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Product confirmation

Customer Name		Customer Model	JBD-SP04S034-60~200A
Our Material Number		Customer Material Number	
Sample Submission Date	2021-12-29	Company Model	JBD-SP04S034
Edition	V1.0	Number of pages	7

Approved by	Reviewed by	Prepared by
	Qiaoqiao zhang	Li Gang Wang
Material Number	JBD-SP04S034	

Customer Confirmation Column

Confirmation Comments:

Signature:

Date:

Special Instruction:

1. Please organize the test in time and give the test feedback to our company, so as to facilitate our company to arrange the follow-up work of this project after the customer receives the sample. If no reply is received within 5 days, our company will assume that the test passed by the customer and the project will be completed normally.

2. If the customer passes the test, please mark the product name and product code in the customer comment column, and stamp the sign for confirmation. Otherwise, please point out the

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problem in the test unqualified column and put forward improvement suggestions.

3. Our company can receive orders only after receiving the original signed and sealed by the customer and attaching the detailed description of the product.

I. Introduction and Features

JBD-SP04S034 is a software protection board solution designed specifically for small energy storage batteries, street lamps, 12V lead-acid replacement lithium batteries and other products with 4 battery packs. It can be applied to lithium batteries with different chemical properties, such as lithium ion, lithium polymer, and phosphoric acid. Lithium iron and so on. The entire system uses TI (Texas Instruments) front-end acquisition chip + MCU, and some parameters can be flexibly adjusted through the host computer according to customer needs.

II Function Configuration

Function	Configuration	Function	Configuration
No of String	3~4S choosable	485 communication(isolation)	choosable
Continuous current	60A~200A choosable	UART port(isolation)	No
No of NTC	1 insert,2 External	CAN	No
Balance function	Passive balance	232	No
UART port(no isolation)	choosable	GPS	No
Switch function	choosable	Heating	choosable
Charging limited current function	no	Bluetooth module	choosable
Support in parallel	Not support	Support in series	Choosable(-S means supporting in series)
Storage function	/	Second protection function	no
Pre-discharge function	/	LCD screen	choosable
Buzzer	/	LED Indicator light port	no

Remark:UART port(no isolation) can not support communication with charger and load

II. Basic parameters

Cell specification	3~4S Lifepo4
Interface type	Charge and discharge same port
Recommend voltage of charging	Lfp:3.6v*string
Working voltage range	Lfp:2.2~3.75v
Continuous charging current	60A~200A
Continuous discharge current	60A-200A
Operating power consumption	≤25mA

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Sleep power consumption	$\leq 3\text{mA}$	
internal resistance of the protection board	$\leq 10\text{mR}$	
Working temperature	$-30^{\circ}\text{C} \sim 75^{\circ}\text{C}$	
Protection board size	$192 \pm 2\text{mm} * 105 \pm 0.5\text{mm} * 20 \pm 1\text{mm}$ (length * width * height)	

Note: The test needs to be in an environment with a temperature of $25 \pm 2^{\circ}\text{C}$ and a relative humidity of $65 \pm 20\%$

Functions	Test items	specification			Unit
		Min.	Type	Max.	
Overvoltage protection	Over-voltage protection voltage	3.72	3.75	3.78	V
	Over-charge protection delay time	1000	2000	3000	mS
	Over-charge protection recovery voltage	3.45	3.50	3.55	V
Over-discharge protection	Over-discharge protection voltage	2.10	2.20	2.30	V
	Over-discharge protection delay time	1000	2000	3000	mS
	Over-discharge protection recovery voltage	2.60	2.70	2.80	V
	Over-discharge protection recovery condition	Automatically recover after a delay of 60S			
Charging over-current protection	Charging Over-current protection value	See below configuration sheet			
	Charging Over-current delay time	5	10	15	S
	Charging over-current release condition	Automatically recover after a delay of 32S			
Discharge over-current protection	Level 1 discharge overcurrent protection current	See below configuration sheet			
	Level 1 discharge overcurrent 1 protection delay	15	20	25	S
	Level 2 discharge overcurrent protection current value	See below configuration sheet			
	Level 2 discharge overcurrent 2 protection delay	320	640	1280	M S

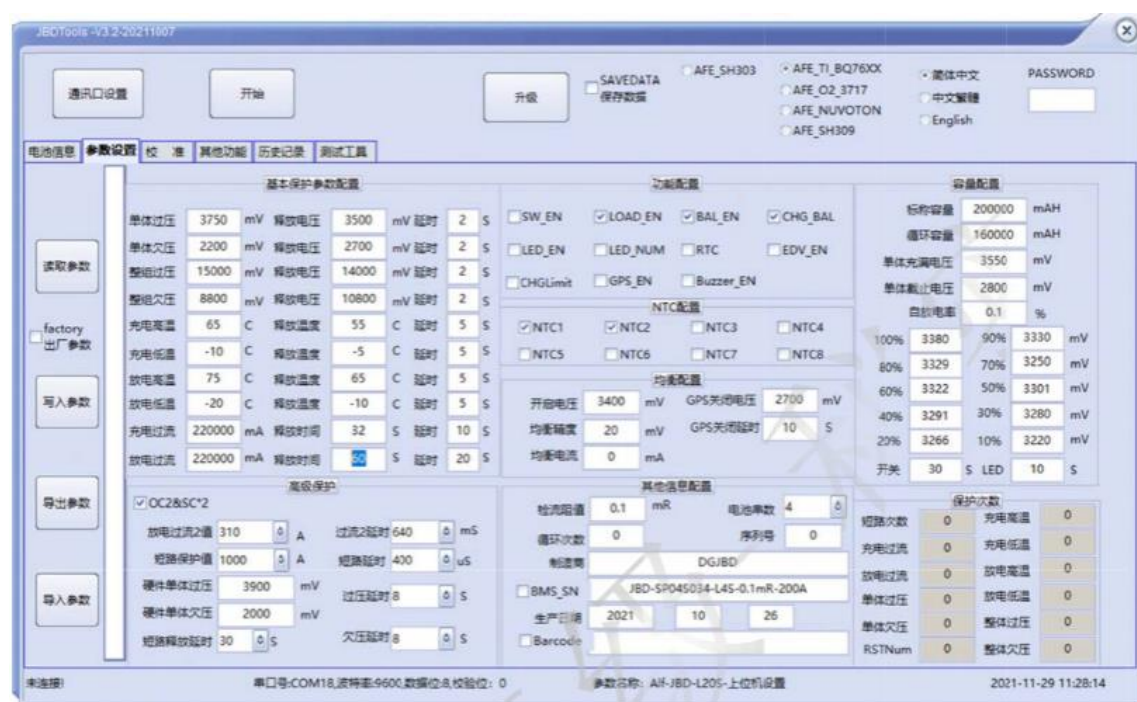
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	Discharge over-current protection recovery condition	Automatically recover after a delay of 60S			
Discharge high temperature protection (external)	Temperature protection value	72	75	78	℃
	Release value of temperature protection	62	65	68	℃
Discharge Low temperature protection (external)	temperature protection value of	-25	-20	-15	℃
	temperature protection release value	-15	-10	-5	℃
Charging high temperature protection	Temperature protection value	62	65	68	℃
(external)	Release value of temperature protection	52	55	58	℃
Charging Low temperature protection(external)	temperature protection value of	-15	-10	-5	℃
	temperature protection release value	-10	-5	0	℃
Short circuit protection	Short circuit protection delay time		400	800	U S
	Short-circuit protection current	See below configuration sheet			
	Delay Time	200	400	800	uS
	Short circuit protection recovery	After disconnecting the load, it will be restored after a delay of 30S.			
	Short-circuit introduction	Short-circuit current less than the minimum value or higher than the maximum value may cause the short-circuit protection to fail. If the short-circuit current exceeds 3000A, short-circuit protection is not guaranteed, and short-circuit protection testing is not recommended.			
FET discharge high temperature protection(Built-in curing)	Temperature Protection value	85	90	95	℃
	Temperature Protection release value	65	70	75	℃
Balance function	Open voltage	3.370	3.400	3.430	V
	Open voltage difference		20		mV
	Balance current	50		150	mA
	Balance method	Charging			
	Balance type	Time-sharing equalization\pulse equalization			

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Note: The test needs to be in an environment with a temperature of $25\pm 2^{\circ}\text{C}$ and a relative humidity of $65\pm 20\%$

Over-current protection value configuration sheet

Continuous current	Charging over-current protection value	Discharge over-current protection value 1	Discharge over-current protection value 2	Short-circuit Protection Value
60A	$70\pm 5\text{A}$	$70\pm 5\text{A}$	$220\text{A}\pm 44\text{A}$	$880\text{A}\pm 176\text{A}$
80A	$90\text{A}\pm 5\text{A}$	$90\text{A}\pm 5\text{A}$	$280\text{A}\pm 56\text{A}$	$1120\text{A}\pm 224\text{A}$
100A	$110\text{A}\pm 5\text{A}$	$110\text{A}\pm 5\text{A}$	$340\text{A}\pm 68\text{A}$	$1560\text{A}\pm 312\text{A}$
120A	$140\text{A}\pm 10\text{A}$	$140\text{A}\pm 10\text{A}$	$380\text{A}\pm 76\text{A}$	$1780\text{A}\pm 356\text{A}$
150A	$170\text{A}\pm 10\text{A}$	$170\text{A}\pm 10\text{A}$	$500\text{A}\pm 100\text{A}$	$200\text{A}\pm 400\text{A}$
200A	$220\text{A}\pm 10\text{A}$	$220\text{A}\pm 10\text{A}$	$620\text{A}\pm 124\text{A}$	$2000\pm 400\text{A}$



4.1 Over-charging Protection and recovery

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

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4.2.1. Cell overdischarge protection and recovery

4.2.1.1. When the lowest cell voltage is lower than the cell overdischarge voltage setting value, and the duration reaches the cell overdischarge delay, the system enters Over-discharge protection status, turn off the discharge MOS, and 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, the discharge MOS is turned off, and the battery cannot be discharged

4.3. 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 the battery cannot be charged. After the charging overcurrent protection occurs, the delay will automatically recover. If you don't need to automatically recover, you can set the corresponding release time longer; discharge can also release the charging overcurrent state.

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 MOS is turned off. 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 over-current protection functions, which have different response speeds to different current values, and protect the battery more reliably.

4.5. The temperature protection and recovery management system has two temperature detection ports, which can be used for temperature protection with NTC.

4.5.1. 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. The battery cannot be protected in this state. Pack charging or discharging. When the temperature of the battery cell surface drops to the high temperature recovery set value, the management system recovers from the high temperature state and reconnects the charge and discharge MOS.

4.5.2. 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. Pack charging or discharging. 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 the 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.

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4.6. Equalization function management system adopts resistance side-by-way method to balance the cells. During the charging process, the maximum cell voltage of the battery pack reaches the set equalization starting voltage value, and the minimum voltage and maximum voltage of the battery pack cell When the pressure difference is greater than the set value, 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 batteries, 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. Charge balance mode and static balance mode can be set

IV. Detailed Notes to the number:

4.7. Capacity calculation can accurately calculate the SOC of the battery pack by integrating current and time. 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 a static state (no communication, no current, no balance and overvoltage protection.) After a delay of 1 minute, it enters the sleep state. After entering this state, the protection board only reduces the frequency of detecting voltage and current and itself Power consumption has no impact on customer use. Communication, toggle switch, charging and discharging can automatically exit the sleep mode

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



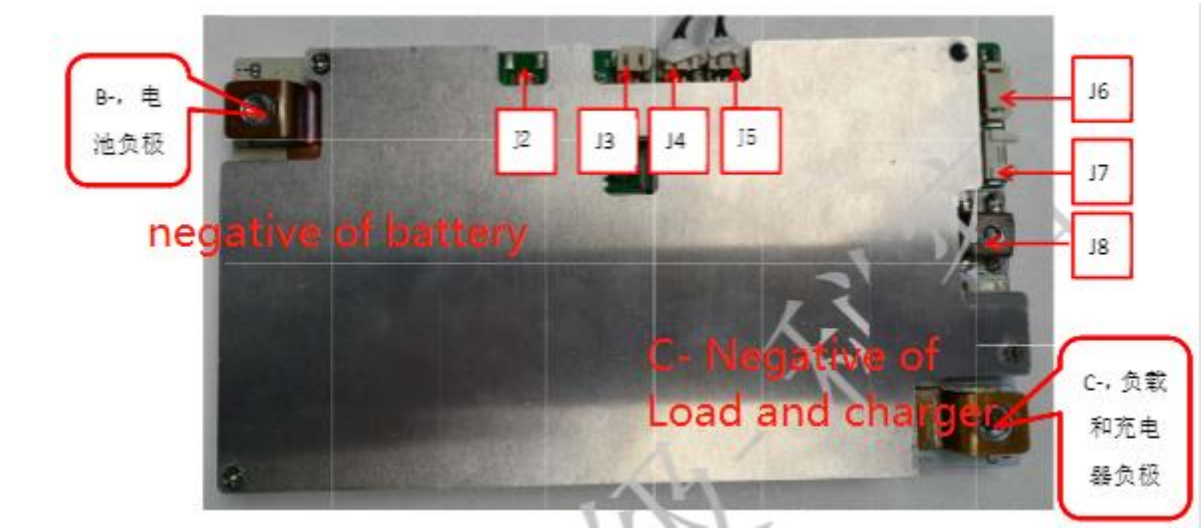
Note: **The above three tools need to be purchased separately.** The connection method is: After installing the dedicated driver for our communication box on the computer, plug the USB end of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the protection board that has been connected to the battery. Turn on the host computer, click the communication port setting, select the CMO port corresponding to the communication box, other options do not change, after confirming, click start, you can 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

V. Diagram and Size



VI. Wiring diagram



Mark ed No	Position no	Connector function	Connector diagram	Pin	PIN function definition
1	J2(HY2.0-2P)	RS485		1	RS485-B
				2	RS485-A
	J7(HY2.0-4P with button)	UART/Blue tooth Port		1	GND ground wire(B-)
				2	RXD protection board data receiving
				3	TXD protection board data sending

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				4	VDD Bluetooth power supply
2	J8(M4 terminal)	Negative of heating film			Connect negative of heating film
3	J6(HY2.0-5P with button)	Voltage detection socket(3S connection ways)		1	Connect to the negative pole of the lowest battery-saving core
				2	Connect to the positive pole of the first battery cell
				3	Connect to the positive pole of the second battery cell
				4	No connect(PCB upper connect J6-3 in short)
				5	Connect to the positive pole of the 3rd battery cell
4	J6(HY2.0-5P with button)	Voltage detection socket(21S connection ways)		1	Connect to the negative pole of the lowest battery-saving core
				2	Connect to the positive pole of the first battery cell
				3	Connect to the positive pole of the 2nd battery cell
				4	Connect to the positive pole of the 3 rd battery cell
				5	Connect to the positive pole of the 4 th battery cell
5	J5(PH2.0-2P)	NTC3(external temperature probe interface)		1	Temperature probe interface
				2	Temperature probe interface
6	J4(PH-2.0-2P)	NTC2(external temperature probe interface)		1	Temperature probe interface
				2	
7	J3	Control discharge weak current switch port		1	SW-1
				2	SW-2

Remarks: The total positive electrode of the battery is short-circuited with the positive electrode of the charger, the positive electrode of the load, and the positive electrode of the heating film, without passing through the protection board

2.B- and C- copper bar connect terminal which hole diameter is 6.5mm

3.J7 UART ground wire is B-,No isolation UART port,don't support communication with charger or load

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8. Environmental suitability

8.1. Working conditions: The BMS protection board is allowed to work normally under the following conditions: Ambient temperature: $-30^{\circ}\text{C}\sim+75^{\circ}\text{C}$; Relative humidity: 5%~90%; Atmospheric pressure: 86kPa~106kPa;

8.2. Storage environment The BMS protection board should be stored in a clean and well-ventilated warehouse with an ambient temperature of $-5^{\circ}\text{C}\sim+40^{\circ}\text{C}$, a relative humidity of not more than 70%, and no corrosive gas or medium that affects electrical insulation in the air. , Shall not be subject to any mechanical shock or heavy pressure. Avoid direct sunlight, and the distance from the heat source (heating equipment, etc.) shall not be less than 2m. Under the above storage conditions, the BMS protection board can be stored for one year

9. Note

- 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 charging impulse current of the adapter may be applied to a single battery pack. Ensure that the total charging impulse current of the adapter does not exceed the maximum charging 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 $40\text{m}\Omega$, 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 it is indeed connected incorrectly, 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 is not available at the first power-on, please check whether the wiring is correct