GE
Digital Energy

Kelman MINITRANS™

Cost-effective on-line DGA & moisture for transformers

Product Overview

Knowledge of the condition of transformers is essential for all electrical networks and on-line monitoring of transformers is an increasingly vital component of successful asset management programs. The information provided by multi-gas on-line DGA allows valuable asset capabilities to be maximised and expensive failures to be avoided.

Dissolved Gas Analysis (DGA) and moisture measurement of the insulation oil are recognised as the most important tests for condition assessment of any tank of a transformer. Traditionally performed in a laboratory environment, the MINITRANS provides for partial on-line discrete DGA and moisture monitoring.

Key Benefits

- Cost effective on-line DGA
- Remote insight into transformer condition
- Discrete measurement of key gases associated with arching cellulose degradation and general fault conditions
- Faults can be detected in infancy
- Generic fault type can be classified from results
- Transformer load and output can be optimised safely
- Aids condition based and predictive maintenance strategies

Applications

Multi-gas DGA has traditionally been confined to infrequent off-line laboratory analysis, forming part of time based maintenance strategies. Globally the average age of transformers continues to increase, whilst in comparison to historical experience a larger percentage of new transformers encounter faults in their early years of operation. This means the possibilities of rapid aging, unplanned outages and even catastrophic failures between off-line tests also increases leading many asset owners to adopt on-line DGA monitoring equipment more suited to condition based / predictive maintenance strategies.

The MINITRANS facilitates entry into discrete on-line DGA and moisture monitoring for transformers and other oil insulated filled electrical equipment. Discretely measuring 3 key gases: Hydrogen; Carbon Monoxide and Acetylene; plus Moisture, MINITRANS gives insight on developing faults, paper degradation and electrical arching providing trending of gas-in-oil through its close integration with GE's powerful Perception software suite and/or users own software, historian and SCADA systems. At a price that facilitates higher volumes of monitor deployment, MINITRANS can be utilised to monitor any size of transformer but is most widely employed to expand multi-gas on-line DGA coverage beyond the typical candidates of large, system critical or compromised transformers helping asset owners incorporate on-line DGA across a larger portion of their fleet , with a view to extending asset life, preventing unexpected failure and operating on a condition based / predictive maintenance schedule.

- Auxiliary GSU transformers
- Transmission transformers
- On load tap changers
- Distribution transformers

Integrated Solution

- Key element of GE's integrated transformer monitoring system
- Operates as standalone DGA monitor or can be integrated with bushing monitoring and transformer modelling modules
- Integrated load monitoring allows DGA results to be analysed against the loading of the transformer
- Can be controlled and configured by GE's Perception™ software – single platform advanced asset management suite providing sophisticated graphical trending & diagnostic analysis of results

Cutting Edge Technology

- Three key fault gases plus moisture
- Automated headspace gas extraction
- State of the art photo-acoustic spectroscopy (PAS) measurement technology
- No carrier or calibration gases required
- Long service life with minimal maintenance
- Capable of sampling frequency up to once per hour

Ease of Use

- Easy installation: no outages required reducing expense and inconvenience for user
- No consumables and minimal maintenance requirements reduces running costs and site visits
- Extensive local and remote communications options available
- Sampling frequency user-configurable, versatile and flexible
- LCD display provides up to date information on site

Configurable Alerts

- Two sunlight visible front panel LED arrays (Red & Yellow)
- User configurable relay contact
- Alarms can be set or changed locally or remotely using Perception software
- Caution and alarm modes can be used to automatically increase sampling frequency

GE imagination at work

Communication

- Two separate channels for remote communications, local USB connection and Ethernet connection
- Communications protocols supported include MODBUS®, MODBUS/TCP, DNP3.0, IEC®61850
- Modules available for communication via RS232, RS485, Ethernet, Fiber Optic, PSTN and cellular GSM/GPRS modems

Technical Features

- Uses photo-acoustic spectroscopy (PAS) to give highly reliable results. Field proven with over 8,000 Kelman PAS systems deployed in over ninety countries worldwide
- Three target gases plus moisture measured
- Fully embedded processor and internal data storage for – 10,000 records - over eight years of data at default sampling rates
- Non-volatile memory storage to prevent loss of data
- Discrete sampling gives more rapid response to gas rises. No 'averaging' of DGA results

Alarms

- Two sunlight visible front panel LED arrays (Red & Green) and a user configurable relay contact
- All alarms can be set or changed locally or remotely using Perception software
- Six alarm setting screens or scenarios are available, which can set alarms based on the level of the three gasses/moisture, and rates of change for each gas
- Each alarm setting screen can activate the alarm relays or send an SMS message if equipped with the optional cellular modem
- Single phase alarm relays: NO and NC: 1A provided, 250 VAC; 200mA 125VDC; 1A, 30 VDC
- Caution and alarm modes can be used to increase sampling frequency
- The alarm results of each screen are independent of the other circuits and alarm setting screens

Technical Specifications

PARAMETER (COMPOUND)	VALUE/MEETS (MEASUREMENT RANGE)
Hydrogen (H_2)	5 - 5,000 ppm
Carbon Monoxide (CO)	10 - 50,000 ppm
Acetylene (C_2H_2)	3 - 50,000 ppm
Moisture (H_20)	0 - 100% RS (given in ppm)
Accuracy*	±10% or ±LDL (whichever is greater)

*Accuracy quoted is the accuracy of the detectors during calibration.

ENVIRONMENT	
Temperature	-35 to 55°C
Oil Temperature Range**	-10 to 100°C
Power Supply	90 - 264VAC; 47 - 63Hz; 6A max
Operating Humidity	10 - 95% RH non-condensing
Enclosure	IP55
Weight	30.5 kg (67 lbs.)
Single Phase Alarm Relays	NO and NC provided,: 1A 250VAC; 200mA 125VDC; 1A 30 VDC
Sampling Frequency	Variable - once per hour to once every 4 weeks

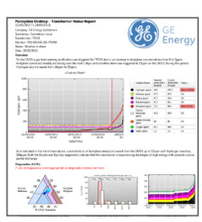
** Based on testing carried out using VOLTESSO™ 35 mineral oil, over a ¼" pipe run of 10 metres or less from oil supply or return valve to monitor connection point and on transformer oil supply valve volumes of 200ml or less. For oil temperatures colder than -10°C GE recommend the use of heat trace cabling on piping

Perception - Transformer Fleet Management & Risk Software

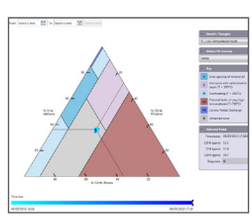
Providing critical insight on your transformers condition and overall fleet risk. Perception features data trending, condition diagnostics, customisable overview reports, wallboard fleet visualisation, alarm notification and visualisation. The smart and standards based logic used in Perceptions fleet ranking algorithms deliver a simplified yet concise overview of your transformers condition and risk. The customisable data import and export facility enhances Perceptions interoperability and the expert email notifications ensures the right person receives critical data should a transformers condition change.


Fleet health/risk overview


Transformer health/risk overview


Customisable reporting


Wallboard visualisation


Advanced Diagnostics

Note - exact feature will depend on Perception version purchased

GE imagination at work

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