



**SIEMENS**

*Ingenuity for life*

# SITRAM® TDCM

## Online Transformer Diagnostic and Condition Monitoring Systems

### Introduction

Worldwide over 70% of transformers have been in service for more than 25 years. The average life of power transformers in operation is exceeding the design-life in an increasing number of cases.

New equipment comes to the grid every year to support new consumers' demand or replace end-of-life units, guaranteeing reliability and smooth grid operation.

Nowadays, the need for grid digitalization, performance optimization and maintenance costs are playing a major role in the market.

Siemens developed SITRAM®TDCM as a technically advanced and cost effective transformer online monitoring system, providing reliable early fault diagnostics and supporting precise operational needs.

### Features

SITRAM®TDCM provides online transformer data from comprehensive modules, early faulty diagnostic, with prognoses and recommendations.

SITRAM®TDCM can be applied on all transformers, from any manufacturer, of any age.

SITRAM®TDCM is used in several applications such as:

- Industrial transformers and reactors
- Transmission and distribution transformers
- Generator transformers

Depending on the customer needs, the system can be applied in stand-alone solutions, as well multi-transformers and multi-substations.

### Benefits

The SITRAM®TDCM System has advanced analysis technology that, when effectively used, assists strategies for mitigation of fault risks, as well as the use of maintenance resources.

The SITRAM®TDCM is also assisting in the:

- Optimization of the maintenance process, allowing condition based maintenance
- Identification of incipient faults<sup>1</sup>, with the opportunity of preventive corrective actions that may avoid costs of a catastrophic fault

- Potential reduction of insurance indemnity for transformers defects or failures
- Intensification on operative conditions knowledge, during normal situations and overloaded needs
- Maximization of availability of the transformers, by means of forecasting specific operational scenarios

### Scope of delivery / deliverable

SITRAM®TDCM is delivered as a cubicle or totally integrated into the transformer, with all sensors installed and commissioned, depending on customers' requirements.

The package of required sensors, like SITRAM H2Guard and Siemens Bushing Monitor, can be part of the scope in the most flexible ways.



<sup>1)</sup> The incipient fault identification, according to studies performed by independent entities, is about 60% of the typical transformers faults.

# Transforming data with a flexible and scalable solution



## Technical details

The SITRAM®TDCM system measures, stores, and correlates indicative values from transformers and by processing data generates diagnostics, prognostics, and recommended actions and trends of incipient faults.

SITRAM®TDCM applies several transformers' models and includes family based evaluation and comparison.

A comprehensive list of evaluation models is provided:

- Bushing Health Condition
- Load Tap Changer Condition
- Cooling System Condition
- Intelligent Cooling Control
- Transformer Thermal Hydraulic Modeling
- Insulation Moisture Model
- Aging and Life Expectancy
- Dissolved Gases and Multi-gases Evaluation
- Oil Volume
- Core Hotspot GIC Estimation
- Dynamic Overload Guide
- Static Overload Guide
- Models Comparison
- Family of equipment Evaluation

Other models, functionalities, and communication requests can be provided.

Each monitored transformer receives sensors to be installed in its main tank, as well as in its tap-changer equipment. All data acquired by each sensor are centralized into the SITRAM®TDCM panel, which also is installed on the transformer's main tank, and processed right there on the field. The processed data remain stored in its memory and are published on a web page which can be accessed through an Ethernet port with RJ45 connector, optional wireless interface.

The system is compatible with Ethernet, serial, analog, and digital interfaces. Data is acquired by communication drivers and signal filters specially developed for the system, without the use of additional third-party software.

Within these aspects, the increased reliability of the data acquired raises the trending and diagnosis quality, aiming to mitigate false positive alarms.

Additionally, the system accesses may be available at the Customer's Intranet. Optionally selected data may be transferred via Modbus-TCP / DNP3-TCP / IEC 60870-5-104 or others, to have the interface with supervision and control systems.

## SITRAM®TDCM as part of Siemens services Long-term Program (LTP)

Siemens provides additional maintenance service contracts supported by Siemens Transformers Experts at the Siemens Diagnostics and Operations Center during the Service Contract duration.

Supervision of your assets, recommendations and thorough primary asset investigation can be realized, applying further OEM evaluation methodologies in combination with SITRAM®TDCM features.

Siemens has more than 150 years of expertise in the field of T&D equipment. From a single dissolved gas analyzer, to our SITRAM®TDCM, Siemens provides the required support to keep the system running.

To enjoy Siemens comprehensive remote services offering, the installation of a Siemens On-Line Monitoring System, including sensors, e.g. DGA, Bushing Monitoring, is required.

## Siemens Industry, Inc.

7000 Siemens Road  
Wendell, NC 27591

For more information, please contact our Customer Support Center.  
Phone: 1-800-333-7421

[usa.siemens.com](http://usa.siemens.com)

Order No: EMTS-B40034-00-4AUS  
Printed in USA

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