



AP 108

Temperature sensor suitable for measurement of pipes and shafts. Rigid sheath is joined to radiator enhancing the area of heat reception. Sensor has a band clamp that enables permanent radiator installation on pipe or shaft.

## Specification

### Temperature range / sensing element

-50÷250°C	<b>Pt100</b>	class B
-40÷400°C	<b>K, J</b>	class 2

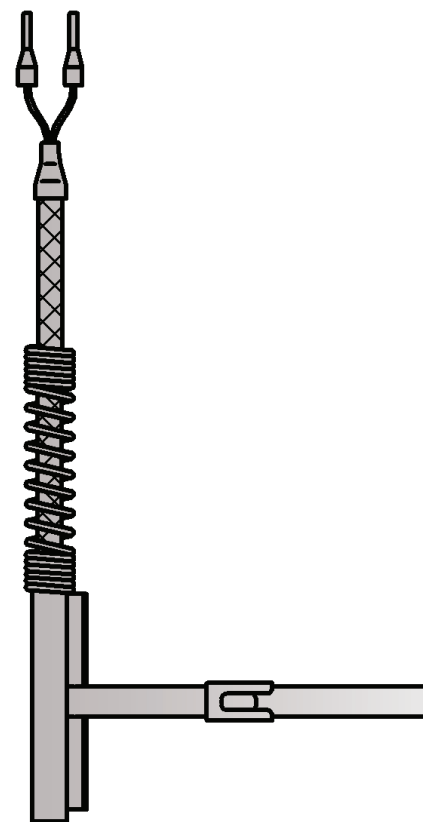
### Sheath

- material brass, length L[mm]: 36
- radiator enhancing area of heat reception with band clamp for mounting on a pipeline DN 15÷200mm

### Lead wire

- stranded Cu wire, 2x0,35mm<sup>2</sup> teflon insulation, metal overbraid
- length L<sub>p</sub> [m]: 1,5 (standard)
- Cu wire resistance ~0,102 Ω/m = ~0,26°C

Other parameters acc. to requirements



## Options

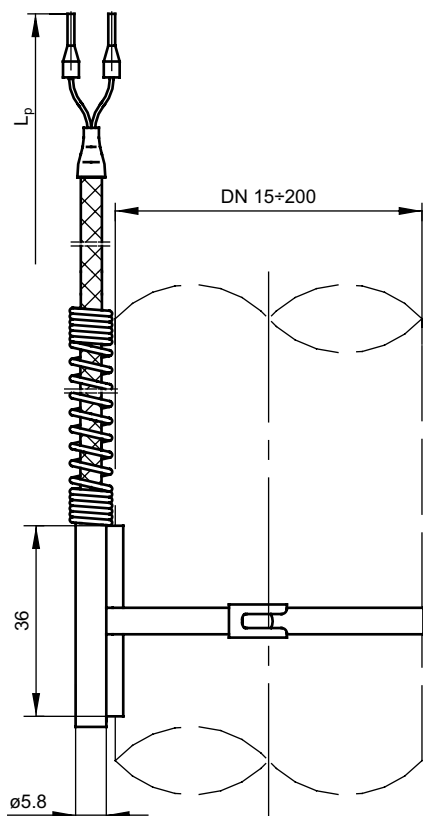
### Temperature transmitter application

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.

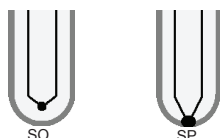
**Notes:** Additionally, copper or steel braids/shields are used on wires to prevent electrical noises, Increasing, at the same time, wire insulation resistance to mechanical damages. In case of longer wire lengths grounding may be needed to minimize the noise in measurement circuit

### 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

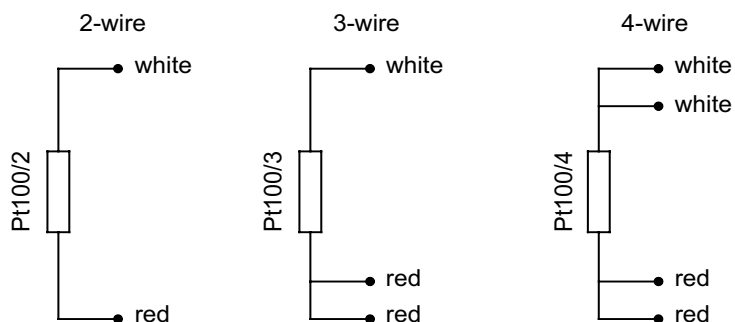
### Tolerance for thermocouple classes acc. to PN-EN 60584

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	$\pm 1,5$ $\pm 0,004  t $	from -40 to +333 from +333 to +750	$\pm 2,5$ $\pm 0,0075  t $
K NiCr-NiAl	from -40 to +375 from +375 to +1000	$\pm 1,5$ $\pm 0,004  t $	from -40 to +333 from +333 to +1200	$\pm 2,5$ $\pm 0,0075  t $

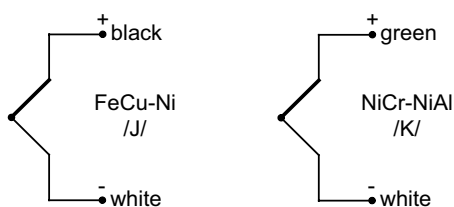
|t|- absolute value of temperature

### Connection schemes

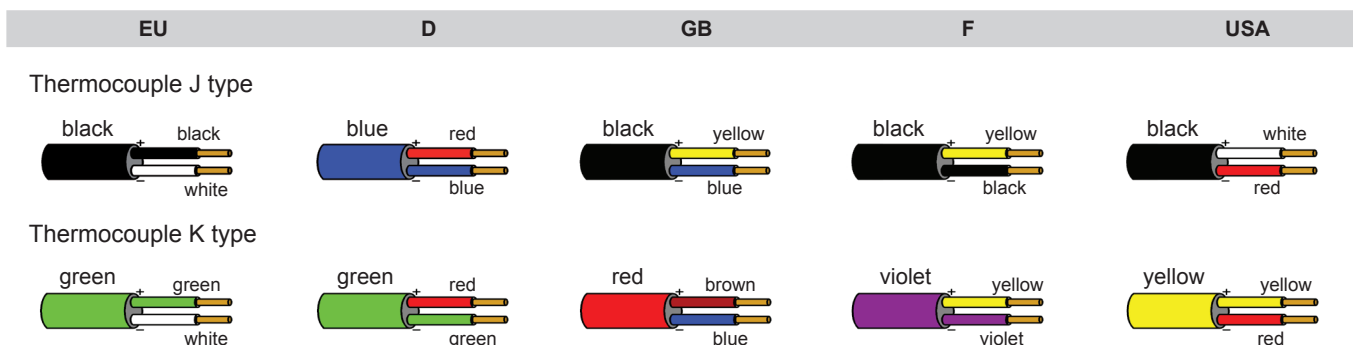
#### Pt100 (thermometric resistor)



#### TC (thermocouple)



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



### Product code

		<b>Sensor version</b>	
1	<input type="text"/>	<b>no designation</b>	single
		<b>2</b>	double
		<b>Sensing element</b>	
2	<input type="text"/>	<b>OP</b>	resistor Pt
		<b>ON</b>	resistor Ni
		<b>TJ</b>	thermocouple Fe-CuNi /J/
		<b>TK</b>	thermocouple NiCr-NiAl /K/
		<b>Resistor type</b>	
3	<input type="text"/>	<b>Pt100</b>	Pt100
			other parameters acc. to requirements
		<b>Accuracy</b>	
4	<input type="text"/>	<b>A or B</b>	for resistor Pt
		<b>1 or 2</b>	for thermocouple

Measurement circuit for resistor or hot junction for thermocouple	
2	2 - wire
3	3 - wire
4	4 - wire
5	SO insulated hot junction
6	SP grounded hot junction
Lead wire length	
1,5	1,5m
	other parameters acc. to requirements

1
2
3
4
5
6  


**T**

**E-244**
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Ordering example:

**2TONE-244-Ni100-2-1,5 m** double RTD sensor with Ni100, 2-wire connection, lead wire with teflon insulation, metallic overbraid, length  $L_p=1,5$  m

**SARLIN OY AB** • PL 750, 00101 Helsinki  
 Käyntiosoite: Kaivokselantie 3-5, 01610 Vantaa  
 Vaihde 010 550 4000 • Fax 010 550 4201  
 info@sarlin.com • www.sarlin.com

