



SIEMENS

Ingenuity for life

Customer Services for Transformers

SITRAM Multisense 5



Monitoring and Diagnostics

Introduction

In their average lifetime of 40 years, transformers endure various forms of stresses that can contribute to a multiplicity of failures (electrical, thermal, chemical or mechanical). Transformer failures may cause e.g. costly damage to primary and secondary equipment, outages, environmental cleanup charges and a loss of reputation.

DGA (Dissolved Gas Analysis) monitoring with *SITRAM Multisense 5* helps utilities to avoid transformer failures.

SITRAM Multisense 5 indicates deviations and imminent faults by analyzing the concentration of four dissolved key gases in transformer insulating oil, and moisture. This helps to predict and prevent four major fault types:

Overheated oil (monitoring C_2H_4)

Partial discharge (monitoring H_2)

Overheated cellulose (monitoring CO)

Arcing in oil (monitoring C_2H_2)

Features

- Robust, NDIR measurement technology without moving parts or reference gas
- Easy installation directly at transformer
- Display and keypad enabling comprehensive configuration and setup without additional computer

- Easy to understand due to simple setup
- Compact, robust design (IP55)
- High accuracy enabling comprehensive early warning
- Various communication options
- Optional high- and low-voltage bushing sensors for bushing monitoring applications from Siemens via communication interface
- Optional: 5 digital outputs, 5 digital optocoupler outputs, 5 analog outputs, 10 analog inputs
- Monitoring functions:
 - Voltage and current monitoring (via voltage and current transformers / transducer)
 - Temperature monitoring: lower and upper oil temperature, ambient temperature (via additional temperature sensors)
 - Cooling stage / tap changer position monitoring (e.g. via current transducer)
 - Free configuration of analog inputs, free allocation to any additional sensor
 - Calculation of hot-spot (acc. to IEC 60076), loss-of-life, ageing rate

Benefits

- Monitoring of key gases inside the transformer oil, enabling recognition of all potential failure types

- Avoidance of major costs due to failures or outages
- Cost savings thanks to scheduled and efficient transformer maintenance
- Easy mounting on a transformer valve (installation without interrupting operation)
- Uses advanced software (the unit and via PC)

Scope of work

- Configuration and administration of each individual Multisense unit
- Data and configuration read-out of Multisense units
- Processing and visualization of data
- Read-out (trend or table)
- Online functions (online sensors, extraction status and process flow)
- Diagnostics functions (Duval triangle)
- Further processing of the processed data (Excel, CSV, clipboard and printing)
- Storage of the processed data and unit configuration
- Automatic data read-out and alerting by e-mail



- Standard electrical and mechanical connection kit, individual mechanical connection kit on request
- Installation flange (different ventilation sizes available)
- Turnkey installation and communications services (optional)
- On-site training courses for operation and maintenance for our systems
- Expert analysis of monitoring data and customer support (optional)

Technical Details

Operation Principle

- Miniaturized gas sample production based on headspace principle
- No membrane, negative pressure proofed
- Patent on oil sampling system (EP 1 950 560 A1)
- Near-infrared gas sensor unit for CO , C_2H_2 and C_2H_4
- Micro-electronic gas sensor for H_2
- Thin-film capacitive moisture sensor H_2O
- Temperature sensors (for oil and gas temperature)
- Optional nominal voltages of auxiliary supply: 120 V AC 50/60 Hz or 230 V AC 50/60 Hz or 120 V DC or 230 V DC

	Range	Accuracy
H_2	0 - 2000 ppm	$\pm 5\%$ or $\pm LDL$ (whichever is greater)
C_2H_2	0 - 2000 ppm	$\pm 5\%$ or $\pm LDL$ (whichever is greater)
CO	0 - 5000 ppm	$\pm 5\%$ or $\pm LDL$ (whichever is greater)
C_2H_4	0 - 2000 ppm	$\pm 5\%$ or $\pm LDL$ (whichever is greater)
H_2O	0 - 100%	$\pm 3\%$ or $\pm LDL$ (whichever is greater)

* Accuracy quoted is the accuracy of the detectors during calibration

- Power consumption: max. 350 VA
- Housing: aluminum, W 263 x H 263 x D 327.5 mm
- Weight: approx. 13.5 kg
- Operating temperature (ambient): $-55^\circ C$ - $+55^\circ C$ (below $-10^\circ C$ display function locked)
- Oil temperature (inside transformer): $-20^\circ C$ - $+90^\circ C$
- Storage temperature (ambient): $-20^\circ C$ - $+65^\circ C$
- Oil pressure: up to 800 kpa (negative pressure allowed)
- Connection to valve: G 1½" DIN ISO 228-1 or 1½" NPT ANSI B 1.20.1
- Safety: CE certified, Isolation protection: IEC 61010-1:2010/IEC 61010-2-081, Degree of protection: IP-55

Fault gas measurement

SITRAM Multisense 5 is executed in two steps: gas extraction (headspace technique) and gas detection (non-dispersive infrared radiation method). It measures the concentration of dissolved gases in the oil.

Discover Siemens comprehensive transformer monitoring and sensor portfolio. For more information about Siemens comprehensive monitoring package for transformers, please contact your local partner or our Customer Support Center.

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