



# **SEG-48100H 4U**

## **HESS Product Specification**

**Shanghai Electric Gotion New Energy Technology Co., Ltd.**

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## 1. Overview

SEG-48100H is a household energy storage product, developed, manufactured and sold by Shanghai Electric Gotion New Energy Technology Co. The product can match with almost major brand inverter protocols, and can be used with inverter to effectively realize energy conversion and storage, solve the imbalance between distributed power generation and load, improve the stability and utilization rate of renewable energy generation, realize "self-generation and self-consumption" at the user side, and save electricity cost. The system adopts high-efficiency and long-life lithium iron phosphate battery, and the excellent battery management system can ensure the life time of more than 6000 times.

## 2. Product Features

- 2.1 Good temperature performance.
- 2.2 full range of protection functions, over-voltage, under-voltage, short circuit, reverse connection, over-current, over-temperature, equalization.
- 2.3 Long life: 6000 cycles at 25°C.
- 2.4 Easy to operate and maintain, integrated BMS design, support self-remaining power management.

## 3. Specification

### 3.1 Operating environment

#### 3.1.1 Ambient temperature

Temperature range of charging battery cell: 0~55°C(charging is prohibited below 0°C)

Temperature range of discharging battery cell: -20~60°C

#### 3.1.2 Ambient humidity

Humidity range of charging/discharging: 5%~95%

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### 3.1.3 Altitude

Charging/discharging altitude:  $\leq 1,000\text{m}$

### 3.2 Storage environment

#### 3.2.1 Temperature of storage environment

Temperature range of storage environment:  $-10\sim 30^{\circ}\text{C}$ . It is recommended to store the System in the ventilated, damp-proof, anti-corrosion and dustproof environment with relative humidity not over 50% and room temperature of  $25^{\circ}\text{C}$ .

#### 3.2.2 Humidity of storage environment

Humidity range of storage environment:  $5\% \sim 95\%$ .

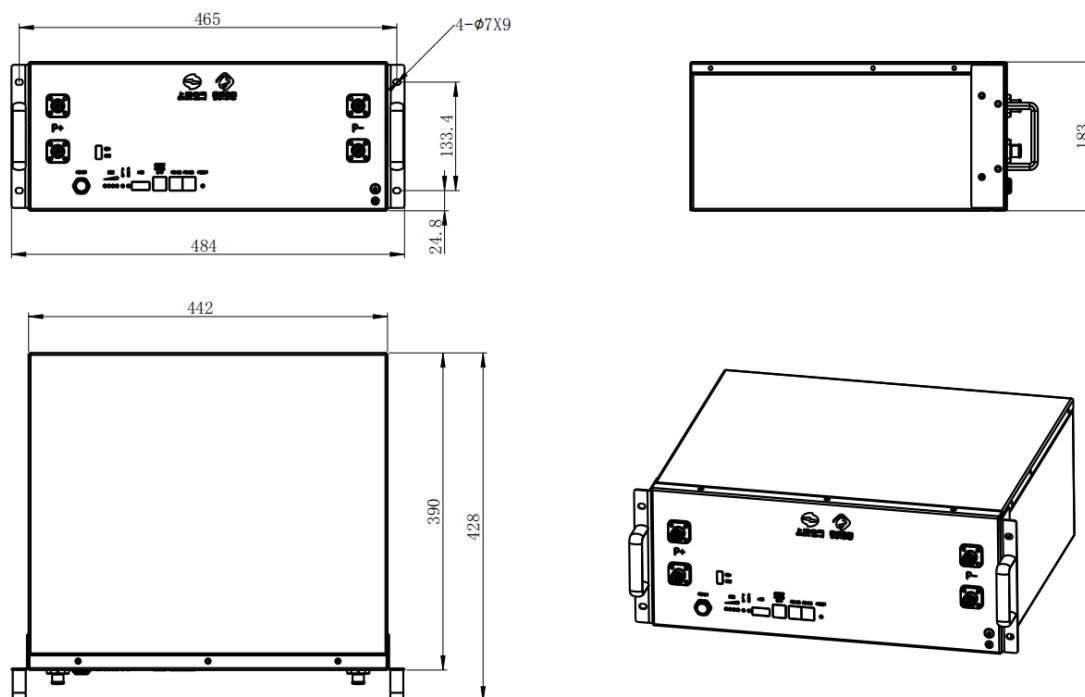
#### 3.2.3 Storage altitude

Requirements of storage altitude:  $\leq 1,500\text{m}$ .

### 3.3 Appearance

The System's appearance should be smooth, dry and free from any deformation, crack, damage or pollutants.

### 3.4 Product picture and technical parameters





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No	Item	Parameter	Note
1	Battery Pack Rated Capacity	100Ah	LFP
2	Rated energy	4800Wh	
3	Rated Voltage	51.2V	
4	Operating voltage range	45.8~57.6V	
5	Charge cut-off voltage	57.6V	
6	Discharge cut-off voltage	45.8V	
7	Rated charging current	50A	Current limit function off
8	Maximum Continuous Discharge Current	100A	1C
9	Single unit type	IFP27175200A-105Ah	
10	Grouping scheme	1P16S	
11	SOC operating range	15%~95%	Recommended
12	Charging efficiency	≥97%	

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13	Internal resistance	$\leq 15\text{m}\Omega$	
14	Cycle life (times)	$>6000$	25°C, 0.5C charge/0.5C discharge, 70%DOD
15	Charging Temperature Range	0°C ~ 55°C	
16	Discharge Temperature Range	-20°C ~ 60°C	
17	Optimal storage temperature	0°C ~ 30°C	
18	Ambient Humidity	5% ~ 95%	
19	Self-discharge rate/month	$\leq 3\%$	25°C
20	Dimension(W*D*H)	(442*390*183) mm	No handle
21	Mass	42±2Kg	
22	Cooling method	Nature	
23	IP protection level	IP20	
24	Output terminal	Two pairs of 100A power terminals	

### 3.5 Charge

No	Item	Parameter	Note
1	Standard charging current limit	10A	
2	Rated charging current	50A	25°C
3	Rated charging voltage	57.6V	
4	Rated charging power	2880W	
5	Allowable voltage range	45.8 ~ 57.6V	

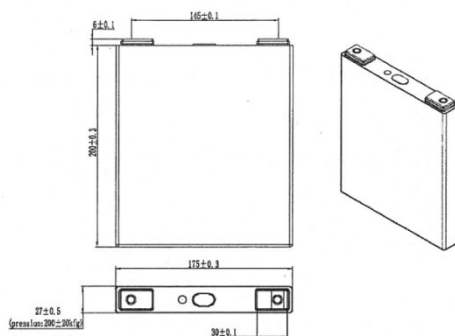
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6	Standard charging mode	Constant current and voltage charging to 57.6V	Cell 3.6V
7	Charging (battery cell) temperature range	0~55°C	

### 3.6 Discharge

No	Item	Parameter	Note
1	Rated discharge current (continuous)	100A	
2	Maximum discharge power	5760W	
3	Discharge (cell) temperature range	-20°C~60°C	
4	Discharge cut-off voltage	45.8V	

### 3.7 Electric cell diagram and technical parameters



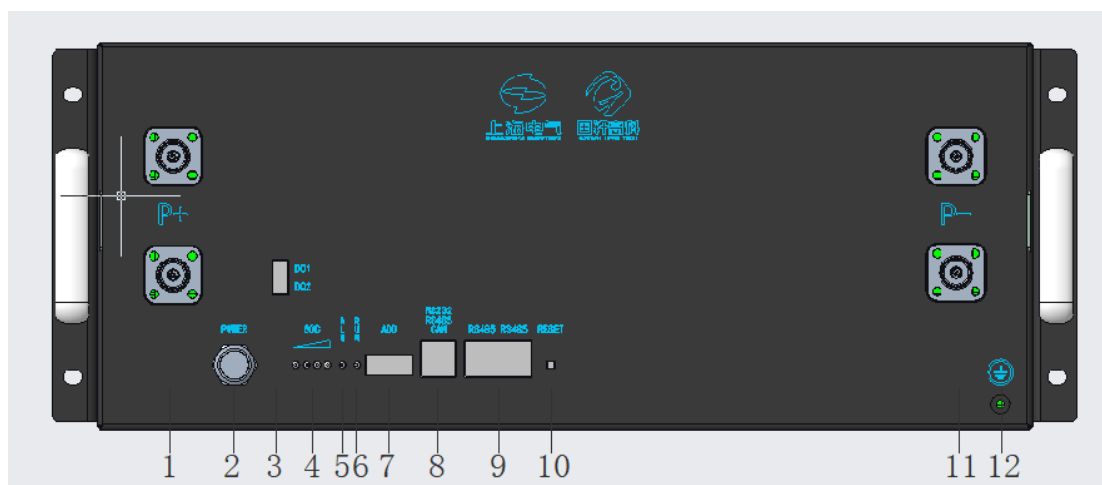
It adopts 3.2V/105Ah lithium iron phosphate battery independently developed and produced by Shanghai Electric Guoxuan, which has four major features such as high safety, long cycle life, superior multiplier charging and discharging performance, green and pollution-free, etc. Its main technical parameters are as follows.

No	Item	Parameter	Note
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1	Rated capacity	105Ah	LFP
2	Rated Voltage	3.2V	
3	Operating Voltage	2.0~3.65V	
4	Dimension	(27±0.5) * (175±0.3) * (200±0.3)	mm
5	Weight	(2060±50) g	
6	Rated energy	336Wh	


#### 4. Front Panel



No	Item	Definition	Note
1	Positive battery terminal	P+	For connecting the positive terminal of the battery pack
2	On/Off key	POWER	Self-resetting button to control the battery pack switch
3	Dry contact	D01/DO2	Normally closed, disconnected when triggered
4	Power status indicator	SOC	Green light to show the remaining battery capacity
5	Alarm light	ALM	Red light, flashing or always on when alarm or



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			protection occurs
6	Run light	RUN	Green light, flashing or long light when the system is operating normally
7	Dipswitch	ADDR	Used to set the battery communication address
8	External communication interface	RS232/RS485/CAN	Used to communicate with upper-level equipment
9	Parallel RS485	RS485	Used to communicate with the background monitoring computer or cascade communication
10	Reset key	RESET	<ul style="list-style-type: none"> <li>● In standby mode, the battery pack can be turned off by pressing the key continuously for 3 seconds.</li> <li>● In the manual shutdown state, press the key continuously for 3 seconds to turn on the battery pack.</li> </ul>
11	Negative battery terminal	P-	Used to connect the negative terminal of the battery pack
12	Ground terminal		Connects the battery to earth.

#### 4.1 Introduction to status indication

System Status	Fault	RUN	ALM	Power Level LED				Note
		●	●	●	●	●	●	
Shutdown	Sleep	off	off	All off				All off
Standby	Normal	1 flicker	off	According to power indication				Standby Status
	Alarm	1 flicker	3 flicker	According to power indication				SOC Below 10%
Charging	Normal	All on	off	According to power indication				Other warning except the overcharging-3: Single overvoltage、 Overall overvoltage 、 overcurrent、 temperature
	Alarm	All on	3 flicker	According to power indication				
Discharging	Normal	3 flicker	off	According to power				/

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	Alarm	3 flicker	3 flicker	indication	Single Undervoltage、 Overall Undervoltage、 overcurrent、 temperature
	Under-voltage protection	off	3 flicker	off	Stop discharging
	Over-current protection	off	All on	off	Stop discharging
Temperature	Protection	off	All on	off	Stop charging and discharging
Failure	Failure of cell, Failure of NTC	off	All on	off	Stop charging and discharging
	Failure of voltage sensor				
	Failure of current sensor				
	Charge and discharge MOS Failure				

#### 4.2 Introduction to capacity indication

Status	Charging				discharging			
	L1●	L2●	L3●	L4●	L1●	L2●	L3●	L4●
Volume Indicator Light								
0~25%	off	off	off	2 flicker	off	off	off	on
25~50%	off	off	2 flicker	on	off	off	on	on
50~75%	off	2 flicker	on	on	off	on	on	on
75~100%	2 flicker	on	on	on	on	on	on	on
Running Indicator Light●	on				3 flicker			

#### 4.3 Setting of dial switch

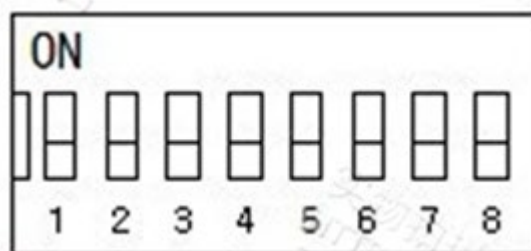
**Parallel dip switch definition:** In the battery pack for parallel when the multi-machine communication, use the dip switch to distinguish different Pack address, hardware address can be set by the dip switch on the board. (Support 8 parallel groups, default 8 parallel groups, 16 parallel groups need to make special request).

**Dipswitch bit1 to bit8 definition:** bit1 to bit4 for setting address, bit5 to bit8 for slave number.

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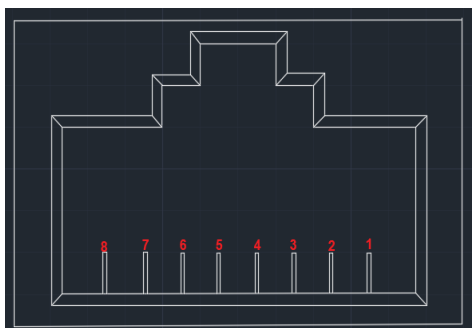
**Host setting:** bit1 to bit4 is 0 and the host address is fixed to 0. bit5 to bit8 is set according to the number of slaves connected in parallel.

**Slave settings:** bit1 to bit4 are set according to the device order, and the slave addresses range from 1 to 15. bit5 to bit8 are fixed to 0.



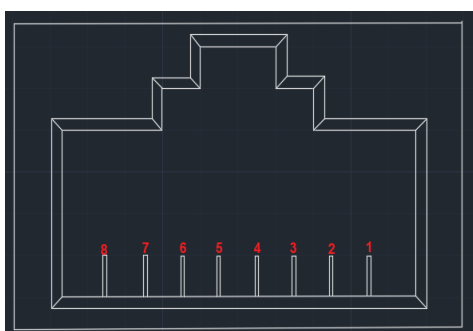
#### 4.4 Communication

##### CAN



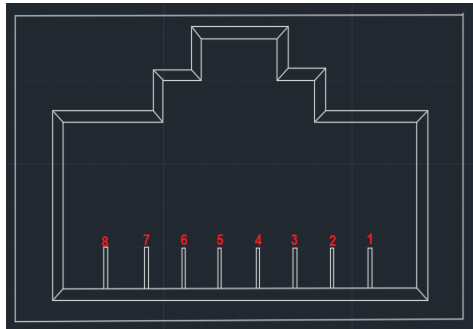
Pin	Definition
4	CAN_H
5	CAN_L
3、6	grounded
1、2、7、8	Empty

##### RS232 ( **Cannot coexist with standalone RS485** )



Pin	Definition
1、8	T232
2、7	R232
3、6	grounded
4、5	Empty

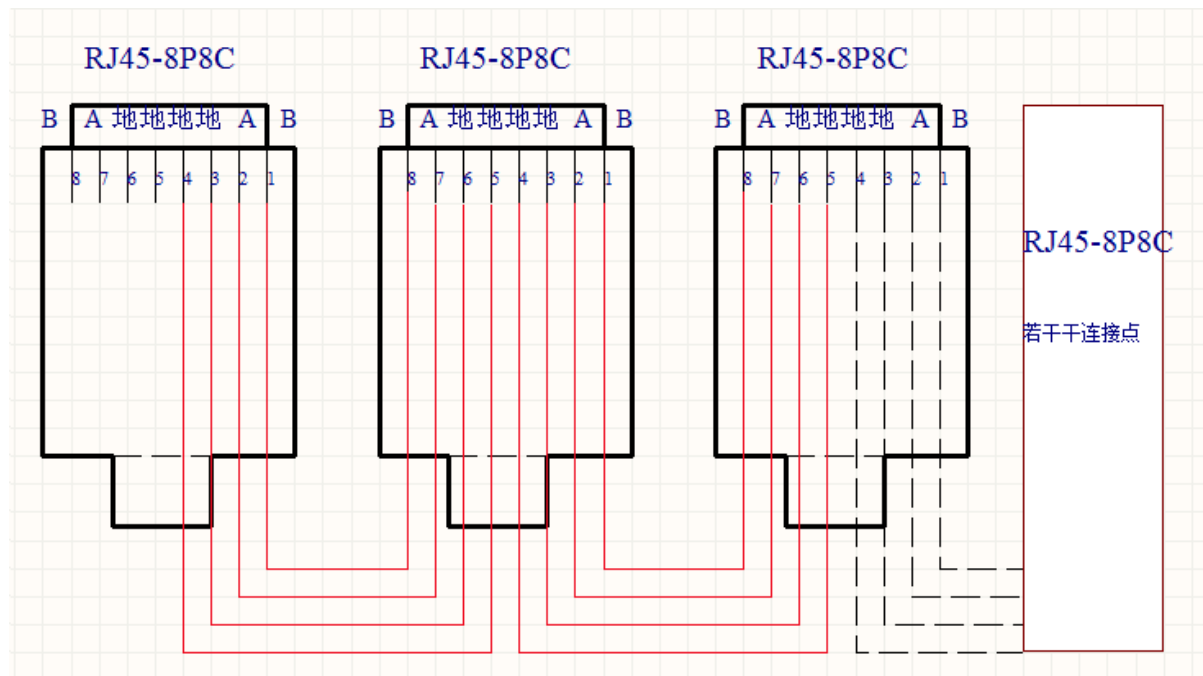
**RS485 (Cannot coexist with standalone RS232)**



Pin	Definition
1、8	485-B
2、7	485-A
3、6	grounded
4、5	Empty

**Parallel RS485 interface**

When multiple machines are connected in parallel, RS485 interface is used as parallel communication interface and independent communication interface is used as uplink communication interface, PC or intelligent terminal device can read battery data of any parallel PACK through independent communication interface.



**4.5 Composite keys**

Intelligent one-touch switch design, the system can be manually turned on and

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started when the power is off, and manually turned off when the power is not ready. Long press of the button can realize software or hardware reset BMS and clear various abnormal states.

#### 4.6 Dry contact

	Status Content	Not triggered state	Trigger state
DO1	BMS power off or unable to start	Conducted	Disconnected
DO2	Charging MOS is damaged	Conducted	Disconnected
	Discharge MOS is damaged	Conducted	Disconnected
	AFE is damaged	Conducted	Disconnected
	NTC disconnection	Conducted	Disconnected
	Cell failure	Conduction	Disconnected

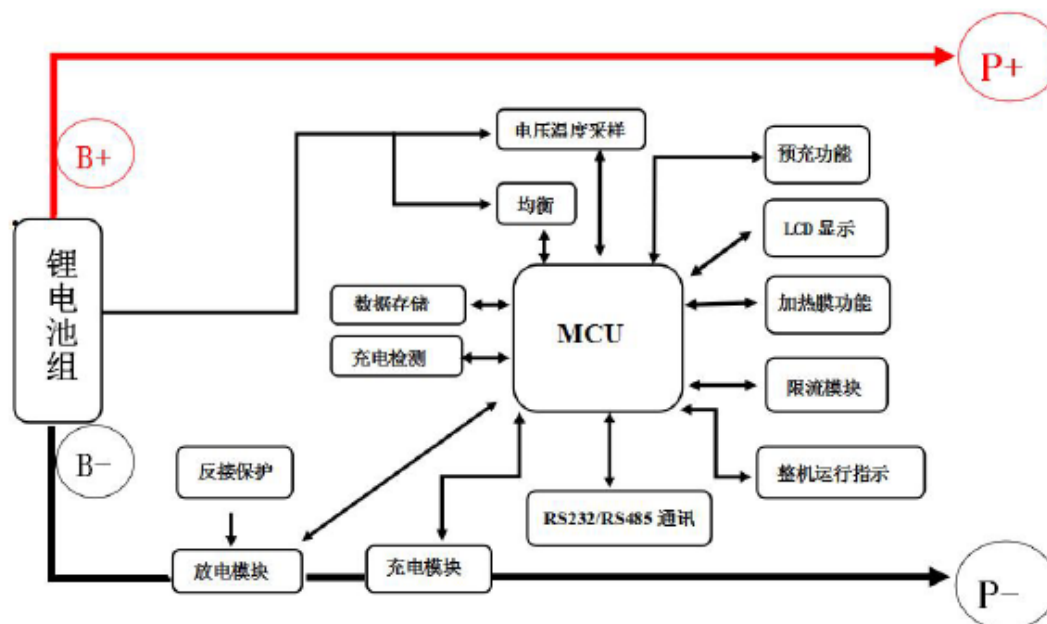
#### 4.7 Terminal

Two pairs of 100A power terminals

## 5、BMS

### 5.1 BMS

This BMS is a protection board specially designed for household products. One BMS protection board can control only one energy storage system. The electrical schematic is as follows.



## 5.2 BMS function

### ■ Alarm function

Function Name	Item List	参数	备注
Monomer voltage alarm	Overvoltage warning voltage	3700mV	
	Undervoltage warning voltage	2700mV	
Single over-voltage protection	Overvoltage protection voltage	3850mV	
	Overvoltage protection recovery voltage	3650mV	
	Overvoltage recovery condition	1、The single cell voltage drops to the protection recovery point and automatically recovers	

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		2、 Discharge current >3A is detected in the battery 3、 Capacity <94%, automatic recovery	
Single under-voltage protection	Undervoltage protection voltage	2500mV	
	Undervoltage recovery voltage	2900mV	
	Undervoltage recovery condition	Charging current (>1A) is detected or utility power is restored	
Overall voltage alarm	Overvoltage warning voltage	57.6V	
	Undervoltage warning voltage	48.0V	
Overall overvoltage protection	Overvoltage protection voltage	57.6V	
	Overvoltage recovery voltage	56.0V	
	Overvoltage recovery condition	1、 The total voltage drops to the recovery point and automatically resumes charging  2 、 Discharge current (discharge current>3A) is detected and the battery continues to discharge for	

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		a period of time or a certain amount of discharge  3 、 Capacity <94%, automatically resume	
Battery undervoltage protection	Undervoltage protection voltage	45.8V	
	Undervoltage recovery voltage	48.0V	
	Undervoltage recovery condition	Battery charging current detected (charging current > 3A)	
Cell temperature alarm	Charging high temperature alarm	55°C	
	Charging low temperature alarm	-5°C	
	Discharge high temperature alarm	55°C	
	Discharge low temperature alarm	-15°C	
Battery cell temperature disable charging	Charge high temperature protection	60°C	
	Charge high temperature recovery	55°C	
	Charge low temperature protection	-10°C	



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	Charge low temperature recovery	-5°C	
Cell temperature prohibition discharge	Discharge high temperature protection	60°C	
	Discharge high temperature recovery	55°C	
	Discharge low temperature protection	-20°C	
	Discharge low temperature recovery	-15°C	
Ambient temperature alarm	Ambient high temperature alarm	55°C	
	Ambient low temperature alarm	-15°C	
MOS high temperature alarm	MOS high temperature alarm	110°C	
Charging overcurrent alarm	Charge alarm current	100A	
Charge overcurrent protection	Charge protection current	110A	
	Charge protection time delay	5S	
Discharge overcurrent alarm	Discharge alarm current	100A	
	Discharge protection current	110A	
	Discharge overcurrent delay time	5S	
Secondary discharge	Secondary protection	160A	

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overcurrent protection	current		
	Secondary overcurrent delay time	500mS	
Output short circuit protection	Short-circuit protection current	206A	
	Short-circuit protection delay time	900uS	
	Short-circuit protection release	Charging lift, charging current $\geq 2A$	
Automatic recovery of discharge current	Automatic recovery time delay	Automatic recovery after 60S	

■ Charge balance

In the charging state, when the battery pack single cell voltage is greater than the balance open voltage (3500mV) and the pressure difference with the lowest single cell is greater than the balance switch pressure difference of 50mV (the pressure difference is adjustable), the equalization function is turned on. When the single cell voltage and the lowest single cell pressure difference is less than the balance off pressure difference, the equalization is stopped. During the equalization process, the Li-ion battery management system monitors the battery temperature and turns off the equalization function of all cells when the battery temperature is higher than the charging high temperature protection temperature. When the battery temperature is lower than the charging high temperature protection recovery temperature, the equalization function is resumed.

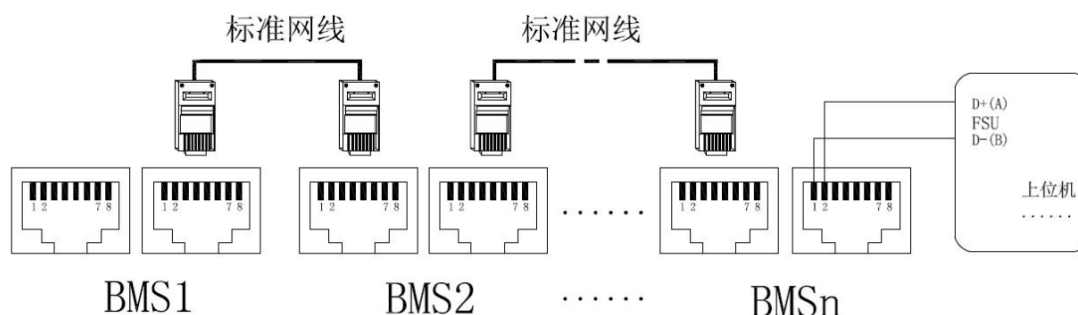
■ Charge current limit

10A current limiting function, the upper computer sets the charging current limit, or charging without current limit.

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■ Intelligent communication

The upper computer software can view the battery parameters and set the protection parameters. The master PACK will collect the data from the PACK and upload it to the upper computer for display in a unified way, and support multi-computer cascade communication.



■ Pre-charge function and short circuit protection

Protection board with pre-charge function, when load access is detected, the protection board pre-charge circuit automatically charges the capacitor at the load end.

■ Anti-reverse connection function

With anti-reverse connection circuit, when the positive and negative polarity of external power supply is reversed with the positive and negative polarity of BMS, BMS will not be damaged and alarm and enter the cut-off protection state.

■ Hibernation

In order to reduce the power consumption of the whole system, the system has a hibernation function and will enter hibernation mode when one of the following conditions occurs.

- 1) Normal standby for 24 hours.
- 2) Release the button after pressing it for 3s.
- 3) The battery triggers undervoltage protection.
- 4) The system is forced to shut down by the software of the host computer.

Before entering hibernation, make sure no charger is connected, otherwise it will not be able to enter low power mode.

■ Wake up

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To combine with the actual situation and for the convenience of use, the system provides a variety of different wake-up methods.

- 1) Charging wake-up: access to the charger, the charger output voltage should be  $\geq 48V$ .
- 2) Press button 3S, after releasing the button.

#### ■ History storage function

The protection board has history storage function, when the protection board appears or clears the alarm, protection and failure abnormality, the protection board automatically saves the battery parameters at that time. It can store up to 500 pieces of information, and when the information is full, it will overwrite the information with the oldest date one by one. The corresponding historical records can be read by the host computer and converted into Excel protection data.

#### ■ Host computer function

The monitoring platform can communicate directly with the BMS through 485 interface to obtain real-time battery voltage, current, temperature, status, SOC and other information. The host computer can access the real-time data and historical data of different battery systems through RS485 cascade. Configuration parameters can be imported and exported. Monitoring related data can be saved to reports, etc.

#### ■ System Upgrade

The BMS system can be upgraded online via serial port.