

## MPPT Controllers

### What is an MPPT controller?

#### MPPT stands for Maximum Power Point Tracking.

This is a solar charge controller which operates a solar panel at its point of 'maximum power output' rather than at a voltage dictated by the batteries it is charging.

### What does this mean to you?

#### Increased Energy Harvest

Using an MPPT controller can significantly increase the amount of energy that can be harvested from a solar panel. Why?

For a solar panel the Maximum Power Voltage ( $V_{MP}$ ) (the voltage at which the panel produces its maximum power) occurs at around 17V for a nominal 12V solar panel. This is higher than the voltage range of 12-15V that is used for battery charging. So a panel is not operating at its point of 'Maximum Power Output' and some of the energy production potential is being lost. Using an MPPT controller ensures that a solar panel operates at its point of 'maximum power output' but continues to charge batteries in the safe voltage range.

Energy harvest can be increased by as much as 30% using an MPPT controller.

#### Use of High Voltage Panels

With an MPPT controller the solar panel voltage can be significantly higher than the battery voltage so allowing the use of;

- a wider range of solar panels for battery charging including high voltage modules designed for grid connect systems
- solar panel arrays with a higher voltage than the battery systems they are charging. For instance the maximum combined solar panel Open Circuit Voltage (Voc) for the **Outback FM80** is 150V when charging 12V, 24V, 36V, 48V or 60V battery systems.

#### Easier and Cheaper Cabling

By running a solar panel array at a higher voltage there is the possibility of reducing cabling costs to achieve the same voltage drop. For instance, if you had 4 x 135W, nominal 12V panels each producing a maximum current of 7.5A, with a cable run of 10m from panel to controller the cable sizes required to keep the voltage drop to less than 2% for different voltages would be;

- 12V – 50mm<sup>2</sup>
- 24V – 16 mm<sup>2</sup>
- 48V – 4 mm<sup>2</sup>

So using the 4 panels connected in series to provide a nominal 48V reduces the size of cable required and continues to charge a 12V battery system.

Just to give you some idea of the size of these cables the diameter of a single core cable of 50mm<sup>2</sup> is 18.5mm, 16 mm<sup>2</sup> - 11.5 mm and 4 mm<sup>2</sup>- 6.5mm. An 18.5mm cable is not easy to handle, heavy and costly.

## Summary

The benefits of MPPT technology are therefore;

- an increase in energy harvest from solar panels.
- the use of a larger range of solar panels in battery charging applications
- the use of smaller cable sizes to achieve a required voltage drop.