

Application

- Measuring range: -40 .. +800°C
- Equipment/tank design
- Technological process installations in all branches of industry
- Machine design
- Heating systems, air conditioning and ventilation systems

Features

- Stainless Steel AISI321 / 1.4541 or AISI316L / 1.4404, AISI316Ti / 1.4571 upon request
- Spring-loaded measuring insert provides ideal contact with the thermowell
- Temperature transmitter can be installed in the sensor head
- Optionally the head can be installed with a local temperature display (see models TWR01H, DANWdie-LED)

The sensor consists of a replaceable insert, a welded protective tube (thermowell) with threaded process connection and an aluminium connection head where a programmable temperature transmitter with a 4-20 mA output signal can be installed.

The measuring insert is a replaceable element of the complete sensor, which significantly reduces the time and cost of maintenance of measuring instruments on site.

Thanks to the spring-loaded fastening of the measuring insert it is perfectly pressed against the bottom of the protective tube, which reduces the time of reaction to temperature changes, increases accuracy of measurement and reduces natural vibrations, thus mechanical and electrical damages can be avoided.

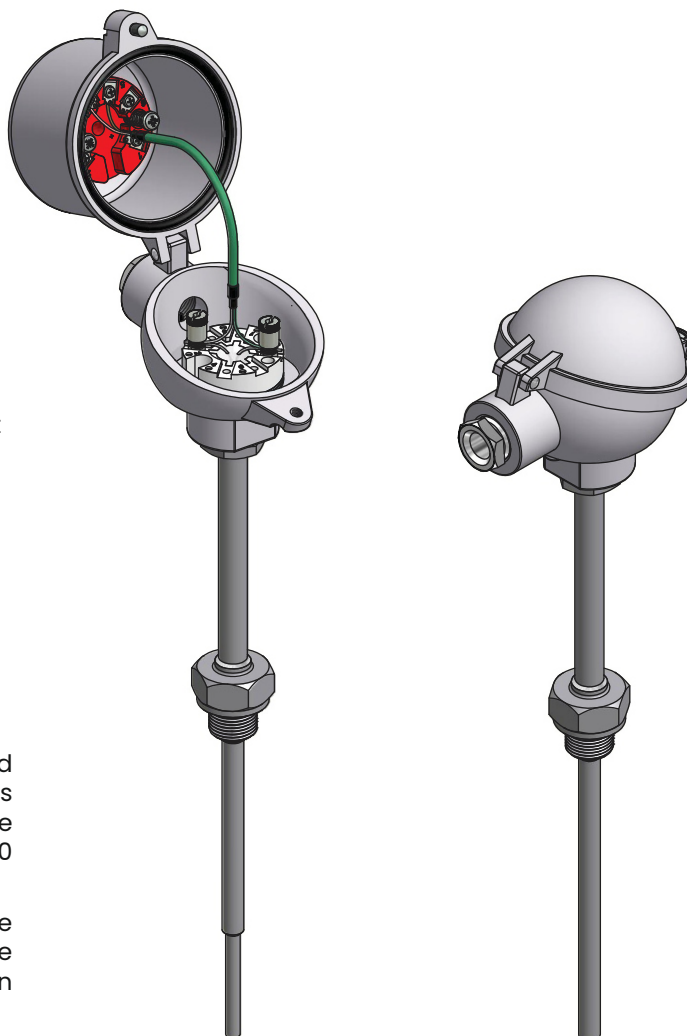
Immersion length, process connection thread, length of the thermowell, connection head, shape and material of the sheath can be selected depending on the requirements of the application.

Temperature Transmitter (Option)

Transmitter is mounted inside the connection head of the sensor. There are two ways of installation: directly on the measuring insert or in the higher cap of the head.

The advantage of the second solution is that replacing the standard insert with a terminal block is easy without having to dismantle the transmitter, which significantly shortens the time and lowers the cost of sensor maintenance and protects the connection cables.

Mounting two transmitters is possible upon customer's request.



Sensor with connection head DANW.
Thermowell with reduced tip.

Sensor with connection head NA

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-TT..GN

Flameproof (Exd)

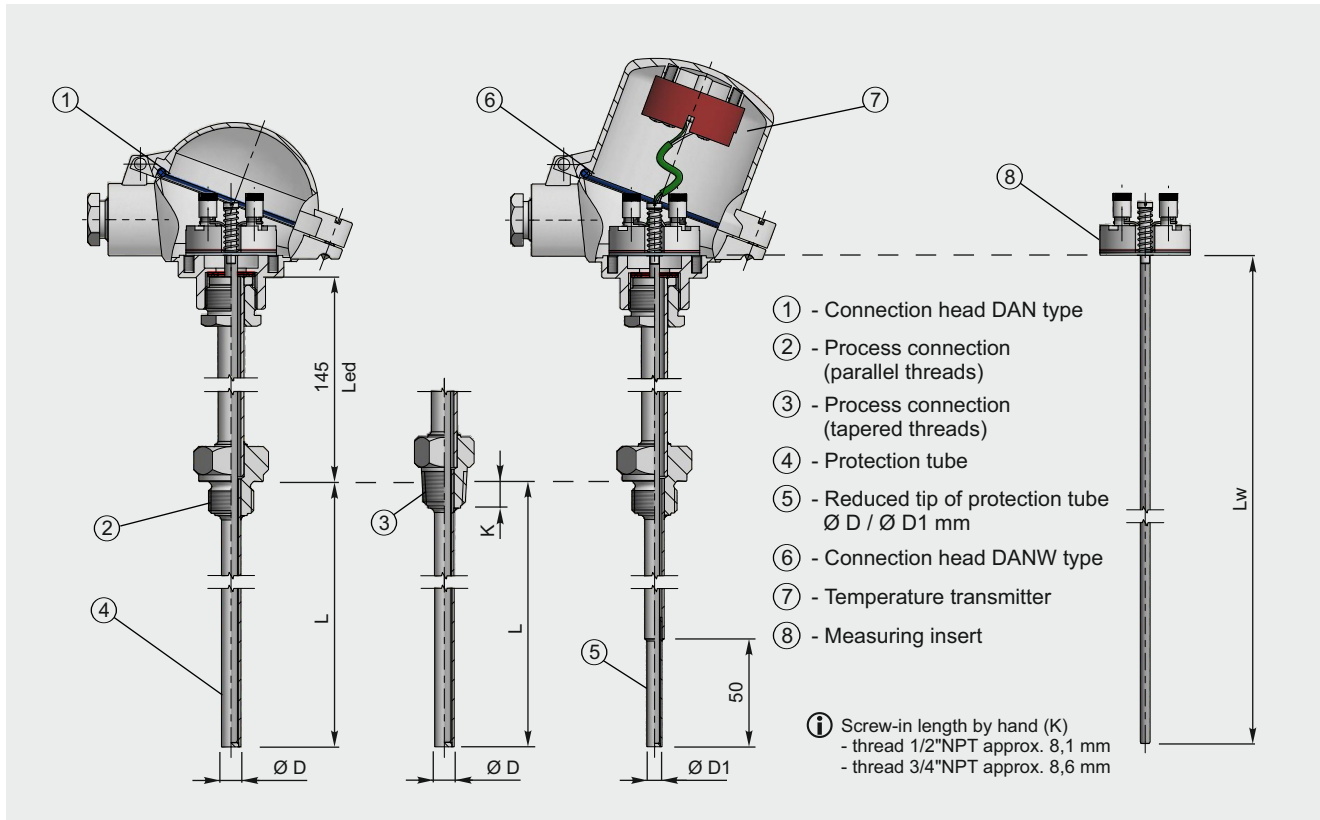
data sheet XD-TT..GN

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
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
	Type N	mV	2.77	5.91	9.34	12.97	16.75	20.61	24.53
Tolerance	Class 1	°C	±1.5	±1.5	±1.5	±1.6	±2.0	±2.4	±2.8
	Class 2	°C	±2.5	±2.5	±2.5	±3.0	±3.7	±4.5	±5.2

Tolerance

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

Standard lengths

Immersion length L	Measuring insert length Lw
100 mm	255 mm
160 mm	315 mm
200 mm	355 mm
250 mm	405 mm
400 mm	555 mm

Response time

Test in mixed water 0,4 m/s (in accordance with DIN EN 60751), at temperature change from 23 to 33°C.

Protection tube diameter D / D1	Response time
Ø 9 mm	t ₅₀ = 10 s
	t ₉₀ = 24 s
Ø 9 / Ø 6 mm	t ₅₀ = 7 s
	t ₉₀ = 14 s

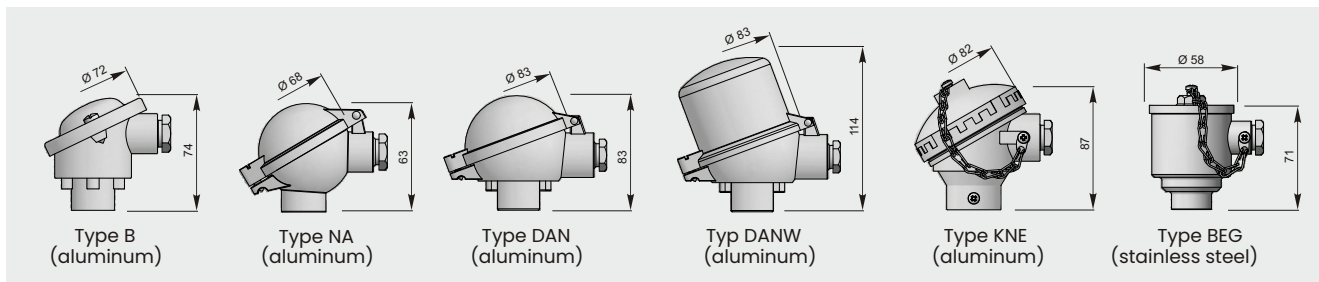
Maximum operating pressure (100°C)

Calculated for maximum flow of steam 25 m/s and of water 3 m/s.

Length L	Maximum operating pressure
160 mm	6.4 MPa
250 mm	4.9 MPa
< 400 mm	2.0 MPa

Connection heads

This sensor can be fitted with one of the following connection heads. For more information about the connection heads see section "Accessories".

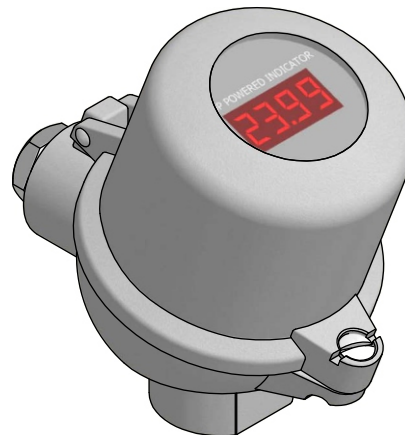


Connection head DANWdie with local LED display

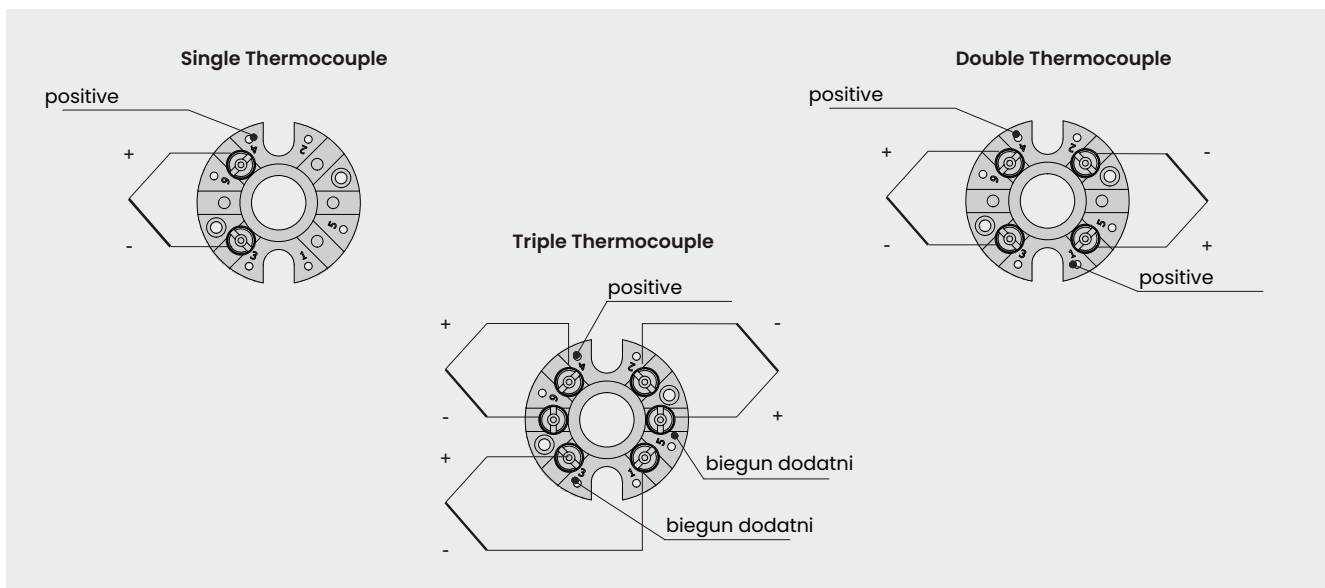
The display is mounted in connection head cover with glass window which allows preview of measuring temperature. 4 digits with a height of 9.5 millimeter ensure clear reading of values.

Programming of measure range can be performed via three buttons placed on the back of display panel.

Mounted temperature transmitter 4..20mAon measuring insert is necessary for proper use. It also works with temperature transmitters with HART® protocol.



Electrical connection on ceramic block



Ordering code

1 2 3 4 5 6 7 8 9 10 11 12
 TT GN - - - - - - - - - - -

1	<input type="checkbox"/>	Version		Single thermocouple
		AP	Single thermocouple, with 4..20 mA temperature transmitter	
		APW	Single thermocouple, 4..20 mA temperature transmitter and local LED display*	
		2	Double thermocouple	
		3	Triple thermocouple	
				* only with connection head DANWdie
2	<input type="checkbox"/>	Thermocouple type		
		J	Type J (Fe-CuNi)	
		K	Type K (NiCr-Ni)	
		xxx	other, please specify	
3	<input type="checkbox"/>	Neck length Led		
		1	neck Led=145 mm	
		2	neck Led=80 mm	
		3	neck Led=250 mm	
4	<input type="checkbox"/>	Closing method of connection head		
		1	closing by screw	
		3	closing by clamp	
5	<input type="checkbox"/>	Connection head		
		NA	Type NA	Aluminium Cable gland: M20x1.5 IP65
		DAN	Type DAN	Aluminium Cable gland: M20x1.5 IP65
		DANW	Type DANW	Aluminium Cable gland: M20x1.5 IP65
		B	Type B	Aluminium Cable gland: M20x1.5 IP65
		BEG	Type BEG	Stal kwasoodporna Cable gland: M20x1.5 IP65
		xxx	other, please specify	
6	<input type="checkbox"/>	Length L [mm]		
		100	100 mm	
		160	160 mm	
		200	200 mm	
		250	250 mm	
		400	400 mm	
		xxx	other, please specify	
7	<input type="checkbox"/>	Thermowell diameter [mm]		
		6	Ø 6 mm	
		9	Ø 9 mm	
		9/6	Ø 9 mm with reduced tip to Ø 6 mm	
		xxx	other, please specify	
8	<input type="checkbox"/>	Process connection		
		M20x1.5	M20x1.5	
		G1/2"	G1/2"	
		xxx	other, please specify	
9	<input type="checkbox"/>	Measuring junction		
		SO	Junction isolated	
		SP	Junction grounded	
		SOB	Junctions isolated (double and triple thermocouples)	
10	<input type="checkbox"/>	Tolerance		
		1	Class 1 according to PN-EN 60584-2	
		2	Class 2 according to PN-EN 60584-2	
11	<input type="checkbox"/>	Measuring range of temperature transmitter		
		0..100	input signal for 4..20mA: 0..100°C	
		xxx	other, please specify	
12	<input type="checkbox"/>	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

Temperature sensor TTKGNII-DAN-200-9-G1/2-SO-1
 (sensor 1xK, connection head type DAN closed by screw, length L=200mm, thread G1/2", junction isolated, class 1).