

Gas-actuated thermometer Model 73, stainless steel version

WIKA data sheet TM 73.01



Applications

- For aggressive media in the chemical, petrochemical and process engineering industries
- 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
- Various connection and case mounting designs
- Versions also available with adjustable stem and dial, with capillary, with contact bulb or edgewise panel design (square)



Gas-actuated thermometer

Fig. left: lower mount (LM), model R73.100

Fig. centre: with capillary and surface mounting bracket, model F73.100

Fig. right: adjustable stem and dial version, model S73.100

Description

This series of thermometers is universally suitable for machine building, plant and apparatus construction. Gas-actuated thermometers with capillary are used in locations which are not easily accessible and where long distances have to be bridged.

The stem, the process connection and the case of the instrument ¹⁾ are made from stainless steel. To allow fitting to the process, different installation lengths and process connections are available. The thermometers have a high ingress protection of IP 65 and can be used in outdoor applications even at negative temperatures. With liquid damping operation under high vibration conditions is

possible. 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, temperature measurements are possible without any contact with the medium, even when the pipe diameter is extremely small. The contact bulb is intended for external mounting on pipes and 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.

1) Not for model Q73.144, edgewise panel case galvanised steel

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) ¹⁾

- 1 Plain stem (without thread)
- 2 Male nut
- 3 Union nut (female)
- 4 Compression fitting (sliding on stem)
- 5 Union nut with fitting
- 6 Compression fitting (sliding on capillary and/or spiral protection hose)
- 7 Compression fitting at the case

1) Not for version with capillary and edgewise panel design

Models

Model	NS	Version
A73.100	100	Back mount (axial)
A73.160	160	
R73.100	100	Lower mount (radial)
R73.160	160	
S73.100	100	Back mount, adjustable stem and dial
S73.160	160	
F73.100	100	Version with capillary
F73.160	160	
Q73.144	144 x 144	Edgewise panel design

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, stem, process connection

Stainless steel

Adjustable stem and dial version

Stainless steel,
swivelling 90° and
rotatable 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, micro adjustment

Temperature limits for storage and transport

-50 ... +70 °C 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 of stem

max. 25 bar, static

Ingress protection

IP 65 per EN 60529

Exception with model Q73.144: IP 65 at the front
IP 40 at the back

Mounting types for F73.xxx

- Surface mounting flange, stainless steel
- Surface mounting bracket, die cast aluminium
- Panel mounting flange, stainless steel
- Triangular bezel with clamp, polished stainless steel

Options

- Scale range °F, °C/°F (dual scale)
- Case with liquid damping
- Case with food-compatible liquid damping
- Armoured or coated capillary: armoured capillary Ø 7 mm, flexible or capillary with PVC coating
- Stem diameter 6, 10, 12 mm (others on request)
- Ingress protection IP 66
- Thermometer with switch contacts (data sheet TV 27.01)
- Special measuring ranges or dial printing to customer specifications (on request)
- Version per ATEX Ex II 2 GD c TX

**Scale ranges, measuring ranges ¹⁾, error limits (EN 13190)
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	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.

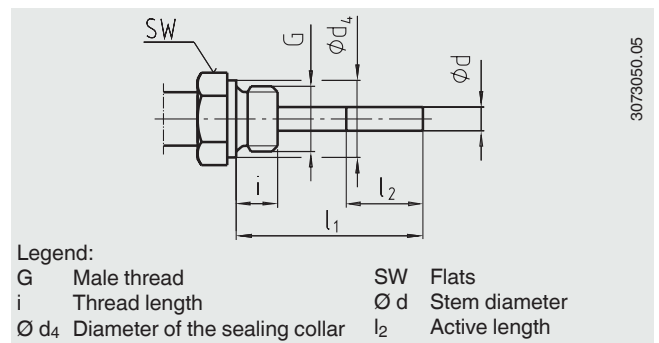
Connection design

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 for version with capillary (F73.xxx) and edgewise panel design (Q73.144)



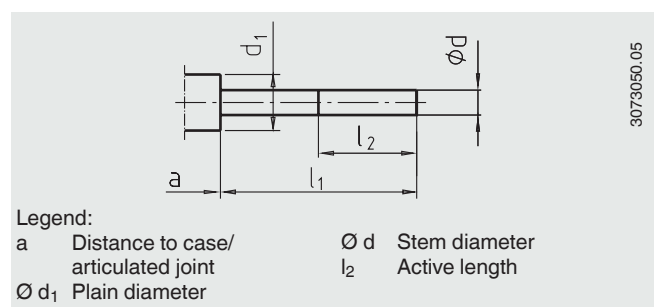
Design 1, plain stem (without thread)

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 ²⁾	$\varnothing d$	a for axial	a for adjustable stem and dial
100, 160, 144 x 144	18	8	15	25

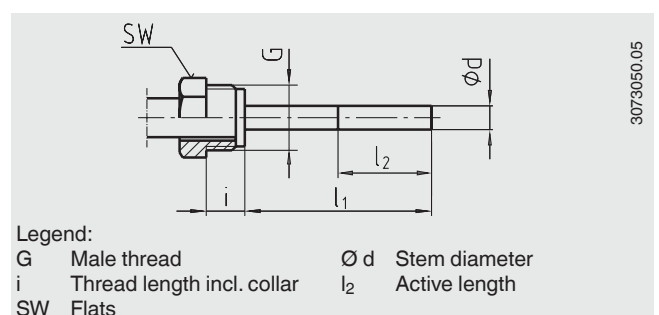
2) Not applicable to version with capillary



Design 2, male nut

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

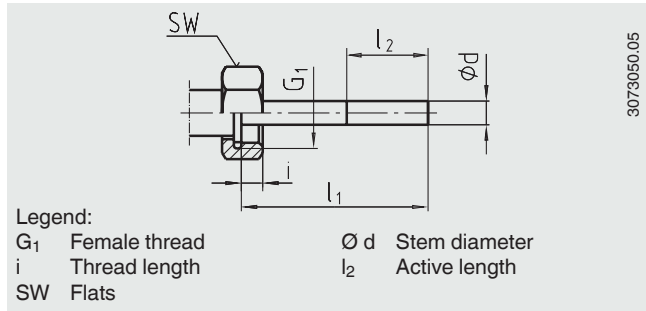
Nominal size NS	Process connection		Dimensions in mm	
	G	i	SW	$\varnothing d$
100, 160, 144 x 144	G 1/2 B	20	27	8
	M20 x 1.5	15	22	8



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, 144 x 144	$G \frac{1}{2}$	8.5	27	8
	$G \frac{3}{4}$	10.5	32	8
	M24 x 1.5	13.5	32	8

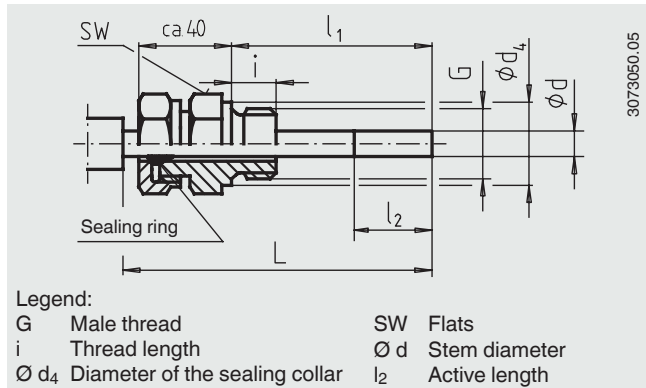


Design 4, compression fitting (sliding on stem)

Insertion length $l_1 =$ variable

Length $L = l_1 + 40$ mm

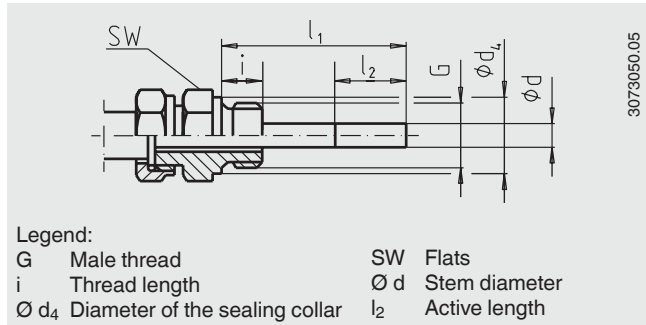
Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160, 144 x 144	$G \frac{1}{2} B$	14	27	26	8
	$G \frac{3}{4} B$	16	32	32	8
	M18 x 1.5	12	24	23	8
	$\frac{1}{2}$ NPT	19	22	-	8
	$\frac{3}{4}$ NPT	20	30	-	8



Design 5, union nut with fitting

Standard insertion lengths $l_1 = 100, 160, 200, 250$ mm

Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160, 144 x 144	$G \frac{1}{2} B$	14	27	26	8
	$G \frac{3}{4} B$	16	32	32	8
	M18 x 1.5	12	24	23	8
	$\frac{1}{2}$ NPT	19	22	-	8
	$\frac{3}{4}$ NPT	20	30	-	8



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

Nominal size NS	Process connection 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)

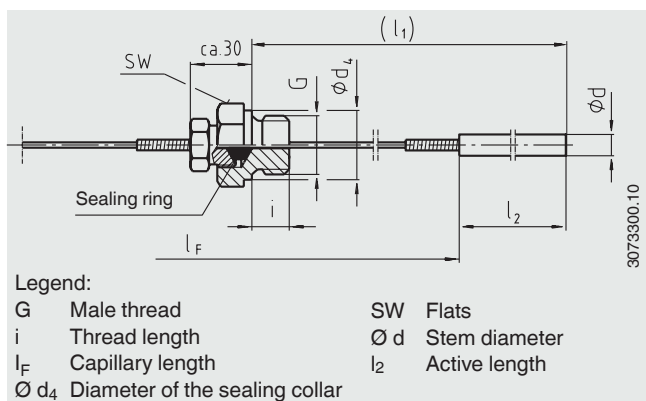
Insertion length $l_1 =$ variable

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, 144 x 144	$G \frac{1}{2} B$	14	27	26	8
	$G \frac{3}{4} B$	16	32	32	8
	$\frac{1}{2}$ NPT	19	22	-	8
	$\frac{3}{4}$ NPT	20	30	-	8

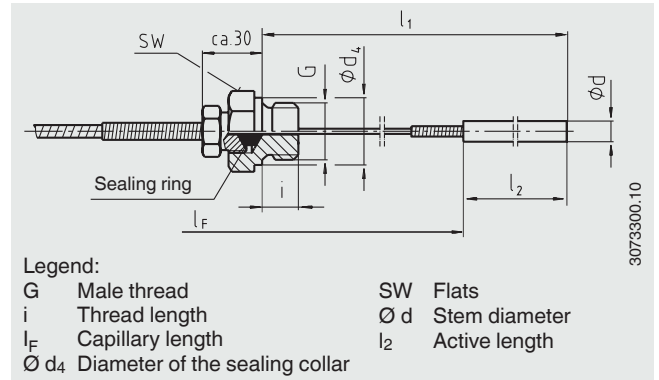


Design 6.2, compression fitting sliding on capillary with spiral protection hose (compression fitting is leak-proof)

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, 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



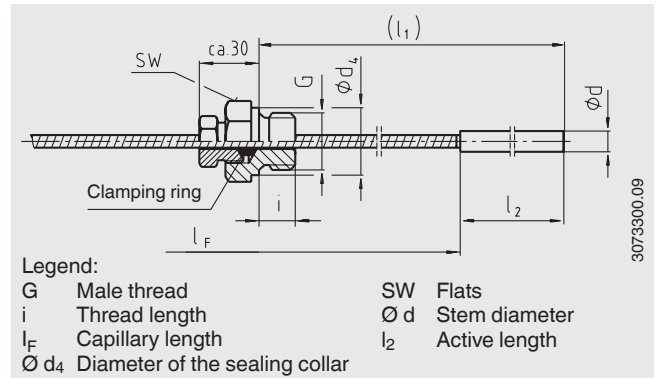
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Design 6.3, compression fitting sliding on spiral protection hose (compression fitting is not leak-proof)

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, 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



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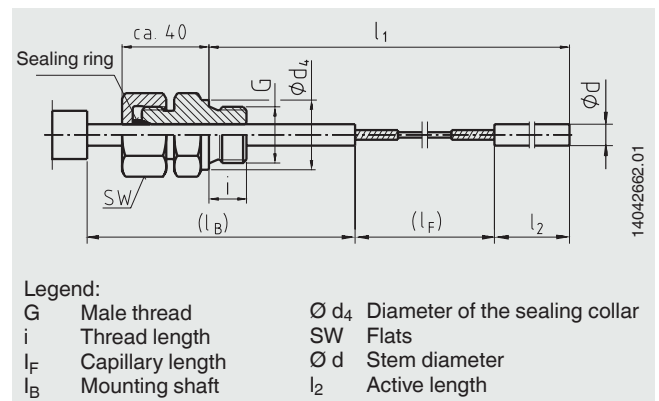
Design 7, compression fitting at the case

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)

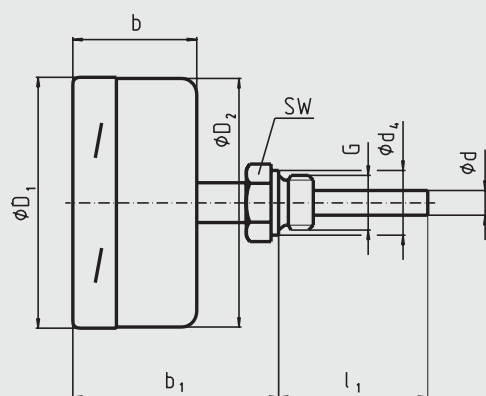
Nominal size NS	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100, 160	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8



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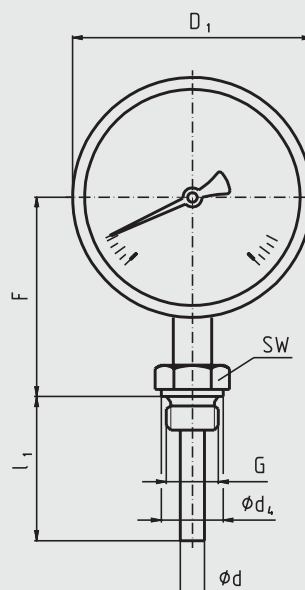
Dimensions in mm

Model A73, back mount



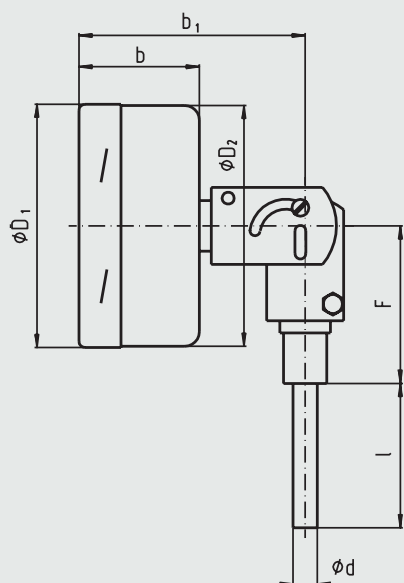
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Model R73, lower mount



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Model S73, back mount, adjustable stem and dial



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Table of dimensions for models A73 and R73

Nominal size NS	Dimensions in mm							Weight in kg		
	b	b ₁ ¹⁾	d	d ₄	D ₁	D ₂	F ¹⁾	G	SW	
100	50	83	8 ²⁾	26	101	99	83	G ½ B	27	1.1
160	50	83	8 ²⁾	26	161	159	113	G ½ B	27	1.4

1) With scale ranges $\geq 0 \dots 300 \text{ }^\circ\text{C}$ the dimensions increase by 40 mm

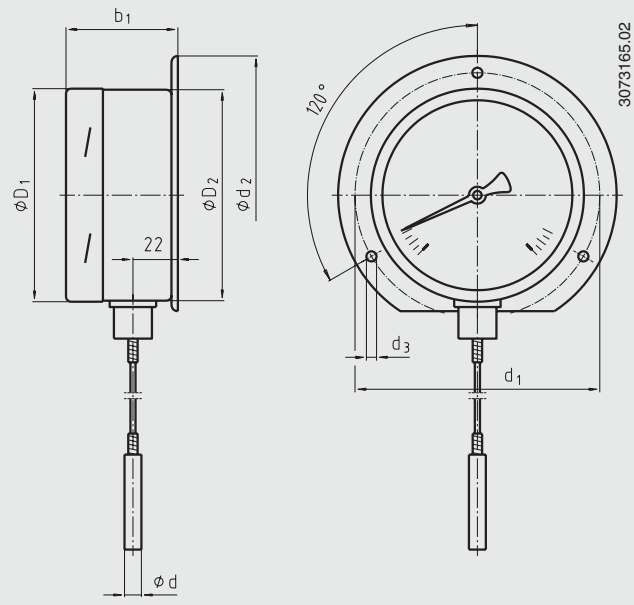
2) Option: Stem diameter 6, 10, 12 mm

Table of dimensions for model S73

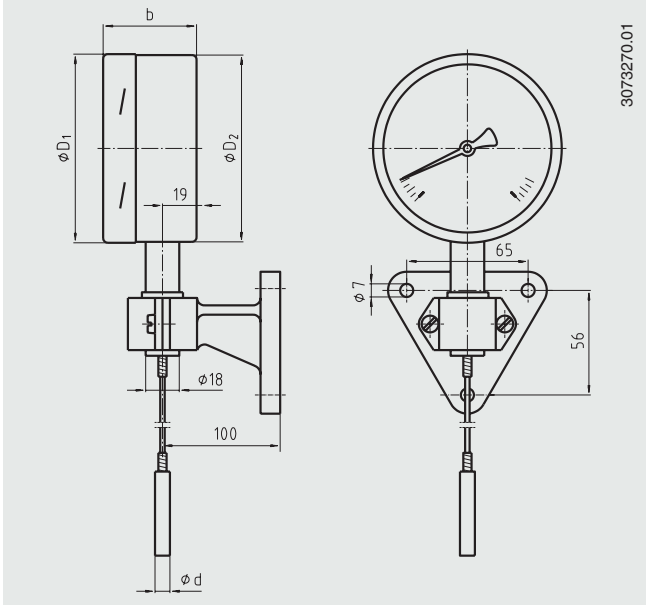
Nominal size NS	Dimensions in mm						Weight in kg
	b	b ₁	d	D ₁	D ₂	F	
100	50	93	8 ²⁾	101	99	68	1.3
160	50	93	8 ²⁾	161	159	68	1.6

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

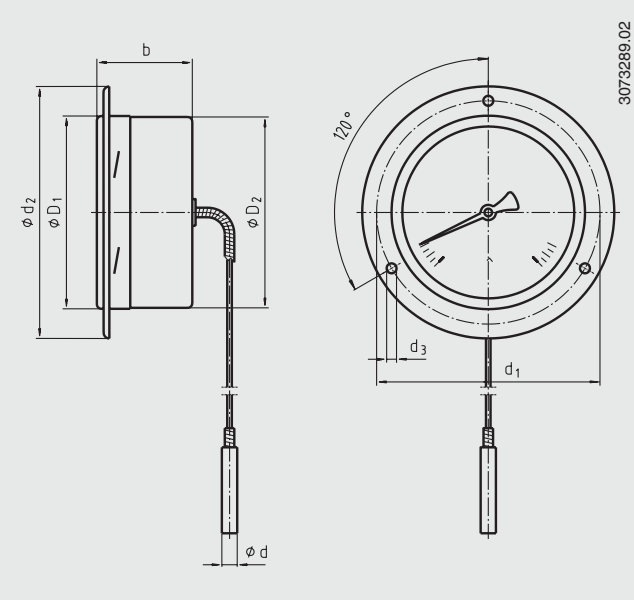
Model F73, with capillary and surface mounting flange



Model F73, with capillary and surface mounting bracket



Model F73, with capillary and panel mounting flange



Model F73, with capillary and triangular bezel with clamp

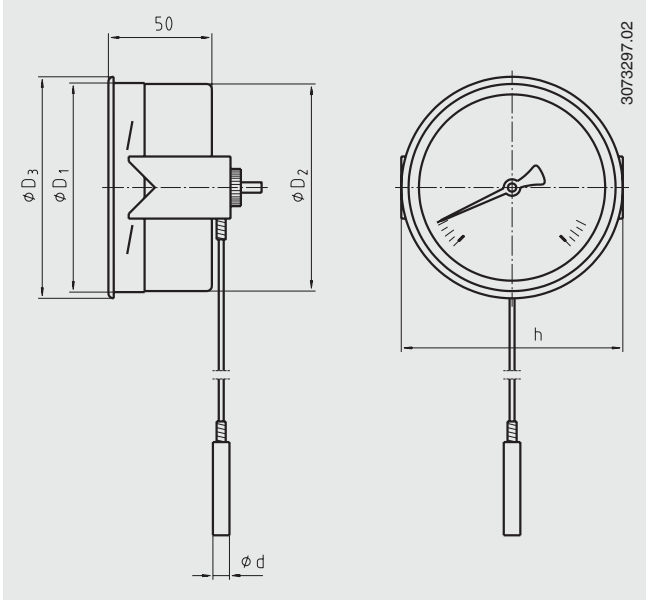


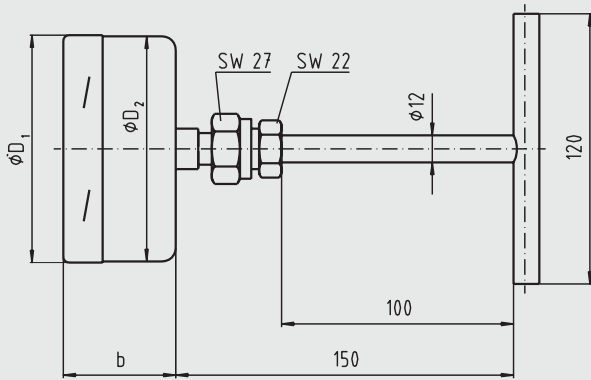
Table of dimensions for model F73 (with capillary)

Nominal size NS	Dimensions in mm										Weight in kg
	b	b ₁	d	d ₁	d ₂	d ₃	D ₁	D ₂	D ₃	h	
100	50	53	8 ¹⁾	116	132	4.8	101	99	107	107	1.4
160	50	53	8 ¹⁾	178	196	4.8	161	159	166	172	1.8

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

Model A73, with contact bulb
Back mount (BM)

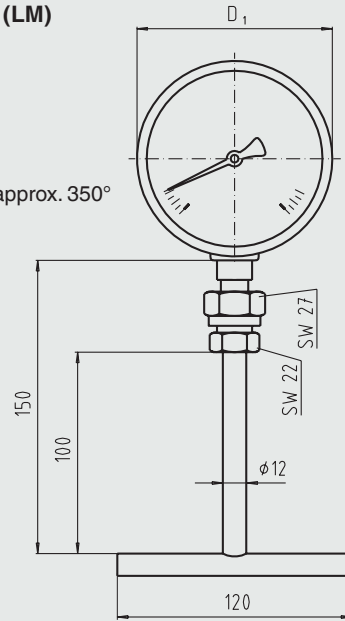
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Model R73, with contact bulb
Lower mount (LM)

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Case rotatable approx. 350°



Model S73, with contact bulb
Back mount, adjustable stem and dial

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Case rotatable approx. 350°, swivelling 90°

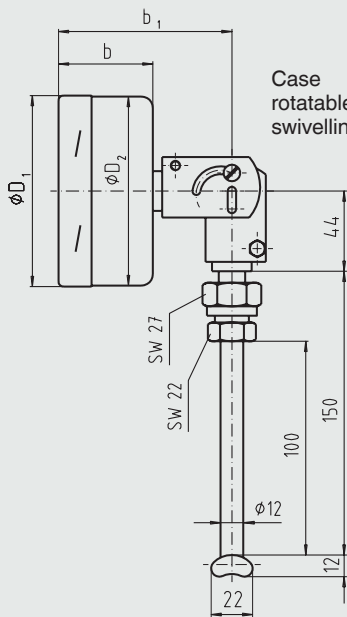
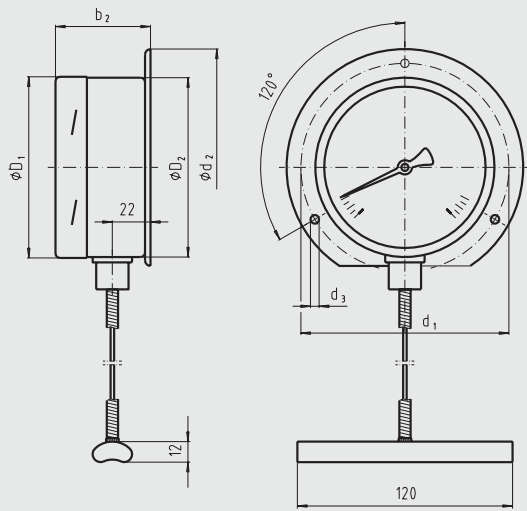


Table of dimensions for models A73, R73 and S73 (with contact bulb)

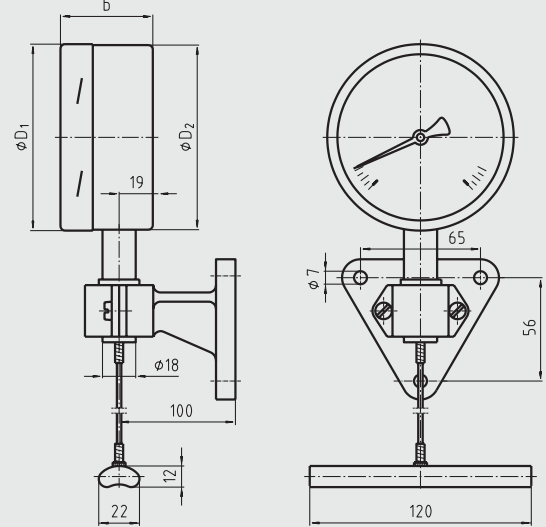
Model	Nominal size NS	Dimensions in mm				Weight in kg
		b	b ₁	D ₁	D ₂	
A73.100	100	50	-	101	99	0.8
A73.160	160	50	-	161	159	0.9
R73.100	100	50	-	101	99	0.8
R73.160	160	50	-	161	159	0.9
S73.100	100	50	93	101	99	0.9
S73.160	160	50	93	161	159	1.0

Model F73, with contact bulb
Capillary and surface mounting flange



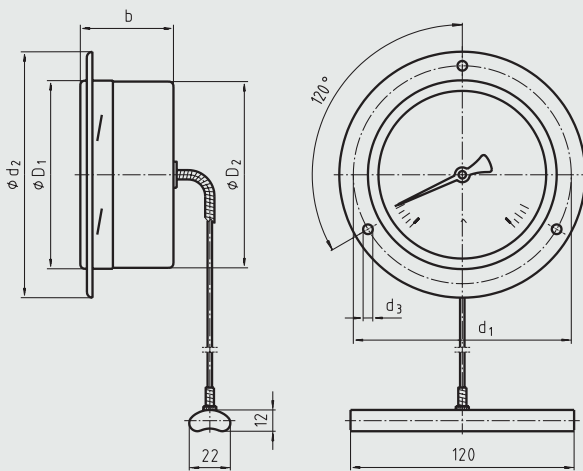
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Model F73, with contact bulb
Capillary and surface mounting bracket



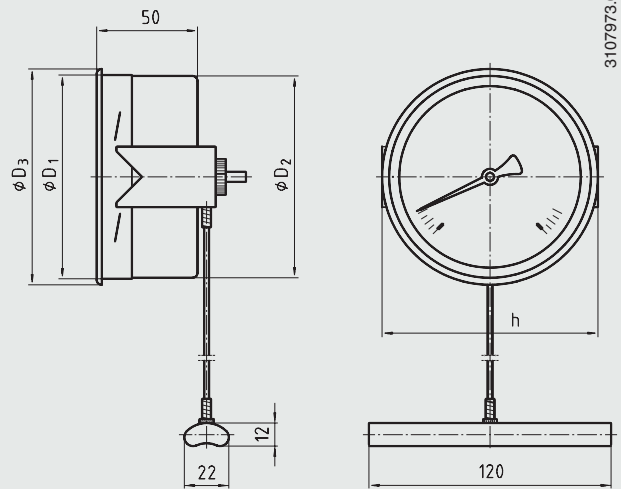
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Model F73, with contact bulb
Capillary and panel mounting flange



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Model F73, with contact bulb
Capillary and triangular bezel with clamp



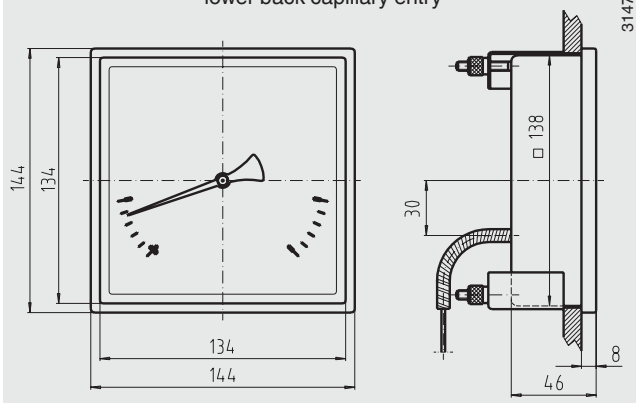
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Table of dimensions for model F73 (with contact bulb and capillary)

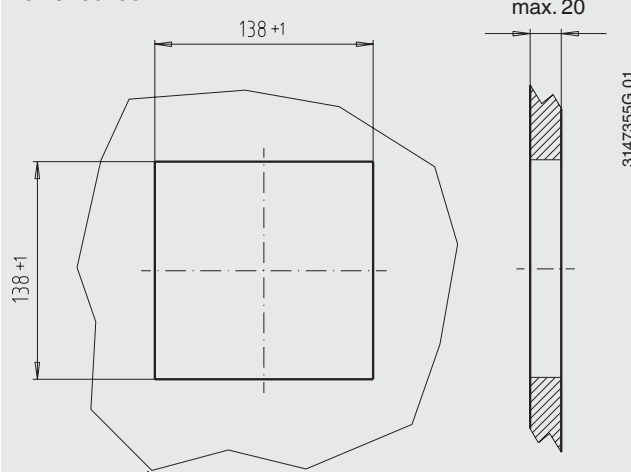
Nominal size NS	Dimensions in mm					Weight in kg				
	b	b ₁	d ₁	d ₂	d ₃	D ₁	D ₂	D ₃	h	
100	50	53	116	132	4.8	101	99	107	107	1.4
160	50	53	178	196	5.8	161	159	166	172	1.8

Model Q73.144, edgewise panel design

Edgewise panel case, 144 x 144 mm,
lower back capillary entry



Panel cutout in mm



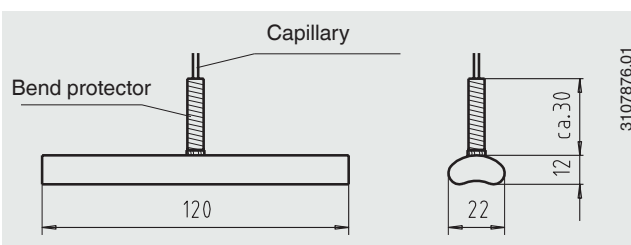
Mounting instructions for contact bulb

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.



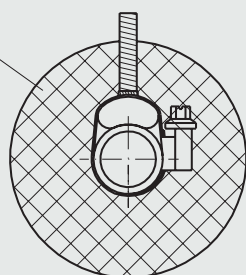
■ Mounting on tanks

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.

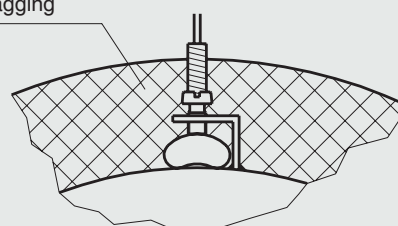
Tube clip mounting

Lagging



Angle bracket mounting

Lagging



Ordering information

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

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