Shenzhen Jiabaida Electronic Technology Co., Ltd.

SHENZHEN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD

Product Specifications

Product specification

Customer Name (CUSTOMER):		
Product Name (SAMPLE NAME):	7~20 strings of 200 software boards	
Product model (MODEL NAME):	JBD-AP20S006-Fe-Li Series	
Submission Date (DATE):	2022-03-14	
VERSION:	A03	
Customer signature and seal (SIGNATURES):		
compile (compiler)	**Reviewer**	**Approver**
Wang Ligang	Zhang Qiaoqiao	

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	2022.02.14	new fiction	
A02	Page 7	Wang Ligang	2022.03.02	Supplementary temperature instructions	
A03	15/16 Page	Wang Ligang	2022.03.14	Added power-on sequence and shorting strings A note on numbers	

1. Product introduction

JBD-AP20S006 is a software protection board solution specially designed for 7~20 series lithium battery packs.

Integrated chip + MCU architecture, some parameters can be flexibly adjusted through the host computer according to customer needs.

JBD-AP20S006 is a software protection board scheme specially designed for 7~20 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	Configuration	Function	Configuration
Number of strings supported	7~20S	485 communication (isolated)	Optional
Continuous current current)	200A	UART interface (isolated) UART interface (isolated)	/
Number of NTCs (Number of NTCs)	2 built-in, 1 external (2 built-in, 1 external)	CAN communication	Optional
Balance function Function)	Passive balance	232 Communication (232 Communication)	/
UART interface (non-isolated) UART (non-isolated)	Standard option	Heating film function function)	/
Switch function	Optional	Bluetooth module (Module of Bluetooth)	Optional
Charging current limit	/	Battery packs in series	Optional
Parallel connection of battery packs packs in parallel)	Not supported	Secondary Protection protection)	/
History (History storage)	/	LCD display	Optional
Pre-discharge function (Pre-discharge function)	/	LED indicator interface (LED indicator interface)	/
Buzzer	Standard option	GPS interface (interface)	/

Remarks: 1. The UART interface (non-isolated) does not support communication with the charger or load.

Note: The UART interface (non-isolated) does not support communication with chargers or loads. 2. It supports the use of battery packs in series, but the total number of strings after series connection is required to be less than or equal to 32 strings.

The battery pack can be used in series, but the total number of strings after series is required to be less than or equal to 32.

3. 7~20 battery cells are connected in series, and the number of battery strings is automatically recognized. 7 ~ 20 battery cells are protected in series, and the number of battery strings is automatically identified.

3. Parameter Setting 3.1. Basic parameter

Cell specifications	7~ 20 strings of Lithium Iron Battery
Interface type	Charge and discharge are both at the same port
charging voltage	3.6V*Number of strings (3.6V*Number of strings)
Cell voltage range range)	2.2~3.75V
Continuous charging current current)	200A
Continuous discharging current current)	200A
Operating power consumption (Consumption of running)	ÿ300mA
Consumption of sleep ÿ1000uA	
Sleep conditions	Delay 65000S in no current\communication\protection state (can be set) Delay 65000s under no current \ communication \ protection state (settable)
Circuit resistance	ÿ10mR
Operating temperature	-30ÿ~75ÿ
Structure size of PCB	
size _	200±2mm * 114.5±0.5mm * 51±1mm (Length*Width*Height) (Length*Width*Height)

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

Supplementary instructions: Continuously standing for 65000S (can be set) will automatically disconnect the relay, reducing the standby power consumption of the BMS. have larger

The charging and discharging current is detected by the pre-charging and discharging circuit, and then the relay is closed.

Supplementary note: continuous standing for 65000s (settable) will automatically disconnect the relay and reduce the standby power consumption of BMS. A large charge discharge current will be identified through the pre charge discharge circuit, and then close the relay.

3.2. Main parameter

	Project	Specification			Unit
		minimum MIN	Typical value TYP	maximum value MAX	
Overvoltage and undervoltage protection (Overvoltage and undervoltage protection)	Overcharge protection voltage	3.72	3.75	3.78	V
	(Overvoltage) Overcharge protection delay	1000	2000	3000	mS
	(Overvoltage delay) Overcharge protection	3.40	3.45	3.50	V
	release (Overvoltage release) Over discharge	2.10	2.20	2.30	V
	protection voltage (Undervoltage) Over	1000	2000	3000	mS
	discharge protection delay (Undervoltage delay)	2.60	2.70	2.80	V
	Over discharge protection release (Undervoltage release) Over discharge Undervoltage release conditions	60S voltage self-recovery or charge recovery			
Charge overcurrent protection (Overcurrent Charge)	Charge overcurrent protection value (Overcurrent Charge protection value)	See the configuration table of overcurrent protection value below			
	Overcurrent Charge delay	5	10	15	S
	Charge over current release conditions	Automatic recover after a delay of 32S			
Discharge overcurrent protection (Overcurrent Discharge)	Level 1 discharge overcurrent protection value (1th Overcurrent Discharge)	See the configuration table of overcurrent protection value below			
	One-stage discharge overcurrent protection delay (1th Overcurrent Discharge delay) Secondary	5	10	15	S
	discharge overcurrent protection current value (2th Overcurrent Discharge)	See the configuration table of overcurrent protection values below (See the configuration table of overcurrent protection value below)			
	Secondary discharge overcurrent 2 protection delay (2th Overcurrent Discharge delay)	640	1280	2560	mS
	Discharge overcurrent protection recovery condition (Overcurrent Discharge release)	Automatic recover after a delay of 32S (See the configuration table of overcurrent protection value below)			
Short circuit protection (Short Circuit Discharge)	Short circuit protection current				
	Short circuit protection delay time	200	400	800	uS
	Short circuit protection recovery	After disconnecting the load, it will recover with a delay of 5s. (Recover after 5S delay after disconnecting the load.)			
	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. The short-circuit current exceeds 3500A, and the short-circuit protection is not guaranteed. protection, short-circuit protection test is not recommended. (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 3500A, short-circuit protection is not guaranteed, and short-circuit protection testing is not recommended.)				

Charging high temperature protection Overtemperature Charge	Temperature protection value	62	65	68	°C
	Temperature protection release value	52	55	58	°C
Charging low temperature protection (no heating function) Undertemperature Charge (no heating function)	Temperature protection value	-15	-10	-5	°C
	Temperature protection release value	-10	-5	0	°C
Charge low temperature protection (with heating function) Undertemperature Charge (with heating function)	Temperature protection value	-3	0	3	°C
	Temperature protection release value	2	5	8	°C
Discharge high temperature protection Overtemperature Discharge	Temperature protection value	72	75	78	°C
	Temperature protection release value	62	65	68	°C
Discharge low temperature protection Undertemperature Discharge	Temperature protection value	-25	-20	-15	°C
	Temperature protection release value	-15	-10	-5	°C
FET high temperature protection (built-in) high temperature protection of FET(Built-in)	Temperature protection value	85	90	95	°C
	Temperature protection release value	65	70	75	°C
Equalization function (Balance Function)	Equalization turn-on voltage (Equalization turn-on voltage)	3.27	3.30	3.33	V
	Open differential pressure (Difference opening voltage value)		10		mV
	Balance current (Balance current)	100	180	260	mA
	Balance mode (Balance model)	Static/charge/discharge equalization (Idle/Charge/Discharge equalization)			
	Balance type (Balance type)	pulse mode (Pulsed model)			

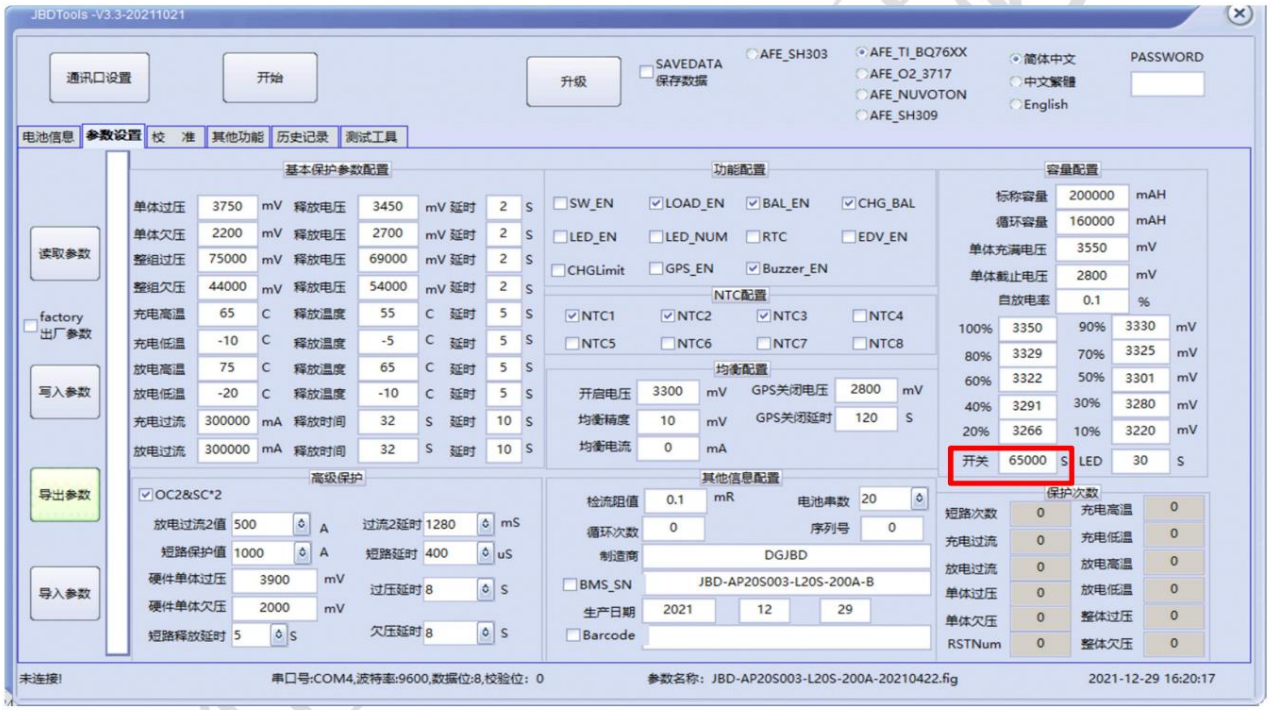
Note: The test should be performed in an environment with a temperature of 25±2ÿ and a relative humidity of 65±20%.

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

3.3. Overcurrent protection value configuration table

Continuous current (Continuous current)	Charge overcurrent protection value (Charge over current protection value)	Level 1 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)
200A	300±15A	300±15A	1000±200A	2000±400A

3.3. Parameter settings



The diagram of upper computer

Remarks: 1. NTC1 is external; NTC2 is built-in FET temperature; NTC3 is built-in detection equalization resistance temperature;

2. The home page of the Bluetooth APP displays the one with the highest temperature among the 3 NTCs.

Remarks: 1. Ntc1 is external; Ntc2 is the built-in FET temperature; Ntc3 is built-in to detect the temperature of equalizing resistance;

2. The home page of Bluetooth app shows the one with the highest temperature among the three NTCs.

4. Function Description 4.1. Overcharge protection and recovery 4.1.1. Cell overcharge protection and recovery

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 and shuts down. Charge MOS, can not 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 by discharge.

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 set value, and the duration reaches the overall overcharge delay, the system enters the overcharge protection state, and the charging MOS is turned Can charge the battery.

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

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 4.2.1. Cell over-discharge protection and recovery

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, and the discharge MOS is turned off. The battery cannot be discharged.

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

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 set value, and the duration reaches the overall over-discharge delay, the system enters the over-discharge protection state, and the discharge MOS is turned off. The battery cannot be discharged.

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

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. Charging overcurrent protection and recovery

When the charging current exceeds the charging over-current protection current and the duration reaches the over-current detection delay time, the system enters the charging over-current protection state. The battery is charged. After charging overcurrent protection occurs, it will automatically recover after a delay. If you need automatic recovery, you can set the corresponding release time to be longer; you can also release the charging after discharging. electrical overcurrent condition.

When the charging current exceeds the protection charging 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

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 Electric 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 state. Discharge has two-level overcurrent protection function, which has different response speeds for 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 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, charging or discharging The 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.

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

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, charging or discharging The 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.

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. Balance function

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 balance start voltage value. And when 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, the equalization function of the cells that meet the conditions is turned on, and the two adjacent equalization channels cannot be equalized at the same time. on.

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.

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.

4.7. Capacity calculation

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 entered through the host computer. Line settings, the capacity can be automatically updated after a full charge-discharge cycle. With the function of calculating the number of charge and discharge cycles, when the cumulative discharge capacity of the battery pack reaches the set value When cycling capacity, the number of cycles increases 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 conduct a capacity study, otherwise the capacity inaccuracy may occur. Capacity learning operations: Fully charge it to overvoltage protection first, then discharge it to undervoltage protection, and then charge it 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 a

4.8. Sleep function

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 The board only reduces the frequency of detecting voltage and current and its own power consumption. Communication, dial switch, 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. The communication format is 9600,8,N,1. The upper computer receives the protection board data.

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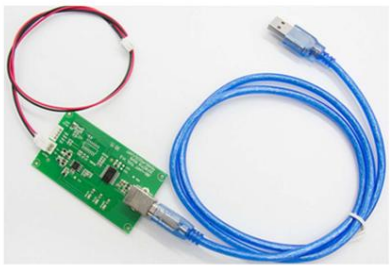
UART communication box

(UART communication box)



RS485 communication box

(RS485 communication box) Note: The

Bluetooth module

(Bluetooth module)

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

method: After installing the special 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 t

Connect the corresponding interface of the battery protection board. Open the host computer, click the communication port setting, select the communication box corresponding to the CMO port, other options do not need to be touched, click Open after confirmation

Start, you can read the protected data. If you need to change the parameters of the protection board, you must first click on the parameter page to read the parameters, and then change the parameters.

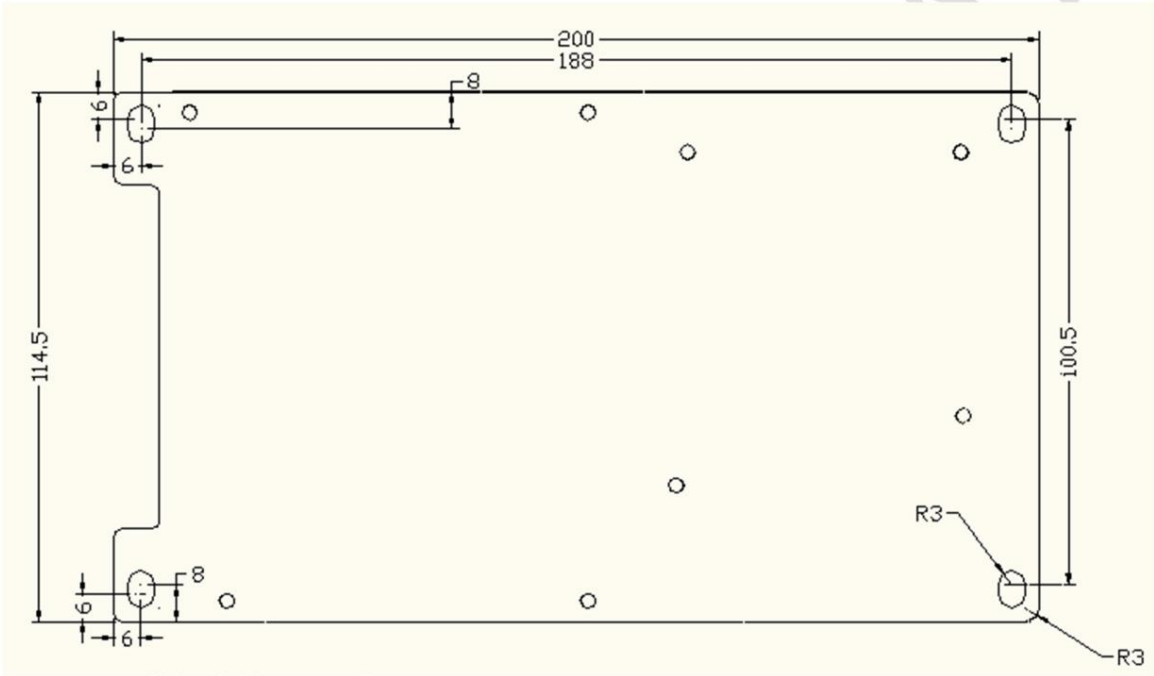
The connection method: after installing the special driver for our communication box on the computer, insert the USB end of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the protection board that has been connected to the battery. Open the host computer, click the communication port settings, select the CMO port corresponding to the communication box, and do not change other options. 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 on the parameter page to read the parameters, and then change the parameters.

5. Main material

serial number (Number)	Name of Material	Manufacturer (Manufacturer)	quantity (Quantity)
1	AN49625A	Panasonic	1PCS
2	STM8S207C8	ST	1PCS
3	BQ7692003PW	TI	1PCS
Accessories			
1	Collection line\14PIN\HY2.0\with buckle\24AWG\800MM\black and white Red\ROHS	---	1PCS
2	Collection line\8PIN\HY2.0\with buckle\24AWG\800MM\black and white Yellow red\ROHS	---	1PCS
3	Plug-in fuse\non-recovery\70*20\400A	---	1PCS
4	Collection line\2PIN\HY2.0\with buckle\24AWG\550MM\black and red	---	1~3PCS (SW optional 1PCS) (CAN optional 1PCS)

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 samp
The controlled specifications, the final interpretation right belongs to Jiabaida.

6. Schematic and Dimensions 6.1.
Dimensions and installation point drawing 6.1.1.
Structural dimensions

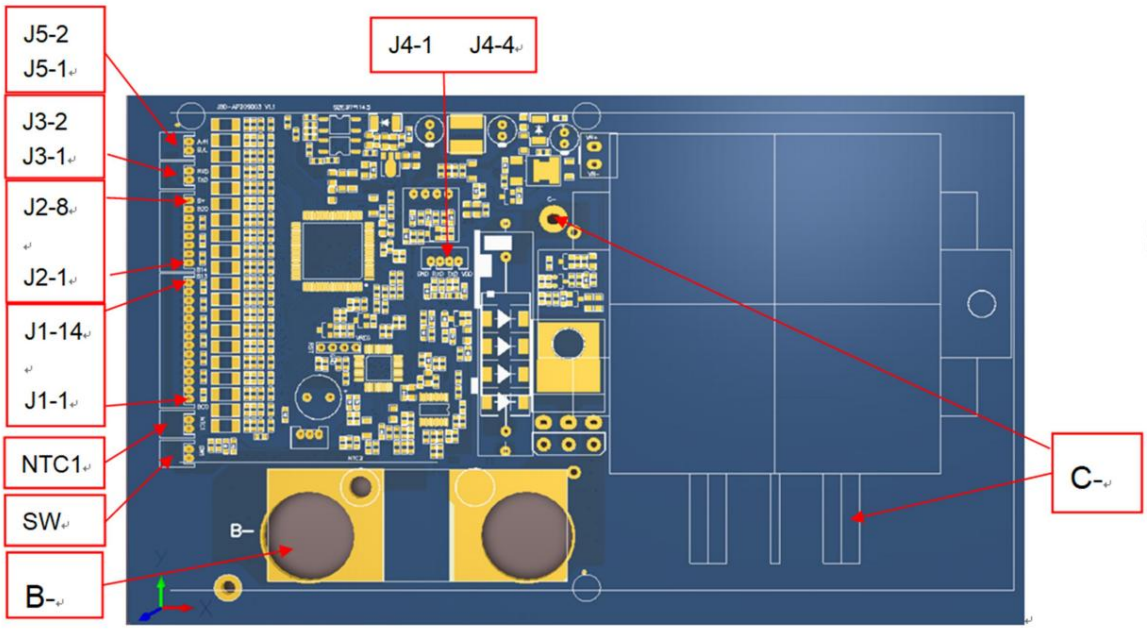


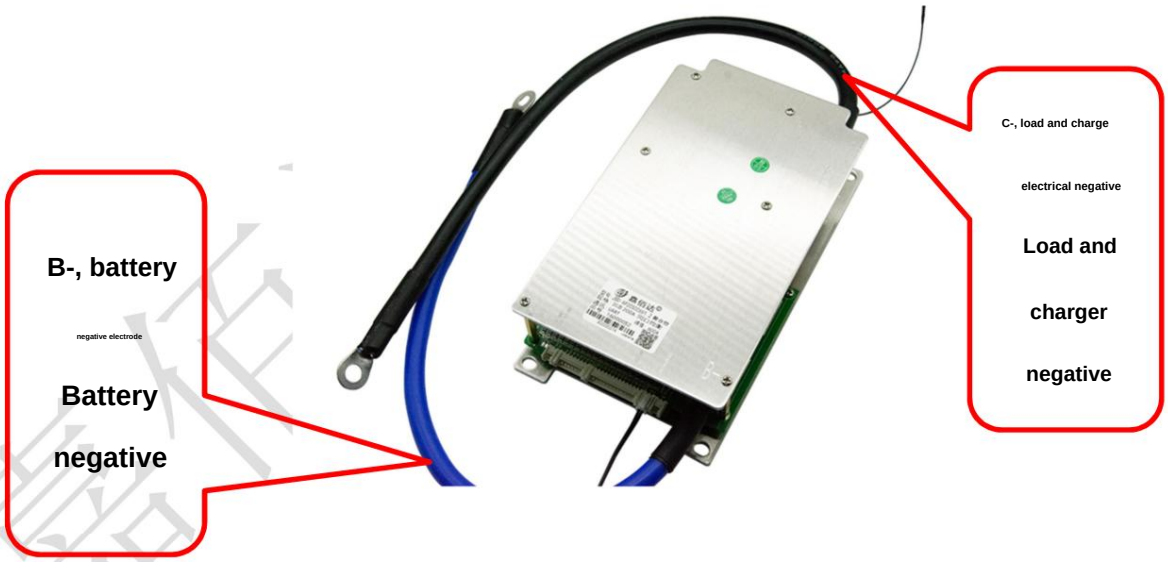
structure size

7. Signal port definition (Signal port definition) 7.1.

Schematic mark the interface label (refer to the figure below)

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





label (Label)	Tag number (Tag number)	Connector function (Connector)	Schematic diagram of connector (Schematic diagram)	PIN	PIN function definition (Pin function)	Remark (Note)
1	J1 (HY2.0-14P) (with buckle)	Voltage detection socket Voltage detection socket		1	Connect to the negative pole of the lowest battery cell Connect to Negative Side of Cell 1.	BC0
				2	Connect to the positive pole of the first battery cell Connect to Positive Side of Cell 1	BC1
				3	Connect to the positive pole of the second battery cell Connect to Positive Side of Cell 2	BC2
				4	Connect to the positive pole of the third battery cell Connect to Positive Side of Cell 3	BC3
				5	Connect to the positive pole of the fourth battery cell Connect to Positive Side of Cell 4	BC4
				6	Connect to the positive pole of the 5th battery cell Connect to Positive Side of Cell 5	BC5
				7	Connect to the positive pole of the 6th battery cell Connect to Positive Side of Cell 6	BC6
				8	Connect to the positive pole of the 7th battery cell Connect to Positive Side of Cell 7	BC7
				9	Connect to the positive pole of the 8th battery cell Connect to Positive Side of Cell 8	BC8
				10	Connect to the positive pole of the 9th battery cell Connect to Positive Side of Cell 9	BC9
				11	Connect to the positive pole of the 10th battery cell Connect to Positive Side of Cell 10	BC10
				12	Connect to the positive pole of the 11th battery cell Connect to Positive Side of Cell 11	BC11
				13	Connect to the positive pole of the 12th battery cell Connect to Positive Side of Cell 12	BC12
				14	Connect to the positive pole of the 13th battery cell Connect to Positive Side of Cell 13	BC13
2	J2 (HY2.0-8P) (with buckle)	Voltage detection socket Voltage detection socket		1	Connect to the positive pole of the 14th battery cell Connect to Positive Side of Cell 14	BC14
				2	Connect to the positive pole of the 15th battery cell Connect to Positive Side of Cell 15	BC15
				3	Connect to the positive pole of the 16th battery cell Connect to Positive Side of Cell 16	BC16
				4	Connect to the positive pole of the 17th battery cell Connect to Positive Side of Cell 17	BC17
				5	Connect to the positive pole of the 18th battery cell Connect to Positive Side of Cell 18	BC18

				6	Connect to the positive pole of the 19th battery cell Connect to Positive Side of Cell 19	BC19
				7	Connect to the positive pole of the 20th battery cell Connect to Positive Side of Cell 20	BC20
				8	Connect to the positive pole of the 20th battery cell Connect to Positive Side of Cell 20	B+
3	J3 (HY2.0-2P) (with buckle)	UART interface (not Isolated) UART (non-isolated)		1	TXD2-BMS	
				2	RXD2-BMS	
4	J4 (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 (Bluetooth power supply)	
5	J5 (HY2.0-2P) (with buckle)	RS485/CAN		1	RS485-B/CANL	
				2	RS485-A/CANH	
6	SW (HY2.0-2P) (with buckle)	Self-locking discharge switch connection mouth Self locking discharge switch interface		1	SW-1	
				2	SW-2	

Remarks:

1. The ground wire of J3-UART is B-, which is a non-isolated UART port and does not support communication with chargers or loads. 2. You must first connect the cable to the battery pack, check that the voltage is normal, and then insert it into J1 and J2 of the protection board in turn. Otherwise, the BMS may be damaged.

Remarks:

1) The ground wire of J3-UART is B-, which is a non-isolated UART port and does not support communication with chargers or loads.

2) The flat cable must be connected with the battery pack first, and then inserted into J1 and J2 of the protection board after checking that the voltage is normal. Otherwise, BMS may be damaged.

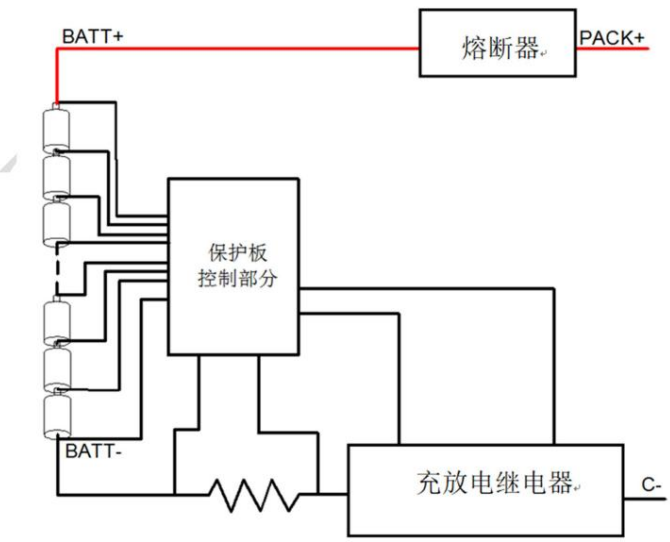
Automatically identify the connection method of the string number

20S is not shorted		
19S	BC17~BC18 are short-circuited, and 17 strings of positive poles are connected together. 2 wires must be welded at one point	
18S	BC16~BC18 are short-circuited, and 16 strings of positive poles and 3 wires must be welded together at one point.	
17S	BC15~BC18 are short-circuited, and 15 strings of positive poles and 4 wires must be welded together at one point.	
16S	BC14~BC18 are short-circuited, and 14 strings of positive poles and 5 wires must be welded together at one point.	
15S	BC13~BC18 are short-circuited, and 13 strings of positive poles and 6 wires must be welded together at one point.	
14S	BC12~BC18 are short-circuited, and 12 strings of positive poles and 7 wires must be welded together at one point.	
13S	BC11~BC18 are short-circuited, and 11 strings of positive poles and 8 wires must be welded together at one point.	
12S	BC10~BC18 are short-circuited, and 10 strings of positive poles and 9 wires must be welded together at one point.	
11S	BC9~BC18 are short-circuited, and 9 strings of positive poles and 10 wires must be welded together at one point.	
10S	BC8~BC18 are short-circuited, and 8 strings of positive poles and 11 wires must be welded together at one point.	
9S	BC7~BC18 short-circuit, connect 7 strings together, 12 positive wires must be welded at one point	
8S	BC6~BC18 are short-circuited, and 6 strings of positive poles and 13 wires must be welded together at one point.	
7S	BC5~BC18 are short-circuited, and 5 strings of positive poles and 14 wires must be welded together at one point.	

Remarks: The cables of the number of short-circuited series are in poor contact; or the cables of the number of short-circuited series are short-circuited at two points, such as 16S battery Group BC14~BC18 are short-circuited together, some of these 5 wires are connected to B14+, some are connected to B15-, B14+ of the battery pack in high current charge and discharge state There is a voltage between B15- and the protection board automatically recognizes that the battery pack of 17S~20S is connected.

7.2. Distribution of fuse wiring diagrams

Fuse wiring diagram delivered



8. Environmental suitability 8.1. The environment of working

ÿ The BMS protection board is allowed to work normally under the following conditions: ÿ Ambient temperature: -30ÿ ~+75ÿ; ÿ Relative humidity: 5% ÿ Atmospheric pressure: 86kPa~106 kPa;

~ 90%;

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

8.2. 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, relative humidity not greater than 70%, The air must not contain corrosive gases and media affecting electrical insulation, and must not be subjected to any mechanical shock or heavy pressure. out of direct sunlight, 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.

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 9.1. Logo

The BMS protective plate shall have the following clear and durable marks:

ÿ Product name and model ÿ Cell model ÿ Date of manufacture and serial number

9.2. Package

ÿ 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 materials, and the product should not move in the box. ÿ External carton box, veneer anti-static bag and bubble bag packaging;

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

9.3. Transportation

ÿ During transportation, the product shall not be subject to violent mechanical impact, exposure to sunlight, 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.

ÿ The packing height should be less than 5 layers.

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

10. Precautions

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.

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. For 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. value.

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 the short-circuit loop is lower than 40mÿ, the capacity of the battery pack exceeds the rated value by 20%, the short circuit When the 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 it yourself Determine if this management system can be used.

5. When welding the battery leads, there must be no wrong or reverse connection. If it is indeed connected incorrectly, the board may be damaged If it is bad, it 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 it may damage th circuit board. Please do not use paste flux when soldering this circuit board, otherwise it may cause this circuit board to work abnormally.

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 it may damage the Bad management system.

10. After the battery pack and the management system are combined, if you find that there is no voltage output or cannot be charged after the first power-on, please Check for correct wiring.

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 40mÿ, 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) 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.