DDX 9161

Partial Discharge (PD) & Radio Interference Voltage (RIV) detector

Datasheet

HAEFELY

Current and voltage – our passion

Designed by Tettex

General Description

The DDX 9161 is a **laboratory optimized**, highly integrated, versatile PD and RIV detector, accommodating up to four simultaneous PD/RIV and Voltage inputs. It is a fully digital state-of-the-art high-performance PD detector.

The DDX 9161 is modular and fits a wide range of PD detection applications. It includes an integrated low-noise power supply together with **rugged** fiber optic connectors and follows the Haefely *"plug & forget"* concept.

Conventional partial discharge measurements according to the latest IEC 60270 or RIV measurement according to the NEMA and CISPR standards are covered. Phase Resolved PD (PRPD) analysis and Data Logger function are possible as well.

Up to 3 stackable unit(s) connected in daisy chain communicate with a Control Software, which handles data acquisition and display PD information, test results and generates reports.

The DDX 9161 increases the laboratory sensitivity as it is equipped with the most flexible digital filters available on the market allowing the measurement frequency band to be shifted into a less noisy range and suppressing frequency-dependent noise.

The reports can be printed or saved to PDF. The software also provides screenshots function for inclusion in other reports. A default report template is included. However, any new template can be provided on request (option).

Features	Advantages
▪ User-defined measuring band ▪ Unique flexible high order digital filters ▪ High-resolution spectrum analyzer with oscilloscope	☑ **Reduced ground noise** - The built-in frequency spectrum analysis and selectable frequency band let the user optimize the setup quick and easy.
▪ Modular design, 1 to 4 channels ▪ Easily upgradable ▪ Daisy chain support up to 12 detectors	☑ **Optimized investment** - Unit can be easily upgraded (up to 12 simultaneous PD/RIV readings).
▪ Optically decoupled from computer ▪ Compact, reliable, and EMC hardened design, IP50	☑ **The galvanic isolation** - Ensures the full safety of the operating personnel. With the DDX 9161, there is no electrical connection between the control room and the high voltage test room.
▪ PRPD (Phase Resolved Partial Discharge) pattern (fingerprinting) ▪ Data acquisition and test report generation	☑ **PD interpretation** - The phase-resolved analysis and recording capabilities allow future data analysis.
▪ Software layout flexibility and versatility ▪ Dark software mode	☑ **Reduced training time** - Modern SW makes the use of the device easier than ever. Operators can start using the device in minutes.
▪ Simultaneous RIV (NEMA or CISPR) and PD reading	☑ **Measuring time reduction** - Simultaneous PD and RIV measurement enables users to reduce the testing time
▪ Mains powered	☑ **Connect and forget** - no battery pack or recharge of batteries needed.

Applications

- Power and distribution transformers
- Instrument transformers
- Rotating machines
- Switchgears (MV/HV/GIS)
- Surge arresters
- Bushings
- Cables
- Power capacitors
- Components testing
- Research and development

Scope of Supply

- PD detector DDX 9160
- Cables and connectors set (per channel)
- Software on USB stick
- Fiber-link adapter
- Grounding cable 1 m
- Test certificate + Operating manual

Technical Data

PD Measurement			
Input impedance	50 Ω		
PD filter (-6 dB)	Frequency range		Bandwidth (Freely selectable)
	30 kHz ... 1.5 MHz	→	3 kHz ... 1.47 MHz
	300 kHz ... 20 MHz	→	30 kHz ... 19.7 MHz
Sensitivity	≤ 0.01 pC (directly at DDX 9160 internal quadripole input; frequency integration)		
Linearity error	< ± 1 %		
Oscilloscope	500 µs recording depth		
Spectrum analyser (FFT)	2.5 kHz resolution		

Built-in (internal) measuring impedance (optional)	
PD input	50 Ω, max. 1 A_{RMS}
PD input frequency range	20 kHz ... 25 MHz (-6 dB); 10 kHz ... 30 MHz (-20 dB)
Voltage measurement	Current input (shunt); 10 µA - full accuracy minimum; 0.2 µA - synchronization minimum

Voltage Measurement	
Input voltage range	≤ 400 V_{pk}
Frequency range	10 … 600 Hz
Input impedance	1 MΩ / 3 pF
Linearity error	< ± 0.1 %
Synchronization	Input voltage

RIV Measurement System	
Filter center frequency	Freely selectable (50 ... 2150 kHz)
Filter bandwidth	4.5 kHz (NEMA) and 9 kHz (CISPR)
Sensitivity	< 1 µV (directly at AKV 9360 quadripole input for NEMA/CISPR)
Quasi-peak detector response	NEMA according to NEMA 107:1987, ANSI C63.2:1996 CISPR according to CISPR 16-1-1:2019, CISPR 18-2:2017, NEMA 107:2016, ANSI C63.2:2016

Connectors	
Fiber-optic	2 x Fiber optic with rugged HARTING connector, Han 3A-gw-M20, SC type
PD input	1x ... 4x BNC (option)
Voltage input	1x ... 4x BNC (option)
Fiber-link adapter	Fiber-optic, HARTING connector conversion to Ethernet 10/100 (data) and USB 2.0 (power/data)

Environmental Mechanical and Power Supply	
Operating temperature	-20 °C … +55 °C
Storage temperature	-40 °C … +85 °C
Humidity	5 ... 95 % r.h., non-condensing
Dimensions (W x D x H)	342 x 315 x 86 mm (13.5 x 12.4 x 3.4 in)
Weight	6 kg (13.2 lb)
Protection class	IP 50
Power supply specification	90 -140; 195 - 265 VAC, 50/60 Hz

PC and Operation System Requirements	
PC configuration	Minimum: Intel Core i5 (3rd Gen) or better, 4 GB RAM, Ethernet / USB 2.0 Recommended: Intel Core i7 (10th Gen) or better, 16 GB RAM, Ethernet / USB 2.0
Operating system	Windows 10 or 11, 64-bit

Applicable Standards	
General	IEC 60270:2000+AMD1:2015, IEC-60060 Parts 1&2, IEC-885-2 and 885-3, IEEE Std. 4, 1995, ICEA T-24-380, ASTM D1868-93, ANSI C57.113, ANSI C57.124-91
CE conformity	EMC Directive 2014/30/EU and RoHS Directive 2011/65/EU

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