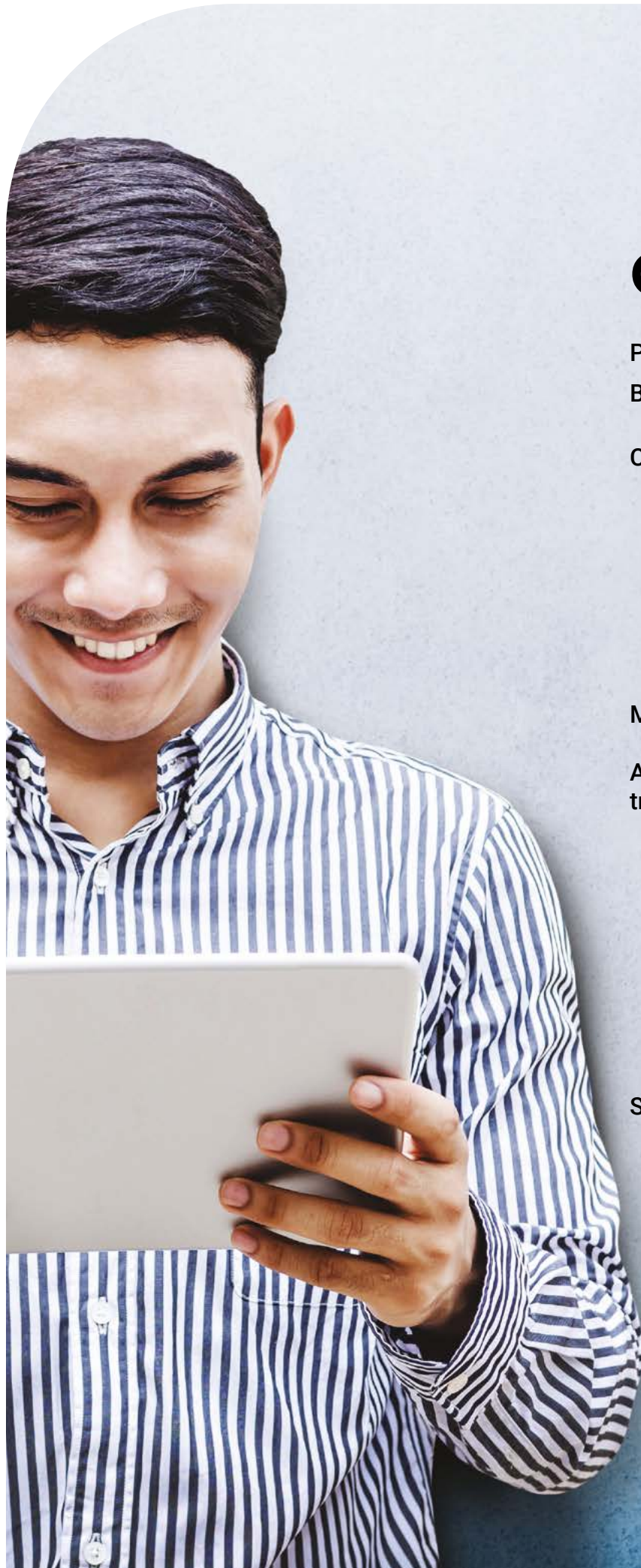


PORTFOLIO FOR NORTH AMERICAN MARKET

**World-class services
and products for
transformers**





Content index

Partner with us	3
Bushings.....	4
Combined resin silicon bushings.....	4
Conventional accessories	6
Dehydrating breathers	6
Buchholz relays.....	8
Shutter valves.....	10
Pressure relief devices	12
Liquid level indicators.....	14
Temperature indicators	16
Integrated safety devices	18
Temperature monitoring unit for dry-type transformers	20
MeDICA	22
Accessories for smart transformers.....	24
Oil diagnostic devices.....	24
Self-dehydrating breathers	26
Buchholz relays.....	28
Pressure relief devices	30
Liquid level indicators.....	32
Contactless ultrasonic liquid level indicators	34
Temperature indicators	36
Integrated safety devices	38
Temperature monitoring units for dry-type transformers	40
Service	42

Partner with us

We know your business and value for time

With history of 60 years on the market, COMEM Group is connecting experience from manufacturing and supply of different types of transformer components to transformer manufacturers, service organizations and end-users with innovative services.

MISSION:

Provide world-class consulting services, product solutions, and after-sales support during the entire transformer lifecycle.

VISION:

Contribute to an effective value chain optimization of our customers, improving the sustainability and efficiency of the energy transformation process.

VALUES:

Global mind-set

Supporting you on a global scale

Integrity

Is the only business enabler

Sustainability

Is the integral part of our social responsibility

People safety

Is our top priority

Energize first

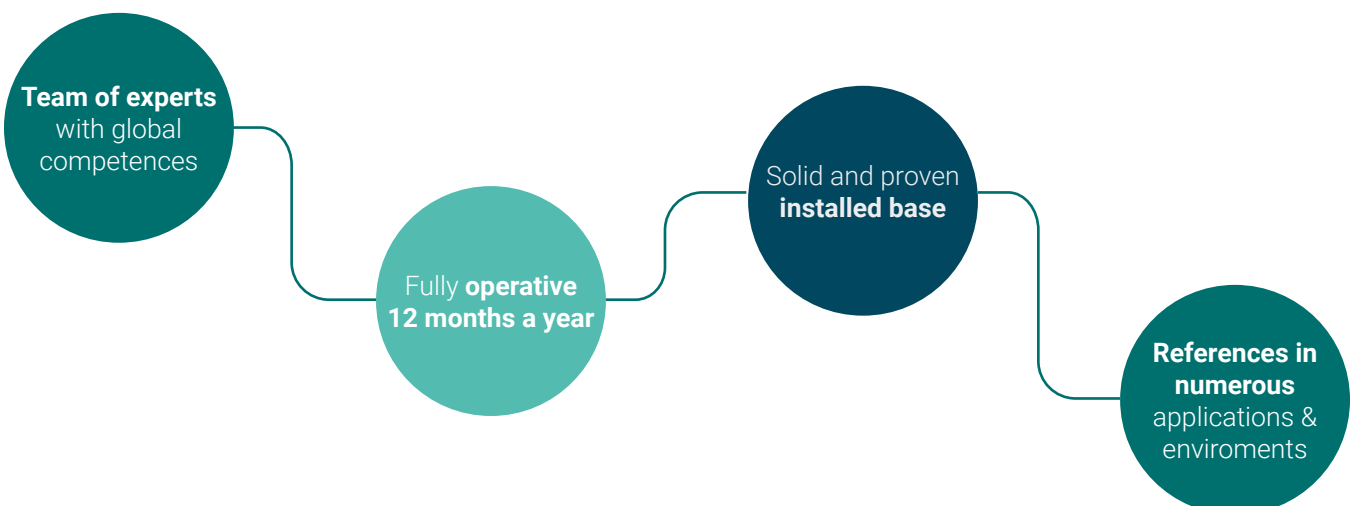
Keeping your needs as our business priority

People empowerment

Because people are our most important company asset

Innovative thinking

Is applied in all business processes



Combined resin silicon bushings

Combined resin silicon bushing type CRS is a non-condenser, non-graded, dry-type bushing, available for oil-filled power transformers. It is especially eligible for applications required to withstand extreme conditions, from very low temperatures up to high levels of humidity and pollution. CRS bushing is completely oil-free, paper-free, and porcelain-free. When choosing CRS, you will guarantee the highest safety to people and the transformer. In case of a failure, there will be no risk of oil explosion and no risk of people injured or properties damaged by the shattering of porcelain fragments.



CRS IEEE

Why buy:

- Highest safety for people secured
- Highest safety for the transformer operators secured
- No need for maintenance or constant bushing monitoring
- Easier asset and spare parts management guaranteed to the end-user, the bushing can be transported and stored at any angle

Application:

- Oil-filled power transformers
- Suitable for extremely cold environment up to -40°C
- Suitable for offshore environment
- Suitable for tropical climates
- Suitable for densely populated or security sensitive areas
- Suitable for new installations and retrofits

Technical data at a glance:

- IEEE range: $U_m \leq 34.5$ kV, $I_r \leq 3000$ A
- Low partial discharges level
- Compliant with IEC 62217
- Pollution test heavy - to - very heavy as specified by IEC 60185
- Qualified as per IEEE C57.19.01 - 2017



Electrical data:

Bushing type	Rated Voltage kV	Rated current A	Related standard
Voltage	25	3000	IEEE C57.19.01-2017
	34.5	1200	
	34.5	2000	
	34.5	3000	

Dehydrating breathers

Transformers breathe during the thermal contraction of the oil inside the transformer. You need to control that no humidity enters inside the transformer during this operation because moisture causes aging and outages.

Choose one of our dehydrating breathers and assure moisture absorption through colored silica gel, which indicates the silica gel saturation. The operator can identify easily on-site when to replace the silica gel with new salt.



Why buy:

- A proven technology with robust design
- Large installed base
- Easy installation and easy maintenance on site

Application:

- Oil-filled transformers with conservator
- On-load tap-changers
- Suitable for new installations and retrofits

Dehydrating breathers

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Technical data at a glance:

Standard	IEC 60076-22-7		
Material	All the external parts are resistant to transformer oils, salt fog and UV rays		
Three types of installation environment	Indoor/outdoor	Corrosion class: C4	RAL 7032
	Tropical proof	Corrosion class: C5-Medium	Grey coating
Protection pipe material	Glass or Polycarbonate		
Ambient temperature	From -40 °C to 80 °C (from -40 °F to 176 °F)		
Connection	Available with EN flange or with female thread		
Adding flange for fixing	Standard in the lower part for dehydrating breathers type 7 and 8		
Desiccant	Colored, non-poisonous silica gel; the color changes from orange to green when absorbing humidity To choose the right size for your transformer, please consult the selection matrix below		
Protection	Stainless steel pipe protection against accidental blows; the opening allows visual inspection of the silica gel on site		
Pressure load loss of air through the dehydrating breather	0,003 kg/cm ² for in-let air; 0,005 kg/cm ² for out-let air		

Selection matrix:

Breather type	Quantity of oil [t]*	Features (available for standard version)		Options							
		Silica gel volume [dm3]	Silica gel weight [Kg]	Corrosion protection C4	Corrosion protection C5-Medium	Hydraulic closing	Mechanical closing	Polycarbonate tube	Glass tube	Flange connection	Female connection
1	0 - 8	0.46	0.37	●	●	●	●	●	●	-	●
2	0 - 8	0.95	0.76	●	●	●	●	●	●	●	●
3	8 - 20	2.75	2.2	●	●	●	●	●	●	●	●
4	8 - 20	6.5	5.2	●	●	●	●	●	●	●	●
5	20 - 60	13.3	10.5	●	●	●	●	●	●	●	●
6	20 - 60	19	15.2	●	●	●	●	●	●	●	●
7	> 60	32	25.6	●	●	●	-	●	●	●	-
8	> 60	58	46.3	●	●	●	-	●	●	●	-

* The oil quantities assigned to size classes are oriented in agreement with EN50216-5, Table 1. The values are intended to give guidance to the user: The propose choice must take into consideration the real environmental conditions, the thermal cycles due to the service conditions of the transformer and the maintenance cycle.

Buchholz relays

Insulation liquid inside the transformer needs to be monitored to reduce any risk of transformer failure to a minimum. Buchholz relays provide information about any internal malfunction indicated by gas accumulation in the liquid and keep oil flow speed monitored and under control.

Choose our solution and assure reliable and safe operation of the transformer and a power supply network. You will get reliable product designed to promptly stop the system when necessary to prevent any catastrophic failure.



BR80

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- A proven technology with robust design
- Adjustable value settings for alarms and switches enables the operators to set-up the device to specific needs
- Easy installation
- Maintenance-free

Application:

- Liquid-filled transformers
- Hermetically sealed transformers
- Transformers with conservator with rubber bag
- On-load tap-changers
- Railway & Traction applications
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for seismic environment
- Suitable for tropical climates

Additional accessories:

- Gas sampling device GSD



Technical data at a glance:

Standard	IEC 60076-22-1		
Housing	Aluminum alloy		
Types of installation environment	Indoor/Outdoor	Corrosion class: C4	RAL 7032
	Coastal area	Corrosion class: C5-Medium	
	Offshore	Corrosion class: CX	RAL 7035
Nominal pipe diameter	DN25, DN50 and DN80 or G 1/2 threaded connection		
Inspection glass	Tempered glass with UV filter		
Oil temperature	From -40°C up to +120°C		
Ambient temperature	From -40°C up to +80°C. Lower temperature available upon request		
Switches	Up to 4		
Max. nominal current	2A		
Min. switching current	10 mA/24 V dc (golden contact is available for lower current)		
Rated insulation voltage	2 kV line to ground 1 kV between contacts in open position		
Flow vents speed	10 m/s to 3.0 m/s (each +- 15%)		
Cable gland	1; M25x1.5		
Degree of protection	IP65		
	IP66 available upon request		
Mechanical test (vibration class)	4M4 Class		
	4M6 Class available upon request		

Shutter valves

Insulation oil inside the transformer needs to be monitored to reduce any risk of transformer failure to a minimum. Loss of oil from the transformer does not only cause environmental pollution but can also lead in extreme cases to an explosion and fire. Shutter valves prevent the conservator from oil draining. In case of any rapid movement of the oil, the shutter valve can immediately close the pipe to stop oil dispersion. It is a perfect solution for transformers located in earthquakes and hurricane risk areas where movement causes pipe ruptures or leaks.

Choose our solution and assure reliable and safe operation of the transformer and a power supply network. You will get reliable accessories designed to shut down the transformer immediately when necessary to prevent any catastrophic failure.



RDR-MK

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- A proven technology with robust design
- Wide pressure range settings allow the adaptation to the volume of the oil in your transformer
- Easy installation
- Maintenance-free

Application:

- Liquid-filled transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates



Technical data at a glance:

Standard	IEC60076-22-1
Corrosion class	C4, C5M
Material	
Housing and upper part inclusive terminal box	Alluminum casting, RAL7032, grey coating, powder coating
Characteristics	
Installation	Indoors/Outdoors, tropical proof. Red arrow indicates the installation way
Ambient temperature	from -40°C to +80°C
Oil temperature	from -40°C to +115°C
Degree of protection	IP65 in accordance with EN60529
Rated insulation voltage	IP65 in accordance with EN60529
Nominal tube diameter	DN25 - DN50 - DN80
Gasket	NBR
Protected reed switch	
Number and types	2 x Change over contacts (one for alarm and one for trip)
Nominal voltage	24 - 230 V ac/dc
Max. nominal current	2A
Min. switching current	10 mA/24 V dc (for lower current golden contacts are available)
Max. breaking capacity dc	250W (L/R < 40 ms)
Max. breaking capacity ac	400 VA (cosΦ > 0.5)
Rated insulation voltage	2.5 kV ac 1 min between contacts and earth; 1.0 kV ac 1 min between open contacts
Insulation resistance	1000 Mohm/5000 Vdc
Connection	
Connection terminals	Min 0.25 mm ² /max. 4 mm ²
Cable gland	1 x PG16 (standard)
Sinusoidal (EN 60721-2-4)	cl.4M4: -9 Hz (6 mm peak to peak), 9 - 200 Hz (1g) - All axis
Shock	cl.4M4: 10g (11 ms) in all directions (EN60721-3-4)

Pressure relief devices

Pressure in the transformer is one of the key health parameters that predict early signs of decreased performance or an upcoming failure. Overpressure in the transformer tank can lead to an explosion and hot oil spill in the surrounding environment. The valve size is proportional to the volume of the oil in your transformer. Choose one of our pressure relief devices to keep the pressure in the transformer under control. It can discharge the overpressure to the exterior very quickly and reduce the risk of tank rupture.



170SB

Why buy:

- Proven technology
- Adjustable value settings for alarms and switches
- Easy installation
- Maintenance free

Application:

- Liquid-filled transformers
- Suitable for mineral or silicone oil
- Suitable for seismic and hurricane areas
- Suitable for new installations and retrofits
- Suitable for offshore environment



170SD

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Technical data at a glance:

Technical data

Standard	IEC 60076-22-1, IEEE Std C57.12.10-2017		
Housing	Aluminum alloy		
Types of installation environment	Indoor/Outdoor	Corrosion class: C4	RAL 7032
	Coastal area	Corrosion class: C5-Medium	
	Offshore	Corrosion class: CX	RAL 7035
Ambient temperature	From -40°C up to +80°C.		
Installation	Indoors and outdoors, tropical proof To prevent the formation of condensation Off shore protection available upon request		
Oi-directed cover	Plastic, stainless steel or aluminium, depending on pressure relief device model		
Gaskets	NBR (Standard) Viton		
Visual indicator	Brass, stainless steel or aluminium indicator, depending on pressure relief device model, Seawater resistant aluminium, red color button		
Switches	Up to 3		
Cable gland	M20x1.5 or M25x1.5, depending on pressure relief device model		
Degree of protection	IP65; IP66 available upon request		

Selection matrix:

Application volume of oil [dm ³]	Size [mm]	Model type	Protection type	Cover material	Corrosion protection C4-Medium	Corrosion protection C5-Medium	Corrosion protection CX
Up to 43,000	170	170SB	Guard	Stainless steel	●	*	
		170SC	Conveyor duct	Alluminium alloy	●	●	●
		170SD	Swiveling conveyor	Stainless steel	●	*	
		e170SC	Conveyor duct	Alluminium alloy	●	●	●

* Valve body in C5-Medium and conveyour duct in stainless steel 316L

Liquid level indicators

Liquids like mineral and silicone oils insulate and cool a transformer. You need to monitor the level of the oil to assure reliable and safe operation of the transformer.

Choose our one of our liquid level indicators and control any unexpected or accidental oil leakages that may lead to a transformer failure. Our accessories fit all transformer designs. Personalize the value settings for alarms and switches to fit your specific needs. The operator can monitor the preset values on-site through the easy-to-read dial and decide on the best transformer maintenance schedule.



OLI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- Proven technology
- Maintenance-free, no need for re-calibration over the time
- Customizable mounting flange to fit all transformer designs
- Adjustable value settings for alarms and switches
- Easy installation
- Easy-to-read dials

Application:

- Liquid-filled transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates



Technical data at a glance:

Standard	IEC 60076-22-1, IEEE Std C57.12.10-2017		
Housing	Aluminum alloy		
Types of installation environment	Indoor/Outdoor	Corrosion class: C4	RAL 7032
	Coastal area	Corrosion class: C5-Medium	
	Offshore	Corrosion class: CX	RAL 7035
Lens	Polycarbonate or tempered glass		
Flange	Aluminum alloy		
Liquid level indicator types	OLI22, L220	OLI	
	In-house design, 8 holes	Compatible with all transformer designs, 4 holes	
Dial	Numbers and letters directly screen-printed on aluminum plate Customizable range (MIN +20°C, MAX, other available)		
Adjustable switches	Yes (on demand)		
Ventilation valve	Yes		
Float element	Rohacell		
Float movement	Radial, axial, axial for rubber bag		
Liquid temperature	from -40°C to +120°C		
Ambient temperature	from -40°C to +80°C		
Cable gland	1; M25x1.5 3; M25x1.5 for OLI; OLI22, eOLI, and eOLI2		
Degree of protection	IP66 (OLI and OLI22)		
Power supply	24 - 230 V ac/dc		
Vibration class	4M4		

Temperature indicators

Winding and liquid temperature are key health parameters in the transformer. You need to monitor and control the temperature variations to assure reliable and safe transformer operation.

Choose one of our liquid and winding temperature indicators type OTI/WTI for your liquid-filled power transformer, and keep any unexpected temperature rise that may lead to a transformer failure under control. Our accessories fit all transformer designs.

Personalize the value settings for alarms and switches to fit your specific needs. The operator can monitor the preset values on-site through the easy-to-read dial and decide on the best transformer maintenance schedule.



OTI/WTI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- Proven technology
- Maintenance-free, no need for re-calibration over the time
- Customizable mounting flange to fit all transformer designs
- Adjustable value settings for alarms and switches
- Easy installation
- Easy-to-read dials

Application:

- Liquid-filled transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates



Technical data at a glance:

Temperature indicators in air / ANSI

Standard	IEEE Std C57.12.00-2015, IEEE Std C57.12.10-2017, IEC 60076-22-1		
Corrosion class	C4, C5M, CX (upon request)		
	Features	Liquid temperature indicators	Winding temperature indicators
Standard configuration	Type	ATI/eATI	AWTI/eAWTI/ATIw/eATIw
	Scale	from 0°C up to +120°C	from 0°C up to +180°C
	Dial protection	Polycarbonate	Polycarbonate
	CT nominal current	na	1, 2, and 5A *
	Ventilation system	YES	YES
	Micro switches	2 or 4	2 or 4
	Capillary length	up to 394" (10 m)	up to 394" (10 m)
	Max pointer	YES	YES
Options	PT100	Up to 2	Up to 2
	Vibration damping	Available	Available
	Analog output 4-20 mA	Embedded or external transducer	Embedded or external transducer
	Digital output Modbus RTU	Embedded (eATI)	Embedded (eAWTI/eATIw)
	Dial protection	Glass	Glass
	Thermal well	Available	Available

*) not applicable for ATIw/eATIw

We also offer a wide range of general-purpose thermometers and thermostats for hermetically sealed transformers.

Integrated safety devices

Keep constant control over four key health parameters in your hermetically sealed transformer: pressure, temperature, oil level, and gassing with just one compact device.

Choose our integrated safety device type RIS2, which integrates the functions performed by different accessories into one, saves space, and assures reliable and safe operation of the transformer. The operator can monitor the different values on-site through the easy-to-read dials and decide on the best transformer maintenance schedule.



RIS2

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- A proven technology with robust design
- Large installed base
- 4-in-1: four accessories combined into one compact device
- Adjustable value settings for pressure range enables the operators to set-up the device to the specific needs
- 270 Degree View for Liquid level indicator increases the flexibility for the installed position
- Easy installation and easy maintenance

Application:

- Hermetically sealed liquid-filled distribution and small power transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates
- Suitable for solar power applications
- Suitable for harsh environments



Technical data at a glance:

Degree of protection (CEI-EN 60529)	IP66; IP67 upon request			
Degree of shock tightness (EN 50102)	IK 07			
Salt-fogtight	1,000 h			
UV-Ray resistance (UNI-ISO 4892 / UNI-ISO 4582)	500 h			
Ambient temperature	from -40°C to +60°C			
Oil temperature	from 40°C to 120°C			
Cable connection	M25x1,5			
Cable box (EN 60947-7-1 / IEC 947-7-1)	According to standard			
Wire section to be used on clamp box	Up to 2,5 mm ³			
Max. rated pressure	500 mbar			
Electrical characteristics	Insulated enclosure			
Thermostats precision	± 4°C accuracy tolerance of end scale			
CONTACTS INTERRUPTION POWER	Voltage	Making capacity	Breaking capacity	
Liquid level / gas bleed	24 V dc to 230 V dc	2A	100 m/a	L/R < 40 ms
Pressure switch	24 V ac to 230 V ac	2A	2A	cos Φ > 0,5
Thermostat				

Temperature monitoring unit for dry-type transformers

Hospitals, data centers, and shopping malls are some of the examples where dry transformers are installed to minimize any risk of fire and power collapse. To secure these transformers' reliable and safe service conditions, different accessories and safety devices are required.

Choose our temperature monitoring unit type DTI, it enables controlling alarms and cooling systems and continuously monitors any anomalous variation in the temperature in your transformer through PT100 temperature sensors and can detect up to a maximum of 4 temperatures simultaneously.



DTI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- Fast temperature variation diagnostics enables informed decision making on the transformer maintenance schedule
- Two programmable signaling levels (Alarm – Trip)
- Control of cooling fan system
- Power supply: 24/230 V dc/ac $\pm 15\%$ 50-60 Hz

Application:

- Dry-type transformers
- Electric motors



Technical data at a glance

Auxiliary power supply	24/230 V ac/dc $\pm 15\%$ 50-60 Hz
Maximum absorption	4 VA
Measure inputs	3 - 4 inputs by RTD PT100 (max wire resistance 20 Ohm)
Interval of measure	-30 °C / +220 °C / precision $\pm 2^\circ\text{C}$
Interval of visualization	-30 °C / +220 °C
Tripped delay-hysteresis	5 seconds and -2 °C
Measure visualization	2 displays with led 7 segments, 3-digit
Outputs	4 relay NO_C_NC (250 V 5 A resistive load)
Output functions	Alarm, trip, fan, auto-diagnostic
Programmable functions	ALARM, TRIP, HOLD, FAN, T.MAX., HOT, FDC
Connection	Extractible terminal with screws, section wires max 2.5 mm ²
Insulation	2500 Vrms 50 Hz per 60 s: U aux - input PT100 / U aux - relay outputs / inputs PT100 - relay outputs
Protection degree	IP52 front panel, IP20 rear panel, compliant with CEI-EN 60529
Dimensions - enclosure	Flash mounting DIN 96x96 mm, depth 120 mm/ Enclosure thermoplastic self-extinguishing as UL94 V0
Working environment	From -10 °C to + 60 °C, humidity max 95%
Storing temperature	From +25 °C to +70 °C
Standards	Security: EN 61010-1 EMC: EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-11; EN 61000-6-4



Choose **MeDICA** and get a complete customer solution that includes products and services that can enable a longer and more efficient transformer life cycle.

We can help you

Gathering relevant health data

Building a suitable maintenance strategy

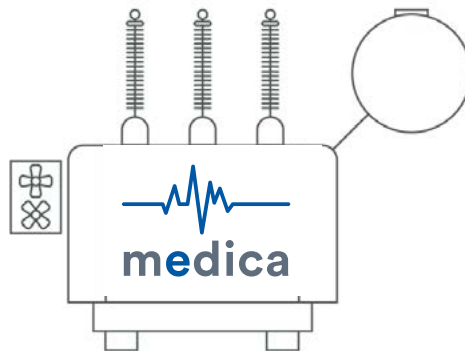
Prolonging asset life & lowering total cost of ownership

Dissolved Gas Analysis

Data aggregator

Offline measurement

Moisture prevention



Installation & Commissioning

Sensor: Safety device monitoring

Data interpretation, Reports, and Consultancy

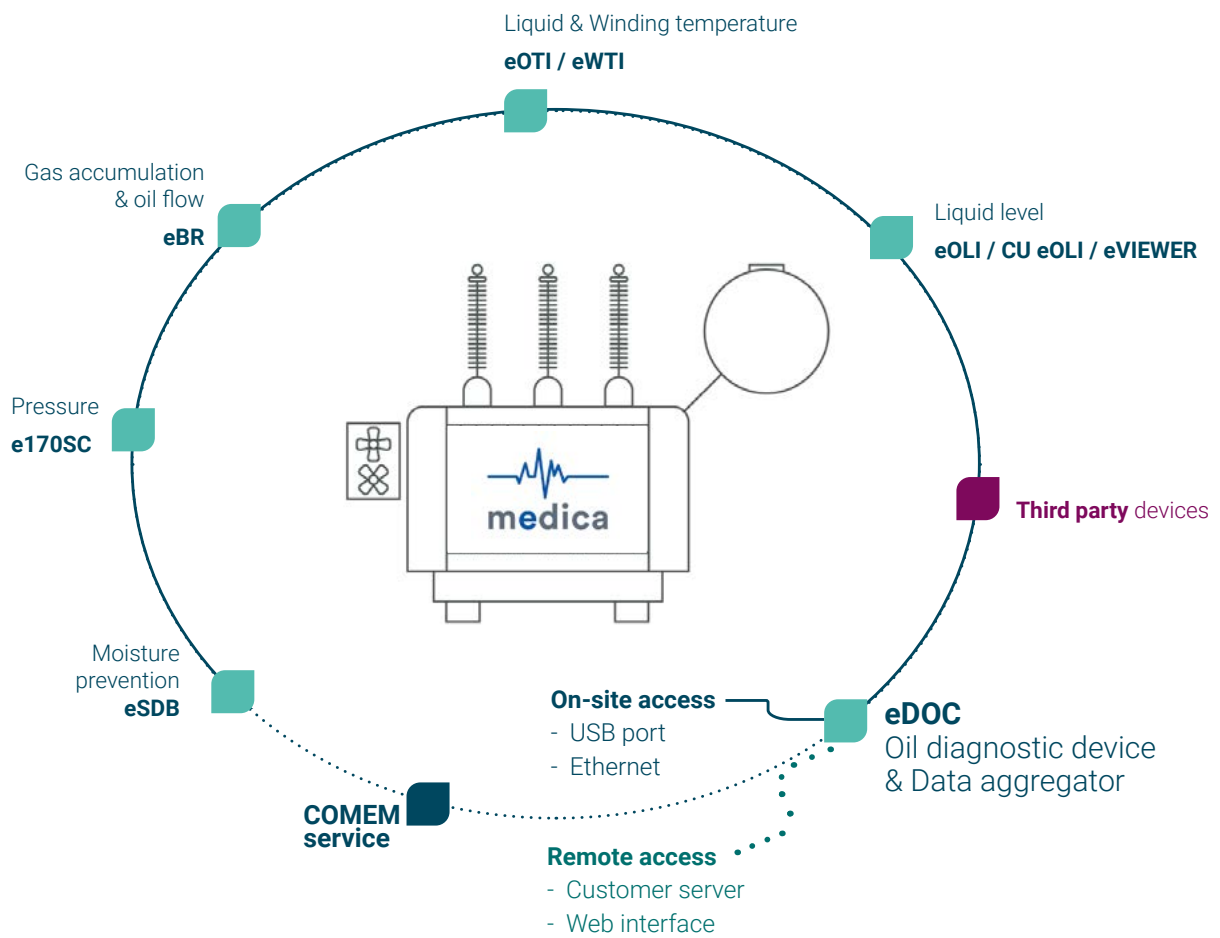
Sensor: Temperature monitoring

Thermal models

Web interface & Communication Protocol



Decision on proactive transformer healthcare strategy should be taken upon relevant health data analysis and consist of online and offline monitoring, testing, and consulting services,”



Oil diagnostic devices

Transformer oil's primary functions are to insulate & cool a transformer.

The oil must be stable at high temperatures and has excellent electrical insulating properties to withstand electrical & mechanical stresses and assure the safe operation of the transformer.

To make sure the oil is suitable for use, the end-user must periodically control its properties. The presence of dissolved gases and moisture is an indicator of an abnormal condition and further investigation is needed to determine the next course of action.

As part of our MeDICA solution, it can also serve as a bridge to all other connected eDevices.



Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

Connectivity

- Data aggregator & storage for eDevices and third party devices
- Web interface for remote control in accordance with cybersecurity assessment
- USB port for direct data downloading and uploading on-site

Serviceability

- Plug & play installation
- Oil drain valves for easy & safe oil sampling and discharging on-site
- Interactive display with icons for easy threshold set-up & functional test on-site

Safety

- Suitable for all applications, and environments
- Hydrogen reading is not sensible to the presence of other gases
- Continuous testing on fresh oil samples

Application

- Power transformers
- Smart grid applications
- Offshore applications
- Part of our MeDICA solution



Technical feature at a glance:

Type	eDOC-H	eDOC-HM
Monitoring of	Hydrogen (H ₂)	Hydrogen (H ₂) & Moisture (H ₂ O)
Connectivity	Data aggregator for eDevices and third-party devices Embedded Web Interface	Data aggregator for eDevices and third-party devices Embedded Web Interface
Input	3 x 4 - 20 mA, Modbus RTU	3 x 4 - 20 mA, Modbus RTU
Output	USB-A 2 x dry contacts (H2, malfunctioning) 2 x 4 -20 mA (H2, Temperature) RS485 2 x RJ45a Fiber Optic LED and display	USB-A 3 x Dry contacts (H2, H2O, malfunctioning) 3 x 4 - 20 mA (H2, H2O, Temperature) RS485 2 x RJ45a Fiber Optic LED and Display
Protocols	Modbus RTU; Modbus TCP/IP; DNP3.0; IEC 61850	Modbus RTU; Modbus TCP/IP; DNP3.0; IEC 61850

MECHANICAL FEATURES & AMBIENT SPECIFICATIONS

Interface to transformer	1.5 NPT male thread (standard); 1" NPT, EN flanges (on request)
Corrosion class	C5-M (standard), CX (on request)
Degree of protection	IP66, IP67 IEC/EN 60529
Ground	External mechanical ground
Dimensions	162 x 255 x 355 mm
Weight	8,5 kg
Vibration	Class 4M6 in agreement with EN 60721-3-4
Seismic	cl.0, level II in agreement with EN 60068-3-3
Operating ambient temperature	-40°C to +80°C (-40°F to +176°F)
Operational oil temperature	-40°C to +120°C (-40°F to +248°F)
Oil pressure	0 to 1000 kPa / 0 to 10 bar / 0 to 145 psi

Self-dehydrating breathers

The transformer life can be maximized by controlling moisture intake. By choosing our breather type eSDB, your transformer will be continuously secured from moisture intake. You can collect data required for your transformer health management remotely or on-site. It is compatible with our complete eDevice family, can be connected also to third-party devices, and be part of our modular monitoring ecosystem for transformer diagnostics – MeDICA.



eSDB

Our products are designed to be compatible with many different transformer brands, and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

Transformer safety:

- Proven technology assures safe transformer operation
- Integrated innovative features facilitate the device management and enable remote control
- The presence of a double tank in all models guarantees uninterrupted continuous automatic silica gel regeneration
- Condition-based regeneration cycle secures longer lifetime and good dehydrating performance of the breather

Serviceability:

- Robust and compact design with no external wires for easy installation and maintenance
- If the silica gel in the breather is contaminated with oil leakage during the transformer installation, the salt is easily replaceable on site
- USB-A data logger and added connectivity features enable full control over the data collection from the device and make firmware upgrade easy for the user, additional cable or notebook not needed

Remote monitoring and control:

- Possibility to remote the control signals through common communications protocols
- Temperature, humidity, and silica gel status continuously monitoring

Application:

- Smart grid application
- Traction
- US market
- Suitable for new installations and retrofits
- Interchangeable DIN and EN flange

Technical features at a glance:

Material	All the external part are resistant to transformer oils, salt fog and UV rays – Treated aluminum and stainless steel		
Four types of installation environment	Indoor/Outdoor/Tropical proof Offshore	Corrosion class: C5-Medium Corrosion class: CX	Grey Coating RAL 7035 (on request)
Ambient temperature	From -40 °C to 80 °C (from -40 °F to 176 °F)		
Degree of protection	IP55 according to EN 60529		
Degree of protection of terminal box	IP65 according to EN 60529		
Desiccant	Colorless, non-poisonous Silicagel; amount according model		
Ventilation valve	To prevent the formation of condensation		
Cable glands	3 x M25x1.5		
Functional test	Standard		
Rated Voltage – Power supply	From 115 to 230 V ac/dc ± 10% 50/60 Hz		
Overvoltage protection	Standard (replaceable varistor and fuse)		
Heating element protection	Standard (replaceable fuse)		
Redundancy	Double feedback signal - Load cell and Humidity sensor for M & L type		
Display	User-friendly – Quick access menu		
Current consumption	In-rush current < 10 A – Maximum current during regeneration < 3 A		
Recommended wires	Power supply: 14 AWG Relays: 18 AWG Analog outputs: 2 x 18 AWG (shielded twisted cable) Digital outputs: - Modbus RTU - 2 x 18 AWG shielded twisted cable - Modbus TCP/IP - Category 5e straight cable		
Analog outputs	2 x 4 – 20 mA		
Digital outputs	Modbus RTU – Modbus TCP/IP – Data logger		
Flange type	DIN & EN flange		

Selection matrix:

eSDB	XS Condition based				S Condition based			M Condition based				L Condition based						
	Application	OLTC	Peterson coil	Cable boxes	Traction	Condition based	Phase shifting <40 MVA	Shunt reactors <40 MVA	Network ≥40 MVA ≤200 MVA	Phase shifting ≥40 MVA ≤200 MVA	Shunt reactors ≥40 MVA ≤200 MVA	Step up ≥40 MVA ≤200 MVA	Generator and network >200 MVA	Phase shifting >200 MVA	Shunt reactors >200 MVA	HVDC	Furnace	Cavern
Quantity of oil	≤40t				≤40t			> 40t ≤ 80t				<100t						

Buchholz relays for smart transformers

Leakage current, arcing, flashovers, loss of insulating liquid, or excessively high flow rates can generate gas inside the transformer oil and affect the transformer performance.

Assure reliable and safe operation of the transformer and a power supply network.

Choose our Buchholz relay type eBR, an evolution of our conventional Buchholz relays. It continuously monitors gas accumulation and oil flow to the conservator from the remote. You will get a reliable product designed to discharge the accumulated gas and detect unexpected oil flow speed and avoid transformer shut down.

The Buchholz relay is equipped with a digital interface for easy connection to smart grid applications and can be integrated into a system through a central control unit. It is compatible with our complete eDevice family, can be connected also to third-party devices, and be part of our modular monitoring ecosystem for transformer diagnostics – MeDICA.



eBR

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

- Continuous online monitoring at any time and from the remote
- Proven technology designed to identify the trip cause immediately enabling the end-user informed decision making
- Compatibility with other eDevices, and third-party accessories enables the end-user a controlled and gradual digitalization of the transformer and remote asset health monitoring

Application:

- Smart grid applications
- Liquid-filled transformers with or without rubber bag
- Transformer conservator
- Transformer tank
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates

Additional accessories:

- Gas sampling device GSD

Technical features at a glance:

Standard	IEC 60076-22-1, IEEE Std C57.12.10-2017
Corrosion class	C4, C5M, CX (Upn request)
Housing and upper part incl. terminal box material	Alluminum casting, RAL 7032, powder coated, Offshore model on request (surface treatment, not painted)
Installation	Indoors and outdoors, tropical proof
Nominal pipe diameter	DN80
Inspection glass	Tempered glass with UV filter
Oil temperature	From -40 °C to +115 °C
Ambient temperature	From -40 °C to +80 °C Arctic version on demand
Switches	Up to 4
Max. nominal current	2A
Min. switching current	10mA/24 V dc
Rated insulation voltage	2.5 kV ac 1 min between contacts and earth, 1.0 kV ac 1 min between open contacts
Insulation resistance	1000 MΩ/500 V dc
Flap triggering oil flow	from 1.0 m/s to 23.0 m/s (each ±15%)
Cable gland	2 M25 x 1.5
Degree of protection	IP65 in accordance with EN60529 (IP66 available upon request)
Rated voltage	24 V dc ±10% polarized
Current consumption	Max 0.5 W
Analog output	4-20 mA
Digital output	MODBUS RTU

Pressure relief devices for smart transformers

Pressure in the transformer is one of the key health parameters that predict early signs of decreased performance or an upcoming failure. Overpressure in the transformer tank can lead to an explosion and hot oil spill in the surrounding environment.

Choose our pressure relief device for smart transformers type ePRD type e170SC, an evolution of our conventional pressure relief devices, to continuously monitor and keep the pressure in the transformer under control. It can discharge the overpressure to the exterior in milliseconds and reduce the risk of tank rupture.

The device is equipped with a digital interface for easy connection to smart grid applications and can be integrated into a system through a central control unit. It is compatible with our complete eDevice family, can be connected also to third-party devices, and be part of our modular monitoring ecosystem for transformer diagnostics – MeDICA.



e170SC

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

- A proven technology with robust design
- Wide pressure range settings allow the adaptation to the volume of the oil in your transformer
- Continuous online monitoring enables the end-users to adopt a condition-based maintenance approach and driving asset health management remotely
- Visual indicator enables easy on-site control of the operating status to the transformer operators
- Bleed screw allowing the removal of air from the system, making it work more efficiently
- Spring is designed outside of the transformer's lid, which removes any moving part from the inside of the tank and allows the transformer designer to choose a simpler outline
- Easy installation
- Maintenance-free

Application:

- Smart grid applications
- Liquid-filled transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates

Technical data at a glance:

Standard	IEC 60076-22-1, IEEE Std C57.12.10-2017
Corrosion class	C4, C5M, CX (Upon request)
Housing	Aluminum alloy, RAL 7032
Installation	Indoor, outdoor and Tropical proof
Ambient temperature	From -40°C up to +80°C Solution for lower temperature available upon request
Oil-directed cover	Seawater resistant aluminum, powder coated
Gaskets	Nitrile, Viton
Visual indicator	Seawater resistant aluminum, red color and stainless-steel stem
Switches	Up to 3, Changeover
Cable gland	M25x1.5 - nickel plate brass
Degree of protection	IP65
Power supply	24 V dc ±10% polarized
Analog output	4-20 mA
Digital output	Modbus RTU Data logger

Liquid level indicators for smart transformers

Liquids like mineral and silicone oils insulate and cool a transformer. You need to monitor the level of the oil to assure reliable and safe operation of the transformer.

Choose our liquid level indicator type eOLI, an evolution of our conventional liquid level indicators, and continuously monitor from the remote any unexpected or accidental oil leakages that may lead to a transformer failure. The operator can monitor the preset values remotely or visualize the values on-site at men-height through the easy-to-read eViewer dial installed on the transformer wall and decide on the best transformer maintenance schedule.

The indicator is equipped with a digital interface for easy connection to smart grid applications and can be integrated into a system through a central control unit. It is compatible with our complete eDevice family, can be connected also to third-party devices, and be part of our modular monitoring ecosystem for transformer diagnostics – MeDICA.



eOLI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

- Continuous online monitoring at any time and from the remote
- Proven technology enabling the end-user informed decision making about effective transformer maintenance schedule
- Customizable mounting flange suitable for all transformer designs
- Adjustable value settings for alarms and switches
- Compatibility with other eDevices, and third-party accessories enables the end-user a controlled and gradual digitalization of the transformer and remote asset health monitoring
- Easy installation
- Maintenance free

Application:

- Smart grid applications
- Liquid-filled transformers with or without conservator
- Conservator with rubber bag
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates



eViewer

Additional accessories:

- eViewer enabling accurate liquid level reading at men-height on-site

Technical data at a glance:

Standard	IEC 60076-22-1, IEEE Std C57.12.10-2017
Corrosion class	C4, C5M, CX (Upon request)
Housing	Aluminum alloy, RAL 7032
Installation	Indoors and outdoors, tropical proof
Lens	Polycarbonate or tempered glass
Flange	Aluminum alloy
Flange design	eOLI-22: COMEM design with 8 holes eOLI: compatible with all transformer designs
Dial	Numbers and letters are directly printed on aluminum plate, customizable range (MIN +20 °C MAX, other available)
Adjustable switches	Yes
Ventilation valve	Yes
Float movement	radial, axial, axial for rubber bag
Oil temperature	From -40 °C to +120 °C
Ambient temperature	From -40°C to +80 °C
Cable gland	3; M25x1.5
Degree of protection	IP66
Power Supply	24 V dc ±10% polarized
Analog output	4-20 mA
Digital output	MODBUS RTU
Dial at men height (eViewer)	Upon request

Contactless ultrasonic liquid level indicator for smart transformers

Liquids like mineral and silicone oils insulate and cool a transformer. You need to monitor the level of the oil to assure reliable and safe operation of the transformer.

Choose our contactless ultrasonic sensor based liquid level indicator type CU eOLI and get continuous high accuracy measurement of liquid level in transformer with or without rubber bag.

The monitors the preset values remotely or choose to visualize the values on-site at men-height through the easy-to-read eViewer dial installed on the transformer wall and decide on the best transformer maintenance schedule.

The indicator is equipped with a digital interface for easy connection to smart grid applications and can be integrated into a system through a central control unit. It is compatible with our complete eDevice family, can be connected also to third-party devices, and be part of our modular monitoring ecosystem for transformer diagnostics – MeDICA.



CU eOLI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

- Continuous online monitoring enables the end-users to adopt condition-based maintenance approach and driving asset health management remotely
- High accuracy measurement of liquid level values enabling the end-user informed decision making about effective transformer maintenance schedule
- No moving parts are immersed in the insulation liquid limiting to minimum any risk of oil contamination with loose particles caused by aging of the materials
- Customizable mounting flange suitable for all transformer designs
- Adjustable value settings for alarms and switches
- Compatibility with other eDevices, and third-party accessories enables the end-user a controlled and gradual digitalization of the transformer and remote asset health monitoring
- Easy installation
- Maintenance free



eViewer

Application:

- Smart grid applications
- Liquid-filled transformers with or without rubber bag
- Transformer conservator
- Transformer tank
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates

Additional accessories:

- eViewer enabling accurate liquid level reading at men-height on-site

Technical data at a glance:

Standard	IEEE Std C57.12.10-2017
Corrosion class	C4, C5M, CX (Upon request)
Sensor technology	Ultrasonic
Housing	Aluminum Alloy, RAL 7032
Installation	Indoors and outdoors, tropical proof
Flange	Alluminum alloy
Measurement range for CUeOLI100	120 - 1,000 mm
Power supply	24 V dc \pm 10%
Analog output	4-20 mA (MAX Load 450 Ω)
Digital output	Modbus RTU
Relay	1X programmable changeover relay
Accuracy	0,5% FS
Repeatability	0,5% FS
Power consumption	<200mA @ 24 V dc
Operating/storage temperature	from -25°C up to +70°C
Temperature autocompensation	Yes
Fdegree of protection	IP65
Cable gland	2; M25x1,5
Flange design	DN65
eViewer - additional dial at men height	Enables liquid level value check on site; Power supply 24 V dc

Temperature indicators for smart transformers

Winding and liquid temperature are key health parameters in the transformer. You need to monitor and control the temperature variations to assure reliable and safe transformer operation.

Choose one of our liquid and winding temperature indicators type eOTI/ eWTI, an evolution of our conventional temperature indicators, and continuously monitor the liquid & winding temperature. It will allow you to keep any unexpected temperature rise that may lead to a transformer failure under control. Our accessories fit all transformer designs. Personalize the value settings for alarms and switches to fit your specific needs. The operator can monitor the preset values remotely or check the values on-site through the easy-to-read dial and decide on the best transformer maintenance schedule.

The indicators are equipped with a digital interface for easy connection to smart grid applications and can be integrated into a system through a central control unit. They are compatible with our complete eDevice family, can be connected also to third-party devices, and be part of our modular monitoring ecosystem for transformer diagnostics – MeDICA.



eOTI/eWTI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

- Proven technology with robust design
- Continuous online monitoring enables the end-users to adopt a condition-based maintenance approach and driving asset health management remotely
- Visual indicator enables easy on-site control of the operating status to the transformer operators
- Accurate and stable measurement based on proven and reliable Bourdon working principle
- Customizable mounting flange to fit all transformer designs
- Adjustable value settings for alarms and switches
- Easy installation
- Maintenance-free

Application:

- Smart grid applications
- Liquid-filled transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates

Technical data at a glance:

Standard	IEC 60076-22-1, IEEE Std C57.12.00-2015, IEEE Std C57.12.10-2017
Corrosion class	C4, C5M, CX (Upon request)
Housing	All the external parts are resistant to oils, salt fog and UV rays
Installation	Indoor, outdoor and Tropical proof
Capillary and bulb	Capillary tube: copper or stainless steel Bulb: bronze or stainless steel
Capillary tube protection	Copper tube Flexible AISI 304 stainless steel armoring or Rilsan
Lens	Polycarbonate, multistrata glass or tempered glass
Ambient temperature	From -40°C up to +70°C
Degree of protection	IP66
Ventilation valve	2; to prevent the formation of condensation
Cable gland	Up to 3; M25x1.5
Micro switches	Up to 4
Supply voltage	24 V dc \pm 10% polarized
Power consumption	0,5 W
Measuring range	ATI/eATI: 0°C / +120°C AWTI/eAWTI/ATlw: 0°C / +180°C
measuring tolerance	1.5% of full scale
Accuracy switch	1.5% of full scale
Analog output	4-20 mA
Digital output	Modbus RTU Data logger

Integrated safety devices for smart transformers

Keep constant control over four key health parameters in your hermetically sealed transformer: pressure, temperature, oil level, and gassing with just one compact device. Choose our integrated safety detector type eRIS2, an evolution of our conventional Integrated Safety device. It integrates the functions performed by different accessories into one, saves space, and assures reliable and safe operation of the transformer. Furthermore, it continuously monitors temperature and pressure from remote and allows you to control pressure variations in the fins of your hermetically sealed transformer. The operator can monitor the different values on-site through the easy-to-read dials or from remote and decide on the best transformer maintenance schedule.



eRIS2

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.



Why buy:

- A proven technology with robust design
- Large installed base
- 4-in-1: four accessories combined into one compact device
- Adjustable value settings for pressure range enables the operators to set-up the device to the specific needs
- 270 Degree View for Liquid level indicator increases the flexibility for the installed position
- Easy installation and easy maintenance
- Thermal and pressure analog output for continuous remote monitoring
- Continuous monitoring of the pressure variations of the fins in the hermetically sealed transformer

Application:

- Hermetically sealed liquid-filled distribution and small power transformers
- Suitable for new installations and retrofits
- Suitable for offshore environment
- Suitable for tropical climates
- Suitable for solar power applications
- Suitable for harsh environments
- Suitable for smart transformers

Technical data at a glance:

Standard	IEC 60076-22-1
Degree of protection (CEI-EN 60529)	IP66 IP67 upon request
Degree of shock tightness (EN 50102)	IK 07
Salt-fogtight	1,000 h
UV-Ray resistance (UNI-ISO 4892 / UNI-ISO 4582)	500 h
Ambient temperature	from -40°C to +60°C
Oil temperature	from 40°C to 120°C
Cable connection	M25x1,5
Cable box (EN 60947-7-1 / IEC 947-7-1)	According to standard
Wire section to be used on clamp box	Up to 2,5 mm ²
Max. rated pressure	500 mbar
Electrical characteristics	Insulated enclosure
Thermostats precision	± 4°C accuracy tolerance of end scale
Overpressure switches precision	± 10°C accuracy tolerance of end scale
Thermometers precision	± 3°C accuracy tolerance of end scale

Analogue Output for eRIS2

Temperature	4-20 mA proportional to the measuring temperature range (0°C – 4 mA ... 160°C – 20mA)
Pressure	4-20 mA proportional to the pressure range (0 mbar – 4 mA ... 500 mbar – 20mA)*
Max distance for analogue output	Max 30 m / 98 ft. Contact us for other options (customerservice@it.comem.com)

*) -1000/+1000 mbar – 4/20 mA is available on demand

Contacts interruption power

	Voltage	Making capacity	Breaking capacity	
Liquid level / gas bleed	24 V dc to 230 V dc	2A	100 m/a	L/R < 40 ms
Pressure switch	24 V ac to 230 V ac	2A	2A	cos Φ > 0,5

Temperature monitoring unit for remote control of dry-type transformers

Choose our temperature monitoring unit type eDTI, a digital version of the conventional unit, which enables continuous monitoring from remote of the transformer temperature and programming of the alarm set-up of the unit in use remotely from your computer through Modbus RTU protocol. Furthermore, the dedicated software allows you to collect information from up to 247 monitoring units at the same time.



eDTI

Our products are designed to be compatible with many different transformer brands and are interchangeable with equivalent models of third party manufacturers.

Contact us and get support with the product selection.

Why buy:

- Continuous online monitoring enables the end-users to adopt condition-based maintenance approach and driving asset health management remotely
- Fast temperature variation diagnostics enables informed decision making
- Two programmable signaling levels (Alarm – Trip)
- Control of cooling fan system
- Power supply: 24/230 V dc/ac $\pm 15\%$ 50-60 Hz

Application:

- Dry-type transformers
- Electric motors



Technical data at a glance:

Auxiliary power supply	24/230 V ac/dc $\pm 15\%$ 50-60 Hz
Maximum absorption	4 VA
Measure inputs	3 - 4 inputs by RTD PT100 (max wire resistance 20 Ohm)
Interval of measure	-30 °C / +220 °C / precision $\pm 2^\circ\text{C}$
Interval of visualization	-30 °C / +220 °C
Tripped delay-hysteresis	5 seconds and -2 °C
Measure visualization	2 displays with led 7 segments, 3-digit
Outputs	4 relay NO_C_NC (250 V 5 A resistive load), 0-20 mA or 4-20 mA (Default); Modbus RTU
Output functions	Alarm, trip, fan, auto-diagnostic
Programmable functions	ALARM, TRIP, HOLD, FAN, T.MAX., HOT, FDC
Connection	Extractible terminal with screws, section wires max 2.5 mm ²
Insulation	2500 Vrms 50 Hz per 60 s: U aux - input PT100 / U aux - relay outputs / inputs PT100 - relay outputs
Protection degree	IP52 front panel, IP20 rear panel, compliant with CEI-EN 60529
Dimensions - enclosure	Flash mounting DIN 96x96 mm, depth 120 mm/ Enclosure thermoplastic self-extinguishing as UL94 VO
Working environment	From -10 °C to + 60 °C, humidity max 95%
Storing temperature	From +25 °C to +70 °C
Management software	Contact our customerservice@it.comem.com

Service

COMEM service provides solutions and a full range of services to Transformer Manufacturers, Service organizations, and End-users.

Our skilled service team can help you guarantee the highest level of performance for your transformer. We can walk you through the entire transformer life cycle and help you increase the lifespan significantly and lower the total cost of ownership.

Contact us for pre- and after-sales support for transformer bushings and accessories, training & consulting services, digital monitoring services and solutions, and on-site transformer service, including maintenance and testing.



Pre-sales support

- Specifications' analysis
- Product identification

After-sales support

- After-sales support for transformer accessories & bushings

Spare parts

- Original spare parts deliverable within 72 hours solving any urgent request

Academy

- Tailor made trainings
- Online webinars
- Offline trainings at COMEM site or customer site

Oil analysis*

- Complete dissolved gases analysis
- Furan analysis process
- Corrosive sulfur

* in collaboration with external accredited laboratory

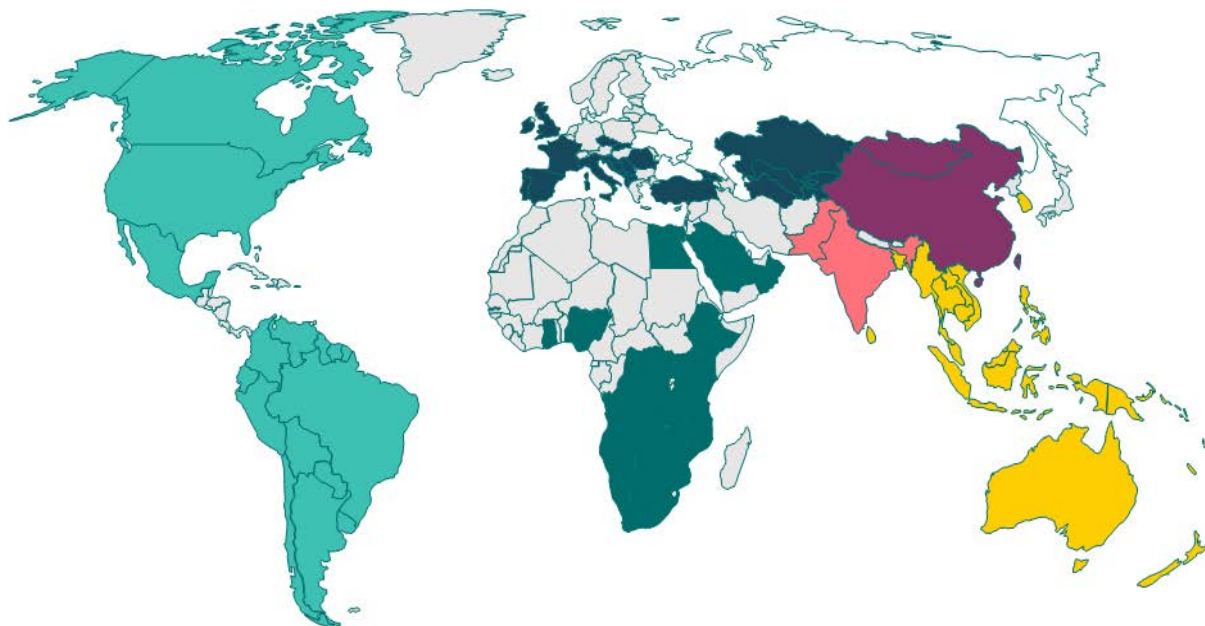
Transformer Service

- General maintenance and testing

Application:

- Distribution transformers up to 2500 kVA
 - Liquid-filled & Dry type
- Power transformers over 2500 kVA
 - Liquid-filled type





COMEM

Authorized
Partner



www.comem.com

The data and illustrations are not binding. We reserve the right to modify the contents of this document without prior notice following the technical and product developments.

Copyright 2023 COMEM. All rights reserved

Brochure-English-08-2023

COMEM SpA

Localita' Signolo 22, SR11
36054 Montebello Vicentino
Vicenza - Italy
Tel +39 0444 449 311