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Rack-Mounted Lithium-ion Battery Pack

User Manual

51.2V105Ah- 5.376KWh

Version: 1.

Warning

Please comply with all warnings and operating instructions in this manual strictly. Save this manual properly and read carefully the following instructions before installing the unit. Do not operate this unit before reading through all safety information and operating instructions carefully.

1.Parameters of Battery

1-1 Parameters of Battery Pack

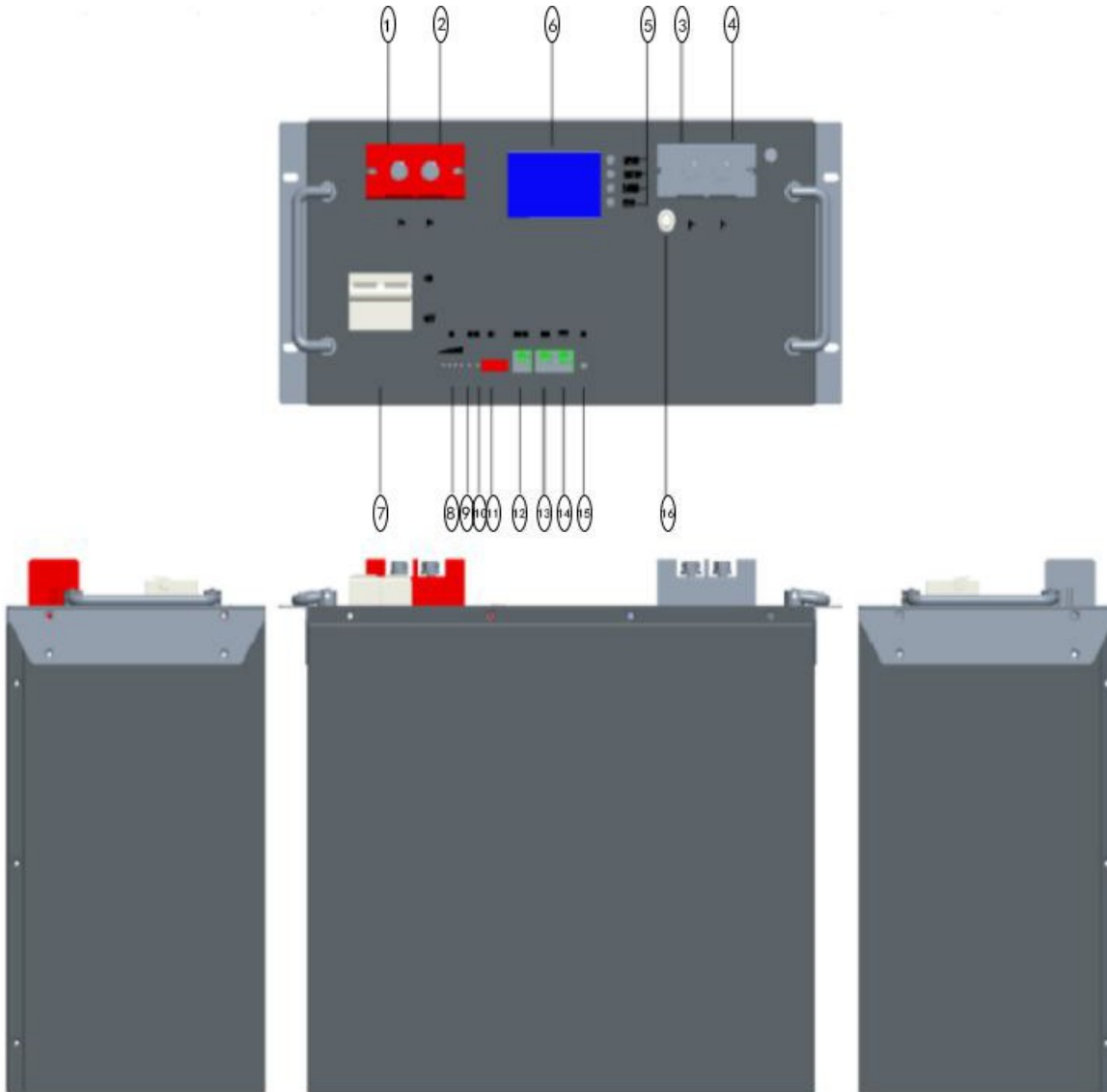
Model of battery pack	51.2V105Ah
Nominal voltage	51.2V
Rated capacity	105AH
Rated reserved energy	5.376KWH
Standard charging current	0.2C
Total charging cut-off voltage	57.6V
Cut-off voltage of charging monomer	3.65V
Standard discharging current	0.2C
Maximum continuous discharging current	105A
Cut-off voltage of discharging	44.8V
Charging temperature range	0°C ~ 45°C
Discharging temperature range	-20°C ~ 60°C
Single module Size(W×L×H)	435*380*222mm (excluding hanger and amphenol connector)
Weight 1PCS	Single module about 46kg

1-2 Technical Parameters of Battery Management System (BMS)

Items	Details	Standard
Cell overcharge protection	Overcharge detection voltage	3.65V
	Overcharge detection delay time	Typical:1.0s
	Overcharge release voltage	3.40V
Cell over-discharge protection	Over-discharge detection voltag	2.80V
	Over-discharge detection delay time	Typical:1.0s
	Over-discharge release voltage	2.90±V or charge release
Over-current protection	discharge Over-current protection current1	110-125A
	discharge Over-current detection delay time 1	2.0S
	discharge Over-current protection current2	150A
	discharge Over-current detection delay time2	≤500ms
	Charge OC protection current	105-110A
Temperature(T) protection	Charge high T protection	55±5℃
	Charge high T recover	50±5℃
	Discharge high T protection	60±5℃

	Discharge high T recover	60±5°C
	Charge low T protection	-5±5°C
	Charge low T recover	0±5°C
	Discharge low T protection	-20±5°C
	Discharge low T recover	-10±5°C
Balance	Balance threshold voltage	3.45V
Communication	It has RS485 and CAN standard communication interface, it can real-time monitoring the capacity of battery bank, the voltage, current, environment temperature, and charging/discharging current.	
Alarm	It has over-temperature, over charge, under-voltage, over-current, short circuit alarmFunction.	

2. Panel operation instructions



No.	Description	Silk-screen	Remark
1	Battery +	P+/P+	Positive terminal
2	Battery +	P+/P+	Positive terminal
3	Battery -	P-/P-	Negative terminal
4	Battery -	P-/P-	Negative terminal
5	LCD KEY		
6	LCD		Display screen
7	Output ON/OFF	OFF/ON	Switch breaker
8	Electricity volume indicator	LED	Display the battery's capacity
9	ALM alarm indicator light blinking	ALM	Red- trouble-light on
10	Run indicator light	RUN	Display state information
11	ADS Dialer	ADS	Display connection address
12	RS485/CAN port	RS485/CAN	RS-485/CAN connection port-A RS485/CAN
13	RS485B port	RS485B	RS-485connection port-B RS485

14	RS485B port	RS485B	RS-485connection port-B RS485
15	On/OFF	RST	Reset key
16	On/OFF button	On/OFF	On/OFF button

3. Installation and Operation

3-1. Single battery Installation

Installation and wiring must be performed in accordance with the local electric laws/regulations and execute the following instructions by professional personnel.

1) Make sure the mains wire and breakers in the building are in compliance with the standard of rated capacity of battery to avoid the hazards of electric shock or fire.

NOTE: Do not use the wall receptacle as the input power source for the battery, as its rated current is less than the battery’s maximum input current. Otherwise the receptacle may be burned and destroyed.

- 2) Switch off the mains switch in the building before installation
- 3) Turn off all the connected devices before connecting to the battery
- 4) Prepare wires based on the following table

Model	Cables(AWG)	Cables(mm2)
<50Ah	8	6
50Ah	6	16
100Ah	4	25

Table 1 Output Cables

NOTE : It is recommended to use suitable wire in above table or thicker for safety and efficiency.

5) Put the terminal block cover back to the front panel of the battery.

NOTE: Set the battery pack breaker in “OFF” position and then install the battery pack.

3-2 Battery installation



Installation: this product is suitable for rack-type or cabinet installation, installation reference picture, specific conditions according to the actual order requirements

3-3.Installation Precautions

- (1) Prior to installation, unpacking to check the quantity of the parts and battery appearance.
- (2) Measure the battery voltage with a multimeter. The general factory voltage of the battery is 50V-53V .
- (3) Prior to wiring, check the anode and cathode of the battery and the anode and cathode terminals shall not be connected reversely.
- (4) During battery connection, please wear the protective gloves. When using such metal tools as torque wrench, please perform insulating packaging for them and two end of the metal tools such as torque wrench shall not contact the positive and negative terminals of the battery at the same time to avoid

battery short-circuit.

(5) Before the battery is connected with the externally connected equipment, make the equipment in a disconnected state, check whether the connecting polarity of the battery and total voltage are correct, connect the battery anode with the equipment anode and battery cathode with the equipment cathode and fix the connecting line.

(6) During handling and placement, the battery must be handled gently. No dropping or impacting. The battery shall not be thrown or beaten to avoid damaging the battery or resulting in potential safety hazard.

(7) Do not touch the surface of the battery box with the sharp part of the tool to scratch or damage the battery box.

(8) Do not disassemble the battery box without authorization.

(9) Do not put any article made of the metal conductive material together with the battery or assemble it into the battery box.

(10) Install it according to the selected installation mode

Installation of standard cabinet (rack): Install the matching hanger for the battery pack and fix them in the standard cabinet and the tray protection is added for the battery box.

Stacking battery box installation: first place the base in the plane area, then stack the battery box according to the outer label number sequence, then the screw holes reserved for the upper and lower chassis are locked and fixed with screws,

Installation of wall-mounted box: Prior to installation, please ensure that the wall complies with the

wall-mounted requirements; according to the location in the design plan, install the special wall-mounted box of the lithium battery; the battery pack is fixed in the wall-mounted box in a hanger manner.

Indoor and outdoor integrated frame cabinet (box) installation: according to the custom integrated frame cabinet (box) installation specifications for installation

3-4 Operation Instruction for Installation

1) Prior to installation, please check whether the battery is normal.

Press the internal switch RST 1 second to start for startup. During startup, 4 capacity indicator lights on the front panel, ALM alarm indicator light (red) and RUN running indicator light light up. Check whether all indicator lights light up normally; then the ALM alarm indicator light goes out, the RUN running indicator light lights up and the capacity indicator light lights up according to the capacity.

If the ALM alarm indicator light flashes after startup, it means that the battery has an alarm. The newly installed battery seldom has alarm. The common alarm is the battery undervoltage alarm (which is resulted from non-use of the battery for a long time). Such case may be removed after the battery is charged for 30min; if the alarm may not be removed, please press the reset key RST for 10S, until all LEDs light up for reset, execute the battery reset operation and confirm whether the alarm is removed. If the alarm is removed, the battery may be used normally. Otherwise the battery shall be reworked.

2) For the battery which is normal after detection, please press the reset key RST for 3S to execute the battery ON/OFF operation.

Instructions of manual operation of the reset key RST	Startup	In the OFF state of BMS, press the key for 3S for startup
	Shutdown	In the non-standby state of BMS, press the key for 3S for shutdown;
	Reset	In the non-standby state of BMS, press the key for 10S, until all LEDs light up for reset.

Instructions: "Shutdown" and "standby" and "startup" and "activation" in Chinese have the same meaning.

3) Installation of the lithium battery, wiring and startup

Make the battery pack in a standby state, install it in the battery cabinet one by one, the anode and cathode of the battery pack are connected respectively, which are connected to the switching mode power supply or UPS (Please note that the switching mode power supply and UPS shall be disconnected from the AC). Press the reset key ON/OFF of one of battery packs for 1S for startup. Such startup battery may activate other batteries which are connected in parallel , and the whole battery pack with high capacity enters the working state. Later, apply AC to the power supply equipment such as switching mode power supply and UPS to make the whole standby system run.

The specification of the connecting line is selected according to the load current, with the common specifications of the connecting line as follows

- 1) When the battery pack with the capacity of 200Ah or below is connected in parallel, it is suggested to select 25mm² copper wire.
- 2) When the battery pack with the capacity of 200Ah~300Ah is connected in parallel, it is suggested

to select 25mm² or 35mm² copper wire.

- 3) When the battery pack with the capacity of 300Ah or above is connected in parallel, it is suggested to select 35mm² copper wire.

4) Note: We do not equip with the battery connecting line by default, which shall be selected according to the total capacity of the battery pack.

Lithium battery	Copper core cable	Copper pigtail	Remarks
48V50Ah	16mm ² /25mm ²	16-8/25-8	M8 copper pigtail is used for 48V50Ah
48V100Ah	16mm ² /25mm ²	16-10/25-10	M10 copper pigtail is used for 48V100Ah

Introduction to operation steps in detail according to the capacity required

5) Battery pack in parallel with the capacity of 200Ah or below (the wiring diagram is shown in Figure 1):

Step1: The battery pack is in the shutdown state, and the battery is installed successively;

Step2: Disassemble the anode insulating cap of the neighboring batteries one by one, connect the anodes of up and own neighboring battery packs with the installation connecting line and screw on the anode insulating cap;

Step 3: According to step 2, connect the cathode of the battery pack.

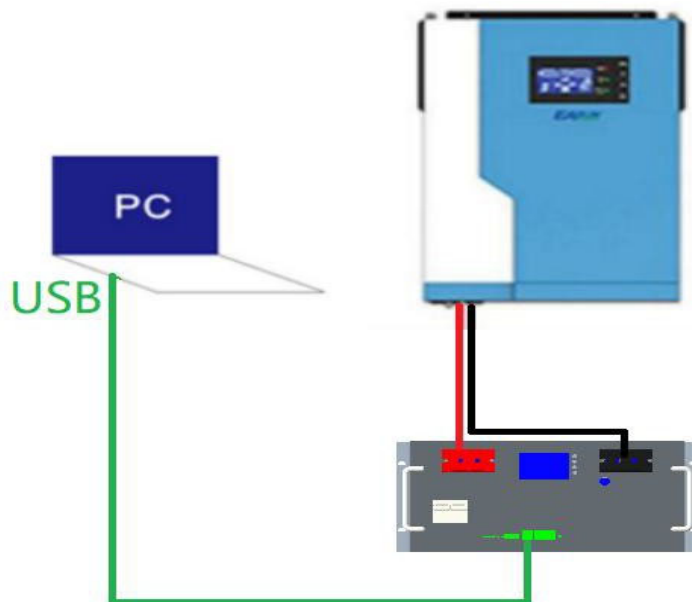
Step 4: Set the dial-up addresses of all battery modules from top to bottom one by one, which are 1000, 0100, 1100 and 0010 (the dial-up addresses are set according to the number of battery modules actually used) respectively; (this step may be skipped if there is no need to access to the remote monitoring platform).

Step 5: Perform the cascade connection to RS485 communication interface of the battery module with the RS485 connecting line; lead to the collector of the monitoring platform from the

CAN interface of the battery module with the address of 1000 with the CAN connecting line; (this step may be skipped if there is no need to access to the remote monitoring platform).

Step 6: Draw out two wires from the anode and cathode of a battery pack at the top or in the middle respectively as the main connecting line of the battery pack in parallel, which are connected with the switching mode power supply or UPS.

Step 7: Press the ON/OFF key of each battery pack for Reset and the whole battery pack with high capacity enters the working state.



Stand-alone installation



Parallel machine installation

3-5. Connection mode for parallel communication:

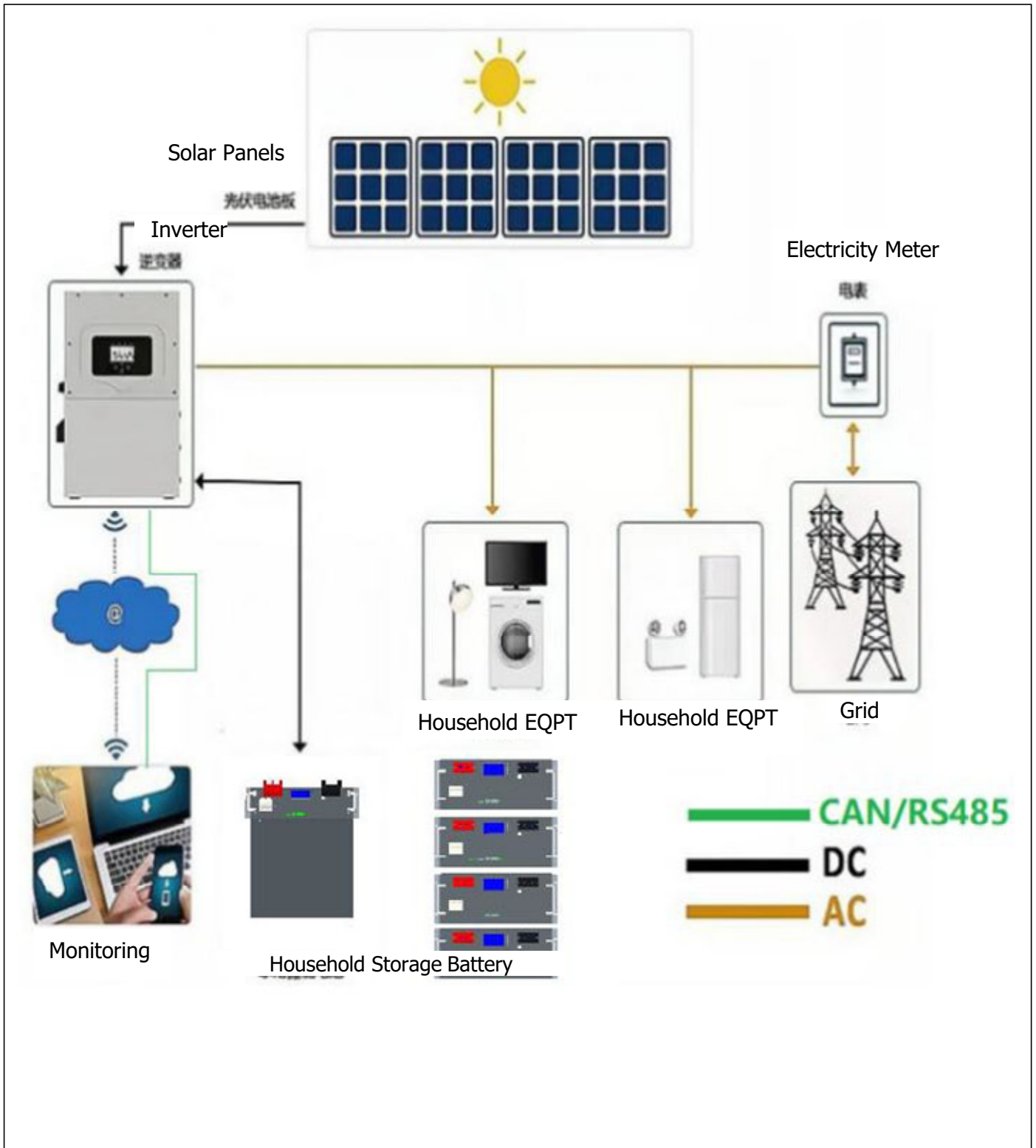
While in parallel communication, dial-up addresses of battery module are 1,2,3,4.....14,15,of which 1 stands for host computer, to which other batteries' data is uploaded; host computer conducts unified uploading, and host computer with dial-up code of 1 is required to connect with upper computer; polling mode used as consulting mode.

3-6. Reference table for parallel dial-up communication::

Parallel Dial-Up Setup									
Parallel Qty	DIP Switches								TIPS
	#1	#2	#3	#4	#5	#6	#7	#8	
1 Pack	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1 Pack
2 Pack	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	1st Master
	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2nd Slave
3 Pack	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	1st Master
	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2nd Slave
	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	3rd Slave
***	***	***	***	***	***	***	***	***	***
***	***	***	***	***	***	***	***	***	***
16 Pack	OFF	OFF	OFF	OFF	ON	ON	ON	ON	1st Master
	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2nd Slave
	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	3rd Slave
	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	4th Slave
	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	5th Slave
	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	6th Slave
	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	7th Slave
	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	8th Slave
	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	9th Slave
	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	10th Slave
	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	11th Slave
	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	12th Slave
	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	13th Slave
	ON	OFF	ON	ON	OFF	OFF	OFF	OFF	14th Slave
	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	15th Slave
	ON	ON	ON	ON	OFF	OFF	OFF	OFF	16th Slave

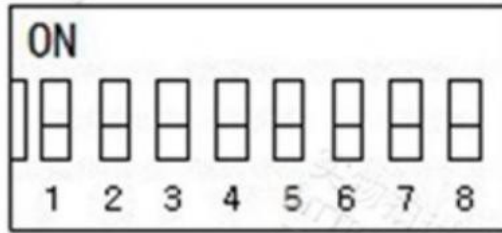
RS485 Parallel Communication

3-7. System integration link installation topology diagram



3-9 Address Switch function(Only in Parallel)

When battery work in parallel, main pack and slave packs need address as follows:



Slave Battery Setup(Table 6)

Address	DIP Switches				TIPS
	#1	#2	#3	#4	
1	ON	OFF	OFF	OFF	Pack1
2	OFF	ON	OFF	OFF	Pack2
3	ON	ON	OFF	OFF	Pack3
4	OFF	OFF	ON	OFF	Pack4
5	ON	OFF	ON	OFF	Pack5
6	OFF	ON	ON	OFF	Pack6
7	ON	ON	ON	OFF	Pack7
8	OFF	OFF	OFF	ON	Pack8
9	ON	OFF	OFF	ON	Pack9
10	OFF	ON	OFF	ON	Pack10
11	ON	ON	OFF	ON	Pack11
12	OFF	OFF	ON	ON	Pack12
13	ON	OFF	ON	ON	Pack13
14	OFF	ON	ON	ON	Pack14
15	ON	ON	ON	ON	Pack15

Master Battery Setup (Table 7)					
Parallel Qty	DIP Switches				TIPS
	#5	#6	#7	#8	
2	ON	OFF	OFF	OFF	2 In Parallel
3	OFF	ON	OFF	OFF	3 In Parallel
4	ON	ON	OFF	OFF	4 In Parallel
5	OFF	OFF	ON	OFF	5 In Parallel
6	ON	OFF	ON	OFF	6 In Parallel
7	OFF	ON	ON	OFF	7 In Parallel
8	ON	ON	ON	OFF	8 In Parallel
9	OFF	OFF	OFF	ON	9 In Parallel
10	ON	OFF	OFF	ON	10 In Parallel
11	OFF	ON	OFF	ON	11 In Parallel
12	ON	ON	OFF	ON	12 In Parallel
13	OFF	OFF	ON	ON	13 In Parallel
14	ON	OFF	ON	ON	14 In Parallel
15	OFF	ON	ON	ON	15 In Parallel

3-10 Communication Function

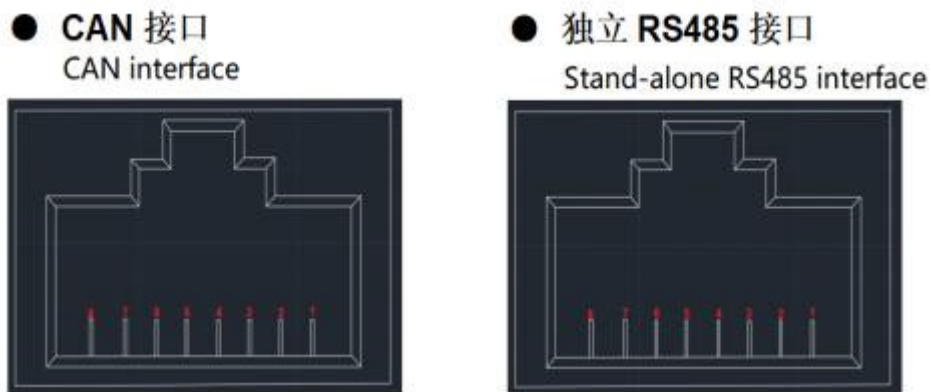


Fig8 Communication Port Interface

RS485/CAN Communication Port Definition

1	RS485-2B	1、8	RS485-B
2	RS485-2A	2、7	RS485-A
3、6	GND	3、6	GND
4	CAN_H	4、5	NC
5	CAN_L	\	\
7、8	NC	\	\

4. Operations LED

4-1. LED Indicators

LED Indicators:

There are 6 LEDs on front panel to show the battery working status







系统状态 System status	运行状态 Running status	RUN	ALM	Power LED 电量 LED				说明 Description
								
关机 Turnitoff	欠压保护, 休眠 Under-voltage protection, dormancy	灭 Extinguish	灭 Extinguish	灭 Extinguish	灭 Extinguish	灭 Extinguish	灭 Extinguish	全灭 All Out
待机 Standby	正常 Normal	闪 1 Flash 1	灭 Extinguish	灭 Extinguish				待机状态 Standby
	告警 Warning	闪 1 Flash 1	闪 1 Flash 1					
浮充 Floating charge	正常 Normal	常亮 Chang Liang	灭 Extinguish	根据电量常亮 According to the electricity always bright				
	告警 Warning	常亮 Chang Liang	闪 2 Flash 2					
	保护 Protection	常亮 Chang Liang	灭 Extinguish	常亮 Chang Liang	有此功能状态 Have this functional status			
充电 Charge	正常 Normal	常亮 Chang Liang	灭 Extinguish	依据电量指示 According to the electricity indication				最高 LED 闪 2 Highest LED flash 2
	告警 Warning	常亮 Chang Liang	闪 2 Flash 2					
	温度过流保护 Temperature overcurrent protection	常亮 Chang Liang	常亮 Chang Liang	依据电量常亮 According to the electricity always bright				充电器在线 Charger online
	温度过流保护 Temperature overcurrent protection	灭 Extinguish	常亮 Chang Liang	灭 Extinguish				充电器不在线 The Charger is not online
	过压保护 Over-voltage protection	常亮 Chang Liang	灭 Extinguish	常亮 Chang Liang				市电在常亮, 无市电 LED 恢复待机 City power in constant light, no city power LED recovery standby
放电 Discharge	正常 Normal	闪 3 Flash 3	灭 Extinguish	依据电量常亮指示 According to the electricity always bright				依据电量常亮指示 According to the charge constant light indication
	告警 Warning	闪 3 Flash 3	闪 3 Flash 3					
	温度过流保护 Temperature overcurrent protection	灭 Extinguish	常亮 Chang Liang	灭 Extinguish				停止放电 Stop the discharge
	过压保护 Over-voltage protection	灭 Extinguish	灭 Extinguish	灭 Extinguish				停止放电 Stop the discharge
	短路/反接保护 Short Circuit/reverse connection protection	灭 Extinguish	常亮 Chang Liang	灭 Extinguish				
	失效保护 Failure protection	闪 1 Flash 1	闪 1 Flash 1	闪 1 Flash 1				6个 LED 全闪 1 6 leds all flash 1
	非工作状态 Non-working state	闪 1 Flash 1	有告警功能 Warning function					
	充电状态 Charging status	闪 2 Flash 2						
	放电状态 Discharge state	闪 3 Flash 3						

Fig7 LED Operating Status

Flash	ON	OFF
Flash1	0.25Sec	3.75Sec
Flash2	0.5Sec	0.5Sec
Flash3	0.5Sec	1.5Sec

NOTE: LED function can be set by monitor software, the default if on.

4-2. Buzzer Operation(Optional)

Model	Description and Status
Non-working state	Flash 1
Charging status	Flash 2
Discharge state	Flash 3

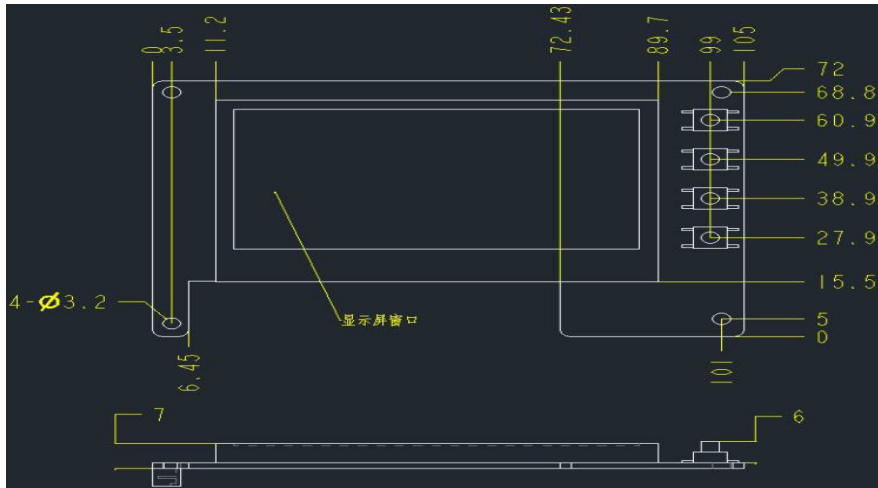
NOTE: Buzzer function can be set by monitor software, the default if off.

4-3. Reset key function

Model	Pressing and Holding time		
	0-3Sec	3-6Sec	>6Sec
Normal	Indication by SOC SOC	Transfer to Sleeping mode	Reset
Sleeping Mode	Wake up from Sleeping mode		

7-4 Display function instruction

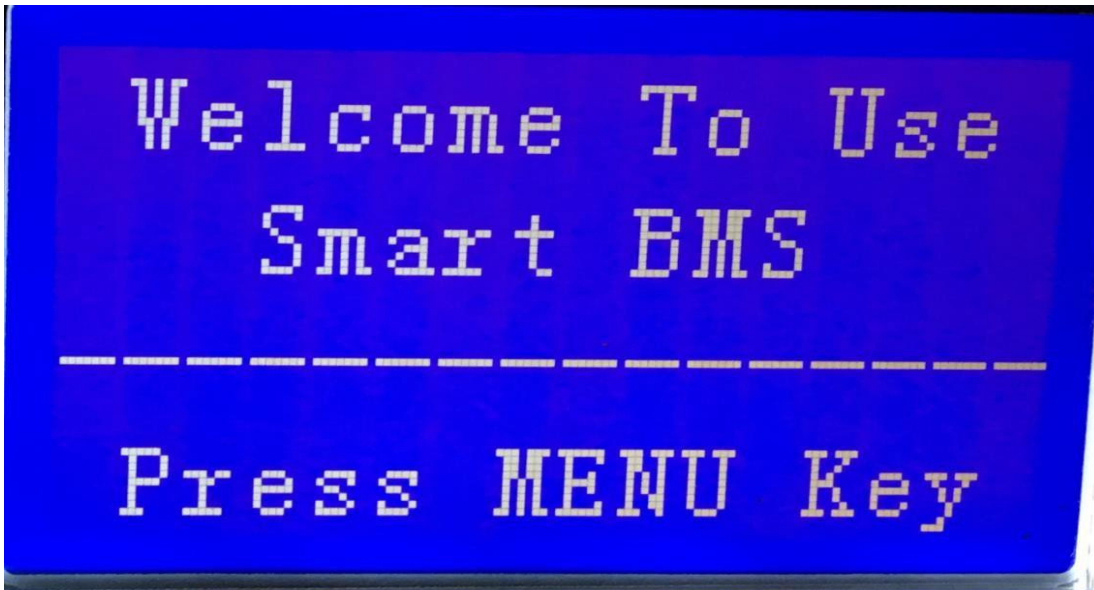
1) LCD Size chart



2) Reference of real figure



3) Display rendering



4) Functional Specifications

4.1 Interface introduction

1) Main menu page

Electricity/dormancy activated, will show the welcome screen, press the MENU button to enter the main menu page. As shown in the figure below:

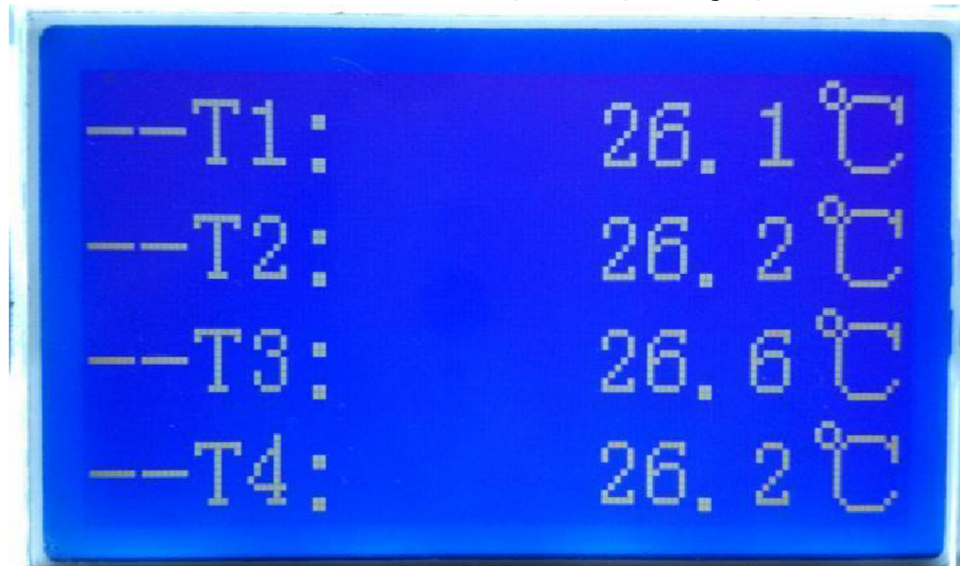


2) Battery parameters collection page

When the cursor "»" is point to "Battery Parameters Acquisition" , press ENTER key will enter into

the page of "Battery Parameters Acquisition" , As shown in the figure below:

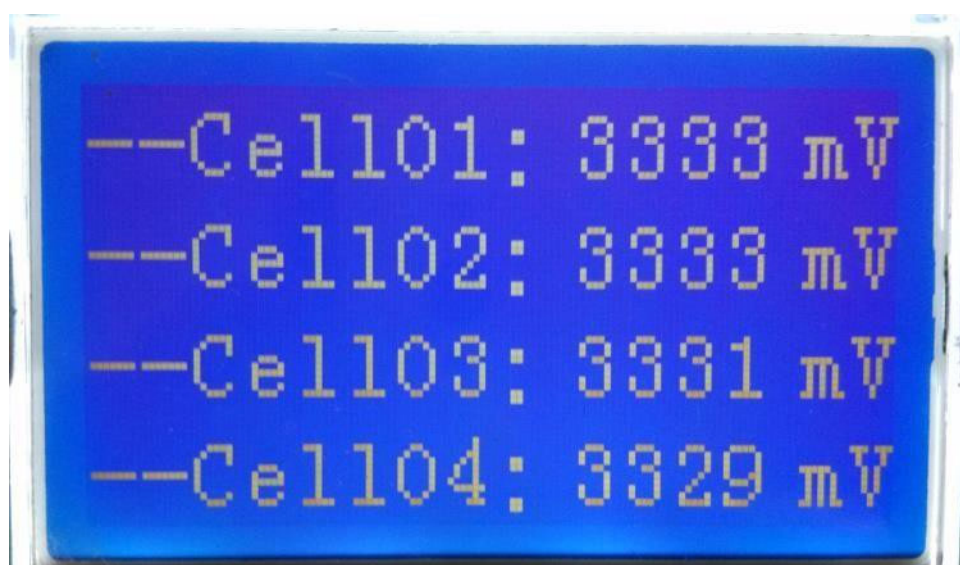




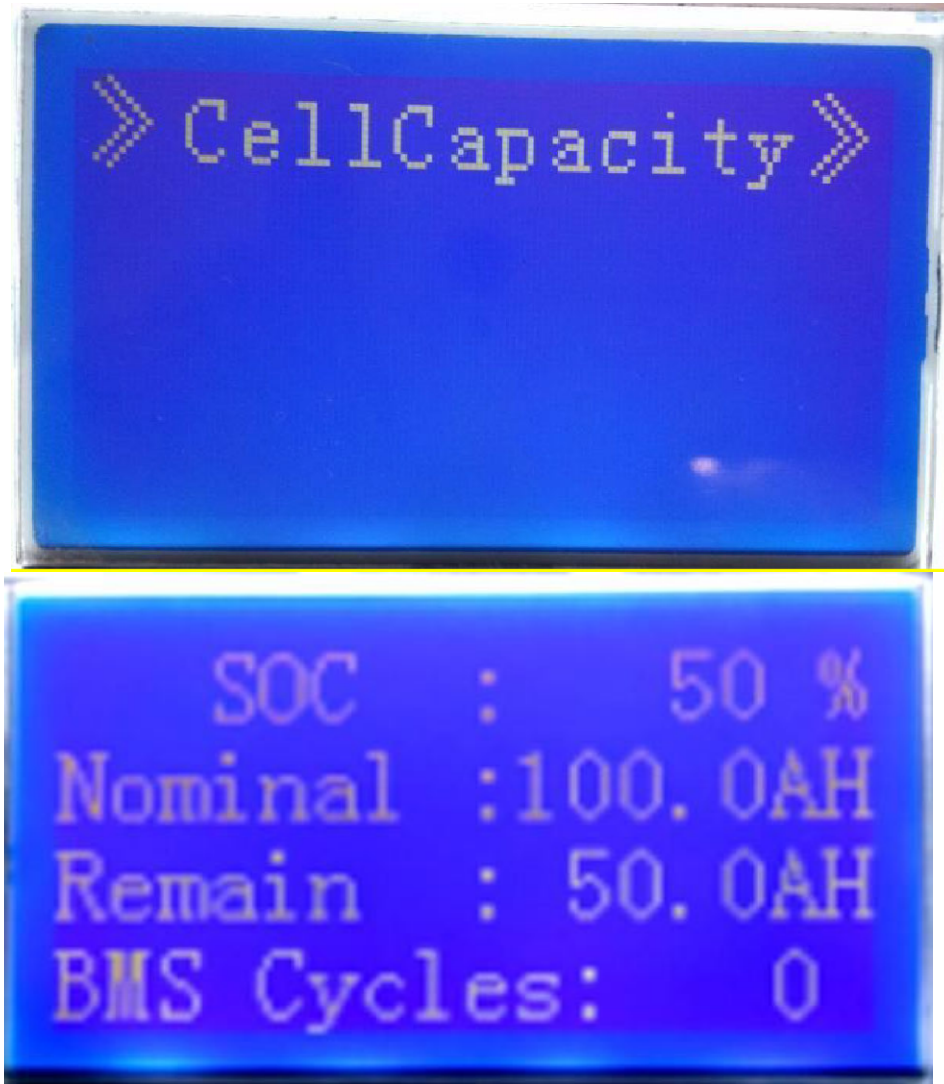
--T1: 26.1°C
--T2: 26.2°C
--T3: 26.6°C
--T4: 26.2°C



--PCB_T: 27.4°C
--ENV_T: 27.4°C



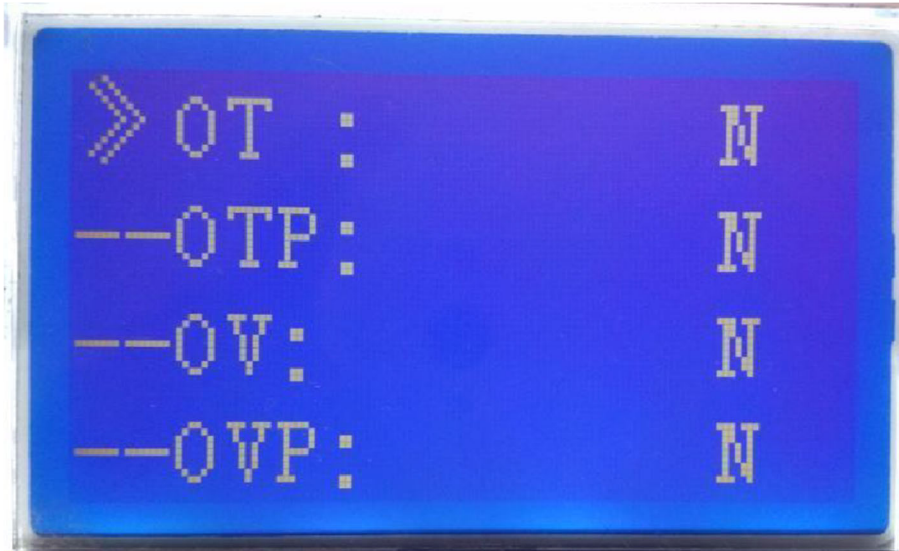
--Cell101: 3333 mV
--Cell102: 3333 mV
--Cell103: 3331 mV
--Cell104: 3329 mV



3) Battery status page

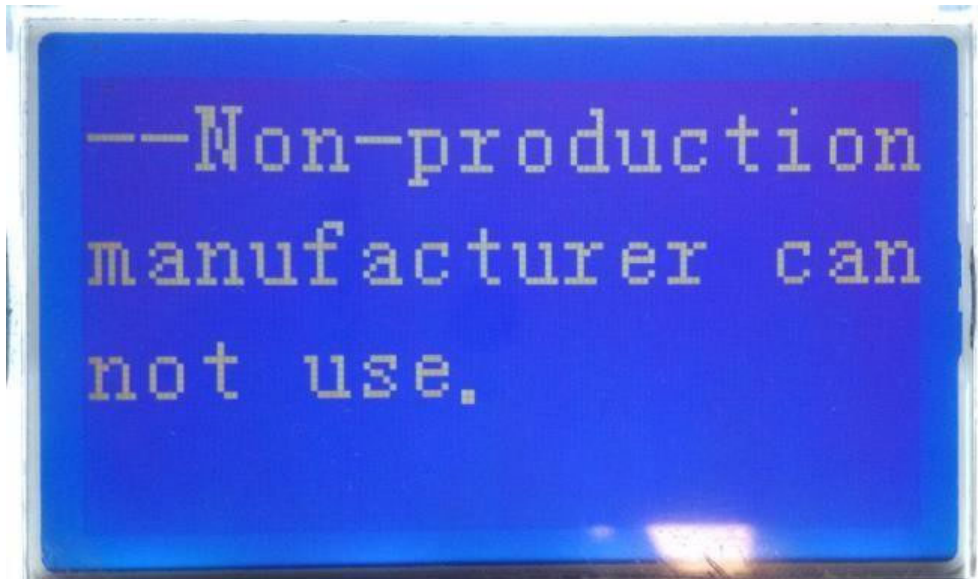
When the cursor "»" is point to "Battery Status" , press ENTER key will enter into the page of "Battery Status" , As shown in the figure below:





4) Parameter Settings

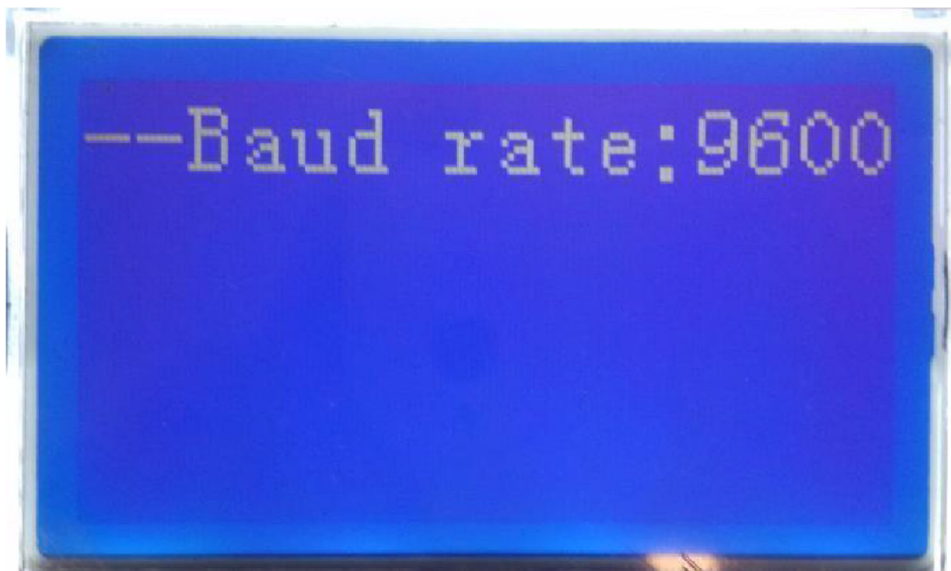
Screen can not set parameters



5) System Settings Page

Baud Rate: 9600 do not

set



Key description

- 1) SW1----NEMU, SW2----ENTER, SW3----DOWN, SW4 ESC.
- 2) Each item is "»" or "--" as a beginning, among them "»" shows the current cursor position, press UP or 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.
- 3) Press ESC key can be returned at the next higher level directory; In any position, press NEMU key can return to the main menu page.
- 4) In a dormant state, press any key, can activate the screen.

Dormancy/shutdown

Under normal operation condition, with no keystrokes 1 minutes later, system will enter a state of dormancy/shutdown.Shutdown/dormancy state, press any key, screen can be activated.

5.0 Safety Precaution

5.1 When Using battery



Danger of High Voltage

The high voltage power supply offer the equipment power, wet object contact high voltage power supply directly or indirectly , can cause fatal danger.



Using a special tool

Working in high voltage and ac power, be sure to use a special tool instead of individual tools.



Static - free antistatique

Static electricity would damage veneer on the electrostatic sensitive components, before touching the plug - in, circuit board or chips, be sure to use correct electrostatic prevention measures.



Disconnect the power supply in operation

When operate the power supply, you must first cut off power supply, power operation is prohibited.



Dc short circuit dangerous

Power system provides dc regulated power supply. Dc short circuit could cause fatal damage to the e quipment.

5.2 While Charging Pendant que la batterie se charge



CAUTION

The temperature range over which the battery can be charged is 0°C to 45°C. Charging the battery at temperatures outside of this range may cause the battery to become hot or to break. Charging the battery outside of this temperature range may also harm the performance of the battery or reduce the battery's life expectancy.

5.3 When Discharging the Battery

 **DANGER**

Do not discharge the battery using any device except for the specified device. When the battery is used in devices aside from the specified device it may damage the performance of the battery or reduce its life expectancy, and if the device causes an abnormal current to flow, it may cause the battery to become hot and cause serious injury.

 **CAUTION**

The temperature range over which the battery can be discharged is -20°C to 60°C. Use of the battery outside of this temperature range may damage the performance of the battery or may reduce its life expectancy.

5.4 Safety Gear

			
Insulated gloves	Safety goggles	Safety shoes	Safety Helmet

6.0 Troubleshooting

If the battery does not operate correctly, please solve the problem by using the table below.

Symptom 症状	Possible cause	Remedy
No indication and alarm in the front display panel	Sleeping mode	Press Reset to normal mode
No indication and alarm in the front display panel even Reset still no reaction	Battery voltage too low	Charge battery immediately
Red LED Flashing when Standby	Battery cell low voltage	Charge battery immediately
Red LED Flashing when charging	Alarm for protection when charging	BMS show alarm, protect and adjustment
Red LED Flashing when Discharging	Battery voltage too low and will shutdown	Charge battery immediately
RED LED Lighting continuous	Battery wrong	Need to repair










7.0 Storage and Maintenance

7-1.

Before storing, charge the battery at least 7 hours. Store the Battery covered and upright in a cool, dry location. Recommend long-term storage temperature is 15°C -25°C . During storage, recharge the battery in accordance with the following table

Storage Temperature	Recharge Frequency	Charging Duration
0°C - 40°C	Every 3 months	1-2 hours

7-2. Maintenance Maintenir

-  The battery system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.
-  Even after the unit is disconnected from the mains, components inside are still connected to the battery cells which are potentially dangerous
-  Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals.
-  Only major persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.
-  . Verify that no voltage between the battery terminals and the ground is present before maintenance or repair. In this product, the battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground.
-  Batteries may cause electric shock and have a high short-circuit current. Please remove all wristwatches, rings and other metal personal objects before maintenance or repair, and only use tools with insulated grips and handles for maintaining or repairing.
-  When replace the batteries, install the same number and same type of batteries.
-  When replace the parallel batteries, make sure the new battery is full charged.
-  Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes.

8.Product Responsibilities and Consulting

- 1) We will not be liable for the accidents resulting from operation breaking this specification and user manual.
- 2) 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.
- 3) 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: +86-13020256650

Appendix:

Tools

The following tools are required to install the battery pack

安装时请准备如下工具



electric screw driver



Phillips screwdriver bit



M10 / M12



Forklift



M8





Clamp meter



Tape measure



Stripper



Box Cutter



Slanting pliers



Nail Hammer