MTE Meter Test Equipment

HYDROCAL BPD

Modular monitoring system for high voltage bushings of power transformers

HYDROCAL BPD is a modular online monitoring system for high voltage bushings. It supports the measurement of voltage and phase angle on the test tap to derive tanδ/PF, bushing capacitance.

HYDROCAL BPD can be combined with other HYDROCAL models, preferably HYDROCAL genX, in order to set up a comprehensive monitoring system.

As per CIGRÉ Working Group A2.37 bushings resp. the lead exit represents the 2nd largest group of transformer failure locations (approx. 25%) after the windings (43%) and before the tap changers (23%). Therefore, bushing monitoring can help to reduce those failures. HYDROCAL BPD combined with online DGA performed by the HYDROCAL product family provides the ideal overall transformer monitoring solution.

The measurement of voltage and phase angle on the test tap of high voltage bushings allows to compare tanδ/PF with factory test results for analysing deterioration of the bushings.

Key Advantages

- Monitoring of capacitance, tanφ/PF of up to six high voltage bushings (1 up to 6 bushings)
- 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 WiFi, USB or ETHERNET 10/100 Mbit/s
- SD memory of test results, history and diagnostic data of power transformers
- Maintenance free system
- Optional 4G modem with external adhesive antenna
- Optional DNP3 protocol for SCADA connection
- Optional IEC 61850 protocol for SCADA connection

HYDROCAL BPD Configurations

The modular concept of HYDROCAL BPD allows to select between 1 up to 6 bushings

HYDROCAL BPD 100

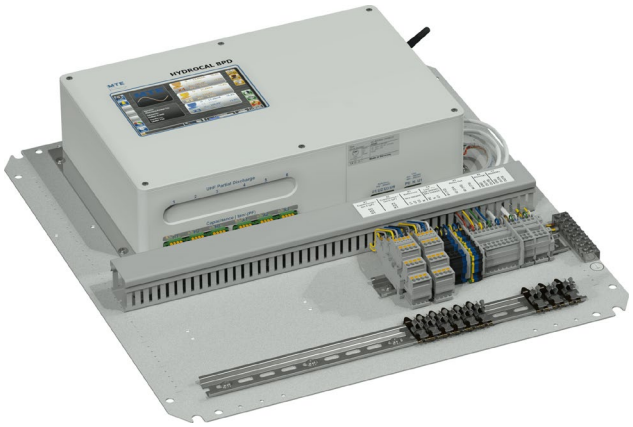
HYDROCAL BPD 200

HYDROCAL BPD 300

HYDROCAL BPD 400

HYDROCAL BPD 500

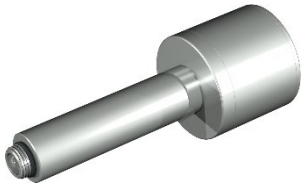
HYDROCAL BPD 600



Bushing sensors

Different designs available according to bushing types and manufacturers

Sensor with thread M16x1.5 long



Sensor with thread M16x1.5 short

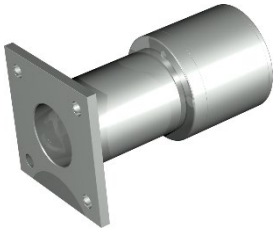
Sensor with thread 1/1 8“-12N-UNF

Sensor with thread M33x1.5

Sensor with thread M24x1.5

Sensor with thread M30x2

Sensor with Flange 70x70 mm



Sensor with thread G3 4“

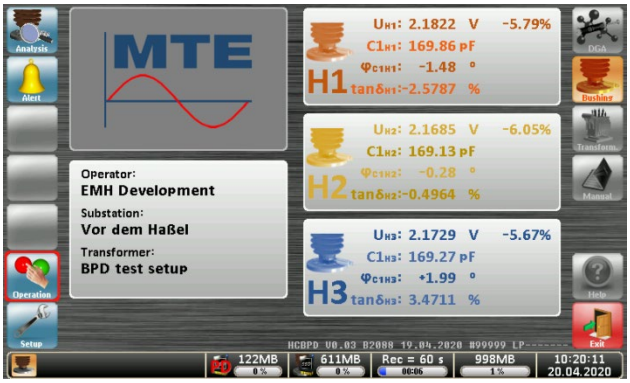
Software Tool HydroSOFT Hybrid App

Analysis: Chart, graph, table, polar and PRPD presentation

Alert: Configuration, report, protocol and acknowledgement of alerts

Operation: Start, stop, configuration of measurement/recording

Setup: Communication, time/date, language and other configurations



Dissolved Gas Analysis: Setup, operation, alert functions and modes

Bushing Monitoring: Setup, operation, alert functions and modes

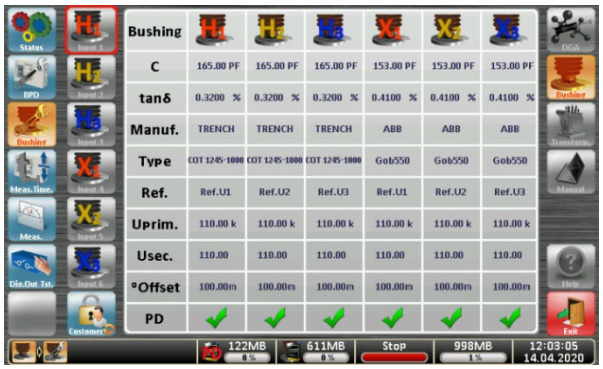
Transformer Monitoring: Setup, operation, alert functions and modes

Manual: Scrolling through/Display of all chapters of the manual

Help: Automatic switching to the relevant page of the manual

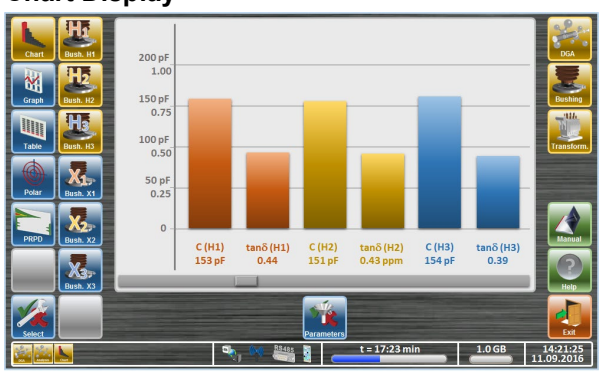
Exit: Closing/Returning to the previous function/step

Bushing Parameter Configuration Summary

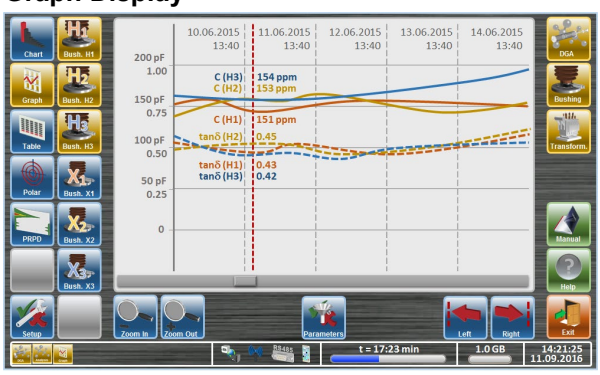


U | C |ϕ | tan δ Measurement

Chart Display



Graph Display



Technical data HYDROCAL BPD

General

Auxiliary power supply:	85 VAC_{min} ... 264 VAC_{max} 90 VDC_{min} ... 300 VDC_{max}	
Operation frequency:	45 Hz … 70 Hz	
Power consumption:	max. 100 VA	
Operation temperature: (ambient)	-55°C ... +50°C	
Storage temperature: (ambient)	-20°C ... +55°C	
Relative Humidity:	≤ 85% at Ta ≤ 21°C	
	≤ 95% at Ta ≤ 25°C, 30 days/year spread	
Operation altitude:	max. 2000 m	
	HYDROCAL BPD	**Cabinet**
Housing:	Hard Plastic	Stainless Steel
Dimensions (W x H x D):	400 x 260 x 97 mm (instrument only) 550 x 570 x 102 mm (on mounting plate)	600 x 600 x 210 mm
Weight:	approx. 10kg	approx. 23kg
Degree of protection:	IP-40	IP-66
Corrosion protection:	C1/2	C5M
Display:	7" Colour (800x600 pixels) TFT touch screen	
Memory:	SD Card (removable) up to 64 GB SSD (with option PD) up to 256 GB	

Safety

CE

Insulation protection:	EN 61010-1:II
Electrical protection class:	EN 61140:I

Measurements

Capacitance (C) tanδ / Power factor (PF)

Measuring quantity	Voltage	Phase Angle	Frequency	Reference voltage
Measuring range:	0 V ... 28 V	0° … 360°	40 Hz … 70 Hz	5 V … 300 V
Uncertainty:	≤ ± 0.1 %	≤ ± 0.01°	≤ ± 0.01 %	≤ ± 0.1 %
Resolution:	14 bit			
Sampling rate:	50 kHz			
Sensors:	Bushing Tap Adapter			PT
Input channels	up to 6			up to 3

Digital outputs

4 x Digital outputs		**Max. Switching capacity** (Free assignment)
Type	Control voltage	
4 x Relay	12 VDC	220 VDC / VAC / 2A / 60W

Communication

- 2 x USB (type A and type B)
- 2 x RS 485 (proprietary or MODBUS® RTU/ASCII protocol)
- ETHERNET 10/100 Mbit/s copper-wired / RJ 45 or fiber-optical / SC Duplex (proprietary or MODBUS® TCP protocol)
- WIFI (genX Webserver)
- 4G modem with external adhesive antenna (optional)
- DNP3 protocol (option)
- IEC 61850 protocol (option)

Connections