

PT20S

Industrial compact RTD temperature sensor

PT20S-####.#####.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
- IO-Link Dual Channel for easy commissioning



Technical data

Performance characteristics

Pt100 accuracy class (EN 60751)	Fast response tip B (± 0.3 °C at 0 °C) $\pm (0.3 + 0.005 \times t)$ °C Standard response tip B (± 0.3 °C at 0 °C) $\pm (0.3 + 0.005 \times t)$ °C A (± 0.15 °C at 0 °C) $\pm (0.15 + 0.002 \times t)$ °C 1/3 B (± 0.1 °C at 0 °C) $\pm 1/3 \times (0.3 + 0.005 \times t)$ °C 1/6 B (± 0.05 °C at 0 °C) $\pm 1/6 \times (0.3 + 0.005 \times t)$ °C
Max. output error	≤ 0.06 % FSR @ 25 °C Including input accuracy, output accuracy and repeatability
Thermal response time, T90	RTD element and transmitter combined < 1.1 s, Ø3 mm < 8.9 s, Ø6 mm
Temperature drift (by ambient)	< 0.025 K/K + 0.01 % FSR/K
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
Sensor tube material	AISI 316L (1.4404)
Surface roughness wetted parts	Ra ≤ 0.8 µm

Ambient conditions

Operating temperature range	-40 ... 85 °C
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Ambient conditions

Storage temperature range	-50 ... 85 °C
Degree of protection (EN 60529)	Connector DIN EN 175301-803 A (DIN 43650 A), 4-pin: IP65 Connector M12-A, 4-pin: IP68, with appropriate cable (336 h @ 10 mH2O) IP69K, with appropriate cable
Humidity	≤ 100 % RH, condensing
Vibration (sinusoidal) (EN 60068-2-6)	1.6 mm p-p (2 ... 25 Hz), 4 g (25 ... 100 Hz), 1 octave / min. GL, test 2

IO-Link interface

IO-Link version	1.1
Device profile	Smart Sensor Profile
IO-Link port type	Class A
Baud rate	38,4 kbaud (COM2)
Process data length	72 bit
SIO-mode	Yes
Process data (cyclic)	Switch state State of alert Process temperature Unit temperature Signal analog output 1
Dual Channel	IO-Link / Analogue

Housing

Style	Compact transmitter
Overall size	Refer to section "Dimensional drawings"
Material	AISI 304 (1.4301)

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Technical data

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 ... 35 V DC (Standard version) 10 ... 35 V DC (Dual Channel version) 18 ... 30 V DC (Dual Channel version, IO-Link communication)
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Power supply

Power-up time	< 2 s
Reverse polarity protection	Yes

Factory settings

Output range	0 ... 150 °C
Damping	0 s
Output at sensor fault	23 mA

Compliance and approvals

EMC	EN 61326-1
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Transmitter

Input

Min. measuring span	10 °C
Sample time	< 0.1 s
Accuracy	0.05 °C (-50 ... 200 °C) 0.06 °C (200 ... 250 °C)
Error detection delay	< 2 s

Output

Output type	PNP NPN Digital (push-pull) 4 ... 20 mA, 2-wire 20 ... 4 mA, 2-wire
Switching logic	Active high Active low
Voltage drop	PNP: (+Vs - 1,2 V) ± 0.5 V, Rload ≥ 10 kΩ NPN: (-Vs + 1,5 V) ± 0.5 V, Rload ≥ 10 kΩ
Resolution	14 bit
Ripple immunity	< 1 % FSR (1 Vrms, 50Hz...1kHz)
Shunt resistance	Rs ≤ (V DC - 7 V)/0.023 A (Standard version) Rs ≤ (V DC - 10 V)/0.023 A (Dual Channel version)
Current rating	100 mA, max.
Off leak current	< 100 µA
Short circuit protection	Yes
Damping	0.0 ... 60.0 s, programmable
Up/Down scaling limits	23 mA / 3.5 mA

Operating conditions

Ordering key	Process connection	BCID	Continuous			
			Process pressure	Process temperature Standard @ Tamb ≤ 20 °C	Process temperature With cooling neck, Sensor tip Ø3 mm @ Tamb ≤ 20 °C	Process temperature With cooling neck, Sensor tip Ø6 mm @ Tamb ≤ 20 °C
			(bar)	(° C)	(° 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.

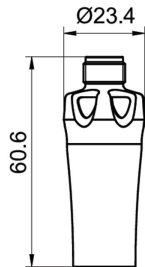
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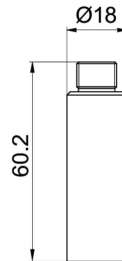
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Dimensional drawings (mm)

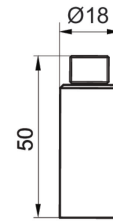
Housing



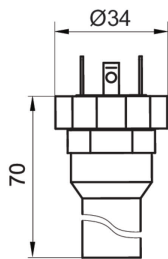
Housing with Dual Channel transmitter and KingCrown connector M12-A, 4-pin (with LED)



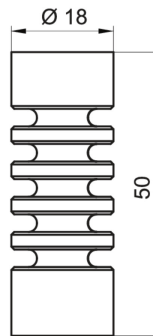
Housing with Dual Channel transmitter and connector M12-A, 4-pin



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

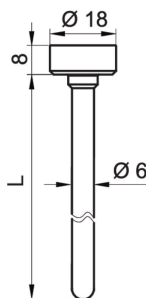


Housing with transmitter and connector DIN EN 175301-803 A (DIN 43650 A), 4-pin

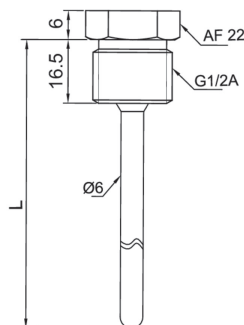


Cooling neck

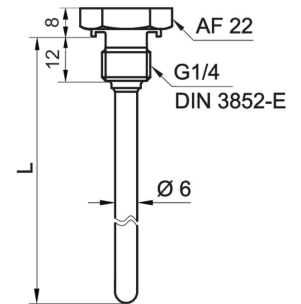
Process connection



Without thread (BCID: T65)



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



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

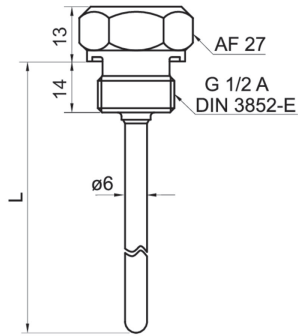
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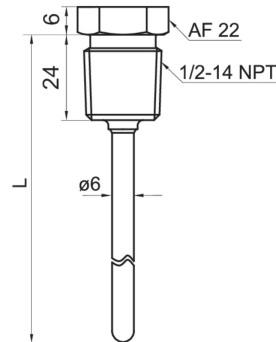
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Dimensional drawings (mm)

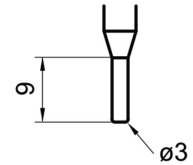
Process connection



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



1/2-14 NPT (BCID: N02)



Fast response tip



Standard response tip

Electrical connection

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

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Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment
	M12-A, 4-pin, stainless steel			
Dual Channel version 4 ... 20 mA, 2-wire			+Vs lout N.C. Frame ground	1 2 3, 4 Plug thread
Dual Channel version IO-Link + 4 ... 20 mA PNP			+Vs SW1 (IO-Link) lout GND (0 V) Frame ground	1 4 2 3 Plug thread
Dual Channel version IO-Link + 4 ... 20 mA NPN			+Vs SW1 (IO-Link) lout GND (0 V) Frame ground	1 4 2 3 Plug thread
Dual Channel version IO-Link + 4 ... 20 mA Digital (push-pull)			+Vs SW1 (IO-Link) lout GND (0 V) Frame ground	1 4 2 3 Plug thread

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Ordering information

Ordering key - Configuration possibilities see website

PT20S - #### . # # # # # # # . 2 # # 0 0 0 # . ####	
Product	PT20S
Process connection	
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
Sensor tip	
Standard tip (Ø6 mm)	1
Fast response tip (Ø3 mm)	2
Sensor element	
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 1/3 B EN 60751, single, 4-wire	B
Pt100 1/6 B EN 60751, single, 4-wire	C
Pt100 1/1 A EN 60751, single, 4-wire	D
Cooling neck	
Without cooling neck	0
With cooling neck	4
Process temperature	
-50...125°C	1
-50...200°C	2
-50...250°C	3
Max. process pressure	
40 bar	2
100 bar	3
Interface	
4...20 mA (2-wire)	1
IO-Link Dual Channel, 4...20 mA	2
Electrical connection	
M12-A, 4 pin, stainless steel, with integrated transmitter	2
M12-A, 4 pin, stainless steel KingCrown, with integrated transmitter (with LED)	3
DIN EN 175301-803 A (DIN 43650 A), 4-pin, with integrated transmitter	5
Wetted parts material	
AISI 316L (1.4404)	2
Surface roughness	
Ra ≤ 0.8 µm	1
Ra ≤ 0.4 µm	2
Electropolished, Ra ≤ 0,8 µm	3
Electropolished, Ra ≤ 0,4 µm	4

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Ordering information

Ordering key - Configuration possibilities see website

	PT20S	-	####	.	#	#	#	#	#	#	.	2	#	#	0	0	0	#	.	####
Gasket material																				
Without																	0			
NBR																	1			
FKM /Viton																	2			
EPDM																	3			
Explosion protection																				
Without																	0			
Industrial approvals																				
Standard																	0			
Special approvals																				
Standard																	0			
Configuration																				
Factory settings																			0	
Customer-specific																			1	
Sensor tube length (mm)																				
20 - 3000																				####

(1) Including female power connector