EN202601120101

User Manual

HOME-ESS-LV-5.12K-M

Smart Energy

Sustainable Solutions

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Contents

1 Manual Overview

1.1 Purpose

This document describes the HOME-ESS-LV-5.12K-M developed by Hanchu ESS in terms of its technical specifications, application scenarios, installation, commissioning, maintenance and troubleshooting. Please read this manual carefully, understand the safety information, familiarize yourself with the functions and usage of the battery, and observe the signs on the equipment and all the safety precautions in the manual.

● Please read and understand all the contents of this manual before installing and operating the product. Any damage caused by ignoring the contents of this manual may void the warranty.

● This product can only be used in accordance with the manual, local standards, laws and regulations. Any other use may cause personal injury and property damage.

● The illustrations provided in this manual are used to illustrate product concepts, including product information, installation guidelines, instructions for use, safety information, FAQs, and maintenance, etc.

● Unauthorized changes or modifications to the product are not permitted; any unauthorized changes will void the HOME-ESS-LV-5.12K-M warranty and Hanchu ESS will not be liable for any damages caused thereby.

● This manual and other product-related manuals are an integral part of the product and need to be kept properly for on-site installation personnel and related technical personnel to consult.

Thank you very much for choosing HOME-ESS-LV-5.12K-M developed by Hanchu ESS. We sincerely believe that our products can meet your needs and look forward to your feedback.

1.2 Target Audience

This manual is intended for:

● End users

● Installers

● System engineers

● Technical Support Engineers

● End users' tasks described in this manual can only be done by qualified electricians.

1.3 Symbol Conventions

Table 1 Meaning of the Identity

Symbol	Description
DANGER	"DANGER" indicates a hazard with a high level of risks which, if not avoided, could result in death or serious injuries.
WARNING	"WARNING" indicates a hazard with a medium level of risks which, if not avoided, could result in death or serious injuries.
ATTENTION	"ATTENTION" indicates a hazard with a low level of risks which, if not avoided, could result in minor or moderate injuries.

The 'DANGER', 'WARNING' and 'ATTENTION' items in the manual do not represent all safety precautions to be followed, but serve as supplements to all safety precautions.

Hanchu ESS is not responsible for any of the following situations:

- Operation beyond the conditions specified in this manual.
- Failure to comply with the operating instructions and safety precautions in this manual.
- Installation or use in environments that do not meet relevant international, national or local standards.
- Damage to the battery, dropping, leaking, or damage to the hardware of the device due to improper operation or intentional damage.
- Disassemble and alter equipment or modify software code without authorization.
- Failure to power up the battery in time after the battery installation and connection is completed, resulting in damage to the battery by over-discharge.
- Battery operation and management parameters are set incorrectly.
- The user or a third party uses the battery outside the scenarios specified by us, including but not limited to connecting excess loads, mixing with batteries of different rated capacities, or mixing with other batteries.
- Damage to the battery when the battery's operating environment or external power parameters do not meet the battery's normal operating environment requirements.
- Frequent over-discharge of the battery due to improper maintenance by the user, improper expansion of the battery by the user, or not fully charged for a long time.
- Failure to maintain the battery in accordance with the operating instructions: e.g. failure to check the battery terminals regularly.
- System damages caused by improper operations of a third party or customer, including those in transportation, installation, adjustment, alteration or removal of identification marks.
- The equipment damage caused by abnormal natural environment (force majeure, such as earthquake, fire, storm, flood, mudslide, etc).
- Damages caused during transportation by the customer.
- Storage conditions do not meet the requirements of the product manual, or failure to charge the battery as required during storage, resulting in loss of capacity or irreversible damage.

2 Safety Requirements

The battery system has been designed and tested in accordance with international safety requirements. However, in order to prevent personal injury and property damage and ensure long-term operation of the battery system, please do read this section carefully and observe all safety information at all times.

2.1 General Requirements

The equipment has a high voltage. Irregular operation may generate electric shock or fire, which may cause death, severe personal injuries or serious property damage. Please standardize the operation:

- It is strictly prohibited to install or operate outdoor equipment and cables (including handling equipment, operating equipment and cables, plugging and unplugging signal interfaces connected to the outdoors, working at heights, outdoor installation, etc.) in severe weather such as thunderstorm, snowy weather, strong wind.
- Please observe the operation sequence and safety precautions in this manual and other related manuals.
- Follow the warning signs, cautions and precautions on the equipment.
- Follow the manual to use correct tools, and master the correct use of tools.
- Do not install and connect cables, maintain, or replace equipment with power on.
- Do not wash the equipment.
- Do not open the panel of the equipment.
- Measure the voltage before touching the conductor surface or terminal to verify that there is no risk of electric shock.
- Repair the scratches that occur during equipment transportation and installation in time. It is strictly forbidden to expose the scratched parts to the outdoor environment for a long time.
- It is forbidden to lift and transport the batteries through the battery terminals or bolts.
- Do not alter the internal structure or installation procedure of the equipment without prior permission from the manufacturer.
- Leave the building or the equipment area and turn on the fire alarm bell or make an emergency call immediately in the case of a fire. Do not enter the building on fire in any case.

2.2 Personnel Requirements

ATTENTION

- Personnel installing or maintaining Hanchu ESS equipment must be trained, understand all necessary safety precautions, and be able to correctly perform all operations. Personnel who will operate the equipment, including operators, trained personnel and professionals, must possess local national required qualifications in special operations such as high-voltage operations and operations of special equipment.
- Only qualified professionals or trained personnel are allowed to install, operate and maintain the equipment.
- Only qualified professionals are allowed to remove security facilities and overhaul equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

- ❖ Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation and maintenance.
- ❖ Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards to themselves in certain operations and are able to take protective measures to minimize the hazards to themselves and other people.
- ❖ Operators: operation personnel who may come into contact with the equipment,except trained personnel and professionals.

2.3 Installation Environment Requirements

- The installation and operating environment must comply with international, national and local standards for lithium batteries and with local laws and regulations.
- Install in a location out of the reach of children.
- Garage installation needs to be far away from the direction of vehicle travel, it is recommended to install the energy storage on the wall above the body bumper to avoid an accidental collision.
- When installing the battery in a basement, keep good ventilation. Do not place flammable or explosive materials around the battery. It is recommended that the battery be mounted on the wall to avoid contact with water.
- Install the battery in a dry and well-ventilated environment. Secure the battery on a solid and flat surface.
- Install the battery in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- Install the battery in a clean environment that is free from sources of strong infrared radiation, organic solvents, and corrosive gases.
- Precautions must be taken for installation in areas with frequent natural disasters such as floods, mudslides, earthquakes and typhoons.
- Keep the battery away from fire sources. Do not place any flammable or explosive materials around the battery.
- Keep the battery away from water sources such as taps, sewer pipes, and sprinklers to prevent water seepage.
- Do not install the battery in a position where it is easy to touch as the temperature of the chassis and heat sink is high when the battery is running.
- To prevent fire due to high temperature, ensure that the vents and the cooling system are not blocked when the battery is running.
- Do not expose the battery to flammable, explosive gas or smoke. Do not perform any operation on the battery in such an environment.
- Do not install the battery on a moving object, such as ships, trains or cars.
- Do not install the system outdoors in a salt-affected area because the system may be corroded. A salt-affected area is an area within 500m of the coast or affected by sea breeze. The area affected by the sea breeze varies according to meteorological conditions (such as typhoons and seasonal winds) or topographical conditions (such as DAMS and hills).

2.4 Electrical Requirements

➢2.4.1 General Requirements

DANGER

Before connecting cables, ensure that the product is intact. Otherwise, electric shocks or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Ensure that the cables you prepared meet local regulations.
- Use dedicated insulated tools when performing high-voltage operations.

➢2.4.2 DC Operation

DANGER

Do not connect or disconnect power cables when the power is on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- Before connecting cables, cut off the power supply if people may contact energized components.
- Please ensure that the label on the power cable is correct before connecting the power cord.
- Disconnect all inputs and operate the equipment only after the equipment is powered off.

➢2.4.3 Cabling Requirements

WARNING

When routing cables, ensure that a distance of at least 30mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.

When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:

- ❖ Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
- ❖ If the storage environment temperature of the cables is below 0°C, the cables must be stored at room temperature for more than 24 hours before laying the cables.

2.5 Personal Safety

WARNING

Wear proper personal protective equipment during operation. If there is a probability of personal injury or equipment damage, stop the operations and take feasible protective measures immediately.

- Use tools correctly to avoid hurting people or damaging the equipment.
- The anti-static gloves must be worn when touching the equipment. Do not wear clothes that can easily generate static electricity.
- Do not touch the shell when the equipment is running; the temperature of the shell is high, which may cause burns.
- To ensure personal safety and normal use, it must be grounded reliably before use.
- When the battery is faulty, the temperature may exceed the burn threshold of the touchable surface. Therefore, avoid touching the battery.

● The electrolyte is harmful to your skin and eyes, so do not disassemble or damage the battery and avoid contact with the electrolyte.

● Do not place irrelevant objects on top of the equipment or insert them into any position of the equipment.

● Do not place flammable objects around the equipment.

● To prevent explosions and body injuries, do not place batteries in a fire.

● Do not place the battery module in water or other liquids.

● Do not short-circuit the battery terminals or it will cause a fire.

● Do not use water to clean electrical components inside or outside of a cabinet.

● Do not stand, rely or sit on the equipment.

● Do not destroy any module of the equipment.

● Batteries may cause electric shocks and high short-circuit currents. When using the battery, pay attention to the following points:

a) Remove all metal objects from yourself, such as watches and rings.

b) Use tools with insulated handles.

c) Wear rubber gloves and boots.

d) Do not put tools or metal parts on top of the battery.

e) Disconnect the charging power supply before connecting or disconnecting the battery terminal.

f) Determine if the battery is unexpectedly grounded. Please remove power from the ground if accidental grounding occurs.

2.6 Battery Safety

DANGER

Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers and heaters. The battery may cause a fire if overheated.

● To avoid leakage, overheating or fire, do not disassemble, alter or damage batteries, do not insert foreign objects into batteries or place batteries in water or other liquids.

● The fire hazard of the lithium-ion battery energy storage system is high. Consider the following safety risks before handling batteries:

❖ Battery electrolytes can be combustible, toxic and volatile.

❖ Battery thermal runaway can generate flammable gases and harmful gases such as CO and HF.

❖ The excessive concentration of flammable gas generated from battery thermal runaway may cause combustion and explosion.

● The batteries must be stored separately inside the packaging. Do not store batteries together with other materials or in the open air. Do not stack batteries too high.

● Do not use batteries beyond the warranty period.

● Do not remove the battery packaging before use. Batteries must be charged during storage by professionals as required. Put batteries back into their packaging after charging during storage.

● Move batteries in the correct direction. Do not place a battery upside down or tilt it.

● Protect batteries from impact.

● Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.

● Use batteries within the temperature range specified in this manual.

● Do not use damaged batteries (such as damages caused when a battery is dropped, bumped or dented on the enclosure). Damaged batteries may release flammable gases. Do not store damaged batteries near undamaged products.

● Do not place damaged batteries in close proximity to flammable materials.

● Monitor damaged batteries during storage for signs of smoke, flammable electrolyte leakage, or heat.

➢*2.6.1 Label Description*

Table 2 Label Description

Symbol	Explanation
	**CE marking** The system complies with the requirements of the applicable EU directives.
	**Observe the documents** Observe all documents supplied with the system.
	**Disposal !** Do not dispose of the system together with household waste; please contact Hanchu service partner to dispose of it in accordance with regulations for electronic waste and used batteries.
	**Grounding conductor** This symbol indicates the position for connecting a grounding conductor.
	**Beware of a danger zone!** This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	**Beware of high voltage and operating current!** The product operates at a high voltage and current. Work on the product must only be carried out by skilled and authorized personnel.
	**Beware of hot surfaces!** The product can get hot during operation. Avoid contact during operation.

	**Capacitor discharge** Danger to life due to high voltages in the inverter. Do not touch live parts for 5 minutes after disconnection from the power sources.
	**Do not touch the product until 90 seconds after shutting down**
	**Keep ventilated**

2.7 Emergency Measures

DANGER

➢*2.7.1 Damaged Battery*

● If the battery is damaged or flooded, it may leak electrolyte and cause a short circuit fire.

● If the battery is wet or immersed in water, do not try to touch it.

● If the battery seems to be damaged, it is not suitable for use and may be dangerous to persons or property.

● Avoid touching the leaked liquids or gases in the case of battery leakage or abnormal odor, do not approach the battery and contact professionals immediately. Professionals must wear safety goggles, rubber gloves, gas masks, and protective clothing.

● Electrolyte is corrosive and can cause irritation and chemical burns. In case of direct contact with the battery electrolyte, do as follows:

❖ Inhalation: Evacuate contaminated areas, get fresh air immediately and seek immediate medical attention.

❖ Eye contact: Immediately flush your eyes with water for at least 15 minutes, do not rub your eyes and seek medical attention immediately.

❖ Skin contact: Wash the affected areas immediately with soap and water and seek medical attention immediately.

❖ Ingestion: Seek immediate medical assistance.

➢*2.7.2 Battery Drop Emergency Measures*

● If a battery is dropped or violently impacted during installation, internal damage may occur. Do not use such batteries. Otherwise, safety risks such as cell leakage and electric shock may arise.

● If a dropped battery has obvious damage or an abnormal odor, or if smoke or fire occurs, evacuate the personnel immediately, call emergency services, and contact professionals. Professionals can use fire extinguishing facilities to extinguish the fire under safety protection.

● If a dropped battery has no obvious deformation or damage, and there is no abnormal odor, smoke or fire, contact professionals to transfer the battery to an open and safe place or contact a recycling company for disposal.

➢*2.7.3 Fire Emergency Measures*

● If a fire occurs, power off the system if it is safe to do so.

● Use carbon dioxide, FM-200 or ABC dry powder extinguishers to extinguish the fire.

● Ask firefighters to avoid contacting high-voltage components during extinguishing fires to prevent the risk of electric shock.

● Overheating may cause batteries to deform and leak corrosive electrolyte or toxic gas. Keep away from the batteries to avoid skin irritation and chemical burns.

2.8 Battery Recovery Process

ATTENTION

● Dispose of used batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste.

● If the batteries leak or are damaged, contact technical support or a battery recycling company for disposal.

● If the batteries are out of service life, contact a battery recycling company for disposal.

● Do not expose batteries to high temperatures or direct sunlight.

● Do not expose batteries to high humidity or corrosive environments.

2.9 EU Declaration of Conformity

ATTENTION

The batteries sold on the European market by Hanchu Ess comply with the requirements of the following directives:

● Electromagnetic compatibility Directive 2014/30/EU (EMC)

● Battery Directive 2006/66/EC and Amending Directive 2013/56/EU

● Waste Electrical and Electronic Equipment 2012/19/EU

3 Product Description

The HOME-ESS-LV-5.12K-M is new-generation equipment with a home energy storage system that can meet the diverse needs of global users. A high-performance lithium iron phosphate battery is used for functional integration and modular structure design. It has realized convenient expansion, rapid product installation, load matching, remote control and many other functions.

Note:

1) Single battery operation:

The Max. charge/discharge current of the HOME-ESS-LV-5.12K-M product is 100A. The power cables (Power cable 1 and Power cable 2) supplied with the unit are 3AWG, with a maximum current capacity of 100A. Please do not operate it under conditions exceeding this current.

2) Parallel battery operation:

- When the input or output current of the inverter connected to the battery exceeds 100A, if not using a combiner box, the power cable connecting the main battery and inverter must be 0AWG. The optional power cable (INV-BAT) is 0AWG with a maximum current capacity of 200A. Please do not operate it under conditions exceeding this current.
- When the input or output current of the inverter connected to the battery exceeds 200A, please use it in conjunction with the combiner box to ensure system safety.

3.1 Product Description

➢*3.1.1 System Composition*

The battery system consists of the BMS and the battery.

The battery consists of a high-performance lithium iron phosphate cell that can be charged and discharged to the load.

BMS(Battery Management System) is an intelligent electronic system that manages the charge and discharge of batteries and provides system safety protection.

➢*3.1.2 Model Identification Description*

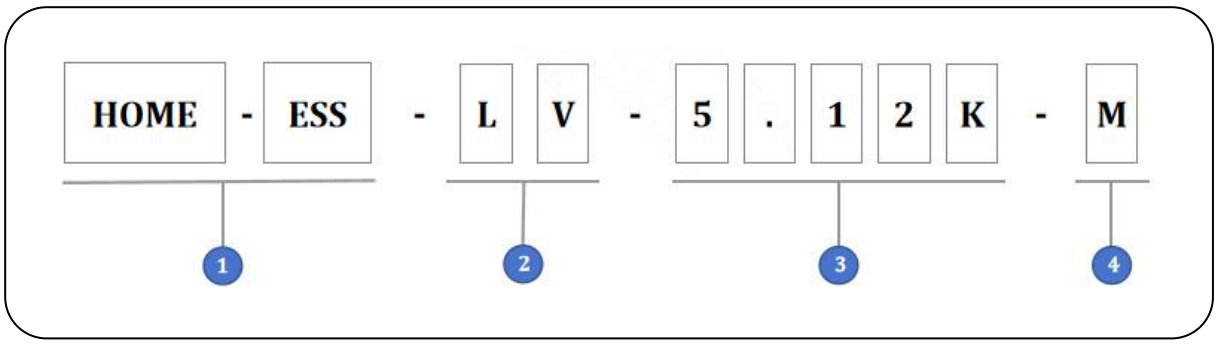


Figure 1 Name of the Product

Table 3 Definition of the Product Name

No.	Meaning	Value
1	Product	HOME-ESS: Home energy storage system
2	Voltage strength	LV: Low Voltage
3	Battery energy	5.12K: The battery energy is 5.12kWh
4	Series	M: M series

➢*3.1.3 Product Dimension And Weight*

Table 4 Product Dimension And Weight

Width	Depth	Height	Weight
400mm	139mm	650mm	46kg

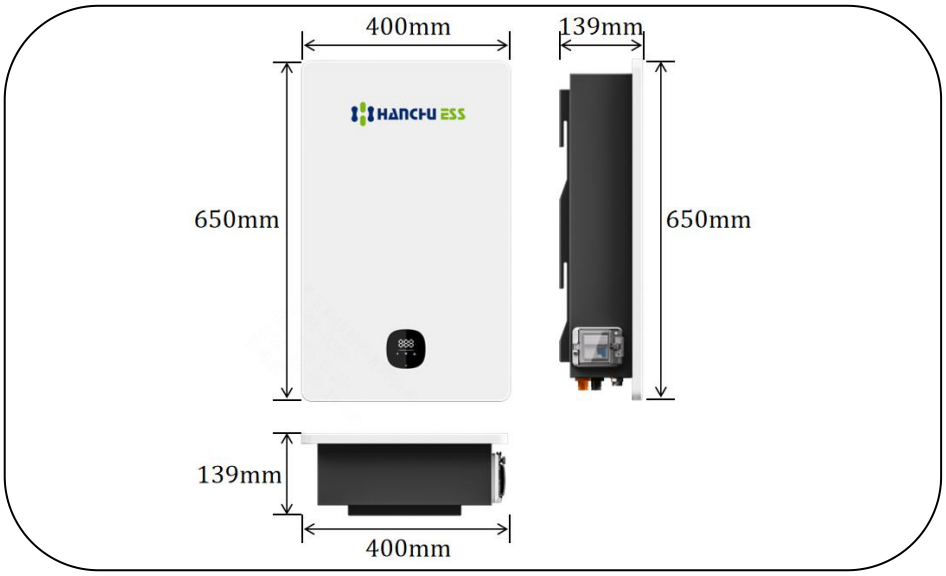


Figure 2 Picture of the Product

3.2 Interface Description

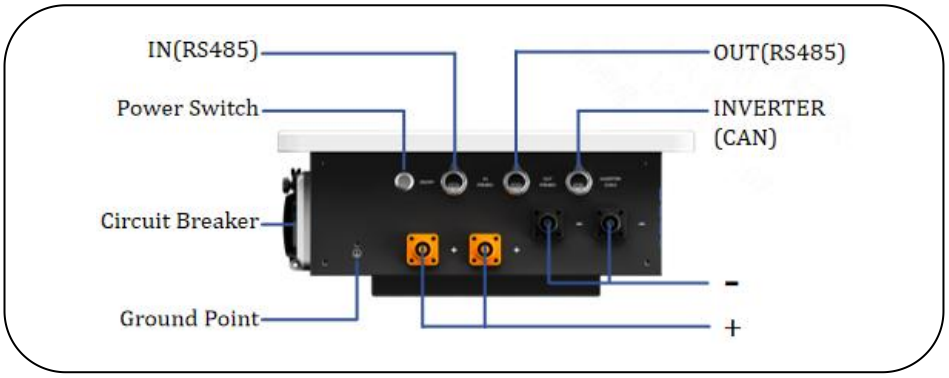


Figure 3 Interface Location Chart

3.3 Product Parameters

Table 5 Product Parameters

No.	Project	Parameter	Remark
1	Models	HOME-ESS-LV-5.12K-M	
2	Dimensions (mm) W*D*H	400*139*650	
3	Enclosure protection rating	IP66	
4	Module configuration	1 parallel 16 strings	1P16S
5	Nominal voltage (V)	51.2	
6	Operating voltage range (V)	43.2~57.6	
7	Nominal energy (kWh)	5.12	
8	Nominal discharge current (A)	100	
9	Max. discharge current (A)	100	
10	Nominal charge current (A)	100	
11	Max. charge current (A)	100	
12	Charge temperature range (℃)	0~50	
13	Discharge temperature range (℃)	-10~55	
14	Total weight (kg)	46	
15	Communication interface	CAN/RS485/WIFI/Bluetooth	
16	Maximum parallel number	16	

4 Installation

4.1 Installation Note

Please read and understand this section carefully before installing the product!

➢*4.1.1 Personnel Qualification*

Product installers must have received safety technical training, obtained the local electrician certifications and the authorized qualifications for product installation. And installers must be familiar with electrical equipment, accumulate relevant experience and have the following capabilities, including but not limited to:

- Setup, startup, shutdown, grounding, short-circuiting and repair of electrical equipment.
- Standardized maintenance and use of protective tools for electrical equipment.
- Providing emergency assistance for the injured.
- Complying with local laws, regulations, standards and directives.

➢*4.1.2 Installation Environment*

1) Please make sure the installation location meets the following basic conditions:

- The building is designed to withstand earthquakes. The wall is flat, hard, and have sufficient load-bearing capacity, and the area has minimal dust and dirt.
- The ambient environment is cool, dry, well-ventilated, and away from the sea, salt water, humid air and heat sources.
- There are no flammable and explosive items, corrosive gases, including ammonia and acid vapors, and contaminants.
- The installation location must provide complete shelter for the equipment, shielding it from direct sunlight, rain, and snow exposure. Ensure the equipment remains fully protected under any conditions, including protection against low-angle sunlight and wind-driven rain or snow from the sides.
- The installation site must strictly avoid low-lying areas prone to water accumulation, ensuring complete protection against submersion risks under extreme weather conditions—including but not limited to torrential rain or snowmelt.

Note:

If the ambient temperature exceeds the operating range, the battery will stop working to protect itself. The optimal temperature range for battery operation is 15°C to 35°C. Frequent exposure to inappropriate temperatures may reduce battery performance and life.

The installation environment shown below can be used as a reference.

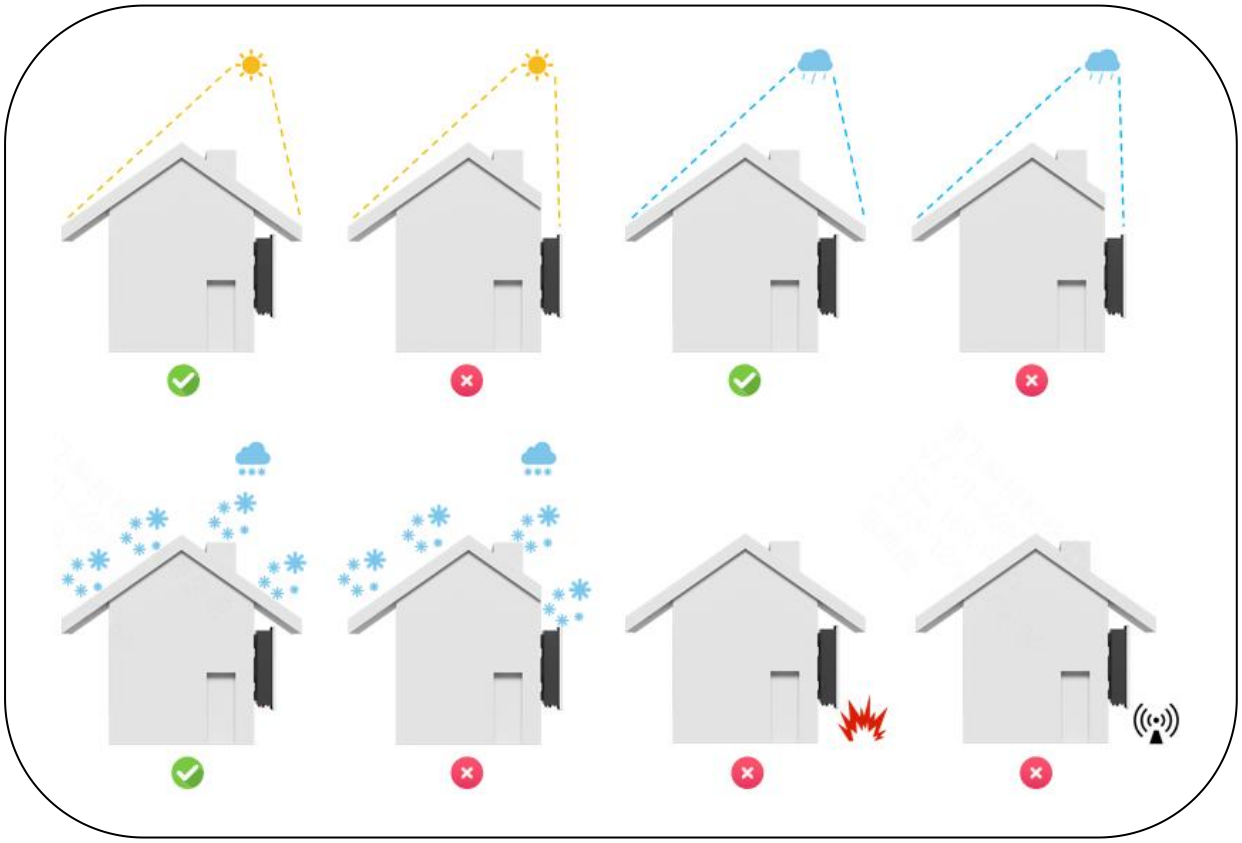


Figure 4 Installation Environment

2) When the installation environment of the system does not meet the above shading requirements, users can choose to use the HANCHU canopy in combination with the system, as shown in the below, or build an installation environment that meets the conditions on their own.

Figure 5 Canopy

Note:
Please install the system according to the above requirements. Otherwise, HANCHU will not be liable for any warranty claims resulting from system damage.

➢4.1.3 Installation Angle

The battery need to be fixed on the wall. When the battery is installed on the wall, install it on a flat wall and keep the battery parallel to the wall. And don't install the battery in inclined, horizontal, or upside down positions.

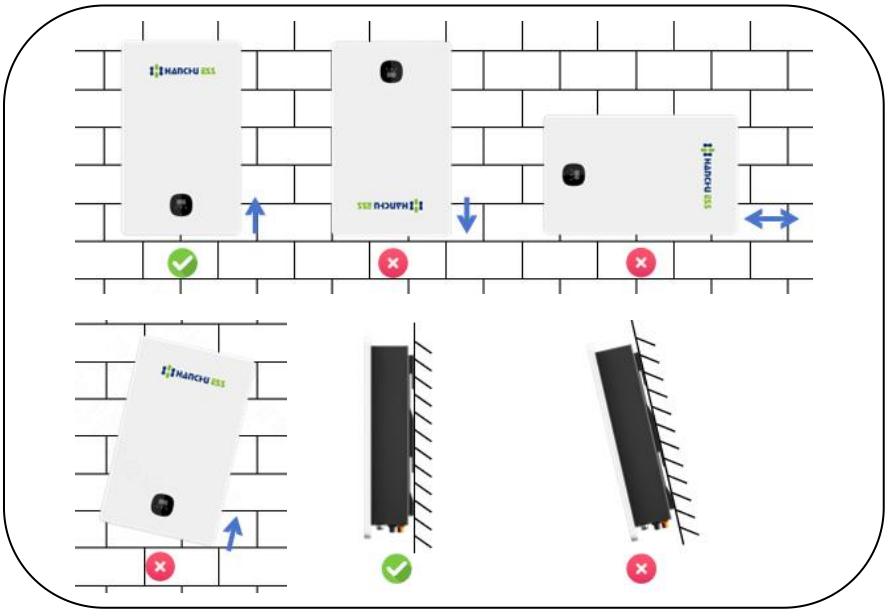


Figure 6 Installation Angle

➢4.1.4 Installation Space

Take the visibility of the status indicators and display into account.

Keep sufficient clearance around the battery for adequate ventilation, and do not store or place any objects close to it. Installation space is as shown below.

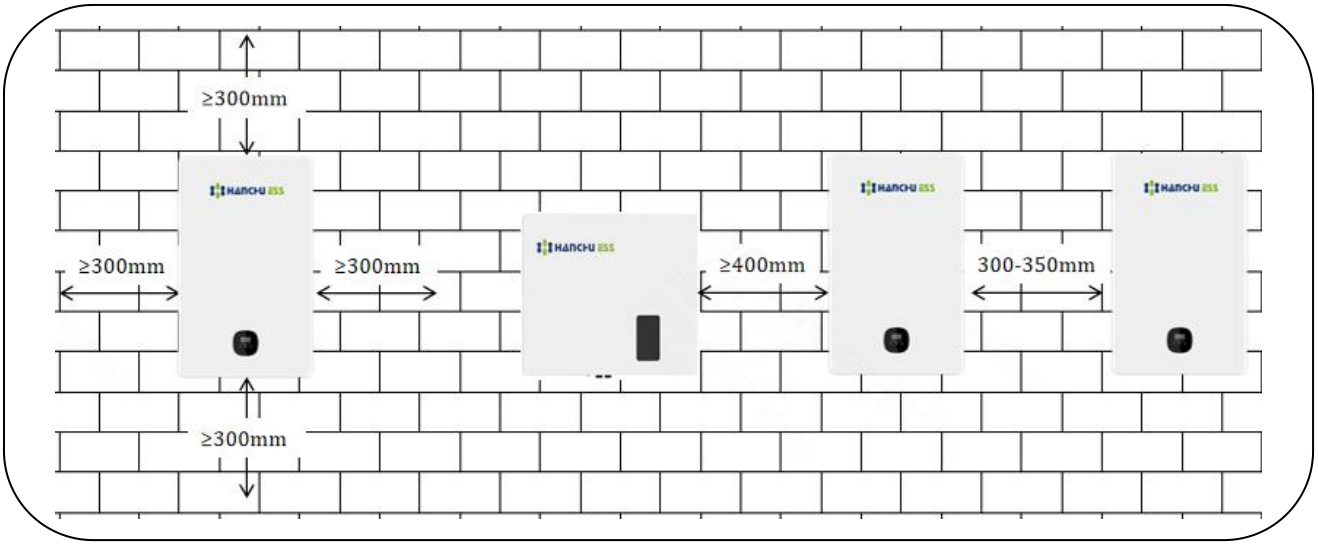


Figure 7 Installation Space

4.2 Installation Preparation

➢*4.2.1 Personal Protective Equipment*

The product is a household energy storage system. Improper operation may cause personal injury and property damage.

Personal protective tools must be used during installation.

The following are the recommended personal protective tools:

- Safety gloves: Prevent the risk of electric shock and scratches during installation.
- Safety glasses: Prevent eye damage from splashing foreign objects during installation.
- Safety Shoes: Prevent the risk of electric shock. Ensure safety in case the module is accidentally dropped during installation.

Figure 8 Personal Protective Equipment

➢*4.2.2 Installation Tools and Accessories*

Tools and accessories needed in the process of installing equipment, more effective to improve installation efficiency.

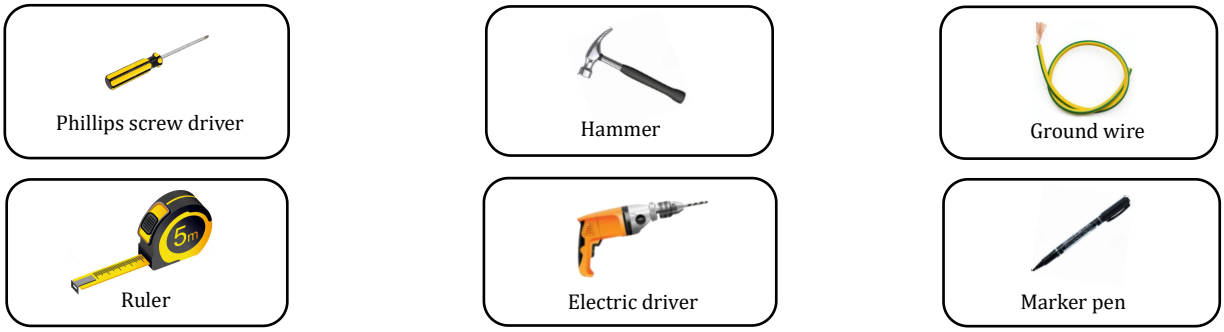


Figure 9 Installation Tools and Accessories

➢*4.2.3 Open Box to Check*

- Make sure the battery is intact during shipping. If there is any visible damage such as cracks, please contact your dealer immediately.
- Tear off the packaging tape to unpack the battery, please check that the battery packaging and all related items are in good condition.
- Please check the packing list carefully by referring to Section 4.2.4 product accessories. If there's any item missing, please contact your dealer directly.

➢*4.2.4 Product Accessories*

Table 6 Product Accessories

Label	Name	Quantity	Function description
A	Battery	1	System core components
B	Power cable 1 Quick plug terminal+SC25-8/black	1	Connect the negative pole between the battery and the inverter
C	Power cable 2 Quick plug terminal+SC25-8/red	1	Connect the positive pole between the battery and the inverter
D	Power cable 3 Quick plug terminals at both ends/black	1	Connect the negative pole between the battery modules
E	Power cable 4 Quick plug terminals at both ends/red	1	Connect the positive pole between the battery modules
F	RS485 communication cable	1	Connect the communication interface between battery modules
G	CAN communication cable	1	Connect the communication interface between battery and inverter
H	Wall mounted bracket	1	Fix battery
I	Connector Hood	1	Protection
J	Expansion tube/screw Diameter 6mm, depth 50mm	5	Fixed bracket
K	Terminal/OT6-4	1	Connected to ground wire
L	Screw/M4*10	5	Connected to ground terminal/Fixed bracket
M	Hexagonal screw/M4*30	2	Fixed Connector Hood
N	Terminal/SC25-8	2	Spare terminals
O	Quick Installation Guide	1	Product installation guide

Table 7 Optional Accessories

Label	Name	Quantity	Function description
A	0AWG power cable(Optional)[1] Quick plug terminal+SC25-8/black	1	Connect the negative pole between the battery and the inverter. Optional when support for parallel operation currents

			exceeding 100A is required.
B	0AWG power cable(Optional)[2] Quick plug terminal+SC25-8/red	1	Connect the positive pole between the battery and the inverter. Optional when support for parallel operation currents exceeding 100A is required.

[1] [2] These optional accessories are not included as standard with the unit; if required, please purchase them separately from our company or an authorized dealer.

4.3 Installation

- Make sure the ground is level and strong enough to bear the weight of products.
- Before you start connecting cables, make sure that the inverter and battery are entirely switched off!
- Make sure there is no water source above or near the battery, including downspouts, sprinklers, or faucets.

Step 1: Locate drill holes in the wall

Use the bracket as a template to make positioning holes in the wall, mark the positions of the 4 holes, and then drill 10mm holes to ensure that the depth of the holes is greater than 50mm. The bracket must be placed at least 550mm above the ground.

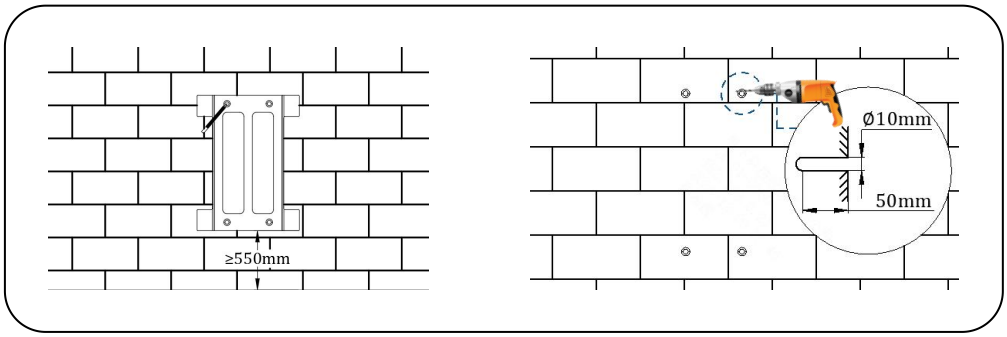


Figure 10 Locate Drill Holes in the Wall

Step 2: Fix the wall mount bracket

Fit the expansion tubes into the holes, pull them tight, and then use the expansion screws (packaged with expansion tube for use) to install and secure the wall mount bracket to the wall.

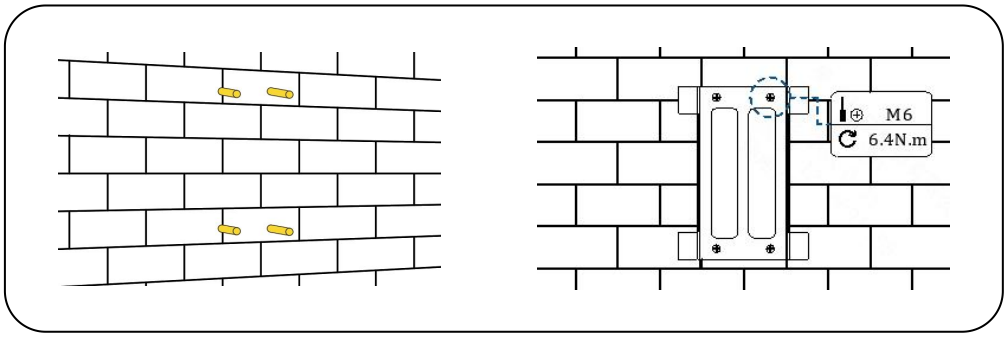


Figure 11 Fix the Wall Mount Bracket

Step 3: Fix the battery module

There is a hook design on the back of the battery box. Align and fix it to the positioning groove of the Wall mount bracket, and secure it with M4*30 screws. The distance between the batteries must be 300-350mm, and the distance between the battery and the inverter must be no less than 400mm.

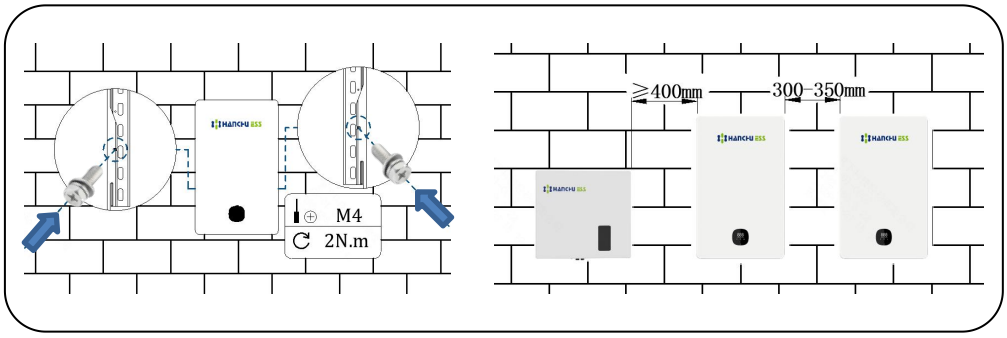


Figure 12 Fix the Battery Module

4.4 Electrical Connections

Before connecting the cables, use a multimeter to measure cable continuity, short circuits, and verify positive and negative terminals and cable labeling.

NOTE: First complete the cable connection at one end, then feed the remaining free end of the cable through the pre-formed hole in the protective hood.

➢*4.4.1 System General Wiring Diagram*

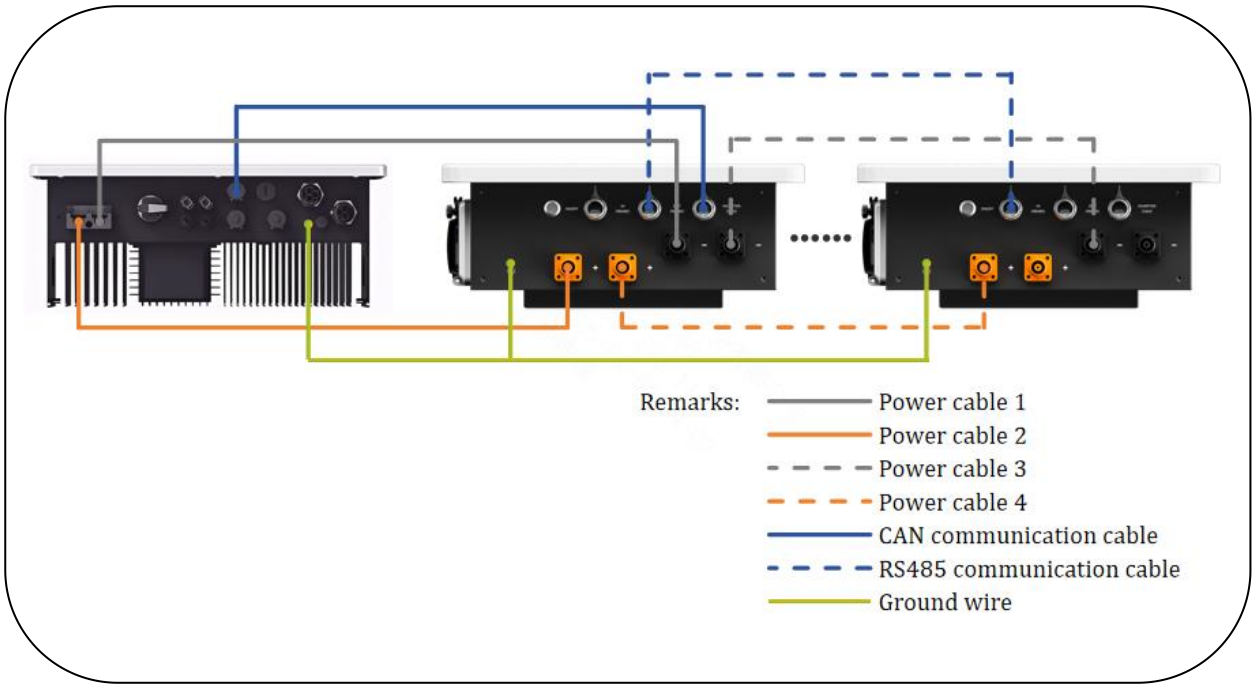


Figure 13 System General Wiring Diagram

➢4.4.2 Preparing Cables

Table 8 Preparing Cables

No.	Name	Function description	Size	Source
1	Ground wire	Ground the battery with a ground wire	6 mm^2	Prepared by the customer
2	Power cable 1	Connect the negative pole between the battery and the inverter	Black	Delivered with the product
3	Power cable 2	Connect the positive pole between the battery and the inverter	Red	Delivered with the product
4	Power cable 3	Connect the negative pole between the battery modules	Black	Delivered with the product
5	Power cable 4	Connect the positive pole between the battery modules	Red	Delivered with the product
6	RS485 communication cable	Connect the communication interface between battery modules	Black	Delivered with the product
7	CAN communication cable	Connect the communication interface between battery and inverter	Black	Delivered with the product

➢4.4.3 Battery Ground Connection

1) Crimp the ground terminal

The customer must prepare a ground wire with a cross-sectional area of at least 6mm^2, then use a ground screw and terminal to connect the ground wire. The bolt locking torque is 2NM.

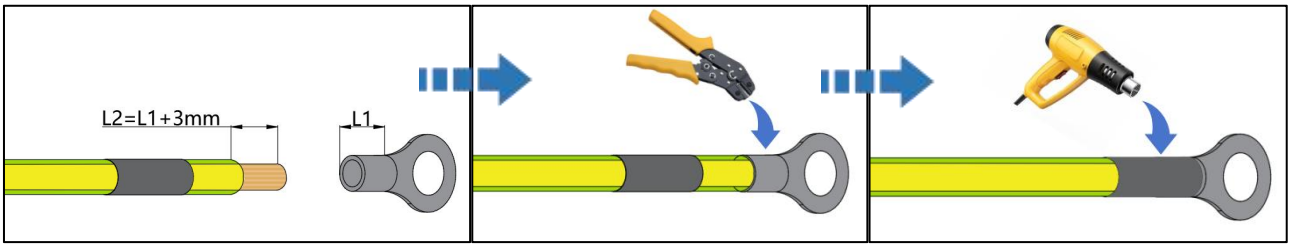


Figure 14 Sample of crimping method

2) Ground the battery with a ground wire through the ground screw and terminal.

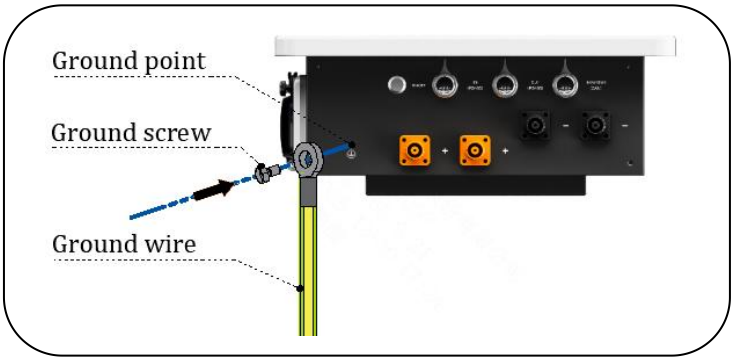


Figure 15 Sample of Battery Ground Connection

➢4.4.4 Power Connections Between Batteries

Use power cable 3 to connect the negative pole (P- terminal) of battery A to the negative pole (P- terminal) of battery B, and use power cable 4 to connect the positive pole (P+ terminal) of battery A to the positive pole (P+terminal) of battery B.

For more than two battery connections, connect the negative poles (P- terminal) between the batteries and connect the positive poles (P+ terminal) between the batteries.

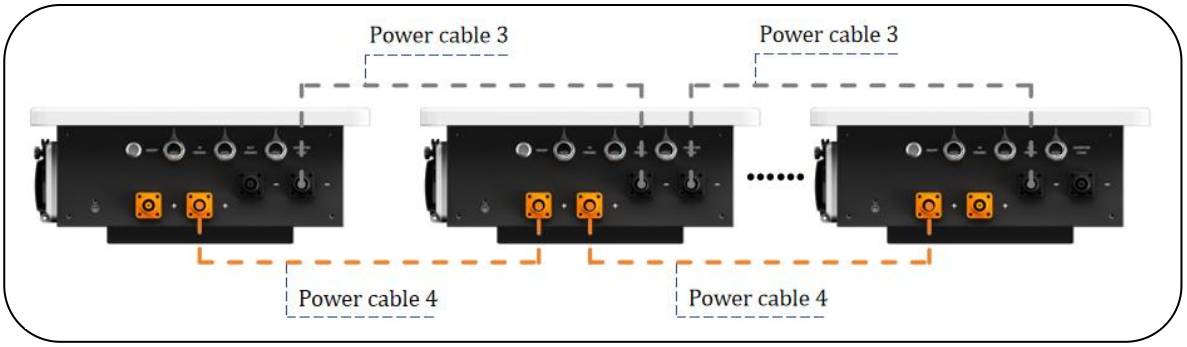


Figure 16 Sample of Power Connections Between Batteries

➢4.4.5 Connect the Primary Battery to the Inverter through Power Cables

- **Single battery operation:**

After the battery is connected, connect the negative pole (P- terminal) of the battery A and the BAT - terminal of the inverter with the power cable 1; connect the positive pole (P+ terminal) of the battery A and the BAT + terminal of the inverter with the power cable 2.

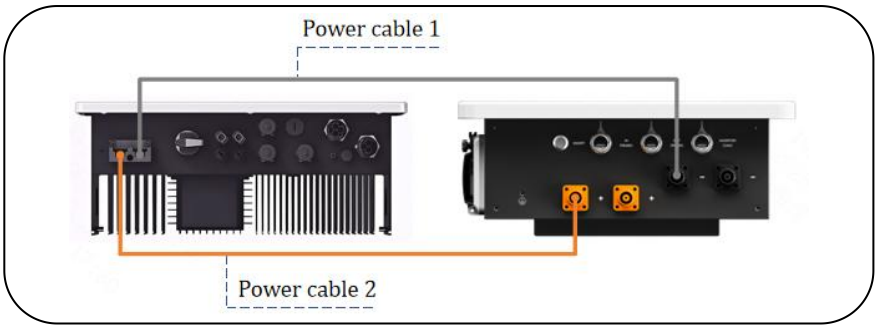


Figure 17 Sample of Power Cable Connections Between the Battery and the Inverter

- **Parallel battery operation:**

1) When the input or output current of the inverter connected to the battery exceeds 100A, if not using a combiner box, the power cable connecting the main battery and inverter must be **0AWG(Optional)**.

2) After the battery is connected, connect the negative pole (P- terminal) of the battery A and the BAT - terminal of the inverter with 0AWG power cable(Black); connect the positive pole (P+ terminal) of the battery A and the BAT + terminal of the inverter with the 0AWG power cable(Red).

3) After completing the electrical connections, please reconfigure the parallel current limit and change the "**Total Charge/Discharge Current Limit**" to **200A**, thereby increasing the parallel current. For detailed operating steps of the parallel current limit setting, refer to Figure 36 in 4.6.3 APP Guide.

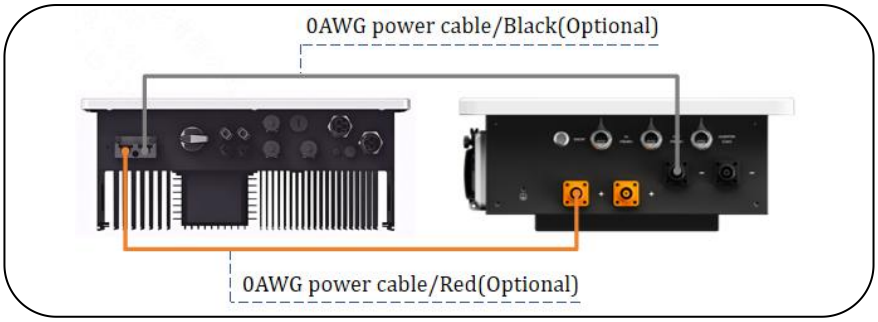


Figure 18 Sample of Power Cable(Optional) Connections Between the Battery and the Inverter

Note :

1) Before connecting the inverter electrically, the inverter and batteries need to be powered off.

2) It is forbidden to mix batteries of different brands, specifications and batches; otherwise it will cause system failure.

➢*4.4.6 Connect the CAN Communication Cable*

Use the CAN communication cable to connect the inverter with the primary battery through CAN protocol.

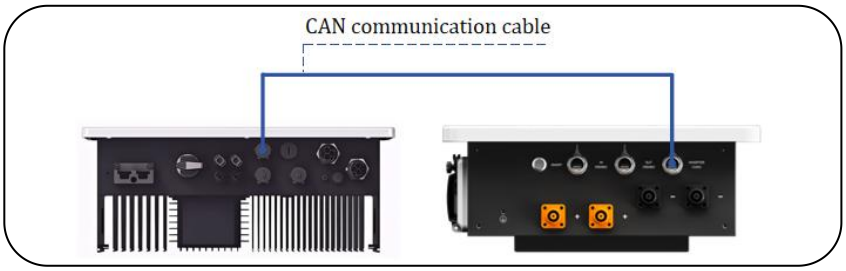


Figure 18 Sample of Connecting the CAN Communication Cable

➢*4.4.7 Connect the RS485 Communication Cable*

Use the RS485 communication cable to connect the battery in sequence through the port.

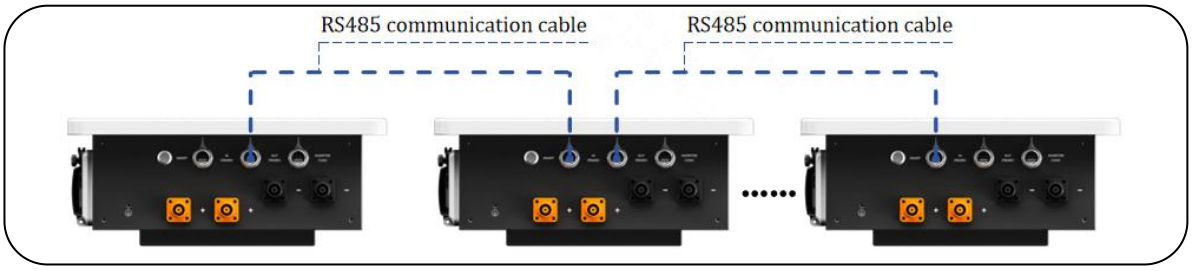


Figure 19 Sample of Connecting the RS485 Communication Cable

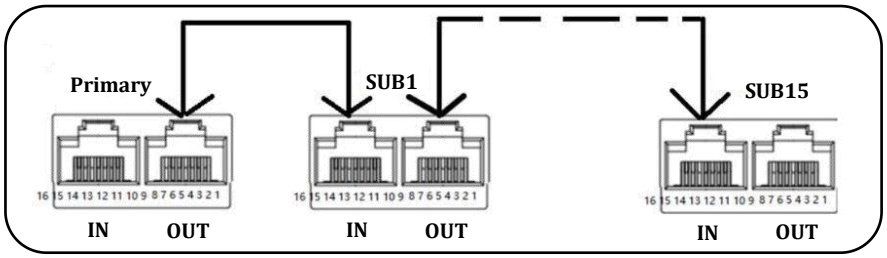


Figure 20 Sample of Parallel Communication

Note:

1) The inverter must connect to the battery's CAN communication port; otherwise communication cannot be performed. Batteries must connect to each other via their RS485 ports.

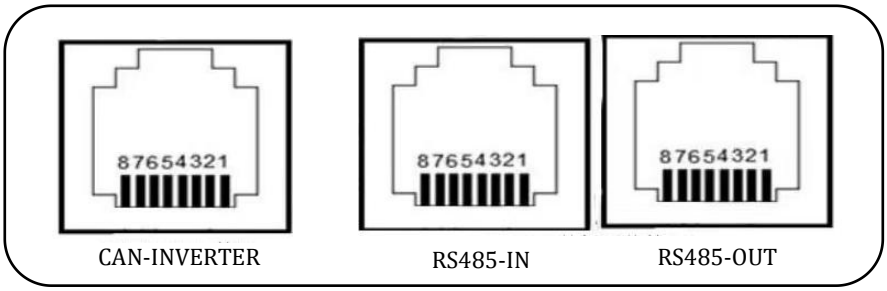
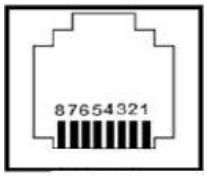


Figure 21 Interface icon

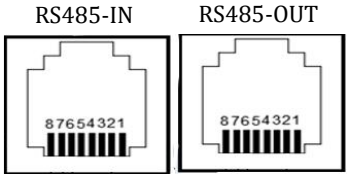
2) The communication port pins connecting the primary battery to the inverter are defined as follows:

Table 9 Definition of CAN Port Pins

CAN-INVERTER	CAN-INVERTER Port	
	RJ45 Pins	Definition
	1、8	RS485A-B
	2、7	RS485A-A
	3	NC
	4	CANH1
	5	CANL1
	6	GNDC

3) The communication port pins connecting subordinate batteries to the primary battery are defined as follows:

Table 10 Definition of RS485 Port Pins

RS485-IN			RS485-OUT	
RJ45 Pin	Definition		RJ45 Pin	Definition
1、8	RS485B-B		1、8	RS485B-B
2、7	RS485B-A		2、7	RS485B-A
3	IN		3	OUT
4	CANH0		4	CANH0
5	CANL0		5	CANL0
6	GNDC		6	GNDC

4.5 Connector Hood Installation

After all cables have been installed and verified to be free of twists, insert the Connector Hood from bottom to top as shown in the figure below until the bottom of the enclosure is parallel to the bottom of the battery. Then use the M4*10 screws to fix the enclosure to the battery back plate.

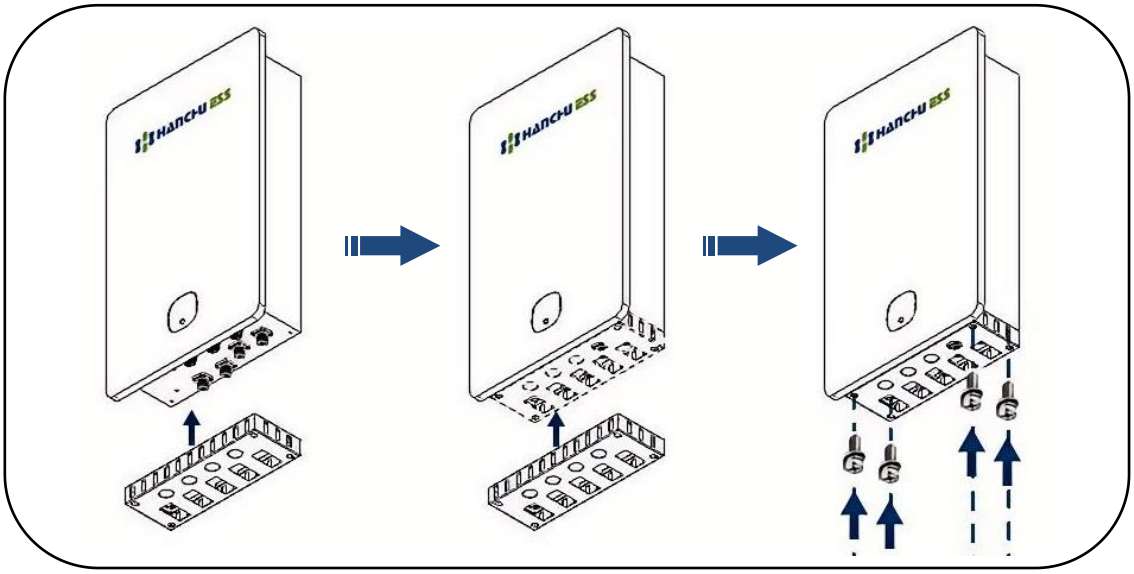


Figure 22 Connector Hood Installation

4.6 Electrical Commissioning

➢ *4.6.1 Address Setting*

The battery directly connected to the inverter is the primary, and the rest are subordinates.

Description of automatic address allocation: After the batteries are activated by pressing the switch in sequence, the system will automatically identify the primary and subordinates and actively assign an address to each device in the system.

➢ *4.6.2 Equipment Power On*

After confirming that the cables are connected in the correct order and the connections are tight, the system is powered on and switched on in the following order:

1) Press the battery power switch in turn (first the primary 01, then the sub 02~16) to start the battery.

Figure 23 Press the Power Switch

2) Observe whether the status of the indicator light on the battery panel is normal according to subsection 4.7 of this manual. Indicator light is normal can continue in order to power on. If the indicator light is faulty, you need to remove the fault and then power on.

Figure 24 Observe the Indicator Light Status

3) Close the circuit breaker on the battery and the circuit breaker between the battery and the inverter.
4) The power-up process of the inverter is carried out according to the manual process of the inverter.

➢ *4.6.3 APP Guide*

➢ 4.6.3.1 App Download

You can scan the QR code or visit the website to download the HanchuEss App: **https://iess.hanchuess.com.**
You can also download the HanchuEss App from the App store or Google play.

Android APP **iOS APP**

➢ 4.6.3.2 Device binding

Step 1: Register and login

- If you have already registered, you can log in directly. Then you can turn to "**Step 2: Bind devices**".

If you don't have an account yet, tap "**SIGN UP**" to register as shown in Fig. 25.

- In order to provide you with the basic functionality of our products / services, you are required to authorise your consent to the "**Privacy Policy**" and "**Terms & Conditions**". We promise to keep users' information strictly confidential and will not disclose users' private information to outside parties unless authorised by the user or required by law.
- Fill in the account information

After filling in the information for registration, tap "**Get Verification Code**" as shown in Fig 26.

We will send the verification code to your email. Fill in the code, and click on "**Confirm**" to log in.

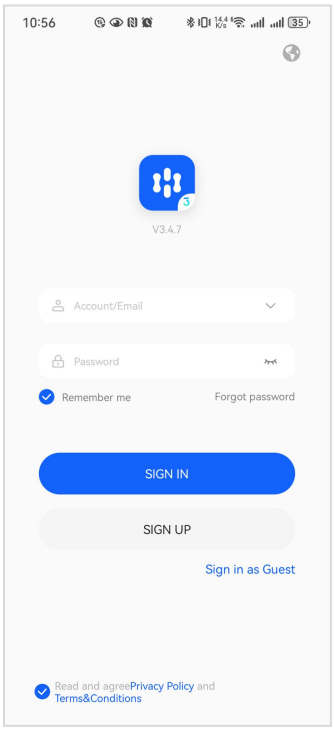


Figure 25

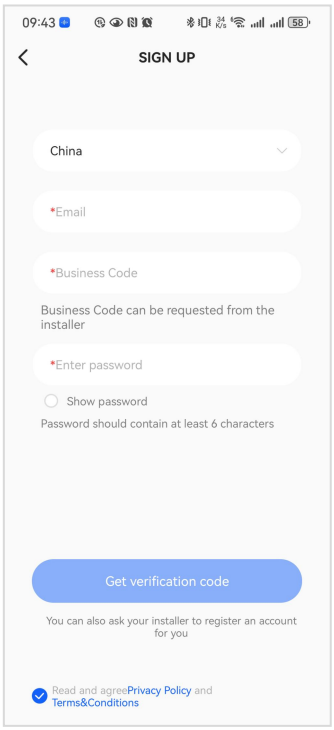


Figure 26

Step 2: Bind devices

You can jump to the relevant section referring to what you want to do:

① Now you have a station, but need to configure the network for devices or add new devices to your station?

- Please tap "**Add Device**" on the page or the "**+**" button to add devices to your station, as shown in Fig. 27. Then you can directly turn to "**Network Connection**".

② Now you don't have a station yet?

- Tap "**Create station**" on the page, as shown in Fig. 28.

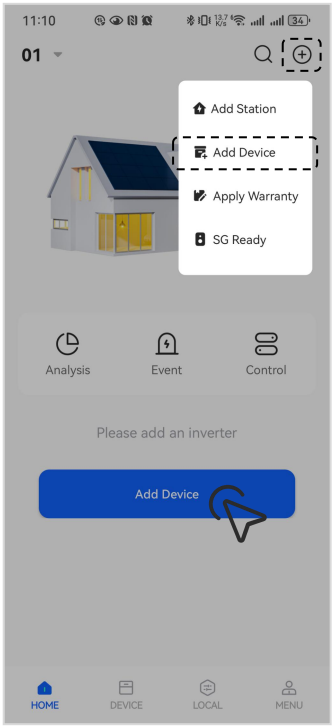


Figure 27

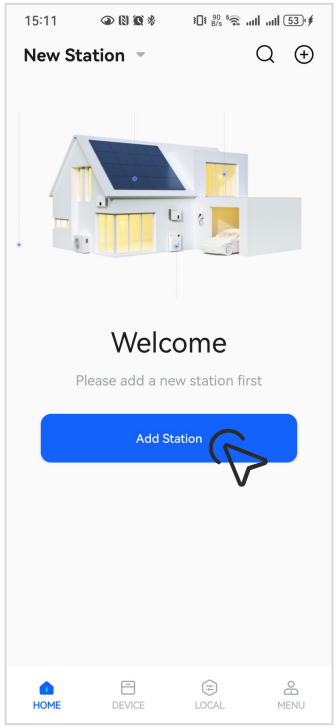


Figure 28

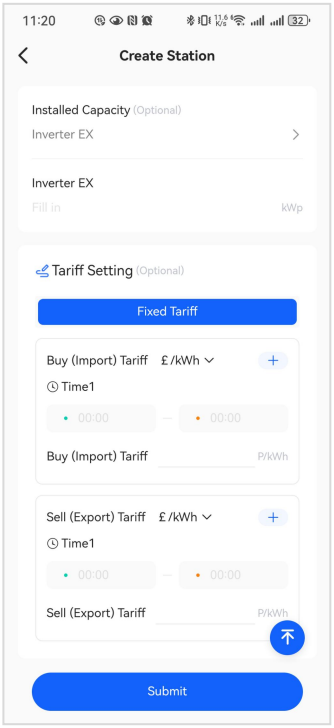


Figure 29

- **Fill in the new station information**

You will need to fill in some information for the station, as shown in Fig. 29.

- Address (optional): Your detailed address; we will only use it for after-sales service.
- Installed Capacity (optional): If the PV and inverter will be installed, please fill it in.
- Tariff Setting (optional): After filled, you will be able to view the income and expenditure of your devices. (Note: this function needs to be used with the HANCHUESS inverter; if you do not have a HANCHUESS inverter, you do not need to fill in this field.)

- **Network Connection**

Select the home Wi-Fi network you want to connect to (not 5G) and enter your Wi-Fi password.

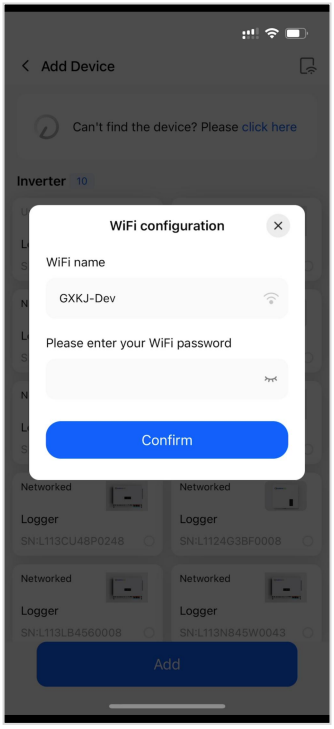


Figure 30

- **Bluetooth search**

- Turn on your phone's Bluetooth, then select the devices you want to bind.
- Tap "**Add**" to bind the devices to your station, as shown in Fig. 31.
- The SN on this page is the same as the SN on the battery.

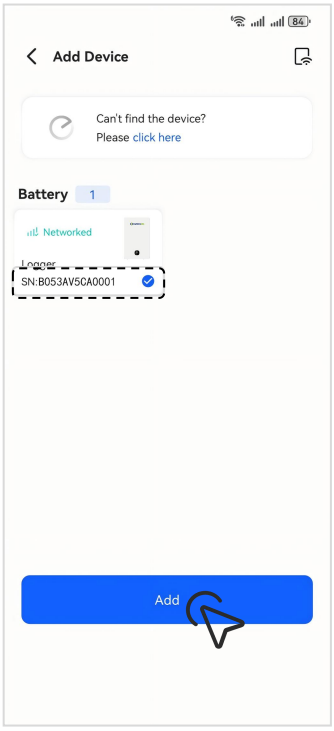


Figure 31

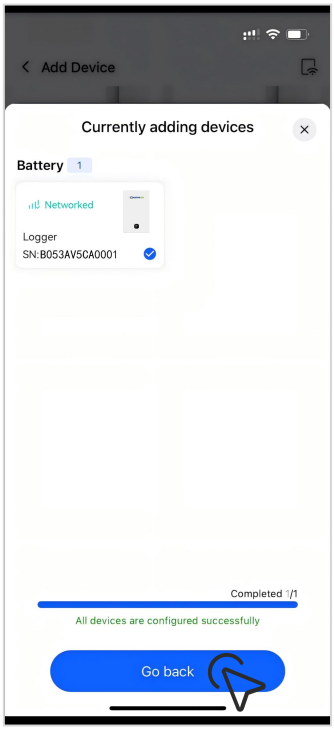


Figure 32

Note:

Please be sure to turn on the Bluetooth of the mobile phone, otherwise the binding function will not be available.

- **Binding completed**

After the devices are connected to the network and bound successfully, you will see the page shown in Fig. 32. Please tap "**Go back**".

- **Choose the Battery**

Choose one Battery to set.

- **Setting the Battery**

- Then enter the Battery Setting page, as shown in Fig. 33.

- Inverter Brand: Select the inverter brand that matches your battery. For example: if the brand of the inverter is HANCHUESS, here you have to select HANCHUESS.

- Click "**Confirm**" to finish the setting.

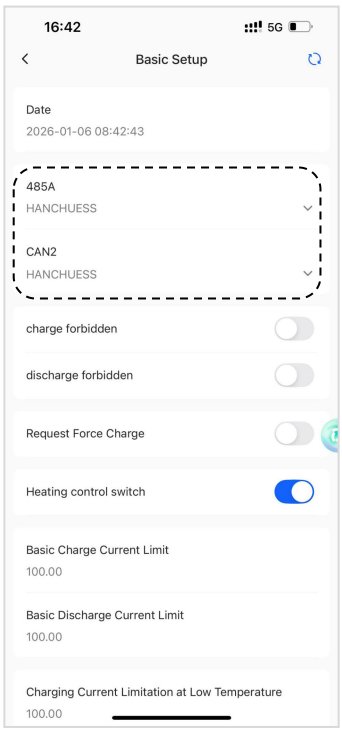


Figure 33

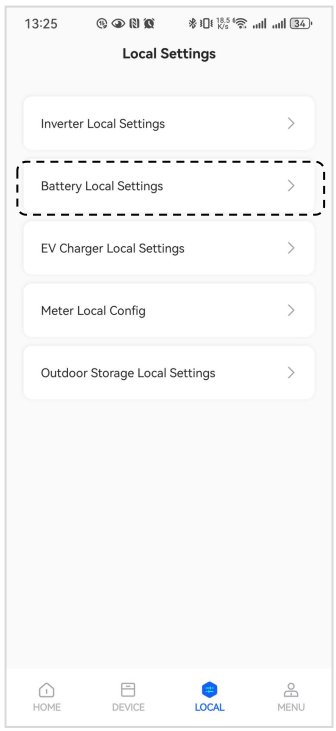


Figure 34

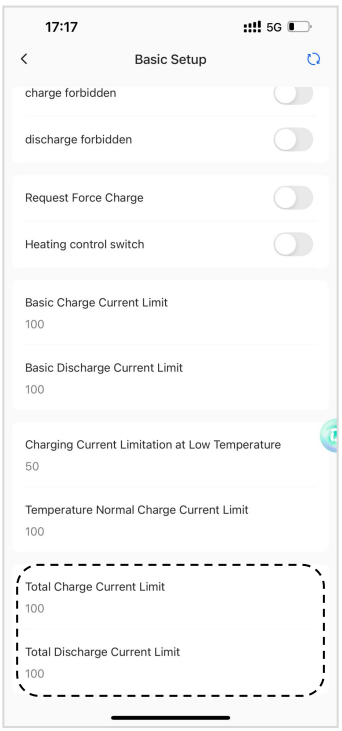


Figure 35

Note:

If you want to set the battery again, you can click "**LOCAL**" under the APP to enter "**Battery Local Settings**", as shown in Fig. 34, then keep your phone's Bluetooth on and select a battery to set. This process can be carried out without a network.

- Set the “Total Charge/Discharge Current Limit”, as shown in Fig. 35.

Congratulations! Now that you have completed the basic setting, you can use the APP to view your device data!

➢ *4.6.4 Inverter Protocol Selection*

The battery system's default factory CAN communication protocol and RS485 communication protocol are both the HANCHUESS protocol. If protocols other than HANCHUESS need to be modified, please contact Hanchu ESS after-sales service or your distributor directly.

Protocol Selection:

1) Check which protocols are supported by the inverter;

2) If the inverter supports the battery factory default protocol, select the corresponding protocol on the inverter directly.

3) If the inverter supports protocols other than the battery factory default protocol, select the same protocol on the battery and the inverter.

Table 11 Battery Protocol Options

	Inverter brands
CAN Communication	HANCHUESS, Luxpower, PYLON, DEYE, Solis, Victron, SMA
RS485 Communication	HANCHUESS, GT, SMK, Voltronic

After setting, you can see the normal status information of the battery pack, such as voltage, SOC, etc. from the inverter.

➢ *4.6.5 Equipment Power Down*

After confirming that the load is off and the battery has stopped charging and discharging, power down in the following order:

1) Disconnect the circuit breaker between the battery and the inverter.
2) Turn off the power switch on the battery.
3) Indicator light goes out.

If the battery will not be in use for a long period of time, it is necessary to maintain and recharge the battery in time according to subsections 6.2 and 6.3 of this manual.

4.7 Definitions of Indicator Lights

The display panel includes a SOC, three indicator lights, and a button. The three indicator lights represent the charge/discharge indicator, WIFI indicator, and alarm indicator, respectively.

Figure 36 Sample of Screen

Table 12 Definition of Indicator Lights

No.	Meaning	Indicator	Status	Explanation
①	Status		P.XX	Indicates power, unit: kW. P.0.2 denotes 200W; P.1.5 denotes 1500W; P.10 denotes 10 kW.
			U.XX	Indicates voltage.
			t.xx	Indicates temperature. Above 100℃, display shows “t.HH”; Below 0℃, display shows “t.Lo”.
			A.XX	Indicates address.
			E.XX	Indicates error. If there is no error, display shows “E.--”.

			Only display Numbers	SOC
			Three dots	Energy-saving mode: Three dots are constantly illuminated. 1st dot flashing: Charging; 2nd dot flashing: Discharging; 3rd dot flashing: Warning present. **Note:** The energy-saving mode is initially turned off. It needs to be enabled through the APP. Once enabled, the system will automatically enter the energy-saving mode after one minute of inactivity on the screen.
②	Charge/ Discharge indicator		Orange On	Discharge current greater than 0.5A.
			Green Blank	Charge current greater than 0.5A.
			OFF	Idle
③	WIFI		Orange Blank	Connecting router
			Orange On	Router connected, connecting to the cloud now.
			White On	Connected to the cloud
			OFF	Not networked.
④	Warning indicator		Red On	BMS communication abnormality
			White Blank	OTA in progress
			Orange On	Warning

			OFF	Normal
⑤	Button		Click	● A short press enters manual rotation mode, cycling through the digital-tube displays one by one. ● Press and hold for 2 s to restore automatic rotation mode.

Note:

After the network configuration is complete, tap "**Battery Local Settings**" screen in the app and set the "**Screen Brightness**" to "**darkest**", and then click on "**Confirm",** as shown in Fig 37, to reduce standby power consumption.

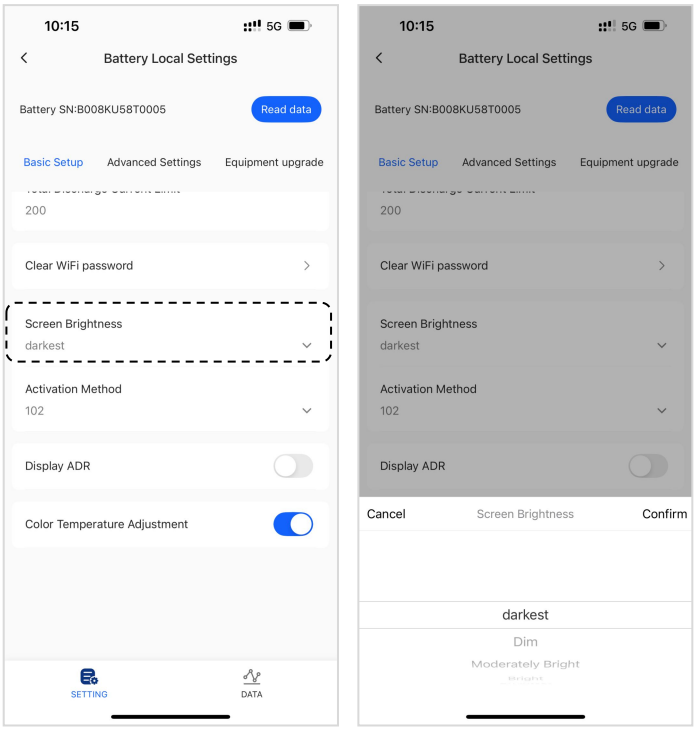


Figure 37

➢ *4.7.1 Alarms Information*

Table 13 Alarms Information

Alarm Codes	Alarms Information	Solution
E.13	Short circuit protection	Restart the battery; if the alarm persists and the system shuts down, check the external wiring.
E.40	Individual undervoltage protection	Recharge the battery in time.
E.41	Individual overvoltage protection	No action is needed-the alarm will clear automatically.
E.42	Overall undervoltage protection	Recharge the battery in time.
E.43	Overall overvoltage protection	No action is needed-the alarm will clear automatically.
E.44	Excessive voltage difference protection	Turn off the battery and contact Hanchu Technical Support.
E.45	Excessive temperature difference protection	Check whether external heat sources (e.g., outdoor A/C unit, fan) are partially affecting the battery. If no interference is found, contact your dealer immediately.
E.46	Charging over-current protection	Restart the battery; if the alarm persists and the system shuts down, inspect the external wiring.
E.47	Discharging overcurrent protection	Restart the battery; if the alarm persists and the system shuts down, inspect the external wiring.
E.48	Charging high temperature protection	1. After shutdown, check whether the ambient temperature is outside the battery’s allowable operating range and verify that ventilation and heat-dissipation conditions around the unit are adequate. 2. If the temperature exceeds the allowable range, improve the installation environment. 3. If the temperature is within range and ventilation is good, contact your dealer immediately.
E.49	Charging low temperature protection	1. After shutdown, check whether the ambient temperature is outside the battery’s allowable operating range. 2. If it is, improve the installation environment. 3. If the temperature is within the allowable range, contact your dealer immediately
E.50	Discharging high temperature protection	1. After shutdown, check whether the ambient temperature is outside the battery’s allowable operating range and verify that ventilation and heat-dissipation conditions around the unit are adequate. 2. If the temperature exceeds the allowable range, improve

		the installation environment. 3. If the temperature is within range and ventilation is good, contact your dealer immediately.
E.60	Cell failure	Turn off the battery and contact Hanchu Technical Support.
E.61	Heating fault	Turn off the battery and contact Hanchu Technical Support.
E.62	Sampling failure	Turn off the battery and contact Hanchu Technical Support.
E.63	NTC failure	Turn off the battery and contact Hanchu Technical Support.
E.64	Charging MOS fault	Turn off the battery and contact Hanchu Technical Support.
E.65	Discharging MOS failure	Turn off the battery and contact Hanchu Technical Support.
E.66	Fuse fault	Turn off the battery and contact Hanchu Technical Support.
E.67	Communication failure	Turn off the battery and contact Hanchu Technical Support.

Note:

If there are multiple alarms at the same time, only one will be displayed.

5 Common Troubleshooting

Table 14 Common Troubleshooting

Accident	Fault description	Solution
Indicator light does not come on	Indicator light does not light up when button is pressed.	Long press the power switch 2s to restore. If the long press does not work, please contact the Hanchu ESS after-sales service or your distributor directly.
No DC Output	Charging and discharging cannot be realized after connecting to the power supply.	Check whether the circuit breaker is closed and switched on. If it is closed and charging/discharging is still not possible, please contact Hanchu ESS after-sales service or your distributor directly.
External Communication Errors	The communication interruption between BMS and inverter.	Check if the communication cable between BMS and the inverter is correct and well connected.
Internal Communication Errors	1. The DIP switch is at the wrong position; 2. The communication lost between batteries.	1. Move the DIP switch to the correct position; 2. Check if the communication cable between the batteries is correct and well connected.
Over Voltage Alarm	Battery voltage is too high .	Wait for the battery voltage to return to normal.
Lower Voltage Alarm	Battery voltage is too low.	Please contact Hanchu ESS after-sales service or your distributor directly.
Charge OCP	Battery charging over current protection.	Please contact Hanchu ESS after-sales service or your distributor directly.
Discharge OCP	Battery discharge over current protection.	Please contact Hanchu ESS after-sales service or your distributor directly.
High Temperature Protection	Battery temperature is too high.	Wait for the cell temperature to return to normal.
Low Temperature Protection	Battery temperature is too low.	Wait for the cell temperature to return to normal.
Cell Imbalance	The capacity of the battery is different.	Please contact Hanchu ESS after-sales service or your distributor directly.
MOS Protection	Battery hardware is under protection.	Please contact Hanchu ESS after-sales service or your distributor directly.
Insulation Fault	Battery insulation failure.	Stop using, please contact Hanchu ESS after-sales service or your distributor directly.

VoltSensor Fault	Battery voltage sensor failure.	Please contact Hanchu ESS after-sales service or your distributor directly.
TempSensor Fault	Battery temperature sensor failure.	Please contact Hanchu ESS after-sales service or your distributor directly.
Temperature difference alarm	The temperature between cells are different.	Stop charging and discharging. Please contact Hanchu ESS after-sales service or your distributor directly.

6 Battery Maintenance

6.1 Battery Storage Requirements

The battery is required to be stored in a temperature range from 0°C to +40°C. Routine maintenance is required for batteries that have been stored for a long time. Depending on the storage time of the battery and the storage environment, please charge the battery to the corresponding SOC at 0.2C as required by the table below.

Table 15 Battery Storage Requirements

Ambient temperature	Relative humidity in storage environment	Storage time	SOC
<0°C	/	Prohibited	/
0~40°C	5%~60%	≤1month	15%≤SOC≤40%
5~35°C		≤6month	30%≤SOC≤60%
>45°C	/	Prohibited	/

- After a long-time storage, the battery must be inspected and tested by professionals before use.
- During the storage period, record temperature, humidity and storage environment in accordance with storage requirements in this manual.
- Long-term storage of batteries is not recommended, which will cause capacity loss. Generally, after 12 months of storage at the recommended storage temperature, an irreversible capacity loss of lithium batteries is 3%~10%.
- The batteries must be stored in accordance with the labels on the packaging box and must not be inverted or placed sideways.
- The battery boxes must be stacked according to the stacking requirements on the outer packaging.
- When handling the battery, take care not to damage it.
- Storage Environment Requirements:
  - Ambient temperature: short-term storage (less than 1 month)0°C~40°C, long-term storage (more than 1 month)5°C~35°C. Recommended storage temperature: 20°C~30°C.
  - Relative humidity: 5%RH~60%RH.
  - Store products in a dry, clean and ventilated place. Keep them away from dust, direct sunlight, rain, vapor or groundwater.
  - Avoid contact with corrosive organic solvents, gases and other substances.

6.2 Charging Requirements After Over-discharge

Even when the battery stops discharging, there is still static power consumption of the internal battery module and its own self-discharge loss. If there is no charge for a long time, it may lead to battery damage due to over-discharge. When the battery SOC is low, it needs to be replenished according to the maximum interval in the following table.

Table 16 Lithium Battery Recharge Cycle

SOC at power down before storage	Maximum recharge interval
SOC<5%	24h

We do not provide warranty service for permanent battery failure due to overdue recharging by the customer.

6.3 Long-term Idle Maintenance Requirements

If a long period of inactivity (≥30 days) is planned, the following two requirements must be observed to protect the battery:

1) Ensure that the battery's SOC system is above 30% and that the battery circuit breaker and power switch remain off.

2) If it is stored for more than 30 days, due to different temperatures and different storage time, it has different effects on self-discharge. Therefore, before the battery batteries go online, it is necessary to check the voltage completely to confirm the necessity of maintaining the state of charge. Our company can assist the customer in making a judgment.

3) If the interval between two charges of the battery exceeds 2 months, the standard charging mode must be adopted 2~3 times before the battery's performance can reach the best state.

4) If it is stored for more than 3 months, it shall be tested and maintained every 3 months. If it is not tested or maintained for more than 9 months, Hanchu will not be responsible for quality protection for capacity loss or other defects caused by batteries.

Note: We do not provide appropriate warranty service for permanent battery failure due to improper storage by the customer.

6.4 Battery Maintenance Safety Requirements

When the equipment is running, a high voltage may cause electric shocks and result in death, serious injury or property damage. Before performing maintenance, turn off the equipment and strictly follow the safety precautions listed in this manual and other related documents.

- Ensure that you are familiar with the contents of this manual and have appropriate tools and test equipment to perform maintenance.
- Before performing maintenance, turn off the equipment according to the instructions and wait for a certain period of time to ensure that the equipment is powered off .
- During maintenance, prevent unnecessary personnel from getting close to the maintenance site. Temporary warning signs or fences must be erected to isolate the site.
- If the equipment fails, please contact your distributor in time to deal with it.
- The equipment can only be powered on again after the fault has been dealt with. Otherwise, the equipment may have some problems or become damaged.
- Do not disassemble the product without authorization. There is a danger of electric shocks and the corresponding failure is not covered by the warranty.
- Maintenance personnel must have received professional training and use protective tools to conduct maintenance.
- When it is necessary to move or rewire, the input power must be cut off. Wait for 5 minutes to ensure that the internal energy of the machine has been discharged. The maintenance must be started after

confirming with a multimeter that there is no dangerous voltage and no parts need to be repaired inside the machine.

- Maintenance of batteries must be performed or supervised by someone who is familiar with batteries and required precautions.
- Please use the same type of cell when replacing cells.
- After maintenance, immediately check that no tools or other parts have been left inside the equipment.
- If the equipment has not been used for a long time, you need to store and charge the battery according to this manual.

All operators of the energy storage system shall comply with the user manual. Any equipment damage caused by neglecting or misreading the user manual will void the product warranty.

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