



▲ Just before completion:
The nacelle is placed on
the tower at a hub height
of 142 meters.

STATE-OF-THE-ART IN THE WIND

Direct drive wind turbines with the Bachmann system

Prokon is a successful company in the field of renewable energy in Germany. The company focuses mainly on the wind power, biogenic fuels and biomass sectors. This year Prokon is putting the first two wind turbines into operation that it has developed itself. The 3 MW class high-tech plants are controlled and monitored with the Bachmann M1 system fitted with an integrated condition monitoring system (CMS).

Prokon decided a few years ago to build its own wind turbine. Not to assert itself as a new competitor in the turbine sector, "but simply because we were looking for a reliable, low maintenance technology for our own wind farms, and wanted to be less dependent on suppliers," Albrecht Schöttle, head of turbine development and production at Prokon describes the motivation behind this step. Schöttle knows what he's talking about: The company has gained over 17 years of experience as an operator of turbines supplied by different manufacturers.

Prokon now owns almost 50 wind farms – with around 300 wind turbines in Germany and Poland.

Prototypes on the grid

The first two prototypes of the P3000 turbines will be connected to the grid in 2013: One plant is being erected in Schleswig-Holstein, Germany, and the second in the German state of Mecklenburg-Western Pomerania. The turbine has a rotor diameter of 116 meters, and with a direct drive permanent magnet generator, has an electrical output ►►



Founded in 1995, the PROKON group of companies based in Itzehoe, Germany, develops projects and concepts for the renewable energy sector. In 2012 PROKON achieved a turnover of 390 million euros with around 1,100 employees.

► www.prokon.net



▲ Every bolt must fit: Installation work on the nacelle.



► of 3 megawatts. The hybrid tower of the wind power plant in Cracow (Mecklenburg-Western Pomerania) is not just manufactured from steel alone, but also has 1,500 tons of concrete in its lower section and 110 tons of steel tubing on the upper section. In this way it was possible to achieve in a safe and cost-effective way a nacelle height of 142 m instead of the conventional 94 m of towers made only from steel.

Plant controls of the latest generation – with CMS

The plant controls are based on the Bachmann M1 automation system featuring the latest MC210 processor generation. The Ω -Guard condition

monitoring system from Bachmann is integrated in the controller. This makes it possible to link the measured variables from the sensors directly with other operating parameters, such as azimuth position, wind direction and wind speed. This increases the diagnostic reliability of the condition monitoring: Fault patterns can be compared to the current operating situation and interpreted with greater accuracy.

Another benefit: The μ -Bridge sensors from Bachmann are specially designed for safe signal acquisition, even with very slow rotating roller bearings – ideal for the drive train of the direct drive generators of the P3000.

» With WTE we were able to complete the development and commissioning of the PLC software and visualization in the shortest possible time.«

*Albrecht Schöttle,
Head of turbine development
and production at Prokon*

Supported software development

The turbine software was developed using the WTE (Wind Turbine Essentials) library as a basis: “Many tasks for the automation of the wind turbine were covered straight away so that we could complete the development and commissioning of the PLC software and visualization in the shortest possible time,” Albrecht Schöttle explains with delight.

Certified safety

The certified Bachmann Safety Control safety system that is distributed over the tower and nacelle protects the entire plant. It consists of the SLC284 programmable safety controller in the nacelle as well as the remote I/Os in the tower. Furthermore, this does not require any separate cabling: The fiber optic cable between the nacelle and the tower handles the reliable data exchange in the safety chain.

Standards compliant grid connection
The GMP232 grid measurement module is also integrated in the controller. This



▲ Construction of the first P3000 prototype in the wind park Krackow-Glasow.

measures and monitors the current, voltage, frequency, output and power quality of the two inverter systems on the P3000. It ensures the proper compliance with the so-called grid codes in order to ensure the stability and availability of the electrical supply: Protection and monitoring functions are thus integrated in the 'conventional' tasks of the controller.

Impressive solution

Up to 100 turbines are to be built at Prokon each year and the production capacity at the plant in Itzehoe is twice as much. Schöttle explains: "Even if we don't intend to compete with other vendors with our turbines, this capacity offers far more than merely competitive production and is absolutely state-of-the-art. The P3000 and the subsystems of Bachmann electronic provide us with a reliable and highly cost-effective and technologically impressive turbine." Another plus point: The M1 automation system allows a high degree of flexibility whilst still ensuring a high degree of functional integration at the same time.

LEADING.

Bachmann systems for tomorrow's energy grid combine controller, communication, monitoring, visualization and efficient engineering into a highly economical complete solution. They also guarantee plant builders and operators the critical edge over their competitors.



PowerPlant Network

Communication platform

Safe, modular and internationally certified.



CMS Condition Monitoring System

Condition monitoring

Maximum productivity and secure yield.



Power Management

Grid measuring and monitoring

Standards compliant and stable power supply.



Safety Control

Integrated safety

Highly functional solutions for personnel and plant protection.



SCADA atvise

SCADA

Efficient engineering and intuitive plant operation.



Redundancy Control

Redundancy solutions

Maximum availability and stable operation.



M-Target for Simulink®

Simulation with Simulink®

Automatic code generation for the M1 controller.