PowMr RV-10A

PowMr 10A 12V MPPT Solar Charge Controller User Manual

Model: RV-10A

1. Introduction

This user manual provides essential information for the safe and efficient operation of your PowMr 10A 12V MPPT Solar Charge Controller. This device is designed to maximize the energy harvest from your solar panels and efficiently charge various 12V battery types, including Gel, AGM, Lithium, and LiFePO4. The controller features an LCD display for easy monitoring and a simple one-touch button for battery type selection. Its compact and portable design makes it ideal for various applications, including outdoor use.

2. Safety Information

Please read all safety instructions carefully before installation and operation.

- This controller is designed exclusively for 12V battery systems. Do not connect to higher voltage batteries.
- The PV (Photovoltaic) open circuit voltage (Voc) must be higher than the battery voltage. The minimum PV Voc is 15V, and the maximum should not exceed 30V.
- Always connect the battery to the controller first, and then connect the solar panel. Disconnect in reverse order: solar panel first, then battery.
- Ensure all connections are secure and correct to prevent damage to the controller or battery.
- The controller has an IP45 waterproof rating, suitable for daily life waterproofing. However, do not immerse the controller in water to extend its service life.
- Avoid short-circuiting the battery or solar panel terminals.
- Do not disassemble or attempt to repair the controller yourself. Contact qualified personnel for service.

3. Product Overview

The PowMr 10A 12V MPPT Solar Charge Controller is a compact and efficient device designed for optimal

solar energy conversion.

Key Features:

- **100% Efficient MPPT Technology:** Maximizes solar energy utilization for faster battery charging.
- **Portable Design:** Mini size and lightweight for easy carrying and space-saving.
- **LCD Display:** Provides real-time monitoring of solar panel and battery working status.
- **One-Touch Battery Type Switching:** Conveniently change battery types with a long press of the mode button.
- **Wide Battery Compatibility:** Supports AGM, Gel, Deep Cycle, Sealed, Lead Acid, Liquid Rich, and LiFePO4 Lithium 12V batteries.
- **Comprehensive Protection Systems:** Includes over-charge, over-discharge, over-voltage, over-current, overload, short-circuit, and reverse polarity protection.
- **Intelligent 3-Stage Charging:** Features equalization, boost charging, and float charging modes for efficient and safe battery charging.
- **IP45 Waterproof Performance:** Offers protection against splashes and dust.
- **SAE Connectors:** Ensures quick and easy plug-and-play connections.

Components:



Figure 3.1: Front view of the PowMr 10A 12V MPPT Solar Charge Controller, showing the LCD display, mode button, and integrated SAE input/output cables.



Figure 3.2: Detailed parameter table for the solar charge controller, including No-load Loss, Max Solar Input Voltage, Rated Solar Charge Current, Max Solar Input Power, Temperature Compensation, Operating Temperature, IP Protection, and Operating Altitude.

4. Setup and Installation

Follow these steps for proper setup and installation of your MPPT solar charge controller.

1. **Connect the Battery:** First, connect the SAE connector labeled "BAT" from the controller to your 12V battery. Ensure the connection is secure. The controller's LCD display should power on.
2. **Connect the Solar Panel:** Next, connect the SAE connector from your solar panel to the input port on the controller. Ensure your solar panel's open circuit voltage (Voc) is between 15V and 30V.
3. **Verify Connections:** Double-check all connections for polarity and security.



Figure 4.1: Connection diagram illustrating the simple plug-and-play setup of the solar charge controller between a solar panel and a battery, highlighting its small size and portability.

Important Note on Connection Order:
Always connect the battery to the controller first, and then the solar panel. When disconnecting, always disconnect the solar panel first, then the battery. This sequence prevents potential damage to the controller.

5. Operating Instructions

Monitoring the Display:

The LCD display provides real-time information about the charging process. It typically shows battery voltage and charging current.



Figure 5.1: The controller's LCD display, indicating battery voltage and charging current, along with a battery level icon.

Selecting Battery Type:

The controller supports various 12V battery types. To switch between battery types (Gel, AGM, LiFePO4), long press the "MODE" button on the controller.



Figure 5.2: Illustration of how to long-press the MODE button to toggle battery types, accompanied by a table detailing Equalize, Boost, and Float charge voltages for GEL, AGM, and Li-Fe batteries.

Refer to the table below for specific charging parameters for each battery type:

Table 5.1: Battery Charging Parameters

Battery Type	GEL	AGM	Li-Fe
Equalize charge	14.6V	14.6V	-
Boost charge	14.2V	14.4V	14.4V
Float charge	13.8V	13.8V	-

6. Protection Systems

The PowMr MPPT Solar Charge Controller incorporates multiple safety features to protect your battery and the controller itself:



Figure 6.1: Overview of the 8 comprehensive protection systems integrated into the controller for enhanced safety and reliability.

- **Over Charge Protection:** Prevents battery damage from excessive charging.
- **Over Discharge Protection:** Protects the battery from being drained too low.
- **Over Voltage Protection:** Safeguards against input voltage spikes.
- **Over Current Protection:** Limits current to safe levels.
- **Overload Protection:** Prevents damage from excessive load.
- **Short Circuit Protection:** Automatically shuts down in case of a short circuit.
- **Reverse Polarity Protection:** Protects against incorrect wiring of battery or solar panel.
- **Over Temperature Protection:** Monitors internal temperature to prevent overheating.

7. Maintenance

The PowMr MPPT Solar Charge Controller is designed for low maintenance. However, regular checks can ensure optimal performance and longevity:

- **Cleanliness:** Keep the controller clean and free from dust and debris. Use a dry cloth for cleaning.
- **Connections:** Periodically check all SAE connections to ensure they are tight and free from corrosion.

- **Environment:** Ensure the controller is installed in a well-ventilated area, away from direct sunlight or excessive heat sources, to maintain optimal operating temperature. While IP45 rated, avoid prolonged exposure to heavy rain or immersion in water.
- **Temperature Range:** The controller is designed to operate in temperatures from -20°C to +45°C (-4°F to +113°F). Ensure it is not exposed to temperatures outside this range for extended periods.



Figure 7.1: The controller's robust design allows it to withstand a wide range of ambient temperatures, from -40°C (-40°F) to +80°C (+176°F) for internal protection.

8. Troubleshooting

This section addresses common issues you might encounter with your PowMr MPPT Solar Charge Controller.

Table 8.1: Troubleshooting Guide

Problem	Possible Cause	Solution
Controller display is off.	No battery connected or battery voltage too low. Incorrect battery connection polarity.	Ensure battery is connected first and correctly. Check battery voltage; if too low, charge it externally.

Problem	Possible Cause	Solution
No charging current displayed.	Solar panel not connected, insufficient sunlight, or PV Voc too low/high. Incorrect solar panel connection polarity.	Ensure solar panel is connected. Check for adequate sunlight. Verify PV Voc is within 15V-30V range. Check solar panel connection polarity.
Battery not charging fully.	Incorrect battery type selected. Insufficient solar panel power.	Long press the MODE button to select the correct battery type. Ensure solar panel power (Max 150W) is sufficient for your battery capacity.
Controller gets hot.	Normal operation under heavy load. Poor ventilation.	Some heat is normal. Ensure adequate airflow around the controller. If excessively hot, reduce load or check for short circuits.

9. Specifications

Table 9.1: Product Specifications

Parameter	Value
Model Number	RV-10A
Rated Solar Charge Current	10A
System Voltage	12V
Max Solar Input Voltage (Voc)	<30V
Max Solar Input Power	150W
No-load Loss	20mA
Display Type	LCD
IP Protection	IP45
Operating Temperature	-20°C to +45°C (-4°F to +113°F)
Temperature Compensation	-40°C to +80°C (-40°F to +176°F)
Item Weight	9.6 ounces (0.27 kg)
Package Dimensions	6.69 x 4.69 x 1.57 inches
Manufacturer	PowMr

10. Warranty and Support

For warranty information and technical support, please refer to the official PowMr website or contact their customer service directly. Details regarding warranty periods and support channels are typically provided with your product packaging or on the manufacturer's official online resources.
For further assistance, you may visit the PowMr Store on Amazon.

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