

# TRANSFORMERIQ

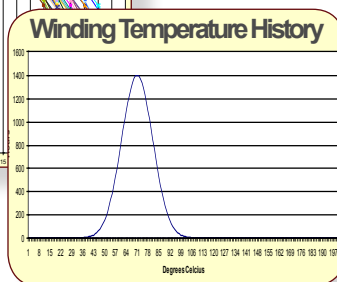
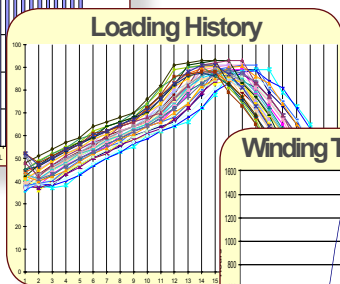
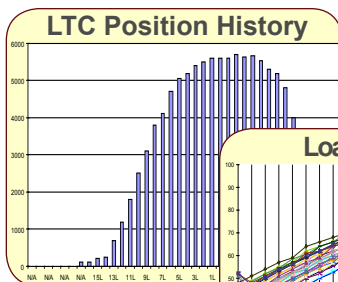
Intelligent Affordable Monitoring

## TIQ

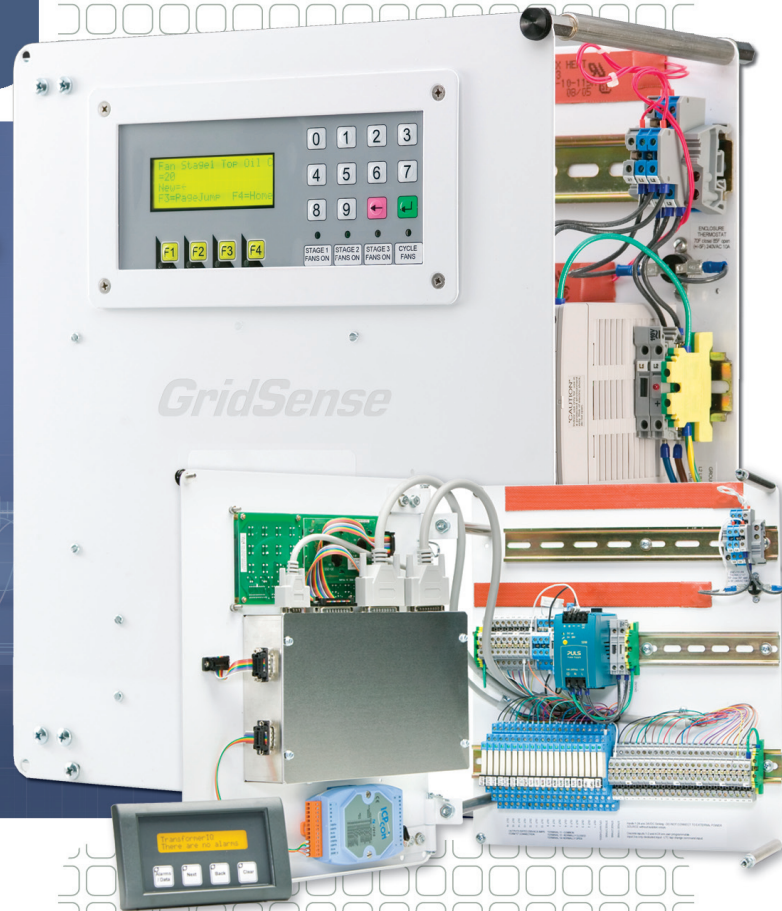
- Temperature Monitoring & Analysis
- Gas & Moisture-in-Oil Processing
- LTC Position & Diagnostics
- Cooling Sensing & Control
- Alarm Recording & Annunciation

The TransformerIQ is a scalable system consolidating all transformer monitoring functions onto a single platform using industry-proven hardware. The compact and field serviceable design integrates easily with new transformers while a magnetic-mount version is ideal for rapid retrofit installations.

The full online monitoring solution provides reliable and simple data access and diagnosing of alarm conditions assisting utility operations managers and system operators in maximizing transformer capacity and life.



Comprehensive  
Platform for New &  
Retrofit Installations



### Features

- ✓ Robust universal platform
- ✓ Scalable for any transformer
- ✓ Certified to C37.90.1&2
- ✓ Industry proven technology
- ✓ Quick installation & easy to use

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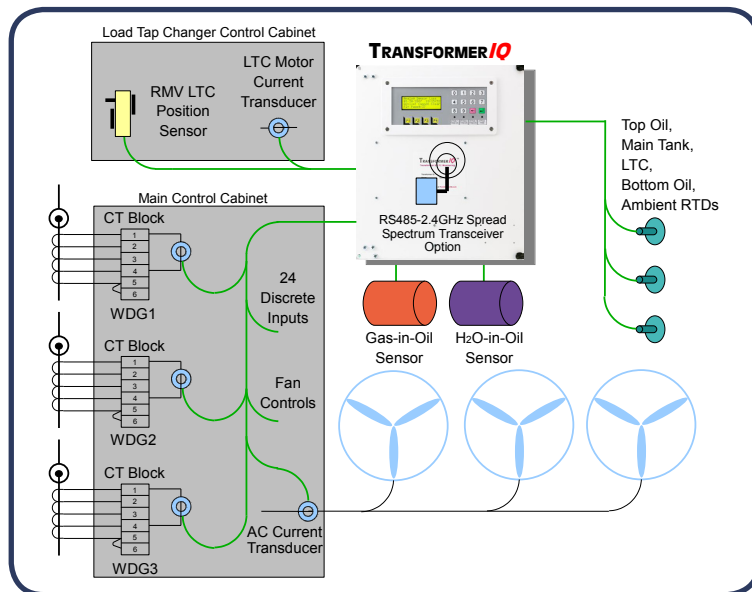
Intelligent Affordable Monitoring

The TransformerIQ is an intelligent, cost-effective, and compact transformer condition monitoring system designed to provide comprehensive diagnostics and real-time performance information of oil-insulated power transformers used by electrical utilities and large power consumers.

The TransformerIQ PLC-based platform replaces traditional IEDs and single functional sensors to provide centralized monitoring. The system controls and logs a variety of performance parameters including LTC position history, LTC motor operation, multi-stage cooling, gas-in-oil, and advanced RTD and fiber optic temperature measuring.

Wireless communications packages provide real-time alarm reporting and historic data access of a single or multiple TransformerIQ installations using the TransformerIQ Dashboard or SubstationIQ software. The DNP3 protocol provides SCADA connectivity for a complete integrated solution.

Manufactured using high quality industry proven components, the TransformerIQ is a robust, reliable and field serviceable system that is quickly and easily deployed to new and existing transformer installations.

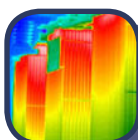
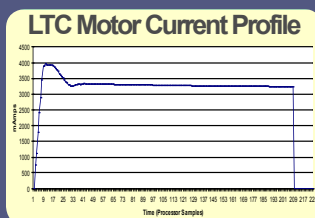
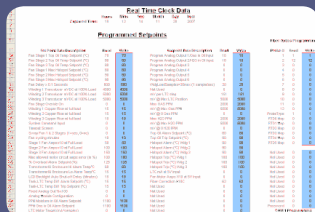
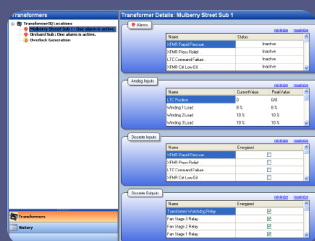


## Configuration & Data Analysis

The TransformerIQ Dashboard software is a powerful application that provides easy access to real time and historical data and alarms as well as programming of transformer set points.

Running on Windows 2000/XP/Vista, the software is designed to be used intuitively to perform periodic functions such as firmware upgrades and serve as a kiosk annunciation platform to view an unlimited number of TransformerIQ installations.

All data from multiple transformers can be instantly retrieved and stored at a single location, archived or even exported to an Excel spreadsheet for post analysis and reporting functions.



## Temperature & Cooling Monitoring

Connect up to 6 RTD temperature sensors and 3 winding load inputs for full three-phase electronic monitoring and multistage cooling control. The TransformerIQ also supports connection up to 12 fiber optic temperature probes for accurate hotspot winding temperature reads. With the advanced patent-pending **OilFlowIQ** technology, the TransformerIQ can also accurately determine loss of oil, blocked cooling, pad imbalance or low oil levels conditions through advanced temperature variance analysis.



## Load Tap Changer Diagnostics

Complete historic operation and alarm records of Load Tap Changers including a histogram on the number of LTC operations at each position as captured from the TransformerIQ LTC position indicator or other sensor. The LTC-main tank differential temperature monitoring accommodates mechanisms not located above the core and coil assembly, differentiating between top oil and main tank RTDs. Unique to the TIQ is the ability to sense mechanical binding, contact wear or LTC motor failure by capturing the motor current and comparing it with stored fingerprint waveform.



## Annunciation & Alarming

The TIQ offers single-screen comprehensive diagnostics in the same manner provided by traditional annunciators with the added benefit of time & date stamping, alarm histories and fully programmable text messaging for the more than 45 different alarm conditions. Maintenance features include mapping of alarms to any combination of contact relays, momentary vs. latching operation and acknowledgement of alarms. Discrete inputs are all user-definable and offer a means to consolidate contact output alarms from across the substation as a remote terminal unit (RTU).

## Technical Specifications

### Communications

- MODBUS ASCII or RTU over RS232
- MODBUS ASCII or RTU over TCP/IP
- Fiber-optic output port\*
- Fiber-RS232 receiving converter\*
- RS485 output port\*
- MODBUS-DNP3 conversion\*

### Power Supply

- 110-370VDC; 85-264 VAC
- 30 Watt - Fused disconnects

### Discrete Inputs

- Normally-open, dry contact inputs
- Optional VDC/VAC isolation relay inputs\*
- (1) Factory & (23) User-defined Inputs

### Discrete Outputs

- 6/10A, 250VAC Form C relays
- (8 - 16) Alarm output relays
- (1) Failsafe watchdog relay
- (3) Failsafe cooling stage relays
- Programmable fan cycling
- Programmable stage 1&2 alternating

### Analog Outputs

- (2) 0-5VDC fixed outputs
- (2 or 4) Optional additional outputs\*
  - 0to1mA, 0to20mA, 4to20mA
  - 0to10VDC,  $\pm 10$ VDC,  $\pm 5$ VDC
- (16) Analog output signals

### Analog Inputs

- Winding load (3)
- LTC motor current
- Cooling motor current
- Temperature (3 to 6) 100 $\Omega$  Pt RTDs
  - Top oil, bottom oil, LTC oil, ambient
- LTC position (0-5VDC or 40 $\Omega$ /step)
- Variety of fiber-optic probe inputs (12)\*
  - Mapped to any winding
  - Correctable to simulate un-probed wdg

### Data Logging & Reports

- Time v. winding temp profile
- 40-Position LTC tap changes
- 31-Day hourly & 12-Month average loads
- Cooling stage starts and operating hours

### Time-stamped Alarms

- Map to any/all output relays
- Program latching vs. momentary
- 100-alarm FIFO storage buffer
- Last occurrence of each alarm stored
- (24) Discrete input alarms
  - Top oil temperature alarm/trip
  - LTC-main tank diff alarm/trip
  - Transformer overload alarm
  - (3) Fan motor stage current alarms
  - HI/LO Cabinet temp alarm
  - Email failure alarm
  - H2O-in-oil PPM alarm
  - Gas-in-oil PPM alarm
  - Analog sensor loss alarm
  - LTC motor current alarm
  - (6) Winding hot spot alarms/trips

### Immunity

- C37.90.1-2002 Surge Withstand
- C37.90.2-2004 RFI Immunity
- EN 50263-1999 Immunity Testing
- IEC 61000-4-2 Electrostatic Discharge
- IEC 61000-4-4 Electrical Fast Transient Isolation (Hi-pot) 2500VAC

### Enclosure & Mounting Options

- Powder-coated steel - NEMA4/IP65
- Stainless steel - NEMA4X/IP65
- Polycarbonate - NEMA4X/IP65
- Magnetic mounting kit

### Environment

- 40°C to +60°C operating range
- 20°C to +85°C storage range

\* Denotes optional components

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