

Wind Cluster®
Creating Synergy

Electrical Pitch System

April 2010

Adaptable for wind turbines
between 1 MW and 3 MW



Open architecture and design

- Based on components manufactured by globally recognized suppliers and available from distributors in China
- Full component documentation and service operations training available
- Service operations can be carried out by wind farm operator

Reliable design increasing availability

- No external fans subject to wear out in harsh climates
- Use of maintenance-free ultracapacitors eliminates biannual replacement of batteries and prevents acid and toxic fume impact on other components
- Condition monitoring of ultracapacitor
- Maintenance-free lightning protection

Operating even if grid power is not stable

- The ultracapacitor is used to ensure continued operation at power failure (low voltage ride through).

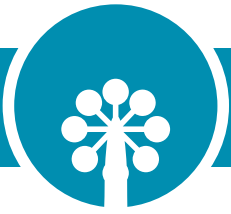
Safety brake systems

- reducing stress on blades and drive train

- Redundant design regarding drive and encoders enables the system to move blades feather position limiting stress on blades - even if a single axle drive should become defect.
- Watchdog function ensures that the wind turbine is stopped in case communication with main controller fails

Full operation under all climate conditions: -40°C to +50°C, dust, moisture, and lightning

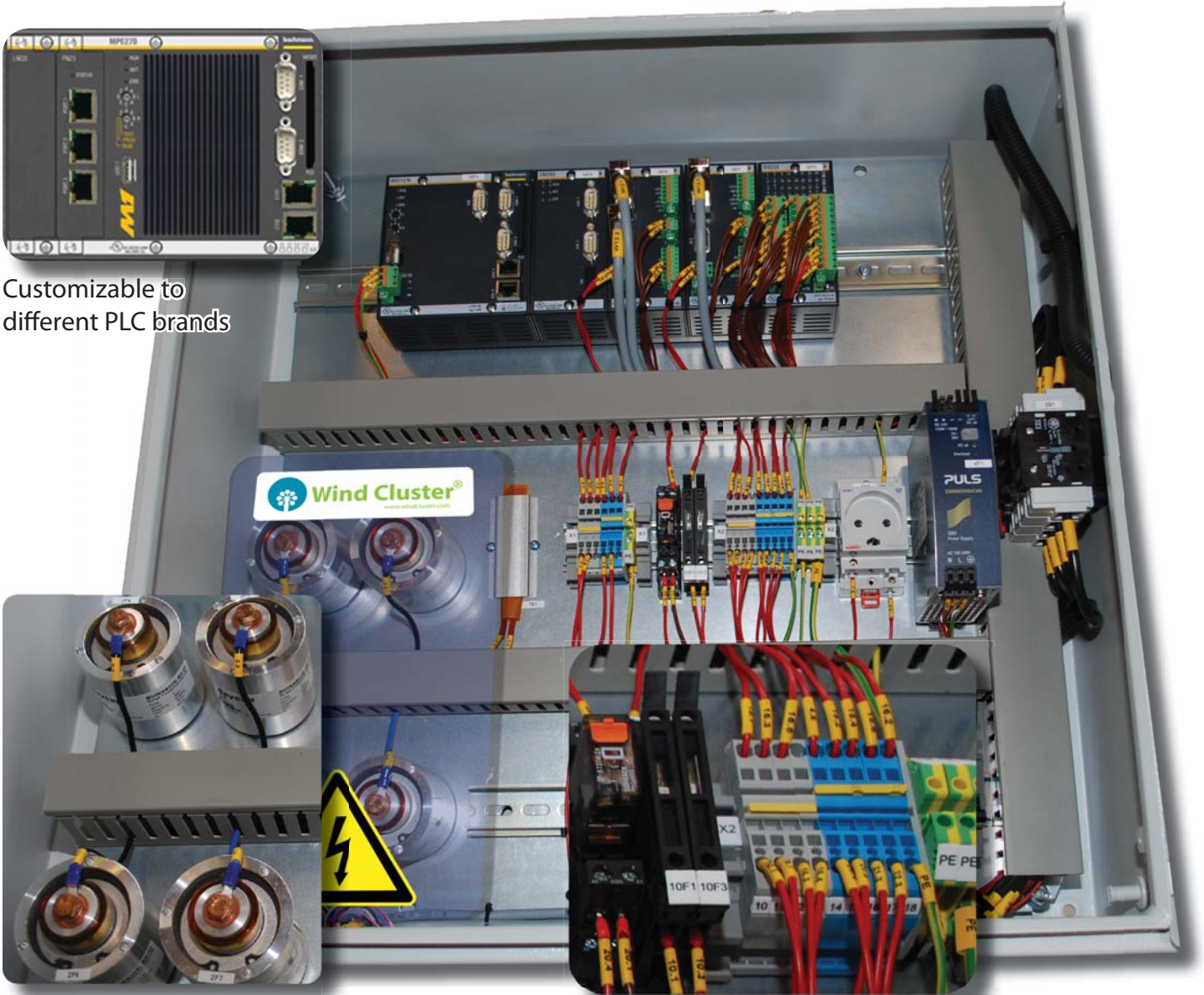
- Ultracapacitors provide power for startup at very low temperatures
- Special coating on printed circuit boards
- Hub controller cabinets manufactured to ensure IP54 or IP65 compliance
- The combination of components selected for cold climate and heating elements assure rapid start-up even at a temperature of -40°C and immediate start-up above -25°C.



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Details of control cabinet



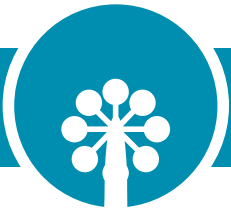
Customizable to
different PLC brands

Strikesorb lightning protection

Service friendly assembly



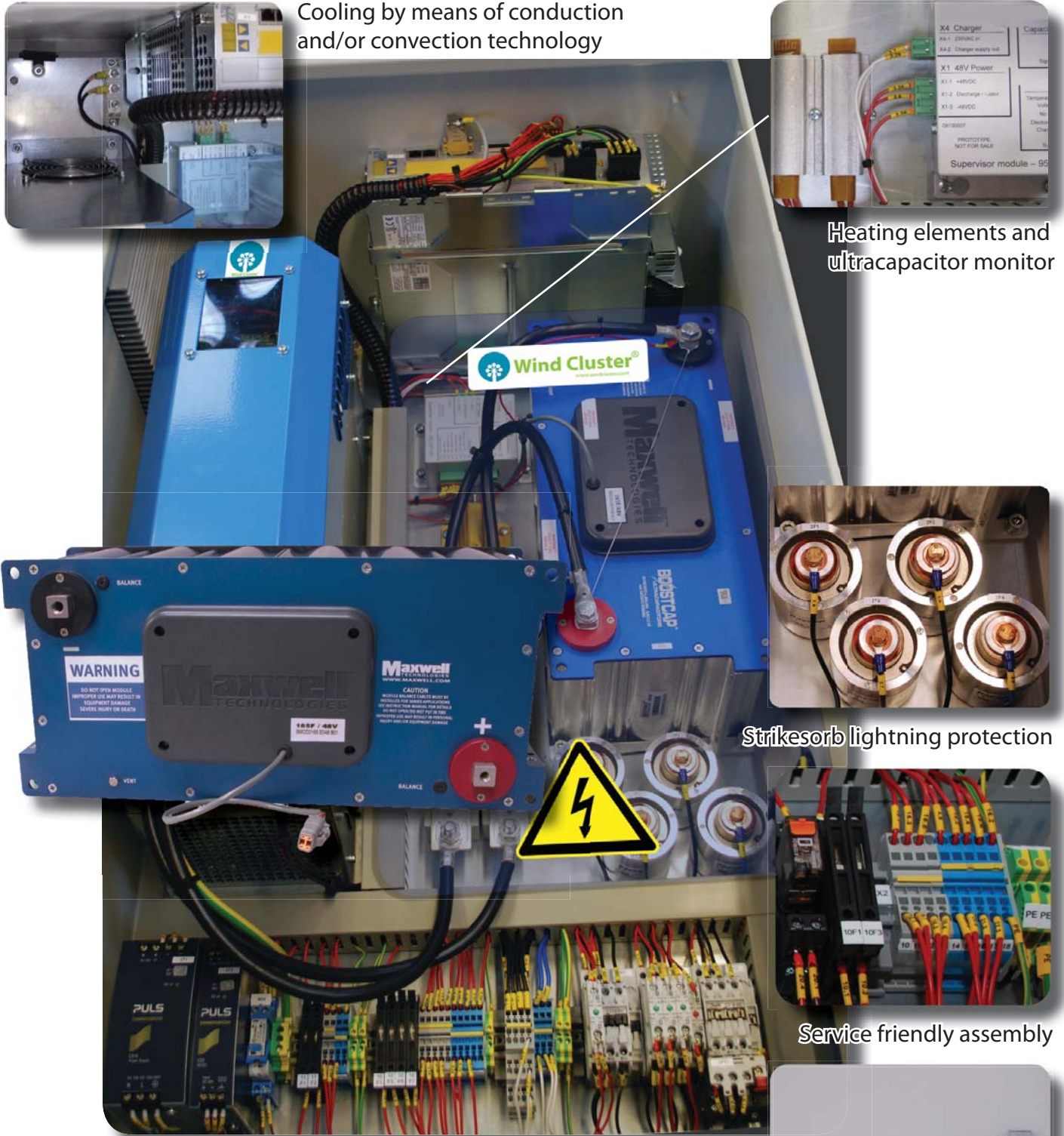
Customizable to Harting, Roxtec
or cable gland connectors



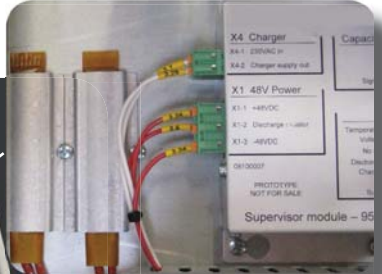
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Details of drive cabinet



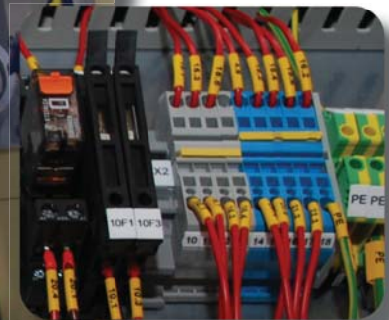
Cooling by means of conduction and/or convection technology



Heating elements and ultracapacitor monitor



Strikesorb lightning protection



Service friendly assembly



Customizable to Harting, Roxtec or cable gland connectors



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Data sheet

Mains power supply	3 x 400 V AC
Interface to turbine controller	Customizable to CANopen, Profibus or other industry standard field bus system
Motor types supported	AC induction or servo
Continuous current for motor	24 Amp (upgradable to 48 Amp)
Peak current for motor	48 Amp (upgradable to 96 Amp)
Minimum ambient temperature for operation	Different choice of components and cooling method allows for operation in the range of -40°C to +50°C
Pitch acceleration	Software configurable
Gear ratio (blade bearing to drive motor)	Software configurable
Cabinet physical dimensions	Customizable to customer request
Connectors between cabinets	Customizable to customer request
Motor drive cooling method	Convection or upon request conduction by means of cold plate

Key components

AC servo motor



Contained in a closed housing; unlike the AC induction motor the AC servo motor does not need a fan for cooling of windings. The peak torque of the AC servo motor is available from zero to maximum speed.

Servo motor drive



Industry leading drive adapted to fit wind turbine harsh mechanical and wide temperature requirements. Delivers peak current 3 times rated current for 1.5 MW turbine. Cooled by means of conductive and convective cooling technologies. Programmable in high level language.

Limit switch



Robust construction and the use of high quality, corrosion resistant materials, precision finishing and protection class IP 67 according to IEC 60529 guarantee trouble-free and reliable operation under the toughest conditions.

Redundant 2nd absolute encoder for pitch system

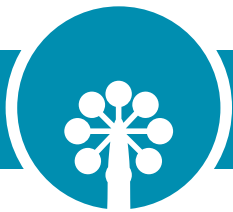


This compact absolute encoder is adapted specifically for use in electrical pitch systems. The encoder not only comprises its particularly rugged enclosure, but also rigid ball bearings suitable for running the shaft connected directly with pinion gear on the blade of a wind turbine.

Blind hollow shaft pitch encoder for installation on motor



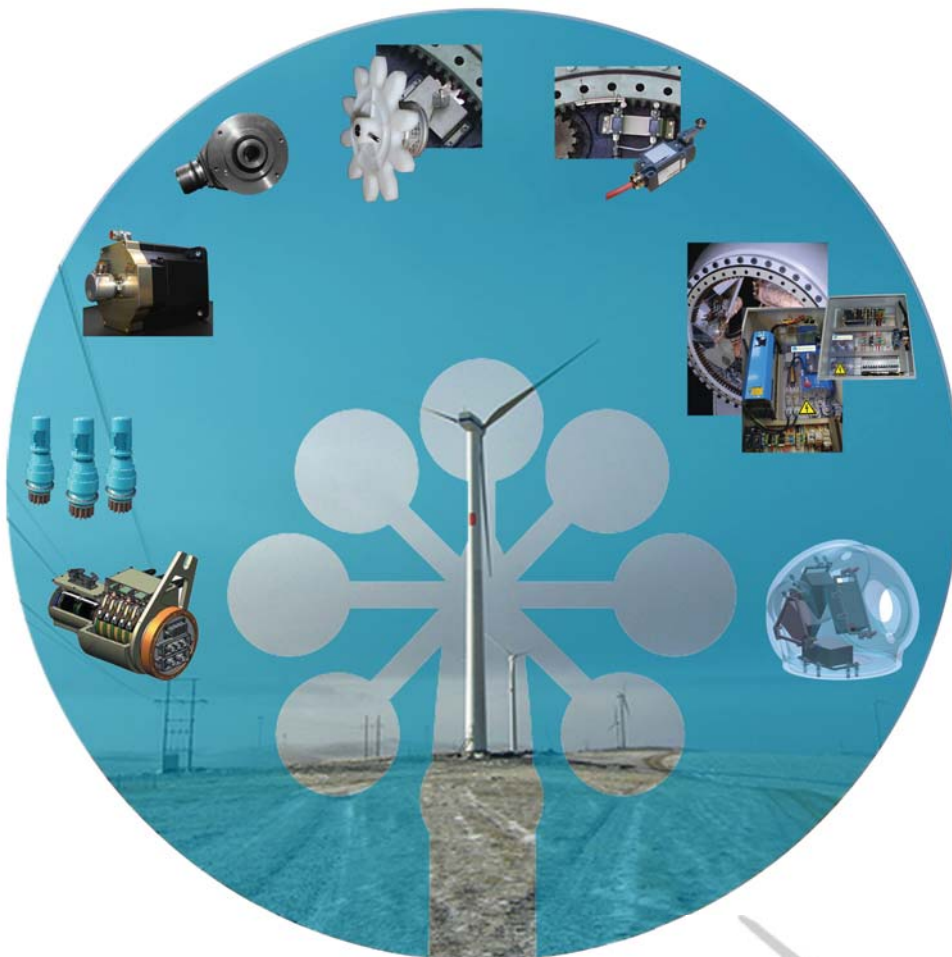
To prevent magnetic field influence when installed at the pitch motor, the encoder uses optic reading technology. For easy mounting the encoders are offered with blind hollow shaft assembly directly on the motor shaft.



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for all climate conditions



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