

Greater returns, less risk

BLADEcontrol[®] provides timely warning of damage and icing

Wind energy



Weidmüller 

Take control of your revenue growth

BLADEcontrol® allows you to act instead of react

The rotor blades of a wind power installation are exposed to particularly high stresses. Gusts of wind, storms, icing or lightening can cause minor damage that is not visible from the ground. This kind of damage is often only detected during routine maintenance, by which point the amount of repair work required will have considerably increased. In the worst-case scenario, the wind power installation may need to be shut down for weeks, meaning that no power will be generated. Our BLADEcontrol® monitoring system continually monitors the condition of each individual rotor blade, and detects any minor changes, 24 hours a day, 365 days a year. As a result, problems are identified much earlier than with visual inspections, and prevents the damage from progressing in an uncontrolled manner. The risk of expensive repairs is reduced, and the economic efficiency of the entire installation increases.

The sensitive BLADEcontrol® sensor system detects damage right from its initial stages, meaning that appropriate measures can be introduced in good time, helping to avoid any system downtime. In the event of serious damage, BLADEcontrol® sends a signal to the installation control unit which then stops the installation immediately and can help to prevent the blades from breaking.

In addition to damage to the rotor blades themselves, BLADEcontrol® can also detect aerodynamic imbalances, loose parts in the blade and misalignments of the hubs or pitch. The system therefore makes an additional contribution to the operational reliability of the installation and helps ensure a high energy yield. The BLADEcontrol® monitoring system has been certified by Germanischer Lloyd (now: DNV GL) continuously since 2008, and is a leading product for rotor blades in terms of damage detection and operating experience.



After a lightening strike, for example, there is a high risk that damage may progress unnoticed. You'll always be in safe hands with the continuous rotor blade monitoring by BLADEcontrol®.



Knowing when icing becomes critical

BLADEcontrol[®] allows for automatic restarting

Cold and dark conditions make winter the peak season for power supply requirements. And as the yields from solar and water power decrease, there is more demand for wind energy than ever. With falling temperatures, however, many wind power installations shut down automatically as a result of the ice sensor on the nacelle signaling a risk of icing.

Accurate ice detection

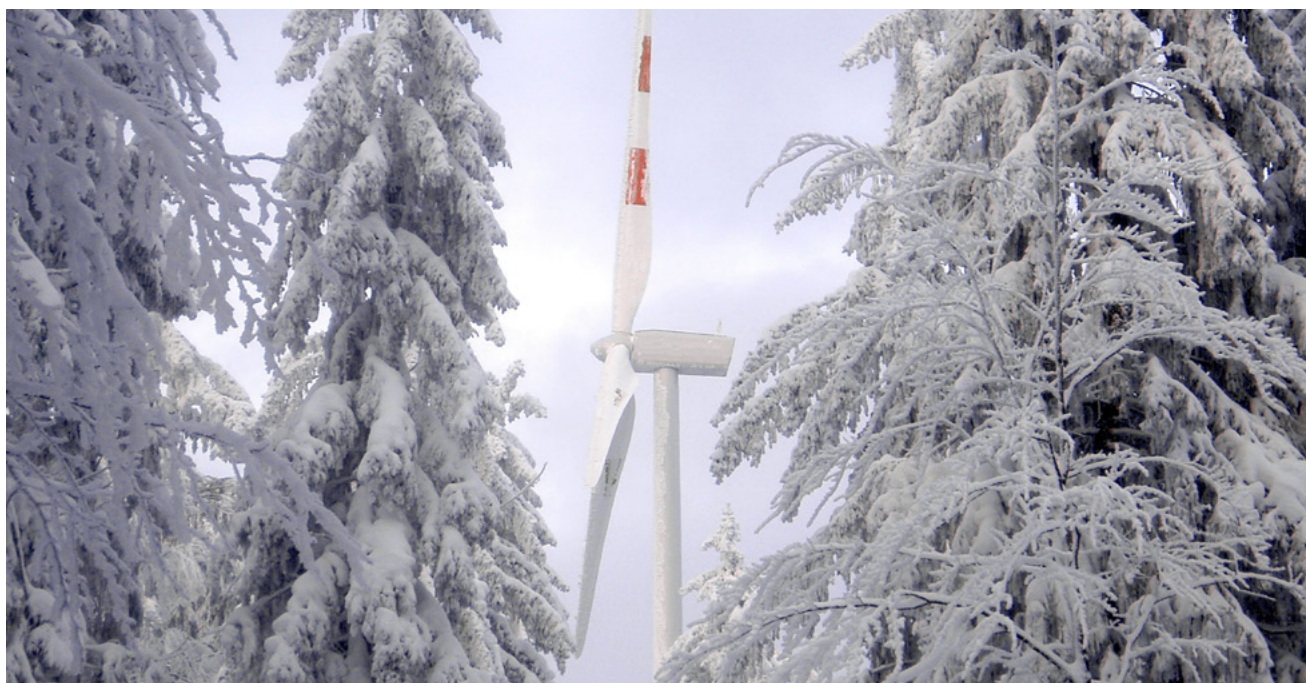
BLADEcontrol[®] measures the level of icing directly on the rotor blades, which move through the frosty air at up to 250 km/h at the blade tips. There are very different icing conditions at the blade tips compared to at the nacelle, where some of the other ice sensors are located. BLADEcontrol[®] ensures particularly accurate detection by taking measurements directly at the site of ice formation, which helps avoid the risk of icing going unnoticed or of installations being taken out of service unnecessarily when they have not actually become iced over.

Automatic restarting

BLADEcontrol[®] detects when rotor blades reach a critical level of icing, and, crucially, can also detect when the risk has passed. As a result, the wind power installation can be restarted automatically at any time, day or night. There is no need for any on-site visual inspections. The automatic restart function is officially recognized and certified by DNV GL.

Effective measuring principle

BLADEcontrol[®] is based on a simple physical principle: The ice build-up changes the natural vibration behaviour of the rotor blade as a result of the additional weight it exerts, which in turn reduces the vibration frequency. Thanks to the highly sensitive sensor system and special evaluation method, the system can achieve a measurement resolution for the thickness of the ice in the millimetre range. Measurements can be taken both during operation and when the installation is at a standstill, meaning that the installation can be checked every time before being starting up to ensure that it is sufficiently free from ice.



Effectively reducing repair and replacement costs

Early damage detection thanks to BLADEcontrol®

Although a visual inspection of the rotor blades can uncover externally visible damage, it may be that the damage actually occurred a long time before the inspection, whereby the defect may have significantly worsened since. With BLADEcontrol®, damage can be detected right from the initial stages.

Detection of even minor changes

BLADEcontrol® measures changes to the natural vibration behaviour of the rotor blade, allowing the system to detect damage inside the rotor blade that is not visible from the outside. This type of detection works reliably in all weather conditions.

Precise measurement and evaluation

Acceleration sensors in each rotor blade allow for maximum measurement accuracy, with a highly sensitive, multi-dimensional and compact system incorporated in a single module. BLADEcontrol® brings the data from the rotor blades together in the hub, and transfers it to the nacelle. An evaluation unit installed in the tower base analyses and documents the data on a continual basis. Damage is detected, classified in relation to its severity, and then forwarded on.

Quick reaction

BLADEcontrol® forwards any critical installation statuses directly to the installation control unit in order to ensure that the installation is switched off in good time. All detected damage is simultaneously transmitted to the Weidmüller Monitoring Centre, where experts evaluate the data and prepare concrete action recommendations for the user.



Simple status checks

Users can find out the installation status online at any time. Intuitive traffic light logic shows the status of each rotor blade: green for normal function, yellow for minor damage and red for serious damage. Additional faults such as blade misalignments or dynamic imbalances are determined by the Weidmüller Monitoring Centre and posted online. This allows for optimal planning of the necessary repair work whilst helping to avoid high follow-up costs.



Make clever investments, increase value creation.

Sustainable revenue increase with BLADEcontrol®

Cost efficiency and high levels of revenue are the most important factors when operating wind power installations. The continual rotor blade monitoring with BLADEcontrol® sustainably increases installation availability and reduces maintenance and repair costs. The costs per installation are comparatively low, meaning that the investment is quick to pay itself off.

Quick amortisation

The experiences of our customers show that BLADEcontrol® pays itself off in just a few years, with both new and old installations. The main reason for this is the increased revenue brought about by higher installation availability during winter months. As the installation ages, however, the risk of rotor blade damage also increases. Having timely damage detection can help to avoid unnecessarily high maintenance and repair costs here, and therefore serves to optimise the efficiency of older installations.

Simple retrofitting

Many manufacturers already offer BLADEcontrol® for new installations on request, but it is also easy to retrofit the system on to older installations. You work out which functions you need, and we'll support you with the planning and carry out the installation and calibration for you, allowing you to increase the efficiency of your installation in line with your specific requirements.

BLADEcontrol® offers a certified solution to meet all requirements:

- Reliable ice detection with automatic restart
- Damage detection with or without a response from the machine control unit
- Damage monitoring and damage tracking with trend analysis by our Monitoring Center

Secure revenue with reduced cost risk

The overall costs of a BLADEcontrol® system only amounts to around ten percent of the cost of replacing a single rotor blade in the 45-metre class. In other words, if just one blade replacement can be avoided over 20 years in a wind park with ten installations, then the purchase will have already paid off.



BLADEcontrol®
CONDITION MONITORING SYSTEM

The benefits of BLADEcontrol® for you

- Timely icing detection
- Automatic restart
- Damage prevention
- Reduced repair costs
- Increased power generation
- Improved economic efficiency

Weidmüller – Your partner in Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.

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