QUALITROL® QTMS
Transformer Monitoring System

Real time transformer monitor providing a comprehensive look into asset health through condition based monitoring

• 5 year product warranty; reliable product platform
• Modular design; full customization of monitoring parameters to meet specification
• Simple system configuration; web based interface software
• Field upgradeable; hot swappable modules with wiring on the front panel of the unit

Product Summary

Description: As industry trends continue to require higher transformer utilization with reduced operations and maintenance budgets it is becoming vital to reliably monitor asset health in real time. Real time monitoring of parameters such as temperature variations, partial discharge, dissolved gas generation as well as others vital transformer factors may indicate early warning signs of potential risks to the electrical network and associated assets. Early detection of transformer abnormally may allow for a shorter issue resolution cycle and avoidance of unnecessary maintenance or even potential unplanned outages.

Application: Transformer monitor for condition based, continuous online monitoring of asset health. Interfaces with a variety of Qualitrol, third party smart sensors, and gauges to accurately measure transformer parameters vital to asset management. The QTMS utilizes a modular approach allowing for full system customization to specification. Modules are hot swappable and field upgradeable with user configurable through web based software.
**Product Reliability**
- Robust design and material sets that are thoroughly tested to provide peace of mind in the field. Standard 5 year product warranty.
- Bring all transformer sensor data into one central location with security to ensure data protection.
- Reduce installation and configuration time due to ease of system use. Designed to be user friendly with web based configuration software and wiring located on the front panel of the unit.

**Highly Customizable**
- Optional display screen and module variety allows for a high level of customization per transformer specification.
- Supports up to 14 I/O modules of any configuration and orientation based on monitoring needs.
- Web based software may be accessed and easily configured in a variety of methods. No need for field upgrades.

**Simple Configuration**
- Fully field configurable by the user with Web based software.
- Field upgradeable hardware modules which can be added or removed at any time. Orientation of modules may also be changed at any time.
- NERC/CIP security features

**Field Upgradeable**
- Modular approach with wiring on the front panel of the unit for easy access.
- Hot swappable, field upgradable, modules for QTMS units already in use.
- Universal power supply
Why is Online Monitoring Important to Asset Health?

With an aging infrastructure under higher utilization demands and shrinking operations and maintenance budgets it is crucial to monitor existing transformer health. Online monitoring may extend useful asset life while avoiding unnecessary maintenance pitfalls and aid in mitigating potential risks of unexpected outages. A majority of key transformer parameters affecting life of windings, bushings, and load tap changers may be monitored real time with smart sensors to gain an insightful window into the current health status.

Data points from multiple smart sensors may now all be fed into one central collection point of the QTMS for further analysis. The QTMS, being modular approach is a highly configurable and customizable system to meet most specifications.

The data may then be fed to a web based software platform where the user has an instant, real time snapshot into each parameter being measured on the transformer. The web interface also allows for ease in naming and configuration of smart sensors with appropriate security measures. QTMS may also be configured to interface with Qualitrol’s SmartSub software for monitoring of multiple transformers and related assets.
A modular platform for transformer monitoring allows for complete customization and field upgrades:

Display
- Optional push button display screen
- Large backlit LCD screen
- Integrated overlay buttons

Fiber Optics
- Accurate direct winding temperature
- Accurately characterize asset aging
- Available in 4, 6, or 8 inputs

Relays
- Versatile control of cooling systems, alarms, and trip signals
- 8 relays per module
- Up to 112 relays available per system

CPU
- USB and serial port s; IEC61850, DNP 3.0, Modbus, IEC60870
- Web based interface
- Universal power supply

Analog Inputs
- Accepts a variety of analog input types with flexible configuration
- 8 analog inputs per module
- Up to 112 analog inputs per system

Digital Inputs
- Completely configurable per specification with wiring on front panel
- 14 digital inputs per module
- Up to 196 digital inputs per system

Bushing Monitor
- Real time monitoring of bushing health
- Detect early changes in Tan Delta
- Detect early changes in capacitance

Rapid Pressure Rise Relay
- Help prevent catastrophic damage due to sudden pressure increases
- Trip function to avoid further damage due to potential fault occurrence
## Technical Specifications

| Power Supply | Universal; 90 - 264 VAC, 50/60 Hz and 127 - 300 VDC; < 50 watts  
|             | Fuse: 5.0A / 250V |
| Processor Module | TX6-DL Dual Core Processor  
|                  | 10/100 Ethernet TX, RJ45 Port  
|                  | USB-A port  
|                  | RS485, 4-wire communications port  
|                  | Display port for optional remote display |
| Communications Module | Option 1  
|                      | Supply power input connection  
|                      | Ethernet FX, ST connector  
|                      | RS485, 4-wire communications port  
|                      | System Status Relay |
| Communications Module | Option 2  
|                      | Supply power input connection  
|                      | 10/100 Ethernet TX, RJ45 port  
|                      | Serial Fiber Optic Port, ST connector  
|                      | System Status Relay  
|                      | IRIG Input Connection |
| Data Communications | Protocols Serial: DNP 3.0 (level 3), Modbus, IEC 60870  
|                     | Protocols Ethernet: IEC 61850, DNP 3.0 (level 3), Modbus, IEC 60870 |
| Memory | Data Logging | 100 variables; store rates 1 minute to 24 hours  
|        | Event Recorder | 32 parameters at 15 second capture rate for 90 days |
| Display | Optional | LCD, 2 x 16 characters, |

### Module Parameters

**Supports up to 14 I/O Modules**

| Analog Input Module | Inputs: Measures up to 8 parameters  
|                     | Accuracy: +/- 0.5% full scale input range  
|                     | Temperature: 100 ohm platinum (Pt100), 10 ohm copper (Cu10) RTD; simulated winding  
|                     | Liquid/ambient temperature range: -40 - 120°C  
|                     | Winding temperature range: -40 - 200°C  
|                     | Current: Clamp-on CT, 0 - 5A, - 10A, - 20A, -100A and others available  
|                     | DC Current Loops: 0 - 1 and 4 - 20 mA DC  
|                     | DC Voltage: 0 - 100 mV DC and 0 - 10 VDC  
|                     | AC Voltage: 0 - 140 VAC and 0 - 320 VAC; 50/60 Hz  
|                     | Potentiometer: 1500 - 15,000 ohms  
|                     | Switch Contact (dry): Open/Closed  
|                     | Switch Contact (powered): >80 V or >130 V open, jumper selectable; optically isolated  
|                     | Tap Position: Up to -10 to +10 VDC and 0 - 125 VDC or non-powered; Resistor Bridges of 40 - 2500 ohm(1% acc, 100 ppm); or 0 - 1 mADC or 4 - 20 mADC  
| Digital Input Module | Inputs: Up to 14 optically isolated inputs  
|                     | Maximum Voltage: 250 VDC  
|                     | Threshold Voltage: >60 VDC  
| Fiber Optic Module | Inputs: Up to 8 fiber optic input probes  
|                     | Accuracy: +/- 1°C  
| Output Relay Module | Output Relays: 8 Form C relays; 10 A @ 120/240 VAC; 10 A @ 30 VDC  
|                     | Output Current Loops: 2 Loops; 0 - 1 mA (max resistive load 10,000 ohms); 4 - 20mA (max resistance 500 ohms); other options available |
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### Environmental Conditions

<table>
<thead>
<tr>
<th>Immunity</th>
<th>Environmental Conditions</th>
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<tbody>
<tr>
<td>Dielectric Potential</td>
<td>2500 VAC ACROSS ALL TERMINAL BLOCKS; 60 SECONDS TO GROUND</td>
</tr>
<tr>
<td>Electrostatic Discharge Immunity</td>
<td>IEC 61000-4-2:2008</td>
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<tr>
<td>Radiated Electromagnetic Field Immunity</td>
<td>IEC 61000-4-3:2010</td>
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<tr>
<td>Electrical Fast Transient Burst Immunity</td>
<td>IEC 61000-4-4:2012</td>
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<tr>
<td>Surge Immunity</td>
<td>IEC 61000-4-5:2005</td>
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<tr>
<td>Radio Frequency Common Mode Immunity</td>
<td>IEC 61000-4-6:2008</td>
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<tr>
<td>Power Frequency Magnetic Field Immunity</td>
<td>IEC 61000-4-8:2009</td>
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<tr>
<td>Voltage Interrupts</td>
<td>IEC 61000-4-11:2004</td>
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<tr>
<td>Operating Temperature</td>
<td>-40°C TO +85°C</td>
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<tr>
<td>Storage Temperature</td>
<td>-60°C TO +85°C</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>5-95% NON-CONDENSING</td>
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<tr>
<td>Shock</td>
<td>10g, HALF-SINE IN THREE ORTHOGONAL PLANES</td>
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<tr>
<td>Vibration</td>
<td>SWEEP 50 TO 240 Hz @ 0.004 INCH DISPLACEMENT IN THREE ORTHOGONAL PLANES 50-240 Hz SWEEP</td>
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<tr>
<td>Optional Heater</td>
<td>120/240 VAC heater option</td>
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<tr>
<td>Size</td>
<td>19 inch rack; 6U high</td>
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### QUALITROL® Field Services
To further improve reliability, QUALITROL provides comprehensive education and on-site commissioning services, maintenance contracts and technical support to all customers worldwide. Emergency response is available on all products and services.

### About QUALITROL®
QUALITROL Company LLC manufactures substation and transformer monitoring and protection devices used by electric utilities and manufacturing companies. It is the global leader in sales and installations of transformer asset protection equipment, fault recorders and fault locators. Established in 1945, QUALITROL Company produces thousands of different types of products on demand, each customized to customers’ unique requirements.

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