Tettex INSTRUMENTS

DDX 9121a-1

Simultaneous Partial Discharge (PD) & Radio interference voltage (RIV) Detector

FEATURES

- Phase resolved displays of each phase
- Real time measurement and display
- Simple setup and testing via a single PC
- Data acquisition and test reporting
- Independent rack mounted units
- Automatic synchronization to a motor generator set
- Upgradeable at any time by adding additional channels
- Compact, 3U (19") desktop case ideal for integrating into a test system

The DDX 9121a-1 partial discharge & radio interference voltage (RIV) detector is the latest in the DDX family of PD detection equipment. It's our solution for single partial discharge & radio interference voltage testing. With the DDX 9121-1 you can setup, control, test, monitor and generate test reports from a single computer. Its modular design makes possible to add additional channels.

The DDX 9121a-1 comprises 1 rack-mounted unit communicating with a remote PC (Laptop, not included), which handles the display of PD information using the DDX 9121/SWR data acquisition and remote control software. The detector is controlled from the PC via an Ethernet link. The PC displays test-results, provides means of calibrating the system and logging of the results into a test report. The reports can then be printed out from the software or displayed as a web page. With help of the software the user can also export the results for use in a spreadsheet. Software also provides bitmaps for inclusion in other reports.

Built-in hardware filters allow the measurement frequency range to be adjusted in both the high and low frequency range to suppress frequency dependent noise. In addition gating possibilities allow blanking out phase synchronous and stationary interferences.

BENEFITS

Perfect for pass/fail testing –The allowable PD level is set and the unit determines pass or fail.

Simple to use –Windows based customer orientated software is all needed to operate the detector.

Straightforward replacement – An analog unit is old and needs a cost effective, simple replacement.

Multiple detectors – With the data acquisition/remote control software monitor multiple detectors can be operated at the same time.

Integrated test systems – because of its compact design and functionality this unit is ideal for an integrated PD test system including an AC power supply.

APPLICATIONS

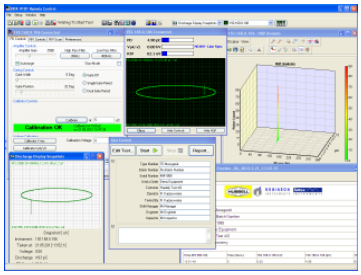
Testing of:

- Distribution Transformers
- Power Transformers
- Current and Potential Transformers
- Rotating Machines
- Switchgears
- Surge Arrestors
- Research & Development
- Universities

DATA ACQUISITION & ANALYSIS

The advanced data acquisition and analysis software allows a wide variety of possibilities like recording PD pulses of each and every test voltage cycle and analyzing them both in the temporal and phase domain.

A chart recorder provides a hard copy of partial discharge level versus voltage and testing time for each channel in one customized graph. Any time during the test the partial discharge levels can be monitored and after the completion of the test, **customized test reports** for the multiple channels can be generated automatically populated with snap-shots from interesting events.



Display Screen DDX®9121a-1

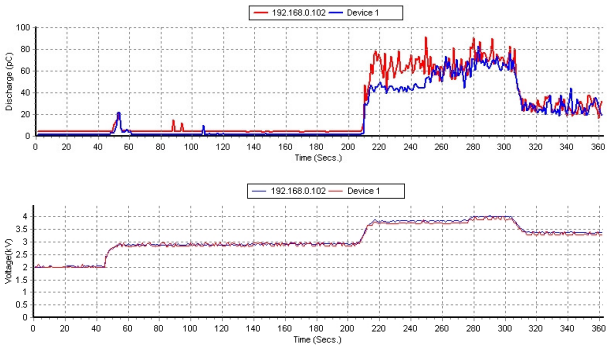
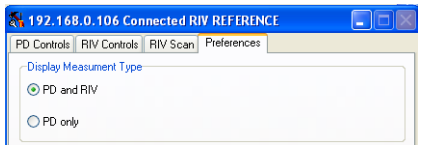
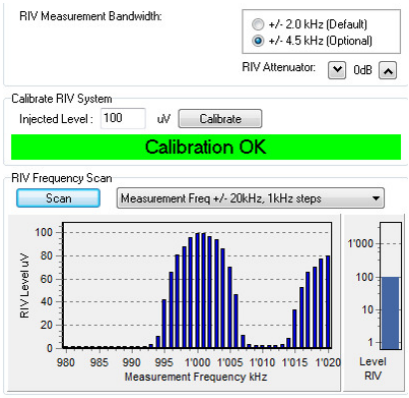


Chart Recorder with graphs PD vs. voltage and time

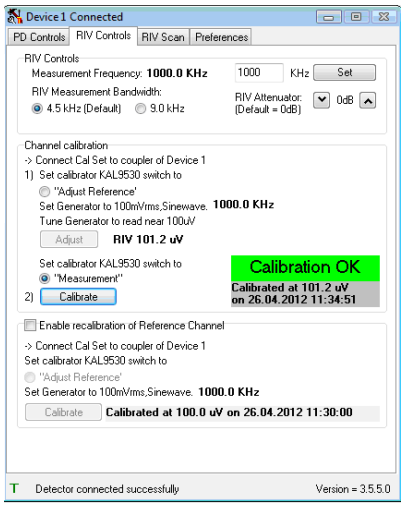
RIV MEASUREMENTS

The DDX 9121a-1 provides as an option RIV measurement according to ANSI and NEMA 107-1987. This permits replacement of outdated RIV measurement instruments without any measurement reading “surprises” seen with other contemporary equipments in the market. Additionally the RIV measurement can be performed simultaneous with the PD measurement,





Freq scan to identify the noise free RIV meas. Freq.

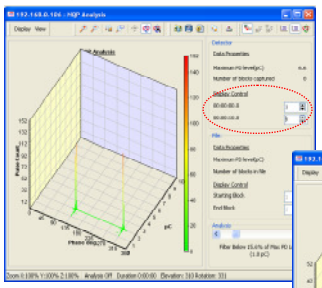


RIV calibration as per the de - facto industry standard – ANSI +NEMA

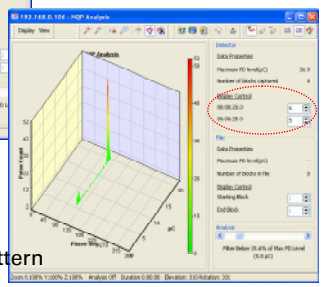
PATTERN ACQUISITION AND ANALYSIS MODULE

With the pattern acquisition and analysis module, several two- and three-dimensional PD pulse patterns of all the monitored channels (when equipped with a multiplexer) can be displayed and recorded. Snaps shots of the 3D patterns can be saved into a windows gallery for further uses like customised test report generation or to export them as image files.

Data filters and time-sliced views further permits a detailed look at the PD pattern as deep as every cycle of the applied test voltage and in certain cases, helps separate and identify noise interferences.



PD Pattern



Noise Pattern

technical specifications

Amplifier	
Gain(Attenuation)	0 dB to 75 dB in 5 dB steps
Attenuator Accuracy	1 %
Gain	9000
Input Impedance	50 Ω
System Noise	< 12 µV referred to input on highest gain range
Filters	High Pass - 30, 50, 60, 80 kHz Low Pass - 100, 200, 300, 400, 500 kHz

PD Measurement	
PD Meter Resolution	10 bits displayed
PD Capture	8 bits (7 plus sign)
Phase Resolution	0.1 %
Linearity Error	< 1 %

Voltage Measurement	
Uncertainty of Scale Factor	< 1 %
Linearity (10-100% FS)	< 1 %
Resolution	11 bits
Measurement modes	Peak / √2 true RMS
Synchronization	Local Mains, HV source (automatic)
Sync Lock range	20 Hz to 400 Hz

Mechancial	
Weight	3 kg (excluding PC
Dimensions	19" 3HU case, 340 mm deep
Power Supply	100-240 V, 40-70 Hz

Environmental	
Operating Temp Range	0 to 40 °C
Storage Temp Range	-10 to 75 °C
Humidity Range	95% non-condensing

Ethernet Port	
Isolated	100BaseT

(Note: Optically isolated cable for connection to LAN is recommended)

RIV measurement	
Measurement frequency range	850 to 1150 kHz
Bandwidth	9 KHz (- 6 dB)
Output level	1uV onwards
RIV system linearity (1 range)	< 2 % FSD

Applicable Standards	
IEC-60060 Parts 1&2	ICEA T-24-380
IEC-60270	ASTM D1868-93
IEC-885-2 and 885-3	ANSI C57.113
IEEE Std. 4, 1995	ANSI C57.124-91
ANSI C63.2-1996	NEMA 107

ORDERING INFORMATION

System

1. PD Detector System including 1 pc. of DDX 9121a-1 detector, Operating Manual and Calibration Certificates in English.
2. LAN cable for connection between laptop (not included)and DDX 9121-1

Options

- Laptop computer
- RIV measurement board
- 3 to 1 Manual Multiplexer.
- Optically isolated LAN cable

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Accessories for PD testing

CALIBRATORS

KAL 451

The KAL 451 is a battery powered PD calibrator for direct coupling of the generated PD signal to the test object according to the related standards IEC 60270 and IEEE 454. Pulse outputs ranges are 2 – 200pC and 20 – 2000pC. The pulse rise time is < 20ns.

9216

The 9216 is a small battery powered PD calibrator for direct coupling of the generated PD signal to the test object according to the related standards IEC 60270 and IEEE 454. Pulse outputs ranges are 10, 100, 1'000, 10'000 pC.

KAL 9530

The RIV calibrator (KAL 9530) includes a signal generator, RIV calibration set, clamp and a switching unit for calibration as per ANSI and NEMA standard.

PD SIMULATORS

753-US

The Miniature Partial Discharge Simulator is a compact, battery operated discharge simulator. It injects a known multiple pulse PD signal into a PD test circuit to allow verification of calibration. The unit also incorporates a fine frequency control for synchronizing to a multiple of the mains frequency.

MEASURING IMPEDANCES

AQS 9110a

The AQS 9110 Passive quadripole is a fully configurable quadripole system optimized for PD and RIV measurement. It has a voltage divider low-arm fitted to it for voltage measurement.

COUPLING CAPACITORS

TK series

The coupling capacitor / HV AC divider consists of 1 unit, built into a glass fibre reinforced epoxy tube. The top electrode allows partial discharge free. For PD measurements an appropriate coupling quadripole must be added.

PSF

PSF (Power Separation Filter) have high self resonant frequencies, high stability and low partial discharge levels. They are mounted on a base with a suitable top electrode and a low voltage arm. Outputs are provided for PD detector input, overload sensing circuit, pulse mark (indicates zeros in AC wave shape) and kilovoltmeter input. Not suitable for RIV measurements.

MULTIPLEXER

DDX9106a

3 to 1 manual multiplexer in a separate housing stackable with DDX 9121a. This includes the piloting software with full functional feature set, including 3D displays, analysis and reporting tools.

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