

Gas-actuated thermometer with electrical output signal

Stainless steel version

Model TGT73.100

WIKA data sheet TV 17.10



For further approvals,
see page 6

intelliTHERM®

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



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.

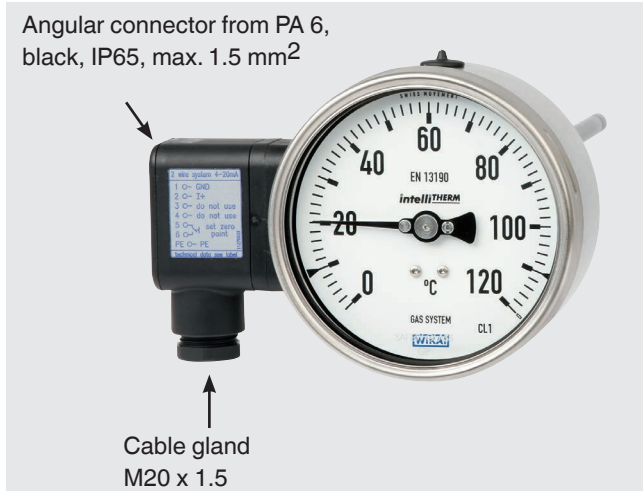
With the contact bulb version (without direct contact with the medium), the temperature can be measured and controlled even when the pipe diameter is extremely small. The electronic WIKA transmitter, integrated into the high-quality mechanical temperature measuring instrument, combines the advantages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

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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ Without ■ With 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ Mounting on pipes ■ Mounting 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	<ul style="list-style-type: none"> ■ °C ■ °F ■ °C/°F (dual scale) ■ °F/°C (dual scale) 	
Dial		
Scale graduation	<ul style="list-style-type: none"> ■ Single scale ■ Dual scale 	
Scale colour	Single scale	Black
	Dual scale	Red
	→ Other colours on request	
Pointer		
Version	Adjustable pointer	

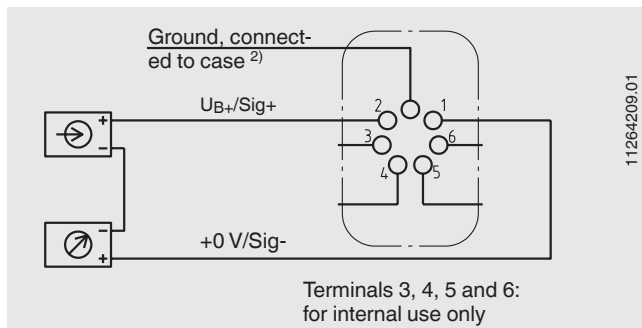
Process connection	
Thread size	<ul style="list-style-type: none"> ■ Plain, without thread ■ G ½ B ■ ½ NPT ■ G ½ female ■ ½ NPT female ■ M20 x 1.5 ■ M24 x 1.5 female <p>→ Other threads on request</p>
Material (non-wetted)	Stainless steel 304
Stem	
Diameter	<ul style="list-style-type: none"> ■ 8 mm [0.31 in] ■ 6 mm [0.24 in] ■ 10 mm [0.39 in] ■ 12 mm [0.47 in] <p>→ Other diameters on request</p>
Material (wetted)	Stainless steel 316
Thermowell / Protection tube	<p>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).</p> <p>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.</p> <p>→ For further information on the wake frequency calculation of the thermowell / protection tube, see technical information IN 00.15.</p>

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 $12 \leq U_B \leq 30$ V
	4 ... 20 mA (Ex version)	DC $14 \leq U_B \leq 30$ V
	0 ... 10 V	DC $15 \leq U_B \leq 30$ V
Permissible residual ripple of auxiliary power	≤ 10 % ss	
Impedance at voltage output	0.5 Ω	
Load capacity	2 ... 100 k Ω	
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 \angle °	

Electrical connection						
Connection type	Angular connector (180° rotatable, max. 1.5 mm ² , cable protection, M20 x 1.5 cable gland, incl. strain relief)					
Wire cross-section	Max. 1.5 mm ²					
Outer cable diameter	7 ... 13 mm [0.28 ... 0.51 in], see dimensions on page 19					
Pin assignment	Terminal 1	Terminal 2	Terminal 3	Terminal 4	Terminal 4	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 (polyamide)					

Designation of connection terminals ¹⁾



1) For 3-wire connection (see operating instructions)


2) 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 I_i	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
	EU declaration of conformity	European Union
	EMC directive	
	RoHS directive	

Optional approvals

Logo	Description	Country
	EU declaration of conformity	European Union
	ATEX directive Hazardous areas - Ex ia Zone 1 gas II 2G Ex ia IIC T6/T5/T4 Gb Zone 20 dust II 2D Ex ia IIIB T85°C/T95°C/T100°C/T135°C Db	
	IECEX	International
	Hazardous areas - Ex ia Zone 1 gas Ex ia IIC T6/T5/T4 Gb Zone 20 dust Ex ia IIIB T85°C/T95°C/T100°C/T135°C Db	
	EAC	Eurasian Economic Community
	EMC directive Hazardous areas	
-	MTSCHS Permission for commissioning	Kazakhstan

Certificates

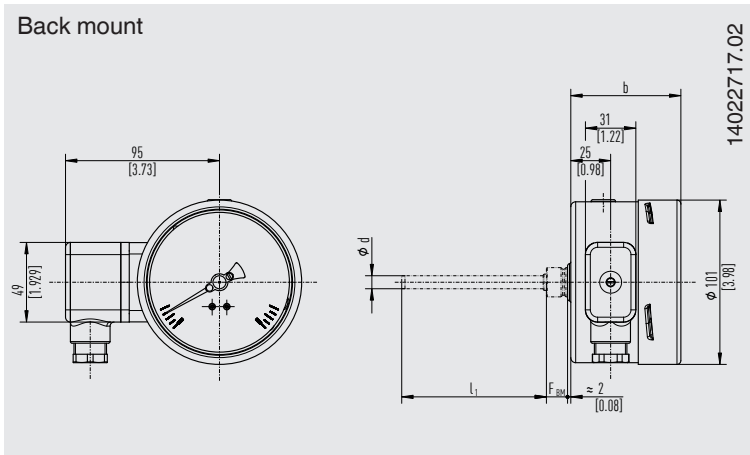
Certificates	
Certificates	<ul style="list-style-type: none"> ■ 2.2 test report ■ 3.1 inspection certificate
Calibration	DAkkS calibration certificate

→ For approvals and certificates, see website

Connection locations

Legend

G	Connection thread	b ₄	Clearance surface mounting lug to upper part of case
i	Thread length (incl. collar)	C	Clearance cable socket to centre of case
∅ D ₁	Case diameter	l ₁	Insertion length
∅ d	Stem diameter	l ₂	Active length
∅ d ₁	Pitch circle diameter	l _F	Capillary length
∅ d ₂	Mounting flange diameter	F _{XX}	Clearance to stem
∅ d ₄	Diameter of the sealing collar	SW	Spanner width
b	Overall instrument height		

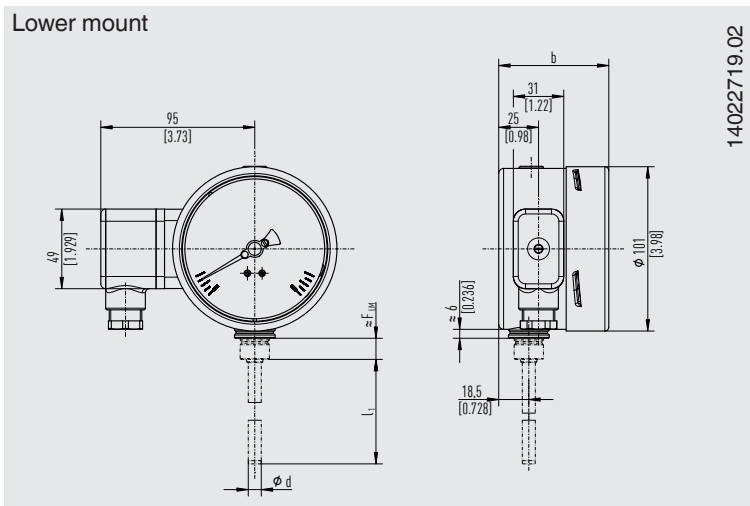


NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

1) Dependent on required measuring system.

Design	F _{BM} ¹⁾	Connection
S	30 [1.18]	G ½ - Male
1	13 [0.51]	∅ 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]



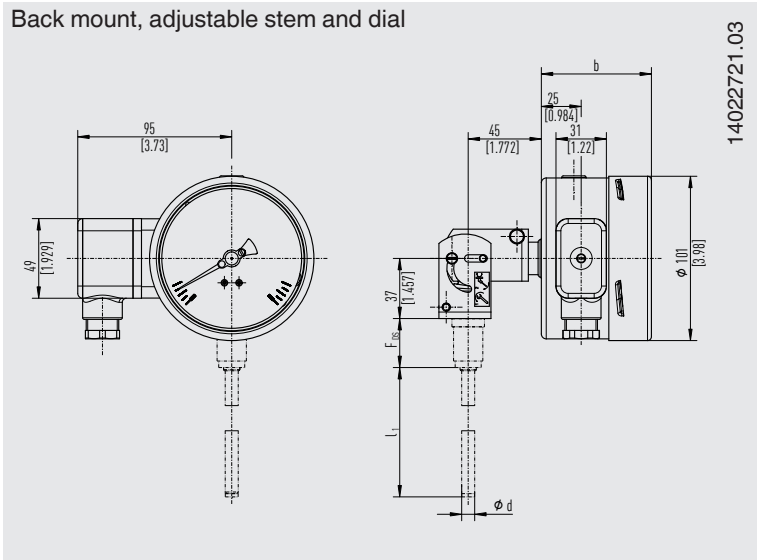
NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

1) Dependent on required measuring system.

Design	F _{LM} ¹⁾	Connection
S	30 [1.18]	G ½ - Male
1	13 [0.51]	∅ 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]

Back mount, adjustable stem and dial



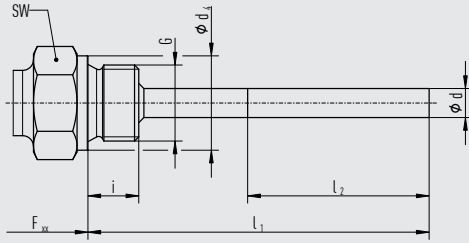
NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

1) Dependent on required measuring system.

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

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

Design: standard (male threaded connection)

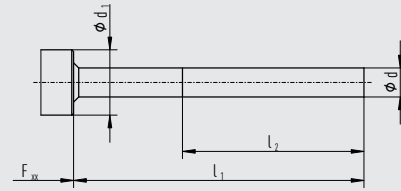


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Process connection	Dimensions in mm [in]		
G	i	SW	d ₄
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Standard insertion = 63, 100, 160, 200, 250 mm
length l₁ [2.48, 3.94, 6.3, 7.87, 9.84 in]

Design 1, plain stem (without thread)

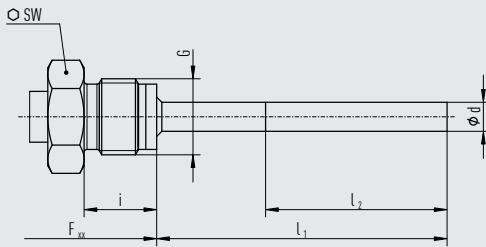


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Process connection	Dimensions in mm [in]
Without thread	Ø d ₁
-	18 [0.7]

Standard insertion = 100, 140, 200, 240, 290 mm
length l₁ [3.94, 5.12, 7.87, 9.45, 11.42 in]
Basis for design 4, compression fitting

Design 2, male nut

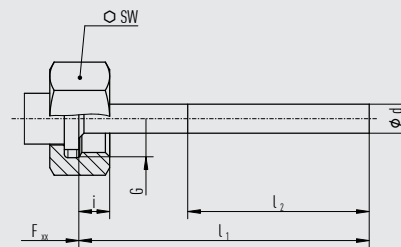


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Process connection	Dimensions in mm [in]	
G	i	SW
G ½ B	20 [0.79]	27 [1.06]
M18 x 1.5	15 [0.59]	22 [0.89]

Standard insertion = 80, 140, 180, 230 mm
length l₁ [3.15, 5.12, 7.09, 9.06 in]

Design 3, union nut

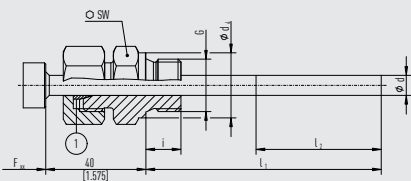


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Process connection	Dimensions in mm [in]	
G	i	SW
G ½ B	14 [0.55]	27 [1.06]
G ¾ B	16 [0.63]	32 [1.26]
M24 x 1.5	13.5 [0.53]	32 [1.26]

Standard insertion = 89, 126, 186, 226, 276 mm
length l₁ [3.50, 4.96, 7.32, 8.9, 10.87 in]

Design 4, compression fitting sliding on stem



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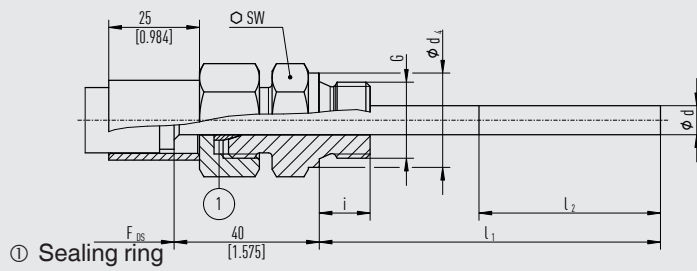
① Sealing ring

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]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Insertion length l₁ = variable

Design 4.1, compression fitting with support tube sliding on stem

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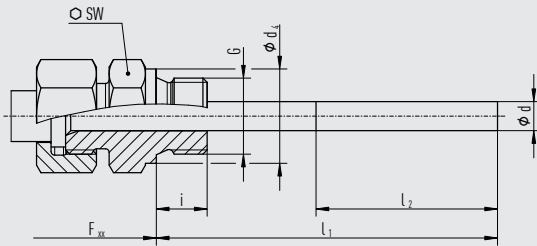
① Sealing ring

Process connection	Dimensions in mm [in]		
	i	SW	ϕd_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]	-

Insertion length l_1 = variable

Design 5, union nut and loose threaded connection

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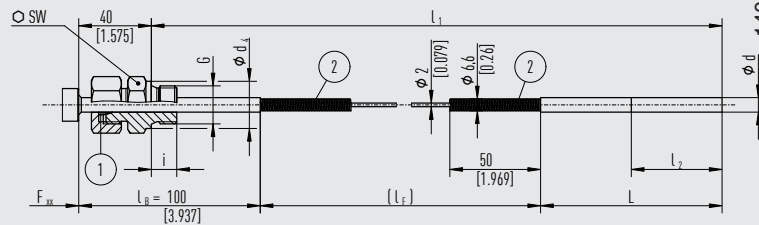


Process connection	Dimensions in mm [in]		
	i	SW	d_4
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
M18 x 1.5	12 [0.47]	24 [0.95]	23 [0.91]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Insertion length l_1 = variable

Design 7, compression fitting on the case

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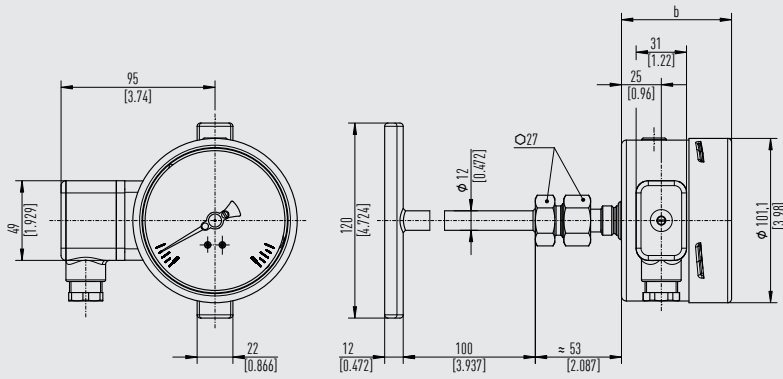
- ① Sealing ring
- ② Bend protection (not applicable to $\phi d = 6$ mm [0.24 in])

Process connection	Dimensions in mm [in]		
	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]	-

- Insertion length l_1 = ≥ 400 mm [15.75 in]
- Probe length L = 200 mm [7.87 in] with $\phi d = 6$ mm
- 170 mm [6.69 in] with $\phi d = 8$ mm
- 100 mm [3.94 in] with $\phi d = \geq 10$ mm
- l_B = 100 mm [3.94 in], others on request

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

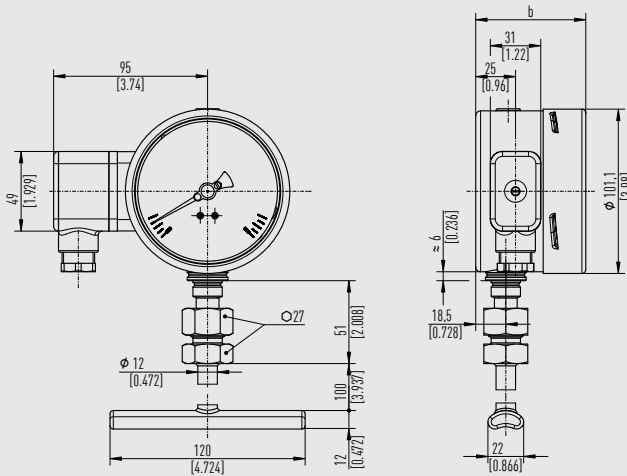
Back mount with contact bulb



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NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

Lower mount with contact bulb

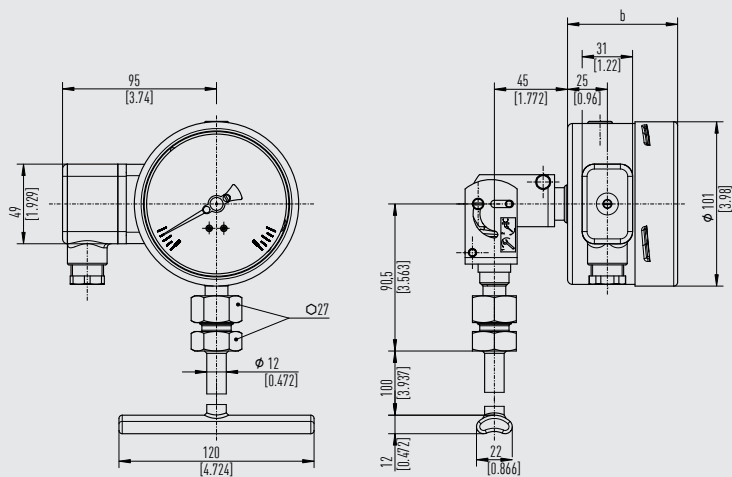


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NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

Adjustable stem and dial with contact bulb

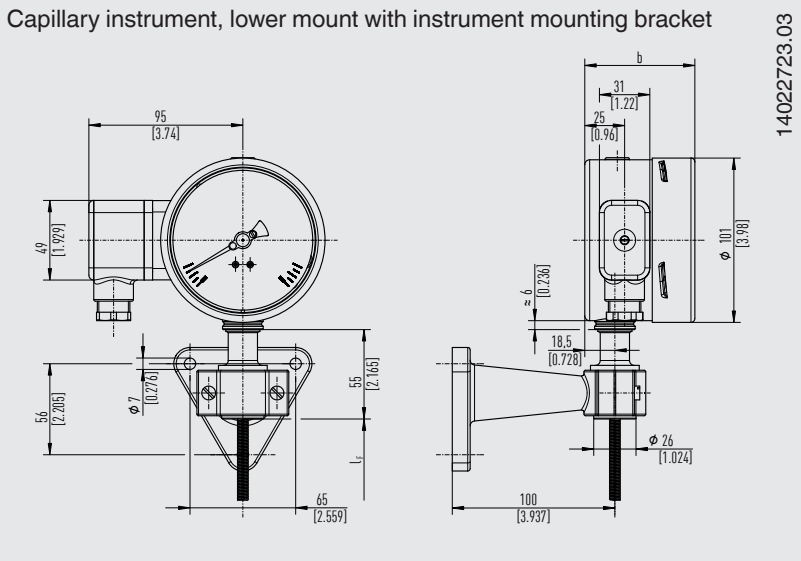
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NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

Capillary instruments with case mounting options

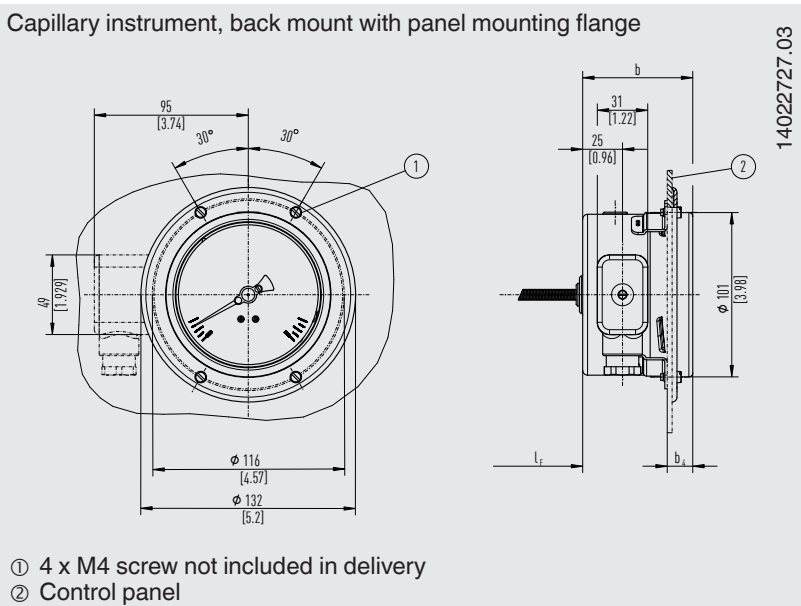
Capillary instrument, lower mount with instrument mounting bracket



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NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

Capillary instrument, back mount with panel mounting flange



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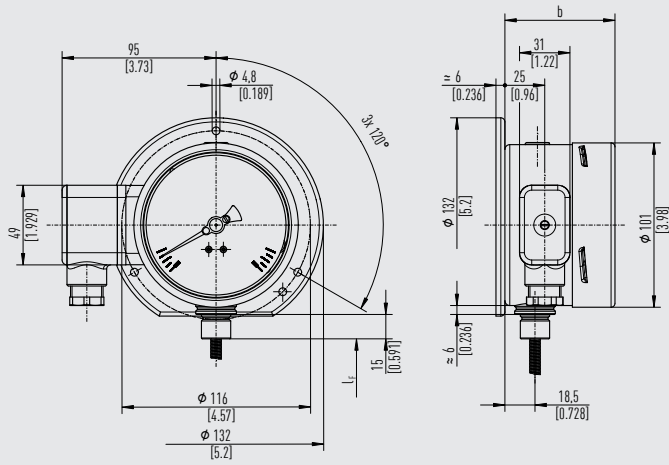
- ① 4 x M4 screw not included in delivery
- ② Control panel

NS	b	b ¹⁾	b ₄	b ₄ ¹⁾
100	60 [2.36]	67.5 [2.66]	6 [0.24]	15 [0.59]

1) Dependent on required measuring system.

Capillary instrument, lower mount, with surface mounting flange

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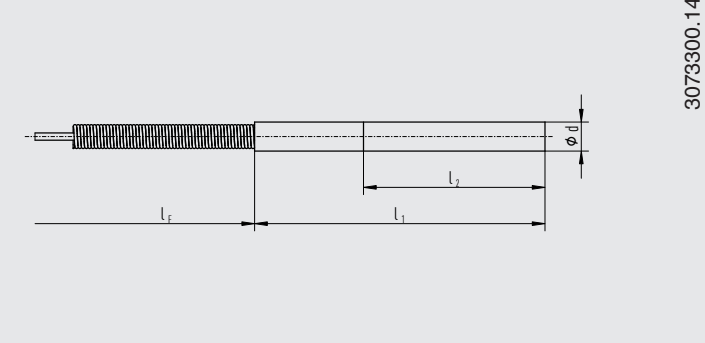


NS	b	b ¹⁾
100	60 [2.36]	67.5 [2.66]

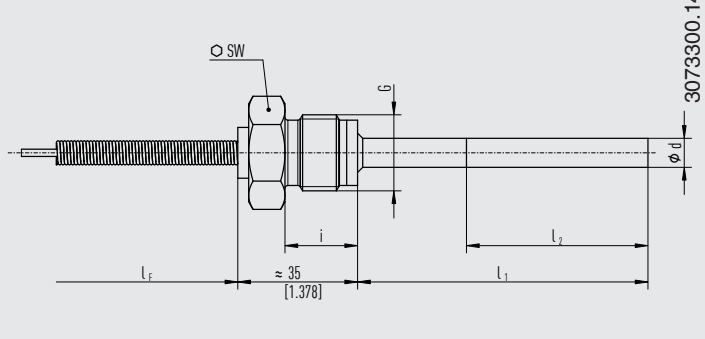
1) Dependent on required measuring system.

Connection designs for capillary instruments

Design 1, plain stem (without thread)

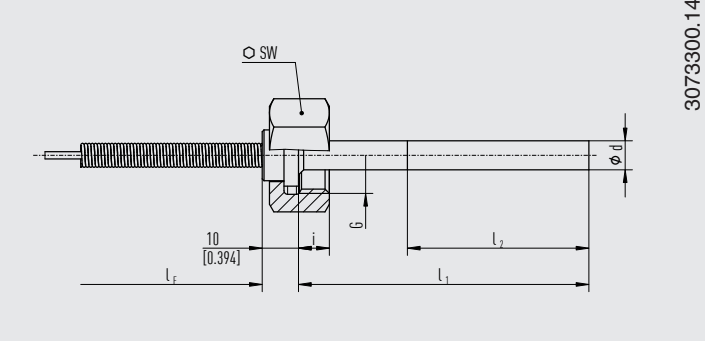


Design 2, male nut



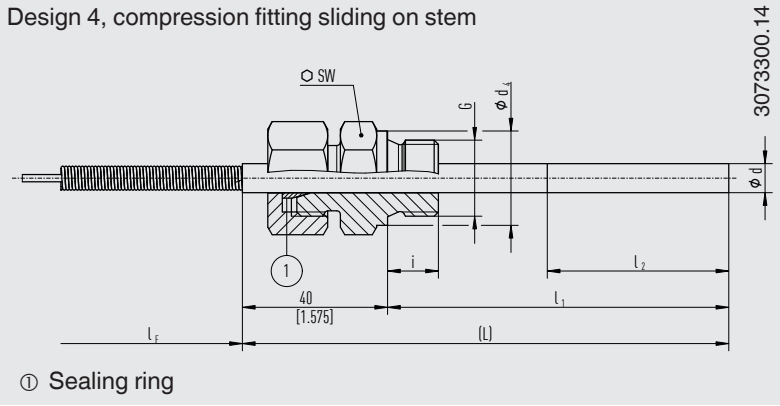
Process connection		Dimensions in mm [in]
G	i	SW
G ½ B	20 [0.787]	27 [1.06]
M8 x 1.5	15 [0.59]	22 [0.87]

Design 3, union nut



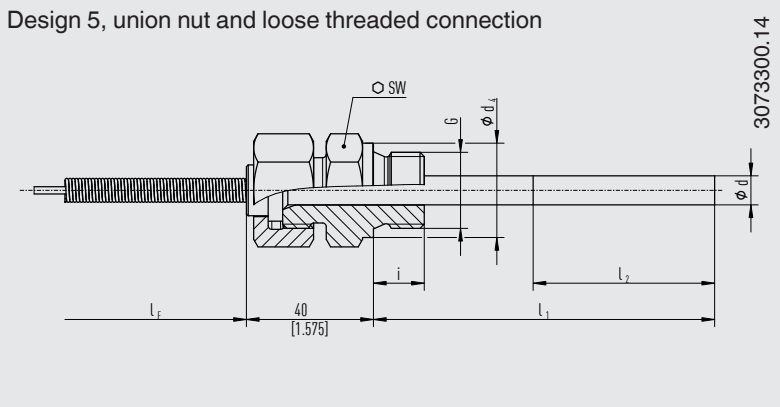
Process connection		Dimensions in mm [in]
G	i	SW
G ½ B	14 [0.55]	27 [1.06]
G ¾ B	16 [0.63]	32 [1.26]
M24 x 1.5	13.5 [0.53]	24 [1.26]

Design 4, compression fitting sliding on stem



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]	-

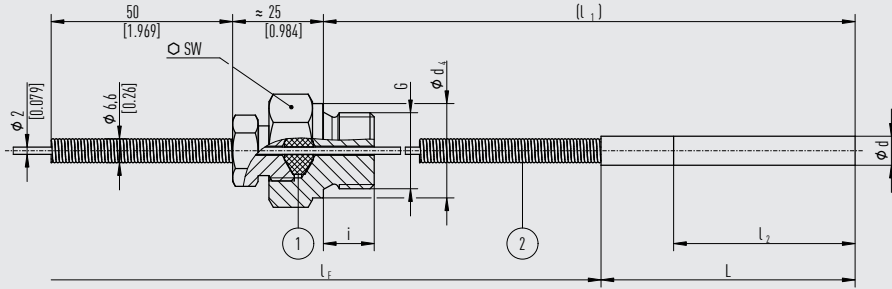
Design 5, union nut and loose threaded connection



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]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Design 6.1, compression fitting sliding on capillary (compression fitting is leak-proof)

3073300.14



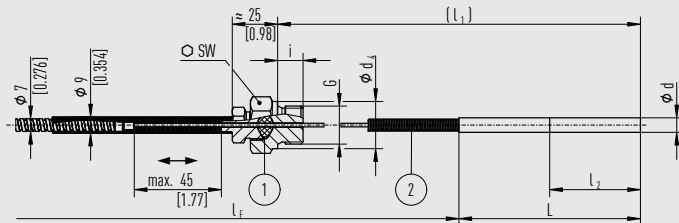
- ① Sealing ring
- ② Bend protection spring (not applicable to $d = 6 \text{ mm}$ [0.24 in])

Process connection		Dimensions in mm [in]	
G	i	SW	$\varnothing d_4$
G ½ B	14 [0.55]	27 [1.06]	26 [1.02]
G ¾ B	16 [0.63]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Insertion length l_1 = Variable
 Probe length L = 200 mm [7.87 in] with $\varnothing d = 6 \text{ mm}$ [0.24 in]
 170 mm [6.69 in] with $\varnothing d = 8 \text{ mm}$ [0.32 in]
 100 mm [3.94 in] with $\varnothing d \geq 10 \text{ mm}$ [0.39 in]

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

3073300.14



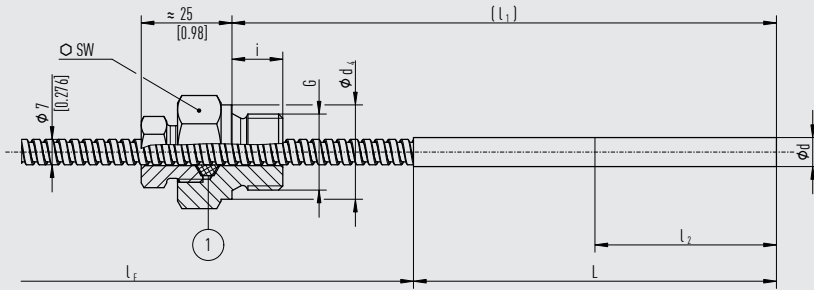
- ① Sealing ring
- ② Bend protection spring (not applicable to $d = 6 \text{ mm}$ [0.24 in])

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 [0.60]	32 [1.26]	32 [1.26]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

Insertion length l_1 = $\geq 300 \text{ mm}$ [11.81 in] with $\varnothing d = 6 \text{ mm}$ [0.24 in] or 8 mm [0.32 in]
 $\geq 200 \text{ mm}$ [7.87 in] with $\varnothing d \geq 10 \text{ mm}$ [0.39 in]
 Probe length L = 200 mm [7.87 in] with $\varnothing d = 6 \text{ mm}$ [0.24 in]
 170 mm [6.69 in] with $\varnothing d = 8 \text{ mm}$ [0.32 in]
 100 mm [3.94 in] with $\varnothing d \geq 10 \text{ mm}$ [0.39 in]

Design 6.3, compression fitting sliding on spiral protective sleeve
(compression fitting is not leak-proof)

3073300.14



① Ferrule

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]
½ NPT	19 [0.75]	22 [0.87]	-
¾ NPT	20 [0.79]	30 [1.18]	-

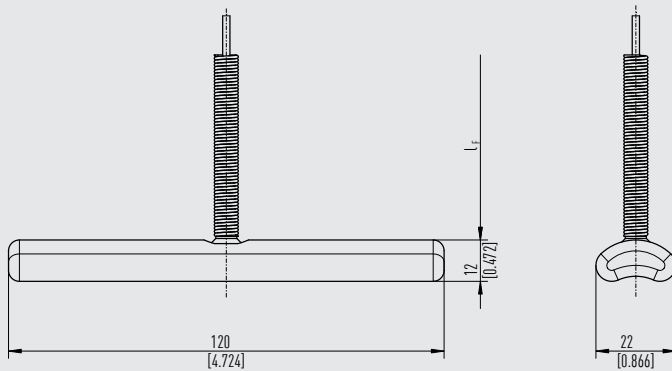
Insertion length l_1 = Variable
 Probe length L = 200 mm [7.87 in] with $\varnothing d = 6$ mm [0.24 in]
 170 mm [6.69 in] with $\varnothing d = 8$ mm [0.39 in]
 100 mm [3.94 in] with $\varnothing d \geq 10$ mm [0.39 in]

Note for designs 6.1, 6.2, 6.3:

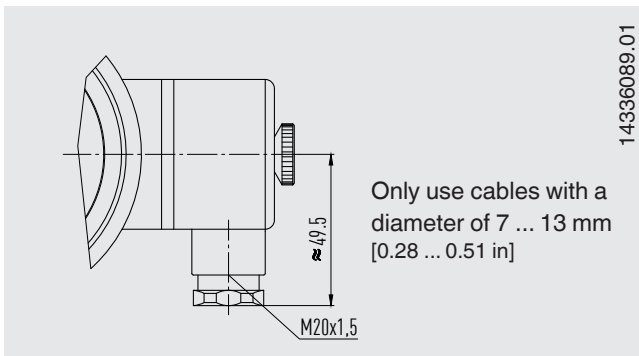
- With some combinations, the active length l_2 can correspond to the probe length L.
- If an additional compression fitting is desired, the probe length L increases by at least 60 mm [2.36 in].

Design: contact bulb

3073300.14



Cable socket



Ordering information

Model / Nominal size / Scale range / Connection design / Process connection / Length I₁ / Capillary length I_F / Options

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