SUNKKO

D2532C

New Energy Vehicle Lithium Battery Module Equalizer & Analyzer

User Manual

Thanks for choosing SUNKKO series produces.It will bring you convenience and efficiency for spot welding work.For optimal user experience,please read the manual carefully before using and store it properly for future reference.

SUNKKO has the right to upgrade the machine and modify the manual without prior notice. Thanks for understanding!

Summarizes

D2532C New energy vehicle lithium battery module equalizer & analyzer uses the latest large-scale and high-speed MCU chips from Microchip Technology Inc. in the United States to precisely detect various units of lithium battery packs in real-time.The chip can store, process, and compare the collected voltage data, and then display the results on the screen.This equalizer can simultaneously detect the voltage situation of up to 32 strings lithium batteries ,automatically analyze and compare the voltage. It has the characteristics of high accuracy, strong timeliness, simple operation, and practical reliability.

Features

❶ The machine can automatically collect and analyze the voltage of each string of lithium battery packs, while monitoring the changes in voltage of each string of battery packs during the equalization process.

❷ The main control chip is an intelligent MCU chip, which can automatically analyze the battery,control the battery to charge and discharge, and then start the equalization work.

❸ You can use Bluetooth to connect to your phone and remotely control it through an app program, achieving simple and effcient work.

❹ The internal component layout is reasonable and equipped with a heat dissipation and coolingsystem, which can effectively avoid the impact of high temperature environment on electronic components.

❺ Supports equalized repair and analysis of 2-32S battery modules, and is used for equalized repair of up to 32S lithium battery modules for new energy vehicles.

❻ The equalization current is adjustable, with a maximum value of 25A.And the machine can accurately equalize repair of different types of battery packs.

❼ Built-in charging system to achieve integrated charging and discharging control

❽ Safer and more reliable charging regulation, matching the charging voltage according to the lithium battery type and number of strings.

❾ Discharge equalization can select continuous discharge equalization mode or pulse discharge equalization mode according to the aging degree of the battery pack and the equalization requirements.

❿ The humanized movable operation panel can change the panel angle according to the operator's vision for easy observation.

Parameters

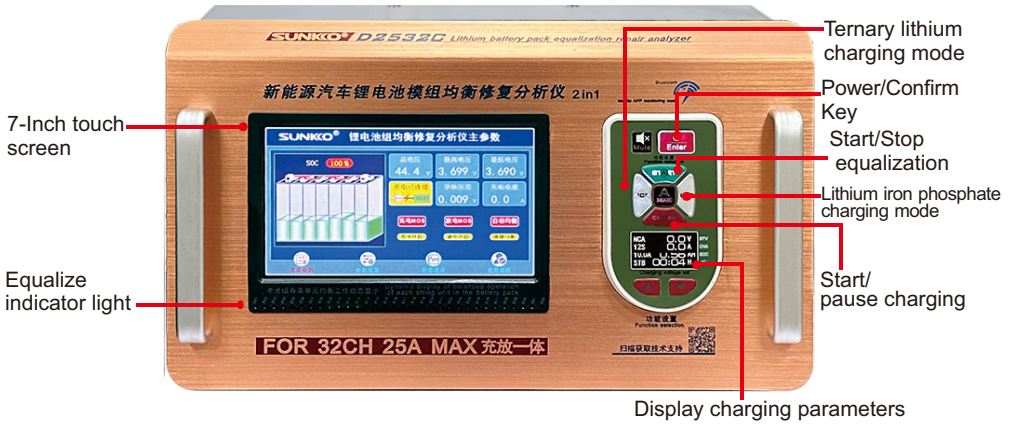
Product Name	New Energy Vehicle Lithium Battery Module Equalizer & Analyzer	Product Model	D2532C
Voltage	AC110V~220V	Size	355x355x210mm
Discharging applicable battery type	Li-ion/LiFePO4/LTO	Number of battery strings used	1~32 strings
Charging applicable battery type	Li-ion/LiFePO4	Discharge current	1.25~25A (adjustable)
Minimum equalization voltage	1mv	Charging current	1-20A (adjustable)

Application

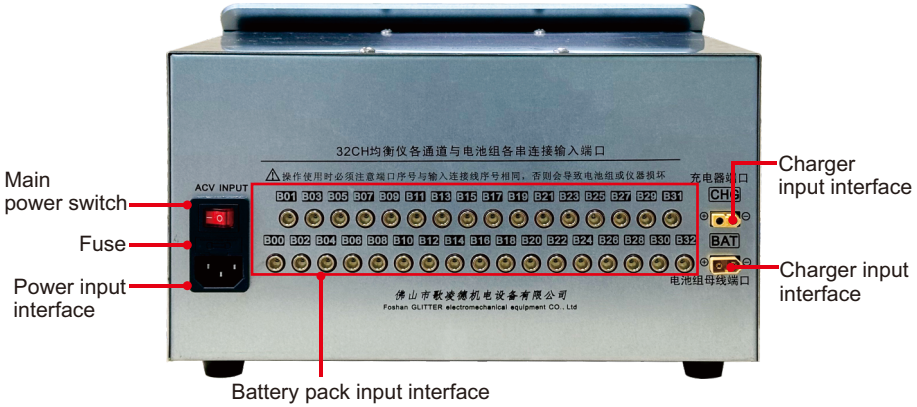
It is suitable for major scientific research institutions, lithium battery dealers, battery pack manufacturers and battery protection system manufacturers to detect and analyze the voltage of multiple batteries, and to perform maintenance services on power battery packs such as new energy vehicles and energy storage systems.

Product Diagram

Front



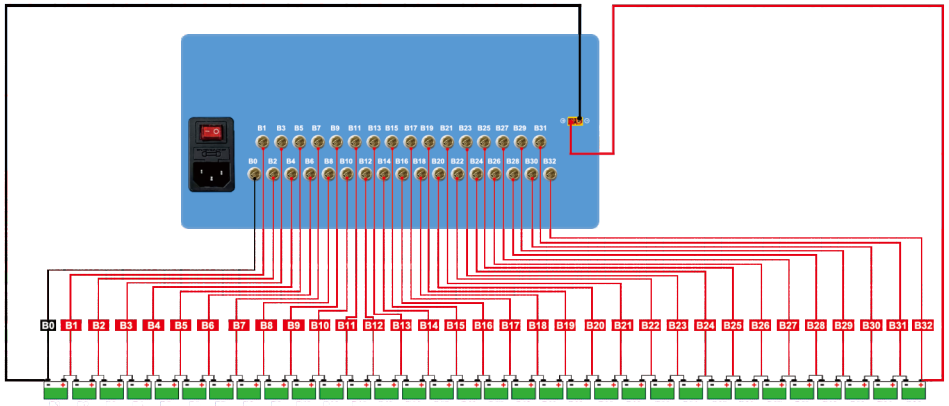
Back



Side

Tilt adjustable range: 0~45°

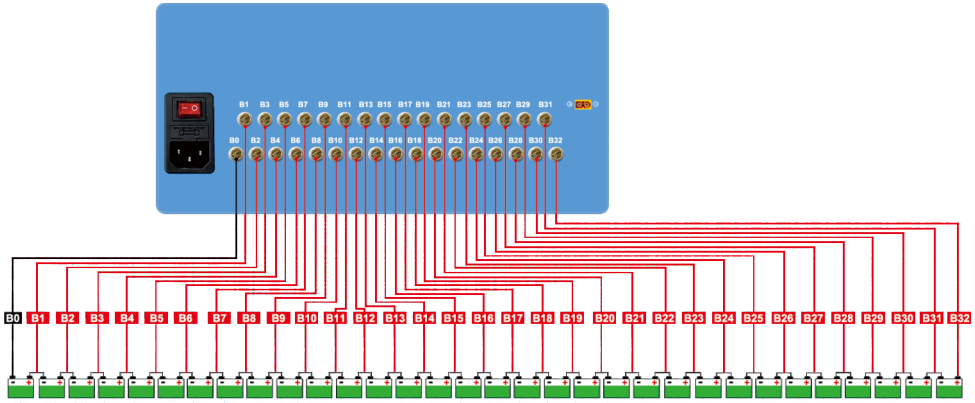
Wiring Diagram



Wiring diagram of charge equalization mode

The connection method of 32 batteries in series is shown inthe figure.

(The charging balance mode is suitable for battery packs with 10-32 batteries connected in series.)

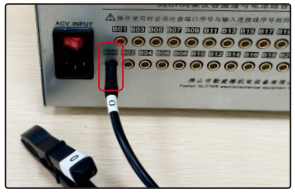


Wiring diagram of discharge equalization mode

The connection method of 32 batteries in series is shown in the figure.The discharging balance mode is suitable for battery packs with 2-32 batteries connected in series.

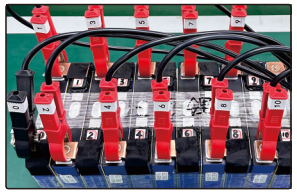
Precautions for connecting the battery pack

Discharge equalization mode



1.Connect the cables to the back of the equalizer in sequence, the black wire of the main negative electrode must be located at B0 of the equalizer.

2.There are paste labels with string number at the cable clamp, please connect the battery packs in sequence(Black wire connected to the main negative electrode of thebattery pack)



3.Make sure the battery wiring sequence is correct. If the wiring sequence is incorrect, the machine may be damaged.

Installation start-up and basic operation instructions

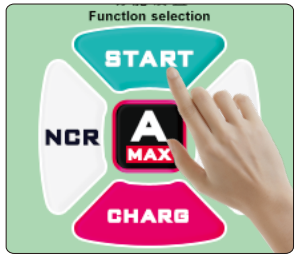
Installation and startup

1.Power-up:Press the “ — ○ ”button at the back of the machine to turn on the main power switch.

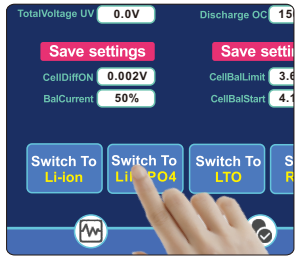
2.Please connected to the battery pack correctly.(Attention: The sequence of positive and negative poles in the battery pack wiring must be consistent with the sequence of positive and negative poles in the equalizer to avoid equipment damage.)

3.After turning on the main power switch, short press the "⏻" button to start the control display screen.

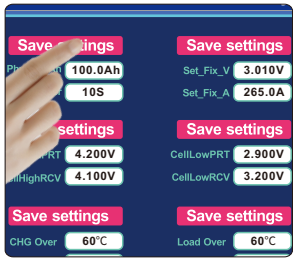
Set parameters



1.Press the “START” button to start the machine battery monitoring system and automatically detect and analyze voltage of battery pack and other information.

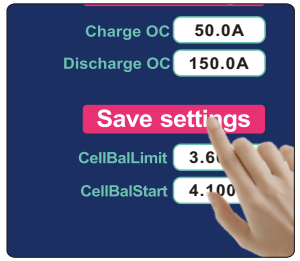


2.Click on “Parameter Settings”and select the type of lithium battery pack connected.

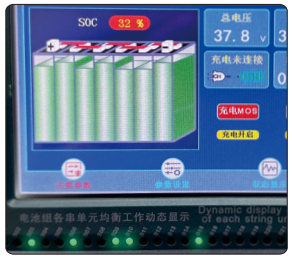


3.Enter the actual number of strings connected to the battery pack, and press the“Synchronize data to BMS” button.

Discharge Equalization mode



1.Set the “equilibrium limit” parameter according to the battery pack voltage. If the voltage is higher than the set value, the machine will automatically start discharge equalization.



2.During discharge equalization, the corresponding string indicator light will flash; it will go out when balancing is completed.

3. During the balancing process, press the "START" button to stop the balancing process.

Switch to the discharge mode

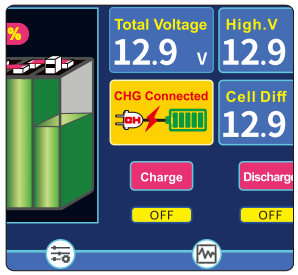
1.Press the “A MAX”button, and the button light will flash.The machine will switch to continuous discharge mode

2.Press the “START” key after switching to the discharge mode, and the machine will be in discharge equalization.the corresponding indicator lights will remain on until the discharge equalization is finished, the indicator light will turn off.

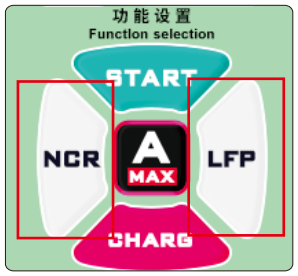
3.Press the "A MAX" button again,the button light will turn off. And the machine will switch to pulse discharge mode. Before switching modes, please press the "STOP" button to stop the equalization work.

Charging Mode

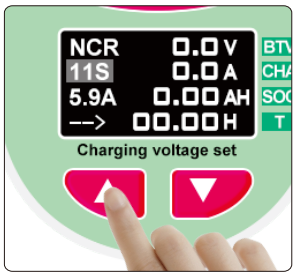
1. In charging mode, the total positive and negative poles of the battery pack must be connected to the equalizer.



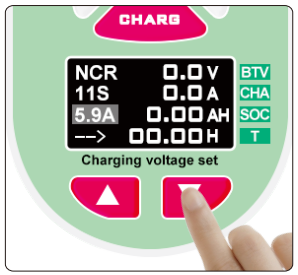
2.When the main display shows "Charging connected", the connection is successful.



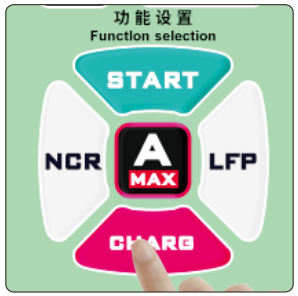
3.Select the battery type: Li-ion(NCR)LiFePO4(LFP) Note: The user is responsible for any damage to the battery pack caused by incorrect type selection.



4.Press the "△" button to enter the setting of the number of battery strings to be connected.If there is no operation for 2 seconds, the setting will be confirmed.

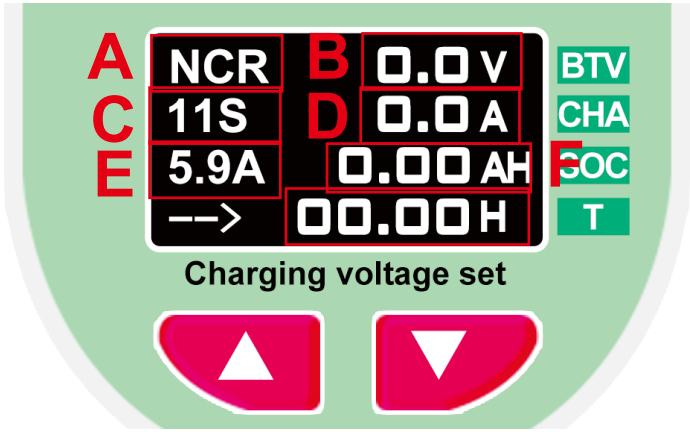


5.Press the "△" button to enter the current setting. (The current is recommended to be set at 10-15A)If there is no operation for 2 seconds, the setting will be confirmed.



6.Press the "CHARG" button and the machine starts charging

Charging mode



A **Battery Type**：NCR(Li-ion)LFP(LiFePO4)(Wrong settings may cause abnormal charging)

B **Charging voltage** Automatically matches the charging voltage according to the battery type and the number of battery strings

C **Number of battery strings** Set the number of connected battery strings (wrong setting may cause abnormal charging)

D **Real-time current** Displays real-time current during charging

E **Setting current** Setting charging current (0.5-20A)

F **Charging capacity** Display charging capacity

G **Charging time** Display charging work time

H

Error code	Clarification	Error code	Clarification
E01	Charging cable reversed or not connected to the battery.	E02	Charging voltage exceeds the set voltage.
E03	Charging current exceeds set current.	E04	Charge current less than 1/6 of set current.
E05	Charging time has reached the maximum time.	E06	No current output
E07	No voltage output	E08	Setting voltage lower than battery voltage.

Bluetooth remote connection steps

Search "Shenzhou Anbang Merchant Edition"in WeChat applet

1.Before connecting the Bluetooth of the mobile phone.pleasemake sure that the machine is in working condition.(The light of the"START" button is on)

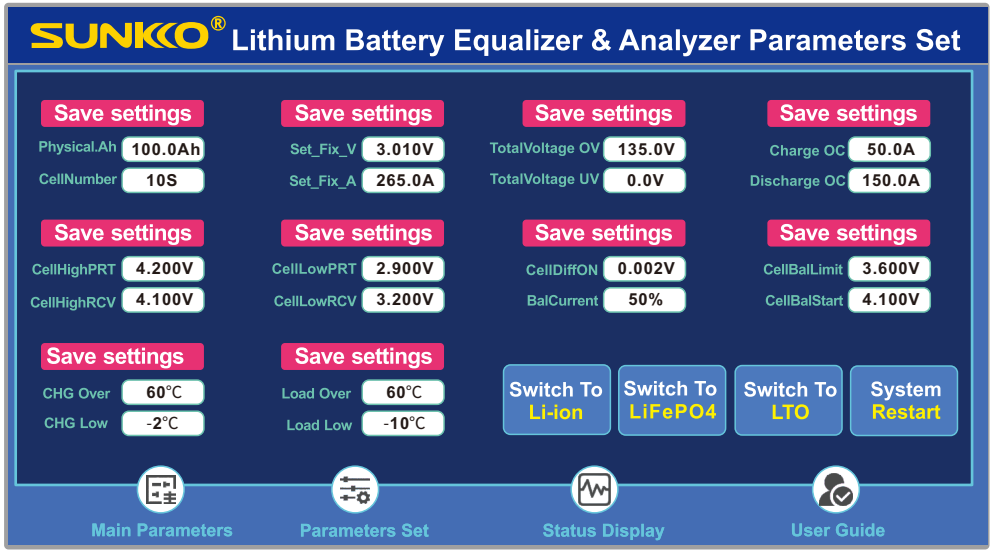
2.Turn on the Bluetooth of the mobile phone ,click on the device list in the upper right corner of the applet, and find the machine with the name prefix ANT.

3.After successful connection, select the type of the battery pack on the -BMS control page (BMS).(The default type is ternary lithium battery)

4.Click on parameter settings→ BMS hardware parameters→ number of consecutive strings →Enter the actual number of strings connected to the battery pack.

5.Click on parameter settings→ BMS hardware parameters→ equalization Limit Voltage→ Enter the value of thebalanced voltage.(Please refer to the parameter settings on page 7)

Detailed parameter adjustment



Ternary Lithium Battery	Set as the default parameter for ternary lithium batteries with one button
$LiFePO_4$	Set as the parameter for $LiFePO_4$ batteries with one button
LTO	Set as the parameter for LTO batteries with one button
Number of Strings	The actual number of strings of battery packs connected to the Equalizer & Analyzer.
Balance Limit	Discharge equalization is started when the individual voltage is higher than the set value ,and discharge equalization is stopped when it is equal to or less than this value.
Equilibrium pressure difference	Allowable differential pressure at the end of equalization
Equalization current	The proportion of discharge current during the equalization process. (The smaller the proportion, the more accurate the equalization.)

Three step settings make it easy to turn on discharge equalization.

❶ Choose the type of battery: ternary lithium, $LiFePO_4$ or LTO.

❷ Set the number of Strings:Enter the actual number of strings connected to the battery pack

❸ Set the Balance Limit:Suggest setting this value to 0.5V lower than the minimum voltage of the single battery pack.

The following parameters are factory adjustment and no need to adjust during normal use.

Total Voltage Overvoltage:It enters the protection state when the total voltage of the battery pack exceeds this value and Charging MOS is forcibly shut down.

Total Voltage Undervoltage:It enters the protection state when the total voltage of the battery pack is lower than this value, and discharging MOS is forcibly shut down.

Single cell Overvoltage:It enters the protection state when the single battery voltage exceeds this value, and charging MOS is forcibly shut down.

Overvoltage Recovery:It is in unprotected status when the single battery voltage falls back to this value,and charging MOS will restart.

Single cell undervoltage: It is in protected status when the single cell voltage is lower than this value, and discharging MOS will forcibly shut down.

Undervoltage recovery:When the single cell voltage returns to this value, the protection state is released and the discharge MOS will restart.

Charge Over Temp:It is in protected status when the internal temperature of the machine is higher than this value,and charging MOS is forcibly shut down.

Charge Low Temp:It is in protected status when the internal temperature of the machine is below this value,and charging MOS is forcibly shut down.

Discharge Over Temp:It is in protected status when the internal temperature of the machine is higher than this value, and discharging MOS is forcibly shut down.

Discharge Low Temp:It is in protected status when the internal temperature of the machine is below this value, and discharging MOS is forcibly shut down.

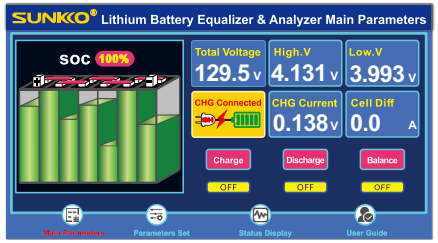
Charge Overcurrent :It is in protected status when the charging current exceeds this value,and charging MOS is forcibly shut down.

Discharge Overcurrent:It is in protected status when the charging current exceeds to this value,and discharging MOS is forcibly shut down.

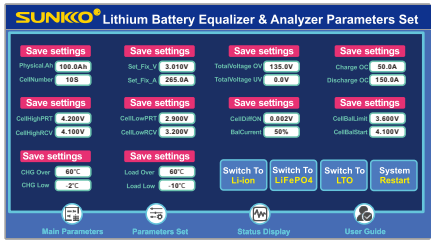
Display interface

D2532C has four display modules(Main Parameters,Parameters Set, Status Display,User Guide)

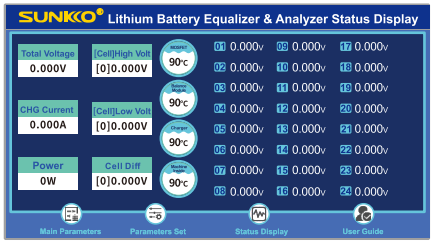
(一) **Main Parameters Interface**



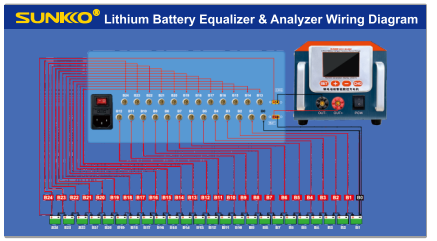
(二) **Parameter Setting Interface**



(三) **Status Display Interface**



(四) **User Guide Interface**



Equilibrium Principle

Voltage disequilibrium
If the battery pack is used for a long time. the voltage becomes uneven.

Discharge equalization
Each string is discharged at 25A to the set minimum voltage

Charge equalization
Stabilize the current during charging to avoid overcharging.

Second Discharge equalization
In order to achieve better equalization effect,it is recommended to continue discharging again.

Second charge equalization
Stabilize the current during charging

Notes in the Use

A.Important reminder

❶ Please choose a equalization mode that matches the battery type or corresponds to the voltage setting when setting parameters,otherwise the responsibility for damaging the battery module will be borne by the user (2.8V for ternary lithium battery; 2.5V for Lithium iron phosphate battery)

❷ Before connecting the equalizer to the battery module,it is required to connect the attached LED line sequence indicator board for testing.After confirming the correct polarity and phase sequence, it can be connected to the equalizer;

❸ When connecting the equalizer to the battery module,it is necessary to pay attention to the polarity and sequence of the battery pack to meet the output terminal requirements of the equalizer.If connected incorrectly it can damage the equalizer and cause internal discharge components to burn in severe cases.

❹ For battery modules with a capacity less than10AH,it is required to set the balancing current to be less than10A during operation based on the safety factors and balancing accuracy of the battery module.

❺ When equalizing the battery module,the equalizer must be placed in a ventilated environment because of the large amount of thermal energy generated due to energy consumption balancing.It is strictly prohibited to insert foreign objects or metal objects in the heat dissipation area behind the equalizer case, otherwise it may cause the instrument to explode during balancing operation.

❻ It is necessary to pay attention to the polarity and voltage of the charging power output that match the balance instrument in charge and discharge equalization mode. Connecting the wrong charging polarity can damage the instrumentand possibly causedamage to the charger;

❼ It is necessary to have personnel monitor the instrument and battery module when equalizing the battery module ,and it is strictly prohibited to use it when no one is on duty;

❽ It is necessary to use the battery pack connection line that is randomly matched with the equalizer.It is prohibited to add or modify the connection line,otherwise the user will be responsible for any accidents caused;

❾ There are multiple high-voltage circuits and components inside the equalizer, and it is strictly prohibited to disassemble or attempt to modify them. otherwise, if any accidents occur ,the user will be responsible;

❿ The interior of the equalizer is composed of precision electrical components.The instrument is strictly prohibited from entering water or mist,otherwise it may cause damage to the instrument;

B.General reminder:

❶ The equalization effect is related to the time and speed of equalization,and the faster the speed, the worse the equalization effect.Suggest setting a smaller balance current value to improve balance accuracy;

❷ The equalizing current marked on the equalizer is the equalizing discharge current when the battery has the highest voltage of 4.2V (ternary lithium battery). The instrument is designed for constant resistance discharge energy consumption. When the battery voltage decreases or it is a low voltage unit, the equalizing current decreases, it is a normal phenomenon.

❸ When it is necessary to measure the balanced real-time current, the instrument should be set to the MAX. function mode, which is a continuous current state. in this state, the DC clamp meter can measure the zero voltage line or maximum voltage line of the battery module to obtain data;(Equalizers without MAX. function are all pulse current during operation, and ordinary current measuring instruments cannot measure theactual current value)

❹ Because the battery is an electrochemical reaction element, it has the phenomenon of electromotive force (voltage) rise. When the battery unit experiences energy consumption discharge and the amplified current discharge ends, the battery end voltage will increase by a certain amount after disconnecting the load.(For example, after the mobile phone notifies that the battery is low and automatically shuts down, it can be turned on again after a few minutes and a small amount of battery will be displayed), in this case, the user may mistakenly think that the equalization effect is poor. Therefore, it is recommended to use the current to perform fine balancing for a long time to achieve satisfactory results;

❺ Any equalizer cannot equalize and repair on damaged battery packs, including but not limited to the following:
a.Increase in battery internal resistance.
b. The voltage at the battery end is lower than the discharge termination voltage.
c.Short circuit or open circuit inside the battery.
d.Damaged battery module BMS (protective board)

❻ Read the user manual of the instrument in detail. If you have any questions, please contact the manufacturer's customer service hotline immediately.