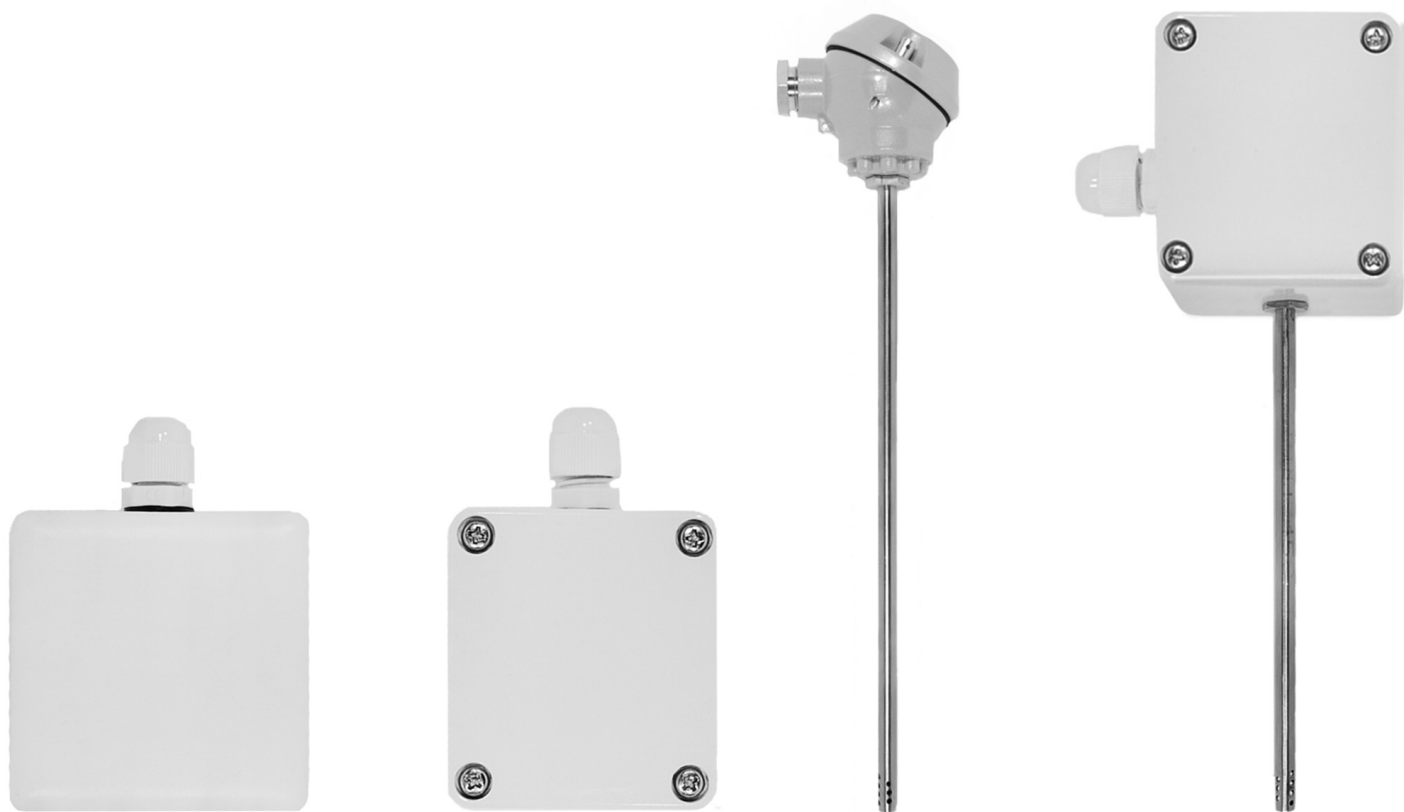


Temperature Sensor for Air-conditioning and Ventilation Systems



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Temperature Sensor for Air-conditioning and Ventilation Systems

The following Operation Manual provides information of temperature sensors for air-conditioning and ventilation systems.

Sensor types: TO...O-831, TO...O-833, TO..Z-850, TO...K-849, TO..M-5, TOPW-1, TOP-565 are manufactured with aesthetic plastic enclosure or stainless steel sheath terminated with aluminium connection head. These sensors have resistance output directly from the applied resistor or standard 4-20mA or voltage 0-10V signal from transmitter.

1. Construction and principle of operation.

The basic element of the temperature sensors is resistor placed directly on a printed circuit board. It is put in the plastic enclosure or extended with wires in additional outer sheath connected with this enclosure or aluminium connection head. In place of the circuit board or terminal block, a transmitter of resistance signal to standard 4-20 mA signal can be installed. These sensors can be installed directly on the wall or in ventilation channels with the aid of compression fittings and flanged fittings.

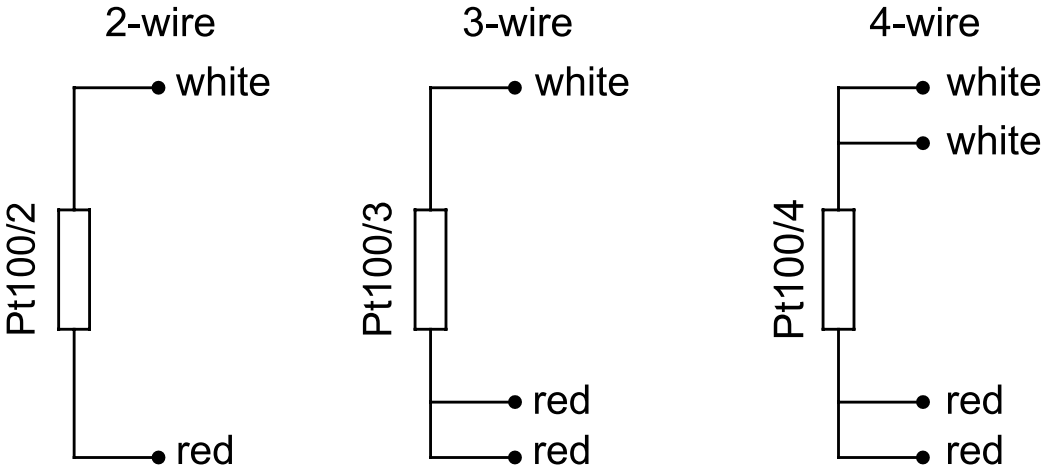
The sensing element reacts to change of process temperature through its resistance change. These changes comply with thermometric characteristics specified in the standards.

Specification:

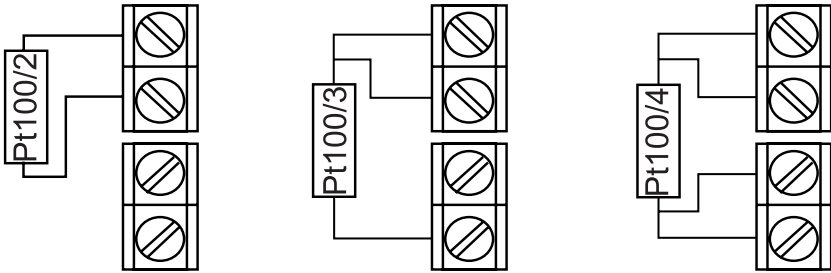
Resistor type.....	1 x Pt 100 ,500,1000 class A or B acc. to PN-EN 60751 1 x Ni 100, 1000 acc. to PN-83/M-53849
Connection type.....	2, 3 or 4- wire
Temperature range	acc. to the catalogue cards
Acceptable operating temp. of enclosure.....	-40 - 60 °C (ABS - TO..O-833) -40 - 85 °C (polycarbonate – other: plastic) -40 - 100 °C (MAA)
Degree of protection.....	IP- 54 connection head MAA IP-20 enclosure ABS IP-67 polycarbonate enclosure
Cable gland type.....	M16x1,5 for connection head MAA
PG 7 for plastic enclosure	
Transmitter type	TxBLOCK, APAQ-HRF, LTT-03B, LTT-01, FLEX TOP 2202, FLEX TOP 2211 – for plastic enclosure LTT-03J for connection head MAA

2. Sensor connection.

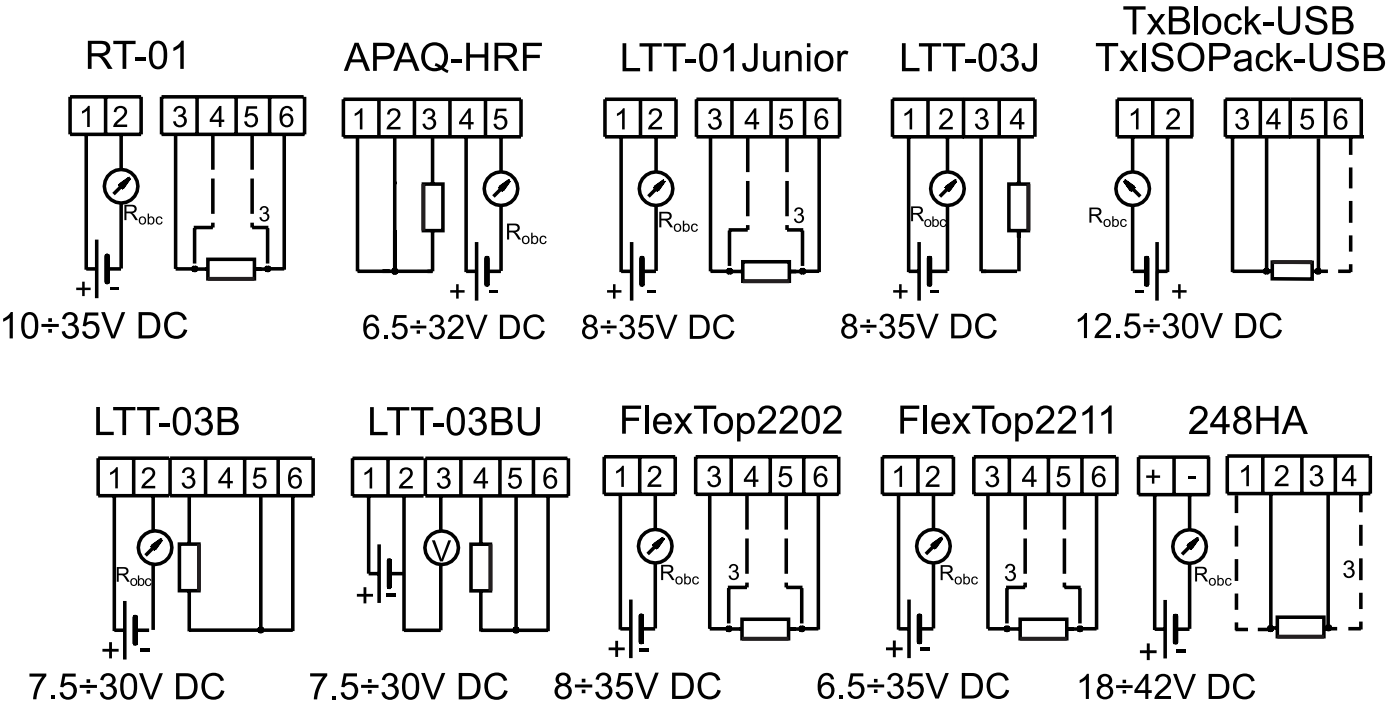
• terminal block - terminals designation:



• printed circuit block



• transmitters RTD/4-20 mA or 0-10 V



3. Types of wire configuration.

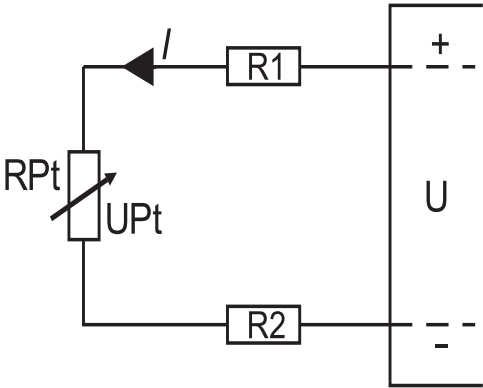
Resistance Sensors - 2-wire connection line

Diameter of the wire / Resistance of the wire

2x0,22 mm ² -0,175 Ω/m		2x0,25 mm ² -0,165 Ω/m
2x0,35 mm ² -0,105 Ω/m		2x0,50 mm ² -0,036 Ω/m

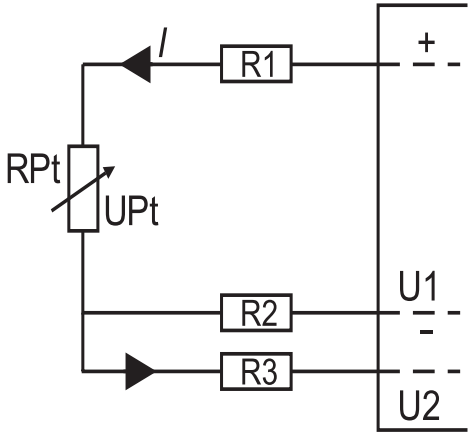
- resistance sensors: 2-wire connection line

2-wire connection can be used when a high accuracy is not required. Resistance of R1+R2 configuration causes error about 2,6°C for Pt100 per 1 Ω wire resistance, about 0,26°C per 1 Ω wire resistance for Pt1000.



- resistance sensors: 3-wire connection line

Three-wire configuration for connecting resistor with the outer device is the most popular in industry because of the automatic compensation of wire resistance and its changes depending on temperature.

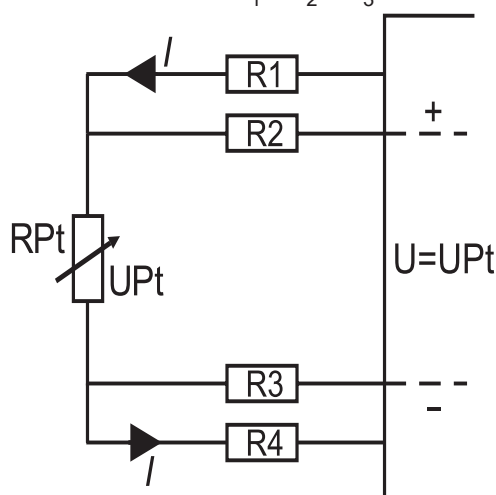


Connection wires must have identical resistance $R_1=R_2=R_3$. The table below provides examples of errors of 3-wire configuration for Pt100 and Pt1000 for wire resistance difference: 0.1Ω i 1Ω .

	Difference in the resistance of wires	
	0. 1Ω	1Ω
Pt100	0.26°C	2.6°C
Pt1000	0.03°C	0.26°C

For practical reasons, the resistance of a single wire input circuit of RTD should not be higher than 11 Ω.

- resistance sensors: 4-wire connection line $R_1=R_2=R_3=R_4=R$



This connection line is used when a very high accuracy of temperature measurements is required. In the case of a 4-wire connection line, the impact of resistor's wires resistance is totally eliminated. For practical reasons, the resistance of a single wire input circuit of RTD should not be higher than 11 Ω.

4. Recommended outer diameters for cable glands.

- Cable gland M16x1,5 (head type MAA) wire diameter /ø4 - 9 mm/
- Cable gland Pg 7 (plastic enclosure) wire diameter /ø4 - 6 mm/

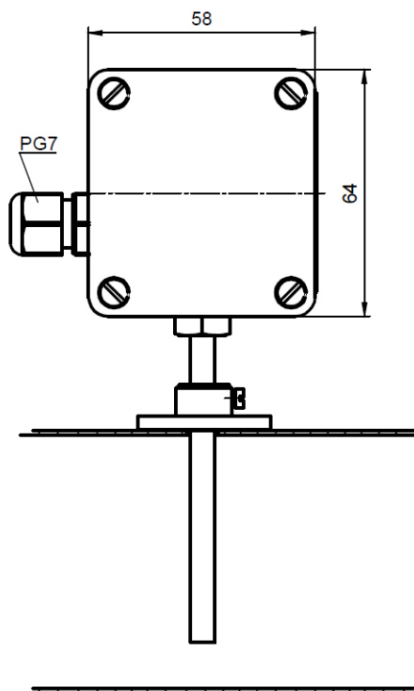
5. Packing and storing and transportation instructions.

For the purpose of transportation temperature sensors should be properly packed (as multipacks and/or individual packages) in order to avoid any damage. They should be stored indoors in their original packages; the indoor air must be free of vapours and/or aggressive substances, the indoor air must range from +5°C to 50°C, and the relative humidity must not exceed 85%. Whilst being transported, the sensors must be protected against shifting inside the packaging. Temperature sensors can be transported by air, by sea and road providing that the direct influence of atmospheric agents is eliminated. Transportation conditions acc. to PN-81/M-42009.

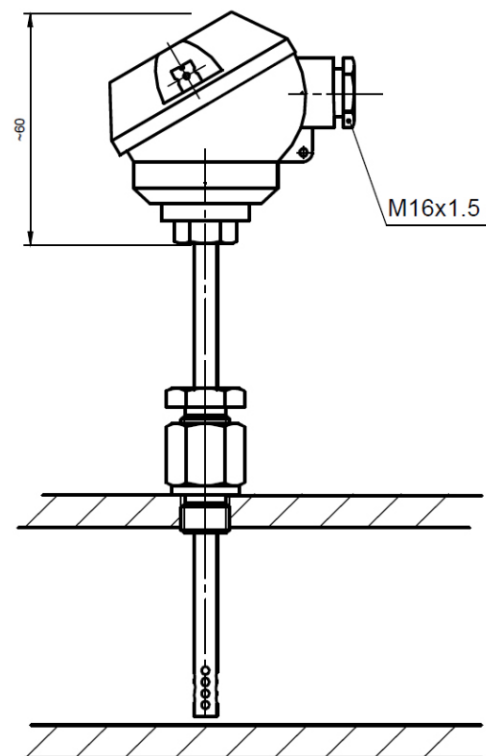
6. Warranty.

- The Manufacturer provides the original purchaser of the sensor (sensors) with a twelve (12) month warranty and necessary service; for this period, the Manufacturer guarantees the uninterrupted and error free functioning of sensors;
- The twelve (12) month warranty begins on the day of purchase;
- Also, the Manufacturer provides the original purchaser of the performed of the sensor with a post-warranty service;
- The warranty voids in the case of any changes in and repairs of the instrument;
- This warranty does not cover damages resulting from improper transportation, nor defects and errors caused by bad handling or misuse which does not comply with the provisions as set forth in this Operation Manual.
- This warranty does not cover damage of the sheath working in environment different than air and water if this has not been specified in the request for quotation or purchase order.

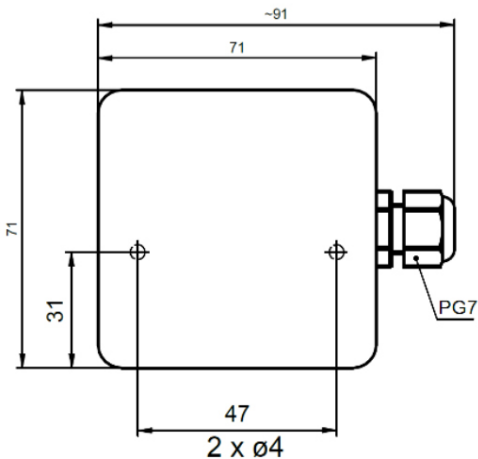
8. Recommended ways of sensor installation,



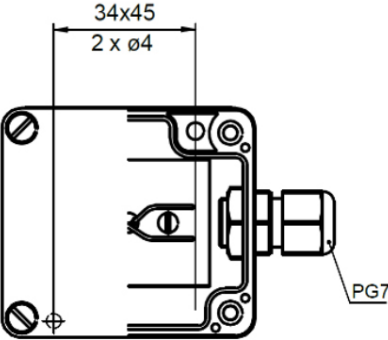
TO..K-851



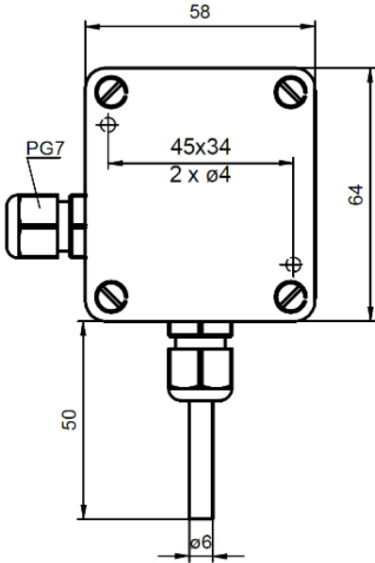
TO..W-1



TO..O-833



TO..M-5



TO..O-831, TO..Z-850