Powerwall Battery

User Manual

Product Name: 5kwh/10kwh/15kwh Powerwall Battery

Model   No: B-LFP48-100/200/300PW

Version   No: V1.1

Content

1.Safety Precautions

It is very important and necessary to read the user manual carefully before installing or using the battery. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or may damage the battery and the whole system.

The battery needs to be recharged within 12 hours after fully discharging.

Do not expose cable outside.

All battery terminals must be disconnected before maintenance.

Do not use cleaning solvents to clean the battery.

Do not expose the battery to flammable or harsh chemicals or vapors.

Do not connect battery with PV solar wiring directly.

Any foreign object is prohibited to be inserted into any part of the battery.

Any warranty claims are excluded for direct or indirect damage due to items above.

If the battery is stored for a prolonged time, it is requirement that they are charged every three months, and the SOC should be no less than 30%.

Symbol	Description
⚠	Caution, risk of electric shock
⚠	Heavy enough may cause severe injure
🚭	Keep the battery away from open flame or ignition sources
🚷	Keep the battery away from children
🗑	Do not dispose of the product with household waste
♻	Recycling
📖	Read this manual before installation and operation

1.1 Note Before Installation

When receiving, please check the battery and packing list first, if the battery is damaged or spare parts are missing, please contact the dealer;

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

Wiring must be correct, do not mix-connect the positive and negative cables, and ensure no short circuit with the external device;

It is prohibited to connect the battery with AC power directly;

The embedded BMS in the battery is designed for 51.2 VDC, please do not connect

battery in series;

It is prohibited to connect the battery with different type of battery;

Please ensure the electrical parameters of battery system are compatible to inverter;

Keep the battery away from fire or water.

1.2 During Operation

If the battery system needs to be moved or repaired, the power must be cut off first and the battery is completely shutdown;

It is prohibited to connect the battery with different type of battery;

It is prohibited to put the batteries working with faulty or incompatible inverter;

In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited;

Please do not open, repair or disassemble the battery. We do not undertake any consequences or related responsibility due to violation of safety operation or violating of design, production and equipment safety standards.

2.System Application Introduction

This product is a household energy storage battery pack. The system is matched with a 5kWh/10kw/15kw lithium iron phosphate battery pack.This product can be used in conjunction with electricity, so that electricity consumption can be adjusted.This product supports a variety of application modes, such as PV self-use surplus power to grid, peak shaving and valley filling, standby power supply, etc. The specific operation logic is as follows.

2.1 PV Self-use Surplus Power to Grid

Under the condition of good illumination in the daytime, the DC power from PV panel is changed into AC through inverter to supply power for household load. If the household load cannot run out of photovoltaic power, the remaining power will be stored in the battery. If the battery is full, photovoltaic power will be supplied to the grid. In the night or rainy days, photovoltaic cannot generate electricity. The battery supplies power to the home load through an inverter. If the battery SOC is low, the household load will take power from the grid.

2.2 Peak Shaving and Valley Filling

In some countries and regions where peak valley time of use price is implemented, if the difference between peak price and low price is large, the application mode of peak shaving and valley filling can be adopted in energy storage system. In the low electricity price period, the energy storage system is charged; in the peak period of electricity price, the energy storage system supplies power to the household load. It can avoid users using too much power grid when the electricity price is high, and save

energy expenditure.

2.3 Standby Power Supply

In some extreme weather (such as tornadoes, typhoons, hail), or substation operation failure, power supply will be interrupted. If the energy storage system is installed, the user can still enjoy sufficient power guarantee under this situation.
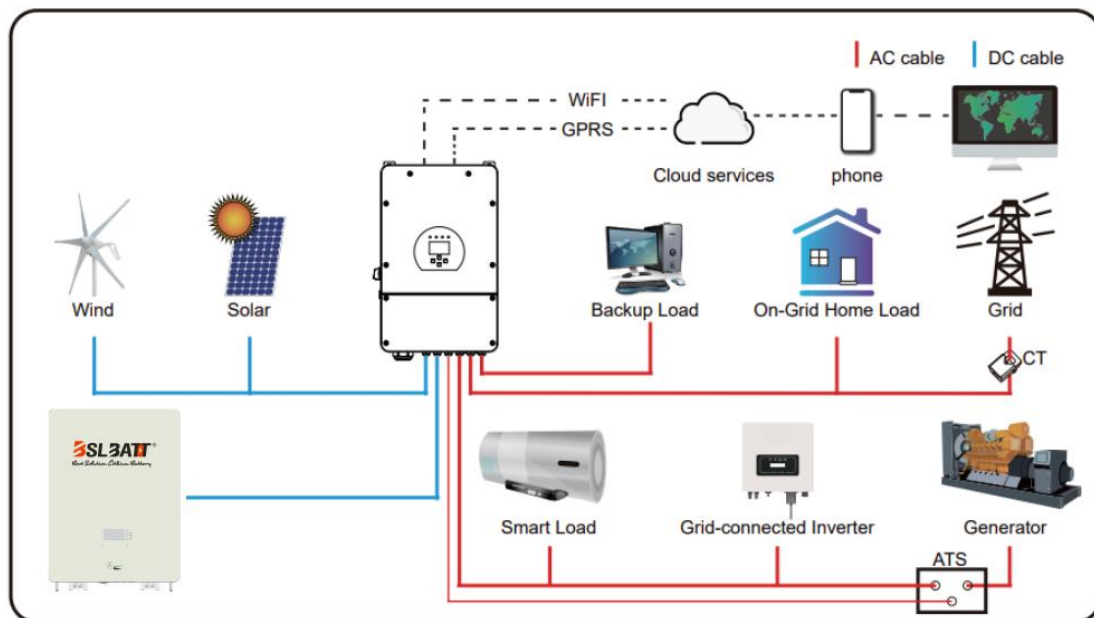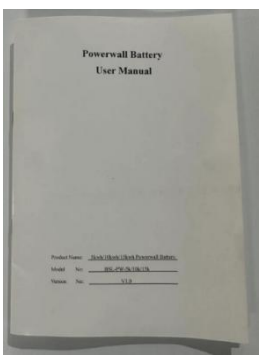

Figure1．System Connection Diagram

3.Product Specification

No	Item	General Parameter		
1	Nominal Voltage	51.2V		
2	Rated Capacity(Ah)(typical)	100	200	300
3	Cell Model（LFP-3.2V）	100Ah	100Ah	300Ah
4	Pack configuration	16S1P	16S2P	16S1P
5	Rate power(Wh)	5120	10240	15360
6	Charging Voltage(V)	58.4V		
7	Float charge Voltage(V)	55V		
8	Discharge Cut-off Voltage(V)	47V		
9	Charging Current limits(A)	80A	180A	
10	Max Discharging current(A)	100A	200A	
11	Charge over Current protect(A)	110/Adjustable	210/Adjustable	
12	Discharge over Current protect(A)	120/Adjustable	210/Adjustable	
13	Pack Weight	53kg	95kg	130kg
14	Internal Impedance	≤100mΩ		
15	Communication protocol	CAN(500Kb/s)/RS485(9600B/S)		
16	Host software and Communication	RS232		
17	Operation Temperature Range	Charge:0~55℃		
		Discharge: -10~55℃		
18	Storage Temperature	0℃~25℃		
Note: Parameters can be adjusted according to customer requirements				

3.1Packing List

Battery pack	Output cable	Parallel communication line	users manual

4.Battery Drawing

51.2V 100Ah	51.2V 200Ah	51.2V 300Ah
490 mm 650 mm	490 mm 820 mm	600 mm 950 mm
490 mm 147 mm	490 mm 147 mm	190 mm
Product size :650*490*147mm	Product size :820*490*147	Product size :950*600*190mm

4.1.Interface Description

SW1
SW2
SW3
SW4

Power light
Capacity indicator light
Alarm indicator light
Running indicator light

Battery negative post
Battery positive post
Breaker

Reset button
Dial switch
Dry connection

RS485B Port
RS485B Port
RS232 port
CANbus port
RS485A Port
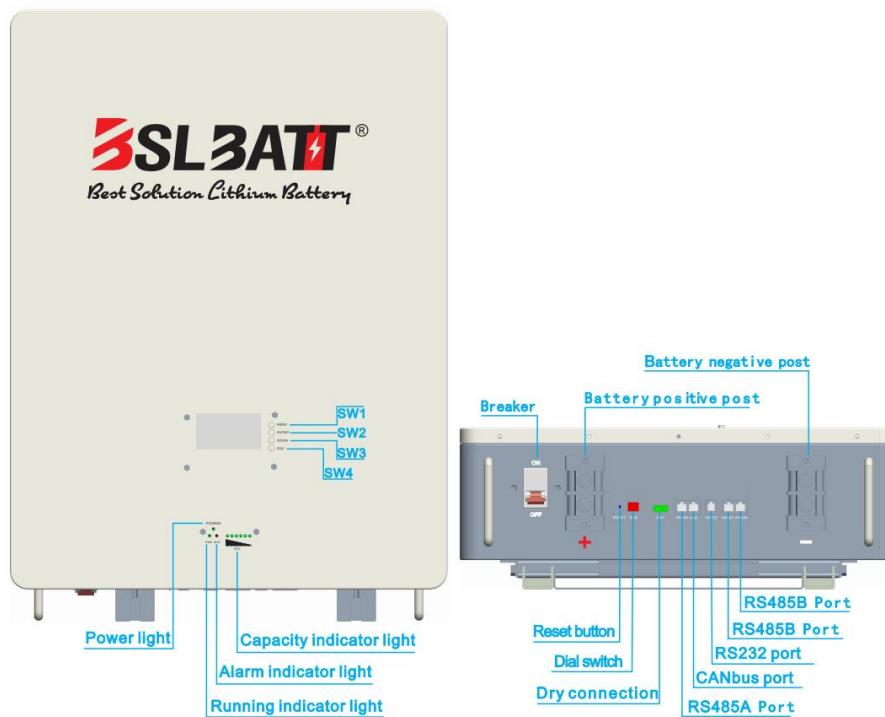
Figure2．Interface Definition Description

Table1.Battery Pack Frontpanel Port Definition

No.	Illustration	Silk-screen	Remark
1	Battery positive post	P+	positive output
2	Battery negative post	P-	negative output
3	Reset button	RESET	Reset battery
4	Dial switch	DIP	Address setting, range 2~15
5	Dry connection	DRY	pin3 to pin4 often open, closed with low power alarm Pin1 to pin2 often open, closed when failure or protection
6	RS485A Port	RS485	RS485 communication with monitoring equipment
7	CANbus port	CAN	CANbus and inverter connection ports
8	RS232 port	RS232	RS232 communication port
9	RS485B port	RS485	RS485 paralleling communication port
10	Power light	POWER	After startup, the LED is steady green
11	Running indicator light	RUN	After startup, the LED blinks green
12	Alarm indicator light	ALM	The fault is displayed in red
13	Capacity indicator light	SOC	Refer to Table 2
14	Breaker	ON/OFF	Battery string output is enabled

4.2 LED Display Definition
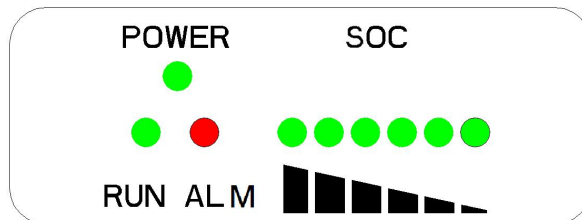
No.	Definition	Specification	Criteria
1	POWER Light	System no abnormal, always bright	
	RUN Light	See Table 2, Table 4	
	ALM Light	See Table 2, Table 4	
	SOC Light	See Table 3, Table 4	

Table 2 LED Working Status Indicators

Status	Normal/alarm/protection	RUN ●	ALM ●	Electricity indicator LED ●	●	●	●	●	●	Remark
Power off	Dormancy	off	off	off	off	off	off	off	off	All off
Stand by	Normal	Flash 1	off	According to the electricity indicator						Standby status
	Alarm	Flash 1	Flash 3							Module low voltage
Charge	Normal	Bright	off	According to the electricity indicator (power indicator maximum LED flash 2)						Maximum power LED flash (flash 2), overcharge alarm ALM no flash
	Alarm	Bright	Flash 3							
	Overcharge protection	Bright	off	Bright	Bright	Bright	Bright	Bright	Bright	If there is no electricity, the indicator is in standby status
	Temperature, overcurrent, failure protection	off	Bright	off	off	off	off	off	off	Stop charging
Discharge	Normal	Flash 3	off	According to the electricity indicator						
	Alarm	Flash 3	Flash 3							
	Undervoltage protection	off	off	off	off	off	off	off	off	Stop discharging
	Temperature, overcurrent, short circuit, reverse connection, failure protection	off	off	off	off	off	off	off	off	top discharging
Invalid	Normal	off	off	off	off	off	off	off	off	Stop charge/discharging

Table 3 Description of capacity indicators

Status		Charge						Discharge					
		L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●	L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●
Capacity indicator	0～16.6%	off	off	off	off	off	Flash 2	off	off	off	off	off	Bright
	16.6～33.2%	off	off	off	off	Flash 2	Bright	off	off	off	off	Bright	Bright

SOC (%)													
	33.2~49.8%	off	off	off	Flash 2	Bright	Bright	off	off	off	Bright	Bright	Bright
	49.8~66.4%	off	off	Flash 2	Bright	Bright	Bright	off	off	Bright	Bright	Bright	Bright
	66.4~83%	off	Flash 2	Bright	Bright	Bright	Bright	off	Bright	Bright	Bright	Bright	Bright
	83~100%	Flash 2	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright
Operating indicator		Bright								Flash (flash 3)			

Table 4 LED Flash Notes

Flash mode	Bright	off
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

Remark：

LED indicator light alarm can be enabled or prohibited through the upper computer , factory default is enable.

4.3 Battery Connection and Communication Instructions

RS485：With a dual RS485 interface to check PACK information, with a default baud rate of 9600bps. To communicate with the monitoring equipment through the RS485, the monitoring equipment as the host, according to the address polling data, address setting range of 2~15.

RS232：BMS can communicate with the upper computer through the RS232, RS485 interface, so as to monitor all kinds of information of the battery at the upper computer end, including battery voltage, current, temperature, state, SOC, SOH and battery production information, etc., the default baud rate is 9600bps.

CAN: With dual isolation CAN communication, default communication rate 500 K, active communication portal between battery and inverter.

Dial switch settings: when the PACK is used in parallel, different PACK can be distinguished by setting the address on the BMS dial switch, avoid to set the same address. The definition of the dial switch refers to the following table5（A maximum of 30 groups can be configured）

Table 5 Set the address of pack

Address	Dial switch position						Remark
	#1	#2	#3	#4	#5	#6	
0	OFF	OFF	OFF	OFF	OFF	OFF	Stepless connection，Single use
1	ON	OFF	OFF	OFF	OFF	OFF	Set as main Pack
2	OFF	ON	OFF	OFF	OFF	OFF	Set as subordinate Pack1
3	ON	ON	OFF	OFF	OFF	OFF	Set as subordinate Pack2
4	OFF	OFF	ON	OFF	OFF	OFF	Set as subordinate Pack3
5	ON	OFF	ON	OFF	OFF	OFF	Set as subordinate Pack4
6	OFF	ON	ON	OFF	OFF	OFF	Set as subordinate Pack5
7	ON	ON	ON	OFF	OFF	OFF	Set as subordinate Pack6
8	OFF	OFF	OFF	ON	OFF	OFF	Set as subordinate Pack7
9	ON	OFF	OFF	ON	OFF	OFF	Set as subordinate Pack8
10	OFF	ON	OFF	ON	OFF	OFF	Set as subordinate Pack9
11	ON	ON	OFF	ON	OFF	OFF	Set as subordinate Pack10
12	OFF	OFF	ON	ON	OFF	OFF	Set as subordinate Pack11
13	ON	OFF	ON	ON	OFF	OFF	Set as subordinate Pack12
14	OFF	ON	ON	ON	OFF	OFF	Set as subordinate Pack13
15	ON	ON	ON	ON	OFF	OFF	Set as subordinate Pack14

Note: large parallel groups (> 3000A current limit)

The CAN bus hexadecimal message format used by the Victron GX controller cannot accept charge current limits (CCL) and discharge current limits (DCL) greater than 3000.

BSL batteries are designed for high current capability, with a maximum upload of 180A for charge current limit (CCL) and 200A for discharge current limit (DCL). This means that if there are more than 16 BSL cells in parallel, the charging current limits (180A) and discharge current limits (200A) for a single BMS need to be adjusted;
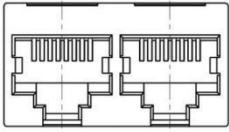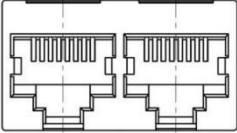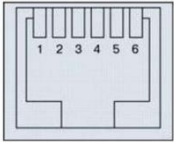
4.4 Interface Diagram
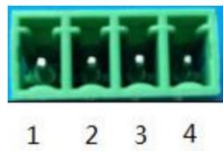
Dry Connection Port

The definition of dry connection port：Pin1 to pin 2 always open, close when broken and protection, Pin3 to Pin4 always open, close when low SOC alarm.
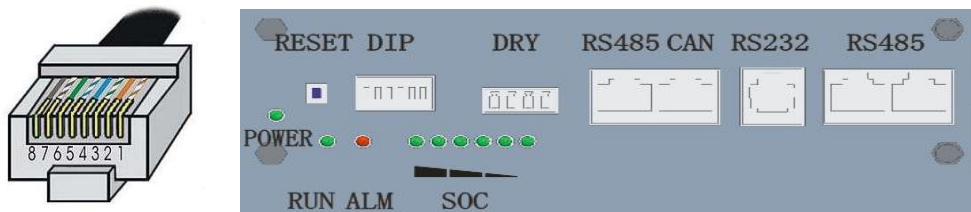

		Table 6	Communication interface table		
Parallel communication		RS485B-8P8C		RS485B-8P8C	
		RJ45		RJ45	
		1,8	RS485-B	9,16	RS485-B
		2,7	RS485-A	10,15	RS485-A
		3,6	GND	11,14	GND
		4,5	NC	12,13	NC
External communication		RS485A port		CAN port	
		RJ45		RJ45	
		1,8	RS485-B1	1,2,3,6,8	
		2,7	RS485-A1	5	CAN-L
		3,6	GND	4	CAN-H
		4,5	NC	7	GND
Communication with host computer		RS232 RJ11			
		RJ11		RJ11	
		1	NC	4	RX
		2	NC	5	GND
		3	TX	6	NC

4.5 Display rendering

Main menu page

After BMS is activated, will show the welcome screen, press the "MENU" button to enter the main menu page. As shown in the figure below：
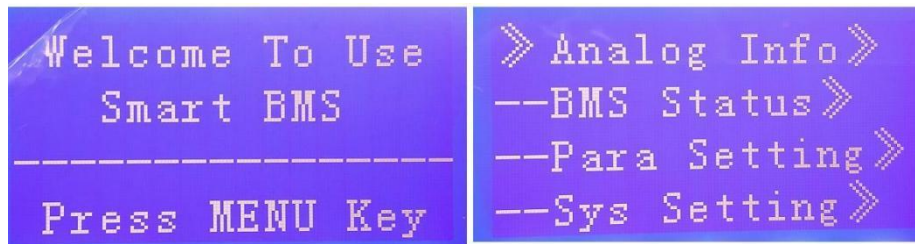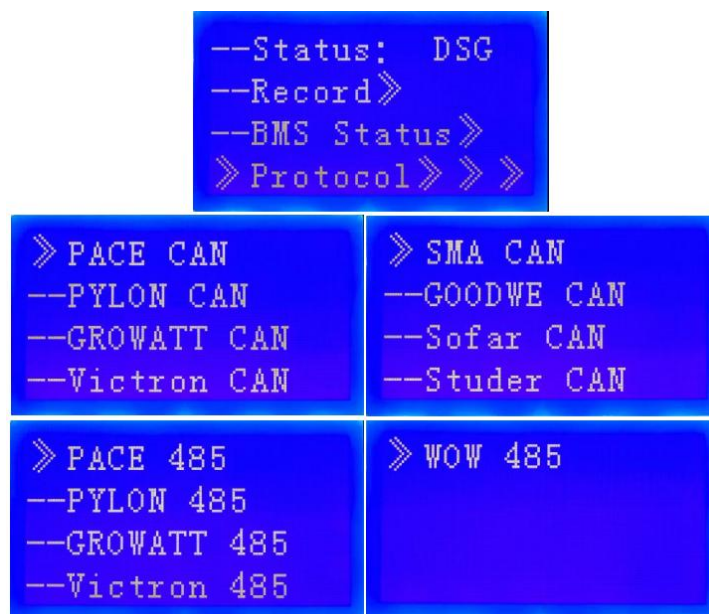

Battery parameters page

When the cursor "》" is point to "Battery Parameters Acquisition"，press "ENTER" key will enter the page of "Battery Parameters Acquisition"，As shown in the figure below：
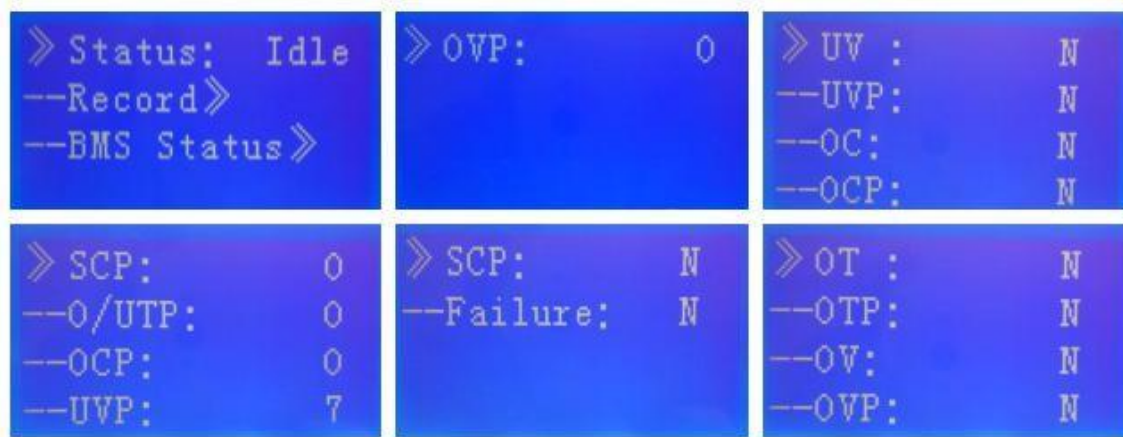

Protocol selection function

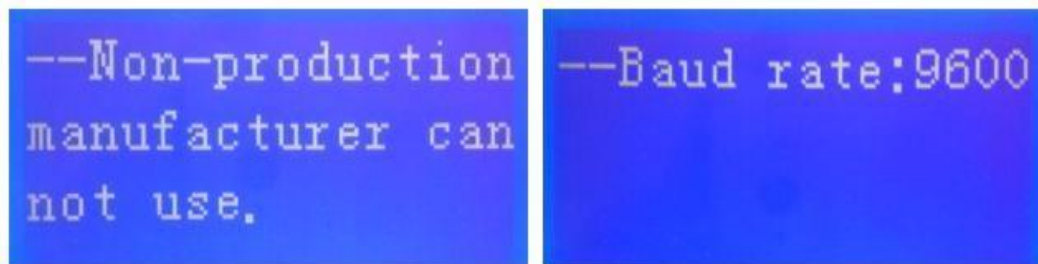（You can switch protocols through the display screen to quickly match inverters of different brands）

When the cursor "》" is point to" Battery Status", press "ENTER" key will enter the page of "Battery Status", As shown in the figure below：

Parameter Settings

Screen can not set parameters Baud Rate：9600 ,Can not be set.

Key description

SW1----MENU，SW2----ENTER，SW3----DOWN， SW4----ESC.

Each item is "》" or "--" as a beginning，among them "》" shows the current cursor position，press "DOWN" key can move the cursor position；with "》" end of the project，the content of the said project has not shown, press "ENTER" key can enter the corresponding page.

Press "ESC" key can be returned at the next higher level directory；In any position， press" MENU" key can return to the main menu page.

When BMS inter sleep mode, press any key, can activate the screen.

Inter standby mode , with no keystrokes 1 minutes later, LCD will enter Shutdown mode press any key,screen can be activated.

5.Battery Installation Instructions

5.1 Installation location

Make sure that the installation location meets the following conditions:

The building is designed to withstand earthquakes.

Far away from the sea to avoid salt water and humidity.

The floor is flat .

No flammable or explosive materials nearby.

Optimal ambient temperature is between 25°C and 55°C.

Temperature and humidity stays at a constant level.

Minimal dust and dirt in the area.

No corrosive gases present, including ammonia and acid vapor.

BSL batteries are IPX4 waterproof, so the battery could be installed indoor. If the ambient temperature is outside the operating range, battery will protect itself by shutting down. The battery optimal operate temperature is 25°C to 55°C. Frequent exposure to severe operating condition would exacerbate the performance and lifetime of the battery.
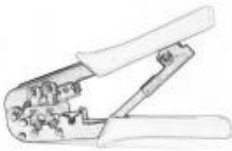
NOTICE
Make sure that the cross-sectional area of charging cables is 25 to 35 mm²
A breaker between BSL battery and inverter was recommended to install and the breakers min. current should meet twice the rated current of the system or following with local regulations.

5.2 Installation Tools

To install the battery pack, those following tools are probably required:

|			
Phillips screwdriver	Torque wrench	Cable crimper	Wire clamp
Voltmeter	Tape measure	Drill	Flat-head screwdriver

Insulated glove	Safety goggles	Safety shoes

Space requirements: Observe the minimum clearance of the walls, other batteries or objects shown in the figure below to ensure adequate heat dissipation.

Direction	Minimum clearance　(mm)
Upper side	300
Underside	300
Side	500
Front	300
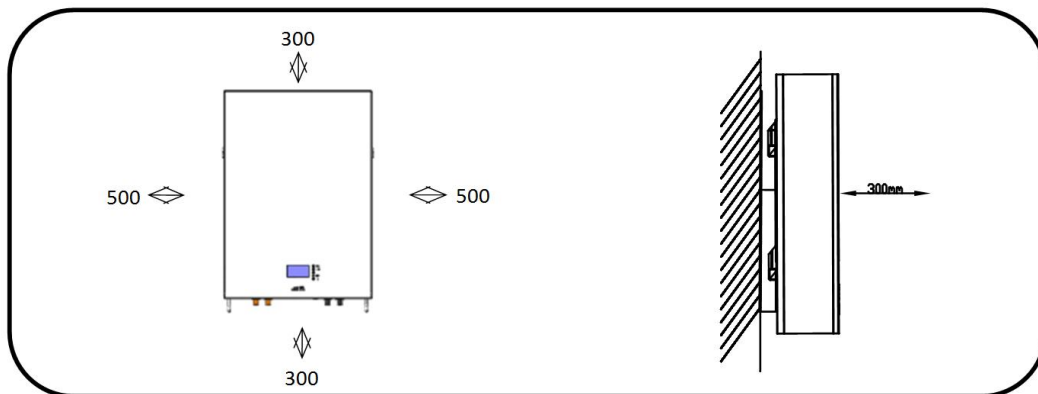
Step 1: install the wall mounted bracket to the wall;

Place the bracket on the wall, mark the position of the six holes and remove it;

1.2　Drill holes with a hole depth above 60mm to ensure sufficient strength to support the battery pack;

1.3 Install the expansion screw in the hole and tighten it, then fix the wall mounted bracket with the expansion screw;

Step 2: Hold the handle at the bottom of the battery, hang the battery pack on the wall mounted bracket;

Step 3: Tighten the setscrews on left and right sides of the battery pack.

5.3 Installing battery strings in parallel

Taking two 51.2V100Ah batteries as an example, two parallel power lines（25 square） are used to combine the positive and negative outputs of two batteries.

One battery pack's positive is connected with another battery pack's positive, negative is connected with negative. The communication between the battery packs adopts RJ45 network wire to connect through the RS485, the battery packs dial code address were set as table 5.
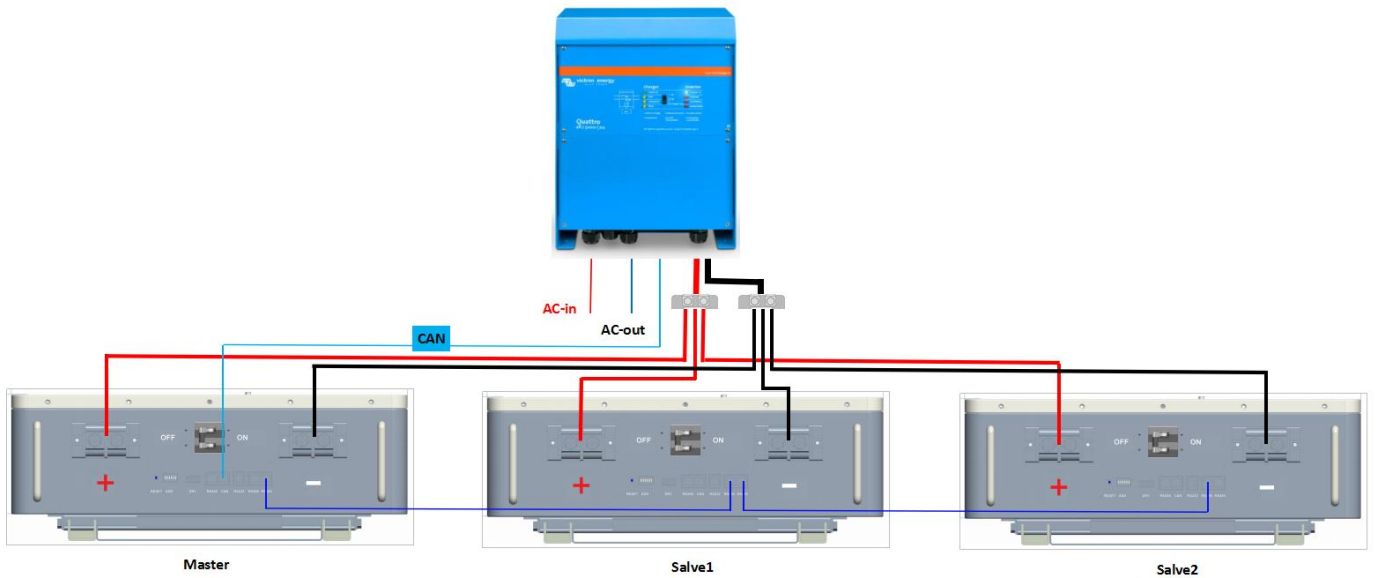
5.3.1 1pack---1 Inverter. Single mode .
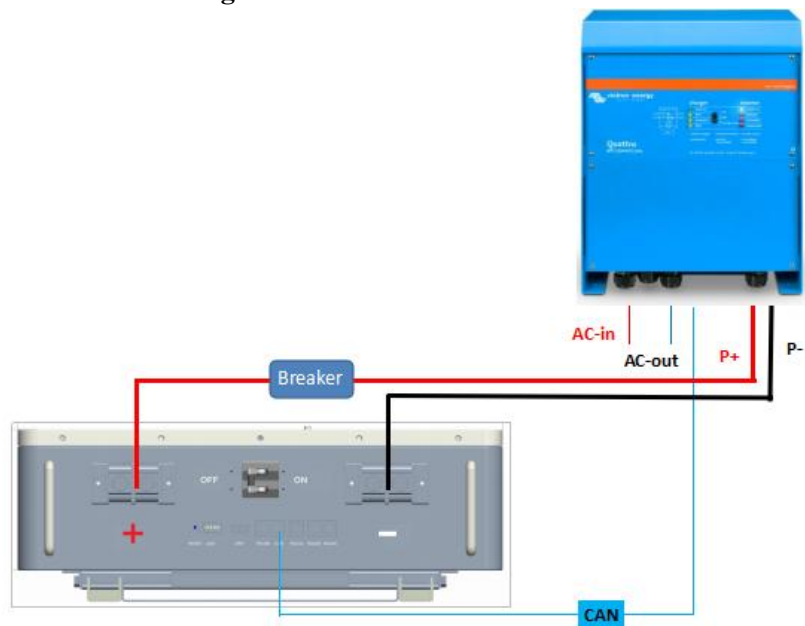
5.3.2 2pack---1 Inverter.

Pack 1 is slave ; pack 2 is master;Negative and Positive power cable has the same length.
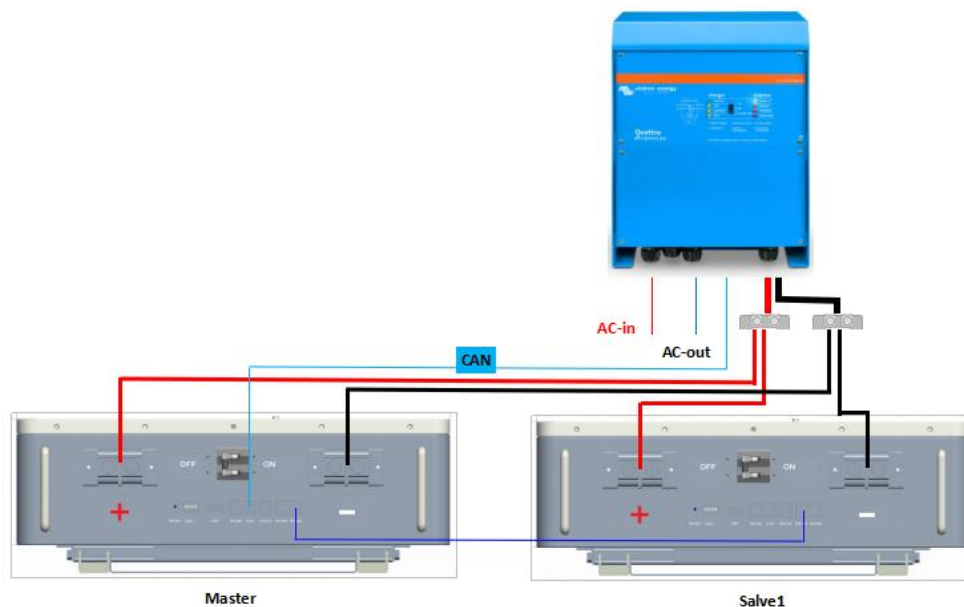
5.5.3 3pack---1 Inverter.

Pack 1 ,2 is slave ; pack 3 is master.more pack are parallel,one pack is master,other are slave.Negative and Positive   power cable has the same.

Note: when a single unit is used, the inverter uses the battery as the main machine to communicate; when multiple batteries are used in parallel, the batteries inside are connected in parallel through the RS485B hardware interface, RS485A/CANBUS communicates with the inverter.

6.Appendix1

When the equipment manufacturer confirms that it is necessary, it can authorize to provide the customer with the host software and operating instructions.

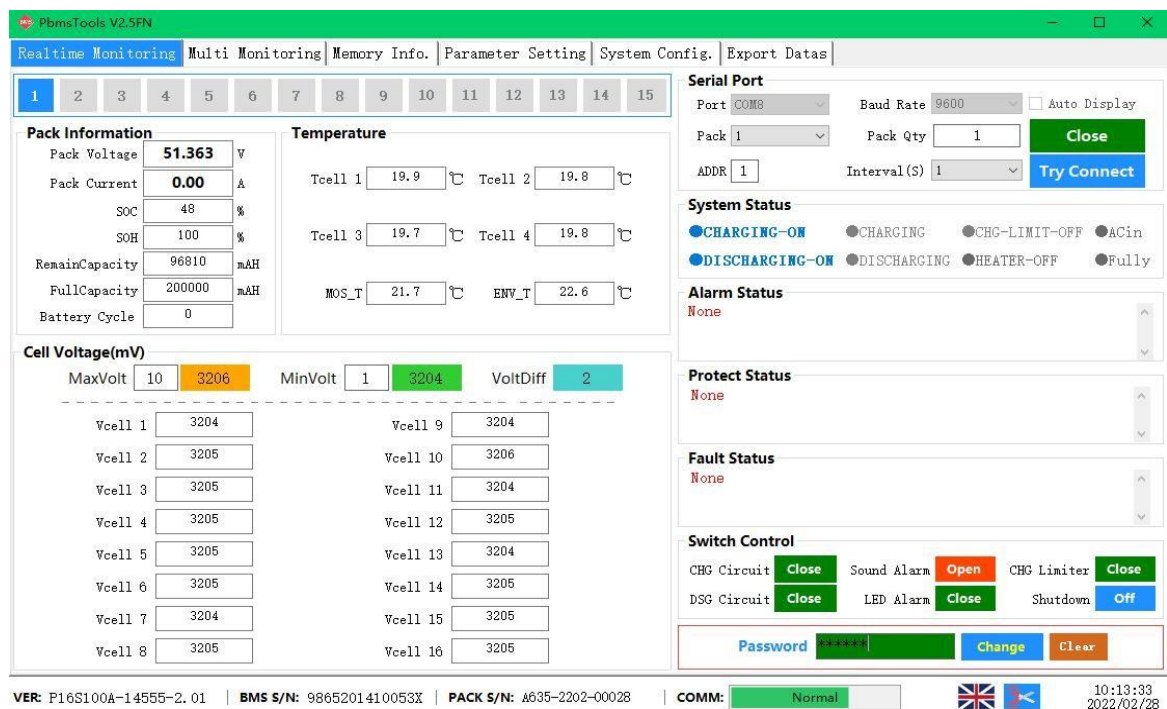Figure 7 RS232 Serial port communication device

Host soft operation:

Figure 8

7.Appendix2

Multi Inverter protocol support.
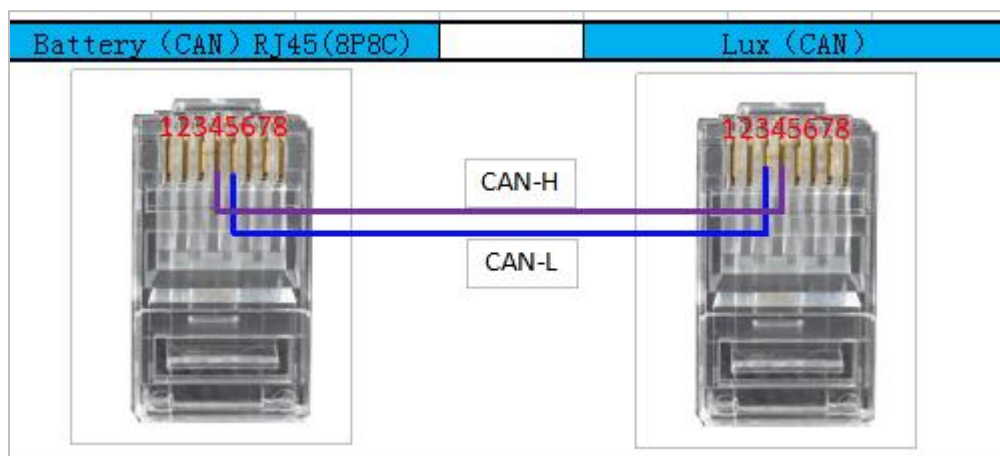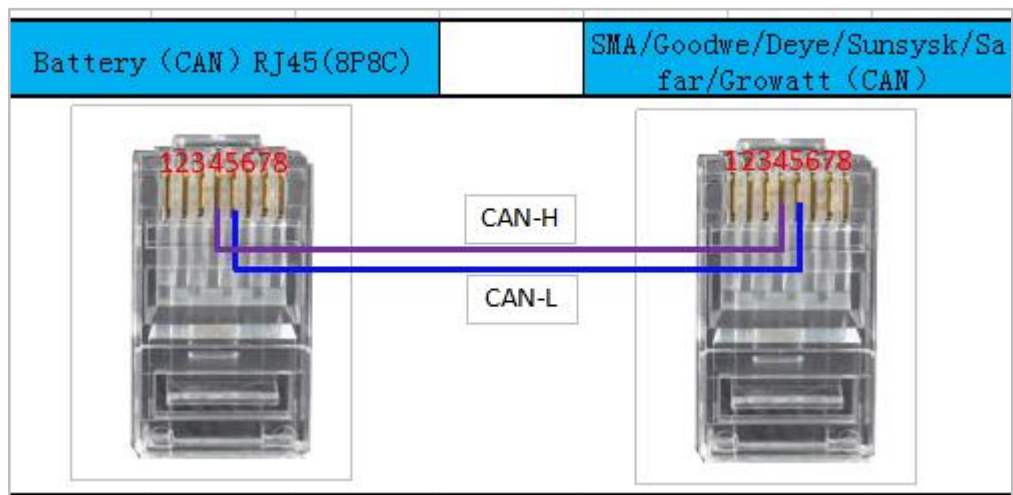**Default setting: CANBUS - Victron, RS485-DEYE.**

NO	Mode	Inverter
1	CAN	Pylon
2		Deye
3		Sunsysk
4		Growatt
5		Victron
6		Goodwe
7		SMA
8		Sofar
10		Ginlong/Solis
11		Studer
12		Kstar
13		Megarevo
14	RS485	Pylon
15		Deye
16		Growatt
17		Voltronic
18		Srne

Remark：

- Please ask your sales team to provide password for host computer software administration enter.
- Different inverters the pin assignment are not the same, please contact inverter supplier for detailed RJ45 cables of pin assignment.

Connector pin configurations for the above-mentioned inverter manufacturers are listed below:

Battery (CAN) RJ45(8P8C)		Victron/Studer (CAN)
12345678	CAN-H CAN-L	12345678

Battery (CAN) RJ45(8P8C)		SMA/Goodwe/Deye/Sunsysk/Safar/Growatt (CAN)
12345678	CAN-H CAN-L	12345678

Battery (CAN) RJ45(8P8C)		Lux (CAN)
12345678	CAN-H CAN-L	12345678

Battery（RS485）RJ45(8P8C)		Lux/Growatt（RS485）
12345678	RS485-B RS485-A	12345678

Battery（RS485）RJ45(8P8C)		Voltronic（RS485）
12345678	RS485-B RS485-A	12345678

Battery（RS485）RJ45(8P8C)		Srne（RS485）
12345678	RS485-B RS485-A	12345678

8.Appendix3

Abnormal Situation Addressing

1.What if the battery pack does not work properly after power on?

A: The most direct way is to connect to the upper computer, through the upper computer to find the fault phenomenon, causes can be roughly analyzed from the upper computer interface prompt alarm, protection, fault and other information, it can also provide necessary reference for further testing.

2.Under what circumstances will RS232 communication fail?

A: The following steps can be taken to eliminate the problem:

1) Confirm that at least one of the indicator lights of the battery pack is on or flashing, that is, the battery pack is in normal working condition;

2) Confirm that the host computer software selects correct COM   port (view device manager);

3) Confirm whether the RS232 communication line is fully inserted into the corresponding communication interface of the battery pack.

3.Under what circumstances will RS485 fail to paralleling batteries communication?

A: The possibility of failure of parallel batteries communication is as follows: first ensure whether the parallel RS485 communication port has been connected, and then make sure that the address dialing position of the battery pack is correct, and make sure that the RS485 terminal Plug-in in the right place.

4.What is the fault alarm mechanism?

A: battery pack has fault alarm function, can be checked through upper computer software.

Failure includes:

1) Sampling failure: analog front-end and main control chip communication failure. When the fault occurs, the charge and discharge function is turned off, and the fault alarm can be automatically cleared after the fault is cleared.

2) Temperature NTC failure: mainly detects whether the temperature NTC is short-circuited or disconnected. When the fault occurs, the charge and discharge function is turned off, and the fault alarm can be automatically cleared after the fault is cleared.

3) Cell failure: the voltage difference of the cell exceeds 1V, or the difference between the total voltage detection voltage and the sum of single cell voltage is more than 5V, or the minimum voltage is less than 0.5V. The voltage sampling line disconnect also reports the same fault. When the fault is cleared, the fault alarm can be automatically cleared.

After the battery is connected to the system and shows over-current protection or short circuit protection. This is not a problem with the battery pack, but the capacity load of the electrical

equipment is too large. Charging can remove the alarm, or extend the battery pack precharge circuit delay time.

Product Responsibilities and Consulting

We will not be liable for the accidents resulting from operation breaking this specification and user manual.

We will not send separate notice, provided that the contents of this specification are changed due to improvement

of product quality or technological upgrading; provided that you want to understand the latest information of

this product, please contact us.

The shelf life of this product is within 60 months after it is delivered; we will maintain the product, which is in the warranty period for free of charge, provided that it has any product.

quality problems within the specified operation range; we may replace the relevant parts, if we fail to maintain it,

so as to achieve the purpose of sustainable use without performance reduction; our after-sales service personnel

will propose the specific maintenance and troubleshooting methods.

In case of any questions, please contact us.

WARRANTY CARD

Product Name		Model Number	
BATCH NO.		Shiping Date	
The Buyer		Phone	
Address			

If a device becomes defective during the agreed warranty period, please report the defective device situation to the original manufacturer with this warranty card. Supplier or end users required to send the warranty claim form to the original manufacturer or authorized service partner with all the necessary information. Customers must present this warranty card, battery purchasing invoice, extension warranty letter if applicable, and other related materials as well if required. It is the responsibility of the warranty holder to substantiate the warranty claim and show that the conditions are met. Please note the original manufacturer reserve the ultimate explanation right on this warranty card.

THANK YOU FOR CHOOSING

LET'S DEVELOP TRUST AND BUSINES