

Qoltec[®]



USER MANUAL

MPPT SOLAR CHARGE CONTROLLER

Model: 53671

Introduction

Thank you for choosing the Qoltec MPPT solar charge controller. This device has been designed to intelligently and safely manage the charging of batteries and the power supply to direct current (DC) loads using energy from photovoltaic panels. Please read this manual carefully before installing and using the device. Following the instructions contained herein will ensure the regulator's long and trouble-free operation, as well as your safety.

About the product

The MPPT (Maximum Power Point Tracking) controller continuously analyses the operating parameters of the solar panels and tracks the maximum power point (V-I), ensuring optimal battery charging efficiency. Compared to standard PWM controllers, MPPT technology can increase charging efficiency by as much as 15–20%.

Example: when the maximum voltage of the panels (V_{mp}/V_{pp}) is around 17V and the battery voltage is around 12V, a conventional PWM controller reduces the voltage to the battery level, resulting in power losses. The MPPT controller adjusts the voltage and current in such a way as to utilise the maximum available energy from the panels.

As operating conditions – such as temperature or sunlight – are constantly changing, the maximum power point also shifts. The MPPT controller dynamically adjusts its operating parameters, keeping the system as close as possible to the optimum point at all times.

Features

- ✓ Microcontroller-based control – intelligent operation, high adaptability and reliable performance in various conditions.
- ✓ MPPT technology – optimal operation at the maximum power point of the I-V curve, with efficiency of up to 99%.
- ✓ Precise temperature detection and compensation system – effectively extends the battery's service life.
- ✓ Automatic 12V/24V system recognition and three-stage charge level indicator – quick and intuitive monitoring of the device's operation.

- ✓ Compact construction and optimised circuit design – efficient use of space and stable operation.
- ✓ Built-in safety features – protection against overcharging, over-discharging, overloading, short circuits and reverse polarity.
- ✓ 5V USB port – convenient charging of mobile devices and other digital equipment.

Safety instructions

Before using the device, please read the following guidelines carefully:

1. Intended use of the device

- a) The regulator is intended solely for charging batteries and powering direct current (DC) loads using photovoltaic panels.
- b) Do not use the device for any other purpose or with incompatible types of batteries.

2. Installation

- a) Connect the cables in the following order: battery → photovoltaic panel → load.
- b) Before starting the device, always ensure that the polarity (+/-) is correct – incorrect connection may damage the device or pose a fire hazard.
- c) Use cables of the correct cross-section, in accordance with the manufacturer's recommendations.
- d) The controller must be installed in a dry and well-ventilated location, away from damp, rainfall and direct sunlight.

3. Operation

- a) The device is designed for use with 12V and 24V LiFePO₄ batteries.
- b) Do not allow the battery terminals or the regulator's outputs to short-circuit.
- c) Do not exceed the device's rated parameters (voltage, current and power).
- d) Do not use the regulator near heat sources or flammable materials.
- e) Check the condition of the cables and all connections regularly.

4. User safety

- a) Do not touch the cables or connectors with wet hands.
- b) The device is not intended for play – keep it out of the reach of children.
- c) If the casing is damaged, or if you notice an unusual smell or smoke, disconnect the appliance from the mains immediately.
- d) Use only a dry cloth for cleaning – do not use water or chemical cleaning agents.

5. Environmental conditions

- a) Operating temperature range: from -35°C to +55°C.
- b) Do not use the device in environments with high humidity or in areas exposed to conductive dust.

Installation instructions

- ✓ First connect the battery, then the solar panel, and finally the load (consumers).
- ✓ The controller has built-in reverse polarity protection; however, incorrect connection may still result in damage to the device.
- ✓ Before commissioning, ensure that the voltage and current are within the regulator's rated range.

Terminal markings (Figures 1 and 2):

PV panel: (1–2)

Battery: (3–4)

DC receiver: (5–6)

Description of LED indicators

Solar	Solar panel indicator
Lights up continuously	Charging in progress
Flashing	The controller is operating in float mode
Load	Load indicator

Lights up continuously	the load output is active (however, this does not mean that current is flowing)
Battery	Battery indicator (charge level)

Troubleshooting

PROBLEM	SOLUTION
All indicators are OFF	Check that the battery cables are properly connected, that the connections are secure, and that the battery voltage is correct.
No charging during the day, even though the sun is shining on the solar panel	Check that the PV and battery cables are properly connected and that the connections are secure.
The load is not responding or starting up	1. Check the system wiring diagram and ensure that all components are correctly connected. 2. Check the battery voltage – the load will only start up when the battery voltage is higher than 12.2 V. 3. . Connect the solar module and charge the battery for 3–5 hours until it returns to its normal state.
Check that the cables are securely tightened and that the controller has correctly recognised the 12V/24V system.	

Technical specifications

Rated charging current	15A
Rated discharge current	10A
Rated voltage	12V / 24V (automatic detection)
MPPT efficiency	Max. 99%
Overload and short-circuit protection	$\geq 1.5 \times$ rated current
No-load current (without load)	< 15 mA
Overvoltage protection	16V; $\times 2/24V$
Charge cut-off voltage	14.7V; $\times 2/24V$
Compatibility	LiFePO4 battery
Recharge restart voltage	12.0V; $\times 2/24V$
Discharge cut-off voltage	10.8V; $\times 2/24V$
USB output	5V 1A

Controller dimensions	130 × 100 × 33 mm
Terminals (wires)	12 AWG / 4 mm ²

Environmental and recycling information

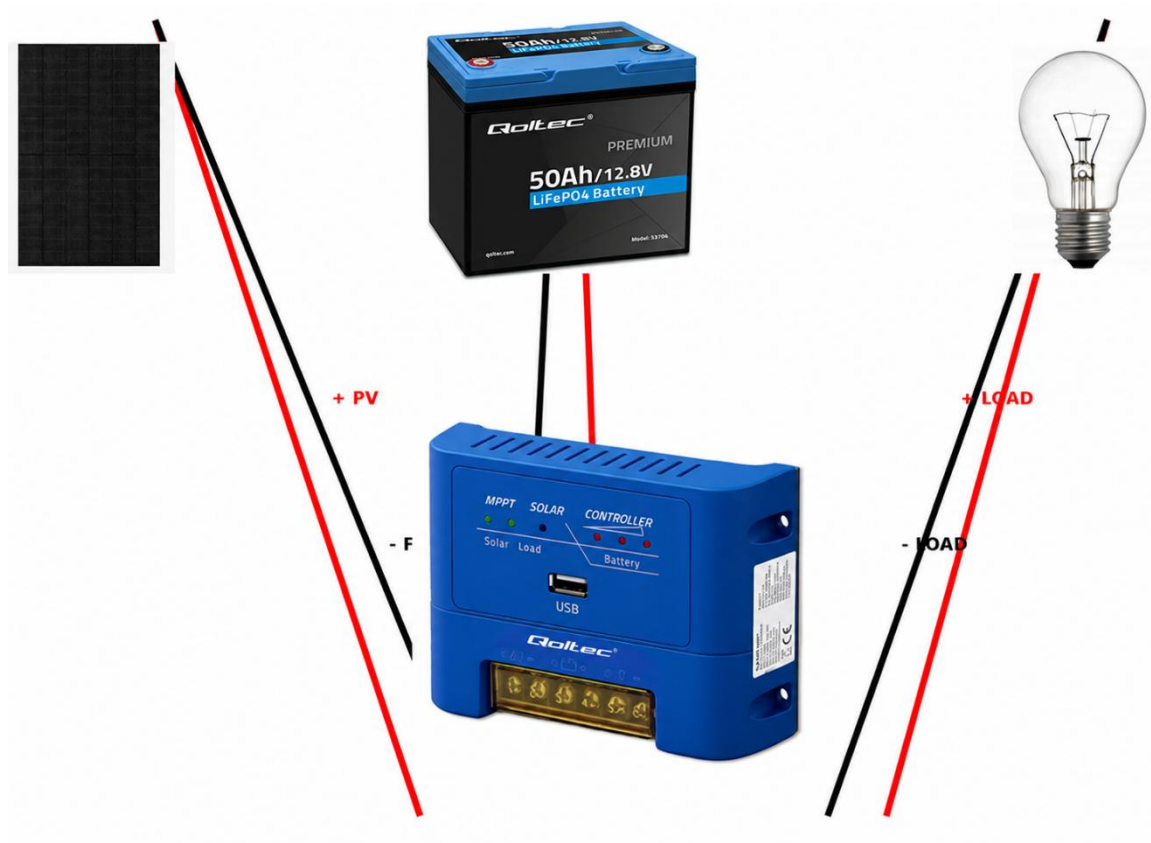
1. Hand the product over to a recycling company.
2. Avoid disposing of it in the bin to prevent environmental pollution.

Warranty and after-sales service

The controller is covered by the manufacturer's warranty. If you experience any problems with the product, please contact the after-sales service for assistance.

Attachement 1

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