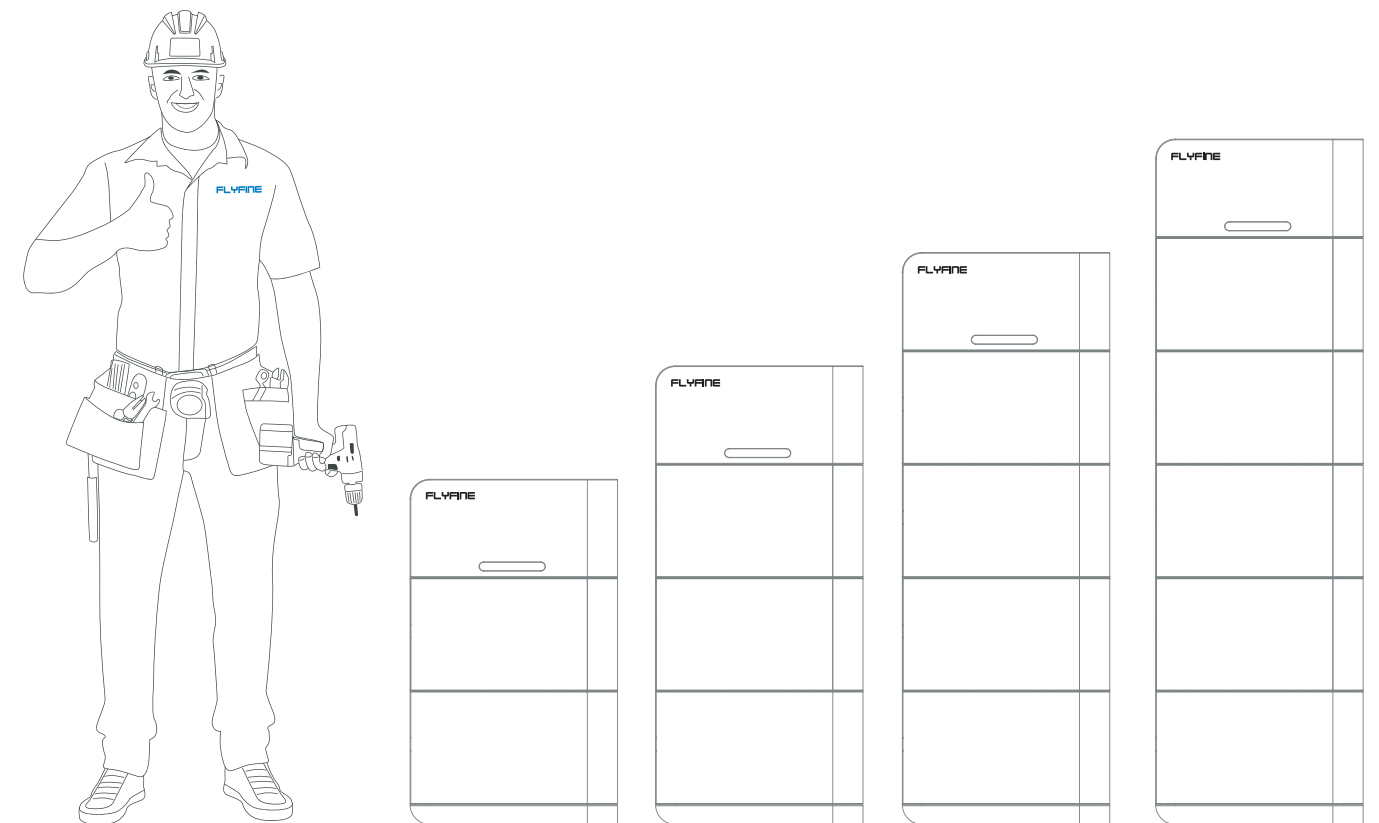


User Manual

High Voltage Stacked
Lithium Battery Energy Storage System
FHV9600C / FHV14400C / FHV19200C / FHV24000C



FLYFINE DIGITAL ENERGY CO.LTD
Battery Storage System Solution Expert Since 2008



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1 Safety Instructions

The Energy storage pack is an essential component of the photovoltaic power generation system. It can provide electricity for the connected load, and it can also store photovoltaic solar modules, fuel generators, or wind energy generators by charging the remaining energy in case of emergency. When the sun goes down energy demand is high, or there is a power outage, you can use the energy stored in the system to meet your energy needs at no additional cost. In addition, the energy storage Pack can help you achieve energy self-consumption and ultimately achieve the goal of energy independence.

According to different power conditions, the energy storage PACK can output power during peak power consumption, and can also store energy during low power consumption. Therefore, when connecting the matching photovoltaic modules or inverter arrays, external equipment is required to match the energy storage the working parameters of the pack to achieve the highest operating efficiency. For a simple diagram of a typical energy storage system.

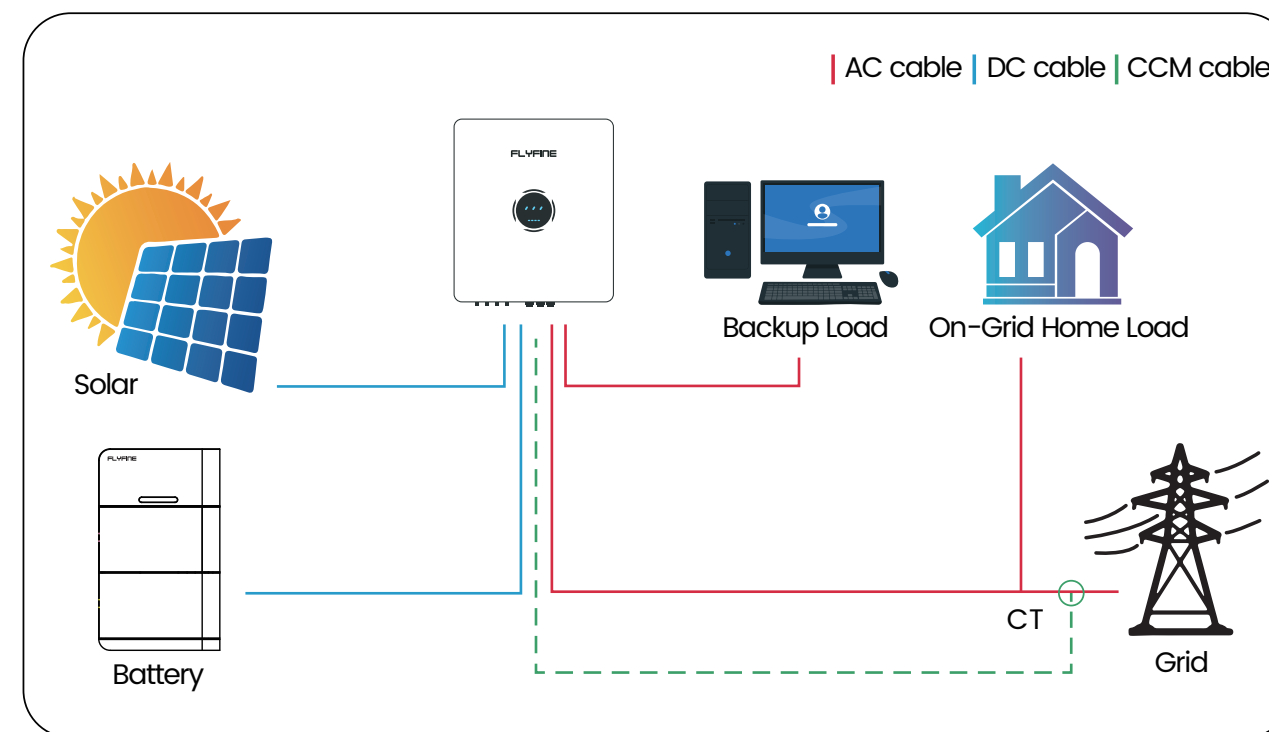


Figure 1 Energy storage System Overview

It is very important and necessary to read the user manual carefully before installing or using the battery. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, death, or may damage the battery and the whole system.

- If the battery is stored for a long time, it is requirement that they are charged every three to six months, and the SOC should be no less than 80%, after fully discharging, The battery needs to be recharged within 12 hours.
- Do not expose cable outside; Do not use cleaning solvents to clean the battery.
- All battery terminals must be disconnected before maintenance.

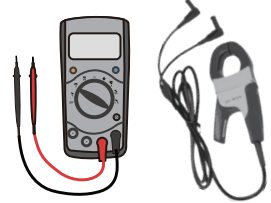


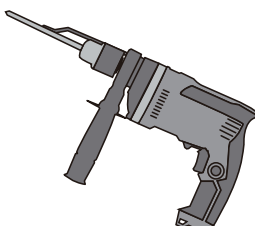

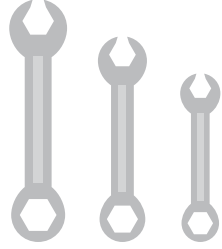

2 Important Safety Warning

- Do not expose the battery to flammable or harsh chemicals or vapors.
- Do not paint any part of the battery, include any internal or external components.
- Do not connect battery with PV solar wiring directly.
- Any foreign object is prohibited to be inserted into any part of the battery.
- Our company will not bear any warranty claims for direct or indirect damage caused by violation of the above items.





2.1 Before connecting

- After unpacking, please check the battery and pack list first, if the battery is damaged or spare parts are missing, Please contact the dealer.
- Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode;
- Wiring must be correct, do not mix-connect the positive and negative cables, and ensure no short circuit with the external device;
- It is prohibited to connect the battery with AC power directly;
- The BMS in the battery is designed for 24VDC/48VDC, DO NOT connect battery in series;
- It is prohibited to connect the battery with different type of battery;
- Please ensure the electrical parameters of battery system are compatible to inverter, Keep the battery away from fire or water.

Necessary installation Tools.

 <p>Multimeter + v</p>	 <p>Screw Driver Set</p>	 <p>Allen Key Set</p>	 <p>Drill + Hammer</p>
 <p>Electrician Scissors</p>	 <p>Wrench set</p>	 <p>Lifting strap + mechanical lifter</p>	 <p>RS 232/USB+screw terminal (insulated)</p>

Personal protective equipment.

			
<p>Insulated gloves</p>	<p>Safety goggles</p>	<p>Safety shoes</p>	<p>Helmet</p>

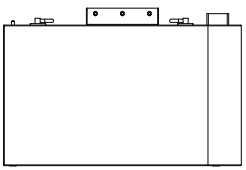


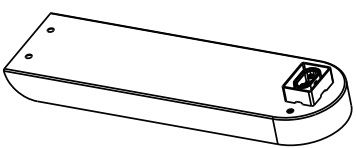



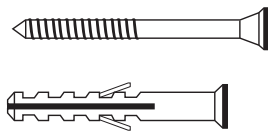




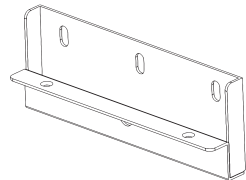
2.2 During operation

- If the battery system needs to be moved or repaired, the power must be cutoff first and the battery is completely shutdown;
- It is prohibited to connect the battery with different type of battery;
- It is prohibited to put the batteries working with faulty or incompatible inverter;
- In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited;
- The BMS in the battery is designed for 24VDC/48VDC, DO NOT connect battery in series;
- Please do not open, repair or disassemble the battery. We do not undertake any consequences or related responsibility due to violation of safety operation or violating of design, production and equipment safety standards.

3 Unpacking & Overview

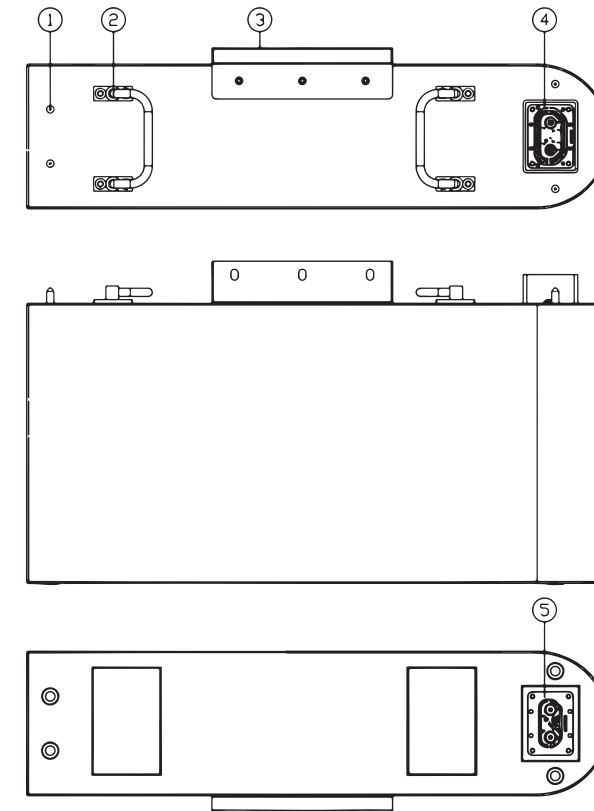
3-1. Packing List

You will receive the following parts(Not a full set), sample as followpicture. For customized requirements, please place an order with themanufacturer.

Battery pack	Combiner box	Power out positive cable*1
		
base*1	Manual *1	Power out Negative cable*1
		
Inverter communication line	M8 Explosion Screw	M10 Screw
		
M4 Screw	*Communication box (Optional)	Matching Resistor
		
pylons		
		

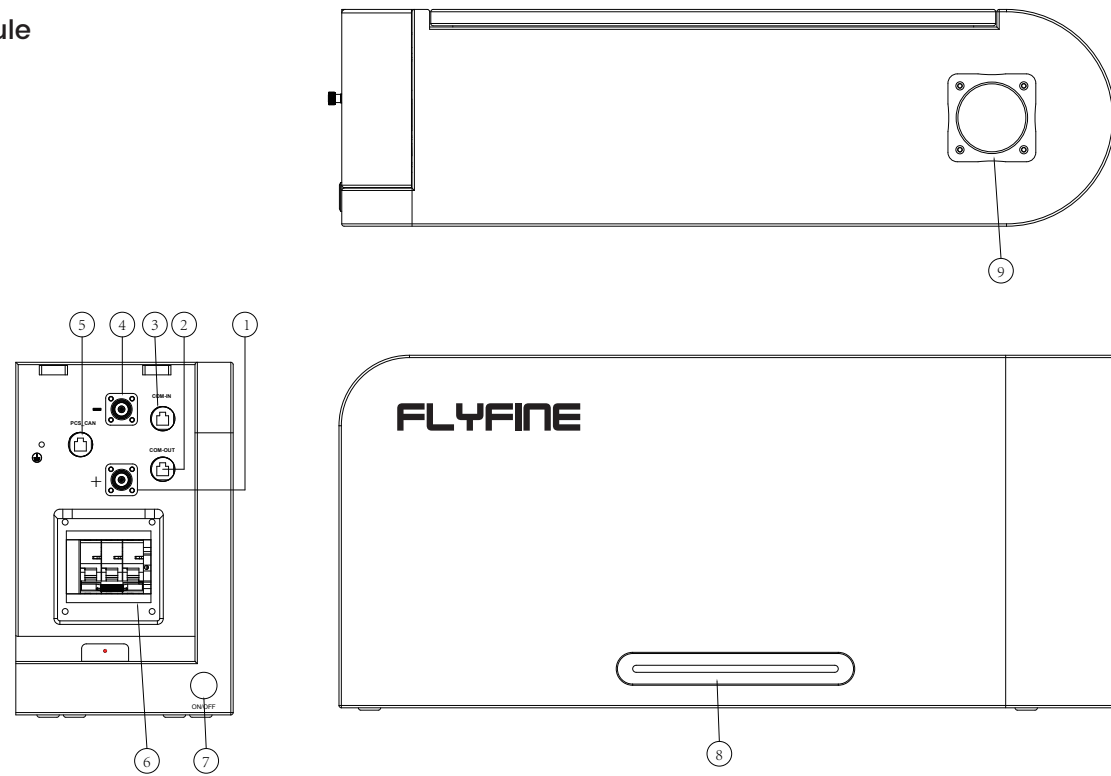
3-2. Product Overview

Battery module



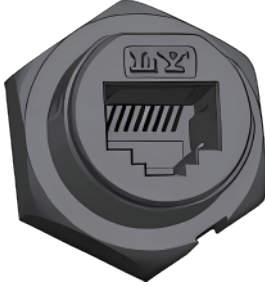
No.	Description	Silk-screen	Remark
1	dowel pin		
2	handle		
3	hanger		
4	Pack Output terminal		
5	Pack Output terminal		

Battery module



No.	Description	Silk-screen	Remark
1	Pack Output terminal	P+	
2	Communication port	COM-OUT	Communication with battery module
3	Pack Output terminal	COM-IN	Parallel communication port
4	Pack Output terminal	P-	
5	Communication port	PCS_CAN	Communication with inverters
6	air switch	/	
7	start switch	ON/OFF	
8	Led	COM-IN	
9	start switch	WIFI	
10	Pack Output terminal	P+	

There is any change in the pin position of the communication line, the customer shall be notified in writing or provided with supporting communication wire.

		CAN Port foot position definition			
		RJ45 Pin	Definition Description	RJ45 Pin	Definition Description
communication		1	NC	5	CANL
		2	NC	6	NC
		3	NC	7	NC
		4	CANH	8	NC

4. Installation

4-1. Selecting Mounting Location

Consider the following points to install the energy storage system:

- The energy storage system needs to be installed on a solid surface;
- It is recommended to place the energy storage system horizontally.
- To ensure air circulation and heat dissipation, please leave a gap about 200mm away from the side of the device.
- The ambient temperature should be between 0°C and 40°C, and the relative humidity should be between 25% and 85% to ensure optimal operation.
- Install the battery module in a dry, protected, dust-free area with sufficient aircirculation. Do not operate in locations where the temperature and humidity are outside the specified range.

4.2 Mounting The PACK



WARNING!! Remember that this Pack is heavy so please be careful when removing it from the package, or install it

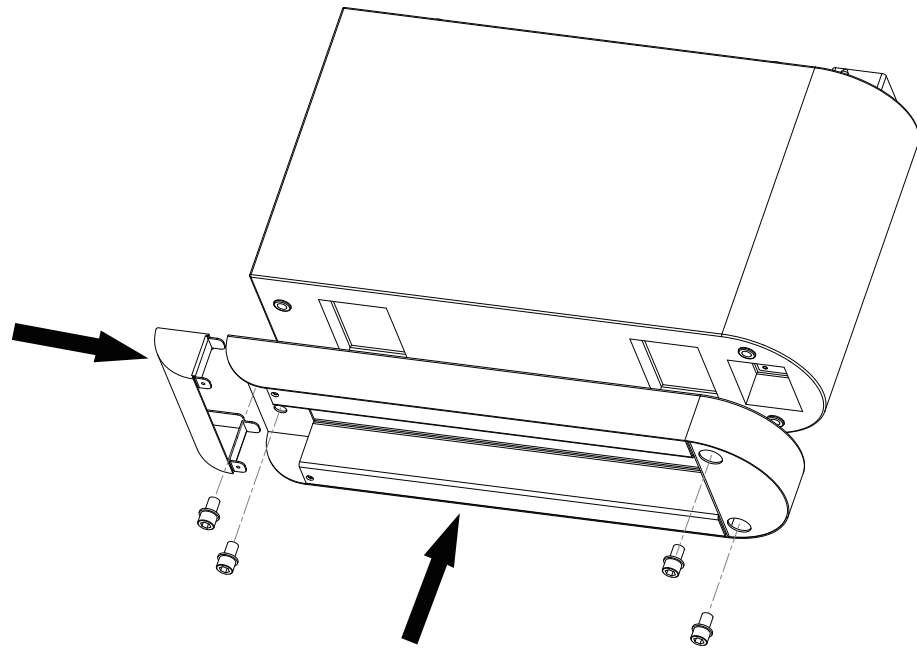
When installing each pack, use appropriate screws to fix it. After that, fix the equipment with bolts.

Step 1:

When receiving the product, first check whether all parts are complete, if not, please report to the Dealer.

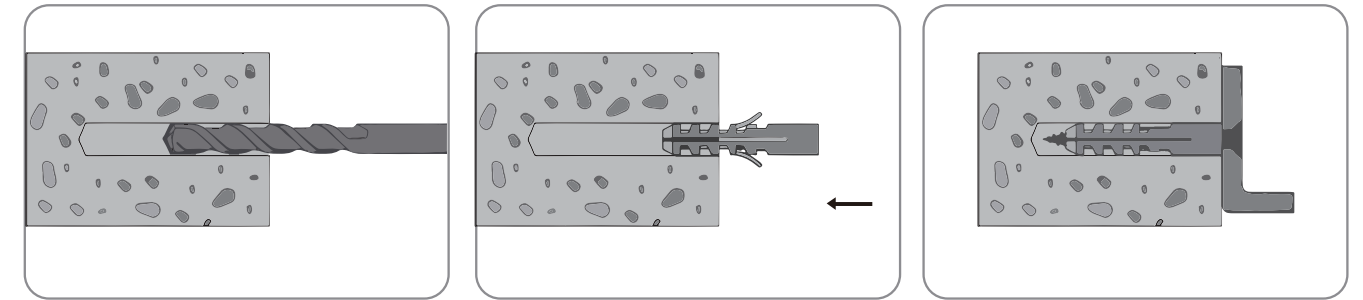
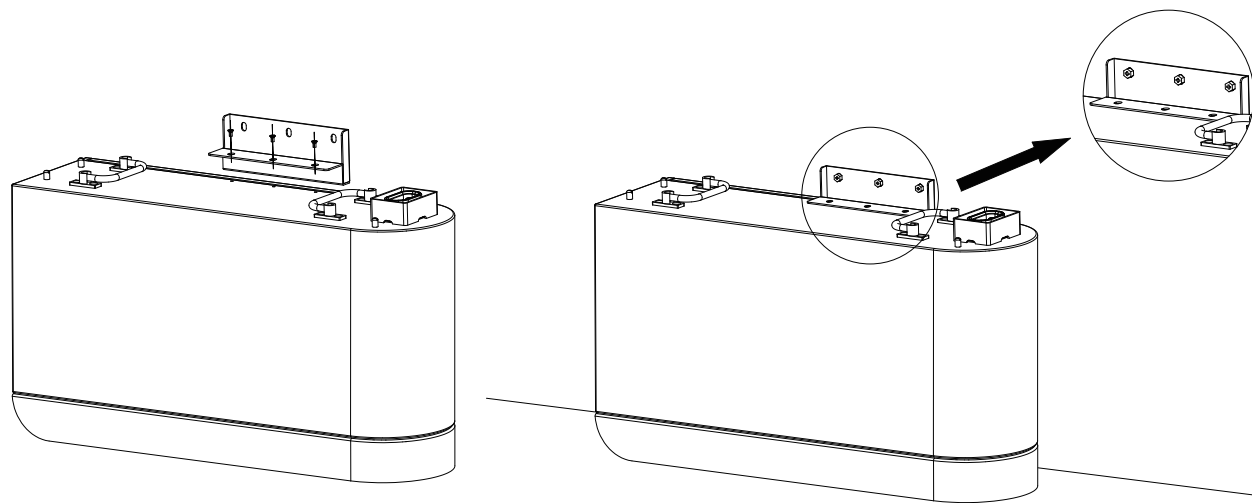
Step 2:

Remove the base and battery pack from the box. Lay the battery pack flat, and fix the base to the bottom of the battery with M10 screws. After the base is installed, insert the accessories and fix them with screws.



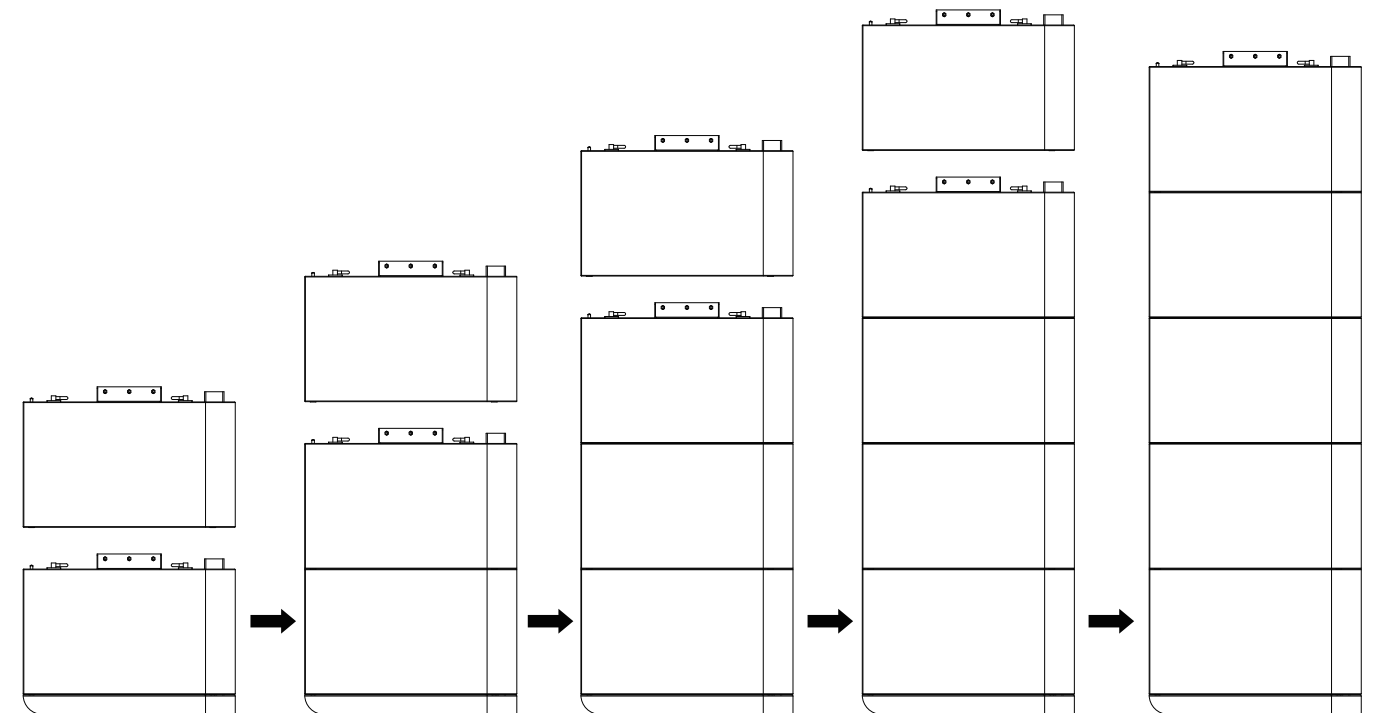
Step 3:

Place the battery pack with the base against the wall, and the wall must be perpendicular to the ground at 90°. (Note: the wall must be a load-bearing wall, otherwise the battery pack cannot be installed on this wall) Fix the hanger on the battery holder. Once installed, secure the position to the wall through the holes in the hanger. Remove the battery pack, drill a Ø8mm depth 60mm hole in the wall with a hammer drill, then screw the M8 blasting screw into the wal. Move the battery pack to a suitable position and lock it with the nut.



Step 4:

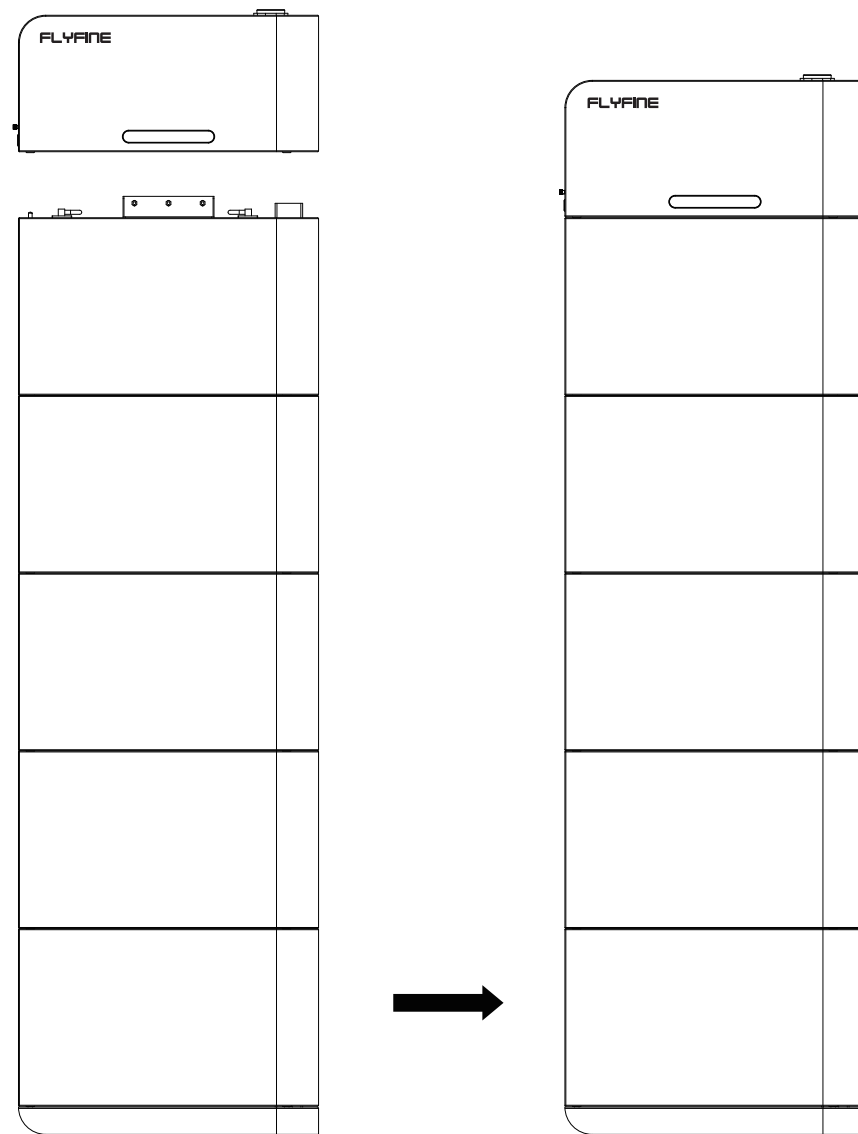
● Align the pins and place the second battery module on top of the first battery module, then secure the hooks with screws. After installing the second battery pack, install the third and fourth battery packs in sequence.



Step 5:

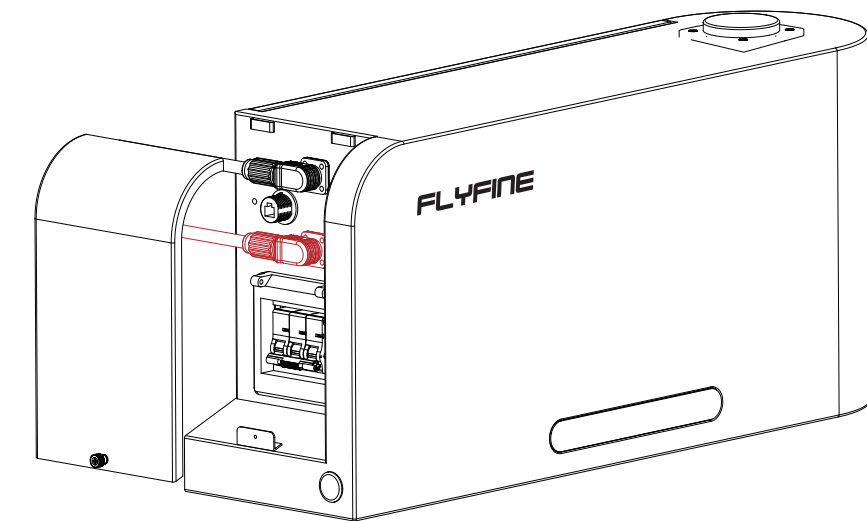
Align the pins, place the second battery module on top of the first battery module, and secure the hanger with the screws. After installing the second battery pack, install the third and fourth battery packs in sequence.

Finally, install the main control box to complete the installation. as the picture shows:



Step 6:

Open the side cover of the main control box, install the output cable and communication cable, and connect to the inverter.

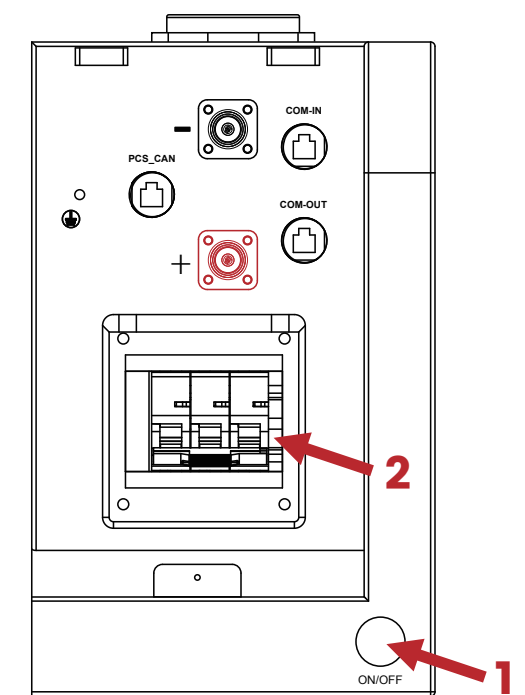


Step 7:

Start the high pressure system. Press the start switch (1).

Turn on the circuit breaker (2) for system output when the battery light is on.

(Before starting the system, ensure that the equipment is grounded.)

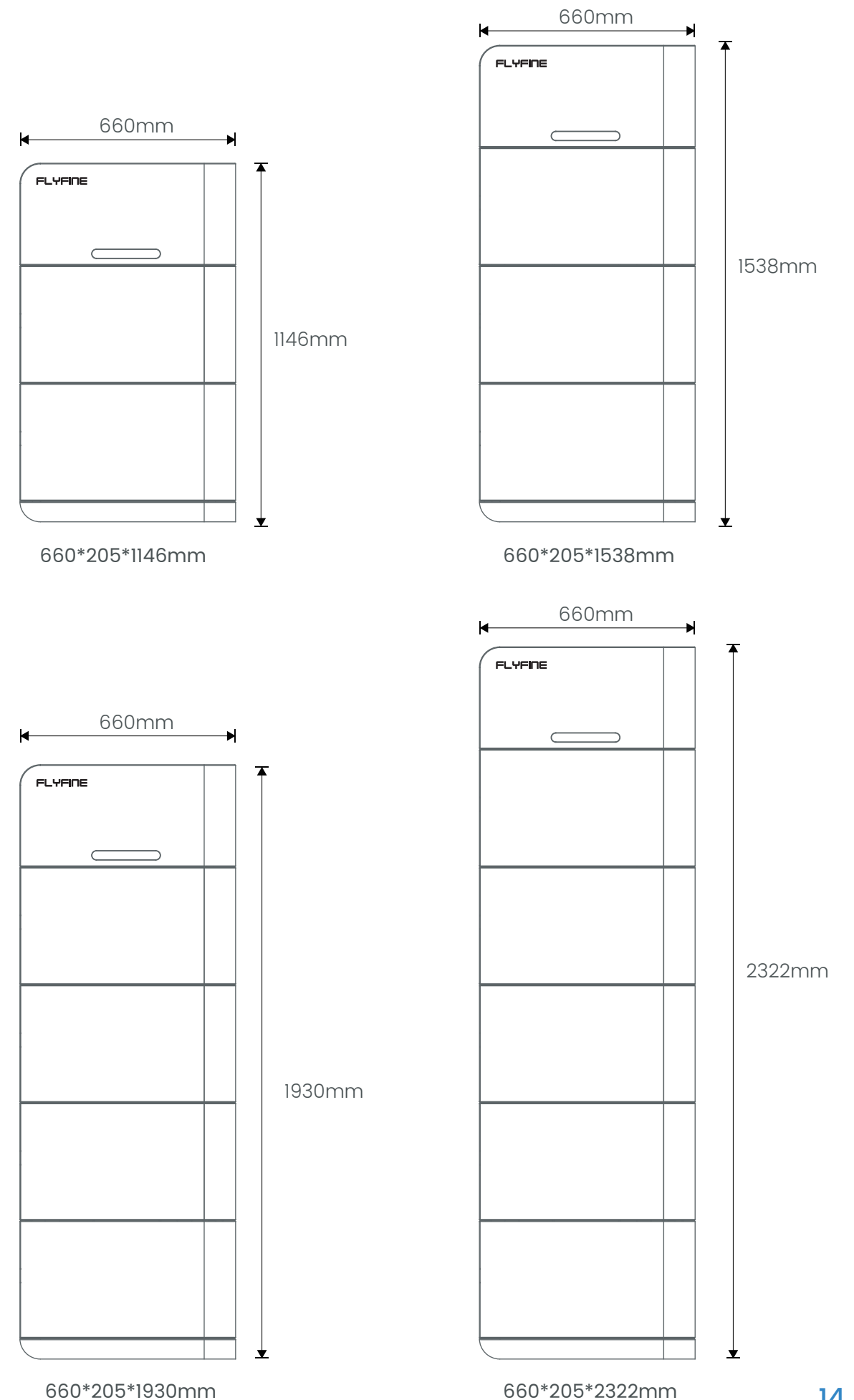


Step 8:

Running the device, set the external charger or inverter parameters, please set according to the corresponding operation manual. Can not exceed the rated parameter requirements.

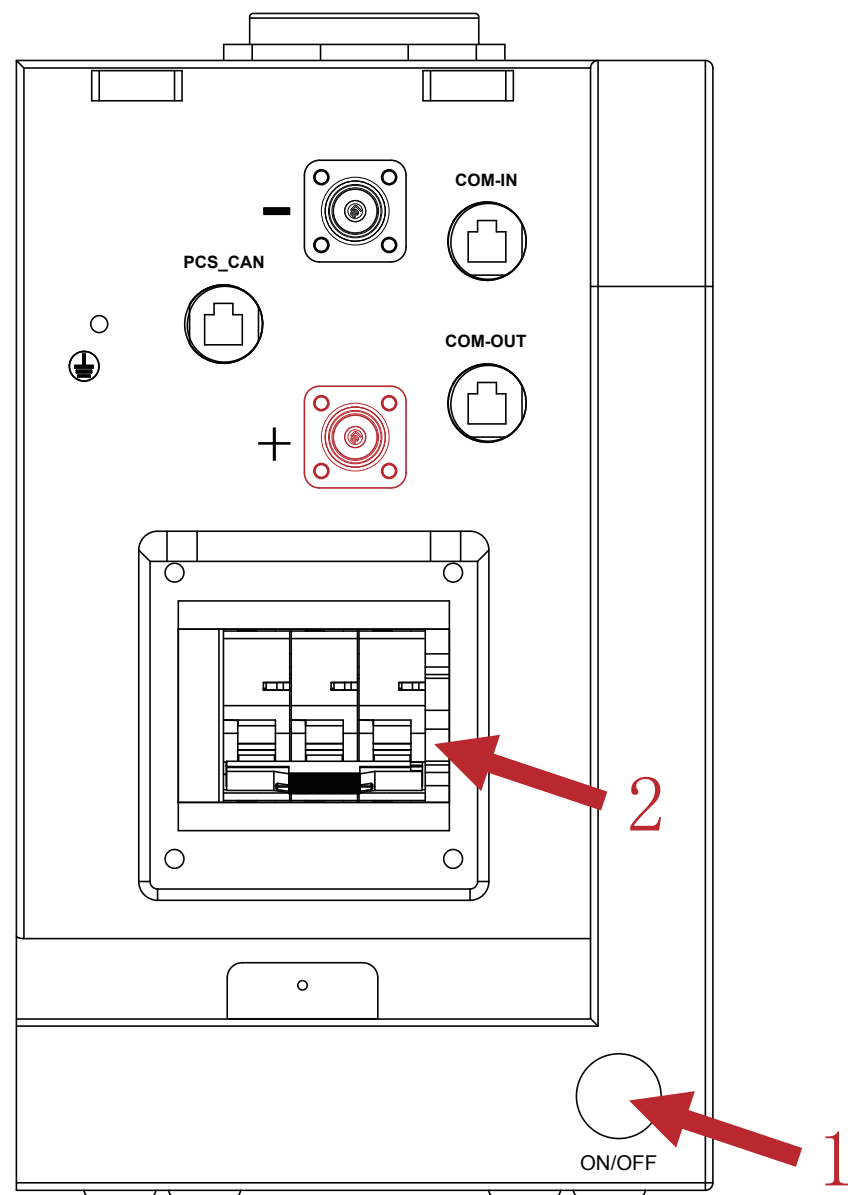
System parameters:

Nominal Voltage	192V (60series)	288V (90series)	384V (120series)	480V (150series)
Capacity	50Ah			
Energy	9.6KWh	14.4KWh	19.2KWh	24KWh
Cycle Life	≥5000cycles@80%DOD,25℃, 0.5C ≥4000cycles@80%DOD,40℃, 0.5C			
Charge Cut-off Voltage	210V	315V	420V	480V
Max.Continuous Work Current	50A			
Discharge Cut-off Voltage	168V	252V	336V	420V
Charge Temperature	0℃~55℃			
Discharge Temperature	-20℃~55℃			
Storage Temperature	-20℃~50℃			
Dimensions(L*W*H)	205*660*1146 MM	205*660*1538 MM	205*660*1930 M	205*660*2322 MM
Weight	120KG	170KG	220KG	270KG
Protocol (optional)	Canbus-Inverter			
Certification	UN38.3,MSDS			



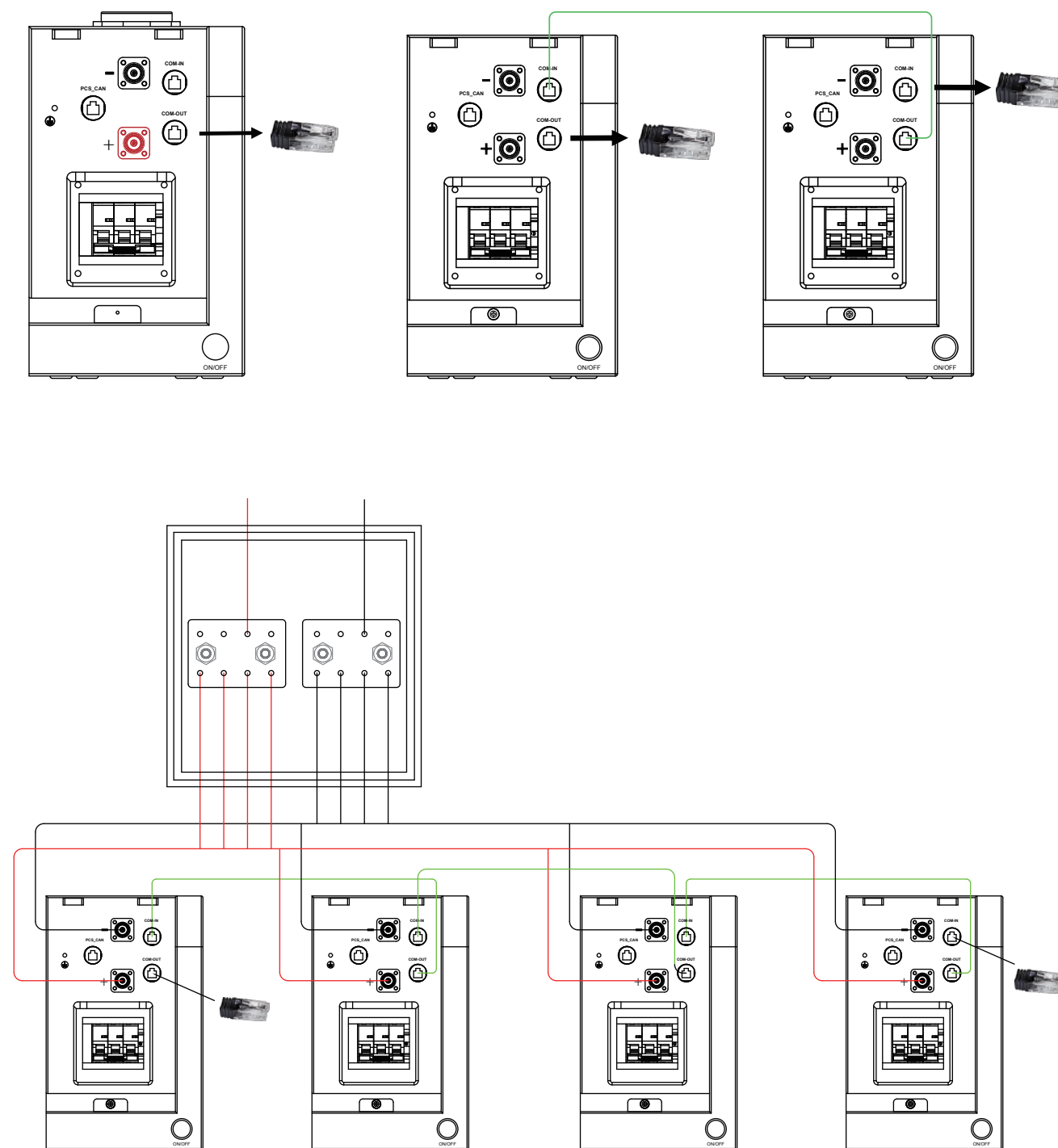
Step 9:

Stop operating the battery pack. When it is necessary to stop battery charging and discharging or troubleshoot, please first stop the external equipment and cut off the input and output circuits. Turn off the system output DC air switch(1). Press the OFF button to turn off the system.



Step 10:

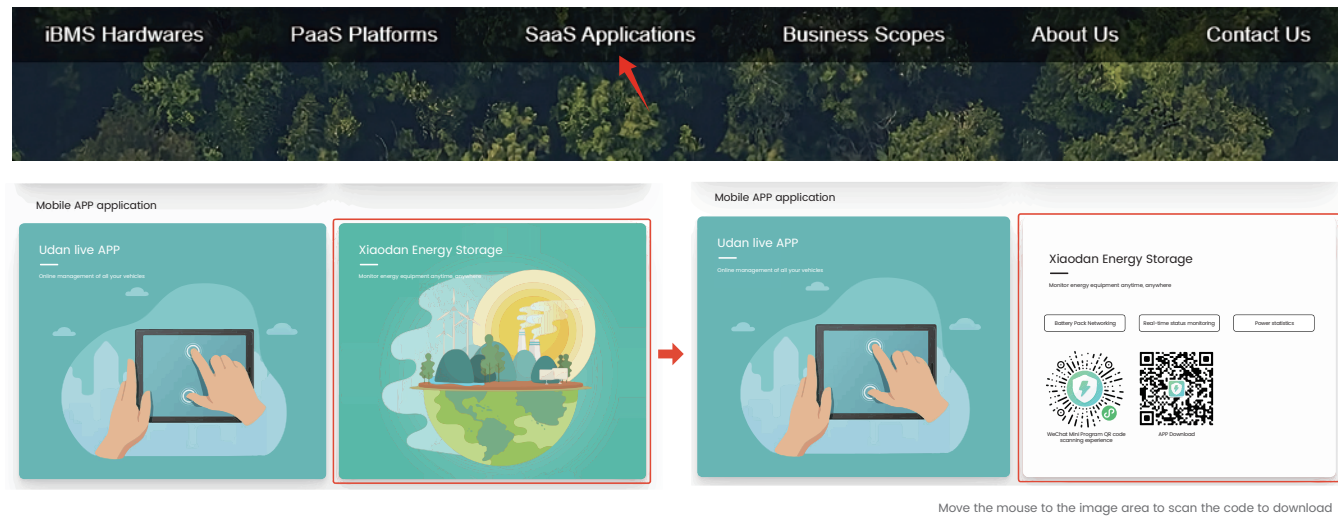
Each high-voltage box is equipped with a matching resistor, and a single running matching resistor is connected to COM-OUT. When multiple machines are connected in parallel, only the COM-OUT of the last one needs to be connected with a matching resistor. Up to 4 clusters are supported. The allel requires additional junction boxes.



5 App Download

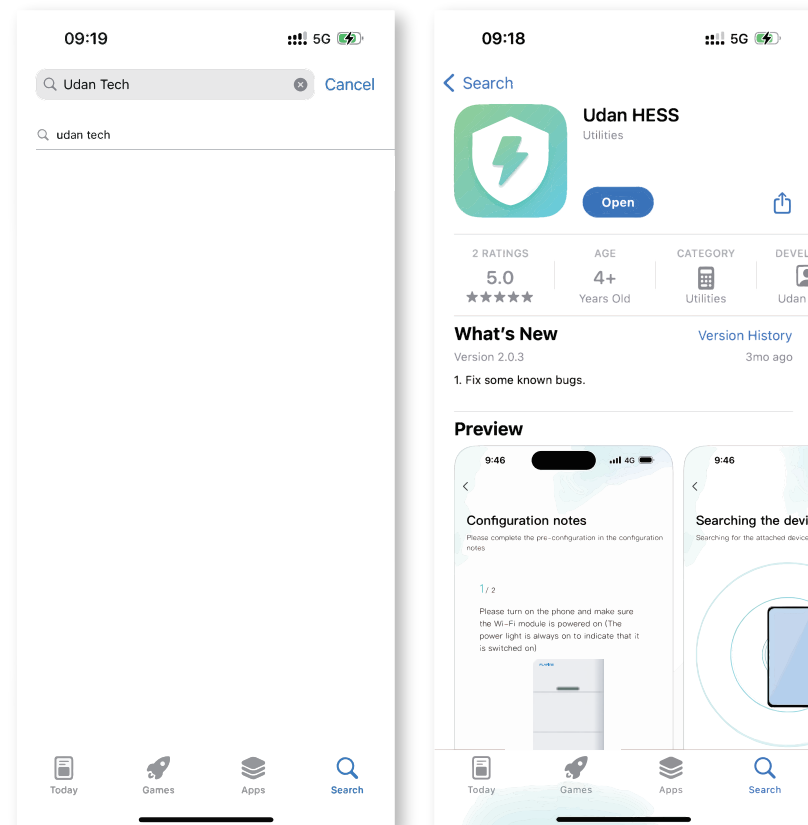
5.1 Android version

Enter the official website of Youdan Technology <https://www.udantech.com/#/>, click on the "SAAS Application" column in the top navigation bar, pull down to the mobile app application module, and you can see the mobile WeChat Mini Program and App application download.



5.2 IOS version

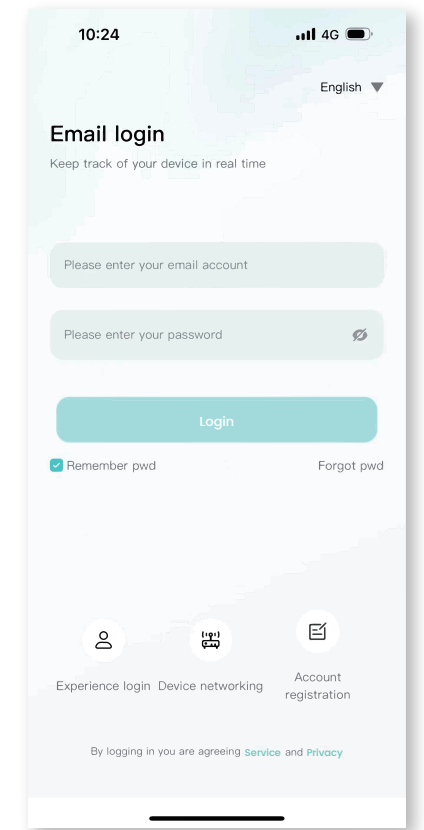
Enter the mobile App Store, search for "Udan Tech", and you can download and install it.



5.3 Log in and register

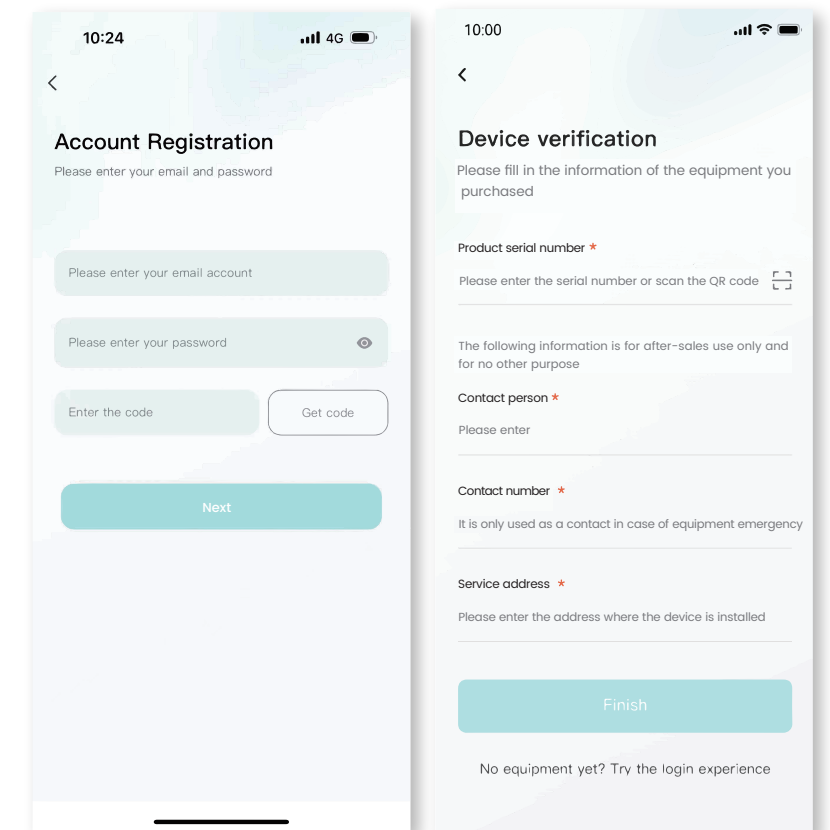
5.3.1 Log in:

- After opening the APP, enter the login interface to log in with your account.
- Currently supports logging in through email accounts.



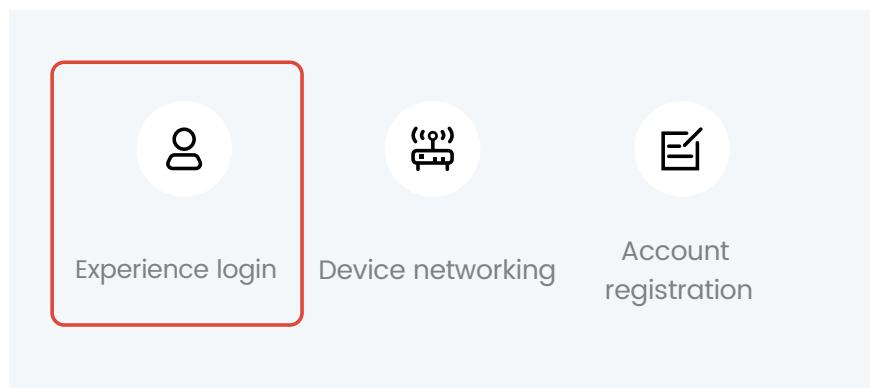
5.3.2 Register:

- At the bottom of the login page, click the "Account Registration" button to enter the registration process.
- Currently, you can register with an email account. After registration, you need to go through the device verification process and enter the device SN code or device QR code for identification.



5.3.3 Experience login

At the bottom of the login page, click the "Experience Login" button to experience the app function without registration as a tourist.



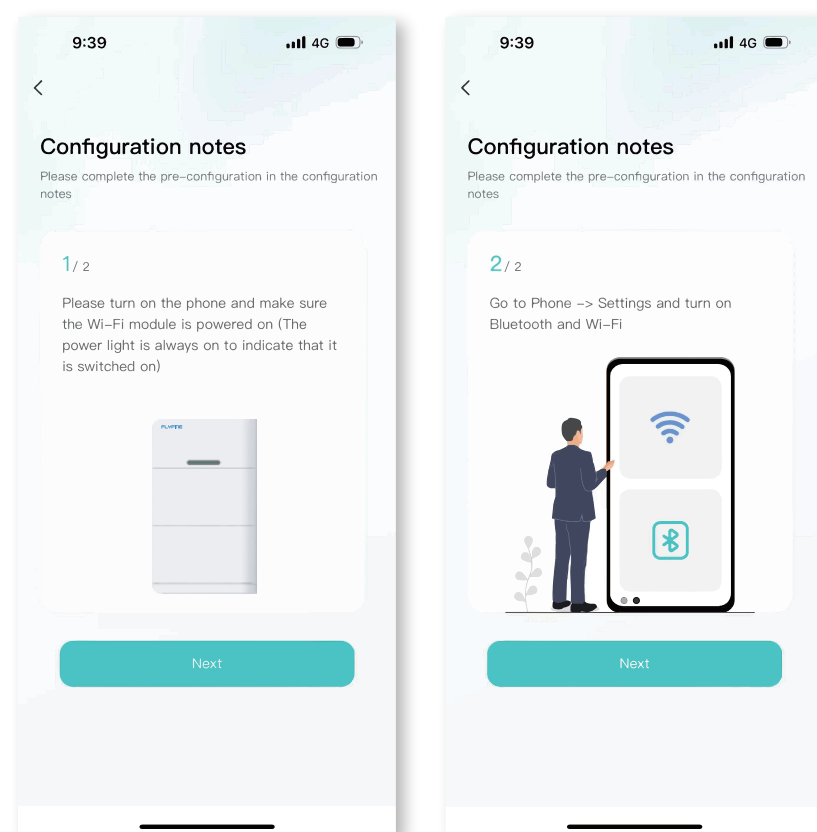
5.4. Equipment distribution network

5.4.1 Overview:

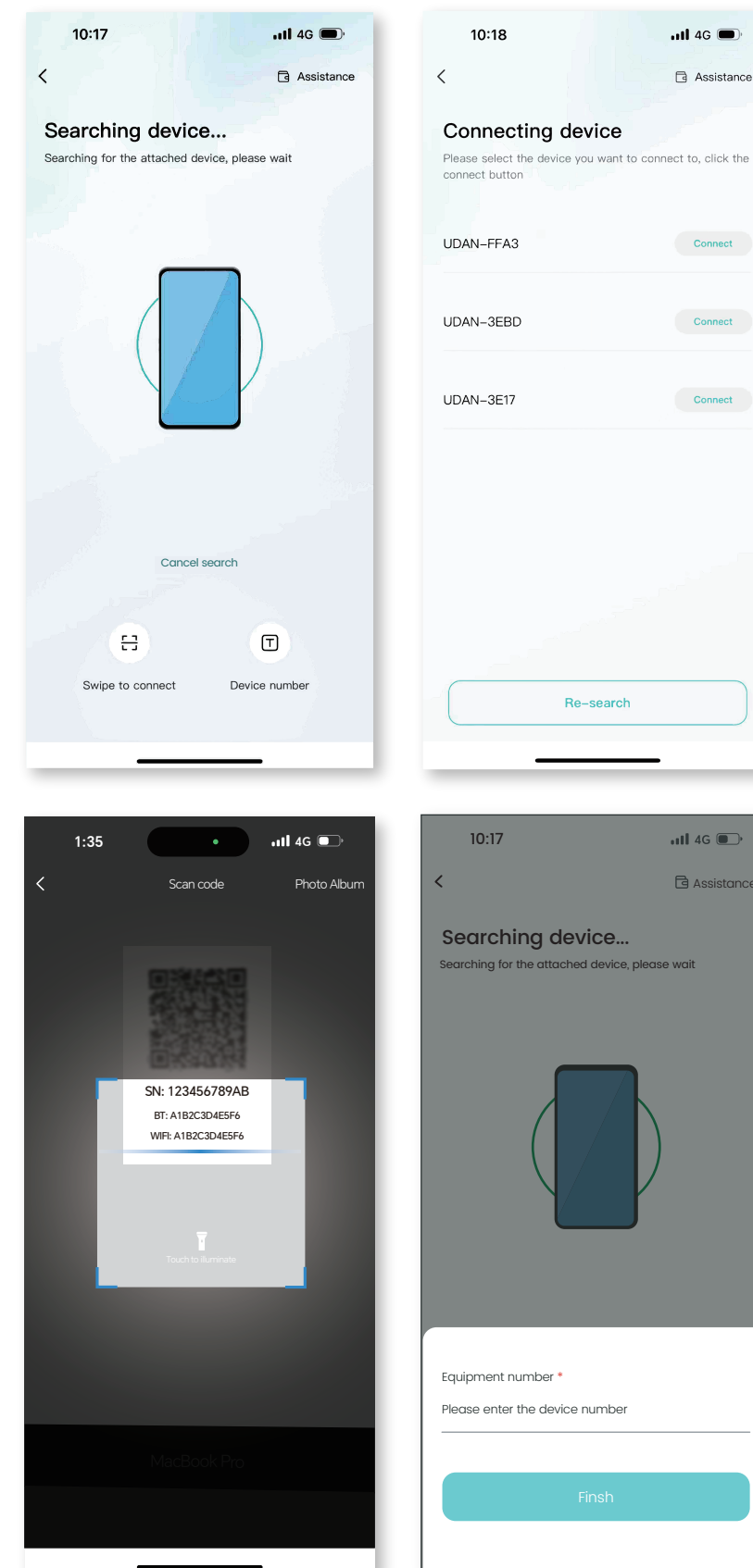
Device distribution network refers to connecting devices to the Cloud Computing Platform to help users obtain real-time device data information.

5.4.2 Distribution process

① Preparation before distribution: Ensure that the device is on, turn on the mobile phone Bluetooth and wireless LAN functions.

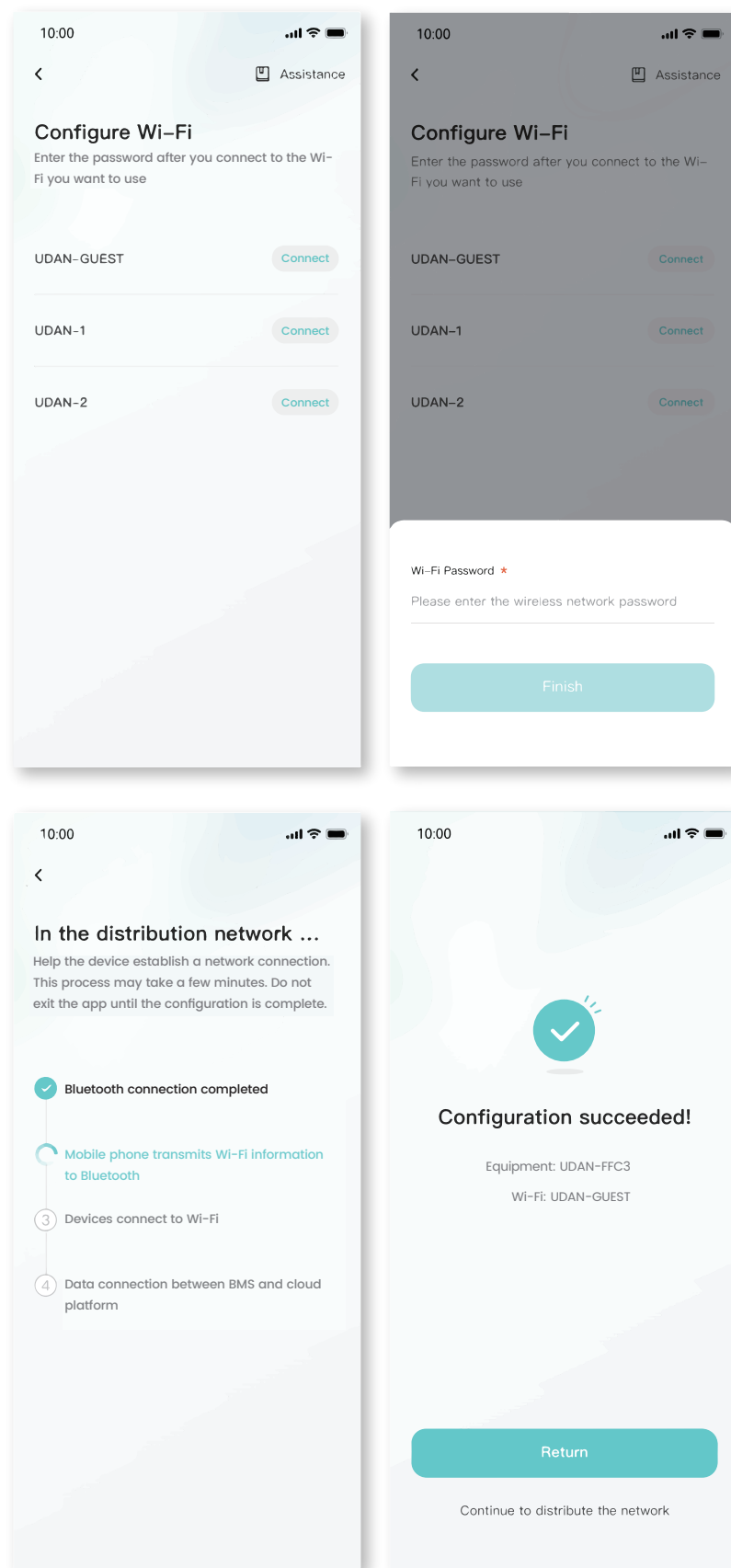


② Connected devices: The current App supports Bluetooth search, device scanning, and manual input of SN code.



③ Connect to WiFi: After the device is connected, enter the WiFi connection process.

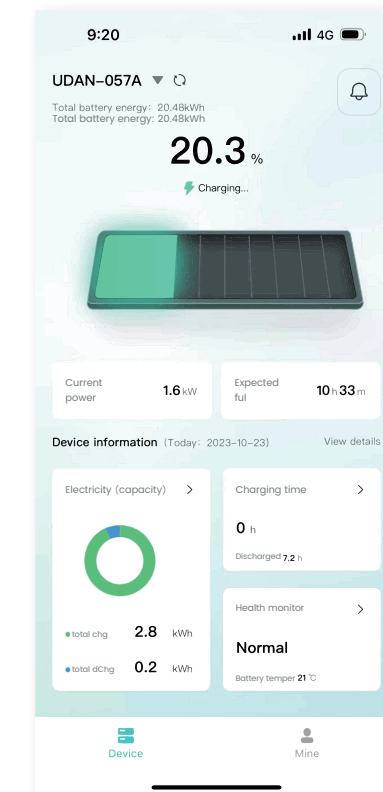
Select the WiFi you want to use and click the "Connect" button. Enter the WiFi password and click the "Finish" button to distribute the network.



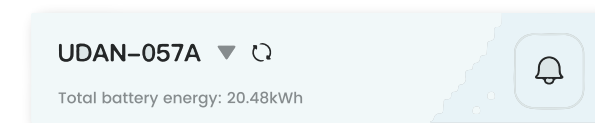
6.App page

6.1 Equipment

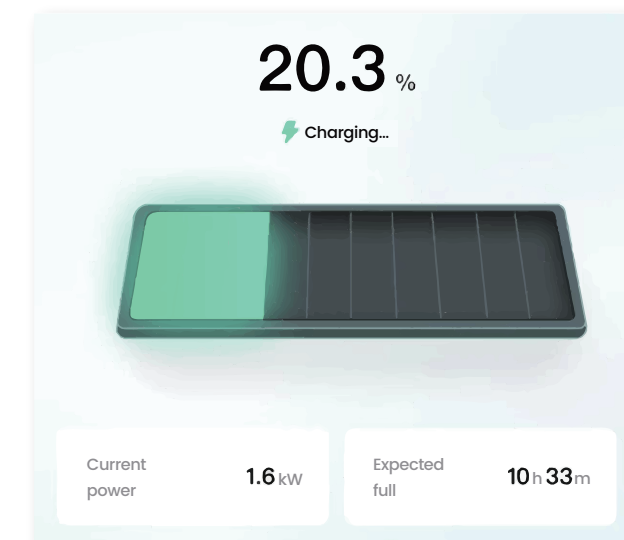
● The device homepage is used to display the currently managed device information.



● The top area displays the device name, battery energy, and message entry.

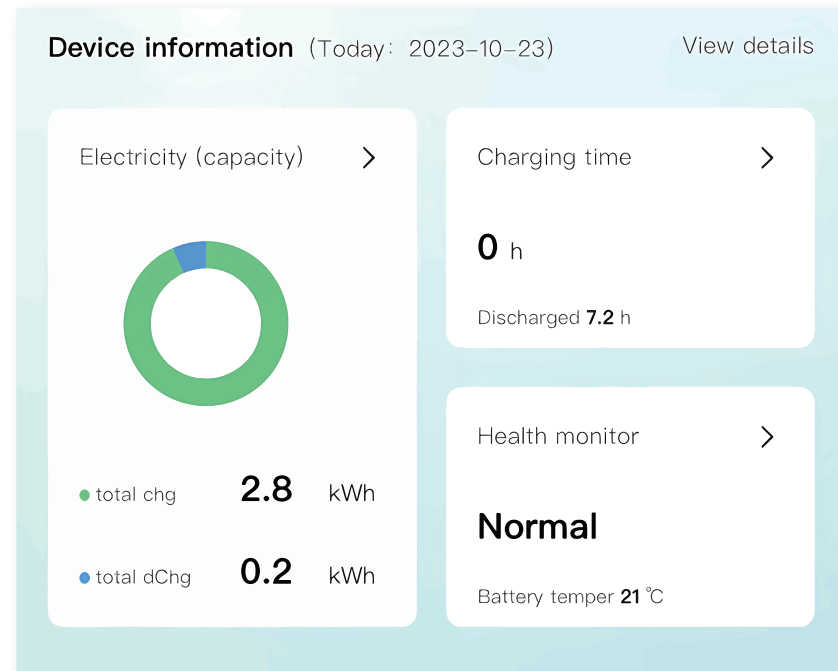


● Middle area: Displays the current battery charging and discharging status, battery percentage, current power, and estimated full time.



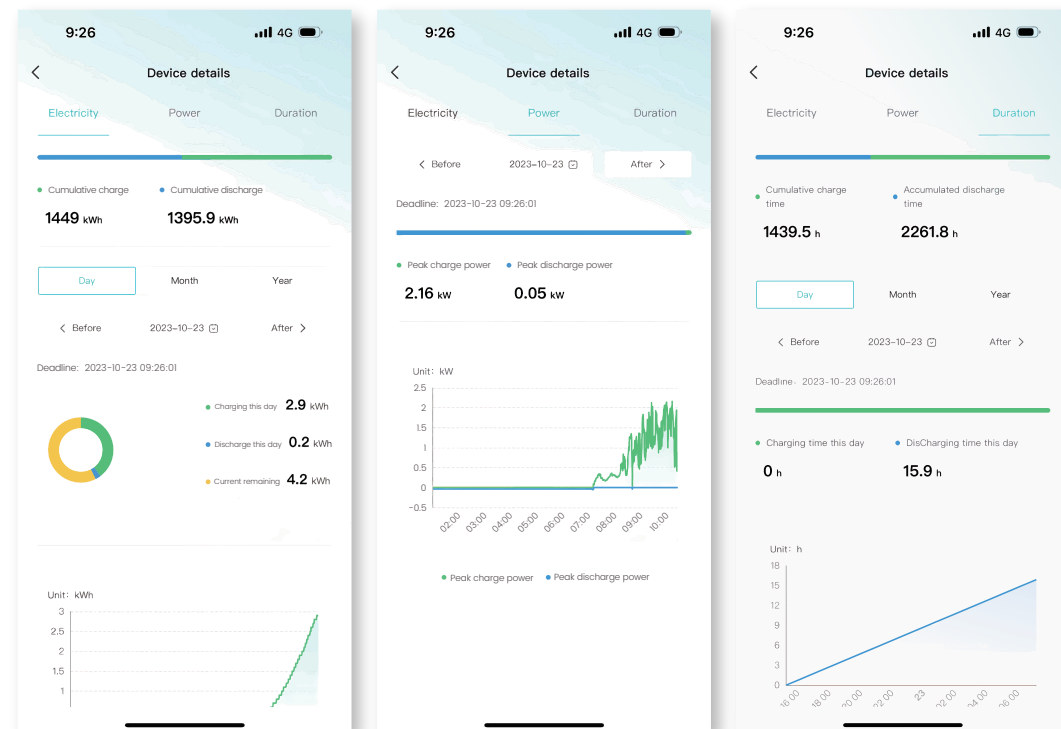
- The bottom area:

Displays the device battery, charging time, and health check overview data of the day in the form of a card. You can click the corresponding card to view the details.



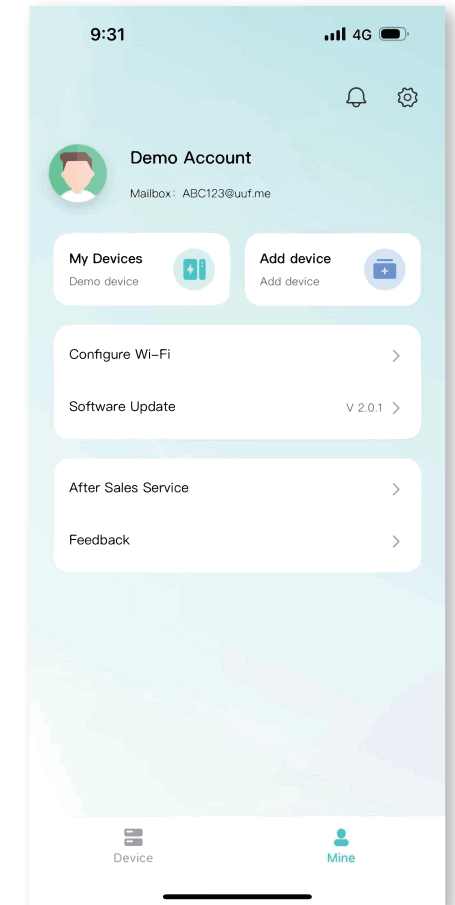
6.2 Data details:

Display the data details of the current device, and view the battery, charging and discharging power, and charging and discharging time data separately, and support time filtering.

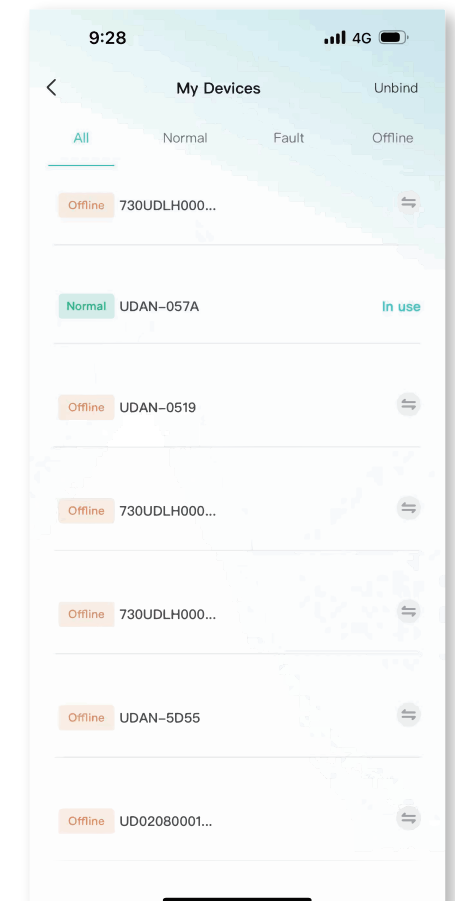


6.3 Mine

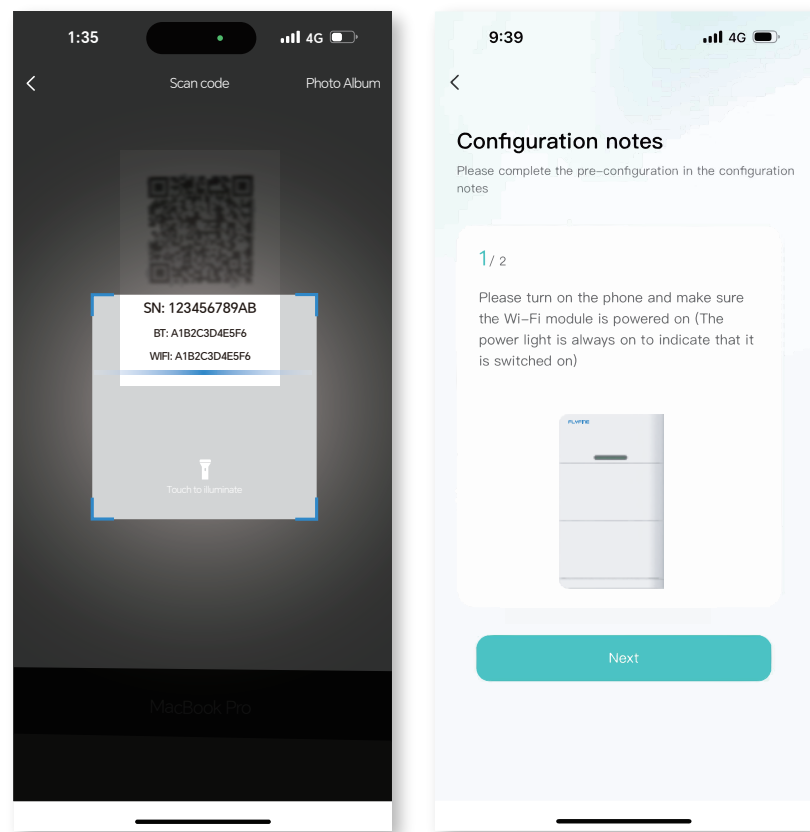
- My page allows users to view my devices, add devices, configure WiFi, software updates, after-sales services, problem feedback, app settings.



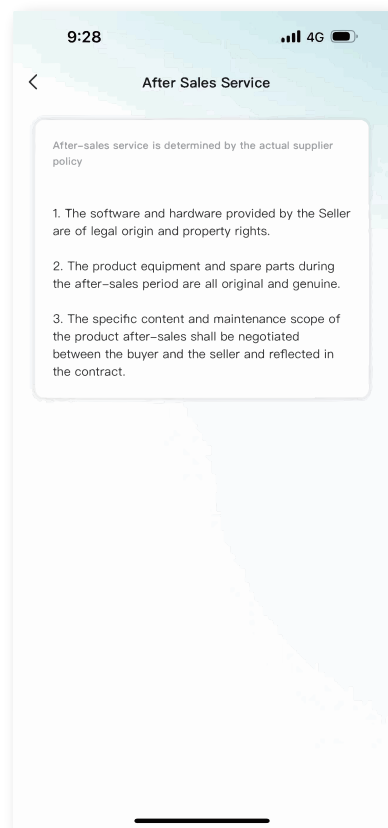
- Click "My Devices" to enter Facility Management. You can view all devices managed under the current account, switch devices displayed on the homepage, unbind devices, and other operations.



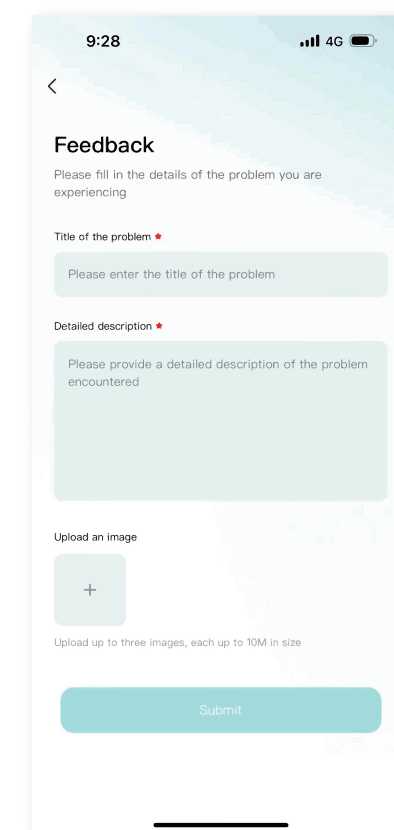
- Click "Add Device" to enter the code scanning page.
- Click "Equipment Distribution Network" to enter the equipment distributionnetwork process.



- After clicking "software update", it will enter the version detection. If there is a new version, it will be updated.
- Click "after-sales services" and enter the after-sales services page to display the after-sales services declaration of the current supplier.

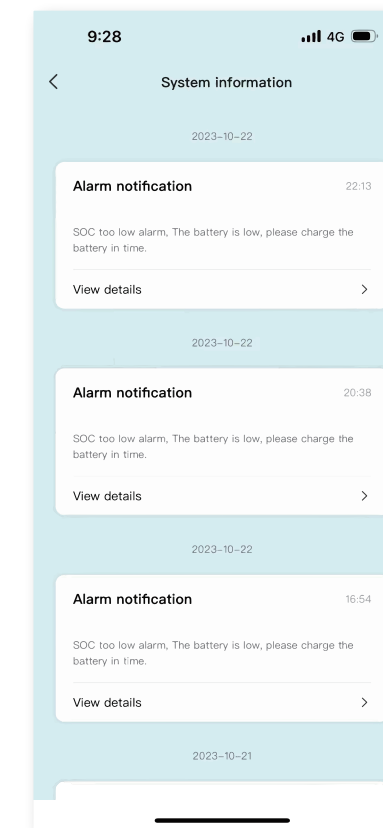


- Click "Feedback" to enter the feedback page. You can enter the current problem that needs feedback and submit it.



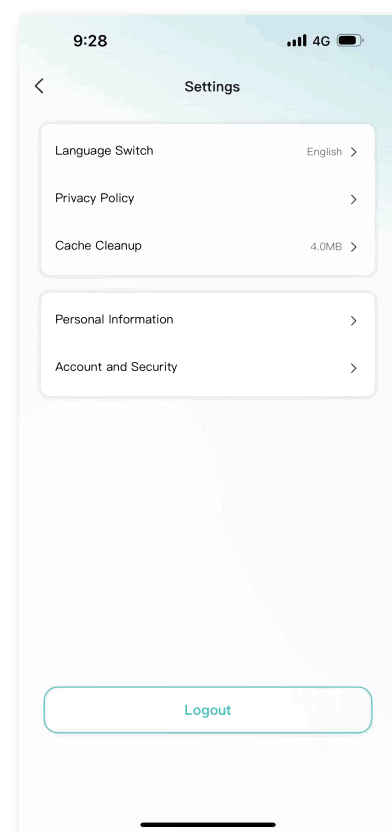
6.4 Message

Click on the device or my page, the message icon above, you can enter the inbox page to view the curent notification or chat history.



6.5 App settings

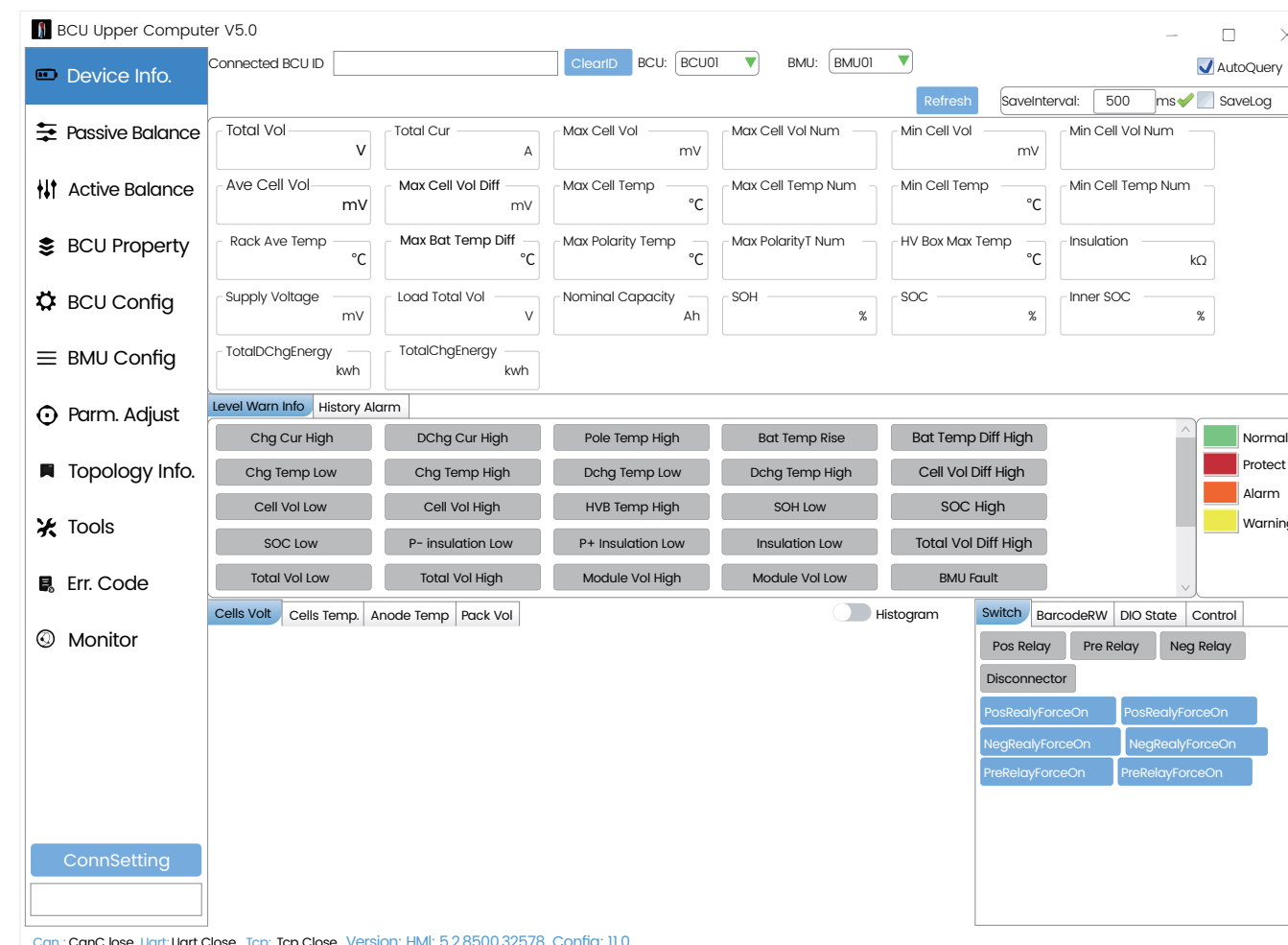
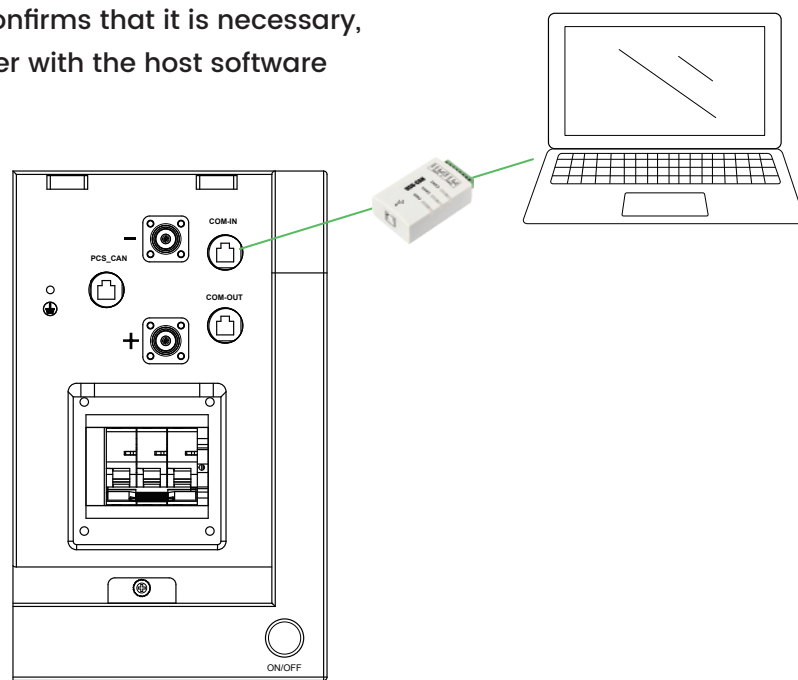
- Click My Pages - Settings icon in the upper-right corner to enter the AppSettings page.
- Settings page support: language switching, Privacy Policy, cache cleaning, personal information, account and security.



Appendix 1

A Host soft operation:

When the equipment manufacturer confirms that it is necessary, it can authorize to provide the customer with the host software and operating instructions.



Appendix 2

Troubleshooting

1. Battery pack stop work.

- A: Turn on switch, be sure it is ON; if battery is low SOC, it needs charging in.
- B: Battery pack low volt or enter sleep mode, there you will press down power switch button, then charge in.

2. No communication, inverter can not received any DATA from BMS.

- A: Check whether if communication cable is OK.
- B: Replace the communication line. Please give feedback to the dealer and exchange it.
- C: Check inverter or other device which connect to BMS, update its firmware.
- D: If the communication function needs to be upgraded, please consult the agent or manufacturer.
- E: Confirm your inverter and battery protocol is correct, different protocol or different connection will make a mistake.

3. Battery pack report SOC is mistake.

A: Inverter received Data from Master BMS, but it is SOC < total SOC, sample as: packs has 50Ah capacity, but inverter read DATA is 30Ah. So you may check every cell Voltage unbalance. This will lead to lower SOC.

B: SOC DATA has Large tolerance.

Discharge empty the battery first, then charge it fully with a small current, and learn to discharge. Any pack is mistake, we advice you read the BMS Data (When we authorize the terminal to use) with host software. Then we reset the BMS and calibration.

4. How to turn on the Pack to discharge. we recommend method is:

A: Reset the power switch, then restart bms system.

B: Turn on the power switch on the bottom/front panel.



WARNING: The operating parameters of the equipment cannot exceed the rated working voltage and current of the Pack, exceed the rated volt and current, Can cause damage to the Pack or other failures.

5. Inverter or other external device can not connect the battery. we recommend method is:

A: Check whether the working parameters of the device and battery are appropriate, and improper parameters cannot be matched.

B: It is necessary to update BMS parameters and match the device, then Reset BMS and restart your device.

6. Replace bad Pack.

There is a bad battery pack, it is need to replace, please connect your supplier, need professional installers to operate it. We recommend replace all or make pack has same voltage and same specification batteries pack.

NOTE: When replacing the battery, the same module needs to be replaced at the same time, and the voltage should be the same.

7. Need to replace spare parts or emergency maintenance.

Some parts can be obtained from the sales or agency, and the excess parts need to be purchased separately. Be careful, turn off the power switch before replacing parts.

8. Need to place some safety device for keep a safe environment.

You'd keep a safe case for Pack and external device, Please place safety device. As: fire-fighting sand, fire-fighting blankets, fire-fighting water pipes.

Install Monitor sound, light, electricity, smoke and other equipment.

WARNING:

Emergency process:

1. The external device catches fire and explodes:

A: Under the condition of ensuring safety, non-operating personnel immediately move to a safe location.

B: Under the condition of ensuring safety, the operator immediately cut off the external power supply of the equipment and the internal power supply.

C: Use fire-fighting equipment for fire-fighting treatment (the use of fire-fighting sand, fire-fighting blankets, fire-fighting water pipes).

D: If you cannot completely extinguish the fire, please call the local fire department for help.

E: Keep the accident site data so that the source of the accident can be traced.

2. The Pack catches fire and explodes:

A: Under the condition of ensuring safety, non-operating personnel immediately move to a safe location.

B: Under the condition of ensuring safety, the operator immediately cut off the external power supply of the equipment and the internal power supply.

C: Use fire-fighting equipment for fire-fighting treatment (First the use of fire-fighting sand, fire-fighting blankets, then fire-fighting water pipes for cool the Pack)

D: If you cannot completely extinguish the fire, please call the local fire department for help.

E: Keep the accident site data so that the source of the accident can be traced.

END

FLYFINE DIGITAL ENERGY CO.LTD

