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PowMr 60A MPPT Controller

PowMr 60A MPPT Solar Charge Controller User Manual

Model: 60A MPPT Controller

1. Product Overview

The PowMr 60A MPPT Solar Charge Controller is an advanced Maximum Power Point Tracking (MPPT) device designed to efficiently manage power flow from your solar panels to your battery bank. It automatically detects 12V, 24V, 36V, or 48V DC input systems and supports a maximum PV input of 160VDC. This controller is compatible with various battery types, including LiFePO4, Gel, Flooded Lead-Acid, and Lithium batteries, offering a customizable user mode for precise battery parameter settings.

Key features include a large, customizable LCD display for easy monitoring and setup, a convenient plug-and-play design for simplified installation, and robust multi-stage charging capabilities to prolong battery life. It incorporates innovative MPPT technology for high tracking efficiency and comprehensive safety protections against common electrical issues.



Figure 1.1: PowMr 60A MPPT Solar Charge Controller with accessories.

2. Safety Information

Please read all instructions and warnings carefully before installation and operation. Failure to follow these instructions may result in electric shock, fire, or severe injury.

- Ensure all connections are secure and correct before applying power.
- Do not attempt to disassemble or repair the controller. Refer to qualified service personnel.
- Install the controller in a well-ventilated area, away from flammable materials and direct sunlight.
- Always disconnect the solar panel and battery power before performing any maintenance or wiring.
- Wear appropriate personal protective equipment (PPE) such as insulated gloves and eye protection during installation.
- The controller is equipped with multiple protections including reverse polarity, overcharging, over-discharging, overload, short-circuiting, and overheating. However, proper installation is crucial for safe operation.



Figure 2.1: Overview of the controller's built-in safety protections and heat dissipation design.

3. Package Contents

Verify that all items listed below are included in your package. If any items are missing or damaged, please contact customer support.

- PowMr 60A MPPT Solar Charge Controller
- Special cable with terminals (red and black)
- User Manual (this document)
- Special cable terminals (additional connectors)
- Mounting screws / bolts

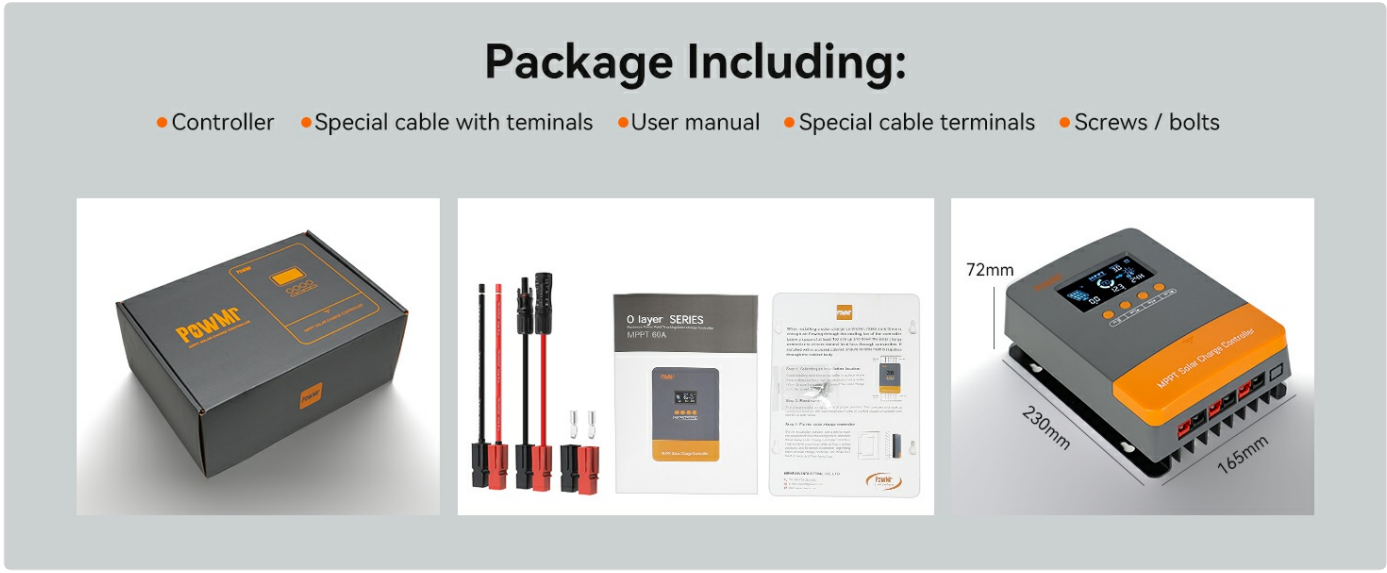


Figure 3.1: Contents included in the product package.

4. Product Components and Diagram

Familiarize yourself with the different parts of your PowMr 60A MPPT Solar Charge Controller.

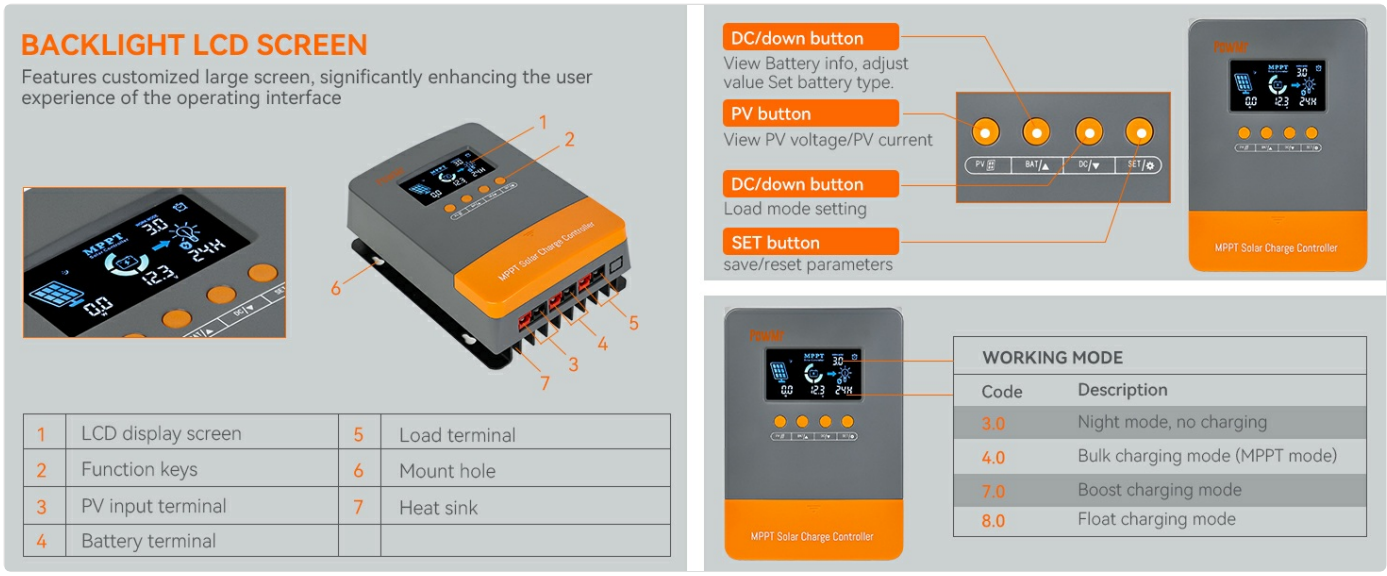


Figure 4.1: Front and side view of the controller with labeled components.

Table 4.1: Component Description

No.	Component	Description
1	LCD Display Screen	Displays system parameters, charging status, and error codes.
2	Function Keys	Used for navigation and setting parameters.
3	PV Input Terminal	Connects to solar panel array.
4	Battery Terminal	Connects to battery bank.
5	Load Terminal	Connects to DC loads.
6	Mount Hole	For securing the controller to a surface.
7	Heat Sink	Dissipates heat for efficient operation.

5. Setup and Installation

Follow these steps for proper installation of your solar charge controller. Ensure all power sources are disconnected before beginning.

5.1 Wiring Sequence

1. **Connect the Battery:** First, connect the battery to the battery terminals of the charge controller. Ensure correct polarity (+ to + and - to -). The controller will automatically detect the battery voltage (12V/24V/36V/48V).
2. **Connect the Solar Panels:** Next, connect the solar panel array to the PV input terminals. Ensure correct polarity. The maximum PV input voltage is 160VDC.
3. **Connect the DC Load (Optional):** Finally, connect your DC loads to the load terminals. Ensure correct polarity. Do not exceed the maximum DC output current of 8A.

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

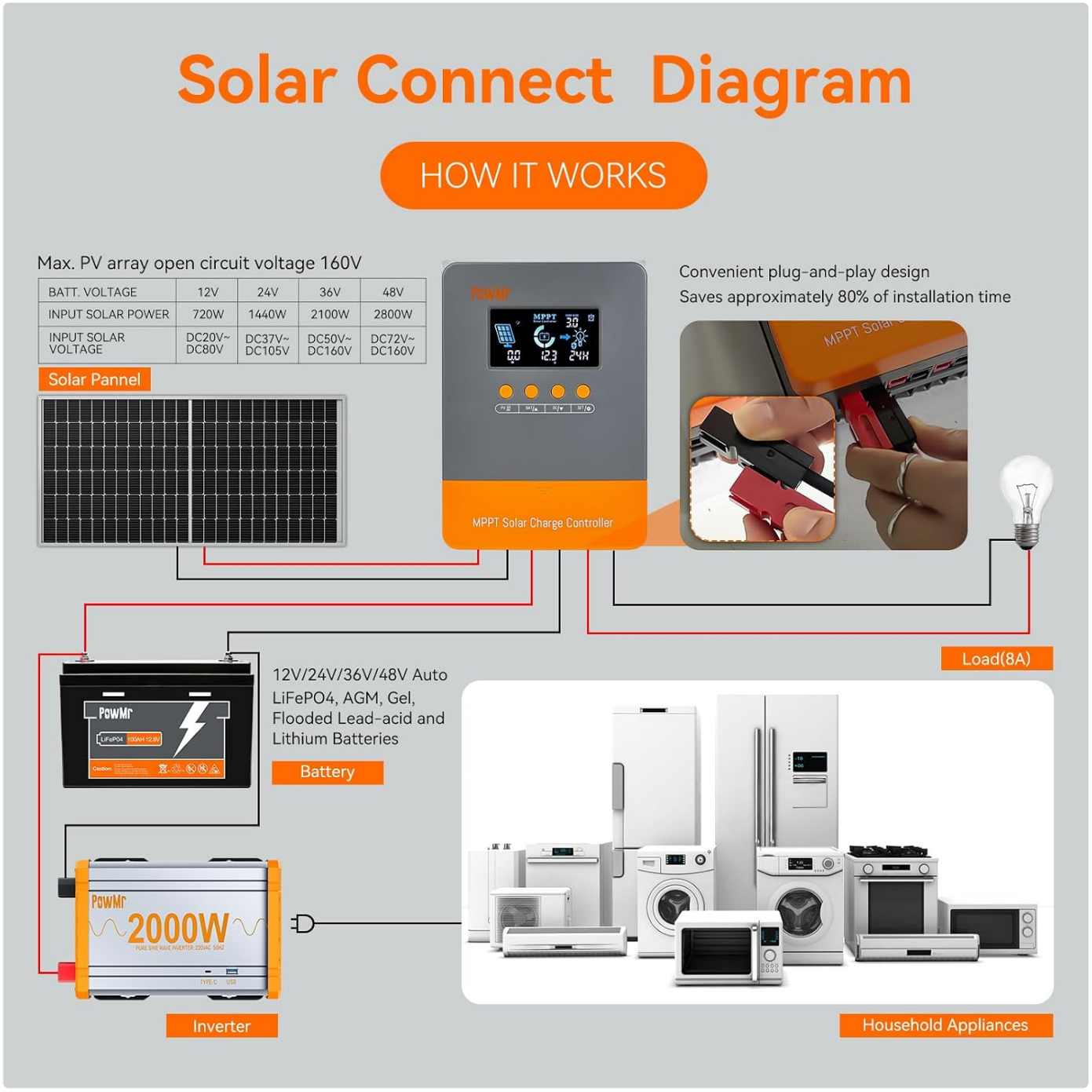


Figure 5.1: Typical solar system connection diagram.

5.2 Cable Connection

The controller features a convenient plug-and-play design for simplified wiring.



Figure 5.2: Guide for connecting cables to the controller.

1. **Clamp both terminals:** Press the release tabs on the special cable terminals to open them.
2. **Insert directly into the port:** Align the terminals with the corresponding ports on the controller and push firmly until they click into place. Ensure the small side of the connector is facing upwards.

6. Operating Instructions

The PowMr 60A MPPT Solar Charge Controller features a user-friendly LCD display and intuitive controls for monitoring and setting parameters.

6.1 LCD Display and Buttons



Figure 6.1: LCD display interface and working modes.

The LCD display provides real-time information on:

- PV Parameters (Solar Panel Voltage/Current)
- Battery Parameters (Voltage, Charging Current, Temperature)
- Load Working Settings

The function keys allow you to navigate through menus and adjust settings:

- **PV Button:** View PV voltage/PV current.
- **BAT/▲ Button:** View battery information, adjust values, set battery type.
- **DC/▼ Button:** Load mode setting, adjust values.
- **SET Button:** Save/reset parameters.

6.2 Battery Parameter Setup

The controller supports various battery types and allows for custom parameter settings.

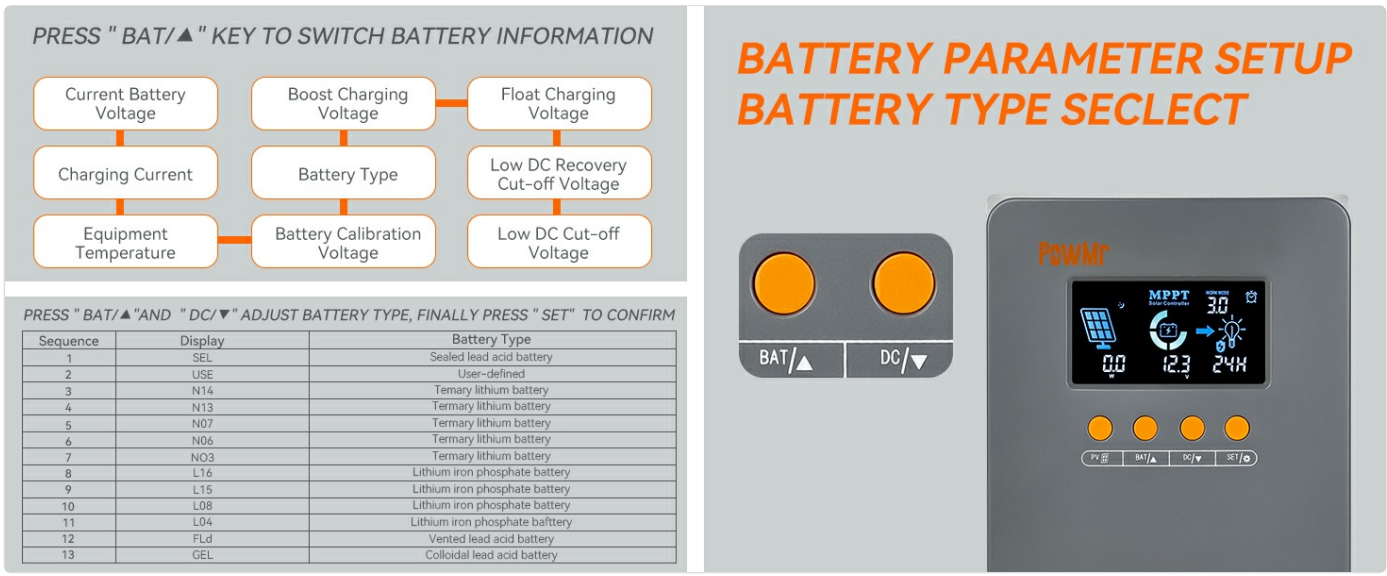


Figure 6.2: Battery parameter setup interface.

To select battery type or adjust parameters:

1. Press the **BAT/▲** key to switch through battery information displays (Current Battery Voltage, Boost Charging Voltage, Float Charging Voltage, Charging Current, Battery Type, Low DC Recovery Cut-off Voltage, Equipment Temperature, Battery Calibration Voltage, Low DC Cut-off Voltage).
2. When "Battery Type" is displayed, press **BAT/▲** or **DC/▼** to select the desired battery type from the list (e.g., SL1 for Sealed Lead Acid, USE for User-defined, L16 for Lithium Iron Phosphate 16 strings, etc.).
3. For user-defined mode, you can adjust specific voltage parameters.
4. Finally, press the **SET** button to confirm and save your settings.

6.3 Calibrating Battery Voltage

The battery calibration voltage parameter is used to correct the current battery voltage measured by the controller, ensuring accuracy.

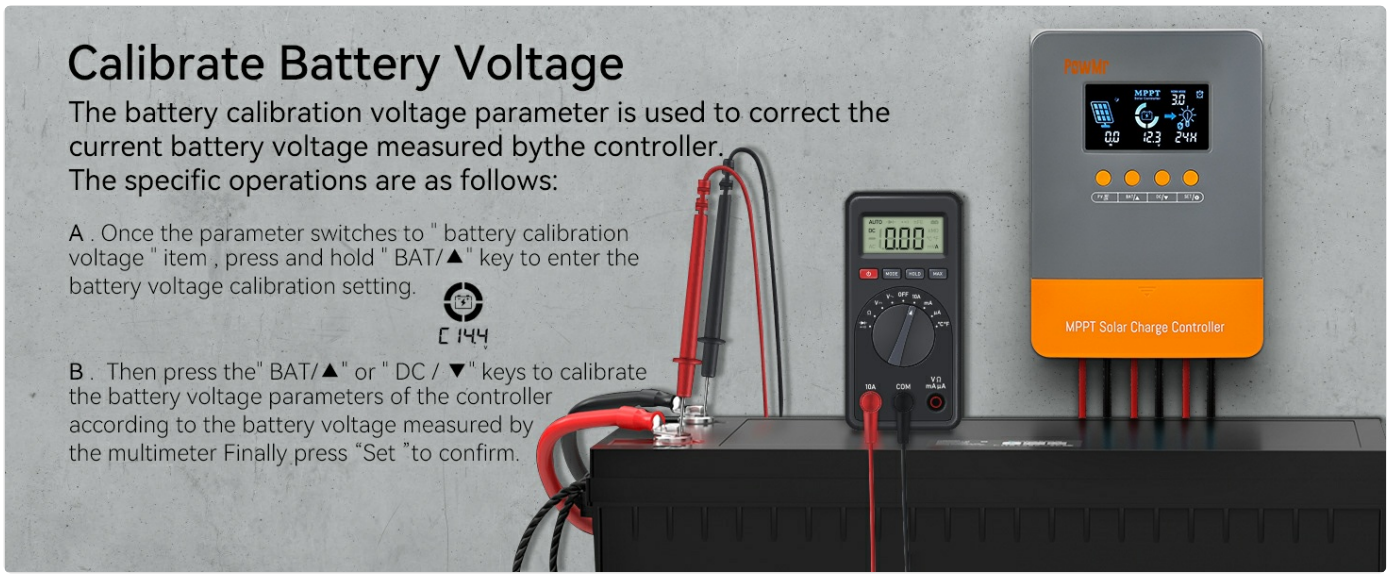


Figure 6.3: Battery voltage calibration process.

1. Once the parameter switches to "Battery Calibration Voltage", press and hold **BAT/▲** to enter the battery voltage calibration setting.
2. Then press the **BAT/▲** or **DC/▼** keys to calibrate the battery voltage parameters of the controller according to the battery voltage measured by an external multimeter.

3. Finally, press **SET** to confirm.

6.4 Load Working Mode Setting

The controller offers different load working modes:

- **24H (Default):** Load is always on.
- **Solar Light Control Mode (OOH):** Load turns on at sunset and off at sunrise.
- **Adjustable Duration (01~23H):** Load turns on at sunset and stays on for a set number of hours.

To set the load working mode, use the**DC/▼** button to navigate to the load settings on the LCD display and adjust as needed, then press **SET** to save.

7. Battery Types and Charging

The PowMr 60A MPPT Solar Charge Controller is compatible with a wide range of battery types and employs intelligent charging algorithms.

7.1 Compatible Battery Types

This controller supports:

- LiFePO4 (Lithium Iron Phosphate)
- Gel batteries
- Flooded Lead-Acid batteries
- Lithium batteries (various chemistries, with activation feature)



Figure 7.1: Controller compatibility with multiple battery types.

The controller features Lithium battery activation. If a connected lithium battery is in a protected (low voltage) state, the controller will use energy from the solar panel to activate it.

7.2 3-Stage Charging (Lead-Acid Batteries)

For Lead-Acid batteries (Gel, Flooded), the controller utilizes a 3-stage charging process to optimize battery health and lifespan:

1. **Bulk Charge:** Charges the battery at maximum current until its voltage rises to the absorption voltage.
2. **Absorption Charge:** Charges the battery at a constant voltage, with the current gradually decreasing. This stage ensures the battery is fully charged without overcharging.
3. **Float Charge:** Maintains the battery at a lower, constant voltage to compensate for self-discharge and keep the battery fully charged.

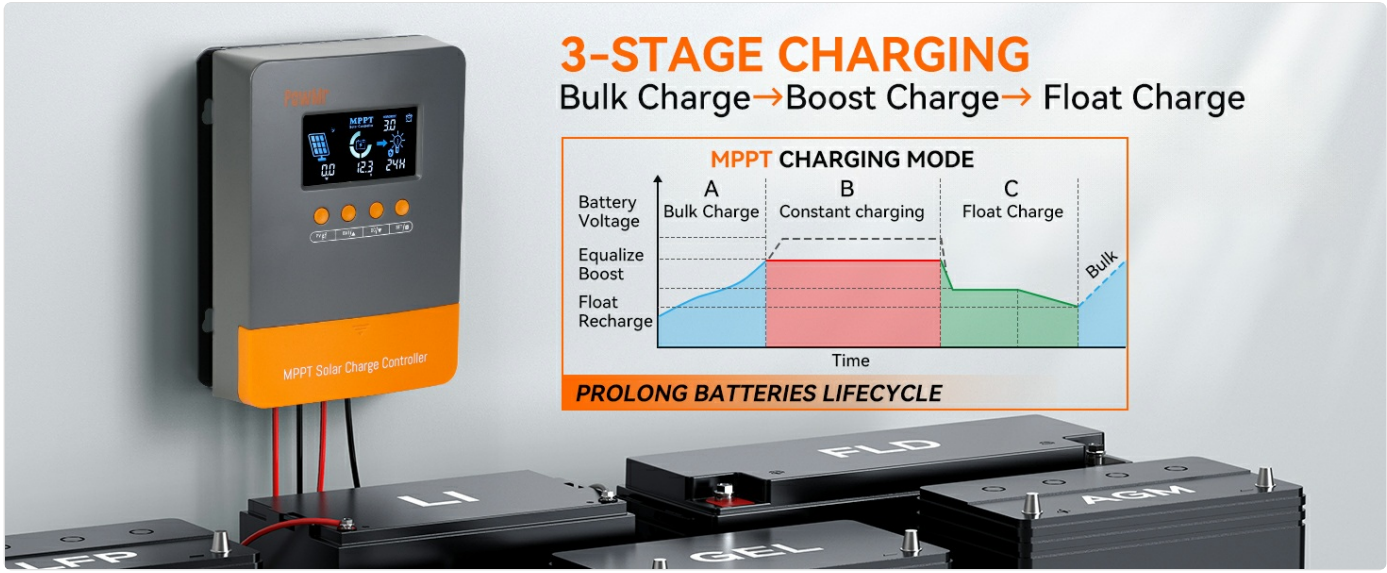


Figure 7.2: 3-Stage charging cycle for lead-acid batteries.

7.3 2-Stage Charging (Lithium Batteries)

For Lithium batteries, the controller uses a 2-stage charging process:

1. **Bulk Charge:** Charges the battery at maximum current.
2. **Absorption Charge:** Charges at a constant voltage until fully charged.

8. Maintenance

Regular maintenance ensures optimal performance and longevity of your PowMr 60A MPPT Solar Charge Controller.

- **Cleanliness:** Keep the controller clean and free from dust and debris. Use a dry, soft cloth for cleaning. Do not use liquid cleaners.
- **Connections:** Periodically check all wiring connections for tightness and corrosion. Loose connections can cause overheating and poor performance.
- **Ventilation:** Ensure the heat sink and ventilation openings are not obstructed to allow for proper heat dissipation.
- **Environmental Conditions:** Verify that the operating environment remains within the specified temperature and humidity ranges.
- **Battery Health:** Monitor your battery bank's health and perform recommended maintenance as per the battery manufacturer's guidelines.

9. Troubleshooting

This section provides solutions to common issues you might encounter with your solar charge controller. For problems not listed here, please contact customer support.

Table 9.1: Common Troubleshooting Guide

Problem	Possible Cause	Solution
Controller not turning on / No display	Battery not connected or reverse polarity; Battery voltage too low.	Check battery connections and polarity. Ensure battery voltage is above minimum operating voltage.

Problem	Possible Cause	Solution
No charging current from PV	PV panels not connected or reverse polarity; Insufficient sunlight; PV voltage too low/high.	Check PV connections and polarity. Ensure adequate sunlight. Verify PV voltage is within controller's input range (Max 160VDC).
Load not working	Load disconnected or reverse polarity; Load current exceeds limit (8A); Load mode setting incorrect.	Check load connections and polarity. Reduce load if exceeding 8A. Adjust load working mode settings on the LCD.
Battery not fully charged	Insufficient PV power; Incorrect battery type setting; Battery aging.	Increase PV array size if needed. Verify battery type setting. Consider battery replacement if old.
Error code displayed	Specific system fault (e.g., over-voltage, short circuit).	Refer to the controller's display for the specific error code and consult the manual's error code section (if available) or contact support.

10. Specifications

Detailed technical specifications for the PowMr 60A MPPT Solar Charge Controller.

Table 10.1: Technical Specifications

Parameter	Value
Model	60A MPPT Controller
System Voltage	12V/24V/36V/48V Auto Detect
Max PV Input Voltage	160VDC
Max PV Input Power	720W (12V), 1440W (24V), 2100W (36V), 2800W (48V)
Rated Charge Current	60A
Max DC Output Current (Load)	8A
MPPT Tracking Efficiency	≥99%
Conversion Efficiency	Max 98%
Battery Types Supported	LiFePO4, Gel, Flooded Lead-Acid, Lithium (User-defined)
Display Type	LCD
Product Dimensions	9.1 x 6.5 x 2.8 inches (230 x 165 x 72 mm)
Item Weight	4.27 pounds
Manufacturer	PowMr

11. Warranty and Support

PowMr products are designed for reliability and performance. For warranty information and technical support, please refer to the official PowMr website or contact their customer service directly.

Contact Information:

- Visit the PowMr Store on Amazon for product information and support resources.
- Refer to the product packaging or official website for the most up-to-date contact details.

Please have your product model number (60A MPPT Controller) and purchase details ready when contacting support.

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