# Wind & Solar
# Hybrid Controller




# User Manual

Ver.-HECR202108

Thank you for purchasing our product(s). This manual is provided to people who need to install and operate the controller. Read this manual before any work with controller and keep it carefully. The contents of this manual will be periodically updated or revised if necessary. However discrepancies cannot be excluded. Please refer to the actual product(s).

## General Safety Information

- Before receive the product, check it carefully. Make sure whether the product is damaged during transport. If it is damaged, contact the shipping company or our company immediately.
- All installation and electrical work must only be performed by professional personnel.
- Without any professional guidance, do not disassemble or attempt to repair the controller.
- Do not use the controller without batteries.
- Do not cut off the connection of controller and batteries when controller is working normally.
- Keep children away from controller.
- Do not allow water to enter the controller.
- Confirm that power connections are tightened to avoid excessive heating from a loose connection. Make sure cables are suitable for system.

## Warranty

- The product is warranted for one year from the date of shipment to the original end user.
- During warranty period, if failure occurs when the product normal using, our company will repair or replace the failure product.
- Out of warranty period, we supply repair service, but for charges.
- This warranty is only provided to buyers who have bought the product and signed the CI with us, and the warranty is nontransferable.
- Our company reserves the right to change products and without notice when products update.

This warranty does not apply under the following conditions:

- Damage by not operating in accordance with user manual.
- Damage by accident, negligence, abuse or improper use.
- Unauthorized product modification or attempted repair.
- Damage occurring during shipment

# 1 Product Introduction

This kind of wind solar hybrid streetlight controller is special design for small off-grid he course of which wind generator and solar panels charge to batteries safely and efficiently.

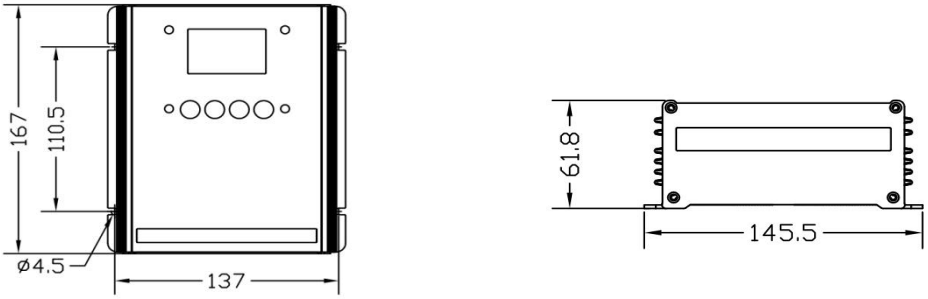
## 1.1 Functions and Feature

- Wind generator MPPT boost charging function.
- PWM dump load of wind, external dump-load resistance, intelligent disconnection of Solar charging.
- Dual power supply function: Battery + solar power supply.
- LCD displays parameters such as voltage and current of wind, solar and load .Some parameters can be set by users.
- DC output with 3 output modes.
- The inner circuit board of the controller is sprayed with conformal coating to prevent dust, moisture and static electricity.

➢ Protection:

| Protection | Explanation |
|---|---|
| Reversed charging Protection of solar | Such as at night, the voltage of the battery may be higher than solar panel. The controller protect the battery from charging the solar panel. |
| Reverse polarity Protection of battery | When the battery polarity is reversed, the controller does not work and there is no display. The fuse protects the internal circuit.If the battery does not work properly after it is connected correctly, just need to replace the fuse . |
| Battery open circuit Protection | After long-term use, the battery may be Open-Circuit or poor connect. The controller can protect itself from damage.Check the connection regularly |
| Over voltage<br>Over current<br>Over load voltage Protection | When it's strong wind or over voltage, the controller will automatically start braking function to protect the wind generator and battery. The controller will automatically cuts off the circuit when the output is over voltage. |
| Lightning Protection | Lightning protection refers to the last level of protection necessary for equipment. For lightning-prone areas, special lightning protection devices and other components of the multilevel lightning protection system are needed. It need additional payment If the user need this function. |

## 1.2 Appearance and size



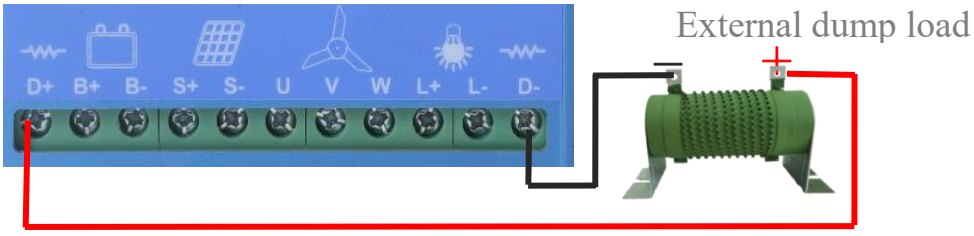

# 2 Installation and Electrical Connection

## 2.1 Mounting Notes

⚠ Read through this entire section first before installation, and install in accordance with this manual.
⚠ All mounting work must only be performed by professional personnel.
⚠ Disconnect all sources of power to the controller before installing or adjusting.
⚠ Do not allow water and snows enter the controller.
⚠ Keep away from corrosive gases and strong electromagnetic interference.
⚠ Installation site should be convenient for installation, electrical connection and later maintenance.

## 2.2 Wiring Steps（Follow the bellow suggestions and steps to connect)

### 2.2.1 Dump load Wiring（this controller has external dump load ）




Connect dump load positive( + ) and negative( - ) to controller as show

### 2.2.2 Load Wiring



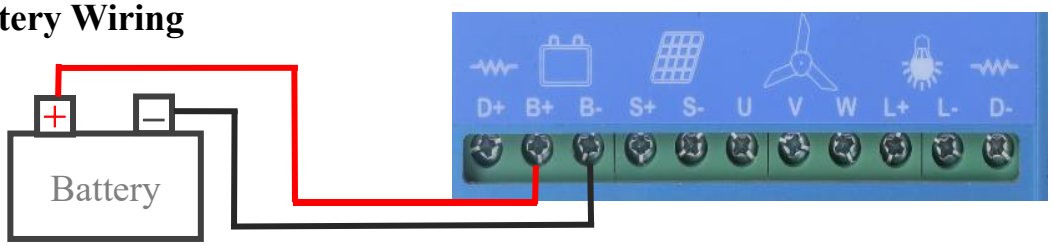

Connect loads positive( + ) and negative( - ) to controller as shown.

⚠ Be careful of avoiding short circuit when wiring loads.

☞ Anti-connecting of loads positive ( + ) and negative( - ) is forbidden.

☞ Loads current should not exceed the rating loads current.

### 2.2.3 Battery Wiring

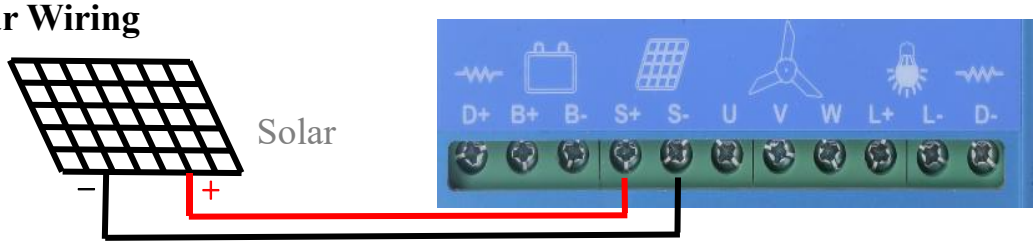



Connect battery positive (+) and negative (-) to controller as shown.

⚠ The solar PV array may produce high voltages in sunlight. Be careful of electric shock when wiring.

☞ Although controller has the protection of solar anti-reverse, but anti-connecting of positive (+) and negative (-) is forbidden.

### 2.2.4 Solar Wiring

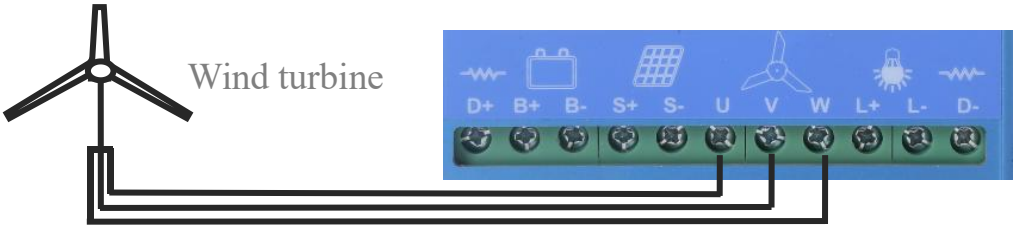



Connect solar positive (+) and negative (-) to controller as shown.

⚠ The solar PV array may produce high voltages in sunlight. Be careful of electric shock when wiring.

☞ Although controller has the protection of solar anti-reverse, but anti-connecting of positive (+) and negative (-) is forbidden.

### 2.2.5 Wind Generator Wiring




Connect wind generator to controller as shown.

⚠ The wind generator could produce high voltages. Be careful of electric shock.

⚠ When it's breeze or windless, connection of wind generator and controller would be safer . Only when controller is working, high-speed rotate wind generator could be connected.

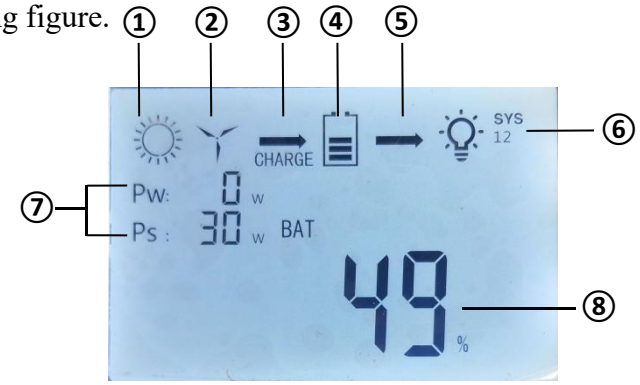
# 3 Operation

## 3.1 Descriptions of Buttons

| Item | Description | Note: if you do not press any key within one minute, the modified parameters will not be saved and will automatically return to the browsing main interface. |
|---|---|---|
| OK | Long press this key in any browsing interface for more than 3 seconds to enter the parameter setting interface.Press this key in the setting interface to switch to the next setting item.In the setting interface, long press the button for more than 3 seconds to save the parameters and exit the setting state. | |
| ◀ | Press this key in the browsing interface to switch to the previous browsing item.<br>Press this key in the setting interface to increase the parameter value being set. Long press this key to quickly adjust. | |
| ▶ | Press this key in the browsing interface to switch to the next browsing item.<br>Press this key in the setting interface to reduce the parameter value being set. Long press this key to quickly adjust. | |
| Esc | Press this key in any browsing interface to return to the main browsing interface;<br>Press this key in the setting interface to switch to the previous setting item;<br>In the setting interface, long press this button for more than 3 seconds to exit the setting state, and the parameters are not saved. | |

## 3.2 Browsing interfaces

After the controller is powered on, enter the LCD parameter browsing default interface, as shown in the following figure.




| Item | Icons | Description | Item | Icons | Description |
|---|---|---|---|---|---|
| ① | | Day | ⑥ | SYS 12 | Locked 12V system. |
| | | Night（this icon is also displayed if there is no PV connected） | | SYS 24 | Locked 24V system. |
| ② | | Wind turbine<br>Charging when it is rotating | | SYS 12 AUTO | The current controller is an automatically identified as a 12V system. |
| ③ | CHARGE | Arrow flash， the PV and wind turbine is charging normally | | SYS 24 AUTO | The current controller is an automatically identified as a 24V system. |
| | BRAKE | Wind turbine brake,usually for 10 minutes<br>. | ⑦ | Pw: 0 w | Current wind turbine charging power |
| ④ | | Battery pattern showing how much power is. The pattern flashes during over discharge protection and returns to normal when the voltage is higher than the over discharge recovery voltage | | Ps : 0 w | Current wind PV charging power |
| ⑤ | OUTPUT | The arrow flashes and the controller load output status is normal | ⑧ | 0 | Display of current browsing content parameters |

In the default interface，press ◀ or ▶，You can switch browsing items. Users can view the status information of battery, solar panels, fan, load, temperature and so on. The display contents are as follows:

| Battery | PV | Wind turbine | Load | Temperature |
|---|---|---|---|---|
| **V-Battery Voltage | **V-PV Voltage | **V-wind turbine voltage | **MODE-output operation loads | **-Controller Temperature |
| **%-Battery Capacity | **A-PV current | **A-wind turbine current | **W-load power | P**-Temperature code |
| **A-Battery Current | **W-PV power | **W-wind turbine power | **A-load current | |
| **W-Battery Power | | | **L0-Load fault code | |
| **KWH-cumulative output | | | | |

Load code and temperature code meanings are as follows

| Load Code | Description |
|---|---|
| L0 | Normal |
| L1 | Manual closing state |
| L2 | Over discharge protection |
| L3 | Over current protection |
| L4 | Over voltage protection |

| Temperature Code | Description |
|---|---|
| P0 | Normal |
| P1 | Low temperature state |
| P2 | High temperature state |
| P3 | Protection state |
| P4 | Abnormal |

## 3.3 Parameter Setting

### Operating instructions

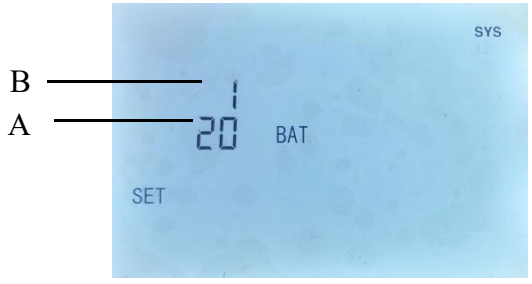
1.Press OK key for more than 3 seconds on any browsing interface to enter the parameter setting interface；

2.Press OK key to enter the next parameter setting item ,Press Esc key to enter the previous parameter setting item.

3.When parameter flash：press ◀ key，value increase，press and hold to increase quickly；
press ▶ key，value decrease，press and hold to decrease quickly.

4.After parameter setting ,press OK for more than 3 seconds ,save the parameters and exit the setting state.

5.After parameter setting ，Press Esc for more than 3 seconds，do not save the parameters and exit the setting state.



In the figure above, A represents the total number of setting items; B indicates that the item serial number is being set. Press ◀ or ▶ to switch the setting item. The settable items are shown in the following table:

| Item | Display | | Description | Options can be set |
|---|---|---|---|---|
| 1 | BAT | SYS<br>12/24<br>AUTO | Rated voltage of battery | **12:** lock 12V system; **24:** Lock 24V system;<br>**AUTO** ： automatic recognition |
| 2 | | TYPE：b0 | Type of battery | **b0**：customization； **b1**：Gel battery；<br>**b2**：Ternary lithium battery； **b3**：Lithium iron phosphate battery.<br>When set to **bo** each voltage can be set by the users， when set to **b1/b2/b3 ,**the controller automatically matches the default value.Details see the technical specifications. |
| 3 | | LOW：***V | Over discharge protection voltage | |
| 4 | | RLOW：***V | Over discharge recovery voltage | |
| 5 | | FULL：***V | Over charge protection voltage | |
| 6 | PV | UL：**V | Light control voltage | Voltage to judge the day and night .Pay attention there are one minute of delay . |
| 7 | | ON/OFF | Solar charge switch | |
| 8 | Wind | ON/OFF | Wind turbine charge switch | |
| 9 | Load | ON/OFF | Load output switch | |
| 10 | | MODE：* | Load mode | **MODE 1**：light control mode ,load off at day and on at night with 100% power<br>**MODE 2**：Load always work with 100% power<br>**MODE 3**：Light control+time control mode .load on at dark and work according to the set time and power by the users .Four sections+morning light mode adjustable . |
| 11 | | T1：***min | First time phase | Time phase and power of load can be adjusted.Each time phase is adjustable from 0 to 900 minutes and power is 0-100%<br>In mode 3, if the first working time is set to 2 minutes and the first power is 0%, the system will delay 2 minutes before turning on the light after dark.In street lamp mode, this function can eliminate the difference between front and rear lights caused by solar panels of different street lamps, so as to achieve the effect of simultaneous lighting. |
| 12 | | P1：***% | Power in first time phase | |
| 13 | | T2：***min | Second time phase | |
| 14 | | P2：***% | Power in second time phase | |
| 15 | | T3：***min | Third time phase | |
| 16 | | P3：***% | Power in third time phase | |
| 17 | | T4：***min | Forth time phase | |
| 18 | | P4：***% | Power in forth time phase | |
| 19 | | TC：***min | Morning time phase | |
| 20 | | PC：***% | Power in time phase | |

# 4 FAQ

| Question | Answer |
|---|---|
| When the wind generator is connected to the controller, it becomes very slow immediately. | 1. The battery reaches the floating voltage.<br>2. The rated output voltage of the wind generator is much higher than the battery, because the speed of the wind generator is proportional to the output voltage, and the voltage is dragged by the battery, so the speed will be very low.<br>3. The dump load MOS was burnt out because of wrong operation. |
| Why wind generator dump load when the controller displays small current ? | The controller protect the all system by detecting battery voltage, charging current and temperature and so on. When the battery reach floating charge voltage or high temperature, the wind generator will dump load, no matter how much charging current it is. |
| LCD does not display | 1. The battery didn't connect the controller well, please check the battery and controller connection.<br>2. Battery is damaged, please check and replace the battery. |
| No charging current | Only when the input voltage of solar panels and wind generator higher than battery then it can charge. |

# 5 Battery parameters of 12V/24V system

| Function / Battery Type | FULL (Charging protection ) | Low (Load disconnect) | RLOW (Load connect) |
|---|---|---|---|
| Customization （b0） | 14.7V/29.4V（adjustable） | 10.2V/20.4V（adjustable） | 11.5V/23.0V（adjustable） |
| Lead acid/Gel Battery（b1） | 14.4V/28.8V（default） | 10.2V/20.4V（default） | 11.5V/23.0V（default） |
| Ternary lithium battery （b2） | 12.6V/25.2V(default） | 9.0V/18.0V（default） | 10.0V20.0V（default） |
| Lithium iron phosphate battery (b3） | 14.4V/28.8V(default)） | 10.0V/20.0V（default） | 11.0V/22.0V（default） |

# 6 Controller parameter

| | |
|---|---|
| Rated system voltage | 12V、24V、12/24V AUTO |
| Rated wind power | 600W/800W/1000W/1200W |
| Rated PV power | 600W/1000W |
| Max input voltage | Wind turbine≤80V solar panel≤55V |
| No-load Current (DC) | ≤0.05A |
| Controller power mode | Battery or solar |
| Control mode | Wind generator MPPT boost charge、PWM dump load、PWM Over current Limiting function |
| Output working mode(Mode) | Mode 1: Light-control on. Light-control off (3 modes adjustable) |
| Display content | LCD display,Voltage, Percentage of battery power, Current, working mode of load, etc |
| Protection type | Solar Reversed Charging protection，Battery open circuit protection、battery anti-reverse connection protection protection、Over current and over voltage auto brake protection、Over load protection,etc. |
| Cooling mode | aluminium profiles Heat dissipation and self-cooling |
| Working temperature / Relative humidity | -25℃~+80℃ /0~90%，non-condensing |
| Net weight / Gross weight | 2.35/2.85kg |
| Controller size/Pack size | 167mm*145.5mm*61.8mm/360mm*250mm*120mm |

**Final interpretation right of the manual belongs to us.Any changes without prior notice.**