GE

Digital Energy

Intellix* MO150

fact sheet

Overview

When an unexpected failure of a critical transformer occurs, the operational and economical impacts on the utility are substantial. Today, many existing oil-insulated transformers used by electrical utilities and other industries are approaching the end of their design life and are experiencing significantly higher probabilities of failures.

The Intellix MO150 transformer monitoring system, from GE Energy, is an intelligent, cost-effective solution which provides comprehensive monitoring and interactive transformer condition diagnostics, to provide early warning of incipient failure conditions.

Based on field-proven technology, the Intellix MO150 uses various sensors such as the Hydran* and state-of-the-art transformer mathematical models based on IEEE® or IEC® standards, to provide real-time information on the overall performance of the transformer to assist utility operations managers and system operators in making critical decisions.

Key Benefits

Optimize your Critical Assets' Lifespan

On-line Monitoring and performing real-time, transformer diagnostics can help reduce the risk of unexpected and sometimes catastrophic failures. This also helps you avoid expensive replacement and clean-up costs, unplanned downtime and overall improvement in asset. Reliability. Early detection of potential transformer problems is vital to the lifespan extension of critical transformers and brings significant business and operational benefits:

- Reduce inspection and maintenance costs by confidently stretching out the time between routine maintenance activities
- Optimize equipment life by monitoring cooling system performance
- Reduce the probability of an unplanned outage with continuous condition monitoring
- Provides greater lifespan confidence through the use of on-line model computation providing real-time transformer condition information
- Defer major replacement costs by optimizing your transformer's performance and extending its lifespan

System Features

On-Line Diagnostic Models[1]

- MVA model which computes the apparent power on primary, secondary or tertiary winding
- Winding hot-spot temperature model which computes the hot-spot temperature of each winding where load current is measured
- Moisture model which computes the moisture content in the thin conductor insulation and in the barrier insulation
- Insulation aging model which computes the aging acceleration factor from IEEE or IEC guidelines
- Cooling control model for management and operation of the transformer cooling system
- Cooling efficiency model which monitors the actual efficiency of the cooling system
- Tap changer thermal model which computes the temperature difference between the LTC tank and main transformer oil tank
- Tap changer position tracking model as the tap position transitions are recorded and tracked

Dynamic Loading Model

The on-line Dynamic Loading Model enables operations personnel to dynamically load transformers to optimum limits without compromising reliability, and do it safely. Combining real-time operating information of the transformer and its environment, the model will provide a continuous estimation of the transformer capability to continue safe operation under overloading conditions. *(See Table 1.)*

imagination at work

Note [1]: All on-line models are executed at the device level

Prognastics and Diagnostics

The prognostics and diagnostics software module on the Intellix MO150 is designed to provide guidance whenever an alarm condition is present. It is intended to provide the first level of awareness of what the alarm condition is all about, what the alarm condition means and what steps or actions could be taken to improve the current situation.

- The module will provide:
  - Diagnostic: Identification of the alarm and/or set of alarm conditions
  - Prognostic: A set of statements that warn the operator about the possible consequences for the transformer if the situation is allowed to continue without any remedial action being taken.
  - Recommendation: Summarizes the verifications that could be carried out, data that could be collected to facilitate further actions and specific actions that could be considered to improve the current situation.

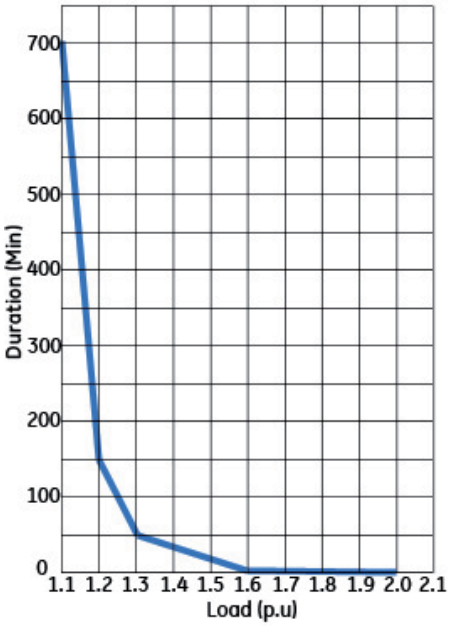
Solution Summary

The Intellix MO150 monitoring package consists of an integrated system of sensors, analysis models and data handling features to address the majority of prevalent failure modes. This costeffective package provides the essential condition assessment tools to enable effective management and optimal utilization of this critical plant component.

Transformer Conditions	
Transformer Tag	Tx-Demo
Rated Power at Cooling Stage 1	200 MVA
Rated Voltage on HV Side	10.0 KV
Rated Voltage on LV Side	100.0 KV
Ambient Temperature	25.4°C
Top Oil Temperature	79.9°C
User Estimated Water in Winding Paper	2.5%WW
Number of Cooling Banks	1 Bank

Acceptable Overload Duration			
Load (p.u)	Duration (Min)	Limit Reached	Overload Limit Value
1.1	720	Duration	720 Min
1.2	132	Bubbling Margin Temp.	20.0 °C
1.3	36	Bubbling Margin Temp.	20.0 °C
1.4	18	Bubbling Margin Temp.	20.0 °C
1.5	12	Bubbling Margin Temp.	20.0 °C
1.6	6	Bubbling Margin Temp.	20.0 °C
1.7	6	Bubbling Margin Temp.	20.0 °C
1.8	6	Bubbling Margin Temp.	20.0 °C
1.9	6	Bubbling Margin Temp.	20.0 °C
2.0	6	Bubbling Margin Temp.	20.0 °C

Table 1 - Dynamic loading model



Multi Host main window on Dynamic Loading model (information updated every 10 mins)

Additional Capability to Suit Your Monitoring Needs

One Intellix MO150 system will be able to have up to four Hydran S2 units connected in a single network and one Hydran M2. The transformer mathematical models will be computed from the Hydran device that will be configured to be the primary main tank. The additional (optional) Hydran S2 devices will only provide a continuous on-line measurement of fault gas and moisture that can develop within a transformer and its associated alarms.

Basic Package Components

- One Intellix MO150 includes:
  - 8 analog inputs (4 - 20mA or RTD PT100)
  - 5 AC inputs (load and fan currents)
  - 2 digital inputs (system alarms, cooling control & cooling alarms)
  - Embedded functions complete with transformer models
  - Historical data acquisition
- One Hydran S2 gas and moisture sensor
- Two magnetic-mounted RTD's (top and bottom oil temperature measurements)
- One Load current CT transducer
- Multi Host software (Client User Interface running on remote PC)

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GEA-14227B-03 (08/10)