

Sensor suitable for temperature measurement of machinery and device parts. Characteristic for this sensor is that sensing element is placed directly in process connection.

Specification

Temperature range / sensing element

-50÷400°C **Pt100** class B
 -40÷400°C **K, J** class 2

Sheath

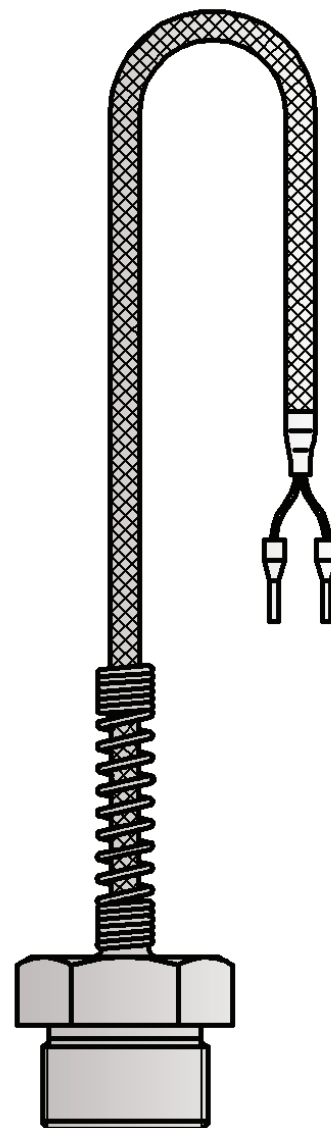
– material: steel 1.4541

Thread D	Standard length L [mm]
M6	8
M8x1	8
M10x1	8
M12x1,5	12
M14x1,5	12
M20x1,5	15
M24x1,5	15
G½	15

Lead wire

- stranded Cu wire or stranded thermocouple wire: 2x0,22mm²
- fiberglass insulation, metal overbraid
- length L_p [m]: 1,5 or other acc. to requirements
- Cu wire resistance ~0,14 Ω/m = ~0,36°C

Other parameters acc. to requirements



Options

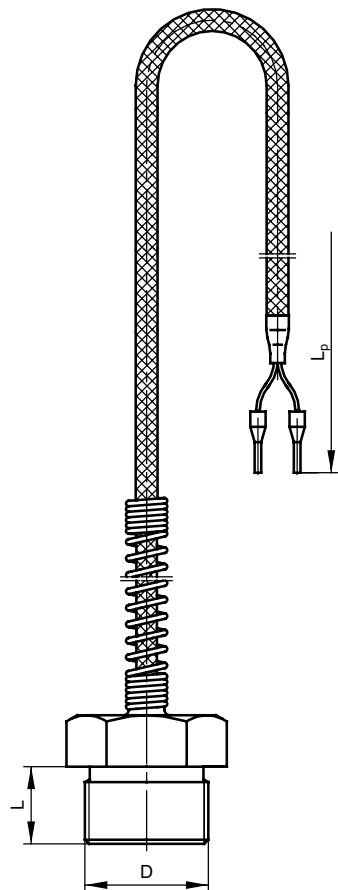
Temperature transmitter application

Temperature transmitter with standard 4÷20mA, 0÷10V output signals and with the HART or PROFIBUS communication protocols can be installed in the control cabinet.

Non-standard design

Process connection length and thread and other parameters can be customized per client request.

Calibrations performed by Limatherm Sensor Sp. z o.o. are confirmed with the Calibration Certificate of the Accredited Laboratory for Temperature Measurements.



Compensation / thermocouple wire insulations

Insulation material	Operating temperature range [°C]	Properties
PCW (PCV)	-10÷105	Applied in mild environmental conditions. Waterproof and flexible.
Yc- polyvinyl chloride	-10÷105	Applied in mild environmental conditions. Waterproof and flexible.
FEP-teflon	-50÷200	Resistant to oils, acids and other aggressive liquids. Good flexibility.
Si-silicone	-50÷180	Waterproof, flexible. Applied in high humidity conditions.
Ws-fiberglass	-60÷400	Good resistance to high temperature Low resistance to liquid penetration.

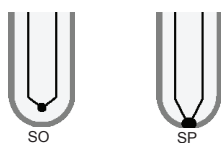
Notes: Additionally, copper or steel braids/shields are used on wires to prevent electrical noises, Increasing, at the same time, wire insulation resistance to mechanical damages. In case of longer wire lengths grounding may be needed to minimize the noise in measurement circuit

Tolerance for classes of sensors with resistors Pt acc. to PN-EN 60751

Sensor classes	Range of application [°C]	Formula for calculating acceptable deviations [°C]
AA	0÷150	$T = \pm(0,10 + 0,0017 t)$
A	-30÷300	$T = \pm(0,15 + 0,002 t)$
B	-50÷500	$T = \pm(0,3 + 0,005 t)$

|t|- absolute value of temperature

Thermocouple hot junction types



Measurement circuit

1 x Pt100			2 x Pt100			1 x TC	2 x TC
2-wire	3-wire	4-wire	2-wire	3-wire	4-wire	2-wire	2-wire
✓	✓	✓	x	x	x	✓	x

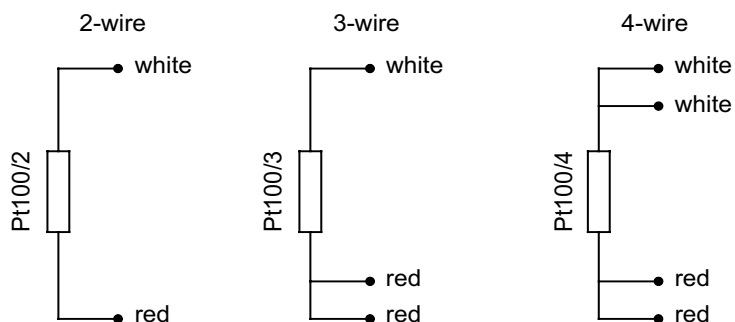
Tolerance for thermocouple classes acc. to PN-EN 60584

Thermocouple type	Class 1		Class 2	
	Range of application [°C]	Tolerance [°C]	Range of application [°C]	Tolerance [°C]
J Fe-CuNi	from -40 to +375 from +375 to +750	±1,5 ±0,004 t	from -40 to +333 from +333 to +750	±2,5 ±0,0075 t
K NiCr-NiAl	from -40 to +375 from +375 to +1000	±1,5 ±0,004 t	from -40 to +333 from +333 to +1200	±2,5 ±0,0075 t

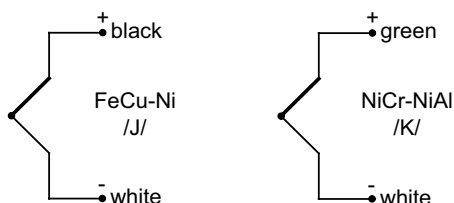
|t|- absolute value of temperature

Connection schemes

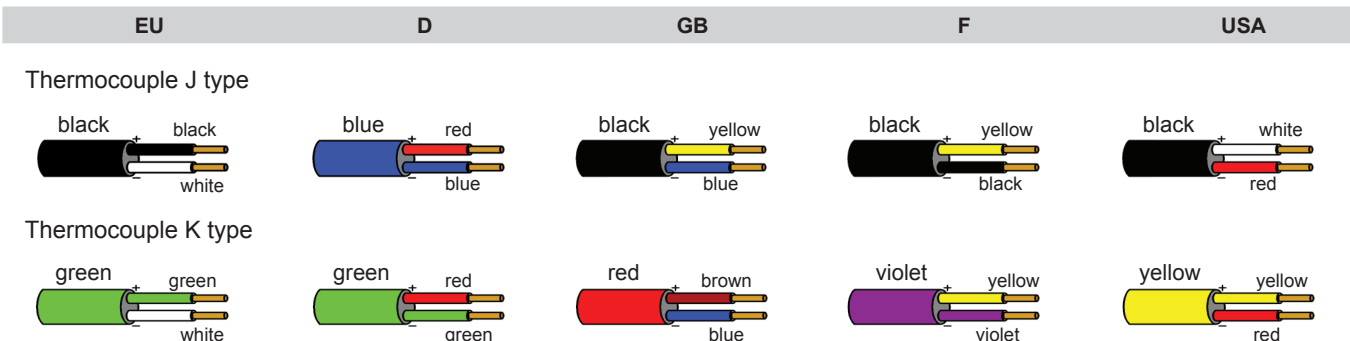
Pt100 (thermometric resistor)



TC (thermocouple)



Cable types and colours acc. to the norm



Product code

		Sensing element	
1	<input type="text"/>	OP	resistor Pt
		TJ	thermocouple Fe-CuNi /J/
		TK	thermocouple NiCr-NiAl /K/
		Resistor type	
2	<input type="text"/>	Pt100	Pt100/Pt500/Pt1000
			other parameters acc. to requirements
		Accuracy	
3	<input type="text"/>	A or B	for measuring resistor
		1 or 2	for thermocouple

Measurement circuit (for resistor) or hot junction type for thermocouple		
4	<input type="checkbox"/> 2	2 - wire
	<input type="checkbox"/> 3	3 - wire
	<input type="checkbox"/> 4	4 - wire
	<input type="checkbox"/> SO	insulated hot junction
5	<input type="checkbox"/> SP	grounded hot junction
	Lead wire insulation type for Pt100	
	<input type="checkbox"/> Si	double silicone insulation
6	<input type="checkbox"/> Ws	fiberglass with steel overbraid
	<input type="checkbox"/>	other parameters acc. to requirements
Thread dimension		
7	<input type="checkbox"/> D/L	D/Lmm
	<input type="checkbox"/>	other parameters acc. to requirements
Lead wire length		
7	<input type="checkbox"/> 1,5	1,5m
	<input type="checkbox"/>	other parameters acc. to requirements

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GE-3
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Ordering example:

TTJGE-3-2-SO-M20x1,5-15-1,5 m sensor with thermocouple Fe-CuNi /J/, class 2, insulated hot junction, thread M20X1,5, thread length 15mm, lead wire length $L_p=1,5m$