



Inspection brochure

ENERTRAG OPERATION

With us, your systems will remain efficient in the future.

Inspections and Checks

We are passionate about the optimal performance of your systems

We are the technical experts for inspections of renewable energy systems. With over 4,000 inspections a year as an inspection body, in the field of safety technology or as part of operational management, we always have our finger on the pulse for our customers. In our state-of-the-art control rooms in Germany and France, we monitor over 1,200 systems in real time. We rely on effective plant management to ensure efficient operations management.

First-class quality through accreditation according to DIN EN ISO 17020

The technical services team consists of 30 employees who work throughout Germany and beyond. The experts specialize in different areas of testing: Machine inspections, gearbox and rotor blade inspections, vibration measurements and also DGUV-V3 checks are all part of the range of services. Only with technical expertise can we carry out our tasks, inspections of energy systems, properly. This enables us to ensure a consistently high level of quality in our work and ensure that our customers are satisfied. You can rely on our expertise, which is underlined by the accreditation of various test procedures in accordance with DIN EN ISO 17020. This recognition guarantees you a high level of quality and reliability. Our inspections are carried out by highly qualified specialists and are based on accredited procedures and established processes that are recognized by the authorities and insurance companies.



Matthes Schachtner, Head of Technical Services ENERTRAG Operation



INSPECTIONS

IN COOPERATION WITH:



SERVICES

- > INSPECTIONS
- > CHECKS

DRONE INSPECTION

IN COOPERATION WITH:



Accredited
DIN EN ISO 17020

6

Locations



DAUERTHAL
BERLIN
EDEMISSEN
HAMBURG
DURY (F)
NEUVILLE (F)



4.150

INSPECTIONS PER
YEAR

>120

EMPLOYEES



Certified
DIN EN ISO
9001:2015

FUTURE TOPICS

POWER-TO-X,
BATTERY,
CONTINUED OPERATION
CONCEPTS



2,7 GW
MONITORED
PLANTS



Inspections and Checks

Customer benefits	Our own specialist staff	With many years of experience in control systems thanks to manufacturer training for all common system types. Thanks to systematic further training, we are also able to carry out any necessary switching operations so that you have no further coordination work.
	Accreditation	Since 2015, our inspection body has been working on various inspections in accordance with accredited procedures. This gives you the security of working with qualified experts. In this way you also fulfill your selection responsibility.
	Certification	We continuously optimize our processes, and our ISO certification underlines this.
	Many years of experience	Benefit from our more than 30 years of experience as an operator and inspection body, in which we have already looked after a large number of wind turbine types.
	Decentral locations	Our teams work at many locations in Germany and beyond.



MANY YEARS OF EXPERTISE IN PHOTOVOLTAICS AND WIND

Bavinck Wind Technik

Damage reports on wind turbines

- > Independent expert in the field of wind turbines
- > Specialized in the assessment of wind turbines as well as consulting and support for operators
- > Certified expert DIN EN ISO/IEC 17024
- > TÜV NORD certified DIN EN ISO 9712:2012



ANALYTICAL PART OF THE CONTIN. OPERATION REPORTS

UL Solutions

Cooperation partner for continued operation reports (analytics)

- > Accredited according to ISO IEC 17065
- > In the expert Advisory Board of the German BWE
- > LTE certifications according to ANSI UL 4143 issued



ROTOR BLADE INSPECTION AND LPS CHECK BY DRONE

Sulzer Schmid Laboratories AG

Cooperation partner for the development of drone services

- > Founded in 2016 in Zurich, Switzerland
- > Focus on innovations in the energy services sector
- > Developer of the 3DX™ Blade Platform for transparent asset management for wind turbine rotor blades



Range of services

- Periodic inspection of wind turbines
- Inspection for condition-based maintenance of wind turbines
- Safety inspections
- Rotor blade inspection
- Inspection after commissioning
- Inspection before expiry of the warranty period of a generation unit
- Offline vibration measurement
- Gearbox inspection
- Lubricant inspection
- Inspection for continued operation 20+ of wind turbines, practical and analytical part
- DGUV-V3 check (low and medium voltage, protective device testing)
- Inspection of the renewable energy system for traffic safety obligation
- Preparation of risk assessments
- Review of deviations (damage assessment)
- Technical due diligence in cooperation with UL Solutions

Is your solar park due for an inspection? Talk to us. Together we will find the optimum solution for you.



Drone inspection and lightning protection measurement

Cutting-edge technology by drone

When working on your wind turbines, we use state-of-the-art technology and combine rotor blade inspection with lightning protection measurement in an efficient 2-in-1 process - for shorter downtimes, an optimized yield and to remain capable of handling ever larger turbines for you.

But that's not all - since spring 2024, we have also been offering drone-based tower inspections. Get a high-resolution photo of every square centimeter.

And don't forget your wallet: with our new inspection solutions, you can ensure that your wind turbine keeps moving.

Every minute your turbine spins means a contribution to your financial success.

So don't wait any longer - discover the future with ENERTRAG Operation!

Your advantages at a glance

smart

→ Greater efficiency during inspections: Machine and rotor blade inspections are carried out by just one team in one visit. This results in less scheduling coordination and reduced downtime and costs

→ High-resolution imaging and a wide detection field ensure a higher detection rate for faults

→ Realistic lightning protection testing: Enertrag Operation is innovative in that it measures the field strength of an induced 6000V current instead of the conventional resistance test. Micro-breaks are thus bridged - just like in a real lightning strike. In case of doubt, this can save time-consuming and expensive repair work. In the event of major damage, the point of interruption is identified directly

comparable

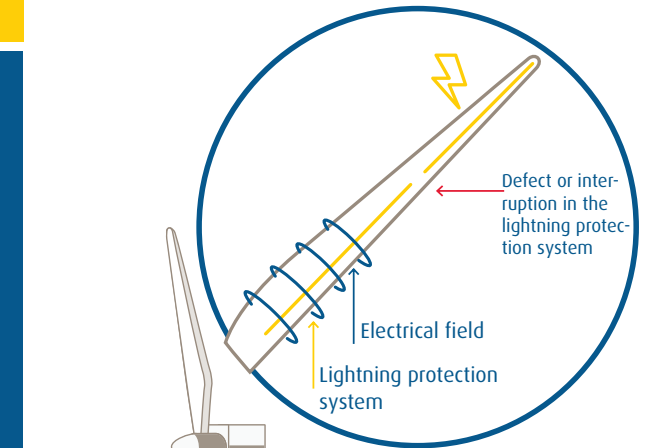
→ TÜV NORD-tested measurement method for lightning protection testing that meets the normative requirements of operators and insurers

→ Smart symbiosis of inspectors and special drone thanks to years of experience in assessing defects and classifying inspection data

realistic

→ More weather-resistant and therefore more predictable: drones can fly at up to 10 m/s and even in very cold temperatures.

Drone with sensor



1 Voltage generator generates an electric field in the lightning conductor.

Drone with sensor measures the field strength at the tip of the rotor blade. If the signal is sufficiently strong, the lightning protection works.

2 Error detection
Signal disrupted? In the event of damage, the drone recognizes the exact position of the interruption during the flight.

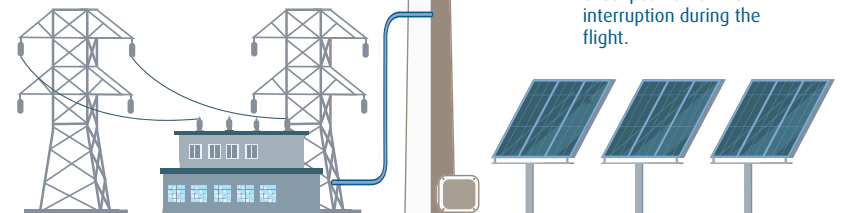
In cooperation with **SULZER SCHMID**

Learn more about the innovative technology of our partner Sulzer Schmid at: www.sulzerschmid.ch

YouTube Video
drone inspection



Approved by the
TÜV NORD



Safety checks

Safety comes first - especially in wind turbines! Annual safety inspections of selected components are therefore essential. Rely on prevention: our dedicated teams not only take care of the prescribed inspections, but also offer comprehensive safety solutions.

From crane inspections and lift inspections to inspections of fixed ladders and the replacement of fire extinguishers - we are your reliable partner for the highest safety standards. Our safety inspections ensure maximum occupational safety for your personnel working on wind turbines. The decisive factor is whether the climbing protection system is still intact or the fire extinguisher is still functional - because this can save lives in an emergency.

Regular safety checks also make economic sense: if, for example, it is not possible to climb the fixed ladders because they have not been checked, necessary inspections or repairs can be delayed, which can lead to loss of earnings.

And the team is well prepared for anything: With an extensive stock of spare parts, they can carry out minor repairs quickly and easily. In addition, larger components are now kept in a central warehouse. This means that repairs can be carried out even more efficiently. As always, prevention pays off: Trust the experienced team at ENERTRAG Operation for any necessary safety checks.

Scope of services

Annual safety check

Climbing ladder, climbing protection, crane systems, first-aid kits, rescue equipment, PPE, fire extinguishers, service lift (if applicable)

ZÜS inspection service lift

Mandatory annual inspections of the service lifts by an approved inspection body (ZÜS). For example: Main/intermediate/possible follow-up inspections, inspections after modifications requiring inspection (e.g. modifications to the lift/winch/catching devices)

Repairs

Any necessary minor repairs to defects identified during the inspection can be carried out directly



YouTube Video
Safety checks



Our three key customer benefits for you

1. Optimized inspection and route planning thanks to the latest drone technology

Previously, there were experts for carrying out machine inspections and experts for rotor blade inspections using rope access technology. This means two journeys to and from the site, two departures, up to four overnight stays and the working time of four employees.

In future, the machine inspectors will only stay at the park a little longer than they do now and will carry out an internal blade inspection during the machine inspection, connect the high-voltage generator in the nacelle for the lightning protection inspection and have the drone automatically fly over the rotor blades. The assessment of defects or deviations on the rotor blade can still be carried out by a specialist - but now bundled from the office.

In addition, a large part of the software analysis options are also available during a drone inspection thanks to the 3DX™ Blade Platform from Swiss cooperation partner Sulzer Schmid Laboratories. For example, with every report you receive access to the complete photo documentation of your rotor blades with a click of a browser. This allows you to view your entire rotor blade yourself, with infinite zoom capability. (Further information at www.sulzerschmid.ch)

The damage progression function compares the progress of existing damage between two inspections. Has a crack increased in size? We can determine this to within a few millimeters.

2. Faster, more straightforward processes with the Powersystem inspection app for machine inspections

Benefit from the symbiosis of the inspection services of ENERTRAG Operation and the inspection app in the Powersystem: Once an inspection has been completed at the wind farm, the final report can be opened in the office with a single click and any deviations and/or defects identified can be evaluated. After the assessment, the report is finalized. The processing of deviations and/or defects is tracked digitally in the operations management software.

3. Fewer duplicate inspections thanks to comparable inspection processes

Our standardized and therefore comparable inspection processes allow the results of one inspection to be used for other inspections. This saves time and money. What's more, a wide variety of inspections require the rotor blades of your wind turbines to be inspected. In order to avoid additional work, we accept any existing current inspection reports from other service providers and incorporate the results into our overall report.

This means for our customers: Reduced operating times can be passed on in the prices for inspections and the downtime of the wind turbines to be inspected is reduced enormously, which means a higher feed-in tariff.



Locations

of ENERTRAG Operation

● Dauerthal
Gut Dauerthal
17291 Dauerthal

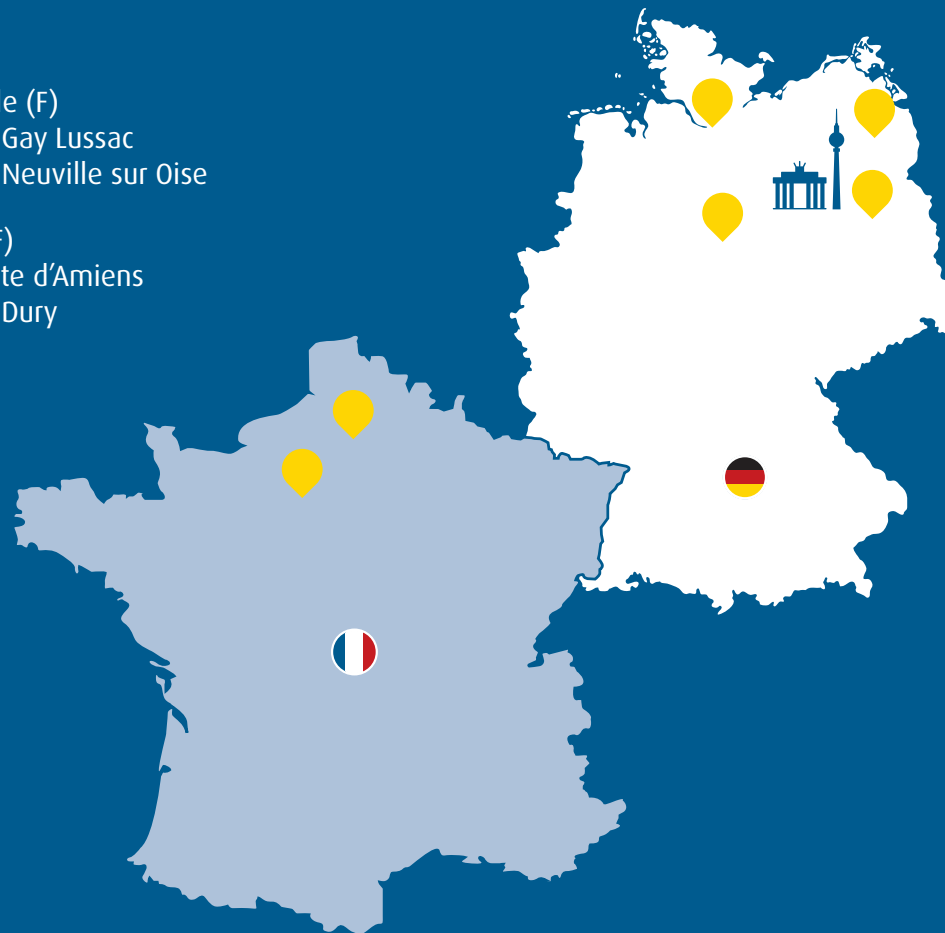
● Berlin
Friedrichstraße 152
10117 Berlin

● Edemissen
Eddesser Straße 8
31234 Edemissen

● Hamburg
Trostbrücke 1
20457 Hamburg

● Neuville (F)
9 mail Gay Lussac
95000 Neuville sur Oise

● Dury (F)
26 Route d'Amiens
80480 Dury



We reliably take care of your energy systems throughout Germany and beyond - including in France, Poland and, after consultation, in other countries too.

Contact

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ENERTRAG Betrieb GmbH is a type C inspection body accredited by the German Accreditation Body (DAKKS) in accordance with international standard DIN EN ISO/IEC 17020 for the scope specified in the certificate with the number D-IS-18273-01-00.



Certification of the quality management system according to DIN ISO 9001:2015