

Expansion thermometer Model 70, stainless steel version

WIKA data sheet TM 81.01



for further approvals
see page 8

Applications

- General-purpose temperature measuring instruments for gaseous, liquid and highly-viscous process media in harsh working environments
- Refrigeration industry
- Machine building

Special features

- Case and stem made of stainless steel
- Design per EN 13190
- Different designs of connection and mounting
- With capillary
- With various fixed connections



Fig. left: expansion thermometer model M70.50.100
Fig. right: expansion thermometer model B70.50.063

Description

This series of thermometers is universally suitable for machine building, refrigeration and air-conditioning industry. Expansion thermometers can be installed in or mounted at nearly all locations. Versions with capillaries are used in locations which are not easily accessible and where long distances have to be bridged.

Case, capillary, stem and process connection are made from stainless steel. Various insertion lengths and process connections are available to match the requirements of each measuring location optimally.

Standard version

Measuring principle

Bourdon tube system

Nominal size in mm

63, 100, 160

Design of 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 (sliding on capillary)

Instrument version and type of mounting

- B Instruments with capillary; centre back mount
triangular bezel with bracket
- H Instruments with capillary; lower mount (radial)
surface mounting flange
- M Instruments with capillary; lower mount (radial)
surface mounting bracket, aluminium die cast
- V Instruments with capillary; back mount ¹⁾
panel mounting flange
- A Back mount ¹⁾, fix
plain stem, threaded connection or thermowell
- R Lower mount (radial), fix
plain stem, threaded connection or thermowell
- S Back mount ¹⁾, fix
plain stem, threaded connection or thermowell;
swivelling approx. 90 °

1) eccentric; NS 63: centric

Fill medium measuring system

Xylol or silicon oil

Accuracy class

Class 2

Rated operating ranges and conditions

EN 13190

Capillary entry

Lower or back

Case

Stainless steel

Bezel ring

Stainless steel

Connection

Stainless steel 1.4571

Capillary

Length to customer specifications (max. 10 m), Ø 2 mm,
stainless steel 1.4571, bending radius not less than 6 mm

Stem

Ø 8 mm, stainless steel 1.4571

Active length of sensor

Depending on Ø d and scale range

Dial

Aluminium, white, black lettering

Pointer

Aluminium, black

Window

NS 100, 160: Instrument glass

NS 63: Transparent plastic

Temperature limits for storage and transport

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

-20 ... +60 °C (EN 13190) with food-compatible liquid
damping

-50 ... +60 °C (EN 13190) with liquid damping

Ambient temperature limit at the case

0 ... 40 °C max. (others on request)

Pressure rating of stem

25 bar max., static

Ingress protection

IP 65 per EN 60529 / IEC 529

Options

- Scale range °F, °C/°F (dual scale)
- Laminated safety glass, clear plastic
- Ambient temperature compensation
- Accuracy class 1.0
- Thermowell per DIN or to customer specification
- Surface mounting bracket from other materials and in other lengths (A)
- Liquid filling case with
 - NS 63: Model X70.53.063
 - NS 100: Model X70.53.100
 - NS 160: Model X70.53.160
 - Filling medium: glycerine
- Spiral protecting hose stainless steel
- Designs per DIN EN ISO 13485, medical applications on request
- Model 70 with micro switch see WIKA data sheet TV 28.01
- Stem diameter 6, 10 mm

Scale ranges, measuring ranges 1)

| Scale range in °C | Measuring range in °C | Limit error ±°C | Scale division in °C |
|----------------------|--------------------------|--------------------|-------------------------|
| -60 ... +40 | -50 ... +30 | 2 | 1 |
| -40 ... +60 | -30 ... +50 | 2 | 1 |
| -30 ... +50 | -20 ... +40 | 2 | 1 |
| -20 ... +60 | -10 ... +50 | 2 | 1 |
| -20 ... +80 | -10 ... +70 | 2 | 1 |
| 0 ... 60 | 10 ... 50 | 2 | 1 |
| 0 ... 80 | 10 ... 70 | 2 | 1 |
| 0 ... 100 | 10 ... 90 | 2 | 1 |
| 0 ... 120 | 10 ... 110 | 4 | 2 |
| 0 ... 160 | 20 ... 140 | 4 | 2 |
| 0 ... 200 | 20 ... 180 | 4 | 2 |
| 0 ... 250 | 30 ... 220 | 5 | 5 |
| 0 ... 300 | 30 ... 270 | 10 | 10 |
| 0 ... 400 | 50 ... 350 | 10 | 10 |

Other scale ranges on request.

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

Models

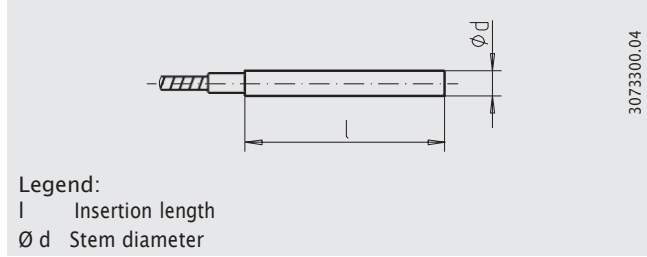
| Model | NS | Connection location | Type of mounting |
|---|-------------------|---|--|
| B70.50 (instruments without liquid filling) B70.53 (instruments with liquid filling) | 063 | Centre back mount | Triangular bezel with bracket |
| H70.50 (instruments without liquid filling) H70.53 (instruments with liquid filling) | 063 100 160 | Lower mount (radial) | Surface mounting flange |
| M70.50 (instruments without liquid filling) M70.53 (instruments with liquid filling) | 063 100 160 | Lower mount (radial) | Surface mounting bracket |
| V70.50 (instruments without liquid filling) V70.53 (instruments with liquid filling) | 063 100 160 | Centre back mount Lower back mount | Panel mounting flange |
| A70.50 (instruments without liquid filling) A70.53 (instruments with liquid filling) | 063 100 | Centre back mount, fix Lower back mount, fix | via connection (plain stem), threaded connection or thermowell |
| R70.50 (instruments without liquid filling) R70.53 (instruments with liquid filling) | 063 100 | Lower mount (radial), fix | via connection (plain stem), threaded connection or thermowell |
| S70.50 (instruments without liquid filling) S70.53 (instruments with liquid filling) | 063 100 | Centre back mount, fix Lower back mount, fix | via connection (plain stem), threaded connection or thermowell; swivelling approx. 90 ° |

Connection designs

Design 1, plain connection (without thread)

Insertion length $l_1 = 140, 200, 240, 290$ mm

Basis for design 4, compression fitting

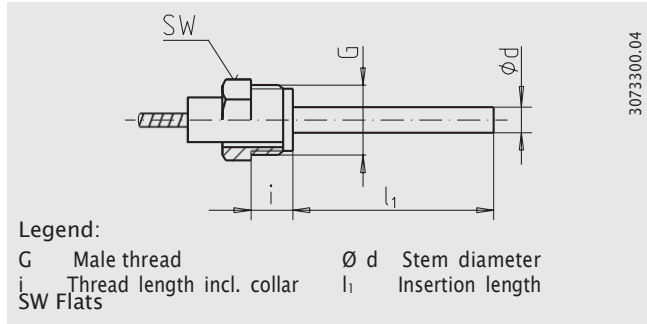


Design 2, male nut

Process connection: G $\frac{1}{2}$ B

Insertion length $l_1 = 80, 140, 180, 230$ mm

| Process connection | Dimensions in mm | |
|--------------------|------------------|----|
| G | SW | i |
| G $\frac{1}{2}$ B | 27 | 20 |

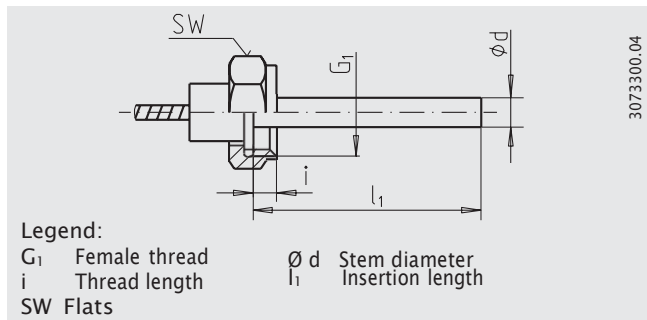


Design 3, union nut

Process connection: G $\frac{1}{2}$, G $\frac{3}{4}$, M24 x 1.5

Insertion length $l_1 = 89, 126, 186, 226, 276$ mm

| Process connection | Dimensions in mm | |
|--------------------|------------------|------|
| G | SW | i |
| G $\frac{1}{2}$ | 27 | 8.5 |
| G $\frac{3}{4}$ | 32 | 10.5 |
| M24 x 1.5 | 32 | 13.5 |



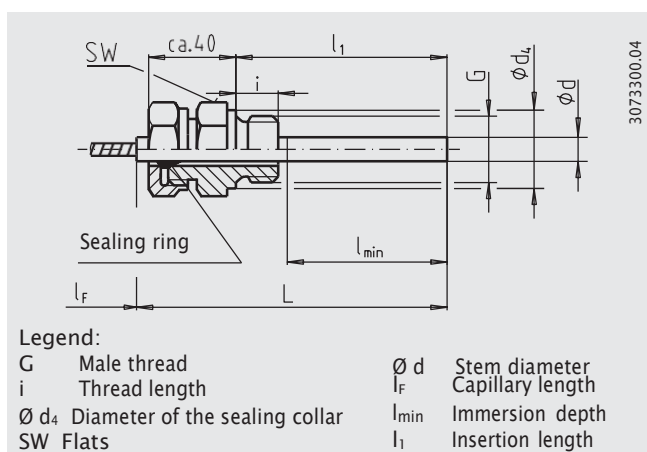
Design 4, compression fitting (sliding on stem)

Process connection: G $\frac{1}{2}$ B, G $\frac{3}{4}$ B, M18 x 1.5, $\frac{1}{2}$ NPT, $\frac{3}{4}$ NPT

Insertion length $l_1 = 100, 160, 200, 250$ mm

(the insertion length used can be reduced to a minimum immersion length of $l_{\min} = 60$ mm)

| Process connection | Dimensions in mm | | |
|--------------------|------------------|-------|----|
| G | SW | d_4 | i |
| G $\frac{1}{2}$ B | 27 | 26 | 14 |
| G $\frac{3}{4}$ B | 32 | 32 | 16 |
| M18 x 1.5 | 24 | 23 | 12 |
| $\frac{1}{2}$ NPT | 22 | - | 19 |
| $\frac{3}{4}$ NPT | 30 | - | 20 |



Design 5, union nut with fitting

Union nut: G 1/2

Process connection: G 1/2 B, G 3/4 B or 1/2 NPT, 3/4 NPT

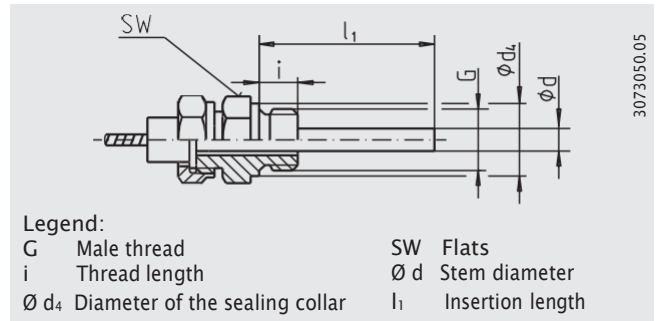
Option:

Union nut: M24 x 1.5

Process connection: M18 x 1.5

Insertion length $l_1 = 63, 100, 160, 200, 250$ mm

| Process connection | Dimensions in mm | | |
|--------------------|------------------|-------|----|
| | SW | d_4 | i |
| G 1/2 B | 27 | 26 | 14 |
| G 3/4 B | 32 | 32 | 16 |
| M18 x 1.5 | 24 | 23 | 12 |
| 1/2 NPT | 22 | - | 19 |
| 3/4 NPT | 30 | - | 20 |



Legend:
 G Male thread
 i Thread length
 phi d4 Diameter of the sealing collar
 SW Flats
 phi d Stem diameter
 l1 Insertion length

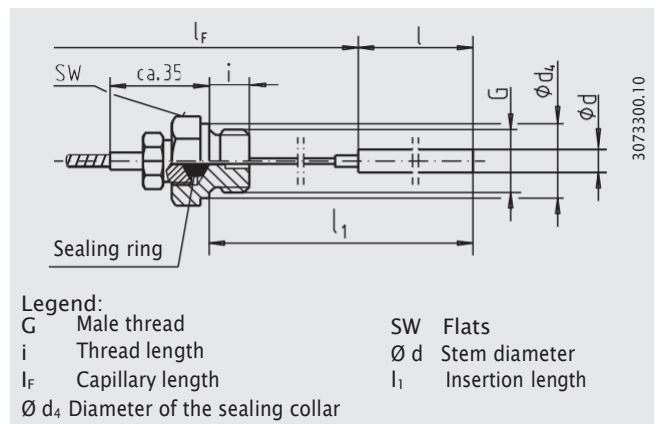
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Design 6, compression fitting (sliding on capillary)

Process connection: G 1/2 B, G 3/4 B or 1/2 NPT, 3/4 NPT

Insertion length $l = 100, 140, 200, 240, 290$ mm

| Process connection | Dimensions in mm | | |
|--------------------|------------------|-------|----|
| | SW | d_4 | i |
| G 1/2 B | 27 | 26 | 14 |
| G 3/4 B | 32 | 32 | 16 |
| 1/2 NPT | 22 | - | 19 |
| 3/4 NPT | 30 | - | 20 |

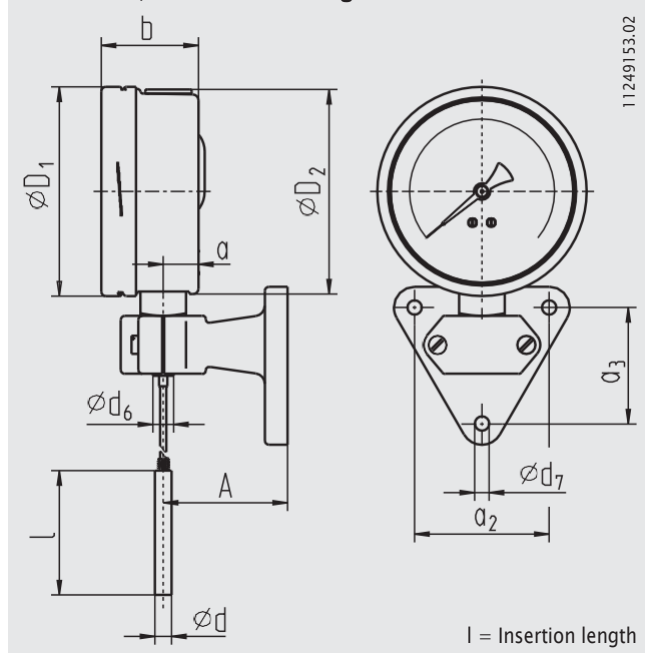


Legend:
 G Male thread
 i Thread length
 lF Capillary length
 phi d4 Diameter of the sealing collar
 SW Flats
 phi d Stem diameter
 l1 Insertion length

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Dimensions in mm

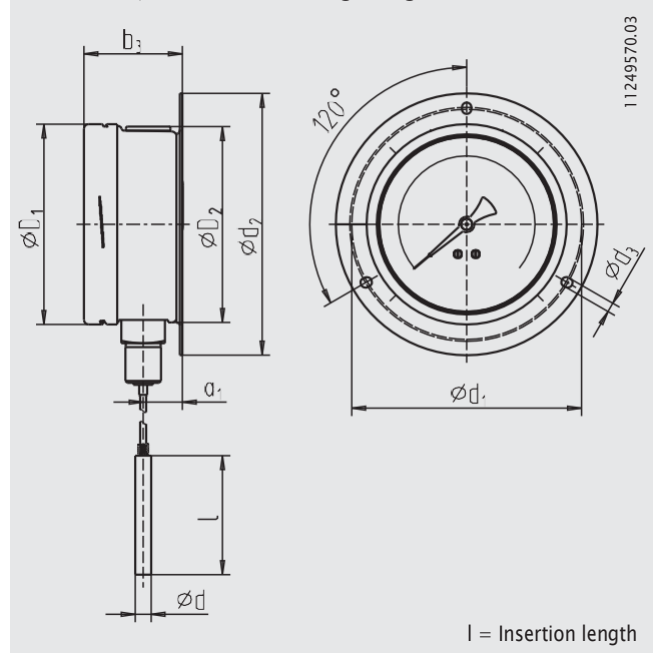
Model M70, surface mounting bracket



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l = Insertion length

Model H70, surface mounting flange

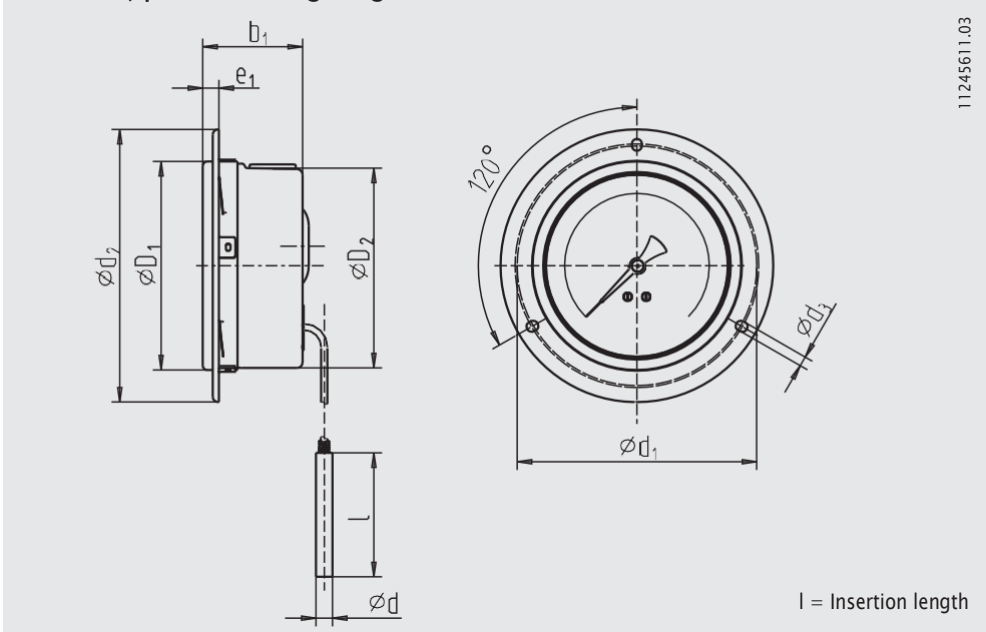


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l = Insertion length

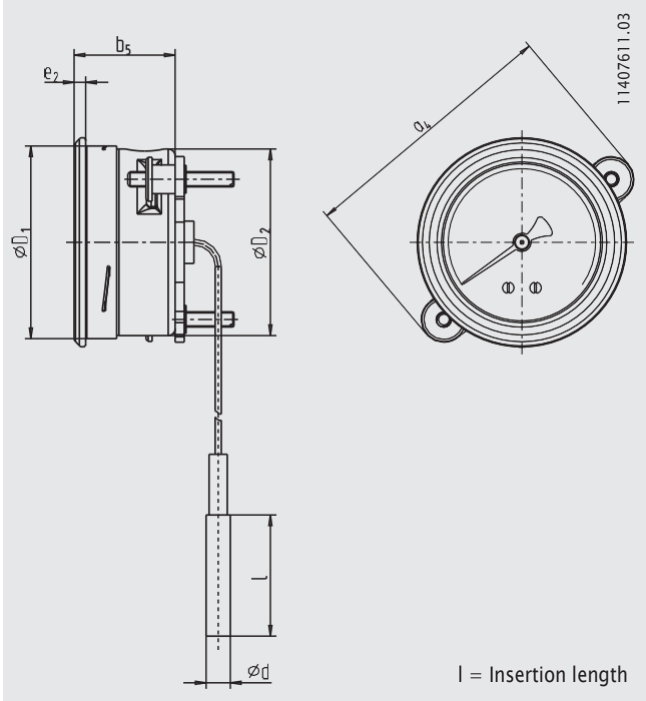
| NS | Dimensions in mm | | | | | | | | | | | | | | | Weight in kg | |
|-----|------------------|----|----|----|------|------|------|-----|------|------|------|------|------|----|-------|--------------|------|
| | a | a1 | a2 | a3 | b | b1 | b3 | Ø d | Ø d1 | Ø d2 | Ø d3 | Ø d6 | Ø d7 | A | Ø D1 | | Ø D2 |
| 63 | 10.5 | 13 | 65 | 56 | 32.5 | 32.5 | 34.5 | 8 | 75 | 85 | 3.6 | 14 | 7 | 60 | 63.5 | 62 | 0.4 |
| 100 | 15.5 | 22 | 65 | 56 | 49.5 | 49.5 | 50.0 | 8 | 116 | 132 | 4.8 | 18 | 7 | 60 | 101.0 | 99 | 0.9 |
| 160 | 15.5 | 22 | 65 | 56 | 49.5 | - | 50.0 | 8 | 178 | 196 | 6.0 | 18 | 7 | 60 | 161.0 | 159 | 1.40 |

Model V70, panel mounting flange



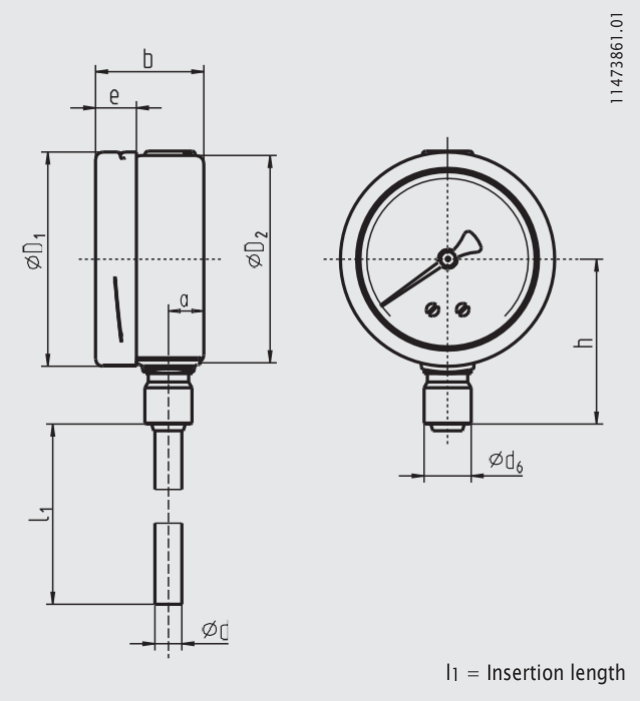
| NS | Dimensions in mm | | | | | | | | Weight in kg |
|-----|------------------|-----|------------------|------------------|------------------|----------------|------------------|------------------|--------------|
| | b ₁ | Ø d | Ø d ₁ | Ø d ₂ | Ø d ₃ | e ₁ | Ø D ₁ | Ø D ₂ | |
| 63 | 32.5 | 8 | 75 | 85 | 3.6 | 5 | 63.5 | 62 | 0.4 |
| 100 | 49.5 | 8 | 116 | 132 | 4.8 | 8 | 101.0 | 99 | 0.9 |
| 160 | - | 8 | 178 | 196 | 6.0 | 8 | 161.0 | 159 | 1.40 |

Model B70, triangular bezel with bracket



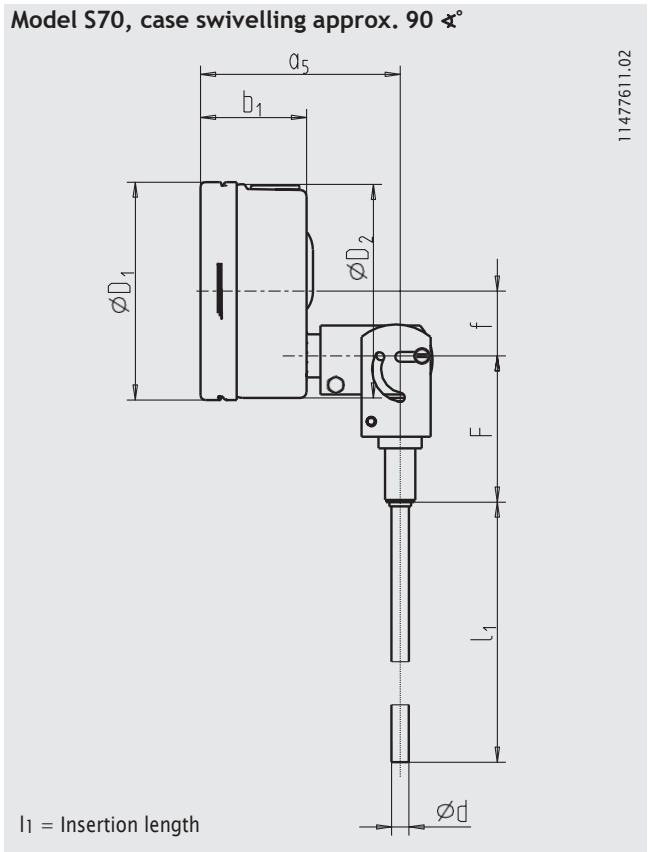
| NS | Dimensions in mm | | | | | Weight in kg |
|----|------------------|----------------|-----|----------------|------------------|--------------|
| | a ₄ | b ₅ | Ø d | e ₂ | Ø D ₁ | |
| 63 | 87 | 33.5 | 8 | 4 | 63.5 | 0.4 |

Model R70, lower mount



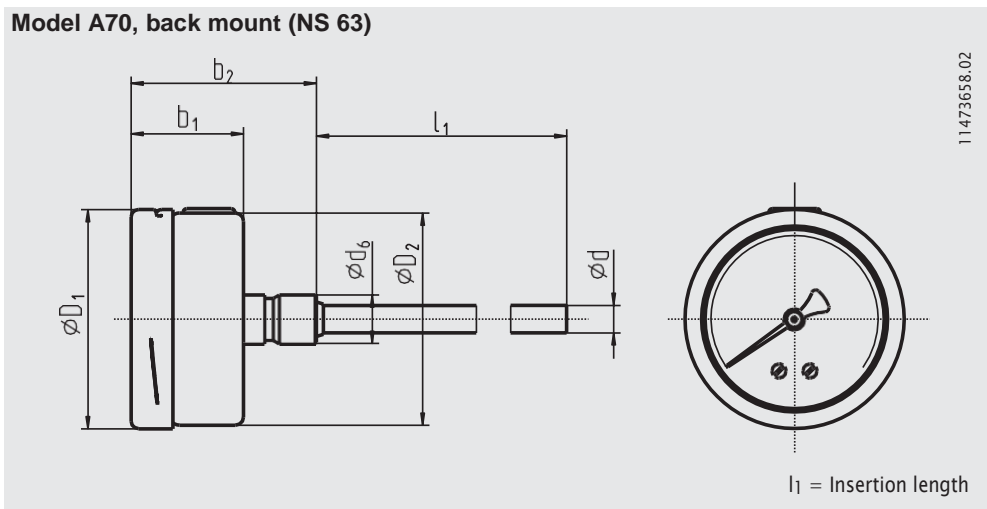
| NS | Dimensions in mm | | | | | | | Weight in kg |
|-----|------------------|------|-----|------------------|------|------|------------------|--------------|
| | a | b | Ø d | Ø d ₆ | e | h | Ø D ₁ | |
| 63 | 10.5 | 32.5 | 8 | 14 | 12.2 | 49.0 | 63.5 | 0.4 |
| 100 | 15.5 | 49.5 | 8 | 18 | 16.8 | 68.5 | 101.0 | 0.9 |

Model S70, case swivelling approx. 90°



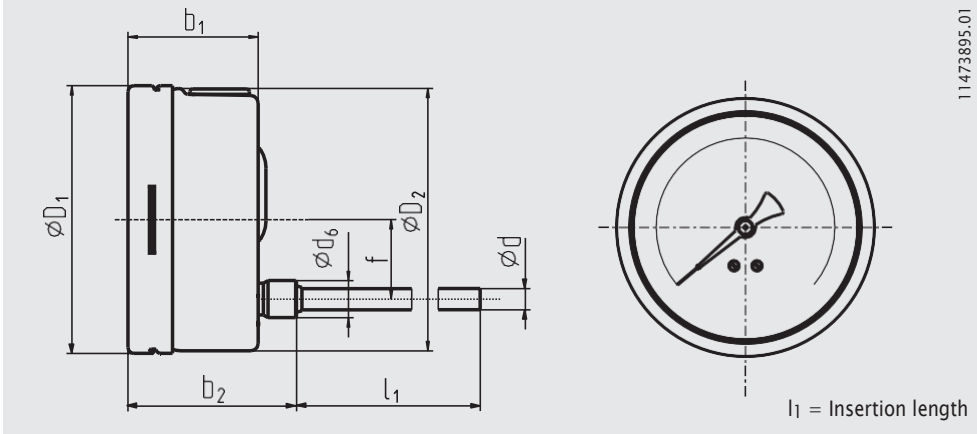
| NS | Dimensions in mm | | | | | | | Weight in kg |
|-----|------------------|----------------|-----|----|------------------|------------------|----|--------------|
| | a ₅ | b ₁ | Ø d | f | Ø D ₁ | Ø D ₂ | F | |
| 63 | 83 | 32.5 | 8 | 0 | 63.5 | 62 | 68 | 0.4 |
| 100 | 93 | 49.5 | 8 | 30 | 101.0 | 99 | 68 | 0.9 |

Model A70, back mount (NS 63)



| NS | Dimensions in mm | | | | | | Weight in kg |
|----|------------------|----------------|-----|------------------|------------------|------------------|--------------|
| | b ₁ | b ₂ | Ø d | Ø d ₆ | Ø D ₁ | Ø D ₂ | |
| 63 | 32.5 | 54.0 | 8 | 14 | 63.5 | 62 | 0.4 |

Model A70, back mount (NS 100)



| NS | Dimensions in mm | | | | | | | Weight in kg |
|-----|------------------|-------|-----------------|-------------------|-----|-------------------|-------------------|--------------|
| | b_1 | b_2 | $\varnothing d$ | $\varnothing d_6$ | f | $\varnothing D_1$ | $\varnothing D_2$ | |
| 100 | 49.5 | 63.5 | 8 | 18 | 30 | 101.0 | 99 | 0.9 |

Approvals

- GOST-R, import certificate, Russia
- GOST, metrology/measurement technology, Russia
- CRN, safety (e.g. electr. safety, overpressure, ...), Canada,

Approvals and certificates, see website