Resistance Thermometer
with exchangeable measuring insert, Type **TOPGB**

Applications

■ Measuring range: -200 .. +150°C

■ Fine chemicals industry

■ Light energy industry

■ General industrial services

■ Food industry

Features

■ Stainless Steel AISI321 / 1.4541
or AISI316L / 1.4404, AISI316Ti / 1.4571 upon request

■ 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)

Description

The sensor consists of an exchangeable measuring insert, outer protective tube (thermowell) 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.
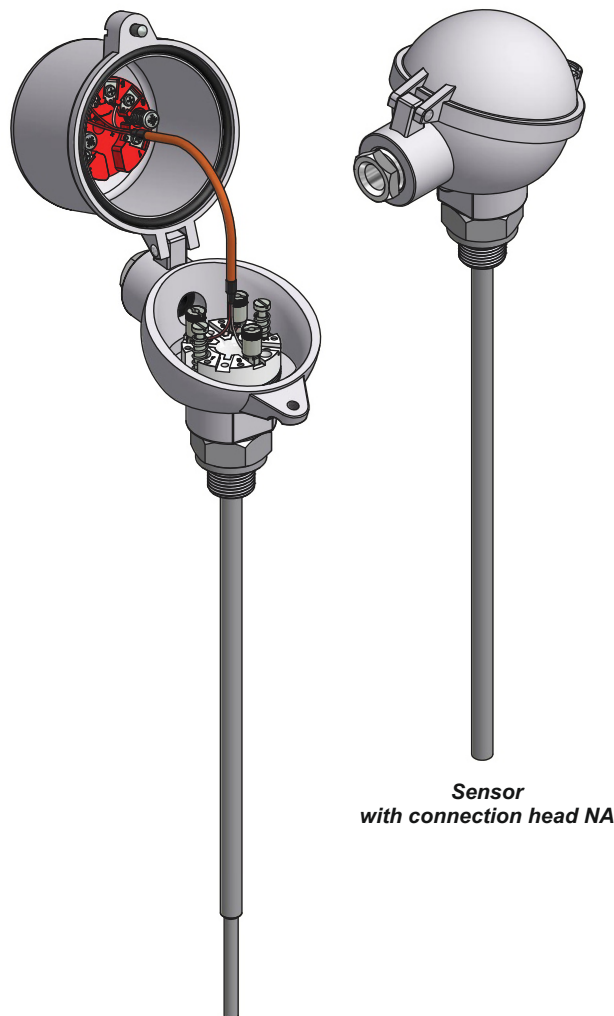
Insertion length, process connection, design of thermowell, connection head as well as type and number of sensors, accuracy and method of connection can be selected individually for the respective application.

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 NA*

*Sensor with connection head DANW.
Thermowell with reduced tip.*

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).
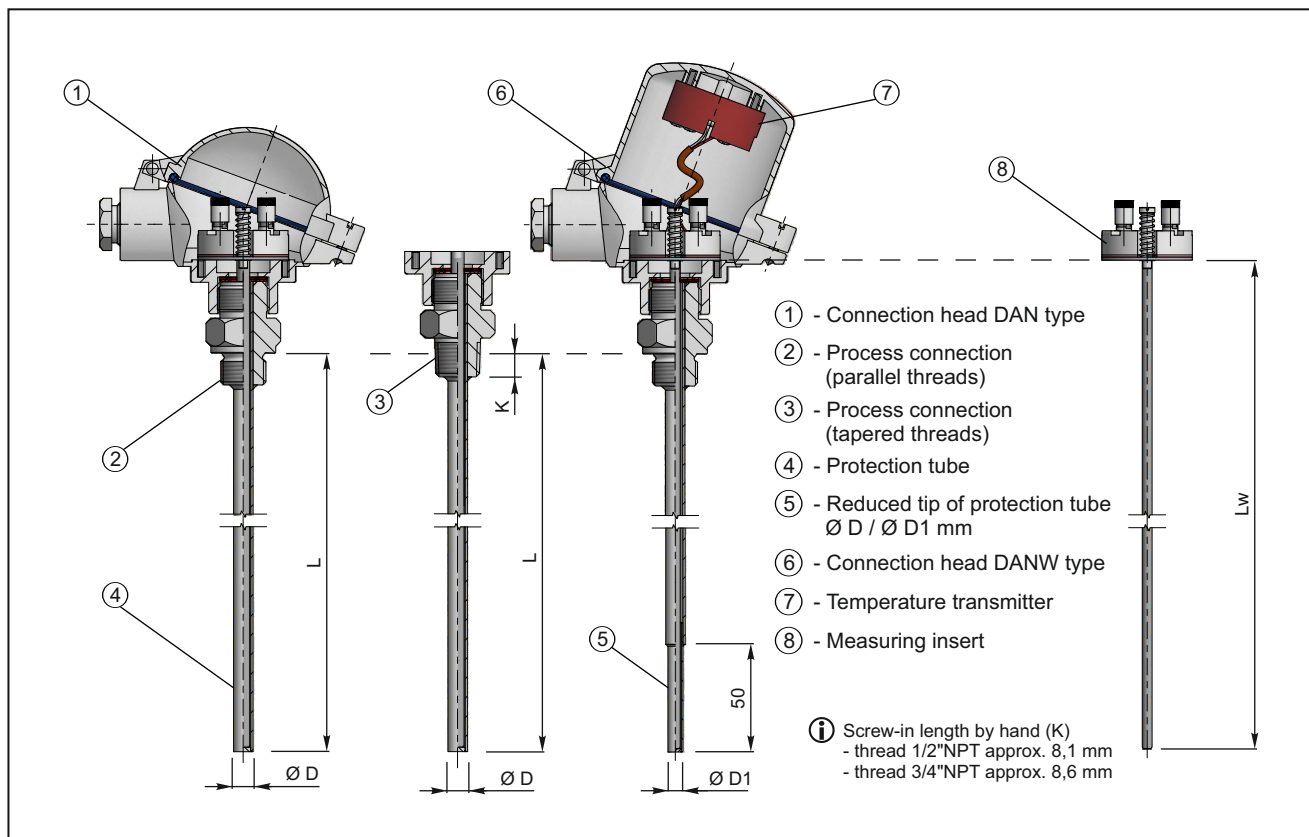
Intrinsically safe (Exi)   data sheet XI-TOPGB
Flameproof (Exd)   data sheet XD-TOPGB

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

① - Connection head DAN type

② - Process connection (parallel threads)

③ - Process connection (tapered threads)

④ - Protection tube

⑤ - Reduced tip of protection tube Ø D / Ø D1 mm

⑥ - Connection head DANW type

⑦ - Temperature transmitter

⑧ - Measuring insert

ⓘ Screw-in length by hand (K)
- thread 1/2"NPT approx. 8,1 mm
- thread 3/4"NPT approx. 8,6 mm

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 9	Ø 6	x	x	x	x	x	x
Ø 9 / 6	Ø 3	x	x	x	x	x	-

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	± 0.15 + (0.002 x | t |)
B	± 0.30 + (0.005 x | t |)

Max. pressure (at 100 ˚C)

Admissible pressure of application for max. speed of flow of steam 25 m/s and water 3 m/s.

Length L	Max. pressure of application
160 mm	6.4 MPa
250 mm	4.9 MPa
< 400 mm	2.0 MPa

Standard lengths

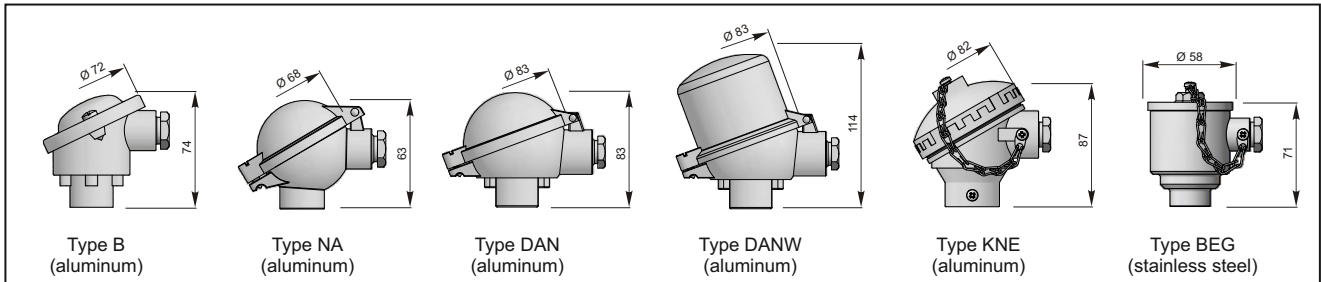| Immersion length L	Measuring insert length Lw
100 mm	145 mm
160 mm	205 mm
200 mm	245 mm
250 mm	295 mm
400 mm	445 mm

Response time

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

Diameter of protection tube	Response time
Ø 9 mm	$t_{50} = 18$ s
	$t_{90} = 55$ s
Ø 9 / Ø 6 mm	$t_{50} = 8$ s
	$t_{90} = 22$ 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".

Type B (aluminum)   Type NA (aluminum)   Type DAN (aluminum)   Type DANW (aluminum)   Type KNE (aluminum)   Type BEG (stainless steel)
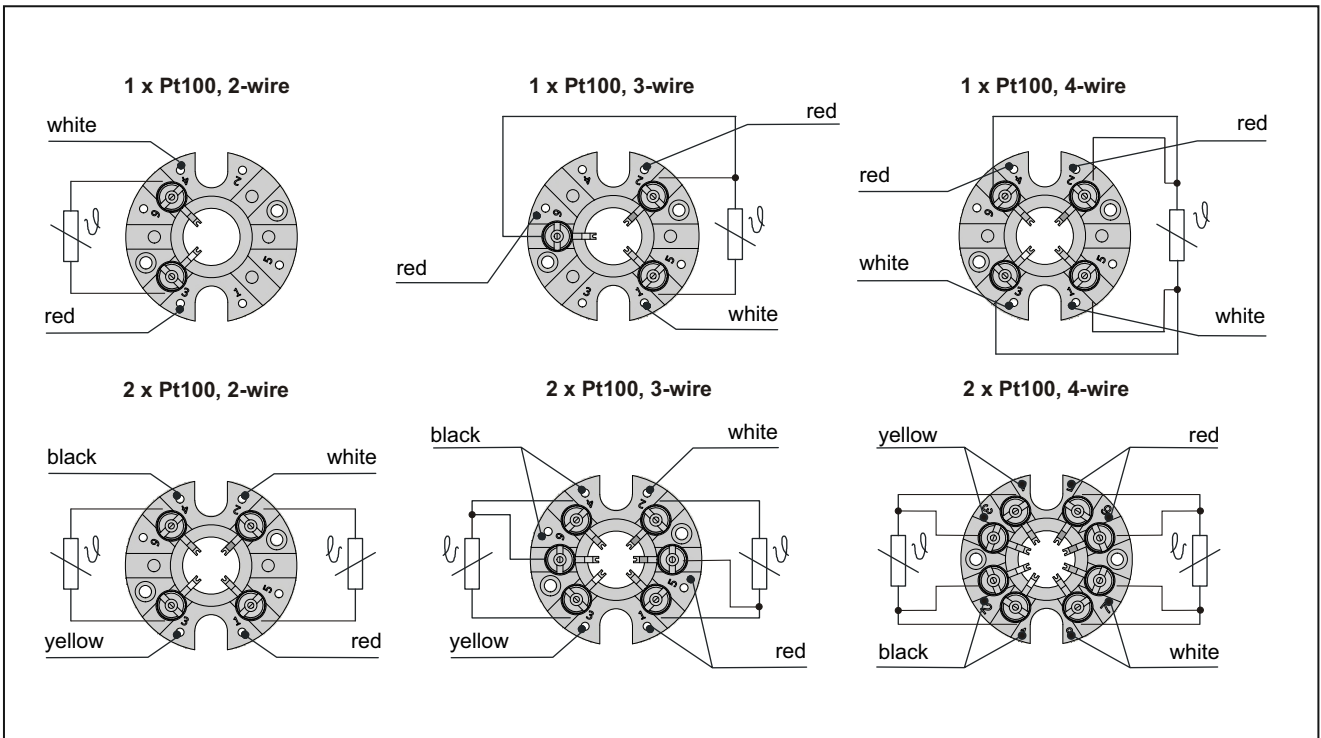
Connection head DANWdie with local LED display

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 milimeter 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

1 x Pt100, 2-wire
white
red

1 x Pt100, 3-wire
red
red
white

1 x Pt100, 4-wire
red
red
white
white

2 x Pt100, 2-wire
black
white
yellow
red

2 x Pt100, 3-wire
black
white
yellow
red

2 x Pt100, 4-wire
yellow
red
black
white

Ordering code

1		2	3	4	5	6	7	8	9	10
☐	TOPGB1 ☐	- ☐	- ☐	- ☐	- ☐	- ☐	- ☐	- ☐ p	- ☐	- ☐

1 ☐

Resistance element

		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 ☐

Closing method of connection head

	1	closing by screw
	3	closing by clamp

3 ☐

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			

4 ☐

Length L [mm]

	100	100 mm
	160	160 mm
	200	200 mm
	250	250 mm
	400	400 mm
	xxx	other, please specify

5 ☐

Protection tube (thermowell) diameter [mm]

	6	Ø 6 mm
	9	Ø 9 mm
	9/6	Ø 9 mm with reduced tip Ø 6 mm
	xxx	other, please specify

6 ☐

Process connection

	M20x1.5	M20x1.5
	G1/2"	G1/2"
	xxx	other, please specify

7 ☐

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

8 ☐

Connection line

	2	2-wire
	3	3-wire
	4	4-wire

9 ☐

Measuring range of temperature transmitter

	0..100	input signal for 4..20mA: 0..100°C
	xxx	other, please specify

10 ☐

Type of temperature transmitter

	PR5333A	Output signal 4..20 mA
	PR5335A	Output signal 4..20 mA, with HART® communication protocol
	PR5350A	Output signal Profibus® PA / Foundation Fieldbus
	xxx	other, please specify

Example

Temperature sensor TOPGB11-DAN-200-9-G1/2-A/4p
(sensor 1xPt100, connection head DAN closing by screw, length L=200mm, process connection G1/2", class A 4-wire).

Temperature sensor APWTOPGB11-DANWdie-500-9/6-M20x1.5-A/3p-0..100°C-PR5335A
(sensor 1xPt100 with transmitter 4..20mA, connection head DANWdie with local LED display, closing by screw, length L=500mm, process connection M20x1.5, thermowell Ø9 with reduced tip Ø6mm, class A 3-wire, temperature transmitter PR5335A).