

**Solar Charge Controller Series CC-PWM-PS**  
**Models: CC-PWM-PS-1224-10, CC-PWM-PS-1224-20**  
**User's Manual**



**SYSTELLAR INNOVATIONS Solar Charge controller**

Congratulations on making the right decision and being the proud owner of Systellar Solar charge controller. Our endeavor is to provide good quality and affordable solar products to all our customers. We are sure that you will appreciate the quality of our products and reap the benefits of FREE solar energy for years to come.

**Selection of solar panels:**

For best results, for 12V battery use 30 cell solar panels with open circuit voltage of 19 – 21V. For 24 volts battery bank use 60 cell or 72cell solar panels with open circuit voltage of 36 – 44V. For 24V battery bank, you can also use two 30 cell solar panels connected in series.

**Expected battery charging current:**

Expected battery charging current at noon =  $0.75 * Wp \text{ rating of solar panel} / \text{Battery voltage}$

For example a 75 Wp solar panel connected to 12V battery will provide about  $0.75 * 75 / 12 = 4.7A$  charging current.

**Features:**

A solar charge controller is connected to Solar PV panel(s) as well as battery, to provide optimum battery charging using solar energy. Systellar charge controller has the following safety features in-built to protect itself as well as inverter's battery and ensure its long life:

- Zero voltage drop design i.e. there is no diode in the current path so that almost all the solar energy produced by the panel is delivered to the battery
- Battery over charging protection using PWM technique
- Reverse polarity protection and fault LED (for both solar panels and battery)
- 12/24V battery voltage auto-select feature
- Can deliver up to 10A or 20A battery charging current depending upon model
- 3 stage battery charging (Boost, Absorption, Trickle) for optimum battery charging without any loss of electrolyte even if the solar panel remains connected for a long time to the battery with no discharge current from the battery
- Flat Plate, Tubular type, SMF/GEL battery type selection
- Power Saver functionality to convert normal inverter into Solar inverter

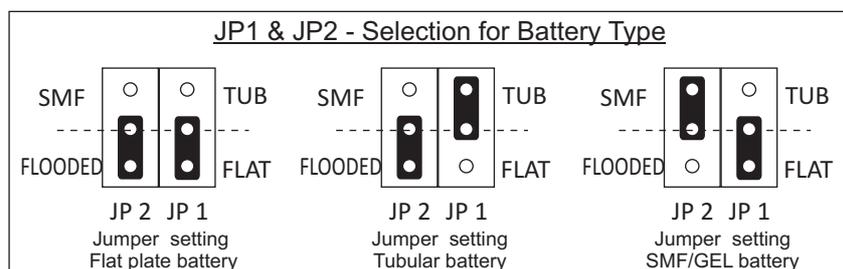
**Installation:**

Before installation, there are two jumper settings that need to be made, to ensure proper working of the charge controller. These settings are done after opening the front cover of the charge controller. These jumpers setting are as follows:

**Battery type selection - JP1, JP2 Setting**

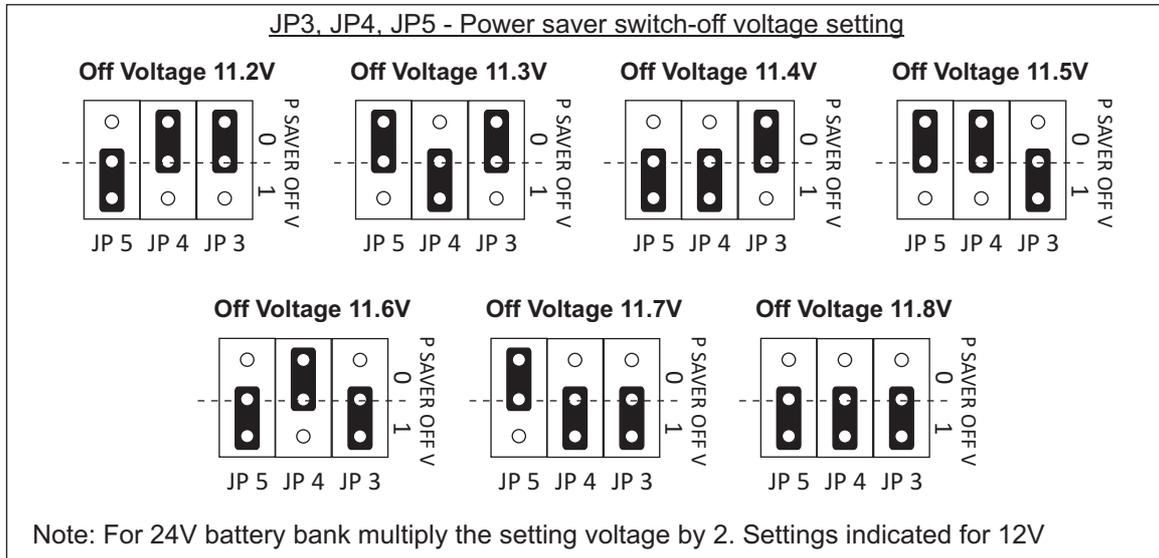
This jumper helps in selecting the type of battery which will be connected to the charge controller. Two jumper positions control the following battery type:

- Flat plate Type (FLAT)
- Tubular plate type (TUB)
- SMF / GEL Maintenance free batteries



### Power Saver switch-off voltage setting - JP3,JP4,JP5

Set appropriate Power Saver Off voltage when using Power Saver accessory. If you want to use maximum solar energy set this voltage nearer to 11.2V. However if you want to minimize the possibility of battery getting discharged (in case of grid supply failure) then set it nearer to 11.8V. The jumper positions are indicated in the diagram below.

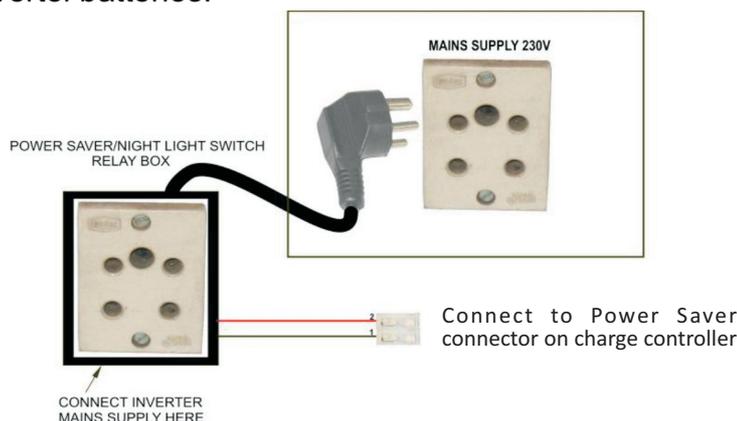


When the battery charge voltage is more than 13.5 V / 27 V, the relay will turn on. This will cut-off the mains supply to the inverter and thus save electricity. Note that in this condition, the load connected from the inverter will be driven by the battery while the battery is being charged by the solar panels.

### Power Saver Accessory

Power Saver accessory can be used to give priority charging to inverter batteries using Solar power. During day, when Solar energy is available, the power saver cuts-off the mains supply to inverter. Hence, the charging of inverter batteries is done using solar energy only. Before sunset, the mains connection to inverter is re-established so that the batteries do not get discharged and can be charged using GRID supply.

Power saver helps in converting normal inverter into Solar inverter without any hardware modifications. Also, it helps in reducing electricity bills, as no GRID power is used throughout the day to charge inverter batteries.



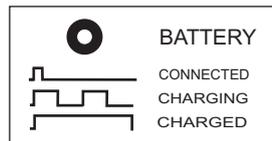
Power Saver accessory

After the jumper settings are done, solar panel and battery connections can be made. In case of wrong polarity connections, fault indicator LEDs glow as explained later.

## **Indicators**

### **Battery charging status indicator**

There is one LED on the face plate of charge controller to indicate the status of battery charging. A waveform type diagram (also given below) on the faceplate explains the blinking patterns of this LED.



*CONNECTED*: The LED glows for a very small duration and then remains off to indicate that the charge controller is connected to the battery.

*CHARGING*: The LED alternates between ON and OFF state to indicate that battery charging is going on.

*CHARGED*: The LED glows continuously to indicate that battery is fully charged.

### **Connection Fault Indicators**

There are two LEDs (just above the terminal block) to warn the user in case connection of solar panel(s) or battery is done with wrong polarity. In case any of these LEDs glows, check the polarity and swap the wires. The charge controller cannot function properly if any of these LEDs is glowing.

## TECHNICAL SPECIFICATIONS

| <b>Parameters</b>  | <b>CC-PWM-PS</b>  |
|--|---|
| Charge controller technology   | PWM charging - Zero drop design   |
| Battery Voltage Configurations   | 12/24 Auto Select   |
| Battery type selection (through Jumper)                                | Flat cell / Tubular / SMF type battery  |
| Input PV Open Circuit Array Voltage                                    | <b>18/21.6</b> Vdc for <b>30/36</b> cell panel (for 12V battery)<br><b>36/43.2</b> Vdc for <b>60/72</b> cell panel (for 24V battery bank)   |
| Charging method  | 3 stage charging (Boost, Absorption, Trickle)   |
| Max Charging Current (at 25°C)   | 10 A or 20 A DC (depending upon model)  |
| Efficiency (%)   | Upto 98.5%  |
| End of charge voltage  | 14.2 V  |
| Trickle charging level   | 13.6 ± 0.1 V  |
| Absorption charge hold time  | Flat cell battery - 30 min. / Tubular battery - 2 hours<br>SMF battery - 5 min  |
|  |   |
| <b>Protection features</b>   | Battery over-charging protection<br>Reverse polarity protection (battery & PV panel both)<br>12/24 V battery voltage auto-select<br>End of charge voltages adjusted for Flat/Tubular/SMF battery<br>Visual indication LED for wrong polarity connections<br>Battery charging status LED |
|  |   |
| <b>General Specifications</b>  |   |
| Specified Temperature Range  | 0°C to 45°C   |
| Usage  | For indoor use only   |
| Unit Weight  | 0.32 kg   |
| Shipping Weight  | 0.50 kg   |
| Dimensions (H x W x D)   | 135mm x 85mm x 55mm   |
| Mounting   | Vertical wall mount - indoor only   |
| Manufacturing Warranty   | One year  |
| * Technical Specification may change in process of product enhancement |   |