



AP 108

This sensor is used for temperature measurement of liquid and gaseous media. The temperature sensor design (replaceable measuring insert) is suitable for various industrial applications. Replacement of the measuring insert does not cause the technological installation damage. Spring-loaded insert ensures an excellent connection with the the bottom of the sensor thermowell.

Specification

Temperature range / sensing element

-200÷550°C	Pt100	class B
-40÷700°C	J	class 2
-40÷900°C	K	class 2

Measuring insert

- 2-, 3-, 4-wire connection (for Pt100)
- 2-, 3-wire connection (for 2xPt100)

Thermowell

- 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]: 85÷2000

Connection head

- BA, IP55, -40÷100°C

Sensor mounting fittings

- UG-1, UG-8,
- UZ-11, UZ-21 (only for ø15mm)

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

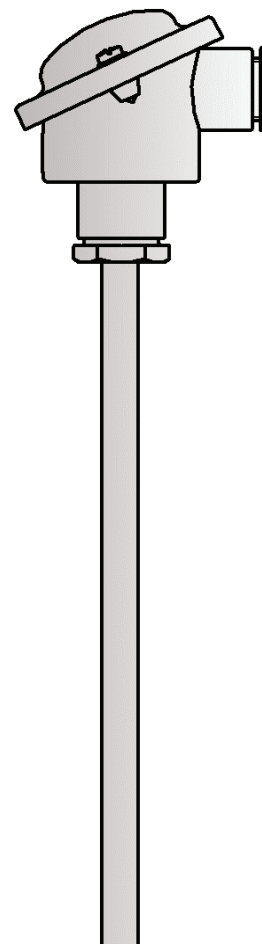
For explosion zones adequate sensor constructions are available:

- intrinsically safe Exi
- flameproof Exd

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

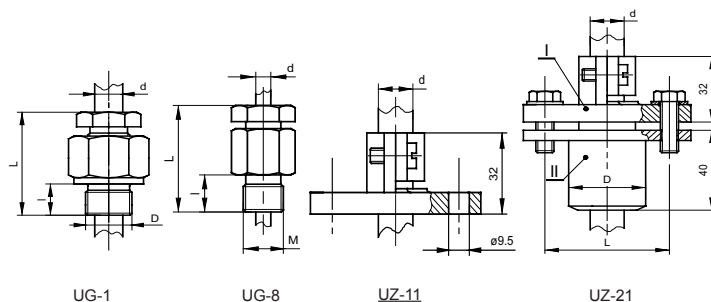
Non-standard design

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.

Mounting fittings



Standard length

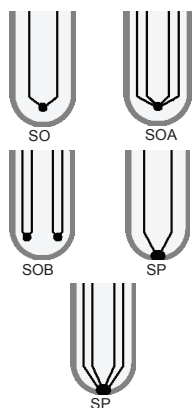
Immersion length L [mm]	Measuring insert length L_w [mm]
250	275
350	375
500	525
710	735

Response time to temperature change

Thermowell diameter [mm]	Response time [s]
$\phi 12$	$t_{0.5} = 45$
	$t_{0.9} = 155$
$\phi 15$	$t_{0.5} = 57$
	$t_{0.9} = 170$

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

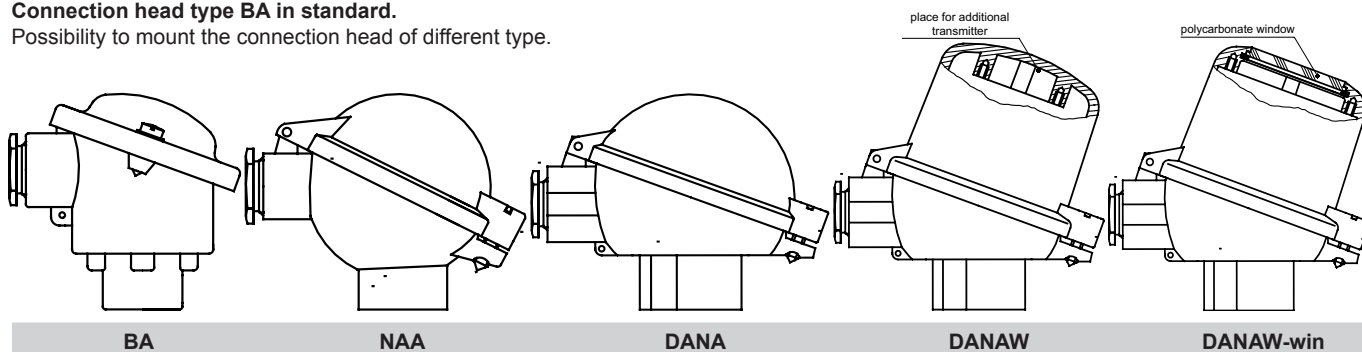
Thermocouple type	Class 1		Class 2	
	Range of application [°C]	Tolerance [°C]	Range of application [°C]	Tolerance [°C]
J Fe-CuNi	from -40 to +375 from +375 to +750	$\pm 1,5$ $\pm 0,004 t $	from -40 to +333 from +333 to +750	$\pm 2,5$ $\pm 0,0075 t $
K NiCr-NiAl	from -40 to +375 from +375 to +1000	$\pm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

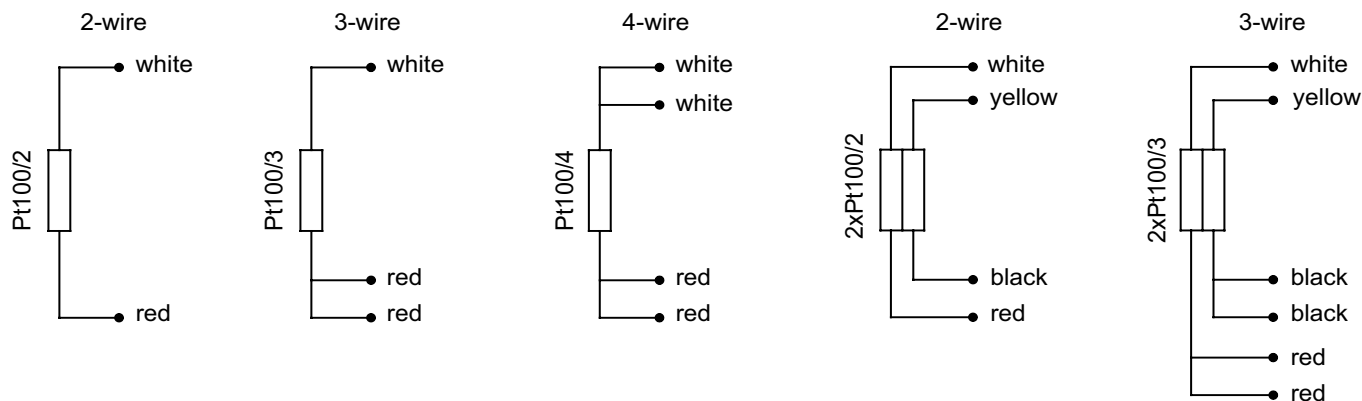
Connection head type BA in standard.

Possibility to mount the connection head of different type.

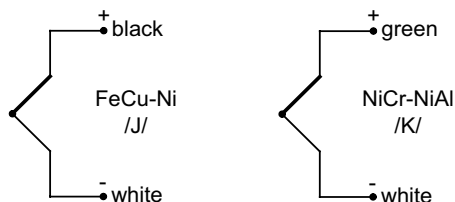


Connection schemes

Pt100 (thermometric resistor)



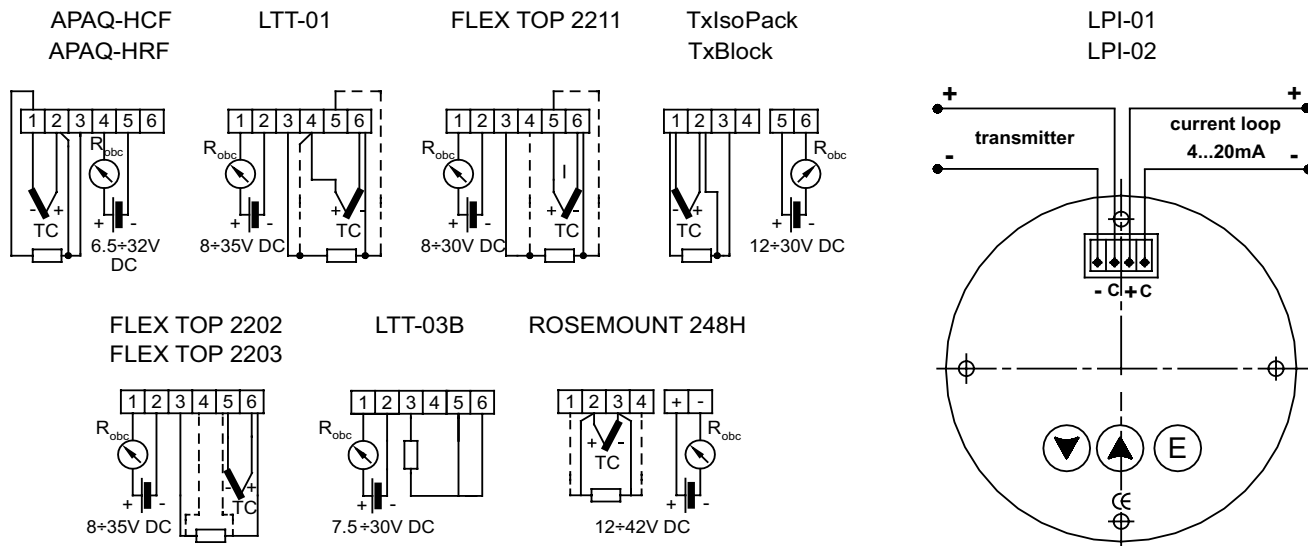
TC (thermocouple)



In double sensors one of thermocouples is additionally marked out.

Transmitters

Local LED display



Product code

0		Sensor version	
		AP	with transmitter
		2AP	with two transmitters
		APW	with display
		no designation	single with pipe insert
1		2	double with pipe insert
		P	single with mineral insulated insert
		2P	double with mineral insulated insert
		Sensing element	
		OP	resistor Pt
2		TJ	thermocouple Fe-CuNi /J/
		TK	thermocouple NiCr-NiAl /K/
			other parameters acc. to requirements
		Thermocouple hot junction type	
		SO	insulated hot junction
3		SP	grounded hot junction
		SOA	one hot junction for two thermocouples insulated from the sheath
		SOB	hot junctions insulated from each other and from the sheath
		Thermowell length	
		250	250mm
4		350	350mm
		500	500mm
		710	710mm
			other parameters acc. to requirements
5		Thermowell diameter	
		9	ø9mm - only for acid-resistant steel
		11	ø11mm - only for acid-resistant steel
		12	ø12mm - only for acid-resistant steel
		14	ø14mm - only for acid-resistant steel
6		15	ø15mm
			other parameters acc. to requirements
		Thermowell material	
		1.4541	acid-resistant steel
		1.4841	creep-resistant steel
7		1.4762	heat-resistant steel
			other parameters acc. to requirements
		Accuracy	
		A or B	for measuring resistor
		1 or 2	for thermocouple
8		Measurement circuit (for resistor)	
		2	2 - wire
		3	3 - wire
		4	4 - wire
9		Transmitter type (optionally)	
		Tx	head mounted transmitter TxBlock
			other parameters acc. to requirements
		Temperature range of transmitter	
		(0÷100°C)	transmitter configured for temperature range 0÷100°C
10			other parameters acc. to requirements

0	1	2	3	4	5	6	7	8	9	10									
		T	P-11	-		-		-		-		-		-		-		-	

Ordering example: **TOPP-11-500-12-1.4541-A-3** single sensor with Pt100, class A, 3-wire connection, thermowell material 1.4541, diameter d=12mm and length L=500mm