iTHERM TrustSens TM37x
World's first self-calibrating thermometer

Simple & affordable innovation

- Maximized process safety through self-calibration and Heartbeat Technology
- No production downtime due to fully automated and traceable inline self-calibration
- Fully automated documentation: audit-proof calibration certificates
- Highest measuring accuracy through characteristic adjustment (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

Industry applications
- Life Sciences
- Food & Beverage

Winner of the
HERMES AWARD 2018

Endress+Hauser

People for Process Automation

As if by magic

The iTHERM TrustSens temperature sensor continuously calibrates itself in the running process – a milestone for temperature measurement engineering.

How iTHERM TrustSens works

Regulated industry Measuring points in the life sciences and food & beverage industries often have to be dismantled and reassembled several times a year in order to be calibrated. This is time-consuming and costly, in particular for large plants.

Sense-it-yourself With iTHERM TrustSens this is a thing of the past: It is the first sensor that can carry out its own traceable calibration – continuously and on-line. This reduces the risk of unrecognized measuring errors down to a minimum.

Physical phenomenon The sensor takes advantage of the so-called Curie temperature: A constant value which, once attained, abruptly changes the characteristics of a material. The Curie value can be precisely determined for every material.
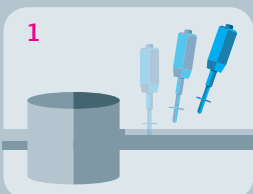
Built-in reference A special reference (master) sensor supervises the primary temperature sensor. A calibration of the primary sensor occurs each time the Curie temperature of the reference sensor falls short.
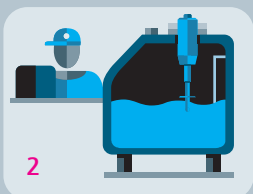
Minimal effort Human intervention is only necessary if the iTHERM TrustSens sensors report a malfunction. Calibration certificates can be provided automatically via asset management software such as Endess+Hauser's FieldCare.
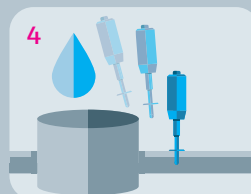
Conventional recalibration

Disassembly Depending on the industry and criticality of the measuring point, a sensor must be calibrated on a biannual to weekly basis. The process has to be stopped.

Calibration Qualified staff have to disassemble the sensor and calibrate it in a mobile block calibrator with a traceable reference (master).

Documentation Authorities and customers alike demand valid certificates. These have to be manually prepared by the calibration specialist before being filed by the customer.

Reassembly, cleaning Following the reassembly of the sensors the plant often requires sterilization. Only now can production begin again.
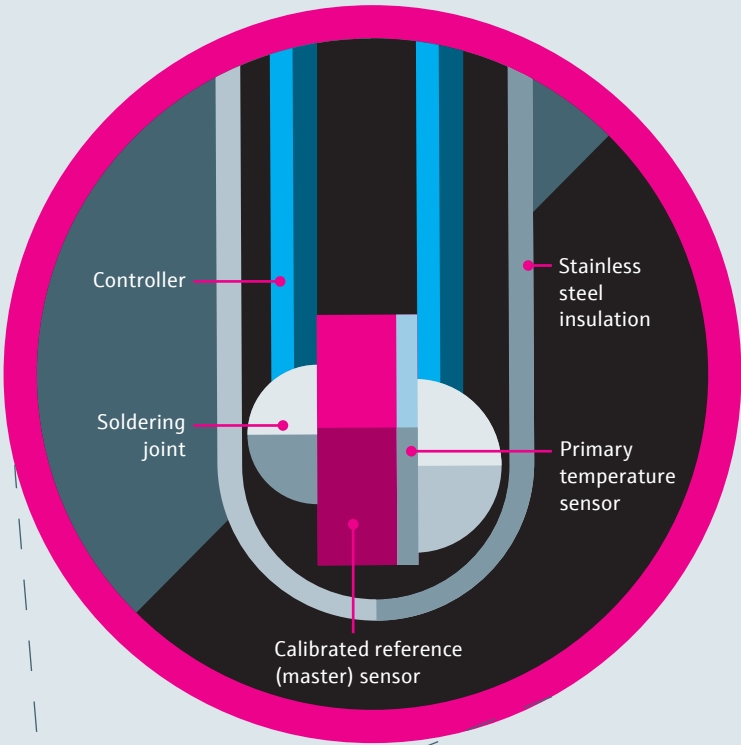
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years of research and development back up iTHERM TrustSens. The Endress+Hauser life sciences network initiated the breakthrough technology. Customers and partners from the world of science were closely involved.
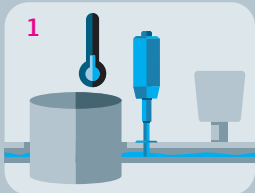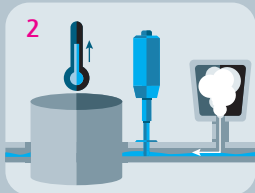
120,000

euros is the amount a plant operator can save with iTHERM TrustSens over a period of five years if 1,000 temperature sensors have to be recalibrated twice a year. By this sample calculation, the extra investment pays off after only the second calibration.
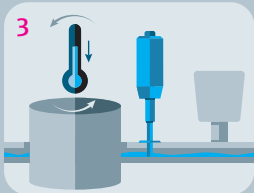
Controller

Stainless steel insulation

Soldering joint

Primary temperature sensor

Calibrated reference (master) sensor

Recalibration with TrustSens

1

Self-monitoring A special reference sensor – the master – allows for a one-point calibration of the primary temperature sensor in the ongoing process.

3

Operation The process is not interrupted; the system is not opened up. Staff need only intervene if iTHERM TrustSens reports a malfunction.

2

Reference measurement The master utilizes the Curie temperature principle. Falling short of this value – such as after cleaning with steam – initiates calibration.
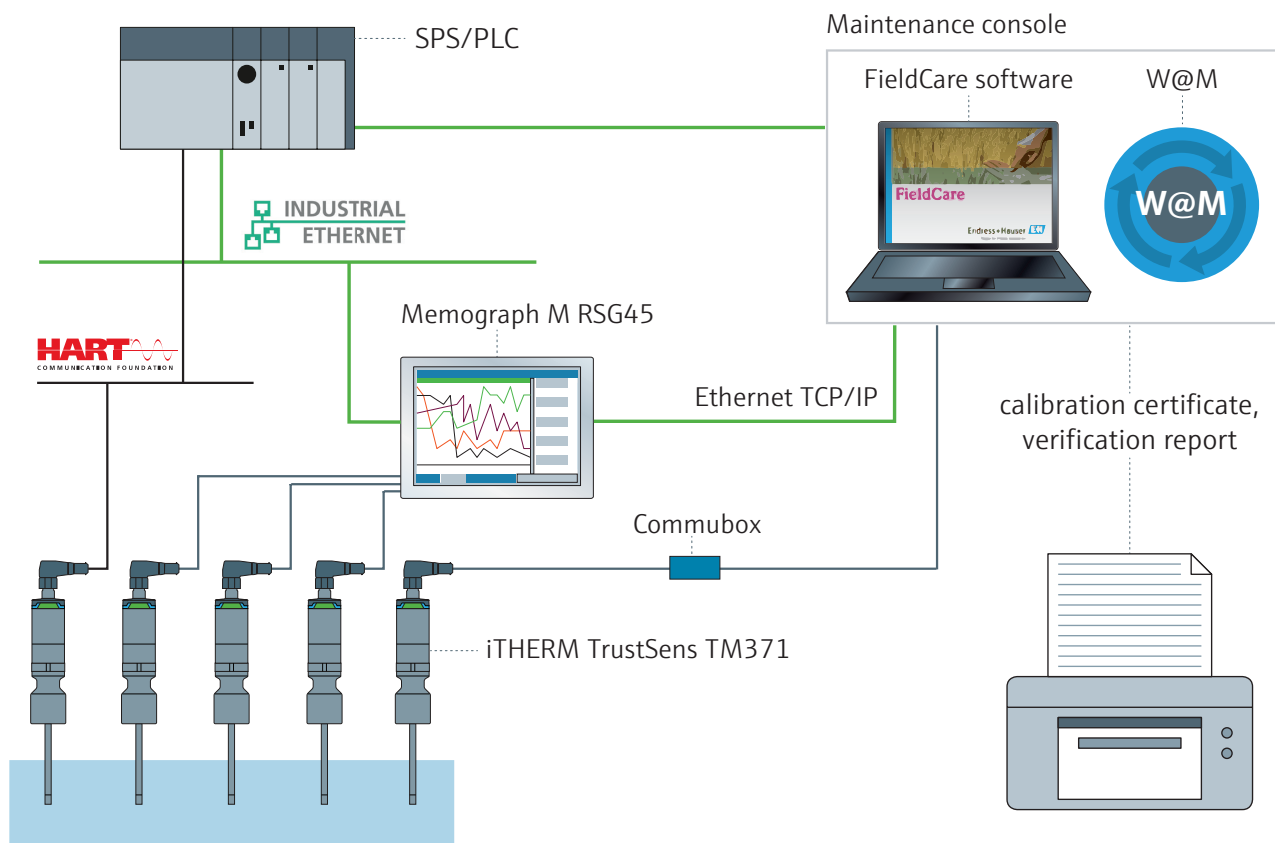
Documentation The calibration data is saved in the field device. With Endress+Hauser's FieldCare software, a valid calibration certificate is always available.

4

iTHERM TrustSens TM37x specifications

- Measuring range: −40 to 190 °C (−40 to 374 °F)
- Pressure range: up to 50 bar (725 psi)
- Protection class: IP67/68 or IP69K
- Signal output: analog 4 to 20 mA, HART

System integration

SPS/PLC

Maintenance console

FieldCare software

W@M

INDUSTRIAL ETHERNET

Memograph M RSG45

HART
COMMUNICATION FOUNDATION

Ethernet TCP/IP

calibration certificate, verification report

Commubox

iTHERM TrustSens TM371

Integrated product and service offering

System component	Feature
Data manager Memograph M RSG45	• Tamper-proof data storage, FDA 21 CFR part 11 compliant (via Field Data Manager Software) • iTHERM TrustSens calibration monitoring with time stamp (built-in real-time clock)
Display unit RIA15	• Display of 4 to 20 mA measured values or up to four HART process variables • Loop-powered; Voltage drop ≤1 V (HART ≤1.9 V) • Displays values such as: temperature, electronics temperature, calibration counter, calibration deviation
Field Data Manager Software MS20	• Archiving and real-time visualization of historical measured values, diagnostic events and protocols • Automatic service for report generation and printing, data read out, storing and export
Netilion cloud-based IIoT ecosystem	• For secure decentralized process & asset monitoring around the clock • Legally compliant documentation & reporting, including audit- andinspection-proof calibration certificates
FieldPort SWA50	• Communication via Bluetooth®/ Wireless HART®

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