. Check the communication between the battery and the inverter. When the communication between the battery and the inverter is normal, the battery will send to the inverter the current that the battery or the system itself can withstand for charging. If the communication is abnormal, overcurrent protection may occur; 2. This is a common issue during the installation of solar batteries or additional batteries. In this case, you can wait for the batteries to spontaneously balance the voltage between them. When the battery Alarm light stops flashing, it indicates that the battery balance is complete and the batteries can be used normally. At this time, it is recommended to perform a full charge or discharge on the batteries; 3. Please contact our technical support or your installer.
P3	Overcurrent discharge protection	1. Check the communication between the battery and the inverter. When the communication between the battery and the inverter is abnormal, the operating status between them is often uncontrollable; if the communication between the inverter and the battery is normal and the battery triggers overcurrent protection, please consider whether the battery output power meets your daily usage; 2. This is a common issue during the installation of solar batteries or additional batteries. In this case, you can wait for the batteries to spontaneously balance the voltage between them. When the battery Alarm light stops flashing, it indicates that the battery balance is complete and the batteries can be used normally. At this time, it is recommended to perform a full charge or discharge on the batteries; 3. Please contact our technical support or your installer.
P4	High charge temp protection	1. Please charging and wait for the cell temperature to decrease before charging again; 2. Reduce the ambient temperature of the battery installation location or reselect a lower-temperature environment to install the battery; 3. Please contact our technical support or your installer.
P5	High discharge temp protection	1. Suspend using the battery and wait for the cell temperature to decrease before using it again; 2. Lower the ambient temperature of the battery installation location or reselect a lower-temperature environment to install the battery; 3. Please contact our technical support or your installer.
P6	Low charge temp protection	1. The battery needs to be equipped with a heating film. If the purchased battery is a battery with thermal management, a DC power supply or inverter needs to be used to charge the battery to maintain the power required for the heating film to heat; if the battery thermal management does not meet your expectations, please contact our technical support or your installer; 2. Please contact our technical support or your installer in a timely manner for handling;

		3. Check the relevant thresholds for battery temperature protection on the parameter settings page of the Cloud Computing Platform. The trigger threshold for low-temperature charging protection should normally be 0°C; if it is incorrect, please change it.
P7	Low discharge temp protection	1. The battery needs to be equipped with a heating film. If the purchased battery is a battery with thermal management, a DC power supply or inverter needs to be used to charge the battery to maintain the power required for the heating film to heat; if the battery thermal management does not meet your expectations, please contact our technical support or your installer; 2. Please contact our technical support or your installer in a timely manner for handling; 3. Check the relevant thresholds for battery temperature protection on the parameter settings page of the Cloud Computing Platform. The trigger threshold for low-temperature charging protection should normally be -20°C; if it is incorrect, please change it.
P9	Excessive voltage difference protection	1. This alarm only applies to the differential pressure protection that occurs when the battery is at rest. If differential pressure overprotection occurs at the end, please ignore it; 2. Please contact our technical support or your installer in a timely manner for handling.
P15	High MOS temp protection	1. Reduce the ambient temperature, and restart the battery.
P19	Overcurrent discharge 2 protection	1. Check the communication between the battery and the inverter. When the communication between the battery and the inverter is abnormal, the operating status between them is often uncontrollable; if the communication between the inverter and the battery is normal and the battery triggers overcurrent protection, please consider whether the battery output power meets your daily usage; 2. This is a common issue during the installation of solar batteries or additional batteries. In this case, you can wait for the batteries to spontaneously balance the voltage between them. When the battery Alarm light stops flashing, it indicates that the battery balance is complete and the batteries can be used normally. At this time, it is recommended to perform a full charge or discharge on the batteries; 3. Please contact our technical support or your installer.
P22	Positive connector high temp protection	1. Check the connection of the battery power cable and ensure that the power cable can carry the current required for battery charging or discharging; 2. You can remove the battery cover to check if the internal screws are loose. When disassembling the battery for inspection, please contact our technical support or your installer.
P23	Negative connector high temp protection	1. Check the connection of the battery power cable and ensure that the power cable can carry the current required for battery charging or discharging; 2. You can remove the battery cover to check if the internal screws are loose. When disassembling the battery for inspection, please contact our technical support or your installer.

7 Appendix

7.1 Communication Cable Requirements

If it is necessary to make your own communication cable, please comply with the following requirements.

Process Name	Operation / Specification Requirements	Materials / Tools Used	Crimping / Assembly Requirements	Labeling / Inspection Requirements
Pre-treatment	Cut cables to actual required lengths	Cable: RJ45 8P8J Cat5e shielded twisted pair, 8-core, 24 AWG, black	Accurate cutting length, flat end face	/
Stripping	Strip outer jacket, length 15 mm	Tool: Stripping pliers (blade depth must suit 24 AWG)	Do not damage inner core insulation or braided shielding layer	/
Pre-treatment	Cut off aluminum foil tape pull tab and drain wire	Tool: Side cutters or special scissors	Cut must be neat, no aluminum foil debris left to avoid short circuits	Residual foil must not extend beyond the outer jacket cut
Assembly of parts	Thread accessories in order: rear nut → claw → rear sealing ring	Materials: Nut, claw, sealing ring	Pay attention to claw orientation; nut threads must face cable tail	Visual inspection: correct order
Insert into housing	Trim cores evenly, then insert into RJ45 connector	Material: RJ45 connector	Cores must reach the front end of the connector; Outer jacket pressed into the stopper	Cores arranged straight, no crossing
Assembly of parts	① Push RJ45 plug into connector housing and crimp ② Insert the claw with the rear sealing ring into the connector housing, and tighten the nut	Tool: Crimping tool	Crimping spec: Contacts pierce insulation to contact copper conductor	After crimping: ① Latch undamaged ② Contact indentations even ③ Housing snaps with "click" sound
Pre-treatment	Print label	Equipment: Label printer Material: PE label	/	Self-adhesive blank label: W15 × L80 mm Requirements: waterproof, tear-resistant, heat-resistant to 100°C
Label application	Apply label 50 mm from the connector	Auxiliary material: Printed label	/	Application requirements: flat, no skew, no bubbles
Electrical test	Electrical performance testing	Equipment: Withstand voltage tester	Post-crimp testing	① Dielectric strength: leakage current ≤5 mA at 300V/DC ② Insulation resistance: ≥200 MΩ ③ Continuity test: 100% continuity, no visual defects
Final inspection	Full visual and dimensional inspection	Tool: Calipers	① Conductor crimping normal ② Sealing parts installed correctly ③ Contact parts inside socket normal	Full inspection items: ① Label content/position ② Cable undamaged ③ Sealing ring not dislodged

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