MTE Meter Test Equipment

HYDROCAL 1011 *genX* P

Portable Dissolved Gas Analysis for Power Transformers and oil-filled Electrical Equipment

The HYDROCAL 1011 genX P is a portable device for the analysis of dissolved and free gases from the isolation fluid of oil-filled power transformers and other electrical equipment. It individually measures moisture in oil (H_2O) and the key gases hydrogen (H_2), carbon monoxide (CO), carbon dioxide (CO_2), methane (CH_4), acetylene (C_2H_2), ethylene (C_2H_4), ethane (C_2H_6), oxygen (O_2), nitrogen (N_2) and propane (C_3H_8) dissolved in transformer oil.

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 insulation the presence and increase of the other light-weight hydrocarbon gases further classifies the nature of a fault as overheating, partial discharge or high energy arcing. Oxygen (O_2) can be a sign of excessive ageing or leakages of the sealing of hermetic transformers.

Key Advantages

- Individual measurement of hydrogen (H_2), carbon monoxide (CO), carbon dioxide (CO_2), methane (CH_4), acetylene (C_2H_2), ethylene (C_2H_4), ethane (C_2H_6), oxygen (O_2), nitrogen (N_2) and propane (C_3H_8)
- Moisture in oil (H_2O) measurement
- Maintenance-free near infrared measurement system with head-space gas extraction acc. IEC 60567
- Operation by integrated 7" color TFT (800x480 pixel) touch-screen or via genX webserver from any smart phone, notepad or PC
- Communication interfaces WiFi, USB or ETHERNET 10/100 Mbit/s
- SD memory of test results, history and diagnostic data of power transformers and oil-filled electrical equipment
- Integrated thermal report printer

Application

HYDROCAL 1011 genX P has been designed for various applications in addition to classical laboratory and online DGA:

- Monitoring of a fleet of smaller (e.g. distribution) transformers where online DGA would not be commercially viable
- Monitoring of other oil-filled high-voltage equipment, e.g. measuring/protection transformers, CTs/PTs, circuit breakers, etc.
- Assistance during installation and/or repair of power transformers
- Analysis of gas samples from Buchholtz relays
- Confirmation of alerts from online DGA equipment or Buchholtz relays

Operation

The operation of HYDROCAL 1011 genX P is especially user-friendly due to various advantages designed into the device:

- Operation via a large 7" color TFT (800x480 pixel) touchscreen display
- Integrated WiFi interface and HYDROCAL genX webserver to operate the device by any smart phone, tablet or notebock PC
- Motion videos integrated into the firmware menu to explain the entire analysis step-by-step to make the operation as easy and user-friendly as possible and to avoid any unforeseen mistakes
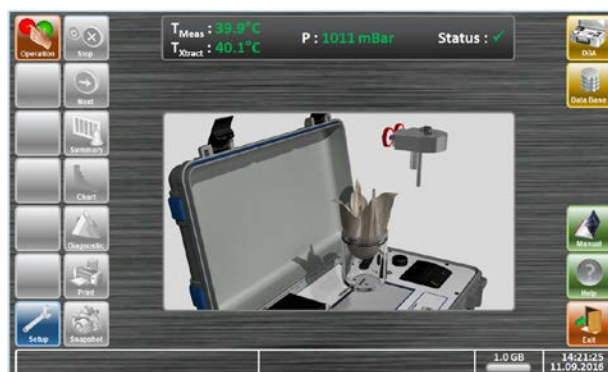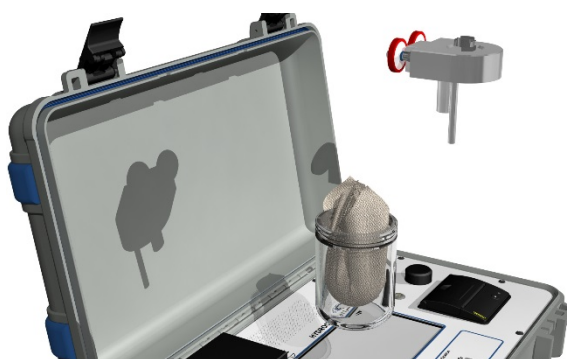
Oil Sampling

Disposal of Oil Sample

## Cleaning and Preparation of Next Analysis

Software Tool HydroSOFT Hybrid App

Concept

HydroSOFT Hybrid App is the central software tool to collect, display and report DGA results from HYDROCAL 1011 genX P as well as all other HYDROCAL online DGA devices.

The software is designed for touchscreen operation as well as for classical operation by keyboard/ mouse.

It is supported by a powerful SQL Server Express database allowing for multi-user access as well as the configuration of HYDROCAL devices.
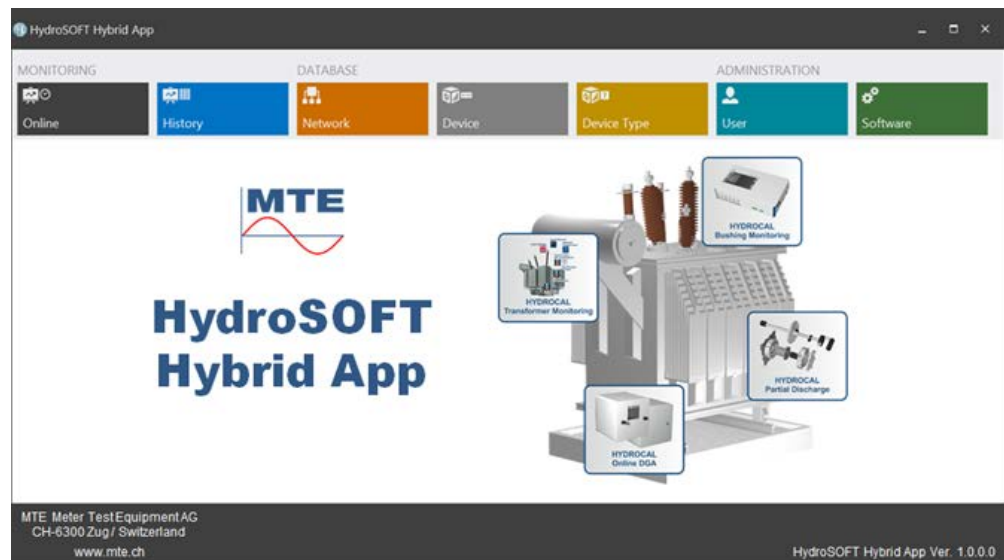

Result Display
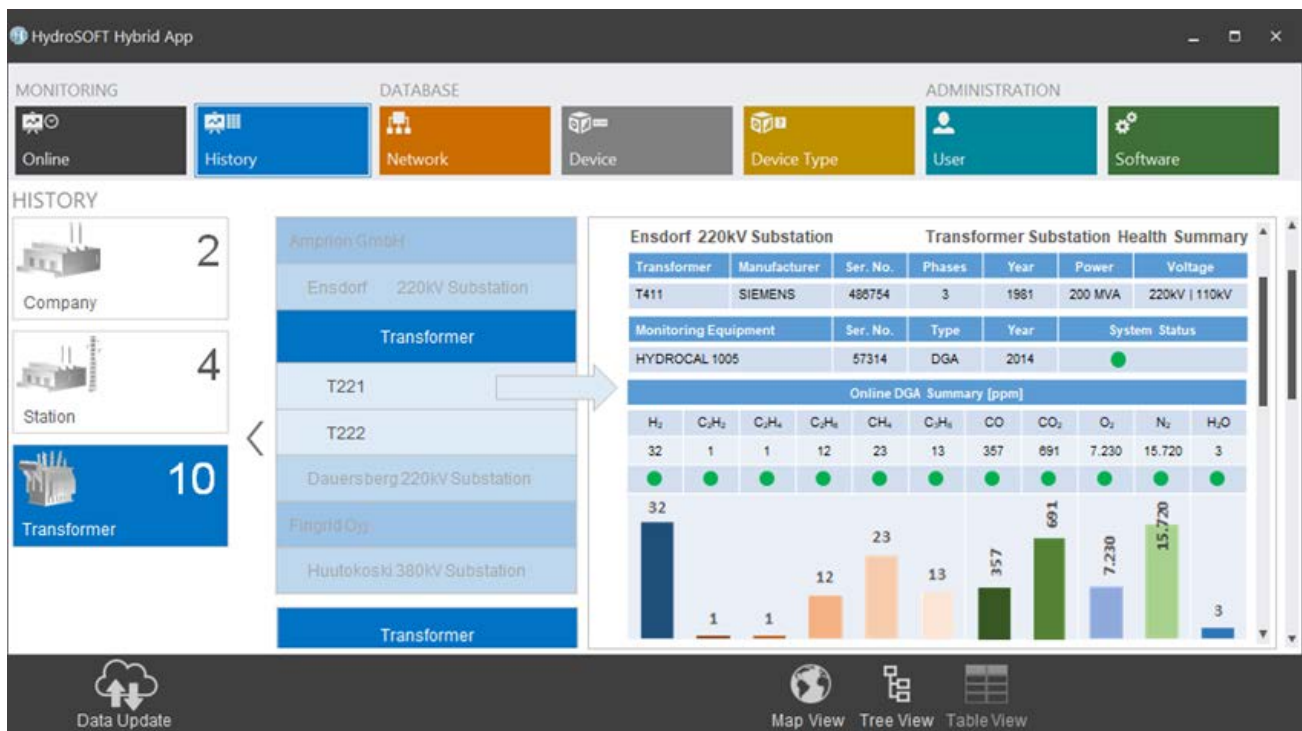
Historical Results

Whenever a new offline DGA analysis has been carried out by HYDROCAL 1011 genX P it can be added to the database inside the device as well as in the HydroSOFT Hybrid App central software tool.

By this trends and tendencies of DGA results can be reviewed which are often more significant than absolute results.

HYDROSOFT Hybrid App also allows to compare online and offline DGA results as well as it includes a powerful reporting tool.
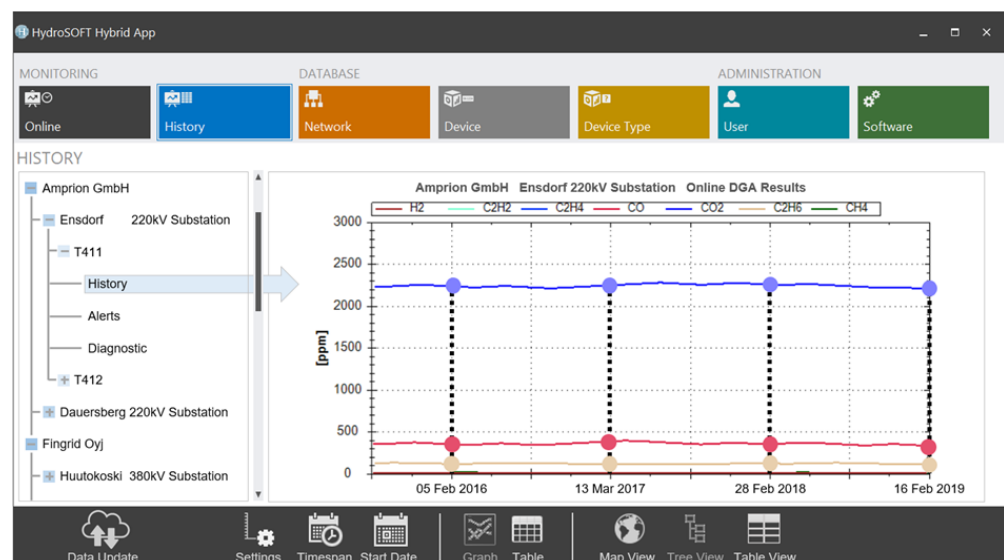
Technical data HYDROCAL 1011 *genX* P

General

Auxiliary power supply:	88 VAC$_{min}$ ... 264 VAC$_{max}$ 47 … 63 Hz
12 VDC supply:	10 VDC$_{min}$ … 14.4 VDC$_{max}$
Power consumption:	max. 600 VA
Housing:	Hard plastic housing
Dimensions:	W 447 x D 297 x H 187 mm
Weight:	approx. 15 kg
Operation temperature: (ambient)	-10°C ... +50°C
Oil temperature: (in the transformer)	-20°C ... +90°C
Storage temperature: (ambient)	-20°C ... +60°C

Safety	CE certified
Insulation protection:	IEC 61010-1
Degree of protection:	IP68 (housing closed) IP40 (housing open)

Operation principle

- Headspace gas extraction system for portable applications
    - Screw connection between upper and bottom part of extraction system
    - Round hard plastics bottom part without sharp edges for efficient cleaning
    - Sealed gas injection port for oil and gas samples
    - Replaceable oil filters to avoid oil drops into measuring system
    - Increase of extraction efficiency by bubbling out target gas under negative pressure
- Near-infrared gas sensor unit for CO, CO2, C2H2, C2H4, C2H6, CH4 and C3H8
- Micro-electronic gas sensor for H2, O2 and N2
- Thin-film capacitive moisture sensor H2O

Communication

- ETHERNET 10/100 Mbit/s copper-wired (RJ 45)
- WLAN / WiFi
- USB Type A/B

Measurement

Measuring Quantity	Gas Measurement Accuracy		Gas Extraction (acc. IEC 60567)	
Hydrogen H$_2$	0 … 10 ppm > 10 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 10 ppm > 10 ppm	≤ ± 4 ppm ≤ ± 18 %
Carbon Monoxide CO	0 … 100 ppm > 100 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 100 ppm > 100 ppm	≤ ± 37 ppm ≤ ± 18 %
Carbon Dioxide CO$_2$	0 … 100 ppm > 100 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 100 ppm > 100 ppm	≤ ± 37 ppm ≤ ± 18 %
Methane CH$_4$	0 … 10 ppm > 10 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 10 ppm > 10 ppm	≤ ± 4 ppm ≤ ± 18 %
Acetylene C$_2$H$_2$	0 … 10 ppm > 10 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 10 ppm > 10 ppm	≤ ± 4 ppm ≤ ± 18 %
Ethylene C$_2$H$_4$	0 … 10 ppm > 10 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 10 ppm > 10 ppm	≤ ± 4 ppm ≤ ± 18 %
Ethane C$_2$H$_6$	0 … 10 ppm > 10 ppm	≤ ± 5 ppm ≤ ± 10 %	0 … 10 ppm > 10 ppm	≤ ± 4 ppm ≤ ± 18 %
Propane C$_3$H$_8$	0 … 10 ppm > 10 ppm	≤ ± 20 ppm ≤ ± 15 %	0 … 10 ppm > 10 ppm	≤ ± 4 ppm ≤ ± 18 %
Oxygen O$_2$		≤ ± 10 %		≤ ± 18 %
Nitrogen N$_2$		≤ ± 10 %		≤ ± 18 %
Moisture in Oil H$_2$O	0 … 100 ppm	≤ ± 3 % ± 3 ppm		

Connections

Subject to alterations

02.2019_R00