







# PD Doctor

## UNIQUE TOOL FOR ONLINE PARTIAL DISCHARGES MEASURING

-  INCREASING SAFETY AND RELIABILITY OF POWER SUPPLY
-  EXPLOITING ELECTRICAL ASSETS TO THE MAX, BY ASSESSING THEIR CONDITION IN REAL TIME
-  IMPROVING MAINTENANCE AND RENEWAL STRATEGIES, AND REDUCING OPERATIONAL AND INVESTMENT COSTS
-  SUPPORTING REDUCTION CO2 EMISSIONS



## DISCOVER PD DOCTOR

### POWERFUL AND RELIABLE TOOL FOR ONLINE PARTIAL DISCHARGES MONITORING

The world of energy has changed. **Safety, reliability, cost reduction, condition asset management, and carbon dioxide reduction** are the key goals for future innovation in the energy sector.

It's time for a real change.

**Online diagnostics** based on partial discharge measurement can help **avoid failures, fires, and service interruptions**.

It's time to **exploit electric assets to the max**, by assessing their condition in real time.

This attitude leads to significant **improvement in maintenance and renewal strategies**, and brings **savings in operational and investment costs**.





## PD DOCTOR FROM MODEMTEC

### LEADER IN PARTIAL DISCHARGE MEASUREMENT TECHNOLOGY

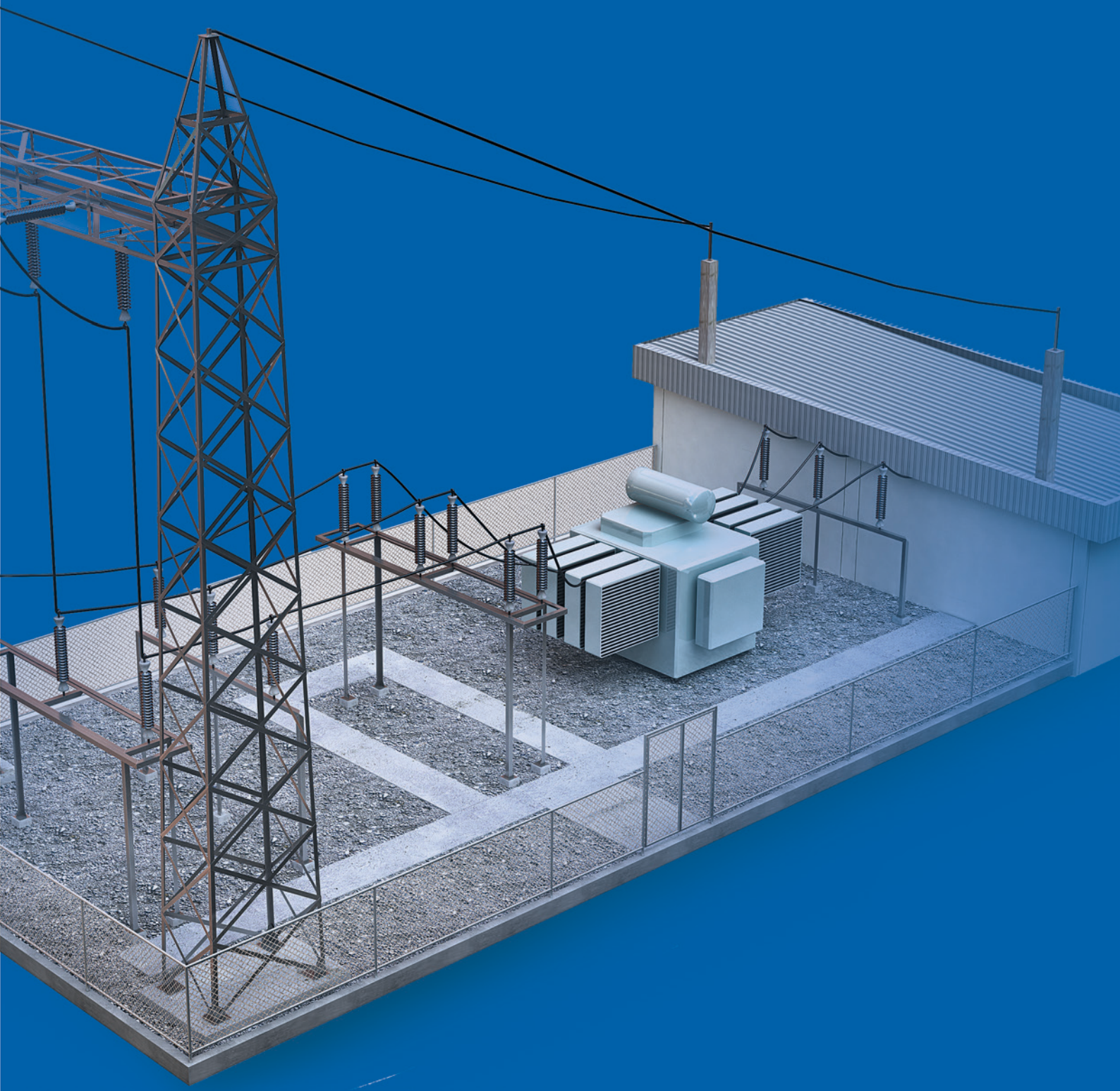
It is a **powerful** and **reliable** tool for online monitoring.

Assessing the condition of electric equipment can be so easy, **without** even causing **service disruption**.

Like the black box found in planes, a pre-failure development is stored for detailed analysis and future learning.

PD Doctor enables the **sharing of data and knowledge** between workers and across company systems.

Remote access makes it so **easy, clear, and convenient** that I you'll regret not using it sooner.





## MEET MODEMTEC

### YOUR SMART GRID TECHNOLOGY PARTNER

ModemTec is a reliable producer and supplier of the products for Smart Grid and Smart City areas. With the strong R&D background, and cooperation with the best technical universities, ModemTec brings innovation for plenty of satisfied customers from industrial and energy world.

ModemTec was founded in 2001 as a company specialized in PowerLine (PLC) communication.

In 2014, with the strong team of experts in data transmission and measurement technologies, ModemTec built its own Centre for Intelligent Power Engineering, which belongs among the most advanced development centers of its kind in the Central Europe.

Today, ModemTec's products and services are used by customers in more than 40 countries across the world.

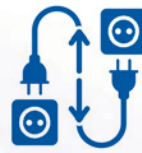
#### OUR CORE PRODUCTS AND SERVICES:



Industrial measurement,  
diagnostics, and data  
collection



Measurement of electricity,  
water, gas, or heat  
consumption



Data transmission,  
and analytical support  
in industry

## SMART SOLUTION FOR ELECTRICAL SYSTEM ASSESSMENT

Just like in other areas, it is important for power distribution area to (I) build up the system, and (II) operate and maintain it. In conjunction with increasing dependence of society on electric power, the questions regarding supply quality and unexpected outages elimination are gaining prominence. The role of diagnostics and its tools thus significantly increases. The quick development in diagnostics area goes hand in hand with growing complexity of diagnostic systems, and with new technical options in the areas of IT and sensorics.

Step-by-step, the off-line diagnostic processes become obsolete, as they require shutdown, and the measurement periodicity is seldom. The on-line kinds of Partial Discharge (PD) diagnostics become more important, as they work continually, during the regular device operation. This will help with identification of failure status, and taking action, prior the emergency status with long-term power outage will occur. MV cable connections, often used in urban areas, could be among monitored parts of MV power system.

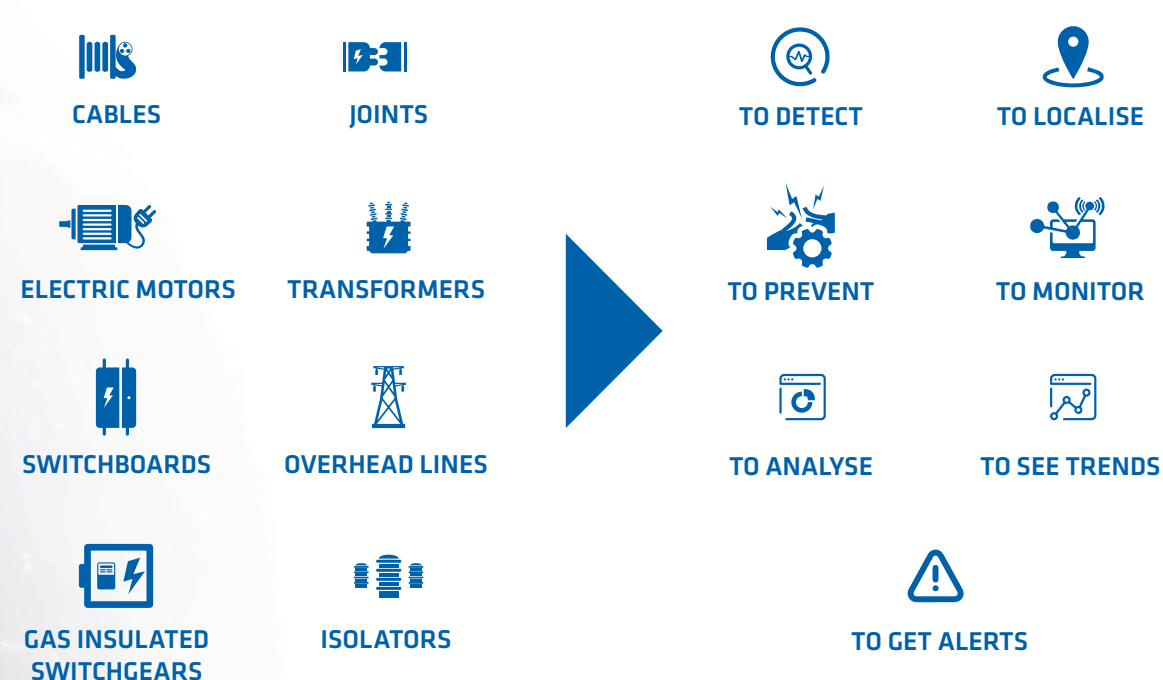
Especially new (polymer) MV cables are under the threat, as their own (low) discharge activity will be overlapped by another (stronger) discharge activity arising somewhere else in the line.

### PD DOCTOR – VALUABLE HELP

PD Doctor solution allows online monitoring of electrical equipment condition, including subsequent precise and reliable analysis. All information can be reported directly into customers systems, even the MV powerline communication can be used for transmission.

Suitable for all voltage levels. **From a low level of 230 V to a high level of 400 kV.**

Suitable for electrical equipment:



## PD DOCTOR APPLICATION AND MONITORING

### ON-LINE PARTIAL DISCHARGE (PD) REPORTS AND ANALYSES

#### DISCOVER MORE

Online monitoring allows to leave old time-based maintenance models and switch to the new condition-based models, which leads to extended deployment of components and thus cost reduction. PD Doctor application is ideal solution for deep analysis, and for everyday health situation overview of power grids and electrical machines. Deep analysis tools are useful mainly for technical experts during diagnosing and localizing intervention. The daily reports provide simple way to summarize the current state and history trends of monitored components via semaphore indication. This allows fast evaluation, easy planning of future maintenance strategies and prevent failures.

#### PD DOCTOR APPLICATION

##### Key features

- Remote and on-site PRPD measurements
- Detailed analysis using PRPD diagrams
- Trends evaluation
- Comparison of measurements
- Automatic measurements according to the scheduler, daily reporting
- Clear presentation of the state of partial discharges at the metering points
- Detailed PRPD comparison
- Limit alarms and notifications
- Data import and export

#### DISCOVER ALSO:

#### PD DOCTOR SERVER

##### Key features

- solution for large scale applications
- 24/7 data collection and analysis
- Long term history and evaluation
- Data backup and encryption
- Data interface for customer application
- OPC UA compatible (IEC 62541, IEC 61850)





## KEY CHARACTERISTICS AND BENEFITS



PREDICTIVE DIAGNOSTICS  
OF FAILURES AND BREAKDOWNS



ASSET LIFETIME PREDICTION AND  
CONDITION ASSESSMENT



INCREASE OF POWER SUPPLY  
SAFETY AND RELIABILITY



BETTER PLANNING OF SHUTDOWNS  
AND FIELD VISITS REDUCTION



EASY  
INSTALLATION



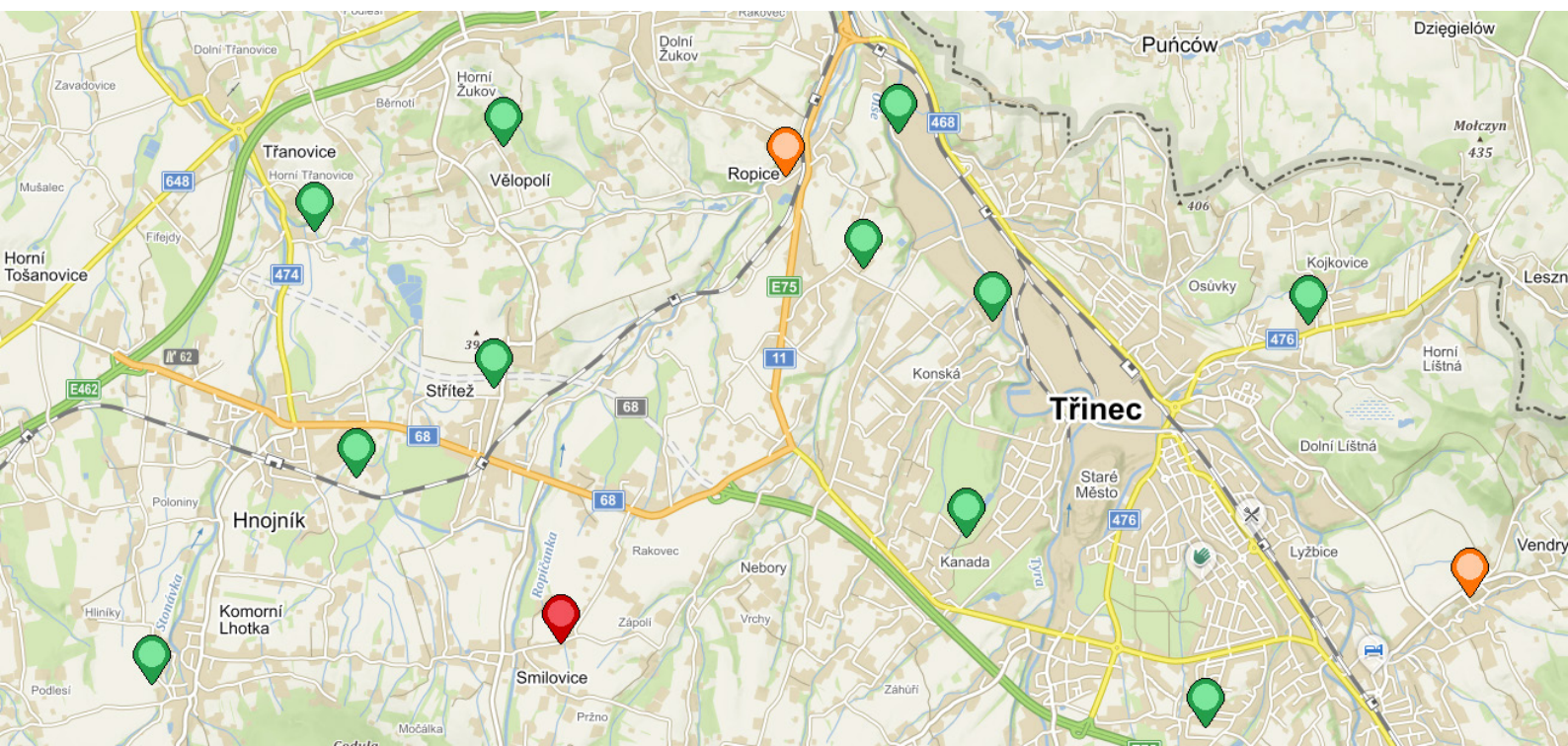
ON-LINE MONITORING OF PARTIAL  
DISCHARGES, TEMPERATURE  
AND HUMIDITY



MEASUREMENT SYSTEM FOR LARGE  
SCALE AREAS



VARIOUS TYPES OF SENSORS FOR  
VARIOUS ELECTRICAL DEVICES



## PD DOCTOR ANALYZER

### SMART TOOL FOR ONLINE PARTIAL DISCHARGE (PD) MEASUREMENT

#### DISCOVER MORE:

PD Doctor Analyzer is high-speed acquisition unit which is capable of capturing, processing and evaluating partial discharge activity. Data about detected activity are provided together with environmental conditions via modern standardized machine-to-machine industrial protocol.

#### Key features:

- 24/7 continuous monitoring
- Multi-channel support
- High-speed connectivity via OPC UA
- Compatible with IEC 61850
- Provides wide data range, from raw samples to statistics





## TECHNICAL CHARACTERISTICS

Input	Up-to 24 channels
Operating modes	Standalone instrument, online monitoring
Measured PD data	$Q_{IEC}$ , PRPD diagram, raw signal waveform
Measured environment data	Temperature, humidity, atmospheric pressure
Sampling frequency	60 MHz
Architecture	ARM + FPGA
Connection interface	Ethernet 10/100 Mbps
Power supply	24 V DC, 3W
Operating temperature	-40°C to +75°C





## PD DOCTOR COUPLER

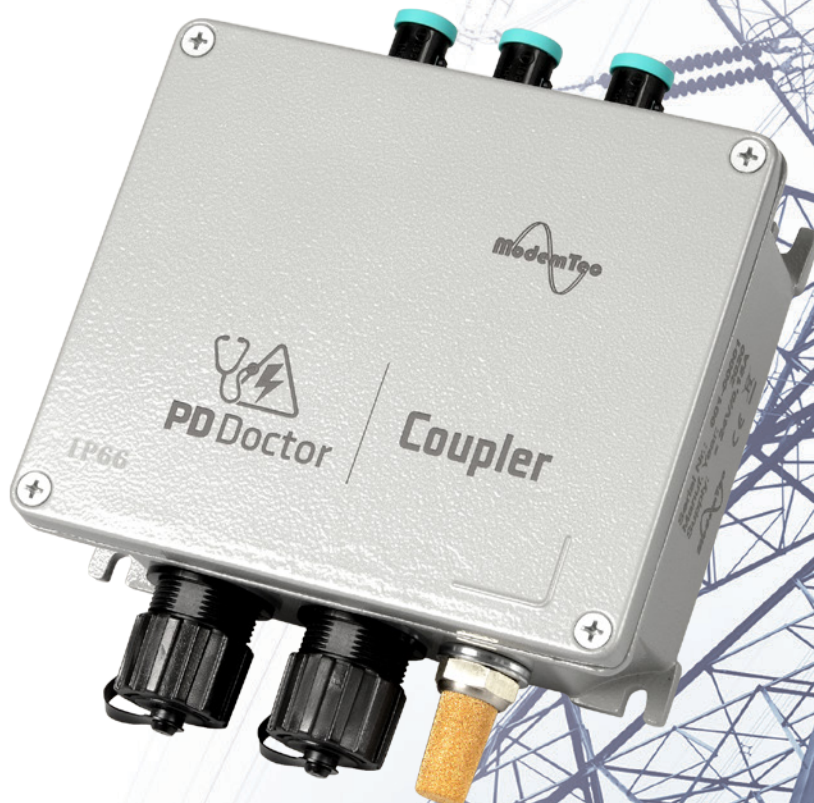
### FIXED SOLUTION FOR MEASUREMENT OF PARTIAL DISCHARGE (PD), TEMPERATURE AND HUMIDITY

#### DISCOVER MORE:

PD Doctor Coupler unifies signals from various types of sensors for PD Doctor Analyzer. It is also responsible for channel switching, selecting measuring range and providing environmental conditions. Multiple couplers can be connected to the single chain to obtain higher number of measuring channels.

#### Key features:

- Multiple sensor types supported
- AC synchronization with line voltage
- Up-to 3 channels per unit
- Integrated temperature, humidity and atmospheric pressure sensor
- Durable construction suitable for rough environment
- Capacitive and inductive solution
- Range up to 1 000 m





## TECHNICAL CHARACTERISTICS

### INDUCTIVE COUPLER

Primary voltage max	500 V
Primary current	0-100 A, 50 Hz
Connection cable length	2 m
Weight	0,4 kg



### CAPACITIVE COUPLER

Nominal primary voltage	230 V - 36 kV
Fast transients test	YES
Surge impulse test	YES
Weight	ca. 6 kg
Connection cable length	2 m
Insulation temperature class	E





**WE INNOVATE TODAY AND SOLVE THE NEEDS OF TOMORROW**

**YOU CAN RELY ON US**

Here at ModemTec, we emphasize on longterm partnership and bringing benefits to our clients.

To learn more about our company, or to discover more information about the PD Doctor solution, please contact a member of our team.

You can find out your contact on our website:  
**PD-DOCTOR.COM**