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 (H₂) 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 (C₂H₂) further classifies the nature of a fault as overheating, partial discharge or high energy arcing.

Key Advantages

- Individual measurement of Hydrogen (H₂), Carbon Monoxide (CO) and Acetylene (C₂H₂)
- Moisture in Oil (H₂O) 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 1004 genX

General
Optional nominal voltages of auxiliary supply:
- 120 V -20% +15% AC 50/60 Hz 1) or 130 V +15% DC 1) or 230 V -20% +15% DC 1)
- 230 V -20% +15% AC 50/60 Hz 1) or 230 V -20% +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)
- (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
Insulation protection: IEC 61010-1
Degree of protection: IP-55

Measurements
Gas/Moisture in oil measurement

<table>
<thead>
<tr>
<th>Gas/Moisture in oil measurement</th>
<th>Accuracy 2) 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring quantity Range</td>
<td></td>
</tr>
<tr>
<td>Hydrogen H₂ 0 ... 6.000 ppm</td>
<td>±10% ±20ppm</td>
</tr>
<tr>
<td>Carbon Monoxide CO 0 ... 6.000 ppm</td>
<td>±10% ± 5ppm</td>
</tr>
<tr>
<td>Acetylene C₂H₂ 0 ... 6.000 ppm</td>
<td>±10% ± 5ppm</td>
</tr>
<tr>
<td>Moisture H₂O 0 ... 100 %</td>
<td>± 3 %</td>
</tr>
<tr>
<td>Moisture in Mineral Oil 0 ... 100 ppm</td>
<td>± 3 % ± 3 ppm</td>
</tr>
<tr>
<td>Moisture in synt. Ester 0 ... 2000 ppm</td>
<td>± 3 % of MSC 5)</td>
</tr>
</tbody>
</table>

4) Option 5) Moisture Saturation Content

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 Vmin 120 V +15% = 138 Vmax
230 V  230 V -20% = 184 Vmin 230 V +15% = 264 Vmax
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)

Connections
Digital outputs (Standard)

<table>
<thead>
<tr>
<th>3 x Digital outputs</th>
<th>Max. Switching capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Control voltage</td>
</tr>
<tr>
<td>3 x Relay</td>
<td>12V</td>
</tr>
<tr>
<td></td>
<td>220V DC / 250V AC / 2A / 60W / 62.5VA</td>
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