



Advanced Test Equipment Corp.  
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## DDX 9161

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

*Datasheet*



**HAEFELY**

Current and voltage – our passion

Designed by



# 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
<ul style="list-style-type: none"> <li>▪ User-defined measuring band</li> <li>▪ Unique flexible high order digital filters</li> <li>▪ High-resolution spectrum analyzer with oscilloscope</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>Reduced ground noise</b> - The built-in frequency spectrum analysis and selectable frequency band let the user optimize the setup quick and easy.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Modular design, 1 to 4 channels</li> <li>▪ Easily upgradable</li> <li>▪ Daisy chain support up to 12 detectors</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>Optimized investment</b> - Unit can be easily upgraded (up to 12 simultaneous PD/RIV readings).</li> </ul>
<ul style="list-style-type: none"> <li>▪ Optically decoupled from computer</li> <li>▪ Compact, reliable, and EMC hardened design, IP50</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>The galvanic isolation</b> - 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.</li> </ul>
<ul style="list-style-type: none"> <li>▪ PRPD (Phase Resolved Partial Discharge) pattern (fingerprinting)</li> <li>▪ Data acquisition and test report generation</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>PD interpretation</b> - The phase-resolved analysis and recording capabilities allow future data analysis.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Software layout flexibility and versatility</li> <li>▪ Dark software mode</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>Reduced training time</b> - Modern SW makes the use of the device easier than ever. Operators can start using the device in minutes.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Simultaneous RIV (NEMA or CISPR) and PD reading</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>Measuring time reduction</b> - Simultaneous PD and RIV measurement enables users to reduce the testing time</li> </ul>
<ul style="list-style-type: none"> <li>▪ Mains powered</li> </ul>	<ul style="list-style-type: none"> <li>☑ <b>Connect and forget</b> - no battery pack or recharge of batteries needed.</li> </ul>

# 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 itself
- FiberLink – Harting to USB
- 20 m Harting fiber optic cable
- USB stick with SW
- Manual
- Quick Start Guide
- PD connection accessories set - per channel (2x 0.5 m banana cable, 2x crocodile clamp, 2x fork-to-4mm adapter, 2x 4mm-socket adapter, 1x 2 m BNC cable, 1x BNC (F) – BNC (F) adapter)

# Technical Data

PD Measurement							
Input impedance	50 Ω						
PD filter (-6 dB)	<table border="0"> <tr> <td>Frequency range</td> <td>Bandwidth (Freely selectable)</td> </tr> <tr> <td>30 kHz ... 1.5 MHz →</td> <td>3 kHz ... 1.47 MHz</td> </tr> <tr> <td>300 kHz ... 20 MHz →</td> <td>30 kHz ... 19.7 MHz</td> </tr> </table>	Frequency range	Bandwidth (Freely selectable)	30 kHz ... 1.5 MHz →	3 kHz ... 1.47 MHz	300 kHz ... 20 MHz →	30 kHz ... 19.7 MHz
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 (together with AKV 9360; frequency integration)						
Linearity error	< ± 1 %						
Oscilloscope	500 μs recording depth						
Spectrum analyser (FFT)	0 ... 50 MHz with 2.5 kHz resolution						
Built-in (internal) measuring impedance (optional)							
PD input	50 Ω, max. 1 A <sub>RMS</sub>						
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	0.1 ... 283 V <sub>RMS</sub> (0.14 ... 400 V <sub>pk</sub> ) – full accuracy; 0.2 mV <sub>RMS</sub> - sync minimum						
Frequency range	DC, 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, 25 VA						
PC and Operation System Requirements							
PC configuration	Minimum: Intel Core i5 (3 <sup>rd</sup> Gen) or better, 4 GB RAM, Ethernet / USB 2.0 Recommended: Intel Core i7 (10 <sup>th</sup> 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						

## Global Presence

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**HAEFELY**

Current and voltage – our passion



H HIGH VOLTAGE

I INSTRUMENTS

E EMC

precision.   
swiss made.