

## EPEVER Tracer4215BN

# EPEVER 40A MPPT Solar Charge Controller Tracer BN Series User Manual

Model: Tracer4215BN

## 1. PRODUCT OVERVIEW

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The EPEVER Tracer BN Series MPPT Solar Charge Controller is an advanced, efficient, and multi-functional device designed for off-grid solar systems. It utilizes Maximum Power Point Tracking (MPPT) technology to maximize energy harvest from solar panels, ensuring optimal charging for your battery bank. This controller is suitable for various applications, including telecommunication base stations, household systems, street lighting, and wilderness monitoring systems.

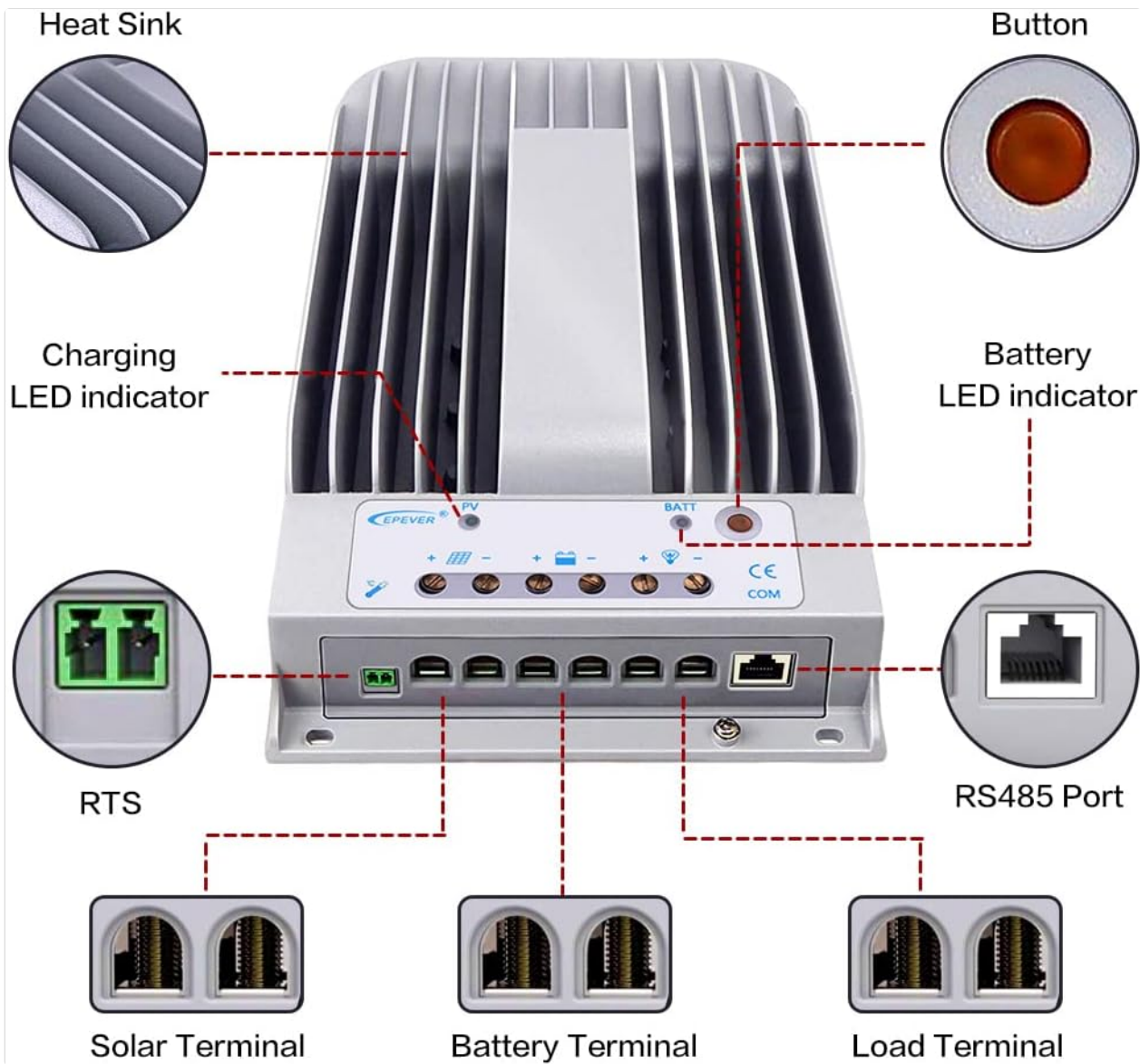
Key features include:

- Advanced MPPT technology with tracking efficiency no less than 99.5% and maximum conversion efficiency of 98%.
- Reliable automatic limit function of maximum PV input power, preventing overload under any circumstances.
- Wide MPP operating voltage range.
- Die-cast aluminum design for excellent heat dissipation.
- 12/24VDC automatic system voltage identification.
- Multiple load control modes: manual control, light ON/OFF, light ON+Timer, and time control.
- Supports 4 charging options: Sealed, Gel, Flooded, and User-defined.
- PC monitoring and external display unit (like MT50) connectivity for real-time data checking and parameter setting, with software upgrade support.
- Modbus communication protocol interface for expanded applications and monitoring.

## 2. PRODUCT COMPONENTS

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Familiarize yourself with the main components and interfaces of the Tracer BN series solar charge controller:



**Figure 2.1: Controller Components Overview**

This image displays the EPEVER Tracer BN Series Solar Charge Controller with key components labeled, including the Heat Sink, Button, Charging LED indicator, Battery LED indicator, RTS port, RS485 Port, Solar Terminal, Battery Terminal, and Load Terminal.

- **Heat Sink:** Dissipates heat generated during operation to maintain optimal performance.
- **Button:** Used for manual control of the load and navigating settings.
- **Charging LED Indicator:** Shows the status of PV (solar panel) charging.
- **Battery LED Indicator:** Displays the battery charging status.
- **RTS (Remote Temperature Sensor) Port:** Connects an optional remote temperature sensor for accurate battery temperature compensation.
- **RS485 Port:** Communication interface for connecting to PC, MT50 remote meter, WiFi, or Bluetooth modules.
- **Solar Terminal (PV):** Connects to the solar panel array.
- **Battery Terminal (BATT):** Connects to the battery bank.
- **Load Terminal:** Connects to DC loads.

### 3. SETUP AND INSTALLATION

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

### 3.1 Unboxing and Initial Inspection

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#### Video 3.1: Unboxing and Component Overview

This video demonstrates the unboxing process of the EPEVER Tracer BN MPPT Solar Charge Controller and provides a visual overview of its main components and ports, including the PV charging LED indicator, battery charging LED indicator, button, PV terminals, battery terminals, load terminals, heat sink, RTS port, and RS485 port.

1. Carefully open the packaging and remove the controller and any accessories.
2. Inspect the controller for any visible damage. If damage is found, contact your supplier.
3. Ensure all listed components are present.

### 3.2 Wiring Connections

**Important Safety Note:** While wiring the controller, ensure that the circuit breaker or fuse is not closed. Verify that the positive ("+") and negative ("-") leads are connected correctly to prevent damage to the controller or other components.

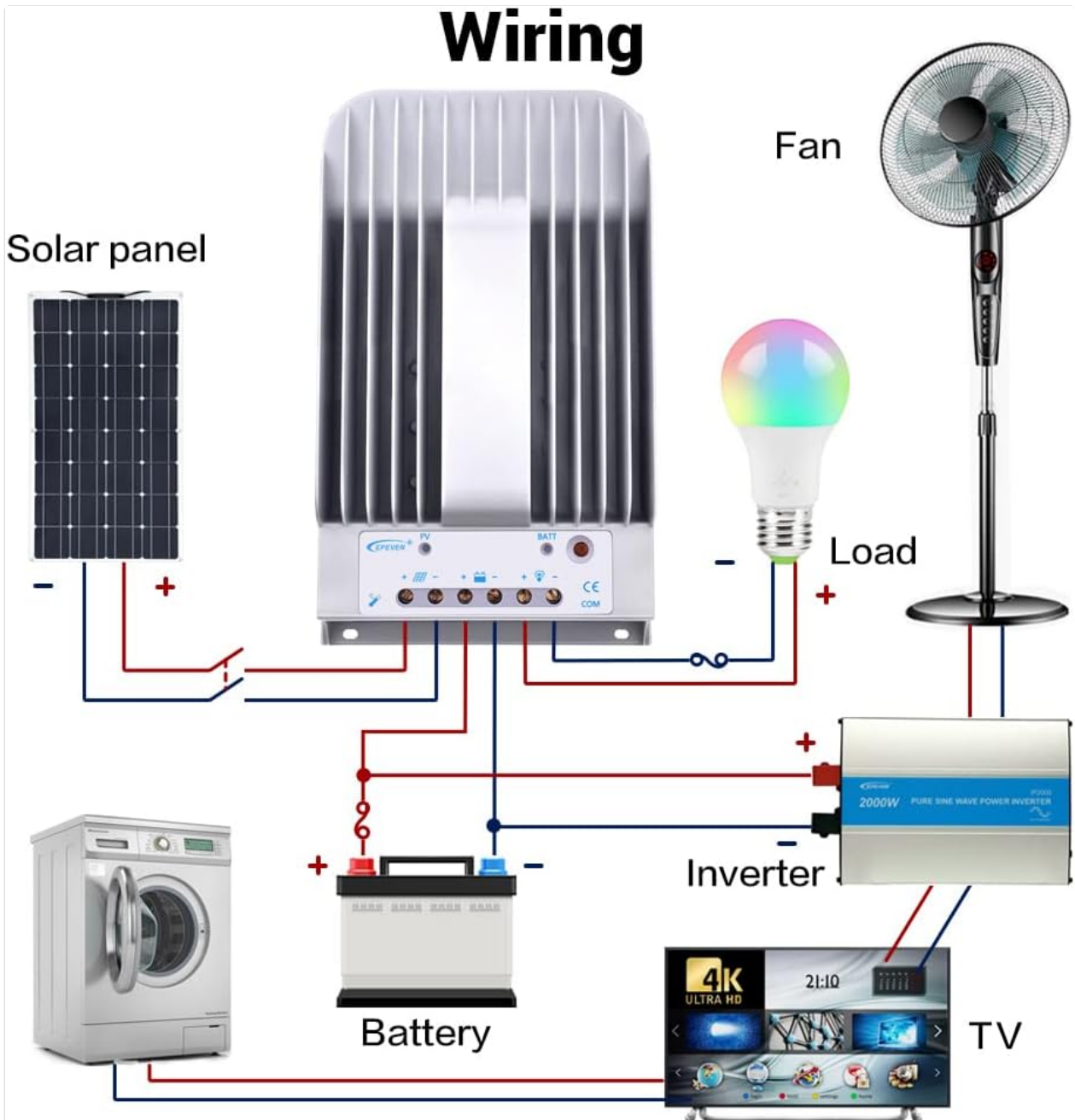


Figure 3.2: Typical System Wiring Diagram

This diagram illustrates a typical solar power system setup, showing the connection of the solar panel to the controller, the controller to the battery, and the controller to various DC and AC loads via an inverter. Ensure correct polarity for all connections.

The connection order is critical:

1. **Connect the Battery:** First, connect the battery to the controller's battery terminals. Ensure correct polarity (positive to positive, negative to negative). The controller will automatically detect the system voltage (12V/24V). The controller supports Lead-acid Batteries (Sealed, AGM, Gel, Flooded) and User-defined settings.
2. **Connect the Load:** Next, connect your DC loads to the controller's load terminals.
3. **Connect the Solar Panel (PV):** Finally, connect the solar panel array to the controller's PV terminals.

The disconnection order is the reverse: PV -> Load -> Battery.

Refer to the following table for recommended wire sizes based on controller model:

Model	Wire Size (AWG/mm <sup>2</sup> )
Tracer1215BN	12AWG (4mm <sup>2</sup> )
Tracer2215BN	8AWG (10mm <sup>2</sup> )
Tracer3215BN	6AWG (16mm <sup>2</sup> )
Tracer4215BN	4AWG (25mm <sup>2</sup> )

## 4. OPERATING INSTRUCTIONS

Once the controller is correctly wired and powered, it will begin operating automatically. The LED indicators provide visual feedback on the system status.

### 4.1 Load Control

The controller offers various load control modes. In manual control mode, you can toggle the load on or off using the controller's button.

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#### Video 4.1: Load Manual Mode Operation

This video segment demonstrates how to manually turn the load ON/OFF by pressing the 'ENTER' button on the controller when it is in load manual mode.

Other load control modes (Light ON/OFF, Light ON+Timer, Time Control) can be configured using an external display unit (like MT50) or PC/APP software connected via the RS485 port.

### 4.2 Monitoring and Parameter Setting

The controller supports various accessories for enhanced monitoring and parameter adjustment:



**Figure 4.2: Controller with Communication Accessories**

This image illustrates how the solar charge controller can be connected to various communication accessories such as the MT50 remote meter, eBox-WIFI-01 for WiFi monitoring, eBox-BLE-01 for Bluetooth monitoring, and a PC via a USB to RS485 cable for detailed system management.

Optional accessories for monitoring and control:

Accessory	Description
<b>Remote Temperature Sensor (RTS300R47K3.81A)</b>	Acquisition of battery temperature for temperature compensation of control parameters. The standard length of the cable is 3m (can be customized). The RTS300R47K3.81A connects to the port (4 <sup>th</sup> ) on the controller. <b>NOTE:</b> If the temperature sensor is short-circuited or damaged, the controller will be charging or discharging at the default temperature 25 °C.
<b>USB to RS485 cable (CC-USB-RS485-150U)</b>	USB to RS-485 converter used to monitor each controller on the network using Solar Station PC software. The length of cable is 1.5m. The CC-USB-RS485-150U connects to the RS-485 Port on the controller.
<b>OTG cable (OTG-12CM)</b>	Used to connect a mobile communication cable and able to achieve real-time monitoring of the controller and modification of the parameters by using mobile APP software.

Accessory	Description
<b>Remote Meter (MT50)</b>	MT50 can display various operating data and fault of the system. The information can be displayed on a backlit LCD screen, the buttons are easy-to-operate, and the numeric display is readable.
<b>WiFi Serial Adapter (eBox-WIFI-01)</b>	After the controller is connected with the eBox-WIFI-01 through the standard Ethernet cable (parallel cable), the operating status and related parameters of the controller can be monitored by the mobile APP software through WiFi signals.
<b>RS485 to Bluetooth Adapter (eBox-BLE-01)</b>	After the controller is connected with the eBox-BLE-01 through the standard Ethernet cable (parallel cable), the operating status and related parameters of the controller can be monitored by the mobile APP software through Bluetooth signals.
<b>Logger (eLOG01)</b>	After the controller is connected with the eLOG-01 through the RS485 communication cable, it can record the operating data of the controller or monitor the real-time operating status of the controller via PC software.

**NOTE:** For setting and operation of accessories, please refer to their specific instructions.

## 5. MAINTENANCE

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

- **Cleanliness:** Keep the controller clean and free from dust and debris. Use a dry cloth to wipe the exterior.
- **Connections:** Periodically check all wiring connections for tightness. Loose connections can cause overheating and damage.
- **Ventilation:** Ensure the heat sink fins are not obstructed to allow for proper airflow and heat dissipation.
- **Environment:** Operate the controller within its specified ambient temperature and humidity ranges.

## 6. TROUBLESHOOTING

If you encounter issues with your EPEVER solar charge controller, consider the following basic troubleshooting steps:

- **No Power/Display:** Check battery connections and ensure the battery voltage is within the controller's operating range. Verify fuses or circuit breakers are not tripped.
- **No Charging:** Ensure solar panels are connected correctly and receiving sufficient sunlight. Check PV input voltage and current. Verify PV circuit breaker/fuse.
- **Load Not Working:** Check load connections and ensure the load is not exceeding the controller's rated current. Verify the load control mode settings.
- **Abnormal LED Indicators:** Refer to the full user manual for specific error codes or indicator patterns to diagnose issues.

For complex issues or persistent problems, contact technical support.

## 7. TECHNICAL SPECIFICATIONS

The following table provides detailed technical specifications for the Tracer BN series, including the 40A model (Tracer4215BN):

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### Video 7.1: Technical Specifications Overview

This video segment displays a table detailing the technical specifications for the Tracer BN series MPPT Solar Charge Controllers, including electrical and environmental parameters for various models (Tracer1215BN, Tracer2215BN, Tracer3215BN, Tracer4215BN).

Item	Tracer 1215BN	Tracer 2215BN	Tracer 3215BN	Tracer 4215BN
Nominal system voltage	12/24VDC Auto			
Rated charge current	10A	20A	30A	40A
Rated discharge current	10A	20A	20A	20A
Battery voltage range	8V~32V			
Max. PV open circuit voltage	150V (at minimum operating environment temperature) 138V (at 25°C environment temperature)			
MPP voltage range	Battery voltage+2V ~ 108V			
Max. PV input power	130W(12V) 260W(24V)	260W(12V) 520W(24V)	390W(12V) 780W(24V)	520W(12V) 1040W(24V)
Self-consumption	≤60mA(12V); ≤30mA(24V)			
Discharge circuit voltage drop	≤0.15V			
Temperature compensate coefficient	-3mV/°C/2V (Default)			
Communication	RS485 (RJ45 interface)			
Grounding	Common negative			
Ambient temperature range*	-35°C ~ +55°C			
Storage temperature range	-35°C ~ +80°C			
Humidity range	≤95% (N.C.)			
Enclosure	IP30			

\*Please operate controller at permitted ambient temperature. If over permissible range, please derate capacity accordingly.

## 8. WARRANTY AND SUPPORT

EPEVER products are designed for reliability and performance. For warranty information, please refer to the documentation included with your purchase or visit the official EPEVER website. If you require technical assistance or have questions regarding your Tracer BN series solar charge controller, please contact EPEVER customer support or your authorized dealer.

