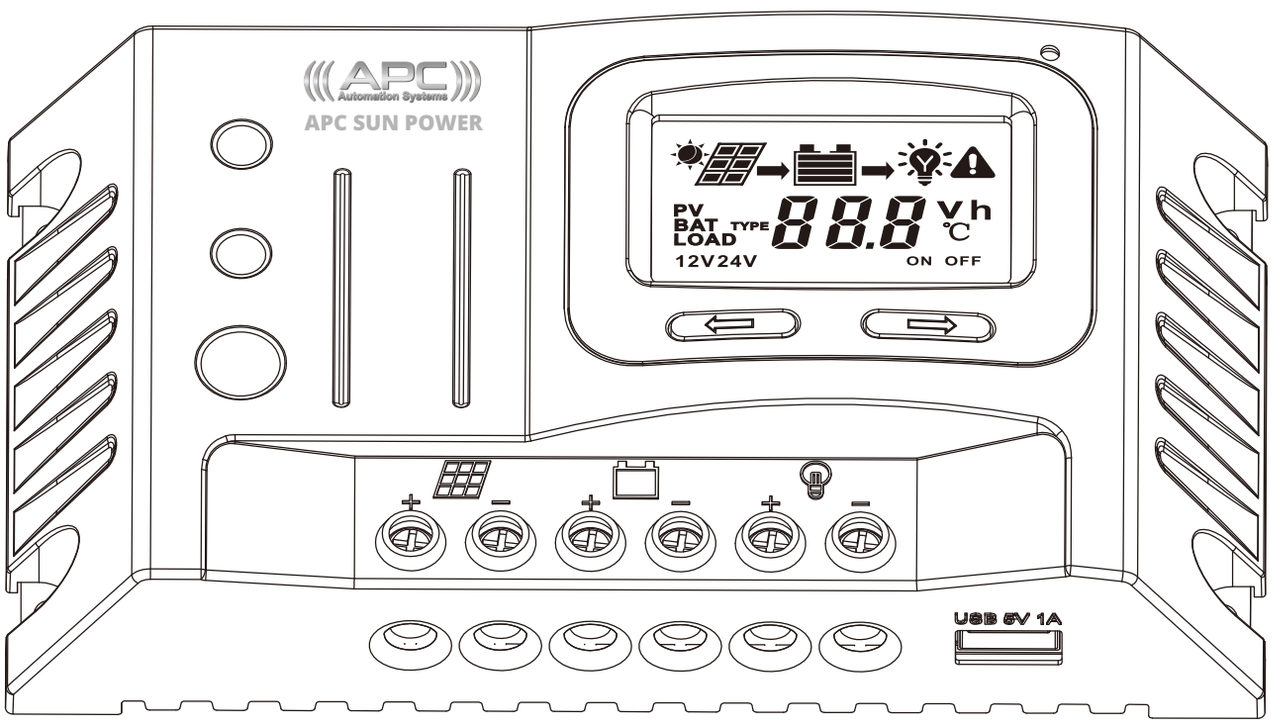
SUN POWER Series

USER'S MANUAL



12V/24V 10A

Dear Users:

Thank you for selecting our product. Please read this manual carefully before you use this product.

This series product base on in series PWM mode, with full digital technology and LCD display, auto run mode with large application range, such as off-grid solar home system, traffic indicator, solar street lights, solar garden lights and so on. The intelligent charging process has been optimized for long battery life and improved system performance.

Features

- 32bits CPU, sampling precision is higher, operation speed is faster
- 12V/24VDC Automatic Identification System Voltage
- 3 stages PWM charging: Bulk, Boost, Float
- Sealed, Gel, Flooded, LiFePO4, Li(NiCoMn)O2 battery selection procedure
- Humanized LCD displaying, dynamic display operation data and working state.
- Built-in operation log, account system working state
- Multi load control mode: Normal mode, Sensor mode, Timer mode
- Temperature Compensation Function
- Fullest digital protection functions: Overcharging, Over-discharging, Overload, Short Circuit, Reverse Connection and so on
- Max 10mm^2 connectors
- 5V 1A USB output

Important Safety Information

- It is better to install controller in the room. If install the controller outside, please keep the environment dry, avoid direct sunlight
- The controller will be hot in process of working, please keep the environment ventilation, away from flammable.
- The Voc of solar panels is high (especially 24V system, please take care

❖ The battery had acidic electrolysis, please put on goggles during installation. If you accidentally exposed to electrolysis, please rinse with water.

❖ The battery has huge power, prohibit any conductor short circuit the positive and negative pole of battery. Suggest to adding a fuse between battery and controller. (Slow motion type, the action current of the fuse should be 1.5 times rated current of controller.)

The suggestion of using

★ The controller could detect the temperature of environment to adjust the voltage of charging, so that the controller should be closed to battery as near as possible.

★ Recommend system current density of cables less than 3A/mm^2

★ Try to use multi strand copper wire in order to connecting with the terminal firmly. Loose power connection and/or corroded wires may result in resistive connections that melt wire insulation, burn surrounding materials or even cause fire.

★ The battery should be full charged each month. Or the battery will be destroyed

Installation of Instructions

■ Controller Fixed

1) The controller should be installed well-ventilated place, avoid direct sunlight, high temperature and do not install in location where water can enter the controller.

2) Please select correct screw to fix the controller on the wall or other platform. Screw M4 or M5, Screw cap diameter less than 10mm.

3) Please reserve enough space between the wall and controller, to allow for cooling and cable connection.

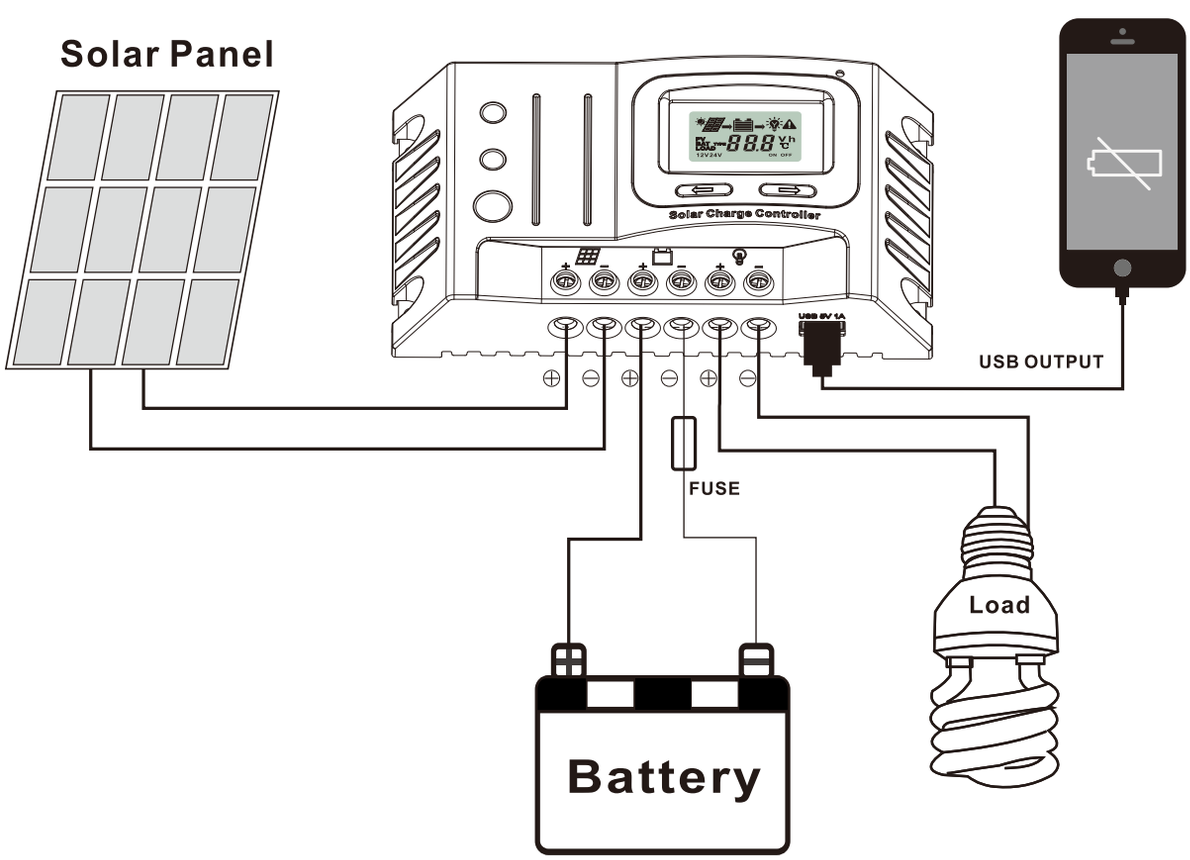
4) The mounting holes distance is 155.8mm*63mm, diameter of the hole is 5mm

■ Controller Connection

★ All terminals are in tight status after factory, in order to well connected, please loose all terminals at first.

★ The following order of connection please do not free change, or cause system voltage recognition fault.

In order to avoid fault installation, please refer to below procedure



1) As figure, first connected the battery to controller correct poles. In order to avoid short circuit, please screw the cable of battery to the controller in advance, then connected to battery poles secondly. If your connection is correct, the LCD displaying will show battery

voltage and other technical data. If LCD no displaying, please check the fault. The length of cable between battery and controller as shorter as possible. Suggest to 30CM -100CM.

- **If short circuit happened on the terminals of controller, it will be result in fire or explode. Please be careful. (We strongly suggest to connecting a fuse at the battery side 1.5time of rated current of controller.)**

- **If the battery reverse connection, the output of controller also same with battery polarity, please do not connect any load with controller at that time, or the load and controller will be destroyed**

2) As figure, connected solar panels with controller correctly, if the connection is successful and sunshine is full, the LCD will show solar panel and an arrow from solar panel to battery will be light.

Warning: The solar panel will generate very high voltage under sunshine, cause injury or destroy controller, especially in 24V system

3) As figure, connected loads with controller correctly. In order to avoiding injury from load voltage, please close to the output of controller with button at first, then connected the load on the controller. The controller do not offer reverse connection protection for load, so please take care, reverse connection for output will be destroy loads.

Attention: If users want toconnect inverter or inrush starting current loads, please connected them with battery

directly, do not connected them with controller, or the controller load can not be start or destroy.

4) USB output: USB offer 5V Max charging current 1000 mA for Mobile, Laptop, MP3 and so on.

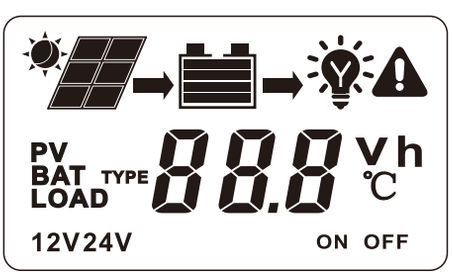
Warning: Please do not connect USB loads to anywhere, the USB output negative poles is in series with Load negative poles.

■ **About ground connection of solar system**

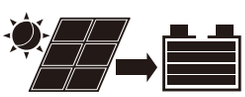
Please noted, this solar charge controller designed by all positive connection, all components inside the controller are positive combined together. If your solar system needs ground connection, please let positive ground connection.

Warning: For some force to ground connected system, such as solar communication system, portable solar system, they are negative ground connected, at this time please do not positive connected, or can cause short circuit.

Main Interface

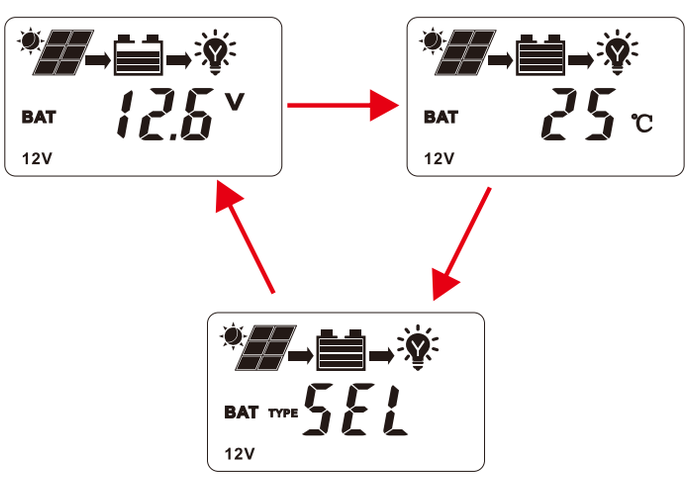


Name	Symbol		Indicate function	
Battery			Battery capacity indicator	
	12V24V		System Voltage	
	BAT		data about battery	
	BAT TYPE		Battery type	
Load			Load on	Load off

	LOAD	data about Load
	LOAD TYPE	Load working type
Solar Panel		Correct connect solar panel and in daytime
		No connect solar panel or wrong connection or at night
		charging
		No charge
	PV	data about charging

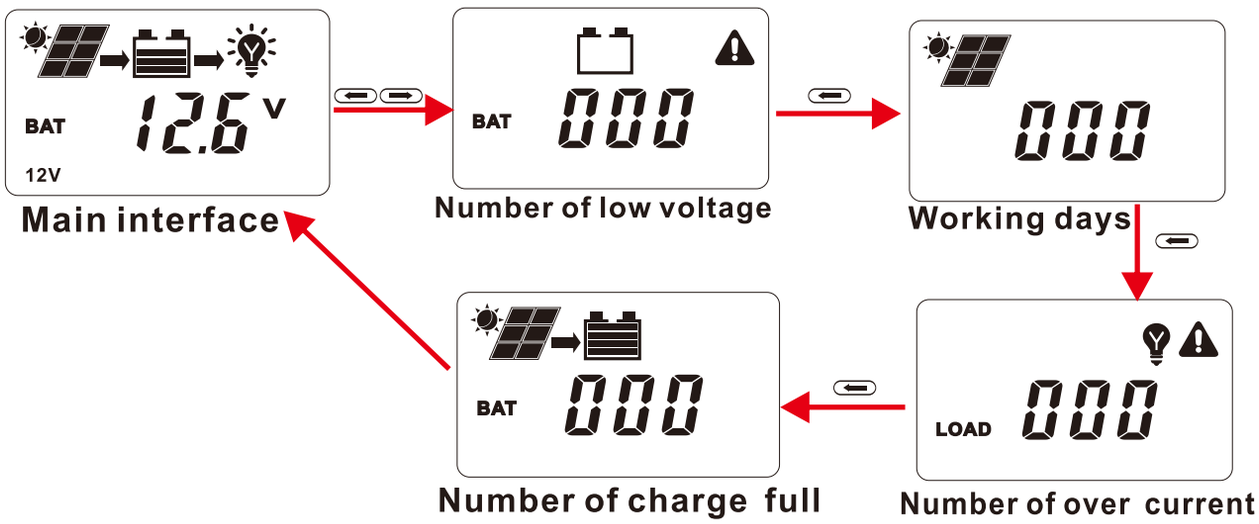
Operation and Indication of controller

➢ Main Interface

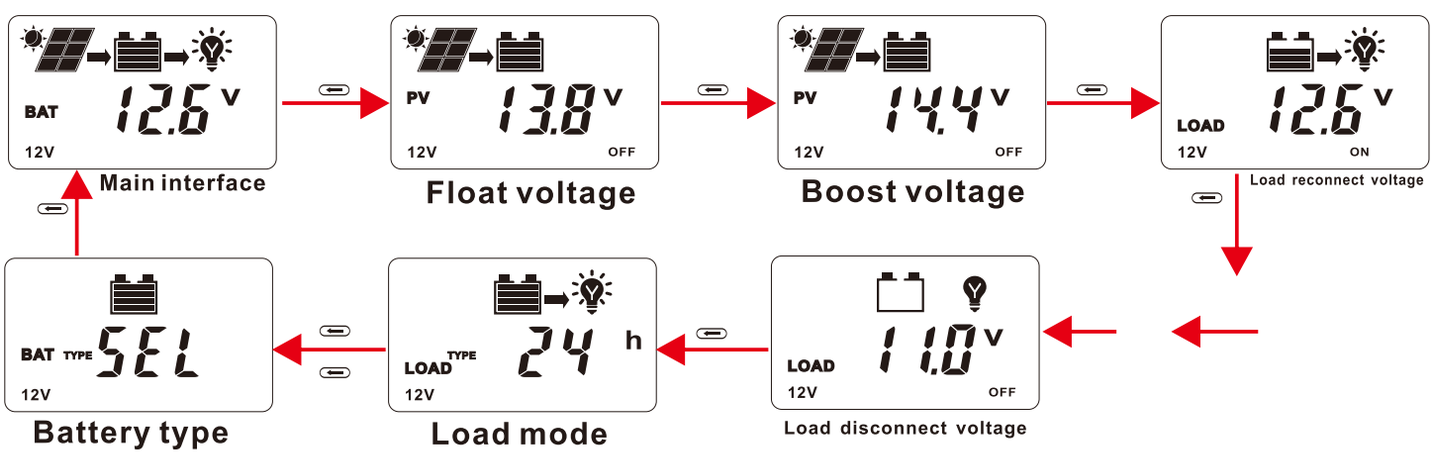


- ❖ If no operation at main interface inner 10s, the main interface will show battery voltage, temperature of environment, battery type, each parameter keep 3s. Long press "→" could speed loop display.
- ❖ At main interface short press "→" could on or off load.
- ❖ At main interface, long press "←" and "→" together 5s could show

operation log, such as times of LVD, working days, times of Over current protection, times of HVD



➢ **At main interface press "←" button could enter into menu interface**



1) Float Voltage: When the voltage of battery reach to this set point, the controller will start PWM charging function, limited voltage of battery rising, keep the battery in full condition. Press "←" button enter into menu interface of float voltage. Long press "←" button≥ 5S the parameter on the interface will be flash, here is set up state. Loose the button, press "←" or "→" could plus or minus the data. After confirm the needed data, long press "←" ≥5S, the data save and come out set up state. If no any cooperation inner 20s, automatically back to main interface.

2) Boost Voltage: When the battery voltage less than 12.6V, the HVD auto reach to 14.4V at the same time keep 2hours can back to float voltage.
3) Low Voltage Reconnection Voltage (LVR): When the controller detected and closed the output of load. If the controller reconnect the output, the voltage of battery must be higher than LVR voltage or press "→" at main interface force to release. The procedure same with (1).
4) Low Voltage Disconnection Voltage(LVD): When the voltage of battery is low, the load output will be cut off. When the controller detected the battery voltage was less than LVD point, the cut off function will be immediately working. At the same time, the status of controller is in lock. Users have to charge the battery, when the battery voltage is higher than LVD voltage or press "→" at main interface force to release. The procedure same with (1)
5) Load Working Mode Selection: The control default load working 24hours. When the Load Working Time set to 24hours, the load will keep working 24hours in no fault status. When the load working time set to ≤23H, it means the load start timer or sensor function. If the battery capacity is enough, the load will be started at sunset. The load will work under timer setting hours or stop working till sunrise.

When the load join into timer or sensor mode, if the reset working time more than actual night time, the load output will be closed at sunrise, although the working time is not reach to setting hours. For example, the local actual night time

is 10hours, user reset the working time at night is 12hours, but 10hours later the output will be closed automatically, the balance hours will be back to zero. The load will be working with next sunset signal.

6) Battery Type Selection: Built-in 5 types battery data. Different battery will use different parameter. (Default SEL battery parameter)

Battery Type	SEL	GEL	FLD	LIF LiFePO4(4s/12V; 8s/24V)	LI3 Li(NiCoMn)O2 (3s/12V; 6s/24V)
Over Voltage Disconnect	16.0V	16.0 V	16.0 V	16.0V	17.5V
Charging Limited Voltage	15.0 V	15.0 V	15.0 V	14.8V	17.0V
Over Voltage Reconnect	15.0 V	15.0 V	15.0 V	14.8V	17.0V
Boost charge	14.4 V	14.2 V	14.6 V	14.6V	12.6V
Float charge	13.8 V	13.8 V	13.8 V	14.2V	12.3V
Boost Restart Voltage	12.6V	12.6V	12.6V	13V	11.5V
Low voltage reconnect	12.6V	12.6V	12.6V	12.6V	11.0V
Low voltage disconnect	11.0V	11.0V	11.0V	11.0V	9.2V

Attention: About the control parameter of battery, we had fully consider user' s working condition, if customers want to adjust the parameter, please refer to battery supplier suggestion, or unreasonable adjust will destroy battery.

Protection Functions

❖ **Fault Symbol Indication**

State	Symbol	Instruction
LVD		Battery empty and Warning Flash
HVD		Battery full and Warning Flash
Over current protection		Load and Warning Flash

- **Short Circuit and Reverse Connected Protection (Solar Panel)**
  When the solar panels have short circuit or reverse connection, the controller will be off the charging immediately, after clearing of the short circuit, the charging will be automatically continue.
- **Reverse Connection of battery Protection**
  If the batter reverse connection, the controller will not destroy, corrected the connection the controller will be normally working.
- **Battery Over Voltage Protection**
  When the voltage of battery was more than 16.5V, the controller will be auto closed charging and output in order to destroy the battery and loads.
- **Battery Low Voltage Protection (LVD)**
  When the voltage of battery was reach to LVD (Low Voltage Disconnection) point, the controller will be auto closed the output in order to over-discharge the battery.
- **Overload Protection**
  If the current of load is more than 1.5times rated current of controller, the controller will be cut off the output after 30s and lock. Users have to decrease loads and press "→" unlock, or 30s later the controller will auto restart unlock.
- **Short Circuit Protection**
  When the load have short circuit, the controller will be cut off immediately and lock. Users have to clearing the short circuit and press "→" unlock, or 30s later the controller will auto restart unlock.
- **Lightning Protection**
  This product could only protect small lightning induction, we suggest to use lightning rod at frequency area.

Fault and Handling

Fault Phenomenon	Possible reason	Solution
LCD no display after connected with battery	● Battery Low ● Battery Reverse Connection ● The connection cut off	Please confirm the voltage of battery reconnect the controller with battery firmly and correctly.
Full of sunshine vertical on solar panel, no solar symbol and no charge symbol on LCD.	The solar panel connection open circuit, short circuit, or reverse connected	Please check the cable of solar panels if they are correct connection and firmly.
The controller displaying LVD	The battery is over discharging	Please check the system design is reasonable or not. If there is discharging capacity more than charging
The controller displaying HVD	The voltage of battery is high	Please first cut off the solar panel and see if the voltage get down normal level. If the fault do not finish, please cut off the battery with controller and reconnect again
The controller displaying Over Current Protection	The load is short circuit, or over load or high surge power	Please check the load cables have short circuit, the power of the load over rated design, the surge power of load too high

Technical Data

System Voltage	12V/24V
PV Max Input Voltage	55V
Self-consumption	≤12mA
Max Charge Current	10A
Max Discharge Current	10A
LVD	11.0V ADJ 9V....12V ; ×2/24V
LVR	12.6V ADJ 11V....13.5V ; ×2/24V
Float	13.8V ADJ 13V....15V ; ×2/24V
Boost Voltage	14.4V ADJ 13V....17V ; ×2/24 battery voltage less than 12.6v auto boost 2hours
Battery Over Voltage Disconnection Voltage	16.5V ; ×2/24V
Reverse Connection Protection	Yes
Load Over Current Protection	Yes, each 30s auto restart again
Charge Type	PWM
Temperature Compensation	-24 mV /℃ for 12Vsystem ; ×2/24V ;
Working Temperature	-20℃---+50℃
Terminal scale	14---6 AWG 10mm^2
Waterproof grade	IP32
Size	168mm× 92mm× 34mm
New weight	320g

* Please under rated power using under high temperature environment.

Mechanical size