# User's Manual

## Wind/Solar Hybrid Street Light Controller

# 1. Introduction

The wind/solar hybrid street light controller is an intelligent equipment which is specially designed for wind/solar hybrid street light system. It can simultaneously control wind turbine and solar panel charge for battery safely and efficiently.

The apparatus has decent appearance, easy operation, visual digit tube and LED indicator display. It has series of perfect protection functions. The controller has high charge efficiency, low no-load loss, with safe, stable and reliable operation.

The wind/solar hybrid street light controller is the most critical part of the off-grid street light system, whose performance will impact the lifetime and stability of the whole system, especially the battery longevity.

# 2. Performance and Functions

**Reliability：**

Intelligentized, modularized design, simple mechanism, powerful functions. With industrial range superior components and strict production technology, the controller can be used in relatively bad working environment and has reliable performance and long life-span.

**Wind Turbine Voltage Limiting and Current Limiting Charge Mode:**

When battery voltage is beyond the pre-set wind turbine charge shutoff voltage point or wind turbine charge current exceed wind turbine brake current point, the controller will automatically start brake to protect battery banks.

**Solar PWM Charge and Dumpload Mode:**

With this mode, the excess energy which controller dumps is divided into thousands of stages. The controller can charge battery while dumping the excess energy, which can extend the battery longevity effectively.

✧ **Two DC Outputs Mode：**



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Each output has various control modes for your choice, including; constant on; constant half power; light control on, light control off; light control on, time control off; light control on, time control half power, light control off; light control on, time control half power, time control off. User can set three output control modes by pressing LCD screen: constant on; light control on, light control off; light control on, time control off.

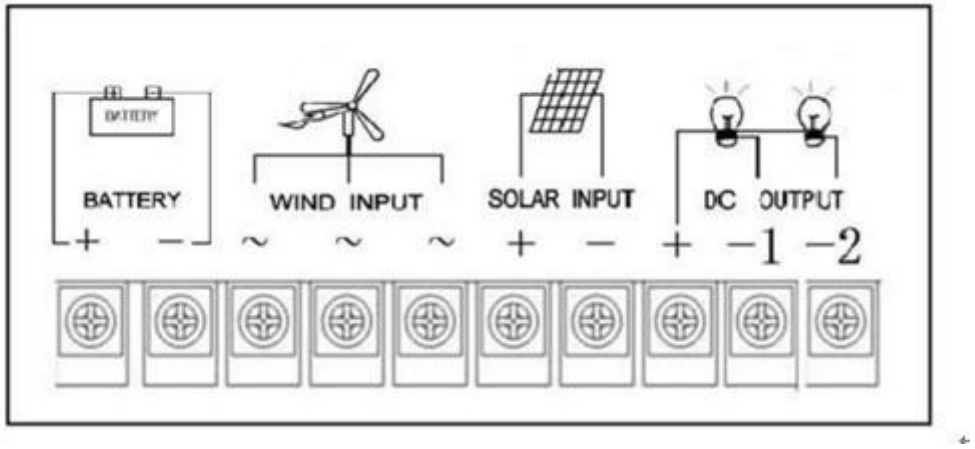
**Intuitionistic Display Function:**

Intuitionistic digits and LED indicator show system status and parameters, including: battery quantity of electricity, light control voltage point, parameter setting of output control modes, indications for day or night, unload, battery over discharge, load status and etc.

**Perfect Protection Functions:**

Battery over charge protection, battery over discharge protection, battery anti-reverse connection, wind turbine current limiting charge, automatically brake, manual brake protection, solar anti-reverse charge, solar anti-reverse connection protection, load short circuit, over load protection, lightning protection, etc.

# 3. Installation Flow




**Controller Terminal Connection Diagram**

User should connect and operate all parts according to the following sequence after wind turbine, solar panel and external circuit constructions are finished.

Step 1 Check the package and then check the controller for damage after unpacking. Damaged controller is not allowed to be installed in the system.

Step 2 Connect DC load to “DC OUTPUT” terminals: The first load should be connected to "+" and "-1" of the “DC OUTPUT” terminals, the second load should be connected to "+" and "-2" of the “DC OUTPUT” terminals.

Step 3 Connect battery to “BATTERY” terminals with 6mm$^2$ copper cables or above.





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**Note: The controller has anti-reverse connection protection function, but wrong polarity of battery shall be forbidden!**

Step 4 Connect wind turbine output line to “WIND INPUT” terminals when the wind turbine is under static status or in low speed running status. If the wind turbine is single-phase DC output, just connect the positive pole line to(+) “WIND INPUT” terminal, negative pole line to (-)“WIND INPUT” terminal.

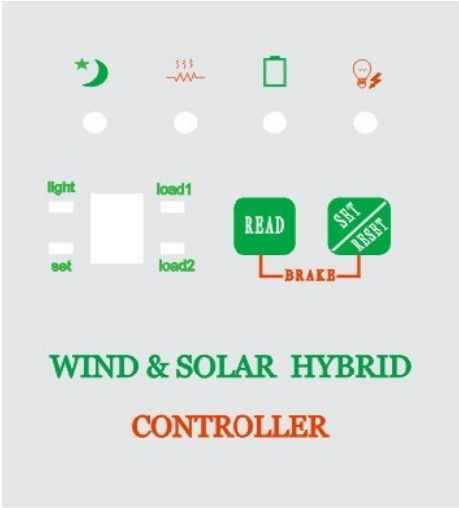
Step 5 Connect solar panel positive wire to (+) “SOLAR INPUT” terminal, negative wire to (-) “SOLAR INPUT” terminal.

Step 6 User can set relevant parameters and load output control modes through LCD buttons.

Step 7 Check whether all the connections are correct and firm.

# 4. Display Instruction and Button Operation

## 4.1. Display Instruction




1) Night Symbol. The indicator on means the PV voltage is lower than light control on voltage point.

2) Dumpload or Brake Symbol. Constant-on indicator means automatic brake, flashing indicates manual brake.

3) Battery Under Voltage Symbol. Constant-on indicator means battery is under voltage.

4) Load Status Symbol. The indicator flashing means load short circuit; Constant-on indicator indicates over load.

5) “**SET**” Setting Symbol. The indicator on means user can set parameters in the current status. Indicator

off means that it is in the browsing status.

6) "**Light**" Light Control Symbol. Indicator on means light control voltage interface, pressing "SET", user can set the light control voltage point while the indicator is on.

7) "**LOAD1**", "**LOAD2**" The First Load and Second Load Output; user can set the output control modes when "SET" and "LOAD" indicators are both on at the same time.

## 4.2. Button Instruction

Pressing any keys, the LED display will be on. It will go out to save power if there is no button operation for 10 seconds.

✧ "**READ**"**.** In browsing window, press this button to check the next parameter. In setting window, press this button to increase the value of current parameter.

✧ "**SET/RESET**" Set/ Reset. In browsing window, press this button to access to setting window. In setting window, press this button to save parameters and back to browsing window. "**SET/RESET**" can also be used to reset. The system will recover output by pressing this button after the load fault is released.

✧ The manual brake will start when user press "READ" and "SET" buttons at the same time.

## 4.3. Parameter Browsing

1) When power is on, press any key, system is in browsing status, LED shows current battery power.

2) In browsing window, LED will circularly display the following parameters by pressing "READ" key. Parameters :battery voltage, light control voltage point, first load output control modes, first load output shutoff hours (When the first load is time control off control mode), second load output control mode, second load output shutoff hours (When the second load is time control off control mode)

3) LED display three output control modes: 1.light control on, light control off 2.light control on, time control off 3.normal open.

## 4.4. Parameter Setting

User can set the light control voltage point, output control modes, time control shutoff hours (When the output mode is time control off).

User can modify the specific parameters by pressing "READ" to browsing window, and access to setting window by pressing "SET/RESET", "SET" indicator will be on. User can set the parameters and output control modes by pressing "READ" again. Save the modified parameters and back to browsing window by pressing "SET/RESET".

**In the following, please check the LED display content:**

| Item | Parameter | Parameter Display Description |
|---|---|---|
| Battery Power | 0 ~ 5 | The value indicates the battery power. “0”indicates the battery is under 11V (system voltage is 12V) or 22V (system voltage is 24V). “2”indicates battery is in the rated voltage status. “5”indicates battery is full. The number will add 1 when controller voltage increases 1V/per (24V system) or 0.5V/per (12 V system), the max number is 5. The number will reduce 1 when controller voltage decreases 1V/per (24V system) or 0.5V/per (12V system), the min number is 0. |
| Light Control Voltage | 0 ~ 19 | The value indicates light control voltage point (Adjustable)<br>N=Rated battery voltage/12V, （ $V_B$=12,N=1;$V_B$=24,N=2 ）<br>X=Setting value (X range 0 ~ 19)<br>Light control on voltage=0.2*N*X<br>Light control off voltage=0.2*N*X+0.6*N |
| Each load Output Mode | 0 ~ 15 | The value indicates output control mode is light control on, time control off.<br>The displayed figure indicates the pre-set time control off hours (Unit: h). |
| | n | Output control mode: constant on. |
| | L | Output control mode: light control on, light control off |



# 5. Technical Data

| Parameters | SW4E24 |
|---|---|

| | |
|---|---|
| Rated Battery Voltage | 24V |
| Rated Wind Turbine Input Power | 400W |
| Maximum Wind Turbine Input Power | 600W |
| Rated Solar Power | 200W |
| Wind Turbine Charge Shutoff Voltage | 29V |
| Wind Turbine Charge Recovery Voltage | 26.4V |
| Wind Turbine Brake Current | 17A |
| PV Floating Charging Voltage | 27V |
| Battery Over Discharge Protection Voltage | 21.6V |
| Battery Over Discharge Recovery Voltage | 24V |
| Output Over Voltage Protection Point | 32V |
| Light Control On Voltage (Factory Default) | 2V【Adjustable】 |
| Light Control Off Voltage (Factory Default) | 3.2V【Adjustable】 |
| Load 1 and Load 2 Rated Output Current | 10A |
| Load 1 Output Control Mode (Factory Default) | 3 Modes Selection ( Light Control On and Light Control Off ) |
| Load 2 Output Control Mode (Factory Default) | 3 Modes selection ( Light Control On and Time Control 5 Hours Off ) |
| Ambient Temperature & Humidity Range | -20～+55℃/35～85%RH ( Without Condensation ) |
| Dimensions (LxWxH) | 123×150×62mm |
| Net Weight | 0.75kg |
| **In order to serve our customers better, our company can adjust parameters configuration according to customer's requirement.** | |

# 6. Troubleshooting

If your phenomenon is out of following descriptions or should you have any problems about these products, please contact our after sales service department or sales man to repair or replace.

| Phenomenon | Troubleshooting |
|---|---|
| LED display "5" no charge or discharge | Battery is over-voltage, check battery voltage, and whether the cables are well-connected or not, re-connect all components. |

| | |
|---|---|
| LED indiactor  is on, and no output | Battery is over-discharge and empty. Please use the battery after it is fully charged. Disconnect the battery and recover it with charger device if the battery is over discharge for a long time. |
| LED indiactor  and  are both on, no output | 1. Overload. Please check the load, remove the extra or abnormal load, press "Esc" button to recover.<br>2. The indicator flashing means load short-circuit, check load and wire connection and remove the short-circuit hazard or damaged load, press "SET/RESET "to recover. |
| No LED display | 1. LED wire connection might be loose, please open controller case to check.<br>2. The fuse might be burnt due to the battery reverse connection, please open controller case to check.<br>3. Battery is empty or virtual connection, please check the battery voltage and examine whether the wire connection is firm or not.<br>4. The button malfunction leads to no LED display. |

# 7. Installation Environment

⚠ Avoid operating the apparatus under direct sunshine, blazing sun, and rainy, moist, acid mist environment, etc.

⚠ Keep the apparatus away from flammable and explosive gas or hazard, including flame and spark.

# 8. Guarantee and Liability

One year warranty is available for our product from the date of delivery. If the product is out of warranty or damaged by transportation, inappropriate operation, human factors, force majeure, no guarantee is made.





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