

INSTRUMENTS



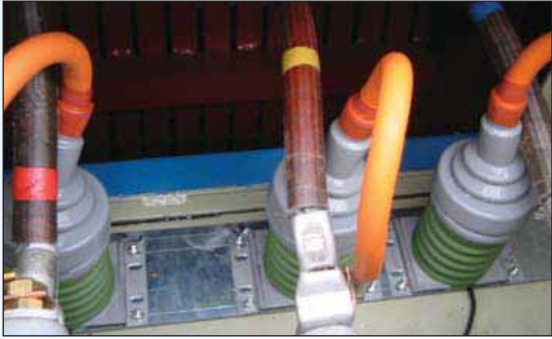
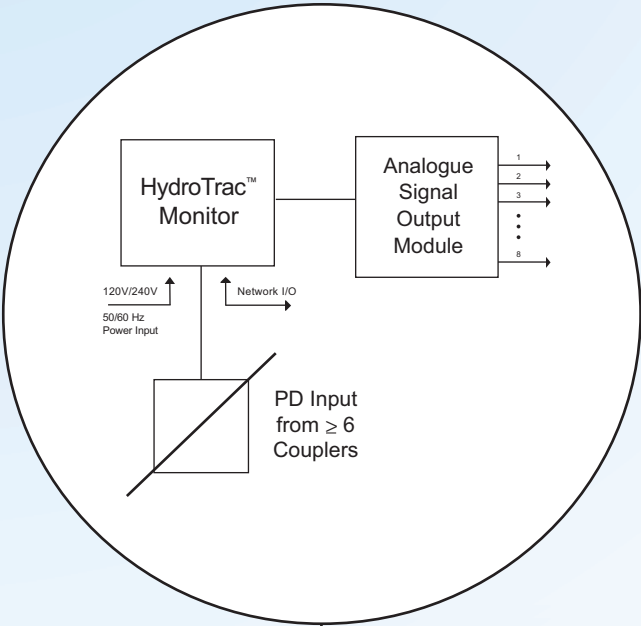
HydroTrac™

Continuous On-Line Partial Discharge
Monitoring of Hydro Generators

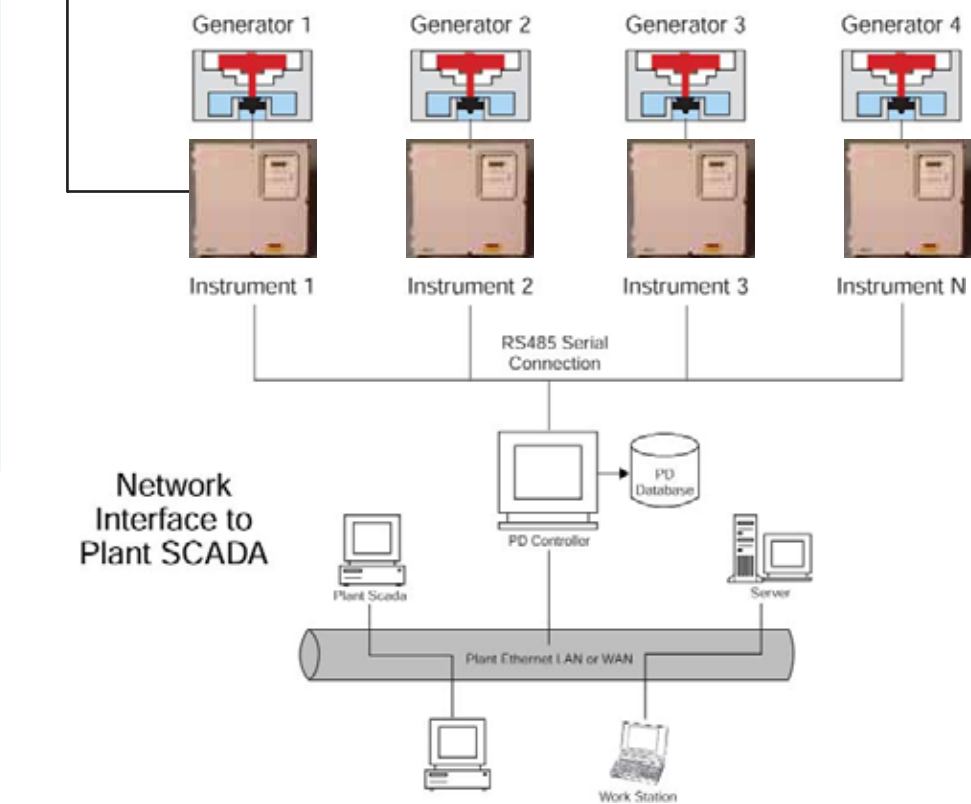


One of the top 100 inventions of 2000

HydroTrac™



Capacitive Coupler



CONTINUOUS ON-LINE PARTIAL DISCHARGE MONITORING

The HydroTrac™ monitor is an economical instrument providing automated and continuous PD measurements on hydro generator stator windings. Hydro generators have a highly reliable performance record, however, studies have indicated that some 40% of failures can be attributed to the gradual aging and degradation of stator winding insulation.



On-line partial discharge testing has been successfully employed for almost 30 years in diagnosing accumulated winding related problems in different types of generators. The benefits of monitoring winding

condition with PD include: increased availability, planned maintenance and a significant reduction of in-service failures. Based on the PDA testing methods developed by Iris founders at Ontario Hydro in conjunction with the Canadian Electrical Association, the HydroTrac™ instrument is the latest innovation in this area, funded in part by the New York Power Authority and EPRI.

Unlike periodic on-line PD testing, the HydroTrac™ monitor provides maintenance professionals with the opportunity to automate the measurement (on site or remotely), and the possibility of integrating the key trending parameters within the plant SCADA, or to trigger a remote alarm indicating the need for a more detailed review of the collected data. The instrument uses the same sensors that have been permanently installed on hydrogenerators over the last three decades around the world.

The HydroTrac™ instrument is the product of Iris' many years of experience developing on-line PD measuring systems for hydro generators, high voltage motors and turbine generators. As its predecessors, the HydroTrac™ monitor includes the unique methods specifically designed to overcome the electrical interference that is typical of most power plant environments. This ensures reliable and repeatable tests results with a low risk of false indications. The test data can be easily interpreted by a maintenance professional who participates in a two-day training seminar, offered by our experienced staff. Since the instrument is fully compatible with all previous generations of the PDA technology, maintenance personnel can use the historical data to make a seamless comparison of similar machines, and they can continue to solicit access to the growing Iris database of over 60,000 test results.

APPLICATION:

Plants that have previous PDA coupler installations can install the HydroTrac™ monitor by connecting the instrument to the existing coupler termination box. This does not require an outage, and the installation effort is limited to providing power to the monitor, deciding on the alarm output options, and running a communications link to a local control room computer or a LAN/WAN through a terminal server.

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

The HydroTrac™ instrument is supplied with a termination box that contains a multiplexor allowing the sequential monitoring of up to 6 pairs of couplers. The instrument can be set up to run in one of two common modes:

1. Single-Shot Mode:

The HydroTrac™ monitor is triggered either through the front panel keypad, or remotely using a host computer running the TracCon™ controlling software. The test results can be viewed immediately and analyzed using our PDView™ display and trending software.

2. Continuous Operating Mode:

The HydroTrac™ instrument collects data continuously several times an hour, and archives the Qm and NQN results which are important for the trending and comparison of similar hydro generators. The data for the day and the month is summarized and archived for up to two years. It can be downloaded through a local RS232 port to a laptop computer or remotely using TracLink software.

Although both modes are mutually exclusive, users can switch back and forth between them.

FEATURES:

- Sophisticated monitoring and analysis system prevents 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/semiconductive paint problems and contamination.
- The HydroTrac™ system consists of 6, 9 or 12 high voltage 80pF capacitors installed on the circuit ring bus of the generator, and an electronic instrument (which provides PD/Noise separating and measures PD activity); both are connected via a coaxial cable termination box that houses a multiplexor.
- The system's compatibility with the PDA 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' PDA-IV portable instrument.
- Remote modes of communication permit command, control and configuration from a distance. For example, the key trending parameters can be transmitted to a SCADA system, and correlated with operating parameters such as hydro generator load and temperature for enhanced analysis of stator winding problems.
- Ensures a consistent testing interval, therefore improving the quality of the trends. The optional alarm features permit maintenance personnel to focus on machines that exhibit unusual or high levels of partial discharge activity. This is attained by increasing testing frequency and by using the single shot mode to generate plots that help to identify the prevailing failure mechanism of stator winding insulation.

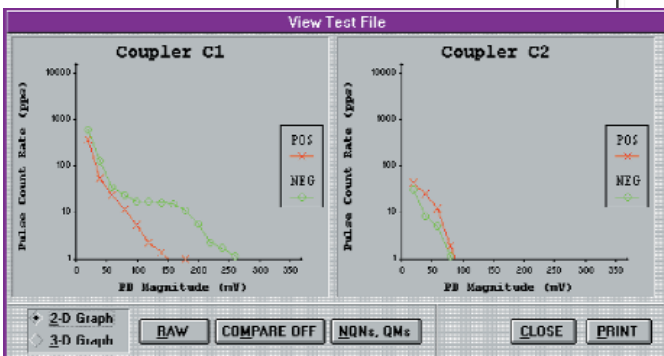
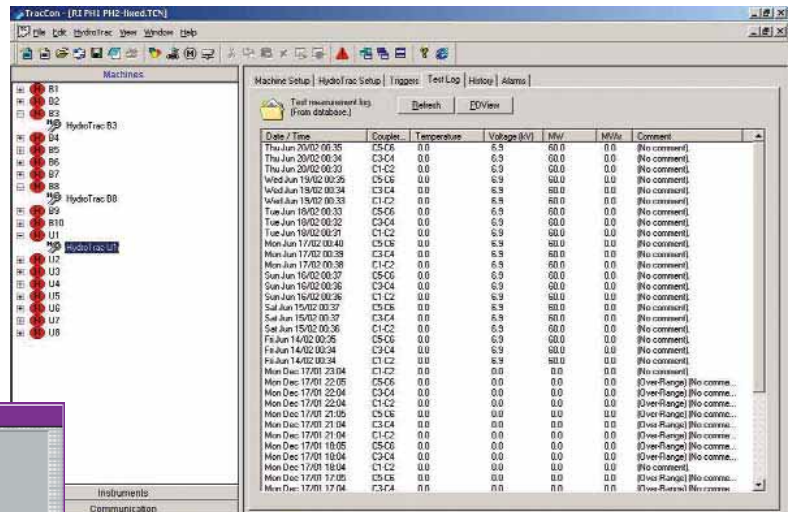
OPTIONS:

Alarm Output Module

- Trac instruments fitted with this option can generate an analog alarm signal based on user-defined PD reading levels. This alarm output can then be wired to an annunciator, or a plant monitoring system or SCADA. The optional alarm output module is located in the termination/multiplexor box of the Trac instrument. Two outputs are provided, one, which is latched, and one that is a momentary contact (four seconds).

Analog Output Module

- This option allows the Trac instrument to generate analog output signal levels, which are proportional to the NQN and Qm partial discharge summary numbers. These signals can then be fed into a plant acquisition system (SCADA, DCS, PLC etc) where they can be trended and stored. Utilizing this option allows the Trac instrument to be treated like any other field sensor and allows PD data display, alarming, and trending to be integrated with other plant systems under an interface familiar to plant operations personnel.



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