

# Gas-actuated thermometer with switch contacts Model 73, stainless steel version

WIKA data sheet TV 27.01



## Applications

- Control and regulation of industrial processes
- Monitoring of plants and switching of electric circuits
- Universally suitable for machine building, plant, vessel, apparatus construction and food industry
- Temperature measurement without any contact to the medium
- Mounting in instrument boards, control cabinets, control panels

## Special features

- Instruments meet the highest standards of measurement technology
- Case and stem from stainless steel
- For external mounting on pipes and tanks
- Gauges with inductive contact for use in hazardous areas with ATEX approval
- Gauges with electronic contact for PLC applications

## Description

Wherever the process temperature must be shown in situ or in hard-to-reach locations, and where, at the same time, an electrical circuit also needs to be switched, the gas-actuated thermometers with switch contacts are ideally suited.

Due to the wide variety of possible designs, the model 73 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 (without any contact with the medium), temperature measurements are possible even when the pipe diameter is extremely small. When mounting this thermometer version, it must be ensured that the contact bulb is in contact with the measuring point over its complete length.

Switch contacts (electrical alarm contacts) make or break an electric control circuit dependent upon the position of the instrument pointer.



**Gas-actuated thermometer with switch contacts model 73**  
Fig. top: with capillary  
Fig. bottom: back mount (BM)

The switch contacts are adjustable over the full measuring range. The instrument pointer (actual value pointer) moves freely across the entire scale range, independent of the setting. The set pointer can be adjusted via the window using a removable adjustment key (mounted on the terminal box).

Switch contacts consisting of several contacts can also be set to a single set point. Contact actuation is made when the actual value pointer travels beyond or below the desired set point.

For switch contacts, sliding and magnetic snap-action contacts, reed contacts, inductive contacts - for requirements to ATEX - or electronic contacts for PLC switching are available.

For further information on the different switch contacts please see data sheet AC 08.01.

## Standard version

### Measuring principle

Gas-pressure inert gas filling, physiologically safe

### Nominal size in mm

100, 160, 144 x 144

### Connection design

S Standard (male thread connection) <sup>1)</sup>

- 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)

1) Not for gauges with capillary or edgewise panel design

### Models

Model	Design
73	Back mount (axial)
	Lower mount (radial)
	Back mount, adjustable stem and dial
	Instruments with capillaries
	Instruments in edgewise panel design

### Accuracy class

Class 1 per DIN 16196

### Working range

Normal (1 year): Measuring range (DIN 16196)

Short time (24 h max.): Scale range (DIN 16196)

### Rated operating ranges and conditions

DIN 16196 (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°

### Edgewise panel case and panel frame

Steel, galvanised

### 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

Length to user specifications

### Dial

Aluminium white, black lettering

### Window

Laminated safety glass  
(at edgewise panel design: shatterproof plastic)

### Pointer

Aluminium, black, adjustable pointer

### Electrical connection

Terminal box

### Temperature limits for storage and transport

-50 ... +70 °C (EN 13190) without liquid damping

-20 ... +60 °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 529

Exception with edgewise panel design: IP 65 at the front  
IP 40 at the back

### Mounting types for instruments with capillary

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

### Scale ranges, measuring ranges <sup>1)</sup>, error limits (DIN 16196)

#### Scale graduation per WIKA standard

Scale range in °C	Measuring range in °C	Scale spacing in °C	Error limit ± °C
-80 ... +60	-60 ... +40	2	3.0
-60 ... +40	-50 ... +30	1	1.5
-40 ... +60	-30 ... +50	1	1.5
-30 ... +50	-20 ... +40	1	1.5
-20 ... +60	-10 ... +50	1	1.5
-20 ... +80	-10 ... +70	1	1.5
0 ... 60	10 ... 50	1	1.5
0 ... 80	10 ... 70	1	1.5
0 ... 100	10 ... 90	1	1.5
0 ... 120	10 ... 110	2	3.0
0 ... 160	20 ... 140	2	3.0
0 ... 200	20 ... 180	2	3.0
0 ... 250	30 ... 220	5	3.75
0 ... 300	30 ... 270	5	7.5
0 ... 400	50 ... 350	5	7.5
0 ... 500	50 ... 450	5	7.5
0 ... 600	100 ... 500	10	15.0
0 ... 700	100 ... 600	10	15.0

1) The measuring range is indicated on the dial by two triangular marks.  
Only within this range is the stated error limit valid per DIN 16196.

## Switch contacts

### Sliding contact model 811

- Simple construction
- No control unit and no extra power supply required
- Direct switching up to max. 230 V, 18 VA / 10 W

### Magnetic snap-action contact model 821

- Simple construction
- No control unit and no extra power supply required
- Direct switching up to max. 230 V, 50 VA / 30 W
- Up to 4 switch contacts per measuring instrument

### Inductive contact model 831

- Long service life due to non-contact sensor
- Additional control unit required
- With corresponding control unit suitable for use in zone 1 / zone 21 (2 GD) hazardous areas
- Low effect on the indication accuracy
- Fail-safe switching at high switching rates
- Insensitive to corrosion
- Up to 3 switch contacts per measuring instrument

### Electronic contact model 830 E

- For direct triggering of a programmable logic controller (PLC)
- No additional control unit required
- Long service life due to non-contact sensor
- Low effect on the indication accuracy
- Fail-safe switching at high switching rates
- Insensitive to corrosion
- Up to 3 switch contacts per measuring instrument

### Reed switch model 851

- No control unit and no extra power supply required
- Direct switching up to max. 250 V, 1 A, 60 W/VA
- Also suitable for direct triggering of a programmable logic controller (PLC)
- Long service life due to non-contact sensor
- Up to two change-over contacts per measuring instrument

### Switching function

The switching function of the switch is indicated by function index 1, 2 or 3.

Model 8xx.1: Contact makes (clockwise pointer motion)

Model 8xx.2: Contact breaks (clockwise pointer motion)

Model 8xx.3: Change over; one contact breaks and one contact makes simultaneously when pointer reaches set point

### Please indicate switch points!

Unless otherwise specified, the instrument will be delivered with the adjustable switching points factory-set as follows:

- Single contact Start of measuring range
- Double contact Start and end of the measuring range
- Triple contact Start, middle and end of the measuring range

### Note:

For magnetic snap-action contacts and reed contacts, it does not make sense to test the display, around the set limit values, in the range  $\pm 5\%$  of the measuring span, because the magnet has an influence on the indication accuracy.

**For further information please see data sheet AC 08.01, electrical switch contacts**

## Options

- Scale range °F, °C/°F (dual scale)
- Case with liquid damping
- Case with food-compatible liquid damping
- Case from 1.4571
- 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)
- Inductive contacts also in safety version
- Version per ATEX Ex II 2 GD c TX

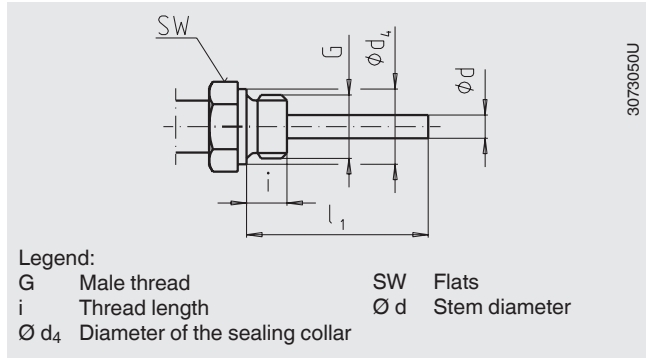
## Connection design

### Design standard (male thread connection) <sup>1)</sup>

Standard stem 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 for gauges with capillary or edgewise panel design



Legend:  
 G Male thread  
 i Thread length  
 Ø  $d_4$  Diameter of the sealing collar  
 SW Flats  
 Ø d Stem diameter

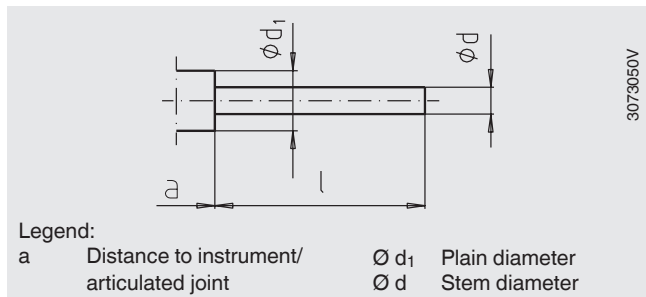
### Design 1, plain stem (without thread)

Standard stem length  $l = 100, 140, 200, 240, 290$  mm

Basis for design 4, compression fitting

Nominal size NS	Dimensions in mm			
	$d_1$ <sup>2)</sup>	$\varnothing d$	a for axial	a for adjustable stem and dial
100, 160, 144 x 144	18	8	15	25

2) Not applicable to version with capillary

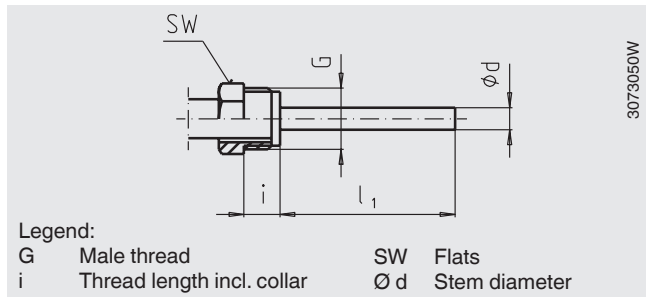


Legend:  
 a Distance to instrument/  
 articulated joint  
 Ø  $d_1$  Plain diameter  
 Ø d Stem diameter

### Design 2, male nut

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

Nominal size NS	Process connection		Dimensions in mm	
	G	i	SW	$\varnothing d$
100, 160, 144 x 144	G 1/2 B	20	27	8
	M20 x 1.5	15	22	8

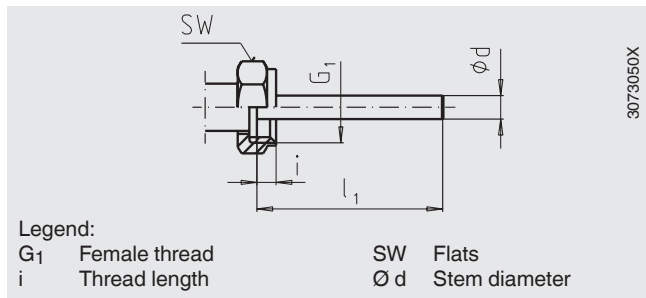


Legend:  
 G Male thread  
 i Thread length incl. collar  
 SW Flats  
 Ø d Stem diameter

### Design 3, union nut

Standard stem 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, 144 x 144	G 1/2	8.5	27	8
	G 3/4	10.5	32	8
	M24 x 1.5	13.5	32	8



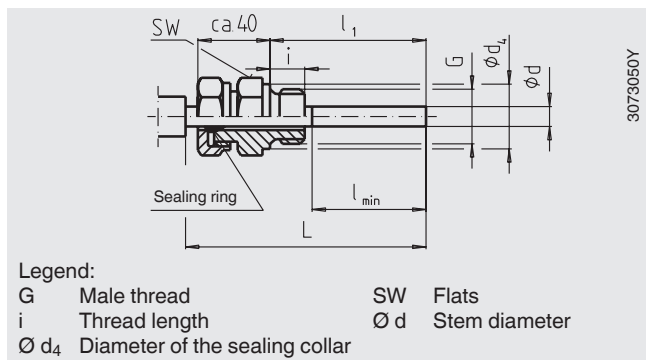
Legend:  
 $G_1$  Female thread  
 i Thread length  
 SW Flats  
 Ø d Stem diameter

### Design 4, compression fitting (sliding on stem)

Stem 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, 144 x 144	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



Legend:  
 G Male thread  
 i Thread length  
 Ø  $d_4$  Diameter of the sealing collar  
 SW Flats  
 Ø d Stem diameter

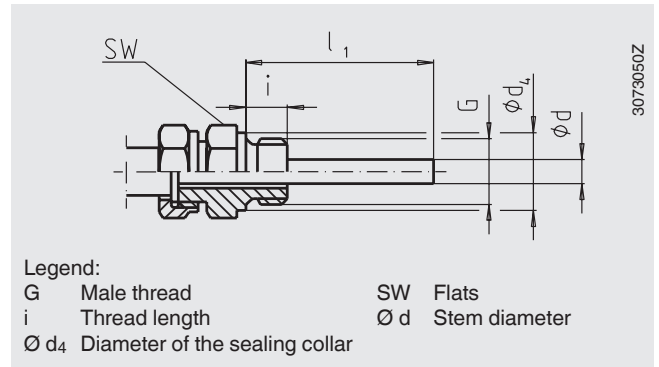
### Design 5, union nut with fitting

Standard stem 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, 144 x 144	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

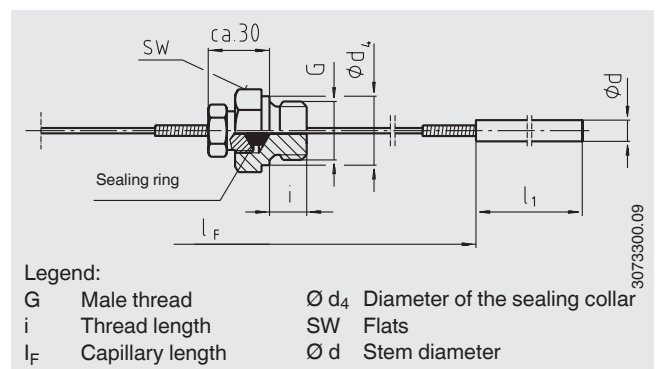
Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	$d_4$	$\varnothing d$
100, 160	M18 x 1.5	12	32	23	8



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

Standard stem length  $l_1 = 100$  mm (others on request)

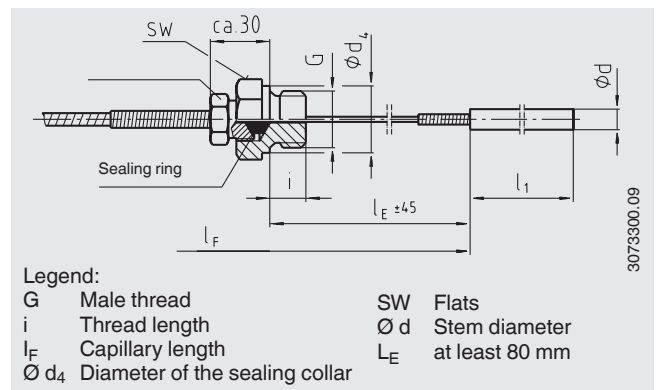
Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	$d_4$	$\varnothing d$
100, 160, 144 x 144	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8



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

Standard stem length  $l_1 = 100$  mm (others on request)

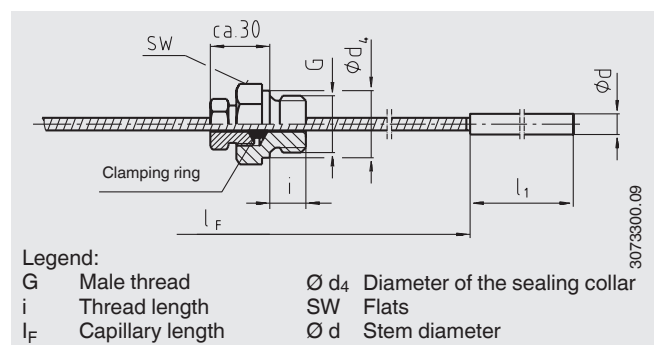
Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	$d_4$	$\varnothing d$
100, 160, 144 x 144	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8



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

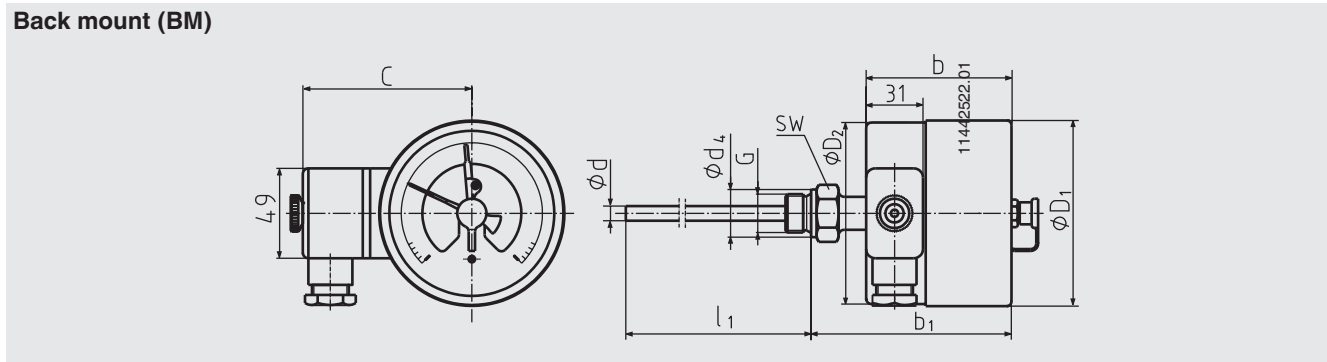
Standard stem length  $l_1 = 100$  mm (others on request)

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	$d_4$	$\varnothing d$
100, 160, 144 x 144	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

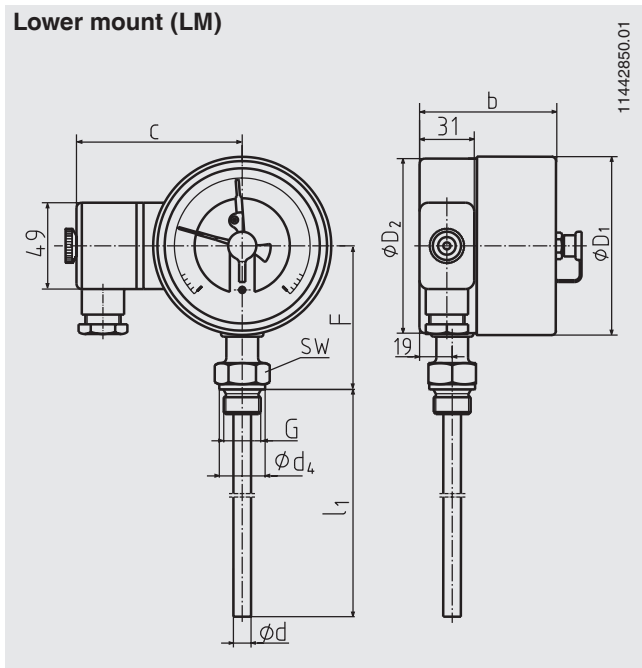


## Dimensions in mm

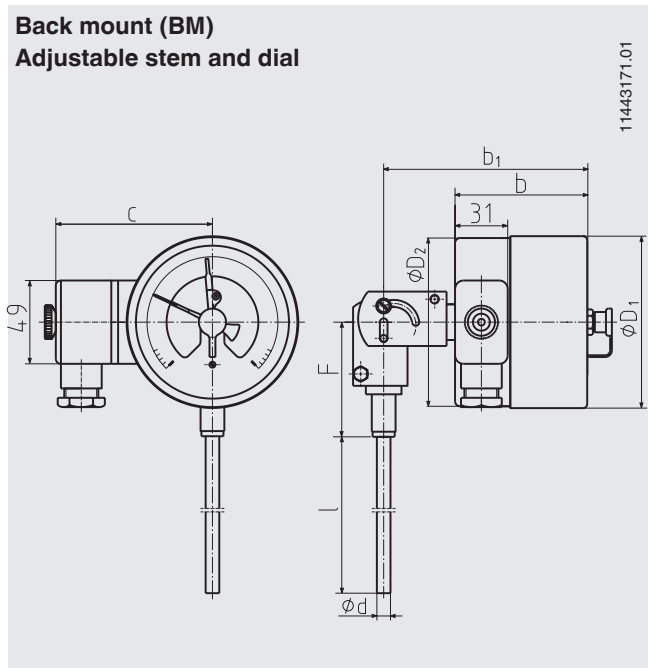
### Back mount (BM)



### Lower mount (LM)



### Back mount (BM) Adjustable stem and dial



### Back mount (BM), lower mount (LM)

Nominal size	Dimensions in mm				Reed contact model 851 1- or 2-way	d	d <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	F <sup>1)</sup>	G	SW	Weight in kg
	Switch contact model 811, 821 or 831 1- or 2-way		3-way										
NS	b	b <sub>1</sub> <sup>1)</sup>	b	b <sub>1</sub> <sup>1)</sup>	b								
100	88	121	-	-	70	8 <sup>2)</sup>	26	101	99	83	G ½ B	27	1.3
160	88	121	96	129	88	8 <sup>2)</sup>	26	161	159	113	G ½ B	27	1.5

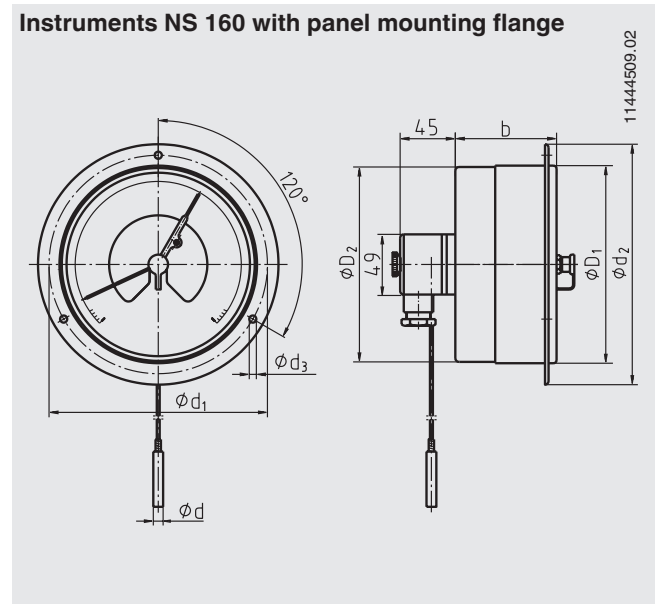
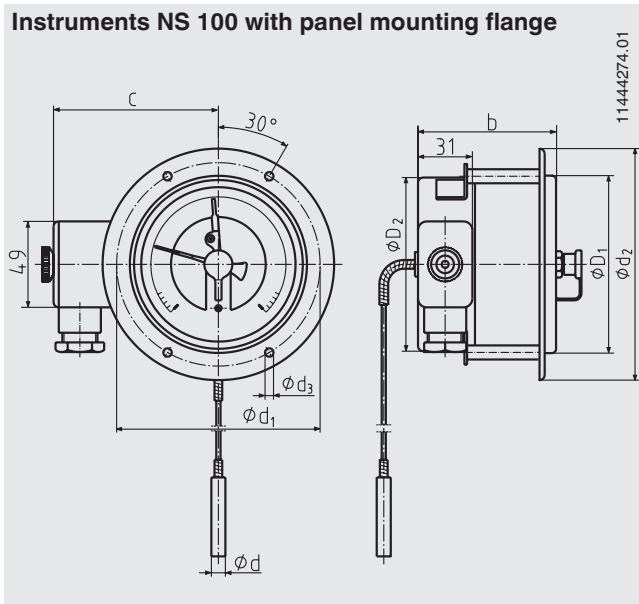
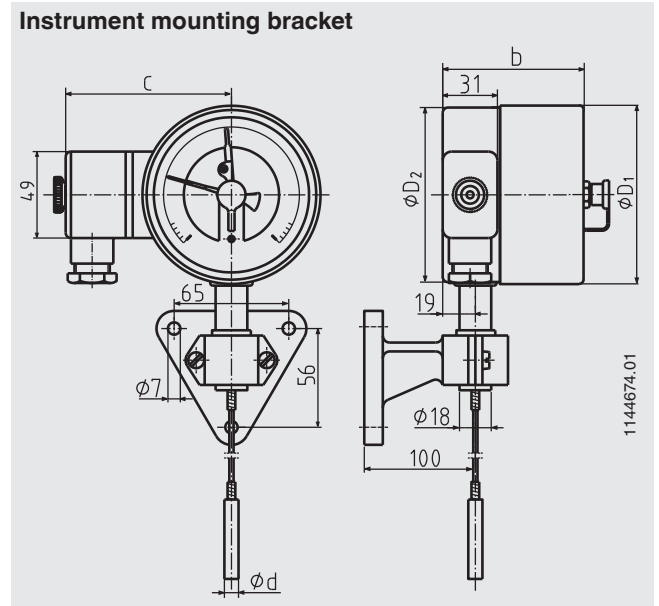
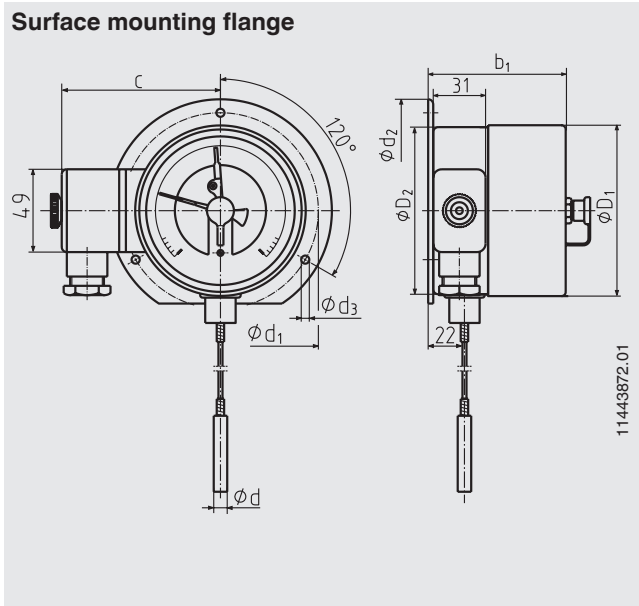
1) With scale ranges  $\geq 0 \dots 500$  °C the dimensions increase by 40 mm  
 2) Option: Stem diameter 6, 10, 12 mm

### Back mount (BM), adjustable stem and dial

Nominal size	Dimensions in mm				Reed contact model 851 1- or 2-way	d	D <sub>1</sub>	D <sub>2</sub>	F	Weight in kg
	Switch contact model 811, 821 or 831 1- or 2-way		3-way							
NS	b	b <sub>1</sub>	b	b <sub>1</sub>	b					
100	88	131	-	-	70	8 <sup>1)</sup>	101	99	68	1.5
160	88	131	97	140	88	8 <sup>1)</sup>	161	159	68	1.7

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

## Dimensions in mm for instruments with capillary

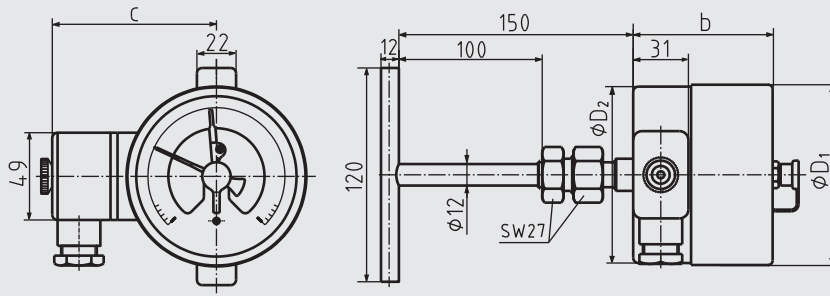


Nominal size	Dimensions in mm					Weight in kg								
	Switch contact model 811, 821 or 831		Reed contact model 851											
	1- or 2-way	3-way	1- or 2-way											
NS	b	b <sub>1</sub>	b	b <sub>1</sub>	b	d	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	h	
100	88	91	-	-	70	8 <sup>1)</sup>	116	132	4.8	101	99	107	107	1.6
160	88	91	97	100	88	8 <sup>1)</sup>	178	196	5.8	161	159	166	172	2.0

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

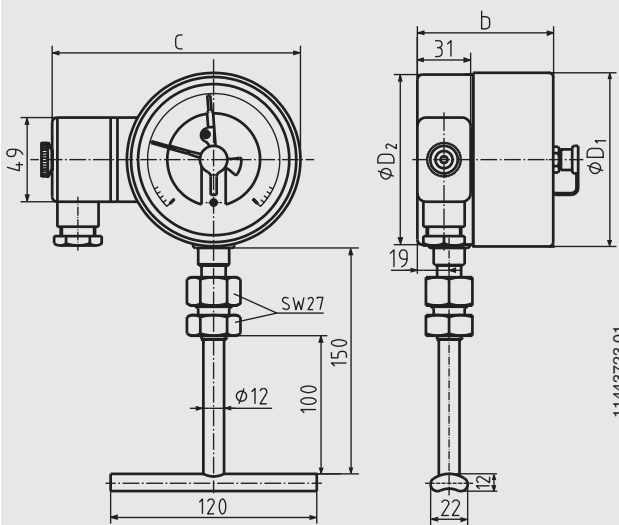
## Dimensions in mm for instruments with contact bulb

### Back mount (BM)



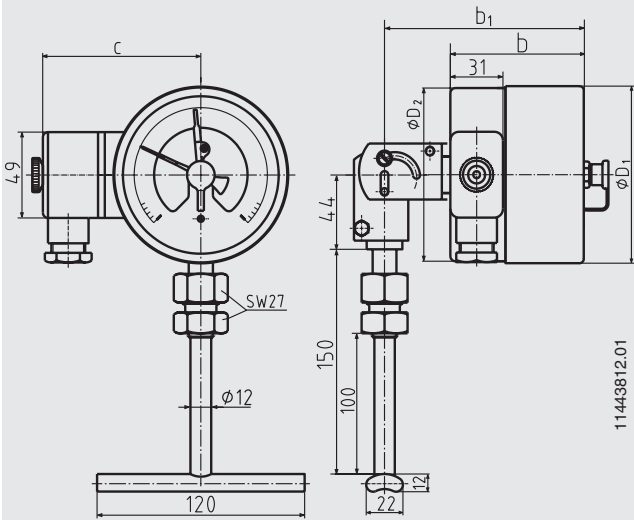
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### Lower mount (LM)



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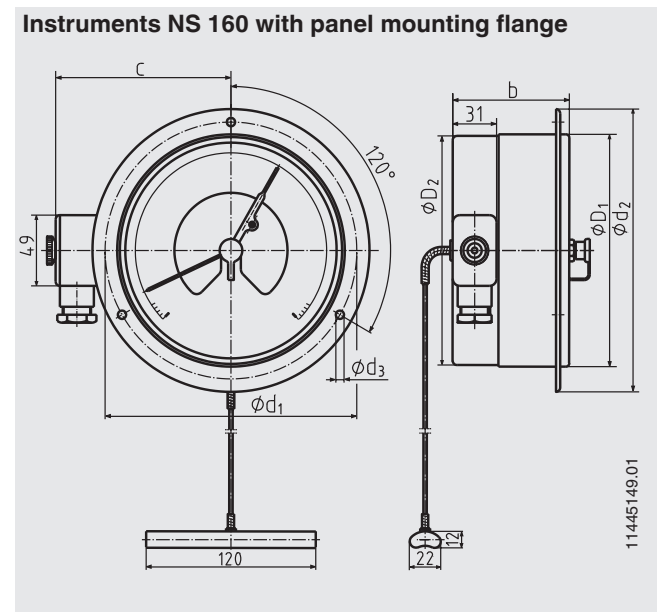
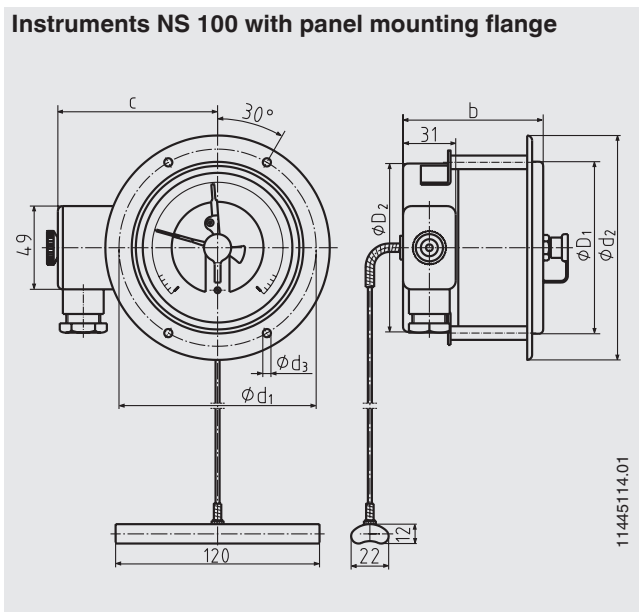
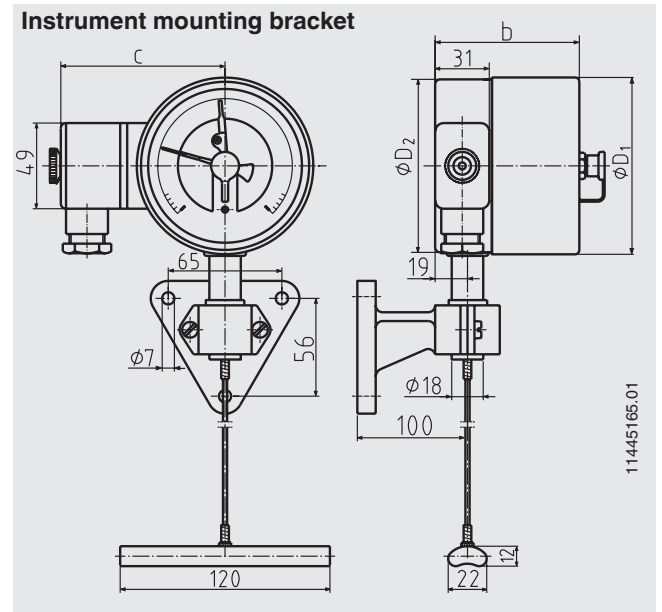
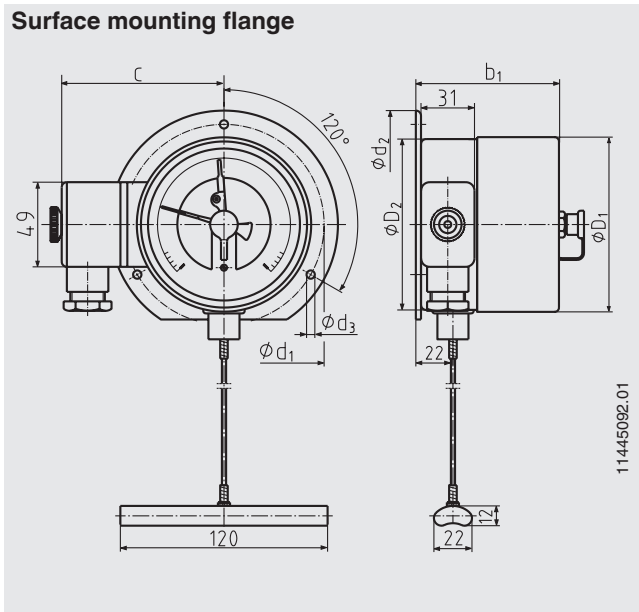
### Back mount, adjustable stem and dial



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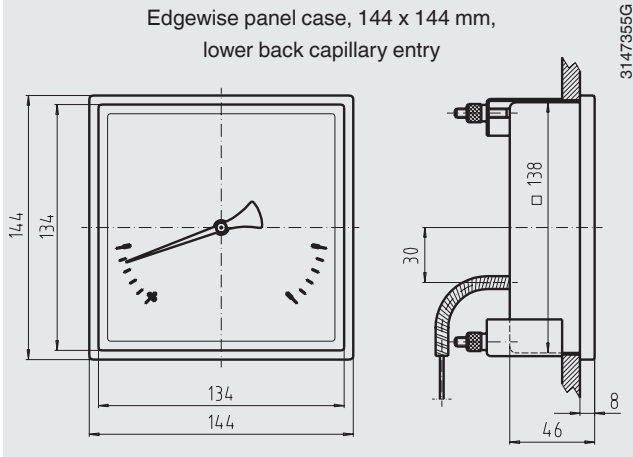
Connection location	Nominal size	Dimensions in mm						Weight in kg	
		Switch contact model 811, 821 or 831				Reed contact model 851		D <sub>1</sub>	D <sub>2</sub>
		1- or 2-way		3-way		1- or 2-way			
NS	b	b <sub>1</sub>	b	b <sub>1</sub>	b				
back mount (BM)	100	88	-	-	-	70	101	99	1.0
	160	88	-	97	-	88	161	159	1.1
lower mount	100	88	-	-	-	70	101	99	1.0
	160	88	-	97	-	88	161	159	1.1
adjustable stem and dial	100	88	131	-	-	70	101	99	1.1
	160	88	131	97	140	88	161	159	1.2

## Dimensions in mm for instruments with contact bulb and capillary

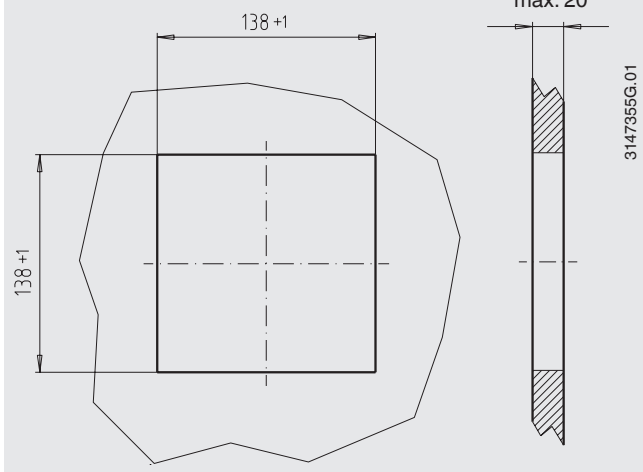


Nominal size	Dimensions in mm												Weight in kg
	Switch contact model 811, 821 or 831		Reed contact model 851			d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	h	
NS	b	b <sub>1</sub>	b	b <sub>1</sub>	b								
100	88	91	-	-	70	116	132	4.8	101	99	107	107	1.6
160	88	91	97	100	88	178	196	5.8	161	159	166	172	2.0

### Edgewise panel design with optional switch contact



### Panel cutout in mm



## Mounting instructions for contact bulb

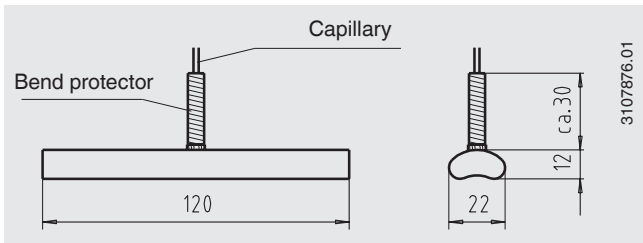
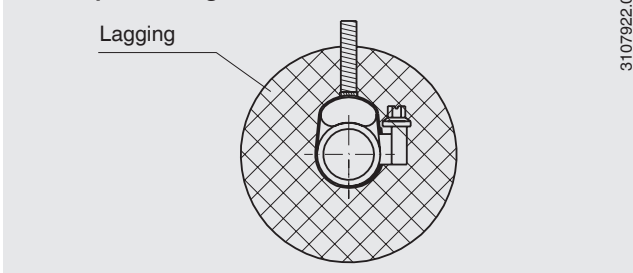
### General

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. 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. 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.

#### Tube clip mounting

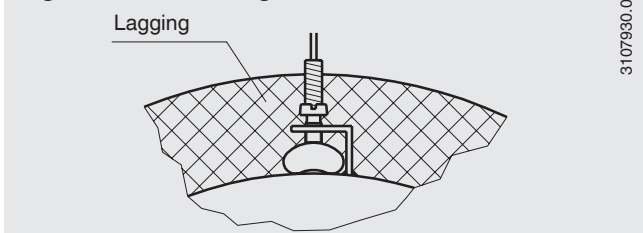


#### ■ Mounting on tanks

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.

#### Angle bracket mounting



### Ordering information

Model / Nominal size / Type of contact and switching function / Scale range / Design of connection / Process connection / Length  $l$ ,  $l_1$  / Capillary length  $l_F$  / Options

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