

- Reverse charging protection: at night, controller can prevent battery reverse power to solar panel.
- Anti-reverse protection: in the process of operation, if the battery or solar cells are negative, won't cause damage to the controller. After the normal operation recover, the controller can work normally.
- Temperature compensation: 30 mv / °C/12V the controller's charging voltage will be changed ig the battery's voltage changes. The 12 v battery, temperature rise per 1 °C, charging voltage will increase 30 mv.

## • Troubleshooting and maintenance instructions

### 1, the system troubleshooting

Fault phenomenon	Possible reasons	Solution
When there is sunlight photovoltaic cells components, the green charging indicator light is not bright	Photovoltaic array line open circuit	Please check on both ends of the photovoltaic power supply wiring is correct, reliable contact
Green charging indicator light flash	Battery voltage is too high or disconnect the battery cable	Measure the battery voltage is too high, disconnect the cell attachment
Battery indicator light yellow	Battery under voltage	Does not affect the output of the load, sufficient electric lamp after automatic green recovery
The indicator of red will be brighter when battery state and the load is not work	Battery discharge	Automatic controller automatically shut down output after full charge indicator light green recovery
Load indicator light slow flash	Load overload	Reduce the load, click the key to restore output after Load decreased
Load indicator light fast flash	Load overload or short circuit	Reduce the load and check whether the short circuit, Click the key to restore output after the load is verified

### 2, system maintenance

In order to maintain the best performance for a long time, suggest doing the following check.

- Confirm all the system's connecting cables is normal or not twice a year, no looseness, virtual or terminals high-temperature discoloration phenomenon.
- Check all bare wires are due to friction in the sun, and other objects around, dry rot, insects or rodents destruction caused insulation damage twice a year. Repair or replace wire if necessary.
- Check the battery every three months if there is a liquid or terminal by oxidation phenomenon.
- Based on system usage, suggest replacing the battery every two years

## • Technical parameters

Parameter Description	Specific parameters
Rated system voltage	12V
Rated Current	10A
Charging circuit voltage drop	<200mV
Discharge loop drop	<150mV
Since the loss	<10mA
Temperature compensation coefficient	30mV/°C/12V (based on 25°C)
Over-discharge protection voltage	10. 8V
Over-discharge protection voltage recovery	12. 6V
Overvoltage protection	16. 5V
Output voltage Overvoltage Recovery	14. 8V
Overcharge protection voltage	15. 5V
Overload protection	60 seconds for 125% exceeded, 5 seconds for 150% exceeded
Short circuit protection	Close the output instantly
Phone charging over-discharge protection voltage	10V
Phone output voltage over-discharge recovery	10. 8V
Operating ambient temperature range	-35°C to +55°C
Storage temperature range	-35°C to +80°C
Dimensions	180*106*36mm

# Solar Controller

## Operation manual

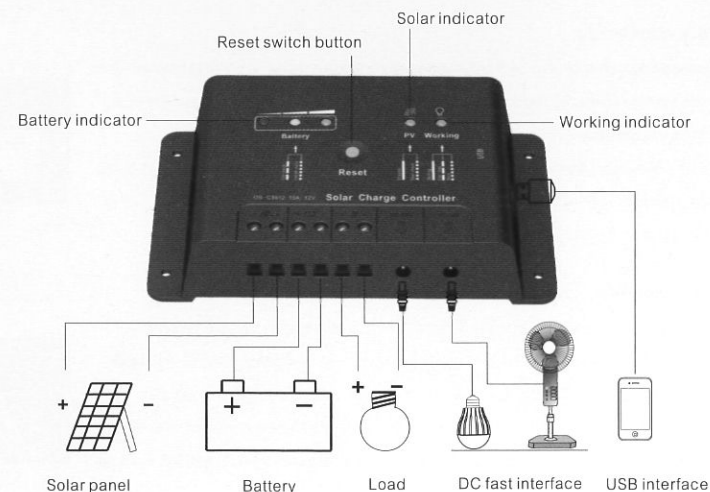
OS-C1012

Please read all the instructions and notes in the manual before installation.

## • characteristics and function

This controller has the functions of automatically control charging and discharging, which is suitable for solar off-grid system (independent system). Controller adopts the PWM segmented charging form in battery charging process, which can prolong the life of battery and improve the performance of system. Its complete self-test function and electronic protection function can avoid the damage to the controller due to installation error and system fault.

- Efficient series mode PWM charging ways, effectively prolong battery life, improve the system performance.
- Using power IR company MOSFET as key electronic switch to ensure the life of the product.
- Temperature compensation function, adjust the charging and discharging parameters automatically, prolong the service life of the battery
- Controller has the functions of overcharge protection, discharge protection, overload protection, short circuit protection, battery anti-reverse connection protection, and anti-reverse charging protection
- Having the functions of humanized automatic fault recovery and locking.
- Peak output current is 1.5 A with USB interface, which can satisfy the user's requirement for mobile phone fast-charging
- Equipped with dual DC fast interface, more convenient for users to connect small power load.



## • Installation instructions

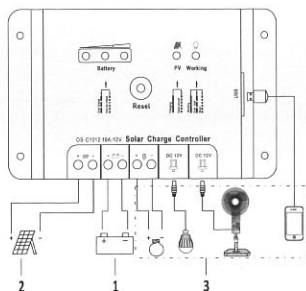
### 1. Note

Before installation, please read the whole installation section to be familiar with the installation steps.

- When installing, make sure the controller, battery and solar panel are at the same voltage-12V.
- Installing the battery carefully and avoiding placing metal objects near the battery, because the releasing current of battery under the short-circuit state can instantly burn out the cables or other metal materials.
- To ensure that the connectors are tight, and the wire should be fixed by the ribbon in case that the connectors will loosen. Due to the high contact resistance, virtual connection points and corrosion wire will emit large amounts of heating energy when an electric current passes through, which seriously will burn the surrounding material, or even cause fire;
- During operation, the system will give off heat, so the installing environment for the controller and battery should be in good ventilation condition.
- Outdoor installation should avoid direct sunlight and rain infiltration.
- System cables shall be selected in accordance with the current density of more than 3.5 A/mm<sup>2</sup>.

### 2. Installation

Controller in the positive control, wiring process special attention should be paid to negative identity.

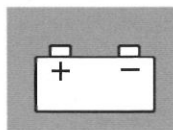


#### Connection sequence

- 1.battery
- 2.solar module
- 3.loads

#### Step 1: battery connection

The battery's connecting cable should be firmly tightened on the controller's terminal according to the identifiers instructions correctly. Adding circuit breaker or the fuse between the battery and controller's positive electrodes is strongly recommended, and the battery's connecting cable should not exceed 1.5 meters. If the connection is normal, the controller's battery status indicator light and working indicator light will be brightened. If the connection is wrong, there would be not any phenomenon, but it won't damage the controller.



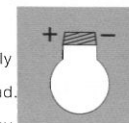
#### Step 2: solar cell connection

The solar cell battery's connecting cable should be firmly tightened on the controller's terminal according to the identifiers instructions correctly. If the solar cells are in parallel input, the solar cell's current should firstly pass through the junction station, and then through the controller together with a single cable. If the connection is normal, the controller's charging indicator will be brightened. If the connection is wrong, the indicator light has no reaction, but this situation will not damage the controller.



#### Step 3: load connection

Please make sure that the voltage of electric equipment and battery is the same before connecting the load. The loading's connecting cable should be firmly tightened on the controller's terminal according to the identifiers instructions correctly. If the load cable's specification is 55 \* 2.1 with DC head, it can be directly inserted into the controller's DC output connector quickly. Then the controller can supply power to the load. Pay attention to the positive and negative electrodes when connecting the load, if they are reversed, it may cause damage to electric equipment.



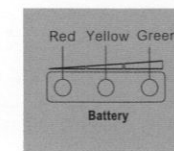
If abnormal phenomenon turns up during the installation, please refer to the system troubleshooting instructions.

## • operating instructions

### 1. the indicator light shows

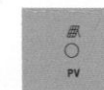
#### (1) Battery power indicator function description

Undervoltage voltage	11. 5V---12. 6V	the indicator of yellow will always brightened
Normal voltage	12. 6V---13.8V	the indicator of green will always brightened
Fully charged voltage	>13.8V	the indicator of green will be slow flash
Overpressure voltage	>16.5V	the indicator of green will be quick flash
Low pressure alarm	10.5V---11V	the indicator of red will be slow flash
Discharge voltage	10.5V	the indicator of red will always brightened



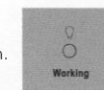
#### (2) Solar battery indicator function description

The indicator of green will be brightened	Solar power supply electricity to system normally
The indicator of green will be flickered	Battery open circuit or battery overcharge



#### (3) The load indicator function description

The indicator of green will be brightened	System supply electricity for the load normally.
The indicator of green will be slow flash	System appears overload, the output will be shut down.
The indicator of green will be quick flash	System will close output for short circuit or overload



### 2. the keys instruction

The key has the reset function. After the system failure, press the key to reset the controller, and then return to normal operation. After the long-term overload or short circuit protection, need to press the key to restore the load output.

### 3. the protection function

- Overload protection: protection within 60 seconds if 125% and protection within 5 seconds if 150%. The loading indicator lights will flash slowly if the output is not closed after overload, while the loading indicator lights will flash quickly after the overload protection. The output will recover automatically in 10s within 3 times after overload, but could not recover output after three consecutive overloads.
- Short circuit protection: instantly close output, recover in 10s after short circuit protection, after three times could not restored.
- Over discharge protection: when the battery voltage is lower than 10.8 V, the controller's output will close. When the battery voltage recovers to 12.6 V, system will automatically restore output.
- Overcharge protection point: after the battery voltage exceeds 15.5 V, the controller's output will close. When the battery voltage down to 14.8 V, system will restore output automatically.