MPPT– Windpower charge controller windMax1000

**Description:**

This windpower charger in processor technique, contains all functions for smooth charging of lead batteries by windpower generators of 1200W at 24V- and 600W at 12V-battery systems. Through power tracking more electrical energy is charged from the wind generator into the battery compared with standard charging systems, depending on the nominal voltage of the wind turbine. The higher the turbine voltage against the battery voltage, the higher the gain.

The maximum generator voltage can be 150Vac (Open circuit voltage). It is a 3 phase input. The voltage in the Maximum powerpoint of the windgenerator is transformed to the level of the battery system. (12V/24V/48V).

The topology of the buck converter feeds the maximum possible current from the power maximum into the battery. As soon as the battery is full and reaches its maximum voltage (14.1V/28.2V/56.4V) the charger drives the generator voltage towards open circuit voltage, preventing overcharging of the battery.

For protection of the windgenerator and charge controller it is possible to connect a break resistor to the terminal [DUMPLOAD]. The break resistor is switched on the gnd level via a mosfet at the output of the 3 phase rectifier.

Optional a power curve can be programmed ex works. The Voltage steps are 1V, between 0V and 192V.

Optional a temperature sensor placed near the battery, effects the maximum battery voltage at a rate of -4mV/°C/battery cell.

Optional the device can be equipped with a LCD Display for battery current, battery voltage, power and energy (kilowatt hour meter).

Optional a boost converter can be equipped, which feeds energy into the battery from minimum 7Vdc generator voltage. The battery system voltage may be 12V, 24V or 48V.

**Highlights:**

- **DC-Converter to optimize wind power income**
- **MPP-Tracking of wind generator voltage**
- **Selection of 3 battery voltages 12V/24V/48V**
- **Break resistor switching output**
- **Deep discharge protection with shortcut protection**
- **optional power curve programming, instead of mppt**
- **optional dc boost converter for generator voltage.**
- **optional LCD for current, voltage, power, energy (kilowatt hour meter)**

**Technical data:**

<table>
<thead>
<tr>
<th>12V-Battery</th>
<th>24V-Battery</th>
<th>48V-Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Generator voltage, Ugen</td>
<td>200Vdc</td>
<td>200Vdc</td>
</tr>
<tr>
<td>Max. Generator current</td>
<td>16A</td>
<td>16A</td>
</tr>
<tr>
<td>Max. Battery current</td>
<td>40A</td>
<td>40A</td>
</tr>
<tr>
<td>Max. Generator power, Pgen@Eff.=90%</td>
<td>644W</td>
<td>1234W</td>
</tr>
<tr>
<td>Efficiency</td>
<td>90% @ 0.5Pgen</td>
<td>94% @ 0.5Pgen</td>
</tr>
<tr>
<td>End of charge voltage</td>
<td>14.5V</td>
<td>29.0V</td>
</tr>
<tr>
<td>Deep discharge protection</td>
<td>10.8V Battery voltage with 60 Sec. Delay</td>
<td>21.6V Battery voltage with 60 Sec. delay</td>
</tr>
<tr>
<td>Load disconnect (short circuit protected)</td>
<td>12.5V</td>
<td>25.0V</td>
</tr>
<tr>
<td>Max. consumer current</td>
<td>25A</td>
<td>25A</td>
</tr>
<tr>
<td>Break resistor dis-/reconnect</td>
<td>150Vdc/160Vdc</td>
<td>150Vdc/160Vdc</td>
</tr>
<tr>
<td>Current consumption</td>
<td>10mA</td>
<td>10mA</td>
</tr>
</tbody>
</table>

**Terminals:**

- 3x wind generator
- 2x battery output
- 2x consumer output.
- 2x temp. sensor
- 2x pot.free contacts
- 2x DUMPLOAD
- 1x Earth

**Temperature sensor**

- RTD (J105) or 1.91kOhm
- KTY10-5 or 1.91kOhm

**LEDs**

- Right: yellow (max. battery voltage)
- Middle: red (load disconnected)
- Left: green (battery current>0.5A)

**Housing**

- Steel wall mounted with 300x300x150mm
- IP65
- Protection: P65
- Weight: 11kg
- Moisture: 90% (coating)
- Operating temperature: -20°C to +50°C

**Option Boost converter**

- 29W
- 58W
- 116W

**Min. Input voltage**

- 7Vdc
**Housing dimensions (mm):**

- Height = 150mm
- Mounting holes in bottom of housing D = 10mm

**Connection diagram**

- Windgenerator Input max. 150Vac, 3phase curr.
- Battery output 12V or 24V/40A 48V/25A
- Consumer output 12V/24V/48V, 25A

**Basic calculations:**

The maximum admissible input voltage of the charge controller is determined by the rectified AC-Voltage of the three phase generator. Depending on star or delta connection, the dc-voltage is different.

At a star connection the maximum generator dc-voltage is: $U_{gendc} = 1.35^*U_{r}$ or $1.35^*U_{st}$ or $1.35^*U_{rt}$

At a delta connection the maximum generator dc-voltage is: $U_{gendc} = 1.35^*U_{r}$

**Connection of break resistor**

The break resistor must be connected to the terminal DUMPLOAD. It's purpose is to remove electrical energy from the windgenerator when the battery is full and if the windpower is too large.

As soon as a generator dc-voltage ($U_{gendc}$) more than 160V is at the charge controller, the break resistor is switched on.

Recommended dimensioning:

- Resistor value: $R = \frac{150V \times 150V}{P_{gen}}$
- Resistor power: $P = \frac{150V \times 150V}{R}$

Example: $P_{gen} = 1240W$

$R = \frac{150 \times 150}{1240} = 18.15\Omega$ => 18Ohm

$P = \frac{150 \times 150}{22} = 1250W$