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Offgridtec MPPT Pro Duo Charge Controller 30A 12V/24V Instruction Manual

Model: MPPT Pro Duo 12V/24V 30A | Brand: Offgridtec

1. INTRODUCTION

Thank you for choosing the Offgridtec MPPT Pro Duo charge controller. This device is designed to efficiently manage solar power input to charge two independent battery banks, typically a main service battery and a starter battery, in 12V or 24V systems. It utilizes Maximum Power Point Tracking (MPPT) technology to optimize energy harvest from your solar panels. Please read this manual thoroughly before installation and operation to ensure safe and optimal performance.



Figure 1: Front view of the Offgridtec MPPT Pro Duo Charge Controller.

2. SAFETY INSTRUCTIONS

Always observe the following safety precautions to prevent personal injury or damage to the controller and connected equipment:

- Installation should only be performed by qualified personnel.
- Ensure all power sources (solar panels, batteries) are disconnected before installation or maintenance.
- Use appropriate tools and wear protective gear.
- Do not disassemble or attempt to repair the controller. Contact Offgridtec support for assistance.
- Ensure proper ventilation around the controller to prevent overheating.
- Connect batteries with correct polarity. Reverse polarity can cause severe damage.
- Use fuses or circuit breakers on all battery and solar panel connections as recommended by local regulations and system design.

- Avoid short-circuiting battery terminals or solar panel wires.
- Keep the controller away from flammable materials, moisture, and direct sunlight.

3. PRODUCT OVERVIEW

3.1 Key Features

- Dual battery charging: Charges both main (service) and starter batteries.
- MPPT Technology: Maximizes power harvest from solar panels.
- Supports 12V and 24V systems.
- Maximum charge current up to 30A.
- Adaptive three-level charging for extended battery life.
- Supports various battery types: Gel, Flooded, LiFePO4, Li-NiCoMn (for main battery).
- Secondary charge output for starter battery (supports lead-acid).
- Optional remote display and Bluetooth compatibility (accessories required).
- AES control signal for car refrigerators to prevent energy waste.
- Standard bus protocol and RS485 communication connection.
- Robust aluminum heatsink design for efficient cooling.
- Overload, reverse polarity, and deep discharge protection.

3.2 Components

The Offgridtec MPPT Pro Duo charge controller includes:

- MPPT Pro Duo Charge Controller unit.
- Connection terminals.
- Integrated LED status indicators.
- SET button for battery type selection.
- Temperature sensor ports (one with integrated sensor, one for external).
- RS485 communication port.
- AES signal output port.



Figure 2: Front and back view of the charge controller, highlighting the heatsink design.

4. SETUP AND INSTALLATION

Proper installation is crucial for the safe and efficient operation of your charge controller. Ensure all safety instructions are followed.

4.1 Mounting Location

- Mount the controller vertically on a non-flammable surface.
- Ensure adequate air circulation around the heatsink for optimal cooling.
- Avoid locations exposed to direct sunlight, high temperatures, or moisture.
- Dimensions: 24.7 cm (L) x 16.5 cm (W) x 6.9 cm (H).
- Mounting holes diameter: 5 mm.



Figure 3: Physical dimensions of the MPPT Pro Duo charge controller, showing the aluminum heatsink.

4.2 Wiring Diagram and Connections

Follow the wiring sequence below. Incorrect wiring can damage the controller or batteries.

1. **Connect Battery 1 (Main/Service Battery):** Connect the positive and negative terminals of your main battery to the BATT1 terminals on the controller. Use appropriate cable gauge (e.g., 16 mm² / AWG6). Ensure correct polarity.
2. **Connect Battery 2 (Starter Battery):** Connect the positive and negative terminals of your starter battery to the BATT2 terminals on the controller. Use appropriate cable gauge (e.g., 4 mm² / AWG12). Ensure correct polarity.
3. **Connect Solar Panels (PV):** Connect the positive and negative terminals of your solar panel array to the PV terminals on the controller. Ensure the open-circuit voltage of your solar array does not exceed 100V.
4. **Connect Temperature Sensors:** The controller includes ports for temperature sensors. Connect the provided sensor to monitor battery temperature for optimized charging.
5. **Optional Connections:**
 - **RS485 Communication:** For connecting an optional remote display or USB adapter for PC communication.
 - **AES Signal Output:** For controlling car refrigerators to prevent excessive discharge of the main battery.
6. **Grounding:** Ensure the controller is properly grounded (negative grounding).

MPPT-Regler der nächsten Generation mit dualem Batteriemanagement

Nutzen Sie jeden Sonnenstrahl mit fortschrittlicher intelligenter Tracking- und Dual-Charging-Technologie.

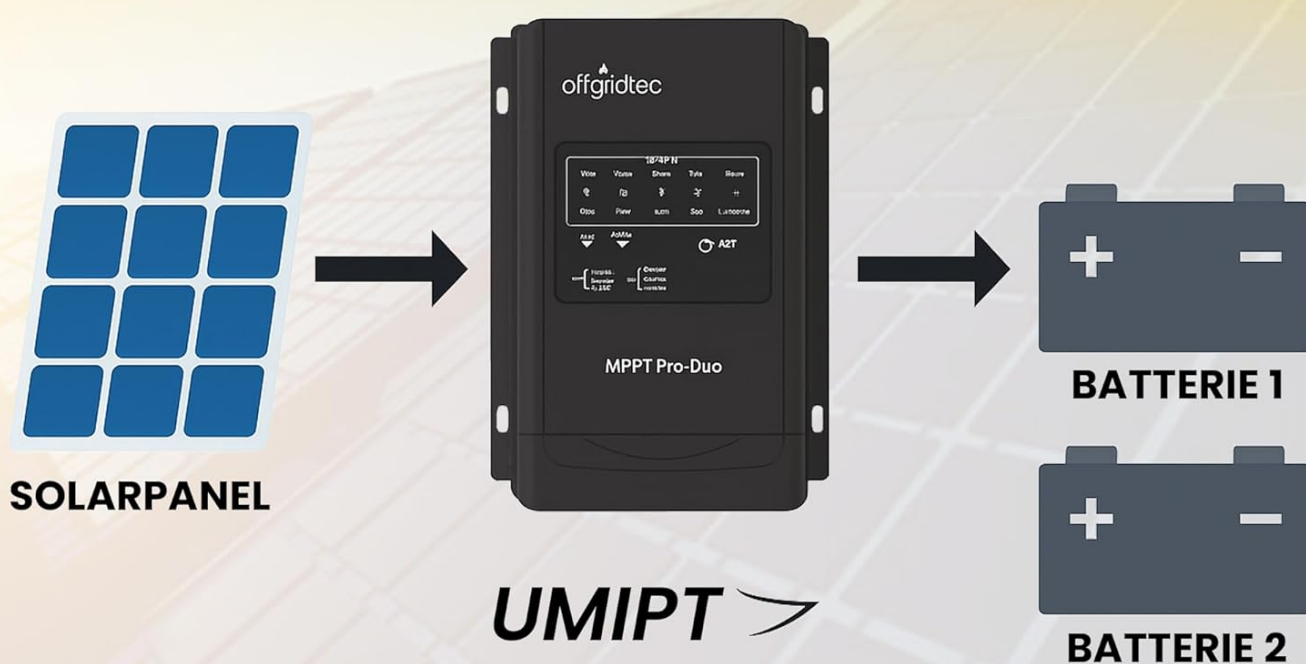


Figure 4: Simplified wiring diagram showing connections from solar panel to controller and dual batteries.



Einfache Installation mit Dual Batterieanschluss

Schnelle, sichere Einrichtung dank intelligentem Dual-Ausgangsdesign.

Figure 5: Example installation of the charge controller in a recreational vehicle.

5. OPERATING INSTRUCTIONS

5.1 Initial Power-Up

After all connections are securely made, connect the battery power first, then the solar panel power. The controller will perform a self-test, and the LED indicators will illuminate.

5.2 Setting Battery Type (BATT1)

The controller supports various battery types for the main battery (BATT1). To select the correct battery type:

1. Press and hold the **SET** button for approximately 5 seconds until the battery type indicator starts flashing.
2. Press the **SET** button repeatedly to cycle through the available battery types (Gel, Flooded, LiFePO4, Li-NiCoMn).
3. Once the desired battery type is selected, wait for 5 seconds without pressing any button. The indicator will stop flashing, and the setting will be saved.

The secondary battery (BATT2) is typically charged as a lead-acid battery and does not require specific type selection.

5.3 LED Indicators

The front panel features LED indicators to show the operational status:

- **PV Status LED:** Indicates solar panel input status.
- **BATT1 Status LEDs:** Show the charging stage and state of charge for the main battery.
- **BATT2 Status LED:** Indicates charging status for the starter battery.
- **Error LED:** Illuminates to indicate a fault or warning. Refer to the troubleshooting section.



Figure 6: Installed charge controller showing illuminated LED indicators.

5.4 Charging Process

The MPPT Pro Duo uses an adaptive three-level charging algorithm to optimize battery health and lifespan. It prioritizes charging the main battery (BATT1) and then provides a maintenance charge to the starter battery (BATT2).

- **Bulk Charge:** Delivers maximum current to rapidly charge the battery.
- **Absorption Charge:** Maintains a constant voltage to fully charge the battery without overcharging.
- **Float Charge:** Reduces voltage to a lower level to maintain the battery at full charge and compensate for self-discharge.

6. MAINTENANCE

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

- **Visual Inspection:** Periodically check for loose connections, damaged wiring, or signs of corrosion.
- **Cleaning:** Keep the controller clean and free of dust. Use a dry cloth to wipe the exterior. Do not use liquids or solvents.
- **Ventilation:** Ensure the heatsink fins are not obstructed to allow for proper heat dissipation.
- **Connection Check:** Verify that all terminal connections are tight and secure.
- **Battery Health:** Monitor the health of your batteries. A failing battery can affect the performance of the entire system.

7. TROUBLESHOOTING

If you encounter issues with your MPPT Pro Duo, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No LED indicators lit.	No power from battery or solar panels; reverse polarity.	Check battery and solar panel connections and polarity. Ensure fuses are intact.
Batteries not charging.	Low solar input; incorrect battery type setting; loose connections; faulty solar panel or battery.	Verify solar panel output. Check battery type setting. Inspect all wiring. Test solar panels and batteries independently.
Error LED is lit.	Overload, short circuit, over-voltage, over-temperature, or other system fault.	Disconnect all power, inspect wiring for shorts or damage. Allow controller to cool if overheating. Reconnect power in correct sequence. If error persists, contact support.
Bluetooth connection issues (with optional adapter).	Incorrect password; app not installed correctly; location services disabled for app.	Try alternative passwords (refer to adapter manual). Reinstall the app. Enable location services for the app on your mobile device.
Secondary battery (BATT2) not charging or charging slowly.	Main battery (BATT1) not fully charged; low solar input; faulty BATT2 connection.	Ensure BATT1 is adequately charged. Verify solar input. Check BATT2 wiring and health. Note that BATT2 receives a compensatory charge after BATT1.

If the problem persists after attempting these solutions, please contact Offgridtec customer support.

8. SPECIFICATIONS

Parameter	Value
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Parameter	Value
Model	MPPT Pro Duo 12V/24V 30A
System Voltage	12V / 24V (Auto-sensing)
Max. Charge Current	30A
Max. PV Input Power (12V System)	390W
Max. PV Input Power (24V System)	780W
Max. PV Open Circuit Voltage	100V
Grounding	Negative
Supported Battery Types (BATT1)	Gel, Flooded, LiFePO4, Li-NiCoMn
Supported Battery Types (BATT2)	Lead-Acid
Efficiency	Up to 98%
Dimensions (L x W x H)	24.7 cm x 16.5 cm x 6.9 cm
Weight	1.4 kg
Operating Temperature	Up to 60 Degrees Celsius
Power Consumption	26 mA (12V), 15 mA (24V)
Manufacturer	Offgridtec GmbH
Product Reference / Model Number	011200

9. WARRANTY AND SUPPORT

For warranty information, please refer to the terms and conditions provided at the time of purchase or contact Offgridtec GmbH directly. Keep your proof of purchase for any warranty claims.

For technical support, troubleshooting assistance beyond this manual, or inquiries about accessories, please contact Offgridtec customer service. Contact details can typically be found on the manufacturer's official website or your purchase documentation.

10. TYPICAL APPLICATIONS

The Offgridtec MPPT Pro Duo charge controller is suitable for a variety of off-grid and mobile solar power systems, including:

- Recreational Vehicles (RVs) and Campervans
- Marine Systems (Boats & Yachts)
- Remote Telecommunication Stations
- Off-grid Cabins and Small Homes
- Camping and Outdoor Solar Setups



Figure 7: Examples of typical applications for the MPPT Pro Duo charge controller.