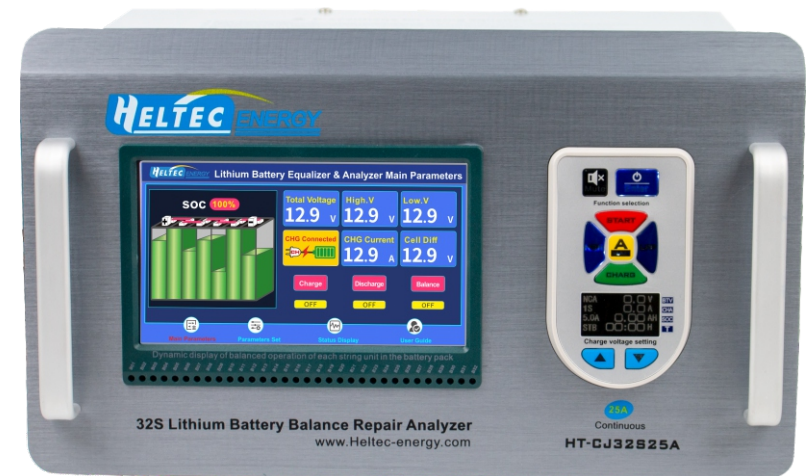



# HT-CJ32S25A


## 32S Lithium Battery Balance Repair Analyzer

# User Manual



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

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

## Summarizes

HT-CJ32S25A 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

- ① 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.
- ② 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.
- ③ You can use Bluetooth to connect to your phone and remotely control it through an app program, achieving simple and efficient work.
- ④ The internal component layout is reasonable and equipped with a heat dissipation and cooling system, which can effectively avoid the impact of high temperature environment on electronic components.
- ⑤ 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.
- ⑥ The equalization current is adjustable, with a maximum value of 25A. And the machine can accurately equalize repair of different types of battery packs.
- ⑦ Built-in charging system to achieve integrated charging and discharging control
- ⑧ Safer and more reliable charging regulation, matching the charging voltage according to the lithium battery type and number of strings.
- ⑨ 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.
- ⑩ The humanized movable operation panel can change the panel angle according to the operator's vision for easy observation.

## Parameters

Product name	32S Lithium Battery Balance Repair Analyzer	Product model	HT-CJ32S25A
Power supply	AC 220V 50/60Hz	Size	355x355x210mm
Discharging applicable battery type	Li-ion/LiFePO <sub>4</sub> /LTO	Number of battery strings used	2~32 strings
Charging applicable battery type	Li-ion/LiFePO <sub>4</sub>	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.

- ③ When it is necessary to measure the equalized real-time current, the instrument should be set to the A/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 A/MAX function are all pulse current during operation, and ordinary current measuring instruments cannot measure the actual current value). Press the A/MAX key on the control panel, switch to continuous discharge current mode, in this state, use DC clamp meter to measure the real-time discharge current (measure the zero voltage line or maximum voltage line of the battery module). If not press the A/MAX key, the balance mode is pulse discharge. Unable to measure the current with DC clamp meter at this time.
- ④ 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 suggested using a low discharge current to balance the battery pack to achieve better effect.
- ⑤ All the equalizer cannot balance and repair on damaged battery packs, including below situations:
  1. The internal resistance of the battery is too high.
  2. The voltage is lower than the limit voltage.
  3. Short circuit or open circuit inside the battery.
  4. Damaged protection board of the battery pack.
- ⑥ Read the user manual of the instrument in detail. If have any questions, please contact the manufacturer's customer service hotline immediately.

## Notes in the Use

### A.Important reminder

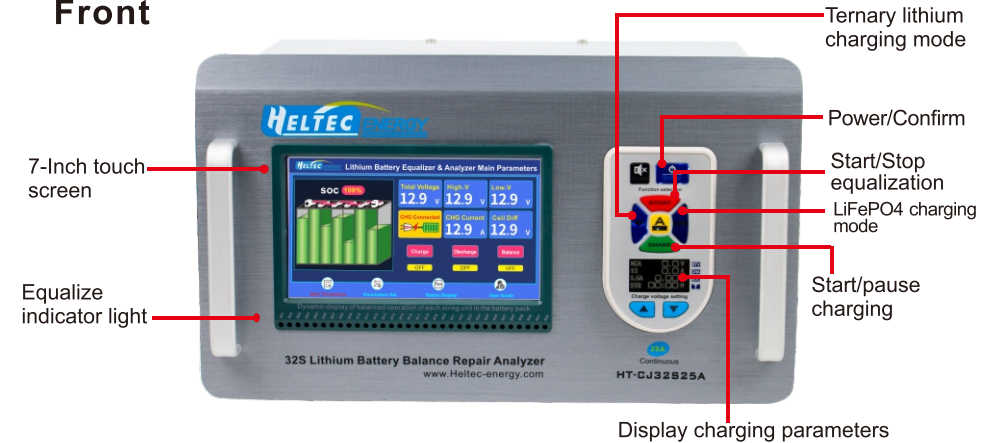
- ❶ Please choose a equalization mode that matches the battery type or corresponds to the voltage setting when setting parameters,otherwise the responsibility for damaging the battery module will be borne by the user.(2.8V for ternary lithium battery; 2.5V for Lithium iron phosphate battery)
- ❷ Make sure the wiring sequence is correct before plugging in the terminal.
- ❸ It is necessary to pay attention to the battery polarity and sequence meet the requirements of the equalizer import terminal. Wrong wiring sequence will damage the equalizer! In severe cases, it may cause internal discharge components to burn.
- ❹ For battery modules with a capacity less than 10AH,it is required to set the equalized current to be less than 10A,based on the safety and equalized 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 equalization.It is strictly prohibited to insert foreign objects or metal objects in the heat dissipation area behind the equalizer, otherwise it will damage the equalizer and causing danger.
- ❻ When using the charge → discharge equalization mode, must pay attention to the charger output polarity.
- ❼ It is necessary to have personnel monitor the equalizer and battery module when equalizing.It is strictly prohibited to use nobody's there.
- ❽ It is necessary to use the battery pack connection cable that is randomly matched with the equalizer.It is prohibited to extend or modify the connection cable, otherwise the user will be responsible for any accidents caused.
- ❾ There are complex high-voltage circuits and components inside the equalizer, and it is strictly prohibited to disassemble or modify them.Otherwise, if any accidents occur, the user will be responsible;
- ❿ The interior of the equalizer is composed of precision electrical components.Be careful not enter water or water mist,otherwise it will cause damage to the equalizer;

### B.Using reminder:

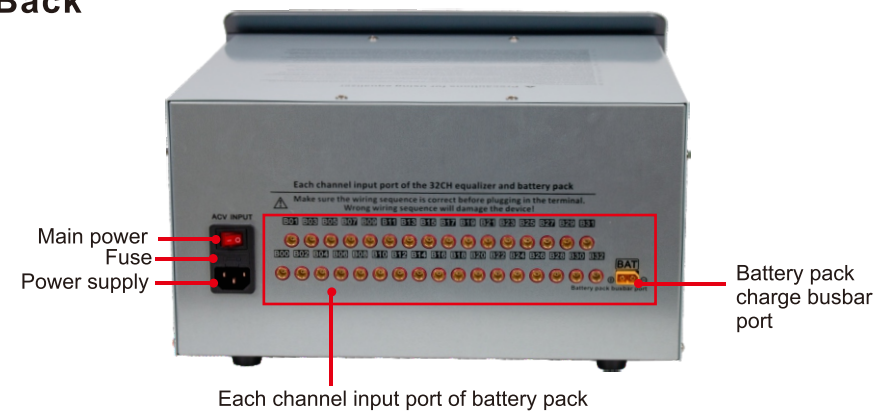
- ❶ The equalization effect and time is related to the equilibrium speed,the faster the speed, the poor balance effect.Suggest setting a smaller balance current to improve balance accuracy.
- ❷ The equalizing current marked on the equalizer is the discharge current when the battery is 4.2V (ternary lithium battery). The equalizer is designed for constant resistance discharge energy consumption. When the battery voltage decreases or it is a low voltage, the equalizing current will decreases.(The equalizer is 168mΩ constant resistance discharge load)

## Product Diagram

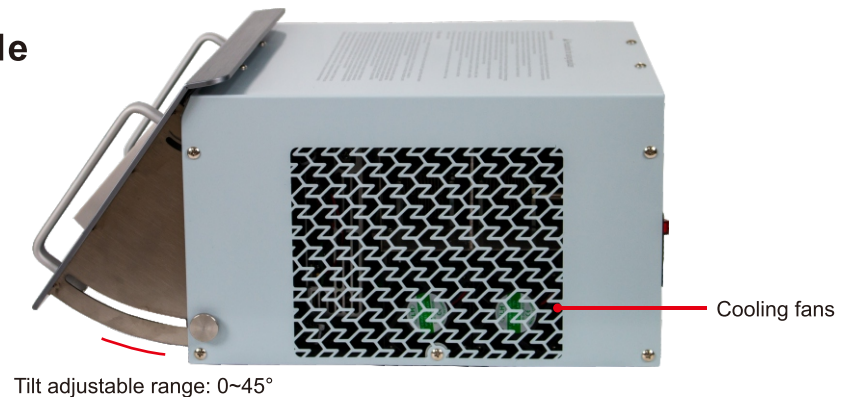
### Front



### Back

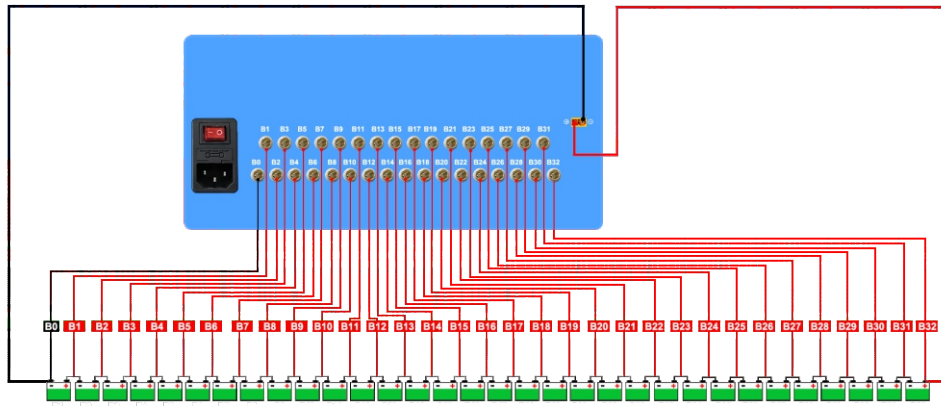


### Side

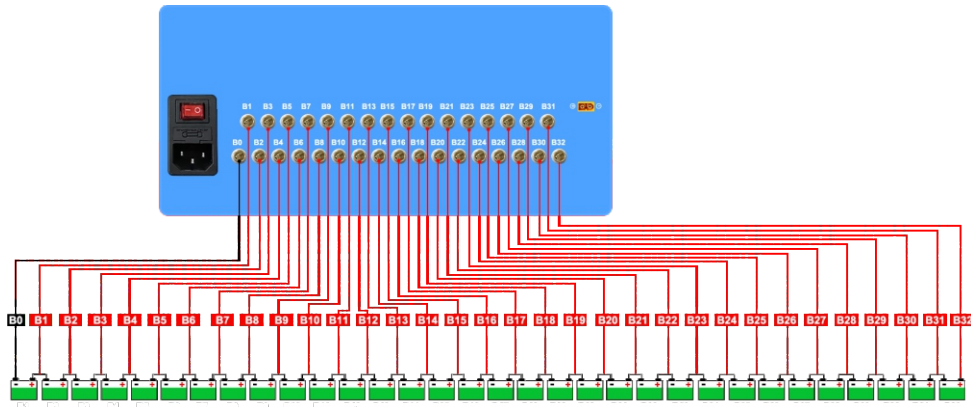


# Wiring Diagram

Wiring diagram of **charge** equalization mode



Wiring diagram of **discharge** equalization mode

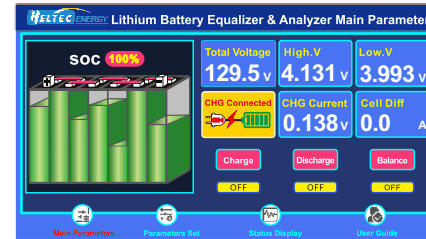


- ① Charge Overcurrent :It is in protected status when the charging current exceeds this value,and charging MOS is forcibly shut down.
- ② Discharge Overcurrent:It is in protected status when the charging current exceeds to this value,and discharging MOS is forcibly shut down.

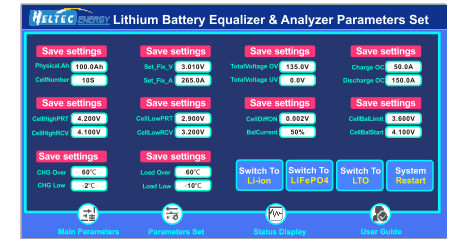
## Display interface

HT-CJ32S25A has four display modules(Main Parameters,Parameters Set, Status Display,User Guide)

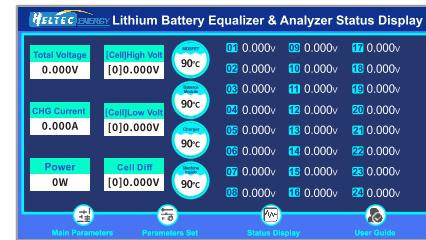
(一) Main Parameters Interface



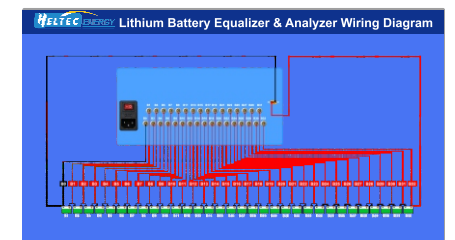
(二) Parameter Setting Interface



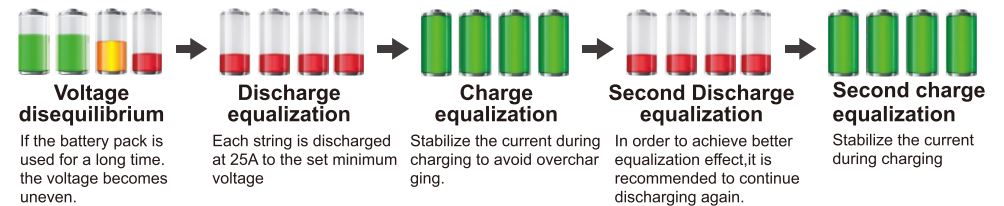
(三) Status Display Interface



(四) Wiring Diagram



## Equilibrium Principle





<b>Ternary Lithium Battery</b>	Set as the default parameter for ternary lithium batteries with one button
<b>LiFePO<sub>4</sub></b>	Set as the parameter for LiFePO <sub>4</sub> batteries with one button
<b>LTO</b>	Set as the parameter for LTO batteries with one button
<b>Number of Strings</b>	The actual number of strings of battery packs connected to the Equalizer & Analyzer.
<b>Balance Limit</b>	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.
<b>Equilibrium pressure difference</b>	Allowable differential pressure at the end of equalization
<b>Equalization current</b>	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.

- ① Choose the type of battery: ternary lithium, LiFePO<sub>4</sub> or LTO.
- ② Set the number of Strings: Enter the actual number of strings connected to the battery pack
- ③ Set the Balance Limit: Suggest setting this value to 0.5V lower than the minimum voltage of the single battery pack.

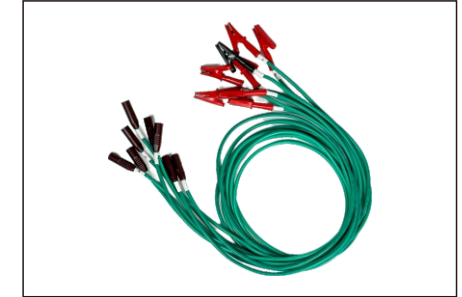
### The following parameters are factory adjustment and no need to adjust during normal use.

- ① 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.
- ② 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.
- ③ Single cell Overvoltage: It enters the protection state when the single battery voltage exceeds this value, and charging MOS is forcibly shut down.
- ④ Overvoltage Recovery: It is in unprotected status when the single battery voltage falls back to this value, and charging MOS will restart.
- ⑤ 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.
- ⑥ Undervoltage recovery: When the single cell voltage returns to this value, the protection state is released and the discharge MOS will restart.
- ⑦ 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.
- ⑧ 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.
- ⑨ 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.
- ⑩ 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.

## Connection Cable Switch

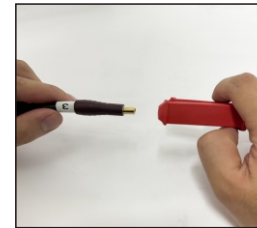


Large Clip

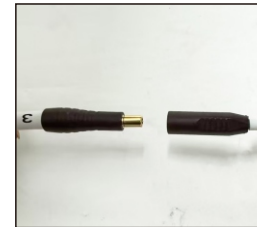


Extension Cord Clip

(The extension cord cannot be used for full power charging and discharging, and must be charged and discharged at 5A)



1. Unplug the clip from the connection cable (Large clips are installed by default when shipped)



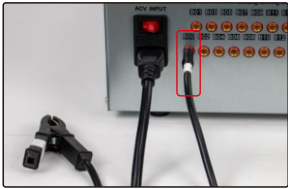
2. Install the extension cord with serial numbers and mark the order in which the cords are connected.



3. Pay attention to the hole position when plugging and unplugging, and do not plug and unplug blindly. This will cause the voltage collection needle to bend.

## Precautions for connecting the battery pack

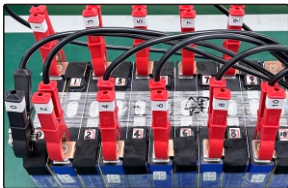
### Discharge equalization mode



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.



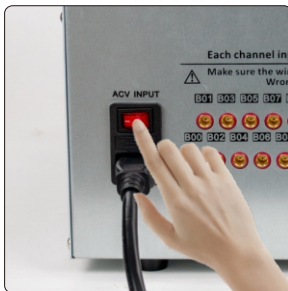
2. There are paste labels with string number at the cable clamp, please connect the battery packs in sequence (Black wire connected to the main negative electrode of the battery pack)



3. Make sure the battery wiring sequence is correct. Error correct will damage the machine.

## Installation start-up and operation instructions

### Installation and startup



1. Power-up: Press the “**—O**” button at the back of the machine to turn on the machine.



2. Please connected to the battery pack correctly.  
(Attention: Connect the equalizer interface according to the sequential labels on the cable)

**F** Charging capacity: Display charging capacity.

**G** Charging time: Display charging work time.

**H**

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

### Detailed parameter adjustment

**HELTEC ENERGY Lithium Battery Equalizer & Analyzer Parameters Set**

<p><b>Save settings</b></p> <p>Physical.Ah <b>100.0Ah</b></p> <p>CellNumber <b>10S</b></p>	<p><b>Save settings</b></p> <p>Set_Fix_V <b>3.010V</b></p> <p>Set_Fix_A <b>265.0A</b></p>	<p><b>Save settings</b></p> <p>TotalVoltage OV <b>135.0V</b></p> <p>TotalVoltage UV <b>0.0V</b></p>	<p><b>Save settings</b></p> <p>Charge OC <b>50.0A</b></p> <p>Discharge OC <b>150.0A</b></p>
<p><b>Save settings</b></p> <p>CellHighPRT <b>4.200V</b></p> <p>CellHighRCV <b>4.100V</b></p>	<p><b>Save settings</b></p> <p>CellLowPRT <b>2.900V</b></p> <p>CellLowRCV <b>3.200V</b></p>	<p><b>Save settings</b></p> <p>CellDiffON <b>0.002V</b></p> <p>BalCurrent <b>50%</b></p>	<p><b>Save settings</b></p> <p>CellBalLimit <b>3.600V</b></p> <p>CellBalStart <b>4.100V</b></p>
<p><b>Save settings</b></p> <p>CHG Over <b>60°C</b></p> <p>CHG Low <b>-2°C</b></p>	<p><b>Save settings</b></p> <p>Load Over <b>60°C</b></p> <p>Load Low <b>-10°C</b></p>	<p>Switch To <b>Li-ion</b>    Switch To <b>LiFePO4</b>    Switch To <b>LTO</b>    System <b>Restart</b></p>	

Main Parameters    Parameters Set    Status Display    User Guide



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

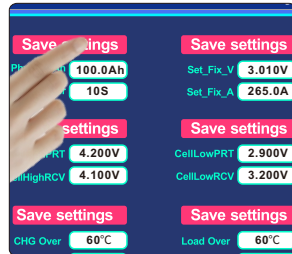
**Set parameters**



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

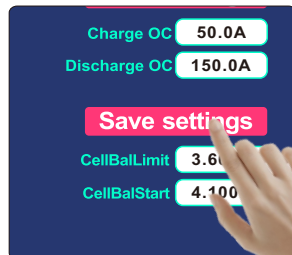


2. Click on "Parameter Settings" and select the type of lithium battery pack connected.



3. Enter the actual number of strings connected to the battery pack, and press the "Save settings" to save parameters.

**Discharge Equalization mode**

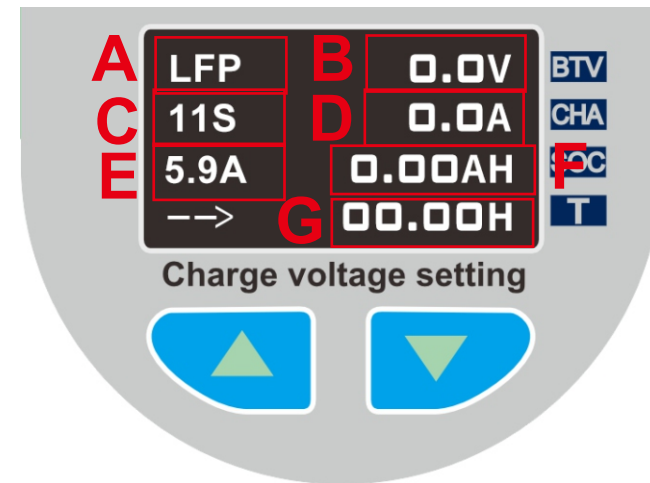


1. Set the "equilibrium limit" parameter according to the battery pack voltage. If the voltage is higher than the set value, the machine will automatically start discharge equalization.



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

**Charging mode**



**A Battery Type:** NCR(Li-ion)/LFP(LiFePO<sub>4</sub>), (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).



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 continuous 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" button and the machine will be in discharge equalization. The corresponding indicator lights will remain on until the discharge equalization is finished.

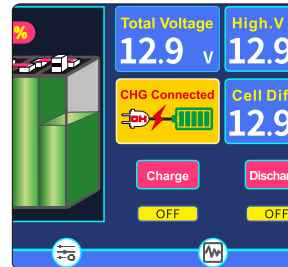


3. Press the "A MAX" button again, the button light will turn off. And the machine will switch to pulse discharge mode. **Before switching modes, please press the "STOP" button to stop the equalization work.**

### Charging Mode



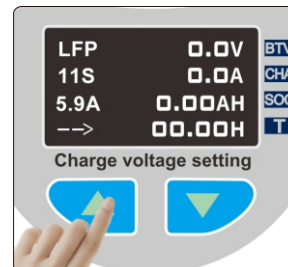
1. In charging mode, the total positive and negative poles of the battery pack must be connected to the equalizer.



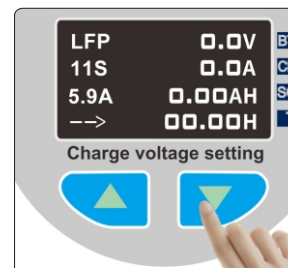
2. When the main display shows "Charging connected", the connection is successful.



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 suggest setting at 10-15A). If there is no operation for 2 seconds, the setting will be confirmed.