ASTAR ELECTRONICS

Installation and Operation Instructions


ASTAR
ASTAR ELECTRONICS
LiFePO4
5120Wh

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1. Safety Instructions

This chapter mainly introduces safety precautions. Before carrying out any operation related to the module, it is necessary to read the manual carefully and follow all the dangerous, warning and safety information as instructed in the operation and installation instructions in the document, in order to avoid endangering personal safety or damaging equipment due to unsafe operation.

1.1 Safety Precautionsa

Reminding

Please read this manual and other related materials carefully before operating, e specially the instructions and instructions in the manual to avoid accidents.

The references to "hazards," "warnings," and "attentions" in the manual do not represent all safety matters to be observed and are only supplementary to various safety precaution s.

We do not accept any liability for breaches of general safe operating requirements or for breach of safety standards for equipment designed, manufactured and used.

1.1.1 Safety Instructions for Use

Danger

◇The product is forbidden to be immersed in water.

◇The product is not used or stored correctly and carries a risk of fire, explosion and burn. Do not

disassemble, crush, incinerate and heat the product

◇If the product emits a foul odor, heat, deformation, discoloration or any other abnormalities, it should not be used and moved to a safe place.


Danger

◇There are no user-operated parts inside the equipment. Do not open the machine enclosure unlawfully, as there is a danger of electric shock and the resulting equipment failure is not covered by the warranty

◇The product should be protected during use to protect it from mechanical shock, collision and pressure shock, otherwise the internal circuit of the product may short-circuit, resulting in high temperature and fire.

◇Do not put a finger or tool into a moving module to avoid endangering personal safety or damaging the equipment.


Danger

◇Damaged equipment or equipment failure may cause an electric shock hazard or fire!

◇Before operating the equipment, please visually check that the equipment is free of damage or other hazards.

◇Check whether other external devices or circuit connections are secure.

◇When equipment is maintained, make sure that the module is completely disconnected from the external connection and set a warning sign where the disconnect occurs to ensure that there is no accidental reconnection.

Reminding

◇The following potential hazards exist during the use and operation of the product: operators may be injured by chemicals, electric shocks or arcs while operating; Although the human body reacts differently to being exposed to DC and AC power, DC voltage above 50V and AC power are equally serious to the human body, so operators must adopt protective measures during operation to avoid the har m of current.

◇When electrolyte leaks, skin and eyes should be avoided from contacting the electrolyte. If there is contact, use a lot of water to clean the area where it has come into contact and seek help from a doctor.

◇The product shall be safely fixed to a solid plane and the power line shall be securely boundin a suitable position to avoid friction causing arcs and sparks.

Reminding

◇ Ruthenium does not allow liquids or other foreign objects to enter the cabinet.

◇Keep products out of the reach of children,do not remove the original packaging of products before use, and dispose of used products in a timely manner in accordance with local recycling or waste regulations.

◇The equipment should be operated under the required working environment (voltage, temperature, humidity, etc.), otherwise it may cause the product to fail.

Warning

◇Do not mix products of different specifications, brands and batches.

Warning

◇The product is prohibited from being put into fire or exposed for prolonged periods to a high temperature environment exceeding the temperature conditions specified in this Agreement, otherwise it may cause a fire.

◇Lithium It is prohibited for products to short circuit positive and negative currents, otherwise strong currents and high temperatures may cause personal injury or fire. Adequate safety protection should be provided when battery systems are assembled and connected to avoid short circuits.

◇It is prohibited to overcharge / discharge the product, otherwise, it may cause the electrical core in the product to overheat and the occurrence of fire accidents.

◇No one or animal is allowed to swallow any part of the product.

1.1.2 Module identification instructions

Warning

◇The warning signs on the outside of the module contain important information about the safe operation of the device. It is strictly forbidden to be torn or damaged! Make sure the device enclosure signs are clearly readable and replace them immediately if they are damaged or blurred

◇Always pay attention to the hazard warning signs on the body. The signs on modules are described in the table.

	There is high pressure inside, which may endanger personal safety. Beware of electric shock.
	Take care of your safety
	Outside ground marking needs to be firmly grounded to ensure the safety of operators.
	Please consult the product manual before use.
	Do not dispose of ordinary waste and must be recycled through special means.
	When the machine is operating, the vent temperature is too high, and it is forbidden to touch the vent shutters to prevent burning.
	Fireworks are prohibited.。
	After power failure, it needs to be left for 15 minutes to ensure that the machine is completely discharged.

1.1.3 Electrical connections

1.1.4 Live Line Work

Reminding

There is a voltage in the equipment, and accidental touching can cause the danger of a fatal electric shock. Therefore, when carrying out charged measurements, protective measures (e.g. wearing insulated gloves, etc.) and other personnel must be present.

The measuring equipment must meet the following requirements:

◇ The measurement equipment's measurement range, conditions of service, etc. meet the field Requirements.

◇Ensure that the measurement equipment is connected correctly and properly so as not to cause hazards such as arcs.

1.1.5 Electrostatic Protection

Reminding

Electrostatic generated by the human body may cause damage to sensitive devices on the printed board. Avoid non-essential printed board contact. Wear an anti-static bracelet before touching sensitive components and properly ground the other end of the bracelet.

1.1.6 Parameter Setting

The setting of parameters is closely related to the operation of the energy storage battery container and internal equipment, so modifications of such parameters need to be made after a reliable evaluation of the system.

◇Inappropriate parameter settings may affect device functionality.

◇Only qualified professionals can set the parameters.

Warning

◇The consequences of an operator's modification of the parameter settings are borne by the operator ！

1.1.7 Security warning signage setup

In order to avoid accidents caused by unrelated personnel approaching or misoperating the energy storage bubble container, please adhere to the following relevant specifications when installing, daily maintaining or servicing the energy storage cell: :

◇Set a warning sign at the job site to prevent accidents caused by misoperation

◇Set a warning sign or safety warning strip in the operation area to avoid unrelated personnel entering to cause injury or damage to equipment.

1.2 Operator requirements

Reminding

Module related wiring work must be completed by professionals to ensure that all electrical safety is in line with electrical installation standards.

The personnel responsible for installing and maintaining the equipment must go through stri ct training, understand all kinds of safety precautions, master the correct operating methods, and then install, operate and maintain the equipment. The operators must meet the following requirements:

◇Have certain knowledge of electrical connection and mechanical installation, and be familiar with electrical and mechanical principles.

◇Full familiarity with the compo0000000000.sition and working principle of the entire energy storage system.

◇Professional electrical operation, installation and commissioning training.

◇Able to handle emergencies during installation and commissioning.

◇Familiar with relevant standards in the countries and regions where the projects are located.

◇The operator needs to be familiar with the relevant instructions in this manual.

1.3 Environmental requirements for use

The use environment has a certain impact on the service life and reliability of the equipment, so please take care to avoid long-term use of the equipment in the following working environments:

◇A site that exceeds the temperature and humidity specified in the technical indicators.

◇There are areas that are vulnerable to impact.

◇Places where dust, corrosive substances, salts and flammable gases are present,

◇Situations where ventilation is poor or closed.

1.4 Other

Where modules are installed in crowded areas, please prepare emergency rescue facilities in advance. All possible auxiliary measures should be taken to ensure the safety of personnel and equipment

2. Introduction

Our energy storage products can provide reliable power support for various types of equipment and systems. The built-in BMS battery management system can manage and monitor battery information, including voltage, current, and temperature. It has the following characteristics:

◇ Build-in soft-start function able to reduce current strike when inverter need to start from battery.

◇ Dual active protection on BMS level.

◇ Automatic address setting when connect in multi-group.

◇ Support wake up by 9~18V signal from RJ45 port.

◇ S upport upgrade battery module from upper controller via CAN or RS485 communication.

◇ Enable 100% depth of discharge, available for the inverter which completely follow Pylontech latest protocol to operate.

◇ The module is non-toxic, non-pollution and environmentally friendly.

◇ Cathode material is made from LiFePO4 with safety performance and long cycle life.

◇ Battery management system (BMS)has protection functions including overdischarge, over charge, over-current and high/low temperature.

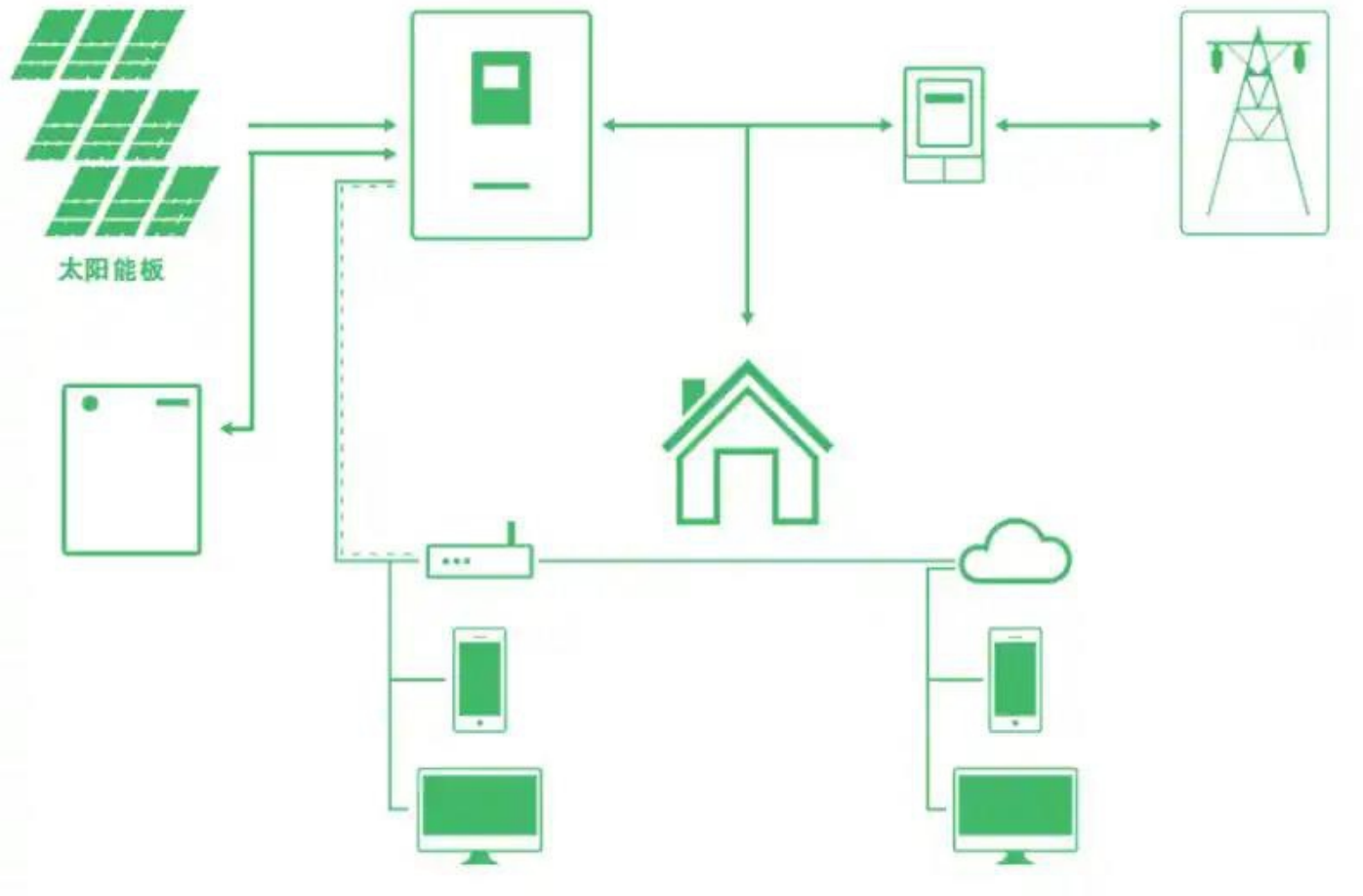
◇ The system can automatically manage charge and discharge state and 5 balance voltage of each cell.

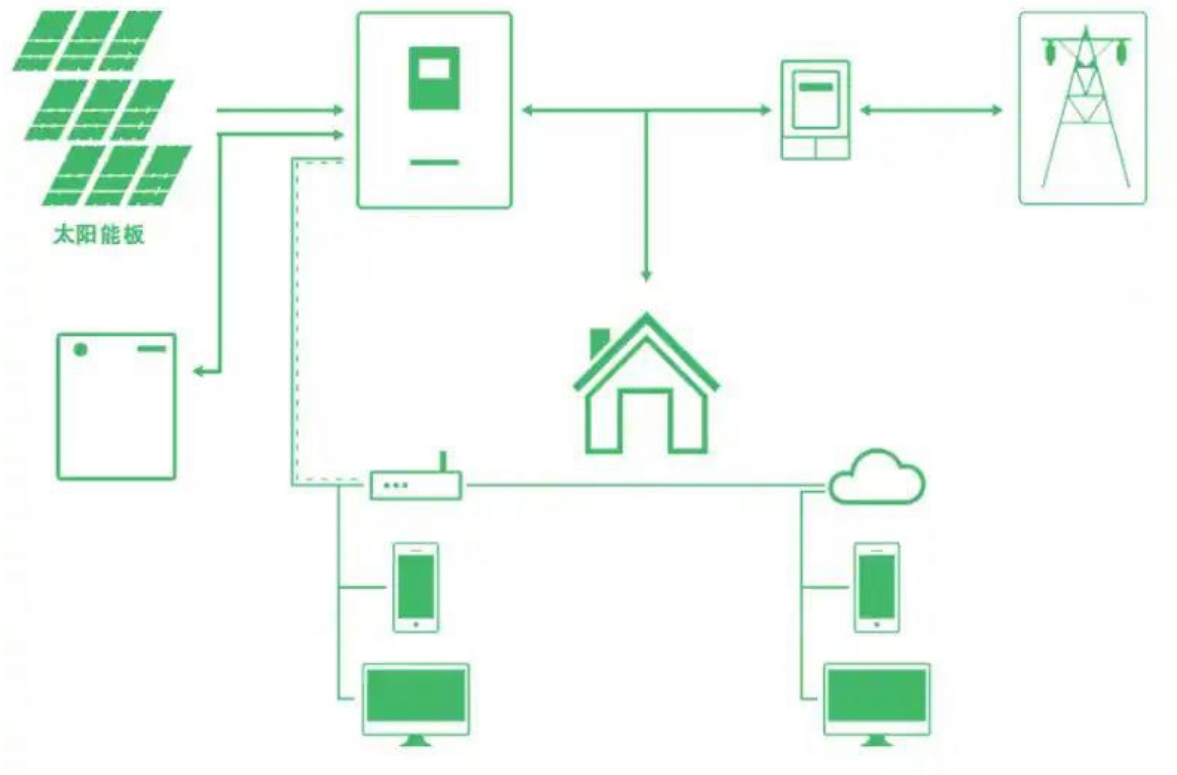
◇ Flexible configuration, multiple battery modules can be in parallel for expanding capacity and power.

◇ Adopted self-cooling mode rapidly reduced system entire noise.

◇ The module has less self-discharge, up to 6 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge.

2.1 Wiring diagram





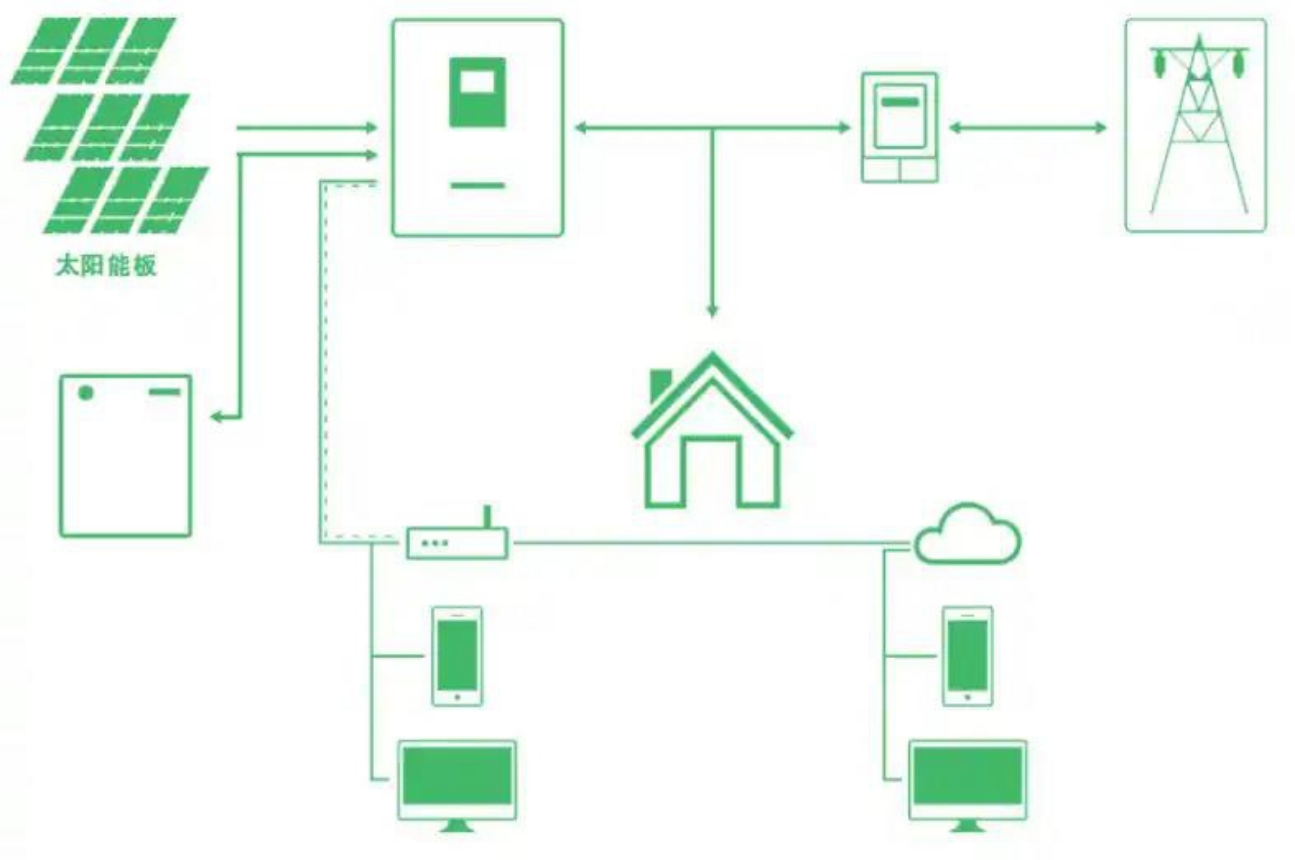
(Please refer to the attachment for the wiring method)

2.2 Equipment interface definition

2.2.1 Pages description (Key LCD screen/Optional)

Display screen operation buttons

Number	Label	Function	Notes
1	Button 1	Main menu	Start the screen or get back into the main page
2	Button 2	Enter	Select and get into the page
3	Button 3	Down	Move the selection down
4	Button 4	Esc	Escape from current page

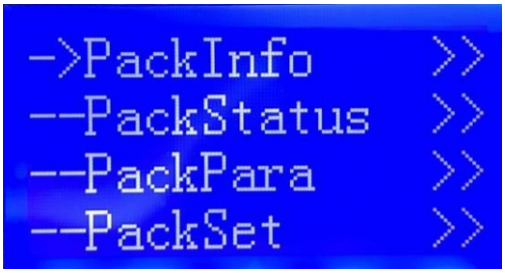


1) Each item starts with "->" or "--", where "->" represents the current cursor position. Press the DOWN key to move the cursor position down. Items that end with "》" indicate that there is content not displayed. Press the ENTER key to enter the corresponding page.

2) Press the ESC key to return to the previous directory: anywhere, press the MENU key to return to the main menu page.

3) In sleep mode, press any button to activate the display screen.

HOME

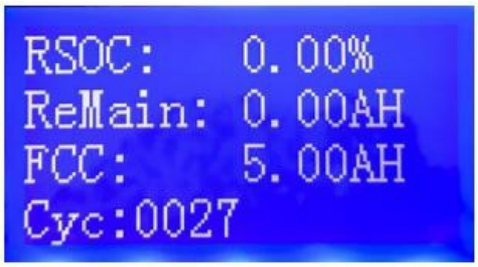


Name	Definition
Pack Info (Pack information)	This page allows you to view voltage, current, temperature, and other data.
Pack Status	This page allows you to view the protection status, protection times, and protection flags.
Pack Para (Pack parameters)	This page can set some protection parameters and is currently not open.
Pack Set (Pack settings)	This page allows you to set the host RS485 protocol or CAN protocol for BMS.

Notes:
If there is no cooperation, the system will shut down for one minute.

Pack information

- Vol(Voltage):Battery pack voltage
- Cur(Current): Charging/discharging current
- Capacity:

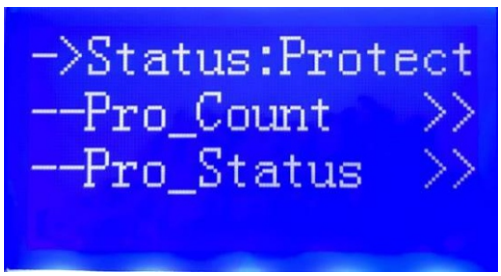


  - RSOC(Rest of state of capacity)
  - Remain:
  - FCC(Full charge capacity)
  - Cyc(Cycle times)
- Temp(Temperature)

- Cell Info(Cell Information)

(The units of cell voltage are all in millivolt)

Pack Status



- Pro Count (Protection Count)

- Pro Status(Protection Status)

Item	Definition
OVP	Over Voltage Protection(single cell)
UVP	Under Voltage Protection(single cell)
POVP	Pack Over Voltage Protection
PUVP	Pack Under Voltage Protection
COTP	Charge Over Temperature Protection
CUTP	Charge Under Temperature Protection
DOTP	Discharge Over Temperature Protection
DUDP	Discharge Under Temperature Protection
COCP	Charge Over Current Protection
DOCP	Discharge Over Current Protection
SCP	Short Circuit Protection
LOCK	Soft Lock

Pack Parameters(Unfinished)

The item of this content is not settable.

Pack Settings

- RS485 (Set the BMS host RS485 interface protocol)
- CAN Bus (Set the CAN interface protocol for BMS)

Optional protocol content:

RS485	CAN BUS
RS485 - PYLON	CAN - Pylon
RS485 - GROWATT	CAN - VicTron
RS485 - Voltronic	CAN - GOODWE
RS485 - LXP	CAN - GROWATT
RS485 - DEYE	CAN - LXP
RS485 - INVT	CAN - DEYE
RS485 - SRNE	CAN - SOFAR
RS485 - OTHER	CAN - GINLONG
...	CAN - SMA
	CAN - MUST
	CAN - OTHER
	...

2.2.2 Pages description (Touch LCD screen/Optional)

Starting screen

Main screen

The main page mainly displays parallel statistics, such as the average SOC, the highest and lowest cell voltage, the highest and lowest cell temperature, the average battery voltage and the t otal current of the system, the average remaining capacity of the system, the operating power, the charge and discharge MOS status, and the language switching function.

Language

The system supports switching between Chinese and English. The switch button is in the upper right corner of the main page.

Slave

After entering the slave page, the upper part displays the slave selection, the middle part visually displays the battery power and SOH data, the center displays the battery voltage and current, charge and discharge status and fault display status, and the lower part displays the slave battery cell and temperature data, as well as the ambient temperature and MOS temperature data.

Background color description of the slave address: blue indicates the selected slave controller, green indicates the online slave controller, and white indicates the offline slave controller.

Parameter Setting

- Users login

Password-666888

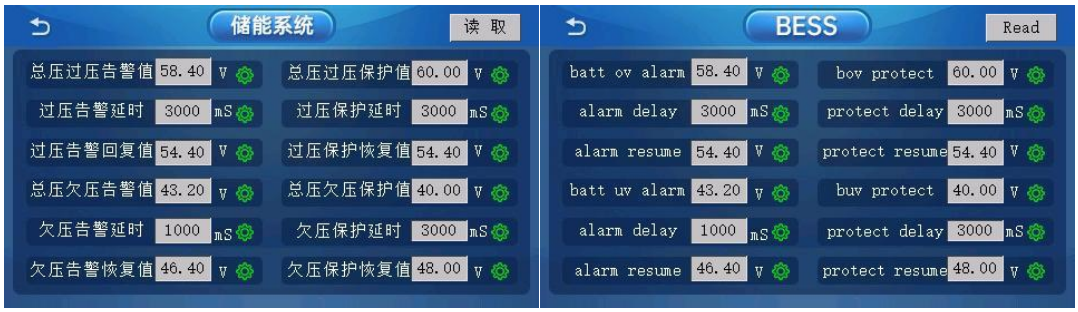
- Parameter setting selection

On the parameter setting page, you can set cell over voltage and under voltage parameters, total over voltage and under voltage parameters, ambient high and low temperature parameters, excessive pressure difference parameters, charge over current parameters, discharge over current parameters, MOS high temperature parameters, charge high and low temperature parameters, discharge high and low temperature parameters, and SOC alarm parameters.

- cell over voltage and under voltage parameters

pack over voltage and under voltage parameters)

-
-



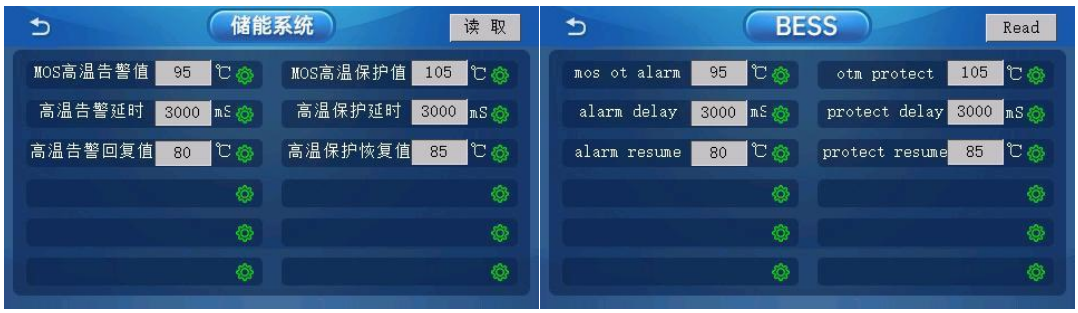
Ambient high and low temperature parameters)

- (Pressure difference parameters)

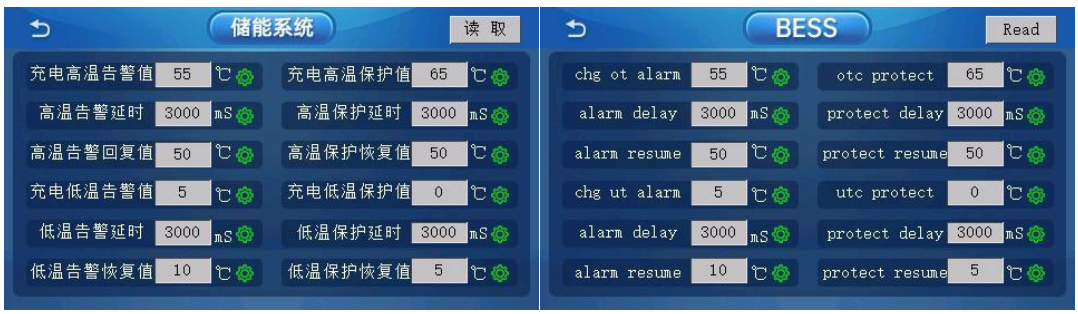
- (Charging over current parameters)

•(Discharging over current parameters)

•MOS high temperature parameters)



•Charging high and low temperature parameters)



•Charging high and low temperature parameters)

•SOC low parameters)

Protocol setting

•CAN protocol selection)

Support plyon、growatt、goodwe、sofarsolar、victron、voltronic、lxp、deye、ginlong、sma.

•RS485 protocol selection)

Support plyon、growatt、Voltronic、lxp、deye、invent、srna.

System setting

2.2.3 ON/OFF

When the BMS is in hibernation state, after closing the self-lock, the protection board is powered on, and the LED indicator lights up successively from "LED1" for 0.5 seconds.

When the BMS is active, turn off the self-locking switch and wait for 1S~3S before the system enters the power-off state.

2.2.4 Main switch

Control the on/off of the entire system

2.2.5 Dial switch setting

When the battery pack is connected in parallel, level to level communication is required. Both the main system and the slave system need to be configured with hardware addresses, which can be set through the dip switch on the board (RS485 parallel communication port needs to be connected).

When PACK is used in parallel, the manual DIP address function is enabled when all DIP switches are dialed

to OFF. Otherwise, use the default automatic addressing function. Use the DIP switch o n the BMS to set the address to distinguish different packs.

Address bit (binary)	(Explain)				
	4	3	2	1	
0001(1)	OFF	OFF	OFF	ON	置 PACK1 (Set PACK1 to be used by a host)
0010(2)	OFF	OFF	ON	OFF	置 PACK2 (Set PACK2)
0011(3)	OFF	OFF	ON	ON	置 PACK3 (Set PACK3)
0100(4)	OFF	ON	OFF	OFF	置 PACK4 (Set PACK4)
0101(5)	OFF	ON	OFF	ON	置 PACK5 (Set PACK5)
0110(6)	OFF	ON	ON	OFF	置 PACK6 (Set PACK6)
0111(7)	OFF	ON	ON	ON	置 PACK7 (Set PACK7)
1000(8)	ON	OFF	OFF	OFF	置 PACK8 (Set PACK8)
1001(9)	ON	OFF	OFF	ON	置 PACK9 (Set PACK9)
1010(10)	ON	OFF	ON	OFF	置 PACK10 (Set PACK10)
1011(11)	ON	OFF	ON	ON	置 PACK11 (Set PACK11)
1100(12)	ON	ON	OFF	OFF	置 PACK12 (Set PACK12)
1101(13)	ON	ON	OFF	ON	置 PACK13 (Set PACK13)
1110(14)	ON	ON	ON	OFF	置 PACK14 (Set PACK14)
1111(15)	ON	ON	ON	ON	置 PACK15 (Set PACK15)

2.2.6 LED Work status indication

Table 2.2.5.1 LED display description

State of system	Event	MOS (LED9)	Run (LED8)	Alarm (LED7)	SOC(LED6~1)						Describe
					LED6	LED5	LED4	LED3	LED2	LED1	
		●	●	●	●	●	●	●	●	●	
Power off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All LED turn off
Static state	Normal	OFF	Flash1	OFF	2.3.2 Refer to table						
	Alarm	OFF	Flash1	Flash3							
Charging	Normal	OFF	ON	OFF							
	Alarm	OFF	ON	Flash3							The over-voltage alarm does not flash
	OV protect	ON	ON	OFF	ON	ON	ON	ON	ON	ON	
	Temperature, Over-current,fail-safe	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	
Discharging	Normal	OFF	Flash3	OFF	2.3.2 Refer to table						

	Alarm	OFF	Flash3	Flash3							
	UV protect)	ON	Flash2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	Temperature, Over-current,fail-safe	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	

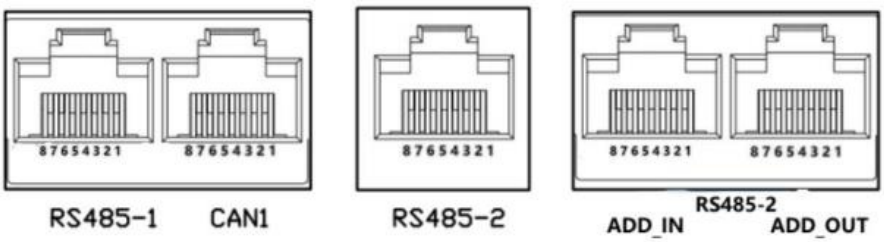
Table 2.2.5.2 SOC display description

State		Charging						Discharging					
LED		LED6 ●	LED5 ●	LED4 ●	LED3 ●	LED2 ●	LED1 ●	LED6 ●	LED5 ●	LED4 ●	LED3 ●	LED2 ●	LED1 ●
SOC(%)	0~16.6%	OFF	OFF	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	OFF	OFF	ON
	16.6~33.2%	OFF	OFF	OFF	OFF	Flash2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2~49.8%	OFF	OFF	OFF	Flash2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8~66.4%	OFF	OFF	Flash2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4~83.0%	OFF	Flash2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	83.0~100%	Flash2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
RUN LED ●		ON						Flash3					

Table 2.2.5.3 LED flash description

Flash Mode	ON	OFF
Flash1	0.25S	3.75S
Flash2	0.5S	0.5S
Flash3	0.5S	1.5S

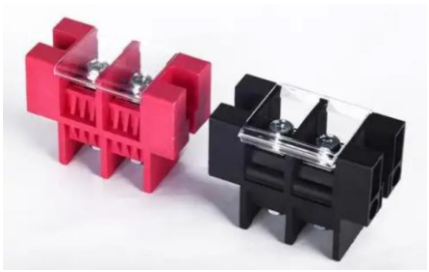
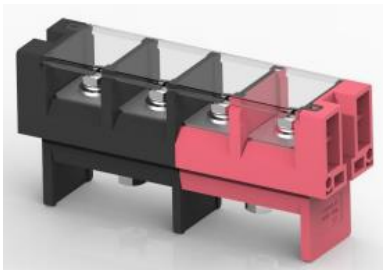
2.2.7 Definition of Communication Port



Connector	RS485-1		CAN1		RS485-2		RS485-2 * 2	
Function	(Connected PC or PCS)		(Connected PC or PCS)		Parallel communication		(Parallel communication) * 2	
Pin specification	PIN	Description	PIN	Description	PIN	Description	PIN	Description
	1、8	RS485-B1	1、8	NC	1、8	RS485-B2	1、8	RS485-B2
	2、7	RS485-A1	2、7	NC	2、7	RS485-A2	2、7	RS485-A2
	4	NC	4	CANH1	4	NC	4、5	NC
	5	NC	5	CANL1	5	NC	3	IN(L)/OUT(R)
	3、6	GND	3、6	GND	3、6	GND	6	GND

2.2.7 Power terminal

Power cord terminals: There are two different colored terminals, red for the+pole and black for the - pole. Used to connect to external devices and connect in parallel with other battery modules to expand capacity.

3. Installation

3.1 Overview

This manual provides a detailed description of the safe use of the module, loading and unloading, installation and inspection. Please strictly follow the descriptions in the manual for things such as loading, unloading, installation and inspection of energy storage containers. Otherwise, it may lead to accidents such as serious damage to equipment and accidental injury to personnel.

◇ The manual should be placed in the data storage area of the product. Please safely ensure that the manual is readily accessible to loading, installing and operating personnel.

◇ The contents of the manual will be updated and revised, and there will inevitably be some discrepancies between the material and the physical product. Users should rely on the physical products purchased.

◇ When reading this manual, if you understand the disassembly, installation, inspection, and use

described in the manual, please contact our company immediately to avoid unnecessary losses during the disassembly, installation, and use process.

3.1.1 Scope of application

◇ The installation manual applies to the following product models: All of our household energy storage products.

3.1.2 Brief description of sections

◇ This installation manual mainly contains the following information:

Safety Instructions

◇ This section mainly describes the safety matters that the module needs to be aware of and observed during handling, installation, wiring, etc.

Product Information

◇ This section mainly describes the module's size, weight, internal layout and other information.

Installation instructions

◇ The mechanical installation of the module, the electrical installation, the communication connection, and the method of checking the completion of the installation were described:

Pre-test inspection

◇ Considerations for pre-test inspection of the module were presented.

Other annexes

◇ The main parameters of the energy storage system and the process parameters in the construction process are appended.

3.1.3 Operator requirements

◇ This manual is for those who install this product and perform the operation of the product.

◇ Operators need some electrical and mechanical expertise.

◇ The loading and unloading of modules requires personnel qualified for professional handling operations.

◇ The installation of the module requires a professional electrician or a person with professional qualifications.

◇ All operations are subject to local laws and regulations.

◇ The operators of the module need to be trained.

3.2 Safety Instructions

3.2.1 Installation tool requirements

◇ Those involved in the dismantling, installation and debugging of the module shall wear the designated protective equipment. Protective appliances include insulated safety, insulated gloves (for battery-related work), safety helmets, and cutting gloves for general work, and they must be valid for a specified period. The main tools are shown in the diagram below.

◇ Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not

available, cover the entire exposed metal surfaces of the available tools except their tips, with electrical tape.

Wire cutter

Crimping modular plier

Screwdriver

◇ It is recommended to wear the following safety gear when dealing with the battery pack.

Insulated gloves

Safety goggles

Safety shoes

3.2.2 Warning stickers and symbols

◇ In order to ensure the safety of the personal and property of the user when using this product and the efficient use of this product, the manual provides relevant information and uses appropriate symbols to highlight it.

3.2.3 Hazardous situations H

◇ **Hoisting danger:** The total weight of this product is about 43kg, which is prone to danger when handling.

◇ **Fire hazard:** Lithium-ion batteries can short-circuit and catch fire in situations such as collisi ons.

◇ **Electrical hazard:** Because the battery carries electrical charge, it is easy to touch the positive and

negative electrodes during installation and wiring, causing electric damage.

◇ **Fall hazard:** During the installation process, materials are handled up and down, which can easily cause the installer to fall and injure.

3.2.4 Emergency management of personnel safety incidents

◇ The minor injuries were treated simply at the scene and arranged for a vehicle to be taken to a nearby health clinic for treatment.

◇ The injuries were seriously treated at the scene as soon as possible, and the injured person was bandaged, Use fixed, or artificial CPR, first aid measures, and call the local 120 emergency telephone at the same time to be taken to the nearest hospital for treatment, and follow the medical advice or transfer to the city-level people's hospital for treatment according to the circumstances.

3.2.5 Emergency medical kits

◇The site should be equipped with emergency medicine box, including gauze, hydrogen peroxide, scissors, iodine, alcohol, swab, bandage, gauze, disposable mask, thermometer, emergency medicine box placed in the project site.

3.2.6 Handling flammable hazards during installation and emergency measures

◇ If a fall occurs during the installation of the module or the electrical core is damaged, there is a risk of flammability, and the module should be stored 50 meters away from the battery shed and densely populated areas, close to the fire extinguishing position.

◇ On-site installers and equipment commissioners must be able to use fire extinguishers,and those who do

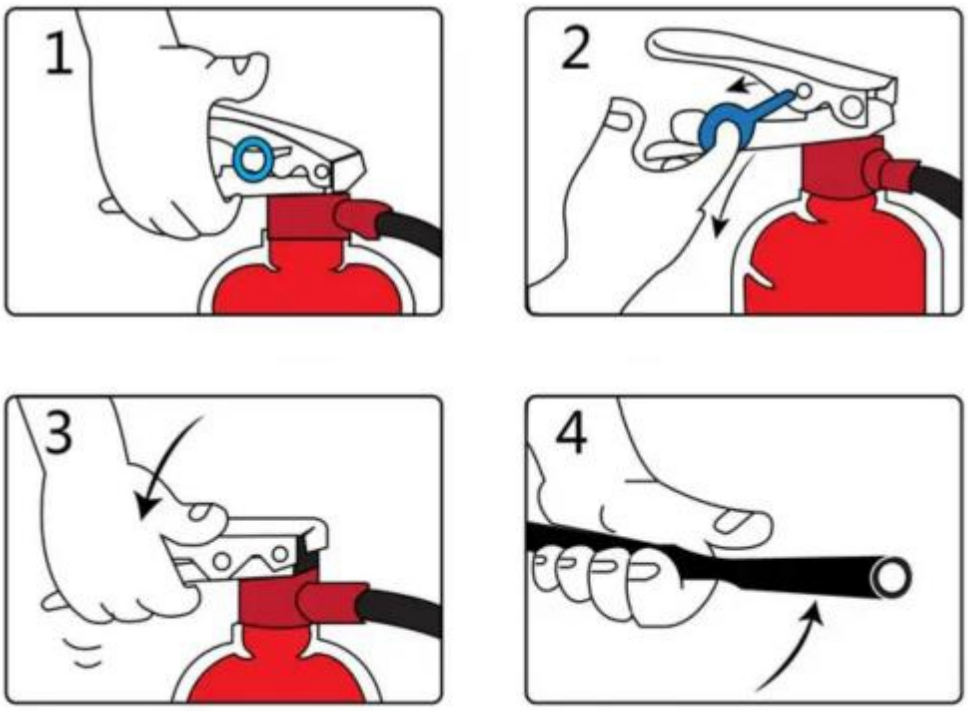
not use fire exponents must be trained to use them before they can carry out construction work.

◇ If a single fire has spread to 3-4 or more modules, and the dry powder fire extinguisher has been continuously extinguished for 10 minutes, the fire is still not reduced, should immediately call the rescue phone and timely evacuation.

◇ The damaged modules need to be returned to the factory for testing and maintenance before they can be returned for use on site.

◇ In case of fire, only dry powder fire extinguisher can be used

◇ The operating process of the portable fire extinguisher is shown in the diagram below.



4. Installation and operation

4.1 Package items

Before leaving the factory, the product undergoes inspection by quality inspectors and is securely

packaged. However, collisions or even damage may occur during transportation. Therefore, upon receiving the product, first confirm whether the markings on the product have been repl aced, then check the shipping list and accompanying documents, inspect the materials to ensure complete arrival, and if there are any omissions, please contact our company promptly.

Unpack the battery on site, not beforehand. The battery must be shipped in its original packaging to prevent damage.

Step 1: Initially inspect the package and battery for any damage before starting installation. Record (photograph) any noticeable damage and do not install a battery that is suspected to have been damaged during transport.

Step 2: Lay the box flat on the floor and slide the ba ttery from the box. Never attempt to lift the battery vertically from the box. Check that all ordered parts are included in the delivery and take care to retain the packaging material if you require it later.

Reminding

Do not unpack the product in the warehouse and transport without original packaging to site.

For battery module package:

- ◇ Ensure all paperwork and product documentation is included with the battery unit and is available at the installation site.

- ◇ These should include the quick start guide, installation instructions, and any site owner provided documentation.

- ◇ After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer.

- ◇ Before installation, be sure to cut off the grid power and make sure the battery is in the turned off mode.

- ◇ Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.

- ◇ It is prohibited to connect the battery and AC power directly.

- ◇ Two power cables

(Users should prepare on their own.Selection based on project actualities)。

◇ one communication cable

(Users should prepare on their own.Selection based on project actualities).

4.2 Installation location

Make sure that the installation location meets the following conditions:

◇ The area is completely waterproof

◇ The floor is flat and level.

◇ There are no flammable or explosive materials.

◇ The ambient temperature is within the range from 0 °C to 50°C.

◇ The temperature and humidity are maintained at a constant level.

◇ There is minimal dust and dirt in the area.

◇ The distance from heat source is more than 2 meters.

◇ The distance from air outlet of inverter is more than 0.5 meters.

◇ The installation areas shall avoid of direct sunlight.

◇ There is no mandatory ventilation requirements for battery module, but please avoid of installation in confined area. The aeration shall avoid of high salinity, humidity or temperature.

Reminding

◇ If the ambient temperature is out of the operating range, the battery stops operating to protect itself. The optimal temperature range for the battery pack to operate is 10 °C to 40°C. Frequent exposure to harsh temperatures may deteriorate the performance and life of the battery .

4.3 Installation

4.3.1 Grounding requirements

Warning

◇ Danger of leaking electricity! Before making an electrical connection, ground must be provided. Require the ground connector to be connected to the earth.

◇ When installing the equipment, ground must be applied first; when dismantling the equipment, the ground line must be dismantled last.。

◇ Battery must connect to ground and the resistance must be less than 0.1 Ω.

◇ Destruction of grounding conductors is prohibited.

◇ Ensure work area is appropriate for the products to be installed. The area should be clean and free of excess debris. It should be large enough for the product to be temporaraly stored, and safely installed.

◇ Be sure all tools required for install are available along with all required hardware.

Danger

◇ If the module has a ground fault, some components that should not be live may carry voltage, and accidental touching may cause serious damage to the product. Ens ure that there is no system ground fault before installation and operation, and take appropriate protective measures

5. Packaging, Transportation, Storage and Disposal

5.1 Packaging

◇ Product and packaging materials are designed and tested to UN 38.3.Keep the battery in its packaging until it is time for installation.

◇ Keeping battery in original packaging helps to protect from pollution, moisture and mechanical damage.

◇ Do not remove the battery from packaging before arriving at location for installati on.

5.2 Transportation

◇ Lithium Batteries are classified as Dangerous Goods and transport restrictions apply – be sure to follow any global and local regulations with regards to handling and transport of Lithium Batteries.

◇ Handle the battery in accordance with any specific marking on packaging – e.g. with regards to package position and any stacking instructions.

◇ The battery in its packaging should be handled with care, not exposed to weather conditions (rain, excessive heat etc), vibrations or sudden impacts, all of which could cause damage to or decrease performance of the battery。

5.3 Storage

◇ Batteries are best stored in a dry, cool environment in order to prevent degradation of performance.

◇ The storage temperature is maintained -20C ~ 35C, and the relative humidity is maintained 0 ~ 95%

◇ When batteries are stored for an extended period of time (see charge by date on product packaging), it is recommended to monitor State of Charge (SOC) on a regular basis.

◇ Keep the battery unit away from water and condensation. Liquid entering the battery unit can cause short circuits, electricity leakage, and connector corrosion. Moist air entering the battery unit must be avoided. If the battery unit is exposed to water or condensation, it must be co nsidered faulty and is not to be used.

◇ If the product cannot be used in a timely manner, do not remove the outer packaging. The package should be checked regularly during storage, and if damage is found, replace it promptly.

◇ There are no corrosive gases around the storage site, no flammable, explosive products and no corrosive chemicals.

◇ The storage site meets fire protection requirements.

◇ Products that have been stored for more than 3 months must be recharged with electricity once.

◇ Products that have been stored for more than 6 months need to be inspected and tested by professionals before they can be put into use.

5.4 Disposal

◇ When a battery reachs the end of its service life or becomes defective and cannot be repaired it will need to be disposed of and recycled. Batteries should be disposed according to local (country) regulations for electronic waste. Battery disposal and recycling must be carried out by qualified personnel only. Contact a waste disposal operator authorized for handling electr onic and lithium battery waste and recycling or contact the organization where you purchased the batteries for further assistance.

◇ Disassembling of Batteries: The batteries should not be opened or disassembled by anyone without proper training. Batteries can contain very high levels of energy which can result both in personal injuries such as burns or electrical shock or resulting in fire or combustion of the battery cells.

◇ All work to disassemble batteries must be carried out by qualified personnel only. There is a high possibility of electric shock or serious burns if not handled professionally. Wear rubber gloves and protective clothing (protective glasses and boots) when working on battery systems.

◇ Never install battery blocks that have been dropped; it can cause visible or invisible damages. Poisonous and corrosive contents of the interior of the battery block can leak and cause damage to the human body, as well as technical equipment and environment. Inspect the box upon arrival and photograph any damage.

6. Maintenance

This section describes general maintenance of the battery unit.

Before checking or repairing, if the DC side and AC side are suddenly turned off, it must wait 15 minutes to ensure that the internal electricity is completely discharged before the machine can be operated.

At least 2 people need to be on site during maintenance or troubleshooting. Make sure the module is turned off and fully discharged before operating. Follow these requirements before carrying out maintenance operations:

◇ Make sure the module does not reconnect accidentally.

◇ Use a universal gauge to measure whether the module is fully discharged.

◇ When operating, cover nearby electrical components with an insulating cloth for insulation protection.

6.1 Preventive Maintenance (Every three months)

◇ If possible, keep the operating ambient environment temperature between +20 and +45 °C. Do not install close to heat sources/ fire. Installation guides and data sheets included warnings and precautions to follow during the installation process.

◇ Keep batteries clean, check cables and connections for any signs of overheating. Make sure connections are properly tightened – especially important if installation may be subject tovibrations eg from traffic.

◇ If the battery unit is stored for a long period of time, it must be charged regularly to 30% SOC. Before cleaning the battery unit, the power must be switched off and the battery unit must be in power off state. Do not rinse the battery unit with water. To clean the battery unit, use a dry cloth, vacuum cleaner, or compressed air.

◇ Check the main circuit terminals (e.g. the junctions for input and output cables) for poor contact, and whether there are traces of overheating in the screw position.

◇ Check whether the control terminal screw is loose, and if so, tighten it with a screwdriver.

◇ Look for color changes on the screw.

6.2 Preventive Maintenance (Every six months)

◇ Observe if the module is damaged or deformed.

◇ Listen to whether the module's operating sound is abnormal.

◇ When the system is running, check that the various operating parameters are normal.

◇ Use tools such as thermal imaging cameras to check whether the heating of the energy storage battery container enclosure is normal and to monitor the system heating.

◇ Check whether the humidity and dust around the module are normal.

◇ Check the corrosion condition of all metal components.

◇ The annual inspection of the contactor (assist switch and microswitch) ensures that the machinery is working well.

◇ Check whether the stop button is normal.

◇ Simulate a downtime and check whether the downtime signal communication is normal.

◇ Check the module's warning signs and other device markings. If they are blurred or damaged, replace them promptly.

◇ Optimize the software.

◇ Check the various parameter settings.

7. Common Troubleshooting

In the event of a failure, the failure light will light up, the LCD will show the current failure, and the energy storage battery container will stop. Typical failures and treatment schemes are shown below.

◇ When the machine breaks down, it is strictly prohibited to reboot through the host computer. You can check the power to confirm that there is no problem, then re-power, otherwise it will cause damage to the machine.

Battery overvoltage

◇ Consider whether the battery configuration of the system is suitable and whether it is within the input voltage range allowed by the machine.

◇ Contact the container manufacturer in a timely manner.

◇ The battery does not have a voltage

◇ Consider whether the battery configuration of the system is suitable and whether it is within the input voltage range allowed by the machine.

◇ Contact the container manufacturer in a timely manner.

CAN Communication Anomaly

◇ Check the communication line connections.

RS485 Communication Exception

◇ Check the communication line connections.

◇ An abnormal insulation impedance

◇ After waiting for the internal discharge of the machine, check that the internal wiring is intact.

DC Overvoltage

◇ Contact the container manufacturer in a timely manner.

BMS System Failure

◇ Contact the container manufacturer in a timely manner.

BMS Communication Exception

◇ Check whether the communication line is connected properly and whether it is back connected; Set the address and baud rate correctly.

BMS dry contact fault

◇ Wait for the internal discharge of the machine, overhaul the BMS system, if the fault still exists, contact the container manufacturer in time.

BMS No Charging

◇ Wait for the internal discharge of the machine, overhaul the BMS system, if the fault still exists, contact

the container manufacturer in time.

BMS Ban Discharge

◇ Wait for the internal discharge of the machine, overhaul the BMS system, if the fault still exists, contact the container manufacturer in time.

BMS standby

◇ Wait for the internal discharge of the machine, overhaul the BMS system, if the fault still exists, contact the container manufacturer in time.

BMS alarm

◇ Wait for the internal discharge of the machine, overhaul the BMS system , if the fault still exists, contact the container manufacturer in time.

8. Statement

Customers should strictly follow the content of this specification when using the product. Customers should ensure that users of the product use it in accordance with the content of this specification. Otherwise, our company will not be responsible for any inconsistencies in product parameters, quality issues, malfunctions, or any losses. If the improper use of the product by customers, product users, and any stakeholders has a social impact and has an impact on our company's reputation, customers, product users, and all stakeholders shall compensate our company for all losses.

9. Abbreviation

Abbreviation	Meaning
Ah	Amp Hour
A	Amp
mm	Millimeter
Nm	Newton Meter
V	Volts (0V, 48V etc.)
LED	Light Emitting Diode
BMS	Battery Management System
kg	Kilogram
Wh	Watt Hours
mΩ	Miliohm
SOC	State of Charge