

Applications

- Measuring range: -50 .. +600°C
- Suitable for additional thermowell
- Fine chemicals industry
- Light energy industry
- General industrial services

Features

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

The sensor consists of an exchangeable measuring insert, neck and aluminum connection head where mounting a temperature transmitter with 4-20 mA/HART® or Profibus®PA output signal 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 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.

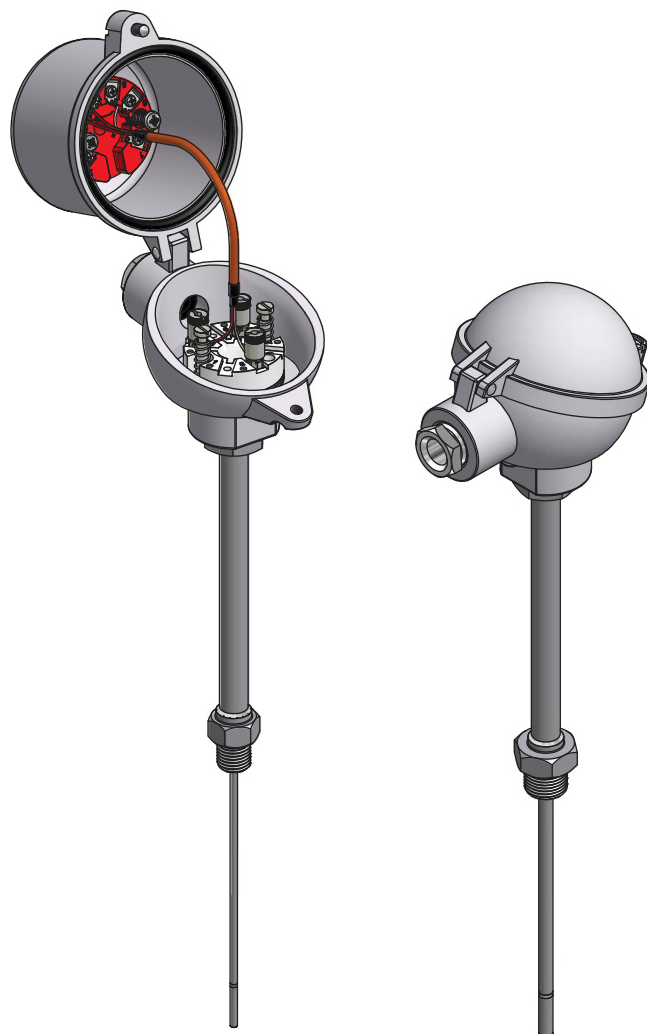
Insertion length, thermometer thread, connection head as well as type and number of sensors, accuracy and method of connection can be selected individually for the respective application.

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 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-TOPWS

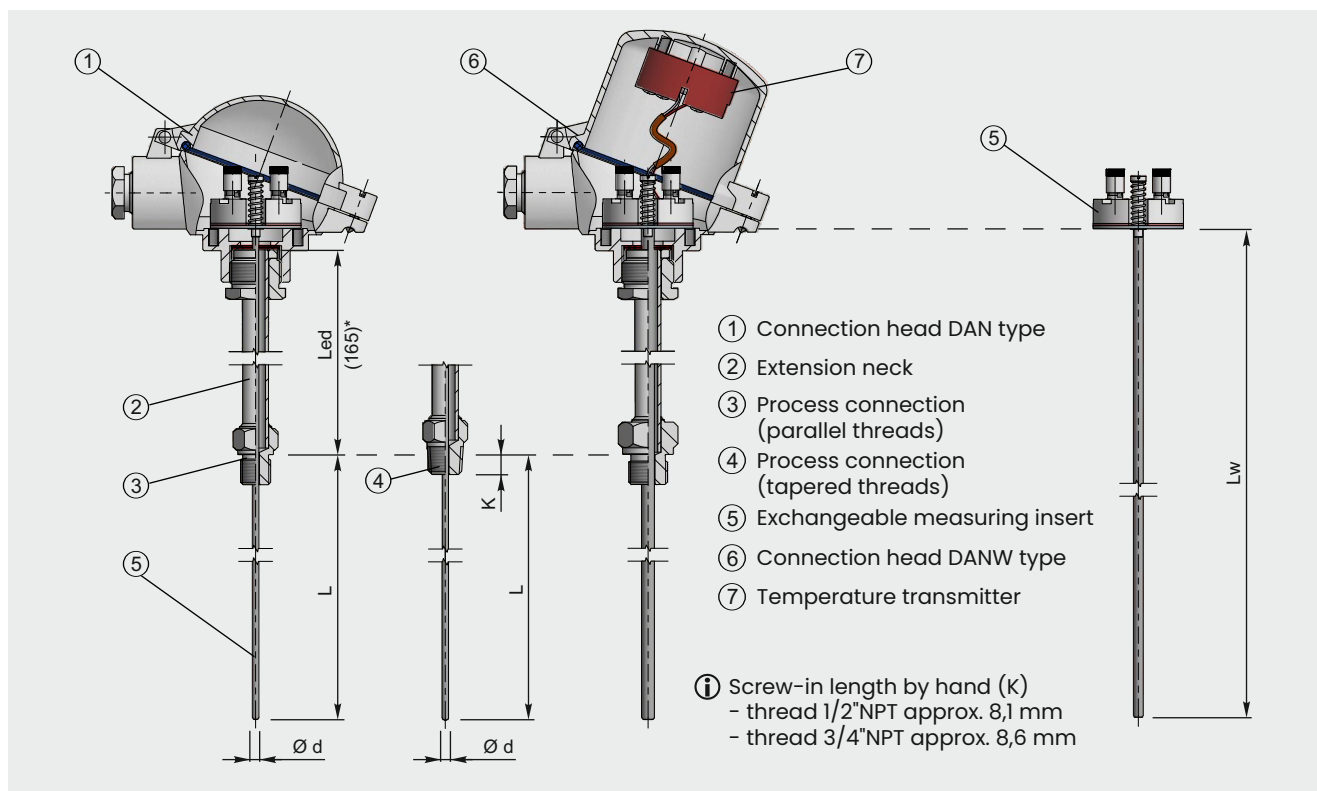
Flameproof (Exd) data sheet XD-TOPWS

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.

* other materials, see: "Thermowell materials"

Designs



Connection line

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 6	✓	✓	✓	✓	✓	✓
Ø 4.5	✓	✓	✓	✓	✓	✓
Ø 3	✓	✓	✓	✓	✓	✗

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.

Measuring insert diameter	Response time
Ø 3 mm	$t_{50} = 1.5 \text{ s}$
	$t_{90} = 4.5 \text{ s}$
Ø 6 mm	$t_{50} = 4 \text{ s}$
	$t_{90} = 10 \text{ s}$

Standard lengths

Immersion length L	Measuring insert length Lw
100 mm	275 mm
140 mm	315 mm
200 mm	375 mm
260 mm	405 mm

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

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

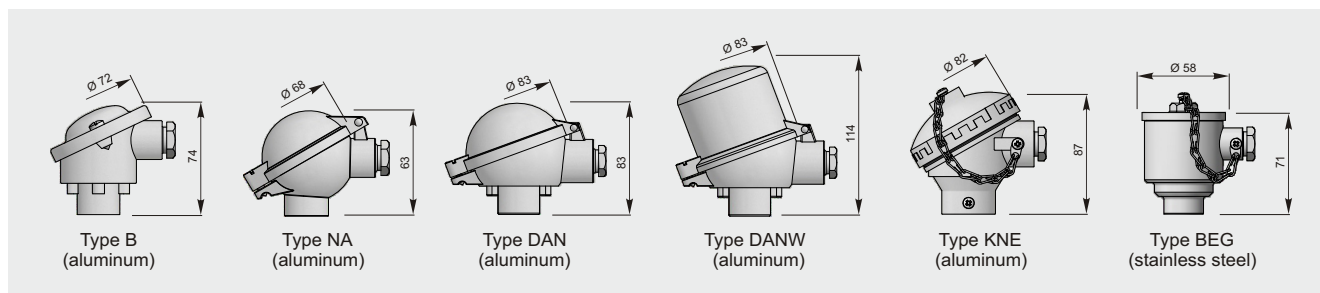
Example:

$$Lw = 200 + 165 + 10$$

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



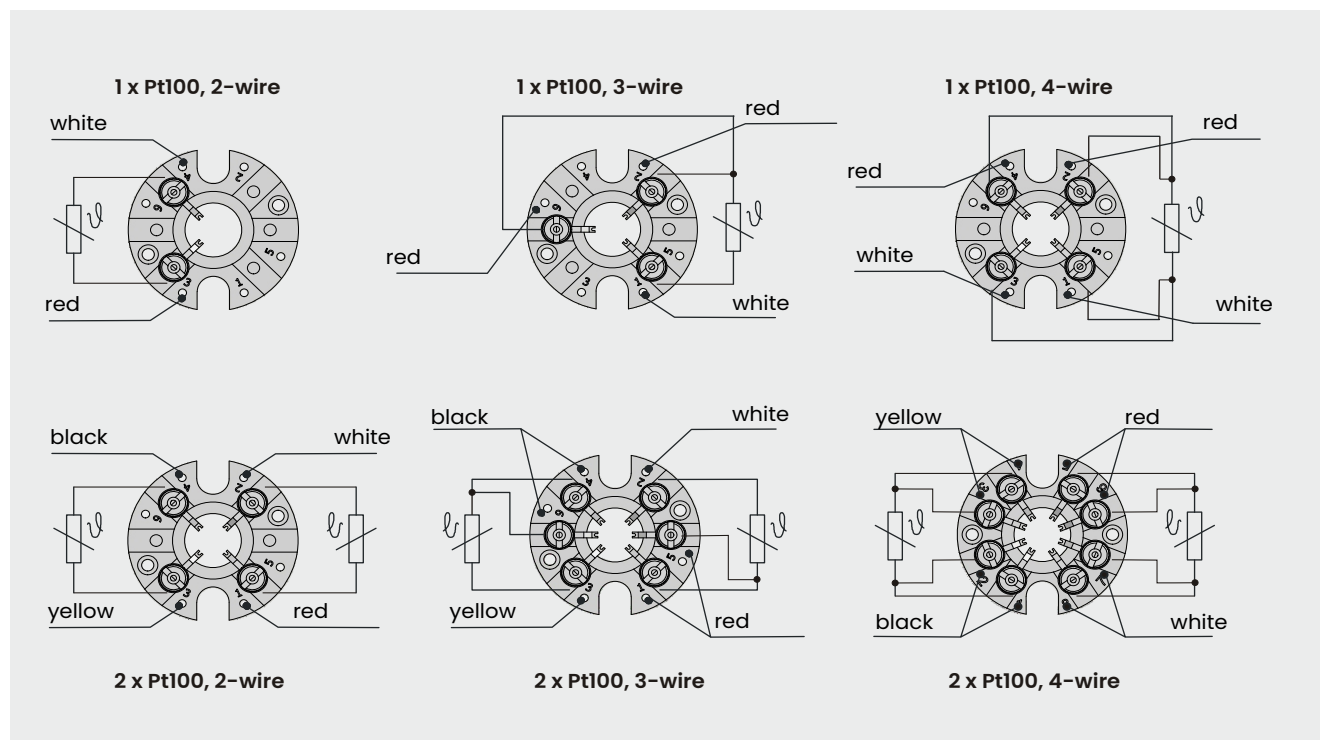
Connection head DANWdie with local LED display

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...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
 TOPWS - - - - - - - - -

1	<input type="text"/>	Resistance element				
		AP	1 x Pt100			
		APW	1 x Pt100, with installed transmitter 4..20 mA			
		2	1 x Pt100, with installed transmitter 4..20 mA and local LED display*			
			2 x Pt100			
* available only with connection head DANWdie						
2	<input type="text"/>	Measuring insert diameter d				
		1	Ø3.0 mm			
		2	Ø6.0 mm			
		3	Ø4.5 mm			
3	<input type="text"/>	Closing method of connection head				
		1	closing by screw			
		3	closing by clamp			
4	<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
		xxx	other, please specify			
5	<input type="text"/>	Length L [mm]				
		100	100 mm			
		140	140 mm			
		200	200 mm			
		260	260 mm			
		xxx	other, please specify			
6	<input type="text"/>	Neck length Led [mm]				
			165 mm (standard)			
		250	250 mm			
		xxx	other, please specify			
7	<input type="text"/>	Process connection				
		M20x1.5	M20x1.5			
		M27x2	M27x2			
		G1/2"	G1/2"			
		xxx	other, please specify			
8	<input type="text"/>	Tolerance				
		A	Class A acc. to PN-EN 60751			
		B	Class B acc. to PN-EN 60751			
		1/3B	Class 1/3B acc. to DIN			
		xxx	other, please specify			
9	<input type="text"/>	Connection line				
		2	2-wire			
		3	3-wire			
		4	4-wire			
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				
		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 TOPWS11-DAN-200-250-M12x1.5-A-4
 (sensor 1xPt100, connection head DAN closing by screw, measuring insert diameter Ø3 mm, length L=200mm, neck Led=250mm, thread M12x1.5, class A 4-wire).