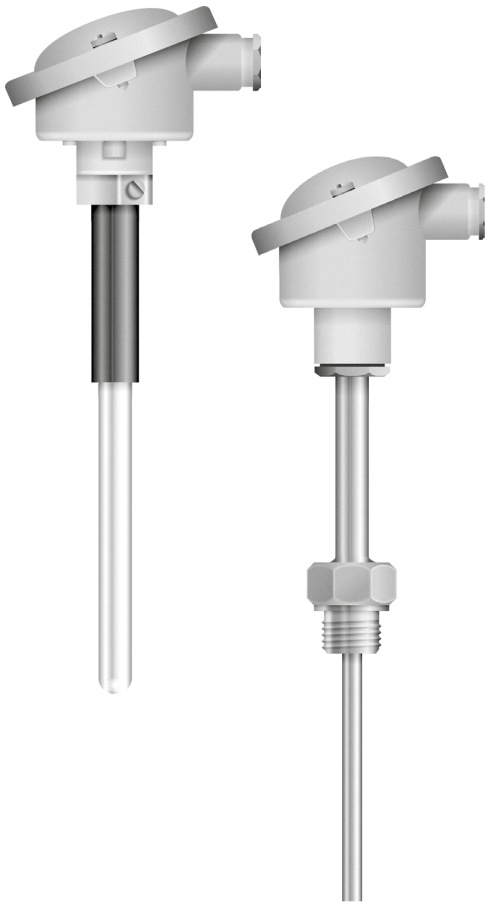
# TE-01

## Insertion-Thermocouple



## Features

/ Temperatures up to 1600°C

/ Head-mounted measuring transmitter

/ Wide range of thread variants

/ Insertion length as per customer specification

## Description:

In thermocouples, the temperature dependence of the electrical voltage between two wires of different materials is utilized to which a setpoint of the temperature to be measured and to which another point of a fixed reference temperature are subjected. In the TE-01 the welded ends of both wires being used are embedded in a metallic or ceramic protection tube which are insulated from each other. The reference point is situated in the connecting head of the device. When the temperature of the measuring point at the tip of the protection tube changes in relation to the reference temperature, a thermal voltage occurs which is proportional to the change in the temperature and the same can be tapped at the connecting head. For foolproof and accurate functioning of the thermoelements, the reference temperature must be constant and 0°C. In case of values like 20. . .50°C, the resulting errors can be balanced by generating a compensation voltage or by taking the ratios in the evaluating software outputs into consideration. However, if the TE-01 is used with a head-mounted measuring transmitter which is capable of converting the thermal voltage directly into a 4. . .20 mA current signal, the compensation will be generated internally and hence minimizes the measuring errors.

## Application:

Thermoelements are used in the industry wherever conventional resistance thermometers reach their limitations. This is the case, mostly, if the media temperatures are too high or if space constraints exist. For operating the TE-01, the user has a choice of three mostly used elements (Type J, Type K and Type S) depending on the required working temperature and the extent of the resulting thermal voltage. Normally, only elements belonging to Class 1 are used which ensures the maximum accuracy. Depending on the media temperature and media properties protection tubes made of stainless steel or ceramic can be supplied. A wide range of connection variants offer maximum possible compatibility with the process. Insertion lengths and shaft diameters can be implemented directly according to customer specifications so that the TE-01 can be customized to any point of measurement.

# Versions:

## TE-01 Thermocouples in Protection Tube

**Protection tube:** For temperatures up to 800°C protection tubes made of stainless steel can be used. For higher temperatures, we recommend ceramic protection tubes with a metallic support tube that is capable of managing temperatures up to 1600°C.

**Process connection:** The versions with a metallic protection tube can be supplied with a variety of connecting thread types or with a smooth shaft. Linking to the process can be, for example, by means of a screw in bushing or compression fitting. In the case of variants with ceramic protection tube, the materials like C610 and C799 are available which can be supplied with 15 mm or 24 mm diameters. In this case, the process connection is on the metallic support tube over a stopper flange or a screw in bushing with compression fitting.

**Output:** Depending on the temperature range and the required thermal voltage, thermoelements of Types J (Fe-CuNi up to 750°C), K (NiCr-Ni up to 1200°C) or S (Pt10Rh-Pt up to 1600°C) are mounted. Other DIN types can be supplied on request. In the versions with integrated head-mounted measuring transmitter the resulting thermal voltage is converted directly into a 4 to 20 mA current signal in 2-wire system.

**Insertion length:** The insertion length is the length of the shaft from the sealing surface and is manufactured as per the customer specifications.

**Shaft diameter:** In the case of stainless steel protection tubes the diameters can be selected from 6 mm, 9 mm, 11 mm and 15 mm depending on the conditions of available space. In the case of ceramic protection tubes only 15 mm or 24 mm are used.

**Connecting head:** Six different connecting heads as per DIN are available. Please refer to "Drawings for connecting heads". For versions with integrated head measuring transmitters, we're using head form B by standard. The connecting head BUZ-H is optional.

# Ordering Codes:

| Order number | TE-01. | 1. | 2. | 1. | []. | 3. | 2. | []. | [] |
|---|---|---|---|---|---|---|---|---|---|

**TE-01 Insertion Thermocouple**

**Protection tube /**
1 = screw in version with stainless steel protection tube (up to 800°C)
2 = version with ceramic protection tube (up to 1600°C)

**Process connection /**
1 = smooth shaft (for version TE-01.1)
2 = G½" (for version TE-01.1)
3 = G¾" (for version TE-01.1)
4 = G1" (for version TE-01.1)
5 = NPT½" (for version TE-01.1)
6 = NPT¾" (for version TE-01.1)
7 = M18 x 1.5 (for version TE-01.1)
8 = M20 x 1.5 (for version TE-01.1)
9 = M27 x 2 (for version TE-01.1)
10 = Protection tube 15x2 of C610 capable up to 1500°C (for version TE-01.2), support tube 200 mm 22x2
11 = Protection tube 15x2 of C799 capable up to 1600°C (for version TE-01.2), support tube 200 mm 22x2
12 = Protection tube 24x2.5 of C610 capable up to 1500°C (for version TE-01.2), support tube 200 mm 32x2
13 = Protection tube 24x2.5 of C799 capable up to 1600°C (for version TE-01.2), Support tube 200 mm 32x2

**Output /**
1 = Type J (Fe-CuNi) as per DIN IEC 584 (up to 750 °C)
2 = Type K (NiCr-Ni) as per DIN IEC 584 (up to 1200 °C)
3 = Type S (Pt10Rh-Pt) as per DIN IEC 584 (up to 1600 °C)
4 = Type J (Fe-CuNi) with head-mounted transmitter
5 = Type K (NiCr-Ni) with head-mounted transmitter
6 = Type S (Pt10Rh-Pt) with head-mounted transmitter

**Insertion length /**
□□□□ Shaft length from sealing surface in mm

**Shaft diameter of stainless steel protection tube /**
1 = 6 mm
2 = 9 mm
3 = 11 mm
4 = 15 mm
5 = Ceramic protection tube

**Connecting head /**
1 = Form A (standard for ceramic protection tube)
2 = Form B (standard for stainless steel protection tube)
3 = Form BUZ (DAN)
4 = Form BUZ-H (DANW) (standard for head-mounted transmitter)
5 = Form BEG
6 = Form GG

**Temperature range /**
□□□□ Initial value

**Temperature range /**
□□□□ End value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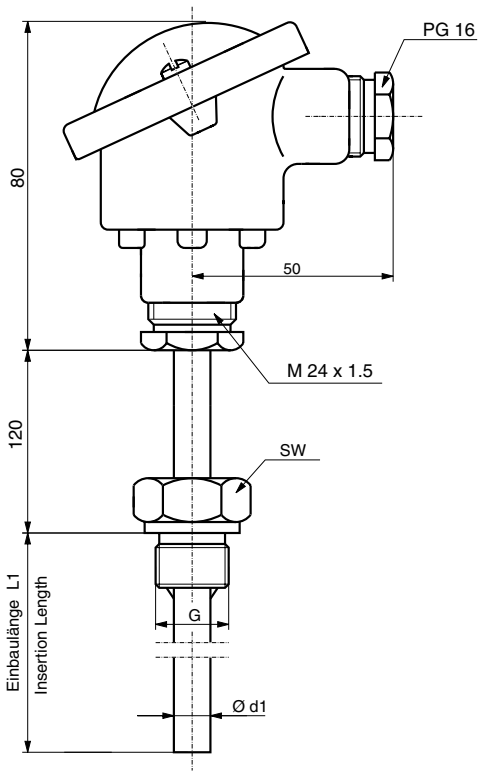
# Technical Specifications:

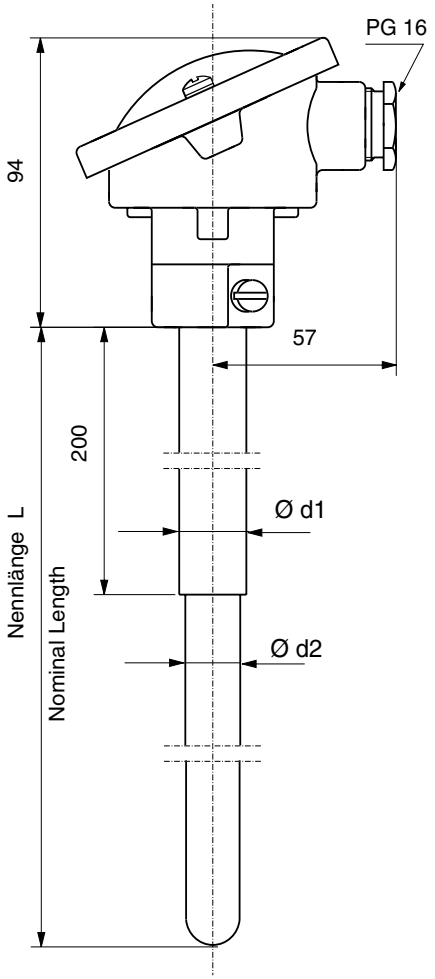
| | |
|---|---|
| **Pressure /** | max. 6 bar for stainless steel protection tube (insertion into high-pressure protection tubes possible) pressureless for ceramic protection tube |
| **Temperature /** | max. 70°C at the connecting head for head-mounted transmitter |
| **Neck tube /** | 120 mm (standard) |
| **Temp. range /** | up to 1600°C |
| **Material /** | Measuring unit:<br><600 °C: st. steel 1.4571<br>>600 °C: Inconel 600 2.4816<br><br>Protection tube:<br><600 °C: st. steel 1.4571<br>>600 °C: st. steel 1.4749 |
| **Accuracy /** | Class 1 as per DIN IEC 584 |
| **El. Connection /** | ceramic connection terminal in connection head |
| **Process Connection /** | stopper flange, welded or screw in bushing |

# Electrical Specifications:

| | |
|---|---|
| **Supply voltage /** | 24 VDC (for head transmitter) |
| **Output /** | Typ J, Typ K, Typ S or 4. . .20 mA |
| **Protection class /** | IP65 |

# Dimensions in mm:

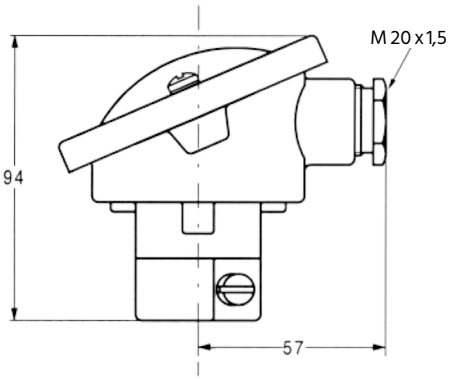


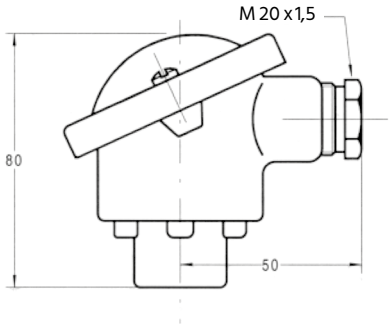

| ø d2/ceramic | ø d1/tube |
|---|---|
| 15 mm | 22 mm |
| 24 mm | 32 mm |

# Connecting Heads for Insertion-Thermocouples:

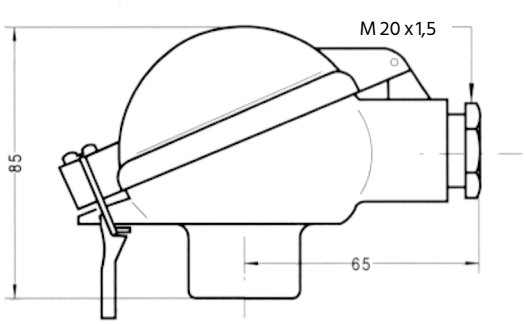
**Form A** – cover with 2 fastening screws
Material: aluminium pressure casting



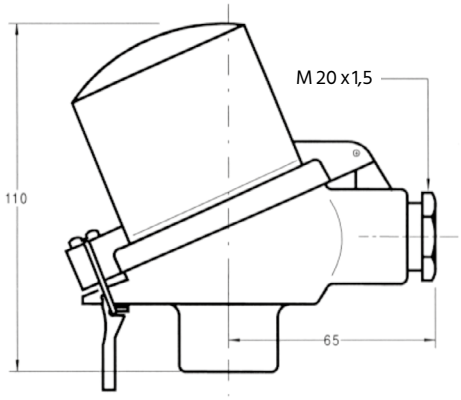

**Form B** – cover with 2 fastening screws
Material: aluminium pressure casting



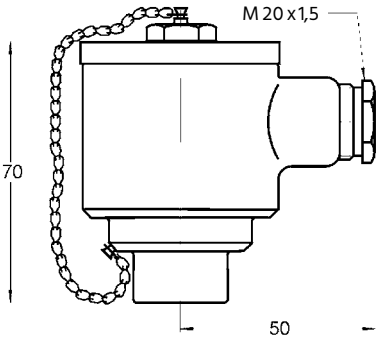

**Form BUZ (DAN)** – flap cover with bracket
Material: aluminium pressure casting



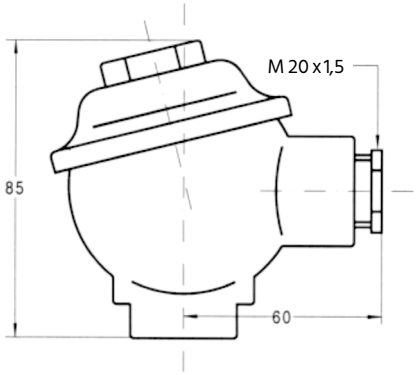

**Form BUZ-H (DANW)** – high flap cover with bracket Material: aluminium pressure casting




**Form BEG** – screw cap with chain
Material: stainless steel 1.4571




**Form GG** – cover with screw closure
Material: steel/cast iron





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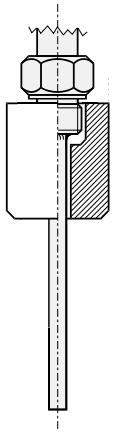
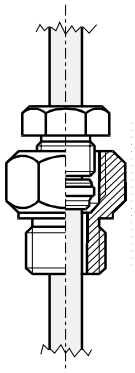
# Possibilities of Installation for Insertion-Thermocouples:

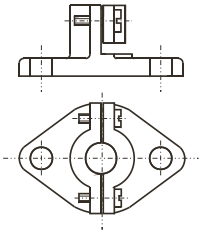
**welded bushing for male thread**



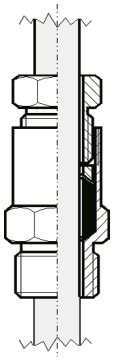
**compression fitting for screwing in for smooth shaft**



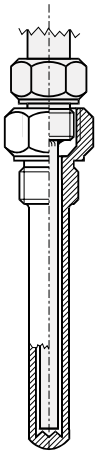
**stopper flange for ceramic protection tube**



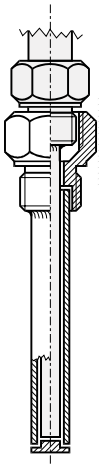
**screw in bushing for ceramic protection tube**



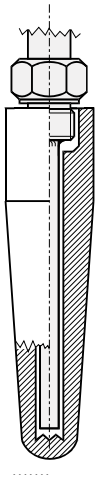
**screw in protection tube for male thread, one-piece**



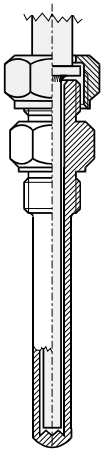
**screw in protection tube for male thread, multi-piece**



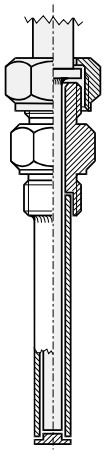
**weld in protection tube for male thread**



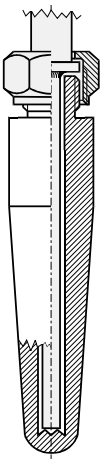
**screw in protection tube for swivel nut, one-piece**



**screw in protection tube for swivel nut, multi-piece**



**weld in protection tube for swivel nut**



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