

EPEVER LS2024B

EPEVER LS2024B PWM Solar Charge Controller User Manual

MODEL: LS2024B

Brand: EPEVER

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the EPEVER LS2024B PWM Solar Charge Controller. The LS2024B is designed for solar off-grid systems, managing the charging process of the battery from solar panels and controlling the load. It features automatic 12V/24V system voltage recognition, intelligent three-level PWM charging, and multiple load working modes.

The controller ensures efficient and safe operation of your solar lighting system, protecting the battery from overcharge and over-discharge.

2. Safety Instructions

- Read all instructions carefully before installation and operation.
- Install the controller indoors, away from direct sunlight, high temperature, and humid environments.
- Ensure good ventilation around the controller.
- The battery should be installed as close as possible to the controller. The suggested cable length between the battery and controller is within 150mm.
- Use appropriate cables for connections to avoid excessive voltage drop and ensure safety.
- **Always connect the battery first, then the solar panel, and finally the load. Disconnect in the reverse order.**
- Ensure all connections are tight to avoid loose connections which can cause excessive heat.
- This controller is designed for lead-acid batteries (Sealed, Gel, Flooded). Do not use with other battery types unless specified.
- Do not disassemble or attempt to repair the controller yourself. Contact qualified personnel for service.

3. Product Overview

The EPEVER LS2024B controller features a compact design with clear indicators and connection terminals.

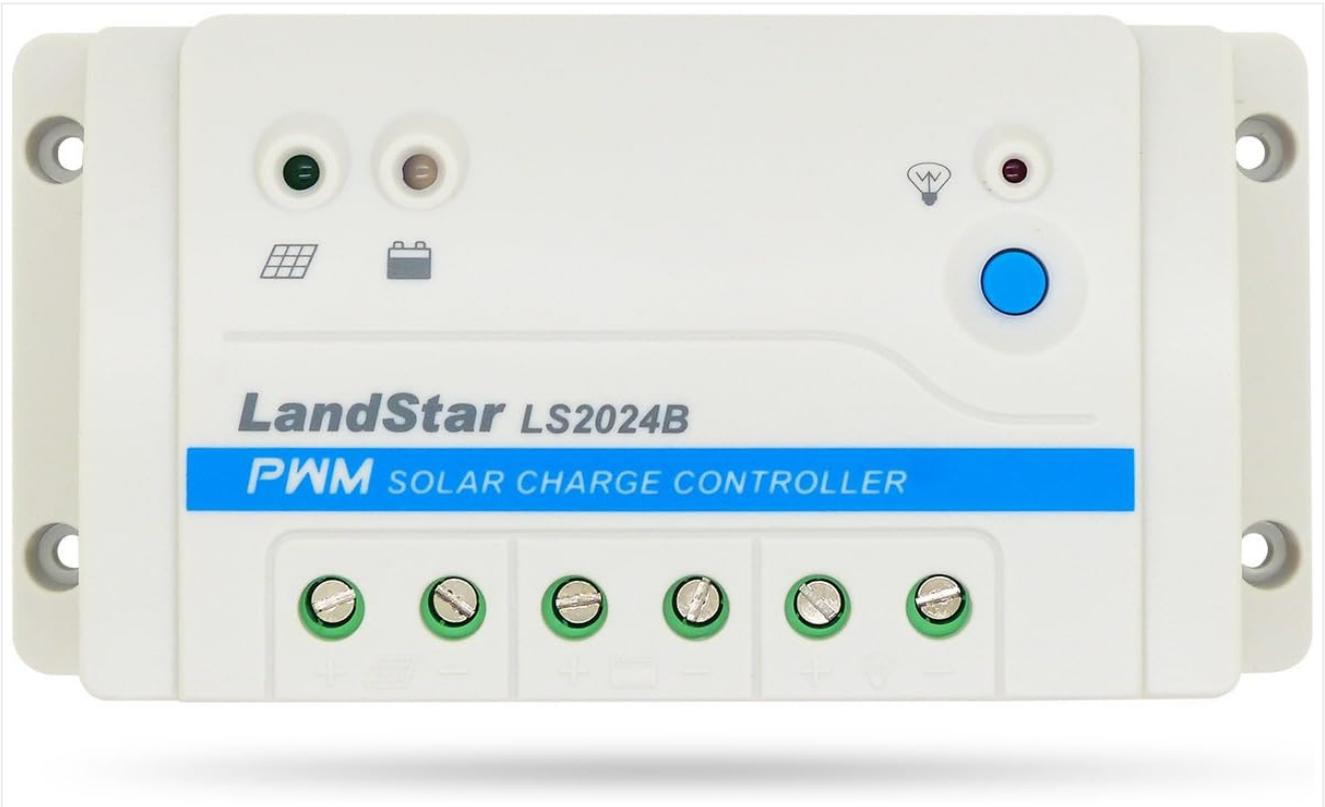


Figure 3.1: Front View of LS2024B Controller. This image shows the front panel of the EPEVER LS2024B solar charge controller, highlighting the LED indicators for PV charging, battery status, and load status, along with the load switch button and the main power terminals.



Figure 3.2: Angled View with Ports. This image provides an angled view of the LS2024B controller, showing the temperature sensor input and the RS485 communication port on the side, in addition to the main terminals.

PWM Solar charge controller

LandStar B series



Landstar B series controller with high reliability, accuracy of sampling and full electronic protection. Programmable via remote meter MT50 ,PC software and APP.



Models:

LS1024B 10A,12/24V auto work
 LS2024B 20A,12/24V auto work
 LS3024B 30A,12/24V auto work

Features:

- PWM charging
- Three LEDs shows PV charging, battery and load status
- Optional RTS for accurate temperature compensation
- Multiple load working modes: Manual Control, Light ON/OFF, Light On+Timer and Time Control
- Battery type selection: Sealed, Gel, Flooded and User(programmable)
- Battery temperature compensation
- Real-time energy statistics
- RS485 port with industrial standard MODBUS open architecture
- Real-time data monitoring and parameters setting with MT50, APP or PC software
- Support firmware upgrade



Figure 3.3: LED Indicators and Switch Button. This diagram illustrates the function of each LED indicator (Charging Status, Battery Status, Load Status) and the Load Switch Button on the EPEVER LS2024B controller.

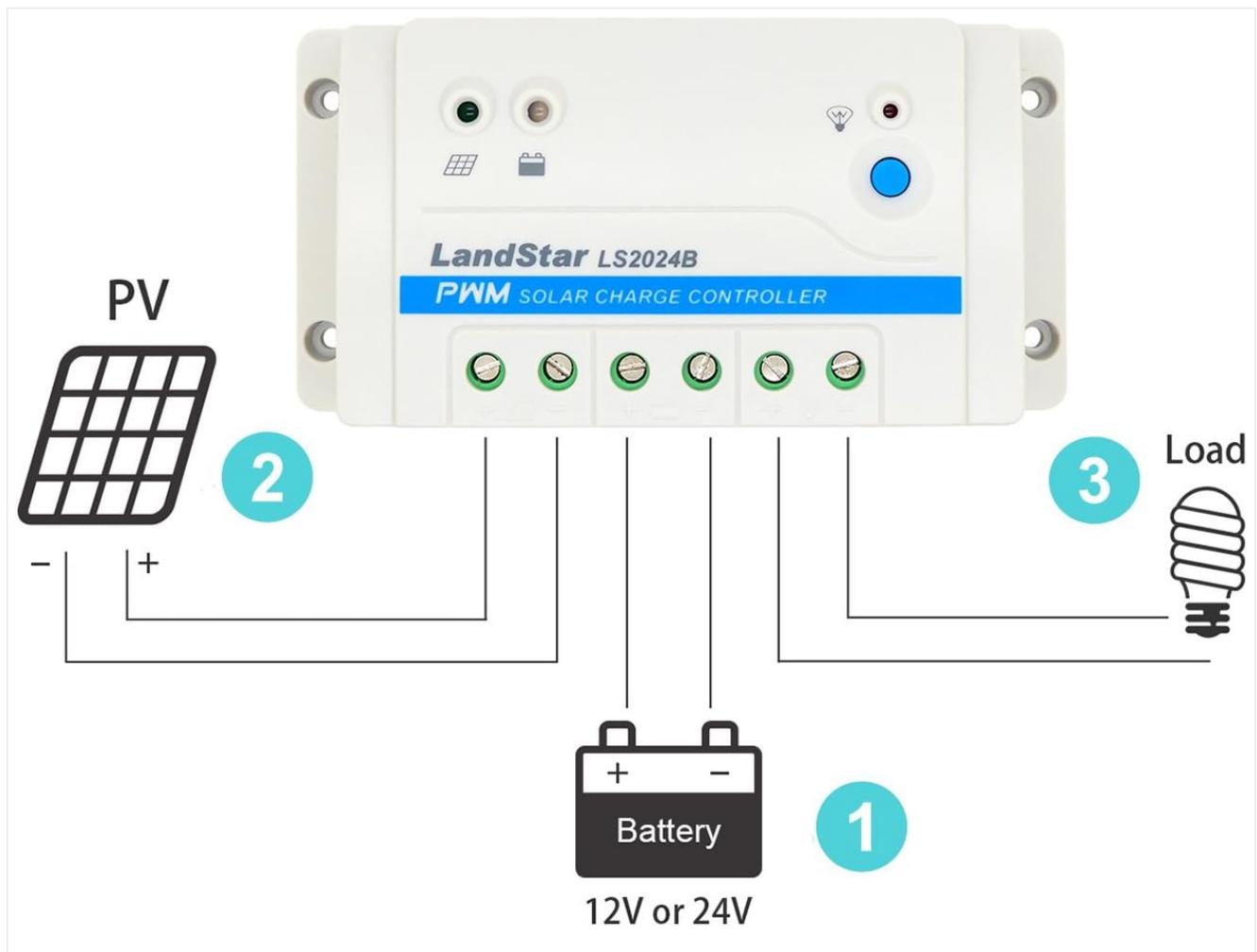
3.1 Key Features:

- 20A 12V/24V automatic system voltage recognition.

- Three-level intelligent PWM charging: Equalize, Boost, and Float.
- Multiple load working modes: Manual Control, Light ON/OFF, Light On+Timer, and Time Control.
- RS485 port for communication with remote meter (MT50), PC software, or mobile app.
- External temperature sensor interface for accurate temperature compensation.
- Comprehensive electronic protections.

4. Setup and Installation

Follow these steps to correctly install your EPEVER LS2024B solar charge controller. Ensure all safety precautions are observed.



1. Connect components to the charge controller in the sequence as shown in above picture 1-2-3 and pay much attention to the + and - . Always power the battery First.
2. After power the battery, check the battery indicator on the controller, it will be green. If it's not green, please refer to manual chapter 5.
3. The battery fuse should be installed as close to battery as possible. The suggested distance is within 150mm.

Figure 4.1: Wiring Diagram. This diagram illustrates the correct connection sequence for the battery, solar panel, and load to the EPEVER LS2024B solar charge controller.

1. **Connect the Battery:** Connect the battery to the charge controller first. Ensure correct polarity (+ to + and - to -). The battery indicator on the controller should illuminate. If it does not, check connections and battery voltage. The suggested distance between the battery and controller is within 150mm. Install a battery fuse as close to the battery as possible.
2. **Connect the Solar Panel:** Connect the solar panel to the charge controller. Ensure correct polarity. The PV charging indicator should illuminate if there is sufficient sunlight.
3. **Connect the Load:** Connect the DC load to the charge controller. Ensure correct polarity. The load indicator should illuminate if the load is active.
4. **Connect Optional Temperature Sensor (RTS):** If using an external temperature sensor, connect it to the designated port. This improves charging accuracy by compensating for battery temperature fluctuations.
5. **Connect RS485 Communication Cable:** For remote monitoring or parameter setting via MT50, PC software, or mobile app, connect the RS485 communication cable to the COM port.

Important: Always connect the battery first and disconnect it last to prevent damage to the controller.

5. Operating Instructions

5.1 LED Indicators

- **PV Charging Indicator:** Indicates the status of solar panel charging.
- **Battery Status Indicator:** Shows the battery charge level and status.
- **Load Status Indicator:** Indicates if the load is active or inactive.

Refer to Figure 3.3 for the location of these indicators.

5.2 Load Working Modes

The LS2024B supports various load working modes, which can be configured via the load switch button or through the RS485 communication interface (MT50, PC software, or app).

- **Manual Control:** The load can be turned ON/OFF manually using the switch button.
- **Light ON/OFF:** The load turns on automatically at dusk and off at dawn.
- **Light On+Timer:** The load turns on at dusk and stays on for a set duration (e.g., 2 hours, 4 hours), then turns off.
- **Time Control:** The load operates according to a pre-set schedule.

5.3 Communication Interface (RS485)

The RS485 port allows for real-time data monitoring and parameter setting. This requires an optional remote meter (MT50) or a connection to a PC (via CC-USB-RS485-150U cable) or mobile device (via OTG cable and app). This enables advanced configuration of load modes, battery types, and other system parameters.

6. Maintenance

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

- **Check Connections:** Periodically inspect all wiring connections for tightness and corrosion. Loose connections can cause overheating and damage.
- **Clean the Controller:** Keep the controller clean and free from dust and debris. Use a dry cloth for cleaning. Ensure ventilation openings are not blocked.
- **Inspect Cables:** Check all cables for signs of wear, fraying, or damage. Replace damaged cables

immediately.

- **Battery Inspection:** Regularly check the battery terminals for corrosion and ensure the battery is in good condition. For flooded batteries, check electrolyte levels.
- **Environmental Check:** Ensure the controller is operating within its specified temperature range and is not exposed to excessive moisture.

7. Troubleshooting

This section provides solutions to common issues you might encounter with your LS2024B controller and outlines its built-in electronic protections.

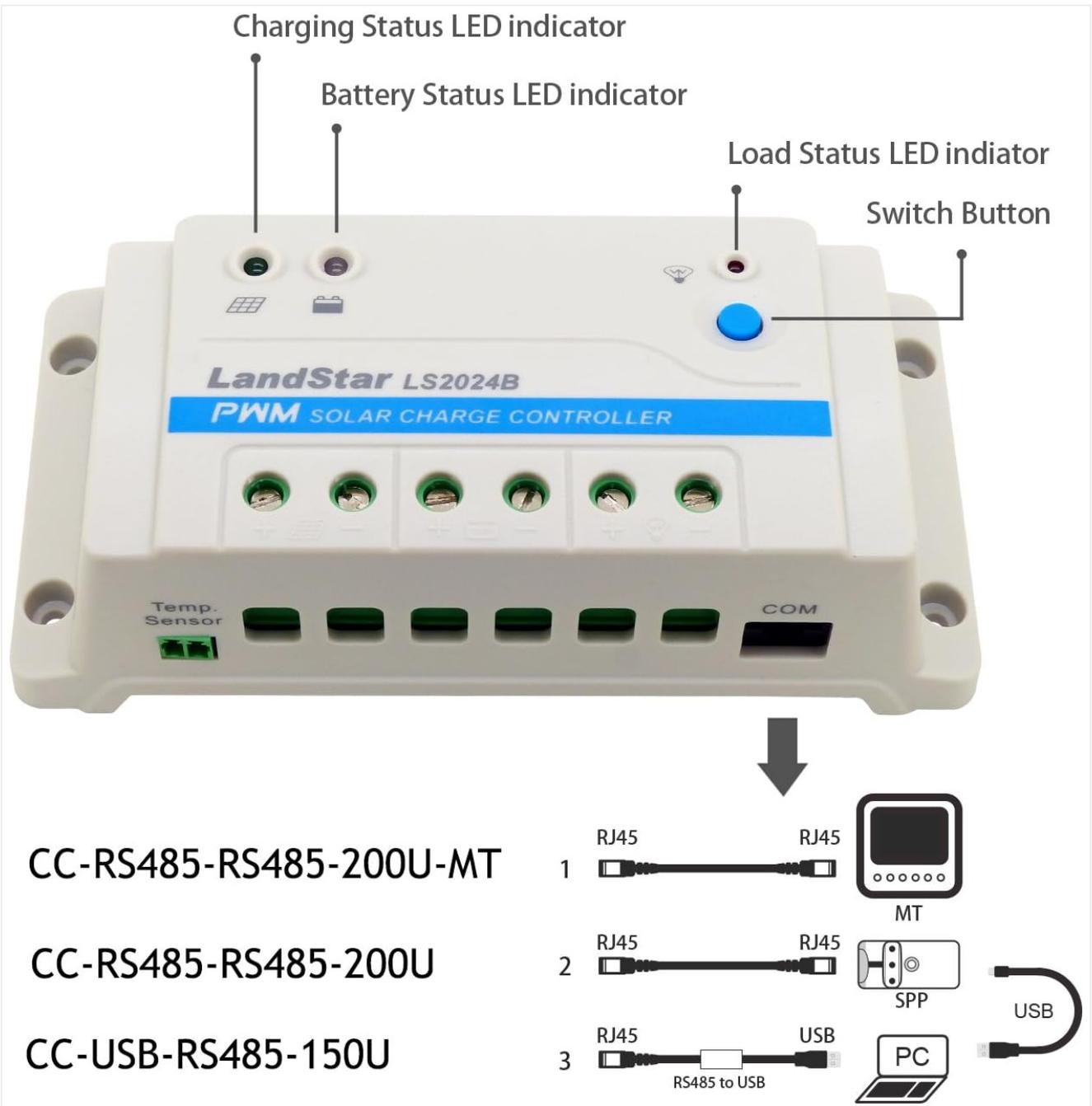


Figure 7.1: Electronic Protections and System Overview. This diagram illustrates the various electronic protections integrated into the EPEVER LS series controllers, such as PV short circuit, battery over-discharge, and load overload protection, alongside a general system connection overview.

7.1 Electronic Protections

The controller is equipped with multiple electronic protections to prevent damage to the system and ensure safe

operation:

- PV short circuit protection
- PV reverse polarity protection
- Battery over voltage protection
- Battery over discharge protection
- Battery reverse polarity protection
- Battery overheating protection
- Load short circuit protection
- Load overload protection
- Controller overheating protection

If any of these protections are triggered, the controller will automatically attempt to recover or indicate an error through its LED indicators.

7.2 Common Issues and Solutions

- **No Indicators On:**
 - Check battery connections and ensure correct polarity.
 - Verify battery voltage is within the operating range (e.g., for a 12V system, typically above 9V).
- **PV Charging Indicator Off (during daylight):**
 - Check solar panel connections and polarity.
 - Ensure sufficient sunlight is reaching the solar panel.
 - Verify solar panel voltage is within the controller's input range.
- **Load Not Working:**
 - Check load connections and polarity.
 - Ensure the load switch button is pressed (for manual mode) or the load mode is correctly configured.
 - Check if the battery voltage is too low (low voltage disconnect protection may be active).
 - Check for load short circuit or overload.
- **Battery Not Charging Properly:**
 - Check all connections.
 - Ensure solar panel output is adequate for charging.
 - Verify battery type settings if configured via RS485.
 - Inspect the battery for signs of damage or age.

8. Technical Specifications

The following table details the technical specifications for the EPEVER LS2024B Solar Charge Controller.

Technical specifications:

CE RoHS IEC62109

Model	LS1024B	LS2024B	LS3024B
Nominal system voltage	12/24V auto work		
Rated charge current	10A	20A	30A
Rated discharge current	10A	20A	30A
Battery input voltage range	8~32V		
Equalize charging voltage *	Sealed: 14.6V, Flooded: 14.8V, User-defined: 9~17V		
Boost charging voltage *	Gel: 14.2V, Sealed: 14.4V, Flooded: 14.6V, User-defined: 9~17V		
Float charging voltage *	Gel /Sealed /Flooded: 13.8V, User-defined: 9~17V		
Low voltage reconnect voltage *	Gel /Sealed /Flooded: 12.6V, User-defined: 9~17V		
Low voltage disconnect voltage*	Gel /Sealed /Flooded: 11.1V, User-defined: 9~17V		
Self-consumption	≤8.4mA(12V), ≤7.8mA(24V)		
Temperature compensation coefficient	-3mV/°C/2V		
Grounding	Common positive		

* Technical data for 12V system at 25°C, twice in 24V system.

* Programmable voltage value by PC, MT50 and APP.

Figure 8.1: Technical Specifications Table. This image displays a table outlining the technical specifications for the LS1024B, LS2024B, and LS3024B models, including nominal system voltage, current ratings, voltage ranges, and environmental conditions.

Parameter	Value (LS2024B)
Nominal System Voltage	12/24V Auto Work
Max. PV Voltage of Storage Battery	34V
Current of Storage Battery	20A
Current of Load	20A
Low Voltage Reconnect Voltage	Sealed/Gel/Flooded: 12.6V, User: 9 17V
Low Voltage Disconnect Voltage	Sealed/Gel/Flooded: 11.1V, User: 9 17V
Self-consumption	8.4mA (12V); 7.8mA (24V)
Temperature Compensation Coefficient	-3mV/°C/2V (25°C)
Enclosure	IP30
Grounding	Common Positive
Working Environment Temperature	-35°C 55°C

Parameter	Value (LS2024B)
Terminal	8AWG (10mm ²)
Dimension	159.6 × 81.4 × 47.8mm
Net Weight	0.3kg
UPC	652042950982

9. Warranty and Support

Warranty information for the EPEVER LS2024B Solar Charge Controller is typically provided with your purchase documentation or can be found on the official EPEVER website. Please retain your proof of purchase for warranty claims.

For technical support, troubleshooting assistance beyond this manual, or warranty inquiries, please contact EPEVER customer service or your authorized dealer.