

Bourdon tube pressure gauge, stainless steel

For the process industry, standard version

Models 232.50, 233.50, NS 63 [2 ½"], 100 [4"] and 160 [6"]

WIKA data sheet PM 02.02



for further approvals
see page 5

Applications

- For gaseous and liquid aggressive media that are not highly viscous or crystallising, also in aggressive environments
- Chemical and petrochemical industries, oil and gas industry, power engineering and also water and wastewater technology
- Machine building and general plant construction

Special features

- Excellent load-cycle stability and shock resistance
- With case filling (model 233.50) for applications with high dynamic pressure loads and vibrations
- Completely from stainless steel
- Scale ranges from 0 ... 0.6 to 0 ... 1,600 bar [0 ... 10 to 0 ... 20,000 psi]



Bourdon tube pressure gauge, model 232.50, NS 100 [4"]

Description

This high-quality Bourdon tube pressure gauge has been designed especially for the process industry.

The use of high-quality stainless steel materials and the robust design are geared to applications in the chemical and process engineering industries. Thus the instrument is suitable for liquid and gaseous media, also in aggressive environments.

Scale ranges of 0 ... 0.6 to 0 ... 1,600 bar [0 ... 10 to 0 ... 20,000 psi] ensure the measuring ranges required for a wide variety of applications.

WIKA manufactures and qualifies the pressure gauge in accordance with the standards EN 837-1 and ASME B40.100. This instrument has as safety function a blow-out device with blow-out plug on the back of the case. In the event of a failure, overpressure can escape there.

The model 233.50 with liquid-filled case is suitable for high dynamic pressure loads and vibrations.

Specifications

Basic information	
Standard	<ul style="list-style-type: none"> ■ EN 837-1 ■ ASME B40.100 <p>For information on the "Selection, installation, handling and operation of pressure gauges", see Technical information IN 00.05.</p>
Nominal size (NS)	<ul style="list-style-type: none"> ■ Ø 63 mm [2 ½"] ■ Ø 100 mm [4"] ■ Ø 160 mm [6"]
Window	Laminated safety glass (NS 63 [2 ½"]: Polycarbonate)
Case	
Design	<p>Safety level "S1" per EN 837-1</p> <p>With blow-out device at case circumference, 12 o'clock (NS 63 [2 ½"]) and on the back of the case (NS 100 [4"] and 160 [6"])</p> <p>Scale ranges ≤ 0 ... 16 bar [≤ 0 ... 300 psi] with compensating valve to vent and reseal case</p>
Material	<ul style="list-style-type: none"> ■ Stainless steel 1.4301 (304) ■ Stainless steel 1.4571 (316 Ti)
Ring	Bayonet ring, stainless steel
Mounting	<ul style="list-style-type: none"> ■ Without ■ Panel mounting flange, stainless steel ■ Panel mounting flange, polished stainless steel ■ Triangular profile ring, stainless steel polished with mounting bracket ■ Surface mounting flange, stainless steel
Case filling (model 233.50)	<ul style="list-style-type: none"> ■ Without ■ Glycerine ■ Glycerine-water mixture for NS 100 [4"] and 160 [6"] with scale range ≤ 0 ... 2.5 bar [≤ 0 ... 40 psi] or for NS 63 [2 ½"] with scale range ≤ 0 ... 4 bar [≤ 0 ... 60 psi] ■ Silicone oil
Movement	<ul style="list-style-type: none"> ■ Stainless steel ■ everlast® design

Measuring element	
Type of measuring element	Bourdon tube, C-type or helical type
Material	<ul style="list-style-type: none"> ■ Stainless steel 1.4404 (316L) ■ Monel (models 262.50 and 263.50)
Leak tightness	<ul style="list-style-type: none"> ■ Helium tested, leakage rate: < 5 · 10⁻³ mbar l/s ■ Helium tested, leakage rate: < 1 · 10⁻⁶ mbar l/s

Accuracy specifications		
Accuracy class		
NS 63 [2 ½"]	■ EN 837-1	Class 1.6
	■ ASME B40.100	±2 ½ % of measuring span (grade A)
NS 100 [4"], 160 [6"]	■ EN 837-1	Class 1,0
	■ ASME B40.100	±1.0 % of measuring span (grade 1A)
Temperature error	On deviation from the reference conditions at the measuring system: ≤ ±0.4 % per 10 °C [≤ ±0.4 % per 18 °F] of full scale value	
Reference conditions		
Ambient temperature	+20 °C [68 °F]	

Scale ranges

Scale range	
bar	kg/cm ²
0 ... 0.6 ¹⁾	0 ... 0.6 ¹⁾
0 ... 1	0 ... 1
0 ... 1.6	0 ... 1.6
0 ... 2.5	0 ... 2.5
0 ... 4	0 ... 4
0 ... 6	0 ... 6
0 ... 10	0 ... 10
0 ... 16	0 ... 16
0 ... 25	0 ... 25
0 ... 40	0 ... 40
0 ... 60	0 ... 60
0 ... 100	0 ... 100
0 ... 160	0 ... 160
0 ... 250	0 ... 250
0 ... 400	0 ... 400
0 ... 600	0 ... 600
0 ... 1,000	0 ... 1,000
0 ... 1,600	0 ... 1,600
kPa	MPa
0 ... 60 ¹⁾	0 ... 0.06 ¹⁾
0 ... 100	0 ... 0.1
0 ... 160	0 ... 0.16
0 ... 250	0 ... 0.25
0 ... 400	0 ... 0.4
0 ... 600	0 ... 0.6
0 ... 1,000	0 ... 1
0 ... 1,600	0 ... 1.6
0 ... 250	0 ... 2.5
0 ... 400	0 ... 4
0 ... 600	0 ... 6
0 ... 1,000	0 ... 10
0 ... 1,600	0 ... 16
0 ... 2,500	0 ... 25
0 ... 4,000	0 ... 40
0 ... 6,000	0 ... 60
0 ... 10,000	0 ... 100
0 ... 16,000	0 ... 160

1) Not available for NS 63 [2 ½"]

Scale range	
psi	psi
0 ... 10 ¹⁾	0 ... 1,000
0 ... 15	0 ... 1,500
0 ... 30	0 ... 2,000
0 ... 60	0 ... 3,000
0 ... 100	0 ... 4,000
0 ... 160	0 ... 5,000
0 ... 200	0 ... 6,000
0 ... 300	0 ... 7,500
0 ... 400	0 ... 10,000
0 ... 600	0 ... 20,000
0 ... 800	

Vacuum and +/- scale ranges

Scale range	
bar	MPa
-0.6 ... 0 ¹⁾	-0.06 ... 0 ¹⁾
-1 ... 0	-0.1 ... 0
-1 ... +0.6	-0.1 ... +0.06
-1 ... +1.5	-0.1 ... +0.15
-1 ... +3	-0.1 ... +0.3
-1 ... +5	-0.1 ... +0.5
-1 ... +9	-0.1 ... +0.9
-1 ... +15	-0.1 ... +1.5
-1 ... +24	-0.1 ... +2.4
kPa	psi
-60 ... 0 ¹⁾	-30 inHg ... 0
-100 ... 0	-30 inHg ... +15
-100 ... +60	-30 inHg ... +30
-100 ... +150	-30 inHg ... +60
-100 ... +300	-30 inHg ... +100
-100 ... +500	-30 inHg ... +160
-100 ... +900	-30 inHg ... +200
-100 ... +1,500	-30 inHg ... +300
-100 ... +2,400	

Further information on: Scale ranges

Special scale ranges

Unit

Other scale ranges on request

- bar
- psi
- kg/cm²
- kPa
- MPa

Further information on: Scale ranges	
Increased overload safety	<ul style="list-style-type: none"> ■ Without ■ 2 times ■ 3 times ■ 4 times ■ 5 times <p>The possibility of selection depends on scale range and nominal size</p>
Vacuum resistance	<ul style="list-style-type: none"> ■ Without ■ Vacuum-resistant to -1 bar
Dial	
Scale colour	Black
Material	Aluminium
Special scale	<ul style="list-style-type: none"> ■ Without ■ With temperature scale for refrigerant, e.g. for NH3: R 717 <p>Other scales or customer-specific dials, e.g. with red mark, circular arcs or circular sectors, on request</p>
Pointer	
Instrument pointer	Aluminium, black
Mark pointer/drag pointer	<ul style="list-style-type: none"> ■ Without ■ Red mark pointer on dial, fixed ■ Red mark pointer on window, adjustable ■ Mark pointer on bayonet ring, adjustable ■ Red drag pointer on window, adjustable
Pointer stop pin	<ul style="list-style-type: none"> ■ Without ■ At the zero point (only for NS 63 [2 ½"]) ■ At 6 o'clock (only for NS 100 [4"], 160 [6"])

Process connections	
Standard	<ul style="list-style-type: none"> ■ EN 837-1 ■ ISO 7 ■ ANSI/B1.20.1
Size	
EN 837-1	<ul style="list-style-type: none"> ■ G ⅛ B, male thread ■ G ¼ B, male thread ■ G ½ B, male thread ■ M12 x 1.5, male thread ■ M20 x 1.5, male thread
ISO 7	<ul style="list-style-type: none"> ■ R ¼, male thread ■ R ½, male thread
ANSI/B1.20.1	<ul style="list-style-type: none"> ■ ¼ NPT, male thread ■ ½ NPT, male thread
Restrictor	<ul style="list-style-type: none"> ■ Without ■ Ø 0,6 mm [0,024"], stainless steel ■ Ø 0,3 mm [0,012"], stainless steel
Materials (wetted)	
Process connection	<ul style="list-style-type: none"> ■ NS 100 [4"], 160 [6"]: Stainless steel 1.4404 (316L) ■ NS 63 [2 ½"]: Stainless steel 1.4571 (316 Ti) ■ Monel (models 262.50 and 263.50)
Bourdon tube	<ul style="list-style-type: none"> ■ Stainless steel 1.4404 (316L) ■ Monel (models 262.50 and 263.50)

Other process connections on request










Operating conditions		
Medium temperature		
Unfilled instruments	-40 ... +200 °C [-40 ... +392 °F]	
Instruments with glycerine filling	-20 ... +100 °C [-4 ... +212 °F]	
Instruments with silicone oil filling	-40 ... +100 °C [-40 ... +212 °F]	
Ambient temperature		
Unfilled instruments or with silicone oil filling	-40 ... +60 °C [-40 ... +140 °F]	
Instruments with glycerine filling	-20 ... +60 °C [-4 ... +140 °F]	
Pressure limitation		
NS 63 [2 ½"]	Steady	3/4 x full scale value
	Fluctuating	2/3 x full scale value
	Short time	Full scale value
NS 100 [4"], 160 [6"]	Steady	Full scale value
	Fluctuating	0.9 x full scale value
	Short time	1.3 x full scale value
Ingress protection per IEC/EN 60529	<ul style="list-style-type: none"> ■ IP65 ■ IP66 (only selectable for scale ranges from 0 ... 20 bar [0 ... 400 psi]) 	

Approvals

Approvals included in the scope of delivery

Logo	Description	Country
	EU declaration of conformity Pressure equipment directive PS > 200 bar, module A, pressure accessory	European Union
-	CRN Safety (e.g. electr. safety, overpressure, ...) For scale ranges ≤ 1,000 bar	Canada

Optional approvals

Logo	Description	Country
 	EU declaration of conformity ATEX directive Hazardous areas - Ex h Gas II 2G Ex h IIC T6 ... T1 Gb X Dust II 2D Ex h IIIC T85°C ... T450°C Db X	European Union
	EAC Hazardous areas	Eurasian Economic Community
	GOST Metrology, measurement technology	Russia
	KazInMetr Metrology, measurement technology	Kazakhstan
-	MTSCHS Permission for commissioning	Kazakhstan
	BelGIM Metrology, measurement technology	Belarus
	UkrSEPRO Metrology, measurement technology	Ukraine
	Uzstandard Metrology, measurement technology	Uzbekistan
-	CPA Metrology, measurement technology	China
	DNV GL Ships, shipbuilding (e.g. offshore)	International

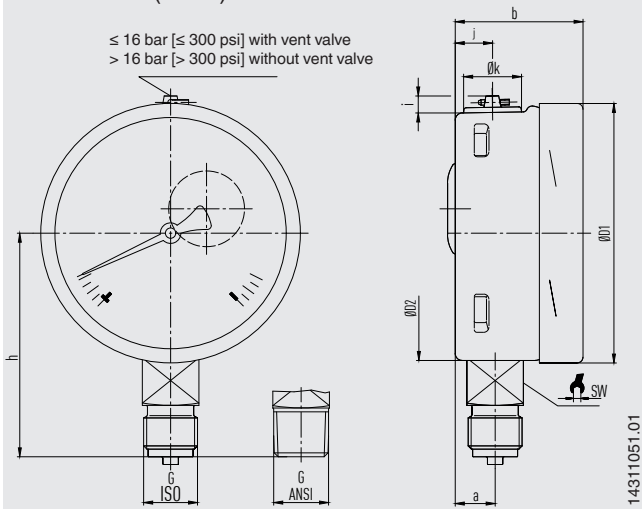
Certificates (option)

Certificates	
Certificates	<ul style="list-style-type: none"> ■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metal parts, indication accuracy) ■ PCA calibration certificate, traceable and accredited in accordance with ISO/IEC 17025 ■ Calibration certificate by the national accreditation body, traceable and accredited in accordance with ISO/IEC 17025 on request
Recommended recalibration interval	1 year (dependent on conditions of use)

→ Approvals and certificates, see website

Dimensions in mm [in]

Lower mount (radial)



NS	Weight	
	Model 232.50	Model 233.50
63 [2 ½"]	approx. 0.16 kg [0.35 lbs]	approx. 0.20 kg [0.44 lbs]
100 [4"]	approx. 0.6 kg [1.32 lbs]	approx. 0.9 kg [1.98 lbs]
160 [6"]	approx. 1.1 kg [2.43 lbs]	approx. 2.0 kg [4.41 lbs]

Process connection with thread per EN 837-1

NS	G	Dimensions in mm [in]								
		h ±1	a	b	D1	D2	i	y	k	SW
63 [2 ½"]	G ¼ B	54 [2.13]	9.5 [0.37]	33 [1.30]	63 [2.48]	62 [2.44]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
	G ⅝ B	51 [2.01]								
	M12 x 1.5	54 [2.13]								
100 [4"]	G ¼ B	80 [3.15]	15.5 [0.61]	49.5 [1.95]	101 [3.98]	99 [3.90]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	G ½ B	87 [3.43]								
	M12 x 1.5	80 [3.15]								
	M20 x 1.5	87 [3.43]								
160 [6"]	G ¼ B	111 [4.37]	15.5 [0.61]	49.5 [1.95] ¹⁾	161 [6.34]	159 [6.26]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	G ½ B	118 [4.65]								
	M12 x 1.5	111 [4.37]								
	M20 x 1.5	118 [4.65]								

Process connection with thread per ISO 7

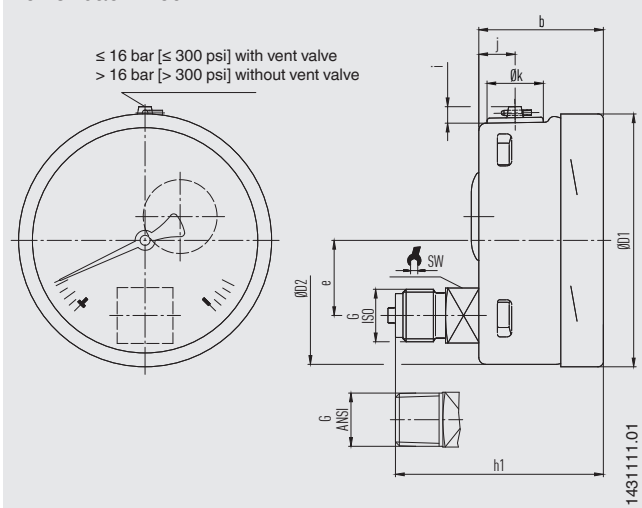
NS	G	Dimensions in mm [in]								
		h ±1	a	b	D1	D2	i	y	k	SW
63 [2 ½"]	R ¼	54 [2.13]	9.5 [0.37]	33 [1.30]	63 [2.48]	62 [2.44]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
100 [4"]	R ¼	80 [3.15]	15.5 [0.61]	49.5 [1.95]	101 [3.98]	99 [3.90]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	R ½	86 [3.39]								
160 [6"]	R ¼	111 [4.37]	15.5 [0.61]	49.5 [1.95] ¹⁾	161 [6.34]	159 [6.26]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	R ½	117 [4.60]								

Process connection with thread per ANSI/B1.20.1

NS	G	Dimensions in mm [in]								
		h ±1	a	b	D1	D2	i	y	k	SW
63 [2 ½"]	¼ NPT	54 [2.13]	9.5 [0.37]	33 [1.30]	63 [2.48]	62 [2.44]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
	⅝ NPT	51 [2.01]								
100 [4"]	¼ NPT	80 [3.15]	15.5 [0.61]	49.5 [1.95]	101 [3.98]	99 [3.90]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	½ NPT	86 [3.39]								
160 [6"]	¼ NPT	111 [4.37]	15.5 [0.61]	49.5 [1.95] ¹⁾	161 [6.34]	159 [6.26]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	½ NPT	117 [4.60]								

1) Plus 16 mm [0.630 in] with scale range 0 ... 1,600 bar [0 ... 20,000 psi]

Lower back mount



NS	Weight	
	Model 232.50	Model 233.50
63 [2 ½"]	approx. 0.16 kg [0.35 lbs]	approx. 0.20 kg [0.44 lbs]
100 [4"]	approx. 0.6 kg [1.32 lbs]	approx. 0.9 kg [1.98 lbs]
160 [6"]	approx. 1.1 kg [2.43 lbs]	approx. 2.0 kg [4.41 lbs]

Process connection with thread per EN 837-1

NS	G	Dimensions in mm [in]								
		h ±1	b	D1	D2	e	i	y	k	SW
63 [2 ½"]	G ¼ B	57 [2.24]	33 [1.30]	63 [2.48]	62 [2.44]	18.5 [0.73]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
	G ⅝ B	54 [2.13]								
	M12 x 1.5	57 [2.24]								
100 [4"]	G ¼ B	76 [2.99]	49.5 [1.95]	101 [3.98]	99 [3.90]	30 [1.18]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	G ½ B	83 [3.27]								
	M12 x 1.5	76 [2.99]								
	M20 x 1.5	83 [3.27]								
160 [6"]	G ¼ B	76 [2.99] ²⁾	49.5 [1.95] ¹⁾	161 [6.34]	159 [6.26]	50 [1.97]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	G ½ B	83 [3.27] ²⁾								
	M12 x 1.5	76 [2.99] ²⁾								
	M20 x 1.5	83 [3.27] ²⁾								

Process connection with thread per ISO 7

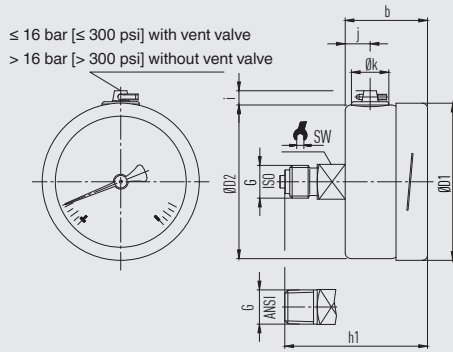
NS	G	Dimensions in mm [in]								
		h ±1	b	D1	D2	e	i	y	k	SW
63 [2 ½"]	R ¼	57 [2.24]	33 [1.30]	63 [2.48]	62 [2.44]	18.5 [0.73]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
100 [4"]	R ¼	76 [2.99]	49.5 [1.95]	101 [3.98]	99 [3.90]	30 [1.181]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	R ½	82 [3.23]								
160 [6"]	R ¼	76 [2.99] ²⁾	49.5 [1.95] ¹⁾	161 [6.34]	159 [6.26]	50 [1.97]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	R ½	82 [3.23] ²⁾								

Process connection with thread per ANSI/B1.20.1

NS	G	Dimensions in mm [in]								
		h ±1	b	D1	D2	e	i	y	k	SW
63 [2 ½"]	¼ NPT	54 [2.13]	33 [1.30]	63 [2.48]	62 [2.44]	50 [1.97]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
	⅝ NPT	51 [2.01]								
100 [4"]	¼ NPT	80 [3.15]	49.5 [1.95]	101 [3.98]	99 [3.90]	50 [1.97]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	½ NPT	86 [3.39]								
160 [6"]	¼ NPT	76 [2.99] ²⁾	49.5 [1.95] ¹⁾	161 [6.34]	159 [6.26]	50 [1.97]	6.5 [0.26]	14.5 [0.57]	22.5 [0.89]	22 [0.87]
	½ NPT	82 [3.23] ²⁾								

1) Plus 16 mm [0.630 in] with scale range 0 ... 1,600 bar [0 ... 20,000 psi]
 2) Plus 16 mm [0.630 in] with scale ranges ≥ 0 ... 100 bar [≥ 0 ... 1,500 psi]

NS 63 [2 1/2"], centre back mount



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NS	Weight	
	Model 232.50	Model 233.50
63 [2 1/2"]	approx. 0.16 kg [0.35 lbs]	approx. 0.20 kg [0.44 lbs]

Process connection with thread per EN 837-1

NS	G	Dimensions in mm [in]							
		h ± 1	b	D1	D2	i	y	k	SW
63 [2 1/2"]	G 1/4 B	57 [2.24]	33 [1.30]	63 [2.48]	62 [2.44]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
	G 1/8 B	54 [2.13]							
	M12 x 1.5	57 [2.24]							

Process connection with thread per ISO 7

NS	G	Dimensions in mm [in]							
		h ± 1	b	D1	D2	i	y	k	SW
63 [2 1/2"]	R 1/4	57 [2.24]	33 [1.30]	63 [2.48]	62 [2.44]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]

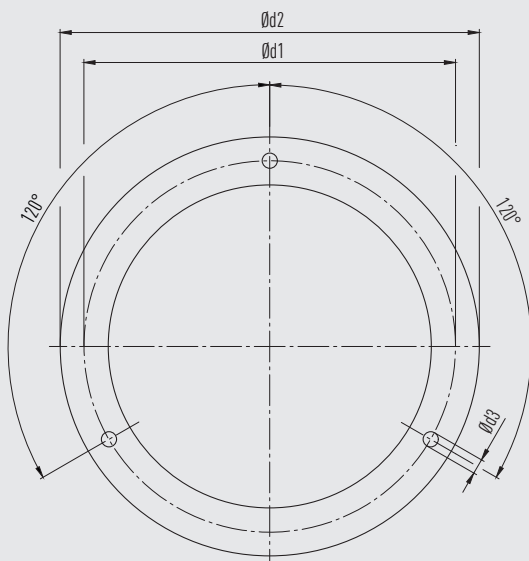
Process connection with thread per ANSI/B1.20.1

NS	G	Dimensions in mm [in]							
		h ± 1	b	D1	D2	i	y	k	SW
63 [2 1/2"]	1/4 NPT	57 [2.24]	33 [1.30]	63 [2.48]	62 [2.44]	6 [0.24]	10 [0.39]	15 [0.59]	14 [0.55]
	1/8 NPT	54 [2.13]							

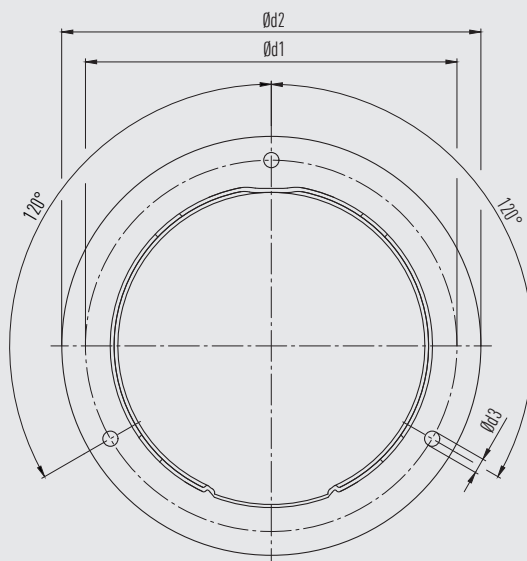
Accessories

Dimensions in mm [in]

Panel mounting flange

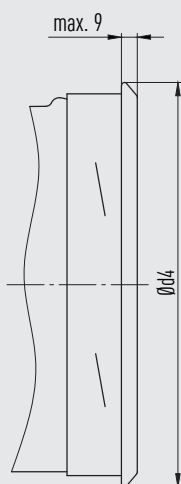


Surface mounting flange






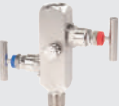



NS	Dimensions in mm [in]			
	Recommended panel cutout	d1	d2	d3
63 [2 ½"]	Ø 67 ±0.3 / Ø 2.6 [Ø 2.64 ±0.01 / Ø 0.10]	75 [2.95]	85 [3.35]	3.6 [0.14]
100 [4"]	Ø 104 ±0.5 / Ø 4.1 [Ø 4.04 ±0.02 / Ø 0.16]	117 [4.61]	132 [5.20]	4.8 [0.19]
160 [6"]	Ø 164 ±0.5 / Ø 6.5 [Ø 6.46 ±0.02 / Ø 0.26]	178 [7.01]	196 [7.71]	5.8 [0.23]

Triangular profile ring



NS	Dimensions in mm [in]	
	Recommended panel cutout	d4
63 [2 ½"]	Ø 64.5 ±0.5 / Ø 2.5 [Ø 2.54 ±0.02 / Ø 0.01]	≤ 69 [2.72]
NS 100 [4"]	Ø 102 ±1.0 / Ø 4.0 [Ø 4.02 ±0.04 / Ø 0.16]	≤ 108 [4.25]
NS 160 [6"]	Ø 162.6 ±1.0 / Ø 6.4 [Ø 6.40 ±0.04 / Ø 0.25]	≤ 168 [6.61]

Accessories and spare parts

Model	Description
	910.17 Sealings → see data sheet AC 09.08
	910.15 Syphons → see data sheet AC 09.06
	910.13 Overpressure protector → see data sheet AC 09.04
	IV10, IV11 Needle valve and multiport valve → see data sheet AC 09.22
	IV20, IV21 Block-and-bleed valve → see data sheet AC 09.19
	IVM Monoflange, process and instrument version → see data sheet AC 09.17
	BV Ball valve, process and instrument version → see data sheet AC 09.28
	IBF2, IBF3 Monoblock with flange connection → see data sheet AC 09.25

Ordering information

Model / Nominal size / Scale range / Process connection / Connection location / Options

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