PD SENTRY
by HV TEST

Continuous Partial Discharge Measurement and Monitoring System in High and Medium Voltage Electrical Assets

Technology for strengthening resilience and smart operation of Electric Grids

¿WHAT IS PD SENTRY?

PD SENTRY is an advanced solution for the continuous monitoring of partial discharges in medium and high voltage electrical assets, designed from a disruptive architecture aimed at massive and ubiquitous supervision of critical infrastructures.

The system incorporates hardware specifically developed for distributed monitoring applications, along with cutting-edge technologies such as artificial intelligence and advanced data analytics, which allow for the early identification of anomalous patterns, assessment of asset condition, and optimization of maintenance strategies.

Its design prioritizes ease of use, offering an intuitive operation experience through HTML/Web clients, and supports different deployment models, both Cloud and On-Premise, adapting to the cybersecurity and operational requirements of each facility.

Likewise, PD SENTRY integrates naturally into the digital environments of substations, providing interoperability according to the IEC 61850 standard, which facilitates its incorporation into existing automation and supervision architectures.
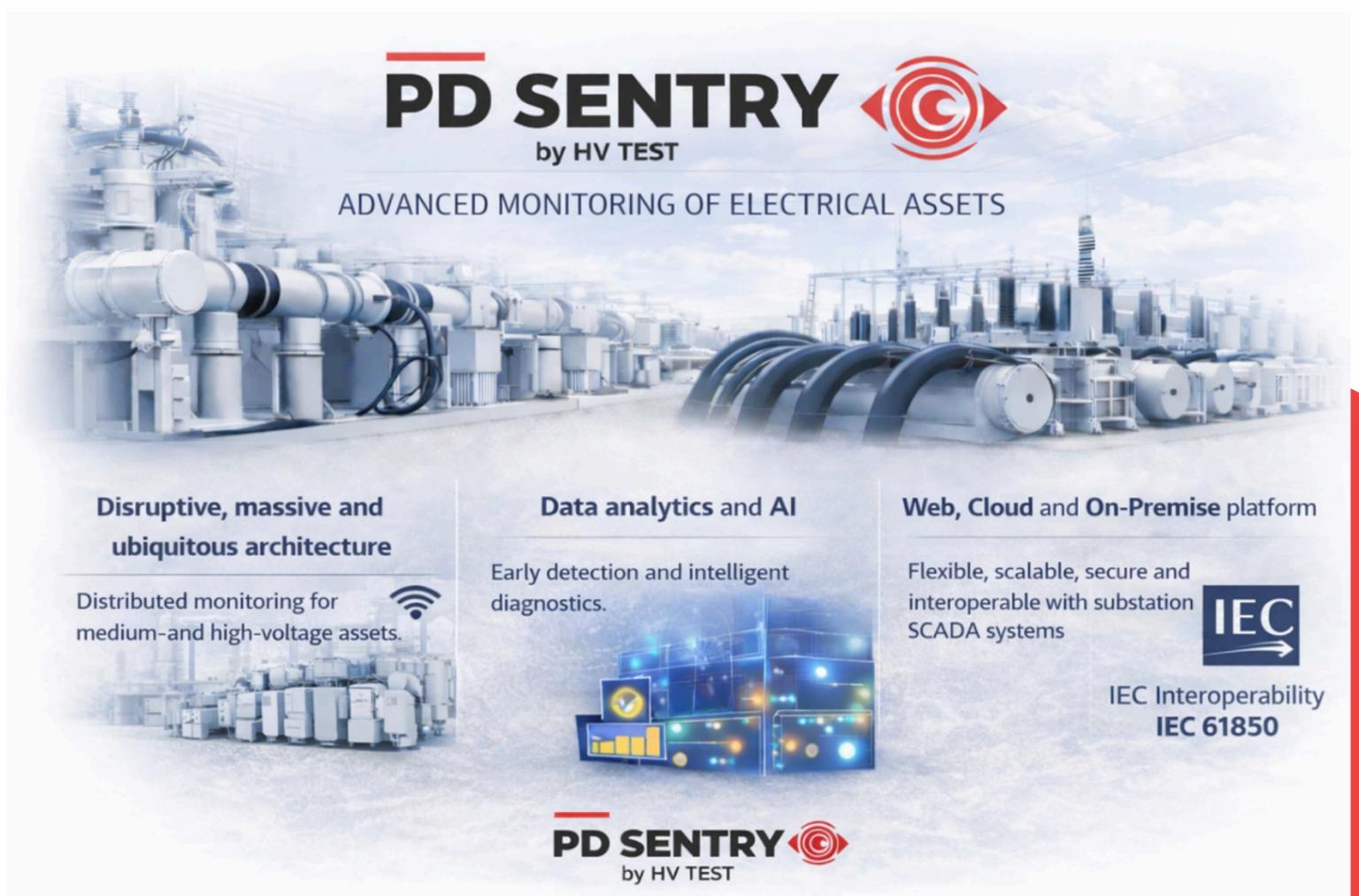
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ADVANCED MONITORING OF ELECTRICAL ASSETS

Disruptive, massive and ubiquitous architecture
Distributed monitoring for medium-and high-voltage assets.

Data analytics and AI
Early detection and intelligent diagnostics.

Web, Cloud and **On-Premise** platform
Flexible, scalable, secure and interoperable with substation SCADA systems

IEC
IEC Interoperability
IEC 61850

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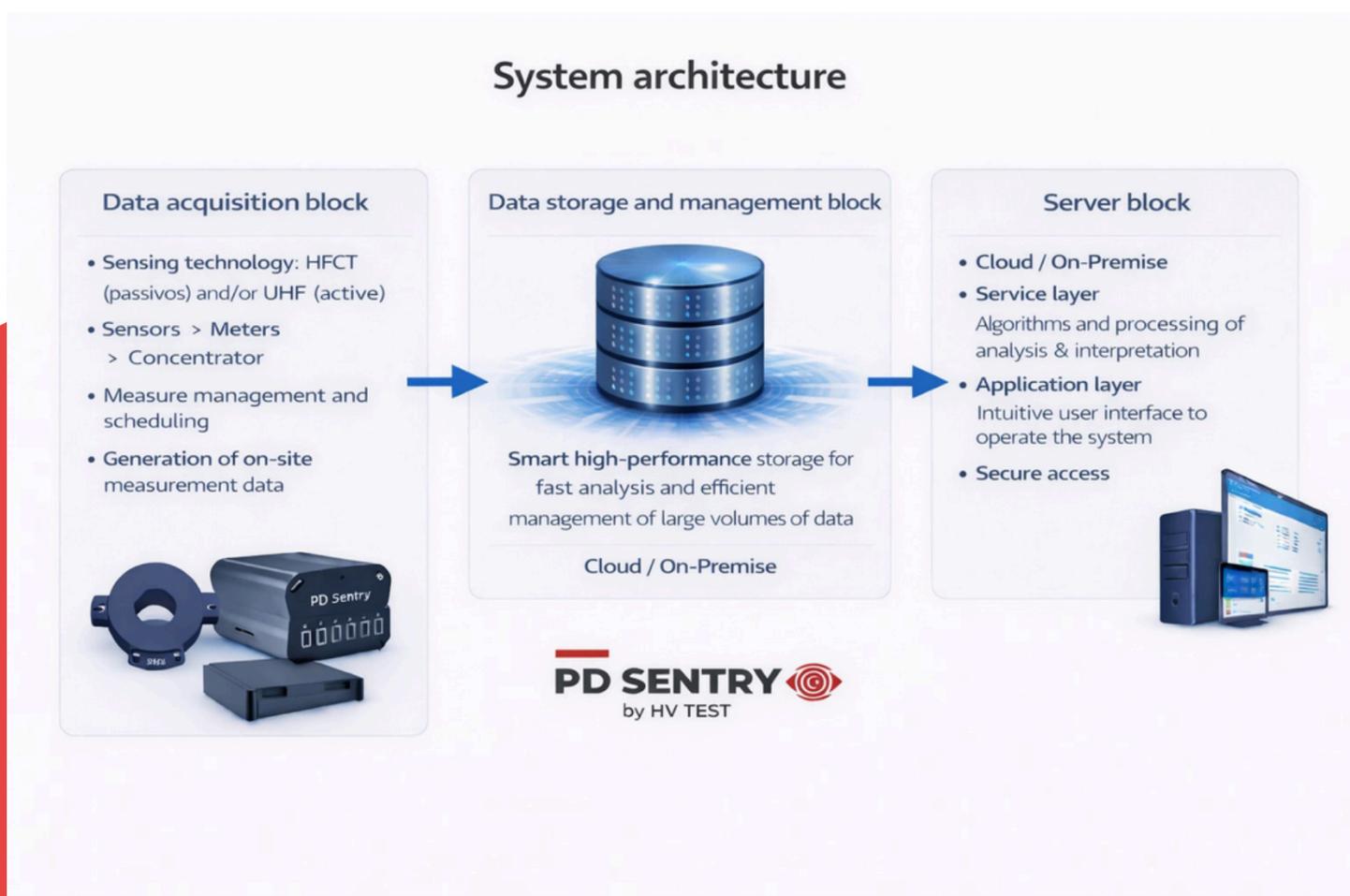by HV TEST

Scalable and Secure Architecture

The modular architecture of **PD SENTRY**, composed of three functional blocks—data acquisition, storage and management, and server with application—allows continuous and scalable monitoring of medium and high voltage assets in installations of any size.

The data **acquisition** block integrates HFCT (passive) and UHF (active) sensing, connected to meters and managed by a concentrator unit that controls the acquisition and generation of measurement data in the field.
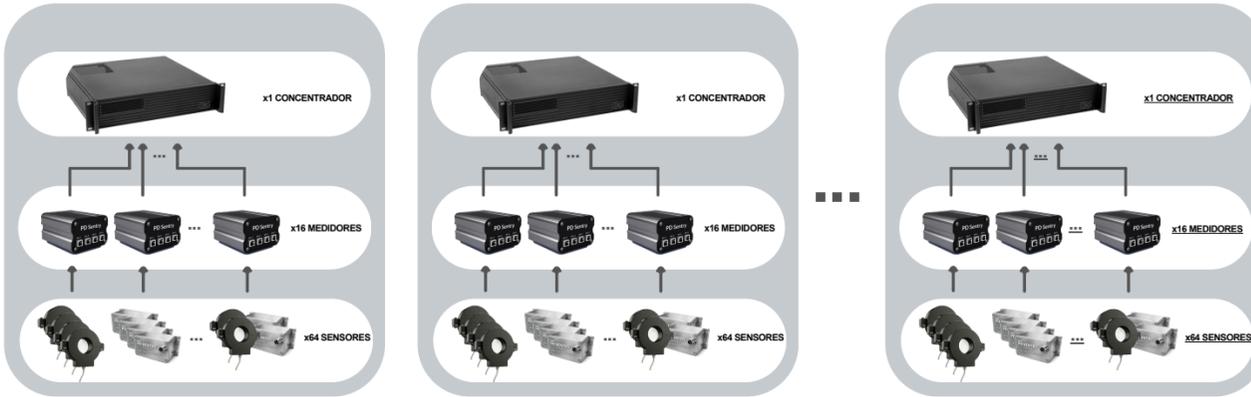
Data is transferred to the **storage and management** block, available in Cloud or On-Premise environments, providing a secure infrastructure ready for handling large volumes of information.

Based on this, the **server** block and the **application** layer incorporate advanced analysis algorithms and an intuitive web interface that allows users to operate the system, interpret the results, and make maintenance decisions efficiently.

PD SENTRY Insight es la plataforma de software de análisis y visualización avanzada que actúa como capa de aplicación del sistema PD SENTRY para la visualización, análisis y diagnóstico avanzado de descargas parciales, permitiendo supervisar en tiempo real el estado de los activos eléctricos y apoyar la toma de decisiones de mantenimiento mediante una interfaz web intuitiva.

System architecture

Data acquisition block

- Sensing technology: HFCT (passivos) and/or UHF (active)
- Sensors > Meters > Concentrator
- Measure management and scheduling
- Generation of on-site measurement data

Data storage and management block

Smart high-performance storage for fast analysis and efficient management of large volumes of data

Cloud / On-Premise

Server block

- Cloud / On-Premise
- Service layer
  Algorithms and processing of analysis & interpretation
- Application layer
  Intuitive user interface to operate the system
- Secure access

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MEASUREMENT ACQUISITION

x1 CONCENTRADOR

x16 MEDIDORES

x64 SENSORES

x1 CONCENTRADOR

x16 MEDIDORES

x64 SENSORES

x1 CONCENTRADOR

x16 MEDIDORES

x64 SENSORES

For needs exceeding 64 sensors, it is possible to deploy multiple hubs to fully cover the monitoring requirements in the infrastructure.

x1 CONCENTRATOR

x16 METERS

x64 SENSORS

PD SENTRY SOFTWARE PLATFORM

The **PD SENTRY software platform** is the operational core of the system, allowing the visualization of partial discharge data, continuous monitoring of asset condition, and the execution of advanced diagnostics..

Based on a client–server architecture, the platform can be deployed on-premise, in the cloud, or in a hybrid mode, with multi-user access and a scalable, easily upgradable structure.

Incorporates advanced analysis and visualization tools, such as PRPD patterns, temporal evolution of PD activity, noise filtering, and generation of clear and actionable diagnostic reports.

Designed for control centers, it offers an intuitive and secure interface, with role-based user management, IEC 61850 integration, and guarantees data integrity and traceability.

DATA STORAGE

ON-PREMISE   CLOUD

Insights AP
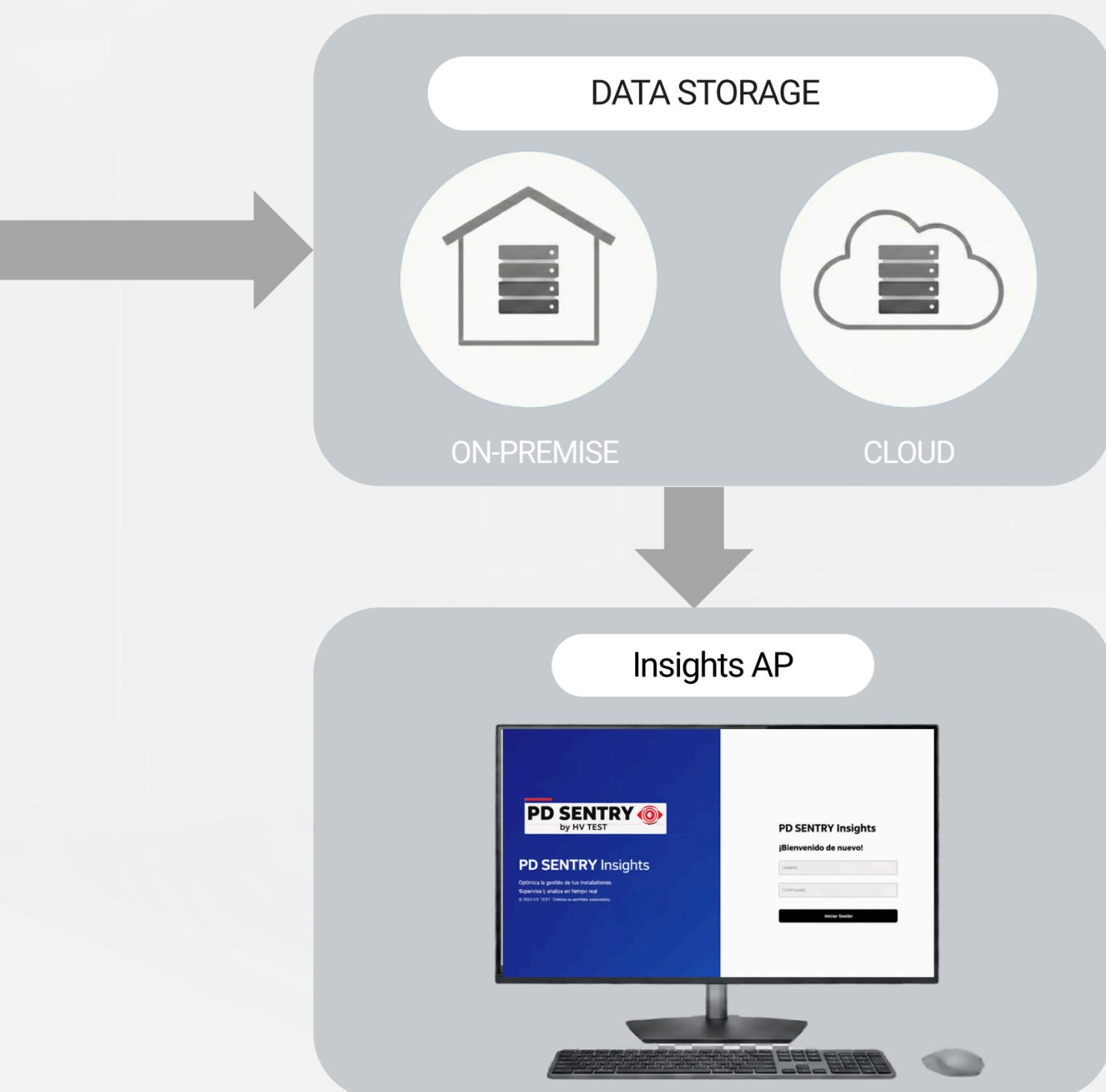
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PD SENTRY *e*HFS SENSOR

HIGH-SENSITIVITY HFCT TECHNOLOGY

PD Sentry eHFS is an HFCT sensor for online partial discharge detection, with high sensitivity to very short duration pulses and reliable operation in environments with high electromagnetic noise, with an operating range of 0.1 MHz to 30 MHz

FAST AND NON-INTRUSIVE INSTALLATION

Open/close split sensor that allows installation without disconnecting the conductor or altering its electrical or mechanical conditions

ROBUST AND INDUSTRIAL CONNECTIVITY

Lightweight and durable casing, suitable for indoor and outdoor use, designed for demanding environmental conditions

DIRECT AND RELIABLE CONNECTIVITY

Industrial connector and direct connection to the meter via USB, without the need for special coaxial wiring

PD SENTRY eUFS SENSOR

HIGH-SENSITIVITY UHF TECHNOLOGY

PD Sentry eUFS is a UHF sensor designed for the detection of electromagnetic emissions from partial discharges in GIS, allowing 24/7 continuous monitoring without service interruption.
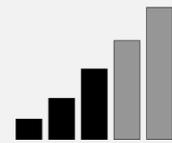
DOUBLE GIS TYPOLOGY

Available in UHF flange/viewing port versions and UHF for integrated plate, compatible with the various UHF measurement points existing in GIS substations.

HIGH SENSITIVITY AND WIDE DYNAMIC RANGE

UHF measurement in bands up to 6 GHz, with high sensitivity and a dynamic range ≥ 70 dB, suitable for advanced analysis and PRPD techniques.

INDUSTRIAL DESIGN AND TOTAL INTEGRATION

Robust, maintenance-free sensors, IP66, suitable for new or existing installations, integrable into combined UHF + HFCT architectures, and compatible with PD diagnostic platforms.

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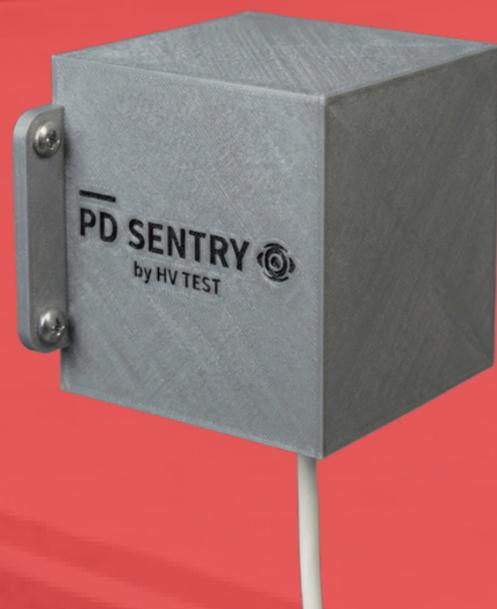
eRS METER

MULTICHANNEL ACQUISITION FOR DP

Partial discharge meter with 4 simultaneous channels, compatible with HFCT and UHF sensors, designed for continuous monitoring and detection of very short pulses.

4

HIGH SENSITIVITY AND LOCAL PROCESS

High sampling frequency, synchronized acquisition between channels, and individual gain adjustment, with local signal processing to maximize sensitivity and measurement quality.

SECURE DIGITAL COMMUNICATION VIA FIBER OPTIC

Digital transmission to the eCS hub via fiber optic (SFP) with galvanic isolation, ensuring immunity to electromagnetic interference and complete data integrity.

## INDUSTRIAL DESIGN AND BATTERY-POWERED

Compact and robust equipment, with no moving parts, suitable for field installation and unattended operation, with high reliability, low maintenance, and autonomy of over 10 years.

PD Sentry

CH-1 CH-2 CH-3 CH-4

eCS CONCENTRATOR

CENTRALIZED MANAGEMENT OF DP METERS

Hub equipment designed for the control, acquisition, processing, and aggregation of partial discharge data, centrally managing multiple meters installed in the field.
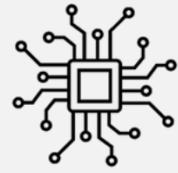
HIGH COMMUNICATION CAPACITY AND SCALABILITY

Capable of managing up to 16 meters per unit through fiber optic communications (SFP) with galvanic isolation, Ethernet connectivity, and an integrated 4G router for secure data transmission.

LOCAL PROCESSING AND MEASUREMENT CONTROL

Local signal processing and analysis, structured data aggregation, and coordinated management of measurement cycles, ensuring temporal synchronization, consistency, and traceability.

INDUSTRIAL DESIGN AND 24/7 OPERATION

Equipo en formato rack 19" (2U), robusto y apto para entornos de subestación, basado en Linux, con supervisión remota, cseguridad integrada y compatibilidad con arquitecturas UHF + HFCT y plataformas de análisis

PD SENTRY Insights

ADVANCED PARTIAL DISCHARGE VISUALIZATION

Clear views by infrastructure, system, measurement point, or channel/phase, with PRPD patterns, temporal evolution, and real-time or delayed states.
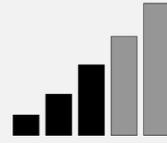
EXPERT ANALYSIS AND DIAGNOSIS

Advanced noise filtering tools, pattern separation, polarity analysis, and discharge source location, with graphical results and diagnostic reports.

TEMPORARY MANAGEMENT AND ASSET MONITORING

Historical analysis, temporal comparison of results, and monitoring the evolution of diagnoses through chronological and Gantt-style views.

SYSTEM ADMINISTRATION AND CONTROL

Comprehensive management of measurement systems, meters, acquisition cycles, and users, with role-based permission control and IEC 61850 integration.
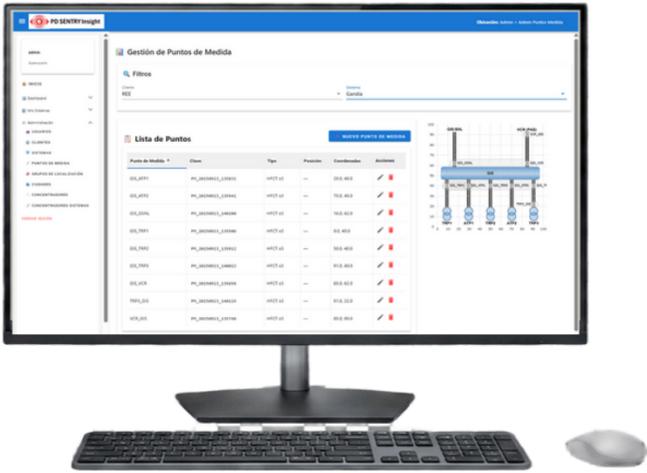
USABILITY AND OPERATIONAL MANAGEMENT

Intuitive web interface, designed for operations centers, with secure authentication, access control, and full data traceability.
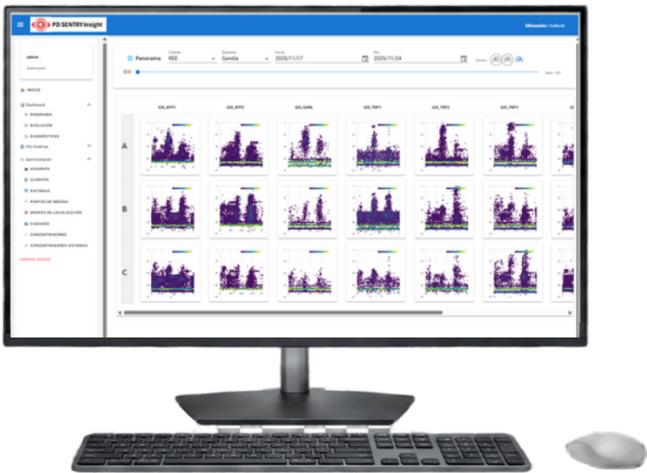
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PD SENTRY Insight

Administers

Manage your facilities from a single point, schedule measurements, add new equipment to the system, and adjust your equipment settings.

Monitor your facilities

Explore in real time what the sensors capture and analyze the evolution of the problem over time.

Diagnoses

The powerful noise removal and clustering tools will allow you to isolate the problem and make decisions about when to carry out maintenance on your facility.
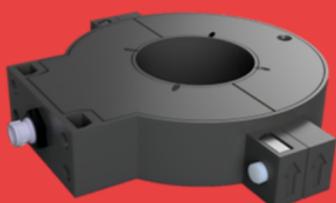
KEY TECHNICAL SPECIFICATIONS

PD SENTRY eHFS Sensor

Type of sensor	Passive HFCT
Application	Online Partial Discharge Measurement
Bandwidth	100 kHz – 30 MHz (-3 dB)
Gain	≈ 15 dB, across the entire bandwidth
Sensitivity	≈ 9 mV/mA, across the entire bandwidth
Inner diameter	52 mm.
Type of installation	Match (open/close), without disconnection
Degree of protection	IP66
Connection with meter	Self-locking industrial connector Twisted pair connection head (UTP/Profinet) Length up to 10 m.

PD SENTRY eUFS Sensor

	eUFSB (GIS Flange)	eUFSP (GIS Plate)
Type of sensor		
Application	DPs Detection in GIS	DPs Detection in GIS
Frequency range	3 - 6 GHz	550 MHz – 6 GHz / 1,65 – 5 GHz
Sensitivity	< –80 dBm	< –80 dBm
Dynamic range	≥ 70 dB	≥ 70 dB
Built-in antenna	YES	NO (external)
GIS Connection	Flange with adapter	Type N RF Connector
Connection with meter	Self-locking industrial connector Connection head for twisted pair cables (UTP/Profinet) Recommended maximum length: 20 m.	
External Input	Not required	Not required
Degree of protection	IP66	IP66

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KEY TECHNICAL SPECIFICATIONS

PD SENTRY eRS Meter

Type of equipment	Pseudo-passive partial discharge (PD) meter
Application	Monitoring of partial discharges in industrial environments
Sensor compatibility	HFCT y UHF
Number of channels	4 simultaneous analog inputs
Bandwidth per channel	300 KHz - 25 MHz
Gain adjustment	Individual per channel, two amplifiers in cascade
Gain range	-25 dB to +30 dB per channel and amplifier
Sensor connection	USB-B Connector Twisted pair connection cable (UTP/Profinet) Maximum length: according to connected sensor
Connection with hub	Fiber optic, using SFP SMF/MMF transceiver
Fiber length	MMF up to 300 m / SMF up to 20 km
External input	Not required, internal battery with > 10 years of autonomy
Dimentions	120 × 120 × 100 mm
Operation	24/7, maintenance-free, hot-swappable
Environment	Industrial, Immune to electromagnetic noise

PD SENTRY eCS Hub

Type of equipment	Partial Discharge Data Hub
Main function	Centralized management of PD meters in the field
Number of meters	Up to 16 meters per unit
Interfaces with meters	Up to 16 fiber optic SFP ports
WAN Interfaces	Ethernet RJ45 (LAN/WAN), Integrated 4G WAN Router
Operating system	GNU Linux
Mechanical installation	Standard 19" rack, 2U high
System scalability	Multiple GPS-synchronized hubs

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Technology for a smarter, more resilient power grid