

# Installation Cell-Protector

Applies only to M-Series solar panels with three wire cable!

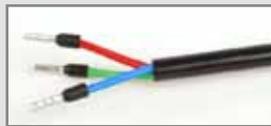
## Attention!

**Before using your solar panel, you have to connect the enclosed cell-protector!**

■ The cable of with each single M-Series solar panel with a three wire cable has to be connected to a separate cell-protector.

### Polarities:

red = solar module "+"  
blue = solar module "-"  
green = middle contact



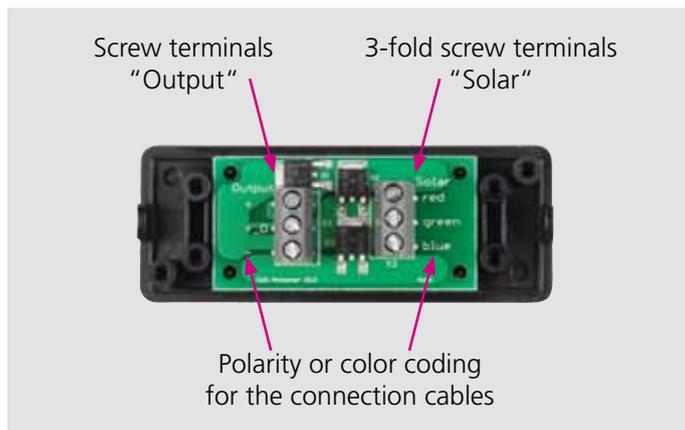
■ The serial or parallel connection of M-Series solar panels has to be done after installing the cell-protector(s).

■ The cell-protector has to be mounted and operated in a dry place, it must not become wet or moist with dew.

## Connection of the cell-protector

1. Screw the 3 wires of the panel cable in the terminal block "Solar". Please note the colour marking! Each wire end have to be screwed down in the correct screw terminal.
2. Use for connection the charge controller a standard 2x1.5mm<sup>2</sup> cable at terminal block "Output". Two kinds of connection are possible, please see below. Please pay attention to the polarity +/- .
3. Fix the cable to the base plate of the box by the 2 attached strain relief clamps.
4. Screw the cap of the box onto the base plate. The connection of the cell-protector is ready.

## Cell-protector with PCB board



## Type of connection A and B

### A) Bypass diodes (standard method)

Left: two cables to charge controller, terminals "+", "-"



With this hookup, the cells are protected with 2 bypass diodes against the hot spot effect.

### B) Bypass diodes + Reverse current protection

Left: two cables to charge controller, terminals "+\_D", "-"



With this hookup, the cells are protected with 2 bypass diodes against the hot spot effect and the additional blocking diode protects against reverse current back into the module. By damage to a module or cable by several modules in parallel operation, an influence can be prevented on the other modules with the use of the blocking diode.

## Cell-protector correctly installed



## Function of the cell-protector:

The purpose of the cell protector is to prevent overheating of the solar cells (risk of hotspot) when the solar module is partial shaded. This is achieved by the diodes on the circuit board. By standard aluminium framed glass modules these diodes are located in the junction box on the backside of the modules.

The bypass diodes can be damaged by power surges and lightning. By fitting into the cap any replacement would be impossible. Therefore the bypass diodes at the M-Series modules are installed in the external cell-protector. Additionally a diode is incorporated on the PC-board to prevent reverse current. Depending on the kind of connection, this protection can be used. However, the Schottky diode produces a voltage drop of about 0.6V.

## Connection graphics

Cell protector required only for modules with 3-wire connection cable!

