Tettex INSTRUMENTS

DDX 9101

Partial Discharge Detector

The DDX 9101 partial discharge detector comes from the very successful family of DDX detectors. It is the ideal solution for pass/fail partial discharge testing; incorporating all the basic functions of an analog detector and meets all IEC and IEEE/ANSI standards for PD testing. We've eliminated the costly advanced features associated with fully computerized PD detectors. The DDX9101 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. The DDX9101 a straightforward replacement for older analog detectors of any make or model. The system is housed in a 3U 19" rack mount case designed to slide into a rack cabinet. Or, if you need a complete new test system, the detector can be integrated into 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 voltage is applied to the test object, an indicator on the screen tells you if the test object passes or fails 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 analog scope, only easier.

The most distinguishing feature of the DDX9101 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 DDX9101 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 is ideal for integrating into a test system

BENEFITS

Ideal 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 analog unit and need a cost effect, simple replacement
Multiple detectors – 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
- Switchgears
- Surge Arrestors
- Cables

- Research & Development
- Universities

etc.

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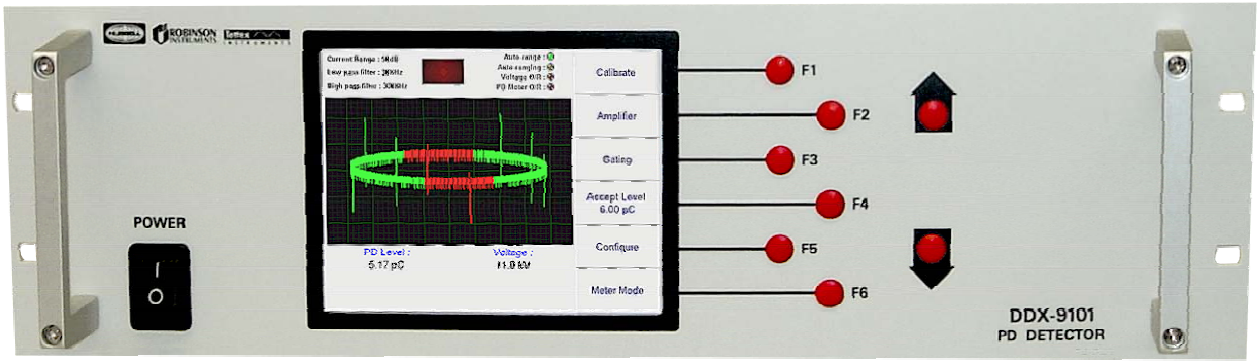
Main Screen / Front Panel Details



Test Status Indicator Bar

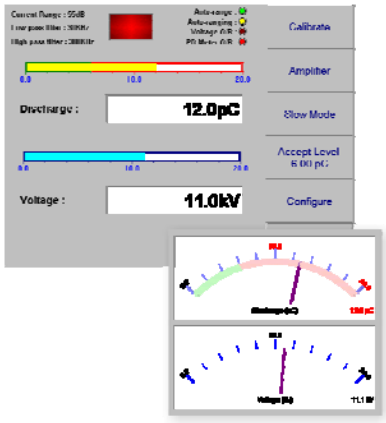
The test status indicator bar includes three sets of test indicators to aid during testing. On the left side are the user selected *Range, Low Pass Filter* and *High Pass Filter* settings. On the right side are indicator lights: a *auto-range* shows if the auto-range feature is enabled and *auto-ranging* 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

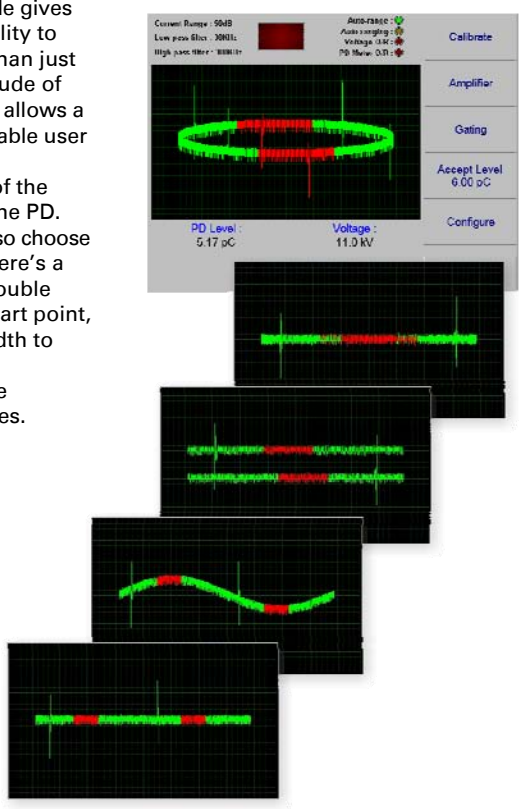
The test results are displayed on the main screen and two graphical modes are available to view the test results: meter mode and scope mode. The threshold shown graphically (in color) together with different meter modes makes monitoring of the test results simple.



When operating in **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 analog 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.



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REMOTE CONTROL / DATA ACQUISITION SOFTWARE

The Remote Control and Data Acquisition software enables control of the detector from a remote location via the Ethernet port of a PC. All data is acquired during the test based upon user-defined parameters. The user can generate customized test reports with graphs and charts.

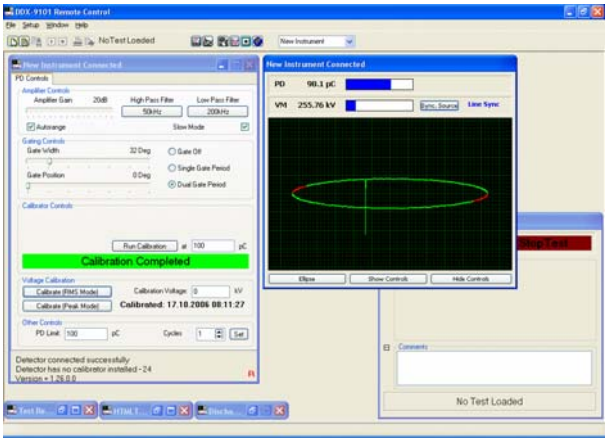
The software also provides the ability to monitor / operate more than one DDX at the same time. For performing routine PD tests on multiple test bays, several DDX9101's can now be linked to a single PC providing a single source for control, monitoring and data acquisition for all connected detectors. This can also be applied to multi-phase testing of transformers.

Test Control

The test control window shows, which DDX is currently running. This window displays the identification information for the device under test. It is also where the user has the ability to start and stop testing on a particular detector.

Measurement Control

This window allows the user to make all the settings as you would make in manual control mode on the detector(s). All the available parameters for amplifier settings, gating, filter settings, choosing the ellipse type and performing voltage calibration are done from this menu. This is also where the partial discharge and voltage meters are displayed and where the threshold indicator is located.

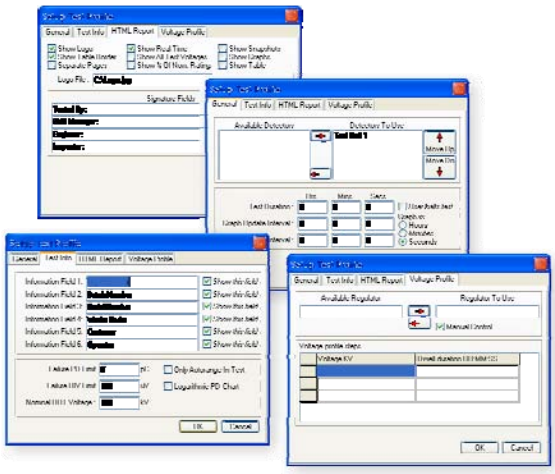


Another useful feature of this software is its "snapshot" capability. At any time during a test you can select the "snapshot" button. This will give you "photos" (i.e. snapshots) of the ellipse during that part of the test.

These can then be previewed and saved, deleted, cut/pasted into another document or printed.

Setup Test Profile

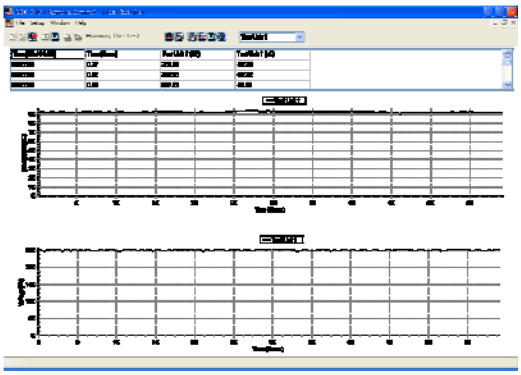
In the Setup Test Profile window there are three tabs to select from. The *General Tab* is where one selects the detectors that will be used and the order in which they will appear in the test reports. The time duration for the test and the rate at which the data for the graphs and the tables are updated are set in this window.



The *Test Info Tab* is the test identification information for the test you are performing and the device under test is entered. Also in this tab is where the user defines the partial discharge threshold limit for the tests. The *HTML Report Tab* is where the user selects the features of the automatically generated test reports. Options include logos, borders, and snapshots. This is also where the signature fields on the test report are defined.

Test Reports

The reports are saved as HTML files containing graphs and charts. In addition all data can be exported as comma separated value (CSV) format for further analysis or highly customized test reports in other programs like Excel MS.



Preview test report Partial Discharge vs. time

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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, 50, 80 kHz Low Pass - 100, 200, 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

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
(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

ORDERING INFORMATION

Scope of Supply	
PD Detector including: - Detector in rack mount case - VM and PD input cables (20 m) - Input line cord - 500 VA isolation box - Users manual - Calibration Certificate	**DDX9101**

Accessories and Options	
DDX 9101/H Desktop Housing	Consult factory
DDX 9104 Internal Calibrator	Consult factory
DDX 9101/SWR Data/Acquisition & Remote Control Software	Consult factory
Coupling Capacitors	Consult factory
Calibrator / Two-Pulse Generator	Consult factory
High Voltage Calibration Injection Capacitors	Consult factory

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