Shenzhen Jiabaida Electronic Technology Co., Ltd.

SHENZHEN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD

Product specification

Product specification

Customer name:	
Customer	
product name:	
Sample Name	4 Lithium iron skewer 200A Software board
Product number:	
Model Name	JBD-SP04S034-L4S-200A-200A-BU
Date of submission:	
Date	2021-05-27
version:	
Version	A01
Customer signature and stamp:	
SIGNATURES	

prepared by: Wang Ligang Review: Zhang Qiaoqiao Approve:

change log

version number	Page/Chapter	Revised by	Revision date	modify the content	Remarks
A01	full text	Wang Ligang	2021.05.27	New fiction	

1. Product Introduction

JBD-SP04S034 It is specifically for small energy storage batteries, street lights,12V Lead-acid for lithium battery and other products 4 The software protection board solution designed by stringing battery packs can be applied to lithium batteries with different chemical properties, such as lithium ion, lithium polymer, lithium iron phosphate, etc.

The whole system adopts TI(The front-end acquisition chip of Texas Instruments+MCU, Some parameters can be flexibly adjusted through the host computer according to customer needs.

2. Features

2.1 3-4 String batteries are protected in series.

2.2 The battery is intelligently balanced, and the balanced opening voltage and pressure difference can be flexibly adjusted by the host computer. Optional charge balance or static balance.

2.3 Integrate hardware protection functions such as overvoltage, undervoltage, overcurrent, and short circuit.

2.4 A variety of working modes, when the protection board is in a static state, it can delay to enter sleep to achieve the purpose of reducing power consumption.

2.5 UART communication(TTL Level) can be connected to Bluetooth to read voltage, current,SOC, Temperature, protection status and other data. Support the host computer or Bluetooth to modify the protection parameters.

2.6 Three temperature detection probes, one built-in for detecting the protection board FET Temperature, two-way external.

2.7 Heating film heating function. (Not enabled)

2.8 Regular version. Does not support tandem use.

3. Technical Parameters

3.1. Basic parameters

Cell specifications: 4 strings of lithium iron phosphate battery pack
The interface type charge and discharge the same port
Recommended charging voltage 14.4V
Working voltage range 9.2V~15.0V
Continuous charging current≤200A
Continuous discharge current≤200A
Operating power consumption≤25mA
Sleep power consumption≤300uA
Protection board conduction internal resistance ≤10mR
Working temperature -30℃~75℃
Protection board size 232±2mm * 105±0.5mm * 20±1mm(length Width Height)

Note: The test needs to be at temperature 25±2℃, relative humidity 65±20% environment of

3.2. **The main parameters**

Features	project	specification			unit
		Minimum	Typical value	Max	
Monomer overvoltage protection	Overvoltage protection voltage	3.60	3.65	3.70	V
	Overcharge protection delay time	1000	2000	3000	mS
	Overcharge protection recovery voltage	3.40	3.45	3.50	V
Single over-discharge protection	Over discharge protection voltage	2.40	2.50	2.60	V
	Over-discharge protection delay time	1000	2000	3000	mS
	Over-discharge protection recovery voltage	2.90	3.00	3.10	V
	Overdischarge protection recovery conditions	60S Internal voltage self-recovery or charge recovery			
Charge overcurrent protection	Charging overcurrent protection value	210	230	250	A
	Charge overcurrent delay	5	10	15	S
	Charge overcurrent release condition	Delay 32S Automatically restore after			
Discharge overcurrent protection	Primary discharge overcurrent protection current	210	230	250	A
	First-level discharge overcurrent 1 Protection delay	15	20	25	S
	Secondary discharge overcurrent protection current value	400	440	480	A
	Secondary discharge overcurrent 2 Protection delay	150	320	500	mS
	Discharge overcurrent protection recovery conditions	Delay 60S Automatically restore after			
Short circuit protection	Short circuit protection circuit	1400	1560	3000	A
	Short circuit protection delay time	200	400	800	uS
	Short circuit protection recovery	Delay after disconnecting the load 30S restore.			
	Short circuit description	Short circuit description: short circuit current is less than minimum or high Above the maximum value may cause the short-circuit protection to fail, short-circuit Current exceeds3000A, Short-circuit protection is not guaranteed, and It is not recommended to do short-circuit protection test.			
Discharge high temperature protection (External)	Temperature protection value	72	75	78	°C
	Temperature protection release value	62	65	68	°C
Discharge low temperature protection (External)	Temperature protection value	-25	-20	-15	°C
	Temperature protection release value	-15	-10	-5	°C

Charging high temperature protection (External)	Temperature protection value	57	60	63	℃
	Temperature protection release value	52	55	58	℃
Charging low temperature protection (External)	Temperature protection value	- 8	-5	- 2	℃
	Temperature protection release value	-3	0	3	℃
FET Discharge high temperature protection Protection (built-in curing)	Temperature protection value	85	90	95	℃
	Temperature protection release value	65	70	75	℃
Balance function	Turn on voltage	3.37	3.40	3.43	V
	Open pressure difference		20		mV
	Balance current	50		150	mA
	Balanced method	Static and charge balance			
	Balance type	Time-sharing equalization\pulse equalization			

Note: The test needs to be at temperature 25±2℃, relative humidity 65±20% environment of

4. Function Description

4.1. Overcharge protection and recovery

4.1.1. Monomer overcharge protection and recovery

When the voltage of any cell is higher than the cell overcharge voltage setting value, and the duration reaches the cell overcharge delay, the system enters the overcharge protection state, and the charging is turned off MOS, Cannot charge the battery.

After the cell overcharge protection, when the voltage of all cells drops below the cell overcharge recovery value, the overcharge protection state is released. It can also be discharged.

4.1.2. Overall overcharge protection and recovery

When the overall voltage is higher than the overall overvoltage setting value, and the duration reaches the overall overcharge delay, the system enters the overcharge protection state, and the charging is turned off MOS, Cannot charge the battery. When the overall voltage drops below the overall voltage overvoltage protection recovery value, the overcharge protection state is released, and the discharge can also be released.

4.2. Overdischarge protection and recovery

4.2.1. Single over-discharge protection and recovery

4.2.1.1. When the lowest cell voltage is lower than the monomer overdischarge voltage setting value, and the duration reaches the monomer overdischarge delay, the system enters the overdischarge protection state, and the discharge is turned off MOS, Cannot discharge the battery.

After the monomer over-discharge protection occurs, charging the battery pack can release the over-discharge protection state.

4.2.2. Overall over-discharge protection and recovery

When the overall voltage is lower than the overall over-discharge voltage setting value, and the duration reaches the overall over-discharge delay, the system enters the over-discharge protection state and closes the discharge MOS, Cannot discharge the battery.

After the overall over-discharge protection occurs, charging the battery pack can release the over-discharge protection state.

4.3. **Charge overcurrent protection and recovery**

When the charging current exceeds the charging overcurrent protection current and the duration reaches the overcurrent detection delay time, the system enters the charging overcurrent protection state and the battery cannot be charged. After the charging overcurrent protection occurs, the delay will automatically recover. If you don't need to automatically recover, the corresponding release time can be set longer; the charging overcurrent state can also be released by discharging.

4.4. **Discharge overcurrent protection and recovery**

When the discharge current exceeds the discharge overcurrent protection current and the duration reaches the overcurrent detection delay time, the system enters the charge overcurrent protection state, and the discharge is turned off MOS. After the discharge overcurrent occurs, the delay will automatically recover. If the automatic recovery is not required, the corresponding release time can be set to be longer. Charging can also release the discharge overcurrent state. The discharge has two-level overcurrent protection functions, which have different response speeds to different current values, and protect the battery more reliably.

4.5. **Temperature protection and recovery**

The management system has two temperature detection ports, which cooperate with NTC Can do temperature protection.

4.5.1. Charge and discharge high temperature protection and recovery

When charging and discharging NTC When the surface temperature of the detected battery is higher than the set high temperature protection temperature, the management system enters the high temperature protection state, charging or discharging MOSFET Closed, the battery pack cannot be charged or discharged in this state.

When the temperature of the battery cell surface drops to the high temperature recovery setting value, the management system recovers from the high temperature state and reconnects to charge and discharge MOS.

4.5.2. Charge and discharge low temperature protection and recovery

When charging and discharging NTC When the temperature of the battery cell surface is lower than the set low temperature protection temperature, the management system enters the low temperature protection state, charging or discharging MOSFET Closed, the battery pack cannot be charged or discharged in this state.

When the temperature of the battery cell surface rises to the low temperature recovery setting value, the management system recovers from the low temperature state and reconnects to charge and discharge MOS.

4.5.3. In static state (without charging and discharging), if the temperature rises or drops to the protection board, the protection board will not make any protection action until the system detects a current, then the corresponding protection action will be made.

4.6. **Balance function**

The management system adopts the resistance side-by-way method to balance the cells. During the charging process, the maximum cell voltage of the battery pack reaches the set equilibrium starting voltage value, and the voltage difference between the minimum voltage and the maximum voltage of the battery pack cell is greater than the set value. When the value is set, the cell equalization function that meets the condition is turned on, and the two adjacent equalizers cannot be turned on at the same time. When the equalization starts, the charging current is reduced for the high-voltage battery, and the reduced current is the equalization current set by the management system.

When the cell voltage difference is less than the set value, the equalization stops. The charge balance mode and static balance mode can be set.

4.7. **Capacity calculation**

The battery pack can be accurately measured by integrating the current and time. SOC Calculation. The full capacity and cycle capacity of the battery pack can be set by the host computer, and the capacity can be automatically updated after a complete charge and discharge cycle. It has the function of calculating the number of charge and discharge cycles. When the cumulative discharge capacity of the battery pack reaches the set cycle capacity, the number of cycles increases by one.

Note: For newly installed batteries, please set the nominal capacity and cycle capacity according to the battery capacity, and perform a capacity study, otherwise capacity inaccuracy may occur. Capacity learning operation: first fully charge to overvoltage protection, then discharge to undervoltage protection, and then charge again.

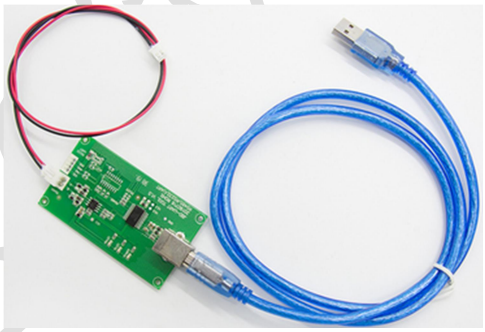
4.8. **Sleep function**

When the protection board is in static state (no communication, no current, no balance and overvoltage protection).) Delay 1 Minutes later, it goes to sleep, After entering this state, the protection board only reduces the frequency of detecting voltage and current and its own power consumption, without any impact on customer use. Communication, dialing Switch, charge and discharge can automatically exit sleep mode

4.9. **Communication function**

The protection board can be connected to the computer through the communication box, communication format 9600,8,N ,1 The upper computer receives the protection board data:

UART Communication box



RS485 Communication box

Bluetooth module

Note: The above three tools need to be purchased separately.

The connection method is: after installing the dedicated driver for our communication box on the computer, connect the communication box USB Plugged into the computer USB The other end of the port is connected to the corresponding port of the protection board that has been connected to the battery. Turn on the host computer, click the communication port setting, select the corresponding communication boxCOM 口, other options do not need to be moved, after confirming, click start to read the data in the protection.**If you need to change the parameters of the protection board, you must first click to read the parameters on the parameter page, and then change the parameters.**

5. Main material

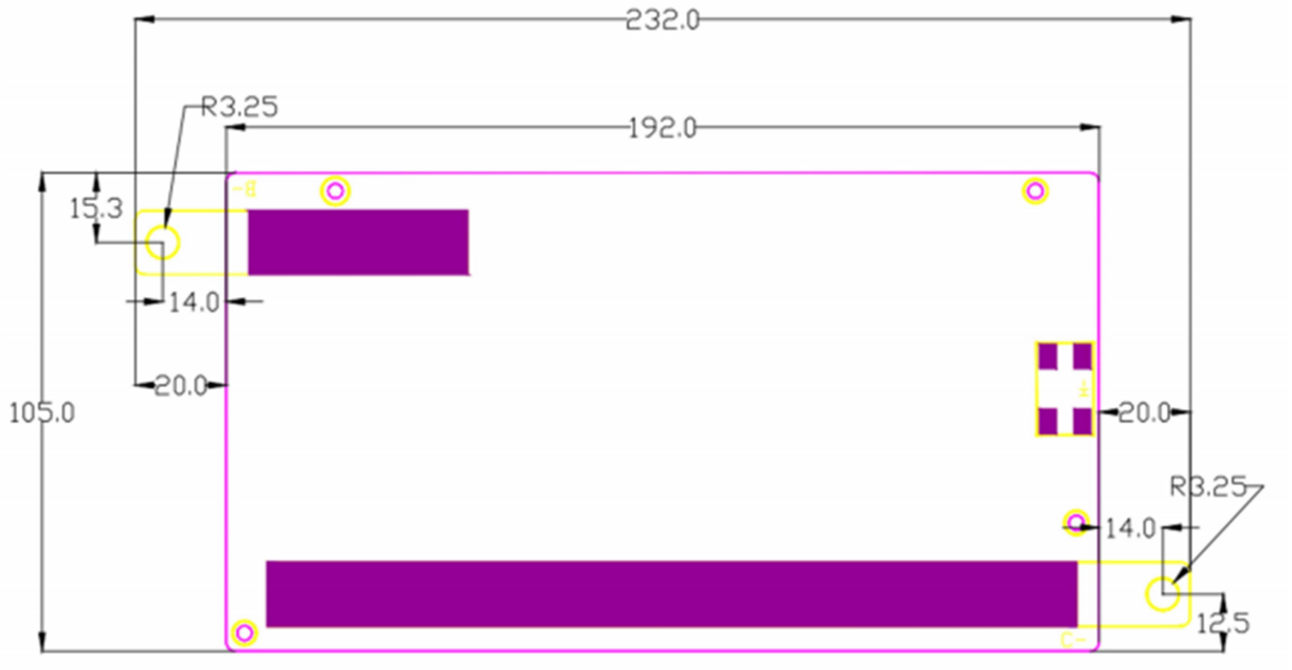
Serial number	Material name	Manufacturer	Dosage
1	NANO100SD3BN	nuvoton	1PCS
2	BQ7692003PW	TI	1PCS
3	HYG013N04NA1B6 orHY4903	Hua Yiwei	30PCS
4	PCB-JBD-SP04S034 V1.2	JBD	1PCS

Note: The above materials may be replaced by materials with the same specifications or better specifications. If the materials are not allowed to be replaced by certification requirements, we need to notify our business to re-sampling, the controlled specifications, and the final interpretation right belongs to Jiabaida .

6. Schematic and size

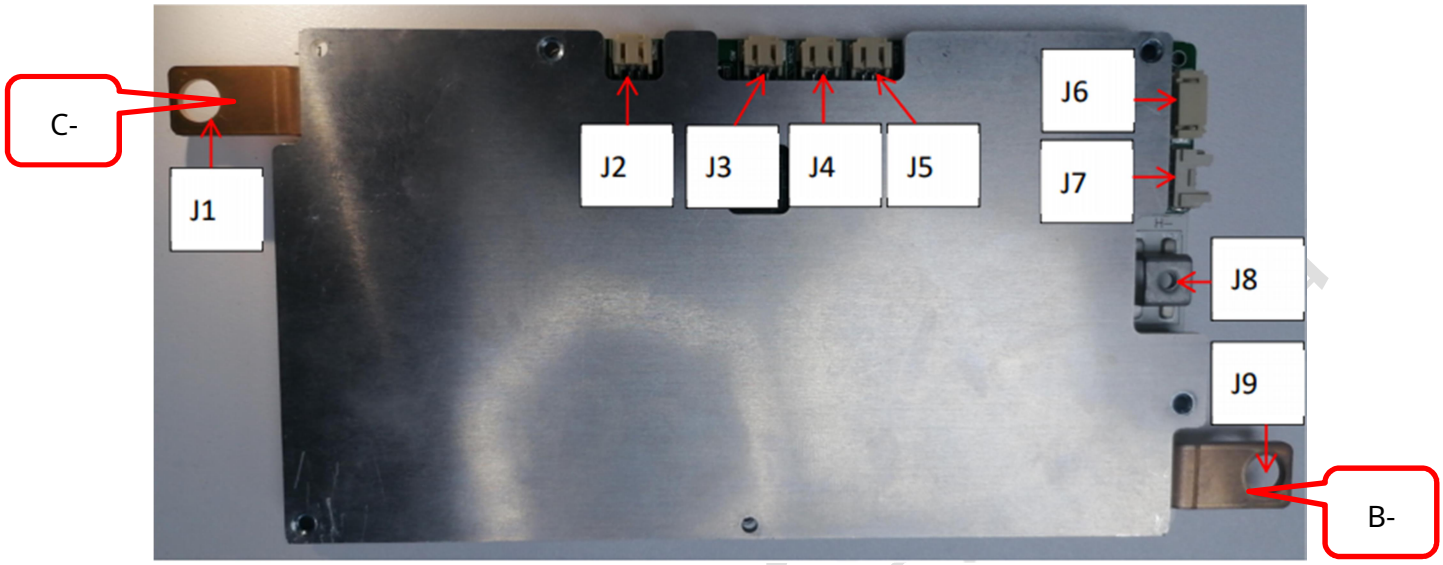
6.1. Mark the size and installation point marking diagram

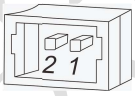
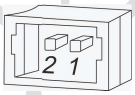
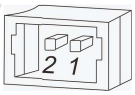
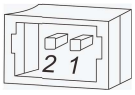
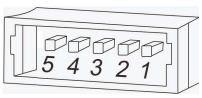
(No installation positioning holes, the screw holes in the figure below have been used to fix the heat sink and PCB)

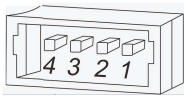


7. Signal port definition

7.1. **The schematic diagram is marked with the interface number (refer to the figure below)**



Label	Tag connector function		Schematic diagram of the connector Pin definition	PIN	Function definition	Description
1	J1	C-		1	Connect the charger and load negative pole	
2	J2	RS485 Communication mouth		1	RS485-B	
				2	RS485-A	
3	J3	Discharge switch interface		1	SW-1	
				2	SW-2	
4	J4	NTC2(External temperature Degree probe interface)		1	Connect temperature probe	
				2		
5	J5	NTC3(External temperature Degree probe interface)		1	Connect temperature probe	
				2		
6	J6	Voltage detection socket		1	Connect the negative pole of the lowest battery-saving core	
				2	Next 1 Battery-saving core positive	
				3	Next 2 Battery-saving core positive	
				4	Next 3 Battery-saving core positive	

				5	Next 4 Battery-saving core positive	
7	J7	UART\Bluetooth connection mouth		1	GND UART Interface ground	
				2	RXD Protection board data receiving	
				3	TXD Protection board data transmission	
				4	VDD Bluetooth powered	
8	J8	Heating film anode			Connect the heating film negative electrode	
9	J9	B-			Connect the battery negative	

Note: The total positive electrode of the battery and the positive electrode of the charger, the positive electrode of the load, and the positive electrode of the heating film are all short-circuited together without passing through the protec

8. Environmental suitability

8.1. **Working conditions:**

BMS The protection board allows normal work under the following conditions:

Ambient temperature:-30℃ ~+75℃;

Relative humidity:5% ~ 90%;

Atmospheric pressure:86kPa~106 kPa;

8.2. **Storage environment**

BMS The protection board should be stored at an ambient temperature of-5°C~+40°C, The relative humidity is not greater than 70%, In a clean and well-ventilated warehouse, the air must not contain corrosive gases and media that affect electrical insulation, and must not be subject to any mechanical shock or heavy pressure. Keep away from direct sunlight, and the distance from the heat source (heating equipment, etc.) should not be less than2m. Under the above storage conditions,BMS The protection board can be stored for one year.

9. Packing and shipping

9.1. **Logo:**

BMS The protective board should have the following clear and durable marks:

1) Product name and model

2) Cell model

3) Factory date and serial number

9.2. **package**

1) The packaging should meet the requirements of moisture-proof and vibration-proof. The packaging box should be firm and reliable. The box should be lined with moisture-proof material, and the product should not move in the box.

2) External carton packing box, veneer anti-static bag and bubble bag packaging;

9.3. **transport**

1) During transportation, the product must not be subject to violent mechanical impact, exposure to the sun, rain, chemically corrosive materials and harmful gases; 5.3.2 During the loading and unloading process, the product should be handled with care, and it is strictly forbidden to drop or press it.

2) The stacking height of the packing box is less than 5 layers.

10. **Precautions**

1) This management system cannot be used in series.

2) When multiple battery packs using this management system are connected in parallel, ensure that the maximum voltage difference of each battery pack is lower than 3V before paralleling.

3) When multiple battery packs using this management system are used in parallel, the total charge impulse current of the adapter may be applied to a single battery pack. It should be ensured that the total charge impulse current of the adapter does not exceed the maximum value of the charge impulse current of a single management system.

4) The short-circuit protection function of this management system is suitable for a variety of application scenarios, but it does not guarantee that it can be short-circuited under any conditions. When the sum of the internal resistance of the battery pack and the short-circuit loop is less than 40mΩ, the battery pack capacity exceeds 20% of the rated value, the short-circuit current exceeds 1800A, the inductance of the short-circuit loop is very large, or the total length of the short-circuited wire is very long, please test by yourself to determine whether You can use this management system.

5) When welding the battery lead, there must be no wrong or reverse connection. If the wrong connection is indeed made, this circuit board may be damaged, and it can be used only after passing the test again.

6) When assembling, the management system should not directly touch the surface of the cell to avoid damage to the circuit board. The assembly must be firm and reliable.

7) Be careful not to touch the components on the circuit board with the lead wire, soldering iron, solder, etc. during use, otherwise the circuit board may be damaged.

8) Pay attention to anti-static, moisture-proof, waterproof, etc. during use.

9) Please follow the design parameters and conditions of use during use, and must not exceed the values in this specification, otherwise the management system may be damaged.

10) After the battery pack and the management system are combined, if you find that there is no voltage output or charging failure at the first power-on, please check whether the wiring is correct.