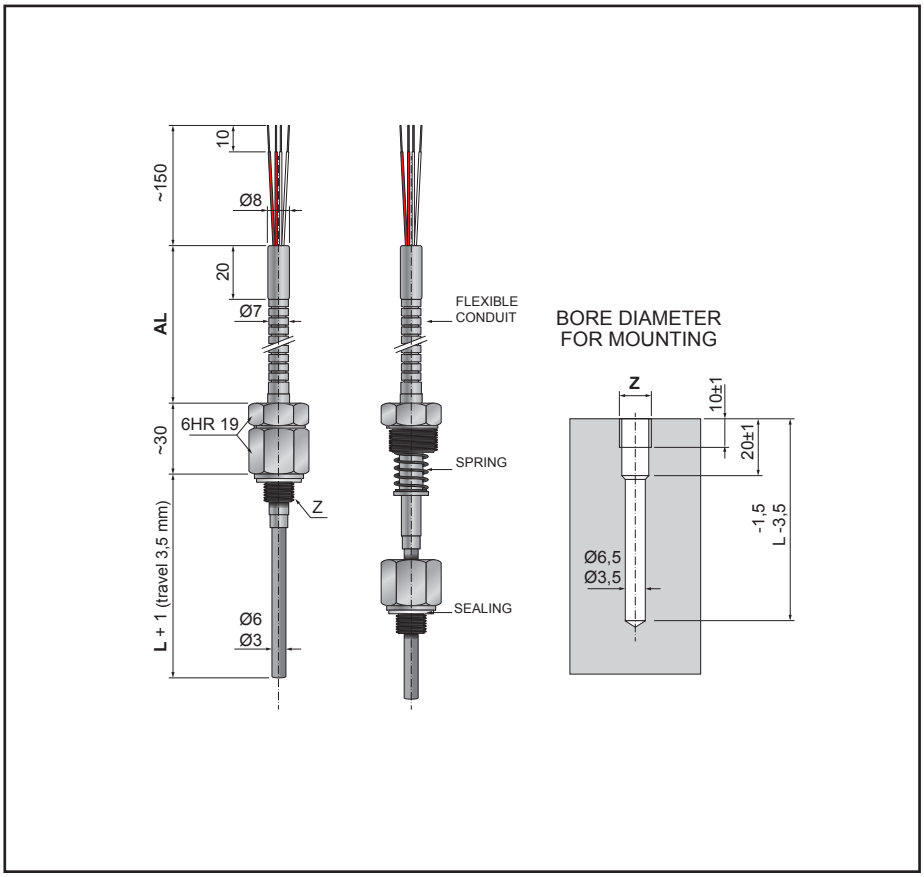
MANUAL

T1061, T1561

Temperature Sensors for Plastic Industry and Bearings with Flexible Steel Conduit



- **Measuring resistor 1x / 2x Pt100, thermocouple 1x / 2x "J", "K"**
- **Measuring range -50 to +400 °C**
- **Accuracy class A, B according to EN 60751, 1, 2 according to EN 60584-1**
- **Suspended measuring stem**
- **Full stainless steel design including flexible conduit**
- **Optional diameter of measuring end**
- **Optional length of protective tube**
- **Housing IP 67 (sensor), IP 40 (flexible stainless steel conduit)**

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Contents

1. General instructions and information

1.1 Symbols used

Symbol of warning; for safe use it is necessary to proceed according to the instructions

This product does not belong to public waste and it is subjected to separate collection

1.2 Safety warnings and cautions

The equipment may be installed only by a qualified personnel who are familiar with national and international laws, directives, standards and with the instructions manual. The equipment shall be supplied from a safe voltage source that meets all requirements of the standard EN 61010-1 and must be-installed in compliance with national requirements and standards providing safety.
The instrument may not be used for other purposes than as specified in this instruction manual. For elimination of a risk of injury from electric shock or fire, the maximum operational parameters of the instrument may not be exceeded.

1.3 Scope of delivery

With the product is delivered:

- Manual for installation, operation and maintenance
- Certificate of calibration (only with calibrated sensors)

1.4 Description of the delivery and packing

The product is packaged in a protective cover and provided with an identification label with a mark of the output control.
The product must not be exposed to direct rain, vibrations and shocks during transport.

1.5 Storage

The product shall be stored at temperatures from +5 to +35 °C and maximum relative humidity 80 % in the rooms with elimination of condensation of water vapours on the products. The stored products shall not be exposed to any shocks, vibrations and effects of harmful vapours and gases.

1.6 Installation and commissioning

During installation, commissioning, operation and maintenance follow the instructions in chapter 4.

1.7 Spare parts

Any of the compact parts of the product can be also ordered as a spare part if there are not required special procedures or technological operations for the exchange.

1.8 Repairs

Products are repaired by the manufacturer. The products for repair should be sent in a packing that guarantees damping of shocks and vibrations and protects against damage during transport.

1.9 Warranty

Products are covered by a warranty for a period of 24 months from the delivery date on the delivery note. The manufacturer guarantees technical and operational parameters of the products within scope of the applicable documentation. Warranty period is specified with individual items and begins from the day of takeover of the goods by the purchaser or delivery to the carrier. Any claims concerning to defects of the goods together can be filed in writing with the manufacturer within the warranty period and the claimed product shall be presented. The claiming party shall give identification of the product, number of the delivery note and description of the fault or defect.
The manufacturer is not responsible for any defects caused by improper storage, incorrect connection, damages caused by external effects, in particular by effects of factors with excessive values, unqualified installation, improper operation or common wearing.

2. End of service and disposal

2.1 End of service

Before removing and ending of service of the sensor is at first necessary to switch the control loop to manual operation, or take other appropriate action to prevent potential harm associated with the end of sensor operation. Connected power supply is switched off and connecting wires of the sensor are disconnected (cut off).

2.2 Disposal

The products do not contain any environmentally hazardous parts. When disposing the packing and destroyed or irreparably damaged product proceed according to the local regulations.

3. Product description

T1061, T1561
Temperature Sensors for Plastic Industry and Bearings with Flexible Steel Conduit

- **Measuring resistor 1x / 2x Pt100, thermocouple 1x / 2x “J“, “K“**
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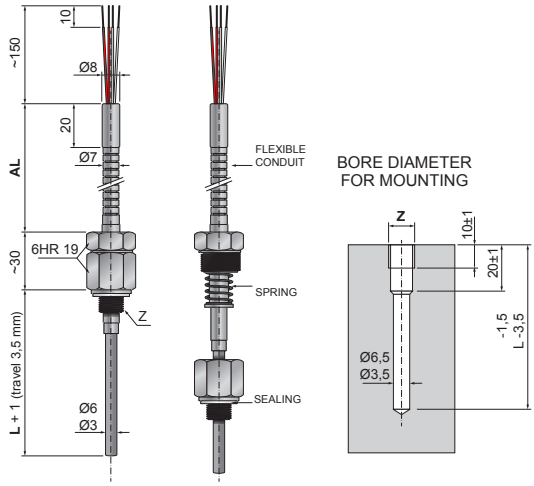
- **Housing IP 67 (sensor), IP 40 (flexible stainless steel conduit)**



3.1 Application

Resistance and thermocouple temperature sensors T1061 and T1561 are designed for temperature measurement in solid materials where a hole and inner screw-thread for sensor installation can be drilled. It is primarily plastics forms, bearing houses, engine units etc. Stainless steel flexible conduit allows using sensor in harsh environment, where standard connecting cable would fail.

3.2 Description

The sensor is composed of screw coupling, suspended measuring stem and extension or compensation cable embedded in metal protective conduit. The sensor can have single or double resistance sensor Pt100 or single or double thermocouple sensor type “J“ or “K“.
The sensor is to be mounted to the screw bore with diameters according to selected sensor version. Measuring stem of the sensor is suspended with suspension travel of 3.5 mm. This allows additional tolerance during making of a bore and sufficient downforce of the measuring stem to the bore bottom. All outer parts of the sensor are made of stainless steel.

4. Installation, operation and maintenance

4.1 Installation and commissioning

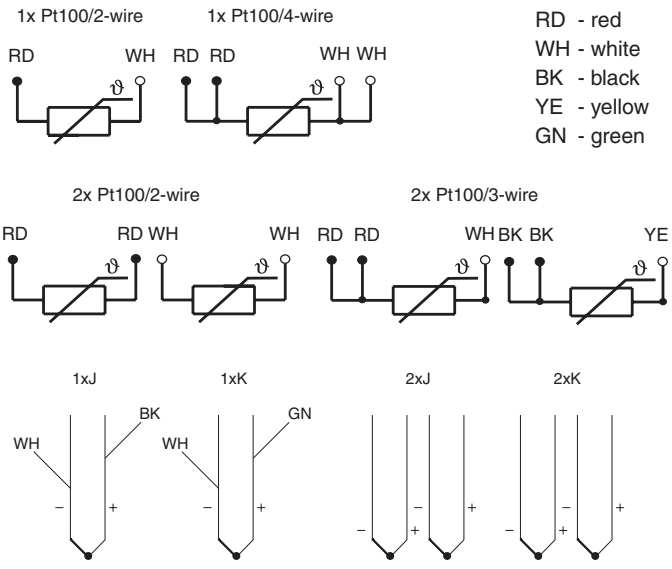
4.1.1 General

Sensor is fixed to the technology by screw coupling with standard thread M12, M20x1.5 or 1/4“ NPT.

4.1.2 Commissioning

Resistance temperature sensor is ready for operation after connection of connection wires between the sensor terminals and terminals of the associated apparatus and after powering on voltage supply. Thermocouple temperature sensor is ready for operation after connecting the compensation (extension) wires to the terminals of the associated apparatus (transmitter, thermostat of comparative connections, devices with internal compensation, etc.).

4.1.3 Electrical connection



4.2 Operation and maintenance

The product does not need any maintenance.
It is recommended to check the mounting of the sensor at preselected intervals.
To ensure metrological parameters of the sensors, periodic checks of calibration parameters must be performed. Period of calibrations is set by the user and it is based on operating conditions and internal metrology regulations. Manufacturer’s recommended period is 12 months. If there is during the calibration found calibration difference from the expected metrological parameters, it is necessary to replace the sensor.

5. Product specifications

5.1 Technical specifications

Measuring resistor (RTD):

1xPt100, accuracy class B according to EN 60751
two-wire inside wiring
1xPt100, accuracy class A, B according to EN 60751
four-wire inside wiring
2xPt100, accuracy class A, B according to EN 60751
three-wire inside wiring
2xPt100, accuracy class B according to EN 60751
two-wire inside wiring

Thermocouple (TC):

"J" (Fe-CuNi), accuracy class 1, 2 acc. to EN 60584-1
"K" (NiCr-NiAl), accuracy class 1, 2 acc. to EN 60584-1

Measuring range:

-50 to +400 °C
-30 to +300 °C (resistance sensor, accuracy class A)

Measuring current (resistance sensor):

recommended 0.3 to 1.0 mA
maximal 3 mA

Dielectric strength:

500 V eff_{ef}
250 V eff_{ef} (outer stem diameter 3 mm / four-wire)

Materials:

resistance sensor sheath
stainless steel 1.4401 (AISI 316)
stainless steel 1.4541 (AISI 321)
(for stem diameter 6 mm)
thermocouple sensor sheath
stainless steel 1.4541 (AISI 321)
(for *thermocouple* "J")
slitina Inconel 600 (2.4816)
(for *thermocouple* "K")
flexible steel conduit
stainless steel 1.4006 (AISI 410)

Connecting and compensation wires:

wiring diameter 0.22 mm^2
silicone isolation

Connection thread:

M12
M20x1.5
1/4" NPT

Housing (according to EN 60529):

IP 67 (temperature sensor)
IP 40 (flexible stainless steel conduit)

5.2 Operational conditions

Maximal temperature of screw couplings:

120 °C

5.3 Metrological parameters

Temperature sensors T1061 and T1561 can be supplied:
- as sensors with calibration,
- as sensors without calibration.

Tolerance limits of accuracy classes are listed in EN 60751 for RTD and EN 60584-1 for TC. The initial tolerance is related to the initial calibration of the sensor. Drift of the sensor meets the requirements of EN 60751, Sec. 6.5.3. To ensure accuracy of measurement, it is necessary to calibrate sensors periodically according to the operating parameters. Sensors can be supplied with calibration at several temperature points, according to customer requirements.

6. Ordering information

6.1 Ordering table

Type	Description		
T1061	Resistance temperature sensor for plastic industry and bearings with flexible steel conduit		
T1561	Thermocouple temperature sensor for plastic industry and bearings with flexible steel conduit		
Code	**Temperature sensor**	**Inside wiring material**	
	Resistance (RTD)		
04	1xPt100, two-wire	Cu	
06	1xPt100, four-wire	Ni	
07	2xPt100, three-wire	Ni	- only for code D105
08	2xPt100, two-wire	Cu	
	Thermocouple (TC)		
21	1x"J" (Fe-CuNi), insulated		
61	2x"J" (Fe-CuNi), insulated, isolated junctions		
22	1x"K" (NiCr-NiAl), insulated		
62	2x"K" (NiCr-NiAl), insulated, isolated junctions		
…U	Grounded version of junction TC		
99	Other		
Code	**Accuracy class**	**Measuring range** [1)]	
	Resistance (RTD) according to EN 60751		
F1	B	-50 to +400 °C	
F4	A	-30 to +300 °C	
	Thermocouple (TC) according to EN 60584-1		
T7	2	-50 to +400 °C	
T6	1	-50 to +400 °C	
	Stem		
Code	**Outer diameter of stem D [mm]**		
S51	3		
S71	6		
Code	**Nominal immersion length L [mm]**		
L063	63		
L080	80		
L100	100		
L120	120		
L160	160		
L....	Other - please fill length in mm		
Code	**Connecting thread Z**		
M12	M12 outer		
M20	M20x1.5 outer		
NPT1/4	1/4" NPT outer		
M99	Other		
	Protective conduit		
Code	**Outer conduit diameter [mm]**	**Conduit material**	
D070	7	SS410	
D105	10.5	SS410	
D999	Other		
Code	**Conduit length AL [mm]**		
AL1000	1000		
AL2500	2500		
AL4000	4000		
AL6300	6300		
AL....	Other - please fill length in mm, step 100 mm		
Code	**Version of cable insulation**		
I2	Teflon		
I9	Other		
Code	**Cable termination**		
00	Flying leads (standard)		
01	Insulated pressing tube according to DIN 46228		
09	Other		
	OPTIONAL ACCESSORIES		
Code	**Calibration in customer defined points, including certificate of calibration**		
KTE31A	Resistance temperature sensor calibration in three points in range -40 to +400 °C		
KTE41A	Resistance temperature sensor calibration in four points in range -40 to +400 °C		
KTE51A	Resistance temperature sensor calibration in five points in range -40 to +400 °C		
KTE32AA	Thermocouple temperature sensor calibration in three points in range -40 to +400 °C		
KTE42AA	Thermocouple temperature sensor calibration in four points in range -40 to +400 °C		
KTE52AA	Thermocouple temperature sensor calibration in five points in range -40 to +400 °C		
KTE9	Other		
Example of order: T1561 21 T7 S71 L100 M12 AL4000 I2 01 KTE32AA (0, 50, 100 °C)			

[1)] … Temperature of screw couplings constantly max. 120 °C

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