

More Precision



Sensors for wind
turbines and
generators



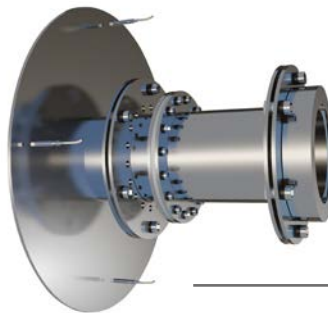
Sensors for wind turbines

Condition monitoring of wind turbines increases their performance and the service life of components and machines. Modern sensor technologies can help to prevent repairs and to optimize maintenance cycles, not only during the construction and manufacturing of wind turbine components, but also in test benches and in the wind turbine itself. Furthermore, sensors can increase operational safety and minimize failure rates. Sensors from Micro-Epsilon have proved invaluable in various applications with regards to safe operation, particularly when it comes to supporting predictive maintenance regimes. Micro-Epsilon offers a wide range of modern sensors. Irrespective of whether your application is offshore or onshore - there are numerous measuring techniques and sensor models for your specific environment.



About us

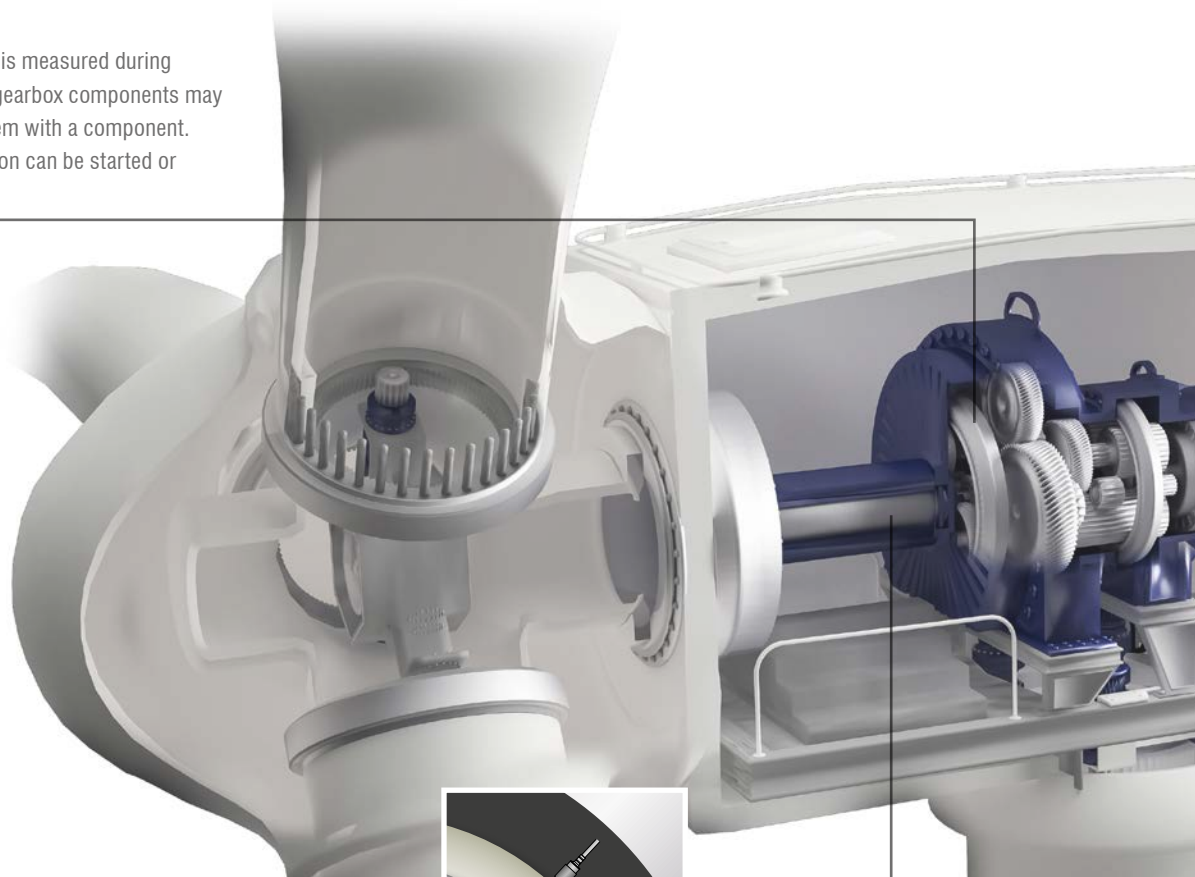
Micro-Epsilon is a German, medium-sized company and a leader in high precision measurement technology. The product portfolio includes sensors for displacement and distance measurement, IR temperature measurement, color recognition, as well as sensor systems for dimensional measurements and defect inspection.



Displacement measurement of the clutch disk
Eddy current displacement sensors measure the axial, radial or tangential deflection of the clutch disk. These robust sensors are designed for harsh ambient conditions and, due to their extremely compact size, can also be integrated in restricted installation spaces.

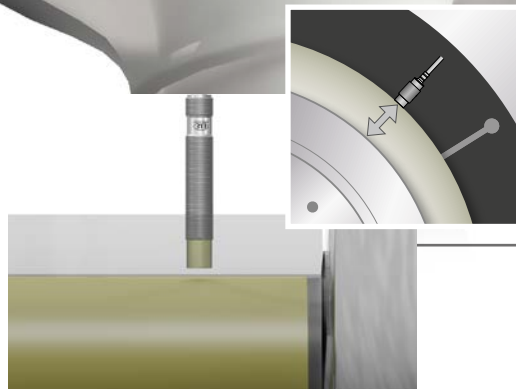
Gearbox temperature

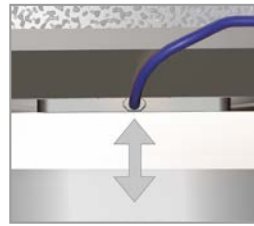
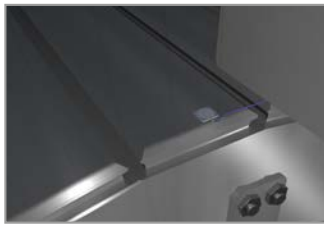
The gearbox temperature is measured during operation. Heating up of gearbox components may indicate a potential problem with a component. Subsequent remedial action can be started or maintenance planned.



Oil gap measurement of the shaft

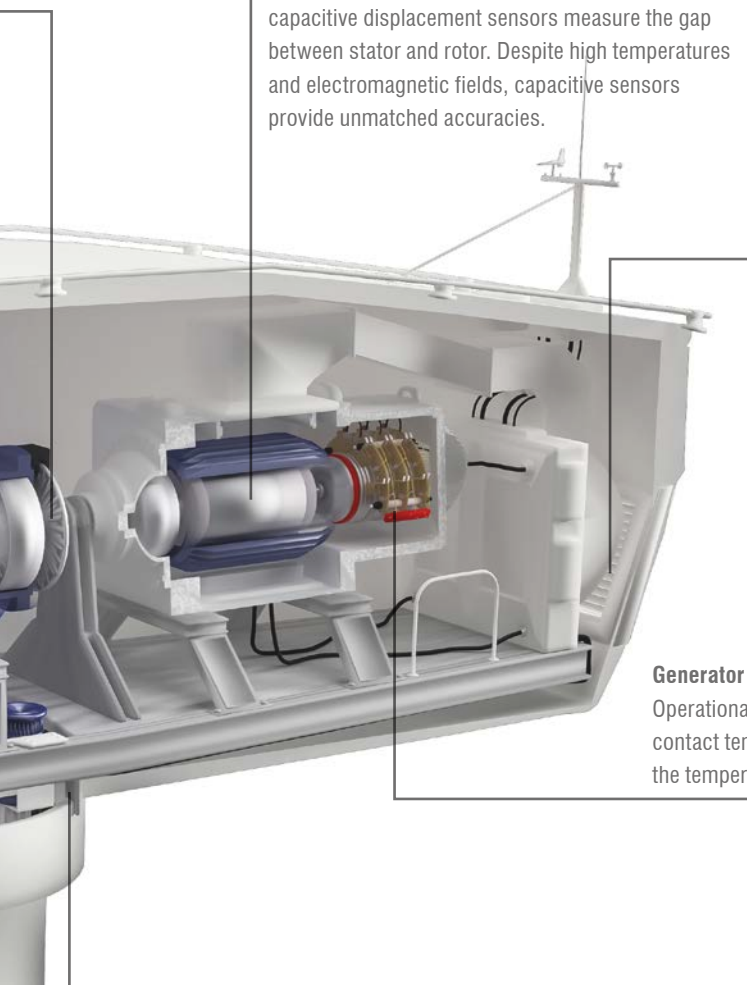
Eddy current displacement sensors measure the oil gap, i.e. the distance that is filled with lubricant between the bearing surface and the shaft. Despite pressure, high temperatures and lubricants, robust eddy current sensors can provide detailed information about the lubricating gap based on high measurement accuracy.





Rotor gap measurement

In order to monitor rotor behavior in the generator, capacitive displacement sensors measure the gap between stator and rotor. Despite high temperatures and electromagnetic fields, capacitive sensors provide unmatched accuracies.



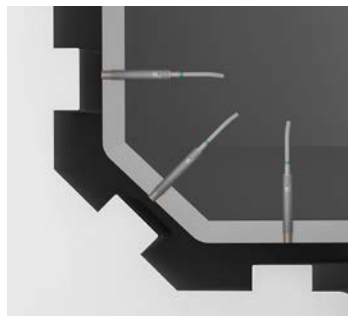
Air flaps

In order to control air supply, the air flaps automatically open and close depending on the temperature. Draw-wire displacement sensors monitor the position of the open air flap.



Generator windings

Operational monitoring includes non-contact temperature sensors that detect the temperature of the generator windings.



Supporting moments of the nacelle

In order to monitor the supporting moments, eddy current displacement sensors measure the distance between the nacelle and the tower, which enables early recognition of any fluctuations.



Rotor stress tests in the test bench

Test rigs have been developed for load tests on wind turbine rotor blades and simulate the real loads caused by high winds and weather. The tip of the rotor blade can be distorted by up to 10m due to mechanical loads.

Draw-wire sensors are used on the test rig for measuring the distortion. Two sensors per traction point measure the deflection and torsion of the rotor blade. The draw-wire sensors operate with measuring ranges between 3m and 10m. The digital signal output is provided for further simulations.

Quality control of rotor blades

Wind turbines rotor blades are semi-shell constructions made of glass-fiber reinforced plastic (GFRP) and other lightweight materials. Following completion, different sensors inspect the rotor blades for defects, damaged areas and inclusions.



Foundation measurements

Laser triangulation sensors measure the distance between the mast and the foundation. High measuring rates enable the sensors to detect any changes reliably. Depending on the number of sensors installed, detailed evaluations about the vibration behavior of the mast can be determined.





eddyNCDT 3001

Compact M12 eddy current sensor with integrated controller

Non-contact displacement and distance measurement with measuring ranges from 2 to 4mm

High bandwidth for dynamic measurements

Temperature resistance for harsh ambient conditions

The alternative to inductive proximity sensors

Ideal for customer-specific designs and OEMs



eddyNCDT 3005

Miniature eddy current measurement system, ideal for integration into plant and machinery

Non-contact displacement and distance measurement with measuring ranges from 1 to 6mm

High accuracy

High bandwidth for dynamic measurements

Pressure-resistant models up to 2000 bar, resistant to oil, dust & dirt

Ideal for high-volume OEM integration



capaNCDT 6110

Compact single-channel system

Non-contact displacement and distance measurement with measuring ranges from 0.05 to 10mm

Submicrometer accuracy

High bandwidth for dynamic measurements

Ideal for long-term measurements

Ideal for customer-specific versions, e.g. IP68



wireSENSOR

Robust draw-wire displacement sensors

Displacement and position measurement with measuring ranges up to 30m

Analog and digital outputs

Flexible measuring wire, ideal for difficult-to-access positions

Compact design for integration into confined spaces



thermoMETER

Infrared pyrometer for non-contact temperature measurement

Temperature ranges from -40 °C to 1600 °C

Ideal for OEMs, also available as two-wire model and high-resolution version

Flexible measuring wire, ideal for difficult-to-access positions

Compact, precise and cost effective



optoNCDT 1420

Compact laser triangulation displacement sensor for high speed, precision measurements

Non-contact displacement measurements with measuring ranges from 10 to 500mm

High accuracy

High measuring rate for dynamic measurements

Compact design and easy installation



MICRO-EPSILON Headquarters
Koenigbacher Str. 15
94496 Ortenburg / Germany
Tel. +49 (0) 8542 / 168-0
Fax +49 (0) 8542 / 168-90
info@micro-epsilon.com
www.micro-epsilon.com