

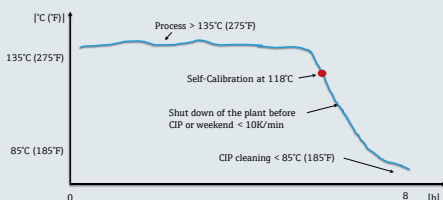
Self-calibrating RTD temperature sensor in UHT processes

Increase process safety and product quality

Benefits in UHT applications

- Maximized process safety: Higher recalibration frequency
- No production downtime: Fully automated and traceable inline self-calibration
- Easy documentation: Fully automated, audit-proof calibration certificates
- Highest measuring accuracy with sensor-transmitter matching
- International certifications and approvals: EHEDG, ASME BPE, FDA, 3-A, 1935/2004, 2023/2006, 10/2011, CE, CRN, CSA General Purpose, Explosion protection, e.g. ATEX/IECEx
- Measuring range: -40 to +190 °C (-40 to +374 °F)
- More than 50 sterile and hygienic process connections as standard

Schematic temperature curve at the sensor



Ultra-high temperature processing (UHT) is a food processing technology to sterilize liquid food products. It is commonly used in milk production.

The challenge In UHT processes the product is heated to above 135 °C to kill as many microorganisms as possible with the aim to increase the shelf life of the end-product.

This requires an optimal combination of temperature and treatment duration for every product. Accurate and reliable temperature control is crucial to avoid negative effects on the taste and product quality, making regular calibration of the installed temperature sensors necessary. Reducing shutdown time, process interference and manual documentation effort can pose a significant challenge to both small and large enterprises.

The solution iTHERM TrustSens is the first self-calibrating compact thermometer that calibrates automatically whenever the process temperature drops below 118 °C (244.4 °F) (shutdown of the plant). The device simultaneously verifies the measured process value of the primary temperature sensor (Pt100) against an integrated, traceable and long-term stable fixed-point reference. In doing so it ensures that a potentially damaged or defective temperature sensor is reliably detected before each batch. Self-calibration is performed reliably during every cooling phase after the system is shut down.

The typical UHT process cooling rate after operation is about 10 Kelvin per minute. Active cooling is mostly avoided, as this could create a strong negative pressure which would damage the system. Therefore, cold water is only injected once the temperature is below 100 °C (212 °F).



100% compliance, 0% effort

Hygienic compact RTD thermometer

The award-winning smart temperature probe with integrated HART® transmitter and Heartbeat Technology features the world's first RTD sensor unit capable of fully automated in-situ self-calibration. It effectively eliminates the risk of undetected non-conformities, reduces production downtime and increases product safety and process efficiency in applications of the food & beverage and life sciences industries. The device is fully compliant to FDA 21 CFR Part 11 regulations and GMP rules.

How it works

Regulated industries Measuring devices in the food & beverage industries are often recalibrated multiple times per year. In addition to opening the process to the risk of contamination, removing and reinstalling probes is a time consuming, costly step. These effects scale with the number of measuring points.

Intelligent TrustSens is the world's first sensor capable of self-calibration, making process disruption a thing of the past. The in-situ technology is fully traceable, cyclical and operates during the active process, minimizing the risk of undetected non-conformities.

Physical principle The sensor makes use of the Curie temperature: A physical constant at which certain materials abruptly change their magnetic properties. The Curie value can be accurately determined for each material.

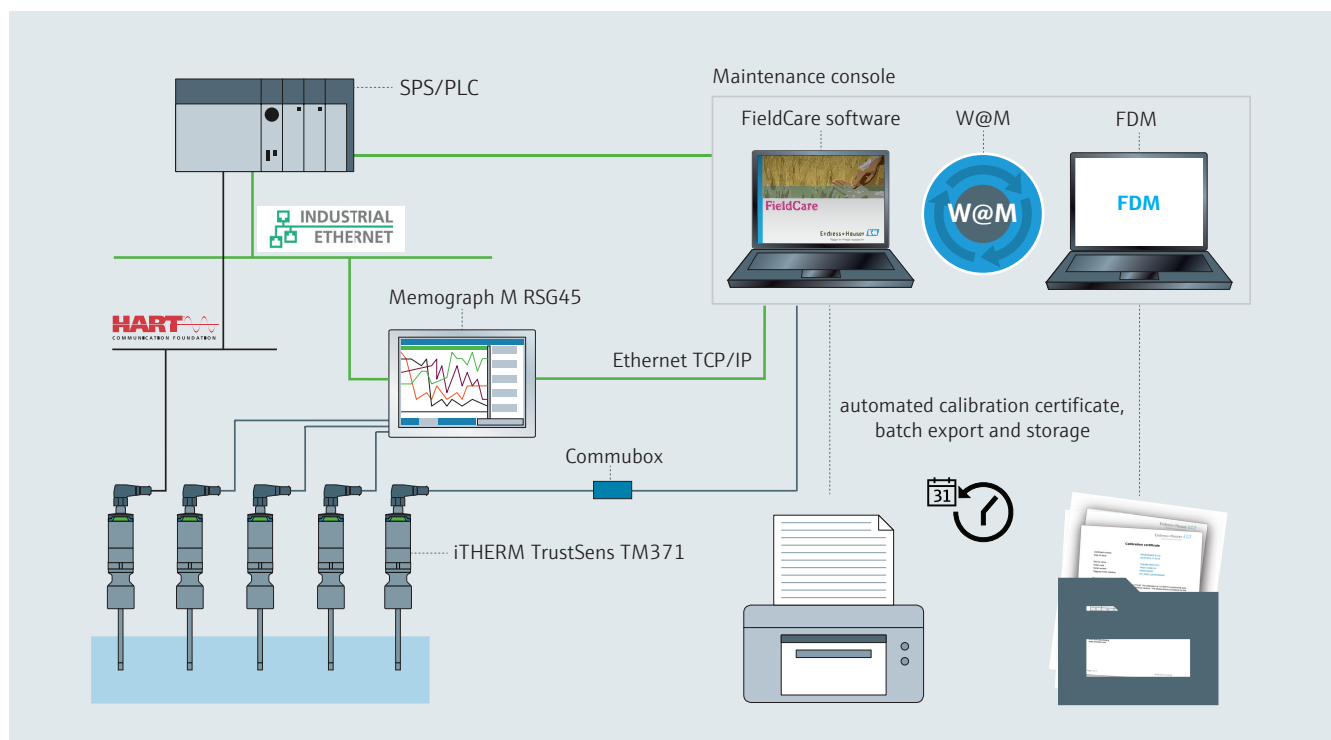
Built-in reference The primary temperature sensor automatically recalibrates itself against the integrated reference element every time the process temperature drops below 118 °C (244.4 °F).

Minimum effort Manual intervention is only necessary if the sensor reports a malfunction.

Certificate on demand Audit-proof calibration certificates can be retrieved at any time using an asset management software such as FieldCare by Endress+Hauser.

System integration The device can be integrated into new and existing systems in many different configurations to be able to react as fast as possible on drifts of the temperature sensor.

System integration





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