

QUALITROL® 609 PDM

Transformer partial discharge monitor



Complete package for accurate and reliable condition monitoring with proactive mitigation recommendations

- Rapid, reliable and accurate early detection of faults
- Highly accurate failure characterization using state of the art artificial neural network
- Proactive mitigation recommendations
- Smart and quick real time alarming / alerting mechanism
- Flexible configuration to meet customer expectations
- Robust design allows for reliable operation in almost any environment
- Flexible installation options
- Remote monitoring and configuration

Product Summary

Description The 609 PDM system utilizes UHF technology to detect PD in transformer insulation. PD signals are detected by UHF couplers (sensors) and carried to the Master Control Unit where intelligent filtering is applied to reject interference. The amplitude and frequency of the UHF partial discharge pulse is then digitized, analyzed and processed to produce the appropriate SCADA alarms and PD data outputs that are accessible through the local LAN and/or relay interface.

Application The 609 PDM system is used for continuous online partial discharge monitoring and analysis of HV/MV transformers. It provides digital and analog (SCADA) outputs for remote alarm and warning as well as remote data access to all diagnostic information. It can be used to monitor insulation damaged transformers to allow continued supervised operation until a replacement can be installed



QUALITROL®
Defining Reliability

QUALITROL 609 PDM Transformer partial discharge monitor

Complete package for accurate and reliable condition monitoring with proactive mitigation recommendations

- The 609 PDM offers a complete packaged system for transformer condition monitoring consisting of:
 - UHF coupler sensors (internal, window, or rod)
 - Signal conditioning and noise cancellation
 - Centralized processing and state of the art hybrid analytics engine

Rapid, reliable and accurate early detection of faults

- Continuous monitoring and detection of partial discharge events enhances system reliability and reduces risks
- The robust and highly sensitive UHF sensors detect incipient faults in real-time before failure, asset damage or loss of power occurs
- Wider sensor bandwidth and external signal antenna to eliminate noise

Highly accurate failure characterization using state of the art artificial neural network

- State of the art artificial intelligence software components that automatically determine if PD is present so that a better risk assessment can be made
- A reference library from the historic PD data of the same asset stored into real-time database (time stamped events for up to ten years)

Proactive mitigation recommendations

- Daily, weekly and monthly reports created automatically in a single document. These reports indicate possible course of action for customer
- Facility of trending and analyzing faults / action based on historic PD data

Smart and quick real time alarming / alerting mechanism

- Hardwired alarms for SCADA and local user interface
- Real-time monitoring of events with time accuracy of 1 millisecond
- Able to alert substation personnel through SMS, email, IEC 61850 or through the substation RTU
- 12 alarm output per module with a relay higher hierarchy
- Real-time database

Flexible configuration to meet customer expectations

- The 609 PDM is modular and scalable to support monitoring of multiple MVA transformers. All modules are plug and play with facility of automatic system recognition
- Alarms and analytics engines are programmable and configured as per the customer need
- Support to multiple operating systems (Windows XP, Windows 7) and web-browsers (IE9, Firefox 7, Chrome 20, Safari 4)

Robust design allows for reliable operation in almost any environment

- Transient protection for each channel
- Rugged sensors with IP66 rating. Expected life of more than 30 years

A complete condition monitoring package...

Flexible installation options

- Sensors can be fitted to any available inspection hatch or manhole as a retrofit
- Auto installation: The software will automatically be able to identify what modules and features are installed and configure it accordingly
- The software will allow the customer to configure and modify the system offline and then download at a later date. Export/import and modify off line configuration file

Remote monitoring and configuration

- Secure client interface provides functionality to monitor inputs, allowing customers to view current system state and archived historical alarm and event information
- Users with assigned access control can download current system configuration, configure initial setup or make necessary (limited) changes

Expandable and field upgradable without reconfiguration

- Design for future expandability and ability to be rolled to other Qualitrol platforms
- More internal memory with possibility of using removable/portable media e.g. USB memory stick
- 16 GB storage capable of being upgraded if required
- Supports the addition of future client applications

Multiple and simultaneous communication methods

- Through its multiple communication methods (Ethernet, RS-485, RS-232, USB) the 609 PDM provides timely information where it is needed
- Built in support for Modbus, DNP3.0 and IEC 61850 protocols
- Ensure simultaneous LAN and dial up clients may be supported and configured

Built-in time synchronization

- The system has built in time synchronization functionality through NTP/SNTP
- The hardware supports accurate time stamping of events with 1 ms resolution

Enhanced levels of security

- The 609 PDM meets NERC cyber-security guidelines. It provides password protected access of three security levels: Operator, Field Tech and Admin. These security levels are configurable

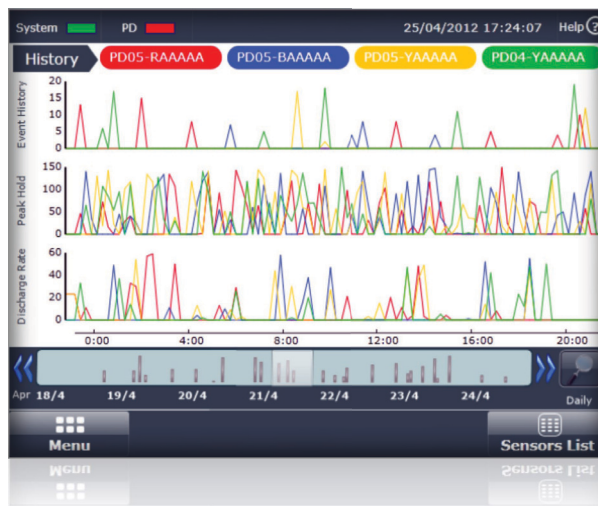
...from the world leader in PDM



System components and options



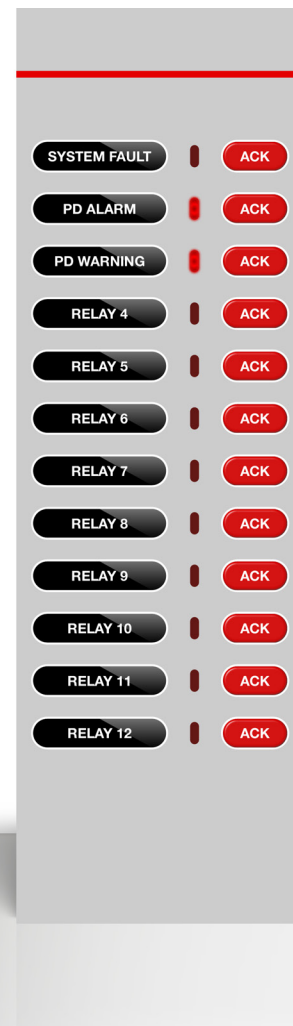
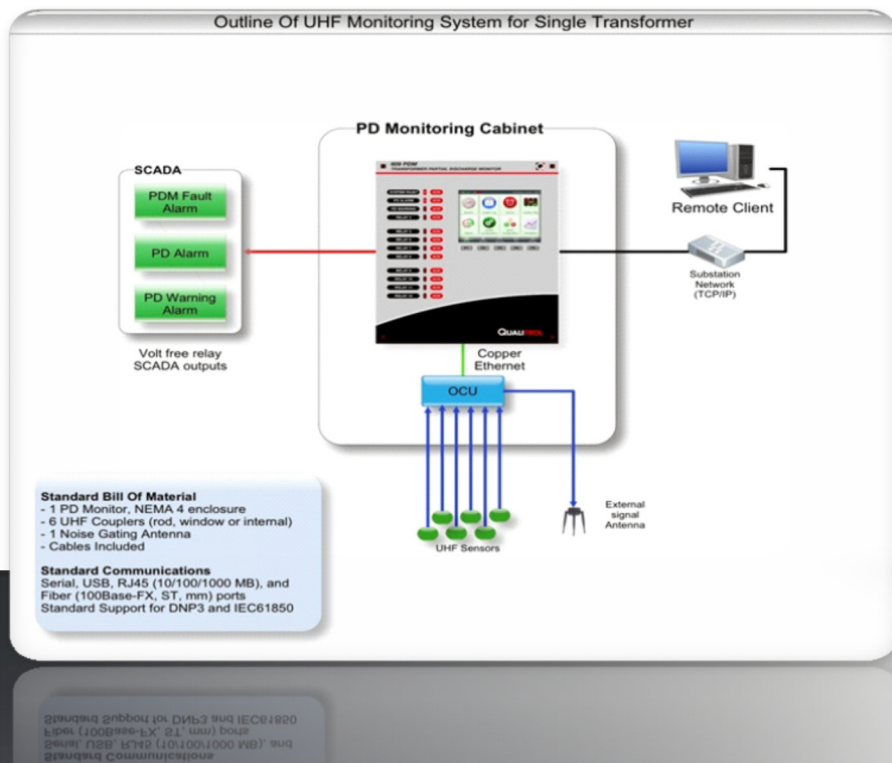
Touch interface display
(showing menu screen)



Touch interface display
(showing PD display)

Optional
expansion
annunciator ▶

609 PDM monitoring system outline
(for single transformer) ▶





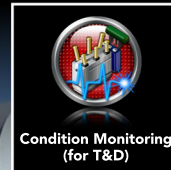
TECHNICAL SPECIFICATIONS

ITM (Integrated Transformer Monitoring)	Input	1 switching 1 VT 2 copper Ethernet remote module support
	Local MMI interface	Touch interface, with separate alarm acknowledgement. 8 x LED status indicators
	Additional MMI interfaces	Remote client server
	Outputs	3 SCADA/SCS alarm contacts: - PD warning - PD alarm - System fault Ethernet, IEC 61850, DNP3.0 or modem communications 1 Customer LAN Ethernet (copper and multi-mode fiber) 1 Ethernet maintenance port (front panel)
OCU (Optical Converter Unit)	Power supply	90 to 264 V AC; 47 to 63 Hz; 40 to 290 V DC, universal supply
	Supply current	150 mA
	Input	Up to 6 UHF channels and noise gating
	Ambient operating temp.	-25 to +65°C [13 to +149°F]
	Humidity	5 - 90%, non-condensing
UHF sensors	Mounting	Internal or external
	Output	Communicates to OCU
	Bandwidth	Wideband 300 - 1500 MHz
	Sensitivity	8mm - 15mm, < 50pC
	Expected lifetime	> 30 years
	Fitting size	Requires Ø200 mm [Ø7.87"] cut out in tank wall or manhole
SMARTHQ software	Operating system	Windows XP / Windows 7 compatible
	Max monitoring locations	128
	Memory	1 GB. Upgradable (if required)
	Min size for installation	128 MB
	System alarms	System fault
	PD alarms	PD threshold, POW amplitude, POW discharge rate
	PD warning	PD threshold, POW amplitude, POW discharge rate
	Reporting	Daily, weekly and monthly reports
Web	HTML based webview interface	IE9, Firefox 7, Chrome 20 and Safari 4 compatible
Ports	Ethernet	100BASE-T (copper and fiber)
Time synchronization	SNTP	Yes
	NTP	Yes
Protocols	Communication	DNP3.0 (UCA) (Ethernet/serial) Modbus (serial) IEC 61850 (Ethernet)



609 PDM

Complete CBM package



- Allows the operator to have confidence in the reliability and continued operation of the plant
- Detects faults in real-time before failure, damage or loss of supply
- Increases safety for personnel
- Implementation of efficient, condition-based maintenance strategies
- Extends residual life of aging plant and defers capital costs
- Reduces insurance premiums
- Retrofits to most major transformers

About QUALITROL®

Established in 1945, with continual improvement at the core of our business, QUALITROL® provides smart utility asset condition monitoring across the globe. We are the largest and most trusted global leader for partial discharge monitoring, asset protection equipment and information products across generation, transmission and distribution. At QUALITROL® we are redefining condition monitoring technology for Electric utilities assets.

©2012 QUALITROL® Company LLC, an ISO 9001 system certified company. QUALITROL is a registered trademark and OTIWTI is a trademark of QUALITROL® Company LLC. All trademarks are properties of their respective companies, as noted herein. All rights reserved. Information subject to change without notice. PD-D27-09L-01E.