

MPPT Solar Charger

User Manual

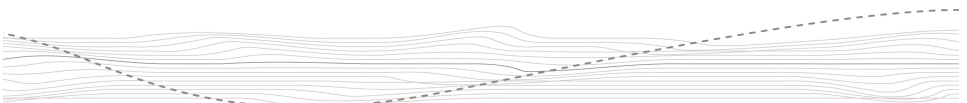


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1 Introduction

The Solar MPPT (Maximum Power Point Tracking) Charge Converter is a device designed to maximize the solar energy collected from 12V-24V nominal solar panels and boost this to a higher voltage for charging an ebike battery. It automatically varies the load on the panels to find the sweet spot that results in the highest power flowing from the panel.

The amount of charging current will therefore vary according to the solar conditions rather than being fixed like a conventional charger. When the voltage of the battery hits the set charge voltage, the current will gradually taper down to zero to prevent overcharging and the device will no longer maximize power draw from the panels.



2 Indicators

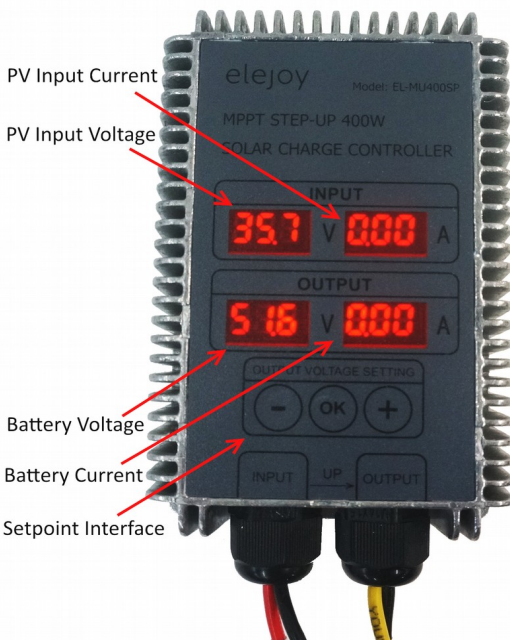
This device gives status feedback via four, three-digit seven segment displays.

The **red** interface will light up when the device is connected to a solar panel that is generating more than 14V. **Without solar input voltage, the unit will not turn on, even if there is a battery providing voltage on the charger's output.**

The two top “**INPUT**” displays read what voltage and current is entering the charger from the solar panel.

The left one corresponds to the PV(*Solar Panel*) input voltage, and the right corresponds to the PV input current, with a resolution of 100mV, and 10mA. They are purely informative and the input side values are non-configurable or manually limit-able.

The two bottom “**OUTPUT**” displays read what voltage and current is being delivered to the battery from the charger, again with a resolution of 100mV, and 10mA.



3 Programming

The charger features programmable output voltage set-point control with 100mV resolution, configurable by a simple three button interface and display through the front panel of the unit.

To program the device, it must first be powered up by connecting the solar input side of the charger to your solar panel(s) that are currently exposed to sunlight. If an operational solar panel is not available, you can power the unit with a battery for configuration purposes only, provided that it has a voltage **under 55V**.

(See Page 4, note "A" for details)

The display should light up and read the panel voltage when this occurs.

You can now program the desired output target voltage(*or full battery voltage*) of the charger. This is accomplished by holding down either the **"+"** or **"-"** buttons until the OUTPUT display reads the desired voltage. The number on the display will continue blinking signifying that the set-point has not yet been applied. Once you arrive at your desired voltage value, Simply press the **"OK"** button, and the number should become solid denoting that the program has been applied successfully, and you should begin to see current flowing to the battery if you have one connected.

Listed below are the Li-Ion battery pack voltage configurations most commonly found in the electric bike industry:

Nominal Voltage	100% Charge (4.2V/cell)	~80% Charge (4.0V/Cell)
24V (7S)*	29.4V	28.0V
36V (10S)	42.0V	40.0V
48V (13S)	54.4V	52.0V
52V (14S)	58.8V	56.0V
60V (16S)	67.2V	64.0V
72V (20S)	84.0V	80.0V

*24V Battery must use 12V Nominal panel voltage

4 Limitations

- This particular device is intended for use as a solar charge controller with a solar panel input; it will not work as a general-purpose boost converter, as it is input controlled. If you require this, please purchase our standard boost-converter model.
- The device should be used with panels that have an open circuit voltage (Voc) of 55V or less, and a max power voltage of 14.5V or higher.
- There is no input current limiting. Be sure your rated panel power will result in less than 20A maximum input current – it may damage itself if connected to a system that continuously supplies more than 20A.

Suggested Maximum Panel Size for Safe Operation (<20A Input)

Panel V	36V Battery	48V Battery	60V Battery	72V Battery
12V Nom.	350W	350W	350W	350W
24V Nom.	400W	400W	400W	400W

- It is not waterproof – install in a manner that avoids water exposure.
- It requires ventilation to cool properly – do not put it inside a sealed box unless you have determined a way to cool the unit
- It does not have reverse polarity protection – you will damage components if the battery or panels are connected in reverse.

Please note:

- a) The unit is not able to source control power from the battery side, so voltage from a solar panel must be present. You can also use a battery on the solar input side for programming purposes only, provided that the charger side **is disconnected from any load, and it will not provide more than 55V to the charger.**
- b) The charger will try and utilize all the power available from the solar panel and thus, does not have any way of limiting the charge current that is sunk to the battery. Because of this, you must make sure that the maximum charger output current does not exceed your battery packs Maximum Charge Current(or “C”) rating. Doing so **will** damage the battery, and could potentially lead to a battery failure.

5 Specifications

Parameter	Solar Input	Battery Output
Quiescent Current	20 mA	0.8mA
Minimum Voltage	18V	24V
Maximum Voltage	55V	85V
Maximum Current	20A (unfused)	15A (SW Limit)
Conversion Efficiency	97%	

Dimensions:

Parameter	Value
Length	120mm
Width	80mm
Height	40mm
Mounting Hole Distance	110x70mm
Mounting Hole Size	5mm
Weight	480g