



# MESSKO<sup>®</sup> PRODUCT CATALOGUE TRANSFORMER SOLUTIONS.

[WWW.REINHAUSEN.COM](http://WWW.REINHAUSEN.COM)



# TRANSFORMER SOLUTIONS

MESSKO® - Precision since 1911

Testing, measuring, analyzing, evaluating – this is what the MESSKO® brand stands for. The MESSKO® product brand is defined by the constant pursuit of precision and perfection. As a result, it has developed since 1911 from a small, local brand for cooler thermometers, air pressure gauges and remote thermometers into a product brand setting global standards for all aspects of monitoring, protection, open and closed-loop control and automation technology that relate to transformers. The current range covers thermo-

meters, oil level indicators, pressure relief devices, dehydrating breathers, flow indicators, sensor systems for oil analysis, and a complete range of services focusing on up-to-date laboratory analysis and diagnosis. MESSKO® products, systems and services contribute towards a reliable power supply, making utility companies and industrial enterprises fit for the future and ensuring that their systems run smoothly and reliably even under the most demanding conditions.

## A few highlights from our company history:

**1911**  
Dr. Albert Hauser founds the "Feinmechanische Anstalt für Präzisionswaagen und Gewichte" (Precision-engineering institute for precision scales and weights).

**1932**  
The company develops the first remote thermometer that applies the Bourdon measuring principle and in so doing sets the definitive standard that still lays the foundation for today's celebrated line of thermometers.

**1935**  
The MESSKO® brand is created from combining the German terms "Messen" (measuring) and "Kontrollieren" (monitoring).

**1960**  
Thermometers for power transformers capture the attention of the market.

**1999**  
MR acquires the company and transforms Messko into one of the most renowned suppliers of measurement equipment for energy utility companies and industry worldwide.

**2011**  
100-year anniversary

**2013**  
The new MESSKO® PrimeLab® –Diagnostic Services program offers comprehensive, professional condition analysis.

## What does MESSKO products stand for?

### Secure

We make no compromises when it comes to quality, which starts with selecting premium materials and continues through to thorough quality and functional testing carried out on state-of-the-art production test rigs developed in house. Every product is inspected in detail. The results speak for themselves as our products are durable, highly precise, and versatile. With testcertificate.

### Reliable

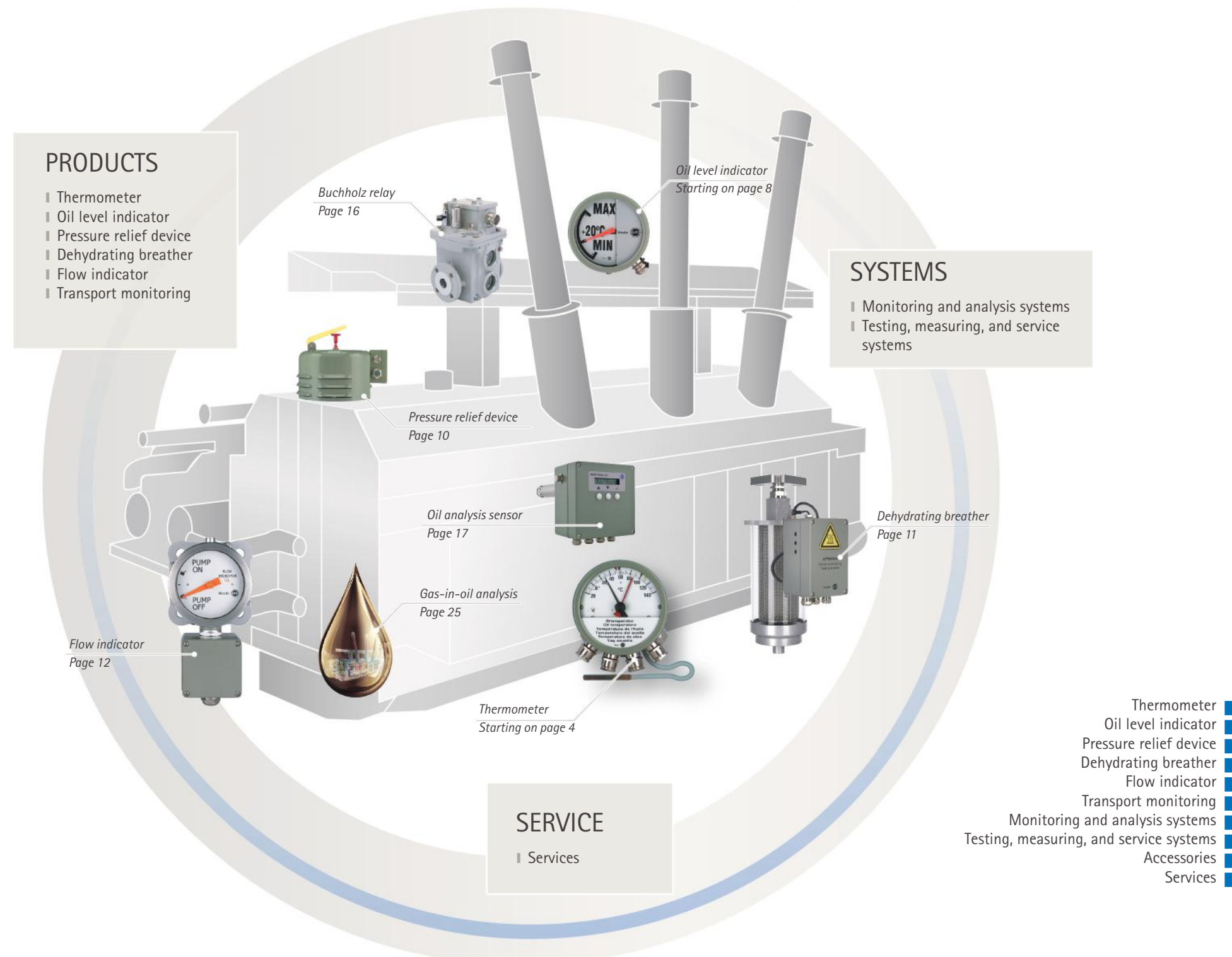
Total reliability doesn't stop at the products we offer. Our production lines, testing procedure, and research program are also characterized by painstakingly high levels of detail and accuracy. Ongoing product advancement and development activities testify to our commitment to listening to what customers want and delivering the innovative solutions they need. Nothing less is expected of us, since we are the centre of excellence regarding sensor technology within the MR.

### Networked

Focus on the customer – We have established an efficient sales and service network to ensure that we always stay close to our customers. We pride ourselves in offering thorough analyses, individual consulting, and first-class support. This, in turn, allows us to devise exactly the solution a customer needs.

# MESSKO® PORTFOLIO

Product and service cycle



- Thermometer
- Oil level indicator
- Pressure relief device
- Dehydrating breather
- Flow indicator
- Transport monitoring
- Monitoring and analysis systems
- Testing, measuring, and service systems
- Accessories
- Services



These products are also available in an offshore configuration.



These products are ideal for retrofit solutions.












# MESSKO® TRASY2

Modular temperature measuring system with a wide variety of matching accessories



## Matching accessories

	<b>MOUNTING WELL</b> For measuring oil temperature
	<b>COMBI WELL</b> For measuring oil temperature
	<b>ZT-F2.1 TEMPERATURE TRANSMITTER</b> For measuring winding temperature
	<b>Pt-MU MEASURING TRANSDUCER</b>
	<b>E100/160 ELECTRONIC INDICATOR</b>
	<b>D1272AT DIGITAL INDICATOR</b> For digital remote indication
	<b>PQ96/PQ144 MOVING COIL METER</b> For analog remote indication
	<b>PSLC242 POWER SUPPLY</b>
	<b>MULTI-BALLAST TRANSFORMER</b>

**Additional information**  
www.reinhausen.com/messko-trasy2



TRASY2 MT-ST160F  
Indicator thermometer for measuring oil temperature, with direct display

The MESSKO® TRASY2 temperature measuring system is specially designed for measuring oil and winding temperatures (thermal image) in medium and large-sized distribution transformers, power transformers, reactors, and similar applications. The indicator thermometer comprises a temperature sensor that connects to a measurement unit (Bourdon spring) via a capillary tube.

### Advantages

- Bourdon tube measuring system with no additional mechanical parts
- Extremely durable and reliable
- No readjustment or recalibration ever needed
- Reliable operation, even when subjected to vibrations and extreme outdoor conditions
- Quick and easy configuration of gradients via DIP switches in the ZT-F2.1 (thermal image of winding temperature)
- Automatic compensation for ambient temperature
- Laminated safety glass with built-in UV filter
- Installation in thermometer pockets as per EN 50216-4 (previously DIN 42554) possible

### Variants and options

- Oil temperature measurement: -20 to +140 °C
- Winding temperature measurement (thermal image): 0 to +160 °C
- 2, 4, 5, or 6 micro-switches
- Two redundant measurement points in conjunction with combi well or ZT-F2.1 winding temperature transmitter
- Offshore configuration
- Protective tube made from PVC or V4A stainless steel

### Sample configurations











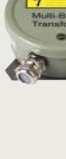
TRASY2 MT-STW160F2  
for measuring winding temperatures (thermal image), with direct display



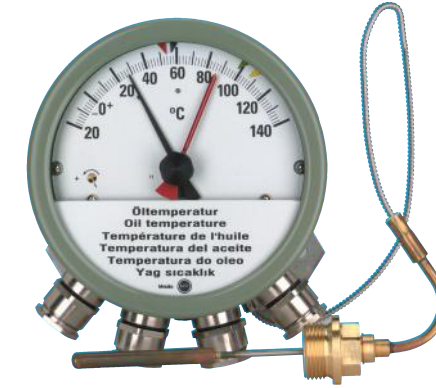
# MESSKO® COMPACT

Temperature measuring system for direct display and remote transmission without additional equipment

## Matching accessories

	<b>FOOT STEP PROTECTION</b>
	<b>TT30 SIGNAL CONVERTER</b>
	<b>IgT-MU MEASURING TRANSDUCER</b>
	<b>E100/160 ELECTRONIC INDICATOR</b>
	<b>D1272AT DIGITAL INDICATOR</b> For digital remote indication
	<b>PQ96/PQ144 MOVING COIL METER</b> For analog remote indication
	<b>SNT36 POWER SUPPLY</b>
	<b>PSLC242 POWER SUPPLY</b>
	<b>MULTI-BALLAST TRANSFORMER</b>

**Additional information**  
www.reinhausen.com/messko-compact



COMPACT MT-ST160SK  
Indicator thermometer for measuring oil temperature, with direct display and protective stainless steel tube

The MESSKO® COMPACT line of thermometers is specially designed for measuring oil and winding temperatures (thermal image) in medium and large-sized distribution transformers, power transformers, reactors, and similar applications. The temperature sensor of the indicator thermometer connects to the measurement unit (Bourdon spring) via a capillary tube.

### Advantages

- Bourdon tube measuring system with no additional mechanical parts
- Extremely durable and reliable
- No readjustment or recalibration ever needed
- Closed system with pressure cell to protect against external influences such as dust and humidity
- Reliable operation, even when subjected to vibrations and extreme outdoor conditions
- Temperature sensor compatible with all common thermometer pockets and wells
- Quick and easy configuration of gradients via potentiometer (thermal image of winding temperature)
- Laminated safety glass with built-in UV filter

### Variants and options

- Oil temperature measurement: -20 to +140 °C or 0 to +160 °C
- Winding temperature measurement: 0 to +160 °C or 0 to +180 °C
- 2, 4, 5, or 6 micro-switches
- With temperature transmitter (analog output 4-20 mA) for remote transmission of measured values
- With IEC- or ANSI-compliant design
- Offshore configuration
- Protective tube made from PVC or V4A stainless steel

### Sample configurations



COMPACT MT-ST160WR  
for measuring winding temperatures, with direct display and stainless steel protective tube



COMPACT MT-ST160RM  
for measuring oil temperature, with direct display and with IEC- or ANSI-compliant design



COMPACT MT-ST160SK/TT  
for measuring oil temperature, with temperature transmitter (analog output)

# MESSKO® BeTech

Thermometer with bellow type technology



MESSKO® BeTech  
Pointer thermometer for measuring the oil temperature, with direct display, with protective tube made from V4A stainless steel

MESSKO® BeTech thermometers are designed for measuring oil and winding temperatures (thermal image) in power transformers.

The thermometers comprise a temperature sensor that connects to the expansion bellows via a capillary tube for displaying measurements and a separate expansion bellows that compensates for ambient temperature.

## Advantages

- ▮ Expansion bellows technology
- ▮ Extremely durable and reliable
- ▮ No readjustment or recalibration ever needed
- ▮ Multiple gradients
- ▮ Contacts individually adjustable
- ▮ Hysteresis selectable
- ▮ Compensation for ambient temperature
- ▮ Laminated safety glass with built-in UV filter

## Variants and options

- ▮ Measuring range: 0 to +150 °C, -20 to +130 °C, 0 to +160 °C, or -40 to +160 °C
- ▮ Measuring accuracy: ±3 °C (+30 to +150 °C), ±2 °C, or ±1.5 °C (optional)
- ▮ 2, 3, 4, or 5 micro-switches
- ▮ Laminated safety glass with built-in UV filter
- ▮ Degree of protection as per EN 60529: IP 55 or IP 65 (optional)
- ▮ Analog output: 4-20 mA, 0-5 V DC, Pt100, or 4-20 mA and 0-5 V DC
- ▮ Magnetic blow out (MBO)
- ▮ Micro-switches: Single-pole or double-pole changeover switches, magnetic blow out (MBO), or single-pole changeover switches with gold-plated contacts
- ▮ Threaded sensor connection: G 3/4", G 1", 7/8" - 14 UNF
- ▮ Offshore configuration

## Sample configurations



MESSKO® BeTech  
Pointer thermometer for measuring the winding temperature (thermal image), with direct display and protective tube made from V4A stainless steel

## Matching accessories



Pt-MU  
MEASURING TRANSDUCER



D1272AT  
DIGITAL INDICATOR  
For digital remote indication



SNT36 POWER SUPPLY



PSLC242 POWER SUPPLY



MULTI-BALLAST  
TRANSFORMER

## Combinable products



MESSKO® MZT1650S  
Calibration bath  
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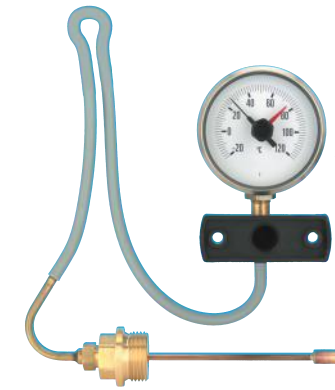


MESSKO® MCTA-5  
CT current simulator  
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**Additional information**  
[www.reinhausen.com/messko-betech](http://www.reinhausen.com/messko-betech)

# MESSKO® SMART-VT, MESSKO® SMART-IN

Thermometer for distribution transformers and industrial applications



SMART-VT KLKA-F80 E  
Indicator thermometer without micro-switch, with bracket for wall mount attachment

MESSKO® SMART-VT thermometers are used for taking temperature measurements at distribution transformers.

MESSKO® SMART-IN thermometers were developed for industrial applications involving pumps, turbines, generators, compressors, electroplating equipment, and die-casting machines.

## Advantages

- ▮ Bourdon tube measuring system with no additional mechanical parts
- ▮ Extremely durable and reliable
- ▮ No readjustment or recalibration ever needed
- ▮ Temperature sensor compatible with all common thermometer pockets and wells
- ▮ For taking temperature measurements in a variety of process media, including oils, coolants, and water

## Variants and options

- ▮ Housing diameter 60, 80, or 100 mm
- ▮ With fixed temperature sensor or flexible capillary tube
- ▮ Snap-on or clamping bracket attachment in control cabinet or wall mount attachment
- ▮ Switchless or with up to 4 micro-switches
- ▮ Temperature range -40 °C to +400 °C, special designs available on request
- ▮ Variable sensor length (min. 50 mm), special design available on request

## Sample configurations



SMART-VT MTG-F80 E  
Indicator thermometer with micro-switches



SMART-IN MTS 80  
Indicator thermometer with capillary tube for flush panel mounting



SMART-IN MTW 60  
Indicator thermometer without capillary tube for horizontal mounting

**Additional information**  
[www.reinhausen.com/messko-smartVT](http://www.reinhausen.com/messko-smartVT)  
[www.reinhausen.com/messko-smartIN](http://www.reinhausen.com/messko-smartIN)

# MESSKO® MTO

Oil level indicator for transformers



MTO-STF  
Oil level indicator with direct display

MESSKO® MTO oil level indicators indicate the oil level in the transformer oil conservator.

Separating the sensor from the display unit prevents any possibility of the oil escaping from the oil conservator.

The oil level is permanently monitored and operation errors (improper filling of the transformer in particular) are avoided.

## Advantages

- Extremely durable and reliable
- No readjustment or recalibration ever needed
- 160 mm version suitable for distribution and power transformers
- Laminated safety glass with built-in UV filter
- With additional EI100/160 indicator for good legibility at eye level, even in applications involving larger transformers

## Variants and options

- Radial or axial design with different floats to adapt to different tank geometries
- Switchless or with up to 3 fixed switches or 2 variable switches that can be freely adjusted over the scale range
- Individual scales possible
- Horizontal or angled installation position (inclination angles of 15, 30, and 45 degrees)
- IEC- or ANSI-compliant design
- Integrated signal converter for remote transmission of measured values (TT model)
- Analog output 0–1 mA, 0–20 mA, or 4–20 mA
- RS-485 interface
- Offshore configuration

## Sample configurations



MTO-STF/TT  
with integrated signal converter for remote transmission of measured values



MTO-STF RM  
with IEC- or ANSI-compliant design

## Matching accessories



EI100  
ELECTRONIC INDICATOR  
with bracket



EI100  
ELECTRONIC INDICATOR  
with clamping bracket



EI100/160  
ELECTRONIC INDICATOR



SNT36 POWER SUPPLY

Additional information  
[www.reinhausen.com/messko-mto](http://www.reinhausen.com/messko-mto)



# MESSKO® MMK

Oil level indicator with magnetic flaps for transformers



MESSKO® MMK  
Oil level indicator with magnetic flaps

The oil level indicator MESSKO® MMK with magnetic flaps allows the fill level to be displayed without having to position a float in the reservoir and uses existing connections.

This makes the device a suitable replacement for an oil level indicator with a glass tube.

## Matching accessories



EI100  
ELECTRONIC INDICATOR  
with bracket



EI100  
ELECTRONIC INDICATOR  
with clamping bracket



EI100/160  
ELECTRONIC INDICATOR



LIMIT SWITCH



REMOTE INDICATOR

## Advantages

- No external power supply required
- Indicator rail made from impact-resistant and torsionally rigid Makrolon, weather-proof and clear as glass for many years
- Easy replacement of indicator rail (oil conservator does not need to be drained)
- Limit switch and equipment for remote transmission of measured values can be retrofitted
- Fill level is easy to read, including when viewed from the side or below

## Variants and options

- Switchless or with limit value switch
- Integrated signal converter for remote transmission of measured values
- Analog output 4–20 mA
- RS-485 interface

## Complementary products



MESSKO® MTO  
Oil level indicator  
Page 8

Additional information  
[www.reinhausen.com/messko-mmk](http://www.reinhausen.com/messko-mmk)



# MESSKO® MPreC®

Pressure relief device for protecting transformers and tap changers



MPreC® LMPRD  
Pressure relief device with standard cover, terminal box, and semaphore

MESSKO® MPreC® pressure relief devices protect medium and large-sized distribution transformers, power transformers, and tap changers during periods of increased oil system pressure.

When the permissible tripping pressure of the valve is exceeded, the valve opens – all within milliseconds.

As soon as the value drops below this pressure, the valve closes again and forms an impermeable seal.

## Advantages

- Opens in 2 ms; closes within 70 ms
- Valve stroke of approx. 4 mm up to forced activation of switching contacts
- Aluminum signal pin with two notches to prevent fallback of a pin that has not fully extended
- Protection for micro-switches and springs via protective cover made from marine-grade aluminum
- CDP-coated springs as per DIN 2095 (cathodic corrosion protection) and additional, internal seals
- Reliable foot step protection
- Computer-controlled (trip) tests, including plant certificate for every valve
- Helium leak detection tests
- Clear signal indication, no false tripping or wear-related faults
- Easy to exchange

## Variants and options

- Triggering pressure of 4–30 psi (0.28–2.07 bar)
- With cable connection inclusive cable gland, terminal box, ANSI or Westinghouse connector
- Up to two micro-switches
- Seals made from Perbunan or Viton
- Cover for defined oil drainage
- Semaphore
- Offshore configuration

## Sample configurations



MPreC® LMPRD OD  
with terminal box and cover for defined oil drainage

## Matching accessories



FLANGE WITH INTERNAL THREAD  
for MESSKO® MPreC® LMPRD OD



WELDING FLANGE  
for MESSKO® MPreC® LMPRD OD

## Combinable products



MESSKO® MPreC® TEST BENCH  
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Additional information  
[www.reinhausen.com/messko-mprec](http://www.reinhausen.com/messko-mprec)



# MESSKO® MTrab®

Maintenance-free dehydrating breather with self-regulating heating element for regenerating the desiccant



MTrab® DB100(HT)  
For transformers in rated power classes ≤40 MVA, with α or β control

The maintenance-free MESSKO® MTrab® dehydrating breather is used in oil-insulated transformers, reactors or tap changers to dry the air which is suctioned in by the oil conservator.

Incoming air is directed toward the desiccant (silica gel) and dried.

The desiccant is regenerated/dehumidified by an installed heating element that is sensor-controlled and self-regulating.

## Advantages

- No routine, expensive replacement and no environmental impact as a result of used desiccant
- Use of glass cylinders to optimize the regeneration process and for excellent weather resistance
- Easy retrofitting thanks to a variety of flange solutions
- Sensor-controlled heating apparatus
- All measured values queried via RS-485 interface
- Intelligent data recording
- Self-monitoring of system with output of operational condition
- Full protection against external influences

## Variants and options

- Optional α, β, or γ control for transformers in different rated power classes
- Supply voltage of 230 V AC/DC or 120 V AC/DC
- Additional overvoltage protection
- Cable connection M20 x 1.5 or 1/2" (14 NPT)
- Analog output 0–1 mA, 0–20 mA, or 4–20 mA
- DIN flange, RM flange, or flange for 1/2" bolts
- Offshore configuration
- Test button for initiating the device self test and verifying functionality
- Additional filter heating for ambient temperatures permanently below –5 °C over a period of 20 days (HT version)
- Lateral mounting
- Protection of electrical cables from damage such as animal bite

## Sample configurations



MTrab® DB200T  
for transformers in rated power classes >40 to ≤200 MVA, β control



MTrab® DB200D-T  
twin design, for transformers in rated power classes >200 MVA, β control and filter heating



MTrab® DB200 G  
with γ control for oven and cavern transformers as well as GSU machine transformers

## Matching accessories



MTrab® DATA LOGGER  
For recording the functional operating sequence over time



CABLE PROTECTION (optional)



PROTECTIVE GRILLE (optional)

Additional information  
[www.reinhausen.com/messko-mtrab](http://www.reinhausen.com/messko-mtrab)

# MESSKO® MFloC®

Flow monitor for the oil-water-cooling circuit of transformers



MFloC® MF100-0  
For insulating oil with DN100 flange and terminal box with terminal strip

The MESSKO® MFloC® flow indicator monitors the flow of coolant through the oil-water-cooling circuit of transformers. It reliably detects and reports a pump failure as soon as it occurs.

## Advantages

- Specially formed, spoon-shaped paddle
- To increase the reliability in laminar as well as non-laminar (turbulent) flows
- Operational from -50 to +80 °C
- For cooling media from -30 to +120 °C
- Laminated safety glass with built-in UV filter
- Guaranteed leaktight connection to the coolant circuit thanks to separation of the transmitter and display parts
- Suitable for all common pipe diameters and flow directions
- Easy assembly
- Convenient adaptation for different flow directions with swiveling display part
- Easy to exchange

## Variants and options

- For mineral-based insulating oil as per IEC 60296, alternative insulating oil or water
- With standard flange (DN100-DN300) or retrofit flange
- Terminal box with terminal strip, ANSI or MIL connector
- Different housing colors and dials
- Offshore configuration

## Sample configurations



MFloC® MF100-W  
for water with flange DN100 and terminal box with terminal strip



MFloC® MF100-0 MR  
with IEC- or ANSI-compliant design

## Complementary products



MESSKO® MSafe  
Buchholz relay  
Page 16

Additional information  
[www.reinhausen.com/messko-mfloc](http://www.reinhausen.com/messko-mfloc)

# MESSKO® MLog®

Transport monitoring: Measuring, saving, and transmitting transport conditions worldwide



MLog® IM100 Premium Control

MESSKO® MLog® reliably monitors the transport and condition of goods of all types.

## Advantages

- Saves and displays acceleration/shock forces (X, Y, and Z-axes), ambient temperature, and humidity
- Temperature measurement from -40 to +125 °C
- Humidity measurement from 0 to 100 % RH
- Storage capacity of up to one year and efficient power supply with commercially available batteries
- No hazardous goods labeling required
- Resistant to UV rays, sea water, and oil
- Resistant to water spray and dust as per IP 65, no additional protective housing required
- Intuitive user interface and PC software
- USB port
- Manipulation-proof data format
- Calibration and update service

## Variants and options

- LCD display, black/white
- Global positioning via GPS
- GSM module to send status and alarm messages via SMS (worldwide)
- Bluetooth interface for wireless data transmission
- 2 digital inputs: <0.8 V, >2.4 V
- 2, 4, or 6 universal inputs (0-5 V DC)

## Sample configurations



MLog® IM50 Basic Control  
with GPS positioning and temperature, humidity, and acceleration measurement



MLog® IM100 Premium Control  
with display, 2 digital and up to 6 universal inputs, Bluetooth interface, and GSM module

## Matching accessories



MLOG ANALYSER  
SOFTWARE



MOUNTING PLATE



ASSEMBLY KIT



LR14 BATTERIES



USB CABLE

Additional information  
[www.reinhausen.com/messko-mlog](http://www.reinhausen.com/messko-mlog)

# MESSKO® MTeC® EPT303

Forward-looking temperature management system for transformers



MTeC® EPT303 - the dawn of a new age in transformer temperature management

The modularly expandable, digital control unit MESSKO® MTeC® EPT303 impresses with highly intelligent solutions in the areas of safety, functionality and user-friendliness: from the modern design of the user interface and the optional MESSKO® MControl® with touch display to compliance with all conventional communication standards.

## Advantages

- Simple parameterization, intuitive user guidance and individual configuration of the user interface thanks to a modern design and operating concept
- User interface in 8 languages guarantees safe use worldwide
- Minimum risk of setting incorrect parameters due to a 3-level role concept and the simulation mode
- Freely configurable alarm levels, triggers and warning instructions
- No software installation for customers thanks to the unit's built-in operating system and the ability to call up the application in any conventional web browser
- Precise determination of the winding temperature thanks to measurement of the top oil temperature (carried out up to twice) and the load measurement in up to 3 phases
- Measurement of the ambient temperature and oil level
- 2 additional, freely selectable temperature differences
- Activation of up to 7 freely configurable cooling stages
- Optional load-dependent or periodic activation, or intermittent cooling group change adjustable
- All conventional communications standards come standard: DNP3, IEC 60870, IEC 61850, Modbus
- Calculation and display of estimated remaining service life

## Variants and options

- Visualization and operation on one user interface thanks to optional MESSKO® MControl® 7-inch color touch display
- Maximum measuring accuracy as the MSpot® sensors and combinable FO module make it possible to take measurements directly in the windings using fiber optics (see MESSKO® MTeC® EPT303 FO on page 15)
- Flexibility in terms placement for integration into existing control cabinets thanks to modular design
- Available as a standalone product or integrated into a customized control cabinet solution
- Option for upgrading and retrofitting

## Matching accessories



MESSKO® MControl®  
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## Compatible products



MESSKO®  
control cabinet systems  
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Additional information  
[www.reinhausen.com/messko-mtec](http://www.reinhausen.com/messko-mtec)



# MESSKO® MTeC® EPT303 FO

Pinpoint temperature management with fiber optic technology



MTeC® EPT303 FO using fiber Bragg grating technology

The MESSKO® MTeC® EPT303 FO combines the advantages of the base module from the MTeC® EPT303 series with state-of-the-art fiber optic temperature measurement technology. As the measurements can be taken directly in the windings, temperature management is always based on highly precise hot spot temperature values.

## Advantages

- Fiber optic measurement using fiber Bragg grating technology
- Multiple measuring head with 3 measurement points per MSpot® sensor
- Sensors do not suffer from the effects of aging
- Up to 32 MSpot® sensors can be used
- Stainless steel flange suitable for use offshore
- Extremely stable connecting lead made up of 8 fiber optic cables in one armor

## Variants and options

- Variants and options available as for the MTeC® EPT303 (see page 14)
- Please note: Upgrading and retrofitting not possible



# MESSKO® MTeC® EPT202

Robust solution for intelligent cooling control



MTeC® EPT202 for DIN rail mounting

The MESSKO® MTeC® EPT202 is a cooling control system that is both rugged and cost-effective. It includes all necessary functions for independently protecting and extending the service life of the transformer for years to come. Both the top oil temperature and load current are measured. The hot spot temperature and the estimated remaining service life of the transformer are calculated using these two values.

## Advantages

- Measurement/display of oil temperature
- Winding and ambient temperature display
- Remaining service life calculation in accordance with the IEC and ANSI standard
- Internal data storage for up to 32,000 data records
- Cooling-type dependent and load-dependent cooling stage activation
- Parameterization of individual cooling stages possible
- Load cycle mode for uniform fan load
- Information on the status, alarm and trip visible on the device LEDs
- Analog outputs for remote transmission of measurement values

## Variants and options

- DIN rail mounting, control panel mounting or installation in 19-inch plug-in housing
- Supply voltage of 100 to 240 V AC with 50 to 400 Hz or 100 to 353 V DC
- Input range of temperature sensor and analog output for oil temperature selectable from -20 to +160 °C
- Analog output for winding temperature 0 to +180 °C
- Option for upgrading and retrofitting

## Matching accessories



Pt100 TEMPERATURE  
SENSOR  
Page 20

## Compatible products



MESSKO® MTO  
oil level indicator  
Page 8

Additional information  
[www.reinhausen.com/messko-mtec](http://www.reinhausen.com/messko-mtec)



# MESSKO® MSafe®

Buchholz relay for protecting power transformers and reactors



MSafe® MBR25  
With nominal flange diameter DN25, 4-hole

The MESSKO® MSafe® Buchholz relay is used as a central protective device for fluid-filled transformers and reactors with an oil conservator.

It triggers in the case of gas accumulation, abrupt increase of the flow rate, as well as the loss of oil. As a result potential damages to the transformer are avoided early.

## Advantages

- High quality materials provide long service life
- Helium leak test for oil and gas tightness
- Avoids false tripping via dry-reed magnetic switch
- Switches can be replaced without having to access the oil circuit
- Additional functional safety provided by solid floats
- Two main switching contacts (NO contact, NC contact, or changeover contact)
- Test line connection/remote verification

## Variants and options

- DN25, DN50, or DN80 connecting flange
- Two or four switching contacts (NO contact, NC contact, or changeover contact)
- Response speed of flap valve 0.65 m/s to 3 m/s
- Mineral-based insulating oil as per IEC 60296 or alternative insulating oil
- M25 or NPT 1/2" threaded cable glands
- Offshore configuration
- Inspection glass cover
- Manual reset for function test
- Remote verification of operational readiness via a compressed-air line (optional)

## Sample configurations



MSafe® MBR80  
with nominal flange diameter DN80, 4-hole

## Matching accessories



GAS SAMPLER



GAS QUICK TEST  
For verifying H<sub>2</sub> and CO levels

Additional information  
[www.reinhausen.com/messko-msafe](http://www.reinhausen.com/messko-msafe)



# MESSKO® MSense®

Oil analysis sensor of persistent quality



MESSKO® MSense®  
with ball valve for installation directly on the transformer tank or piping to the cooling system

With hydrogen, carbon monoxide, and moisture in the insulating oil of power transformers, the MESSKO® MSense® product family monitors the primary early indicators of possible damage in the transformer with thermal or electrical causes.

Continual functional safety and reliable measurements are ensured by components which are just as robust as they are technically refined and by the new 2-stage measurement procedure directly in the oil flow.

False alarms, downtimes, and results distorted by environmental influences are therefore a thing of the past.

## Advantages

- Long-term functional safety thanks to capillary gas extraction unit, stainless steel pipe to protect the measuring technology, and robust housing
- High-precision measurements thanks to semiconductor sensors, capacitive moisture sensor, inert measurement chamber, 2-stage measurement procedure directly in the oil flow
- Interfaces to all common SCADA systems for continuous remote monitoring
- The internal memory makes available for long-term analyses all measurements from up to 4 years in the past
- Needs-based parameterization using the MESSKO® MSeT® software provided
- Manual sampling directly at the point of measurement using integrated Luer lock connection
- Two free DGA and moisture analyses in the MESSKO lab included
- Installation options for all common equipment scenarios: Initial fitting and retrofitting
- Rapid on-site assistance from global, quality-certified service network

## Variants and options

- Monitoring of the most important early indicators:
  - x1.5 - Hydrogen and moisture
  - x2.5 - Hydrogen, Carbon monoxide and moisture
- Integrated display on housing
- Installation with flange screw connection for direct inlet or using oil loop for retrofitting (optional)
- Offshore version
- Optional: MESSKO® MSense® protocol converter - converting data from Modbus RTU to the following protocols: DNP 3.0, Modbus TCP, and IEC 61850-8-1 MMS
- Housing color RAL 7033 or RAL 7038

## Sample configurations



MESSKO® MSense®  
without display

## Complementary products



MESSKO® PrimeLab®  
Gas-in-oil analysis for transformers and tap changers  
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Additional information  
[www.reinhausen.com/messko-msense](http://www.reinhausen.com/messko-msense)

## MESSKO® MCTA-5

CT current simulator for verifying and setting CT current-operated temperature measurements at transformers



MESSKO® MCTA-5  
CT current simulator

The MESSKO® MCTA-5 CT current simulator is used in testing facilities for commissioning or maintenance work. Using this device CT currents are simulated at the switched off transformer to verify and adjust measuring instruments via the created thermal image.

### Advantages

- Mobile application
- Constant alternating current (adjustable from 0 to 5 A) up to 40 VA load
- Housing with built-in handle
- Alternating current adjustable via a control button, display window for displaying information

## MESSKO® MZT1650S

Calibration bath for checking temperature sensors



MESSKO® MZT1650S  
Calibration bath

The MESSKO® MZT1650S is a highly precise calibration bath for checking and verifying temperature sensors at the transformer or in the laboratory.

### Advantages

- Compact, mobile unit for carrying out on-site checks
- Lightweight and easy to transport in the service and transport case
- Programmable temperature profile
- Easy to operate thanks to an intuitive user interface
- Sample holder in integrated liquid bath

### Combinable products



MESSKO® TRASY2  
Temperature measuring system  
Page 4



MESSKO® COMPACT  
Temperature measuring system  
Page 5



MESSKO® BeTech  
Thermometer  
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ZT-F2.1  
TEMPERATURE TRANSMITTER  
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### Combinable products



MESSKO® TRASY2  
Temperature measuring system  
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MESSKO® COMPACT  
Temperature measuring system  
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MESSKO® BeTech  
thermometer  
Page 6

Additional information  
[www.reinhausen.com/messko](http://www.reinhausen.com/messko)

## MESSKO® MPreC® TEST BENCH

Mobile test bench for pressure relief devices



MPreC® test bench  
with installed pressure relief device

The MESSKO® MPreC® test bench tests and logs the accuracy and functionality of new and used pressure relief devices. Commissioning, maintaining, and servicing these devices become much easier as a result.

### Advantages

- For use in a laboratory or testing facility, or for commissioning or maintenance work
- V4A stainless steel and IP 65 control unit for applications involving extreme ambient conditions
- Measuring range 4 psi to 30 psi
- Ambient conditions -10 to +50 °C
- Straightforward commissioning and easy and safe operation
- Pressure ranges and number of test cycles individually selectable
- Intuitive MESSKO® MPreC® test bench software in English and Chinese for reliable evaluation, processing, and administration of data
- Graphic display, saving and printing of test results



MPreC® test bench  
with fitted cover hood

### Combinable products






MESSKO® MPreC®  
Pressure relief device  
Page 10

Additional information  
[www.reinhausen.com/messko](http://www.reinhausen.com/messko)



# TEMPERATURE MEASUREMENT

Suitable for

ZT-F2.1 TEMPERATURE TRANSMITTER		<ul style="list-style-type: none"> <li>Core component of the MESSKO® TRASY2 temperature measuring system</li> <li>Variety of functions, depending on the connection</li> </ul>	<p>MESSKO® TRASY2 Temperature measuring system Page 4</p>
MOUNTING WELL		<ul style="list-style-type: none"> <li>Mounting well for placing the oil thermometer in the thermometer pocket as per DIN 42 554</li> <li>With leadthrough to immersion tube for the temperature sensor of the indicator thermometer</li> </ul>	<p>MESSKO® TRASY2 Temperature measuring system Page 4</p>
COMBI WELL		<ul style="list-style-type: none"> <li>Mounting well for placing the oil thermometer in the thermometer pocket as per DIN 42 554</li> <li>With leadthrough to immersion tube for the temperature sensor of the indicator thermometer</li> <li>Integrated Pt100 laboratory resistor as per DIN 43 760 facilitates remote transmission of measured values</li> </ul>	<p>PQ96/PQ144 Moving coil meter Page 22</p>
Pt100 TEMPERATURE SENSOR			<p>PQ96/PQ144 Moving coil meter Page 22</p> <p>MESSKO® MTeC® EPT202 Thermometer with intelligent fan control Page 15</p>



# REMOTE TRANSMISSION AND PROCESSING OF MEASURED VALUES

Suitable for

TT30 SIGNAL CONVERTER		<ul style="list-style-type: none"> <li>For converting a variety of sensor signals into process signals</li> <li>Adaptable, on the input side, to different mechanical and electrical sensors</li> <li>Maximum safety and functionality at the transformer when combined with mechanical base units</li> <li>Connects to control room systems for process monitoring while safety-relevant mechanical switching functions are maintained</li> <li>Current bus technology</li> </ul>	<p>MESSKO® TRASY2 Temperature measuring system Page 4</p> <p>MESSKO® COMPACT Temperature measuring system Page 5</p>
Pt-MU MEASURING TRANSDUCER		<ul style="list-style-type: none"> <li>Converts the signal of a Pt100 temperature sensor into a standardized signal proportional to the temperature</li> <li>Connects to the Pt100 connectors in the ZT-F2.1 transformer temperature transmitter or to the combi well, for example</li> <li>Conditions the output signals of these devices for further processing via a computer or for electric/electronic display</li> <li>For transferring measured values across large distances or disturbance fields</li> </ul>	<p>MESSKO® TRASY2 Temperature measuring system Page 4</p> <p>MESSKO® BeTech Thermometer Page 6</p> <p>PQ96/PQ144 Moving coil meter Page 22</p>





Additional information  
www.reinhausen.com/messko

Suitable for

IgT-MU MEASURING TRANSDUCER		<ul style="list-style-type: none"> <li>Used to convert and separate direct current or direct voltage into a load-independent direct current and direct voltage signal</li> </ul>	<p>MESSKO® COMPACT Temperature measuring system Page 5</p>
MTraB® DATA LOGGER		<ul style="list-style-type: none"> <li>For recording the functional operating sequence of the dehydrating breather over time to determine the air circulation of the transformer and/or tap changer</li> <li>Data readouts via mobile computer</li> <li>Easy evaluation of data using supplied software for optimizing the operational readiness and service life of the transformer</li> </ul>	<p>MESSKO® MTraB® Maintenance-free dehydrating breather Page 11</p>

# MEASURED VALUE DISPLAYS

Suitable for

EI100/160 ELECTRONIC INDICATOR		<ul style="list-style-type: none"> <li>Analog pointer instrument with digital LCD display</li> <li>For installation in a control cabinet or directly on the transformer</li> <li>Displays the temperature or a percentage output of any sensor</li> <li>Input signal 4–20 mA, supply voltage 24 V DC</li> <li>Can be used in conjunction with the TT30 signal converter</li> </ul>	<p>MESSKO® TRASY2 Temperature measuring system Page 4</p> <p>MESSKO® COMPACT Temperature measuring system Page 5</p> <p>MESSKO® MTO Oil level indicator Page 8</p>
EI100 ELECTRONIC INDICATOR WITH BRACKET		<ul style="list-style-type: none"> <li>Analog pointer instrument with digital LCD display</li> <li>For installation in a control cabinet using a bracket</li> <li>Displays the temperature or a percentage output of any sensor</li> <li>Input signal 4–20 mA, supply voltage 24 V DC</li> <li>Can be used in conjunction with the TT30 signal converter</li> </ul>	<p>MESSKO® MTO Oil level indicator Page 8</p> <p>MESSKO® MMK Oil level indicator Page 9</p>
EI100 ELECTRONIC INDICATOR WITH CLAMPING BRACKET		<ul style="list-style-type: none"> <li>Analog pointer instrument with digital LCD display</li> <li>For installation in a control cabinet using a clamping bracket</li> <li>Displays the temperature or a percentage output of any sensor</li> <li>Input signal 4–20 mA, supply voltage 24 V DC</li> <li>Can be used in conjunction with the TT30 signal converter</li> </ul>	<p>MESSKO® MTO Oil level indicator Page 8</p>
D1272AT DIGITAL INDICATOR		<ul style="list-style-type: none"> <li>Remote digital indicator of oil or winding temperature</li> <li>Connects to the analog output (Pt100 or 4–20 mA) of the combi well or to the ZT-F2.1 temperature transmitter</li> <li>Two freely adjustable limit contacts and different output signals (4–20 mA, 0–5 V, 0–10 V) for further signal processing optionally available</li> </ul>	<p>MESSKO® TRASY2 Temperature measuring system Page 4</p> <p>MESSKO® COMPACT Temperature measuring system Page 5</p> <p>MESSKO® BeTech Thermometer Page 6</p>

Additional information  
www.reinhausen.com/messko



Suitable for

PQ96/PQ144  
MOVING COIL METER



- Remote analog indication of oil or winding temperature
- Connects to the analog output (Pt100 or 4–20 mA) of the combi well or to the ZT-F2.1 temperature transmitter

MESSKO® TRASY2  
Temperature measuring system  
Page 4  
MESSKO® COMPACT  
Temperature measuring system  
Page 5

## POWER SUPPLY

Suitable for

SNT36 POWER SUPPLY



- Wide-range power supply unit for input voltages of 85 to 270 V AC and 110 to 400 V DC
- Output 24 V DC

MESSKO® TRASY2  
Temperature measuring system  
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MESSKO® COMPACT  
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MESSKO® BeTech  
Thermometer  
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MESSKO® MTO  
Oil level indicator  
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ZT-F2.1 TEMPERATURE TRANSMITTER  
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COMBI WELL  
Page 20

PSLC242 POWER SUPPLY



- Turn-key, unregulated power supply unit
- For installation on 35 mm DIN rail profile and bolting to an assembly and support surface
- For line voltages of 230 V AC and 115 V AC
- Output with sustained short circuit-proof protection and potential-free as per VDE 0551
- Compatible with tropical environments thanks to resin encapsulation

MESSKO® TRASY2  
Temperature measuring system  
Page 4  
MESSKO® COMPACT  
Temperature measuring system  
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MESSKO® BeTech  
Thermometer  
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MESSKO® MTO  
Oil level indicator  
Page 8

Additional information  
[www.reinhausen.com/messko](http://www.reinhausen.com/messko)

## PROTECTIVE DEVICES

Suitable for

PROTECTIVE GRILLE



- Constructed from V4A stainless steel

MESSKO® MTrab®  
Maintenance-free dehydrating  
breather  
Page 11

INSECT GRILLE  
For stainless steel filter



- Constructed from V4A stainless steel

MESSKO® MTrab®  
Maintenance-free dehydrating  
breather  
Page 11

FOOT STEP PROTECTION



- Constructed from galvanized steel

MESSKO® TRASY2  
Temperature measuring system  
Page 4  
MESSKO® COMPACT  
Temperature measuring system  
Page 5

## MATCHING ACCESSORIES

Suitable for

MESSKO® MLOG® ANALYSER  
SOFTWARE



- Configure the MESSKO® MLog® transport monitor from a PC
- Evaluate recorded data
- Optional 3-level password protection

MESSKO® MLog®  
Transport monitor  
Page 13

MOUNTING PLATE



- Constructed from V4A stainless steel

MESSKO® MLog®  
Transport monitor  
Page 13

MULTI-BALLAST TX  
Multi-ballast transformer



- Conversion of the CT current

MESSKO® TRASY2  
Temperature measuring system  
Page 4  
MESSKO® COMPACT  
Temperature measuring system  
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MESSKO® BeTech  
Thermometer  
Page 6

MControl®



- Configure and visualize parameters on site without any service computer
- Full visualization convenience regardless of the degree of expansion

MESSKO® MTeC EPT303  
Digital temperature  
management system  
Page 14

Additional information  
[www.reinhausen.com/messko](http://www.reinhausen.com/messko)

# MESSKO® CONTROL CABINET SYSTEMS

Customized control cabinet solutions for special customer requirements



Individual control cabinet solutions – the full-service package from MESSKO®

MESSKO develops application and customer-specific control cabinets and control cabinet systems to meet individual requirements and configurations.

To this end, special attention is paid to ensuring that all modules and components are arranged in a maintenance-friendly and ergonomic fashion as soon as initial design work for the control cabinet begins.

## Advantages

- Customer-specific solutions – from planning through to production
- Production based on electrical wiring diagrams drafted in house or by the customer
- Maintenance-friendly and logically organized arrangement of modules and components
- Easy to upgrade and expand, and lightweight construction thanks to the modular system
- Ongoing compliance with current standards and guidelines
- High-quality, reliable materials
- Operation possible even under extreme ambient conditions
- Single contact appointed to offer professional assistance throughout the entire project
- Comprehensive functional test prior to delivery

Additional information  
[www.reinhausen.com/messko-systemsandprojects](http://www.reinhausen.com/messko-systemsandprojects)

# MESSKO® PrimeLab®

Gas-in-oil analysis for transformers and tap changers



PrimeLab® sampling kit

PrimeLab® gas-in-oil analysis from MESSKO is a safe, reliable, and proven method for assessing the internal status of transformers and oil-filled electrical equipment.

## Advantages

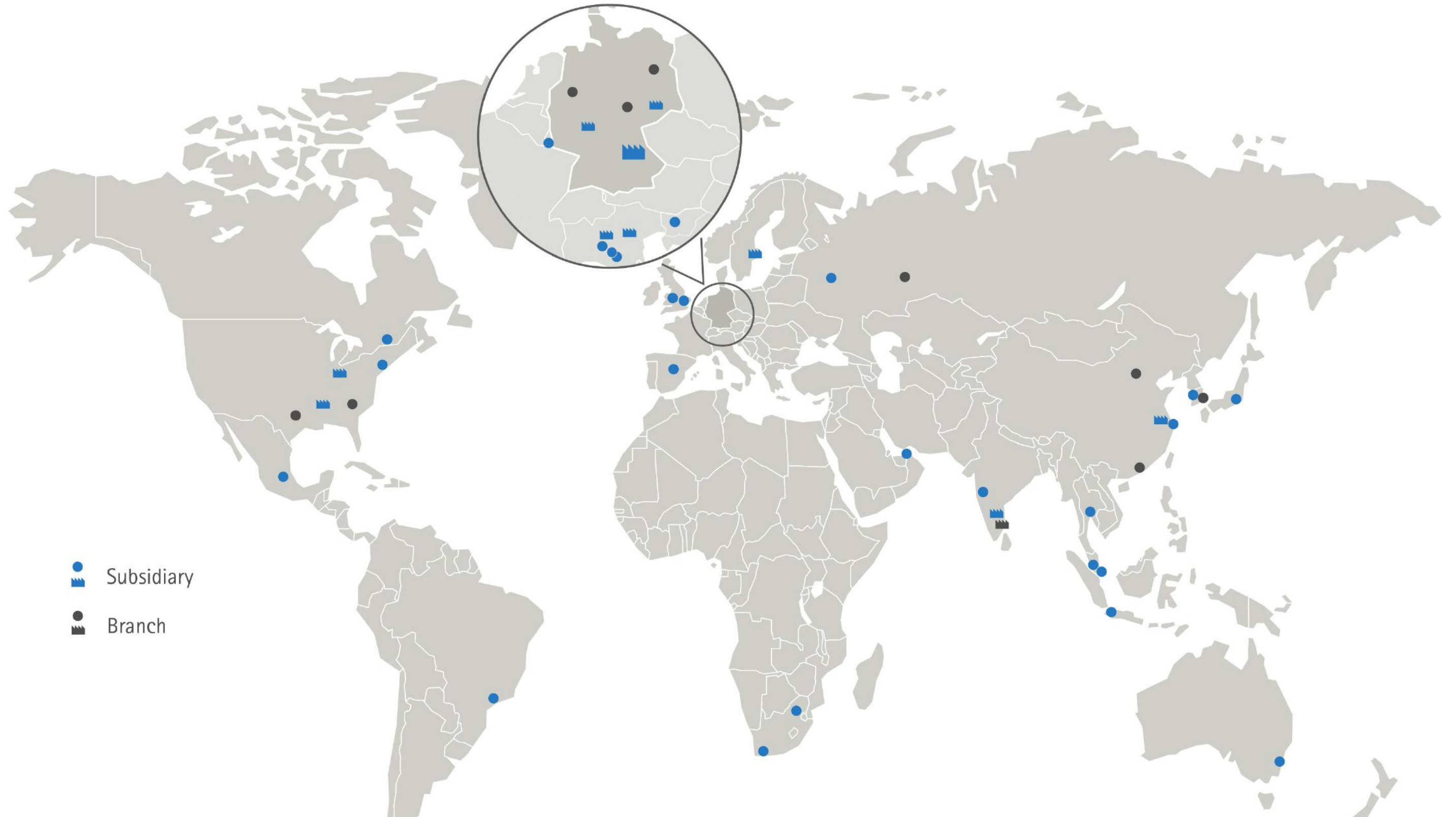
- Complete sampling kit with sampling guide
- Easy and clean sample taking
- Analysis in modern MESSKO oil laboratory
- Information provided about the status of transformers, tap changers, and other equipment
- Verification of the measuring accuracy of multi-gas sensors in monitoring systems
- Efficient, early error detection
- Malfunctions and downtime are avoided
- Comprehensive test reports and graphical formatting of the data
- Derivation of economically sensible courses of action, maintenance schedules (oil conditioning), and counter-measures (cooling)

## Range of tests available for oil sample provided

- Concentration of fault gases dissolved in oil (DGA) as per IEC 60567 (H<sub>2</sub>, CO, CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>2</sub>, C<sub>3</sub>H<sub>8</sub>, C<sub>3</sub>H<sub>6</sub>)
- Moisture analysis (water concentration in insulating oil) as per IEC 60814
- Disruptive discharge voltage (min. 30 kV) as per DIN EN 60156
- Dielectric loss (tan δ) as per IEC 60247
- Permittivity (dielectric number) as per IEC 60247
- Specific electrical DC resistance as per IEC 60247
- Electrical conductivity
- Total solid matter count as per DIN IEC 60422, appendix C
- Wear metal content (Fe, Cr, Sn, Al, Ni, Cu, Pb, Mo)
- Additive content (Ca, Mg, Zn, P, Ba, B)
- Impurity content (Si, K, Na, Li)
- Viscosity at 40 and 100 °C
- Viscosity index
- Degree of oxidation
- Appearance (visual inspection)
- Color number
- Neutralization number
- Surface tension
- Total particulate count via microscopical counting
- Flashpoint as per DIN EN ISO 2719, DIN 51758
- Pour point as per DIN ISO 3016, ASTM D97
- Furfural/furan content as per DIN EN 61198
- Degree of depolymerization (DP) of paper insulation as per DIN EN 61198
- Polychlorinated biphenyl (PCB) content as per DIN EN 12766-2
- Corrosive sulfur content as per ASTM D 127
- Density at 15 °C as per DIN EN ISO 12185

Additional information  
[www.reinhausen.com/messko-primelab](http://www.reinhausen.com/messko-primelab)

MESSKO® –  
WORLDWIDE CONNECTED





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Please note:

The data in our publications may differ from  
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IN2064/09/01 EN – MESSKO® Product Catalogue –  
MS99085006 – 08/16 –  
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THE POWER BEHIND POWER.

