

Iris Power SMTracII™

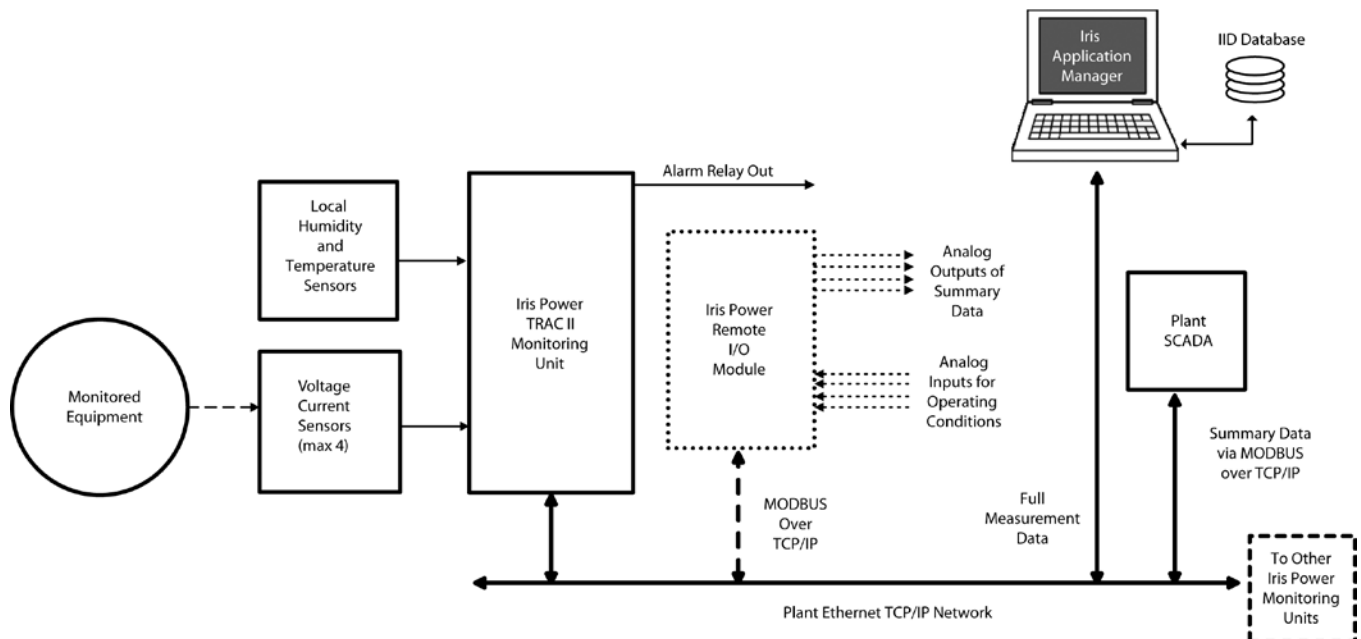
Continuous On-Line Shaft Voltage and Current Monitor



IRIS POWER ON-LINE PRODUCTS

IRIS POWER SMTracII SYSTEM

Iris Power SMTracII technology is a robust and cost effective continuous on-line shaft voltage and current monitor that revolutionizes the detection and alerting of the presence of harmful levels of voltage and current. This system collects and analyzes data from up to two voltage and two current inputs in real time, providing maintenance staff with a tool to collect and trend shaft voltage and current levels. Once configured, the Iris Power SMTracII requires no user intervention and will alert when significant levels are detected. It is ideal as a complimentary monitor to rotor flux, stator partial discharge and shaft and bearings vibration monitors. The system is available in two options, as self-standing SMTracII device, or as a part of GuardII, multiple technologies CBM platform.



SYNCHRONOUS GENERATOR SHAFT VOLTAGE AND CURRENT MONITORING

The phenomenon of voltages and currents on motor and generator shafts has been known for the past 100 years. It affects motors, hydro generators and turbo generators. There has been an increase in occurrences and intensity of shaft current damages as machines became larger, particularly on high speed turbo generators. The build-up of voltage on the shaft and the resulting currents may damage bearings and could result in catastrophic rotating machine failure.

The main sources of shaft voltages are:

1. Potential applied to the shaft as a result of rotor winding ground fault or spikes caused by the rotor excitation system.
2. Asymmetry of magnetic fields caused by design or manufacturing details or by large stator core faults.
3. Flux generated by axially magnetized turbine and generator parts.
4. Shaft movement off magnetic center.
5. Electrostatic effects caused by charged steam or lubricants.

IRIS POWER SMTracII

The purpose of shaft monitoring is to indicate presence of high levels of voltage and/or current on the shaft and detect poor shaft grounding performance.

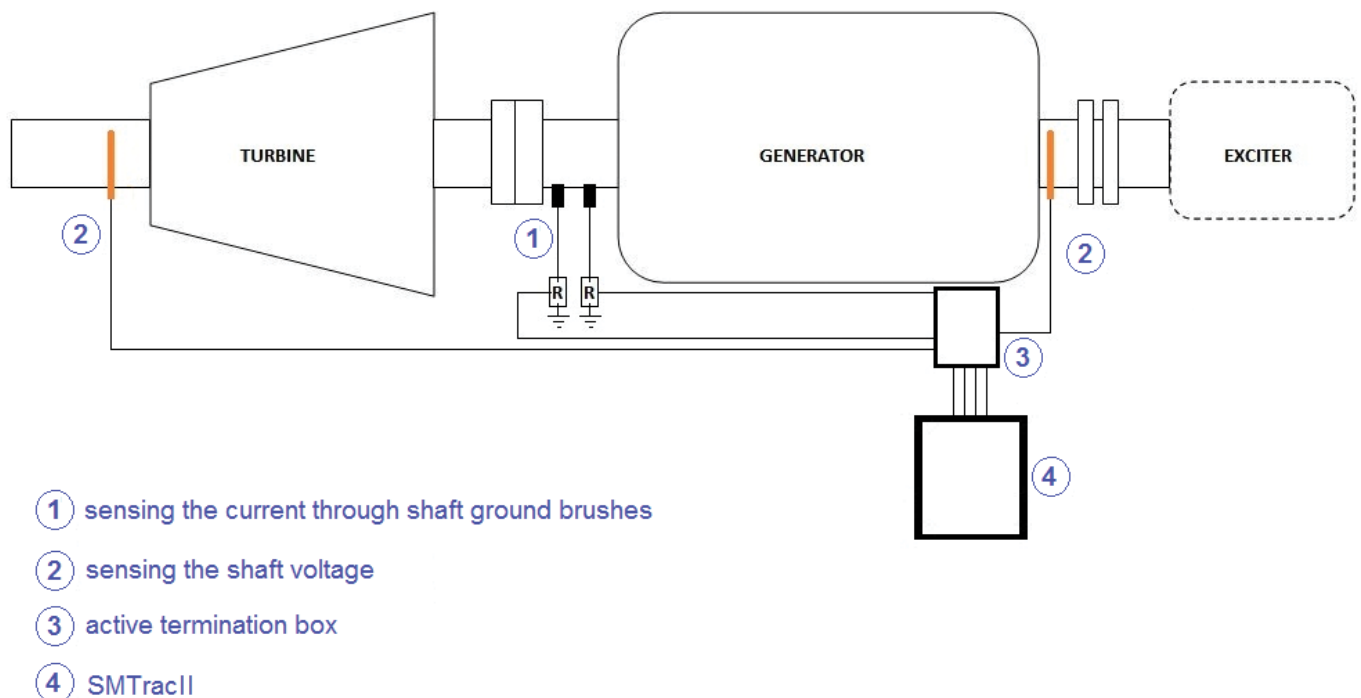
The monitoring system consists of the Active termination box and SMTracII monitor to digitize, process and store the measured data. Signals from existing or customer supplied grounding and voltage brushes are brought to active termination box and then to SMTracII.

FEATURES

- Accepts currents from existing grounding brushes using two different shunt values.
- Continuously monitors up to 4 inputs (two voltage and two current).
- Provides relay contact to alert user of high level current and voltage
- Up to 2 years of storage for archiving voltage and current data and trending at user selectable intervals.
- Multiple communication ports: USB, Ethernet.
- Measurements can be downloaded, locally or remotely, to a computer with Iris Power Application Manager™ software.
- Modbus over TCP/IP protocol available for built-in server and client capability, for collecting machine operating data and to provide measurement summary values to third party software.
- User-friendly Windows™ based software for data display and analysis.

CAPABILITIES

- Analysis of up to two voltage and two current signals.
- Perform a manual spot measurement,
- Automatically saves results every 6 hours and saves daily peak over months and years during normal machine operation, without user intervention.
- Combine shaft monitoring with Iris Power on-line rotor flux and partial discharge testing to provide a complete diagnostic of rotating machine condition using GuardII multiple technologies system.
- Voltage and current vs. frequency spectrum or vs. time waveform, trend view of measured RMS and pk-pk values with display of machine operating parameters and statistical view of more than 10 measured and calculated values.



SHAFT VOLTAGE AND CURRENT MONITORING BASICS

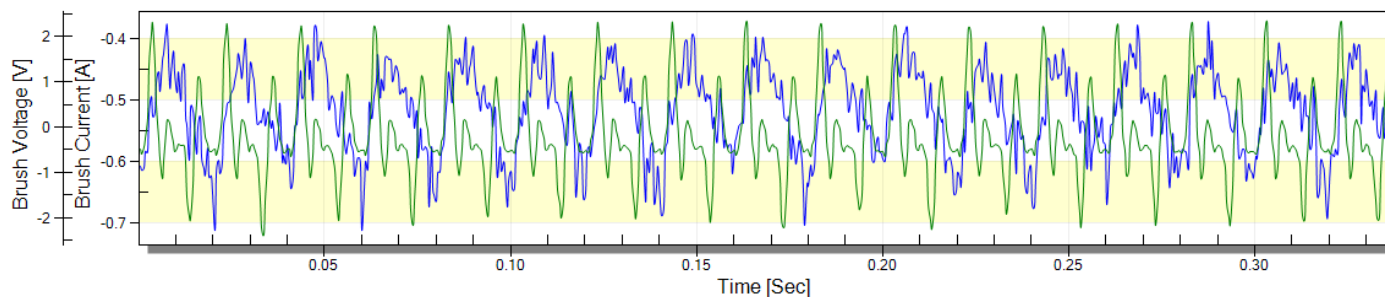
As a result of the combination of various sources of voltages, up to 300 Vp-p can be created on the shaft and damage to bearing surfaces and oil seals can occur. The most frequent problem is pitting of the shaft and bearing surfaces (mechanical damage resulting from arcing between the shaft and bearing). Arcing between two surfaces causes very high temperature at contact points and results in vaporization of metal. Movement between the bearing and shaft journal contributes to current interruptions, resulting in high induced voltage across the oil film, which in turn causes sustained arcing. Although the shaft is less sensitive to sparking effects, compared to the bearing surface, a more serious effect of bearing currents on the shaft is the mechanical wear produced by the buildup of metallic debris. Shaft

voltages can also cause damage to hydrogen seals, oil pumps, drive gears, etc. In addition to pitting of surfaces, shaft currents may also alter the chemical properties of the lubrication oil. The lubricating oil becomes oxidized and acidic as a result of arcing between the shaft and the bearing. As well, metallic particles released by pitting, reduce the dielectric properties of oil film, lowering the oil breakdown voltage. Deterioration of the lubricant leads to more mechanical wear and further destruction of the bearing. This process usually increases bearing vibration and can result in unplanned shut-downs. Poor performance of a shaft grounding brush is one of the most frequent reasons for the build-up of shaft voltage.

On-line measurements of shaft voltage and current require

the permanent installation of 1 or 2 voltage brushes and the installation or modification of the existing shaft grounding brush. Different styles of brushes can be used as sensors, but it is required to keep the contact resistance to a minimum. Shaft current and voltage signals are fed to a monitor to facilitate continuous monitoring and processing of the shaft grounding current and the shaft voltage. These continuously monitored signals are the key to machine condition determination and can provide early warning of developing unit problems.

Installation of the SMTracII can be performed without unit shutdown, but installation of the voltage brushes and connection to the shaft grounding brush might require a shutdown, depending on the type of the brush installed.



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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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