

OilQSens® OQ3000 - Oil sensor system

High performance, early detection of critical operation conditions



Features

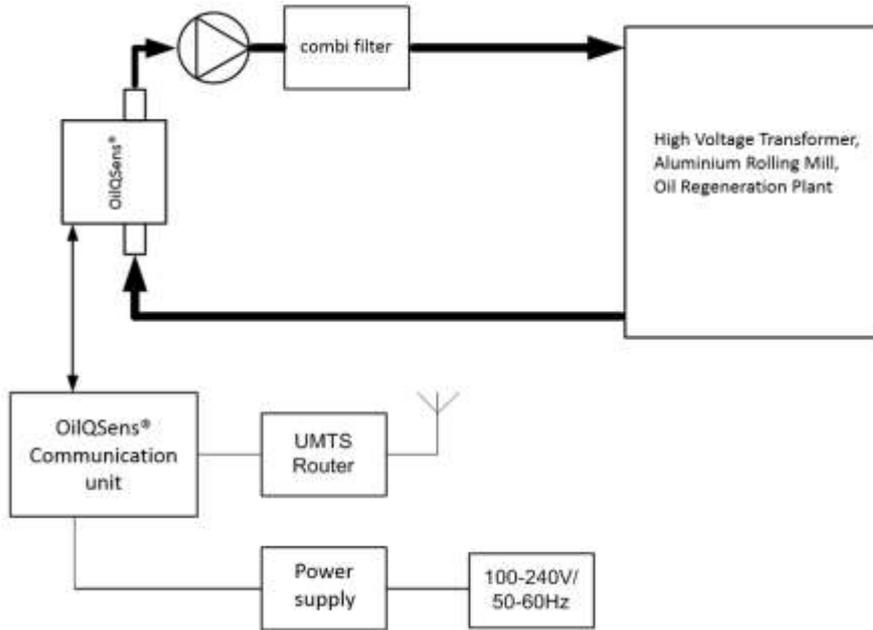
- Detect change before wear damage
- Easy to install or retro-fit
- Web based, decentralised monitoring
- Condition Based Maintenance
—> large cost savings
- Early warning before damage starts
- Online, continuous 24 / 7
- Low cost of ownership, no service contract required, no consumables,

Applications

- High voltage transformer monitoring
- Oil regeneration process control
- Contamination detection
- Oil deterioration monitoring
- Oil Condition monitoring solution

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OilQSens® can detect early changes in oil quality/condition from day 1 before damage occurs. Contamination products, such as particles, cellulose fibres, moisture and their contaminating effects, such as acid and oil soaps cause a change in the electrical properties of oil. With the oil quality sensor, OilQSens®, dependent parameters are measured continuously and on-line. From the changes in the oil, the condition of the transformer oil is evaluated. Dissolved gas analysis (DGA) is a sampling technique that may miss intermittent problems. OilQSens® works online, continuously from day 1, prior to other technologies limits of detection.

Conductivity, permittivity and temperature are measured with

high precision. Both conductivity and permittivity are temperature dependent. OilQSens® features a self-adapting temperature compensation algorithm similar to a neural network.

Electrical conductivity of oil is extremely low. However, the highly sensitive OilQSens® measures conductivity down to 0.1 picosiemens per metre and all values are accurately temperature compensated.

Relative permittivity is a measure of the dielectric constant. The measurement of permittivity by OilQSens® makes a statement about water ingress and a modification of the insulating strength of the oil. Taken in conjunction with the conductivity values, a clear picture emerges of the changes in the oil.

The monitoring of oil in transformer, high voltage circuit breakers and oil regeneration plants is an important parameter for the efficiency and safety. As oil ages it forms charge carriers which alter the conductivity. The process is accelerated by the presence of metal catalysts, oxygen and temperature.

The loss angle $\tan \delta$ is calculated from the conductivity and permittivity. The measurement according to IEC61620 is based on alternating square-wave voltage with low voltage and frequency

The web based, decentralised monitoring system is perfect for remote or inaccessible locations. Measurements are transmitted via LAN, WLAN or the serial interface.

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—> Various Applications! What is yours?



Converter substation offshore



Petrochemical



High Voltage Transformers



Mobile oil regeneration unit



Traction Transformers

Specification

Ranges

Conductivity: 0.1 to 20,000 pS/m
(other on request)
Relative permittivity: 1 to 5

Sensitivity

Conductivity: 0.01 pS/m
Relative permittivity: $1 \cdot 10^{-6}$

Accuracy

Conductivity: $\pm 1\%$ value, ± 0.5 pS/m
Relative permittivity: $\pm 1\%$ value, ± 0.0001

Temperature and pressure

Max oil pressure: 60 barg at 20°C
(870 psig at 68°F)
Oil temperature: -10°C to +70°C
(optional, high temperature: -10° to + 150°C)
(optional, low temperature: -40° to + 65°C)
Operating temperature: -20°C to +70°C

Material:

Sensor material: Stainless steel
(bowl, carrier and head)
Cable: 3 metre, shielded
(optional, different cable length)

Connections:

$\frac{1}{4}$ " Swagelok® for 6mm o.d. tube
(optional connectors available)

Communication Interface:

Serial communication via RS232/RS232-USB
(opt.: LAN, GSM, Profibus, Modbus, CAN,
0-10V)

Electrical requirements:

115/230 VAC, 50/60 Hz (optional, +24 VDC)

Weights and Dimensions

Dimensions (mm):

Sensor: 103 (height) x 70 (diameter)
Communication unit: 210 x 250 x 165
Communication module: 87 x 110 x 30

Weights net:

Sensor: 2.35 kg
Communication unit: 4.45 kg
Communication module: 0.25 kg

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Ordering Information

Part No.	Description
OilQSens® OQ3000	Consist of base sensor and communication unit with communication module, standard sensor cable length of 3 meter, serial communication via RS232 / RS232 to USB interface, 115/230 VAC, 50/60 Hz power supply
Options	
-HT	High Temperature Range (-10°C to + 150°C)
-LT	Low Temperature Range (-40°C to +65°C)
-LAN	LAN Interface, enables data transfer via TCP/IP
-GSM	GSM Interface, enables mobile data transfer via 3G phone network (SIM card has to be provided by the customer, requires LAN interface)
-PROFIBUS	PROFIBUS Interface (replaces standard RS232 interface)
-MODBUS	MODBUS Interface (replaces standard RS232 interface)
-CAN	CANBUS Interface (replaces standard RS232 interface)
-AO_X	Analog Output: 0 - 10 Volt (X = numbers of channels to be transmitted)
-1Z	1 inch connector block (replaces the standard sensor connector block)
-24VDC	+24 Volt DC power supply connector (replaces the standard power supply using the more compact communication module for easy installation into existing electrical cabinets)
Accessories	
-PC	PLA Protection cap for the base sensor during transport
Service & spares	
OQ-OR-NBR	O-ring for base sensor, optimized for Diesel applications
OQ-OR-FKM	O-ring for base sensor, standard applications
OQ-FCC	Factory Calibration Certificate

Patent pending EP 2 163 887



v4_2017-04-26