



AP 108

Temperature sensor suitable for measurement in district heating substations. Applicable for temperature measurement of liquid and gaseous media in high pressure conditions. This sensor consists of sensing element placed in the thin-walled acid-resistant sheath with connector and flexible lead wire. Temperature sensor has ATEX approval for application in hazardous area:

II 1/2G Ex ia IIC T6
II 1/2D Ex ia IIC T85°C

Specification

Temperature range / sensing element

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

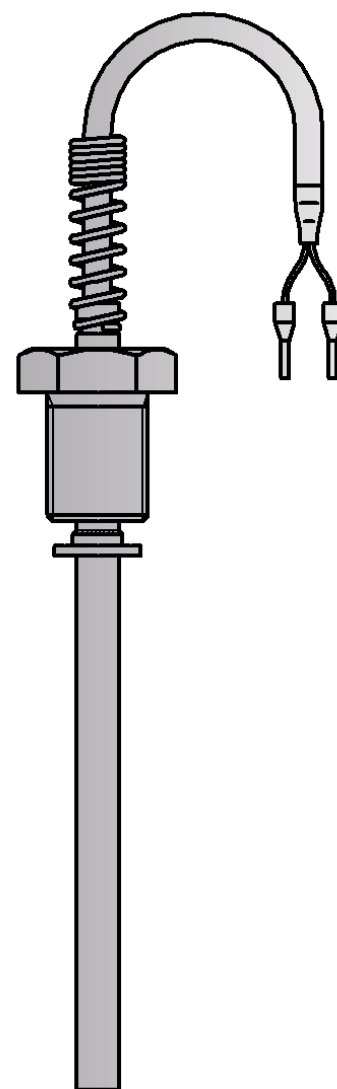
Sheath

- material: steel 1.4541
- movable threaded connector or nut
- length L[mm]: 50÷1000

Lead wire

- Ws: stranded Cu wire or stranded thermocouple wire 0,22mm² with fiberglass insulation steel overbraid, operating temperature up to 400°C,
- Si: stranded Cu wire or stranded thermocouple wire 0,22mm² with silicone insulation, operating temperature up to °C, for d>5
- lead wire length L_p 1,5m(standard)
- Cu wire resistance ~0,14 Ω/m = ~0,36°C

Other parameters acc. to requirements

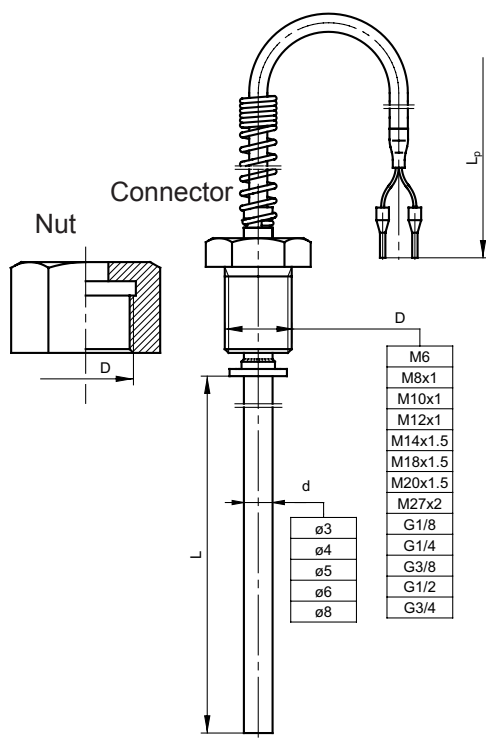


Options

Non-standard design

Lead wire length 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.

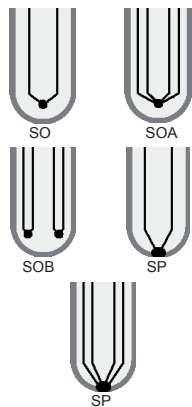
Notes: Additionally, copper or steel braids/shields are used on wires to prevent electrical noises. Increasing, at the same time, wire insulation resistance to mechanical damages. In case of longer wire lengths grounding may be needed to minimize the noise in measurement circuit

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	-50÷250	$T = \pm(0,10 + 0,0017 t)$
A	-100÷450	$T = \pm(0,15 + 0,002 t)$
B	-196÷600	$T = \pm(0,3 + 0,005 t)$

|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	✓	✓

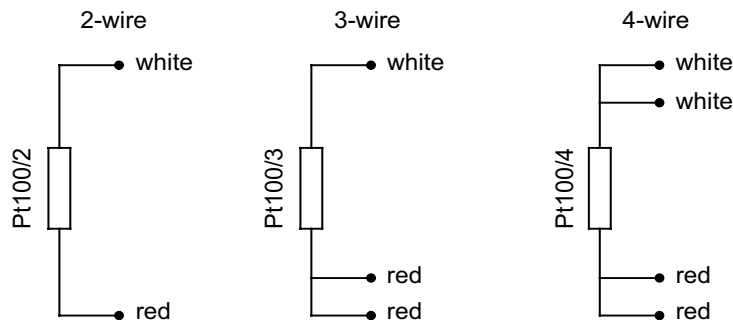
Tolerance for thermocouple classes acc. to PN-EN 60584

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

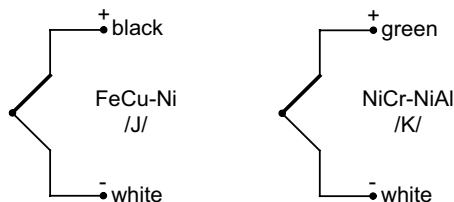
|t| - absolute value of temperature

Connection schemes

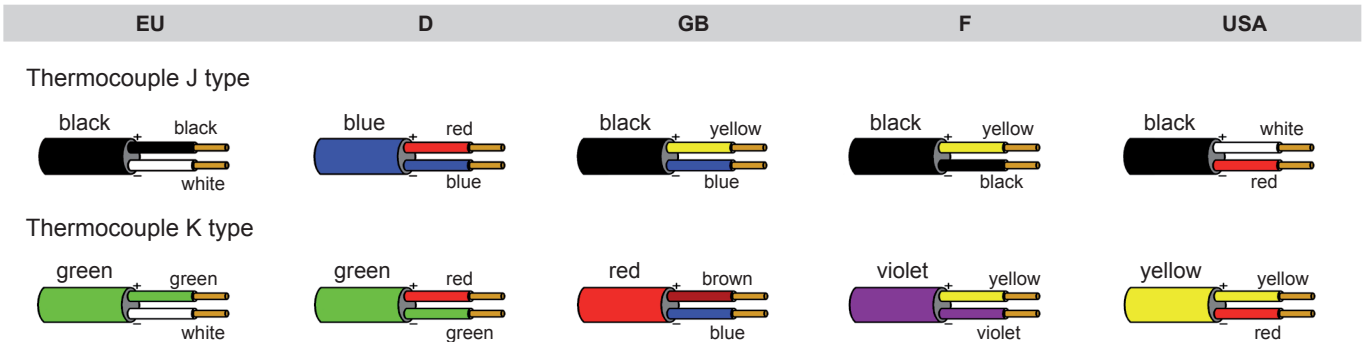
Pt100 (thermometric resistor)



TC (thermocouple)



Cable types and colours acc. to the norm



Product code

Sensor version	
no designation	single
2	double
Sensing element	
OP	resistor Pt
TJ	thermocouple Fe-CuNi /J/
TK	thermocouple NiCr-NiAl /K/
TN	thermocouple NiCrSi-NiSi /N/
TT	thermocouple Cu-CuNi /T/
Sheath length	
50	50mm
	other parameters acc. to requirements
Sheath diameter	
6	ø6mm
	other parameters acc. to requirements

5	<input type="text"/>	Lead wire type	
		Ws	fiberglass
		Si	silicone
6	<input type="text"/>	Resistor type	
		Pt100	Pt100
			other parameters acc. to requirements
7	<input type="text"/>	Accuracy	
		A or B	for resistor Pt
		1 or 2	for thermocouple
8	<input type="text"/>	Measurement circuit (for resistor)	
		2	2 - wire
		3	3 - wire
		4	4 - wire
9	<input type="text"/>	Thread dimension	
		KM12x1	connector with female thread M12x1
		NM12x1	nut with male thread M12x1
			other parameters acc. to requirements
10	<input type="text"/>	Lead wire length	
		1,5	1,5m
			other parameters acc. to requirements

1 2 3 4 5 6 7 8 9 10
 T E - 365Exi - - - - - - - - -

Ordering example: **TOPE-365Exi-80-6-Si-Pt100-A-4-KM20x1,5-1m** RTD sensor with Pt100, class A, 4-wire connection, sheath length L=80mm and diameter 6mm, with movable connector M20x1,5, silicone insulated lead wire length L_p=1m