Gas-actuated thermometer with electrical output signal Stainless steel version **Model TGT73.100**

WIKA data sheet TV 17.10









For further approvals,



Applications

- Chemical, petrochemical industry
- Oil and gas industry
- Power engineering, renewable energy
- Machine building, plant and vessel construction

Special features

- Cost-effective "2 in 1" temperature measurement
- Compact design
- Scale ranges from -200 ... +700 °C [-328 ... +1,292 °F]
- Plug-and-play, thus no transmitter configuration necessary



Configurator



Fig. left: lower mount (radial) Fig. right: back mount (axial)

Description

Wherever the process temperature has to be indicated on-site and, at the same time, a signal transmission to the central control or remote centre is desired, the model TGT73 intelliTHERM® can be used.

Through the combination of a mechanical measuring system and electronic signal processing, the process temperature can be read reliably, even if the voltage supply is lost.

Due to the wide variety of possible designs, the model TGT73 gas-actuated thermometers can be perfectly adapted to any process connection or location. With the adjustable stem and dial version, the case can be adjusted precisely to the desired viewing angle.

With the contact bulb version (without direct contact with the medium), the temperature can be measured and controlled even when the pipe diameter is extremely small. The electronic WIKA transmitter, integrated into the high-quality mechanical temperature measuring instrument, combines the advantages of electrical signal transmission with the advantages of a local mechanical display.

The measuring span (electrical output signal) is adjusted automatically with the mechanical display, i.e. the scale over the full scale range corresponds to 4 ... 20 mA.

A 4 ... 20 mA version is available for use in hazardous areas.

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Specifications

Detailed views of the cable connection



Basic information	
Standard	EN 13190
Nominal size in mm [in]	100 [4"]
Window	Laminated safety glass
Connection location	 Back mount (axial) Lower mount (radial) Back mount, adjustable stem and dial Version with capillary
Connection design	→ For drawings, see page 7
S	Standard (threaded connection) 1)
1	Plain stem (without thread)
2	Male nut
3	Union nut
4	Compression fitting (sliding on stem)
5	Union nut and loose threaded connection
6	Compression fitting (can be adjusted on either capillary or spiral protective sleeve)
7	Compression fitting at the case
"Adjustable stem and dial" case version	Swivelling 90° and rotatable 360°
Damping, case filling	WithoutWith liquid damping
Reverse polarity protection	Yes
Material (non-wetted)	
Case, ring	Stainless steel 304
Pointer	Aluminium, black
Articulated joint "adjustable stem and dial"	Stainless steel 304
Dial	Aluminium

¹⁾ Not applicable to version with capillary

Measuring element		
Type of measuring element	Inert gas expansion system	
Working range		
Constant loading (1 year)	Measuring range (EN 13190)	
Short time (max. 24 h)	Scale range (EN 13190)	
Capillary		
Diameter	2 mm [0.08 in]	
Spiral protective sleeve	7 mm [0.28 in]	
Length	Capillary without spiral protective sleeve	Max. 60 m [196.85 in]
	Capillary with spiral protective sleeve	Max. 40 m [131.23 in]
	Capillary with spiral protective sleeve and PVC coating	Max. 20 m [65.62 in]
Minimum bending radius	Capillary without spiral protective sleeve	6 mm [0.24 in]
	Capillary with spiral protective sleeve	20 mm [0.79 in]
	Capillary with spiral protective sleeve and PVC coating	30 mm [1.18 in]
Material (non-wetted)	Stainless steel 316	
Mounting options	 Surface mounting flange, stainless steel Instrument mounting bracket, aluminium die-casting Panel mounting flange, stainless steel 	
Contact bulb		
Dimensions	120 x 22 x 12 mm [4.72 x 0.87 x 0.47 in]	
Mounting types	Mounting on pipesMounting on tanks	
Material (non-wetted)	Stainless steel 316	

Accuracy specifications	
Accuracy class	Class 1 per EN 13190 at 23 °C ±10 °C ambient temperature
Accuracy of output signal	0.2 % of full scale value (only electronics)
Influence of auxiliary power	≤ 0.1 % of full scale/10 V
Influence of load	≤ 0.1 % of full scale
Temperature error (electronics)	< 0.3 % of full scale value/10 K (in overall temperature range)
Long-term stability (electronics)	< 0.3 % of full scale/a
Resolution	0.15 % of full scale (10-bit resolution at 360°)

Scale range in °C	Measuring range 1) in °C	Scale interval in °C	Error limit in °C
-80 +60	-60 +40	2	2
-60 +40	-50 +30	1	1
-40 +60	-30 +50	1	1
-30 +50	-20 +40	1	1
-20 +60	-10 +50	1	1
-20 +80	-10 +70	1	1
-20 +120	0 100	2	3
-20 +140	0 120	2	3
0 60	10 50	1	1
0 80	10 70	1	1
0 100	10 90	1	1
0 120	10 110	2	2
0 160	20 140	2	2
0 200	20 180	2	2
0 250	30 220	5	2.5
0 300	30 270	5	5
0 400	50 350	5	5

Scale range in °C	Measuring range 1) in °C	Scale interval in °C	Error limit in °C
0 500	50 450	5	5
0 600	100 500	10	10
0 700	100 600	10	10

¹⁾ The limits of the measuring range are indicated on the dial by two triangular marks. Only within this range is the stated error limit valid per EN 13190.

Further details on: scale range		
Unit	 °C °F °C/°F (dual scale) °F/°C (dual scale) 	
Dial		
Scale graduation	Single scaleDual scale	
Scale colour	Single scale	Black
	Dual scale	Red
		→ Other colours on request
Pointer		
Version	Adjustable poi	nter

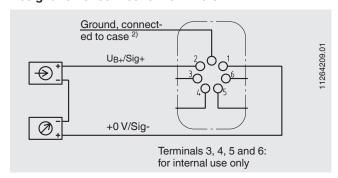
Process connection	
Thread size	 Plain, without thread G ½ B ½ NPT G ½ female ½ NPT female M20 x 1.5 M24 x 1.5 female
	→ Other threads on request
Material (non-wetted)	Stainless steel 304
Stem	
Diameter	 8 mm [0.31 in] 6 mm [0.24 in] 10 mm [0.39 in] 12 mm [0.47 in]
	→ Other diameters on request
Material (wetted)	Stainless steel 316
Thermowell / Protection tube	In principle, the operation of a mechanical thermometer is possible without a thermowell / protection tube with low process-side loading (low pressure, low viscosity and low flow rates). However, in order to enable exchanging the thermometer during operation (e.g. instrument replacement or calibration) and to ensure a better protection of the instrument and also the plant and the environment, it is advisable to use a thermowell / protection tube from the extensive WIKA portfolio.
	\rightarrow For further information on the wake frequency calculation of the thermowell / protection tube, see technical information IN 00.15.

Output signal	
Signal range	
Variant I	4 20 mA, 2-wire, passive, per NAMUR NE43
Variant II (Ex version)	0 10 V, 3-wire
Variant III	0 10 V
Max. permissible load R _A	$R_A \leq (U_B$ - 12 V)/0.02 A with R_A in Ω and U_B in V however max. 600 Ω
Measuring rate (refresh rate)	> 1/s

Output signal			
Voltage supply			
Auxiliary power U _B	4 20 mA	DC $12 \le U_B \le 30 \text{ V}$	
	4 20 mA (Ex version)	DC $14 \le U_B \le 30 \text{ V}$	
	0 10 V	DC $15 \le U_B \le 30 \text{ V}$	
Permissible residual ripple of auxiliary power	≤ 10 % ss		
Impedance at voltage output	0.5 Ω		
Load capacity	$2 \dots 100 \ k\Omega$		
Warm-up time	≤ 5 min		
Sampling rate sensor	600 ms		
Linear error	≤ 1.0 % of span (terminal method)		
Input signal, angle of rotation	0 270 ∢ °		

Electrical connection						
Connection type	(180° rotatal	Angular connector (180° rotatable, max. 1.5 mm², cable protection, M20 x 1.5 cable gland, incl. strain relief)				
Wire cross-section	Max. 1.5 mm	Max. 1.5 mm ²				
Outer cable diameter	7 13 mm [7 13 mm [0.28 0.51 in], see dimensions on page 19				
Pin assignment	Terminal 1	Terminal 1 Terminal 2 Terminal 3 Terminal 4 Terminal 4 Terminal 6			Terminal 6	
Variant I	GND	I ₊	reserved	reserved	reserved	reserved
Variant II (Ex version)	GND	I ₊	reserved	reserved	reserved	reserved
Variant III	GND	U_{B+}	U _{out}	reserved	reserved	reserved
Material	PA 6 (polyan	nide)				

Designation of connection terminals 1)



- For 3-wire connection (see operating instructions)
 This connection must not be used for equipotential bonding. The instrument must be incorporated in the equipotential bonding via the process connection.

Operating conditions	
Ambient temperature range	-40 +60 °C [-4 +140 °F] without/with liquid damping
Storage temperature range	-40 +60 °C [-40 +140 °F]
Max. operating pressure at stem	Max. 25 bar [362.59 psi], static
Ingress protection (IP code) per IEC/EN 60529	IP65

Safety-related characteristic values (Ex, variant II)	
Max. auxiliary power U _i	DC 30 V
Max. short-circuit current Ii	100 mA
Max. power P _i	0.72 W
Effective internal capacitance C _i	12 nF
Effective internal inductance L _i	Negligible

Approvals

Approvals included in the scope of delivery

Logo	Description	Country
C€	EU declaration of conformity	European Union
	EMC directive	
	RoHS directive	

Optional approvals

Logo	Description		Country
€x>	EU declaration of co	nformity	European Union
	ATEX directive Hazardous areas - Ex ia Zone 1 gas Zone 20 dus	II 2G Ex ia IIC T6/T5/T4 Gb II 2D Ex ia IIIB T85°C/T95°C/T100°C/T135°C Db	
IEC IECEX	Hazardous areas - Ex ia Zone 1 gas Zone 20 dus	Ex ia IIC T6/T5/T4 Gb t Ex ia IIIB T85°C/T95°C/T100°C/T135°C Db	International
EH[Ex	EAC		Eurasian Economic
	EMC directive		Community
	Hazardous areas		
-	MTSCHS		Kazakhstan
	Permission for commis	sioning	

Certificates

Certificates	
Certificates	2.2 test report3.1 inspection certificate
Calibration	DAkkS calibration certificate

 $[\]rightarrow$ For approvals and certificates, see website

Connection locations

Legend

G Connection thread

i Thread length (incl. collar)

Ø D₁ Case diameter

Ø d Stem diameter

 \emptyset d₁ Pitch circle diameter

Ø d₂ Mounting flange diameter

 \emptyset d₄ Diameter of the sealing collar

b Overall instrument height

b₄ Clearance surface mounting lug to upper part of case

C Clearance cable socket to centre of case

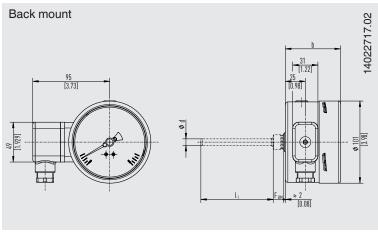
I₁ Insertion length

l₂ Active length

I_F Capillary length

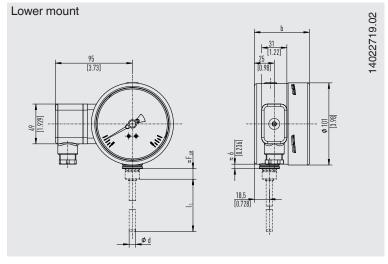
F_{XX} Clearance to stem

SW Spanner width



NS	b	b 1)
100	60 [2.36]	67.5 [2.66]

¹⁾ Dependent on required measuring system.



NS	b	b 1)
100	60 [2.36]	67.5 [2.66]

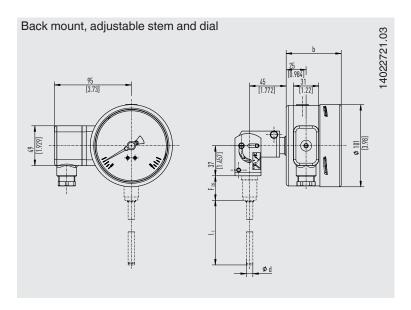
¹⁾ Dependent on required measuring system.

Design	F _{BM} 1)	Connection
S	30 [1.18]	G ½ - Male
1	13 [0.51]	Ø 18
2	35 [1.38]	G ½ - Male
3	15 [0.59]	G ½ - Female
4	53 [2.09]	G ½ - Male
5	50 [1.97]	G ½ - Male
7	53 [2.09]	G ½ - Male

1) Additionally + +40 mm [1.57 in] for instruments with end of scale range: >= 300 °C [572 °F], start of scale range: -200 °C [-328 °F]

Design	F _{LM} 1)	Connection
S	30 [1.18]	G ½ - Male
1	13 [0.51]	Ø 18
2	35 [1.38]	G ½ - Male
3	15 [0.59]	G ½ - Female
4	53 [2.09]	G ½ - Male
5	50 [1.97]	G ½ - Male
7	53 [2.09]	G ½ - Male

1) Additionally + 40 mm [1.57 inch] for instruments with: end of scale range: >= 300 °C [572 °F], start of scale range: -200 °C [-328 °F]

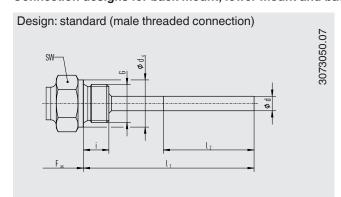


Design	F _{DS}	Connection
S	17.5 [0.69]	G ½ - Male
1	28 [1.10]	Ø 18
2	38 [1.50]	G ½ - Male
3	30 [1.18]	G ½ - Female
4	68 [2.68]	G ½ - Male
	68 [2.68]	G ½ - Male
5	55 [2.68]	G ½ - Male
7	68 [2.68]	G ½ - Male

NS	b	b 1)
100	60 [2.36]	67.5 [2.66]

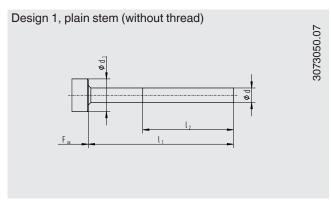
¹⁾ Dependent on required measuring system.

Connection designs for back mount, lower mount and back mount adjustable stem and dial



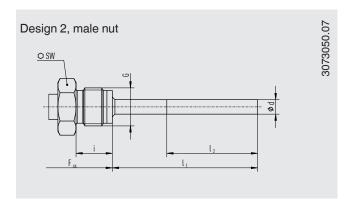
Process connection	Dimensions in mm [in]		
G	i	sw	d ₄
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G 3/4 B	16 [0.63]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
3/4 NPT	20 [0.79]	30 [1.18]	-

Standard insertion = 63, 100, 160, 200, 250 mm length I₁ [2.48, 3.94, 6.3, 7.87, 9.84 in]



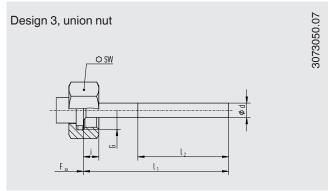
Process connection	Dimensions in mm [in]
Without thread	Ø d ₁
-	18 [0.7]

Standard insertion = 100, 140, 200, 240, 290 mm [3.94, 5.12, 7.87, 9.45, 11.42 in] length I₁ Basis for design 4, compression fitting



Process connection	Dimensions in mm [in]	
G	i	SW
G ½ B	20 [0.79]	27 [1.06]
M18 x 1.5	15 [0.59]	22 [0.89]

Standard insertion = 80, 140, 180, 230 mm length I₁ [3.15, 5.12, 7.09, 9.06 in]

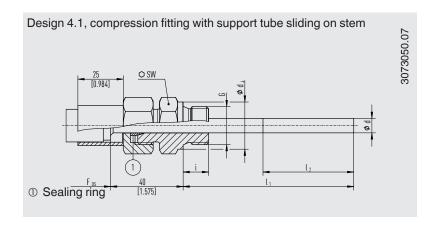


Process connection	Dimensions in mm [in]	
G	i	SW
G 1/2 B	14 [0.55]	27 [1.06]
G 3/4 B	16 [0.63]	32 [1.26]
M24 x 1.5	13.5 [0.53]	32 [1.26]

Standard insertion = 89, 126, 186, 226, 276 mm length I₁ [3.50, 4.96, 7.32, 8.9, 10.87 in]

esign 4, compression fitting sliding on stem		Process connection	Dimension	s in mm [in]	
<u>○ SW</u>	.07	G	i	SW	Ø d ₄
	3073050.07	G 1/2 B	14 [0.55]	27 [1.06]	26 [1.02]
208	307	G 3/4 B	16 [0.63]	32 [1.26]	32 [1.26]
		M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
F _m = 40		½ NPT	19 [0.75]	22 [0.87]	-
•		¾ NPT	20 [0.79]	30 [1.18]	-

Insertion length I_1 = variable



Process connection	Dimensions in mm [in]		
G	i	SW	Ø d ₄
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
½ NPT	19 [0.75]	22 [0.87]	-
34 NPT	20 [0.79]	30 [1.18]	-

Insertion length I_1 = variable

Design 5, union nut and loose threaded connection	70:07
O SW F _x	3073050.07

Process connection	Dimensions in mm [in]		
G	i	SW	d ₄
G 1/2 B	14 [0.55]	27 [1.06]	26 [1.02]
G 3/4 B	16 [0.63]	32 [1.26]	32 [1.26]
M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
½ NPT	19 [0.75]	22 [0.87]	-
3/4 NPT	20 [0.79]	30 [1.18]	-
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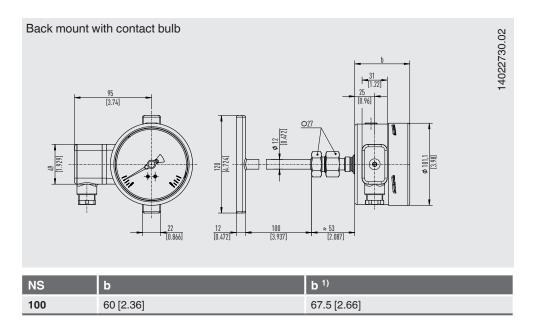
Insertion length I_1 = variable

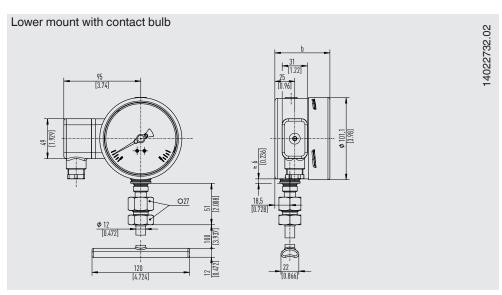
Design 7, compression fitting on the case	14042662.02
O SW 40 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 140
F_{x} $I_{g} = 100$ $I_{g} $	
② Bend protection (not applicable to Ø d = 6 mm [0.24 in])	

Process connection	Dimensions in mm [in]		
G	i	SW	d ₄
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

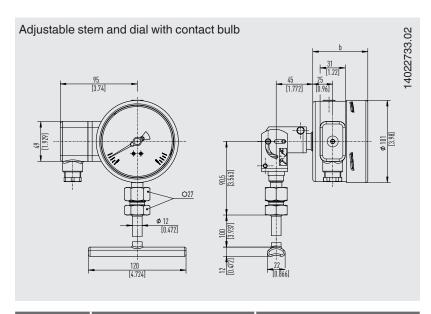
 $\begin{array}{ll} \text{Insertion length I}_1 &=& \geq 400 \text{ mm } [15.75 \text{ in}] \\ \text{Probe length L} &=& 200 \text{ mm } [7.87 \text{ in}] \text{ with } \varnothing \text{ d} = 6 \text{ mm} \\ && 170 \text{ mm } [6.69 \text{ in}] \text{ with } \varnothing \text{ d} = 8 \text{ mm} \\ && 100 \text{ mm } [3.94 \text{ in}] \text{ with } \varnothing \text{ d} = \geq 10 \text{ mm} \\ \text{I}_B &=& 100 \text{ mm } [3.94 \text{ in}], \text{ others on request} \\ \end{array}$

Back mount, lower mount and back mount adjustable stem and dial connection designs with contact bulb



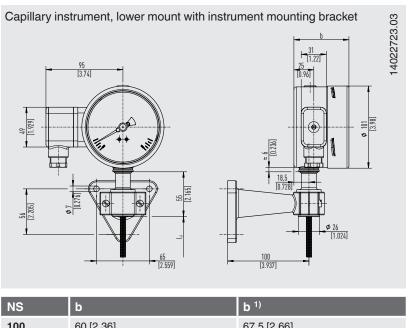


NS	b	b 1)
100	60 [2.36]	67.5 [2.66]

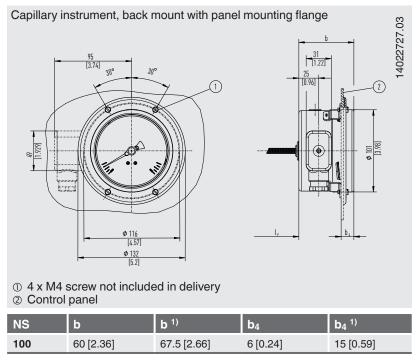


NS	b	b 1)
100	60 [2.36]	67.5 [2.66]

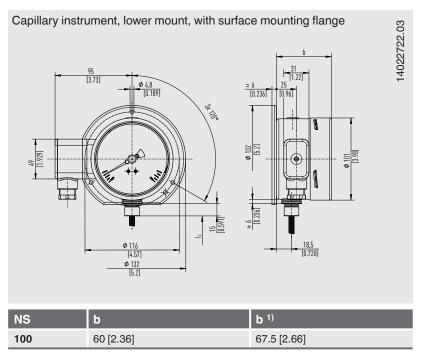
Capillary instruments with case mounting options



NS	b	b 1)
100	60 [2.36]	67.5 [2.66]

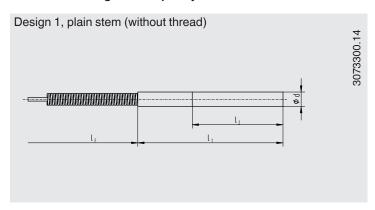


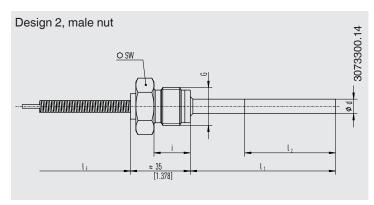
¹⁾ Dependent on required measuring system.



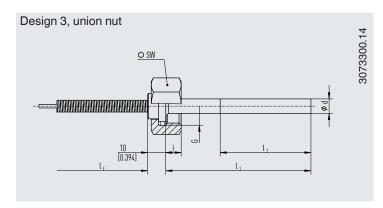
¹⁾ Dependent on required measuring system.

Connection designs for capillary instruments

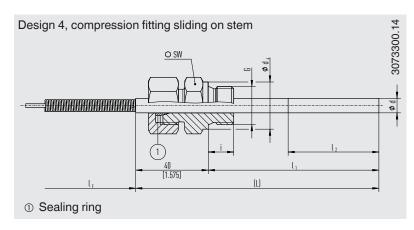




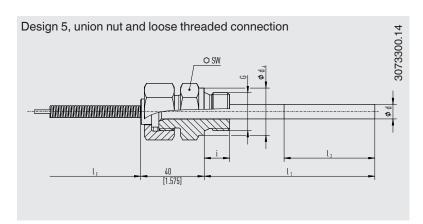
Process connection		Dimensions in mm [in]
G	i	sw
G ½ B	20 [0.787]	27 [1.06]
M8 x 1.5	15 [0.59]	22 [0.87]



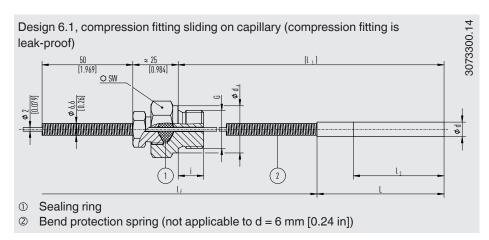
Process connection		Dimensions in mm [in]
G	i	SW
G 1/2 B	14 [0.55]	27 [1.06]
G ¾ B	16 [0.63]	32 [1.26]
M24 x 1.5	13.5 [0.53]	24 [1.26]



Process connection		Dimensions in mm [in]	
G	i	SW	d ₄
G 1/2 B	14 [0.55]	27 [1.06]	26 [1.02]
G 3/4 B	16 [0.63]	32 [1.26]	32 [1.26]
M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
½ NPT	19 [0.75]	22 [0.87]	
¾ NPT	20 [0.79]	30 [1.18]	-



Process connection		Dimensions in mm [in]	
G	i	SW	Ø d ₄
G 1/2 B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-



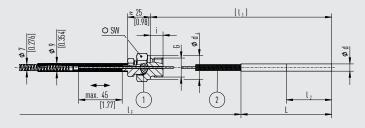
Process connection		Dimensions in mm [in]	
G	i	SW	Ø d ₄
G 1/2 B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Insertion length I_1 = Variable

Probe length L = 200 mm [7.87 in] with Ø d = 6 mm [0.24 in] 170 mm [6.69 in] with Ø d = 8 mm [0.32 in] 100 mm [3.94 in] with Ø d = \geq 10 mm [0.39 in]

Design 6.2, compression fitting sliding on capillary with spiral protective sleeve (compression fitting is leak-proof)

3073300.14



- Sealing ring
- ② Bend protection spring (not applicable to d = 6 mm [0.24 in])

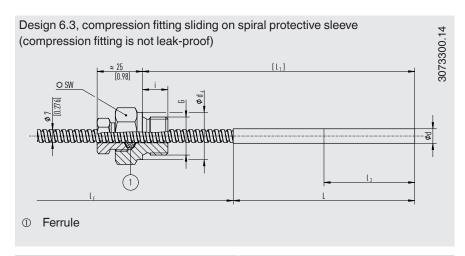
Process connection		Dimensions in mm [in]	
G	i	sw	d ₄
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G 3/4 B	16 [0.60]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
3/4 NPT	20 [0.79]	30 [1.18]	-

Insertion length $I_1 = \ge 300 \text{ mm} [11.81 \text{ in}] \text{ with } \emptyset \text{ d} = 6 \text{ mm} [0.24 \text{ in}] \text{ or } 8 \text{ mm} [0.32 \text{ in}]$

 \geq 200 mm [7.87 in] with Ø d = \geq 10 mm [0.39 in]

Probe length L = $200 \text{ mm} [7.87 \text{ in}] \text{ with } \emptyset \text{ d} = 6 \text{ mm} [0.24 \text{ in}]$

170 mm [6.69 in] with \emptyset d = 8 mm [0.32 in] 100 mm [3.94 in] with \emptyset d = \ge 10 mm [0.39 in]



Process connection		Dimensions in mm [in]	
G	i	sw	d ₄
G 1/2 B	14 [0.55]	27 [1.06]	26 [1.02]
G 3/4 B	16 [0.63]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
3/4 NPT	20 [0.79]	30 [1.18]	-

Insertion length I₁

Variable

Probe length L

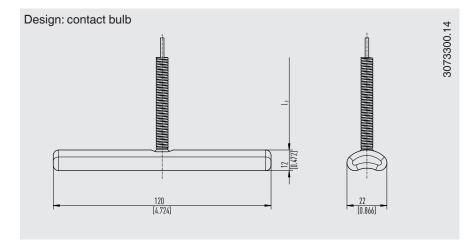
= 200 mm [7.87 in] with \emptyset d = 6 mm [0.24 in]

170 mm [6.69 in] with \emptyset d = 8 mm [0.39 in]

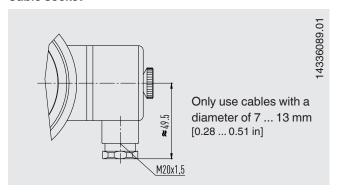
100 mm [3.94 in] with \emptyset d = \ge 10 mm [0.39 in]

Note for designs 6.1, 6.2, 6.3:

- With some combinations, the active length I2 can correspond to the probe length L.
- If an additional compression fitting is desired, the probe length L increases by at least 60 mm [2.36 in].



Cable socket



Ordering information

 $Model \ / \ Nominal \ size \ / \ Scale \ range \ / \ Connection \ design \ / \ Process \ connection \ / \ Length \ I_1 \ / \ Capillary \ length \ I_F \ / \ Options$





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