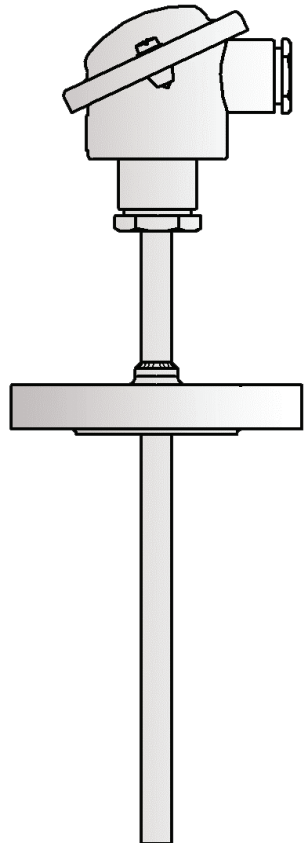
limatherm SENSOR

Temperature Sensors with Replaceable Measuring Inserts
TOPT-11, TTJT-11, TTKT-11

AP 108

This sensor is suitable for temperature range -200÷550°C, primarily for measurements carried out in tanks and pipelines, in all these places where mounting of a threaded process connection would be problematic. 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 bottom of the sensor thermowell.



Specification

Temperature range / sensing element

-200÷550ºC	**Pt100**	class B
-40÷550ºC	**K, J**	class 2

Measuring insert

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

Thermowell

– material: steel 1.4541
– flanged, PN16, DN 20, 25 with lap B1 acc. to PN-EN 1092
– diameter [mm]: 11
– length [mm]: 80÷2000

Connection head

– BA, IP55, -40÷100ºC

Flange

– DN20, DN25

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, process connection, shape and material of the thermowell, connection head type 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.

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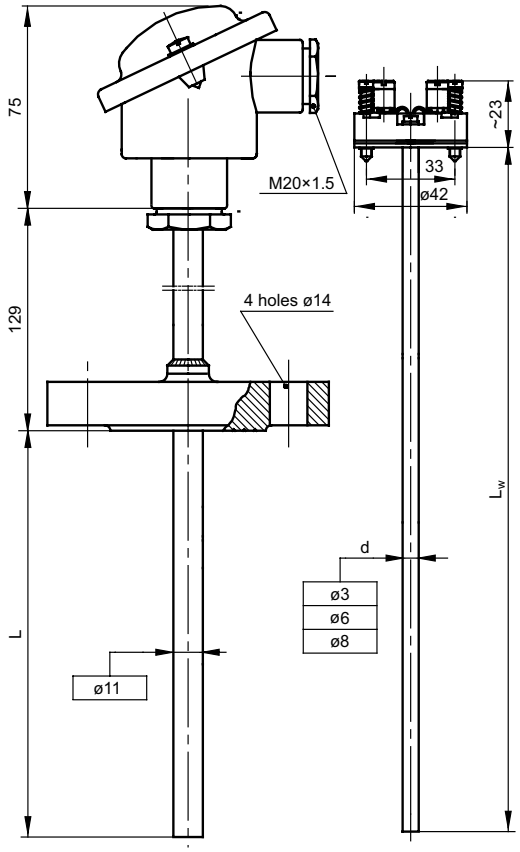


Standard length

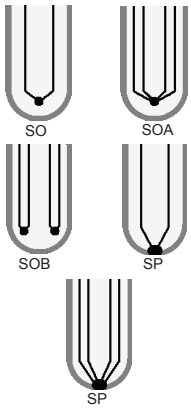
Immersion length L [mm]	Measuring insert length L_w [mm]
100	255
160	315
250	405
400	555

Maximum pressure

Length L [mm]	Maximum pressure [MPa]
do 160	11.8
do 250	6.9
do 400	4.4

Values specified on the basis of the maximum speed of steam flow: 25 m/s and water flow: 3 m/s with thermowell standard diameter 9 mm.

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 = ±(0,10 + 0,0017 |t|)
A	-100÷450	T = ±(0,15 + 0,002 |t|)
B	-196÷600	T = ±(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	±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

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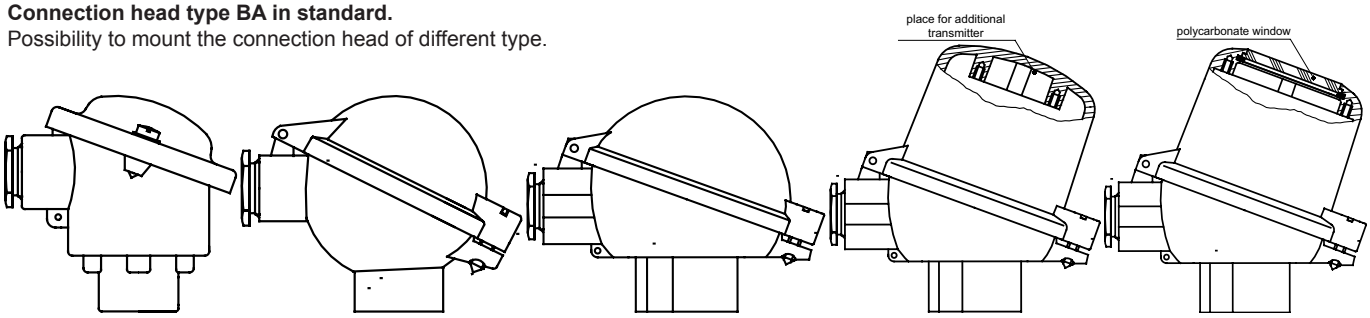
Connection head types

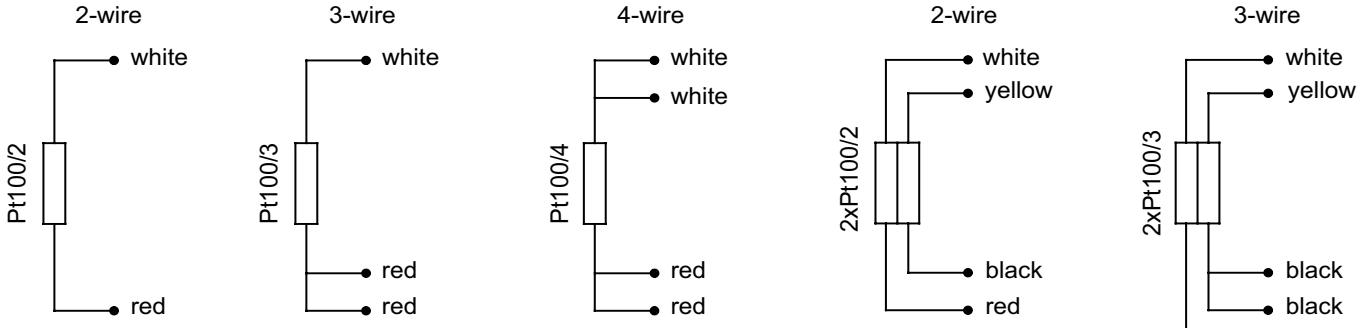
Connection head type BA in standard.
Possibility to mount the connection head of different type.



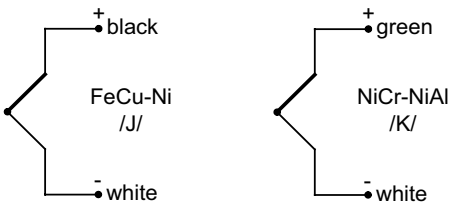
BA | NAA | DANA | DANAW | DANAW-win

Connection schemes

Pt100 (thermometric resistor)



TC (thermocouple)



In double sensors one of thermocouples is additionally marked out.

Transmitters

Local LED display

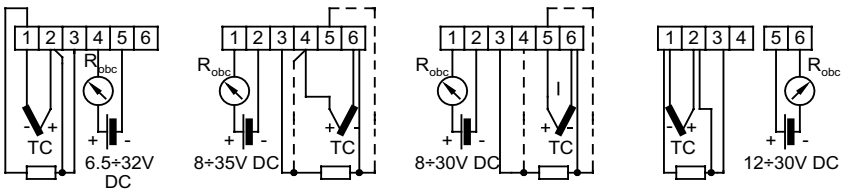
APAQ-HCF
APAQ-HRF

LTT-01

FLEX TOP 2211

TxIsoPack
TxBlock

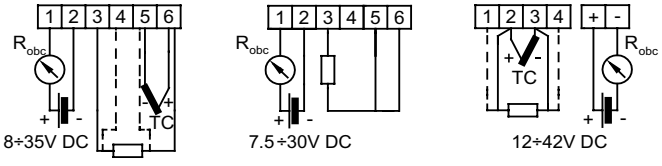
LPI-01
LPI-02

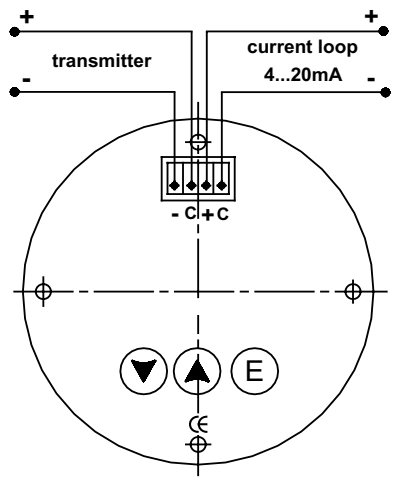


FLEX TOP 2202
FLEX TOP 2203

LTT-03B

ROSEMOUNT 248H





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Product code

		Sensor version	
0		**AP**	with transmitter
		2AP	with two transmitters
		APW	with display
		no designation	single with pipe insert
		2	double with pipe insert
1		**P**	single with mineral insulated insert
		2P	double with mineral insulated insert
		Sensing element	
		OP	resistor Pt
		TJ	thermocouple Fe-CuNi /J/
		TK	thermocouple NiCr-NiAl /K/
2			other parameters acc. to requirements
		Thermocouple hot junction type	
		SO	insulated hot junction
		SP	grounded hot junction
		SOA	one hot junction for two thermocouples insulated form the sheath
3		**SOB**	hot junctions insulated from each other and from the sheath
		Thermowell length	
		100	100mm
		160	160mm
		250	250mm
		400	400mm
4			other parameters acc. to requirements
		Thermowell diameter	
		11	ø11mm
5			other parameters acc. to requirements
		Accuracy	
		A or B	for measuring resistor
6		**1 or 2**	for thermocouple
		Measurement circuit (for resistor)	
		2	2 - wire
		3	3 - wire
7		**4**	4 - wire
		Flange	
		DN20	flange dimension acc. to PN-EN 1092 - DN20
		DN25	flange dimension acc. to PN-EN 1092 - DN25
8			other parameters acc. to requirements
		Transmitter type (optionally)	
		Tx	head mounted transmitter TxBlock
9			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		**11**	–	–	–	–	–	–	–	–	–

Ordering example: **TOPT-11–500–A–3–DN20** single sensor with Pt100, class A, 3-wire connection, thermowell diameter 11mm and length L=500mm, with flange DN20