

Sensor suitable for temperature measurement of enclosures, movable parts and injection moulds.

Specification

Temperature range / sensing element

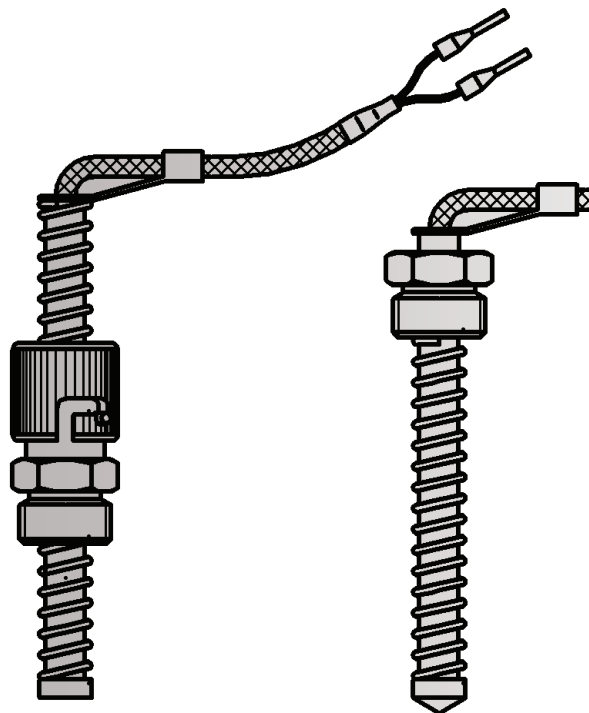
-50÷400°C	Pt100	class B
-40÷400°C	K, J	class 2

Sheath

- material: steel 1.4541
- flat or tapered tip
- quick disconnect: with thread (standard - M12x1)
- connector: standard - M12x1
- length L[mm]: 50÷150

Lead wire

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



Other parameters acc. to requirements

Options

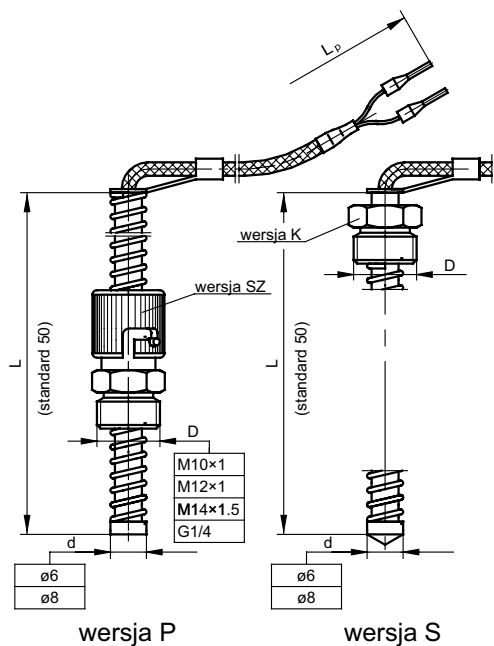
Temperature transmitter application

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

Immersion length, diameter and material of the sheath, and measuring insert 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

Thermocouple hot junction types



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

Measurement circuit

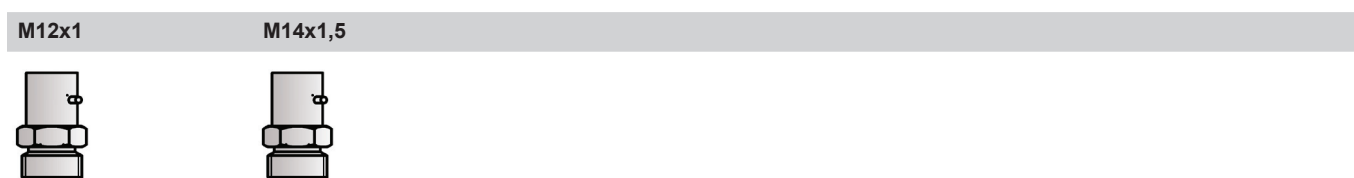
1 x Pt100			2 x Pt100			1 x TC	2 x TC
2-wire	3-wire	4-wire	2-wire	3-wire	4-wire	2-wire	2-wire
✓	✓	✓	x	x	x	✓	x

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

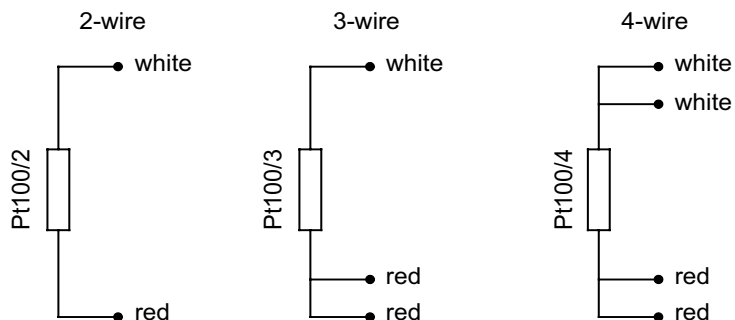
|t|- absolute value of temperature

Process connection type

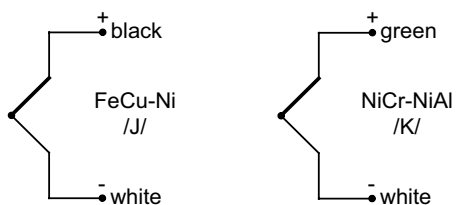


Connection schemes

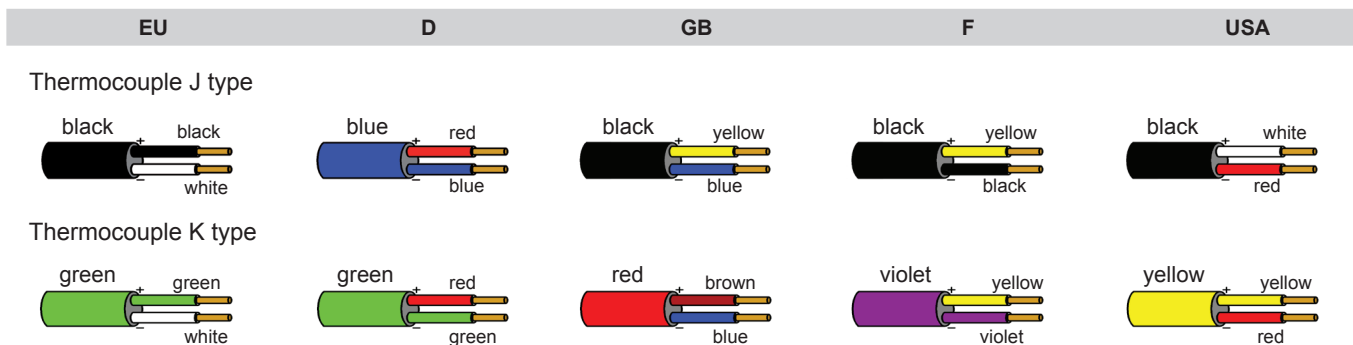
Pt100 (thermometric resistor)



TC (thermocouple)



Cable types and colours acc. to the norm



Product code

		Sensing element	
		OP	resistor Pt
1	<input type="text"/>	TJ	thermocouple Fe-CuNi /J/
		TK	thermocouple NiCr-NiAl /K/
		Measuring tip type	
		P	flat
2	<input type="text"/>	S	tapered
		Sheath length	
		30	30mm
3	<input type="text"/>	other parameters acc. to requirements	

4	<input type="checkbox"/>	Tip diameter	
		6	6mm
5	<input type="checkbox"/>	Process connection type	
		SZ/M14x1,5	quick disconnect with connector M14x1,5
6	<input type="checkbox"/>	K/M12x1	connector M12x1
		Resistor type/ spoiny for thermocouple	
		Pt100	Pt100/Pt500/Pt1000
		SO	insulated hot junction
7	<input type="checkbox"/>	SP	grounded hot junction
		Accuracy	
8	<input type="checkbox"/>	A or B	for measuring resistor
		1 or 2	for thermocouple
9	<input type="checkbox"/>	Measurement circuit for Pt	
		2	2 - wire
		3	3 - wire
10	<input type="checkbox"/>	Lead wire type	
		Ws	Ws
10	<input type="checkbox"/>	Lead wire length	
		2	2m
			other parameters acc. to requirements

	1	2	3	4	5	6	7	8	9	10											
T	<input type="checkbox"/>	E-462	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>	-	<input type="checkbox"/>

Ordering example:

TOPE-462P-40-8-SZ/M14x1,5-Pt100-A-3-Si-1,5 m sensor with Pt100, class A, 3-wire connection, silicone insulated lead wire length $L_p=1,5$ m, sheath diameter 8 mm and length 40 mm, quick disconnect with thread M14x1,5