RS-LP-005K005K-002
LFP System Instruction Manual

Version: A0

No.	Version	Description	Author	Date
1	A0	New draft	Zhang Xin	12th Jan,2024

Contents

Chapter 1：Precautions

1.1 Operational Safety

1) During operation, please pay attention to all warning signs and operate as required.
2) Do not use this product in direct sunlight, rain or humidity.
3) This product cannot be installed near the heat source area, such as electric heaters, hot stoves and similar products.
4) When cleaning, please use a dry towel to wipe.
5) In case of fire, please use dry powder fire extinguisher correctly to extinguish the fire. If liquid fire extinguisher is used, there is danger of electric shock.

1.2 Electrical Safety

1) When the product needs to be moved or rewired, it should be shut down before operation to ensure that the output is not live.
2) The output line length of the product should be within 10 meters.

1.3 Battery Safety

1) The life of battery shortens as the ambient temperature increases. Being in a cool environment is conducive to prolonging the service life of the product.
2) Regular maintenance of the battery can extend its service life. The installation and maintenance of the battery must be operated by relevant professionals.
3) The battery has the risk of electric shock and short circuit. In order to avoid accidents such as electric shock and injury, please observe the following warnings when installing and maintaining the battery:

l When removing or installing the battery, do not wear watches, rings or similar metal objects, and use insulated tools;

l Please wear rubber shoes and gloves to disassemble the battery;

l Do not place metal tools or similar metal parts on the battery;

Chapter 2：Product Description

2.1 Product Introduction

This product is used to supply the backup power for domestic appliance when the main power is cut off, ensuring normal appliances operation and improving power supply reliability.

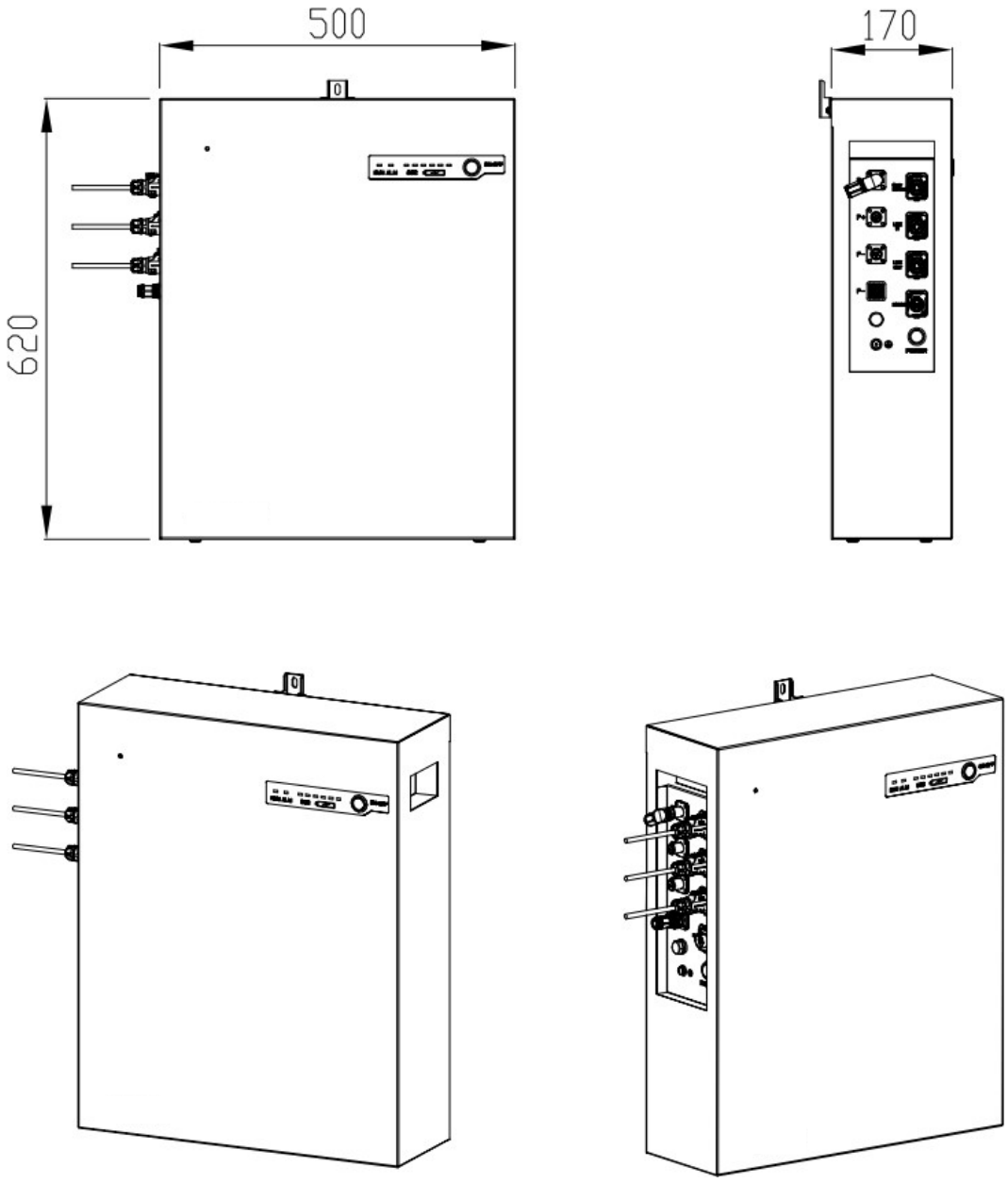
This product uses LiFePO4 battery with a nominal capacity of 100Ah and a nominal output DC of 51.2V. The system has BMS, which has sophisticated management of charge and discharge indicators, SOC estimation and calibration, battery balance management, alarm on-site instructions and reporting and other functions, providing RS485/RS232/CAN interface.

2.2 Parameter

No.	Item		Parameter	Remark
1	Rated Voltage		51.2V	
2	Rated capacity		100Ah	25°C/0.2C Charge/0.5C Discharge
3	Combination Method		1P16S	
4	Max Continuous Charge Current		100A（1C）	
5	Overcharge Protection Voltage		56V	Battery module: 56V, cell: 3.7V. Whichever comes first
6	Max Continuous Discharge Current		100A（1C）	
7	Over discharge Protection Voltage		45.6V	Battery module：45.6V Cell：2.8V. Whichever comes first
8	Battery Dimension		500mm*170mm*620mm	W*D*H（without handle and hanging ear）
9	Work Temperature（Charge）		0~55℃	
10	Work Temperature（Discharge）		-20~60℃	
11	Storage Temperature		-20~45℃	Short time（within 1 month）
			15~35℃	Long time（within 6 month）
12	Operating Relative Humidity		10%~90%RH	No condensation
13	Storage Relative Humidity		5%~95%RH	No condensation
14	Weight		About 52.8kg	
15	Design Life		10 years	
16	IP code		IP65	
17	Cooling		Natural cooling	
18	External port	power	Quick-plug terminal	
		communication	RS485/RS232/CAN	
19	Panel color		RAL9005	

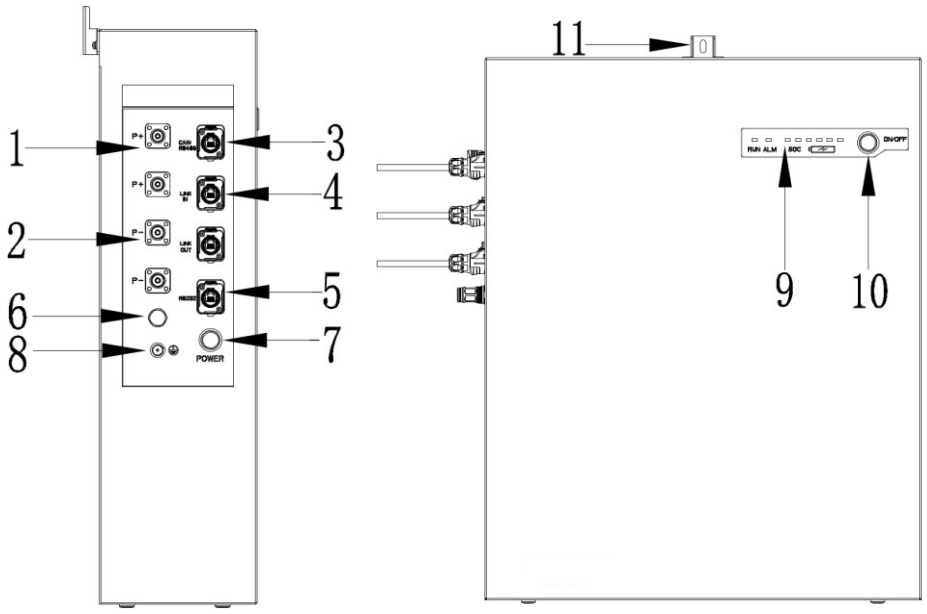
2.3 Dimensions

Overall dimension of battery box：500mm*170mm*620mm（W*D*H without handle and hanging ear）



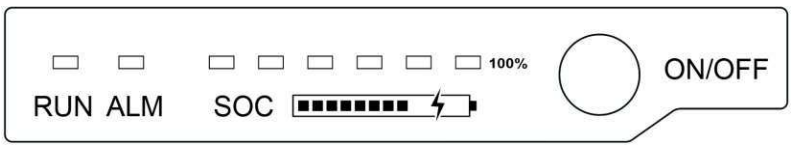
2.4 Product Manual

2.4.1 Operation Panel Description



No.	Item	Function	Remark
1	P+	Battery output positive*2	Push-in terminals
2	P-	Negative battery output*2	Push-in terminals
3	Communication port	CAN/RS485 interface	Interface type RJ45
4	Communication port	Parallel communication interface*2	Interface type RJ45
5	Communication port	RS232 interface	Interface type RJ45
6	Breathable valves	Breathable valves	
7	Push button switch	Weak current switch Reset button	
8	Ground hole	Ground hole	M6
9	Status indicator	Battery module capacity and faulty display	
10	RESET	Reset button	
11	Anti-tipping screw holes	Tip proof	

2.4.2 Status Display Introduction



NO	Item	Function
1	RUN	Operated indicator
2	ALM	Faulty indicator
3	SOC	Capacity indicator

2.4.2.1 Capacity indicator

STATUS		CHARGE						
		L6●	L5●	L4●	L3●	L2●	L1●	RUN●
SOC（%）	0~17%	OFF	OFF	OFF	OFF	OFF	Flash 2	ON
	18~33%	OFF	OFF	OFF	OFF	Flash 2	ON	
	34~50%	OFF	OFF	OFF	Flash 2	ON	ON	
	51~66%	OFF	OFF	Flash 2	ON	ON	ON	
	67~83%	OFF	Flash 2	ON	ON	ON	ON	
	84~100%	Flash 2	ON	ON	ON	ON	ON	
STATUS		DISCHARGE						
		L6●	L5●	L4●	L3●	L2●	L1●	RUN●
SOC（%）	0~17%	OFF	OFF	OFF	OFF	OFF	ON	Flash 3
	18~33%	OFF	OFF	OFF	OFF	ON	ON	
	34~50%	OFF	OFF	OFF	ON	ON	ON	
	51~66%	OFF	OFF	ON	ON	ON	ON	
	67~83%	OFF	ON	ON	ON	ON	ON	
	84~100%	ON	ON	ON	ON	ON	ON	

2.4.2.2 Status indicator

Status	Normal/Alarm/Protection	RUN	ALM	Capacity LED						Remark
		●	●	●	●	●	●	●	●	
Power off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All off
Standby	Normal	Flash 1	OFF	Indicate according to capacity						Standby status
	Alarm	Flash 1	OFF							Module low voltage
Charge	Normal	ON	OFF	Indicate according to electricity (The maximum capacity indicator LED flashes 2)						
	Alarm	ON	OFF							
	Overcharge protection	ON	OFF	ON	ON	ON	ON	ON	ON	If there is no mains power, the indicator is in standby mode
	Temperature, overcurrent and failure protection	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop charge
Discharge	Normal	Flash 3	OFF	Indicate according to capacity						
	Alarm	Flash 3	OFF							
	Under voltage protection	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
	Temperature, overcurrent short circuit, reverse connection and failure protection	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
Failure		OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop charge, discharge

2.4.2.3 LED flashing instruction

Flash way	ON	OFF
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

2.5 Operation mode

2.5.1 Power ON/OFF

When the product is in the sleep (shutdown) state, power on the weak current switch, then press the reset button for 3s and release it, the battery is activated, and the LED indicator lights up successively from "RUN" for 0.5 seconds.

When the product is in the startup state, power off the weak current switch. The product is dormant, and the LED indicator lights up successively from the lowest light for 0.5 seconds.

2.5.2 Sleep Mode

When any of the following conditions is met, the system enters the sleep mode(low power consumption mode):

1) The individual or overall over discharge protection has not been released within 30s (Adjustable).

2) Power off the weak current switch.

3) Press the RESET button for 3s and release the button.

4) The minimum monomer voltage is lower than the sleep voltage(Refer to the specification, adjustable), and the duration reaches the sleep delay time(Refer to the specification, adjustable), At the same time, it meets the requirements of no communication and no charging and discharging current.

5) Forced shutdown by upper computer software.

Before entering sleep mode, ensure that the input terminal is not connected to charger, otherwise it will not be able to enter sleep mode.

2.5.3 Power on wake-up operation

When the system is in the low power consumption mode and meets any of the following conditions, the system will exit the low power consumption mode and enter the normal operation mode:

1) Power on the weak current switch, connect the charger, and the output voltage of the charger shall be greater than 48V.

2) Power on the weak current switch, press the reset button for 3s and release the button.

2.6 Storage

Item		Requirement
Storage Temperature	Less than 1 month	-20~45℃
	Less than 6 month	15~35℃
Humidity		5%-95%RH. No condensation
Storage SOC		40~60%SOC, Power supply shall be supplemented every 6 months
Other Requirement	It should be protected from direct sunlight and no less than 2m away from heat source. When stored, the battery module shall not be inverted, and avoid mechanical shock and pressure. Please not touch power terminal directly. Do not short circuit the positive and negative terminals.	

Chapter 3： Product Installation Instructions

3.1 Instructions Before Installation

Before starting the installation, please follow the instructions below:

1) Check whether the installation environment temperature is within the specified range (charging: 0°C~55°C, discharging: -20°C~60°C). When using the product, avoid working in an environment below 0°C and above 40°C for a long time, otherwise it can reduce battery life;
2) The area where the product is placed must be well ventilated and away from dangerous items such as water, flammable gases, and corrosives;
3) It is forbidden to install for a long time in salt fog environment;
4) The product should not be exposed to direct sunlight;
5) If it is disassembled and used at a low temperature, water droplets may condense. You must wait until the inside of the product is completely dry before installing and using, otherwise there is a risk of electric shock;
6) In any emergency, please immediately stop charging and discharging the battery pack and turn off the switch;
7) All power sockets should be connected to the protective ground wire.

3.2 Installation Requirements

3.2.1 Requirements for Construction Personnel

The construction personnel must have basic safety operation knowledge, need professional training, master the correct operation method, and have corresponding operation qualifications.

	**The construction personnel failing to operate in accordance with the requirements of this article cause damage to individuals and equipment, our company does not assume any responsibility**

3.2.2 Installation Tool

Installation tool: Phillips screwdriver/Slotted screwdriver 

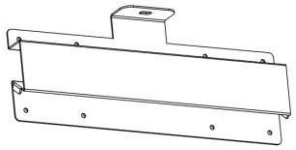
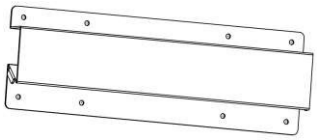
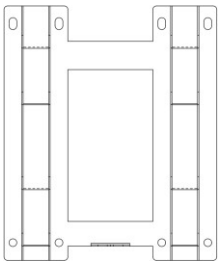
	**Construction personnel must use tools with insulated handles to prevent electric shock**

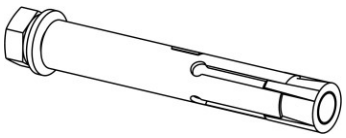
3.3 Battery Box Installation

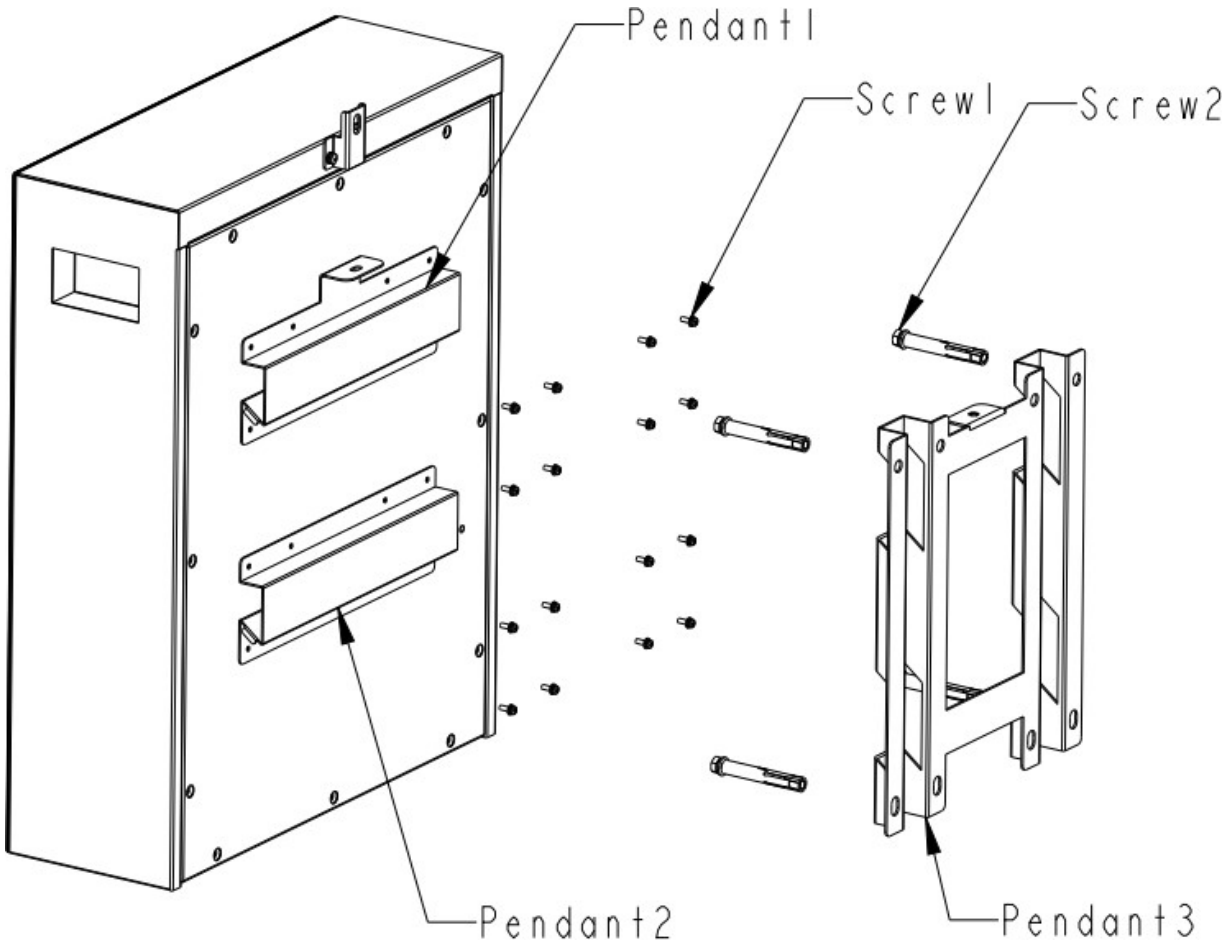
3.3.1 Unpacking Acceptance

1) Step 1: Check whether the outer box packaging is intact. If the outer box packaging is seriously damaged or wet, please find out the reason and feedback to us.
2) Step 2: Unpack the outer box and visually inspect the product for damage, scratches, or deformation. If you have any of the above questions, please send us feedback.

3.3.2 Battery Box Installation

Name	Pendant 1	Pendant 2	Pendant 3
Quantity	1PCS	1PCS	2PCS
Graphic			

Name	Screw 1	Screw 3
Spec	M4*12	M8*100
Quantity	16PCS	4PCS
Graphic		



Assembly steps:

1. Install the Pendant 1 on the battery box and tighten it with M4*12 screws. The recommended installation force is 1.2 N.M；;

2. Install the Pendant 2 on the battery box and tighten it with M4*12 screws. The recommended installation force is 1.2 N.M；

3. Install the pendant 3 to the wall used for wall hanging with M8*100 screws, and the recommended torque of expansion bolt installation is 12 N.M;

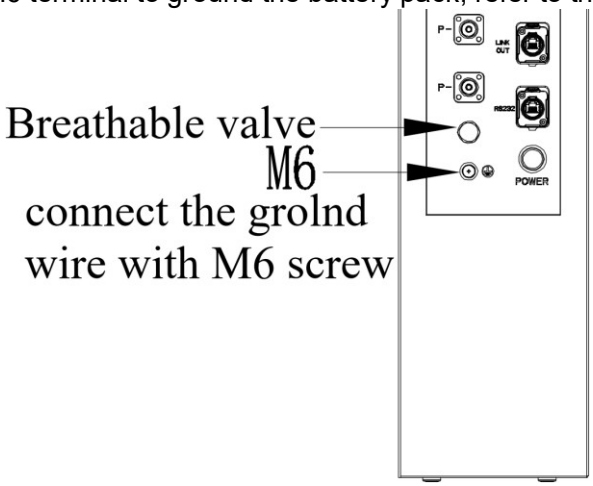
4. 4. Install the chassis from top to bottom, and insert the clips of the Pendant 3 into the card slots of the Pendant 1 and Pendant 1 to complete the installation.

3.4 Cable Installation

3.4.1 Power and Grounding Cable Installation

- Installation of grounding wire.

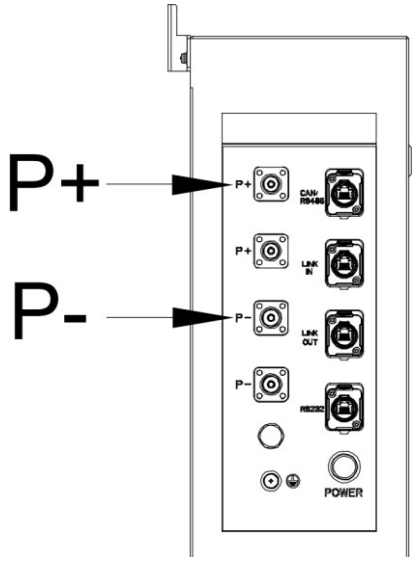
  When in use, first use M6 terminal to ground the battery pack, refer to the following figure:



- Single use of battery pack.

  When the battery box is used alone, the battery box P + and P - are respectively connected with the positive and negative of the corresponding equipment.

  When installing the cable, turn off the battery first.

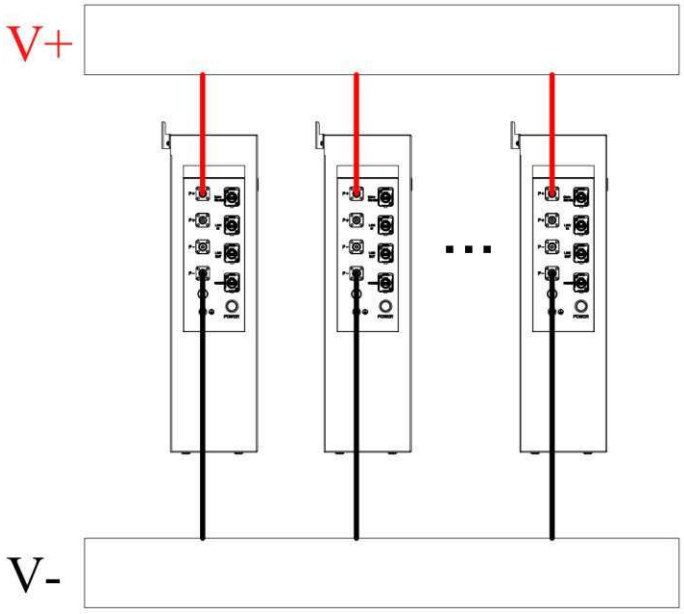


- The battery pack is used in parallel

When the terminals are connected in parallel, up to 16 sets of batteries are allowed to be connected in parallel, the maximum output power is 5kW, and the parallel voltage difference is not greater than 1V.

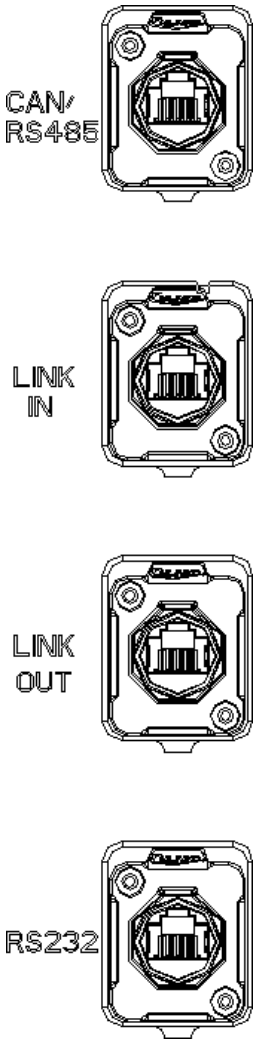
When installing the cable, turn off the battery first.

Number of parallels	2	3	4	5	6	7	8	9
maximum power	7.1	9.2	12.3	14.1	16.9	17.9	20.5	20.9
Number of parallels	10	11	12	13	14	15	16	
maximum power	22.2	23.5	24.5	26.6	28.6	29.7	32.7	

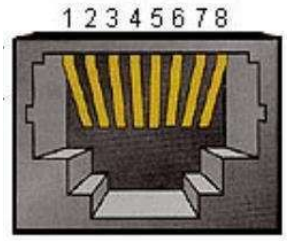


3.4.2 Communication Cable Installation

The battery pack panel has a variety of communication ports: RS232、RS485、CAN,RS232 interface is used for communication with the upper computer; RS485 port is used for multi machine parallel communication,CAN port is use for communication with PCS.

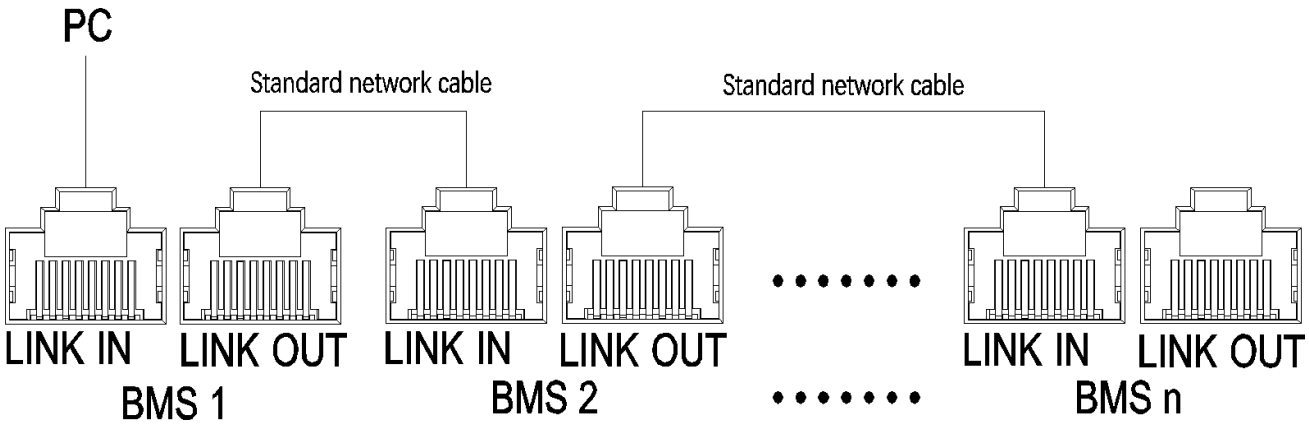


➢ Communication interface and pin definition：



RS232		CAN/RS485	
RJ45	Definition description	RJ45	Definition description
1	TX	1	RS485-B
2	GND	2	RS485-A
3	RX	3	GND
4	NC	4	CAN-H
5	NC	5	CAN-L
6	NC	6	NC
7	NC	7	NC
8	NC	8	NC

The battery pack uses RS485 communication to realize human-computer interaction or debugging with the upper computer. When multiple battery packs are used in parallel, connect and communicate as shown in the figure below.



3.5 Installation Inspection

1) Check that all fixing screws are firm and free of looseness (especially those with electrical connections), and check whether flat washers and spring washers are installed correctly.
2) Check whether the power cable of the battery box is installed correctly, and there is no wrong connection and reverse connection. Whether the power line is neatly arranged and fixed without twisting or bending.
3) Check whether the plug-in of the communication cable is firmly installed, and the plug-in of the communication cable is not misaligned. Whether the communication lines are neatly arranged and fixed without twisting or bending.

Chapter 4：System Test

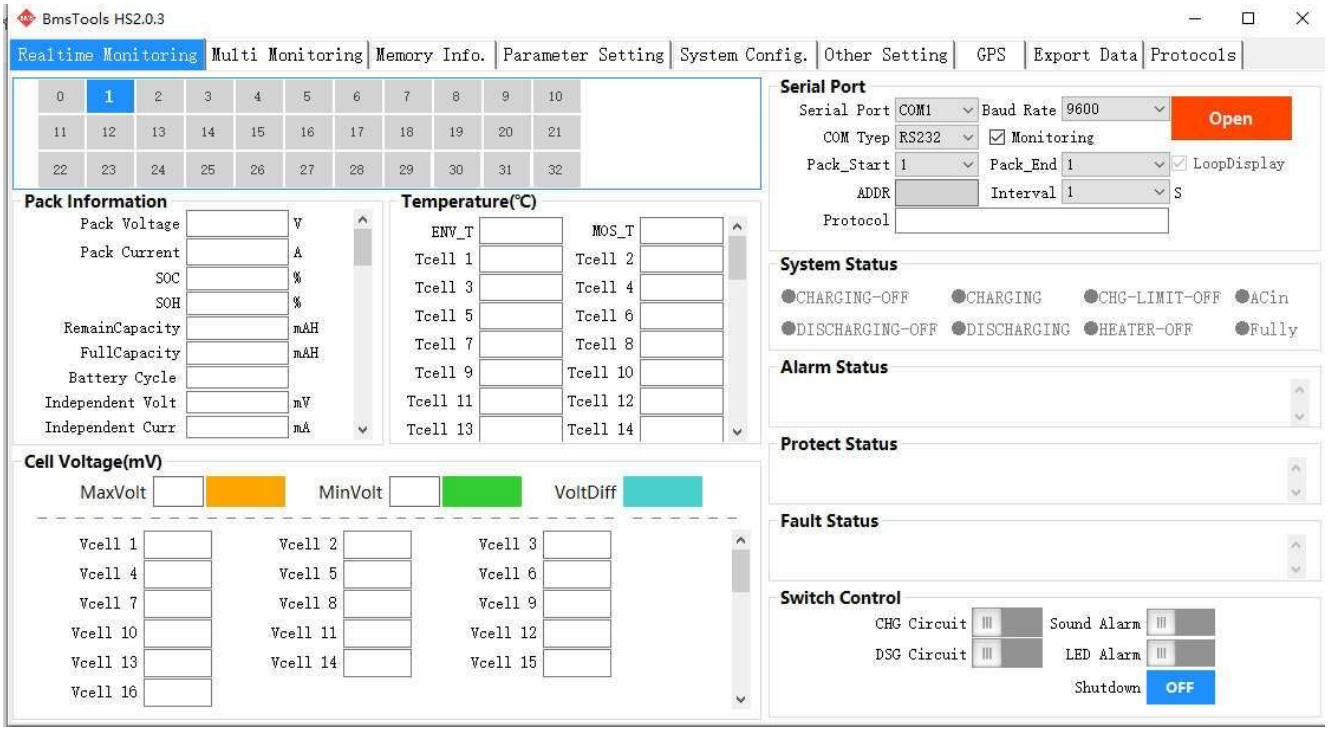
Attention	**The testing personnel must go through the corresponding technical training and should be sure to refer to the commissioning instructions.** **The testing process is live working.Please stand on dry insulation during operation. Do not wear metal objects such as watches and necklaces.** **Tools should be insulated.** **In the process of testing, you should shut down the power immediately if you find any abnormal phenomenon., and then continue after you find out the reason.**

4.1 Boot

Connect the power cable and communication cable of the battery box. After checking for correctness, activate the battery box. Measure the voltage between the power terminals P+ and P- of the battery box, which should be between 45.6V and 58.4V. The indicator lights on the panel of the battery box follow normal definition in " Status Display Introduction ".

4.2 Upper Computer Communication Settings

- Turn on “BmsTools.exe” program software.
- Select the corresponding serial port in the upper right corner, set the baud rate to 9600, Then click "open" to open serial port, and then click "start monitor".



4.3 Power-on Debugging

After the communication is normal and the parameter setting is completed, the product can be debugged and put into operation.

4.4 Equipment removal

If the product needs maintenance, you need to cut off the power or load first, power off the weak current switch, and the battery box will shut down before removing the device or cable. **Live operation is strictly prohibited to prevent electric shock or short circuit of the equipment!**

Chapter 5：System Maintenance

5.1 Routine Maintenance

<table>
<tr><td colspan="3">⚠ Attention：
☆Before the inspection and maintenance, please make sure that whether the power supply or load is powered off and whether the battery pack is turned off.
☆Avoid leaving metal or other objects in the product case, otherwise it may cause short circuit and damage to the system.</td></tr>
<tr><td rowspan="3">Daily Maintenance</td><td>Environment</td><td>☆In order to improve the service life of the battery box, the installation environment should be kept good. Generally, it is required to avoid direct sunlight or other radiation for a long time, and avoid the entry of water, other liquids, dust or mud.
☆It is strictly forbidden to expose to the sun. Excessive temperature will affect the service life of the lithium battery.</td></tr>
<tr><td>Alarm</td><td>☆If there is a fault alarm prompt, please refer to the fault phenomenon in Section 5.2 and the corresponding treatment methods in time to avoid damage to the battery box.</td></tr>
<tr><td>Charge/Discharge</td><td>☆Avoid large current discharge.
☆ When the power is too low, the device should be charged in time to avoid long-term low-capacity storage of the battery pack.</td></tr>
<tr><td>Regular Maintenance</td><td colspan="2">☆It is strictly forbidden to lose power when the battery box is not in use, and it needs to be charged within 7 days after discharge.
☆When the battery box is in use, if the backup time is greatly shortened in a short time, it may be that the voltage between the cells is unbalanced. At this time, you should contact us as soon as possible for inspection and repair.
☆Regularly check whether all connectors are loose. If there is any looseness, it needs to be reinforced in time.
☆Check all external output cables for wear. If they are worn, they need to be replaced in time to avoid short circuit of the battery output cables.</td></tr>
</table>

5.2 Alarm

Malfunction	Possible Reason	Solution
No response from pressing the switch	Internal failure	Please contact us
Shorten discharge time	Low battery	Keep the 15A current of battery pack charged continuously for more than 6 hours to fully charge the battery
	Overload, short circuit	Remove the load. Confirm whether the load exceeds the rated current of 100A or whether there is a short circuit point. If the fault is removed, small current charging can be carried out to continue the operation
	Battery capacity drops	The standby time of the battery system is below 80% for a long time. Please contact our company for evaluation and treatment
	Internal failure	Please contact us
The system cannot be charged or discharged	Over temperature	Let stand for more than 3 hours at room temperature

When you need to feed back the fault information to our company, please be sure to record and inform the following information: product model, machine batch number, fault occurrence date, complete problem description (including panel indicator display, buzzer ringing, load capacity and upper computer fault record, etc.).

Export the fault record from the upper computer according to the following instructions: