Temperature and system products

for general and demanding applications in Power & Energy, Chemical and Oil & Gas

Endress+Hauser

People for Process Automation

Endress+Hauser offers innovative temperature sensors and assemblies, system products, accessories, software solutions and related services for general and demanding applications in the Oil & Gas, Power & Energy and Chemical industries. Our products and services are available globally and designed to comply with international standards and help reduce costs, increase safety and plant availability.

Temperature measurement

The all-new iTHERM ModuLine and iTHERM MultiSens range of innovative temperature assemblies delivers excellent measurement performance and flexibility. With their modular design, quick selection and configuration, digital tooling and our expert application support, the offering helps you in keeping your process up and running.
Stay ahead with innovative features, accurate and stable temperature measurement and gain valuable additional process and diagnostic information.

Temperature transmitters

The iTEMP TMT72 and TMT142B HART® 7 temperature transmitter offer high accuracy, easy commissioning, integrated Bluetooth® connectivity and provide valuable diagnostics information.

SIL 2/3 certified iTEMP TMT82 and TMT162 transmitters with full HART® 7 functionality offer highest reliability, long-term stability and safety in hazardous areas and critical processes.

The new iTEMP TMT86 is a reliable, intelligent and future proof dual-channel Ethernet-APL PROFINET temperature head transmitter for thermometers with terminal head form B and is suitable for use in hazardous areas.

System Products

The advanced data manager Memograph M RSG45 for data logging and recording offers flexible system integration, connectivity and cloud-capability for safe and intuitive handling of your process values.

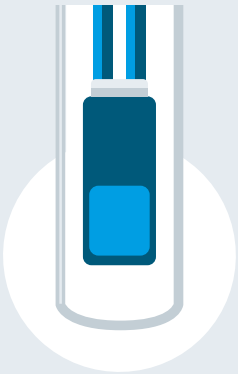
The rugged RIA15 process field indicator capable of handling 4 to 20 mA and HART® values delivers critical measurement data right where you need it.

Temperature measurement

System products

Sensor technology for thermometers

Exclus

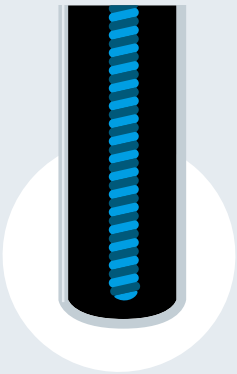


Basic thinfilm
Pt100 (RTD)

- Thinfilm sensor consisting of ceramic substrate with vapor-deposited platinum
- Sensing element and wiring in stainless steel sheath

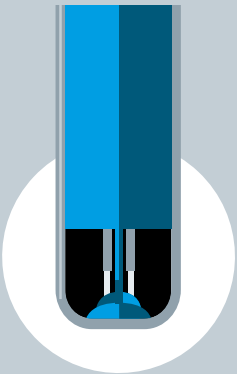
Standard thinfilm
Pt100 (RTD)

- Small sensor consisting of ceramic substrate with vapor-deposited platinum
- Embedded in mineral isolated stainless steel sheath



Wirewound
Pt100 (RTD)

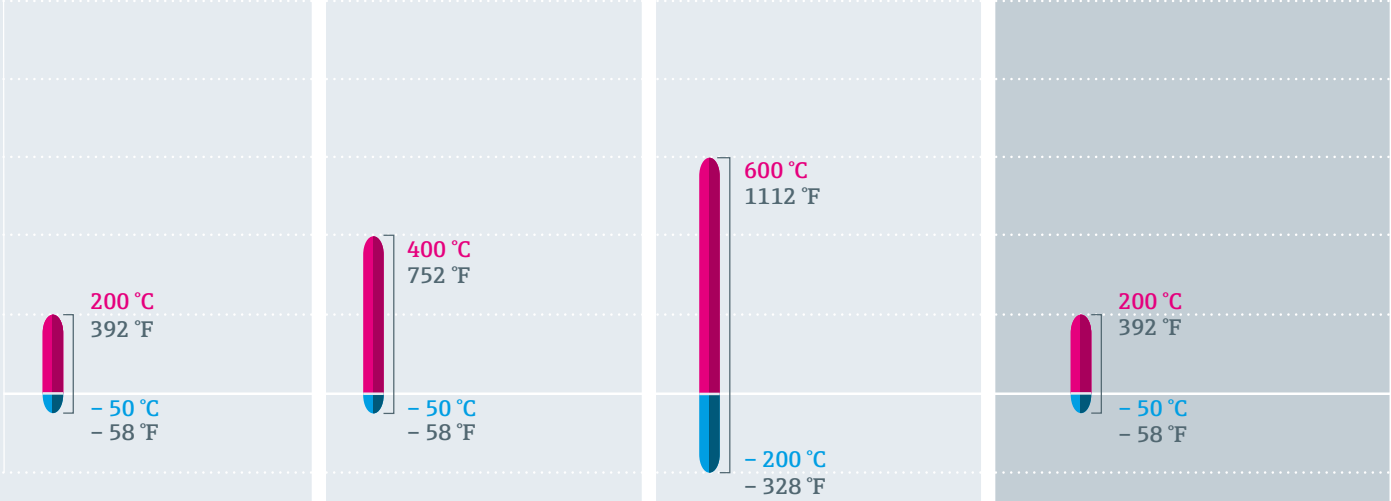
- Ultrapure platinum wire wound around a ceramic core
- Embedded in mineral isolated stainless steel sheath



iTHERM QuickSens
Pt100 (RTD)

- Pt100 thinfilm sensor with the world's fastest response time
- Sensor-on-tip technology for short immersion length
- Better process control and product quality, optimized efficiency
- Highest accuracy

Measurement range



Properties

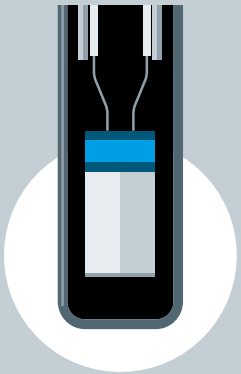
Basic thinfilm
- \+ Measurement performance sufficient for most support processes
- – Limited measurement range

Standard thinfilm
- \+ Long-term stability
- \+ Vibration resistance
- – Limited measurement range

Wirewound
- \+ Long-term stability
- \+ High measurement repeatability
- – Relative cost
- – Susceptible to mechanical stress

iTHERM QuickSens
- \+ World's fastest response time
- \+ Maximum process safety
- – Limited measurement range

ive Endress+Hauser technology



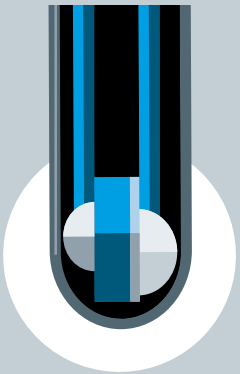
iTHERM StrongSens
Pt100 (RTD)

- Ceramic-encapsulated Pt100 thinfilm RTD with unmatched robustness
- Vibration resistance up to 60g (2,116 oz) for lower life cycle cost
- High long-term stability, high plant availability

500 °C
932 °F

– 50 °C
– 58 °F

- \+ World's highest vibration resistance
- \+ Robust
- \+ Long lifetime and plant availability
- – Limited measurement range



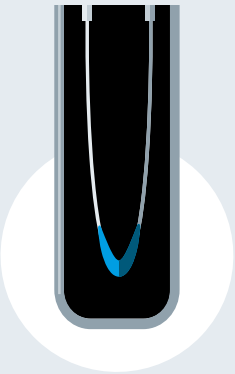
iTHERM TrustSens
Pt100 (RTD)

- Self-calibrating sensor unit
- Pt100 sensor and integrated fixed point reference
- Higher product quality and safety
- Lower risk, cost and effort

190 °C
374 °F

– 40 °C
– 40 °F

- \+ Self-calibrating
- \+ High accuracy
- \+ Reliability
- \+ High degree of automation
- \+ Risk reduction
- – Limited measurement range



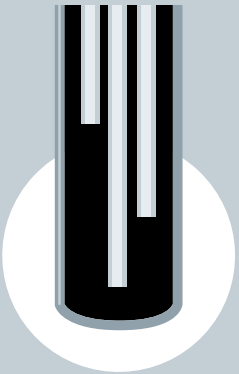
Thermocouple (TC)

- Two dissimilar metals spot welded (hot junction)
- Ideal for high temperatures

up to 1800 °C
3272 °F

– 270 °C
– 454 °F

- \+ Measurement range
- \+ Ideal for high temperatures
- – Long-term stability
- – Limited accuracy



iTHERM ProfileSens
Thermocouple (TC)

- Minimally invasive multipoint cable sensor profiling system
- Up to six individual thermocouple sensors per probe
- MI cable mineral insulated (MgO powder)
- Robust design with double metal sheathing technology

1100 °C
2012 °F

– 40 °C
– 40 °F

- \+ Robust and reliable
- \+ For high temperatures, pressure, agressive media
- \+ Increased plant safety
- – Limited accuracy (compared to RTD)

iTHERM ModuLine

Thermowell	**Direct contact - without thermowell**		
Design	Metric		Imperial
Model	TM101	TM111	TM112
Design			
Communication standards	4 to 20 mA, HART	4 to 20 mA, HART, ProfiNet, Foundation FieldBus	
Segment	**F** L E X	F L **E** X	
Features	Excellent price performance	iTHERM StrongSens iTHERM QuickSens	
Approvals / certificates	-	Ex	
Temperature range	**TC:** -270 to 650 °C (-454 to 1202 °F) **RTD:** -50 to 200 °C (-58 to 392 °F)	**TC:** -270 to 1100 °C (-454 to 2012 °F) **RTD:** -200 to 600 °C (-328 to 1112 °F)	

Welded thermowell		Barstock thermowell	
Metric		Metric	Imperial
TM121	TM131	TM151	TM152
			
4 to 20 mA, HART	4 to 20 mA, HART, ProfiNet, Foundation FieldBus		
FLEX	FLEX		
Excellent price performance with thermowell	iTHERM StrongSens iTHERM QuickSens iTHERM QuickNeck - Fast responding - Dual Seal technology - Dual compartment housing	iTHERM StrongSens iTHERM QuickSens iTHERM QuickNeck iTHERM TwistWell - Fast responding - Dual Seal technology - Dual compartment housing	
-	Ex		
TC: -270 to 650 °C (-454 to 1202 °F) **RTD:** -50 to 200 °C (-58 to 392 °F)	**TC:** -270 to 1100 °C (-454 to 2012 °F) **RTD:** -200 to 600 °C (-328 to 1112 °F)		

iTHERM ModuLine TM101, TM121

Reliable temperature measurement for simple applications

Modular RTD or thermocouple thermometers for general use

New iTHERM ModuLine offering of basic temperature assemblies designed for general applications across all industries.

Reliable temperature measurement performance with direct process contact (TM101) or temperature sensors with thermowells manufactured from pipe or tube material (TM121).

The innovative, highly modular temperature assemblies are available with basic RTD and thermocouple Type K sensors as well as Bluetooth®-enabled iTEMP TMT72 HART® 7 transmitters, offering quick, easy and safe device setup and service.

iTHERM ModuLine temperature assemblies available in a variety of modular configurations

Your benefits

Value	Benefit	Feature
Easy selection, user-friendly operation, lower life cycle cost	▪ Excellent value and performance ▪ Measurement device fit for purpose	▪ Reliable sensor performance ▪ Simple transmitter functionality
	▪ Quick, easy and fail-safe product configuration ▪ Straight-forward product support	▪ Guided product selection and configuration ▪ Standardized offering with reduced number of order codes ▪ Readily available documentation for certification, startup, troubleshooting & maintenance
	▪ On-site device setup & commissioning ▪ Local indication of process values	▪ Transmitters with integrated Bluetooth® interface for remote device operation (iTEMP TMT71, TMT72) ▪ Plug-on display with excellent readability (TID10)

Applications

- Designed for use in common industrial applications in non-hazardous areas
- Excellent value for supporting processes with lower demands in terms of mechanical, thermal or corrosive stress
- Available with various standard process connections, basic sensor technology RTD and thermocouple type K
- Outputs and communication protocols: 4 to 20 mA, HART®

For more information please visit:
www.endress.com/tm101
www.endress.com/tm121

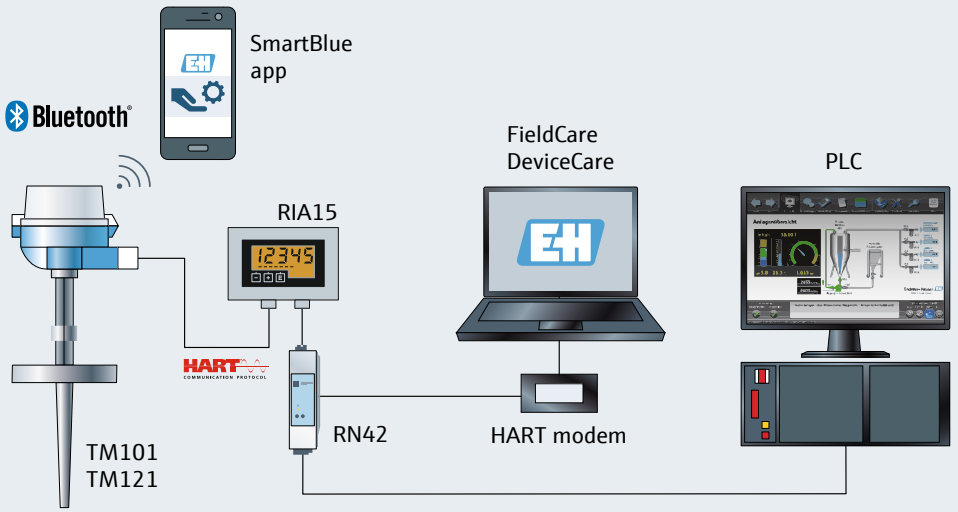
Features and specifications

Measuring range:	-50 to 650 °C (-58 to 1,202 °F) TM101 -50 to 650 °C (-58 to 1,202 °F) TM121
Pressure range:	Up to 75 bar (1,088 psi)
Protection class:	Up to IP66/67
Communication:	Analog output 4 to 20 mA, HART®
Accuracy:	Pt100 Class A; TC Class standard

Model comparison

	TM101	TM111	TM121	TM131/ TM151
Direct contact	✓	✓	-	-
Thermowell	-	-	✓	✓
Hazardous areas	-	✓	-	✓
Accuracy	■■□	■■□	■■□	■■■

Product integration and system architecture



SmartBlue app for wireless operation

endress.com/smartblue

Related offering

Product	Feature
Display unit RIA15	■ Display of 4 to 20 mA measured values or HART® process variables ■ Loop-powered; Voltage drop ≤1 V (HART® ≤1.9 V)
Active barrier RN42	■ Active barrier with integrated wide range power supply ■ Bidirectional HART® transmission for monitoring and diagnostics ■ Compact, side-by-side DIN rail housing ■ International Ex approvals
SmartBlue app	■ Mobile remote access to your device via Bluetooth® ■ Diagnostics and real-time process information ■ Encoded and highly secure data transmission
Endress+Hauser Service	■ Commissioning service ensures optimal startup ■ Technical experts are always on call to support with product queries ■ Calibration service

For more information please visit:
www.endress.com/tm101
www.endress.com/tm121

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iTHERM ModuLine TM111, TM131, TM151

Reliable temperature measurement for demanding applications

Advanced, modular, innovative

Improve your process control and reduce downtime with iTHERM ModuLine advanced temperature assemblies.

Designed for applications in the chemical, oil and gas and power industries that rely on accurate, reliable and stable temperature measurements, the highly modular offering includes thermometers for direct process contact (TM111) and with thermowells manufactured from pipe (TM131) or barstock material (TM151).

High-performance temperature sensor technology (e.g. RTD or thermocouple) combined with innovative safety features guarantee highest plant safety and availability.

iTHERM ModuLine TM111 & TM131 & TM151 available in a variety of modular configurations

Your benefits

Value	Benefit	Feature
Improved process efficiency, plant uptime and safety Reduced risk of unexpected incidents	Valuable diagnostic information for (predictive) maintenance	▪ Second process barrier: Patented dual seal technology ▪ Condensed status according to NAMUR NE 107 ▪ Advanced diagnostic functions such as corrosion monitoring or undervoltage detection
	Efficient process control	▪ Long-term stable, accurate and robust sensor technologies ▪ Ultra-fast response times with new thermowell technology
	Robust design, suitable for nearly any application	▪ Wide selection of materials ▪ Wide selection of thermowell, assembly and sensor designs
Easy selection and usability Reduced life cycle cost	On-site device setup and local availability of process values	▪ Integrated Bluetooth® interface for remote device operation ▪ Plug-on display with excellent readability
	Quick, easy and fail-safe product configuration	▪ Standardized offering with reduced number of order codes ▪ Supported product selection and configuration
	Standardization, readily available documentation for certification, start-up, troubleshooting & maintenance	▪ Integration of worldwide approvals ▪ Integration of required tests, certificates and calibration options ▪ Availability of all common communication protocols
	Higher system safety and availability, lower risk and cost	▪ iTHERM QuickNeck for easy calibration & maintenance: tool-free dismounting, no disconnecting/rewiring

Applications

- Specially designed for use in a variety of demanding applications in the oil & gas, chemical, power & energy industries
- Approved for use in hazardous areas with different types of protection according to ATEX, IEC Ex, CSA C/US, CCC
- Outstanding sensor technology to fit almost any application;
  Quick response times, accurate long-term stable and robust measurements for a reliable and safe temperature control.
- Outputs and communication protocols: 4 to 20 mA, HART®, PROFIBUS PA, FOUNDATION™ Fieldbus, PROFINET

For more information please visit:
www.endress.com/tm111
www.endress.com/tm131
www.endress.com/tm151

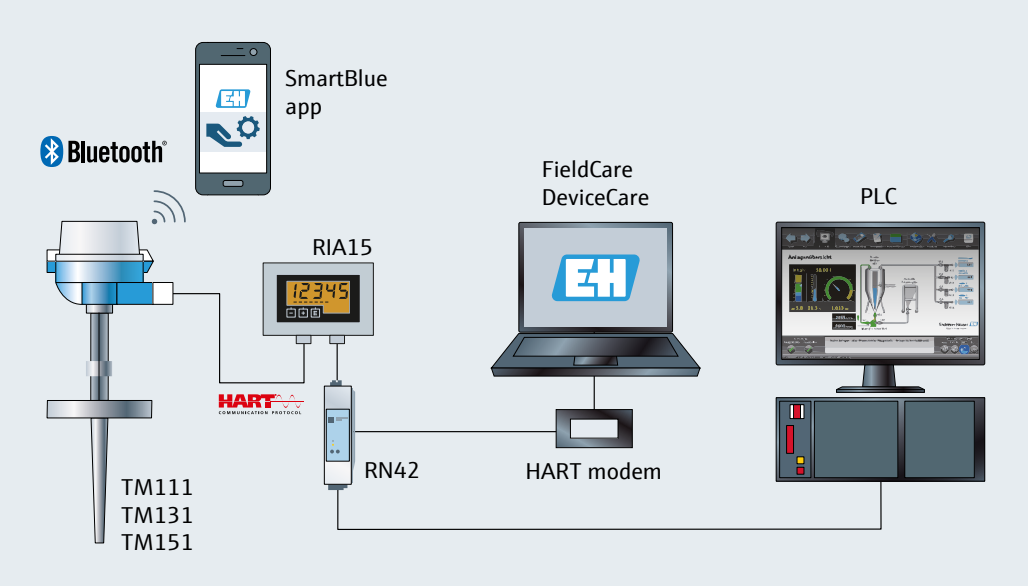
Features and specifications

Measuring range:	–200 to 1,100 °C (–328 to 2,012 °F) direct contact or with thermowell
Pressure range:	Up to 500 bar (7252 psi)
Protection class:	Up to IP68
Communication:	Analog output 4 to 20 mA, HART®, PROFIBUS PA, FOUNDATION™ Fieldbus, PROFINET; single- or dual-channel transmitters
Accuracy:	Pt100 Class AA, optional transmitter-sensor matching for highest accuracy; TC Class special

Model comparison

	TM101	TM111	TM121	TM131/ TM151
Direct contact	✓	✓	-	-
Thermowell	-	-	✓	✓
Hazardous areas	-	✓	-	✓
SIL 2/3	-	✓	-	✓
Accuracy	■■□	■■■	■■□	■■■

Product integration and system architecture



SmartBlue app for wireless operation

endress.com/smartblue

Related offering

Product	Feature
Display unit RIA15	▪ Display of 4 to 20 mA measured values or HART® process variables ▪ Loop-powered; Voltage drop ≤1 V (HART® ≤1.9 V)
Active barrier RN42	▪ Active barrier with integrated wide range power supply ▪ Bidirectional HART® transmission for monitoring and diagnostics ▪ Compact, side-by-side DIN rail housing ▪ International Ex approvals
SmartBlue app	▪ Mobile remote access to your device via Bluetooth® ▪ Diagnostics and real-time process information ▪ Encoded and highly secure data transmission

For more information please visit:
www.endress.com/tm111
www.endress.com/tm131
www.endress.com/tm151

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iTHERM MultiSens

Pre-engineered, modular multipoint temperature assemblies

Model	**Flex TMS01**		**Flex TMS02**		**Linear TMS11**	**Linear TMS12**	**Slim TMS21**		**Bundle TMS31**
Design									
Type	direct contact	individual ther-mo-wells	direct contact	individual ther-mo-wells	multiple, primary thermowell		annealed tube	annealed tube with flexible part	stainless steel flexible rope
Response time	▪▪▪▪▪	▪▪▪▫▫	▪▪▪▪▪	▪▪▪▫▫	▪▪▫▫▫		▪▪▪▪▫	▪▪▪▪▫	▪▪▪▪▪
Layout / bendability	▪▪▪▪▪	▪▪▪▪▫	▪▪▪▪▪	▪▪▪▪▫	-		▪▪▪▫▫	▪▪▪▪▫	▪▪▪▫▫
Diagnostic capabilities	-		Advanced		Basic	Advanced	-		
Individually replaceable sensors	✔	✔	✔	✔	✔	✔	-		
Max. number of points	48 (linear or 3D) 80 (Profile-Sens)	48 (linear or 3D)	52 (linear or 3D) 80 (Profile-Sens)	48 (linear or 3D)	16 (linear)	12 (linear)	59 (linear)		20 (linear)
Max. pressure in bar (psi)	100 (1,450)		200 (2,900)		240 (3,481)		90 (1,305)		100 (1,450)

Benefits at a glance

- Measurement and recording of a temperature profile for control of the process in the reactor
- Shortest response time enabled by high number of temperature probes
- Easily configurable and globally available
- Coverage of all key applications in the Oil & Gas, Chemical, Petrochemical industries
- Defective thermocouples can be replaced during shutdown
- Increased safety thanks to a diagnostic chamber able to contain the process in the event of leakages through the primary seals (PED certified chamber)

Temperature Engineered Solutions - TES

Endress+Hauser bundles vast industry knowledge and application know-how from worldwide, complex projects to deliver innovative and fully customized Temperature Engineered Solutions.

Customized engineered temperature solutions – excellence in instrumentation, services and project support

Our solutions including tests, accessories and service – are planned and executed specifically with the aim of satisfying challenging customer requirements. Engineering and production expert design, selected materials and highest production standards guarantee instrument longetivity in all types of process media, pressure and temperature ranges.

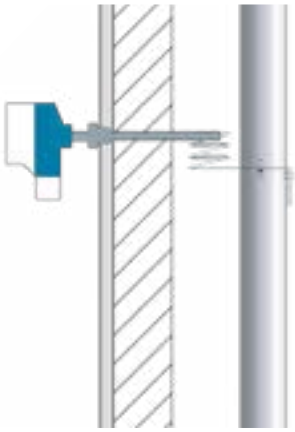
Expertise from project start to finish

- Active support during turn-around planning
- Design studies
- Installation and supervision
- Field tests, complete in-house validation test packages
- Immediate on-site or remote service and consultation
- Maintenance, training
- Comprehensive documentation package

Customized SkinPoint thermometers – for surface temperature measurement

Benefits at a glance

- Continuous temperature detection and heat exchange monitoring
- No affection of the stream's steadiness or invasion into the pipe
- Engineered for maximum reliability – wide range of high-grade materials
- Compensation for thermal distortion with optimized expansion coils
- Quick & easy commissioning
- Compatibility with existing process connections



To configure and order a customized multipoint thermometer, surface thermometer or other Temperature Engineered Solutions and for further information please contact your Endress+Hauser sales representative.

iTHERM MultiSens Flex TMS01, TMS02

Multipoint thermometer family

Fine-tune your catalytic refining processes

The modular iTHERM MultiSens Flex TMS01 and TMS02 multipoint temperature assemblies are engineered to deliver reliable temperature profiling in demanding catalytic refining and petrochemical applications. The high-performance instruments provide accurate 3D temperature maps in reactors and vessels.

Fully customizeable to meet your specific requirements, the serviceable assemblies are available with or without thermowells as well as with different types of RTD or thermocouple sensors.

Advanced diagnostic capabilities provide additional safety and valuable process information for predictive maintenance.

The patented iTHERM ProfileSens multipoint cable probe technology offers maximum long-term reliability even under extreme conditions.

Level 3

iTHERM MultiSens Flex TMS01 & TMS02
3D flexible multipoint assemblies

Your benefit

Value	Benefit	Feature
Lower risk and cost Higher process safety	Reduced risk of unplanned plant shutdowns, environmental hazards or health and safety related incidents	Advanced diagnostic chamber as secondary process barrier for additional safety, capable of pressure monitoring for predictive maintenance
Higher process efficiency and product quality	▪ Precise temperature profiling ▪ Higher catalyst charge ▪ Less channeling	▪ High number of measuring points (up to 30/48) ▪ 3D flexible multipoint cable probes ▪ Minimally invasive
Reliable and cost-effective design	▪ High mechanical strength ▪ Low maintenance ▪ Fast installation ▪ Individual sensor replacement	▪ iTHERM ProfileSens technology ▪ Modular configuration ▪ Optional thermowells ▪ Optional diagnostic chamber

Application

- Easy to use, flexible design, specially developed for demanding applications in the oil & gas and petrochemical industries
- Certifications and approvals for critical components: ATEX, IEC-Ex, EAC-Ex, UL, FM, CSA and NEPSI

For more information please visit
www.endress.com/tms01
www.endress.com/tms02

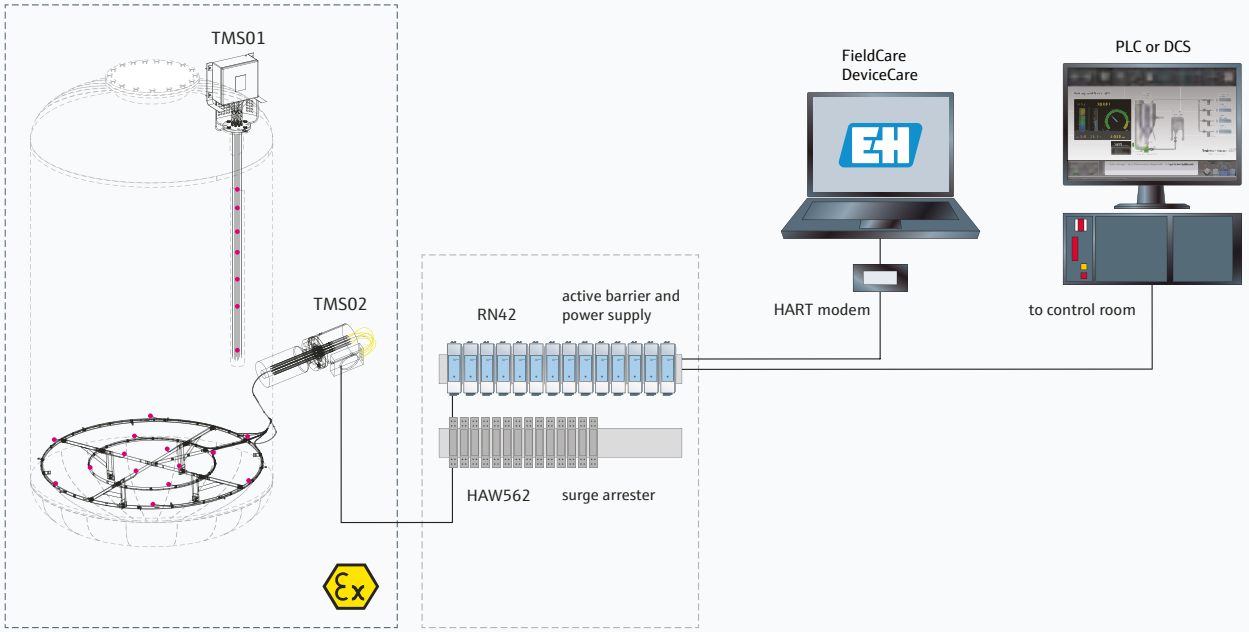
Features and specifications

Measuring range (RTD): **Measuring range (TC):**	−200 to 600 °C (−328 to 1,112 °F) −270 to 1,100 °C (−454 to 2,012 °F)
Static pressure range:	Up to 100 bar (1,450 psi) / up to 200 bar (2,900 psi)
Protection class:	Up to IP66/67
Communication:	Analog output 4 to 20 mA, digital protocols (with temperature transmitters)

Model comparison

	TMS01	TMS02
Direct contact	✓	✓
Thermowells	optional	
Hazardous areas	✓	✓
Diagnostics	-	advanced

Integration and system architecture



Related offering

Product	Feature
Active barrier RN42	▪ Multi-voltage power supply unit, global Ex approvals and SIL2 ▪ Safe separation of 4 to 20 mA standard signal circuits ▪ Front side HART® communication jacks and integrated 250 Ohm resistor
Surge arrester HAW562	▪ DIN rail surge arrester according to IEC 60715 ▪ Safeguards electronic components in measuring instruments against overvoltage surges ▪ Application in Ex areas; available with SIL2 intrinsically safe approvals (optional)
Endress+Hauser Service	▪ Application experts for defining process integration, consulting, planning and training ▪ Installation service and safety check guarantee optimal startup ▪ Complete life cycle management including maintenance and repair ▪ Calibration service with complete documentation

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For more information please visit
www.endress.com/tms01
www.endress.com/tms02

iTHERM MultiSens Linear TMS11, TMS12

Multipoint thermometer family

Linear profiling in harsh process conditions

The ultra-durable, modular iTHERM MultiSens Flex TMS11 and TMS02 multipoint temperature assemblies are engineered to deliver reliable linear temperature profiling in demanding catalytic refining and petrochemical applications.

Fully customizeable to meet your specific requirements, the easily serviceable assemblies with thermowell are available with RTD or thermocouple sensors.

Advanced diagnostic capabilities provide additional safety and valuable process information for predictive maintenance, increasing process safety and maximizing reactor performance.

iTHERM MultiSens Linear TMS11 & TMS12
linear multipoint assemblies

Your benefit

Value	Benefit	Feature
Lower risk and cost Higher process safety	▪ Reduced risk of unplanned plant shutdowns, environmental hazards or health and safety related incidents	▪ Primary thermowell and diagnostic chamber functioning as first and second process barriers
Higher process efficiency and product quality	▪ Precise temperature profiling ▪ High reliability	▪ High mechanical strength ▪ High number of measuring points (up to 16/12)
Easy installation, integration and maintenance	▪ Customizable configuration ▪ Electrical and Pressure Directive compliance ▪ Serviceable: Individual sensor replacement even during operation	▪ Modular instrument design ▪ Highly robust primary thermowell ▪ Inserts according to standards IEC 60584, ASTM E230 and IEC 60751 ▪ Advanced diagnostic chamber (TMS12)

Application

- Easy to use, flexible design, specially developed for demanding applications in the oil & gas and petrochemical industries
- Certifications and approvals for critical components: ATEX, IEC-Ex, EAC-Ex, UL, FM, CSA and NEPSI

For more information please visit
www.endress.com/tms11
www.endress.com/tms12

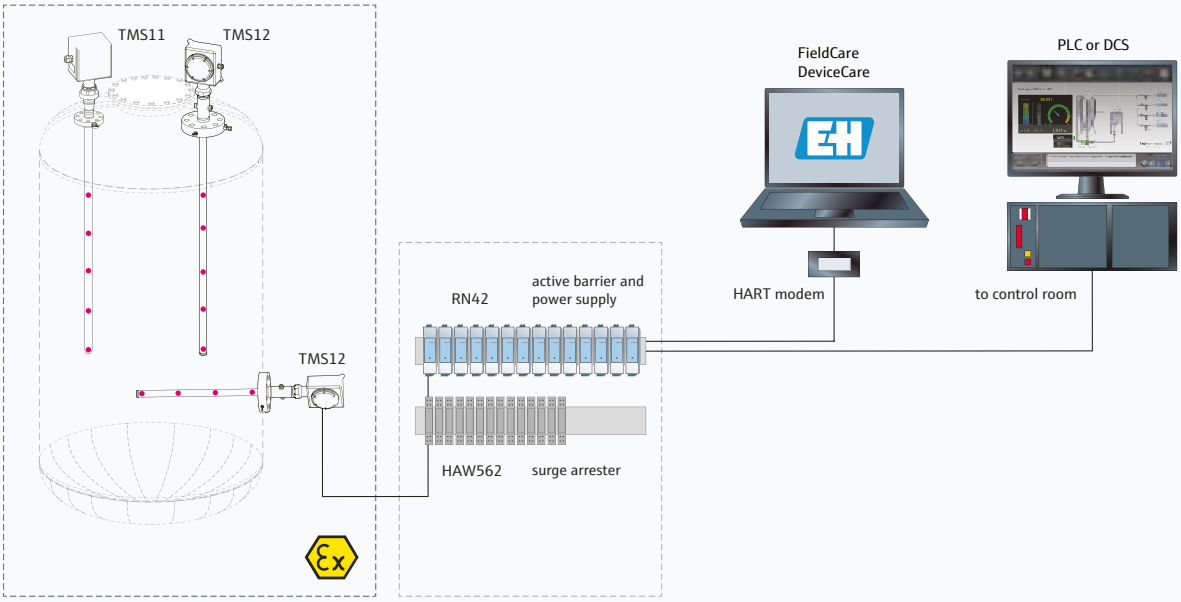
Features and specifications

Measuring range (RTD): **Measuring range (TC):**	−200 to 600 °C (−328 to 1,112 °F) −270 to 1,100 °C (−454 to 2,012 °F)
Static pressure range:	Up to 240 bar (3,481 psi)
Protection class:	Up to IP66/67
Communication:	Analog output 4 to 20 mA, digital protocols (with temperature transmitters)

Model comparison

	TMS11	TMS12
Max. number of sensors	16	12
Thermowell	✓	✓
Hazardous areas	✓	✓
Diagnostics	basic	advanced

Integration and system architecture



Related offering

Product	Feature
Active barrier RN42	▪ Multi-voltage power supply unit, global Ex approvals and SIL2 ▪ Safe separation of 4 to 20 mA standard signal circuits ▪ Front side HART® communication jacks and integrated 250 Ohm resistor
Surge arrester HAW562	▪ DIN rail surge arrester according to IEC 60715 ▪ Safeguards electronic components in measuring instruments against overvoltage surges ▪ Application in Ex areas; available with SIL2 intrinsically safe approvals (optional)
Endress+Hauser Service	▪ Application experts for defining process integration, consulting, planning and training ▪ Installation service and safety check guarantee optimal startup ▪ Complete life cycle management including maintenance and repair ▪ Calibration service with complete documentation

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For more information please visit
www.endress.com/tms11
www.endress.com/tms12

iTHERM MultiSens Slim TMS21

Multipoint thermometer family

Minimally-invasive and highly accurate

The iTHERM MultiSens Slim TMS21 multipoint thermometer is specially designed for applications in the chemical industry, where it combines high accuracy with a small footprint. The lightweight, single-nozzle probe is easy to install and guarantees minimum process disturbance.

Up to 59 thermocouple sensors are packaged into a linear or flexible, low-diameter probe to establish a complete temperature profile in tube reactors, vessels or storage tanks.

Its flexible thermowell can be bent to accomodate the routing required by your application.

iTHERM MultiSens Slim TMS21
linear, bendable multipoint probe

Your benefit

Value	Benefit	Feature
Cost-effective	▪ Quick installation ▪ Easy process integration	▪ Customizable design: Sizing, materials, configuration (linear or flexible)
Better process control and product quality	▪ Precise temperature profiling ▪ Fast sensor response times	▪ Up to 59 thermocouple sensors ▪ Compact thermowell
Safety by design	▪ Minimal process disturbance	▪ Single process connection ▪ Low-impact probe design

Application

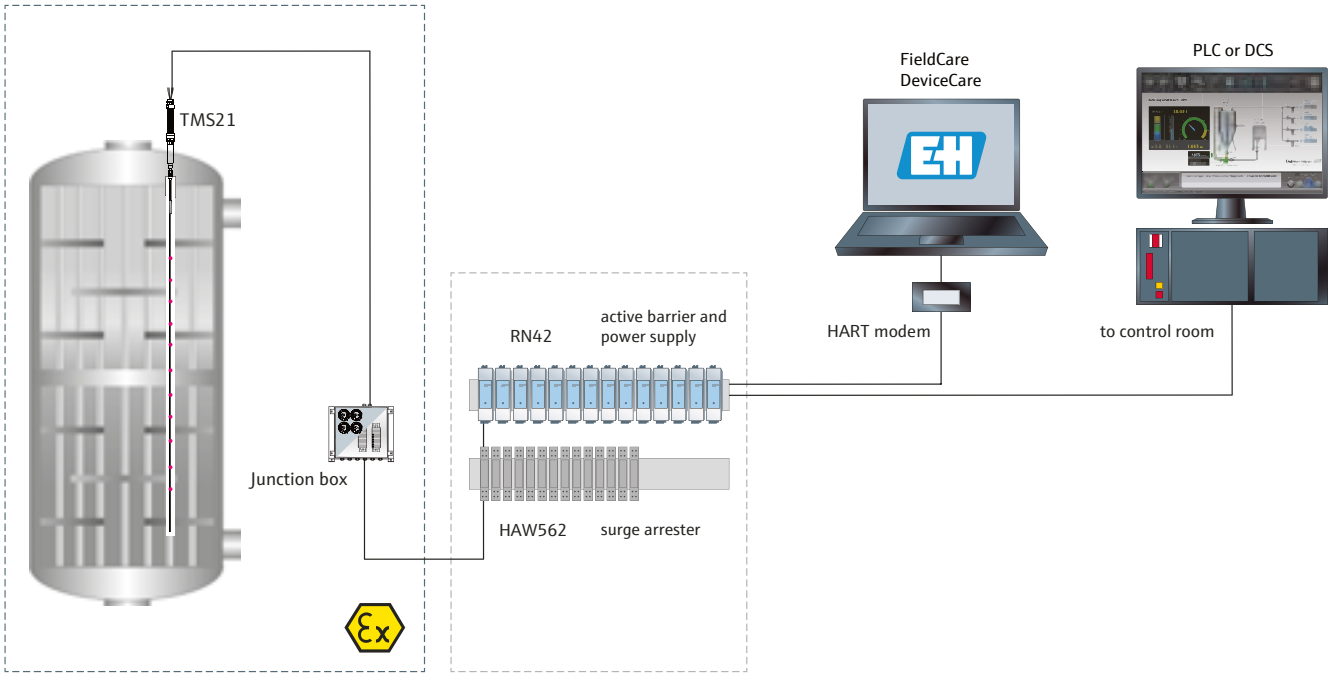
- Easy to use, flexible design, specially developed for light chemical applications
- Certifications and approvals: ATEX Ex-ia

For more information please visit
www.endress.com/tms21

Features and specifications

Measuring range (TC):	–270 to 1,100 °C (–454 to 2,012 °F)
Static pressure range:	Up to 90 bar (1,305 psi)
Protection class:	Up to IP66/67
Communication:	Analog output 4 to 20 mA, digital protocols (with temperature transmitters)

Integration and system architecture



Related offering

System component	Feature
Active barrier RN42	▪ Multi-voltage power supply unit, global Ex approvals and SIL2 ▪ Safe separation of 4 to 20 mA standard signal circuits ▪ Front side HART® communication jacks and integrated 250 Ohm resistor
Surge arrester HAW562	▪ DIN rail surge arrester according to IEC 60715 ▪ Safeguards electronic components in measuring instruments against overvoltage surges ▪ Application in Ex areas; available with SIL2 intrinsically safe approvals (optional)
Endress+Hauser Service	▪ Application experts for defining process integration, consulting, planning and training ▪ Installation service and safety check guarantee optimal startup ▪ Complete life cycle management including maintenance, repair and overhaul ▪ Calibration service with complete documentation

PU01237T/09/EN/03.22

For more information please visit
www.endress.com/tms21

iTHERM MultiSens Bundle TMS31

Multipoint thermometer family

Flexible temperature profiling in storage tanks and bulk silos

The iTHERM MultiSens TMS31 multipoint assembly offers maximum versatility for temperature profiling in silos and storage applications, where high mechanical robustness and flexibility are crucial.

The modular thermocouple or RTD assembly is a cost-effective solution various tank gauging, feedstock quality and condition monitoring applications. It provides reliable temperature data via several communication protocols. Instruments are available with a wide range of accessories, different process connections and probe configurations that simplify system integration to accomodate various installation setups.

iTHERM MultiSens Bundle TMS31
flexible multipoint assembly

Your benefit

Value	Benefit	Feature
Reduce overhead costs	▪ Easy installation ▪ Adapts to different silos and tank operating conditions (filling, emptying, storage, ...) ▪ Cost-effective design and maintenance	▪ Modular configuration ▪ Robust, flexible probe design ▪ Long instrument life
Minimize risk	▪ Control product quality, prevent microbial growth ▪ Prevent temperature runaways ▪ Avoid unplanned maintenance ▪ Prevent product loss or damage	Up to 20 highly accurate temperature measuring points for accurate feed stock level and condition monitoring

Application

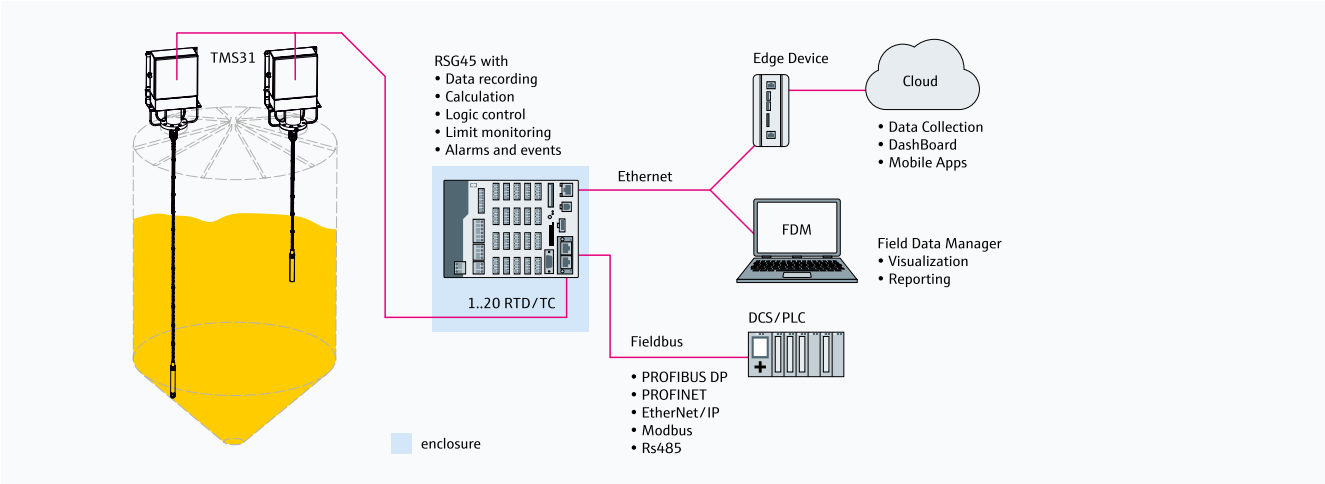
- Ready to use device, flexible design, specially developed for storage applications
- Certifications and approvals for critical components: ATEX, IECEX, EAC, UL, FM, CSA and NEPSI

Features and specifications

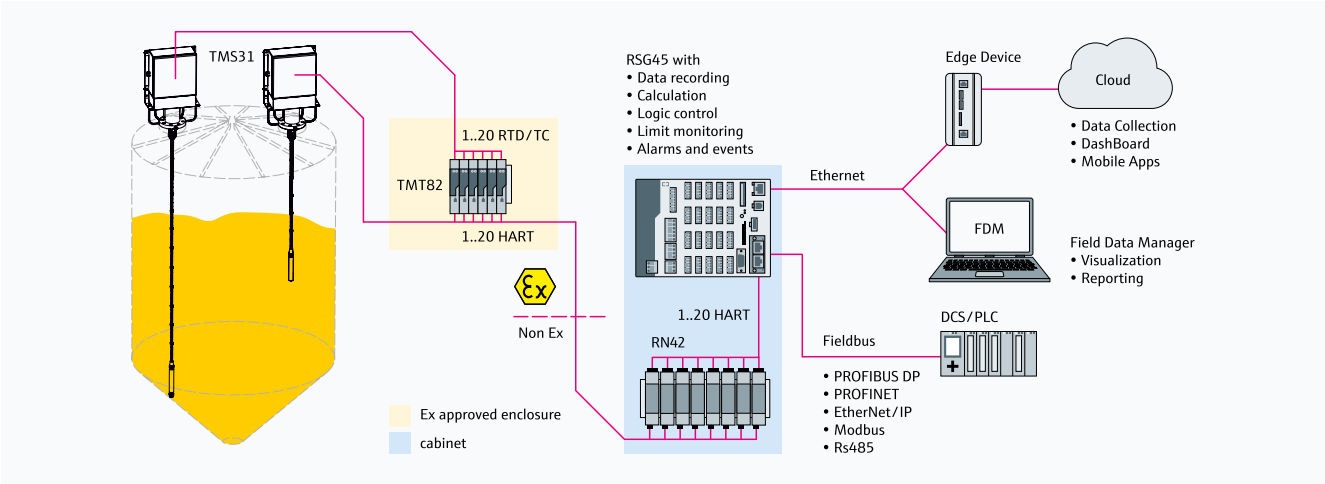
- Measuring range (RTD/TC): −200 to +600 °C (−328 to +1,112 °F) / −270 °C to 800 °C (−454 to 1,472 °F)
- Static pressure range: Up to 40 bar (580 psi)
- Protection class: Up to IP66/67
- Communication: Analog output 4 to 20 mA; digital protocols (with temperature transmitters)

For more information please visit
www.endress.com/tms31

Typical installation: Non-Ex / RSG45 DIN rail



Typical installation: Ex / RSG45 DIN rail + System Components



Integrated product and service offering

System component	Feature
Active barrier RN42	▪ Multi-voltage power supply unit, global Ex approvals and SIL2 ▪ Safe separation of 4 to 20 mA standard signal circuits ▪ Front side HART® communication jacks and integrated 250 Ohm resistor
Data management Memograph M RSG45 DIN rail	▪ Tamper-proof data storage and access ▪ HART® gateway; Up to 40 HART® devices connected at a time ▪ Communication protocols: Modbus, PROFIBUS DP, PROFINET, EtherNet/IP
Surge arrester HAW562	▪ DIN rail surge arrester according to IEC 60715 ▪ Safeguards electronic components in measuring instruments against overvoltage surges ▪ Application in Ex areas; available with SIL2 intrinsically safe approvals (optional)
Endress+Hauser Service	▪ Application experts for defining process integration, consulting, planning and training ▪ Installation service and safety check guarantee optimal startup ▪ Complete life cycle management including maintenance and repair ▪ Calibration service with complete documentation

PU01314T/09/EN/02.22

For more information please visit
www.endress.com/tms31

Multipoint temperature instruments generate useful information in addition to process temperature values. With basic, advanced and modular diagnostic chamber systems, process leakage events can be safely contained, identified and analyzed for predictive maintenance.

Advanced diagnostics

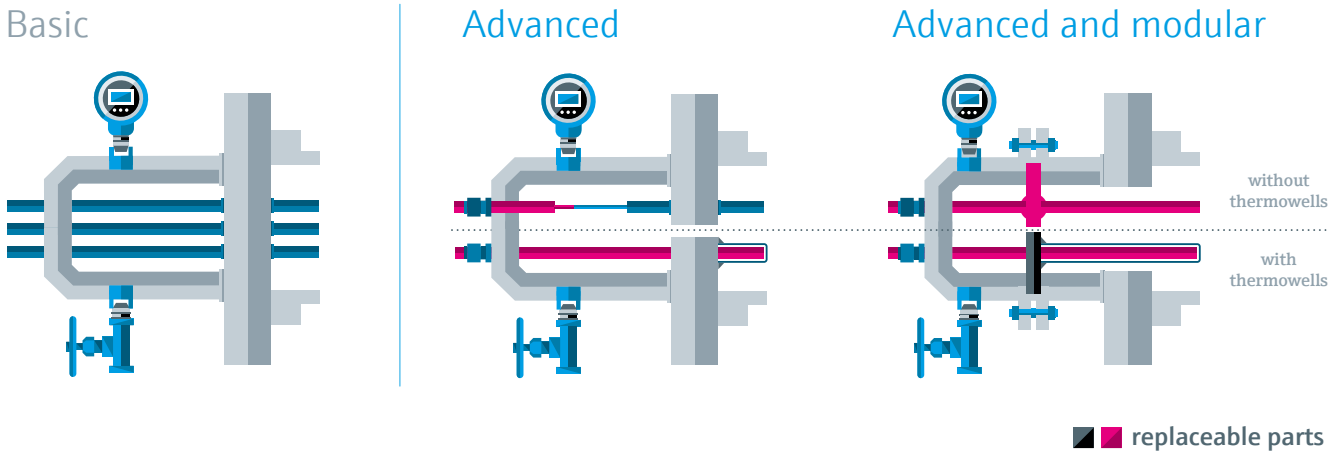
Leakage prevention and process diagnostic system

Contain, diagnose, analyze, plan

iTHERM MultiSens Flex, Linear and Bundle multipoint temperature assemblies* are available with a unique and innovative diagnostic chamber that provides additional safety and valuable process information for predictive maintenance.

In addition to containing hazardous process leakage, diagnostic chambers are equipped to provide valuable process data which can be used to analyze leakage events and plan timely counter-measures or predictive maintenance and lifecycle activities.

Designed with maintenance flexibility in mind, the systems are available with replaceable and reuseable parts (advanced, modular) for configurations with or without thermowells, saving time and cost over the instrument's entire life.



Valuable process information
Analyze leakage event data

Plant uptime
Maintenance flexibility thanks to replaceable parts

Increased plant safety
Contain process leakage

Predictive maintenance
Efficient planning of lifecycle activities

* Diagnostic systems available with iTHERM MultiSens TMS01/TMS02, TMS11/TMS12 and TMS31

iTHERM ProfileSens TS901

Ultra-reliable multipoint sensor technology

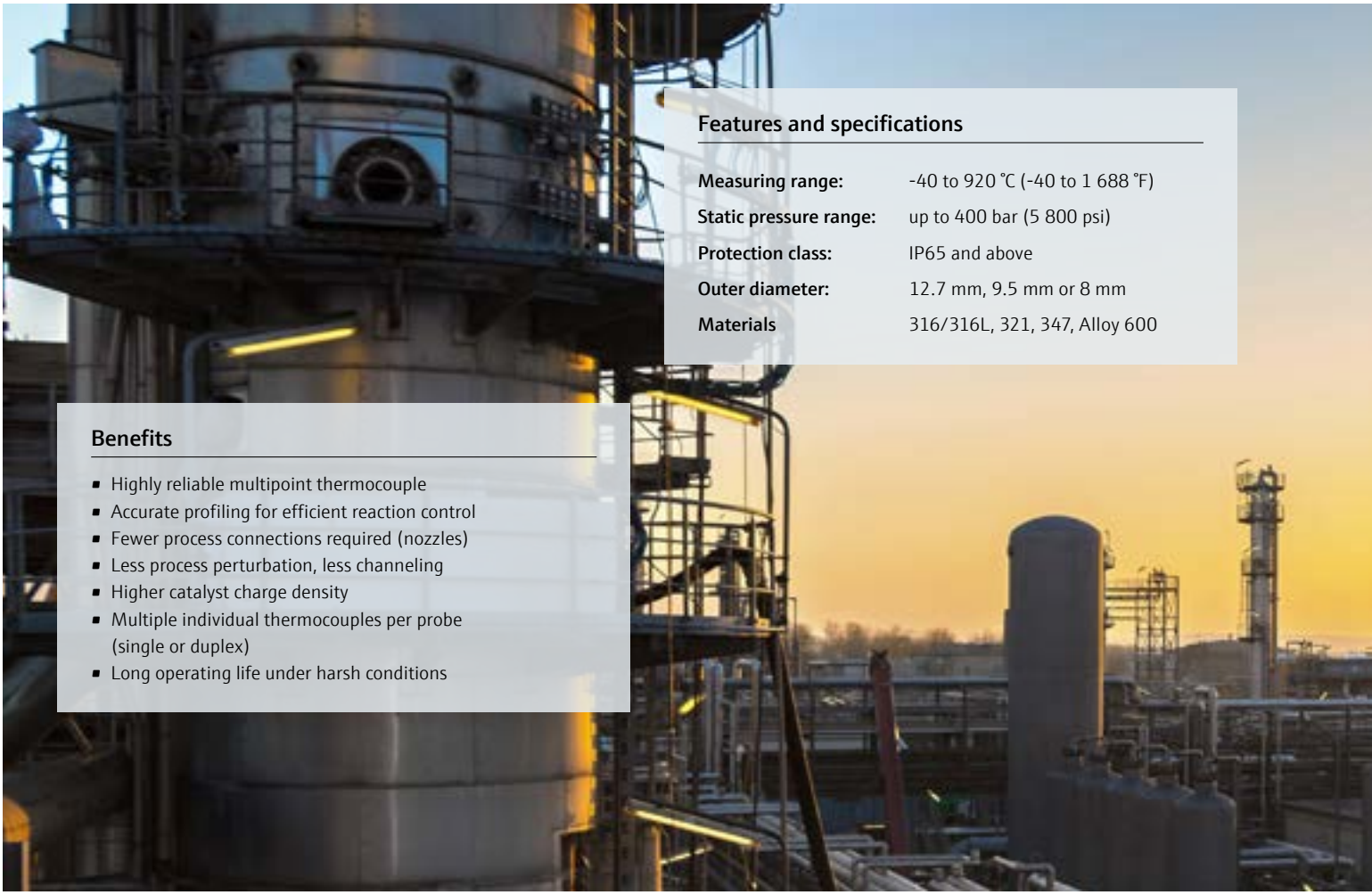
The patented multipoint sensor cable has been specially developed for the oil and gas refining industry to reduce maintenance intervals and the risk of untimely shutdowns due to thermocouple sensor failure. It accurately measures temperature profiles in demanding catalytic hydroprocessing units such as hydrotreaters, hydrodesulfurization and hydrocracker units.

Reliable and durable Temperature measurement instruments need to be capable of withstanding high temperatures, high pressure and corrosion. The new iTHERM ProfileSens TS901 cable probe offers outstanding performance, delivering precise temperature profile information. Its mechanical properties and the complete electrical independence of the multiple internal sensors make it the most robust and reliable multipoint probe available today.

Less is more The sensor internals are minerally insulated (MgO powder). Each individual sensor is protected by an additional metal sheath. The flexible probe drastically reduces process perturbation due to its minimally-invasive design, increasing safety and reactor performance.

Catalytic processes in particular profit from a denser catalyst charge, a lower risk of channeling, resulting in greater reaction efficiency.

The iTHERM ProfileSens TS901 multipoint cable probe technology is exclusively available as a standard option in combination with the iTHERM MultiSens Flex TMS01 and TMS02 multipoint temperature assemblies.



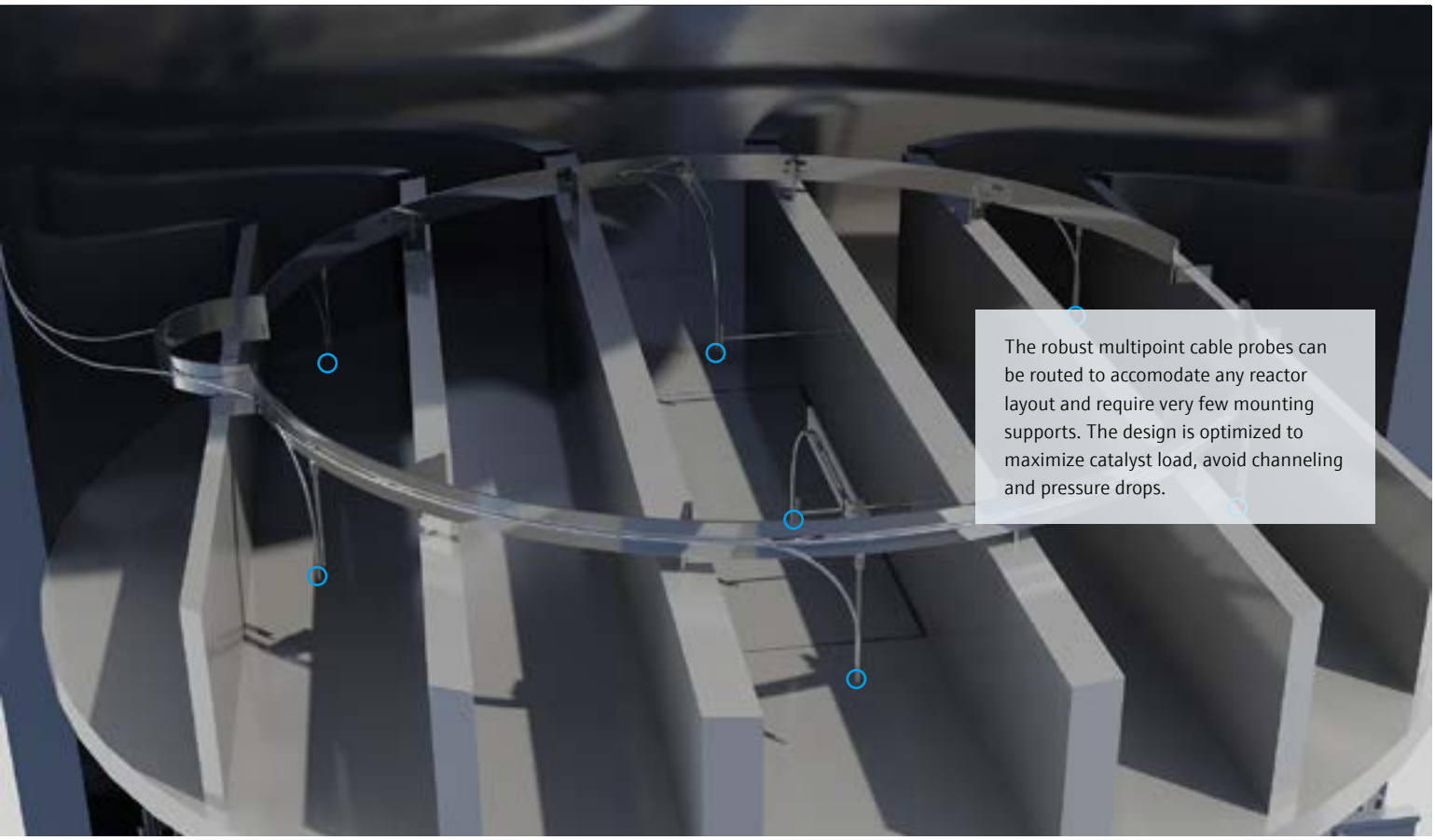
Features and specifications

Measuring range:	-40 to 920 °C (-40 to 1 688 °F)
Static pressure range:	up to 400 bar (5 800 psi)
Protection class:	IP65 and above
Outer diameter:	12.7 mm, 9.5 mm or 8 mm
Materials	316/316L, 321, 347, Alloy 600

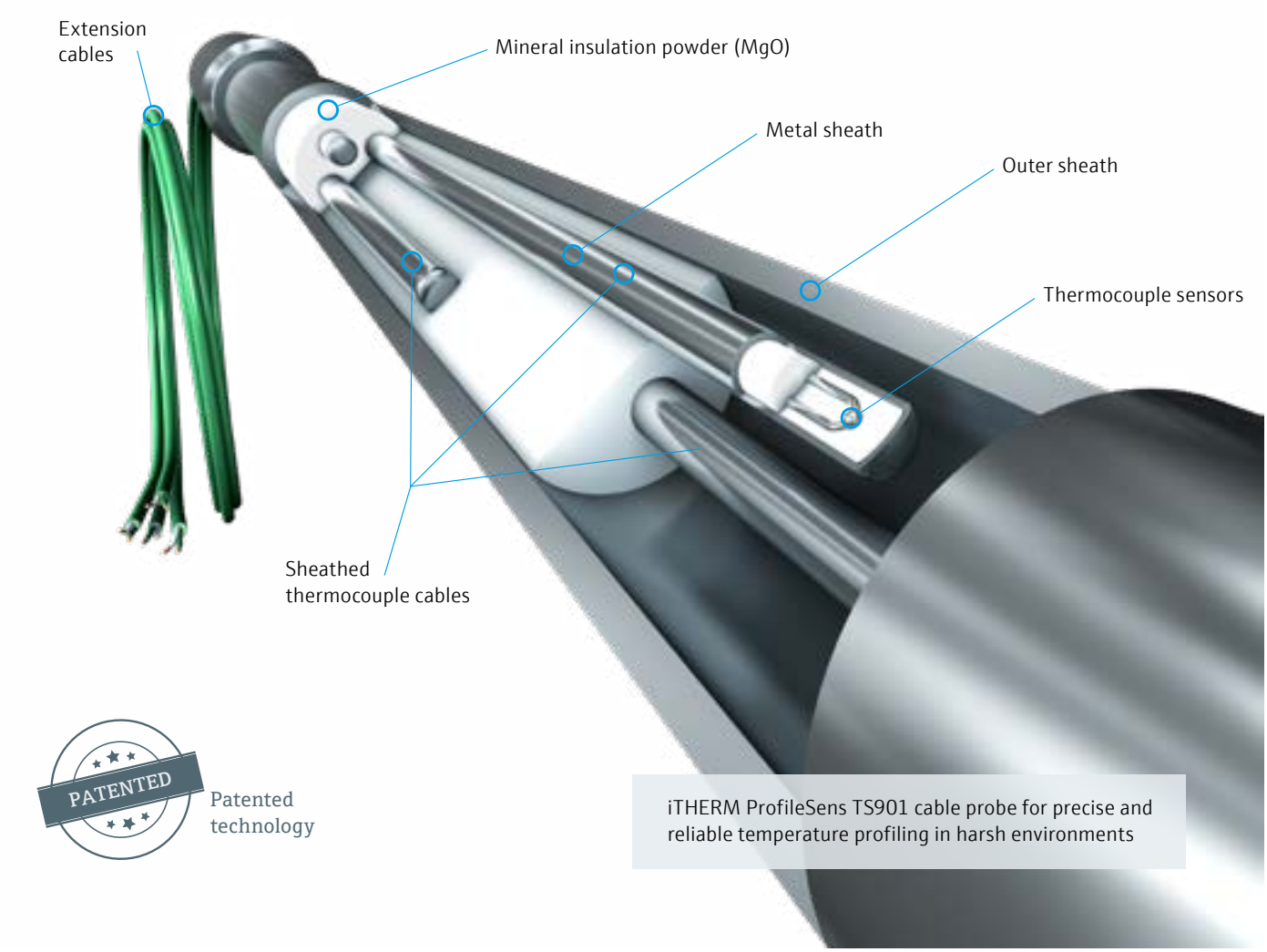
Benefits

- Highly reliable multipoint thermocouple
- Accurate profiling for efficient reaction control
- Fewer process connections required (nozzles)
- Less process perturbation, less channeling
- Higher catalyst charge density
- Multiple individual thermocouples per probe (single or duplex)
- Long operating life under harsh conditions

For more information please visit
https://eh.digital/profilesens



The robust multipoint cable probes can be routed to accomodate any reactor layout and require very few mounting supports. The design is optimized to maximize catalyst load, avoid channeling and pressure drops.



PATENTED

Patented technology

iTHERM ProfileSens TS901 cable probe for precise and reliable temperature profiling in harsh environments

iTEMP temperature transmitters

Communication standard	**4 to 20 mA**				
Field housings	-				
	-				TMT71 
Top hat / DIN rail	TMT127 	TMT128 	-		TMT71 
Head mount	TMT31 	TMT188 	TMT80 	TMT31 	TMT71 
Sensor input(s)	RTD	thermocouple	1-ch universal	RTD	1-ch universal
Approvals	Ex Zone 2	Ex	-	Ex Zone 2	Ex
Additional information	fixed configuration		-		Bluetooth
	-				plug-in display unit (TID10) available for head transmitters

HART		Foundation Fieldbus	ProfiBus	ProfiNet
TMT142B 	TMT162 	TMT162 	TMT162 	-
TMT72 	TMT82 	TMT85 	TMT84 	TMT86 
TMT72 	TMT82 	-	-	-
TMT72 	TMT82 	TMT85 	TMT84 	TMT86 
1-ch universal	2-ch universal	2-ch universal	2-ch universal	2-ch universal
Ex		Ex	Ex	Ex
Bluetooth	SIL 2 SC 3	-	-	Ethernet-APL
plug-in display unit (TID10) available for head transmitters				

iTEMP TMT86

Ethernet-APL: Smart, fast, digital

The iTEMP TMT86 is a reliable, intelligent and future proof dual-channel Ethernet-APL PROFINET temperature head transmitter, suitable for use in hazardous areas.

The iTEMP TMT86 temperature transmitter is designed for integration in all standard thermometers. **The focus industry for this transmitter is the chemical industry. Due to its universal usage the transmitter can also be integrated in hygienic thermometers for applications in the Food & Beverage or Life Sciences industries.**

Beneficial diagnostic functions like corrosion monitoring of the sensor wires help to improve the plant up-time.
The embedded webserver and the up-to-date FDI package simplify the device configuration and integration.

Your benefits

Value	Benefit	Feature
Process safety and plant availability	Digital communication down to the field level, even in explosion hazardous areas	▪ Ethernet-APL with PROFINET ▪ Simple Ex planning and validation by 2-WISE (2-wire Intrinsically Safe Ethernet)
	Long-term stability, accurate and precise temperature measurement	▪ Long-term stability of the electronics ▪ Highly accurate sensor input
	Robust technology which ensures high availability of the process plant	▪ Condensed status according to NE107 ▪ PROFINET PA Profile 4 ▪ Advanced diagnostic functions like corrosion monitoring
Functional simplicity	Save time and effort on commissioning, configuration and maintenance	▪ Easy access to the device in the network - Web server ▪ Local device interface for fast maintenance access – CDI interface ▪ Easy and state-of-the-art device integration – FDI package
	Clear process information in the field	▪ Excellent readability of plug-in display - TID10 ▪ Warning / alarm indication

Applications

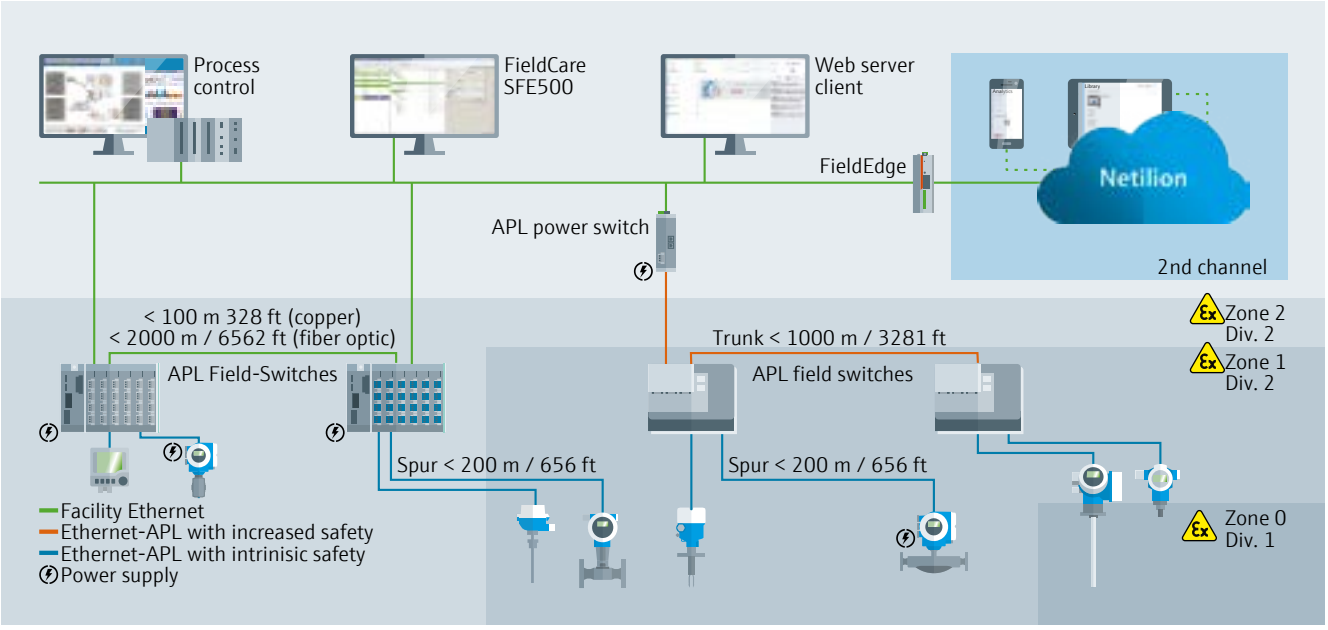
- Universal temperature transmitter with PROFINET communication
- Installation in terminal head form B and field housing
- International certifications and approvals: Intrinsically safe and explosion-proof

For more information please visit:
www.endress.com/TMT86

Features and specifications

Sensor input:	2x RTD, TC, Ohm and mV
Operation and commissioning:	FDI package via PROFINET, DTM via CDI or Webserver, GSD
Output:	PROFINET
Power supply:	Ethernet-APL, 2-wire Ethernet SPE based on 10BASE-T1L (special SPE switch)
Approvals:	2-Wire Intrinsically Safe Ethernet (2-WISE) ATEX, IECEx, NEPSI, cCSAus, UKCA, INMETRO, KC

System integration and architecture



Related offering

Component	Feature
Local display TID10	▪ Clear information at the measuring point and process ▪ Inverse display in case of diagnostic messages ▪ Permanent process monitoring or temporary application for service and maintenance work ▪ Device configuration via DIP-switches
Thermometer ModuLine iTHERM TM131	▪ High degree of flexibility, modular design

For more information please visit:
www.endress.com/TMT86

IN01288T/09/EN/01.23

iTEMP TMT71 and TMT72 HART® 7

Temperature transmitter family for all industries

Superior measurement performance and usability

The iTEMP TMT71 and TMT72 HART® temperature transmitters are designed for use across all industries where applications require accurate temperature measurements and long-term stability.

The devices provide valuable additional diagnostic information and features enabling predictive maintenance, contributing to improve process efficiency and increase plant uptime.

Your benefits

Value	Benefit	Feature
Improved process efficiency and plant availability	Efficient and reliable process control	▪ Long-term stable electronic ▪ Highly accurate sensor input and analog output
	Valuable diagnostic information for (predictive) maintenance	▪ Condensed status according to NAMUR NE 107 ▪ Advanced diagnostic functions such as corrosion monitoring and undervoltage detection
Improved usability and system integration	On-site device setup and local availability of process values	▪ Integrated Bluetooth® interface for remote operation via mobile devices ▪ Excellent readability of plug-on display
	Integrative operation with all Endress+Hauser devices	▪ Uniform and optimized user interface for all tools ▪ User-guided setup wizards ▪ Self-explaining operating structures
	Quick and easy system integration for iTEMP TMT72 HART®	Quality gate: Endress+Hauser integration lab ensures seamless integration into all major control and asset management systems
	Time saving device connection	▪ Push-in terminals for toolless wiring (optional) ▪ Laser-printed connection diagram

Applications

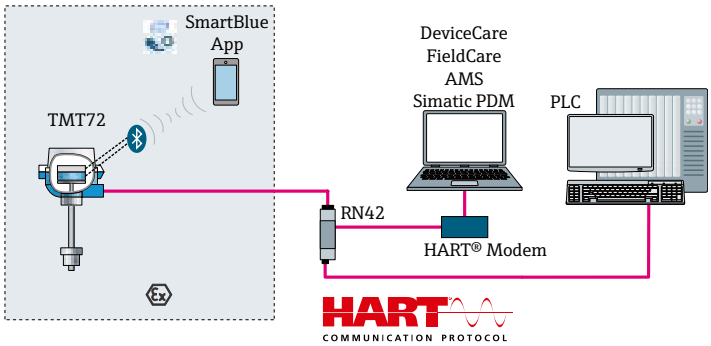
- Universal temperature transmitter with optional HART® communication for the conversion of various input signals into a scalable, analog 4 to 20 mA output signal
- Installation in terminal head form B, mounting on the DIN rail (DIN rail housing style), field housing
- International certifications and approvals: Ex approvals, radion approvals, CE, DNV GL, NAMUR

For more information please visit:
www.endress.com/tmt71
www.endress.com/tmt72

Features and specifications

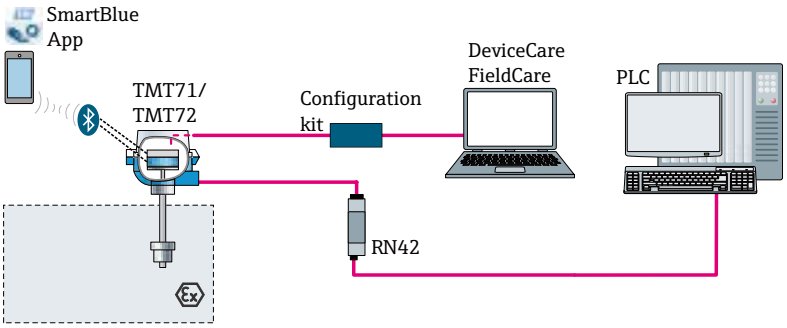
Sensor input:	RTD, TC, Ohm and mV
Operation and commissioning:	SmartBlue App (Android/iOS) via Bluetooth® DTM via CDI DD/DTM via HART®
Output:	4 to 20 mA, HART® 7 protocol (TMT72)
Power supply:	2-wire device, loop powered, 10 V to 36 V_{DC} (head transmitter); 12 V to 36 V_{DC} (DIN rail)
Approvals:	ATEX, $_{C}CSA_{US}$, EAC, IECEx, INMETRO, NEPSI, DNV GL
Operating temperature:	-40 °C to +85 °C

Product integration and system architecture



iTEMP TMT72
System architecture for HART® communication

QR code to SmartBlue APP



iTEMP TMT71, TMT72: System architecture for PC programable transmitter

Related offering

Component	Feature
SmartBlue app	▪ Mobile, remote access to your device ▪ Diagnostics and real-time process information ▪ Encoded and secure data transmission
Active barrier RN42	▪ Active barrier with integrated power supply ▪ Bidirectional HART® transmission for monitoring and diagnostics ▪ Compact, side-by-side DIN rail housing ▪ International Ex approvals
Thermometer ModuLine iTHERM TM131	High degree of flexibility, modular design

For more information please visit:
www.endress.com/tmt71
www.endress.com/tmt72

PU01304T/09/EN/02.22

iTEMP TMT82 HART® 7

Dual-channel temperature transmitter family

Highly reliable in safety-critical applications

With its dual-channel input and comprehensive feature set, the high-performance **iTEMP TMT82** digital temperature transmitter is the perfect choice for critical and demanding applications and safety loops, delivering highest measurement accuracy and reliability.

The **SIL 2/3 certified** devices provide valuable diagnostic information, ensuring plant safety, availability and boosting process efficiency.

Benefits at a glance

Value	Benefits	Features
Functional safety Plant availability	Safety by design: Optimal for use in safety loops	▪ SIL 2/3 certification according to IEC 61508:2010 ▪ Dual sensor input with hot backup function ▪ Checksum for validation of the device configuration
	Predictive maintenance with advanced diagnostic functions	▪ Condensed status notification according to NAMUR NE 107 ▪ Advanced diagnostic functions including: corrosion monitoring, undervoltage and sensor drift detection
	Reliable and efficient process control	▪ Long-term stable electronic ▪ Highly accurate sensor input and analog output
Functional simplicity	Quick and easy system integration	▪ Device drivers for all common control systems ▪ Endress+Hauser integration lab ensures seamless integration into all major control and asset management systems
	Save time and effort on commissioning and maintenance	▪ Push-in terminals for toolless wiring ▪ Laser-engraved connection diagram
	Clear process information in the field	▪ Plug-on display (TID10) with excellent readability ▪ Alarm/warning: flashing indication

- Universal temperature transmitter with optional HART® communication, conversion of various input signals into a scalable analog 4 to 20 mA output signal
- Installation in terminal head form B, DIN rail mounting or robust field housing
- International certifications and approvals: Ex approvals, IEC 61508:201, CE, DNV GL, NAMUR

For more information please visit
www.endress.com/tmt82

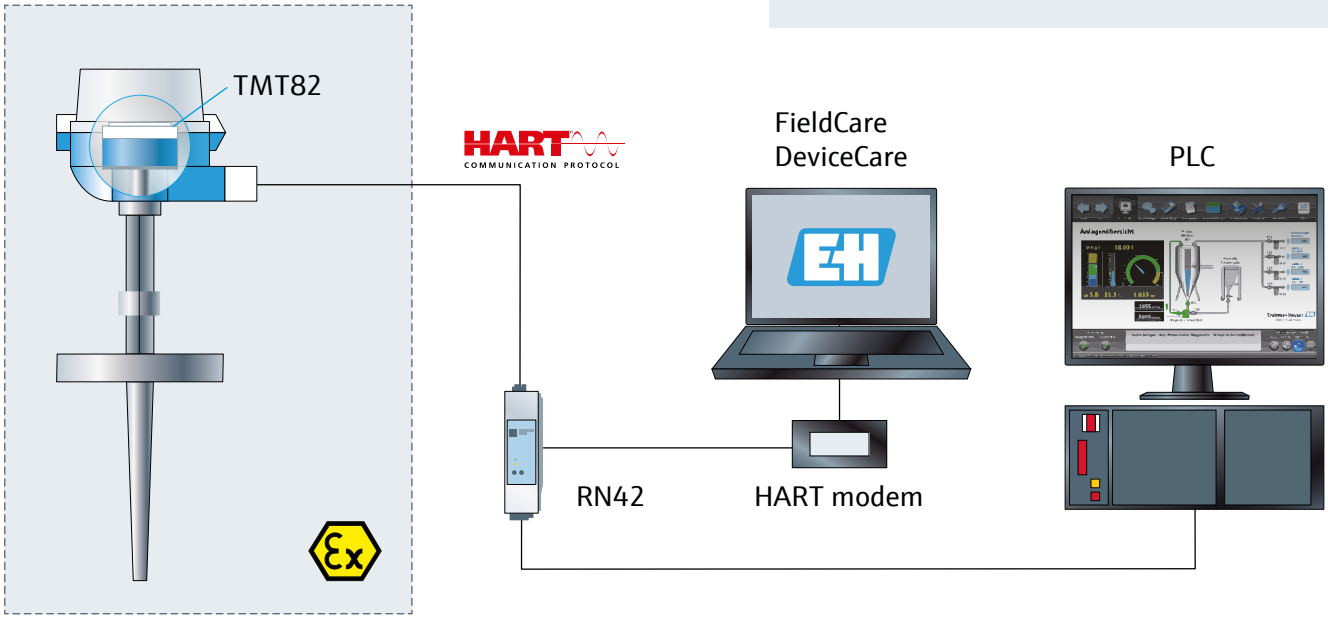
Features and specifications

Sensor input:	Dual: RTD, thermocouple (TC), Ohm and mV
Operation and commissioning:	DTM via CDI DD/DTM via HART®
Output:	4 to 20 mA, HART® protocol (version 7)
Power supply:	2-wire device, loop powered, 11 V to 36 V_{DC}
Approvals:	SIL 2/3 acc. IEC 61508:2010, ATEX, CSA, FM, EAC, IECEx, NEPSI, DNV GL
Ambient temp. range:	-52 °C to +85 °C (-61.1 °F to 185 °F)

Model comparison

	TMT72	TMT82	TMT162
Inputs	1	2	2
SIL	-	SIL 2/3	SIL 2/3
HART® 7 certified	✓	✓	✓
Overvoltage protection	-	-	✓
NE 107	✓	✓	✓
Bluetooth®	✓	-	-
Housing variants	head, DIN rail, field (light)	head, DIN rail, field (light)	field (heavy)

System integration



Related offering

Product	Feature
HAW Surge arrester	▪ Surge protection for power supply or signal/communication cables ▪ DIN rail mounting (HAW562) or field mounting (HAW569) ▪ For Ex areas, available with SIL 2 instrinsically safe approvals
Active barrier RN42	▪ Active barrier with integrated wide range power supply ▪ Bi-directional HART® transmission for monitoring and diagnostics ▪ Compact, side-by-side DIN rail housing ▪ International Ex approvals
Modular temperature assemblies	▪ Fully modular and robust thermometer iTHERM ModuLine TM131 ▪ Modular US style thermometer for general applications TH1x ▪ Explosion proof US style thermometer T1x and T5x

For more information please visit
www.endress.com/tmt82

PU01491T/09/EN/01.23

iTEMP TMT142B HART® 7

New generation smart temperature transmitter with Bluetooth®

Rugged, easy to use, high performance temperature transmitter for the field

With its robust, compact single-chamber housing, the new **TMT142B** is the perfect choice for applications in harsh environments. The update to the popular TMT142 brings new features and improvements, further increasing measurement accuracy and reliability for optimal performance in critical control applications.

Smart diagnostic information ensures process safety and efficiency by detecting deviations prior to reaching failure status. The self-guided user interface and integrated Bluetooth® interface simplifies device configuration and maintenance routines in difficult-to-reach places.

Benefits at a glance

Value	Benefits	Features
Functional simplicity	Clear process information in the field	▪ Unique backlit display with excellent visibility ▪ Warning/alarm indication (red, flashing)
	Save time and effort on commissioning, configuration and maintenance	▪ Integrated Bluetooth® interface (AISEC Security Level rating: *High*) ▪ Optimized user interface ▪ User-guided setup wizards, self-explaining menu structure
	Quick and easy system integration	▪ Device drivers for all common control systems ▪ Endress+Hauser integration lab ensures seamless integration into all major control and asset management systems
Process safety Plant availability	Continued accurate measurement even after common upset events	▪ Integrated surge/overvoltage protection ▪ Robust housings; Protection class: up to IP67 ▪ Fully potted electronics
	Reliable process control	▪ Long-term stability of the electronics ▪ Highly accurate sensor input and analog output
	Predictive maintenance with advanced diagnostic functions	▪ Condensed status notification according to NAMUR NE 107 ▪ Advanced diagnostic functions including: corrosion monitoring, undervoltage detection

- Universal temperature transmitter with optional HART® communication, conversion of various input signals into a scalable analog 4 to 20 mA output signal
- Field housing specially designed for use in harsh environments (e.g. Oil & Gas, Chemical, Primaries & Metal)
- International certifications and approvals: Ex approvals, radio approvals, CE, $_{c}$CSA$_{us}$ GP, NAMUR

For more information please visit
www.endress.com/tmt142B

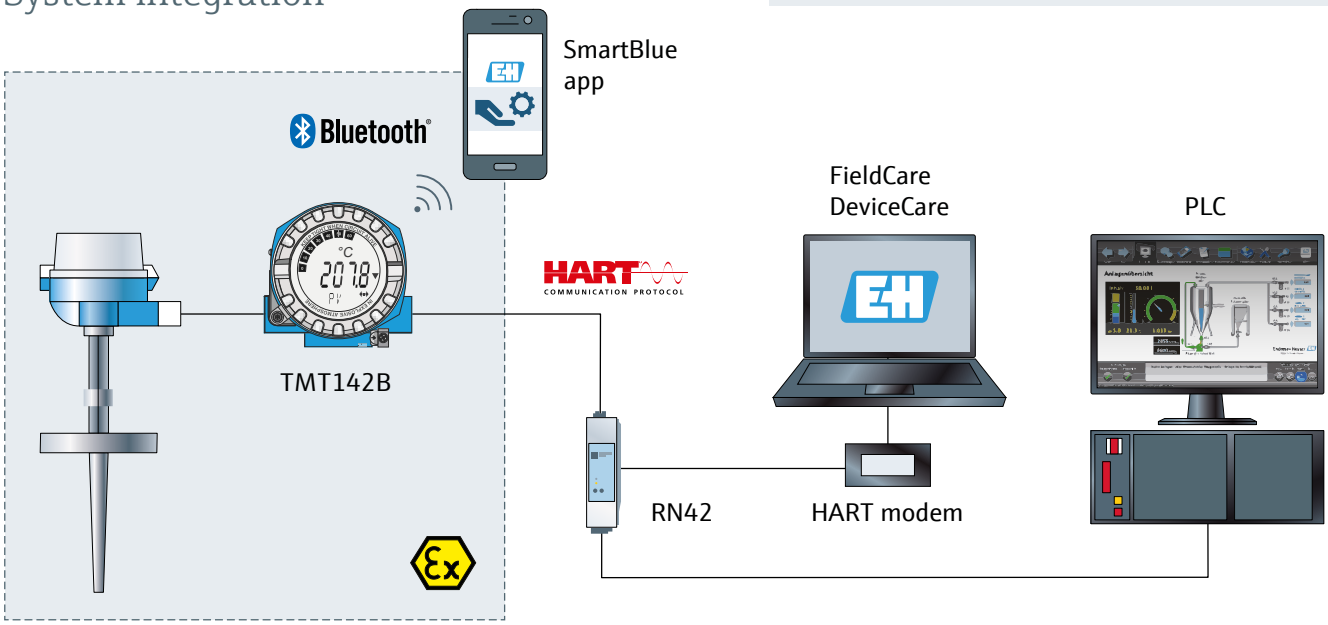
Features and specifications

Sensor input:	Single: RTD, thermocouple (TC), Ohm or mV
Operation and commissioning:	SmartBlue app (Android/iOS) via Bluetooth® DTM via CDI DD/DTM via HART®
Output:	4 to 20 mA, HART® protocol (version 7)
Power supply:	2-wire device, loop powered, 11 V to 36 V_{DC}
Approvals:	ATEX, $_{C}CSA_{US}$, EAC, IECEx, INMETRO, NEPSI
Ambient temp. range:	-40 °C to +85 °C (-40 °F to 185 °F)

Model comparison

	TMT142	TMT142B	TMT162
Inputs	1	1	2
SIL	-	-	SIL 2/3
HART® 7 certified	- (HART® 5)	✓	✓
Overvoltage protection	-	✓	✓
NE 107	-	✓	✓
Bluetooth®	-	✓	-
Accuracy	■■□	■■■	■■■

System integration



Related offering

Product	Feature
SmartBlue app	▪ Mobile remote access to your device via Bluetooth® ▪ Diagnostics and real-time process information ▪ Encoded and highly secure data transmission
Active barrier RN42	▪ Active barrier with integrated wide range power supply ▪ Bi-directional HART® transmission for monitoring and diagnostics ▪ Compact, side-by-side DIN rail housing ▪ International Ex approvals
Modular temperature assemblies	▪ Fully modular and robust thermometer iTHERM ModuLine TM131 ▪ Modular US style thermometer for general applications TH1x ▪ Explosion proof US style thermometer T1x and T5x

For more information please visit
www.endress.com/tmt142B

PU01514T/09/EN/01.23

iTEMP TMT162 HART® 7

Dual-channel temperature field transmitter

Robust temperature field transmitter for oil & gas and chemical applications

With its dual-channel input and comprehensive feature set, the iTEMP TMT162 HART 7 is designed to perform in the harshest environments, offering long-term stability in critical processes.

Intrinsic safety and advanced diagnostics: Full HART® 7 functionality, Ex approvals and a SIL 2/3 certification ensure reliable operation, higher plant safety, process efficiency and increased plant availability. Robust housings encase a newly developed, black-on-white backlit display that guarantees perfect readability under all ambient conditions in the field.

Your benefit

Value	Benefit	Feature
Increased product safety	Safeguarding the electronic components in the field device from being destroyed for maximum reliability and availability	▪ Integrated surge/overvoltage protection ▪ Robust housings, protected up to IP68 ▪ Fully-potted electronics
Increased process safety and plant availability	▪ Certification according to the latest standard for safety related devices ▪ Sensor redundancy ▪ On-site availability of process values	▪ SIL 2/3 certification according to IEC 61508:2010 -1/2/3 ▪ Integrated button for fast proof testing ▪ Dual sensor input with hot back-up function ▪ Backlit LCD display
Higher transparency	Access to additional data and diagnostics information through the use of the complete HART® 7 functionality	▪ Condensed status according to NE 107 ▪ Enhanced Burst Mode ▪ Latest HART 7 protocol

Application

- Specially designed for use in the oil & gas, chemical, power & energy and the life sciences industries
- International certifications and approvals:
  CE, NAMUR, NEMA, UL61010-1, CSA GP, GL, IEC 61508:2010, Ex approvals

For more information please visit
www.endress.com/tmt162

Feature spotlight

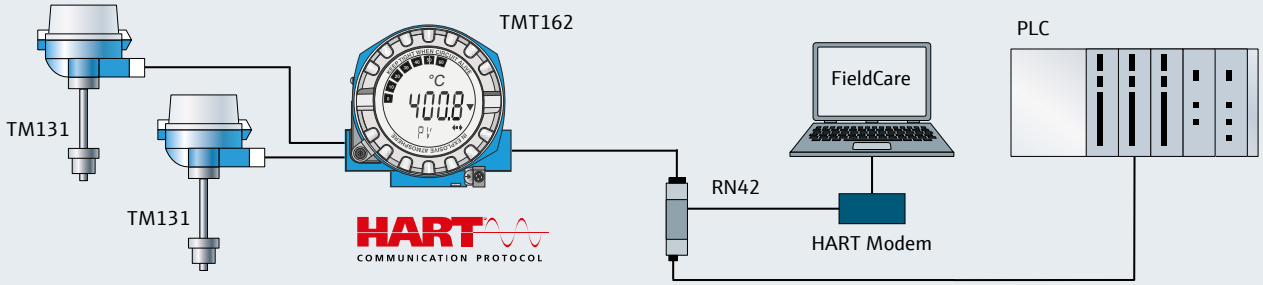
Overvoltage protection

The integrated surge arrester is used to protect the electronic components from being destroyed by overvoltage. It ensures that overvoltage surges in communication and power lines are safely directed into the ground without affecting the transmitter's functionality.

Model comparison

	TMT142B	TMT162
Inputs	1	2
SIL	-	SIL 2/3
HART® 7 certified	✓	✓
Overvoltage protection	✓	✓
NE 107	✓	✓
Bluetooth®	✓	-
Accuracy	■■■	■■■

System integration



Related product and service offering

Product	Feature
Active barrier RN42	▪ Active barrier with integrated wide range power supply ▪ Bidirectional HART® transmission for monitoring and diagnosis ▪ Compact side-by-side DIN rail housing ▪ International Ex approvals
Temperature assembly iTHERM ModuLine TM131	▪ Highest measurement performance, fast response times: innovative thermowells, iTHERM QuickSens ▪ High degree of flexibility, robust, modular design ▪ Approvals for hazardous areas; SIL2/3 approved transmitters
Endress+Hauser Service	▪ Commissioning service ensures optimal startup and reliable base for future self-checks ▪ Technical experts are always on call to support with product queries ▪ Calibration service

For more information please visit
www.endress.com/tmt162

PU01225T/09/EN/02.22

Memograph M RSG45

Advanced data manager family

Memograph M RSG45 Designed for the Industry 4.0

The range of highly flexible advanced data managers for applications across all industries provide secure, intuitive access to your remote instruments and data.

The tamper-proof solution for monitoring and storing measured process values offers predefined application packages and remote administration via webserver, saving time and increasing process transparency.

The devices excel in connectivity for seamless integration into new and existing system architectures, bridging the gap from the field level up to the Ethernet-based control level or cloud infrastructure.

Your benefit

Value	Benefit	Feature
Secure data handling	▪ Protection against unauthorized access ▪ Fulfillment of burden of proof ▪ FDA 21 CFR part 11 compliant	▪ User administration ▪ Tamper-proof data storage ▪ Built-in and removable storage
Time-saving integration into validated systems	▪ Easy setup and intuitive operation ▪ Simplified programming ▪ RSG45 and FDM - harmonized system	▪ IQ/OQ documentation for guided commissioning ▪ Predefined application packages ▪ Fieldbus & protocols: HART, Modbus (RTU/TCP), PROFIBUS DP, EtherNet/IP, PROFINET, OPC
Maximum process transparency, plant safety and availability	▪ Gapless data transfer ▪ Direct access to field device for status information, diagnostics and configuration ▪ Enables predictive maintenance	▪ Webserver ▪ Telealarm, limits, linearization ▪ Real-time clock (NTP synchronization) ▪ iTHERM TrustSens calibration monitoring

Application

Memograph M RSG45 is a flexible and powerful system for organizing process values. With its intuitive operation, the system quickly and easily adapts to nearly any application. Measured process values are clearly presented on the display or webserver, analyzed and safely logged, all while being monitored against programmed limits. The measured and calculated values can be readily communicated to higher-level systems via common communication protocols such as EtherNet/IP, PROFINET or Modbus. Individual plant modules can be easily interconnected.

For more information please visit
www.endress.com/rsg45

Specifications & features at a glance

Input / Output

- Up to 20 universal (U, I, TC, RTD) / HART inputs Integration; linearization
- 6 (14) digital inputs
- 6 (12) relays
- 2 analog outputs
- Sensor power supply (24 V DC / 250 mA)

Interfaces

- Ethernet TCP/IP, USB
- Modbus (RTU/TCP), PROFIBUS DP, PROFINET, EtherNet/IP
- Serial RS232, RS485

Data storage

- Internal memory: 256 MB
- SD card, USB drive: up to 32 GB
- Storage cycle: 100 ms

Visualization (n.a. DIN rail)

- 7″ TFT screen; 256 colors, 800 × 480 pixels
- Display modes: Curve, waterfall, bargraph, digital, instrument display, circular chart, process-related graphic

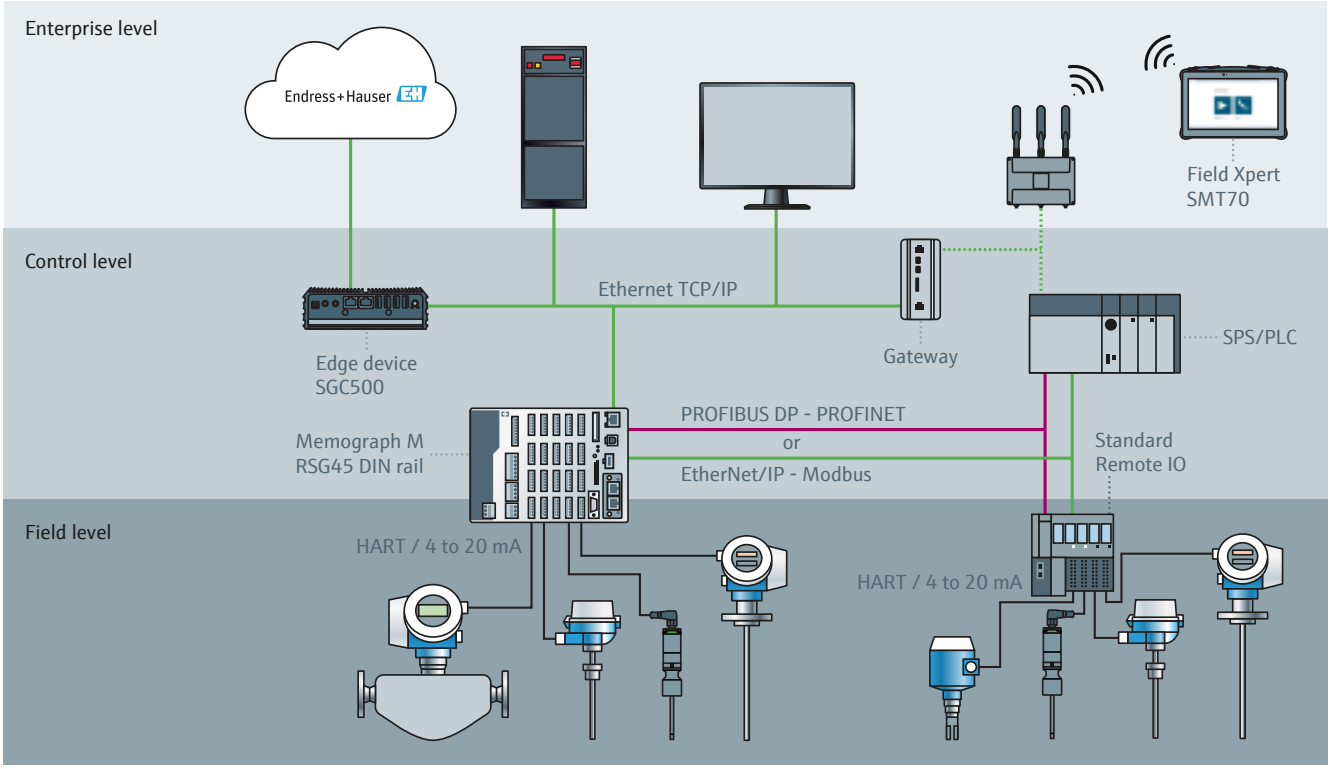
Operation & setup

- Webserver, touch screen or navigator
- Keyboard + mouse (USB)

Software and application packages

- 12 mathematic channels
- Limit switches, integration, linearization
- Tele alarm
- Batch software
- Water & Wastewater, storm overflow
- Energy software
- iTHERM TrustSens calibration monitoring

System integration



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RIA15

Process indicator

Compact, loop-powered process display for 4 to 20 mA or HART® signals

The capable and highly flexible RIA15 process indicator for analog and HART® values brings crucial transparency to applications in the life sciences and food & beverage industries.

Available globally for panel or field mounting, the device offers an excellent price/performance ratio. Its very low voltage drop, even with optional display backlight, makes it safe for use in Ex-areas.

Your benefit

Value	Benefit	Feature
Time and cost saving	▪ Quick and easy installation ▪ Flexible system integration	▪ Compact housing designed for panel or field mounting ▪ Minimal installation depth ▪ Certified for installation in Ex-areas (field housing) ▪ Very low voltage drop; Low voltage drop with backlight ▪ Loop powered
Added safety and process transparency	Local indication of measurement parameters: 4 to 20 mA signals or up to four HART® values (PV, SV, TV, QV)	▪ Good readability in poor lighting conditions ▪ Bargraph for quick process overview ▪ Large character size ▪ Easily activated backlight (optional) ▪ Control functions (limit-value monitoring, mathematics, differential pressure and linearization, ...)
Ease of use	▪ Excellent usability ▪ Safe and convenient handling	▪ 3-key operation and configuration ▪ Remote commissioning and operation

Application bundles for HART® devices

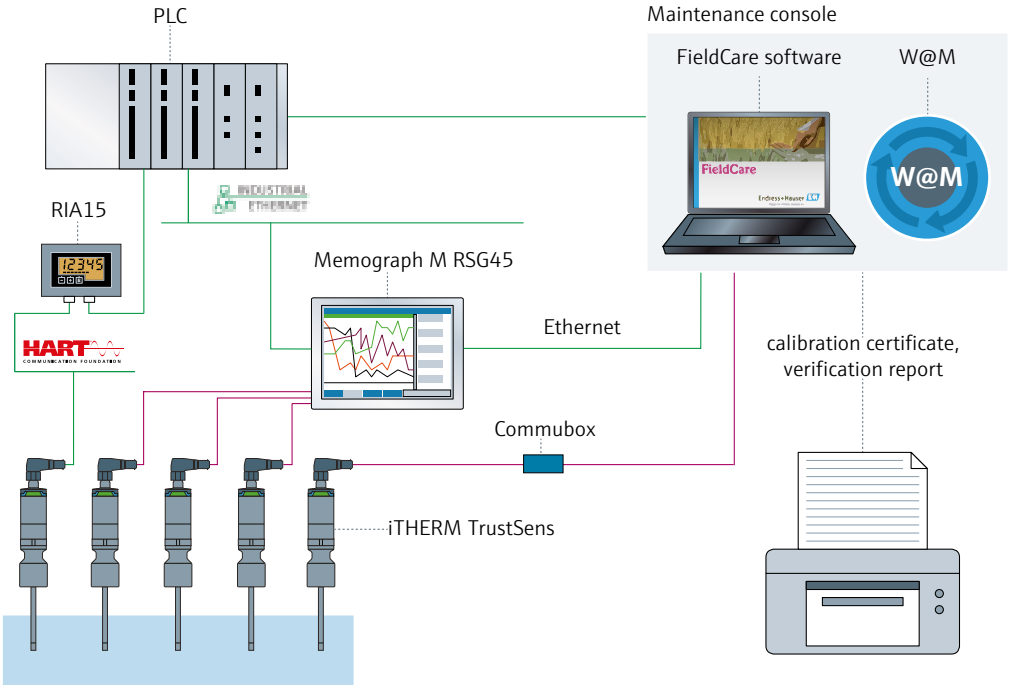
- **iTHERM TrustSens TM371:** Indicator for temperature, electronics temperature, calibration counter and offset
- **Waterpilot FMX21** and **Micropilot FMR20:** Process display and configuration via HART®
- **Liquiline Compact CM82** transmitter for Memosens sensors: Process display and configuration via HART®

For more information please visit
www.endress.com/ria15

RIA15 specifications

- Display of 4 to 20 mA measured values or HART® process variables; Scalable display values
- Use as primary or secondary HART® master
- Loop powered; Voltage drop ≤ 1 V (HART® ≤ 1.9 V)
- Panel-mount housing or field housing as local process display
- Remote commissioning and operation
- Ambient temperature range: −40 to 60 °C (−40 to 140 °F)
- Protection class: IP67, NEMA4x (aluminium housing)
- International certifications and approvals: ATEX, FM, CSA, IECEx, GL, SIL interference freeness

Integrated product and service offering



System component	Feature
Data management Memograph M RSG45	▪ Tamper-proof data storage and access (FDA 21 CFR 11) in combination with FDM Software MS20, Field Data Manager software by Endress+Hauser ▪ HART® gateway functionality; Up to 40 HART® devices connected at a time ▪ Communication capabilities: Modbus, PROFIBUS DP, PROFINET, EtherNet/IP
Field Data Manager Software MS20	▪ Archiving and visualization of historical measured values, diagnostic events and protocols ▪ Automatic service for report generation and printing, data read out, storing and export ▪ Online visualization of instantaneous values (live data)
Endress+Hauser Service	▪ Commissioning service ensures optimal startup and reliable base for future self-checks ▪ Technical experts are always on call to support with product queries

For more information please visit
www.endress.com/ria15

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At Endress+Hauser, we offer the most innovative, complete and globally available portfolio of temperature measurement and system products for customers in the Power & Energy, Chemical and Oil & Gas industries.

Our instruments, services and solutions provide reliable process data, state-of-the-art connectivity, measurement performance and intuitive handling. Focus on gaining the valuable process information you need to boost your plant's safety and output. We take care of the rest.

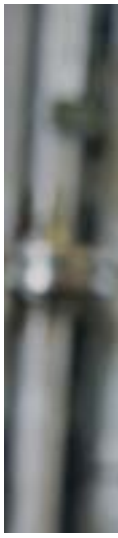
For more information please visit:
https://eh.digital/temperature

Power & Energy: Power up your plant

Power plants play a vital role. We help minimize downtime while delivering safety and productivity
Whether your power plant serves the needs of ordinary homes, hospitals or factory production lines - the world needs reliable and safe power, and you need profitability. At Endress+Hauser, we bring precision and safety to power plants all over the world.

Reliable solutions with proven, state-of-the-art technologies ensure elevated standards of safety and output, empowering you to operate according to industry regulations and meet ever-higher environmental demands. We are your partner of choice for all matters of efficiency, safety and expertise.

Chemical: Be competitive and increase safety



Get the extra project skill and know-how you need to boost your plant's safety and performance
It is a challenge to find the optimum balance between demands such as productivity, profitability, risk reduction and good environmental management. Endress+Hauser support you in attaining technology leadership and peak performance in your required areas in times of increasing cost pressure. With a long history of industry firsts we have grown with the sector by listening, acting and innovating to better serve you.

Oil & Gas: Fuel for thought

With vast experience in the Oil & Gas sector, we help you to perform, comply and thrive
Although markets can be unpredictable, your operation cannot be. Whether upstream or downstream, you need a partner who understands that you must maintain and maximize plant availability - and do it with ever-tighter resources.

Meeting evolving demands
From exploration to refinery, storage to distribution, and from plant upgrades to new projects, we have the application expertise to help you succeed.
At a time when the Oil & Gas industry faces skills shortages and regulations tightening, our organization is here across the full life cycle of your project always with your deadlines in mind.
While complexity of facilities and processes are ever increasing, and downtime must be reduced, your competitiveness is enhanced with reliable, accurate and traceable asset information.

In short, you need to do more with less, benefiting from a stable partner who is here for the long haul and ready across the globe.

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Endress+Hauser

People for Process Automation