

Gas-actuated thermometer with electrical output signal Stainless steel version Models TGT73.100 and TGT73.160

WIKA data sheet TV 17.10

intelliTHERM®

Applications

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

Special features

- Economical temperature measurement "2 in 1"
- Compact design
- Application ranges from -200 ... +700 °C
- "Plug-and-play", therefore no transmitter configuration necessary



Gas-actuated thermometer model TGT73.100
Fig. left: Lower mount (radial)
Fig. right: Back mount (axial)

Description

At any point where the process temperature must be displayed locally and there is a requirement to simultaneously transmit the signal to a central controller or remote control room, 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 securely, even if the power 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. The adjustable stem and dial version can be adjusted to any angle to allow easy reading. With the contact bulb version, temperature measurements are possible without any contact with the medium, even when the pipe diameter is extremely small.

The WIKA electronic transmitter, integrated into the high-quality mechanical temperature gauge, combines the advantages of electrical signal transmission with the advantages of a local mechanical display.

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

Standard version

Measuring principle

Inert gas expansion system

Nominal size in mm

100, 160

Connection design

- S Standard (male thread connection)
- 1 Plain stem (without thread)
 - 2 Male nut
 - 3 Union nut
 - 4 Compression fitting (sliding on stem)
 - 5 Union nut with fitting
 - 6 Compression fitting (can be adjusted on either capillary or spiral protection hose)
 - 7 Compression fitting at the case

Instrument version

- Back mount (axial)
- Lower mount (radial)
- Back mount (adjustable stem and dial)
- Instruments with capillaries

Accuracy class

Class 1 per EN 13190

Working range

Normal (1 year): Measuring range (EN 13190)

Short time (24 h max.): Scale range (EN 13190)

Rated operating ranges and conditions

EN 13190

Case, bezel ring, process connection

Stainless steel 1.4301

Stem

Stainless steel 1.4571

Adjustable stem and dial

Stainless steel,
can be swivelled through 90° and
rotated through 360°

Contact bulb

120 x 22 x 12 mm, stainless steel 1.4571

Capillary

Ø 2 mm, stainless steel 1.4571, bending radius no less than 6 mm

Standard capillary: max. 60 m

Capillary with spiral protection hose: max. 40 m

Capillary with PVC coating: max. 20 m

Length to user specifications

Dial

Aluminium white, black lettering

Window

Laminated safety glass

Pointer

Aluminium, black, adjustable pointer

Electrical connection

Angular connector

Temperature limits for storage and transport

-40 ... +70 °C (EN 13190) without liquid damping

-20 ... +70 °C (EN 13190) with liquid damping

Permissible ambient temperature at case

0 ... 40 °C max. (others on request)

Permissible pressure rating at the stem

max. 25 bar, static

Ingress protection

IP 65 per IEC 60529

Mounting types for instruments with capillary

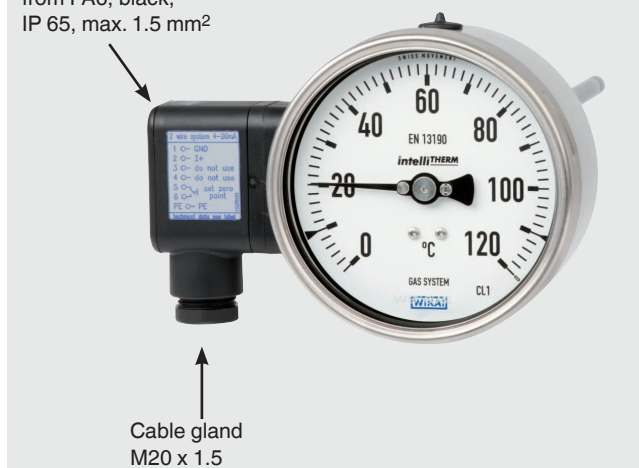
- Surface mounting flange, stainless steel
- Surface mounting bracket, die cast aluminium
- Panel mounting flange, stainless steel

Options

- Scale range °F, °C/°F (dual scale)
- Case with liquid damping
- Armoured coating for capillary: Ø 7 mm spiral protective sleeve, flexible or PVC coated
- Stem diameter 6, 10, 12 mm (others on request)
- Special measuring ranges or dial printing to customer specifications (on request)

Cable connection

Angular connector
from PA6, black,
IP 65, max. 1.5 mm²



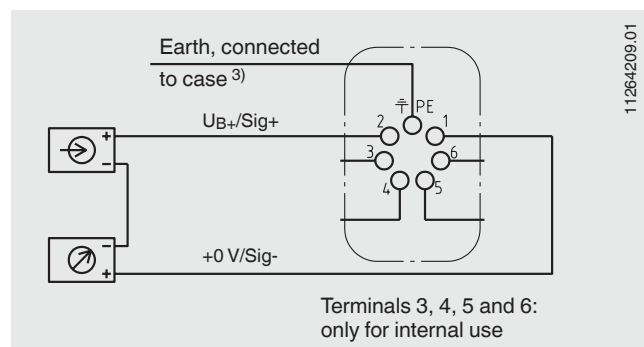
Electrical data		intelliTHERM® models TGT73.100 and TGT73.160	
Power supply U_B	DC $12 \leq U_B \leq 30$ V		
Influence of power supply	≤ 0.1 % of full scale value/10 V		
Permissible residual ripple	≤ 10 % ss		
Output signal, version I	4 ... 20 mA, 2-wire, passive, per NAMUR NE43		
Permissible max. load R_A	$R_A \leq (U_B - 12 \text{ V})/0.02 \text{ A}$ with R_A in Ω and U_B in V, however max. 600 Ω		
Effect of load	≤ 0.1 % of full scale value		
Output signal, version II	0 ... 10 V, 3-wire		
Impedance at voltage output	0.5 Ω		
Load capacity at voltage output	2 ... 100 k Ω		
Sampling rate sensor	600 ms		
Linearity	≤ 1.0 % of span (limit point setting)		
Output signal accuracy	0.2 % of full scale value (only electronics)		
Resolution	0.15 % of full scale value (10 bit resolution at 360°)		
Refresh rate (measuring rate)	$> 1/s$		
Input signal, angle of rotation	0 ... 270 \angle°		
Long-term stability of electronics	< 0.3 % of full scale value/a		
Temperature error, electronics	< 0.3 % of full scale value/10 K (in overall temperature range)		
Warm-up time	≤ 5 min		
Permissible ambient temperature	0 ... 40 $^\circ\text{C}$		
Permissible storage temperature	-40 ... +70 $^\circ\text{C}$ without liquid damping -20 ... +70 $^\circ\text{C}$ with liquid damping		
Electromagnetic compatibility (EMC)	2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)		
Electrical connection	Via angular connector, rotatable by 180°, max. 1.5 mm ² , wire protection, M20 x 1.5 cable gland, 7 ... 13 mm cable outer diameter, incl. strain relief		
Ingress protection	IP 65 per IEC 60529 Protection against reverse polarity		
Designation of terminal connectors dependent on the output signal version	Terminal Type	Variant I	Variant II
	1	4 ... 20 mA GND	0 ... 10 V GND
	2	I ₊	U_{B+}
	3	reserved	U_{out}
	4	reserved	reserved
	5	reserved	reserved
	6	reserved	reserved

Scale ranges, measuring ranges ¹⁾, error limits (EN 13190) Scale graduation per WIKA standard

Scale range in $^\circ\text{C}$	Measuring range in $^\circ\text{C}$	Scale spacing in $^\circ\text{C}$	Error limit \pm $^\circ\text{C}$
-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
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
0 ... +500	+50 ... +450	5	5
0 ... +600	+100 ... +500	10	10
0 ... +700	+100 ... +600	10	10

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

Designation of terminal connectors ²⁾



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.

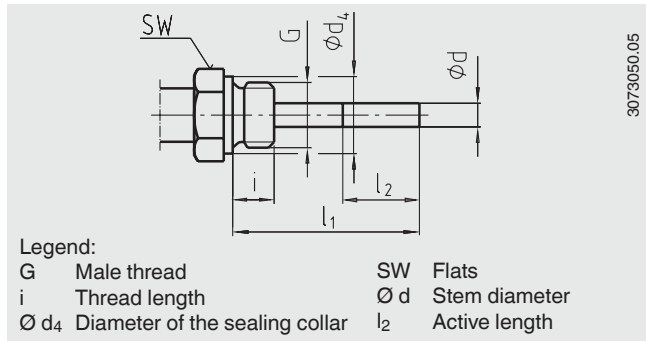
Connection designs

Design standard (male thread connection) ¹⁾

Standard insertion length $l_1 = 63, 100, 160, 200, 250$ mm

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8

1) Not applicable to version with capillary



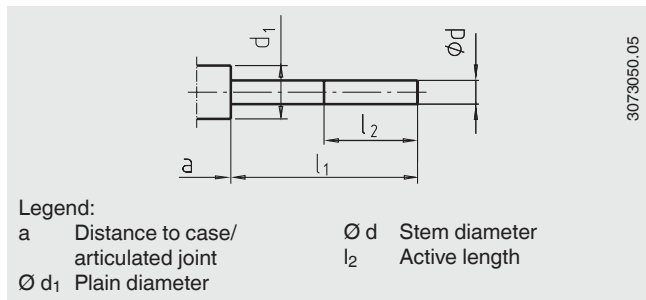
Design 1, plain stem (without thread)

Standard insertion length $l_1 = 100, 140, 200, 240, 290$ mm

Basis for design 4, compression fitting

Nominal size NS	Dimensions in mm			
	d_1 ¹⁾	$\varnothing d$	a for axial	a for adjustable stem and dial
100, 160	18	8	15	25

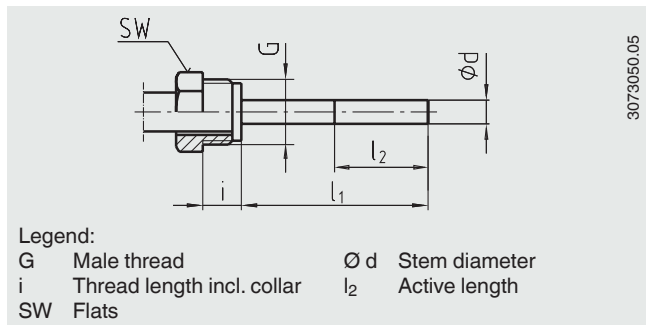
1) Not applicable to version with capillary



Design 2, male nut

Standard insertion length $l_1 = 80, 140, 180, 230$ mm

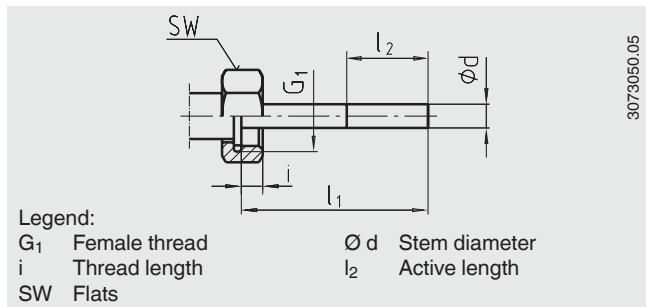
Nominal size NS	Process connection		Dimensions in mm	
	G	i	SW	$\varnothing d$
100, 160	G 1/2 B	20	27	8
	M20 x 1.5	15	22	8



Design 3, union nut

Standard insertion length $l_1 = 89, 126, 186, 226, 276$ mm

Nominal size NS	Process connection		Dimensions in mm	
	G_1	i	SW	$\varnothing d$
100, 160	G 1/2	8.5	27	8
	G 3/4	10.5	32	8
	M24 x 1.5	13.5	32	8

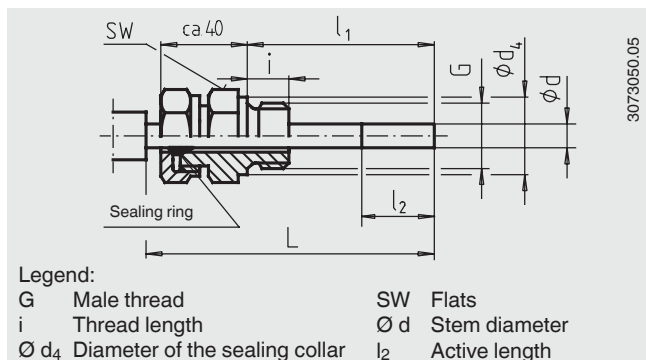


Design 4, compression fitting (sliding on stem)

Insertion length $l_1 =$ variable

Length $L = l_1 + 40$ mm

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	M18 x 1.5	12	24	23	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8



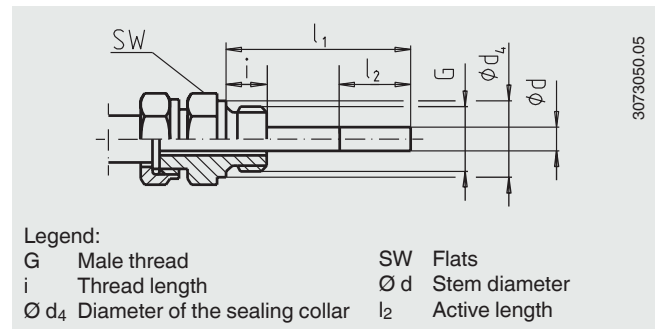
Design 5, union nut with fitting

Standard insertion length $l_1 = 63, 100, 160, 200, 250$ mm

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	M18 x 1.5	12	24	23	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8

Option: Connection with union nut M24 x 1.5 with fitting M18 x 1.5

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	M18 x 1.5	12	32	23	8

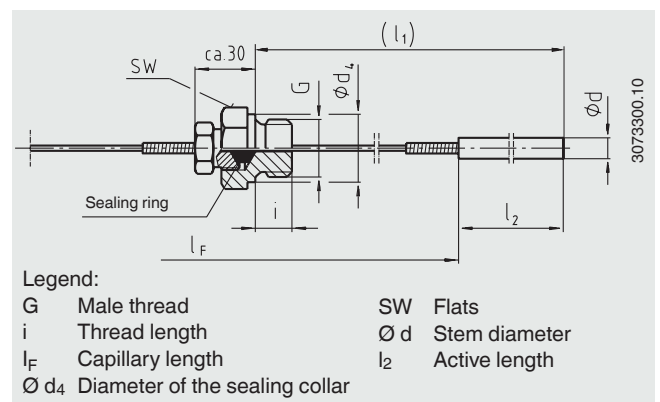


Design 6.1, compression fitting sliding on capillary (compression fitting is leak-proof)

Insertion length $l_1 =$ variable

Active length l_2 : standard 200 mm at $\varnothing d = 6$ mm
 standard 170 mm at $\varnothing d = 8$ mm
 standard 100 mm at $\varnothing d \geq 10$ mm

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8

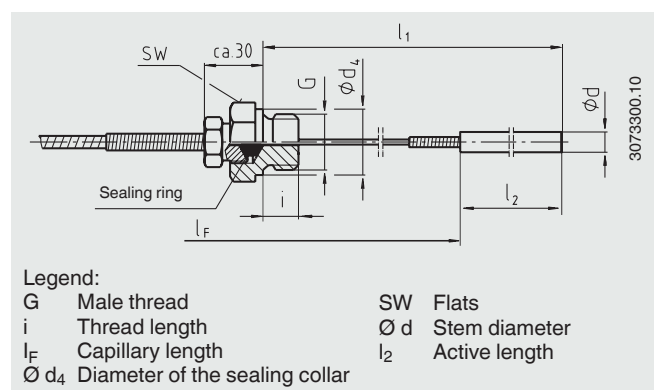


Design 6.2, compression fitting sliding on capillary with spiral protection hose (compression fitting is leak-proof)

Insertion length l_1 : ≥ 300 mm at $\varnothing d = 6.8$ mm
 ≥ 200 mm at $\varnothing d \geq 10$ mm

Active length l_2 : standard 200 mm at $\varnothing d = 6$ mm
 standard 170 mm at $\varnothing d = 8$ mm
 standard 100 mm at $\varnothing d \geq 10$ mm

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8

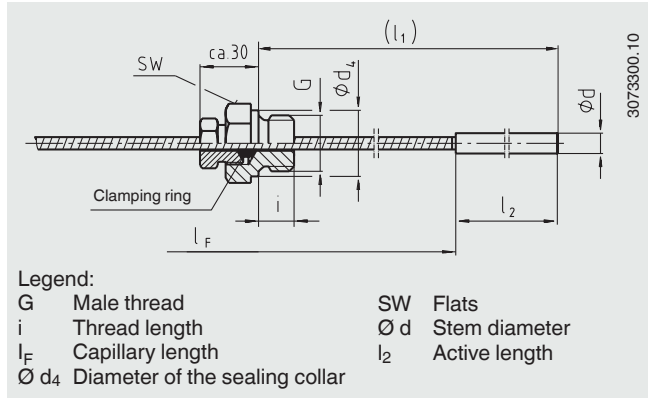


Design 6.3, compression fitting sliding on spiral protection hose (compression fitting is not leak-proof)

Insertion length l_1 = variable

Active length l_2 : standard 200 mm at $\varnothing d = 6$ mm
 standard 170 mm at $\varnothing d = 8$ mm
 standard 100 mm at $\varnothing d \geq 10$ mm

Nominal size NS	Process connection		Dimensions in mm			
	G	i	SW	d_4	$\varnothing d$	
100, 160	G 1/2 B	14	27	26	8	
	G 3/4 B	16	32	32	8	
	1/2 NPT	19	22	-	8	
	3/4 NPT	20	30	-	8	



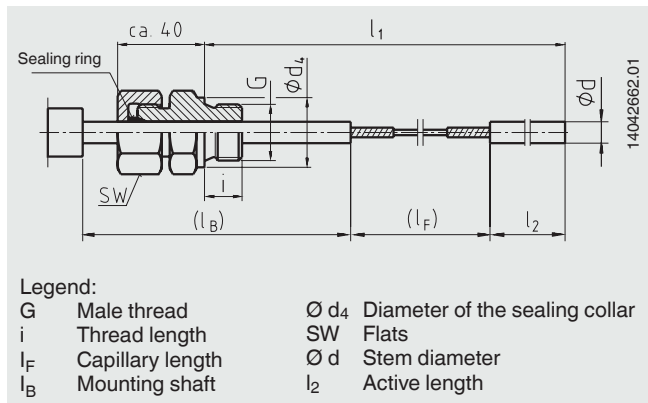
Design 7, compression fitting at the case

Insertion length $l_1 \geq 400$ mm

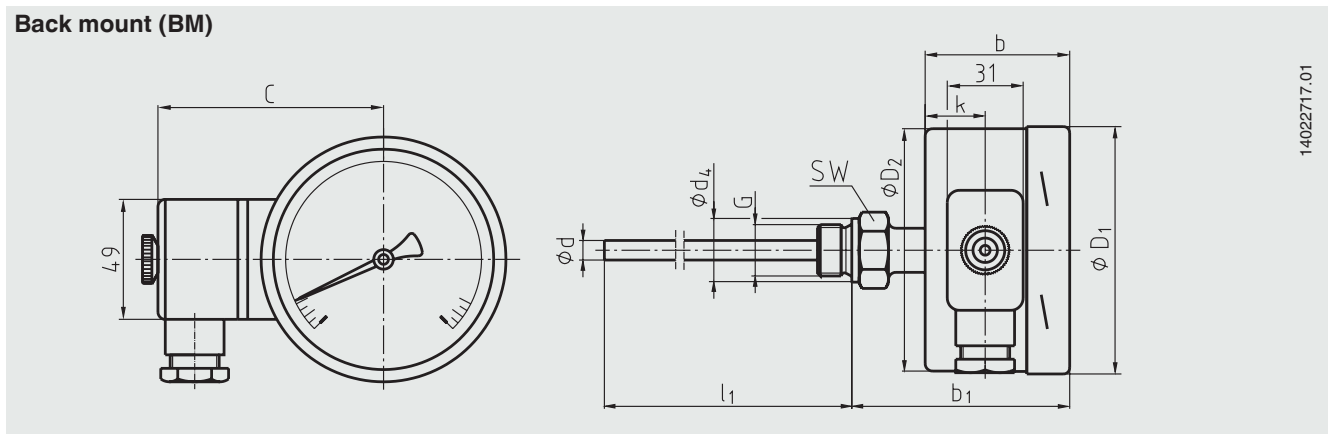
Active length l_2 : standard 200 mm at $\varnothing d = 6$ mm
 standard 170 mm at $\varnothing d = 8$ mm
 standard 100 mm at $\varnothing d \geq 10$ mm

l_B = standard 100 mm (others on request)

Nominal size NS	Process connection		Dimensions in mm			
	G	i	SW	d_4	$\varnothing d$	
100, 160	G 1/2 B	14	27	26	8	
	G 3/4 B	16	32	32	8	
	1/2 NPT	19	22	-	8	
	3/4 NPT	20	30	-	8	



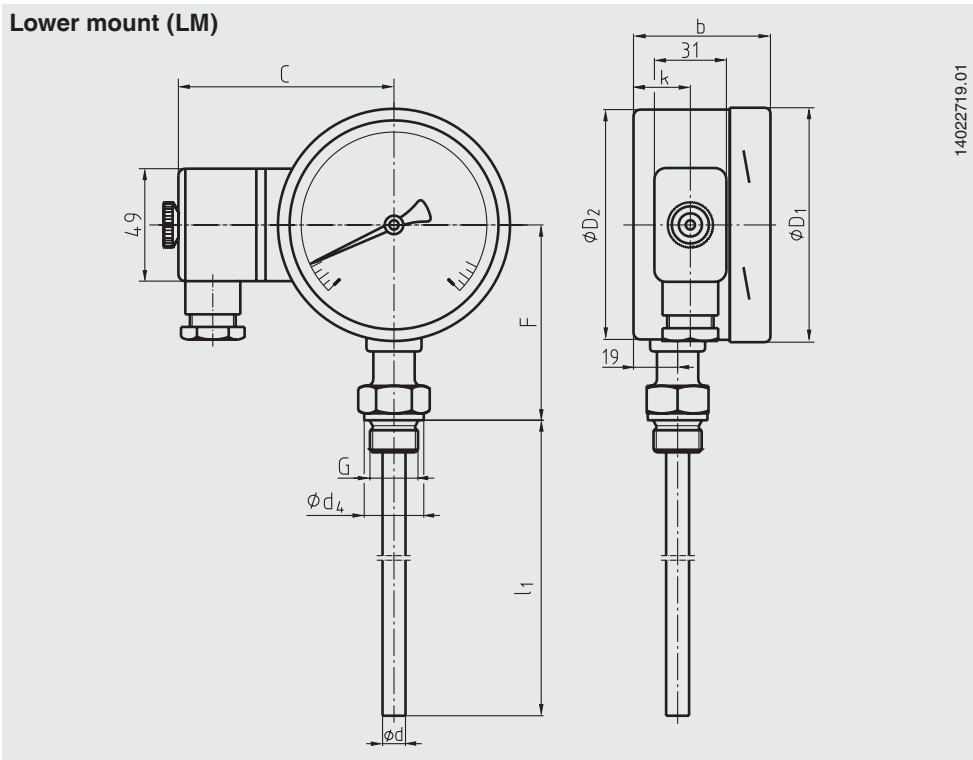
Dimensions in mm



Nominal size NS	Dimensions in mm			d	d_4	D_1	D_2	G	k	SW	Weight in kg
	$b^{1)}$	$b_1^{1)}$	C								
100	60/68	92/100	94	8 ²⁾	26	101	99	G 1/2 B	25	27	1.3
160	66/70	99/103	122	8 ²⁾	26	161	159	G 1/2 B	32	27	1.5

1) Dependent on required measuring system
 2) Option: Stem diameter 6, 10, 12 mm

Lower mount (LM)



Nominal size NS	Dimensions in mm			ϕd	ϕd_4	ϕD_1	ϕD_2	F ³⁾	G	k	Weight in kg
	b ¹⁾	b ₁ ¹⁾	C								
100	60/68	92/100	94	8 ²⁾	26	101	99	85	G ½ B	25	1.3
160	66/70	99/103	122	8 ²⁾	26	161	159	114	G ½ B	32	1.5

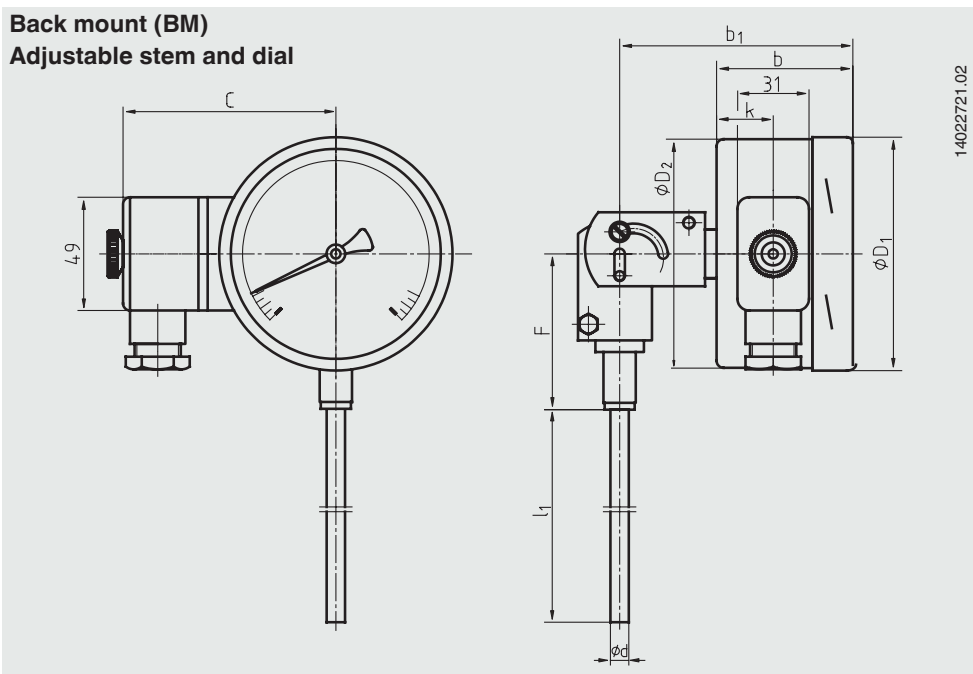
1) Dependent on required measuring system

2) Option: Stem diameter 6, 10, 12 mm

3) With scale ranges $\geq 0 \dots 500$ °C the dimensions increase by 40 mm

Back mount (BM)

Adjustable stem and dial



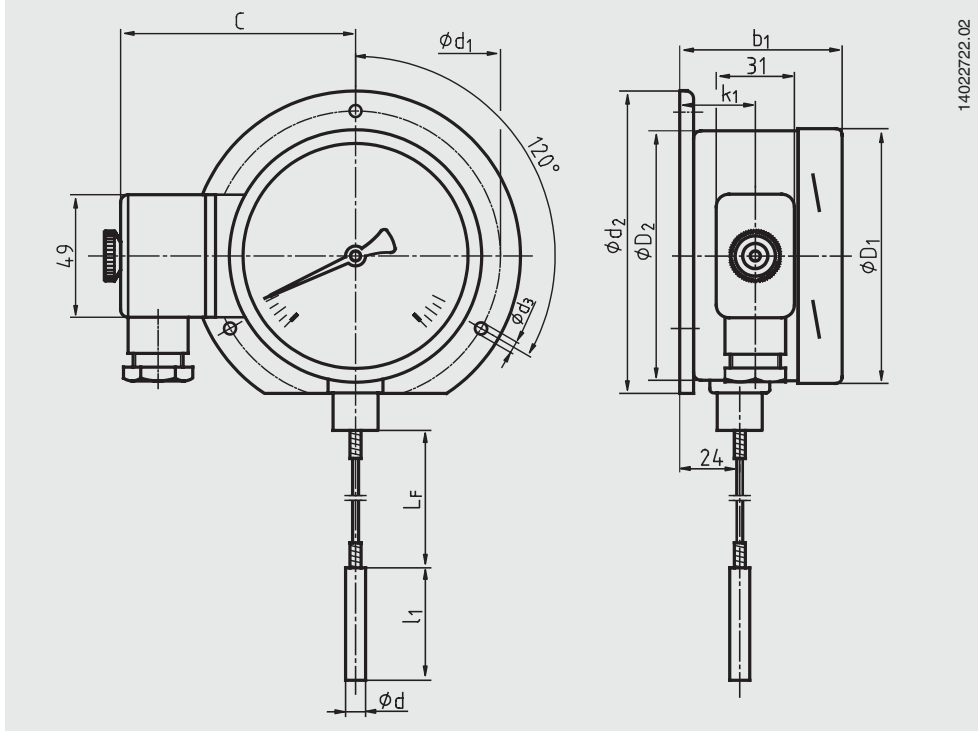
Nominal size NS	Dimensions in mm			d	D ₁	D ₂	F	k
	b ¹⁾	b ₁ ¹⁾	C					
100	60/68	104/112	94	8 ²⁾	101	99	68	25
160	66/70	110/114	122	8 ²⁾	161	159	68	32

1) Dependent on required measuring system

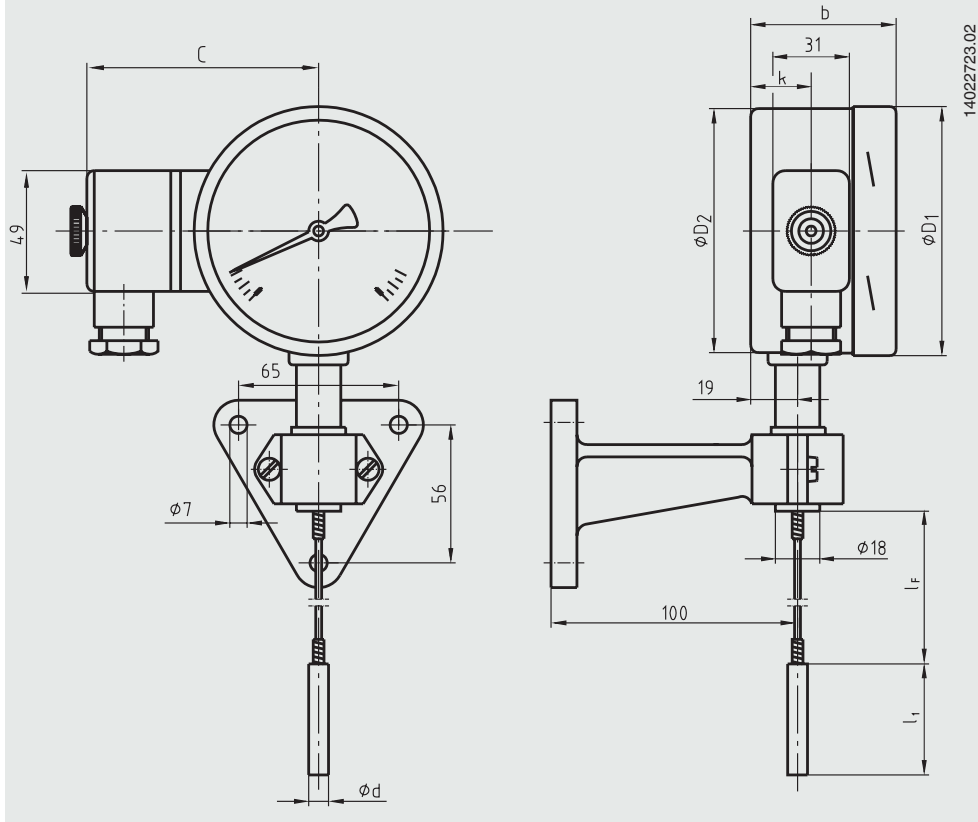
2) Option: Stem diameter 6, 10, 12 mm

Dimensions in mm for instruments with capillary

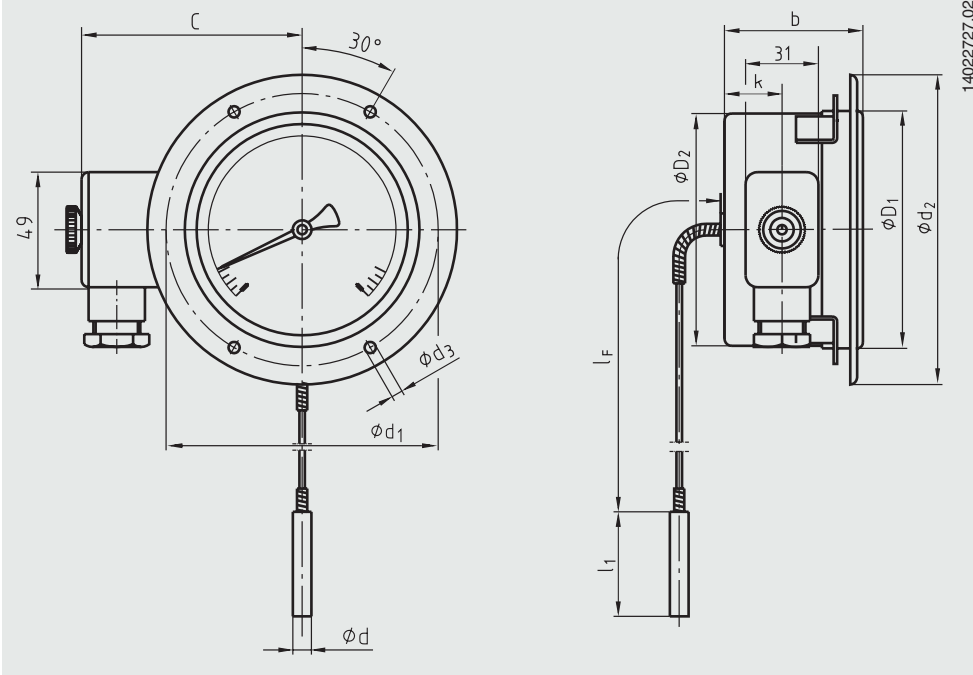
Surface mounting flange



Instrument mounting bracket



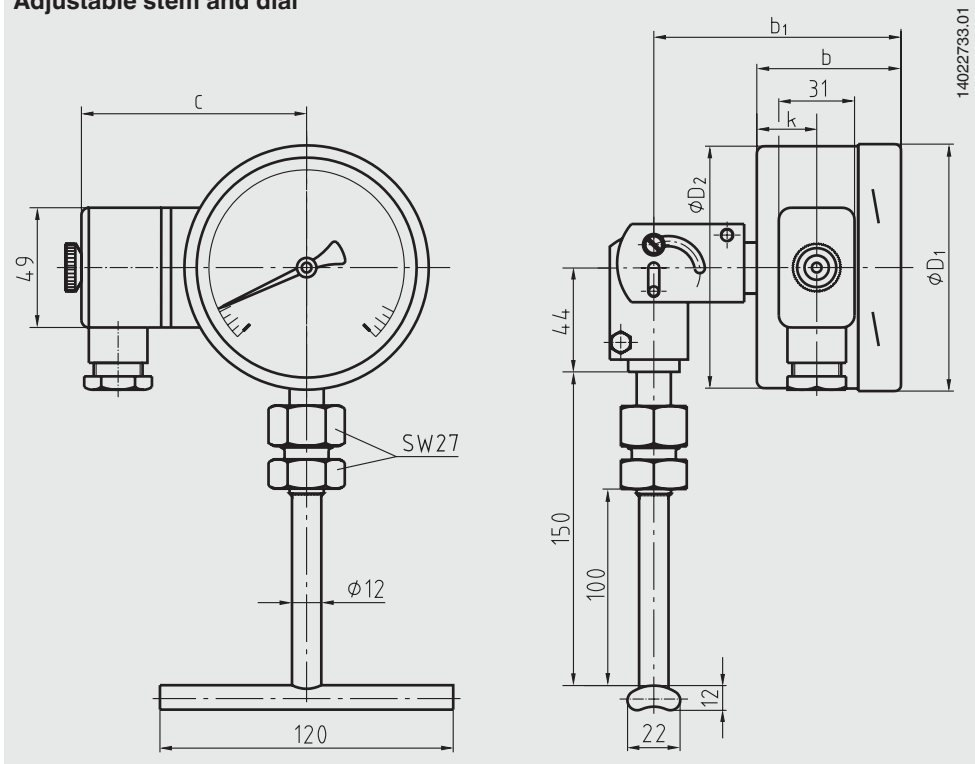
Panel mounting flange



Nominal size NS	Dimensions in mm		C	d	d ₁	d ₂	d ₃	D ₁	D ₂	k	k ₁
	b ¹⁾	b ₁ ¹⁾									
100	60/68	65/73	94	8 ²⁾	116	132	4.8	101	99	25	30
160	66/70	72/76	122	8 ²⁾	178	196	5.8	161	159	32	37

- 1) Dependent on required measuring system
 2) Option: Stem diameter 6, 10, 12 mm

Back mount (BM)
Adjustable stem and dial

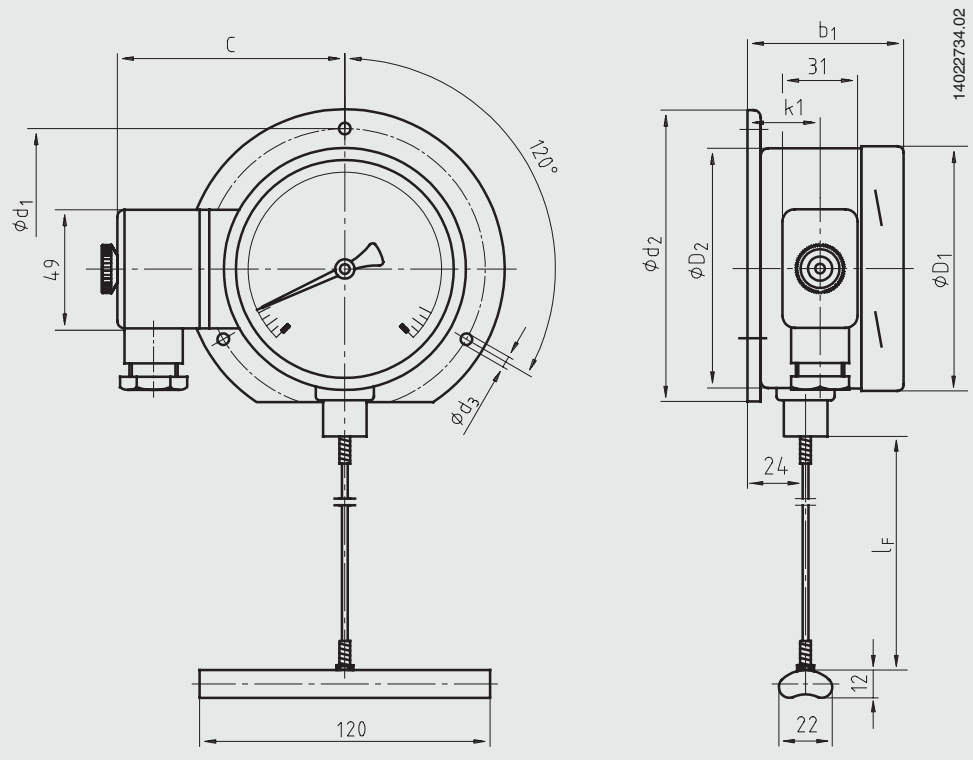


Connection location	Nominal size NS	Dimensions in mm					
		b ¹⁾	b ₁ ¹⁾	C	D ₁	D ₂	k
Back mount (BM)	100	60/68	104/112	94	101	99	25
	160	66/70	110/114	122	161	159	32
Lower mount (LM)	100	60/68	104/112	94	101	99	25
	160	66/70	110/114	122	161	159	32
Adjustable stem and dial	100	60/68	104/112	94	101	99	25
	160	66/70	110/114	122	161	159	32

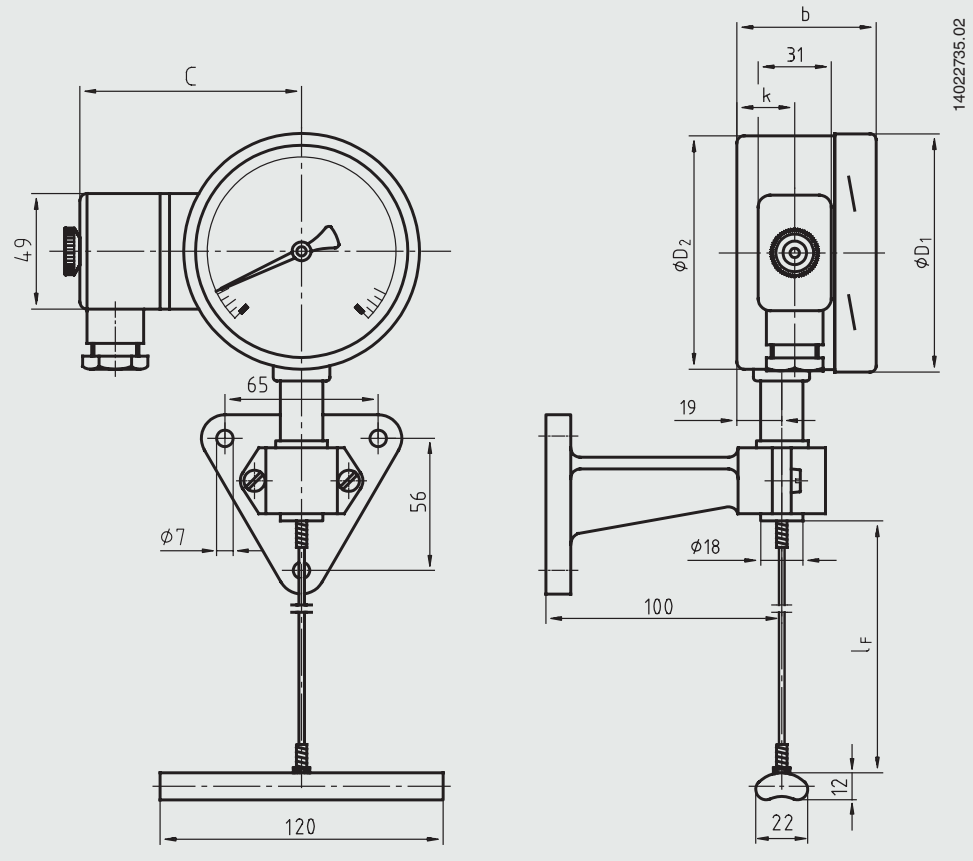
1) Dependent on required measuring system

Dimensions in mm for instruments with contact bulb and capillary

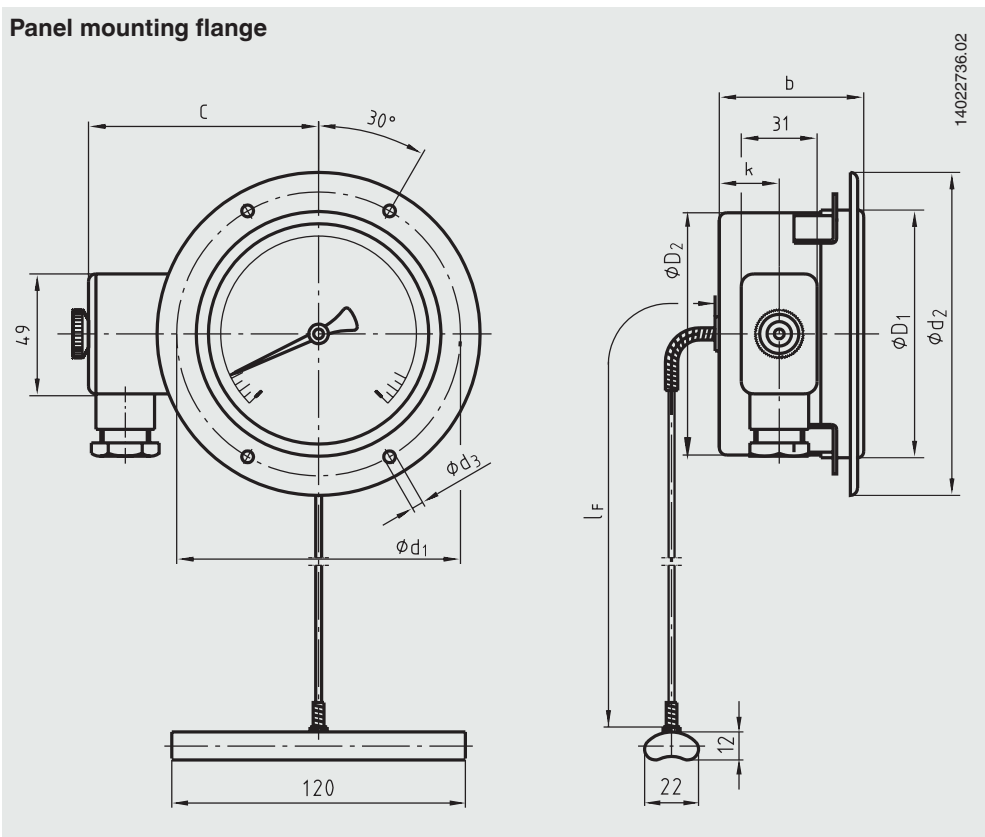
Surface mounting flange



Instrument mounting bracket



Panel mounting flange



Nominal size NS	Dimensions in mm			d ₁	d ₂	d ₃	D ₁	D ₂	D ₃	h	k	k ₁	Weight in kg
	b ¹⁾	b ₁ ¹⁾	C										
100	60/68	65/73	94	116	132	4.8	101	99	107	107	25	30	1.6
160	66/70	72/76	122	178	196	5.8	161	159	166	172	32	37	2.0

1) Dependent on required measuring system

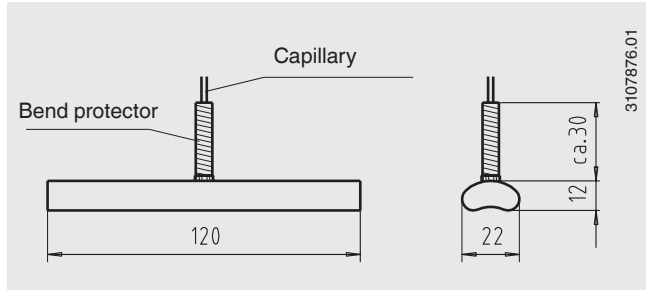
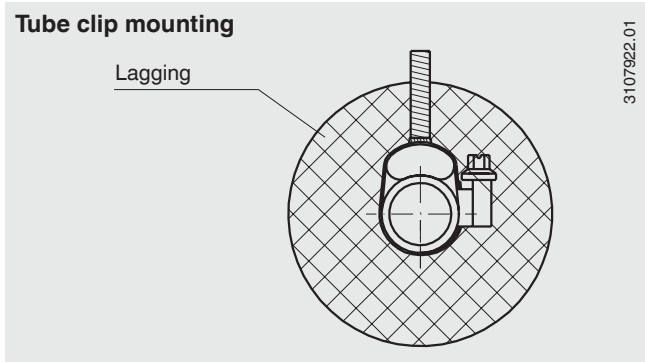
Mounting instructions for contact bulb

General

The contact bulb has been designed for mounting on pipes or tanks. When mounting this thermometer version, it must be ensured that the contact bulb is in contact with the measuring point over its complete length. The basic requirements to ensure a perfect measurement result is to retain good thermal contact between the skin mounted contact bulb and the outside wall of the pipe or tank with minimal heat loss to ambient from the skin mounted contact bulb and measuring point.

■ Mounting on pipes

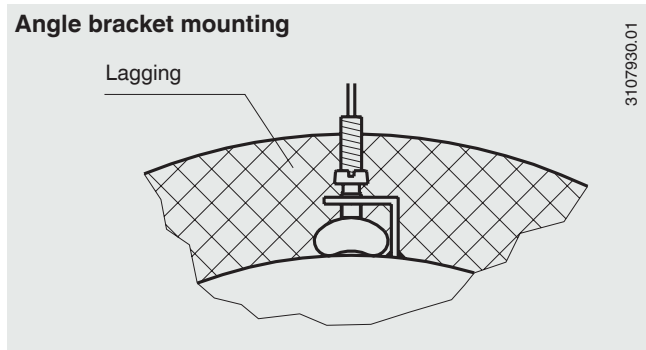
The geometry of the contact bulb has been designed for pipes with external diameters between 20 and 160 mm. Pipe clamps are suitable for fixing the contact bulb to the pipe. The skin mounted contact bulb should have direct metallic contact with the measuring point and have firm contact with the surface of the pipe. Where temperatures under 200 °C are to be expected, a heat conducting paste can be used to optimise the heat transmission between skin mounted contact bulb and pipe. This lagging must have sufficient temperature resistance and is not provided with the instrument.



■ Mounting on tanks

The geometry of the contact bulb has been designed for tanks with an external radius up to 80 mm. If the mounting point of the skin mounting contact bulb on the tank has an external radius greater than 80 mm, we recommend the use of an intermediate piece designed for the respective tank diameter, made of a material with good thermal conductivity. The contact bulb should be fastened to the tank by means of an angle bracket with clamping screws, or any similar method. The skin mounted contact bulb should have direct metallic contact with the measuring point and have firm contact with the surface of the tank.

A heat conductive paste can be used to optimise the heat transmission between skin mounted contact bulb and tank if temperatures under 200 °C are to be expected. Lagging must be applied where the skin mounted contact bulb has been mounted, in order to avoid error due to heat loss. This lagging must have sufficient temperature resistance and is not provided with the instrument.



Ordering information

Model / Nominal size / Scale range / Design of connection / Process connection / Length l_1 / Capillary length l_f / Options

© 2012 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.
The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.



WIKAL
WIKAL Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. (+49) 9372/132-0
Fax (+49) 9372/132-406
E-mail info@wika.de
www.wika.de