

Application

- Measuring range: -40 .. +1150°C
- Replaceable measuring element for thermocouple thermometers

Features

- Spring-loaded measuring insert provides ideal contact with the protective tube
- Temperature transmitter can be installed directly on the insert
- Made of sheathed cable, insulated inside with magnesium oxide (MgO)
- The metal sheath is made of the Inconel® 600 (2.4816) alloy
- Vibration resistant
- Easy to replace during operation

Measuring insert for thermocouple thermometers is made of metal sheathed cable with internal wires insulated from each other and from the outer sheath with magnesium oxide (MgO) powder. This provides the sensor with high vibration resistance, flexibility as well as resistance to temperature and electrical insulation.

Screw clamps on the ceramic block enable easy connection of the sensor with the connection wires.

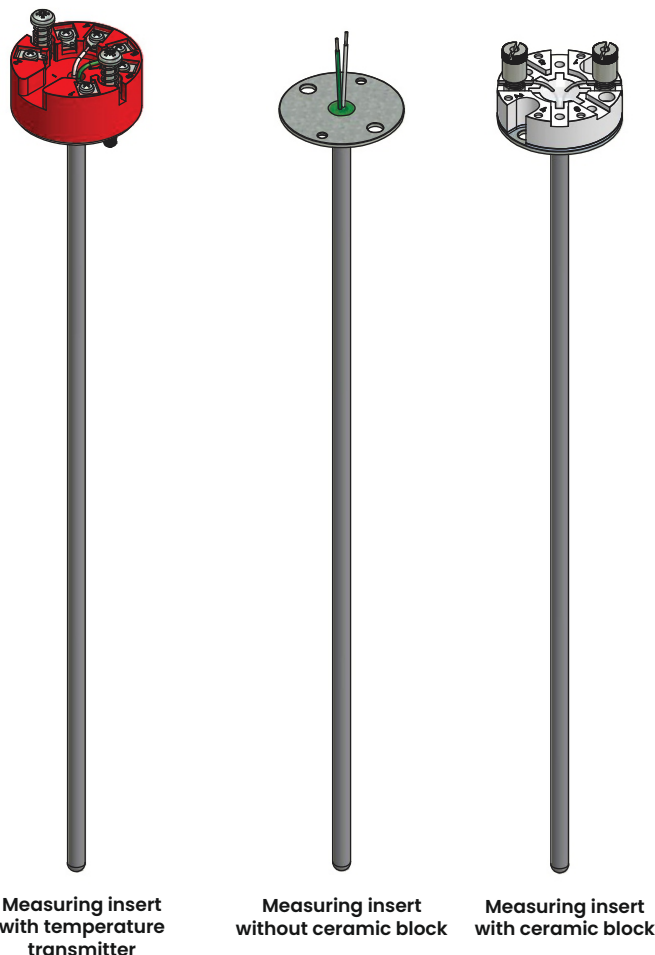
Spring-loaded fastening of the measuring insert provides ideal pressure against the bottom of the sensor's process sheath. This allows:

- short response time for temperature change,
- length compensation in case of dimension discrepancy (+/- 10 mm),
- reduced natural vibration due to two-sided positioning in the protective tube.

When ordering please take notice of the fact that the space between the insert sheath and the wall of the outer protection of the sensor should not exceed 1mm. Matching the measuring insert's outer diameter properly guarantees proper heat transfer and helps to avoid additional proper vibrations of the complete sensor.

Temperature transmitter (option)

There is a possibility of installing a measuring transmitter with a 4-20 mA output signal directly on the insert instead of the ceramic terminal block.



ATEX, EAC Ex versions

Intrinsically safe and Flameproof designs are available for applications in hazardous areas. These models are provided with certificate for „intrinsically safe“ and „flameproof“ type of protection according to Directive 2014/34/UE (ATEX) and EAC Ex TR-CU 012/2011 (Eurasian Economic Union).

Intrinsically safe (Exi)

data sheet XI-W2

Flameproof (Exd)

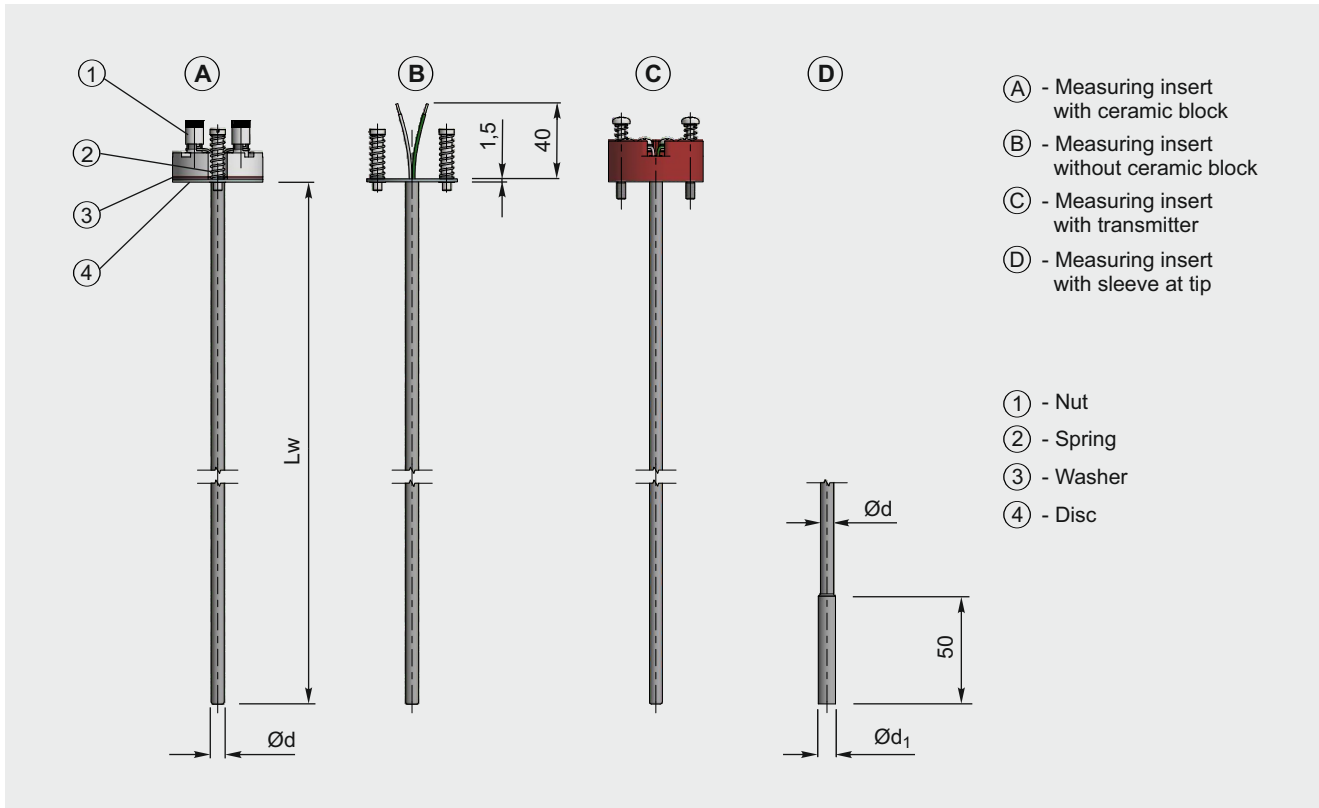
data sheet XD-W2

Other versions

This data sheet contains only a small portion of our program of supplying thermocouple thermometer with a replaceable measuring insert.

Other versions can be supplied upon customer's request.

Designs



Basic values of thermocouples type J, K, N according to PN-EN 60584 / IEC 584

Temperature		°C	100	200	300	400	500	600	700	800	900	1000
Nominal value	Type J	mV	5.27	10.78	16.33	21.85	27.39	33.10	39.13	-	-	-
	Type K	mV	4.10	8.14	12.21	16.40	20.64	24.91	29.13	33.28	37.33	41.28
	Type N	mV	2.77	5.91	9.34	12.97	16.75	20.61	24.53	28.46	32.37	36.26
Tolerance	Class 1	°C	±1.5	±1.5	±1.5	±1.6	±2.0	±2.4	±2.8	±3.2	±3.6	±4.0
	Class 2	°C	±2.5	±2.5	±2.5	±3.0	±3.7	±4.5	±5.2	±6.0	±6.7	±7.5

Tolerance

The PN-EN 60584 Standard defines the formulas for calculating acceptable measure tolerance. More information available in the general thermocouple sheet.

Type J (Fe-CuNi)

Class	Temperature range	Tolerance
1	-40 °C .. +375 °C	± 1.5 °C
	+375 °C .. +750 °C	± 0.0040 x t
2	-40 °C .. +333 °C	± 2.5 °C
	+333 °C .. +750 °C	± 0.0075 x t

Type K (NiCr-Ni), Typ N (NiCrSi-NiSi)

Class	Temperature range	Tolerance
1	-40 °C .. +375 °C	± 1.5 °C
	+375 °C .. +1000 °C	± 0.0040 x t
2	-40 °C .. +333 °C	± 2.5 °C
	+333 °C .. +1200 °C	± 0.0075 x t

Response time

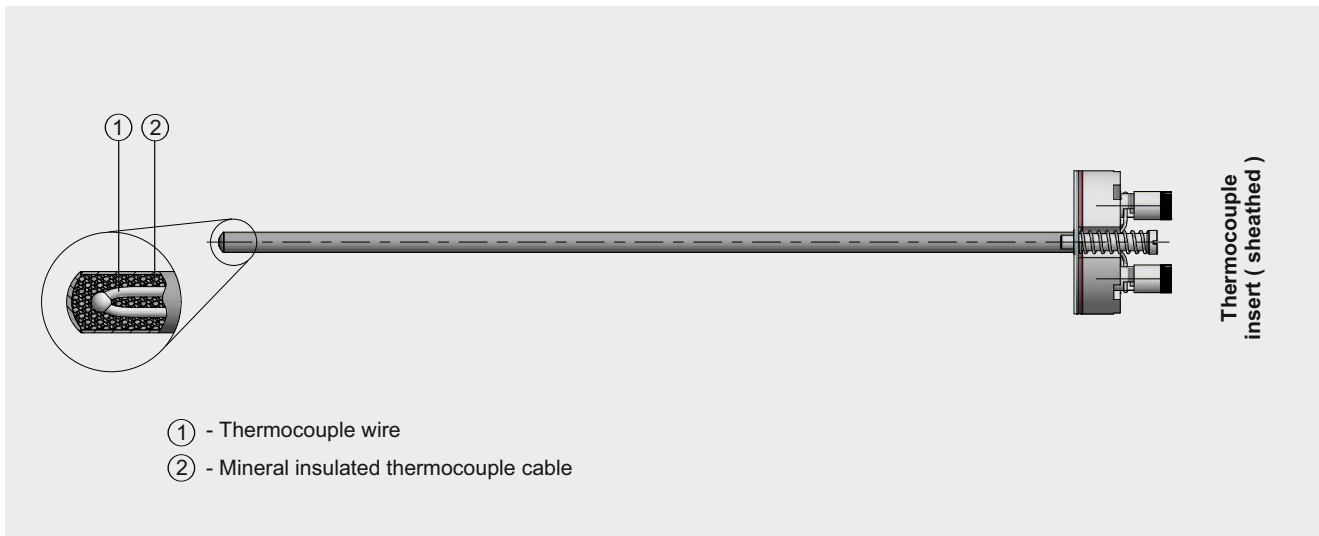
Tests refers to thermocouples with isolated measuring junction (SO,SOB).

Outer diameter [mm]	in water 0.4 m/s		in air 2 m/s	
	t ₅₀	t ₉₀	t ₅₀	t ₉₀
Ø 8	7	14	100	290
Ø 6	7	9.5	60	200
Ø 4.5	4	6	37	120
Ø 3	2.5	2.9	26	88

Type T (Cu-CuNi)

Class	Temperature range	Tolerance
1	-40 °C .. +125 °C	± 0.5 °C
	+125 °C .. +350 °C	± 0.0040 x t
2	-40 °C .. +133 °C	± 1.0 °C
	+133 °C .. +350 °C	± 0.0075 x t

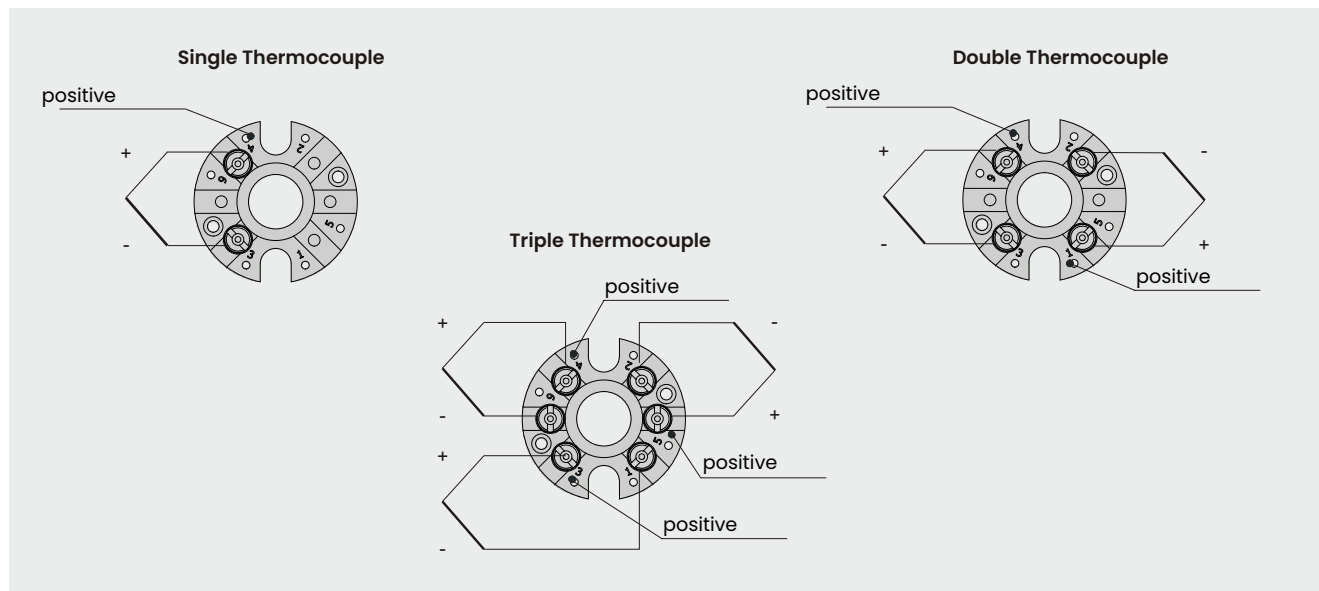
Construction of measuring insert



Standard lengths

Outer diameter	Standard length Lw [mm]											
Ø 3 mm	145	205	275	315	405	525	555	735	1025	1525	2025	
Ø 6 mm	145	205	275	315	405	525	555	735	1025	1525	2025	
Ø 8 mm			275	315	405	525	555	735	1025	1525	2025	

Electrical connection on ceramic block



Ordering code

1 2 3 4 5 6 7 8
 W2 - - - - - - -

1	<input type="text"/>	Type of insert	
		2	Single thermocouple, with ceramic block
		BK	Double thermocouple, with ceramic block
		2BK	Single thermocouple, without ceramic block
		AP	Double thermocouple, without ceramic block
2	<input type="text"/>	Thermocouple type	
		J	Type J (Fe-CuNi)
		K	Type K (NiCr-Ni)
		xxx	other, please specify
3	<input type="text"/>	Outer diameter d/d_i	
		3	Ø 3.0 mm
		4.5	Ø 4.5 mm
		4.8	Ø 4.8 mm
		6	Ø 6.0 mm
		6.4	Ø 6.4 mm
		6/8	Ø 6.0 mm with sleeve Ø8.0 x 50 mm
		8	Ø 8.0 mm
xxx	inna, należy określić		
4	<input type="text"/>	Length Lw [mm]	
		145	145 mm
		205	205 mm
		255	255 mm
		315	315 mm
		375	375 mm
xxx	other, please specify		
5	<input type="text"/>	Measuring junction	
		SO	Junction isolated
		SP	Junction grounded
6	<input type="text"/>	Tolerance	
		1	Class 1 according to PN-EN 60584-2
		2	Class 2 according to PN-EN 60584-2
7	<input type="text"/>	Measuring range of temperature transmitter	
		0..100	input signal for 4..20mA: 0..100°C
8	<input type="text"/>	Type of temperature transmitter	
		PR5334A3B	Output signal 4..20 mA
		PR5335A	Output signal 4..20 mA, with HART® protocol
		PR5350A	Output signal Profibus® PA / Foundation Fieldbus
xxx	other, please specify		

Example

Measuring insert W2K-6-555-SO-1

(sensor 1xK, outer dia. Ø6.0 mm, length Lw=555 mm, junction isolated, class 1).

Measuring insert APW2K-6-375-1-0..600°C-PR5334A3B

(sensor 1xK with 4.20mA temperature transmitter, outer dia. Ø6.0 mm, length L=375 mm, junction isolated, class 1, measuring range for transmitter 0÷600°C, transmitter type PR5334A3B).