MTE Meter Test Equipment Inc.

# 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 headspace gas extraction acc. IEC 60567
- Operation by integrated 7” color TFT (800x480 pixel) touchscreen 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

Optional Battery Pack for up to 10 measurements and Automotive Supply 12 VDC to 24 VDC

## 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 Buchholz relays
- Confirmation of alerts from online DGA equipment or Buchholz relays

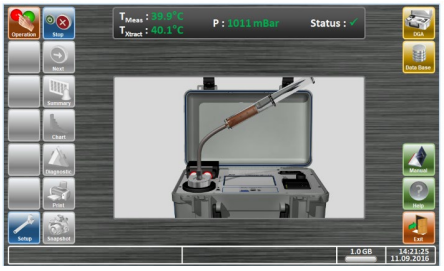
## Operation

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
- 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
- Integrated WiFi interface and HYDROCAL genX webserver to operate the device by any smart phone, tablet or notebock PC

### Oil Sampling



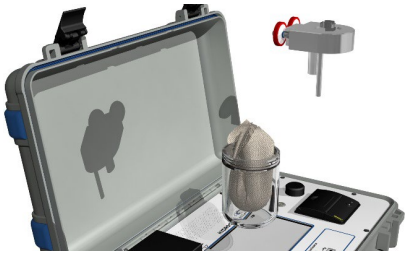


### Disposal of Oil Sample





### Cleaning and Preparation of Next Analysis





## Options

### HYDROCAL 1011 genX P Battery Pack

- 24 VDC – 13.6 Ah
- Tested (fully charged): independency 14h, approx. 10 measurements




### HYDROCAL 1011 genX P Automotive Supply

- Conversion 12VDC from typical automotive auxiliary power outlet to 24VDC battery supply
- Input of HYDROCAL 1011 genX P



## Software Tool HydroSOFT Hybrid App

### Concept

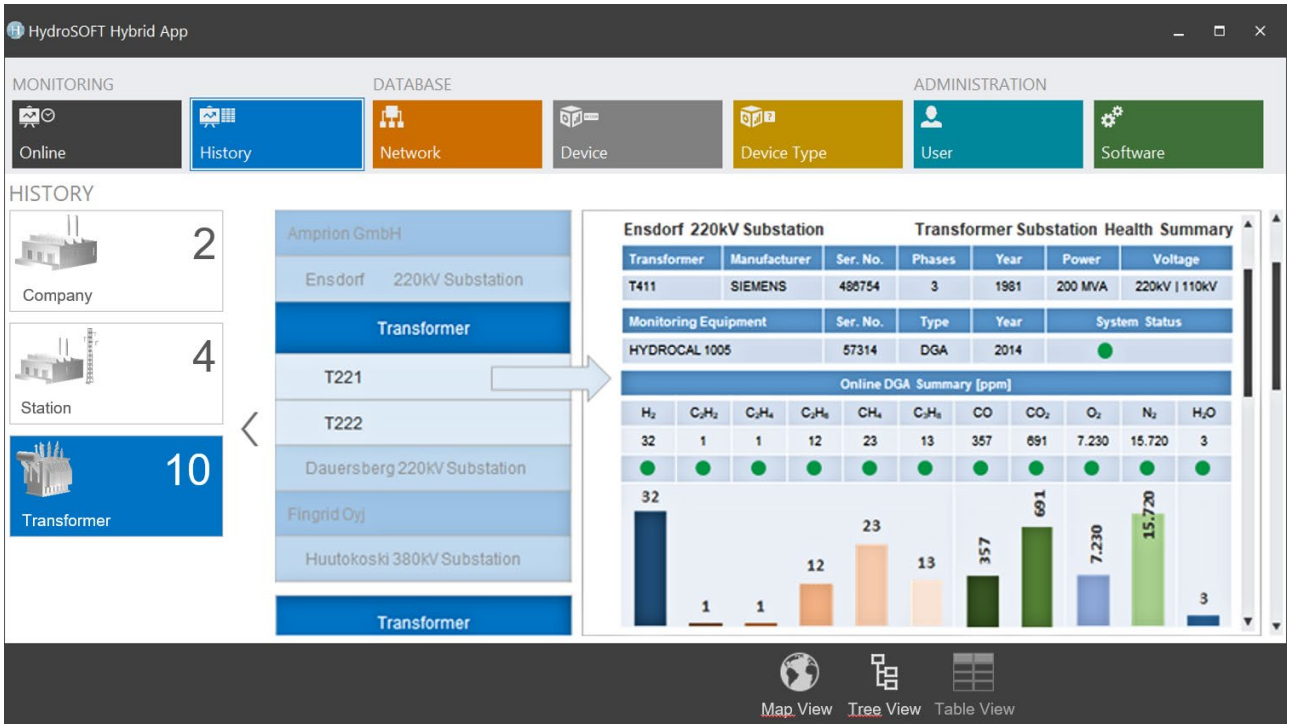
HydroSOFT Hybrid App is the new central software tool to collect, display and report DGA results from HYDROCAL 1011 genX P as well as all other HYDROCAL online DGA devices.

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

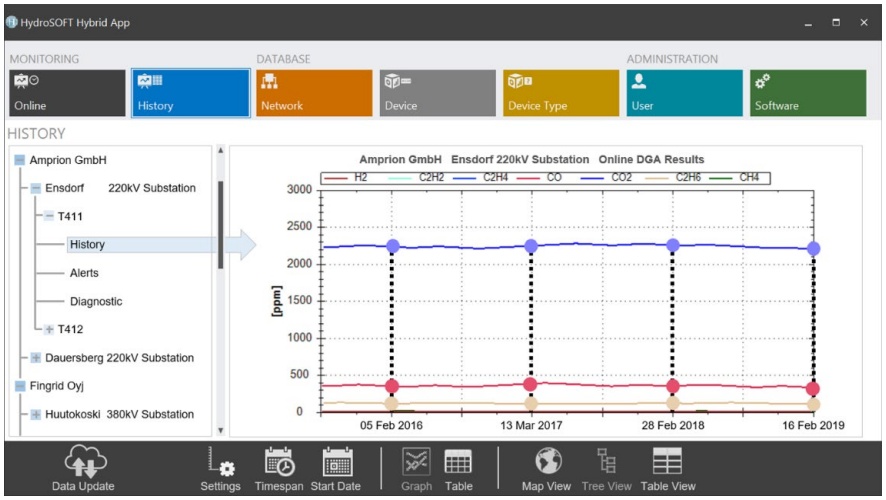



### Historical Results

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

| | |
|---|---|
| Power supply: | 88 $VAC_{min}$ ... 264 $VAC_{max}$<br>47 … 63 Hz |
| 24 VDC supply: | 20 $VDC_{min}$ … 28 $VDC_{max}$ |
| Power consumption: | max. 130 W |
| Housing: | Hard plastic housing |
| Dimensions: | W 447 x D 297 x H 187 mm |
| Weight: | approx. 13.4 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 |
| Insulation protection: | IEC 61010-1 |
| Degree of protection: | IP68 (housing closed)<br>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, $CO_2$, $C_2H_2$, $C_2H_4$, $C_2H_6$, $CH_4$ and $C_3H_8$
- Micro-electronic gas sensor for $H_2$, $O_2$ and $N_2$
- Thin-film capacitive moisture sensor $H_2O$

## Communication

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

## Options

- HYDROCAL 1011 genX P Battery Pack up to 10 measurements
- HYDROCAL 1011 genX P Automotive Supply 12 VDC to 24 VDC

## Measurement

| Measuring Quantity | Measuring Range | Accuracy of gas extraction | Accuracy of the gas measurement |
|---|---|---|---|
| **Hydrogen $H_2$** | 0 … 10000 ppm | ≤ ± 8 % ± 4 ppm | ≤ ± 10 % ± 20 ppm |
| **Carbon Monoxide CO** | 0 … 10000 ppm | ≤ ± 8 % ± 30 ppm | ≤ ± 10 % ± 5 ppm |
| **Carbon Dioxide $CO_2$** | 0 … 20000 ppm | ≤ ± 8 % ± 30 ppm | ≤ ± 10 % ± 5 ppm |
| **Methane $CH_4$** | 0 … 10000 ppm | ≤ ± 8 % ± 4 ppm | ≤ ± 10 % ± 5 ppm |
| **Acetylene $C_2H_2$** | 0 … 10000 ppm | ≤ ± 8 % ± 4 ppm | ≤ ± 10 % ± 5 ppm |
| **Ethylene $C_2H_4$** | 0 … 10000 ppm | ≤ ± 8 % ± 4 ppm | ≤ ± 10 % ± 5 ppm |
| **Ethane $C_2H_6$** | 0 … 10000 ppm | ≤ ± 8 % ± 4 ppm | ≤ ± 10 % ± 5 ppm |
| **Propane $C_3H_8$** | 0 … 5000 ppm | ≤ ± 8 % ± 4 ppm | ≤ ± 15 % ± 20 ppm |
| **Oxygen $O_2$** | 0 … 50000 ppm | ≤ ± 8 % ± 500 ppm | ≤ ± 10 % ± 500 ppm |
| **Nitrogen $N_2$** | 0 … 150000 ppm | ≤ ± 8 % ± 1500 ppm | ≤ ± 10 % ± 1500 ppm |

## Oil moisture measurement

| Measuring Quantity | Measuring Range | Accuracy of oil moisture measurement |
|---|---|---|
| **Moisture in Oil $H_2O$** | 0 … 100 %<br>0 … 150 ppm<br>0 … 2000 ppm | ≤ ± 3 % (absolut)<br>≤ ± 3 % ± 3 ppm<br>≤ ± 3 % of MSC[1)] |

[1)]Moisture Saturation Content

## Connections

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