Shenzhen Jiabaida Electronic Technology Co., Ltd.

SHENZHEN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD

Product specification

Product specification

Customer name:	
Customer	
product name:	
Sample Name	6~21 String ternary 100A~200A Software board
Product number:	
Model Name	JBD-AP21S001
Date of submission:	
Date	2021-11-05
Version:	
Version	A01
Customer signature and stamp:	
SIGNATURES	

Organization: Yi Yuanbing Review: Zhang Qiaoqiao approve:

change log

version number	Page/Chapter	Revised by	Revision date	modify the content	Remark
A01	full text	Yi Yuanbing	2021.11.05	New fiction	

1. Product Introduction

JBD-AP21S001 It is specifically for electric motorcycles, small three-wheelers, small four-wheelers, etc. 6-21 Software protection board designed for stringing battery packs

It can be applied to lithium batteries with different chemical properties, such as lithium ion, lithium polymer, lithium iron phosphate, etc.

The whole system uses Panasonic's front-end acquisition chip+MCU,**Can automatically identify the current battery string number,**External communication port, part

The sub-parameters can be flexibly adjusted through the upper computer according to customer needs.

2. Function configuration

Function	Configuration	Function	Configuration
Support the number of strings	6~21S Optional	485 Communication (isolated)	Optional
Support continuous current	100A~200A optional	UART Interface (isolated)	Optional (and 485 pick one of two)
NTC quantity	1 Built-in,2 External	CAN communication	Optional
Balance function	Yes, passive balance	232 communication	without
UART Interface (non-isolated)	Optional	GPS Module	Optional
Switch function	Optional	Heating film function	Optional
Charging current limit function	not support	Bluetooth module	Optional
Parallel use of battery packs	not support	Use battery packs in series	not support
History storage function	without	Secondary protection function	Optional
Pre-discharge function	without	LCD Display screen	Optional
buzzer	without	led Indicator interface	Optional

3. technical parameter

3.1. Basic parameters

Cell specifications	6~21 string ternary
Interface Type	Same port for charging and discharging
Recommended charging voltage	Three yuan: 4.2V* number of strings
Cell voltage range	Three yuan: 2.8~4.25V
Continuous charging current	100A~200A optional
Continuous discharge current	100A~200A optional
Operating power consumption	≤20mA

Sleep power consumption	⩽3mA
Protection board conduction internal resistance	⩽10mR
Operating temperature	-30℃~75℃
Protection board size	202±0.5mm * 76±0.5mm * 18±1mm (length Width Height)

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

3.2. The main parameters

	project	Specification			unit
		Minimum	Typical value	Max	
Function	Ternary overvoltage protection voltage	4.220	4.250	4.280	V
	Overcharge protection delay time	1000	2000	3000	mS
	Ternary overcharge protection recovery voltage	4.100	4.150	4.200	V
	Three yuan over-discharge protection voltage	2.700	2.800	2.900	V
	Over-discharge protection delay time	1000	2000	3000	mS
	Three yuan over-discharge protection recovery voltage	2.900	3.000	3.100	V
	Overdischarge protection recovery conditions	Charge recovery			
Charge overcurrent protection	Charging overcurrent protection value	See the configuration table of overcurrent protection value below			
	Charge overcurrent delay	7	10	13	S
	Charge overcurrent release condition	Delay 32S Automatically restore after			
Discharge overcurrent protection	Discharge overcurrent 1 Protection value	See the configuration table of overcurrent protection value below			
	Discharge overcurrent 1 Protection delay	7	10	13	S
	Secondary discharge overcurrent protection current value	See the configuration table of overcurrent protection value below			
	Secondary discharge overcurrent 2 Protection delay	320	640	1280	mS
	Discharge overcurrent protection recovery conditions	Delay 32S Automatically restore after			
Short circuit protection	Short circuit protection current	See the configuration table of overcurrent protection value below			
	Short circuit protection delay time	-	400	800	uS
	Short circuit protection recovery	Delay after disconnecting the load 5S recover.			
	Short circuit description	Short circuit description: short circuit current is less than minimum or high Above the maximum value may cause the short-circuit protection to fail, short-circuit Current exceeds**2600A**, Short-circuit protection is not guaranteed, and It is not recommended to do short-circuit protection test.			

Discharge high temperature protection (External)	Temperature protection value	82	85	88	°C
	Temperature protection release value	72	75	78	°C
Discharge low temperature protection (External)	Temperature protection value	- twenty three	-20	-17	°C
	Temperature protection release value	-16	-15	-12	°C
Charging high temperature protection (External)	Temperature protection value	72	75	78	°C
	Temperature protection release value	62	65	68	°C
Charging low temperature protection (External)	Temperature protection value	- 8	-5	- 2	°C
	Temperature protection release value	-3	0	3	°C
FET Discharge high temperature protection Protection (built-in curing)	Temperature protection value	85	90	95	°C
	Temperature protection release value	65	70	75	°C
Balance function	Ternary balanced opening voltage	3.970	4.000	4.030	V
	Ternary opening pressure difference		15		mV
	Balance current			200	mA
	Balanced method	Charge balance			
	Balance type	Time-sharing equalization\pulse equalization			

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

Overcurrent protection value configuration table

Continuous current	Charging overcurrent protection value	Discharge overcurrent1Protection value	Discharge overcurrent2Protection value	Short circuit protection value
100A	110±5A	110±5A	500±100A	1400±280A
110A	120±10A	120±10A	500±100A	1400±280A
120A	140±10A	140±10A	500±100A	1400±280A
130A	150±10A	150±10A	500±100A	1400±280A
140A	160±10A	160±10A	700±140A	1800±360A
150A	170±10A	170±10A	700±140A	1800±360A
160A	180±10A	180±10A	700±140A	1800±360A
170A	190±10A	190±10A	900±180A	2200±440A
180A	200±10A	200±10A	900±180A	2200±440A
190A	210±10A	210±10A	900±180A	2200±440A
200A	220±10A	220±10A	900±180A	2200±440A

4. Function Description

4.1. Overcharge protection and recovery

4.1.1. Monomer overcharge protection and recovery

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

After the cell overcharge protection, when the voltage of all cells drops below the cell overcharge recovery value, the overcharge protection state is released. also may The discharge is released.

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 State, turn off charging MOS, Cannot charge the battery. When the overall voltage drops below the overall voltage overvoltage protection recovery value, the solution In addition to the overcharge protection state, it can also be discharged.

4.2. Overdischarge protection and recovery

4.2.1. Single over-discharge protection and recovery

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

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

4.2.2. Overall over-discharge protection and recovery

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

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

4.3. Charge overcurrent protection and recovery

When the charging current exceeds the charging overcurrent protection current and the duration reaches the overcurrent detection delay time, the system enters the charging Over current protection status, the battery cannot be charged. After charging over-current protection occurs, the delay will automatically restore, if necessary, do not automatically restore The corresponding release time can be set to be long; the 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 Over current protection status, turn off the discharge MOS. After discharge overcurrent occurs32 The system will automatically recover in seconds, if necessary, do not automatically recover

You can set the corresponding release time longer. Charging can also release the discharge overcurrent state. Discharge has two-level overcurrent protection function, right?

The same current value has different response speeds, which can protect the battery more reliably.

4.5. Temperature protection and recovery

4.5.1. Charge and discharge high temperature protection and recovery

When charging and discharging NTC When the surface temperature of the detected battery is higher than the set high temperature protection temperature, the management system enters the high temperature protection sta

State, charge or discharge MOSFET Closed, the battery pack cannot be charged or discharged in this state.

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

4.5.2. Charge and discharge low temperature protection and recovery

When charging and discharging NTC When the temperature of the detected battery cell surface is lower than the set low temperature protection temperature, the management system enters the low temperature protection st

State, charge or discharge MOSFET Closed, the battery pack cannot be charged or discharged in this state.

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

4.5.3. In static state (without charging and discharging), if the temperature rises or drops to the protection board, the protection board will not make any protection action until

When the system detects that there is current, it will make the corresponding protection action.

4.6. Balance function

The management system adopts the resistance bypass method to balance the cells, and the maximum cell voltage of the battery pack reaches the set value during the charging process.

When the equalized starting voltage value of the battery pack is greater than the set value, the cells that meet the conditions are all

The balance function is turned on, and the two adjacent equalizers cannot be turned on at the same time.

When the cell voltage difference is less than the set value or the cell voltage is less than the equalization opening voltage, the equalization stops. Charge balance mode can be set and

Static balance mode.

4.7. Capacity calculation

The battery pack can be accurately measured by integrating the current and time. SOC calculate. Full capacity and cycle capacity of the battery pack

The capacity can be set by the host computer, and the capacity can be automatically updated after a complete charge and discharge cycle. With charge and discharge cycle count

Calculating function, when the cumulative discharge capacity of the battery pack reaches the set cycle capacity, the number of cycles is increased 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 may appear

No problem. Capacity learning operation: first fully charge to overvoltage protection, then discharge to undervoltage protection, and then charge again.

4.8. Sleep function

When the protection board is in static state (no communication, no current, no balance and overvoltage protection.) Delay 1 Minutes later, it enters the dormant state,

After entering this state, the protection board only reduces the frequency of detecting voltage and current and its own power consumption. Communication, dial switch, charging and discharging can automatically retreat

Out of sleep mode.

4.9. Automatic identification of the number of strings

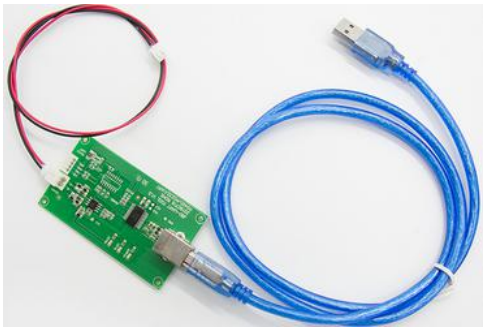
According to the table 7.2 After the number of strings required by the customer is short-circuited, check that the voltage is correct. After connecting the protection board, the protection board can

Automatically identify the current battery string number, and automatically change the overvoltage/undervoltage value of the entire group. (You need to re-power on each time you change the number of strings.)

4.10. Communication function

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

UART Communication box



RS485 Communication box

Bluetooth module

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

The connection method is: after installing the dedicated driver for our communication box on the computer, connect the communication box USB Plugged into the computer USB port,

The other end is connected 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 corresponding communication boxC

□, other options do not need to be moved, after confirming, click start to read the data in the protection.**If you need to change the parameters of the protection board, you must first**

After clicking to read the parameter on the parameter page, change the parameter again.

5. Main material

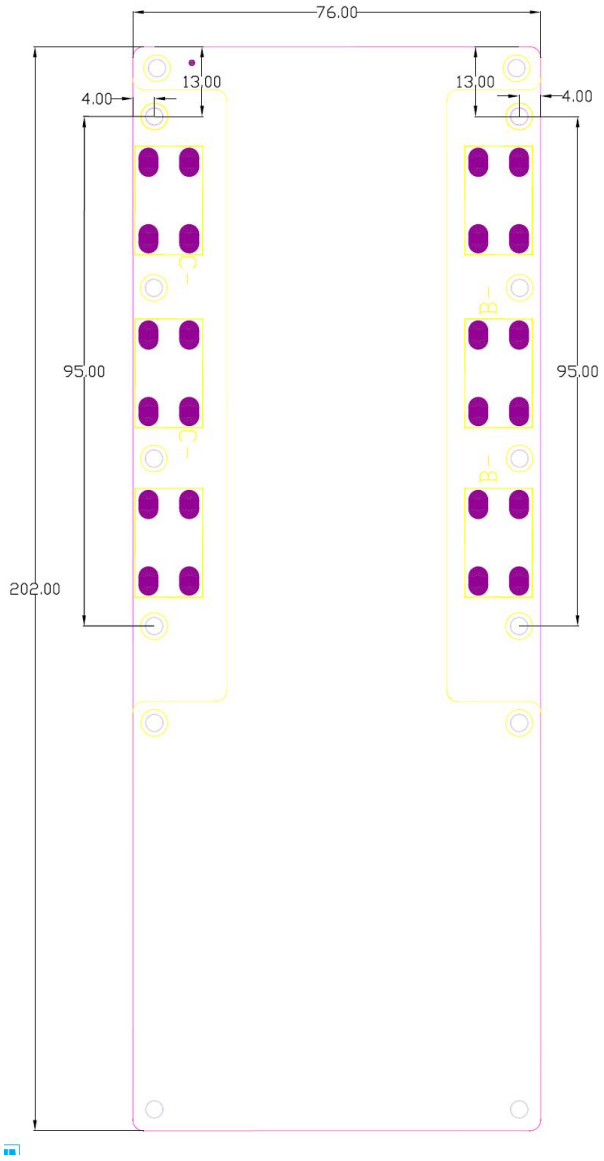
Serial number	Material name	Manufacturer
1	NANO100SD3BN	nuvoton
2	KA49522A	Matsushita
3	HYG015N10NS1TA	Hua Yiwei
4	PCB-JBD-AP21S001 V1.2	JBD

Note: The above materials may be replaced by materials with the same specifications or better specifications. If there is a certification requirement, the materials are not allowed to be replaced.

Need to notify our business to re-send samples and controlled specifications, and the final interpretation right belongs to Jiabaida.

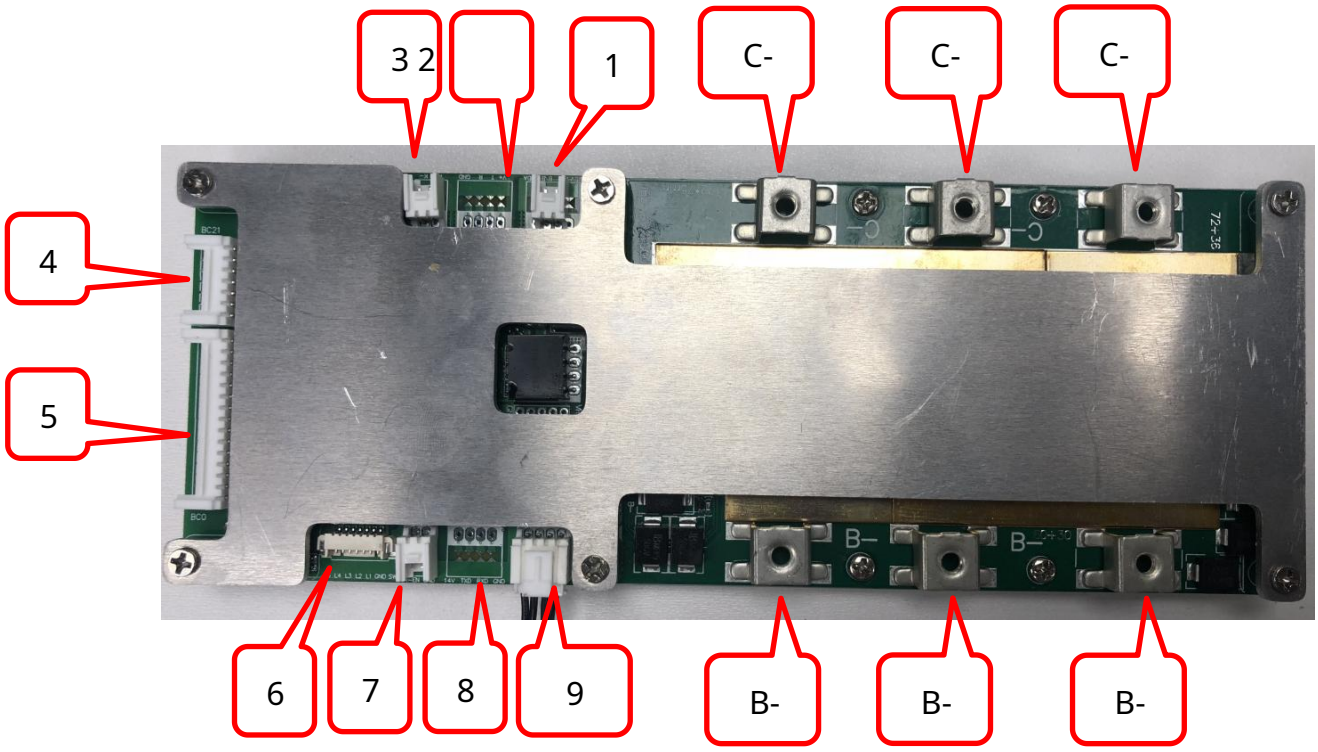
6. Schematic and size

6.1. Mark the size and mark the installation point

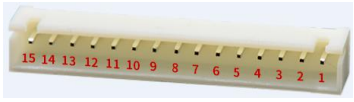
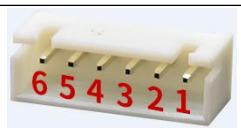


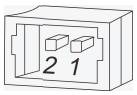
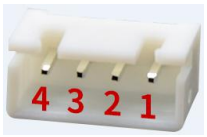
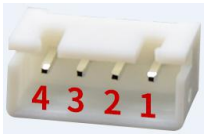
7. Signal port definition

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



Mark No	Tag	Connector Function	Schematic diagram of the connector	Pin Certainly righteous	PIN Function definition	illustrate
1	J12 (HY2.0-2P)	RS485 communication		1	RS485-B	
				2	RS485-A	
	(HY2.0-4P) (With buckle)	UART communication		1	GND	Optional (and 485Second choice one)
				2	RXD	
				3	TXD	
				4	14V	
2	J8 (HY2.0-4P) (With buckle)	GPS catch Mouth (pre Keep)		1	GND	
				2	RXD	
				3	TXD	

				4	PW+	Battery positive pole
3	J9 (HY2.0-2P) (With buckle)	Switch connection mouth		1	Switch enable pin	
				2	Battery positive level	
4	J1 (HY2.0-7P) (With buckle)	Voltage check Test socket (twenty one string Connected party Mode)		7	Connect the battery twenty one String positive	
				6	Connect the battery 20 String positive	
				5	Connect the battery 19 String positive	
				4	Connect the battery 18 String positive	
				3	Connect the battery 17 String positive	
				2	Connect the battery 16 String positive	
				1	Connect the battery 15 String positive	
5	J2 (HY2.0-15P) (With buckle)	Voltage check Test socket (twenty one string Connected party Mode)		15	Connect the battery 14 String positive	
				14	Connect the battery 13 String positive	
				13	Connect the battery 12 String positive	
				12	Connect the battery 11 String positive	
				11	Connect the battery 10 String positive	
				10	Connect the battery 9 String positive	
				9	Connect the battery 8 String positive	
				8	Connect the battery 7 String positive	
				7	Connect the battery 6 String positive	
				6	Connect the battery 5 String positive	
				5	Connect the battery 4 String positive	
				4	Connect the battery 3 String positive	
				3	Connect the battery 2 String positive	
				2	Connect the battery 1 String positive	
				1	Connect the battery 1 String negative	
6	J6 (1.25-6P)	led Show Display interface		1	led Key enable pin	
				2	led Plate negative	

	(With buckle)	(Pre-Keep)		3	LED1 positive electrode	
				4	LED2 positive electrode	
				5	LED3 positive electrode	
				6	LED4 positive electrode	
				7	LED5 positive electrode	
7	J5 (HY2.0-2P) (With buckle)	Heating letter Trumpet		1	Heating signal negative	
				2	Heating signal positive	
8	J10 (HY2.0-4P) (With buckle)	Bluetooth connection mouth		1	GND	Reserved
				2	RXD	
				3	TXD	
				4	VCC (14V 10 mA)	
9	J7 (HY2.0-4P) (With buckle)	NTC catch mouth		1	NTC2	
				2		
				3	NTC3	
				4		
		B-	M4 Door terminal		Connect the negative pole of the battery pack	
		C-	M4 Door terminal		Connect to the negative electrode of charge and discharge	

7.2. Other serial connection methods

20 string	Short BC18-BC19 Followed by 18 String positive
19 string	Short BC17-BC19 Followed by 17 String positive
18 string	Short BC16-BC19 Followed by 16 String positive
17 string	Short BC15-BC19 Followed by 15 String positive
16 string	Short BC14-BC19 Followed by 14 String positive
15 string	Short BC13-BC19 Followed by 13 String positive
14 string	Short BC12-BC19 Followed by 12 String positive
13 string	Short BC11-BC19 Followed by 11 String positive
12 string	Short BC10-BC19 Followed by 10 String positive

11 string	Short BC9-BC19 Followed by 9 String positive
10 string	Short BC8-BC19 Followed by 8 String positive
9 string	Short BC7-BC19 Followed by 7 String positive
8 string	Short BC6-BC19 Followed by 6 String positive
7 string	Short BC5-BC19 Followed by 5 String positive
6 string	Short BC4-BC19 Followed by 4 String positive

8. Environmental suitability

8.1. Working conditions:

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

Ambient temperature:-30℃ ~+75℃;

Relative humidity:5% ~ 90%;

Atmospheric pressure:86kPa~106 kPa;

8.2. Storage environment

BMS The protection board should be stored at an ambient temperature of-5°C~+40°C, The relative humidity is not greater than 70%, Clean and well ventilated warehouse Inside, the air must not contain corrosive gases and media that affect electrical insulation, and must not be subjected to any mechanical shock or heavy pressure. Not direct from the sun The distance from the heat source (heating equipment, etc.) shall not be less than 2m. Under the above storage conditions,BMS The protection board can be stored for one year.

9. Packing and shipping

9.1. Logo:

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

1) Product name and model

2) Cell model

3) Factory date and serial number

9.2. Package

1) The packaging should meet the requirements of moisture-proof and vibration-proof. The packaging box should be firm and reliable. The box should be lined with moisture-proof materials.

Should move.

2) External carton packaging box, single board anti-static bag and bubble bag packaging;

9.3. transportation

1) During transportation, the product shall not be corroded by violent mechanical impact, exposure, rain, chemical corrosive materials and harmful gases; 5.3.2

During the loading and unloading process, the product should be handled with care, and it is strictly forbidden to drop, throw, or press.

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

10. Precautions

1) This management system cannot be used in series.

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

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

It should be ensured that the total charging impulse current of the adapter does not exceed the maximum value of the 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 electricity

The sum of the internal resistance of the battery pack and the short-circuit circuit is less than 40mΩ, the battery pack capacity exceeds the rated value by 20%, and the short-circuit current exceeds 1800A.

When 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 tube can be used

理系统。 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 needs to be re-connected.

It can be used after the new test is qualified.

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 leads, 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 can not be found at the first power-on, please check whether the wiring is correct.

Indeed.