



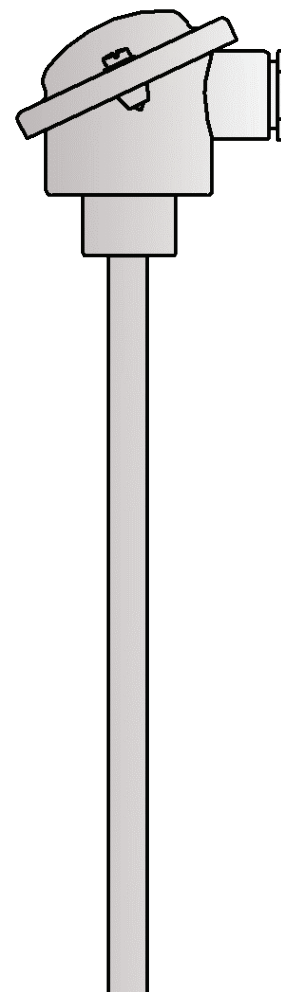
AP 108

Temperature sensor suitable for measurement of industrial processes
Sensing element placed directly in the sheath.

Specification

Temperature range / sensing element		
-200÷600°C	Pt100	class B
-40÷600°C	K, J	class 2
Measuring insert		
– non-replacable		
Sheath		
– material: steel 1.4541 for [mm]: ø9, 11, 12, 14, 15		
– material: steel 1.4841 for [mm]: ø15		
– material: steel 1.4762 for [mm]: ø15		
– length [mm]: 50÷2000		
Connection head		
– BA, IP54, -40÷100 °C		

Other parameters acc. to requirements



Options

Temperature transmitter application

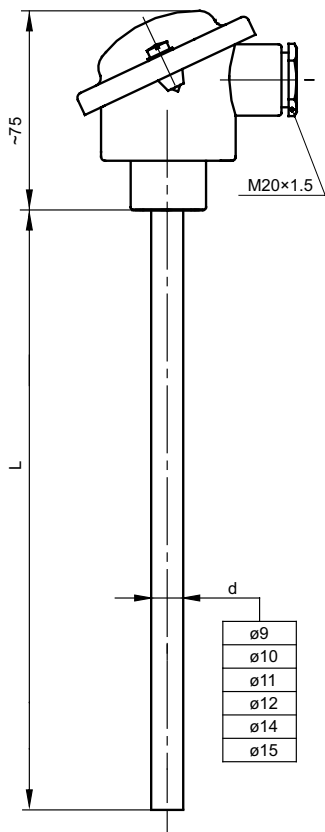
Temperature transmitter with standard 4÷20mA, 0÷10V output signals and with the HART or PROFIBUS communication protocols can be mounted in the connection head. Transmitter installation is carried out directly on the measuring insert (in place of a terminal block) or in the high cover connection head (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.

Non-standard design

Calibrations performed by Limatherm Sensor Sp. z o.o. are confirmed with the Calibration Certificate of the Accredited Laboratory for Temperature Measurements.



Standard length

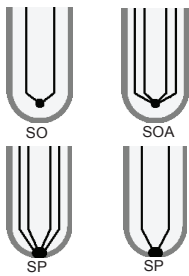
Immersion length L [mm]
500
710
1000
1400
2000

Response time to temperature change

Thermowell diameter [mm]	Response time [s]
ø10	$t_{0.5} = 35$
	$t_{0.9} = 100$
ø12	$t_{0.5} = 45$
	$t_{0.9} = 155$
ø15	$t_{0.5} = 57$
	$t_{0.9} = 170$

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

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	-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

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

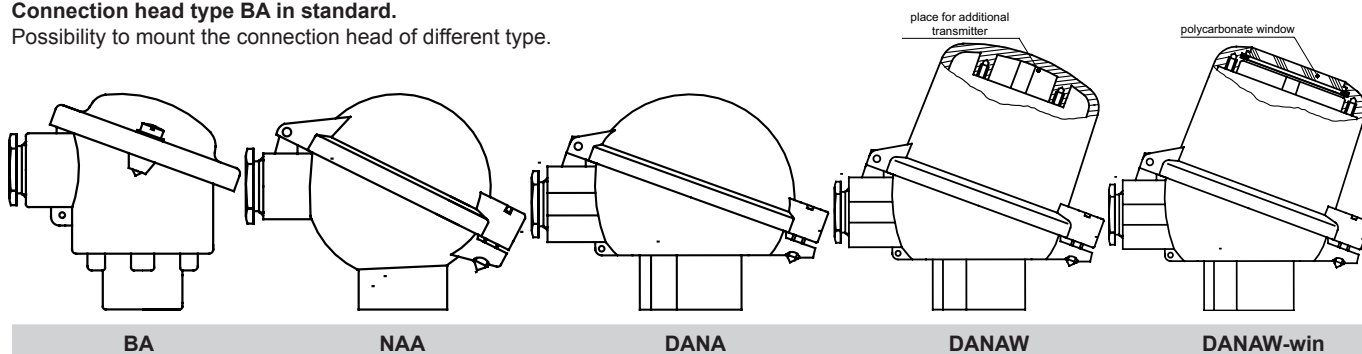
Thermocouple type	Class 1		Class 2	
	Range of application [°C]	Tolerance [°C]	Range of application [°C]	Tolerance [°C]
J Fe-CuNi	from -40 to +375 from +375 to +750	$\pm 1,5$ $\pm 0,004 t $	from -40 to +333 from +333 to +750	$\pm 2,5$ $\pm 0,0075 t $
K NiCr-NiAl	from -40 to +375 from +375 to +1000	$\pm 1,5$ $\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 head types

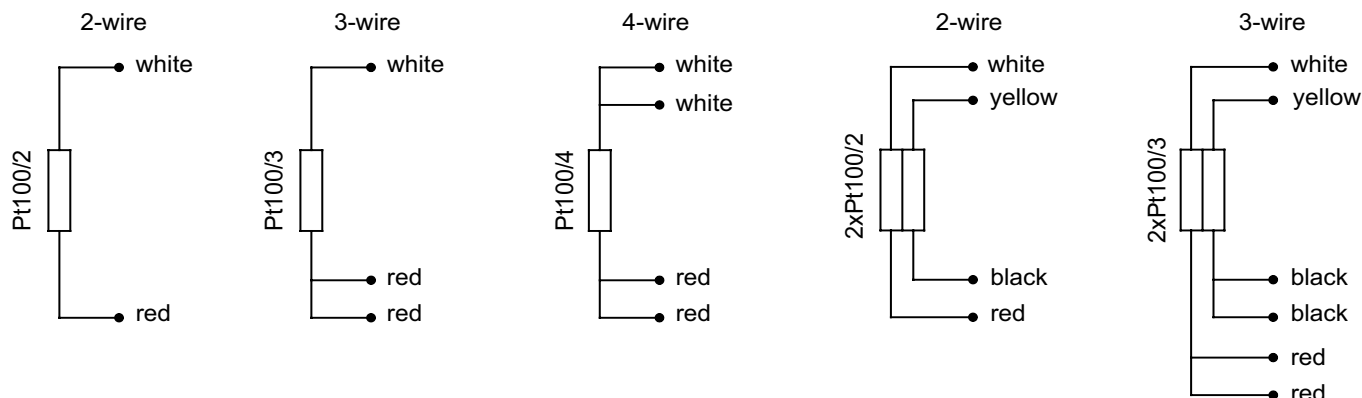
Connection head type BA in standard.

Possibility to mount the connection head of different type.

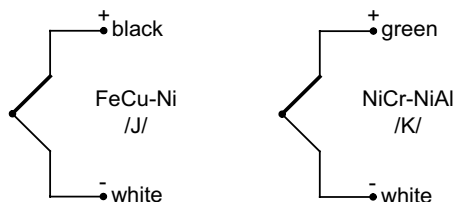


Connection schemes

Pt100 (thermometric resistor)



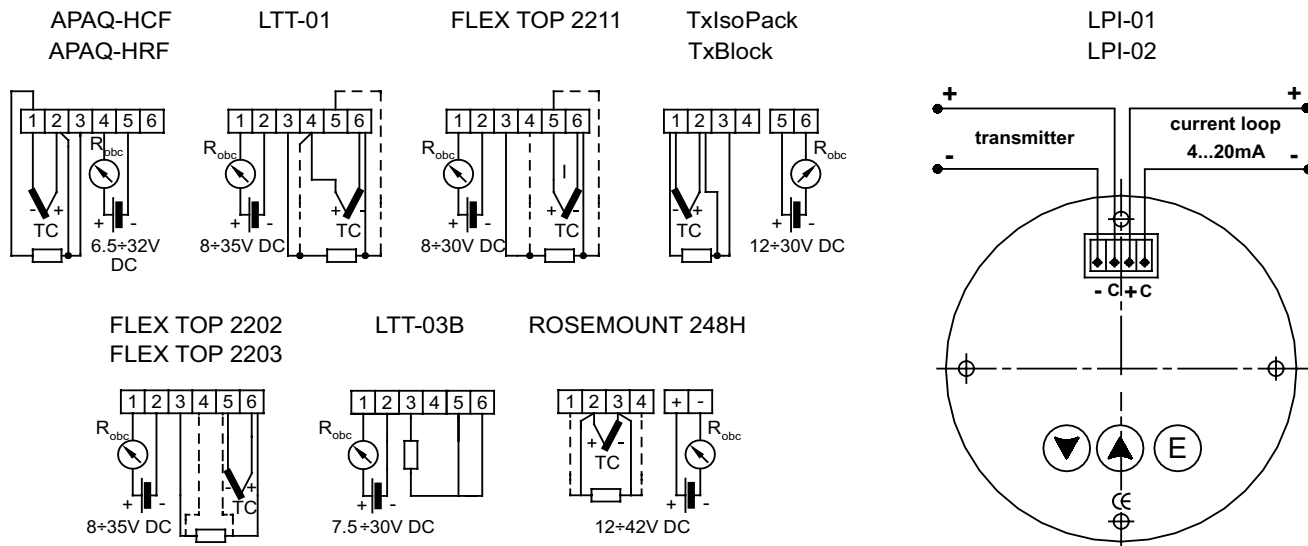
TC (thermocouple)



In double sensors one of thermocouples is additionally marked out.

Transmitters

Local LED display



Product code

		Sensor version	
0		AP	with transmitter
		2AP	with two transmitters
		APW	with display
1		no designation	single
		2	double
		Sensing element	
2		OP	resistor Pt
		TJ	thermocouple Fe-CuNi /J/
		TK	thermocouple NiCr-NiAl /K/
			other parameters acc. to requirements
		Thermocouple hot junction type	
3		SO	insulated hot junction
		SP	grounded hot junction
		SOA	one hot junction for two thermocouples insulated form the sheath
		Sheath diameter	
4		9	ø9mm
		10	ø10mm
		11	ø11mm
		12	ø12mm
		14	ø14mm
		15	ø15mm
			other parameters acc. to requirements
		Sheath material	
5		1.4541	acid-resistant steel
		1.4762	heat-resistant steel
		1.4841	creep-resistant steel
			other parameters acc. to requirements
		Sheath length	
6		500	500mm
		710	710mm
		1000	1000mm
		1400	1400mm
		2000	2000mm
			other parameters acc. to requirements
		Accuracy	
7		A or B	for measuring resistor
		1 or 2	for thermocouple
		Measurement circuit (for resistor)	
8		2	2 - wire
		3	3 - wire
		4	4 - wire
		Transmitter type (optionally)	
9		Tx	head mounted transmitter TxBlock
			other parameters acc. to requirements
		Temperature range of transmitter	
10		(0÷100°C)	transmitter configured for temperature range 0÷100°C
			other parameters acc. to requirements

0	1	2	3	4	5	6	7	8	9	10					
		T	I-3	-		-		-		-		-		-	

Ordering example: **TOPP-1-12-500-A-3** single sensor with Pt100, class A, 3-wire connection, sheath diameter 12 mm and length L=500 mm