Threaded thermocouple
Miniature design
Model TC10-D

for further approvals
see page 2

Applications

- Machine building, plant and vessel construction
- Propulsion technology
- Air-conditioning and refrigeration systems

Special features

- Sensor ranges from -40 ... +600 °C (-40 ... +1,112 °F)
- Compact design
- Universal application
- Direct installation into the process
- Explosion-protected versions

Fig. left: Model TC10-D with process connection compression fitting
Fig. right: Model TC10-D with process connection double threaded hex bushing

Description

Thermocouples of this series are used for the measurement of liquid and gaseous media at low and medium pressures.

The thermocouple is screwed directly into the process. The electrical connection is made via connection terminals in the connection head (splash-proof). The measuring inserts are available in two variants, depending upon the application. The choice is between a replaceable, spring-loaded miniature measuring insert and a non-replaceable, permanently screwed-in design.

Insertion length, process connection and sensor can each be selected for the respective application.

Data sheets showing similar products:
Resistance thermometer for additional thermowell; model TR10-B; see data sheet TE 60.02
Cable thermocouple; model TC40; see data sheet TE 65.40

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.

Approvals (explosion protection, further approvals)

Logo	Description	Country
CE	**EU declaration of conformity** ■ EMC directive [1)] EN 61326 emission (group 1, class B) and immunity (industrial application) ■ RoHS directive	European Union
Ex	■ ATEX directive (option) Hazardous areas - 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 20 dust [II 1D Ex ia IIIC T125 ... T65 °C Da] Zone 21 dust [II 2D Ex ia IIIC T125 ... T65 °C Db]	
IEC IECEx	**IECEx (option)** (in conjunction with ATEX) Hazardous areas - Ex i Zone 0 gas [Ex ia IIC T1 ... T6 Ga] Zone 1 gas [Ex ia IIC T1 ... T6 Gb] Zone 20 dust [Ex ia IIIC T125 ... T65 °C Da] Zone 21 dust [Ex ia IIIC T125 ... T65 °C Db]	International
EAC Ex	**EAC (option)** Hazardous areas - Ex i Zone 0 gas [0 Ex ia IIC T3/T4/T5/T6] Zone 1 gas [1 Ex ib IIC T3/T4/T5/T6] Zone 20 dust [DIP A20 Ta 65 °C/Ta 95 °C/Ta 125 °C] Zone 21 dust [DIP A21 Ta 65 °C/Ta 95 °C/Ta 125 °C]	Eurasian Economic Community
INMETRO	**INMETRO (option)** Hazardous areas - Ex i Zone 0 gas [Ex ia IIC T3 ... T6 Ga] Zone 1 gas [Ex ib IIC T3 ... T6 Gb] Zone 20 dust [Ex ia IIIC T125 ... T65 °C Da] Zone 21 dust [Ex ib IIIC T125 ... T65 °C Db]	Brazil
Ex NEPSI	**NEPSI (option)** Hazardous areas - Ex i Zone 0 gas [Ex ia IIC T3 ~ T6] Zone 1 gas [Ex ib IIC T3 ~ T6]	China
KCs	**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 gas [Ex ib IIC T3 ... T6 Gb]	India
DNOP	**DNOP - MakNII (option)** Hazardous areas - Ex i Zone 0 gas [II 1G Ex ia IIC T3, T4, T5, T6 Ga] Zone 1 gas [II 2G Ex ia IIC T3, T4, T5, T6 Gb] Zone 20 dust [II 1D Ex ia IIIC T65, T95, T125 °C Da] Zone 21 dust [II 2D Ex ib IIIC T125 ... T65 °C Db]	Ukraine

1) Only for built-in transmitter

Logo	Description	Country
	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

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 themocouple)

Sensor types

Type	Operating temperatures of the thermocouple			
	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.

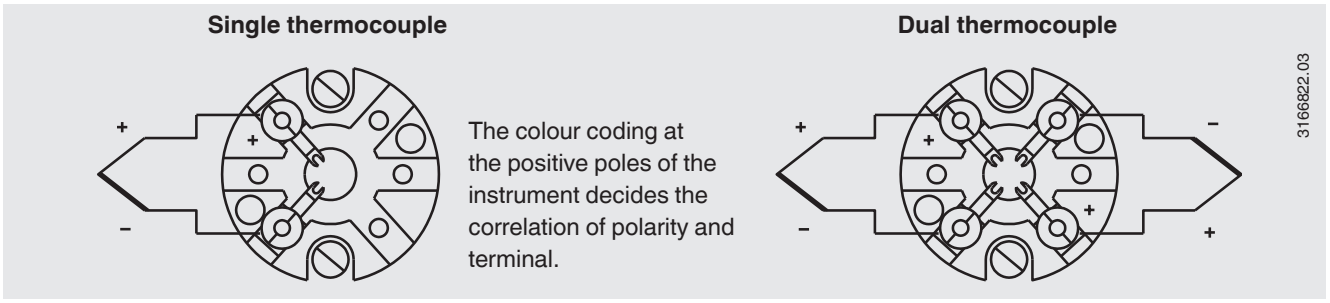
The actual operating temperature of the thermometer is limited both by the maximum permissible operating temperature and the diameter of the thermocouple and the sheathed cable, as well as by the maximum permissible working temperature of the thermowell material.

Listed models are available both as single or dual thermocouples. The thermocouple will be delivered with an ungrounded measuring point, unless explicitly specified otherwise.

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

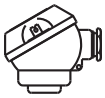
Tolerance value
For the tolerance value of thermocouples, a cold junction temperature of 0 °C has been taken as the basis.

Electrical connection



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

Connection head



JS

Model	Material	Cable entry thread size	Ingress protection (max.) [1]	Cap	Surface	Connection to neck tube
JS	Aluminium	M16 x 1.5 [2]	IP65	Cover with 2 screws	Blue, lacquered [3]	M24 x 1.5, ½ NPT

Model	Explosion protection		
	Without	Ex i (gas) Zone 0, 1, 2	Ex i (dust) Zone 20, 21
JS	x	x	x

1) The ingress protection refers to the connection head, for information on the cable glands, see below
2) Standard
3) RAL 5022

Cable entry

Standard

Plastic

Plastic (Ex)

Brass, nickel-plated

The figures show examples of connection heads.

Cable entry	Cable entry thread size
Standard cable entry	M16 x 1.5
Plastic cable gland	M16 x 1.5
Brass cable gland, nickel-plated	M16 x 1.5

Cable entry	Colour	Ingress protection (max.)	Min./max. ambient temperature	Explosion protection	
				without	Ex i (gas), zone 0, 1, 2
Standard cable entry	Blank	IP65	-40 ... +80 °C	x	x
Plastic cable gland	Black or grey	IP66, IP68	-40 ... +80 °C	x	-
Plastic cable gland, Ex e	Light blue	IP66, IP68	-20 ... +80 °C (standard) -40 ... +70 °C (option)	x	x
Plastic cable gland, Ex e	Black	IP66, IP68	-20 ... +80 °C (standard) -40 ... +70 °C (option)	x	-
Brass cable gland, nickel-plated	Blank	IP66, IP68	-40 ... +80 °C	x	-
Brass cable gland, nickel-plated, Ex e	Blank	IP66, IP68	-40 ... +80 °C	x	x

Ingress protection

to IP65 per IEC/EN 60529 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

Transmitter (option)

Within the model JS connection head, a model T91.20 analogue temperature transmitter can be factory-fitted. It is mounted in place of the terminal block.

The version with temperature transmitter is not suitable for use in hazardous areas.

For further specifications on the model T91.20 temperature transmitter please refer to WIKA data sheet TE 91.01.

Transmitter model

Output signal 4 ... 20 mA	
Transmitter (selectable versions)	**Model T91.20**
Data sheet	**TE 91.01**
Output	
■ 4 ... 20 mA	x
Input	
■ Thermocouples IEC 60584-1	K, J, T
Explosion protection	-

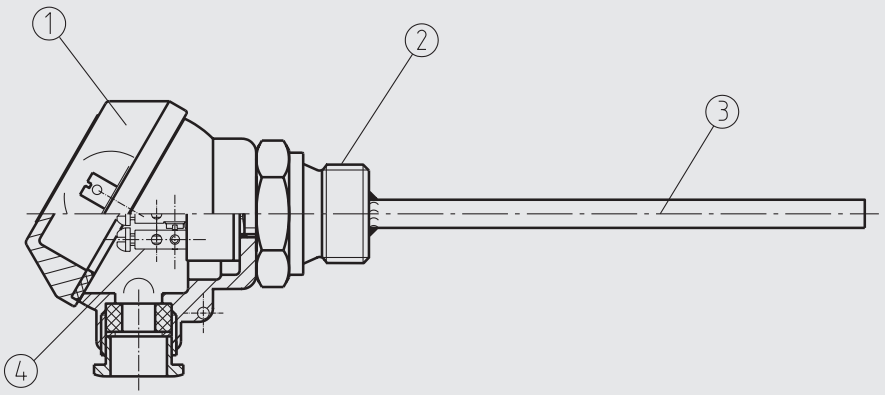
Possible mounting positions for transmitters

Connection head	T91.20
JS	○

○ Mounted instead of terminal block

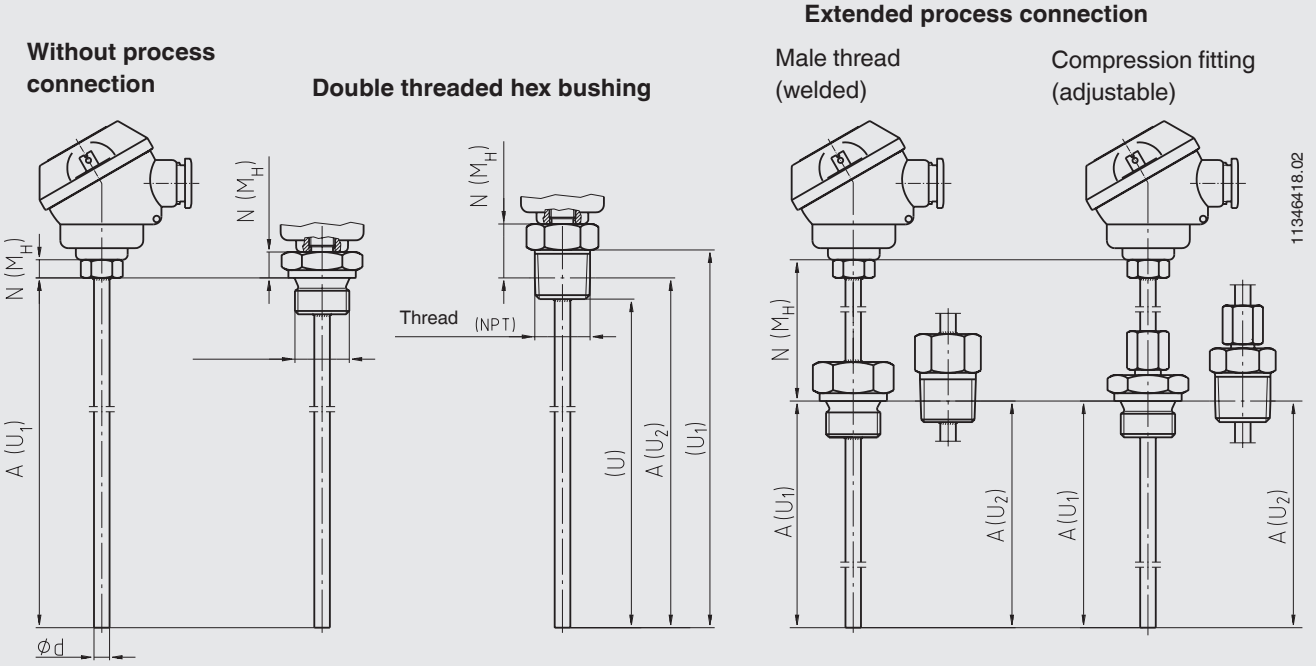
For a correct determination of the overall measuring deviation, the sensor and transmitter measuring deviations must be added.

Components model TC10-D



Legend:
① Connection head
② Process connection
③ Thermowell
④ Terminal block

Dimensions in mm



Legend:

A (U_1)	Insertion length (with parallel threads)
A (U_2)	Insertion length (with tapered threads)
N (M_H)	Neck length
(U)	Insertion length per DIN 43772
(U_1)	Insertion length in accordance with international standards
Ø d	Measuring insert diameter

Thermowell / Process connection

Diameter	Process connection	Thread size	Neck length (standard)	Max. neck length	Min. insertion length	Max. insertion length	Material
			N (M_H)	N (M_H)	A (U_1) / A (U_2)	A (U_1) / A (U_2)	
6 mm 8 mm	without	-	7 mm (hexagonal height)	7 mm (hexagonal height)	50 mm	600 mm	1.4571
	Double threaded hex bushing (male thread directly on the connection head)	G ¼ B	10 mm (hexagonal height incl. dimension up to the screw-in plane)	10 mm (hexagonal height incl. dimension up to the screw-in plane)			
		G ⅜ B					
		G ½ B					
		M10 x 1 [1]					
		M14 x 1.5					
		M18 x 1.5					
		M20 x 1.5					
		¼ NPT	approx. 19 mm (hexagonal height incl. dimension up to the screw-in plane)	approx. 19 mm (hexagonal height incl. dimension up to the screw-in plane)			
		½ NPT					
	Male thread (offset-welded to thermowell)	G ¼ B	55 mm	200 mm	50 mm	600 mm (incl. neck length)	
		G ⅜ B					
		G ½ B					
		M10 x 1 [1]					
		M14 x 1.5					
		M18 x 1.5					
		M20 x 1.5					
		¼ NPT					
		½ NPT					
	Compression fitting with metal ferrule Compression fitting with PTFE ferrule [2]	G ¼ B	approx. 55 mm				
		G ⅜ B					
		G ½ B					
		M10 x 1 [1]					
		M14 x 1.5					
		M18 x 1.5					
		M20 x 1.5					
		¼ NPT					
		½ NPT					
	Spring-loaded compression fitting	G ¼ B	approx. 100 mm				
		G ⅜ B					
		G ½ B					
		M14 x 1.5					
		M18 x 1.5					
		M20 x 1.5					
		¼ NPT					
		½ NPT					

1) only Ø = 6 mm
2) Maximum temperature at process connection: 150 °C

Compression fitting

Ferrules from stainless steel are only adjustable once; once the fitting has been loosened, sliding along the thermowell is no longer possible.

Ferrules from PTFE can be adjusted numerous times; once the fitting has been loosened it can again be tightened onto the thermowell.
Max. temperature at process connection: 150 °C

On delivery, the compression fittings are only tightened hand-tight. Insertion length A and neck length N (M_H) can thus be checked. The final positioning/fixing of the compression fitting is carried out at the installation location.

Neck length N (M_H)

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, also to protect any built-in transmitters from high medium temperatures.

Operating conditions

Ambient and storage temperature
-40 ... +80 °C

Other ambient and storage temperatures on request

Measuring insert

Specifications		
	Removable design	**Fixed design**
Description	The measuring insert is spring-mounted with two screws into the connection head and can simply be removed from the thermowell for calibration purposes. The thermowell itself can thus remain in the process. The terminal block for electrical connection is connected to the probe tube of the measuring insert.	There is no removable measuring insert in this version. Instead, the sensor element is mounted directly in the thermowell tip. The terminal base for the electrical connection is permanently screwed into the connection head.
Diameter (for thermowell Ø = 6 mm)	3 mm	-
Diameter (for thermowell Ø = 8 mm)	6 mm	-
Operating temperatures (dependent upon the sensor design type and the accuracy class)	Min: -40 °C Max: +600 °C	Min: -40 °C Max: +250 °C
Built-in measuring insert model	TC10-A	-

Certificates (option)

Certification type	Measurement accuracy	Material certificate
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.

Ordering information

Model / Version measuring insert / Explosion protection / Process connection / Version and material of threaded connection / Thread size / Measuring element / Temperature range / Design of the probe tip / Probe diameter / Insertion length A / Neck length N(M_H) / Certificates / Options

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