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PDMA200   S/N: APM02010A
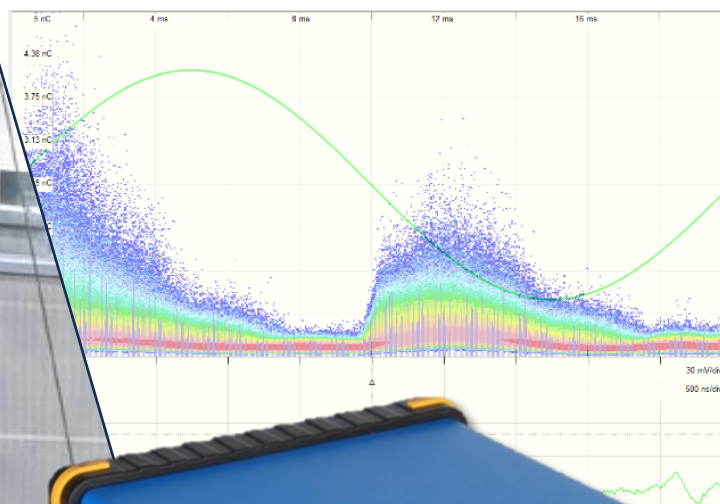MADE IN IRAN

PDMA 200

UNIVERSAL PARTIAL DISCHARGE MEASUREMENT AND ANALYSIS SYSTEM

Fully Digital PD Analysis System

Optically Isolated

**Three-channel Measurement**

Partial Discharge Analysis

The PDMA 200 Partial Discharge Analysis System is a three-channel high-end, high-precision, modular acquisition and analysis Device for detecting, recording, Monitoring and analyzing partial discharge events in many applications.

Partial Discharges = weak points in insulation systems

Partial discharge (PD) phenomena, as defined by IEC 60270, are localized dielectric breakdowns of a small portion of a solid or liquid electrical insulation system under high voltage stress.

The detection and monitoring of partial discharge is of vital importance because PD phenomena often precede an insulation breakdown of high voltage equipment, leading to cost-intensive outages and repairs.

Measuring PD during routine or preventive maintenance with the PDMA 200 provides full compliance with the relevant standards IEC 60044, IEC 60076, IEC 60270 and IEC 60885 for power systems.
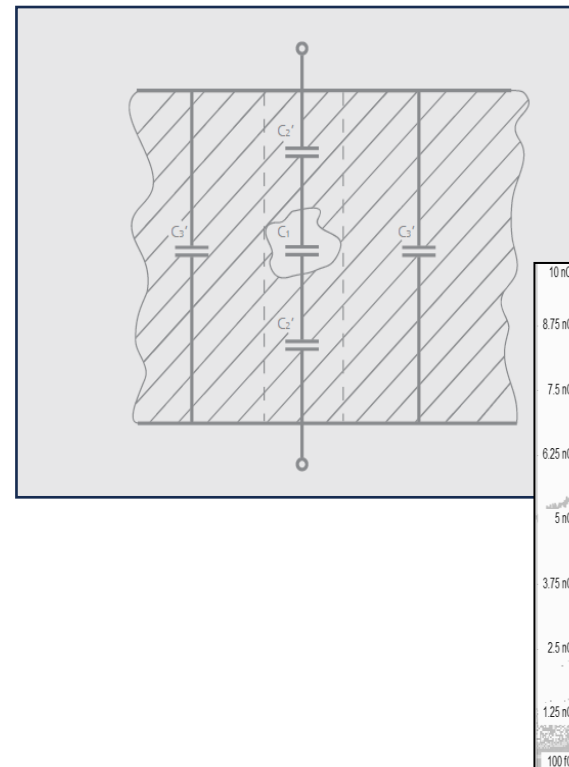
Your benefits:

• Three multiplexer PD input channels can be connected to three phase HV assets for faster and easier testing and monitoring

• PD detection in full conformity with IEC 60270

• Excellent noise immunity

• Easily transportable acquisition units allow testing at different locations

• Exceptional graphical display of all relevant PD information

The challenge of PD analysis is the detection and evaluation of minute discharges in the range of picocoulombs (pC) while dealing with test voltages of up to several hundred kilovolts. This is often complicated by severe external interference, or "noise", from nearby equipment caused by corona or other radio frequency (RF) sources.

The PDMA 200 incorporates a range of leading-edge technologies in order to provide accurate, reliable and reproducible measurements – even under the most demanding circumstances.
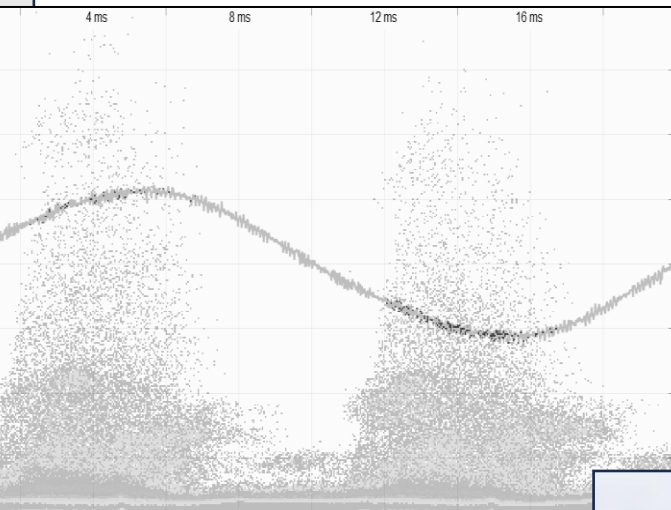
OFFLINE and ONLINE APPLICATION

One device for all assets and testing applications

You can use the PDMA 200 for a wide range of testing applications, beginning with the traditional power supply sector, at manufacturers or repair shops, in laboratories or, for example, during diagnostic testing of motors in the industry sector. It supports you during standards-compliant PD testing for routine and type testing, factory and site acceptance testing, as well as for troubleshooting to localize or investigate PD sources in:

• Power transformers

• Power cables

• Rotating machines

• Gas-insulated switchgear (GIS)
 and medium-voltage switchgear

• Industrial drives

• Railway transportation

• High-voltage components such as bushings,
 insulators, capacitors, cable terminations, busbars

Factory Testing

In High voltage labs, PD measurements on HV components can be performed with the standard PD measuring circuit, using coupling capacitors and measuring impedances. After the calibration process, the PDMA 200 will display the value of the apparent charge in accordance with IEC 60270. Graphical tools, such as PRPD pattern visualization, support the PD analysis.

On-site Testing

The PD measurement provides one major criterion for assessing the quality of the HV equipment and their accessories, as well as their assembly on-site. The HV assets are tested with a sensitive PD measurement during manufacture and so during commissioning the focus is on the quality control. In addition to the classical PD measurement with a coupling capacitor at the cable termination, there are alternative decoupling methods based on PD-field sensors which are more important in onsite testing and online Monitoring.

Online Monitoring

PDMA 200 has versatile application in the Online Monitoring of various HV assets like Rotating machines, power transformers, Cables and GIS.

Based on wide frequency bandwidth (up to 50 MHz), it can be connected to many online sensors like HFCTs, coupling capacitors, acoustic sensors and etc.

So you can perform online monitoring in the power plants, substations, and industrial utilities easily.
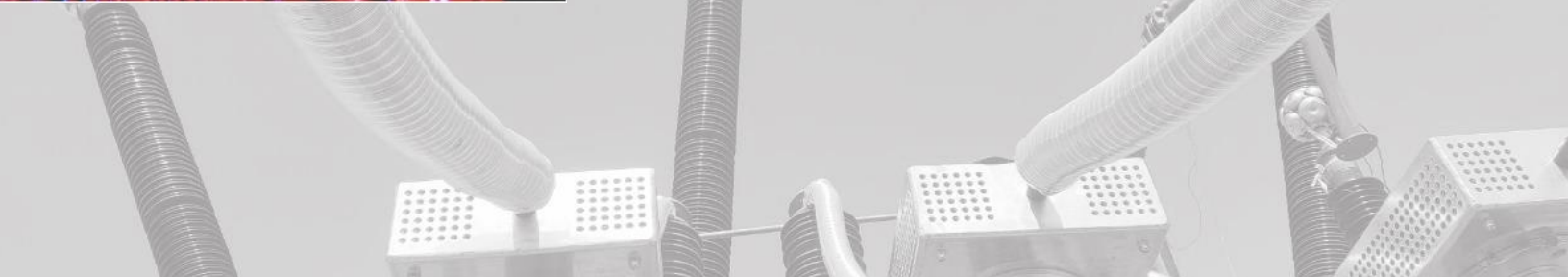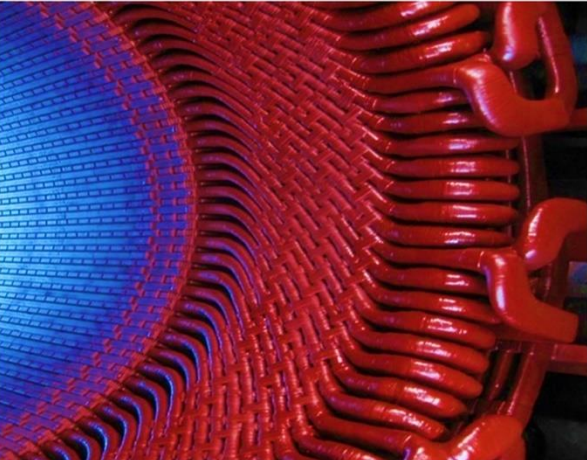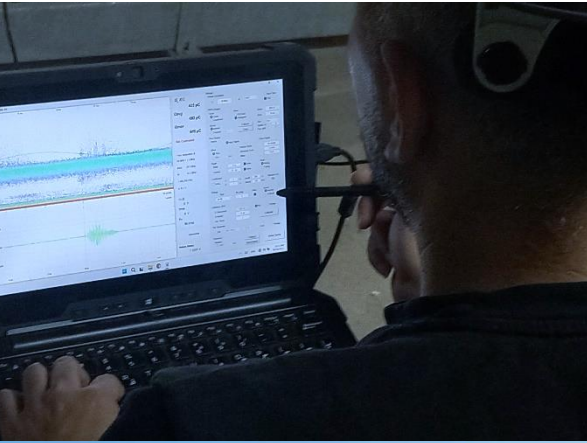
A Fully Digital System

Its versatility and robustness makes the PDMA 200 the ideal system for both laboratory and on-site measurement of partial discharge in power system equipment.

The System

The PDMA 200 system consists of three acquisition unit which are , a fiber optic LAN-controller and its innovative software to make PD measurements in full accordance with international standards. High-resolution digital processing technology delivers exceptional measurement accuracy.

Field-Proven Technology

Field-tested in some of the largest PD measuring projects and used by major cable, transformer and rotating machine manufacturers the system has fully proved its reliability.

Galvanic Isolation-

PDMA 200 benefits from fiber optical communication with laptop or windows-based tablets. So, there is a galvanic isolation between the operator and the high voltage area and the measurement can be performed in safer environment.

Battery Powered Acquisition

PDMA 200 Due to the very low power consumption, an uninterrupted battery operation time of more than 8 hours can be guaranteed. During battery operation no noise from the mains power supply can enter the measuring circuit. The measurement unit can be operated at high voltage potential (for ungrounded measurements).

5 - 50 m

Shielded HF cable

PD
Detector

PC

~ 2 km

Optical fiber

LAN
Control

PC
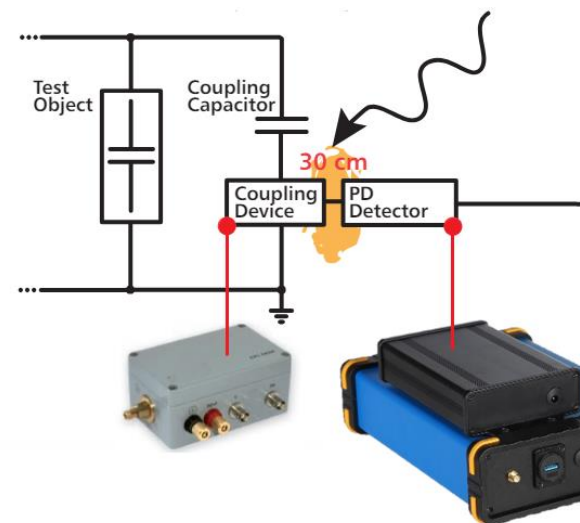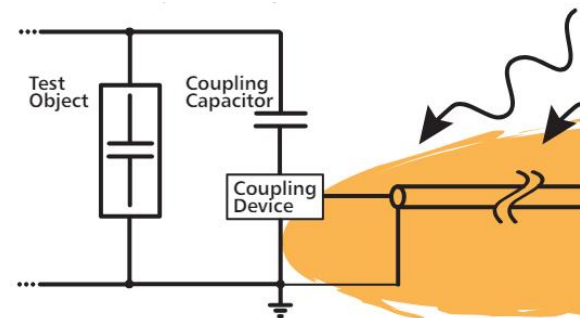
Optical Isolation

The unique high-speed fiber-optic network technology guarantees complete galvanic isolation between the individual acquisition units and the PC controller. The elimination of ground loops reduces interference and enables the system to have higher sensitivity (better signal-to-noise-ratio).

Fiber-optic connections are well proven in industrial environments where electrical or radio frequency connections are unreliable because of frequent disturbances from machines or electrical discharges (e.g. PD). Fiber optic connections may also be very long (up to 2 km) without degrading the instrument's performance.

Another convincing advantage of the fiber-optic network, in comparison to conventional copper wired systems, is the complete real time of the connected acquisition units down to the range of nanoseconds. Due to an automatic propagation delay compensation over the length of all network segments, a continuous, uninterrupted acquisition of time-critical PD events and the related test-voltage signal is ensured.
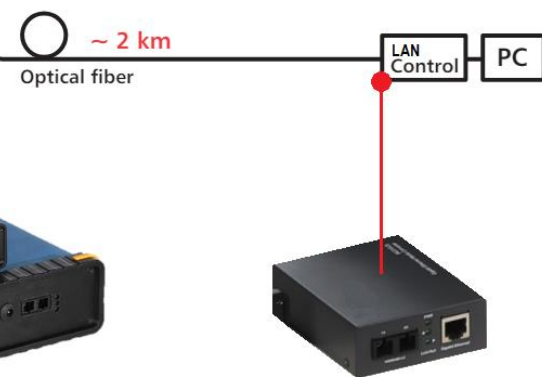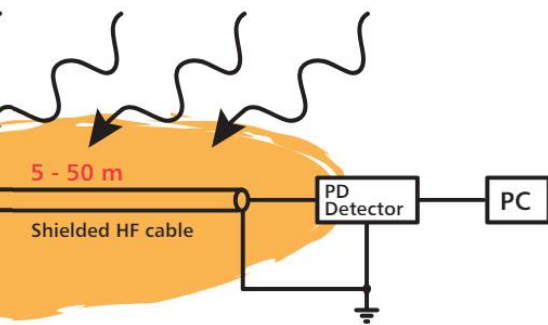
Your benefits:

• Ability to extend for testing large systems

• No noise from mains due to battery operation

• Optical fiber connections significantly reduce base noise level

• Full real time measurement of coupled PD detectors, leading to extensive analysis possibilities

• Extremely high measurement accuracy and sample rate

Powerful Software

The innovative software solution provides various options for easier measurement and analysis of partial discharge for different user needs.

Software Features

• The large scope view shows the high-voltage curve(s) of the connected acquisition units, as well as the phase resolved histogram of the currently selected unit

• The small scope view can be configured to show different sets of data: the spectrum of the input signal at the PD input (DC through 50 MHz), the time signal, Q(t) and V(t)

• The measured quantities display shows the current values for quantities conforming with IEC 60270 such as: charge level, high voltage, frequency, etc.

• display of input PD signal and Filter Output

• Charge and Voltage calibration based on IEC 60270 standard
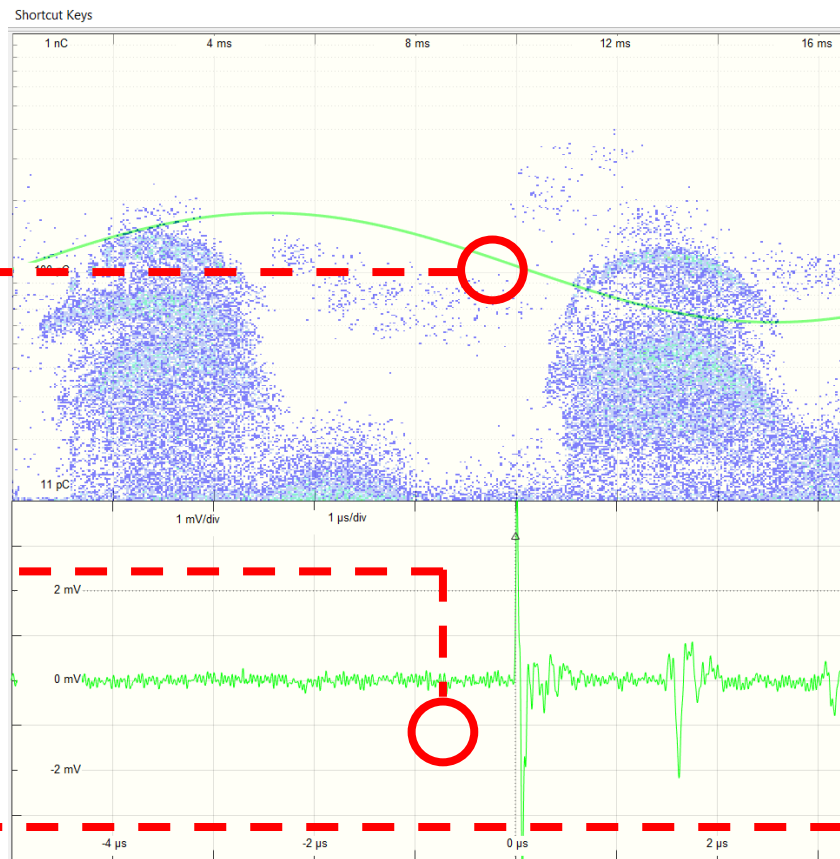
Results at the "click" of a mouse

• Highly responsive real-time display (> 20 frames /sec)

• Fully configurable and highly responsive real-time oscilloscope views, for the voltage and PD inputs

• Flexible PD event visualization, including the phase resolved histogram view, and real-time view

Lightweight & portable

The display is subdivided in the large scope view, the small scope view, and the measured quantities display
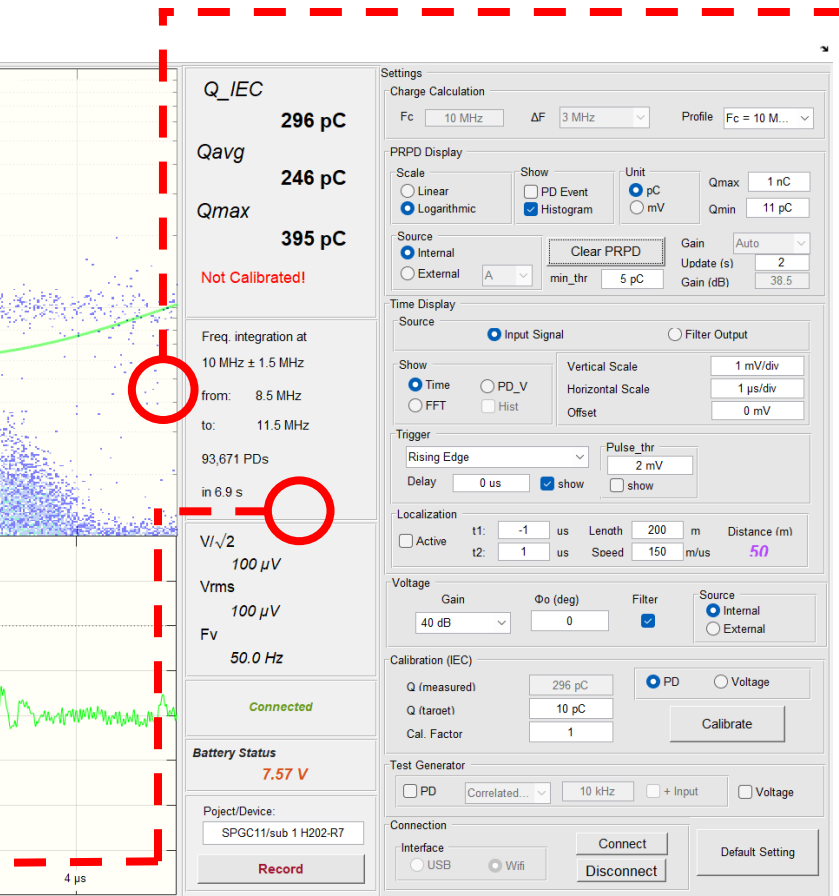
Fast and Flexible application

• Pre-defined Profile setting for easy and fast testing

• Automatic and manual setting of gain of input Signal to reduce the background noise up to 70 dB

• linear and logarithmic display of PRPD

• pC and mV measurement of partial discharge

• Setting the threshold for PD measurement

• Advanced setting of trigger values for time signals

• Time Domain Reflectometry

• Self-test generator for PD and V measurement

Project bipc$_t$r, Devise Id u, PRPD Pattern

Measured at F_m=15 MHz, df=3 MHz, and supply voltage U=100 µV

Q_{IEC}=59.9 pC, Q_{peak}=88.2 pC, Q_{avg}=46.8 pC, and PD filter out peak = 4.4 mV
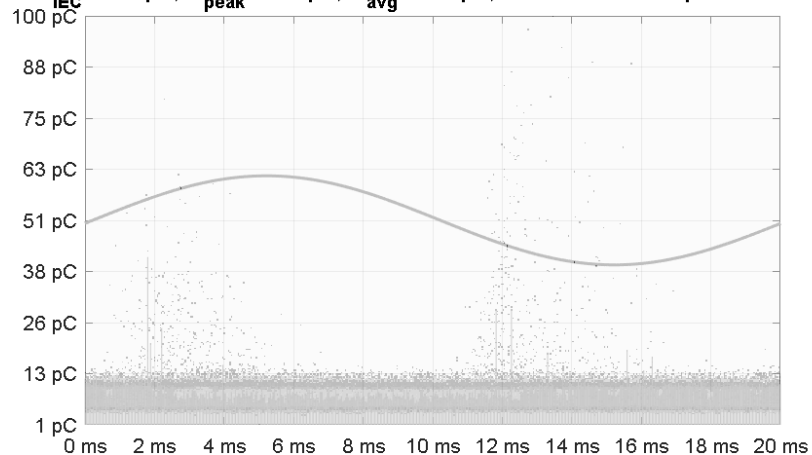
Noise Suppression

A major problem to overcome when making PD measurements, is interference from electrical noise, which may render the detection and location of PD signals difficult, or even impossible. The elimination of this interference is therefore critical for successful PD detection. The PDCAM 200 offers several methods for passive and active noise suppression.
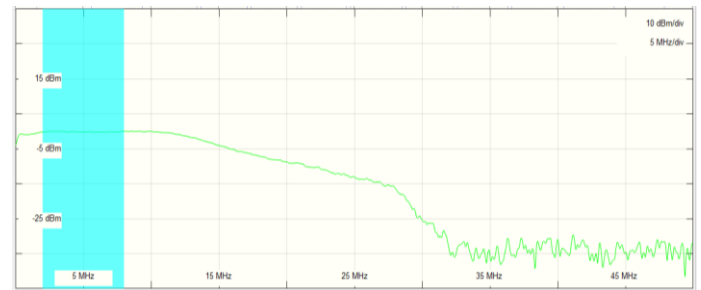
Advanced Fully Digital Filtering

In the PDMA 200 the classical analog filter has been replaced by a mathematical algorithm. Therefore, no aging effects or drift over time and temperature occurs and the PDMA 200 offers an exceptionally high degree of reproducibility to perform reliable, calibrated and traceable PD quality control.

PD events can sometimes be overlaid by disturbances in certain frequencies. PDMA 200 allows you to select individual measurement settings by adapting the center frequency and choosing between various bandwidths. By doing so, the frequencies with noise can be excluded and the analysis will target the real PD.

Flexibly adjusted to the appropriate frequency spectrum range
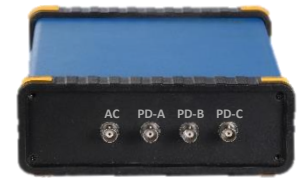
FFT Display Histogram

Analysis of captured pulses in the frequency domain using FFT display is possible. The FFT display can be set to show a histogram of the spectrum. By using this feature the FFT of PD pulses can be distinguished from noise and helps to choose the best frequency filter.
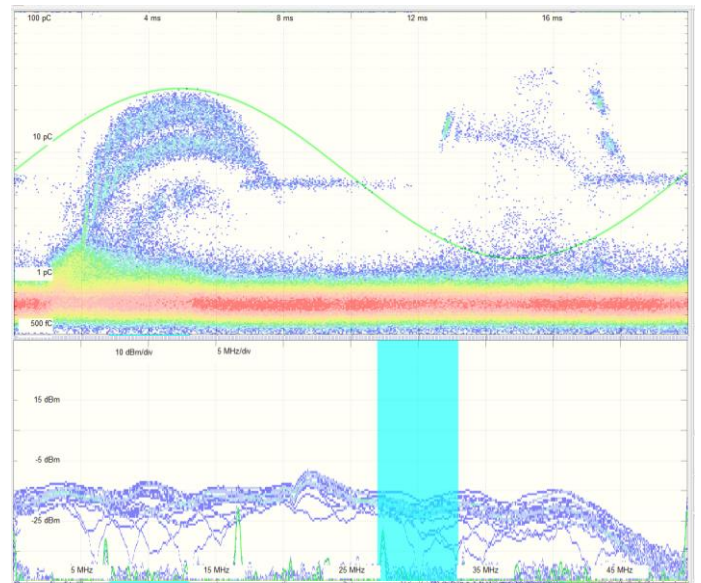
FFT of captured signals can be seen together

PDMA 200 Specification

Number of channels	3 Multiplexer
Spike Protection	yes
Standard	IEC 60270
Input Voltage	V input: 60 V rms (max), PD input: 10 V rms (max)
Dynamic Range	V input: 102 dB, PD input: 132 dB (overall) 70 dB (per input range selection)
Sensor types	QPOL 200 (measuring impedance)
	HFCT for cable PD
	AA for acoustic
PD range	0.2 pC to 1,000,000 pC
Display type	PRPD – PD pattern, wave shape analysis, TDR, FFT and FFT histogram, PD pulse shape after filter,
Signal sampling	105M Samples/sec, 14 bit
Frequency range	55kHz –50MHz
Band-width	3 MHz, 1MHz, 500 kHz, 300 kHz, 100 kHz, 30 kHz and 9 kHz
interface	Optical fiber connection via LAN
Processing	Real-time, Configurable, Band-pass filter and Innovative pulse detection algorithm
TDR	Yes
Test voltage frequency tracking	Yes (up to 400 Hz)
Operating Environment	
Temperature	0°C to 50°C
Humidity	20 to 90% RH non-condensing
Power	Battery operated 8 V, 7200 mAh
AC Frequency	47 to 63Hz

About US

AZARBAIJAN TECNOLOGIES is an Iranian start-up company that works passionately on ideas for making electric power systems safe and reliable with focus on partial discharge measurement and monitoring. We produce high-tech systems for the monitoring of power distribution devices and engineering services for high-voltage diagnostic applications. Our solutions are designed to meet our industry's current and future challenges. We always go the extra mile to empower our customers: we react to their needs, provide extraordinary local support, and share our expertise. Within our team, we research and develop innovative technologies for fields in partial discharge measuring systems and methods to prevent insulation failures in power grid assets. Also, we have more valuable experience in offering advanced testing and diagnostic services for different industries. In 2019, Azerbaijan technologies introduced first Iranian partial discharge measurement and monitoring systems for using in MV and HV cables with precision as well as pioneering global companies. Now, we have more than 5 products in this field that provide wide solutions for different needs.

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