

Process resistance thermometer Model TR12, for additional thermowell

WIKA data sheet TE 60.17



Applications

- Chemical industry
- Petrochemical industry
- Off-shore
- Machine building, plant and vessel construction

Special features

- For many variants of temperature transmitters with field transmitter
- For mounting in all standard thermowell designs
- Spring-loaded measuring insert (replaceable)
- Explosion-protected versions Ex-i, Ex-n and NAMUR NE24
- ATEX Ex-d (in preparation)

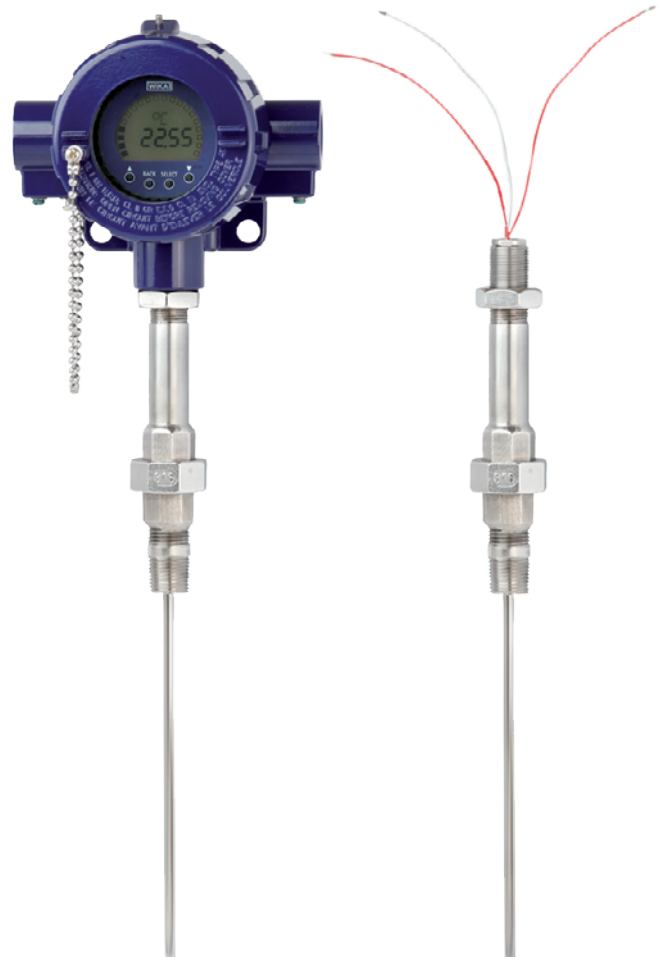


Fig. left: Process resistance thermometer model TR12-B

Fig. right: Basis module model TR12-M

Description

Resistance thermometers in this series can be combined with a large number of thermowell designs. The replaceable, centrally spring-loaded measuring insert and its extended spring travel enable combination with the widest range of connection head designs.

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.

Specifications

Output signal Pt100	
Temperature range	Measuring range -200 ... +600 °C
Measuring element	Pt100 (measuring current: 0.1 ... 1.0 mA)
Connection method	1 x 2-wire 1 x 3-wire 1 x 4-wire 2 x 2-wire 2 x 3-wire 2 x 4-wire
Sensor tolerance value ¹⁾ per DIN EN 60751	Class B Class A Class AA

Output signal 4 ... 20 mA, HART® protocol, FOUNDATION™ fieldbus and PROFIBUS® PA ²⁾						
Transmitter (selectable versions)	model T19	model T24	model T12	model T32	model T53	Model TIF50
Data sheet	TE 19.03	TE 24.01	TE 12.03	TE 32.04	TE 53.01	TE 62.01
Output						
■ 4 ... 20 mA	x	x	x	x		x
■ HART® protocol				x		x
■ FOUNDATION™ Fieldbus and PROFIBUS® PA					x	
Connection method						
■ 1 x 3-wire	x	x	x	x	x	x
■ 1 x 4-wire			x	x	x	x
Measurement current	0.8 mA	0.5 mA	0.2 mA	0.3 mA	0.2 mA	0.3 mA

Measuring insert (replaceable)	
Material	Stainless steel 1.4571, 316/316L
Diameter	Standard: 3 mm ³⁾ , 6 mm, 8 mm Option (on request): 1/8 inch ³⁾ (3.17 mm), 1/4 inch (6.35 mm), 3/8 inch (9.53 mm)
Spring travel	approx. 20 mm
Response time	t ₅₀ < 10 s t ₉₀ < 20 s (measuring insert diameter 6 mm: the thermowell required for the operation increases the response time depending on its mass and dimensions)

Neck tube	
Material	Stainless steel 316/316L
Thread to the thermowell	G 1/2 B G 3/4 B 1/2 NPT 3/4 NPT M14 x 1.5 M18 x 1.5 M20 x 1.5 M27 x 1.5
Connection thread to the head	M20 x 1.5, with counter nut M24 x 1.5, with counter nut 1/2 NPT, welded 3/4 NPT, welded
Neck tube length	min. 150 mm, standard neck tube length 200 mm 250 mm Other neck tube lengths on request

Use resistance thermometers with shielded cable, and ground the shield on at least one end of the lead, if the lines are longer than 30 m or leave the building. For a correct determination of the overall measuring error, both sensor and transmitter measuring deviations have to be considered.

1) For detailed specifications for Pt100 sensors, see Technical Information IN 00.17 at www.wika.com

2) The temperature transmitter should therefore be protected from temperatures over 85 °C

3) not at 2 x 4-wire connection method

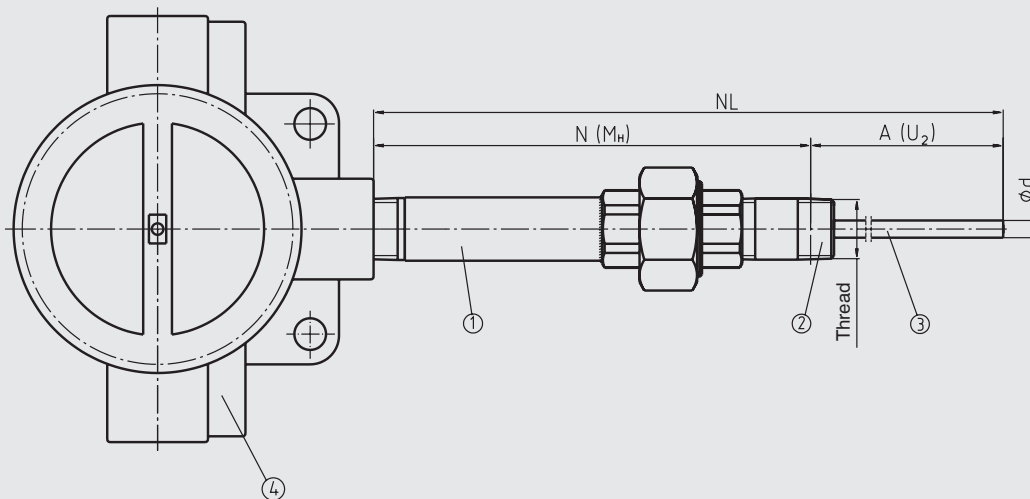
Ambient conditions

Ambient and storage temperature	{-50} -40 ... +85 °C
Ingress protection	IP 65 per IEC 529/EN 60529 The indicated ingress protection only applies for TR12-B with corresponding connection head, cable gland and appropriate cable dimensions
Vibration resistance	3 g (DIN EN 60751, standard) 20 g (DIN EN 60751, special designs on request)

{ } Items in curved brackets are optional extras

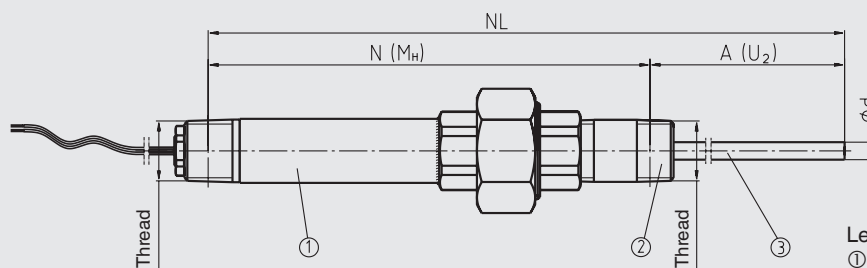
TR12 components

Process resistance thermometer model TR12-B



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Basis module model TR12-M



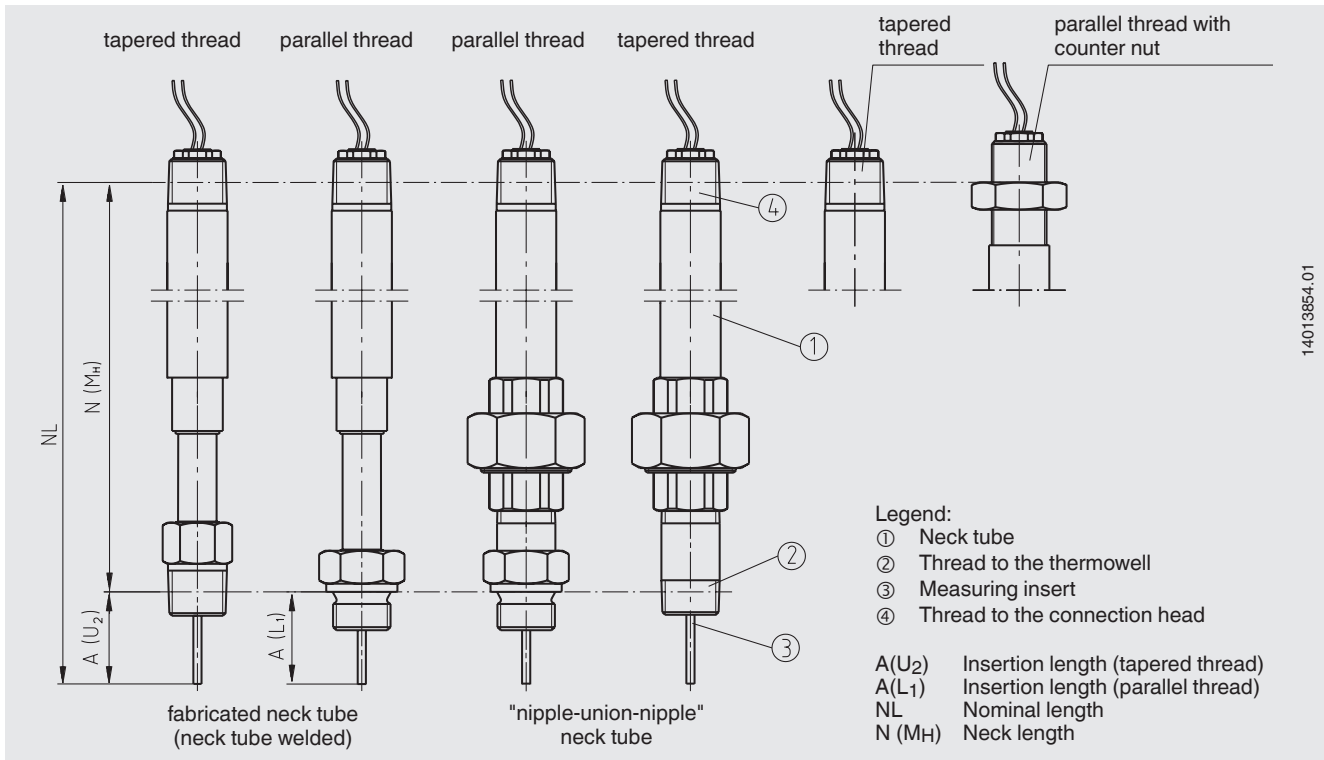
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Legend:

- ① Neck tube
- ② Connection to thermowell
- ③ Measuring insert
- ④ Connection head

A (U₂) Insertion length
 NL Nominal length
 N (M_H) Neck length

Neck tube version



Measuring insert

The exchangeable measuring insert is made of a vibration-resistant sheathed measuring 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). The measuring insert should be spring-loaded (spring travel: 0 to 20 mm) in order to ensure that it presses against the bottom of the thermowell.

The standard material used for the measuring insert sheath is stainless steel 1.4571. Other materials on request.

This model series has outstanding resistance to vibration (3 g amplitude, optionally 20 g amplitude also possible).

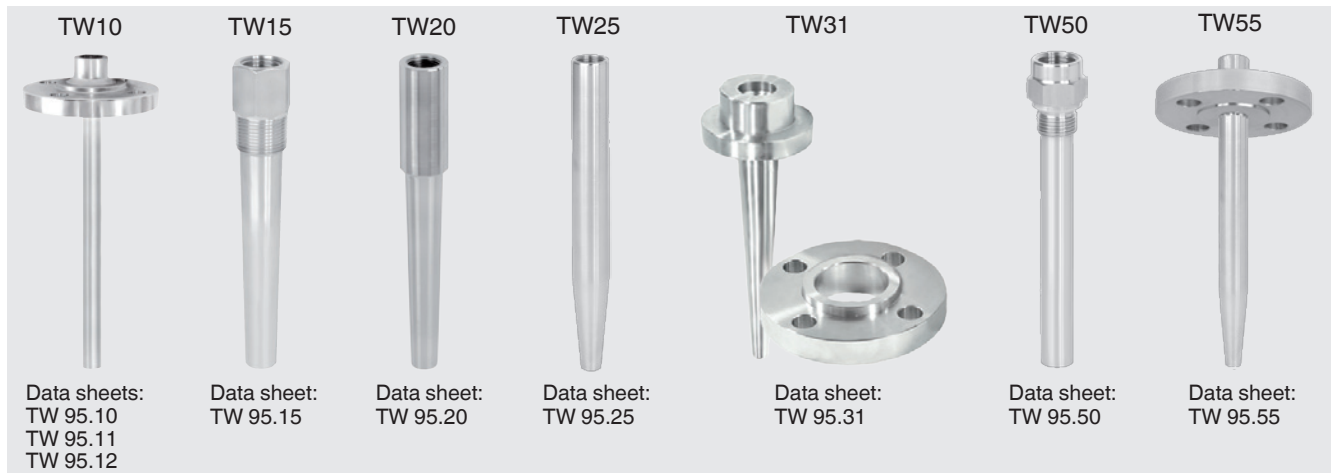
Neck tube

The neck tube is screwed into the connection head or the case. 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.

In the Ex-d version the flameproof joint is integrated in the neck tube.

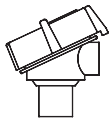
Material for the neck tube is stainless steel 316/316L.

Thermowell selection

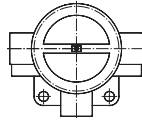


Special thermowells on request

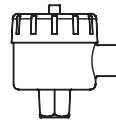
Connection head



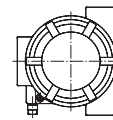
1/4000 F



5/6000



7/8000



on request

Model	Material	Cable outlet	Ingress protection	Cap	Surface finish
1/4000 F	Aluminium	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	blue, painted ¹⁾
	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, painted ¹⁾
7/8000	Aluminium	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	blue, painted ¹⁾
	Stainless steel	½ NPT, ¾ NPT or M20 x 1.5	IP 65	Screw cover	blank

1) RAL5022, polyester paint saltwater-resistant

Field temperature transmitter with digital display (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 equipped with an LCD indication module.



Field temperature transmitter model TIF50

Transmitter (option)

As an option, WIKA transmitters can be installed in the TR12 connection head.

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 temperature transmitter, HART® protocol	optional	TE 62.01

Other transmitters on request.

Explosion protection

For application in hazardous areas, intrinsically-safe versions are available.

The instruments meet the requirements of the 94/9/EC (ATEX) guideline, for gases 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.

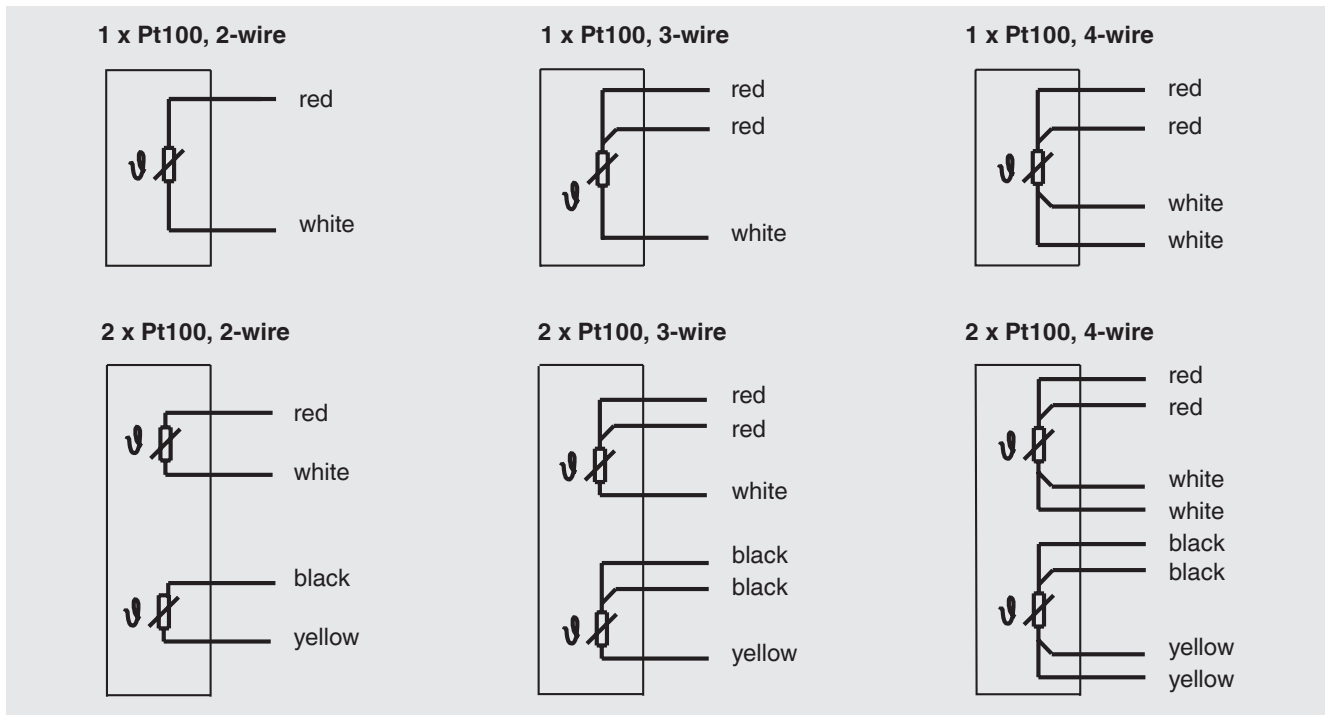
Functional safety (option)

In safety-critical applications, the entire measuring chain must be taken into consideration in terms of the safety parameters. The SIL classification allows the assessment of the risk reduction reached by the safety installations.

Selected TR12 process resistance thermometers in combination with an appropriate temperature transmitter (e.g. model T32.1S) are suitable as sensors for safety functions up to SIL 2.

Matched thermowells allow easy dismantling of the measuring insert for calibration. The optimally tuned measuring point consists of a thermowell, a TR12 thermometer and a T32.1S transmitter developed in accordance with IEC 61508. Thus, the measuring point provides maximum reliability and a long service life.

Termination at lead end



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

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