# QCM-PPDM

## Portable partial discharge monitor for transformers and GIS

# Handy system for precise assessment of partial discharge during testing, commissioning and periodic inspections

- **Full characterization and localization of partial discharge faults to determine the severity of PD and help in scheduling maintenance**
- **Very rapid and easy deployment enables maximum time for condition assessment of assets**
- **Robust and rugged design to maximize portable operation life and support inspections / testing for extended period of time (24 hours up to 12 months)**
- **Accurate fault detection improves reliability of HV testing ensuring safe and stable HV apparatus installed in substations**

## Product Summary

**Description** **A self sufficient and portable PDM system for rapid monitoring and analysis of partial discharge in gas insulated switchgear (GIS) and power transformers. The system is field operated, touch screen based and gives engineers the tools required for diagnosing partial discharge with limited or no access to the main PDM infrastructure.**

**Application** **Used for low-cost, high performance periodic online and offline PD testing on HV insulating system of GIS and power transformers in transmission installations, power plants and large industrial consumers. The information gained from the system may be used for condition based maintenance decisions.**

**PD testing and analysis whilst installation and commissioning of HV GIS and transformers.**

**Quality testing for PD during or after assembling or manufacturing of GIS and transformers.**

**Lab measurements of PD on any insulating material for scientific and research laboratories.**


QUALITROL®
Defining Reliability

# QCM-PPDM Portable partial discharge monitor for transformers and GIS

| | |
|---|---|
| **Handy system for precise assessment of partial discharge during testing, commissioning and periodic inspections** | • All testing functions integrated into a single, hand-carry system (17kg [37.5 lbs]) in a compact enclosure with trolley wheels<br>• Wideband measurement across the frequency range of 300 - 1500 MHz<br>• Higher data acquisition rate of 15400 samples per second<br>• UHF technology based proven (for more than 20 years) hardware and software in identifying partial discharge |
| **Full characterization and localization of partial discharge faults to determine the severity of PD and help in scheduling maintenance** | • Interpretation is based on multiple artificial neural network classification of events<br>• 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)<br>• Ability to detect multiple PD sources simultaneously<br>• Helps in approximate localization of partial discharge by amplitude comparison |
| **Very rapid and easy deployment enables maximum time for condition assessment of assets** | • Pre-installed software - no installation required on site<br>• Easy configuration of system (offline / online) using touch screen interface<br>• Sensors can be fitted to any available inspection hatch or manhole as a retrofit<br>• Require only one field engineer / operator with basic knowledge of partial discharge |
| **Robust and rugged design to maximize portable operation life and support inspections / testing for extended period of time (24 hours up to 12 months)** | • IP66 rated highly protective case<br>• Built-in display (no separate laptop) helps in putting system in any environmental condition for longer time<br>• 16 GB data storage sufficient to store PD events continuously for 12 months<br>• Facility to store data into external storage further enhances data storage capacity |
| **Accurate fault detection improves reliability of HV testing ensuring safe and stable HV apparatus installed in substations** | • Outstanding sensitivity and unique accuracy (75 dBm / 5pC) of UHF measurements<br>• In-built sensitivity of -75 dBm enables better PD analysis<br>• Noise gating by external signal antenna (optional)<br>• Cross channel coincidence gating |
| **HVDC compatibility saves cost of buying different PD testing equipment for HVDC apparatuses** | • Live stream data recording up to 3 days<br>• Higher sampling rate (15.4 kS/s per channel) improves the chances of PD detection |
| **Advanced HMI provisions (SMARTSUB Software - intelligent data handling, display and interpretation)** | • In-built LCD screen with touch screen based interface<br>• Easy to add / modify / delete substation / site location<br>• 2D and 3D display of PD signals in multiple formats (Single Cycle, Peak Hold, PRPD and STT)<br>• Automatic self-check of PDM with faults logged and alarmed<br>• Trend analysis facility on stored PD data<br>• State of the art data export function for PD results |

*Minimal installation and Smart inspection...*

QUALITROL®
Defining Reliability

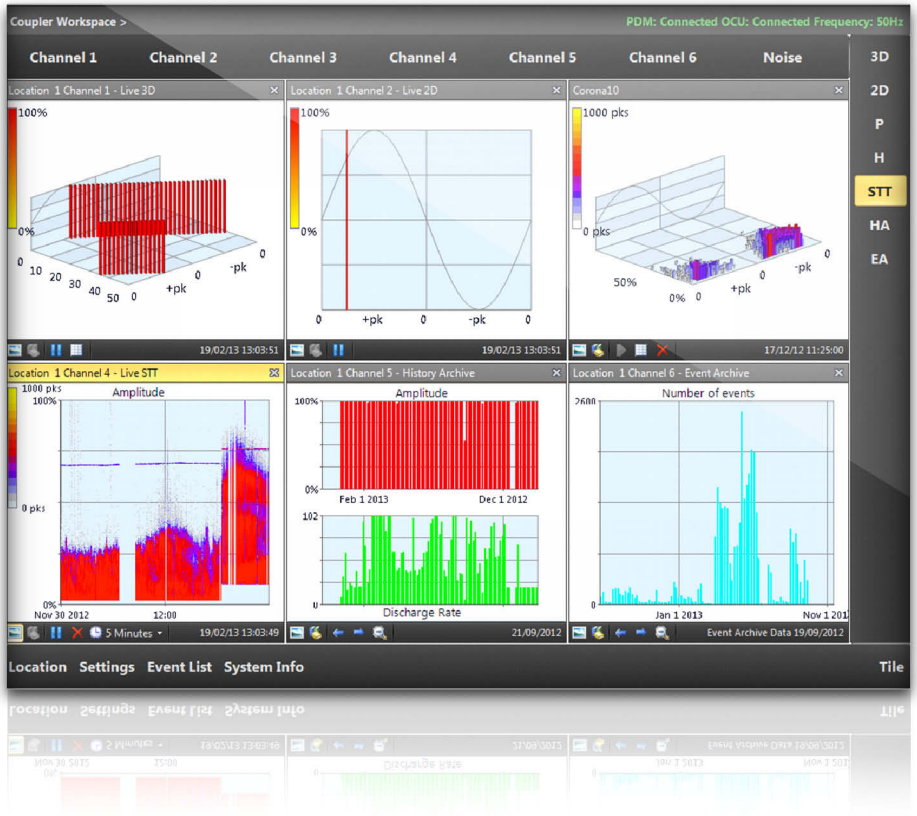
| | |
|---|---|
| **Intelligent customizable reporting** | • Need based customizable reports created automatically in a single document. These reports indicate possible courses of action for customers<br>• Fast and easy access of data in generating reports |
| **Smart and quick real time alarming / alerting mechanism** | • Programmable alarm criteria and rule engines<br>• Facility to send alarms / warnings to local user interface<br>• Real-time monitoring of events with time accuracy of 1 millisecond |
| **Expandable and field upgradable without reconfiguration** | • Expansion of internal storage to 32 GB with ability to use removable / portable media e.g. USB memory stick for backup<br>• 2 GB program memory capable of being upgraded if required<br>• Supports the addition of future client applications<br>• Facility to link other portables to expand monitoring capabilities |
| **Other key benefits** | • Designed to meet highest security standards, including NERC cyber-security standards<br>• Built-in time synchronization through NTP / SNTP<br>• Provides timely information where needed through its multiple communication methods (Ethernet, USB)<br>• Superior safety in high voltage test setups |

*IP-66 rated highly protective case with trolley wheels*

*Flight-friendly and lightweight system (17 kg [37.5 lbs]) and easy to operate by one person*

***...from the world leader in PDM***

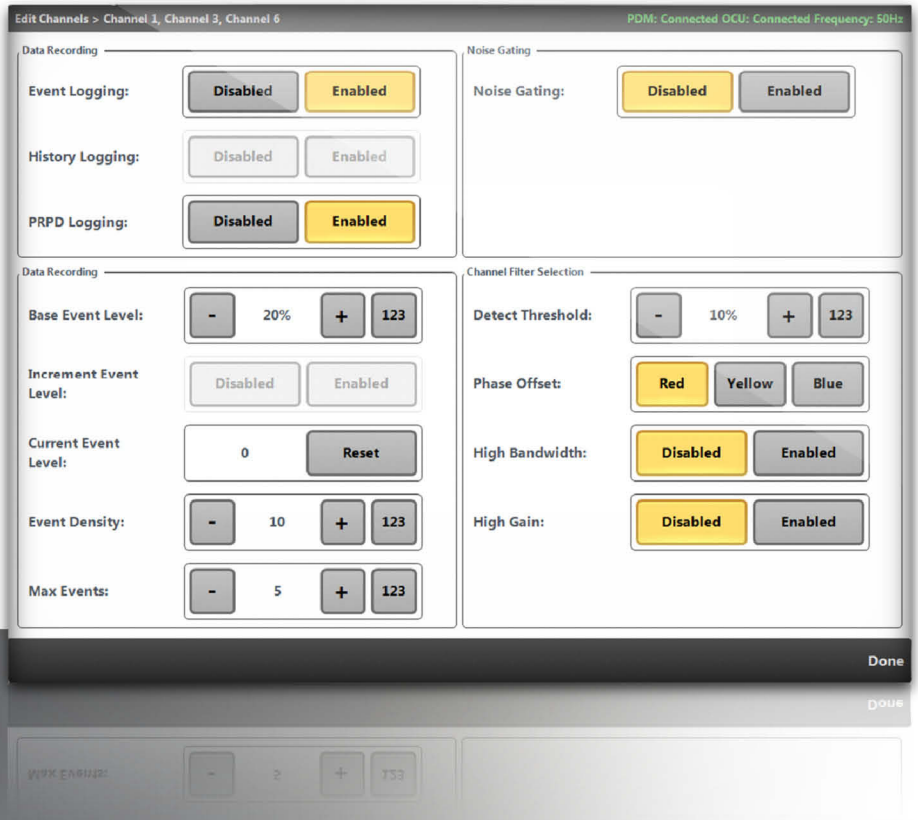
# System software - LCD display with full touch interface




*Real-time display of up to 6 UHF channels*

## Key features

- Clean, intuitive interface with QWERTY touch keyboard
- Display up to 6 UHF channels at once
- View live and recorded data as POW, PRPD, STT, history archive and event archive
- Easy configuration of all parameters
- Built-in self diagnostics




*Easy configuration of all parameters*

## TECHNICAL SPECIFICATIONS

| | | |
|---|---|---|
| **Power supply** | Voltage range | 90 to 264 VAC, 47-63 Hz; 40 to 290 VDC universal supply |
| | Supply current | 110 mA @ 230 VAC |
| | Power | 70 W |
| **MCU (Master Control Unit)** | Input | 3 UHF channels / (or) 6 UHF channels<br>1 additional channel for noise antenna |
| | Outputs | Alarm indications on the screen: - PD fault alarm - PD alarm<br>- PD warning alarm - System status indicator |
| | MMI | LCD display with full touch interface |
| **UHF sensors (optional)** | Mounting | Internal or External |
| | Output | Communicates to portable |
| | Bandwidth | Wideband 300 - 1500 MHz |
| | Sensitivity | > 6 mm, < 5pC |
| **Remote SMARTSUB software** | Operating system | Windows XP / Windows 7 compatible |
| | Max monitoring locations | 100+ |
| | Memory | 1GB, upgradable (if required) |
| | Min size for installtion | 20 MB |
| | System alarms | System fault, channel fault |
| | PD alarms / PD warning | Gradient, PD Trend |
| **Performance** | Sample rate | 15.4 KS/s per channel<br>Total of 107.5 KS/s for 7 channels (simultaneous sampling) |
| | Data storage | 16 GB |
| | Clock | 1.2 GHz |
| | Time synchronization | Yes |
| | Noise gating coincidence filters | Yes |
| **Comms** | Ethernet ports - external | RJ45 (10/100 Mbps) |
| | USB | One port to facilitate firmware upgrade, configuration upgrade and manual download of data |
| | GPRS | Optional |
| **Environmental** | Ambient operating temperature | -25ºC to +55ºC |
| | Storage temperature | -25ºC to +75ºC |
| | Humidity | 5 - 95% non-condensing |
| | Enclosure rating | NEMA IP66 |
| | Siesmic | IEEE C37.98 (Seismic Testing of Relays) |
| | Environmental test compliance | BS EN60068-2-2, BS EN60068-2-1, BS EN60068-2-78 |
| | Vibration test compliance | BS EN68-2-6, BS EN68-2-27, BS EN68-2-29 |
| **Immunity** | EMC test compliance | Confirms to relevant specifications for monitoring / control equipment in HV substations.<br>BS EN55022 (:2006); BS EN61000-3-2 to -3-3, BS-EN61000-4-2 to -4-6, BS EN61000-4-8, BS EN61000-4-11, BS EN61000-4-18; IEC 60255-5, IEC 61180-1 |
| | Others | EMI / RFI immunity |
| **Mechanical** | Dimensions and weight | 508 mm x 355 mm x 254 mm [20” x 14” x 10”]. 17 kg [37.5 lbs] |
| | Display | 12” touch screen, (1024 x 768). Rotary / push button |

# Portable PDM

## *Smart and easy CBM*

Condition Monitoring (for T&D)

Condition Monitoring (for Generation)

Smart Grid PRODUCT


- **Allows the operator to have confidence in the reliability and continued operation of the plant**
- **Extends residual life of aging plant and defers capital costs**
- **Implementation of efficient, condition-based maintenance strategies**
- **Excellent interference immunity for PD measurement under difficult conditions**
- **Usable for HV GIS commissioning tests**
- **Retrofits to most major GIS and transformers**
- **HV record mode, versatile sync, superior data review method**

### 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.



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