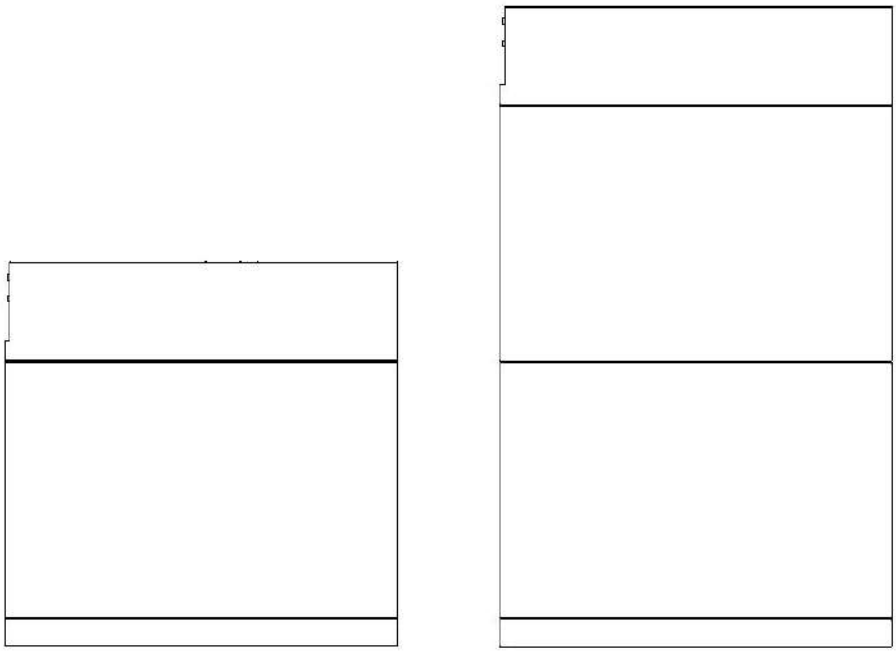
User Manual

Energy Storage System

TG-ESS-9HV-S1 TG-ESS-9HV-S2



About This Manual

The manual primarily encompasses product information, along with installation, operation, and maintenance guidelines.

It will refer to the device as the "TG-ESS-9HV-S1 TG-ESS-9HV-S2" unless otherwise specified.

- Target Group

  This manual is intended for professional technicians who have responsibilities for the installation, operation, and maintenance of inverters, as well as users who need to check inverter parameters.

  Installation Requirements:

  The installation of the TG-ESS-9HV-S1 TG-ESS-9HV-S2 should only be carried out by professional technicians who meet the following requirements

- Possess knowledge of electronics, electrical wiring, and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Have received professional training related to the installation and commissioning of electrical equipment.
- Capable of promptly responding to hazards or emergencies that may arise during the installation and commissioning process.
- Familiar with local standards and relevant safety regulations pertaining to electrical systems.
- Thoroughly read this manual and understand the safety instructions associated with the operations.
- **Symbols**

  This manual incorporates crucial safety instructions that are emphasized using specific symbols. These symbols are employed to ensure the safety of individuals and property during product usage or to assist in maximizing product performance efficiently.

  It is essential to thoroughly comprehend the significance of the warning symbols to enhance your utilization of the manual.

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Contents

1 Introduction

This series is a complete solution for lithium iron phosphate battery systems in the field of household energy storage. It includes two installation methods: wall mounted and vertical installation. The system is safe and reliable, It can be used in home storage.industrial and commercial energy storageand other fields 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.

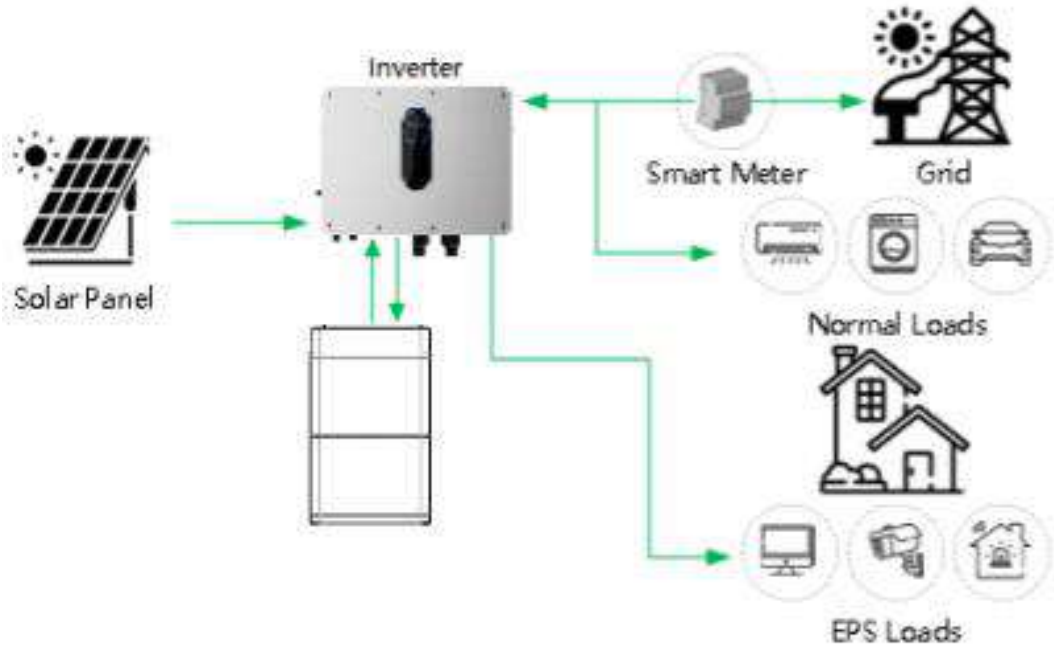
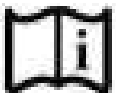


Figure 2-1 Energy storage System Overview

2 Symbols Explanation

2.1 Symbols on the type label and warning label of the battery pack.

Symbol	Explanation
	Beware of a danger zone This symbol indicates that the battery pack must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Risk of chemical burns
	Risk of explosion
	Observe the documentation
	Risk of electrolyte leakage
	CE marking The product complies with the requirements of the applicable EU directives.
	Refer to the instruction for operation
	Use eye protection
	Fire, naked light and smoking prohibited
	Install the product out of reach of children
	Do not dispose of the battery pack together with the household waste but in accordance with the locally applicable disposal regulations for batteries
	Recycling code

UN38.3	Marking for transport of dangerous goods The product passes the certifications of the UN38.3

2.2 Emergency

2.2.1 Leaking Batteries

Improper handling, misuse, or physical damage to the battery may lead to increased internal cell pressure, potentially resulting in electrolyte leakage or venting. In the event of electrolyte release:

Immediate Actions:

Do not enter the affected area under any circumstances.

Avoid direct contact with leaked liquid or gases.

Contact local emergency services or the Fire Brigade if necessary.

First Aid Measures for Exposure:

Inhalation: Immediately evacuate to fresh air and seek medical attention.

Eye Contact: Rinse thoroughly with copious amounts of water for at least 15 minutes, holding eyelids open. Seek immediate medical assistance.

Skin Contact: Wash affected areas with plenty of water for at least 15 minutes. Remove contaminated clothing carefully and continue rinsing. Seek medical help if irritation persists.

Ingestion: Do not induce vomiting unless instructed by medical personnel. Rinse mouth with water and seek urgent medical care.

Spill Containment:

Carefully wipe the affected area using a water-soaked sponge or cloth.

Caution: Electrolyte exposure can cause severe chemical burns, skin irritation, or eye damage (including blindness). Handle with extreme care.

2.2.2 Fire

Despite rigorous design safeguards, lithium-based batteries may pose a fire risk under certain conditions. External factors such as exposure to open flames, excessive heat, or thermal abuse can also lead to battery ignition.

Fire Emergency Protocol

In case of a battery fire:

Access Restriction: Only trained firefighters equipped with full protective gear and self-contained breathing apparatus (SCBA) may enter the affected area.

Extended Burn Risk: Complete extinguishment may require prolonged effort due to thermal runaway propagation. If the fire cannot be controlled safely, consider controlled burning under monitored conditions.

Smoke Observation: Persistent smoke indicates ongoing combustion. Maintain a safe distance—reignition is possible even after apparent suppression.

Firefighting Procedures

In the event of a fire, follow these steps in sequence:

Isolate Power Sources

Immediately shut down all connected electrical systems, including:

Battery and battery isolator

PV DC isolator(s)

AC isolator

Solar supply main switch

Normal supply main switch

Initial Fire Suppression

From a safe distance, perform sufficient fire knockdown before approaching the hot zone.

Battery Fire Response

If the battery is actively burning, use:

Firefighting sand

CO_2 extinguisher

Other fire department-approved suppression equipment

Note: Lithium battery fires may require continuous water application for cooling.

Non-Battery Fire Containment

For fires not involving the battery:

Use an ABC-class fire extinguisher

Immediately remove all batteries and potential ignition sources from the area

Critical Reminders:

Always maintain a safe distance - battery fires may reignite

Structural fires near batteries should be treated as potential battery fires

Never compromise personal safety - evacuate if conditions deteriorate

2.2.3 Damaged Batteries

The battery system utilizes lithium-ion dry cell technology. While these batteries are designed to minimize electrolyte leakage, physical damage may result in limited fluid release.

Thermal Hazard Warning:

Cell damage can trigger rapid temperature escalation. If smoke is observed emanating from the battery compartment:

Immediately treat this as an active battery fire

Initiate emergency protocols as outlined in Section 2.2.2 (Fire Response Procedures)

Damaged Battery Handling Protocol:

Compromised batteries present significant safety risks and must be:

Considered permanently unfit for service

Isolated from personnel and sensitive equipment

Mandatory Disposal Procedure:

Containment: Securely package the damaged unit in its original protective casing

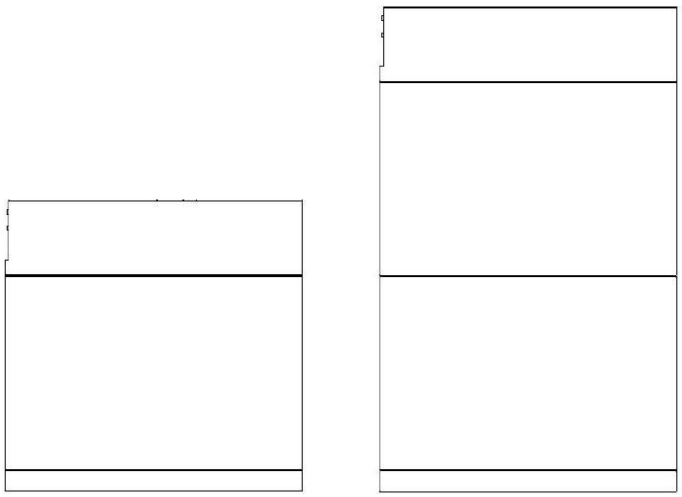
Quarantine: Store in a dedicated, fire-resistant isolation area matching the installation's safety rating

Notification: Immediately contact TGpro's technical support team for professional disposal guidance

3 Product Parameters

3.1 Appea**rance**

The image shown here is for reference only. The actual product received may differ.

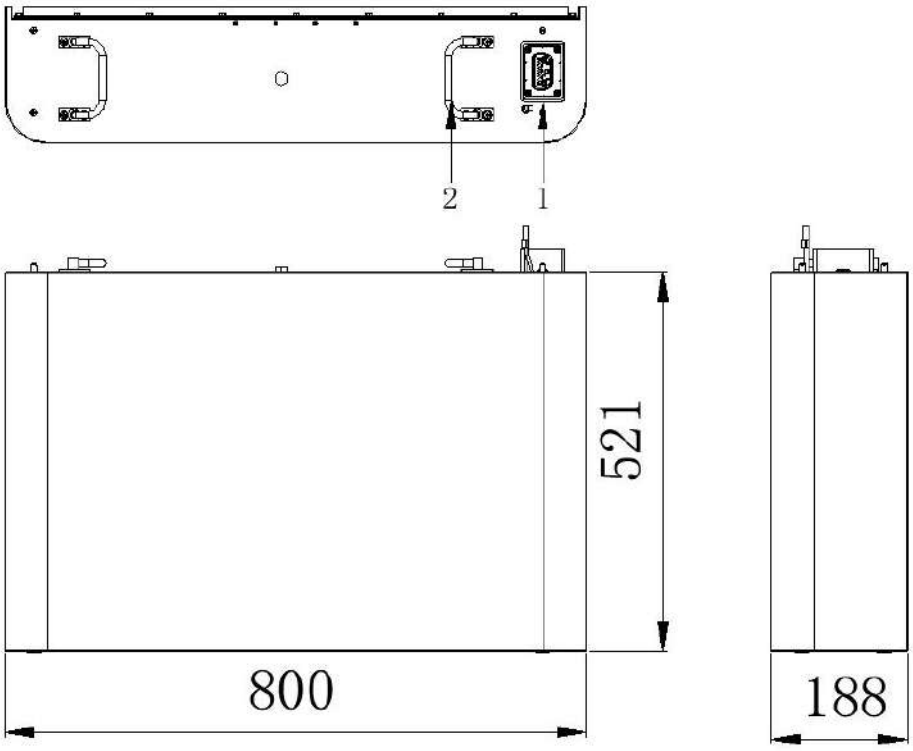


Appearance

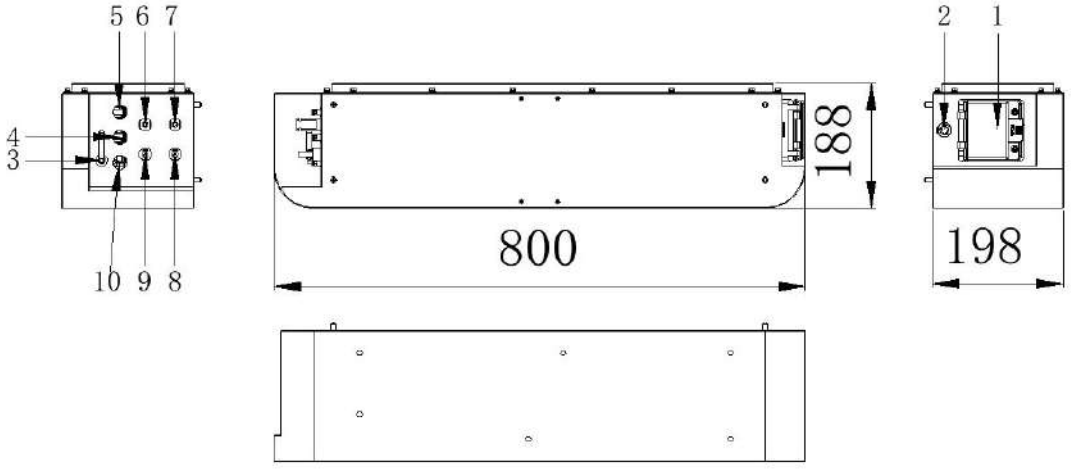
Model	**TG-ESS-9HV-S1 （9.6KWh）**	**TG-ESS-9HV-S2（19.2KWh）**
Cell combination	60S1P*1	120S1P
Rated Capacity	50Ah	50Ah
Factory Voltage	192~198V	384~396V
Voltage at end of Discharge	168V	336V
Charging Voltage	210V	420V
Standard charge	25A	
Standard discharge	25A	
Maximum Continuous Charge Current	45A	
Maximum Continuous Discharge Current	49A	
Operation Temperature Range	Charge:0~55℃	
	Discharge: -20~60℃	
System size	800*188*782MM	800*188*1304MM
System weight	115KG	207KG

3.2 Product Description

Battery Interface Introduction



No.	Description	Silk-screen	Remark
1	Connector	/	
2	handle	/	



Main control box Interface Introduction

No.	Description	Silk-screen	Remark
1	DC air switch	DC switch	
2	E-switch	ON/OFF	
3	WI-FI-master control	Connect to the communication module of the main control box	
4	communication	OUT	Parallel communication portl communication port
5	communication	IN	Parallel communication port
6	communication	OUT	Parallel communication port
7	Battery expansion port	Parallel+	
8	Battery expansion port	Parallel-	
9	Battery positive electrode output	P+	
10	CAN bus Port	CAN	bus and inverter connection port

4.Storage and Transport

4.1. Storage

4.1.1. Battery Storage

The following requirements should be met if the battery pack is not put into use directly:

1.Place batteries according to the signs on the packing case during storage. Do notput batteries upside down or sidelong.

2.Stack battery packing cases by complying with the stacking requirements on theexternal package.

3.Store the battery pack out of reach of children and animals.

4.Store the battery pack where it should be minimal dust and dirt in the area.

5.Handle batteries with caution to avoid damage.

6.The storage environment requirements are as follows:

a.Ambient temperature: -10~55°C, recommended storage temperature: 15~30°C

b.Relative humidity: 15%~ 85%

c.Place batteries in a dry and clean place with proper ventilation.

d.Place batteries in a place that is away from corrosive organic solvents and gases.

e.Keep batteries away from direct sunlight.

f.Keep batteries at least 2 meters away from heat sources.

7.The batteries in storage must be disconnected from external devices. The indicators(if any) on the batteries should be off.

8.Batteries should be delivered based on the "first in, first out" rule.

9.The warehouse keeper should collect battery storage information every month andperiodically report the battery inventory information to the planning department.The batteries that have been stored for nearly 6 months should be recharged timely.

10.If a lithium battery is stored for a long time, capacity loss may occur. After a lithiumbattery is stored for 12

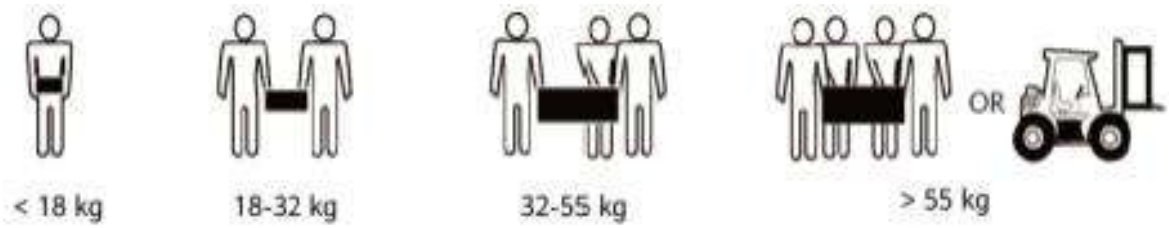
months in the recommended storage temperature, theirreversible capacity loss rate is 3%~10%. It is recommended that batteries not bestored for a long period. If the batteries need to be stored for more than 6 months,it is recommended to recharge the batteries to 65~75% of the SOC.

4.2. Transport

During transportation, please follow these guidelines:

1.Priority to use the original packaging for transportation. If the original packagingis not available, put the product inside a suitable cardboard box and seal it properly.

2.Handle with care, choose the corresponding handling method according to theweight, and pay attention to safety;



3.During transportation, please keep the packaging away from dangerous sourcesand take waterproof measures;

4.Please fix the packaging during transportation to prevent falling or mechanicalimpact;

5.Mounting

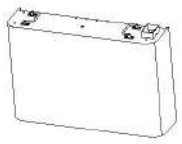
5.1. Checking the Outer Packing

Before unpacking the product, check the outer packing for damage, such as holes and cracks. If any damage is found, do not unpack the product and contact your dealer as soon as possible.

5.2. Scope of Delivery

Check the scope of delivery for completeness and any externally visible damage.

Contact your distributor if the scope of delivery is incomplete or damaged.

				
A	B	C	D	E
				
F	G	H	I	J

Iterm	Name	Quantity
A	Battery Module	1~2
B	Base	1
C	Top Bracket	1*N
D	Mounting screws	4*N
E	M4 Flat-head screws	4*N
F	Confluence box.	1
G	Positive output line	1
H	Negative output line	1
I	Inverter communication line	1

5.3. Requirements for Mounting

WARNING

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires.

- Do not mount the system in areas containing highly flammable materials or gases.
- Do not mount the system in potentially explosive atmospheres.

5.3.1. Basic Requirements

- The TG-ESS-9HV-S1 TG-ESS-9HV-S2 is suitable for indoor and outdoor use.

For battery pack, we have both indoor version and outdoor version, please check the batter type label.

- Do not mount the system in areas with flammable or explosive materials.
- Do not mount the Battery at a place within children's reach.
- Do not mount the system outdoors in salt areas because it will be corroded there and may cause fire. A salt area refers to the region within 500m from the coast or prone to sea breeze. The regions prone to sea breeze vary depending on weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

5.3.2. Mounting Environment Requirements

- The system must be mounted in a well-ventilated environment to ensure good heat dissipation.
- When mounted under direct sunlight, the power of the system may derate due to additional temperature rise.
- Mount the system in a sheltered place or mount an awning over the product.
- The optimal temperature range for the battery pack to operate is from 15 to 30℃.
- Do not expose or place near water sources like downspouts or sprinklers.
- If the battery pack is mounted in the garage, then ensure that it is above the height of the vehicle bumper and/or door.

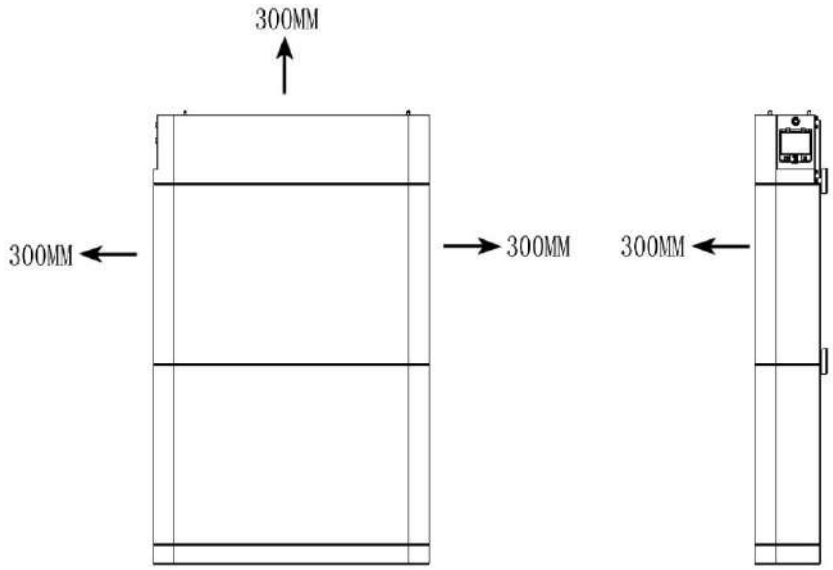
5.3.3. Mounting Structure Requirements

- The mounting structure where the system is mounted must be fireproof.
- Do not mount the system on flammable building materials.
- Ensure that the mounting surface is solid enough to bear the weight load.

5.3.4. Mounting Space Requirements

- Reserve sufficient clearance around the product to ensure sufficient space for installation, maintenance and heat dissipation.
- The side clearance is a recommendation. Keep the clearance as short as you can if there is no influence to the operation and maintenance.

Recommended clearances for TG-ESS-9HV-S1 TG-ESS-9HV-S2 series

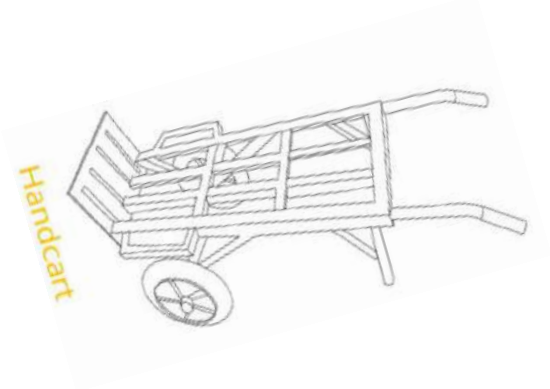


5.4 Necessary installation Tools

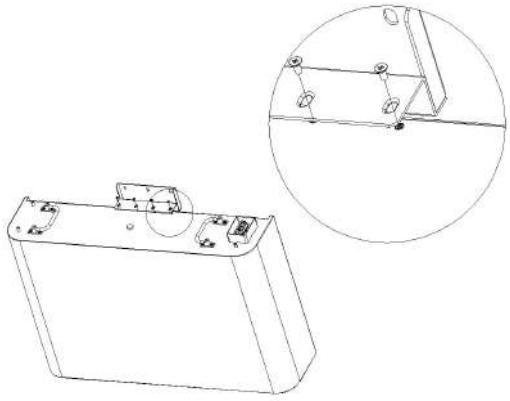
5.5. Mounting the Product

5.5.1 For TG-ESS-9HV-S1 TG-ESS-9HV-S2 series batteries

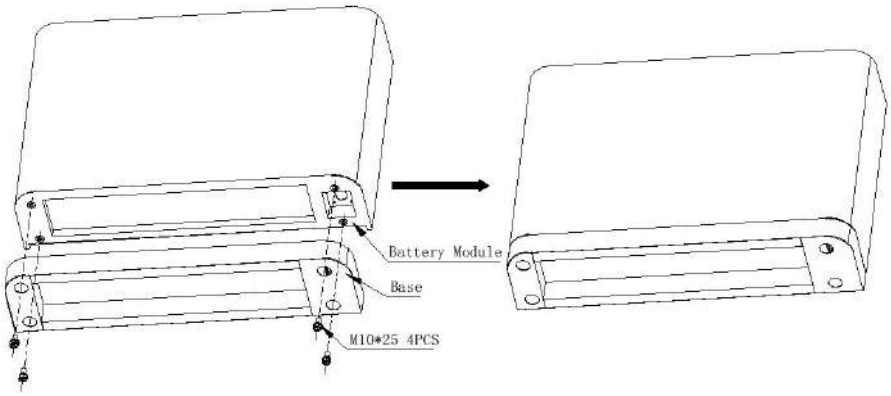
Take out the battery from the carton, transport it to the installation site tied to a handcart whose bearing capacity should be more than 200kg.



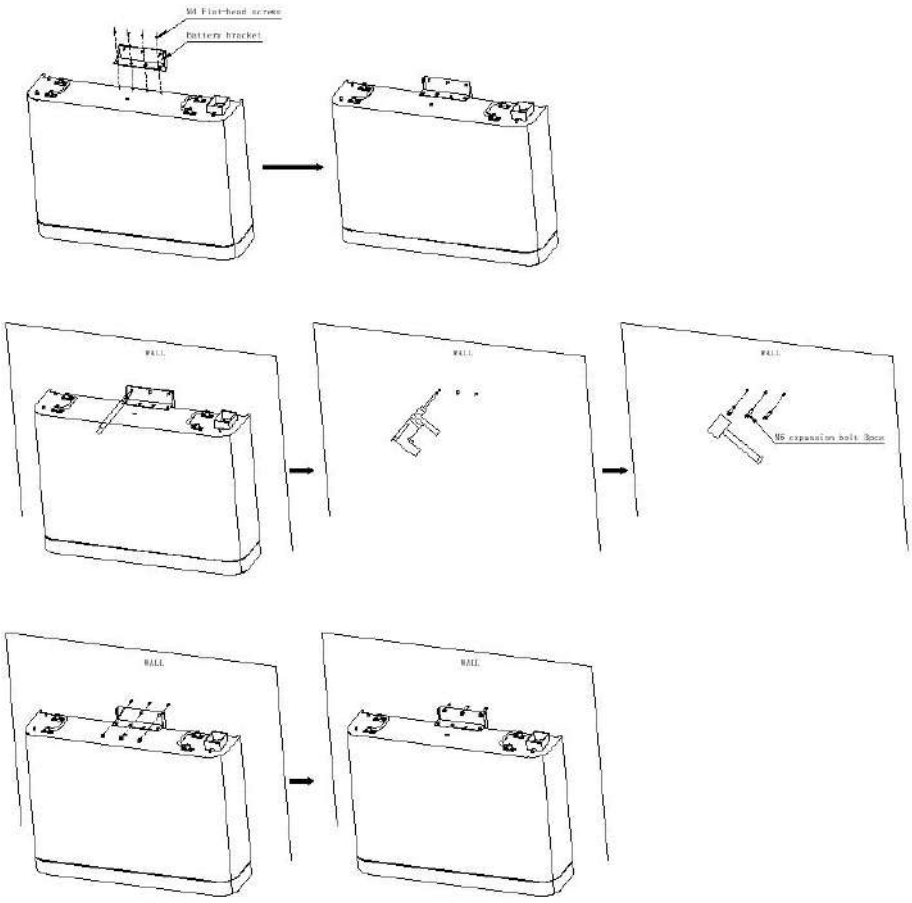
Step 1: fix the lug and the battery module with M4 head screws



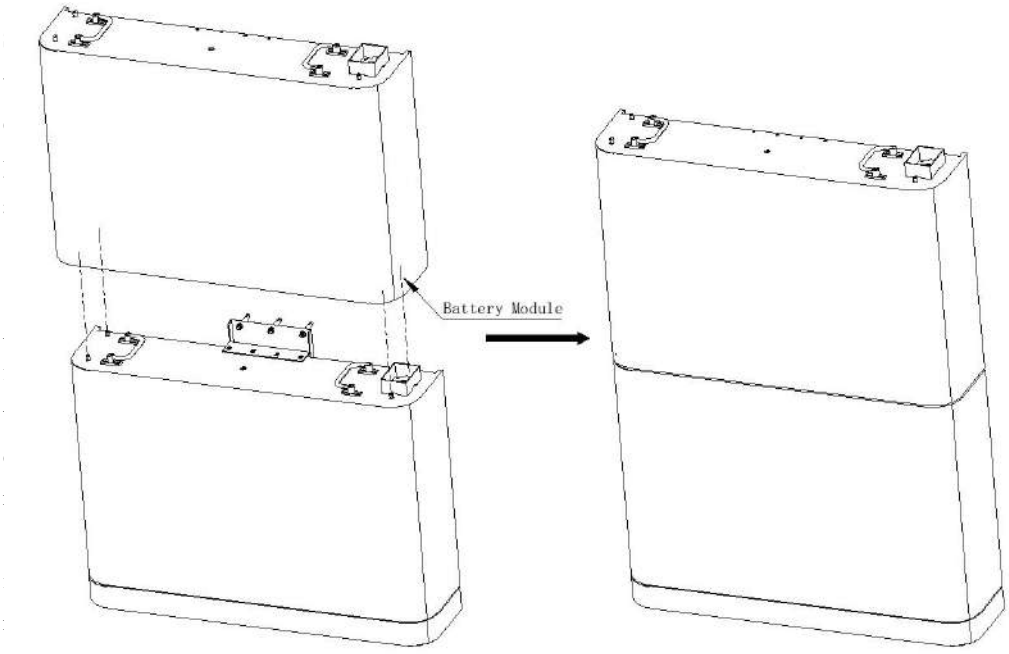
Step 2: Align the bolt holes on the bottom cover with the bolt positions on the battery pack, and use M10*25 bolts to secure them as shown in the diagram.



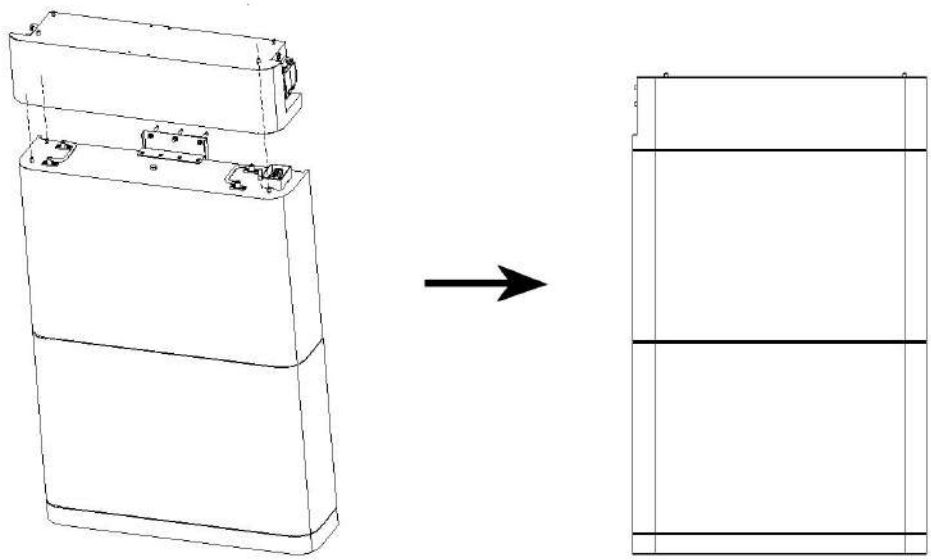
Step 3: After marking the wall with a marker, remove the battery pack. Drill a hole with a diameter of 10 on the wall using an impact drill, with a depth of 60MM. Knock the yellow rubber plug into the hole. Move the battery to the perforated wall and secure it with screws.



Step 4: Follow Step 3 to install the remaining battery packs in turn。



talling the battery module according to the system capacity, finally install the combiner box.



6.Electrical Connection

Precautions

DANGER

Before connecting the cables, please ensure that all circuit breakers and switches of the battery pack are in the closed state. Otherwise, the dangerous voltage of the energy storage system may cause electric shock.

WARNING

The energy storage system damage caused by incorrect cable connections is not covered under any warranty.

Only certified electricians are allowed to connect cables.

Operation personnel must wear proper PPE when connecting cables.

NOTICE

The cable colors shown in the electrical connection diagrams provided in this chapter are for reference only.

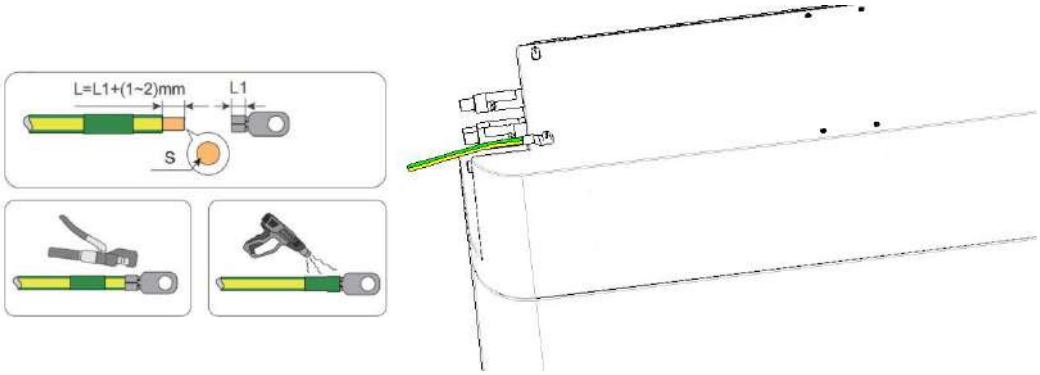
Select cables in accordance with local cable specifications (green-and-yellow cables are only used for PE).

6.1. Cable Requirements for Connection

No.	Cable	Type	Conductor Cross Section Area Range	Outer Diameter	Source
1	Battery power cable	EV cable	10mm2	N/A	Delivered with the battery
2	Signal cable	Standard network ca-ble in the industry (recom-mended type: Cat5e, FTP, UV-resistant for outdoor use)	0.12 ～ 0.2 mm2(AWG26~AWG24)	N/A	Delivered with the battery

6.2. Connecting Additional Grounding

Prepare M6 OT terminals, strip the grounding cable insulation, insert the stripped part of the grounding cable into the ring terminal lug and crimp using a crimping tool. Fixed on the pin of M8.

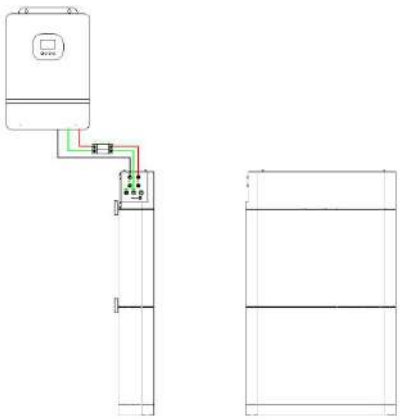


6.3 Connection Description

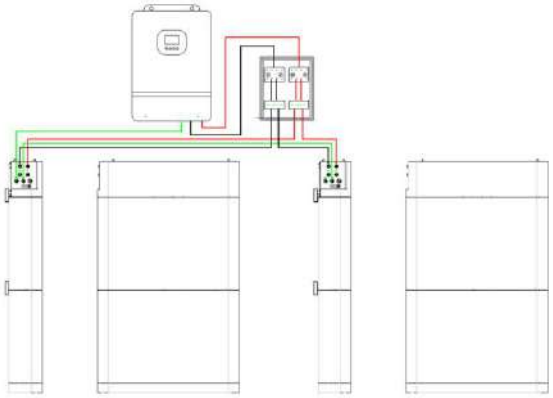
6.3.1 Schematic diagram of battery system to inverter wiring.

Connect the communication line to the inverter. The battery output line needs to be connected to an external circuit breaker. Lock the positive and negative terminals of the battery and device respectively onto the circuit breaker. As shown in the figure (note: do not reverse the positive and negative poles).

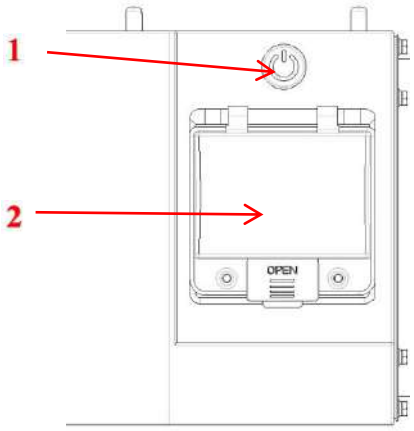
Circuit breaker used between the inverter and the high-voltage battery, we recommend using molded case circuit breakers with a rated operating voltage greater than 500V and a rated operating current greater than 63A. When connecting the power cord, it is necessary to use terminals of the same color for connection, otherwise there may be risks such as short circuits.The DC circuit breaker installed between the battery system and PCS needs to be purchased and installed separately.



6.3.2 chematic diagram of battery system expansion and inverter wiring



6.3.3 Battery power on/off



Check the following items before starting the battery:

Check that the battery system has been installed completely.

Check that the appearance of the battery system is intact.

Check that the battery system output wiring harness is correctly connected to thepositive and negative terminals of the battery and hybrid inverter to avoid misconnectionand reverse connection.

A: Battery power on

Step 1:Press the power switch ① to start the battery. After the green status indicator light on the power button lights up, the battery management system (BMS) has entered a self check state. Indicates that the battery system is powered on and operating normally.

step 2 Turn on the DC switch ② to allow the battery to output.

B: Battery power off

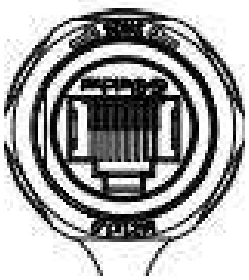
step 1 Disconnect the Do circuit breaker ②

step 2 Press the power switch ① until the button switch light goes out

step 3 One minute after the DC circuit breaker is disconnected, disconnect all cables between thebattery and other devices.

7 BMS Comm. Interface

If 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.

<table>
<tr><td rowspan="6">External communication</td><td rowspan="6">  </td><td colspan="4">CAN And RS485A interface</td></tr>
<tr><td>RJ45 Pin</td><td>Definition Description</td><td>RJ45 Pin</td><td>Definition Description</td></tr>
<tr><td>1</td><td>RS485A_B</td><td>5</td><td>CAN_L</td></tr>
<tr><td>2</td><td>RS485A_A</td><td>6</td><td>NC</td></tr>
<tr><td>3</td><td>NC</td><td>7</td><td>RS485A_A</td></tr>
<tr><td>4</td><td>CAN_H</td><td>8</td><td>RS485A_B</td></tr>
</table>

8.App Download

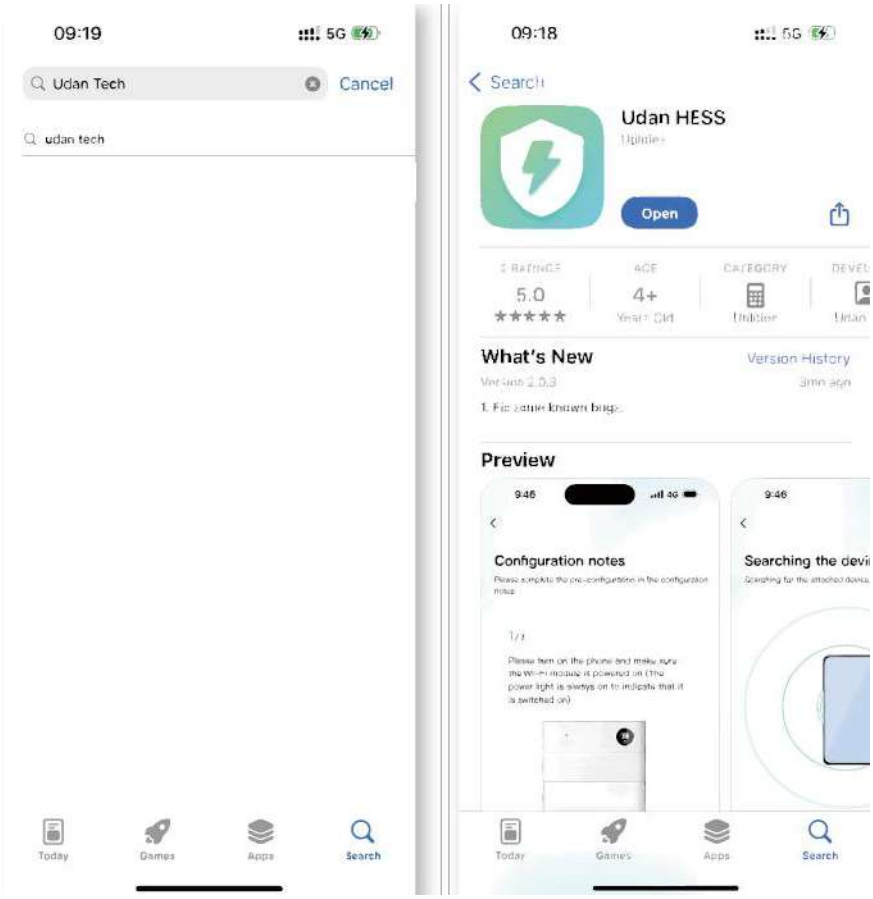
8.1 Android version

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.

Move the mouse to the image area to scan the code to download

8.2 IOS version

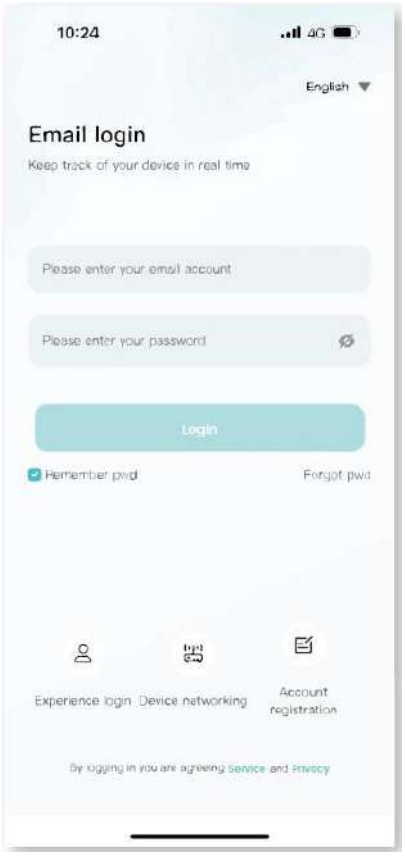
Enter the mobile App Store, searchfor "Udan Tech ", and you candownload and install it.



8.3 Log in and register

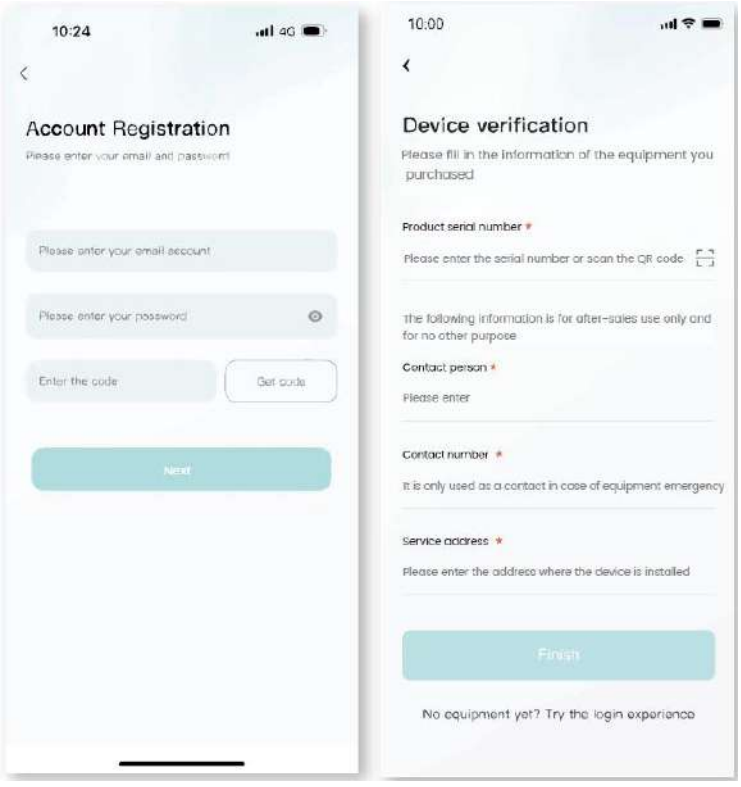
8.3.1 Log in:

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



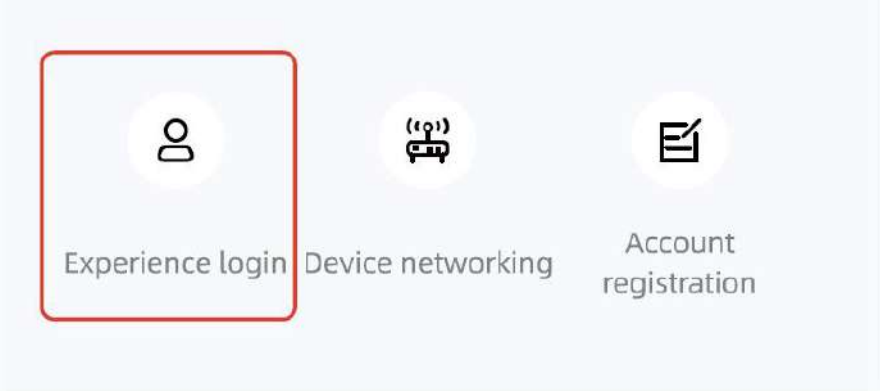
8.3.2 Register:

At the bottom of the login page!click the "Account Registration'button to enter the registrationprocess. Currently, you can register withan email account. After registration,you need to go through the deviceverification process and enter thedevice SN code or device QR codefor identification.



8.3.3 Experience login

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



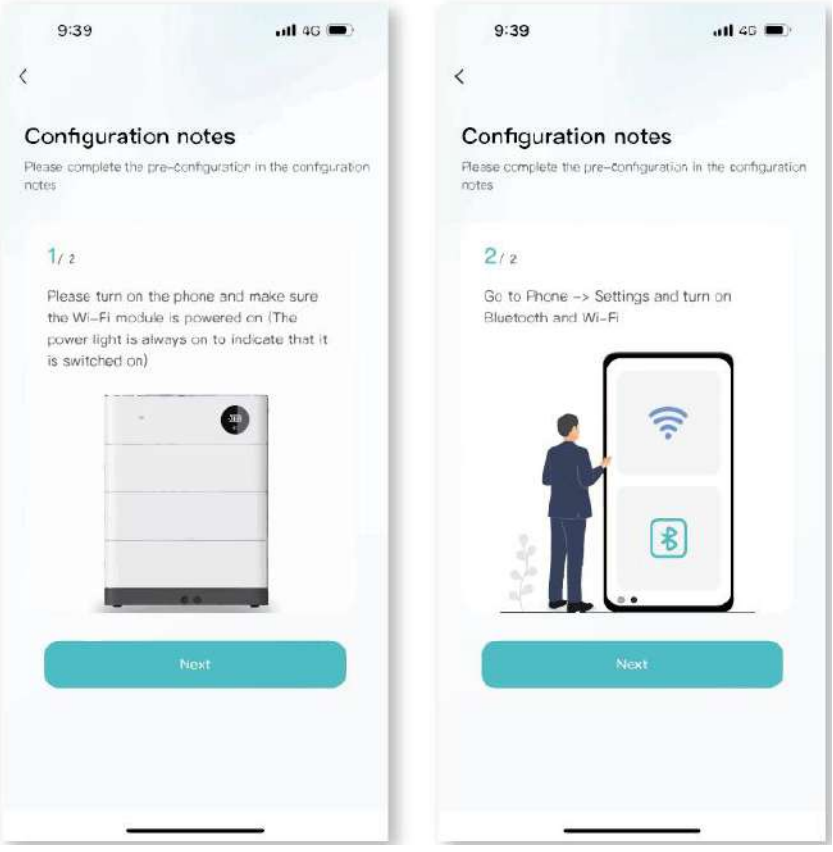
8.4. Equipment distribution network

8.4.1 overview:

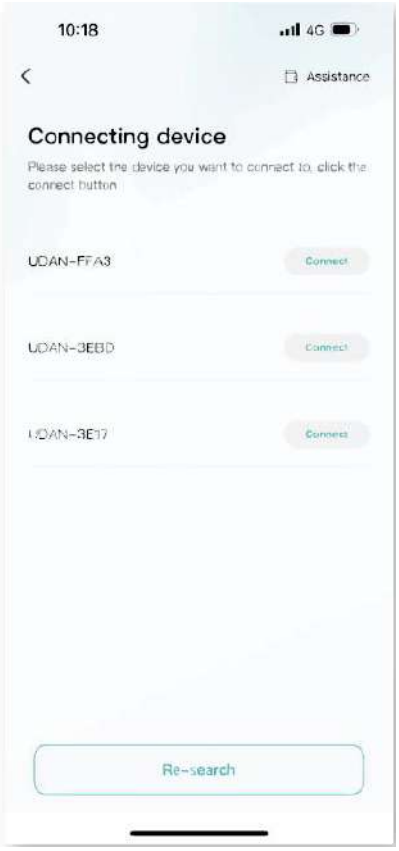
Device distribution network refers to connecting devices to the Cloud Computing Platform to helpusers obtain real-time device data information.

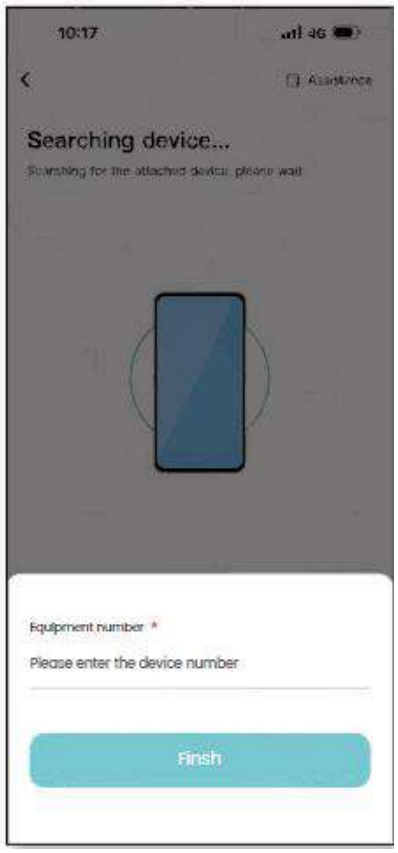
8.4.2 Distribution process

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



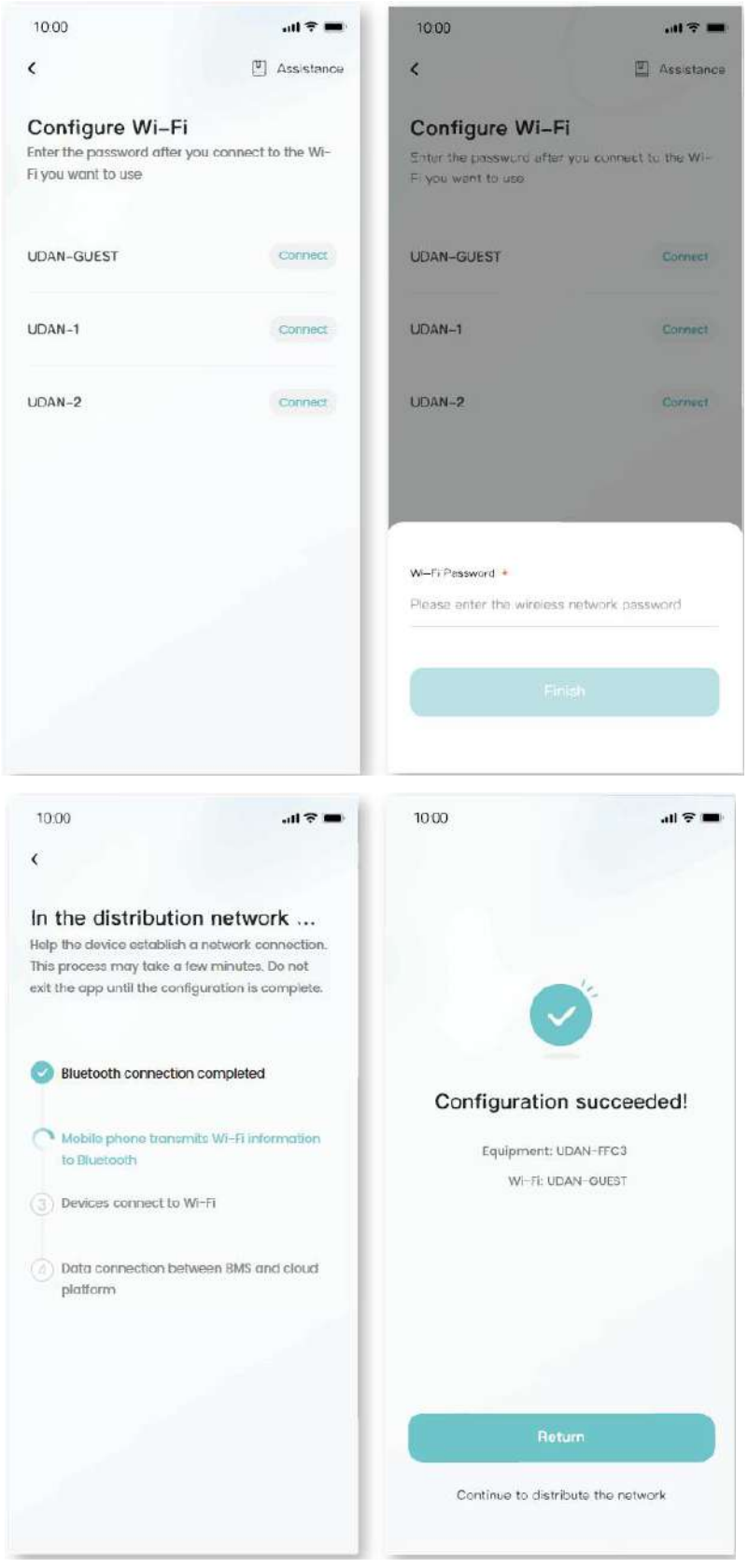
② Connected devices: The current App supports Bluetooth search, device scanning, and manual input of SN code.





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

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



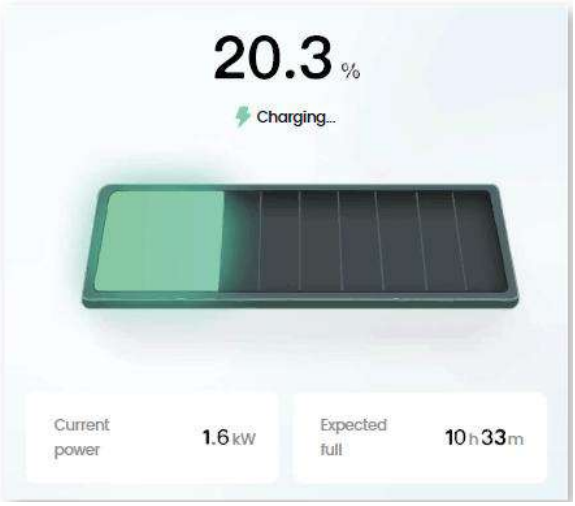
8.5 App page

8.5.1 Equipment

The device homepage is used to displaythe currently managed deviceinformation.

The top area displays the device namebattery energy, and message entry.

Middle area: Displays the current batterycharging and discharging status, batterypercentage, current power, and estimatedfull time.

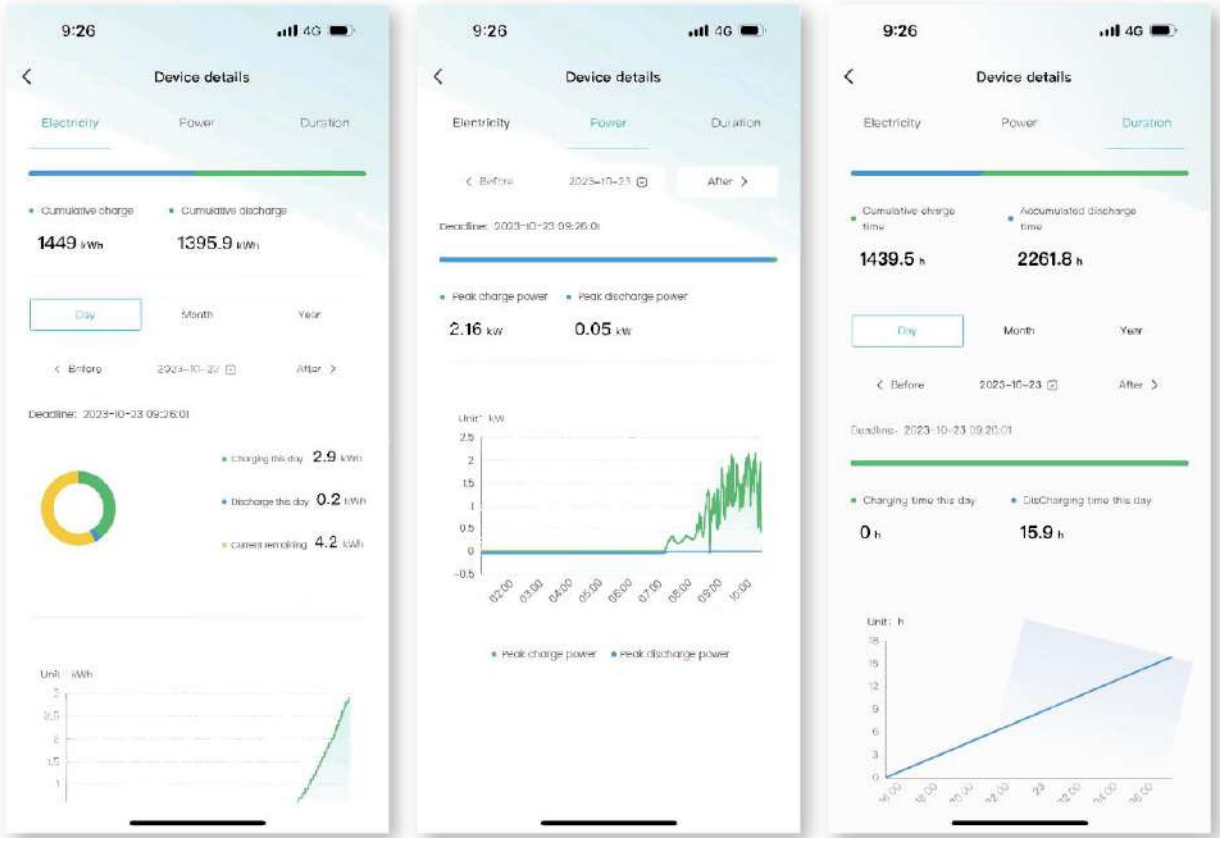


● The bottom area:

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

8.5.2 Data details:

Display the data details of the current device, and view the battery, charging anddischarging powerand charging and discharging time data separately, and supporttime filtering.



8.5.3 Mine

● My page allows users to view my devices, add devices, configure Wifi, softwareupdates, after-sales seryices.problem feedback.
app settings.

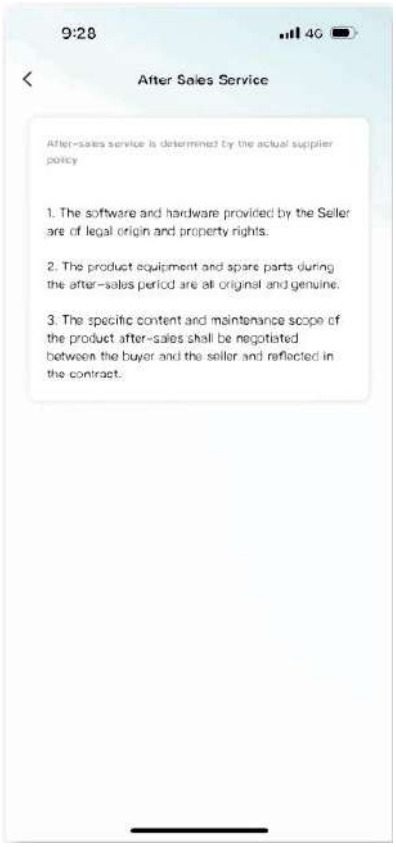
● Click "My Devices" to enter FacilityManagement. You can view alldevices managed under the currentaccount, switch devices displayed onthe homepage, unbind devices, andother operations.

●Click "Add Device" to enter thecode scanning page.

●Click "Equipment DistributionNetwork to enter the equipmentdistributionnetwork process.

● After clicking "software update", it will enter the version detection. lf there is a new version, itwill be updated.

● Click"after-sales services" and enter the after-sales servicespage to display the after-sales services declaration of the currentsupplier.

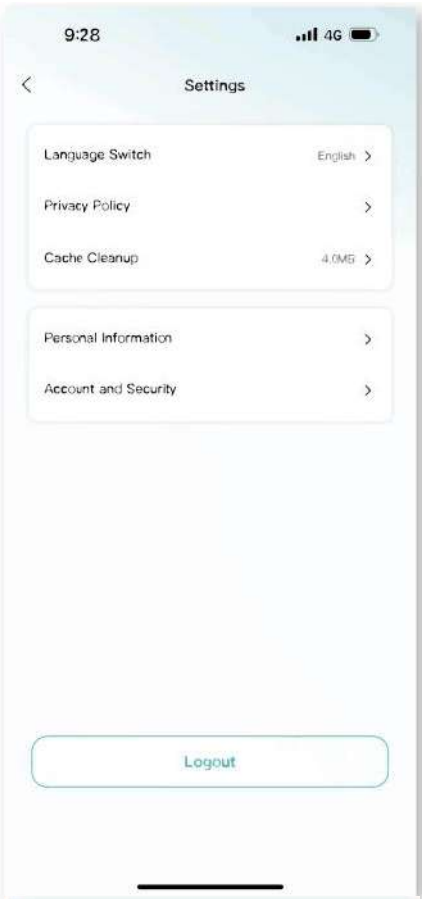


● Click"Feedback" to enter the feedback page. You canenter the current problem that needs feedback and submit it.

8.5.4 App settings

Click My Pages -settings icon in the upper-ight corner toenter the Appsettings page.

Settings page support: language switching, Privacy Policy,cache cleaning. personal information, account and security.



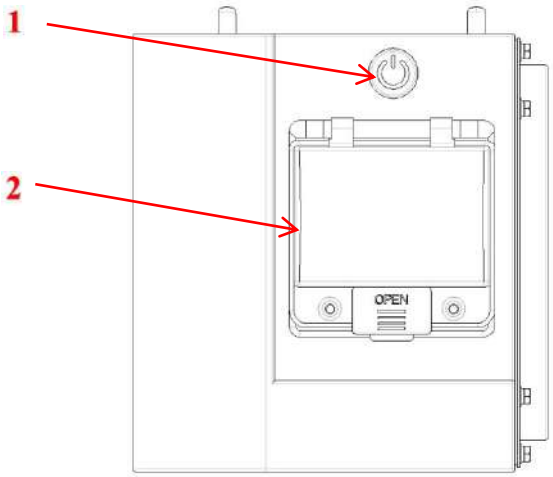
8.5.5 Message

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

9.Troubleshooting

A:turn on switch,be sure it is ON;if battery is low SOC.it need to charging in.

B: DC switch to prevent DC short circuits and ensure system safety.



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

- A :Check whether if communication cable is OK,check CAN PIN CANH:PIN4 CANL :PIN5
- 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 it is 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: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.

- B:When multiple batteries are connected in parallel, the SOC is different.

We recommend that each pack has a small current discharged and it is emptied until the SOC alarm appears, and then recharged in parallel and fully charged.

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:When the device is turned on, the current is too large, resulting in battery protection. from the battery panel.in this case,You can adjust your equipment parameters or contact the dealer to solve.

C: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.

10.Routine maintenance

Check content	Inspection method	Maintenance cyele
System cleanlinesg	Check whether the appearance of the system is damaged or deformed.	Once every to 12 months
System ruing state	1.Check that the battery does notgenerate abnormal soumd when it is inoperation. 2.Check that the batteryparaeters arecorrectly set when the battery is running.	Once every 6 months
Electrical conne ction	1.Check that cables are secured. 2.Check that cables are intact,and thatin particular,the parts touching themetallic surface are not scratched.	Once every 6 months
Ground reliability	Check that ground cables aresecurelyconne cted	The first inspection is 6 months after the initial commissioning.From then on,the intervalcanbe6to 12monthg.

Product Responsibilities and Consulting

●We will not be liable for the accidents resulting from operation breaking this specification and user manual.

●We will not send separate notice, provided that the contents of this specification are changed due to improvement of product quality or technological upgrading; provided that you want to understand the latest information of this product, please contact us.

●The shelf life of this product is within 36 months after it is delivered; we will maintain the product, which is in the warranty period for free of charge, provided that it has any product.

●quality problems within the specified operation range; we may replace the relevant parts, if we fail to maintain it, so as to achieve the purpose of sustainable use without performance reduction; our after-sales service personnel will propose the specific maintenance and troubleshooting methods.

In case of any questions, please contact us.