



AP 108

Sensor suitable for temperature measurement of movable or replaceable parts of machines, liquid and gaseous media. Straight and solid construction can be used in various applications.

## Specification

### Temperature range / sensing element

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

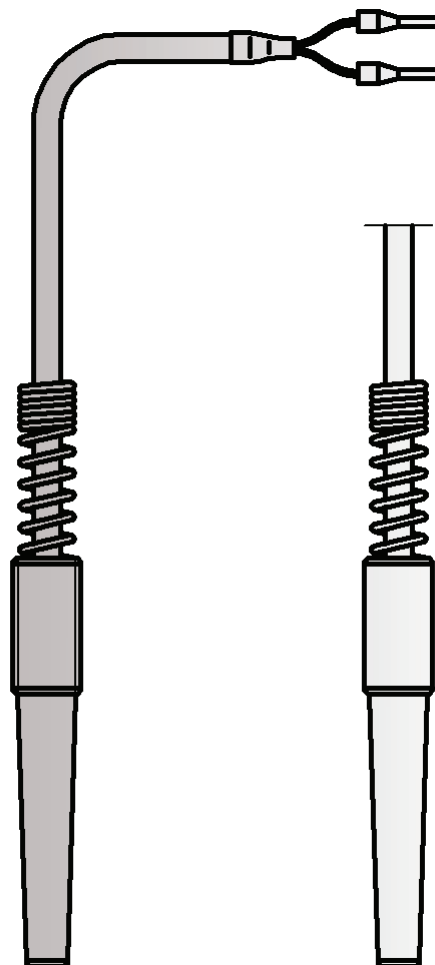
### Sheath

- material: steel 1.4541
- diameter [mm]: 6/8,5
- length L[mm]: 30÷100
- with thread M10x1 - T...GE-5, without thread T...GE-6

### Lead wire

- stranded Cu wire or stranded thermocouple wire: 2x0,22mm<sup>2</sup>
- fiberglass insulation, metal overbraid
- length L<sub>p</sub> [m]: 1,5 (standard)
- Cu wire resistance ~0,14 Ω/m = ~0,36°C

Other parameters acc. to requirements



## Options

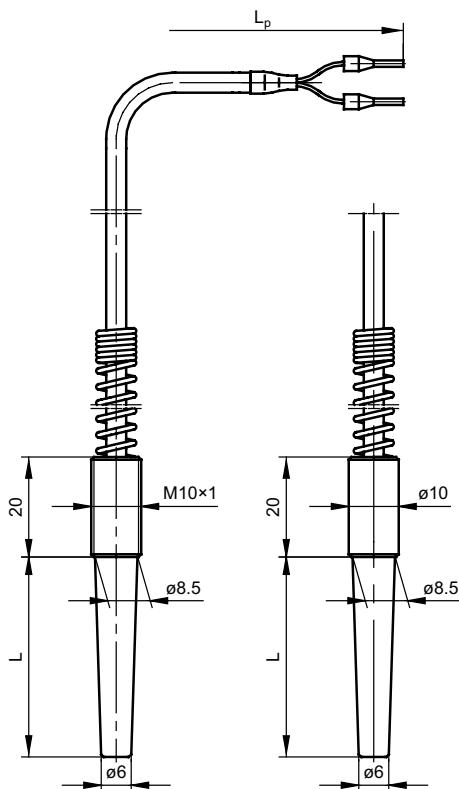
### Temperature transmitter application

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.**



T...GE-5

T...GE-6

### 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

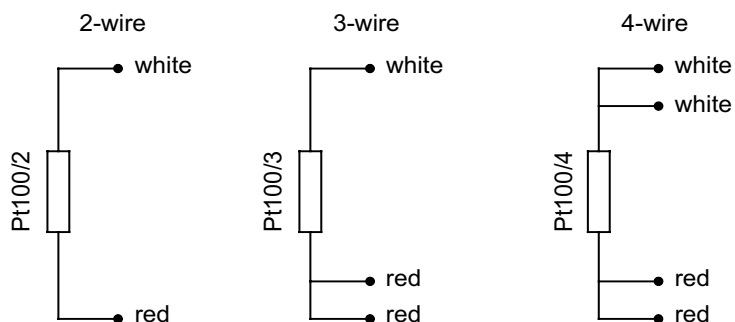
### Tolerance for thermocouple classes acc. to PN-EN 60584

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

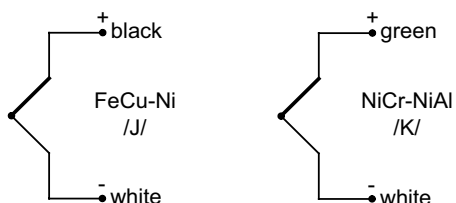
|t| - absolute value of temperature

### Connection schemes

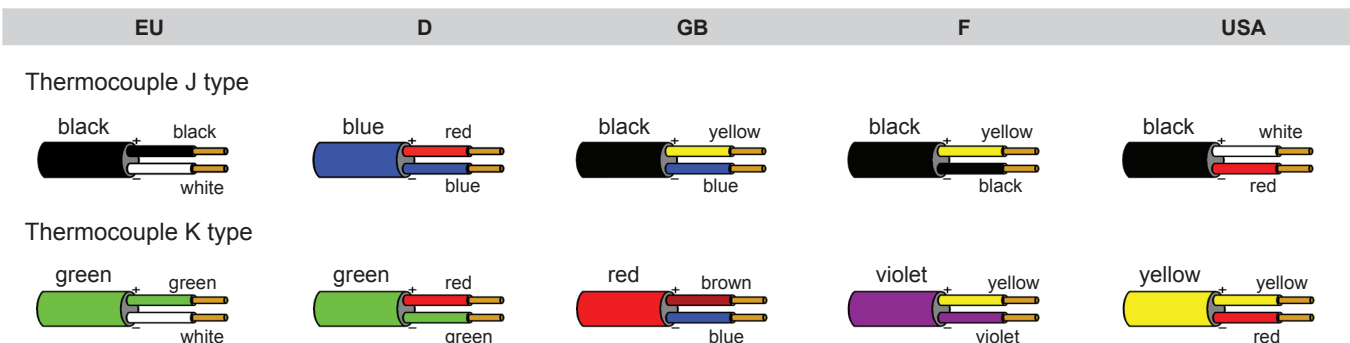
#### Pt100 (thermometric resistor)



#### TC (thermocouple)



### Cable types and colours acc. to the norm



### Product code

1	<input type="text"/>	<b>Sensing element</b>	
		OP	resistor Pt
		TJ	thermocouple Fe-CuNi /J/
2	<input type="text"/>	TK	thermocouple NiCr-NiAl /K/
		<b>Constructional version</b>	
3	<input type="text"/>	5	with thread
		6	without thread
<b>Resistor type</b>			
3	<input type="text"/>	Pt100	Pt100
			other parameters acc. to requirements

		<b>Accuracy</b>	
4	<input type="checkbox"/>	<b>A or B</b>	for measuring resistor
		<b>1 or 2</b>	for thermocouple
		<b>Measurement circuit (for resistor)</b>	
		<b>2</b>	2 - wire
5	<input type="checkbox"/>	<b>3</b>	3 - wire
		<b>4</b>	4 - wire
		<b>Sheath length</b>	
		<b>100</b>	100mm
6	<input type="checkbox"/>		other parameters acc. to requirements
		<b>Lead wire length</b>	
		<b>1,5</b>	1,5m
7	<input type="checkbox"/>		other parameters acc. to requirements



Ordering example:

**TOPGE-5-Pt100-B-50-2 m** sensor with Pt100, class B, sheath length L=50mm, lead wire with fiberglass insulation, length L<sub>p</sub>=2m