

# Resistance thermometer Model TR10-B, for additional thermowell

WIKA data sheet TE 60.02



for further approvals  
see page 2 and 16

## Applications

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

## Special features

- Application ranges from -200 ... +600 °C  
(-328 ... +1,112 °F)
- For mounting in all standard thermowell designs
- Spring-loaded measuring insert (replaceable)
- Pt100 or Pt1000 sensors
- Explosion-protected versions Ex i, Ex n and NAMUR NE24

## 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 Pt100 or Pt1000 sensor, connection head, insertion length, neck length, connection to thermowell etc. are available for the thermometers; suitable for any thermowell dimension and any application.

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



**Resistance thermometer, model TR10-B**  
Fig. left: connection head, model BSZ  
Fig. right: connection head, model 1/4000








## Explosion protection (option)

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, the IECEx certificate or in the operating instructions.



### Attention:

Only with the corresponding suitable protective fitting is operation in dust Ex hazardous areas permissible.

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.

Explosion protection	Ignition protection type	Zone
ATEX 	Ex i	Zone 1 gas [II 2G Ex ia IIC T3 ... T6 Gb] Zone 1 connection to zone 0 gas [II 1/2G Ex ia IIC T3 ... T6 Ga/Gb] Zone 0 gas [II 1G Ex ia IIC T3 ... T6 Ga] Zone 21 dust [II 2D Ex ia IIIC T125 ... T65 °C Db] Zone 21 connection to zone 20 dust [II 1/2D Ex ia IIIC T125 ... T65 °C Da/Db] Zone 20 dust [II 1D Ex ia IIIC T125 ... T65 °C Da]
	Ex n <sup>1)</sup>	Zone 2 gas [II 3G Ex nA IIC T1 ... T6 Gc X] Zone 22 dust [II 3D Ex tc IIIC T440 ... T80 °C Dc X]
IECEX (in conjunction with ATEX) 	Ex i	Zone 1 gas [Ex ia IIC T3 ... T6 Gb] Zone 1 connection to zone 0 gas [Ex ia IIC T3 ... T6 Ga/Gb] Zone 0 gas [Ex ia IIC T3 ... T6 Ga] Zone 21 dust [Ex ia IIIC T125 ... T65 °C Db] Zone 21 connection to zone 20 dust [Ex ia IIIC T125 ... T65 °C Da/Db] Zone 20 dust [Ex ia IIIC T125 ... T65 °C Da]
NEPSI 	Ex i	Zone 1 gas [Ex ia IIC T3 ... T6 Gb] Zone 1 connection to zone 0 gas [Ex ia IIC T3 ... T6 Ga/Gb]
	Ex n	Zone 2 gas [Ex nA IIC T1 ... T6]
EAC (previously GOST-R-Ex) 	Ex i	Zone 1 gas [Ex ia IIC T1 ... T6 Gb] Zone 0 gas [Ex ia IIC T3 ... T6 Ga] Zone 21 dust [Ex ia IIIC T125 ... T65 °C Db] Zone 20 dust [Ex ia IIC T125 ... T65 °C Da]
	Ex n	Zone 2 gas [Ex nA IIC T1 ... T6]
INMETRO 	Ex i	Zone 1 gas [Ex ia IIC T3 ... T6 Gb] Zone 1 connection to zone 0 gas [Ex ia IIC T3 ... T6 Ga/Gb] Zone 0 gas [Ex ia IIC T3 ... T6 Ga] Zone 21 dust [Ex ia IIIC T125 ... T65 °C Db] Zone 21 connection to zone 20 dust [Ex ia IIIC T125 ... T65 °C Da/Db] Zone 20 dust [Ex ia IIIC T125 ... T65 °C Da]
	Ex n	Zone 2 gas [Ex nA IIC T1 ... T6]
KOSHA 	Ex i	Zone 1 gas [Ex ia IIC T3 ... T6 Gb] Zone 0 gas [Ex ia IIC T3 ... T6 Ga]
PESO	Ex i	Zone 1 gas [Ex ia IIC T1 ... T6 Gb]
NAMUR NE24 	Ex i	-

## Further approvals, certificates (options)

Approval/Certificate	Description												
EAC 	Import certificate incl. operators certificate Meteorological certificate (GOST) Passport												
DNV 	Type approval for the shipbuilding industry - Maximum insertion length $l_1$ : 435 mm - Connection head: models BS, BSZ, BSZ-H - Neck tube: min. $\varnothing$ 11 x 2 mm, 50 ... 150 mm long - Measuring insert: $\varnothing$ 6 mm Location classification: <table border="1"> <thead> <tr> <th>Parameter</th> <th>Classification</th> </tr> </thead> <tbody> <tr> <td>Temperature</td> <td>D (ambient temperature: -25 ... +70 °C)</td> </tr> <tr> <td>Humidity</td> <td>B (relative humidity: up to 100 %)</td> </tr> <tr> <td>Vibration</td> <td>B (frequency: 3 ... 25 Hz; amplitude: 1.6 mm peak; frequency: 25 ... 100 Hz; amplitude: 4 g)</td> </tr> <tr> <td>EMC</td> <td>Not relevant</td> </tr> <tr> <td>Case</td> <td>For installation on board, the required protection in accordance with DNV rules must be ensured. For use on open deck, an IP 68 connection head is required. <sup>2)</sup> (for "open deck")</td> </tr> </tbody> </table>	Parameter	Classification	Temperature	D (ambient temperature: -25 ... +70 °C)	Humidity	B (relative humidity: up to 100 %)	Vibration	B (frequency: 3 ... 25 Hz; amplitude: 1.6 mm peak; frequency: 25 ... 100 Hz; amplitude: 4 g)	EMC	Not relevant	Case	For installation on board, the required protection in accordance with DNV rules must be ensured. For use on open deck, an IP 68 connection head is required. <sup>2)</sup> (for "open deck")
	Parameter	Classification											
Temperature	D (ambient temperature: -25 ... +70 °C)												
Humidity	B (relative humidity: up to 100 %)												
Vibration	B (frequency: 3 ... 25 Hz; amplitude: 1.6 mm peak; frequency: 25 ... 100 Hz; amplitude: 4 g)												
EMC	Not relevant												
Case	For installation on board, the required protection in accordance with DNV rules must be ensured. For use on open deck, an IP 68 connection head is required. <sup>2)</sup> (for "open deck")												
	- Optional with TW10-P (data sheets TW 95.10, TW 95.12)												

1) Only with model BSZ or BSZ-H connection head (see "Connection heads")  
2) Suitable cable gland required

# Sensor

## Measuring element

Pt100, Pt1000 <sup>1)</sup> (measuring current: 0.1 ... 1.0 mA) <sup>2)</sup>

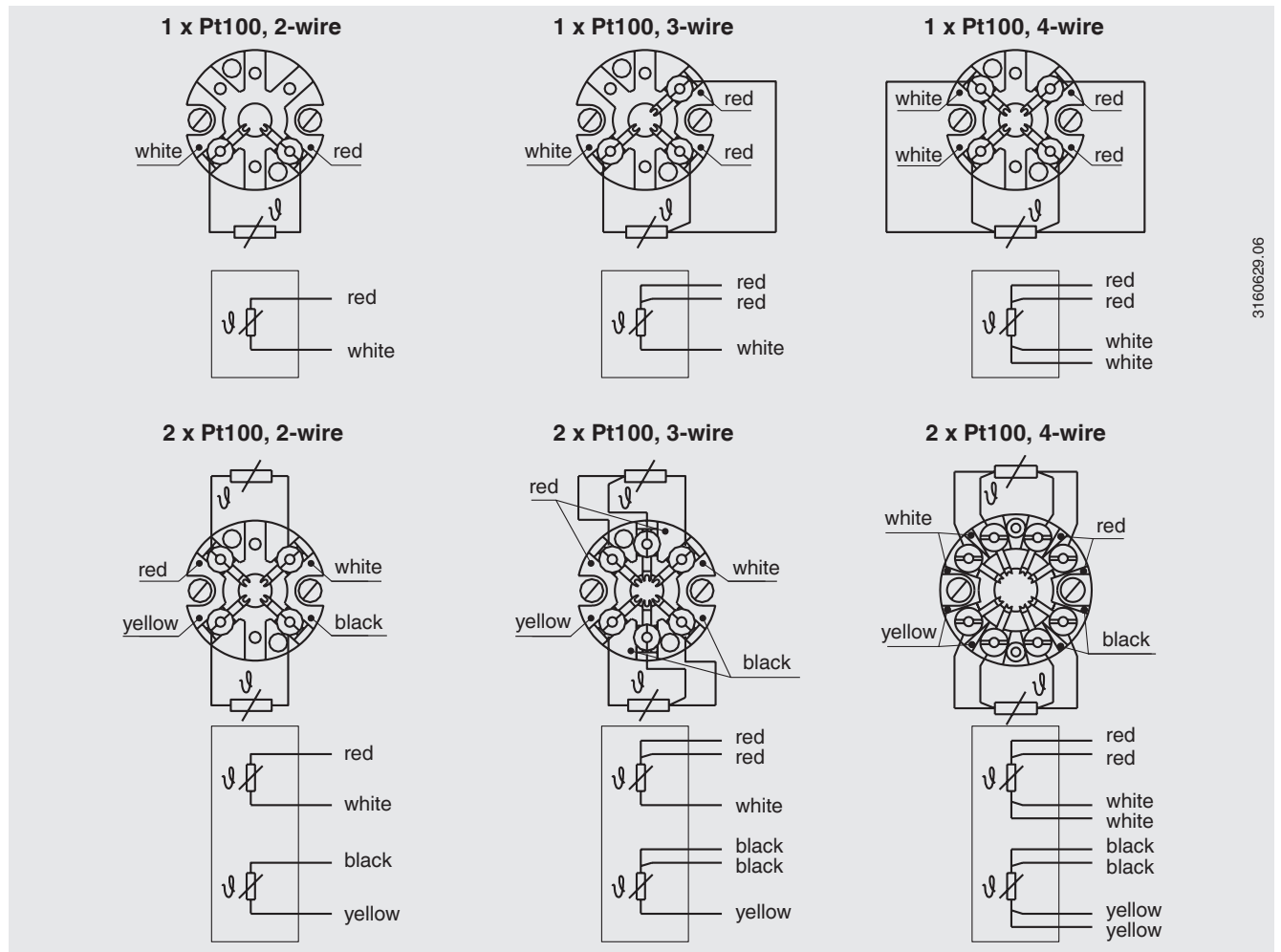
Connection method	
Single elements	1 x 2-wire
	1 x 3-wire
	1 x 4-wire
Dual elements	2 x 2-wire
	2 x 3-wire
	2 x 4-wire <sup>3)</sup>

Accuracy class / Range of use for the sensor per EN 60751		
Class	Sensor construction wire-wound	Thin-film
Class B	-200 ... +600 °C	-50 ... +500 °C
	-200 ... +450 °C	-50 ... +250 °C
Class A <sup>4)</sup>	-100 ... +450 °C	-30 ... +300 °C
	-200 ... +600 °C <sup>5)</sup>	
Class AA <sup>4)</sup>	-50 ... +250 °C	0 ... 150 °C

- 1) Pt1000 only available as a thin-film measuring resistor
- 2) For detailed specifications for Pt100 sensors, see Technical information IN 00.17 at [www.wika.com](http://www.wika.com).
- 3) Not with 3 mm diameter
- 4) Not with 2-wire connection method
- 5) -200 ... -100 °C, +450 ... +600 °C: Class B

## Electrical connection

(Colour code per EN/IEC 60751)

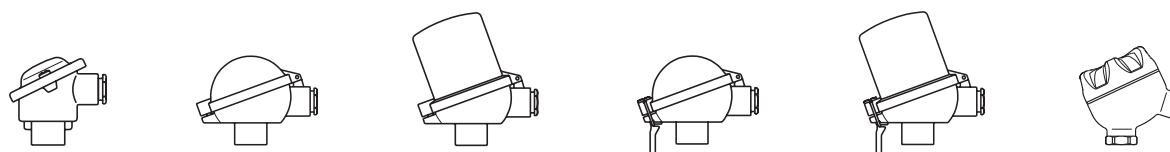


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For the electrical connections of built-in temperature transmitters see the corresponding data sheets or operating instructions.

## Connection head

### ■ European versions per EN 50446 / DIN 43735



BS

BSZ,  
BSZ-K

BSZ-H, BSZ-HK,  
BSZ-H / DIH10

BSS

BSS-H

BVS

Model	Material	Cable entry thread size	Ingress protection	Cap	Surface	Connection to neck tube
BS	Aluminium	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Flat cap with 2 screws	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BSZ	Aluminium	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Spherical hinged cover with cylinder head screw	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BSZ-K	Plastic	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Spherical hinged cover with cylinder head screw	Black	M24 x 1.5
BSZ-H	Aluminium	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Raised hinged cover with cylinder head screw	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BSZ-H (2x cable outlet)	Aluminium	2 x M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Raised hinged cover with cylinder head screw	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BSZ-HK	Plastic	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Raised hinged cover with cylinder head screw	Black	M24 x 1.5
BSZ-H / DIH10 <sup>1)</sup>	Aluminium	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Raised hinged cover with cylinder head screw	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BSS	Aluminium	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Spherical hinged cover with clamping lever	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BSS-H	Aluminium	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Raised hinged cover with clamping lever	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
BVS	Stainless steel	M20 x 1.5 <sup>2)</sup>	IP 65 <sup>3)</sup>	Precision-cast screw cap	Blank, electropolished	M24 x 1.5

Model	Explosion protection				
	without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex nA (gas) Zone 2	Ex tc (dust) Zone 22
BS	x	x	-	-	-
BSZ	x	x	x	x	x
BSZ-K	x	x	-	-	-
BSZ-H	x	x	x	x	x
BSZ-H (2x cable outlet)	x	x	x	x	x
BSZ-HK	x	x	-	-	-
BSZ-H / DIH10 <sup>1)</sup>	x	x	-	-	-
BSS	x	x	-	-	-
BSS-H	x	x	-	-	-
BVS	x	x	-	-	-

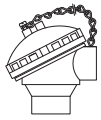
1) LED display DIH10

2) Standard (others on request)

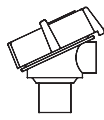
3) Suitable cable gland required (optional up to IP 66/IP 68 possible)

4) RAL 5022

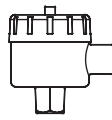
■ North American versions



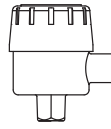
**KN4-A**  
**KN4-P**



**1/4000 F**  
**1/4000 S**



**7/8000 W**  
**7/8000 S**



**7/8000 W / DIH50**  
**7/8000 S / DIH50**

Model	Material	Cable entry thread size	Ingress protection	Cover / Cap	Surface	Connection to neck tube
<b>KN4-A</b>	Aluminium	½ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blue, lacquered <sup>4)</sup>	M24 x 1.5, ½ NPT
<b>KN4-P <sup>4)</sup></b>	Polypropylene	½ NPT	IP 65 <sup>7)</sup>	Screw cap	White	½ NPT
<b>1/4000 F</b>	Aluminium	½ NPT, ¾ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blue, lacquered <sup>4)</sup>	½ NPT
<b>1/4000 S</b>	Stainless steel	½ NPT, ¾ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blank	½ NPT
<b>7/8000 W</b>	Aluminium	½ NPT, ¾ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blue, lacquered <sup>4)</sup>	½ NPT
<b>7/8000 S</b>	Stainless steel	½ NPT, ¾ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blank	½ NPT
<b>7/8000 W / DIH50 <sup>6)</sup></b>	Aluminium	½ NPT, ¾ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blue, lacquered <sup>4)</sup>	½ NPT
<b>7/8000 S / DIH50 <sup>6)</sup></b>	Stainless steel	½ NPT, ¾ NPT, M20 x 1.5 <sup>2)</sup>	IP 65 <sup>7)</sup>	Screw cap	Blank	½ NPT

Model	Explosion protection				
	without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex nA (gas) Zone 2	Ex tc (dust) Zone 22
<b>KN4-A</b>	x	x	-	-	-
<b>KN4-P <sup>5)</sup></b>	x	-	-	-	-
<b>1/4000 F</b>	x	x	-	-	-
<b>1/4000 S</b>	x	x	-	-	-
<b>7/8000 W</b>	x	x	-	-	-
<b>7/8000 S</b>	x	x	-	-	-
<b>7/8000 W / DIH50 <sup>6)</sup></b>	x	x	-	-	-
<b>7/8000 S / DIH50 <sup>6)</sup></b>	x	x	-	-	-

- 2) Standard
- 4) RAL 5022
- 5) on request
- 6) DIH50 LC display
- 7) Suitable seal/cable gland required

## Connection head with digital display



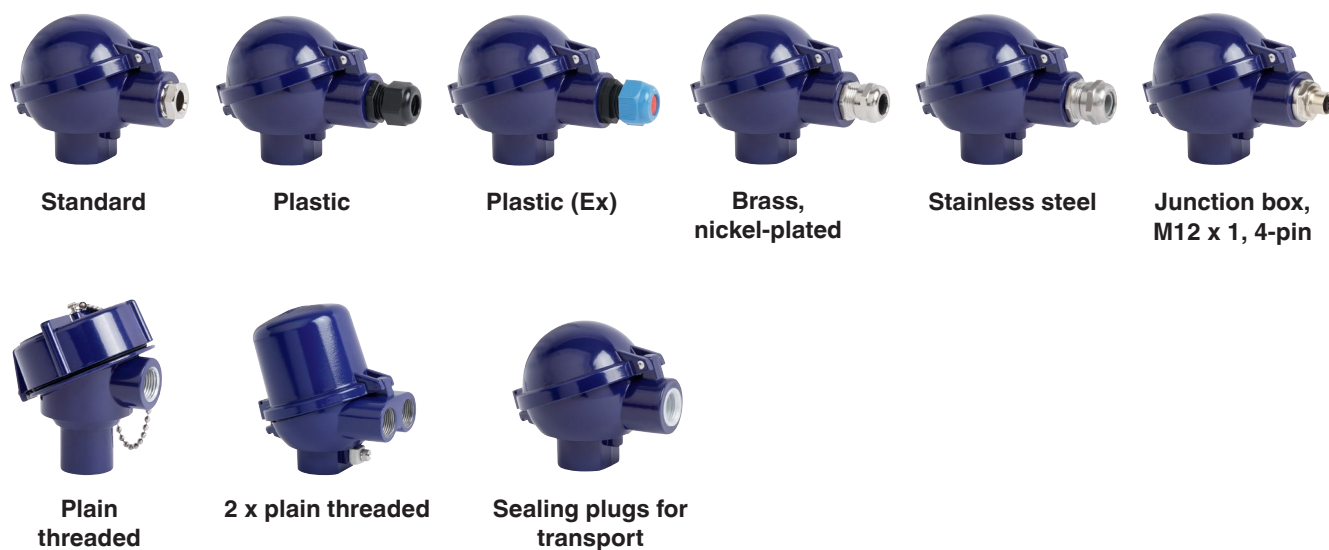
**Connection head BSZ-H with LED display model DIH10**  
see data sheet AC 80.11



**Connection head 7/8000 W with LC display model DIH50**

To operate the digital displays, a transmitter with a 4 ... 20 mA output is always required.

## Cable entry



The pictures show examples of connection heads.

Cable entry	Min./max. ambient temperature	Cable entry thread size
Standard cable entry <sup>1)</sup>	-40 ... +80 °C	M20 x 1.5 or ½ NPT
Plastic cable gland (cable Ø 6 ... 10 mm) <sup>1)</sup>	-40 ... +80 °C	M20 x 1.5 or ½ NPT
Nickel-plated brass cable gland (cable Ø 6 ... 12 mm)	-50 ... +80 °C	M20 x 1.5 or ½ NPT
Stainless steel cable gland (cable Ø 7 ... 12 mm)	-50 ... +80 °C	M20 x 1.5 or ½ NPT
Plain threaded	-	M20 x 1.5 or ½ NPT
2 x plain threaded <sup>2)</sup>	-	2 x M20 x 1.5 or 2 x ½ NPT
Junction box, M12 x 1, 4-pin <sup>3)</sup>	-40 ... +80 °C	M20 x 1.5
Sealing plugs for transport	-40 ... +80 °C	M20 x 1.5 or ½ NPT

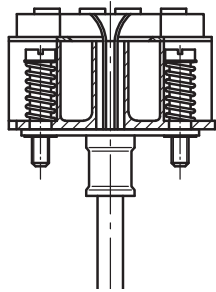
Cable entry	Colour	Explosion protection				
		without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex nA (gas) Zone 2	Ex tc (dust) Zone 22
Standard cable entry <sup>1)</sup>	Blank	x	x	-	-	-
Plastic cable gland <sup>1)</sup>	Black or grey	x	-	-	-	-
Plastic cable gland, Ex e <sup>1)</sup>	Light blue	x	x	x	-	-
Plastic cable gland, Ex e <sup>1)</sup>	Black	x	-	-	x	x
Nickel-plated brass cable gland	Blank	x	-	-	-	-
Nickel-plated brass cable gland, Ex e	Blank	x	x	x	x	x
Cable gland stainless steel	Blank	x	x	x	-	-
Stainless steel cable gland, Ex e	Blank	x	x	x	x	x
Plain threaded	-	x	x	x <sup>5)</sup>	x <sup>5)</sup>	x <sup>5)</sup>
2 x plain threaded <sup>2)</sup>	-	x	x	x <sup>5)</sup>	x <sup>5)</sup>	x <sup>5)</sup>
Junction box, M12 x 1, 4-pin <sup>3)</sup>	-	x	x <sup>4)</sup>	x <sup>4)</sup>	-	-
Sealing plugs for transport	Transparent	not applicable, transport protection				

- 1) Not available for BVS connection head  
 2) Only for BSZ-H connection head  
 3) Not available for ½ NPT thread size cable entry  
 4) With appropriate mating connector connected  
 5) Suitable cable gland required for operation

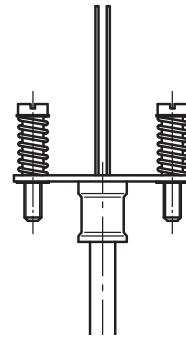
# Transmitter

## Mounting onto the measuring insert

With mounting on the measuring insert, the transmitter replaces the terminal block and is fixed directly to the terminal plate of the measuring insert.



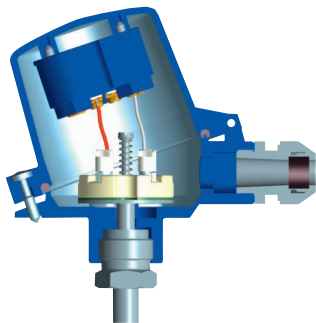
Measuring insert with mounted transmitter (here: model T32)



Measuring insert prepared for transmitter mounting

## Mounted within the cap of the connection head

Mounting the transmitter in the cap of the connection head is preferable to mounting it on the measuring insert. With this type of mounting, for one, a better thermal insulation is ensured, and in addition, exchange and mounting for servicing is simplified.



## Transmitter models



T19



T24



T12



T32



T53

Output signal 4 ... 20 mA, HART® protocol, FOUNDATION™ Fieldbus and PROFIBUS® PA					
Transmitter (selectable versions)	Model T19	Model T24	Model T12	Model T32	Model T53
Data sheet	TE 19.03	TE 24.01	TE 12.03	TE 32.04	TE 53.01
Output					
■ 4 ... 20 mA	x	x	x	x	
■ HART® protocol				x	
■ FOUNDATION™ Fieldbus and PROFIBUS® PA					x
Connection method					
■ 1 x 3-wire	x	x	x	x	x
■ 1 x 4-wire			x	x	x
Measuring current	0.8 mA	0.5 mA	0.2 mA	0.3 mA	0.2 mA
Explosion protection	Without	Optional	Optional	Optional	Standard

## Possible mounting positions for transmitters

Connection head	T19	T24	T12	T32	T53
BS	○	○	-	-	○
BSZ	○	○	○	○	○
BSZ-K	●	●	●	●	●
BSZ-H	●	●	●	●	●
BSZ-H (2x cable outlet)	●	●	●	●	●
BSZ-HK	●	●	●	●	●
BSZ-H / DIH10	●	●	●	●	-
BSS	○	○	○	○	○
BSS-H	●	●	●	●	●
BVS	○	○	○	○	○
KN4-A / KN4-P	○	○	○	○	○
1/4000 F	○	○	○	○	○
1/4000 S	○	○	○	○	○
7/8000 W	○	○	○	○	○
7/8000 S	○	○	○	○	○
7/8000 W / DIH50	○	○	○	○	-
7/8000 S / DIH50	○	○	○	○	-

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

The mounting of a transmitter on the measuring insert is possible with all the connection heads listed here. The fitting of a transmitter in the (screw) cap of a North American design connection head is not possible.

Mounting of 2 transmitters on request.

For a correct determination of the overall measuring deviation, the sensor and transmitter measuring deviations must be added.

## Functional safety (option) with temperature transmitter model T32



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.

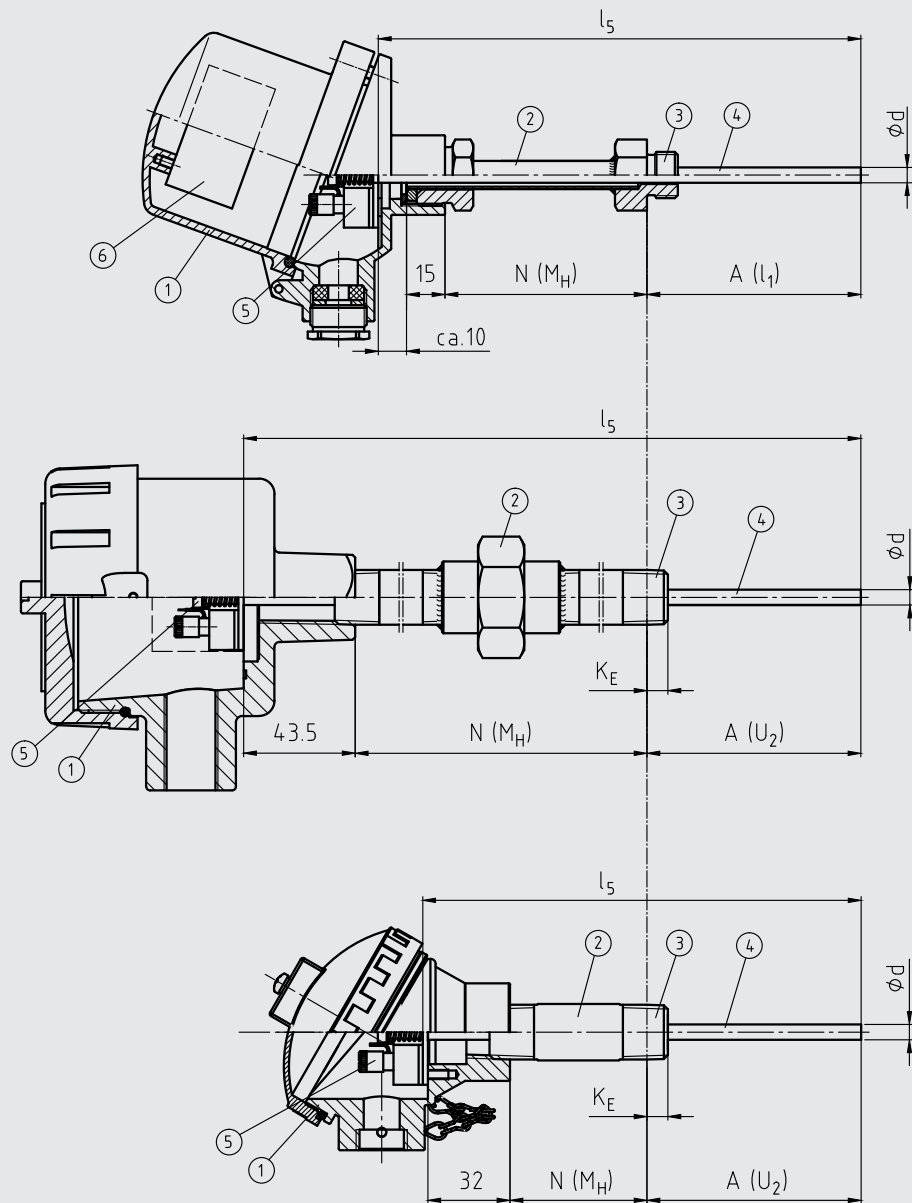
Selected TR10-B resistance thermometers, in combination with a suitable temperature transmitter (e.g. model T32.1S, TÜV certified SIL version for protection systems developed in accordance with IEC 61508), are suitable as sensors for safety functions to SIL 2.

For detailed specifications, see Technical information IN 00.19 at [www.wika.com](http://www.wika.com).



# Components model TR10-B

Fig. with parallel thread, for tapered thread see "Connection to thermowell"



**Legend:**

- ① Connection head
- ② Neck tube
- ③ Connection to thermowell
- ④ Measuring insert
- ⑤ Terminal block/transmitter (option)
- ⑥ Transmitter (option)

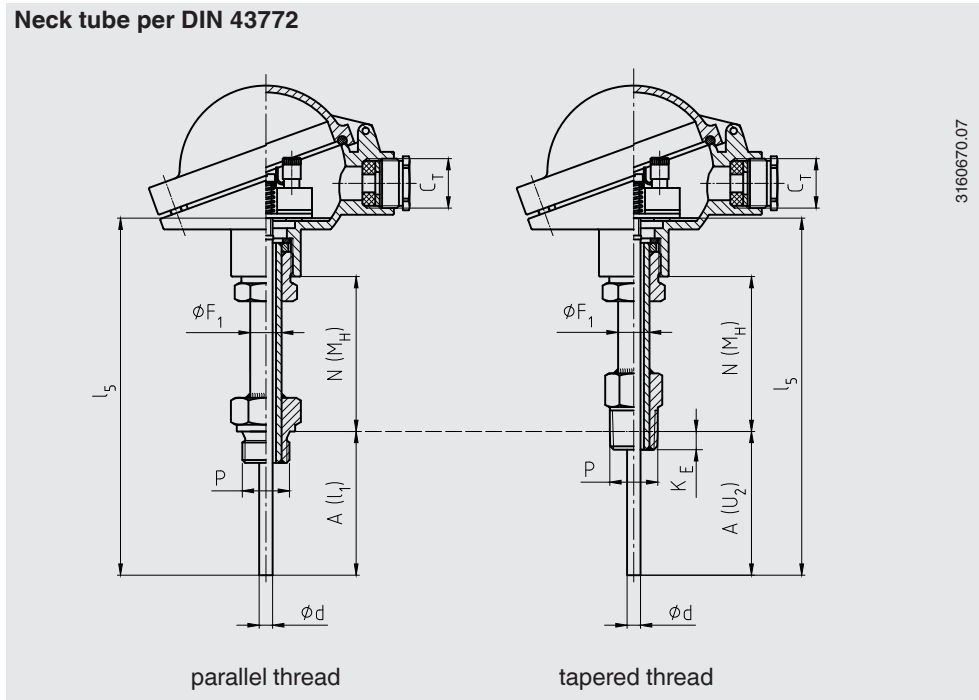
- $A (l_1)$  Insertion length (parallel threads)
- $A (U_2)$  Insertion length (tapered threads)
- $l_5$  Measuring insert length
- $N (M_H)$  Neck length
- $K_E$  1/2 NPT: 8.13 mm  
3/4 NPT: 8.61 mm
- $\varnothing d$  Measuring insert diameter

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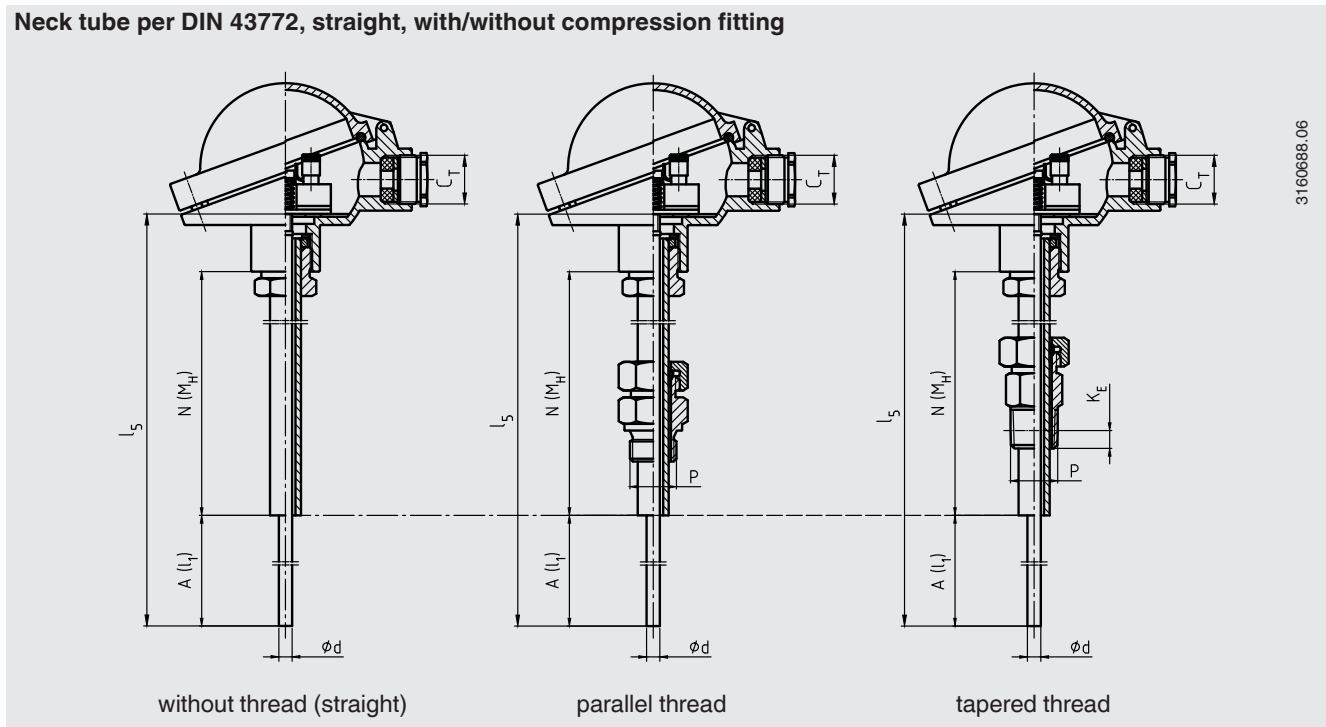
# Neck tube

## Neck tube designs

### Neck tube per DIN 43772



### Neck tube per DIN 43772, straight, with/without compression fitting

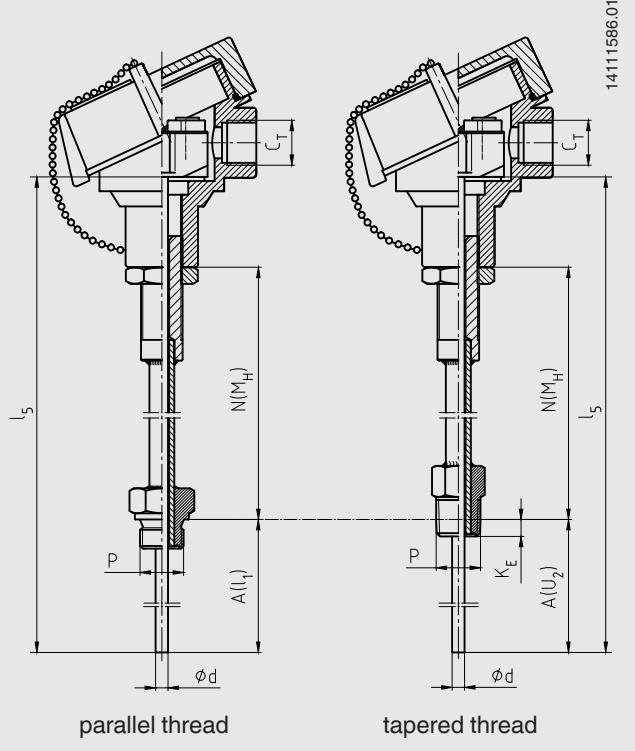


#### Legend:

A (I <sub>1</sub> )	Insertion length (parallel threads)	C <sub>T</sub>	Thread cable entry
A (U <sub>2</sub> )	Insertion length (tapered threads)	∅ F <sub>1</sub>	Neck tube diameter
l <sub>5</sub>	Measuring insert length	P	Thread to the thermowell
N (M <sub>H</sub> )	Neck length	∅ d	Measuring insert diameter
K <sub>E</sub>	1/2 NPT: 8.13 mm		
	3/4 NPT: 8.61 mm		

The pictures show examples of connection heads.

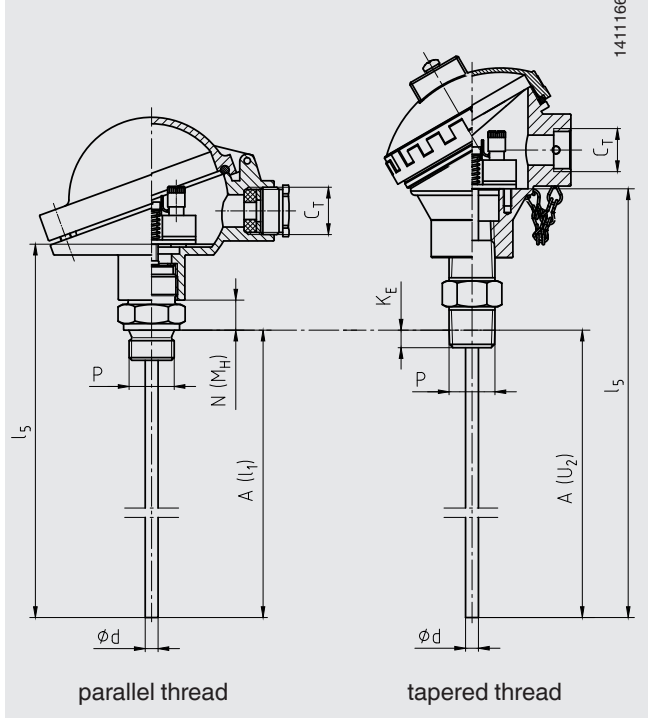
**Neck tube, with counter nut to head**



parallel thread

tapered thread

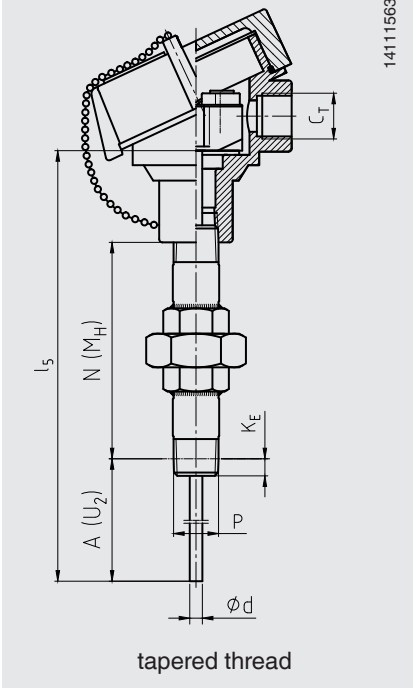
**Double threaded hex bushing (with hexagonal spanner flats)**



parallel thread

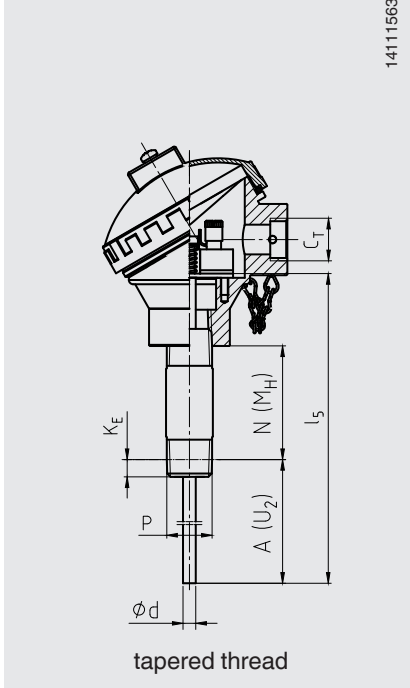
tapered thread

**“Nipple-union-nipple” neck tube**



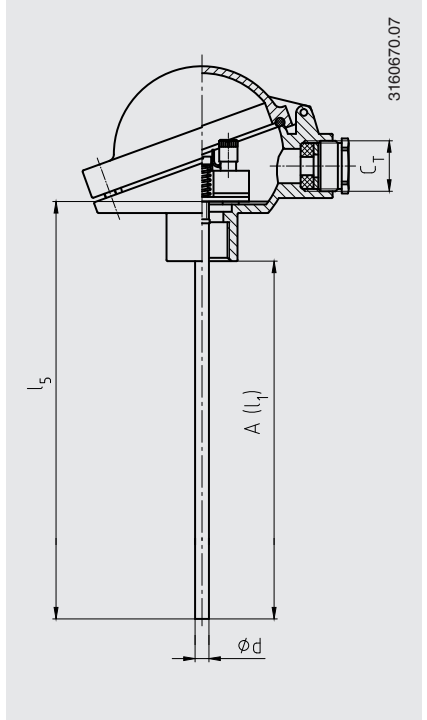
tapered thread

**Double threaded hex bushing (tube section)**



tapered thread

**Without neck tube**



**Legend:**

- |  |                                    |
|--|------------------------------------|
| $A(I_1)$ Insertion length (parallel threads) | $C_T$ Thread cable entry           |
| $A(U_2)$ Insertion length (tapered threads)  | $\phi F_1$ Neck tube diameter      |
| $l_5$ Measuring insert length                | $P$ Thread to the thermowell       |
| $N(M_H)$ Neck length                         | $\phi d$ Measuring insert diameter |
| $K_E$ 1/2 NPT: 8.13 mm                       |                                    |
| 3/4 NPT: 8.61 mm                             |                                    |

The pictures show examples of connection heads.

## Neck tube versions

Neck tube design	Diameter	Connection to head	Connection to thermowell	Material
Neck tube per DIN 43772	12 x 1.5 mm	M24 x 1.5 (rotatable threaded connection)	Mounting thread, compression fitting, union nut, male nut, straight	1.4571
	12 x 2.5 mm			
	14 x 2.5 mm		Mounting thread, union nut, male nut	
Neck tube with counter nut to head	14 x 2.5 mm	M20 x 1.5 (with counter nut)	Mounting thread	1.4571
Double threaded hex bushing (with hexagonal spanner flats)	-	M24 x 1.5, ½ NPT	Mounting thread	1.4571
“Nipple-union-nipple” neck tube (nipple-union-nipple)	~ 22 mm	½ NPT	Mounting thread	316
	~ 27 mm	¾ NPT		
Double threaded hex bushing (tube section)	~ 22 mm	½ NPT	Mounting thread	316
	~ 27 mm	¾ NPT		

## Thread sizes

Neck tube design	Diameter	Thread to the thermowell
Neck tube per DIN 43772	12 x 1.5 mm 12 x 2.5 mm	G ½ B
		G ¾ B
		G ¼ B
		M20 x 1.5
		M18 x 1.5
		M14 x 1.5
		½ NPT
		¾ NPT
		G ½ B compression fitting (metal ring)
		G ¾ B compression fitting (metal ring)
		M18 x 1.5 compression fitting (metal ring)
		M20 x 1.5 compression fitting (metal ring)
		G ½ B union nut
		G ¾ B union nut
		M20 x 1.5 union nut
		G ½ B male nut
		G ¾ B male nut
M20 x 1.5 male nut		
Without threaded connection, straight		
Neck tube per DIN 43772	14 x 2.5 mm	G ½ B
		G ¾ B
		G ¼ B
		M20 x 1.5
		M18 x 1.5
		M14 x 1.5
		½ NPT
		¾ NPT
		G ½ B union nut
		G ¾ B union nut
		M20 x 1.5 union nut
		G ½ B male nut
		G ¾ B male nut
M20 x 1.5 male nut		
Neck tube with counter nut to head	14 x 2.5 mm	½ NPT
		¾ NPT
		G ½ B
		G ¾ B
		G ¼ B
		M14 x 1.5
		M18 x 1.5
M20 x 1.5		

Continued on next page

Neck tube design	Diameter	Thread to the thermowell
Double threaded hex bushing (with hexagonal spanner flats)	-	G ½ B
		G ¾ B
		G ¼ B
		½ NPT
		¾ NPT
		M14 x 1.5
		M18 x 1.5
M20 x 1.5		
“Nipple-union-nipple” neck tube	~ 22 mm	½ NPT
	~ 27 mm	¾ NPT
Double threaded hex bushing (tube section)	~ 22 mm	½ NPT
	~ 27 mm	¾ NPT

## Neck lengths

Neck tube design	Neck length	Min. / max. neck length
Neck tube per DIN 43772	150 mm (approx. 6 inch)	25 mm (approx. 1 inch) / 500 mm (approx. 20 inch)
Neck tube per DIN 43772, straight	150 mm (approx. 6 inch)	75 mm (approx. 3 inch) / 900 mm (approx. 35 inch)
Neck tube with counter nut to head	150 mm (approx. 6 inch)	75 mm (approx. 3 inch) / 250 mm (approx. 10 inch)
<b>Double threaded hex bushing (with hexagonal spanner flats)</b>		
■ M24 x 1.5 to connection head, parallel thread to thermowell	13 mm	-
■ 1/2 NPT to connection head, parallel thread to thermowell	25 mm	-
■ M24 x 1.5 to connection head, tapered thread to thermowell	25 mm	-
■ 1/2 NPT to connection head, tapered thread to thermowell	25 mm	-
“Nipple-union-nipple” neck tube	150 mm (approx. 6 inch)	75 mm (approx. 3 inch) / 250 mm (approx. 10 inch)
Double threaded hex bushing (tube section)	50 mm (approx. 2 inch)	50 mm (approx. 2 inch) / 250 mm (approx. 10 inch)

The neck tube is screwed into the connection head. 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.

Other versions on request

## Measuring insert

Within the TR10-B, the measuring insert of model TR10-A is fitted.

The replaceable measuring insert is made of a vibration-resistant, sheathed, mineral-insulated cable (MI cable).

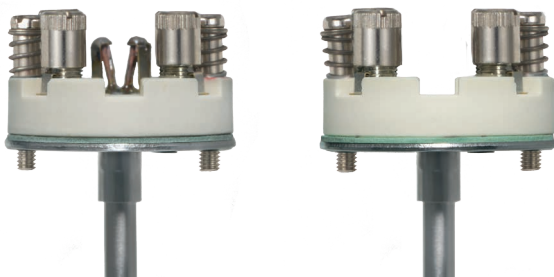
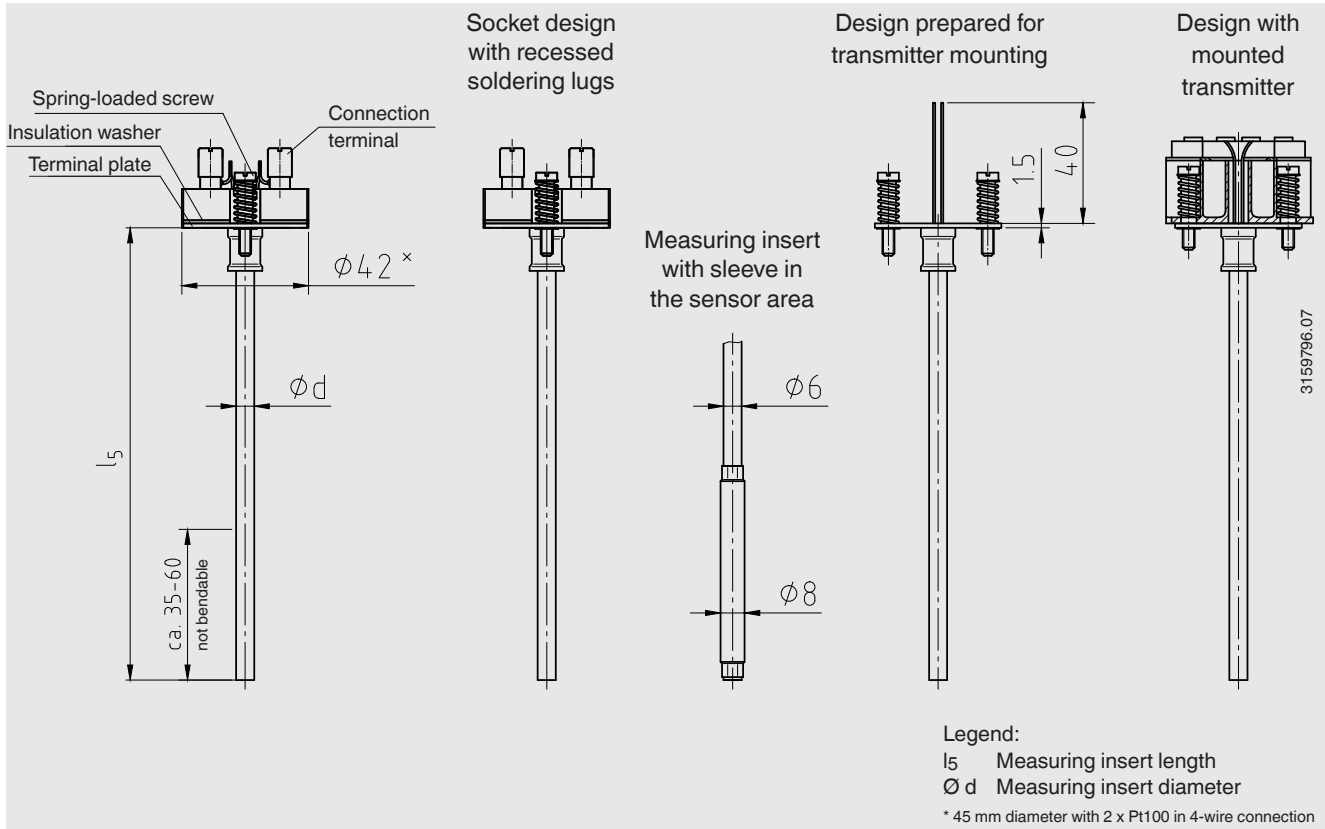


Fig. left: standard version

Fig. right: version with recessed soldering lugs (option)

## Dimensions in mm



Measuring insert diameter $\phi d$ in mm	Index per DIN 43735	Tolerance in mm	Sheath material		
			Standard design	Recessed soldering lugs	
3 <sup>1)</sup>	Standard	30	3 ±0.5	1.4571, 316L <sup>1)2)</sup>	1.4571
6	Standard	60	6 <sup>0</sup> <sub>-0.1</sub>	1.4571, 316L <sup>1)2)</sup>	1.4571
8 (6 mm with sleeve)	Standard	-	8 <sup>0</sup> <sub>-0.1</sub>	1.4571	1.4571
8	Standard	80	8 <sup>0</sup> <sub>-0.1</sub>	1.4571, 316L <sup>1)2)</sup>	1.4571

1) Not possible with 2 x 4-wire versions

2) Not with socket design with recessed soldering lugs

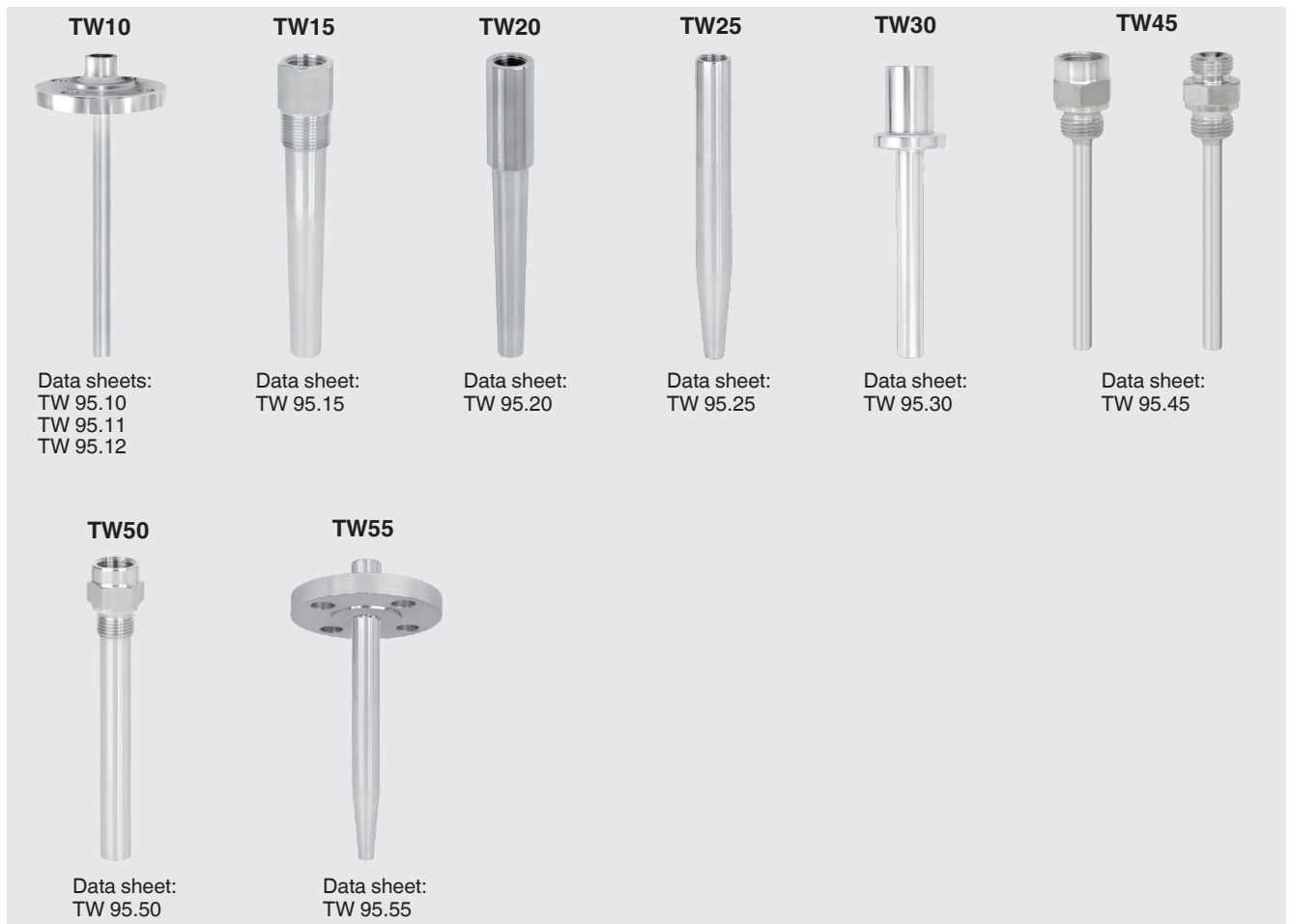
Only correct measuring insert length and correct measuring insert diameter ensure sufficient heat transfer from thermowell to the measuring insert.

The bore diameter of the thermowell should be a max. 1 mm larger than the measuring insert diameter.

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  $\leq 5.5$  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: max 10 mm).

## Thermowell selection



Special thermowells on request

## Operating conditions

### Mechanical requirements

Version	
Standard	6 g peak-to-peak, wire-wound or thin film measuring resistor
Option	Vibration-resistant sensor tip, max. 20 g peak-to-peak, thin-film measuring resistor Highly vibration-resistant sensor tip, max. 50 g peak-to-peak, thin-film measuring resistor

### Response time (in water, per EN 60751)

$$t_{50} < 10 \text{ s}$$

$$t_{90} < 20 \text{ s}$$

Specifications for measuring insert diameter 6 mm:  
The thermowell required for operation increases the response time dependent upon the actual parameters for the thermowell and the process.

### Ambient and storage temperature

{-50} -40 ... +80 °C

{ } Items in curved brackets are available optional extras

### Ingress protection

- Without thermowell  
IP 20 per IEC 60529/EN 60530
- With thermowell  
To IP 66/IP 68 in accordance with IEC 60529/EN 60530 under the following conditions:
  - Corresponding thermowell (tightly screwed to the neck tube and head)
  - Use of a suitable cable gland
  - Use of a cable cross-section appropriate for the gland or select the appropriate cable gland for the available cable
  - Adhere to the tightening torques for all threaded connections

## CE conformity

### EMC directive <sup>1)</sup>

2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)

### ATEX directive (option)

94/9/EC

## Approvals (option)

- **IECEX**, international certification for the Ex area
- **NEPSI**, ignition protection type "i" - intrinsic safety, ignition protection type "n", China
- **EAC (GOST-R-Ex)**, import certificate, customs union Russia/Belarus/Kazakhstan
- **GOST**, metrology/measurement technology, Russia
- **SIL**, Functional safety (only in conjunction with model T32 temperature transmitter)
- **INMETRO**, Institute of Metrology, Brazil
- **DNV**, ships, shipbuilding (e.g. offshore), international
- **KOSHA**, ignition protection type "i" - intrinsic safety, South Korea
- **PESO (CCOE)**, ignition protection type "i" - intrinsic safety, India

## Certificates

Certification type	Measuring accuracy	Material certificate <sup>2)</sup>
2.2 test report	x	x
3.1 inspection certificate	x	-
DKD/DAkkS calibration certificate	x	-

The different certifications can be combined with each other.

1) Only for built-in transmitter

2) Thermowells have their own material certificates

Approvals and certificates, see website

## Ordering information

Model / Explosion protection / Further approvals, certificates / Sensor / Accuracy class, range of use of the sensor / Connection housing / Cable entry / Transmitter / Connection to neck tube / Neck tube / Thread size / Neck length N (M<sub>H</sub>) / Insertion length A (I<sub>1</sub>), A (U<sub>2</sub>) / Measuring insert diameter Ø d / Measuring insert sheath material / Certificates / Options

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