

# Thermocouple

## For additional thermowell

### Model TC10-B

WIKA data sheet TE 65.02



for further approvals  
see page 2

#### 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

- Sensor ranges from -40 ... +1,200 °C [-40 ... +2,192 °F]
- For mounting in all standard thermowell designs
- Spring-loaded measuring insert (replaceable)
- Explosion-protected versions are available for many approval types (see page 2)

#### Description

Thermocouples 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.

A large number of different explosion protection approvals are available for the TC10-B.

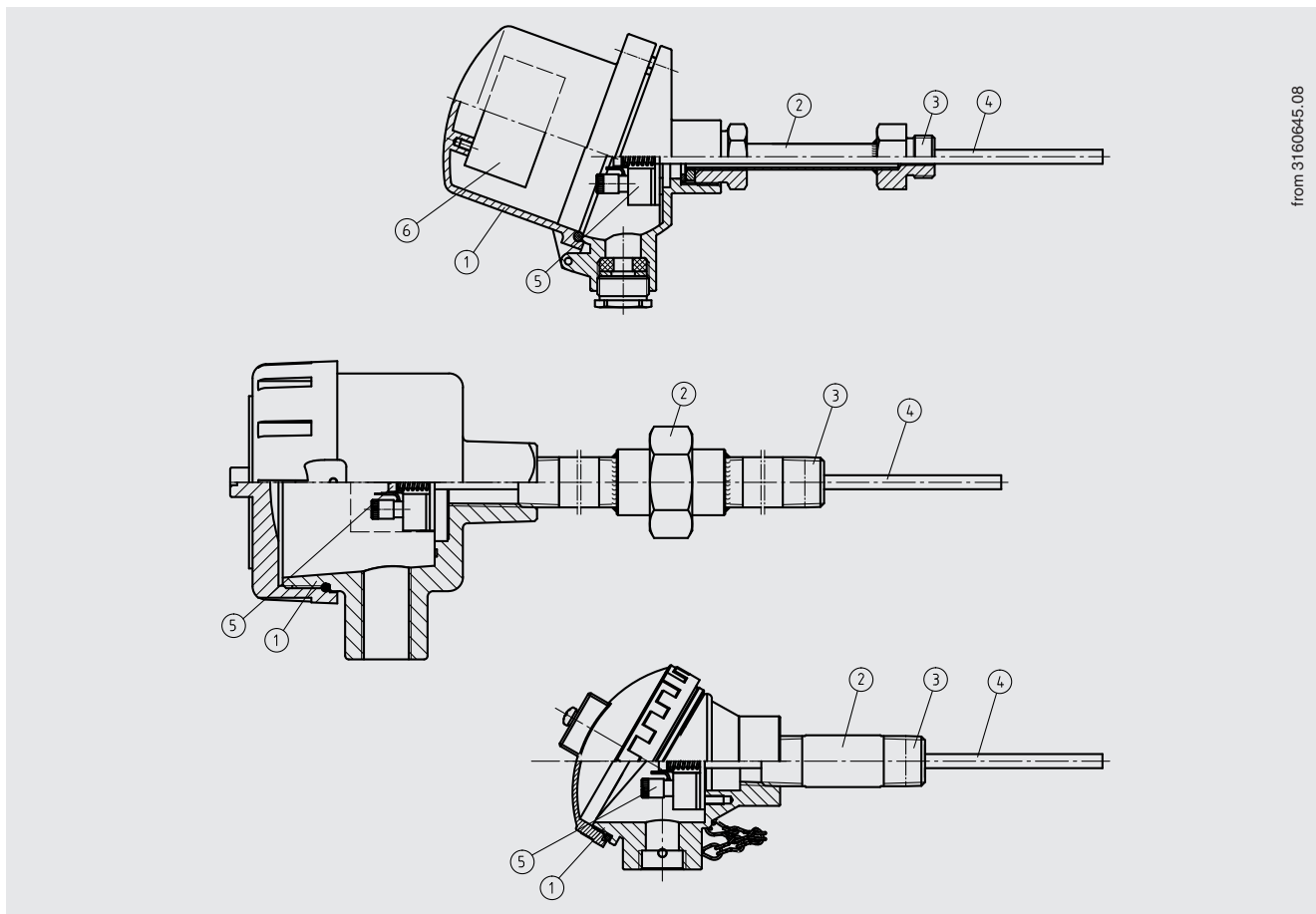
Optionally, we can fit transmitters from the WIKA range into the connection head of the TC10-B.



Fig. left: Model TC10-B with BSZ connection head

Fig. right: Model TC10-B with 1/4000 connection head

## Description of the components



from 31606/45.08

### Legend:

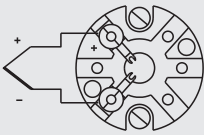
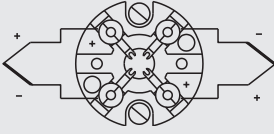
- ① Connection head
- ② Neck tube
- ③ Connection to thermowell
- ④ Measuring insert (TC10-A)
- ⑤ Terminal block/transmitter (option)
- ⑥ Transmitter (option)

## Overview of approvals for explosion protection

Approval	Explosion protection				
	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex e (gas) Zone 1, 2	Ex t (dust) Zone 21, 22	Ex nA (gas) Zone 2
<b>ATEX</b>	x	x	x	x	x
<b>IECEX</b>	x	x	x	x	x
<b>EAC</b>	x	x	-	-	x
<b>Ex Ukraine</b>	x	x	-	-	-
<b>INMETRO</b>	x	x	-	-	-
<b>CCC</b>	x	x	x	-	x
<b>KCs</b>	x	-	-	-	-
<b>PESO</b>	x	-	-	-	-

→ For detailed information, see page 15

## Measuring element

Measuring element		
Type of measuring element	Thermocouple per IEC 60584-1 or ASTM E230 Types K, J, E, N, T	
Measuring current	<ul style="list-style-type: none"> <li>■ Ungrounded welded (standard)</li> <li>■ Welded to the bottom (grounded)</li> </ul>	
Marking of the polarity	The colour coding at the positive poles of the instrument decides the correlation of polarity and terminal	
Single thermocouple		
Dual thermocouple		
Validity limits of the class accuracy per EN 60584-1		
Type K	Class 2	-40 ... +1,200 °C
	Class 1	-40 ... +1,000 °C
Type J	Class 2	-40 ... +750 °C
	Class 1	-40 ... +750 °C
Type E	Class 2	-40 ... +900 °C
	Class 1	-40 ... +800 °C
Type N	Class 2	-40 ... +1,200 °C
	Class 1	-40 ... +1,000 °C
Type T	Class 2	-40 ... +350 °C
	Class 1	-40 ... +350 °C
Validity limits of the class accuracy in accordance with ASTM-E230		
Type K	Standard	0 ... 1,260 °C
	Special	0 ... 1,260 °C
Type J	Standard	0 ... 760 °C
	Special	0 ... 760 °C
Type E	Standard	0 ... 870 °C
	Special	0 ... 870 °C
Type N	Standard	0 ... 1,260 °C
	Special	0 ... 1,260 °C
Type T	Standard	0 ... 370 °C
	Special	0 ... 370 °C

→ For detailed specifications for thermocouples, see IEC 60584-1 or ASTM E230 and Technical Information IN 00.23 at [www.wika.com](http://www.wika.com).







The table shows the temperature ranges listed in the respective standards, in which the tolerance values (class accuracies) are valid.

The actual operating temperature of the thermometer is limited both by the maximum permissible working temperature and the diameter of both the thermocouple and the sheathed cable, as well as by the maximum permissible working temperature of the thermowell material.

For the tolerance value of thermocouples, a cold junction temperature of 0 °C has been taken as the basis.

## Connection head

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

Model	Material	Cable entry thread size	Ingress protection (max.) <sup>1)</sup> IEC/EN 60529	Cap	Surface	Connection to neck tube
 <b>BS</b>	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65 <sup>3)</sup>	Flat cover with 2 screws	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
 <b>BSZ</b>	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65 <sup>3)</sup>	Spherical hinged cover with cylinder head screw	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
<b>BSZ-K</b>	Plastic	■ M20 x 1.5 ■ ½ NPT	IP65	Spherical hinged cover with cylinder head screw	Black	M24 x 1.5
 <b>BSZ-H</b>	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65 <sup>3)</sup>	Raised hinged cover with cylinder head screw	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
<b>BSZ-H (2 x cable outlet)</b>	Aluminium	■ 2 x M20 x 1.5 ■ 2 x ½ NPT	IP65 <sup>3)</sup>	Raised hinged cover with cylinder head screw	Blue, painted (RAL 5022)	M24 x 1.5
<b>BSZ-H / DIH10<sup>2)</sup></b>	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with cylinder head screw	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
<b>BSZ-HK</b>	Plastic	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with cylinder head screw	Black	M24 x 1.5
 <b>BSS</b>	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Spherical hinged cover with clamping lever	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
 <b>BSS-H</b>	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with clamping lever	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
 <b>BVS</b>	Stainless steel	M20 x 1.5	IP65	Precision-cast screw-on lid	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 e (gas) Zone 1, 2	Ex t (dust) Zone 21, 22	Ex nA (gas) Zone 2
<b>BS</b>	x	x	x	-	-	-
<b>BSZ</b>	x	x	x	x <sup>4)</sup>	x <sup>4)</sup>	x <sup>5)</sup>
<b>BSZ-H</b>	x	x	x	x <sup>4)</sup>	x <sup>4)</sup>	x <sup>5)</sup>
<b>BSZ-H (2 x cable outlet)</b>	x	x	x	x <sup>4)</sup>	x <sup>4)</sup>	x <sup>5)</sup>
<b>BSZ-H / DIH10<sup>2)</sup></b>	x	x	-	-	-	-
<b>BSS</b>	x	x	-	-	-	-
<b>BSS-H</b>	x	x	-	-	-	-
<b>BVS</b>	x	x	-	-	-	-
<b>BSZ-K</b>	x	x	-	-	-	-
<b>BSZ-HK</b>	x	x	-	-	-	-

1) IP ingress protection of the connection head. The IP ingress protection of the complete TC10-B instrument does not necessarily have to correspond to the connection head.

2) DIH10 LED display



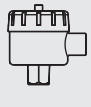
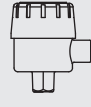
3) Ingress protections, describing temporary or permanent immersion, on request

4) Only ATEX and CCC

5) Only ATEX, CCC and EAC

Further thread sizes on request

■ North American designs

Model	Material	Cable entry thread size	Ingress protection (max.) <sup>1)</sup> IEC/EN 60529	Cap	Surface	Connection to neck tube	
	<b>KN4-A</b>	Aluminium	■ ½ NPT ■ M20 x 1.5	IP65 <sup>3)</sup>	Screw-on lid	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
	<b>KN4-P<sup>2)</sup></b>	Polypropylene	½ NPT	IP65 <sup>3)</sup>	Screw-on lid	White	½ NPT
	<b>1/4000 F</b>	Aluminium	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66 <sup>3)</sup>	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	<b>1/4000 S</b>	Stainless steel	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66 <sup>3)</sup>	Screw-on lid	Natural finish	½ NPT
	<b>7/8000 W</b>	Aluminium	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66 <sup>3)</sup>	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	<b>7/8000 S</b>	Stainless steel	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66 <sup>3)</sup>	Screw-on lid	Natural finish	½ NPT
	<b>7/8000 W / DIH50<sup>4)</sup></b>	Aluminium	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66 <sup>3)</sup>	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	<b>7/8000 S / DIH50<sup>4)</sup></b>	Stainless steel	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66 <sup>3)</sup>	Screw-on lid	Natural finish	½ NPT

Model	Explosion protection					
	Without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex e (gas) Zone 1, 2	Ex t (dust) Zone 21, 22	Ex nA (gas) Zone 2
<b>KN4-A</b>	x	x	-	-	-	-
<b>KN4-P<sup>2)</sup></b>	x	-	-	-	-	-
<b>1/4000 F</b>	x	x	x	x	x	x
<b>1/4000 S</b>	x	x	x	x	x	x
<b>7/8000 W</b>	x	x	x	x	x	x
<b>7/8000 S</b>	x	x	x	x	x	x
<b>7/8000 W / DIH50<sup>4)</sup></b>	x	x	x	-	-	-
<b>7/8000 S / DIH50<sup>4)</sup></b>	x	x	x	-	-	-

1) IP ingress protection of the connection head. The IP ingress protection of the complete TC10-B instrument does not necessarily have to correspond to the connection head.

2) On request

3) Suitable sealing/cable gland required

4) DIH50 LC display

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**  
→ see data sheet AC 80.10

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

## Cable entry

Cable entry	Colour	Ingress protection (max.) IEC/EN 60529 <sup>1)</sup>	Cable entry thread size	Min./max. ambient temperature
 Standard cable entry <sup>2)</sup>	Natural finish	IP65	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-40 ... +80 °C
 Plastic cable gland (cable Ø 6 ... 10 mm) <sup>2)</sup>	<ul style="list-style-type: none"> <li>■ Black</li> <li>■ Grey</li> </ul>	IP66 <sup>3)</sup>	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-40 ... +80 °C
 Plastic cable gland (cable Ø 6 ... 10 mm), Ex e <sup>2)</sup>	<ul style="list-style-type: none"> <li>■ Light blue</li> <li>■ Black</li> </ul>	IP66 <sup>3)</sup>	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	<ul style="list-style-type: none"> <li>■ -20 ... +80 °C</li> <li>■ -40 ... +70 °C</li> </ul>
 Nickel-plated brass cable gland (cable Ø 6 ... 12 mm)	Natural finish	IP66 <sup>3)</sup>	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-60 <sup>4)</sup> / -40 ... +80 °C
	Natural finish	IP66 <sup>3)</sup>	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-60 <sup>4)</sup> / -40 ... +80 °C
 Stainless steel cable gland (cable Ø 7 ... 12 mm)	Natural finish	IP66 <sup>3)</sup>	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-60 <sup>4)</sup> / -40 ... +80 °C
	Natural finish	IP66 <sup>3)</sup>	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-60 <sup>4)</sup> / -40 ... +80 °C
 Plain threaded	-	IP00	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-
 2 x plain threaded <sup>5)</sup>	-	IP00	<ul style="list-style-type: none"> <li>■ 2 x M20 x 1.5</li> <li>■ 2 x ½ NPT</li> </ul>	-
 Junction box M12 x 1 (4-pin) <sup>6)</sup>	-	IP65	M20 x 1.5	-40 ... +80 °C
 Sealing plugs for shipping	Transparent	-	<ul style="list-style-type: none"> <li>■ M20 x 1.5</li> <li>■ ½ NPT</li> </ul>	-40 ... +80 °C

1) IP ingress protection of the cable gland. The IP protection of the complete TC10-B instrument does not necessarily have to correspond to the cable gland.

2) Not available for BVS connection head

3) Ingress protections, describing temporary or permanent immersion, on request

4) Special version on request (explosion-protected versions only available with specific approvals)

5) Only for BSZ-H connection head

6) Not available for ½ NPT thread size cable entry

Cable entry	Explosion protection					
	Without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex e (gas) Zone 1, 2	Ex t (dust) Zone 21, 22	Ex nA (gas) Zone 2
Standard cable entry <sup>1)</sup>	x	x	-	-	-	-
Plastic cable gland <sup>1)</sup>	x	x	-	-	-	-
Plastic cable gland (light blue), Ex e <sup>1)</sup>	x	x	x	-	-	-
Plastic cable gland (black), Ex e <sup>1)</sup>	x	x	x	x	x	x
Brass cable gland, nickel-plated	x	x	x	-	-	-
Brass cable gland, nickel-plated, Ex e	x	x	x	x	x	x
Stainless steel cable gland	x	x	x	-	-	-
Stainless steel cable gland, Ex e	x	x	x	x	x	x
Plain threaded	x	x	x <sup>5)</sup>	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>	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 shipping	Not applicable, transport protection <sup>5)</sup>					

1) Not available for BVS connection head

2) Only for BSZ-H connection head

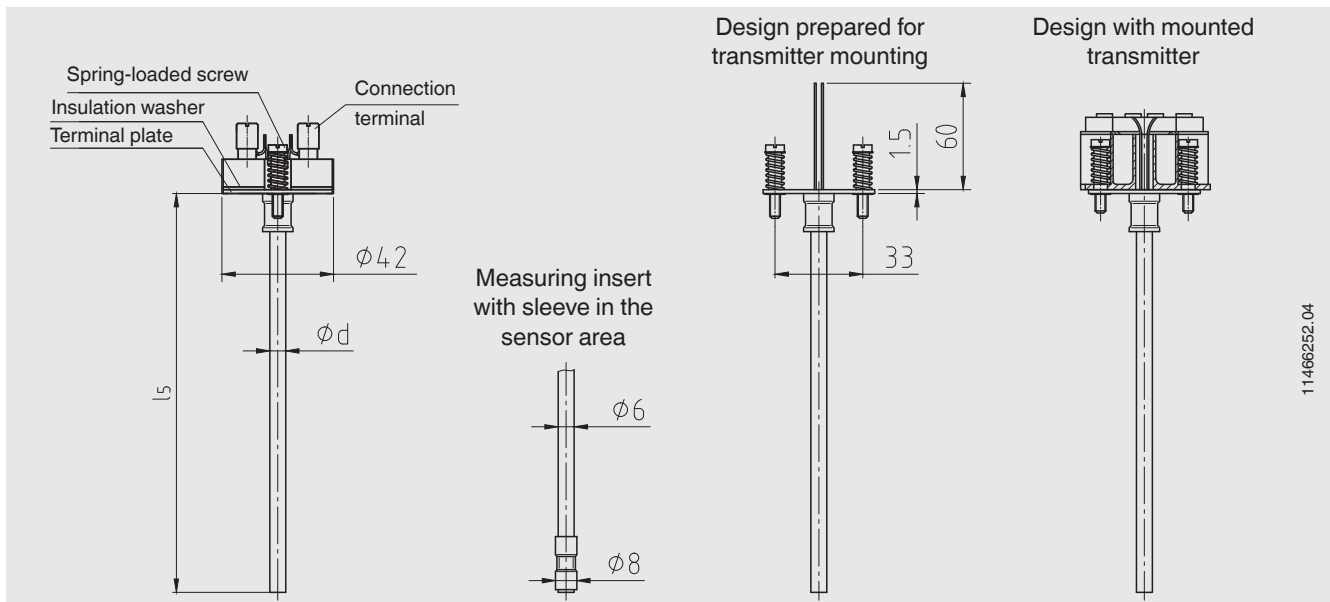
3) Not available for ½ NPT thread size cable entry

4) With appropriate mating connector connected

5) Suitable cable gland required for operation

# Measuring insert

Measuring insert		
<b>Versions</b>	Vibration-resistant, sheathed measuring cable (MI cable)	
<b>Optimal heat transfer</b>	Requirement <ul style="list-style-type: none"> <li>■ Correct measuring insert length</li> <li>■ Correct measuring insert diameter</li> </ul>	
	Bore diameter of the thermowell	Max. 1 mm larger than the measuring insert diameter
	Gap width	For joint width > 0.5 mm between thermowell and measuring insert: → Negative impact on heat transfer → Unfavourable response behaviour of the thermometer
<b>Insertion length</b>	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: max. 10 mm).	
<b>Spring travel</b>	Max. 10 mm	
<b>Tolerance in mm</b>		
$l_5 = 75 \dots 825 \text{ mm}$	+2 0	
$l_5 > 825$	+3 0	



11466252.04

Measuring insert diameter $\varnothing d$ in mm		Index per DIN 43735	Tolerance in mm	Sheath material
<b>3</b>	Standard	30	$3 \pm 0.05$	Ni alloy: Alloy 600
<b>6</b>	Standard	60	$6 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$	
<b>8 (6 mm with sleeve)</b>	Standard	-	$8 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$	Ni alloy: Alloy 600
<b>8</b>	Standard	80	$8 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$	Ni alloy: Alloy 600
<b>1/8 in [3.17 mm]</b> <b>1/4 in [6.35 mm]</b> <b>3/8 in [9.53 mm]</b>	On request	-	-	Ni alloy: Alloy 600

Legend:



- $l_5$  Measuring insert length
- $\varnothing d$  Measuring insert diameter



Measuring insert for thermocouple, model TC10-A



# Transmitter

Transmitter models	Model T16	Model T32
Transmitter data sheet	TE 16.01	TE 32.04
Figure		
<b>Output</b>		
4 ... 20 mA	x	x
HART® protocol	-	x
<b>Input</b>	<ul style="list-style-type: none"> <li>■ Type K</li> <li>■ Type J</li> <li>■ Type E</li> <li>■ Type N</li> <li>■ Type T</li> </ul>	<ul style="list-style-type: none"> <li>■ Type K</li> <li>■ Type J</li> <li>■ Type E</li> <li>■ Type N</li> <li>■ Type T</li> </ul>
<b>Explosion protection</b>	Option	Option
<b>Mounting types</b>		
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.	
Mounted within the cover of the connection head	Mounting the transmitter in the cover 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.	

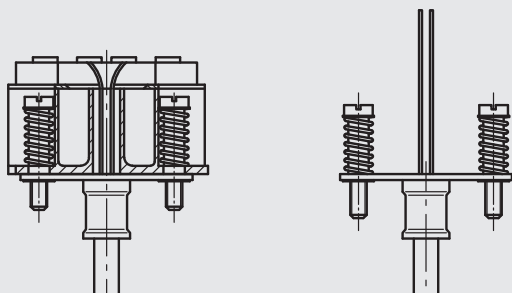
## Mounting types

Mounting onto the measuring insert

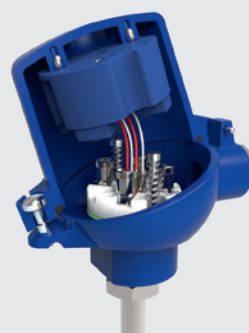


Measuring insert with mounted transmitter (here: Model T32)

Measuring insert prepared for transmitter mounting



Mounted within the cover of the connection head



Possible mounting positions for transmitters	Model T16	Model T32
BS	○	-
BSZ	○	○
BSZ-H	●	●
BSZ-H (2 x cable outlet)	●	●
BSZ-H / DIH10	○	○
BSS	○	○
BSS-H	●	●
BVS	○	○
BSZ-K	○	○
BSZ-HK	●	●
KN4-A	○	○
KN4-P	○	○
1/4000	○	○
7/8000	○	○
7/8000 / DIH50	○	○

Legend:

- Mounted instead of terminal block
- Mounted within the cover 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 with model T32 temperature transmitter (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 achieved by the safety installations.

Selected TC10-B thermocouples, 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).

## Neck tube

### Versions

Neck tube design	Diameter	Connection to head	Connection to thermowell	Material
Neck tube per DIN 43772	<ul style="list-style-type: none"> <li>■ 12 x 1.5 mm</li> <li>■ 12 x 2.5 mm</li> </ul>	M24 x 1.5 (rotatable threaded connection)	<ul style="list-style-type: none"> <li>■ Mounting thread</li> <li>■ Compression fitting</li> <li>■ Union nut</li> <li>■ Pressure screw</li> <li>■ Without threaded connection, plain</li> </ul>	1.4571
	14 x 2.5 mm	M24 x 1.5 (rotatable threaded connection)	<ul style="list-style-type: none"> <li>■ Mounting thread</li> <li>■ Union nut</li> <li>■ Pressure screw</li> </ul>	1.4571
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)	-	<ul style="list-style-type: none"> <li>■ M24 x 1.5</li> <li>■ ½ NPT</li> </ul>	Mounting thread	1.4571
“Nipple-union-nipple” neck tube	~ 22 mm	½ NPT	Mounting thread	316
	~ 27 mm	¾ NPT	Mounting thread	316
Double threaded hex bushing (tube section)	~ 22 mm	½ NPT	Mounting thread	316
	~ 27 mm	¾ NPT	Mounting thread	316

### Thread sizes

Neck tube design	Diameter	Thread to the thermowell
Neck tube per DIN 43772	<ul style="list-style-type: none"> <li>■ 12 x 1.5 mm</li> <li>■ 12 x 2.5 mm</li> </ul>	<ul style="list-style-type: none"> <li>■ G ½ B</li> <li>■ G ¾ B</li> <li>■ G ¼ B</li> <li>■ M20 x 1.5</li> <li>■ M18 x 1.5</li> <li>■ M14 x 1.5</li> <li>■ ½ NPT</li> <li>■ ¾ NPT</li> <li>■ G ½ B compression fitting (metal ferrule)</li> <li>■ G ¾ B compression fitting (metal ferrule)</li> <li>■ M18 x 1.5 compression fitting (metal ferrule)</li> <li>■ M20 x 1.5 compression fitting (metal ferrule)</li> <li>■ G ½ B union nut</li> <li>■ G ¾ B union nut</li> <li>■ M20 x 1.5 union nut</li> <li>■ G ½ B pressure screw</li> <li>■ G ¾ B pressure screw</li> <li>■ M20 x 1.5 pressure screw</li> <li>■ Without threaded connection, plain</li> </ul>
Neck tube per DIN 43772	14 x 2.5 mm	<ul style="list-style-type: none"> <li>■ G ½ B</li> <li>■ G ¾ B</li> <li>■ G ¼ B</li> <li>■ M20 x 1.5</li> <li>■ M18 x 1.5</li> <li>■ M14 x 1.5</li> <li>■ ½ NPT</li> <li>■ ¾ NPT</li> <li>■ G ½ B union nut</li> <li>■ G ¾ B union nut</li> <li>■ M20 x 1.5 union nut</li> <li>■ G ½ B pressure screw</li> <li>■ G ¾ B pressure screw</li> <li>■ M20 x 1.5 pressure screw</li> </ul>

Neck tube design	Diameter	Thread to the thermowell
Neck tube with counter nut to head	14 x 2.5 mm	<ul style="list-style-type: none"> <li>■ 1/2 NPT</li> <li>■ 3/4 NPT</li> <li>■ G 1/2 B</li> <li>■ G 3/4 B</li> <li>■ G 1/4 B</li> <li>■ M14 x 1.5</li> <li>■ M18 x 1.5</li> <li>■ M20 x 1.5</li> </ul>
Double threaded hex bushing (with hexagonal spanner flats)	-	<ul style="list-style-type: none"> <li>■ G 1/2 B</li> <li>■ G 3/4 B</li> <li>■ G 1/4 B</li> <li>■ 1/2 NPT</li> <li>■ 3/4 NPT</li> <li>■ M14 x 1.5</li> <li>■ M18 x 1.5</li> <li>■ M20 x 1.5</li> </ul>
"Nipple-union-nipple" neck tube	~ 22 mm	1/2 NPT
	~ 27 mm	3/4 NPT
Double threaded hex bushing (tube section)	~ 22 mm	1/2 NPT
	~ 27 mm	3/4 NPT

### Neck lengths

Neck tube design	Neck length	Min. / Max. neck length
Neck tube per DIN 43772	150 mm [approx. 6 in]	30 mm [approx. 1.2 in] / 500 mm [approx. 20 in]
Neck tube per DIN 43772, plain	150 mm [approx. 6 in]	75 mm [approx. 3 in] / 900 mm [approx. 35 in]
Neck tube with counter nut to head	150 mm [approx. 6 in]	75 mm [approx. 3 in] / 250 mm [approx. 10 in]
<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 in]	75 mm [approx. 3 in] / 250 mm [approx. 10 in]
Double threaded hex bushing (tube section)	50 mm [approx. 2 in]	50 mm [approx. 2 in] / 250 mm [approx. 10 in]

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 a possible built-in transmitter from high medium temperatures.

Other versions on request

## Operating conditions

Operating conditions	
Ambient and storage temperature	-60 <sup>1)</sup> / -40 ... +80 °C
Vibration resistance	50 g (probe tip)
	The information on vibration resistance refers to the tip of the measuring insert. → For detailed specifications on the vibration resistance of Pt100 sensors, see Technical information IN 00.17 at <a href="http://www.wika.com">www.wika.com</a> .

### IP ingress protection per IEC/EN 60529

First index number	Degree of protection / Short description	Test parameters
<b>Degrees of protection against solid foreign bodies (defined by the 1st index number)</b>		
5	Dust-protected	Per IEC/EN 60529
6	Dust-tight	Per IEC/EN 60529
<b>Degrees of protection against water (defined by the 2nd index number)</b>		
4	Protected against splash water	Per IEC/EN 60529
5	Protected against water jets	Per IEC/EN 60529
6	Protected against strong water jets	Per IEC/EN 60529
7 <sup>2)</sup>	Protected against the effects of temporary immersion in water	Per IEC/EN 60529
8 <sup>2)</sup>	Protected against the effects of permanent immersion in water	By agreement

1) Special version on request (explosion-protected versions only available with specific approvals)




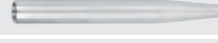




2) Ingress protections, describing temporary or permanent immersion, on request

Standard ingress protection of the model TC10-B is IP65.

The specified degrees of protection apply under the following conditions:

- Use of a suitable thermowell  
(without suitable thermowell: IP40)
- 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


## Thermowell (option)

Thermowell selection		
Model	Data sheet	Representation
TW10	TW 95.10	
TW15	TW 95.15	
TW20	TW 95.20	
TW25	TW 95.25	
TW30	TW 95.30	
TW45	TW 95.45	
TW50	TW 95.50	
TW55	TW 95.55	






Special thermowells on request









# Approvals

## Approvals included in the scope of delivery

Logo	Description	Country
	<b>EU declaration of conformity</b>	European Union
	EMC directive <sup>1)</sup>	
	EN 61326 emission (group 1, class B) and immunity (industrial application)	
	RoHS directive	

## Optional approvals

Logo	Description	Country
	<b>EU declaration of conformity</b>	European Union
	ATEX directive Hazardous areas	
	- Ex i Zone 0 gas II 1G Ex ia IIC T1 ... T6 Ga Zone 1 mounting to zone 0 gas II 1/2G Ex ia IIC T1 ... T6 Ga/Gb Zone 1 gas II 2G Ex ia IIC T1 ... T6 Gb Zone 20 dust II 1D Ex ia IIIC T125 ... T65 °C Da Zone 21 mounting to zone 20 dust II 1/2D Ex ia IIIC T125 ... T65 °C Da/Db Zone 21 dust II 2D Ex ia IIIC T125 ... T65 °C Db	
	- Ex e <sup>2)</sup> Zone 1 gas II 2G Ex eb IIC T1 ... T6 Gb <sup>3)5)</sup> Zone 2 gas II 3G Ex ec IIC T1 ... T6 Gc X Zone 21 dust II 2D Ex tb IIIC TX °C Db <sup>3) 5)</sup> Zone 22 dust II 3D Ex tc IIIC TX °C Dc X	
	- Ex n <sup>2)</sup> Zone 2 gas II 3G Ex nA IIC T1 ... T6 Gc X Zone 22 dust II 3D Ex tc IIIC TX °C Dc X	
	<b>IECEx - in combination with ATEX</b>	International
	Hazardous areas	
	- Ex i Zone 0 gas Ex ia IIC T1 ... T6 Ga Zone 1 mounting to zone 0 gas Ex ia IIC T1 ... T6 Ga/Gb Zone 1 gas Ex ia IIC T1 ... T6 Gb Zone 20 dust Ex ia IIIC T125 ... T65 °C Da Zone 21 mounting to zone 20 dust Ex ia IIIC T125 ... T65 °C Da/Db Zone 21 dust Ex ia IIIC T125 ... T65 °C Db	
	- Ex e <sup>4)</sup> Zone 1 gas Ex eb IIC T1 ... T6 Gb <sup>3)5)</sup> Zone 2 gas Ex ec IIC T1 ... T6 Gc Zone 21 dust Ex tb IIIC TX °C Db <sup>3) 5)</sup> Zone 22 dust Ex tc IIIC TX °C Dc	
	- Ex n <sup>4)</sup> Zone 2 gas Ex nA IIC T1 ... T6 Gc Zone 22 dust Ex tc IIIC TX °C Dc	
	<b>EAC</b>	Eurasian Economic Community
	Hazardous areas	
	- Ex i Zone 0 gas 0 Ex ia IIC T6 ... T1 Ga X Zone 1 gas 1 Ex ia IIC T6 ... T1 Gb X Zone 20 dust Ex ia IIIC T80...T440 °C Da X Zone 21 dust Ex ia IIIC T80...T440 °C Db X	
	- Ex n Zone 2 gas 2Ex nA IIC T6 ... T1 Gc X	
	<b>Ex Ukraine</b>	Ukraine
	Hazardous areas	
	- Ex i Zone 0 gas II 1G Ex ia IIC T1 ... T6 Ga Zone 1 mounting to zone 0 gas II 1/2G Ex ia IIC T1 ... T6 Ga/Gb Zone 1 gas II 2G Ex ia IIC T1 ... T6 Gb Zone 20 dust II 1D Ex ia IIIC T65°C Da Zone 21 mounting to zone 20 dust II 1/2D Ex ia IIIC T65°C Da/Db Zone 21 dust II 2D Ex ia IIIC T65°C Db	
	<b>INMETRO</b>	Brazil
	Hazardous areas	
	- Ex i Zone 0 gas Ex ia IIC T3 ... T6 Ga Zone 1 mounting to zone 0 gas Ex ia IIC T3 ... T6 Ga/Gb Zone 20 dust Ex ia IIIC T125 ... T65 °C Da Zone 21 mounting to zone 20 dust Ex ia IIIC T125 ... T65 °C Da/Db	

Logo	Description	Country
	<b>CCC<sup>5)</sup></b> Hazardous areas - Ex i Zone 0 gas Ex ia IIC T1 ~ T6 Ga Zone 1 gas Ex ia IIC T1 ~ T6 Gb Zone 1 mounting to zone 0 gas Ex ia IIC T1 ~ T6 Ga/Gb Zone 2 gas Ex ic IIC T1 ~ T6 Gc Zone 20 dust Ex iaD 20 T65/T95/T125°C Zone 21 dust Ex iaD 21 T65/T95/T125°C Zone 21 mounting to zone 20 dust Ex iaD 20/21 T65/T95/T125°C - Ex e <sup>4)</sup> Zone 1 gas Ex eb IIC T1 ~ T6 Gb <sup>3) 5)</sup> Zone 2 gas Ex ec IIC T1 ~ T6 Gc - Ex n <sup>4)</sup> Zone 2 gas Ex nA IIC T1 ~ T6 Gc	China
	<b>KCs - KOSHA</b> Hazardous areas - Ex i Zone 0 gas Ex ia IIC T4 ... T6 Zone 1 gas Ex ib IIC T4 ... T6	South Korea
-	<b>PESO</b> Hazardous areas - Ex i Zone 0 gas Ex ia IIC T1 ... T6 Ga Zone 1 mounting to zone 0 gas Ex ia IIC T1 ... T6 Ga/Gb Zone 1 gas Ex ia IIC T1 ... T6 Gb	India
	<b>GOST</b> Metrology, measurement technology	Russia
	<b>KazInMetr</b> Metrology, measurement technology	Kazakhstan
-	<b>MTSCHS</b> Permission for commissioning	Kazakhstan
	<b>BelGIM</b> Metrology, measurement technology	Belarus
	<b>UkrSEPRO</b> Metrology, measurement technology	Ukraine
	<b>Uzstandard</b> Metrology, measurement technology	Uzbekistan
	<b>DNV GL</b> Type approval for the shipbuilding industry - Maximum insertion length $l_1$ : 435 mm - Connection head: Model BSZ - Neck tube: $\varnothing$ 11 x 2 mm or $\varnothing$ 12 x 2.5 mm, max. 150 mm long - Measuring insert: $\varnothing$ 6 mm - Optional with TW10-P (data sheets TW 95.10, TW 95.12)  <i>Location classification:</i> 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 Required protection according to DNV rules shall be provided upon installation on board. For use on open deck a connection head IP68 is required. <sup>6)</sup> (for "open deck")	International

1) Only for built-in transmitter

2) Only with connection head, model BSZ, BSZ-H, 1/4000, 5/6000 or 7/8000 (see "Connection head")

3) Only for insulated thermocouples

4) Only with connection head, model 1/4000, 5/6000 or 7/8000 (see "Connection head")

5) Without transmitter

6) Suitable cable gland required

Instruments marked with "ia" may also be used in areas only requiring instruments marked with "ib" or "ic". If an instrument with "ia" marking has been used in an area with requirements in accordance with "ib" or "ic", it can no longer be operated in areas with requirements in accordance with "ia" afterwards.



### Explosion protection (option)

The permissible power,  $P_{max}$ , as well as the permissible ambient temperature, for the respective category can be seen on the Ex certificate or the operating instructions.

The transmitter have their own Ex certificates. The permissible ambient temperature ranges of the built-in transmitters can be taken from the corresponding transmitter operating instructions and approvals.

## Manufacturer's information and certificates

Logo	Description
	<b>SIL 2</b> Functional safety
	<b>NAMUR NE 024</b> Hazardous areas (Ex i)

## Certificates (option)

Certification type	Measurement accuracy	Material certificate <sup>1)</sup>
2.2 test report	x	x
3.1 inspection certificate	x	x
DKD/DAkkS calibration certificate	x	-

1) Thermowells/protection tubes have their own material certificates for selected components

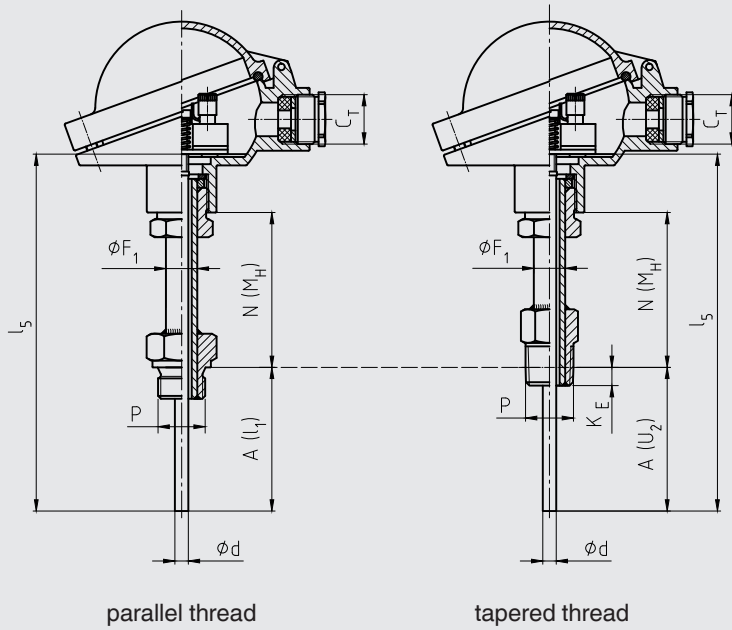
For calibration, the measuring insert is removed from the thermometer. The minimum length (metal part of the probe) for carrying out a 3.1 measurement accuracy test or DKD/DAkkS is 100 mm. Calibration of shorter lengths on request.

The different certifications can be combined with each other.

→ Approvals and certificates, see website

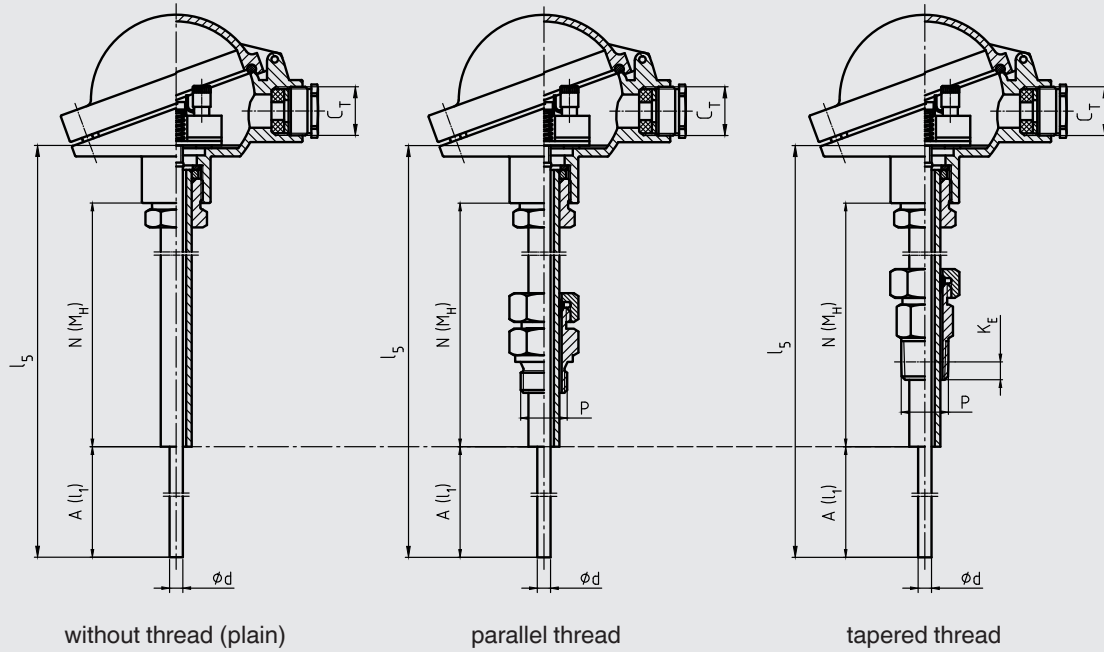
# Dimensions

Neck tube per DIN 43772



3160670.07

Neck tube per DIN 43772, plain, with/without compression fitting



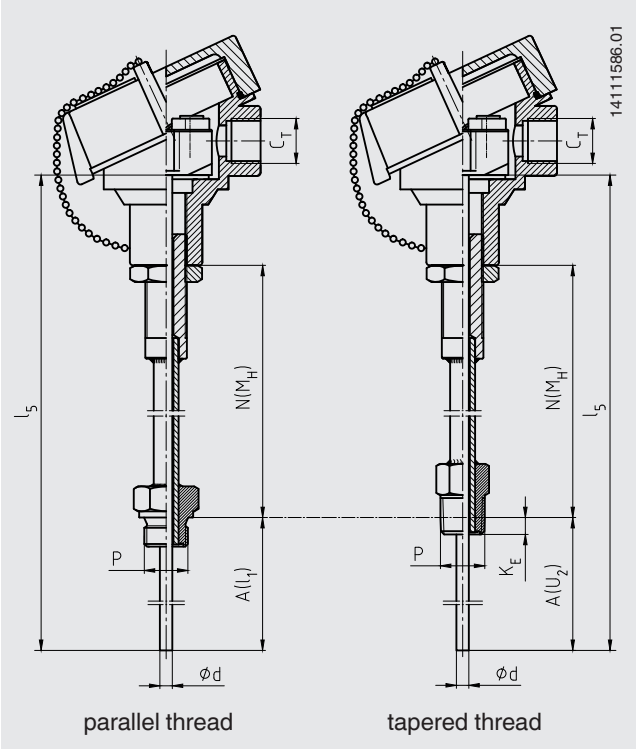
3160688.06

## Legend:

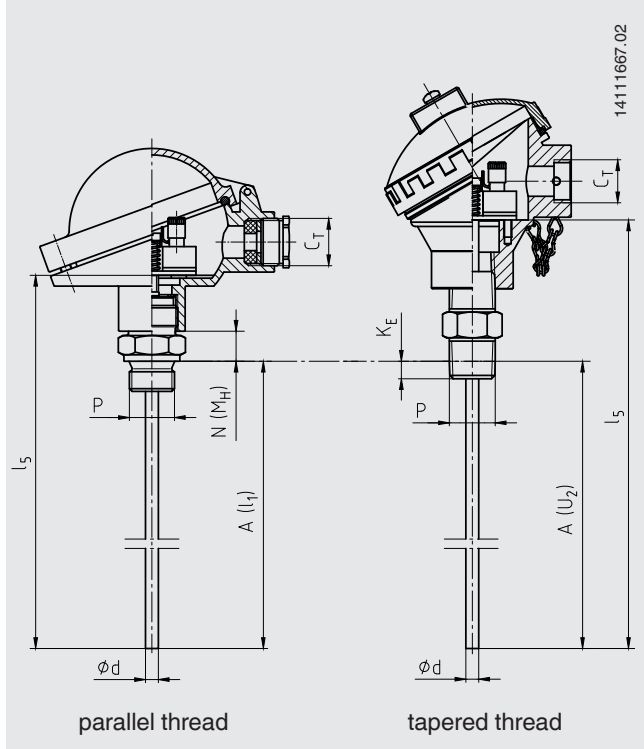
$A (I_1)$	Insertion length (parallel threads)	$C_T$	Thread cable entry
$A (U_2)$	Insertion length (tapered threads)	$\phi F_1$	Neck tube diameter
$l_5$	Measuring insert length	$P$	Thread to the thermowell
$N (M_H)$	Neck length	$\phi d$	Measuring insert diameter
$K_E$	1/2 NPT: 8.13 mm 3/4 NPT: 8.61 mm		

The figures show examples of connection heads.

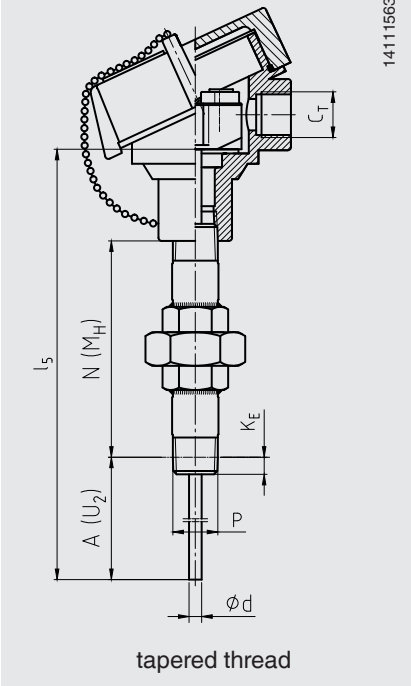
Neck tube, with counter nut to head



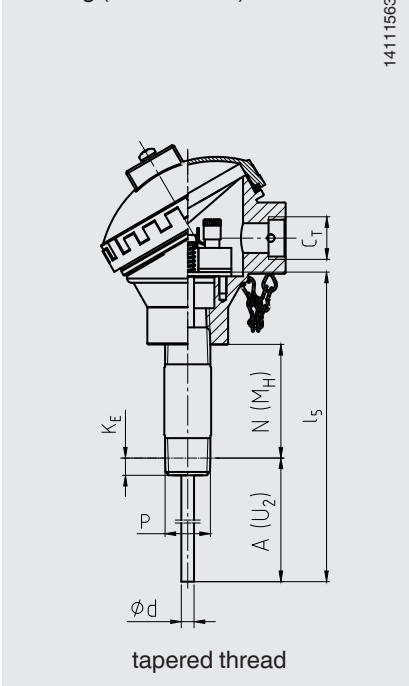
Double threaded hex bushing (with hexagonal spanner flats)



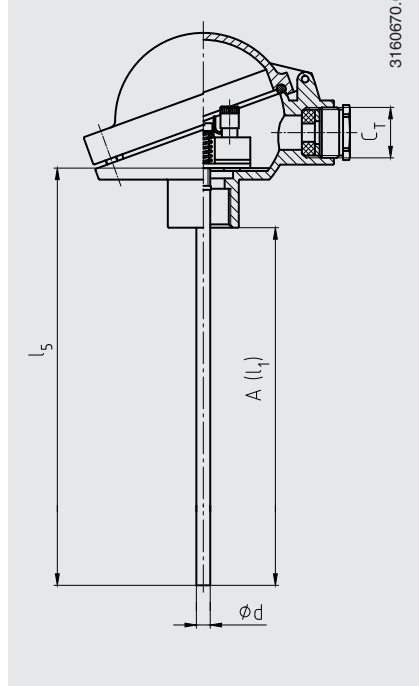
"Nipple-union-nipple"  
neck tube



Double threaded hex bushing (tube section)



Without neck tube



Legend:

- |  |                                    |
|--|------------------------------------|
| $A(l_1)$ 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 figures show examples of connection heads.

### 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 (l<sub>1</sub>), A (U<sub>2</sub>) / Measuring insert diameter Ø d / Measuring insert sheath material / Certificates / Options

© 09/2003 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.  
The specifications given in this document represent the state of engineering at the time of publishing.  
We reserve the right to make modifications to the specifications and materials.



**WIKA Alexander Wiegand SE & Co. KG**  
Alexander-Wiegand-Straße 30  
63911 Klingenberg/Germany  
Tel. +49 9372 132-0  
Fax +49 9372 132-406  
info@wika.de  
www.wika.de