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Lithium battery intelligent protection user manuel

JK -B 2A 8S 20P

Use and maintenance instruction manual

Chengdu jikong Technology Co., LTD

Product warranty terms

Product name: Lithium battery intelligent protection board

Warranty period: one year

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catalogue

1 Overview....4
2. Main technical parameters....4
the key technical indexes....4
Use of the environmental conditions....5
3. Description of the connector and the interface....6
Connector, LED, lamp position description....6
Description of the connector, the LED definition....7
Product appearance....8
size....9
weight....9
4. installation method and precautions....10
Unpacking and inspection and precautions....10
APP install....11
4. Use and operation....11
Preparation and examination before use....11
Power supply works on the protective plate....11
APP operation declaration....12
5. Safety and protection measures and matters needing attention....20
It is not allowed to modify the power line of the protective board privately. The privately modified power line will cause the uneven flow of the protection board and burn down....20
6. Transportation and storage....20
transport....20
keep in storage....21
The default parameters of "one key lithium iron", "one key three yuan" and "one key lithium titanate"....22

1 Overview

Lithium battery intelligent protection board is a customized management system designed for large capacity series lithium battery pack. It has the functions of voltage acquisition, high current active balance, over-charge and flow temperature protection, Kulun meter, Bluetooth communication, GPS remote and so on. Can be applicable to lithium iron phosphate, ternary lithium and other battery types.

Relying on the energy transfer active equalization technology with independent intellectual property rights, the protection board can achieve the maximum continuous equilibrium current of 2A. High-current active balancing technology can maximize battery consistency, improve battery range, and delay battery aging.

The protective board has a matching mobile phone APP, supporting Android and IOS operating systems. The APP can be connected to the protective board through the mobile phone Bluetooth to view the working state of the battery, modify the working parameters of the protective board, control the charge and discharge switch, and so on. The protection board is small in size, simple operation and full function, and can be widely used in small sightseeing car, mobility scooter, shared cars, high-power energy storage, base station backup power supply, solar power station and other products of battery PACK.

2. Main technical parameters

2.1 the key technical indexes

The main technical indicators of JK-B 2A 8S 20P protective plates are shown in Table 1.

Table 1. Main technical indicators of the protection board

Specification	**Product model**
Three string number	3~8
Lithium iron string number	4~8
The number of titanium acid string	nonsupport
Balanced way	Active equilibrium
equalizing current	2 A
Internal resistance of the main circuit	0.3mΩ
Persistent discharge current	200A
Maximum discharge current	350A

Overcurrent protection(adjustable)	10~200 A
Other optional functions	RS 485 (Customized) / CAN (custom) / heating (custom) / LCD Other interface s screen
Outline way	The same mouth
Single cell voltage range	1 ~ 5 V
Voltage acquisition accuracy	±5 mV
Overcharge protection voltage	1.2~4.35V (adjustable)
Overcharge release voltage	1.2~4.35V (adjustable)
Over flow release time	The 2~120S is adjustable
Overput protection voltage	1.2~4.35V (adjustable)
Overput release voltage	1.2~4.35V (adjustable)
Number of temperature detected	3
Temperature protection	Yes
short-circuit protection	Yes
coulombmeter	Yes
bluetooth function	Support iOs and Android
GPS joggle	Support

2.2Use of the environmental conditions

A) Operating temperature range: -20℃ ~70℃;

B) Power supply requirements: 10~40V.

C) Power consumption: 25mA @40V and 20mA @40V.

3. Description of the connector and the interface

3.1 Location description of the connector and LED lamp

The positions of the protective plate connector and LED lamp are shown in Figure 1.

3.2 Connector, LED, and define the description

B 2A 8S 20P The definition of protective board connector and LED lamp are shown in Table 2.

Table 2 Connector definitions

juncto r	Pipe foot numb er	JK -B 2A 8S 20P	
		name	definition
P1	1	B-	Total negative electrode of battery
	2	B1	The first string of battery positive electrode
	3	B2	The second string of battery positive electrode
	4	B3	The third string of battery positive electrode
	5	B4	The th string battery positive electrode
	6	B5	The fifth string of battery positive electrode
	7	B6	The sixth string of battery positive electrode
	8	B7	Seventh string battery positive electrode
	9	B8	The eighth string of battery positive electrode
	10	B+	Protection plate power supply
P2	Heating interface		
P3	The LCD display screen interface		
P4	External GPS interface		
P5	RS 485 / CAN interface (two alternative)		
P6	1	T1A	The 1st temperature sensor A pin
	2	T1B	1st temperature sensor B pin
	3	T2A	2nd temperature sensor A pin
	4	T2B	2nd temperature sensor B pin
D1	Bluetooth connection indicator is always on, and flashes when the protection board is disconnected.		

C -	Connect to the external load or, the recharger negative electrode
B-	Connect the negative electrode of the cell

3.3 Product appearance

B 2A 8S 20P The protective plate shape is shown in Figure 2.

Figure Figure 2, JK-B 2A 8S 20P, and the renderings

3.4size

JK-B 2A 8S 20P, protective plate, size 153mm 126mm 17.6mm, external dimensions as shown in Figure 3.

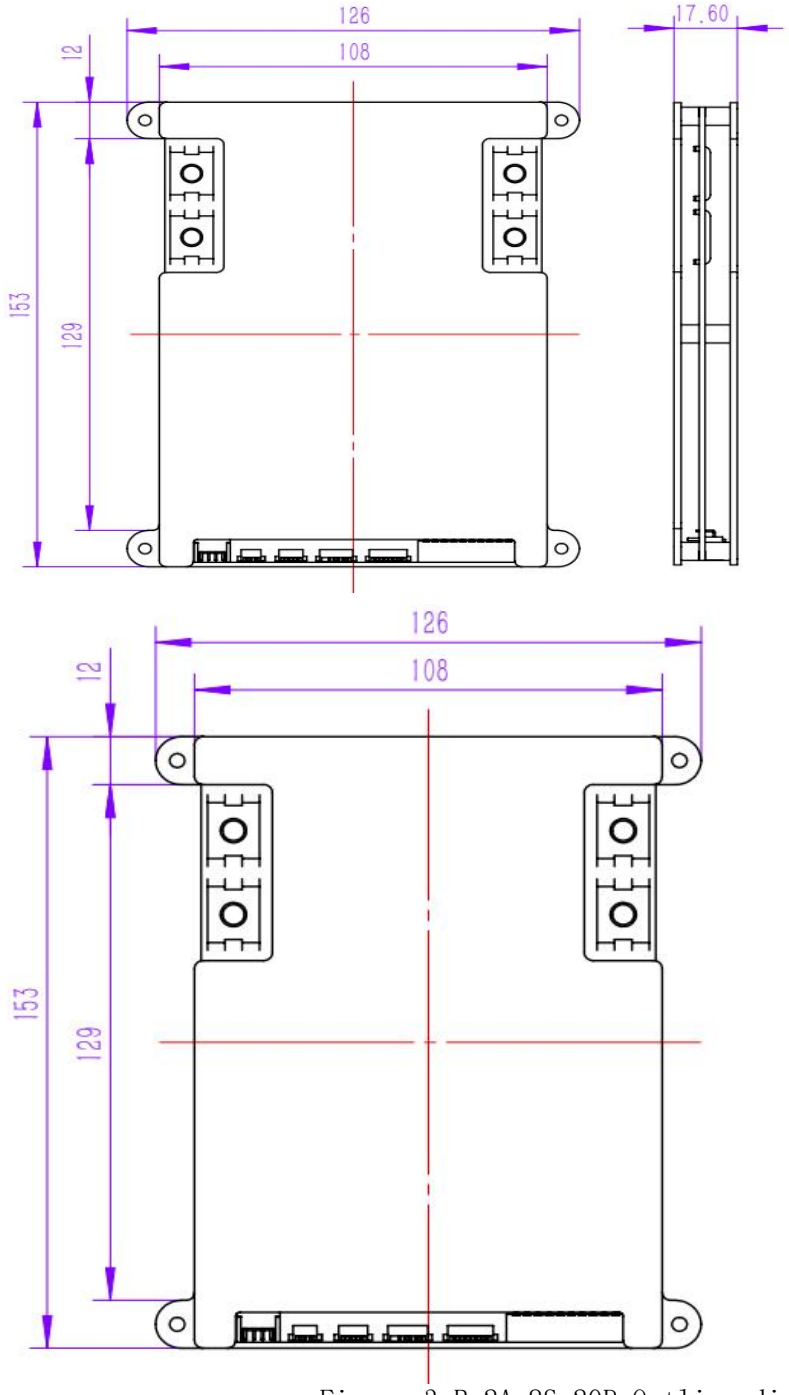

Figure 3 B 2A 8S 20P Outline dimensions

3.5weight

The JK-B 2A 8S 20P protective plate weighs approximately 349g.

4. installation method and precautions

4.1Unpacking and inspection and precautions

Unpacking inspection and precautions are as follows:

A) Take the packing boxes and protective boards lightly and try not to put them upside down;

B) Before opening the box, pay attention to whether the packaging is intact, such as whether there is any impact trace, any damage, etc.;

4.2hookup

JK-B 2A 8S 20P, protective plate, suitable for lithium battery pack of 8 batteries, installation wiring method is shown in Figure 4.

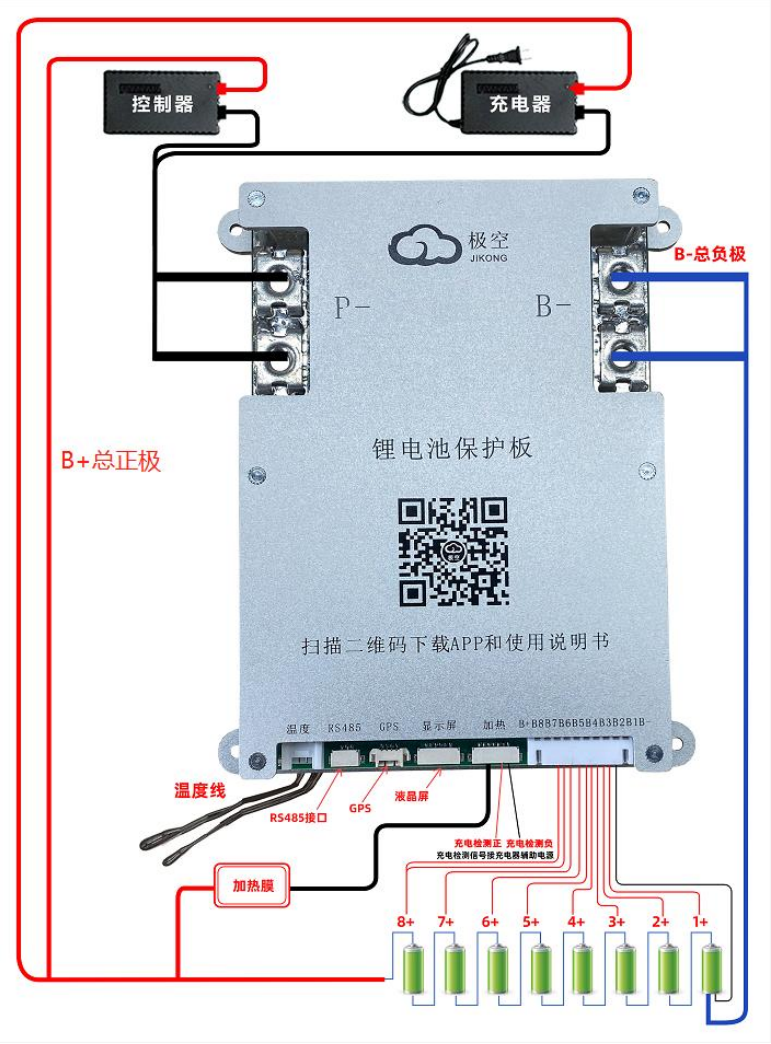

Figure 4 8Series battery wiring diagram

4.3 APP install

By scanning the QR code shown in Figure 5, you can obtain the mobile phone APP matching with the product.

Figure 5 QR code linked by mobile APP

4. Use and operation

5.1 Preparation and examination before use

Before starting the protection board, please again check whether the balance line connection is normal, and whether the "C-" and "B-" are connected correctly. Check whether the protective plate has been safely fixed with the cell, and confirm that it can be connected to the protective plate, otherwise it may cause abnormal work, or even burn and other serious consequences.

5.2 Power supply works on the protective plate

After confirming that the above operation is correct, the protection plate can be charged. The protection board has no power-on control switch, and is designed as the charging activation mode (the charger voltage is 5V higher than the battery voltage), that is, after the battery assembly is installed, it needs to be connected to the charger to enable the protection board to work.

5.3APP operation declaration

Equipment operation

A) Device connection

First turn on the mobile phone Bluetooth, and then open the APP, as shown in Figure 6.

Click the upper left corner icon to scan the device, wait for the scan to complete, and click the name of the device that needs to be connected, such as "JK-B 1A 24S". During the first connection, the APP will prompt the input password. The default password of the device is "1234". After the device is connected, the APP will automatically record the password
As shown in Figure Figure 77.

Figure 6. Device scanning

Figure 7. Password input

B) Change the password and name

After the device connection, click the "Pen Type" icon on the right side of the device list to modify the device name and password.

The interface for modifying the device name is shown in Figure 8. Note that the device name only supports English or numbers, not Chinese name and Chinese characters.

The password modification interface is shown in Figure 9. To modify the device password, you must first enter the old password of the device, and only if the current password is correct. After entering a new password twice, click 'OK' to complete the device password modification.

Figure 8. Name modification

Figure 9. Password modification

Status view

The real-time state interface is shown in Figure Figure 10.

Figure 10 Live status display

Divided into 3 regions in the live status page.

Area 1 in the figure is the battery comprehensive information bar. The definitions of each parameter are as follows:

a) performance period

The running time represents the total running time from the first startup of the protection board.

b) charge

Indicates the on state of the current protection board charging MOS. When "ON" appears, the current board charging MOS is open and the battery is allowed to charge; when "ON" appears, the current board charging MOS is off and the battery is not allowed to charge.

c) discharge

Indicates the on state of the current protection board discharge MOS. When On, the current protective board discharge MOS is on and the battery is allowed to discharge; when Off, the current protective board discharge MOS is off and the battery is not allowed to discharge.

d) balanced

Indicates the open state of the current protection plate equalization switch. When "On" is displayed, the protection board is automatically balanced, and when "off" is displayed, the balance is off, and the protection board will not balance the battery.

e) voltage

The voltage area displays the total voltage of the current battery in real time, and the total voltage is the sum of all single voltages.

f) current

The current area displays the total current of the current battery in real time. The current is positive when the battery is charged and negative when the battery is discharged.

g) power of battery

It represents the total output power of the current battery or input, whose value is the absolute product of the current battery voltage and battery current.

h) dump energy

Represents the percentage of the current battery.

i) battery capacity

It represents the actual capacity of the battery calculated by the current protection board through the high-precision SOC, in unit: AH. (This value requires a complete discharge and charge cycle before updating).

j) residual capacity

The remaining capacity represents the remaining capacity of the current battery in AH.

k) circulation volume

The cycle capacity represents the cumulative discharge capacity of the battery in AH.

l) cycle index

The number of cycles represents the number of times the current battery.

And m) of the monomer average

It represents the average cell voltage of the current cell in V.

N) Maximum pressure difference

The maximum pressure difference represents the difference between the highest cell voltage and the lowest cell voltage of the current battery, unit: V.

o) equalizing current

When the protection plate opens the equalization function and reaches the equilibrium condition, the equilibrium current display area displays the equilibrium current in real time, unit: A.

When equalization proceeds, the monomer voltage of the real-time state displays the area, blue represents the discharged battery and red represents the charged battery. Equilibrium current negative current means that the

battery is discharging, blue is flashing, positive current indicates that the battery is charging, and red is flashing.

The protection board adopts active balancing technology. The principle of equalization is to take power from the high voltage cell, store it to the protection board, and then put it to the low voltage cell.

p)MOS temperature

Display the temperature of the current protection board power MOS in ℃.

And q) Battery temperature 1

Display "NA" without the installation of the temperature sensor 1, and display the temperature of the temperature sensor 1 in ℃.

R) Battery temperature 2

Display "NA" without installing the temperature sensor 2, and display the temperature of the temperature sensor 2 in ℃.

The monomer voltage region in the 2nd area of Fig. The voltage data for each monomer in the cell pack are displayed in real time, where red indicates the monomer with the lowest voltage and blue indicates the monomer with the highest voltage.

Area 3 is the resistance area of the equilibrium line. The resistance of the equilibrium line is the equilibrium line resistance obtained by the self-inspection of the protection plate. This value is only the initial calculation. The purpose is to prevent wrong line connection or bad contact. When the resistance of the equilibrium line exceeds a certain value, it is displayed as yellow, and the equilibrium cannot be opened at this time.

parameter setting

The parameter setting page is shown in Figure Figure 11.

Figure 11 The parameter setting page is shown

If you need to modify the working parameters of the protection board, you must first click the "License Settings" button and enter the parameter setting password to verify the parameter setting permission. Parameter setting password factory default is "123456". The parameters of the protection board can only be modified after the parameter setting password is entered correctly. Parameter settings password and the device Bluetooth connection password are independent of each other.

The working parameters of the protection board can be modified on the parameter setting page. The definition of each parameter is as follows.

A) One-key lithium iron

Click this button to modify all the working parameters of the protection board to the parameters of lithium iron battery. The default value of lithium iron parameters is shown in the appendix.

B) Three yuan for one key

Click this button to modify all the working parameters of the protection board to ternary battery parameters. The default value of ternary lithium parameters is shown in the appendix.

C) One-click lithium titanate

Function This button can modify all the working parameters of the protection board to the lithium titanate battery parameters. The default value of the lithium titanate parameters is shown in the appendix.

And d) number of monomer

The number of cells indicates the number of cells of the current battery. Please set the value accurately before use, otherwise the protection plate will not work normally.

e) battery capacity

This value is the design capacity of the battery.

F) Trigger the equilibrium pressure difference

In the case that the equilibrium switch is on, when the maximum pressure difference of the battery pack exceeds the value and the current unit voltage exceeds the equilibrium starting voltage, the equilibrium starts until the pressure difference is below the value or the unit voltage is below the equilibrium starting voltage. For example, the equilibrium trigger pressure difference is set to 0.01V, when the battery pack pressure difference is greater than 0.01V, and the balance is lower than 0.01V.

(It is recommended that the differential equilibrium trigger pressure for batteries above 50 AH is 0.005V, and that for batteries below 50 AH **The difference is 0.01V).**

G) Voltage calibration

The voltage calibration function can be used to calibrate the accuracy

of the voltage acquisition of the protective plate.

When there is found between the total voltage collected by the protection plate and the total voltage of the battery, the voltage calibration function can be used to calibrate the protection plate. The calibration method is to fill in the current measured total battery voltage, and then click the 'Set' button behind the voltage calibration to complete the calibration.

H) Current calibration

The current calibration function can be used to calibrate the accuracy of the current acquisition of the protective plate.

When there is found between the total current collected by the protection plate and the actual current of the battery, the current calibration function can be used to calibrate the protection plate. The calibration method is to fill in the current measured total battery current, and then click the 'Set' button behind the current calibration to complete the calibration.

I) "monomer undervoltage protection" and "monomer undervoltage recovery"

"Single undervoltage protection" refers to the cut-off voltage of the cell. As long as the single voltage in the battery pack is lower than this value, the 'single undervoltage alarm' is generated. At the same time, the protection plate turns off the discharge MOS, and at this time the battery cannot be discharged and can only be charged. When the alarm is generated, only after all the single voltage value exceeds the value of "single voltage recovery", the protection plate removes the "single undervoltage alarm" and opens the discharge MOS at the same time.

J) "monomer overcharge voltage" and "monomer overcharge recovery"

"Single overcharge voltage" refers to the saturation voltage of the cell. As long as the voltage of any unit in the battery pack exceeds this value, a "single overcharge alarm" is generated. At the same time, the protection plate closes the charging MOS, and at this time, the battery cannot be charged and only discharged. When the alarm is generated, only the voltage value of all units is lower than the value of "single overcharge recovery", the protection board removes the "single overcharge alarm" and the charging MOS is opened at the same time.

K) automatic shutdown voltage

The automatic shutdown voltage represents the lowest voltage of the protection plate operation, and the protection plate is closed when the voltage of the highest cell in the battery pack is below this value. This value must be lower than the "monomer undervoltage protection".

L) "Maximum charging current", "Overcurrent charging delay", "Overcurrent charging discharge"

When charging the battery pack, the current exceeds the ″maximum charging current″ and the duration exceeds the ″charging overcurrent delay″, the protection plate generates a ″charging overcurrent alarm″ and turns off the charging MOS. After the alarm is generated, after the time of ″charging overcurrent discharge″, the protection board removes the charging overcurrent discharge alarm, and the charging MOS is restarted.

For example: set the ″maximum charging current″ to 10A, ″charge overcurrent delay″ to 10 seconds, and ″charge overcurrent release″ to 50 seconds. During the charging process, if the charging current exceeds 10 A for 10 seconds, the protection board will generate a charging overcurrent alarm, and close the charging MOS at the same time. 50 seconds after the alarm, the charging overcurrent alarm is removed, and the protection board will restart the charging MOS.

M) "Maximum discharge current", "discharge overcurrent delay", "discharge overcurrent release"

When the battery pack is discharged, the current exceeds the ″maximum discharge current″ and the duration exceeds the ″discharge overcurrent delay″, the protection plate generates a ″discharge overcurrent alarm″ and turns off the discharge MOS. After the alarm is generated, after the time of ″discharge overdischarge″, the protection board removes the ″discharge overdischarge alarm″ and the discharge MOS is restarted.

Example: set the ″maximum discharge current″ to 100A, ″discharge overcurrent delay″ to 10 seconds, and ″discharge overcurrent release″ to 50 seconds. During the discharge process, if the discharge current exceeds 10 0 A for 10 seconds, the protection board will generate the discharge overcurrent alarm and close the discharge MOS. 50 seconds after the alarm, the discharge overcurrent alarm is removed, and the protection board will restart the discharge MOS.

N) Short-circuit protection is lifted

When the short circuit protection occurs, after the'short circuit protection removed " after the set time, remove the short circuit protection.

O) Equalize the starting voltage

The equilibrium starting voltage is used to control the voltage stage of the equilibrium, and the equilibrium is only triggered when the single voltage exceeds this value and the maximum pressure difference of the battery pack exceeds the equilibrium triggered pressure difference.

And p) the maximum equilibrium current

Equilibrium current represents the continuous current of high voltage battery discharge and low voltage battery charging during energy transfer.most

Large equilibrium current represents the maximum current in the energy transfer process, and the maximum equilibrium current should not exceed 0. 1C.

For example, the 20 AH battery does not exceed 20 * 0. 1=2A.

Qs) "charging over temperature protection", "charging over temperature recovery"

During the charging process, when the battery temperature exceeds the value of "charging over temperature protection", the protection plate generates a "charging over temperature protection" alarm

Notice, while the protection board turns off the charging MOS. After the alarm is generated, when the temperature is lower than "charging overtemperature recovery", the protection board removes the "charging over temperature protection" warning and resumes the charging MOS at the same time.

R) "Charging low temperature protection", "charging low temperature recovery"

During the charging process, when the battery temperature is lower than the value of "charging low temperature protection", the protection plate generates a "charging low temperature protection" alarm

Notice, while the protection board turns off the charging MOS. After the alarm is generated, when the temperature is higher than the "charging low temperature recovery", the protection board removes the "charging low temperature protection" warning, and resumes the charging MOS at the same time.

S) "MOS overtemperature protection", "MOS overtemperature recovery"

When the MOS temperature exceeds the value of "MOS over temperature protection", the protection plate generates "MOS over temperature alarm" and turns off the charging and discharging MOS, and the battery cannot be charged or discharged. After the alarm is generated, the MOS temperature is lower than the value of "MOS over temperature recovery", the protection

board removes the "MOS over temperature alarm", and the charge and discharge MOS is restarted (the MOS over temperature protection value is 75℃, and the MOS over temperature recovery value is 65℃. These two values are the factory default value and cannot be modified).

pay attention to:

For any parameter modification, please refer to the instruction manual. Improper parameters may make the protective plate not working properly, or even burn the protective plate.any

After a parameter is modified, click the "Set" button behind the parameter to complete the parameter distribution, and the protection board receives it successfully

After the parameters, it will make a "drop" sound.

BMS control

The BMS control page is shown in Figure Figure 12. Through BMS control, the protection plate can be switched for charging, discharged and restored to factory settings.

Figure 12 The BMS control page

5. Safety and protection measures and matters needing attention

The protection plate itself does not have high pressure and does not cause electric shock damage to the body.

Before use, please read the instruction manual carefully. According to the correct wiring diagram of different strings, connect from the negative electrode to the positive electrode. After the balance line is connected, the multimeter is confirmed again before the protection plate can be inserted.

It is not allowed to modify the power line of the protective board privately. The privately modified power line will cause the uneven flow of the protection board and burn down backplate.

6. Transportation and storage

7.1transport

After packing, the products are not directly affected by rain and snow and under violent collisions, and can be transported by the usual means of transport. It is not allowed to be put together with corrosive substances such as acid and base during transportation.

7.2keep in storage

The packaged products should be stored in a permanent warehouse, the warehouse temperature is 0℃ ~35℃, the relative humidity is not more than 80%, the warehouse should be no acid, alkali and corrosive gas, no strong mechanism vibration and impact, no strong magnetic field.

The default parameters of "one key lithium iron", "one key three yuan" and "one key lithium titanate"

order number	parameter	Three default	Lithium iron default	Lithium titanate default	unit
1	Single under-pressure protection	2.9	2.6	1.8	V
2	The monomer interception and undervoltage protection was restored	3.2	3.0	2.0	V
3	Single overcharge voltage	4.2	3.6	2.7	V
4	Single-cell overcharge protection and recovery	4.1	3.4	2.4	V
5	Trigger the equilibrium pressure difference	0.01	0.01	0.01	V
6	Automatic shutdown voltage	2.8	2.5	1.7	V
7	Charge overcurrent protection delay	30	30	30	second
8	Release time of charging overcurrent protection	60	60	60	second
9	Overcurrent discharge protection delay	30	30	30	second
10	Release time of discharge overcurrent protection	60	60	60	second
11	Short-circuit protection release time	60	60	60	second
12	Charging at the overtemperature protection temperature	60	60	60	℃
13	Return to the temperature after charging with overtemperature	55	55	55	℃
14	Discharge to the overtemperature	60	60	60	℃

	protection temperature				
15	Discharge overtemperature recovery temperature	55	55	55	℃
16	Charging for the low-temperature protection temperature	-20	-20	-20	℃
17	Charge at low temperature recovery temperature	- 10	- 10	- 10	℃
18	The MOS over-temperature protection temperature	75	75	75	℃
19	The MOS over-temperature protection is required for the recovery temperature	70	70	70	℃