

## Shenzhen Jiabaida Electronic Technology Co., Ltd.

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 SHENZHEN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD
 

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### product specifications

#### Product specification

<b>Customer name (CUSTOMER):</b>		
<b>product name(SAMPLE NAME):</b>	3~4string60~200Asoftware board	
<b>Product number(MODEL NAME):</b>	JBD-SP04S034-Iron lithium series	
<b>Submission date (DATE):</b>	2022-01-10	
<b>Version(VERSION):</b>	A04	
<b>Customer signature and seal (SIGNATURES):</b>		
prepared by(compiler)	review (Reviewer)	approve(Approver)
Zhang Wanlian	Wang Ligang	Zhang Qiaoqiao

**Correction records** (Correction record)

version number Version number	page number Page number	Revised by Reviser	Revision date revision date	modify the content Revised content	Remark remarks
A01	full text	Wang Ligang	2021.11.06	brand new fiction	
A02	Page 6	Wang Ligang	2021.11.29	Add parameter screenshot	
A03	11 pages	Wang Ligang	2021.12.07	Add temperature switch wiring diagram	
A04	full text	Zhang Wanlian	2022.01.10	Change to Chinese and English format	

## 1. Product Introduction (Product introduction)

JBD-SP04S034 is specifically targeted at 3~4A software protection board solution designed for series lithium battery packs. This product uses a front-end acquisition chip+MCU

Architecture, some parameters can be flexibly adjusted through the host computer according to customer needs.

JBD-SP04S034 is a software protection board scheme specially designed for 3~4 strings of lithium battery packs. The product adopts architecture of front-end acquisition chip + MCU, and some parameters can be flexibly adjusted through the host computer according to customer needs.

## 2. Function configuration (Configuration)

Function(Function)	configuration(Configuration)	Function(Function)	configuration (Configuration)
Number of strings supported (Number of strings supported)	3~4S	485 Communication (Quarantine)485 communication (isolated)	Optional (Optional)
continuous current (Continuous current)	60~200A	UART interface (isolated) (UART interface (isolated))	/
NTC quantity (Number of NTCs)	1 channel built-in, 2 channels external (1 built-in, 2 external)	CAN communication (CAN communication)	/
Equalization function (Balance Function)	passive equilibrium (Passive balance)	232 Communication (232 Communication)	/
UART interface (non-isolated) UART (non-isolated)	Standard configuration (Standard option)	Heating film function (Heating function)	Optional (Optional)
switch function (Switch function)	Optional (Optional)	Bluetooth module (Module of Bluetooth)	Optional (Optional)
Charging current limiting function (Charging current limit)	/	Battery packs in series (Battery packs in series)	Optional (Optional)
Battery packs connected in parallel (Battery packs in parallel)	not support (Not supported)	secondary protection function (Secondary protection)	/
Resume (History storage)	/	LCD display(LCD display)	Optional (Optional)
Pre-discharge function (Pre-discharge function)	/	LED indicator interface (LED indicator interface)	/
buzzer (Buzzer)	/	GPS interface (interface)	/

Note: The UART interface (non-isolated) does not support communication with chargers or loads.

Note: The UART interface (non-isolated) does not support communication with chargers or loads.

### 3. parameter settings(Parameter Setting)

#### 3.1.Basic parameters(Basic parameter)

Cell specifications(Cell specifications)	3~4 skewerslithium iron(3~4 strings of Lithium Iron Battery)
Interface Type(Interface type)	Same port for charging and discharging(Charge and discharge are both at the same port)
Charging voltage(charging voltage)	3.6V*number of strings(3.6V*Number of strings)
Cell voltage range(Cell voltage range)	2.2~3.75V
Continuous charging current(Continuous charging current)	60A~200A
Continuous discharge current(Continuous discharging current)	60A~200A
Operating power consumption(Consumption of running)	≤25mA
Sleep power consumption(Consumption of sleep)	≤300uA
Internal circuit resistance(Circuit resistance)	≤10mR
Operating temperature(Operating temperature)	- 30°C~75°C
Protection plate structure size (Structure size of PCB)	
Regular size(60~100A)(Regular size)	192±2mm*105±0.5mm*13±1mm (length Width Height) (Length*Width*Height)
Regular size(120~200A)(Regular size)	192±2mm*105±0.5mm*20±1mm (length Width Height)(Length*Width*Height)
Optional structure 1 (Optional structure 1)	The copper strip without nuts extends beyond the edge of the board, and the length of the protective board becomes232±2mm
Optional structure 2 (Optional structure 2)	The heat sink with studs widens the positioning hole, and the width of the protective plate becomes 125±0.5mm

Note: The test needs to be carried out in an environment with a temperature of 25±2°C and a relative humidity of 65±20%.

Note: Test should be at temperature25±2°C, and relative humidity 65±20% of surroundings.

### 3.2.The main parameters(Main parameter)

	project(Project)	Specification(Specification)			unit(Unit)
		minimum value	typical value	maximum value	
	MIN	TYP	MAX		
Overvoltage and Undervoltage Protection  (Overvoltage and undervoltage protection)	Overcharge Protection Voltage (Overvoltage)	3.72	3.75	3.78	V
	Overcharge Protection Delay (Overvoltage delay)	1000	2000	3000	mS
	Overcharge protection release (Overvoltage release)	3.50	3.55	3.60	V
	Over-discharge protection voltage (Undervoltage)	2.10	2.20	2.30	V
	Over-discharge protection delay (Undervoltage delay)	1000	2000	3000	mS
	Over-discharge protection release (Undervoltage release)	2.60	2.70	2.80	V
	Over-discharge protection release condition (Undervoltage release conditions)	Voltage self-recovery or charging recovery within 60S (60S voltage self-recovery or charge recovery)			
Charging overcurrent protection  (Overcurrent Charge)	Charging overcurrent protection value (Overcurrent Charge protection value)	See the configuration table of overcurrent protection value below (See the configuration table of overcurrent protection value below)			
	Charge overcurrent delay time (Overcurrent Charge delay)	5	10	15	S
	Charge overcurrent release condition (Charge over current release conditions)	Automatic recovery after 32S delay (Automatic recovery after a delay of 32S)			
Discharge overcurrent protection  (Overcurrent Discharge)	Primary discharge overcurrent protection value  (1th Overcurrent Discharge)	See the configuration table of overcurrent protection value below (See the configuration table of overcurrent protection value below)			
	Primary discharge overcurrent protection delay  (1th Overcurrent Discharge delay)	15	20	25	S
	Secondary discharge overcurrent protection current value  (2th Overcurrent Discharge )	See the configuration table of overcurrent protection value below (See the configuration table of overcurrent protection value below)			
	Secondary discharge overcurrent 2 protection delay  (2th Overcurrent Discharge delay)	320	640	1280	mS
	Discharge overcurrent protection recovery conditions  (Overcurrent Discharge release)	Automatic recovery after 32S delay (Automatic recovery after a delay of 32S)			
Short circuit protection  (Short Circuit Discharge)	Short circuit protection current (Short circuit protection current)	See the configuration table of overcurrent protection value below (See the configuration table of overcurrent protection value below)			
	Short circuit protection delay time (Short circuit protection delay time)	200	400	800	uS
	Short circuit protection recovery (Short circuit protection recovery)	Delay 30s to recover after disconnecting the load. ( Recover after 30S delay after disconnecting the load.)			
	<div>Short-circuit description: short-circuit current less than the minimum value or higher than the maximum value may cause short-circuit protection failure, short-circuit current exceeds 3000A, short-circuit protection is not guaranteed, and short-circuit protection testing is not recommended.</div> <div>(Short-circuit description: The short-circuit current is less than the minimum value or higher than the maximum value, which may cause the short-circuit protection to fail, and the short-circuit current exceeds 3000A, short-circuit protection is not guaranteed, and short-circuit protection testing is not recommended.)</div>				

Charging high temperature protection <b>Overtemperature Charge</b>	Temperature protection value (Temperature protection value)	62	65	68	°C
	Temperature protection release value (Temperature protection release value)	52	55	58	°C
Charging low temperature protection (no heating function) <b>Undertemperature Charge (no heating function)</b>	Temperature protection value (Temperature protection value)	- 15	- 10	- 5	°C
	Temperature protection release value (Temperature protection release value)	- 10	- 5	0	°C
Charging low temperature protection (with heating function) <b>Undertemperature Charge (with heating function)</b>	Temperature protection value (Temperature protection value)	- 3	0	3	°C
	Temperature protection release value (Temperature protection release value)	2	5	8	°C
Discharge high temperature protection <b>Overtemperature Discharge</b>	Temperature protection value (Temperature protection value)	72	75	78	°C
	Temperature Protection Release (Temperature protection release value)	62	65	68	°C
Discharge high temperature protection <b>Undertemperature Discharge</b>	Temperature protection value (Temperature protection value)	- 25	- 20	- 15	°C
	Temperature Protection Release (Temperature protection release value)	- 15	- 10	- 5	°C
FET high temperature protection (built-in) <b>high temperature protection of FET (Built-in)</b>	Temperature protection value (Temperature protection value)	85	90	95	°C
	Temperature protection release value (Temperature protection release value)	65	70	75	°C
Equalization function <b>(Balance Function)</b>	Balanced turn-on voltage (Equalization turn-on voltage)	3.27	3.30	3.33	V
	opening pressure difference (Difference opening voltage value)		15		mV
	Balance current (Balance current)	50		150	mA
	equilibrium mode (Balance model)	Charge balancing (Charge equalization)			
	Balance type (Balance type)	pulse mode (Pulsed model)			

Note: The test needs to be carried out in an environment with a temperature of 25±2°C and a relative humidity of 65±20%.

**Note: Test should be at temperature 25±2°C, and relative humidity 65±20% of surroundings.**

### 3.3. Overcurrent protection value configuration table (Overcurrent protection value configuration table)

continuous current (Continuous current)	Charging overcurrent protection value (Charge over current protection value)	Primary discharge overcurrent protection value (The first discharge over current protection value)	Secondary discharge overcurrent protection value (The second discharge over current protection value)	Short circuit protection value (Short circuit protection value)
60A	70±5A	70±5A	220±44A	880±176A
80A	90±5A	90±5A	280±56A	1120±224A
100A	110±5A	110±5A	340±68A	1560±312A
120A	140±10A	140±10A	380±76A	1780±356A
150A	170±10A	170±10A	500±100A	2000±400A
200A	220±10A	220±10A	620±124A	2000±400A

### 3.4. Parameter setting (parameter settings)

JBDTools -V3.3-20211021

☐ SAVEDATA 保存数据

☒ AFE\_SH303
 ☒ AFE\_TI\_BQ76XX
 ☒ 简体中文

☐ AFE\_O2\_3717
 ☐ 中文繁體

☐ AFE\_NUVOTON
 ☐ English

☐ AFE\_SH309

☐ factory 出厂参数

☒ OC2&SC\*2

放电过流2值 310 A 过流2延时 640 ms  
 短路保护值 1000 A 短路延时 400 μs  
 硬件单体过压 3900 mV 过压延时 8 S  
 硬件单体欠压 2000 mV 欠压延时 8 S  
 短路释放延时 5 S

基本保护参数配置  
 单体过压 3750 mV 释放电压 3500 mV 延时 2 S  
 单体欠压 2200 mV 释放电压 2700 mV 延时 2 S  
 整组过压 15000 mV 释放电压 14000 mV 延时 2 S  
 整组欠压 8800 mV 释放电压 10800 mV 延时 2 S  
 充电高温 65 C 释放温度 55 C 延时 5 S  
 充电低温 -10 C 释放温度 -5 C 延时 5 S  
 放电高温 75 C 释放温度 65 C 延时 5 S  
 放电低温 -20 C 释放温度 -10 C 延时 5 S  
 充电过流 220000 mA 释放时间 32 S 延时 10 S  
 放电过流 220000 mA 释放时间 32 S 延时 20 S

功能配置  
☐ SW\_EN ☒ LOAD\_EN ☒ BAL\_EN ☒ CHG\_BAL  
☐ LED\_EN ☐ LED\_NUM ☐ RTC ☐ EDV\_EN  
☐ CHGLimit ☐ GPS\_EN ☐ Buzzer\_EN

NTC配置  
☒ NTC1 ☒ NTC2 ☒ NTC3 ☐ NTC4  
☐ NTC5 ☐ NTC6 ☐ NTC7 ☐ NTC8

均衡配置  
 开启电压 3300 mV GPS关闭电压 3000 mV  
 均衡精度 15 mV GPS关闭延时 120 S  
 均衡电流 0 mA

其他信息配置  
 检流阻值 0.1 mR 电池串数 4  
 循环次数 0 序列号 0  
 制造商 DGJBD  
☐ BMS\_SN JBD-SP04S034-L4S-200A  
 生产日期 2022 1 10  
☐ Barcode

容量配置  
 标称容量 200000 mAh  
 循环容量 160000 mAh  
 单体充满电压 3550 mV  
 单体截止电压 2800 mV  
 自放电率 0.1 %  
 100% 3350 90% 3330 mV  
 80% 3329 70% 3325 mV  
 60% 3322 50% 3301 mV  
 40% 3291 30% 3280 mV  
 20% 3266 10% 3220 mV  
 开关 30 S LED 10 S

保护次数  
 短路次数 0 充电高温 0  
 充电过流 0 充电低温 0  
 放电过流 0 放电高温 0  
 单体过压 0 放电低温 0  
 单体欠压 0 整体过压 0  
 RSTNum 0 整体欠压 0

未连接! 串口号:COM4,波特率:9600,数据位:8,校验位:0 参数名称: 2022-01-10 21:28:39

The diagram of upper computer

## 4. Function Description(Function Description)

### 4.1.Overcharge protection and recovery (Overcharge protection and recovery)

#### 4.1.1.Cell overcharge protection and recovery (Cell overcharge protection and recovery)

When the voltage of any battery cell is higher than the set value of the overcharge voltage of the single cell, and the duration reaches the overcharge delay of the single cell, the system enters the overcharge protection state, turns off the charging MOS, and 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 released by discharge.

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When the voltage of any cell is higher than the set value of the cell overcharge voltage, and the duration reaches the cell overcharge delay, the system enters the overcharge protection state, the charging MOS is turned off, and the battery cannot be charged.

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 released by discharge.

#### 4.1.2.Overall overcharge protection and recovery (Entire 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, turns off the charging MOS, and cannot charge the battery.

When the overall voltage drops below the total voltage overvoltage protection recovery value, the overcharge protection state is released, or it can be released by discharging.

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When the entire voltage is higher than the entire overvoltage set value, and the duration reaches the entire overcharge delay, the system enters the overcharge protection state, turns off the charging MOS, and cannot charge the battery.

When the entire voltage drops below the recovery value of the entire voltage overvoltage protection, the overcharge protection state is released, and it can also be released by discharge.

### 4.2.Over-discharge protection and recovery (Over-discharge protection and recovery)

#### 4.2.1.Single unit over-discharge protection and recovery (Cell over-discharge protection and recovery)

When the minimum cell voltage is lower than the cell over-discharge voltage setting value, and the duration reaches the cell over-discharge delay, the system enters the over-discharge protection state, turns off the discharge MOS, and cannot discharge the battery.

After the over-discharge protection of a single cell occurs, charging the battery pack can release the over-discharge protection state.

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When the minimum cell voltage is lower than the set value of the over-discharge voltage of the cell, and the duration reaches the over-discharge delay of the cell, the system enters the over-discharge protection state, turns off the discharge MOS, and cannot discharge the battery.

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

#### 4.2.2.Entire 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, turns off the discharge MOS, and cannot discharge the battery.

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

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When the entire voltage is lower than the entire over-discharge voltage set value, and the duration reaches the entire over-discharge delay, the system enters the over-discharge protection state, turns off the discharge MOS, and



cannot discharge the battery.

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

#### 4.3.Charge overcurrent protection and recovery (Charging 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 cannot charge the battery. After charging over-current protection occurs, it will automatically recover with a delay. If you need to automatically recover, you can set the corresponding release time longer; discharging can also release the charging over-current state.

When the charging current exceeds the charging protection current and the duration reaches the overcurrent detection delay time, the system enters the charging overcurrent protection state and cannot charge the battery. After the charging overcurrent protection occurs, it will automatically recover after a delay. If you want to automatically recover or not, you can set the corresponding release time to be longer; the charging overcurrent state can also be released by discharging.

#### 4.4.Discharge overcurrent protection and recovery (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 discharge overcurrent protection state and turns off the discharge MOS. Delayed automatic recovery after discharge overcurrent occurs. If automatic recovery is not required, the corresponding release time can be set longer. Charging can also relieve the discharge overcurrent state. The discharge has a two-level overcurrent protection function, which has different response speeds to different current values and protects the battery more reliably.

When the discharge current exceeds the discharge overcurrent protection current and the duration reaches the overcurrent detection delay time, the system enters the discharge overcurrent protection state and turns off the discharge MOS. Delayed automatic recovery after discharge overcurrent occurs, and the corresponding release time can be set longer if automatic recovery is required. Charging can also release the discharge overcurrent condition. Discharge has two-level overcurrent protection function, which has different response speeds for different current values, and protects the battery more reliably.

#### 4.5.Temperature Protection and Recovery (Temperature Protection and Recovery)

##### 4.5.1.Charge and discharge high temperature protection and recovery (Charge and discharge high temperature protection and recovery)

When the NTC detects that the temperature of the cell surface is higher than the set high-temperature protection temperature during charging and discharging, the management system enters the high-temperature protection state, and the charging or discharging MOSFET is turned off. In this state, the battery pack cannot be charged or discharged.

When the temperature on the surface of the battery core drops to the high temperature recovery set value, the management system recovers from the high temperature state and turns on the charge and discharge MOS again.

When the NTC detects that the temperature of the battery cell surface is higher than the setting of high temperature protection value during charging and discharging, the management system enters the high temperature protection state, the charging or discharging MOSFET is turned off, and the battery pack cannot be charged or discharged in this state.

When the temperature of the surface of the cell drops to the high temperature recovery set value, the management system recovers from the high temperature state and turns on the charge and discharge MOS again.

##### 4.5.2.Charge and discharge low temperature protection and recovery (Charge and discharge low temperature protection and recovery)

When the NTC detects that the temperature of the cell surface is lower than the set low-temperature protection temperature during charging and discharging, the management system enters the low-temperature protection state, and the charging or discharging MOSFET is turned off. In this state, the battery pack cannot be charged or discharged.

When the temperature of the cell surface rises to the low-temperature recovery set value, the management system recovers from the low-temperature state and turns on the charge and discharge MOS again.

When the NTC detects that the temperature of the cell surface is lower than the setting of low temperature protection value during charging and discharging, the management system enters the low temperature protection state, the charging or discharging MOSFET is turned off, and the battery pack cannot be charged or discharged in this state.

When the temperature of the cell surface rises to the low temperature recovery set value, the management system recovers from the low temperature state and turns on the charge and discharge MOS again.

#### 4.6.Equalization function (Balance function)

The management system uses a resistor bypass method to balance the cells. During the charging process, the voltage of the highest single cell of the battery pack reaches the set balanced starting voltage value, and the voltage difference between the lowest voltage and the highest voltage of the single cell of the battery pack is greater than the set value. When the value is set, the cell equalization function that meets the conditions is turned on, and the two adjacent equalizers cannot be turned on at the same time.

Equalization stops when the cell voltage difference is less than the set value or the cell voltage is lower than the equalization start voltage. Charge balance mode and static balance mode can be set.

The management system uses the resistance bypass method to balance the cells. During the charging process, the voltage of the highest single cell 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 single cell of the battery pack is greater than the set value. When the value is set, the equalization function of the cells that meet the conditions is enabled, and the two adjacent equalizers cannot be enabled at the same time.

The equalization stops when the cell voltage difference is less than the set value or the cell voltage is less than the equalization turn-on voltage. Charge balance mode and static balance mode can be set.

#### 4.7.Capacity Calculation (Capacity calculation)

The SOC of the battery pack can be accurately calculated by integrating current and time. The full capacity and cycle capacity of the battery pack can be set through 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 is increased by one.

The SOC calculation of the battery pack can be accurately performed by integrating current and time. The full capacity and cycle capacity of the battery pack can be set through 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 once.

Note: For newly installed batteries, please set the nominal capacity and cycle capacity according to the battery capacity, and perform a capacity learning, otherwise the capacity may not be accurate. Capacity learning operation: first fully charge to overvoltage protection, then discharge to undervoltage protection, and then charge again.

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

#### 4.8.Sleep function(Sleep function)

When the protection board is in static state (no communication, no current, no balancing and overvoltage protection.) After a 1-minute delay, it enters the sleep state. After entering this state, the protection board only reduces the frequency of detecting voltage and current and its own power consumption. Communication, switching, charging and discharging can automatically exit the sleep mode.

When the protection board is in static state (no communication, no current, no balance and overvoltage protection) . After a delay of 1 minute, it will enter the sleep state. After entering this state, the protection board will only reduce the frequency of Detecting voltage and current and its own power consumption. Communication, dial switch, charging and discharging can automatically exit the sleep mode.

#### 4.9.Communication function (Communication)

The protection board can be connected to the computer through the communication box, and the communication format is 9600,8,N,1. The host computer receives the protection board data.

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



UART communication box

**(UART communication box)**



RS485 communication box

**(RS485 communication box)**



Bluetooth module

**(Bluetooth module)**

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

Connection method: After installing our company's special driver for the communication box on the computer, plug the USB end of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the protective board that has already connected the battery. Open the host computer, click Communication Port Settings, select the CMO port corresponding to the communication box, and leave other options untouched. After confirmation, 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 materials (main material)

serial number (Number)	Material name(Name of Material)	Manufacturer (Manufacturer)	quantity (Quantity)
1	NANO100SD3BN	NUVOTON	1PCS
2	BQ7692003PW	Ti	1PCS
Accessories			
1	Acquisition line\5PIN\HY2.0\with card\550MM\black and white red	- - -	1PCS
2	Screws\M6*12mm (total length 16mm; copper strip is only for models with nuts)	- - -	2PCS
3	Temperature control\60°C\BH05-BB5D Normally closed\Plastic head\10A\Cable length 200mm (only with heating function)	treasure lake	1PCS

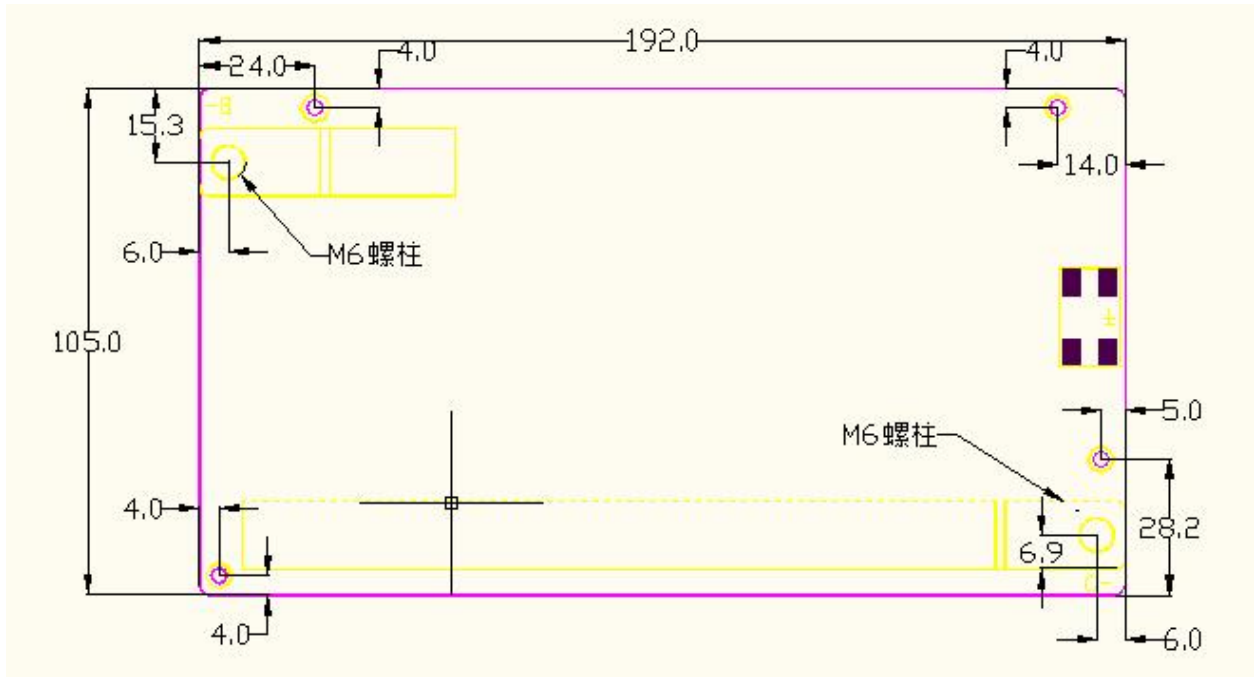
**Note: The above materials may be replaced by materials with the same specifications or better specifications. If there are certification requirements, material replacement is not allowed. We need to notify our business to re-submit samples and controlled specifications. The final right of interpretation belongs to Jiabaida.**

**Note: The above materials may be replaced by materials with the same specifications or better specifications. If there are certification requirements, the replacement of materials is not allowed, and we need to notify our business to send samples again. The controlled specifications, the final interpretation right belongs to Jiabaida.**

## 6. Schematic diagram and dimensions (Schematic and Dimensions)

### 6.1. Dimensions and installation point markings (Dimensions and installation point drawing)

#### 6.1.1. Regular construction dimensions (copper strip M6 nut)



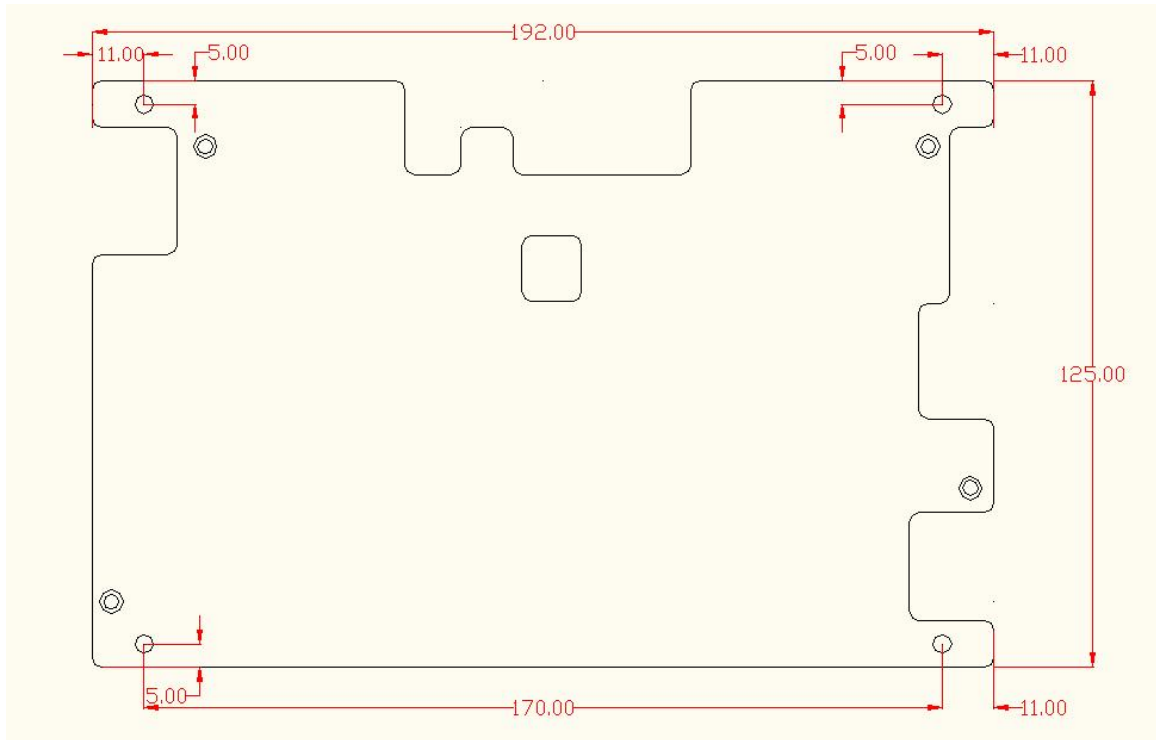
General structure size (copper strip M6 nut)

#### 6.1.2. Optional structure 1 Dimensions (the copper strip without nuts extends beyond the edge of the board, and the length of the protective board becomes 232±2mm)



Dimensions of optional structure 1

6.1.3.Optional structure2Dimensions (with stud heat sink and widened positioning holes, the width of the protective plate becomes $125\pm0.5\text{mm}$ )

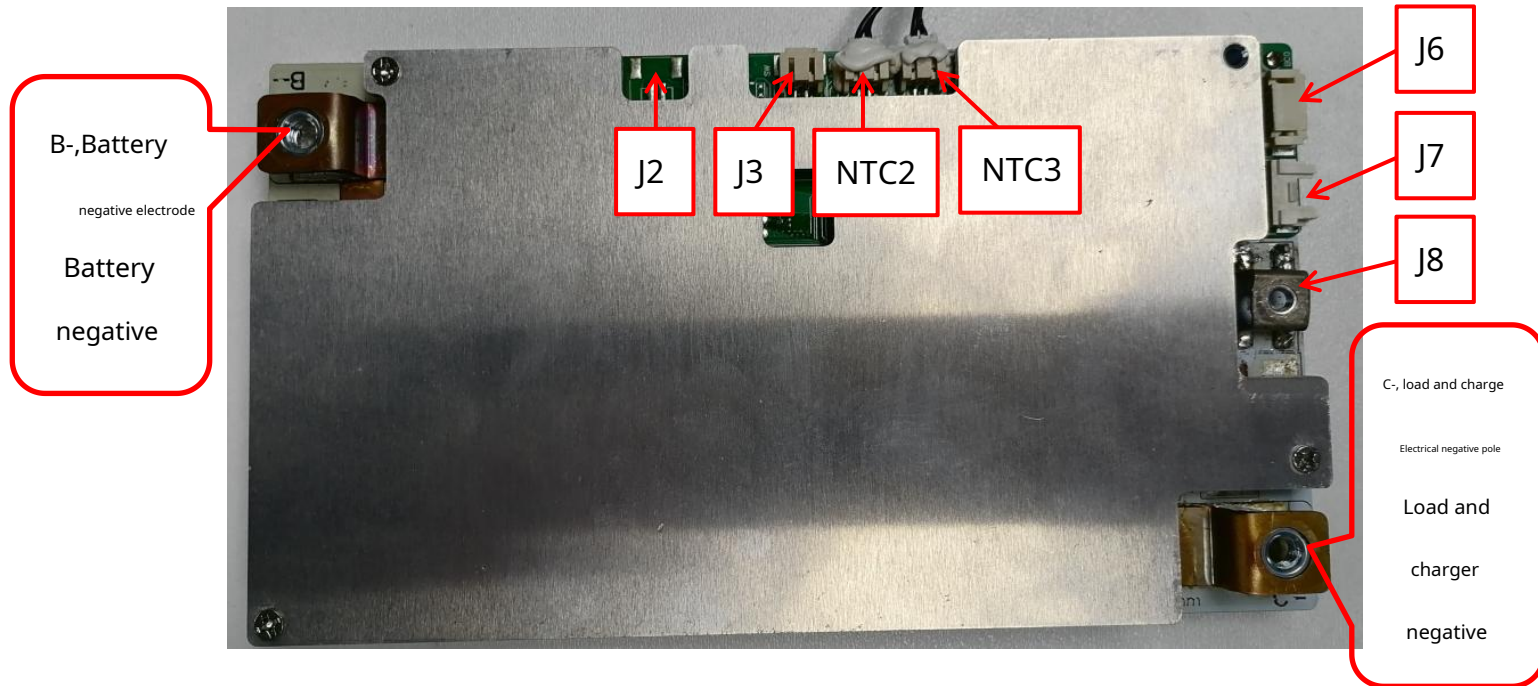





Dimensions of optional structures 2



## 7. Signal port definition (Signal port definition)

7.1.The schematic diagram indicates the interface number (refer to the figure below)

Schematic marking the interface label (refer to the following figure)



label (Label)	bit number (Tag number)	Connector function (Connector)	Connector diagram picture (Schematic diagram)	PIN	PIN function definition (Pin function)	Remark (Note)
1	J2 (PH2.0-2P)	RS485		1	RS485-B	
				2	RS485-A	
2	J3 (PH2.0-2P)	Self-locking discharge switch interface		1	SW-1	
				2	SW-2	
3	J6 (HY2.0-5P) (with buckle)	Voltage detection socket (4 skewerseven connection method) Voltage detection socket (4 series connection mode)		1	Connect to the negative pole of the lowest battery cell Connect to Negative Side of Cell 1.	
				2	Connect to the positive terminal of battery cell 1 Connect to Positive Side of Cell 1	
				3	Connect to the positive terminal of battery cell 2 Connect to Positive Side of Cell 2	
				4	Connect to the positive terminal of battery cell 3 Connect to Positive Side of Cell 3	
				5	Connect to the positive terminal of the 4th battery cell Connect to Positive Side of Cell 5	

	J6 (HY2.0-5P) (with buckle)	Voltage detection socket (3 skewer even connection method)  Voltage detection socket (3 series connection mode)		1	Connect to the negative pole of the lowest battery cell <b>Connect to Negative Side of Cell 1.</b>	
				2	Connect to the positive terminal of battery cell 1 <b>Connect to Positive Side of Cell 1</b>	
				3	Connect to the positive terminal of battery cell 2 <b>Connect to Positive Side of Cell 2</b>	
				4	<b>null (No Connect)</b>	
				5	Connect to the positive terminal of battery cell 3 <b>Connect to Positive Side of Cell 3</b>	
4	J7 (HY2.0-4P) (with buckle)	UART\Bluetooth interface  UART\Bluetooth interface		1	GND UART interface ground (UART-GND)	
				2	RXD protection board data connection (RXD-BMS)	
				3	TXD protection board data transmission (TXD-BMS)	
				4	VDD Bluetooth power supply <b>(Bluetooth power supply)</b>	
5	J8 (M 4 terminal)	Heating film negative electrode  Heating film negative			Connect the negative electrode of the heating film (Connect the heating film negative electrode)	

#### Remark:

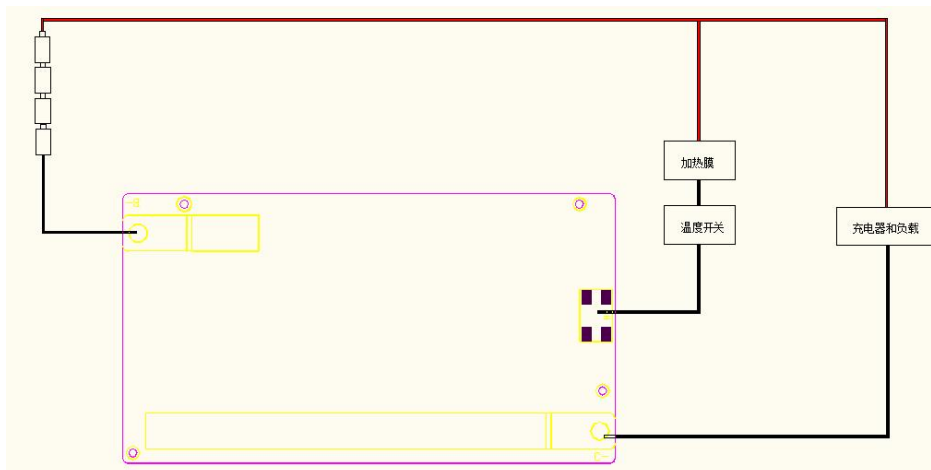
1. The total positive pole of the battery, the positive pole of the charger, the positive pole of the load, and the positive pole of the heating film are all shorted together without passing through the protection board.
2. The aperture diameter of B- and C-copper strip connection terminals is 6.5mm.
3. **The ground wire of J7-UART is B-, which is a non-isolated UART port and does not support communication with chargers or loads.**

#### Remarks:

- 1) 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 shortened together, without the protection board.
- 2) The diameter of the B- and C-copper connection terminals is 6.5mm.
- 3) **The ground wire of J7-UART is B-, which is a non-isolated UART port and does not support communication with chargers or loads.**

#### 7.2.Wiring diagram of heating film and distribution temperature switch (model with heating function)

##### Wiring diagram of heating film and distribution temperature switch (Model with heating function)



## 8. Environmental suitability (Environmental suitability)

### 8.1.working environment(The environment of working)

- The BMS protection board allows normal operation under the following conditions:
- Ambient temperature: -30°C ~+75°C;
- Relative humidity: 5% ~ 90%;
- Atmospheric pressure: 86kPa~106 kPa;

- 
- BMS The protective plate allows normal operation under the following conditions:
  - Ambient temperature: -30°C ~+75°C;
  - Relative humidity: 5% ~ 90%;
  - Atmospheric pressure: 86kPa~106kPa;

### 8.2.storage environment (The environment of storage)

The BMS protection board should be stored in a clean and well-ventilated warehouse with an ambient temperature of -5°C~+40°C, a relative humidity of no more than 70%, and the air must not contain corrosive gases and media that affect electrical insulation, and must not be exposed to any Mechanical shock or heavy pressure. Keep away from direct sunlight, and the distance from heat sources (heating equipment, etc.) should not be less than 2m. Under the above storage conditions, the BMS protection board can be stored for one year.

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BMS The protection board should be stored in a clean and well-ventilated warehouse with an ambient temperature of -5°C~+40°C, a relative humidity of not more than 70%, and the air must not contain corrosive gases and media that affect electrical insulation, and must not be affected by any mechanical Shock or heavy pressure. Not subject to direct sunlight, and the distance from the heat source (heating equipment, etc.) should not be less than 2m. Under the above storage conditions , the BMS protection board can be stored for one year.

## 9. Packing and shipping(Packing and shipping)

### 9.1.flag(Logo)

BMS protection panels should have the following clear and durable markings:

- Product name, model
- Cell model
- Date of manufacture and serial number

### 9.2.Package(Package)

-The packaging should meet the requirements of moisture-proof and vibration-proof, the packaging box should be strong and reliable, and the box should be lined with moisture-proof material.

There should be no movement in the box.

- External carton packaging, single board anti-static bag and bubble bag packaging;
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-The packaging should meet the requirements of moisture-proof and anti-vibration, the packing box should be firm and reliable, the inside of the box should be lined with moisture-proof material, and the product should not move in the box.

-External carton box, veneer anti-static bag plus bubble bag packaging;

### 9.3.transportation(transportation)

-During transportation, the product must not be subject to severe mechanical impact, exposure to the sun, rain, chemical corrosive substances and harmful gases.

Corrosion; 5.3.2 During the loading and unloading process, the product should be handled with care, and throwing or heavy pressure is strictly prohibited.

-The stacking height of packaging boxes is less than 5 layers.

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-During transportation, the product shall not be subject to severe mechanical impact, exposure to the sun, rain, chemical corrosive substances 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 throw or press it.

-The height of the packing boxes shall be less than 5 layers.

## 10.Precautions(Precautions)

1. This battery management system cannot be used in series. A customized version is required to support series use.

2. When multiple battery packs using this management system are connected in parallel, it should be ensured that the maximum voltage difference of each battery pack before parallel connection is lower than

3V.

3. When multiple battery packs using this management system are used in parallel, the total charge surge current of the adapter may be applied to a single battery pack.

On each battery pack, it should be ensured that the total charging inrush current of the adapter does not exceed the maximum charging inrush 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 used under any conditions. short circuit. When the total internal resistance of the battery pack and short-circuit loop is less than 40mΩ, the battery pack capacity exceeds the rated value by 20%, 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 This management system can be used.

5. When welding the battery leads, there must be no wrong connection or reverse connection. If it is indeed connected incorrectly, the circuit board may be damaged.

Bad, it can be used only after passing the test again.

6. During assembly, the management system should not directly contact the surface of the battery core to avoid damaging the circuit board. The assembly must be firm and reliable.

7. During use, be careful not to touch the lead tips, soldering iron, solder, etc. on the components on the circuit board, otherwise the product may be damaged. circuit board. Please do not use paste flux when soldering this circuit board, otherwise it may cause the circuit board to not work properly.

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

9. Please follow the design parameters and usage conditions during use, and do not exceed the values in this specification, otherwise it may be damaged.

Bad management system.

10. The parameters, functions and appearance in this specification are for reference only, and the actual protective board shall prevail.

11. After assembling the battery pack and management system, if you find no voltage output or no charge when powering on for the first time, please

Check that the wiring is correct.

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1) This battery management system cannot be used in series in general, and requires a customized version to support series use.

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

3) When multiple battery packs using this management system are used in parallel, The total charging inrush current of the adapter may be applied to a single battery pack. It should be ensured that the total charging inrush current of the adapter does not exceed the maximum charging inrush 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 total internal resistance of the battery pack and the short-circuit loop is lower than 40mΩ, the capacity of the battery pack exceeds the rated value by 20%, the short-circuit current exceeds 1800A, the inductance of the short-circuit loop is very large, or the total length of the short-circuit wire is very long, please test yourself to determine whether This management system can be used.

5) When soldering the battery leads, there must be no wrong or reverse connection. If it is indeed connected incorrectly, the circuit board may be damaged and needs to be re-tested before it can be used.

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

7) During use, be careful not to touch the components on the circuit board such as lead tips, soldering iron, solder, etc., otherwise the circuit board may be damaged. Please do not use paste flux when soldering this circuit board, otherwise it may cause this circuit board to work abnormally.

8) During use, pay attention to anti-static, moisture-proof, waterproof, etc.

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

10) The parameters, functions and appearances in this specification are for reference only, and the actual protection board shall prevail.

11) After the battery pack and the management system are combined, please check whether the wiring is correct if you find that there is no voltage output or charging fails when the battery is powered on for the first time.