Version 01

User Manual

HOME-ESS-LV-9.4K

Empowering Energy Clean And Affordable

Android APP

iOS APP

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Version 01(2023-6-30)

First release.

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1. Foreword

1.1 Purpose

This document describes the HOME-ESS-LV-9.4K by developed Hanchu ESS in terms of its overview, application scenarios, installation, commissioning, system maintenance and technical specifications. Please read it carefully before operation.

1.2 Target Audience

This manual is intended for:

- Sales engineers
- System engineers
- Technical support engineers
- End users tasks described in this manual can only be done by qualified electricians.

1.3 Symbol Conventions

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.

Thank you very much for choosing HOME-ESS-LV-9.4K developed by Hanchu ESS. We sincerely believe that our products can meet your needs and look forward to your feedback.

- Please read and understand all the contents of this manual before installing and operating the product. Any loss 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-9.4K 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.

2. Safety Requirements

2.1 Statement

When installing, operating and maintaining the equipment, please read this manual first and follow the signs on the equipment and all safety precautions in the manual.

The 'Caution', 'Warning' and 'Danger' items in the manual do not represent all safety precautions to be followed, but as a supplement to all safety precautions. Hanchu ESS disclaims any liability arising from violations of general safety operation requirements or violations of safety standards for the design, manufacture and use of equipment.

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

- Operations beyond the conditions specified in this manual.
- Installation or use in environments that do not meet relevant international, national or local standards.
- Disassemble and alter equipment or modify software code without authorization. Failure to follow the operation instructions and safety precautions in this manual.
- 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 product manual.
- Damage of the hardware or data of the equipment due to customer's negligence or intentional damages.
- System damages caused by improper operations of a third party or customer, including those in transportation, installation, adjustment, alteration or removal of identification marks.

2.2 General Requirements

DANGER

The equipment has a high voltage. Irregular operation may generate electricshock or fire which may causes death, severe personal injuries or serious property damages. Please standardize the operation:

- It is strictly prohibited to install or operate outdoor equipments 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 breeze, etc.
- 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 equipments with power on.
- Do not wash the equipment.
- Do not open the panel of the equipment.
- Measure the voltage before touching 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 consent 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.

2.3 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.

● 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.

● Personnel who will operate the equipment, including operators, trained personnel and professionals should possess local national required qualifications in special operations such as high-voltage operations, working at heights and operations of special 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 on themselves in certain operations and are able to take protective measures to minimize the hazards on themselves and other people.

❖ Operators: operation personnel who may come in contact with the equipment,except trained personnel and professionals.

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 with power-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 30 mm exists between the cables and heat-generating components or areas. This prevents damage of 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 contacting 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 should 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.
- ● Do not disassemble or damage the battery. The released electrolyte is harmful to your skin and eyes. Avoid contact with the electrolyte.
- ● Do not place irrelevant objects on the 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.
- ● 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 the 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.
- ● 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.

2.6 Battery Safety

2.6.1 Statement

ATTENTION

Hanchu ESS shall not be liable for equipment functional abnormality, component damage, personal s afety accidents, property loss, or other damage caused by the following reasons.

- The batteries are not charged as required during storage, resulting in capacity loss or irreversible damage to the batteries.
- Battery damage, drop, or leakage caused by improper operations or failure to connect the batteries as required.
- After being installed and connected to the system, the batteries are not powered on in time, which causes damage to the batteries due to Over-discharge.
- The battery running management parameters are set incorrectly.
- Customers or a third party uses the batteries beyond the scenarios specified by Hanchu ESS. For example, connect extra loads or use with other batteries, including but not limited to batteries of other brands or batteries of different rated capacities.
- Damages are caused to batteries when the battery operating environment or external power parameters do not meet the environmental requirements.
- Batteries are frequently over-discharged due to improper maintenance, capacity is incorrectly expanded or the batteries have not been fully charged for a long time.
- Batteries are not maintained based on the operation guide, such as failure to check battery terminals regularly.
- Batteries are stolen.
- Beyond the warranty period.

2.6.2 Basic Requirements

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 gas and harmful gas such as CO and HF.
  - ❖ The concentration of flammable gas generated from battery thermal runaway may cause combustion and explosion.

WARNING

- 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 should 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.

2.7 Installation Environment Requirements

WARNING

- 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 should 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 ship, train or car.
- 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 from 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).

2.8 Emergency Measures

2.8.1 Battery Emergency Measures

DANGER

● Avoid contact with leaked liquids or gases in the case of battery leakage or abnormal odor. Do not approach the battery. 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. Should you come into 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.

2.8.2 Fire Emergency Measures

DANGER

● 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 contact with high-voltage components during fire fighting 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.

2.8.3 Damaged Battery

DANGER

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

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

● If the battery seems to be damaged, they are not suitable for use and may be dangerous to personals or property.

2.8.4 Battery Drop Emergency Measures

DANGER

● 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 abnormal odor, 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 no abnormal odor, smoke or fire occurs, contact professionals to transfer the battery to an open and safe place or contact a recycling company for disposal.

2.8.5 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.

3. Product Description

The HOME-ESS-LV-9.4K is a new generation equipment with home energy storage system that can meet the diverse needs of global users. High-performance lithium iron phosphate battery is used for functional integration and modular structure design. It has realized the convenient expansion, rapid product installation, load matching, remote control and many other functions.

Note: The rated current of the HOME-ESS-LV-9.4K product is 100A. Please ensure that the battery does not operate that exceed this current limit. If you need to connect an inverter with a capacity of more than 6KW, please use it in conjunction with the Hanchu combiner box.

3.1 Product Description

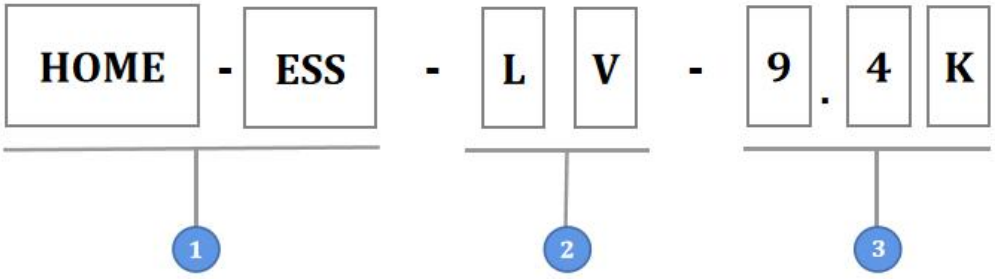
3.1.1 System Composition

The battery system consists of BMS and 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.

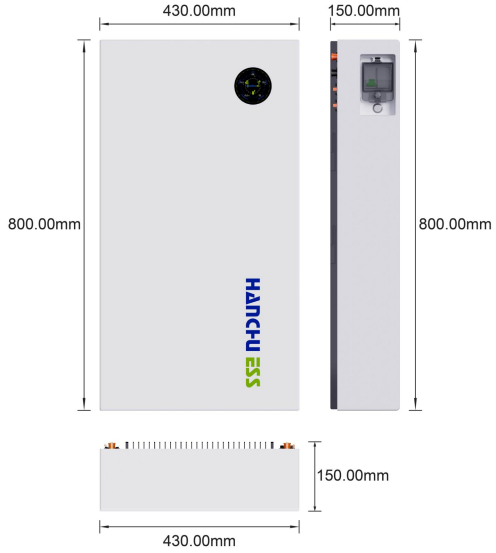
3.1.2 Model Identification



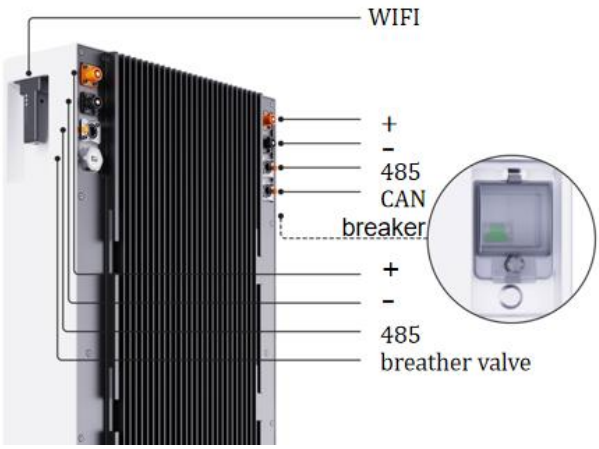
No.	Meaning	Value
1	Product	HOME-ESS: Home energy storage
2	Voltage strength	LV: Low Voltage
3	Battery sizes	9.4K: The battery capacity is 9.4kW·h

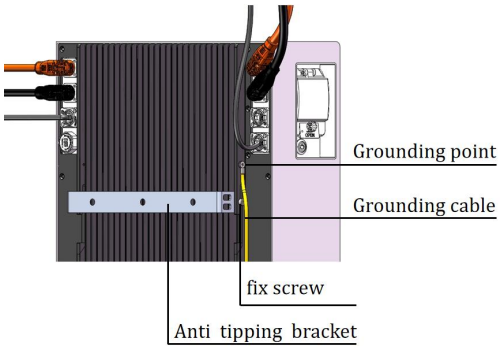
3.1.3 Product Dimension And Weight

Length	Width	Height	Weight
430mm	150mm	800mm	72KG



3.2 Interface Description





No.	Symbol	Name	Definition
1	WIFI	WIFI interface	Connect to Logger
2	+	Positive socket	The battery DC output positive pole, which is connected to the positive pole of the inverter through the cable.
3	-	Negative socket	The battery DC output negative pole, which is connected to the negative pole of the inverter through the cable.
4	485	RS485 socket	When the system is used in parallel: connect the batteries in through the RS485 socket.

5	CAN	CAN socket	The CAN socket is connected to the inverter CAN interface through the cable.
6	Breaker	DC circuit breaker	Circuit Protection
7	Breather valve	Breather valve	
8	Grounding point	Grounding point	Shell ground connection

3.3 Symbol Explanation

Symbol	Explanation
	The relevant equipment complies with the requirements in the EC guidelines.
	After the battery life is terminated, the battery can continue to be used after it recycled by the professional recycling organization and do not discard it at will.
	The scrapped battery cannot be put into the garbage can and must be professionally recycled
	The danger of electric shock!
	Follow the attached manuals
	Do not touch the product until 90 seconds after shutting down
	Hot surface
	Keep ventilated
	Be careful with your actions and be aware of the dangers.

3.3.1 Product Parameters

No.	Project	Parameter	Remark
1	Models:	HOME-ESS-LV-9.4K	
2	Dimensions (mm) W*D*H:	430*150*800	
3	Protection degree:	IP65	
4	Module configuration :	1 parallel 16 strings	1P16S
5	Rated voltage (V):	51.2	
6	Operating voltage range (V):	43.2~57.6	
7	Energy (Wh):	9420.8	
8	Standard discharging current (A):	92	
9	Max. discharging current (A):	100	
10	Standard charging current (A):	92	
11	Max. charging current (A):	100	
12	Charge temperature range (℃):	0~50	
13	Discharge temperature range (℃):	-20~60	
14	Total weight (Kg):	72	
15	Communication interface:	RS485/CAN/WIFI/Bluetooth	
16	Fire protection configuration:	Hot aerosol	
17	Cooling method:	Natural cooling	
18	Maximum parallel number:	16	

3.4 Features

3.4.1 Ultra Safe

Equipped with BMS (battery management system) mode with better performance,
possesses protection function like over-discharge, over-charge, over-current, abnormal temperature.
Pack-level immersion fire protection,ultra quadruple safety.

3.4.2 Smart BMS & IOT Monitoring

Integrated with intelligent BMS to provide strong protection and free & handy monitoring both on mobile & PC.
Smart control to optimize your energy allocation provide 24/7 automatic monitoring.Thoughtful cloud service for preserving batteries providing remote diagnostics or upgrades.

3.4.3 Innovative Features

intelligent automatically addressing.

3.4.4 Flexible & Easier Installation

Multiple option for floor-standing or wall-mounted installation.

3.4.5 Modular Design

Max 16pcs products to make parallel connection; Max capacity150 kWh (9.4KWh *16), Flexible configurations allow parallel of multi battery for longer standby time.

3.4.6 Super Performance

Higher DOD meets more energy demand, 6000 cycles, 10 years' life span.

3.4.7 Wide Compatibility

Compatible with main brands of inverters in the market.

4. Installation

4.1 Installation Note

Please read and understand this section carefully before installing the product!
Please follow the equipment installation steps process to ensure the equipment can be successfully installed.

4.1.1 Personnel Qualification

Product installers should have received safety technical training, obtained the local electrician certifications and the authorized qualifications for product installation. And installers should 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

Please make sure the installation location meets the following conditions:

- The installation and use environment need to comply with local laws and regulations and relevant international national and regional standards for lithium battery products.
- Install in a dry, well-ventilated environment and secure the equipment on a sturdy, level support surface.
- Avoid water accumulation in the installation location, and keep away from water sources such as faucets, sewer pipes, sprinklers, etc. to avoid water infiltration.
- The environment around the installation location is clean, and there is no large amount of infrared radiation, organic solvents and corrosive gases, etc.
- When the equipment is running, the temperature of the under-frame and heat sink will be relatively high, please do not install it in a place where it is easy to touch.
- When the equipment is running, do not block the ventilation openings or cooling system to prevent high temperature fires.
- Please choose a sheltered installation site, or build a awning to avoid direct sunlight or rain.

4.2 Installation Preparation

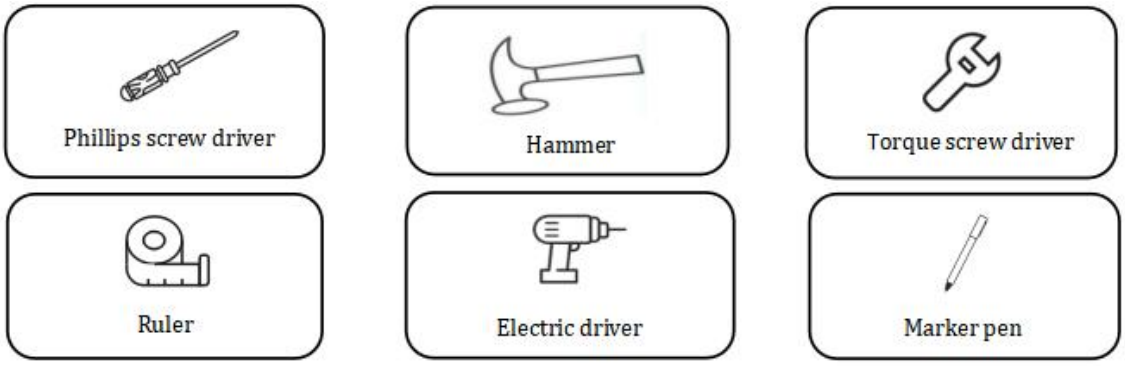
4.2.1 Personal Protective Equipment

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: Ensure safety in case the module is accidentally dropped during installation.

4.2.2 Installation Tools

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



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 tapes 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 Packing accessories. If there's any item missing, please contact your dealer directly.

4.2.4 Product Accessories

Label	Name	Quantity	Function description
A	Battery	1	System core components
B	Anti tipping bracket	1	Fix battery
C	Wall Mount Bracket(optional)	1	Fix battery
D	Power cable 1 Quick plug terminals at both ends/black/400mm	1	Connect the negative pole between the battery modules
E	Power cable 2 Quick plug terminals at both ends/red/400mm	1	Connect the positive pole between the battery modules
F	Power cable 3 Quick plug terminal+SC25-6 /black/1000mm	1	Connect the negative pole between the battery and the inverter
G	Power cable 4 Quick plug terminal+SC25-6 /red/1000mm	1	Connect the positive pole between the battery and the inverter
H	RS485 communication line/400mm	1	Connect the communication interface between battery modules
I	CAN communication line/1000mm	1	Connect the communication interface between battery and inverter
J	Logger	1	System Status Monitoring
K	Universal wheel	4	
L	L-shaped hexagonal tool * 1	1	
M	Expansion tube/screw	6	Fix bracket
N	Hexagonal Screw M4x10	2	Fixing battery box with battery bracket
O	Terminal/OT6-4	1	Connected to ground wire
P	Ground screw/M4x8	1	Connected to ground terminal
Q	Terminal/SC25-6	2	Spare terminals
R	Positioning Auxiliary Paper	1	Positioning the position of the wheels
S	Quick Installation Guide	1	Product installation guide

4.3 Installation

There are two types of battery installation methods: floor installation and wall installation, the installation method is decided by the customer.

4.3.1 Floor Installation

Attention should be paid to the following items before installation:

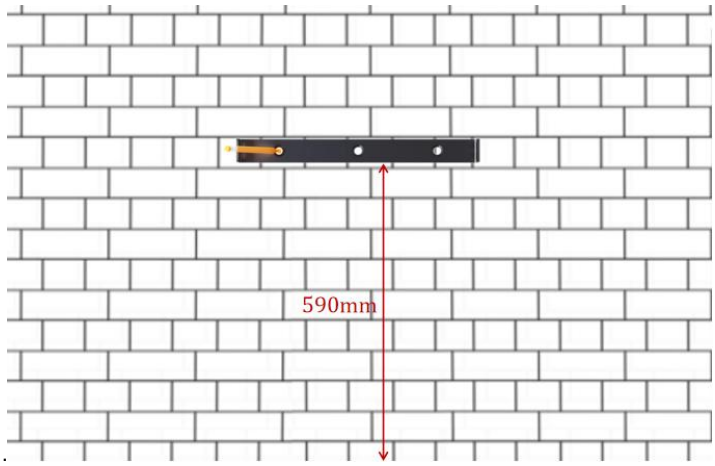
● Power cable specification： The matching power cable is 4AWG, and the max current is 110A. Please do not work under the condition of exceeding this current.

● Mounting space： Make sure that the battery system has enough space to install, make sure the ground is strong enough to bear the weight of the battery system. The battery is in danger of falling, so the anti-tipping bracket must be firmly installed on the wall, and the battery and anti-tipping bracket must be reliably fixed (the battery backplane and stand should be locked with screws).

● Wiring: Make sure the power cable and ground wire are reasonable. Not easy to short-circuit, water and corrosion.

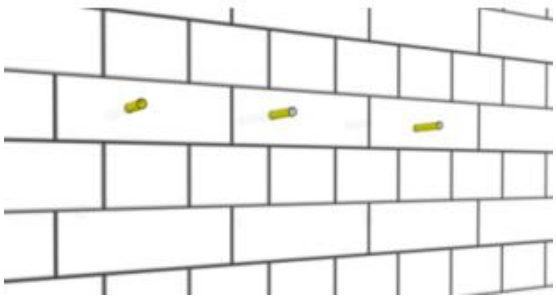
Step 1: Drill positioning holes on the wall

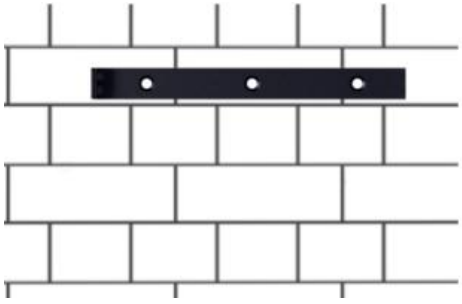
Use the bracket as a template to make positioning holes in the wall, mark the positions of the 3 holes, and then drill 10mm holes to ensure that the depth of the holes is greater than 50mm.The bracket is 590mm away from the ground .



Step 2: Fix the anti tipping bracket

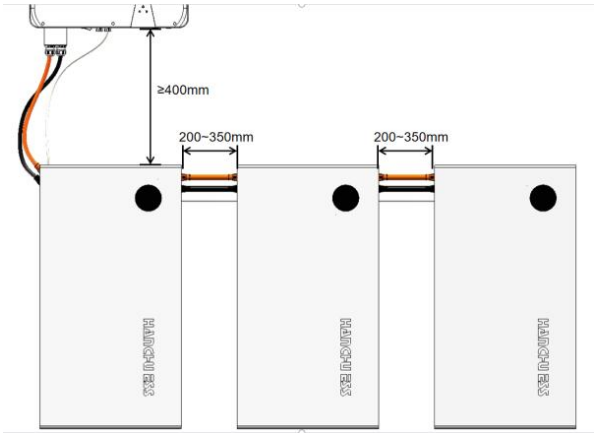
Fit the expansion tube into the hole and pull tight, then use the expansion screw to install and secure the anti tipping rack to the wall.





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 anti tipping bracket and fix it with screws. The distance between the batteries is 200-350mm, and the distance between the battery and the inverter is not less than 400mm.



Note： We provide four universal wheels as standard with the device, which can be installed on the bottom of the battery, making the installation process more convenient. It can also be placed directly on the ground, the installation method is decided by the customer.

4.3.2 Wall Installation

Attention should be paid to the following items before installation:

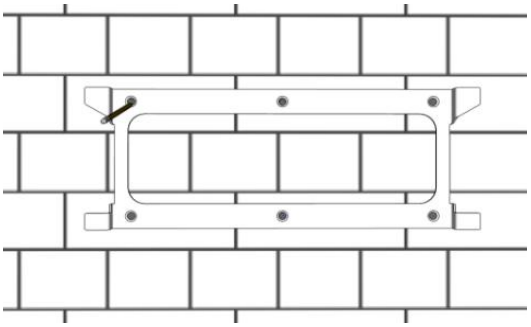
● Power cable specification: The matching power cable is 4AWG, and the carrying capacity is 110A. Please do not work under the condition of exceeding this current.

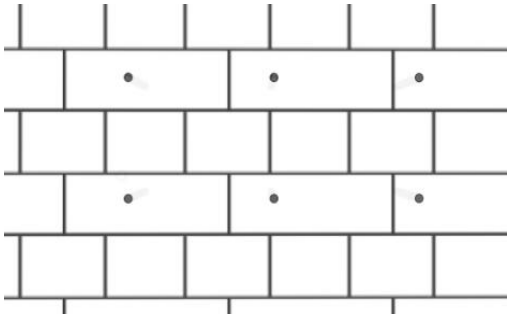
● Mounting space: Make sure that the battery system has enough space to install, make sure the wall is strong enough to bear the weight of the battery system. Installing on a solid cement wall with a thickness of not less than 100mm is recommended.

● Wiring: Make sure the power cable and ground wire are reasonable. Not easy to short-circuit, water and corrosion.

Step 1: Drill positioning holes on the wall

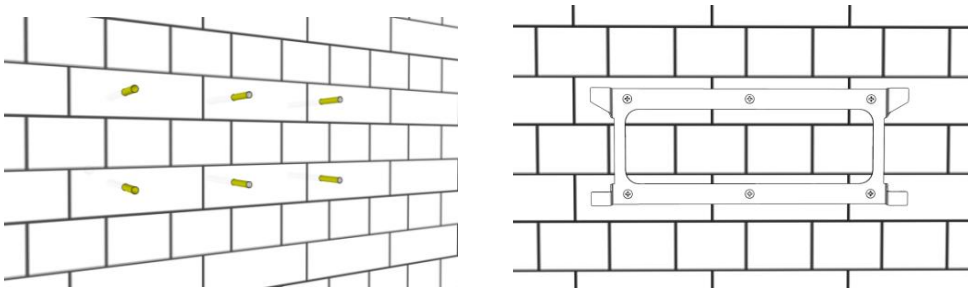
Use the bracket as a template to make positioning holes in the wall, mark the positions of the 6 holes, and then drill 10mm holes to ensure that the depth of the holes is greater than 50mm.





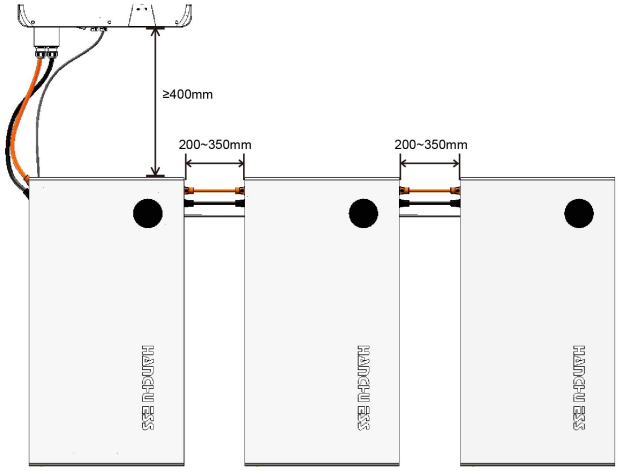
Step 2: Fix the Wall Mount Bracket

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.



Step 3: Fix the battery

There is a hook design on the back of the battery box, align and fix it to the positioning groove of the wall bracket for firm support.The distance between the batteries is 200-350mm, and the distance between the battery and the inverter is not less than 400mm.



4.4 Electrical Connections

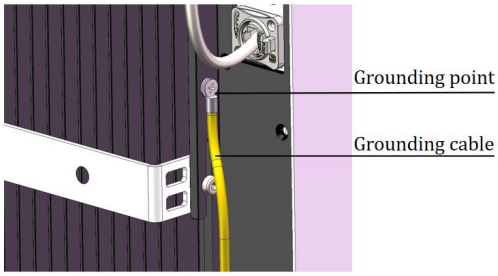
● Before connecting cables, make sure the battery and inverter are entirely switched off. Make sure all breaker switches are fully switched off.

● Before connecting cables, using multi meter to measure cable continuity, short circuit, confirm positive and negative.

● The batteries are parallel connection. The negative terminal is connected to the negative terminal and the positive terminal is connected to the positive terminal between the battery strings and the inverter.

4.4.1 Battery Ground Connection

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

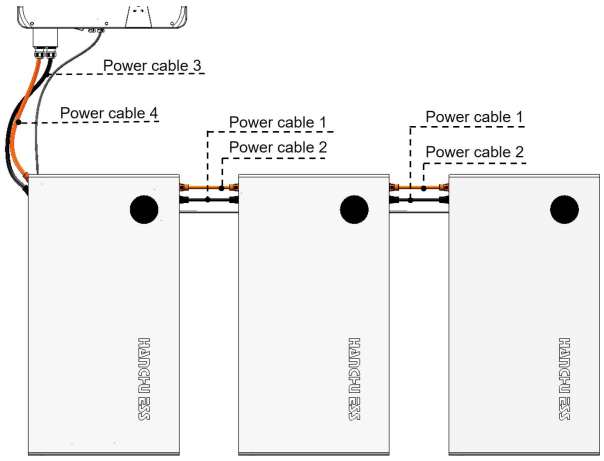


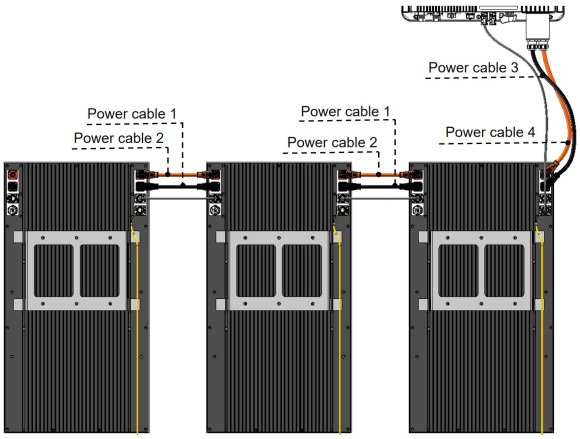
4.4.2 Power Connections Between Batteries

Use power cable 1 to connect the negative pole (P- terminal) of battery pack A to the negative pole (P- terminal) of battery pack B, and use power cable 2 to connect the positive pole (P+ terminal) of battery pack A to the positive pole (P+terminal) of battery pack B.

4.4.3 Connect The Primary Battery With The Inverter Through Power Cord

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





Note: Once the cord is successfully connected to the terminal, an audible sound will indicate the proper connection. It is forbidden to mix batteries of different brands, specifications and batches, otherwise it will cause a system failure.

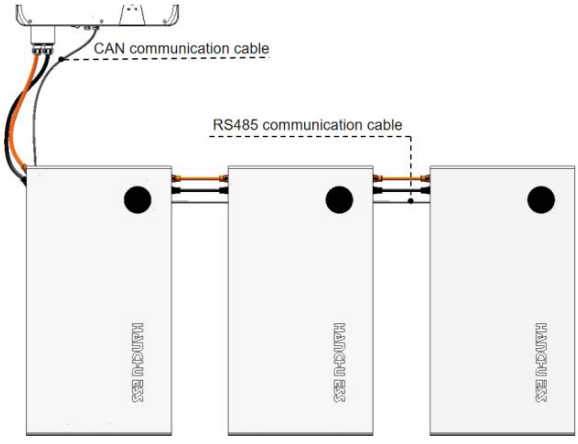
4.5 Communication Connection

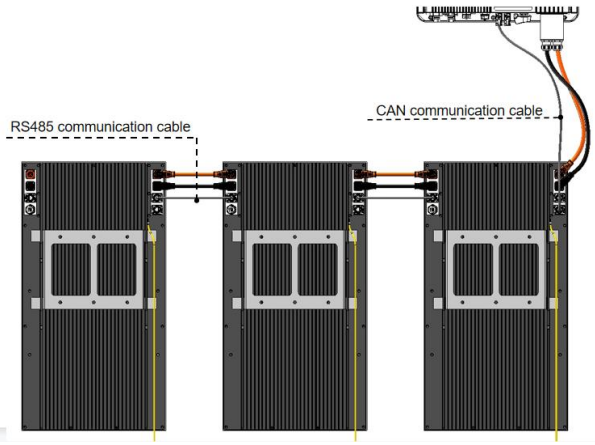
4.5.1 Connect The CAN Communication Cable

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

4.5.2 Connect The RS485 Communication Cable

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





4.6 Setting Up

4.6.1 Equipment Power On

Confirm again that the cables are connected in the correct order and the connection is firm before starting the test.

1) First turn on the inverter.
2) Then press the power switch power on the battery pack in turn to turn on.
3) Then turn on the circuit breaker switch on the battery.
4) Observe whether the status of the LCD on the battery panel is normal.

Note: The shut down procedure is opposite to the startup process, first shut down the battery circuit breaker; Then shut down the power switch power on the battery.Final turn off the inverter.When the system starts, ensure the boot sequence of each equipment, otherwise it may cause pre-charging and trigger the circuit breaker protection fault.

4.6.2 Inverter Protocol Selection

1) On the inverter, the battery manufacturer chooses the Hanchu ESS protocol, or chooses the inverter's own adaptive protocol.
2) On the battery, the inverter manufacturer chooses the matching inverter protocol（Protocol options include Hanchu、PYLON、DEYE、AISWEI、GROWATT）.
3) Then you should see the normal status information of the battery pack such as voltage, SOC, etc. from the inverter.

4.6.3 Confirm Address

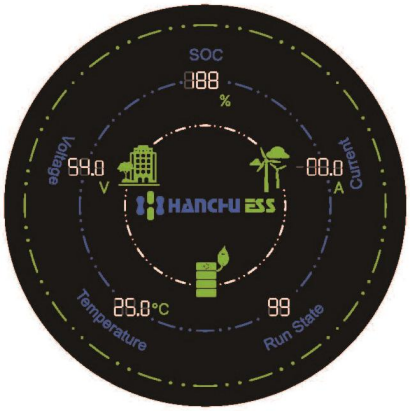
1) When the system is used in parallel, it supports up to 16 batteries in parallel.
2) When running in parallel, you need to confirm the address of each unit. The Run State 01~16 in the display shows the address of the battery, 01 represents the host device, and the rest 02~16 are slaves.

4.6.4 Logger Installation

Please refer to the attached Monitor Usage Guide for the installation and registration of the logger.

4.7 Definition Of LCD

The LCD screen is shown below.



Icon		function
		Battery remaining capacity is 76%~100%
		Battery remaining capacity is 50%~75%
		Battery remaining capacity is 26%~49%
		Battery remaining capacity is below 25%
Current		Current value
Soc		Remaining capacity
Voltage		Voltage
Temperature		Battery temperature
Run station	01~19	Address,01 represents the host device, 02~19 are slaves
	20	No alarm
	21	Individual undervoltage alarm
	22	Individual overvoltage alarm
	23	Overall undervoltage alarm
	24	Overall overvoltage alarm
	25	Excessive pressure difference alarm
	26	Excessive temperature differencealarm
	27	Charging overcurrent alarm

Run station	28	Discharge overcurrent alarm
	29	Charging high temperature alarm
	30	Charging low temperature alarm
	31	Discharge high temperature alarm
	32	Low temperature discharge alarm
	33	Environmental high temperature alarm
	34	Environmental low temperature alarm
	35	MOS high temperature alarm
	40	Individual undervoltage protection
	41	Individual overvoltage protection
	42	Overall undervoltage protection
	43	Overall overvoltage protection
	44	Excessive voltage differenceprotection
	45	Excessive temperature differenceprotection
	46	Charging over-current protection
	47	Discharge overcurrent protection
	48	Charging high temperature protection
	49	Charging low temperature protection
	50	Discharge high temperatureprotection
	60	Cell failure
	61	Heating fault
	62	Sampling failure
	63	NTC failure
	64	Charging MOS fault
	65	Discharge MOS failure
	66	Fuse fuse
	67	Communication failure

5. Common Troubleshooting

Accident	Fault description	Solution
External Errors	The communication interruption between BMS and inverter	Check if the communication cable between BMS and inverter is correct and well connected.
Internal Errors	The communication lost between batteries	Check if the communication cable between the batteries is correct and well connected.
Over Voltage	Battery over voltage	Wait for the battery voltage to return to normal.
Lower Voltage	Battery voltage is too low	Please contact Hanchu ESS after-sales service department or your dealer directly.
Charge OCP	Battery charging over current protection	Please contact Hanchu ESS after-sales service department or your dealer directly.
Discharge OCP	Battery discharge over current protection	Please contact Hanchu ESS after-sales service department or your dealer directly.
High Temperature	Battery temperature is too high	Wait for the cell temperature to return to normal.
Low Temperature	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 company or your dealer directly.
Hardware Protection	Battery hardware is under protection	Please contact Hanchu ESS after-sales service company or your dealer directly.
Insulation Fault	Battery insulation failure	Stop using, Please contact Hanchu ESS after-sales service company or your dealer directly.
VoltSensor Fault	Battery voltage sensor failure	Please contact Hanchu ESS after-sales service company or your dealer directly.
TempSensor Fault	Battery temperature sensor failure	Please contact Hanchu ESS after-sales service company or your dealer directly.
CurrSensor Fault	Battery current sensor failure	Please contact Hanchu ESS after-sales service company or your dealer directly.
Self-Check Fault	BMS self-check failure	Please contact Hanchu ESS after-sales service company or your dealer directly.
Cell Temp Diff Fault	The temperature between cells are different	Stop charging and discharging. Please contact Hanchu ESS after-sales service company or your dealer directly.

6. Battery Maintenance

6.1 Battery Storage Requirements

The battery is required to be stored in a temperature range from -10°C to +45°C for charging. Routine maintenance is required for batteries that have been stored for a long time. Please charge the battery to 50% SOC at 0.2C as required by the table below.

Ambient temperature	Relative humidity in storage environment	Storage time	SOC
<-10℃	/	Prohibited	/
-10~25℃	5%~80%	≤12month	30%≤SOC≤60%
25~35℃		≤6month	
35~45℃		≤3month	
>45℃	/	Prohibited	/

- After a long-time storage, the battery can only be used after being checked and tested by professionals.
- The batteries should be stored correctly according to the label of the packing box, and should not be placed upside down or sideways.
- The battery boxes should be stacked according to the stacking requirements on the outer packaging.
- When handling the battery, take care not to damage the battery.
- Storage Environment Requirements:
- Ambient temperature: -10℃～55℃,Recommended storage temperature: 20℃～30℃.
- Relative humidity: 5%RH～80%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

Charge the over-discharged battery according to the table below. Otherwise, the discharging battery module may be damaged.

Storage ambient temperature	storage time
-10~25℃	≤15days
25~45℃	≤7days

- 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 storage environment must meet local regulations and standards.

6.3 Long-term Idle Maintenance Requirements

If you plan to leave for a long time (≥30 days), you should comply with the following two requirements to protect the batteries.

1) Before leaving, please check that the whole system can work normally in case that nobody is at home.

2) Ensure that the SOC system of the battery is above 60% and the power switch is kept OFF. Keep in mind that the system should restart to charge the battery within 90 days.

6.4 Battery Maintenance 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, turnoff 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 power-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 dealer in time to deal with it.
- The equipment can only be power-on again after the fault has been dealt with. Otherwise, the equipment may have some problems or become damaged.
- Do not dissemble the product without authorization. There is a danger of electric shocks and the corresponding failure is not covered by the warranty.
- Maintenance personnel should have received the 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 should 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 should 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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