

MPPT Bluetooth™

Solar charge controller

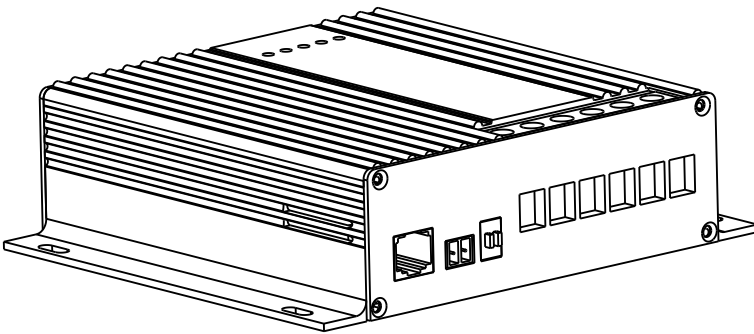
USER MANUAL

MPPT5020

MPPT5040

MPPT5020-COM

MPPT5040-COM



Description of Functions

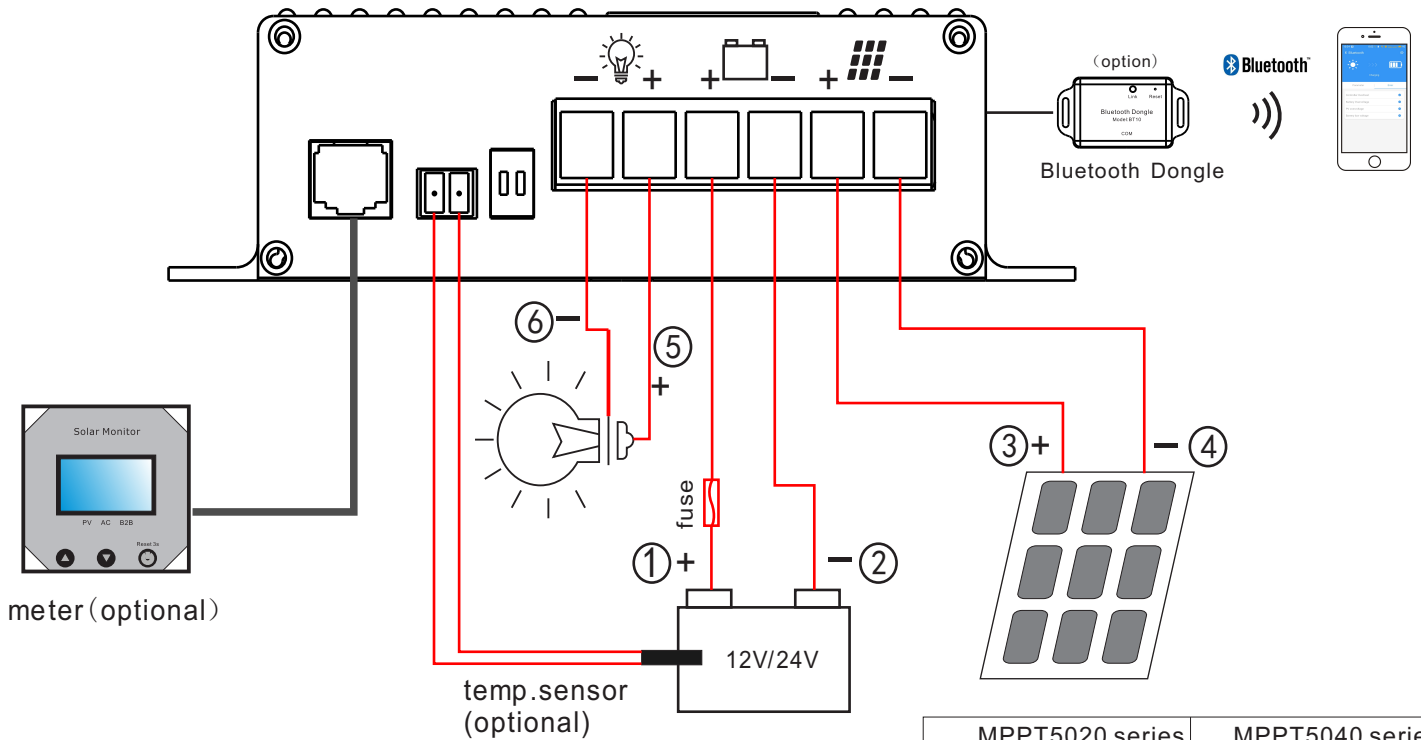
1. **Increased MPP charging** current compared with conventional controllers, due to ultramodern controller technology (microprocessor) by 10 % to 30 % (efficiency > 95 %)
2. **Switchable characteristic lines of charging** for optimum charging of Gel/dryfit/AGM/fleece or acid/lead-acid, as well as LiFePO4 batteries .
3. Load output function with short circuit, overload protection function.
4. Bluetooth function, Phone APP display controller parameters
5. RS485 communication capability for end devices to reliably read operating parameters to the controller (MPPT5020-COM,MPPT5040-COM only)
4. **Unattended Charging:** Standard protection against overload, overheating, reverse battery and back discharge of the battery (in case of insufficient solar power, such as at twilight, at night etc.).
5. **Overcharge protection:** Reduction of the charging current of the battery in case of excessive solar power and full battery. Immediate recharging in case of power consumption to ensure always the best possible charging state of the battery.
6. **Connection for temperature sensor,** Automatic adaptation of the charging voltage to the battery temperature. In case of low outside temperatures, full charging of the weaker battery is improved, and in case of summery temperatures unnecessary battery gassing will be avoided.

This is highly recommended, if the battery is exposed to strong variations in temperature, such as in the motor

Safety Regulations and Appropriate Application:

- 1.Charging of lead-gel, lead-AGM, lead-acid or LiFePO4 (with integrated BMS!) batteries of the indicated nominal voltage and simultaneous supply of the consumers being connected to these batteries in fixed installed systems.
- 2.Solar panels up to the maximum power rating (Wp) of the used solar controller.
3. The indicated cable cross sections at the charging ports and at the panel input.
4. With fuses of the indicated capacity near the battery to protect the cabling between battery and charging ports.
5. Installation in a well-ventilated room, protected from rain, humidity, dust, aggressive battery gas, as well as in an environment being free from condensation water
- 6.Except for the fuse, the unit is not equipped with parts, which can be replaced by the user. Always use replacement car fuses of the indicated capacity!
- 7.Keep children away from the solar controller and the batteries.

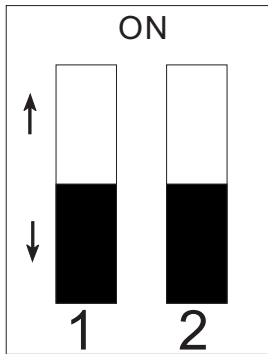
Connection Plan



Battery selection

Battery type

MPPT5020 series	MPPT5040 series
12V: max.240W	12V: max.480W
24V: max.480W	24V: max.960W



	1	2
GEL	↓	↓
Lead-acid	↑	↓
AGM	↓	↑
LiFePO4	↑	↑

Note:

The connection plan shows the maximum terminal assignment for operation of all existing functions of the solar controller. The minimum terminal assignment consists of the solar panel inputs ("+" and "-") and the connections of the main battery.

Always connect the fuses as close as possible to the batteries (cable protection!).

Required Cable Cross Sections, Notes	MPPT5020 series	MPPT5040 series
+/- Panel cables, length as required	4mm-6 mm ²	6mm-10 mm ²
+/- Battery I cables, length max. 2 m	4mm-6 mm ²	6mm-10 mm ²
Fuse close to battery I	40A	80A

Connection

*The polarities (+ and -) of solar panel and batteries are absolutely to be observed!

Observe the cross-sections and length measures of the cables!



the fuses near the batteries into the + cables (protection against cable fire)!

*The solar panels should be protected from direct sunlight (by covering or shading) prior to connection.

1.) **Battery (must be connected):**

- Connect the **battery connections** of the controller - (Minus) and + (Plus) to the 12 V main battery, observing the correct polarity and the cross section of the cables (refer to connection plan).
- In case of wrong polarity of battery I, the internal safety fuse will be released. The replacement fuse should have the same capacity, and it should be of the same type (car fuse)!

Parallel charging of two or several batteries of the same voltage (12 V) is admissible. The batteries are to be “paralleled”

2.) **Solar Panel (must be connected):**

Shade the panels to minimize sparking during connection and to avoid damages due to eventual wrong polarity.

Observe the cable cross-sections (refer to connection plan)!

If several small solar panels are used, they are connected in parallel (refer to connection plan). Partial shading of the panels results in average higher capacity (see connection plan).

3.) **Load (Need load work to connect)**

please close the power switch before the load connection

The load current must be less than the rated current of the controller

The load must not be short circuited and overloaded

4.) **Temperature Sensor (Option, can be connected):**

For automatic adaptation and correction of the charging voltage to the battery temperature (temperature compensation).

Mounting:

The thermal contact of sensor and battery (inside temperature) should be well. Thus, it should be screwed down to the negative pole or positive pole of the battery. It is also possible to fasten it at the sidewall centre of the battery casing. Ensure that the installation place is not influenced by any source of heat (motor block, exhaust, heater etc.).

Connection:

Connect the temperature sensor to the terminal by means of a 2-pole cable (cable cross section 0.5 - 1.5 mm²). The polarity and cable length is of no importance. The solar controller recognizes the sensor automatically.

Effect:

The temperature-dependent charging voltage of battery I will be adapted automatically to the battery temperature.

The temperature sensor measures the battery temperature. In case of low temperatures (winter operation), the charging voltage will be increased in order to improve and accelerate full charging of the weak battery.

5) **LCD meter (Option, can be connected):**

The LCD display indicates the following values: Battery voltage, charging current, charging capacity, stored capacity and energy (V, A, W, Ah, Wh)

Pilot Lamps

“**Batt. Full**” (green):

- If it is lighting: Battery (batteries) has (have) been charged to 100 %, finished.

“**>80 %**” (green):

- If it is lighting: Battery has been charged almost fully. Solar controller is still in the charging constant current
- Flashing(2s): Controller overheat or PV overvoltage.

“**MPP**”(green)

- If it is lighting: solar controller is charging.
- flashing(2s): No charging, no solar panels or in night

“**Batt. Low**“ (yellow):

If it is lighting: Low voltage at battery

The battery should be recharged as soon as possible!

“Load’ (red):

- If it is lighting: Low-voltage protection
- flashing(2s): Load overload or shortcircuit

All pilot lamps (5) are flashing:

- system voltage error

Operating Instructions:

Lifetime of the battery:

Recharge totally discharged batteries immediately!

Sulphation of the lead battery plates due to total discharge is to be prevented by soon charging, particularly in case of high ambient temperatures. If the grade of sulphation is not too intensive, the battery can recover part of the battery capacity after several charging/discharging cycles.

Partially Discharged Batteries:

In contrast to other battery types, batteries on lead basis do not have any harmful memory effect. Consequently: In case of doubt, partially discharged batteries have to be charged fully as soon as possible.

Always store only fully charged lead batteries. Recharge them periodically, particularly in case of used (older) batteries and higher temperatures.

- Keep batteries cool and dry; choose an appropriate location for installation.

- In case of insufficient solar power and/or high current consumption, the battery should be subject to occasional full charging by means of a mains supply charger.

Overvoltage Protection:

The 12 V solar controllers protect themselves against connection of excessive battery voltage rates or will be switched-off in case of defective additional charging systems, switching threshold 15.0-16.0 V.(24V: 30-32V)

Overvoltage Limitation:

Sensitive consumers are protected by means of a limitation of the charging voltage to max. 15.0 V during all modes of charging.

Overload / Overheating Protection Solar Controller:

The solar controller is equipped with a double electronic protection against overload and with an automatic protection against adverse installation conditions (e. g. insufficient ventilation, excessive ambient temperatures) by gradual reduction of the charging capacity.

- Voltage Measurement:** Measurement of the voltage is to be effected at the battery and never at the solar controller (loss at the charging cable).

Battery charging parameter

Battery type	Boost charging voltage	Float charging voltage	Default temperature
GEL	14.3V/28.6V	13.8V/27.6V	25°C
AGM	14.7V/29.4V	13.5V/27V	25°C
Lead-acid	14.4V/28.8V	13.5V/27V	25°C
LiFePO4	14.4V/28.8V	13.8V/27.6V	25°C

Note: The voltage levels before/after the slash are valid for 12 V and 24 V systems respectively.

ATTENTION: Only connect LiFePO4 batteries with integrated BMS!

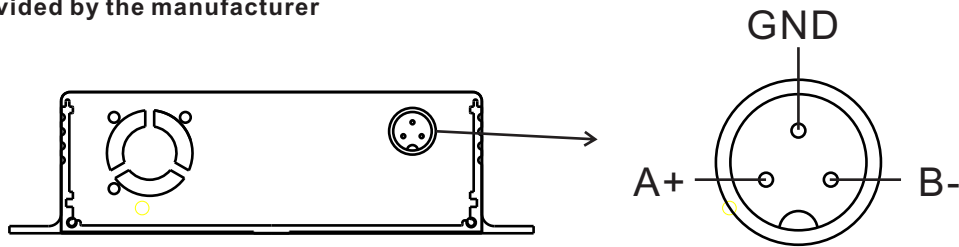
Note: The possible parallel/floating operation with consumers being connected to the battery is also automatically considered by all charging programs.

Instructions for the RS485 Communications (MPPT5020/40-COM only)

The terminal equipment (host computer) can read and modify the running parameters of the controller through Modbus communication protocol to realize remote monitoring and debugging.

The RS485 interface is defined as follows: contact sales staff for detailed communication protocol.

Provided by the manufacturer



RS485 Interface definition

Parameter

Model	MPPT5020 MPPT5020-COM(RS485)	MPPT5040 MPPT5040-COM(RS485)
system voltage	12V/24V auto recognition	12V/24V auto recognition
Max. PV power:	12V: 240Wp / 24V: 480W	12V: 480Wp / 24V: 960W
Max. PV voltage:	50 V	50 V
Max.charge current:	20A	40A
Self-consumption (max.):	30mA	30 mA
recharge the battery voltage:	12V: 13.2 V 24V: 26.4V	12V: 13.2 V 24V: 26.4V
HVD (max.):	12V: 15.5 V 24V: 31V	12V: 15.5 V 24V: 31V
Max. Load current	20A	40A
Low voltage disconnect	12V: 11.0V 24V:22.0V	12V: 11V 24V: 22.0V
Load reconnect voltage	12V: 12.5V 24V: 25V	12V: 12.5V 24V: 25V
Overcurrent protection:	Yes	Yes
Short circuit protection:	Yes	Yes
Overheat protection:	Yes	Yes
Fan control:	Yes	Yes
Build-in fuse :	40 A	80A
temperature sensor	Yes	Yes
Charging stage:	3 stage	3 stage
Dimension:	147x125.5x40mm	147x155x40mm
weight:	500g	820g
Max. altitude:	max. 95 % RH	max. 95 % RH
Optional accessories	Temperature sensor LCD meter Bluetooth Dongle	