
User Manual

5120Wh Lithium-Ion Battery Pack

Model: 51.2V100Ah



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1. Overview

Thank you very much for using our 51.2V 100Ah Lithium battery Pack. Please read this manual carefully before using the Battery Pack. Improper operation of the Battery Pack or use of improper electrical equipment could damage the Battery Pack and/or the electrical equipment. Please check the specifications of the electrical equipment in advance to ensure that the power and voltage matches the Battery Pack input and output characteristics.

The battery is widely used for energy storage and power reserve

The Battery Pack is an integrated system that consists of Lithium Ion Battery and BMS (Battery Management System) that can store and provide stable DC electricity power to electronic devices. The Battery Pack can be charged and discharged at any time. 16 sets battery pack can be connected in parallel to obtain more capacity. The battery pack consists of Lithium-Iron Phosphate Battery Cell and provides nominal 51.2V DC voltage and 100Ah capacity. Each Battery Pack has its own BMS to monitor the cell voltage, current and temperature. The BMS protects the battery against over-charge, over-discharge, over-load and over-temperature. The BMS can be monitored and controlled by display screen states.

2. Warning and Cautions

Please read the following carefully before using the Battery. Improper operation of the Battery or use of improper electrical equipment could damage the Battery and/or the electrical equipment. Please check the specifications of the electrical equipment in advance to ensure that the power and voltage matches the Battery input and output characteristics.

- 2.1. Installing and using the Battery after reading this manual carefully.
- 2.2. Non-professionals are not allowed to disassemble and modify the internal parts or change the parameters of system without authorization, otherwise the consequences will be borne by themselves.
- 2.3. Adequate and suitable fire extinguishing equipment must be available near the system.
- 2.4. Do not bump, knock, damage, heat, or get wet the Battery.

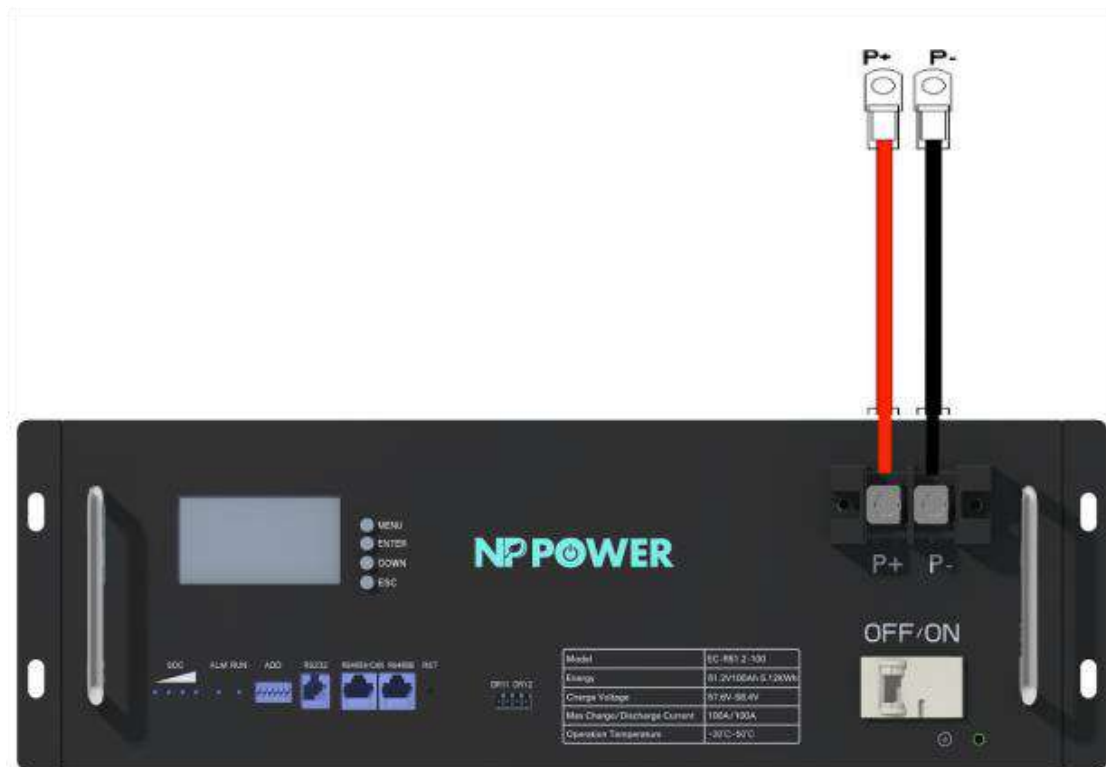
If the battery pack temperature exceeds 55°C during charging and discharging, the charging or discharging operation must be stopped immediately.

- 2.5. Be sure to use matching charging and discharging equipment, and over-charge and discharge are strictly prohibited.
Before charging and discharging the battery pack, one must ensure that all wires are connected correctly, that the positive and negative connections are correct, that there is good contact, and that no metal is exposed to avoid electric shock.
- 2.6. Be sure to strictly follow the instructions for use of the battery pack. For the failure of the battery pack caused by operations that violate the instructions, the user shall bear the maintenance costs.

3. Product Parameters

51.2V100Ah	
Dimension (L×W×H)	480mm×442mm×155mm
Weight	45.0±1kg (Subject to actual Weight)
Rated Capacity	100Ah
Nominal Voltage	51.2V
Continuous Charging Current	100A
Charging Cut-off Voltage	58.4V
Standard Discharge Current	100A
Max Discharge Current	100A
Max. Pulse Discharge Current	120A
Discharging Cut-off Voltage	40V
Cycle Life	≥3000
Operating Temperature(Charging)	0℃ ~ 55℃
Operating Temperature(Discharging)	-20℃ ~55℃
Transportation and storage temperatures	10℃~35℃
Relative Humidity	60±25%R.H.
Initial State-of-Charge (SOC)	30-50%
Display	Capacity percentage, voltage , current, battery capacity
Features	Support to 4S4P connections to expand capacity
Protection	Over-charge\over-discharge\over-load\over-temperatur e
Applications	Store Energy and reserve electricity

4. Diagram Of Product



4.1 Function of Battery



4.1.1 Positive and Negative Anodes

As shown in 2, P+ and P- are the DC power output terminals of the battery pack, P+ is positive, and P- is negative. The terminals can be fastened with M6 bolts, and the cross-sectional area of the power cable is recommended to be 13.3 mm².

4.1.2 Air switch

Air switch has controlling and other varieties of protection functions, as long as the circuit current exceeds 125A current, it will be automatically disconnected. In addition to complete the closure and break the circuit, still can circuit or electrical equipment short circuit, serious overload and undervoltage protection, but also can be used to start the battery infrequently

4.2 Indicator

SOC4	SOC3	SOC2	SOC1		
					
				ALM	RUN

4.2.1 Capacity indication

state		charge				discharge			
Capacity indicato		SOC4 ●	SOC3 ●	SOC2 ●	SOC1 ●	SOC4 ●	SOC3 ●	SOC2 ●	SOC1 ●
	0~25%	Blink2	Off	Off	Off	On	Off	Off	Off
	25~50%	On	Blink2	Off	Off	On	On	Off	Off
	50~75%	On	On	Blink2	Off	On	On	On	Off
	75~100%	On	On	On	Blink2	On	On	On	On
Running indicator light		Stady light				Blink 3 tims			

4.2.2 State indication

System state	Abnormal event	SOC LED				ALM	RUN	description		
										
Shut down	Shut down/sleep mode	All shut down								
standby	normal	Indicator by SOC				off	blink1	Standby only normal and alarm, protection and fault reported according to the charge and discharge status: Alarms include the following types: large pressure difference alarm, low capacity alarm, high and low voltage of a single unit, high and low overall voltage, all temperature alarms (high and low cell temperature, high and low ambient temperature, high and low MOS temperatur		
	alarm					blink2	blink1			
charge	normal	Indicator by SOC				off	on			
	normal					blink2	on	Alarms are classified into the following types: large pressure difference alarm, low capacity alarm, low voltage of a single unit, low voltage of the whole unit, and all temperature alarms (high and low cell temperature, high and low ambient temperature, high and low MOS temperature; Over current alarm)		
	Unit \ overall over voltage protection \ full charge protection	Indicator by SOC				off	on			
	Over current protection (Enter current limiting charge)	Indicator by power(When there is charging current, the LED with the highest power indicator flashes 2)				off	on	After charging over current protection, it enters current limiting charging and the charging current is displayed in normal state; After over current protection, it enters current limiting charging and no charging current is displayed according to fault state, ALM steady on and all others are off		
	Temperature protection					on	off	Cell, MOS, environment		
discharge	normal	Indicator by SOC				off	Blink3			
	alarm	Indicator by SOC				blink2	Blink3	Alarms include the following types: large pressure difference alarm, low capacity alarm, high and low voltage of a single unit, high and low voltage of the whole system, and all temperature alarms (high and low cell temperature, high and low ambient temperature, high and low MOS temperature; Over current alarm)		
	Monomer/whole Under voltage protection	Indicator by SOC				blink2	off			
	Over current, short circuit protection	off				on	off			
	Temperature protection	off				on	off	Cell, MOS, environment		
failure	NTC fault, MOS fault,reverse connection, differential pressure protection, ultralow voltage protection	off				on	off			

4.2.3 Indicator flash description

Blink indication	on	off
blink1	0.25 S	3.75 S
Blink2	0.5 S	0.5 S
Blink3	0.5 S	1.5 S

4.3 Communication interface

4.3.1 RS485

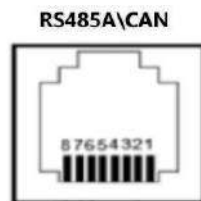
BMS can communicate with the upper computer through the RS485 communication interface, through the upper computer to view various information of the battery, such as voltage, current, temperature, SOC, SOH, working state, battery production information and can be set parameters.

The RS485 parallel port supports a maximum of 16 battery strings simultaneously. The default baud rate is 9600bps.

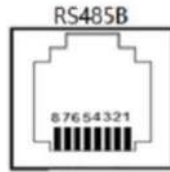
With upper computer/inverter communication RS485 interface, the default baud rate is 9600bps。

4.3.2 (Communication interface definition)

RS485A/CAN、RS485B



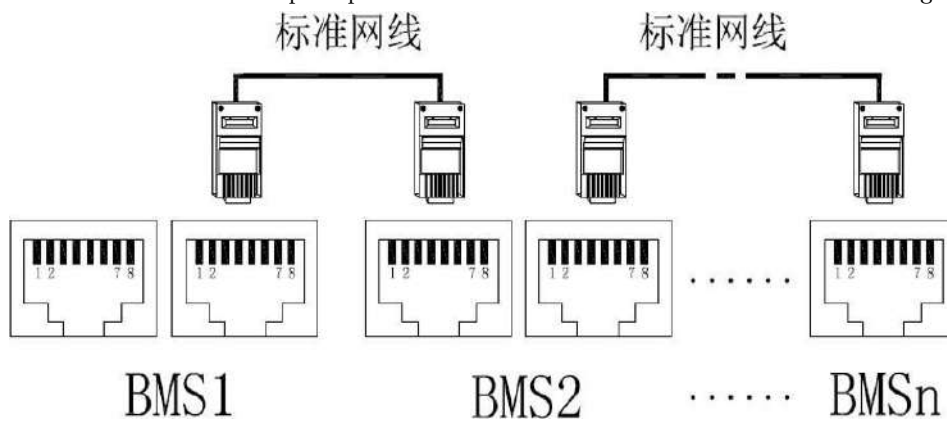
8P8C vertical RJ485 socket	
Pin	Definition
1	RS485-B
2	RS484-A
3、6	GND
4	CANH1
5	CANL1



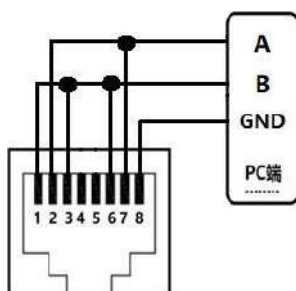
8P8C vRJ485 socketertical	
Pin	Definition
1	RS485-B
2	RS485-A
3、6	GND
4、5	NC

4.3.3 (Interface diagram)

The BMS battery pack communicates in parallel through the RS485 bus and can also communicate with devices with RS485 bus. The RS232 interface enables communication with PCs or other intelligent terminals, allowing for human-machine interaction of information about any battery pack connected in parallel to the RS485 bus. The interface between multiple parallel buses is shown in the following diagram.



4.3.4 (BMS and PC communication)



4.4 (Dip switch setup (supports parallel and protocol selection))

When battery strings are connected in parallel, the hardware DIP address of each PACK is unique. The hardware address is set by the DIP switch on the board. See the following table. When performing multi machine parallel communication operations, it is necessary to first configure the dialing addresses for each PACK. The dialing code adopts BCD code format, and the definition of address 0 is  (black dot is OFF state, blank is ON state, the same below), address 1 , address 2 , and so on for other addresses.



address	Dip switch position				reserved	host	declaration
	#1	#2	#3	#4			
0	OFF	OFF	OFF	OFF	OFF	OFF	(从机) Pack0
1	ON	OFF	OFF	OFF	OFF	OFF	(主机) Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	(从机) Pack2
3	ON	ON	OFF	OFF	OFF	OFF	(从机) Pack3
4	OFF	OFF	ON	OFF	OFF	OFF	(从机) Pack4
5	ON	OFF	ON	OFF	OFF	OFF	(从机) Pack5
6	OFF	ON	ON	OFF	OFF	OFF	(从机) Pack6
7	ON	ON	ON	OFF	OFF	OFF	(从机) Pack7
8	OFF	OFF	OFF	ON	OFF	OFF	(从机) Pack8
9	ON	OFF	OFF	ON	OFF	OFF	(从机) Pack9
10	OFF	ON	OFF	ON	OFF	OFF	(从机) Pack10
11	ON	ON	OFF	ON	OFF	OFF	(从机) Pack11
12	OFF	OFF	ON	ON	OFF	OFF	(从机) Pack12
13	ON	OFF	ON	ON	OFF	OFF	(从机) Pack13
14	OFF	ON	ON	ON	OFF	OFF	(从机) Pack14
15	ON	ON	ON	ON	OFF	OFF	(从机) Pack15

4.5 LCD Indicators

This product is equipped with 4 buttons. The function sequence of buttons from top to bottom is Enter, Page+, Page- and Exit.

》: indicates that there is sub-menu, press Enter to access the sub-menu

Button function description:

This product is equipped with 4 buttons, and the functional order of the buttons from top to bottom is: MENU、ENTER、▼、ESC

》: Indicates that there is a submenu, press the Enter key to enter the submenu

Key Function Description :

MENU: Press this key to enter the management system

ENTER: Press this key to enter the submenu

▼ : Press this key to move the cursor down or page down

ESC: Press this key to return to the previous menu level

As shown in the figure :



4.6 Introduction to Display Screen Functions

Power on interface:

system date	SOH
Charging and discharging current	ambient temperature
Total voltage	Maximum temperature of battery cells
Remaining capacity	SOC
Maximum voltage of a single unit	Minimum voltage of a single unit

Battery protection status :

Overvoltage	OV
Lowvoltage	LV
Overcurrent	OC
short circuit	SC
Over temperature	OT
low temperature	LT

Note: When the battery cell is not in a protected state, a blank will be displayed here. Conversely, the corresponding protection state will be reported, as shown in the following figure.



4.6.1、 Press MENU to enter the main menu :

- BMS Parameter
- Battery Status
- GYRO Status
- More

As shown in the following figure:

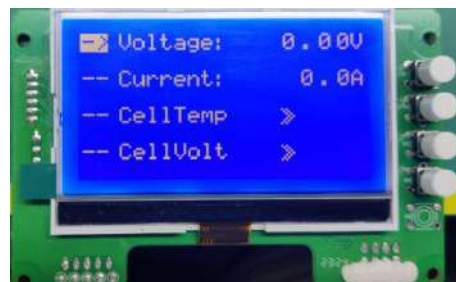


4.6.2、

Select the cursor to "BMS Parameter > >" and press to "ENTER"

- Voltage:
- Current:
- Cell Temp >>
- Cell Volt >>

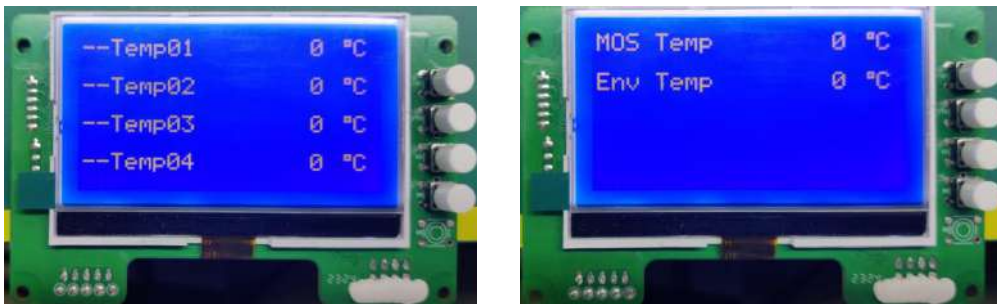
As shown in the following figure:



Select the cursor to "Cell Temp >>" and press "ENTER" to enter the battery temperature information, then press "▼" to turn the page

```
--Temp01:xx°C
--Temp02:xx°C
--Temp03:xx°C
--Temp04:xx°C
--MOS Temp:xx°C
--Env Temp:xx°C
```

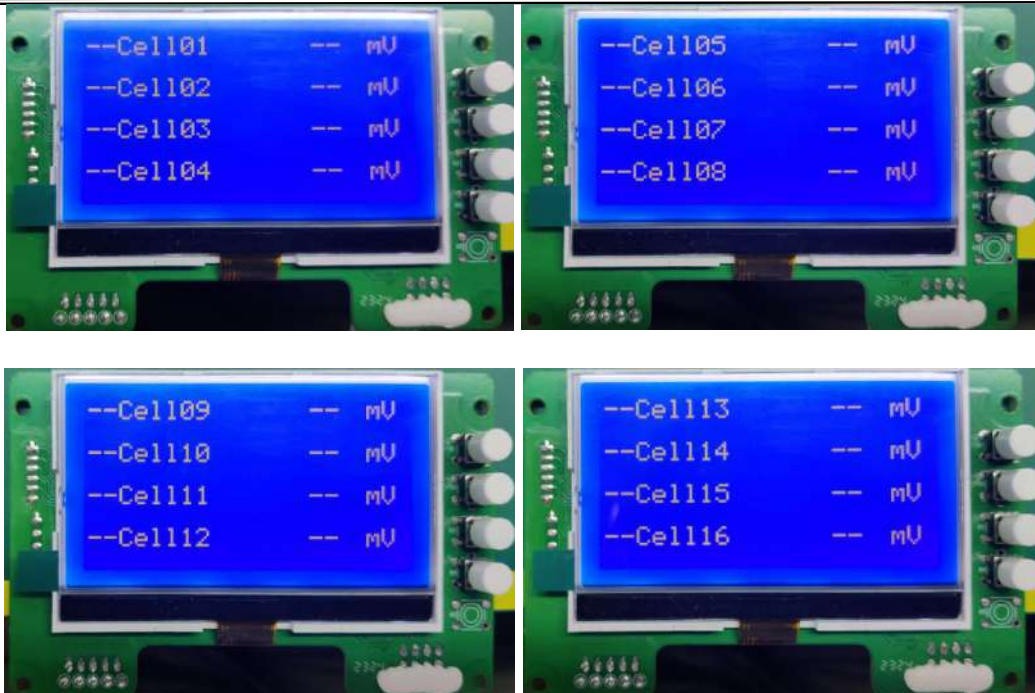
As shown in the following figure:



Select the cursor to "Cell Volt 》" and press "ENTER" to enter the battery voltage information, then press "▼" to turn the page

```
--Cell01 : xxxx mV
--Cell02 : xxxx mV
--Cell03 : xxxx mV
--Cell04 : xxxx mV
--Cell05 : xxxx mV
--Cell06 : xxxx mV
--Cell07 : xxxx mV
--Cell08 : xxxx mV
--Cell09 : xxxx mV
--Cell10 : xxxx mV
--Cell11 : xxxx mV
--Cell12 : xxxx mV
--Cell13 : xxxx mV
--Cell14 : xxxx mV
--Cell15 : xxxx mV
--Cell16 : xxxx mV
```

As shown in the following figure:



--SOC:	--> SOC
--Nominal:	--> Nominal capacity
--Remain:	--> Remaining capacity
--BMS Cycles:	--> BMS Cycles

As shown in the following figure:



4.6.3、

Select the cursor to "Battery Status >>" and press "ENTER" to enter the battery status information, then press the "▼" to turn the page

--Status: (IDLE/DISCHG/CHARGE/FULL)	
--Alarm Status:	>>
--Protect Status:	>>
--Failure Alarm:	>>

As shown in the following figure:



Select the cursor to "Alarm Status >> " and press "ENTER" to enter the battery alarm information, then press the "▼" to turn to the page

```
--Over Volt   YES/NO
--Low Volt    YES/NO
--Over Temp   YES/NO
--Low Temp    YES/NO
--Low SOC     YES/NO
--Diff Volt   YES/NO
--Over Curr   YES/NO
--Reverse     YES/NO
```

如下图As shown in the following figure:



Select the cursor to "Protect Status >> " and press "ENTER" to enter the battery protection information, then press the "▼" to turn the page

```
-- Over Volt   YES/NO
-- Low Volt    YES/NO
-- Over Temp   YES/NO
-- Low Temp    YES/NO
```

-
- Over Curr YES/NO
 - Short Curr YES/NO

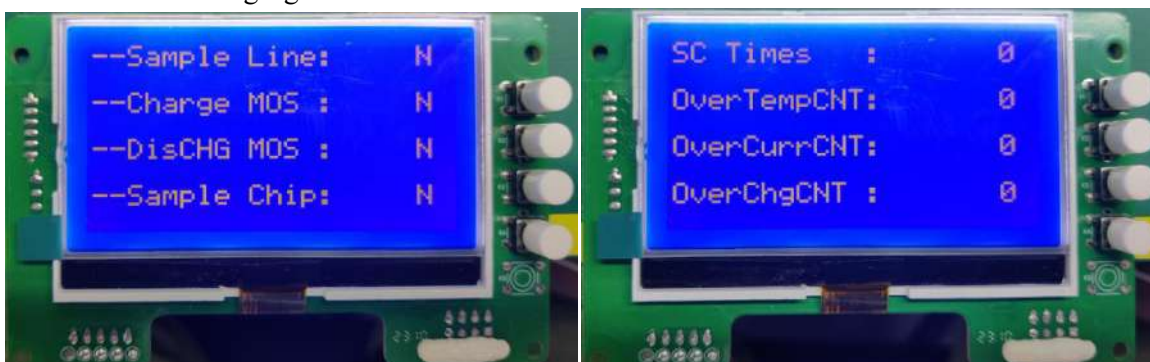
As shown in the following figure:



Select the cursor to "Failure Alarm" and press "ENTER" to enter the battery fault information, then press "▼" to turn the page

- | | |
|--------------------|---|
| --Sample Line(N/Y) | → Sampling line disconnection fault (NO/Yes) |
| --Charge MOS (N/Y) | → Charging MOS fault (NO/Yes) |
| --DisCHG MOS(N/Y) | → Discharge MOS fault (NO/Yes) |
| --Sample Chip(N/Y) | → AFE failure (single cell voltage ultra-high/ultra-low) (NO/Yes) |
| --SC Times | → Short circuit protection frequency |
| --Over Temp CNT | → Temperature protection frequency |
| --Over Cur CNT | → Number of overcurrent protection times |
| --Over Chg CNT | → Number of overcharge protection times |
| --Over Dchg CNT | → Number of overdischarge protection times |

As shown in the following figure:





4.6.4、

Select the cursor to "GYRO Status » " and press "ENTER" to enter the gyroscope information, then press the "▼" to flip

--Set X axis

--Place Option

Note: This gyroscope setting function is optional

As shown in the following figure:



4.6.5、

Select the cursor to "More » ", press "ENTER" to enter more, then press "▼" to flip the selection

--Protocol : »

--BMS Version : »

--LCD Version : »

As shown in the following figure:



Select the cursor to "Protocol >>" and press "ENTER" to enter the serial port selection, then press "▼" to flip the selection

```
--RS485A      >>
--RS485B      >>
--RS485C      >>
--CAN1        >>
--CAN2        >>
```

As shown in the following figure:



(Taking RS485A as an example here) Select the cursor to "RS485A" and press "ENTER" to enter the serial port selection, then press "▼" to flip the selection

Current Protocol:

9600 DR1363

Other agreements >>

As shown in the following figure:



Press "ENTER" to enter other protocol selection (which corresponds to the protocol supported by the current serial port), then press "▼" to flip the selection, select the cursor to the corresponding protocol, and press "ENTER" to complete the protocol selection.

As shown in the following figure:



Select the cursor to "BMS Version »" and press "ENTER" to enter the version information

--BMS SW Version :

--BMS HW Version :

As shown in the following figure:



Select the cursor to "LCD Version »" and press "ENTER" to enter the LCD version information

--LCD SW Version:

--LCD HW Version:

As shown in the following figure:



4.7 Sleep and activation functions

In normal operation mode, after 1 minute of no button operation, the display system will be in a off screen state (only the backlight will be off). Press any button when the screen is turned off, and the display screen will run normally.

5. Battery installation steps

一) Installation requirement

Before installation, please read and comply with the following requirements

1. Before installation, unpack and check battery pack, turn on the battery circuit breaker or long press the reset button to ensure that the battery is activated
2. The ambient temperature of equipment room should range from 0°C~60°C (recommended temperature: 15°C~35°C). The relative humidity should be kept within 90%. The dedicated battery room should be equipped with ventilation devices.
3. Do not place battery pack in direct sunlight or near heat sources, and do not point the air conditioner port directly at battery pack. Reserve enough maintenance space between battery packs and keep battery pack in a clean, dry, and well-ventilated area when installing cabinets and racks
4. Ensure that each battery cabinet is properly grounded during installation 安装时应保证每个电池机柜能够有效接地。
5. Do not connect battery packs in series for integrated battery system; otherwise, BMS may be damaged.
6. Before installation, carefully check the positive and negative terminals of the battery pack and the positive and negative terminals of the device, in order to avoid short circuit and reverse connection between the battery and the device
7. Before installation, carefully check the positive and negative terminals of the battery pack and the positive and negative terminals of the device, in order to avoid short circuit and reverse connection between the battery and the device.
8. The charging parameters of Switching Mode Power Supply must be set according to the parameters provided by the manufacturer.
9. After the battery is installed, if the battery cannot be charged within a short time, disconnect the switching power supply from the battery. Otherwise, the switching power supply will continue to consume battery power until the battery over-discharges, causing irreversible damage to the battery

二) Installation operation specification :

1. Wearing protective gloves during connecting battery system. If you use metal tools such as torque wrenches, make insulation packing, Do not contact the positive and negative terminals of the battery at the same time, which may cause battery short circuit.
2. Before connecting to the external device, make sure the device is in the disconnected state and double

check that the battery connection polarity and overall voltage are correct. Then the positive electrode of the battery shall be connected to the positive electrode of the device, the negative electrode of the battery shall be connected to the negative of the device, and tighten the connecting line;

3. Carry and place batteries carefully. Do not fall, impact, throw, or beat batteries to avoid battery damage or potential safety risks

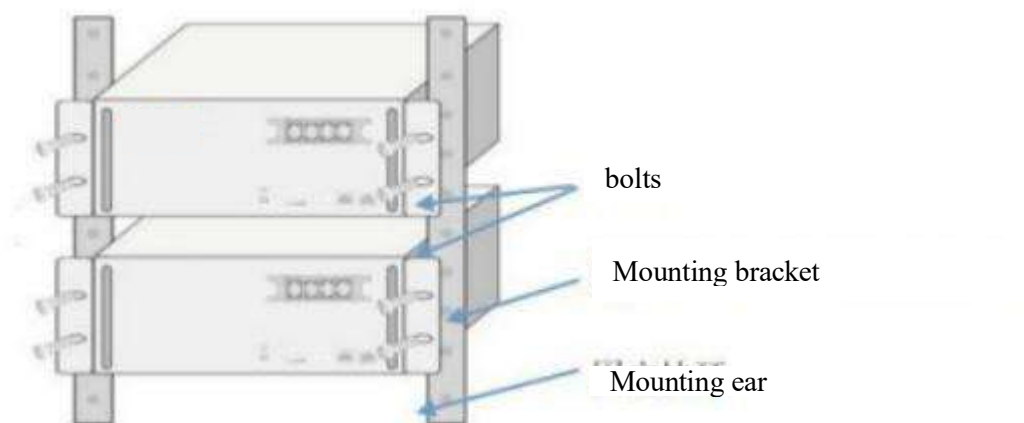
4. Do not use sharp part of the tool to touch the battery case surface, scratch or damage the battery case

5. Do not disassemble the battery case without permission

6. Do not place or assemble any metal or conductive material with the battery in the battery box

三) Stationary-mount

Insert the battery pack into battery cabinet, and secure the system to the cabinet using four bolts at the mounting ears on both sides of the cabinet



Improper installation of battery packs may cause potential security risks. Therefore, install battery modules correctly.



Proper installation mode - The panel faces horizontally front

6. Packaging, Transportation and Storage

6.1 Packaging

The lithium-ion battery cells shall be packaged in a case to ensure that the product is free from any harmful gases, chemical pollution, static electricity, humidity and mechanical damage during handling, transportation and storage.

6.2 Transportation

Pay attention to the following aspects during battery handling

- (1) Handle gently to avoid violent vibration of the Pack.
- (2) Do not invert, roll, drop, or impact the Pack to avoid damaging the appearance.
- (3) The Pack should be protected from direct sunlight and rain, and should not be directly submerged in water.
- (4) Short circuit of Positive and Negative is strictly prohibited.

6.3 Storage

- (1) The battery with a storage period of more than 3 months should be recharged. It is recommended to charge the battery with a switching power supply. After the charging is completed, the battery can be set in sleep mode.
- (2) The battery design life is 10 years under normal use.
- (3) The battery should be stored in a dry, clean, ventilated, non-corrosive gas environment, kept away from fire sources, and avoid direct sunlight.

7. After-Sale Service

This product is for free limited warranty for 12 months. The following circumstances are not covered by the warranty

1. Normal aging and wear-out parts of the product, such as protective coatings, after a period of time, there will be a certain amount of worn out.
2. The product is dismantled and changed by personnel not certified and authorized by Hunan Joysun New Energy Co., Ltd..
3. Failure or damage caused by accidents, man-made, environmental factors, such as operational errors, collisions, dampness, etc.
4. Failure or damage caused by force majeure such as natural disasters, including earthquakes, fires, tsunamis, etc.
5. For products that exceed the warranty period, the company provides paid services.