

EPsolar VS6048BN

EPsolar VS6048BN PWM Solar Charge Controller User Manual

Model: VS6048BN

1. INTRODUCTION

The EPsolar VS6048BN is a Pulse Width Modulation (PWM) solar charge controller designed for off-grid solar systems. It is suitable for applications such as street lighting, solar home systems, or small power stations. This controller features an LCD display for monitoring and parameter adjustment, reliable battery charging, comprehensive electronic protections, and programmable settings. It automatically detects 12V, 24V, 36V, or 48V system voltages.

2. KEY FEATURES

- High-speed 32-bit MCU for efficient operation.
- Efficient Series PWM charging method.
- Supports four battery types: Sealed, Gel, Flooded, and User-defined.
- Integrated lighting and timer control for solar lighting systems.
- 12-bit A/D high-precision sampling ensures accurate measurements.
- Utilizes MOSFETs as electronic switches for reliability.
- Full control parameter setting and modification, with diversified load control modes.
- User-friendly interface with a graphics dot-matrix LCD screen and 4 buttons for menu display and operation.
- Includes temperature compensation for optimal battery charging.
- Energy statistics function for monitoring system performance.
- RS485 port with MODBUS communication protocol for external monitoring.
- Optional PC monitoring software and remote meter for real-time monitoring and battery management.
- Firmware is field-upgradable.

3. SAFETY INSTRUCTIONS

Please read all instructions and warnings carefully before installation and operation. Keep this manual for future reference.

- **Electrical Safety:** Installation must be performed by qualified personnel. Ensure all power sources are disconnected before installation or maintenance.
- **Battery Safety:** Batteries can produce explosive gases. Install in a well-ventilated area. Do not short-circuit battery terminals. Wear eye protection when working with batteries.
- **Overcurrent Protection:** Install appropriate fuses or circuit breakers for the solar panel, battery, and load circuits.
- **Mounting:** Mount the controller in a dry, well-ventilated area, away from direct sunlight and heat sources. Ensure adequate clearance for airflow around the heat sink.
- **Correct Polarity:** Always connect the battery first, then the solar panel, and finally the load. Ensure correct polarity for all connections to prevent damage.
- **Operating Environment:** Do not operate the controller in environments with flammable gases or corrosive substances.

4. PRODUCT COMPONENTS AND DIAGRAM



Figure 4.1: Front View of the VS6048BN Controller. This image shows the front panel of the EPsolar VS6048BN PWM Solar Charge Controller, featuring the LCD display, control buttons, and the six terminal blocks for solar panel, battery, and load connections. The model number "VS6048BN" is visible at the top right.



Figure 4.2: Rear View of the VS6048BN Controller. This image displays the back of the controller, highlighting the large aluminum heat sink designed for efficient heat dissipation. Mounting holes are visible at each corner.



Figure 4.3: Bottom View of the VS6048BN Controller. This perspective shows the bottom edge of the controller, emphasizing the robust terminal blocks for wiring connections and the lower portion of the heat sink fins.



Figure 4.4: Side View with Communication Ports. This image shows one side of the controller, featuring the "Temp. Sensor" port (green terminal block) and the "COM" (RS485) port (RJ45 connector) for external communication and temperature sensing.



Figure 4.5: Side View with Product Label. This image displays the other side of the controller, showing a product label with key specifications such as "Type: VS6048BN", "Voltage: 12/24/36/48V", and "Current: 60A", along with CE marking and a barcode.

5. SETUP AND INSTALLATION

Follow these steps for proper installation of your VS6048BN solar charge controller.

1. **Mounting:** Choose a suitable location for mounting the controller. It should be indoors, protected from direct sunlight, high temperatures, and water. Ensure good ventilation around the unit, especially the heat sink.
2. **Wire Preparation:** Ensure all wires are of appropriate gauge for the current and length, and strip insulation approximately 10mm.
3. **Connect Battery:** Connect the battery to the controller's battery terminals (marked with a battery symbol). Ensure correct polarity (+ to + and - to -). The controller will automatically detect the system voltage (12V/24V/36V/48V).
Always connect the battery first.
4. **Connect Solar Panel:** Connect the solar panel to the controller's solar panel terminals (marked with a solar panel

symbol). Ensure correct polarity.

5. **Connect Load:** Connect the DC load to the controller's load terminals (marked with a light bulb symbol). Ensure correct polarity.
6. **Optional Connections:**
 - **Temperature Sensor:** If using an external temperature sensor, connect it to the "Temp. Sensor" port. This improves charging accuracy.
 - **RS485 Communication:** For PC monitoring or remote meter connection, connect the RS485 cable to the "COM" port.

7. **Verify Connections:** Double-check all connections for tightness and correct polarity before applying power.

Important: Disconnect the solar panel and load before disconnecting the battery. Reconnect in reverse order: battery, then solar panel, then load.

6. OPERATING INSTRUCTIONS

6.1 LCD Display and Buttons

The controller features an LCD display and four buttons for navigation and parameter settings:

- **Menu Button:** Used to enter/exit menu and confirm settings.
- **Up Button:** Used to navigate up through menu options or increase values.
- **Down Button:** Used to navigate down through menu options or decrease values.
- **Load Control Button:** Used to manually turn the load ON/OFF (when in manual load control mode).

6.2 Parameter Settings

To access and modify parameters:

1. Press the **Menu** button to enter the main menu.
2. Use the **Up** and **Down** buttons to navigate through different parameter screens.
3. To modify a parameter, press the **Menu** button again when the desired parameter is displayed. The value will start flashing.
4. Use the **Up** and **Down** buttons to adjust the value.
5. Press the **Menu** button to confirm the new setting.
6. Press and hold the **Menu** button to exit the menu.

6.3 Battery Type Selection

It is crucial to select the correct battery type for optimal charging and battery longevity. The controller supports Sealed, Gel, Flooded, and User-defined battery types. Refer to the controller's menu for specific battery type selection and voltage settings.

6.4 Load Control Modes

The controller offers diversified load control modes, including manual, light control, and light control with timer. Configure the desired mode through the LCD menu.

7. MAINTENANCE

Regular maintenance ensures optimal performance and extends the lifespan of your solar charge controller.

- **Cleaning:** Periodically clean the controller's exterior with a dry cloth. Ensure the heat sink fins are free from dust and debris to maintain proper cooling.
- **Connections:** Annually check all wiring connections for tightness. Loose connections can cause overheating and power loss.
- **Battery Inspection:** Regularly inspect battery terminals for corrosion. Clean if necessary. Ensure battery electrolyte levels are adequate for flooded batteries.
- **Environmental Check:** Ensure the installation environment remains dry, well-ventilated, and free from corrosive gases.

8. TROUBLESHOOTING

This section provides solutions to common issues you might encounter.

Problem	Possible Cause	Solution
No display on LCD	Battery not connected or reverse polarity; Battery voltage too low.	Check battery connections and polarity. Ensure battery voltage is above the minimum operating voltage.
Battery not charging	Solar panel not connected or reverse polarity; Solar panel voltage too low; PV short circuit.	Check solar panel connections and polarity. Ensure sufficient sunlight and panel voltage. Check for PV short circuits.
Load not working	Load not connected or reverse polarity; Load overload; Load short circuit; Low battery voltage disconnect.	Check load connections and polarity. Reduce load. Check for load short circuits. Charge battery.
Controller overheating	Poor ventilation; Excessive load or charging current.	Ensure adequate airflow around the controller. Reduce load or charging current if possible.

For issues not listed here, please contact customer support.

9. SPECIFICATIONS

Parameter	Value
Model	VS6048BN
Brand	EPsolar
System Voltage	12V/24V/36V/48V Auto Work
Rated Charge Current	60A
Battery Type Options	Sealed, Gel, Flooded, USER
Communication Port	RS485
Item Weight	3.5 Pounds
UPC	694090267421
ASIN	B07568HBW9

10. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the documentation provided with your purchase or contact EPsolar customer service directly. Keep your purchase receipt as proof of purchase for warranty claims.

Manufacturer: EPsolar