

Thermocouples Measuring Insert Model TC002, flexible

WIKA Data Sheet TE 65.01



Applications

- Suitable for all industrial and laboratory applications
- Replacement measuring insert for service operations

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
Fig. left with terminal block Ø 42 mm
Fig. right with mounted transmitter

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-examination certificate for "intrinsically safe" type of protection according to directive 94/9/EC (ATEX), EEx-i, for gases. Manufacturer's Declarations in accordance with EN 50 020 are 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⁾
ISA (ANSI) MC96.1-1982		
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⁾
ISA (ANSI) MC96.1-1982		
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

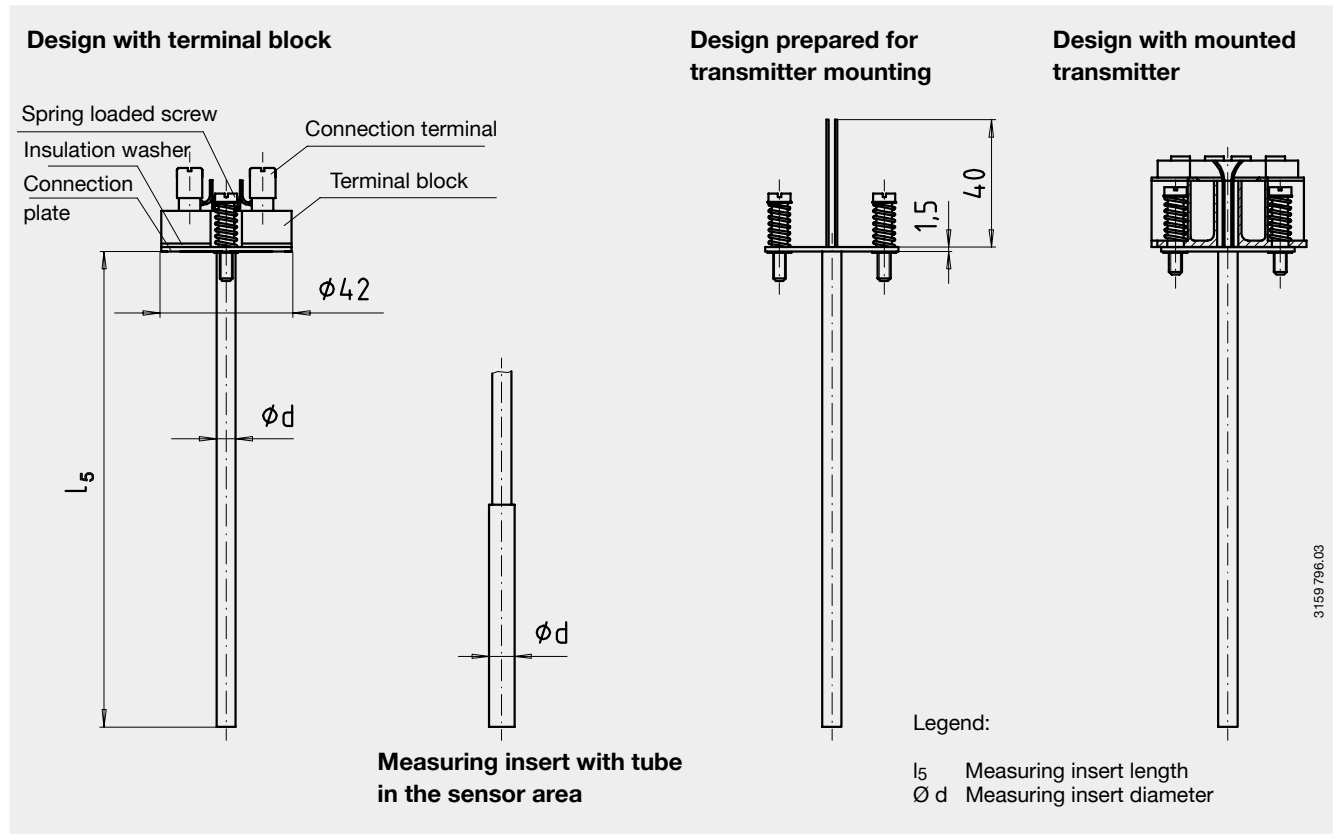
Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +1000 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +1200 °C	± 0.0075 • t ¹⁾

1) |t| is the value of the temperature in °C without consideration of the sign
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

The lengths specified in this table correspond to the standard lengths. Intermediate lengths or excess lengths are possible without any problems.

Transmitter (option)

It is possible to mount 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.

Model	Description	Explosion protection	Data sheet
T19	Analogue transmitter, configurable	without	TE 19.01
T12	Digital transmitter, PC configurable	optional	TE 12.01
T32	Digital transmitter, HART protocol	optional	TE 32.01
T42	Digital transmitter, PROFIBUS PA	optional	TE 42.01
T53	Digital transmitter FOUNDATION Fieldbus and PROFIBUS PA	standard	TE 53.01

Explosion protection (option)

Intrinsically safe designs are available for applications in hazardous areas. These measuring inserts are suitable for mounting (replacement demand) in type-examined thermometers. Manufacturer's Declarations in accordance with EN 50 020 are also available.

The classification / suitability of the instrument (permissible power P_{max} and permissible ambient temperature) for the respective category can be seen on the type-examination certificate and in the operating instructions.

The responsibility for using suitable thermowells rests with the user.

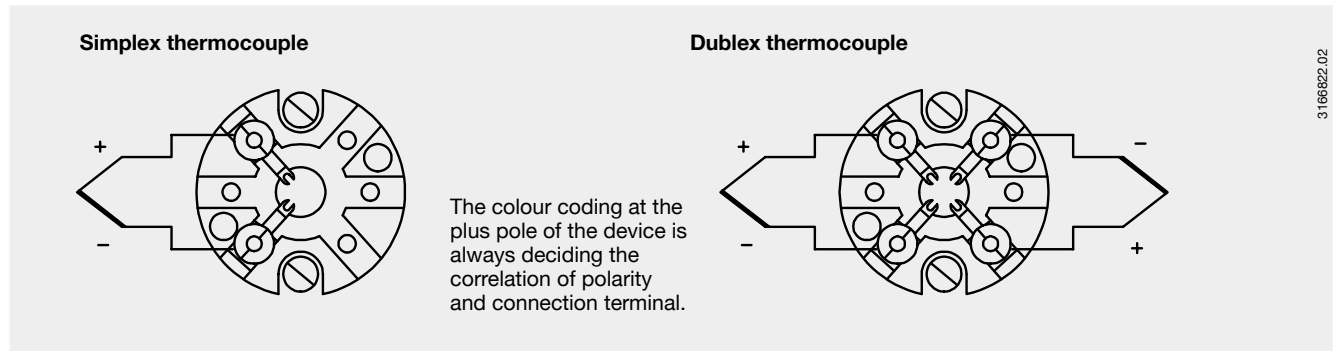
The permissible ambient temperature ranges of the built-in transmitters can be taken from the corresponding transmitter approval.

Attention!

In hazardous areas the use of a measuring insert without a suitable connection head (case) is not permissible!

Where required a suitable thermowell is to be used.

Electrical connection



Ordering information

Field No.	Code	Features
		Explosion protection
1	Z	without
	Y	according to directive 94/9/EC (ATEX) EEx-i G for gases
		Type and number of sensors
2	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⁾
	?	other <i>please state as additional text</i>
		Sensor limiting error
3	2	class 2 per DIN EN 60 584
	1	class 1 per DIN EN 60 584
	8	ISA (ANSI) standard to MC96.1-1982
	9	ISA (ANSI) special to MC96.1-1982
	?	other <i>please state as additional text</i>
		Measuring point
4	1	insulated
	2	not insulated <i>explosion protection on request</i>
		Cable sheath material
5	T	stainless steel
	A	Ni-alloy 2.4816 (Inconel 600) <i>not with sensor type J</i>
	?	other <i>please state as additional text</i>
		Measuring insert diameter
6	1	3 mm
	3	6 mm
	4	8 mm <i>tubing</i>
	?	other <i>please state as additional text</i>
		Measuring insert length
7	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
		length in mm, e.g. 0290 for 290 mm
	????	longer than 9999 mm <i>please state as additional text</i>

Ordering information, continued

Field No.	Code	Features	
		Terminal block	
	1	42 mm diameter for connection head form B	
	2	replaced by transmitter	
8	?	other <i>please state as additional text</i>	
		Transmitter	
	ZZ	without	
9	TA	mounted on the measuring insert	
		Additional order info	
	YES	NO	
10	1	Z	quality certificates <i>see price list</i>
11	T	Z	additional text <i>Please state as clearly understandable text!</i>

1) 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.

