

Application

- Measuring range: -40 .. +800°C
- Suitable for additional thermowell
- Fine chemicals industry
- Light energy industry
- General industrial services
- Food industry

Features

- Exchangeable measuring insert made of mineral insulated cable (vibration proof)
- Spring-loaded measuring insert provides ideal contact with the thermowell
- Temperature transmitter can be installed in the sensor head
- Connection head with local LCD or LED display as an option (see models TWR01H, DANWdie-LED)

The sensor consists of a replaceable insert, neck and an aluminium connection head where a programmable temperature transmitter with a 4-20 mA output signal can be installed.

The measuring insert represents the replaceable element of the complete sensor which reduces time and costs of maintenance of the measuring apparatus installed in the object. Spring fixation of the measuring insert provides perfect pressure to the bottom of the protecting tube, reduces time of reaction to changes of temperature and increases accuracy of measurement as well as reduces natural vibration thus mechanical and electrical defects can be avoided.

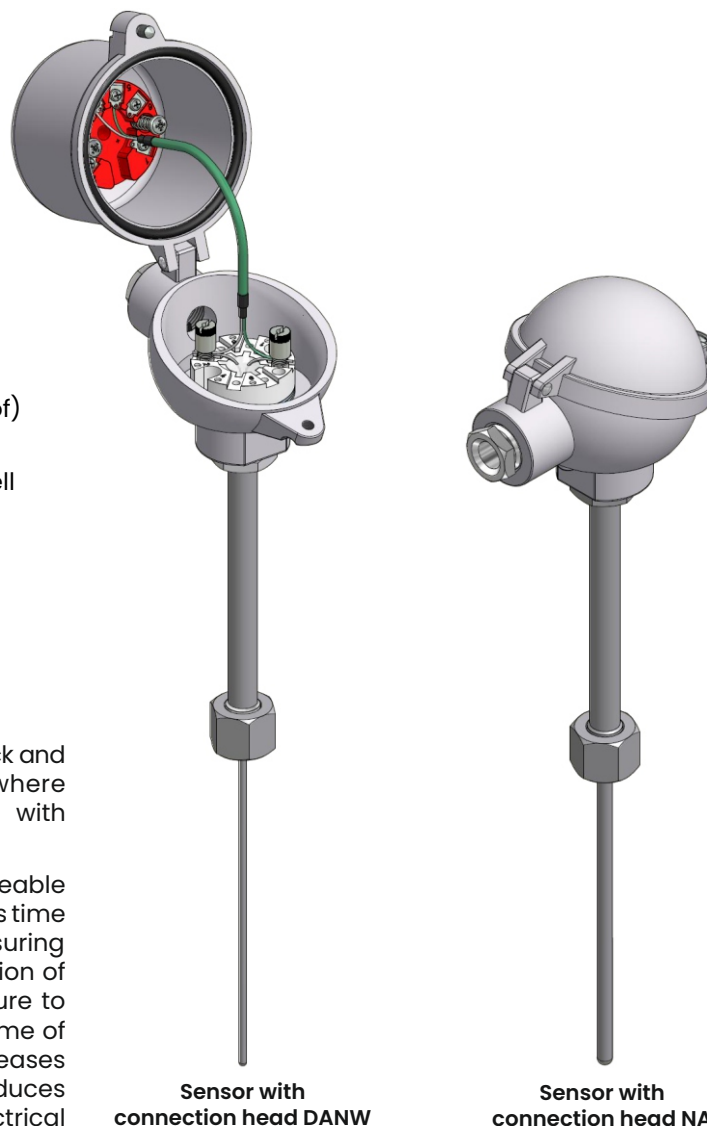
Insertion length, thermometer thread, connection head as well as type and number of sensors, accuracy and method of connection can be selected individually for the respective application.

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



Sensor with
connection head DANW

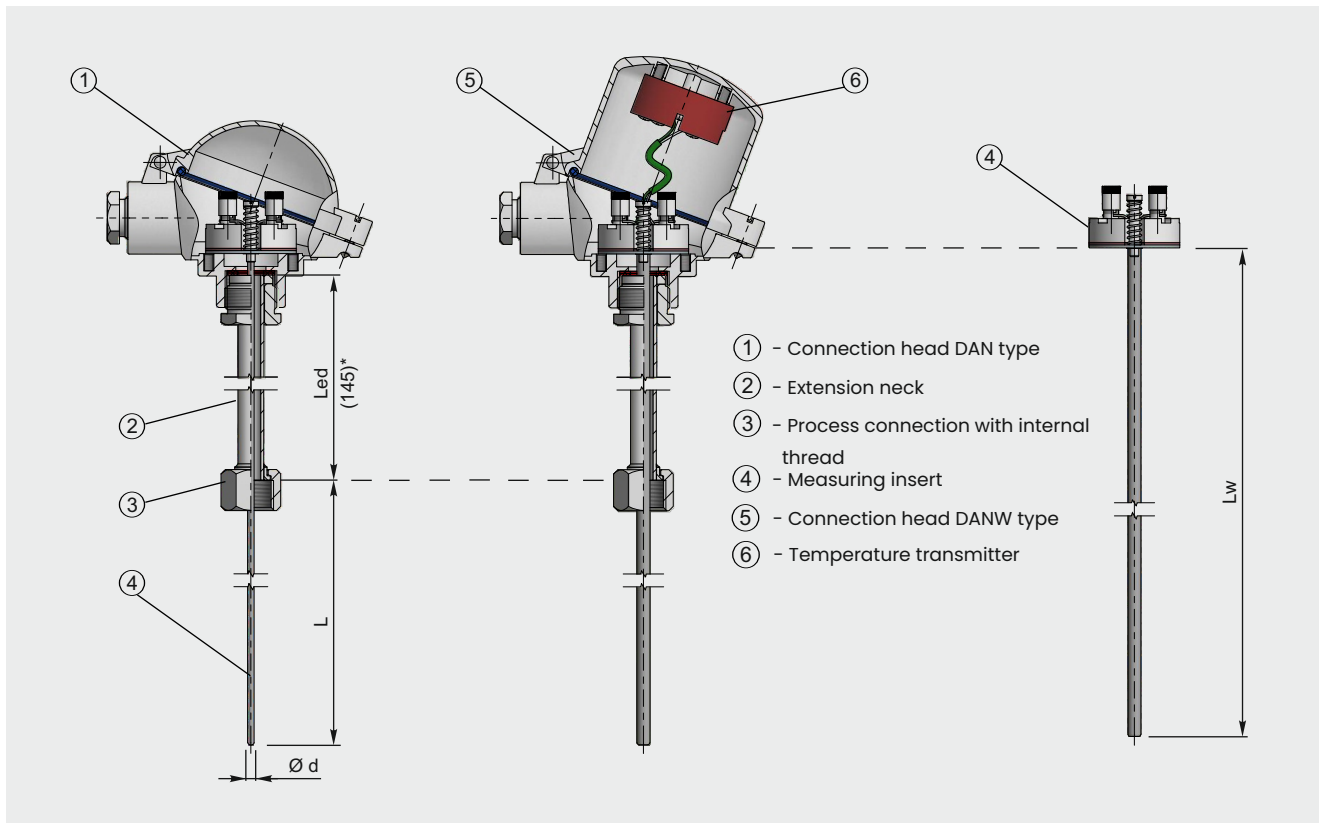
Sensor with
connection head NA

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	275 mm
140 mm	315 mm
200 mm	375 mm
260 mm	435 mm

In case of non-standard lengths, below formula should be used to calculate length of measuring insert:

$$Lw = L \text{ (thermowell length)} + 165 \text{ (neck length)} + 10$$

Example:

$$Lw = 200 + 165 + 10$$

For thermowell L=200 mm long, length of measuring insert is 375mm.

Response time

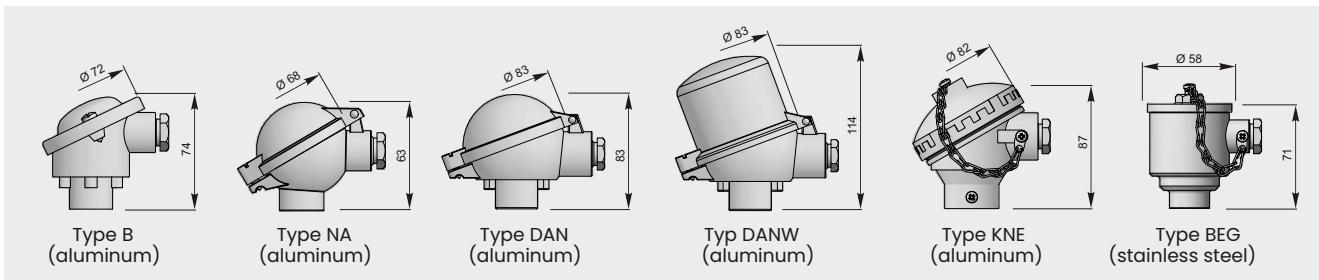
Average response time at mixed water 0.4 m/s (acc. to DIN EN 60584), at temperature change from 23 to 33°C.

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

Measuring insert diameter	Response time
Ø 3 mm	t ₅₀ = 2.5 s
	t ₉₀ = 3 s
Ø 6 mm	t ₅₀ = 7 s
	t ₉₀ = 9.5 s

Connection heads

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

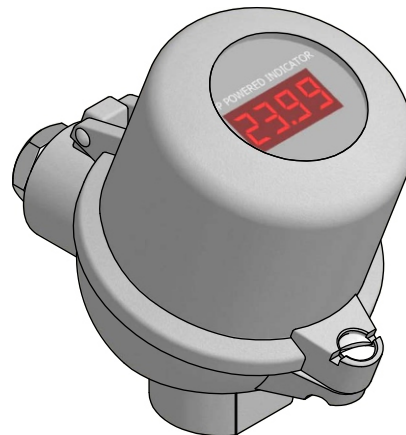


Connection head DANWdie with local LED display

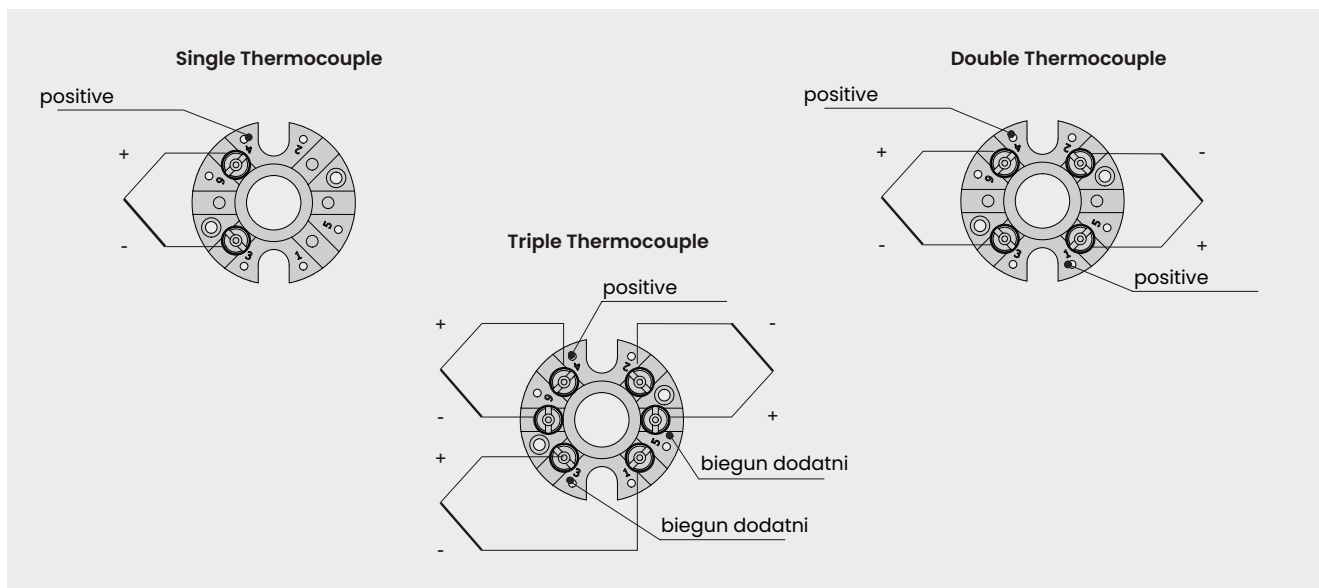
The display is mounted in connection head cover with glass window which allows preview of measuring temperature. 4 digits with a height of 9.5 millimeter ensure clear reading of values.

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

Mounted temperature transmitter 4..20mA 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
 TT GWN - - - - - - - - - -

1	<input type="text"/>	Version	
		AP	Single thermocouple
		APW	Single thermocouple, with 4..20 mA temperature transmitter
		2	Single thermocouple, 4..20 mA temperature transmitter and local LED display*
		3	Double thermocouple
			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"/>	Measuring insert diameter d	
		1	Ø3.0 mm
		2	Ø6.0 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 Aluminum Cable gland: M20x1.5 IP65
		DAN	Type DAN Aluminum Cable gland: M20x1.5 IP65
		DANW	Type DANW Aluminum Cable gland: M20x1.5 IP65
		B	Type B Aluminum Cable gland: M20x1.5 IP65
		BEG	Type BEG Stainless Steel 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"/>	Neck length Led [mm]	
			145 mm (standard)
		250	250 mm
		xxx	other, please specify
8	<input type="text"/>	Thermometer connection	
		M20x1.5	M20x1.5
		M27x2	M27x2
		G1/2	G1/2"
		xxx	other, please specify
9	<input type="text"/>	Measuring junction	
		SO	Junction isolated
		SP	Junction grounded
		SOB	Junctions isolated (double and triple thermocouples)
10	<input type="text"/>	Tolerance	
		1	Class 1 according to PN-EN 60584-2
		2	Class 2 according to PN-EN 60584-2
11	<input type="text"/>	Measuring range of temperature transmitter	
		0..100	input signal for 4..20mA: 0..100°C
		xxx	other, please specify
12	<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 TTKGWNII-DAN-200-M20x1.5-SO-1

(sensor IxK, connection head type DAN closed by screw, length L=200mm, measuring insert diameter Ø3 mm, thermometer thread M20x1.5, junction isolated, class 1).