

# Wind & Solar Hybrid Controller



## User Manual

Ver.-HECR202211

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.

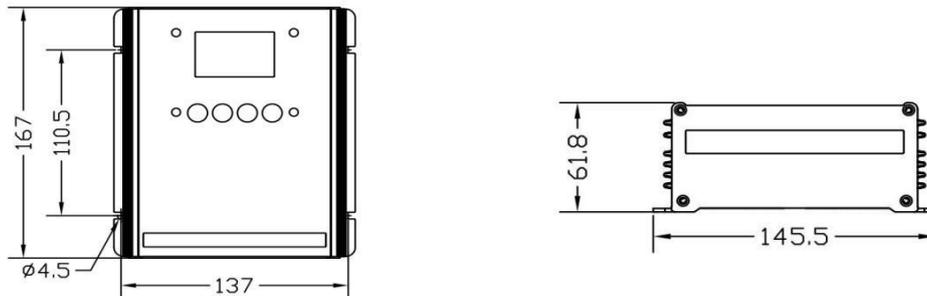
## **1.1 Functions and Feature**

- Wind generator MPPT boost charging function.
- PWM dump load of wind, external dump-load resistance, intelligent disconnection of Solar charging.
- Bluetooth connection function of controller to connect mobile phone APP monitoring data.
- 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 Over current 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



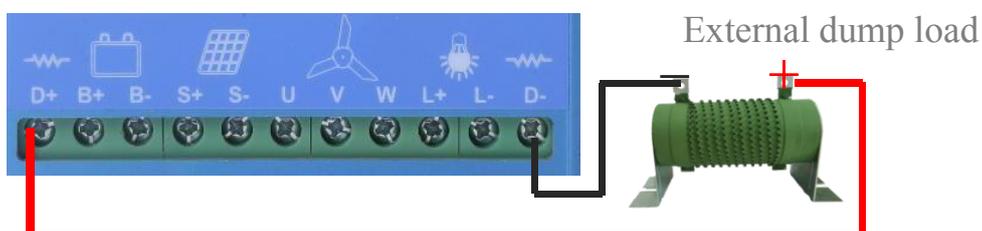
## 2 Installation and Electrical Connection

### 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

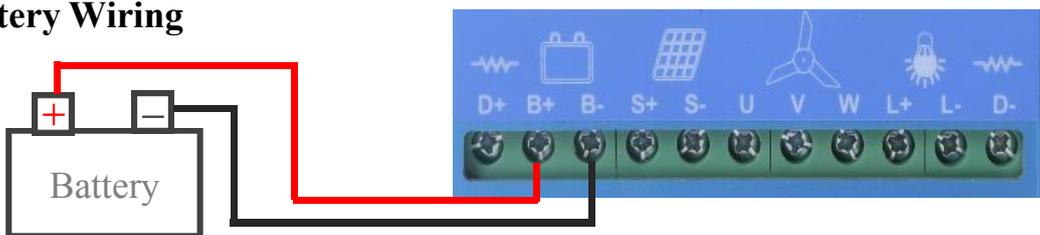
## 2.2.2 Load Wiring



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.

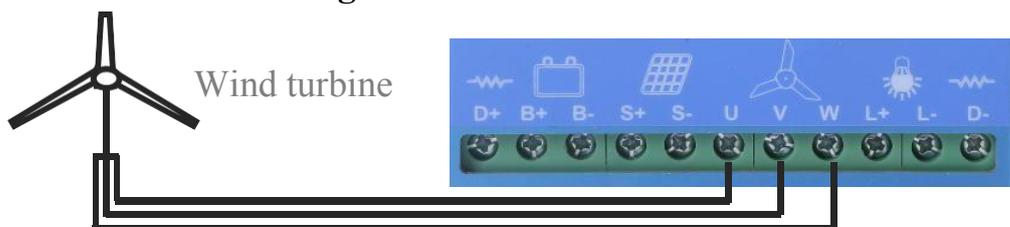
## 2.2.4 Solar Wiring



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.

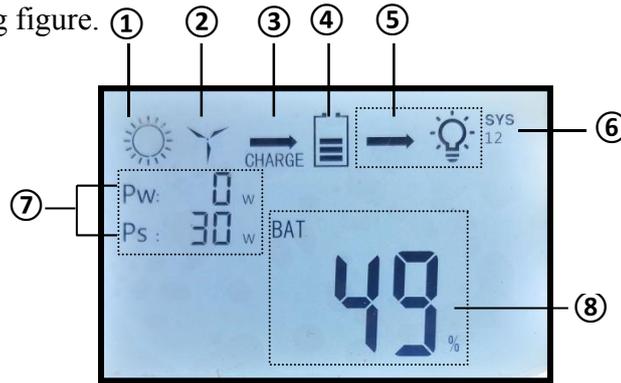
### 3 Operation

#### 3.1 Descriptions of Buttons

Item	Description	<p><b>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.</b></p>
	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 and hold the key for more than 10 seconds in any browsing interface to clear all power generation statistics; Press this key in the browsing interface to switch to the previous browsing item. Press this key in the setting interface to increase the parameter value being set. Long press this key to quickly adjust.	
	Press and hold the key for more than 10 seconds in any browsing interface to clear all electricity consumption statistics; Press this key in the browsing interface to switch to the next browsing item. Press this key in the setting interface to reduce the parameter value being set. Long press this key to quickly adjust.	
	Press this key in any browsing interface to return to the main browsing interface; Press this key in the setting interface to switch to the previous setting item; 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 Charging when it is rotating		SYS 12 AUTO	The current controller is an automatically identified as a 12V system.	
		Arrow flash , the PV and wind turbine is charging normally		SYS 24 AUTO	The current controller is an automatically identified as a 24V system.	
③		Wind turbine brake, usually for 10 minutes		SYS 48	Locked 48V system.	
		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		SYS 48 AUTO	The current controller is an automatically identified as a 48V system.	
④		The arrow flashes and the controller load output status is normal		⑦	Pw: 0w	Current wind turbine charging power
⑧		Display of current browsing content parameters			Ps: 0w	Current wind PV charging power

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	**d-kW.h-Daily power generation	**d-kW.h-Daily power generation	**L0-Load fault code	
**d-kW.h-Daily power generation	**P-kW.h-30 days power generation	**P-kW.h-30 days power generation	**d-kW.h-Current electricity consumption	
**P-kW.h-30 days power generation	**T-kW.h-Cumulative power generation	**T-kW.h-Cumulative power generation	**P-kW.h-30 days power consumption	
**T-kW.h-Cumulative power generation			**T-kW.h-Accumulated electricity consumption	
**R-Device address				
**PR-Bluetooth password <sup>(1)</sup>				

(1) "----" is displayed when no password is set in the mobile phone APP; Please ignore this display when the Bluetooth communication function is not selected.

Load code and temperature code meanings are as follows:

Load Code	Description	Temperature Code	Description
L0	Normal	P0	Normal
L1	Manual closing state	P1	Low temperature state
L2	Over discharge protection	P2	High temperature state
L3	Over current protection	P3	Protection state
L4	Over voltage protection	P4	Abnormal

### 3.3 Parameter Setting

#### Operating instructions

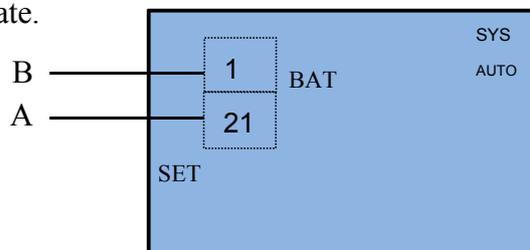
1. Press **OK** key for more than 3 seconds on any browsing interface to enter the parameter setting interface;
2. Press **OK** key to enter the next parameter setting item ,Press **Esc** key to enter the previous

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  for more than 3 seconds ,save the parameters and exit the setting state.

5. After parameter setting , Press  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		SYS 12/24/48 AUTO	Rated voltage of battery	<b>12:</b> lock 12V system; <b>24:</b> Lock 24V system; <b>48:</b> Lock 48V system; <b>AUTO:</b> automatic recognition
2	<b>BAT</b>	TYPE: b*	Type of battery	<b>b0:</b> customization; <b>b1:</b> Gel battery (1strings/2strings/4strings) ; <b>b2:</b> Ternary lithium battery (3strings/6strings/13strings) ; <b>b3:</b> Ternary lithium battery (3strings/7strings/14strings) ; <b>b4:</b> Lithium iron phosphate battery (4strings/8strings/16strings) . When set to <b>b0</b> each voltage can be set by the users, when set to <b>b1/b2/b3/b4</b> ,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		**R	Device address	485communication address of current equipment
7	<b>PV</b>	ON/OFF	Solar charge switch	ON/OFF
8		UL: **V	Light control voltage	Voltage to judge the day and night .Pay attention there are one minute of delay .
9	<b>Wind</b>	ON/OFF	Wind turbine charge switch	ON/OFF

10		ON/OFF	Load output switch	ON/OFF
11		MODE: *	Load mode	<b>MODE1:</b> light control mode ,load off at day and on at night with 100% power; <b>MODE2:</b> Load always work with 100% power; <b>MODE3:</b> 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 .
12	<b>Load</b>	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% 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.
13		P1: ***%	Power in first time phase	
14		T2: ***min	Second time phase	
15		P2: ***%	Power in second time phase	
16		T3: ***min	Third time phase	
17		P3: ***%	Power in third time phase	
18		T4: ***min	Forth time phase	
19		P4: ***%	Power in forth time phase	
20		TC: ***min	Morning time phase	
21		PC: ***%	Power in time phase	

## 4 FAQ

Question	Answer
When the wind generator is connected to the controller, it becomes very slow immediately.	<ol style="list-style-type: none"> <li>1. The battery reaches the floating voltage.</li> <li>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.</li> <li>3. The dump load MOS was burnt out because of wrong operation.</li> </ol>
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	<ol style="list-style-type: none"> <li>1. The battery didn't connect the controller well, please check the battery and controller connection.</li> <li>2. Battery is damaged, please check and replace the battery.</li> </ol>
No charging current	Only when the input voltage of solar panels and wind generator higher than battery then it can charge.

## 5 Use of mobile APP (Need to choose to buy)

Install mobile APP (see Figure 1); After the controller is connected and powered on, open the Bluetooth APP and mobile phone Bluetooth, and click "Connect device" (see Figure 2), Enter the device scanning interface (see Figure 3), click the device name to connect the device. After the successful connection, you can view the device information (see Figure 4), and click the interface to enter the corresponding setting interface. (Android system only).

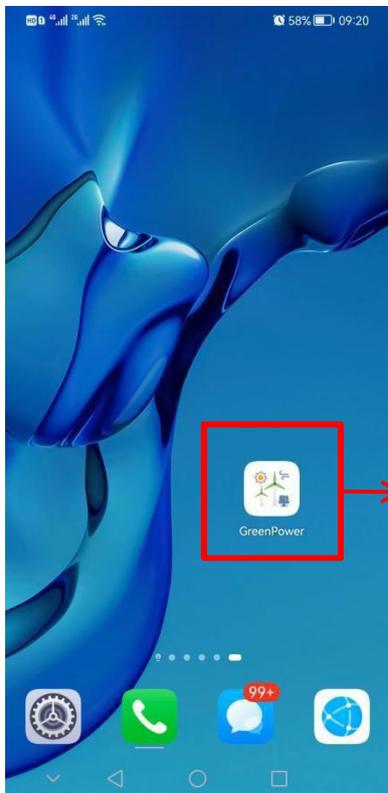


Figure 1



Figure 2



Figure 3



Figure 4

## 6 Technical parameter

### ► Battery parameters of 12V/24V/48V system

Function Battery Type	FULL (Charging protection )	Low (Load disconnect)	RLOW (Load connect)
Customization (b0)	14.4V/28.8V/57.6V (adjustable)	10.5V/21.0V/42.0V (adjustable)	12.5V/25.0V/50.0V (adjustable)
Lead acid/Gel Battery (b1)	14.4V/28.8V/57.6V (default)	10.5V/21.0V/42.0V (default)	12.5V/25.0V/50.0V (default)
Ternary lithium battery (b2)	12.6V/25.2V/54.6V (default)	9.0V/18.0V/39.0V (default)	10.0V/20.0V/43.4V (default)
Ternary lithium battery (b3)	12.6V/29.4V/58.8V (default)	9.0V/21.0V/42.0V (default)	10.0V/23.4V/46.8V (default)
Lithium iron phosphate battery (b4)	14.4V/28.8V/57.6V (default)	10.0V/20.0V/40.0V (default)	12.0V/24.0V/48.0V (default)

### ► Controller parameter

Rated system voltage	12V, 24V, 48V, 12/24VAuto, 24/48VAuto (One out of five)
Max input voltage	12/24V system: Wind turbine≤80V solar panel≤55V 48V system: Wind turbine≤80V solar panel≤95V
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
Communication function (Need to purchase)	Bluetooth (connected to the mobile phone APP, the Bluetooth password is 4 digits, which can be viewed on the device when the APP forgets the password.
Output working mode(Mode)	Multiple working modes are available: pure light control mode, normally open mode, light control+time control mode (four periods+morning light)(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	2.05/2.45kg
Controller size/Pack size	167mm*145.5mm*61.8mm/360mm*250mm*120mm
Resistance size	12/24V: 200*60*120mm; 24/48V: 210*70*130mm

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