



# 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 and tests on renewable energy systems. With over 4,800 inspections a year as an inspection body, in the field of safety technology or as part of technical operations management, we are always on duty 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 are deployed throughout Germany and beyond its borders. The experts specialize in various inspection areas: Machine inspections, gearbox and rotor blade inspections, vibration measurements and also DGUV-V3 inspections are all part of the range of services. In-depth system knowledge and well-established processes and test procedures help us to carry out several thousand orders per year properly and efficiently.

Trust is good, control is better: We underline our quality standards through the accreditation of various test procedures in accordance with DIN EN ISO 17020. This award guarantees you 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)



4.800

INSPECTIONS PER  
YEAR

>120

EMPLOYEES



Certified  
DIN EN ISO  
9001:2015

### With focus on

POWER-TO-X,  
STORAGE SOLUTIONS  
CONTINUED OPERATION  
CONCEPTS



2,7 GW  
MONITORED  
PLANTS



# Inspections and checks

Kundenvorteile

Our own specialist staff	We offer many years of control experience through 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 do not have any further coordination work.
Accreditation	Since 2015, our inspection body has been working according to accredited procedures for the majority of inspections. This gives you the assurance that you are fulfilling your selection responsibility.
Certification	We are constantly optimizing our processes, which is impressively underlined by our ISO certification.
Years of experience	Benefit from more than 30 years of experience as an operator and inspection body. Thanks to this experience, we know a large number of system types very well.
Location promise	Our teams work at many locations in Germany and France.



ANALYTICAL PART OF THE CONTIN.  
OPERATION REPORT

## UL Solutions

Analytical part of the contin. operation reports

- > Accredited according to ISO IEC 17065
- > In the expert Advisory Board of 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



# We offer

- 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 this year, 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.

## Your advantages at a glance

smart

- Higher 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.

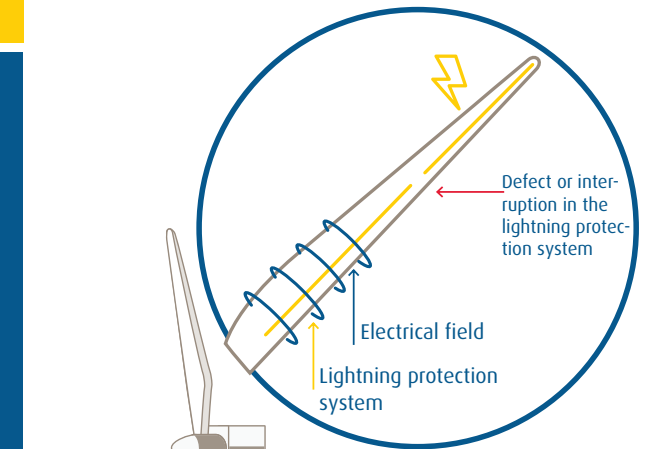
comparable

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

realistic

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

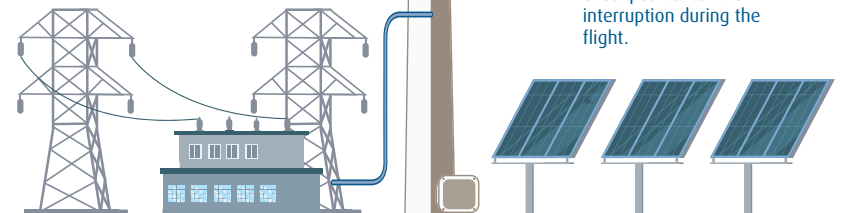
In cooperation with **SULZER SCHMID**

Learn more about the innovative technology of our partner Sulzer Schmid at: [www.sulzerschmid.ch](http://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: we not only take care of the prescribed inspections, but also offer comprehensive safety solutions.

From crane inspections and lift inspections to inspections of vertical ladders and the replacement of fire extinguishers - we are your partner for the highest safety standards. 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.

With an extensive stock of spare parts, we can carry out minor repairs quickly and easily. In addition, larger components are now stored in a central warehouse. This means that repairs can be carried out even more efficiently.

## 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

In the past, there were experts for carrying out machine inspections and experts for rotor blade inspections using rope access technology. This meant a great deal of coordination effort in terms of deployment planning.

In future, the machine inspectors will only remain at the park for a little longer 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 rotor blades flown over automatically using a special drone. The assessment of defects or deviations on the rotor blade can then 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, each report gives you access to the complete photo documentation of your rotor blades with a click of a browser. This allows you to view the entire rotor blade yourself, with infinite zoom capability. (Further information at [www.sulzerschmid.ch](http://www.sulzerschmid.ch))

The damage progression function compares the progress of existing damage between two inspections. If a crack has increased in size, for example, this can be determined to within a few millimeters.

## 2. faster processes with the Powersystem inspection app for machine inspections

Benefit from the symbiosis of ENERTRAG Operation inspection services 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 or defects identified can be assessed. After the assessment, the report is sent to the customer. The processing of the deviations or defects is tracked digitally in the operations management software.

## 3. fewer duplicate inspections thanks to comparable inspection processes

Our standardized 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 turbine to be inspected. To avoid additional work, we accept current inspection reports from other service providers and incorporate the results into our overall report.



# Our locations

● Dauerthal  
Gut Dauerthal  
17291 Dauerthal

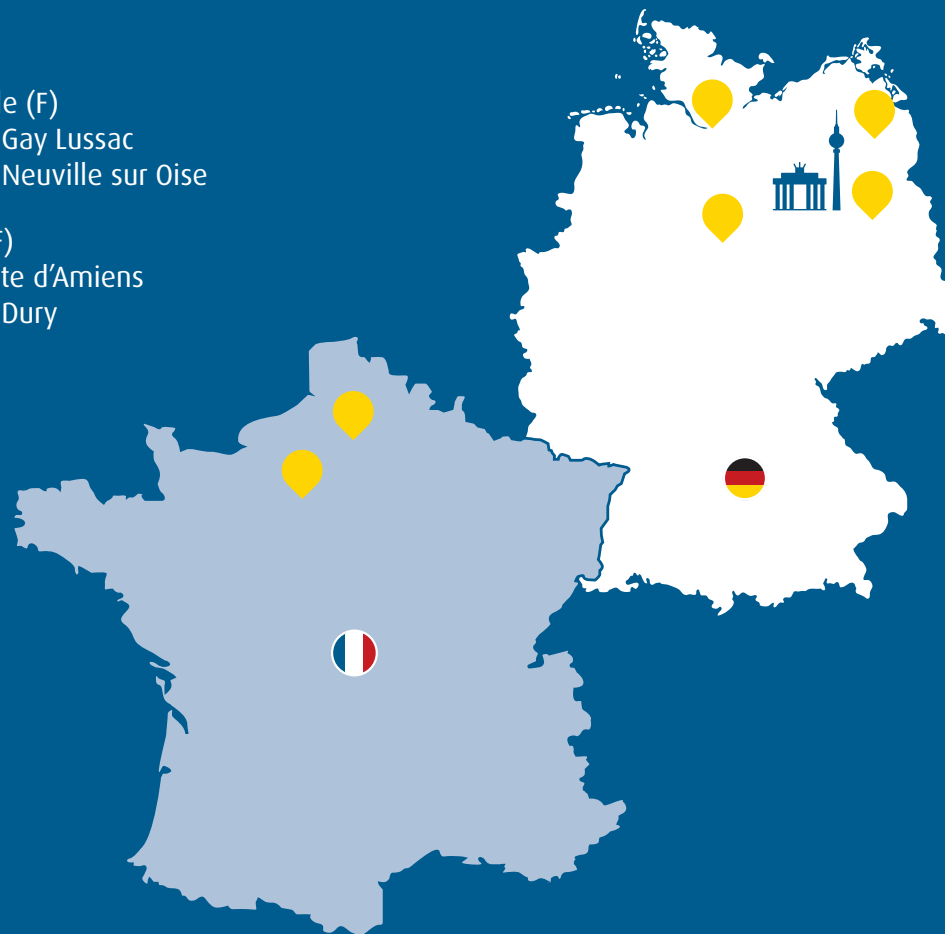
● Neuville (F)  
9 mail Gay Lussac  
95000 Neuville sur Oise

● Berlin  
Friedrichstraße 152  
10117 Berlin

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

● Edemissen  
Eddesser Straße 8  
31234 Edemissen

● Hamburg  
Trostbrücke 1  
20457 Hamburg



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.com/betrieb](http://enertrag.com/betrieb)



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