

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 model DANWdie-LED)

The sensor consists of a replaceable insert, a welded protective tube (thermowell) with flanged 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.

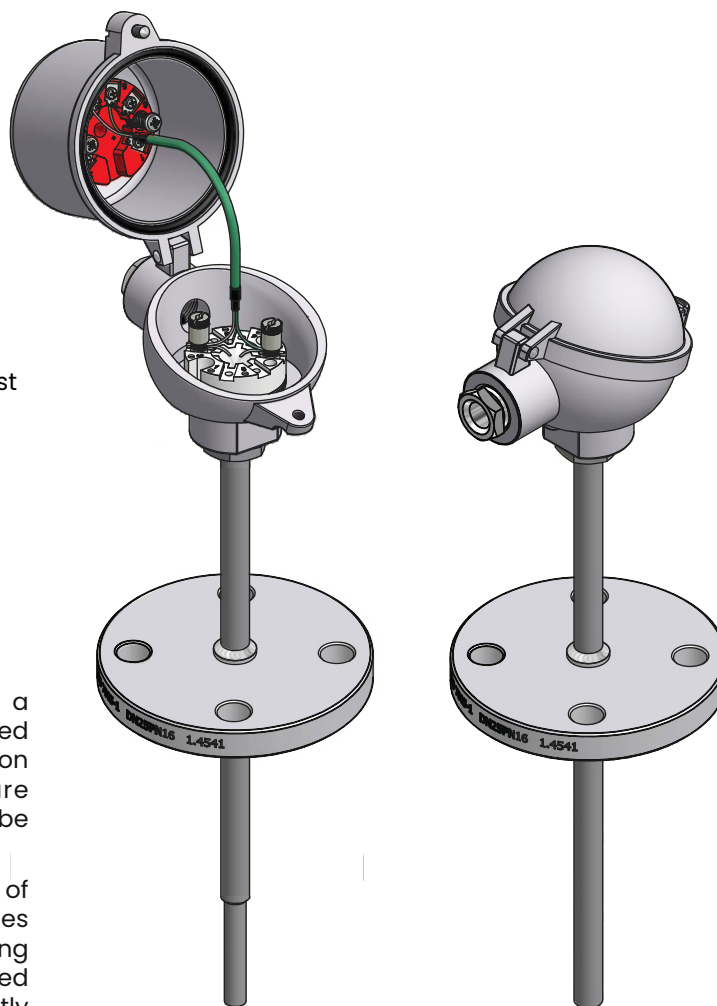
Immersion length, process connection flange, length of the thermowell, connection head, shape and material of the sheath can be selected depending on the requirements

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..T

Flameproof (Exd)

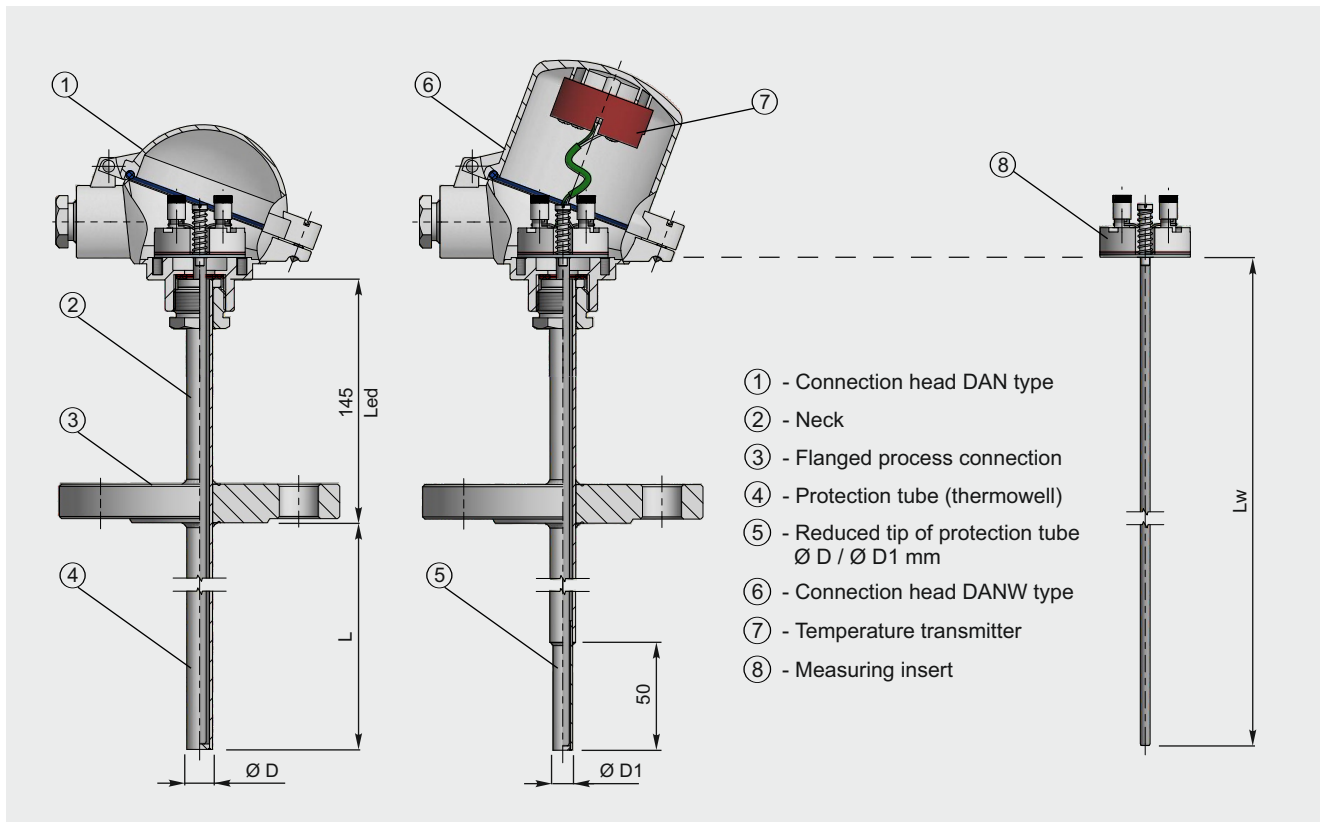
data sheet XD-TT..T

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



- ① - Connection head DAN type
- ② - Neck
- ③ - Flanged process connection
- ④ - Protection tube (thermowell)
- ⑤ - Reduced tip of protection tube $\varnothing D / \varnothing D1$ mm
- ⑥ - Connection head DANW type
- ⑦ - Temperature transmitter
- ⑧ - Measuring insert

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

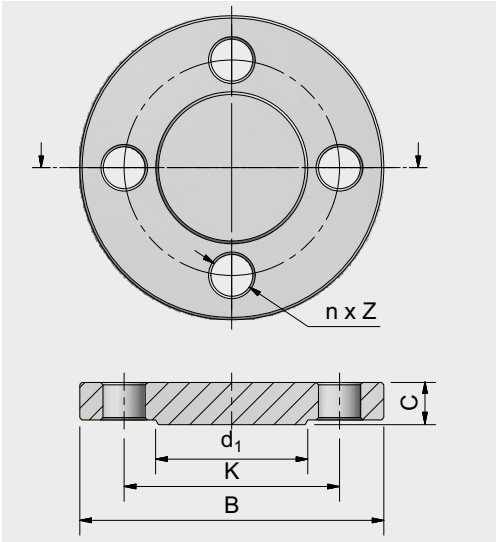
Immersion length L	Measuring insert length Lw
100 mm	255 mm
160 mm	315 mm
200 mm	355 mm
250 mm	405 mm
400 mm	555 mm

Response time

Test in mixed water 0,4 m/s (in accordance with DIN EN 60584), at temperature change from 23 to 33°C.

Protection tube diameter D / DI	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

Flange (process connection) acc. to ISO 7005-1



Connection flanges can be made in accordance with standards PN-ISO 7005-1, EN 1092-1, DIN2527, ASME B16.5. Other types available upon request.

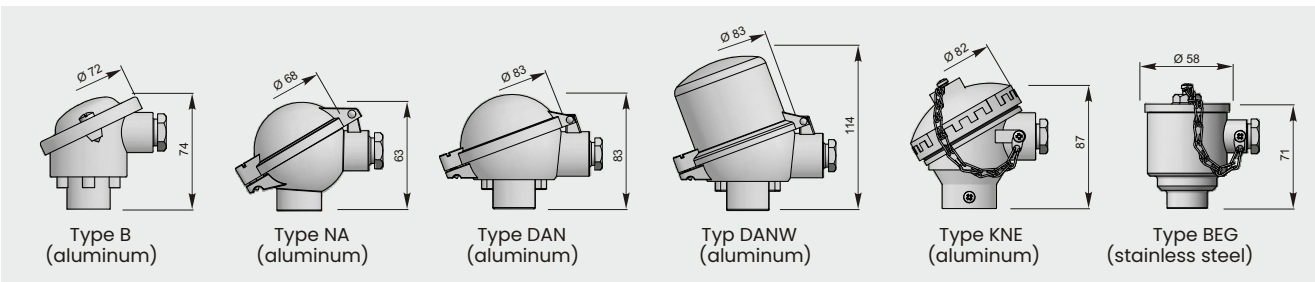
DN20 PN16 05 B				
Diameter B	Diameter K	Diameter d ₁	Height C	Dimension n x Z
Ø105 mm	Ø75 mm	Ø58 mm	18 mm	4 x Ø14 mm

DN25 PN16 05 B				
Diameter B	Diameter K	Diameter d ₁	Height C	Dimension n x Z
Ø115 mm	Ø85 mm	Ø68 mm	18 mm	4 x Ø14 mm

DN50 PN16 05 B				
Diameter B	Diameter K	Diameter d ₁	Height C	Dimension n x Z
Ø165 mm	Ø125 mm	Ø102 mm	20 mm	4 x Ø18 mm

Connection heads

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



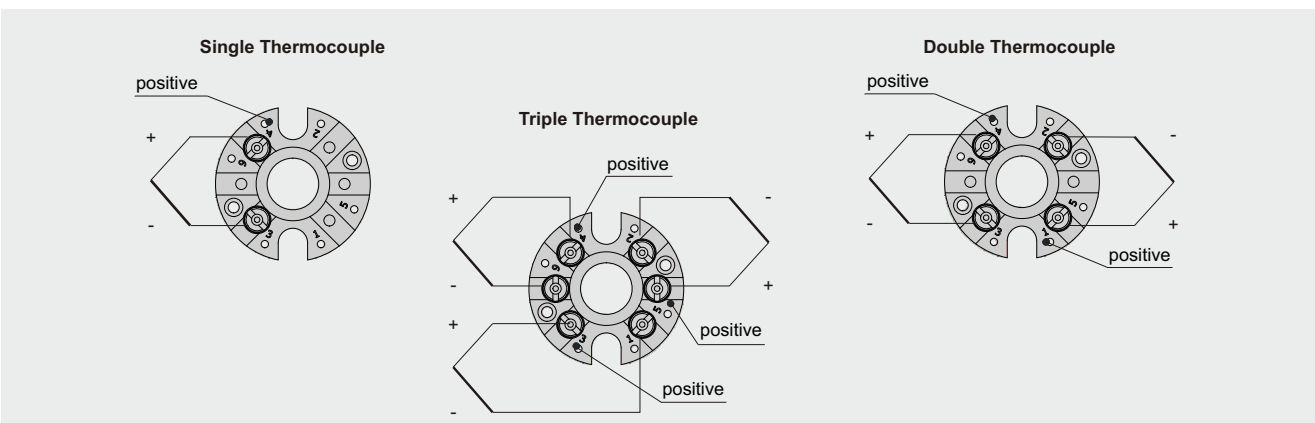
Connection head DANWdie with local LED display

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..20 mA on 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 13
 TT T - - - - - - - - - - -

1	<input type="text"/>	Version				
			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="text"/>	Thermocouple type				
			J	Type J (Fe-CuNi)		
			K	Type K (NiCr-Ni)		
			xxx	other, please specify		
3	<input type="text"/>	Neck length Led				
			1	neck Led=145 mm		
			2	neck Led=80 mm		
			3	neck Led=250 mm		
4	<input type="text"/>	Closing method of connection head				
			1	closing by screw		
			3	closing by clamp		
5	<input type="text"/>	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="text"/>	Length L [mm]				
			100	100 mm		
			160	160 mm		
			200	200 mm		
			xxx	other, please specify		
7	<input type="text"/>	Thermowell diameter [mm]				
			12	Ø 12 mm		
			15	Ø 15 mm		
			12/9	Ø 12 mm with reduced tip to Ø 9 mm		
			xxx	other, please specify		
8	<input type="text"/>	Process connection (flange)				
			DN20PN16	Flange DN20PN16 acc. to ISO 7005-1		
			DN25PN16	Flange DN25PN16 acc. to ISO 7005-1		
			xxx	other, please specify		
9	<input type="text"/>	Thermowell material				
			1.4541	Stainless Steel 1H18N9T (1.4541)		
			1.4571	Stainless Steel H17N13M2T (1.4571)		
			xxx	other, please specify		
10	<input type="text"/>	Measuring junction				
			SO	Junction isolated		
			SP	Junction grounded		
			SOB	Junctions isolated (double and triple thermocouples)		
11	<input type="text"/>	Tolerance				
			1	Class 1 according to PN-EN 60584-2		
			2	Class 2 according to PN-EN 60584-2		
12	<input type="text"/>	Measuring range of temperature transmitter				
			0..100	input signal for 4..20mA: 0..100°C		
			xxx	other, please specify		
13	<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

Temperature sensor TTKT11-DAN-500-12-DN25PN16-1.4541-SO-1
 (sensor IxK, connection head type DAN closed by screw, length L=500mm, flange DN25PN16 acc. to ISO 7005-1, thermowell material 1.4541, junction isolated, class 1).