



GÜNTHER

ATEX

Assembly and operating instructions



Product group RE4 - TE5

Ex e - Increased safety

Ex t - Protection by enclosure

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1. General remarks

1.1 Introduction

This manual contains basic and essential instructions for the installation, operation and maintenance of the RE4 to RE5 series resistance thermometers and TE4 to TE5 series thermocouples.

- The document should be read thoroughly before installation and commissioning of the equipment by the installer, as well as by the personnel responsible for the unit.
- These operating instructions must be available and accessible at the site at all times.
- It must also be ensured that the temperature sensors are operated exclusively in the undamaged and clean condition.

The following sections contain important safety instructions, whose non-observance may lead to risks for humans and animals, things and objects.

1.2 Staff qualifications

The equipment may be operated only by qualified personnel that has been familiarised with installation, commissioning and operation of this product which was assembled and put into operation.

Qualified persons are those that due to their specialised training, know-how and experience and their knowledge of the relevant standards assess the work assigned to them and recognise possible dangers and hazards.

In the case of explosion-proof equipment, the staff must have appropriate education or training, or authorisation to work on explosion-protected equipment in explosion-hazard areas.

Dangers related to the failure to comply with safety instructions

Failure to comply with these safety instructions, foreseen applications or limiting values provided in the technical data of the unit may lead to dangers and damages of persons, environment or the installation.

In such a case damages claims against GÜNTHER GmbH Temperaturmesstechnik shall be excluded.

1.3 General

Temperature sensors are used to convert temperature at a measuring location into an electrical quantity (voltage, resistance). They are used for the measurement, registration, regulation and limit value monitoring of temperatures in the range from -40 °C to +400 °C (thermocouples from -40 °C to +1000 °C). The resistance thermometers and thermocouples RE0, RE4 to RE5 and the series TE0, TE4 to TE5 are used as equipment with increased safety for temperature measurements in liquid and gaseous media as well as in areas at risk of dust explosion. Various models of the above mentioned series can also be used in areas at risk of dust explosion. The temperature sensors consist of a protective fitting with various process connections, a connection head or connecting cable, and, depending on the type, an exchangeable measuring insert. All fittings (parts in contact with the process environment) are subjected to a leak test.

The resistance thermometers are equipped with Pt 100 temperature sensors compliant with DIN EN 60751 in tolerance classes A or B in two-, three- or four-wire technology. Models with two measuring circuits are also possible.

Thermocouples are optionally equipped with the thermocouples T, J, K, E and N according to DIN EN 60584-1 in tolerance classes 1 or 2 as single or double measuring circuit. They meet the requirements for explosion group II category 2G or 2D. They are therefore suitable for use in hazardous areas of zone 1 for gas or zone 21 for dust.

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1.4 Installation and use

During installation relevant standards must be complied with, e.g. EN 60079-14
“Electrical equipment for potentially explosive atmospheres”.

- Defective temperature sensors must not be used.
- Repairs must be performed only by appropriately authorised persons.
- Repairs may be done only using original spare parts from the original supplier, otherwise the requirements of the approval are not guaranteed.
- If a component of electrical unit which is of vital importance for the protection against explosion has been repaired, the unit may be put into operation again only after an expert has determined that its features vital for explosion protection comply with the requirements.

1.5 Installation and connection instructions

- In principle, the Regulation on the Use of Electrical Installations in Hazardous Areas (BetrSichV) must be observed!
- When connecting the „associated equipment“, the electrical data specified in the type examination certificate must be observed or complied with.
- Ensure that the specified permissible ambient temperature values are not exceeded. When laying a connection cable, it must be ensured that the temperature resistance of the insulation is >100 °C.
Connection cable (max. 1.5 mm²) - insulation must be tightened on the connection base with a torque of 0.55 - 0.6 Nm.
- It must also be ensured that the required degrees of protection (IP rate) are met for the complete temperature sensors. A galvanic connection (grounding) must be ensured by permanent installation of the sensor in the system.

Required for ignition protection type  **II 2 G Ex eb IIC T6...T1 Gb**

Required for ignition protection type  **II 2 D Ex tb IIIC T80°C...T440°C Db** → protection class at least IP6X

2. Electrical and Thermal Characteristics

2.1 Electric limiting characteristics

- Electric strength test:
U = 500 V/AC Measuring circuit/sheath and between measuring circuits for double measuring circuit
- Maximum values: I_N = 2 mA (Nominal current)
U_{max} = 30 V
P_{max} = 102 mW

A current limiter must be provided as overcurrent protection. I_{max} = 1,7x I_N (I_N = Nominal safety current according to IEC 60127)

With these temperature sensors in type of protection Ex e, design measures are taken to prevent impermissibly high temperatures and the occurrence of sparks and arcs during normal operation or under specified exceptional conditions.

For sensors used in dust zones (zone 21), the sensors also meet the requirements „Protection by enclosure“ (tD),
Required protection rate according to EN 60529: IP6x

- Capacity of the connecting wire/cable
The primarily used cross-sections are 0.22 mm² to 1.5 mm².
The following maximum value for the capacitance of the cables is specified here:
 - wire/wire → C_i = 110 pF/m
 - wire/shield → C_i = 340 pF/m
 - Inductivity → L_i = 1µH/m

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2.2 Thermal characteristics

- P_0 can be taken from the name plate of the associated equipment.
- Thermal resistance (power loss) R_{TH} (to determine the self-heating at the sensor surface):
 - Measuring inserts:
 - Sheath- \varnothing 3.0 mm → 165 K/W
 - Sheath- \varnothing 4.5 mm → 110 K/W
 - Sheath- $\varnothing \geq 6.0$ mm → 90 K/W
 - Protection tube:
 - \varnothing 6.0 mm, 8.0 mm and 9.0 mm → 58 K/W
 - \varnothing 10.0 mm, 11.0 mm, 12.0 mm, 15.0 mm and bigger → 22 K/W

The self-heating of thermocouples is negligible.

The table shows the maximum permissible media temperature ($^{\circ}\text{C}$) in relation to the respective power supplied as an example for resistance thermometers of sheath measuring insert \varnothing 3.0 mm

Sheath measurement insert diameter	Temperature class	Max. media temperature T_M at maximum power P_i at sensor	
		$P_i \leq 25$ mW	$P_{i(\max)} \leq 102$ mW
3.0 mm	T1; +450 $^{\circ}\text{C}$	+430.0 $^{\circ}\text{C}$	+423.0 $^{\circ}\text{C}$
	T2; +300 $^{\circ}\text{C}$	+280.0 $^{\circ}\text{C}$	+273.0 $^{\circ}\text{C}$
	T3; +200 $^{\circ}\text{C}$	+190.0 $^{\circ}\text{C}$	+178.0 $^{\circ}\text{C}$
	T4; +135 $^{\circ}\text{C}$	+125.0 $^{\circ}\text{C}$	+113.0 $^{\circ}\text{C}$
	T5; +100 $^{\circ}\text{C}$	+90.0 $^{\circ}\text{C}$	+78.0 $^{\circ}\text{C}$
	T6; +85 $^{\circ}\text{C}$	+75.0 $^{\circ}\text{C}$	+63.0 $^{\circ}\text{C}$

Ambient temperature at the connection head with cable gland: -40 $^{\circ}\text{C}$ to +100 $^{\circ}\text{C}$.

The temperature measuring range can be -40 $^{\circ}\text{C}$ to +400 $^{\circ}\text{C}$ for resistance thermometers and -40 $^{\circ}\text{C}$ to +1000 $^{\circ}\text{C}$ for thermocouples at the measuring tip. Compliance with the indicated temperature class in the Ex area and the permissible operating temperatures must be ensured by the operator by taking suitable measures.

3. Types of protection and coding of individual series

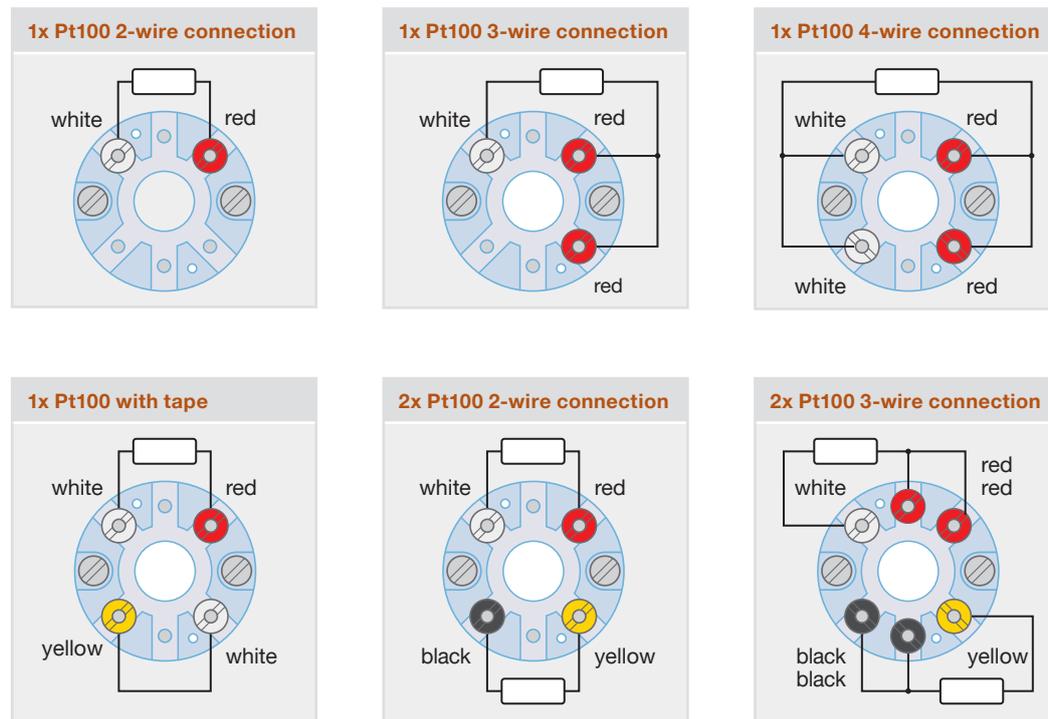
Product group: RE4-TE5 (RE4; TE4; RE5; TE5) (Label)



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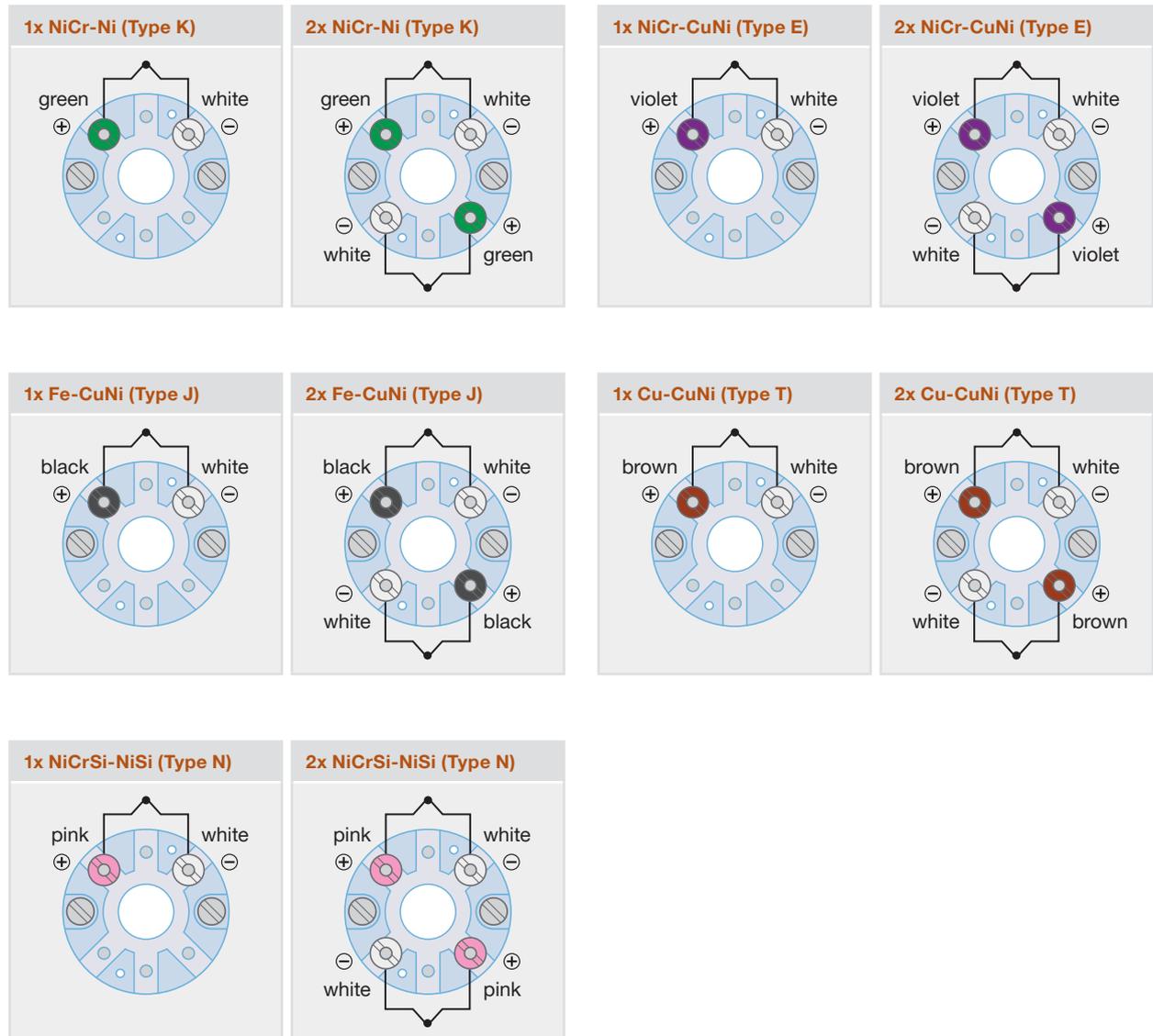
4. Connection options

4.1 Resistance thermometers (Colour coding of connectors)



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4.2 Thermocouples (Color coding of connectors)





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