

Bourdon tube pressure gauge with switch contacts

Stainless steel case, NS 40 [1 ½"], 50 [2"] and 63 [2 ½"]

Models PGS21.040, PGS21.050 and PGS21.063

WIKA data sheet PV 21.02



For further approvals,
see page 8

switchGAUGE

Applications

- Indication and monitoring of vessel pressure and for alerting the loss of contents from the vessel
- General industrial applications
- Machine building and general plant construction

Special features

- High switching reliability and long service life
- With up to two magnetic snap-action contacts or one reed switch
- Set points fixed to customer requirements
- Increased ingress protection, IP65
- Scale ranges from 0 ... 2.5 to 0 ... 400 bar
[0 ... 60 to 0 ... 6,000 psi]

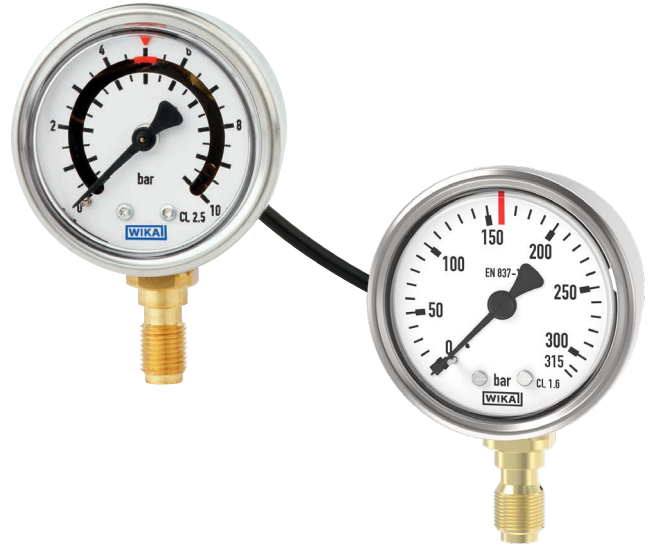


Fig. left: with magnetic snap-action contact
Fig. right: with reed switch

Description

The model PGS21 switchGAUGE is a combination of a Bourdon tube pressure gauge and either one or two switch contacts. It offers the usual analogue indication, which can be read on-site irrespective of the power supply, and in addition the possibility to switch a potential-free electrical signal.

One or two switch points are factory-set to customer requirements, fixed between 10 and 90 % of the scale range, and indicated on the dial by red mark pointers. Depending on the pointer position, the circuit will be opened or closed. Thus the switchGAUGE can be used actively for process monitoring, for example to monitor the level of a gas cylinder or a hydraulic circuit.

The switchGAUGE is available in scale ranges from 0 ... 2.5 to 0 ... 400 bar [0 ... 60 to 0 ... 6,000 psi] with an accuracy class of 2.5 and a 1 m round cable for the electrical connection. There are further versions available, e.g. with higher accuracy class, a different cable length or with plug connection. Thus, the instrument can be adapted to customer-specific requirements for each application.

The instrument has been designed in accordance with EN 837-1 and fulfils all the requirements within it. Furthermore it features increased ingress protection of IP65.

Specifications

Basic information	
Standard	
Bourdon tube pressure gauges	EN 837-1
Pressure gauges with electrical limit contact devices	DIN 16085
→ For information on the "Selection, installation, handling and operation of pressure gauges", see technical information IN 00.05.	
Nominal size (NS)	■ Ø 40 mm [1 ½"] ■ Ø 50 mm [2"] ■ Ø 63 mm [2 ½"]
Further version	■ Bourdon tube pressure gauge with electronic pressure switch; model PGS25; data sheet PV 21.04 ■ Bourdon tube pressure gauge with switch contact, with VdS approval; models PGS21.040 and PGS21.050; data sheet SP 21.03
Window	Polycarbonate (PC)
Case	
Design	Safety level "S1" per EN 837-1: with blow-out device
Material	Stainless steel 1.4301 (304)
Movement	Copper alloy

Measuring element	
Type of measuring element	Bourdon tube, C-type or helical type
Materials (wetted)	Copper alloy
Leak tightness	Helium tested, leakage rate: $< 5 \cdot 10^{-5}$ mbar l/s

Accuracy specifications	
Accuracy class	■ 2.5 per EN 837-1 ■ 1.6 per EN 837-1
Switching accuracy	■ ± 2.5 % of span ■ ± 4 % of span
Temperature error	On deviation from the reference conditions at the measuring system: $\leq \pm 0.4$ %/10 K of respective full scale value
Reference conditions	
Ambient temperature	+20 °C

Scale ranges

bar	
0 ... 2.5	0 ... 60
0 ... 4	0 ... 100
0 ... 6	0 ... 160
0 ... 10	0 ... 250
0 ... 16	0 ... 315
0 ... 25	0 ... 400
0 ... 40	-

psi	
0 ... 60	0 ... 1,000
0 ... 100	0 ... 1,500
0 ... 160	0 ... 2,000
0 ... 200	0 ... 3,000
0 ... 300	0 ... 4,000
0 ... 400	0 ... 5,000
0 ... 600	0 ... 6,000
0 ... 800	-

kPa	
0 ... 250	0 ... 4,000
0 ... 400	0 ... 6,000
0 ... 600	0 ... 10,000
0 ... 1,000	0 ... 16,000
0 ... 1,600	0 ... 25,000
0 ... 2,500	0 ... 40,000

kg/cm ²	
0 ... 2.5	0 ... 40
0 ... 4	0 ... 60
0 ... 6	0 ... 100
0 ... 10	0 ... 160
0 ... 16	0 ... 250
0 ... 25	0 ... 400

MPa	
0 ... 0.25	0 ... 4
0 ... 0.4	0 ... 6
0 ... 0.6	0 ... 10
0 ... 1	0 ... 16
0 ... 1.6	0 ... 25
0 ... 2.5	0 ... 40

Vacuum and compound scale ranges

bar	
-0.6 ... 0	-1 ... +5
-1 ... 0	-1 ... +9
-1 ... +0.6	-1 ... +15
-1 ... +1.5	-1 ... +24
-1 ... +3	-

psi	
-30 inHg ... 0	-30 inHg ... +100
-30 inHg ... +15	-30 inHg ... +160
-30 inHg ... +30	-30 inHg ... +200
-30 inHg ... +60	-30 inHg ... +300

kPa	
-60 ... 0	-100 ... +500
-100 ... 0	-100 ... +900
-100 ... +60	-100 ... +1,500
-100 ... +150	-100 ... +2,400
-100 ... +300	-

MPa	
-0.06 ... 0	-0.1 ... +0.5
-0.1 ... 0	-0.1 ... +0.9
-0.1 ... +0.06	-0.1 ... +1.5
-0.1 ... +0.15	-0.1 ... +2.4
-0.1 ... +0.3	-

→ Other scale ranges on request

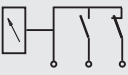
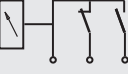
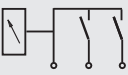
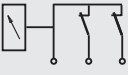
Further details on: scale ranges		
Unit	bar psi kg/cm² MPa kPa	
	Other units on request	
Dial		
Scale layout	Single scale Dual scale	
Scale colour	Single scale	Black
	Dual scale	Black/red
Material	Aluminium	
Customer-specific version	→ Other scales, e.g. with red mark, circular arcs or circular sectors, on request	
Instrument pointer		
Magnetic snap-action contact	Plastic, black	
Reed switch	Aluminium, black	
Set pointer ¹⁾	Plastic, red (only for magnetic snap-action contact)	

1) There is no set pointer for the reed switch, but there is a red mark on the dial.

Process connection	
Standard	EN 837
	ANSI/B1.20.1
	ISO 7
Size	
EN 837-1	G ½ B, male thread G ¼ B, male thread M10 x 1, male thread
ANSI/B1.20.1	½ NPT, male thread ¼ NPT, male thread
ISO 7	R ½, male thread R ¼, male thread
Materials (wetted)	
Measuring element	Copper alloy
Process connection with lower measuring flange	Copper alloy

→ Other process connections on request

Output signal: Magnetic snap-action contact	
Type of contact	Magnetic snap-action contact
Number of switch contacts	
NS 40 [1 ½"], NS 63 [2 ½"]	1 contact
NS 50 [2"]	■ 1 contact ■ 2 contacts
Switching function	→ See table "Switching function"
Switch point setting	Set pointer factory-set, fixed within scale range
Setting range (recommended)	10 ... 90 % of span (0 ... 100 % on request)
Distance between switch points	With a version with 2 contacts, these must not be set to the same point. The required distance is approx. 15 % of the span.
Switching current	5 ... 100 mA
Switching voltage	DC / AC 4.5 ... 24 V
Switching power	≤ 2.4 W

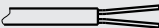
Switching function Magnetic snap-action contact	Index	Symbol	Setting direction	Code
1 normally open (NO)	1		Contact makes with clockwise pointer motion	1
			Contact makes with anticlockwise pointer motion	5
1 normally closed (NC)	2		Contact breaks with clockwise pointer motion	2
			Contact breaks with anticlockwise pointer motion	4
1 normally open + 1 normally closed	12		For setting directions of the switching functions, see NO or NC	-
1 normally closed + 1 normally open	21		For setting directions of the switching functions, see NO or NC	-
2 normally open	11		For setting directions of the switching functions, see NO or NC	-
2 normally closed	22		For setting directions of the switching functions, see NO or NC	-

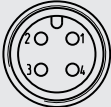
Electrical connection				
Connection type	IP code ¹⁾	Wire cross-section	Cable diameter	Cable material
Cable outlet				
Unshielded	IP67	3 x 0.14 mm ²	4 mm	PUR
Angular connector DIN 175301-803 C				
With mating connector	IP65	To max. 0.75 mm ²	4.5 ... 6 mm	-
Circular connector M12 x 1 (4-pin)				
Without mating connector	IP67	-	-	-
Circular connector M8 x 1 (3-pin)				
Without mating connector	IP67	-	-	-

1) The stated IP codes only apply when plugged in using mating connectors that have the appropriate IP code.

Output signal: reed switch, model 851	
Type of contact	Bistable reed switch
Number of switch contacts	1 switch contact
Switching function	→ See table "Switching function"
Switch point setting	Factory-set, fixed within scale range (red mark on the dial)
Setting range (recommended)	10 ... 90 % of span
Switch hysteresis	< 4 %
Switching current	≤ AC/DC 0.5 A
Switching voltage	≤ AC/DC 48 V
Switching power	≤ 5 W, 5 VA
Contact resistance (static)	150 mΩ
Insulation resistance	10 ⁹ Ω
Breakdown voltage	DC 200 V
Switching time incl. contact bounce	4.5 ms

Switching function Reed switch, model 851	Index	Setting direction
Normally open (NO)	1	Contact makes with clockwise pointer motion
Normally closed (NC)	2	Contact breaks with clockwise pointer motion
Change-over	3	One contact breaks and one contact makes simultaneously when pointer reaches set point

Cable outlet, cable ends tin-coated for soldered joints per standard IPC-WHMA-A-620A			
		1 contact	2 contacts
	U _B	Red	Red
	SP1	Black	Orange
	SP2	-	Black

Circular connector M12 x 1 (4-pin) ¹⁾			
		1 contact	2 contacts
	U _B	1	1
	SP1	4	4
	SP2	-	2

1) Only available for NS 40 and 50

Angular connector DIN 175301-803 C ¹⁾			
		1 contact	2 contacts
	U _B	1	1
	SP1	2	2
	SP2	-	3

Circular connector M8 x 1 (3-pin) ¹⁾			
		1 contact	2 contacts
	U _B	1	1
	SP1	4	4
	SP2	-	3

Legend

- U_B Positive power supply terminal
- SP1 Normally open/normally closed for switch contact 1
- SP2 Normally open/normally closed for switch contact 2

Operating conditions	
Medium temperature range	≤ +60 °C [+140 °F]
Ambient temperature range	-20 ... +60 °C [-4 ... +140 °F]
Storage temperature range	-40 ... +70 °C [-40 ... +158 °F]
Pressure limitation	
Steady	3/4 x full scale value
Fluctuating	2/3 x full scale value
Ingress protection per IEC/EN 60529	IP65

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	RoHS directive	

Optional approvals

Logo	Description	Region
	PAC Kazakhstan Metrology, measurement technology	Kazakhstan
-	PAC Ukraine Metrology, measurement technology	Ukraine
	PAC Uzbekistan Metrology, measurement technology	Uzbekistan
-	CRN Safety (e.g. electr. safety, overpressure, ...)	Canada

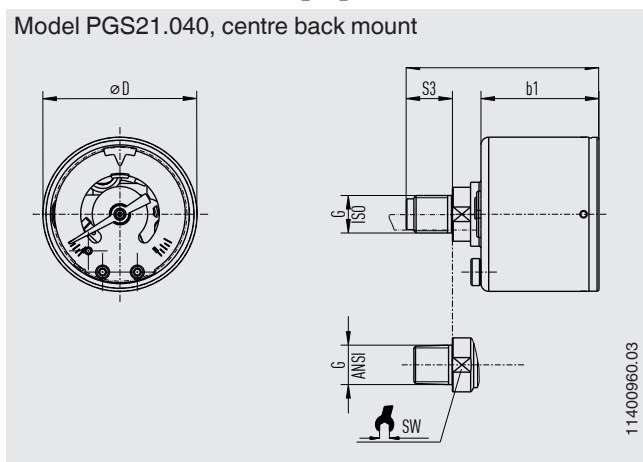
Certificates

Description	
Certificates	■ 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. indication accuracy)
Recommended calibration interval	1 year (dependent on conditions of use)

→ For approvals and certificates, see website

Dimensions in mm [in]

Model PGS21.040, centre back mount

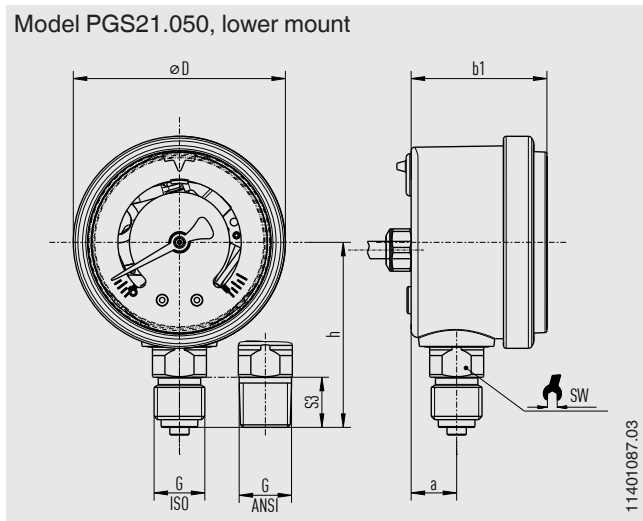


This drawing and all subsequent ones show the magnetic snap-action contact version as an example. The reed switch version has identical dimensions.

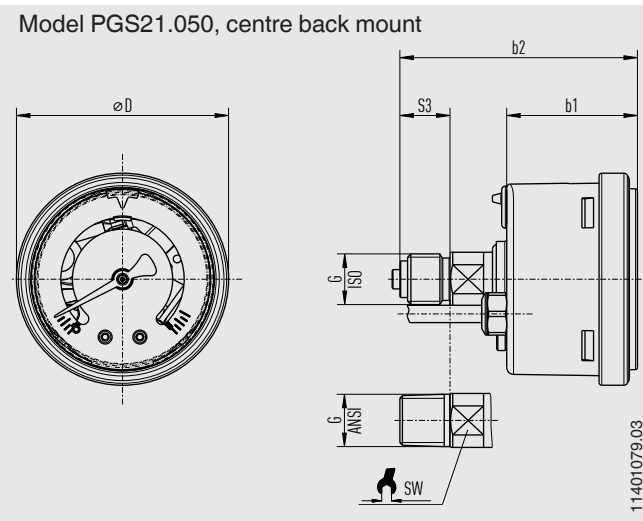
NS 40 [1 ½"], 1 contact

G	Dimensions in mm [in]				
	D	b1 ±0.5 [±0.02]	b2 ±1 [±0.04]	S3	SW
G ⅛ B	40 [1.57]	30.5 [1.2]	53 [2.09]	12 [0.47]	14 [0.55]
G ¼ B	40 [1.57]	30.5 [1.2]	54 [2.13]	13 [0.51]	14 [0.55]
M10 x 1	40 [1.57]	30.5 [1.2]	51.5 [2.03]	10.5 [0.41]	14 [0.55]
⅛ NPT	40 [1.57]	30.5 [1.2]	51 [2.01]	10 [0.39]	14 [0.55]
¼ NPT	40 [1.57]	30.5 [1.2]	54 [2.13]	13 [0.51]	14 [0.55]
R ⅛	40 [1.57]	30.5 [1.2]	51 [2.01]	10 [0.39]	14 [0.55]
R ¼	40 [1.57]	30.5 [1.2]	54 [2.13]	13 [0.51]	14 [0.55]

Model PGS21.050, lower mount



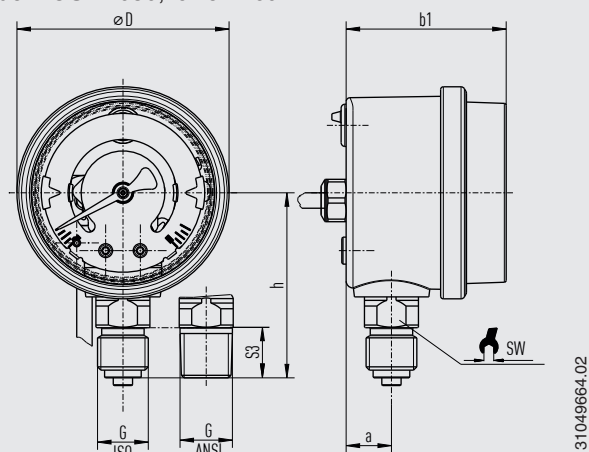
Model PGS21.050, centre back mount



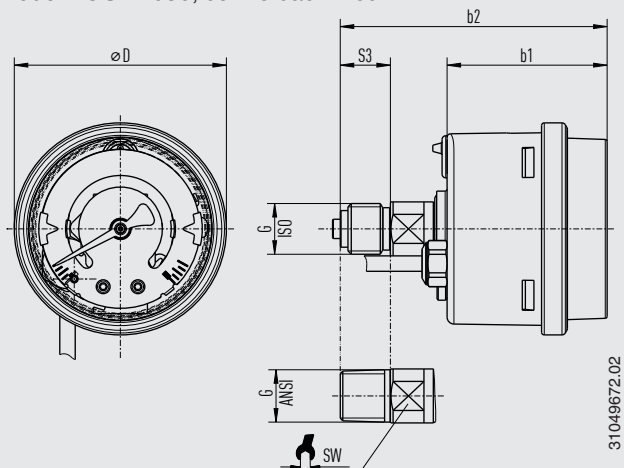
NS 50 [2"], 1 contact

G	Dimensions in mm [in]					
	D	h	b1 ±0.5 [±0.02]	b2 ±1 [±0.04]	S3	SW
G ⅛ B	55 [2.17]	49 [1.93]	35.5 [1.4]	62 [2.44]	12 [0.47]	14 [0.55]
G ¼ B	55 [2.17]	50 [1.97]	35.5 [1.4]	63 [2.48]	13 [0.51]	14 [0.55]
M10 x 1	55 [2.17]	47.5 [1.87]	35.5 [1.4]	60.5 [2.38]	10.5 [0.41]	14 [0.55]
⅛ NPT	55 [2.17]	47 [1.85]	35.5 [1.4]	60 [2.36]	10 [0.39]	14 [0.55]
¼ NPT	55 [2.17]	50 [1.97]	35.5 [1.4]	63 [2.48]	13 [0.51]	14 [0.55]
R ⅛	55 [2.17]	47 [1.85]	35.5 [1.4]	60 [2.36]	10 [0.39]	14 [0.55]
R ¼	55 [2.17]	50 [1.97]	35.5 [1.4]	63 [2.48]	13 [0.51]	14 [0.55]

Model PGS21.050, lower mount



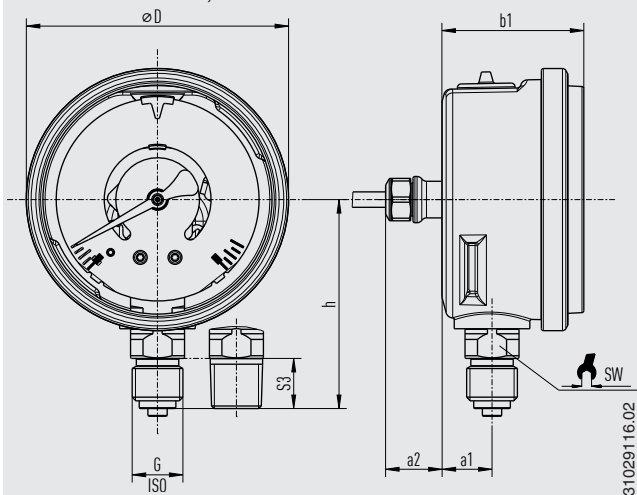
Model PGS21.050, centre back mount



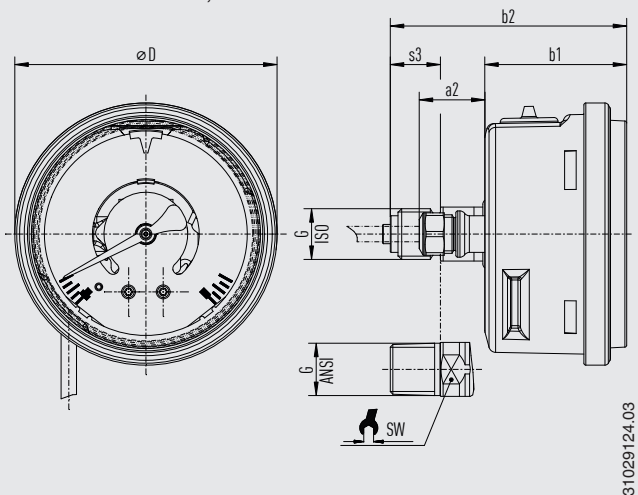
NS 50 [2"], 2 contacts (only with magnetic snap-action contact)

G	Dimensions in mm [in]					
	D	h	$b1 \pm 0.5 [\pm 0.02]$	$b2 \pm 1 [\pm 0.04]$	S3	SW
G ½ B	55 [2.17]	49 [1.93]	41.5 [1.63]	70.5 [2.76]	12 [0.47]	14 [0.55]
G ¼ B	55 [2.17]	50 [1.97]	41.5 [1.63]	71.5 [2.82]	13 [0.51]	14 [0.55]
M10 x 1	55 [2.17]	47.5 [1.87]	41.5 [1.63]	69 [2.72]	10.5 [0.41]	14 [0.55]
½ NPT	55 [2.17]	47 [1.85]	41.5 [1.63]	68.5 [2.7]	10 [0.39]	14 [0.55]
¼ NPT	55 [2.17]	50 [1.97]	41.5 [1.63]	71.5 [2.82]	13 [0.51]	14 [0.55]
R ½	55 [2.17]	47 [1.85]	41.5 [1.63]	68.5 [2.7]	10 [0.39]	14 [0.55]
R ¼	55 [2.17]	50 [1.97]	41.5 [1.63]	71.5 [2.82]	13 [0.51]	14 [0.55]

Model PGS21.063, lower mount



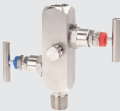
Model PGS21.063, centre back mount



NS 63 [2 ½"], 1 contact

G	Dimensions in mm [in]						
	D	h	$b1 \pm 0.5 [\pm 0.02]$	$b2 \pm 1 [\pm 0.04]$	S3	a2	SW
G ½ B	68 [2.68]	53.2 [2.09]	36.8 [1.45]	60.3 [2.37]	12 [0.47]	~ 17 [0.67]	14 [0.55]
G ¼ B	68 [2.68]	54.2 [2.13]	36.8 [1.45]	61.3 [2.41]	13 [0.51]	~ 17 [0.67]	14 [0.55]
M10 x 1	68 [2.68]	51.7 [2.03]	36.8 [1.45]	58.8 [2.15]	10.5 [0.41]	~ 17 [0.67]	14 [0.55]
½ NPT	68 [2.68]	51.2 [2.02]	36.8 [1.45]	58.3 [2.30]	10 [0.39]	~ 17 [0.67]	14 [0.55]
¼ NPT	68 [2.68]	54.2 [2.13]	36.8 [1.45]	61.3 [2.41]	13 [0.51]	~ 17 [0.67]	14 [0.55]
R ½	68 [2.68]	51.2 [2.02]	36.8 [1.45]	58.3 [2.30]	10 [0.39]	~ 17 [0.67]	14 [0.55]
R ¼	68 [2.68]	54.2 [2.13]	36.8 [1.45]	61.3 [2.41]	13 [0.51]	~ 17 [0.67]	14 [0.55]

Accessories and spare parts

Model	Description	
	910.17	Seals → 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
	IV1	Needle valve and multiport needle valve → See data sheet AC 09.22
	IV2	Block-and-bleed valve → See data sheet AC 09.19

Ordering information

Model / Nominal size / Output signal / Switching function / Scale range / Connection location / Process connection / Options

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