

# PT20S

Industrial compact RTD temperature sensor

PT20S-####.#####1#.2##000#.####

## Overview

- Precision measurement from -50 ... 250 °C
- Integrated 4 ... 20 mA transmitter with high accuracy
- Fast power-up time < 2 s
- Short response time < 1.1 s
- All parts welded together
- Customer-specific immersion depth down to 3000 mm



## Technical data

### Performance characteristics

Pt100 accuracy class (EN 60751)	Fast response tip B ( $\pm 0.3 \text{ °C at } 0 \text{ °C}$ ) $\pm (0.3 + 0.005 \times t) \text{ °C}$ Standard response tip B ( $\pm 0.3 \text{ °C at } 0 \text{ °C}$ ) $\pm (0.3 + 0.005 \times t) \text{ °C}$ A ( $\pm 0.15 \text{ °C at } 0 \text{ °C}$ ) $\pm (0.15 + 0.002 \times t) \text{ °C}$ 1/3 B ( $\pm 0.1 \text{ °C at } 0 \text{ °C}$ ) $\pm 1/3 \times (0.3 + 0.005 \times t) \text{ °C}$ 1/6 B ( $\pm 0.05 \text{ °C at } 0 \text{ °C}$ ) $\pm 1/6 \times (0.3 + 0.005 \times t) \text{ °C}$
Max. output error	$\leq 0.06 \text{ % FSR @ } 25 \text{ °C}$ Including input accuracy, output accuracy and repeatability
Temperature drift (by ambient)	$< 0.025 \text{ °C} + 0.01 \text{ % FSR/°C}$
Thermal response time, T90	$< 1.1 \text{ s}$ , $\varnothing 3 \text{ mm}$ $< 8.9 \text{ s}$ , $\varnothing 6 \text{ mm}$
Process temperature	Refer to section "Operating conditions"

### Process connection

Connection variants	Refer to section "Dimensional drawings"
Sensor length	$\leq 3000 \text{ mm}$
Sensor diameter outside	$\varnothing 6 \text{ mm}$
Mounting position	Any, top, bottom, side
Standard response tip	$\varnothing 6 \text{ mm}$
Fast response tip	$\varnothing 3 \text{ mm}$
Sensor tube material	AISI 316L (1.4404)
Surface roughness wetted parts	$R_a \leq 0.8 \text{ }\mu\text{m}$

## Transmitter

### Input

Min. measuring span	$10 \text{ °C}$
Sample time	$< 0.1 \text{ s}$
Error detection delay	$< 2 \text{ s}$

### Ambient conditions

Operating temperature range	$-40 \text{ ... } 85 \text{ °C}$
Storage temperature range	$-50 \text{ ... } 85 \text{ °C}$
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 IP 69K, with appropriate cable
Humidity	$\leq 100 \text{ % RH}$ , condensing
Vibration (sinusoidal) (EN 60068-2-6)	$1.6 \text{ mm p-p}$ (2 ... 25 Hz), 4 g (25 ... 100 Hz), 1 octave / min. GL, test 2

### 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
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### Power supply

Voltage supply range	$7 \text{ ... } 35 \text{ V DC}$
Power-up time	$< 2 \text{ s}$
Reverse polarity protection	Yes

### Factory settings

Output range	$0 \text{ ... } 150 \text{ °C}$
Damping	$0 \text{ s}$
Output at sensor fault	$23 \text{ mA}$

### Compliance and approvals

EMC	EN 61326-1
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### Output

Output signal	$4 \text{ ... } 20 \text{ mA}$ , 2-wire $20 \text{ ... } 4 \text{ mA}$ , 2-wire
Resolution	$14 \text{ bit}$

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## Transmitter

### Output

Effect of variations in supply voltage	< 0.001 %/V
Ripple immunity	< 1 %, FSR (1 Vrms, 50Hz...1kHz)
Shunt resistance	$R_s \leq (V_{DC} - 7 V)/0.023 A$
Damping	0.0 ... 60.0 s , programmable
Up/Down scaling limits	23 mA / 3.5 mA

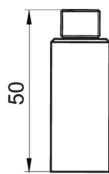
## Operating conditions

Ordering key	Process connection	BCID	Process pressure  (bar)	Process temperature Standard @ Tamb ≤ 20 °C  (° C)	Continuous	
					Process temperature With cooling neck, Sensor tip Ø3 mm @ Tamb ≤ 20 °C  (° C)	Process temperature With cooling neck, Sensor tip Ø6 mm @ Tamb ≤ 20 °C  (° C)
T650	Sleeve Ø 6	T65	-1 ... 40	-50 ... 125	-50 ... 200	-50 ... 250
G060	G 1/2 A ISO 228-1	G06	-1 ... 100	-50 ... 125	-50 ... 200	-50 ... 250
G500	G 1/4 A DIN 3852-E	G50	-1 ... 100	-50 ... 125	-50 ... 200	-50 ... 250
G510	G 1/2 A DIN 3852-E	G51	-1 ... 100	-50 ... 125	-50 ... 200	-50 ... 250
N020	1/2-14 NPT	N02	-1 ... 100	-50 ... 125	-50 ... 200	-50 ... 250

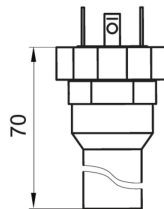
For further information on permissible process and ambient temperatures, please refer to the operating instructions.

## Dimensional drawings (mm)

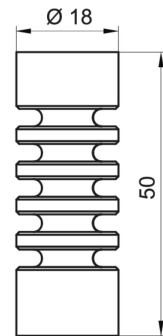
### Housing



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



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



Cooling neck

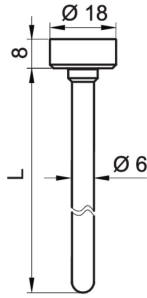
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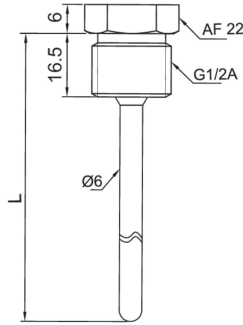
PT20S-####.#####1#.2##000#.####

## Dimensional drawings (mm)

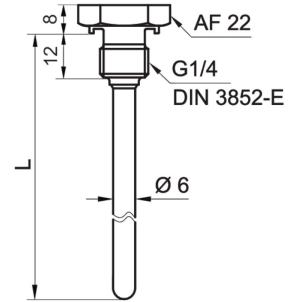
### Process connection



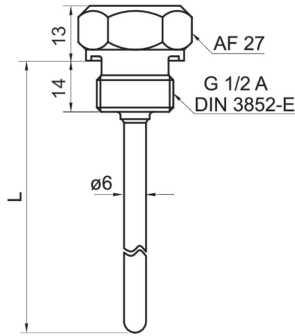
Without thread (BCID: T65)



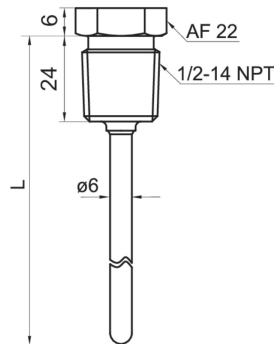
G 1/2 A ISO 228-1 (BCID: G06)



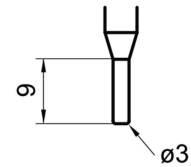
G 1/4 A DIN 3852-E (BCID: G50)



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



1/2-14 NPT (BCID: N02)



Fast response tip



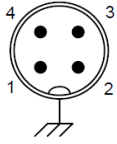
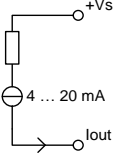
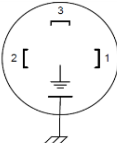
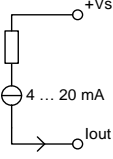
Standard response tip

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## Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment								
	<b>M12-A, 4-pin, stainless steel</b>											
4 ... 20 mA, 2-wire			<table border="1"> <tr><td>+Vs</td><td>1</td></tr> <tr><td>Iout</td><td>2, 3</td></tr> <tr><td>N.C.</td><td>4</td></tr> <tr><td>Frame ground</td><td>Plug thread</td></tr> </table>	+Vs	1	Iout	2, 3	N.C.	4	Frame ground	Plug thread	
+Vs	1											
Iout	2, 3											
N.C.	4											
Frame ground	Plug thread											
	<b>DIN EN 175301-803 A (DIN 43650 A), 4-pin</b>											
4 ... 20 mA, 2-wire			<table border="1"> <tr><td>+Vs</td><td>1</td></tr> <tr><td>Iout</td><td>2</td></tr> <tr><td>N.C.</td><td>3</td></tr> <tr><td>Frame ground</td><td>Grounding lug</td></tr> </table>	+Vs	1	Iout	2	N.C.	3	Frame ground	Grounding lug	
+Vs	1											
Iout	2											
N.C.	3											
Frame ground	Grounding lug											

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## Ordering information

Ordering key - Configuration possibilities see website

	PT20S	-	####	.	#	#	#	#	#	1	#	.	2	#	#	0	0	0	#	.	####
<b>Product</b>	Temperature sensor PT20S																				
	PT20S																				
<b>Process connection</b>																					
Sleeve Ø 6 (T65)																					T650
G 1/2 A ISO 228-1 (G06)																					G060
G 1/4 A DIN 3852-E (G50)																					G500
G 1/2 A DIN 3852-E (G51)																					G510
1/2-14 NPT (N02)																					N020
<b>Sensor tip</b>																					
Standard tip (Ø6 mm)																					1
Fast response tip (Ø3 mm)																					2
<b>Sensor element</b>																					
Pt100 1/1 B EN 60751, single, 2-wire																					1
Pt100 1/3 B EN 60751, single, 2-wire																					3
Pt100 1/6 B EN 60751, single, 2-wire																					5
Pt100 1/1 A EN 60751, single, 2-wire																					7
Pt100 1/1 B EN 60751, single, 4-wire																					A
Pt100 1/6 B EN 60751, single, 4-wire																					C
Pt100 1/6 B EN 60751, single, 4-wire																					C
Pt100 1/1 A EN 60751, single, 4-wire																					D
<b>Cooling neck</b>																					
Without cooling neck																					0
With cooling neck																					4
<b>Process temperature</b>																					
-50...125°C																					1
-50...200°C																					2
-50...250°C																					3
<b>Max. process pressure</b>																					
40 bar																					2
100 bar																					3
<b>Interface</b>																					
4...20 mA (2-wire)																					1
<b>Electrical connection</b>																					
M12-A, 4 pin, stainless steel, with integrated transmitter																					2
DIN EN 175301-803 A (DIN 43650 A), 4-pin, with integrated transmitter																					5
<b>Wetted parts material</b>																					
AISI 316L (1.4404)																					2
<b>Surface roughness</b>																					
Ra ≤ 0.8 µm																					1
Ra ≤ 0.4 µm																					2
Electropolished, Ra ≤ 0,8 µm																					3
Electropolished, Ra ≤ 0,4 µm																					4
<b>Gasket material</b>																					
Without																					0
NBR																					1
FKM /Viton																					2
EPDM																					3
<b>Explosion protection</b>																					
Without																					0

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## Ordering information

Ordering key - Configuration possibilities see website

	PT20S	-	####	.	#	#	#	#	#	1	#	.	2	#	#	0	0	0	#	.	####
<b>Industrial approvals</b>																					
Standard																					0
<b>Special approvals</b>																					
Standard																					0
<b>Configuration</b>																					
Factory settings																					0
Customer-specific																					1
<b>Sensor tube length (mm)</b>																					
20 - 3000																					####

2021-01-05 The product features and technical data specified do not express or imply any warranty. Technical modifications subject to change.