

# TEMPERATURE SENSORS WITH A CABLE AND A DIGITAL OUTPUT

112.01en

## DESCRIPTION AND APPLICATION

These temperature sensors with a cable are designed for contact temperature measurement of solid, liquid and gaseous substances in various industries, e.g. in the food industry, chemical and refrigeration industries etc. The sensors are either fitted with TSic 206, 506 and 716 series of temperature sensors with a digital output, or, as a part of the supply cable, there is an electronic module converting signal from the Pt 1000 resistance sensor to the 1-Wire output signal, corresponding to DS 18B20 sensors. The basic versions of digital outputs are:

- communication via 1-Wire bus
- ZACWire communication protocol – TSic 206, 506 and 716 digital temperature sensors

The temperature range of sensor use is defined in the table of technical parameters for the individual versions of sensors and temperature sensors. The basic versions of these temperature sensors are:

- **TG 8 and TG 8J** – sensor versions with a smooth case
- **TG 2, TR 011** – sensor versions with a thread
- **TR 024, TR 024A** – sensor versions with a smooth case
- **TR 141A and TR 141E** – contact temperature sensor versions
- **TR 050A** – a sensor version with a smooth case up to 400 °C

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 sensor head.

## ACCESSORIES

- various versions of connectors – HIRSCHMANN, LEMO, MOLEX etc.
- fitting with a collet or with cutting rings – for setting of different immersion lengths of the sensor
- stainless steel thermowells – JTG8 etc.

## DECLARATION, CERTIFICATES, CALIBRATION

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The entire production passes through a final metrological inspection, which is carried out by comparing with standards or working measuring instruments. Continuity of the standards and working measuring instruments is ensured within the meaning of Section 5 of Act No. 505/1990 on Metrology. The manufacturer offers to supply the sensors calibrated in the SENSIT s.r.o. laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an accredited laboratory.

## SPECIFICATIONS

Output signal / temperature sensing element	1-Wire communication / Pt 1000	ZacWire communication / TSic x06
Type / Accuracy of the temperature sensing element	Pt 1000 / $\pm (0.3 \text{ }^\circ\text{C} + 0.0005 t )$	TSic 206 $\pm 0.5 \text{ }^\circ\text{C}$ in the range of 10 to 90 °C TSic 306 $\pm 0.3 \text{ }^\circ\text{C}$ in the range of 10 to 90 °C TSic 506 $\pm 0.1 \text{ }^\circ\text{C}$ in the range of 5 to 45 °C TSic 716 $\pm 0.07 \text{ }^\circ\text{C}$ in the range of 25 to 45 °C
Accuracy of the electronics	$\pm 0.2 \text{ }^\circ\text{C}$	/
Converter case material	PA - MACROMELT	/
Connection of the temperature sensor	2-Wire or 4-Wire	3-Wire
Supply voltage (U)	4.5 to 5 V DC	3 to 5.5 V DC
Rated supply voltage (Un)	5 V DC	3.3 V DC
Supply current	6.5 mA	30 $\mu\text{A}$



## OTHER PARAMETERS

Output signal / temperature sensing element	1-Wire communication / Pt 1000	ZacWire communication / TSic x06
Insulation resistance	> 200 MΩ at 500 V DC, 25 °C ± 3 °C	
Supply cable types and their temperature resistance	silicone, -50 to 200 °C PVC, -40 to 105 °C PVC, -30 to 80 °C PTFE, -50 to 260 °C	
Weight	according to the design and the cable length; min. 0.15 kg	

### TG 8, TG 8J series

Measuring range *)	1-Wire: -50 to 200 °C	TSic 206 and 306: -30 to 100 °C TSic 506 and 716: -10 to 60 °C
Diameter of the case	5.7 ± 0.1 mm	
Case length	40 to 200 mm	
Case material	40, 50, 60 mm: stainless steel DIN 1.4571 other: stainless steel DIN 1.4301 stainless steel	
Ingress protection **)	IP 67 in accordance with EN 60529, as amended (for a silicone cable)	
Resistance to pressure (applied on the stem with the medium)	without a thermowell PN 25 with a thermowell PN 63	
Time response	τ0.5 < 9 s (0.2 m.s-1 in running water)	

### TG 2, TR 011 series

Measuring range *)	1-Wire: -100 to 250 °C	TSic 206 and 306: -30 to 100 °C TSic 506 and 716: -10 to 60 °C
Diameter of the case	4, 6, 8, 10 a 12 ± 0.1 mm	
Case length	20 to 500 mm	
Case material	stainless steel DIN 1.4301, DIN 1.4404, DIN 1.4571	
Ingress protection **)	IP 67 in accordance with EN 60529, as amended (for a silicone cable)	
Resistance to pressure (applied on the stem with the medium)	diameter 4 to 6 mm: PN 25 diameter 8 to 12 mm: PN 63	
Time response	diameter 4 mm: τ0,5 < 5 s (0.2 m.s-1 in running water) diameter 12 mm: τ0.5 < 35 s (0.2 m.s-1 in running water)	

### TR 024, TR 024A series

Measuring range *)	1-Wire/TR 024: -100 to 250 °C	1-Wire/TR 024A: -50 to 200 °C
Diameter of the case	4.0 ± 0.1 mm	
Case length	40 to 200 mm	
Case material	stainless steel DIN 1.4301, DIN 1.4404, DIN 1.4571	
Ingress protection **)	IP 64 in accordance with EN 60529, as amended	IP 67 accoin accordance with EN 60529, as amended
Resistance to pressure (applied on the stem with the medium)	without a thermowell PN 25	
Time response	τ0.5 < 5 s (0.2 m.s-1 in running water)	

### TR 141A, TR 141E series

Measuring range *)	1-Wire: -50 to 400 °C	TSic 206 and 306: -30 to 100 °C TSic 506 and 716: -10 to 60 °C
Case dimensions	cuboid-shaped, 12 x 8 mm	
Case length	40 to 60 mm	
Case material	stainless steel DIN 1.4301 or Al (Duralumin) alloy	
Ingress protection **)	IP 50 to IP 67 in accordance with EN 60529, as amended	
Time response (on smooth surface without paste)	stainless stee DIN 1.4301 I τ0.5 ≤ 10 s; Duralumin τ0.5 ≤ 8 s	

### TR 050A series

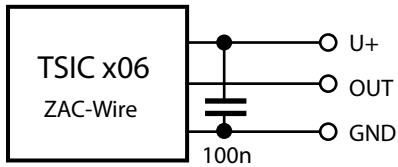
Measuring range *)	1-Wire: -50 to 400 °C	
Diameter of the case	6.0 ± 0.1 mm	
Case length	40 to 200 mm	
Case material	stainless steel DIN 1.4301	
Ingress protection **)	IP 50 in accordance with EN 60529, as amended	
Response time	τ0.5 < 20 s (0.2 m.s-1 in running water)	

\* Measuring range may be limited according to the type of the supply cable used

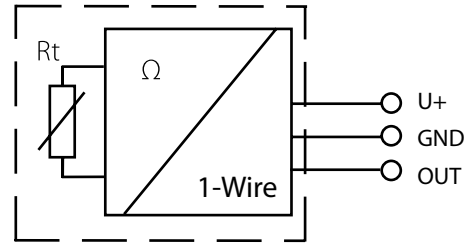
\*\* Ingress protection may be adjusted according to the type of the cable used

## WIRING DIAGRAM

TSiC sensors / ZAC Wire communication

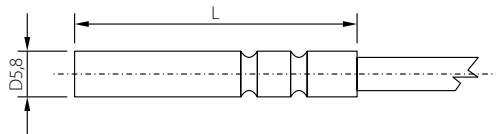


Pt 1000 sensor / 1-Wire communication

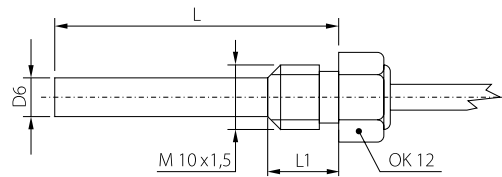


## DIMENSIONAL DRAFT

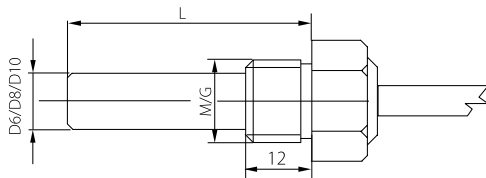
TG 8, TG 8J



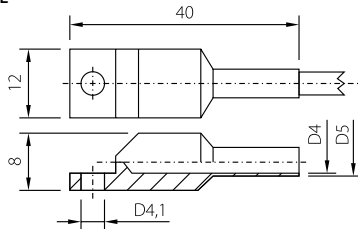
TG 2



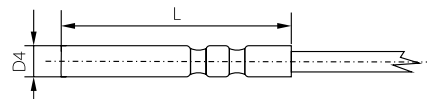
TR 011



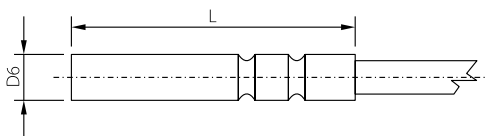
TR 141A, TR 141E



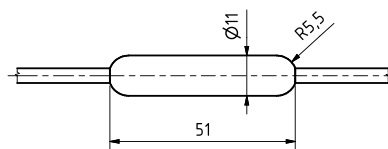
TR 024, TR 024A



TR 050A



Converter Pt 1000/1-Wire



## MODIFICATION AND CUSTOMIZATION

- change of a sensor standard length and/or case material
- change of a version and a cable design type
- change of a case design according to specific requirements

