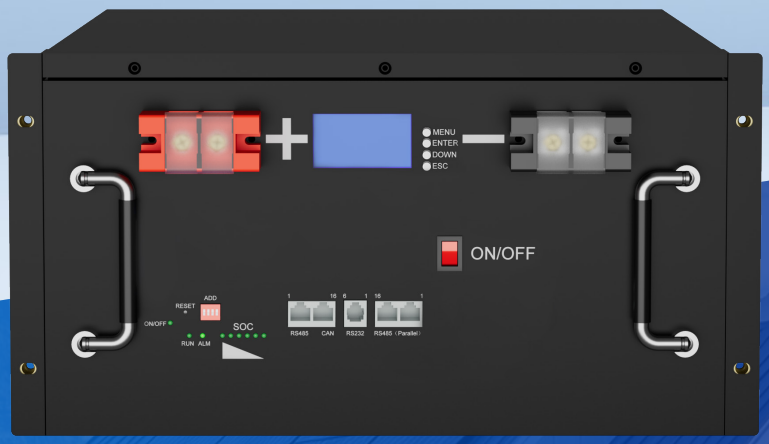
FT51.2V 100/200/300Ah

Battery Module User Manual

This product is a lithium iron phosphate battery (including BMS). It consists of lithium iron phosphate battery cells, and the battery cell configuration employs intelligent sorting, which is accurate and reliable. The BMS utilizes a professional protection board testing system to perform comprehensive testing before going online, ensuring that the BMS provides thorough and effective protection for the battery pack during use.



To better use and maintain this product,
please read this user manual carefully before use.

CATALOG

1.PRECAUTIONS FOR USE

1. Installation work must be carried out by engineering personnel with professional qualifications, and general knowledge must be utilized to operate electrical components at all times.

2. Please keep the installation site away from water, steam, and other liquid substances, away from flammable and explosive materials, and away from other heat sources.

3. The weight and volume of the product are relatively large, so avoid falling and colliding during transportation.

4. The battery cabinet is a live equipment, and any operator must strictly follow the operating procedures when using it.

5. Please do not overload the system to avoid equipment damage or to reduce its service life.

6. Please regularly recharge the battery to avoid damage to the battery system caused by prolonged failure to recharge.

7. After the installation of the equipment, reasonable parameter settings have been made, and system parameters cannot be modified or set without the manufacturer's approval.

8. Do not disassemble this product at will. When maintenance is needed, please seek qualified professional assistance.

9. The power main circuit terminal must be firmly installed with the wire nose. When connecting the cable, pay attention to whether the positive and negative poles of the system are connected correctly. After installation, check whether all line connections are tight to avoid the danger of heat accumulation due to virtual connections. When installing the machine When connecting the cable, make sure the machine is turned off;

10. After the battery box is placed and installed, there should be some space around it for airflow to dissipate heat. The battery box should be situated in a location that is not easily accessible to children.

2.PRODUCT BASIC INTRODUCTION

1 The following figure shows the system application scenario of this product. A complete system includes the following parts:

① Photovoltaic modules: convert light energy into direct current energy, charge lithium batteries through inverters, or directly invert it into alternating current to power loads.

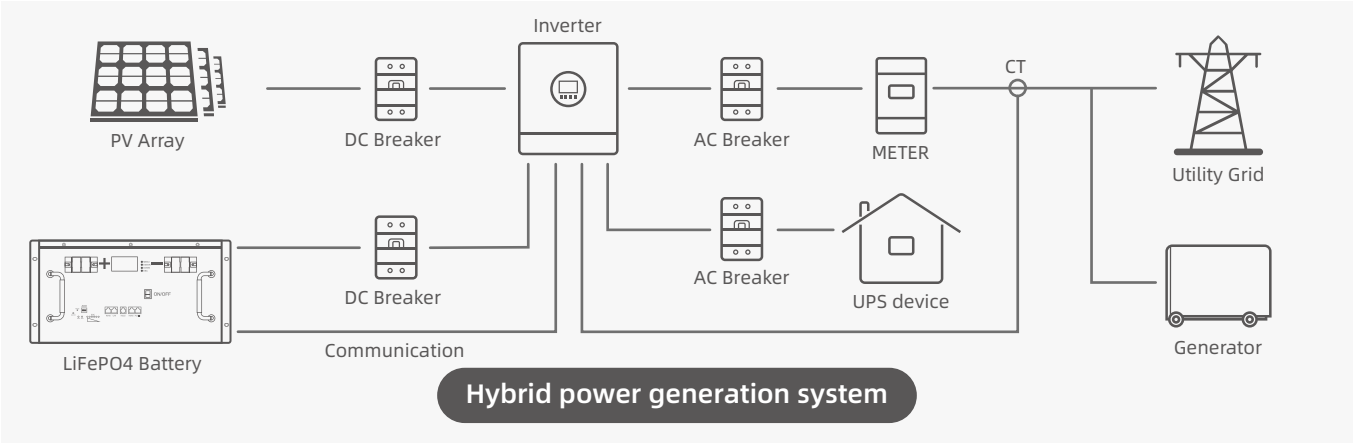
② Mains power or generator: connected to the AC input, it can supply power to the load and charge the lithium battery simultaneously. The system can also operate normally if the mains power or generator is not connected. At this time, the load power supply is provided by batteries and photovoltaic modules.

③ Lithium battery: The function of the lithium battery is to ensure the normal power consumption of the system load when solar energy is insufficient and there is no mains power.

④ Household load: can be connected to various household and office loads, including AC loads such as refrigerators, lamps, televisions, fans, air conditioners, etc.

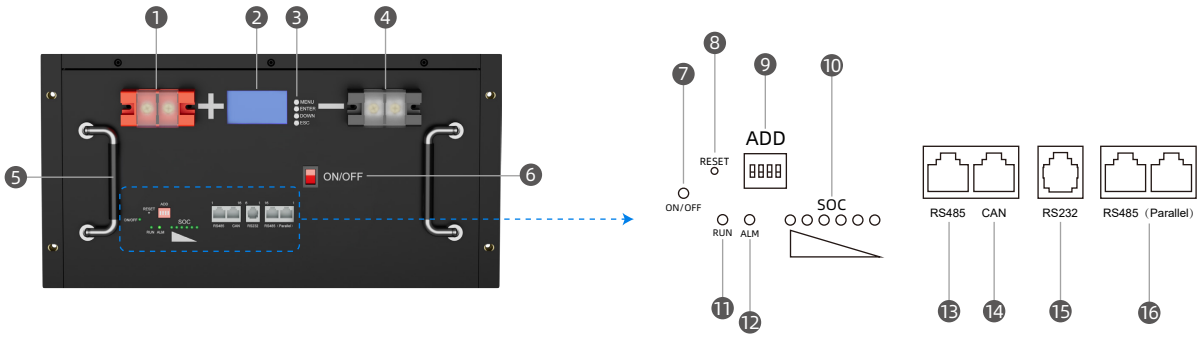
⑤ Inverter: The energy conversion device of the entire system

2 The specific wiring method for the system is determined by the actual application scenario.



3 Product appearance features

The voltage of a single battery box is 51.2V.



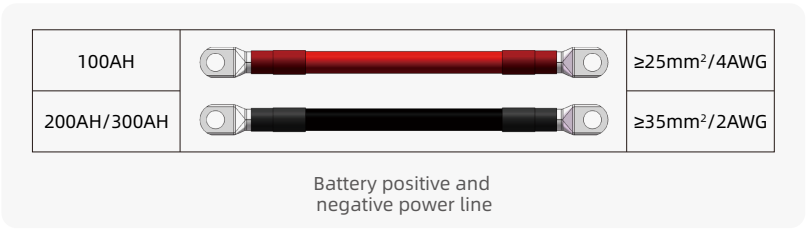
1.Positive terminal	5.Handle	9.Decoder switch	13.RS485- External communication interface
2.Display screen	6.On-off key	10.State of Charge	14.CAN - External communication interface
3.Operator buttons	7.Switch light	11.Run prompt	15.RS232-Communication interface
4.Negative terminal	8.Reset switch	12.Alarm prompt	16.RS485- Parallel internal communication interface

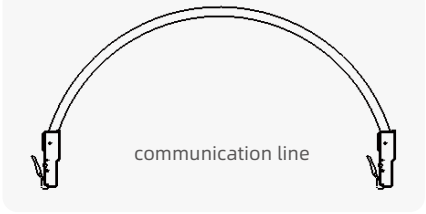
3.BATTERY BOX ELECTRICAL CONNECTION

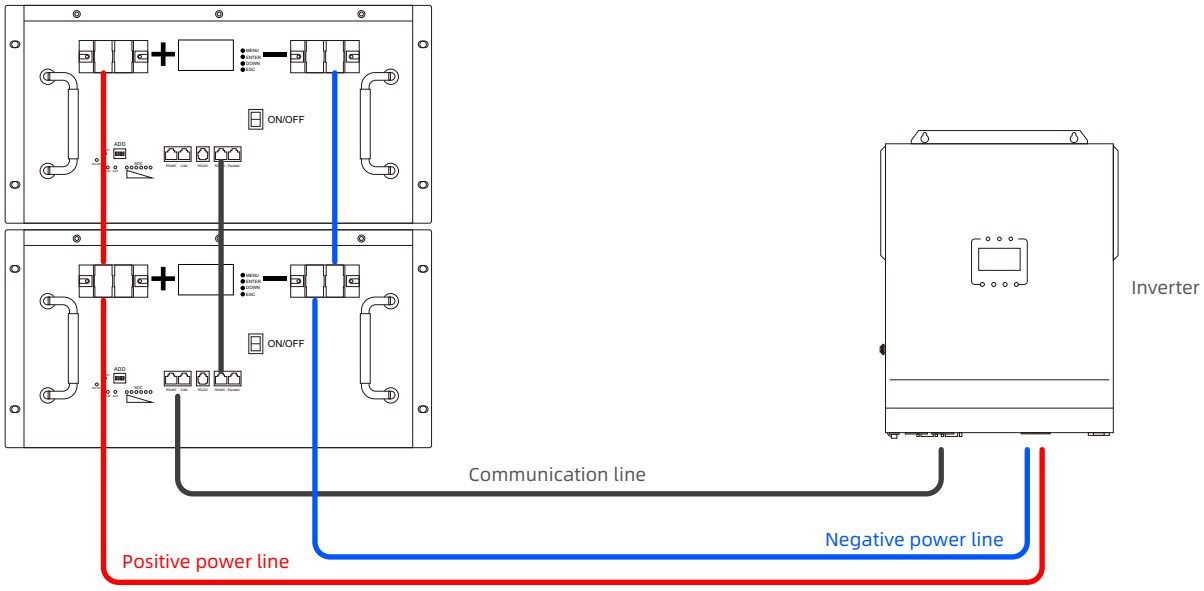
1 Connect power cables and communication cables

- Before connecting the battery module, ensure that the battery is not functioning and that the indicator on the battery is off. Use the power cable supplied with the product to connect the positive and negative terminals of other batteries or power modules. It should be noted that the red cable must be connected to the red terminal (battery positive terminal), and the black cable must be connected to the black terminal (battery negative terminal).

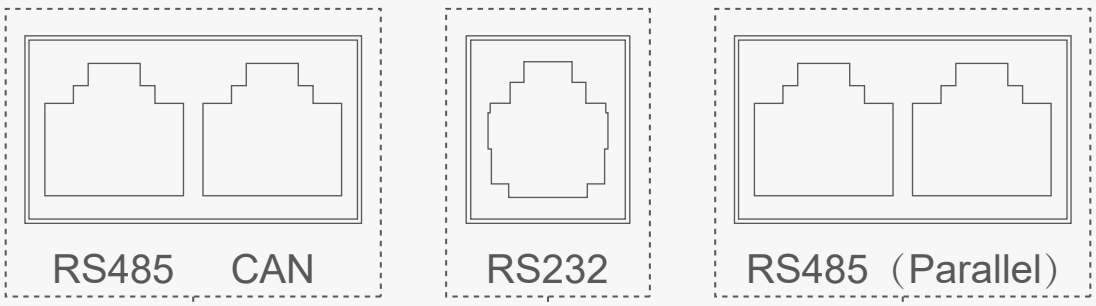
- The communication between each battery module should utilize the RS485 (Parallel) communication interface. To communicate with the inverter, the RS485 or CAN interface for external communication of the battery module must be employed, and the first battery (with a code of "1") must be connected to the inverter for communication.





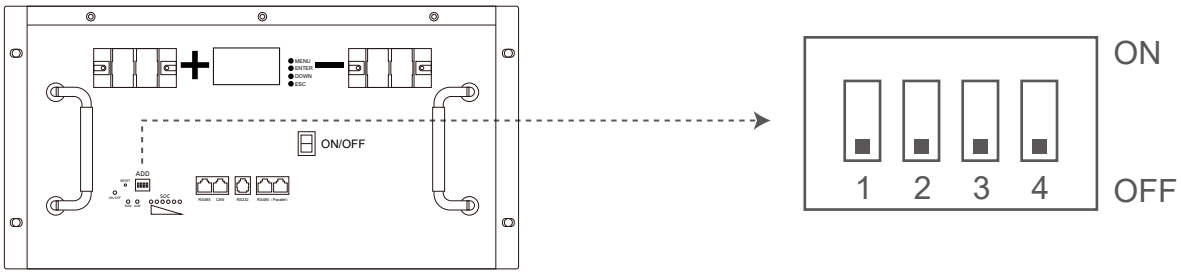


The image here only represents the description of electrical connections and is not related to the installation method of the product;



3.BATTERY BOX ELECTRICAL CONNECTION

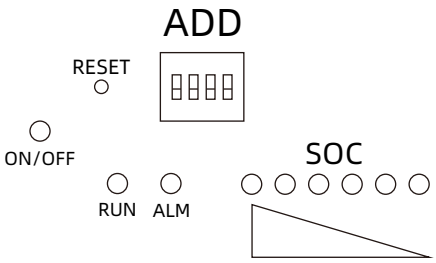
2 Address setting of the energy storage battery module

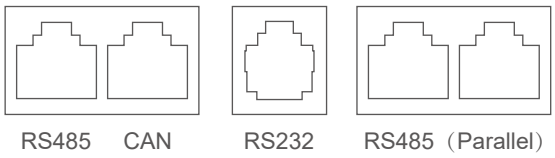


Address	DIP switch position				Introductions	Notes
	#1	#2	#3	#4		
1	ON	OFF	OFF	OFF	Let PACK1 set to be master	
2	OFF	ON	OFF	OFF	Let PACK2 set to be slave	
3	ON	ON	OFF	OFF	Let PACK3 set to be slave	
4	OFF	OFF	ON	OFF	Let PACK4 set to be slave	
5	ON	OFF	ON	OFF	Let PACK5 set to be slave	
6	OFF	ON	ON	OFF	Let PACK6 set to be slave	
7	ON	ON	ON	OFF	Let PACK7 set to be slave	
8	OFF	OFF	OFF	ON	Let PACK8 set to be slave	
9	ON	OFF	OFF	ON	LLet PACK9 set to be slave	
10	OFF	ON	OFF	ON	Let PACK10 set to be slave	
11	ON	ON	OFF	ON	Let PACK11 set to be slave	
12	OFF	OFF	ON	ON	Let PACK12 set to be slave	
13	ON	OFF	ON	ON	Let PACK13 set to be slave	
14	OFF	ON	ON	ON	Let PACK14 set to be slave	
15	ON	ON	ON	ON	Let PACK15 set to be slave	

4.ENERGY STORAGE BATTERY MODULE ENERGIZED

1 Turn on the battery input circuit breaker switch and confirm (if applicable), then turn on the switch for the energy storage battery module. If there are multiple modules, please turn on the corresponding power switches in order of their addresses. After turning on the power switches, the LED indicator light will illuminate or flash.





Capacity indication description

Status		Charge						Discharge					
Capacity indicator light		L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●	L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●
Electricity（%）	0%～17%	OFF	OFF	OFF	OFF	OFF	Flash 2	OFF	OFF	OFF	OFF	OFF	Solid Green
	18%～33%	OFF	OFF	OFF	OFF	Flash 2	Solid Green	OFF	OFF	OFF	OFF	Solid Green	Solid Green
	34%～50%	OFF	OFF	OFF	Flash 2	Solid Green	Solid Green	OFF	OFF	OFF	Solid Green	Solid Green	Solid Green
	51%～66%	OFF	OFF	Flash 2	Solid Green	Solid Green	Solid Green	OFF	OFF	Solid Green	Solid Green	Solid Green	Solid Green
	67%～83	OFF	Flash 2	Solid Green	Solid Green	Solid Green	Solid Green	OFF	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green
	84%～100%	Flash 2	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green
Running indicator light ●		Solid Green						Flash3					

4.ENERGY STORAGE BATTERY MODULE ENERGIZED

working status indication

Status	Normal / Alarm / Protection	ON /OFF	RUN	ALM	LED working status indication						Instructions
					L6	L5	L4	L3	L2	L1	
		●	●	●	●	●	●	●	●	●	
Shut down	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Standby	Normal	Solid Green	Flash 1	OFF	According to the electric quantity indication						Standby status
	Alarm	Solid Green	Flash 1	Flash 3							Module low pressure
Charge	Normal	Solid Green	Solid Green	OFF	According to the electric quantity indication						The maximum power LED flashes(flashing 2), and the ALM does not flash during the overcharge alarm
	Alarm	Solid Green	Solid Green	Flash 3							
	Overcharge protection	Solid Green	Solid Green	OFF	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	If there is no mains supply, the indicator turns to standby
	Temperature、Overcurrent Failure 、protection	Solid Green	OFF	Solid Green	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	normal	Solid Green	Flash 3	OFF	According to the electric quantity indication						
	Alarm	Solid Green	Flash 3	Flash 3							
	Under-voltage protection	Solid Green	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
	Temperature, overcurrent, short circuit, reverse connection, failure protection	Solid Green	OFF	Solid Green	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Lose efficacy		OFF	OFF	Solid Green	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging and discharging

2 LED flashing instructions (can be enabled or disabled through the PC software for LED indicator light alarms; default is enabled at the factory).

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

3 Reset button instructions

- When the BMS is in sleep mode, press the button for (3 to 6 seconds) and release it. The protection board is activated, and the LED indicator lights up successively for 0.5 seconds from "RUN."
- When the BMS is activated, press the button for (3 to 6 seconds) and release it. The protection board goes to sleep, and the LED indicator lights up successively for 0.5 seconds, starting from the lowest power indicator.
- When the BMS is activated, press the button (6-10 seconds) and then release it. The protection board resets, and all LED lights turn off simultaneously.

4 Buzzer logic

- When the fault occurs, the sound is 0.25s every 1s.
- When protecting, chirp for 0.25 seconds every 2 seconds (except for over-voltage protection, chirp for 0.25 seconds every 3 seconds when under-voltage);
- When an alarm is generated, it buzzes for 0.25 seconds every 3 seconds (except for the over-voltage alarm).
- The buzzer function can be enabled or disabled by the upper computer, but it is disabled by factory default.

5 Sleep

When any of the following conditions are met, the system enters the sleep mode:

- Cell or total under-voltage protection is not removed within 30 seconds.
- Press and hold the button for 3 to 6 seconds, then release it.
- The minimum voltage of a single cell is lower than the sleep voltage, and it meets the requirements of no communication, no protection, no balance, and no current, with a duration reaching the sleep delay time.
- The standby time exceeds 24 hours (no communication, no charging or discharging, no mains power).
- Force shutdown through upper computer software.

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

6 Wake up

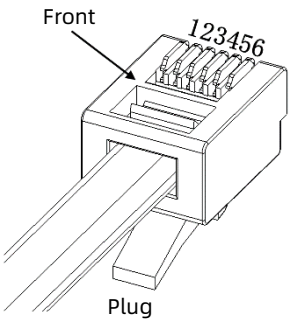
When the system is in sleep mode and any of the following conditions are met, the system exits the hibernation mode and enters the normal operation mode.

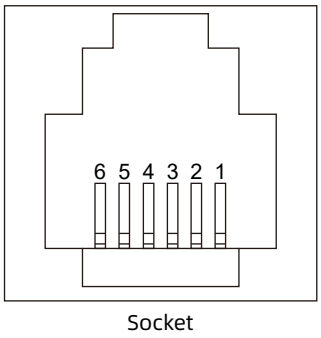
- Connect the charger, and the charger's output voltage must be greater than 48V.
- Press the button (for 3-6 seconds) and release it.
- Activate using RS232 communication.

7 Communication socket pin definition instructions

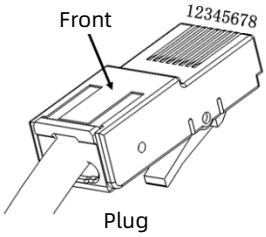
- **RJ11-6P6C Vertical socket**

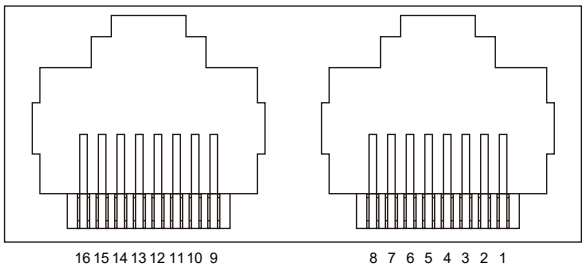
RS232 communication port	
RJ232 pin	Defined declaration
1	/
2	/
3	TXD
4	RXD
5	GND
6	/





- **RJ45-8Px2 8P8C vertical RJ45 socket**





CAN+485 External communication port			
RJ45 pin	Defined declaration	RJ45 pin	Defined declaration
1	/	9	RS485-B
2	GND	10	RS485-A
3	/	11	GND
4	CAN-H	12	/
5	CAN-L	13	/
6	/	14	GND
7	/	15	RS485-A
8	/	16	RS485-B

Dual RS485 Parallel port for internal communication			
RJ45 pin	Defined declaration	RJ45 pin	Defined declaration
1	RS485-B	9	RS485-B
2	RS485-A	10	RS485-A
3	GND	11	GND
4	/	12	/
5	/	13	/
6	GND	14	GND
7	RS485-A	15	RS485-A
8	RS485-B	16	RS485-B

5.LCD SCREEN INTRODUCTION

1 Button Description

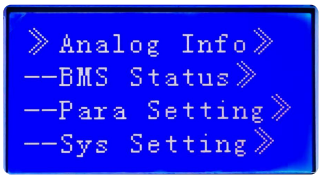
MENU ENTER DOWN ESC

- Each item starts with "》 " or "--," where "》 " represents the current cursor position, and pressing the DOWN key moves the cursor downwards. Projects that end with "》 " indicate that there is content that has not been displayed. Press ENTER to access the corresponding page.
- Press the ESC key to return to the previous directory; press the MENU key at any position to return to the main menu page.

2 Interface Introduction

Ⅰ Main menu page

After power on or sleep activation, a welcome interface will be displayed. Press the **MENU** key to enter the main menu page, as shown in the figure on the right:



The definitions on main menu page	
Analog Info	View the total voltage, current, and individual voltages and temperatures of the battery
BMS Status	View the current status of the battery
Para Setting	Viewing and switching inverter communication protocols
Sys Setting	View the communication baud rate and version number of the display screen

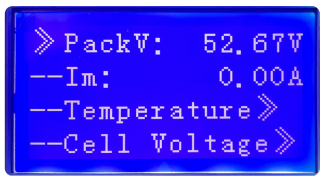
Ⅱ BMS Status Page

BMS Status Page definitions	
Status	View the current status of the battery module: Idle\CHG\DSG\ Failure
BMS Status	View the current status of the battery
Record	Record the number of protection occurrences of the battery module, as outlined in the "Record and BMS Status Explanation Form"
BMS Status	View the current status of BMS, as defined in the "Record and BMS Status Explanation Form"

5.LCD SCREEN INTRODUCTION

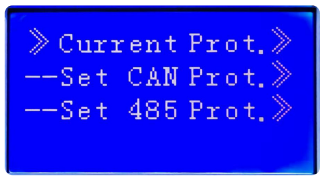
Record and BMS Status Explanation Table	
SCP	Short circuit protection
O/UTP	It includes the following temperature protections: • High-temperature protection during charging/discharging • Low-temperature protection during charging/discharging • MOSFET tube high-temperature protection • Environmental high and low-temperature protection
OC	Charge/discharge overcurrent alarm
OCP	Charging/discharging overcurrent protection
UV	Single cell voltage low voltage alarm Overall voltage low voltage alarm
UVP	Single cell voltage over discharge protection Overall voltage over discharge protection
OVP	Single cell voltage overcharge protection Overall voltage overcharge protection
OT	It includes the following temperature alarms: • Charging/discharging high temperature alarm
OTP	It includes the following temperature protections: • High temperature protection during charging/discharging • MOSFET tube high temperature protection • Environmental high and low temperature protection
OV	Single cell voltage overcharge alarm Overall voltage overcharge alarm
Failure	Failure

③ Analog Info Page



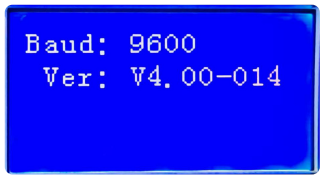
Analog Info Page definitions	
PackV	View the total voltage of the battery module
Im	View the current of the battery module
Temperature	View the temperature of the battery cell
Cell Volatge	View the voltage of the battery cell
CellCapacity	SOC(State Of Charge)\ FCC(Full charge capacity)\ Rm(Remaining capacity)\CC(Battery cycle count)

④ Para Setting Page



Para Setting Page definitions	
Current Prot.	View the current communication protocol of the battery module
Set CAN Prot.	Switching the CAN protocol of battery modules
Set 485 Prot.	Switching the RS485 protocol of battery modules

⑤ Sys Setting Page



Sys Setting Page definitions	
Baud	Baud rate of display screen communication
Ver	Display screen version

6.ENERGY STORAGE BATTERY MODULE MAINTENANCE, CARE AND STORAGE

1 Turn off the power supply to the energy storage battery module.

Before performing maintenance operations, turn off the energy storage module switch and disconnect the battery switch until all indicator lights are off and the energy storage device is successfully shut down.

2 Routine maintenance

Project	Method	Maintenance interval time
Product appearance cleanliness	Regularly check if the casing is covered or dirty	Three times a month for a year
System operating status	·Observe whether the appearance of the energy storage module is damaged or deformed · Listen for any abnormal sounds from the energy storage module during operation · When the energy storage module is running, check if the energy storage parameter settings are correct	Once a month
Electrical connection	· Check if the cable connection is disconnected or loose. · Check for any cable damage, especially if there is a break in the protective sheath where the cable contacts the metal surface	One month after the initial debugging and testing, and then every three months to six months thereafter

3 Battery module storage requirements

Do not place the battery in the fire, as it may explode;
Do not open or damage the battery, as the electrolyte discharged from the battery is harmful to the skin and eyes, and the electrolyte may also be toxic.

- During storage, the battery should be positioned correctly according to the markings on the packaging box. Do not turn it upside down or lay it on its side.
- When stacking battery packaging boxes, the stacking requirements for the outer packaging should be met.
- The battery should be handled with care, and it is strictly forbidden to damage it.
- Storage environment requirements:
  - Ambient temperature: -10℃ to 55℃, recommended storage temperature: 20℃ to 30℃.
  - Relative humidity: 5%RH~80%RH.
  - Clean, clean and well ventilated.
  - Keep away from corrosive organic solvents, gases and other substances.
  - Avoid direct sunlight.
  - The distance from the heat source should not be less than two meters.

6.ENERGY STORAGE BATTERY MODULE MAINTENANCE, CARE AND STORAGE

4 Battery Charging Requirement

Batteries that are stored for a long time (unused, more than three months) must be kept in a dry and cool place. The storage voltage is 51V-53V. The battery should be stored in a clean environment with a temperature of 23±2℃ and a humidity level of 45%-75%. If the battery is not used for an extended period, it should be recharged every three months to ensure that its voltage is within the specified range.

For batteries in long-term storage, daily maintenance is required. Please charge the battery to a 40% charge state at a current of 0.2C, as specified in the table below.

Storage environment temperature	Storage environment relative humidity	storage duration	state of charge (SOC)
<-10℃	/	Prohibited	/
-10℃~25℃	5%~70%	≤12 months	30%≤SOC≤60%
25℃~35℃		≤6 months	
35℃~45℃		≤3 months	
>45℃	/	Prohibited	/

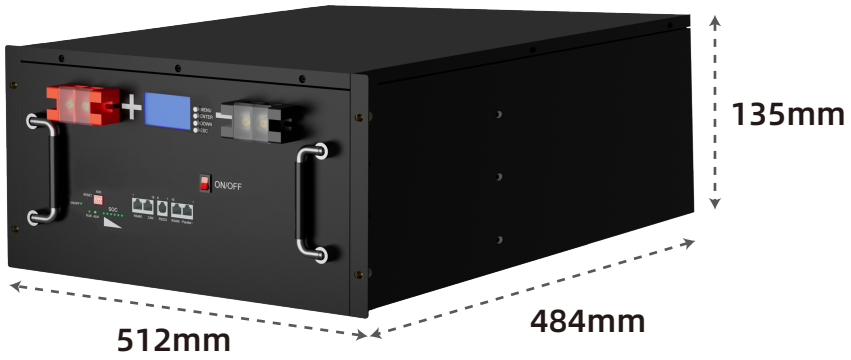
7.SPECIFICATIONS OF THE ENERGY STORAGE BATTERY MODULE

NO	Items		Parameter		
System					
1	Battery type		LiFePO4		
2	Nominal Capacity		100Ah	200Ah	300Ah
3	Nominal voltage		51.2V/DC		
4	Maximum continuous charging current		100A	200A	200A
5	Maximum continuous discharge current		100A	200A	200A
6	Voltage range		8S:20-29.2V; 16S:40-58.4V		
7	Operating temperature		Charging：0~45℃, Discharge：-10~45℃		
8	Working humidity		5%~85%		
9	Class of protection		IP20		
10	Recommended working environment		Indoor		
11	Installation mode		Suggest installing this product in a cabinet		
12	Weight		46±1kg	86±1kg	123±1kg
13	Dimensions (L×W×H)mm		512 × 484 × 135	570 × 440 × 235	640 × 550 × 235
BMS protection board					
1	Consumption of current	Self-consuming current at operation	≤75mA（With a display）		
			≤45mA（Without display）		
		Dormant mode consumption current	<200uA（Default）		
		Sleep time	Standby time exceeding 24 hours (no communication, no charging and discharging, no mains power)		
2	Voltage acquisition accuracy		±10mV		
3	Current acquisition accuracy		±2%FSR		
4	Temperature acquisition accuracy		±2℃（At normal temperature）		
5	Is there a balanced current		Have		
6	SOC metering		Adopting current integration method, accuracy ≤5% (affected byambient temperature)		
7	Protection and alar		Including: monomer over, under voltage, overall over, under voltage, over current, over temperature, short circuit and other protection, and the protection setting value can be adjusted.		
8	Communication		RS232/RS485/ CAN		

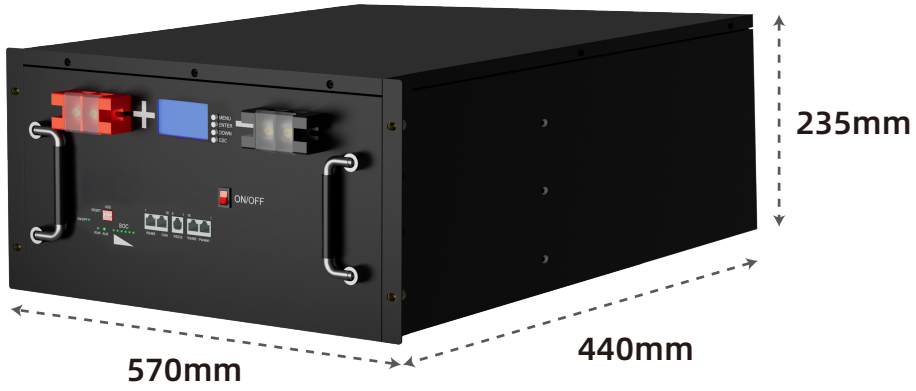
8.PRODUCT SIZE

The external dimensions of the energy storage battery module.

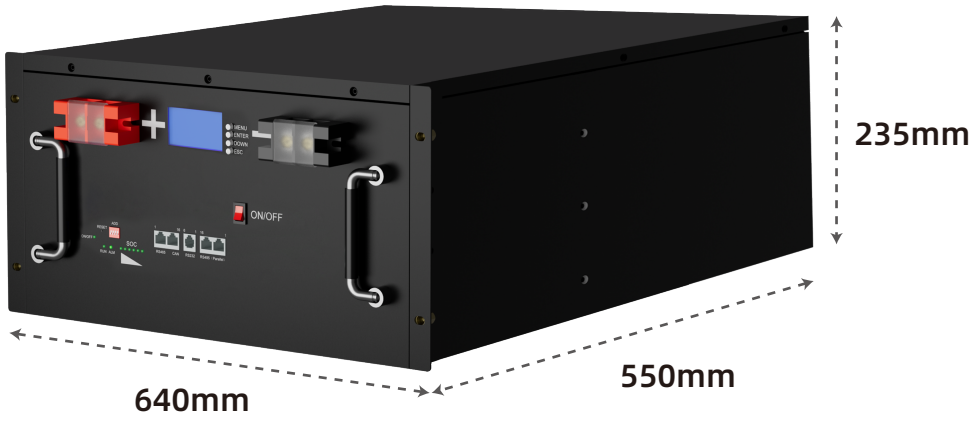
51.2V100Ah



51.2V200Ah



51.2V300Ah



(Reference)

Thank you very much for choosing our company's energy storage system.