

TRANSFORMER SERVICE

TXpert™ Ready CoreSense™ M10 DGA analyzer

Multi-gas sensing for optimal transformer operation



01 CoreSense™ M10 installed on a transformer at CERN, the European Organization for Nuclear Research in Switzerland

Continuous online monitoring

CoreSense™ M10 provides real-time, continuous, online monitoring of gas and moisture levels in transformer oil. The CoreSense M10 is a TXpert ready analyzer that connects seamlessly with the CoreTec 4 TXpert Hub and the LUMADA APM Edge asset performance management system. It Measures nine gases: hydrogen, methane, acetylene, ethylene, ethane, carbon monoxide, carbon dioxide, propane and propene. Dissolved gas readings can be used to provide early identification and warnings for most transformer faults; whereas moisture monitoring can prevent premature aging. Early identification and detection of such incipient faults allow you to take preemptive measures, when needed.

Easy installation

Thanks to its thermal element that induces convection currents, CoreSense™ M10 can be connected to new or existing transformers of all types and brands, at most locations including the drain valve. CoreSense™ M10 shares the same transformer interface as the CoreSense™ single gas sensor. This enables easy interchangeability between the two devices, which useful to optimize the operation of a sick transformer by replacing a CoreSense™ with a CoreSense™ M10.

Fast response with continuous sampling

Oil is being sampled continuously with readouts every 10 minutes resulting in the fastest response times in the industry. A gas increase in a transformer can be detected in as little as 10 minutes and accurately quantified in under 2 hours.

Reliable design

CoreSense™ M10 is designed for at least 10 years of maintenance free operation with no consumables. Thanks to its

Gases in transformer oil serve as chemical indicators of potential transformer problems that can result in interrupted operations and unplanned expenditures. Monitoring dissolved gas levels with CoreSense™ M10 is the most effective condition-based maintenance tool to mitigate these risks. It ensures reliable transformer operation and optimized maintenance planning.

innovative Fourier Transform Infrared spectrometer (FTIR) and industrial grade design, the CoreSense™ M10 provides the lowest total cost of ownership in the industry. It has an expected usable lifetime of 20 years and a 10 year preventive maintenance requirement. The CoreSense™ M10:

- will not drift over time and does not require any carrier or calibration gases,
- reduces risks of oil leaks with a simple pump-less oil circuit limited to the measuring head,
- has reduced maintenance with built-in redundancies,
- can survive in harsh and corrosive outdoor conditions
- can withstand vacuum and operate under one meter (3 feet) of water thanks to its IP67 rated enclosure.

Simple interface

- Whether looking at the LED alarms on the device, the built-in touch screen display or at the intuitive web interface, the message will be concise and simple to read,
- WARNING and ALARM settings are user-configurable for all gases and moisture levels,
- Collected data is available for download in .csv format.

TXpert ecosystem integration

As part of the TXpert ecosystem CoreSense M10 will work in synergy with the TXpert hub to provide integration of simple analog sensors and advanced analytics, including:

- Trend analysis
- Advanced diagnostics including Duval triangles
- Correlation of gas to load and temperature data
- Hot spot and aging calculations
- Insulation moisture modeling

CoreSense M10 integrates with Lumada APM to provide complete end to end monitoring solutions.

Gases		
Hydrogen (H ₂)		25 to 5,000 ppm (μl/l) ±25 ppm or ±20 % (whichever is higher) 5 to 5,000 ppm (μl/l) high performance version available as an option
Carbon monoxide (CO)		2 to 5,000 ppm (μl/l) ±2 ppm or ±5 % (whichever is higher)
Carbon dioxide (CO ₂)		5 to 20,000 ppm (μl/l) ±5 ppm or ±5 % (whichever is higher)
Methane (CH ₄)		1 to 10,000 ppm (μl/l) ±1 ppm or ±5 % (whichever is higher)
Acetylene (C ₂ H ₂)*		0.5 to 10,000 ppm (μl/l) ±0.5 ppm or ±5 % (whichever is higher)
Ethylene (C ₂ H ₄)		2 to 10,000 ppm (μl/l) ±2 ppm or ±5 % (whichever is higher)
Ethane (C ₂ H ₆)		2 to 10,000 ppm (μl/l) ±2 ppm or ±5 % (whichever is higher)
Propene (C ₃ H ₆)		10 to 10,000 ppm (μl/l) ±10 ppm or ±5 % (whichever is higher)
Propane (C ₃ H ₈)		10 to 10,000 ppm (μl/l) ±10 ppm or ±5 % (whichever is higher)
Moisture		
Moisture measurement range		0 to 1 aw (0 to 100% RH)
Moisture measurement accuracy		± 0.02 aw (± 2% RH)
Moisture range in ppm		Range in mineral oil (ppm): 0 to 60 @ 25 °C (77 °F) or 0 to 190 @ 55 °C (131 °F) ±3% Range in Synthetic Ester: 0 to 2220 @ 25 °C (77 °F) or 0 to 3490 @ 55 °C (131 °F) ±3% Range in Natural Ester: 0 to 1010 @ 25 °C (77 °F) or 0 to 1780 @ 55 °C (131 °F) ±3% Range in Silicon: 0 to 300 @ 25 °C (77 °F) or 0 to 590 @ 55 °C (131 °F) ±3%
Moisture measurement accuracy in ppm		± 3%
Temperature measurement accuracy		-40 to +120 ± 0.2 °C (-40 to +248 ± 0.4 °F)
Mechanical specifications		
Sensor head	Dimensions, Weight	392 x 264 x 158 mm (14.43 x 10.39 x 6.2 in), 8 kg (17.6 lbs)
	Interface to transformer	1.5 NPT male thread
	Enclosure	IP67/NEMA4X/C4
Analytical unit	Dimensions, Weight	685 x 863 x 292 mm (27 x 34 x 11.5 in), 65 kg (143.3 lbs)
	Enclosure	IP66/NEMA4X/C4
Electrical specifications		
Voltage input		100–240 V AC single phase (50 to 60 Hz) (mains supply voltage fluctuations not to exceed 10% of nominal supply voltage)
Power consumption		600 VA
Communications specifications		
Ultrabright easy to read LED		Four color-coded LED system to indicate status
Color touch screen		Integrated color touch screen provides gas concentrations in the field
Digital interfaces		RS485 serial port 2 RJ45 100 base-T Ethernet ports 100 base-FX fiber optic Ethernet port USB port 2 digital inputs 0-24V
Protocols		Modbus RTU over RS485 and Modbus TCP over Ethernet DNP3 over RS485 and Ethernet IEC61850 over Ethernet
Analog interfaces		4 dry-contact relays for alarms 8 analog 4-20 mA outputs for publishing values 4 analog 4-20 mA inputs for reading external sensors
Environmental specifications		
Operating ambient temperature and humidity		-50 °C to 55 °C (-58 °F to 131 °F) with 5 to 95 % RH, non-condensing Cold start minimum temperature -40C
Oil temperature at valve		-20 °C to 120 °C (-4 °F to 248 °F)
Oil pressure at valve		0 to 1,000 kPA / 0 to 10 bar / 0 to 145 psi

* Acetylene (C₂H₂) for Mineral oils, synthetic esters and silicon fluids 0.5 to 10,000 ppm (μl/l) ±0.5 ppm or ±5 % (whichever is higher)

Acetylene (C₂H₂) for Natural ester (FR3) 0.5 to 200 ppm (μl/l) ±0.5 ppm or ±5 % (whichever is higher) 200 to 10,000 ppm (μl/l) ±0.5 ppm or ±30 % (whichever is higher)