Grid Solutions

KELMAN DGA 900 MULTITRANS

On-line DGA & Moisture for 3 x Single Phase Transformer

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 comprehensive information provided by the Kelman™ DGA 900 MULTITRANS not only allows expensive failures to be avoided but enables asset capabilities to be maximized.

The DGA 900 MULTITRANS offers discrete multigas on-line DGA and moisture monitoring across three adjacent single phase transformers, enabling a very cost effective monitoring solution. Utilizing photo-acoustic spectroscopy (PAS) measurement technology, well suited to field application, it provides laboratory challenging levels of precision and repeatability. Full 9 gas oil sampling and analysis can be performed as often as every hour on a single tank and up to once every three hours if all three possible oil tanks are connected.

Through close integration with GE Vernova's Perception™ software suite and/or user's own software, historian and SCADA systems, the MULTITRANS offers full gas-in-oil trending, analysis and diagnostic capabilities including various diagnostic methods prescribed by international standards.

Key Benefits

- Modular and retrofittable architecture using selectable standard add-on cards
- Provides extensive remote insight into transformer condition and safe operation
- Enables correlation of data for validation and in-depth fault analysis
- Graphical presentation using built-in web-page based HMI and local color screen
- Full integration with GE Vernova's Perception™ Fleet asset management software
- From the only vendor with 15 years PAS experience and installed base of >15,000 units
- Remote insight into transformer condition enables rapid action to correct any issues
- Discrete measurement of all fault gases facilitates full remote diagnostic without having to go to site and take an oil sample
- Cost effective solution for 3 adjacent single phase transformer configuration

Applications

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 maximized and expensive failures to be avoided.

MULTITRANS is best suited for monitoring large, system critical or already compromised transformers, arranged in a 3 single phase tank configuration, with a view to extending asset life, preventing unexpected failure and operating on a condition based maintenance schedule.

Cutting Edge DGA

- Nine gases plus moisture in a single monitor
- Automated headspace gas extraction and state of the art photo-acoustic spectroscopy (PAS) measurement technology
- No carrier or calibration gases required
- Long service life with minimal maintenance

Ease of Use

- Easy installation: no outages required reducing expense and inconvenience for user
- No consumables and minimal maintenance reduces running costs and site visits
- Extensive remote communications options and protocols available (including IEC® 61850)
- Sampling frequency is user-configurable, up to once per hour
- Can be connected to normal AC power or protected DC supply
- Supports new lower flammability ester

Configurable Alerts

- Two alarm levels (one for Caution and one for Alarm) can be set to show increasing severity
- Sunlight visible front panel LED arrays
- Six user configurable alarm relay contacts
- Caution and alarm modes can be used to automatically increase sampling frequency

Integrated Solution

- Integrates to Perception Fleet to provide health/ risk ranking of the monitored transformers compared to other fleet assets

GE VERNOVA

Technical Specifications

MEASUREMENTS

Technology

Automated head-space gas extraction.
Photo-acoustic spectroscopy (PAS) gas measurement.
Thin film capacitive moisture sensor.
Immersed fiber optic oxygen sensor.

Frequency

Configurable from once per hour to once every 4 weeks.
Faster sampling automatically triggered upon alert level reached.
"Rapid Mode" provides a rapid indication of the evolution of the gasses indicated below in ~30 minutes.

Range

	LDL	UDL	Accuracy*	Repeatability	Response Time***	Rapid Mode
Hydrogen (H_2)	5	5,000 ppm	± LDL or ±5 %	< 3 %	> 90 %	•
Carb. Monox. (CO)	1	50,000 ppm	± LDL or ±3 %	< 2 %	> 95 %	•
Methane (CH_4)	2	50,000 ppm	± LDL or ±3 %	< 2 %	> 95 %	
Acetylene (C_2H_2)	0.5	50,000 ppm	± LDL or ±3 %	< 2 %	> 95 %	•
Ethylene (C_2H_4)	1	50,000 ppm	± LDL or ±3 %	< 2 %	> 95 %	
Carb. Diox. (CO_2)	20	50,000 ppm	± LDL or ±3 %	< 3 %	> 95 %	•
Ethane (C_2H_6)	1	50,000 ppm	± LDL or ±3 %	< 2 %	> 95 %	
Oxygen (O_2)	100	50,000 ppm	± LDL or ±5 %	< 2 %		
Nitrogen (N_2) **	10,000	100,000 ppm	± LDL or ±15 %			
Moisture (H_2O)	0	100% RS (in ppm)	± 3.5%RH (RS) or ± 3ppm	< 3 %		•

*Whichever is greater. Accuracy quoted is the accuracy of the detectors during calibration. Gas-in-oil measurement may be affected by oil type and condition. Repeatability as measured from final production test data.

** N_2 value is calculated and available on free-breathing transformers only.

Time Response (typical): 1 measurement cycle ; >95 %: C_2H_2, CO, C_2H_6, C_2H_4, CH_4, CO_2 ; >90 %: H_2

*** Time Response (typical): % of value after 1 measurement cycle.

Location of maximum 3 x add-on cards

FEATURES

Display

4 x sunlight visible LED arrays

Backlit 7" inch color resistive touch screen (800 × 480)

Embedded secure webserver (https)

Analogue Input

1 x Standard for split core load CT sensor

Digital Output

6 x Standard customer programmable dry contact relays (type C, SPDT), NO/NC, 10A @250Vac resistive load, 8A @30Vdc resistive load

1 x standard service alarm relay

1 x standard watchdog relay

Digital Communications / Protocols

1 x Modbus® over RS485 / TCP/IP as standard

1 x DNP3.0 over TCP/IP as standard

1 x Standard 1Gb Ethernet (RJ45)

Option: DNP3.0 over RS485 or TCP/IP

Option: IEC 61850 Edition 2

Option: ST/SC Multi-mode fiber converters

Option: GPRS/UMTS/HSPA+ modem

ENVIRONMENT

Operating Conditions

Ambient Temperature	-40 °C to +55 °C (-40 °F to +131 °F)
Ambient Humidity	0-95 % RH, non-condensing
Oil Temperature at Valve††	-20 °C to +120 °C (-4 °F to +248 °F)

Enclosure

IP56 certified

Standard: Powder coated marine grade aluminium (RAL9002)

Option: Unpainted 316 Stainless Steel

Power Requirements

AC	Nominal 100-240 Vac, Range 85-264 Vac, 4A
DC	Nominal 100-250 Vdc, Range 90-300 Vdc

Mechanical

	Analysis Unit	Hub Unit
Dimensions	600 × 484 × 330 mm	600 × 380 × 330 mm
	23.6 × 19.1 × 13.0 in	23.6 × 15.0 x 13.0 in
Weight	32 Kg	18.5 Kg
	70.5 lb	40.8 lb

OPTIONS

Mounting stand and Sun canopy

Longer umbilical cable between units

††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 200 ml or less. For oil temperatures colder than -20 °C GE Vernova recommends the use of heat trace cabling on piping

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