



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical Information

RTD TH17 and TH18

Sanitary RTD temperature assembly with enclosure



Areas of application

The TH17 and TH18 sanitary temperature sensors are RTD's designed for use in dairy, food & beverage, pharmaceutical and bio-technology plants.

- Temperature dryers in food processes
- Pasteurization
- Heat exchangers
- Material storage tanks
- Cheese vats
- Brewhouse / cellar
- Cookers / freezers
- Dehydrator
- Fermentor / bio-reactor control
- CIP/SIP systems

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

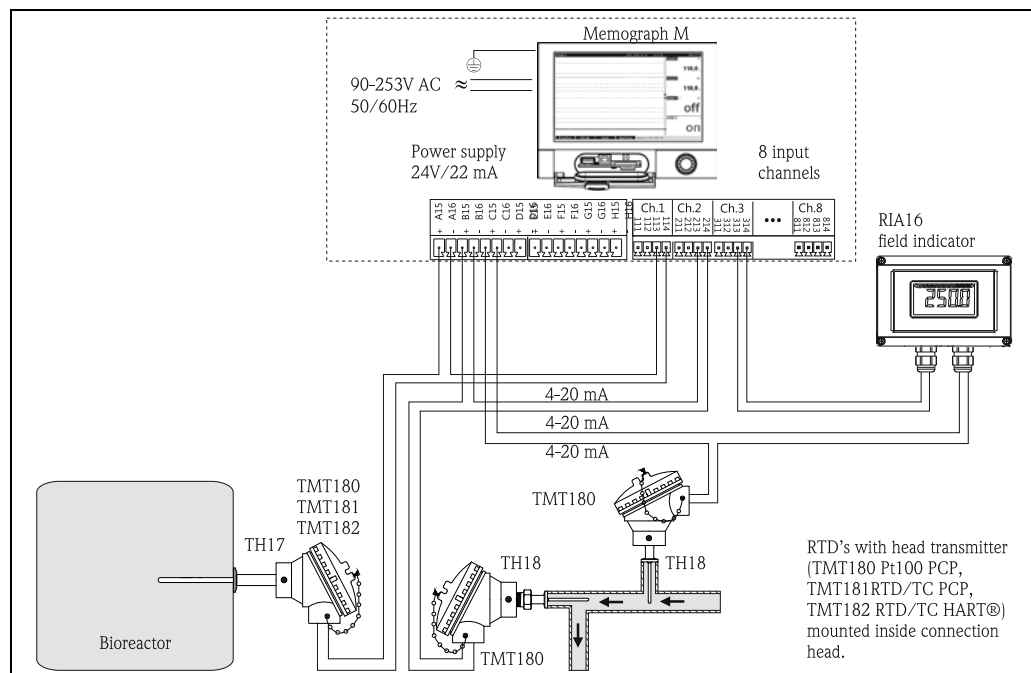
- Sensor assemblies TH17 & TH18 meet 3-A[®] sanitary standards
- Sensor assemblies TH18 are based on ASME, BPE 2002 Standard for Bio-Pharma equipment
- Sensor assemblies TH17 meet PMO requirements by US FDA for dairies
- One source shopping for temperature measurement solutions. World class transmitter 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

Function and system design

Measuring principle

The RTD (Resistance Temperature Detector) element consists of an electrical resistance with value of 100 Ω at 0 °C (called Pt100, in compliance with IEC 60751), which increases at higher temperatures according to a coefficient characteristic of resistor material (platinum). In industrial thermometers that comply with the IEC 60751 standard, the value of this coefficient is $\alpha = 0.00385 \text{ }^{\circ}\text{C}^{-1}$, calculated between 0 and 100 °C (32 and 212 °F).

Measuring system



A0016293-EN

Example of an application of the temperature assemblies

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. ReadWin 2000 PC software for comprehensive device configuration and data evaluation. Details see Technical Information (see "Documentation").

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. The measuring range, decimal point and offset of the indicator can be configured comfortably by means of three keys in the device with the housing open or by means of a PC with the FieldCare PC software. Details see Technical Information (see "Documentation").

Equipment architecture

The single element RTDs are designed to measure temperature in Food, Dairy and Pharmaceutical applications. These RTDs are specifically designed for very short response time. The clean in place sanitary assemblies TH17 & TH18 with 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.

Measurement range

- Class A: -50 to 200 °C (-58 to 392 °F)
- Class 1/10DIN: -50 to 260 °C (-58 to 500 °F)

Electronics

Family of temperature transmitters

Measurement assemblies with iTEMP® transmitters are an installation ready solution to improve the functionality of temperature measurement by increasing accuracy and reliability when compared to direct wired sensors. Overall installation costs are lower than with direct wired sensors, since an inexpensive pair of signal (4 to 20 mA) wires can be run over long distances.

PC programmable devices TMT180 and TMT181

PC programmable head transmitters offer you extreme flexibility and help control costs with the ability to stock one device and program it for your needs. Regardless of your choice of output, all iTEMP® transmitters can be configured quickly and easily with a PC. To help you with this task, Endress+Hauser offers free software ReadWin® 2000 which can be downloaded from our website. Go to www.readwin2000.com to download ReadWin® 2000 today. For details see Technical Information.

HART® TMT182 head transmitter

HART® communication is all about easy, reliable data access and getting better information more inexpensively. iTEMP® transmitters integrate seamlessly into your existing control system and provide painless access to preventative diagnostic information.

Configuration with a DXR275 or 375 hand-held or a PC with configuration program (FieldCare, ReadWin® 2000) or configure with AMS or PDM. For details, see Technical Information.

PROFIBUS® PA TMT84 head transmitter

Universally programmable head transmitter with PROFIBUS®-PA fieldbus communication. Converting various input signals into a digital output signal. High accuracy in the total ambient temperature range. Swift and easy operation, visualization and maintenance using a PC direct from the control panel, e. g. using operating software such as FieldCare, Simatic PDM or AMS. DIP switch for address setting, makes start up and maintenance safe and reliable. For details, see Technical Information.

FOUNDATION Fieldbus™ TMT85 head transmitter

Universally programmable head transmitter with FOUNDATION fieldbus™ communication. Converting various input signals into a digital output signal. High accuracy in the total ambient temperature range. Swift and easy operation, visualization and maintenance using a PC direct from the control panel, e. g. using operating software such as ControlCare 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 by accepting Callendar Van Dusen constants. For details, see Technical Information.

Field transmitter TMT162 - Dual compartment housing

Field transmitter with HART® communication, FOUNDATION Fieldbus™ protocol and blue backlit display. Can be read easily from a distance, in sunlight and at night. Large measurement value, bargraph and fault indication display. Benefits are: dual sensor input, highest reliability in harsh industrial environments, mathematic functions, thermometer drift monitoring, sensor back-up functionality, corrosion detection and sensor transmitter matching by accepting Callendar Van Dusen constants. For details, see Technical Information.

Performance characteristics

Response time 63% response time per ASTM E644

Model	Tube diameter 1/4" OD, 316L	Tube diameter 3/8" OD reduced 3/16" OD, 316L	Tube diameter 5/32" OD, 316L
TH17	4 s	3 s	-
TH18	-	-	2 s



Note!
Response Time for the sensor assembly without Transmitter

PMO* Version, Grade "A"
TH17- __ F _ (B/C/D/E) 3 _ _ _ _
*PMO - Pasteurized Milk Ordinance

The response time of the versions in the table above complies to Grade "A" by US FDA; use TH17 with 3/16" (reduced tip - option "F"). All units are tested, E+H records the sensor response time in the lid of the RTD connection head to help the end user pass inspections.

Maximum measured error Class A tolerance as per IEC 60751, at operating temperature range of -50 to 200 °C (-58 to 392 °F).

Class	max. Tolerance
A	$\pm (0.15 + 0.002 \cdot t ^{1})$
1) $ t $ = absolute value °C	



Note!
For measurement errors in °F, calculate using equation above in °C, then multiply the outcome by 1.8.

Measurement accuracy **Transmitter**

TMT 180 Pt100 PCP	TMT 181 multifunctional PCP	TMT 182 HART®
0.2 °C (0.36 °F) or 0.08% ¹⁾	0.2 °C (0.36 °F) or 0.08% ¹⁾	0.2 °C (0.36 °F) or 0.08% ¹⁾
1) % is related to the adjusted measurement range (the larger value applies)		

Transmitter long-term stability ≤ 0.1 °C / year (≤ 0.18 °F / year) or $\leq 0.05\%$ / year
Data under reference conditions; % is related to the set span. The larger value applies.

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

- ≥ 100 M Ω at 25 °C (77 °F)
- ≥ 10 M Ω 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.

Sensor current

Sensor current of Endress+Hauser iTEMP® transmitters

Transmitter type	Sensor
TMT180 & TMT181 PCP	≤ 0.6 mA
TMT182 HART®	≤ 0.2 mA
TMT162 HART® Field transmitter	≤ 0.3 mA

Galvanic isolation

Galvanic isolation of Endress+Hauser iTEMP® transmitters (input/output)

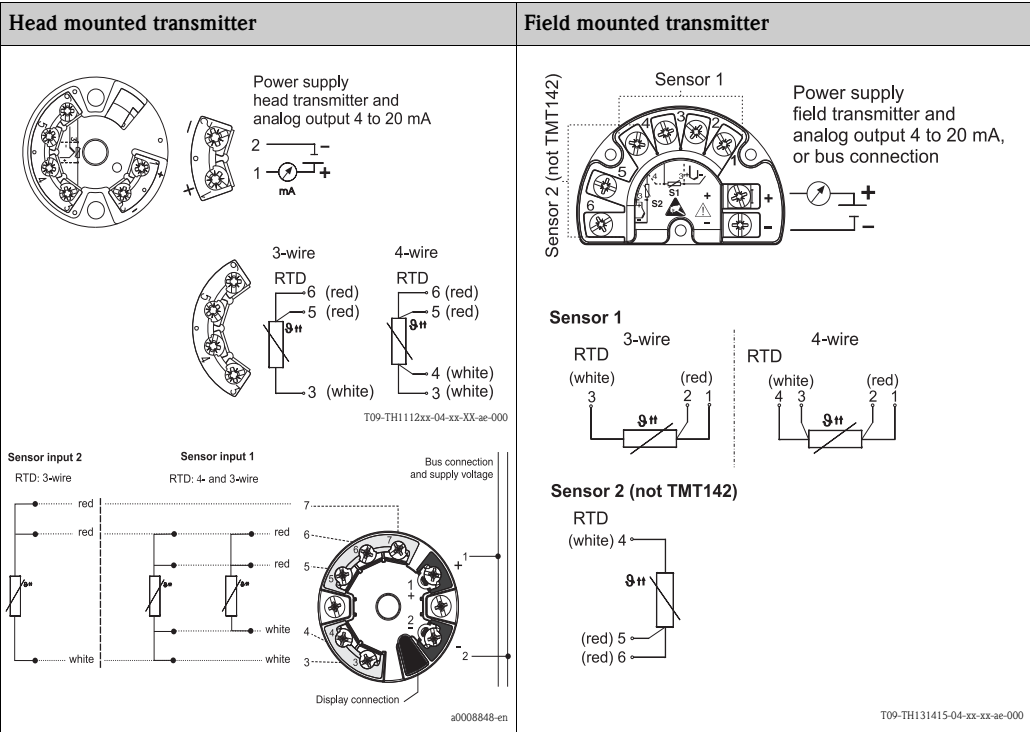
Transmitter type	Sensor
TMT181 PCP	U = 3.75 kV AC
TMT182 HART®	U = 2 kV AC
TMT162 HART® Field transmitter	U = 2 kV AC

Wiring

Electrical connection cables must comply with 3-A® standard, must be smooth, corrosion resistant and cleanable.

Wiring diagrams

Type of sensor connection



3-wire single

R1 = Red1
R3 = Red3
W5 = White5

Outside screw

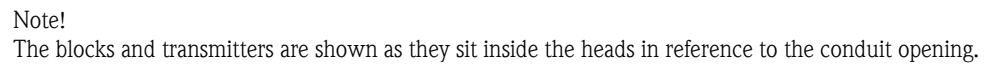
4-wire single

R1 = Red3
R3 = Red1
W4 = White4
W6 = White6

2 x 3-wire single

R1 = Red1
R2 = Red2
W3 = White3
B5 = Black5
B6 = Black6
G4 = Green4

T09-TH1112xx-04-xx-XX-ae-001



24AWG, 19 strand silver plated copper with 0.010" PTFE extruded outer, 5/32" OD sensors (TH18) have 28AWG seven strand wires with the same extrusion.

No restrictions, but self draining. If applicable leak detection hole must be at the lowest point.

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). Installation with minimal 3° inclination because of self draining.
C - D: Tilted installation.

6 Endress+Hauser

Immersion

Minimum immersion per ASTM E644, $\Delta T \leq 0.05\text{ }^{\circ}\text{C}$ (0.09 $^{\circ}\text{F}$)

Version	Minimum Immersion (in)
TH17	1 ¼ "
TH18	¾ "

Environmental conditions

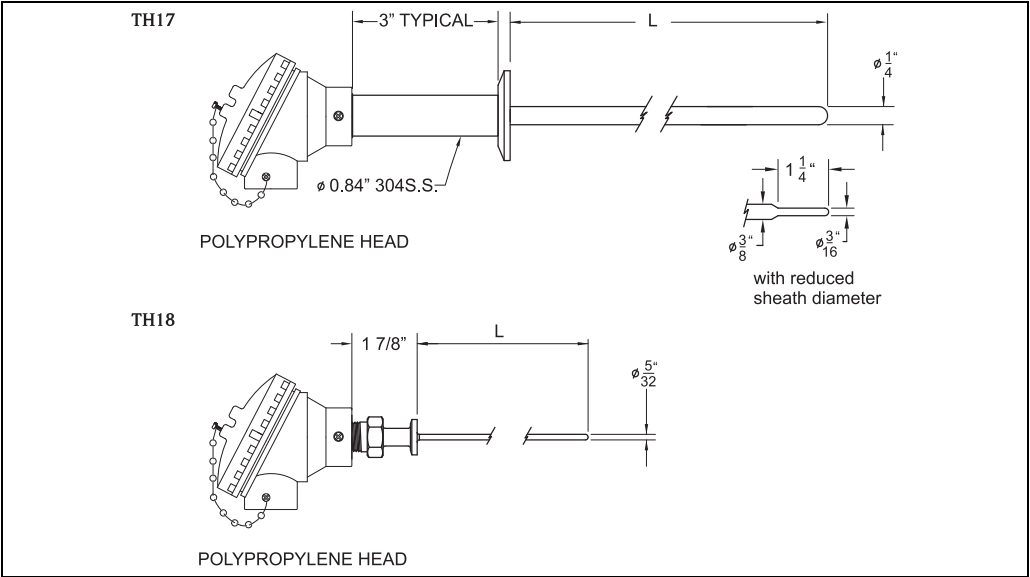
Ambient temperature

- Housing without head-mounted transmitter
- Aluminum pressure die-cast housing -40 to 150 $^{\circ}\text{C}$ (-40 to 300 $^{\circ}\text{F}$)
 - Plastic housing -40 to 85 $^{\circ}\text{C}$ (-40 to 185 $^{\circ}\text{F}$)
 - Deep drawn SS housing without display -40 to 150 $^{\circ}\text{C}$ (-40 to 300 $^{\circ}\text{F}$)
- Housing with head-mounted transmitter
- -40 to 85 $^{\circ}\text{C}$ (-40 to 185 $^{\circ}\text{F}$)
- Field transmitter without display
- -40 to 85 $^{\circ}\text{C}$ (-40 to 185 $^{\circ}\text{F}$)

Shock and vibration resistance 4g / 2 to 150 Hz as per IEC 60 068-2-6

Mechanical construction

Design, dimensions



T09-TH17/18xx-06-xx-xx-ae-000

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

Dimensions in inches:

	TH17	TH18
Insertion length "L"	2", 2.5", 3", 4", 5", 6" specified length in ½" increments	¾", 1 ¼", 2 ¼", 2 ¾" specified length in ¼" increments

Weight From 1 to 5.5 lbs

Material Material: wetted parts 316L SS.

Surface finish TH17

TH17 sensors are intended for use in food processing systems. The wetted surfaces of the sensors and sanitary fittings are mechanically polished to achieve a 32 micro-inch maximum surface finish, in accordance with "3-A Sanitary Standards for Sensors and Sensor Fittings and Connections used on Milk and Milk Products Equipment, Number 74-03". Minimal material has been removed to achieve the indicated surface finish. Residual polishing compounds are removed after polishing operations are completed on all surfaces and sanitary end fittings. The end fitting material and sensor sheath are both composed of 316L stainless steel.

Surface finish TH18

TH18 sensors are intended for use in food and pharmaceutical processing systems. The wetted surfaces of the sensors and sanitary fittings are mechanically polished to achieve a 20 micro-inch maximum surface finish, in accordance with "ASME BPE-2002, Bioprocessing Equipment Standard". Minimal material has been removed to achieve the indicated surface finish. Residual polishing compounds are removed after polishing operations are completed on all surfaces and sanitary end fittings. The end fitting material and sensor sheath are both composed of 316L stainless steel.

Process connection

Tri-clamp® connection (3-A® marked)

Technical drawing of a tri-clamp connection. The side view shows a pipe with a flange (B) and a MicroClamp (A) clamping it. Dimensions include C (flange thickness), L (pipe length), d (pipe diameter), and D (flange diameter). The top view shows the flange (B) and the MicroClamp (A) clamping it. Dimensions include d (pipe diameter) and A (MicroClamp width).

Technical drawing of a tri-clamp connection. The side view shows a pipe with a flange (B) and a MicroClamp (A) clamping it. Dimensions include C (flange thickness), L (pipe length), d (pipe diameter), and A (MicroClamp width). The top view shows the flange (B) and the MicroClamp (A) clamping it. Dimensions include d (pipe diameter) and A (MicroClamp width).

(*)							(**)	
DN	A	B	C	d	D std.	D strong	PNmax (bar)	
1/2" (***)	20,0	25,0	3,6	9,5	-	12,7	-	
3/4" (***)				15,8	-	19,0	-	
1"	43,5	50,5	2,85	22,2	-	29,5	-	
1 1/2"				34,9	25,4	-	9÷20,7	
	56,5	64,0			-	42,6	-	
					38,1	-	9÷20,7	
					-	55,7	-	
2"				47,6	50,8	-	9÷17,2	

(*) Pipes according to ISO 2037 and BS 4825 Part1.

(**) Depends on clamping ring type, at 121°C with suitable gasket.

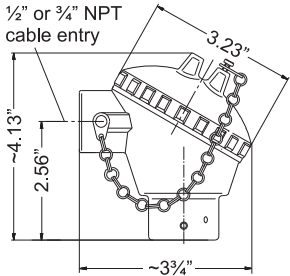
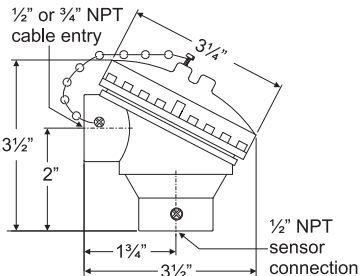
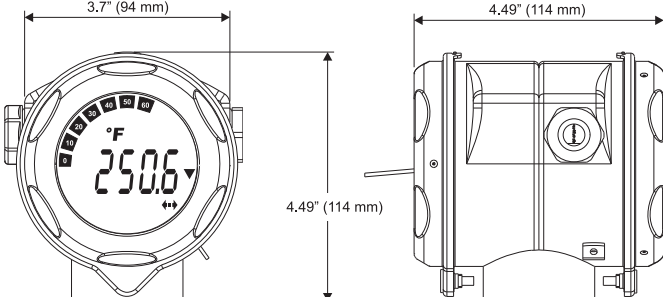
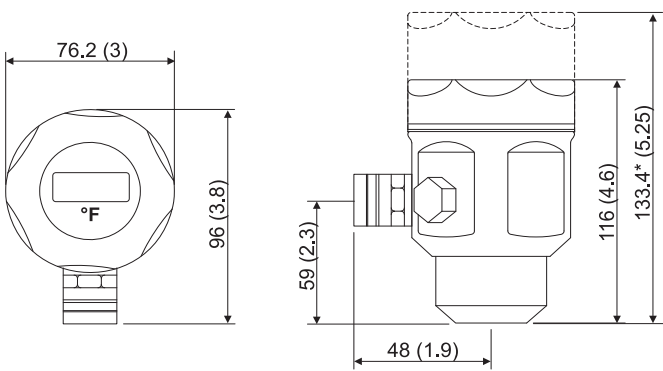
(***) MicroClamp.

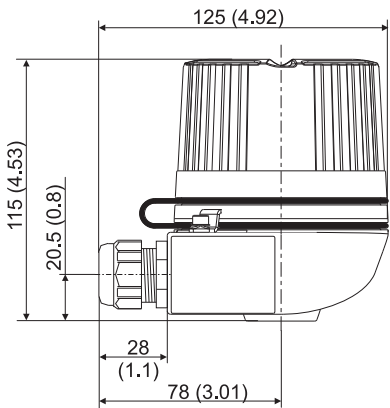
a0009566

Packaging Sanitary sensors and fittings are individually bagged and sealed to ensure cleanliness upon delivery to the final customer.

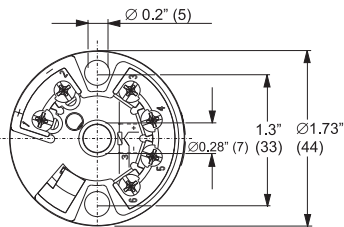
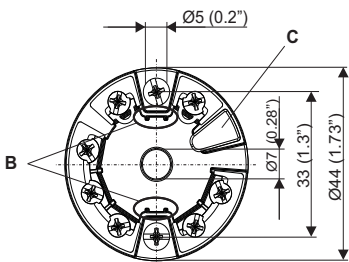
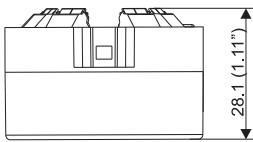
System components

Housing

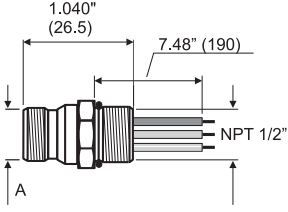
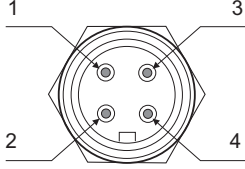
Type of housing	Specification
<p>Connection head Aluminum</p>  <p style="text-align: right; font-size: small;">T09-TH11xxxx-06-xx-xx-ae-001</p>	<ul style="list-style-type: none"> Material: Die-cast Aluminum head Sensor connection: 1/2" NPT Female Cable entry: 1/2" NPT or 3/4" NPT Female. 1/2" NPT has a Al reducer bushing Body paint: Spray SPU, RAL5012 Cover paint: Spray SPU, RAL7035 Coating thread (body-cover), lubricant acc. E+H standard, MgO coating; benefits include ease of opening/closing cover and improved thread engagement. Improves lifetime of the connection head. Degree of protection NEMA Type 4x Encl. (IP 66)
<p>Connection head plastic</p>  <p style="text-align: right; font-size: small;">T09-TH11xxxx-06-xx-xx-ae-000</p>	<ul style="list-style-type: none"> Polypropylene, FDA compliant Sensor connection: 1/2" NPT Female Cable entry: 1/2" NPT or 3/4" NPT Female. 1/2" NPT with nylon reducer bushing (FDA compliant) Degree of protection NEMA Type 4x Encl.
<p>Temperature field transmitter iTEMP® TMT162</p>  <p style="text-align: right; font-size: small;">T09-TMT162ZZ-06-00-xx-ae-003</p>	<ul style="list-style-type: none"> 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 1/2" 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 <p>Details see Technical Information (see 'Documentation')</p>
<p>Connection head deep drawn stainless steel, TA20J style</p>  <p style="text-align: right; font-size: small;">a0005938</p> <p><i>* dimensions with optional display</i></p>	<ul style="list-style-type: none"> Material: Deep drawn stainless steel AISI 316L SS (hygienic design) Optional with display and/or head transmitter Sensor connection: 1/2" NPT female Cable entry: 1/2" NPT female Degree of protection NEMA Type 4x Encl. (IP 66) <p>Display:</p> <ul style="list-style-type: none"> 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) <p>The programming is executed through 3 keys mounted on the bottom of the display.</p>

Type of housing	Specification
<p>TA30H with display window in cover</p>  <p>a0009831</p>	<ul style="list-style-type: none"> ■ Flameproof (XP) version, explosion-protected, captive screw cap ■ Protection class: IP 66/68 ■ Max. temperature: 150 °C (300 °F) for rubber seal (observe max. permitted temperature of the cable gland!) ■ Material: aluminum; polyester powder coated ■ Cable entry glands: 1/2" NPT, 3/4" NPT, M20x1.5, only thread G1/2"; plug: M12x1 PA, 7/8" FF ■ Neck tube/thermowell connection: 1/2" 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

Head transmitter

Type of transmitter	Specification
<p>iTEMP® TMT18x</p>  <p>R09-TMT182ZZ-06-06-XX-ae-001</p>	<ul style="list-style-type: none"> ■ Material Housing: PC Potting: PUR ■ Terminals: Screw terminals: 2.5 mm² (16 AWG) with latches at the fieldbus terminals for easy connection of a handheld terminal, e.g. DXR375 Spring terminals: e.g. rigid wire version 0.14 mm² to 1 mm² (24 AWG to 18 AWG); stripped length = min. 10 mm (0.39 in) ■ Degree of protection NEMA Type 4x Encl. (see also type of connection head) <p>Details see Technical Information (see 'Documentation')</p>
<p>iTEMP® FF TMT85 iTEMP® PA TMT84</p>  <p>a0007301-ae</p> <p><i>Model with screw terminals</i></p>  <p>a0007672</p> <p><i>Model with spring terminals. The same dimensions except for height of housing</i></p>	<ul style="list-style-type: none"> ■ Material Housing: PC Potting: PUR ■ Terminals: Screw terminals: 2.5 mm² (16 AWG) with latches at the fieldbus terminals for easy connection of a handheld terminal, e.g. DXR375 Spring terminals: e.g. rigid wire version 0.14 mm² to 1 mm² (24 AWG to 18 AWG); stripped length = min. 10 mm (0.39 in) ■ Degree of protection NEMA Type 4x Encl. (see also type of connection head) <p>Details see Technical Information (see 'Documentation')</p>

Fieldbus connector

Type (dimensions in inches [mm])	Specification	
<p>Fieldbus connector to PROFIBUS® -PA or FOUNDATION Fieldbus™</p>  <p>T09-FFCONNEC-06-xx-xx-ae-000</p> <p>Pos. A: M12 on PROFIBUS® -PA connector 7/8-16 UNC on FOUNDATION Fieldbus™ connector</p>	<p>■ Ambient temperature: -40 to 150 °C (-40 to 300 °F) ■ Degree of protection IP 67</p> <p>Wiring diagram:</p>  <p>a0006023</p>	
	<p>PROFIBUS® -PA Pos 1: grey (shield) Pos 2: brown (+) Pos 3: blue (-) Pos 4: not connected</p>	<p>FOUNDATION Fieldbus™ Pos 1: blue (-) Pos 2: brown (+) Pos 3: not connected Pos 4: ground (green/yellow)</p>

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.
- IEC 60751: Industrial platinum resistance thermometer
- ASTM E644: American society for testing and materials, standard test methods for testing industrial resistance thermometers.
- PMO: Pasteurized Milk Ordinance 2001 Revision, U.S. Food and Drug Administration, Center for Food Safety & Applied Nutrition
- BPE: Bioprocessing Equipment, ASME - BPE - 2002 Standard
- NEMA - ANSI / NEMA 250 Standardization association for the electrical industry.

UL

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

Sanitary compatibility

A sanitary standard for sensors, connections and sensor fittings used in milk and milk products equipment, 3-A®, Number 74-03.

Ordering information

Product structure, RTD assembly TH17

This information provides an overview of the order options available. The information is not exhaustive, however, and may not be fully up to date. More detailed information is available from your local Endress+Hauser representative.

TH17-	RTD Assembly, TH17, sanitary U.S. style			
	Process connection			
	B	1+1½" Tri-clamp connection; 316L SS, 3-A		
	C	2" Tri-clamp connection; 316L SS, 3-A		
	D	2½" Tri-clamp connection; 316L SS, 3-A		
	E	3" Tri-clamp connection; 316L SS, 3-A		
	Y	Special version, TSP-no. to be specified		
	Immersion length L			
	1	2 inch		
	2	3 inch		
	3	4 inch		
	4	5 inch		
	5	6 inch		
	6	2.5 inch		
	8 inch (increment 0.5)		
	Y	Special version, TSP-no. to be specified		
	Tube OD diameter; material			
	C	¼"; 316L SS		
	F	3/8" reduced 3/16"; 316L SS		
	G	¼"; 316L SS HTST/PMO		
	H	3/8" reduced 3/16"; 316L SS HTST/PMO		
	Y	Special version, TSP-no. to be specified		
	Sensor type			
	C	1x Pt100; class A; 3 wire, -50...200 °C		
	G	1x Pt100; class A; 4 wire, -50...200 °C		
	L	2x Pt100; class A; 3 wire, -50...200 °C		
	P	1x Pt100; class 1/10DIN; 4 wire, -50...260 °C		
	Q	1x Pt100; class 1/10DIN; 4 wire, -50...260 °C		
	Y	Special version, TSP-no. to be specified		
	Enclosure; cable entry:			
	A	Not selected		
	B	Alu, E+H blue; NPT ½"		
	C	Alu, E+H blue; NPT ¾"		
	D	Plastic PP white; NPT ½"		
	E	Plastic PP white; NPT ¾"		
	F	SS304 (TA20J); NPT ½"		
	G	SS304 (TA20J) LC display; NPT ½"		
	H	316L (T17) field housing; 1 x Input + NPT ½" + HART		
	I	316L (T17) field housing; NPT ½" + HART + 1 x Input + display		
	J	316L (T17) field housing; 2 x Input + NPT ½" + HART		
	K	316L (T17) field housing; NPT ½" + HART + 2 x Input + display		
	L	316L (T17) field housing; 2 x Input + FF + NPT ½"		
	M	316L (T17) field housing; NPT ½" + FF + 2 x Input + display		
	1	Alu, E+H blue + flip cover high; NPT ½"		
	3	Alu + display, E+H blue; NPT ½" (TA30H)		
	4	Alu + display, E+H blue; NPT ¾" (TA30H)		
	Y	Special version, TSP-no. to be specified		
	Electrical connection:			
	A	Programmable RTD TMT180		
	C	Programmable TMT181 Non Ex		
	D	Programmable TMT181 FM IS		
	E	Programmable TMT181 CSA IS		
	I	TMT162, dual compartment		
	J	TMT162, FM IS, dual compartment		
	K	TMT162, CSA IS, dual compartment		
	O	HART TMT182, FM/CSA IS, Advanced diagnostics		

13

Product structure, RTD assembly TH18

This information provides an overview of the order options available. The information is not exhaustive, however, and may not be fully up to date. More detailed information is available from your local Endress+Hauser representative.

TH18-	RTD Assembly, TH18, sanitary U.S. style				
Process connection					
A	½" + ¾" Tri-clamp; 316L SS, 3-A				
Y	Special version, TSP-no. to be specified				
Immersion length L					
2	¾ inch				
4	1¼ inch				
5	2¼ inch				
6	2¾ inch				
8 inch (increment 0.25)				
Y	Special version, TSP-no. to be specified				
Tube OD diameter; material:					
1	5/32 inch; 316L SS				
9	Special version, TSP-no. to be specified				
Sensor type					
C	1x Pt100; class A; 3 wire; -50...200 °C				
G	1x Pt100; class A; 4 wire; -50...200 °C				
Y	Special version, TSP-no. to be specified				
Enclosure; cable entry:					
A	Not selected				
B	Alu, E+H blue; NPT ½"				
C	Alu, E+H blue; NPT ¾"				
D	Plastic PP white; NPT ½"				
E	Plastic PP white; NPT ¾"				
F	SS304 (TA20J); NPT ½"				
G	SS304 (TA20J) LC display; NPT ½"				
H	316L (T17) field housing; 1 x Input + NPT ½" + HART				
I	316L (T17) field housing; NPT ½" + HART + 1 x Input + display				
J	316L (T17) field housing; 2 x Input + NPT ½" + HART				
K	316L (T17) field housing; NPT ½" + HART + 2 x Input + display				
L	316L (T17) field housing; 2 x Input + FF + NPT ½"				
M	316L (T17) field housing; NPT ½" + FF + 2 x Input + display				
1	Alu, E+H blue + flip cover high; NPT ½"				
3	Alu + display, E+H blue; NPT ½" (TA30H)				
4	Alu + display, E+H blue; NPT ¾" (TA30H)				
Y	Special version, TSP-no. to be specified				
Electrical connection:					
A	Programmable RTD TMT180				
C	Programmable TMT181 Non Ex				
D	Programmable TMT181 FM IS				
E	Programmable TMT181 CSA IS				
I	TMT162, dual compartment				
J	TMT162, FM IS, dual compartment				
K	TMT162, CSA IS, dual compartment				
O	HART TMT182, FM/CSA IS, Advanced diagnostics				
P	HART TMT182				
R	HART TMT182 FM IS				
T	HART TMT182 CSA IS				
U	FF Head transmitter DIN B, GP				
V	FF Head transmitter DIN B, FM/CSA IS				
Y	Special version, TSP-no. to be specified				
2	Flying leads				
3	Terminal block				
4	Profibus PA head transmitter DIN B, GP				
5	Profibus PA head transmitter DIN B, FM/CSA IS				
Documentation requirement:					
1	Standard				

[illegible]

Documentation

- Compact instructions TH17 RTD temperature sensor for Food & dairy applications (KA180r/24/ae)
- Compact instructions TH18 RTD temperature sensor for pharmaceutical applications (KA181r/24/ae)

Technical information temperature transmitter:

- iTEMP® GMT162 (TI086r/24/ae)
- iTEMP® Pt TMT180 (TI088r/24/ae)
- iTEMP® PCP TMT181 (TI070r/24/ae)
- iTEMP® HART® TMT182 (TI078r/24/ae)
- iTEMP® PA® TMT84 (TI138r/24/ae)
- iTEMP® TMT85 FF (TI134r/24/ae)

Application example:

- Technical information Data Manager Memograph M, RSG40 (TI133R/09/en)
- Technical information Field indicator RIA16 (TI00144R/09/en)

USA	Canada	México	Instruments International
Endress+Hauser, Inc. 2350 Endress Place Greenwood, IN 46143 USA Tel.317-535-7138 Fax317-535-8498 Sales888-ENDRESS Service800-642-8737 inquiry@us.endress.com www.us.endress.com	Endress+Hauser Canada 1075 Sutton Drive Burlington, ON L7L 5Z8 Canada Tel.905-681-9292 800-668-3199 Fax905-681-9444 www.ca.endress.com	Endress+Hauser, México, S.A. de C.V.F Fernando Montes de Oca 21 Edificio A Piso 3 Fracc. Industrial San Nicolas 54030. Tlalnepantla de Baz Estado de México México Tel.+52 55 5321 2080 Fax+52 55 5321 2099 eh.mexico@mx.endress.com www.mx.endress.com	Endress+Hauser Instruments International AG Kaegenstrasse 2 4153 Reinach Switzerland Tel.+41 61 715 81 00 Fax+41 61 715 25 00 www.endress.com info@ii.endress.com

Endress+Hauser 
People for Process Automation