

EPEVER XTR4215N

EPEVER XTRA4215N Series MPPT Solar Charge Controller User Manual

Model: XTR4215N | Brand: EPEVER

1. INTRODUCTION

The EPEVER XTRA(10A~40A) series MPPT solar charge controller is an advanced device designed for off-grid photovoltaic systems. It utilizes Maximum Power Point Tracking (MPPT) technology to optimize energy harvesting from solar panels. This controller is built to international standards, ensuring high quality, reliability, and safety for your solar power system.

Key features include a limitation function for charging power and current, as well as an automatic power reduction function. These features ensure system stability, even when operating with oversized PV modules (up to 1.5 times the rated power) or in high-temperature environments. Optional display units (XDB1/XDS1/XDS2) are available for enhanced monitoring and control.

2. KEY FEATURES

- **High-Efficiency Charging:** Exceptional MPPT tracking and charge conversion efficiency for optimal power utilization.
- **Versatile Battery Compatibility:** Seamlessly works with both lead-acid and lithium-ion batteries.
- **Enhanced Stability:** Includes functions for limiting charging power and current, ensuring system stability even in demanding conditions.
- **Easy Integration:** Equipped with a standard Modbus communication protocol and isolated RS485 interface for seamless system integration.
- **Optional LCD Display Units:** Compatible with XDB1/XDS1/XDS2 display units and other accessories for advanced monitoring.
- **IP33 Ingress Protection:** Provides protection against solid objects over 2.5mm and water spray.
- **Real-Time Energy Statistics:** Monitors energy production and consumption in real-time.
- **Multiple Load Modes:** Offers various load control modes for different application requirements.
- **Power & Current Limitation:** Automatically adjusts charging parameters to prevent overcharging and ensure system longevity.
- **High-Temp Power Derating:** Reduces power output in high-temperature conditions to protect the device.

Features



Figure 2.1: Overview of EPEVER XTRA4215N features, including high MTTP efficiency, IP33 protection, real-time energy statistics, Modbus protocol & RS485, optional LCD display units, high-temp power derating, power & current limitation, multiple load modes, support for lead-acid & Li-ion battery, and high charging conversion efficiency.

3. PRODUCT OVERVIEW

This section provides a visual guide to the EPEVER XTRA4215N MPPT Solar Charge Controller, highlighting its main components and connection points.



Figure 3.1: Angled view of the EPEVER XTRA4215N MPPT Solar Charge Controller, showing the white casing, blue display area, and black heatsink.



Figure 3.2: Front view of the EPEVER XTRA4215N, displaying the LCD screen, control buttons, and LED indicators.



Figure 3.3: Annotated front view highlighting the mounting holes, the display unit, and the terminal protection cover at the bottom.

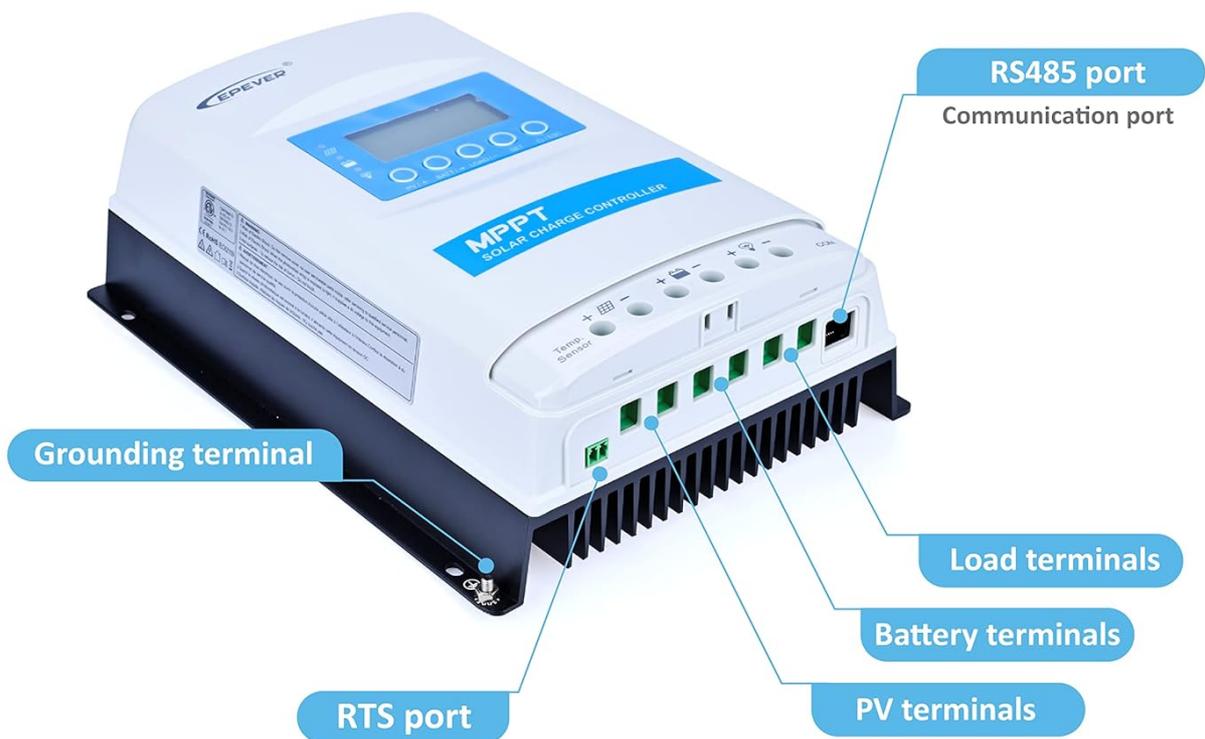


Figure 3.4: Annotated side view detailing the connection ports: RS485 communication port, grounding terminal, RTS port, load terminals, battery terminals, and PV terminals.



Figure 3.5: Back view of the controller, prominently featuring the large black heatsink designed for efficient heat dissipation.

4. SETUP AND INSTALLATION

Proper installation is crucial for the safe and efficient operation of your solar charge controller. Please follow these guidelines carefully.

4.1 Safety Precautions

- Ensure all power sources are disconnected before installation.
- Use insulated tools to prevent electrical shock.
- Install the controller in a well-ventilated area, away from flammable materials.
- Avoid direct sunlight, high temperatures, and moisture.
- Ensure proper grounding of the system.

4.2 Mounting the Controller

1. Select a suitable mounting location that meets the safety precautions.
2. Mark the positions for the mounting holes on the wall or mounting surface using the controller as a template.
3. Drill the holes and secure the controller using appropriate screws and anchors. Ensure the heatsink has adequate clearance for airflow.

4.3 Wiring Connections

Connect the components in the following order to prevent damage:

1. **Battery Connection:** Connect the battery to the controller's battery terminals (BAT+/-). Ensure correct polarity. The controller will detect the battery voltage.
2. **PV Array Connection:** Connect the solar panel array to the controller's PV terminals (PV+/-). Ensure correct

polarity.

3. **Load Connection:** Connect the DC load to the controller's load terminals (LOAD+/-). Ensure correct polarity.
4. **Temperature Sensor (RTS) Connection:** If using an external temperature sensor, connect it to the RTS port. This improves charging accuracy.
5. **RS485 Communication Port:** For external communication (e.g., with a PC or optional display unit), connect the RS485 cable to the RS485 port.
6. **Grounding:** Connect the grounding terminal to an earth ground.

Warning: Incorrect wiring polarity can cause permanent damage to the controller and other components. Always double-check connections before applying power.

5. OPERATING INSTRUCTIONS

Once installed and wired correctly, the EPEVER XTRA4215N controller will begin operation automatically. The optional display unit (if connected) provides real-time system status and allows for parameter adjustments.

5.1 Initial Power-Up

After connecting the battery, PV array, and load in the specified order, the controller will power on. The display (if present) will show system information such as battery voltage, charging current, and PV voltage.

5.2 Display and Buttons (with optional display unit)

The front panel features an LCD display and several buttons for navigation and setting adjustments.

- **PV/+:** Used to navigate forward through menus or increase values.
- **BATT+/-:** Used to navigate backward through menus or decrease values.
- **LOAD:** Used to switch the load on/off manually or enter load control settings.
- **SET:** Used to enter setting mode or confirm selections.
- **ESC:** Used to exit setting mode or return to the previous menu.

5.3 Battery Type Selection

The controller supports various battery types. It is essential to select the correct battery type for optimal charging and battery longevity. Refer to the optional display unit's manual for specific steps on how to change battery parameters.

5.4 Load Control Modes

The controller offers different load control modes to manage the connected DC load. These typically include:

- **Manual Control:** Load can be turned on/off manually via the LOAD button.
- **Light Control:** Load turns on at dusk and off at dawn.
- **Light Control + Timer:** Load turns on at dusk and stays on for a set duration.
- **Dual-Timer Control:** Allows for two separate timer periods.
- **Test Mode:** For system testing.

Consult the optional display unit's manual for detailed instructions on configuring load control modes.

6. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your EPEVER XTRA4215N solar charge controller.

- **Check Connections:** Periodically inspect all wiring connections for tightness and corrosion. Loose connections can cause overheating and power loss.
- **Clean Controller:** Keep the controller clean and free from dust and debris. Use a dry cloth to wipe the exterior. Ensure the heatsink fins are not obstructed to allow for proper cooling.
- **Battery Inspection:** For lead-acid batteries, check electrolyte levels and specific gravity regularly. Ensure battery terminals are clean and free of corrosion.
- **PV Array Inspection:** Inspect solar panels for dirt, shading, or damage. Clean panels as needed to maximize energy harvest.
- **System Performance Monitoring:** Regularly monitor system parameters (PV voltage, battery voltage, charging current, load current) via the display unit or communication software to ensure normal operation.

Caution: Before performing any maintenance, disconnect all power sources (PV array, battery, and load) in reverse order of installation.

7. TROUBLESHOOTING

This section provides solutions to common issues you might encounter with your solar charge controller.

Problem	Possible Cause	Solution
No display/Controller not powering on	<ul style="list-style-type: none"> ◦ Battery not connected or reverse polarity. ◦ Battery voltage too low. ◦ Loose battery connection. 	<ul style="list-style-type: none"> ◦ Check battery connection and polarity. ◦ Charge battery externally if voltage is below minimum operating level. ◦ Tighten battery terminals.
No charging from PV array	<ul style="list-style-type: none"> ◦ PV array not connected or reverse polarity. ◦ Insufficient sunlight. ◦ PV array voltage too low or too high. ◦ Shading on PV panels. 	<ul style="list-style-type: none"> ◦ Check PV connection and polarity. ◦ Wait for adequate sunlight. ◦ Verify PV array voltage is within controller's operating range. ◦ Clear any shading from panels.
Load not working	<ul style="list-style-type: none"> ◦ Load not connected or reverse polarity. ◦ Load control mode is off or incorrect. ◦ Battery voltage too low (LVD). ◦ Overload or short circuit on load terminals. 	<ul style="list-style-type: none"> ◦ Check load connection and polarity. ◦ Adjust load control mode settings. ◦ Charge battery. ◦ Reduce load or check for short circuit.
Controller overheating	<ul style="list-style-type: none"> ◦ Poor ventilation. ◦ Ambient temperature too high. ◦ Oversized PV array. 	<ul style="list-style-type: none"> ◦ Ensure adequate airflow around the heatsink. ◦ Relocate controller to a cooler environment. ◦ The controller has power derating, but ensure PV input is within limits.

8. SPECIFICATIONS

Detailed technical specifications for the EPEVER XTRA4215N MPPT Solar Charge Controller.

Parameter	Value
Model Number	XTR4215N
Product Dimensions	10.04 x 7.36 x 2.98 inches
Item Weight	5.31 Pounds
Brand	EPEVER
Color	Blue and white
Display Type	LCD (with optional display units)
Manufacturer	HUIZHOU EPEVER TECHNOLOGY CO., LTD.
First Available Date	February 24, 2022
Max Charge/Discharge Current	40A (for XTRA4215N model)
Battery Compatibility	Lead-acid (Sealed, Gel, Flooded) and Lithium-ion
Communication	RS485 (Modbus protocol)
Ingress Protection	IP33

9. WARRANTY INFORMATION

EPEVER products typically come with a standard manufacturer's warranty. Please refer to the warranty card included with your product or visit the official EPEVER website for the most current and detailed warranty terms and conditions. The warranty generally covers defects in materials and workmanship under normal use. Keep your purchase receipt as proof of purchase for any warranty claims.

10. CUSTOMER SUPPORT

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

- **Manufacturer:** HUIZHOU EPEVER TECHNOLOGY CO., LTD.
- **Website:** www.epever.com (Please visit the official website for contact details and support resources.)

When contacting support, please have your product model number (XTR4215N) and purchase information readily available.