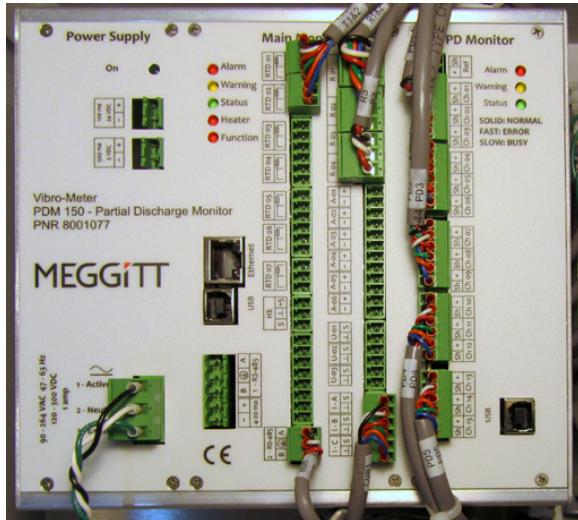


Vibro-Meter®

Partial discharge monitoring system

Model PDM 150



The PDM 150, from Meggitt's Vibro-Meter product line, is the most comprehensive and versatile partial discharge (PD) monitoring system on the market. The system includes the necessary hardware and software to monitor, log and report PD activity for systems used in industrial power generation systems and provides important information about the performance of equipment to enable early detection of problems.

A partial discharge is a localized electrical discharge in an insulation system that does not completely bridge the electrodes. PDs usually occur in voids and gaps in high-voltage insulation and are a leading indicator of insulation breakdown, which can lead to destruction, if not addressed.

Key features

- Standalone monitoring system consisting of power supply module, main CPU module and sensor input module
- Up to 15 partial discharge sensor inputs
- Additional inputs for temperature, pressure, shaft voltages and currents, and power and current signature analysis
- Built-in current signature analysis to detect possible broken rotor bars on induction machines
- Up to two years of data can be stored internally
- Ethernet, RS-485 and USB communication interfaces
- Easy connection to an industrial plant's DCS or SCADA system
- Supplied with software (user configurable) for system configuration and analysis and display of real-time and historical data
- Compatible with the CC 3xx series of coupling capacitors and the RTD 600, from Meggitt Sensing Systems

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Specifications

Operating	Power supply	90-264 V _{AC} , 47-63 Hz 120-300 VDC 1 A maximum
Inputs	Partial discharge sensor	Up to 15 inputs Additional PD channels can be supplied on special request Refer to the CC 308, CC 316 and CC 328 datasheets Refer to the RTD 600 datasheet 1 MHz to 20 MHz
	Measurement frequency bandwidth	Up to 7 inputs (An internal sensor uses one of the inputs for ambient temperature)
	Temperature sensor	1 internal sensor, included 6
	Ambient relative humidity input	3
	4 to 20 mA current loop inputs	3 (300 V _{AC})
Outputs	Relay outputs	4 dry relay contacts 24 V _{DC} at 0.1 A max or 5 V _{DC} at 0.5 A max
Filtering	User configurable	By amplitude, polarity, or time of arrival
Communications	Interfaces	Ethernet (10 Mbps) Fast Ethernet (100 Mbps) RS-485 (isolated serial link) USB
	Protocols	Modbus RTU (serial connection) Modbus TCP (Ethernet connection) Proprietary protocol (Meggit Sensing Systems)
Environmental	Temperature range	-40 to +158° F (-40 to +70° C)
Physical	Mounting	DIN rail, using bracket on rear panel of enclosure
PDM150	Height	7.0 in (178 mm)
	Width	7.0 in (178 mm)
	Depth	4.5 in (114 mm)
Nema 4 enclosure	Height	17.58 in (444.6 mm)
	Width	15.96 in (405.4 mm)
	Depth	8.34 in (211.8 mm)

Contact

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Ordering information

Item	Model	Ordering number
15-channel partial discharge monitoring system, with software	PDM 150	8001077
Accessories	Model	Ordering number
8 kV power coupling capacitor kit	CC 308	8001078
16 kV power coupling capacitor kit	CC 316	8001079
28 kV power coupling capacitor kit	CC 328	8001080
6-channel RTD partial discharge module	RTD 600	8001081

Note: Up to 30 or 45 input channels are possible on special request. Contact Meggitt Sensing Systems for details.

Hardware

The PDM 150 system hardware is a standalone unit consisting of three modules: a power supply, a main CPU and a 15-channel PD sensor input module. The main CPU is microprocessor-based and continuously monitors the insulation system of a turbine generator or hydro generator for PD activity.

Up to two years of data can be stored in the unit, with no external connection to a computer required. At the same time, the PDM 150 can log and store additional key parameters, configured by the user, such as the power or the thermal and mechanical condition of a machine. This facilitates more comprehensive trend plots when viewing historical data and enables analysis of the relationships (correlation) between various measured characteristics. Other inputs and outputs are also available for monitoring temperature, humidity, pressure, motor-frame or shaft vibration, shaft voltages and currents, and power and current signature analysis.

Three communication interfaces – Ethernet, RS-485 and USB – provide flexibility in exchanging data with the 'monitoring system workstation' (host computer running the PDM 150 system software called PDSight) and other local control system instrumentation. With dry relay contacts and both Modbus RTU (RS-485) and Modbus TCP (Ethernet) communications capability, the PDM 150 can easily be connected to an industrial plant's DCS or SCADA system.

Simultaneous data acquisition on all channels and the ability to provide time-of-flight measurements and /or pulse-polarity detection to determine pulse direction provide unique capabilities for noise cancellation. This ensures that the low-level signals are reliably and accurately detected, even in harsh industrial environments.

Applications information

In order to provide a complete PD analysis system, the CC 3xx series of CCs are typically used in conjunction with the RTD 600 and the PDM 150 monitoring system and software.

The PDM 150 monitoring system is supplied in a NEMA 4 enclosure with terminal strips, ready to install. For additional information about installation, set up and operation, please refer to the PDM 150 manual.

For specific applications, contact your Meggitt Sensing Systems representative.

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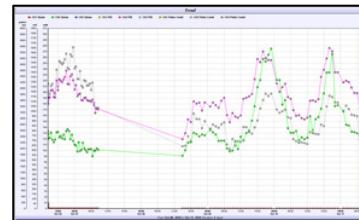
Partial discharge monitoring system

Model PDM 150

Software

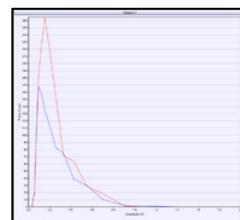
The PDSight software, supplied with the partial discharge monitoring system, supports the configuration of the PDM 150 unit and the analysis and display of all data generated by the periodic or continuous monitoring of equipment. The software supports simplified downloading and storing of captured data to provide the user with tools for effective data presentation and analysis.

PDSight works with the PDM 150 hardware to measure or calculate multiple PD pulse parameters, including polarity (+ or -), pulse count (number/second), magnitude (mV or pC), phase angle (degrees) and PD intensity (mW). Based on this information, the PDSight software can determine the type of PD problem and its severity, in addition to the trend information.



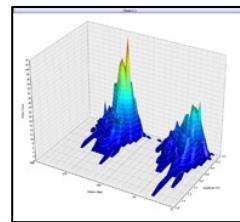
Trend

Outputs from the PDSight software include partial discharge quantities (defined by Meggitt Sensing Systems), N-Q distributions, trending of key parameters, and 3D/2D data presentation. For a more completely integrated system, the PDSight software can be installed on a central 'monitoring system workstation' along with Meggitt Sensing Systems' other machinery protection system and condition monitoring system products: MPS, CMS and VibroSight®.



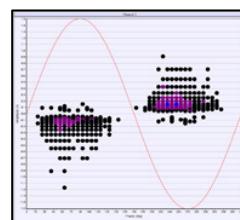
N-Q distributions

For data analysis and display, the trend plot of the PDSight software can be used to view equipment parameters over time. For example, magnitudes, pulse count and PD intensity (power), and operating dynamics such as ambient temperature, humidity, load current and winding temperature.



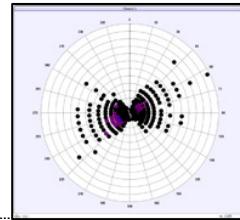
3D phase resolved

In addition, N-Q distributions (a plot of repetition rate against charge, for pulses of PD activity) provide an easy depiction of predominance. The observed equipment's operating dynamics can be correlated with predominance to provide additional diagnostic capability and better understand the characteristics of a power generation system.



2D phase resolved

The 3D plot is a common way to present the angular distribution of the PD data and investigate its structure. The phase resolved data plot (2D) presents the same data as the 3D plot but with the number of pulses per second shown using different coloured dots.



Polar phase resolved

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Partial discharge sensors

The PDM 150 system accepts signals from a wide variety of PD sensors including the CC 3xx series of coupling capacitors and the RTD 600 resistance temperature detector PD module, both available from Meggitt Sensing Systems' Vibro-Meter product line.

The PDM 150 can also interface with PD sensors from other manufacturers.

Coupling capacitors installed at line terminals only monitor about 10 to 15 % of the winding, since PD signals attenuate very rapidly. It is therefore recommended to use existing RTDs, embedded in the equipment windings and installed at the line terminals, as additional PD sensors. Using the PD signals from the RTDs in generator and motor windings dramatically improves the coverage of PD monitoring.

The RTD 600 is installed in series with any existing RTD wiring. In this way, the PD signal is extracted from the wires for analysis by the PDM 150 system without affecting any pre-existing winding temperature monitoring equipment.

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