

PARADIMO 100

Ultra-high-frequency partial discharge monitoring system
for GIS and GIL



Complete system for UHF PD monitoring on GIS and GIL

PARADIMO 100 at a glance

PARADIMO 100 is a smart edge computing device that provides you with continuous monitoring and trending of partial discharge (PD) activity in Gas-Insulated Switchgear (GIS) and Gas-Insulated Lines (GIL). It automatically detects and classifies insulation defects and issues alerts for reliable risk assessment. You will experience:

- > **Peace of mind** – Benefit from automatic alerts and reliable insulation assessments to determine risk and eliminate critical defects to avoid possible failure.
- > **Straightforward installation** – Mount and connect the device to AC power, a pre-installed UHF sensor, and existing IT infrastructure.
- > **Simple integration into communication networks** – via Modbus/TCP.
- > **Minimal operator intervention** – After setup and configuration, the system begins to automatically record, save, and evaluate the monitoring data. Alerts are automatically generated for risk assessment if defects are detected and classified.
- > **Highly reliable PD monitoring** – Multiple UHF monitoring modes greatly enhance sensitivity in noisy environments and optimize data analysis.
- > **Convenient Web user interface** – There is no need to install additional software on your external PC to access the system. The Web user interface allows convenient access for configuring measurement and alert settings and viewing real-time PD data and recorded trends.
- > **Built-in PD know-how** – You do not have to be an expert to interpret the results. The system detects and automatically classifies all PD-related defects for reliable risk assessment.

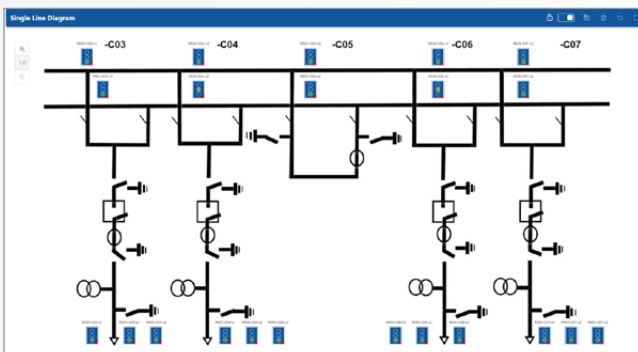


PD EXPERTISE
you can trust

INSIDE

Easy remote system access

Get a complete status overview of connected devices and view alert status as well as real-time and recorded PD trend data via the Web user interface.



PARADIMO 100 system overview

Built-in processing, storage and communication

Secure enclosure for indoor and outdoor use

Status LEDs

Plug-and-play connections:

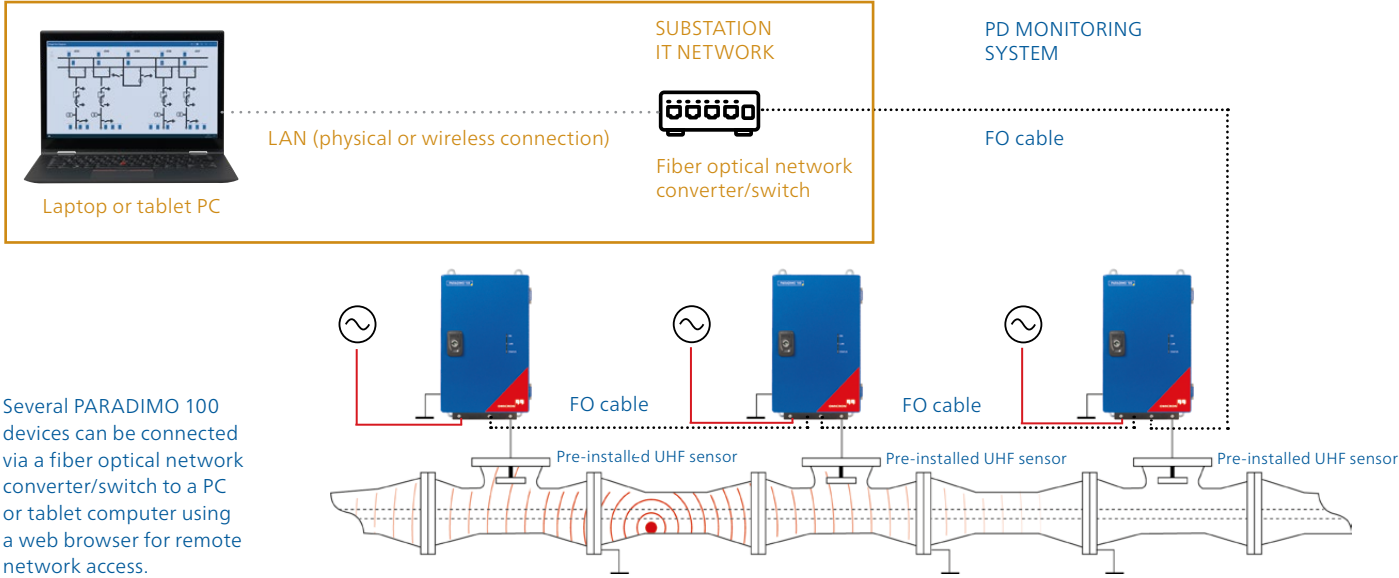
AC power

UHF sensor
Ethernet (via fiber optics)





PARADIMO 100 devices communicate via standard network protocols. Multiple monitoring points facilitate trending, defect detection, and classification for reliable risk assessment in GIS and GIL.

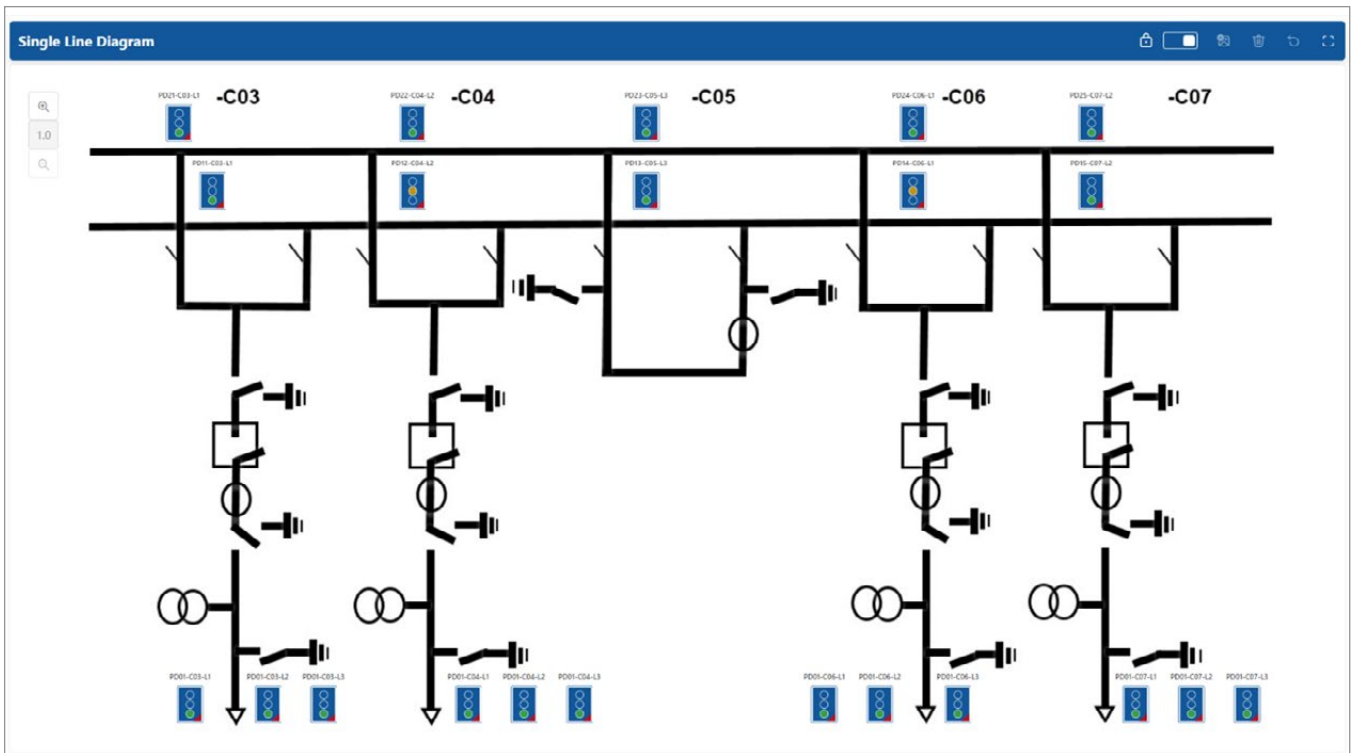


Several PARADIMO 100 devices can be connected via a fiber optical network converter/switch to a PC or tablet computer using a web browser for remote network access.

PARADIMO 100 Web Interface

System Overview

Access a system overview remotely via the convenient Web interface. It displays the status of and information about the devices connected in the network



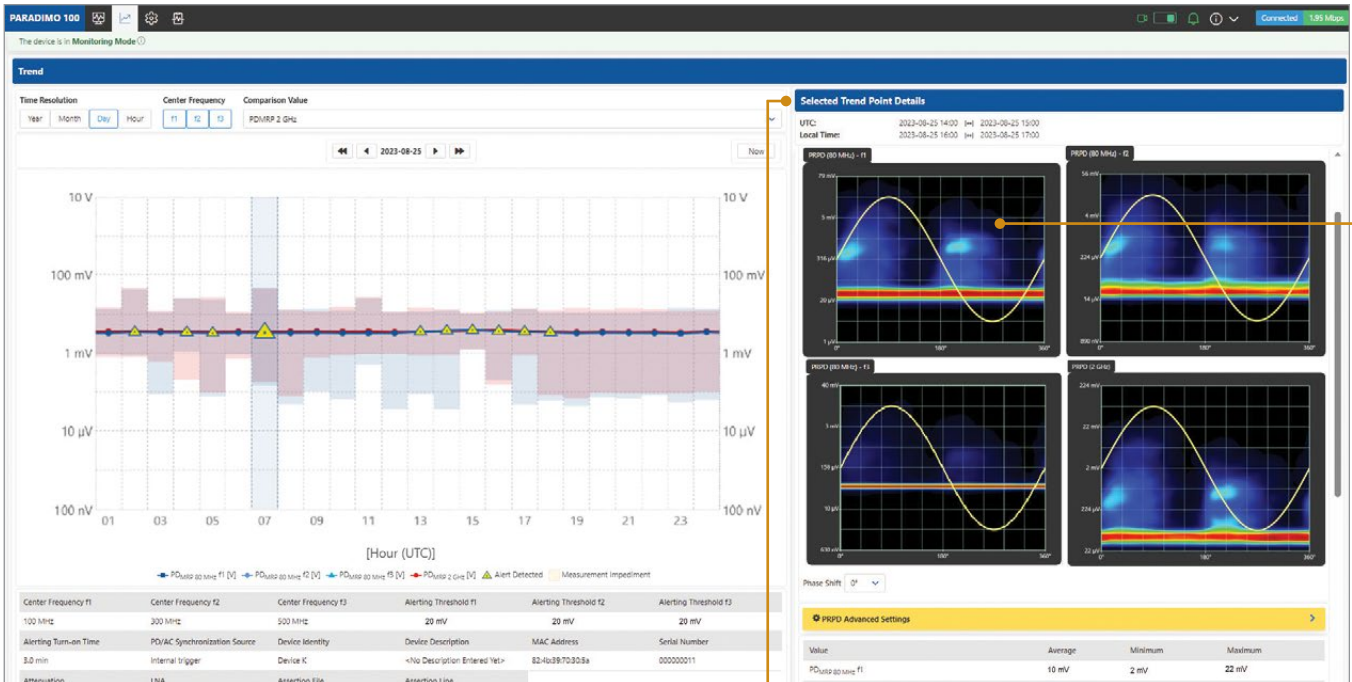
Customized substation overview - Upload a line diagram of your GIS. Place installed PARADIMO edge computing devices per drag-and-drop into the diagram. View device and alert status of each device installed in the GIS line diagram.



Detailed device overview – Click on a device in the line diagram to see a detailed device overview for more information about the status of each installed PARADIMO 100 device.

Trend Page

The trend page provides you with a more detailed overview of recorded activity. Observe PD levels and alerts during specific time periods (year, month, day, hour) and scroll down to see individual events in a specific UHF monitoring range.



Trend View

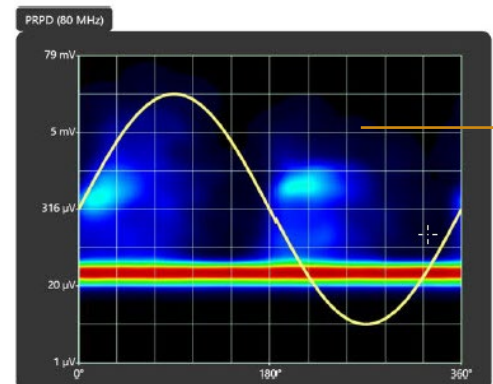
- > Observe the trend behavior of PD activity.
- > Displays PD trend data per year, month, day, and hour.
- > See when alerts were triggered due to high PD activity levels.
- > Shows PRPD diagram for selected trend point and UHF monitoring mode.

Selected Trend Point Details

Evaluate the PRPD diagram of the selected trend point in different UHF monitoring ranges and inspect numerical PD levels and defect classifications in the table below.

PRPD Diagram

The Phase-Resolved Partial Discharge (PRPD) diagram is an established tool to analyze PD activity in relation to the phase angle of the applied voltage. Characteristic PRPD patterns correspond to specific types of defects, which can be used to identify the nature of the PD.



Multiple UHF PD monitoring modes

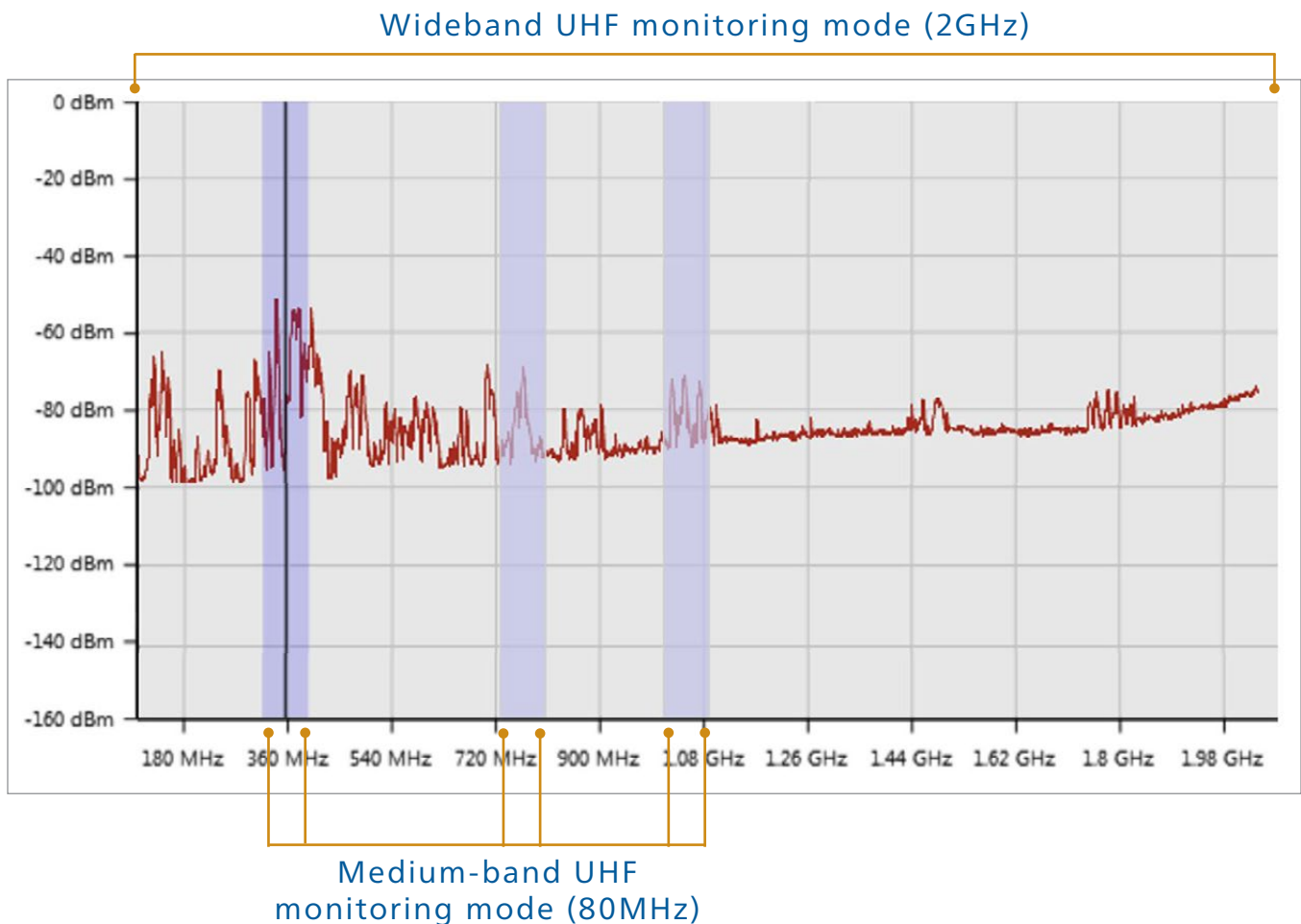
High signal-to-noise ratios

Partial discharge (PD) measurement is a highly effective tool for assessing the insulation condition by detecting critical defects in high-voltage (HV) devices.

However, conventional on-site PD measurements, such as those specified by the IEC 60270 standard, are often affected by noise in the surrounding environment. Alternative PD measurements in the Ultra-High Frequency (UHF) range result in a very high signal-to-noise ratio. Numerous noise sources, such as mobile communications and radar, transmit predominantly in lower or narrow frequency ranges. PD detection in the UHF range can also be applied to continuous PD monitoring in noisy on-site environments.

Simultaneous wideband and medium-band UHF PD monitoring

The PARADIMO 100 simultaneously monitors PD activity in four different frequency ranges using wideband and medium-band UHF monitoring modes. This allows you to achieve high signal-to-noise ratios despite surrounding noise.

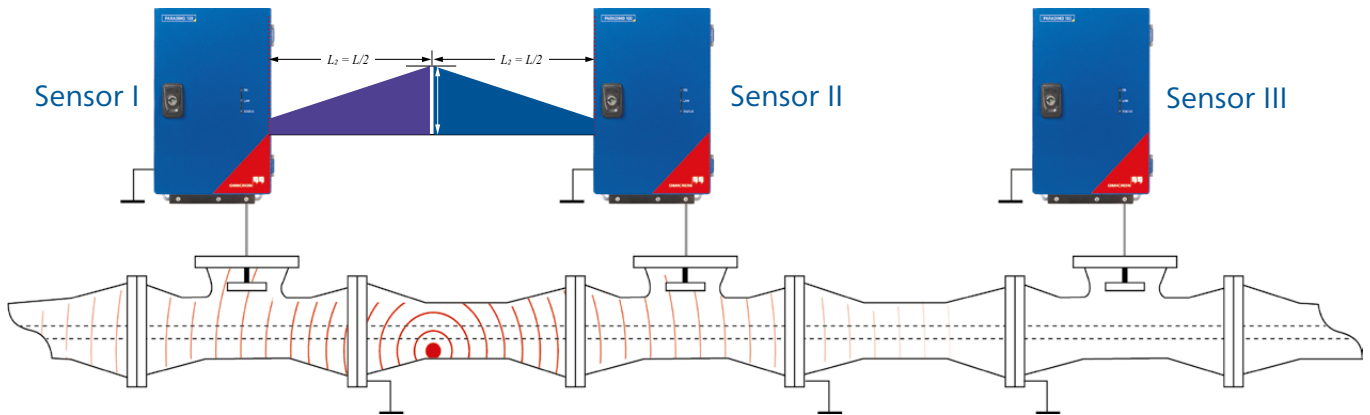


Smart Alarming Algorithm

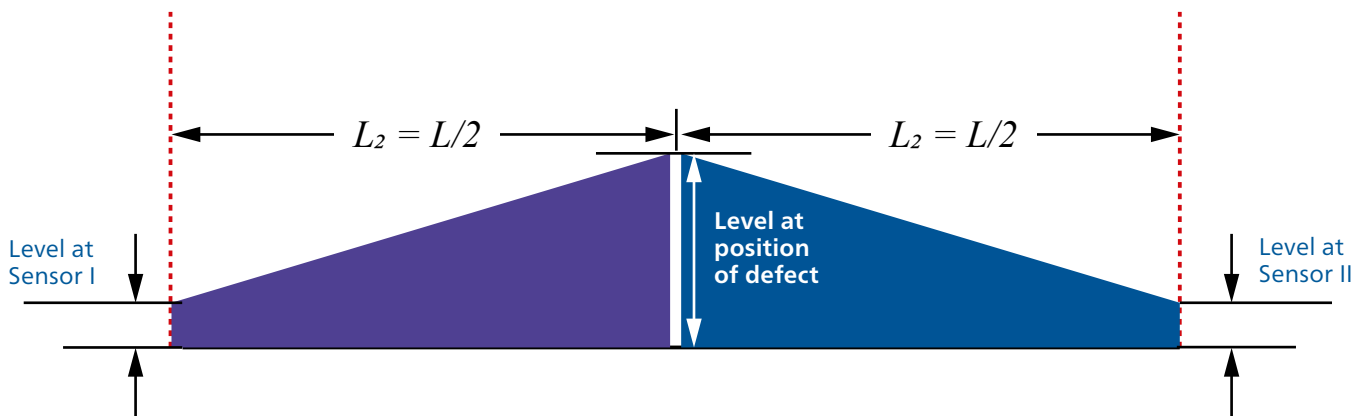
PARADIMO 100 periodically evaluates the monitored PD level of the 80 MHz filter to issue alerts. An alert will be issued if the PD level is continuously above the configured alerting threshold for the specified period of time and the PRPD pattern is classified as a defect.

By nature, PD pulses occurring inside a GIS/GIL are attenuated along the signal path before being picked up by the sensors. As a result, the PD signal of a defect located between two sensors may be detected at only a fraction of its actual level.

The alerting algorithm in PARADIMO 100 takes the attenuation between neighboring sensors into consideration for the continuous evaluation of measured PD levels. This enables critical PD events to be detected, which otherwise could have been overlooked.



PARADIMO 100 utilizes the process of attenuation to detect and verify possible PD defects.



Attenuation profile – A linear approximation of the attenuation profile for a PD defect location in the middle of two sensors, as described in Cigrè TB 654.

Test generator

To determine the attenuation between two neighboring sensors, each PARADIMO 100 device can optionally send out test pulses using the built-in Test Generator.

Technical specifications

Partial discharge monitoring

Number of UHF input channels	1
UHF connector type	N-type
Frequency range	PD: 100 MHz ... 2 GHz AC Sync: 50 Hz...60 Hz
Measurement accuracy of AC system frequency	± 0.01%
Maximum double pulse resolution	< 80 ns typical
PD event time resolution	< 8 ns
PD pulse rate	> 63 k pulses /s
PD measurement modes	Wideband: 2 GHz Medium-band: 80 MHz
Sensitivity	2 GHz range: < -78 dBm 80 MHz range: < -86 dBm

Enclosure with smart computing device

Mechanical data

Dimensions (W × H × D)	205 × 340 × 98 mm / 8.07 × 13.38 × 3.85 in.
Weight	~ 4,5 kg / 10 lbs.
Humidity	5 % ... 95%, non-condensing
Ambient temperature (operating)	-20 °C ... +55 °C / -4 °F ... 131 °F
Equipment and Reliability Standards	EMC IEC/EN 61326-1 (industrial electromagnetic environment) FCC subpart B of 15, Class A
Safety	IEC/EN/UL 61010-1 IEC/EN/UL 61010-2-030
Ingress protection	IP65

Power supply

Supply voltage	200 V ... 240 V AC 100 V ... 130 V AC
Power consumption	≤ 15 W
Supply voltage frequency	50 Hz ... 60 Hz
Protection class	Class II

Fiber optic connection

Medium	Standard: Duplex multi-mode fiber optic cables 50/125 μm (OM3 or better)
Wavelength	1300 nm
Maximum cable length	2 km
Connector type	ST