EPEVER Triron4210N

EPEVER MPPT Solar Charge Controller Triron4210N User Manual

Model: Triron4210N

1. Introduction

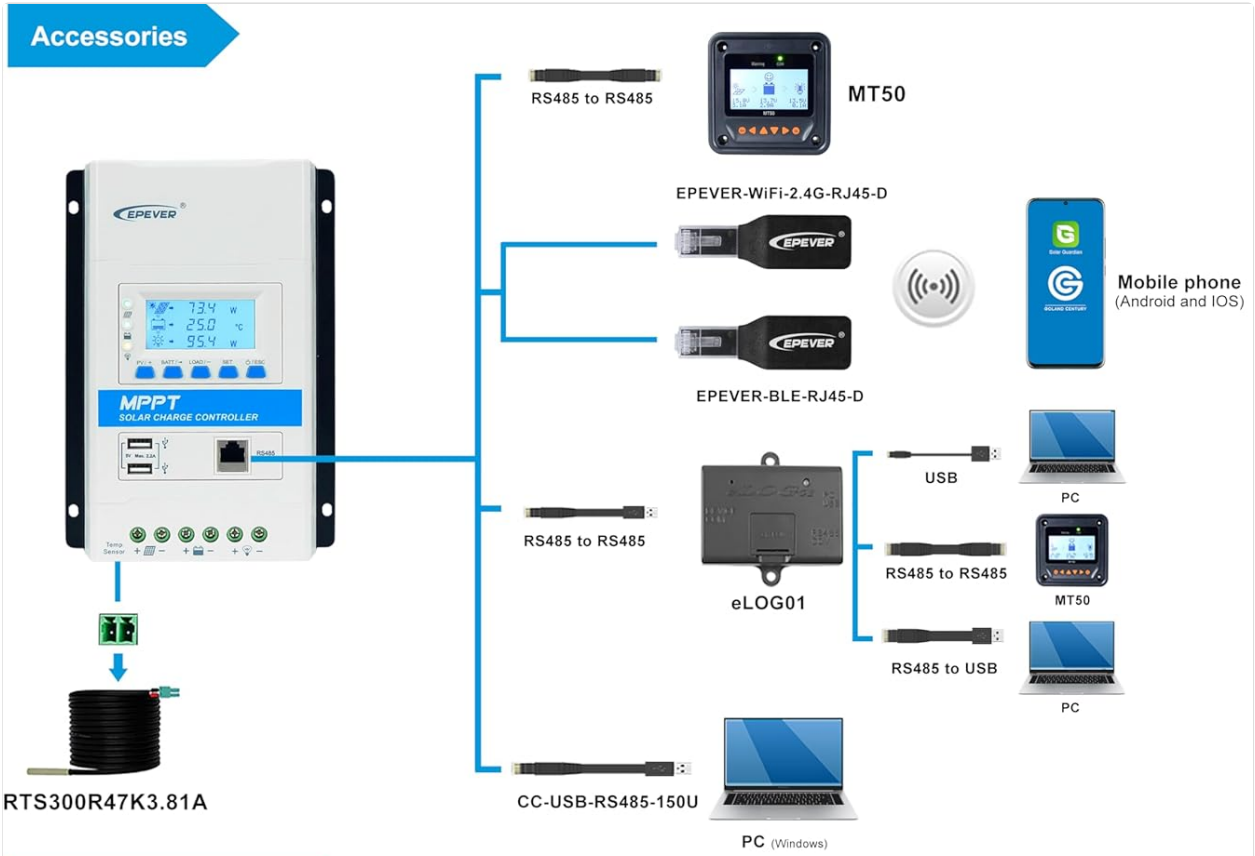
The EPEVER MPPT Solar Charge Controller Triron4210N is an advanced Maximum Power Point Tracking (MPPT) controller designed for solar power systems. This 40A controller automatically detects 12V or 24V system voltages and supports a maximum PV input of 100V, handling up to 520W for 12V battery systems or 1040W for 24V battery systems. It features common negative grounding and is an upgraded version (Triron4210N DS2+UCS) compatible with various battery types, including Sealed, Gel (AGM), Flooded, LiFePO4, Li(NiCoMn)O2, and user-defined settings. It offers enhanced electronic protection features and can be integrated with different display and interface modules to meet diverse functional requirements.

2. Safety Instructions

- **Always connect the battery first:** Ensure the battery is connected to the controller before connecting solar panels or loads.
- **Disconnect in reverse order:** When disconnecting the system, always disconnect the PV array first, then the load, and finally the battery.
- **System Voltage:** For lithium battery types, the controller cannot auto-recognize the system voltage. Please confirm the system voltage (12V or 24V) before use.
- **Equalize Charging:** Equalize charging is not performed when the battery type is set to "lithium battery".
- **Operating Environment:** The controller is designed for full load operation within its specified working environment temperature range.
- **Wiring:** Ensure all wiring is correct and secure to prevent damage or hazards.

3. Product Overview

The Triron4210N controller is designed for robust performance and user-friendly operation. It features a clear LCD display, intuitive buttons, and multiple connection ports.



Mechanical Parameters

Item	TRIRON2206N TRIRON2210N	TRIRON3210N	TRIRON3215N	TRIRON4210N TRIRON4215N
Diemension	150×216×56.7mm	158×238.3×62.7mm	183×256.8×66.7mm	183×256.8×66.7mm
Mounting dimension	141×170mm	158×200mm	174×220mm	174×220mm
Mounting hole size	Φ5mm			
Terminal	6AWG(16mm²)	6AWG(16mm²)	6AWG(16mm²)	6AWG(16mm²)
Recommended cable	10AWG(6mm²)	8AWG(10mm²)	8AWG(10mm²)	6AWG(16mm²)
Weight	0.92kg	1.35kg	1.85kg	1.85kg
Certification	EN/IEC62109-1 、 EN61000-6-3/EN61000-6-1 、 47 CFR Part 15, Subpart B 、 IEC62509 、 IEC62321-3-1			

Figure 1: Front view of the EPEVER MPPT Solar Charge Controller Triron4210N, showing the LCD display, control buttons, and USB ports.

Figure 2: Back view of the EPEVER MPPT Solar Charge Controller Triron4210N, highlighting the heat sink for efficient thermal management.

Key Features:

- **LCD Display:** Provides real-time data on PV voltage/current, battery voltage/current/temperature/capacity, and load status.
- **Control Buttons:** Five buttons for easy navigation and parameter setting.
- **Dual USB Output:** Two 5VDC/2.2A USB ports for charging electronic devices.
- **Common Negative Grounding:** Ensures compatibility with various system configurations.
- **Modular Design:** The Triron series is modular-designed, allowing integration with different display and interface modules (DS2+UCS included in this model).
- **Heat Sink:** Integrated heat sink for better heat dissipation.

4. Setup and Installation

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

Wiring Diagram:

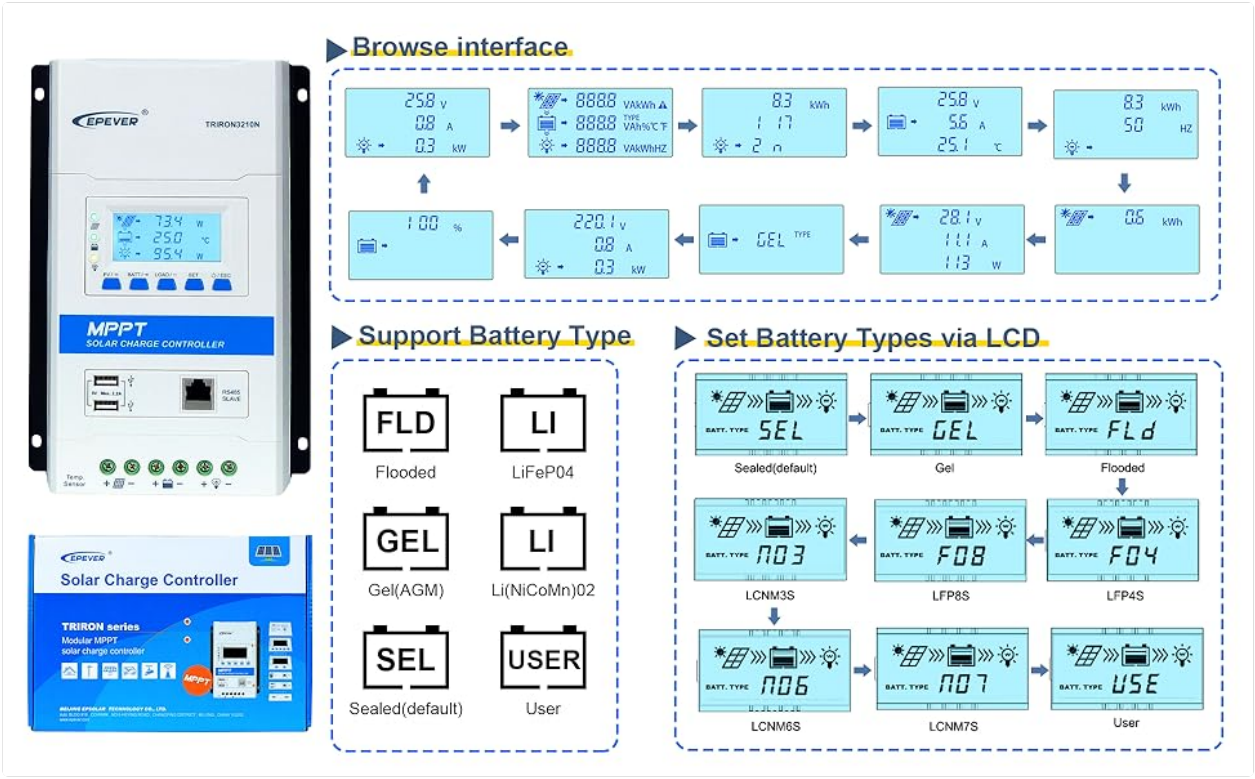


Figure 3: A typical solar system connection diagram showing the MPPT controller, PV panel, battery, DC load, and inverter for AC load. Note the connection order: Battery → Load → PV Array.

Connection Steps:

1. **Connect the Battery:** Connect the battery to the controller's battery terminals. Ensure correct polarity (+ to + and - to -). This is the first and most critical step.
2. **Connect the Load:** Connect your DC loads to the controller's load terminals. Ensure correct polarity.
3. **Connect the PV Array:** Connect the solar panels to the controller's PV terminals. Ensure correct polarity.

Important: For safety, circuit breaker connections are recommended for all connections.

Disconnection Steps:

To disconnect the system, follow the reverse order of connection:

1. Disconnect the PV Array.
2. Disconnect the Load.
3. Disconnect the Battery.

5. Operating Instructions

The Triron4210N controller features an intuitive LCD display and five buttons for easy operation and monitoring.

LCD Display and Buttons:

Figure 4: The controller's browse interface showing various parameters and the steps to set battery types via the LCD.

- **PV/+ Button:** Used to browse PV parameters or increase values during setting.
- **BATT/→ Button:** Used to browse battery parameters or move right during setting.
- **LOAD/- Button:** Used to browse load parameters or decrease values during setting.
- **SET Button:** Used to enter setting mode or confirm selections.
- **ESC Button:** Used to exit setting mode or return to the previous menu.

Viewing Parameters:

Press the PV/+, BATT/→, or LOAD/- buttons to cycle through the respective parameters on the LCD display. The display will show real-time values such as voltage, current, power, and temperature.

6. Battery Type Configuration

The Triron4210N supports various battery types. It is essential to correctly configure the battery type for optimal charging and discharge management.

Setting Battery Type via LCD:

1. From the main display, press the**SET** button to enter the menu.
2. Navigate to the "Battery Type" option using the arrow buttons.
3. Press **SET** to select the battery type (e.g., Sealed, Gel, Flooded, LiFePO4, Li(NiCoMn)O2, User).
4. Press **SET** again to confirm and save your selection.

Note: For LiFePO4 and Li(NiCoMn)O2 batteries, the controller does not automatically identify the system voltage. You must manually select 12V or 24V for your lithium battery system.

Advanced Lithium Battery Parameters:

For detailed parameter settings for lithium batteries, optional accessories are required:

- MT50/MT52 Remote Meter
- WiFi/BLE Adapter via APP (Solar Guardian)
- PC software via RS485 interface (CC-USB-RS485-150U cable)

Figure 5: Reference table for lithium battery parameter settings, including Over Voltage Disconnect, Charging Limit, Boost Charge, and Float Charge voltages.

7. Load Working Mode

The Triron4210N offers multiple load working modes to suit different application needs:

- **Manual Control:** Turn the load ON or OFF manually.
- **Light ON/OFF:** Load turns ON at dusk and OFF at dawn.
- **Light ON + Timer:** Load turns ON at dusk and stays ON for a set duration.
- **Time Control:** Load operates during specific programmed times.

These modes can be configured using the controller's buttons or through external accessories like the MT50/MT52 remote meter or PC software.

8. Monitoring and Communication

The Triron4210N supports various accessories for real-time monitoring and remote control of your solar system.

Figure 6: Illustration of real-time remote monitoring capabilities using a mobile app via WiFi/Bluetooth adapter and PC software via RS485 or Serial Device Server.

Compatible Accessories:

- **MT50/MT52 Remote Meter:** Provides a comprehensive display of system parameters and allows for parameter adjustment.
- **WiFi/BLE Adapter:** Enables wireless monitoring and parameter configuration via a mobile app (Solar Guardian).
- **RS485 Communication Cable (CC-USB-RS485-150U):** Connects the controller to a PC for monitoring and configuration using EPEVER PC software.
- **eLOG01:** Data logger for recording system performance.

Video Tutorials:

Video 1: EPEVER MPPT solar charge controller Triron-N unboxing. This video provides a visual guide to what's included in the Triron-N package and initial physical overview.

Video 2: EPEVER WiFi Adapter for MPPT Solar Charge Controller. This video demonstrates how to set up and use the WiFi adapter for remote monitoring via a mobile application.

Video 3: EPEVER MPPT charge controller connected via PC software. This video illustrates the process of connecting the controller to a PC and using the monitoring software.

9. Maintenance

Regular maintenance ensures the longevity and optimal performance of your EPEVER MPPT Solar Charge Controller.

- **Visual Inspection:** Periodically inspect the controller for any visible damage, loose connections, or corrosion.
- **Cleanliness:** Keep the controller clean and free from dust and debris. Ensure the heat sink is not obstructed to allow for proper cooling.
- **Connection Check:** Verify that all wire connections are tight and secure. Loose connections can cause overheating and damage.
- **Battery Inspection:** Regularly check the battery terminals for corrosion and ensure the battery itself is in good condition.

10. Troubleshooting

If you encounter issues with your Triron4210N controller, refer to the following general troubleshooting tips. For specific error codes or complex problems, consult the full user manual or contact technical support.

- **No Display/Power:** Check battery connections and ensure the battery voltage is within the operating range (8-32V).
- **No Charging:** Verify PV panel connections and ensure sufficient sunlight. Check PV open circuit voltage and current.
- **Load Not Working:** Check load connections, ensure the load is not overloaded, and verify the load working mode settings.

- **Error Indicators:** Refer to the LED indicators on the controller for specific error conditions (e.g., overvoltage, undervoltage, overheating).

11. Specifications

Technical data for the EPEVER MPPT Solar Charge Controller Triron4210N:

Controller buttons suitable for setting battery types :Lead-Acid or Lihtium (default parameters) , USE type for customized setting. More setting need EPEVER accessories device: MT50 , eBox (APP), eLOG01, PC software.

Battery type / Voltage	Sealed	Gel	Flooded	User	LiFePO4		Li(NiCoMn)O2		
					LFP4S	LFP8S	LCNM3S	LCNM6S	LCNM7S
Over Voltage Disconnect Voltage	16.0V	16.0V	16.0V	9～17V	14.8V	29.6 V	12.8 V	25.6 V	29.8 V
Charging Limit Voltage	15.0V	15.0V	15.0V	9～17V	14.6 V	29.2 V	12.6 V	25.2 V	29.4 V
Over Voltage Reconnect Voltage	15.0V	15.0V	15.0V	9～17V	14.6 V	29.2 V	12.5 V	25.0 V	29.1 V
Equalize Charging Voltage	14.6V	——	14.8V	9～17V	14.5 V	29 .0 V	12.5 V	25.0 V	29.1 V
Boost Charging Voltage	14.4V	14.2V	14.6V	9～17V	14.5 V	29.0 V	12.5 V	25.0 V	29.1 V
Float Charging Voltage	13.8V	13.8V	13.8V	9～17V	13.8 V	27.6 V	12.2 V	24.4 V	28.4 V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V	9～17V	13.2 V	26.4 V	12.1 V	24.2 V	28.2 V
Low Voltage Reconnect Voltage	12.6V	12.6V	12.6V	9～17V	12.8 V	25.6 V	10.5 V	21.0 V	24.5 V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V	9～17V	12.2 V	24.4 V	12.2 V	24.4 V	28.4 V
Under Voltage Warning Voltage	12.0V	12.0V	12.0V	9～17V	12.0 V	24.0 V	10.5 V	21.0 V	24.5 V
Low Voltage Disconnect Voltage	11.1V	11.1V	11.1V	9～17V	11.1 V	22.2 V	9.3 V	18.6 V	21.7 V
Discharging Limit Voltage	10.6V	10.6V	10.6V	9～17V	11.0 V	22.0 V	9.3 V	18.6 V	21.7 V
Equalize Duration	120 min	——	120 min	0～180 min					
Boost Duration	120 min	120 min	120 min	10～180 min					

① The battery parameters under the "User" battery type is 9-17V for LFP4S. They should x2 for LFP8S, and x4 for LFP15S/LFP16S.

Figure 7: Electrical parameters table for the Triron series, including Triron4210N.

Parameter	Value (Triron4210N)
Nominal System Voltage	12V/24V DC Auto
Rated Charge & Discharge Current	40A
Max. PV Input Power	520W (12V) / 1040W (24V)
Max. PV Open Circuit Voltage	100V (at min. operating temp) / 92V (at 25°C)
Battery Input Voltage Range	8-32V
MPP Voltage Range	V(BAT+2V) ~ 72V
Tracking Efficiency	≥99.5%
Max. Conversion Efficiency	98%
Working Environment Temperature	-25°C ~ +55°C
Enclosure	IP30

Parameter	Value (Triron4210N)
Terminals	#6 AWG (16mm²)
Dimension (L×W×H)	256.8×183×66.7mm
Weight	1.85 KG

12. Warranty and Support

EPEVER products are backed by comprehensive support to ensure your satisfaction.

- **Technical Support:** Our US engineer team in Chicago is available to provide free technical support for off-grid solar system questions.
- **Authorized Seller:** GolandCentury is an official authorized sales agent for the EPEVER brand, offering the latest versions of controllers and accessories.
- **Service Centers:** GolandCentury has established warehouses and service centers in Chicago (USA), Munich (Germany), Toronto (Canada), and Melbourne (Australia) to provide local support.