

# 1 Product Introduction

This kind of wind and solar hybrid streetlight controller is special design for small off-grid wind solar hybrid generation system. Appearance is elegant, operations are easy. It also makes the course of which wind generator and solar panels charge to batteries safely and efficiently.

## 1.1 Functions and Features

- **Protect wind generator from over-current**

Once the wind current is over the setting max current, PWM intelligent dumping will start automatically. That protect wind generator.

- **Intelligent limiting of batteries max current**

According to the actual of the system, you could set batteries capacity on controller. The controller will calculate the maximum charging current (It's 0.3 times of the battery's capacity) . Then batteries will be protected.

- **Function of manual brake**

- **Wind charging manual switch**

On the controller you can manually set whether using wind charge to battery.

- **Solar charging manual switch**

On the controller you can manually set whether using solar charge to battery.

- **DC output manual switch**

Users could manually set whether use DC output.

- **DC output has 4 working modes**

- **There are boost function or buck function for constant current load**

- **RS232 or RS485 interface**

By RS232 or RS485 serial interface communication, you could monitor the whole system, storage and analyze data.

Program could be upgraded by serial interface.

Connect PC and controller by serial interface. You could set the parameters on PC and controller simultaneously.

Software is free, easy to operate and no need to be installed.

## 1.2 Appearance and Size

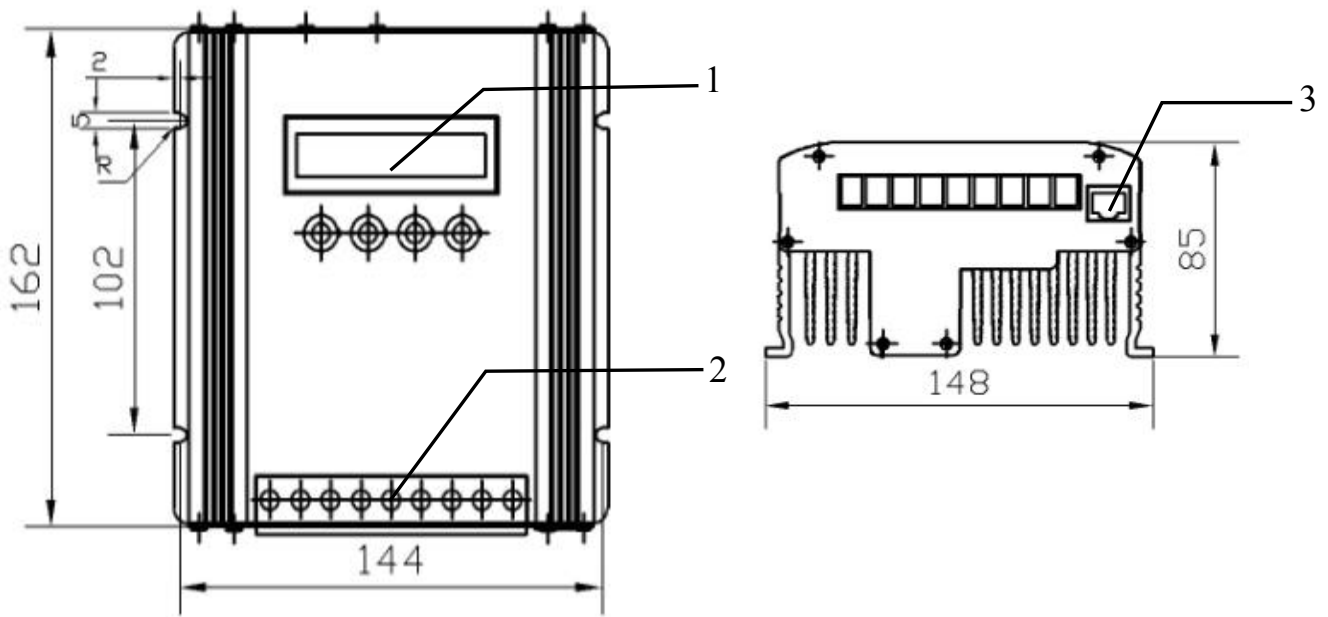


Figure1-1 Appearance description and dimensions of controller

Item	Name	Description
1	LCD display panel	A friendly human-computer interaction interface. Running data and configuration parameters are displayed in the LCD screen. Parameters could be set by keys on the panel.
2	Terminal block	Connect wind generator, pv panel, battery and load.
3	Communication interface	RS232or RS485 optional

## 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.

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

### 2.2.1 Battery Wiring

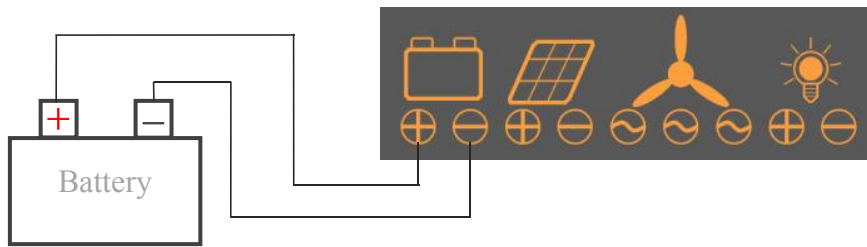


Figure2-1 Battery wiring

Connect battery positive (+) and negative (-) to controller as shown in figure2-1.

- ⚠ Be careful of avoiding short circuit when wiring the battery.
- 🔒 Although controller has the protection of battery anti-reverse, but anti-connecting of positive (+) and negative (-) is forbidden.

### 2.2.2 Solar Wiring

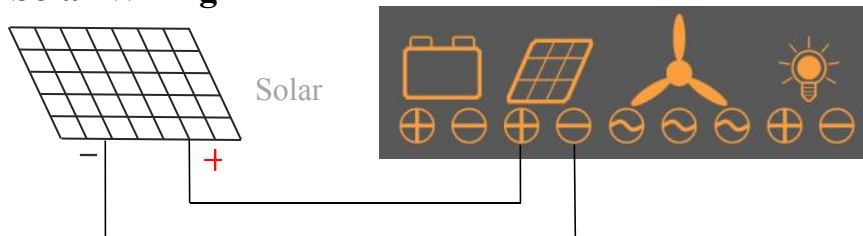


Figure2-2 Solar wiring

Connect solar positive (+) and negative (-) to controller as shown in figure2-2.

- ⚠ 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.

### 2.2.3 Wind Generator Wiring

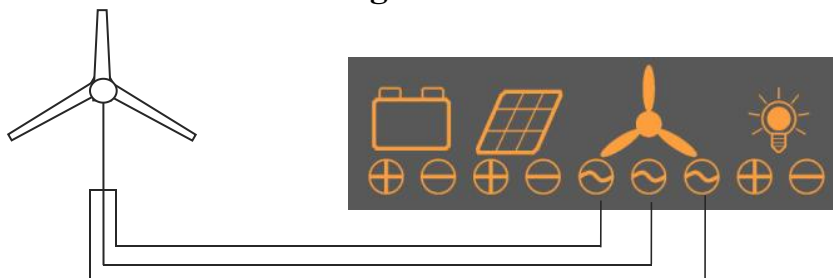


Figure2-3 Wind generator wiring

Connect wind generator to controller as shown in figure2-3.

- ⚠ The wind generator could produce high voltages. Be careful of electric shock.
- ⚠ When it is breeze or windless, connection of wind generator and controller would be safer and better. Only when controller is in the state of start-up, high-speed rotate wind generator could be connected.

## 2.2.4 Loads Wiring



Figure2-4 Loads wiring

Connect loads positive( + ) and negative( - ) to controller as shown in figure2-4.

- ⚠ 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.

## 3 Operation

### 3.1 Description of Buttons

Buttons	Description
OK	Enter into sub-screen or confirm the command.
◀	Switch between sibling menu or decrease the setting value.(Press more than two seconds change the setting value quickly )
▶	Switch between sibling menu or increase the setting value.(Press more than two seconds change the setting value quickly )
Esc	Return to parent screen or cancel the command.

### 3.2 Setting Parameters

- The parameters in shadow on Figure3-1 could be set manually by users.
- Parameter setting steps:
  1. Press “OK” to enter the setting state, setting value would flash.
  2. Press “ ◀ ” to decrease the setting value. Press “ ▶ ” to increase the setting value.
  3. The number would be set one by one from left to right. After one number is set, press “OK”, the flash number will be the next. When the last number (unit) is finished press “OK” to save the setting, press “Esc” to back out.

### 3.3 Overview of LCD Menu

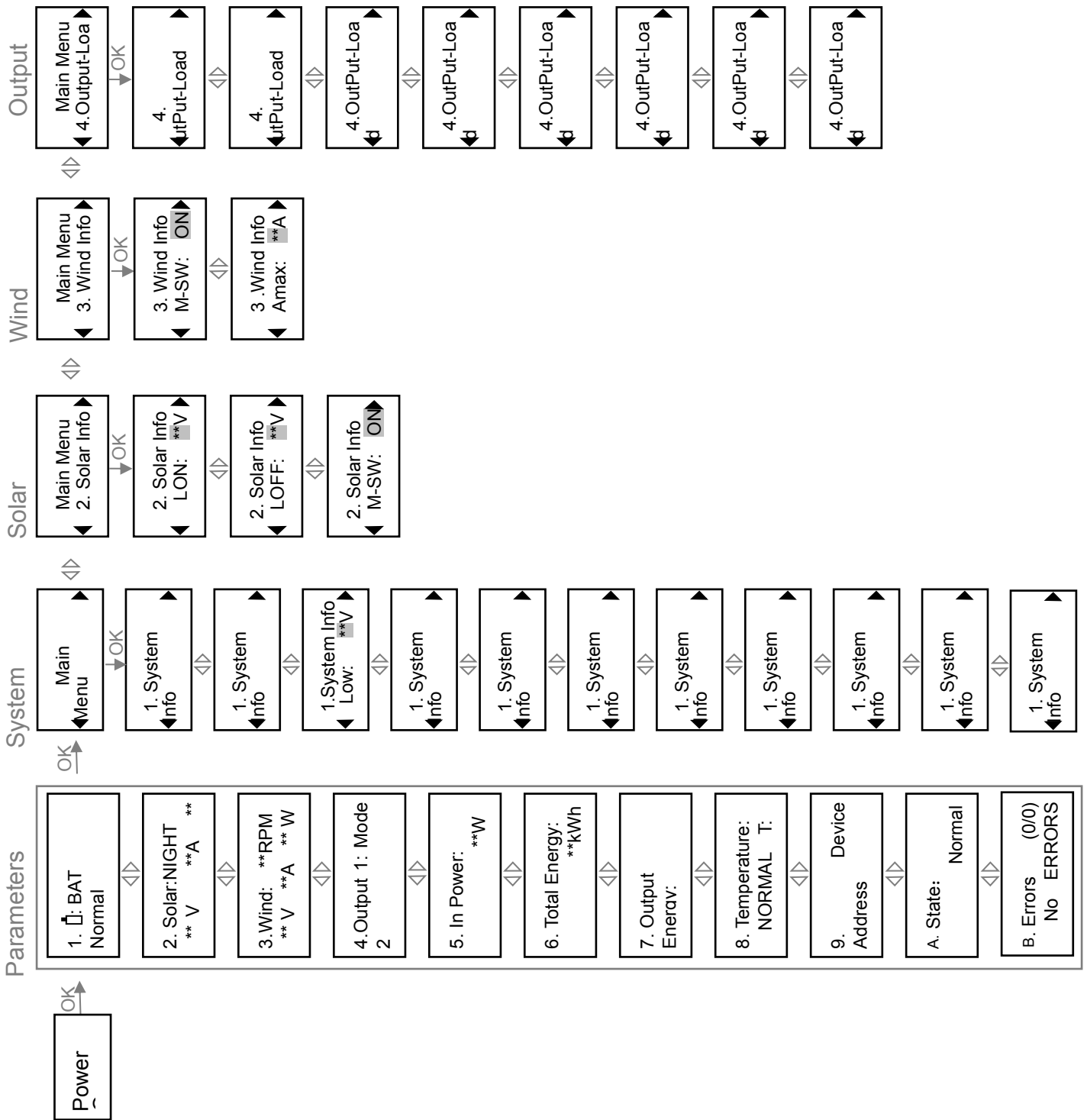




Figure3-1 Overview of LCD

### 3.4 Parameters Browsing

1. :BAT Normal  
\*\* V \*\*A \*\* W

 : **BAT** —**Battery information**

- Top right corner have below displays:
  - Low**—Battery power is low
  - Normal**—Battery power is normal
  - Full**—Battery power is full
- **\*\*V**—Battery voltage
- **\*\* I**—Battery charging current
- **\*\*W**—Battery charging power

2. Solar: NIGHT  
\*\* V \*\*A \*\* W

**Solar: Solar information**

- Top right corner have below displays:
  - DAY**—When solar voltage is higher than “Lon” voltage, right corner display “DAY”. It delays 1 minute. When controller is power on, it displays “DAY”, analysis present circumstance, 1 minute later it displays normally.
  - NIGHT**—When solar voltage is lower than “Loff” voltage, right corner display “NIGHT”. It delays 1 minute.
- **\*\*V**—Solar charging voltage
- **\*\*I**—Solar charging current
- **\*\*W**—Solar charging power

3.Wind: MS-OFF  
\*\* V \*\*A \*\* W

**Wind: Wind information**

- In normal working condition, the top right corner show nothing. If the upper right corner shows “MS-OFF”, the wind charging is off (“M-SW” which parameter is in wind information is state of “OFF” )
- **\*\*V**—Wind input voltage
- **\*\*A**—Wind input current
- **\*\*W**—Wind input power

4. Output: Mode2  
\*\* V \*\*A \*\* W

**Output: Output information**

- Top right corner displays the working mode of output
- **\*\*V**—Load output voltage
- **\*\*A**—Load output current
- **\*\*W**—Load output power

5. In Power:  
\*\*W

**In-Power**—**Total input power**

6. Total Energy  
\*\*kWh

**Total Energy—Total generated energy**

This value is cumulative. If you want to start from 0, set “Ener” in 3.4

Note: If cleared, the Total Energy and Output Energy are cleared at the same time.

7. Output Energy  
\*\*kWh

**Output Energy—Total output energy**

This value is cumulative. If you want to start from 0, set “Ener” in 3.4

Note: If cleared, the Total Energy and Output Energy are cleared at the same time.

8. Temperature:  
NORMAL T: \*\*C

**Temperature—Temperature information**

- NORMAL: MOSFET temperature is normal
- HIGH: MOSFET temperature is high.
- OTP: MOSFET temperature is over protect temperature.
- ERROR: Temperature detection is error.
- T: \*\*C \*\* Celsius degree.

9. Device Address  
Address: 1

**Device Address**—Address of this controller in standard MODBUS protocol. (The address could be set in 3.4.)

A. State: Normal  
C: \*\*\* L: \*\*\*

**State—Controller charge and discharge status**

- Normal: Battery is normal
- HVol: Battery is abnormal
- C: \*\*\* Time until controller charging returns to normal
- L: \*\*\* Time until output returns to normal

B. Errors: (0/0)  
No Errors.

**Errors: Errors code**

- **0/0** —The fault number / total faults  
For example: If it is 2/4. 2 indicate the error display on next line is the 2<sup>nd</sup> error of the 4 errors. 4 indicate there are 4 errors now. Press key “Menu” to browse the error display on next line. Press ◀ and ▶ to switch over. When the second line display “No Errors”, press “Menu” into parameters browsing.
- **NO BATTERY**—Battery is not detected or battery voltage is too low
- SHORT LOAD**—load short-circuit or current is large
- SOLAR OVER V**—Solar voltage is too high
- LOAD OVER V**—Load voltage is too high
- TEMP ERROR**—Temperature sensor error
- EEPROM ERROR**—Data storage error

### 3.5 System Information

Main Menu ◀ 1. System Info ▶	<b>System Info</b> —System information
1. System Info Batt: **Ah ▶	<b>Batt</b> —Battery capacity
1. System Info Ener: ADD ▶	<b>Ener</b> —ADD: Energy cumulates CLEAR: Energy clears to 0
1. System Info Low: **V ▶	<b>Low</b> —Under voltage of Battery
1. System Info RLow: **V ▶	<b>RLow</b> —Under-voltage recovery voltage of battery
1. System Info Float: **V ▶	<b>Float</b> —Floating voltage of battery
1. System Info Full: **V ▶	<b>Full</b> —Over voltage of battery
1. System Info RFul: **V ▶	<b>RFul</b> —Over-voltage recovery voltage of battery
1. System Info Out: **V ▶	<b>Out</b> —Over output voltage
1. System Info ROut: **V ▶	<b>ROut</b> —Over output voltage recovery voltage
1. System Info BNomV: 24V ▶	<b>BNomV</b> — Nominal voltage of battery. Display the rated voltage of battery at present

### 3.6 Solar Information

Main Menu ◀ 2. Solar Info ▶	<b>Solar Info</b> —Solar Information
2. Solar Info ◀ LON: **V ▶	<b>LON</b> —Light-control on voltage
2. Solar Info ◀ Loff: **V ▶	<b>LOFF</b> —Light-control off voltage
2. Solar Info ◀ M-SW: ON ▶	<b>M-SW</b> —Solar charging manual switch ON: turn on      OFF:turn off

### 3.7 Wind Information

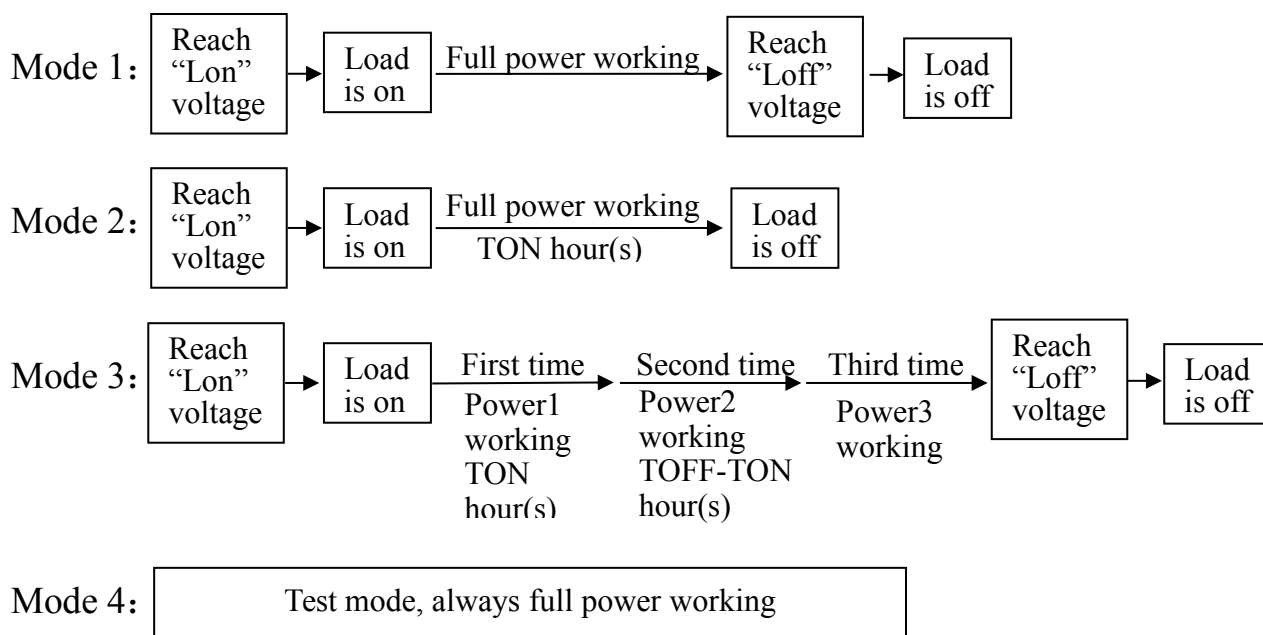
Main Menu ◀ 3. Wind Info ▶	<b>Wind Info</b> —Wind information
3. Wind Info ◀ M-SW: ON ▶	<b>M-SW</b> —Wind charging manual switch ON: turn on      OFF: turn off
3. Wind Info ◀ Amax: **A ▶	<b>Amax</b> —Maximum current of wind

### 3.8 Output Information

Main Menu ◀ 4.Output-Load ▶	<b>OutPut-Load</b> —Output load
4.Output-Load ◀ M-SW: ON ▶	<b>M-SW</b> —Output manual switch
4. OutPut-Load ◀ Mode: ** ▶	<b>Mode</b> —Output mode
4. OutPut-Load ◀ Rated W: **W ▶	<b>RatedW</b> —Rated output power
4. OutPut-Load ◀ TON: **h ▶	<b>TON</b> —Output time-control on

4.OutPut-Load TOFF: **h	<b>Toff</b> —Output time-control off
4. OutPut-Load Power 1: 0%	In the first time, Output working power / Output rated power *100%
4. OutPut-Load Power 2: 0%	In the second time, Output working power / Output rated power *100%
4. OutPut-Load Power 3: 0%	In the third time, Output working power / Output rated power *100%

**Output has 4 working modes for users:**



**For Example:**

*If you want the load work as follow:*

In first time, working 3 hours at 80% of rated power;  
 In second time, working 5 hours at 50% of rated power;  
 In third time, working at 90% of rated power.

*You could set as bellow:*

Power1 set 80%, Ton set 3h;  
 Power2 set 50%, Toff set 8h;  
 Power3 set 90%.

**Note:**

In 3.5, Lon, Loff could be set.  
 In 3.7 TON, TOFF, Power 1, Power 2, Power 3 could be set.  
 TON、TOFF are start from the same origination (reach Lon voltage), TON should be less or equal to TOFF  
 After reach light control voltage (Lon or Loff), load on or off have 1 minutes delay.

## 4 Software

The software is easy to operate need not to be installed. You can browse and set parameters on PC through the software. Users could ask the software from sellers.

- Browsing interface on PC:



- Contents displayed on browsing interface:
  - Battery: voltage; charging current; power; power obtained; generated energy obtained.
  - Solar: voltage; charging current; charging power; generated energy.
  - Wind turbine: voltage; charging current; charging power; generated energy.
  - Output load: voltage; current; power; output energy.
- Software using method could reference to the instruction of software compressed file.

## 5 Technical Parameters

### Electrical Parameter

Rated wind power	100W-600W
Rated solar power	100W-400W
Nominal system voltage	12V 24V 48V
Note: the above three parameters must meet the requirements	(rated wind power+Rated solar power) / Nominal system voltage $\leq 35A$
Max. wind input voltage	80V
Max. solar input voltage	80V
Dump load device	Built in electronic dump load
Wind turbine protection	Over Current protection dump load, manual brake dump load
Load protection	Over-discharge protection; over-charge protection, over current protection
Wind charging mode	PWM

Solar charging mode	PWM
Display mode	LCD
Operating temperature & Relative humidity	- 20~ + 55°C/35~85%RH(Non-condensing)
Quiescent power drain	≤1.2W
Communication function	RS232, RS485 (Alternative)

### Voltage Parameter

Battery voltage	12V	24V	48V	Adjustable
Battery under voltage (Low)	10.2V	20.4V	40.8V	
Battery under voltage recovery voltage(Rlow)	11.5V	23.0V	46.5V	
Battery over voltage(Full)	14.7V	29.4V	58.8V	
Battery over voltage recovery voltage(RFull)	13.2V	26.4V	52.8V	
Battery float voltage(Flot)	13.5V	27.0V	54.0V	
Over-load voltage(Out)	17.5V	35.5V	65.0V	
Over-load recovery voltage(ROut)	15.0V	30.0V	60.0V	

### Load Parameter

Solar voltage of light-control on (Lon)	6V(adjustable)
Solar voltage of light-control off (Loff)	6V(adjustable)
Max PWM output current	10A
Max output power of constant current load	12V 50W      24V 100W
Output working mode (Mode)	Mode 1 Light-control on. Light-control off (adjustable)

### Mechanical Parameter

Controller size	162mm*148mm*85mm	Net weight	1.8kg
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