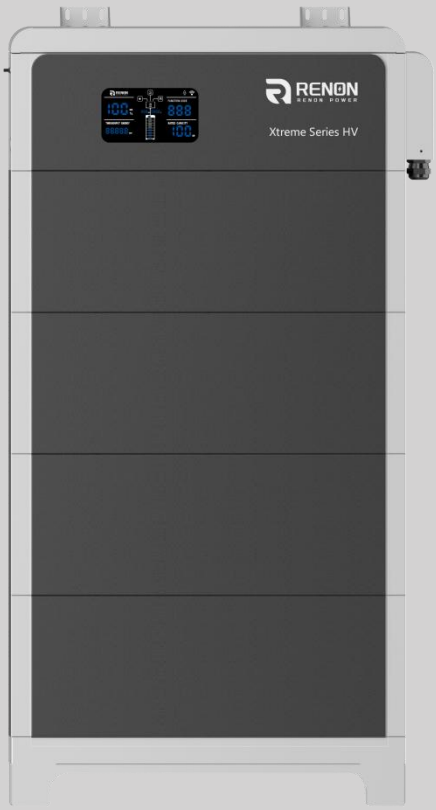
RENON
RENON POWER

User Manual.

Xtreme HV

A05 VERSION



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Renon Power Technology Inc.

Renon Power

We Care About Sustainability

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

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 green power within reach.

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

Renewable · Reliable · Remarkable

Table of Contents

1. Safety Instructions

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

1.1. General Safety Precautions

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

1.2. Transportation and Storage Precautions

- The batteries must be transported according to UN3480, they must be packed according to packaging requirements of Special Regulation 230 of IMDG CODE (40-20 Edition) for maritime transport, and P965 IA for air transport (SOC less than 30%). The original packaging complies with these instructions.

- If the product needs to be moved or repaired, the power must be cut off and completely shut down.
- The product must be transported in its original or equivalent package;
- The 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.

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 over which the battery can be charged is 32℉ (0℃) to 122℉ (50℃). Frequently charging the battery in high or low temperature may deteriorate the performance and life of the battery pack.
- Do not charge or discharge a damaged battery.
- Please contact the supplier within 24 hours if there is something abnormal.

1.5. Response to Emergency Situations

- Damaged batteries are dangerous and must be handled with extreme care. They are not suitable for use and may cause danger to people or property. If the battery pack appears to be damaged, place it in the original container and return it to an authorized dealer.
- If the battery pack is wet or submerged in water, do not allow anyone to touch the water, and then contact authorized dealer for technical support.
- In case of fire, use carbon dioxide, FM-200 or ABC dry powder fire extinguisher; if possible, move the battery pack to a safe area before it catches fire.
- If a user happens to be exposed to the internal materials of the battery cell due to damage on the outer casing, the following actions are recommended.
- In case of inhalation: Leave the contaminated area immediately and seek medical attention.
- In case of contact with eyes: Rinse eyes with running water for 15 minutes and seek medical attention.
- In case of contact with skin: Wash the contacted area with soap thoroughly and seek medical attention.
- In case of ingestion: Induce vomiting and seek medical attention.

1.6. Qualified Personnel

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

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

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

2. Installation and Usage

2.1. Safe Handling Guide

2.1.1. Familiar with the Product

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".**

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

2.1.2. Precautions before Installation

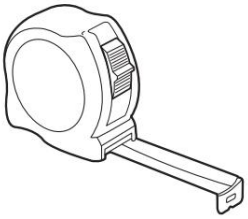
Before installation, be sure to read the contents in chapter **“Safety Precautions”**, which is related to the operation safety of installation personnel, please pay attention to it.

2.1.3. Tools

The following tools are required to install the product:

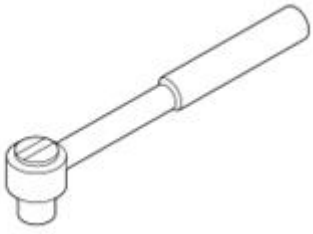
Drill

Pencil or marker

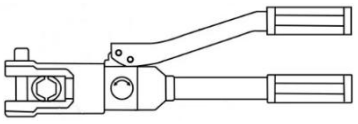


Tape measure

Screwdriver



Torque Wrench



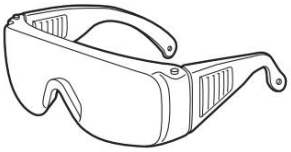
Hydraulic pliers

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

2.1.4. Safety Gear

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

Insulated gloves



Safety goggles

Safety shoes

2.2. System Premeasurement

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

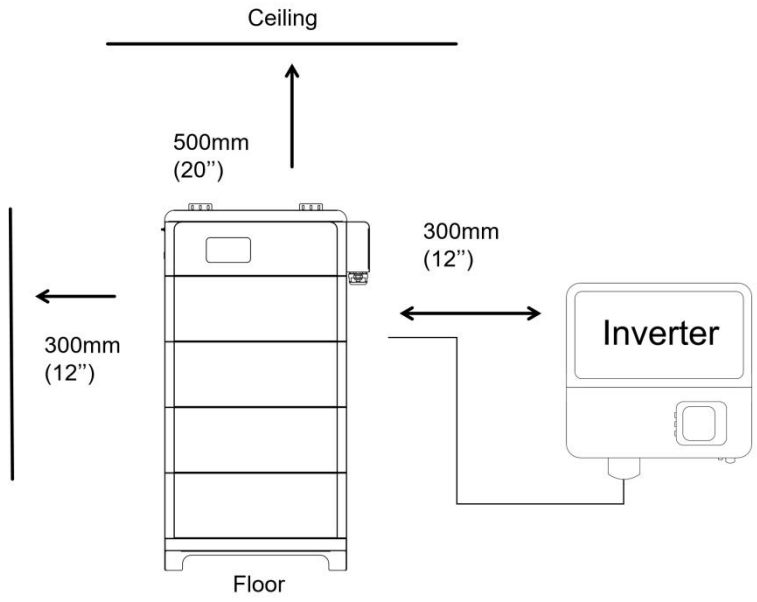


Figure 2.2.1. System clearance

2.3. Installation Location

Make sure that the installation location meets the following conditions:

●The floor is flat and level.

●The surface of the wall is smooth and perpendicular to the ground, which can bear the weight.

●The area is completely water proof.

●The area shall avoid direct sunlight.

●There are no flammable or explosive materials.

●The distance from heat source is more than 80 inch (2m).

●The ambient temperature is within the range from 32℉(0°C) to 95℉(35°C).

●The humidity is maintained at a constant level.

●There is minimal dust and dirt in the area.

●Avoid installation in an area confined or with high salinity.

●Do not install outside directly.

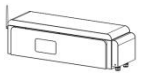
●Do not place in an area accessible to children or pets.

2.4. Package Items

After receiving the product, please unpack the boxes, and check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer.

Here is the Xtreme Series Packing List:

(1) Main controller:

No.	Item	Specification	Qty	Usage	Diagram
1	Main controller	32.3*10.6*9inches /820*270*229mm	1	Controller of the battery cluster	
2	Base	30.5*9.4*4.8inches /775*238*121.5mm	1	Bottom base of the battery cluster	
3	Mounting bracket A	3.1*2.2*2.2inches /80*55*55mm	2	Mounted at the rear of the controller, used to stabilize the cluster	
4	Mounting bracket B	3.1*1.6*0.9inches /80*40*22mm	2	Combine the mounting bracket A to wall, used to stabilize the cluster	
5	Screw	Stainless steel M4*12 triple combination	8	Fasten mounting bracket A to controller， fix the side panel connector to the bottom base	
6	Screw	Stainless steel M6*16 triple combination	6	Fasten mounting bracket B to A	

7	Screw	Stainless steel M4*10	8	Side plate fixing screws	
8	Screw	Plastic expansion screw 10*60	6	Fasten mounting bracket B to wall	
9	Screw	Stainless steel expansion screw M8*80	4	Fasten base to floor	
10	WIFI antenna	2.4GHz L-type	1	Connect with internet	
11	User manual	Xtreme HV series	1	User manual	
12	Positive power cable (customizable)	Red, 6AWG, with RNB14-6S terminals on both side, 1.5m	1	Connect positive pole of battery and inverter	
13	Negative power cable (customizable)	Black, 6AWG, with RNB14-6S terminals on both side, 1.5m	1	Connect negative pole of battery and inverter	
14	Communication cable(optional)	Standard RJ45 network cable, 200mm*1, 2000mm*1	2	Connect the communication pole of battery and inverter	
15	Pin order select box (optional)	3.3*1.0*0.9inches /85*26*22mm	1	Set the pin order of the communication cable of battery and inverter, cooperate with 2 standard network cable	
16	Allen key	M4	1	Tighten the screws on the side cover of the main controller	
17	Pedestral layer	163x15, SPCC, T=2	2	Under aluminium side panel	
18	Main control layer	163x26, Aluminium, T=4.5	2	Main control sides	
19	Communication cable	RJ45, L=2m	1	Parallel communication cable	
20	OT terminal	RNB14-6	2	Use for power cable	

(2) Battery module:

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

3. Installation

3.1. Battery Installation

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

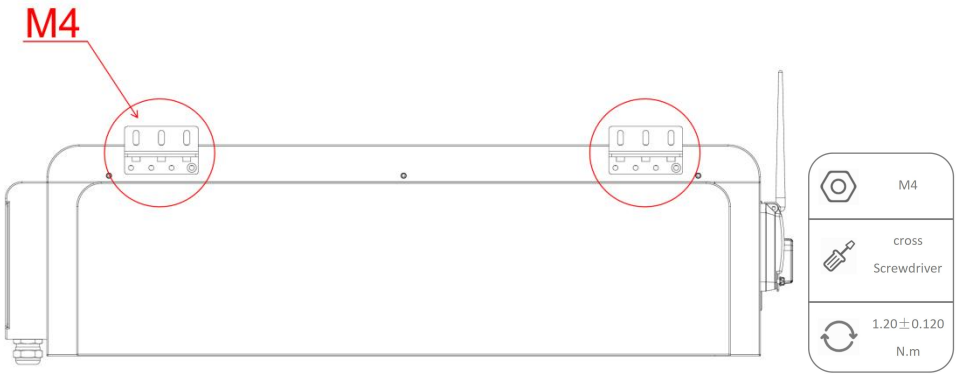


Figure 3.1.1. Fastened the mounting bracket A

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

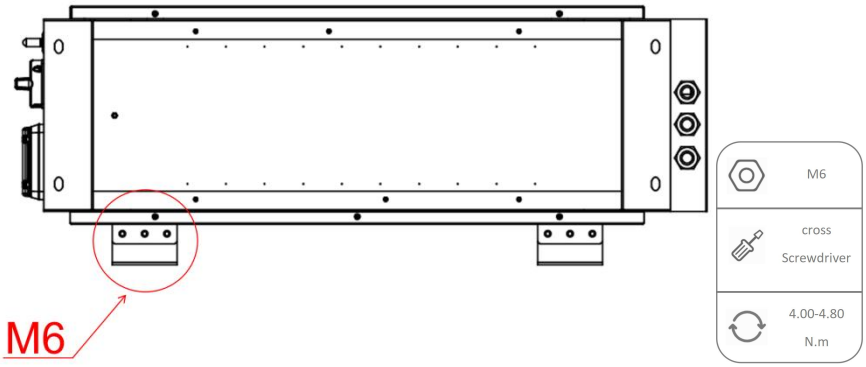


Figure 3.1.2. Fastened the mounting bracket B

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

Figure 3.1.3. Put the base on the floor

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

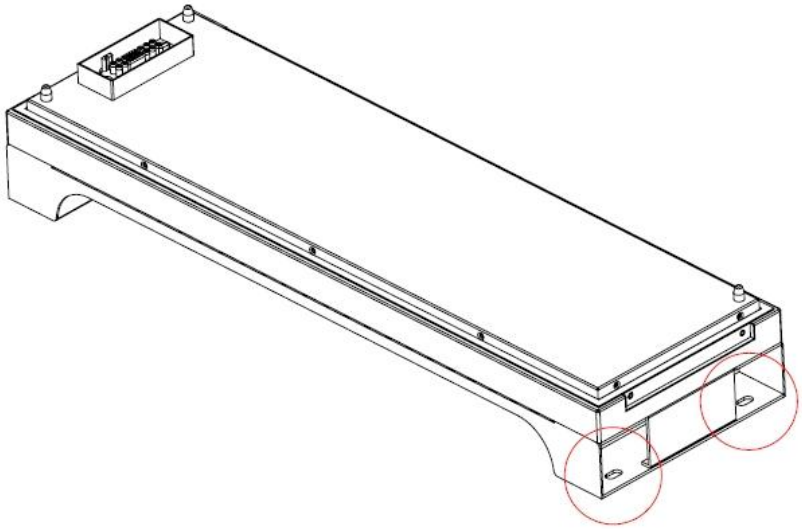


Figure 3.1.4. Mounting holes of the base

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

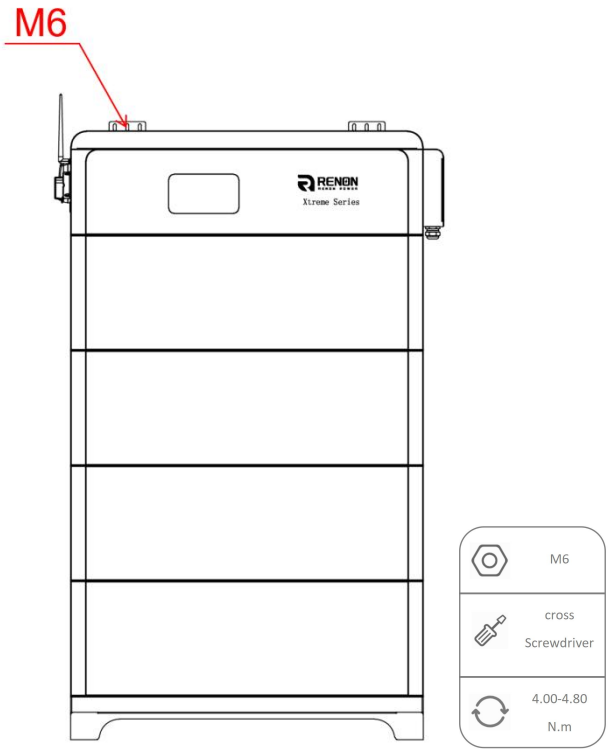


Figure 3.1.5. Stacked product (4 modules)

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

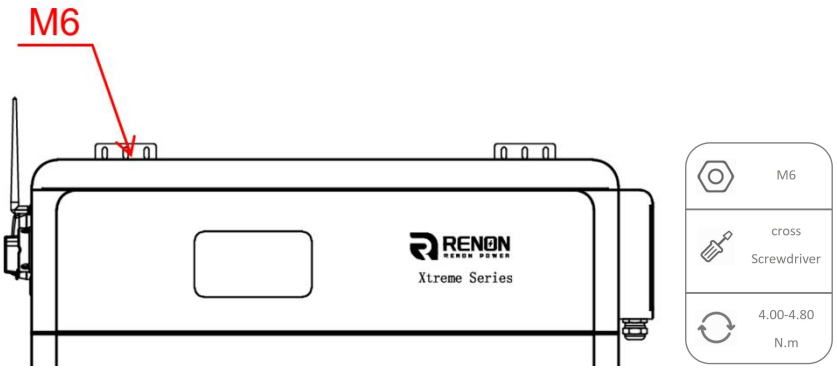


Figure 3.1.6. Mounting holes of the base

6) Install the side panel connector between the bottom battery module and the base.

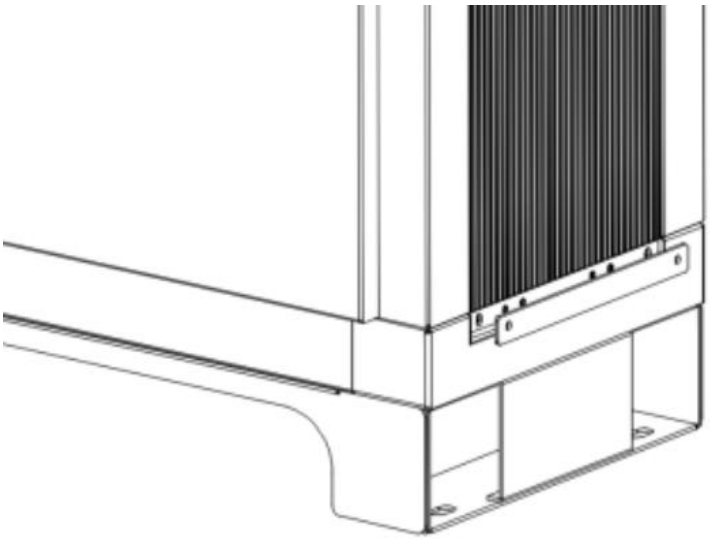


Figure 3.1.7. Mounting side panel connector

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

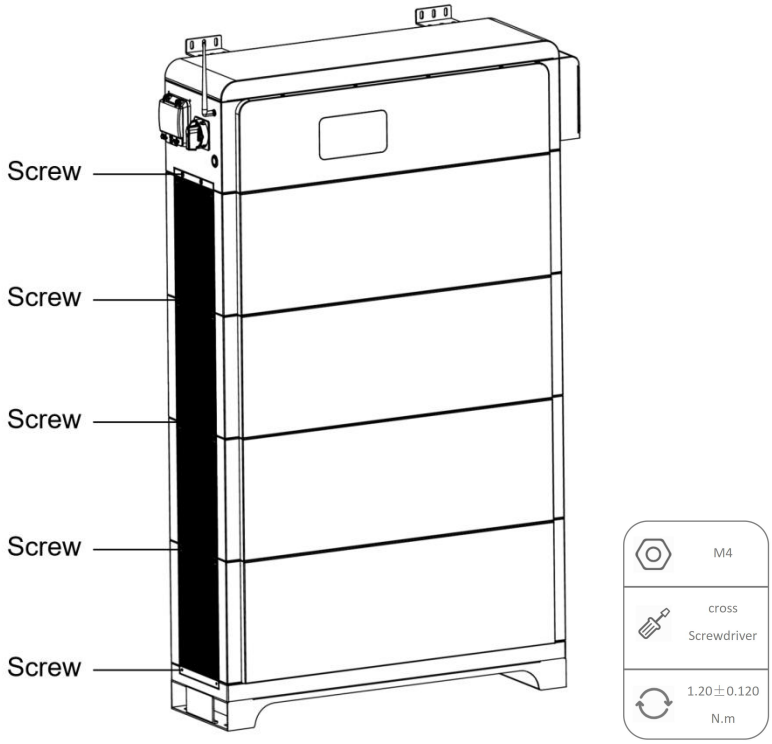


Figure 3.1.8. Installation Diagram of the mounting brackets

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

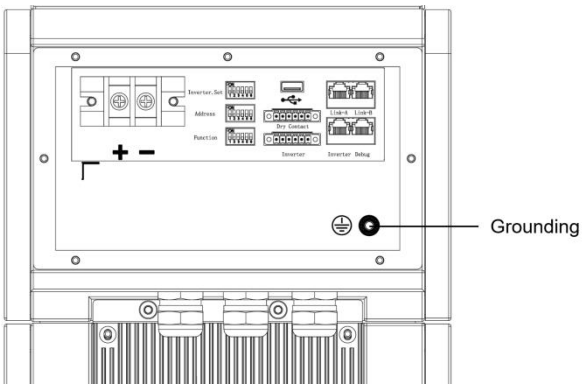


Figure 3.1.9. Ground wire connection

3.2. Connections of Cable and Power

1) Remove the side panel.

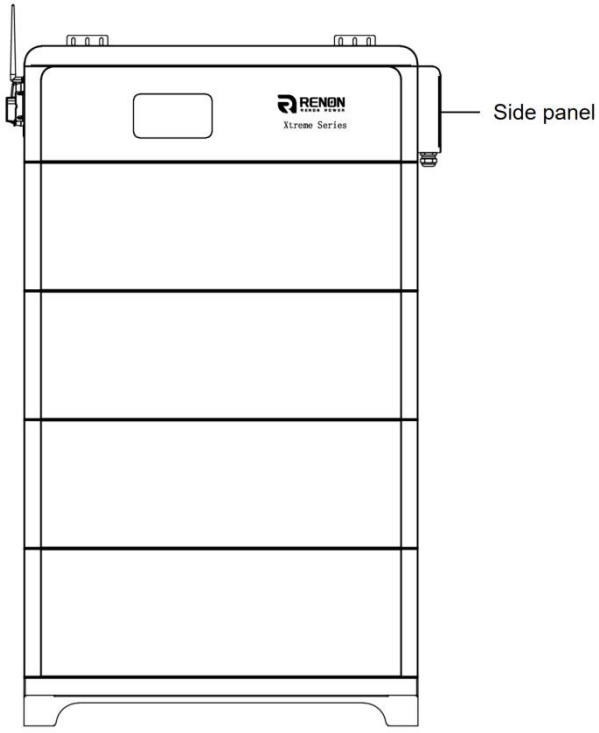


Figure 3.2.1. Removal position of the battery control module

2) Power cable connection

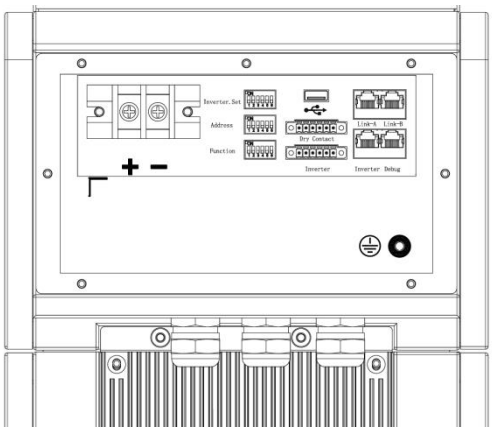


Figure 3.2.2. Power cable connection

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

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

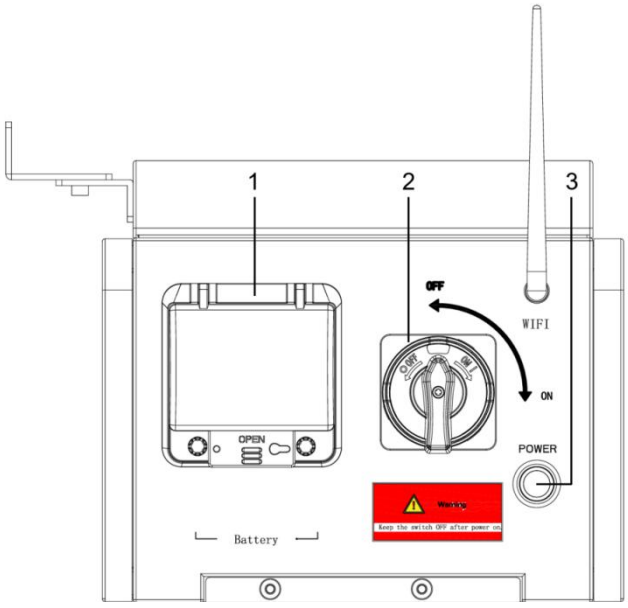


Figure 3.2.3. Power on

4) Set the inverter dial code to the corresponding inverter's code.

5) Check the screen to make sure the number of battery modules is showing correctly without any alarm.

4. WiFi 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

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.

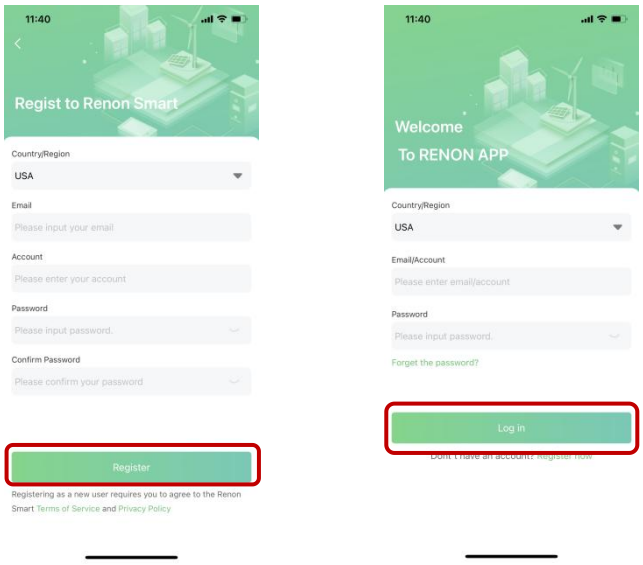


Figure 4.1.4. Register & Log in

3) Log in

This is a general user account.

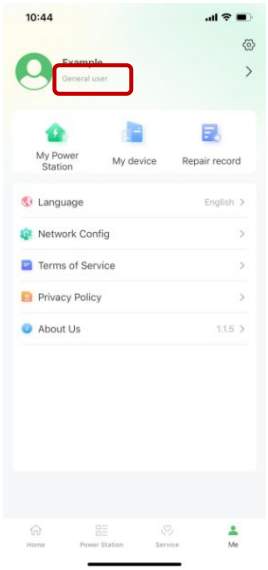


Figure 4.1.5. General user

4) Binding

Method 1:

a. Distribution

To register as an end user, scan the binding QR code provided by your installer, then request device assignment to your account.

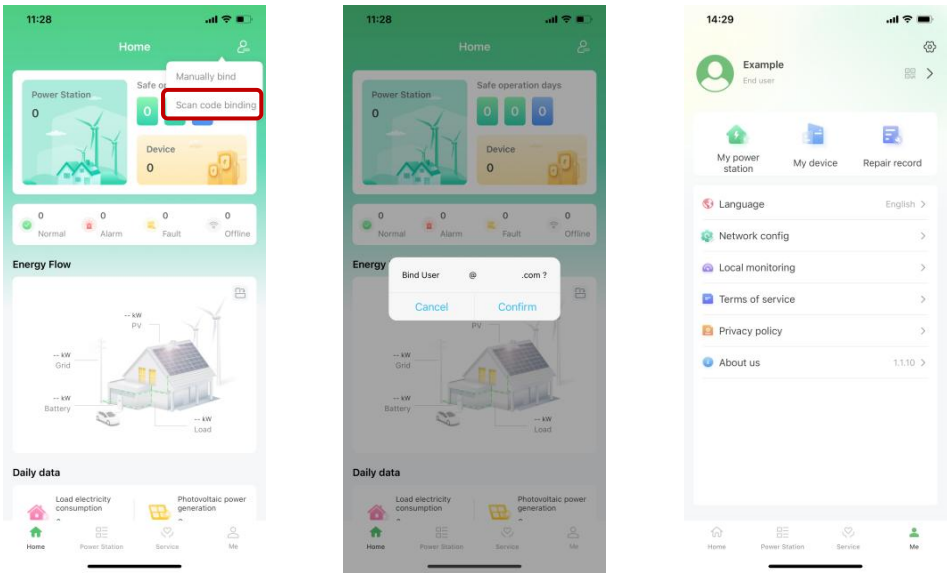


Figure 4.1.6. Scan upper-level account, Confirm binding & Become end user

b. Scan QR code

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

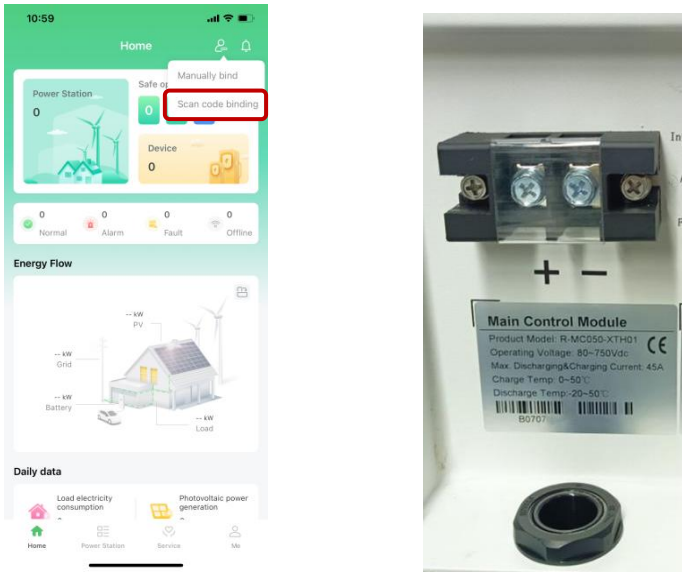


Figure 4.1.7. Scanning QR code

Method 2:

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

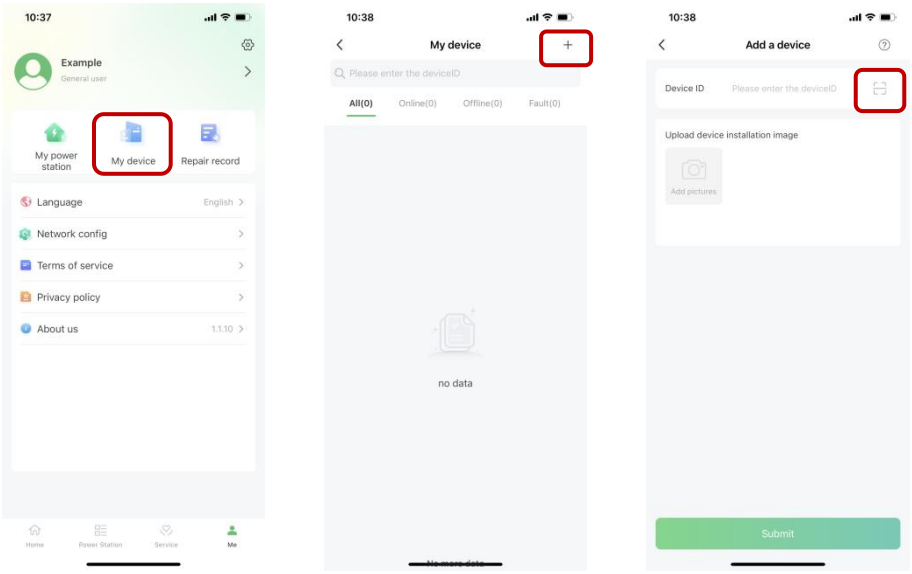


Figure 4.1.8. My device, add & scanning

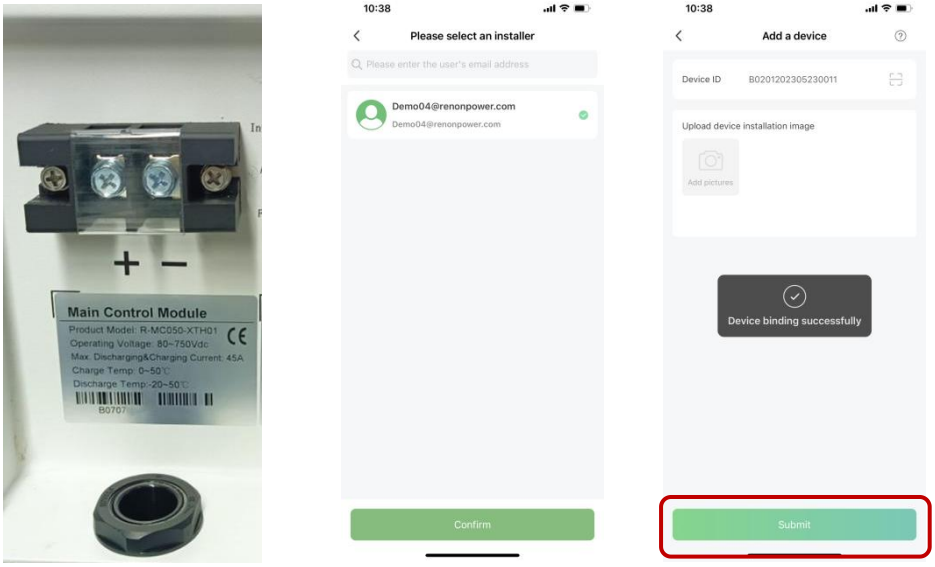


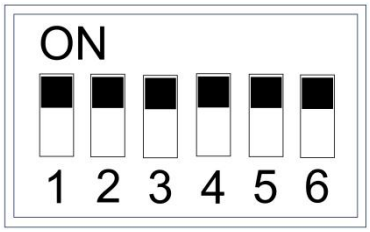
Figure 4.1.9. QR code, upper-level account & binding successfully

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.



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

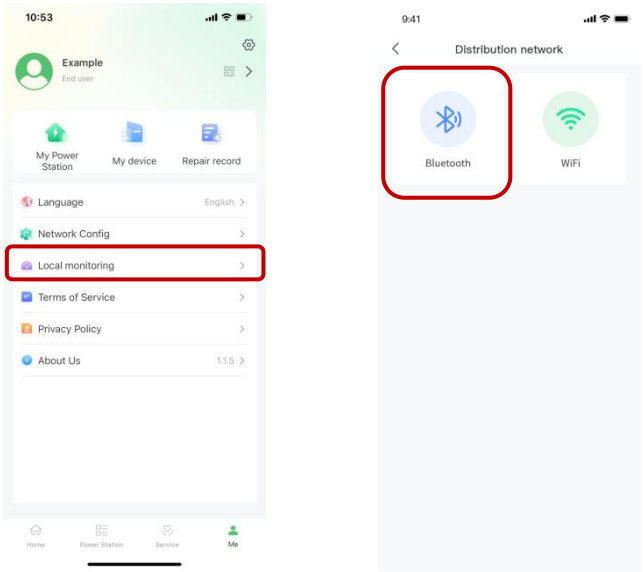


Figure 4.1.10. Bluetooth network setting

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

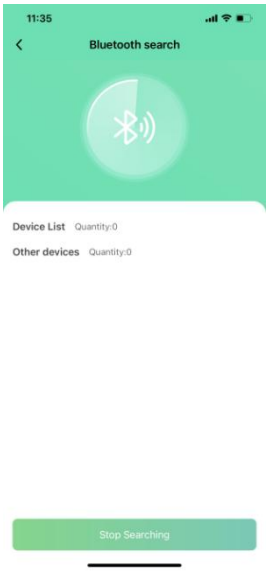


Figure 4.1.11. Connect battery Bluetooth

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

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

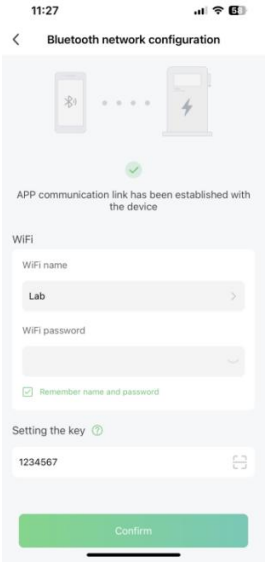


Figure 4.1.12. Connecting private WiFi

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.

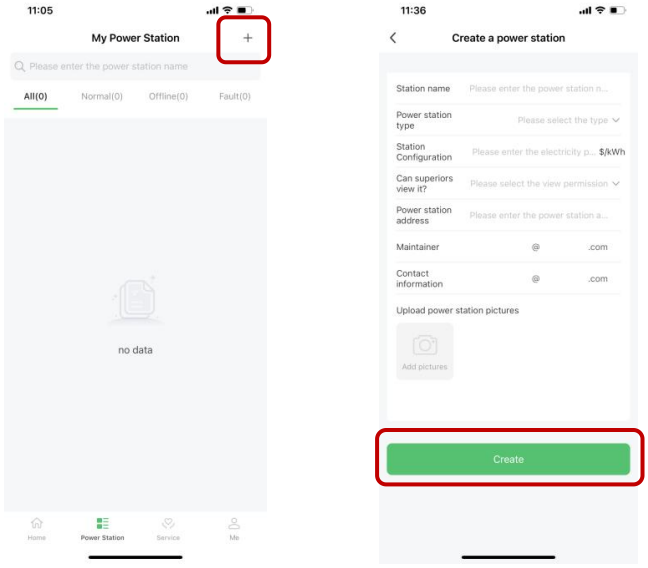


Figure 4.1.13. Create a new power station

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.

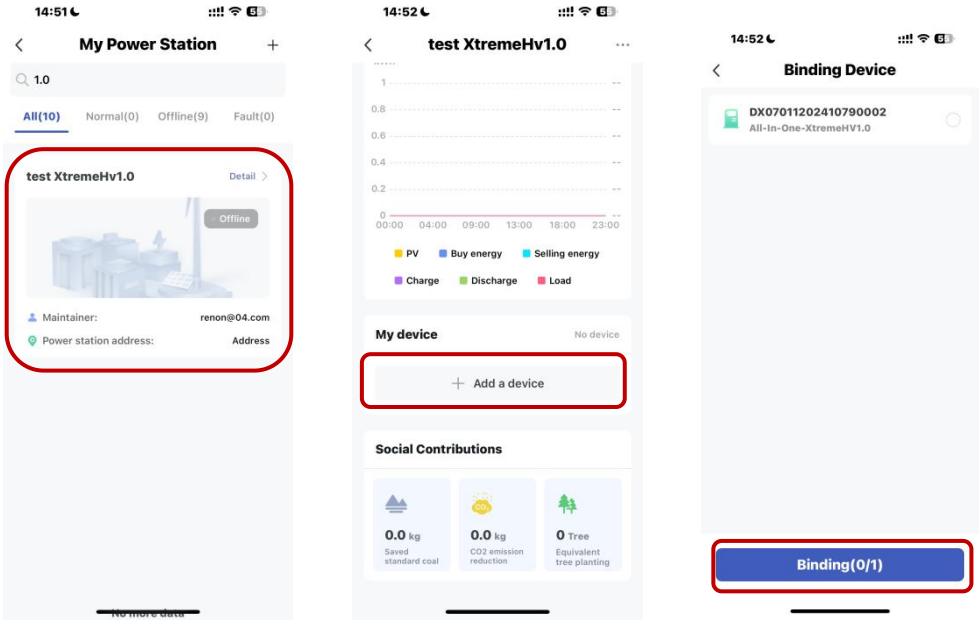


Figure 4.1.14. Manage your power station & Confirm your device

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

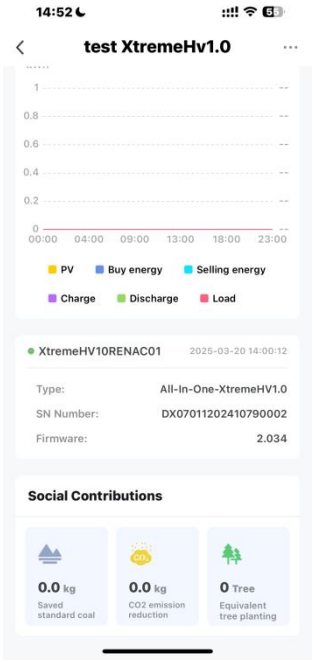


Figure 4.1.15. Manage your device

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.

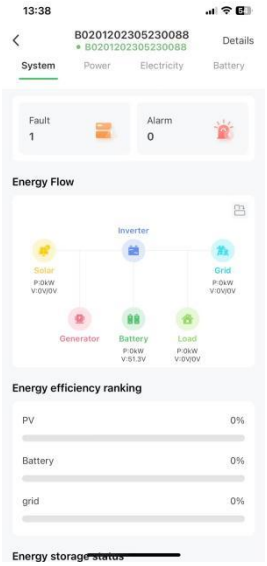


Figure 4.1.16. Monitoring device

Set the inverter dial code to match the inverter brand after WiFi configuration finished (Please refer to the chapter **5.3.2 Inverter Dial Switch**).

5. Introduction

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

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

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

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

5.1. Product Features

●The whole product is non-toxic, pollution-free and environment-friendly.

●The battery chemistry is made from LiFePO4 with safety performance and long cycle life.

●Small volume, plug & play embedded design module, easy to install and maintain.

●Working temperature range between -4℉ to 122℉ (-20℃to 50℃) with excellent discharge performance.

●Battery management system (BMS) has protection functions for over-discharge, over-charge, and over-current and high/low temperature.

●The battery has less self-discharge up to 3 months without charging. It has no battery memory effect, excellent performance of shallow charge and discharge.

●The system can automatically manage battery charge and discharge state;

and save energy cost by various control strategy.

5.2. Specifications

Item	R-XH010021 (-H)	R-XH015031 (-H)	R-XH020041 (-H)	R-XH025051 (-H)	R-XH030061 (-H)
Control Module	R-MC050-XT01 (-H)				
Battery Module Model	R-EM102050-XTH01 (-H)				
Battery Chemistry	LiFePO4				
Module Quantity	2	3	4	5	6
Nominal Energy (kWh)	10.24	15.36	20.48	25.60	30.72
Nominal Capacity (Ah)	50				
Max. Charging/Discharging Current (A)	48				
Nominal Voltage (V)	204.8	307.2	409.6	512.0	614.4
Recommend Charging Voltage (V)	227.2	340.8	454.4	568.0	681.6
Max. Charging Voltage (V)	233.6	350.4	467.2	584.0	700.8
Discharge Cut-off Voltage (V)	172.8	259.2	345.6	432.0	518.4
Heating Film Resistance ()	56 per module (-H module only)				
Heating Start Temperature ()	35/2 (-H module only)				
Operation Temperature ()	Discharge: -4~122 / -20~50 Charge: 32~122 / 0-50				
Safety Function	Over-charge, Over-discharge, Over-current, Low/High temperature, Short circuit protections				
Communication	RS485/ CAN/ WiFi				
Weight (lb/kg) (Approx.)	335/152	467/212	600/272	732/332	864/392
Physical Dimensions (inch/mm) (W*D*H)	30.5*10.6*32.6 /775*270*829	30.5*10.6*42.6 /775*270*1082	30.5*10.6*52.5 /775*270*1334	30.5*10.6*62.5 /775*270*1587	30.6*10.6*72.4 /775*270*1839
Level of Protection	IP65				
Altitude	⩽4000m				

5.3. Interface Information

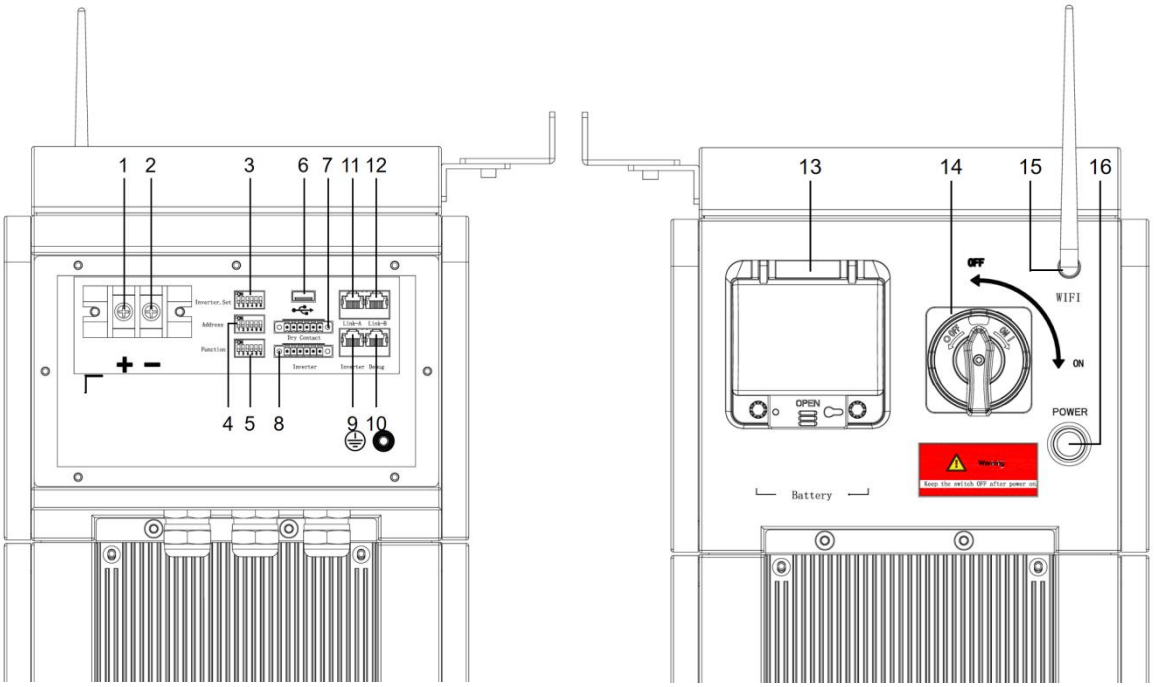


Figure 5.3.1. Interface definition of Controller module

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

5.3.1. Power Positive & Negative

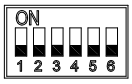
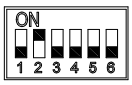
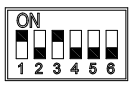
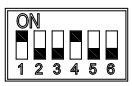
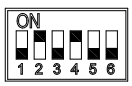
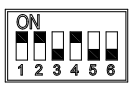
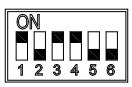
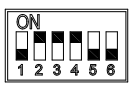
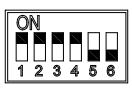
Terminal type: Terminal for 10mm² power cable

Usage: connect to inverter's terminal.

5.3.2. Inverter Dial Switch

Code 0 ~ 18 of this Dial Switch are used to match which brand of inverter is using.

The definitions of code 0 ~ 18 are shown as below table.

Code	Dial Switch Position	Brand	Logo
0		Renon	
2		Sol-Ark	
4		Sermatec	
5		Invt	
6		ThinkPower	
8		Deye	
9		ATESS	
10		Solis	
11		Growatt	
13		MEGAREVO	
14		Sofar	
15		Renac	
17		AFORE	
18		SINENG	

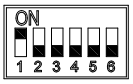
5.3.3. USB Port

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

5.3.4. Address Dial Switch

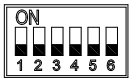
Use this Dial Switch to set the address of master controller and then turn on to activate the system.

The illustration of dialing as shown below:

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

5.3.5. Function Dial Switch

Use this dial switch to match the communication impedance, should set as below:

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

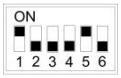
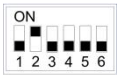
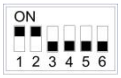
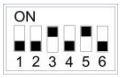
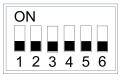
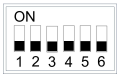
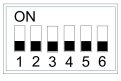
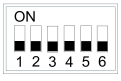
Optimize and enhance the communication between the master control unit and the battery.

5.3.6. Parallel Dial Code

Sample: When three devices are connected in parallel .

(*Note*:The Inverter please follow the actual operation.)

The upper limit for parallel battery connections is 4 units.

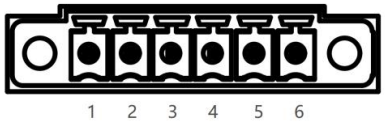
	1	2	3	4
Address				
Function				

5.3.7. Dry Contact

Terminal type: 6-Pin terminal block

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

Defined as below:

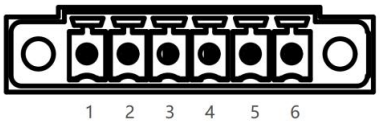
6pin Terminal	Pin	Usage
	1	DRY1_NO
	2	DRY1
	3	DRY1_NC
	4	DRY2_NO
	5	DRY2
	6	DRY2_NC

5.3.8. Inverter Communication Port (connector)

Terminal type: 6-Pin terminal block

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

Defined as below:

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

5.3.9. Inverter Communication Port (RJ45)

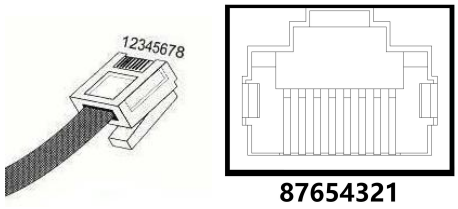
Terminal type: RJ45

Usage: communicate with inverter, PCS or other equipment.

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

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

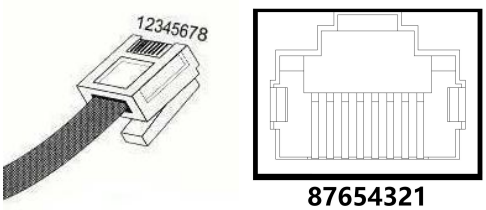
Illustration for battery connection port as shown below:

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

5.3.10. Debug Port

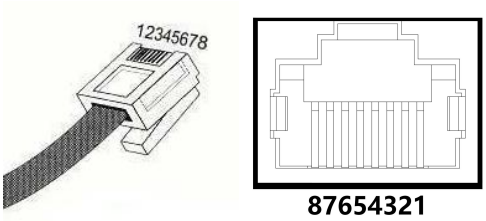
Terminal type: RJ45

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

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

5.3.11. Link A and Link B

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

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

5.3.12. Power Switch

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

5.3.13. Active Switch

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

5.3.14. On/Off

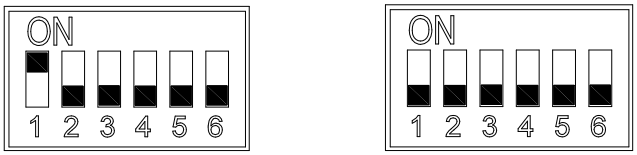
Press this button once to power on the system, and press it again to power off.

5.3.15. WIFI Antenna

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

5.3.16. Dial Code Switch

1) Set the Address dial code as 1 and set the function dial code as 0 in binary formation.



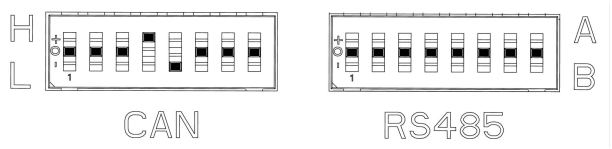
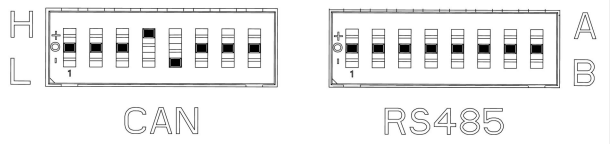
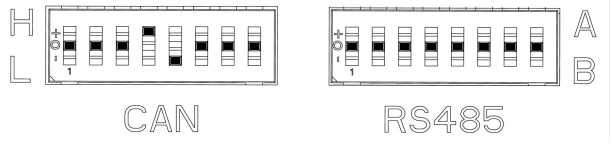
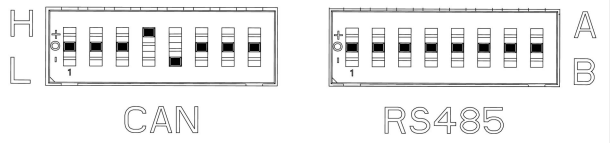
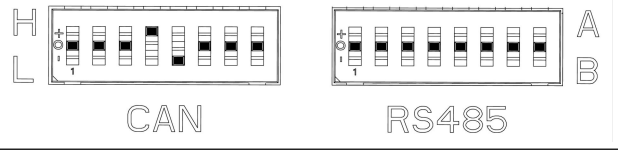
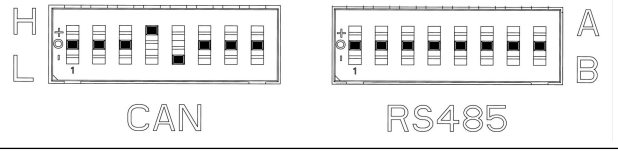
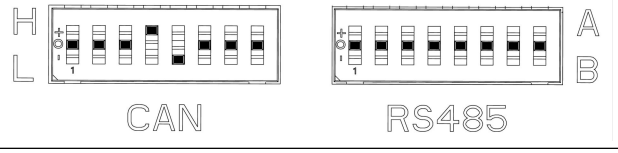
Address Function

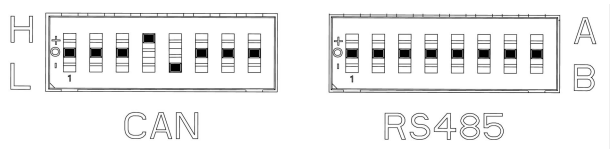
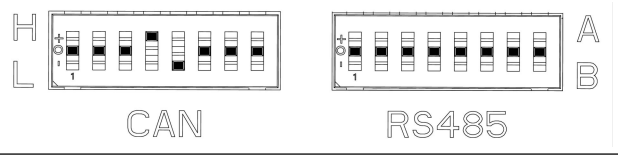
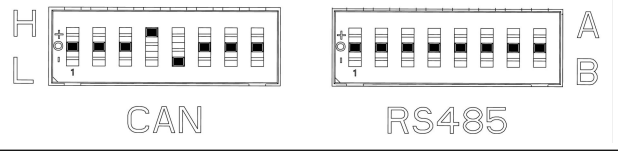
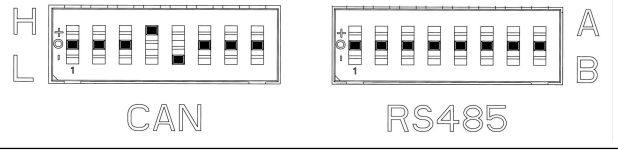
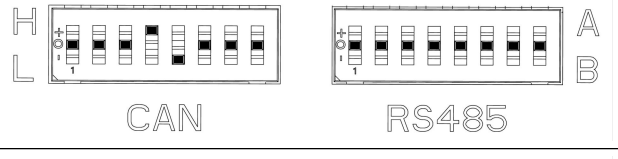
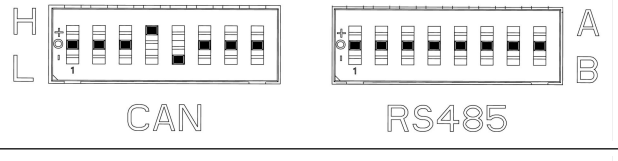
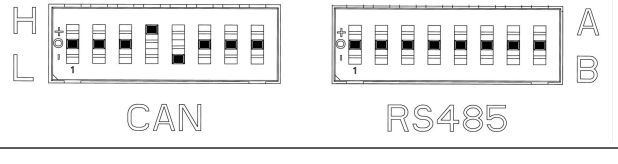
Figure 5.3.2. Dial code

2) Remove the cover of the positive and the negative electrode. Connect the battery positive and negative electrode with the inverter's positive and negative electrode separately.

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

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

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

	Solis	CAN
	Growatt	CAN
	MEGAREVO	CAN
	Sofar	CAN
	Renac	CAN
	AFORE	CAN
	SINENG	CAN

6. Monitoring Screen

6.1. LCD Screen Introduction

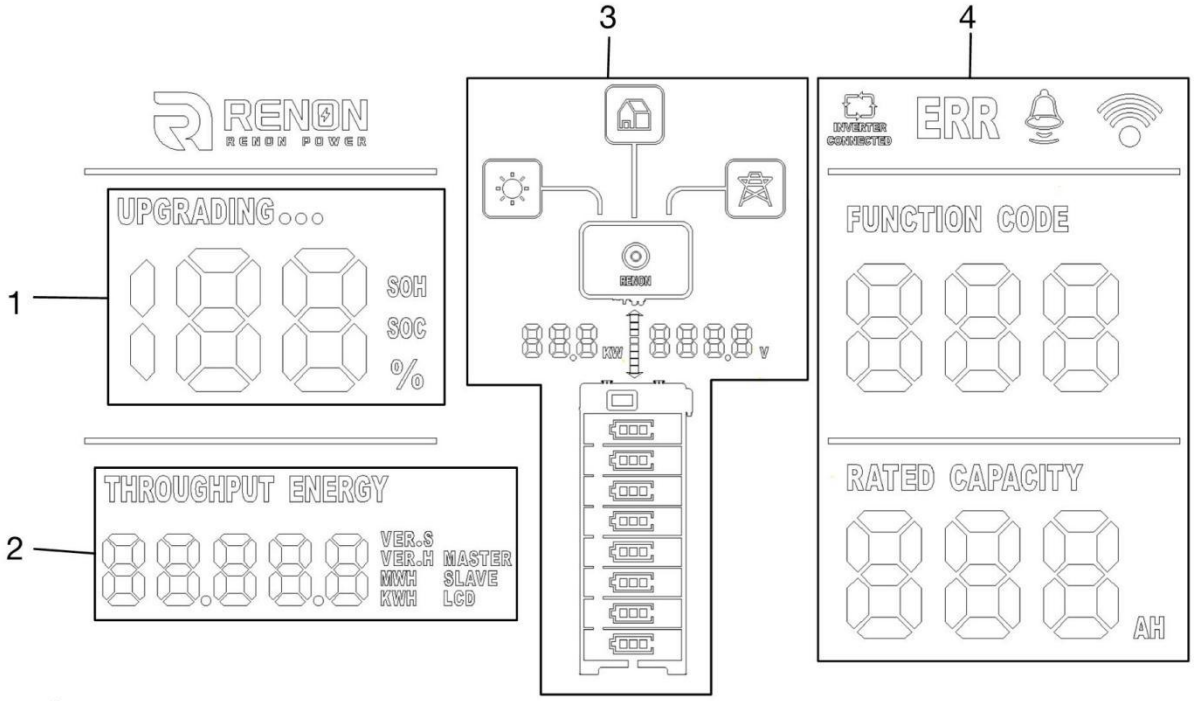


Figure 6.1.1 LCD Screen Introduction

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

6.2. SOC, SOH and Upgrading State

1) The percent number displays current SOC when underneath SOC sign lights on and current SOH when underneath SOH blinking lights on, respectively. The SOC will light up 60s and then SOH light up 3s in a display cycle.

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

6.3. Version and Accumulated Discharge Energy

The number shows version of software and hardware for LCD, master, and slave, accumulated discharged energy counted in kWh or MWh, respectively. Each part will keep showing on for 3 seconds and then switch to next.

6.4. ESS status, Power, and Voltage

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

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

6.5. Battery Operation Status

1) Indication Code

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

2) Inverter Connection

“INVERTER CONNECTION” indicates the status of the connection between inverter and battery. It will display when proper connection is detected. Otherwise, it will be off.

3) Wi-Fi Connection Symbol

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

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

4) Rated Capacity

Rated Capacity indicates the nominal capacity of current cluster.

6.6. Screen Display Code

Warning Code (Sign like “ 🔔 ”)

Code	Warning Type
1	Battery cell undervoltage protection
2	Overcurrent charge protection
3	Overcurrent discharge protection
4	High charge temp protection
5	High discharge temp protection
6	Low charge temp protection
7	Low discharge temp protection
8	High ambient temp protection
9	Excessive voltage difference protection
10	Excessive temp of main control relay
11	Overtemp protection of master DC busbar
12	Low insulation resistance protection
13	Low total voltage protection
14	Low ambient temp protection
15	High MOS temp protection
16	Battery cell overvoltage protection
17	High total voltage protection
18	Low SOC protection
19	Overcurrent discharge 2 protection
21	Excessive temp difference protection
22	Positive connector high temp protection
23	Negative connector high temp protection

24	Relay high temp protection
25	Positive high temp protection for docking terminal
26	Negative high temp protection for docking terminal
27	Positive high temp protection for discharge port
28	Negative high temp protection for discharge port
30	Charger overvoltage protection
400	PCS disconnect(All-in-one only)

Error Code (Sign like “ERR”)

Code	Warning Type
100	The main control discharge relay is faulty
101	The main control charge relay is faulty
102	Battery cell fault
103	NTC fault
104	Current sensor fault
105	Pack disconnection
106	Short circuit fault
107	Internal total voltage detection fault
108	Heating fault
109	Battery module conflict
110	Cluster address conflict
111	Charge MOS fault
112	Discharge MOS fault
113	Addressing failure
114	Precharge fault
115	Cluster disconnection
116	Battery reverse connection fault
117	External total voltage detection fault

118	Address non-1 fault
119	Address break-sign failure
121	The faulty of power on switch is not turned off
123	Microelectronic fault
124	Smoke sensor fault
125	The number of slave voltage strings does not match
126	Temp NTC short circuit of master relay
127	Temp NTC open circuit of master relay
128	Temp NTC short circuit of master DC busbar
129	Temp NTC open circuit of master DC busbar
130	Master drop-off fault
132	EMS SN is empty
133	Master SN is empty
134	Pack SN is empty
136	High voltage relay fault
137	DC breaker disconnect
138	Overcurrent charge 2 protection
200	Battery cell undervoltage safety lock
201	Battery cell high voltage safety lock
202	Charge high temp safety lock
203	Charge low temp safety lock
204	Discharge high temp safety lock
205	Discharge low temp safety lock
206	Charge overcurrent safety lock
207	Discharge overcurrent safety lock

7. Troubleshooting & Maintenance

7.1. Regular Maintenance

1) Check the battery modules every 3 months to verify whether there are damages.
2) Check the battery modules every 3 months to verify whether the operating parameter is normal or there is no abnormal heating.
3) Fully charge and discharge the battery system every 3 months.
4) Clean the battery modules with a dry rag once a month.

7.2. Troubleshooting

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

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

7.3. Status Codes

The following status codes are displayed on the cloud platform.

7.3.1. Warning Codes

Code	Warning type	Investigation & troubleshooting
W1	Battery cell undervoltage alarm	1. Low voltage level and needs to be charged.
W2	Charge overcurrent alarm	1. Restore to factory setting. 2. Make sure the inverter's setting of max current do not excess the max charge current of the battery.
W3	Discharge overcurrent 1 alarm	1. Make sure the power of load do not exceed the power of battery.
W4	High charge temp alarm	1. Make sure the battery's temperature shown on the inverter or the APP is below 55℃, otherwise turn off the battery till the temperature is below 55℃ and then try to charge battery.
W5	High discharge temp alarm	1. Make sure the battery's temperature shown on the inverter or the APP is below 55℃, otherwise turn off the battery till the temperature is below 55℃ and then try to discharge battery.
W6	Low charge temp alarm	1. Make sure the battery's temperature shown on the inverter or the APP is above 0℃, otherwise turn off the battery till the temperature is above 0℃ and then try to charge battery.
W7	Low discharge temp alarm	1. Make sure the battery's temperature shown on the inverter or the APP is above -20℃, otherwise turn off the battery till the temperature is above -20℃ and then try to charge battery.
W8	High ambient temp alarm	1. Make sure the ambient temperature of the battery is below 50℃.
W9	High voltage difference alarm	1. Restart the battery, and if the error code W9 still remaining or reappear, contact your installer.
W11	High main DC busbar temp alarm	1. Restart the battery, and if the error code W11 still remaining or reappear, contact your installer.
W12	Low insulation resistance alarm	1. Restart the battery, and if the error code W12 still remaining or reappear, 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 -25℃.

W15	High MOS temp alarm	1. Reduce the ambient temperature and restart the battery.
W16	Battery cell overvoltage alarm	1. High voltage level and needs to be discharged.
W17	High total voltage alarm	1. High voltage level and needs to be discharged.
W18	Low SOC alarm	1. Low SOC and needs to be charged.
W21	High temp difference alarm	1. Restart the battery, and if the error code W21 still remaining or reappear, contact your installer.
W22	Positive connector high temp alarm	1. Restart the battery, and if the error code W22 still remaining or reappear, contact your installer.
W23	Negative connector high temp alarm	1. Restart the battery, and if the error code W23 still remaining or reappear, contact your installer.
W24	Relay high temp alarm	1. Restart the battery, and if the error code W24 still remaining or reappear, contact your installer.
W25	Positive high temp alarm for docking terminal	1. Restart the battery, and if the error code W25 still remaining or reappear, contact your installer.
W26	Negative high temp alarm for docking terminal	1. Restart the battery, and if the error code W26 till remaining or reappear, contact your installer.
W27	Positive high temp alarm for discharge port	1. Restart the battery, and if the error code W27 still remaining or reappear, contact your installer.
W28	Negative high temp alarm for discharge port	1. Restart the battery, and if the error code W28 still remaining or reappear, contact your installer.
W400	PCS disconnection	1. Restart the battery, and if the error code W400 still remaining or reappear, contact your installer.

7.3.2. Error Codes

Code	Error Type	Investigation & troubleshooting
F100	The main control discharge relay is faulty	1. Restart the battery, and if the error code F100 still remaining or reappear, contact your installer.
F101	The main control charge relay is faulty	1. Restart the battery, and if the error code F101 still remaining or reappear, contact your installer.
F102	Battery cell fault	1. Restart the battery, and if the error code F102 still remaining or reappear, contact your installer.
F103	NTC fault	1. Restart the battery, and if the error code F103 still remaining or reappear, contact your installer.
F104	Current sensor fault	1. Restart the battery, and if the error code F104 still remaining or reappear, contact your installer.
F105	Pack disconnection	1. Restart the battery, and if the error code F105 still remaining or reappear, contact your installer.
F106	Short circuit fault	1. Make sure the external connection for both battery and inverters are proper. 2. Disconnect all external connections and restart the battery, and if the error code F106 still remaining or reappear, contact your installer.
F107	Internal total voltage detection fault	1. Restart the battery, and if the error code F107 still remaining or reappear, contact your installer.
F108	Heating fault	1. Restart the battery, and if the error code F108 still remaining or reappear, contact your installer.
F109	Battery module conflict	1. Restart the battery, and if the error code F109 still remaining or reappear, contact your installer.
F110	Cluster address conflict	1. Restart the battery, and if the error code F110 still remaining or reappear, contact your installer.
F111	Charge MOS fault	1. Restart the battery, and if the error code F111 still remaining or reappear, contact your installer.
F112	Discharge MOS fault	1. Restart the battery, and if the error code F112 still remaining or reappear, contact your installer.
F113	Addressing failure	1. Restart the battery, and if the error code F113 still remaining or reappear, contact your installer.

F114	Precharge fault	1. Restart the battery, and if the error code F114 still remaining or reappear, contact your installer.
F115	Cluster disconnection	1. Restart the battery, and if the error code F115 still remaining or reappear, contact your installer.
F116	Battery reverse connection fault	1. Restart the battery, and if the error code F116 still remaining or reappear, contact your installer.
F117	External total voltage detection fault	1. Restart the battery, and if the error code F117 still remaining or reappear, contact your installer.
F118	Address non-1 fault	1. Restart the battery, and if the error code F118 still remaining or reappear, contact your installer.
F119	Address break-sign failure	1. Restart the battery, and if the error code F119 still remaining or reappear, contact your installer.
F120	Pack disconnect fault	1. Restart the battery, and if the error code F120 still remaining or reappear, contact your installer.
F121	The faulty of power on switch is not turned off	1. Restart the battery, and if the error code F121 still remaining or reappear, contact your installer.
F123	Microelectronic fault	1. Restart the battery, and if the error code F123 still remaining or reappear, contact your installer.
F124	Smoke sensor fault	1. Restart the battery, and if the error code F124 still remaining or reappear, contact your installer.
F125	The number of slave voltage strings does not match	1. Restart the battery, and if the error code F125 still remaining or reappear, contact your installer.
F126	Temp NTC short circuit of master relay	1. Restart the battery, and if the error code F126 still remaining or reappear, contact your installer.
F127	Temp NTC open circuit of master relay	1. Restart the battery, and if the error code F127 still remaining or reappear, contact your installer.
F128	Temp NTC short circuit of master DC busbar	1. Restart the battery, and if the error code F128 still remaining or reappear, contact your installer.
F129	Temp NTC open circuit of master DC busbar	1. Restart the battery, and if the error code F129 still remaining or reappear, contact your installer.
F130	Master drop-off fault	1. Restart the battery, and if the error code F130 still remaining or reappear, contact your installer.

F132	EMS SN is empty	1. Restart the battery, and if the error code F132 still remaining or reappear, contact your installer.
F133	Master SN is empty	1. Restart the battery, and if the error code F133 still remaining or reappear, contact your installer.
F134	Pack SN is empty	1. Restart the battery, and if the error code F134 still remaining or reappear, contact your installer.
F136	High voltage relay fault	1. Restart the battery, and if the error code F136 still remaining or reappear, contact your installer.
F137	DC breaker disconnect	1. Restart the battery, and if the error code F137 still remaining or reappear, contact your installer.
F138	Overcurrent charge 2 protection	1. Restart the battery, and if the error code F138 still remaining or reappear, contact your installer.
F200	Battery cell undervoltage safety lock	1. Restart the battery, and if the error code F200 still remaining or reappear, contact your installer.
F201	Battery cell high voltage safety lock	1. Restart the battery, and if the error code F201 still remaining or reappear, contact your installer.
F202	Charge high temp safety lock	1. Restart the battery, and if the error code F202 still remaining or reappear, contact your installer.
F203	Charge low temp safety lock	1. Restart the battery, and if the error code F203 still remaining or reappear, contact your installer.
F204	Discharge high temp safety lock	1. Restart the battery, and if the error code F204 still remaining or reappear, contact your installer.
F205	Discharge low temp safety lock	1. Restart the battery, and if the error code F205 still remaining or reappear, contact your installer.
F206	Charge overcurrent safety lock	1. Restart the battery, and if the error code F206 still remaining or reappear, contact your installer.
F207	Discharge overcurrent safety lock	1. Restart the battery, and if the error code F207 still remaining or reappear, contact your installer.

7.3.3. Protection Codes

Code	Error Type	Investigation & troubleshooting
P1	Battery cell undervoltage protection	1. Low voltage level and needs to be charged.
P2	Overcurrent charge protection	1. Restore to factory setting. 2. Make sure the inverter's setting of max current do not excess the max charge current of the battery.
P3	Overcurrent discharge protection	1. Make sure the power of load do not exceed the power of battery.
P4	High charge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 55℃, otherwise turn off the battery till the temperature is below 55℃ and then try to charge battery.
P5	High discharge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 55℃, otherwise turn off the battery till the temperature is below 55℃ and then try to discharge battery.
P6	Low charge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is above 0℃, otherwise turn off the battery till the temperature is above 0℃ and then try to charge battery.
P7	Low discharge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is above -20℃, otherwise turn off the battery till the temperature is above -20℃ and then try to charge battery.
P8	High ambient temp protection	1. Make sure the ambient temperature of the battery is below 50℃.
P9	Excessive voltage difference protection	1. Restart the battery, and if the error code P9 still remaining or reappear, contact your installer.
P10	Excessive temp of main control relay	1. Reduce the ambient temperature and restart the battery.
P11	Overtemp protection of master DC busbar	1. Reduce the ambient temperature and restart the battery.
P12	Low insulation resistance protection	1. Restart the battery, and if the error code P12 still remaining or reappear, contact your installer.
P13	Low total voltage protection	1. Low voltage level and needs to be charged.
P14	Low ambient temp protection	1. Make sure the ambient temperature of the battery is above -25℃.

P15	High MOS temp protection	1. Reduce the ambient temperature and restart the battery.
P16	Battery cell overvoltage protection	1. High voltage level and needs to be discharged.
P17	High total voltage protection	1. High voltage level and needs to be discharged.
P18	Low SOC protection	1. Low voltage level and needs to be charged.
P19	Overcurrent discharge 2 protection	1. Make sure the power of load do not exceed the power of battery.
P21	Excessive temp difference protection	1. Restart the battery, and if the error code P21 still remaining or reappear, contact your installer.
P22	Positive connector high temp protection	1. Reduce the ambient temperature and restart the battery.
P23	Negative connector high temp protection	1. Reduce the ambient temperature and restart the battery.
P24	Relay high temp protection	1. Reduce the ambient temperature and restart the battery.
P25	Positive high temp protection for docking terminal	1. Reduce the ambient temperature and restart the battery.
P26	Negative high temp protection for docking terminal	1. Reduce the ambient temperature and restart the battery.
P27	Positive high temp protection for discharge port	1. Reduce the ambient temperature and restart the battery.
P28	Negative high temp protection for discharge port	1. Reduce the ambient temperature and restart the battery.
P30	Charger overvoltage protection	1. Restart the battery, and if the error code P30 still remaining or reappear, contact your installer.

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