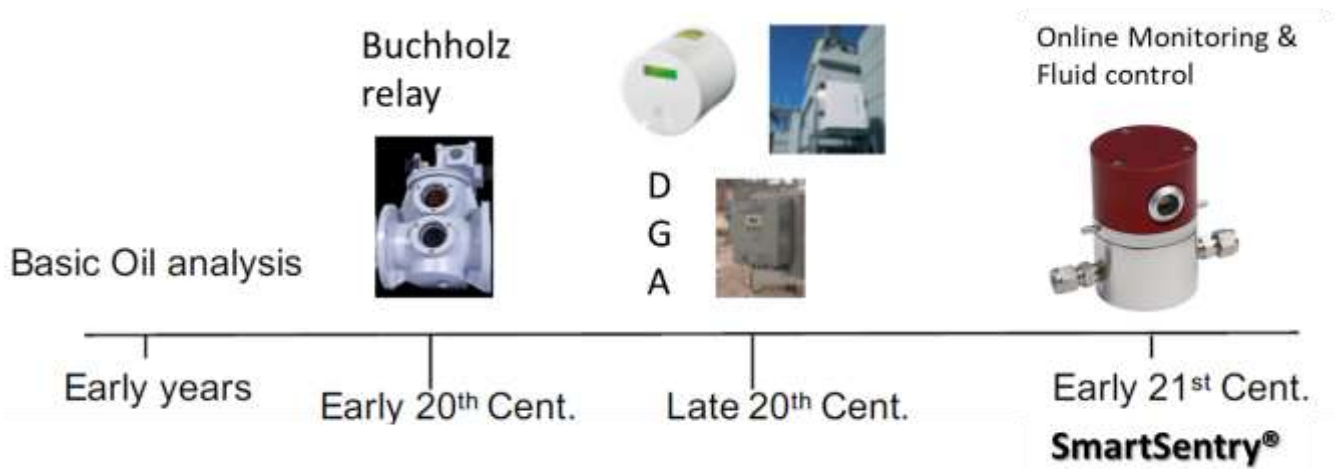


The worlds most effective transformer oil conditioning
system combined with the worlds most advanced
online condition monitoring system.

SmartSentry[®]



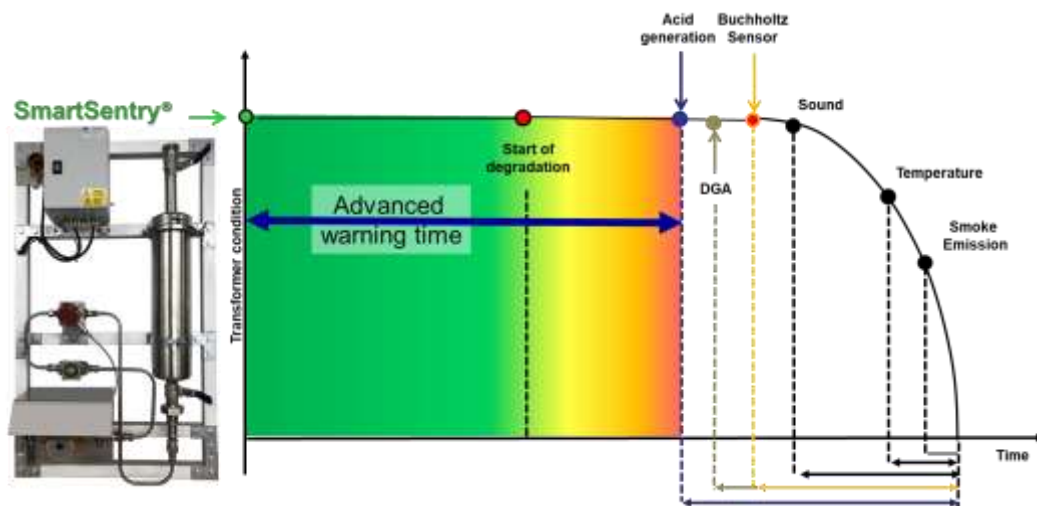
SmartSentry® - Online Monitoring and Fluid conditioning



Since the earliest use of oil filled transformers ways have been sought to give early warning Of both faults and deteriorating oil condition. By the late 20th Century online gas monitors had become common but had limitations. Sensitive electronics have been problematic particularly at high temperatures, and Online DGA monitors are sampling based. It takes between 45 minutes and 2 hours for these systems to extract the gases from the oil and measure them. So the monitoring is intermittent. That has been the situation..... **Until now.**

The Smart Sentry® changes that. It is a continuous monitoring system, detecting changing conditions As they occur and relaying the information In seconds. Smart Sentry® starts monitoring the critical parameters from day 1.

- True, real time monitoring
- Early intervention warning
- Robust
- Ease of communication



The SmartSentry® detects the onset of conditions that lead to faults. It does this by detecting and measuring sub-minute changes in the conductivity and permittivity of the oil with highest precision. Both conductivity and permittivity are temperature dependent. The sensor system features a self-

adapting temperature compensation algorithm - similar to a neural network. Electrical conductivity of oil is extremely low. However, the highly sensitive sensor system measures conductivity down to 0.01 picosiemens per metre and all values are accurately temperature compensated.

SmartSentry® - Online Monitoring and Fluid conditioning



Converter substation offshore



Petrochemical



High Voltage Transformers / Smart Grids

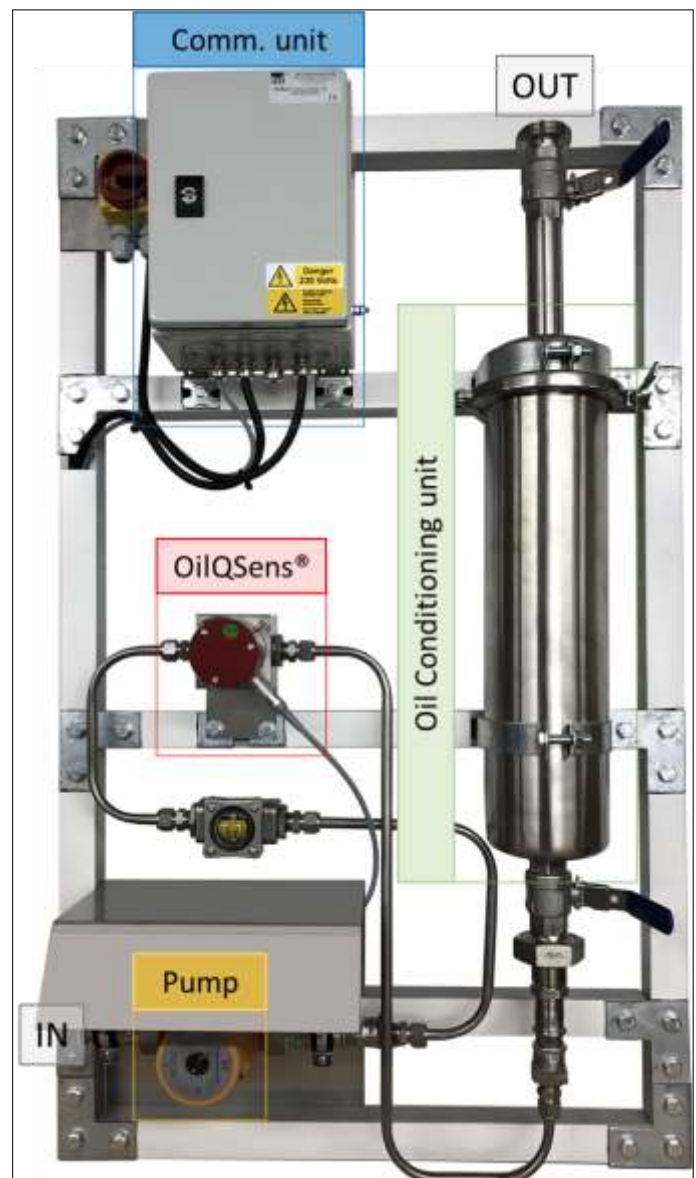
SmartSentry® enables online, real-time measurement of:

- Electrical conductivity κ
- Relative permittivity ϵ_r
- Loss factor $\tan \delta$
- Oil temperature

SmartSentry® does so much more than simply monitor the conditions inside the transformer. It also maintains the oil and the paper insulation in a healthy and low risk state.

Insulating paper life = Transformer life!

The goal for operators of transformer assets is to maximise the life of the asset while minimising the risk of failure. This requires that we keep contaminants that reduce the life of the paper insulation at as low a level as we can.



SmartSentry®: pre-installed at a framework for easy installation.

The **SmartSentry**[®] starts working from day one and works continuously. So once the oil has been restored the contaminants creeping out from the paper insulation are removed as they appear. Oxidation by-products are removed at their formation and so the transformer insulation system can be restored and maintained in optimum condition.

The **SmartSentry**[®] unlike the mobile oil reclamation (regeneration) plants, does not use on site burning to re-activate the media. This prevents the formation of Aggressive Sulphur species that can cause corrosive Sulphur activity.

The **SmartSentry**[®] is unique, patented, combined system that provides:

- Real time condition monitoring of the transformer
- Continuous maintenance of the oil / paper insulation system.

So what is the next step?

Send us the latest analysis report for your transformer and let our experts advise on whether Smart Sentry[®] is suitable and appropriate for your specific circumstances.

For further information please visit us at www.cmc-instruments.de,
email us on info@cmc-instruments.de or
give us a phone call +49 6173 320078.

cmc Instruments GmbH
Rudolf Diesel Strasse 12 A
D-65760 Eschborn
Germany
Tel: +49 6173 320078
Fax: +49 6173 65050
info@cmc-instruments.de
www.cmc-instruments.de



Patent pending EP 2 163 887

v1_2019-03-01