

HYDROCAL 1004 *genX*

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



The new HYDROCAL 1004 *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.

Key Advantages

- Individual measurement of Hydrogen (H_2), Carbon Monoxide (CO) and Acetylene (C_2H_2)
- 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 Webserver 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

Technical data HYDROCAL 1004 genX

General

Optional nominal voltages of auxiliary supply:	120 V -20% +15% AC 50/60 Hz ¹⁾ or 230 V -20% +15% AC/DC 50/60 Hz ¹⁾ or 130 V +15% DC ¹⁾
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

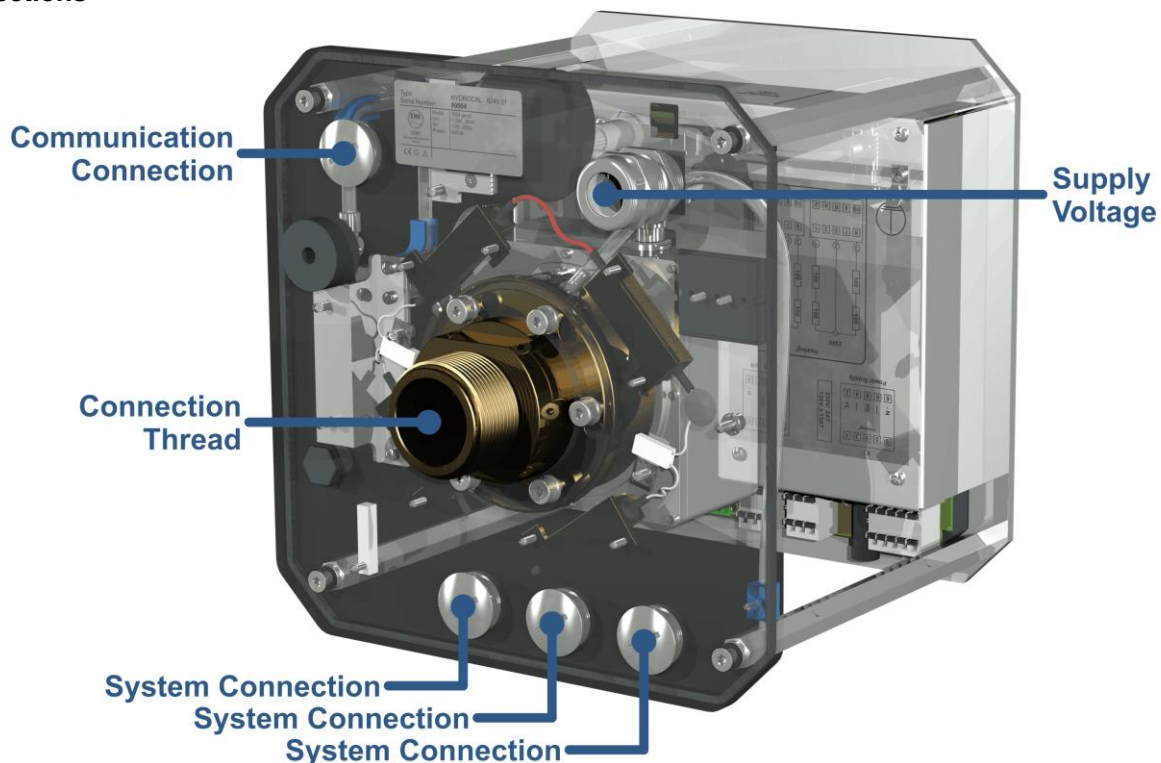
	IEC 61010-1
Insulation protection:	Class 1
Degree of protection:	IP-55

Measurements

Gas/Moisture in oil measurement		Accuracy ^{2) 3)}
Measuring quantity	Range	
Hydrogen H₂	0 ... 6.000 ppm	Gas Measurement: ±10% ±20ppm Gas Extraction (acc. IEC 60567) ± 8% ± 4ppm
Carbon Monoxide CO	0 ... 6.000 ppm	Gas Measurement: ±10% ± 5ppm Gas Extraction (acc. IEC 60567) ± 8% ±30ppm
Acetylene C₂H₂	0 ... 6.000 ppm	Gas Measurement: ±10% ± 5ppm Gas Extraction (acc. IEC 60567) ± 8% ± 4ppm
Moisture H₂O (aw)	0 ... 100 %	± 3 %
Moisture in Mineral Oil	0 ... 100 ppm	± 3 % ± 3 ppm
Moisture in synt. Ester⁴⁾	0 ... 2.000 ppm	± 3 % of MSC ⁵⁾

⁴⁾Option ⁵⁾Moisture Saturation Content

Connections



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_{min} 120 V +15% = 138 V_{max}
230 V ⇒ 230 V -20% = 184 V_{min} 230 V +15% = 264 V_{max}
130 V ⇒ 130 V = 130 V_{min} 130 V +15% = 149 V_{max}
- 2) Related to temperatures ambient +20°C and oil +55°C
- 3) Accuracy for moisture in oil for mineral oil types

Operation principle

- Diffusion principle with gas-permeable membrane with copolymer
- Micro-electronic gas sensors for H₂ measurement
- Near-infrared gas sensor unit for CO and C₂H₂
- Thin-film capacitive moisture sensor for H₂O measurement
- Temperature sensors
(oil temperature, gas temperature, back plate temperature)