

## MPPT- Wind Power Charge Controller windMax250 Description:

The wind charge controller designed in processor technology contains all features required for a careful charging of lead batteries with wind power generators with an output of 200W at 24V or 140W at 12V battery systems.

Through the MPP-controller (MPP= **Maximum Power Point**) there is a 200% increase of electrical power withdrawal from the wind power generator as compared to conventional controllers. This is because the wind power station always works from its optimal range of operation. The generator voltage can be 200Vdc at most (off-load voltage). The input is 3-phase. (three-phase current). The voltage in the MPP (Maximum Power Point) will be transformed to the relevant battery voltage (12V/24V).

The controller designed as DC buck converter initially feeds the maximum possible current in the MPP into the battery. After achieving the end charging voltage of the battery the controlling is in the direction of the off-load-voltage of the generator, so that the end charging voltage of the battery is not exceeded.

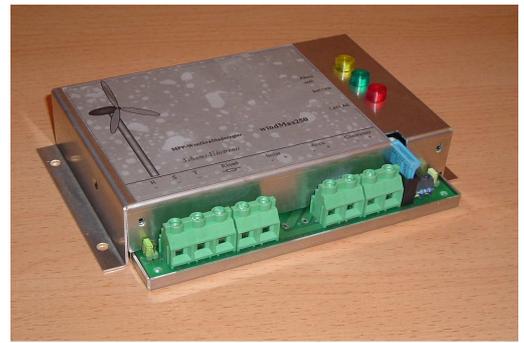
For protection of the controller, a load resistor can be connected at the output **Rcharge**. The load resistor can be added earth-sided via a Mosfet between the rectified wind power generator voltage.

A temperature sensor at the battery causes a change of the end charging voltage of  $-4\text{mV}/^\circ\text{C}$ /battery cell.

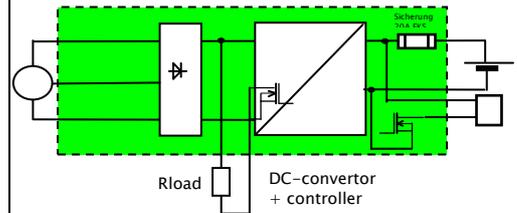
The MPP controlling is activated every 1 sec. in order to adjust the MPP. LED displays inform about the charge current and charging condition of the battery.

A battery management system ensures the best use of the battery capacity.

The battery charging current and battery voltage can be measured via a RS-232 port



### Block diagram



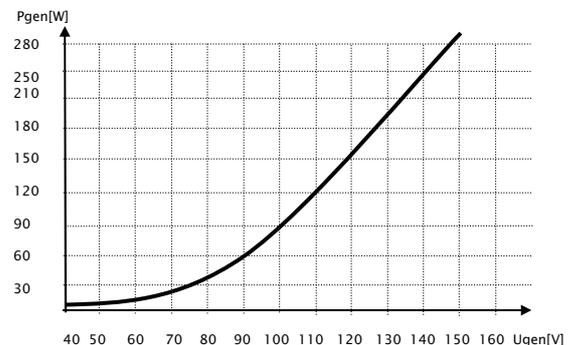
### Special Features:

- \* DC converter for best use of gen. output
- \* MPP tracking of the wind generator voltage
- \* Switchable between 2 battery volt. 12V/24V
- \* Connection of a load resistor
- \* Total discharge protection
- \* Temperature adapter of the battery voltage
- \* RS232 port for battery voltage and charge current

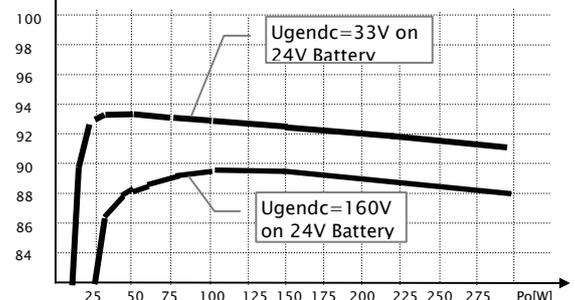
### Technical Data

	12V-Battery	24V-Battery
<b>Max. Generator voltage</b> Ugenac/Ugendc @ operation	141Vac/200Vdc	141Vac/200Vdc
<b>Max. Generator current</b> @Ugendc=160V	0.975Adc	1.3Adc
<b>Max. Battery charging curr.</b>	10A	7A
<b>Max. Generator output</b> Pgen@Eff.=90%	141W	196W
<b>Efficiency, Eff.</b>	Ca. 92% at half load	Ca. 94% at half load
<b>Total discharge prote.</b> Load throw off Load connection	at 10.8V at the battery With delay of 10 secs. 12.5V	at 21.6V at the battery With delay of 10 secs. 25.0V
<b>Load resistor</b> Connection/Disconnection Connection load resistor	160Vdc/130Vdc 113Vac/92Vac max.290W @160Vdc	160Vdc/130Vdc 113Vac/92Vac max.290W @160Vdc
<b>Self consumption</b>	7mA	13mA
<b>Connections</b> 3phas. Generator R S T 2phas. Battery output 2phas. Consumer output 2phas. Load resistor 2phas. Temperature sensor	6qmm, solid, 4qmm, braid, terminal 6qmm, solid, 4qmm, braid, terminal 6qmm, solid, 4qmm, braid, terminal 6qmm, solid, 4qmm, braid, terminal 1.5qmm, solid, terminal	
<b>Temperature sensor</b>	KTY10-5 or 1.91 kOhm resistor	
<b>LEDs</b>	top: yellow (end charging voltage achieved) middle: green (Battery charge current >0.2A) down: red (consumer off)	
<b>Housing</b>	Aluminum wxhxd 174x37x117mm	
<b>Protection category</b>	IP40	
<b>Weight</b>	400g	
<b>Moisture</b>	90% (paint protection)	
<b>Operating temperature port</b>	-10°C to +40°C Serial, RS232, 9600Baud, D-Sub9-plug Output of Ubattery, Jbattery	

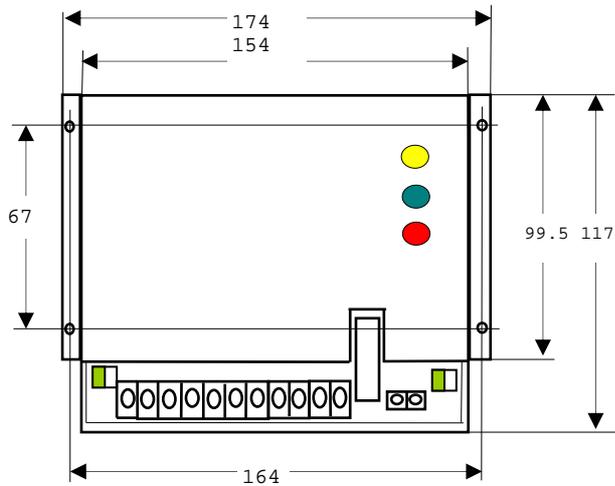
### Expected generator output (battery sided)



### Efficiency characteristic curve

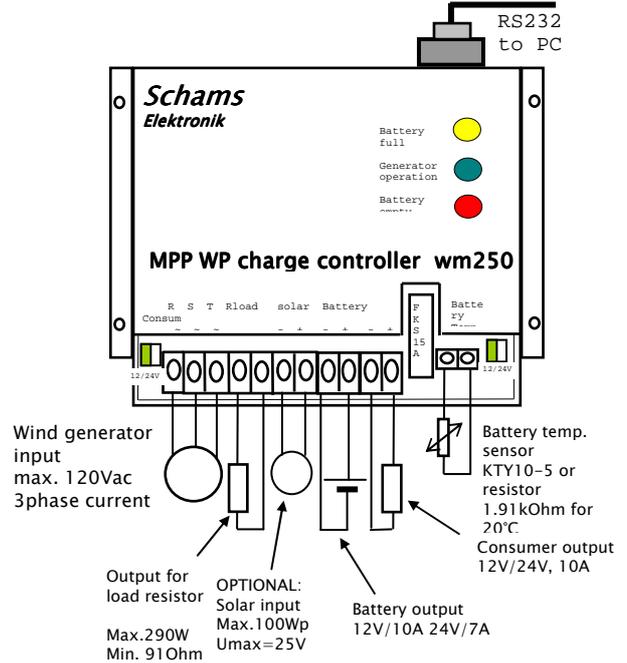


**Housing measures**



Installation height: h=37mm  
 Drill for the housing mounting: d=5mm

**connection diagram**



**Conversion formula**

The maximum DC voltage of the charge controller depends on the AC voltage of the 3phase generator. The DC voltage is calculated according to the interconnections in the generator.

At the star circuit, the maximum generator DC voltage is:

**Ugdc=1.41\*Urs or 1.41\*Ust or 1.41\*Urt**  
**Urs=1.73\*Ustrang**

At the delta-connection, the maximum generator DC voltage is:

**Ugdc=1.41\*Urs**

**Connection of the load resistor**

The load resistor is connected at the output **Rload**. It serves as power limiter in case of fully charged battery as well as overload protection at too much wind speed.

Starting with an alternating voltage of 113Vac at the generator, a MOSFET connects the load resistor.

In case the voltage goes below 92Vac, the load resistor will be disconnected.

Recommended dimensioning:

Resistance value:  $R_{last} = 113V_{ac} \times 113V_{ac} \times 2 / P_{nom}$   
 Output at the resistor:  $P_{load} = 113V_{ac} \times 113V_{ac} \times 2 / R_{load}$

Example:  $P_{nom} = 280W$

$R_{load} = 113 \times 113 \times 2 / 280 = 91 \Omega \Rightarrow$  **minimum 91Ohm**  
 $P_{load} = 113 \times 113 \times 2 / 91 = 280W \Rightarrow$  **maximum 280W**

Wind generator 3phase rectifier MPP-charge contr. DC-buck converter Battery Consum.

