

Applications

- Measuring range: $-50 \dots +600^{\circ}\text{C}$
- Particularly suitable for steam and gas applications with high process pressures and temperatures
- Universal range of application

Features

- Spring-loaded measuring insert provides ideal contact with protective tube
- Temperature transmitter can be installed inside connection head of sensor
- High flexibility due to modular assembly with standard terminal heads and customized immersion length
- High compatibility with a design according to DIN 43772
- Connection head with local LED display as an option (see model DANWdie-LED)

The sensor consists of an exchangeable measuring insert, solid machined thermowell with neck and aluminum connection head where mounting a temperature transmitter with 4-20 mA/HART® or Profibus®PA outputsignal is possible.

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 thermowell, 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.

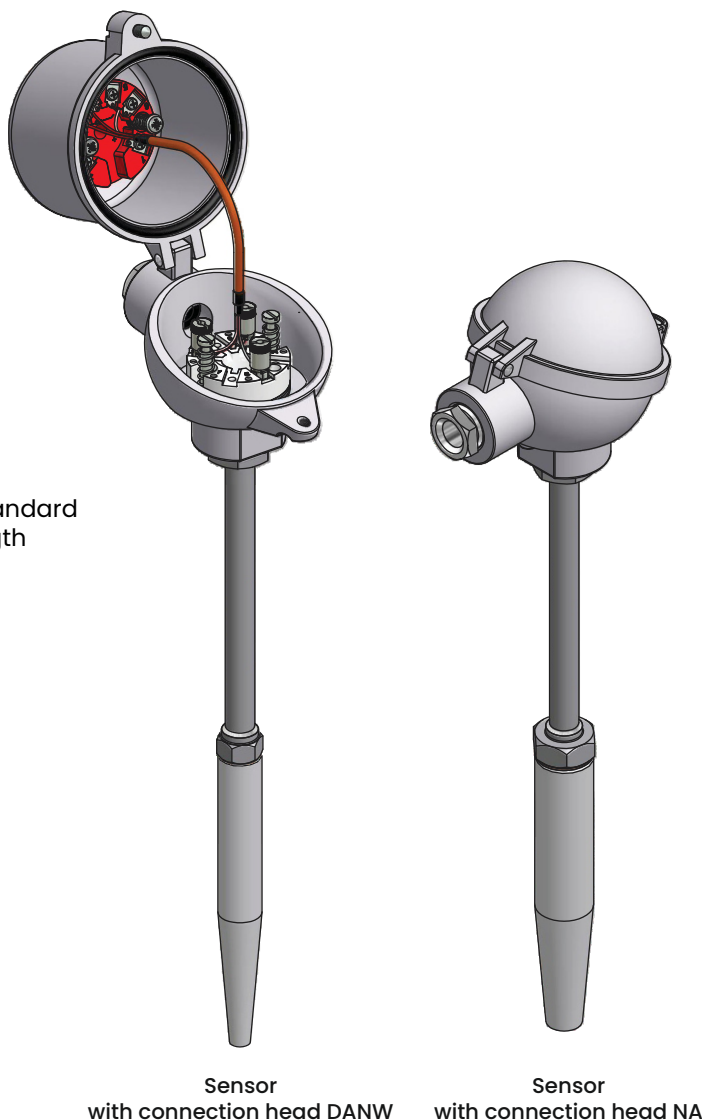
Immersion length, design of thermowell, connection head as well as type and number of sensors, accuracy and method of connection can be selected individually for the respective application.

Temperature Transmitter (Option)

Transmitter is mounted inside the connection head of the sensor: directly on measuring inset or in the high cap of head.

The second method is advantageous as it allows changing standard measuring inset quickly without a need to disassemble the transmitter; it means reduction of time and costs of maintenance of the sensor and protecting wires against any damage possible.

Mounting of two transmitters inside the connection head available upon request.



Sensor with connection head DANW Sensor with connection head NA

ATEX and 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-TOPSW

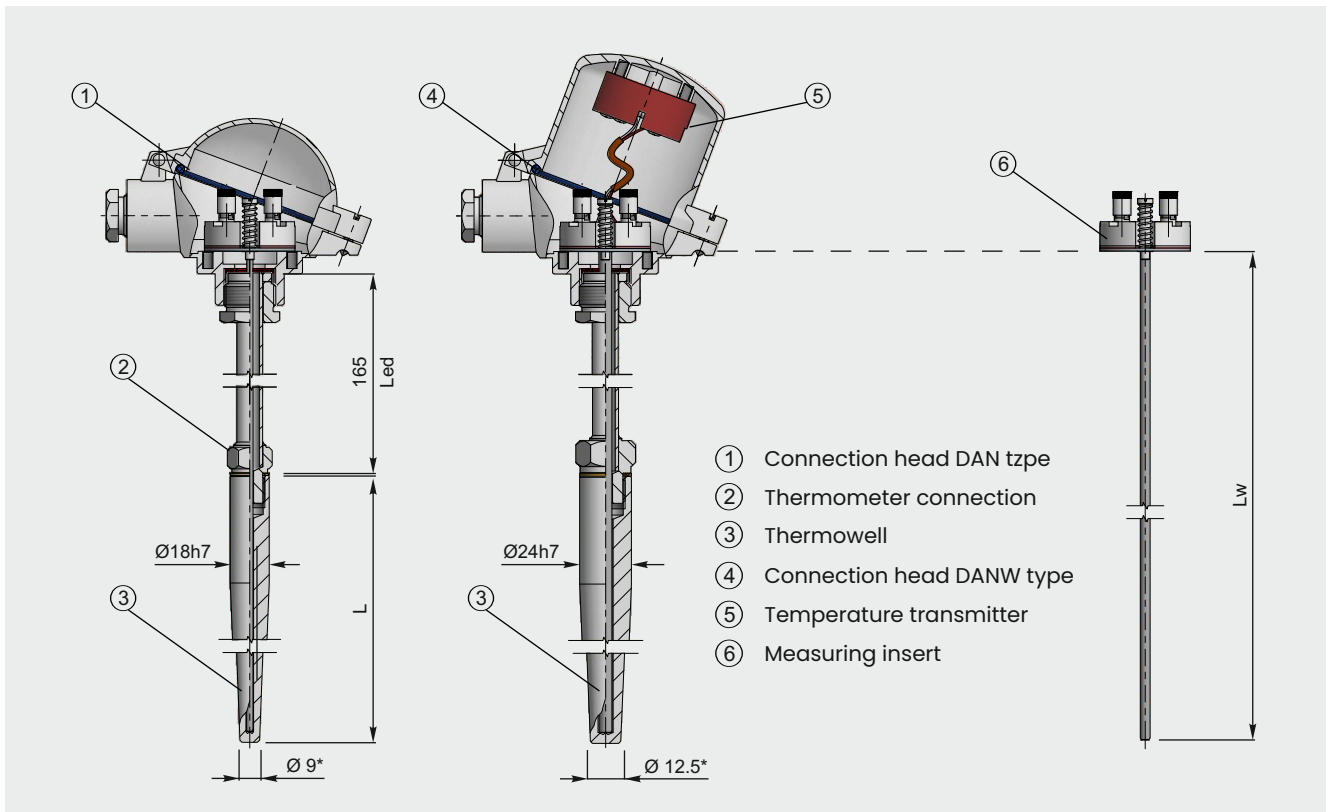
Flameproof (Exd) data sheet XD-TOPSW

Other versions

This data sheet contains only small part of our supplies program of resistance thermometers with exchangeable measuring insert.

Upon the customer's request, other versions can also be delivered.

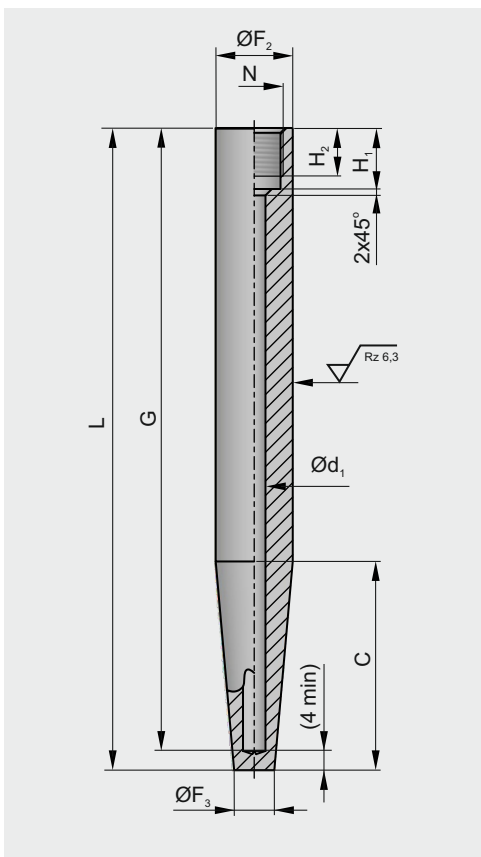
Designs



- ① Connection head DAN type
- ② Thermometer connection
- ③ Thermowell
- ④ Connection head DANW type
- ⑤ Temperature transmitter
- ⑥ Measuring insert

* other parameters available upon request

Solid machined thermowell acc. to DIN 43772 - form 4



Standard diameters and threads type

d_1	F_2	N	F_3	H_1	H_2
3,5	18h7	M14x1,5	9	16	13
	24h7	M18x1,5			
7	26h7	G1/2" (M20x1,5)	12,5	19	15
9	32h11	G3/4" (M27x2)	17	22	17
11			19		
13			20		
14					

Standard lengths

L_o^{*2}	G_o^{*1}	C_o^{*2}
110	105	65
110	105	73
140	135	65
170	165	133
200	195	65
200	195	125
260	255	125
410	405	275

Maximal process pressure

Thermowell length L [mm]	Maximal pressure [MPa]			
	thermowell SW1		thermowell SW2	
	air	water	air	water
100	15.7	44	-	-
140	13.4		22	44
200				
260	-	-	-	-

values calculated for air velocity of 60 m/s and for water velocity of 5

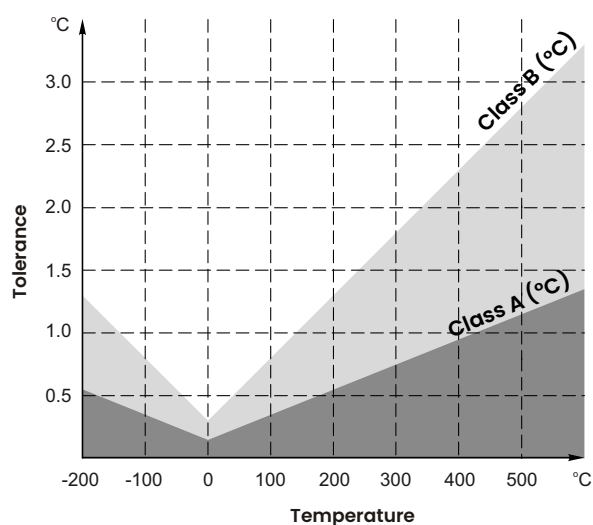
Connection line

Protection tube [mm]	Measuring insert [mm]	Connection line					
		1 x Pt 100			2 x Pt 100		
		2-wire	3-wire	4-wire	2-wire	3-wire	4-wire
Ø 18	Ø 3	✓	✓	✓	✓	✓	
Ø 24	Ø 6	✓	✓	✓	✓	✓	✓

Tolerances

Basic values and limiting errors for the platinum measurement resistances are laid down in PN-EN 60 751.

Class of tolerance	Tolerance °C
A	$\pm 0.15 + (0.002 \times t)$
B	$\pm 0.30 + (0.005 \times t)$



Response time

Average response time at mixed water 0.4 m/s (acc. to DIN EN 60751), at temperature change from 23 to 33 °C.

Thermowell diameter	Response time	Length C=65 mm	Length C=125 mm
Ø 18h7	t ₅₀	22 s	22 s
	t ₉₀	60 s	60 s
Ø 24h7	t ₅₀	31 s	31 s
	t ₉₀	96 s	96 s

Non-standard neck lengths

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

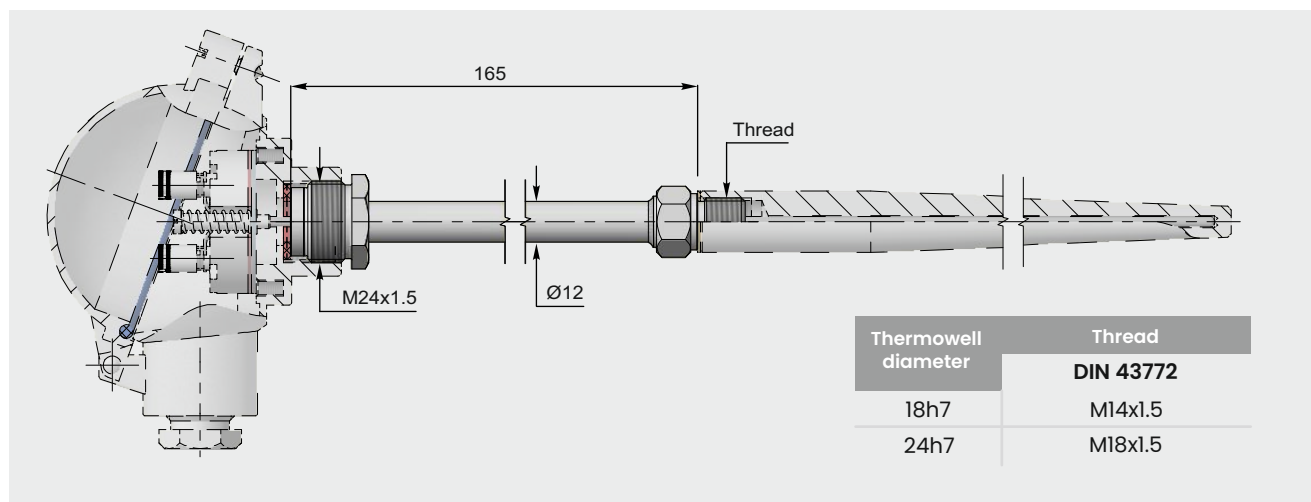
$$L_w = L_{\text{(thermowell length)}} + 165_{\text{(neck length)}} + 10$$

Example:

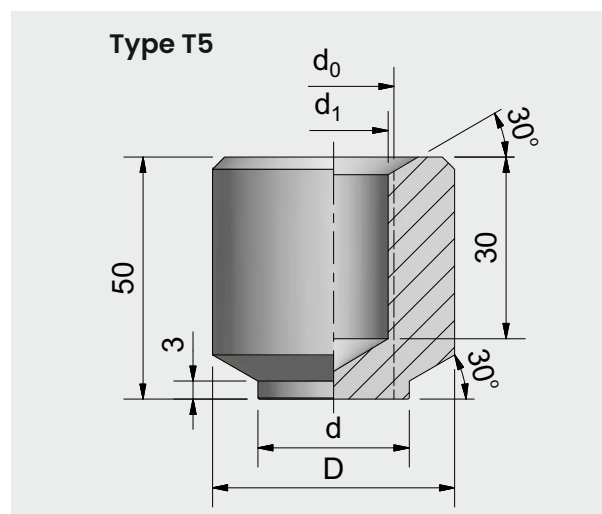
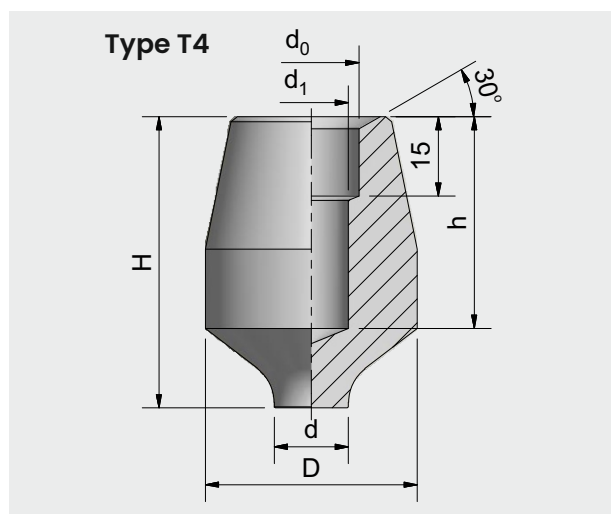
$$L_w = 200 + 165 + 10$$

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

Cooling neck



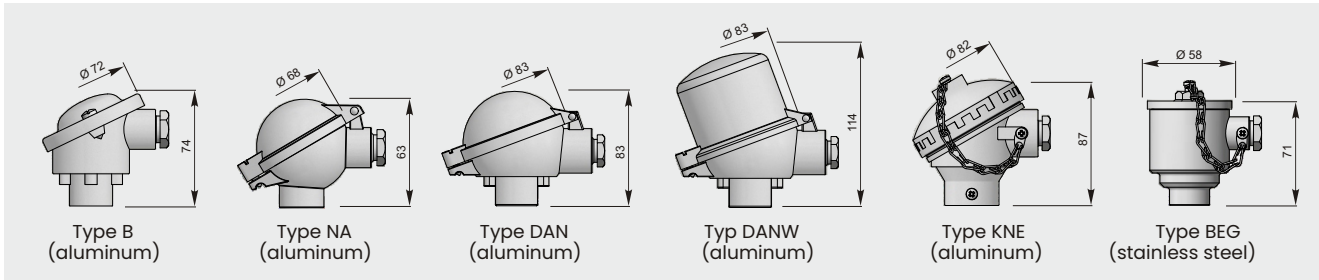
Adaptors for weld-in



More detailed information are available in the „Adaptors for weld-in” data sheet.

Connection heads

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

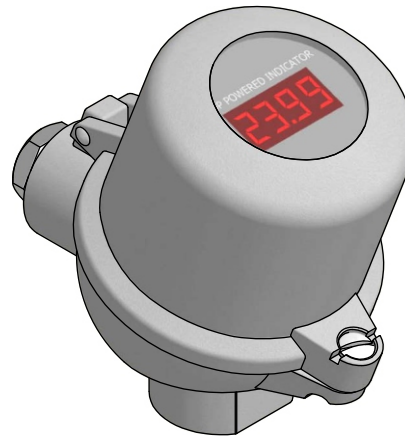


Connection head DANWdie with local LED display

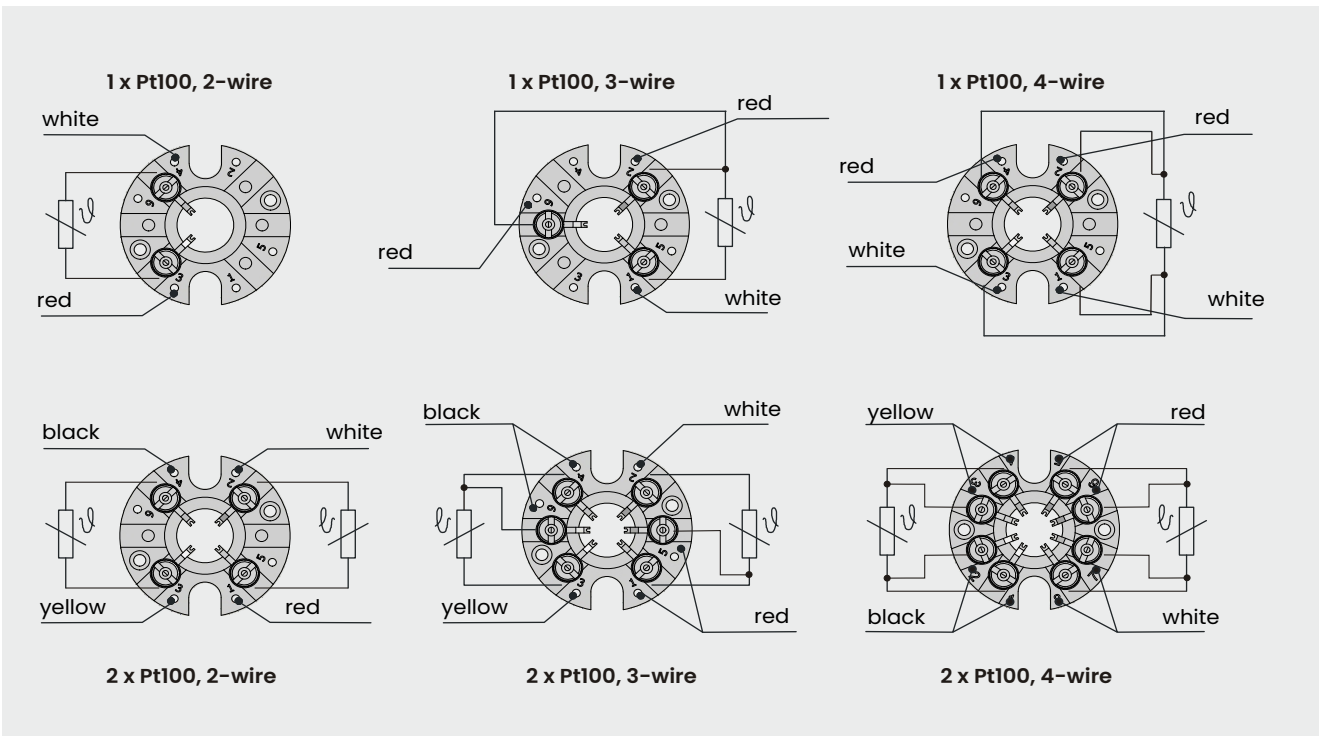
The display is mounted in connection head cover with glass window which allows preview of measuring temperature. 4 digits with a height of 9.5 millimeter ensure clear reading of values.

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
 TOPSW - - - - - - - - - -

1	<input type="checkbox"/>	Resistance element			
		1	1 x Pt100		
		AP	1 x Pt100, with installed transmitter 4..20 mA		
		APW	1 x Pt100, with installed transmitter 4..20 mA and local LED display		
	2	2 x Pt100			
* available only with connection head DANWdie					
2	<input type="checkbox"/>	Thermowell diameter			
		1	Ø 18h7		
	2	Ø 24h7			
3	<input type="checkbox"/>	Closing method of connection head			
		1	closing by screw		
	3	closing by clamp			
4	<input type="checkbox"/>	Connection head			
		NA	Type NA	Aluminum	Gland: M20x1.5 IP65
		DAN	Type DAN	Aluminum	Gland: M20x1.5 IP65
		DANW	Type DANW	Aluminum	Gland: M20x1.5 IP65
		B	Type B	Aluminum	Gland: M20x1.5 IP65
		BEG	Type BEG	Stainless steel	Gland: M20x1.5 IP65
xxx	other, please specify				
5	<input type="checkbox"/>	Thermowell material			
		1.4541	Stainless Steel 1H18N9T (1.4541)		
		1.4571	Stainless Steel HI7Ni3M2T (1.4571)		
		1.7335	Steel 15HM (1.7335)		
	xxx	other, please specify			
6	<input type="checkbox"/>	Length L [mm]			
		100	100 mm		
		140	140 mm		
		200	200 mm		
		260	260 mm		
	xxx	other, please specify			
7	<input type="checkbox"/>	Neck length Led [mm]			
			165 mm (standard)		
		250	250 mm		
	xxx	other, please specify			
8	<input type="checkbox"/>	Tolerance			
		A	Class A according to PN-EN 60751		
		B	Class B according to PN-EN 60751		
		1/3B	Class 1/3B DIN		
	xxx	other, please specify			
9	<input type="checkbox"/>	Connection line			
		2	2-wire		
		3	3-wire		
	4	4-wire			
10	<input type="checkbox"/>	Measuring range of temperature transmitter			
		0..100	input signal for 4..20mA: 0..100°C		
	xxx	other, please specify			
11	<input type="checkbox"/>	Type of temperature transmitter			
		PR5333A	Output 4..20 mA		
		PR5335A	Output 4..20 mA, with HART® communication protocol		
		PR5350A	Output Profibus® PA / Foundation Fieldbus		
	xxx	other, please specify			

Example

Temperature sensor TOPSWII-DAN-1.4541-200-A-4
 (sensor 1xPt100, connection head DAN closing by screw, thermowell Ø18h7, length L=200mm, thermowell material 1.4541, class A 4-wire).