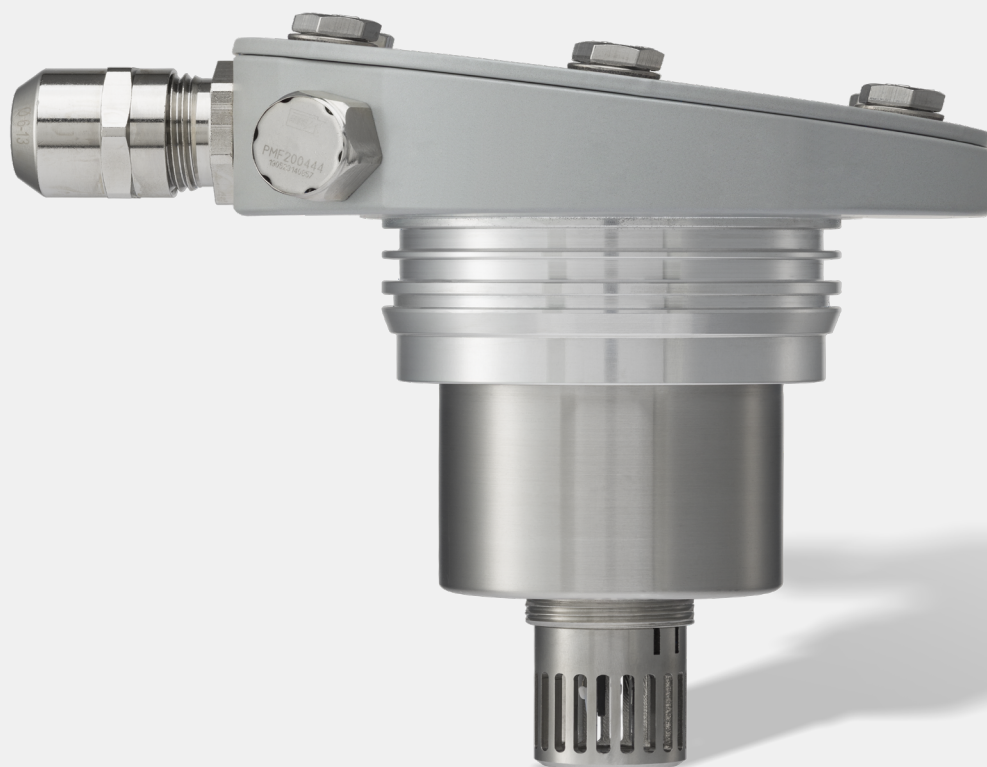




Monitoring of oil moisture and breakdown voltage of vacuum on-load tap-changers – TFMR sensor

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Who will send me a timely warning in the case of insulation problems?

Why a TFMR sensor for tap changers?

In the CIGRÉ A2.37 Transformer reliability study from 2015, faults and their origin were statistically investigated in transformers worldwide. For transformers > 100 kV, approx. 27 % can be traced back to the on-load tap-changer. Therefore, in addition to the winding and the bushings, special attention must be paid to this component. The on-load tap-changer is a complex mechanical system and the only moving part in the transformer. In combination with an insulating liquid, which provides both electrical insulation and cooling, the „tap changer“ system is indispensable for a constant power supply in the power grid. In order to ensure consistent functionality and a long lifetime, in addition to a robust design principle and the use of high-quality materials, the monitoring of important parameters is recommended.

In addition to temperature, the humidity and breakdown voltage of the insulating oil are essential parameters for assessing the condition of the insulating medium and thus also serve to assess the condition of the tap changer. Too much moisture in the insulating oil impairs its insulating strength, i.e. the dielectric voltage decreases. Furthermore, water promotes degradation reactions of the insulating oil, and this also reduces the insulating strength. The TFMR sensor for the vacuum on-load tap-changer, in combination with ETOS®, offers you a solid and cost-effective way to continuously monitor these important condition parameters.

How does the TFMR sensor work?

A capacitive sensor and a PT1000 sensor are used to determine the relative humidity of the insulating oil and the oil temperature. A second PT100 sensor, galvanically isolated, can be used for locking functions of the tap changer. The breakdown voltage is mainly influenced by the relative humidity in the oil and is calculated using an AI-based model approach. With the help of oil-specific parameters stored in the software, the absolute humidity in ppm (mg/kg) can also be calculated (cf. CIGRÉ TB 741, Moisture Measurement and Assessment in Transformer Insulation – Evaluation of chemical methods and moisture capacitive sensors). The breakdown voltage is displayed by means of a traffic light display in classes based on DIN EN / IEC 60422.

The sensor can be used in mineral oil-based insulating oils as well as in synthetic and natural ester oils.

Your benefits

- Continuous monitoring of oil temperature and oil moisture (both relative and absolute)
- In combination with ETOS®, continuous monitoring of breakdown voltage
- A second PT100 sensor for temperature interlock functions and arctic operation
- Reduction of regular, manual oil sampling
- Customer-specific parameterization of limit values
- Together with MSENSE® VAM, warranty extension for the vacuum on-load tap-changer to 5 years
- Integration with ETOS®, the expert at your side for data analysis, evaluation, and recommendations for action
- We are there when you need us – global service network MR with 24/7 availability
- Personal support from your local contact person in MR Sales



Contact: sales@reinhausen.com