

Flanged resistance thermometer Model TR10-F with fabricated thermowell model TW40

WIKA data sheet TE 60.06



Applications

- Machine building, plant and vessel construction
- Energy and power plant technology
- Chemical and petrochemical industry
- Food and beverage industry
- Sanitary, heating and air-conditioning technology

Special features

- Application ranges from -200 ... +600 °C
- Model TW40 fabricated thermowell included
- Spring-loaded measuring insert (replaceable)
- Explosion-protected versions Ex-i, Ex-n and NAMUR NE24

Description

Resistance thermometers of this series are designed for fitting into vessels and pipelines. Standard flanges to DIN EN or ASME are available.

These temperature probes are suitable for liquid and gaseous media under moderate mechanical load. The model TW40 thermowell is fully-welded and screwed into the connection head. Stainless steel thermowells are suitable for normal chemical conditions. Coating is recommended as an optional extra with chemically aggressive media, or solid wear-resistant coating for abrasive media.

The interchangeable measuring insert can be removed without taking out the complete probe from the plant. This enables inspection, verification of the measuring chain and, when servicing is necessary, replacement during operation and while the plant is running. The choice of standard lengths assists with short delivery times and the possibility of stocking spare parts.



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Insertion length, flange size, thermowell design, connection head and sensor can each be selected to suit the respective application.

Optionally we can fit analogue or digital transmitters from the WIKA range into the connection head of the TR10-F.

Sensor

The sensor is located in the measuring insert. This is replaceable and 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.

Tolerance value of the sensor to DIN EN 60751

- Class B
- Class A
- Class AA

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

For detailed specifications for 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 with a thermowell, it is very important to determine the correct insertion length (= thermowell length with bottom thicknesses of ≤ 5.5 mm). In this connection the fact that the measuring insert is spring-loaded (spring travel: max. 10 mm) has to be taken into account in order to ensure that the measuring insert presses against the bottom of the thermowell.

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

Standard measuring insert lengths

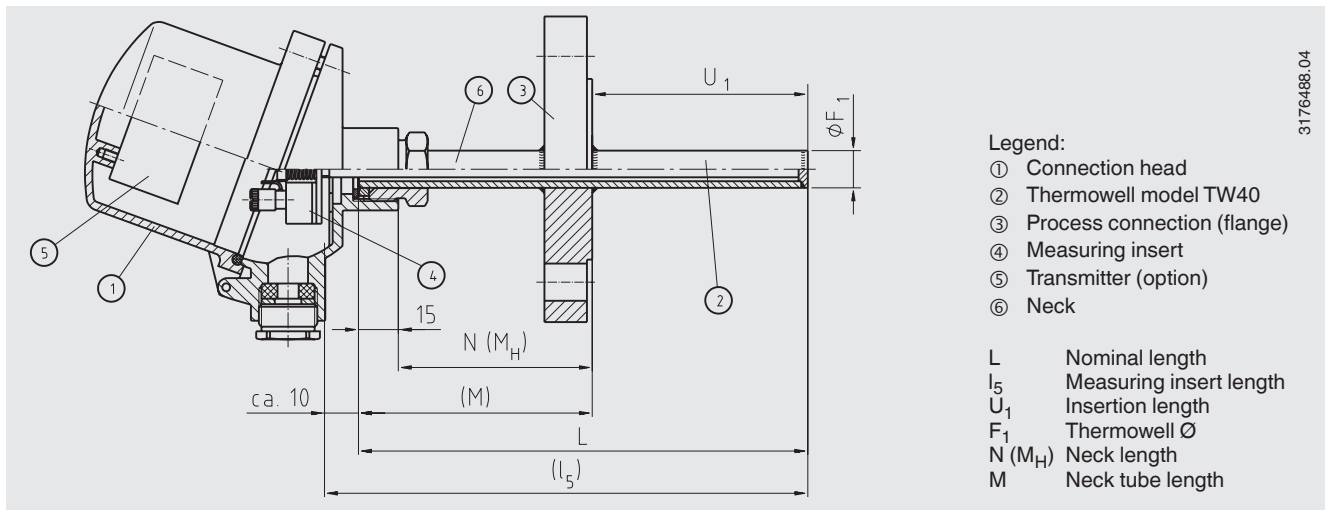
Measuring insert \varnothing in mm	Standard measuring insert lengths in mm										
3	275	315		375		435					
6	275	315	345	375	405	435	525	555	585	655	735
8	275	315	345	375	405	435	525	555	585	655	735

The lengths specified in this table correspond to the standard lengths. Intermediate lengths or greater lengths are possible without any difficulty.

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
8	x	x	x	x	x	x

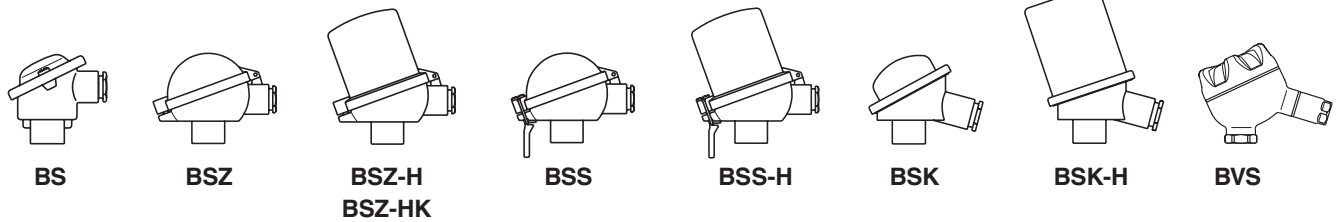
TR10-F components



Legend:

- ① Connection head
 - ② Thermowell model TW40
 - ③ Process connection (flange)
 - ④ Measuring insert
 - ⑤ Transmitter (option)
 - ⑥ Neck
-
- L Nominal length
 - l_5 Measuring insert length
 - U_1 Insertion length
 - F_1 Thermowell \varnothing
 - $N (M_H)$ Neck length
 - M Neck tube length

Connection head



Model	Material	Cable entry	Ingress protection	Cap	Surface finish
BS	Aluminium	M20 x 1.5 ¹⁾	IP 65	Cap with 2 screws	blue, painted ²⁾
BSZ	Aluminium	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	blue, painted ²⁾
BSZ-H	Aluminium	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	blue, painted ²⁾
BSZ-HK	Plastic	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	black
BSS	Aluminium	M20 x 1.5 ¹⁾	IP 65	Hinged cover with clip	blue, painted ²⁾
BSS-H	Aluminium	M20 x 1.5 ¹⁾	IP 65	Hinged cover with clip	blue, painted ²⁾
BSK	Plastic	M20 x 1.5 ¹⁾	IP 54	Screw cover	black
BSK-H	Plastic	M20 x 1.5 ¹⁾	IP 54	Screw cover	black
BVS	Stainless steel	M20 x 1.5 ¹⁾	IP 65	Screw cover	Precision casting, electropolished

1) Standard

2) RAL5022, polyester paint saltwater-resistant

Connection head with digital indicator (option)

As an alternative to the standard connection head the thermometer can be fitted with an optional DIH10 digital indicator. The connection head used for this is similar to the model BSZ-H head. For operation, a 4 ... 20 mA transmitter is needed, which is mounted to the measuring insert. The scale range of the indicator is configured identically to the measuring range of the transmitter.

Designs with ignition protection type "intrinsically safe", Ex-i, are also available.



Fig. connection head with digital indicator, model DIH10

Transmitter (option)

Depending on the connection head used, a transmitter can be mounted within the thermometer.

- Mounted instead of terminal block
- Mounted within the cap of the connection head
- Mounting not possible
- x Mounted in the cap of the connection head, using a mounting bracket

Connection head	Transmitter model				
	T12	T19	T24	T32	T53
BS	-	○	○	-	○
BSZ	○	○	○	○	○
BSZ-H / BSZ-HK	●	●	●	●	●
BSS	○	○	○	○	○
BSS-H	●	●	●	●	●
BSK	-	○	○	-	○
BSK-H	x	x	x	x	x
BVS	○	○	○	○	○

Mounting of two transmitters on request.

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

Thermowell model TW40

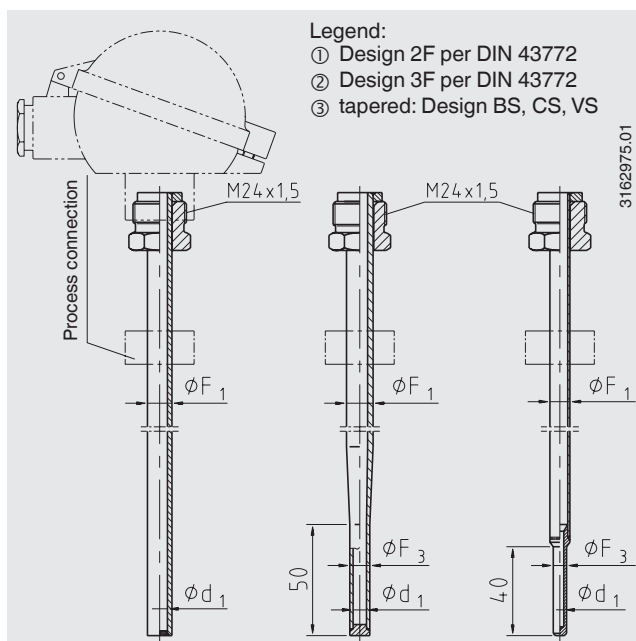
The thermowell is made of drawn tube with a welded bottom and is screwed into the connection head. The cable entry can be aligned by rotating the connection head.

The process connection, in accordance with the customer specification, is welded onto the thermowell in the factory, which also fixes the insertion length. Insertion lengths to DIN Standards are preferable.

Designs to DIN Standards and also special designs (e. g. with tapered thermowell, reinforced neck tube, etc.) are available in stainless steel or special materials on request.

For further technical specifications on the thermowell please see WIKA data sheets TW 95.40 or TW 95.41.

Assembly of model TW40



Dimensions in mm

Versions per DIN 43772

Design	Insertion length U_1	Thermowell outer ϕF_1	Thermowell outer ϕ at tip F_3	Thermowell inner ϕ at tip d_1	Neck length N
Design 2F	160	9, 11, 12, 14	-	-	130
Design 2F	250	9, 11, 12, 14	-	-	130
Design 2F	400	9, 11, 12, 14	-	-	130
Design 2F	225	9, 11, 12, 14	-	-	65
Design 2F	315	9, 11, 12, 14	-	-	65
Design 2F	465	9, 11, 12, 14	-	-	65
Design 3F	225	12	$9 + 0.2$	$6 + 0.1 / - 0.05$	67
Design 3F	285	12	$9 + 0.2$	$6 + 0.1 / - 0.05$	67
Design 3F	345	12	$9 + 0.2$	$6 + 0.1 / - 0.05$	67

Versions not to standards

Design	Insertion length U_1	Thermowell outer ϕF_1	Thermowell outer ϕ at tip F_3	Thermowell inner ϕ at tip d_1	Neck length N
Design BS/CS/VS	160	9 / 11 / 12	6	3.5	130
Design BS/CS/VS	250	9 / 11 / 12	6	3.5	130
Design BS/CS/VS	400	9 / 11 / 12	6	3.5	130

Explosion protection (option)

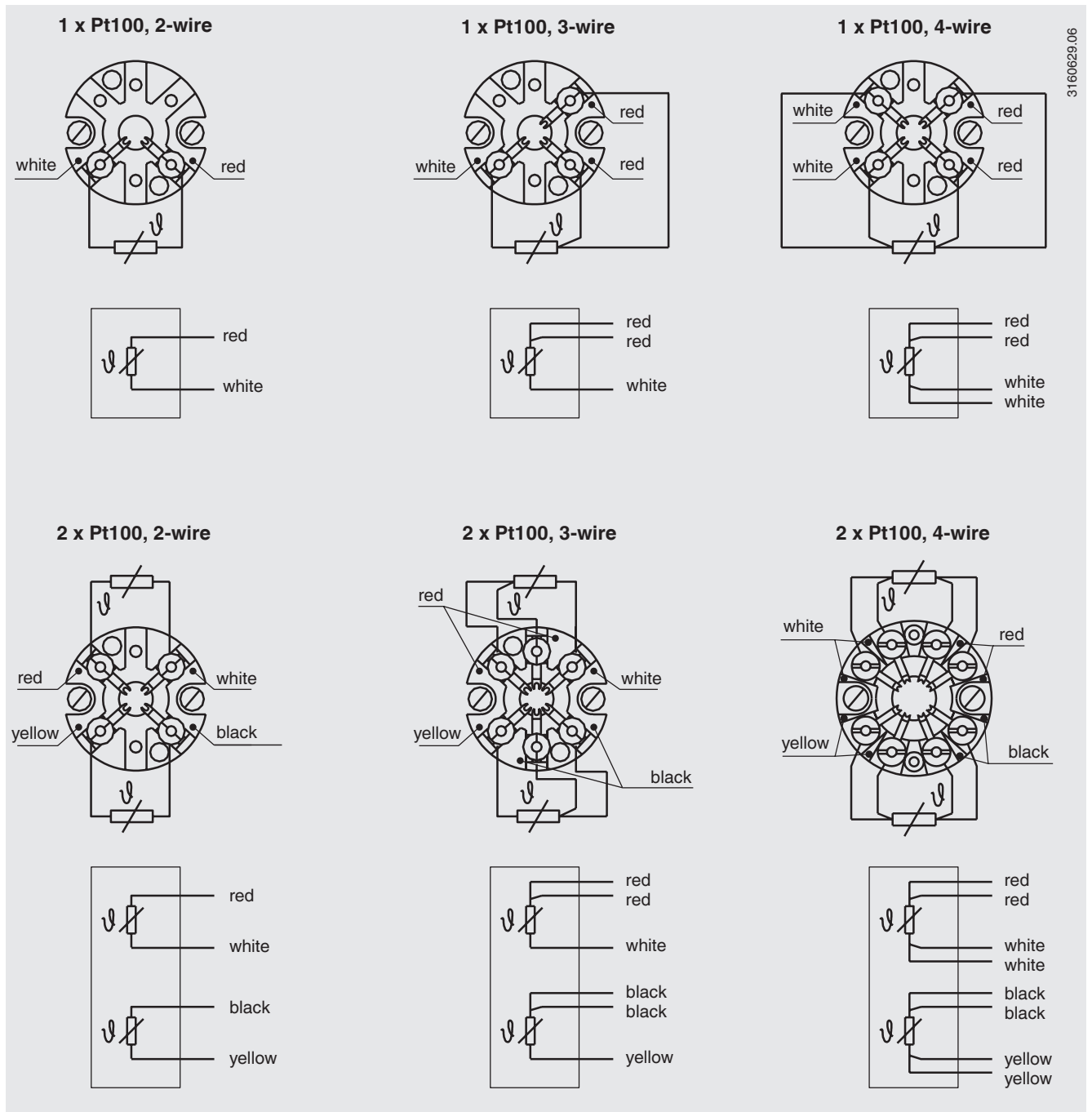
Resistance thermometers of the TR10-F series are available with a EC type-examination certificate for "intrinsically safe", Ex-i, ignition protection.

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.

Electrical connection



3160629.06

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

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