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PowMr 30A PWM

PowMr 30 Amp 12V/24V PWM Solar Charge Controller User Manual

Model: 30A PWM

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of your PowMr 30 Amp 12V/24V PWM Solar Charge Controller. This device is designed to manage the power flow from your solar panels to your battery bank, ensuring efficient charging and protecting your batteries from overcharge and over-discharge. It is suitable for use with 12V and 24V lead-acid battery systems.



Figure 1: Front view of the PowMr 30 Amp PWM Solar Charge Controller, showing the LCD display, USB ports, and connection terminals.

2. Safety Instructions

- Ensure all wiring is correctly connected before powering on the controller. Incorrect wiring can damage the device or connected components.
- Only use solar panels as the charging power source. Do not connect direct current (DC) or other power sources to the PV input terminals.
- This controller is designed for lead-acid batteries only. Do not use with other battery types (e.g., lithium-ion, NiMH) unless explicitly stated by the manufacturer.
- Install the controller in a well-ventilated area to prevent overheating.
- Avoid short-circuiting the terminals.
- Keep the device away from water and corrosive substances.
- Do not attempt to disassemble or repair the controller yourself. Contact qualified personnel for service.

3. Product Overview

3.1 Key Features

- 12V/24V automatic system voltage detection.
- PWM charging mode for efficient battery management.
- Built-in LCD display for real-time monitoring of system status.
- Dual USB 5V/2.5A output ports for charging external devices.
- Comprehensive protection functions: overcharging, over-discharging, short-circuit, overload, reverse polarity, reverse current, and temperature protection.
- Compact and lightweight design.

3.2 Dimensions



Figure 2: Physical dimensions of the solar charge controller, illustrating its compact size for easy integration into various setups.

4. Setup and Installation

Follow these steps for proper installation. Ensure all connections are secure and correct to prevent damage.

4.1 Wiring Order

1. **Connect the Battery:** First, connect the battery to the charge controller's battery terminals. Ensure correct polarity (+ to + and - to -). The controller will automatically detect the battery voltage (12V or 24V).
2. **Connect the Solar Panel:** Next, connect the solar panel(s) to the PV input terminals of the controller. Observe correct polarity.
3. **Connect the DC Load:** Finally, connect your DC load (e.g., lights, fan) to the load terminals. Ensure correct polarity.

Important: Always connect the battery first, then the solar panel, and then the load. Disconnect in the reverse order: load, then solar panel, then battery.



Figure 3: Wiring diagram illustrating the correct connection sequence for the battery, solar panels, and DC load to the charge controller.

4.2 Installation Environment

- Install the controller in a dry, well-ventilated indoor environment.

- Avoid direct sunlight, high temperatures, and humid conditions.
- Ensure sufficient clearance around the controller for heat dissipation.

5. Operation

5.1 LCD Display and Button Functions

The controller features an LCD display to show various system parameters and three buttons for navigation and settings.



Figure 4: Diagram showing the controller's buttons (Up, Down/Manual, Menu) and the flow of LCD display screens for various parameters.

- **Short Press Menu Key:** Cycles through the interface and parameters displayed on the LCD.
- **Long Press Menu Button (3 seconds):** Enters manual settings mode. The number on the display will start flashing.
- **Up/Down Buttons:** Used to adjust parameters when in settings mode.
- **Automatic Save:** Once adjustments are complete, the system will automatically save the settings and exit the setup menu.

5.2 Displayed Parameters

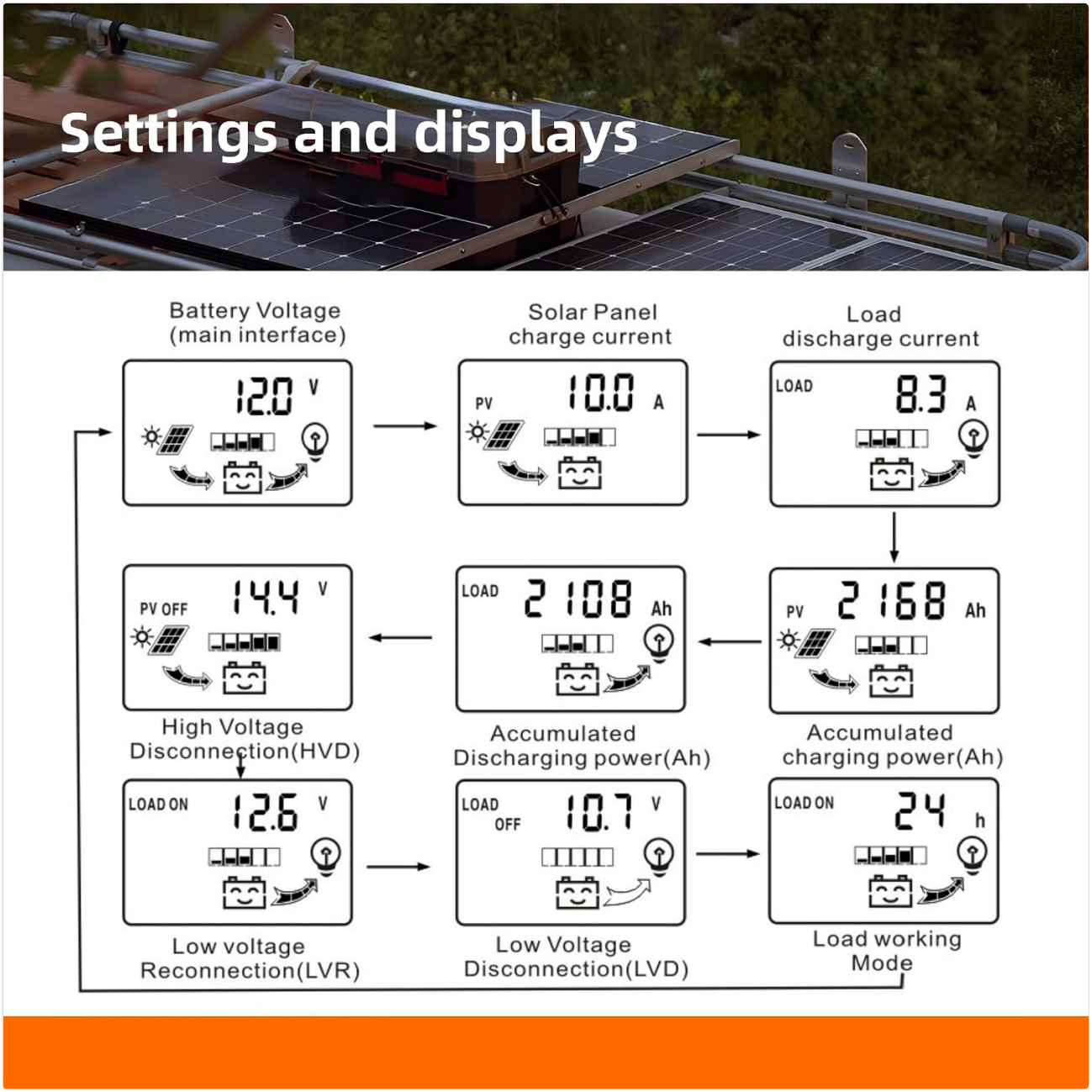


Figure 5: Flowchart of the LCD display screens, showing various parameters such as battery voltage, solar panel charge current, load discharge current, accumulated power, and voltage disconnection/reconnection points.

The LCD cycles through various parameters, including:

- Battery Voltage (main interface)
- Solar Panel Charge Current
- Load Discharge Current
- High Voltage Disconnection (HVD)
- Low Voltage Reconnection (LVR)
- Low Voltage Disconnection (LVD)
- Accumulated Discharging Power (Ah)
- Accumulated Charging Power (Ah)
- Load Working Mode

5.3 PWM Charging Stages

The controller utilizes a 3-stage PWM charging process to optimize battery life and performance:



Figure 6: Illustration of the three-stage PWM charging process: Bulk, Boost, and Float, which effectively prevents battery overcharging or over-discharging.

1. **Bulk Charge:** Delivers maximum current to rapidly charge the battery.
2. **Boost Charge:** Charges the battery to a higher voltage to ensure full charge, then maintains it for a set period.
3. **Float Charge:** Reduces the voltage to a lower level to maintain the battery at full charge without overcharging, compensating for self-discharge.

5.4 USB Output

The dual 5V/2.5A USB ports can be used to charge compatible electronic devices such as phones and tablets. These ports provide a convenient power source directly from your solar system.

6. Maintenance

- Regularly check all wiring connections for tightness and corrosion.
- Keep the controller clean and free from dust and debris.

- Ensure the installation area remains well-ventilated.
- Periodically inspect the battery for signs of damage or low electrolyte levels (for flooded lead-acid batteries).

7. Troubleshooting

Refer to the table below for common issues and their solutions.



Figure 7: Troubleshooting guide detailing common problems, possible reasons, and recommended solutions for the solar charge controller.

Case	Possible Reason	Solution
Not charge when sunny	Solar panel opened or reversed	Reconnect
Load icon off	Wrong mode setting	Reset
	Low battery voltage	Recharge
Load icon flash	Overload	Reduce the load
	Short circuit protection	Remove short circuit, automatic recovery after approximately 1 minute
Power off	Low battery voltage/reverse polarity	Check battery/reconnect

8. Specifications

Parameter	Value
System Voltage	12V/24V Auto-detection
Rated Charging Current	30A
Rated Discharging Current	10A
Max PV Input (12V battery)	23V
Max PV Input (24V battery)	46V

Parameter	Value
USB Output	Dual 5V/2.5A (Max)
Operating Temperature	-31°F to 140°F (-35°C to 60°C)
Dimensions	Approximately 4.4 x 4.92 x 1.3 inches (11.2 x 12.5 x 3.4 cm)
Weight	6.4 ounces (0.4 lbs)
Display Type	LCD
Material	Plastic

8.1 Multiple Safety Protections



Figure 8: Icons representing the various safety features integrated into the controller, including protection against short circuits, over current, open circuits, self-recovery, temperature fluctuations, and high temperatures.

- Short Circuit Protection
- Over Current Protection
- Open Circuit Protection
- Self-recovery
- Temperature Protection
- High-temperature Protection
- Overcharging Protection
- Over-discharging Protection
- Reverse Polarity Protection
- Reverse Current Protection

9. Warranty and Support

For warranty information and technical support, please refer to the official PowMr website or contact your retailer. Keep your purchase receipt as proof of purchase for any warranty claims.

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