

Threaded thermocouple With protection tube Model TC10-C

WIKA data sheet TE 65.03



For further approvals,
see page 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

- Sensor ranges from -40 ... +1,200 °C [-40 ... +2,192 °F]
- With integrated protection tube
- Spring-loaded measuring insert (replaceable)
- Explosion-protected versions are available for many approval types

Description

Thermocouples of this model series are designed for screw-fitting directly into the process, mainly in vessels and pipelines. These thermometers are suitable for liquid and gaseous media under moderate mechanical load and normal chemical load.

The protection tube is fully welded and screwed into the connection head. The interchangeable measuring insert can be removed without taking out the complete probe from the plant. This enables inspection, measuring equipment monitoring or, when servicing is necessary, replacement while the plant is running.

Model TR10-C with protection tube



Configurator



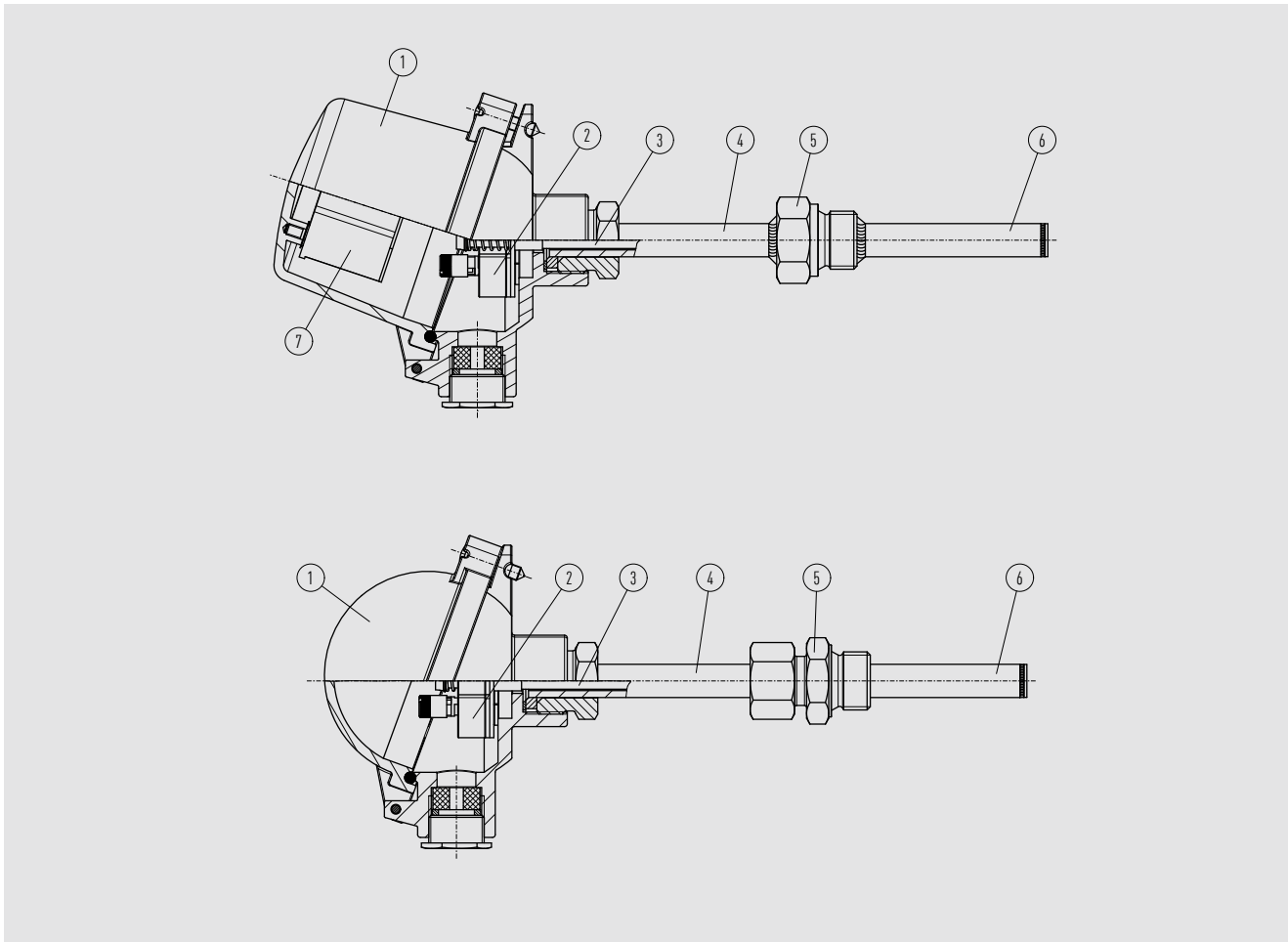
The choice of standard lengths assists with short delivery times and the possibility of stocking spare parts.

Insertion length, process connection, protection tube design, connection head, type and number of sensors and accuracy can each be selected to suit the respective application. A large number of different explosion protection certificates are available for the TC10-C.

On request, we can mount analogue or digital transmitters from the WIKA range in the connection head of the TC10-C.

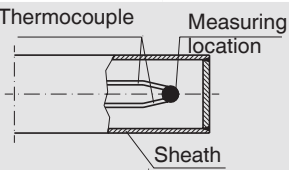
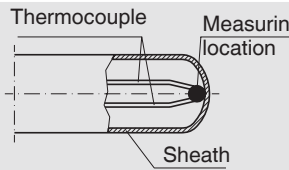
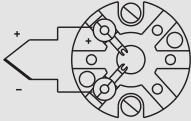
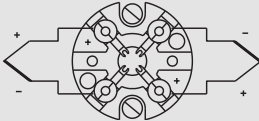
Specifications

Representation of the components



Legend:

- ① Connection head
- ② Terminal block / Transmitter (selectable)
- ③ Measuring insert (TC10-A)
- ④ Neck tube
- ⑤ Process connection (selectable)
- ⑥ Protection tube
- ⑦ Transmitter (selectable)

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.

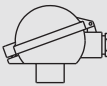
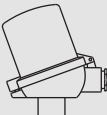


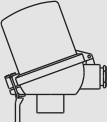

The table shows the temperature ranges listed in the respective standards, in which the tolerance values (class accuracies) are valid.

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 sheathed cable, as well as by the maximum permissible working temperature of the 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
	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
	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 / DIH10³⁾	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with cylinder head screw	Blue, painted (RAL 5022)	M24 x 1.5
	BSZ-H / TND⁴⁾	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with cylinder head screw	Blue, painted (RAL 5022)	M24 x 1.5
	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
	BSS	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Spherical hinged cover with clamping lever	Blue, painted (RAL 5022)	M24 x 1.5
	BSS-H	Aluminium	■ M20 x 1.5 ■ ½ NPT	IP65	Raised hinged cover with clamping lever	Blue, painted (RAL 5022)	M24 x 1.5
	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 instrument TC10-C 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 / DIH10³⁾	x	x	-	-	-	-
BSZ-H / TND⁴⁾	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
- 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 versions

Model	Material	Thread size of cable inlet	Ingress protection (max.) ^{1) 2)} IEC/EN 60529	Cap	Surface	Connection to neck tube
 KN4-A	Aluminium	<ul style="list-style-type: none"> ■ ½ NPT ■ M20 x 1.5 	IP65	Screw-on lid	Blue, painted (RAL 5022)	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
KN4-A	x	x	-	-	-	-

Connection head with digital display







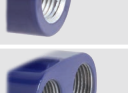



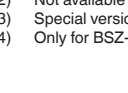


Connection head BSZ-H with model TND LC display
→ see data sheet TE 38.01

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

For operation of the TND digital display, a model T38 transmitter is always required.
For operation of the DIH10 digital display, a transmitter with 4 ... 20 mA is always required.

Cable inlet

Cable inlet	Colour	Max. ingress protection ¹⁾ DIN EN IEC 60529	Thread size of cable inlet	Min./Max. ambient temperature
 Standard cable inlet ²⁾	Natural finish	IP65	M20 x 1.5	-40 ... +80 °C [-40 ... +176 °F]
 Plastic cable gland (cable Ø 6 ... 10 mm) ²⁾	<ul style="list-style-type: none"> ■ Black ■ Grey 	IP66	<ul style="list-style-type: none"> ■ M20 x 1.5 ■ ½ NPT 	-40 ... +80 °C [-40 ... +176 °F]
 Plastic cable gland (cable Ø 6 ... 10 mm), Ex e ²⁾	<ul style="list-style-type: none"> ■ Light blue ■ Black 	IP66	<ul style="list-style-type: none"> ■ M20 x 1.5 ■ ½ NPT 	<ul style="list-style-type: none"> ■ -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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ M20 x 1.5 ■ ½ NPT 	-60 ³⁾ / -40 ... +80 °C [-76 / -40 ... +176 °F]
 Plain threaded	-	IP00	<ul style="list-style-type: none"> ■ M20 x 1.5 ■ ½ NPT 	-
 2 x plain threaded ⁴⁾	-	IP00	<ul style="list-style-type: none"> ■ 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	-	<ul style="list-style-type: none"> ■ M20 x 1.5 ■ ½ NPT 	-40 ... +80 °C [-40 ... +176 °F]

1) IP ingress protection of the cable gland. The IP ingress protection of the complete instrument TC10-C 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)

4) Only for BSZ-H connection head

Cable inlet	Explosion protection					
	With-out	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		
Version	Vibration-resistant mineral-insulated metal-sheathed cable (MIMS cable)	
Optimal heat transfer	Requirement <ul style="list-style-type: none"> ■ Correct measuring insert length ■ Correct measuring insert diameter 	
	Bore diameter of the 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 protection tube and measuring insert: → Negative impact on heat transfer → Unfavourable response behaviour of the thermometer
Insertion length	When fitting the measuring insert into a protection tube, it is very important to determine the correct insertion length (= protection tube 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 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 ^{+0.05} _{-0.05}	<ul style="list-style-type: none"> ■ Alloy 600 (Inconel 600) ■ 316L ■ 1.4571
6 [0.236]	Standard	60	6 ⁰ _{-0.1}	<ul style="list-style-type: none"> ■ Alloy 600 (Inconel 600) ■ 316L ■ 1.4571
8 [0.315]	Standard	80	8 ⁰ _{-0.1}	<ul style="list-style-type: none"> ■ Alloy 600 (Inconel 600) ■ 316L ■ 1.4571
8 [0.315] (6 [0.236] with sleeve)	Standard	-	8 ⁰ _{-0.1}	<ul style="list-style-type: none"> ■ Alloy 600 (Inconel 600) ■ 316L ■ 1.4571

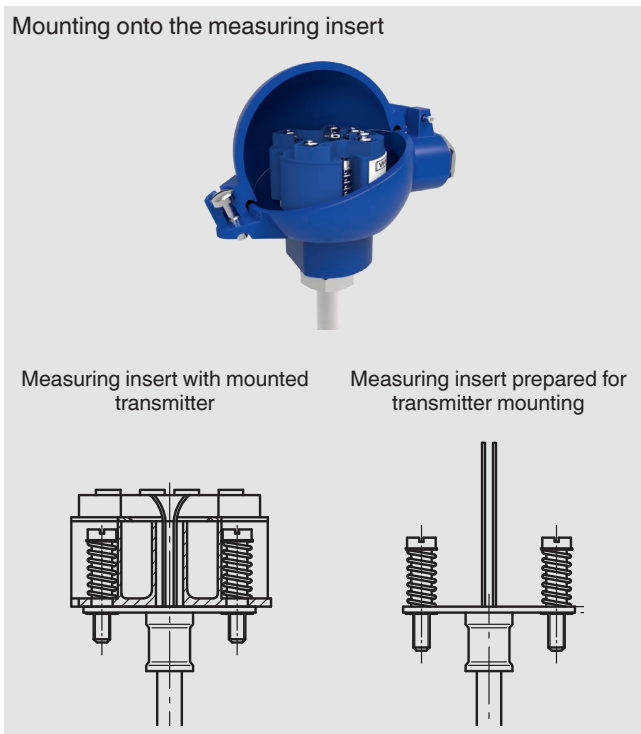
Transmitter models	Model T16	Model T38
Transmitter data sheet	TE 16.01	TE 38.01
Figure		
Output signal		
4 ... 20 mA	x	x
HART® protocol	-	x
Explosion protection	Ex version possible	
Mounting types		
Mounting onto the measuring insert	With mounting on the measuring insert, the transmitter replaces the 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 insulation is ensured, and in addition, exchange and mounting for servicing is simplified.	

Mounting types

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.



Possible transmitter mounting positions	Model T16	Model T38
BSZ	○	○
BSZ-K	○	○
BSZ-H	●	●
BSZ-H (2 x cable outlet)	●	●
BSZ-H / DIH10	○	○
BSZ-H / TND	○	○
BSZ-HK	●	●
BS	○	-
BSS	○	○
BSS-H	●	●
BVS	○	○
KN4-A	○	○

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 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-C resistance thermometers, in combination 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 up to SIL 2.

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

→ For details, see technical information IN 00.19 on www.wika.com.

Protection tube versions

In the versions in accordance with DIN 43772, the protection tubes are made of drawn tube with a welded bottom and are screwed into the connection head with a swivel connection (male nut). By loosening this male nut, the connection head, and thus the cable outlet, can be adjusted to the desired position.

The process connection is either welded on at the factory in accordance with customer specifications - which means that the insertion length is fixed - or offers a variable insertion length by using a compression fitting.

Versions without process connection are also available.

Protection tube versions with double threaded hex bushing are screwed directly into the connection head. The connection head cannot be rotated with this design.

The immersion depth into the process medium should be at least 10 times the protection tube outer diameter. This minimises heat dissipation effects that could have a negative impact on the measuring result.

Protection tube in accordance with DIN 43772	Protection tube diameter	Process connection	Suitable for measuring insert diameter	Connection to head	Material ¹⁾			
Straight, form 2G, mounting thread	9 x 1 mm [0.35 ... 0.04 in]	G ¼ B, mounting thread	6 mm [0.24 in]	M24 x 1.5 (swivel connection, male nut)	1.4571			
		G ½ B, mounting thread						
		G ¾ B, mounting thread						
		G 1 B, mounting thread						
		M18 x 1.5, mounting thread						
		M20 x 1.5, mounting thread						
		M27 x 2, mounting thread						
		½ NPT, mounting thread						
		¾ NPT, mounting thread						
	11 x 2 mm [0.43 ... 0.08 in] 12 x 2.5 mm [0.47 ... 0.09 in]	G ½ B, mounting thread	6 mm [0.24 in]					
		G ¾ B, mounting thread						
		G 1 B, mounting thread						
		M18 x 1.5, mounting thread						
		M20 x 1.5, mounting thread						
		M27 x 2, mounting thread						
		½ NPT, mounting thread						
		¾ NPT, mounting thread						
		14 x 2.5 mm [0.55 ... 0.09 in]				G ½ B, mounting thread	8 mm [0.32 in] (6 mm [0.24 in] with sleeve)	
	G ¾ B, mounting thread							
	G 1 B, mounting thread							
	M18 x 1.5, mounting thread							
	M20 x 1.5, mounting thread							
	M27 x 2, mounting thread							
	½ NPT, mounting thread							
	¾ NPT, mounting thread							
	Tapered, form 3G, mounting thread		12 x 2.5 mm [0.47 ... 0.09 in], tapered to 9 mm [0.35 in]			G ½ B, mounting thread		6 mm [0.24 in]
		G ¾ B, mounting thread						
G 1 B, mounting thread								
M18 x 1.5, mounting thread								
M20 x 1.5, mounting thread								
M27 x 2, mounting thread								
½ NPT, mounting thread								
¾ NPT, mounting thread								

Protection tube in accordance with DIN 43772	Protection tube diameter	Process connection	Suitable for measuring insert diameter	Connection to head	Material ¹⁾
Straight, plain, form 2, with/without compression fitting	9 x 1 mm [0.35 ... 0.04 in]	G ½ B compression fitting (metal ferrule)	6 mm [0.24 in]	M24 x 1.5 (swivel connection, male nut)	1.4571
	11 x 2 mm [0.43 ... 0.08 in]	Compression fitting ½ NPT (metal ferrule)			
	12 x 2.5 mm [0.47 ... 0.09 in]	Without threaded connection, plain			
Tapered, plain, form 3, with/without compression fitting	12 x 2.5 mm [0.47 ... 0.09 in], tapered to 9 mm [0.35 in]	G ½ B compression fitting (metal ferrule)	6 mm [0.24 in]	M24 x 1.5 (swivel connection, male nut)	1.4571
		Compression fitting ½ NPT (metal ferrule)			
		Without threaded connection, plain			

1) Other materials on request.

Tapered protection tube, not standardised	Protection tube diameter	Process connection	Suitable for measuring insert diameter	Connection to head	Material ¹⁾	
Tapered, weld-on solid tip, mounting thread	9 x 1 mm [0.35 ... 0.04 in], tapered to 6 mm [0.24 in]	G ¼ B, mounting thread	3 mm [0.12 in]	M24 x 1.5 (swivel connection, male nut)	1.4571	
		G ½ B, mounting thread				
		G ¾ B, mounting thread				
		G 1 B, mounting thread				
		M18 x 1.5, mounting thread				
		M20 x 1.5, mounting thread				
		M27 x 2, mounting thread				
		½ NPT, mounting thread				
		¾ NPT, mounting thread				
	11 x 2 mm [0.43 ... 0.08 in], tapered to 6 mm [0.24 in]	G ½ B, mounting thread				
		G ¾ B, mounting thread				
		G 1 B, mounting thread				
		M14 x 1.5, mounting thread				
		M18 x 1.5, mounting thread				
		M20 x 1.5, mounting thread				
12 x 2.5 mm [0.47 ... 0.09 in], tapered to 6 mm [0.24 in]	½ NPT, mounting thread					
	¾ NPT, mounting thread					
	Tapered, weld-on solid tip, plain, with/without compression fitting	9 x 1 mm [0.35 ... 0.04 in], tapered to 6 mm [0.24 in]	G ½ B compression fitting (metal ferrule)	3 mm [0.12 in]	M24 x 1.5 (swivel connection, male nut)	1.4571
			11 x 2 mm [0.43 ... 0.08 in], tapered to 6 mm [0.24 in]			
12 x 2.5 mm [0.47 ... 0.09 in], tapered on 6 mm [0.24 in]						

1) Other materials on request.

Straight protection tube, not standardised	Protection tube diameter	Process connection	Suitable for measuring insert diameter	Connection to head	Material	
Straight, mounting thread	6 mm [0.24 in]	G ¼ B, mounting thread	3 mm [0.12 in]	M24 x 1.5 (swivel connection, male nut)	1.4571	
		G ½ B, mounting thread				
		M18 x 1.5, mounting thread				
		M20 x 1.5, mounting thread				
		½ NPT, mounting thread				
Straight, hexagonal threaded connection, double threaded hex bushing	9 x 1 mm [0.35 ... 0.04 in] 12 x 2.5 mm [0.47 ... 0.09 in]	G ¼ B, mounting thread	6 mm [0.24 in]	M24 x 1.5 (non-rotatable, fixed threaded connection)	1.4571	
		G ½ B, mounting thread				
		G ¾ B, mounting thread				
		M18 x 1.5, mounting thread				
		½ NPT, mounting thread				
	6 mm [0.24 in]	G ¼ B, mounting thread	3 mm [0.12 in]			
		G ½ B, mounting thread				
		G ¾ B, mounting thread				
		M18 x 1.5, mounting thread				
		½ NPT, mounting thread				
Straight, plain, with/without compression fitting	6 x 1 mm [0.24 ... 0.04 in]	G ½ B compression fitting (metal ferrule)	3 mm [0.12 in]	M24 x 1.5 (swivel connection, male nut)	1.4571	
		Compression fitting ½ NPT (metal ferrule)				
		Without threaded connection, plain				
	9 x 1 mm [0.35 ... 0.04 in]	G ½ B compression fitting (metal ferrule)	6 mm [0.24 in]			1.4571 (9 x 1 mm)
		Compression fitting ½ NPT (metal ferrule)				
		Without threaded connection, plain				

Protection tube design	Standard insertion length	Min./Max. insertion length
Straight, mounting thread, form 2G DIN 43772	100, 160, 250, 400 mm [3.94, 6.23, 9.84, 15.75 in]	50 mm / 4,000 mm [1.97 in / 157.48 in]
Straight, hexagonal threaded connection (double threaded hex bushing)	100, 160, 250, 400 mm [3.94, 6.23, 9.84, 15.75 in]	50 mm / 4,000 mm [1.97 in / 157.48 in]
Tapered, mounting thread, form 3G DIN 43772	160, 220, 280 mm [6.23, 8.66, 11.02 in]	110 mm / 4,000 mm [4.33 in / 157.48 in]
Straight, plain, with/without compression fitting, form 2 DIN 43772	-	50 mm / 4,000 mm [1.97 in / 157.48 in]
Tapered, plain, with/without compression fitting, form 3 DIN 43772	-	110 mm / 4,000 mm [4.33 in / 157.48 in]
Tapered, weld-on solid tip, mounting thread, not standardised design	100, 160, 250, 400 mm [3.94, 6.23, 9.84, 15.75 in]	75 mm / 4,000 mm [2.95 in / 157.48 in]
Tapered, plain, weld-on solid tip, with/without compression fitting, not standardised design	-	75 mm / 4,000 mm [2.95 in / 157.48 in]

Neck lengths

Protection tube design	Standard neck length	Min./Max. neck length
Straight, mounting thread, form 2G DIN 43772	130 mm [5.12 in]	30 mm / 1,000 mm [1.18 in / 39.37 in]
Tapered, mounting thread, form 3G DIN 43772	132 mm [5.19 in]	30 mm / 1,000 mm [1.18 in / 39.37 in]
Straight, plain, with compression fitting, form 2 DIN 43772	50 mm [1.97 in]	50 mm [1.97 in]
Straight, plain, without compression fitting, form 2 DIN 43772	-	-
Tapered, plain, with compression fitting, form 3 DIN 43772	50 mm [1.97 in]	50 mm [1.97 in]
Tapered, plain, without compression fitting, form 3 DIN 43772	-	-
Tapered, weld-on solid tip, mounting thread, not standardised design	130 mm [5.12 in]	30 mm / 1,000 mm [1.18 in / 39.37 in]
Tapered, weld-on solid tip, with compression fitting, not standardised design	50 mm [1.97 in]	50 mm [1.97 in]
Tapered, weld-on solid tip, without process connection, not standardised design	-	-
Straight, hexagonal threaded connection, double threaded hex bushing	13 mm [0.51 in]	-

The neck 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 element 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	
Ambient and storage temperature	<ul style="list-style-type: none"> ■ -40 ... +80 °C [-40 ... +176 °F] ■ -60 ¹⁾ ... +80 °C [-76 ... +176 °F]
Vibration resistance	<p>The replaceable measuring insert is made of a MIMS cable (mineral-insulated metal-shielded cable) that is not susceptible to vibration. Standard vibration resistance: 50 g</p> <p>The information on vibration resistance refers to the tip of the measuring insert.</p>

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

Max. process temperature, process pressure, dependent on:

- Load diagram DIN 43772
- Protection tube version (dimensions, material)
- Process conditions (flow rate, medium density)

Wake frequency calculation

With critical operating conditions, a wake frequency calculation in accordance with Dittrich/Klotter is recommended as a WIKA engineering service. Note: ASME PTC 19.3 TW-2016 is not applicable for TC10-C.

→ For further information, see technical information IN 00.15

IP ingress protection per DIN EN IEC 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 DIN EN IEC 60529
6	Dust-tight	Per DIN EN IEC 60529
Degrees of protection against water (defined by the 2nd numeral)		
4	Protected against splash water	Per DIN EN IEC 60529
5	Protected against water jets	Per DIN EN IEC 60529
6	Protected against powerful water jets	Per DIN EN IEC 60529

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

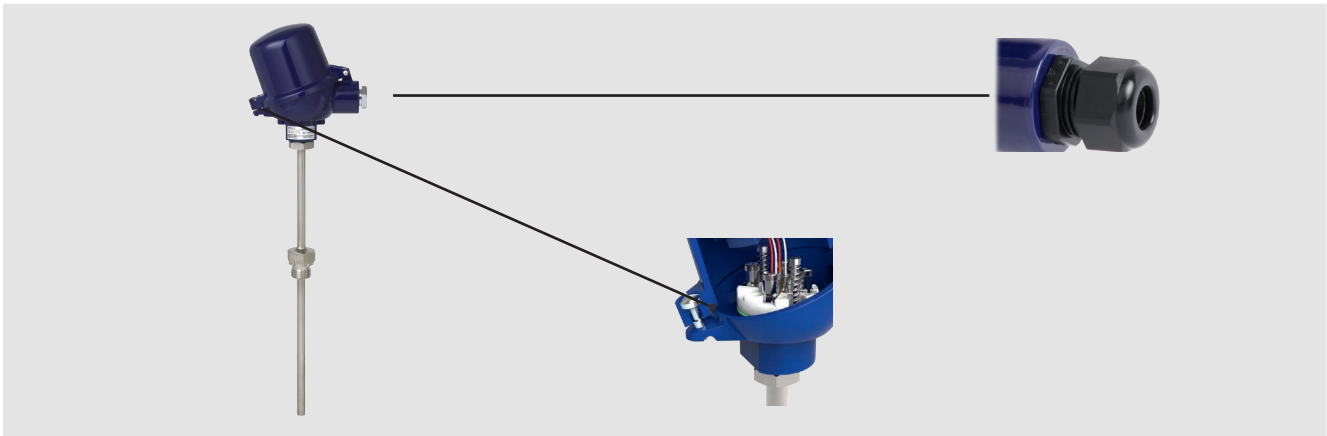
Standard ingress protection of model TC10-C is IP65.

The specified degrees of protection apply under the following conditions:

- 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

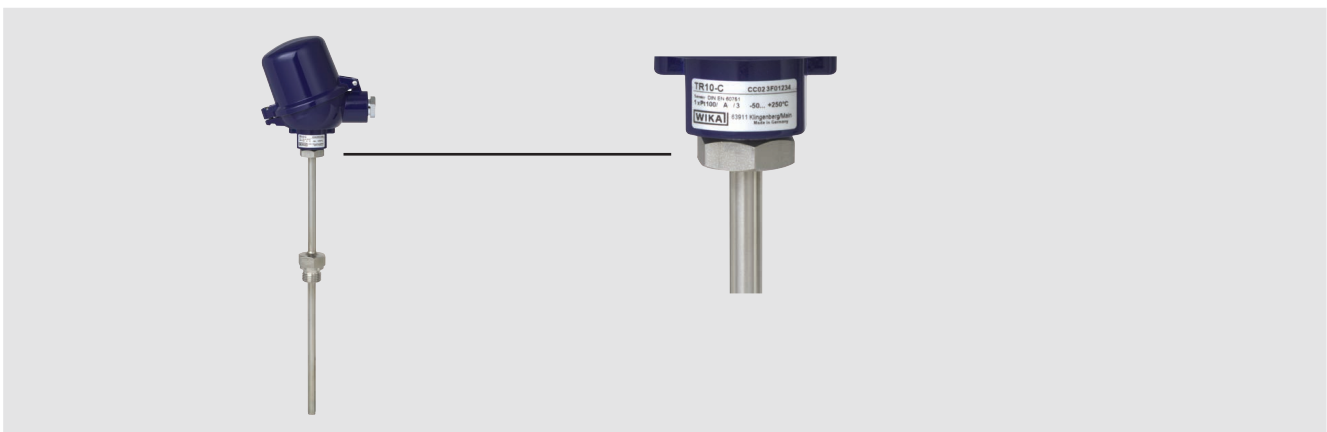
Seal at the connection head

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 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.









Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	EMC Directive ¹⁾	
	EN 61326 emission (group 1, class B) and immunity (industrial environments)	
	RoHS directive	

Optional approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	<p>ATEX directive</p> <p>Hazardous areas</p> <p>- Ex i Zone 0 gas II 1G Ex ia IIC T6...T1 Ga</p> <p>Zone 1 gas II 2G Ex ia IIC T6...T1 Gb</p> <p>Zone 1 mounting to zone 0 gas II 1/2G Ex ia IIC T6...Ta Ga/Gb</p> <p>Zone 20 dust II 1D Ex ia IIIC T₂₀₀X °C Da</p> <p>Zone 21 dust II 2D Ex ia IIIC TX °C Db</p> <p>Zone 21 mounting to zone 20 dust II 1/2D Ex ia IIIC TX °C Da/Db</p> <p>- Ex n Zone 1 gas II 2G Ex eb IIC T6...T1 Gb ^{2) 3)}</p> <p>Zone 2 gas II 3G Ex ec IIC T6...T1 Gc X</p> <p>Zone 21 dust II 2D Ex tb IIIC Tx °C Db ^{2) 3)}</p> <p>Zone 22 dust II 3D Ex tc IIIC TX °C Dc X</p> <p>- Ex t Zone 21 dust II 2D Ex tb IIIC TX °C Db ^{2) 3)}</p> <p>Zone 22 dust II 3D Ex tc IIIC TX °C Dc X</p>	
	IECEx	International
	<p>Hazardous areas</p> <p>- Ex i Zone 0 gas Ex ia IIC T6...T1 Ga</p> <p>Zone 1 gas Ex ia IIC T6...T1 Gb</p> <p>Zone 1 mounting to zone 0 gas Ex ia IIC T6...T1 Ga/Gb</p> <p>Zone 20 dust Ex ia IIIC T₂₀₀X °C Da</p> <p>Zone 21 dust Ex ia IIIC TX °C Db</p> <p>Zone 21 mounting to zone 20 dust Ex ia IIIC TX °C Da/Db</p>	
	EAC	Eurasian Economic Community
	<p>Hazardous areas</p> <p>- Ex i Zone 0 gas 0 Ex ia IIC T6...T1 Ga X</p> <p>Zone 1 gas 1 Ex ia IIC T6...T1 Gb X</p> <p>Zone 20 dust Ex ia IIIC T65...T125 °C Da X</p> <p>Zone 21 dust Ex ib IIIC T65...T125 °C Db X</p> <p>- Ex n Zone 1 gas 1Ex eb IIC T6...T1 Gb X ²⁾</p> <p>Zone 2 gas 2Ex ec IIC T6...T1 Gc X</p>	
	Ex Ukraine	Ukraine
	<p>Hazardous areas</p> <p>- Ex i Zone 0 gas II 1G Ex ia IIC T6...T1 Ga</p> <p>Zone 1 gas II 2G Ex ia IIC T6...T1 Gb</p> <p>Zone mounting to zone 0 gas II 1/2G Ex ia IIC T6...T1 Ga/Gb</p> <p>Zone 20 II 1D Ex ia IIIC T125...T65 °C Da</p> <p>Zone 21 II 2D Ex ia IIIC T125...T65 °C Db</p> <p>Zone 21 mounting to zone 20 dust II 1/2D Ex ia IIIC T125...T65 °C Da/Db</p> <p>- Ex n Zone 2 gas II 3G Ex ex IIC T6...T1 Gc</p> <p>- Ex t Zone 22 dust II 3D Ex tc IIIC TX °C Dc X</p>	

Logo	Description	Region
	INMETRO Hazardous areas - Ex i Zone 0 gas Ex ia IIC T6...T3 Ga Zone 1 mounting to zone 0 gas Ex ia IIC T6...T2 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	Brazil
	CCC 3) 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 20 dust Ex ia IIIC T ₂₀₀ 65°C/T ₂₀₀ 95°C/D 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/D ₂₀₀ 125°C Da/Db - Ex e Zone 1 gas Ex eb IIC T1...T6 Gb Zone 2 gas Ex ec IIC T1...T6 Gc - Ex t Zone 21 dust Ex tb IIIC T135°C Db Zone 22 dust Ex tb IIIC T135°C Dc	China
	NEPSI 4) 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 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 - Ex e Zone 2 gas Ex ec IIC T1...T6 Gc - Ex t Zone 22 dust Ex tb IIIC T135°C Dc	China
	KCs Hazardous areas - Ex i Zone 0 gas Ex ia IIC T4/T5/T6 Zone 1 gas Ex ib IIC T4/T5/T6	Korea
-	PESO 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	India
	PAC Kazakhstan Metrology, measurement technology	Kazakhstan
-	MChS Permission for commissioning	Kazakhstan
-	PAC Ukraine Metrology, measurement technology	Ukraine
	PAC Uzbekistan Metrology, measurement technology	Uzbekistan

- 1) Only for built-in transmitter
- 2) Only for model BSZ or BSZ-H connection head
- 3) Only without transmitter
- 4) Only with transmitter

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, Pmax, 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 2 Functional safety
	NAMUR NE 024 Hazardous areas (Ex i)

Certificates

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

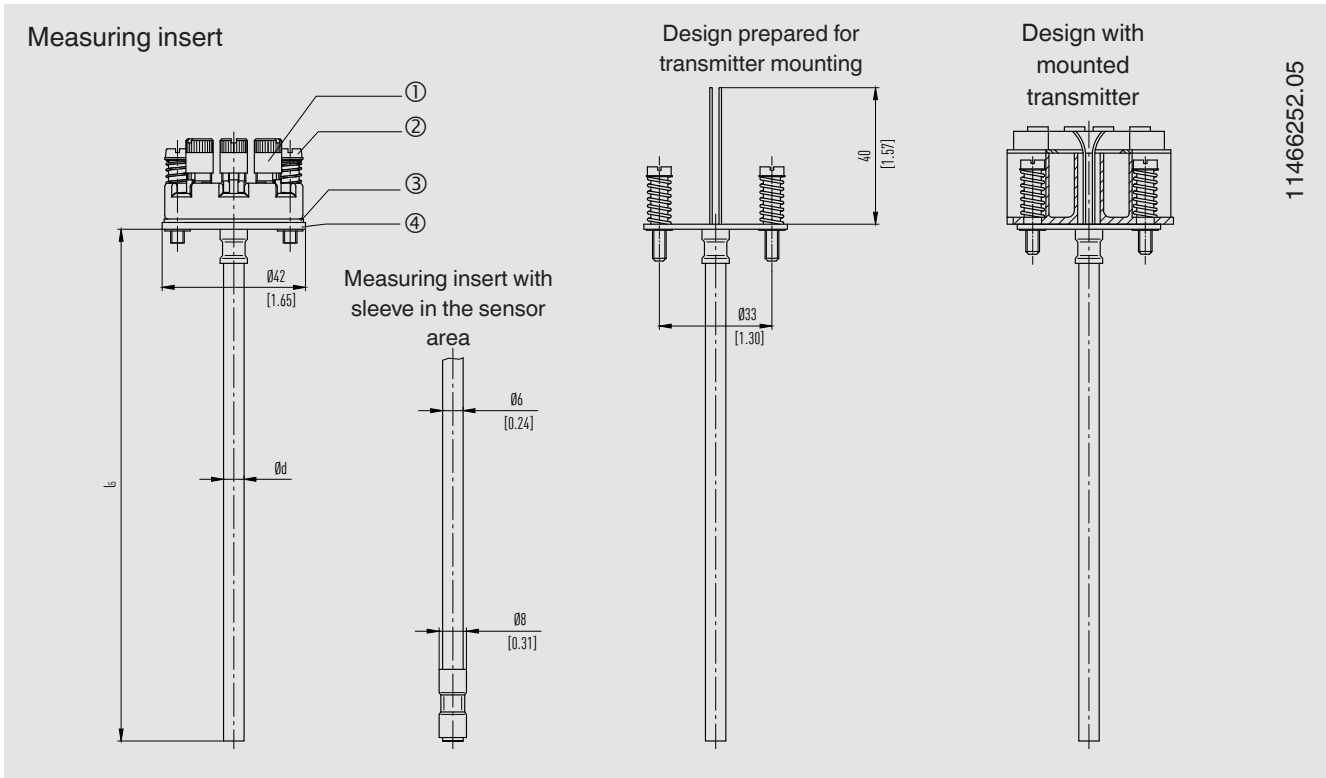
1) Protection tubes have their own material certificates for selected components

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 certifications can be combined with each other.

→ For approvals and certificates, see website

Dimensions in mm [in]



1 1466252.05

Legend

- ① Connection terminal
- ② Spring-loaded screw
- ③ Insulation washer
- ④ Terminal plate

Protection tube

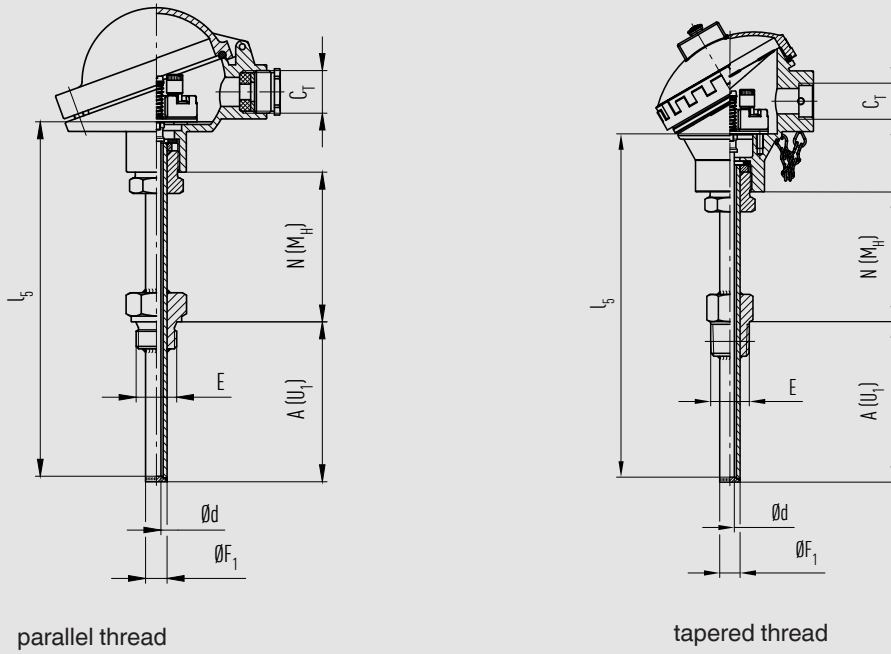
Legend:

U ¹	Insertion length	∅ F ₁	Protection tube diameter
l ₅	Measuring insert length	∅ F ₃	Diameter of protection tube tip
N (M _H)	Neck length	E	Mounting thread
K _E	½ NPT: 8.13 mm	∅ d	Measuring insert diameter
	¾ NPT: 8.61 mm		
C _T	Thread of cable inlet	P	Mounting thread of compression fitting

Protection tube designs

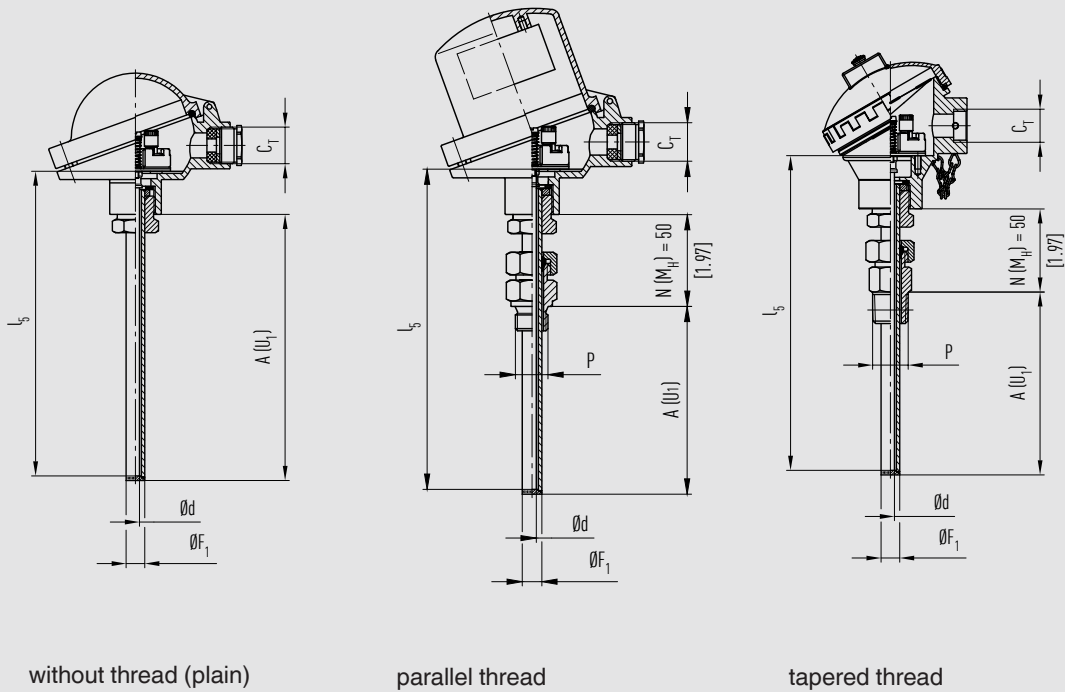
The figures show examples of connection heads.

Straight protection tube, mounting thread, form 2G DIN 43772



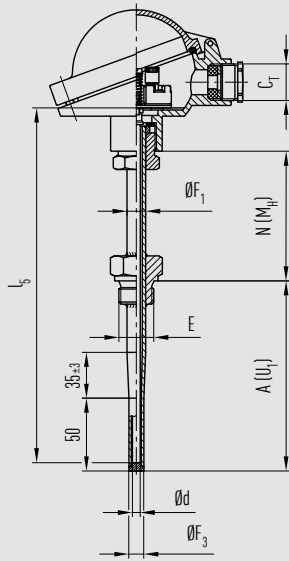
14126798.03

Straight protection tube, plain, form 2 DIN 43772, with/without compression fitting

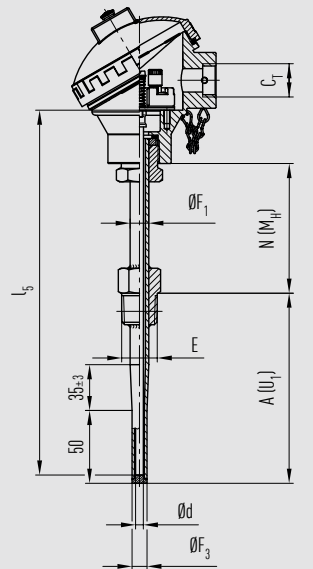


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Tapered protection tube, mounting thread, form 3G DIN 43772



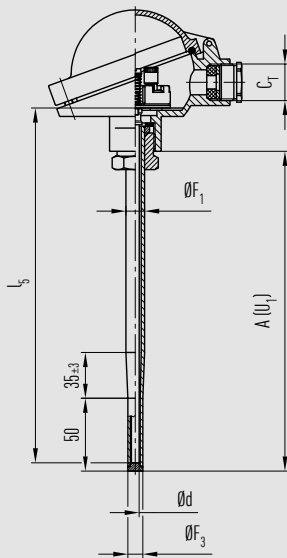
parallel thread



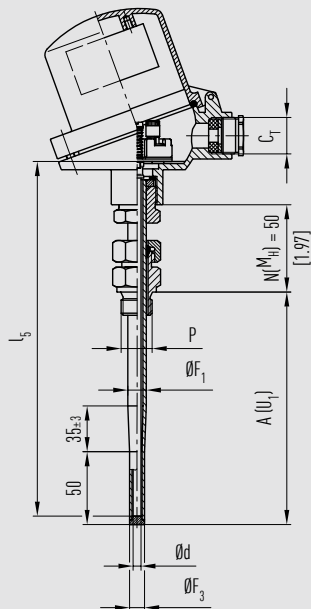
tapered thread

14126834.02

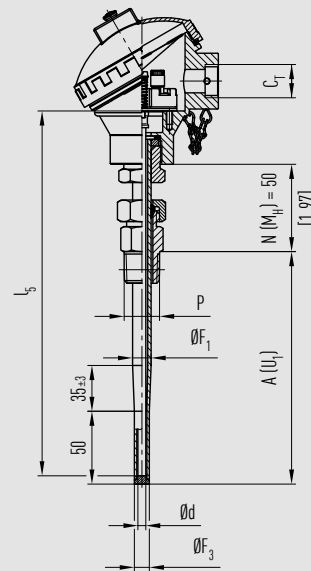
Tapered protection tube, plain, form 3 DIN 43772, with/without compression fitting



without thread (plain)



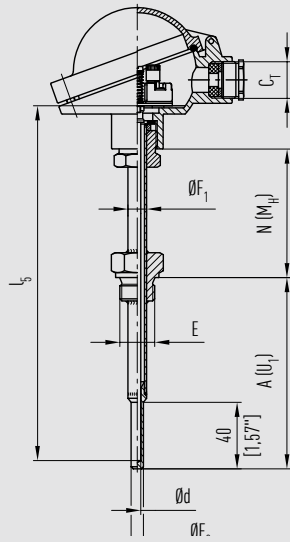
parallel thread



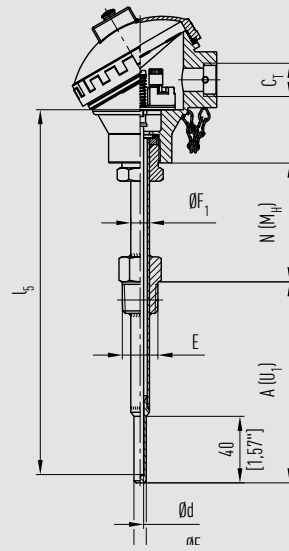
tapered thread

14126834.02

Tapered protection tube, weld-on solid tip, mounting thread, not standardised design



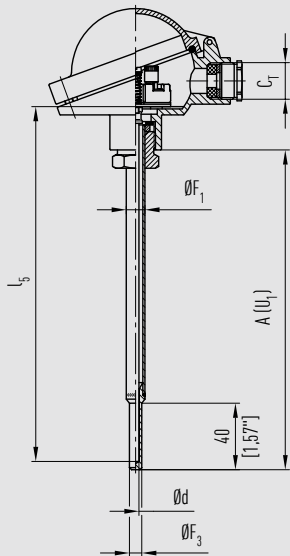
parallel thread



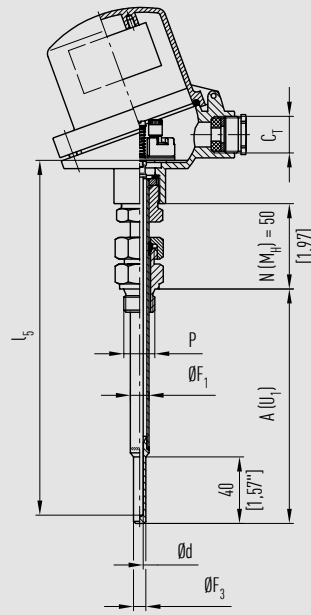
tapered thread

14126855.03

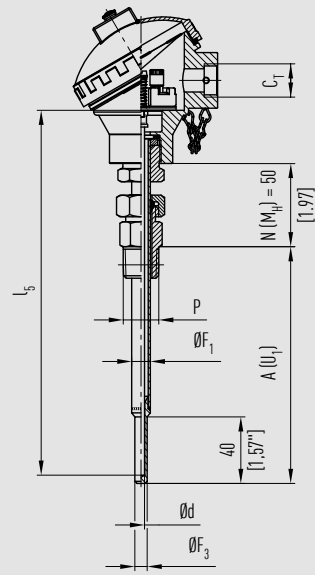
Tapered protection tube, weld-on solid tip, plain, with/without compression fitting



without thread (plain)



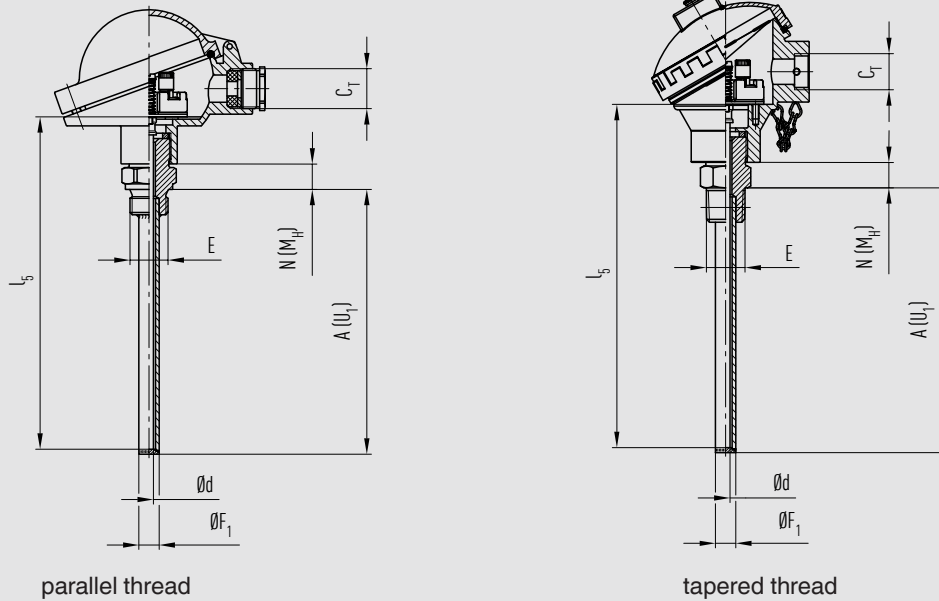
parallel thread



tapered thread

14126855.03

Straight protection tube, hexagonal threaded connection, double threaded hex bushing



14126798.03

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 / Protection tube / Protection tube diameter / Process connection / Protection tube material / Insertion length / Neck length / Certificates / Options



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