User Manual

Lithium Battery
Energy Storage System
（Wall-mounted ）

Version: 1.0

48V/51.2V100Ah/200Ah/280Ah

Contents

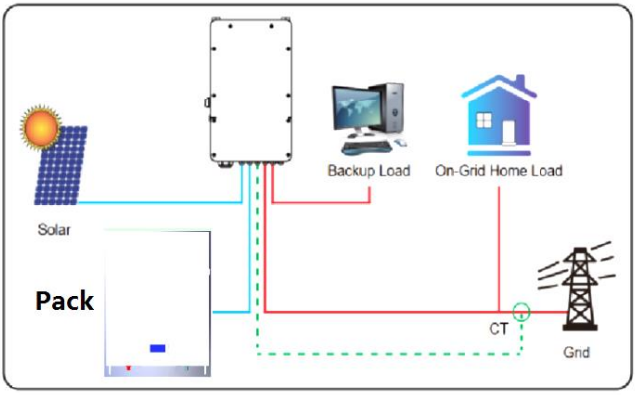
1. Safety Warning

Before using this product, please read this manual carefully. The safety precautions mentioned in this manual do not represent all safety precautions that should be observed, but can only be used as a supplement to all safety precautions. When installing, operating and maintaining equipment, local safety regulations and specifications shall be observed. Only trained professionals can install, operate and maintain the equipment. Our company will not be liable for any loss caused by violating the general safety operation requirements or the safety standards for design, production and use of equipment. The installation and maintenance personnel must have the technical ability of high-voltage and AC power operation. During installation, operation and maintenance, do not wear any conductive objects, such as watches, bracelets and rings. During transportation, installation and use, water and metal objects must be prevented from entering the battery.

1. High voltage hazard: direct contact or indirect contact with power supply through wet objects may cause fatal injury.
2. DC short circuit hazard: short circuit or reverse connection of positive and negative poles will damage the equipment and cause fatal injury.
3. Waterproof and moisture-proof: rain or moisture will cause short circuit and corrosion of the circuit board, causing the failure of the protective board.
4. Anti-static: static electricity generated outside the human body or equipment may damage the sensitive components of the internal circuit board.
5. Live operation is prohibited to prevent accidents.
6. Use special tools: when contacting DC high voltage or AC power supply, use special tools.
7. The battery shall be recharged every three months after long-term storage, so that its capacity is not less than 80%; When the capacity is less than 10%, it is necessary to charge in time.

2. Product Introduction

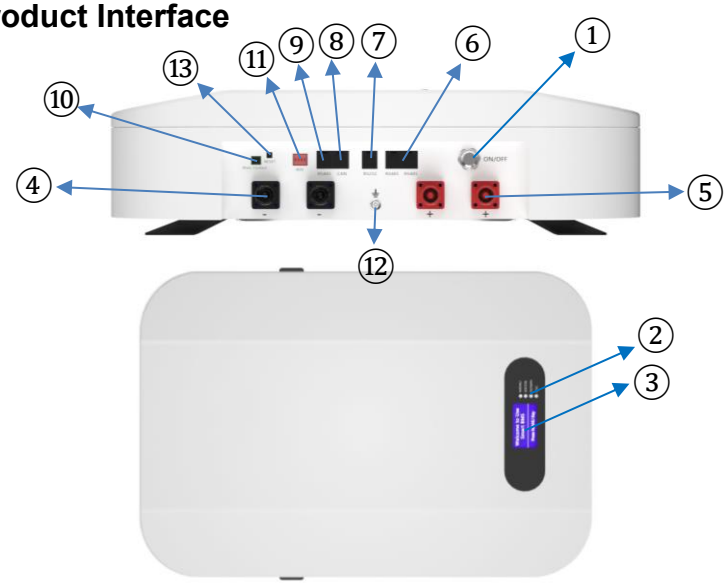
This product is one of lithium iron phosphate household energy storage batteries provided by our company. It is widely used in photovoltaic energy storage systems and can be compatible with more than 70% of the inverters on the market (use schematic diagram is as follows). The internal battery management system (BMS) is equipped with multiple protection measures such as voltage protection, current protection, temperature protection, short circuit protection, cell balance, etc. It has the advantages of integration, miniaturization, lightweight, long life ant high safety factor.



2.1 Product Picture

Note: Take 51.2V200Ah as an example, other models are only different in appearance.

2.2 Product Interface



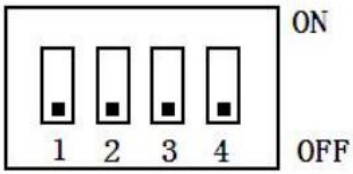
2.2.1 Product Interface Definition

No.	Name	Print	Definition
1	Power Switch	ON/OFF	Activate battery
2	LCD keys		Check status of battery

3	LCD Screen		Display status of battery
4	Negative Electrode	P-	Connect the negative pole of the load or use it in parallel
5	Positive	P+	Connect the positive pole of load or used in parallel
6	Double RS485 interface	RS485	To use when parallel battery
7	RS232 interface	RS232	Host PC test
8	CAN interface	CAN	To connect CAN of inverter
9	RS485A interface	RS485	To connect RS485 of inverter
10	Main Contact	Main Contact	Main Contact 1-PIN1 to PIN2: normally on，off during fault protection. Main contact 2-PIN3 to PIN4:normally on, off during low capacity alarm
11	Address Dial Switch	ADS	To set address code when parallel
12	GND	GND	
13	Reset Switch	RESET	

2.2.2 Definition of Dial Switch

When the PACK is used in parallel, the address can be set through the dial switch on the BMS to distinguish different PACKs. It is necessary to avoid setting the same address. Refer to the following table for the definition of the BMS dial switch.



Address	Dial Switch Position			
	#1	#2	#3	#4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

2.2.3 Definition of LED Indicator

Table 1 LED Indicator Status

Status	Normal/Caution/ Protection	ON/OFF	RUN	ALM	Capacity LED Indicator						Remarks
		●	●	●	●	●	●	●	●	●	
OFF	Dormancy	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby	Normal	ON	Flash 1	OFF	Indicate according to capacity						Standby
	Caution	ON	Flash 1	Flash 3							Low voltage
Charge	Normal	ON	ON	OFF	Indicate according to capacity (Max capacity indicate LED flash 2)						Max capacity LED flash 2, ALM do not flash when overcharge
	Caution	ON	ON	Flash 3							
	Overcharge Protection	ON	ON	OFF	ON	ON	ON	ON	ON	ON	Indicator turn to standby mode when no mains power
	Protection on Temperature/Overcurrent	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	stop charge
Discharge	Normal	ON	Flash 3	OFF	Indicate according to capacity						
	Caution	ON	Flash 3	Flash 3							
	low-voltage Protection	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
	Protection on Temperature,Overcurrent, Short circuit, Reverse	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
Failure		OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop charge and discharge

Table 2 Capacity LED Indication

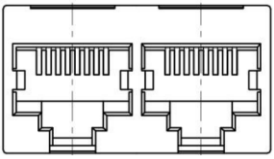
Status		Charge						Discharge					
Capacity LED indicator		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
		●	●	●	●	●	●	●	●	●	●	●	●
Capacity	0~16.6%	OFF	OFF	OFF	OFF	OFF	Flash 2	OFF	OFF	OFF	OFF	OFF	ON
	16.6~33.2%	OFF	OFF	OFF	OFF	Flash 2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2~49.8%	OFF	OFF	OFF	Flash 2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8~66.4%	OFF	OFF	Flash 2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4~83.0%	OFF	Flash 2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	83.0~100%	Flash 2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
LED ●		ON						Flash 3					

Table 3LED Flash Definition

	ON	OFF
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

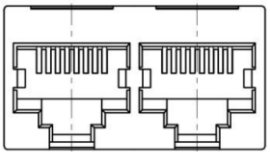
Note: The LED indicator warning can be enabled or disabled through the host computer. The factory default is enabled.

2.2.4 Definition of RS485/CAN/ RS232



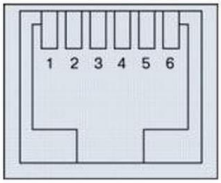
CAN 和 RS485 接口

RS485- 8P8C Vertical RJ45 Plug		CAN-8P8C Vertical RJ45 Plug	
RJ45 Pin	Definition	RJ45 Pin	Definition
1.8	RS485-B1	9.10.11.14.16	NC
2.7	RS485-A1	12	CANL
3.6	GND	13	CANH
4.5	NC	15	GND



并联通讯端口

RS485- 8P8C Vertical RJ45 Plug		RS485-8P8C Vertical RJ45 Plug	
RJ45 Pin	Definition	RJ45 Pin	Definition
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



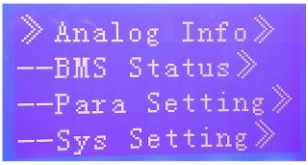
RS232-6P6C Vertical RJ11 Plug	
RJ11 Pin	Definition
2	NC
3	TX
4	RX
5	GND

RS232 通讯接口

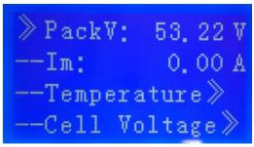
2.2.5 LCD Screen

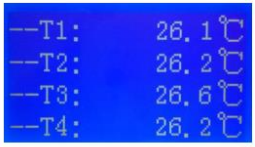
To View data:

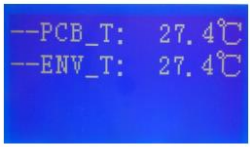
1.After the BMS is activated, press the key of“MENU”，then press“ENTER”,as shown in the following pictures:

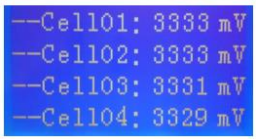


2.Enter into the following page , press the key of “DOWN”to adjust position of cursor“》”， press“ENTER”to view data. As shown in the following pictures.









NO need to view the other data.

2.3 Product parameters

2.3.1 Environmental Parameters

Item	Parameters	Unit
Work Temperature	-20~75	℃
Storage Temperature	-20~75	℃
Working Humidity	10~85	%RH
Storage Humidity	10~85	%RH

2.3.2 Electricity Parameters

S/N	Item		Default	Can be modified	remarks
1	Cell overcharge protection	Cell overcharge voltage alarm	3600mV	Yes	
		Cell overcharge voltage protection	3700mV	Yes	
		Cell overcharge protection delay	1.0S	Yes	
	Cell overvoltage protection release	Cell overcharge voltage protection release	3380mV	Yes	
		Capacity release	SOC<96%	Yes	
		Discharge protection release	Discharge current > 1A		
2	Cell overdischarge protection	Cell overdischarge voltage alarm	2800mV	Yes	Once overdischarge protection does not relese after last for 30s, low power consumption mode start.
		Cell overdischarge voltage protection	2700mV	Yes	
		Cell overdischarge protection delay	1.0S	Yes	
	Cell overdischarge protection release	Cell overdischarge voltage protection release	2950mV	Yes	
		release when charging	Activate when charger is connected		
3	Pack overcharge protection	Pack overcharge voltage alarm	57.6V	Yes	
		Pack overcharge voltage protection	58.4V	Yes	
		Pack overcharge protection delay	1.0S	Yes	
	Pack overvoltage protection release	Pack overcharge voltage protection release	54V	Yes	
		Capacity release	SOC<96%	Yes	
		Discharge protection release	Discharge current > 1A		
4	Pack overdischarge protection	Pack overdischarge voltage alarm	44.8V	Yes	Once overdischarge protection does not relese after last for 30s, low power consumption mode start.
		Pack overdischarge voltage protection	43.2V	Yes	
		Pack overdischarge protection delay	1.0S	Yes	
	Pack overdischarge voltage protection release	Pack overdischarge voltage protection release	47.2V	Yes	
		release when charging	Activate when charger is connected		
5	Charging Current limitation	Charging Current limit	20A		Current limit can be set, and the maximum charing current is 100A.
6	Overcharge current Protection	Overcharge current alarm	105A	Yes	Ten consecutive occurrences will lock the status and will not automatically release it
		Overcharge current protection	110A	Yes	
		Overcharge current protection delay	1.0S	Yes	
	Overcharge current Protection release	release automatically	release automatically after 1min		
		Discharge release	Discharge current > 1A		
7	Discharge overcurrent 1 protection	Discharge over current 1alarm	105A	Yes	Ten consecutive occurrences will lock the status and will not automatically release it
		Discharge over current 1 protection	110A	Yes	
		Discharge over current 1 protection delay	1.0S	Yes	
	Discharge overcurrent 1 protection release	release automatically	release automatically after 1min		
		charge release	charge current > 1A		
8	Discharge overcurrent 2 protection	Discharge overcurrent 2 protection	≥150A	Yes	Ten consecutive occurrences will lock the status and will not automatically release it
		Discharge overcurrent 2 protection delay	100mS	Yes	
	Discharge overcurrent 2 protection release	release automatically	release automatically after 1min		
		charge release	charge current > 1A		

9	Short circuit protection	Short circuit protection	Yes		
		Short circuit protection release	release when charge		
			release automatically when loads are removed		
10	MOS high temperature protection	MOS over temperature alarm	90℃	Yes	
		MOS over temperature protection	115℃	Yes	
		MOS over temperature protection release	85℃	Yes	
11	Cell temperature protection	Charge low temperature alarm	0℃	Yes	
		Charge low temperature protection	-5℃	Yes	
		Charge low temperature protection release	0℃	Yes	
		Charge high temperature alarm	60℃	Yes	
		Charge high temperature protection	65℃	Yes	
		Charge high temperature protection release	55℃	Yes	
		discharge low temperature alarm	-15℃	Yes	
		discharge low temperature protection	-20℃	Yes	
		discharge low temperature protection release	-15℃	Yes	
		discharge high temperature alarm	65℃	Yes	
		discharge high temperature protection	70℃	Yes	
		discharge high temperature protection release	60℃	Yes	
12	Environment Temperature Alarm	Environment low temperature Alarm	-15℃	Yes	
		Environment low temperature protection	-20℃	Yes	
		Environment low temperature protection release	-15℃	Yes	
		Environment high temperature Alarm	65℃	Yes	
		Environment high temperature protection	75℃	Yes	
		Environment high temperature protection release	65℃	Yes	
13	Power consumption current	Self-consumption current during operation	≤55mA (with LCD display)		
			≤45mA(without LCD display)		
		Low Power consumption current	≤200μA		
14	Cell balance	Balance opening voltage	3500mV	Yes	
		Opening differential voltage	30mV	Yes	
15	Low capacity Alarm	low capacity alarm	SOC<5%	Yes	Not alarm when charge
16	Sleep function	Sleep voltage	3150mV	Yes	
		Delay time	5min	Yes	
17	Cell failure protection	Cell voltage difference	Δ U >1V	No	Not allow to charge or discharge
18	Full judgment	voltage	>56V	Yes	Stop charging when the conditions are met at the same time,SOC 100%
		current	<2A	Yes	

The two models have the same parameters except for the different continuous current. Continuous current of 200Ah model is 150A and continuous current of 100Ah is100A.

3. Product List

Battery Pack(bracket included)	communication cable(0.6m)	Battery cable(1.5m)	Manual
			

4. Installation Instructions

4.1 Necessary installation Tools

Multi-meter, Screw driver, RS232/USB+screw terminal, Personal anti-static clothing, drill, expansion screws

4.2 Selecting Mounting Location

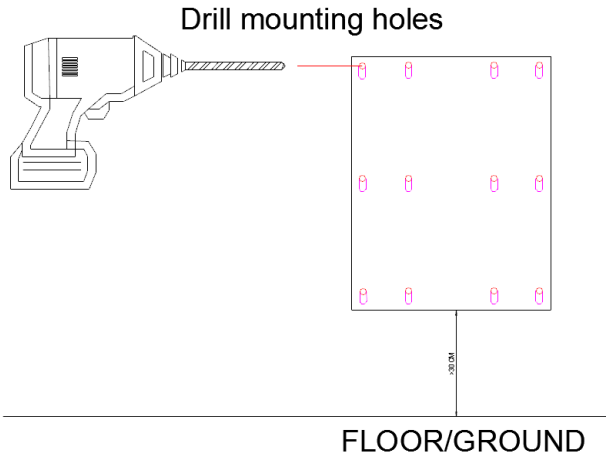
Consider the following points to install the energy storage Pack:

- Do not mount the Pack on flammable construction materials.
- Install this Pack module at eye level in order to allow the readability of LCD display at all times.
- For proper air circulation to dissipate heat, please leave a gap of about ＞0.3 meter from the ground,30 cm from the side of the device.
- The ambient temperature should be between 0°C and 40°C and relative humidity should be between 25% and 85% to ensure optimal operation.
- The recommended installation is Vertical installation.
- Install the battery module in a dry, protected area with no excessive dust and sufficient air circulation. Do not operate in locations where the temperature and humidity are outside the specified range.

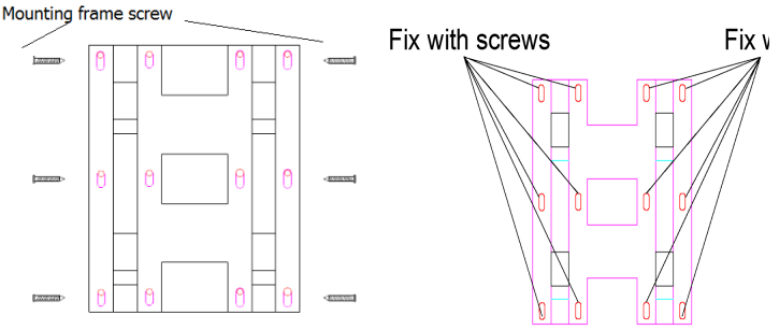
4.3 Installation Steps

4.3.1 Ensure that the Pack is installed on the wall surface. Choose a suitable installation location and require the battery pack to be placed at a safe distance greater than 30cm from the ground and the safety distance between battery packs is also greater than 30cm.We recommend an installation distance is 50cm.(For other PV lines and converter lines, please consult the corresponding suppliers.）

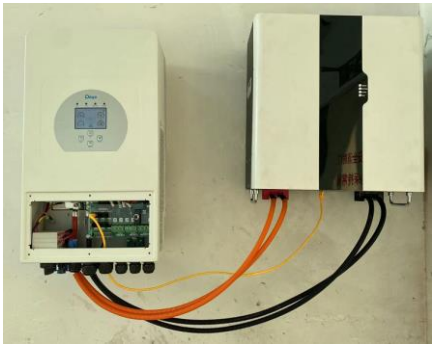
4.3.2 Use the mounting bracket to mark the location of the positioning screw hole on the wall, and use an electric drill to drilling the hole. Need to be drilled with a drill of appropriate diameter.



4.3.3 Insert frame screws, then place the bracket and use screws to lock it(Please make sure it is firm)



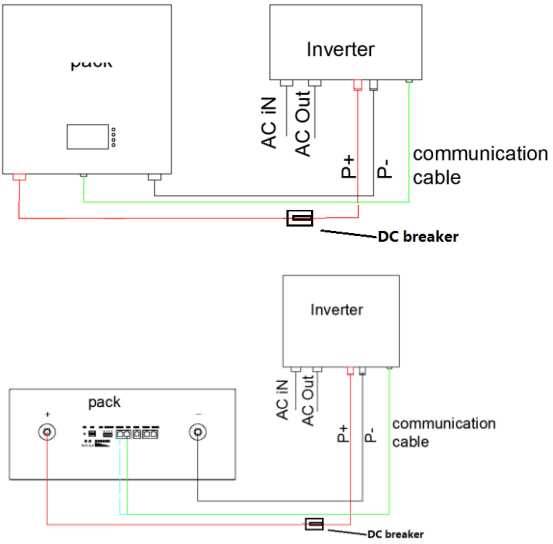
4.3.4 Please ensure that the battery is turned off and the main switch of the inverter is disconnected. Hang the battery and inverter on the wall, As shown as below,



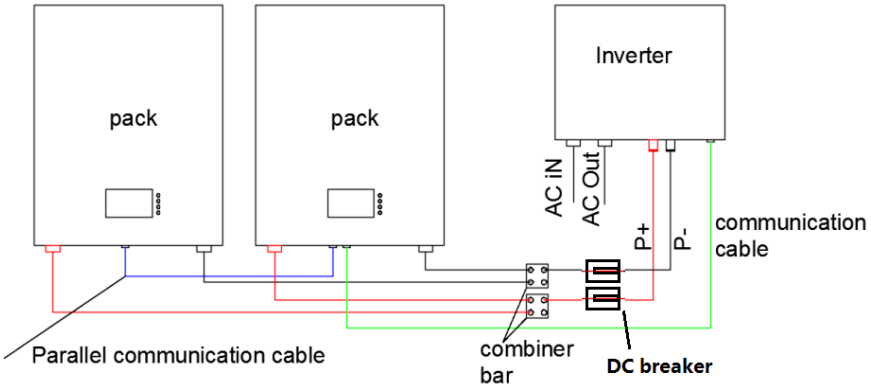
4.3.5 Connect the battery ground wire: fix one end of the wire at the battery ground wire connection, and the other end of the wire on the equipment that is connected to the ground, or directly buried in the ground.

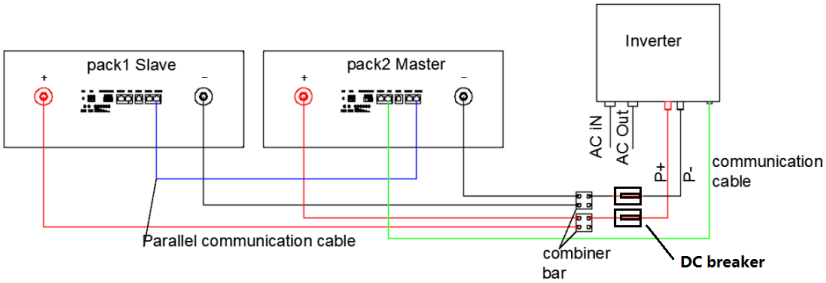
4.3.6 Schematic diagram of different proportion of pack and inverter （Refer to schematic diagram to connect communication cable and power cable）

1. pack:inverter=1:1

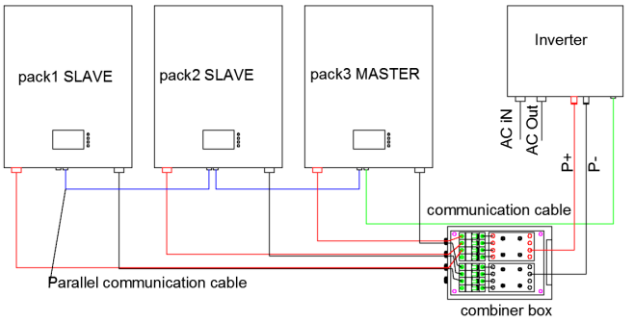


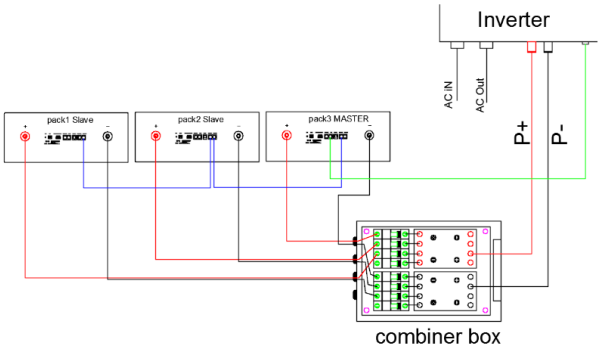
2 pack:inverter=2:1. Pack 1 is slave , Pack 2 is master.The length of the negative and positive power lines is the same.



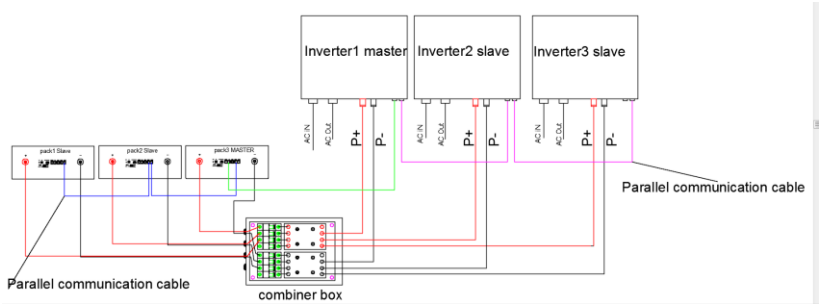


3 Pack:Inverter=3:1,Pack 1 and Pack 2 is slave, Pack 3 is master.More packs is paralleled, one pack is master, the other are slave.The negative and positive power lines have same functions.



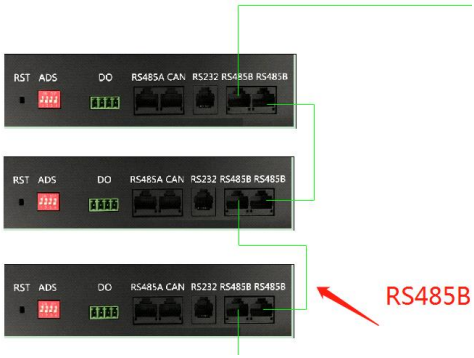


4 Pack:Inverter=3:3, Mainly wiring for 3-phase inverter. Pack 1 ,2 is slave, pack 3 is master. more packs are paralleled, one pack is master, other are slave. 3-phase inverter output 380VAC.One inverter is master, other are slave .Please refer to the operation manual of the inverter for the parallel connection method of the inverter, there is only an example.



4.3.7 Setting the address of the battery pack ,refer to the table in 2.2.2 for the definition of the BMS dial switch.

4.3.8 Connect the parallel communication cable (yellow network line).Any Pack has 2 PCS RS485B port for parallel communication, 1 PCS RS485A and 1PCS CAN port for inverter or other device.RS232 port only used for host software and update the firmware.



4.3.9 To start battery packs. Confirm that the wiring is correct, then you can start the battery. Press ON/OFF for 3 seconds to start the pack.

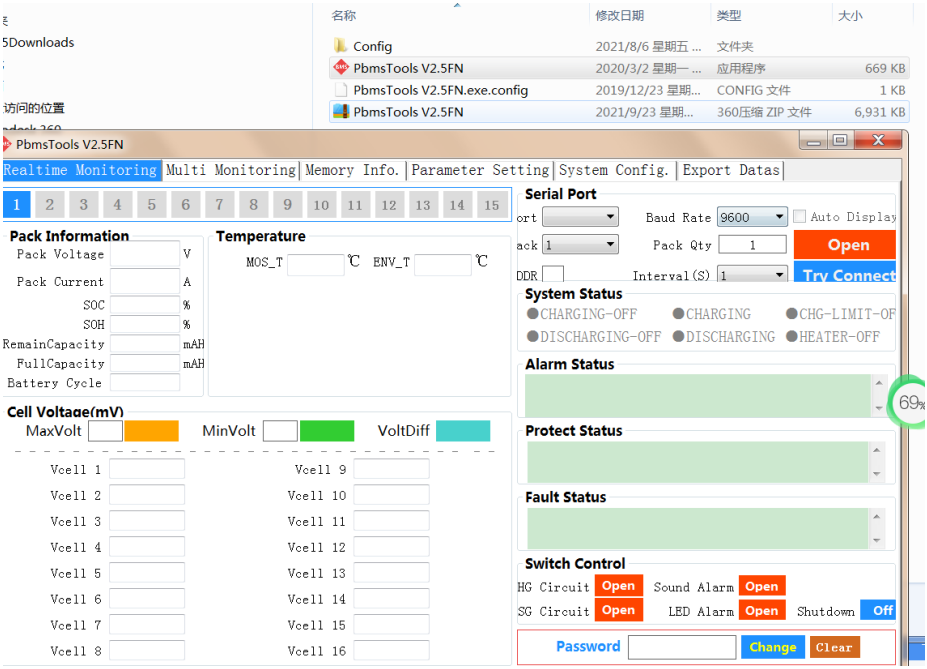
4.3.10 Running the device, set the external charger or inverter parameters, please set according to the corresponding operation manual. Can not exceed the rated parameter requirements. Refer to 2.3.2

4.3.11 Monitor all running status, and record all parameters. If there are any mistake, please record it .After start the system, every pack is on ,and RUN-led indicate these status.

4.3.12 Stop running battery pack.

When it is necessary to stop the charging and discharging of the battery or troubleshooting, please stop the external equipment first, cut off the input and output circuits, and then press the power switch off each battery pack.

5. Host software interface



6. Troubleshooting

6.1 Battery pack stop work.

A: Turn on switch, be sure it is ON; if battery is low SOC, it need to charge.

B: Battery pack low volt or enter sleep mode, there you will press down "RST" button for 3-6 seconds, or charge .

6.2 No communication , inverter can not received any DATA from BMS.

A : Check whether if communication cable is OK, check RJ45 PIN,

CAN :PIN4:CANH,485A-A,
PIN5:CANL; 485A-B
RS485A:PIN2:485A-A,
PIN1:485A-B;

B: Replace the communication line. Please give feedback to the dealer and exchange it.

C: Check inverter or other device which connect to BMS, update it is firmware.

D: If the communication function needs to be upgraded, please consult the agent or manufacturer.

E: Confirm your inverter and battery protocol is correct. Different protocol or different connection will make a mistake.

6.3 Battery pack report SOC is mistake.

A: inverter received Data from Master BMS , but it is SOC <total SOC, sample as :9PCS packs has 1800Ah,but inverter read DATA is 1600Ah.So you may check any one is disconnected. check RS485B communication cable(yellow),RS485 communication cable ,replace the cable which is broken.

B: SOC DATA has Large tolerance.
Discharge empty the battery first, then charge it fully with a small current, and learn to discharge. Any pack is mistake ,we advice you read the BMS Data(When we authorize the terminal to use) with host software.then we reset the BMS and calibration.

C: When multiple batteries are connected in parallel, the SOC is different.
We recommend that each pack has a small current discharged and it is emptied until the SOC alarm appears, and then recharged in parallel and fully charged.

6.4 How to turn on the Pack to discharge.
we recommend method is :

A: reset the single pack's BMS,LED will flash and start work

B:turn on the power switch on the bottom/front panel;

C:turn on power switch in the combiner box .

WARNING：The operating parameters of the equipment cannot exceed the rated working voltage and current of the Pack，exceed the rated volt and current, Can cause damage to the Pack or other failures.

6.5 Inverter or other external device can not connect the battery.

we recommend,

A: Check whether the working parameters of the device and battery are appropriate, and improper parameters cannot be matched.

B: When the device is turned on, the current is too large, resulting in battery protection. At this time, you should be able to see the LED flashing from the battery panel.in this case, You can adjust your equipment parameters or contact the dealer to solve.

C: It is necessary to update BMS parameters and match the device, then Reset BMS and restart your device.

6.6 Replace bad Pack

It is necessary to replace bad battery pack . Please contact your supplier，and it needs professional installers to operate it .We recommend replace all or make packs have same voltage and same specification batteries.

NOTE: When replacing the battery, the same module needs to be replaced at the same time, and the voltage should be the same.

6.7 Need to replace spare parts or emergency maintenance

Some parts can be obtained from the sales or agency, and the excess parts need to be purchased separately. Be careful, turn off the power switch before replacing parts.

6.8 Need to place some safety device for keep a safe environment.

You'd better keep a safe case for Pack and external device. Please place safety device such as :fire-fighting sand, fire-fighting blankets, fire-fighting water pipes .Install Monitor sound, light, electricity, smoke and other equipment.

7. **Warning**

Emergency process:

1 .The external device catches fire and explodes:

A: Under the condition of ensuring safety, non-operating personnel immediately move to a safe location;

B: Under the condition of ensuring safety, the operator immediately cut off the external power supply of the equipment and the internal power supply.

C:Use fire-fighting equipment for fire-fighting treatment (the use of fire-fighting sand, fire-fighting blankets, fire-fighting water pipes)

D:If you cannot completely extinguish the fire, please call the local fire department for help.

E:Keep the accident site data so that the source of the accident can be traced.

2 .The Pack catches fire and explodes:

A: Under the condition of ensuring safety, non-operating personnel immediately move to a safe location;

B: Under the condition of ensuring safety, the operator immediately cut off the external power supply of the equipment and the internal power supply.

C:Use fire-fighting equipment for fire-fighting treatment (first the use of fire-fighting sand, fire-fighting blankets, then fire-fighting water pipes for cool the Pack)

D:If you cannot completely extinguish the fire, please call the local fire department for help.

E:Keep the accident site data so that the source of the accident can be traced.