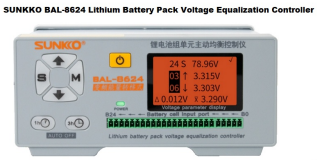


SUNKKO BAL-8624 Lithium Battery Pack Voltage Equalization Controller User Manual

Contents

SUNKKO BAL-8624 Lithium Battery Pack Voltage Equalization Controller

Product Information

Specifications

- **Supports:** 2~24S lithium battery packs
- **Maximum** Equalizing Current: 8A
- **Equalizing** Voltage Difference: Up to 30mV
- **Equilibrium** Current at 0.8V difference: 8.03A

Product Usage Instructions

Setup and Connection:

- Ensure the analyzer is powered off before connecting it to the lithium battery pack. Connect the appropriate terminals of the analyzer to the battery pack according to the specified polarity.

Power On and Initialization:

- Power on the analyzer and wait for it to initialize. The LCD screen will display information about the connected lithium battery pack.

Real-time Monitoring

- The analyzer will continuously monitor the voltage of each unit of the lithium battery pack in real time. The collected data will be processed and displayed on the LCD screen for analysis.

Equalization Process

- If an imbalance is detected in the voltage levels of the battery cells, the analyzer will automatically initiate the equalization process. The forced start switch can be used to manually trigger equalization if needed.

Frequently Asked Questions (FAQ):

Q: What types of battery packs is the analyzer suitable for?

- **A:** The analyzer is suitable for high-capacity ternary lithium battery packs and lithium iron phosphate battery packs, among others.

Q: What is the maximum equalizing current supported by the analyzer?

- **A:** The analyzer supports a maximum equalizing current of 8A.
- Thank you for choosing SUNKKO series products, they will bring you convenience and efficiency for spot welding work.
- For optimal user experience, please read the manual carefully before using it and keep it for future reference.
- SUNKKO has the rights to upgrade the machine and modify the manual with no more notices, thanks for understanding.

Product Overview

- BAL-8624 equalizer controller adopts high-frequency transformer inversion and equipotential isolation coupling energy technology to realize the parallel connection of each series of batteries through equipotential isolation coupling.
- Based on the parallel connection state, each series of batteries with different high and low voltages realize energy transmission and distribution and finally realize the high-efficiency and precise balance of the battery pack.The Taiwan main-control chip MCU combines with the ultra-low dynamic impedance inverter to obtain the more than 8A balanced current. The precise transformer process and fully symmetrical circuit design can achieve a balanced effect
  of ≤ 30mV.
- The analyzer adopts the latest large-scale high-speed MCU chip of American microchip to carry out real-time precision detection of each unit of the lithium battery pack.
- The voltage information collected by the chip is stored calculated and compared, and the data is processed and displayed on the LCD screen detector can detect the voltage of up to 24 series of lithium batteries at the same time and automatically analyze and compare the voltage. Real-time monitoring equalizing voltage.
- It is suitable for high-capacity ternary lithium battery packs lithium iron phosphate battery packs, etc.
- The maximum equalizing current can reach 8A, and the equalizing voltage differencecan reach 30mV; Forced start switch is added to better solve the problem of poor equalization effect.

Product Features

1. Automatically analyzing the maximum voltage difference value and the average voltage value of the battery pack. When balancing, it can quickly detect the voltage of each string of the battery pack.
2. Voltage difference analysis and equalizing voltage dual function.
3. Equipped with a multi-mode intelligent voltage detection display, it can monitor the working progress of battery pack repair in real-time.
4. Nano amorphous isolated fully symmetrical transformer ensures the minimum voltage difference
5. American ultra-low internal resistance MOS devices constitute an ultra-low dynamic impedance inverter circuit. Achieve high power balance.

6. The control and management of intelligent MCU chips realize automatic self balancing;
7. Automatically detect the minimum voltage of the battery, stop working when the battery energy is low, and protect the battery from power loss;
8. Overcurrent fuse resistance at each series input end to ensure safety;
9. 1h/3h/4h time-limited equalization time adjustable;
10. Heat dissipation design of inverter under extreme equilibrium state of high voltage difference.

BAL-8624

Product name	**Lithium battery pack voltage equalization controller**		
Power supply	AC 11OV~220V	**Applicable battery strings**	2~24S
Type of battery	Ternary lithium Lithium iron phosphate	**Equalizing current**	0~8A
Equalization effect	: S30mV	**Interface**	3.81 Interface
Equalization duration	1h/3h/4h	**Equalization mode**	Parallel energy transfe r mode
Low voltage automatic s hutdown	2.7V(2.5V)/S	**Voltage high precision test range**	0.5~5V
Range of battery pack's t otal voltage	100.8V	**Setting an alarm for low vol tage of the battery**	0.5~5V
Setting alarm for high vo ltage of the battery	0.5~5V	**Setting alarm** for **voltage's maximum difference**	0.5~5V
Minimum voltage detecti on resolution	0.001V	**Precision of testing voltage**	±(0.1%RD+0.1%FS)
Voltage sampling rate	1000 times/S	**Screen refresh rate**	10 Times/$

Application range

It is especially suitable for all scientific research institutions, lithium battery dealers, battery production units, and battery protection system production units to carry out outdoor detection and on-site analysis of multi-string battery voltage, maintenance of electric vehicles, electric tools, battery pack manufacturers, power battery pack maintenance, etc.

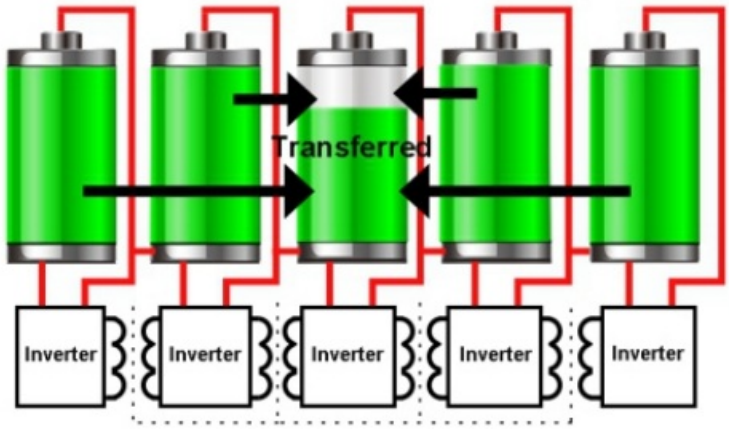
Working principle

Equalization principle:

- High voltage energy is transferred to low voltage parallel transmission at the same time to realize battery

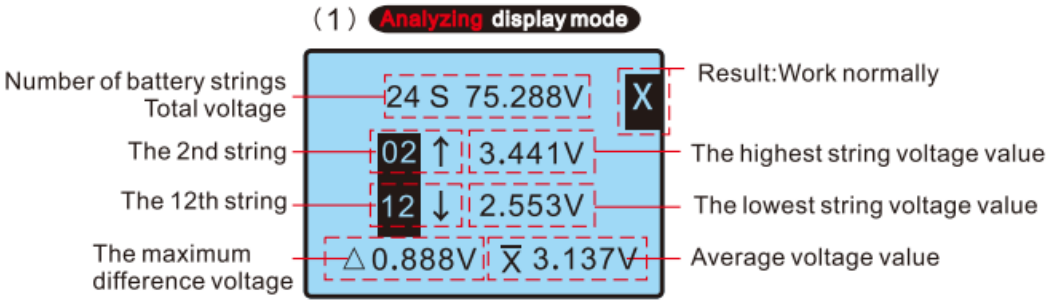
voltage balance.

Sketch:

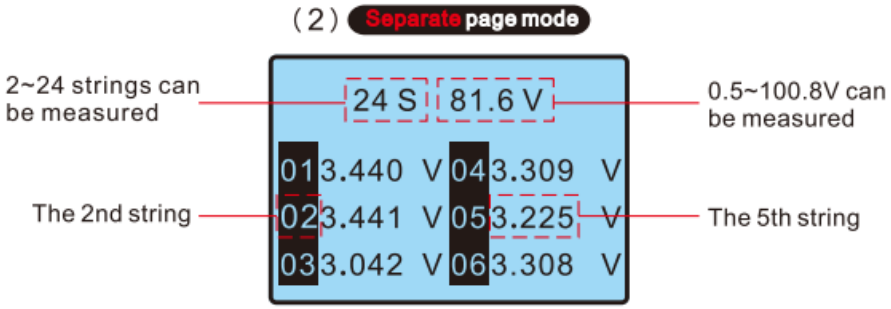


Voltage analysis interface

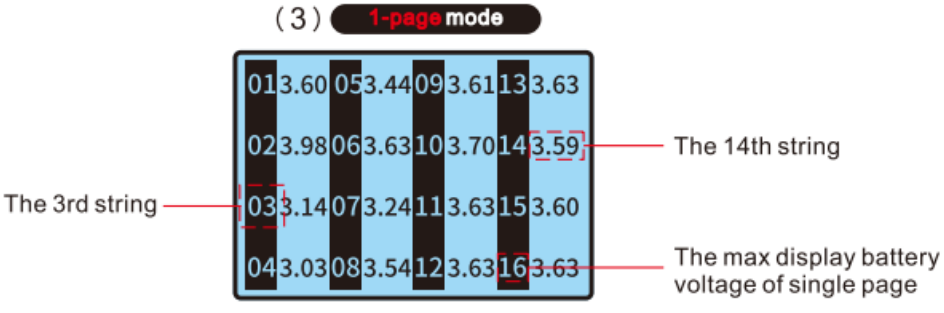
- The BAL-8624 instrument has three display modes.
- Press the “M” key to switch mode.



Analyzing display mode is the POWER-ON default mode



Press the “M” key to switch.



Press the “M” key again to switch.

How to set an alarm for safety parameters?

Switch to analyzing display mode

- Continuously press the “S” key, and set the high/low voltage and differential voltage by the ⬆⬇.
- If the set value is exceeded, it will alarm.

How to calibrate voltage Switch to calibration voltage interface

- Continuously press the “S” key switch to the cal-voltage interface, according to the test data of multimeter, and adjust the voltage by the⬆⬇ key.
- Before delivery the instrument has been calibrated, that’s not 0mV.

- **Example:** If the BAL-8624 controller tests the 2nd string voltage is 3.58 V, but the multimeter test result is 3.65V, that needs to press the key to reduce 70mV, don’t care about the “‡” signs.

How to set the alarm and silence?

- Press the “S” key switch to analysis mode, press the⬆⬇ key to set the high and low voltage values, and the setting alarm for the voltage’s maximum difference. When the set value is exceeded, it will alarm

- Continuously press the “S” key switch to voice, and press the ⬆⬇ key to set.

Battery pack descending string cable diagram

- Wiring from the total negative electrode BO in sequence.
- According to the following line sequence diagram

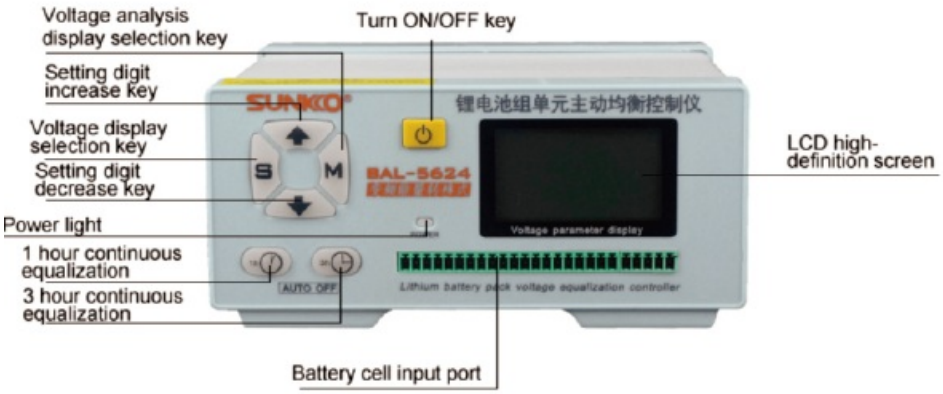
24S wiring diagram

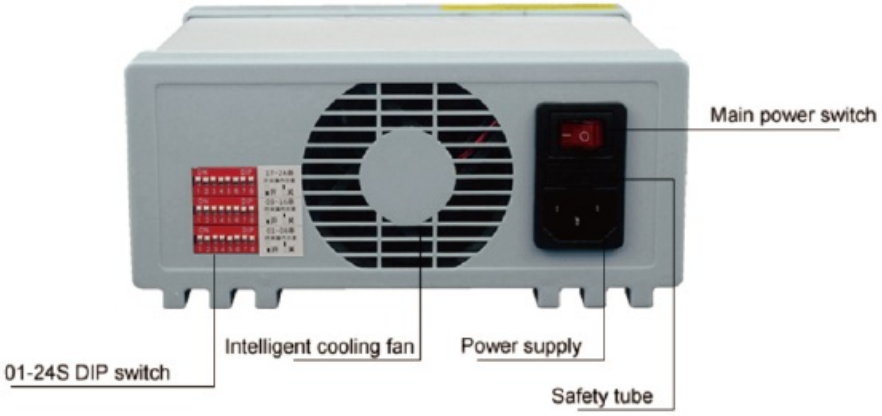
13S wiring diagram:

- Wiring from the total negative electrode BO in sequence.
- According to the following line sequence diagram. The rest of the vacant ones are not connected.

Product diagram

Functional Controlled Panel





Three equalization durations are available

1. 1-hour balance duration
2. 3-hour balance duration
3. 4-hour balance duration

Press the "1h" button
The red light flashing

Press the "3h" button
The red light flashing

Press the "1h" "3h" button. The red light flashing.

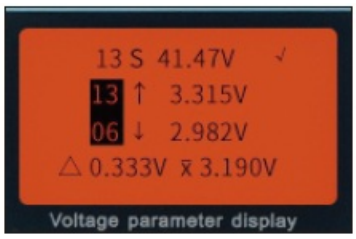
- **Note:** If the ternary lithium battery is lower than 2.7V / lithium iron phosphate battery is lower than 2.5V, the active equalization board does not start the equalization work.
- **Suggestion:** Since the high voltage battery is balanced by energy transfer to the low voltage battery, the voltage of each string of the balanced battery pack needs to be greater than 3.2V for better effect.

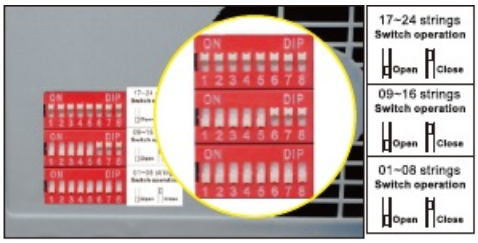
How to set the DIP switch

- Before use, be sure to connect the terminals after the correct wiring, and then according to the battery pack string number, turn on the DIP switch corresponding to the string number on the back of the balance controller.
- Otherwise, the string number will be displayed abnormally or the screen display will be garbled. The wrong or

reverse connection of the line sequence will directly damage the balance controller.

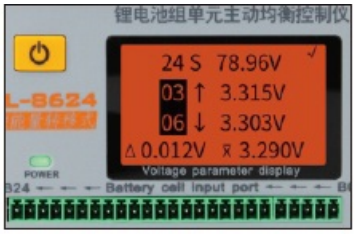
- **Correct operation** Correctly display the voltage of each string.

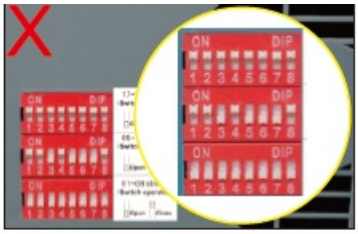


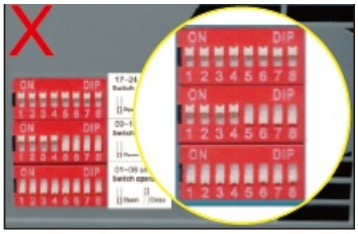


Wrong operation

- Wrong operation the string number will be displayed abnormally or the screen display will be garbled.







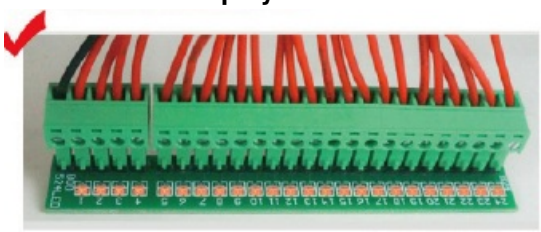
Test line sequence

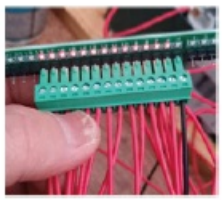
Line sequence detection board

Attention

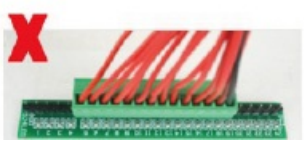
- Before connecting the equalizing board, be sure the wiring sequence is correctly used by the line sequence test board.
- The wrong line sequence will lead to damage to the equalizing board.
- In that case, the board cannot be returned and replaced. Please pay attention

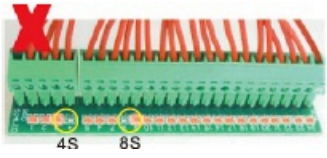
Line sequence correct connection display





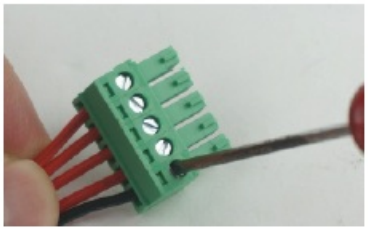
- When the positive and negative wire sequence of the battery pack is correctly connected, the corresponding LED light is red.



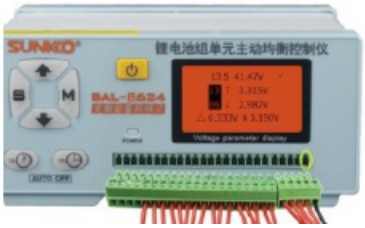


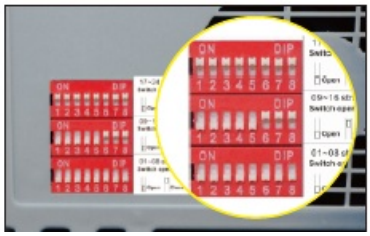
- Reverse polarity display
- When the sequence connection of two strings of wires is reversed, it shows the balanced arrangement of wires.

Operation instance



- Connect the wire to the socket
- Connect the positive pole of the of 3.81 and pay attention to the battery pack in line sequence. locking crow
- Be sure the wiring sequence is right used by the line sequence test board.






- Connect the instrument, pay attention to the interface BO connect the negative pole (black).
- Turn on the DIP switch corresponding to the string number on the back of the balance controller.
- Press the main switchback of the balance controller.

- Press the ⏻ to turn on the balance controller.
- Press the “M” key to analyze the differential voltage.
- Press the 1h 3h button at the same time. Start 4 hours balance duration. The red light flashes.
- After 4 hours of equalization, detect the voltage, if the voltage difference is not satisfied.
- That can press 1h 3h again to continue equalizing. If the battery pack capacity is above 50AH, that needs to repeat equalization 2-3 times.

- The minimum voltage difference after equalization is related to the equalization time.
- The longer the equalization time is, the smaller the pressure difference is;
- The minimum voltage difference after equalization is related to the battery’s internal resistance, connecting line resistance, and connector resistance.
- The smaller the resistance is, the smaller the pressure difference is.

Attention

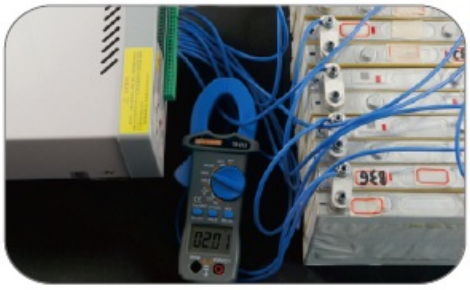
- This product can charge and equalize at the same time when the charging current is less than 8A.
- If the charging current is greater than 8A, it is not recommended to charge while equalizing. Otherwise, the instrument will be damaged.

Noted in operation

1. Please connect the battery pack with the equalization controller correctly. Please follow the manual instructions to test voltage within the range. Otherwise, the instrument will be damaged.
2. Please make sure to follow the instructions about voltage within the range when the tester is supplied by external power.
3. Do not connect more than one battery pack to test.
4. Please turn off the power when using the inner power supply after testing.
5. Please disconnect the instruction with the battery pack when not testing to avoid energy loss.
6. Please make sure the connection is correct to avoid loose contact. and that the testing voltage is within the range.
7. Please do not use it in flammable areas or steam areas.
8. Please keep dry to reduce fire and electric shock.

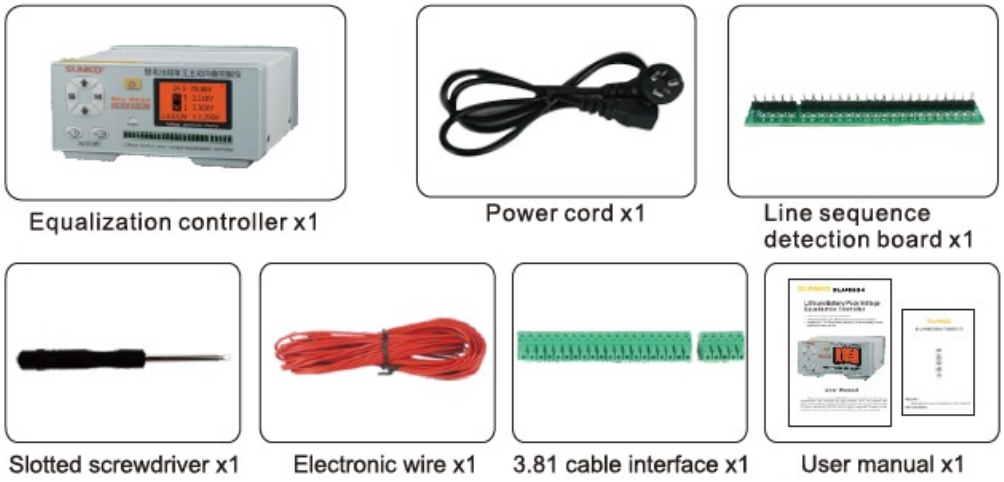
Equalizing current measurement

- The voltage difference is 0.8V, the equilibrium current is 8.03A.
- The voltage difference is 0.1V, the equilibrium current is about 2.01A.



- Do not use the protection board line directly! Because the line of part of the protection board is only 0.1 square and is a signal line, the current can not exceed 2A.
- If it’s directly connected to the equalization board, it will be easy to overheat because of the large current, which has potential safety hazards.
- Equalizer boards using 8A must be rewired and the wire must not be less than 0.5 square.

Packing list



Explanation of equalizing current, equalizing time, equalizing connection, and equalizing minimum differential pressure

1. The equalization current is marked on the equalization module and the equalizer is the maximum current that can be output or absorbed by the product, and it is also the maximum current allowed to flow through the chip on the product.
2. When the equalizer is used to equalize the battery pack, the equalized current is affected by the following factors:
    1. Internal resistance of battery pack;
    2. Resistance of connecting cable;
    3. Contact resistance of connector;
        - The voltage difference between battery cells (unbalanced condition)
        - **A:** The smaller the internal resistance of the battery pack, the greater the equilibrium current
        - **B**: The smaller the resistance of connecting wires and connectors, the greater the equilibrium current

          C: The greater the voltage difference of the battery, the greater the equilibrium current
    4. **current test conditions:**
        - Voltage difference between batteries ≥ 0.5V, connecting line battery < 8m ® (single wire)
        - The internal resistance of the battery is ≤ 15m Q, connector resistance is < 4m 0
3. **Measurement method of equalizing current:**
    - Since the equalizing current is affected by the loop resistance, the loop resistance will be increased and the equalizing current will be reduced when the ammeter is connected, so the access ammeter is not recommended.
    - In addition, disconnecting the equalizing line during normal equalizing operation will lead to the risk of battery short circuits and damage to the equalizer.
    - Therefore, the test current can only be measured by the DC Clamp ammeter.
4. **Equilibrium time correlation**
    - **A:** Under the condition of the same internal resistance of the battery, if it can work in equilibrium with the maximum current, the time will be shorter, and the smaller the resistance of connecting line and connector, the shorter the time will be.
    - **B:** The equalization time of the high-capacity battery pack will be longer.
    - **C:** The smaller the equalizing voltage difference, the longer the time.

- **D:** In the final stage of equalization, the voltage difference is very small, so the current is also very small, this period takes a long time.
- **E:** When active continuous online equalization is adopted, the equalization state is ideal, and the battery voltage difference can also be controlled between 30mv-80mv. You don't need to pay attention to time in this way.

About the connection of equalizer and battery pack:

1. The connection mode of the connector on the equalizer product is based on the convenience of users' installation and use. However, because the connector has a contact resistance of 3~10m2, each string of batteries will increase 2×3~10=6~20ml, which will greatly reduce the equalization current. Therefore, it is recommended to cancel the connector and connect it directly with wires;
2. A larger cross-sectional area and shorter connection shall be adopted as far as possible for the connecting wire between the battery pack and the battery pack;
3. When direct wire connection is adopted, one end of the equalizer must be welded first, and the battery pack end shall be connected (welded) when it is firmly welded. Pay attention to prevent short circuit between wires during operation!
4. To obtain a larger balanced current value, it is recommended to use 0.5mm / A when selecting the connecting wire. If the equalizer is far away from the battery pack and needs to be extended, the conductor section needs to be increased proportionally.

About the voltage difference between battery strings after equalization:

1. The minimum voltage difference of the 24 series design is ≤30mV (actually15~20mv);
2. The minimum voltage difference after equalization is related to the equalization time.
    - The longer the equalization time is, the smaller the pressure difference is;
3. The minimum voltage difference after equalization is related to the battery's internal resistance, connecting line resistance, and connector resistance.
    - The smaller the resistance is, the smaller the pressure difference is.

About the voltage difference between battery strings after equalization:

- The BAL-8624 battery voltage equalizer adopts the high-frequency transformer reversion and equipotential isolation coupling energy mode to realize the parallel connection of each series of batteries through the equipotential isolation coupling mode.
- Based on the parallel connection state series of batteries with different voltages can realize energy transmission and distribution, and finally realize the high-power precision balance of the battery pack.
- The actual equalization work is carried out by the main control chip MCU and the inverter with ultra-low dynamic impedance obtains more than 8A equalization current.
- Precise transformer technology and fully symmetrical circuit design can achieve the equalization effect of≤ 30mV.
- **Manufacturer: Foshan Meilide Electronic Co., Ltd**
- **E-mail:** service@glitterwelder.com
- **Website:** www.glitterwelder.com

- **Address: NO.4 Guda Road Zhangcha, Chancheng,**
- **Foshan, Guangdong, China.**

Documents / Resources

	**SUNKKO BAL-8624 Lithium Battery Pack Voltage Equalization Controller** [pdf] User Manual BAL-8624 Lithium Battery Pack Voltage Equalization Controller, BAL-8624, Lithium Battery Pack Voltage Equalization Controller, Battery Pack Voltage Equalization Controller, Pack Voltage Equalization Controller, Voltage Equalization Controller, Equalization Controller, Controller

References

- **User Manual**