TRANSFORMER, GRID AND POWER PLANT MONITORING REVISITED

EFFICIENTLY LINK, MONITOR AND CONTROL YOUR UTILITY WITH OUR EZY DEVICES, SERVICES AND SOLUTIONS - AT A REMARKABLE ACCURACY LEVEL

By Dr. **Bernhard Fruth** with contributions from: **Thomas Finstermann** and **Javis Chiu**

The implementation of a risk-oriented maintenance strategy based on measured data requires a high degree of plant-specific knowledge and highly developed sensor technology, sophisticated data processing, and information mining. Using suitable monitoring techniques allows operators to determine and know the condition of the plants, machines, and components at all times.

Risk Identification – Risk Elimination – Reliability Increase

If you want to avoid unplanned downtimes, it is imperative to forecast possible remaining running times until you will need to carry out a maintenance action. With the right technology, it is possible to plan future investments in detail, hire an expert (if necessary) and execute maintenance during planned operational downtime.

Machine Learning and Artificial Intelligence

We tackle the abundance of time-synchronized, real-time data of various origins with AI and Machine Learning tools. Our curiosity drives us to pioneer solutions. With a passion for sophisticated products, we create pioneer solutions to power the world, effortlessly and dependably.

Our mission is to make our customers' decisions easy and reliable. We synchronise big data in order to simplify our customers' decision-making and ensure reliability.

Synchronisation of data across systems provides a unique and unified evaluation of raw data. Our pioneering products offer our customers all the information necessary to integrate previously incompatible data and enable more economical processes.

International experts have come together to develop a unique solution to monitor and control your utility. The newly established EZY Family is fusing knowledge, experience and products to give customers a competitive industry advantage. By drawing on our individuality, we enable our customers to tap into the unused potential of their investment data.

Experience Counts

Our EZY family monitors over 15,000 objects, seamlessly 3,500 monitoring systems report seamlessly to our server and we monitor and control more than 400 gas turbines.

PDS
Power Diagnostic Service

> The use of diagnostically supported maintenance requires reliable condition monitoring systems, reliable diagnostic results and extensive experience in determining the relationship between the measurement result and the condition of the component.

WITH A PASSION FOR SOPHISTICATED PRODUCTS, WE CREATE PIONEER SOLUTIONS TO POWER THE WORLD, EFFORTLESSLY AND DEPENDABLY.

GO BEYOND

You need an individual power plant solution information system which provides a unique state-of-the-art to the split second 'big picture' to efficiently monitor and control your utility.

- EZY Family devices conduct measurements that enable full data sharing between devices.
- This helps you to recognize correlations of events and signals based on fully automated assessments.
- EZY Family devices offer a unique analytical accuracy level with joint view and optimal evaluation capabilities.

Imagine having a network of devices, collecting and analyzing a full spectrum of information.

- With our 'Plug & Work' application, we aim to make connectivity easy – simply plug in your device without any setup requirements.
- The EZY devices provide a unique, state-of-the-art snapshot of your working environment – on one single screen.
- The high-level security of all EZY Family devices provides the efficiency and safety that every utility needs to push beyond the limit.
- Extensively tested embedded software/systems
- Robust and fault-tolerant product design
- Full integration into TMOS SCADA system over Ethernet
- User-friendly operator interface with individualized charts
- Accurate device-specific as well as customized limits
- Event-based audiovisual alarms
- Fully customizable long term data logging
- Customized control sequence
- Remote monitoring and configuration possible

It is necessary to have global expertise and human resources within the company to monitor a power plant 24/7 efficiently. If this is not achievable for your company, we offer comprehensive remote monitoring at numerous locations in highly specialized diagnose centres worldwide.

Dr. **Bernhard Fruth** is currently CEO of Power Diagnostic Service Switzerland and R&D Manager of the EZY Monitoring group. He obtained his PhD in 1986 from University of Technology in Aachen and worked in ABB Corporate Research in Switzerland where he designed the first commercial PRPDA 1988 for discharge pattern acquisition. He was one of the co-founders of Power Diagnostix in Aachen, and PDTECH in Switzerland, where he pioneered a line of monitoring devices. He authored more than 60 papers on PD Physics and monitoring.

Photo: Shutterstock, SDA

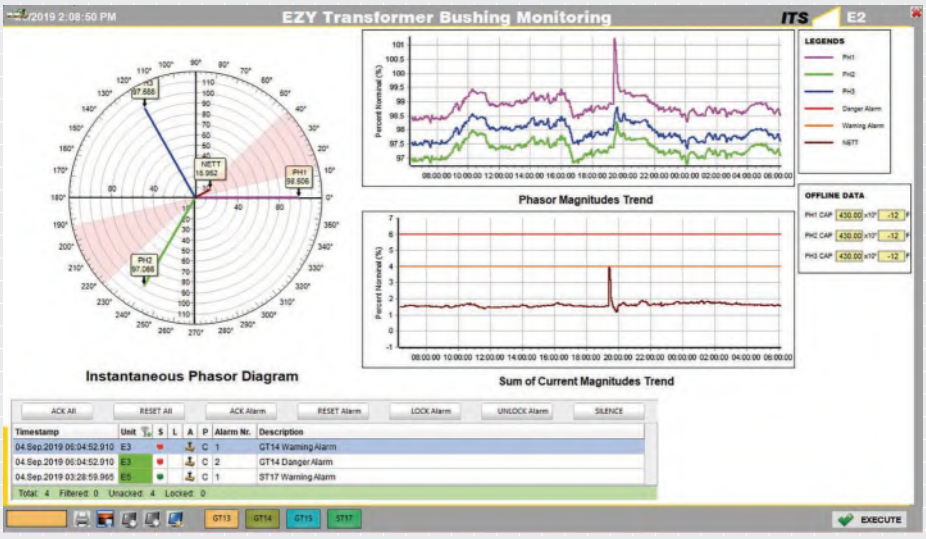
Here industry experts, with many years of experience, accurately monitor your utility around the clock. Benefit from extensive know-how and unique diagnostic tools that compile a detailed report with recommendations. Highly specific diagnoses, industry innovations as well as statistic data are considered in the reporting.

"The customer is always in full control of their data."

It is possible to send the data manually or allow the expert remote access to specific data areas.

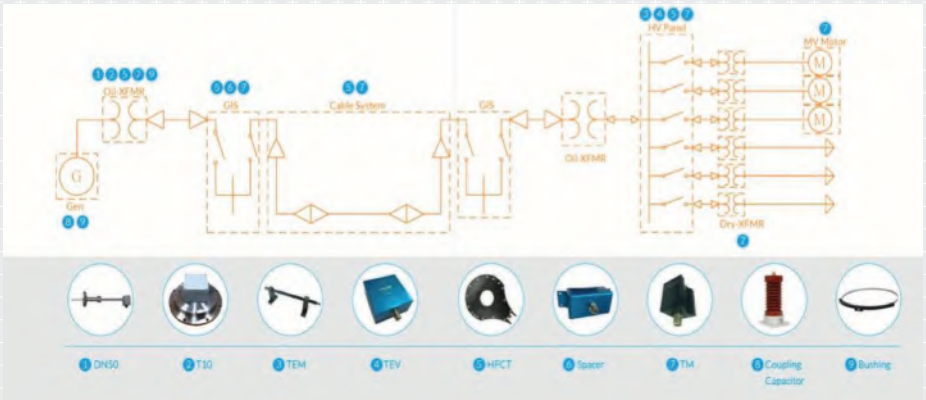
The Bushing and Transformer Monitor

The bushing of a transformer is a key source of trouble. EZY bushing monitoring allows measuring the dielectric properties of a bushing using real-time phasor diagrams to calculate capacitance and tan delta imbalance.

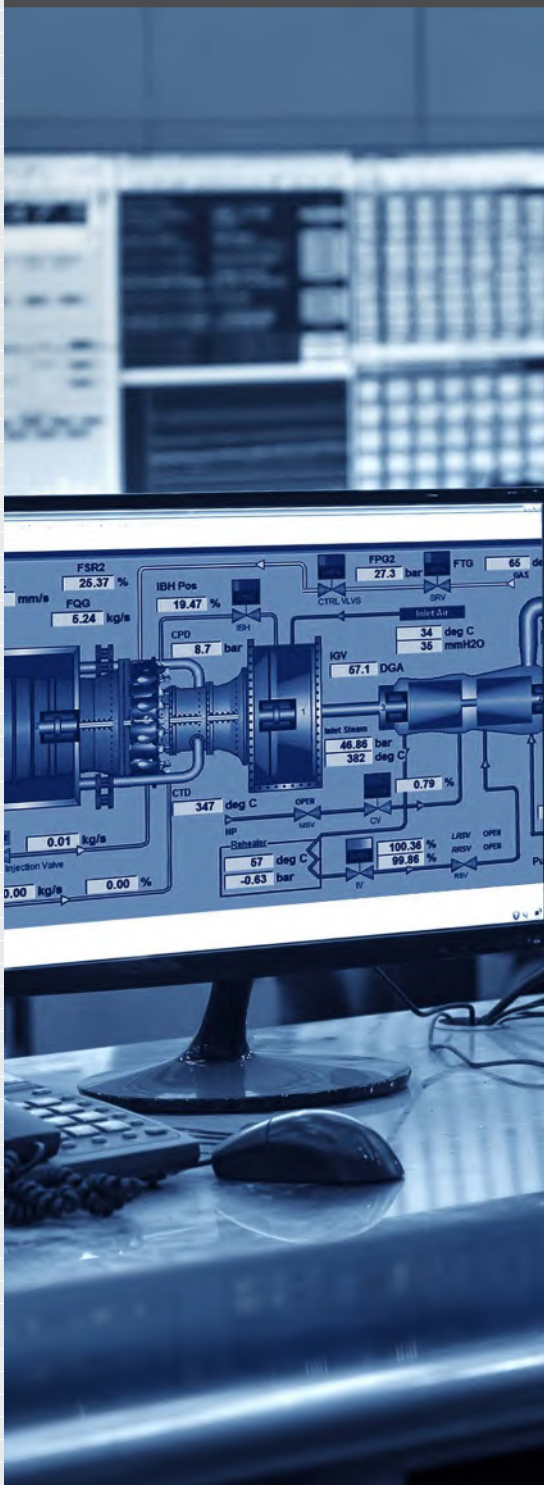


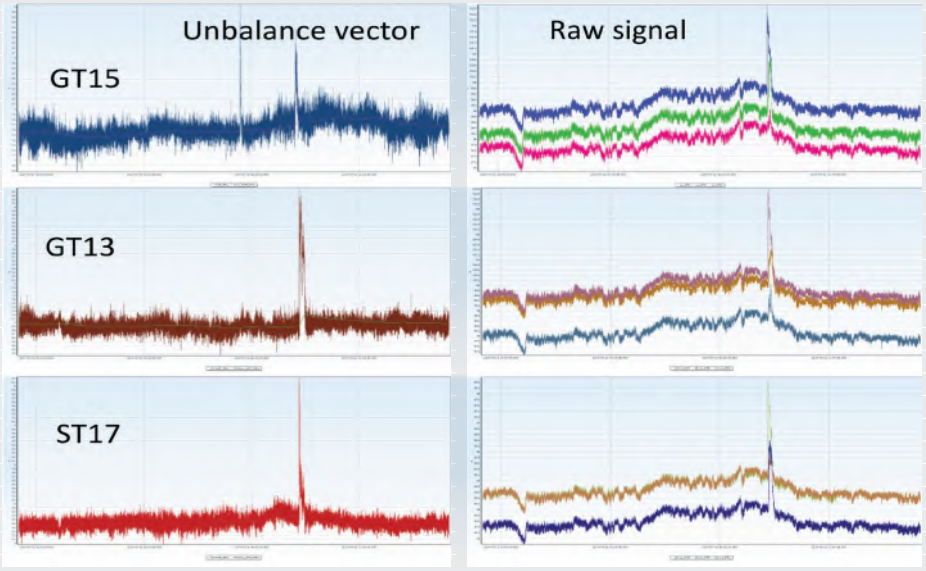
Phasor Diagram shows the instantaneous currents of each phase and the summed currents in angular domain. Note: The NETT (sum of current) vector shown is post-multiplied 10 times for visual amplification purposes.
Phasor Magnitudes Trend shows the magnitude trends of the current of each phase over the last hour.
Sum of Current Magnitude Trend shows the magnitude trend of the unbalanced current, and the alarm thresholds.
Alarm Table shows active and inactive alarms and allows user to act on them. Button functions are shown in the picture below.
Offline Data shows the initial bushing capacitances of each phase and allows user to adjust after offline test.

Combine this with UHF Partial Discharge Monitoring using our non-intrusve sensor design and you see the insulation state of the complete high voltage network.



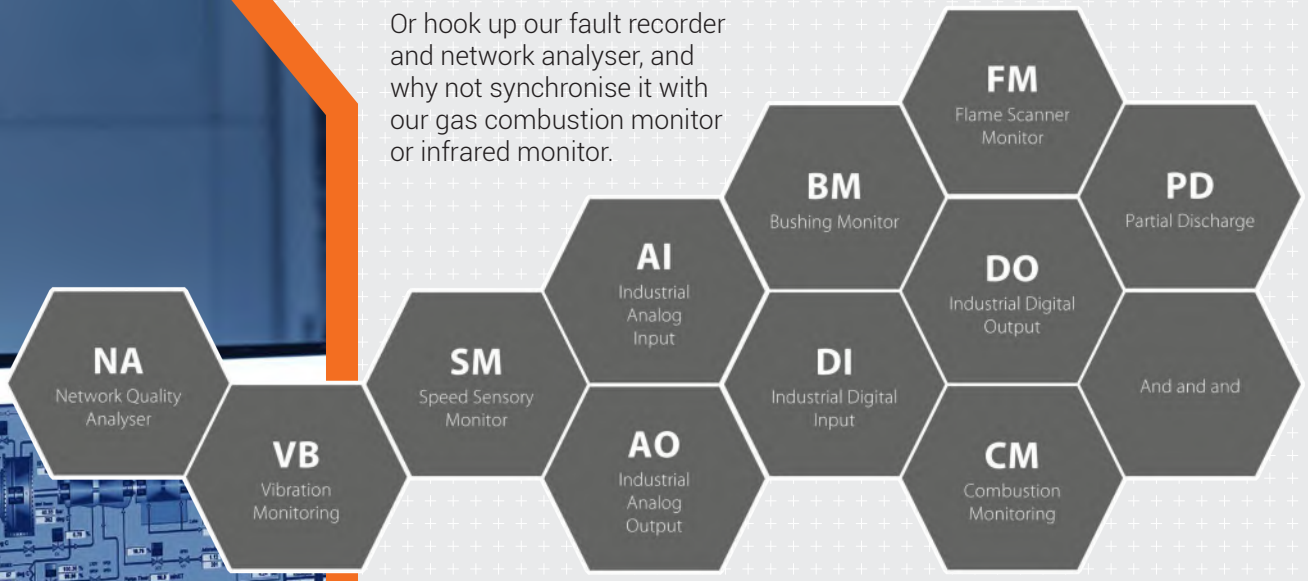
IT IS NECESSARY TO HAVE GLOBAL EXPERTISE AND HUMAN RESOURCES WITHIN THE COMPANY TO MONITOR A POWER PLANT 24/7 EFFICIENTLY. IF THIS IS NOT ACHIEVABLE FOR YOUR COMPANY, WE OFFER COMPREHENSIVE REMOTE MONITORING AT NUMEROUS LOCATIONS IN HIGHLY SPECIALIZED DIAGNOSTIC CENTRES WORLDWIDE.





Unbalance vector and current raw signal in each phase in three different power transformers in a powerplant with two gas turbines and one steam turbine.

Or hook up our fault recorder and network analyser, and why not synchronise it with our gas combustion monitor or infrared monitor.



Everything is synchronised in real-time seamlessly and our artificial intelligence and machine learning algorithms keep it together, including third party devices – the possibilities are endless.

All at a glance...