

Advanced Wind/Solar Hybrid (Street Light) Controller



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1. General Description

The advanced wind/solar hybrid controller is specially designed for high-end small-scale wind/solar hybrid system and especially suitable for wind/solar hybrid street light system and wind/solar hybrid monitoring system. It can also control the wind generator and solar cells to charge the batteries safely and efficiently.

The advanced wind/solar hybrid controller is the core components of the off-grid power generation systems. The performance of the controller will impact the life and the stability of the whole system, especially the life of the battery.

2. Performance Features

- **Reliability:** Intelligentized, modularized, simple structure design with powerful function and stable performance.; The high-quality components and the strict production process make the controller suitable for the severe environment .It also have reliable performance and service life.
- **P W M charging ways, voltage limiting and current limiting charging pattern:** Controller will charge battery with current limiting when battery power is low .Controller will charge battery with voltage limiting when battery power is high. In order to extend the service life of the battery. the over power will be unloaded by PWM
- **Two DC output:** There are various output control modes can be choose for each DC output. Including: (1)constant on, (2)constant off , (3)constant half-power, (4)light-control on ,light-control off, (5)light-control on and time-control off, (6)light-control on, time-control & half-power , light-control off, (7) light-control on, time-control & half-power , time control off. Through the LCD buttons users can set three different output control modes including: (1) constant on. (2)light-control on ,light-control off, (3)light-control on and time-control off,
- **LCD display:** Running data and system status are displayed in the LCD screen. Including: battery voltage, wind turbine voltage, PV voltage, wind power, PV power, wind current, PV current, load current, output control mode ,the output off time of load , voltage point of light-control on, voltage point of light-control off, indicating lamp stands for day or night, battery power status, load status, as well as over-voltage, under-voltage, over-load, short circuit, etc.
- **Protection functions:** Including: solar panel reverse-charging, solar panel reverse-connection, battery over-charge, battery over-discharge, battery reverse-connection, load short-circuit, over-load, lightning,

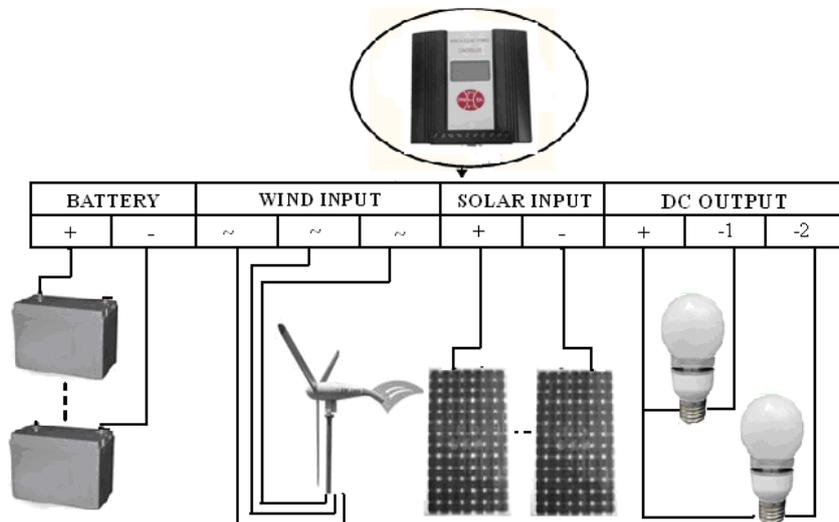


wind turbine current limiting, wind turbine automatic brake and manual brake.

- **Low voltage charging module,:** This function enables wind turbine to charge battery under low power. The input impedance and the wind turbine starting charge voltage point can be modified through serial port communication depending on the different characteristics of wind turbine.

3. Operation Process

The wiring diagram of wind&solar hybrid system and Terminal connection of wind/solar hybrid controller as following.



After installing wind wind/solar hybrid system, please connect the controller accurately as the sequential operation

- Open the package and check whether the equipment is damaged due to transportation or not.
- Choose the appropriate line diameter. The current through per square millimeter of wires is not more than 5A .
- Connect DC load to “DC OUTPUT” terminal: 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. The modes of load output can be set according to the requirements of system. (The half-power output is only applicable to LED load).
- Connect battery positive pole to the positive (+) “BATTERY” terminal, Connect battery negative pole to the negative (-) “BATTERY” terminal with copper core cable.

Although the controller has anti-reverse protection, but reversing battery is still forbidden!



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- Ensure wind turbine in brake status and then connect the wind turbine output lines to the “WIND INPUT” terminals in back panel.
 - Cover solar panel with a shelter and then connect solar panels to the “SOLAR INPUT” terminals in back panel.
 - Remove the shelter of solar panel and release the brake switch of wind turbine.
 - Users can set parameters and load output modes through the software and the LCD key-press

4. LCD operation and Display Instructions

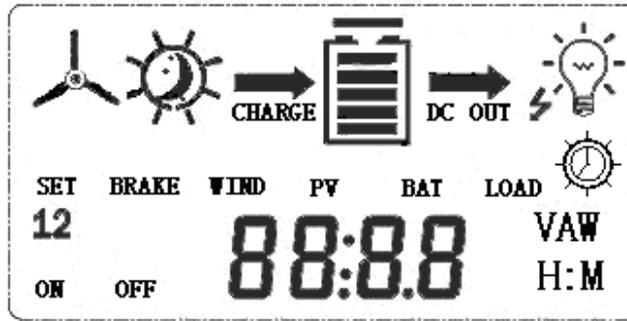
4.1 Description of Key-Press:

LCD backlight is on after pressing any key. The backlight will auto-off 10 seconds later while stop pressing any key

- "↑(+)" key symbolizes increase or next one. In browsing window, press this key to check next parameter. In setting window, press this key to check next adjustable parameter or increase the value of the current parameter.
- "↓(-)" key symbolizes decrease or previous one. In browsing window, press this key to check the previous parameter. In setting window, press this key to check the previous adjustable parameter or decrease the value of the current parameter.
- "Enter" key symbolizes set or confirm. In browsing window, press this key to access setting window. In setting window, press this key to save parameter and return to browsing window.
- "Esc" key symbolizes cancel or manual switch. In setting window, press this key to return to browsing window and do not save the modified parameters. In browsing window, the key is as a manual reset key for load short-circuit or overload

4.2 Displayed Content Description

LCD screen displays the following picture.



- 1)  symbolizes the wind turbine.
- 2)  symbolizes the day,  symbolizes the night.
- 3)  symbolizes the battery, internal strip graph represents the status of battery power., The symbol  is flashing when the battery is over-discharge, this flashing will not stop until over-discharging recover; the symbol  is flashing when the battery is over-voltage, The flashing will not stop until over-voltage recover.
- 4)  symbolizes the status of load and error
 -  stands for normal load without output ,  stands for normal load with output .
 - The symbol  flashing stands for over-load, users must remove the extra load, click “Esc” key to recover the over-load
 - The symbol of short-circuit  flashing stands for short-circuit protection status, users should check load wiring, confirm the line wiring is normal and press “ Esc “ key to recover the short-circuit
- 5)  symbolizes light-control and time-control.  symbolizes light-control on and light-control off.  symbolizes light control on and time control off.
- 6) The character "SET" symbolizes the setting status.
- 7) The character "12" symbolizes the first output and the second output.
- 8) **88:88** is parameters showing. The LCD displays all system status value and system parameters with intuitive digital and graph.

4.3 Browsing Parameters and Output Modes Description

- 1) Turn on the power, the LCD is under browsing window and displays battery voltage: XX.X V;
- 2) In browsing window, LCD will circularly display the following parameters by pressing "↑(+)" key, battery voltage, wind turbine voltage, solar panel voltage, wind power, solar panel power, wind turbine





Interface of light control on and time control off

3) The below picture shows interface of constant on.

Lower-left corner of LCD displays "1" which symbolizes the first load output and displays character "on" symbolize the load is constant on which means that the corresponding load has output within 24 hours except for low voltage protection status or fault condition., The right side displays character "load" This mode is applicable to outdoor monitoring system.



Interface of constant on

4.4 Setting Parameters and Output Modes Description

User can set following parameters from LCD press-key: output modes of first load .output modes of second load, the time of first load off, the time of second load off, the voltage point of light-control on and the voltage point of light-control off. And three output modes for each load: Light-control on, light-control off, light-control on, time-control off, constant on.

When users need to modify any given parameter, enter into setting window by pressing "↑(+)" "or "↓(-)" key and "Enter" Key, and then user can view and modify parameters by pressing "↑(+)" "or "↓(-)" key .Save the modified parameters and return to browsing window by pressing "Enter" key after setting parameters, not save the modified parameter and return to browsing window by pressing "Esc" key.

4.5 Manual Brake Setting:

Press the "Enter" key and "Esc" key at the same time, LCD displays the symbol **BRAKE** that suggests wind turbine is in brake status. Press the "Enter" key and "Esc" key at the same time in brake status, the symbol **BRAKE** will disappear and the brake status is released. In normal situation, the wind turbine can not be set in brake status.

6. Performance Parameters



Rated Battery Voltage	12V	24V	48V
Rated Wind Turbine Power	300/400W	600W	600W
Wind Turbine Maximum Input Power	500W	1000W	1000W
PV Power	150W	300W	300W
Unload Voltage	14V	28V	56V
Unload Current	25A	25A	25A
Battery Over-discharge Voltage Shutoff	11V	22V	42V
Battery Over-discharge Voltage Recovery	12V	24V	48V
Output Protection Voltage	16V	32V	64V
PV Voltage Of Light-Control On	1.0V	2V	4V
PV Voltage Of Light-Control Off	1.5V	3V	6V
Line 1 Rated Output Current	10A		
Line 2 Rated Output Current	10A		
Line 1 Output Mode(Factory Default)	3 Modes selection (Light-control on and Light-control off)		
Line 2 Output Mode(Factory Default)	3 Modes selection (Light-control on and time-control 5 hours)		
Control Mode	PWM		
Display Mode	LCD		
Quiescent Current	≤20 mA		
Working Temperature & Humidity	Ordinary: -20~+55°C/35~85%RH (Without Condensation) Industrial: -30~+55°C/35~85%RH (Without Condensation)		
Communication Function (Optional)	RS232、RS485、RJ45、GPRS		
Temperature Compensation Function	-4mV/°C/2V ,-35°C--+80°C,Precision: ±1°C		
By-Pass Function (Optional)	Automatic Switch		
Product Size (Wide×Deep×High)	142×150×80mm		205×150×80mm
Product Weight(kg)	1.9kg		2.16kg
Low-voltage charge function :			
Wind Turbine Starting Charge Voltage	2V	4V	8V



Input Admittance	1-10/15S	1-10/30S	1-10/60S
Line 1 Output Mode(Factory Default)	7 Modes selection (Light-control on and Light-control off)		
Line 2 Output Mode(Factory Default)	7 Modes selection (Light-control on and time-control 5 hours)		
Product Size (Wide×Deep×High)	220×150×80mm		
Product Weight(kg)	2.8kg	3 kg	
In order to serve our customers better. Our company can adjust parameters configuration according to customer's requirement.			

7. Abnormal phenomenon and treatment

Phenomenon	Description
The symbol  flashing, without charge or discharge	Battery is over-voltage, check battery voltage, and the cable is well connected or not, re-connect all components;
The symbol  flashing and no output	Battery is over-discharging and battery is empty. Please continue to use the battery after battery is fully charged. Remove the battery and recover it with battery-charging device if the battery is over discharging for a long time.
The symbol  flashing and no output	Over loading occurs. Please check the load and ensure that the load power consumption is not exceed the rated current of product, remove the extral or abnormal load, press "Esc" key to recover
The symbol  flashing and no output	Short-circuit protection occurs. Please check load and wiring, remove the short-circuit risks or damaged load, press "Esc" key to recover.

If the phenomenon do not meet the description or can not be returned to normal please contact our service department or salesman to repair or replace.

8. Warranty and after Sales Service



We provide 1 year warranty for our product from the date of delivery

If the product is exceed warranty or damaged by transportation, improper operation , human element, force majeure, it is not under warranty.

Declare: The product has applied for patent protection, counterfeiting will be subject to legal sanctions. Our Company reserves the right to change products and without notice when products update.