ZHCSolar HWB **BATTERY BALANCER**
Doubles Battery life

www.zhcsolar.com
batteryequalizer.shop


### What is Battery Balancer?

this battery Balancer as known as battery equalizer is design for balance the batteries voltage difference in the battery bank to keep the battery in a health condition and finally achieve a long-term service life

### How Battery Balancer Works

Battery equalizer is energy transfer type equalizer,it can compensate both parties when the battery is connected and voltage difference exist, then the battery equalization starts to work, Final achieved the balance of the batteries set. It can be connected for long periods for automatically battery state of equilibrium.The current will flow from a higher voltage to low voltage,eventually reach equilibrium.

### Where to use a Battery Equalizer?

Battery Equalizer is recommended for use in autos, boats, golf carts, motorcycles, solar, trucks, RV's, electric forklift batteries, and any other battery groups Configuration.

### ZHCSolar HWB Series Support Battery Type:

Lead-acid Battery

### The Main Function

1. Balance the charge, so that when the battery bank is charged, all battery voltages is the same, to avoid laggard battery over-voltage and water loss.
2. Discharge equalization, so that when the battery discharge, all battery voltage is the same, to avoid lagging battery voltage vulcanization.
3. Thermal runaway warning when the thermal runaway occurs, indicating that water should be filled.

### Other Functions:

1. Old Batteries and new batteries can be mixed and no need to replace whole batteries group.
2. Battery Capacity Expansion
3. for example, obtain 12V voltage directly from the 48V battery Bank (24V, 36V, etc. can be obtained as well, must in the discharge state).
4. for example, charge the 48V Battery Bank directly with a 12V, 24V, 36V, 48V charger. (need to modify the charging port wiring)
5. Battery activation: The battery will not be used for a long time and will cause severe vulcanization and other problems. The equalizer can activate the battery by the pulse.

### Features of Battery Equalizers:

1. Backward Compatible: that means, for example, 48V can compatible with 36V and 24V. Connect the wire in steps from 48V,36V,24V,12V to 0V, then the device start self-checks. The indicator light flashes in seconds, flash times same as the unit quantity
2. Multiple Protection: over-voltage, over-current, over-temperature, Under-voltage, overtime and other abnormal state detection and protection, to ensure product safety.
3. Professional aluminum profile shell: special aluminum profile shell, surface oxidation process to enhance the product appearance, and also enhanced the protection and dissipation

### Learn more about batteries and battery equalizer

To learn more about batteries and charging batteries, please refer to our book 'Battery Saver Guide' (available free of charge from ZHCSolar and downloadable from www.zhcsolar.com.

ZHCSolar **HWB Series Battery Equalizer includes**:

- HWB4820 48V Battery Equalizer
- HWB6020 60V Battery Equalizer
- HWB7220 72V Battery Equalizer

**Comparison Data sheet of Battery Equalizer**

| Parameters | 48V Equalizer | 60V Equalizer | 72V Equalizer |
|---|---|---|---|
| Nominal Voltage | 48V | 60V | 72V |
| Compensation Current | 20A | 20A | 20A |
| Batteries Quantity | 4×12V | 5×12V | 6×12V |
| Maximum power | 1000W | 1200W | 1500W |
| Protection | Multiple protection | Multiple protection | Multiple protection |
| Wire Length | 350 mm / 13.8 in | 350 mm / 13.8 in | 350 mm / 13.8 in |
| Over-current Protection | 12A | 12A | 12A |
| Size | 124×68×34 mm / 4.88×2.67×1.33 in | 138×68×34 mm / 5.43×2.67×1.33 in | 152×68×34 mm / 5.98×2.67× 1.33 in |

| | | | |
|---|---|---|---|
| Weight | 280 g / 0.61 lb | 350 g / 0.77 lb | 400 g / 0.88 lb |

**Instructions of use**

1. After the product is installed, it will automatically work according to the state of the battery without manual intervention.
2. When the product is properly connected, the blue indicator light flashes with a buzzer sound, the light flashes and sounds number is the number of batteries. After the flash is completed, the indicator light is off.
3. in standby mode, the blue indicator flashes once every 4 seconds.
4. When charging, if any battery voltage reaches 13.6V, the device goes into the working state.when all the battery voltages are lower than 13.5V, it will exit the working state and return to the standby state.
5. When the voltage is lower than 9V or higher than 15.6V, the device will stop working and goes into the error state. The red indicator flashes in seconds, indicating that the voltage is abnormal. after the voltage returns to normal, the red indicator light will stop flashing.
6. when working, if the current is greater than 20A, the device will stop working, and goes into the error alarm state, The red indicator will flashes in seconds, after the delay of 15s, if the current is less than 20A, the balancer will return to normal state, and the red indicator will stop flashing.
7. Press the RST button, the device will resets and restarts, the SET is the manual switch of goes into or off the balancing working state.
8. If the battery bank is not used for charging or discharging for a long time (more than 30 days), please remove this device.

## Product Details

### HWB4820 48V Battery Equalizer

Main functions and Technical Parameters:

1. Balance battery: Balance Current 20A
2. Temperature Protection: 70 C
3. Over-current protection:12A
4. Over-voltage protection, any battery voltage exceeds 15.8V
5. Under voltage protection, all battery voltage is lower than 9V
6. Thermal Runaway Protection

Backward Compatible: that means,48V can compatible with 36V and 24V. Connect the wire in steps from 48V,36V,24V,12V to 0V, then the device start self-checks. The indicator light flashes in seconds, flash times same as the unit quantity

### HWB6020 60V Battery Equalizer

Main functions and Technical Parameters:

1. Balance battery: Balance Current 20A
2. Temperature Protection: 70 C
3. Over-current protection:12A
4. Over-voltage protection, any battery voltage exceeds 15.8V
5. Under voltage protection, all battery voltage is lower than 9V
6. Thermal Runaway Protection

Backward Compatible: that means,60V can compatible with 48V and 36V. Connect the wire in steps from 60V,48V,36V,24V,12V to 0V, then the device start self-checks. The indicator light flashes in seconds, flash times same as the unit quantity

### HWB7220 72V Battery Equalizer

Main functions and Technical Parameters:

1. Balance battery: Balance Current 20A
2. Temperature Protection: 70 C
3. Over-current protection:12A
4. Over-voltage protection, any battery voltage exceeds 15.8V
5. Under voltage protection, all battery voltage is lower than 9V
6. Thermal Runaway Protection

Backward Compatible: that means,72V can compatible with 48V and 36V. Connect the wire in steps from 72V.60V,48V,36V,24V,12V to 0V, then the device start self-checks. The indicator light flashes in seconds, flash times same as the unit quantity

### 48V 20A balancer charge and discharge test summary (regular use):

1. The balancing charge ensures that the original unbalanced battery voltage is consistent, avoiding further damage due to overcharge, water loss, and heat generation.
2. The Equilibrium discharge ensures that the original unbalanced battery voltage is consistent, avoiding further damages such as Vulcanization and reverse polarity that caused by over-discharge

Although the battery bank is a strictly matched configuration, differences still exist. The balance makes all the battery work under normal conditions, the unbalanced battery bank capacity becomes the sum of all batteries, the unbalanced battery service life will be same as the single battery.

### Indicator Instruction

1. Two Stage of Equalizer’ s Starting Detection.

Stage 1, Battery Unit Quantity Detection, the indicator light flashes every two seconds, the number of flashes is the same as the number of batteries.

Stage 2, The indicator light on 5S, equalizer mode self-test.

2. Standby Status: indicator light stop 4S, flash 1S
3. Working status: light is always on,
4. The definition of the equalizer working status:

1. The car driving status and the battery voltage difference reaches 200mV, start equilibrium
2. Normal type, anyone battery voltage reaches and exceeds 13.6V, start equilibrium, All battery voltage drops to 13.4V, stop the balance
3. Anti-bubbling status, dedicated charging terminal access to the qualified charger, start balance.
4. Anti-bubbling status also supports normal charging start mode.
5. Anti-bubbling type only for the 48V (4 battery bank), when the batteries are less than 4, then it will not support the anti-charging access starting, turn into the normal status.

## INSTALLATION

Before the installation, makes sure the equalizer has a short-circuiting protection (as shown in the above pictures). wires can be wrapped with an electrically insulating tape or wrapped with transparent plastic to prevent inadvertent contact between two wires, and avoid the fuse blowout when the cable is connected.

The figure above shows the style when the equalizer is connected. beware that the wiring must start from the yellow line (48V Balancer at 48V end) and the black line should be connected at the very last. When removing the equalizer, first remove the black line.

## Product installation warning

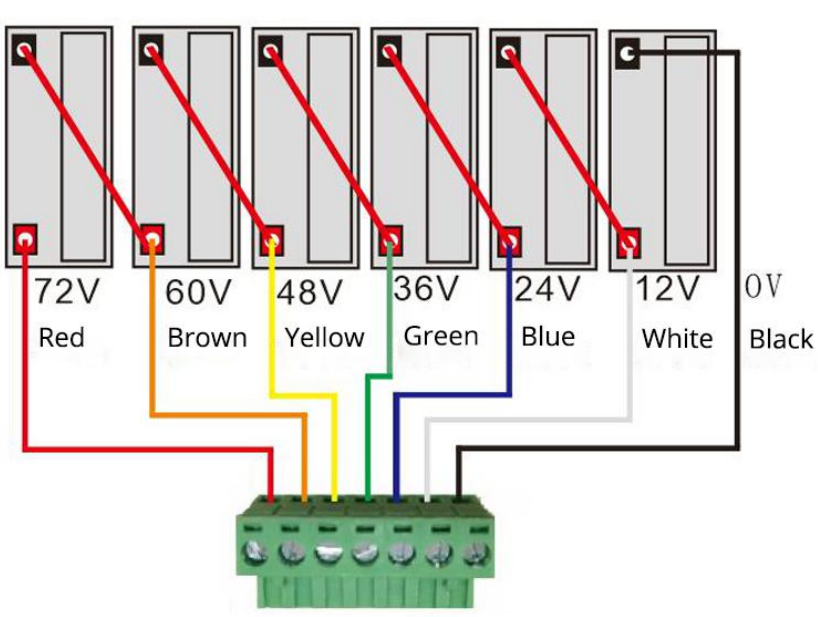
Please read the contents carefully before installing the product to prevent the product from damaged during installation.

1. DO NOT connect the wire terminal and balancer before installation.
2. First, connect the wires to the battery pack tightly, no loose.
3. After the wire is connected,confirm that the voltage between every two wires is: 12V (between black and white Wire),24V(between black and blue wire),36V(between black and green wire),48V(between black and yellow wire),60V(between black and brown wire),72V(between black and red wire)
4. After confirming the voltage is correct, plug in the balancer.
5. If possible, put a low-capacity battery in the middle of two high-capacity batteries.

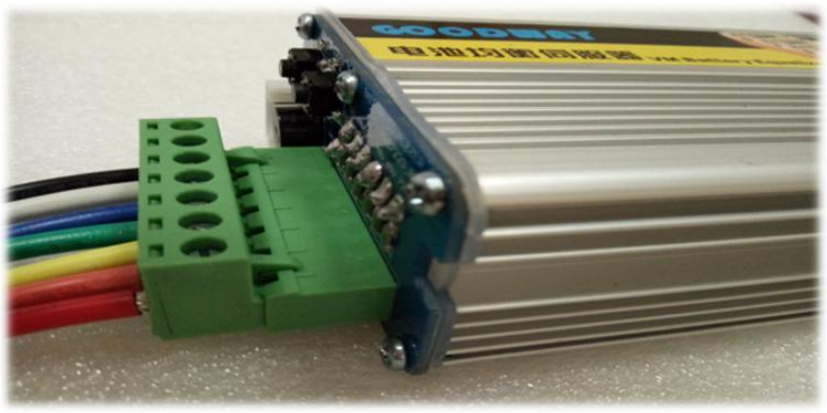
## Tips at installation

1. Pay attention to the connection order of the wires. You must connect the black wire last and disconnect the black wire first. Otherwise, the number of batteries may not recognize correctly.
2. The wire cannot wrongly connect or reverse connect, otherwise, damage may occur. normally, the fuse will blowout to protect
3. Wires and batteries must be connected tightly, otherwise the balance current will drop.
4. When extending the wire, under 40cm, use 16AWG wire. under 60cm, use 14AWG wire. under 100cm, use 12AWG wire. only use high-quality wire, otherwise, the working current will drop.
5. when replacing the fuse, Please use 20A fuse

## Connection Diagram




Step 1



Step 2

## Install steps:

1. Make sure that the wire terminal is not plugged into the Balancer and the wiring is correct before installation.
2. Check whether each wire is consistent with the connection of step 1. After it is consistent, it can be connected to the Balancer. Otherwise, the device may damage by the wrong connection. normally, the fuse will blowout to protect the device.
3. Plug the wire terminal to the balancer, as shown in step 2.
4. When removing the balancer, pull off the wire terminal, no need disconnecting the wire.
5. When extending the wire, under 60cm, use 14AWG wire, under 100cm use 12AWG wire. An unqualified wire will affect the working current and the equalization effect.

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