

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 $-40 \dots +1,200 \text{ °C}$ [$-40 \dots +2,192 \text{ °F}$]
- For mounting in all standard thermowell designs
- Spring-loaded measuring insert (replaceable)
- Explosion-protected versions (option)

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

Explosion protection (option)






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

Attention:

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

Built-in transmitters have their own EC-type examination certificate. The permissible ambient temperature ranges of the built-in transmitters can be taken from the corresponding transmitter approval.

Approvals (explosion protection, further approvals)










Logo	Description	Country
 	EU declaration of conformity <ul style="list-style-type: none"> ■ EMC directive ¹⁾ EN 61326 emission (group 1, class B) and interference immunity (industrial application) ■ RoHS directive ■ ATEX directive (option) Hazardous areas <ul style="list-style-type: none"> - 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 ²⁾ Zone 1 gas ³⁾ II 2G Ex eb IIC T1 ... T6 Gb Zone 2 gas II 3G Ex ec IIC T1 ... T6 Gc X Zone 21 dust ³⁾ II 2D Ex tb IIIC TX °C Db Zone 22 dust II 3D Ex tc IIIC TX °C Dc X - Ex n ²⁾ Zone 2 gas II 3G Ex nA IIC T1 ... T6 Gc X Zone 22 dust II 3D Ex tc IIIC TX °C Dc X 	European Union
 	IECEx (option) - in conjunction with ATEX Hazardous areas <ul style="list-style-type: none"> - 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 ⁴⁾ Zone 1 gas ³⁾ Ex eb IIC T1...T6 Gb Zone 2 gas Ex ec IIC T1...T6 Gc Zone 21 dust ³⁾ Ex tb IIIC TX °C Db Zone 22 dust Ex tc IIIC TX °C Dc - Ex n ⁴⁾ Zone 2 gas Ex nA IIC T1...T6 Gc Zone 22 dust Ex tc IIIC TX °C Dc 	International
	EAC (option) Hazardous areas <ul style="list-style-type: none"> - 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 	Eurasian Economic Community

1) Only for built-in transmitter

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

3) Only for insulated thermocouples



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

Logo	Description	Country
	INMETRO (option) 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 1 gas Ex ia IIC T3 ... 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	Brazil
	NEPSI (option) 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 - Ex n ⁴⁾ Zone 2 gas Ex nA IIC T1 ~ T6 Gc	China
	KCs - KOSHA (option) Hazardous areas - Ex i Zone 0 gas Ex ia IIC T4 ... T6 Zone 1 gas Ex ib IIC T4 ... T6	South Korea
-	PESO (option) 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
	GOST (option) Metrology, measurement technology	Russia
	KazInMetr (option) Metrology, measurement technology	Kazakhstan
-	MTSCHS (option) Permission for commissioning	Kazakhstan
	BelGIM (option) Metrology, measurement technology	Belarus
	UkrSEPRO (option) Metrology, measurement technology	Ukraine
	Uzstandard (option) Metrology, measurement technology	Uzbekistan
	DNV GL (option) Type approval for the shipbuilding industry - Maximum insertion length l ₁ : 435 mm - Connection head: Model BSZ - Neck tube: Ø 11 x 2 mm or Ø 12 x 2.5 mm, max. 150 mm long - Measuring insert: Ø 6 mm Location classification: <i>Temperature D (ambient temperature: -25 ... +70 °C)</i> <i>Humidity B (relative humidity: up to 100 %)</i> <i>Vibration B (frequency: 3 ... 25 Hz; amplitude: 1.6 mm peak; frequency: 25 ... 100 Hz; amplitude: 4 g)</i> <i>EMC Not relevant</i> <i>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.⁵⁾ (for "open deck")</i> - Optional with TW10-P (data sheets TW 95.10, TW 95.12)	International

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

5) Suitable cable gland required

Manufacturer's information and certifications

Logo	Description
	SIL 2 Functional safety (only in conjunction with model T32 temperature transmitter)
	NAMUR NE24 Hazardous areas (Ex i)

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.

Approvals and certificates, see website

Sensor

Thermocouple per IEC 60584-1 or ASTM E230

Types K, J, E, N, T (single or dual thermocouple)

Measuring point

- Ungrounded (standard)
- Grounded

Sensor types

Type	Validity limits of the class accuracy			
	IEC 60584-1		ASTM E230	
	Class 2	Class 1	Standard	Special
K	-40 ... +1,200 °C	-40 ... +1,000 °C	0 ... 1,260 °C	
J	-40 ... +750 °C	-40 ... +750 °C	0 ... 760 °C	
E	-40 ... +900 °C	-40 ... +800 °C	0 ... 870 °C	
N	-40 ... +1,200 °C	-40 ... +1,000 °C	0 ... 1,260 °C	
T	-40 ... +350 °C		0 ... 370 °C	

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 thermometers is limited both by the maximum permissible working temperature and the diameter of the thermocouple and the MI cable, as well as by the maximum permissible working temperature of the thermowell material.

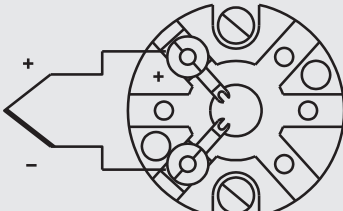
For detailed specifications for thermocouples, see IEC 60584-1 or ASTM E230 and Technical information IN 00.23 at www.wika.com.

Tolerance value

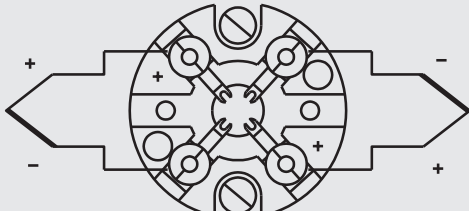
For the tolerance value of thermocouples, a cold junction temperature of 0 °C has been taken as the basis.

Electrical connection

Single thermocouple



Dual thermocouple



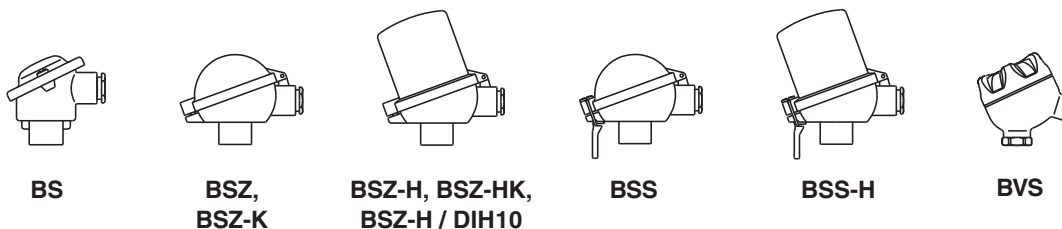
The colour coding at the positive poles of the instrument decides the correlation of polarity and terminal.

3166822.03

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

Connection head

■ European designs per EN 50446 / DIN 43735



Model	Material	Cable entry thread size	Ingress protection (max) ¹⁾ IEC/EN 60529	Cap	Surface	Connection to neck tube
BS	Aluminium	M20 x 1.5 or ½ NPT ³⁾	IP65 ⁴⁾	Flat cap with 2 screws	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
BSZ	Aluminium	M20 x 1.5 or ½ NPT ³⁾	IP65 ⁴⁾	Spherical hinged cover with cylinder head screw	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
BSZ-H	Aluminium	M20 x 1.5 or ½ NPT ³⁾	IP65 ⁴⁾	Raised hinged cover with cylinder head screw	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
BSZ-H (2x cable outlet)	Aluminium	2 x M20 x 1.5 or 2 x ½ NPT ³⁾	IP65 ⁴⁾	Raised hinged cover with cylinder head screw	Blue, painted ⁵⁾	M24 x 1.5
BSZ-H / DIH10 ²⁾	Aluminium	M20 x 1.5 or ½ NPT ³⁾	IP65	Raised hinged cover with cylinder head screw	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
BSS	Aluminium	M20 x 1.5 or ½ NPT ³⁾	IP65	Spherical hinged cover with clamping lever	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
BSS-H	Aluminium	M20 x 1.5 or ½ NPT ³⁾	IP65	Raised hinged cover with clamping lever	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
BVS	Stainless steel	M20 x 1.5 ³⁾	IP65	Precision-cast screw-on lid	Blank, electropolished	M24 x 1.5
BSZ-K	Plastic	M20 x 1.5 or ½ NPT ³⁾	IP65	Spherical hinged cover with cylinder head screw	Black	M24 x 1.5
BSZ-HK	Plastic	M20 x 1.5 or ½ NPT ³⁾	IP65	Raised hinged cover with cylinder head screw	Black	M24 x 1.5

Model	Explosion protection							
	Without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex eb (gas) Zone 1	Ex tb (dust) Zone 21	Ex ec (gas) Zone 2	Ex nA (gas) Zone 2	Ex tc (dust) Zone 22
BS	x	x	x	-	-	-	-	-
BSZ	x	x	x	x ⁶⁾	x ⁶⁾	x ⁶⁾	x ⁶⁾	x ⁶⁾
BSZ-H	x	x	x	x ⁶⁾	x ⁶⁾	x ⁶⁾	x ⁶⁾	x ⁶⁾
BSZ-H (2x cable outlet)	x	x	x	x ⁶⁾	x ⁶⁾	x ⁶⁾	x ⁶⁾	x ⁶⁾
BSZ-H / DIH10 ¹⁾	x	x	-	-	-	-	-	-
BSS	x	x	-	-	-	-	-	-
BSS-H	x	x	-	-	-	-	-	-
BVS	x	x	-	-	-	-	-	-
BSZ-K	x	x	-	-	-	-	-	-
BSZ-HK	x	x	-	-	-	-	-	-

1) The ingress protection refers to the connection head, for information on the cable glands, see page 7

2) LED display DIH10

3) Standard (others on request)

4) Ingress protections, which describe temporary or lasting submersion, available on request

5) RAL 5022

6) Only ATEX, no IECEx, no NEPSI

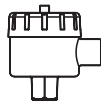
■ North American designs



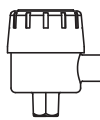
KN4-A
KN4-P



1/4000 F
1/4000 S



7/8000 W
7/8000 S



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

Model	Material	Cable entry thread size	Ingress protection (max.) ¹⁾ IEC/EN 60529	Cover / Cap	Surface	Connection to neck tube
KN4-A	Aluminium	½ NPT, M20 x 1.5 ³⁾	IP65 ⁴⁾	Screw-on lid	Blue, painted ⁵⁾	M24 x 1.5, ½ NPT
KN4-P ²⁾	Polypropylene	½ NPT	IP65 ⁴⁾	Screw-on lid	White	½ NPT
1/4000 F	Aluminium	½ NPT, ¾ NPT, M20 x 1.5 ³⁾	IP66 ⁴⁾	Screw-on lid	Blue, painted ⁵⁾	½ NPT
1/4000 S	Stainless steel	½ NPT, ¾ NPT, M20 x 1.5 ³⁾	IP66 ⁴⁾	Screw-on lid	Blank	½ NPT
7/8000 W	Aluminium	½ NPT, ¾ NPT, M20 x 1.5 ³⁾	IP66 ⁴⁾	Screw-on lid	Blue, painted ⁵⁾	½ NPT
7/8000 S	Stainless steel	½ NPT, ¾ NPT, M20 x 1.5 ³⁾	IP66 ⁴⁾	Screw-on lid	Blank	½ NPT
7/8000 W / DIH50 ⁶⁾	Aluminium	½ NPT, ¾ NPT, M20 x 1.5 ³⁾	IP66 ⁴⁾	Screw-on lid	Blue, painted ⁵⁾	½ NPT
7/8000 S / DIH50 ⁶⁾	Stainless steel	½ NPT, ¾ NPT, M20 x 1.5 ³⁾	IP66 ⁴⁾	Screw-on lid	Blank	½ NPT

Model	Explosion protection							
	Without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex eb (gas) Zone 1	Ex tb (dust) Zone 21	Ex ec (gas) Zone 2	Ex nA (gas) Zone 2	Ex tc (dust) Zone 22
KN4-A	x	x	-	-	-	-	-	-
KN4-P ²⁾	x	-	-	-	-	-	-	-
1/4000 F	x	x	x	x	x	x	x	x
1/4000 S	x	x	x	x	x	x	x	x
7/8000 W	x	x	x	x	x	x	x	x
7/8000 S	x	x	x	x	x	x	x	x
7/8000 W / DIH50 ⁶⁾	x	x	x	-	-	-	-	-
7/8000 S / DIH50 ⁶⁾	x	x	x	-	-	-	-	-

1) The ingress protection refers to the connection head, for information on the cable glands, see page 7

2) On request

3) Standard

4) Suitable seal/cable gland required

5) RAL 5022

6) 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



Standard



Plastic



Brass,
nickel-plated



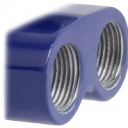
Stainless steel



Junction box,
M12 x 1 (4-pin)



Plain
threaded



2 x plain
threaded



Sealing plugs for
transport

The pictures show examples of connection heads.

Cable entry	Cable entry thread size	Min./max. ambient temperature
Standard cable entry ¹⁾	M20 x 1.5 or ½ NPT	-40 ... +80 °C
Plastic cable gland (cable Ø 6 ... 10 mm) ¹⁾	M20 x 1.5 or ½ NPT	-40 ... +80 °C
Plastic cable gland (cable Ø 6 ... 10 mm), Ex e ¹⁾	M20 x 1.5 or ½ NPT	-20 ... +80 °C (standard) -40 ... +70 °C (option)
Nickel-plated brass cable gland (cable Ø 6 ... 12 mm)	M20 x 1.5 or ½ NPT	-60 ⁴⁾ / -40 ... +80 °C
Stainless steel cable gland (cable Ø 7 ... 12 mm)	M20 x 1.5 or ½ NPT	-60 ⁴⁾ / -40 ... +80 °C
Plain threaded	M20 x 1.5 or ½ NPT	-
2 x plain threaded ²⁾	2 x M20 x 1.5 or 2 x ½ NPT	-
Junction box M12 x 1 (4-pin) ³⁾	M20 x 1.5	-40 ... +80 °C
Sealing plugs for transport	M20 x 1.5 or ½ NPT	-40 ... +80 °C

Cable entry	Colour	Ingress protection (max.) IEC/EN 60529	Explosion protection							
			Without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21, 22	Ex eb (gas) Zone 1	Ex tb (dust) Zone 21	Ex ec (gas) Zone 2, 21, 22	Ex nA (gas) Zone 2	Ex tc (dust) Zone 22
Standard cable entry ¹⁾	Blank	IP65	x	x	-	-	-	-	-	-
Plastic cable gland ¹⁾	Black or grey	IP66 ⁵⁾	x	x	-	-	-	-	-	-
Plastic cable gland, Ex e ¹⁾	Light blue	IP66 ⁵⁾	x	x	x	-	-	-	-	-
Plastic cable gland, Ex e ¹⁾	Black	IP66 ⁵⁾	x	x	x	x	x	x	x	x
Nickel-plated brass cable gland	Blank	IP66 ⁵⁾	x	x	x	-	-	-	-	-
Nickel-plated brass cable gland, Ex e	Blank	IP66 ⁵⁾	x	x	x	x	x	x	x	x
Stainless steel cable gland	Blank	IP66 ⁵⁾	x	x	x	-	-	-	-	-
Stainless steel cable gland, Ex e	Blank	IP66 ⁵⁾	x	x	x	x	x	x	x	x
Plain threaded	-	IP00	x	x	x ⁷⁾	x ⁷⁾	x ⁷⁾	x ⁷⁾	x ⁷⁾	x ⁷⁾
2 x plain threaded ²⁾	-	IP00	x	x	x ⁷⁾	x ⁷⁾	x ⁷⁾	x ⁷⁾	x ⁷⁾	x ⁷⁾
Junction box M12 x 1 (4-pin) ³⁾	-	IP65	x	x ⁶⁾	x ⁶⁾	-	-	-	-	-
Sealing plugs for transport	Transparent	-	not applicable, transport protection							

1) Not available for BVS connection head

2) Only for BSZ-H connection head

3) Not available for ½ NPT thread size cable entry

4) Special version on request (only available with specific approvals), other temperatures on request

5) Ingress protections, which describe temporary or continuous immersion, available on request

6) With appropriate mating connector connected

7) Suitable cable gland required for operation

Ingress protection per IEC/EN 60529

Degrees of protection against solid foreign bodies (defined by the first index number)

First index number	Degree of protection / short description	Test parameter
5	Dust-protected	per IEC/EN 60529
6	Dust-tight	per IEC/EN 60529

Degrees of protection against water (defined by the second index number)

Second index number	Degree of protection / short description	Test parameter
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	Protected against the effects of temporary immersion in water	per IEC/EN 60529
8	Protected against the effects of continuous immersion in water	by agreement

The stated degrees of protection apply under the following conditions:

- Use of a suitable thermowell
- 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

Transmitter

Mounting onto the measuring insert

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

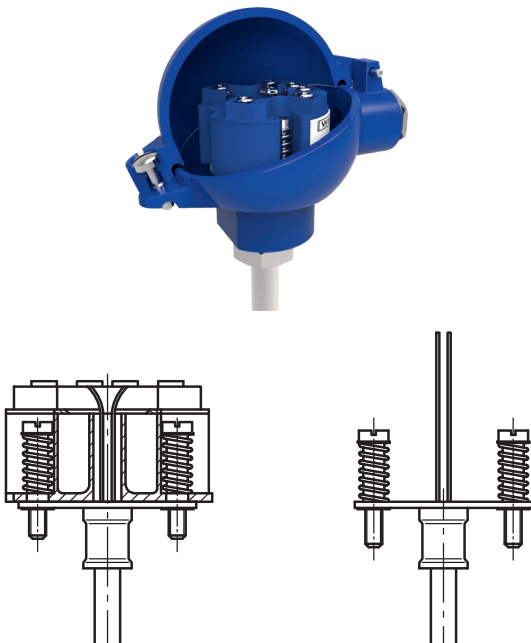


Fig. left: Measuring insert with mounted transmitter (here: model T32)

Fig. right: Measuring insert prepared for transmitter mounting

Mounted within the cap of the connection head

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



Transmitter models



Output signal 4 ... 20 mA, HART® protocol, FOUNDATION™ Fieldbus and PROFIBUS® PA			
Transmitter (selectable versions)	Model T16	Model T32	Model T53
Data sheet	TE 16.01	TE 32.04	TE 53.01
Output			
■ 4 ... 20 mA	x	x	
■ HART® protocol		x	
■ FOUNDATION™ Fieldbus and PROFIBUS® PA			x
Input			
■ Thermocouple IEC 60584-1	K, J, E, N, T	K, J, E, N, T	K, J, E, N, T
Explosion protection	Optional	Optional	Standard

Possible mounting positions for transmitters

Connection head	T16	T32	T53
BS	○	-	○
BSZ, BSZ-K	○	○	○
BSZ-H, BSZ-HK	●	●	●
BSZ-H (2x cable outlet)	●	●	●
BSZ-H / DIH10	○	○	-
BSS	○	○	○
BSS-H	●	●	●
BVS	○	○	○
KN4-A / KN4-P	○	○	○
1/4000 F, 1/4000 S	○	○	○
7/8000 W, 7/8000 S	○	○	○
7/8000 W / DIH50, 7/8000 S / DIH50	○	○	-

○ Mounted instead of terminal block

● Mounted within the cap of the connection head – Mounting not possible

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

Mounting of 2 transmitters on request.

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

Functional safety (option) with temperature transmitter model T32



In safety-critical applications, the entire measuring chain must be taken into consideration in terms of the safety parameters. The SIL classification allows the assessment of the risk reduction reached by the safety installations.

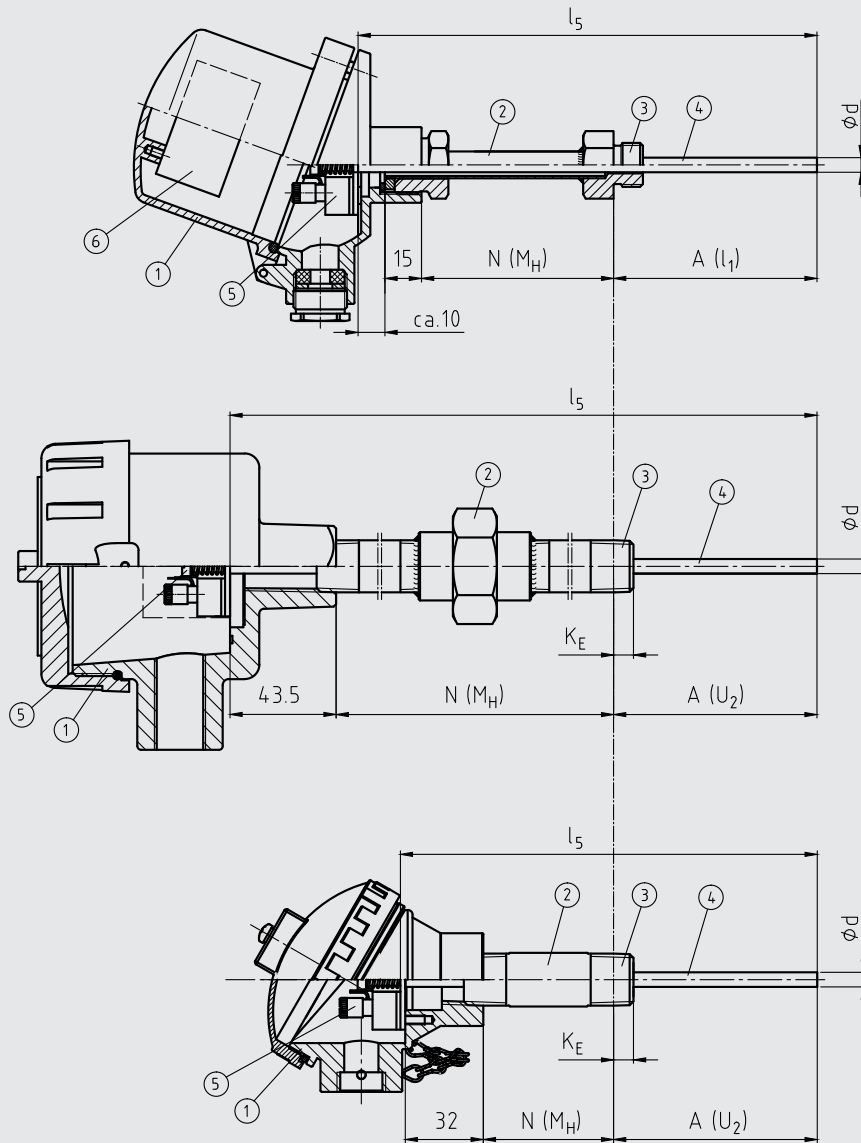
Selected TC10-B thermocouples, in combination with a suitable temperature transmitter (e.g. model T32.1S, TÜV

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.

Components model TC10-B

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



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Legend:

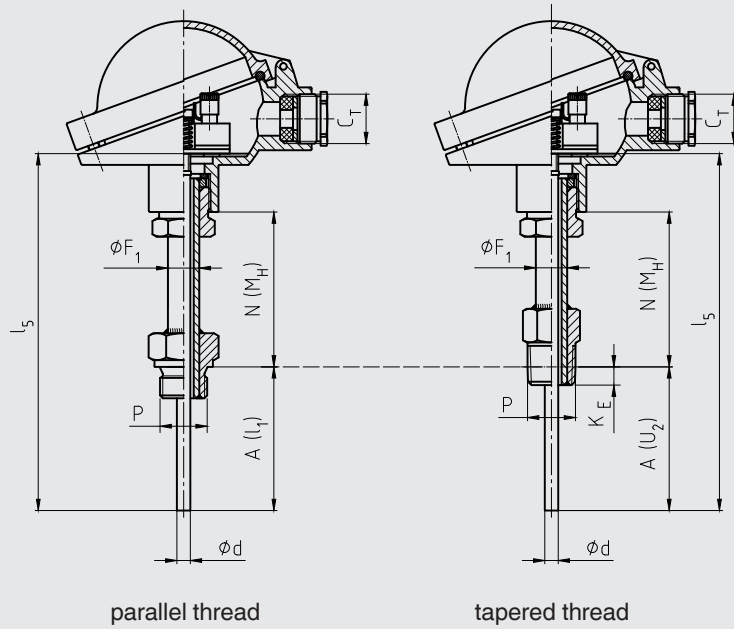
- ① Connection head
- ② Neck tube
- ③ Connection to thermowell
- ④ Measuring insert (TC10-A)
- ⑤ Terminal block/transmitter (option)
- ⑥ Transmitter (option)

- A (l₁) Insertion length (parallel threads)
- A (U₂) Insertion length (tapered threads)
- l₅ Measuring insert length
- N (M_H) Neck length
- K_E 1/2 NPT: 8.13 mm
3/4 NPT: 8.61 mm
- Ø d Measuring insert diameter

Neck tube

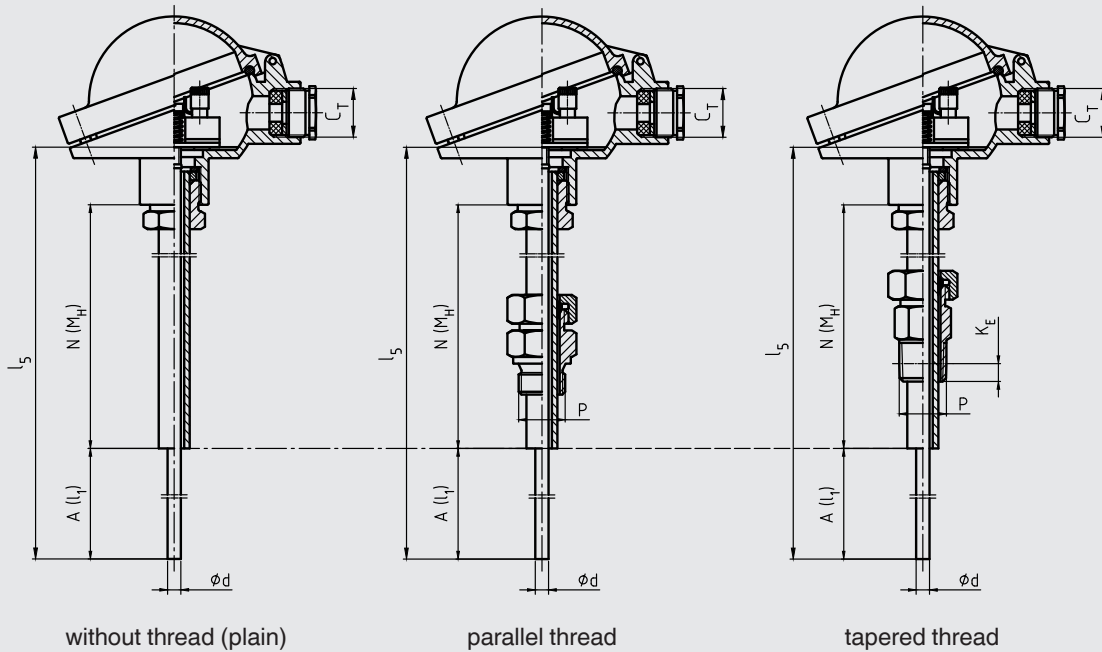
Neck tube designs

Neck tube per DIN 43772



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



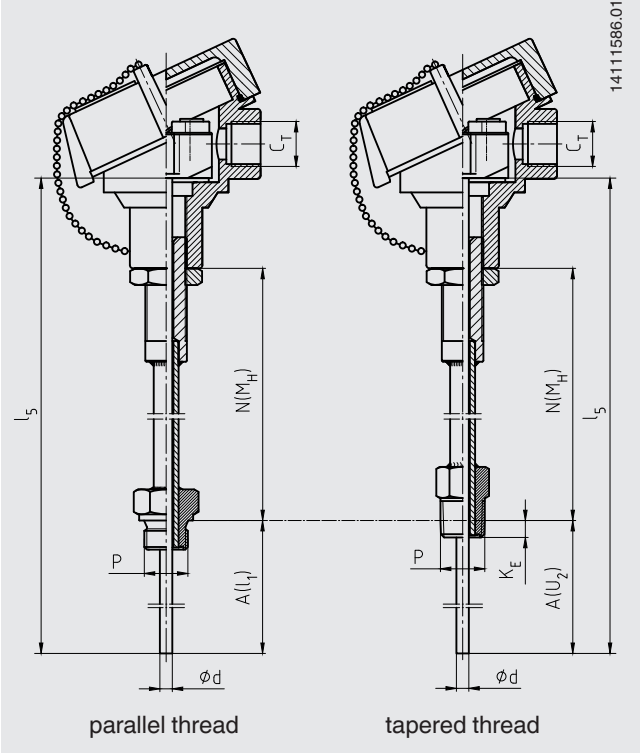
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Legend:

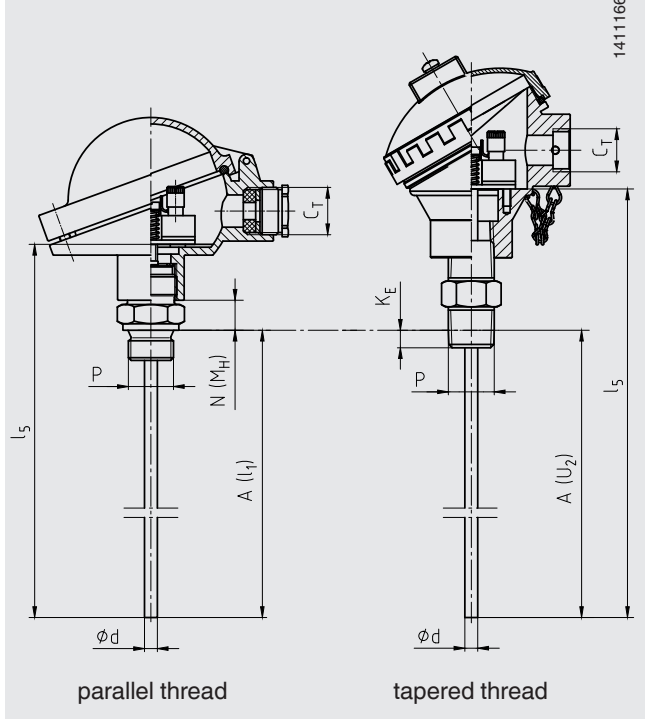
A (I ₁)	Insertion length (parallel threads)	C _T	Thread cable entry
A (U ₂)	Insertion length (tapered threads)	Ø F ₁	Neck tube diameter
l ₅	Measuring insert length	P	Thread to the thermowell
N (M _H)	Neck length	Ø d	Measuring insert diameter
K _E	1/2 NPT: 8.13 mm 3/4 NPT: 8.61 mm		

The pictures show examples of connection heads.

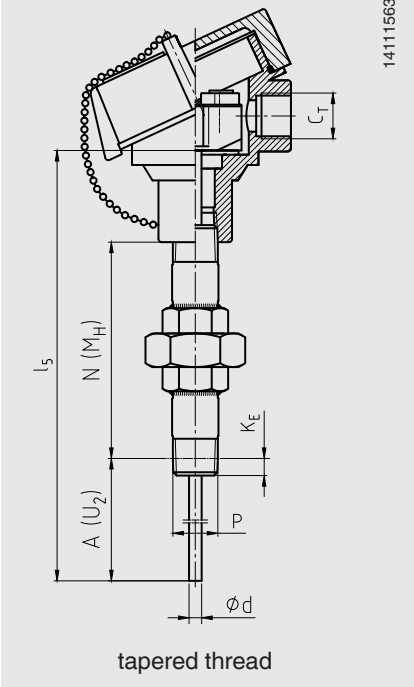
Neck tube, with counter nut to head



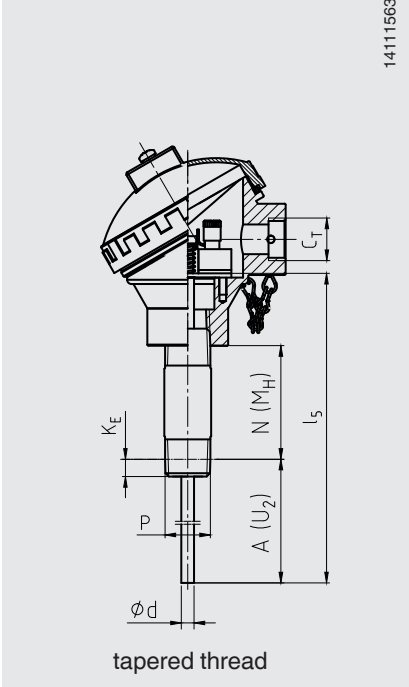
Double threaded hex bushing (with hexagonal spanner flats)



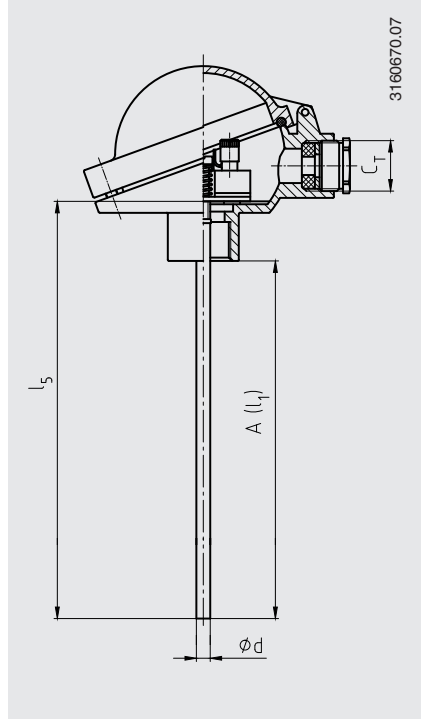
“Nipple-union-nipple” neck tube



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) | ϕF_1 Neck tube diameter |
| l_5 Measuring insert length | P Thread to the thermowell |
| $N (M_H)$ Neck length | ϕd Measuring insert diameter |
| K_E 1/2 NPT: 8.13 mm | |
| 3/4 NPT: 8.61 mm | |

The pictures show examples of connection heads.

Neck tube versions

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

Thread sizes

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

Continued on next page

Neck tube design	Diameter	Thread to the thermowell
Neck tube with counter nut to head	14 x 2.5 mm	½ NPT
		¾ NPT
		G ½ B
		G ¾ B
		G ¼ B
		M14 x 1.5
		M18 x 1.5
		M20 x 1.5
Double threaded hex bushing (with hexagonal spanner flats)	-	G ½ B
		G ¾ B
		G ¼ B
		½ NPT
		¾ NPT
		M14 x 1.5
		M18 x 1.5
		M20 x 1.5
"Nipple-union-nipple" neck tube	~ 22 mm	½ NPT
	~ 27 mm	¾ NPT
Double threaded hex bushing (tube section)	~ 22 mm	½ NPT
	~ 27 mm	¾ NPT

Neck lengths

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

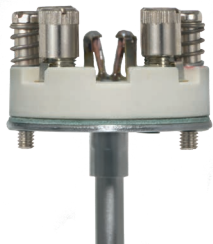
The neck tube is screwed into the connection head. The neck length depends on the intended use. Usually an isolation is bridged by the neck tube. Also, in many cases, the neck tube serves as a cooling extension between the connection head and the medium, in order to protect any possible built-in transmitter from high medium temperatures.

Other versions on request

Measuring insert

Within the TC10-B, the measuring insert of model TC10-A is fitted.

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



Measuring insert for thermocouple, model TC10-A

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

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

Gaps of more than 0.5 mm between thermowell and the measuring insert will have a negative effect on the heat transfer, and they will result in unfavourable response behaviour of the thermometer.

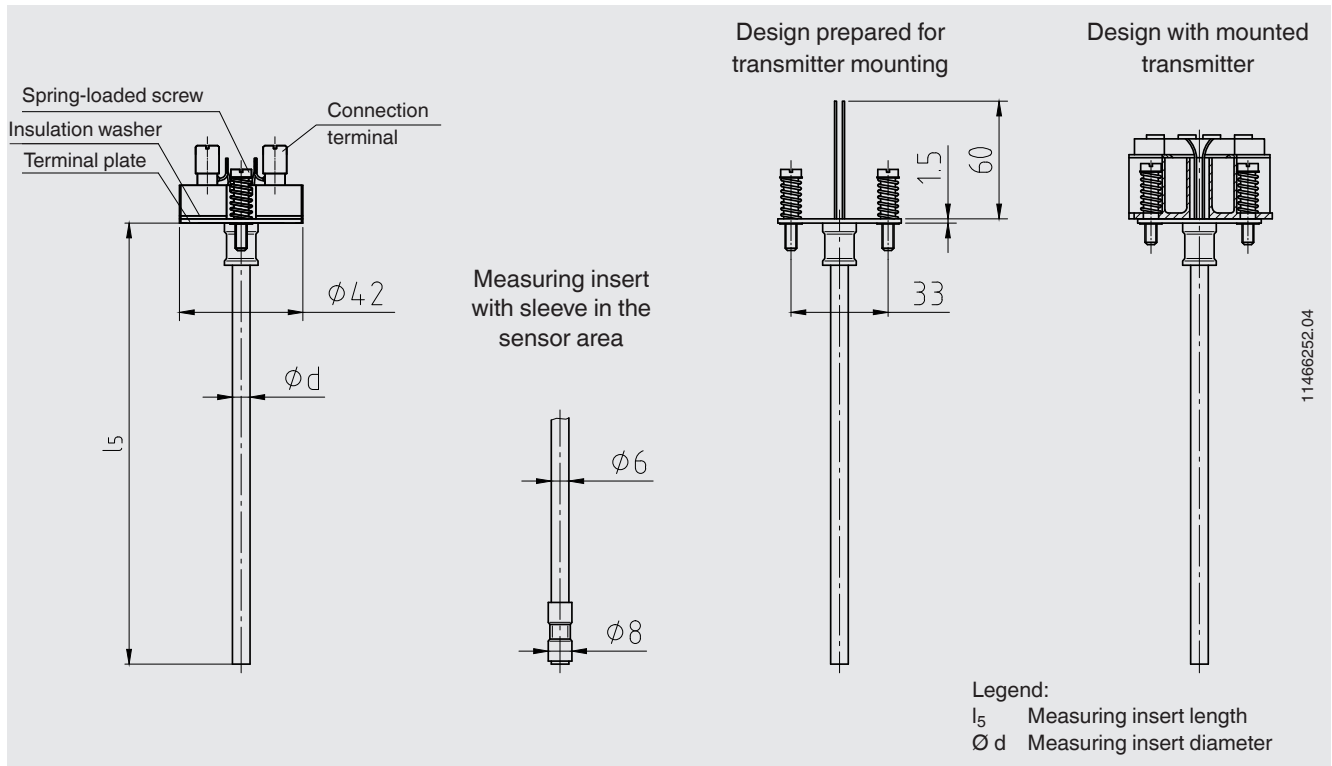
When fitting the measuring insert into a thermowell, it is very important to determine the correct insertion length (= thermowell length for bottom thicknesses of ≤ 5.5 mm). In order to ensure that the measuring insert is firmly pressed down onto the bottom of the thermowell, the measuring insert must be spring-loaded (spring travel: max. 10 mm).

Material

Sheath material	Ni alloy: alloy 600
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Other sheath materials on request

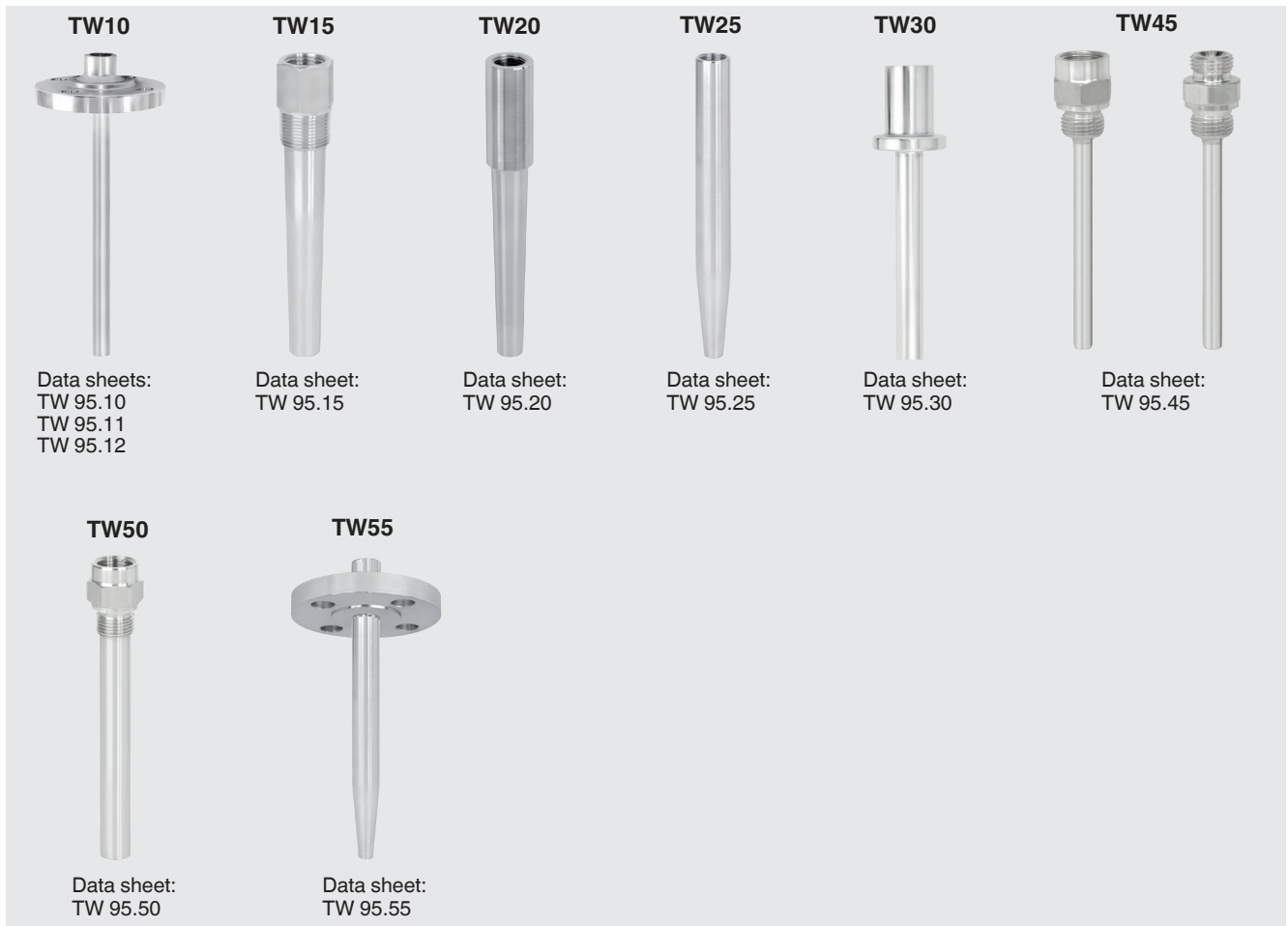
Dimensions in mm



Measuring insert length l_5 in mm	Tolerance in mm
75 ... 825	+2 0
> 825	+3 0

Measuring insert diameter $\varnothing d$ in mm		Index per DIN 43735	Tolerance in mm
3	Standard	30	3 ± 0.05
6	Standard	60	$6 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$
8 (6 mm with sleeve)	Standard	-	$8 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$
8	Standard	80	$8 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix}$
1/8 inch (3.17 mm) 1/4 inch (6.35 mm) 3/8 inch (9.53 mm)	Option, on request	-	-

Thermowell selection



Special thermowells on request

Operating conditions

The replaceable measuring insert is made of a vibration-resistant, sheathed measuring cable (MI cable).
Standard vibration resistance: 50 g (sensor tip)

Ambient and storage temperature

-60 ¹⁾ / -40 ... +80 °C

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

Other ambient and storage temperatures on request

Certificates (option)

Certification type	Measurement accuracy	Material certificate ²⁾
2.2 test report	x	x
3.1 inspection certificate	x	x
DKD/DAkkS calibration certificate	x	-

The different certifications can be combined with each other.

2) For selected components, thermowells have their own material certificates

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_H) / Insertion length A (I₁), A (U₂) / Measuring insert diameter Ø d / Measuring insert sheath material / Certificates / Options

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