



Instruction Manual

TEM01

Sheathed temperature probes with cable connection



PKP Prozessmesstechnik GmbH
Borsigstraße 24
D-65205 Wiesbaden-Nordenstadt
Tel.: ++49-(0)6122-7055-0
Fax: ++49-(0)6122-7055-50
Email: info@pkp.de

Safety instructions

General Instructions

To ensure safe operations, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories.

Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions.

Proper Usage

The temperature sensors TEM01 are designed to measure the temperature of liquids or gases which do not attack the device materials.

All other usage is regarded as being improper and outside the scope of the device.

The series TEM01 should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous Substances

For dangerous media such as e.g. Oxygen, acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The TEM01 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Norms

Resistance thermometers generally comply according to DIN IEC 751

Thermocouples generally comply according to DIN IEC 584.

Mounting and Commissioning

- The temperature measuring point should be prepared according to the indications for screw-in holes. For more information, please see of VDE/VDI directive 3511 and 3512 page 3.
- For sealing purposes, please use gaskets according to DIN 7603A.
- The correct torque depends on material and design of the sealing used. It should not exceed 80 Nm.
- The mounting location should be free from strong vibrations.
- The mounting location should be at a characteristic point in the process.
- The TEM01 is designed with exchangeable measuring insert. That means, the measuring element can be replaced during the process, the protective tube remains mounted in the process.
- The active length (the temperature-sensitive part) of a resistance thermometer is max. 30 mm at the lower end of the immersion tube; even a few millimeters for thermocouples. In media with a temperature stratification, so only the temperature is measured at the level of the dip tube end. If you want to measure the average temperature, special designs are required - please inquire.
- The smaller the size of the probe, the faster it will respond to temperature changes. The response speed improves the most by reducing the probe diameter.

Electrical Connection

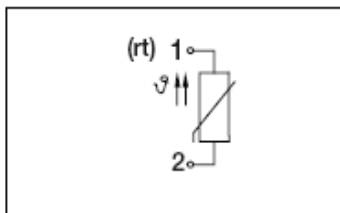
Attention: Before the electrical connection of the device, it must be ensured that the supply voltage matches that required and the supply voltage is switched off.

- Wiring is made via the connectors in the connection head
- The exact wiring details can be taken from the drawings
- The measuring current for resistance thermometers Pt100 is 0,3 -1,0 mA. This may not be exceeded
- For resistance thermometers, we recommend commercial copper-sheathed conductors with a preferably 1,5 mm² cross-section as connection. To avoid magnetic or electrical interference, the use of twisted and shielded conductors is recommended.
- For thermocouples adequate compensation conductors (AGL) should be used. When connection, please consider the polarity. Against magnetic or electrical interference we recommend twisted and shielded compensation conductors.
- When connection the transmitters, the mounting, connection and test regulations for the different versions used are to be observed.

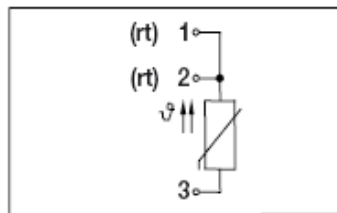
Wiring details for resistance thermometers Pt100

The type of connection has a considerable influence on the measuring accuracy.

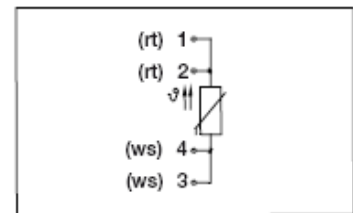
- The **2-wire** circuit, together with a balancing resistor, compensates for a static lead-in resistance. Temperature-related changes of the lead-in resistance are not compensated.
- The **3-wire** circuit compensates the lead-in resistance and its changes with high accuracy. Prerequisite for this kind of connection are three identical connecting leads, preferably three wires of the same line.
- The **4-wire** circuit compensates all errors that can occur due to lead-in resistances.



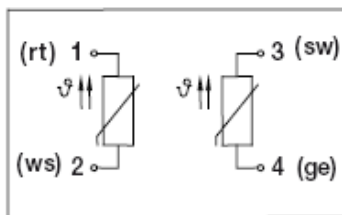
1 x Pt100 / 2-wire



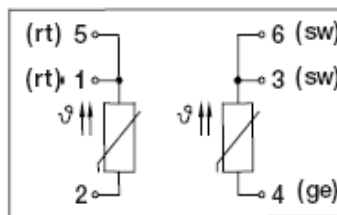
1 x Pt100 / 3-wire



1 x Pt100 / 4-wire



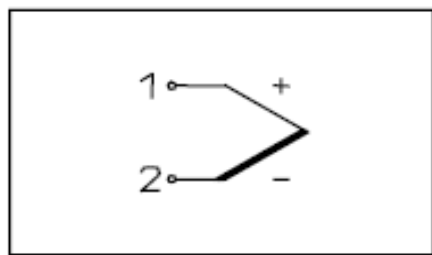
2 x Pt100 / 2-wire



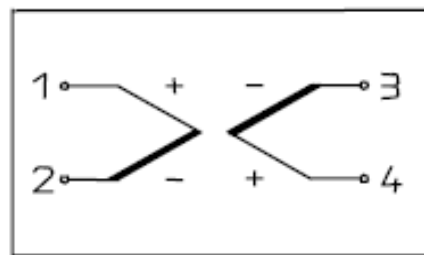
2 x Pt100 / 3-wire

Legende
 rt = red
 ws = white
 sw = black
 ge = yellow

Wiring details for thermocouples



1 x thermocouple



2 x thermocouple

Thermocouples IEC 584-1				
Element	T min	T max	+ connection	- connection
Type K (NiCr-Ni)	-270 °C	1370 °C	green	white
Type J (Fe-CuNi)	-210 °C	760 °C	black	
Type R (Pt13Rh-Pt)	-50 °C	1760 °C	orange	
Type S (Pt10Rh-Pt)	-50 °C	1760 °C	orange	
Thermocouples DIN43710				
Typ L (Fe-CuNi)	-200 °C	900 °C	red	blue

Between 850 and 950 °C type K involves the risk of selective chrome oxidation. If the service temperature is continually fluctuating within this area, we recommend sensor type N.

Maintenance

The resistance thermometers and thermocouples require no maintenance. If incorporates no components which have to be repaired or replaced on the site. Repairs can only be carried out at the factory.

Calibration

We recommend a check interval of 2 years. The period for calibrating the instruments should be determined individually by the user, it depends on how often they are used.

If impermissible deviations (defined by the customer) occur during recalibration, the period of recalibration must be shortened.

TEM01

Temperature Sensor with Cable Connector

- **resistance thermometer (Pt100)
or thermocouple (NiCr-Ni)**
- **to plug in or to screw in**
- **max. temperature: 1200 °C, max. pressure: PN 25**
- **special designs as requested**



Description:

The temperature sensors of the model series TEM01 are provided in a stainless steel or Inconel thermowell. Connection cable and thermowell are firmly connected together. As Measuring sensors resistance thermometers or thermocouples can be chosen. The diameter of the thermowell is between 2 and 6 mm. Apart from the standard lengths, the installation length can be adjusted according to customer requirements.

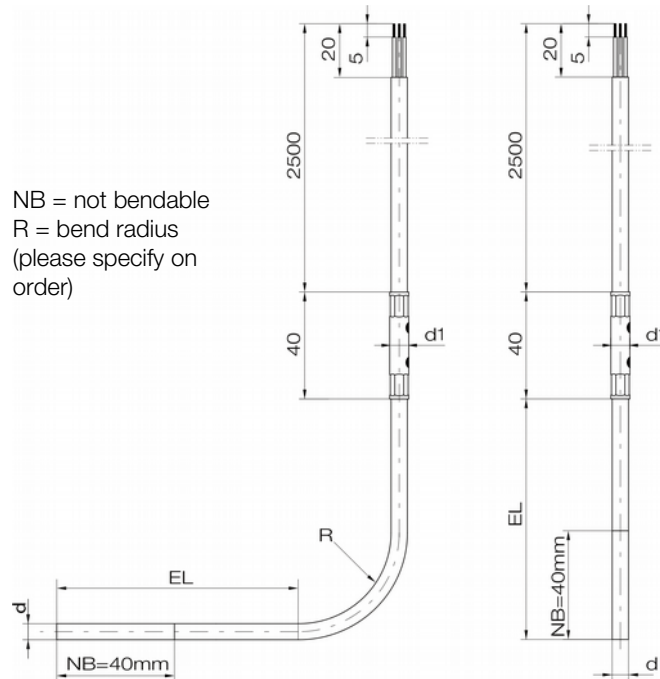
Typical applications:

Temperature sensors of this version are applied in general use, preferred in processes with liquid or gaseous media at low pressure.

Main applications:

- mechanical engineering
- vessels- and pipeline-construction
- heating- and oven- construction

Dimensions:



NB = not bendable
R = bend radius
(please specify on order)

d [mm]	d1 [mm]	installation length EL [mm]
2	6	100
3		200
4,5		300
6	8	400
		500

Technical Data:

Process connection:

Compression fitting: G 1/4 B, G 1/2 B, M10x1
Process pressure: PN 25

Thermowell:

Diameter: 2...6 mm
Material:
Pt100: stainless steel 1.4571
thermocouple K: Inconel 600 (2.4816)
others on request
Smallest bend radius: 5 x diameter

Connection cable:

Standard length: 2.5 m
Material: silicone (standard)
-50 °C...+180 °C
PFTE -190 °C...+260 °C
glass fibre / st. steel mesh
-50 °C...+350 °C

Sensor:

Resistance thermometer: Pt100 acc. to DIN EN 60751,
usable: -199...600 °C
class A: -70...+400 °C
otherwise class B
Thermocouple: type K, NiCr-Ni / insulated
DIN EN 60584,
temp. range: -200...+1200 °C
type J and L on request

Order Code:

Order number: **TEM01. 08V. 6. 0050. S. 1P3. 0**

Temperature sensor
with cable connection

Connection thread:

0 = without
08V = G 1/4 variable
15V = G 1/2 variable
1MV = M10 x1 variable
others on request

Thermowell diameter:

2 = 2 mm
3 = 3 mm
4 = 4,5 mm
6 = 6 mm

Installation length (without screw connect.):

0100 = 100 mm
0200 = 200 mm
0300 = 300 mm
0400 = 400 mm
0500 = 500 mm
xxxx = special request

Connection cable:

S = Silicone, -50...+180 °C
T = PTFE, -190...+260 °C
G = Glass fibre / st. steel mesh -50...+350 °C
other lengths see options

Sensor:

1P3 = 1 x Pt100 / 3-wire
2P3 = 2 x Pt100 / 3-wire
1KA = 1 x NiCr-Ni, thermocouple, type K
2KA = 2 x NiCr-Ni, thermocouple, type K

Options:

0 = without
xx = please specify in plain text (see "Options")

Please specify bend radius at order

Options:

Please specify in plain text:

- longer connection cable
- Anti bend protection spring on the cable output
- other material of thermowell
- other compression fitting