Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

RTD TH11 and TH12

General purpose RTD with terminal head or conductor extension lead wires for process and laboratory applications

Areas of application

The TH11 and TH12 temperature sensors are RTD's designed for use in the process industry or factory automation type of environment. They are made up of a measurement probe with a RTD, insulation and sheath.
Among other applications the sensors can be used on:

- Heat exchangers
- Power & recovery area
- Carbon regeneration furnace
- Dryers
- Flue Gas
- Compressor stations
- Process reactors

Head Transmitters

Instead of directly wiring your temperature sensors to your control system, use transmitters to reduce wiring and maintenance costs while increasing measurement accuracy.

Your benefits

- High flexibility due to modular assembly with standard terminal heads and customized immersion length
- One Source shopping for temperature measurement solutions. World class transmitter with integrated sensor offering.
  – 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 and transmitter assembly for a complete point solution
- All iTEMP® transmitters provide long term stability ≤ 0.05 % per year
- Fast response time with reduced/tapered tip form

TI00108R/24/en
71147552

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

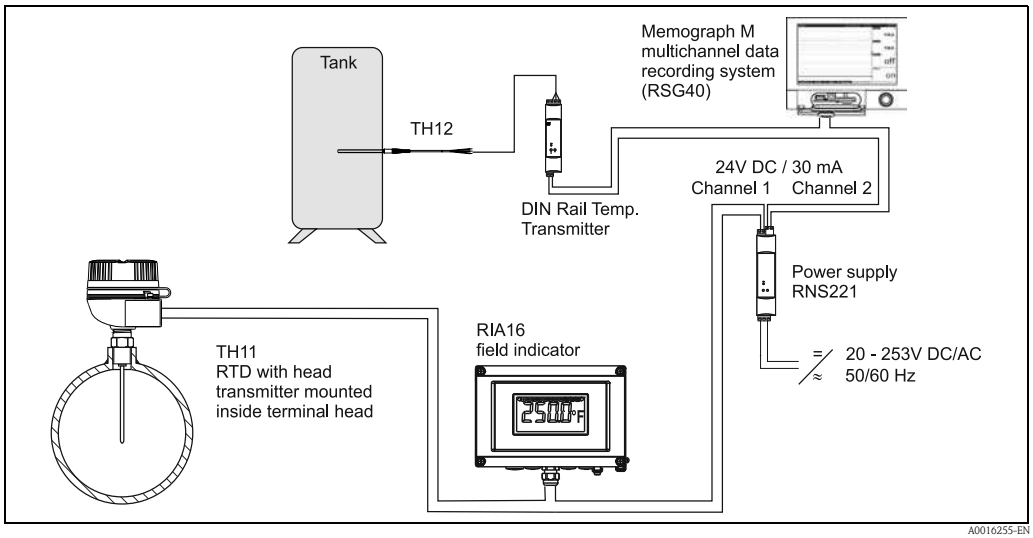
These resistance thermometers use a Pt100 temperature sensor according to IEC 60751. This temperature sensor is a temperature-sensitive platinum resistor with a resistance of 100 Ω at 0 °C (32 °F) and a temperature coefficient is $\alpha = 0.003851\ °C^{-1}$.

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 (1112 °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 approx. 300 °C (572 °F). For this reason, thin-film sensors are generally only used for temperature measurements in ranges below 400 °C (932 °F).

Measuring system



Example of an application of the temperature assemblies

RIA16 Field indicator

The field indicator records an analog measuring signal and shows this on the display. The LCD display shows the currently measured value digitally and as a bargraph with limit value violation signalling. The indicator is looped into the 4 to 20 mA circuit and obtains the required energy from there. Details see Technical Information (see "Documentation").

RNS221

The RNS221S power supply (24 V DC, 30 mA) has two galvanically isolated outputs for supplying voltage to loop powered transmitters. The two channel power supply has a wide-range input for mains power, 20 to 253 V DC/AC, 50/60 Hz to be used in any electrical circuit. Details see Technical Information (see "Documentation"). RNS221 is an UL recognized component to UL-3III-1.

Memograph M, RSG40
Multichannel data recording system with multicolored TFT display (170 mm/7 in screen size), galvanically isolated universal inputs (U, I, TC, RTD, pulse, frequency), digital input, transmitter power supply, limit relay, communication interfaces (USB, Ethernet, RS232/485), internal SD memory, external SD card and USB stick. 100 ms scan rate for all channels. Details see Technical Information (see "Documentation").

Equipment architecture

The single element RTDs are designed to measure temperature in a variety of process and laboratory applications. These RTDs are specifically designed for use in two different process temperature ranges and they will provide accurate and repeatable temperature measurement through a broad range of -200 to 600 °C (-328 to 1112 °F). Low range thin film RTDs -50 to 200 °C (-58 to 392 °F) are constructed using silver plated copper internal leads, PTFE wire insulations with potting compounds to resist moisture penetration. High range RTDs -200 to 600 °C (-328 to 1112 °F) are constructed with nickel internal leads inside swaged MgO insulated cable to allow higher temperature measurements at the RTD element and to provide higher temperature lead protection along the sheath.

Measurement range

Construction	Model code (class and type of sensor)	max. range
Low temperature range (thin film)	TH11-_ _ _ (A/C/E/G/J/L) _ _ _ _ _ _	-50 to 200 °C (-58 to 392 °F)
	TH12-_ _ _ (A/C/E/G/J/L) _ _ _ _ _ _	
High temperature range (wire wound)	TH11-_ _ _ (B/D/F/H/K/M) _ _ _ _ _ _	-200 to 600 °C (-328 to 1112 °F)
	TH12-_ _ _ (B/D/F/H/K/M) _ _ _ _ _ _	

System components

Family of temperature transmitters

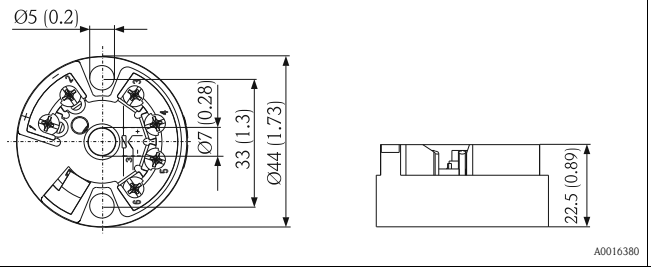
Thermometers fitted with iTEMP® transmitters are an installation ready complete solution to improve temperature measurement by increasing accuracy and reliability, when compared to direct wired sensors, as well as reducing both wiring and maintenance costs.

PC programmable head transmitter TMT180 and TMT181

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 the ReadWin® 2000 configuration software for this purpose. This software can be downloaded free of charge at **www.readwin2000.com**. More information can be found in the Technical Information (see "Documentation" section).

HART® TMT182 head transmitter

HART® communication is all about easy, reliable data access and getting additional information about the measurement point more inexpensively. It can be installed as an intrinsically safe apparatus in zone 0 hazardous areas and is used for instrumentation in the flat face terminal head to DIN EN 50446. iTEMP® transmitters integrate seamlessly into your existing control system and provide painless access to numerous diagnostic information.
Configuration with a hand-held (Field Xpert SFX100 or DXR375) or a PC with configuration program (FieldCare, ReadWin® 2000) or configure with AMS or PDM. Details see Technical Information (see chapter "Documentation").

Type of transmitter	Specification
iTEMP® TMT18x  	■ Material: Housing (PC), Potting (PUR) ■ Terminals: Cable up to max. ≤ 2.5 mm² / 16 AWG (secure screws) or with wire end ferrules ■ Eyelets for easy connection of a HART®-handheld terminal with alligator clips ■ Degree of protection NEMA Type 4x Encl. (see also type of terminal head) Details see Technical Information (see chapter "Documentation")

HART® programmable head transmitter iTEMP® TMT82

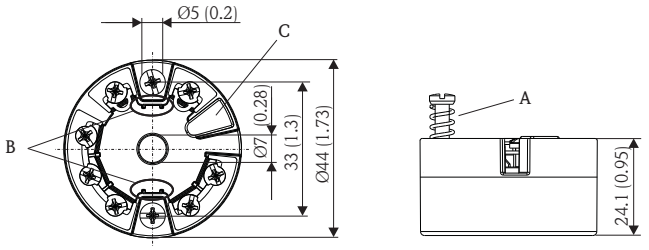
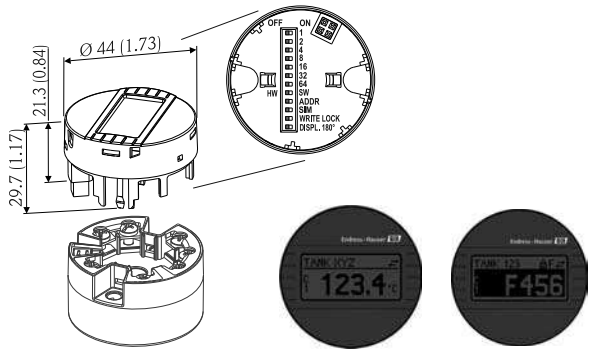
The iTEMP® TMT82 is a 2-wire device with two measurement inputs and one analog output. The device transmits both converted signals from resistance thermometers and thermocouples as well as resistance and voltage signals via the HART® communication. It can be installed as an intrinsically safe apparatus in zone 0 hazardous areas and is used for instrumentation in the flat face terminal head to DIN EN 50446. Fast and easy operation, visualization and maintenance via PC using configuration software such as FieldCare, Simatic PDM or AMS.
Benefits are: Dual sensor input, maximum reliability, accuracy and long-term stability for critical processes, mathematical functions, monitoring of thermometer drift, backup function of the sensor, diagnostic functions of the sensor and sensor-transmitter matching based on the Callendar/Van Dusen coefficient. For more information, refer to the Technical Information (see chapter "Documentation").

PROFIBUS® PA TMT84 head transmitter

Universally programmable head transmitter with PROFIBUS® PA communication. Converting various input signals into a digital output signal. High accuracy over the complete ambient temperature range. It can be installed as an intrinsically safe apparatus in zone 0 hazardous areas and is used for instrumentation in the flat face terminal head to DIN EN 50446. Swift and easy operation, visualization and maintenance using a PC directly from the control panel, e. g. using operating software such as FieldCare, Simatic PDM or AMS.
Benefits are: dual sensor input, highest reliability in harsh industrial environments, mathematic functions, thermometer drift monitoring, sensor back-up functionality, sensor diagnosis functions and sensor-transmitter matching using Callendar-Van Dusen coefficients. Details see Technical Information (see chapter "Documentation").

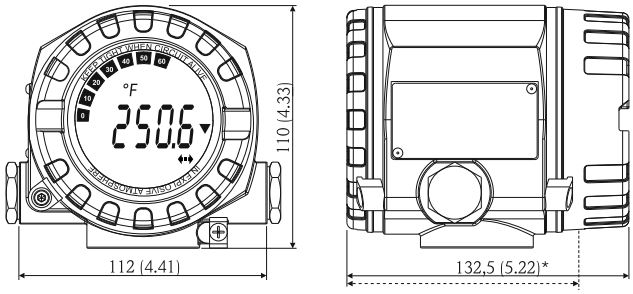
FOUNDATION Fieldbus™ TMT85 head transmitter

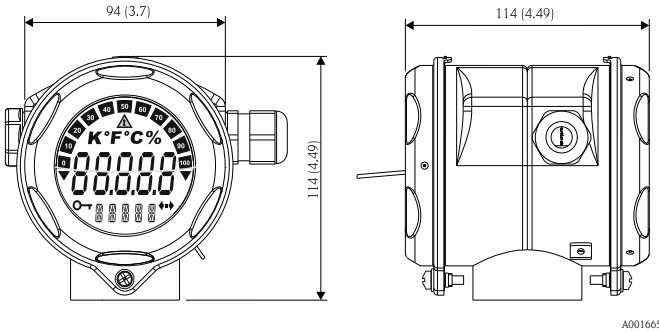
Universally programmable head transmitter with FOUNDATION Fieldbus™ communication. Converting various input signals into a digital output signal. High accuracy over the complete ambient temperature range. It can be installed as an intrinsically safe apparatus in zone 0 hazardous areas and is used for instrumentation in the flat face terminal head to DIN EN 50446. Swift and easy operation, visualization and maintenance using a PC directly from the control panel, e. g. using operating software such as FieldCare from Endress+Hauser or the NI Configurator from National Instruments.
Benefits are: dual sensor input, highest reliability in harsh industrial environments, mathematic functions, thermometer drift monitoring, sensor back-up functionality, sensor diagnosis functions and sensor-transmitter matching using Callendar-Van Dusen coefficients. Details see Technical Information (see chapter "Documentation").

Type of transmitter	Specification
iTEMP® TMT8x  A0007301	■ Spring range L ≥ 5 mm (0.2 in), see Pos. A ■ Fixing elements for pluggable measured value display, see Pos. B ■ Interface for contacting measured value display, see Pos. C ■ Material (RoHS-compliant) Housing: PC Potting: PU ■ Terminals: Screw terminals (cable up to max. ≤ 2.5 mm² / 16 AWG) or spring terminals (e. g. from 0.25 mm² to 0.75 mm²/ 24 AWG to 18 AWG for flexible wires with wire-end ferrules with plastic ferrule) ■ Degree of protection NEMA Type 4x Encl. (see also type of terminal head) Details see Technical Information (see chapter "Documentation")
Pluggable display TID10 as option  A0009955	■ Displays the actual measured value and the measurement point identification ■ Displays fault events in inverse color with channel ident and diagnostics code ■ DIP-switches on the rear for hardware set-up, e. g. PROFIBUS® PA bus address Display is only available with suitable terminal head with display window, e.g. TA30

iTEMP® TMT162 field transmitter

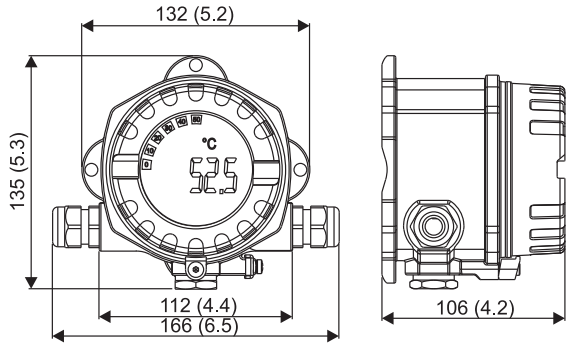
Field transmitter with universal communication (HART®, PA, FF) and blue backlit display. Can be read easily from a distance, in sunlight and at night. Large measurment value, bargraph and fault indication display. Benefits are: dual sensor input, highest reliability in harsh industrial environments,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

Type of transmitter (dimensions in mm [in])	Specification
Temperature field transmitter iTEMP® TMT162 for general purpose  A0016656	■ Material: Die-cast aluminium housing AlSi10Mg/AlSi12 with powder coating on polyester base ■ Separate electronics compartment and connection compartment ■ Display rotatable in 90° increments ■ Cable entry: 2 x ½" NPT ■ Degree of protection: NEMA Type 4x Encl. (IP67) ■ Brilliant blue backlit display with ease of visibilty in bright sunshine or pitch darkness ■ Gold plated terminals to avoid corrosion and additional measurement errors Details see Technical Information (see "Documentation") * Dimensions without display = 112 mm (4.41")

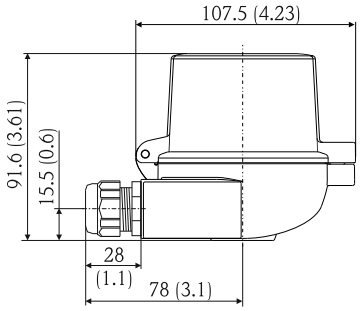
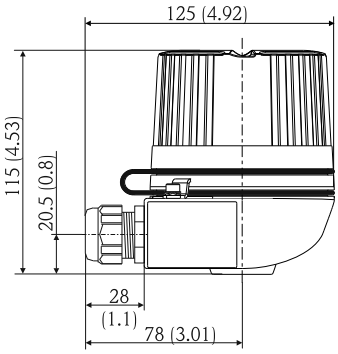
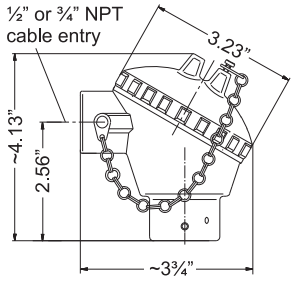
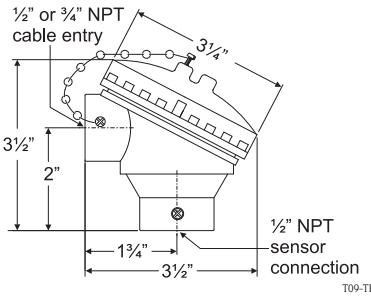
Type of transmitter (dimensions in mm [in])	Specification
Temperature field transmitter iTEMP® TMT162 for hygienic applications 	■ Material: Stainless steel 1.4435 (AISI 316L) for hygienic applications (T17 housing) ■ Separate electronics compartment and connection compartment ■ Display rotatable in 90° increments ■ Cable entry: 2 x ½" NPT ■ Degree of protection (IP69K) ■ Brilliant blue backlit display with ease of visibility in bright sunshine or pitch darkness ■ Gold plated terminals to avoid corrosion and additional measurement errors Details see Technical Information (see "Documentation")

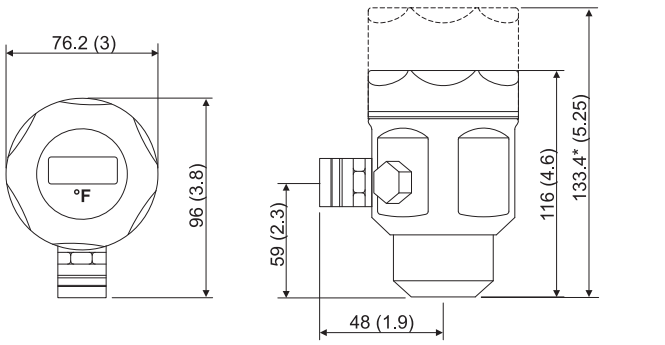
Field transmitter TMT142 – Single compartment housing

Field transmitter with HART® communication. The one channel TMT142 allows for cost effective replacement of smaller transmitters with tiny display and old style analog transmitters. Large and brilliant blue backlit display. Regardless of whether you install the transmitter in a dark location or in direct sunlight, you still get a clear temperature reading. Reliable temperature measurment through advanced diagnostics. For details, see Technical Information.

Type of transmitter (dimensions in mm [in])	Specification
Temperature field transmitter iTEMP® HART® TMT142 	■ Material: Die-cast aluminium housing AlSi10Mg/AlSi12 with powder coating on polyester base ■ Display rotatable in 90° increments ■ Cable entry: 3 x ½" NPT ■ Degree of protection NEMA Type 4x Encl. (IP67) ■ Brilliant blue backlit display with ease of visibility in bright sunshine or pitch darkness ■ Gold plated terminals to avoid corrosion and additional measurement errors Details see Technical Information (see "Documentation")

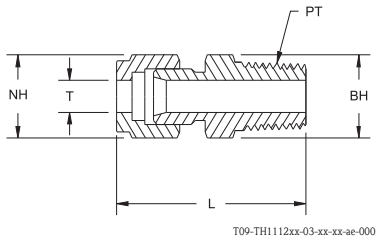
Housing

Type of housing (dimensions in mm [in])	Specification
TA30A  A0009821	■ Degree of protection: IP66/68 ■ Temperature: -50 °C to +150 °C (-58 °F to +302 °F) without cable gland ■ Material: aluminium, polyester powder coated Seals: silicone ■ Cable entry incl. glands: ½" NPT and M20x1.5, only thread: G½", plugs: M12x1 PA, 7/8" FF ■ Protection armature connection: M24x1.5 ■ Head color: blue RAL 5012 ■ Cap color: gray RAL 7035 ■ Weight: 420 g (14.81 oz) ■ Head transmitter optional with TID10 display
TA30H  A0009831	■ Flameproof (XP) version, explosion-protected, captive screw cap ■ Degree of protection: IP66/68 ■ Temperature: -50 °C to +150 °C (-58 °F to +302 °F) for rubber seal without cable gland (observe max. permitted temperature of the cable gland!) ■ Material: aluminium; polyester powder coated ■ Cable entry glands: ½" NPT, ¾" NPT, M20x1.5, only thread G½"; plug: M12x1 PA, 7/8" FF ■ Neck tube/thermowell connection: ½" NPT ■ Color of head: blue, RAL 5012 ■ Color of cap: gray, RAL 7035 ■ Weight: 860 g (30.33 oz) ■ Head transmitter optionally available with TID10 display
Terminal head Al (dimensions in inch)  T09-TH11xxxx-06-xx-xx-ae-001	■ Material: Die-cast Aluminium head ■ Sensor connection: ½" NPT Female ■ Cable entry: ½" NPT or ¾" NPT Female ½" NPT has got Al reducer bushing ■ Color of head: Spray SPU, RAL 5012 ■ Color of cap: Spray SPU, RAL 7035 ■ Coating thread (body-cover), lubricant acc. E+H standard, MgO coating; benefits include ease of opening/closing cover and improved thread engagement. Improves life time of the terminal head. ■ Degree of protection NEMA Type 4x Encl. (IP 66/68)
Terminal head plastic (dimensions in inch)  T09-TH11xxxx-06-xx-xx-ae-000	■ Polyprolylene, FDA compliant ■ Sensor connection: ½" NPT Female ■ Cable entry: ½" NPT or ¾" NPT Female ½" NPT with nylon reducer bushing (FDA compliant) ■ Degree of protection NEMA Type 4x Encl.

Type of housing (dimensions in mm [in])	Specification
Terminal head deep drawn stainless steel, TA20J style  ** dimensions with optional display*	■ Material: Deep drawn stainless steel AISI 316L SS (hygienic design) ■ Optional with display and/or head transmitter ■ Sensor connection: ½" NPT female ■ Cable entry: ½" NPT female ■ Degree of protection NEMA Type 4x Encl. (IP66) Display: ■ 4 digits 7-segments LC display (loop powered) ■ Maximum error: 0.1% of programmed range ■ Loop drop: 2.5 V at 22 mA ■ Max. ambient temperature: -20 to 70°C (-4 to 160 °F) The programming is executed through 3 keys mounted on the bottom of the display.

Compression fitting

All dimensions in inches

Type of fitting	Sheath Ø (T)	Process connection (PT)	Over all length (L)	Nut Hex (NH)	Body Hex (BH)
 	1/16"	1/8"-27 NPT	1.03	5/16"	7/16"
	1/8"	1/8"-27 NPT	1.20	7/16"	7/16"
		¼"-18 NPT	1.40	7/16"	9/16"
	3/16"	1/8"-27 NPT	1.23	½"	½"
		¼"-18 NPT	1.43	½"	9/16"
	¼"	1/8"-27 NPT	1.29	9/16"	½"
	¼"	¼"-18 NPT	1.49	9/16"	9/16"
	3/8"	¼"-18 NPT	1.57	11/16"	5/8"

Material

- One time adjustable fitting
  316 Stainless Steel coldfinished bar stock in accordance with ASTM A-479. Shaped bodies are machined from close-grained 316 stainless steel forgings in accordance with ASTM A-182.
- Re-adjustable fitting
  316 Stainless Steel with TFE ferrule.

Performance characteristics

Response time

63% response time per ASTM E644

Construction	Ø 1/8"	Ø 3/16"	Ø ¼"	Ø 3/8" red. 3/16"
High temp. range	2 s	2 s	3 s	not available
Low temp. range	3 s	7 s	9 s	6 s

Response time for the sensor assembly without transmitter.

Maximum measured error

RTD corresponding to IEC 60751

Sensor element	Class	max. Tolerances (°C)	Temperature range
Thin film (TF)	A	± (0.15 + 0.002 · |t|[1])	-50 °C to +200 °C (-58 °F to +392 °F)
	B	± (0.3 + 0.005 · |t|[1])	
Wire wound (WW)	A	± (0.15 + 0.002 · |t|[1])	-100 °C to +450 °C (-148 °F to +842 °F)
	B	± (0.3 + 0.005 · |t|[1])	-200 °C to +600 °C (-328 °F to +1112 °F)

1) |t| = absolute value °C

For measured error in °F, calculate using equation above in °C, then multiply the outcome by 1.8.

Transmitter specifications

	TMT82 HART®/ TMT84 PA / TMT85 FF	TMT180 Pt100 PCP	TMT181 multifunctional PCP	TMT182 HART®	TMT162 HART® Field transmitter	TMT142
Measurment accuracy	± typ. 0.25 °C (0.45 °F)	0.2 °C (0.36 °F), optional 0.1 °C (0.18 °F) or 0.08%[1]	0.5 °C (0.9 °F) or 0.08%[1]		≤ 0.105 °C (0.19 °F)	0.2 °C (0.36 °F)
Sensor current	I ≤ 0.3 mA	I ≤ 0.6 mA		I ≤ 0.2 mA	I ≤ 0.3 mA	
Galvanic isolation (input/output)	U = 2 kV AC	-	U = 2 kV AC			

1) % is related to the adjusted measurement range (the larger value applies)

Transmitter long-term stabiltiy

≤ 0.1 °C/year (≤ 0.18 °F / year) or ≤ 0.05% / year
Data under reference conditions; % relates to the set span. The larger value applies.

Insulation resistance

Insulation resistance between terminals and probe sheath, test voltage 250 V.

- ≥100 MΩ at 25 °C (77 °F)
- ≥10 MΩ at 300 °C (572 °F)

Self heating

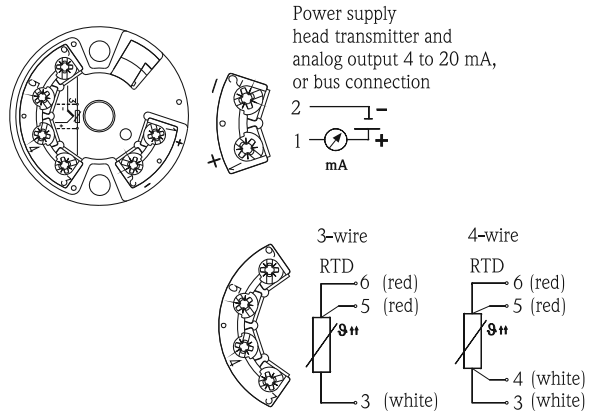
RTD elements are not self-powered and require a small current be passed through the device to provide a voltage that can be measured. Self-heating is the rise of temperature within the element itself, caused by the current flowing through the element. This self-heating appears as a measurement error and is affected by the thermal conductivity and velocity of the process being measured; it is negligible when an Endress+Hauser iTEMP® temperature transmitter is connected.

Wiring

Wiring diagrams

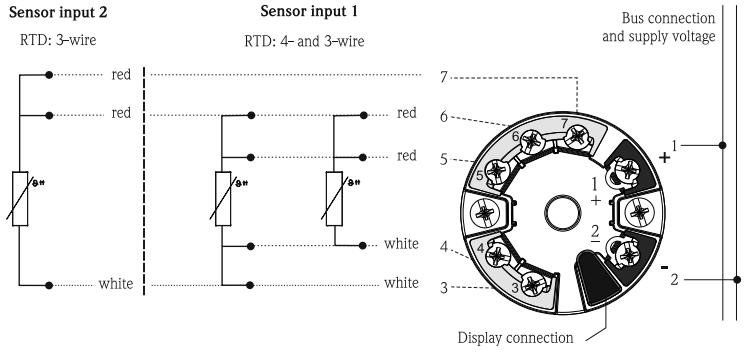
Type of sensor connection TH11

Head transmitter mounted



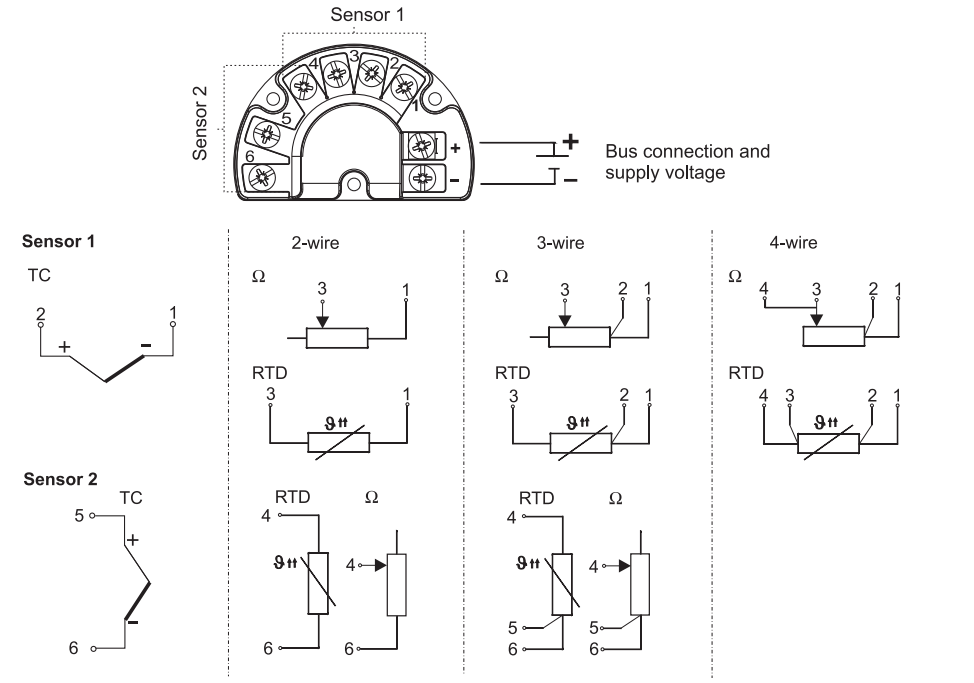
A0016433-EN

Head mounted transmitter iTEMP® TMT8x (dual input)

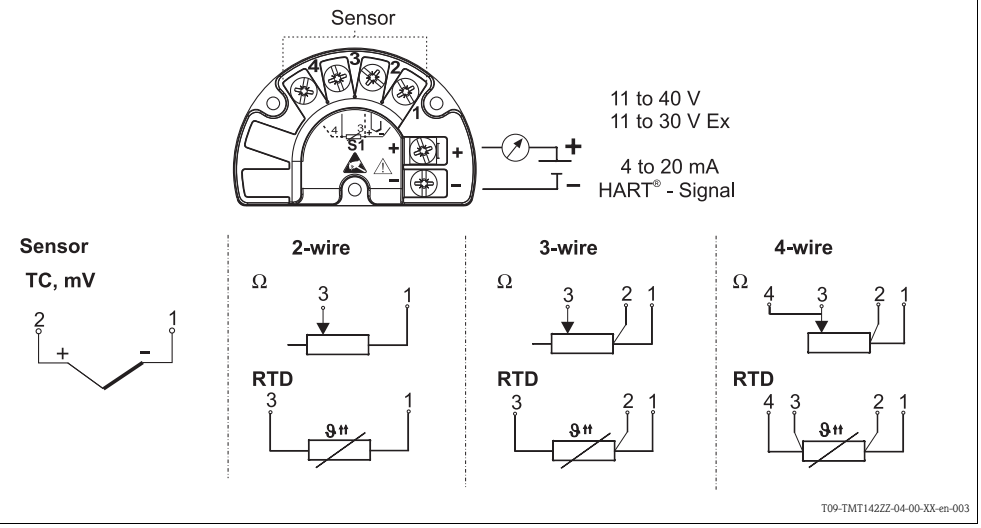


A0008848-EN

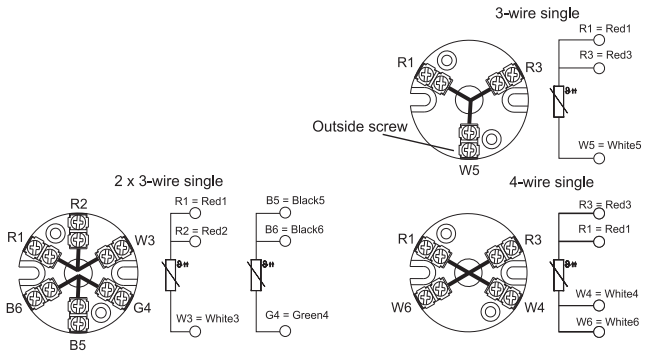
Head mounted transmitter iTEMP® TMT162



Head mounted transmitter iTEMP® TMT142



Terminal block mounted



TH12 is available only with conductor external lead wires, DIN rail transmitters (TMT121 PCP / TMT122 HART®) are available, see "Documentation".
The blocks and transmitters are shown as they sit inside the heads in reference to the conduit opening.

Wire specifications

TH11
24AWG, 19 strand silver plated copper with 0.010” PTFE extruded outer, 1/8” sensors have 28AWG seven strand wires with the same extrusion.

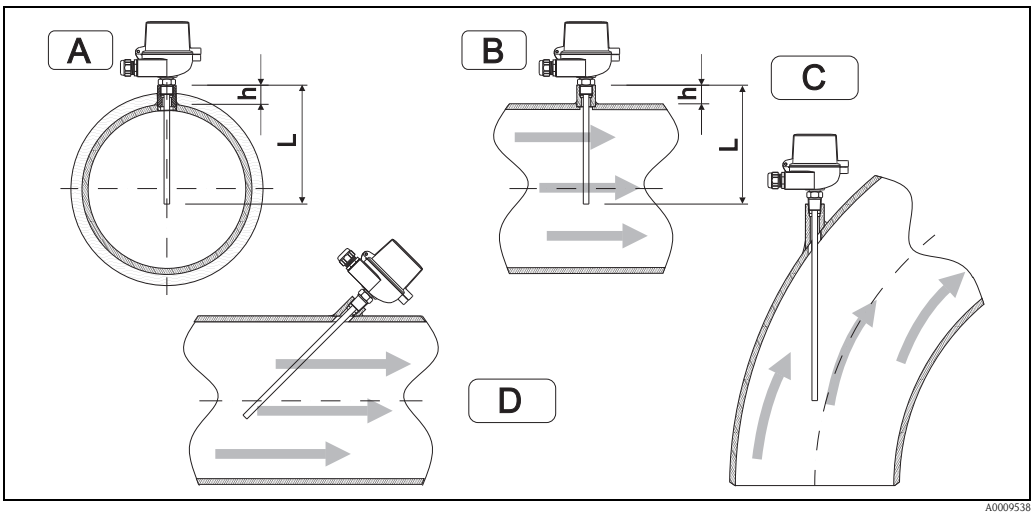
TH12
24AWG, seven strand silver plated copper with 0.010” PTFE then 0.015” FEP outer jacket, 1/8” sensors are 28AWG, seven strand SPC, 0.010” PTFE, 0.015” FEP white outer jacket. Flex armor is 0.272” nominal OD, 304SS 0.010” thick , square lock style.
The maximum temperature for the extension cable is 200 °C (392 °F).

Installation conditions

Orientation

No restrictions for installation orientation.

Installation instructions



Installation examples

A - B: In pipes with a small cross section the sensor tip should reach or extend slightly past the center line of the pipe (= L).
C - D: Tilted installation.

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 must be half of the pipe diameter, ideally.

- Installation possibilities: Pipes, tanks or other plant components
- Minimum immersion length = 80 to 100 mm (3.15 to 3.94 in)
  The immersion length should correspond to at least 8 times of the thermowell diameter. Example: Thermowell diameter 12 mm (0.47 in) x 8 = 96 mm (3.8 in). A standard immersion length of 120 mm (4.72 in) is recommended
- ATEX certification: Always take note of the installation regulations!

When operating in small nominal bore pipes it must be guaranteed that the thermowell tip is extending far enough into the process to reach out past the pipe center line (see Pos. A and B). A further solution could be an angled (tilted) installation (see Pos. C and D). 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).

Environmental conditions

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, → 🖹 7
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)

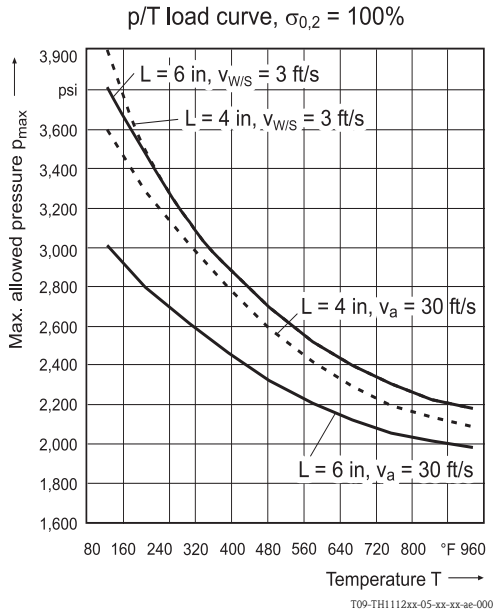
Shock and vibration resistance

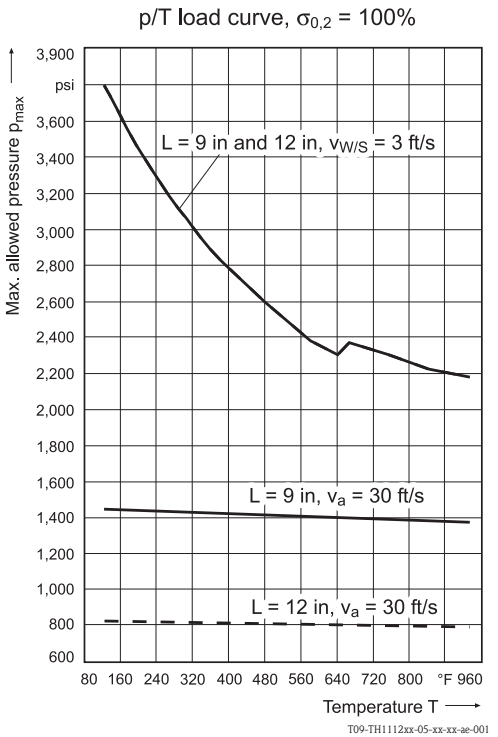
4G / 2 to 150 Hz as per IEC 60068-2-6

Process conditions

Process pressure limits

p/T load curve example for low temperature range - thin film construction according to Dittrich.





- L = insertion length
- v_a= flow velocity air
- $v_{w/s}$= flow velocity water or steam

Example calculation: Probe = 316 SS sheath Ø = ¼", 0.028" wall thickness
Avoid resonance frequency as this will cause damage to the probe!

- L = 4 and 6 in:
  Resonance frequency occurs when permanent flow velocity is at 18.1, 22.6 or 27.1 ft/s (air) for 6 in and/or 40.5, 50.6 or 60.8 ft/s (air) for 4 in probe (T = 482 °F, p = 2700/2600 psi).
- L = 9 and 12 in:
  Resonance frequency occurs when permanent flow velocity is at 8.1, 10.1 or 12.1 ft/s (air) for 9 in and/or 4.6, 5.7 or 6.8 ft/s (air) for 12 in probe (T = 482 °F, p = 2600 psi).

Max. allowable process pressure (PSIG) for instrumentation with one time adjustable compression fittings.

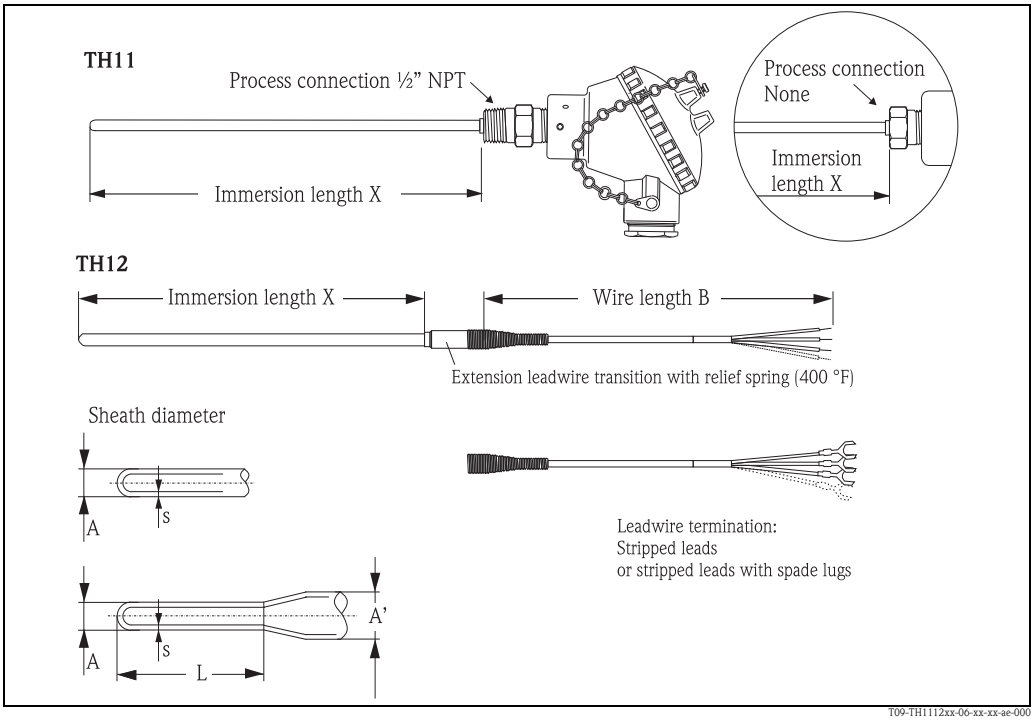
Temperature		1/8" NPT & ¼" NPT compression fitting			
°F	°C	sheath Ø = 1/8" x 0.012" wall thickness	sheath Ø = 3/16" x .0.020" wall thickness	sheath Ø = ¼" x 0.028" wall thickness	sheath Ø = 3/8" x 0.12" wall thickness[1]
-20 to 300	-28 to 149	2850	3150	3350	3900
400	204	2750	3050	3250	3800
500	260	2550	2850	3000	3500
600	316	2400	2700	2850	3300
700	371	2350	2600	2750	3200
800	427	2300	2550	2650	3100
900	482	2200	2450	2600	3050
1000	538	2100	2300	2450	2850

1) Not available with compression fittings 1/8" NPT

For high temperature range construction with compacted magnesium oxide (MgO) the values might be higher. In any case for different length, other materials, variation in sheath diameter or wall thicknesses stress analysis is recommended. Failures are caused by forces imposed by static pressure, steady state flow and vibration.
Re-adjustable compression fittings are not intended to be used for pressure retaining applications and should only be used tor the mechanical holding of sensors.

Mechanical construction

Design, dimensions



For values related to this graphic please refer to the table below.

Dimensions in inches:

Immersion length X		Wire length B	Sheath diameter A (A')	Wall thickness s	Reduced length L
TH11	**TH12**				
4", 6", 9", 12"	6", 12", 18", 24"	48", 72", 120" specified length 12" to 300" in 12" increments	1/8 in 316 SS	0.012"	-
			3/16 in 316 SS	0.020"	-
			¼ in 316 SS	0.028"	-
specified length 2" to 96" in ½" increments			3/8 in (A') red. 3/16 in (A) 316 SS[1]	0.120" (0.016" at tip)	1¼"

1) High temperature version is not available with reduced tip.

Weight

From 1 to 5.5 lbs

Material

Wetted parts 316 SS

Certificates and approvals

CE Mark

The iTEMP® Series of temperature transmitters complies with the legal requirements laid out within the EU regulations.

Other standards and guidelines

- IEC 60529:
  Degrees of protection by housing (IP-Code).
- IEC 61010:
  Safety requirements for electrical measurement, control and laboratory instrumentation.
- ASTM E644:
  American society for testing and materials, standard test methods for testing industrial resistance thermometers.
- NEMA – ANSI / NEMA 250
  Standardization association for the electrical industry.
- IEC 60571
  Industrial platinum resistance thermometer

UL

Temperature transmitter are recognized components to UL 3111-1 (iTEMP® Series).

Ordering information

Detailed ordering information is available from the following sources:

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

Product Configurator - the tool for individual product configuration

- 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

Documentation

Short operation manual:

- TH11 RTD temperature sensor (KA178r/24/ae)
- TH12 RTD temperature sensor with cable (KA179r/24/ae)

Technical Information:

- Temperature head transmitter:
  - iTEMP® HART® TMT82 (TI01010T/09/en)
  - iTEMP® PROFIBUS PA TMT84 (TI138R/09/en)
  - iTEMP® FF TMT85 (TI134R/09/en)
  - iTEMP® HART® TMT142 (TI107R/09/en)
  - iTEMP® HART® TMT162 (TI086r/24/ae)
  - iTEMP® PCP TMT181 (TI070r/24/ae)
  - iTEMP® Pt TMT180 (TI088r/24/ae)
  - iTEMP® HART® TMT182 (TI078r/24/ae)

Application example:

- Technical information:
  - Field indicator RIA16 (TI00144R/09/en)
  - Power supply RNS221 (TI081R/24/ae)
  - Data Manager Memograph M, RSG40 (TI133R/09/en)

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