

# PDTech DELTAMAXX™



## DIGITAL DISSIPATION FACTOR/CAPACITANCE ANALYZER AND PARTIAL DISCHARGE DETECTOR FOR TEST VOLTAGES UP TO 50 kV

The PDTech DELTAMAXX is an ultra-compact instrument to measure dielectric loss and capacitance, with an option to measure partial discharge. A new digital computing algorithm replaces the moving parts and fragile structure of conventional dissipation factor and capacitance bridges. It can be battery operated, and uses differential amplifiers, thus allowing easy application to grounded and non-grounded test objects. The system automatically adapts to a wide range of test frequencies and locks into the main frequency while rejecting higher harmonics by the new algorithm. Typical 3rd and 5th harmonics are automatically eliminated. Its robustness against external disturbance and ease of application allows retrofit to many older high voltage test benches.

**PDTECH DELTAMAXX DIGITAL SYSTEM DETERMINES WITH HIGH PRECISION THE DIELECTRIC LOSS FACTOR (DISSIPATION FACTOR), CAPACITANCE, AND PARTIAL DISCHARGE OF:**

- Generator and motor windings
- Dry-type Transformers
- Capacitors and Mass-impregnated paper cables

**The available systems are:**

- Loss factor and capacitance measuring device with integrated reference capacitor
- PD detector with integrated coupling capacitor
- Both functions integrated into one single unit

**UNITS FOR 15 KV, 20 KV, 30 KV AND 50 KV TEST VOLTAGES ARE AVAILABLE.**

### **THE LOSS FACTOR/ CAPACITANCE TEST**

The PDTEch DELTAMAXX system measures the high voltage applied to a DUT (Device Under test) and the current through the DUT, driven by the applied voltage.

A 16-bit A/D converter processes these signals to calculate precisely the capacitance and the loss factor of the DUT, using novel algorithms. These algorithms allow effective noise rejection and allows potential error sources to be eliminated.

A USB interface allows communication to a PC and as the analog signal is processed very close to the test object, long signal cables are not necessary. Typically, this length is limited to 5m, however, should longer connections be necessary, a fibre optic USB extender is available. For the measurements a variation of shunt resistors is available, to achieve best precision.

The PDTEch DELTAMAXX loss factor analyzer does not need an external power supply as it is powered by USB. If a PD measurement option is included external power supply (5V DC) is used.

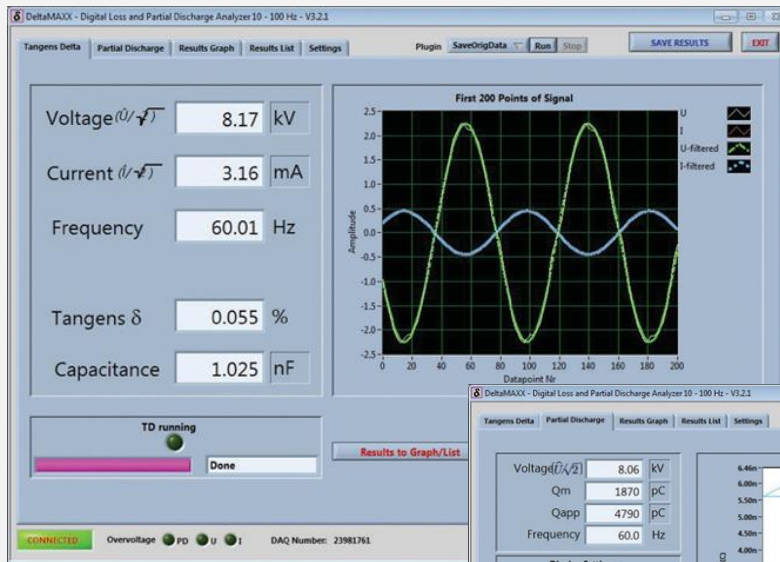
### **THE PARTIAL DISCHARGE TEST**

The PDTEch DELTAMAXX is configured to extract PD pulses via the integrated coupling capacitor. PD measurement does not require external components, as the complete hardware signal processing is integrated in the device. This technique allows the PDTEch DELTAMAXX unit to be placed in the direct vicinity of the test object and long signal cables, which could pick-up interference, are no longer necessary. Data is transferred digitally via the USB connection, which does not interfere with the analog part.

The instrument measures the partial discharge pattern and the apparent charge  $Q_{app}$ , in accordance with IEC 60270. Developed specially for the use with rotating electrical machines is the  $Q_m$  value, defined as the PD activity with a repetition rate higher than 10 per second, as specified in the IEC 60034-27-1.

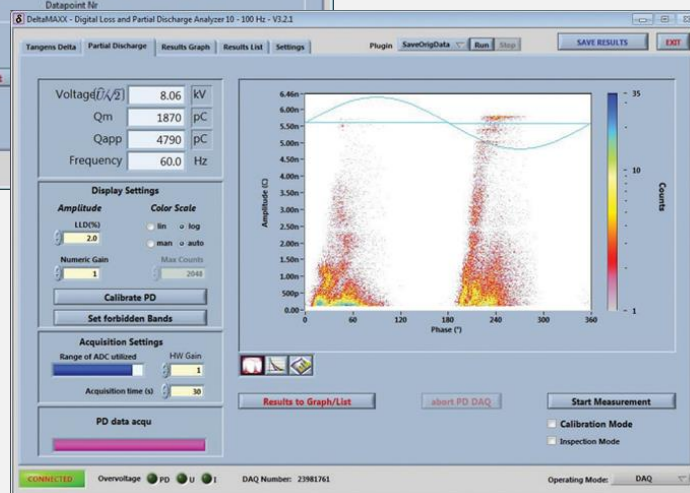
## THE SOFTWARE IS THE INSTRUMENT

The computer program is the instrument. The system calibration is part of the software, thus protocol generation and operation of the system is easier than using a microprocessor unit with extra computer interface. The PC is an integral part of the instrumentation. Protocol generation is included (HTML, Excel-Export).



< Results Screen for  $\tan\delta$

Results Screen for Partial Discharge >



### < PDcal20 (Battery Operated Calibration Pulse Generator)

The calibration pulse generator is used to inject known charge pulses into a high voltage test circuit in order to calibrate the amplitude scale of the PDTech DELTAMAXX. It is typically connected to the test circuit by (short) leads with 4mm banana plugs. The connectors are separated by 19mm, so that a coaxial or banana adaptor can be used to connect the calibration pulse generator to coaxial cable.

## SPECIFICATIONS FOR DF/C MEASUREMENTS

<b>Test Frequency</b>	10 to 100Hz
<b>Maximum Current</b>	depends on external components (shunts), standard is 10A, 50 mA and 2A
<b>Reference/Coupling Capacitor</b>	1nF nominal for 15 & 20 kV 0.7nF nominal for 30 kV 0.5nF nominal for 50 kV
<b>Tan</b>	$10^{-5} \delta$ (resolution)
<b>Error</b>	DF $1-2 \cdot 10^{-4}$ (uncertainty) Capacitance 0.5% at 5V input at 20°C
<b>Display Units</b>	selected via user interface
<b>Power Supply</b>	Via USB (for PD Module external power required)
<b>Harmonics</b>	Numerically rejected by software algorithm
<b>Interface</b>	USB PC requirement: Desktop or Notebook, Windows XP, 512 MB (min.)
<b>Test Voltage Range</b>	15kV (DELTAMAXX 15) 20kV (DELTAMAXX 20) 30kV (DELTAMAXX 30) 50kV (DELTAMAXX 50)
<b>Standards</b>	IEC 60034-27-3, IEEE 286

## KIT CONTENTS

- Data acquisition module with integrated coupling and reference capacitor
- Three current shunt modules (50 mA, 2 A, and 10 A)
- Connection cable set or shunt module, USB, banana cables and external power supply
- CD with configuration and operation software and user manual

## OPTIONS

- PD Module with PDCAL 20 calibrator
- Laptop
- Optical USB link

## ADDITIONAL SPECIFICATIONS FOR PARTIAL DISCHARGE OPTION

<b>Coupler Impedance</b>	Integrated high-voltage isolation transformer
<b>PD Band Pass</b>	Designed according to IEC60270, 40-800kHz
<b>PD Ranges</b>	Depends on test object and noise, 10pC to 200nC typical
<b>Max. Pulse Rep. Rate</b>	40'000 PD events per second
<b>Display</b>	Phase Resolved Partial Discharge Pattern and various statistical values
<b>Power</b>	USB and external 5V DC power supply
<b>Standards</b>	IEC 60034-27-1, IEC 60270, IEEE 1434

## GET IN TOUCH

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