Thermocouple
For additional thermowell
Model TC10-B

For further approvals,
see page 15

Configurator

Standard article

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

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

Description

Thermocouples of this model series can be combined with a large number of thermowell / protection tube designs. Operation without thermowell / protection tube is only recommended in certain applications.

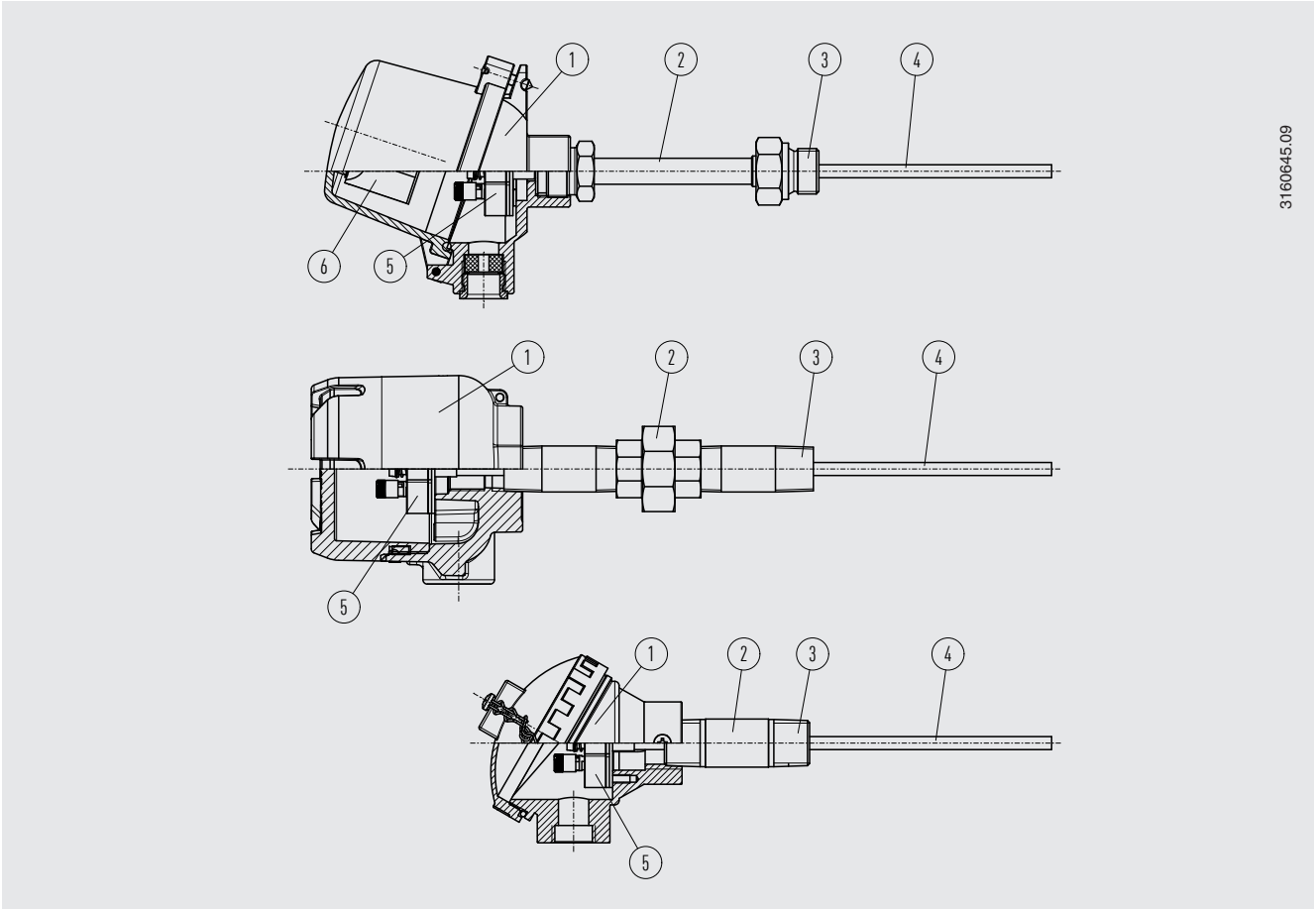
A wide variety of possible combinations of sensor, connection head, insertion length, neck length, connection to thermowell / protection tube etc. are available for the thermometers; suitable for any thermowell / protection tube dimension and any application.

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

On request we can mount analogue or digital transmitters from the WIKA range into the connection head of the TC10-B.

Data sheets showing similar products:
Thermocouple for additional thermowell; model TC10-B; see data sheet TE 65.02
Threaded resistance thermometer; model TR10-C; see data sheet TE 60.03
Threaded thermocouple; model TC10-C; see data sheet TE 65.03

Representation of the components



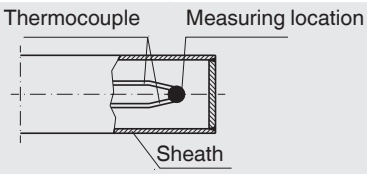
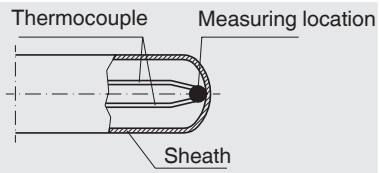
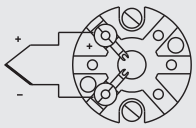
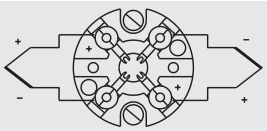
Legend:
① Connection head
② Neck tube
③ Connection to thermowell
④ Measuring insert (TC10-A)
⑤ Terminal block / Transmitter (option)
⑥ Transmitter (option)

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
ATEX	x	x	x	x	x
IECEx	x	x	x	x	x
ECASEx	-	-	x	x	x
EACEx	x	x	x	x	x
Ex Ukraine	x	x	-	-	-
INMETRO	x	x	-	-	-
CCC	x	x	x	x	-
NEPSI	x	x	-	-	-
KCs	x	-	-	-	-
PESO	x	-	-	-	-

→ For detailed information, see “Approvals” on page 15

Measuring element

Measuring element		
Type of measuring element	Thermocouple per IEC 60584-1 or ASTM E230 Types K, J, E, N, T	
Probe tip design (measuring location)	Ungrounded (measuring location ungrounded welded, standard) 	Grounded (measuring location grounded, welded to the bottom) 
Marking of the polarity	The colour code at the positive poles of the instrument decides the correlation of polarity and terminal	
Single thermocouple		
Dual thermocouple		
Validity limits of the class accuracy in accordance with IEC 60584-1		
Type K	Class 2	-40 ... +1,200 °C [-40 ... +2,192 °F]
	Class 1	-40 ... +1,000 °C [-40 ... +1,832 °F]
Type J	Class 2	-40 ... +750 °C [-40 ... +1,382 °F]
	Class 1	-40 ... +750 °C [-40 ... +1,382 °F]
Type E	Class 2	-40 ... +900 °C [-40 ... +1,652 °F]
	Class 1	-40 ... +800 °C [-40 ... +1,472 °F]
Type N	Class 2	-40 ... +1,200 °C [-40 ... +2,192 °F]
	Class 1	-40 ... +1,000 °C [-40 ... +1,832 °F]
Type T	Class 2	-40 ... +350 °C [-40 ... +662 °F]
	Class 1	-40 ... +350 °C [-40 ... +662 °F]
Validity limits of the class accuracy in accordance with ASTM E230		
Type K	Standard	0 ... 1,260 °C [32 ... 2,300 °F]
	Special	0 ... 1,260 °C [32 ... 2,300 °F]
Type J	Standard	0 ... 760 °C [32 ... 1,400 °F]
	Special	0 ... 760 °C [32 ... 1,400 °F]
Type E	Standard	0 ... 870 °C [32 ... 1,598 °F]
	Special	0 ... 870 °C [32 ... 1,598 °F]
Type N	Standard	0 ... 1,260 °C [32 ... 2,300 °F]
	Special	0 ... 1,260 °C [32 ... 2,300 °F]
Type T	Standard	0 ... 370 °C [32 ... 698 °F]
	Special	0 ... 370 °C [32 ... 698 °F]

→ For detailed specifications for thermocouples, see IEC 60584-1 or ASTM E230 and technical information IN 00.23 at www.wika.com.

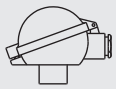
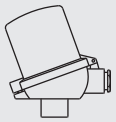
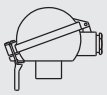
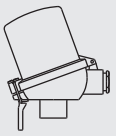
The table shows the temperature ranges listed in the respective standards, in which the tolerance values (class accuracies) are valid.

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 MIMS cable, as well as by the maximum permissible working temperature of the thermowell / protection tube material.

For the tolerance value of thermocouples, a cold junction temperature of 0 °C [32 °F] has been taken as the basis.

Connection head

European designs per EN 50446 / DIN 43735

Model		Material	Thread size of cable inlet	Ingress protection (max.) [1] [2] IEC/EN 60529	Cap	Surface	Connection to neck tube
	**BSZ**	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Spherical hinged cover with cylinder head screw	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
	BSZ-K	Plastic	■ M20 x 1.5 ■ ½ NPT	IP65	Spherical hinged cover with cylinder head screw	Black	M24 x 1.5
	**BSZ-H**	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
	BSZ-H (2 x cable outlet)	Aluminium	■ 2 x M20 x 1.5 ■ 2 x ½ NPT	IP65	Raised hinged cover with cylinder head screw	Blue, painted (RAL 5022)	M24 x 1.5
	BSZ-H / DIH10 [3]	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
	BSZ-H / TND [4]	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
	BSZ-HK	Plastic	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with cylinder head screw	Black	M24 x 1.5
	**BS**	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Flat cover with 2 screws	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
	**BSS**	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Spherical hinged cover with clamping lever	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
	**BSS-H**	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with clamping lever	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
	**BVS**	Stainless steel	M20 x 1.5	IP65	Precision-cast screw-on lid	Natural finish, electropolished	M24 x 1.5

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) Suitable sealing / cable gland required.
3) LED display DIH10 in combination with transmitter with 4 ... 20 mA output (loop)
4) LC display TND in combination with T38

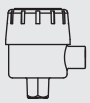
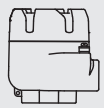
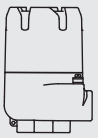
→ Further thread sizes on request

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
BSZ	x	x	x	x [1]	x [1]	x [2]
BSZ-K	x	x	-	-	-	-
BSZ-H	x	x	x	x [1]	x [1]	x [2]
BSZ-H (2 x cable outlet)	x	x	x	x [1]	x [1]	x [2]
BSZ-H / DIH10 [3]	x	x	-	-	-	-
BSZ-H / TND [4]	x	x	-	-	-	-
BSZ-HK	x	x	-	-	-	-
BS	x	x	x	-	-	-

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
BSS	x	x	-	-	-	-
BSS-H	x	x	-	-	-	-
BVS	x	x	-	-	-	-

1) Only ATEX and CCC/NEPSI
2) Only ATEX and EACEx
3) LED display DIH10 in combination with transmitter with 4 ... 20 mA output (loop)
4) LC display TND in combination with T38

International connection heads

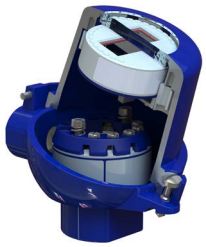
Model		Material	Thread size of cable inlet	Ingress protection (max.) [1) 2)] IEC/EN 60529	Cap	Surface	Connection to neck tube
	**KN4-A**	Aluminium	■ ½ NPT ■ M20 x 1.5	IP65	Screw-on lid	Blue, painted (RAL 5022)	■ M24 x 1.5 ■ ½ NPT
	KN4-P [3)]	Polypropylene	½ NPT	IP65	Screw-on lid	White	½ NPT
	**1/4000**	Aluminium	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	1/4000	Stainless steel	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66	Screw-on lid	Natural finish	½ NPT
	**7/8000**	Aluminium	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	7/8000	Stainless steel	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66	Screw-on lid	Natural finish	½ NPT
	**7/8000 / DIH50** [4)]	Aluminium	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	7/8000 / DIH50 [4)]	Stainless steel	■ ½ NPT ■ ¾ NPT ■ M20 x 1.5	IP66	Screw-on lid	Natural finish	½ NPT
	**PIH-L**	Aluminium	■ ½ NPT / closed ■ M20 x 1.5 / closed ■ 2 x ½ NPT ■ 2 x M20 x 1.5	IP66	Screw-on lid, flat	Blue upper body, painted (RAL 5022) Grey lower body, painted (RAL 7032)	■ 1/2 NPT ■ M20 x 1.5
	**PIH-H**	Aluminium	■ 1/2 NPT ■ M20 x 1.5 ■ 2 x ½ NPT ■ 2 x M20 x 1.5	IP66	Screw-on lid, high	Blue upper body, painted (RAL 5022) Grey lower body, painted (RAL 7032)	■ 1/2 NPT ■ M20 x 1.5
	PIH-W / TND [5)]	Aluminium	■ ½ NPT ■ M20 x 1.5 ■ 2 x ½ NPT ■ 2 x M20 x 1.5	IP66	Screw-on lid, high	Blue upper body, painted (RAL 5022) Grey lower body, painted (RAL 7032)	■ ½ NPT ■ M20 x 1.5

1) IP ingress protection of the connection head The IP ingress protection of the complete TR10-B instrument does not necessarily have to correspond to the connection head.
2) Suitable sealing / cable gland required.
3) On request.
4) LC display DIH50 in combination with transmitter with 4 ... 20 mA output (loop).
5) LC display TND in combination with T38

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
KN4-A	x	x	-	-	-	-
KN4-P [1]	x	-	-	-	-	-
1/4000	x	x	x	x	x	x
7/8000	x	x	x	x	x	x
7/8000 / DIH50 [2]	x	x	x	-	-	-
PIH-L / PIH-H	x	x	x	x	x	x
PIH-W / TND [3]	x	x	x	x	x	x

1) On request
2) LC display DIH50 in combination with transmitter with 4 ... 20 mA output (loop)
3) TND LC display in combination with T38 (Ex e: only zone 2, Ex t: only zone 22)

Connection head with digital display



Connection head BSZ-H with model TND LC display
→ see data sheet TE 38.01

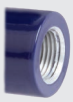
Connection head PIH-W with model TND LC display
→ see data sheets TE 38.01 and AC 80.30

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

Connection head 7/8000 W with model DIH50 LC display
→ see data sheet AC 80.10

A model T38 transmitter is always required to operate the TND digital display.
To operate the DIH10 and DIH50 digital display, there is always a transmitter with 4 ... 20 mA required.

Cable inlet

Cable inlet		Colour	Ingress protection (max.) IEC/EN 60529 [1]	Thread size of cable inlet	Min./Max. ambient temperature
	**Standard cable inlet** [2]	Natural finish	IP65	■ M20 x 1.5 ■ ½ NPT	-40 ... +80 °C [-40 ... +176 °F]
	**Plastic cable gland (cable Ø 6 ... 10 mm)** [2]	■ Black ■ Grey	IP66	■ M20 x 1.5 ■ ½ NPT	-40 ... +80 °C [-40 ... +176 °F]
	**Cable gland plastic (cable Ø 6 ... 10 mm), Ex e** [2]	■ Light blue ■ Black	IP66	■ M20 x 1.5 ■ ½ NPT	■ -20 ... +80 °C [-4 ... +176 °F] ■ -40 ... +70 °C [-40 ... +158 °F]
	**Nickel-plated brass cable gland (cable Ø 6 ... 12 mm)**	Natural finish	IP66	■ M20 x 1.5 ■ ½ NPT	-60 [3] / -40 ... +80 °C [-76 / -40 ... +176 °F]
	Nickel-plated brass cable gland (cable Ø 6 ... 12 mm), Ex e	Natural finish	IP66	■ M20 x 1.5 ■ ½ NPT	-60 [3] / -40 ... +80 °C [-76 / -40 ... +176 °F]
	**Stainless steel cable gland (cable Ø 7 ... 12 mm)**	Natural finish	IP66	■ M20 x 1.5 ■ ½ NPT	-60 [3] / -40 ... +80 °C [-76 / -40 ... +176 °F]
	Stainless steel cable gland (cable Ø 7 ... 12 mm), Ex e	Natural finish	IP66	■ M20 x 1.5 ■ ½ NPT	-60 [3] / -40 ... +80 °C [-76 / -40 ... +176 °F]
	**Plain threaded**	-	IP00	■ M20 x 1.5 ■ ½ NPT	-
	**2 x plain threaded** [5]	-	IP00	■ 2 x M20 x 1.5 ■ 2 x ½ NPT	-
	**Built-in connector (male) M12 x 1 (4-pin)** **Built-in connector (female) M12 x 1 (4-pin)**	-	IP65	M20 x 1.5	-40 ... +80 °C [-40 ... +176 °F]
	**Sealing plugs for shipping**	Transparent	-	■ M20 x 1.5 ■ ½ NPT	-40 ... +80 °C [-40 ... +176 °F]

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) Special version on request (explosion-protected versions only available with specific approvals)
5) Only for BSZ-H connection head and PI housing

Cable inlet	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 inlet [1) 3)]	x	x	-	-	-	-
Plastic cable gland [1)]	x	x	-	-	-	-
Plastic cable gland (light blue), Ex e [1)]	x	x	x	-	-	-
Plastic cable gland (black), Ex e [1)]	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 [5)]	x [5)]	x [5)]	x [5)]
2 x plain threaded [2)]	x	x	x [5)]	x [5)]	x [5)]	x [5)]
Junction box M12 x 1 (4-pin) [3)]	x	x [4)]	x [4)]	-	-	-
Sealing plugs for shipping	Not applicable, transport protection [5)]					

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

Measuring insert

Measuring insert		
Versions	Vibration-resistant mineral-insulated metal-sheathed cable (MIMS cable)	
Optimal heat transfer	Requirement	■ Correct measuring insert length ■ Correct measuring insert diameter
	Bore diameter of the thermowell / protection tube	Max. 1 mm [0.039 in] larger than the measuring insert diameter
	Gap width	With gap widths > 0.5 mm [> 0.020 in] between thermowell / protection tube and measuring insert: → Negative impact on heat transfer → Unfavourable response behaviour of the thermometer
Insertion length	When mounting the measuring insert into a thermowell, it is very important to determine the correct insertion length (= thermowell length for tip thicknesses of ≤ 5.5 mm [≤ 0.217 in]). In order to ensure that the measuring insert is firmly pressed down onto the bottom of the thermowell / protection tube, the insert must be spring-loaded (spring travel: max. 10 mm [0.394 in]).	
Spring travel	Max. 10 mm [0.394 in]	

Measuring insert diameter Ø d in mm [in]		Code number per DIN 43735	Tolerance in mm	Sheath material
3 [0.118]	Standard	30	$3^{\pm 0.05}$	■ Alloy 600 ■ 1.4571 ■ 316L
6 [0.236]	Standard	60	$6^{0}_{-0.1}$	
8 [0.315] **(6 [0.2366] with sleeve)**	Standard	-	$8^{0}_{-0.1}$	■ Alloy 600 ■ 1.4571
8 [0.315]	Standard	80	$8^{0}_{-0.1}$	■ Alloy 600 ■ 1.4571 ■ 316L

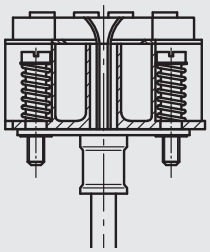
Transmitter

Transmitter models	T16	T38
Transmitter data sheet	TE 16.01	TE 38.01
Figure		
Output		
4 ... 20 mA	x	x
HART® protocol	-	x
Input	■ Type K ■ Type J ■ Type E ■ Type N ■ Type T	■ Type K ■ Type J ■ Type E ■ Type N ■ Type T
Explosion protection	Ex version possible	
Mounting types		
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 mounting type, for one, a better thermal decoupling is ensured, and in addition, exchange and mounting for servicing is simplified.	

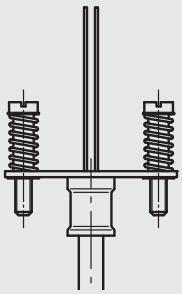
Mounting types

Mounting onto the measuring insert

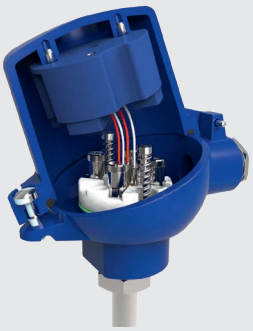
Measuring insert with mounted transmitter (here: model T32)



Measuring insert prepared for transmitter mounting



Mounted within the cover of the connection head



When using dual sensors in combination with a single transmitter, sensor 1 is connected to the transmitter. The connection leads of sensor 2 (insulated against short-circuits) protrude loosely into the connection head.
Exceptions
T38: The combination of a dual thermocouple in combination with the T38 transmitter in the “redundancy” configuration. In this case, both sensors are connected to the T38.

Possible mounting positions for transmitters	Model T16	Model T38
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	○	○
PIH-L / PIH-H	○	○

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 mounting of a transmitter in the (screw) cap of a 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 T38 temperature transmitter

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 resistance thermometers, in conjunction with a suitable temperature transmitter (e.g. model T38, TÜV certified SIL version for protection systems developed in accordance with IEC 61508), are suitable as sensors for safety functions to SIL 2.

For SIL-3 applications, WIKA recommends the use of two individual TC10-Bs, each with a connected SIL-certified T38 transmitter.

→ For further information, see technical information IN 00.19 at www.wika.com.

Neck tube

Thread sizes				
Neck tube design	**Diameter**	**Thread to the thermowell / protection tube**	**Connection to head**	**Materials [1]**
Neck tube per DIN 43772	■ 12 x 1.5 mm [0.472 x 0.059 in] ■ 12 x 2.5 mm [0.472 x 0.098 in]	■ 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 ferrule) ■ G ¾ B compression fitting (metal ferrule) ■ M18 x 1.5 compression fitting (metal ferrule) ■ M20 x 1.5 compression fitting (metal ferrule) ■ 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, plain	M24 x 1.5 (swivel connection, male nut)	1.4571
Neck tube per DIN 43772	14 x 2.5 mm [0.551 x 0.098 in]	■ 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 [0.551 x 0.098 in]	■ 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	M20 x 1.5 (with counter nut)	1.4571
Double threaded hex bushing (with hexagon 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	M24 x 1.5, ½ NPT	1.4571
“Nipple-union-nipple” neck tube [2]	~ 22 mm [~ 0.9 in]	½ NPT	½ NPT	316
Double threaded hex bushing (tube section)	~ 22 mm [~ 0.9 in]	½ NPT	½ NPT	316

1) Further materials on request
2) Union material: stainless steel

Neck lengths

Neck tube design	Neck length	Min./Max. neck length
Neck tube per DIN 43772	150 mm [~ 6 in]	■ 30 mm [~ 1.2 in] ■ 500 mm [~ 20 in]
Neck tube per DIN 43772, plain	150 mm [~ 6 in]	■ 75 mm [~ 3 in] ■ 900 mm [~ 35 in]
Neck tube with counter nut to head	150 mm [~ 6 in]	■ 75 mm [~ 3 in] ■ 250 mm [~ 10 in]
Double threaded hex bushing (with hexagonal spanner flats)		
M24 x 1.5 to connection head, parallel thread to thermowell	13 mm [0.512 in]	-
½ NPT to connection head, parallel thread to thermowell	~ 25 mm [1 in]	-
M24 x 1.5 to connection head, tapered thread to thermowell	~ 25 mm [1 in]	-
½ NPT to connection head, tapered thread to thermowell	~ 25 mm [1 in]	-
“Nipple-union-nipple” neck tube	~ 150 mm [6 in]	■ ~ 75 mm [3 in] ■ ~ 250 mm [10 in]
Double threaded hex bushing (tube section)	~ 50 mm [2 in]	■ ~ 50 mm [2 in] ■ ~ 250 mm [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.

→ Further versions on request.

Operating conditions

Operating conditions	
Ambient and storage temperature	-60 [1] / -40 ... +80 °C
Vibration resistance	50 g (probe tip)
	The information on vibration resistance refers to the tip of the measuring insert.

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

IP ingress protection per IEC/EN 60529

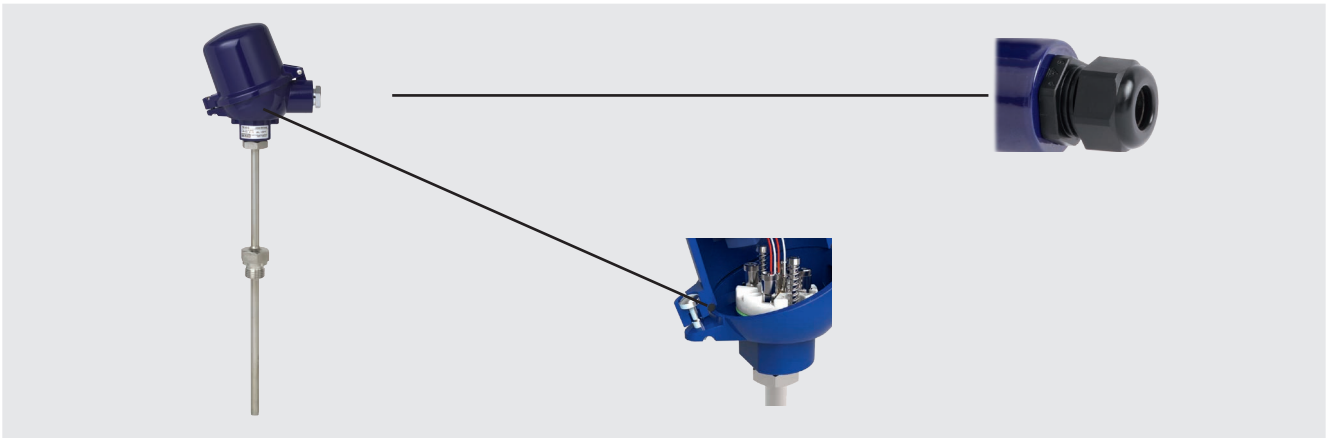
First numeral	Degree of protection / Short description	Test parameters
Degrees of protection against solid foreign bodies (defined by the 1st numeral)		
5	Dust-protected	Per IEC/EN 60529
6	Dust-tight	Per IEC/EN 60529
Degrees of protection against water (defined by the 2nd numeral)		
4	Protected against splash water	Per IEC/EN 60529
5	Protected against water jets	Per IEC/EN 60529
6	Protected against powerful water jets	Per IEC/EN 60529

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

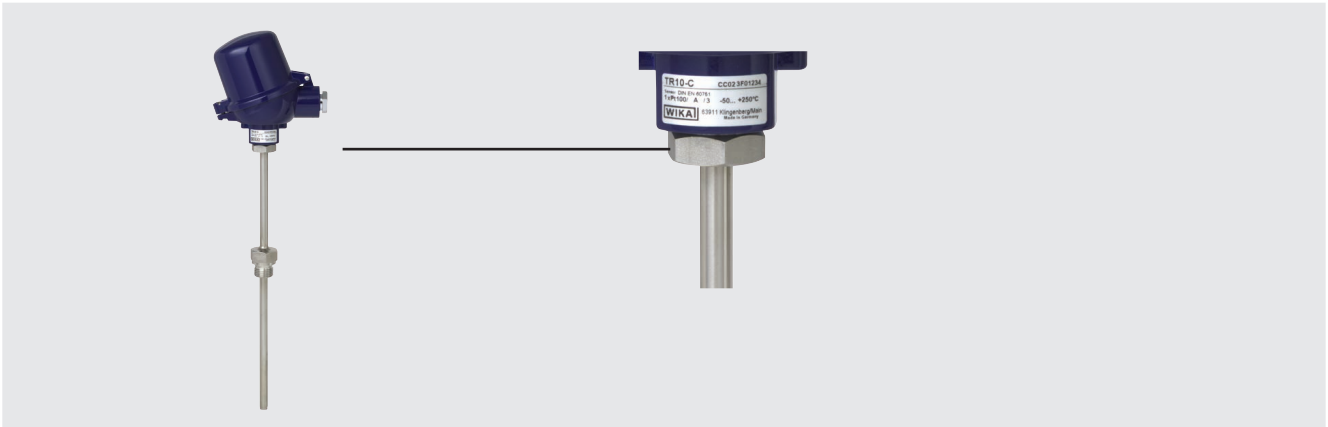
The specified degrees of protection apply under the following conditions:
- Use of a suitable thermowell (without suitable thermowell: IP40)
- Use of a suitable cable gland
- Use of a cable cross-section appropriate for the gland or select the appropriate cable gland for the available cable
- Adhere to the tightening torques for all threaded connections

→ For further information, see technical information IN 00.64 at www.wika.com

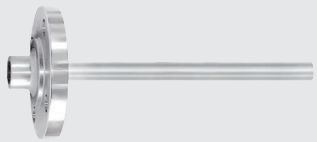
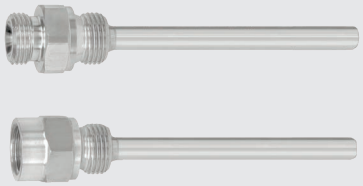
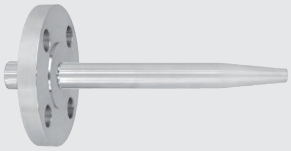
Sealing at the connection head
A ring-shaped seal in the cover of the connection head and a suitable cable gland prevent the ingress of dust and water.



Sealing at the junction of the protection tube / neck tube to the connection head
The thermowell / protection tube is screwed to the connection head or neck tube, which means that IP65 ingress protection is usually achieved without any problems. A suitable ring-shaped seal and, if necessary, PTFE sealing tape are used.



Thermowell / Protection tube

Thermowell / Protection tube selection		
Representation	**Model**	**Data sheet**
	**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

→ Further special thermowells on request.

Approvals

Approvals included in the scope of delivery

Logo	Description	Country
CE	**EU declaration of conformity**	European Union
	EMC Directive [1] EN 61326 emission (group 1, class A) and immunity (industrial environment)	
	RoHS directive	

1) Only for built-in transmitter

Optional approvals

Logo	Description			Country
Ex	**EU declaration of conformity** ATEX directive Hazardous areas			European Union
	- Ex i	Zone 0 gas	II 1G Ex ia IIC T6 ... T1 Ga	
		Zone 1 gas	II 2G Ex ia IIC T6 ... T1 Gb	
		Zone 1 mounting to zone 0 gas	II 1/2G Ex ia IIC T6 ... T1 Ga/Gb	
		Zone 20 dust	II 1D Ex ia IIIC T_{200}X °C Da	
		Zone 21 dust	II 2D Ex ia IIIC TX °C Db	
		Zone 21 mounting to zone 20 dust	II 1/2D Ex ia IIIC TX °C Da/Db	
	- Ex e [1]	Zone 1 gas	II 2G Ex eb IIC T1 ... T6 Gb [3]	
		Zone 2 gas	II 3G Ex ec IIC T1 ... T6 Gc X	
		Zone 21 dust	II 2D Ex tb IIIC TX °C Db [3]	
		Zone 22 dust	II 3D Ex tc IIIC TX °C Dc X	
	- Ex t [1]	Zone 21 dust	II 2D Ex tb IIIC TX °C Db [3]	
		Zone 22 dust	II 3D Ex tc IIIC TX °C Dc X	
IEC IECEx	**IECEx** Hazardous areas			International
	- Ex i	Zone 0 gas	Ex ia IIC T6 ... T1 Ga	
		Zone 1 gas	Ex ia IIC T6 ... T1 Gb	
		Zone 1 mounting to zone 0 gas	Ex ia IIC T6 ... T1 Ga/Gb	
		Zone 20 dust	Ex ia IIIC T_{200}X °C Da	
		Zone 21 dust	II 2D Ex ia IIIC TX °C Db	
		Zone 21 mounting to zone 20 dust	II 1/2D Ex ia IIIC TX °C Da/Db	
	- Ex e [2]	Zone 1 gas	Ex eb IIC T1 ... T6 Gb [3]	
		Zone 2 gas	Ex ec IIC T1 ... T6 Gc	
		Zone 21 dust	Ex tb IIIC TX °C Db [3]	
		Zone 22 dust	Ex tc IIIC TX °C Dc	
	- Ex t [2]	Zone 21 dust	Ex tb IIIC TX °C Db [3]	
		Zone 22 dust	Ex tc IIIC TX °C Dc	
-	**ECASEx** Hazardous areas			United Arab Emirates
	- Ex e [2]	Zone 1 gas	Ex eb IIC T1 ... T6 Gb [3]	
		Zone 2 gas	Ex ec IIC T1 ... T6 Gc	
		Zone 21 dust	Ex tb IIIC TX °C Db [3]	
		Zone 22 dust	Ex tc IIIC TX °C Dc	
	- Ex n [2]	Zone 2 gas	Ex nA IIC T1 ... T6 Gc	
	- Ex t [2]	Zone 21 dust	Ex tb IIIC TX °C Db [3]	
		Zone 22 dust	Ex tc IIIC TX °C Dc	
	Ex Ukraine Hazardous areas			Ukraine
	- Ex i	Zone 0 gas	II 1G Ex ia IIC T1 ... T6 Ga	
		Zone 1 gas	II 2G Ex ia IIC T1 ... T6 Gb	
		Zone 1 mounting to zone 0 gas	II 1/2G Ex ia IIC T1 ... T6 Ga/Gb	
		Zone 20 dust	II 1D Ex ia IIIC T65°C Da	
		Zone 21 dust	II 2D Ex ia IIIC T65°C Db	
		Zone 21 mounting to zone 20 dust	II 1/2D Ex ia IIIC T65°C Da/Db	
		Zone 2 gas	II 3G Ex ec IIC T1 ... T6 Gc	
		Zone 22 dust	II 3D Ex tc IIIC TX °C Dc X	

Logo	Description			Country
	INMETRO Hazardous areas			Brazil
	- 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	
	CCC [3] Hazardous areas			China
	- 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 20 dust	Ex ia IIIC T_{200}65°C/T_{200}95°C/T_{200}125°C Da	
		Zone 21 dust	Ex ia IIIC T65°C/T95°C/T125°C Db	
		Zone 21 mounting to zone 20 dust	Ex ia IIIC T_{200}65°C/T_{200}95°C/T_{200}125°C Da/Db	
	- Ex e [2]	Zone 1 gas	Ex eb IIC T1 ... T6 Gb	
		Zone 2 gas	Ex ec IIC T1 ... T6 Gc	
	- Ex t [2]	Zone 21 mounting to zone 20 dust	Ex tD A21/A22 IP66 T135 °C	
	NEPSI [4] Hazardous areas			China
	- 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 20 dust	Ex iaD 20 T65/T95/T125	
		Zone 21 dust	Ex iaD 21 T65/T95/T125	
		Zone 21 mounting to zone 20 dust	Ex iaD 20/21 T65/T95/T125	
	KCs Hazardous areas			South Korea
	- Ex i	Zone 0 gas	Ex ia IIC T4/T5/T6	
		Zone 1 gas	Ex ib IIC T4/T5/T6	
-	**PESO** Hazardous areas			India
	- 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	
	EACEx Hazardous areas			Eurasian Economic Community
	- 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 T65 …T125 °C Da X	
		Zone 21 dust	Ex ib IIIC T65 ... T125 °C Db X	
	- Ex e [2]	Zone 1 gas	1Ex eb IIC T6...T1 Gb X	
		Zone 2 gas	2Ex ec IIC T6...T1 Gc X	
		Zone 21 dust	Ex tb IIIC T85 °C Db X [3]	
		Zone 22 dust	Ex tc IIIC T85 °C Dc X	
	- Ex n [2]	Zone 2 gas	2Ex nA IIC T6 ... T1 Gc X	
	- Ex t [2]	Zone 21 dust	Ex tb IIIC T85 °C Db X [3]	
		Zone 22 dust	Ex tc IIIC T85 °C Dc X	
-	**PAC Ukraine** Metrology, measurement technology			Ukraine
	PAC Kazakhstan Metrology, measurement technology			Kazakhstan
-	**MchS** Permission for commissioning			Kazakhstan
	PAC Uzbekistan Metrology, measurement technology			Uzbekistan

1) Only for connection head model BSZ, BSZ-H, 1/4000, 5/6000, 7/8000 or PI housing, see „Connection head“
2) Only for connection head model 1/4000, 5/6000, 7/8000 or PI housing, see „Connection head“
3) Only without transmitter
4) Only with transmitter
5) 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.

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 transmitters have their own certificates for hazardous areas. 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
SIL	**For SIL 2, SIL 3, see page 10** Functional safety
NAMUR	**NAMUR NE 024** Hazardous areas (Ex i)

Certificates (option)

Certificate type	Measurement accuracy	Material certificate [1)]
2.2 test report	x	x
3.1 inspection certificate	x	x
DAkkS calibration certificate	x	-

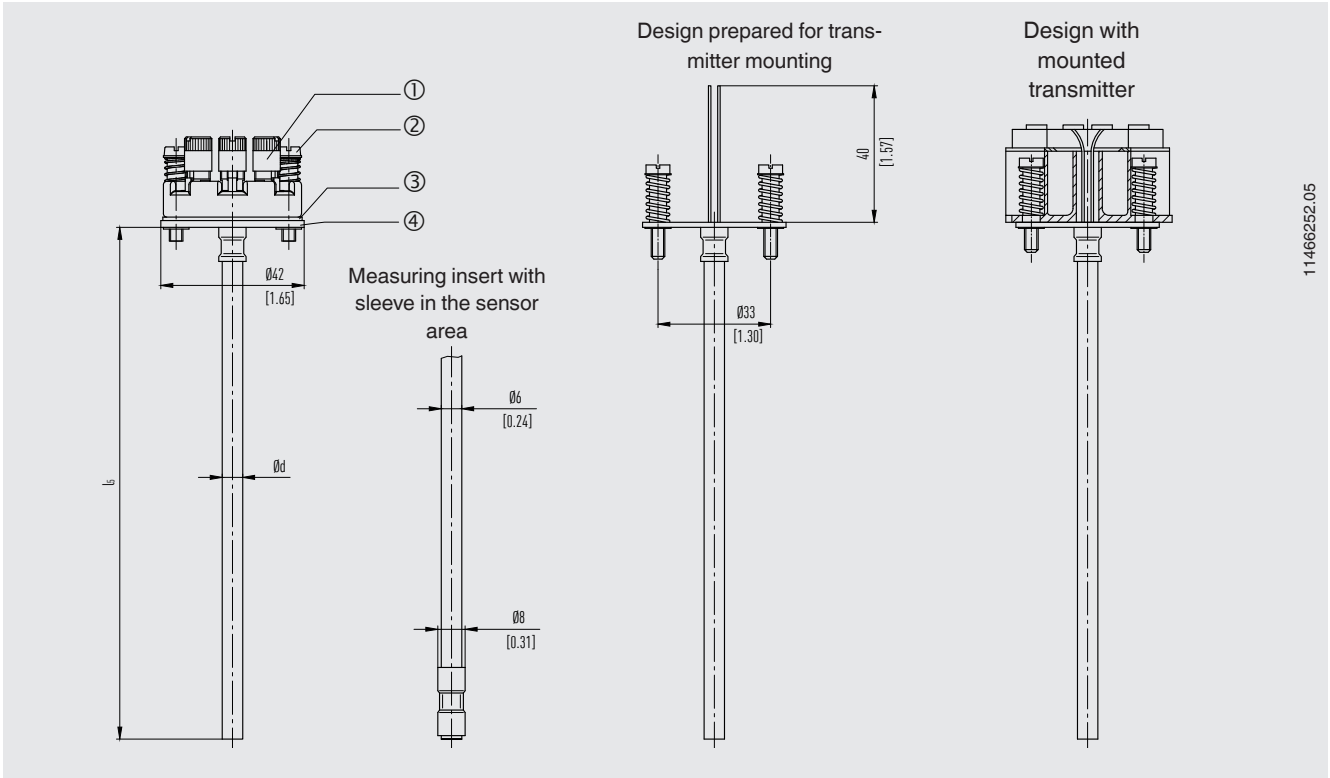
1) Thermowells / Protection tubes have their own material certificates for selected components

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 DAkkS is 100 mm [~ 4 in].
Calibration of shorter lengths on request.

The different certificates can be combined with each other.

→ For approvals and certificates, see website

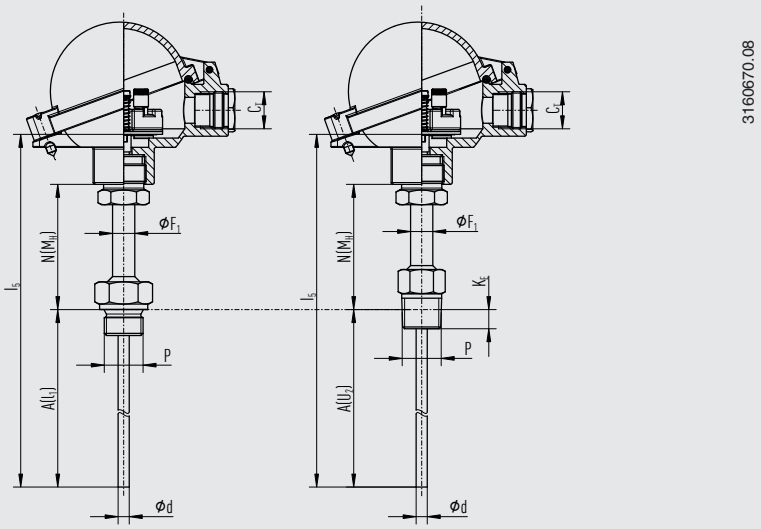
Dimensions in mm [in]



Legend
① Connection terminal
② Spring-loaded mounting
③ Insulation washer
④ Terminal plate
l_5 Measuring insert length
Ø d Measuring insert diameter

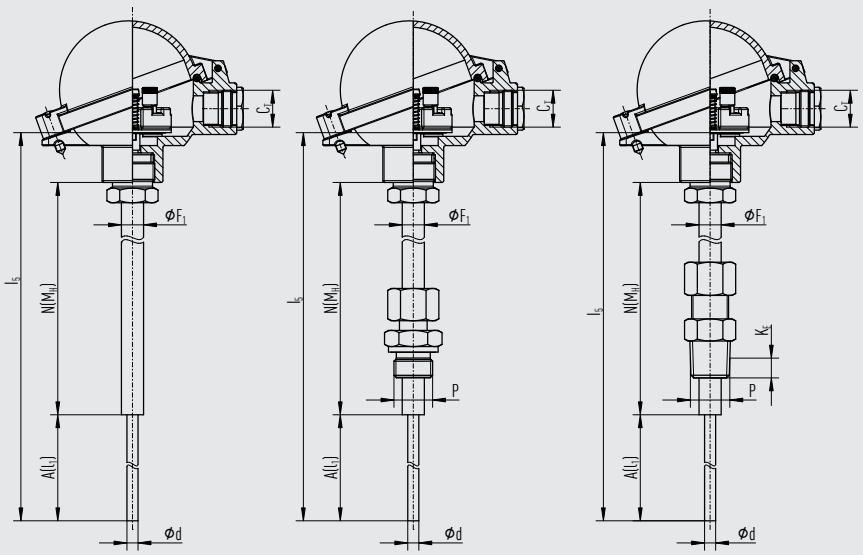
The following figures show examples of connection heads.

Neck tube per DIN 43772



parallel thread tapered thread

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

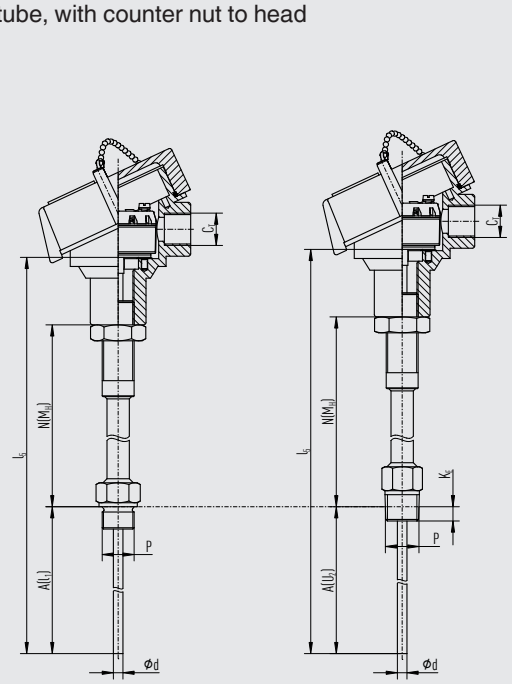


without thread (plain) parallel thread tapered thread

Legend:

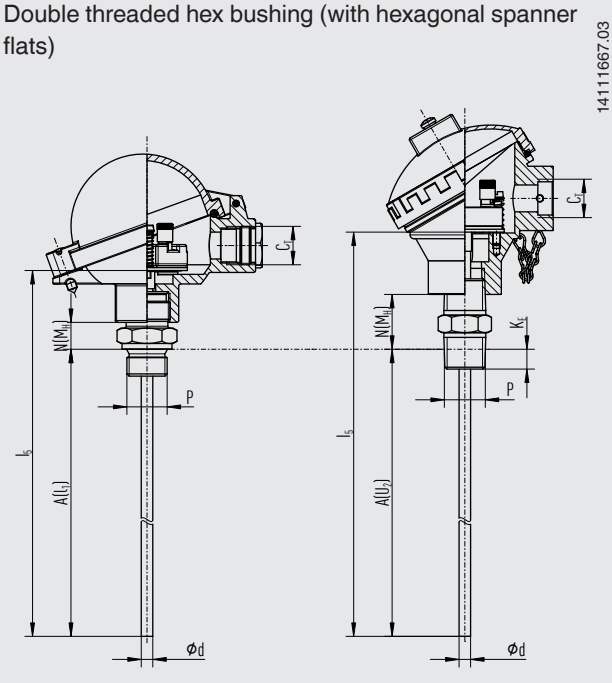
A (l_1)	Insertion length (parallel threads)
A (U_2)	Insertion length (tapered threads)
l_5	Measuring insert length
N (M_H)	Neck length
K_E	½ NPT: 8.13 mm [0.320 in] ¾ NPT: 8.61 mm [0.339 in]
C_T	Thread of cable inlet
Ø F_1	Neck tube diameter
P	Thread to the thermowell
Ø d	Measuring insert diameter

Neck tube, with counter nut to head



parallel thread tapered thread

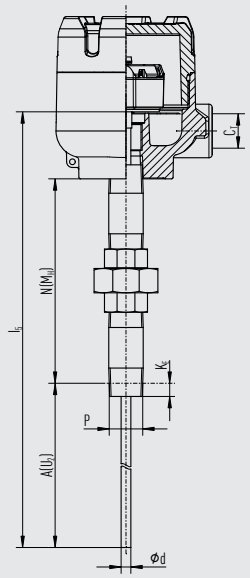
Double threaded hex bushing (with hexagonal spanner flats)



parallel thread tapered thread

“Nipple-union-nipple” neck tube

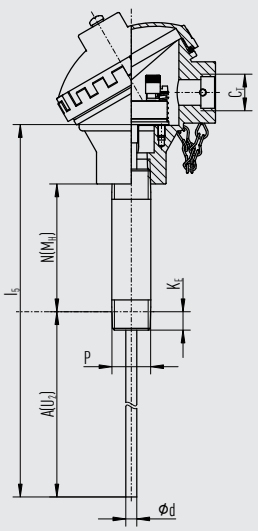
14111563.03



tapered thread

Double threaded hex bushing (tube section)

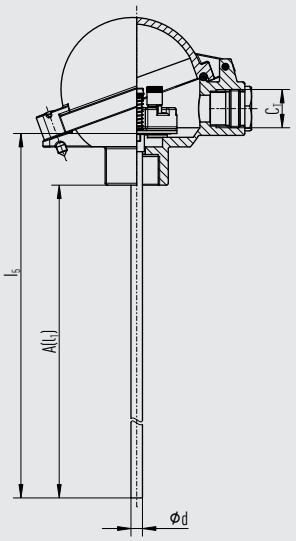
14111563.03



tapered thread

Without neck tube

3160670.08



Legend:

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	½ NPT: 8.13 mm [0.320 in] ¾ NPT: 8.61 mm [0.339 in]
C_T	Thread of cable inlet
Ø F_1	Neck tube diameter
P	Thread to the thermowell
Ø d	Measuring insert diameter

Ordering information

Model / Explosion protection / Further approvals, certificates / Sensor / Accuracy class, range of use of the sensor / Connection housing / Cable inlet / Transmitter / Connection to neck tube / Neck tube / Thread size / Neck length N (M_H) / Insertion length A (l_1), A (U_2) / Measuring insert diameter Ø d / Sheath material of measuring insert / Certificates / Options

Standard article

Configurator

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