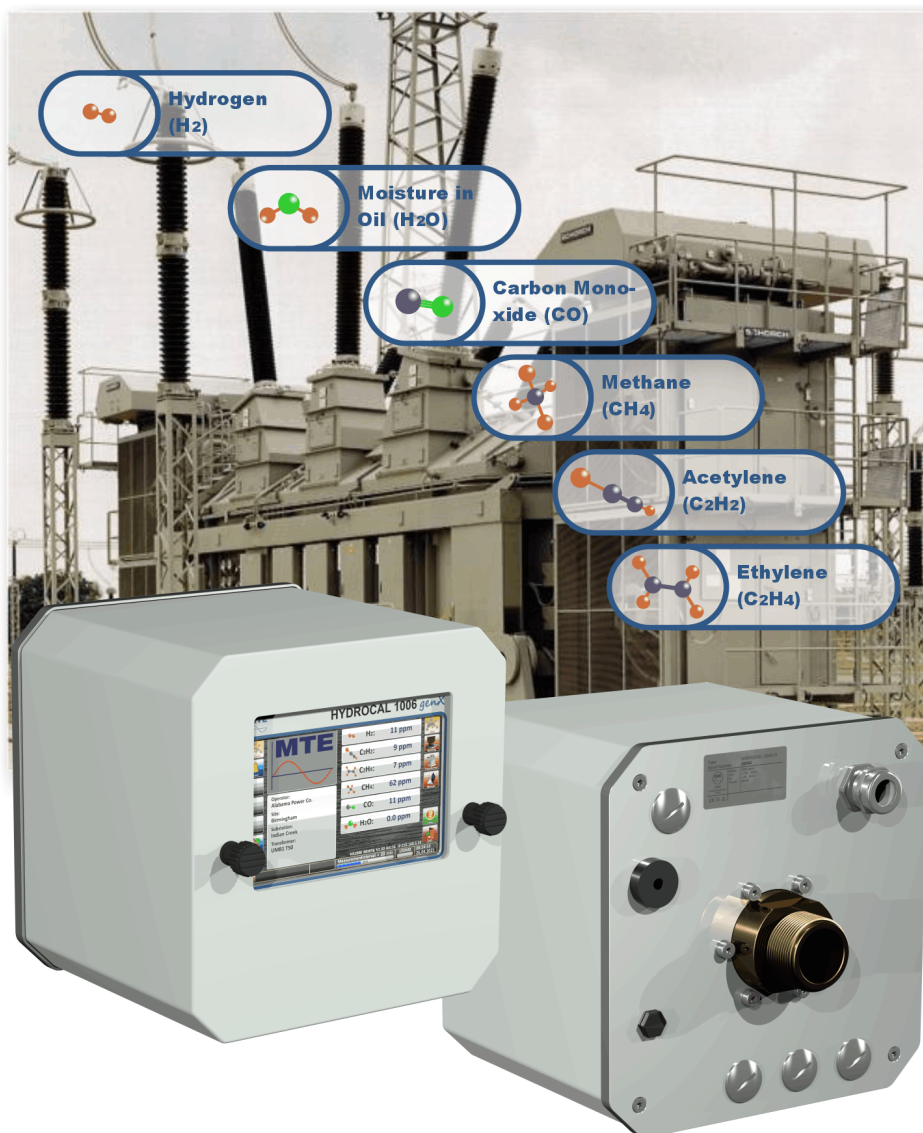


## HYDROCAL 1006 *genX*

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 ½" 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 1006 *genX*

### General

|                                                |                                                                                                                                |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Optional nominal voltages of auxiliary supply: | 120 V -20% +15% AC 50/60 Hz <sup>1)</sup> or<br>230 V -20% +15% AC/DC 50/60 Hz <sup>1)</sup> or<br>130 V +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<br>(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<br>1½" NPT ANSI B 1.20.1                                                                                |

### Safety

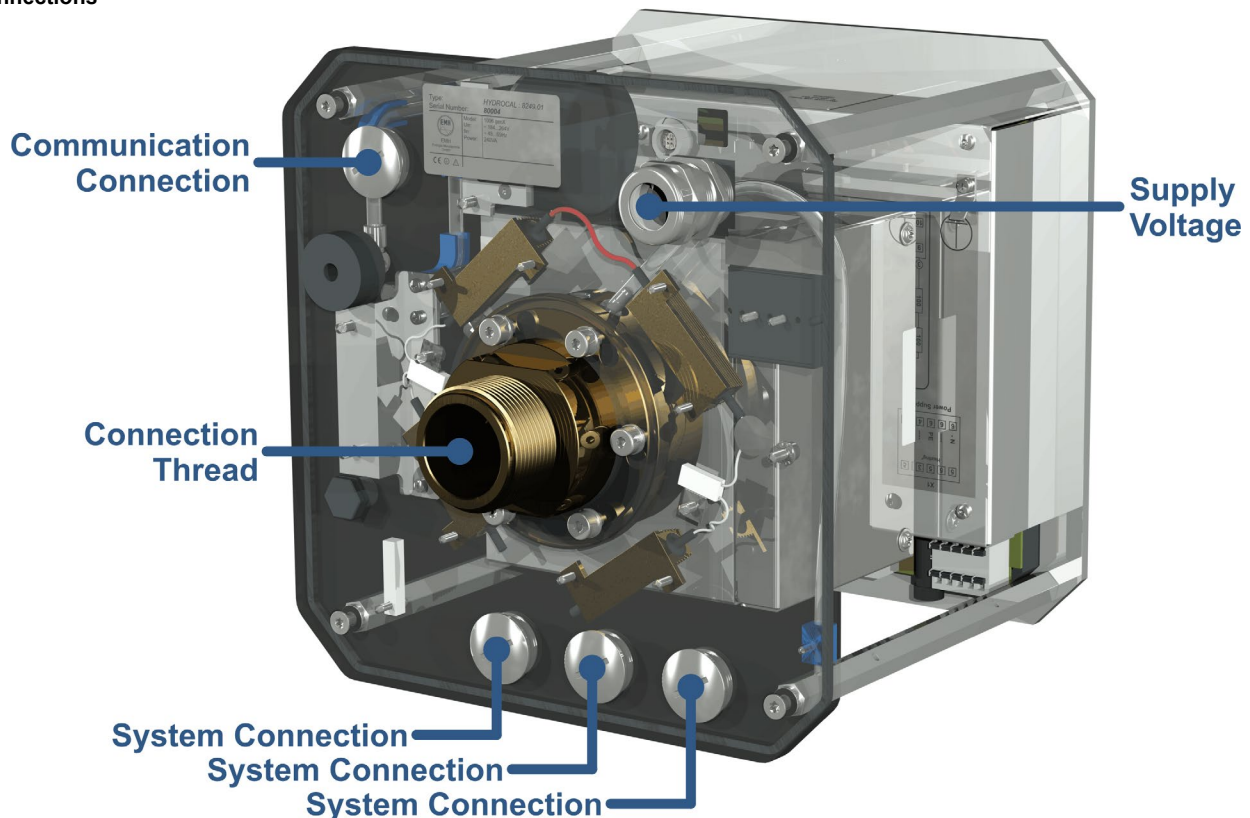
|                        |             |
|------------------------|-------------|
|                        | IEC 61010-1 |
| Insulation protection: | Class 1     |
| Degree of protection:  | IP-55       |

### Measurement

| Dissolved Gas Analysis                                      |                 | Accuracy <sup>2)3)</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           |                              |                   |
| 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] <sup>4)</sup>                 | 0 ... 2000 ppm  | ≤ ± 3 % of MSC <sup>5)</sup> |                   |

<sup>2)</sup>Related to temperatures ambient +20°C and oil +55°C | <sup>3)</sup>Accuracy for moisture in oil for mineral oil types | <sup>4)</sup>Option | <sup>5)</sup>Moisture Saturation Content

### Connections



### Digital outputs (Standard)

| 3 x Digital outputs |                 | Max. Switching capacity<br>(Free assignment) |
|---------------------|-----------------|----------------------------------------------|
| Type                | Control voltage |                                              |
| 3 x Relay           | 12V             | 220V DC / 250V AC / 2A /<br>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)
- DNP3 software stack modem (Option)
- IEC 61850 software stack modem (Option)
- HTML protocol. WLAN and Webserver operation from any phone, tablet or notebook PC

### Notes

|                                                              |                                         |
|--------------------------------------------------------------|-----------------------------------------|
| <sup>1)</sup> 120 V ⇒ 120 V -20% = <b>96 V<sub>min</sub></b> | 120 V +15% = <b>138 V<sub>max</sub></b> |
| 230 V ⇒ 230 V -20% = <b>184 V<sub>min</sub></b>              | 230 V +15% = <b>264 V<sub>max</sub></b> |
| 130 V ⇒ 130 V = <b>130 V<sub>min</sub></b>                   | 130 V +15% = <b>149 V<sub>max</sub></b> |

### 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)