PINAXA Monitoring
Online Bushing Monitoring System

PINAXA Monitoring – Bushing Monitoring is a modular, online condition monitoring system for high-voltage bushings used in power transformers, generators, reactors, and switchgear. The system is based on the proven **HYDROCAL BPD** technology and enables continuous supervision of bushing insulation health to prevent catastrophic failures and unplanned outages.

Why Online Bushing Monitoring?

High-voltage bushings are among the most failure-prone components in HV equipment. Degradation of insulation due to moisture ingress, partial discharge, thermal stress, or ageing can lead to sudden bushing explosions and major asset damage. Online bushing monitoring enables:

- Early detection of insulation deterioration
- Continuous measurement of tanδ / Power Factor and capacitance
- Trend analysis for predictive maintenance
- Avoidance of forced outages and fire incidents
- Extension of bushing and transformer service life

Measurement Principle

PINAXA Bushing Monitoring continuously measures the voltage magnitude and phase angle at the bushing test tap. Using a reference voltage input, the system calculates:

- tanδ / Power Factor of each bushing
- Bushing capacitance (C1 / C2)
- Phase-resolved deviation and imbalance

Any deviation from baseline values or abnormal trends is detected and alarmed, allowing maintenance teams to act before critical failure occurs.

System Overview


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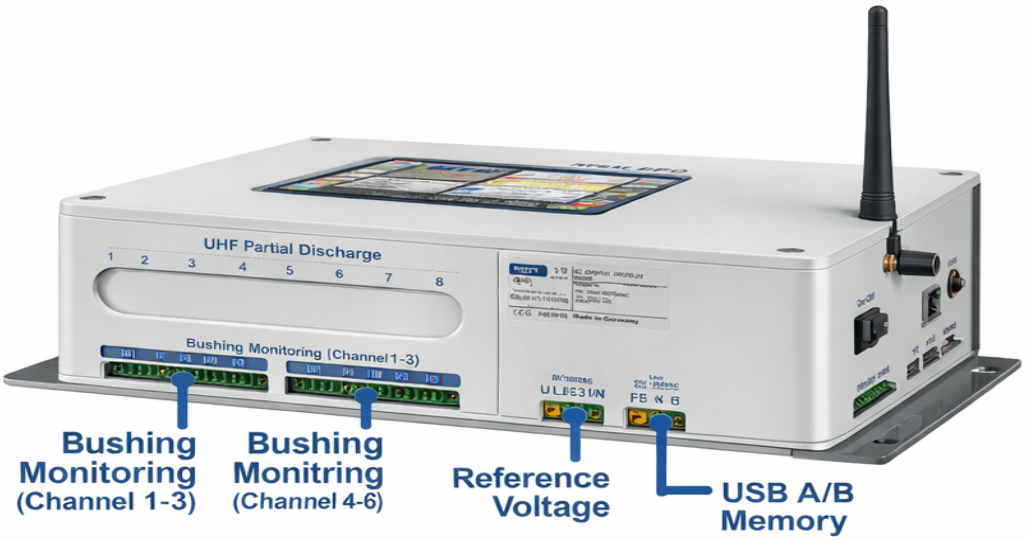
SET


UHF Partial Discharge
1 2 3 4 5 6 7 8
Bushing Monitoring (Channel 1-3)
Bushing Monitoring (Channel 1-3)
Bushing Monitring (Channel 4-6)
Reference Voltage
USB A/B Memory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234.5
1,4.9
50.66


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Typical Applications

- Power transformers (HV, EHV, UHV)
- Generator and generator step-up transformer bushings
- Shunt reactors and series reactors
- Gas-insulated and oil-filled bushings
- Critical substations and power plants

System Integration & Communication

PINAXA Bushing Monitoring can be integrated with **PINAXA genX** and other condition monitoring systems to form a centralized asset health monitoring platform. The system supports seamless integration with substation automation and SCADA systems.

- Local HMI with graphical trending and alarms
- Remote monitoring via Ethernet / serial communication
- Data logging and historical trend storage
- Alarm outputs for warning and trip levels

Technical Specifications

Parameter	Specification
Auxiliary Power Supply	85 VAC … 264 VAC / 90 VDC … 300 VDC
Operating Frequency	45 Hz … 70 Hz
Power Consumption	Maximum 100 VA
Operating Temperature	-55°C … +50°C
Storage Temperature	-20°C … +55°C
Humidity	≤ 85% at 21°C, ≤ 95% at 25°C (30 days/year)
Housing	Hard plastic
Dimensions (Instrument)	400 × 260 × 97 mm
Dimensions (Mounting Plate)	550 × 570 × 102 mm
Weight	Approx. 10 kg
Degree of Protection	IP40
Corrosion Protection	C1 / C2
Cabinet	Available

Safety & Standards Compliance

Insulation Protection: EN 61010-1: II
Electrical Protection Class: EN 61140: I

PINAXA Monitoring provides a reliable, scalable, and future-ready solution for online bushing condition monitoring, supporting utilities and industries in achieving higher asset availability, improved safety, and optimized maintenance strategies.