



Lightning Key Data System (LKDS®)

AVOID UNNECESSARY AND EXPENSIVE INSPECTIONS AND DOWNTIME



The right and accurate data on lightning strikes is the key to proper operation and maintenance of wind turbines.

The Lightning Key Data System (LKDS®) is a unique wind turbine lightning measurement system developed by our experts at Polytech. The system measures and records lightning events and calculates the four key parameters from a lightning strike in your wind turbine. Due to the individual impact of lightning on the exposed structure, the system provides you important, useful, and valuable information.

Knowing the exact time, peak current, charge, specific energy, and rise time, you will get a unique and accurate insight to make immediate and right decisions on whether the turbine can continue to operate safely or must be stopped immediately for inspection. You can therefore plan your service more efficiently and avoid stopping the turbine for no reason.

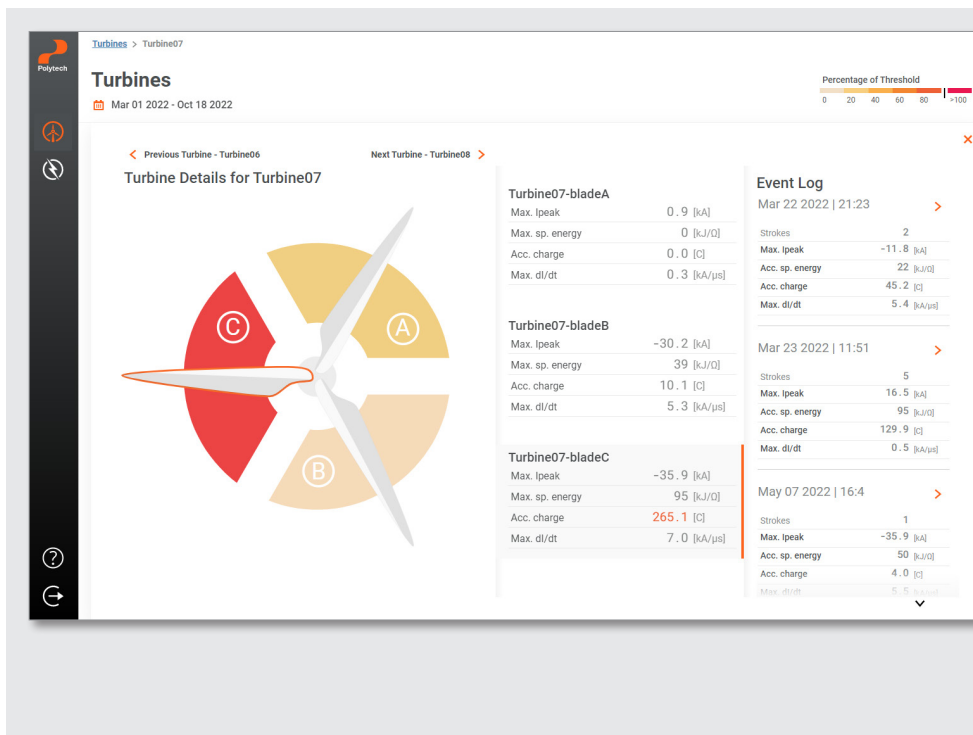
With LKDS®, you also avoid overlooking emerging and incipient vulnerabilities on the blade or electronics, which may have fatal consequences for the turbine if not taken care of in time.

The complete picture right away

LKDS® records the lightning strike in a time frame of 1.5s on each of the three channels. This ensures a measurement of the entire lightning incidence and an accurate calculation of the four key parameters. Due to the system architecture, LKDS® can measure four consecutive 1.5s events on each channel, enabling recordings even in severe thunderstorms with fast and multiple strikes.

SUMMARY OF LKDS® ADVANTAGES

- Designed for wind turbines
- Captures the full lightning event in real time
- Calculates the four key parameters
- Online and cyber secure communication
- Redundant data storage and power supply
- Integrates easily into SCADA and turbine control systems
- Easy to install and robust design
- Multiple communication and interface options
- Enables improved blade service and maintenance strategy



The four key parameters

1. Peak current [kA]

The maximum value of the lightning current measured in kA. The peak current indicates the dynamic force, which can tear things apart.

2. Specific energy [MJ/O]

A time integral of the square of the lightning current, identifying potential heating of inadequate connection components. The specific energy is a key parameter when conducting lightning tests.

3. Charge content [C]

The time integral of the current, also conducted for the full waveform. Charge creates wear on attachment points – and in any transfer systems, bearing components etc.

4. Maximum rise time [kA/μs]

Rise time indicates how quickly the lightning current rises from zero to peak level. Valuable knowledge to define the frequency content.

A lightning strike is powerful and complex. By installing the Lightning Key Data System in your wind turbine, you can capture the characteristics of the lightning strike by processing the lightning current waveform into four key parameters. The system provides you with instant access to accurate data on each parameter.

The LKDS® can store up to 1,000 events on the expandable onboard flash memory. You can access these data recordings either as the four key parameters or in the full recording resolution using ethernet communication. So you will know exactly what is going on.

Installing Lightning Key Data System

LKDS® is typically installed with a sensor in each blade, while the central processing unit is located in the wind turbine hub. We adapt the complete LKDS® to your specific wind turbine, including drawings, instructions, physical brackets, and cable trays. Once the system is installed and configured, it will provide valid lightning measurements.

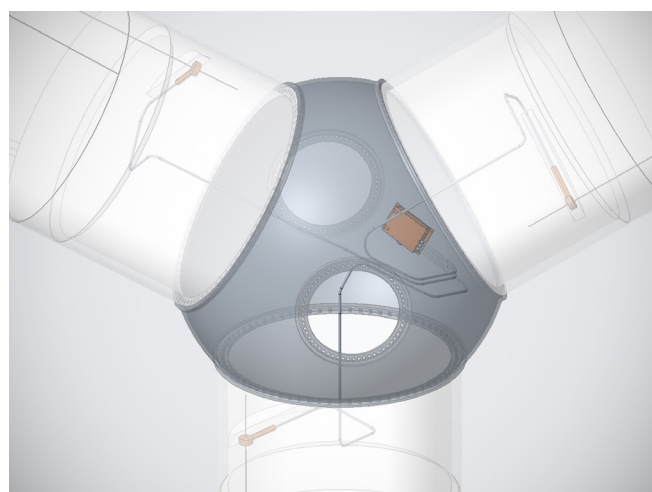
Designed specifically for wind turbines

LKDS® can withstand the most severe wind turbine operating conditions in terms of temperature variations, humidity, vibrations, and EMI during lightning exposure.

LKDS® has been tested extensively in EMC, climate chambers, and mechanical test rigs, and has also been exposed to numerous lightning strike impacts at an accredited testing facility. With thousands of systems installed and validated in the field, LKDS® has a

proven field performance above 99.9%. It is a robust and reliable product suitable for the harsh onshore and offshore operating conditions.

Choose LKDS® to ensure a robust system, certified by DNV and compliant to Class 1 of the future IEC 61400-24 Ed2 Annex L.



The Lightning Key Data System is integrated in the wind turbine hub and blade area and is designed to withstand harsh environments. One sensor in each blade gives momentary measurements of the lightning behavior during a strike.