

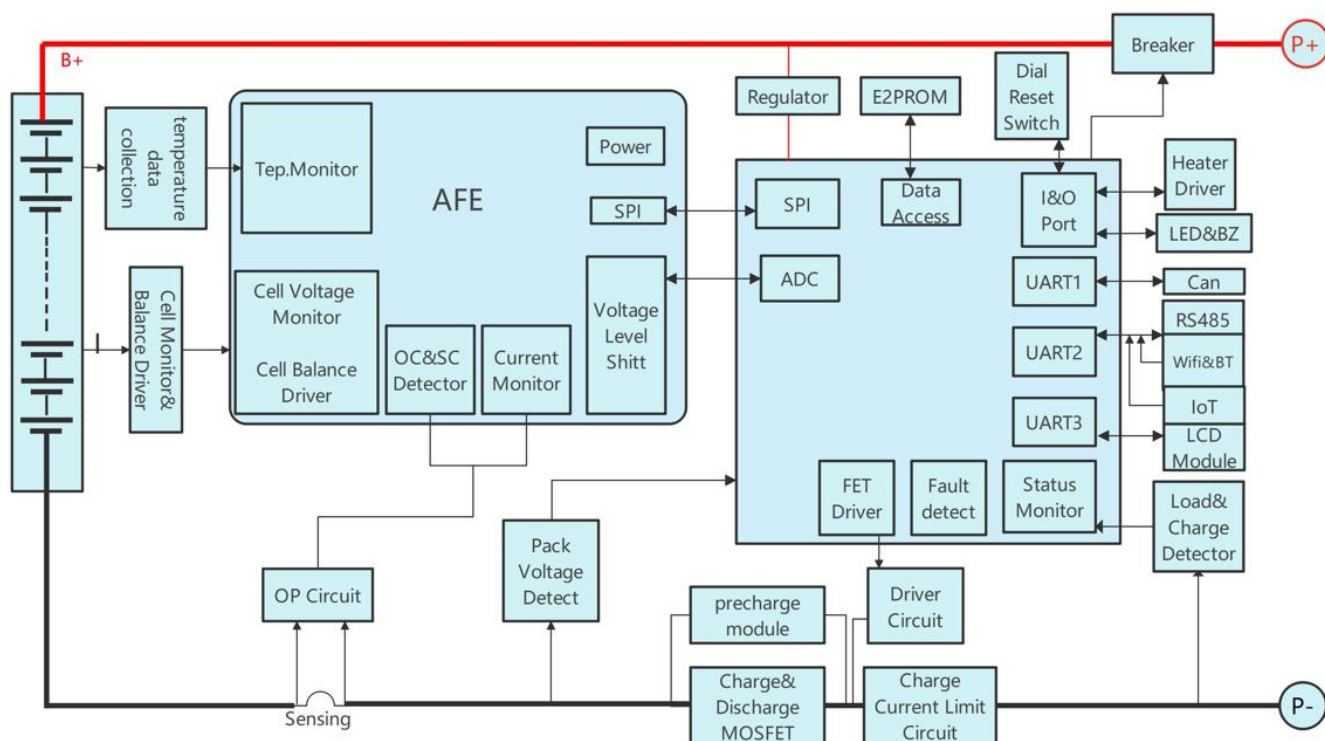
Specification For ApprovalProduct Acknowledgement				
Customer Name				
Product Model	KS48200-Ho21 (16S200A 200AH) - Split + Active Balancing + Wifi + Light Bar			
Customer Model				
Customer Part Number				
Version	A4			
date	2025/ 09/09			
match pieces clear one	Serial number	name	model	quantity
	1	BMS motherboard	KS-48200-Ho21 _V2 The split version has heating, no dry contact, current limit 20A , 2-way 485, 1-way Can	1 piece
	2	B + Line	UL1015; 16#; Red; 3.5mm banana female OT8 , plastic; ROHS L= 2 00 mm ± 10 mm	1
	3	Single voltage acquisition line (Customers purchase on their own)	XHB-17P buckle; UL1430:22#; OT4 terminal; red and black; adhesive; ROHS L=800mm ± 10mm	1
	4	Temperature acquisition line	PHS-8P;24#;NTC;10K,B value 3950;;Glue;ROHS: L=900mm ± 10mm	1
	5	Self-locking switch with wiring harness (with socket)	PJPB16-AP1SEB03N Self-Locking Switch 16mm Blue Light 3V -16mm Flat Metal Pushbutton Switch L= 900 mm ± 10 mm	1
	6	screw	Three combination screws M5*15	8 pieces
	7	adapter plate	KS- P B1 8 V 3 (Welding dry contact terminal (add 6 SOC lights))	1 piece
	8	Adapter board harness 18pin	2.54mm 18P Terminal Wire (FC18P Double-Ended Reverse UL2651 26AWG Red Edge Gray Strip) Butterfly Clip L= 60 0 mm ± 10 mm	1
	9	Adapter board harness 16pin	2.54mm 16P Terminal Wire (FC16P Double-Ended Reverse UL2651 26AWG Red Edge Gray Strip) Butterfly Clip L= 60 0 mm ± 10 mm	1
	10	Wi-Fi module	BT	1 piece
	11	Wi-Fi module power supply line	Bluetooth Cable-PHS-4P; UL1430; 24#; White; Adhesive; ROHS L= 6 00 mm ± 10 mm	1
	12	Light Bars & Wiring Harnesses	LED8-V2 – 32 LEDs L= 60 0 mm ± 10 mm	1 set
	13	Heating wire	JST-VH3.96-2P Red and White UL3135 18AWG 120mm Stripped 5±1mm Glue ROHS L= 90 0 mm ± 10 mm	1
	14	Busbar	200A 4-hole small copper busbar	2
	15	Active balancing	KS- 16S-AE _V3 The balancing module sampling line is purchased by the customer	1 piece

		module		
	16	Active balancing control line	PHS-2P;24#;Glue;ROHS: L= 90 0 mm ± 10 mm	1
	17	Secondary protection harness	2510-P 2P UL1430 22# twisted wire, tinned, 3.5±0.5mm, red and black plastic, ROHS 601-000502 L= 9 00 mm ± 10 mm	1
Kesheng BMS			Customer Confirmation	
Formulated:	Li Bo		Re-sign:	
Approved:	Guo Jing			
This product complies with environmental protection: ☒ ROHS ☐ REACH ☐ Halogen-free				
Function Configuration Table				
Function	Number of strings		☒ 16 strings ☐ 15 strings ☐ 14 strings ☐ 13 strings ☐ 8 strings	
	Charging current limit		☐ None ☐ 10A ☒ 20A ☐ ___A ☒ Passive current limiting ☐ Active current limiting	
	Reverse polarity protection		☒ No ☐ Yes	
	Weak current switch		☐ No ☒ Yes	
	buzzer		☐ No ☒ Yes	
	storage		☐ None ☒ 500 items ☐ 1000 items	
	Heating film interface		☐ No ☒ Yes	
	Secondary protection interface		☐ No ☒ Yes	
	Precharge function		☐ No ☒ Yes The pre-charge circuit can support a maximum capacitive load of 30000uF. The specific value is subject to actual system measurement.	
	Dry Contact		☒ No ☐ Yes (2 -way) ☐ Function	
	Display		☒ None ☐ English smart ☐ White keycap ☐ Key membrane ☐ 5-inch touch screen	
	Dip switch		☐ None ☒ 4 digits ☐ 6 digits	
	LED lights		☐ None ☒ RUN ☒ ALARM ☐ SOC 4 ☒ Long light strip	
	Collection socket		☒ Vertical ☐ Horizontal ☒ 17+8 ☐ 6+7+6+7	
	WIFI		☐ No ☒ Yes	
	Bluetooth		☐ No ☒ Yes	
communication	Communication interface		☐ RS232 ☒ RS485 ☒ Parallel dual RS485 ☒ CAN	
	Upgrade method		☒ RS485	
	Matching inverter		CAN: Payne, Deye, GoodWe, Growatt , Jinlong, Victron, Shouhang , SMA, etc. RS485: Riyueyuan, Shuori, Pylon, etc.	
	Communication Protocol		Pylon-CAN-V1.2-180408-lowVoltage Growatt BMS CAN-Bus-protocol-low-voltage-V1.05 Victron-Victor-CAN-V1.00-220910 Voltronic-485-V1.0.3-200325 WOW-protocol-Shuori-V1.3 Kesheng-BMS_Protocol_V1_0_0	

Summary of file changes

date	Version number	Revision Notes	Maker	Approver
2025-5-9	A 1	First draft writing	Li Bo	Guo Jing
2025-5-10	A2	The single sampling line is purchased by the customer	Li Bo	Guo Jing
2025-5-14	A3	Add secondary protection harness	Li Bo	Guo Jing
2025-09-09	A4	Mainboard updated to V2 Active balancing updated to V3	Li Bo	Guo Jing

1. Product topology diagram :



2. Scope of application

This product is suitable for a 16- string lithium-ion battery management system , providing battery pack protection and recovery functions for overvoltage, undervoltage, overcurrent, high temperature, low temperature, and short circuit. It accurately measures the SOC during charging and discharging, and provides SOH health statistics . It also achieves voltage balancing during the charging process . Through human-computer interaction with the host software , it displays and sets alarm protection parameters such as voltage , current , and temperature , and stores and displays real-time and historical battery operating status data. It features multiple sleep and wake-up modes, supports parallel communication via RS485 , and communicates with a PC via RS485 and CAN. Parameter configuration and data monitoring are performed through human - computer interaction with the host software . It can be widely used in home energy storage inverters, indoor and outdoor base stations, and other applications.

3. Functional Description

3.1. Cell and battery voltage detection

monitors the voltage of series-connected cells in real time, providing overvoltage and undervoltage warnings and protection. Cell voltage detection accuracy is $\pm 10\text{mV}$ at $0-45^\circ\text{C}$ and $\pm 20\text{mV}$ at $-20-70^\circ\text{C}$.

Alarm and protection parameter settings can be modified via the host computer.

3.2. Battery charge and discharge current detection

provides overcurrent alarm and protection for battery pack charge and discharge currents, as well as output short-circuit protection. Real-time acquisition and monitoring of battery pack charge and discharge currents. Continuous charge and discharge currents up to 200A , temperature rise less than

50° C, and accuracy better than $\pm 1\%$.

Alarm and protection parameter settings can be modified via the host computer.

3.3. Cell, ambient, and power temperature detection:

4 cell temperature detection channels , 1 ambient temperature detection channel , and 1 MOS temperature detection channel provide high and low temperature alarms and protection. The temperature detection accuracy is $\pm 2^{\circ}$ C. The cell temperature sensor uses a 10K, B value of 3950

3.4. Battery capacity calculation and cycle count function

Real-time calculation of remaining battery capacity, learning of total charge and discharge capacity in one go, and SOC estimation accuracy better than $\pm 5\%$.

It has the function of calculating the number of charge and discharge cycles. When the cumulative discharge capacity of the battery pack reaches 80% of the set full capacity, the number of cycles is +1 .

The ampere-hour integration realizes the accurate calculation of battery SOC. It supports the open circuit voltage static calibration method and the charge and discharge dynamic calibration method for SOC correction.

3.5. Charge and discharge MOSFET switch function

Low internal resistance, high current, optimized design for startup with large capacitive loads, zero switching, and high charging voltage resistance in backup power applications.

3.6. Battery charge balancing function

The charge equalization strategy can be flexibly set (start-up voltage, equalization voltage), which can effectively improve the battery's service time and cycle life.

3.7. LED light status indication function

It has 6 LED indicators, 4 for remaining battery capacity, 1 for operation, and 1 for alarm protection status .

3.8. Key switch function

Self-locking switch: Intelligent one-button switch design, the system can be manually turned on when the power is off, and can be manually turned off in any state.

Reset and sleep button: Press and hold the button for 3-6 seconds in the non-backup state to enter sleep mode, and press and hold the button for 1-3 seconds to wake up in the idle state.

3.9. RS485 , CAN communication function

PC or FSU can realize remote measurement, remote signaling, remote adjustment, remote control and other commands through RS485 to realize battery data monitoring, control and parameter setting.

Real-time monitoring of BMS and Pack status.

The inverter or terminal can obtain battery status data and adjust its own output through CAN or RS485 communication.

3.10. Host computer control function

It can set various battery management parameters such as single cell over-voltage and under-voltage, total battery voltage over-voltage and under-voltage, charging overcurrent, discharging overcurrent, cell high and low temperature, ambient high and low temperature, balancing strategy, number of battery series cells, battery capacity, etc. It can also turn on and off the discharge MOS, charging MOS, current limiting function switch, buzzer alarm switch, forced sleep switch, and realize online upgrade of system software.

3.11. Hardware voltage detection function

The BMS is designed with a unique hardware detection and protection circuit to ensure that the BMS can operate safely and reliably for a long time under abnormal conditions.

3.12. Historical data storage function

It has a historical record storage function with a storage capacity of no less than 500 records , which is convenient for system monitoring, analysis and maintenance .

3.13. 3Parallel communication function

through the RS485 interface, and the dip switch is used to set the address during parallel communication.

3.14. Charging current limiting function

It has a 20A current limiting function. The current limiting mode includes passive current limiting mode and active current limiting mode. The default current limiting mode is passive . When the charging current is greater than 215A, the current limiting function is activated.

3.15. Dry contact function (optional)

Dry contact definition: (default normally open)

- ①When there is protection, dry contact 1 is closed;
- ② When there is a fault (NTC fault , M OS fault, single sampling fault), dry contact 2 will operate.

3.16. Heating function

It has a low-temperature battery heating function. When the battery cell temperature is lower than 0° C during charging, or the charging low-temperature protection is triggered, heating is turned on; when the battery cell temperature is higher than 15 ° C, heating is stopped.

3.17. Secondary protection function

The BMS can drive the trip device to operate or the controlled fuse to disconnect the external output circuit when the charging and discharging MOS fails or the single cell voltage is too high or too low, thereby achieving the effect of secondary protection.

Control strategy: execute actions when any condition is met

- Triggering the MOS fault, and the MOS temperature is greater than 100 °C or the MOS NTC fault alarm lasts for 5 seconds , and the fuse is blown and reports "secondary protection"
- The highest single cell voltage is greater than the overvoltage protection value + 300 mV , and the system is still in charging mode for 5 seconds . The fuse is blown and reports "secondary protection".
- The lowest single cell voltage is less than the undervoltage protection value - 300 mV , and the system is still in discharge mode for 5 seconds . The fuse is blown and reports "secondary protection".

Appendix: Reliability parameters

Serial number	project	Specifications/Conditions
1	Detection accuracy	Current accuracy: ±2% Voltage accuracy: ±2 0mV Temperature accuracy: ±3℃ SOC average accuracy: ≤± 5 %
2	Current threshold	Charging current: 0.6 A Discharging current : 0.6 A
3	Failure type	1、 The charging and discharging MOS tube fails; 2. The current detection fails; 3. Temperature detection failure 4. Voltage detection failure (charging is prohibited if the voltage is lower than 1.0V)
4	Information Exists	Store no less than 500 historical data information, including current total voltage, current, temperature, SOC , SOH , number of cycles and operating status,

		etc.
5	Communication interface	1、The inverter supports CAN communication 2、Support RS485 communication (communication port can realize program upgrade)
6	Power on	In shutdown mode, turn on the weak current switch to turn on the machine, and the LED lights corresponding to the real-time SOC will light up at the same time.
7	Shutdown	In power-on mode, disconnect the weak current switch for 3~ 6 seconds until the 6 LEDs go out in sequence.
8	Short Circuit	The internal resistance of the battery pack and the short-circuit loop is not less than 40mΩ , the short-circuit current does not exceed 1000A, and the air switch is used for short-circuiting 50 times

4.Electrical characteristics

4.1. Electrical properties

project	Minimum	maximum	conventional	unit
Operating voltage	38	60	51.2	V
Charging voltage	48	60	57.6	V
Operating temperature range	-25	60	25	℃
Operating humidity range	10	85	/	%
Continuous charge and discharge current		200		A
Discharge output internal resistance	< 10			mΩ
Normal operating power consumption	≤ 30 (without display)			mA
	≤80 (with display)			mA
Sleep power consumption		200	100	uA

4.2. Basic parameter settings

Alarm value					
Function Name	Function Settings	Can it be set	Index items	Factory default	Remark
Single cell voltage alarm	Open	Can be set	Overvoltage alarm	3600 mV	± 20mV
		Can be set	Overvoltage delay	3000mS	1000-5000mS
		Can be set	Overvoltage recovery	3380mV	± 20mV
		Can be set	Undervoltage alarm	2700mV	± 20mV
		Can be set	Undervoltage delay	3000mS	1000-5000mS
		Can be set	Undervoltage recovery	3000 mV	± 20mV

Overall voltage alarm	Open	Can be set	Overvoltage alarm	57.6V	± 50mV
		Can be set	Overvoltage delay	3000mS	1000-5000mS
		Can be set	Overvoltage recovery	56.0 V	± 50mV
		Can be set	Undervoltage alarm	44.0V	± 50mV
		Can be set	Undervoltage delay	3000mS	1000-5000mS
		Can be set	Undervoltage recovery	48.0 V	± 50mV
Battery cell temperature prohibits charging alarm	Open	Can be set	High temperature alarm	50 ℃	± 2 ℃
		Can be set	High temperature delay	5000ms	1000-5000mS
		Can be set	High temperature recovery	45 ℃	± 2 ℃
		Can be set	Low temperature alarm	3 ℃	± 2 ℃
		Can be set	Low temperature delay	5000ms	1000-5000mS
		Can be set	Low temperature recovery	5 ℃	±3℃
Battery cell temperature prohibition alarm	Open	Can be set	High temperature alarm	55 ℃	±3℃
		Can be set	High temperature delay	5000ms	1000-5000mS
		Can be set	High temperature recovery	50 ℃	±3℃
		Can be set	Low temperature alarm	-15 ℃	±3℃
		Can be set	Low temperature delay	5000ms	1000-5000mS
		Can be set	Low temperature recovery	- 5 ℃	±3℃
Ambient temperature alarm	Open	Can be set	High ambient temperature alarm	55 ℃	±3℃

		Can be set	Ambient high temperature delay	5000ms	1000-5000mS
		Can be set	Environmental high temperature recovery	50 °C	±3℃
		Can be set	Low ambient temperature alarm	-15 °C	±3℃
		Can be set	Low temperature delay	5000ms	1000-5000mS
		Can be set	Environmental low temperature recovery	- 5 °C	±3℃
Charging overcurrent alarm	Open	Can be set	Charging overcurrent alarm	200 A	±2 A
		Can be set	Charge overcurrent delay	5000ms	1000-4000mS
		Can be set	Charge overcurrent recovery	195A	±2 A
Discharge overcurrent alarm	Open	Can be set	Discharge alarm current	200A	±2 A
		Can be set	Discharge overcurrent delay	5000ms	1000-4000mS
		Can be set	Discharge recovery current	195A	±2 A
M OS high temperature alarm	Open	Can be set	MOS high temperature alarm	90 °C	±3℃
		Can be set	MOS high temperature delay	3000ms	1000-5000mS
		Can be set	MOS high temperature recovery alarm	80 °C	±3℃
Pressure differential alarm	Open	Can be set	Excessive pressure difference alarm	500mV	± 50mV
		Can be set	The excessive pressure difference alarm is restored	300mV	± 50mV
SOC alarm	Open	Can be set	SOC low alarm	10 %	

		Can be set	SOC low alarm recovery	15 %	
Protection Value					
Function Name	Function Settings	Can it be set	Index items	Factory default	Remark
Single protection	Open	Can be set	Single overvoltage protection	3650 mV	± 20mV
		Can be set	Single overvoltage delay	2000ms	± 2000mS
		Can be set	Single overvoltage recovery	3380mV	± 20mV
		Can be set	Single cell undervoltage protection	2500mV	± 20mV
		Can be set	Single cell undervoltage delay	3000ms	± 2000mS
		Can be set	Single cell undervoltage recovery	3000mV	± 20mV
Overall protection	Open	Can be set	Overall overvoltage protection	58.4V	± 50mV
		Can be set	Overall overvoltage delay	3S	± 2000mS
		Can be set	Overall overvoltage recovery	54.4V	± 50mV
		Can be set	Overall undervoltage protection	40V	± 50mV
		Can be set	Overall undervoltage delay	3S	± 2000mS
		Can be set	Overall undervoltage recovery	48.0V	± 50mV
Battery cell temperature prohibits charging	Open	Can be set	Charging high temperature protection	55 ℃	±3℃
		Can be set	Charging high temperature delay	3000mS	± 1000mS
		Can be set	Charging high temperature recovery	50 ℃	±3℃
		Can be set	Charging low temperature protection	-1 ℃	±3℃

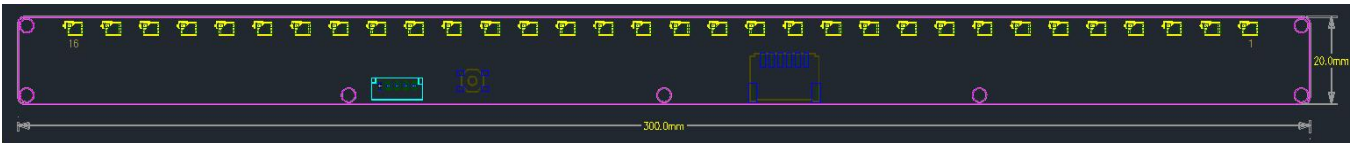
		Can be set	Charging delay at low temperature	3000mS	± 1000mS
		Can be set	Charging low temperature recovery	5 °C	±3℃
Battery core temperature prohibited	Open	Can be set	Discharge high temperature protection	60 °C	±3℃
		Can be set	Discharge high temperature delay	3000mS	± 1000mS
		Can be set	Discharge high temperature recovery	55 °C	±3℃
		Can be set	Discharge low temperature protection	-20 °C	±3℃
		Can be set	Discharge low temperature delay	3000mS	± 1000mS
		Can be set	Discharge low temperature recovery	-15 °C	±3℃
Ambient temperature protection	Open	Can be set	Low temperature protection	-25 °C	±3℃
		Can be set	Ambient low temperature release	-15 °C	±3℃
		Can be set	High temperature protection	65℃	±3℃
		Can be set	Ambient high temperature release	55℃	±3℃
MOS tube high temperature protection	Open	Can be set	MOS high temperature protection	110 °C	±3℃
		Can be set	MOS high temperature delay	3000mS	± 1000mS
		Can be set	MOS high temperature recovery	80 °C	±3℃
Pressure differential protection	Open	Can be set	Excessive pressure difference protection	800mV	± 50mV
		Can be set	Recovery from excessive pressure difference	500mV	± 50mV

Charging overcurrent protection	Open	Can be set	Charge overcurrent 1 protection	215A	±2 A
		Can be set	Charge overcurrent 1 delay	3 000mS	1 000-6 000mS
		Can be set	Charge overcurrent 2 protection	250A	± 2.0A
		Can be set	Charge overcurrent 2 delay	500mS	100-2000mS
		Not settable	Automatic recovery after charging overcurrent	10 min	10 minutes, locks after 3 attempts, can be recovered manually or by discharging
Discharge overcurrent protection	Open	Can be set	Discharge overcurrent 1 protection	215 A	± 2A
		Can be set	Discharge overcurrent 1 delay	3000mS	1 000-6 000mS
		Can be set	Discharge overcurrent 2 protection	250A	± 5.0A
		Can be set	Discharge overcurrent 2 delay	500mS	100-2000mS
		Not settable	Automatic recovery after discharge overcurrent	1 min	1 minute, locks after 3 consecutive attempts, can be recovered manually or by charging
Short-circuit protection	Open	Not settable	Short circuit protection current	380A ± 100A	Upgrade program can change
		Not settable	Short circuit protection delay	300uS ± 100uS	Upgrade program can change
		Short circuit protection Protection Release	1、 Detects effective charging current 2、 Retest every 1 minute and lock after 3 consecutive attempts		
Basic parameter settings					
Function Name	Function Settings	Can it be set	Index items	Factory default	Remark

Cell balancing function	Open	Can be set	Cell charging balancing	Static or charging (not activated when high temperature alarm is triggered)	
		Can be set	Balanced turn-on voltage	345 0mV	± 20mV
		Can be set	Balanced opening pressure difference	30mV	± 10mV
		Not settable	Balancing current	65mA	50-100mA
Battery capacity setting	Open	Can be set	Battery rated capacity	200AH	
		Can be set	Remaining battery capacity	200AH	
BMS power consumption management	Open	Can be set	Sleep voltage	3. 35V	± 50mV
		Can be set	Sleep delay	1440 min ± 10 min	No charge and discharge current, no communication, no external charging voltage (<4 8V)
Full charge setting	Open	Can be set	Constant pressure value	56.0 ± 0. 5 V	When the overall voltage is greater than the constant voltage value and the current is less than the constant current value, the BMS will consider that the battery capacity is fully charged and meets the self-learning conditions.
		Can be set	Constant current value	1.5A ± 0.5A	
		Not settable	Delay	10S ± 2S	

4.3 LED indicator definition

RGB light: 1 6-way dual-color light, red and green.

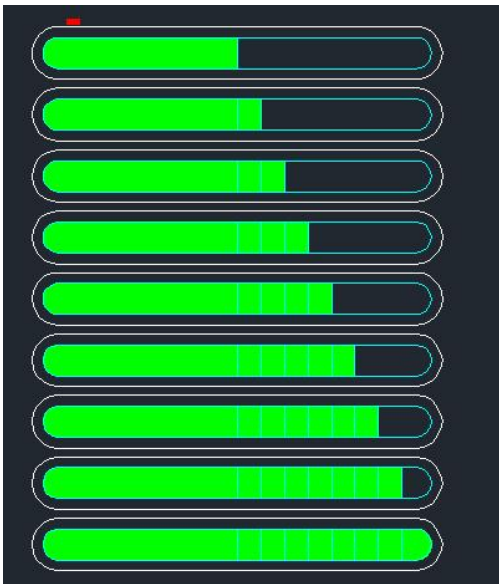


4.3.1 Instructions (Definition of Marquee and Signal Lights)

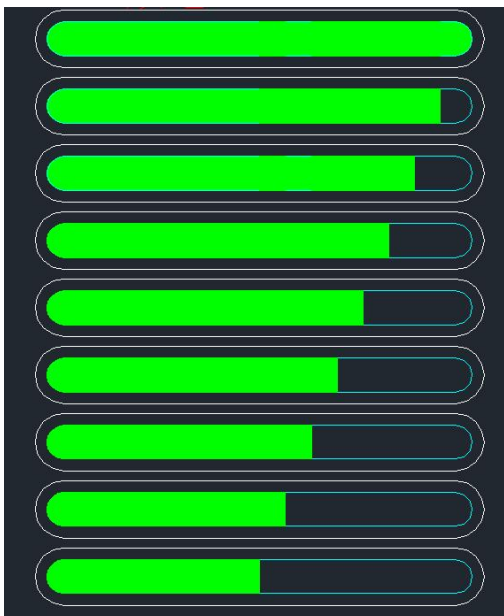
- Power-on self-test: Green runs from low to high, from light 1 to light 16, with a frequency of 300mS. After the self-test is completed, it enters the normal display state.
- The communication between BMS and the light board is interrupted for 30 seconds, and the yellow light flashes, on for 1 second and off for 1 second.
- The red light is always on when there is a fault or protection, and it flashes (0.5S flashing) when there is an alarm. (The red light is off when there is undervoltage protection, and it should not flash or be always on when there is an overvoltage alarm or overvoltage protection.)



- When charging, the green light flashes in a cycle (for example, when the SOC is 50%, the highest SOC light flashes



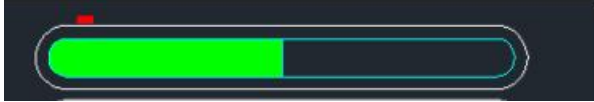
- When discharging, the SOC decreases.



- Over-discharge protection, the system enters sleep mode, all power off



- the corresponding length is displayed according to the actual SOC (for example, when it is 50% , as shown in the figure below)



5. Working Mode

5.1 Basic Mode

5.1.1 Charging Mode

When the BMS detects an external charging voltage and the cell voltage and temperature are within the chargeable range, it turns on the charging MOSFET for charging. When the charging current reaches the effective charging current, it enters charging mode. In charging mode, both the charging and discharging MOSFETs are turned on.

5.1.2 Discharge mode

The BMS enters discharge mode when it detects that a load is connected, the cell voltage and temperature are within the dischargeable range, and the discharge current reaches the effective discharge current. In discharge mode, both the charge and discharge MOSFETs are turned on.

5.1.3 Sleep and wake- up modes

The system enters sleep mode when the following conditions are met:

- ① The single unit undervoltage protection or the overall undervoltage protection is not released within 30 minutes;
- ② Press the button for 3 seconds and then release it;
- ③ The lowest cell voltage is lower than the sleep setting voltage (the default value is 33 50mV) and the duration reaches the delay time (the default value is 1440 minutes while there is no communication and no charge or discharge current);
- ④ Force shutdown through the host computer software.

Before entering sleep mode, ensure that the P - terminal is not connected to an external voltage, otherwise the system will not be able to enter low power mode.

- If the lowest cell voltage is lower than the undervoltage protection value of -500 mV , the device will be forced to enter deep sleep after a delay of 10 minutes .

Wake-up conditions from sleep mode:

- 1) Connect to a charger with an input voltage greater than 48V ;
- 2) Press and hold the button for 1 second and then release it to wake up the device.

5.2 Shutdown mode

When the weak current switch is disconnected , the BMS enters shutdown mode and can only be turned on by closing the weak current switch.

5.3 Button Description (Optional)

When the BMS is in sleep mode , press the button for 1 second and then release it, the BMS is activated and the LEDs start lighting up in sequence from "RUN" for 0.5 seconds.

the BMS is in working state, press the button for 3-6 seconds and then release it , the BMS will be put into sleep mode , and the LEDs will light up in sequence for 0.5 seconds starting from the lowest power light .

the BMS is in working state, press the button for $\geq 10S$ and then release it. The BMS is reset by hardware and the LED indicator shows the current power level.

4. communication

6.1 RS485 communication

BMS can communicate with the host computer through the RS485 communication interface.

It has an RS485 parallel interface, which can support up to 16 battery packs in parallel, with a default baud rate of 9600bps .

RS485 interface for inverter communication , and the default baud rate is 9600 bps.

6.2 CAN communication

The BMS can communicate with the inverter through the CAN interface and upload various battery information such as voltage, current, temperature, SOC , SOH , working status, etc. The default baud rate is 500K bps .

CAN port inverter communication protocol selection:

BMS must be in host mode CAN to communicate with the inverter, and protocol switching is achieved through DIP5 and 6 :

6.3 Communication interface definition:

6.3.1 Interface diagram:



RS485/ Can RS485 C RS485B parallel

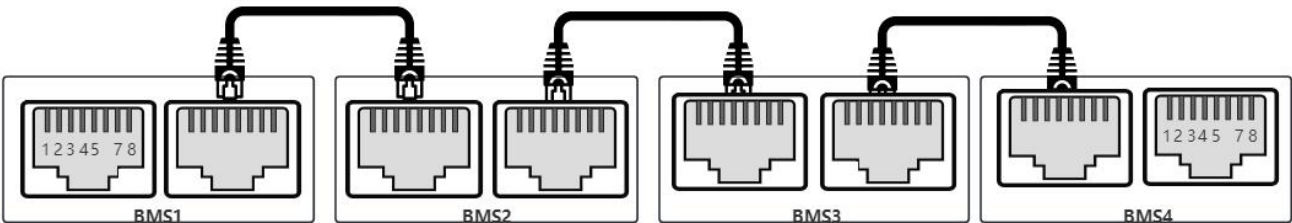
6.3.2 Communication interface definition

RS485-1 interface (communication with host computer or inverter) Supports Suori, Riyueyuan, and Pylon protocols - switch protocols through the host computer		CAN-1 communication interface (inverter communication) Support Victron, Pylon , Growatt protocols - switch protocols through the host computer	
R S485— Using 8 P8C vertical R J45 socket		CAN— Using 8 P8C vertical R J45 socket	
R J45 pinout	Definition	R J45 pinout	Definition
1	RS485A -B	4	CAN1 -H
2	RS485A-A	5	CAN1 -L
6	GND	6	GND

EMS communication port (no function)	
RS 232 — uses vertical R J 11 socket	
R J45 pinout	Definition
3	RS485 C
4	RS485 C
5	GND

Parallel communication port (only used for parallel operation)			
RS485-2 — Using vertical RS485 socket		RS485-2— Using 8 P8C vertical R J45 socket	
R J45 pinout	Definition	R J45 pinout	Definition
1	RS485C -B	1	RS485C -B
2	RS485C -A	2	RS485C -A
6	GND	6	GND
7	RS485B-A (parallel)	7	RS485B-A (parallel)
8	RS485B-B (parallel)	8	RS485B-B (parallel)

6.2.3 BMS board parallel connection method

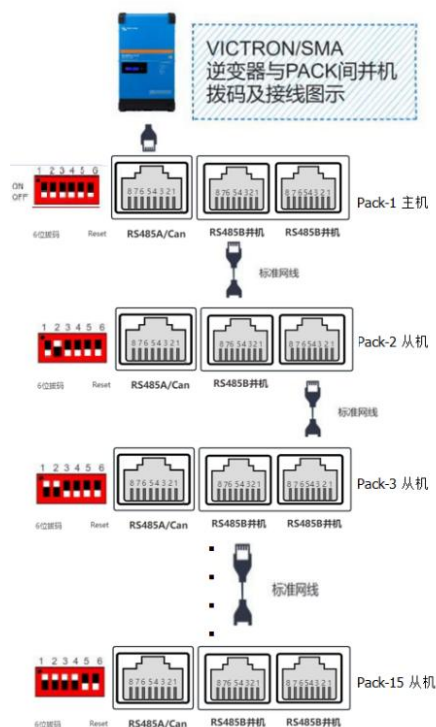


6.3 DIP switch settings (supports parallel operation and protocol selection)

When the packs are used in parallel, the hardware dial address is used to distinguish different pack addresses , and the address of each pack in the entire battery pack is unique. The following is the hardware address set by the dip switch, refer to the table below.



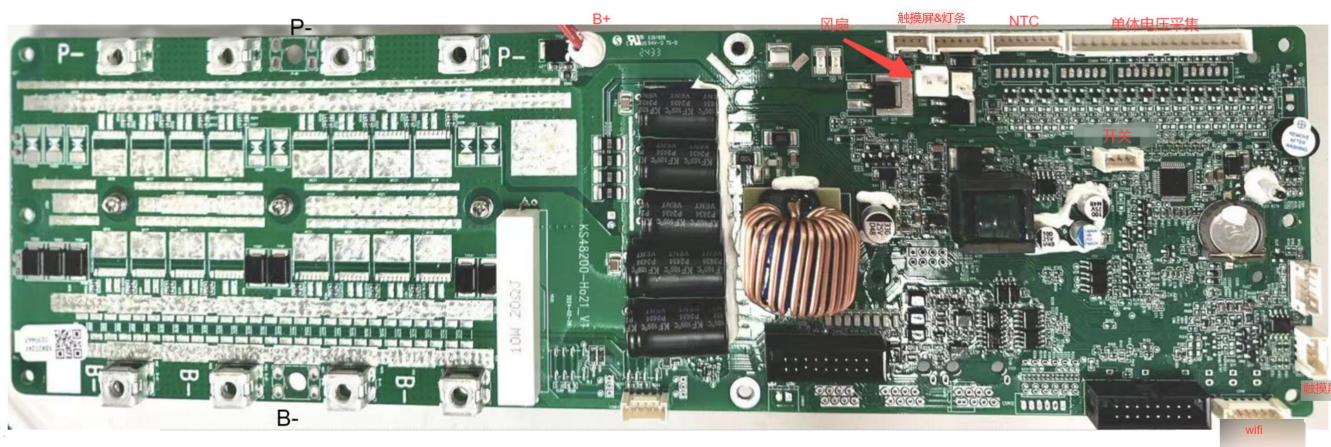
addre ss	Dip switch position				Reserve	Host	illustrate
	# 1	# 2	# 3	# 4	# 5	# 6	
0	OFF	OFF	OFF	OFF	OFF	OFF	(host)
1	ON	OFF	OFF	OFF	OFF	OFF	(从机) Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	(从机) Pack2
3	ON	ON	OFF	OFF	OFF	OFF	(Slave) Pack 3
4	OFF	OFF	ON	OFF	OFF	OFF	(Slave) Pack4
5	ON	OFF	ON	OFF	OFF	OFF	(Slave) Pack5
6	OFF	ON	ON	OFF	OFF	OFF	(Slave) Pack6
7	ON	ON	ON	OFF	OFF	OFF	(Slave) Pack7
8	OFF	OFF	OFF	ON	OFF	OFF	(Slave) Pack8
9	ON	OFF	OFF	ON	OFF	OFF	(Slave) Pack9
10	OFF	ON	OFF	ON	OFF	OFF	(Slave) Pack10
11	ON	ON	OFF	ON	OFF	OFF	(Slave) Pack11
12	OFF	OFF	ON	ON	OFF	OFF	(Slave) Pack12
13	ON	OFF	ON	ON	OFF	OFF	(Slave) Pack13
14	OFF	ON	ON	ON	OFF	OFF	(Slave) Pack14
15	ON	ON	ON	ON	OFF	OFF	(Slave) Pack1 5



7. Electrical interface definition

7.1 BMS board interface definition

Motherboard interface definition



7.2 Wiring Definition

B +: The positive electrode of the battery cell P ACK is used to power the BMS . The power positive electrode P + is directly connected to the positive electrode of the battery cell;

B -: Battery Pack negative terminal (using M5 terminal)

P-: Battery P ACK negative pole, charging negative pole is also discharge negative pole (charging and discharging at the same port)

Note: B - P- uses M5 terminal block

using the 17 + 8pin sampling cable (for foolproofing) :



CON2: (PHS-2.0-8PIN) from P IN1 → PIN8 : N TC1+ , N TC1- , N TC2+ , N TC2- , N TC3+ , N TC3- , N TC4+ , N TC4-
CON3: (XHB-2.5-17PIN)从PIN1→PIN17: CELL16 B+ , CELL15 , CELL14 , CELL13 , CELL12 , CELL11 , CELL10 , CELL9 , CELL8 ,
CELL7 , CELL6 , CELL5 , CELL4 , CELL3 , CELL2 , CELL1 , CELL0 B-

Remark:

CELL0—Pin17 is the B - end of the Pack , CELL16—Pin 1 is the B + end of the Pack

NTC model : NTC tadpole , B value 3950 , $10K \pm 1 \% 25^{\circ}C$

Note:

If you want to change to 15S , you should connect CELL15 and CELL16 to the B + terminal battery cell together or notify the BMS manufacturer in advance to add short-circuit resistors to CELL13 , CELL14 , CELL15 and CELL16 , and update the software. This shipment is 16 strings.

7.4 BMS power supply line description:

+ power supply line of the BMS must be connected to the total positive pole of the battery with a separate lead. It cannot be connected to the circuit breaker switch (circuit breaker) or behind the B + power line. Otherwise, it will affect the normal operation of the BMS. Please be sure to comply with the PACK wiring .

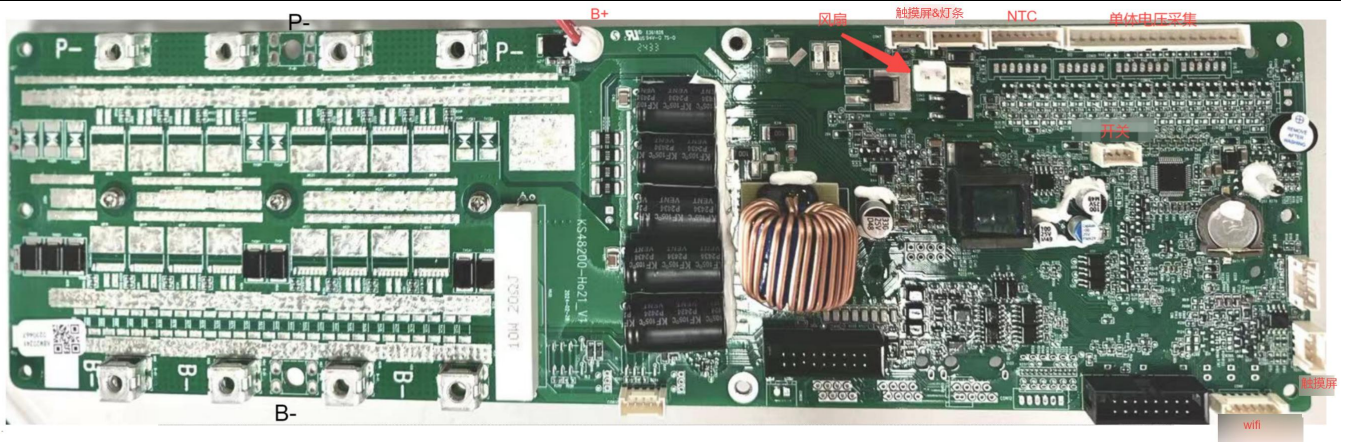
7.5 Power on and off sequence

The power-on sequence should be as follows : first connect the mainboard B- , then the sampling line , then B+ , and finally connect P- , P+ to the negative load or charger.

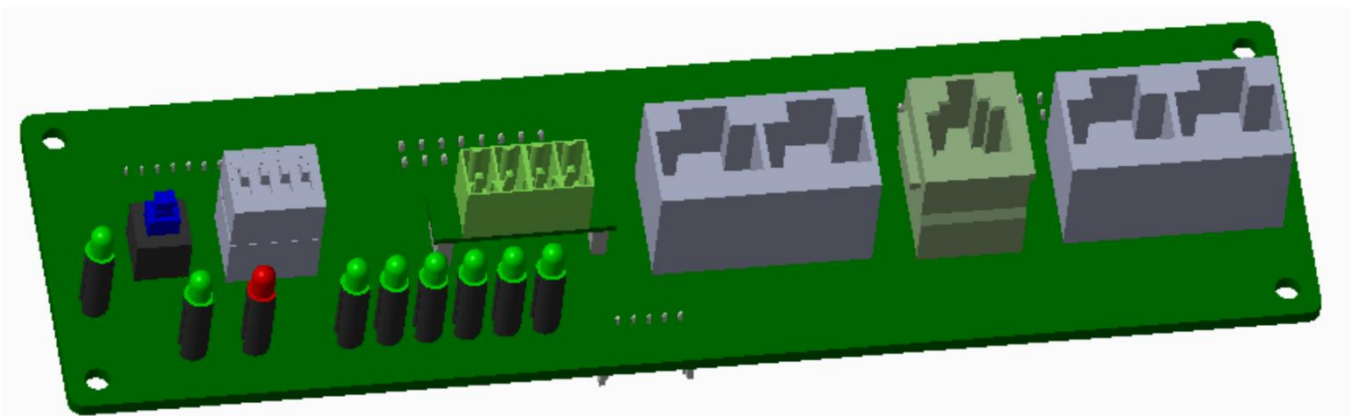
The power-off sequence is exactly the opposite: first disconnect the charger and load, then disconnect B+ , then the port sampling line, and finally disconnect B-.

8.Product pictures and structural dimensions

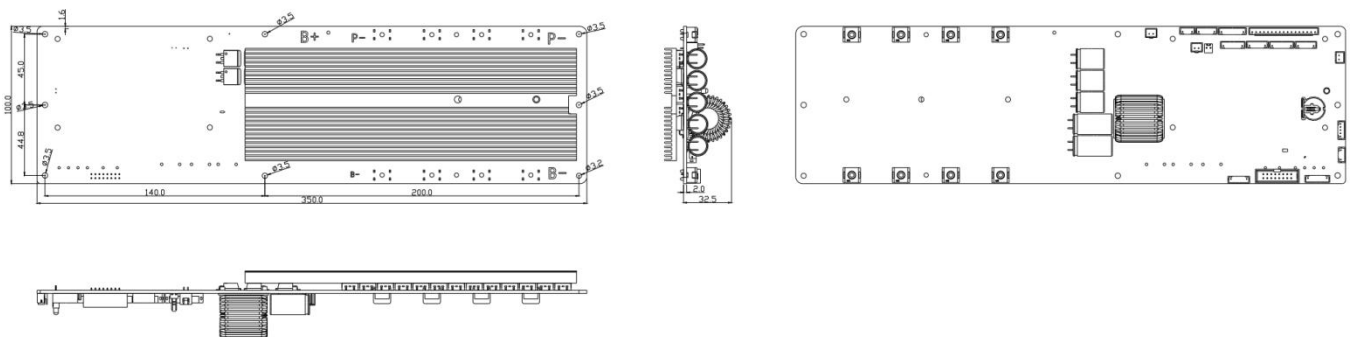
8.1. Front view



8.2. Reverse side actual picture

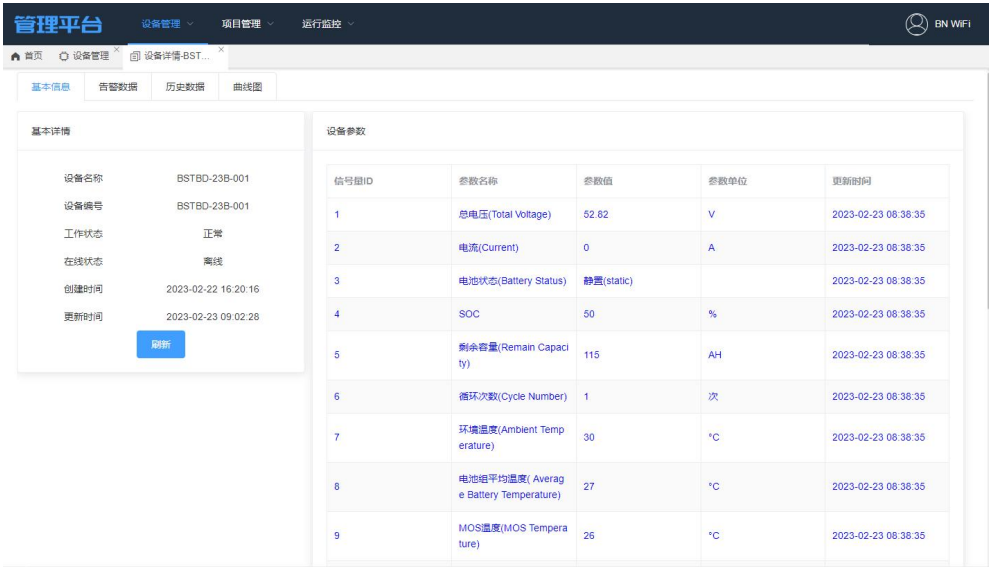
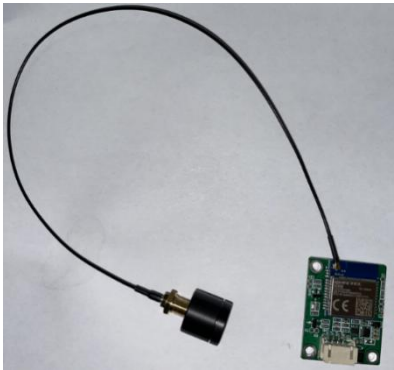


8.3. Mainboard dimensions:



8.4. Display screen picture

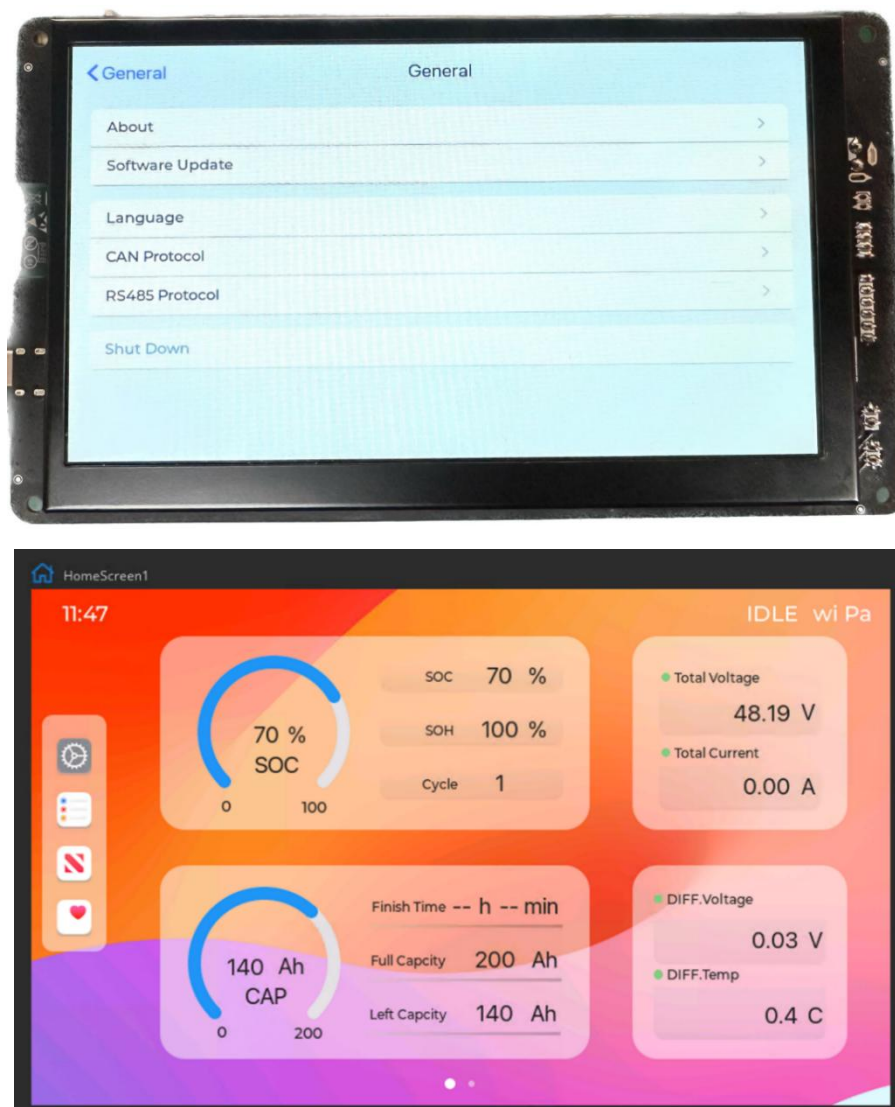
Note: The actual picture is for reference only, the actual product shall prevail



9. List of main components

category	model	brand	Dosage (pcs)
Main control IC	R7FA6M2AF3CFP	Renesas	1
Acquisition IC	SH367309U/048UR	Zhongying	1
MOS tube	JBL101N	Jiejie	28
	PGT10N15H	Golden Mile	28
485 IC	TP8485E-SR	Si Rui Pu	2
CAN transceiver	TPT1051V-S01R	Si Rui Pu	1

Display screen picture



10.Assembly and usage precautions

This software is used on PCs of Windows series platforms .

Before use, please ensure that the USB cable has data transmission capabilities and that the communication tool is correctly connected between the protection board's communication port and the PC 's USB interface . Open the dedicated PC client software and set the communication method corresponding to the BMS . After a successful connection, "Communication: Connected" will be displayed in the lower left corner of the host computer's homepage. If communication fails, please check whether the host computer's communication method is set correctly and whether the wiring is good.

The host computer can support Chinese and English language switching. Click "Help" on the left column of the home page to switch the language.

The following parameter screenshots are for reference only. Please refer to the actual parameters of the BMS.

10.1 Real-time monitoring interface:



10.2 Basic Parameters 1



1. Assembly and usage precautions

1. When connecting or disconnecting the power supply, the power supply must be connected or disconnected in the order specified.
2. When connecting the battery pack, do not connect it incorrectly or even reversely. If you cannot connect to the host computer or the main chip on the circuit board is obviously hot, please turn off the power immediately. At this time, the circuit board may be defective and need to be replaced and repaired.

-
3. During assembly, it is strictly forbidden to allow wire ends, solder, etc. to touch the circuit board components. If they do touch, the circuit components may be damaged and cause defects.
 4. Strictly follow the design parameter requirements of the specification, otherwise the circuit board may be damaged.
 5. Pay attention to moisture-proof, waterproof and anti-static during use.
 6. When performing charge and discharge tests on a battery pack equipped with a management system, please do not use a battery aging cabinet to measure the voltage of each battery in the battery pack.
Otherwise, the management system and battery may be damaged.
 7. After assembling the battery pack, a complete charge and discharge cycle should be carried out to trigger overcharge and over-discharge protection so that the circuit board can learn the initial capacity of the battery.
 8. The management system does not have a 0V battery charging function. Once the battery reaches 0V, the battery performance will be severely degraded and may even be damaged. In order to avoid damaging the battery, the user needs to charge it regularly to replenish the power when it is not used for a long time (storage for more than 3 months); and when in use
After discharging, the battery must be recharged within 12 hours to prevent it from discharging to 0V due to self-consumption.