

Online DGA

VERSION 2 – AUTONOMOUS MONITORING SYSTEM

for dissolved gas analysis
of power transformers

Complies with ASTM D3612 and IEC 60567



- Highly efficient vacuum extraction (ASTM D3612, Method A)
- Sensitive gas chromatograph – detection of 11 gases
- Monitoring of up to 3 transformers with one device
- Built-in calibration gas for self-calibration
- 24/7 monitoring with alarm, relay outputs & signal columns

The OnlineDGA version 2 analyses the insulating liquid of your power transformer around the clock – with true lab accuracy, directly on site.

Technical description

The OnlineDGA version 2 is a monitoring system for dissolved gas analysis of the insulating liquid of power transformers. The system uses a highly efficient vacuum extraction technology combined with a sensitive gas chromatograph to separate and quantify the gases which are formed during transformer failures.

The operator receives this data via network connection or visually with signal columns.

The OnlineDGA version 2 complies with ASTM D3612 and IEC 60567.



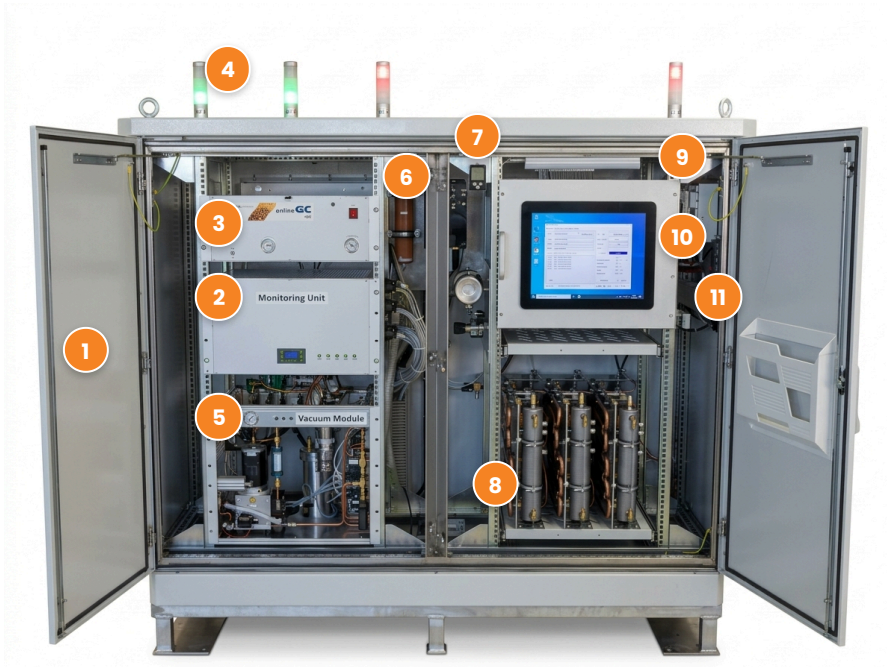
Technical features

- AC controlled outdoor cabinet – IP55
- 1700 × 1600 × 700 mm (W × H × D)
- 230 V, 50–60 Hz, 1400 W
- Highly efficient vacuum extraction technology (ASTM D3612, Method A)
- Sensitive gas chromatograph for detection of 11 gases
- Trend visualisation of each gas
- Optional: measurement of relative moisture of the insulating liquid
- Monitoring of multiple transformers possible (up to 3 transformers with one device)
- Isolated oil circulation control panels to avoid cross contamination and to ensure oil return to the conservator
- Built-in calibration gas mixture for self-calibration
- 15" touch monitor and industrial PC for on-site adjustment, result check and chromatogram review
- Customisable signal columns for a simple transformer or DGA fault indication
- Physical relay outputs for individual fault response
- Customisable measurement routine
- Automatic prioritising of a faulty transformer instead of the routine cycle
- Implemented software tool for result interpretation based on international standards

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Module description



- 1 OnlineDGA cabinet
- 2 Monitoring unit (control unit)
- 3 Gas chromatograph
- 4 Signal column
- 5 Vacuum extraction module
- 6 Calibration gas mixture (10 L)
- 7 Hygrometer
- 8 Oil circulation panel
- 9 Lamp
- 10 15" touch monitor
- 11 Industrial PC

Sensitivity detection range

11 gases standardised – lab accuracy as per ASTM / IEC

H₂	Hydrogen	1 ppm	C₂H₆	Ethane	0.1 ppm
CO	Carbon monoxide	0.2 ppm	C₃H₆	Propylene	0.5 ppm
CO₂	Carbon dioxide	0.2 ppm	C₃H₈	Propane	0.5 ppm
CH₄	Methane	0.1 ppm	O₂	Oxygen	30 ppm
C₂H₂	Acetylene	0.1 ppm	N₂	Nitrogen	30 ppm
C₂H₄	Ethylene	0.1 ppm			

Service & support

Warranty

All the equipment supplied is covered by a one-year warranty as per manufacturer specification.

Delivery of the system

The standard lead time is 16–20 weeks after receipt of order.

Service and maintenance

The OnlineDGA version 2 is almost maintenance-free (depending on the measurement routine). Online access allows a remote diagnosis of the equipment in case of any failure. Service is performed by the manufacturer or a trained representative.

Training

An on-site user training course is available after system installation. Alternatively, an in-house training course can take place in our factory in Germany before shipment of the device.



Important note

Operating our system is very easy – but more than that, it is important to interpret the DGA result, conclude the correct reason for the fault in the transformer and then take the right steps to eliminate it.

Technical consultancy

Energy Support, Germany, has been working in the field of transformer maintenance and diagnosis for more than 25 years and also provides consultancy and training in this field. It would be a great pleasure to extend our consultancy service to you as per your requirement.

Our expert from Germany can be invited to provide all required knowledge and consultancy on site. Please note that this is a separate paid programme which can be discussed and arranged individually.

Prestigious projects in recent past

- Power Plant, Germany
- Iran Maintenance Intl. for Iran Power Plant
- Infracor Industrial Park, Germany
- ABB Service for Transformer Factory, Germany
- Vattenfall, Germany
- TNB, Malaysia
- KOEPCO, Korea
- KESCO, Korea

Important points about online monitoring

DGA is also known as the “**blood test**” of the transformer. This shows how important the test is – and therefore both the test and the instrument used must be very accurate and cover all required parameters.

An online DGA system monitors important, identified transformers 24/7 by automatically analysing the gases dissolved in the oil and sending data and reports for further analysis. It raises an alarm as soon as it detects an unusual increase of gases evolved in the transformer.

An online monitoring system is a valuable asset, established to protect critical transformers through accurate and precise diagnosis and proactive failure prevention. It is therefore essential to have a precise, reliable and highly accurate instrument that is 100 % in line with ASTM D3612 / IEC 60567 and covers all required parameters – generally referred to as **lab accuracy**.



Why 11 gases and not just 9?

Any gas evolved in the oil – in any quantity – relates to the energy released by a small, noticeable or unnoticeable fault, whether thermal, electrical or mechanical (e.g. leakage).

Propane and propylene are two gases which other instruments cannot detect: they occur in very low quantities and require a highly accurate instrument. Technologies that do not follow the method described in ASTM D3612 lack this accuracy. Propane and propylene are known as **memory gases**. Traces of these gases are a clear indication that:

- a fault did occur, but was so minor that it was instantly quenched by the insulating property of the oil.
- a possible fault exists, which – being very small – is currently covered by the insulating property of the oil in its dormant stage.

The transformer should then be monitored carefully for some time to evaluate further results.

Proactive maintenance & total gas content

If the memory gases are ignored and we wait for the fault to evolve further, the whole purpose of DGA is lost. This is why we emphasise accuracy and detection level: the volume of gas from a fault is not in our control – but detecting even the slightest increase of gases in oil is.

All gases are soluble in oil, but solubility varies from gas to gas. Only after reaching saturation do gases collect in the Buchholz relay. It is therefore important to know the total gas content long before that. A special pressure sensor in our system determines the **total gas content** of the oil sample online – a key criterion for the overall health of the transformer.

Deciding factors for transformer monitoring

- 1 How important is the transformer to the process it has been established for?
- 2 How old is the transformer?
- 3 Did any past DGA test show results which could be of concern?
- 4 Were there any faults (minor or major) in the past which were noticed or rectified?
- 5 Is the transformer operated at full capacity or under overload condition?

Additional equipment from Energy Support

OSM2 PRO

Contamination-free oil sampling set according to IEC / ASTM standard

Mobil GC2

Portable DGA equipment for the analysis of 9/11 gases

TOGA GC2

DGA analysis according to ASTM D3612 / IEC 60567 with autosampler 16/32 and full vacuum degassing

POCKET Titrator KF

Karl Fischer method for water content measurement

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