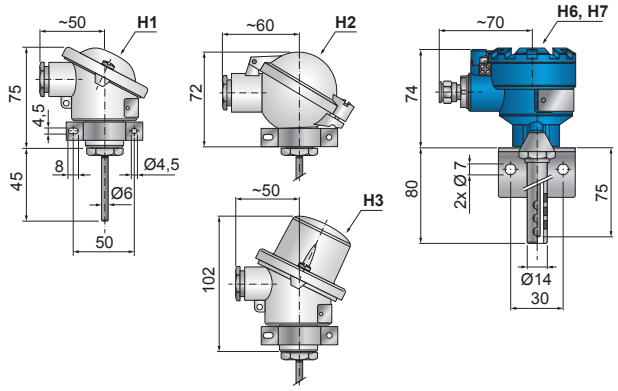
T1010
Spatial Resistance Temperature Sensors without/with Transmitter

- **Measuring resistor 1x / 2x Pt100, Pt500, Pt1000**
- **Measuring range -50 to +150 °C**
- **Accuracy class A, B according to EN 60751**
- **Head form B according to DIN (Al alloy or stainless steel)**
- **Housing IP 65, IP 68**
- **Optional headmounted transmitter with output 4 to 20 mA, HART, Profibus, Fieldbus, including version with galvanic isolation and intrinsically safe version**
- **Flameproof enclosure Ex II 2G Ex d IIC T5/T6 Gb**
- **Protection by enclosure Ex II 2D Ex tb IIIC T90°C Db**



Application

Spatial resistance temperature sensors T1010 are intended for remote ambient temperature measurement (ambient air). Sensors with head H6 or H7 in version for explosion hazard environment of gasses (flameproof enclosure, code ED) and for explosion hazard environment of dusts (protection by enclosure, code ET) can be installed in zone 1, 2, 21, 22 according to EN 60079-10. Sensors can be supplied with connecting terminal or with transmitter mounted in the sensor head.

Description

A sensor of the thermometer is made of one or two measuring resistors, embedded in the stem of exchangeable measuring insert. Resistors are connected by inner wiring to the terminal block in the sensor head. There is used defined resistance change according to temperature change. At sensors with transmitter is resistance signal further transformed to linearized unified current signal 4 to 20 mA, optionally to HART, Profibus, Fieldbus output. Sensors are mounted by auxiliary head holder on wall in rooms, construction halls, sports halls etc.

Technical specifications

Measuring resistor:
1xPt100, 1xPt500, 1xPt1000 accuracy class A, B according to EN 60751, inside wiring: four-wire
2xPt100, 2xPt500, 2xPt1000 accuracy class B according to EN 60751, inside wiring: two-wire

Measuring range:
-40 to +150 °C
-50 to +85 °C in flameproof enclosure version (code ED) or in protection by enclosure version (code ET)

Measuring current:
up to 2 mA (Pt100) [1)]
up to 0.5 mA (Pt500, Pt1000) [1)]
recommended ≤ 1 mA (code ED)
maximal 3 mA (code ED)

Output signal:
without transmitter resistance
with transmitter linearized 4 to 20 mA
other after agreement

Dielectric strength:
500 V eff

Electrical insulation resistance:
min. 100 MΩ according to EN 60751,
at temperature (25 ±10)°C, max. 80 % relative humidity

Materials:
head
- aluminium alloy (code H1, H2, H3, H6)
- stainless steel 1.4541 (AISI 321) (code H7)

stem
- stainless steel 1.4541 (AISI 321)

holder
- varnished carbon steel (P1, P2)
- stainless steel 1.4541 (AISI 321) (P3 - ED/ET version)

inside wiring
- Cu

Housing (according to EN 60529):
IP 65, IP 68 (according to used head)

Operation conditions

Maximal temperature of head H1, H2, H3 (not for Ex version):
150 °C (without transmitter)
85 °C (with transmitter P5310, P5311 and 5335)

Ambient temperature Ta of head H6, H7 for Ex version (code ED, ET):
-50 ≤ Ta ≤ 85 °C temperature class T5
-50 ≤ Ta ≤ 75 °C temperature class T6

Maximal permissible operating properties of transmitter in the head for Ex (version ED, ET):
I_{imax}: 30 mA
P_{imax}: 1 W

[1)] ... only for sensor without transmitter

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Surface temperature for Ex version (code ED, ET):

User is obliged to ensure installation of temperature sensors in such a way, that there is no influence of external heat sources (measured medium, sun heating, etc.) on the surface of the sensor and its fittings that could lead to exceeding defined maximum surface temperature defined in EN 60079-0. When defining a surface temperature of the sensor, it has to be calculated with a 5 °C for heating of the sensor from possible maximum operating energy output (P_{imax} = 1 W).

Maximal surface temperatures for electrical devices group II for explosion hazard environment of gases, vapors and mists according to EN 60079-14 are listed in the following table. The maximal surface temperature for electrical equipment group II for explosion hazard environment of dusts according to EN 60079-14 is given by the smaller of the values defined in the following points:

a) ignition temperature of dust in layer decreased by 75 °C,

b) 2/3 of ignition temperature of dust in turbulent state.

Temperature class	Maximal surface temperature	Max. temperature of measured medium
T5	100 °C	85 °C
T6	85 °C	80 °C

Maximal surface temperature Tx for dust explosive atmosphere is equal to measured medium temperature Tm.

Tx = Tm

Supplementary parameters

EMC (electromagnetic compatibility):
according to EN 61326-1

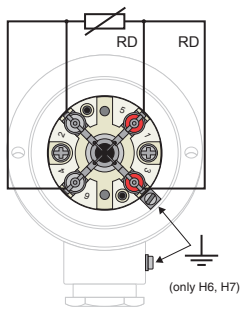
Flameproof enclosure (code ED):
Ⓔx II 2G Ex d IIC T5/T6 Gb
only for heads H6, H7

Protection by enclosure (code ET):
Ⓔx II 2D Ex tb IIIC T90°C Db
only for heads H6, H7

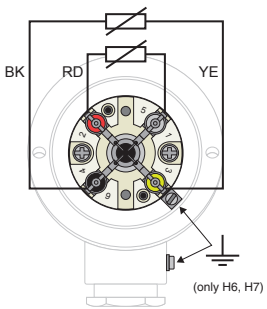
Electrical connection

RD - red
BK - black
YE - yellow
⏚ - ground clamps

1xPt100, 1xPt500, 1xPt1000/4-wire



2xPt100, 2xPt500, 2xPt1000/2-wire



For sensors with flameproof enclosure (code ED) and protection by enclosure (code ET) it is possible to use other cable glands than mentioned Ex cable glands in the ordering table. Other cable gland has to be with connection thread M20x1.5 and with individual approving.

When using cable glands (code KME1, KME2) designed for fixed cable installation, the cable shall be fixed against a possible rotation and displacements.

In case that the sensor with flameproof enclosure (code ED) or protection by enclosure (code ET) version is under voltage, the sensor shall not be dismounted, cover of the head shall not be opened and the cable outlet shall not be released! Any intervention into construction of the sensor with a explosion proof version is not permitted and may cause an explosion!

Weight:

a) without transmitter with head H1: 0.25 kg

b) with head H2 plus 0.04 kg
H3 plus 0.05 kg
H6 plus 0.16 kg
H7 plus 0.70 kg

c) with transmitter P5310 plus 0.04 kg
P5311 plus 0.05 kg
5335 plus 0.05 kg

	Type	Description	
•	**T1010-1**	**Spatial resistance temperature sensor**	
	Code	**Temperature sensor**	**Accuracy class according to EN 60751**
•	**02 1**	**1xPt100, four-wire inside wiring**	**B**
○	**03 1**	**2xPt100, two-wire inside wiring**	**B**
	05 1	1xPt500, four-wire inside wiring	B
	06 1	2xPt500, two-wire inside wiring	B
○	**08 1**	**1xPt1000, four-wire inside wiring**	**B**
○	**09 1**	**2xPt1000, two-wire inside wiring**	**B**
○	**02 2**	**1xPt100, four-wire inside wiring**	**A**
	05 2	1xPt500, four-wire inside wiring	A
○	**08 2**	**1xPt1000, four-wire inside wiring**	**A**
	Code	**Nominal length L [mm]**	
•	**045**	**45 (only with code H1, H2, H3)**	
	075	75 (only with code H6, H7)	
	Code	**Stem - outer diameter [mm]**	**Stem coat material**
•	**S21**	**Ø 6 mm**	**Stainless steel 1.4541**
	Code	**Head**	
•	**H1**	**Al alloy, with terminal board, for cable diameter 4 to 12.5 mm, IP 65**	
	H2	**Al alloy, with terminal board, for cable diameter 4 to 12.5 mm, IP 65**	
•	**H3**	**Al alloy, with cap for mounting of transmitter Ø 44 mm, with terminal board, for cable diameter 4 to 12.5 mm, IP 65**	
	H6 [1)]	Al alloy, for mounting of transmitter Ø 44 mm, without terminal board, ground clamps, thread for cable outlet M20x1.5, IP 68	
	H7 [1)]	Stainless steel, for mounting of transmitter Ø 44 mm, without terminal board, ground clamps, thread for cable outlet M20x1.5, IP 68	
	S1 [2)]	Terminal board for connection wire (for heads H6, H7 without transmitter)	
	Code	**Process connection**	
•	**P1**	**Thermometer holder for wallmounting (for heads H1, H2, H3)**	
	P3	Stainless thermometer holder for wallmounting (for heads H6, H7)	
		OPTIONAL ACCESSORIES	
	Code	**Versions for explosive atmosphere of gasses or dusts**	
	ED/ET	Explosion proof (Ex) II 2G Ex d IIC T5/T6 Gb, protection by enclosure (Ex) II 2D Ex tb IIIC T90°C Db (only with code H6, H7)	
	Code	**Calibration in customer defined points, including certificate of calibration**	
○	**KTE-P3**	**Spatial resistance temperature sensor calibration in three points in range -40 to +60 °C**	
	KTE-P9	Other	
	Code	**Cable outlet**	
•	**KM1**	**Cable outlet, nickel silver, IP 68, M20x1.5, diameter of cable 5 to 10 mm (for heads H6, H7)**	
•	**KME1**	**Cable outlet, nickel silver, Ex d, M20x1.5, IP 68, for fixed assembly cable with diameter 4.5 to 8.5 mm**	
•	**KME2**	**Cable outlet, nickel silver, Ex d, M20x1.5, IP 68, for fixed assembly cable with diameter 7 to 12 mm**	
	KM9	Other	
•	**PK1**	**Lock anti pull-up cable for Ex d cable outlet KME1**	
•	**PK2**	**Lock anti pull-up cable for Ex d cable outlet KME2**	
	Code	**Transmitters for headmounting**	
•	**P5310 H10**	**Transmitter with LHP protocol (see data sheet No. 0824)**	
○	**P5310EN2 H10**	**Transmitter with LHP protocol, (Ex) II 3G Ex nA IIC T4 Gc (see data sheet No. 0824)**	
•	**P5311 H10**	**Transmitter with LHP protocol with galvanic isolation (see data sheet No. 0824)**	
○	**P5311EN2 H10**	**Transmitter with LHP protocol with galvanic isolation, (Ex) II 3G Ex nA IIC T4 Gc (see data sheet No. 0824)**	
○	**P5311EI1 H10**	**Transmitter with LHP protocol with galvanic isolation, (Ex) II 1G Ex ia IIC T4-T6 Ga, (Ex) II 1D Ex ia IIIC T106°C Da (see data sheet No. 0824)**	
•	**5335A**	**Transmitter with HART protocol with galvanic isolation, (Ex) II 3G, (Ex) II 3D (see data sheet No. 0786)**	
•	**5335D**	**Transmitter with HART protocol with galvanic isolation, Ex) II 1G Ex ia IIC T6 or T4 Ga, (Ex) II 1D Ex ia IIIC Da, (Ex) I M1 Ex ia I Ma, CSA and FM (see data sheet No. 0786)**	
	Example of order:	**T1010-1 02 1 045 S21 H3 P1 KTE-P3 (-40, 10, 60 °C)**	

• ... Ex stock version ° ... Marked version can be dispatched up to 5 working days (with calibration up to two weeks)

[1)] … Temperature transmitter is mounted directly on flange of measuring insert instead of ceramic terminal block when temperature sensor is supplied with head H6 or H7.

[2)] … Only for sensor without transmitter.