Lithium iron Phosphate Battery

Specification

MODEL:24V200Ah (25.6V200Ah)

Prepared By/Date	Checked By/Date	Approved By/Date

Customer Approval	**Signature/Date**
	Company Name
	Company Stamp

1. Scope

This specification is applied to the LiFePO4 battery pack with built-in smart BMS for over charge/discharge, over temperature and short-circuit protection.

2. Specification

No.	Item	General Parameter	Remark
1	Rated Capacity	200Ah	Standard discharge（0.2C）after standard charge（0.2C）
2	Minimal Capacity	195Ah	
3	Nominal Voltage	25.6V	
4	Life Expectation	Residual capacity is more than 60% of the rated capacity	1)Charge: CC@0.2C to 28.8V, then CV till current to 0.05C 2)Rest: 30min. 3)Discharge: 0.2C to 21.6V Temperature:20±5℃ Carry out 1500 cycles
5	Discharge cut-off voltage	2.7V/cell（≥21.6V）	
6	Charging cut-off voltage	3.6V/cell（≤28.8V）	
7	Assembly method	IFR26700EC-4.0Ah	8S50P
8	Housing material	Steel casing	
9	Standard charge	0.2C constant current (CC) charge to 28.8V,then constant voltage（CV）28.8V charge till charge current decline to ≤0.02C	Charge time: Approx. 7.0h

10	Standard discharge	Constant current 0.2C Cut-off voltage 21.6V	
11	Maximum Continuous Charge Current	100A@25℃	If the batteries in parallel exist high voltage difference, the charging current would be limited to 20A
12	Maximum Continuous Discharge Current	100A@25℃	150A for 100mS
13	Operation Temperature Range	Charge: 0~45℃	60±25%R.H. At lower temperature, the charge current should be smaller.
		Discharge: -20~60℃	
14	Storage Temperature Range	Less than 6 months: -20~35℃	60±25%R.H. at the shipment state
		Less than 3 months: -20~45℃	
15	Approx. Weight	51 Kg	
16	Dimension	482.6(19') *432.2*220(5U)	Width*Depth*Height mm
17	Internal resistance	35mΩ@ 50%SOC	
18	Cell balancing	100mA	
19	Over-temperature protection	Discharge: Min.: -10℃, Max.: 60℃ Charge: Min.: 0℃, Max.: 60℃	
20	Communication protocol	RS485 & RS232	
21	Batteries in parallel	12 batteries at most are recommended	

3. Performance and Test Conditions

3.1 Standard Test Conditions

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise specified, test and measurement shall be done under temperature of 20±5℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30℃ and humidity 25~85%RH.

3.2 Measuring Instrument or Apparatus

3.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

3.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than 10kΩ/V

3.2.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

3.2.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method (1kHz LCR meter).

3.3 Standard Charge/Discharge

3.3.1 Standard Charge: 0.2C

Charging at 0.2C constant current until the battery reaches 28.8V. The battery shall then be charged at constant voltage of 28.8V while tapering the charge current. Charging shall be terminated when the current has tapered to 0.02C. Charge time is approx 7.0 hours, the battery shall demonstrate no permanent degradation when charged between 0 ºC and 45 ºC.

3.3.2 Standard Discharge: 0.2C

Battery shall be discharged at a constant current of 0.2C to 21.6V @ 20 ± 5ºC

3.3.3 If no otherwise specified, the rest time between charging and discharging is 30min.

3.4 Appearance

There shall be no such defect as crack, rust, leakage, which may adversely affect commercial value of battery.

4. Handling of battery

4.1 Prohibition short circuit

Never short circuit battery. It generates very high current which causes heating of the battery and may cause electrolyte leakage, gassing or explosion that is very dangerous.
The terminals may be easily short-circuited by putting them on conductive surface.
Such outer short circuit may lead to heat generation and damage of the battery.

4.2. Mechanical shock

Falling, hitting, bending, etc. may cause degradation of battery characteristics.

5. Period of Warranty

The period of warranty is 18 months from the date of shipment. We guarantee to give a replacement in case of battery with defects proven due to manufacturing process instead of the customer abuse and misuse.

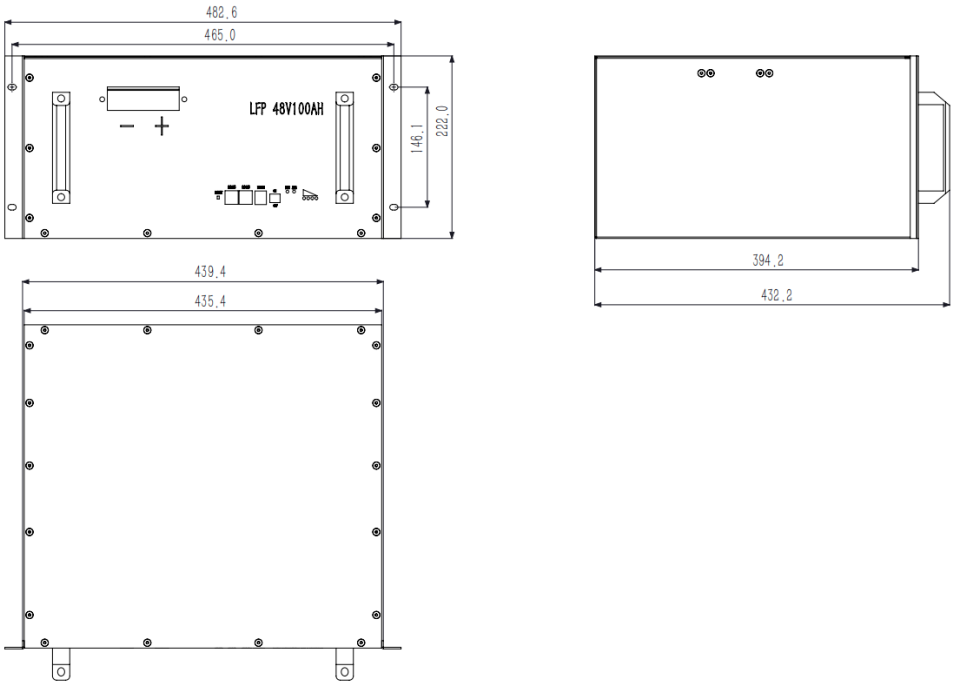
6. Storing the Batteries

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity. We recommend that battery to be charged once each three months to prevent over-discharge.

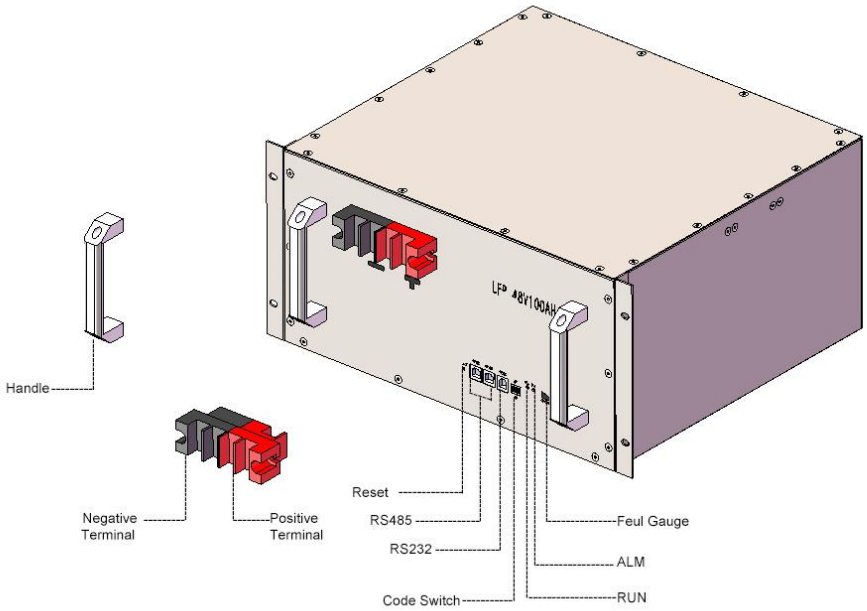
7. Photo

8. Any other items which are not covered in this specification shall be agreed by both parties.

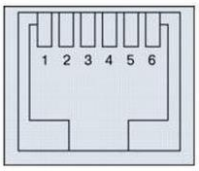
9. Outline Dimension

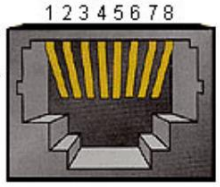


10. Appearance



11. Communication Port





RS232--use RJ11 plug		RS485--use RJ45 plug	
RJ11 pin	Definition	RJ45 pin	definition
1,2,6	NC	1,8	RS485-B
3	TX	2,7	RS485-A
4	RX	3,6	GND
5	GND	4,5	NC

12. Code Switch

Address	Code switch address				Description
•	#1	#2•	#3•	#4•	•
0	OFF	OFF	OFF	OFF	Use alone
1	ON	OFF	OFF	OFF	Pack1 (master)•
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

13.LED status

Status	Normal/Alarm/ protection	RUN	ALM	Fuel gauge LED				Description
		●	●	●	●	●	●	
Power off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	All off
Standby	Normal	Flash1	OFF	Indicate as per fuel gauge				Standby status
	Alarm	Flash1	Flash3					Low voltage
Charge	Normal	ON	OFF	Indicate as per SOC (The LED of max. SOC Flash2)				ALM will not flash when over-charge alarm
	Alarm	ON	Flash3					
	Over-charge protection	ON	OFF	ON	ON	ON	ON	If there is no power supply, the indicator is standby status
	Temperature, over-current, failure	OFF	ON	OFF	OFF	OFF	OFF	Stop charging
Discharge	normal	FLASH3	OFF	Indicate as per SOC				
	alarm	FLASH3	FLASH3					
	Over-discharge protection	OFF	OFF	OFF	OFF	OFF	OFF	stop discharging
	temperature, over-current, short, reverse, failure	OFF	ON	OFF	OFF	OFF	OFF	stop discharging
Failure		OFF	ON	OFF	OFF	OFF	OFF	Stop charging & discharging

14.SOC indicator

Status		Charge				Discharge			
Fuel gauge indicator		L4●	L3●	L2●	L1●	L4●	L3●	L2●	L1●
SOC(%)	0～25%	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	ON
	25～50%	OFF	OFF	Flash2	ON	OFF	OFF	ON	ON
	50～75%	OFF	Flash2	ON	ON	OFF	ON	ON	ON
	75～100%	Flash2	ON	ON	ON	ON	ON	ON	ON
RUN indicator●		ON				Flash(Flash3)			

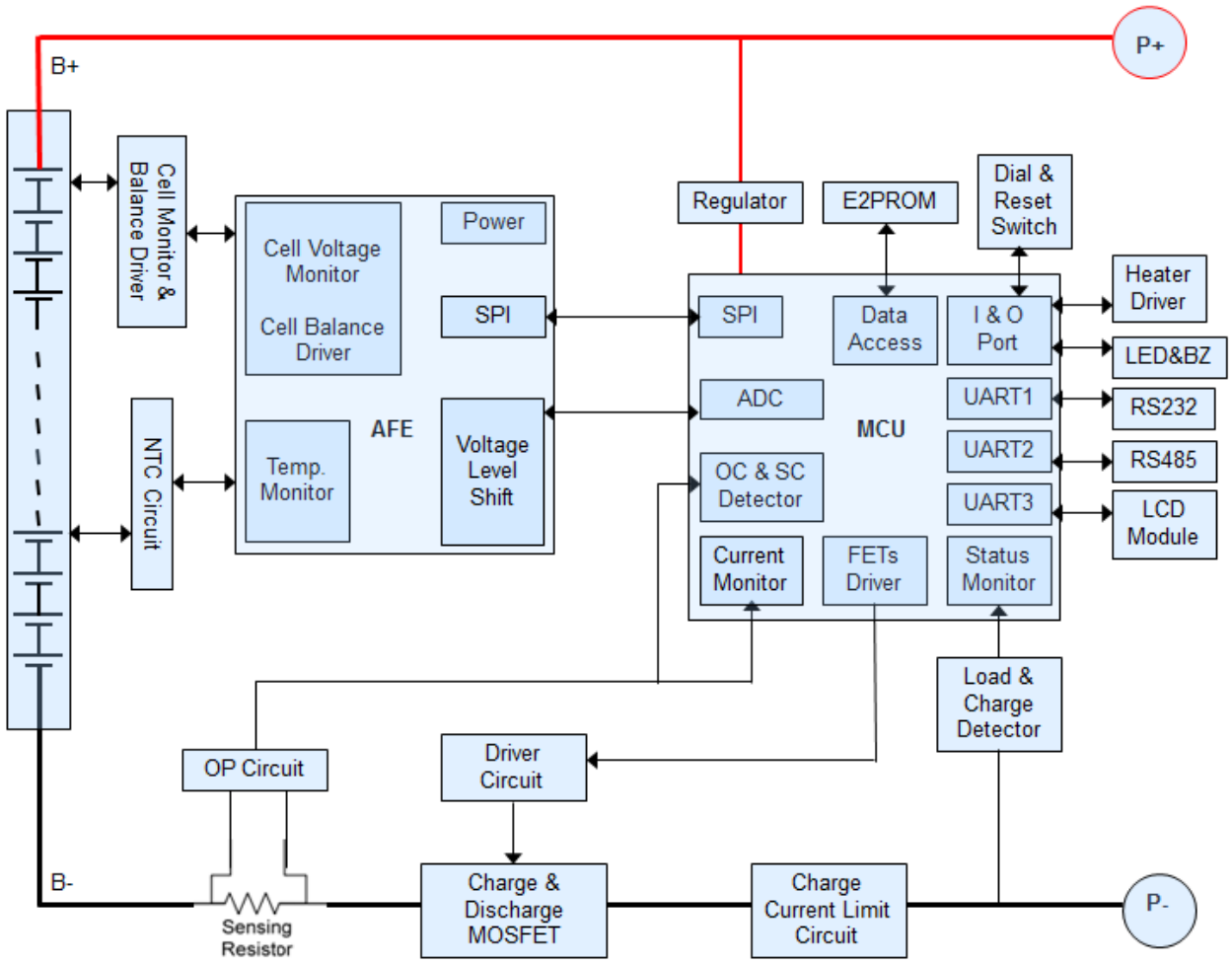
* LED flash instruction

Flash method	ON	OFF
Flash1	0.25S	3.75S

Flash2	0.5S	0.5S
Flash3	0.5S	1.5S

Note：we can enable or disable the alarm of LED indicator from HOST. The default settings are enable

15.Function diagram



16.Specification of BMS

No.	Specification		Default parameters	Adjustable	Remark
1	Over-charge protection (single cell)	Alarm voltage	3600mV	yes	
		Over-charge voltage	3700mV	yes	
		Over-charge delay time	1.0S	yes	
		Over-charge release voltage	3380mV	yes	
		Released by SOC	SOC<96%	yes	
		Released by discharging	Discharge current > 1A		
2	Over-discharge	Alarm voltage	2900mV	yes	If the battery cannot

	protection (single cell)	Over-discharge voltage	2700mV	yes	recover within 30S after over-discharge protection, it will be at low power consumption mode
		Over-discharge delay time	1.0S	yes	
		Over-discharge release voltage	3000mV	yes	
		Charging recover	Connect charger		
3	Over-charge protection (battery)	Alarm voltage	28.8V	yes	
		Over-charge voltage	29.2V	yes	
		Over-charge delay time	1.0S	yes	
		Over-charge release voltage	27V	yes	
		Released by SOC	SOC<96%	yes	
		Released by discharging	Discharge current > 1A		
4	Over-discharge protection (battery)	Alarm voltage	23V	yes	If the battery cannot recover within 30S after over-discharge protection, it will be at low power consumption mode
		Over-discharge voltage	21.6V	yes	
		Over-discharge delay time	1.0S	yes	
		Over-discharge release voltage	24V	yes	
		Released by charging	Connect charger		
5	Over-current (charge) protection	Alarm current	105A	yes	If over-current(charge) protection occurred 10 times consecutively, the protection will not release automatically
		Protection current	110A	yes	
		Over-current delay time	1S	yes	
		Automatically release	1 minute		
		Released by discharging	Discharge current > 1A		
6	Over-current(discharge) protection 1	Alarm current1	105A	yes	If over-current(discharge) protection occurred 10 times consecutively, the protection will not release automatically
		Protection current1	110A	yes	
		Over-current delay time 1	1S	yes	
		Automatically release	1 minute		
		Released by charging	Charge current > 1A		
7	Over-current(discharge) protection 2	Protection current2	150A	yes	If over-current(discharge) protection occurred 10 times consecutively, the protection will not release automatically
		Over-current delay time 2	100±50mS	yes	
		Automatically release	1 minute later		
		Released by charging	Charge current > 1A		
8	Short circuit protection	Protection	yes		
		Automatically release	Removal of load		
			Released by charging		
9	Over-temperature (MOS) protection	Alarm temperature	90℃	yes	
		Protection temperature	110℃	yes	
		Over-temperature release temperature	85℃	yes	
10	Temperature protection (cell)	Low temperature (charge) alarm	0℃	yes	
		Low temperature (charge)	-5℃	yes	

		protection			
		Low temperature (charge) release temperature	0℃	yes	
		High temperature (charge) alarm	50℃	yes	
		High temperature (charge) protection	55℃	yes	
		High temperature (charge) release temperature	50℃	yes	
		Low temperature (discharge) alarm	-15℃	yes	
		Low temperature (discharge) protection	-20℃	yes	
		Low temperature (discharge) release temperature	-15℃	yes	
		High temperature (discharge) alarm	55℃	yes	
		High temperature (discharge) protection	60℃	yes	
		High temperature (discharge) release	55℃	yes	
11	Ambient temperature protection	Low ambient temperature alarm	-20℃	yes	
		Low ambient temperature protection	-25℃	yes	
		Low ambient release	-20℃	yes	
		High ambient temperature alarm	65℃	yes	
		High ambient temperature protection	70℃	yes	
		High ambient release	65℃	yes	
12	Current consumption	Normal mode	≤25mA		
		Low power consumption	≤100μA		
13	Balancing function	Balancing start voltage	3400mV	yes	
		Balancing start voltage different	30mV	yes	
14	Low capacity alarm	Low capacity alarm	SOC < 5%	yes	No alarm during charging
15	Sleep function	Sleep voltage	3150mV/Cell	yes	
		Delay time	5min	yes	

17. Sleep

1) Over-discharge (single cell or battery) protection didn't release within 30 seconds;
2) Release the button after pressing the button for 3 seconds.
3) The lowest cell voltage is lower than the sleep voltage, and the duration reaches the sleep delay time.
4) The standby time exceeds 24 hours.
5) Force shutdown through the host computer software.
PS: Before entering sleep, make sure that there is no charger connected, otherwise it will not be able to enter low power consumption mode.

18.Wake up

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

1) Connect the charger, the output voltage of the charger must be greater than 48V.

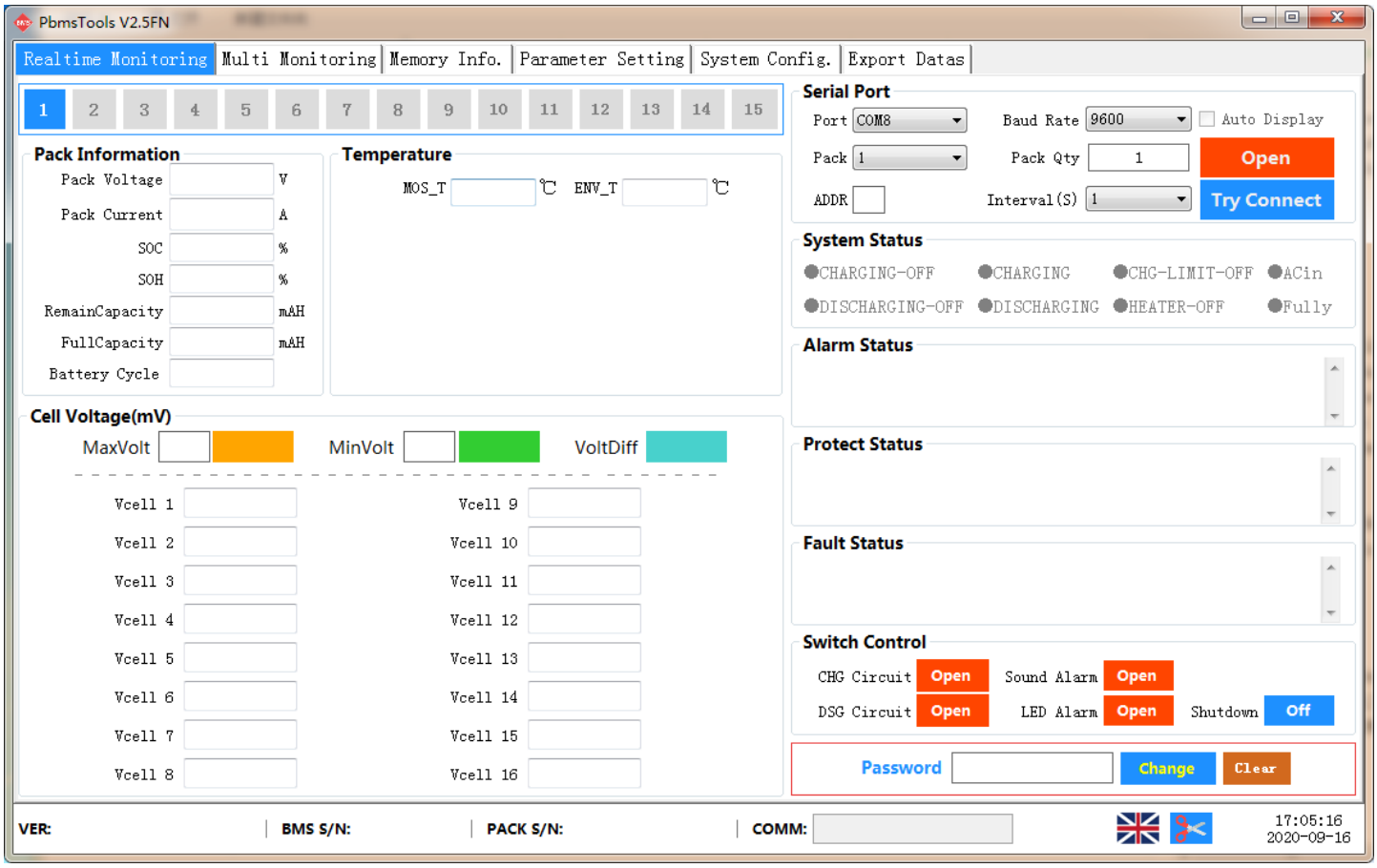
2) Press the button for 3S, after releasing the button.

3) Connect the communication line and turn on the host computer software (by this way, we cannot wake up the battery fallen into sleep mode because of over-discharge protection).

PS: If the battery fallen into low power consumption mode after single cell or battery over-discharge protection, it will wake up regularly every 4 hours, and turn on charging and discharging MOS. If the battery can be charged, it will exit the sleep status and enter normal charging; If the battery cannot be charged after 10 consecutive automatic wake-ups, it will not wake up automatically. When the system is defined as the end of charging, after 2 days(48hours) of standby (standby time setting value), the recovery voltage is not reached, and the charging is forced to resume until the end of recharging.

19. Host software

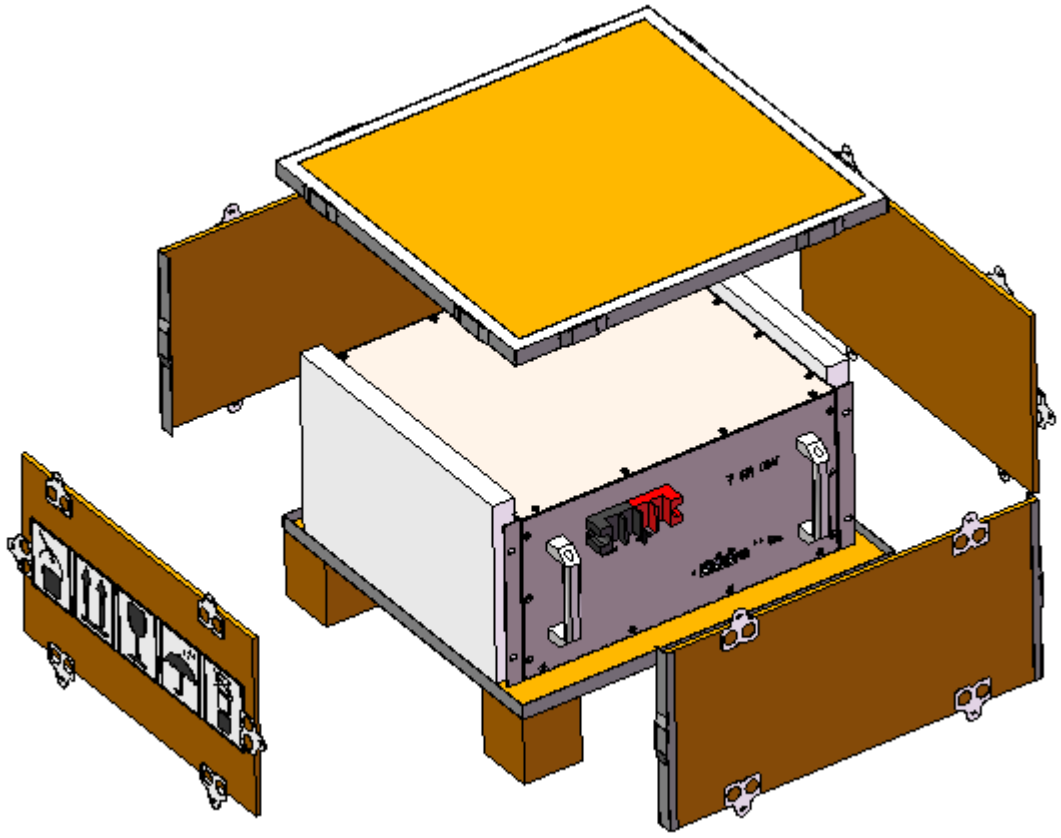
The battery can communicate with the host through the RS232 interface. Then various information of the battery can be monitored through the host, including battery voltage, current, temperature, status, SOC and battery production information, etc., The default baud rate is 9600.



20. Battery Power on/off

When the BMS is in sleep status, press the button for 3 seconds and then release it, the battery is activated;
When the BMS is active, press the button for 3 seconds and then release it, the battery is sleep;
When the BMS is active, press the button for 6S and then release it, the battery is reset;

21. Packaging



The polywood box dimension: L505*W460*H340mm

For 1.2m*1.0m pallet, 4 batteries/layer and 3 layers each pallet which means 12 batteries each pallet and 120 batteries each 20 GP.