※ Thank you for selecting this series solar charge controller. Please read this manual carefully before using the product.
※ Please keep this product manual for future reference.

PWM solar charge controller

1. Overview

Thank you for selecting this series common positive solar charge controller. The controller is a PWM charge controller with built in LCD display that adopts the most advanced digital technique. The multiple load control modes enable it can be widely used on solar home system, traffic signal, solar street light, solar garden lamp, etc. The features are listed below:

- Adopt high quality components of ST, make sure product using lifespan
- Controller can work continuously at full load within the environment temperature range from -15 to 50 ℃
- 4-Stage intelligent PWM charging: Bulk, Boost, Equalize, Float
- Support 4 charging options: Sealed, Gel, Flooded and User
- LCD display design, dynamically displaying device's operating data and working condition
- Double USB design, the power supply charge for electronic equipment
- With humanized button settings, operation will be more comfortable and convenient
- Multiple load control modes
- Battery temperature compensation function

2. Product Features

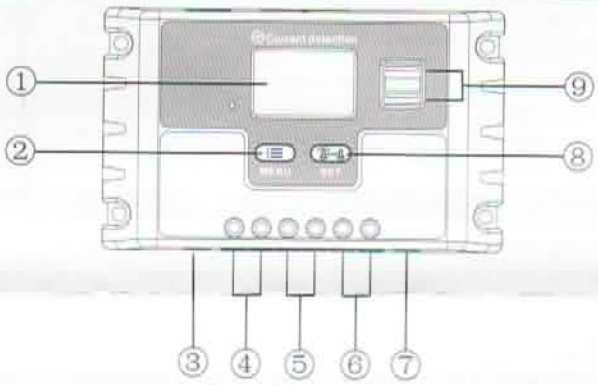


Figure 1 Characteristic

①	LCD	⑥	Load Terminals
②	MENU Button	⑦	DC Loading Terminal (Optional)
③	ETS Port (Optional)※	⑧	SET Button
④	PV Terminals	⑨	USB Output Ports※
⑤	Battery Terminals		

※ USB output ports provide the power supply of 5VDC/1.2A and have the short circuit protection.
※ ETS (External Temperature Sensor)

3. Wiring

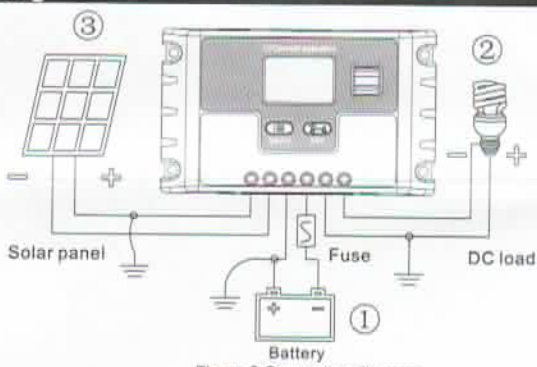


Figure 2 Connection diagram

(1) Connect components to the charge controller in the sequence as shown above and pay much attention to the "+" and "-". Please don't insert the fuse or turn on the breaker during the installation. When disconnecting the system, the order will be reserved.

(2)After power on the controller, check the LCD on. Otherwise please refer to chapter 6.Always connect the battery first, in order to allow the controller to recognize the system voltage.

(3)The battery fuse should be installed as close to battery as possible. The suggested distance is within 150mm.

(4) This series is a positive ground controller. Any positive connection of solar, load or battery can be earth grounded as required.

NOTE: Please connect the inverter or other load that it has the large start current to the battery rather than to the controller, if the inverter or other load is necessary.

4. Operation

4.1 Button Function

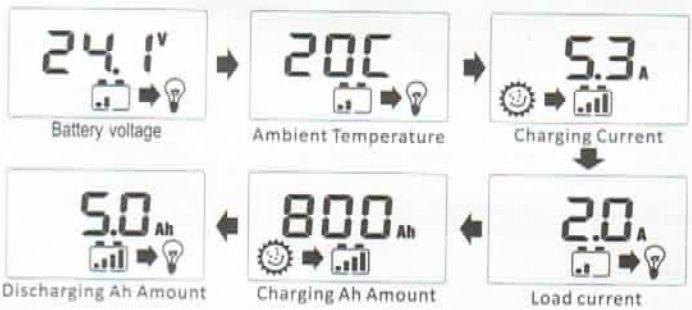
Mode	Remark
Load switch	Press the SET button lightly to switch the load.
Error Clearing	Press SET button lightly.
Browsing mode	Press MENU button lightly.
Setting mode	Press MENU button longer and enter setting mode,Press MENU or SET button lightly to set parameters,press MENU button longer to confirm modification ;If no operation for 10s, it exits the interface automatically.

4.2 LCD Display

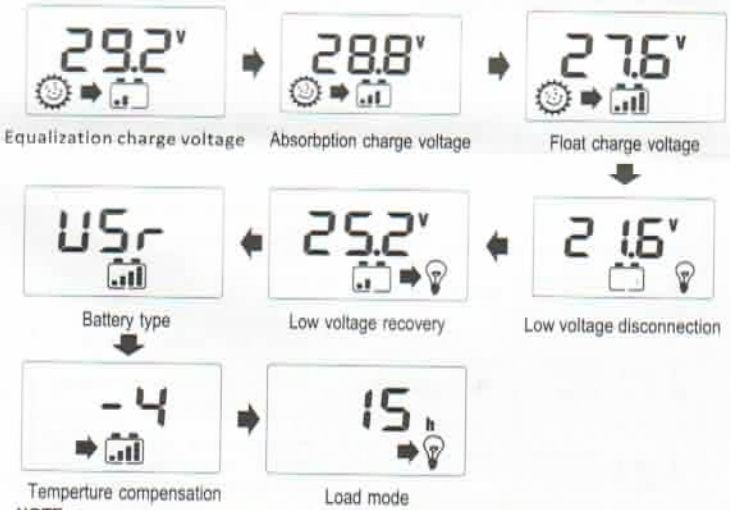
➢ Status Description

Item	Icon	Status
PV array		No charging
		Charging
Battery		Battery capacity
Load		Load ON
		Load OFF

➢ **First level browsing interface**



➢ **Second level browsing interface**



NOTE: 1.In battery voltage interface of the first level browsing interface ,by pressing MENU button longer ,second level browsing interface will appear. And it exits the second level browsing interface automatically if no operation for 10s.
2.Restore Ah Amount: Press SET over 3s under screen of "Charging Ah Amount" or "Discharging Ah Amount".
3.Restore Factory Setting: Press SET over 3s under screen of "Environment Temperature".

⊕ Current detection

➢ **Fault Indication**

Status	Icon	Description
Battery over discharged		Battery level shows empty, battery frame blink, fault icon blink
Battery over voltage		Battery level shows full, battery frame blink, fault icon blink
Load failure		Load icon is flashing,over-load

4.3 Battery Type

➢ **Operating Steps**

In battery interface of second level browsing interface ,by long press MENU button , value flashes. Then press MENU or SET button shortly to modify setting. Keep and exit setting by long press MENU button.

User Sealed Flooded Gel

NOTE: Please refer to the battery voltage parameters table for the different battery type.

4.4 Load mode setting

➢ **Operating Steps**

In Load mode interface of second level browsing interface ,by long press MENU button , value flashes. Then press MENU or SET button shortly to modify setting. Keep and exit setting by long press MENU button.

Code	Working mode for load
15	Regular controller mode
14	Light controller mode
0-13	Light controller with switch-off at night (0-13hrs)

5. Protections

Protection	Conditions	Status
PV Reverse Polarity	When the battery is correct connecting, the PV can be reversed.	The controller is not damage
Battery Reverse Polarity	When the PV is not connecting, the battery can be reversed.	
Battery Over Voltage	The battery voltage reaches to the HVD	Stop charging and Stop discharging
Battery Over Discharge	The battery voltage reaches to the LVD	Stop discharging
Load Overload	The load current exceeds the rated current of controller	Output is OFF Clear the fault: Press the SET button or restart the controller
Overheating Alert	Over-heat Above 85 ℃	Stop Charging

6. Troubleshooting

Faults	Possible reasons	Troubleshooting
The LCD is off during daytime when sunshine falls on PV modules properly	PV array disconnection	Confirm that PV wire connections are correct and tight
Wire connection is correct, LCD not display	1) Battery voltage is lower than 9V 2) PV voltage is less than battery voltage	1) Please check the voltage of battery. At least 9V voltage to activate the controller 2) Check the PV input voltage which should be higher than battery's
E12 Interface blink	Battery over voltage	Check if the battery voltage is higher than OVD point (over voltage disconnect voltage), and disconnect the PV.
E11 Interface blink	Battery over discharged	When the battery voltage is restored to or above LVR point (low voltage reconnect voltage), the load will recover
E13 Interface blink	Over load	Please reduce the number of electric equipments or check carefully loads connection.
E15 Interface blink	Overheating Alert	Check Whether Controller Match With Solar Panel Power

7.Technical Specifications

Rated charge/discharge current	10A	15A	20A	30A	50A	60A
Nominal system voltage	12/24VDC Auto					
Battery input voltage range	9V~32V					
Max. PV open circuit voltage	50V					
Battery type	Usr (Default)/Sealed / Gel / Flooded					
Equalized Voltage※	User(Defualt)/Selaed:14.6V/Gel:13.8V/Flooded:14.8V					
Boost Charging Voltage※	Usr (Default)/ Sealed:14.4V/ Gel:14.2V/ Flooded:14.6V					
Float Charging Voltage※	Usr (Default)/Sealed/Gel/Flooded:13.8V					
Low Voltage Reconnect Voltage※	Usr (Default)/Sealed/Gel/Flooded:12.6V					
Low Voltage Disconnect Voltage※	Usr (Default)/Sealed/Gel/Flooded:10.8V					
Self-consumption	≤11.5mA/12V;≤13.5mA/24V;					
Temperature compensation coefficient	-4mV/℃/2V (25℃)					
Charge circuit voltage drop	≤0.25V					
Discharge circuit voltage drop	≤0.12V					
Working environment temperature	-15℃~+50℃(Product can work continuously at full load)					
Relative humidity	≤90%, N.C.					
Enclosure	IP30					
Grounding	Common Positive					
USB output	5VDC/1.2A (Total)					
Overall dimension	130x75x36 mm		140x85x 34.5 mm	160x95x 37mm	192x114x53.5mm	
Mounting dimension	118x50mm		128x60 mm	146x60 mm	178x73mm	
Mounting hole size	Φ5mm					
Terminals	6mm²/9AWG		10mm²/ 7AWG	16mm²/5AWG		
Net weight (Approx.)	0.19kg		0.263kg	0.315kg	0.474kg	0.554kg

※**Above the parameters are in 12V system at 25℃, twice in 24Vsystem.**

Any changes without prior notice!

8. Disclaimer

This warranty does not apply under the following conditions:

1) Damage from improper use or use in an unsuitable environment.

2) PV or load current, voltage or power exceeding the rated value of controller.

3) The controller is working temperature exceed the limit working environment temperature.

4) User disassembly or attempted repair the controller without permission.

5) The controller is damaged due to natural elements such as lighting.

6) The controller is damaged during transportation and shipment.