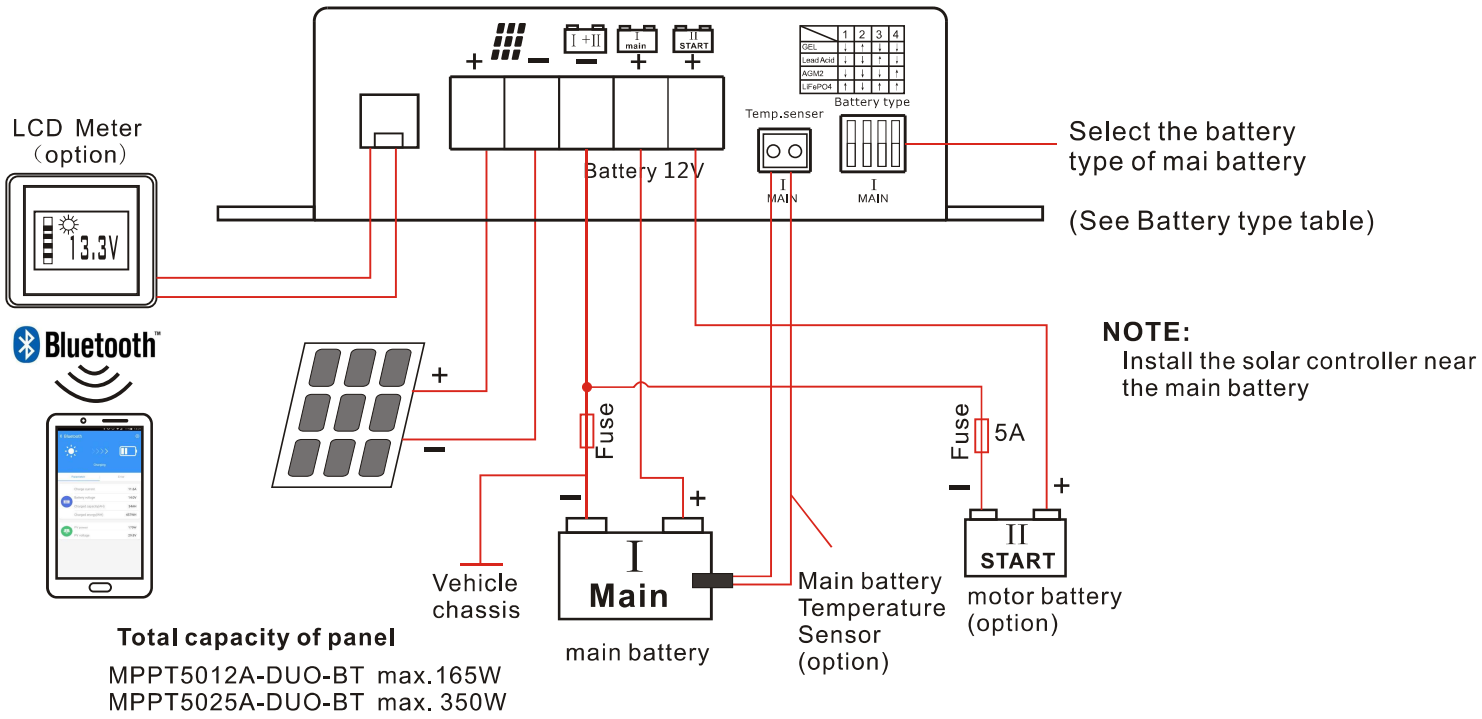
Connection Plan



Total capacity of panel

MPPT5012A-DUO-BT max.165W
MPPT5025A-DUO-BT max. 350W

Battery selection

Battery type

	1	2	3	4
GEL	↓	↑	↓	↓
Lead Acid	↓	↓	↑	↓
AGM2	↓	↓	↓	↑
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	MPPT5012A-DUO	MPPT5024A-DUO
+/- Panel cables, length as required	2.5-4 mm 2	6-10 mm 2
+/- Battery I cables, length max. 2 m	2.5-4 mm 2	6-10 mm 2
Fuse close to battery I	15 A	30 A

Connection

*The polarities (+ and -) of solar panel and batteries are absolutely to be observed!
Observe the cross-sections and length measures of the cables!

*Connection of the solar controller to the battery "Board I" should be effected first. Cable Protection:
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.） **Main Battery “MAIN I”（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).

○Never operate the controller without the battery “Main I” . If the battery is not connected, the unit will not deliver a defined output voltage.

○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.） **Starter Battery „START II“ (Option, can be connected):**

Connect the second charging port to the second battery using the red connection cable (wire cross section 1.5 - 2.5 mm²). This cable may be longer. In case of non-utilization, this terminal is left free.

If used, the output for starter battery II will be working with reduced voltage and charging current rates. Thus, the valuable solar power will be supplied to board/solar battery I being more suitable.

However, the vehicles starter battery II will be kept in a condition, that starting will always be possible, even in case of longer downtimes and during winter operation.

Connection of the negative pole „START II“ is not required, if the negative pole „BOARD I“ is connected to the vehicle body. Depending on the length of the cable, it may also be connected to the common negative connection of the solar controller or to the negative pole of „BOARD I“.

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 "Main I" (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)

5) **Safety Mode:**

Battery Protection:

In case of too low battery temperatures (-30 °C for lead batteries or -20 °C for LiFePO4) or too high battery temperatures (from +50 °C), the charging voltage will be reduced strongly to safety charging voltage for battery protection (depending on the type from 12.75 V to 13.00 V). Safety mode, LED "charge" is flashing, but any charging data being recorded hitherto will be kept in memory.

Battery charging is then interrupted, but the supply of eventually connected consumers will be continued by the solar controller, and the battery is allowed to cool down. As soon as the battery temperature reaches the admissible range again, automatic charging will be continued.

The solar controller recognizes automatically a missing sensor, cable break or short-circuit of the sensor lines, as well as unreasonable measuring values. In that case, it will switch automatically to the usual charging voltage rates of 20 °C / 25 °C being recommended by the battery manufacturers.