2~24/32-Cell Lithium Battery Module Smart Automatic Equalizer

Single channel 2~4.5V User Manual

（HTB-J24S/32S 15/20/25A）

Heltec Energy

Thanks for choosing series produces.It will bring you convenience and efficiency for battery capacity testing work.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!

1.Product Overview

The HTB-J24/32S15/20/25A is an intelligent balance and repair analyzer designed for 2-24/32-series lithium battery modules. Its single channel is suitable for lithium batteries with voltages range from 2 to 4.5V. The instrument supports maximum discharge currents of 15A/20A/25A. Employ high-frequency pulse discharge balancing technology, it offers three balance modes: manual balance, automatic balance, and charge balance. This device provides precise battery test and repair services for both battery manufacturers and end-users.

2.Product Features

Freely configure equalization modes to meet diverse application scenarios and usage requirements.

Automatically collect and analyze voltage data from each series of lithium battery cells, while simultaneously monitoring real-time voltage status of every individual cell during equalization.

Adjustable equalization current and power enable precise balance and repair tailored to different battery pack types.

The internal components are logically arranged and integrated with a heat dissipation system to effectively mitigate the impact of high-temperature environments on electronic components.

An automatic alarm will sound when the equalizer is improperly connected; the equalization indicator will only illuminate once the connection is successfully established.

3.Product model parameters

Technical Indicators	Product Model			
Type	HTB-J24S25A	HTB-J32S15A	HTB-J32S20A	HTB-J32S25A
Number of applicable battery strings	2~24S	2~32S		
Applicable battery types	LFP/NCM/LTO			
Maximum balanced current	25A	15A	20A	25A
Balance Parameters	Cell Over-voltage Protection：3.6V			
	Cell Over-voltage Recovery：3.6V			

of Lithium Iron Phosphate	Forced Equilibrium Voltage：3.6V	
	Balance cell voltage differences：0.005V	
	Cell Under-voltage Protection:2.6V	
	Equilibrium current proportion：5%~100%	
Balance Parameters for Ternary Lithium Batteries	Cell Over-voltage Protection：4.2V	
	Cell Over-voltage Recovery：4.2V	
	Forced Equilibrium Voltage：4.2V	
	Balanced Start-Up Voltage：4V	
	Balance cell voltage differences：0.005V	
	Cell Under-voltage Protection:2.7V	
	Equilibrium current proportion：5%~100%	
Balance Parameters for Sodium-Ion Batteries	Cell Over-voltage Protection：4V	
	Cell Over-voltage Recovery：4V	
	Forced Equilibrium Voltage：4V	
	Balance cell voltage differences：0.005V	
	Cell Under-voltage Protection:1.2V	
	Equilibrium current proportion：5%~100%	
Dimensions（cm）	36*29*17	
Weight（kg）	6.5	9.5

Product Application Scope:

Widely used in battery test and maintenance, it is suitable for applications such as consumer electronics repair, quality inspection, fault diagnosis, and aging tests.

4.Product appearance schematic

①	②	③
Battery Pack Negative Terminal Connection Port (Required for Charge)	Touchscreen display	Battery Pack Input Port
④	⑤	⑥
Main power switch	Balance Confirmation Button	Charger Negative Terminal Port

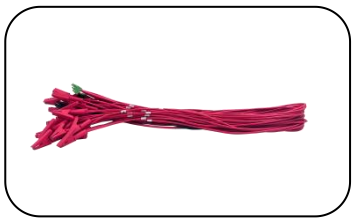
***Product List：**

Equalizer *1

Adapter cord *1

Equalizer transfer plate *1

Fixture line *1



Battery pack connection line *24

(Optional) Charger

5.Work Mode Explained

1. Manual Equalization (belongs to high-frequency pulse discharge equalization)

Set the voltage manually. When the equipment is in normal condition, click "Manual Equalization" to modify the "Voltage Value" (the set value must be within the valid range of the current type of battery). Click "OK" to achieve discharge equalization up to this set value, and make all the series voltages consistent with the set value.

2. Automatic Equalization (belongs to high-frequency pulse discharge equalization)

Automatic equalization is suitable for low-speed vehicles and small-capacity battery groups. The power is 5% - 30%. Operation: In normal equipment condition, click "Automatic Equalization". The equalizer automatically identifies the highest voltage and the lowest voltage. Take the lowest voltage as the standard, the voltage that is high is lowered and the voltage that is low is kept consistent.

3. Charge Equalization (needs to be used together with a variable power supply)

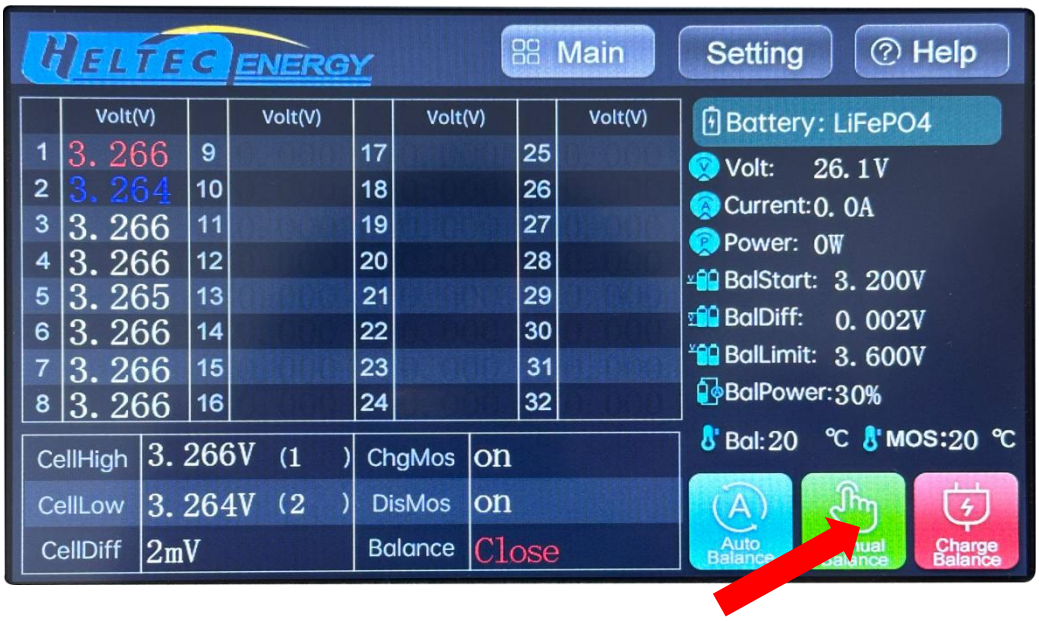
During charging equalization, the "Battery Total Negative Terminal" on the front panel of the machine must be connected to the total negative terminal of the battery group. The negative terminal of the charger is connected to the "Charge Negative Terminal" on the front panel of the machine. The positive terminal of the charger is connected to the end line clamp positive terminal of the battery batch. Before entering the equalization state, the charge current must not exceed 25A. When the equalization starts (When lithium iron phosphate reaches 3.450V / When ternary lithium reaches 4.00V), the charge current does not exceed 5A. A small current constant voltage equalization effect will be better.

For example:

Capacity ≥ 20Ah: Equalization current can be set to 10–20A (high-power rapid equalization).

10Ah ≤ Capacity < 20Ah: Equalization current recommended at 5–10A (medium-power balance for efficiency and safety).

Capacity < 10Ah: Equalization current must ≤10A, recommended at 3–5A (low-power protection for small-capacity batteries).



Select the appropriate balance method based on battery type:

1. Automatic Balance: Choose automatic balance for battery strings that can be fully balanced in a single session.

2. Manual Balance: Opt for manual balance when multiple strings require batch balance. Set each batch manually to the lowest value within the string group.

3. Charge Balance: Due to the concentrated energy density of lithium iron phosphate batteries, charge balance yields optimal results. This method can be used in conjunction with an adjustable power supply.

Device Features:

4. Automatically identifies the highest/lowest voltage strings within the battery pack and dynamically adjusts the balance strategy. Manual mode supports customizable balance voltage values for precise control of each cell's voltage.

5. Efficient Energy Transfer: Utilizes high-frequency pulse technology to minimize heat buildup during balancing, enhancing efficiency. Supports high-current balance (25A) to reduce balance time, suitable for large-capacity battery packs.

6. Multi-Layer Safety Protection: Reverse Connection Protection: Automatically detects battery polarity to prevent reverse connection damage.

Over-voltage/Under-voltage Protection: Halts balancing and triggers an alarm when thresholds are exceeded.

Balance Cable Disconnection Alert: Continuously monitors connection status and issues warnings during anomalies.

Emergency System Shutdown: Automatically cuts output during sudden failures to ensure safety.

7. Data Monitoring and Logging: Displays critical parameters in real time, includes cell voltage, total voltage, and balance current. Facilitates analysis of battery pack performance trends.

6.Device Connection and Usage Instructions

Precautions Before Use:

1. Maintain ambient temperature and humidity during operation.

2. Keep the air intake unobstructed with at least 5 cm of clearance.

3. Ensure the exhaust outlet remains clear with at least 5 cm of clearance and free from debris.

Device Startup Procedure:

1. Connect the 12V power adapter, press the power button, click Continue, select the lithium battery type, click OK, choose the number of strings, and use the numeric keypad to input the required number of strings. For example, if the current battery pack has 20 strings, enter the number 20 here. After inputting, click Confirm. Select the appropriate equalization power based

on the connection method: choose 30% power for adapter boards, or 50%-100% power for clamp connections. After selection, click Confirm and proceed to the next step.

Battery Connection Steps:

Step 1: Verify the battery pack voltage is between 2V-4.5V per cell, with total voltage ≤120V (24S)/135V (32S).

Step 2: Turn off the equalizer power supply. Connect the battery pack to the equalizer input terminals according to the manual.

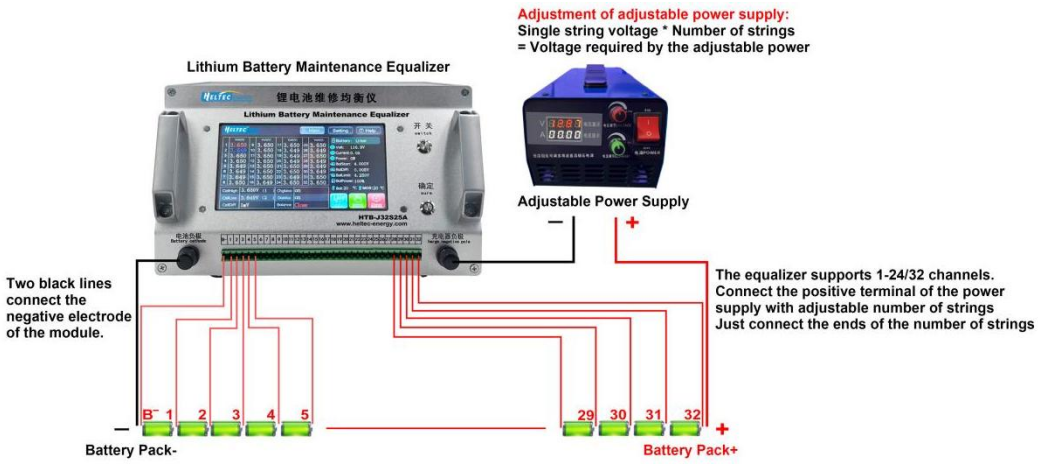
Step 3:

The B- black terminal clamp connects to the battery pack's common negative terminal. B1 connects to the common positive terminal of the first battery string, B2 connects to the positive terminal of the second string, and so on. Verify the displayed voltage is correct after connecting each string. When using battery clamps, ensure a firm grip—especially when clamping thin nickel plates—as poor contact directly affects voltage display and balancing accuracy.

Step 4: Connect to 220V power and power on. Only after correctly configuring the actual battery type, number of strings, and connection method can you enter the main interface. Upon enter the “Main Interface,” immediately verify the accuracy of all displayed data. The charging and discharging statuses should show “On.” If wiring is incorrect, “Equalizer Line Disconnected” will appear. Check the voltage of each individual cell in each string to identify the abnormal position and re-adjust the wiring correctly.

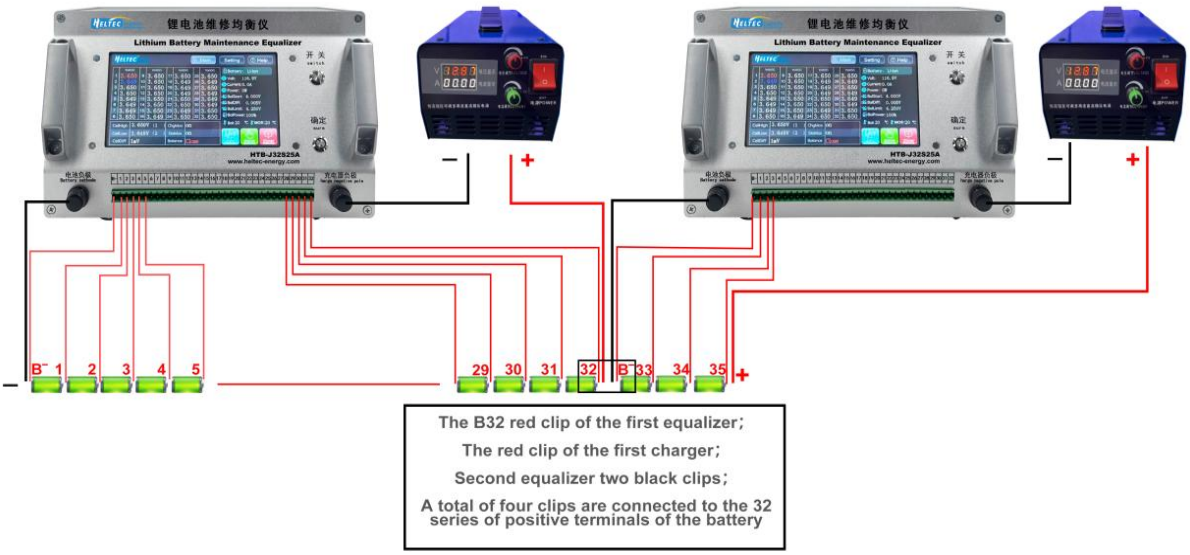
Step 5: After restarting and confirming both “Charging Status” and “Discharging Status” display “On,” press the “Balance” button on the front panel of the equalizer (indicator light illuminates when activated) to initiate balance. Activate the ‘Balance’ button while in the “Balance Line Disconnected” state may cause device damage.

Charge Balancing Connection Method

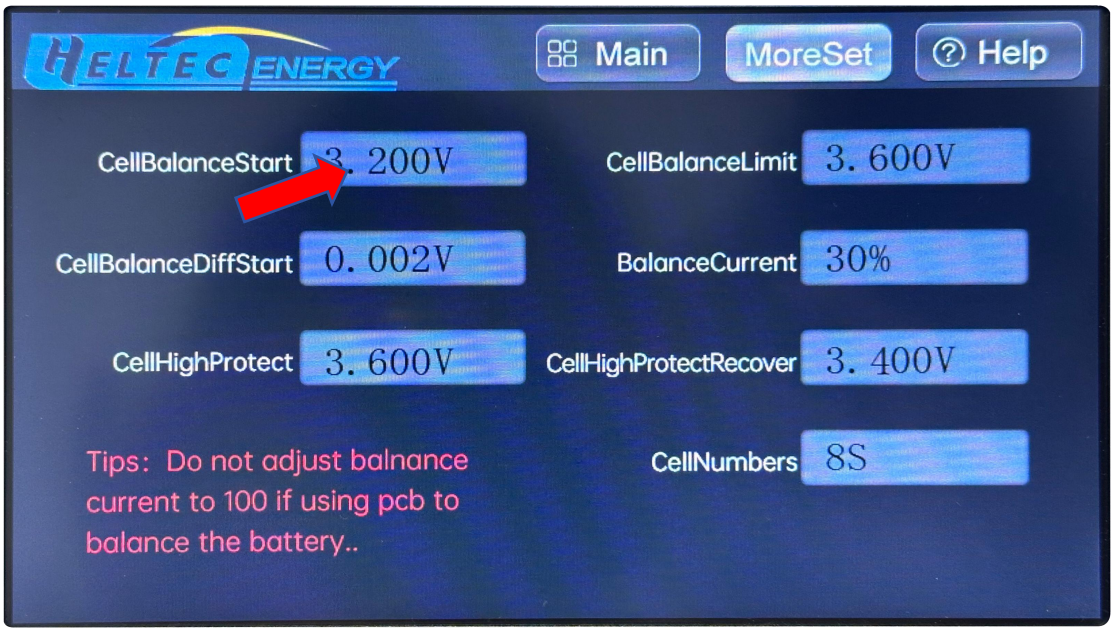


When using the equalizer wiring alone, the blue power supply can be left disconnected.

Equalizer Cascade Method

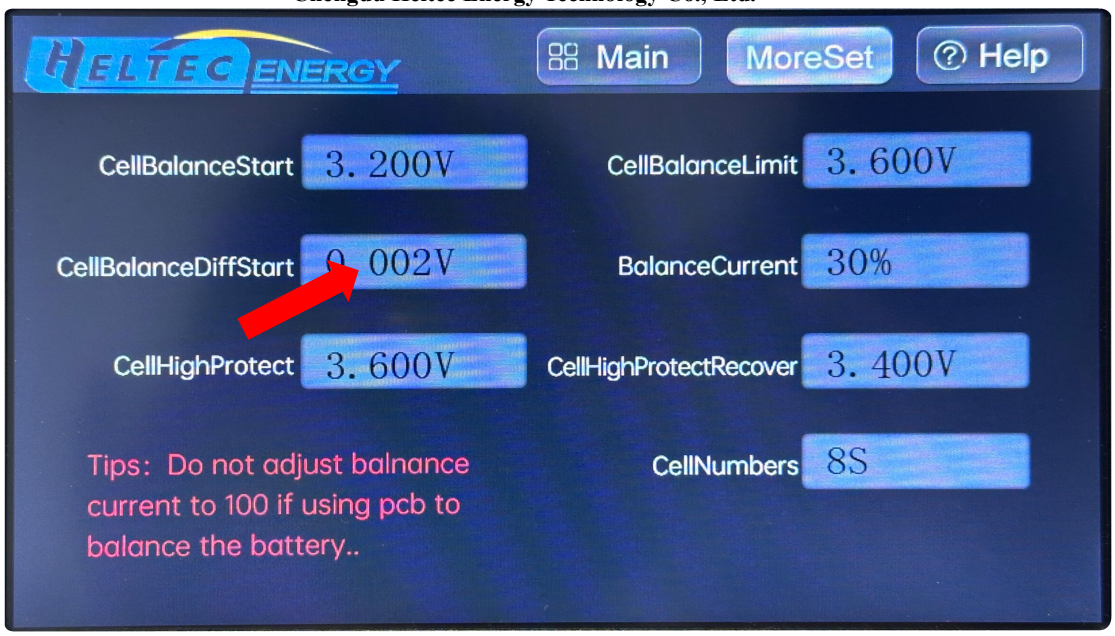


Parameter Settings Instructions



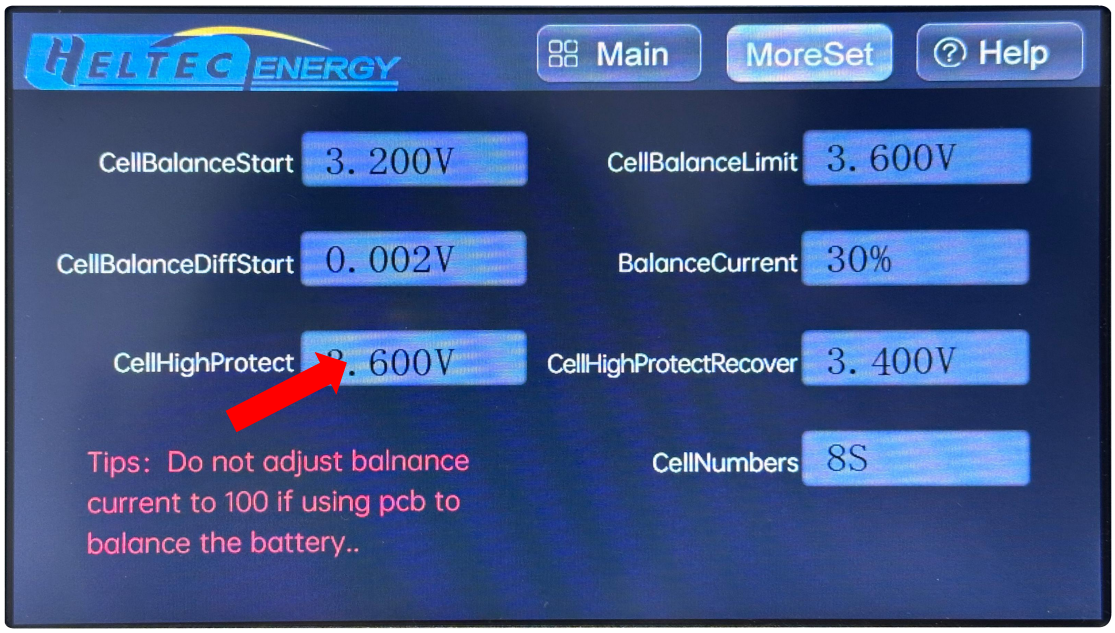
Cell Balance Start Setting:

During charging equalization, you can set the voltage level at which the equalizer activates. Typically, this is set to the lowest voltage in the series string to initiate equalization early, allowing the equalizer to quickly resolve voltage imbalances. This parameter does not need to be set for discharge equalization.



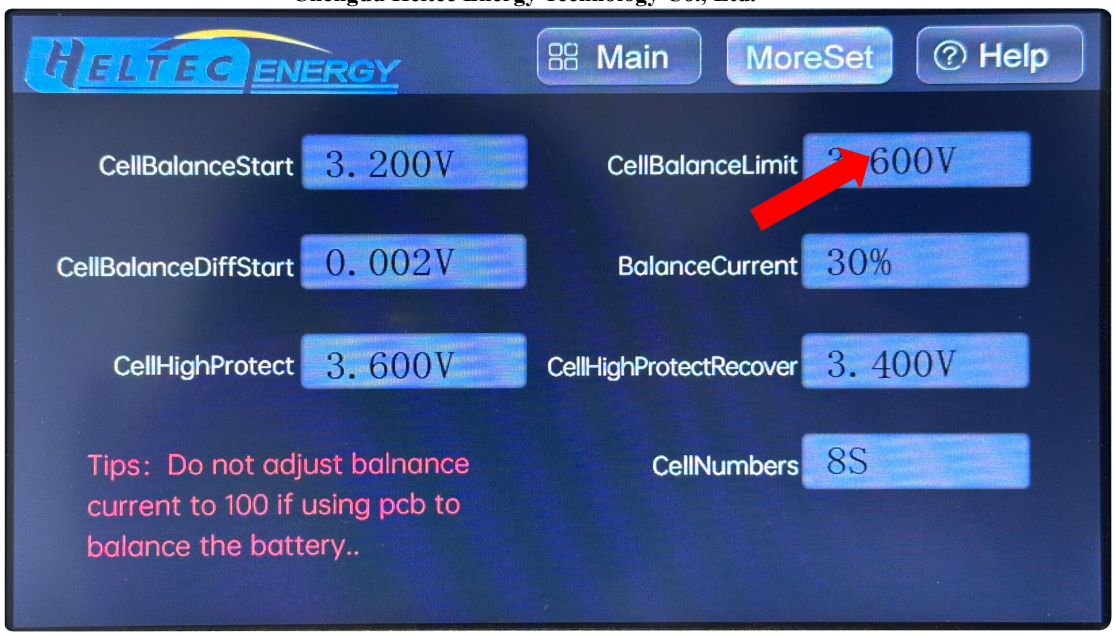
Cell Balance Diff Start setting:

The default settings are generally not modified.



Cell High Protect Setting:

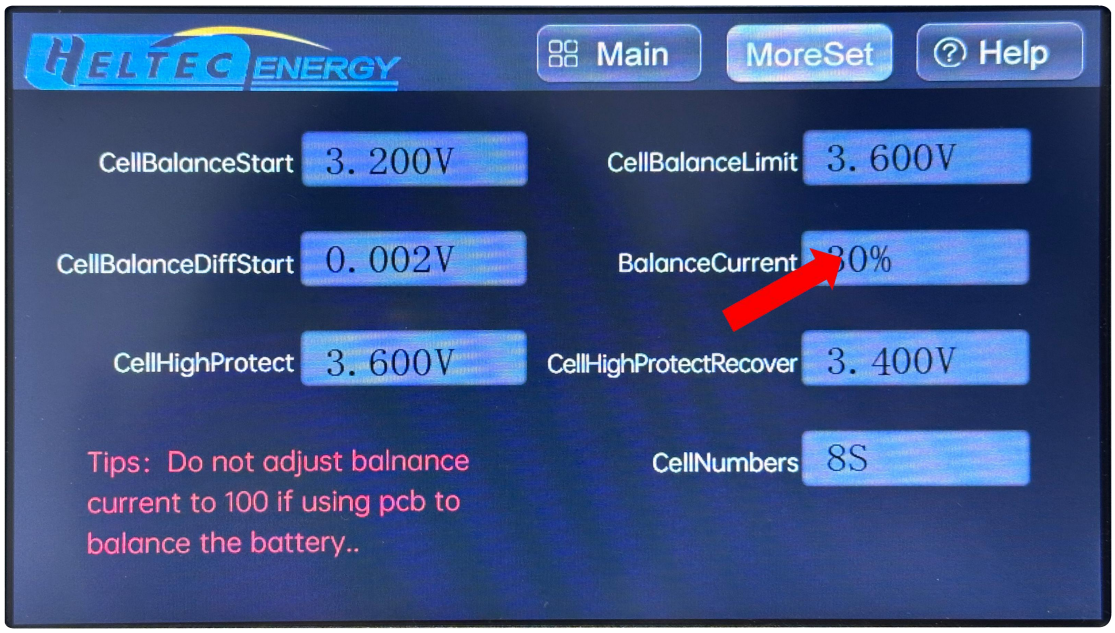
When performing charge balancing, you can set the voltage level at which charging should stop. (Regardless of battery type, charge balancing causes voltage drop when the charger disconnects. Higher charging power results in greater voltage drop, so it's advisable to set this parameter 10-20 millivolts higher.)



Cell Balance Limit Setting:

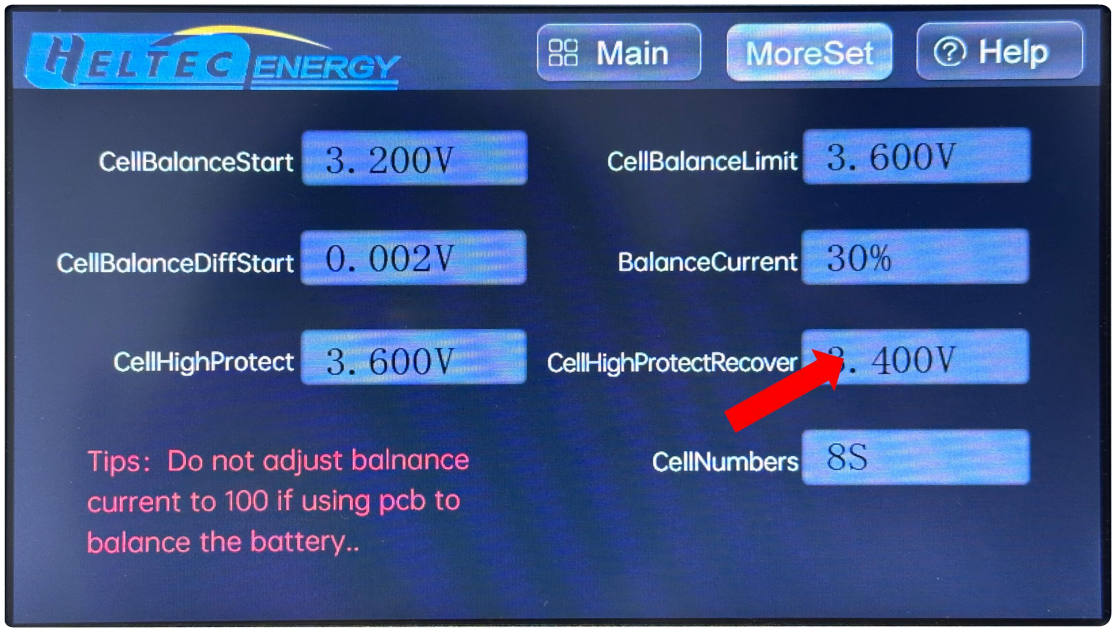
This parameter setting controls the forced discharge voltage. To achieve a specific balancing voltage, configure this setting. Regardless of conditions, after setting the balancing voltage in "Balancing Settings," return to the main interface and press the "Manual Balance" button to initiate discharge balancing for the battery pack. (This setting must fall within the battery's valid voltage range. Never exceed or fall below this range, as doing so will cause the battery to over-discharge.)

Note that during charge balancing, the Cell Balance Limit value must be greater than the Cell High Protect value. Doing so will cause the charger to force charge while the equalizer forces discharge, leading to a conflict between the two devices and potential damage to the equipment.



Balance Current Setting:

Power adjustment for the equalizer: Select the corresponding current ratio based on the connector. Minimum 5%, maximum 100%. Power can be increased in cumulative 5% increments: 5%, 10%, 15%, 20%, 25%, 30%----------100%.



Cell High Protect Recover Setting:

During charge balancing, the charger automatically disconnects when the set voltage value is reached. When the battery voltage drops back to the preset parameter value, charging will restart. This value is typically set by default and should not be modified.

Charge Balance Instructions:

1.Adjusting the power supply voltage: For example, if I want to charge each string to 3.7V, click “Parameters” to set the balance voltage to the lowest value across all strings. Check the minimum value—currently 3.648V—so we input 3.648V and confirm. If I want to charge each string to 3.7V, set the balance voltage, overcharge protection threshold, and overcharge recovery threshold all to 3.7V.

Confirm and return to the main menu. Now adjust the power supply voltage. For example, to charge all batteries to 3.7V, with 32 battery strings: 3.7V multiplied by 32 equals 118.4V. The voltage can be set slightly higher, so in this case we can set it to 119V. The voltage can be a bit higher but not too low. Now turn the left current knob all the way down. As the voltage drops, turn it back up one full rotation. Flip the DC switch on the back. Now we can set the current. 5A is better; don't make it too high. When a voltage difference appears, balancing starts automatically. When the voltage difference disappears, it stops automatically.

2. Initiate Equalization

Press the “Equalization Confirm” button to start. The device automatically detects the battery pack status and begins equalization.

Real-time data can be monitored via the LCD screen during the equalization process.

3. Operation Completion

Upon completion of equalization, the device automatically stops and emits an audible alert.

Wait until the cooling fan stops operating before disconnecting the battery pack.

7. Important Notice

1. When configuring settings, select an equalization mode matching the battery type or corresponding voltage settings. Failure to do so may damage the battery module, and the user shall bear full responsibility for any resulting damage! (Ternary lithium batteries: 2.8V; Lithium iron phosphate batteries: 2.5V)

2. When connecting the equalizer to the battery module, ensure the battery pack polarity and sequence match the equalizer's input requirements. Incorrect connection may damage the equalizer and, in severe cases, cause internal components to ignite.

3. For battery modules with capacities below 10AH, safety considerations and balancing accuracy require setting the balancing current below 10A.

4. Personnel must monitor both the instrument and battery modules throughout the balancing process. Unattended operation is strictly prohibited.

Warranty Regulations

Warranty service period is 1 year.

The warranty service is limited to normal use: man-made damage, self-disassembly, modification and repair, use not in accordance with the instructions, and damage caused by external force majeure factors are not within the scope of free warranty.

Accessories such as test fixtures are consumables without warranty.

When you need warranty service, please contact your dealer for processing. If you cannot contact the dealer, you can contact our company by email or phone.

There are no after-sales service stations in other countries except China. If you need warranty service, please send the product to us for free repair, but you need to pay the freight for the round trip.