

New Safety Standard for Small Wind Turbine Systems

Bremerhaven, March 2009 - VENCO Power is going straight forward with new innovations and developments for small wind turbines. The newest development is a self supplying safety system, which makes one of the main advantages of the VENCO-Twister-1000 series. It is formed by the generator and a safety controller, which is now integrated into the unit controller (pat. pending).

This self supplying safety system makes a unique advantage for the VENCO-Twister-1000 series compared to other small wind turbines. Commonly small wind turbines have no safety systems or just externally supplied systems by grid or batteries. The VENCO-Twister-1000 series now are equipped...

with the new developed self supplying safety system for small wind systems:

The Safety Controller

is self controlled by two computing units which are composed redundantly. For the safety of the wind turbine it controls continuous:

- Overvoltage

is the maximum voltage which the inverter can withstand.

- Overspeed

which can damage the unit by producing high centrifugal forces.

- Heavy Vibrations

caused by unbalanced masses, such as ice load or damages

- Phase Deviation

i.e. by damage of one phase; may cause overspeed

- Missing Loads

i.e. by fault of inverter, power failure or damage of heat resistor; may cause overspeed

• Excess Temperature of Generator

may cause a burn out of generator

At occurrence of one of the above mentioned conditions the unit will be slowed down and according to the condition prevented from restart.

The units are self starting and at low revolutions enough power is produced to supply the safety controller. During operation the safety controller is supplied by the unit accordingly. If the unit is inoperative there is no need to run the safety controller. With this technology the unit is independent of batteries or any other power supply. Hence further maintenance of batteries is avoided as well as unnecessary power consumption at still air.

The Generator

feeds the safety controller during operation. It is built within the stator of copper windings arranged in three layers. Each layer makes up one phase. In case of one damaged phase the remaining phases remain operative. By this design with three levels the central phase is protected from mechanical damage by the two outer phases.

A further advantage of this kind of generator used with the VENCO-Twister series regards to its "shrunk on disk" design. Commonly used cheap generators use brushes or slip rings to conduct the electrical power outside. Meanwhile it has been experienced that such parts may burn out at stormy conditions due to regular wearout. Thus far these units can't be stopped in such cases by short circuit anymore as basically defined by their design. They will overspeed and go into dangerous condition. In much cases blades of the units have been broken and thrown off. This is generally avoided by the VENCO-Twister series design as no brushes or slip rings are used.

The three phases of the generator are continuously checked by the safety controller. At deviation of one phase the unit is slowed down by short circuit of the remaining phases as well as it is remaining prevented from restarting.