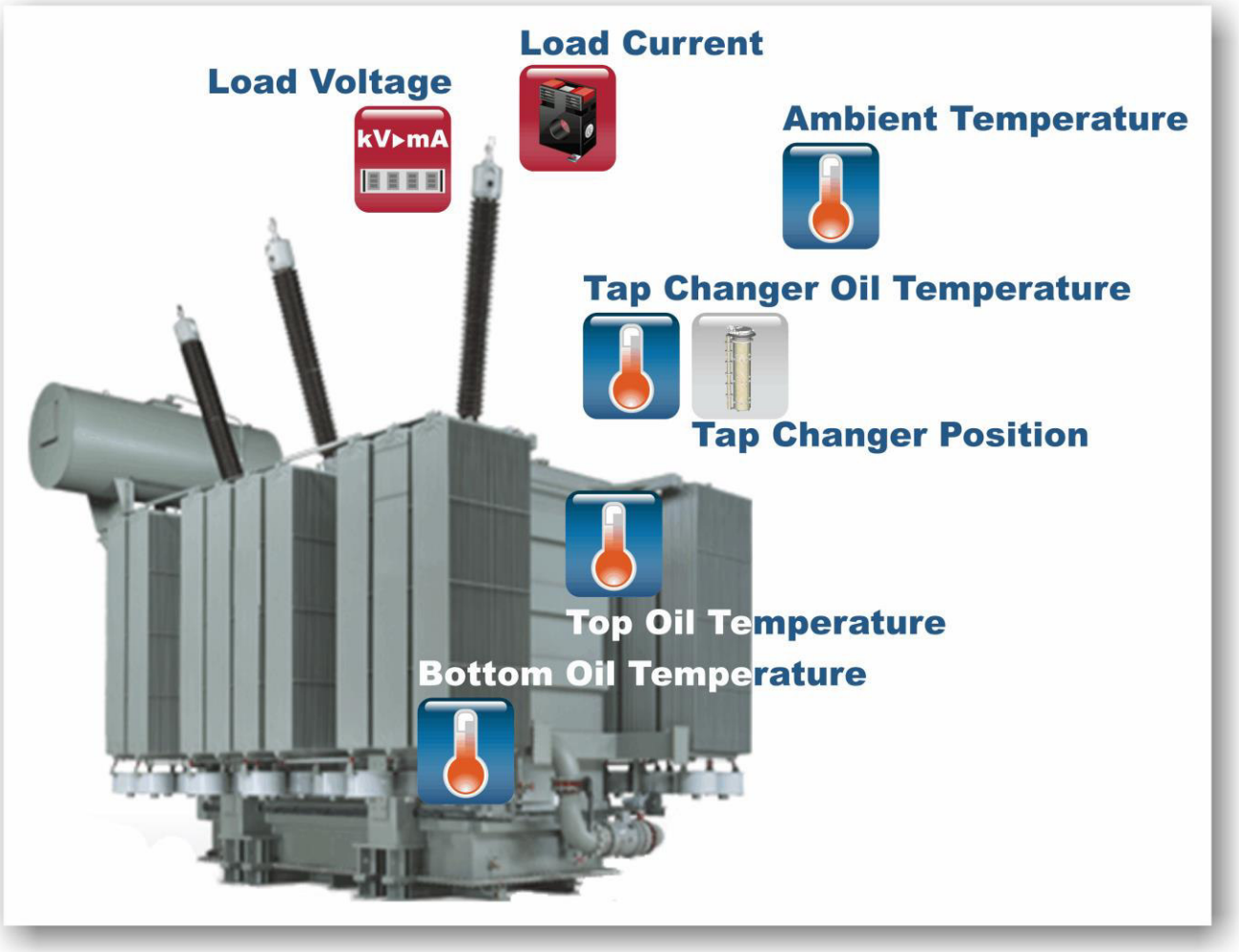
MTE Meter Test Equipment

HYDROCAL MS-7

On-line Transformer Monitoring Extension Package



Thermal condition monitoring is one of the most important ways to detect transformer problems and to avoid transformer outages.

That`s why MTE has addressed this issue and presents a selection of the most important indicators which are required for thermal condition monitoring.

The HYDROCAL MS-7, which is an extension package of the MTE HYDROCAL product line, is providing all these important information.

This innovative solution measures 3 oil temperatures (top oil, bottom oil & tap changer oil), ambient temperature, load current, load voltage and the tap changer position. These measurements are centralized and passed over to its analog outputs:

- 7 analog outputs 4 ... 20 mA

The analog outputs of HYDROCAL MS-7 are directly connectable to the analog inputs of HYDROCAL 1003, 1005 [1], 1008 [1)] or 1009 [1)] units and in conjunction with these units it offers a complete transformer monitoring system in one package.

Key Advantages

- Complete on-line transformer monitoring extension package including cabinet, cable glands, power supply, circuit breakers, terminal connectors, anti condensation heater & thermostatic sensor, wiring, measurement sensors, measurement transducers, connection cable, transmission cable and wiring diagram
- Individual measurement of top oil temperature, bottom oil temperature, ambient temperature, tap changer oil temperature, tap changer position, load current and load voltage
- Transmission interface with 7 analog outputs 4 ... 20 mA
- Direct integration into HYDROCAL 1003, 1005[1)], 1008[1)] and HYDROTAP[1)] hardware, firmware and software
- All information provided to use the HYDROCAL standard functions hot-spot calculation, aging rate and loss-of-life according IEC 60067-7
- Prewired transmission cable on cabinet side – 10 m
- Connection cable (one single piece) for individual wiring of sensors / transducer

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Load Current

Ambient Temperature

Load Voltage

Tap Changer Oil Temperature

Tap Changer Position

Top Oil Temperature

Bottom Oil Temperature

Transmission Cable

Technical data HYDROCAL MS-7

General

Supply voltage:	85 ... 264 V AC / 43 ... 67 Hz or 85 ... 375 V DC
Power consumption:	max. 100 VA
Cabinet:	Mild steel with RAL 7035 structure powder coating
Dimensions:	W 300 x H 400 x D 210 mm
Weight:	approx. 11.5 kg
Operation temperature: (ambient)	-40°C ... +65°C
Storage temperature: (ambient)	-40°C ... +65°C
Degree of protection:	IP-65

Measurements

Measurement		Accuracy [2]
Measuring quantity	Range	
Top oil temperature	-20 ... +140 °C	± 1.5 % ± 0.2 °C
Tap changer oil temperature	-20 ... +140 °C	± 1.5 % ± 0.2 °C
Bottom oil temperature	-20 ... +120 °C	± 1.5 % ± 0.2 °C
Ambient temperature	-20 ... +120 °C	± 3.0 % ± 0.2 °C
Load current	0 ... 5 A	± 1.5 % ± 0.2 mA
Tap changer position	0 ... 100 Ω / 0 ... 100 kΩ	
Load voltage	0 ... 250 V AC / 0 ... 450 V AC	± 0.5 %

Operation principle

- PT100 temperature sensor for top oil temperature
- PT100 temperature sensor for tap changer oil temperature
- PT100 temperature sensor for bottom oil temperature
- PT100 temperature sensor for ambient temperature
- Split-core transducer for load current
- Potentiometer position transducer for tap changer position
- AC voltage transducer for load voltage

Scope of delivery

- Complete cabinet including cable glands, power supply, circuit-breakers, anti condensation heater and thermostatic sensor, terminal connectors, wiring and wiring diagram
- 2 internal transducers
- 5 external sensors / transducers
- Transmission cable - 10 m (prewired on cabinet side) (ÖLFLEX® ROBUST 215 C 18G0,75 mm²)
- Sensor / transducer connection cable - 70 m (one single piece) (ÖLFLEX® CLASSIC 110 CY Black 0,6/1kV 2x0,75 mm²)

Analog outputs

Output 1 - Top oil temperature		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	MESSKO® Combi Well TT

Output 2 - Tap changer oil temperature		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	MESSKO® Combi Well TT

Output 3 - Bottom oil temperature		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	FuehlerSysteme eNET Int. OM4/E-I

Output 4 - Ambient temperature		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	FuehlerSysteme eNET Int. AM1/E-I

Output 5 - Load current		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	LEM AT 5 B420L

Output 6 - Tap changer position		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	PHOENIX CONTACT MINI MCR-SL-R-UI

Output 7 - Load voltage		Sensor model
Type	Range	
1 x Current DC	4 ... 20 mADC	AD Messtechnik AD-TV 591 GS

Communication

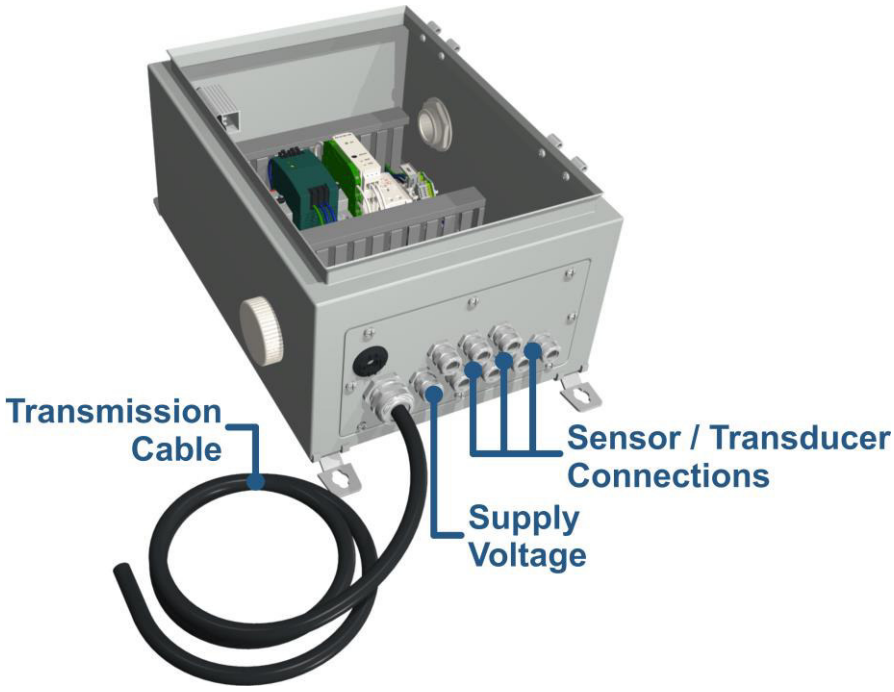
- Transmission interface with 7 x analog outputs 4 ... 20 mA

Notes

[1] Analog inputs on HYDROCAL 1005, 1008, 1009 and HYDROTAP units are optional (note on front page)

[2] Related to +20°C ambient temperature

Connections and outputs



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