

1PDM Transformer Fault Detection Monitor

1PDM is a cost-effective solution developed by Prolec for the detection of transformer winding faults in all single-phase pole-type transformers, suitable for the full range of current ratings and most common Distribution voltages.

This single-phase monitor is capable of analyzing and communicating faults. The equipment was designed for easy installation in new or field- installed transformers.

1PDM measures transformer electrical parameters, and performs a continuous evaluation of the operating status, using sophisticated algorithms, and communicates the data upstream to a wireless IoT technology based network of self-configuring mesh devices.

Fault Detection

1PDM features an algorithm that operates under the principle of a differential protection scheme. Incipient to low impedance faults in the windings are detected by comparing magnitudes of medium and low voltage currents.



These current magnitudes are measured using four clip-on Rogowski current sensors with wide dynamic range, installed in the high and low voltage bushings.

1PDM records current and voltage waveforms with a rate of 60 samples per cycle and stores data of transformer faults, inrush events, as well as over-voltage and under-voltage conditions, on board.

1PDM Dashboard: Monitoring Software

Provides a responsive web-based interface system, with user management modules and include functions for grouping transformers, run reports, log/track events, displayed in a monitoring dashboard.

Monitors the status of transformers at specified time intervals. Historical data logs are continuously updated, and fault alerts are communicated visually and by email. The software has been developed to be easily deployed and scalable.

Communications

Data is sent with low-latency using Low-Power, highly-reliable mesh radios and protocols. Each 1PDM unit can act as a repeater node. This enables the sending of data packets upstream thru an optimal path.

- **1PDM** is capable of identifying and distinguishing between internal and external transformer winding faults, giving the system operator a clear indication of which devices require attention, and the ability to deploy a smarter repair strategy that reduces crew mobilization and other costs.
- Unlike conventional solutions that use a single current sensor in the primary winding, in an attempt to detect faults, 1PDM uses two non-invasive sensors at both, the input and the output of both windings (HV and LV) to deliver unsurpassed fault detection, with best-in-class selectivity and sensitivity.
- The web-based Software allows users to monitor multiple, possible geographically dispersed 1PDMs, and generate unified reports, visualize data behavior graphs and historical data logs.
- Neodymium magnet clamping system enables easy installation of the 1PDM on all new and most previously installed transformers. Other mounting options are available for special cases.



GENERAL SPECIFICATIONS	
Current measurement	50mA to 12.5kA
Waveform Capture (I & V)	60 samples/cycle (3.6 kHz)
Temperature range	-40°C to +85°C
Power Supply	120 or 240 VAC (self-powered)
Power Supply Range	±15% of selected voltage
Data Channels	5 Analog (2 HV Currents + 2 LV Currents + 1 LV Voltage)
Frequency	50/60 Hz
Communication Options	Mesh Radio Low Power Wireless and LTE/Cat M1
Backup Power	≈20 h (SLA Battery)
Dimensions	270 mm W x 320 mm L x 155 mm H 10.6" W x 12.6" L x 6.1" D
Weight	3.6 kg (7.9 Lb)

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