

TEMPERATURE SENSORS – FOR EXPLOSIVE ENVIRONMENTS WITH A CABLE

014.08en

DESCRIPTION AND APPLICATION

The sensors are designed to meet the requirements of EN 60079-0:2013+A11:2014, EN 60079-7:2016 and EN 60079-31:2014, as amended. Sensors marked on the nameplate with II3G Ex ec IIC T6...T2 Gc and II3D Ex tc IIIC T60°C...230°C DC can be used in potentially explosive environments – Equipment Group II, Zone 2 and Zone 22. The sensors operate on the principle of defined dependency of the change of property of the sensor and the change of temperature. They are not capable of generating sparks, arcs or high surface temperatures. The temperature range for use in potentially explosive environments is limited by the insulation of the cable used and specifically specified in the operating instructions – the specified measuring range must not be exceeded, even for a brief period. The supply cable may have an outer PVC, silicone or PTFE (Teflon) insulation and may be either shielded or unshielded. According to EN 60529, as amended the sensors meet IP 65 in the case of PTFE (Teflon) cable insulation and IP 67 in the case of other supply cables. The sensors are designed to be operated in a chemically non-aggressive environment, the use must be chosen with regard to the temperature and chemical resistance of the case and the supply cable. From the design perspective, there are two sensor variants:



- TG8Ex** – In combination with the JTG8 thermowell or central holder, supplied as accessories, the sensors can be used for temperature measurement of gaseous and liquid substances in piping or air conditioning ducts or separately for temperature measurement of solids. They consist of a metal measuring case with a diameter of 5.7 mm, 6 mm, 7 to 10 mm or 12 mm, which contains a temperature sensing element and supply cable. The metal sensor case can be made of stainless steel DIN 1.4301, DIN 1.4404, DIN 1.4571. The wiring of the sensors can be 2-wire, 3-wire or 4-wire. In the case of shielded supply cables, the shielding is not connected to the case or to the temperature sensing element. The case length can be selected from the range of 40 to 400 mm, depending on the sensor case diameter.
- TR011Ex** – The sensors can be used for temperature measurement of gaseous and liquid substances in piping or air conditioning ducts or separately for temperature measurement of solids. They consist of a metal measuring case with a diameter of 6 mm, 7 to 10 mm or 12 mm, which contains a temperature sensing element and supply cable. The metal sensor case can be made of stainless steel DIN 1.4301, DIN 1.4404, DIN 1.4571. The fixed part of the case is a mounting fitting with different thread sizes and OK hexagon, allowing direct installation in the measured location without the use of a thermowell. The wiring of the sensors can be 2-wire, 3-wire or 4-wire. In the case of shielded supply cables, the shielding is not connected to the case or to the temperature sensing element. The case length can be selected from the range of 40 to 400 mm, depending on the sensor case diameter.
- TR141Ex** – The sensors can be used to measure the surface temperature of solids with a smooth surface. They consist of a cuboid-shaped metal measuring case, which contains a temperature sensing element and supply cable. The metal sensor case can be made of stainless steel DIN 1.4301 or aluminium alloy (Duralumin). The case contains a mounting hole, allowing the sensor to be mounted on the to-be-measured surface. The wiring of the sensors can be 2-wire, 3-wire or 4-wire. The supply cable may have an outer PVC, silicone or PTFE (Teflon) insulation and is either shielded or unshielded. In the case of shielded supply cables, the shielding is not connected to the case or to the temperature sensing element. The total case length can be selected from the range of 40 to 60 mm, depending on the sensor case design and type of the supply cable.

DECLARATION, CERTIFICATES, CALIBRATION

Manufacturer provides **EU Declaration of Conformity**.

The declaration is issued on the basis of the following certificates issued by the Physical-Technical Testing Institute Ostrava – Radvanice:

- **TG8Ex** Appendix No. 2 to Certificate No. FTZÚ 07 ATEX 0142X
- **TR011Ex** Appendix No. 2 to Certificate No. FTZÚ 07 ATEX 0143X
- **TR141Ex** Certificate No. FTZÚ 16 ATEX 0145X

Calibration – All temperature sensors pass through the final metrological inspection, which is carried out by comparing with standards or working gauges. Continuity of the standards and working gauges is ensured within the meaning of Section 5 of Act No. 505/1990 on metrology, as amended. The manufacturer offers the possibility to supply sensors calibrated in the laboratory of SENSIT s.r.o. (according to the requirements of EN ISO/IEC 17025) or in an accredited laboratory.

SPECIFICATIONS

Standard types of sensing elements	all types (Pt 100, Pt 1000, Ni 1000, Ni 10000, Ni 2226=T1, NTC, PTC, KTY, TSic, DALLAS, TCK, TC J, TCT and others)
Measuring range	Y - T2: $-40 \leq T_a \leq 230$ °C cable PTFE (teflon) T3: $-30 \leq T_a \leq 180$ °C cable SILICONE T5: $-20 \leq T_a \leq 95$ °C cable PVC up to 105 °C T6: $-20 \leq T_a \leq 70$ °C cable PVC
Recommended / maximum DC measuring current	1 mA / 3 mA for the sensor with the sensing element Pt 100 0.5 mA / 1.5 mA for the sensor with the sensing element Pt 500 0.3 mA / 0.8 mA for the sensor with the sensing element Pt 1000 0.3 mA / 1 mA for other sensors
Recommended / maximum DC power consumption of sensing element	0.05 mW / 1 mW for the sensor with the sensing element NTC 20 kΩ
Accuracy class	Ni sensing elements: class B, $\Delta t = \pm (0.4 + 0.007 t)$, for $t \geq 0$ in °C, $\Delta t = \pm (0.4 + 0.0028 t)$, for $t \leq 0$ in °C Pt sensing elements: class B according to EN 60751, $\Delta t = \pm (0.3 + 0.005 t)$ in °C NTC 20 kΩ: ± 1 °C for the range 0 to 70 °C
Sensor connection	2-wire, 3-wire, 3-wire
Insulation resistance	min. 200 MΩ at 500 V DC, at the temperature 15 to 35 °C, max. relative humidity 80 %
Electric strenght ATEX	1 000 V DC during the period 1 s, at the temperature 15 to 35 °C, max. relative humidity 80% according to the article 6.8.1 of the EN 60079-15 ed. standard
Ingress protection	IP 67 for cables with PVC and SILICONE insulation in accordance with EN 60529, as amended IP 65 for cables with PTFE (teflon) insulation in accordance with EN 60529, as amended
Types of lead-in cables and their thermal resistivity	-50 to 200 °C MCBE-AFEP, 2 x 0.34 a 4 x 0.15 mm ² , silicone insulation -40 to 105 °C FLRYWYW, 2 x 0.35 a 4 x 0.35 mm ² , PVC insulation up to 105 °C -30 to 80 °C LiYCY 2 x 0.34 mm ² , PVC insulation -50 to 260 °C PTFE
Weight	according to the length of the cable, minimum 0.15 kg

SUPPLEMENTARY DATA TO THE INDIVIDUAL TYPES

Serie TG8Ex

Stem diameter	5.7 mm, 6 mm, 7 to 10 mm, 12 mm
Stem length	40 to 400 mm
Stem material	stainles steel DIN 1.4301, DIN 1.4571, DIN 1.4404
Time response (in flowing water 0.2 m.s.-1)	$T_{0,5} \leq 5$ s, $T_{0,9} \leq 12$ s for stem \varnothing 5.7 mm $T_{0,5} \leq 9$ s, $T_{0,9} \leq 20$ s for stem \varnothing 6 mm $T_{0,5} \leq 14$ s, $T_{0,9} \leq 35$ s for stem \varnothing 7 to 8 mm $T_{0,5} \leq 25$ s, $T_{0,9} \leq 60$ s for stem \varnothing 9 to 10 mm $T_{0,5} \leq 35$ s, $T_{0,9} \leq 80$ s for stem \varnothing 12 mm

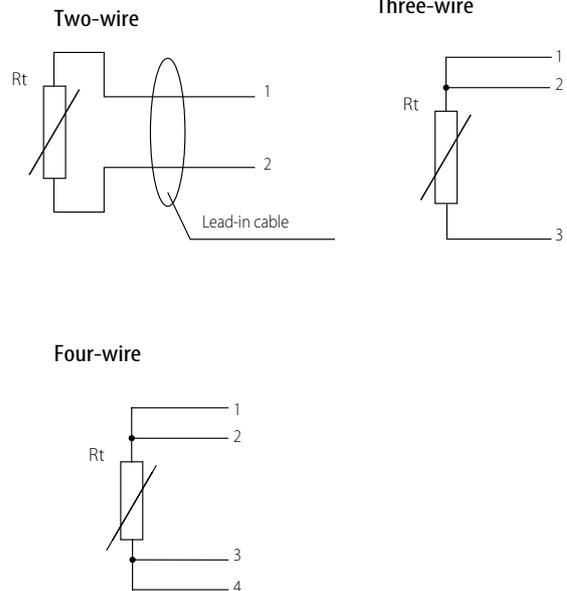
Serie TR141Ex

Basic cuboid size	12 x 8 mm
Inner diameter of the case in the cable sealing area	4.5 mm to 6 mm
Case length	40 to 60 mm
Case material	stainless steel DIN 1.4301, dural
Time response (on flat surface without paste)	stainless steel DIN 1.4301 $T_{0,5} \leq 10$ s dural $T_{0,5} \leq 8$ s

Serie TR011Ex

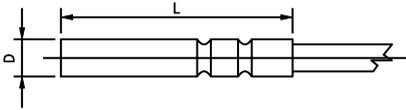
Stem diameter	6 mm, 7 to 10 mm, 12 mm
Stem length	40 to 400 mm
Stem material	stainless steel DIN 1.4301, DIN 1.4571, DIN 1.4404
Type of the thread	according to the customer's requirement
Time response (in flowing water 0.2 m.s.-1)	$T_{0,5} \leq 9$ s, $T_{0,9} \leq 20$ s for stem \varnothing 6 mm $T_{0,5} \leq 14$ s, $T_{0,9} \leq 35$ s for stem \varnothing 7 to 8 mm $T_{0,5} \leq 25$ s, $T_{0,9} \leq 60$ s for stem \varnothing 9 to 10 mm $T_{0,5} \leq 35$ s, $T_{0,9} \leq 80$ s for stem \varnothing 12 mm

WIRING DIAGRAM

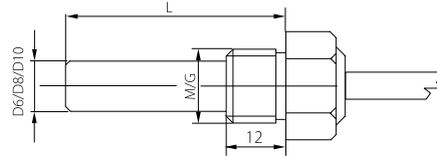


DIMENSIONAL DRAFT

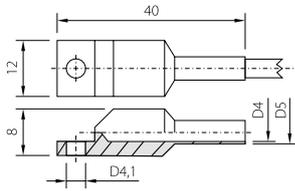
TG8Ex



TR011Ex



TR141Ex



MODIFICATION AND CUSTOMIZATION

- length of the case of the sensor
- possibility to encase two sensing elements
- A class of accuracy (except for the NTC 20kΩ sensing element)

