

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 1H18N9T (1.4541 / AISI321)*
- Thermowell covered with hard chrome layer
- 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.

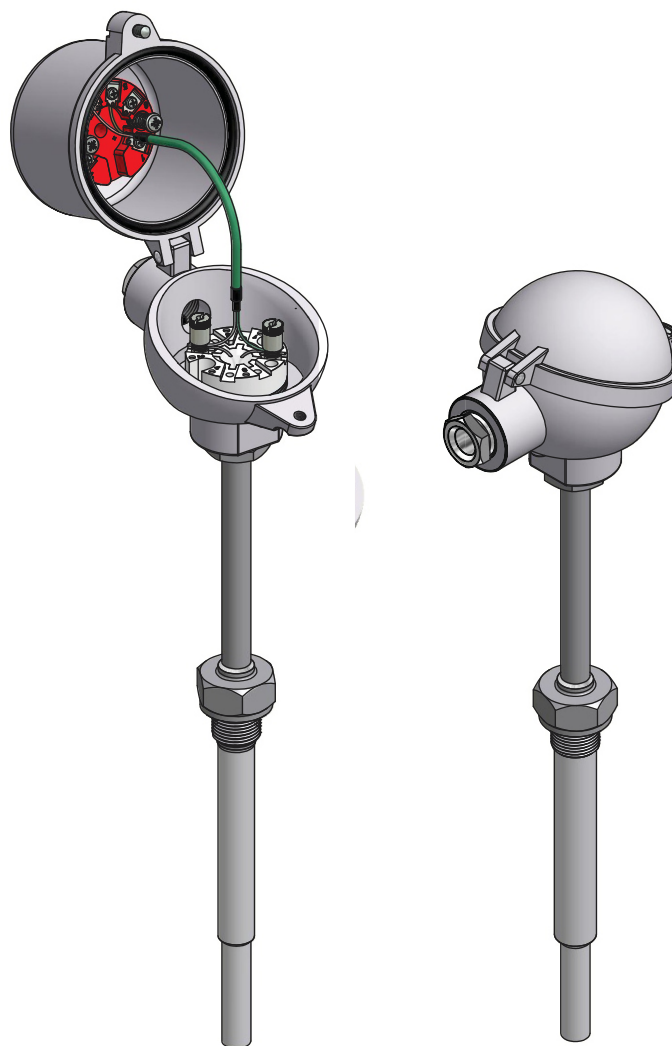
Immersion length, process connection thread, length of the thermowell, connection head, shape and material of the sheath can be selected depending on the requirements of the application.

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..GS

Flameproof (Exd)

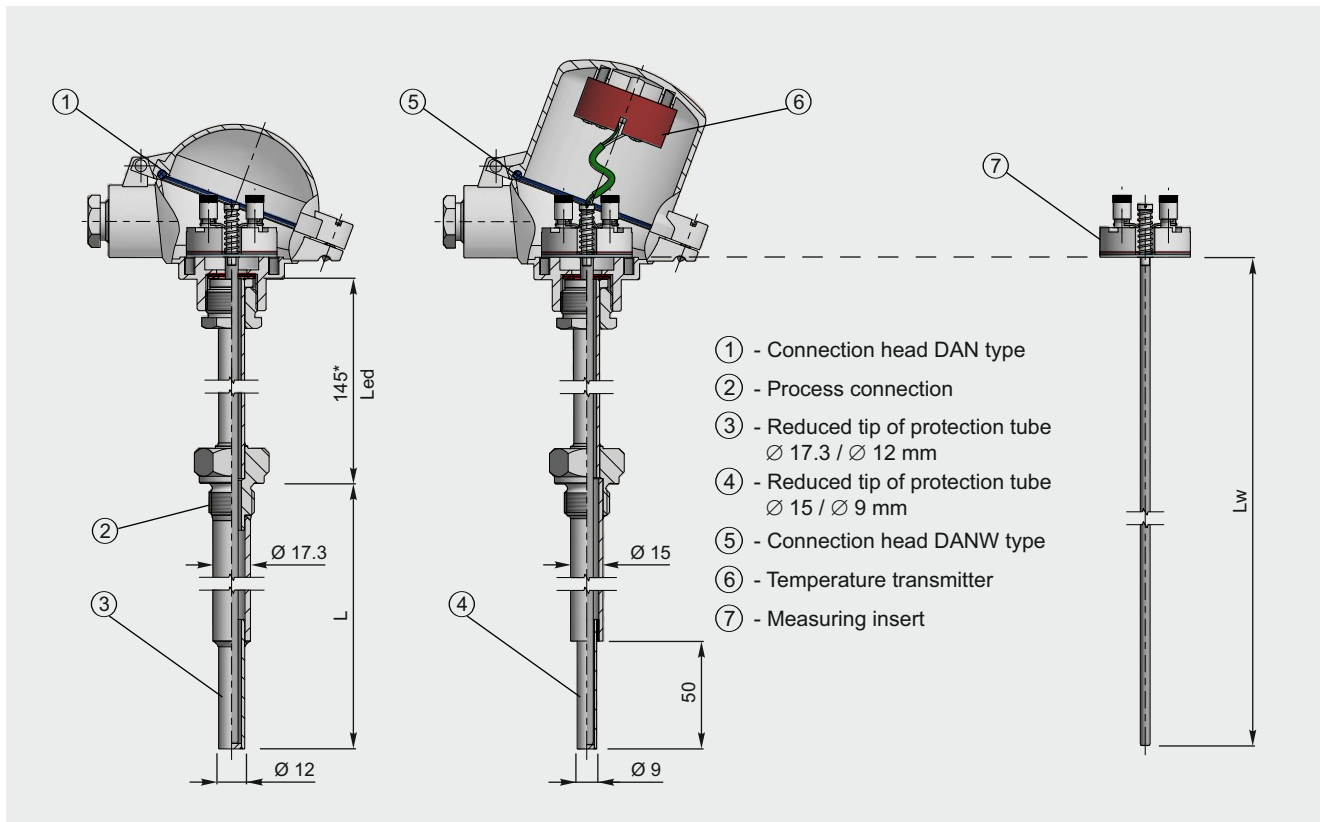
data sheet XD-TT..GS

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 / DI	Response time
Ø 17.3 mm / Ø 12 mm	t ₅₀ = 38 s
	t ₉₀ = 125 s
Ø 15 / Ø 9 mm	t ₅₀ = 18 s
	t ₉₀ = 55 s

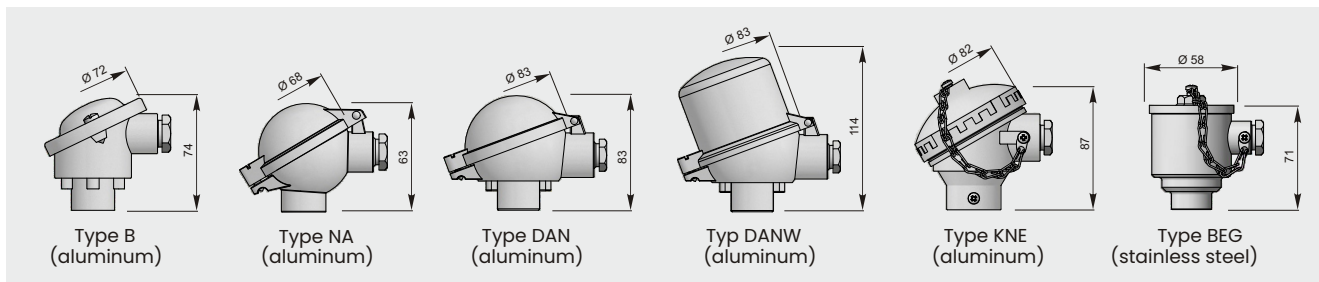
Hard chrome layer properties

- Layer thickness: 10 - 15 µm
- Layer hardness: ~ 1000 HV
- High abrasion resistance

Thermowell can be supplied with following protection layers upon customer's request: chrome carbide (Cr_3C_2), Teflon® PTFE/PFA, Stellite®, Tantalum, silicon carbide (SiC), aluminum oxide.

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

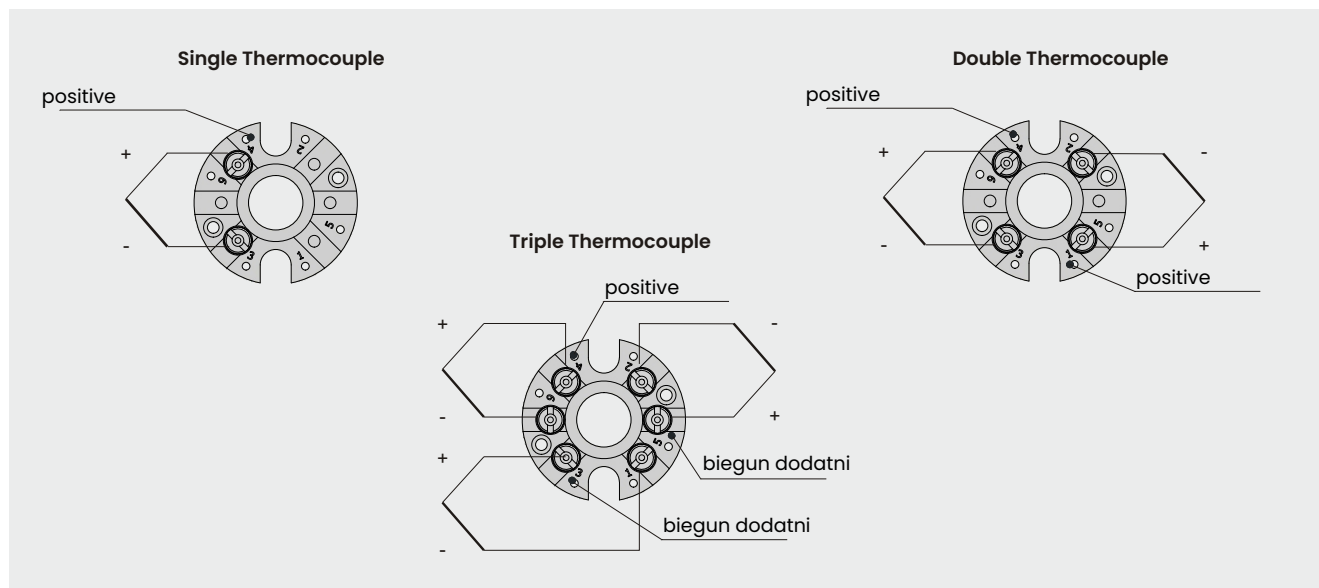
The display is mounted in connection head cover with glass window which allows preview of measuring temperature. 4 digits with a height of 9.5 millimeter ensure clear reading of values.

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
 TT GS - - - - - - - - -

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"/>	Thermowell diameter [mm]				
		1	Ø17.3 mm with reduced tip to Ø12 mm			
		2	Ø15 mm with reduced tip to Ø9 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			
		250	250 mm			
		400	400 mm			
		xxx	other, please specify			
7	<input type="text"/>	Process connection				
		M20x1.5	M20x1.5			
		G1/2"	G1/2"			
		xxx	other, please specify			
8	<input type="text"/>	Measuring junction				
		SO	Junction isolated			
		SP	Junction grounded			
		SOB	Junctions isolated (double and triple thermocouples)			
9	<input type="text"/>	Tolerance				
		1	Class 1 according to PN-EN 60584-2			
		2	Class 2 according to PN-EN 60584-2			
10	<input type="text"/>	Measuring range of temperature transmitter				
		0..100	input signal for 4..20mA: 0..100°C			
		xxx	other, please specify			
11	<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 TTKGS11-DAN-200-G1/2-SO-1

(sensor IxK, connection head type DAN closed by screw, length L=200mm, thread G1/2", thermowell dia. Ø17.3 with reduced tip to Ø12mm, junction isolated, class 1).

Temperature sensor APWTTKGS21-DANWdie-500-M20x1.5-SO-1-0..100°C-PR5335A

(sensor IxK with 4..20mA temperature sensor, connection head DANWdie with local LED display, closing by screw, length L=500mm, thread M20x1.5, protection dia. Ø15 with reduced tip to Ø9mm, junction isolated, class 1, temperature transmitter PR5335A).