



# Low-voltage Home Energy Storage Battery User Manual

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# CONTENTS

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<b>Preface.....</b>	<b>01</b>
<b>Limitation of liability.....</b>	<b>01</b>
<b>Safety Instructions.....</b>	<b>02</b>
<b>Product.....</b>	<b>04</b>
<b>Battery Description.....</b>	<b>05</b>
<b>Storage and Packing.....</b>	<b>09</b>
<b>System installation.....</b>	<b>11</b>
<b>System operation.....</b>	<b>14</b>
<b>BMS APP.....</b>	<b>17</b>
<b>Control method.....</b>	<b>18</b>
<b>WIFI Telecontrol.....</b>	<b>19</b>
<b>Recommended configurations of inverters.....</b>	<b>21</b>
<b>Maintenance.....</b>	<b>23</b>
<b>Alarm code.....</b>	<b>24</b>



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## PREFACE

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## LIMITATION OF LIABILITY

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The device manufacturer shall not undertake any direct or indirect liability for battery system damage or property loss caused by the following situations.

The battery system is modified, refitted or replaced by parts without the device manufacturer's authorization.

Anyone that is not the technician of device manufacturer changed and cleared the battery system serial number.

A system designed and installed to collaborate with other devices fails to comply with standards, safety regulations and other related requirements.

Device damage caused by failure to comply with the battery system user manual.

Battery system damage caused by improper use or misuse.

Device damage caused by insufficient ventilation of the battery system.

Maintenance procedures related to battery system do not follow acceptable standards.

Battery system damage caused by force majeure, such as earthquake, storm, lightning, fire, etc.

Any device damage caused by external factors.

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## SAFETY INSTRUCTIONS

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Before operating the device, turn off the power to avoid danger, and strictly check all the safety precautions in this manual and the safety labels on the device.

Only professionals are allowed to operate the device. Professional personnel should be familiar with local regulations, standards and electrical systems, be professionally trained, and be familiar with product information.

Do not use the battery module if it is defective, damaged, or lack of accessories.

Do not remove or modify any part of the battery module without the official authorization of the device manufacturer.



Battery damage may result in electrolyte leakage. If the electrolyte is leaked, do not touch the leaked electrolyte or volatile gas, and contact the after-sales service center immediately.

**In case of inadvertent exposure to leaked material, do the following.**

Inhalation of leaked material: Evacuate from contaminated area and seek medical help immediately.

Eye contact: Flush with water for at least 15 minutes and seek medical help immediately.

Skin contact: Thoroughly wash the contact area with soap and water and seek medical help immediately.

Ingestion: Induce vomiting and seek medical help immediately.

Do not move the battery system when connecting an external battery expansion module. If user needs to replace or add a battery, contact the after-sales services.



**Transportation:**

- Ensure battery systems are not damaged during transportation and storage.
- Be careful when lifting the battery and consider its weight.
- Do not hit, pull, drag or step on the device, and do not put irrelevant items into any part of the battery system.
- Transportation must be carried out by trained professionals and operations must be documented.
- Ensure that the device is firmly placed and do not tilt the device.
- Otherwise, device damage or personal injury may occur.
- Make sure there is a CO<sub>2</sub>, Novac1230 or FM-200 fire extinguisher nearby.
- When extinguishing fire, please use the recommended material fire extinguisher, do not use water or ABC dry powder fire extinguisher. Fire fighters are required to wear protective clothing and self-contained breathing apparatus.
- When the ambient temperature exceeds 150 °C, the battery may explode.
- When installing and maintaining heavy equipment, use proper tools and take protective measures. Improper operation may cause personal injury.
- The insulation layer may be aged or damaged if the cable is used in a high temperature environment. Keep the cable at least 30mm away from the outside of the heating device or heat source area.
- The cables of the same type must be bound together. Lay different types of cables at least 30mm apart. Do not twine or cross them.

# SAFETY INSTRUCTIONS

## >>> Product Description

This document describes the low-voltage series energy storage battery system (hereinafter referred to as battery system) in terms of product introduction, application scenarios, installation, commissioning, maintenance, and technical parameters.

The battery system can be used with inverters from Goodwe, Growatt, Deye, Victron Energy, Victronic Power, etc. The battery supports maximum 6 batteries in parallel.

### Description

Potential risks exist when the device is running. When operating the device, take protective measures.

Please use the device properly. In extreme cases, the device may explode.

The device contains corrosive electrolyte. Avoid contact with the leaked electrolyte.

Read the product instruction carefully before operating the device.

Pay attention to personal protection during installation, operation and maintenance.

Keep the device away from open flames or ignition sources.

Device should be kept away from areas accessible to children.

At the end of service life, do not dispose of it together with household garbage.

Device should be placed in the right place and recycled in accordance with local environmental regulations.

# BATTERY DESCRIPTION

## >>> Components

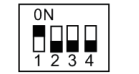
The model listed in this picture is 48V100Ah, and the usage and installation methods of the same series are basically the same. It will not be repeated.



## >>> Parameters

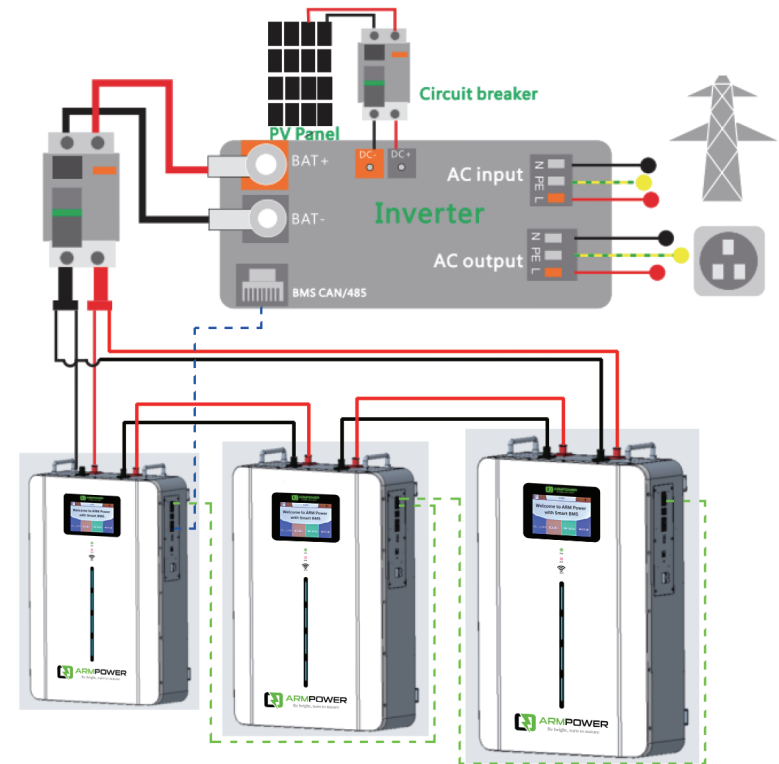
	24V Series		48V Series			
	24V100AH	24V200AH	48V100AH	48V150AH	48V200AH	48V300AH
Nominal Voltage(V)	25.6V		51.2V			
Series Connection	8S		16S			
Power (Wh)	2560Wh	5120Wh	5120Wh	7680Wh	10240Wh	15360Wh
Max. Continuous Charge Current(A)	100A	200A	100A	200A	200A	300A
Max. Continuous Discharge Current(A)	100A	200A	100A	200A	200A	300A

ADD	ADD switch				Remark
	#1	#2	#3	#4	
0	OFF	OFF	OFF	OFF	
1	ON	OFF	OFF	OFF	Host machine
2	OFF	ON	OFF	OFF	Pack1
3	ON	ON	OFF	OFF	Pack2
4	OFF	OFF	ON	OFF	Pack3
5	ON	OFF	ON	OFF	Pack4
6	OFF	ON	ON	OFF	Pack5
7	ON	ON	ON	OFF	Pack6
8	OFF	OFF	OFF	ON	Pack7
9	ON	OFF	OFF	ON	Pack8
10	OFF	ON	OFF	ON	Pack9
11	ON	ON	OFF	ON	Pack10
12	OFF	OFF	ON	ON	Pack11
13	ON	OFF	ON	ON	Pack12
14	OFF	ON	ON	ON	Pack13
15	ON	ON	ON	ON	Pack14



Host machine

## >>> Sketch map

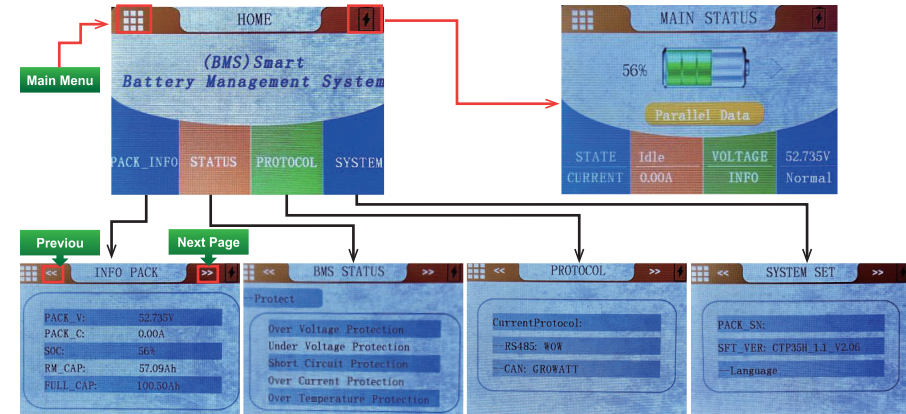


## >>> Battery port definition

Item	Component	Description
1	Battery negative terminal	Battery negative“-”
2	Battery positive terminal	Battery positive“+”
3	Display buttons	Menu, Button, Confirm, Next, BACK buttons.
4	Display	Display the battery status and remaining power etc.
5	SOC indicator	Capacity indicator: combine button indicator to show battery status.
6	Alert indicator	Be on when there is a fault.
7	Running indicator	Be on or flashing when the battery is running.
8	Dipswitch	For parallel communication and selection of inverter protocols.
9	RS232 interface	Manufacturer debug interface
10	RS485-1 interface	Inverter communication port
11	CAN interface	Inverter communication port
12	RS485 interface	Parallel communication port
13	Dry contact	Not available
14	Switch button	Battery on/off

## >>> Boot screen, as shown

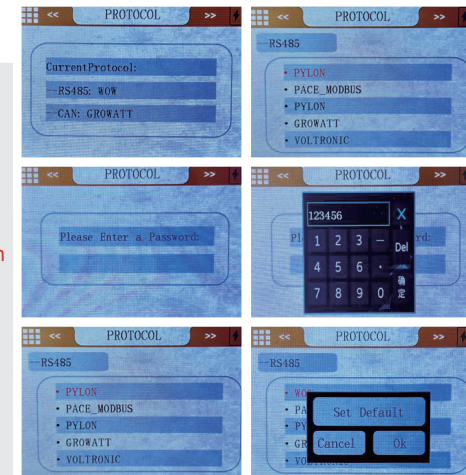
After power-on or hibernation activation, the welcome screen will be displayed. Click anywhere on the screen to go to the main menu page, as shown in the following figure.



## >>> Communication protocol

1. Click on "PROTOCOL",
2. Click on "RS232 or CAN",
3. Click on any protocol, enter your password (123456), click "OK",
4. Select the protocol you want, click "OK".

**Note:** Do not enter the password can not turn the page.



## >>> Parallel Data

1. After the batteries are connected in parallel, click the icon in the upper right corner to enter the Main State interface.
2. Click enter the parallel data monitoring page. Swipe left and right to switch batteries



## STORAGE AND PACKING

If the device is not installed and used immediately, ensure that the storage environment meets the following conditions:

The device must be packed in a packing case, and then sealed with a desiccant

Storage SOC: 25~50%SOC, charge and discharge cycle should be conducted every 3 months.  
Storage temperature range: -20℃ to 40℃,Storage not more than 1 month;0℃ to 35℃,Storage not more than 1 year.

Humidity range: 0~95% No condensation.Do not install the battery when there is moisture condensation at connection port.

The device should be stored in a cool place away from direct sunlight radiation




Keep the device away from flammable, explosive, and corrosive objects



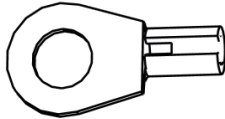


No rain on the device.

### >>> Packing list

Before unpacking the battery, check whether the package is damaged and the battery model is correct. If there is any exception, please do not open the packing case and contact the after-sales service as soon as possible.

After installation, check whether the product delivery is complete according to the packing information. If there is any exception, please contact the after-sales service as soon as possible

Item	Name	Quantity	Pictures	Remark
1	Battery	1		Subject to actual products
2	Positive plug power cable	1		
3	Negative plug power cable	1		

Item	Name	Quantity	Pictures	Remark
4	Hanging frames	2		
5	Screws	4		
6	Terminals	2		
7	Parallel cable	2		Need to purchase separately
8	Parallel communication	1		



## STORAGE AND PACKING

### >>> Installation condition

The battery system should be installed on the wall with sufficient bearing capacity and flatness. If the wall does not have enough support and flatness, other means are needed to ensure it (such as making foundation, adding load-bearing plates, etc.).

The battery operates best at a temperature of 20-40 °C

Avoid installation in direct heat and rain environment

Do not install battery near a high temperature heat source or low temperature cold source.

Avoid installation in areas with extreme changes in ambient temperature

Avoid installation in a strong interference environment

Do not install in areas accessible to children

Avoid installation in areas prone to water accumulation

Do not place inflammable or explosive objects around the device



NOTE

The left and right distances between batteries are the recommended distance and should be reduced as much as possible on an operable basis.

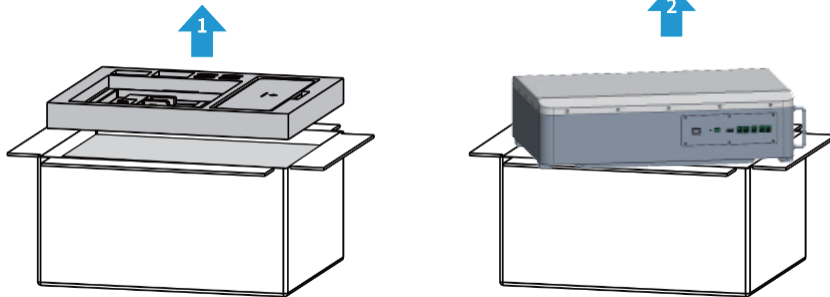
### >>> System installation



NOTE

If parallel use is required, check and select batteries with similar production date and same model and specifications to use.

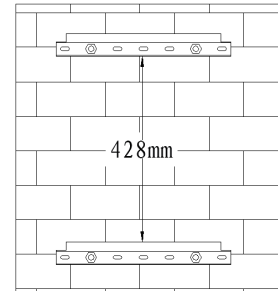
Open the carton and take out the accessory bag and battery.



NOTE

Wall mounting requires at least two installation persons.

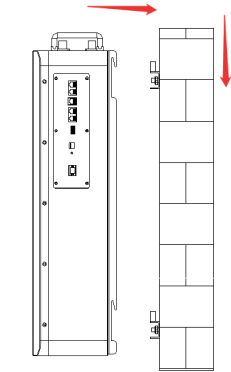
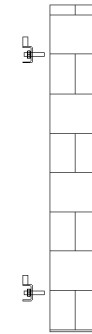
Position the wall mounted hanger panel as a template and use a leveler to make the wall panel parallel to the ground.



Keep the wall mounted hanger panel close to the wall. Make sure to place firmly, mark the holes with a marker and remove the panel.

Use a hammer drill to drill holes in the wall (Aperture diameter:10mm, Depth:65mm).

Tighten the expansion bolt, with torque of 10N·m.



NOTE

The red power cable corresponds to the red skin cable bundle, and the black power cable corresponds to the black skin cable bundle.

The cross-sectional area of the cable bundle is 25-50mm<sup>2</sup>. The wire should meet the standards for outdoor use.

Dielectric Strength: DC1500V, temperature resistance: -40 °C~200 °C.

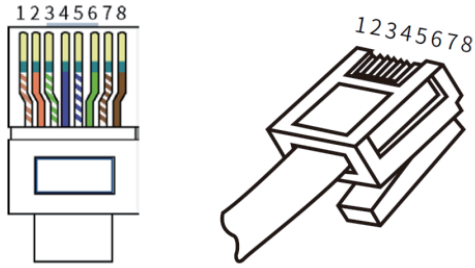
Check whether there is any gap. If there is no gap, the installation is completed.

Recommended crimping tool: manual hydraulic crimping pliers(die:25-50mm<sup>2</sup>).

After crimping, the drawing force shall not be less than 1200N.

The parallel power cables between batteries should be as short as possible under the condition of meeting installation connection requirements.

RJ45 Registered Jack



CAN Communication port

CAN interface	
PIN	Definition
4	CAN_H
5	CAN_L
RS485 interface	
PIN	Definition
1,8	RS485-B
2,7	RS485-A

BOne end of the communication cable should be plugged into the battery CAN communication port, and another end is to be plugged into the BMS port of the inverter.

## SYSTEM OPERATION

### >>> Check before switch on

Before switching on the battery system, check the following items to prevent system damage.

Item NO.	Check content
1	The device is firmly installed, the installation position is convenient for operation and maintenance, the installation space is convenient for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	GND cables, power cables, communications cables, and terminal resistors are properly and firmly connected.
3	Cable bundling meets cable routing requirements, properly distributed, and not damaged.

### >>> Switch on

Press battery switch on button.

Urn on the Circuit-Breaker.

### >>> Operating status indicator

Status	Normal/alert/protection	ON/OFF	RUN	ALM	Capacity indicator LED					Description	
					●	●	●	●	●		
Switch off	Sleep	Off	Off	Off	Off	Off	Off	Off	Off	Off	all Off
Standby	Normal	On	Flash*1	Off	Indicated by remaining power.					Standby	
	Alert	On	Flash*1	Flash*3						Module low voltage	
Charge	Normal	On	On	Off	Indicated by remaining power.(Indicator flash*2 when power is at max)					Indicator flash*2 when power is at max, ALM no flash during overcharge alert.	
	Alert	On	On	Flash*3							

Status	Normal/alert/protection	ON/OFF	RUN	ALM	Capacity indicator LED						Description
		●	●	●	●	●	●	●	●	●	
Charge	Overcharge protection	On	On	Off	On	On	On	On	On	On	If there is no utility power, the indicator turns to standby
	Temperature, over-current, and failure protection	On	Off	On	Off	Off	Off	Off	Off	Off	Charging stopped
Discharge	Normal	On	flash*3	Off	Indicated by remaining power.						
	Alert	On	flash*3	flash*3	Indicated by remaining power.						
	Under-voltage protection	On	Off	Off	Off	Off	Off	Off	Off	Off	Discharging stopped
	Temperature, over-current, short circuit, reverse connection, failure protection	On	Off	On	Off	Off	Off	Off	Off	Off	Discharging stopped
Disable		Off	Off	On	Off	Off	Off	Off	Off	Off	Charging, discharging stopped

### >>> Capacity status indicator

Status		Charge						Discharge					
Capacity indicator		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
Capacity (%)	0 ~ 17%	Off	Off	Off	Off	Off	flash*2	Off	Off	Off	Off	Off	On
	18 ~ 33%	Off	Off	Off	Off	flash*2	On	Off	Off	Off	Off	On	On
	34 ~ 50%	Off	Off	Off	flash*2	On	On	Off	Off	Off	On	On	On
	51 ~ 66%	Off	Off	flash*2	On	On	On	Off	Off	On	On	On	On
	67-83%	Off	flash*2	On	On	On	On	Off	On	On	On	On	On
	84-100%	flash*2	On	On	On	On	On	On	On	On	On	On	On
Running Indicator ●		On						Flash*3					

### >>> Capacity status indicator

Flash manner	On	Off
Flash*1	0.25S	3.75S
Flash*2	0.5S	0.5S
Flash*3	0.5S	1.5S



## BMS APP

### >>> Download and install

According to the mobile phone system, select the download link: Android

entrance: Mobile phones that support GMS can download PACEEX App through Google Play Store, and Android phones that do not support GMS can install APK directly.

<https://play.google.com/store/apps/details?id=com.paicheng.bms>

iOS entrance: Search for PACEEX downloads in the App Store

<https://apps.apple.com/cn/app/6461723294>

### >>> APP dynamic permission

Install the APP, click the start button and start smoothly.

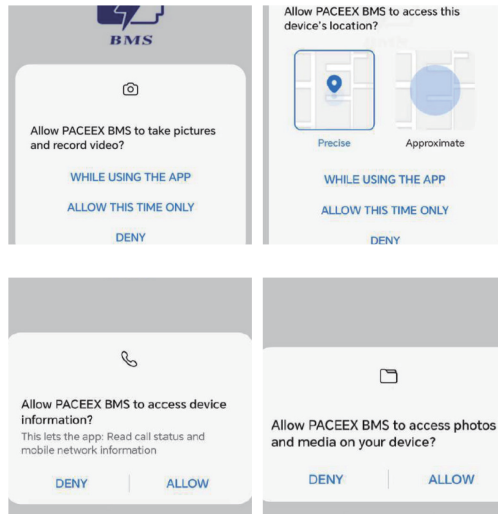
For the first start, you will request the user to confirm and authorize the following authority: Camera.

Permission: Add wifi devices in remote control.

Location permission: search for nearby. Bluetooth devices in local control and identify current network information in remote control.

Equipment status information: to detect the operation status of the equipment.

Photos and audio: The code scanning interface in the remote control system can directly identify the local photo album.



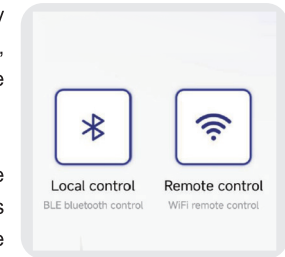
## CONTROL METHOD

### >>> Local control

BLE Bluetooth communication, directly search for the nearby Bluetooth signal, a pair of continuous connection, control devices, no account login, do not do binding records, that is, ready to use

Remote control: WiFi

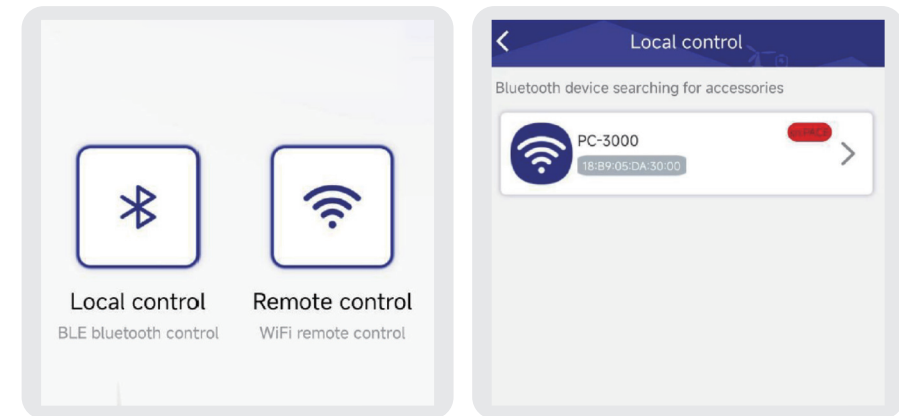
communication, which realizes the purpose of controlling the device rather than in the same geographical location. It requires account registration and login, records the binding between the account and the device, and requires distribution network operation.



Local control when the device is in the state of distribution network, **click the.**

local control button, in the local control page can search for the device, **click the.**

device to enter the device control page



# WIFI TELECONTROL

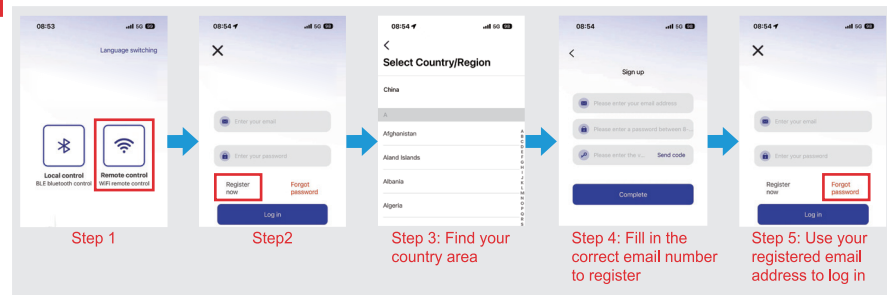
## >>> Account registration and login

Registration: Create the new account by means of email account, password and verification code.

Note: Please select the real country and region according to the actual situation. This is very important. Once selected and created successfully, the devices added through the account distribution network will automatically connect to the server node with the same account.

Login: Log in with the registered account number and password.

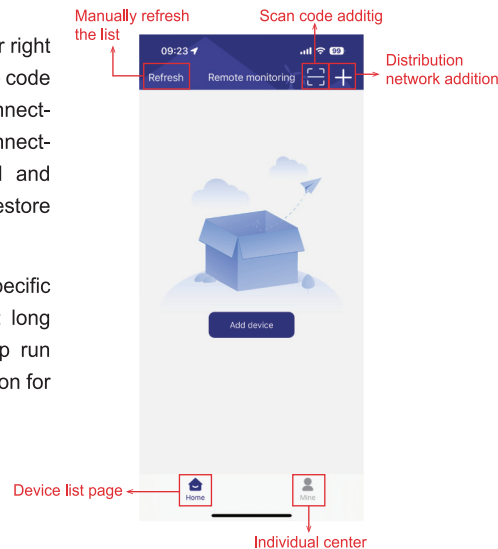
Forget your password: You can reset your password through your email.



## >>> Add device

Click "ADD DEVICE" or the "+" in the upper right corner to enter the search page, or scan the code to connect directly. A device can only be connected to one account. When the device is connected, other accounts cannot be searched and found. At this time, you need to unbind or restore the WIFI module to factory settings.

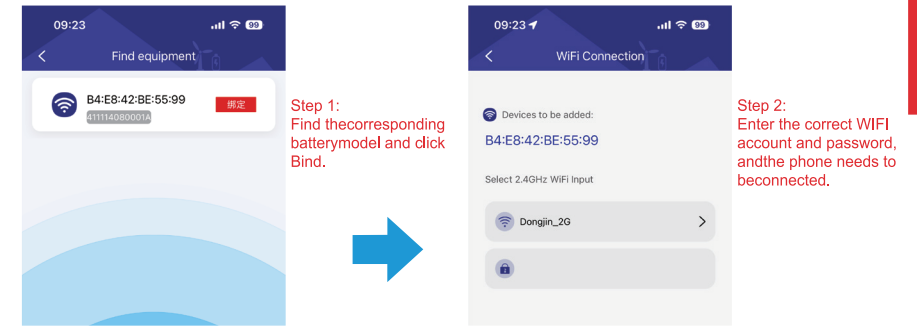
Long press the reset button 10-13 s, the specific operation of the LED lamp is shown as : long press the button to make the water lamp run one. Release the button when all lights are on for 5 seconds and then turn off



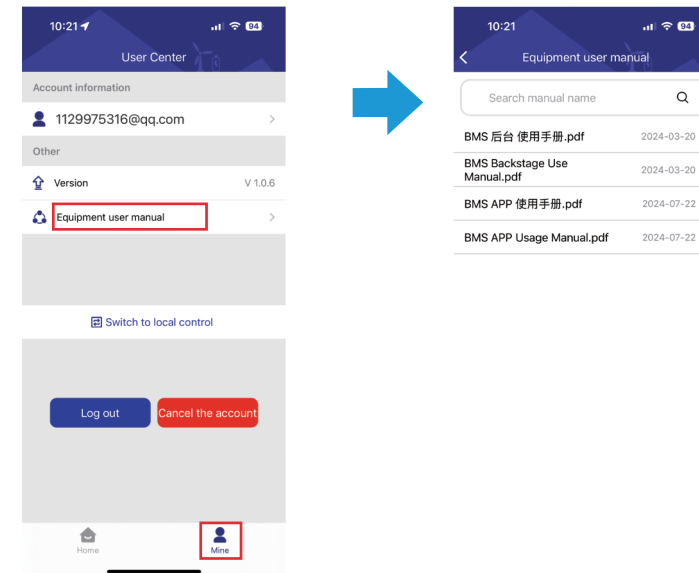
After clicking on bind, It will be redirected to the network configuration information page. You need to enter the same WIFI account and password as the mobile phone connection.

Only 2.4G WIFI is supported. After filling in the information, click Next to automatically connect to the network.

If the connection fails, please check whether the WIFI account and password are correct and whether it is 2.4G WIFI.



WIFI, Bluetooth User Manual After logging in, click My-User Manual.



## RECOMMENDED CONFIGURATIONS OF INVERTERS

There is a custom mode in a inverter. When custom mode is selected, it is recommended to configure the inverter according to the following parameters.

### >>> Applicable to 24V series (8 cell)

Option	Recommended value	Remarks
Charge voltage	28.2V	If the inverter does not have these options available for setting, please consult the inverter manufacturer.
Float charge voltage	28V	
Inverter low voltage protection voltage	24V	
Voltage of battery stopping discharge when the utility power is available	24V	
Voltage of battery stopping charge when the utility power is available	27V	
When solar energy is unavailable and the battery voltage is below the set value, it will switch to using the grid for power supply	24.5V	

### >>> Applicable to 48V series (16 cell)

Option	Recommended value	Remarks
Charge voltage	56.4V	If the inverter does not have these options available for setting, please consult the inverter manufacturer
Float charge voltage	56V	
Inverter low voltage protection voltage	48V	
Voltage of battery stopping discharge when the utility power is available	48V	
Voltage of battery stopping charge when the utility power is available	54V	
When solar energy is unavailable and the battery voltage is below the set value, it will switch to using the grid for power supply	49V	

## MAINTENANCE

Maintenance content	Period
If the battery is not in use, fully charge the battery and discharge the power to 25~50%.	Every 3 months
Check whether the wall hanger installation is loose, if yes, please tighten the corresponding position.	Every 6 months
Check whether the shell is damaged, if so, please repaint or contact after-sales service.	Every 6 months
Check whether the exposed wire is worn. If so, please replace the corresponding cable or contact the after-sales service.	Every 6 months
Check whether there is debris around the battery. If so, clear it to avoid affecting battery heat dissipation.	Every 6 months
Check for water or pests to avoid long-term invasion to the battery.	Every 6 months



### WARNING!

If user finds any problems that may affect the battery or the battery and energy storage inverter system, please contact the after-sales services, it is forbidden to disassemble it privately.

If user finds that the copper wire inside the conductive line is exposed, it's forbidden to touch as there is high voltage risk. Please contact after-sales services and do not disassemble it privately.

In case of unexpected operation, please contact the after-sales staff immediately and operate under the guidance of the after-sales staff, or wait for the staff conduct on-site operation.

## ALARM CODE

Alarm code	Annotation
Cell OV	Cell over-voltage alarm
Cell UV	Cell low voltage alarm
Pack OV	Pack voltage over-voltage alarm
Pack UV	Pack voltage low-voltage alarm
CHG OC	The charge over-current alarm is generated
DSG OC	The discharge over-current alarm is generated
CHG OT	Charging high temperature alarm
DSG OT	High discharge temperature alarm
CHG UT	Charge low temperature alarm
DSG UT	Discharge low temperature alarm
ENV OT	Ambient high temperature alarm
ENV UT	Ambient low temperature alarm
MOS OT	MOS High temperature Alarm
SOC Low	Low power
Cell OVP	Monomer over-voltage protection
Cell UVP	Monomer over-discharge protection
Pack OVP	Overall over-voltage protection
Pack UVP	Overall over-release protection
CHG OCP	Charge over-current protection
DSG OCP	Discharge over-current protection
	Short circuit protection

Charger OVP	Charger high voltage protection
Charger Inversed	Charger reverse connection
CHG OTP	Charge over-temperature protection
DSG OTP	Discharge over-temperature protection
CHG UTP	Charge low temperature protection
DSG UTP	Low temperature discharge protection
MOS OTP	MOS high temperature protection
ENV OTP	Environmental high temperature protection
ENV UTP	Environmental low temperature protection
Fully	Fully charged
Overdue	Time expired
CHG MOS Faul	Charging MOS fault
DSG MOS Fault	Discharge MOS fault
NTC Fault	NTC fault
Cell Fault	Cell fault
Sampling Fault	Sampling fault
CCB Fault	The restrictor board is faulty
Heater Fault	Heating film failure
Failure	Failure alarm
T-SENSOR is open	Anti-theft opening
Para setting	Parallel setup

Serial number	Fault phenomenon	Appearance reasons	Handling method
1	The inverter connected to the battery cannot detect the battery and reports a "bp" fault.	The cable connection is incorrect or the startup sequence is incorrect, or the battery is in the protected state.	<p>First, close the mains circuit breaker to OFF, close the PV circuit breaker to OFF, and close the inverter.</p> <p>Turn ON the battery in the correct power-on sequence: 1: Turn ON the battery toggle switch to ON. Turn on the battery output circuit breaker switch to ON.</p> <p>2: Press the power button of the inverter to display the output voltage 230V.</p> <p>3: Switch the PV circuit breaker to ON, PV input.</p> <p>4: Switch the mains input circuit breaker to ON for mains input.</p> <p>5: Close the output circuit breaker switch to ON, access the load (with electrical appliances).</p> <p>Press the battery restart button to restart the battery.</p>
2	The inverter shuts down the output and does not charge the battery.	The communication line is not connected or the communication line is reversed or the line sequence is incorrect, or the battery is in the protection state.	<p>First, make sure that the communication line sequence is correct, and insert the communication line into the communication interface of the battery and the inverter in turn (no need to restart the inverter). After the communication between the inverter and the battery, wait a few seconds for the error to disappear and the output to recover.</p> <p>Second, enter the inverter setting item [05], change the 485 mode to LIB mode, confirm the exit, wait a few seconds, the inverter fault code error '61' disappeared, the output will be restored.</p>

			Press the battery restart button to restart the battery.
3	Battery over current protection upon first startup.	(8.2KW/10.2KW inverter DC electrolytic capacitance is relatively large) just start the inverter capacitor charging current will be large, resulting in battery over current protection, battery output off, the inverter can not start.	<p>1. When over current protection occurs when the 100AH battery is connected, turn off the inverter switch (the fault red light is on for a long time). The battery does not need to turn off. Wait for about 1 minute until the battery itself removes the over current protection (the fault red light disappears) and turn on the inverter switch again.</p> <p>2. Increase battery AH. If 200 Ah or 300AH batteries are used, it is recommended that 8.2KW and 10.2KW inverters match 51.2V 200AH or larger.</p>