

# Resistance thermometer

## For sanitary applications

### Model TR22-B, for orbital welding

WIKA data sheet TE 60.23



#### Applications

- Sanitary applications
- Food industry
- Beverage industry
- Bio and pharmaceutical industry, production of active ingredients
- Paint finishing systems

#### Special features

- Simplified calibration through replaceable measuring inserts
- Stainless steel connection head in optimised hygienic design
- Pt100, 4 ... 20 mA or HART® protocol, FOUNDATION™ fieldbus and PROFIBUS® PA output possible
- Wetted parts from stainless steel 1.4435
- Self-draining and dead-space minimised



**Resistance thermometer model TR22-B with flow-through housing for orbital welding**  
Options: Sealing combination at neck tube, cable gland in hygienic design

#### Description

The model TR22-B resistance thermometer is used for temperature measurement in sanitary applications. For an integration into the process the thermowell is directly fitted into a pipeline by means of orbital welding.

The connection ends are smooth and prepared for orbital welding. The process connections meet the stringent requirements, in terms of materials and design, of hygienic measuring points.

For easy calibration or maintenance, the sensor is removable without having to break into the process or disconnect the electrical connection. Thus hygiene risks can be minimised and downtimes can be reduced.

The spring-loaded measuring insert guarantees the contact between the sensor tip and the bottom of the thermowell and thus ensures a fast response time and high accuracy.

## Specifications

### Output signal Pt100

Temperature range	Measuring range -50 ... +250 °C
Measuring element	Pt100 (measuring current: 0.1 ... 1.0 mA) standard measuring resistor Pt100 (measuring current: 0.1 ... 1.0 mA) face-sensitive measuring resistor <sup>1)</sup>
Connection method	1 x 3-wire 1 x 4-wire 2 x 3-wire
Sensor tolerance value <sup>2)</sup> per DIN EN 60751	Class AA Class A Class B
Response time <sup>3)</sup>	t <sub>50</sub> < 3.2 s    t <sub>90</sub> < 7.3 s
Measuring deviation <sup>4)</sup>	-1 Kelvin
Measuring insert diameter	3 mm

### Output signal 4 ... 20 mA, HART® protocol, FOUNDATION™ fieldbus and PROFIBUS® PA

Transmitter (selectable versions) <sup>5)</sup>	model T19	model T24	model T32	model T53
Output				
■ 4 ... 20 mA	x	x	x	
■ HART® protocol			x	
■ FOUNDATION™ Fieldbus and PROFIBUS® PA				x
Connection method				
■ 1 x 3-wire	x	x	x	x
■ 1 x 4-wire			x	x
Measurement current	0.8 mA	0.5 mA	0.3 mA	0.2 mA
Temperature range	Measuring range -50 ... +250 °C <sup>6)</sup> , other measuring ranges are adjustable			
Response time <sup>3)</sup>	t <sub>50</sub> < 3.2 s    t <sub>90</sub> < 7.3 s + response time of the relevant transmitters (compare transmitter data sheet)			
Measuring deviation <sup>4)</sup>	-1 Kelvin + accuracy of the relevant transmitters			
Measuring insert diameter	3 mm			

### Thermowell model TW61 <sup>7)</sup>

Design of connection	<ul style="list-style-type: none"> <li>■ Flow-through housing</li> <li>■ Angular housing</li> </ul>
Nominal width of tube	cf. table of dimensions
Surface finish	Standard: R <sub>a</sub> < 0.8 μm Optional: R <sub>a</sub> < 0.8 μm electropolished, R <sub>a</sub> < 0.4 μm, R <sub>a</sub> < 0.4 μm electropolished
Materials	Stainless steel 1.4435
Connection to the thermometer	M24 x 1.5
Thermowell diameter	cf. table of dimensions
Neck tube length M	The neck tube length M is adjusted to the length A(l <sub>1</sub> ) of 125 mm. The use of uniform measuring insert lengths even for different nominal tube sizes reduces the inventory of the measuring inserts, particularly for larger plants. Additionally, the measuring insert length is optimised for an on-site calibration, for example with a WIKA dry well calibrator model CTD 9x00.  further lengths to customer specifications
Pressure ratings	cf. table of dimensions
Tube length TL and L <sub>1</sub> , thermowell insertion length U <sub>1</sub>	cf. table of dimensions

1) Face-sensitive measuring resistors, through their small design, serve to reduce the heat dissipation with short insertion lengths.

Available for the temperature range -50...+150 °C in classes A and B.

For thermowell insertion lengths of less than 11 mm, face-sensitive measuring resistors are generally used.

2) For detailed specifications for Pt100 sensors, see Technical information IN 00.17 at [www.wika.com](http://www.wika.com).

3) Flow-through housing OD 26.9 mm, measurement per DIN EN 60751

4) measured at 100 °C

5) For a correct determination of the overall measuring error, both sensor and transmitter measuring deviations have to be considered.

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

7) For TR22-B designs without thermowell, the insertion length is defined by the dimension A(l<sub>1</sub>) from the lower edge of the connection head to the tip of the measuring insert (see "Dimensions of the connection head in mm"). The thickness of bottom of the thermowell can be neglected for dimensioning. It is offset by the spring travel of the measuring insert.

## Available documentation, certificates

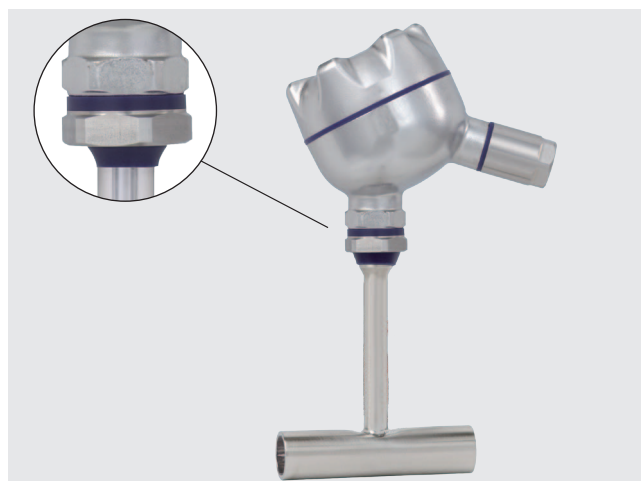
- 2.2 Test certificate
- 3.1 Acceptance test certificate
- DKD certificate
- Hygiene certificates

Certificate	Flow-through housing	Angular housing
3-A (74-03)	yes	yes, from DIN 11866 series A: DN 65 DIN 11866 series B: DN 76.1 DIN 11866 series C: DN 2.5"

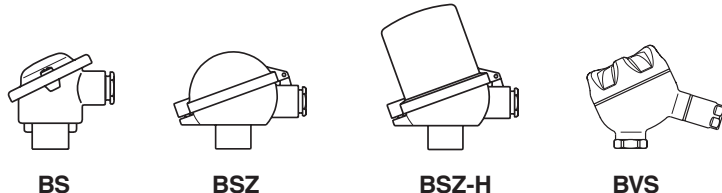
## Options

The transition from the connection head to the thermowell is effected via an optional sealing combination of flat gasket and wiper. This combination permanently prevents the penetration and depositing of humidity and impurities in this area (IP 68). Additionally, the sealing combination simplifies the cleaning process significantly.

The design of the BVS head combined with the cable gland in hygienic design results in an easy to clean and hygienic measuring location, even in areas which are not in contact with the product.



## Connection head



Model	Material	Cable entry	Ingress protection	Cap	Surface finish	Weight in kg
BS	Aluminium	M20 x 1.5 <sup>1)</sup>	IP 65	Cap with 2 screws	blue, lacquered <sup>2)</sup>	0.142
BSZ	Aluminium	M20 x 1.5 <sup>1)</sup>	IP 65	Hinged cover with cylinder head screw	blue, lacquered <sup>2)</sup>	0.290
BSZ-H	Aluminium	M20 x 1.5 <sup>1)</sup>	IP 65	Hinged cover with cylinder head screw	blue, lacquered <sup>2)</sup>	0.303
BVS	Stainless steel	M20 x 1.5 <sup>1)</sup>	IP 68	Screw cover	precision casting, electropolished	0.500

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 indication range 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 (optional)

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

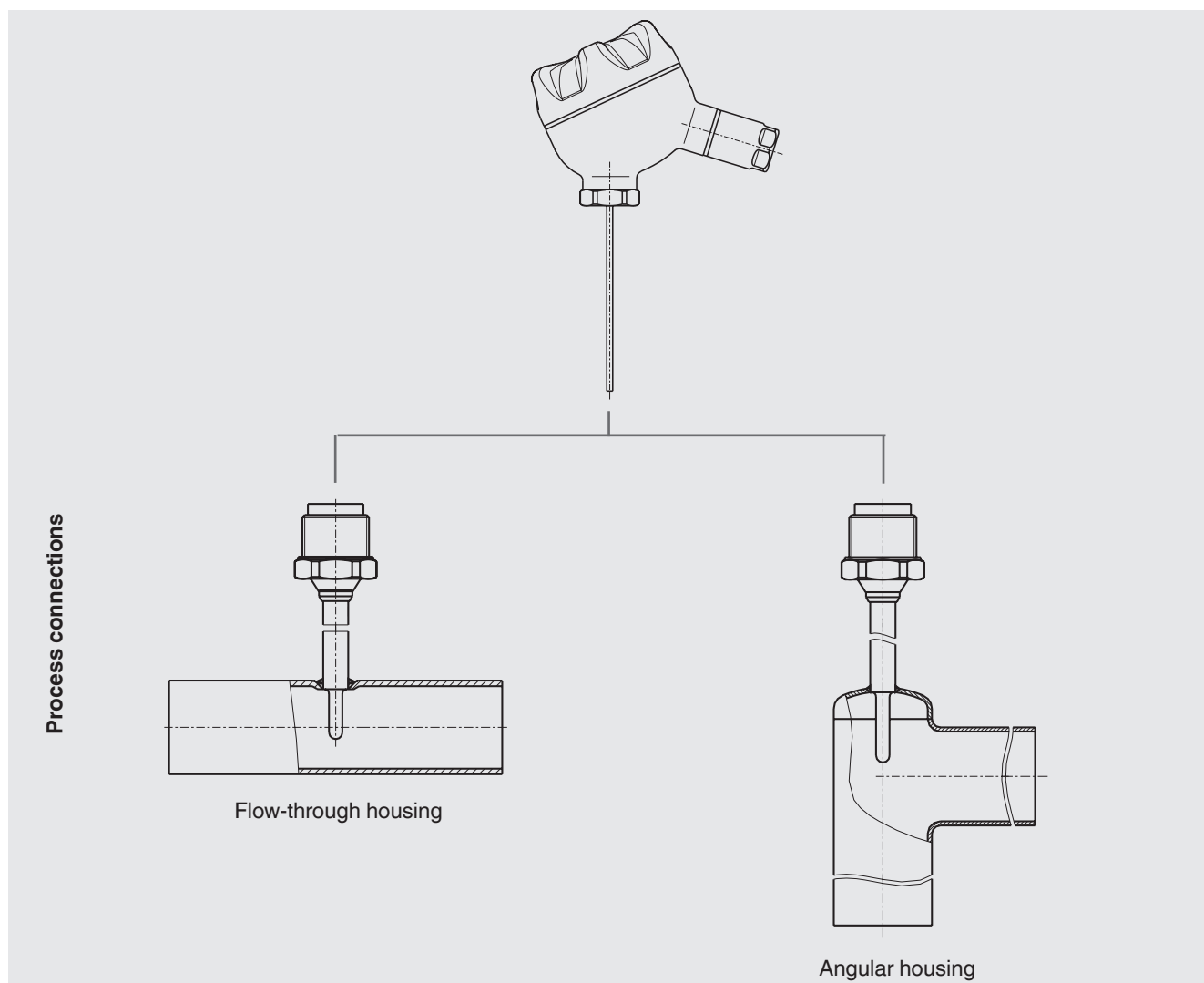
- Mounted instead of terminal block
- Mounted within the cap of the connection head
- Mounting not possible

Connection head	Transmitter model			
	T19	T24	T32	T53
BS	○	○	-	○
BSZ	○	○	○	○
BSZ-H	●	●	●	●
BVS	○	○	○	○

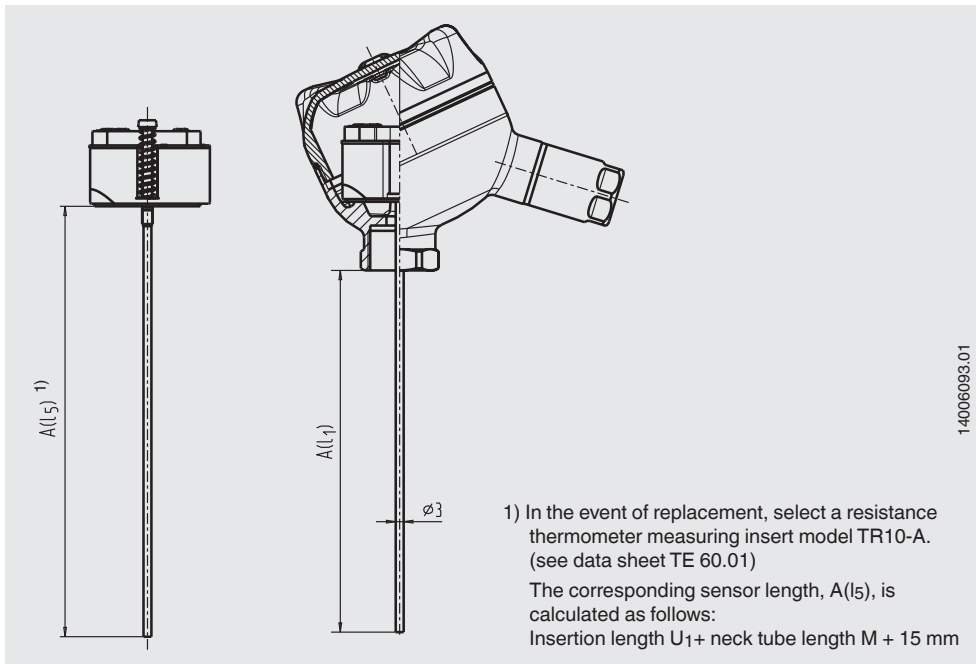
Mounting of 2 transmitters on request.

Model	Description	Explosion protection	Data sheet
T19	Analogue transmitter, configurable	without	TE 19.03
T24	Analogue transmitter, PC configurable	optional	TE 24.01
T32	Digital transmitter, HART® protocol	optional	TE 32.04
T53	Digital transmitter FOUNDATION™ Fieldbus and PROFIBUS® PA	Standard	TE 53.01

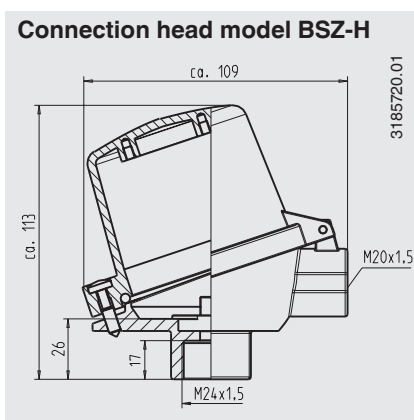
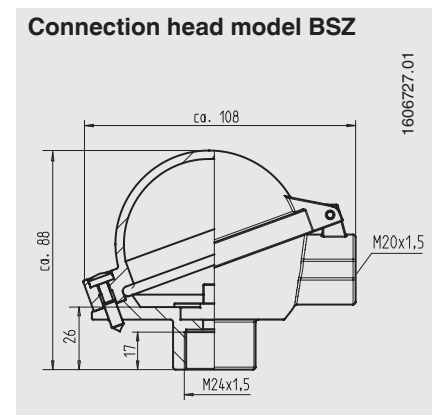
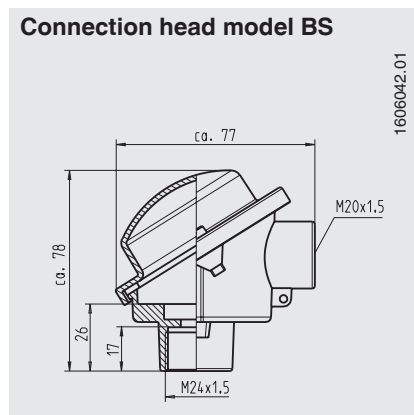
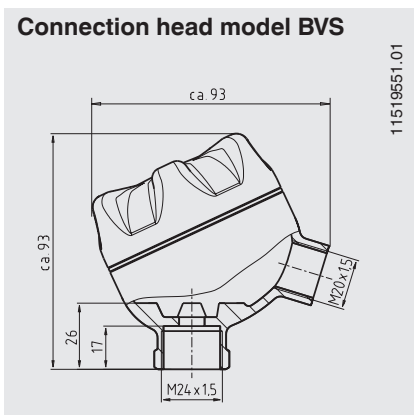
## Overview of the process connections, thermowell variants



## Dimensions in mm

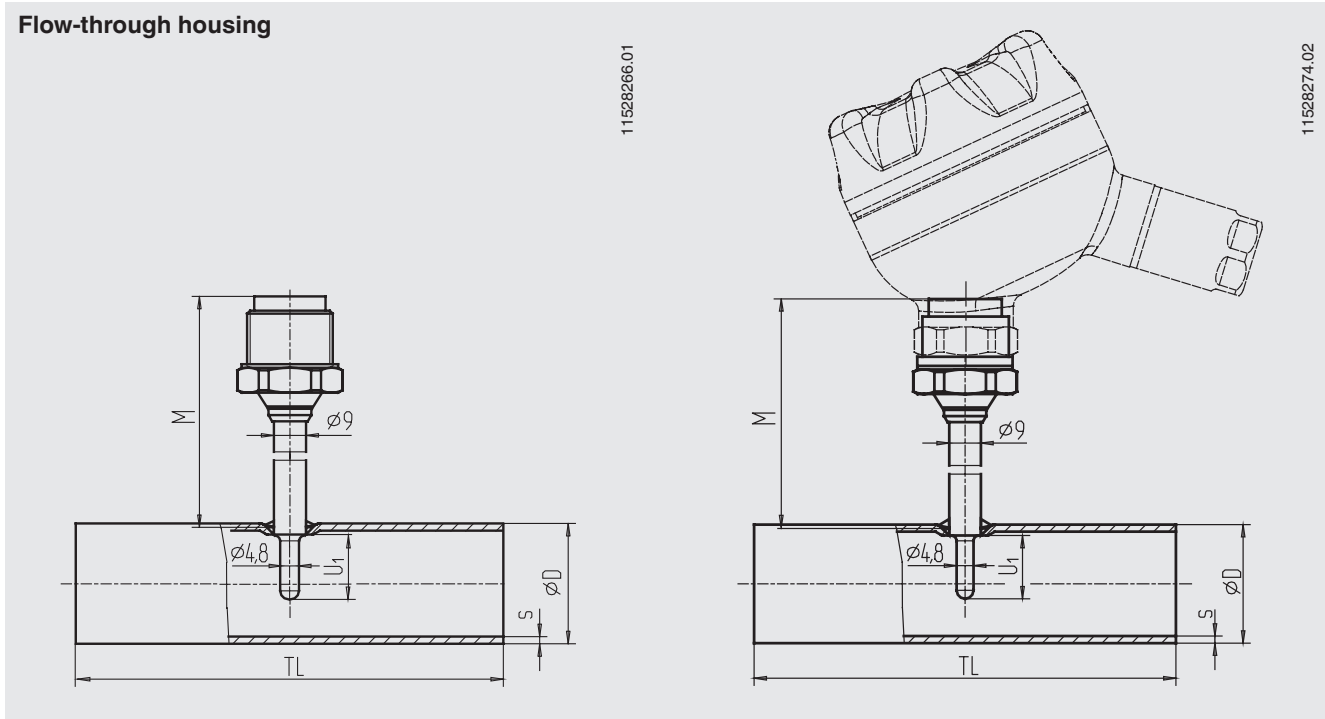


## Dimensions of the connection heads in mm



# Dimensions of the process connections in mm (model TW61 thermowells)

## Flow-through housing

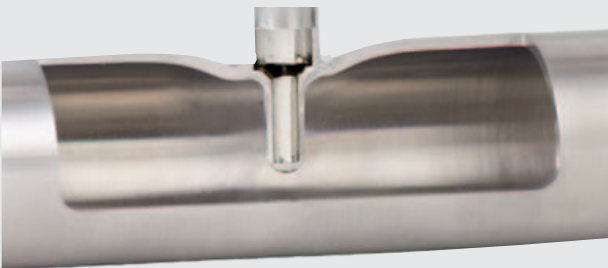


## ISO tubes, or DIN 11866 series B

Nominal width of tube OD	Nominal pressure in bar PN	Tube outer diameter Ø D	Tube wall thickness s	Tube length TL	Thermowell insertion length U <sub>1</sub>	Neck tube length M
17.2	25	17.2	1.0	68	9	126
21.3	25	21.3	1.6	72	11	124
26.9	25	26.9	1.6	110	11	124
42.4	25	42.4	2.0	130	18	117

Further nominal tube widths such as versions to DIN 11866 series A/metric and DIN 11866 series C/ASME BPE on request.

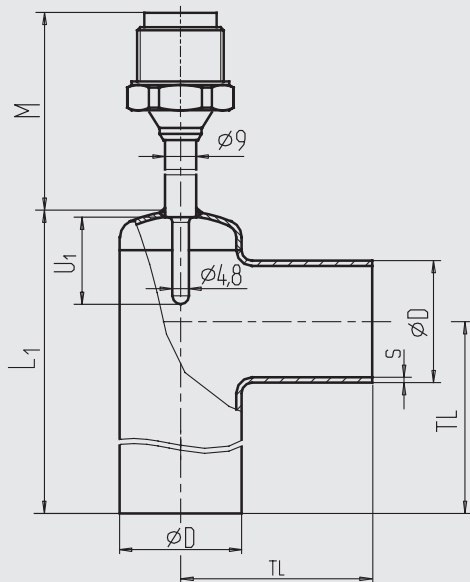
## Hygienic design



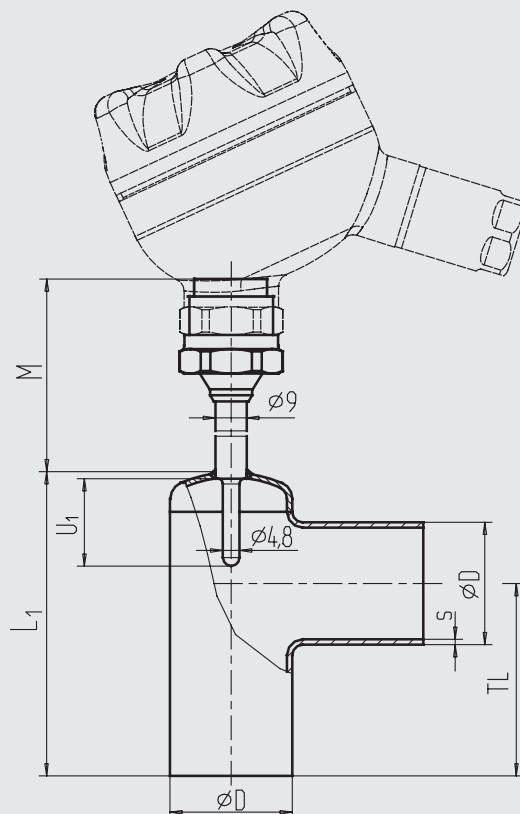
The patented hygienic design of the TW61 flow-through housing enables dead-space minimised, invasive temperature measurement and, through self-draining, a flexible mounting position.

## Angular housing

11528452.01



11575795.02



## ISO tubes, or DIN 11866 series B

Nominal width of tube OD	Nominal pressure in bar PN	Tube outer diameter Ø D	Tube wall thickness s	Tube length TL	Tube length L <sub>1</sub>	Thermowell insertion length U <sub>1</sub>	Neck tube length M
17.2	25	17.2	1.6	34	55	16	119
21.3	25	21.3	1.6	36	58	18	117
26.9	25	26.9	1.6	55	81	30	105
42.4	25	42.4	2.0	65	102	30	105

Further nominal tube widths such as versions to DIN 11866 series A/metric and DIN 11866 series C/ASME BPE on request.

## Explosion protection (option)

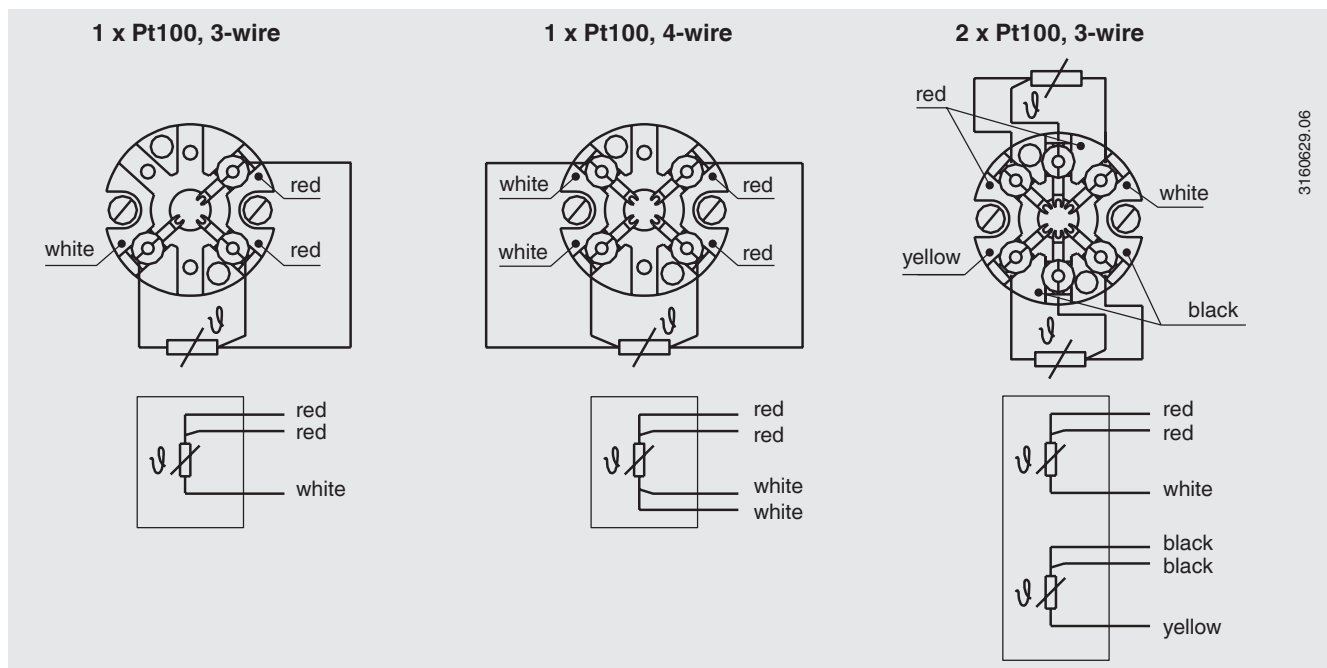
Resistance thermometers of the TR22-B series are available with a EC type-examination certificate for "intrinsically safe", Ex-i, ignition protection.

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. The system operator is responsible for using suitable thermowells.

## Electrical connection



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

## Ordering information

Model / Explosion protection / Sensor / Accuracy class / Connection head / Cable gland / Transmitter / Thermowell / Process connection / Wetted-parts materials / Neck-tube length / Certificates / Optional further seal combinations

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