Technical Information
T13, T14 and T15

Explosion proof RTD assemblies in thermowells with spring loaded insert and enclosure for process industry

Application

- Heavy duty applications
- The sensor assemblies can be used in process industries such as:
  - Chemicals
  - Petrochemical
  - Refineries
  - Offshore platforms
- Measuring range: −200 to 600 °C (−328 to 1 112 °F)
- Protection class: IP66/67

Head transmitter

All Endress+Hauser transmitters are available with enhanced accuracy and reliability compared to directly wired sensors. Easy customizing by choosing one of the following outputs and communication protocols:

- Analog output 4 to 20 mA
- HART®
- PROFIBUS® PA
- FOUNDATION Fieldbus™

Field transmitter

Temperature field transmitters with HART® or FOUNDATION Fieldbus™ protocol for highest reliability in harsh industrial environments. Blue backlit display with large measured value, bargraph and fault condition indication for ease of reading.

Your benefits

- FM/CSA XP Class I, Div. 1 approved temperature assemblies for maximum safety
- One source shopping for temperature measurement solutions. World class transmitter with integrated sensor offering for heavy process industry applications
- Remove and install straight out of the box
- Improved galvanic isolation on most devices (2 kV)
- Simplified model structure: Competitively priced, offers great value. Easy to order and reorder. A single model number includes sensor, thermowell and transmitter assembly for a complete point solution
- All iTEMP transmitters provide long-term stability ≤ 0.05% per year

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

Resistance thermometer (RTD)

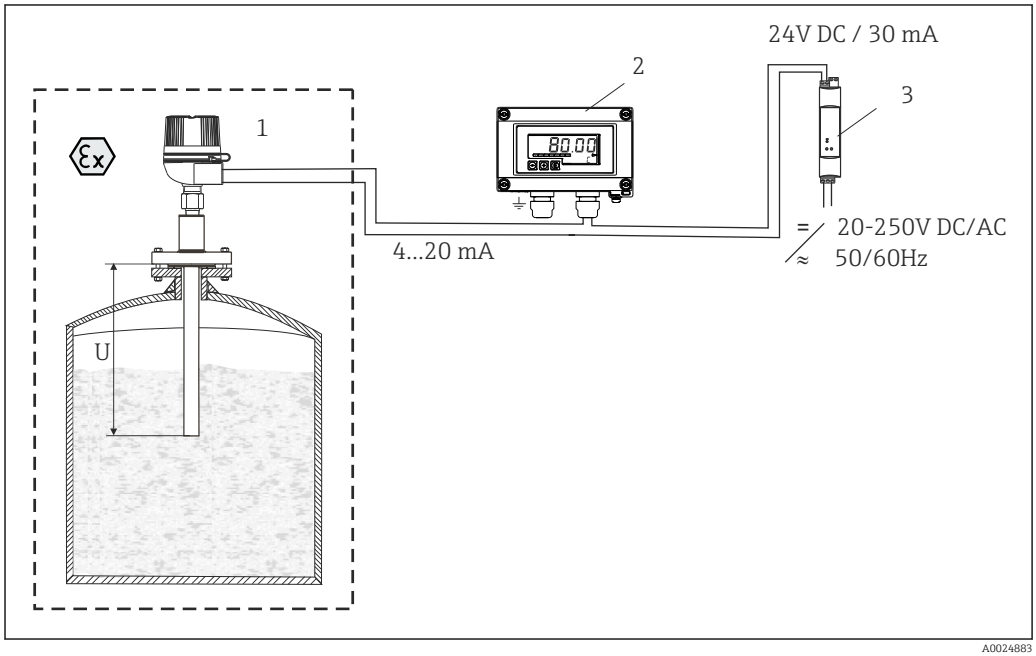
These resistance thermometers use a Pt100 temperature sensor according to IEC 60751. The temperature sensor is a temperature-sensitive platinum resistor with a resistance of 100 Ω at 0 °C (32 °F) and a temperature coefficient α = 0.003851 °C^{-1}.

There are generally two different kinds of platinum resistance thermometers:

- **Wire wound (WW):** Here, a double coil of fine, high-purity platinum wire is located in a ceramic support. This is then sealed top and bottom with a ceramic protective layer. Such resistance thermometers not only facilitate very reproducible measurements but also offer good long-term stability of the resistance/temperature characteristic within temperature ranges up to 600 °C (1 112 °F). This type of sensor is relatively large in size and it is comparatively sensitive to vibrations.
- **Thin film platinum resistance thermometers (TF):** A very thin, ultrapure platinum layer, approx. 1 µm thick, is vaporized in a vacuum on a ceramic substrate and then structured photolithographically. The platinum conductor paths formed in this way create the measuring resistance. Additional covering and passivation layers are applied and reliably protect the thin platinum layer from contamination and oxidation, even at high temperatures.

The primary advantages of thin film temperature sensors over wire wound versions are their smaller sizes and better vibration resistance. A relatively low principle-based deviation of the resistance/temperature characteristic from the standard characteristic of IEC 60751 can frequently be observed among TF sensors at high temperatures. As a result, the tight limit values of tolerance category A as per IEC 60751 can only be observed with TF sensors at temperatures up to 200 °C (392 °F).

Measuring system



1 Application example

1 Mounted thermometer with head transmitter installed.
2 RIA15 process display - The display unit records the analog measuring signal from the head transmitter and shows this on the display. The LC display shows the current measured value in digital form and as a bar graph indicating a limit value violation. The process display unit is integrated in the 4 to 20 mA or HART® loop and is powered directly from the current loop. Optionally up to four of a sensor's HART® process variables can be displayed. More information on this can be found in the Technical Information, see "Documentation".
3 Active barrier RN221N - The RN221N (24 V_{DC}, 30 mA) active barrier has a galvanically isolated output for supplying voltage to loop-powered transmitters. The universal power supply works with an input supply voltage of 20 to 250 V DC/AC, 50/60 Hz, which means that it can be used in all international power grids. More information on this can be found in the Technical Information, see "Documentation".

Input

Measurement range

Construction	Model code (class and type of sensor)	Max. measurement range
Low temperature range	T13-_ _ _ _ _ (A/C/E/G/J/L) _ _ _ _ _	−50 to 200 °C (−58 to 392 °F)
	T14-_ _ _ _ _ (A/C/E/G/J/L) _ _ _ _ _	
	T15-_ _ _ (A/C/E/G/J/L) _ _ _ _ _	
High temperature range	T13-_ _ _ _ _ (B/D/F/H/K/M) _ _ _ _ _	−200 to 600 °C (−328 to 1 112 °F)
	T14-_ _ _ _ _ (B/D/F/H/K/M) _ _ _ _ _	
	T15-_ _ _ (B/D/F/H/K/M) _ _ _ _ _	

Options J, K, L, M are duplex platinum elements of two sensors inside the same sheath.

Output

Output signal

Generally, the measured value can be transmitted in one of two ways:

- Directly-wired sensors - sensor measured values forwarded without a transmitter.
- Via all common protocols by selecting an appropriate Endress+Hauser iTEMP temperature transmitter. All the transmitters listed below are mounted directly in the terminal head or as field transmitter and wired with the sensory mechanism.

Family of temperature transmitters

Thermometers fitted with iTEMP transmitters are an installation-ready complete solution to improve temperature measurement by significantly increasing accuracy and reliability, when compared to direct wired sensors, as well as reducing both wiring and maintenance costs.

PC programmable head transmitters
They offer a high degree of flexibility, thereby supporting universal application with low inventory storage. The iTEMP transmitters can be configured quickly and easily at a PC. Endress+Hauser offers free configuration software which can be downloaded from the Endress+Hauser Website. More information can be found in the Technical Information.

HART® programmable head transmitters
The transmitter is a 2-wire device with one or two measuring inputs and one analog output. The device not only transfers converted signals from resistance thermometers and thermocouples, it also transfers resistance and voltage signals using HART® communication. It can be installed as an intrinsically safe apparatus in Zone 1 hazardous areas and is used for instrumentation in the terminal head (flat face) as per DIN EN 50446. Swift and easy operation, visualization and maintenance by PC using operating software, Simatic PDM or AMS. For more information, see the Technical Information.

PROFIBUS® PA head transmitters
Universally programmable head transmitter with PROFIBUS® PA communication. Conversion of various input signals into digital output signals. High accuracy over the complete ambient temperature range. Swift and easy operation, visualization and maintenance using a PC directly from the control panel, e. g. using operating software, Simatic PDM or AMS. For more information, see the Technical Information.

FOUNDATION Fieldbus™ head transmitters
Universally programmable head transmitter with FOUNDATION Fieldbus™ communication. Conversion of various input signals into digital output signals. High accuracy over the complete ambient temperature range. Swift and easy operation, visualization and maintenance using a PC directly from the control panel, e.g. using operating software such as ControlCare from Endress +Hauser or NI Configurator from National Instruments. For more information, see the Technical Information.

Advantages of the iTEMP transmitters:
- Dual or single sensor input (optionally for certain transmitters)
- Pluggable display (optionally for certain transmitters)
- Unsurpassed reliability, accuracy and long-term stability in critical processes

- Mathematical functions
- Monitoring of the thermometer drift, sensor backup functionality, sensor diagnostic functions
- Sensor-transmitter matching for dual sensor input transmitters, based on Callendar/Van Dusen coefficients

HART® Field transmitter
Field transmitter with HART® communication and blue backlit display. Can be read easily from a distance, in sunlight and at night. Large measurement value, bargraph and fault indication displayed. Benefits are: dual sensor input, highest reliability in harsh industrial environments, mathematic functions, thermometer drift monitoring and sensor back-up functionality, corrosion detection.

Galvanic isolation

Galvanic isolation of Endress+Hauser iTEMP transmitters

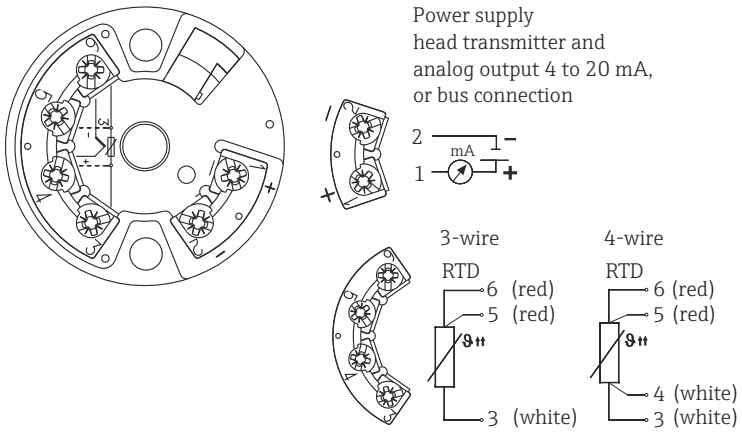
Transmitter type	Sensor
TMT181 PCP	Û = 3.75 kV AC
TMT182 HART®	U = 2 kV AC
TMT162 HART® Field transmitter	U = 2 kV AC

Wiring

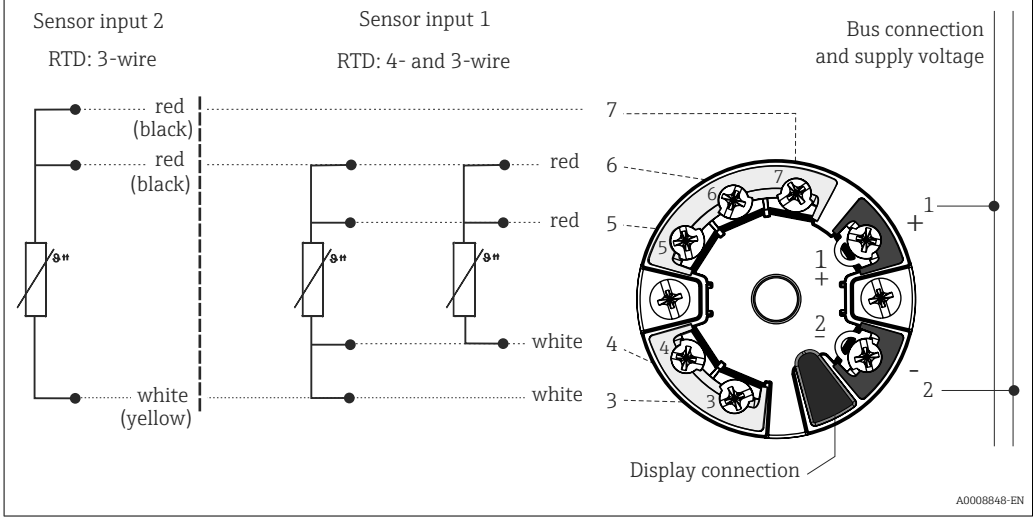
Wiring diagrams

Type of sensor connection

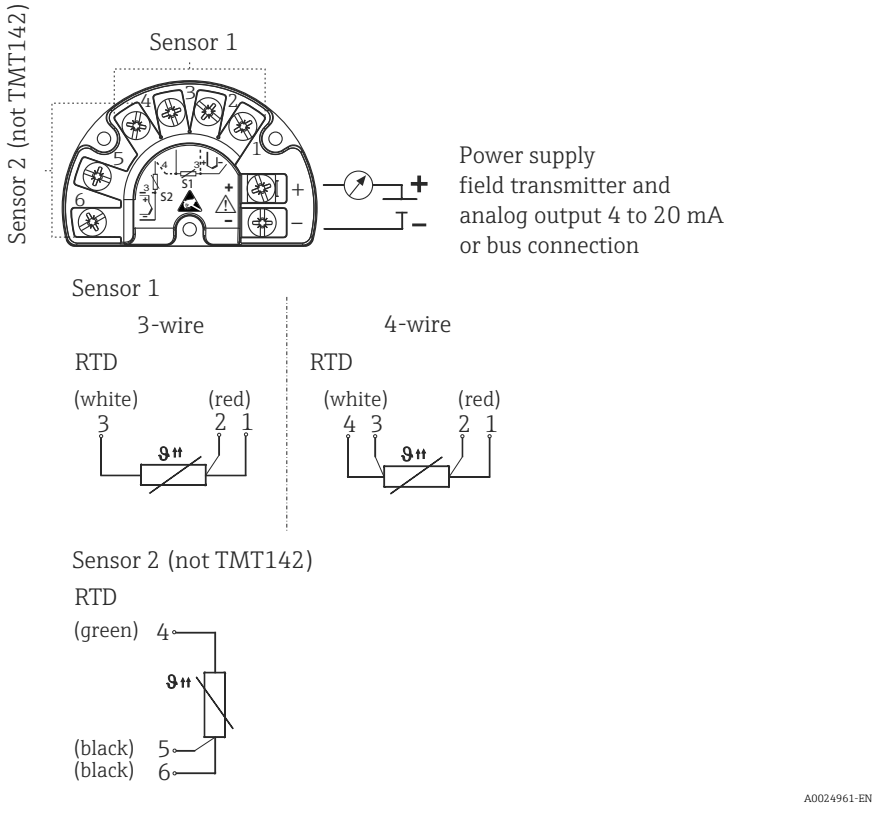
Head mounted transmitter TMT18x (single input)

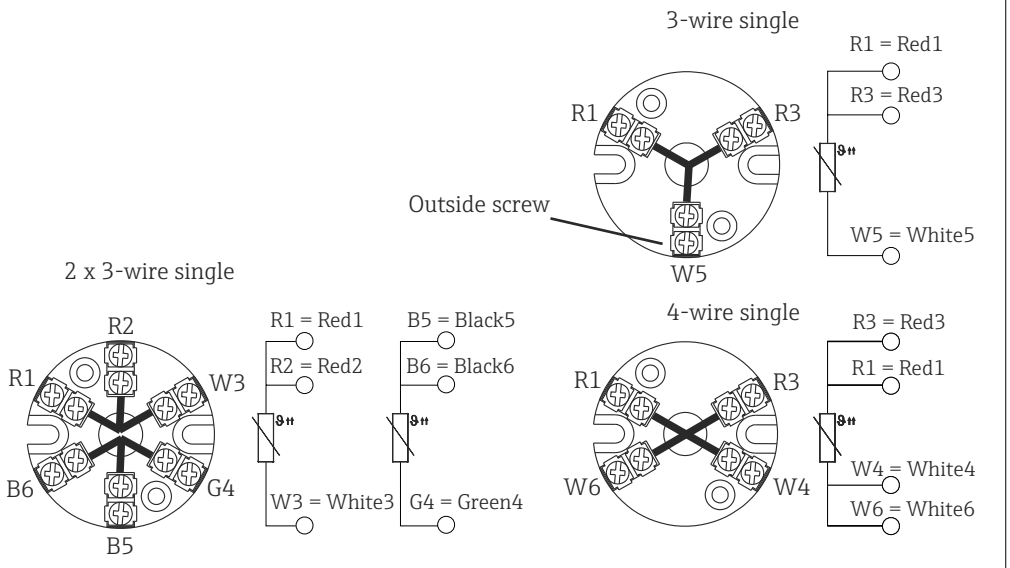


Head mounted transmitter TMT8x (dual input)



Field mounted transmitter

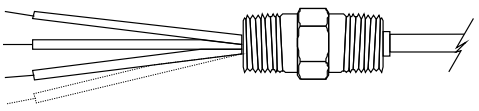


Terminal block mounted


Wire specifications

24 AWG, 19 strand silver plated copper with 0.010" PTFE extruded outer.

Electrical connection
Flying leads, standard 139.7 mm (5.5 in) for wiring in connection head, head mounted transmitter or terminal block mounted, and for wiring with TMT162 or TMT142 assemblies

Design of leads	
Flying leads 139.7 mm (5.5 in) with brass crimped sleeves	

Performance characteristics

Reference conditions

These data are relevant for determining the accuracy of the temperature transmitters used. More information on this can be found in the Technical Information of the iTEMP temperature transmitters.

Response time

63% response time per ASTM E644

RTD assembly T15 without thermowell

Construction	
High temperature range	3 s
Low temperature range	9 s

Response time for the sensor assembly without transmitter.

Response time examples for RTD assemblies with thermowell T13 and T14

Construction	Stepped thermowell	Tapered thermowell	Straight thermowell (¾")
High temperature range	20 s	25 s	30 s
Low temperature range	25 s	30 s	35 s

Response times for RTD assemblies with thermowell are provided for general design guidance without transmitter.

When the temperature of a process media changes, the output signal of a RTD assembly follows this change after a certain time delay. The physical cause is the time related to heat transfer from the process media through the thermowell and the insert to the sensor element (RTD). The manner in which the reading follows the change in temperature of the assembly over time is referred to as the response time. Variables that influence or impact the response time are:

- Wall thickness of thermowell
- Spacing between RTD insert and thermowell
- Sensor packaging
- Process parameters such as media, flow velocity, etc.

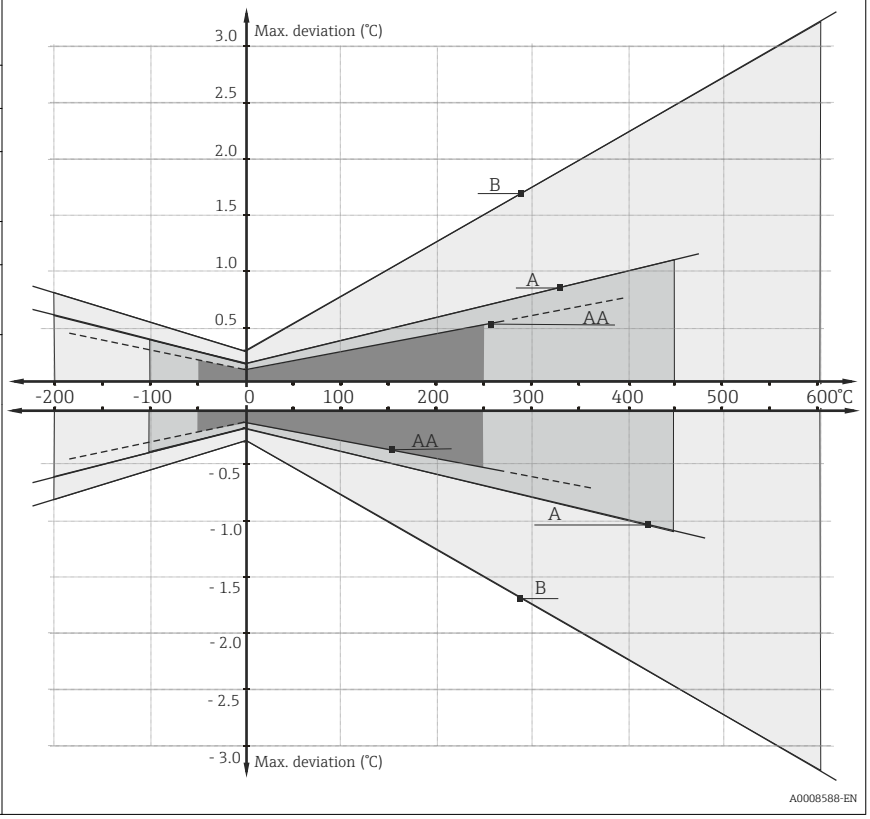
Reference operating conditions

Accuracy

RTD resistance thermometer as per IEC 60751

Class	Max. tolerances (°C)	
Cl. AA, former 1/3 Cl. B	± (0.1 + 0.0017 · |t| [1])	
Cl. A	± (0.15 + 0.002 · |t| [1])	
Cl. B	± (0.3 + 0.005 · |t| [1])	
Temperature ranges for compliance with the tolerance classes		
Wire wound sensor (WW):	Cl. A	Cl. AA
	−100 to +450 °C	−50 to +250 °C
Thin-film version (TF):	Cl. A	Cl. AA
Standard	−30 to +300 °C	0 to +150 °C

Characteristics



1) |t| = absolute value °C

In order to obtain the maximum tolerances in °F, the results in °C must be multiplied by a factor of 1.8.

Transmitter long-term stability

≤ 0.1 °C (0.18 °F) / year or ≤ 0.05 % / year

Data under reference conditions; % relates to the set span. The larger value applies.

Dielectric strength

The units are factory tested with 500 V_{AC} for one minute between live parts (terminals) and exposed non-current-carrying metal parts (e.g. probe sheath).

Self heating

RTD elements are passive resistances that are measured using an external current. This measurement current causes a self-heating effect in the RTD element itself which in turn creates an additional measurement error. In addition to the measurement current, the size of the measurement error is also affected by the temperature conductivity and flow velocity of the process. This self-heating error is negligible when an Endress+Hauser iTEMP temperature transmitter (very small measurement current) is connected.

Calibration specifications

The manufacturer provides comparison temperature calibrations from −20 to 300 °C (−4 to 572 °F) on the International Temperature Scale of 1990. Calibrations are traceable to standards maintained by the National Institute of Standards and Technology (NIST). Calibration services are in conformance with ASTM E220, IEC 17025 and ANSI/NCSL Z540-1-1994. The report of calibration is referenced to the serial number of the assembly.

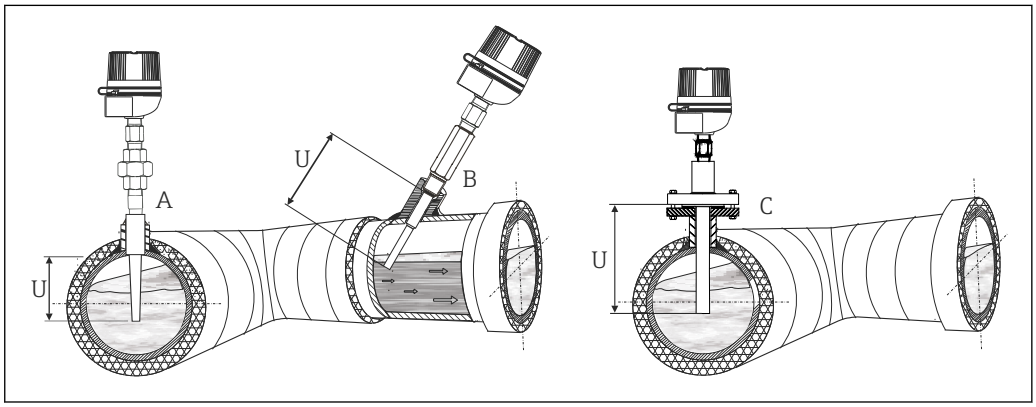
Three point calibrations are provided, given that the specified temperatures are within the recommended range and the minimum length requirements are met as specified. The minimum length is based on the overall length "x" of the spring loaded insert.

Installation

Orientation

No restrictions.

Installation instructions



2 *Installation examples*

A-C In pipes with a small cross section the thermowell tip should reach or extend slightly past the center line of the pipe (= U)
B Threaded, angled installation of T13 assembly
C Flange installation of T14 assembly

The immersion length of the thermometer influences the accuracy. If the immersion length is too small then errors in the measurement are caused by heat conduction via the process connection and the container wall. If installing into a pipe then the immersion length should be at least half of the pipe diameter. A further solution could be an angled (tilted) installation (see C). When determining the immersion length all thermometer parameters and the process to be measured must be taken into account (e.g. flow velocity, process pressure).

- Installation possibilities: Pipes, tanks or other plant components
- Minimum immersion length per ASTM E644, $\Delta T \leq 0.05$ °C (0.09 °F):

For temperature assemblies with themowell (T13 and T14) the minimum immersion is the depth to which the thermowell is immersed in the medium, measured from the tip. To minimize errors from ambient temperature the following minimum immersion lengths are recommended:

Construction	Minimum immersion
Stepped thermowell	63.5 mm (2.5 in)
Tapered thermowell	114.3 mm (4.5 in)
¾" straight thermowell	101.6 mm (4 in)
Weld-in thermowell	114.3 mm (4.5 in)

T15 assemblies can only be used in existing thermowells.

Environment

Ambient temperature

Terminal head	Temperature in °C (°F)
Without mounted head transmitter	Depends on the terminal head used and the cable gland or fieldbus connector, see 'Terminal heads' section
With mounted head transmitter	−40 to 85 °C (−40 to 185 °F)
With mounted head transmitter and display	−20 to 70 °C (−4 to 158 °F)

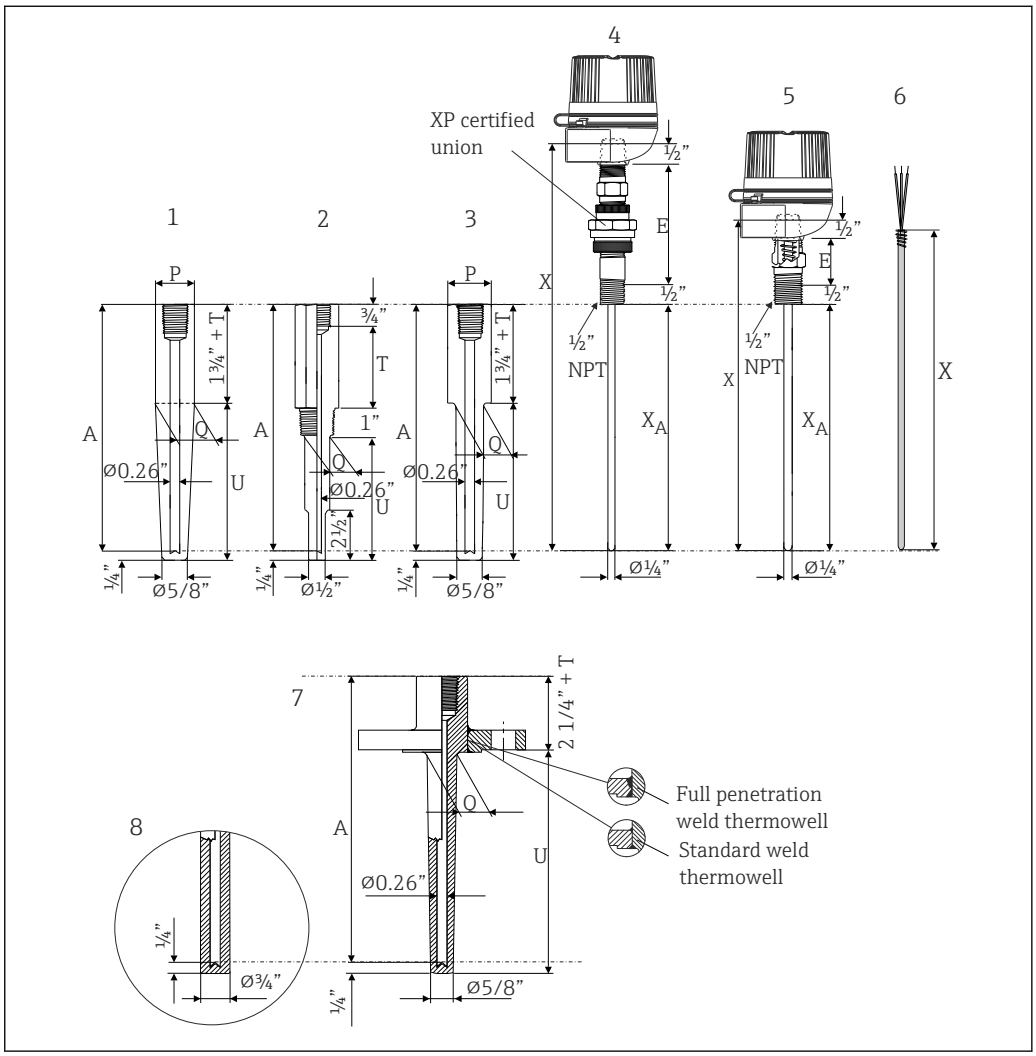
Shock and vibration resistance

4 g/2 to 150 Hz as per IEC 60068-2-6

Mechanical construction

Design, dimensions

All dimensions in inch. For values related to the graphics please refer to the tables and equations below.



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3 Dimensions of the sensor assemblies

1 T13 weld-in thermowell (tapered)
2 T13 threaded thermowell (stepped)
3 T13 socket weld thermowell (tapered)
4 T13/T14 extension, nipple-XP-union-nipple (NUN), without thermowell
5 T13/T14 extension hex nipple without thermowell
6 TU111 spring loaded insert
7 T14 flange thermowell (tapered)
8 Straight thermowell tip
E Extension length
P Pipe size
Q Thermowell root diameter
T Lag dimension
U Thermowell immersion length
XA Immersion length RTD sensor
A Drill depth of thermowell
X Overall insert length

For T13 thermowells with ½" NPT and 1" process thread length and ¾" hex length dimensions, spring loaded sensor assemblies must be used with the thermowells.

All thermowells are marked with a material ID, CRN (Canadian Registration Number) and heat number.

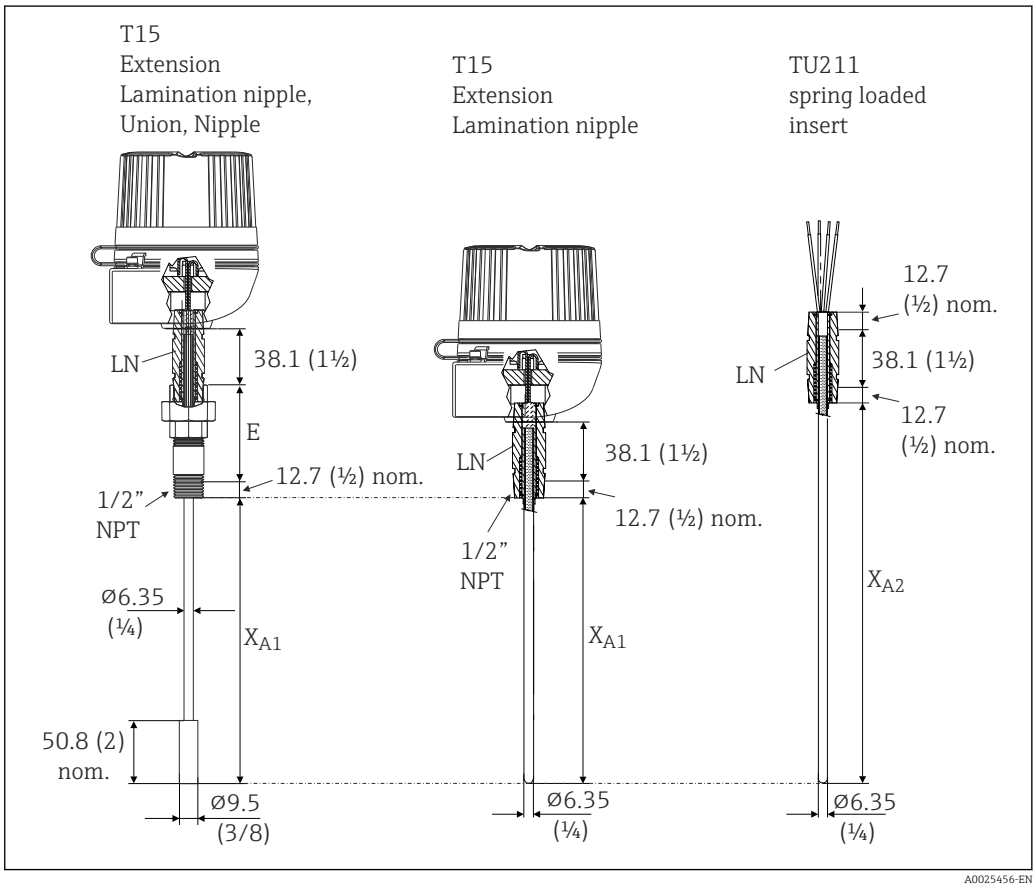
Dimensions of T13

U	E (nominal dimension)	T	Process connection	Shape of thermowell	ØQ
63.5 mm (2.5 in) 114.3 mm (4.5 in) 190.5 mm (7.5 in) 266.7 mm (10.5 in) 342.9 mm (13.5 in) 419.1 mm (16.5 in) 571.5 mm (22.5 in) specified length 50.8 to 571.5 mm (2 to 22.5 in) in ½" increments	Material: Steel or 316SS Hex nipple = 25.4 mm (1 in) Nipple Union Nipple (NUN) = 101.6 mm (4 in) 177.8 mm (7 in)	76.2 mm (3 in) or specified length 25.4 to 152.4 mm (1 to 6 in) in ½" increments	½" NPT	Stepped (standard duty)	16 mm (⅝ in)
				Tapered (heavy duty)	16 mm (⅝ in)
			¾" NPT	Stepped (standard duty)	19.05 mm (¾ in)
				Tapered (heavy duty)	22.3 mm (⅞ in)
			1" NPT	Stepped (standard duty)	22.3 mm (⅞ in)
				Tapered (heavy duty)	26.9 mm (1 1/16 in)
			¾" socket weld	Stepped (standard duty)	19.05 mm (¾ in)
				Tapered (heavy duty)	22.3 mm (⅞ in)
			1" socket weld	Stepped (standard duty)	22.3 mm (⅞ in)
				Tapered (heavy duty)	25.4 mm (1 in)
			¾" weld in	Tapered (heavy duty)	26.6 mm (1.050 in)
			1" weld in	Tapered (heavy duty)	33.4 mm (1.315 in)
Immersion length RTD sensor = thermowell drilled length			X_A = A = U + 38.1 mm (1.5 in) + T		
Overall insert length			X = A + E		
P = Pipe size ▪ ¾" Nominal utilizes 1.050" ▪ 1" Nominal utilizes 1.315"					

Dimensions of T14

U	E (nominal dimension)	T	Flange size	ØQ, tapered version
50.8 mm (2 in)	Hex nipple = 25.4 mm (1 in) or Nipple Union Nipple (NUN) = 101.6 mm (4 in) 177.8 mm (7 in)	specified length 25.4 to 254 mm (1 to 10 in) in ½" increments	25.4 mm (1 in)	22.3 mm (⅞ in)
101.6 mm (4 in)			38.1 mm (1½ in)	26.9 mm (1 1/16 in)
177.8 mm (7 in)			50.8 mm (2 in)	26.9 mm (1 1/16 in)
254 mm (10 in)				
330.2 mm (13 in)				
406.4 mm (16 in)				
558.8 mm (22 in)				

U	E (nominal dimension)	T	Flange size	ØQ, tapered version
specified length 50.8 to 571.5 mm (2 to 22.5 in) in ½" increments				
Immersion length RTD sensor = thermowell drilled length		X = A = U + 50.8 mm (2 in) + T		
Overall insert length		X = A + E		



4 *Design and dimensions of T15 (without thermowell), all dimensions in mm (in)*

E Extension length (nominal dimension)
LN Lamination nipple (flamepath nipple)
XA1 Insert immersion length
XA2 Insert immersion length TU211

When ordering a sensor with a ⅜" diameter, only the bottom 2" will have an outer diameter of ⅜".

Dimensions of T15 (without thermowell)		Extension E
Immersion length	RTD sensor X_{A1}	Lamination Nipple Union Nipple (LUN) = 76.2 mm (3 in) or 152.4 mm (6 in)
	specified length 101.6 to 2 540 mm (4 to 100 in) in ½" increments	
	RTD sensor X_{A2} for spring loaded insert TU211 as spare part insert for Lamination Nipple Union Nipple (LUN) version [1]	
	Calculate X_{A2} as follows: X_{A1}+E	

1) Order code for spring loaded insert TU211 (TU211-_ _ _5 _ _ _ _ _)

Weight	1 to 30 lbs

Material

Process connection and thermowell

The temperatures for continuous operation specified in the following table are only intended as reference values for use of the various materials in air and without any significant compressive load. The maximum operation temperatures are reduced considerably in some cases where abnormal conditions such as high mechanical load occur or in aggressive media.

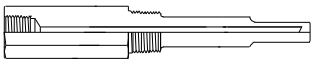
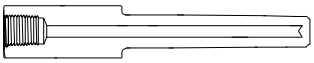
Material name	Short form	Recommended max. temperature for continuous use in air	Properties
AISI 316/ 1.4401	X5CrNiMo17-12-2	650 °C (1 202 °F) [1]	▪ Austenitic, stainless steel ▪ High corrosion resistance in general ▪ Particularly high corrosion resistance in chlorine-based and acidic, non-oxidizing atmospheres through the addition of molybdenum (e.g. phosphoric and sulfuric acids, acetic and tartaric acids with a low concentration)
AISI 316L/ 1.4404 1.4435	X2CrNiMo17-12-2 X2CrNiMo18-14-3	650 °C (1 202 °F) [1]	▪ Austenitic, stainless steel ▪ High corrosion resistance in general ▪ Particularly high corrosion resistance in chlorine-based and acidic, non-oxidizing atmospheres through the addition of molybdenum (e.g. phosphoric and sulfuric acids, acetic and tartaric acids with a low concentration) ▪ Increased resistance to intergranular corrosion and pitting ▪ Compared to 1.4404, 1.4435 has even higher corrosion resistance and a lower delta ferrite content

1) Can be used to a limited extent up to 800 °C (1472 °F) for low compressive loads and in non-corrosive media. Please contact your Endress+Hauser sales team for further information.

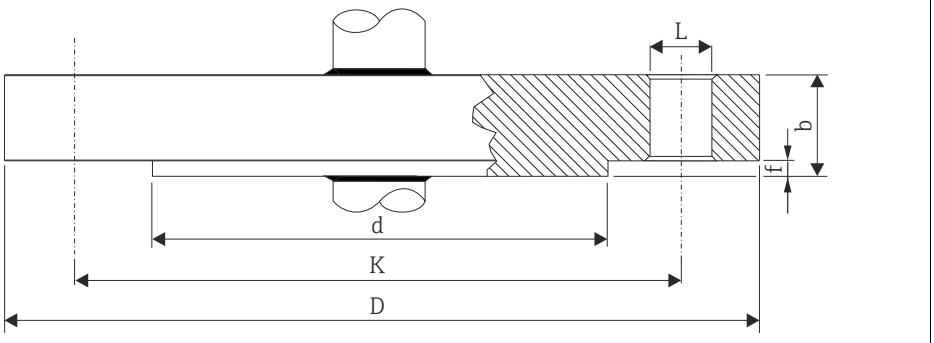
Process connection

The process connection is the means of connecting the thermometer to the process. The following process connections are available:

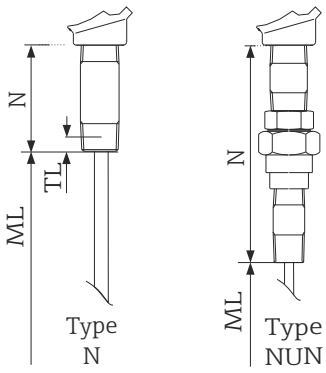
T13

Thread		Version	
 A0026110		NPT thread	NPT 1/2"
			NPT 3/4"
			NPT 1"
 A0026111		NPS for socket weld	NPS 3/4"
			NPS 1"
 A0026108		NPS for weld-in	NPS 3/4"
			NPS 1"

T14

Flange	
	
For detailed information on the flange dimensions refer to the following flange standard: ANSI/ASME B16.5	The flange material must be the same as of the stem of the thermowell.

T15

Type		Thermowell connection	Extension neck lengths in mm (in)
	Type N	½" NPT external thread	25.4 mm (1 in)
	Type NUN	½" NPT external thread	101.6 mm (4 in) 177.8 mm (7 in)

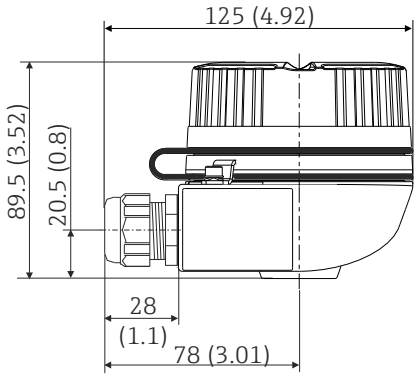
Housing

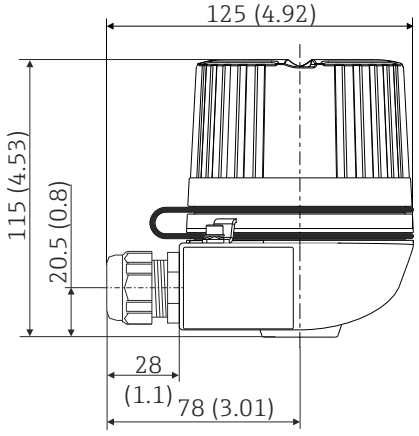
Terminal heads

All terminal heads have an internal shape and size in accordance with DIN EN 50446, flat face and a thermometer connection with a ½" NPT thread. All dimensions in mm (in). Specifications without head transmitter installed. For ambient temperatures with head transmitter installed, see the 'Environment' section. → 10

As a special feature, Endress+Hauser offers terminal heads with optimized terminal accessibility for easy installation and maintenance.

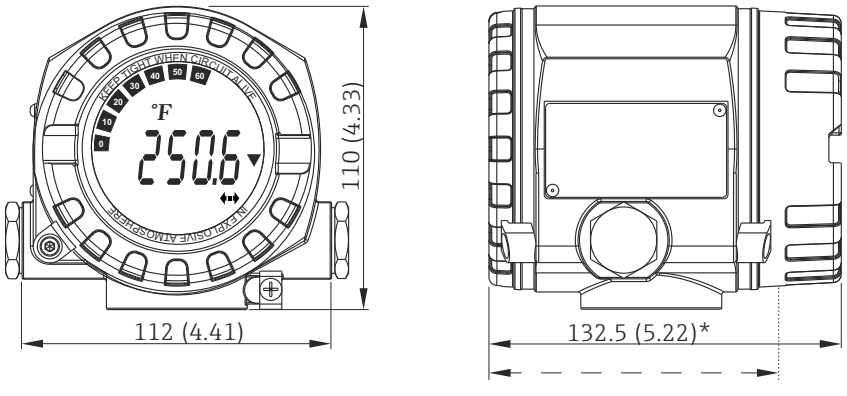
Some of the specifications listed below may not be available on this product line.

TA30H	Specification
	▪ Flameproof (XP) version, explosion-protected, captive screw cap, available with one or two cable entries ▪ Protection class: IP 66/68 ▪ Temperature: −50 to +150 °C (−58 to +302 °F) for rubber seal without cable gland (observe max. permitted temperature of cable gland!) ▪ Material: aluminum; polyester powder coated ▪ Thread: ½" NPT, ¾" NPT, M20x1.5, G½" ▪ Extension neck/thermowell connection: ½" NPT ▪ Color of head: blue, RAL 5012 ▪ Color of cap: gray, RAL 7035 ▪ Weight: approx. 640 g (22.6 oz)

TA30H with display window in cover	Specification
	▪ Flameproof (XP) version, explosion-protected, captive screw cap, available with one or two cable entries ▪ Protection class: IP 66/68 ▪ Temperature: −50 to +150 °C (−58 to +302 °F) or rubber seal without cable gland (observe max. permitted temperature of cable gland!) ▪ Material: aluminum; polyester powder coated ▪ Thread: ½" NPT, ¾" NPT, M20x1.5, G½" ▪ Extension neck/thermowell connection: ½" NPT ▪ Color of head: blue, RAL 5012 ▪ Color of cap: gray, RAL 7035 ▪ Weight: approx. 860 g (30.33 oz) ▪ Head transmitter optionally available with TID10 display

Field housings

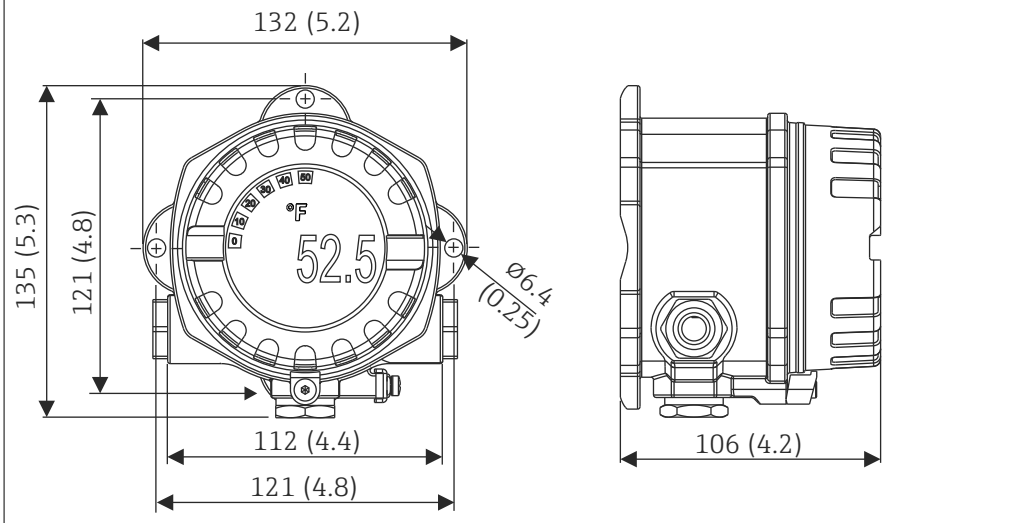
Temperature field transmitter iTEMP TMT162



* Dimensions without display = 112 mm (4.41 in)

- Separate electronics compartment and connection compartment
- Protection class: IP67, NEMA type 4x
- Material: Die-cast aluminum housing AlSi10Mg with powder coating on polyester base, 316L
- Display rotatable in 90° increments
- Cable entry: 2x ½" NPT
- Brilliant blue backlit display with ease of visibility in bright sunshine or pitch darkness
- Gold plated terminals to avoid corrosion and additional measurement errors

Temperature field transmitter iTEMP HART® TMT142



- Protection class: IP67, NEMA type 4x
- Material: Die-cast aluminum housing AlSi10Mg with powder coating on polyester base
- Display rotatable in 90° increments
- Cable entry: 3x ½" NPT
- Brilliant blue backlit display with ease of visibility in bright sunshine or pitch darkness
- Gold plated terminals to avoid corrosion and additional measurement errors

Certificates and approvals

CE Mark

The device meets the legal requirements of the EC directives if applicable. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.

Other standards and guidelines

- IEC 60529: Degree of protection of housing (IP code)
- IEC 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
- IEC 60751: Industrial platinum resistance thermometers
- ASTM E644: American society for testing and materials, standard test methods for testing industrial resistance thermometers
- NEMA - ANSI/NEMA 250: Enclosures for Electrical Equipment
- ASME PTC 19.3 TW2010: Performance test codes
- CSA Standard C22.2 (No. 25, no. 30, no. 157, no. 213, no. 1010.1): Requirements for hazardous locations & safety requirements for electrical equipment for measurement, control and laboratory use
- FM Standards (Class No. 3600, 3611, 3615, 3810): Requirements for hazardous locations & electrical and electronic test, measuring and process control equipment

UL

Temperature transmitters UL recognized components under Category Code.file number QUYX8.E225237 and QUYX2.E225237 except for TMT84 PROFIBUS® PA.

CSA/FM

T13, T14 with blue connection head or field housing
FM XP DIP Class I, II, III Div. 1+2, Grp. A-G
FM XP NI DIP Class I, II, III Div. 1+2, Grp. A-G
CSA XP DIP Class I, II, III Div. 1+2, Grp. A-G
CSA XP NI DIP Class I, II, III Div. 1+2, Grp. A-G
FM/CSA XP DIP Class I, II, III Div. 1+2, Grp. A-G

T13, T14 with blue connection head or field housing
FM/CSA XP NI DIP Class I, II, III Div. 1+2, Grp. A-G
CSA General Purpose

T15 with blue connection head or field housing
FM XP DIP Class I, II, III Div. 1+2, Grp. A-G
FM XP NI DIP Class I, II, III Div. 1+2, Grp. A-G
CSA XP DIP Class I, II, III Div. 1+2, Grp. A-G
CSA XP NI DIP Class I, II, III Div. 1+2, Grp. A-G
FM/CSA XP DIP Class I, II, III Div. 1+2, FM Grp. A-G, CSA Grp. A-G
FM/CSA XP NI DIP Class I, II, III Div. 1+2, FM Grp. A-G, CSA Grp. A-G
CSA General Purpose

Ordering information

Product Configurator

Product Configurator - the tool for individual product configuration

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: www.endress.com→ Select country→ Instruments→ Select device→ Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Communication-specific accessories

Configuration kit TXU10	Configuration kit for PC-programmable transmitter with setup software and interface cable for PC with USB port Order code: TXU10-xx
Commubox FXA195 HART	For intrinsically safe HART communication with FieldCare via the USB interface. For details, see "Technical Information" TI00404F
Commubox FXA291	Connects Endress+Hauser field devices with a CDI interface (= Endress+Hauser Common Data Interface) and the USB port of a computer or laptop. For details, see "Technical Information" TI00405C
HART Loop Converter HMX50	Is used to evaluate and convert dynamic HART process variables to analog current signals or limit values. For details, see "Technical Information" TI00429F and Operating Instructions BA00371F
Wireless HART adapter SWA70	Is used for the wireless connection of field devices. The WirelessHART adapter can be easily integrated into field devices and existing infrastructures, offers data protection and transmission safety and can be operated in parallel with other wireless networks with minimum cabling complexity. For details, see Operating Instructions BA061S
Fieldgate FXA320	Gateway for the remote monitoring of connected 4-20 mA measuring devices via a Web browser. For details, see "Technical Information" TI00025S and Operating Instructions BA00053S
Fieldgate FXA520	Gateway for the remote diagnostics and remote configuration of connected HART measuring devices via a Web browser. For details, see "Technical Information" TI00025S and Operating Instructions BA00051S
Field Xpert SFX100	Compact, flexible and robust industry handheld terminal for remote configuration and for obtaining measured values via the HART current output (4-20 mA). For details, see Operating Instructions BA00060S

Service-specific accessories

Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: ▪ Calculation of all the necessary data for identifying the optimum measuring device: e.g. pressure loss, accuracy or process connections. ▪ Graphic illustration of the calculation results Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: ▪ Via the Internet: https://wapps.endress.com/applicator ▪ On CD-ROM for local PC installation.

Configurator+temperature	Software for selecting and configuring the product depending on the measuring task, supported by graphics. Includes a comprehensive knowledge database and calculation tools: ▪ For temperature competence ▪ Quick and easy design and sizing of temperature measuring points ▪ Ideal measuring point design and sizing to suit the processes and needs of a wide range of industries The "Configurator" is available: On request from your Endress+Hauser sales office on a CD-ROM for local PC installation.

W@M	Life cycle management for your plant W@M supports you with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle. The application already contains the data of your Endress+Hauser device. Endress +Hauser also takes care of maintaining and updating the data records. W@M is available: ▪ Via the Internet: www.endress.com/lifecyclemanagement ▪ On CD-ROM for local PC installation.

FieldCare	FDT-based plant asset management tool from Endress+Hauser. It can configure all smart field units in your system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition. For details, see Operating Instructions BA00027S and BA00059S

System components

Accessories	Description
Field display unit RIA16	The display unit records the analog measuring signal from the head transmitter and shows this on the display. The LC display shows the current measured value in digital form and as a bar graph indicating a limit value violation. The display unit is looped into the 4 to 20 mA circuit and gets the required energy from there. For details, see the "Technical Information" document TI00144R/09/en

RN221N	Active barrier with power supply for safe separation of 4-20 mA standard signal circuits. Offers bidirectional HART transmission. For details, see "Technical Information" TI00073R and Operating Instructions BA00202R

Documentation

Brief operating instructions

- T13 Explosion proof RTD assembly in thermowell, KA00236R/24/EN
- T14 Explosion proof RTD assembly in flanged thermowell, KA00237R/24/AE
- T15 Explosion proof RTD assembly, KA00238R/24/EN

Technical Information

- Temperature transmitter iTEMP HART® TMT82, TI01010T/09/EN
- Temperature transmitter iTEMP PROFIBUS PA TMT84, TI00138R/09/EN
- Temperature field transmitter iTEMP TMT162, TI00086R/09/EN
- Temperature field transmitter iTEMP HART® TMT142, TI00107R/09/EN
- Temperature head transmitter iTEMP Pt TMT180, TI00088R/09/EN
- Temperature head transmitter iTEMP PCP TMT181, TI00070R/09/EN
- Temperature head transmitter iTEMP HART® TMT182, TI00078R/09/EN

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