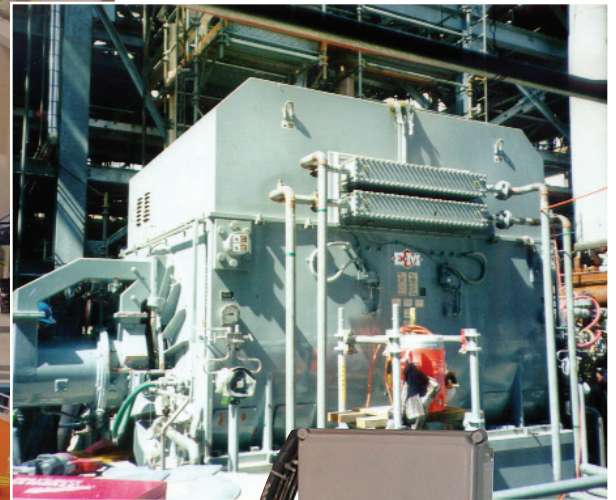
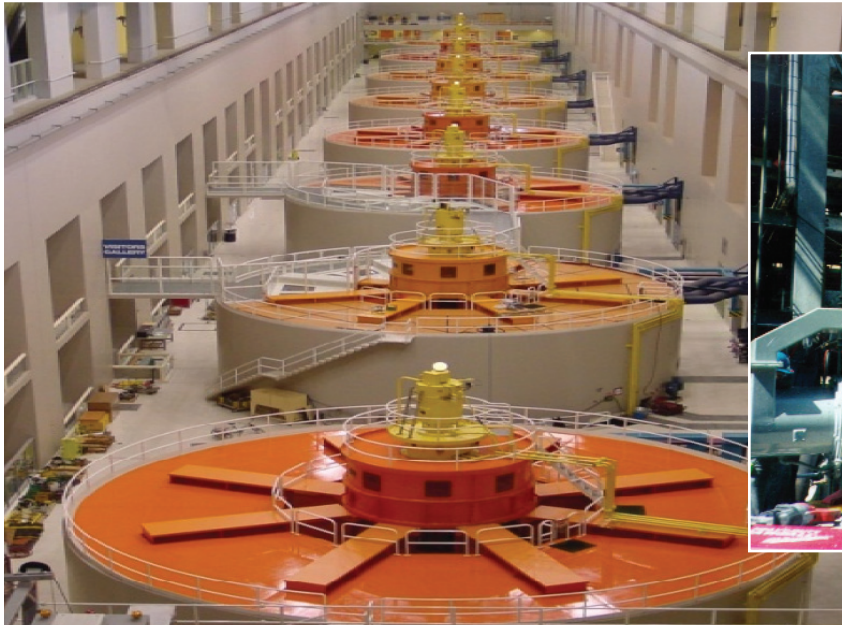


QUALITROL-IRIS POWER, THE WORLD'S LARGEST PROVIDER OF ON-LINE PERIODIC AND CONTINUOUS PARTIAL DISCHARGE MEASUREMENT SYSTEMS



Iris Power HydroGuard™, BusGuard™, TurboGuard™

Continuous On-Line Partial Discharge Monitors for Motors and Generators



IRIS POWER ON-LINE PRODUCTS

IRIS POWER HydroGuard, BusGuard, TurboGuard

The Iris Power HydroGuard, Iris Power BusGuard, and Iris Power TurboGuard products, collectively referred to as the Iris Power Guard system, can be programmed to continuously measure partial discharge (PD) activity on motors and generators rated 6kV and above. The system is sensitive to the most common stator winding failure mechanisms such as overheating, contamination, and loose windings. The Iris Power Guard technology allows plant personnel to plan corrective action if the Iris Power Guard system detects problems.

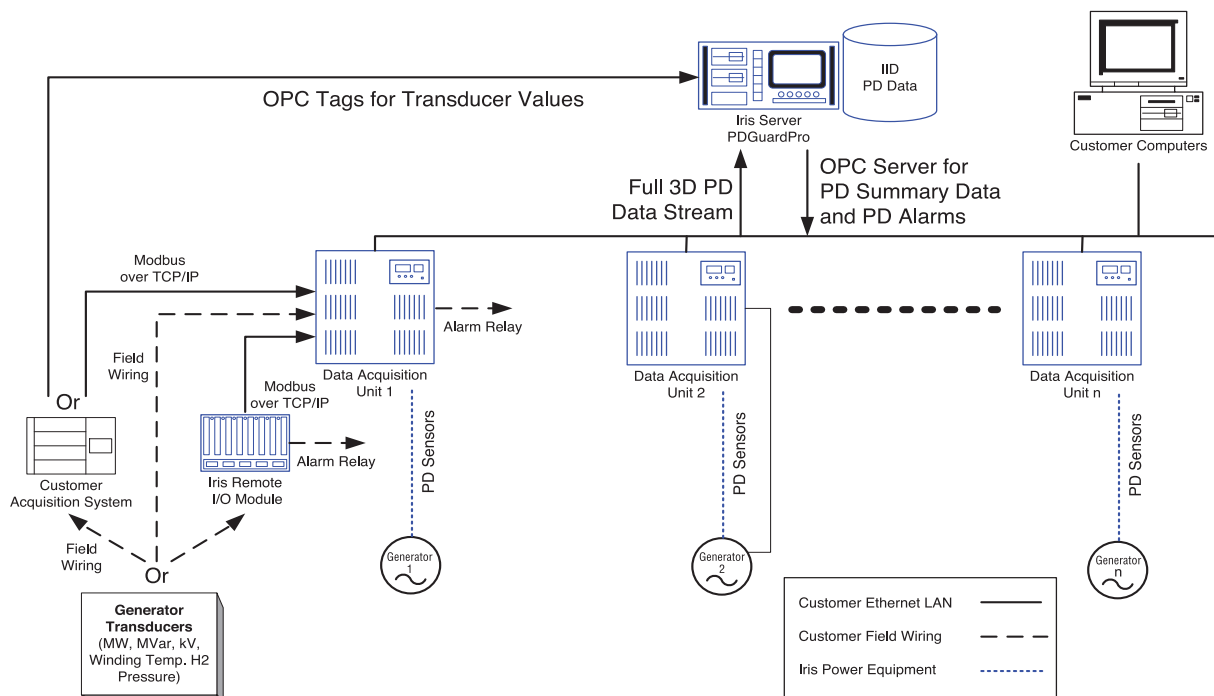
The Iris Power Guard system was designed with these main goals in mind:

- Continuous and automated measurement of partial discharges, with the data being accessible from a remote location. Data can be automatically forwarded to a plant data acquisition system.
- Independent monitoring of individual motors or generators and collection of PD data at specific machine conditions providing a reliable trend.
- Separation of noise to ensure a low risk of false indication of stator problems.
- Elimination of the need for an on-site expert to set up and collect data when monitoring a motor or generator.
- Detection of rapidly developing insulation problems such as winding looseness or endwinding contamination.
- Better interpretation of test results and trending of data under similar operating conditions.

APPLICATIONS

- Iris Power HydroGuard system for use with capacitive couplers installed within hydro generator stator winding.
- Iris Power BusGuard system for use with capacitive couplers mounted on the output bus of small turbo generators, and motors.
- Iris Power TurboGuard system for use with turbo generators equipped with stator slot couplers.

The Iris Power Guard system uses Iris Power EMCs (epoxy mica couplers) or Iris Power SSCs (stator slot couplers) that are permanently installed on motors and generators (6kV or higher). Each machine to be monitored requires one Data Acquisition Unit (DAU) to be mounted outside of the machine, near the sensors. Coaxial cables connect the sensors to the DAU. Ethernet is used to connect the DAU to a central monitoring computer.



IRIS POWER HydroGuard, BusGuard, TurboGuard

IRIS POWER GUARD SYSTEM

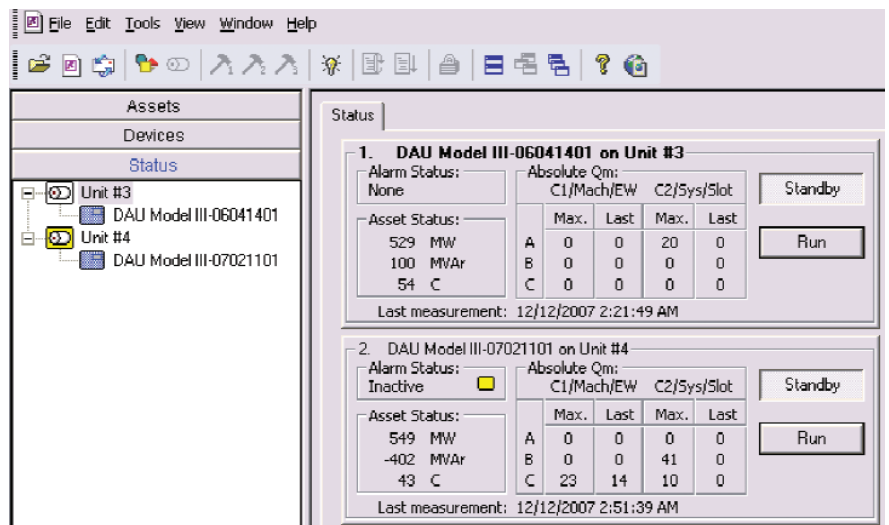
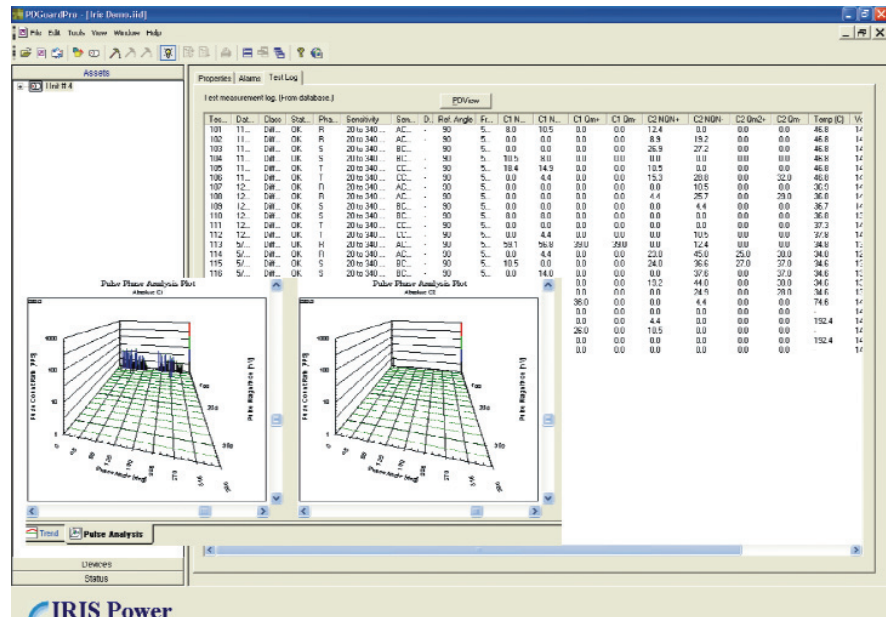
One dedicated system controller can control multiple DAUs, usually over a dedicated LAN. The system controller includes Iris Power PDGuardPro™ software. Through the software, the user defines the generator or motor operating conditions and frequencies (triggers) for each DAU to measure and store the PD activity. An alarm is raised if the PD activity is above a defined user threshold.

The system controller also includes Iris Power PDView™, a program for displaying or trending any saved PD data. The system controller can be remotely accessed via a remote computer connected to the same wide area network (WAN). This allows personnel in distant offices to define or change trigger conditions and alarm levels, as well as download test results for display on a secondary computer. The Iris Power Guard system continuously collects PD data (summary numbers [NQN, Qm], 2D, and 3D data) that are used for identification of stator winding insulation degradation, trending and comparison with similar machines.

Facilities that have existing coupler installations used with portable instruments can easily install a Guard system by connecting the instrument to the existing sensor termination panel within the plant. This does not require an outage and the installation effort is limited to providing power to the system, configuration, and running a communication link to the system controller. New users of the Iris Power PD technology must first permanently install the couplers during a suitable machine outage.

The Iris Power Guard system has undergone unique and rigorously researched methods to overcome the electrical interference (noise) which is 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 a maintenance professional after participating in a 2-day training seminar offered by Qualitrol-Iris Power's experienced engineering staff.

The user's assessment of insulation system condition using on-line PD testing is greatly enhanced by having access to Iris Power's extensive PD database of over 225,000 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 HydroGuard, BusGuard, TurboGuard

FEATURES

- Superior noise separation technology based on 40MHz high pass filter, time-of-arrival, and pulse shape characteristics.
- Data collected is compatible with the existing patented TGA/PDA technology.
- Remote data collection - pulse magnitude and pulse phase analysis and summary numbers.
- Remote modes of communication allow diagnostics, control, and configuration from a distance.
- Guard systems perform continuous PD measurements with advanced alarm features, requiring minimal intervention by maintenance professionals. Alarms are preset based on the Qualitrol-Iris Power database of over 225,000 test results.
- Optional input sensors for operating conditions such as active power, reactive power, stator voltage, winding temperature, and hydrogen pressure.
- Optional OPC interface to transmit PD data and/or receive operating conditions through the network.
- Can be applied to existing and new motors and generators.

WHAT IS PARTIAL DISCHARGE?

Partial discharges (PD) are small electrical sparks that occur within the high voltage electrical insulation in stator windings. 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 stator winding failure. Since PD monitoring can be performed during normal motor or generator 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 stator winding are:

- Increased availability of machines
- Plan maintenance based on actual conditions
- Significant reduction of in-service failures

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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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www.irispower.com

www.qualitrolcorp.com

Iris Power LP
3110 American Drive
Mississauga, ON, Canada L4V 1T2
Phone: 1-905-677-4824
Fax: 1-905-677-8498
sales.iris@qualitrolcorp.com

Qualitrol Company LLC
1385 Fairport Road
Fairport, NY, USA 14450
Phone (585) 586-1515
Fax (585) 377-0220



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