



## HYDROCAL 1006 *genX*

Online Dissolved Gas Analysis (DGA) and Moisture Analysis System for Power Transformers and oil-filled electrical Equipment



The new HYDROCAL 1006 genX is the first truly maintenance-free multi-gas online DGA solution combining proven near infrared (NIR) measuring technology with vacuum protected membrane extraction.

As Hydrogen ( $H_2$ ) is involved in nearly every fault of the insulation system of power transformers and Carbon Monoxide (CO) is a sign of an involvement of the cellulosic / paper isolation the presence and increase of Acetylene ( $C_2H_2$ ) further classifies the nature of a fault as overheating, partial discharge or high energy arcing.

The additional measurement of Ethylene ( $C_2H_4$ ) and Methane ( $CH_4$ ) serves for further analysis, e.g. Duval triangle according IEC 60599.

### Key Advantages

- Individual measurement of Hydrogen ( $H_2$ ), Carbon Monoxide (CO), Acetylene ( $C_2H_2$ ), Methane ( $CH_4$ ) and Ethylene ( $C_2H_4$ )
- Moisture in Oil ( $H_2O$ ) measurement

- Easy to mount on a transformer valve (G 1½" DIN ISO 228-1 or 1½" NPT ANSI B 1.20.1)
- Easy to mount on the operating transformer without any operational interruption
- Maintenance free system due to less movable parts
- Advanced software (on the unit and via PC) with intuitive operation by 7" color TFT capacitive touchscreen, WLAN and Web-server operation from any smart phone, tablet or notebook PC
- Communication interfaces ETHERNET 10/100 Mbit/s (copper-wired / RJ 45 or fibre-optical / SC Duplex) and RS 485 to support MODBUS® RTU/ASCII, MODBUS®TCP, DNP3, proprietary communication protocols and substation communication protocol IEC 61850
- Optional external I/O module

## Technical data HYDROCAL 1006 genX

### General

Optional nominal voltages of auxiliary supply:	120 V -20% +15% AC 50/60 Hz <sup>1)</sup> or 230 V -20% +15% AC 50/60 Hz <sup>1)</sup> or 130 V +15% DC <sup>1)</sup> or 230 V -20% +15% DC <sup>1)</sup>
Power consumption:	240 VA
Housing:	Aluminium
Dimensions:	W 250 x H 250 x D 286 mm
Weight:	Approx. 8.0 kg
Operation temperature: (ambient)	-55°C ... +55°C (below -10°C display function locked)
Oil temperature: (inside transformer)	-20°C ... +105°C
Storage temperature: (ambient)	-20°C ... +65°C
Oil Pressure:	0 ... 800 kPa
Connection to valve:	G 1½" DIN ISO 228-1 or 1½" NPT ANSI B 1.20.1

### Safety

	IEC 61010-1
Insulation protection:	Class 1
Degree of protection:	IP-55

### Digital outputs (Standard)

3 x Digital outputs		Max. Switching capacity (Free assignment)
Type	Control voltage	
3 x Relay	12V	220V DC / 250V AC / 2A / 60W / 62.5VA

### Communication

- 1 x RS 485 (proprietary or MODBUS® RTU/ASCII protocol)
- ETHERNET 10/100 Mbit/s copper-wired / RJ 45 or fibre-optical / SC Duplex (proprietary or MODBUS® TCP protocol)
- IEC 61850 (Option)
- DNP3 serial modem or GPRS/UMTS modem (Option)
- HTML protocol. WLAN and Webserver operation from any phone, tablet or notebook PC

### Notes

- 1) 120 V ⇒ 120 V -20% = 96 V<sub>min</sub>                      120 V +15% = 138 V<sub>max</sub>  
230 V ⇒ 230 V -20% = 184 V<sub>min</sub>                      230 V +15% = 264 V<sub>max</sub>
- 2) Related to temperatures ambient +20°C and oil +55°C
- 3) Option
- 3) Moisture Saturation Content

### Operation principle

- Diffusion principle with gas-permeable membrane with copolymer
- Micro-electronic gas sensors for H<sub>2</sub> measurement
- Near-infrared gas sensor unit for CO, CH<sub>4</sub>, C<sub>2</sub>H<sub>2</sub> and C<sub>2</sub>H<sub>4</sub>
- Thin-film capacitive moisture sensor for H<sub>2</sub>O measurement
- Temperature sensors  
(oil temperature, gas temperature, back plate temperature)

### Measurement

Dissolved Gas Analysis		Accuracy <sup>2)</sup>	
Measuring Quantity	Range	Gas Extraction	Gas Measurement
Hydrogen H <sub>2</sub>	0 ... 10000 ppm	≤ ± 8% ± 4 ppm	≤ ± 10% ± 20 ppm
Carbon Monoxide CO	0 ... 10000 ppm	≤ ± 8% ± 30 ppm	≤ ± 10% ± 5 ppm
Acetylene C <sub>2</sub> H <sub>2</sub>	0 ... 10000 ppm	≤ ± 8% ± 4 ppm	≤ ± 10% ± 5 ppm
Methane CH <sub>4</sub>	0 ... 10000 ppm	≤ ± 8% ± 4 ppm	≤ ± 10% ± 10 ppm
Ethylene C <sub>2</sub> H <sub>4</sub>	0 ... 10000 ppm	≤ ± 8% ± 4 ppm	≤ ± 10% ± 5 ppm
Dissolved Moisture Analysis		Accuracy	
Measuring Quantity	Range	Accuracy	
Dissolved Moisture in Oil (H <sub>2</sub> O) – relative [%]	0 ... 100 %	≤ ± 3 %	
in Mineral Oil – absolute [ppm]	0 ... 100 ppm	≤ ± 3% ± 3 ppm	
in Ester Oil – absolute [ppm]	0 ... 2000 ppm	≤ ± 3 % of MSC <sup>4)</sup>	

### Connections

