

# Mineral Insulated Thermocouple model 0

## MTE "blank" with free ends model 0

### In general

Reckmann GmbH temperature sensors (R58®) are used exclusively for measuring process temperatures in solid, liquid or gaseous media. This design with bendable sheath material makes it possible to measure the temperature even in places that are difficult to access. This sensor is the "blank" for further designs.

#### Range of application:

Blank for further designs in different areas of application.

**For installation-specific data, see installation instructions for mineral-insulated thermocouples,**

**Type code 1R9-E0.**

### Technical datas

- **Measuring unit** (fig. 1/5) according or similar to DIN 43735 without terminal base, with sleeve (fig. 1/4) and connecting cable (fig. 1/2).
- **Sensor** depended on use:
  - with 1 or 2 thermocouples according to IEC / EN 60584-1.
  - Operating temperature MIT (fig. 1/5) depended on the thermocouple type and diameter:
    - Type J:** Ø 0,5 and 1,0 mm up to 260°C, Ø 1,5 and 2,0 mm up to 440°C, Ø 3,0 mm up to 520°C, Ø 4,5 up to 620°C, 6,0 und 8,0 mm up to 720°C.
    - Type K:** Ø 0,15 mm up to 400°C, Ø 0,25 and 0,35 mm up to 500°C, Ø 0,5 and 1,0 mm up to 700°C, Ø 1,5 and 2,0 mm up to 920°C, Ø 3,0 mm up to 1070°C, Ø 4,5; 6,0 and 8,0 mm up to 1100°C.
    - Type N:** Ø 0,25 and 0,35 mm up to 500°C, Ø 0,5 and 1,0 mm up to 700°C, Ø 1,5 and 2,0 mm bis 920°C, Ø 3,0 mm bis 1070°C, Ø 4,5; 6,0 and 8,0 mm up to 1100°C.
    - Type E:** Ø 1,5 and 2,0 mm up to 510°C, Ø 3,0 mm up to 650°C, Ø 4,5 up to 730°C, 6,0 und 8,0 mm up to 820°C.
    - Type T:** Ø 1,5 and 2,0 mm up to 260°C, Ø 3,0 mm up to 315°C, Ø 4,5 / 6,0 and 8,0 mm up to 350°C.
    - Typ S/R:** Ø 1,5 mm, Ø 3,0 and 6,0 mm up to 1300°C.
- **Sheath material** type according to IEC / EN 61515.
  - Standard - material 2.4816, 1.4541 or Pt10%Rh depended on process temperature,
  - On request:** material 1.4404, 1.4435, 1.4571, 1.4841, 1.4845, 1.4846, Pyrosil®, Microbell®, Nimonic® 75, Omegaglad®, Inconel® 600.
  - diameter** 0,15 / 0,25 / 0,32 / 0,35 / 0,5 / 2,0 / 4,0 / 4,5 / 5,0 / 5,5 / 8,0 / 10,8 mm.  
preference diameter 0,5 / 1,0 / 1,5 / 3 or 6 mm.
- **Process connection** with 20 mm free ends, other on request

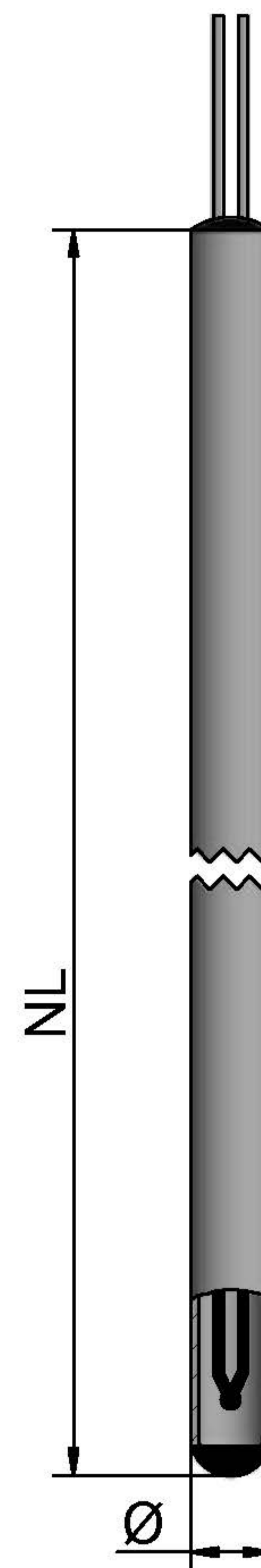


fig. 1

## Deviations according to the sensor type

### Thermocouples

table 1

Thermocouple type	Permitted deviations <sup>1)</sup> (±°C) and the validity for the temperature		
	class 1	class 2	class 3 <sup>2)</sup>
<b>by Type T</b>	0,5 °C oder 0,004 x  t	1 °C oder 0,0075 x  t	1 °C oder 0,015 x  t
<b>Type T</b>	-40 °C bis +350 °C	-40 °C bis +350 °C	-200 °C bis +40 °C
<b>bei Typ E,J,K,N</b>	1,5 °C oder 0,004 x  t	2,5 °C oder 0,0075 x  t	2,5 °C oder 0,015 x  t
<b>Type E</b>	-40 °C bis +800 °C	-40 °C bis +900 °C	-200 °C bis +40 °C
<b>Type J</b>	-40 °C bis +750 °C	-40 °C bis +750 °C	/
<b>Type K</b>	-40 °C bis +1000 °C	-40 °C bis +1200 °C	-200 °C bis +40 °C
<b>Type N</b>	-40 °C bis +1000 °C	-40 °C bis +1200 °C	-200 °C bis +40 °C
<b>by Typ R oder S</b>	1 °C für t < 1100 °C [1 + 0,003 x (t - 1100)] für t > 1100 °C	1,5 °C oder 0,0025 x  t	4 °C oder 0,005 x  t
<b>by Type B</b>	/	0,01 x  t	/
<b>Type B</b>	/	600 °C bis 1700 °C	600 °C bis 1700 °C

1) The deviation limit is either given as the difference in °C or as a function of temperature (°C from IST-90) according to the above mentioned table. For each the greater value is valid.  
2) The normally available material for thermocouples keeps the limit deviation according to Table 1 for temperatures above -40°C. At low temperatures, these materials do not necessarily meet the class 3 limit deviations. If thermocouples of types T, E, K and N are required, which comply with both the class 3 and class 1 or 2 limit deviations, this must be specified by the user because therefore a special selection of the available material is usually necessary.

Source: Technical dates from IEC / EN 60584-1:2014-07 chapter 5

## Simple function test

### "Quick test" at room temperature:

- When heating the measuring tip of the MTE, the mV - voltage at the free ends slowly increases according to the thermocouple voltage. The standardised thermoelectric voltage (according to DIN EN 60584-1) at 20 °C is: Type J 1.019 mV, Type T 0.790 mV, Type E 1.192 mV, Type K 0.798 mV, Type N 0.525 mV, Type S 0.113 mV, and for Type R 0.111 mV.
- The insulation resistance of a sheathed cable depends not only on the insulating powder used but also on the cable length and is therefore specified as length-related resistance in Ω x m for an MTE length ≥ 1 m. The minimum insulation resistance for MTE's ≥ 1 m is 1000 MΩ x m at room temperature, i.e. the amount of the insulation resistance actually measured (e.g. 15 MΩ) multiplied by the length of the line (e.g. 100 m) must be greater than 1000 (MΩ x m).
- Useful tip if colour coding is no longer available:  
Fe-CuNi => plus wire is magnetic  
Cu-CuNi => positive wire is copper-coloured  
NiCr-Ni => minus wire  
PtRh-Pt => minus wire is softer