SIEMENS
Ingenuity for life

SITRAM H2Guard

Customer Services for Transformers
TLM Transformer Lifecycle Management

Monitoring and Diagnostics

Introduction
Fault gases inside the transformer oil are the most important indicator to assess the condition of a transformer. When failures occur – whether the root cause is the initiation of an arc, a partial discharge, a local hotspot or insufficient cooling – each kind of failure generates specific gases with different concentrations.

Among those gases hydrogen is the one which is generated in almost every failure scenario. This is why a continuous surveillance of hydrogen is an efficient method for transformer monitoring.

It enables early detection of failures and the timely initiation of preventive measures in order to avoid consequential damages.

With SITRAM H2Guard Siemens offers a single gas monitoring system for hydrogen measurement.

Features
SITRAM H2Guard enables a continuous inspection of the transformer oil condition and the determination of trends.

SITRAM H2Guard can be used as a stand-alone system or in combination with superior monitoring platforms.

An integration into existing SCADA landscapes based on a variety of communication and protocol interfaces is available on request.

In addition sensors for moisture and temperature measurement can easily be included.

Benefits
- Efficient scheduling of maintenance work
- Prevention of unplanned downtimes by reliable early fault detection
- Low-maintenance, user-friendly, expendable and inexpensive

Scope of work / deliverable
Each SITRAM H2Guard comprises:

- An electrical and mechanical connection kit or an individual mechanical connection kit on request
- An installation flange including a venting facility in different sizes
- External sensors, e.g. for measurement of moisture or temperature, optional
- Turnkey installation and communication services of the sensor
- Analysis of monitoring data by experts and customer support, optional
- On-site training courses for operation and maintenance of our systems

Technical details
Fault gas measurement
The SITRAM H2Guard hydrogen sensor is based on a compact solid involving the elements Palladium (Pd) and Nickel (Ni) in a thin film alloy. It is especially suitable for the measurement of dissolved hydrogen in transformer oil.

The new technology does not require a membrane which results in reduced need for maintenance and a long service life.

Measurement of moisture level
Moisture accelerates aging of the insulation and leads to a degradation of the breakdown voltage in the transformer oil. This is why SITRAM H2Guard offers also the possibility to measure and analyze the moisture level of the oil continuously by applying an optional moisture sensor.

The measurement of moisture supports the timely use of adequate drying equipment, like SITRAM DRY.

Technical details

Measuring Demands	
Range	25ppm – 5000ppm
Accuracy	25ppm or 20% of reading (whichever is greater)
Repeatability	10% of reading or 15ppm (whichever is greater)
Response Time	< 60 min. (90% of step change)
Cross - Sensitivity	< 2% to other gases CO, CO2, CH4, C2H2, C2H4, C2H6, C3H8 etc.

SITRAM H2Guard – General Data	
Supply Voltage / Power Consumption	110 to 240 VAC, 50-60 Hz / max. 50 W
Ambient Operating Conditions	-40°C...+70°C, indoor/outdoor also in harsh EMC areas, 5 % ... 95 % RH (non-condensing) for complete operating temperature, 100 % RH for gross of operating temperature range
Operating Conditions	Pressure and vacuum withstanding Oil temperature, pressure: ≤ 105°C / ≤ 3 bar
Physical Dimensions and Weight	Tube > ¾" NPT / 3.5", size: 406x127x140mm (LxBxH) weight: 2,3 kg
Ingress and Corrosion Protection	· IP67 (IEC 60529) · C5M (a.o. ISO 12944) · Weather and UV resistant powder coat (AAMA 2604) · Cast aluminum enclosure (UNS A03280) with a stainless steel probe tube (316 type)
Resistance to Shock and Vibration	Among others tested on basis of: · DIN EN 60068-2-6 – Shock and Vibration · DIN EN 60068-2-64 – Vibration Environmental Test · DIN EN 60068-2-27 – Shock Test for Transformer Environment · Additional performed tests such as extended, aggressive vibrational dwell at 50 and 60 Hz.
Data Rate	Maximal 1 measurement value per second, Self-calibration: 2 h every 12 h
Output Relays	Four "Form C" relays with NO, NC, and COM terminals are available for use
Analogue I/O	· 2 inputs, standard: 0-20 mA (e.g. for connection of additional external sensors e.g. humidity) · 3 outputs, standard 0-20 mA (first output is reserved to report hydrogen)
Communication	· Serial RS-232 and RS-485, Mini-USB, Ethernet · Protocols: Modbus over Ethernet or serial
Memory	· Micro-SD slot (support is dependent on firmware version) · Sufficient data storage capability on internal flash memory
Display and Status LED Indication	· Multi-line OLED monochrome graphics display (orange text on black background) · Three bright discrete LEDs (red, yellow, green)

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