

KELMAN DGA 900



Next Generation Online Multi-Gas DGA

Dissolved Gas Analysis (DGA) and moisture measurement of insulating fluids are recognized as the most important tests for condition assessment of transformers. In previous years, Multi-Gas DGA was traditionally confined to a laboratory environment, with infrequent off-line manual sampling forming part of time-based maintenance strategies. However, as the global average age of transformers continued to rise, the possibility of rapid ageing, unplanned outages and even catastrophic failure between off-line tests also increased, leading many asset owners to adopt online DGA monitoring strategies to increase network reliability.

In the early 2000's, GE Vernova's Kelman™ range of analysers brought consumable-free online Multi-Gas DGA to the market and GE Vernova introduced the Kelman DGA 900, our next generation Multi-Gas online DGA and moisture analyser. At its heart lies an evolved implementation of GE Vernova's proven Photo-Acoustic Spectroscopy (PAS) measurement technology, providing laboratory challenging levels of precision and repeatability with no consumables and no need for frequent re-calibration. Benefiting from over 40 years of global DGA vendor experience, the Kelman DGA 900 encapsulates learnings and improvements derived from its predecessors to bring improved performance, innovative new features, enhanced user experience and increased robustness.

Key Benefits

- Provides remote alert and Multi-Gas diagnostic of deteriorating transformer condition
- Expedites operational decisions without needing to go to site for manual oil sampling
- Issues can be detected in their infancy, avoiding unexpected failures and facilitating planned outages
- Anchors condition based maintenance and asset replacement strategies on hard data
- No need for consumables or frequent recalibration to operate at optimum performance
- "Rapid Mode" provides near real-time insight on fast developing faults
- Enhanced computing power and scalable I/Os for a flexible transformer monitoring solution
- Compatible with mineral insulating oils and newer ester based fluids (natural and synthetic)

Applications

The Kelman DGA 900 is an invaluable foundational tool for implementing Asset Performance Management (APM) across electrical generation, transmission and industry, enabling a condition based asset replacement strategy and delivering improvements in system reliability and availability.

The Kelman DGA 900 has a wide range of communication methods and protocols. This enables connection to those platforms and integrations with GE Vernova's Perception™ / EnergyAPM Edge transformer fleet management software as well as other software, historian and SCADA systems.

Proven Technology

- 4th generation of GE Vernova's PAS technology, delivering improved accuracy with lower detection limits
- From the only vendor with over 20 years PAS experience and installed base in excess of ~20,000 units
- No carrier or calibration gas consumables
- Laboratory challenging field measurement of nine gases plus moisture
- Complete DGA analysis up to once per hour and "Rapid Mode" for critical gases in ~30 min

Reliable and Available

- Designed by GE Vernova leveraging our quality and continuous improvement Lean ethos
- Enhanced reliability and easier field servicing
- 5-year warranty as standard †
- Factory calibration benchmarked against industry standard laboratory assessment

Intuitive and Flexible

- Integrated 7" colour LCD screen for simplified local user interaction and visualisation of data
- Lightweight innovative two-enclosure design enables adjacent or separated installation
- Can connect to AC or sub-station DC power

Scalable and Connected

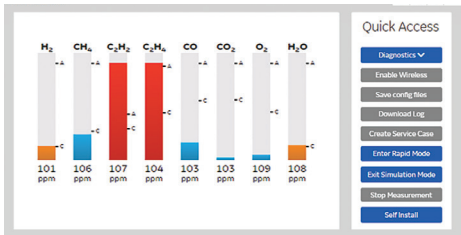
- Expandable analogue/digital I/Os
- Future proof computing platform ready for feature enhancements
- Designed for cyber security, with a range of comms options and protocols



GE VERNOVA

Technical Specifications

MEASUREMENTS					
Technology			Frequency		
Automated head-space gas extraction. Photo-acoustic spectroscopy (PAS) gas measurement. Thin film capacitive moisture sensor. Immersed fiber optic oxygen sensor.			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	Available in Rapid Mode
Hydrogen (H ₂)	5	5,000 ppm	± LDL or ±5 %	< 3 %	•
Carb. Monox. (CO)	1	50,000 ppm	± LDL or ±3 %	< 2 %	•
Methane (CH ₄)	2	50,000 ppm	± LDL or ±3 %	< 2 %	
Acetylene (C ₂ H ₂)	0.5	50,000 ppm	± LDL or ±3 %	< 2 %	•
Ethylene (C ₂ H ₄)	1	50,000 ppm	± LDL or ±3 %	< 2 %	
Carb. Diox. (CO ₂)	20	50,000 ppm	± LDL or ±3 %	< 3 %	•
Ethane (C ₂ H ₆)	1	50,000 ppm	± LDL or ±3 %	< 2 %	
Oxygen (O ₂)	100	50,000 ppm	± LDL or ±5 %	< 3 %	
Nitrogen (N ₂) **	10,000	100,000 ppm	± LDL or ±15 %		
Moisture (H ₂ O)	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 ₂ H ₂ , CO, C ₂ H ₆ , C ₂ H ₄ , CH ₄ , CO ₂ ; >90 %: H ₂					



DGA 900 gas levels displayed on the local LCD screen

FEATURES		Alarms	Power Requirements										
Display 4 x sunlight visible LED arrays Integrated backlit 7" inch color resistive touch screen (800 × 480) Embedded secure webserver (https)		Multiple Alarm setting/scenarios, all assignable to relays or SMS Gas: absolute gas level, Rate of Change (ROC), moisture level, Total Dissolved Combustible Gas (TDCG) and 7 x user defined gas ratios alarms Analog inputs: absolute Level, and Rate of Change (ROC) Digital inputs: status transition	AC	Nominal 100-240 Vac, Range 85-264 Vac, 4A									
Analogue Inputs 1 x CT input standard 5 x optional analogue inputs slots (Add up to 5 additional load CT's or PT100 inputs or 4-20mA sensor cards)			DC	Nominal 100-250 Vdc, Range 90-300 Vdc									
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		ENVIRONMENT Conditions Operating Ambient Temperature -40 °C to +55 °C (-40 °F to +131 °F) Operating Ambient Humidity 0-95 % RH, non-condensing Oil Temperature at Valve*** -20 °C to +120 °C (-4 °F to +248 °F) <i>***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</i>	Mechanical <table><tr><th></th><th>Analysis Unit</th><th>Hub Unit</th></tr><tr><td rowspan="2">Dimensions</td><td>600 × 484 × 330 mm 23.6 × 19.1 × 13.0 in</td><td>600 × 380 × 330 mm 23.6 × 15.0 x 13.0 in</td></tr><tr><td>Weight</td><td>33.4 Kg 73.6 lb</td><td>18.5 Kg 40.8 lb</td></tr></table>			Analysis Unit	Hub Unit	Dimensions	600 × 484 × 330 mm 23.6 × 19.1 × 13.0 in	600 × 380 × 330 mm 23.6 × 15.0 x 13.0 in	Weight	33.4 Kg 73.6 lb	18.5 Kg 40.8 lb
	Analysis Unit	Hub Unit											
Dimensions	600 × 484 × 330 mm 23.6 × 19.1 × 13.0 in	600 × 380 × 330 mm 23.6 × 15.0 x 13.0 in											
	Weight	33.4 Kg 73.6 lb	18.5 Kg 40.8 lb										
Digital Communications / Protocols 1 x Modbus® over RS485 / TCP/IP as standard 1 x DNP3 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 Option: Wi-Fi (802.11b/g/n)		Enclosure IP56 certified Standard: Powder coated marine grade aluminium (RAL9002) Option: Unpainted 316 Stainless Steel	OPTIONS Mounting stand Sun canopy Longer umbilical cable between units Analogue output of gas values										

† Terms and conditions apply

† Terms and conditions apply

Grid Solutions
Lissue Industrial Estate East
Unit 1, 7 Lissue Walk
Lisburn BT28 2LU
United Kingdom
Tel: +44 (0) 2892 622915

For more information
visit **GEGridSolutions.com**



Modbus is a registered trademark of Schneider Automation Inc., IEC is a registered trademark of Commission Electrotechnique Internationale. Voltesso is a registered trademark of Exxon Mobil Corporation. GE, the GE monogram, Kelman, DS-Agile and Perception are trademarks of the General Electric Company.

GE reserves the right to make changes to specifications of products described at any time without notice and without obligation to notify any person of such changes.

©2024 GE Grid Solutions, LLC, a GE Vernova company, and/or affiliates. All rights reserved.



GE VERNOVA

GEA-1599-(E)
English
241023