

RESISTANCE TEMPERATURE DETECTOR PROBES

Cable RTD probes are particularly suitable for applications where the metal probe tip is mounted directly in drilled holes (e.g. in machine components) or directly in the process for any application without chemically aggressive media or abrasion.

Temperature measurement with resistance thermometers is based on the property of all conductors and semiconductors that their resistance varies with temperature.

This relative change in resistance depending on temperature is known as temperature coefficient and is unique to the material and construction of the sensing element.

The most common resistance thermometers are made of platinum coils characterized by internal resistance at 0 °C. Thus, the Pt100 is a platinum resistance thermometer whose resistance at 0 °C will be 100 Ω and a Pt1000 will have a resistance of 1000 Ω .

When using resistance thermometers to measure temperature, it should be noted that the resistance of the selected wire affects the measurement result.

Three types of circuits are generally used: 2-wire, 3-wire and 4-wire circuits.

The more wires, the higher the accuracy since a current (in the order of tenths of a milliampere) must be induced in order to measure the resistance of the sensor. Spreading the current over more wires therefore results in a lower error, especially for longer cable lengths.

Still the most common configuration is 3-wire due to the ease of implementation of the Wheatstone bridge measurement. This configuration can perform in-class measurements up to a combined bulb and cable length of 30m.



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Sensor element

Pt100		
	Standard	Optional
Range	-70/500 °C	From -196 to 850 °C
Accuracy	1 DIN B (Class F 0.3)	1 DIN B (Class F 0.3) 1 DIN A (Class F 0.15) 1/3 DIN B (Class F 0.1) 1/10 DIN B
Wires	3 wires	2 wires 3 wires 4 wires
Number of sensors	1 sensor	1 sensor 2 sensors 3 sensors
Temperature coefficient	TCR = 3850 ppm/K	
Max current	1 mA	
Overtemperature	+50 °C	
Self-heating	0,4 K/mW at 0 °C	

Pt1000		
	Standard	Optional
Range	-70/500 °C	From -196 to 750 °C
Accuracy	1 DIN B (Class F 0.3)	1 DIN B (Class F 0.3) 1 DIN A (Class F 0.15) 1/3 DIN B (Class F 0.1) 1/10 DIN B
Wires	3 wires	2 wires 3 wires 4 wires
Number of sensors	1 sensor	1 sensor 2 sensors 3 sensors
Temperature coefficient	TCR = 3850 ppm/K	
Max current	1 mA	
Overtemperature	+50 °C	
Self-heating	0,4 K/mW at 0 °C	

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Construction

Probe		
	Standard	Optional
Material	AISI 316	AISI 304 AISI 316 Inconel 600 PTFE Other available
Length (mm)	50 100 150 ... 400	From 20 to 2000 mm Other available
Diameter	6 mm 8 mm	From 2 mm to 16 mm Other available
Construction	Straight	Straight Double diameter Spiked for soft bodies Curved
Wall	1 mm	
Insulation	Powder MgO	Powder MgO C-610

Thermowell (optional)		
	Standard	Optional
Material	AISI 316	AISI 316
Length (mm)	100	From 50 to 1000 mm Other available
Diameter	8 mm 10 mm	From 2 mm to 16 mm Other available
Max pressure	40 bar	From 40 bar to 250 bar
Construction	Welded tube	Welded tube Drilled solid tube
Process connection	1/2" Gas	Other available
Sensor connection	1/2" Gas	1/2" Gas

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Connection

Wired sensor		
	Standard	Optional
Range	-20...250°C	-70...500 °C
Section (n cables x section)	3x0,25 mm ²	nx0,25 mm ² nx0,5 mm ² nx0,8 mm ² Other available
Cable length	2 m	-
Cable material	Silicone/Silicone	Silicone PTFE PVC Screened Fiberglass
Cable protection	Heat-shrink tubing	Heat-shrink tube Spring
Output	3 cables	n cables Cable terminal Connector Other available
Process connection	-	See page 5

Terminal head sensor		
	Standard	Optional
Range	-20...250°C	-70...500 °C
Head	KN	KN Din B ATEX Other available
Material	Aluminium	Aluminium Polyamide
Terminal block	Ceramic	Ceramic Other available
Output	3 wires	n wire 4...20 mA
Process connection	1/2" Gas Fixed	See page 5

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Fittings			
	Usage	Thread	Options
Compression fitting	Allows vertical adjustment and turning of the head	1/4" NPT 1/2" NPT 3/4" Gas 1/4" Gas 1/2" Gas 1/8" Gas	for Ø6 and Ø 8
		1/2" Gas	for Ø10 and Ø12
Fixed	The thread is attached to the head	1/2" Gas 1/2" NPT	for Ø6, Ø 8 and Ø10
Fixed height	The thread is welded to the probe at a set height	1/4" Gas	for Ø3
		1/2" Gas 1/2" NPT	for Ø6
		1/2" Gas 1/2" NPT M18x1,5	for Ø8
		1/2" Gas 1/2" NPT 3/4" Gas 3/8" Gas 3/8" NPT	for Ø10
Spinning thread	Allows the turning of the head at a set height	1/2" Gas 1/2" NPT	for Ø6
		1/2" Gas 1/2" NPT M18x1,5	for Ø8
		1/2" Gas 1/2" NPT 3/4" Gas 3/8" Gas 3/8" NPT	for Ø10
Female thread	Allows the turning of the head at a set height	1/2" Gas 1/2" NPT 3/4" Gas	for Ø6
		1/2" Gas 1/2" NPT 1/4" NPT	for Ø8
		1/2" Gas 1/2" NPT 3/4" NPT M18x1,5	for Ø12
Special for transformers	Nylon or polypropylene thread special for power distribution transformers.	1" Gas	for Ø8

Other threads available

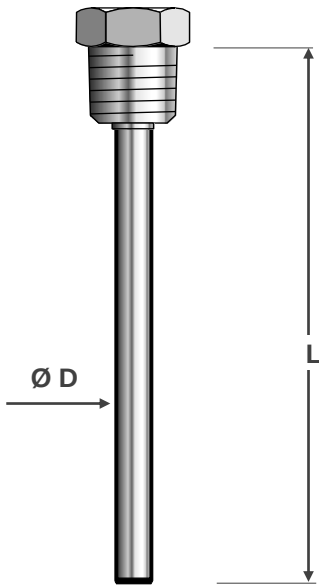
Other options also include: magnet attachment, handle, clamp and flanged connections

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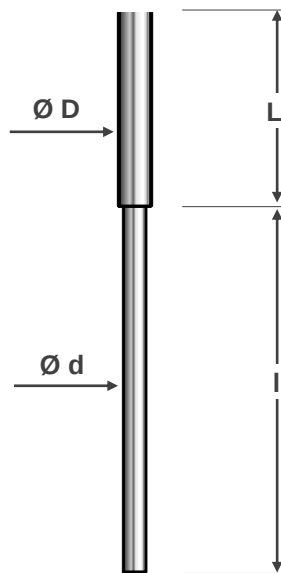
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Probe definition

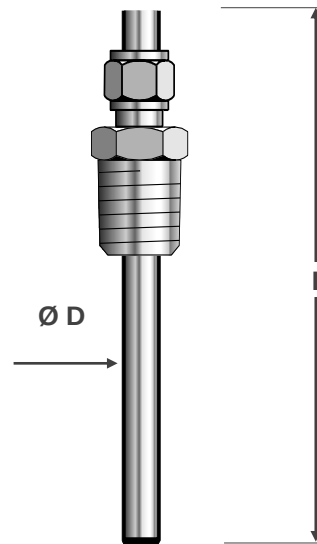
Simple



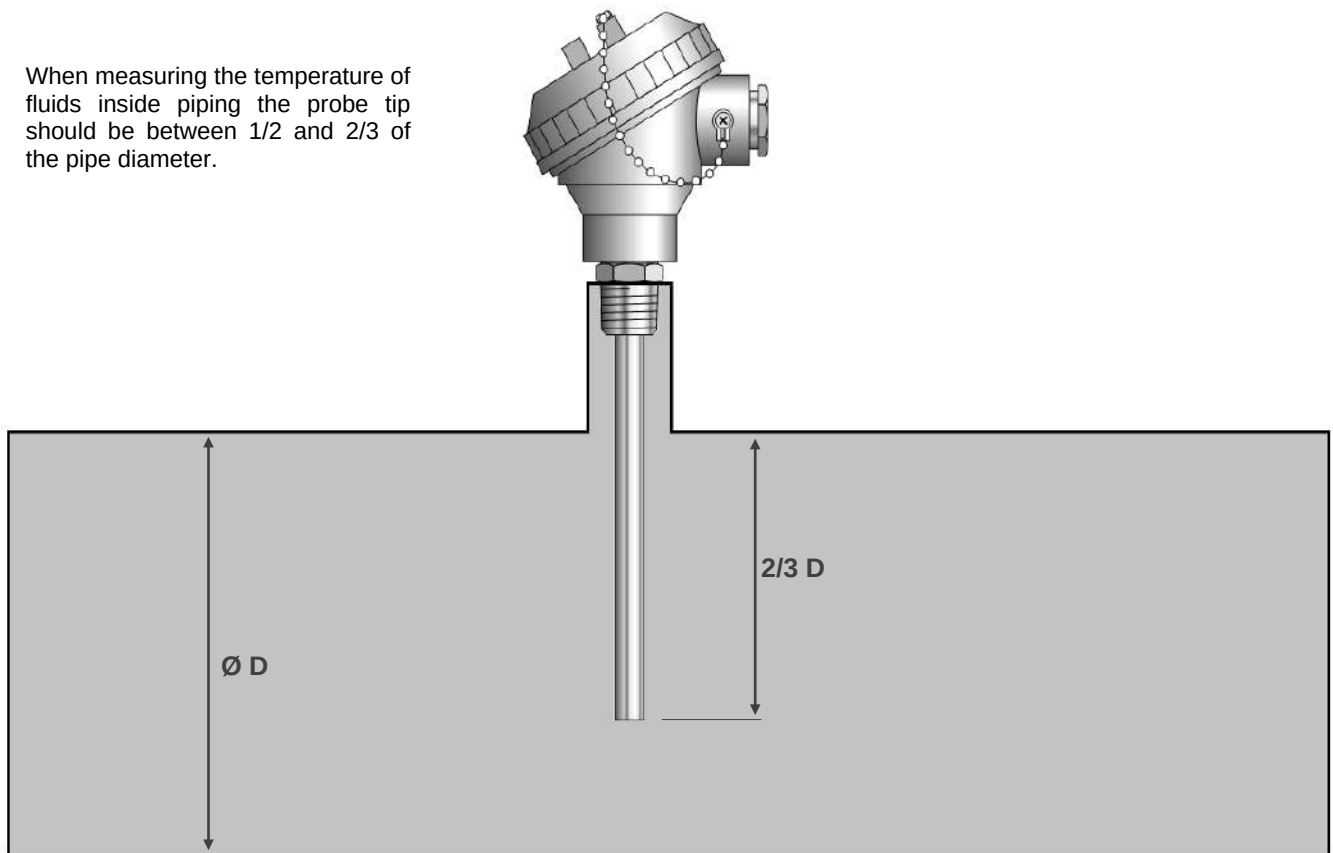
Double



Compression fitting



When measuring the temperature of fluids inside piping the probe tip should be between 1/2 and 2/3 of the pipe diameter.



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How to order (standard configuration)

Cable probe

S **A A** **B** **C** **D** **E E** **F F F** **G** **H H**

AA	Sensor
P1	PT100 B 1 DIN
P3	PT100 B 1/3 DIN
P0	PT100 B 1/10 DIN
PA	PT100 A
M1	PT1000 B 1 DIN
M3	PT1000 B 1/3 DIN
WW	Special

B	Cable protection
U	PVC
V	Fiberglass
X	PTFE
Y	Shielded
Z	Silicone
W	Special

C	Thread
0	Without
1	1" Gas
2	1/2" Gas
3	3/4" Gas
4	1/2" NPT
5	1" Nylon
6	1/4" Gas
7	1 1/2" Clamp
8	3/8" Gas
9	Special

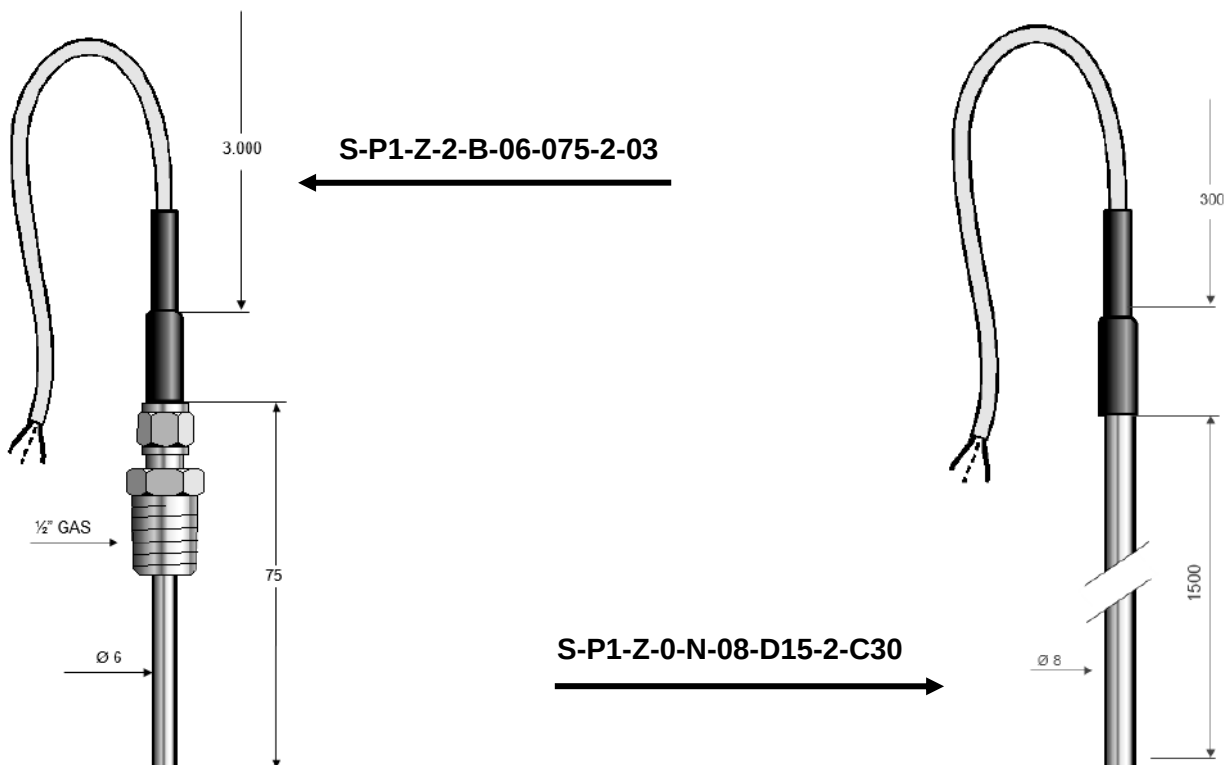
D	Fitting
B	Compression
C	Clamp
G	Spinning
H	Female
I	Magnet
M	Handle
N	Without
R	Fixed height
U	Fixed

EE	Probe diameter
2 digits	mm

FFF	Probe length
3 digits	mm
D + 2 digits	dm

G	Probe material
1	AISI 304
2	AISI 316
3	PTFE
4	Inconel 600
5	Ceramic C610
9	Special

HH	Cable length
2 digits	m
D + 2 digits	dm
C + 2 digits	cm



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How to order (standard configuration)

Head probe

C **A** **A** **B** **C** **D** **E** **E** **F** **F** **F** **G**

AA	Sensor
P1	PT100 B 1 DIN
P3	PT100 B 1/3 DIN
P0	PT100 B 1/10 DIN
PA	PT100 A
M1	PT1000 B 1 DIN
M3	PT1000 B 1/3 DIN
WW	Special

B	Head
B	DIN B
K	KN
X	ATEX

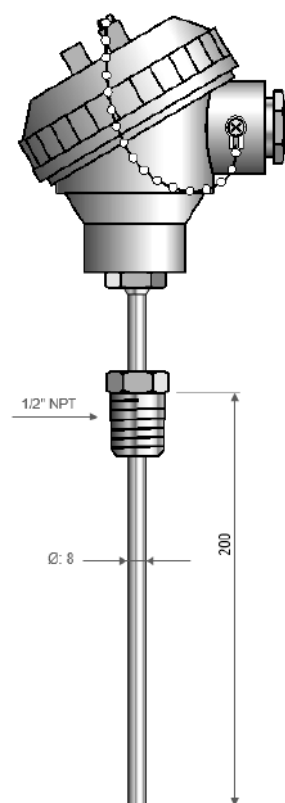
C	Thread
0	Without
1	1" Gas
2	1/2" Gas
3	3/4" Gas
4	1/2" NPT
5	1" Nylon
6	1/4" Gas
7	1 1/2" Clamp
8	3/8" Gas
9	Special

D	Fitting
B	Compression
C	Clamp
G	Spinning
H	Female
I	Magnet
M	Handle
N	Without
R	Fixed height
U	Fixed

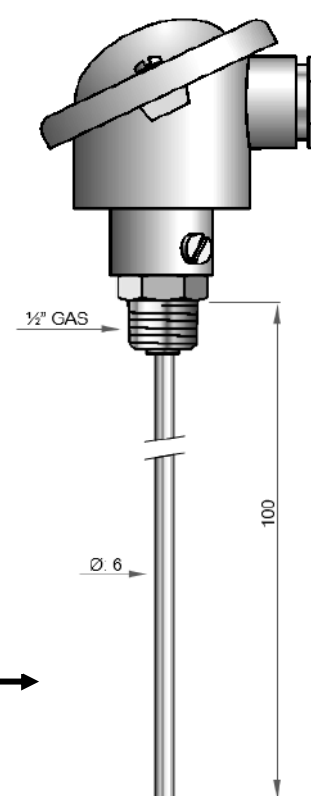
EE	Probe diameter
2 digits	mm

FFF	Probe length
3 digits	mm
D + 2 digits	dm

G	Probe material
1	AISI 304
2	AISI 316
3	PTFE
4	Inconel 600
5	Ceramic C610
9	Special



C-P1-K-4-G-08-200-2



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