

Resistance thermometer Model TR10-E, for additional thermowell

WIKA data sheet TE 60.05



further approvals
see page 6

Applications

- Chemical industry
- Petrochemical industry
- Offshore
- Machine building, plant and vessel construction
- Energy and power plant technology

Special features

- Application ranges from -200 ... +600 °C
- For many variants of temperature transmitters with displays
- For mounting in all standard thermowell designs
- Spring-loaded measuring insert (not replaceable)
- Explosion-protected versions Ex i, Ex n and NAMUR NE24



Resistance thermometer for additional thermowell,
model TR10-E

Description

Resistance thermometers in this series can be combined with a large number of thermowell designs. Operation without thermowell is only recommended in certain applications.

A wide variety of possible combinations of sensor, connection head, insertion length, neck length, connection to thermowell etc. are available for the thermometers; suitable for any thermowell dimension and any application.

Sensor

The sensor is located in the tip of the measuring insert. This is spring-loaded.

Sensor connection method

- 2-wire The lead resistance is recorded as an error in the measurement.
- 3-wire With a cable length of approx. 30 m or longer, measuring errors can occur.
- 4-wire The internal lead resistance of the connecting wires is negligible.

Sensor tolerance value per DIN EN 60751

- Class B
- Class A
- Class AA

The combinations of a 2-wire connection with class A or class AA are not permissible, since the lead resistance of the measuring insert negates the higher sensor accuracy.

For detailed information on Pt100 sensors, see Technical information IN 00.17 at www.wika.com.

Measuring insert

The measuring insert is made of a vibration-resistant, sheathed, mineral-insulated cable (MI cable). The diameter of the measuring insert should be approx. 1 mm smaller than the bore diameter of the thermowell. Gaps of more than 0.5 mm between thermowell and the measuring insert will have a negative effect on the heat transfer, and they will result in unfavourable response behaviour from the thermometer.

When fitting the measuring insert into a thermowell, it is very important to determine the correct insertion length (= thermowell length for bottom thicknesses of ≤ 5.5 mm). In order to ensure that the measuring insert is firmly pressed down onto the bottom of the thermowell, the insert must be spring-loaded (spring travel: 0 ... 19 mm).

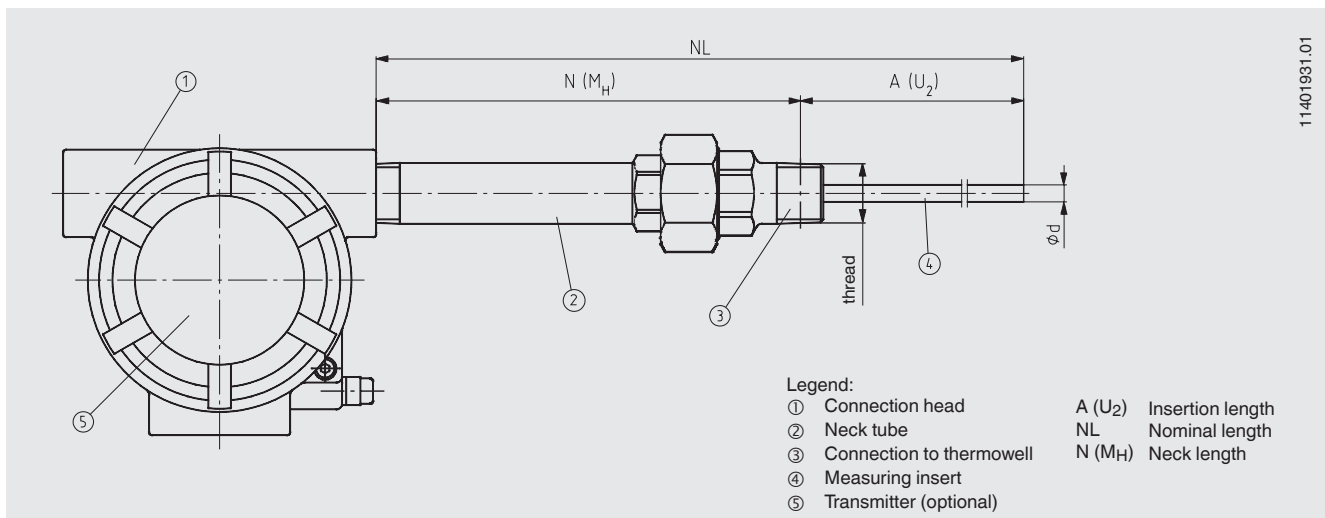
Neck tube

The neck tube is screwed into the connection head or the case. Connection to head: $\frac{1}{2}$ NPT, M20 x 1.5 or M24 x 1.5

The neck length depends on the intended use. Usually an isolation is bridged by the neck tube. Also, in many cases, the neck tube serves as a cooling extension between the connection head and the medium, in order to protect any possible built-in transmitter from high medium temperatures.

The standard material for neck tubes is stainless steel.

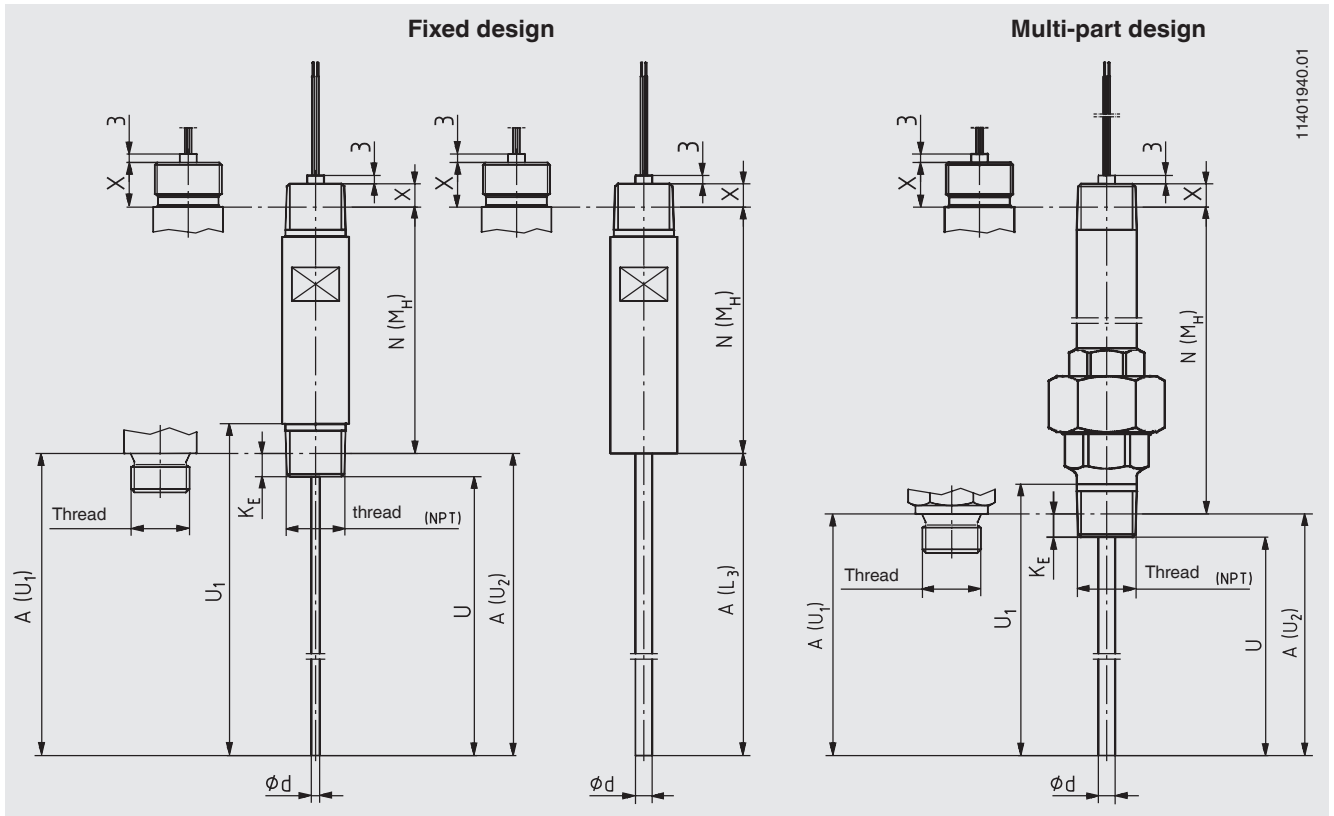
Components model TR10-E



Connection to thermowell

The many possible designs ensure that the model TR10-E resistance thermometers can be combined with almost all possible thermowells.

The most usual designs of connection are shown in the following drawings; further connections on request.



Possible combinations of measuring insert diameter, number of sensors and sensor connection method

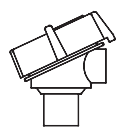
Measuring insert \varnothing in mm	Sensor / connection method 1 x Pt100			Sensor / connection method 2 x Pt100		
	2-wire	3-wire	4-wire	2-wire	3-wire	4-wire
3	x	x	x	x	x	-
6	x	x	x	x	x	x

Possible thread sizes of the male thread at the neck tube

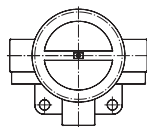
Thread to the thermowell
G 1/2 B
G 3/4 B
M14 x 1.5
M18 x 1.5
1/2 NPT
3/4 NPT

Connection thread to the head	X
1/2 NPT	8 mm
M20 x 1.5	14 mm
M24 x 1.5	16 mm

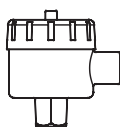
Connection head



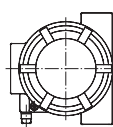
1/4000



5/6000



7/8000



other connection heads

Model	Material	Cable entry	Ingress protection	Cap	Surface
1/4000 F	Aluminium	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	Blue, lacquered ¹⁾
1/4000 S	Stainless steel	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	Blank
5/6000	Aluminium	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	Blue, lacquered ¹⁾
7/8000 W	Aluminium	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	Blue, lacquered ¹⁾
7/8000 S	Stainless steel	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	Blank

1) RAL 5022

Field temperature transmitter with digital indicator (option)

Field temperature transmitter model TIF50

As an alternative to the standard connection head the thermometer can be fitted with an optional model TIF50 field temperature transmitter.

The field temperature transmitter comprises a 4 ... 20 mA / HART® protocol output and is fitted with an LCD indication module.



Field temperature transmitter, model TIF50

Transmitter (optional)

As an option, WIKA analogue or digital transmitters can be installed in the TR10-E connection head.

Matching the certification of the installed transmitter to the explosion protection of the sensor is necessary.

Model	Description	Explosion protection	Data sheet
T19	Analogue transmitter, configurable	Without	TE 19.03
T24	Analogue transmitter, PC configurable	Optional	TE 24.01
T12	Digital transmitter, PC configurable	Optional	TE 12.03
T32	Digital transmitter, HART® protocol	Optional	TE 32.04
T53	Digital transmitter FOUNDATION™ Fieldbus and PROFIBUS® PA	Standard	TE 53.01
TIF50	Digital field transmitter, HART® protocol	Optional	TE 62.01

Other transmitters on request

Explosion protection

Resistance thermometers of the TR10-E series are available with an EC-type examination certificate for "intrinsically safe", Ex i, ignition protection.

These instruments comply with the requirements of 94/9/EC (ATEX) directive for gas and dust. Manufacturer's declarations in accordance with NAMUR NE24 are also available.

The classification/suitability of the instrument (permissible power P_{max} as well as the permissible ambient temperature) for the respective category can be seen on the EC-type examination certificate and in the operating instructions.

Built-in transmitters have their own EC-type examination certificate. The permissible ambient temperature ranges of the built-in transmitters can be taken from the corresponding transmitter approval.

Functional safety (option)

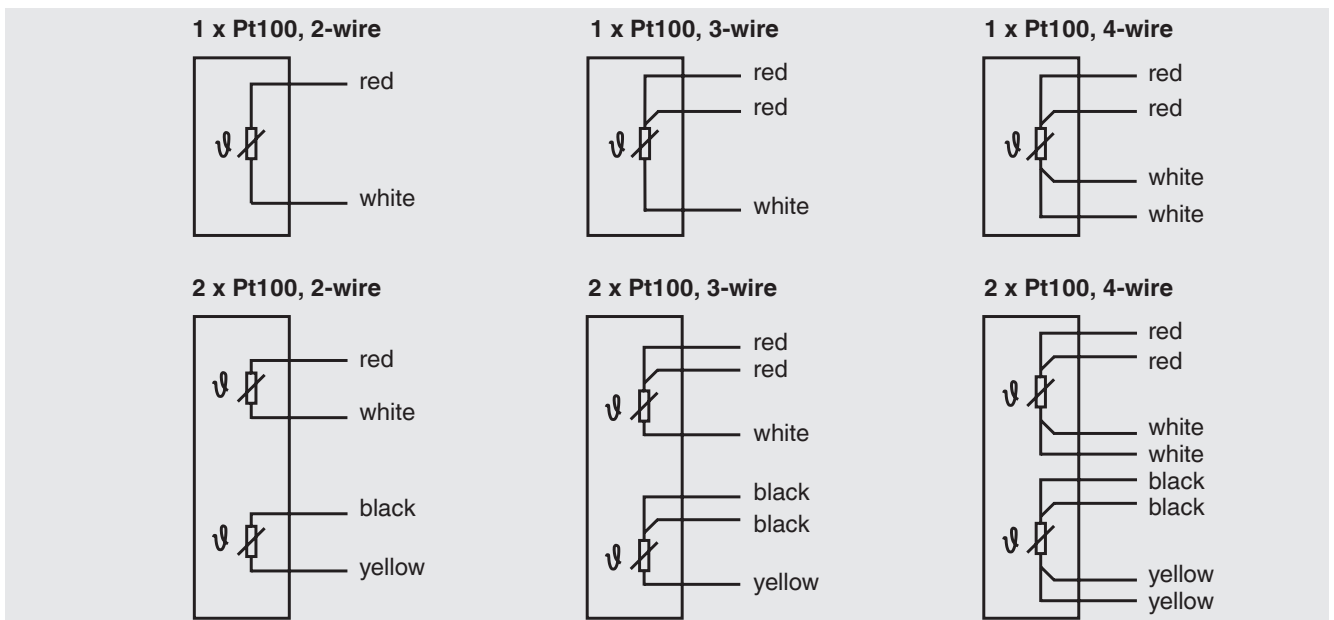
In safety-critical applications, the entire measuring chain must be taken into consideration in terms of the failure risk. The SIL classification allows the required risk reduction as well as the associated remaining rest estimation of the measuring chain or the components used.

Model TR10-E resistance thermometers with integrated model T32.1S temperature transmitter are certified to IEC 61508 per SIL-2.

Matched thermowells allow easy dismounting of the measuring insert for calibration.

The optimally tuned measuring point, consisting of a thermowell, a temperature sensor in the measuring insert and a certified SIL transmitter, provides maximum reliability and a long service life even under extreme conditions.

Electrical connection



For the electrical connections of built-in temperature transmitters see the corresponding data sheets or operating instructions.

Ordering information

Model / Explosion protection / Connection head / Cable entry of connection head / Female thread on connection head / Terminal block, transmitter / Process connection / Neck tube material / Measuring element / Sealing type / Temperature range / Design of the sensor tip / Sensor diameter / Insertion length A (U₂) / Neck length N (M_H) / Certificates / Options

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