



AP 108

Sensor with pressure thermowell is suitable for temperature measurement in difficult environmental conditions. Mounted by welding, primarily in turbo-generators, pipelines and pressure tanks. 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

| | | |
|---------|--------------|---------|
| 0÷540°C | Pt100 | class B |
| 0÷540°C | K, J | class 2 |

Measuring insert

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

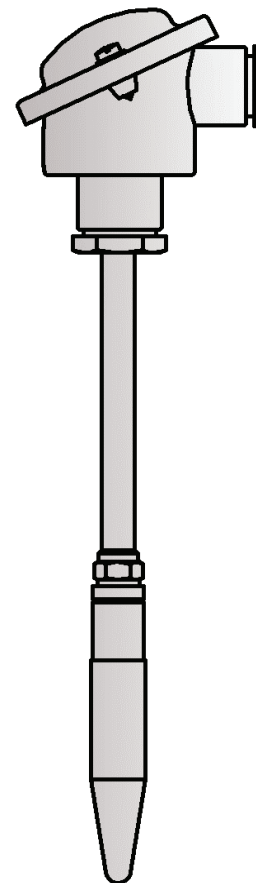
Thermowell

- material: boiler steel 1.7335 (15HM)
- diameter [mm]: 18 (SW1) or 24 (SW2)
- dimension [mm]: 100/ 35, 140/ 65, 200/ 65, 260/ 125 (SW1)
140/ 65, 200/ 65, 260/ 125 (SW2)

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:

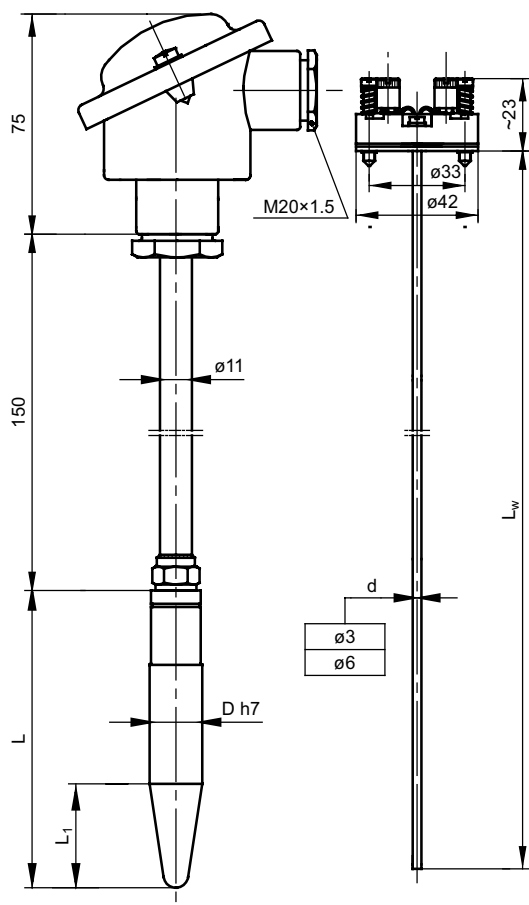
- intrinsically safe Exi
- flameproof Exd

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

Non-standard design

Immersion length, process connection thread, 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

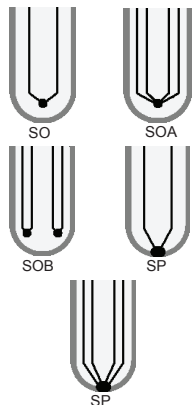
| Immersion length L/L_1 [mm] | Measuring insert length L_w [mm] |
|----------------------------------|---------------------------------------|
| 100/35 | 273 |
| 140/65 | 313 |
| 200/65 | 373 |
| 260/135 | 433 |

Maximum pressure

| Immersion length L [mm] | Maximum pressure [MPa] | | | |
|----------------------------|------------------------|-------|----------------|-------|
| | Thermowell SW1 | | Thermowell SW2 | |
| | air | water | air | water |
| 100 | 15.7 | 44 | – | – |
| 140 | 13.4 | | 22 | 44 |
| 200 | | | | |
| 260 | – | | | |

Values specified for air speed: 60 m/s and water speed: 5 m/s.

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 | ±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

Product code

| | | | |
|---|--|------------------------------------|--|
| 0 | | Sensor version | |
| | | AP | with transmitter |
| | | 2AP | with two transmitters |
| | | APW | with display |
| 1 | | no designation | single with pipe insert (only SW-21) |
| | | 2 | double with pipe insert (only SW-21) |
| | | P | single with mineral insulated insert |
| | | 2P | double with mineral insulated insert |
| 2 | | Sensing element | |
| | | OP | resistor Pt |
| | | TJ | thermocouple Fe-CuNi /J/ |
| | | TK | thermocouple NiCr-NiAl /K/ |
| | | | other parameters acc. to requirements |
| 3 | | Thermowell diameter | |
| | | 11 | for ø18mm |
| | | 21 | for ø24mm |
| | | | other parameters acc. to requirements |
| 4 | | Thermocouple hot junction type | |
| | | SO | insulated hot junction |
| | | 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 |
| 5 | | Thermowell length | |
| | | 100 | 100mm |
| | | 140 | 140mm |
| | | 200 | 200mm |
| | | 260 | 260mm |
| | | | other parameters acc. to requirements |
| 6 | | Accuracy | |
| | | A or B | for measuring resistor |
| | | 1 or 2 | for thermocouple |
| 7 | | Measurement circuit (for resistor) | |
| | | 2 | 2 - wire |
| | | 3 | 3 - wire |
| | | 4 | 4 - wire |
| 8 | | Transmitter type (optionally) | |
| | | Tx | head mounted transmitter TxBlock |
| | | | other parameters acc. to requirements |
| 9 | | Temperature range of transmitter | |
| | | (0÷100°C) | transmitter configured for temperature range 0÷100°C |
| | | | other parameters acc. to requirements |

0

1

2

3

4

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6

7

8

9

T

SW

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-

-

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Ordering example: TOPSW-11-200-A-3 single sensor with Pt100, class A, 3-wire connection, thermowell material steel 15HM, diameter 18mm and length L = 200mm