Specification

Product Name：12V200A Lithium Battery Management System

Product Number：1204-1CE-EJ01-04S

Version	Date	Editor	Version Revision Note
V1.0	2024.11.07	Zhou Guinan	Create first draft

Function configuration table	
Customer name	
Cell type	☑Lithium iron phosphate
Number of cell strings	☑4S
5ACurrent limiting	☐Active current limiting ☐Passive current limiting ☑No
Precharge function	☑Yes ☐No
Storage function	☐Yes ☑No
Inverter communication mode	☑CAN ☑RS485
Optional function	☐ Low temperature heatin ☐ External switch ☐ Two-stage trip ☐LCD Display screen ☐One click power on/off ☐Onboard bluetooth
	Board type ： ☐ Integrated board ☑Split plate Note:Split board communication port, dip, capacity light can be independently led out
Other parameters	Battery capacity（AH）：

Signature and seal of supplier			Customer's signature and seal		
Executed By	Xie Huajun	Checked By	We Qi	Approved By	Huang Bin
Date		Date		Date	

Content

1、System overview

1.1、Summarize

This product is a full-featured Li-ion battery pack management system that supports up to 4 batteries in series, with protection and recovery functions such as single overvoltage/undervoltage, total undervoltage/overvoltage, charge/discharge overcurrent, high temperature, low temperature and short circuit. Achieve accurate SOC measurement and SOH health status statistics during charge and discharge. Realize voltage equalization during charging.

Note：Baud rate of the upper computer19200

1.2、Enjie Internal product model definition

12 04-1C E-EJ 01-04S

A B C D E F G

Serial number	definition	content
A	Voltage	12V
B	Plate type	1101、1102、1103、1203、1204
C	Infinite flow	No
D	communication	CAN、RS485
E	Customer name	It consists of the first letter of the customer's Chinese name，Such as：EJ
F	Model number	The same customer orders different models, and the models are stacked repeatedly
G	Sampling string number	04S

2、 Normative citation documents

The following documents are essential for the application of this document. The date-only version of the reference file is applicable to this file. The latest version of any undated reference file (including all modifications) applies to this file.

GB/T 191	Marking of Packaging Storage and Transportation
GB/T 2408-2008	plastic Determination of combustion properties Horizontal and vertical test
YD/T 983-2013	Electromagnetic Compatibility Limit and Measurement Method for Communication Power Equipment
GB/T 17626.5-2008	Electromagnetic compatibility test and surge (shock) immunity test for measuring technology
GB/T 17626.2-2006	Electromagnetic Compatibility Test and Measurement Technology
YD/T 2344.1—2011	Lithium iron phosphate battery pack for communications – Part 1: integrated battery pack
YD/T 2344.2—2015	Lithium iron phosphate battery pack for communications – Part 2: discrete batteries
YD/T 1363.3	Communications Bureau (Station) Power, Air Conditioning and Environmental Centralized Monitoring Management System Part 3:Front-end Intelligent Equipment Protocol
YD/T 1058-2015	High Frequency Switching Power Supply System for Communication

3、 Functional characteristics

3.1、Battery voltage detection

Real-time acquisition and monitoring of the voltage of the series cell to realize the alarm and protection of overvoltage and undervoltage.The voltage detection accuracy of the cell is ±10mV at 0 ~ 45℃ .

Alarm, protection parameter setting can be changed by the upper computer.

3.2、Cell, environment and power temperature detection

The NTC collects and monitors 2 cell temperatures, 1 ambient temperature and 1 power temperature in real time to realize high and low temperature alarm and protection. The measured temperature difference is within ±2℃. Cell temperature sensor USES 10K, B value 3435.

Alarm, protection parameter setting can be changed by the upper computer.

3.3、Battery charge/discharge current detection

The charge and discharge current of the battery pack is collected and monitored in real time by detecting the resistance of the current connected in the charge and discharge main circuit, The current accuracy is better than ±2%.

Alarm, protection parameter setting can be changed by the upper computer.

3.4、Short circuit protection function

Has the function of detecting and protecting the output short circuit.

3.5、Battery capacity and cycle times

Real-time calculation of battery residual capacity, complete the learning of total charging and discharging capacity at one time, SOC estimation accuracy is better than ±5%. It has the function of counting the number of charge and discharge cycles. When the accumulative discharge capacity of the battery pack reaches 80% of the set full capacity, the number of cycles will increase once.

Alarm, protection parameter setting can be changed by the upper computer.

3.6、Charge, Discharge MOSFET switch

Low internal resistance, high current, high capacitance for backup power applications load startup, zero switching, double charging voltage optimization design.

3.7、Balance of intelligent single cell

Unbalanced cells can be balanced when charging or standby, which can effectively improve the service time and cycle life of the battery.

Equalizing open voltage and equalizing differential voltage can be set by upper computer.

3.8、PC

The host computer uses BatteryMonitorV2.1.8 and above， It can switch between English and Chinese （English protocol is loaded when switching to English）， and the loading protocol (Chinese file name：1204_04S_V10_ADDR）.Please check the operation method in the file of host computer for the operation instructions.

3.9、Program upgrades

The main program version can be upgraded through the firmware update in the upper computer software.

The upper computer and the BMS are connected via RS485.

4、Functional frame diagram

5、 Electrical characteristics

Project	Min	Max	Type	Unit
Normal operating voltage	8	15	12	V
Normal charging voltage	/	30	11.5	V
Operating temperature range	-20	70	25	℃
Storage temperature	-40	85	25	℃
Use environment humidity	10	85	/	%
Continuous charging current	/	200	200	A
Continuous discharge current	/	200	200	A
Discharge output resistance	<2			mΩ
Normal operating power	<40			mA
Dormancy power consumption		50	0	uA

6、 Basic parameters

6.1、 Basic parameters

Function name	Function settings	Item list	Set value	Setting range
Single voltage alarm	Open	Single high voltage alarm	3500mV	Can be set
		High voltage recovery of monomer	3400mV	Can be set
	Open	Single low voltage alarm	2900mV	Can be set
		Low voltage recovery of monomer	3000mV	Can be set
Monomer overweight protection	Open	Monomer overweight protection	3650mV	Can be set
		Recovery of monomeric overvoltage	3400mV	Can be set

		Overvoltage recovery conditions	1.The maximum cell voltage is lower than the single overvoltage protection value. 2.It is detected that the battery has a discharge current＞3A **Note: Two conditions must be met to recover**	
Monomer undervoltage protection	<mark>Open</mark>	Under voltage protection voltage	2700mV	Can be set
		Under voltage recovery voltage	2900mV	Can be set
		Single under voltage shutdown	Shut down after undervoltage protection and maintain 1 minute communication	
		Under voltage recovery conditions	1.The minimum cell voltage is greater than the single undervoltage protection value. 2.Battery charging current detected>10A **Note: Two conditions must be met to recover**	
Battery Total voltage Alarm	<mark>Open</mark>	Total voltage high voltage alarm	14.0V	Can be set
		Total voltage recovery	13.6V	Can be set
		Total voltage Low voltage Alarm	11.8V	Can be set
	<mark>Open</mark>	Total voltage and low voltage recovery	12.0V	Can be set
Total voltage overvoltage protection	<mark>Open</mark>	Total voltage overvoltage protection	14.2V	Can be set
		Total voltage relief	13.2V	Can be set
		Overvoltage recovery conditions	1.The maximum cell voltage is lower than the single overvoltage protection value. 2.Discharge current detected>3A **Note: Two conditions must be met to recover**	

Total voltage undervoltage protection	Open	Total voltage undervoltage protection	10.4V	Can be set
		Total undervoltage recovery	11.2V	Can be set
		Total undervoltage shutdown	Shut down after undervoltage protection and maintain 1 minute communication	
		Undervoltage recovery conditions	1.The minimum cell voltage is greater than the single undervoltage protection value. 2.Battery charging current detected>10A **Note: Two conditions must be met to recover**	
Cell temperature forbidden to charge	Open	Charge High Temperature Alarm	50℃	Can be set
		Charging High Temperature Recovery	47℃	Can be set
		Overcharge protection	60℃	Can be set
		Overcharge recovery	50℃	Can be set
		Charge Low Temperature Alarm	2℃	Can be set
		Low temperature charging recovery	5℃	Can be set
		Undercharge protection	-10℃	Can be set
		Recovery of undercharging	0℃	Can be set
Cell temperature forbidden to discharge	Open	High Temperature Discharge Alarm	52℃	Can be set
		High temperature discharge recovery	47℃	Can be set

		Discharge overtemperature protection	60℃	Can be set
		Discharge overtemperature recovery	50℃	Can be set
		Low temperature discharge alarm	-10℃	Can be set
		Low temperature discharge recovery	3℃	Can be set
		Discharge undertemperature protection	-20℃	Can be set
		Discharge undertemperature recovery	-10℃	Can be set
Environmental temperature protection	Open	Environmental High Temperature Alarm	50℃	Can be set
		Environmental High Temperature Recovery	47℃	Can be set
		Environmental Over-temperature Protection	60℃	Can be set
		Environmental Overheating Recovery	55℃	Can be set
		Environmental Low Temperature Warning	-10℃	Can be set

		Environmental Low Temperature Recovery	3℃	Can be set
		Environmental under-temperature protection	-20℃	Can be set
		Environmental undertemperature recovery	-10℃	Can be set
Power temperature protection	Open	Power High Temperature Alarm	90℃	Can be set
		Power High Temperature Recovery	80℃	Can be set
		Overpower protection	95℃	Can be set
		Power overtemperature recovery	85℃	Can be set
Charge Overcurrent Alarm	Open	Charge Overcurrent Alarm	200A	Can be set
		Charging Overcurrent Recovery	195A	Can be set
Charging Overcurrent Protection	Open	Charging Overcurrent Protection	210A	Can be set
		Charge Overcurrent Delay	10S	Can be set
		Overcurrent recovery conditions	1)Timing reached overcurrent recovery delay release. 2)Immediate discharge recovery	
Discharge Overflow Warning	Open	Discharge Overflow Warning	-200A	Can be set

		Short circuit lock release	Connect charger	
Core equalization functio	Open	Standby balance	Uncharged/discharge state open equilibrium	
		Standby equalization time	10 hours	Can be set
	Open	Charge Balance	Open equalization in charging state and floating state	
	On voltage condition	Balanced on voltage	3400mV	Can be set
		Equilibrium Open voltage	30mV	
		Equilibrium end differential voltage	20mV	
	Open	Equilibrium temperature limits	Close the temperature range evenly according to the (**ambient alarm temperature**)	
		Equilibrium High Temperature Ban	50℃	Can be set
		Equilibrium cryogenic prohibition	0℃	
Battery capacity setting		Battery rated capacity	200Ah	5Ah~300Ah
		Battery residual capacity	Estimation of core voltage	Can be set
		Accumulated cycle capacity	80%	Number of cycles（Set）
	Open	Residual capacity alarm	15%	
	Open	Residual capacity protection	5%	Turn off output
BMS Power Management	Open	Maximum standby time	48h（Charger is not present and no effective discharge current）	

Precharge function	Precharge time (1mS to 5000mS)	BMS starts the precharge function at the moment of startup.
LCD screen	Open	Simple monitoring software, can view the core,temperature, current and other data.

6.2、 **Basic mode of work**

Charging mode	When the BMS detects that the charger is connected and the external charging voltage is greater than the internal battery voltage by more than 0.5V, when the charging current reaches the effective charging current, it enters the charging mode.	
Discharge mode	BMS into discharge mode when the load connection is detected and the discharge current reaches the effective discharge current.	
Standby mode	When the above two modes are not satisfied, enter standby mode.	
Shutdown mode	Shutdown condition： 1）Normal standby for 48 hours 2）Battery triggers under-voltage protection 3）key-press shutdown	Wake-up conditions for shutdown mode: 1）Charge activation 2）Press the key to turn on

6.3、 **LED light indication instructions**

6.3.1、 **LED**

1 operational light ,1 alarm light ,4 capacity indicator lights

L1●	L2●	L3●	L4●	●	●
SOC				ALARM	RUN

6.3.2、 **Capacity indication**

Status		Status				Discharge			
Capacity indicator		L4●	L3●	L2●	L1●	L4●	L3●	L2●	L1●
The remaining capacity	0～25%	OFF	OFF	OFF	Flash	OFF	OFF	OFF	Solid Green
	25～50%	OFF	OFF	Flash	Solid Green	OFF	OFF	Solid Green	Solid Green

50～75%	OFF	Flash	Solid Green	Solid Green	OFF	Solid Green	Solid Green	Solid Green
≥75%	Flash	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green
Running indicator light 🟢	Solid Green				Flash			

6.3.3、Light Blink explanation

Flash Mode	ON	OFF
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

6.3.4、State indication

System state	Running state	RUN 🟢	ALM 🔴	SOC L4 🟢	L3 🟢	L2 🟢	L1 🟢	Note
Shutdown	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Standby	Normal	Flash1	OFF	OFF	OFF	OFF	OFF	Standby status
Charge	Normal	Solid Green	OFF	According to battery indicator				Highest LED flash 2
Charge	Alarm	Solid Green	Flash2	According to battery indicator				Highest LED flash 2
Charge	overvoltage protection	Flash1	OFF	OFF	OFF	OFF	OFF	
Charge	Temperature ,overcurrent protection	Flash1	Flash1	OFF	OFF	OFF	OFF	
Discharge	Normal	Flash3	OFF	According to battery indicator				According to battery indicator
Discharge	Alarm	Flash3	Flash3					
Discharge	Temperature ,overcurrent , short circuit protection	OFF	Solid Green	OFF	OFF	OFF	OFF	Stop discharging, forced dormancy without action after 48h when the mains is offline
Discharge	Under-voltage protection	OFF	OFF	OFF	OFF	OFF	OFF	Stopping Discharge

7、 Functional description

7.1、Standby state

No.	Feature	Definition
1	Power on	When the BMS is in hibernation state, press the reset button to start the BMS.After the LED indicator light shines in turn, it turns into normal working state.
2	Power off	When the BMS is in the standby or discharge state, press this key and continue for 5s , the BMS will be hibernated, and the LED indicator will flash successively and then turn to hibernation state. The BMS has no power consumption after hibernation.
3	Standby mode	BMS the correct connection on the power, in no overvoltage, undervoltage, overcurrent, short circuit, over temperature, under temperature and other protection state, press the reset button to boot, BMS in standby state.BMS standby state, the running lamp flashes, and the battery can be charged and discharged.

7.2、Overcharge protection and recovery

Overcharge	monomer	Protection	When any section is higher than the set value of the single overcharge protection, the charging device cannot charge the battery.
		recover	If the maximum voltage of a cell is lower than the recovery value of the cell overcharge protection, the overcharge protection state is removed. Can also discharge discharges.
	Total voltage	Protection	When the battery voltage is higher than the total voltage overcharge protection set value, the BMS enters the overcharge protection state, and the charging device cannot charge the battery.
		recover	When the battery string voltage is lower than the total voltage overvoltage protection recovery value, the overcharge protection is removed. Can also discharge discharges.

7.3、Overdischarge protection and recovery

overshoot	monomer	Protection	When any section is lower than the set value of single overdischarge protection, the BMS enters the overdischarge protection state, and the load cannot discharge the battery. After 1 minute of communication, the BMS shuts down.
		recover	After the overdischarge protection, charge the battery pack to release the overdischarge protection state. Or press the reset button, the BMS will turn on the battery to check whether the voltage reaches the recovery value.
	Total voltage	Protection	When the total voltage overdischarge protection is lower than the set value, the BMS enters the overdischarge protection state, and the load cannot discharge the battery. After 1 minute of communication, the BMS shuts down.
		recover	After the overdischarge protection, charge the battery pack to release the overdischarge protection state. Or press the reset button, the BMS will turn on the battery to check whether the voltage reaches the recovery value.

7.4、Overcurrent protection and recovery

Charge overcurrent	Protection	Exceeds the set value of charge overcurrent protection and reaches the delay time. The BMS enters charge overcurrent protection, and the charging device cannot charge the battery.
	recover	After overcurrent protection, the BMS automatically delays recovery and re-detects the external charger current. Discharge can also remove charge overcurrent protection.
Discharge overcurrent	Protection	Exceeds the set value of the discharge overcurrent protection and reaches the delay time. The BMS enters the discharge overcurrent protection, and the load cannot charge the battery.
	recover	After overcurrent protection, the BMS automatically delays recovery and re-detects the external load current. Charging can also remove the discharge overcurrent protection.

Note：The discharge overcurrent protection has two levels of protection to achieve the same recovery as the transient overcurrent protection and discharge overcurrent protection. The transient overcurrent protection will be locked when the number of occurrences reaches the condition, and the recovery must be powered off and then on or the charge is discharged.

7.5、Temperature protection and recovery

Note：BMS has 5 temperature detection ports to monitor temperature changes to achieve protective measures.

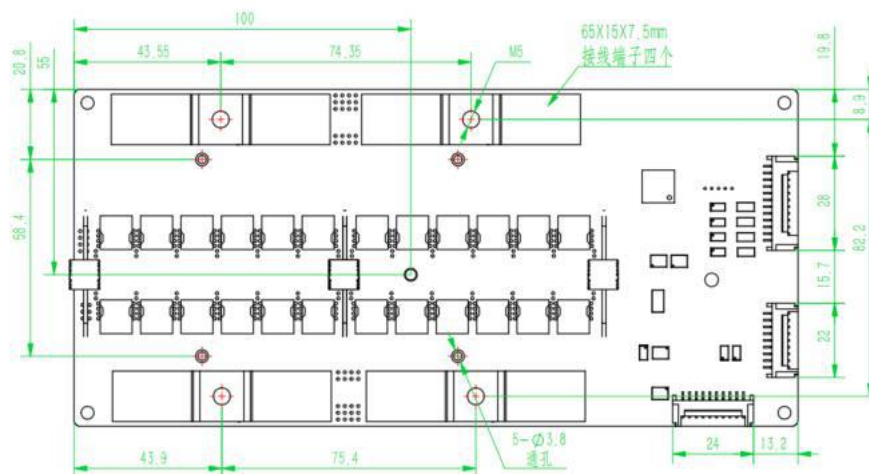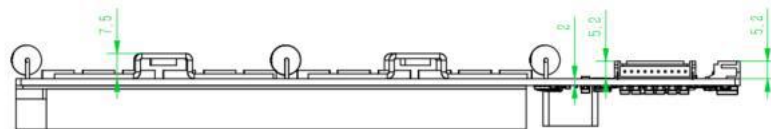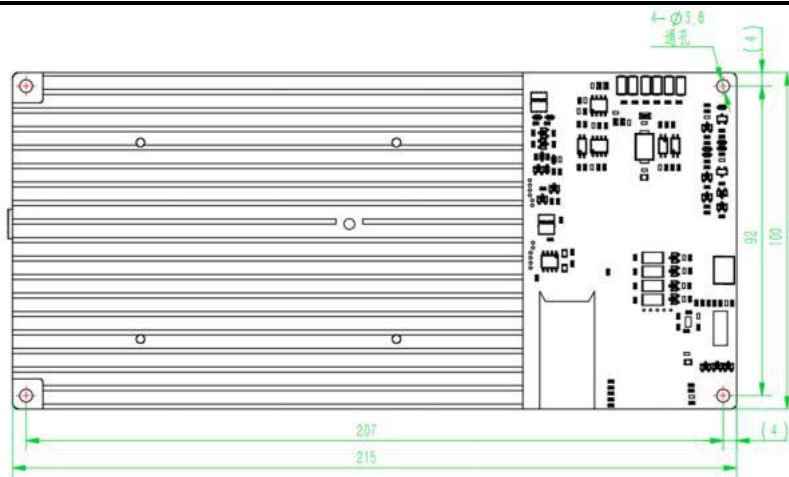|			
Charge and discharge	hyperthermia	Protection	When the NTC of any cell is higher than the high temperature protection setting value, the BMS enters the high temperature protection. The BMS stops charging or discharging.
		recover	When the cell temperature is lower than the high temperature recovery value, the BMS resumes charging or discharging.
	hypothermy	Protection	When the NTC of any cell is lower than the low temperature protection setting value, the BMS enters the low temperature protection. The BMS stops charging or discharging.
		recover	When the cell temperature is higher than the low temperature recovery value, the BMS resumes charging or discharging.
Ambient temperature protection	overtemperature	Protection	When the NTC detects that the ambient temperature is higher than the ambient high temperature setting value, the BMS enters the ambient overtemperature protection. The BMS stops charging and discharging.
		recover	When the ambient temperature is lower than the ambient recovery value, the BMS resumes charging or discharging.
	undertemperature	Protection	When the NTC detects that the ambient temperature is lower than the ambient low temperature setting value, the BMS enters the environment under temperature protection. The BMS stops charging and discharging.
		recover	When the ambient temperature is higher than the ambient recovery value, the BMS resumes charging or discharging.
Power temperature protection	When the NTC detects that the power temperature is higher than the power protection set value, the BMS enters the power high-temperature protection. The BMS stops charging and discharging.		

7.6、Optional function

Optional	Low temperature heating	When the low temperature of the battery cell is met and the charger is online, the output voltage through the heating port supplies power to the optional heating film to realize the heating function. The standby state and discharge state do not heat.
	Two-stage trip	The two-level trip signal realizes two-layer protection by controlling the external actuator. Trigger trip condition： 1）Temperature sensing failure； 2）The maximum voltage of a cell is greater than "Cell overvoltage protection + 50mV"； 3）The minimum voltage of a cell is less than "Cell undervoltage protection -200mV".； 4）The current still exceeds the "Discharge overcurrent protection value" after discharge overcurrent protection； 5）The current is still greater than the "charge overcurrent protection value" after charging overcurrent protection； One of the above five triggers and maintains the state for more than 5 seconds, executes and continues to trip; Recovery condition: The BMS needs to be restarted.
function	Bluetooth	Configurable Bluetooth display. Through the wireless connection between the Bluetooth of the mobile phone and the Bluetooth module of the battery pack, various functions such as battery pack management and alarm information collection, query, display, and configuration modification are implemented. Bluetooth APP can achieve the following functions: 1) Battery pack basic information display; 2) BMS and inverter communication configuration; 3)Battery pack alarm/protection parameters and control switch configuration; 4) Support single machine and parallel machine; Support real-time switching of single battery pack connection; 5) Chinese and English display switch.

7.7、Other functions
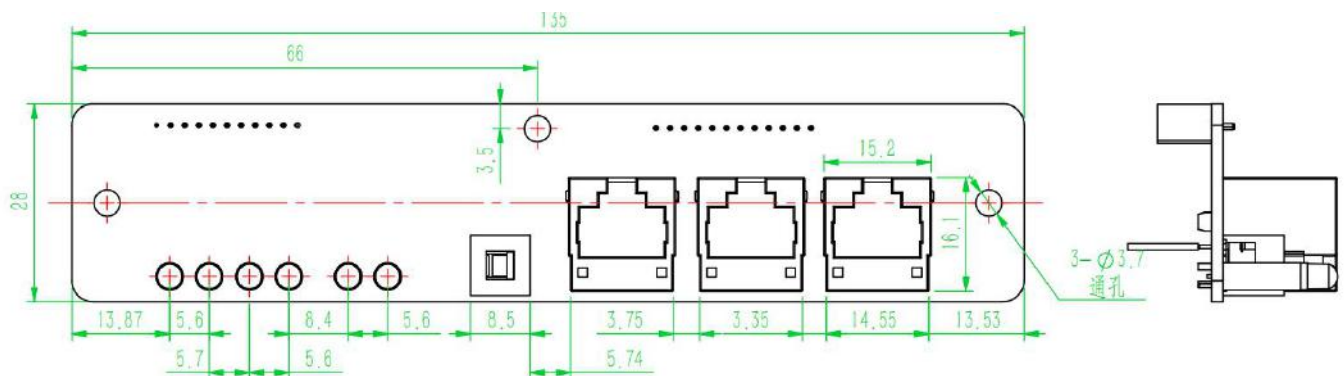
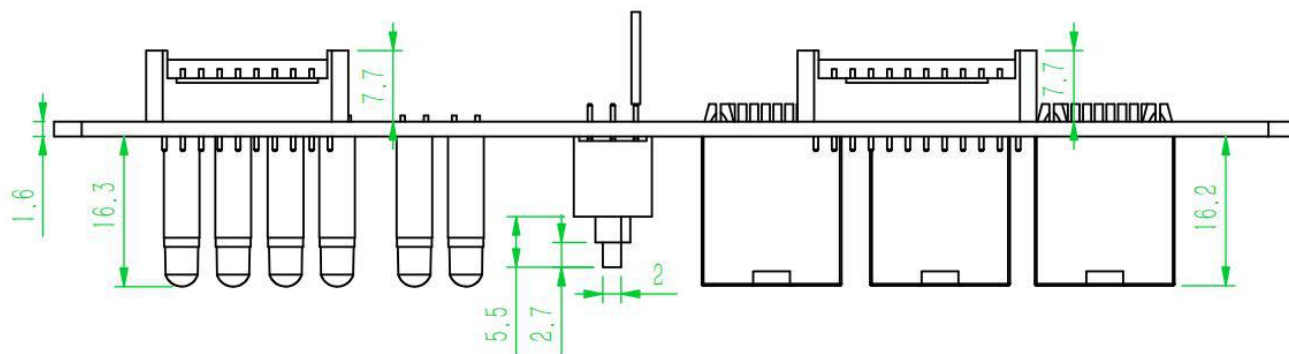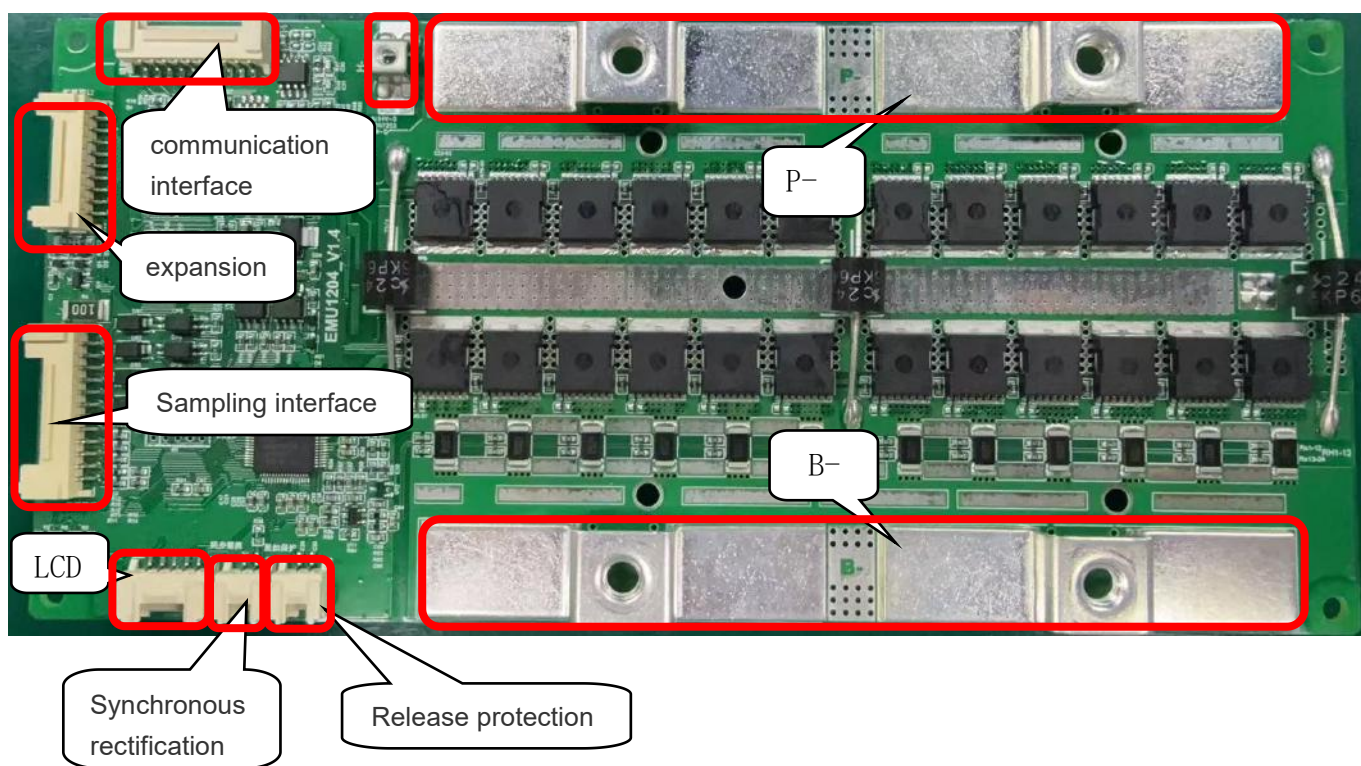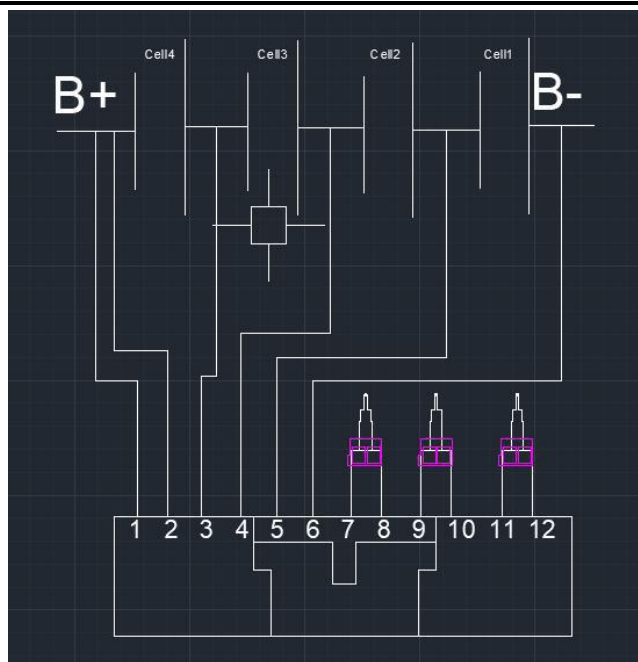|		
Others	Balanced function	BMS should have standby and charge equalization function, the system adopts energy consumption type equalization circuit, the equalization open voltage softwareis adjustable, the equalization open condition any section is higher than the equalization open voltage and the voltage difference reaches the condition together.
	Historical data records are stored and read	The storage contents include protection and alarm categories, recovery time of protection and alarm, battery voltage, total battery string voltage, charge/discharge capacity, charge/discharge current, and temperature Record the information in year/month/day/hour/minute/second. You can also set this parameter to record the information in a certain period..Currently can store not less than 500 historical data records, through the PC to read historical data and save as excel files into the computer.
	Dormant function	Automatic sleep function： The battery will automatically sleep for 48 hours when there is no external charging or discharging. When the battery pack is over-discharged, the communication is maintained for 1 minute, and the BMS enters the dormant state. / Manual sleep function： 1）By manually pressing the 15S reset button, the six LED lights turn on in turn, and the BMS goes to sleep. 2）The standby and hibernation can be set through the host computer.
	One-key switch machine	BMS in parallel, the host can control the secondary shutdown and startup. The host must dial the switch in parallel mode. If the host does not dial the DIP switch address, the host cannot switch on or off with one key.
	Precharge function	The precharge function can be started immediately after starting up or discharging tube is turned on. The precharge time can be set (1mS to 5000mS) to cope with various capacitiy load scenarios and avoid short circuit protection of BMS output.

8、Dimensioning map

IMU1204：

LED017:

9、Reference

communication interface

expansion

Sampling interface

LCD

Synchronous rectification
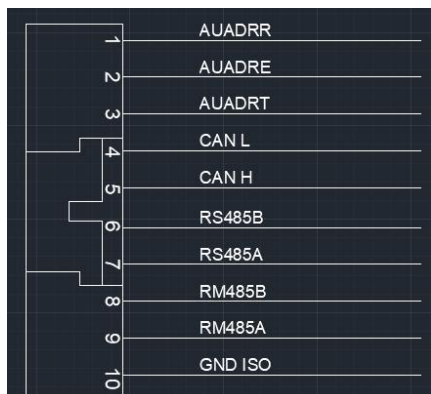
Release protection

P−

B−

Note: There may be some differences between the actual product and the physical drawing of the above products.
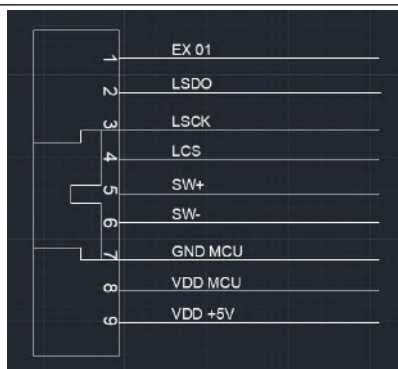
9.1、Wiring definition

Sampling interface（12PIN）		
PIN1	Connect temperature sensor NTC2	
PIN2	Connect temperature sensor NTCD	
PIN3	Connect temperature sensor NTC3	
PIN4	Connect temperature sensor NTCD	
PIN5	Connect temperature sensor NTC4	
PIN6	Connect temperature sensor NTCD	
PIN7	Connect to the negative of the first battery	
PIN8	Connect to the positive pole of the first battery	
PIN9	Connect to the positive pole of the second battery	
PIN10	Connect to the positive pole of the third battery	
PIN11	Connect to the positive pole of the fourth battery	
PIN12	Connect to the positive pole of the fourth battery	

Communication interface（10PIN）		
	PIN1	AUADRR
	PIN2	AUADRE
	PIN3	AUADRT
	PIN4	CAN L
	PIN5	CAN H
	PIN6	RS485B
	PIN7	RS485A
	PIN8	RM485B
	PIN9	RM485A
	PIN10	GND ISO

Expansion（9PIN）		
	PIN1	EX 01
	PIN2	LSDO
	PIN3	LSCK
	PIN4	LCS
	PIN5	SW+
	PIN6	SW-
	PIN7	GND MCU
	PIN8	VDD MCU
	PIN9	VDD +5V

LCD（5PIN）		
	PIN1	LRXD
	PIN2	LTXD
	PIN3	GND MCU
	PIN4	VDD MCU
	PIN5	VDD +5V

Release protection（2PIN）		
	PIN1	VDD MCU
	PIN2	TKGF

Synchronous rectification（2PIN）		
	PIN1	CHGF
	PIN2	GND MCU

9.2、Order of up and down

1) First connect "B-", then connect the communication, LCD and other lines, and then connect P+ and P- to the charger or load, and finally connect the sampling line with the positive terminal of the power supply.

2) First disconnect the sampling line with the positive power terminal, then disconnect P+ and P- to the charger or load, as well as communication, LCD and other lines, and finally disconnect the "B-".

3) Input and output

When Charging: The positive terminal of the charger is connected to the total positive terminal of the battery pack, and the negative terminal of the charger is connected to the "P-" of the protection board.

When Discharging:The positive terminal of the load is connected to the total positive terminal of the battery pack, and the negative terminal of the load is connected to the "P-" of the protection plate.

10、Communications

10.1、 Communications

The communication interface is a 10pin horizontal HY2.0mm base, including 2 channels 485 communication, including RS485 (4A, 5B) for firmware update, parameter modification, baud rate of19200bps. RM485 is used to realize information interaction between parallel machines (2A, 3B), baud rate 9600bps. One CAN communication (6H, 7L) is used for external communication, such as connecting the inverter.

Cmmunication interface definition：

PIN	Definitions
1	GND
2	RM485-A
3	RM485-B
4	RS485-A
5	RS485-B
6	CAN H
7	CAN L
8	AUADRT

9	AUADRE
10	AUADRR

11、Parts list

No.	Part name	Quantity	Disposition
1	Voltage acquisition line	1	Select
2	Conventional switching line	1	Select
3	Conventional transfer plate wire	1	Select
4	M5*12screw	2	Select
5	LCD	1	Select
6	Conventional transfer plate	1	Select

12、Points for attention

❖ Battery management systems can not be used in series.

❖ BMS power components withstand voltage 100V.

❖ If the battery module is assembled in the form of long wire and long copper bar, it must communicate with the BMS manufacturer for impedance compensation.Otherwise, it will affect the consistency of the cell.

❖ The external switch on BMS is prohibited to connect with other equipment. If necessary, please confirm with the technology for docking. Otherwise, BMS will not bear any responsibility for damage.

❖ Do not touch the surface of the core directly when assembling, so as not to damage the core. The assembly should be firm and reliable.

❖ In use pay attention to lead wire head, soldering iron, solder and so on do not touch the components on the circuit board, otherwise it may damage the circuit board.

❖ Use process should pay attention to anti-static, moisture-proof, waterproof and so on.

❖ Please follow the design parameters and use conditions during use, must not exceed the value in this specification, otherwise it may damage the protection board.

❖ After combining the battery pack and the protection plate, if you find no voltage output or charge, please check the wiring is correct.

❖ The final interpretation right is owned by our company.