

Thermocouples Measuring Insert Model TC002, flexible

WIKA Data Sheet TE 65.01

Applications

- Suitable for all industrial and laboratory applications.

Special Features

- Application ranges from 0 °C to 1200 °C
- Made of mineral-insulated sheathed cable
- Suitable for all standard thermowell designs
- Spring-loaded design
- Intrinsically safe versions (ATEX)

Description

The measuring inserts for thermocouples described here are designed for installation in a protection assembly. Operation without thermowell is only recommended in certain applications. These measuring inserts are made from flexible, mineral insulated sheathed cable. The thermocouple is fitted on the end of the measuring insert. Apart from being flexible this model has outstanding resistance to vibration.

This model is spring loaded to ensure that the measuring insert is firmly pressed down on the thermowell bottom and conforms to DIN 43 762.

Apart from the DIN versions, customer specific versions are available, for example:

- to suit inner diameter of the thermowell
- tapered tip
- without terminal block
- with transmitter

Models with rigid insert tube are also available.

Type, number of sensors and accuracy can be selected individually for the appropriate application. Adequate heat transfer between thermowell and measuring insert is only ensured when the measuring insert is of correct length



Thermocouples measuring insert, flexible Model TC002

and diameter. Selection of standard lengths enables short delivery time and lower costs.

Intrinsically safe designs are available for applications in hazardous areas. The models of the TC002 series are provided with a type test certificate for "intrinsically safe" type of protection according to guideline 94/9/EC (ATEX). ATEX-Manufacturer-Declaration of Conformity in accordance with EN 50 020 is also available.

The range of applications is completed by designs without terminal block for direct transmitter installation. Optionally we can fit analogue or digital transmitters from the WIKA range.

Sensor

Sensor type

Type	Recommended max. operating temperature
K (NiCr-Ni)	1200 °C
J (Fe-CuNi)	800 °C
E (NiCr-CuNi)	800 °C
T (Cu-CuNi)	400 °C
N (NiCrSi-NiSi)	1200 °C

In the case of type K there is a risk of blue mould between 850 °C and 950 °C . We recommend the use of a sensor type N , if the working temperature fluctuates continuously in this range.

The application range of these thermometers is limited by the permissible max. temperature of the thermocouple as well as the max. temperature of the thermowell material.

Listed sensor types are available both as simplex or duplex thermocouples.

The measuring point (hot junction) of the probe is supplied as ungrounded unless specified otherwise.

Sensor limited error

A cold junction temperature of 0 °C is taken as basis with the definition of the sensor limited error of thermocouples.

Type K

Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +1000 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +1200 °C	± 0.0075 • t ¹⁾
ANSI MC96.1 (for information only, standard is cancelled)		
Standard	0 °C ... +1250 °C	± 2.2 °C or ²⁾ ± 0.75 %
Special	0 °C ... +1250 °C	± 1.1 °C or ²⁾ ± 0.4 %

Type J

Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +750 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +750 °C	± 0.0075 • t ¹⁾
ANSI MC96.1 (for information only, standard is cancelled)		
Standard	0 °C ... +750 °C	± 2.2 °C or ²⁾ ± 0.75 %
Special	0 °C ... +750 °C	± 1.1 °C or ²⁾ ± 0.4 %

Type E

Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +800 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +900 °C	± 0.0075 • t ¹⁾

Type T

Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +125 °C	± 0.5 °C
1	+125 °C ... +350 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +133 °C	± 1.0 °C
2	+133 °C ... +350 °C	± 0.0075 • t ¹⁾

Type N

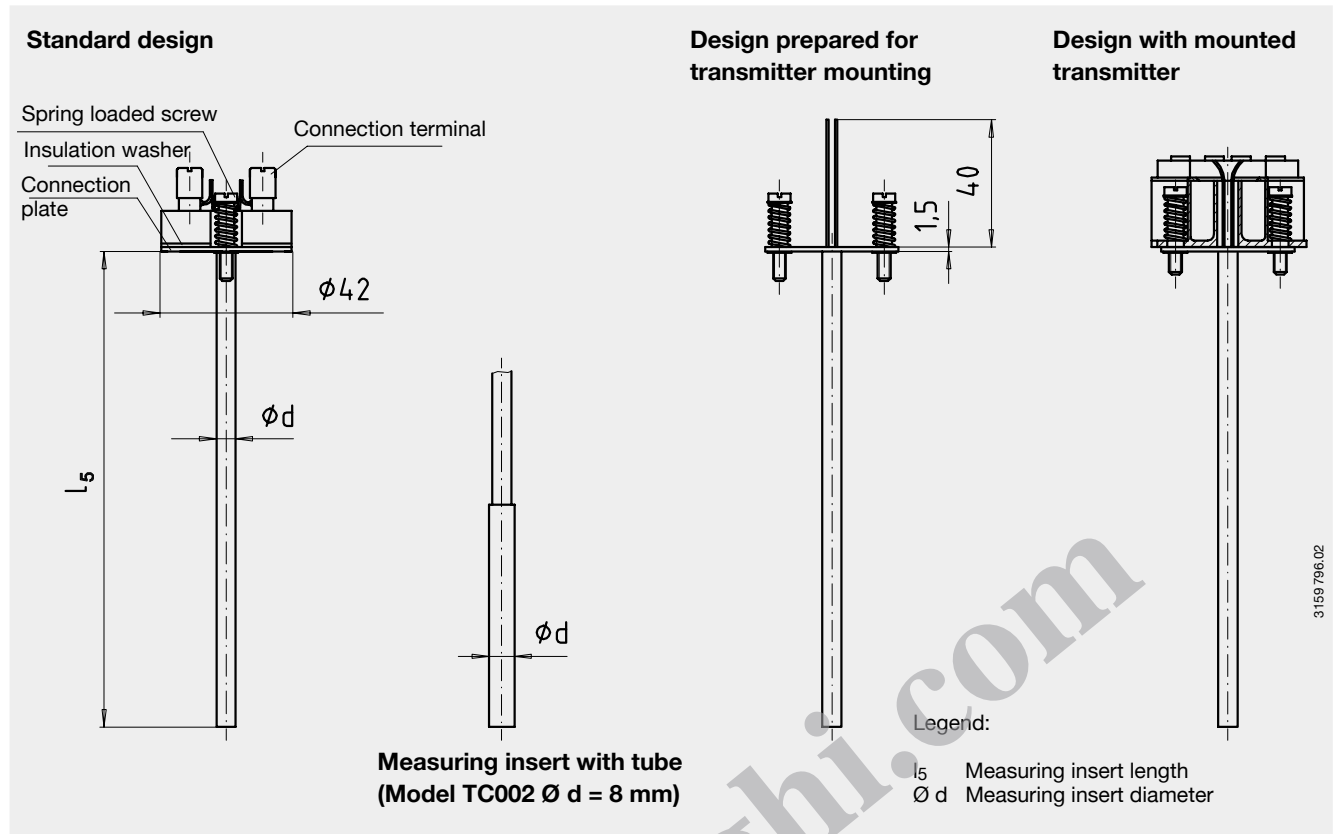
Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +1000 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +1200 °C	± 0.0075 • t ¹⁾

1) |t| is the value of the temperature in °C without consideration to the prefix
2) Whichever is larger.

Limited error with selected temperatures in °C for thermocouples type K and type J

Temperature (ITS 90) °C	Limited error DIN EN 60584	
	Class 1 °C	Class 2 °C
0	± 1.5	± 2.5
100	± 1.5	± 2.5
200	± 1.5	± 2.5
300	± 1.5	± 2.5
400	± 1.6	± 3
500	± 2	± 3.75
600	± 2.4	± 4.5
700	± 2.8	± 5.25
800	± 3.2	± 6
900	± 3.6	± 6.75
1000	± 4	± 7.5
1100	± 4.4	± 8.25
1200	± 4.8	± 9

Dimensions in mm



Standard measuring insert length

Measuring insert ϕ in mm	Standard measuring insert length in mm										
3	275	315	375	435							
6	275	315	345	375	405	435	525	555	585	655	735
8	275	315	345	375	405	435	525	555	585	655	735

Transmitter (option)

It is possible to build a transmitter onto the measuring insert. Doing so, the transmitter replaces the terminal block and is directly attached to the connection plate of the measuring insert.

Explosion protection (option)

Thermocouples TC002 are available with a type test certificate for "intrinsic safety" type of ignition protection (TÜV 02 ATEX 1793 X). These thermometers comply with the requirements of directive 94/9/EC (ATEX).

The classification / suitability of the instrument for the

respective category can be seen from the table.

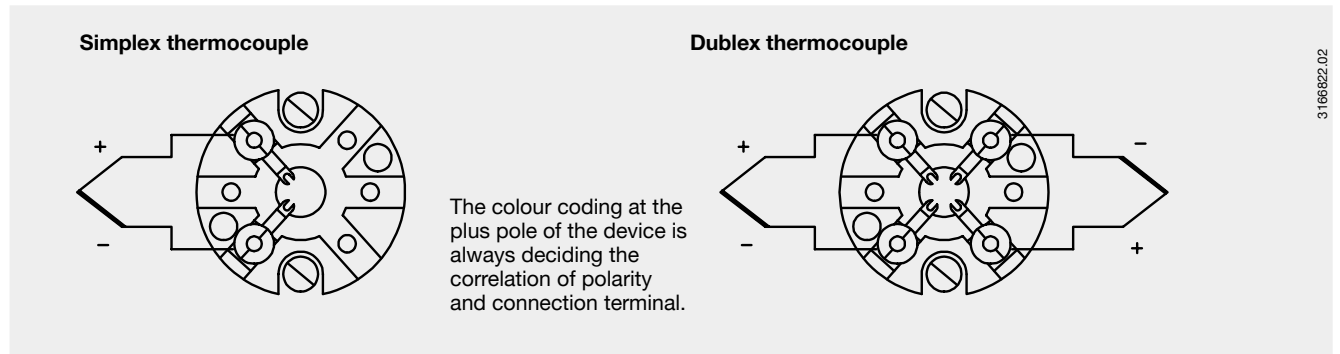
The responsibility for using suitable thermowells rests with the user.

Built-in transmitters have their own type test certificate.

Marking	Standard value t_{norm}	Temperature maximum in °C at the thermowell / measuring insert				Neck length minimum M_H	Temperature range ambient T_{amb}
		Power P_{max} at the sensor:					
		50 mW	100 mW	250 mW	500 mW		
Supply circuit ia							
II 1/2 G EEx ia IIC T6	85 °C	62	59	54	46		-20°C ... 55 °C
II 1/2 G EEx ia IIC T5	100 °C	74	71	66	58		-20°C ... 70 °C
II 1/2 G EEx ia IIC T4	135 °C	102	99	94	86	50 mm	-20°C ... 100 °C
II 1/2 G EEx ia IIC T3	200 °C	154	151	146	138	50 mm	-20°C ... 100 °C
II 1/2 G EEx ia IIC T2	300 °C	230	227	222	214	100 mm	-20°C ... 100 °C
II 1/2 G EEx ia IIC T1	450 °C	350	347	342	334	100 mm	-20°C ... 100 °C
Supply circuit ib							
II 1/2 G EEx ib IIC T6	85 °C	54	46				-20°C ... 55 °C
II 1/2 G EEx ib IIC T5	100 °C	66	58				-20°C ... 70 °C
II 1/2 G EEx ib IIC T4	135 °C	94	86			50 mm	-20°C ... 100 °C
II 1/2 G EEx ib IIC T3	200 °C	146	138			50 mm	-20°C ... 100 °C
II 1/2 G EEx ib IIC T2	300 °C	222	214			100 mm	-20°C ... 100 °C
II 1/2 G EEx ib IIC T1	450 °C	342	334			100 mm	-20°C ... 100 °C
Supply circuit ib							
II 2 G EEx ib IIC T6	85 °C	77	74	67	58		-20°C ... 55 °C
II 2 G EEx ib IIC T5	100 °C	92	89	82	73		-20°C ... 70 °C
II 2 G EEx ib IIC T4	135 °C	127	124	117	108	50 mm	-20°C ... 100 °C
II 2 G EEx ib IIC T3	200 °C	192	189	182	173	50 mm	-20°C ... 100 °C
II 2 G EEx ib IIC T2	300 °C	287	284	277	268	100 mm	-20°C ... 100 °C
II 2 G EEx ib IIC T1	450 °C	437	434	427	418	100 mm	-20°C ... 100 °C

Further information see Ex operating instructions

Electrical connection



Ordering information

Field No.	Code	Features
1		Explosion protection
	Z	without
	Y	according to directive 94/9/EG (ATEX) EEx(i) ¹⁾
2		Type and number of sensors
	A	1 x type K (NiCr-Ni)
	B	2 x type K (NiCr-Ni) ¹⁾
	C	1 x type J (Fe-CuNi)
	D	2 x type J (Fe-CuNi) ¹⁾
2	?	other <i>please state as additional text</i>
3		Sensor limiting error
	2	class 2 per DIN EN 60 584
	1	class 1 per DIN EN 60 584
3	?	other <i>please state as additional text</i>
4		Measuring point
	1	insulated
4	2	not insulated
5		Cable sheath material
	T	stainless steel
	A	Ni-alloy 2.4816 (Inconel 600) <i>not with sensor type J</i>
5	?	other <i>please state as additional text</i>
6		Measuring insert diameter
	1	3 mm
	3	6 mm
	4	8 mm <i>tubing</i>
	?	other <i>please state as additional text</i>
7		Measuring insert length
	0275	275 mm
	0285	285 mm
	0315	315 mm
	0375	375 mm
	0405	405 mm
	0435	435 mm
	0525	525 mm
	0555	555 mm
	0585	585 mm
	0655	655 mm
7		length in mm, e.g. 0290 for 290 mm
7	????	longer than 9999 mm <i>please state as additional text</i>
8		Terminal block
	1	42 mm diameter for connection head form B
	2	replaced by transmitter
8	?	other <i>please state as additional text</i>

Ordering information, continued

Field No.	Code	Features
Transmitter		
9	ZZ	without
	TA	mounted on the measuring insert
Additional order info		
10	YES	NO
	1	Z
11	T	Z additional text <i>Please state as clearly understandable text!</i>

1) Designs with explosion protection: The combination of duplex thermocouple / transmitter is not permissible!

Order code:

	1	2	3	4	5	6	7	8	9	10	11
TC002 -	□	□	□	□	□	□	□	□	□	ZZ -	□ □

Additional text: _____

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.

