Home Energy Storage System

User Manual

48V 100Ah-4.8kWh

Lithium Ion Battery Pack

INDEX

1. Manual Function

1.1 Purpose

This manual provides information on the introduction,installation,operation and emergency handling of the battery bank.

Please read this manual carefully before installation and operation.

Keep it for future reference.

1.2 Scope

This manual includes safety and installation guidelines,as well as information on required tools and wiring.

1.3 Safety Instructions

WARNING: This chapter contains important safety and operating instructions.

Read and keep this manual for future reference.

1. Before using the unit, read all instructions and cautionary markings on the unit,the batteries,and all relevant sections of this manual.
2. **CAUTION!** To reduce the risk of injury or damage,please use the unit as described in this manual. Improper use may cause personal injury or equipment damage.
3. **Do not disassemble the battery.** Take it to a qualified service center for any service or repairs. Incorrect reassembly may result in a fire risk.
4. To reduce the risk of electric shock, disconnect all wiring before attempting any maintenance or cleaning. Turning off the unit will not eliminate this risk.
5. **CAUTION!** Only qualified personnel should install this device.
6. **For optimum operation, select the appropriate cable size as specified.**
7. Be cautious when working with metal tools around batteries. Dropping a tool could cause a spark or short circuit, potentially leading to an explosion or fire.
8. Follow the installation procedure strictly.
9. **GROUNDING INSTRUCTIONS** - Comply with local requirements.
10. NEVER short circuit the AC output and DC input. Do not connect to the mains when the DC input is short-circuited.
11. Warning! Only qualified service personnel should service this device.
12. Install the battery indoors, away from water, high temperatures, mechanical force, and flames.

2. Scope of application

This product is a 4.8kWh energy storage lithium iron phosphate battery pack.

2.1 Higher Energy Density: Smaller volume, ideal for household use

2.2 Parallel Connection Support: Allows for expansion

2.3 Designed for Photovoltaic Systems: Optimized for household solar power systems

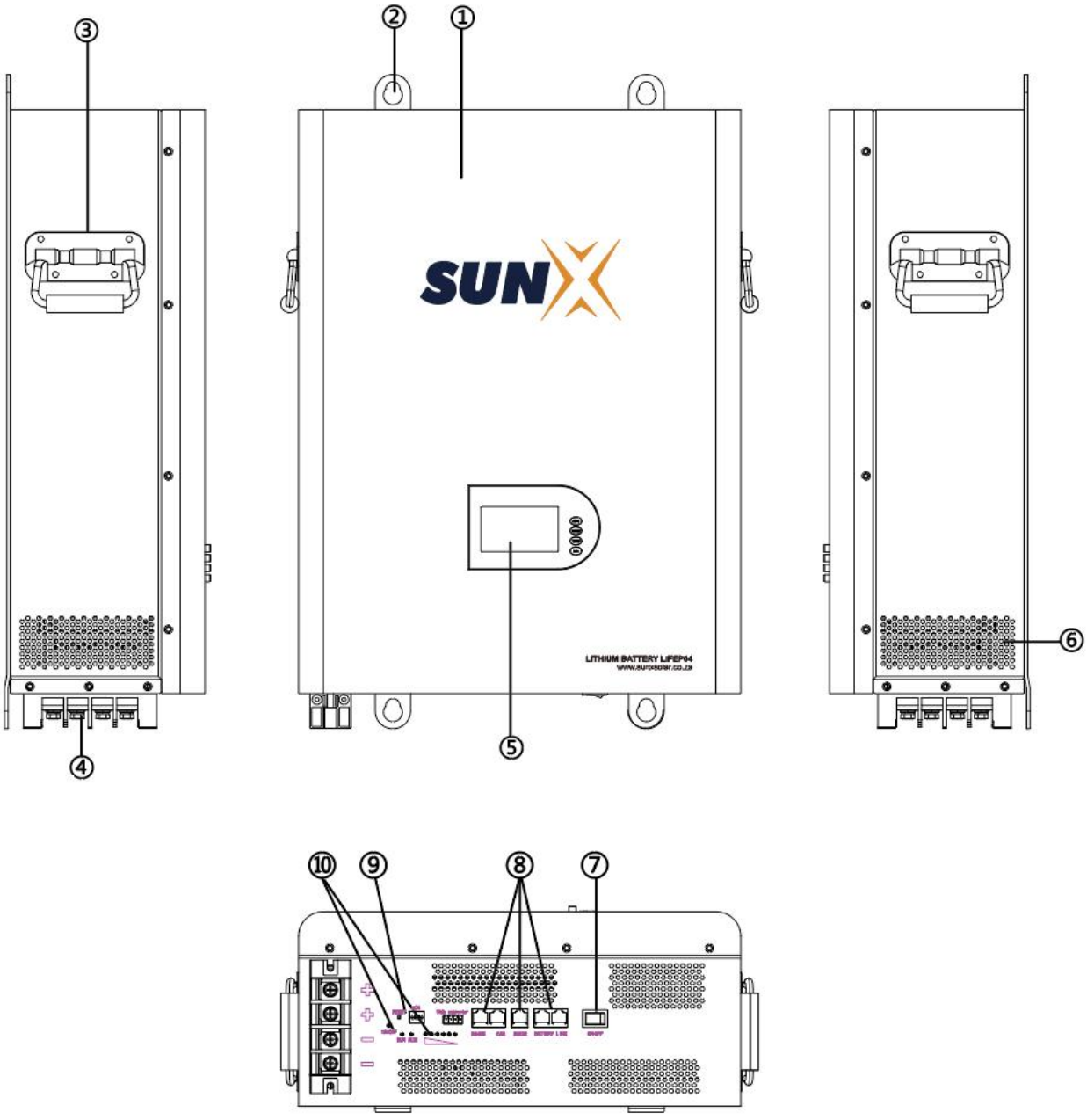
2.4 Battery Management System (BMS): Built-in BMS monitors operation and prevents the battery from operating outside design limitations

2.5 Expand ability: Easily expandable by adding additional battery packs in parallel connection

3. Battery Specifications

Nominal Parameters	
Product	Lithium Ion Battery Pack
Installation Mode	Wall Mounted
Rated Voltage	48V
Rated Capacity	100Ah
Energy	4.8kWh
Cell Spec.	3.7V100Ah
BMS Brand	PACE
BMS Communication	RS485, RS232, CAN
Pack Configuration	13S1P
Charge Cutoff Voltage	54V
Discharge Cutoff Voltage	40.5V
Design Life(25°C)	15 years
Life Cycles(80% DOD, 25°C)	6000 cycles
Maximum Charging Continuous Current	100A
Maximum Discharge Continuous Current	100A
Charging Efficiency	≥98%
Electricity Charged in the Shipped Product	30%-50% SOC
Operating Temperature	Charging: 0～55℃ Discharge: -10～55℃
Storage Temperature	- 20～60℃
Working Humidity	10～85%
Storage Humidity	10～85%
Dimensions (L x W x H)	About 375+-mm(L)*556+-mm(W)*165+-mm(H)
Weight	45kgs
Scalability	Maximum 16 in Parallel
Ingress Protection	IP 20

4. Appearance description



① Cover
② Hanging Ear
③ Handle
④ Output Terminal
⑤ Display Screen
⑥ Cooling Case
⑦ Power Switch
⑧ Communication Interface
⑨ Reset Switch
⑩ Led Lights

5. Communication Instructions

5.1.1 RS232 communication

BMS can communicate with the host computer through RS232, RS485, and CAN interfaces, so that it can monitor various battery information through the host computer, including battery voltage, current, temperature, status, and battery production information. The default baud rate is 9600bps.

5.1.2 CAN communication

The default communication rate is 500K.

5.1.3 RS485 communication

With RS485 interface, you can view PACK information. The default baud rate is 9600bps. If you need to communicate with the monitoring device through RS485, the monitoring device serves as the host and polls data according to the address. The address setting range is 2~15.

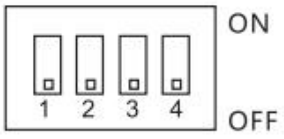
5.1.4 DIP switch setting

When PACK are used in parallel, different PACK can be distinguished by setting the address via the DIP switch on the BMS. It is necessary to avoid setting the same address. For the definition of the BMS DIP switch, refer to the table below.

1.After the battery system is installed, you need to connect the RS485/RJ45 network cable port of the BMS module with a communication network cable. Multiple BMS modules can be connected in cascade with a communication network cable (no connection is required when a single module is used).

2.Multiple When BMS modules are used in parallel, it is necessary to set the communication address (that is, the dial switch ADD). When a single BMS module is used, the communication address is 1, and the dial is "1". The original state is "0", which means "OFF", dial up to "1", which means "ON".

Note: Both RS485 network cable ports of BMS can communicate. Multi-level cascade starts from address #1(communication starts from #2) and dials according to the dial switch comparison table as shown below. Through the host computer software, set the master-slave BMS, usually the first one is the master BMS, and the others are set as the slave BMS, up to 15 units in parallel.

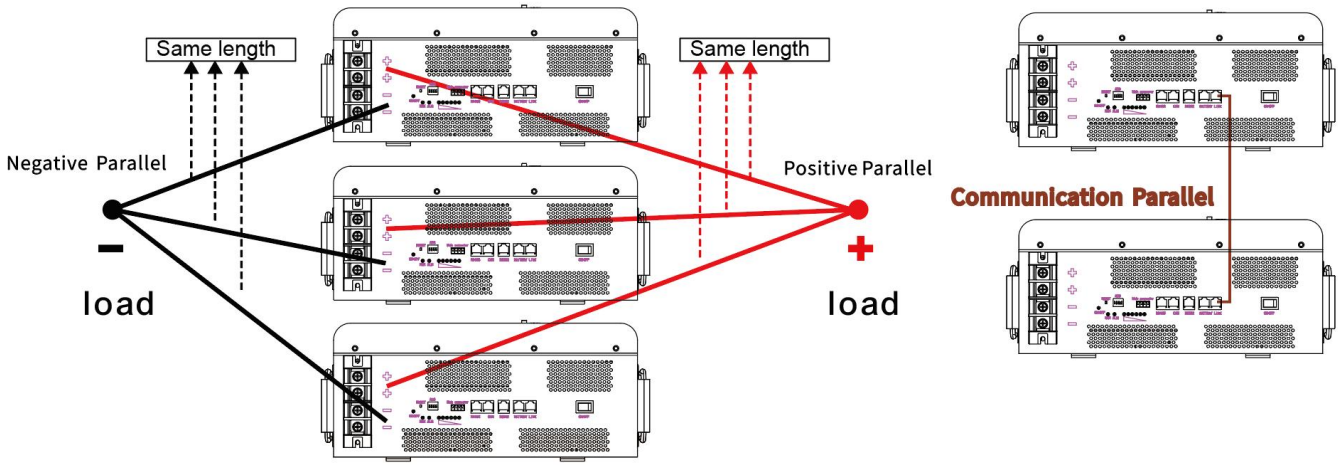


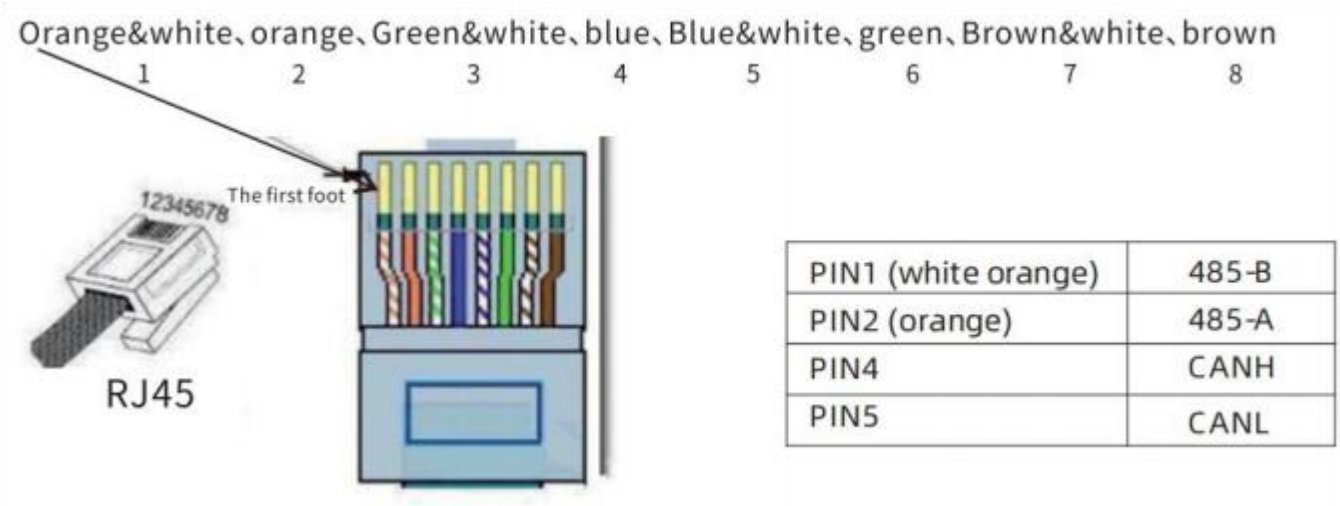
ADS	DIP Switch				Remark
	#1	#2	#3	#4	
1	ON	OFF	OFF	OFF	Master
2	OFF	ON	OFF	OFF	Battery 2
3	ON	ON	OFF	OFF	Battery 3
4	OFF	OFF	ON	OFF	Battery 4
5	ON	OFF	ON	OFF	Battery 5
6	OFF	ON	ON	OFF	Battery 6
7	ON	ON	ON	OFF	Battery 7
8	OFF	OFF	OFF	ON	Battery 8
9	ON	OFF	OFF	ON	Battery 9
10	OFF	ON	OFF	ON	Battery 10
11	ON	ON	OFF	ON	Battery 11
12	OFF	OFF	ON	ON	Battery 12
13	ON	OFF	ON	ON	Battery 13
14	OFF	ON	ON	ON	Battery 14
15	ON	ON	ON	ON	Battery 15

5.1.5 Communication cascade between BMS modules

Lead out a communication network cable from the RS485 port of the BMS module, and connect it to the RS485 of the FSU device serial port of the dynamic loop monitoring system, The R 45 plug of the network cable 1 positive (white orange) connects to RS485A; 2 negative (Orange)Connect to RS485 B;

Note: The main battery and the slave battery are only connected in parallel with 1, 3B, and 7A. Now only 3 wires need to be connected. If other wires are connected, it will affect the CAN data and prevent communication with the inverter!





PIN1 (white orange)	485-B
PIN2 (orange)	485-A
PIN4	CANH
PIN5	CANL

5.2 Buzzer action description

1) When there is a fault, it will chirp for 0.25S every 1S;
2) During protection, it chirps for 0.25S every 2S (except for over voltage protection);
3) When alarming, the sound will beep for 0.25S every 3S (excluding over voltage alarm)
4) The buzzer function can be enabled or disabled through the host computer, and the factory default is disabled.

5.3 Button description

When the BMS is in sleep state, press the button (3~6S) and then release it, the protection board will be activated, and the LED indicators will light up sequentially starting from "RUN" for 0.5 seconds.
When the BMS is activated, press the button (3~6S) and then release it. The protection board will be put to sleep, and the LED indicators will light up in sequence starting from the lowest battery light for 0.5 seconds.

When the BMS is activated, press the button (6~10S) and then release it. The protection board will be reset and all LED lights will light up at the same time for 1.5 seconds. BMS was copied after setting, the parameters and functions set by the host computer will still be retained. If you need to restore the initial parameters, you can use the "restore default values" of the host computer to achieve it.However, the relevant operating records and storage data remain unchanged (such as battery power, number of cycles, protection records, etc.).

5.4 Sleep and wake up

5.4.1 Hibernation

When any of the following conditions is met, the system enters low-power mode:

1） Body or overall over-discharge protection is not released within 30 seconds.

2） Press the button (3~6S) and release the button.

3） The lowest cell voltage is lower than the sleep voltage, and the duration reaches the sleep delay time (while satisfying no communication, no protection, no equalization, and no current).

4） The standby time exceeds 24 hours (no communication, no charging and discharging, and no mains power).

5） Force shutdown through the host computer software.

6） Before entering sleep mode, make sure that the input terminal is not connected to external voltage, otherwise it will not be able to enter low-power mode.

5.4.2 Wake up

When the system is in low-power mode and any of the following conditions is met, the system will exit the low-power mode and enter the normal operating mode:

1）Connect to the charger, the charger output voltage must be greater than 48V.

2）Press the button (3~6S) and release the button.

3）RS232 communication activated.

Note: After single or overall over-discharge protection, it enters low-power consumption mode, wakes up regularly every 4 hours, and turns on charging and discharging MOS. If it can be charged, it will exit the sleep state and enter normal charging; if it cannot be charged after automatic wake-up for 10 consecutive times, it will no longer wake up automatically.

When the system defines the end of charging and the recovery voltage has not been reached after 2 days of standby (standby time setting value), charging will be forced to resume until the end of charging again.

6. Test conditions

Unless otherwise noted, all tests are conducted under the following conditions (standard test conditions):

Environmental humidity: 30%~80%

Atmospheric pressure: 86kpa~106kpa group standard charge and discharge.

Standard charging: Charge the battery pack with a constant current and voltage of 10A to a cut-off voltage of 54V and a cut-off current of 0.5A (500mA).

Standard discharge: Discharge the battery pack at a constant current of 100A to a cut-off voltage of 40.5V.

7. Packaging method

Model	Product	Specification	Unit	Quantity
48V100Ah	Lithium battery pack	48V100Ah	Set	1
	Mounting frame screw	M8*60mm	Pc	4
	Desiccant	5g	Bag	2
	Manual	User Manual	Set	1
	Cable	Positive and negative power cables	Set	1
	Communication line	1 meter with RJ45 connector	Pc	1

7.1 Before packaging, the host computer is set to forced sleep state;
7.2 After the battery has passed the visual inspection, it will be packed into boxes;
7.3 The material and hardness of the outer carton ensure the safety of turnover and transportation.
7.4 There must be shaped buffer packaging material inside; the packaging material should consider: space for terminal posts, placement of bagged screws, etc.

8. Product storage and transportation

8.1 When the product is stored for a long time and is not in use, please place it in a dry and ventilated place away from flammable and explosive items; inspect the battery pack regularly every three months.
Perform charging and maintenance to ensure the battery is in optimal performance.
8.2 The battery pack should be transported through external packaging. During transportation, it should be protected from severe shock, impact or extrusion, and should be protected from sunlight and rain.

9. Precautions for product use

9.1 Never put the battery into water or get it wet.
9.2 It is prohibited to charge and use the battery outside the temperature range specified by us; do not store, charge or use this product near fire or heat sources.
9.3 When the battery pack emits a peculiar smell or leaks, stop using or charging it immediately, move it to an open and ventilated place, away from fire sources, and contact us in time.
9.4 When using with a load, do not reverse the positive and negative poles.
9.5 Do not use metal conductors to short-circuit the positive and negative terminals of the battery pack.
9.6 It is strictly prohibited to perform artificial dissection of the battery pack, to pierce the battery pack with nails or sharp objects, to strike the battery pack with a hammer or other external force, and to step on or drop the battery pack.
9.7 Do not place the battery pack in a microwave oven or pressure vessel.

9.8 If any abnormality occurs during charging or use, please stop charging and using it immediately.
9.9 The optimal operating temperature of the product is 25±5℃. If the product is not within this temperature range during use, the discharge capacity will be low.
9.10 If any malfunction or abnormality occurs during use, please contact us and do not disassemble the battery pack without permission.
9.11 Do not turn the battery upside down when installing it on the cabinet.
9.12 The above tests are for new batteries that are no more than 1 month.

10. Installation Location

Make sure the installation location meets the following conditions:
10.1 The installation location must be suitable for the size and weight of the battery.
10.2 Must be installed on a solid surface to bear the weight of the battery.
10.3 The area is waterproof.
10.4 There are no flammable and explosive items nearby.
10.5 The ambient temperature is within the range of 0°C to 45°C.
10.6 Temperature and humidity are maintained at constant levels.
10.7 Minimum dust and dirt in this area.
10.8 It is recommended to wear the following safety equipment when handling battery packs: insulating gloves, safety goggles, safety shoes
10.9 Installation must be vertical or tilted backwards by a maximum of 15° - avoid forward or sideways stilts.

11. Standard installation instructions

11.1 Choose a suitable solid wall with a thickness greater than 80mm.
11.2 Use the mounting bracket as a template to mark the hole positions.
11.3 Drill 4 holes according to the hole positions, with a diameter of ø10 and a depth of 60mm.
11.4 Hammer the M8 screw into the above hole and tighten the nut. NOTE: Do not position the screws flush with the wall - leave 10 to 20 mm exposed.
11.5 Secure the mounting frame to the 4 screws.
11.6 Raise the battery slightly higher than the installation frame, while keeping the battery balanced, and hang the battery on the frame through hooks.

12.Common abnormal phenomena of battery system and troubleshooting methods

Failure phenomenon	Possible Causes	
BMS cannot be activated	Whether the weak current switch of the BMS is turned on;Module serial connection connection error	Check the connection line and install it according to the method described in the installation manual
BMS red light is always on	Red light warning, existence failure	Locate the fault point according to the method described in the above table: 1.Voltage sensor failure/temperature sensor failure: Check whether the sampling line is connected correctly, you can replace the sampling line for troubleshooting;restart to observe whether it is restored 2.Charging circuit failure,discharging circuit failure: contact the manufacturer for consultation 3. Battery failure: check whether the connection of the sampling terminal is normal: check whether the voltage value of all modules is within the voltage range in the manual after turning off the BMS: observe whether it is cleared after restarting,otherwise contact the manufacturer 4.Sampling IC signal failure: check whether the voltage sampling line is connected properly, you can replace the sampling line for troubleshooting: observe whether it is restored after restarting: contact the manufacturer if it is not
BMS cannot communicate with dynamic ring	1.The BMS aid code address is different from the address of the dynamic loop query 2.When multiple units are connected in parallel, they cannot communicate normally 3.The communication serial port setting is incorrect 4.RS485 communication line sequence is incorrect 5.Abnormal physical connection	1.Detect and reset the RMS dialing address 2.When multiple units are connected in parallel, different addresses need to be set, and the dialing address of each product should be reset according to the address of the dynamic loop 3.Set the correct serial port configuration according to our communication protocol 4.Connect the communication line correctly as described in the installation manual 5.Check that the physical connection of the communication circuit is normal

13.LED operating status analysis

LED indicator definition of BMS module

Logo	Show Content	Colour	Description
Error	Fault Indicator	Red	Red light is always on 1.Short circuit, reverse connection, 2. Cell failure: cell voltage is less than 1.5V, or greater than 4.1V 3. BMS failure (voltage sensor, temperature sensor failure, abnormal charging and discharging current)
Run	Running Lights	Green	1. Idle: the green light is always on 2.Charging: the green light flashes slowly 3.Discharge: the green light flashes quickly 4. Fully charged: the green light is always on, 4 capacity lights are on
Alm	Warning Indicator	Yellow	1.Warning: Yellow light flashes -1Hz (cell voltage is too low, discharge current, temperature is too low, temperature is too high, capacity is low,Pack voltage is too high) 2. Protection: the orange light is always on (the battery voltage is too low, the battery cell voltage is too low, the charge and discharge are overcurrent, the temperature is too low, and the pack voltage is too high)
Soc	Battery Capacity Indicator	Green	The capacity LED indicator light flashes slowly at 0.5HZ only when charging, and other lights are always on: when the capacity is 100%,All 4 lights are on: when the capacity is 99%-75%(inclusive), the fourth light from the top flashes slowly The bottom three lights are always on: when the capacity is 74%-50%(inclusive), the third light from the top flashes slowly and the bottom two lights are always on: when the capacity is 49%-25% (inclusive), The second light from the top flashes slowly and the bottom light is always on: when the capacity is 24%-0% (inclusive), the first light from the top flashes slowly

14.How to judge LED and buzzer when BMS fails

Invalid Errled Status Judgment	Invalid Buzzer Judgment
Entry conditions: When in the protection state or failure state: 1.Press RESET 1S to release and hear a short beep Buzzer sound 2. The RUN light is always on, and the ERR light flashes times number, display the alarm code in turn; 3. After the display, the ERR light returns to always on status	Entry conditions: Buzzer control 15S as a period
Judgment: Red light flashes: Voltage sensor failure: 1 time Temperature sensor failure:2 times Charging circuit failure:3 times Discharge circuit failure:4 times Battery failure: 5 times Sampling IC communication failure: 6 times	Judgment 1.Reverse connection, short circuit; 4 times; (highest priority) 2. Battery failure; 3 times; 3. Voltage sensor failure, temperature sensor failure; 2 times; 4. Failure of charging circuit and discharging circuit; 1 time;(lowest priority)

15.Safety and precautions

1. The battery module must be used in conjunction with BMS, and the mixed use of batteries from different manufacturers is strictly prohibited.
2. Check the battery module voltage for damage; if there is any abnormality, please stop using it.
3. It is strictly forbidden to stack the whole trailer battery with fork plate during transportation and storage, and it is forbidden to stack battery modules when installing and transporting batteries. There are positive and negative lead terminals or sampling line lead ends, and it is strictly forbidden to squeeze, stack and place them down.
4.Parallel matching requirements for battery modules: (Notes before picking and installation)
(1) Two identical models and same capacity, The battery modules of the same voltage are connected in parallel to 24V.
(2) Serial use is strictly prohibited.
5.Parallel wires are included in the battery module packing box, and the parallel wires correspond to the battery modules. Mixed insertion is strictly prohibited.
6.It is forbidden to use or leave the battery module near high temperature and high heat sources, away from fire and water sources.
7.It is forbidden to disassemble the battery module, knock, throw or step on the battery module, and dismantle the BMS and dismantle the yellow tamper-evident sticker without authorization.
8. Before installing the battery module, check whether the open circuit voltage of the battery is within the normal range. The "positive" and "negative" signs are printed on the module, and the electrical properties should be correctly determined. It is strictly forbidden to reverse or short-circuit the battery.

9.Insulation tools and gloves should be used during installation and transportation, and metal-containing conductors such as watches, bracelets (bracelets) and rings should be removed from the wrist to prevent electric shock and short-circuit the positive and negative electrodes. During installation, the battery module poles need to be insulated and protected. If the poles are close to the battery rack and other conductors, the battery poles or battery racks need to be insulated and protected.
10.The recommended transportation method is for two people to carry it at the same time. The transportation tool is a safety rope or a load-bearing net bag. The battery box must be carried to the site. Violent construction is strictly prohibited to damage the product.
11. Installation and maintenance requirements. After the battery module is installed on the wall, the poles and plug-ins are required to achieve frontal maintenance.
12. Battery rack compatibility: multiple groups of parallel type batteries, battery rack installation steps, battery module installation and cable connection, according to the different types of batteries to choose the corresponding installation diagram, installation without battery rack (such as outdoor integration Power cabinet) Refer to the schematic diagram of battery module installation and cable connection in battery rack mode.
13. Please read this installation manual carefully before installation. If you have any questions, please contact your supplizer.

Warranty Card

Customer	
Address	
Telephone	
Email	
Installation Location	
Battery Model	
Serial Number	
Invoice Number	
Dealer	
Dealer's address	
Purchase Date	
Commission date	
Fault/Error Description	

Keep the warranty card properly. Any signs of tampering might Invalidate the warranty card.