

# BlueSolar charge controller MPPT 150/70 & 150/85

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Solar charge controllers MPPT 150/70 and 150/85

# PV voltage up to 150 V

The BlueSolar MPPT 150/70 and 150/85 charge controllers will charge a lower nominal-voltage battery from a higher nominal voltage PV array.

The controller will automatically adjust to a 12, 24, 36, or 48 V nominal battery voltage.

# **Ultra fast Maximum Power Point Tracking (MPPT)**

Especially in case of a clouded sky, when light intensity is changing continuously, an ultra fast MPPT controller will improve energy harvest by up to 30% compared to PWM charge controllers and by up to 10% compared to slower MPPT controllers.

# **Advanced Maximum Power Point Detection in case of partial shading conditions**

If partial shading occurs, two or more maximum power points may be present on the power-voltage curve. Conventional MPPT's tend to lock to a local MPP, which may not be the optimum MPP.

The innovative BlueSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

### **Outstanding conversion efficiency**

Maximum efficiency exceeds 98%. Full output current up to 40°C (104°F).

### Flexible charge algorithm

Several preprogrammed algorithms. One programmable algorithm.

Manual or automatic equalisation.

Battery temperature sensor. Battery voltage sense option.

### **Programmable auxiliary relay**

For alarm or generator start purposes

### **Extensive electronic protection**

Over-temperature protection and power derating when temperature is high.

PV short circuit and PV reverse polarity protection.

Reverse current protection.

BlueSolar charge controller	MPP	T 150/70		MPPT 150/85	
Nominal battery voltage	12 / 24 / 36 / 48V Auto Select				
Rated charge current	70A @ 40℃ (104℉)			85A @ 40℃ (104℉)	
Maximum solar array input power 1)	12V: 1000W / 24V: 2000V	N / 36V: 3000W / 48V: 4000	W	12V: 1200W / 24V: 2400W / 36V: 3600W / 48V: 4850W	
Maximum PV open circuit voltage	150V absolute maximum coldest conditions 145V start-up and operating maximum				
Minimum PV voltage	Battery voltage plus 7 Volt to start Battery voltage plus 2 Volt operating				
Standby power consumption	12V: 0,55W / 24V: 0,75W / 36V: 0,90W / 48V: 1,00W				
Efficiency at full load	12V: 95% / 24V: 96,5% / 36V: 97% / 48V: 97,5%				
Absorption charge	14.4 / 28.8 / 43.2 / 57.6V				
Float charge	13.7 / 27.4 / 41.1 / 54.8V				
Equalization charge	15.0 / 30.0 / 45 / 60V				
Remote battery temperature sensor	Yes				
Default temperature compensation setting	-2,7mV/℃ per 2V battery cell				
Remote on/off		No		Yes	
Programmable relay	DPST	AC rating: 240VAC/4A	DC rating	g: 4A up to 35VDC, 1A up to 60VDC	
Communication port	VE.Can: two paralleled RJ45 connectors, NMEA2000 protocol				
Parallel operation	Yes, through VE.Can. Max 25 units in parallel				
Operating temperature	-40 °C to 60 °C with output current derating above 40 °C				
Cooling	Natural Convection			Low noise fan assisted	
Humidity (non condensing)	Max. 95%				
Terminal size	35mm² / AWG2				
Material & color	Aluminium, blue RAL 5012				
Protection class	IP20				
Weight	4,2 kg				
Dimensions (h x w x d)	350 x 160 x 135 mm				
Mounting	Vertical wall mount Indoor only				
Safety	EN60335-1				
EMC	EN61000-6-1, EN61000-6-3				



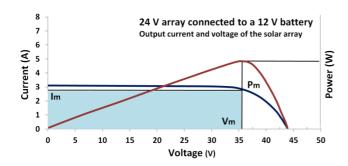
# Which solar charge controller: PWM or MPPT?

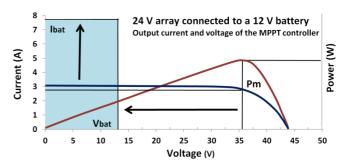
What follows is a summary of our white paper with the same title.

# 1. What they do

The PWM controller is in essence a switch that connects a solar array to a battery. The result is that the voltage of the array will be pulled down to near that of the battery.

The MPPT controller is more sophisticated (and more expensive): it will adjust its input voltage to harvest the maximum power from the solar array and then transform this power to supply the varying voltage requirement, of the battery plus load. Thus, it essentially decouples the array and battery voltages so that there can be, for example, a 12 volt battery on one side of the MPPT charge controller and a large number of cells wired in series to produce 36 volts on the other.





Graphical representation of the DC to DC transformation as performed by an MPPT controller

# 2. The resultant twin strengths of an MPPT controller

# a) Maximum Power Point Tracking

The MPPT controller will harvest more power from the solar array. The performance advantage is substantial (10% to 40%) when the solar cell temperature is low (below 45°C), or very high (above 75°C), or when irradiance is very low.

At high temperature or low irradiance the output voltage of the array will drop dramatically. More cells must then be connected in series to make sure that the output voltage of the array exceeds battery voltage by a comfortable margin.

# b) Lower cabling cost and/or lower cabling losses

Ohm's law tells us that losses due to cable resistance are Pc (Watt) = Rc x  $I^2$ , where Rc is the resistance of the cable. What this formula shows is that for a given cable loss, cable cross sectional area can be reduced by a factor of four when doubling the array voltage.

In the case of a given nominal power, more cells in series will increase the output voltage and reduce the output current of the array (P = V x I, thus, if P doesn't change, then I must decrease when V increases).

As array size increases, cable length will increase. The option to wire more panels in series and thereby decrease the cable cross sectional area with a resultant drop in cost, is a compelling reason to install an MPPT controller as soon as the array power exceeds a few hundred Watts (12 V battery), or several 100 Watts (24 V or 48 V battery).

### 3. Conclusion

### PWM

The PWM charge controller is a good low cost solution for small systems, when solar cell temperature is moderate to high (between 45°C and 75°C).

# **MPPT**

To fully exploit the potential of the MPPT controller, the array voltage should be substantially higher than the battery voltage. The MPPT controller is the solution of choice for higher power systems because of the lowest overall system cost due to smaller cable cross sectional areas. The MPPT controller will also harvest substantially more power when the solar cell temperature is low (below 45°C), or very high (above 75°C), or when irradiance is very low.

