

Converter system suppliers

While great for promoting green energy and reducing reliance on fossil fuels, the constantly growing percentage of electricity generated by wind power places are increasing certain demands on electrical grids. Whereas in times gone by the electricity utilities disconnected the wind turbines from the grid when there were grid problems, the turbines nowadays truly have to support the grid. As a result, converters play a crucial role today. The manufacturers of converter systems master the task of supporting wind turbine-enabled grids with the help of fast and flexible Beckhoff technology.

The Switch

Switch Drive™ fullpower converter guarantees reliable operation

The Switch Drive generator and converter package was developed by the Finnish wind turbine parts supplier The Switch. In addition to increased reliability and availability, the Switch Drive™ offers high efficiency in the partial load range, leading to a higher energy yield. The converter is controlled by a Beckhoff Embedded PC. Both the internal converter communication and the external communication are based on EtherCAT.

“The Switch” arose in December 2006 from the fusion of three enterprises, Rotatek Finland, Verteco and Youtility; over 25 years of expert know-how flowed together among the three companies. Apart from the company headquarters in Vantaa and the production sites in Lappeenranta and Vaasa in Finland, The Switch also manufactures in Hudson, New Hampshire in the United States and in China. In 2009 the company brought solutions onto the market for 2.5 MW high-speed turbines, for medium-speed 1.25 MW generators and for a 1.5 MW direct drive solution. The annual production capacity for generator and converter systems currently amounts to 5.5 GW.

The Switch offers a large selection of standard and customer-specific gearless drive systems, consisting of a permanent magnet generator (PMG) and a full-power converter (FPC). They represent a direct drive solution in which the rotor of the wind turbine is connected directly to the generator, thus making a gearbox unnecessary. The payoff is improved reliability and availability as well as simplified maintenance over the entire turbine life cycle. The technology also guarantees compliance with future grid compatibility requirements by providing grid-supporting functions.

EtherCAT promotes communication freedom

In supplying its customers with generator and converter packages, The Switch found itself confronted with different customer needs regarding the transmission of data between the Switch Drive™ and the plant

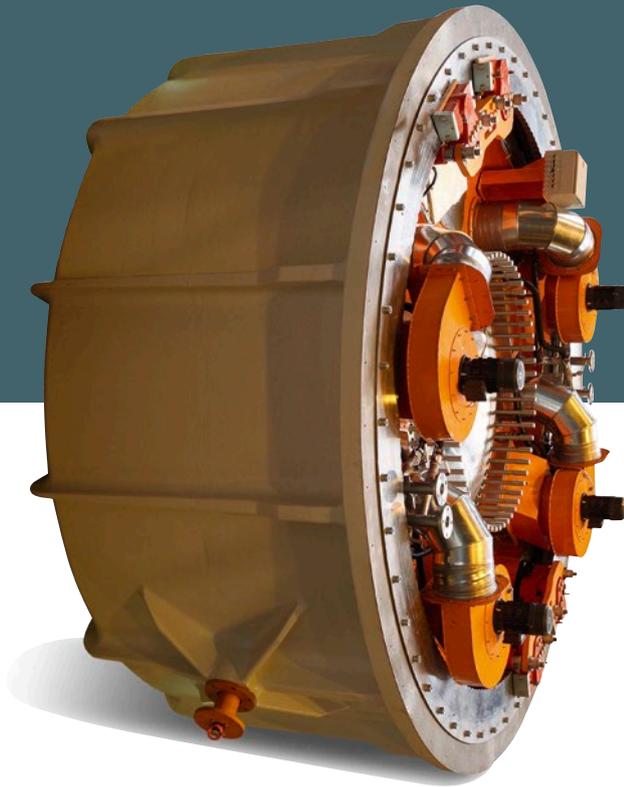
controller. With the use of the EtherCAT Terminal system, however, the company can offer its customers any desired communication interface: PROFIBUS, CANopen, DeviceNet, RS485, etc. The communication master that matches the specific project is simply selected from the modular EtherCAT Terminal system and implemented. If the Beckhoff CX9000 or CX1010 Embedded PCs are used, Modbus TCP can also be utilized directly as the gateway to higher-level systems, without the use of a separate communication master. This greatly simplifies communication between the converter unit and the turbine controller, while at the same time reducing the number of components required for communication. If, as in many cases, the turbine controller is also from Beckhoff, then the operational management can also be connected via real-time EtherCAT or real-time Ethernet.

Integrated data recording

Apart from their function as communication interfaces, Embedded PCs also serve to log all necessary process data. The system can also monitor and log the temperature via analog EtherCAT Terminals. An almost unlimited storage capacity is available for data logging via the USB interface of the Embedded PC.

The Switch
Beckhoff Finland

www.theswitch.com
www.beckhoff.fi



The permanent magnet generators (PMGs) from The Switch cover all wind power applications. Each PMG is designed with special magnet shapes and arrangements to match specific wind conditions for smooth operation and maximum efficiency. The directly driven, low-speed PMGs work without a gearbox, which results in an unequalled overall efficiency of the drive train.

The sturdy full-power converters from The Switch, which are designed for the highest performance demands in wind power generation, are virtually immune to disturbances or changes in the grid and enable adaptation to changing operating conditions due to the flexible design of the controller.

