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1. Overview:

GSC Series MPPT-type Solar Charge Controller is specifically designed for home-use solar system, solar DC street lighting system, small-scale solar power plant system, solar DC power supply system, and other electrical premises. It employs advanced low-power consumption, high-performance micro-controller, dedicated control algorithm, tandem PWM charging circuit which can intelligently control solar cell to both charge the battery and supply the power for DC load. It has complete protection mechanism and achieved "MPPT+SOC" double intelligent charge control. All power switching devices employ low-loss, high-efficient, long-life MOSFETs, using synchronous rectification technology, which greatly reduces the power loss of charging circuit and load output circuit and thus is a green and environmental protection smart charge controller.

2. Safety Precautions:

- 1) The controller is wall-mount installed, which can take advantage of airflow's "chimney effect" for cooling the controller. The top of the controller shall not be covered by any airtight material and firmly fixed.
 - 2) Select appropriate cable, recommend the standard wire that the current is not more than 5A per square millimeter and minimize the wire length to reduce the conduction losses.
 - 3) Controller must be installed inside the room where it's dry and ventilate with good heat dissipation. The product should not be used in the following environments:
 - a) Place of humidity, rain and sun, such as bathrooms, outdoor;
 - b) Place with potentially explosive gas or combustible gas;
 - c) Place stacked of combustibles nearby;
 - d) Place where children are easy to reach;
 - e) Place where temperature exceed the range of -20℃, +45℃.
 - 4) To ensure the battery wiring is correct and the controller can work properly, then connect the wires of the solar panels, pay attention to the "+", "-", "pole, no reverse. If there is sunlight, the charging status LED should be on. Otherwise, need to check the connections.
 - 5) When replacing the battery or turning off the battery switch, the solar cell connection and load connection have to be disconnected first. It is strictly prohibited to have solar power input if the system isn't function properly.
- Safety Warning: batteries and solar cable connection short circuit may lead to ignition burns and fire hazard. Battery + (positive), - (negative) pole reversed, wrong connection or short circuit is strictly prohibited.
- 6) Multi-class lightning protection system consists of special lightning protection devices should be used for lightning-prone areas.

7) System Configuration Notes:

- Battery voltage must be consistent with the system rated voltage, otherwise it will lead to the damage of device or battery pack;
- Battery pack capacity (AH) must be three times bigger than the maximum output current of the solar panels;
- The maximum output current and voltage of solar panel should be less than the controller rated current and voltage;
- The maximum output current of solar panels shall not exceed 30% of the rated capacity of the battery;
- The open circuit voltage of solar panels shall not exceed 2 times of rated voltage of the battery pack;

(The company follows a strategy of sustainable development, and reserves the right of not inform in advance if improvements of the user manual content have been made.)

3. Technical Parameters

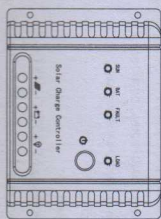
Model	F12-05 F12-05M	F12-10 F12-10M	F12-20	F24-05 F24-05M	F24-10 F24-10M	F24-20
System voltage	12V					
Max. Rated Charging Current	5A	10A	20A	5A	10A	20A
Output Current	5A	10A	20A	5A	10A	20A
PV panels (Imp ≤ Rated current)	≤ 5A	≤ 10A	≤ 20A	≤ 5A	≤ 10A	≤ 20A
Battery capacity	17Ah ~ 400Ah					
Max. efficiency	> 98%					
Max. PV Input voltage (Voc)	0 - 25V			0 - 50V		
PV working voltage (Vmp)	14.5-18V			29V-38V		
Rated battery voltage	12V					
Equalized charge voltage	14.6V ± 0.2V					
Floot charge voltage	14.4V ± 0.2V					
Overcharge	14.8V ± 0.2V					
Over discharge resume starting voltage	13.2V ± 0.2V					
Under voltage alarm	11.2V ± 0.2V					
Over discharge	10.8V ± 0.3V					

Over discharge resume starting voltage	13.2 ± 0.2V	26.4 ± 0.4V
Over load, short circuit protection	125% (60s) / 150% (10s) / short circuit shut down automatically;	
PV anti-reverse polarity protection	Yes	
Control mode	Switch control / PWM	
Display	LED	
Alarm mode	Sound(optional), light alarm	
Working temperature	-20°C ~ +45°C	
Relative humidity	0-95% (Noncondensing)	
Storage temperature	-25°C ~ + 85°C	
Storage humidity	≤ 85%	
Installation method	Hanging vertical installation	
Dimension (mm)	136 × 100 × 35	

Note: "M" means with MPPT function

4. Panel Description

1) Controller Panel Description:



2) LED Display:

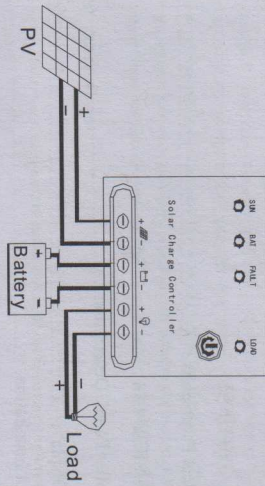
SUN: On, PV input in normal mode; Flash, PV overvoltage; Red light on, PV polar reversed

BAT: Green light on, battery input in normal mode; Green light flashes (1time/1s), battery over discharged; Yellow light on, (1time/1s) charging over current.

FAULT: long bright, output short circuit; over current protection. Flash, charging over current.

LOAD: On, output in normal mode; Flash, output overload.

5. Product Installation:



Caution:

The "+, -" pole of the solar cell, batteries and load should be corresponding to those of controller PV output, battery input and load, reversed connection is not allowed, otherwise may lead to the damage of the product.

6. Operating Instructions

- After PV input 3s, the system will turn on the output automatically. (Except the airbrake switch/OFF mode and special customized products.
- When is no light, press the panel button for 2s, the device will turn on the output automatically. When the status is ON, press and hold for 2s, the system will turn off automatically.
- The system will shut down automatically when load short circuit, overload and low voltage for the battery.

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7. Common Faults and Treatments

Please check according to the following methods if such phenomenon occurs.

Fault Indication	Resolving Method
All indicators are off	Check both end of battery to ensure the correctness of wiring and the reliability of contact
When is sunlight, shooting the solar panels directly, charging indicator off	Ensure solar cell rated voltage level matches that of battery. Check both end of solar panel to ensure the correctness of wiring and the reliability of contact
SUN: Flash	PV system over voltage
BAT: Yellow light Flash	Battery open circuit or low voltage, check the reliability of PV input connection; or controller damaged
FAULT: Long on	Output short -circuit, please check output circuit, press "on" button after removed all loads, controller will be back to normal output after 30s
FAULT: Flash (1 time/1s)	Please Check if the PV panel configuration exceeds system's ratings. Remove the redundant PV panels
LOAD: Flash (1 time/1s)	Load power exceed the rated one, reduce the No. of electrical-consuming equipment, press load switch button, controller output will recover the output after 30s.

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