

# DDX 9101

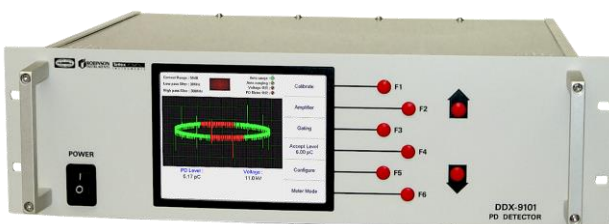
## Partial Discharge Detector

■ **The DDX 9101** partial discharge detector belongs to our very successful family of DDX detectors. It is the ideal solution for pass/fail partial discharge testing; incorporating all the basic functions of an analogue detector and meeting all IEC and IEEE/ANSI standards for PD testing. We've eliminated the costly, advanced features associated with fully computerized PD detectors. The DDX 9101 simply measures the level of PD and the applied test voltage. It's designed to help you modernize your facility at an affordable price and it's simple to operate.

DDX 9101 is a straightforward replacement for older analogue detectors of any make or model. The system is housed in a 3U 19" rack mount case designed to slide into a rack. Or, if you need a complete new test system, the detector can be integrated with an AC power supply for production PD testing of HV components.

This simple-to-use detector is controlled via 8 control buttons on the front panel. To operate the detector, select the desired operation mode (magnitude meter or oscilloscope mode) and choose the appropriate amplifier settings. Calibrate the measurement setup, set the maximum acceptable PD level and you are ready to start the test. Once the voltage is applied to the test object, an indicator on the screen tells you if the test object passed or failed the test.

With the data acquisition / remote control software and a PC (optional) the capabilities of the unit are greatly expanded. All data is acquired during the test according to user-defined parameters, the data can then be used to generate customized test reports with graphs and charts. The user can also take "snapshots" of the ellipse any time during a test. It's just like that camera on your old analogue scope, only easier.



The most distinguishing feature of the DDX 9101 advanced software is its ability to operate and monitor multiple detectors simultaneously. If you are a manufacturer performing routine PD tests in multiple bays, each DDX 9101 can now be linked to a single PC enabling remote controls, monitoring and acquisition of all data.

### FEATURES

- Settable PD threshold with indicator light when limit is exceeded
- Ethernet port for communication with a PC (optional)
- Data acquisition and remote control software package
- Two modes of operation - meter mode or scope mode
- Compact, 3U (19") rack mount case ideal for integrating into a test system

### BENEFITS

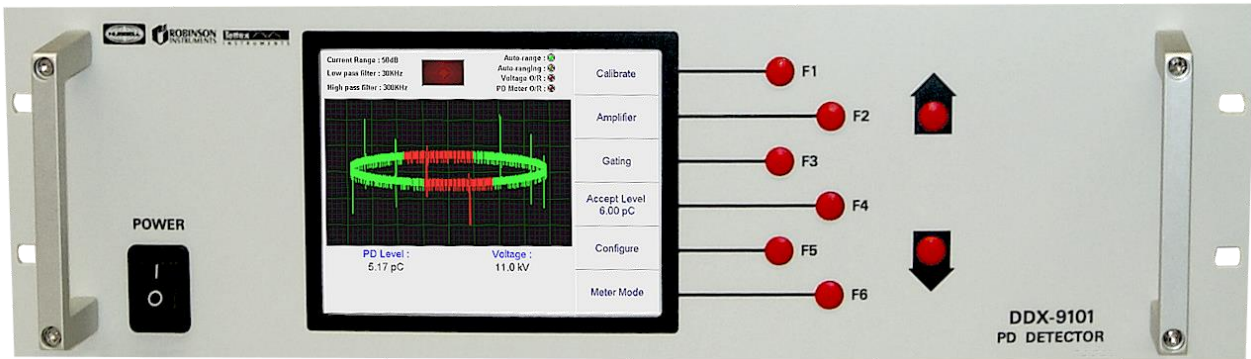
- Perfect for pass/fail testing – you set the allowable PD level and the unit determines pass and fail.
- Simple to use – 8 buttons on the front panel are all you need to operate the detector.
- Straightforward replacement – if you've got an old analogue unit and need a cost effective, simple replacement.
- Multiple detector – with the data acquisition/remote control software you can operate and monitor multiple detectors at the same time.
- Integrated test systems – because of it's 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
- Power Capacitors
- Switchgears
- Surge Arrestors
- Cables
- Research & Development

Main Screen / Front Panel Details



**Test Status Indicator Bar**

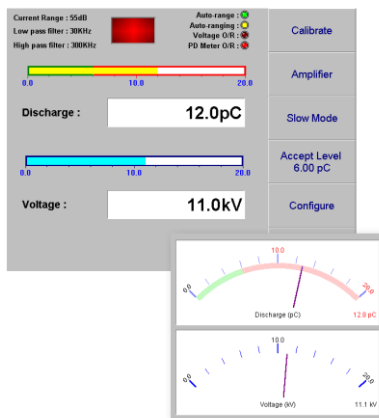
The test status indicator bar includes three sets of test indicators to aid during testing. On the left side are the user selected Range, Low Pass Filter and High Pass Filter settings. On the right side are indicator lights: auto-range shows if the auto-range feature is enabled and auto-ranging lights when the device is actively auto-ranging. The Voltage and PD Meter O/R light when the meter reading is beyond the scale of the meters. The light in the middle is the pass/fail indicator for PD levels that are over the user defined limit and shows in red during a “failed” test.

**Function Menu Bar**

The six buttons along side (the function menu bar) are used to enter the parameters and select settings for the unit and the test. The function menu bar along with the up/down buttons supply the user with control and the ability to set/alter the test setup.

**Main Screen**

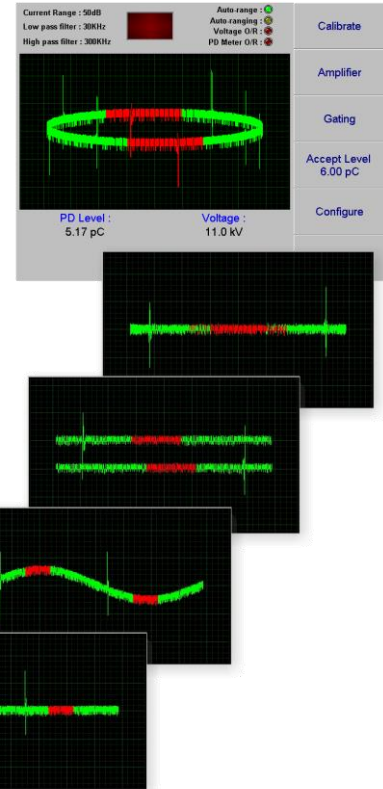
The test results are displayed on the main screen and two graphical modes are available to view the test results: meter mode and scope mode. The threshold shown graphically (in color) together with different meter modes makes monitoring of the test results simple.



When operating in the **meter mode**, you have opted to only view the magnitudes of the partial discharge. In meter mode, two meters are displayed: one for partial discharge and one for voltage. You can select two different types of meters: a traditional analogue meter display or a bar-type digital display. In either mode you select the update rate as either fast or slow.

The **scope mode** display looks just like an oscilloscope. You select the type of oscilloscope display as an ellipse, straight line or a sine wave. Gating features are also available in scope mode.

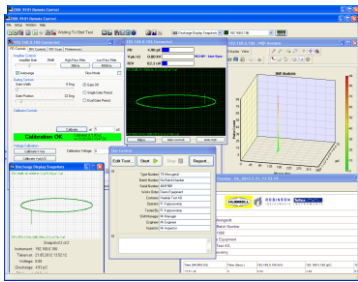
Scope mode gives you the ability to see more than just the magnitude of the PD and allows a knowledgeable user to perform diagnosis of the source of the PD. You can also choose whether there's a single or double gate, the start point, and the width to gate out undesirable interferences.



## DATA ACQUISITION & ANALYSIS

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



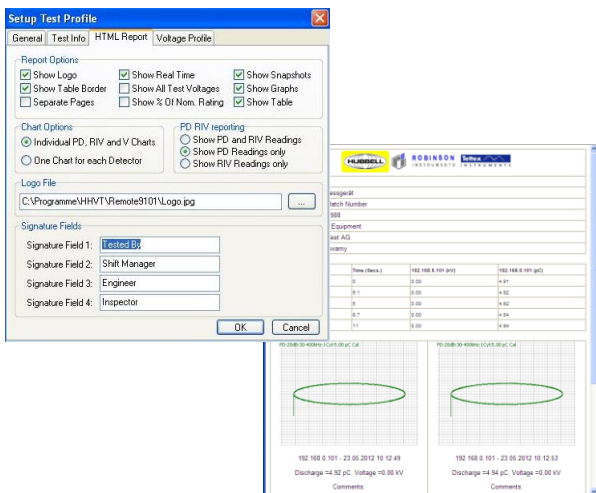
Software Display

## 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. Snapshots 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

## Test Reports

Test report generator allows generation of test reports with pre-defined or user-defined fields (logos, tabular / graphical display of results, snap-shots, etc). The reports can be further saved as HTML files containing graphs and charts and the data can be additionally exported as comma separated value (CSV) format for further analysis.



## TECHNICAL SPECIFICATIONS

### Amplifier

Gain (Attenuation)	0 dB to 75 dB in 5 dB steps
Attenuator Accuracy	1 %
Gain	3000
Input Impedance	50 Ω
System Noise	< 12 μV referred to input on highest gain range
Filters	High Pass – 20, 30, 50, 60, 80 kHz Low Pass - 100, 200, 400, 500 kHz

### PD Measurement

PD Meter	10 bits displayed
Resolution	8 bits (7 plus sign)
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

### Mechanical

Weights	5 kg
Dimensions	19" 3U case, 280 mm deep
Power Supply	100-240 V, 40-70 Hz

### Environmental

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

### Ethernet Port

Isolated	10BaseT
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(note: optically isolated cable recommended)

### Applicable Standards

IEC-60060 Part 1 & Part 2
IEC-60270
IEC-885-2 and IEC-885-3
IEEE Std. 4, 1995
ICEA T-24-380
ASTM D1868-93
ANSI C57.113
ANSI C57.124-91

## ACCESSORIES FOR PD TESTING

### CALIBRATORS

#### KAL 9510 Basic PD calibrator



Partial Discharge calibrator battery powered, ranges 1 pC – 50 nC in 1,2,5,10 multipliers; touch screen.

#### KAL 9520 Advanced PD calibrator



Double impulse Partial Discharge calibrator, battery powered, any value in range 0.1 pC – 50 nC, pulse burst mode (for DC tests), touch screen

### 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.

### 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.

#### AKV 9330



AKV 9330 is active measuring impedance optimized for PD testing of power capacitor as per IEC 60270. It is rated for 300 amperes.

### COUPLING CAPACITORS

#### 9230 series coupling capacitors



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.

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