



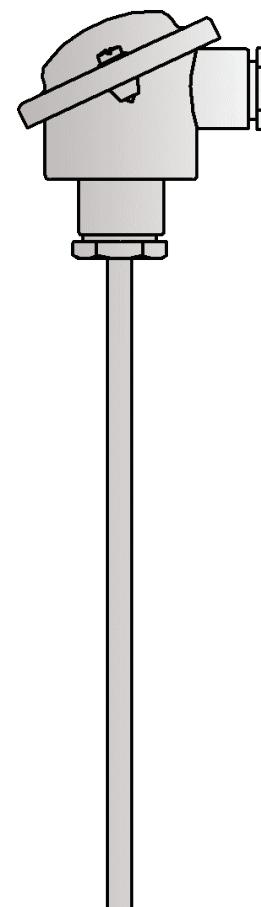
AP 108

Temperature sensor applied in industrial pipelines, pressure tanks and different industrial devices for temperature measurement of liquids and gases. Sensing element is placed directly in the sheath.

### Specification

Temperature range / sensing element		
-200+600°C	<b>Pt100</b>	class B
-40+700°C	<b>K, J</b>	class 2
Measuring insert		
– non-replacable		
Sheath		
– material: steel 1.4541		
– sheath length:		
115, 175, 245, 375, 525 [mm]: for ø6		
495, 705, 995, 1395, 1995 [mm]: for ø8		
– L <sub>max</sub> [mm]: for ø6 = 1500		
– L <sub>max</sub> [mm]: for ø8 = 2000		
Connection head		
BA, IP55, -40+100 °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 mounted in the connection head. Transmitter installation is carried out directly on the measuring insert (in place of a terminal block) or in the high cover connection head (solution used to enable installation of two transmitters).

#### Local display application

The temperature sensor can be equipped with the connection head enabling the local LED display installation. The local display operates in current loop 4+20mA. This version makes the local temperature reading and transmission of the analogue signal possible.

#### ATEX design

For explosion zones adequate sensor constructions are available:

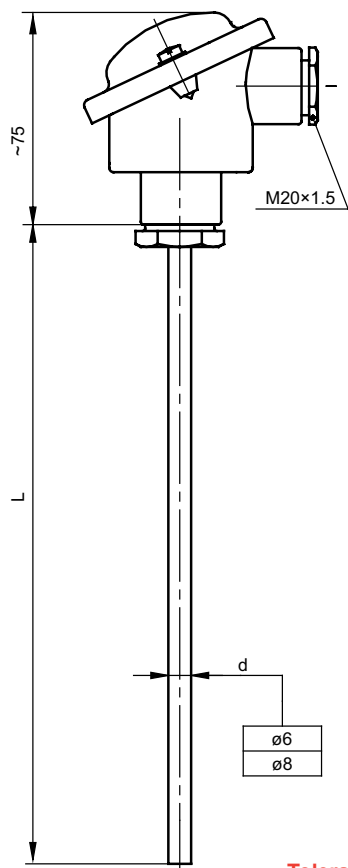
- intrinsically safe Exi
- flameproof **Exd**

These designs possess EC-Type Examination Certificate in compliance with 94/9/EC(ATEX) directive.

#### Non-standard design

Immersion length, shape and material of the thermowell, connection head type and the 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.**



### Standard length

Immersion length for ø6 mm		Immersion length for ø8mm	
L [mm]	L <sub>w</sub> [mm]	L [mm]	L <sub>w</sub> [mm]
115	145	495	525
175	205	705	735
245	275	995	1025
285	315	1395	1425
375	405	1995	2025
525	555	–	–

### Response time to temperature change

Thermowell diameter [mm]	Response time [s]
ø6	t <sub>0,5</sub> = 12
	t <sub>0,9</sub> = 55
ø8	t <sub>0,5</sub> = 20
	t <sub>0,9</sub> = 85

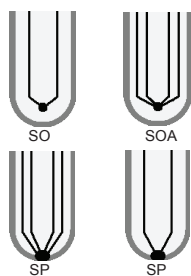
test carried out in mixed water 0,4 m/s acc. to PN-EN 60751

### 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

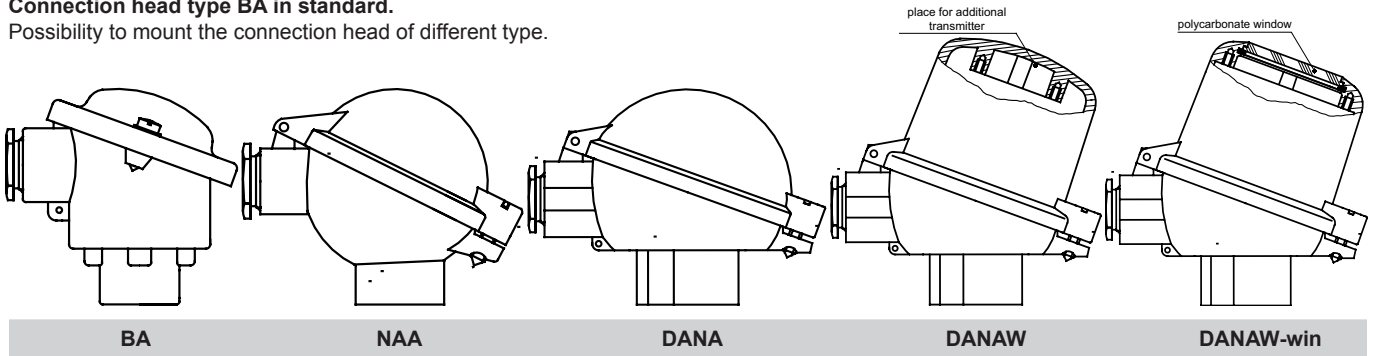
Thermocouple type	Class 1		Class 2	
	Range of application [°C]	Tolerance [°C]	Range of application [°C]	Tolerance [°C]
<b>J</b> Fe-CuNi	from -40 to +375 from +375 to +750	±1,5 ±0,004  t	from -40 to +333 from +333 to +750	±2,5 ±0,0075  t
<b>K</b> NiCr-NiAl	from -40 to +375 from +375 to +1000	±1,5 ±0,004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

|t| - absolute value of temperature

### Connection head types

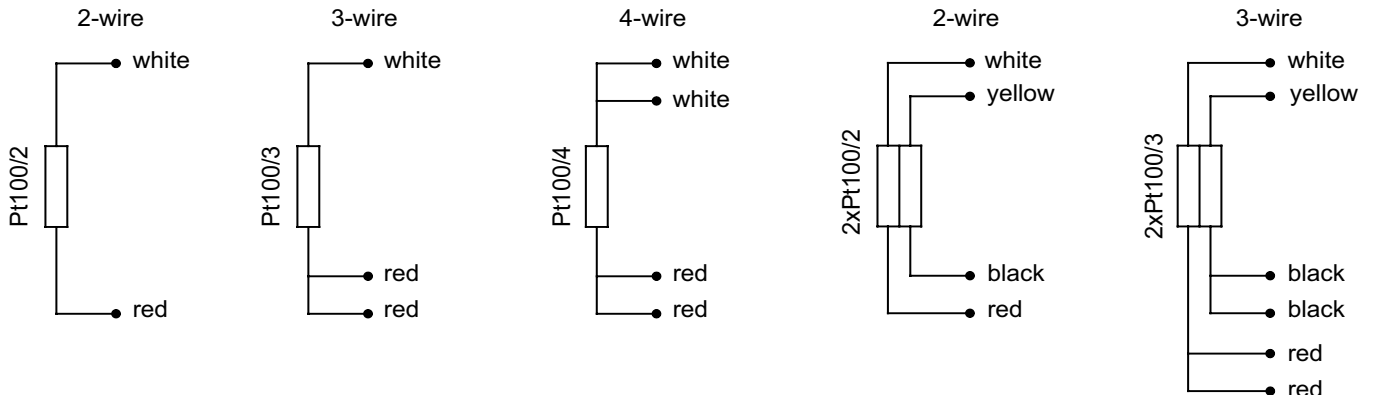
Connection head type BA in standard.

Possibility to mount the connection head of different type.

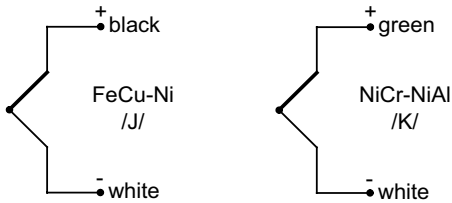


### Connection schemes

#### Pt100 (thermometric resistor)



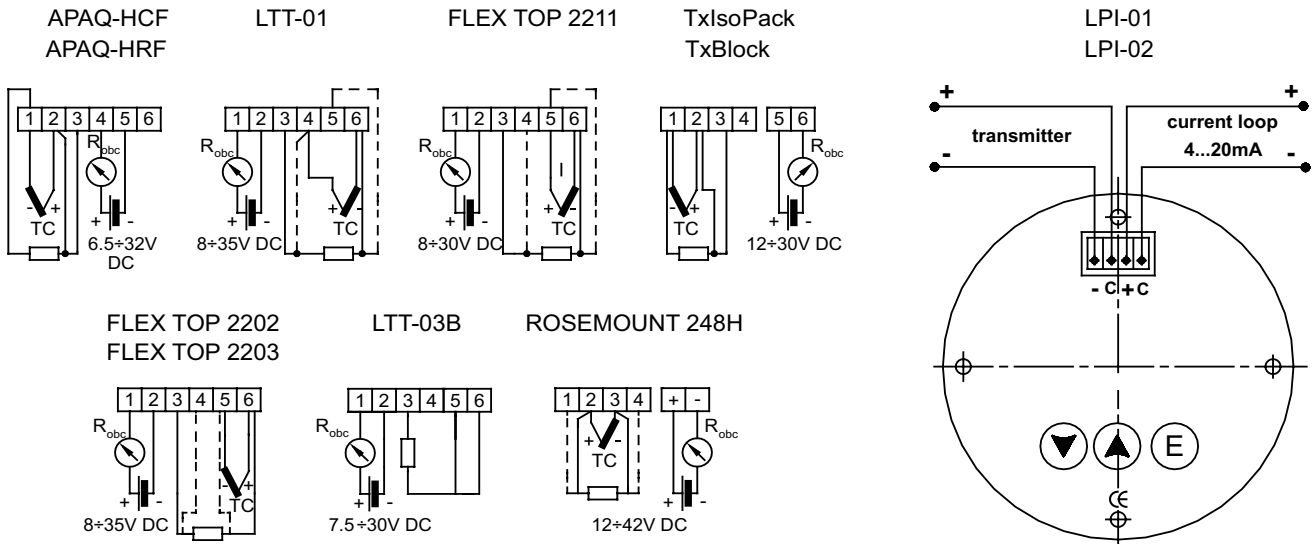
#### TC (thermocouple)



In double sensors one of thermocouples is additionally marked out.

#### Transmitters

#### Local LED display



**Product code**

		<b>Sensor version</b>	
0	<input type="text"/>	<b>AP</b>	with transmitter
		<b>2AP</b>	with two transmitters
		<b>APW</b>	with display
1	<input type="text"/>	<b>no designation</b>	single
		<b>2</b>	double
		<b>Sensing element</b>	
		<b>OP</b>	resistor Pt
		<b>TJ</b>	thermocouple Fe-CuNi /J/
2	<input type="text"/>	<b>TK</b>	thermocouple NiCr-NiAl /K/
			other parameters acc. to requirements
		<b>Thermowell diameter</b>	
		<b>6</b>	ø6mm
3	<input type="text"/>	<b>8</b>	ø8mm
			other parameters acc. to requirements
		<b>Thermocouple hot junction type</b>	
		<b>SO</b>	insulated hot junction
		<b>SP</b>	grounded hot junction
4	<input type="text"/>	<b>SOA</b>	one hot junction for two thermocouples insulated form the sheath
		<b>Sheath length</b>	
		<b>ø6 / ø8</b>	<b>ø6 / ø8</b>
		<b>115 495</b>	115mm 495mm
		<b>175 705</b>	175mm 705mm
		<b>245 995</b>	245mm 995mm
		<b>285 1395</b>	285mm 1395mm
		<b>375 1995</b>	375mm 1995mm
5	<input type="text"/>	<b>525 -</b>	525mm -
			other parameters acc. to requirements
		<b>Accuracy</b>	
		<b>A or B</b>	for measuring resistor
6	<input type="text"/>	<b>1 or 2</b>	for thermocouple
		<b>Measurement circuit (for resistor)</b>	
		<b>2</b>	2 - wire
		<b>3</b>	3 - wire
7	<input type="text"/>	<b>4</b>	4 - wire
		<b>Transmitter type (optionally)</b>	
		<b>TX</b>	head mounted transmitter TxBlock
8	<input type="text"/>		other parameters acc. to requirements
		<b>Temperature range of transmitter</b>	
		<b>(0±100°C)</b>	transmitter configured for temperature range 0±100°C
9	<input type="text"/>		other parameters acc. to requirements

0    1    2    3    4    5    6    7    8    9  
   **T**   **I** -  -  -  -  -  -  -  -

**Ordering example:**    **TOPI-6-115-B-2** single sensor with Pt100, class B, 2-wire connection, sheath diameter 6mm and length L=115mm