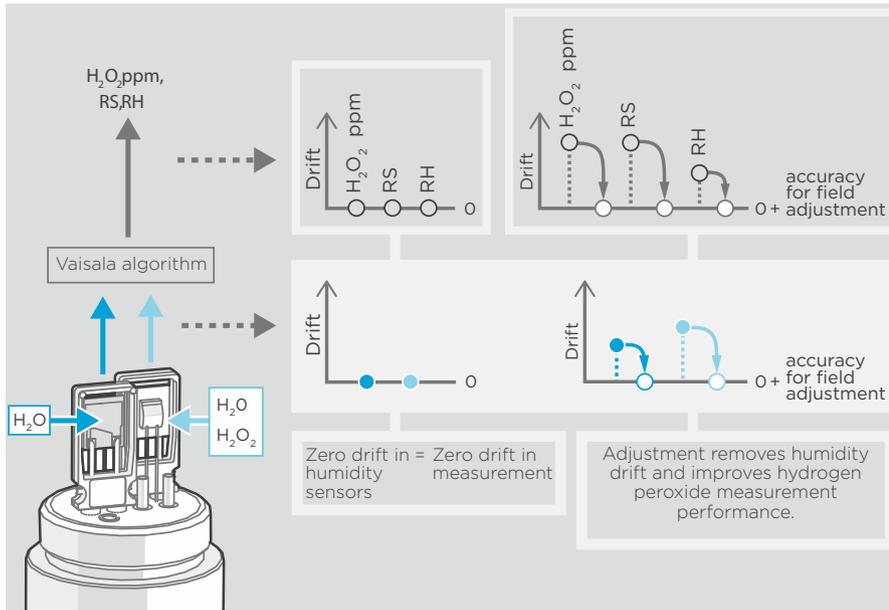


Vaisala PEROXCAP® Sensor Calibration



Vaisala algorithm transforms humidity sensor observations into measurement readings. This means that calibrating and adjusting the humidity sensors removes the drift from the measurement readings.

PEROXCAP® Sensor for Vaporized Hydrogen Peroxide ppm Measurement

PEROXCAP® sensor technology works using measurements from two HUMICAP® sensors. HUMICAP sensors guarantee quality and reliability, with their reputation for repeatability, accuracy, excellent long-term stability, and negligible hysteresis – even in the most demanding high-concentration H₂O₂ and high humidity applications in atmospheric pressure.

HUMICAP sensor is a thin-film polymer sensor consisting of a substrate on which a thin polymer film is deposited between two

electrodes. The film absorbs or releases vapor according to humidity changes in the environment. As the humidity changes, the dielectric properties of the polymer film change, and so does the capacitance of the sensor. The instrument's electronics measure the capacitance of the sensor and convert it into a humidity reading.

PEROXCAP measurement uses two composite HUMICAP sensors, one with a catalytic protection layer and one without. The catalytic protection layer catalyzes H₂O₂ from the vapor mixture. Therefore, the HUMICAP sensor with this layer only senses water vapor, providing a measurement of partial water pressure, i.e. relative humidity (RH).

The sensor without the catalytic layer senses both hydrogen peroxide vapor and water vapor in the air mixture. The difference between the readings from these two sensors indicates the vapor concentration of H₂O₂.

Why Is Calibration Important?

Anything that is worth measuring is worth measuring right. All electronics and sensors are subject to drift over time. Vaisala HPP270 product family provides the highest accuracy and precision for several types of process applications where vaporized hydrogen peroxide is used. But even the highest performing measurement instruments drift over time. A humidity sensor must measure the ambient condition – it cannot be hermetic like a temperature sensor. Gases and vapors in the environment may interact with the humidity sensor. Drift can be caused by dirt and chemicals in the ambient air or simply by temperature changes. Regular calibration protects against incremental sensor drift and verifies that units are operating within the given specifications.

Measurement accuracy directly affects process performance and life cycle costs of your measurement equipment. In order to keep your process performance valid, your measurement equipment needs to be calibrated regularly. Calibration is recommended in order to maintain accuracy and to avoid sensor drift over an extended period of time.

Traceable H₂O₂ Calibration at Vaisala

Choosing the right calibration laboratory and service supplier can be as important for lifetime accuracy and reliability as the initial selection of the instrument. Our high-performance calibration laboratories were established in 1958, and we are continually improving our technology, facilities, and capabilities to provide the high quality services you expect from Vaisala.

At Vaisala, both of the HPP270 series probes are adjusted in relative humidity and H₂O₂ vapor and calibrated in H₂O₂. Additionally, the HPP272 is calibrated also in relative humidity. At the factory, the humidity calibration for the HPP272 is done using three different relative humidity points. The H₂O₂ vapor calibration for the HPP270 series is done using two H₂O₂ concentrations. The temperature as well as the other parameters are calibrated at room temperature.

Vaisala Service Center calibrations are traceable to SI-units and include adjustment to meet the instrument specification. The calibrations are done following the ISO 9001 and ISO 10012 quality standards and recommended especially to fulfill your regulatory requirements. We can also offer full maintenance as an option. Calibration certificates are issued with calibrations. This ensures the best accuracy for your measurement.

PEROXCAP Sensor Can Be Calibrated On-site Using RH Calibrator

Both of the HPP270 series probes can be calibrated and adjusted on-site either in H₂O₂ environment or by using an RH calibrator. H₂O₂ is a strongly absorbent, unstable compound that easily decomposes to form oxygen and water. Thus, the concentration of H₂O₂ is constantly changing. This makes it difficult to prepare and perform an on-site calibration with H₂O₂.

However, as the Vaisala PEROXCAP sensor comprises two HUMICAP humidity sensors, it can be calibrated using any humidity calibrator, like Vaisala HMK15 Humidity Calibrator. The most convenient way to make the calibration and adjustment is to use the Vaisala Insight PC Software. The software shows you the drift in both Relative Saturation (RS) and Relative Humidity (RH) and gives you the possibility to make two-point adjustment to these parameters in order to show the same value as the reference value. Based on the humidity calibration, the software also calculates H₂O₂ ppm error at a certain ppm level. H₂O₂ measurement performance improves at the same time when humidity is adjusted.

For more information about Vaisala PEROXCAP calibration or the offering to measure vaporized hydrogen peroxide, humidity and temperature, please go to www.vaisala.com/PEROXCAP.

Calibration Terminology

- **Calibration** – comparing the output of a measurement instrument against a reference value and merely reporting the result.
- **Adjustment** – changing the output to correspond to the reference value.
- **Traceability** – a traceable measurement can be related to appropriate national or international standards through a documented, unbroken chain of comparisons.
- **Uncertainty** – a doubt that exists about the result of any measurement, calculated via three main sources: the reference used, the unit under calibration, and the calibration process used.
- **Calibration Interval** – the time between successive calibrations of an instrument.

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