TE2

Compact RTD temperature sensor

TE2-#.#.####.####.0

Overview

- Compact and rugged design
- Customer-specific immersion depth down to 3000 mm
- Precision measurement from -50 ... 250 °C
- Integrated 4 ... 20 mA transmitter or Pt100 output
- Easy process implementation from DN 25 or in tank

3 74-07

EN 50155

Technical data

Performance characteristics	
Pt100 accuracy class (EN 60751)	B (± 0.3 °C at 0 °C) ± (0.3 + 0.005 × t)°C A (± 0.15 °C at 0 °C) ± (0.15 + 0.002 × t)°C 1/3 B (± 0.1 °C at 0 °C) ± 1/3 × (0.3 + 0.005 × t)°C 1/6 B (± 0.05 °C at 0 °C) ± 1/6 × (0.3 + 0.005 × t)°C
Thermal response time, T50	RTD element only ≤ 1.0 s , conical sensor ≤ 1.3 s , Ø3 mm ≤ 2.5 s , Ø4 mm ≤ 3.0 s , Ø6 mm
Thermal response time, T90	RTD element only ≤ 3.0 s , Ø3 mm ≤ 3.6 s , Ø4 mm ≤ 8.5 s , Ø6 mm
Process pressure	Refer to section "Operating conditions"
Process temperature	Refer to section "Operating conditions"
Process connection	
Connection variants	Refer to section "Dimensional drawings"
Sensor length	≤ 3000 mm
Sensor diameter outside	ø 6 mm
Mounting position	Any, top, bottom, side
Standard response tip	ø 6 mm
Fast response tip	ø 3 mm ø 4 mm
Sensor tube material	AISI 316L (1.4404)
Surface roughness wetted parts	Ra ≤ 0.8 µm
Ambient conditions	
Operating temperature range	-40 … 125 °C , with Pt100 -40 … 85 °C , with transmitter

Ambient conditions	
Storage temperature range	-55 … 90 °C
Degree of protection (EN 60529)	IP 65 , with DIN EN 175301-803 A (DIN 43650 A), 4-pin IP 68 , with M12-A, 4-pin and appropriate cable
Humidity	≤ 100 % RH , condensing
Long-term test (transmitter)	IEC 770 6.3.2
Vibration (sinusoidal) (EN 60068-2-6)	1.6 mm p-p (2 … 25 Hz), 4 g (25 … 100 Hz), 1 octave / min.
Output signal	
Without transmitter	1 x Pt100, 4-wire
With transmitter	4 … 20 mA , 2-wire
Housing	
Style	Compact transmitter
Overall size	Refer to section "Dimensional drawings"
Material	AISI 304 (1.4301)
Electrical connection	
Connector	DIN EN 175301-803 A (DIN 43650 A), 4-pin M12-A, 4-pin
Power supply	
Voltage supply range	8 … 35 V DC
Power-up time	< 20 s
Reverse polarity protection	Yes
Factory settings	
Output range	0 … 150 °C
Damping	0 s
Output at sensor fault	23 mA

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Technical data

Compliance and approvals

EMC	EN 61000-6-2 EN 61000-6-3 EN 61326-1 NE21

Compliance and approvals

Hygiene	FDA (21 CFR 177.2415) 3-A (74-07)
Railway applications	EN 50155
Explosion protection	Ex ia Simple apparatus, gas and dust

Transmitter

Input

Measuring unit	°C °F
Min. measuring span	25 °C
Sample time	< 0.7 s
Accuracy	< 0.25 °C , @ ≤ 100 °C
Repeatability	< 0.1 °C
Resolution	14 bit
Ripple immunity	IEC 770 6.2.4.2
Error detection delay	< 10 s
Offset adjustment	± 10 °C , max.
Isolation, sensor to case	50 V AC , test 500V
Protection	± 35 V DC
Suppression	50 Hz 60 Hz

Output

Output signal	4 … 20 mA , 2-wire
Accuracy	< 0.1 % , measuring span < 0.016 mA
Temperature drift	< 0.003 %/K , typ. < 0.01 %/K , max.
Resolution	12 bit
Effect of variations in supply voltage	< 0.01 %/V
Ripple immunity	3 Vrms
Shunt resistance	Rs ≤ (V DC - 8 V)/0.023 A
Damping	0.0 … 30.0 s , programmable
Up/Down scaling limits	23 mA / 3.5 mA

Operating conditions

Ordering key	Process connection	BCID	Process pressure	Continuous Process temperature Standard @ Tamb ≤ 20 °C	Process temperature With cooling neck @ Tamb ≤ 20 °C
			(bar)	(° C)	(° C)
TE2-#.1.####.####.#	Sleeve Ø 6	T65	-1 … 40	-50 … 125	-50 … 250
TE2-#.3.####.####.#	G 1/2 A ISO 228-1	G06	-1 … 100	-50 … 125	-50 … 250
TE2-#.4.####.####.#	G 1/2 A hygienic	A03	-1 … 40	-50 … 125	-50 … 250
TE2-#.5.####.####.#	M12 × 1.5 hygienic	A02	-1 … 40	-50 … 125	-50 … 250
TE2-#.6.####.####.#	M12 × 1.5 hygienic, with PEEK cone	A02	-1 … 10	-50 … 115	N/A
TE2-#.7.####.####.#	G 1/8 female thread hygienic	A01	-1 … 40	-50 … 205	-50 … 250
TE2-#.8.####.####.#	G 1/4 A DIN 3852-E	G50	-1 … 100	-50 … 125	-50 … 250
TE2-#.9.####.####.#	ISO 2852 (Tri-Clamp), DN 33.7; 38, Ø 50.5	C04	-1 … 40	-50 … 125	-50 … 250
TE2-#.A.####.####.#	Tri-Clamp Ø 24.9	C01	-1 … 40	-50 … 125	-50 … 250
TE2-#.B.####.####.#	BHC 3A DN 38	B01	-1 … 40	-50 … 125	-50 … 250
TE2-#.D.####.####.#	1/2-14 NPT	N02	-1 … 100	-50 … 125	-50 … 250
TE2-#.E.####.####.#	1/4-18 NPT	N01	-1 … 100	-50 … 125	-50 … 250
TE2-#.F.####.####.# TE2-#.G.####.####.#	G 1/2 A DIN 3852-E	G51	-1 … 100	-50 … 125	-50 … 250

For further information on permissible process and ambient temperatures, please refer to the operating instructions.

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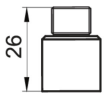
Compliance and approvals

Ordering key	Process connection	BCID	EN 10/2011	EN 1935/2004 EN 2023/2006	FDA	3-A
TE2-#.1.####.####.#	Sleeve Ø 6	T65				
TE2-#.3.####.####.#	G 1/2 A ISO 228-1	G06				
TE2-#.4.####.####.#	G 1/2 A hygienic	A03		■		
TE2-#.5.####.####.#	M12 × 1.5 hygienic	A02		■		
TE2-#.6.####.####.#	M12 × 1.5 hygienic, with PEEK cone	A02	■	■	■	
TE2-#.7.####.####.#	G 1/8 female thread hygienic	A01		■		
TE2-#.8.####.####.#	G 1/4 A DIN 3852-E	G50				
TE2-#.9.####.####.#	ISO 2852 (Tri-Clamp), DN 33.7; 38, Ø 50.5	C04		■		■
TE2-#.A.####.####.#	Tri-Clamp Ø 24.9	C01		■		
TE2-#.B.####.####.#	BHC 3A DN 38	B01		■		■
TE2-#.D.####.####.#	1/2-14 NPT	N02				
TE2-#.E.####.####.#	1/4-18 NPT	N01				
TE2-#.F.####.####.# TE2-#.G.####.####.#	G 1/2 A DIN 3852-E	G51				

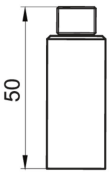
The requirements of the respective 3-A Sanitary Standard will be only fulfilled in combination with appropriate mounting accessories. Those are marked with the 3-A logo.

Dimensional drawings (mm)

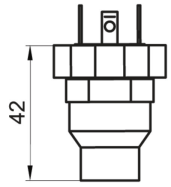
Housing



Housing with connector M12-A, 4-pin



Housing with transmitter and connector M12-A, 4-pin



Housing with connector DIN EN 175301-803 A (DIN 43650 A), 4-pin

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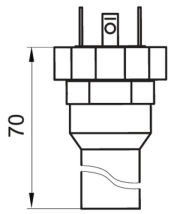
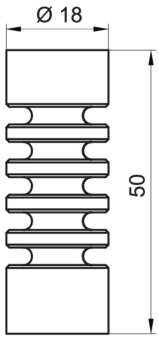
Dimensional drawings (mm)

Housing

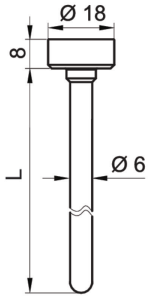


Housing with transmitter and connector DIN EN 175301-803 A (DIN 43650 A), 4-pin

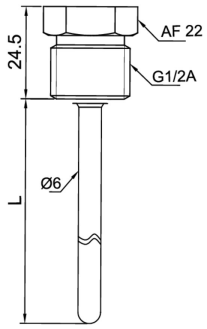


Cooling neck

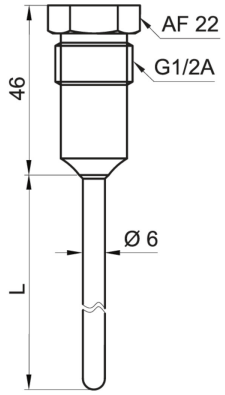
Process connection



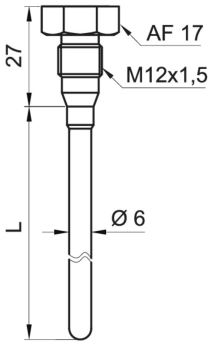
Without thread (BCID: T65)



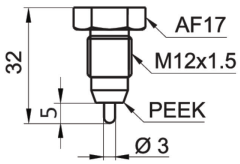
G 1/2 A ISO 228-1 (BCID: G06)



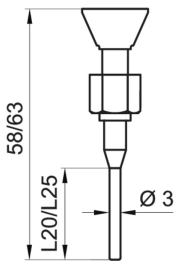
G 1/2 A hygienic (BCID: A03)



M12 × 1.5 hygienic (BCID: A02)



M12 × 1.5 hygienic, PEEK cone, tip Ø 3 x 5 mm (BCID: A02)



G 1/8 female thread hygienic (BCID: A01)

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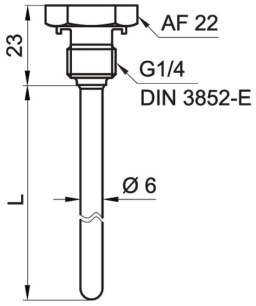
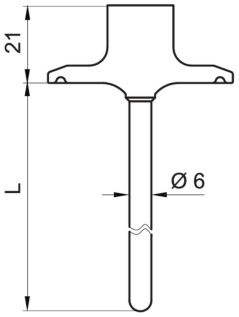
Dimensional drawings (mm)

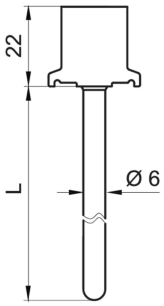
Process connection



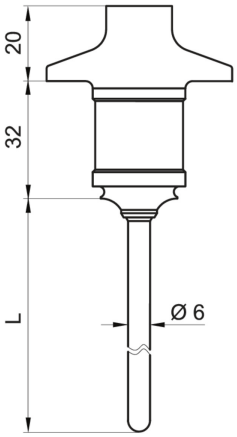
G 1/4 A DIN 3852-E (BCID: G50)



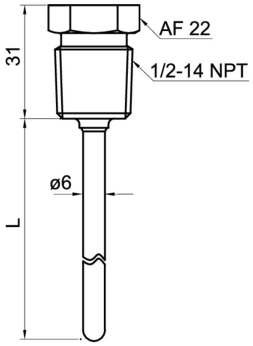
Tri-Clamp Ø 50.5 (BCID: C04)



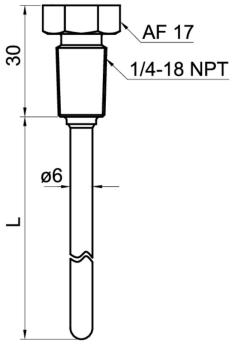
Tri-Clamp Ø 24.9 (BCID: C01)



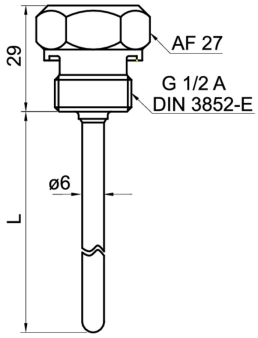
BHC 3A DN 38 (BCID: B01)



1/2-14 NPT (BCID: N02)

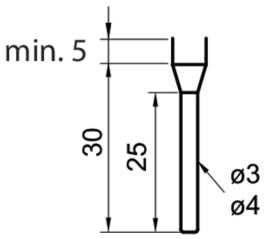


1/4-18 NPT (BCID: N01)



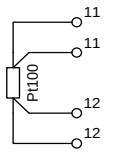
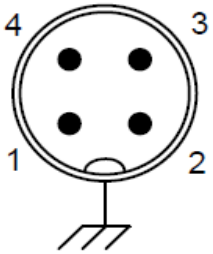
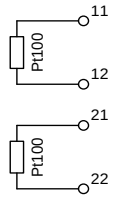
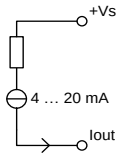
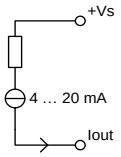
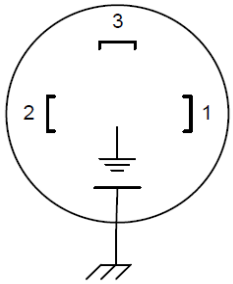
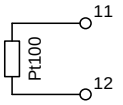
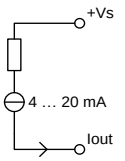
G 1/2 A DIN 3852-E (BCID: G51)

Standard response tip



Fast response tip

Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment
	M12-A, 4-pin, stainless steel			
Pt100 (Single element)			Pt100 11 Pt100 12 Frame ground	1, 2 3, 4 Plug thread
Pt100 (Double element)			Pt100 11 Pt100 12 Pt100 21 Pt100 22 Frame ground	1 4 2 3 Plug thread
4 … 20 mA, 2-wire, Iout at pin 2			+Vs Iout N.C. Frame ground	1 2 3, 4 Plug thread
4 … 20 mA, 2-wire, Iout at pin 2, 3			+Vs Iout N.C. Frame ground	1 2, 3 4 Plug thread
	DIN EN 175301-803 A (DIN 43650 A), 4-pin			
Pt100 (Single element)			N.C. Pt100 11 Pt100 12 Frame ground	1 2 3 Grounding lug
4 … 20 mA, 2-wire			+Vs Iout N.C. Frame ground	1 2 3 Grounding lug

Ordering information

Ordering key - Configuration possibilities see website

	TE2	-	#	.	#	.	#	#	#	#	.	####	.	#
Product	TE2													
Sensor tip														
Not specified			0											
Standard response tip, Ø 6 mm			1											
Fast response tip, Ø 4 mm			2											
Fast response tip, Ø 3 mm			3											

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Ordering information

Ordering key - Configuration possibilities see website

	TE2	-	#	.	#	.	#	#	#	#	.	####	.	#
Process Connection														
Tube without connection					1									
G 1/2 A ISO 228-1 (G06)					3									
G 1/2 A hygienic (A03)					4									
M12 × 1.5 hygienic (A02)					5									
M12 × 1.5 hygienic, PEEK cone, sensor tip Ø 3x5 mm (A02)					6									
G1/8 ISO 228/1 female thread, Hygienic (A01)					7									
G 1/4 A DIN 3852-E, with NBR seal (G50)					8									
ISO 2852 (Tri-Clamp), DN 25; 33.7; 38, Ø 50.5 (C04)					9									
DIN 32676-C (Tri-Clamp), DN 3/4, Ø 24.9 (C01)					A									
BHC 3A DN 38 (B01)					B									
1/2-14 NPT (N02)					D									
1/4-18 NPT (N01)					E									
G 1/2 A DIN 3852-E, with FKM seal (G51)					F									
G 1/2 A DIN 3852-E, with EPDM seal (G51)					G									
Sensor element														
1/1 B EN 60751, single						1								
1/1 B EN 60751, duplex						2								
1/3 B EN 60751, single						3								
1/3 B EN 60751, duplex						4								
1/6 B EN 60751, single						5								
1/6 B EN 60751, duplex						6								
1/1 A EN 60751, single						7								
1/1 A EN 60751, duplex						8								
Cooling neck														
Without cooling neck							0							
With cooling neck							4							
Electrical connection														
M12-A, 4-pin, stainless steel								1						
M12-A, 4-pin, stainless steel, with integrated transmitter								2						
DIN EN 175301-803 A (DIN 43650 A), 4-pin(1)								4						
DIN EN 175301-803 A (DIN 43650 A), 4-pin, with integrated transmitter(1)								5						
M12-A, 4-pin, stainless steel, with integrated transmitter, Iout pin 2+3								A						
Certificates														
Not specified									0					
Railway EN 50155									4					
Ex ia Simple apparatus, gas and dust									9					
Sensor tube length (mm)														
5 - 3000												####		
Configuration														
No configuration														0
Configuring according to customer specification														C

(1) Including female power connector