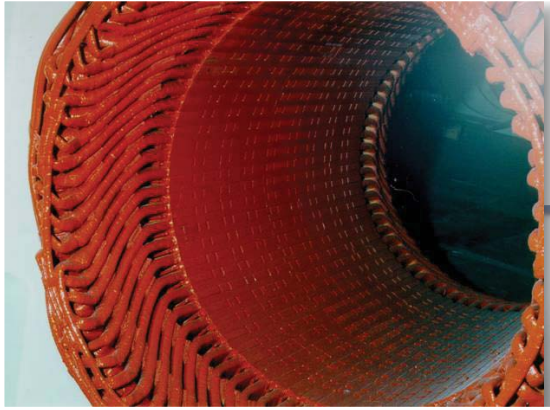


Iris Power BusTracII™

Continuous On-Line Partial Discharge Monitoring for Small Turbine Generators



IRIS POWER BusTracII

IRIS POWER BusTracII SYSTEM

The Iris Power BusTracII System is an economical means of providing automated, continuous partial discharge (PD) measurement in turbine generators and isolated phase bus equipped with Bus couplers. The system consists of permanently installed capacitive couplers (2 per phase), a dedicated Iris Power BusTracII monitor, plus digital communications for configuring the monitor and downloading the stored PD data.

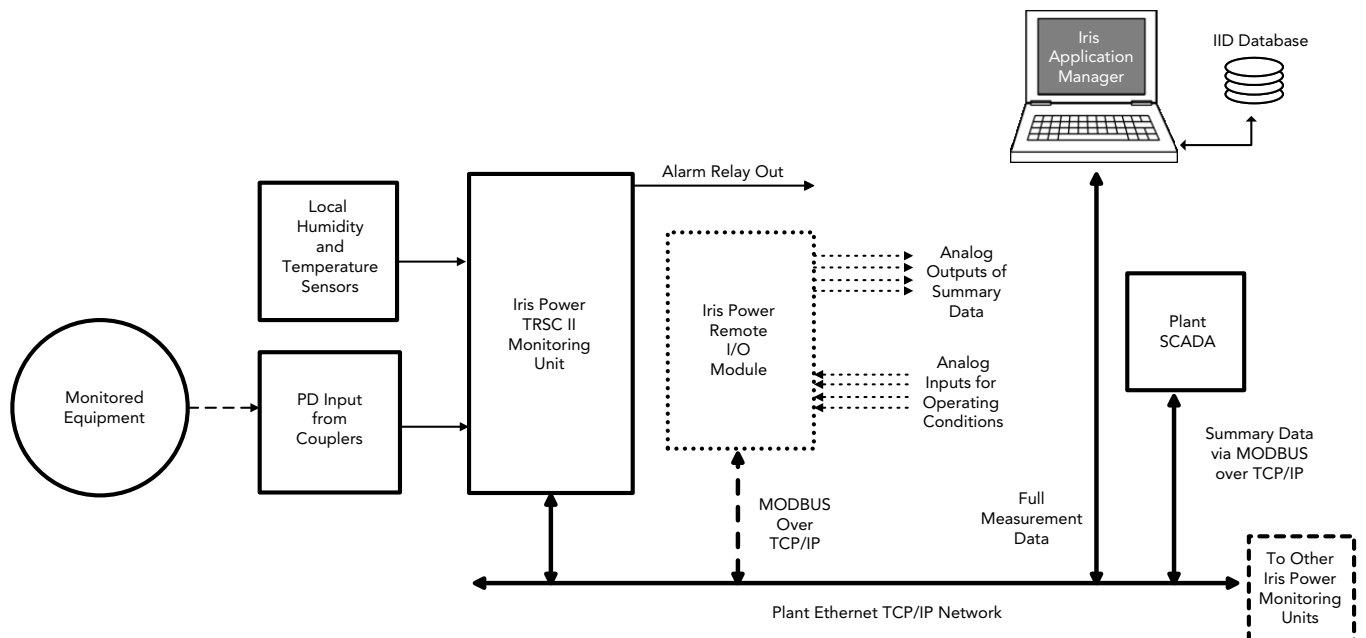
The Iris Power BusTracII is a second generation continuous online monitor that provides maintenance professionals with an opportunity to automate PD testing. The Iris Power BusTracII monitor also allows for the possibility of integrating important operating conditions needed for trending PD activity, and will trigger a remote alarm, indicating the need for a more detailed analysis

Facilities that have existing bus coupler installations can easily install the Iris Power BusTracII monitor by connecting the monitor to the existing coupler termination panel. The installation of the Iris Power BusTracII monitor does not require an outage. Qualitrol-Iris Power field service specialists can install and/or commission your Iris Power BusTracII monitor so that alarm thresholds are set to the best levels for that particular machine.

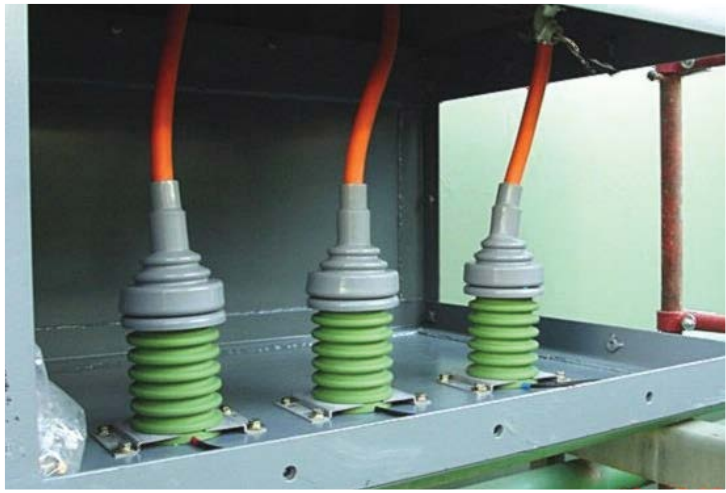
New users of the Iris Power BusTracII monitor technology must first permanently install 80pF capacitive couplers during a suitable machine outage.

The Iris Power BusTracII monitor is the product of Qualitrol-Iris Power's many years of experience developing on-line PD measuring systems for high voltage motors, turbine generators, and hydro generators.

Like its predecessors, the monitor includes our unique and rigorously researched methods to overcome the electrical interference (noise) typical in most plant environments. This ensures reliable and repeatable measurements with a low probability of false alarms. The collected data can be easily interpreted by maintenance professionals after participating in a 2-day training seminar offered by Qualitrol-Iris Power's experienced engineering staff. The user's assessment of motor and generator insulation systems using on-line PD testing is greatly enhanced by access to Qualitrol-Iris Power's extensive PD database of over 272,000 test results. The collective experience and results of our clients are regularly summarized in statistical tables, available to all users. This is a service unique to Qualitrol-Iris Power and its clients and ensures objective interpretation of insulation condition.



IRIS POWER BusTracII



*Installed
Capacitive
Couplers*

FEATURES

- Sophisticated monitoring and analysis system reduces false indications by digitally separating partial discharges from electrical noise, on a pulse-by-pulse basis.
- Proven filtering and pattern recognition enhances noise separation, allowing for a reliable and objective detection of poor impregnation, overheated windings, coil movement in the slot, ineffective or deteriorating grading/semi-conductive material problems and contamination.
- The system's compatibility with the Iris Power TGA-B™ technology allows users with existing sensor installations to commission the system without an additional outage. Data can be easily confirmed and further analyzed with Iris Power's TGA-B portable monitor.
- Ensures a consistent testing interval, thereby improving the quality of the trends. The Iris Power BusTracII instrument continuously collects PD data and archives data which are used to produce 2D and 3D (phase resolved) plots as well as summary numbers (Qm and NQN), which are used for trending and comparison with similar machines. Using the Windows™-based software, the archived PD data can be downloaded locally over a USB port, or remotely using Ethernet (TCP/IP) network communication.
- Important operating conditions such as humidity, stator winding or equipment temperature, stator voltage, and real and reactive power can be recorded and stored with the archived PD data. These parameters are useful for in-depth analysis and trending of the partial discharge activity.
- Qualitrol-Iris Power has extensive experience with continuous on-line PD monitoring. Over 2,000 continuous PD monitors have been installed.
- Networking with an Ethernet port for remote diagnostics, downloading, configuration with Iris Power software.
- Modbus over Ethernet protocol included for interfacing to third party applications to obtain machine operating state and provide summary PD data.

BENEFITS OF CONTINUOUS MONITORING

Motors, generators and iso-phase bus are highly reliable. However, studies indicate that approximately 40% of all failures can be attributed to the gradual aging and deterioration of the stator winding insulation. On-line, periodic partial discharge testing has been successfully employed 1951 in diagnosing accumulated winding related problems in different types of generators. Unlike periodic on-line PD testing, the Iris Power BusTracII monitor provides maintenance professionals with the opportunity to:

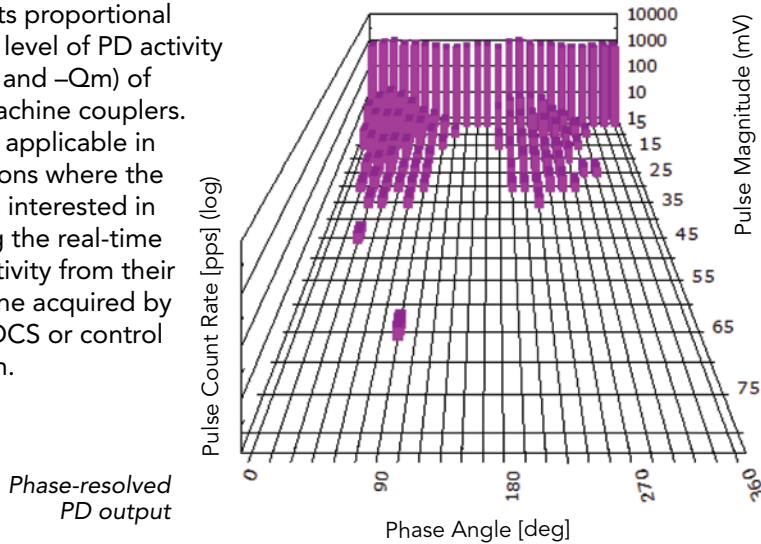
- automate the measurement (on site or remotely)
- integrate the key trending parameters within the plant SCADA
- trigger a remote alarm indicating the need for a more detailed review of the collected data
- maximize collection of PD activity
- maximize warning of pending problems
- create a smoother trend curve
- lower testing cost.

The monitor uses the same sensors that have been permanently installed on over 12,000 motors and generators around the world over the last three decades; and provides the reliability that comes with over 2000 installed continuous PD monitors.

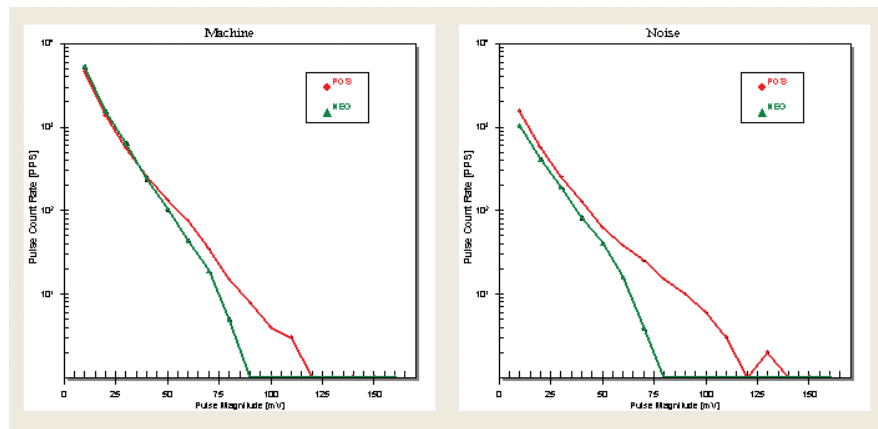
IRIS POWER BusTracII

OPTIONS - REMOTE I/O OVER ETHERNET CONNECTION

- Remote inputs with up to 8 analog points proportional to operating conditions such as stator winding temperature, voltage, current, or power. These conditions are recorded for trending and analysis.
- Remote outputs with 6 analog outputs proportional to the level of PD activity (+Qm and -Qm) of the machine couplers. This is applicable in situations where the user is interested in having the real-time PD activity from their machine acquired by their DCS or control system.



Phase-resolved PD output



PD Pulse Magnitude Output

Iris Power BusTracII and Iris Power TGA-B are trademarks of Qualitrol-Iris Power.
Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

WHAT IS PARTIAL DISCHARGE?

Partial discharges (PD) are small electrical sparks that occur within the high voltage electrical insulation in stator windings and iso-phase bus. PD occurs whenever there are small air gaps or voids in or on the surface of the insulation. Normally, well made stator windings that are in good condition display very little PD activity. However, over 60 years' experience has shown that as a stator winding deteriorates from winding vibration, operation at high temperatures, or contamination from oil, moisture and other chemicals, the PD activity will increase by a factor of ten or more. Thus, on-line PD monitoring detects the main root causes of winding failure. Since PD monitoring can be performed during normal equipment operation, and generally gives two or more years of warning indicating a risk of failure, on-line PD monitoring has become a very powerful tool for predictive maintenance.

Some benefits of PD monitoring of the apparatus are:

- increased availability of machines
- plan maintenance based on actual conditions
- significant reduction of in-service failures.

QUALITROL-IRIS POWER HAS BEEN THE WORLD LEADER IN MOTOR AND GENERATOR WINDING DIAGNOSTICS SINCE 1990, PROVIDING A FULL LINE OF ON-LINE AND OFF-LINE TOOLS, AS WELL AS COMMISSIONING AND CONSULTING SERVICES.



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