

Diaphragm pressure switch For the process industry Model MW

WIKA data sheet PV 31.10



for further approvals,
see page 6

Process Performance Series

Applications

- Pressure monitoring and control of processes
- Safety-critical applications in general process instrumentation, especially in the chemical and petrochemical industries, oil and gas industries, power generation incl. nuclear power plants, water/wastewater industries, mining
- For gaseous and liquid, aggressive and highly viscous or contaminated media, also in aggressive environments

Special features

- Case from 316L, IP66, NEMA 4X
- Setting ranges from 16 mbar to 600 bar, also all other equivalent vacuum or combined pressure and vacuum ranges
- Intrinsic safety Ex ia available
- 1 or 2 independent switch points, high switching power up to AC 250 V, 20 A
- Switch point repeatability < 1 %

Description

These high-quality mechanical pressure switches have been developed especially for safety-critical applications. The great advantage of mechanical pressure switches is that no supply voltage is required for the switching process.

In production, the switches are traced by quality assurance software at every step and subsequently are 100 % tested. The robust switch enclosure from stainless steel 316L can withstand the rough and corrosive operating conditions of the process industry with working ranges of up to 600 bar. The pressure switch is fitted with 1 or 2 microswitches, which make it possible to switch an electrical load of up to AC 250 V, 20 A directly.

For lower switching power ratings, such as for PLC applications, argon gas-filled microswitches with gold-plated contacts are available.



Fig. left: Model MW with threaded connection
Fig. right: Model MW with flange connection

Depending on the application, the appropriate variant for the contact version and the electrical connection can be selected; e.g. adjustable dead band instead of fixed dead band is often a feature necessary for control processes.

By using a diaphragm measuring system, the model MW pressure switch is extremely robust and guarantees optimal operating characteristics. Flanged process connections are excellently suited for measuring highly viscous, contaminated or crystallising media.

For applications with special requirements on the wetted parts, versions with materials from PTFE, Monel or Hastelloy are available.

For safety applications, the pressure switch is optionally available in a SIL 2-qualified or a SIL 3-qualified version.

Specifications

Basic information	
Version	Diaphragm pressure switch
Special design feature	■ Version for hazardous areas (Ex ia) ■ For oxygen, oil- and grease-free ■ Per NACE ¹⁾ MR0175 / ISO 15156, use in H₂S-containing environments in oil and gas production ■ Per NACE ¹⁾ MR0103 / ISO 17945, metals resistant to sulphide stress cracking ■ Version compliant with EN 1854, pressure sensing devices for gas burners and gas burning appliances ■ Version compliant with EN 12952 and EN 12953, limiting devices in water-tube and shell boilers ■ Drying of wetted parts ■ Offshore version ■ Tropical version (suitable for environments with increased air humidity) ■ Version for ammonia applications ■ Geothermal version ■ Low-temperature version to -60 °C ■ Assembled as a diaphragm seal system ■ Additional protection from stainless steel 316L or Hastelloy for setting ranges 2.5 ... 25 bar ■ Sealing towards the pressure chamber from PTFE/NBR
Contact version	→ See table "Contact version"
Function	■ 1 x SPDT (single pole double throw) ■ 2 x SPDT (single pole double throw) ■ 1 x DPDT (double pole double throw) The DPDT function is realised with 2 simultaneously triggering SPDT microswitches, within 0.2 % of span.
Dead band	■ 1 or 2 contacts with fixed dead band ■ 1 or 2 contacts with adjustable dead band ■ 1 contact with fixed dead band and 1 contact with adjustable dead band
Dielectric strength	Safety class I (IEC 61298-2: 2008)
Switch enclosure	
Design	Case cover with bayonet lock, protection against unauthorised access by lead sealing possible. Laser-engraved product label from stainless steel.
Material	Stainless steel 316L
Mounting ²⁾	■ Direct mounting ■ Wall bracket from stainless steel AISI 304 ■ Mounting bracket for 2" pipe mounting from stainless steel AISI 304

1) General information about NACE standards; see data sheet IN 00.21

2) → See page 8 for permissible mounting positions

Contact version		Electrical rating (resistive load)		Suitable for Ex ia option
		AC	DC	
With fixed dead band				
UN	1 x SPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A	No
US	1 x SPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A	Yes
UO	1 x SPDT, gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A	Yes
UG	1 x SPDT, gold-plated	125 V, 1 A	24 V, 0.5 A	Yes
DN	2 x SPDT or 1 x DPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A	No
DS	2 x SPDT or 1 x DPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A	Yes

Contact version		Electrical rating (resistive load)		Suitable for Ex ia option
		AC	DC	
DO	2 x SPDT, or 1 x DPDT gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A	Yes
DG	2 x SPDT or 1 x DPDT, gold-plated	125 V, 1 A	24 V, 0.5 A	Yes
With adjustable dead band				
UR	1 x SPDT, silver	250 V, 20 A	24 V, 2 A, 220 V, 0.5 A	Yes ²⁾
RR ³⁾	2 x SPDT or 1 x DPDT, silver	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A	Yes ²⁾
With fixed dead band and adjustable dead band				
DR ³⁾	2 x SPDT, silver (1 x UN + 1 x UR)	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A	Yes ²⁾

1) Permissible ambient temperature range: -30 ... +70 °C

2) Wika recommends argon gas-filled contact versions, use of adjustable dead band allowed.

3) Information on switching performance for this contact version on request

Sensor element		Model	Wetted parts		Permissible medium temperature ¹⁾
			Sensor element	Process connection	
Setting range 0 ... 16 mbar to 0 ... 40 bar					
XX ²⁾	Diaphragm element	MWB, MW	Stainless steel 316 ³⁾	Stainless steel 316L	-30 ... +85 °C
TX	Diaphragm element	MWB, MW	Stainless steel 316 ³⁾ + PTFE ⁴⁾	Stainless steel 316L	-30 ... +85 °C
TT	Diaphragm element	MWB, MW	Stainless steel 316 ³⁾ + PTFE ⁴⁾	Stainless steel 316L + PTFE	-30 ... +85 °C
KK ²⁾	Diaphragm element	MWB, MW	Monel ⁵⁾	Monel	-30 ... +85 °C
KX ²⁾	Diaphragm element	MWB, MW	Monel ⁵⁾	Stainless steel 316L	-30 ... +85 °C
Setting range 4 ... 40 bar to 30 ... 600 bar					
GXX ⁶⁾	Piston with welded diaphragm element	MWG	Hastelloy C276	Stainless steel 316L	-40 ... +85 °C
HXX ⁷⁾	Piston with O-ring sealing from FPM	MWH	Stainless steel 316	Stainless steel 316L	0 ... 85 °C
	Piston with O-ring sealing from NBR	MWH	Stainless steel 316	Stainless steel 316L	-10 ... +85 °C

1) Permissible medium temperature range in the main process line. Depending on the measuring assembly, this may differ from the permissible temperature at the process connection. For further information, see operating instructions.

2) Standard sealing: Model MWB with O-Ring from PTFE and model MW with O-Ring from FPM

3) Other diaphragm element material depending on setting range: Stainless steel 304: -1 ... 5, 0 ... 6, -1 ... 9, 0 ... 10 bar; Inconel 718: -1 ... 15, 0 ... 16, 0 ... 25, 0 ... 40 bar

4) PTFE coating is not available for all setting ranges → See table "Setting range"

5) Only for setting ranges ≤ 10 bar

6) Particularly suited for gaseous media

7) Particularly suited for liquid media

Other materials for wetted parts on request

Accuracy specifications	
Set point repeatability	≤ 1 % of span of setting range
Dead band	→ See table "Setting range"

Setting range for model MWB								
Span of setting range from 16 mbar to max. 100 mbar								
Standard		Variant 1		Variant 2		Dead band		
Setting range (= working range)	Proof pressure	Working range	Proof pressure	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable
in mbar		in bar	in bar	in bar	in bar	in mbar	in mbar	in mbar
0 ... 16	250	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 2.0	≤ 2.8	-
0 ... 25	250	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 2.0	≤ 3	8 ... 18
0 ... 40	300	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 2.6	≤ 3.4	8 ... 20

Setting range for model MWB Span of setting range from 16 mbar to max. 100 mbar								
Standard		Variant 1		Variant 2		Dead band		
Setting range (= working range)	Proof pressure	Working range	Proof pressure	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable
in mbar		in bar	in bar	in bar	in bar	in mbar	in mbar	in mbar
0 ... 60	300	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 3.0	≤ 4.2	12 ... 25
0 ... 100	600	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 3.6	≤ 5	17 ... 40
-16 ... 0	-21	-1 ... 0 ¹⁾	0.25	-	-	≤ 2.0	≤ 2.8	-
-25 ... 0	-35	-1 ... 0 ¹⁾	0.25	-	-	≤ 2.0	≤ 3	8 ... 18
-40 ... 0	-55	-1 ... 0 ¹⁾	0.30	-	-	≤ 2.6	≤ 3.4	8 ... 20
-60 ... 0	-90	-1 ... 0 ¹⁾	0.30	-	-	≤ 3.0	≤ 4.2	12 ... 25
-100 ... 0	-150	-1 ... 0 ¹⁾	0.40	-	-	≤ 3.6	≤ 5	17 ... 40
-12.5 ... +12.5	-25 / 250	-	-	-	-	≤ 2.0	≤ 3	8 ... 18
-30 ... +30	-60 / 250	-	-	-	-	≤ 3.0	≤ 4.2	12 ... 25
-50 ... +50	-100 / 250	-	-	-	-	≤ 3.6	≤ 5	17 ... 40

1) Diaphragm element with PTFE coating is not available

2) Proof pressure of 100 bar not available for wetted parts from PTFE and Monel

Setting range for model MW Span of setting range from 0.2 bar to max. 40 bar								
Standard		Variant 1		Variant 2		Dead band		
Setting range (= working range)	Proof pressure	Working range	Proof pressure	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable
in bar		in bar	in bar	in bar	in bar	in mbar	in mbar	in mbar
0 ... 0.2	0.4	0 ... 32	40	-1 ... 32 ¹⁾	40	≤ 10	≤ 13	30 ... 70
0 ... 0.4	1	0 ... 32	40	-1 ... 32 ¹⁾	40	≤ 15	≤ 20	40 ... 95
-0.2 ... 0	-0.3	-1 ... 0 ¹⁾	-1	-1 ... 8	10	≤ 10	≤ 13	30 ... 70
-0.4 ... 0	-0.6	-1 ... 0 ¹⁾	-1	-1 ... 8	10	≤ 15	≤ 20	40 ... 95
-0.1 ... + 0.1	-0.2 / 1	-	-	-	-	≤ 10	≤ 13	30 ... 70
-0.5 ... 0.5	-1 / 4	-	-	-	-	≤ 15	≤ 50	75 ... 170
-1 ... 0	-1	-1 ... 8	10	-	-	≤ 15	≤ 50	75 ... 170
-1 ... 1.5	2	-1 ... 8	10	-	-	≤ 48	≤ 67	200 ... 500
-1 ... 5	12	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 100	≤ 160	400 ... 1,000
-1 ... 9	20	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 100	≤ 180	600 ... 1,400
-1 ... 15	25	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 150	≤ 250	1,000 ... 2,400
0 ... 1	4	0 ... 32	40	-1 ... 32	40	≤ 15	≤ 50	75 ... 170
0 ... 1.2	4	0 ... 32	40	-1 ... 32	40	≤ 15	≤ 50	75 ... 170
0 ... 2.5	5	0 ... 32	40	-1 ... 80	100 ²⁾	≤ 48	≤ 67	200 ... 500
0 ... 6	12	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 100	≤ 160	400 ... 1,000
0 ... 10	20	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 100	≤ 180	600 ... 1,400
0 ... 16	25	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 150	≤ 250	1,000 ... 2,400
0 ... 25	40	-1 ... 32	40	-1 ... 80	100 ²⁾	≤ 300	≤ 450	1,700 ... 4,000
0 ... 40	50	-	-	-	-	≤ 400	≤ 800	2,200 ... 5,800

1) Diaphragm element with PTFE coating is not available

2) Proof pressure of 100 bar not available for wetted parts from PTFE and Monel

Setting range for models MWG and MWH Setting range to 600 bar				
Standard		Dead band		
Setting range (= working range)	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable ¹⁾
in bar		in bar	in bar	in bar
4 ... 40	100	≤ 3	≤ 4	5 ... 11 to 8 ... 15
10 ... 100	200	≤ 4	≤ 6	10 ... 22 to 15 ... 28
10 ... 250	400	≤ 10	≤ 13	15 ... 38 to 27 ... 55
20 ... 400	600	≤ 10	≤ 25	35 ... 80 to 43 ... 90
30 ... 600	700	≤ 20	≤ 25	45 ... 105 to 83 ... 155

1) The adjustable dead band is depending on the switch point setting. The indicated ranges are valid for start and end of the setting range. Other setting ranges are proportional.

Distance between set points

For versions with 2 x SPDT the distance between the set points must be > 5 % of the respective span.

Set point adjustment

The set point can be specified by the customer or factory-set within the setting range.

After unscrewing the cover, set point adjustment can be made using the adjustment screw, which is fastened to the switch and thus secured against loss.

The set point (SP) and the switching direction need to be specified (e.g. SP1: 0.5 bar falling and SP2: 3 bar rising).

The set point is selectable within the entire setting range. For optimal performance we suggest to adjust the set point between 25 ... 75 % of the setting range. In the following example, the maximum possible setting range is shown to be dependent upon the switching direction.

Example

Setting range: 0 ... 1 bar with one switch contact

Repeatability: 1 % of 1 bar = 10 mbar

Dead band: ≤ 15 mbar → See table "Setting range"

Non-settable range: 2 x repeatability + dead band = 2 x 10 mbar + 15 mbar = 35 mbar

Rising pressure: Set point can be adjusted between 35 ... 1,000 mbar

Falling pressure: Set point can be adjusted between 0 ... 965 mbar

→ See operating instructions for further details.

Process connection	
Standard	■ ANSI/ASME B1.20.1 ■ DIN EN ISO 228 ■ ASME B16.5 ¹⁾ ■ EN 1092-1 ¹⁾
Size	
ANSI/ASME B1.20.1	■ ¼ NPT, female thread ■ ½ NPT, female thread via adapter ■ ½ NPT, male thread via adapter
DIN EN ISO 228	■ G ¼, female thread via adapter ■ G ½ A, male thread via adapter ■ G ¾ A, male thread via adapter
ASME B16.5 ¹⁾	Flange variant "S" : With fixed stud bolts and included nuts and washers Flange variant "T" : With through-holes and extension pipe → See dimensions from page 9
EN 1092-1 ¹⁾	
Material (wetted)	
Sensor element	Depending on the selected sensor element → See table "Sensor element"
Process connection	
Sealing	PTFE, FPM, NBR, without sealing: welded diaphragm element, depending on setting range and operating conditions. → See table "Setting range"

1) Only available for models MWB and MW

Other process connections on request

Electrical connection	
Connection type	■ Female thread ½ NPT ■ Female thread M20 x 1.5 ■ Female thread ¾ NPT, G ½, G ¾, M 20 x 1.5 ■ Cable gland non-armoured, nickel-plated brass ■ Cable gland non-armoured, stainless steel (AISI 304) ■ Cable gland armoured, nickel-plated brass ■ Cable gland armoured, stainless steel (AISI 304) ■ MIL connector, 7-pin, DTL 5015
Wire cross-section	Use 0.5 ... 1.5 mm² (20 ... 16 AWG) for internal terminal block (also suitable for cable lugs). For the grounding cable connection to the protective conductor use max. 4 mm² for the internal and external screw.
Pin assignment	Connection details are given on the product label of the instrument. Connection terminals and the ground terminal are appropriately marked.

Operating conditions	
Medium temperature range	Depending on sensor element and sealing → See table "Sensor element"
Ambient temperature range	T6/T85°C T _a -60 ... +60 °C
	T4/T135°C T _a -60 ... +85 °C
	Non-Ex versions ■ -40 ... +85 °C ■ -60 ... +85 °C
Ingress protection of the complete instrument	IP66 per EN/IEC 60529 (NEMA 4X)
Weight	Approx. 1.0 kg for models MW, MWG, MWH Approx. 1.5 kg for model MWB

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	Pressure equipment directive PED, annex 1, category IV, safety accessories, module B + D	
	Low voltage directive	
	RoHS directive	

Optional approvals

Logo	Description	Region
 	EU declaration of conformity	European Union
	ATEX directive ¹⁾ I M 1 II 1 GD	
	IECEx ¹⁾ Ex ia I Ma Ex ia IIC T6/T4 ²⁾ Ga Ex ia IIIC T85°C/T135°C ²⁾ Da IP66	International

Logo	Description	Region
	UKCA	United Kingdom
	Pressure equipment (safety) regulations	
	Electrical equipment designed for use within certain voltage limits in support of the electrical equipment (safety) regulations	
	Restriction of hazardous substances (RoHS) regulations	
	Equipment and protective systems intended for use in potentially explosive atmospheres regulations ¹⁾	
	EAC	Eurasian Economic Community
	Low voltage directive (applies only for non-Ex versions)	
	Hazardous areas ¹⁾	
	Ex Ukraine Hazardous areas ¹⁾	Ukraine
	CCC Hazardous areas ¹⁾	China
	KCs Hazardous areas ¹⁾	South Korea
-	ECAS Hazardous areas ¹⁾	United Arab Emirates

1) Double marking ATEX and IECEx on the same product label. Country-specific Ex marking according to selected option.

2) The temperature class is related to the ambient temperature range

Manufacturer's information and certificates

Logo	Description
	SIL 3-capable (option) Functional safety per IEC 61508 Contains performance level calculation per ISO 13849-1

Certificates (option)

Certificates	
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

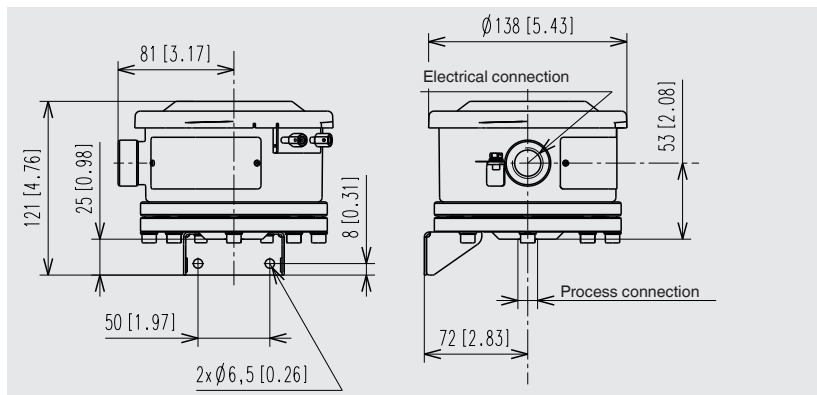
Safety-related characteristic values (only for Ex version)

Safety-related characteristic values (Ex)	
Voltage	U _i = DC 30 V
Current	I _i = 100 mA
Power	P _i = 750 mW
Effective internal capacitance	C _i = 0 µF
Effective internal inductance	L _i = 0 mH

Dimensions in mm [in]

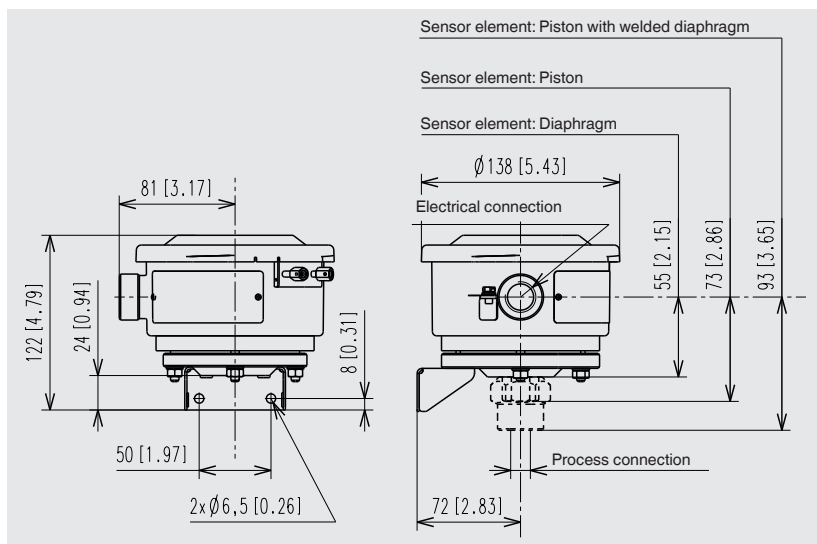
Model MWB

Span of setting range from 16 mbar to max. 100 mbar

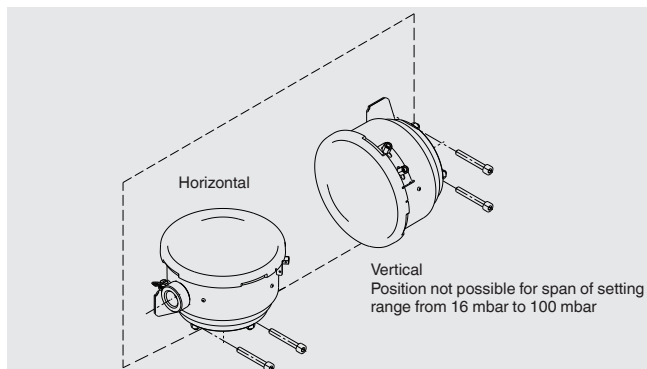


Models MW, MWG, MWH

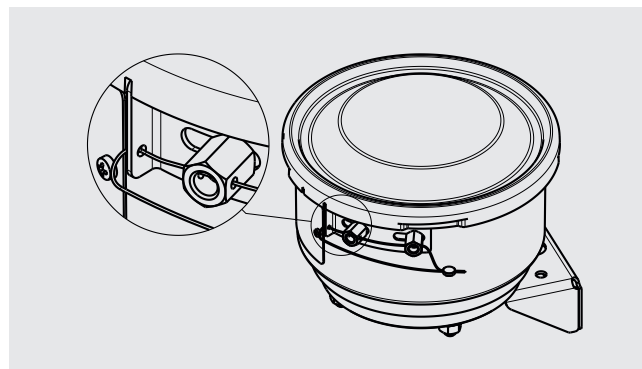
Span of setting range from 0.2 bar to max. 600 bar



Permissible mounting positions

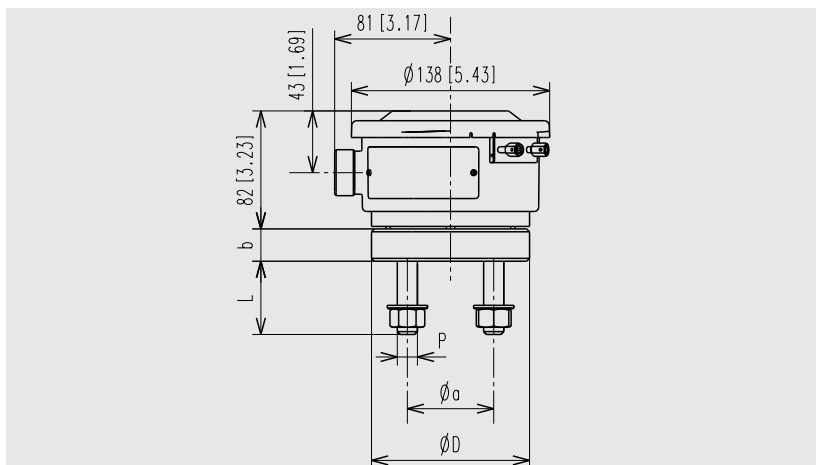


With affixed lead seal



Models MWB and MW, flange variant "S"

Span of setting range from 16 mbar to max. 40 bar



Flange variant "S" has fixed metric stud bolts and the delivery includes nuts and washers.

Material

Stud bolts: ASTM A193-B7 zinc-plated Fe/Zn 8c2C

Nuts: ASTM A194-2H zinc-plated Fe/Zn 8c2C

Flange connection per ASME B 16.5, FF or RF

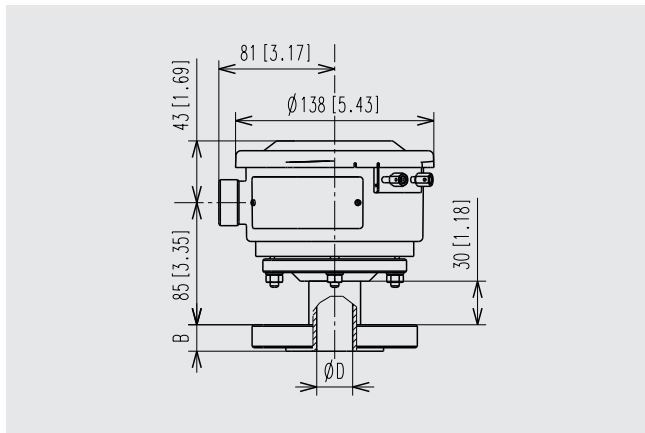
DN	Class	Dimensions in mm [in]				
		D	b	a	P	L
½"	150	110 [43,31]	25 [9,84]	60,3 [23,74]	4 x M14	51 [20,08]
	300	110 [43,31]	25 [9,84]	66,7 [26,26]	4 x M14	51 [20,08]
¾"	150	110 [43,31]	25 [9,84]	69,8 [27,48]	4 x M14	51 [20,08]
1"	150	110 [43,31]	25 [9,84]	79,4 [31,26]	4 x M14	51 [20,08]
	300	150 [59,06]	25 [9,84]	88,9 [35]	4 x M16	54 [21,26]
1 ½"	150	150 [59,06]	25 [9,84]	98,4 [38,74]	4 x M14	51 [20,08]
	300	150 [59,06]	25 [9,84]	114,3 [45]	4 x M20	60 [23,62]
2"	150	150 [59,06]	25 [9,84]	120,6 [47,48]	4 x M16	54 [21,26]
	300	165 [64,96]	22 [8,66]	127 [50]	8 x M16	54 [21,26]

Flange connection per EN 1092-1, form A or B1

DN	PN	Dimensions in mm [in]				
		D	b	a	P	L
15	10/40	110 [43,31]	25 [9,84]	65 [25,59]	4 x M12	48 [18,9]
20	10/40	110 [43,31]	25 [9,84]	75 [29,53]	4 x M12	48 [18,9]
25	10/40	110 [43,31]	25 [9,84]	85 [33,46]	4 x M12	48 [18,9]
40	10/40	150 [59,06]	25 [9,84]	110 [43,31]	4 x M16	54 [21,26]

Note: The maximum pressure limitation of the pressure switch is the lower value between proof pressure and flange pressure rating.

Models MWB and MW, flange variant "T"
Span of setting range from 16 mbar to max. 40 bar



Flange variant "T" has an extension pipe to allow mounting the standard flange connections.

Flange connection per ASME B 16.5, FF, RF or RJ

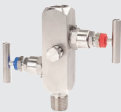
DN	Class	Dimensions in mm [in]			
		B			D
		FF	RF	RJ	
½"	300	12,6 [4,96]	14,2 [5,59]	-	12 [4,72]
	600	-	20,6 [8,11]	19,8 [7,8]	12 [4,72]
¾"	150	11,2 [4,41]	12,8 [5,04]	-	12 [4,72]
	300	14,3 [5,63]	15,9 [6,26]	-	11 [4,33]
	600	-	22,1 [8,7]	22,1 [8,7]	11 [4,33]
1"	150	12,6 [4,96]	14,2 [5,59]	-	11 [4,33]
	300	15,9 [6,26]	17,5 [6,89]	-	11 [4,33]
	600	-	23,9 [9,41]	23,9 [9,41]	11 [4,33]
1 ½"	150	15,9 [6,26]	17,5 [6,89]	-	26,7 [10,51]
	300	19,1 [7,52]	20,7 [8,15]	-	26,7 [10,51]
	600	-	28,7 [11,3]	28,7 [11,3]	26,7 [10,51]
2"	150	17,5 [6,89]	19,1 [7,52]	-	26,7 [10,51]
	300	20,7 [8,15]	22,3 [8,78]	-	26,7 [10,51]
	600	-	31,7 [12,48]	32,2 [12,68]	26,7 [10,51]

Flange connection per EN 1092-1, form A or B1

DN	PN	Dimensions in mm [in]		
		B		D
		Form A	Form B1	
20	10/40	18 [7,09]	18 [7,09]	16 [6,3]
25	10/40	18 [7,09]	18 [7,09]	25 [9,84]
40	10/40	-	18 [7,09]	25 [9,84]

Note: The maximum pressure limitation of the pressure switch is the lower value between proof pressure and flange pressure rating.

Accessories and spare parts

Model	Description	
	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

Ordering information

Model / Unit / Setting range of set point / Contact version / Process connection / Electrical connection / Wetted parts / Options

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Diaphragm pressure switch, flameproof enclosure Ex d For the process industry Model MA

WIKA data sheet PV 31.11



for further approvals,
see page 7

Process Performance Series

Applications

- Pressure monitoring and control of processes
- Safety-critical applications in general process instrumentation, especially in the chemical and petrochemical industries, oil and gas industries, power generation incl. nuclear power plants, water/wastewater industries, mining
- For gaseous and liquid, aggressive and highly viscous or contaminated media, also in aggressive environments

Special features

- Robust switch enclosure from aluminium alloy, IP66, NEMA 4X
- Setting ranges from 16 mbar to 600 bar, also all other equivalent vacuum or combined pressure and vacuum ranges
- 1 or 2 independent switch points, high switching power up to AC 250 V, 20 A
- Switch point repeatability < 1 %



Fig. left: Model MA with threaded connection

Fig. right: Model MA with flange connection

Description

These high-quality mechanical pressure switches have been developed especially for safety-critical applications. The great advantage of mechanical pressure switches is that no supply voltage is required for the switching process.

In production, the switches are traced by quality assurance software at every step and subsequently are 100 % tested. The robust switch enclosure from aluminium alloy can withstand the rough and corrosive operating conditions of the process industry with working ranges of up to 600 bar. The pressure switch is fitted with 1 or 2 microswitches, which make it possible to switch an electrical load of up to AC 250 V, 20 A directly.

For lower switching power ratings, such as for PLC applications, argon gas-filled microswitches with gold-plated contacts are available.

Depending on the application, the appropriate variant for the contact version and the electrical connection can be selected; e.g. adjustable dead band instead of fixed dead band is often a feature necessary for control processes.

By using a diaphragm measuring system, the model MA pressure switch is extremely robust and guarantees optimal operating characteristics. Flanged process connections are excellently suited for measuring highly viscous, contaminated or crystallising media.

For applications with special requirements on the wetted parts, versions with materials from PTFE, Monel or Hastelloy are available.

For safety applications, the pressure switch is optionally available in a SIL 2-qualified or a SIL 3-qualified version.

Specifications

Basic information	
Version	Diaphragm pressure switch, flameproof enclosure Ex d
Special design feature	■ For oxygen, oil- and grease-free ■ Per NACE ¹⁾ MR0175 / ISO 15156, use in H₂S-containing environments in oil and gas production ■ Per NACE ¹⁾ MR0103 / ISO 17945, metals resistant to sulphide stress cracking ■ Version compliant with EN 1854, pressure sensing devices for gas burners and gas burning appliances ■ Version compliant with EN 12952 and EN 12953, limiting devices in water-tube and shell boilers ■ Drying of wetted parts ■ Offshore version ■ Tropical version (suitable for environments with increased air humidity) ■ Version for ammonia applications ■ Geothermal version ■ Low-temperature version to -60 °C ■ Assembled as a diaphragm seal system ■ Additional protection from stainless steel 316L or Hastelloy for setting ranges 2.5 ... 25 bar ■ Sealing towards the pressure chamber from PTFE/NBR
Contact version	→ See table "Contact version"
Function	■ 1 x SPDT (single pole double throw) ■ 2 x SPDT (single pole double throw) ■ 1 x DPDT (double pole double throw) The DPDT function is realised with 2 simultaneously triggering SPDT microswitches, within 0.2 % of span.
Dead band	■ 1 or 2 contacts with fixed dead band ■ 1 or 2 contacts with adjustable dead band ■ 1 contact with fixed dead band and 1 contact with adjustable dead band
Dielectric strength	Safety class I (IEC 61298-2: 2008)
Switch enclosure	
Design	Housing cover can be secured against unauthorised access with screw locking. Laser-engraved product label from stainless steel.
Material	Aluminium alloy, copper-free, painted with acrylic paint
Mounting ²⁾	■ Direct mounting ■ Wall bracket from stainless steel AISI 304 ■ Mounting bracket for 2" pipe mounting from stainless steel AISI 304

1) General information about NACE standards; see data sheet IN 00.21

2) → See page 8 for permissible mounting positions

Contact version		Electrical rating (resistive load)	
		AC	DC
With fixed dead band			
UN	1 x SPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A
US	1 x SPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A
UO	1 x SPDT, gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A
UG	1 x SPDT, gold-plated	125 V, 1 A	24 V, 0.5 A
DN	2 x SPDT or 1 x DPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A
DS	2 x SPDT or 1 x DPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A
DO	2 x SPDT, or 1 x DPDT gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A
DG	2 x SPDT or 1 x DPDT, gold-plated	125 V, 1 A	24 V, 0.5 A

Contact version		Electrical rating (resistive load)	
		AC	DC
With adjustable dead band			
UR	1 x SPDT, silver	250 V, 20 A	24 V, 2 A, 220 V, 0.5 A
RR³⁾	2 x SPDT or 1 x DPDT, silver	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A
With fixed dead band and adjustable dead band			
DR³⁾	2 x SPDT, silver (1 x UN + 1 x UR)	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A

1) Permissible ambient temperature range: -30 ... +70 °C

2) Wika recommends argon gas-filled contact versions, use of adjustable dead band allowed.

3) Information on switching performance for this contact version on request

Sensor element		Model	Wetted parts		Permissible medium temperature ¹⁾
			Sensor element	Process connection	
Setting range 0 ... 16 mbar to 0 ... 40 bar					
XX ²⁾	Diaphragm element	MAB, MA	Stainless steel 316 ³⁾	Stainless steel 316L	-30 ... +85 °C
TX	Diaphragm element	MAB, MA	Stainless steel 316 ³⁾ + PTFE ⁴⁾	Stainless steel 316L	-30 ... +85 °C
TT	Diaphragm element	MAB, MA	Stainless steel 316 ³⁾ + PTFE ⁴⁾	Stainless steel 316L + PTFE	-30 ... +85 °C
KK ²⁾	Diaphragm element	MAB, MA	Monel ⁵⁾	Monel	-30 ... +85 °C
KX ²⁾	Diaphragm element	MAB, MA	Monel ⁵⁾	Stainless steel 316L	-30 ... +85 °C
Setting range 4 ... 40 bar to 30 ... 600 bar					
GXX ⁶⁾	Piston with welded diaphragm element	MAG	Hastelloy C276	Stainless steel 316L	-40 ... +85 °C
HXX ⁷⁾	Piston with O-ring sealing from FPM	MAH	Stainless steel 316	Stainless steel 316L	0 ... 85 °C
	Piston with O-ring sealing from NBR	MAH	Stainless steel 316	Stainless steel 316L	-10 ... +85 °C

1) Permissible medium temperature range in the main process line. Depending on the measuring assembly, this may differ from the permissible temperature at the process connection. For further information, see operating instructions.

2) Standard sealing: Model MAB with O-Ring from PTFE and model MA with O-Ring from FPM

3) Other diaphragm element material depending on setting range: Stainless steel 304: -1 ... 5, 0 ... 6, -1 ... 9, 0 ... 10 bar; Inconel 718: -1 ... 15, 0 ... 16, 0 ... 25, 0 ... 40 bar

4) PTFE coating is not available for all setting ranges → See table "Setting range"

5) Only for setting ranges ≤ 10 bar

6) Particularly suited for gaseous media

7) Particularly suited for liquid media

Other materials for wetted parts on request

Accuracy specifications	
Set point repeatability	≤ 1 % of span of setting range
Dead band	→ See table "Setting range"

Setting range for model MAB Span of setting range from 16 mbar to max. 100 mbar								
Standard		Variant 1		Variant 2		Dead band		
Setting range (= working range)	Proof pressure	Working range	Proof pressure	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable
in mbar		in bar	in bar	in bar	in bar	in mbar	in mbar	in mbar
0 ... 16	250	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 2.0	≤ 2.8	-
0 ... 25	250	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 2.0	≤ 3	8 ... 18
0 ... 40	300	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 2.6	≤ 3.4	8 ... 20
0 ... 60	300	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 3.0	≤ 4.2	12 ... 25
0 ... 100	600	0 ... 8	10	-1 ... 8 ¹⁾	10	≤ 3.6	≤ 5	17 ... 40

Setting range for model MAB Span of setting range from 16 mbar to max. 100 mbar								
Standard		Variant 1		Variant 2		Dead band		
Setting range (= working range)	Proof pressure	Working range	Proof pressure	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable
in mbar		in bar	in bar	in bar	in bar	in mbar	in mbar	in mbar
-16 ... 0	-21	-1 ... 0 ¹⁾	0.25	-	-	≤ 2.0	≤ 2.8	-
-25 ... 0	-35	-1 ... 0 ¹⁾	0.25	-	-	≤ 2.0	≤ 3	8 ... 18
-40 ... 0	-55	-1 ... 0 ¹⁾	0.30	-	-	≤ 2.6	≤ 3.4	8 ... 20
-60 ... 0	-90	-1 ... 0 ¹⁾	0.30	-	-	≤ 3.0	≤ 4.2	12 ... 25
-100 ... 0	-150	-1 ... 0 ¹⁾	0.40	-	-	≤ 3.6	≤ 5	17 ... 40
-12.5 ... +12.5	-25 / 250	-	-	-	-	≤ 2.0	≤ 3	8 ... 18
-30 ... +30	-60 / 250	-	-	-	-	≤ 3.0	≤ 4.2	12 ... 25
-50 ... +50	-100 / 250	-	-	-	-	≤ 3.6	≤ 5	17 ... 40

1) Diaphragm with PTFE coating is not available

2) Proof pressure of 100 bar not available for wetted parts from PTFE and Monel

Setting range for model MA Span of setting range from 0.2 bar to max. 40 bar								
Standard		Variant 1		Variant 2		Dead band		
Setting range (= working range)	Proof pressure	Working range	Proof pressure	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable
in bar		in bar	in bar	in bar	in bar	in mbar	in mbar	in mbar
0 ... 0.2	6	0 ... 32	40	-1 ... 32 ¹⁾	40	≤ 10	≤ 13	30 ... 70
0 ... 0.4	10	0 ... 32	40	-1 ... 32 ¹⁾	40	≤ 15	≤ 20	40 ... 95
-0.2 ... 0	-0.3	-1 ... 0 ¹⁾	-1	-1 ... 8	10	≤ 10	≤ 13	30 ... 70
-0.4 ... 0	-0.6	-1 ... 0 ¹⁾	-1	-1 ... 8	10	≤ 15	≤ 20	40 ... 95
-0.1 ... +0.1	-0.2 / 1	-	-	-	-	≤ 10	≤ 13	30 ... 70
-0.5 ... 0.5	-1 / 4	-	-	-	-	≤ 15	≤ 50	75 ... 170
-1 ... 0	-1	-1 ... 8	10	-	-	≤ 15	≤ 50	75 ... 170
-1 ... 1.5	2	-1 ... 8	10	-	-	≤ 48	≤ 67	200 ... 500
-1 ... 5	60	-1 ... 80	100	-	-	≤ 100	≤ 160	400 ... 1,000
-1 ... 9	60	-1 ... 80	100	-	-	≤ 100	≤ 180	600 ... 1,400
-1 ... 15	60	-1 ... 80	100	-	-	≤ 150	≤ 250	1,000 ... 2,400
0 ... 1	25	0 ... 32	40	-1 ... 32	40	≤ 15	≤ 50	75 ... 170
0 ... 1.2	25	0 ... 32	40	-1 ... 32	40	≤ 15	≤ 50	75 ... 170
0 ... 2.5	60	0 ... 80	100	-1 ... 80	100 ²⁾	≤ 48	≤ 67	200 ... 500
0 ... 6	60	-1 ... 80	100	-	-	≤ 100	≤ 160	400 ... 1,000
0 ... 10	60	-1 ... 80	100	-	-	≤ 100	≤ 180	600 ... 1,400
0 ... 16	60	-1 ... 80	100	-	-	≤ 150	≤ 250	1,000 ... 2,400
0 ... 25	60	-1 ... 80	100	-	-	≤ 300	≤ 450	1,700 ... 4,000
0 ... 40	60	-	-	-	-	≤ 400	≤ 800	2,200 ... 5,800

1) Diaphragm with PTFE coating is not available

2) Proof pressure of 100 bar not available for wetted parts from PTFE and Monel

Setting range for models MAG and MAH Setting range to 600 bar				
Standard		Dead band		
Setting range (= working range)	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable ¹⁾
in bar		in bar	in bar	in bar
4 ... 40	100	≤ 3	≤ 4	5 ... 11 to 8 ... 15
10 ... 100	200	≤ 4	≤ 6	10 ... 22 to 15 ... 28
10 ... 250	400	≤ 10	≤ 13	15 ... 38 to 27 ... 55
20 ... 400	600	≤ 10	≤ 25	35 ... 80 to 43 ... 90
30 ... 600	700	≤ 20	≤ 25	45 ... 105 to 83 ... 155

1) The adjustable dead band is depending on the switch point setting. The indicated ranges are valid for start and end of the setting range. Other setting ranges are proportional.

Distance between set points

For versions with 2 x SPDT the distance between the set points must be > 5 % of the respective span.

Set point adjustment

The set point can be specified by the customer or factory-set within the setting range.

After unscrewing the cover, set point adjustment can be made using the adjustment screw, which is fastened to the switch and thus secured against loss.

The set point (SP) and the switching direction need to be specified (e.g. SP1: 0.5 bar falling and SP2: 3 bar rising).

The set point is selectable within the entire setting range. For optimal performance we suggest to adjust the set point between 25 ... 75 % of the setting range. In the following example, the maximum possible setting range is shown to be dependent upon the switching direction.

Example

Setting range: 0 ... 1 bar with one switch contact

Repeatability: 1 % of 1 bar = 10 mbar

Dead band: ≤ 15 mbar → See table "Setting range"

Non-settable range: 2 x repeatability + dead band = 2 x 10 mbar + 15 mbar = 35 mbar

Rising pressure: Set point can be adjusted between 35 ... 1,000 mbar

Falling pressure: Set point can be adjusted between 0 ... 965 mbar

→ See operating instructions for further details.

Process connection	
Standard	■ ANSI/ASME B1.20.1 ■ DIN EN ISO 228 ■ ASME B16.5 ¹⁾ ■ EN 1092-1 ¹⁾
Size	
ANSI/ASME B1.20.1	■ ¼ NPT, female thread ■ ½ NPT, female thread via adapter ■ ½ NPT, male thread via adapter
DIN EN ISO 228	■ G ¼, female thread via adapter ■ G ½ A, male thread via adapter ■ G ¾ A, male thread via adapter
ASME B16.5 ¹⁾	Flange variant "S" : With fixed stud bolts and included nuts and washers Flange variant "T" : With through-holes and extension pipe → See dimensions from page 9
EN 1092-1 ¹⁾	
Material (wetted)	
Sensor element	Depending on the selected sensor element → See table "Sensor element"
Process connection	
Sealing	PTFE, FPM, NBR, without sealing: welded diaphragm, depending on setting range and operating conditions. → See table "Setting range"

1) Only available for models MAB and MA

Other process connections on request

Electrical connection	
Connection type	■ ½ NPT female (standard) ■ ¾ NPT, Gk ½, Gk ¾, M20 x 1.5 female ■ Cable gland non-armoured, Ex d, nickel-plated brass ■ Cable gland non-armoured, Ex d, AISI 304 ■ Cable gland armoured, Ex d, nickel-plated brass ■ Cable gland armoured, Ex d, AISI 304
Wire cross-section	Use 0.5 ... 1.5 mm² (20 ... 16 AWG) for internal terminal block (also suitable for cable lugs). For the grounding cable connection to the protective conductor use max. 4 mm² for the internal and external screw.
Pin assignment	Connection details are given on the product label of the instrument. Connection terminals and the ground terminal are appropriately marked.

Operating conditions	
Medium temperature range	Depending on sensor element and sealing → See table "Sensor element"
Ambient temperature range	T6/T85°C T _a -60 ... +60 °C
	T4/T135°C T _a -60 ... +85 °C
Ingress protection of the complete instrument	IP66 per EN/IEC 60529 (NEMA 4X)
Weight	Approx. 3.1 kg for models MA, MAG, MAH Approx. 3.5 kg for model MAB

Approvals

Logo	Description	Region
 	EU declaration of conformity	European Union
	Pressure equipment directive PED, annex 1, category IV, safety accessories, module B + D	
	Low voltage directive	
	RoHS directive	
	ATEX directive ¹⁾ II 1/2 GD (models MAB, MA, MAG) II 2 GD (model MAH)	
 	IECEx ¹⁾ Ex db IIC T6/T4 ²⁾ Ga/Gb, Ex tb IIC T85/T135 ²⁾ Db (models MAB, MA, MAG) Ex db IIC T6/T4 ²⁾ Gb, Ex tb IIC T85/T135 ²⁾ Db (model MAH)	International

Optional approvals

Logo	Description	Region
	UKCA	United Kingdom
	Pressure equipment (safety) regulations	
	Electrical equipment designed for use within certain voltage limits in support of the electrical equipment (safety) regulations	
	Restriction of hazardous substances (RoHS) regulations	
	Equipment and protective systems intended for use in potentially explosive atmospheres regulations ¹⁾	
	EAC Hazardous areas ¹⁾	Eurasian Economic Community
	Ex Ukraine Hazardous areas ¹⁾	Ukraine
	CCC Hazardous areas ¹⁾	China
	INMETRO Hazardous areas ¹⁾	Brazil
	KCs Hazardous areas ¹⁾	South Korea
-	ECAS Hazardous areas ¹⁾	United Arab Emirates

1) Double marking ATEX and IECEx on the same product label. Country-specific Ex marking according to selected option.

2) The temperature class is related to the ambient temperature range

Manufacturer's information and certificates

Logo	Description
	SIL 3-capable (option) Functional safety per IEC 61508 Contains performance level calculation per ISO 13849-1

Certificates (option)

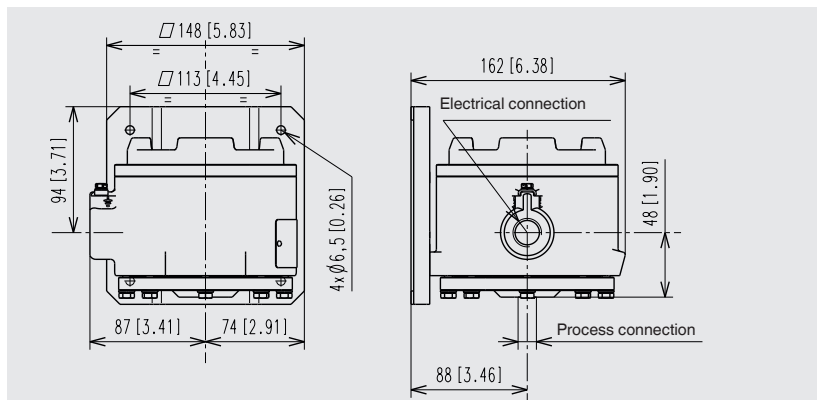
Certificates	
Certificates	■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)
Recommended calibration interval	1 year (dependent on conditions of use)

For approvals and certificates, see website

Dimensions in mm [in]

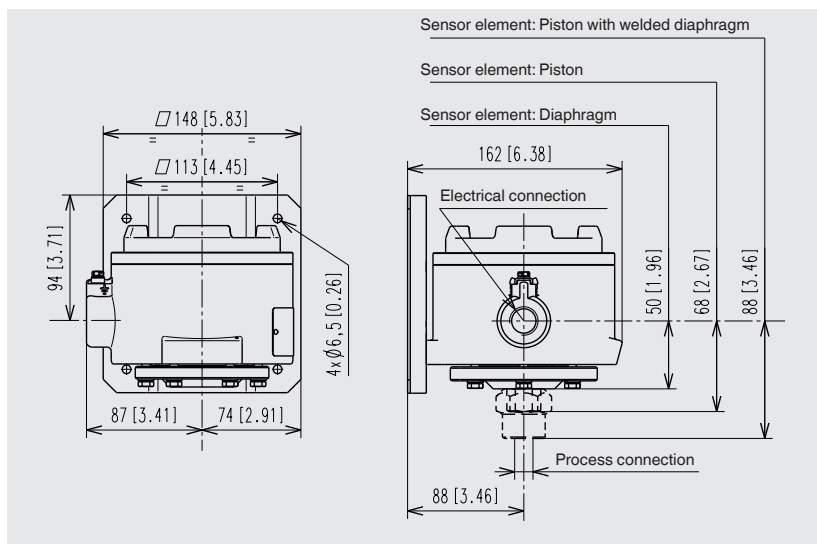
Model MAB

Span of setting range from 16 mbar to max. 100 mbar

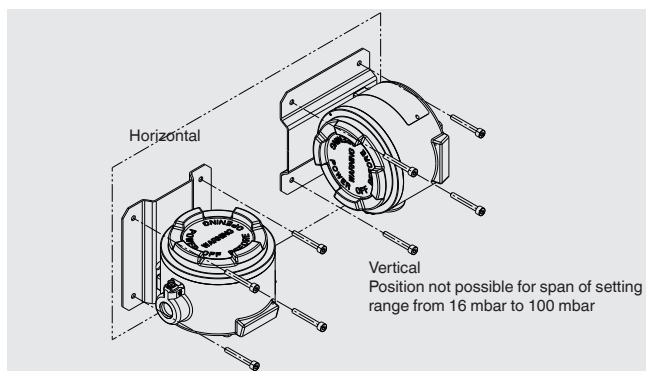


Models MA, MAG, MAH

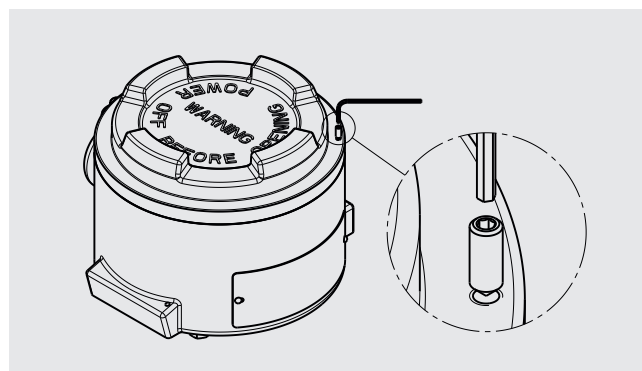
Span of setting range from 0.2 bar to max. 600 bar



Permissible mounting positions

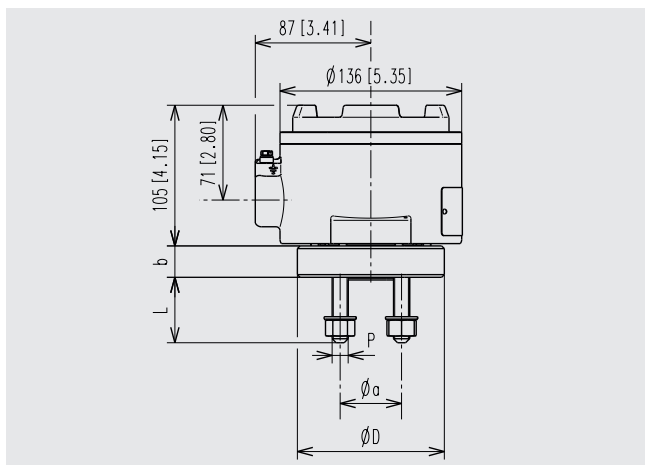


Screw locking of the case cover



Models MAB and MA, flange variant "S"

Span of setting range from 16 mbar to max. 40 bar



Flange variant "S" has fixed metric stud bolts and the delivery includes nuts and washers.

Material

Stud bolts: ASTM A193-B7 zinc-plated Fe/Zn 8c2C

Nuts: ASTM A194-2H zinc-plated Fe/Zn 8c2C

Flange connection per ASME B 16.5, FF or RF

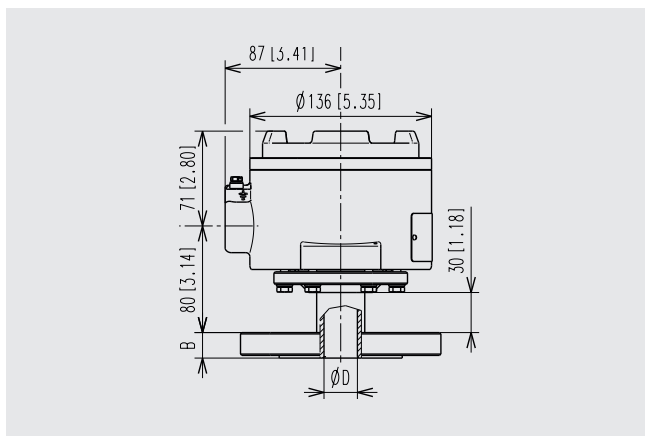
DN	Class	Dimensions in mm [in]				
		D	b	a	P	L
½"	150	110 [43,31]	25 [9,84]	60,3 [23,74]	4 x M14	51 [20,08]
	300	110 [43,31]	25 [9,84]	66,7 [26,26]	4 x M14	51 [20,08]
¾"	150	110 [43,31]	25 [9,84]	69,8 [27,48]	4 x M14	51 [20,08]
1"	150	110 [43,31]	25 [9,84]	79,4 [31,26]	4 x M14	51 [20,08]
	300	150 [59,06]	25 [9,84]	88,9 [35]	4 x M16	54 [21,26]
1 ½"	150	150 [59,06]	25 [9,84]	98,4 [38,74]	4 x M14	51 [20,08]
	300	150 [59,06]	25 [9,84]	114,3 [45]	4 x M20	60 [23,62]
2"	150	150 [59,06]	25 [9,84]	120,6 [47,48]	4 x M16	54 [21,26]
	300	165 [64,96]	22 [8,66]	127 [50]	8 x M16	54 [21,26]

Flange connection per EN 1092-1, form A or B1

DN	PN	Dimensions in mm [in]				
		D	b	a	P	L
15	10/40	110 [43,31]	25 [9,84]	65 [25,59]	4 x M12	48 [18,9]
20	10/40	110 [43,31]	25 [9,84]	75 [29,53]	4 x M12	48 [18,9]
25	10/40	110 [43,31]	25 [9,84]	85 [33,46]	4 x M12	48 [18,9]
40	10/40	150 [59,06]	25 [9,84]	110 [43,31]	4 x M16	54 [21,26]

Note: The maximum pressure limitation of the pressure switch is the lower value between proof pressure and flange rating.

Models MAB and MA, flange variant "T"
Span of setting range from 16 mbar to max. 40 bar



Flange variant "T" has an extension pipe to allow mounting the standard flange connections.

Flange connection per ASME B 16.5, FF, RF or RJ

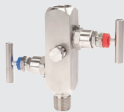
DN	Class	Dimensions in mm [in]			
		B			D
		FF	RF	RJ	
½"	300	12,6 [4,96]	14,2 [5,59]	-	12 [4,72]
	600	-	20,6 [8,11]	19,8 [7,8]	12 [4,72]
¾"	150	11,2 [4,41]	12,8 [5,04]	-	12 [4,72]
	300	14,3 [5,63]	15,9 [6,26]	-	11 [4,33]
	600	-	22,1 [8,7]	22,1 [8,7]	11 [4,33]
1"	150	12,6 [4,96]	14,2 [5,59]	-	11 [4,33]
	300	15,9 [6,26]	17,5 [6,89]	-	11 [4,33]
	600	-	23,9 [9,41]	23,9 [9,41]	11 [4,33]
1 ½"	150	15,9 [6,26]	17,5 [6,89]	-	26,7 [10,51]
	300	19,1 [7,52]	20,7 [8,15]	-	26,7 [10,51]
	600	-	28,7 [11,3]	28,7 [11,3]	26,7 [10,51]
2"	150	17,5 [6,89]	19,1 [7,52]	-	26,7 [10,51]
	300	20,7 [8,15]	22,3 [8,78]	-	26,7 [10,51]
	600	-	31,7 [12,48]	32,2 [12,68]	26,7 [10,51]

Flange connection per EN 1092-1, form A or B1

DN	PN	Dimensions in mm [in]		
		B		D
		Form A	Form B1	
20	10/40	18 [7,09]	18 [7,09]	16 [6,3]
25	10/40	18 [7,09]	18 [7,09]	25 [9,84]
40	10/40	-	18 [7,09]	25 [9,84]

Note: The maximum pressure limitation of the pressure switch is the lower value between proof pressure and flange rating.

Accessories and spare parts

Model	Description	
	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

Ordering information

Model / Unit / Setting range of set point / Contact version / Process connection / Electrical connection / Wetted parts / Options

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We reserve the right to make modifications to the specifications and materials.



Bourdon tube pressure switch

Flameproof enclosure Ex d

Models BA, BAX

WIKA data sheet PV 32.21



for further
approvals,
see page 5

Process Performance Series

Applications

- Pressure monitoring and control of processes
- Safety-critical applications in general process instrumentation, especially in the chemical and petrochemical industries, oil and gas industries, power generation incl. nuclear power plants, water/wastewater industries, mining
- For gaseous, liquid and aggressive media, also in aggressive ambience

Special features

- No supply voltage needed for the switching of electrical loads
- Robust switch enclosure from 316L, IP66, NEMA 4X
- Setting ranges from 0 ... 2.5 bar up to 0 ... 1,000 bar, vacuum ranges
- Switch point repeatability < 0.5 %
- 1 or 2 independent set points, SPDT or DPDT, high switching power up to AC 250 V, 20 A



Bourdon tube pressure switch, model BA

Description

These high-quality pressure switches have been developed especially for safety-critical applications. The high quality of the products and manufacturing in accordance with ISO 9001 ensure reliable monitoring of your plant. In production, the switches are traced by quality assurance software at every step and subsequently are 100 % tested. All wetted materials are from stainless steel as a standard.

In order to ensure as flexible operation as possible, the pressure switches are fitted with micro switches, which enable the switching of an electrical load of up to AC 250 V, 20 A directly. For lower switching power ratings, such as for PLC applications, argon gas-filled micro switches with gold-plated contacts can be selected.

Depending on the application, the appropriate variant for the contact version and the electrical connection can be selected; e.g. adjustable dead band instead of fixed dead band is often a feature necessary for control processes.

For applications with special requirements on the wetted parts, a version with Monel® is available.

By using a Bourdon tube measuring system, the model BA and BAX pressure switch is extremely robust and guarantees optimal operating characteristics and the highest measuring performances, with repeatability lower than 0.5 % of span.

For safety applications, the pressure switch is optionally available in a SIL 2-qualified or a SIL 3-qualified version.

Specifications

Basic information	
Version	Bourdon tube pressure switch, flameproof enclosure Ex d
Special design feature	■ For oxygen, oil- and grease-free ■ Per NACE ¹⁾ MR0175 / ISO 15156, use in H₂S-containing environments in oil and gas production ■ Per NACE ¹⁾ MR0103 / ISO 17945, metals resistant to sulphide stress cracking ■ Version for hydrogen (H₂) applications ■ Drying of wetted parts ■ Offshore version ■ Tropical version (suitable for environments with increased air humidity) ■ Version for ammonia applications ■ Geothermal version ■ Low-temperature version to -60 °C ■ Assembled as a diaphragm seal system
Contact version	→ See table "Contact version"
Function	■ 1 x SPDT (single pole double throw) ■ 2 x SPDT (single pole double throw) ■ 1 x DPDT (double pole double throw) The DPDT function is realised with 2 simultaneously triggering SPDT microswitches, within 0.2 % of span.
Dead band	■ 1 or 2 contacts with fixed dead band ■ 1 or 2 contacts with adjustable dead band ■ 1 contact with fixed dead band and 1 contact with adjustable dead band
Dielectric strength	Safety class I (IEC 61298-2: 2008)
Switch enclosure	
Design	Housing cover can be secured against unauthorised access with screw locking. Laser-engraved product label from stainless steel.
Material	Aluminium alloy, copper-free, painted with acrylic paint
Mounting ²⁾	■ Direct mounting ■ Mounting bracket for 2" pipe mounting from stainless steel AISI 304 ■ Wall mounting (only available for model BA) ■ Wall bracket from stainless steel AISI 304 (only available for model BAX)

1) General information about NACE standards; see data sheet IN 00.21

2) → See page 6 for permissible mounting positions

Contact version		Electrical rating (resistive load)	
		AC	DC
With fixed dead band			
UN	1 x SPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A
US	1 x SPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A
UO	1 x SPDT, gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A
UG	1 x SPDT, gold-plated	125 V, 1 A	24 V, 0.5 A
DN	2 x SPDT or 1 x DPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A
DS	2 x SPDT or 1 x DPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A
DO	2 x SPDT, or 1 x DPDT gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A
DG	2 x SPDT or 1 x DPDT, gold-plated	125 V, 1 A	24 V, 0.5 A
With adjustable dead band			
UR	1 x SPDT, silver	250 V, 20 A	24 V, 2 A, 220 V, 0.5 A
RR ²⁾	2 x SPDT or 1 x DPDT, silver	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A
With fixed dead band and adjustable dead band			
DR ²⁾	2 x SPDT, silver (1 x UN + 1 x UR)	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A

1) Permissible ambient temperature range: -30 ... +70 °C

2) Information on switching performance for this contact version on request

Accuracy specifications	
Set point repeatability	≤ 0.5 % of span of setting range
Dead band	→ See table "Setting range"

Setting range						
Model	Setting range (=working range)	Proof pressure	Fixed dead band			Adjustable dead band
	in bar	in bar	1 contact, UN, US, UO, UG in bar	2 contacts, DN, DS, DO, DG in bar		1 contact, UR in bar
				Model BA	Model BAX	
BA	-1 ... +1.5	4.5	≤ 0.15	≤ 0.30	-	0.35 ... 1.10
	-1 ... +5	12	≤ 0.20	≤ 0.30	-	0.55 ... 1.70
	-1 ... +15	30	≤ 0.30	≤ 0.40	-	1.40 ... 3.10
	0 ... 2.5	4.5	≤ 0.15	≤ 0.30	-	0.35 ... 1.10
	0 ... 6	12	≤ 0.20	≤ 0.30	-	0.55 ... 1.70
	0 ... 16	30	≤ 0.30	≤ 0.40	-	1.40 ... 3.10
BA, BAX	0 ... 40	75	≤ 0.80	≤ 0.70	≤ 1.2	2.10 ... 6.00
	0 ... 100	160	≤ 2	≤ 2	≤ 5	6 ... 17
	0 ... 160	210	≤ 3	≤ 3	≤ 7	13 ... 35
	0 ... 250	330	≤ 5	≤ 5	≤ 10	21 ... 65
	0 ... 400	480	≤ 8	≤ 8	≤ 12	26 ... 93
	0 ... 600	720	≤ 12	≤ 12	≤ 20	40 ... 115
BAX	0 ... 1,000 ¹⁾	1,200	≤ 20	-	≤ 50	75 ... 190

1) Wetted parts, bourdon tube: Inconel 718 (2.4668), process connection: Stainless steel AISI 316L

Distance between set points

For versions with 2 x SPDT the distance between the set points must be > 5 % of the respective span.

Set point adjustment

The set point can be specified by the customer or factory-set within the setting range.

After unscrewing the cover, set point adjustment can be made using the adjustment screw, which is fastened to the switch and thus secured against loss.

The set point (SP) and the switching direction need to be specified (e.g. SP1: 30 bar falling and SP2: 60 bar rising).

The set point is selectable within the entire setting range. For optimal performance we suggest to adjust the set point between 25 ... 75 % of the setting range. In the following example, the maximum possible setting range is shown to be dependent upon the switching direction.

Example

Setting range: 0 ... 100 bar with one switch contact

Repeatability: 0.5 % of 100 bar = 0,5 bar

Dead band: ≤ 2 bar → See table "Setting range"

Non-settable range: 2 x repeatability + dead band = 2 x 0.5 bar + 2 bar = 3 bar

Rising pressure: Set point can be adjusted between 3 ... 100 bar

Falling pressure: Set point can be adjusted between 0 ... 97 bar

→ See operating instructions for further details.

Process connection	
Standard	■ ANSI/ASME B1.20.1 ■ DIN EN ISO 228
Size	
ANSI/ASME B1.20.1	■ ¼ NPT, female thread ■ ½ NPT, female thread via adapter ■ ½ NPT, male thread via adapter
DIN EN ISO 228	■ G ¼, female thread via adapter ■ G ½ A, male thread via adapter ■ G ¾ A, male thread via adapter
Material (wetted)	
Sensor element	Depending on the selected version
Process connection	→ See table "Wetted parts"

Other process connections on request

Wetted parts		
Version	Bourdon tube	Process connection
Standard	Stainless steel AISI 316L	
Setting range: 0 ... 1,000 bar	Stainless steel 17-4PH® (1.4542)	Stainless steel AISI 316L
NACE Setting range: 0 ... 40 to 0 ... 400 bar	Monel® 400	Stainless steel AISI 316L
Monel® Setting range: 0 ... 40 to 0 ... 400 bar	Monel® 400	

Electrical connection	
Connection type	■ ½ NPT female (standard) ■ ¾ NPT, Gk ½, Gk ¾, M20 x 1.5 female ■ Cable gland non-armoured, Ex d, nickel-plated brass ■ Cable gland non-armoured, Ex d, AISI 304 ■ Cable gland armoured, Ex d, nickel-plated brass ■ Cable gland armoured, Ex d, AISI 304
Wire cross-section	Use 0.5 ... 1.5 mm² (20 ... 16 AWG) for internal terminal block (also suitable for cable lugs). For the grounding cable connection to the protective conductor use max. 4 mm² for the internal and external screw.
Pin assignment	Connection details are given on the product label of the instrument. Connection terminals and the ground terminal are appropriately marked.

Operating conditions		
Medium temperature range	-40 ... +85 °C	
Ambient temperature range	T6/T85°C	T _a -60 ... +60 °C
	T4/T135°C	T _a -60 ... +85 °C
Ingress protection of the complete instrument	IP66 per EN/IEC 60529 (NEMA 4X)	
Weight	Approx. 2.4 kg for model BA Approx. 3.7 kg for model BAX	

Approvals

Logo	Description	Region
 	EU declaration of conformity	European Union
	Pressure equipment directive PED, annex 1, category IV, safety accessories, module B + D	
	Low voltage directive	
	RoHS directive	
	ATEX directive ¹⁾ II 1/2 GD (model BAX) II 2 GD (model BA)	
 	IECEx ¹⁾ Ex db IIC T6/T4 ²⁾ Ga/Gb, Ex tb IIIC T85/T135 ²⁾ Db (model BAX) Ex db IIC T6/T4 ²⁾ Gb, Ex tb IIIC T85/T135 ²⁾ Db (model BA)	International

Optional approvals

Logo	Description	Region
	UKCA	United Kingdom
	Pressure equipment (safety) regulations	
	Electrical equipment designed for use within certain voltage limits in support of the electrical equipment (safety) regulations	
	Restriction of hazardous substances (RoHS) regulations	
	Equipment and protective systems intended for use in potentially explosive atmospheres regulations ¹⁾	
	EAC Hazardous areas ¹⁾	Eurasian Economic Community
	Ex Ukraine Hazardous areas ¹⁾	Ukraine
	CCC Hazardous areas ¹⁾	China
	INMETRO Hazardous areas ¹⁾ (only available for model BA)	Brazil
	KCs Hazardous areas ¹⁾	South Korea
-	ECAS Hazardous areas ¹⁾	United Arab Emirates

1) Double marking ATEX and IECEx on the same product label. Country-specific Ex marking according to selected option.

2) The temperature class is related to the ambient temperature range

Manufacturer's information and certificates

Logo	Description
	SIL 3-capable (option) Functional safety per IEC 61508 Contains performance level calculation per ISO 13849-1

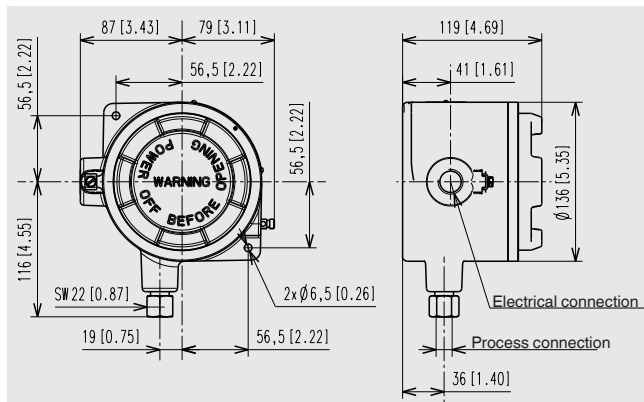
Certificates (option)

Certificates	
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)

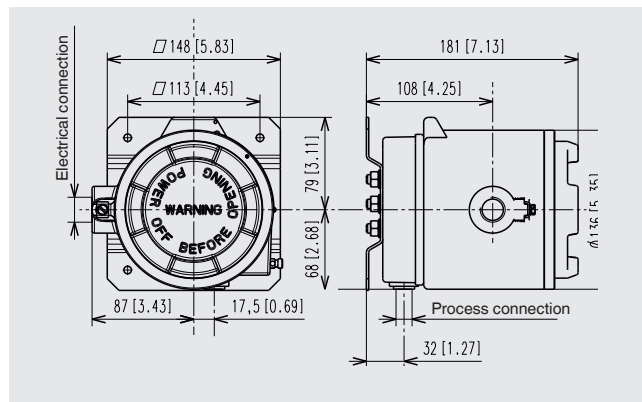
For approvals and certificates, see website

Dimensions in mm [in]

Model BA

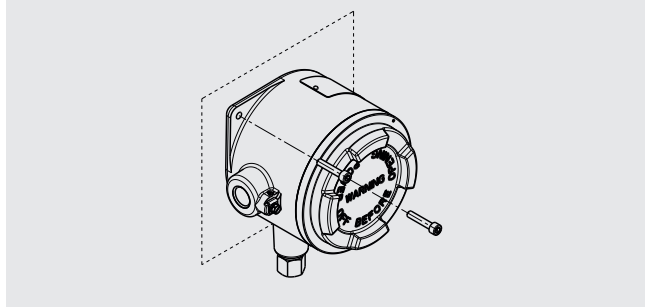


Model BAX

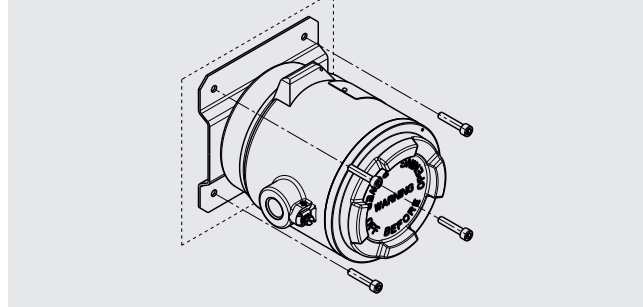


Permissible mounting position

Model BA

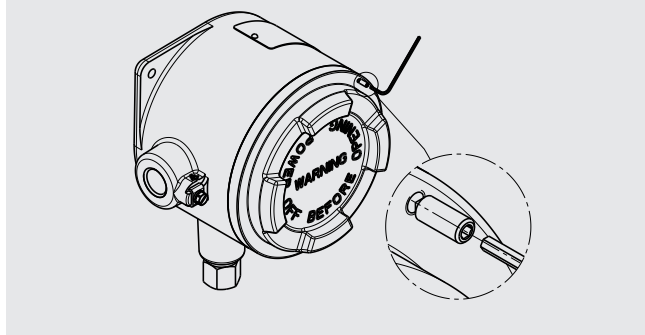


Model BAX

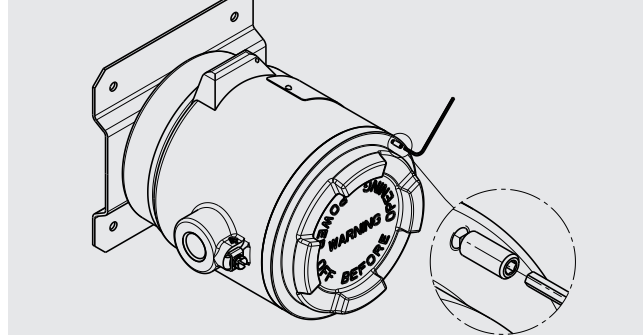


Screw locking of the case cover

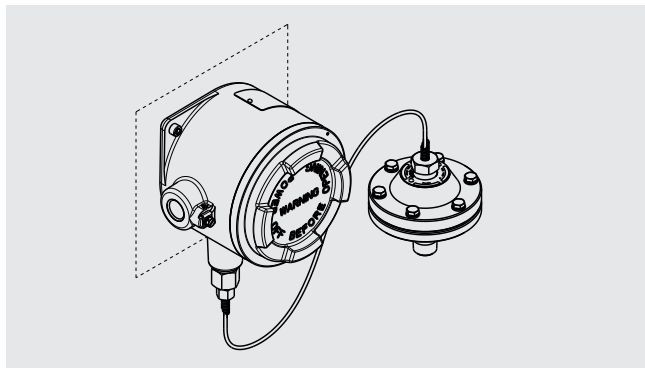
Model BA



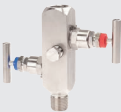
Model BAX



Diaphragm seal system example with model BA



Accessories and spare parts

Model	Description	
	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

Ordering information

Model / Unit / Setting range of set point / Contact version / Process connection / Electrical connection / Wetted parts / Options

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In case of a different interpretation of the translated and the English data sheet, the English wording shall prevail.



Compact pressure switch

For the process industry

Model PCS

WIKA data sheet PV 33.30



for further approvals, see
page 5

Process Compact Series

Applications

- Pressure monitoring and control of processes
- Safety-critical applications in general process instrumentation, especially in the chemical and petrochemical industries, oil and gas industries, power generation incl. nuclear power plants, water/wastewater industries, mining
- For gaseous and liquid, aggressive and highly viscous or contaminated media, also in aggressive environments
- For measuring locations with limited space, e.g. control panels

Special features

- Compact design
- Robust switch enclosure from aluminium alloy or stainless steel with identical dimensions, IP66, NEMA 4X
- Setting ranges from 0.2 ... 1.2 bar to 200 ... 1,000 bar, vacuum range -1 ... -0.2 bar
- Intrinsic safety Ex ia available
- High switching power and large selection of contact variants and electrical connections



Model PCS, compact pressure switch

Description

These high-quality mechanical pressure switches have been developed especially for safety-critical applications. The great advantage of mechanical pressure switches is that no supply voltage is required for the switching process.

In production, the switches are traced by quality assurance software at every step and subsequently are 100 % tested. Due to its compactness, the model PCS pressure switch can be installed in measurement environments with limited space. The robust switch enclosure from aluminium alloy or stainless steel 316L can withstand the rough and corrosive operating conditions of the process industry with working ranges of up to 1,000 bar.

The pressure switch is fitted with microswitches, which make it possible to switch an electrical load of up to AC 250 V, 15 A directly within a repeatability of 1 % of the set point.

Depending on the application, the appropriate variant for the contact version and the electrical connection can be selected; e.g., hermetically sealed microswitches are suitable for corrosive ambient conditions and DPDT contact versions for two separate circuits.

By using a diaphragm element with antagonist spring as sensor element, the model PCS pressure switch is extremely robust and guarantees optimal operating characteristics. For safety applications, the pressure switch is optionally available in a SIL 2-qualified or a SIL 3-qualified version.

Specifications

Basic information	
Version	Compact pressure switch
Special design feature	■ Version for hazardous areas (Ex ia) ■ For oxygen, oil- and grease-free ■ Per NACE ¹⁾ MR0175 / ISO 15156, use in H₂S-containing environments in oil and gas production ■ Per NACE ¹⁾ MR0103 / ISO 17945, metals resistant to sulphide stress cracking ■ Version compliant with EN 1854, pressure sensing devices for gas burners and gas burning appliances ■ Drying of wetted parts ■ Offshore version ■ Tropical version (suitable for environments with increased air humidity) ■ Version for ammonia applications ■ Geothermal version ■ Assembled as a diaphragm seal system
Contact version	■ 1 x SPDT (single pole double throw) ■ 1 x DPDT (double pole double throw) Microswitch with fixed dead band The DPDT function is realised with 2 simultaneously triggering SPDT microswitches. → See table "Contact version"
Dielectric strength	Safety class I (IEC 61298-2: 2008)
Switch enclosure	
Design	Tamper-proof due to access cover plate with lead seal option Laser-engraved product label from stainless steel
Material	■ Aluminium alloy, copper-free, painted with acrylic ■ Stainless steel 316L
Mounting ²⁾	■ Direct mounting ■ Wall bracket from stainless steel ■ Mounting bracket for 2" pipe mounting

1) General information about NACE standards; see data sheet IN 00.21

2) See page 7 for permissible mounting positions

Contact version		Electrical rating (resistive load)		Suitable for Ex ia option
		AC	DC	
A	1 x SPDT, silver	250 V, 15 A	24 V, 2 A, 125 V, 0.5 A, 220 V, 0.25 A	No
B	1 x SPDT, silver, hermetically sealed, argon gas filling ¹⁾	250 V, 15 A	24 V, 2 A, 220 V, 0.5 A	Yes
C	1 x SPDT, gold-plated, hermetically sealed, argon gas filling ¹⁾	125 V, 1 A	24 V, 0.5 A	Yes
G	1 x DPDT, silver	250 V, 5 A	24 V, 0.5 A	No
H	1 x DPDT, silver, hermetically sealed, air filling	250 V, 5 A	24 V, 0.5 A	Yes

1) Permissible ambient temperature range: -30 ... +70 °C

Sensor element		Wetted parts		Permissible medium temperature ¹⁾
		Sensor element	Sealing	
V	Diaphragm element with antagonist spring	NBR	-	-30 ... +110 °C
T	Diaphragm element with antagonist spring	PTFE	-	-30 ... +110 °C
M	Diaphragm element with antagonist spring	Inconel	O-ring: FPM	-30 ... +200 °C

Sensor element		Wetted parts		Permissible medium temperature ¹⁾
		Sensor element	Sealing	
P	Piston with antagonist spring ²⁾	Stainless steel 316L	O-ring: FPM	0 ... 200 °C
			O-ring: NBR	-10 ... +110 °C
			O-ring: EPDM	-40 ... +110 °C
G	Piston with antagonist spring and welded diaphragm element	Hastelloy C276	-	-40 ... +140 °C

1) Permissible medium temperature range in the main process line. Depending on the measuring assembly, this may differ from the permissible temperature at the process connection. For further information, see operating instructions.

2) Particularly suited for liquid media.

Accuracy specifications	
Set point repeatability	≤ 1 % of end of setting range
Dead band	→ See table "Setting range of set point"

Setting range	Sensor element	Working range ¹⁾	Proof pressure ²⁾	Max. dead band for contact version		
				A, B, C	G	H
in bar		in bar	in bar	in bar	in bar	in bar
-1 ... -0.2	V	-1 ... 6	10	0.03	0.06	0.12
0.1 ... 2.5	M	-1 ... 30	40	0.05	0.1	0.4
0.2 ... 1.2	T	0 ... 6	10	0.03	0.06	0.12
0.5 ... 2.5	M	-1 ... 10	40	0.05	0.1	0.4
0.8 ... 6	M	-1 ... 10	40	0.06	0.2	0.8
1.6 ... 10	M	-1 ... 25	40	0.2	0.4	1.6
3 ... 25	P, G	0 ... 250	400	2	4	16
3.5 ... 70	P, G	0 ... 140	500	7	7	21
4 ... 25	M	-1 ... 25	60	0.25	0.75	3
8 ... 40	P, G	0 ... 100	400	2	4	16
10 ... 40	M	-1 ... 60	100	1	2	8
16 ... 100	P, G	0 ... 250	400	5	5	20
20 ... 100	M	0 ... 100	150	7	9	20
20 ... 220	P, G	0 ... 350	500	8	15	24
40 ... 250	P, G	0 ... 400	600	12	20	80
60 ... 250	P, G	0 ... 400	600	5 ... 12 to 12 ... 20 ³⁾	-	-
80 ... 400	P, G	0 ... 600	600	20	20	80
100 ... 600	P, G	0 ... 600	700	30	30	120
100 ... 700	P	0 ... 700	1,050	30 ... 100 ³⁾	30 ... 100 ³⁾	30 ... 100 ³⁾
200 ... 1,000	P	0 ... 1,000	1,500	40 ... 110 ³⁾	40 ... 110 ³⁾	40 ... 110 ³⁾

1) Pressure range that can be applied continuously without causing any damage or shifting the set point.

2) Maximum pressure that the sensor element can withstand without suffering permanent damage. The instrument might have to be calibrated afterwards.

3) The dead band depends on the set point adjustment. The indicated ranges are valid for the start and end of the setting range.
Other setting ranges are proportional.

Other setting ranges on request

Set point adjustment

The set point can be specified by the customer or factory-set within the setting range.

The switch point and the switching direction need to be specified (e.g. switch point: 2 bar, rising).

The set point is selectable within the entire setting range. For optimal performance we suggest to adjust the set point between 25 ... 75 % of the setting range. In the following example, the maximum possible setting range is shown to be dependent upon the switching direction.

Example

Setting range: 0.8 ... 6 bar with one switch contact

Dead band = 0.06 bar (see table "Setting ranges" for contact version: A, B, C)

Rising pressure: Set point can be adjusted between 0.86 ... 6 bar

Falling pressure: Set point can be adjusted between 0.8 ... 5.94 bar

→ See operating instructions for further details.

Process connection	
Standard	■ ANSI/ASME B1.20.1 ■ DIN EN ISO 228
Size	
ANSI/ASME B1.20.1	■ ¼ NPT, female thread ■ ½ NPT, female thread via adapter ■ ½ NPT, male thread via adapter
DIN EN ISO 228	■ G ¼, female thread via adapter ■ G ½ A, male thread via adapter ■ G ¾ A, male thread via adapter
Material (wetted)	
Process connection	Stainless steel 316L Other materials on request
Sensor element	Depending on the selected sensor element → See table "Sensor element"

Other process connections on request

Electrical connection	
Connection type	■ Female thread ½ NPT ■ Female thread M20 x 1.5 ■ Female thread ¾ NPT ■ Cable gland non-armoured, nickel-plated brass ■ Cable gland non-armoured, stainless steel (AISI 304) ■ Cable gland armoured, nickel-plated brass ■ Cable gland armoured, stainless steel (AISI 304)
Wire cross-section	0.5 ... 1.5 mm ² (20 ... 16 AWG) For the grounding cable connection to the protective conductor use max. 2.5 mm ² for the internal screw and max. 4 mm ² for the external screw.
Pin assignment	Connection details are given on the product label of the instrument. Connection terminals and the ground terminal are appropriately marked.

Operating conditions		
Medium temperature range ¹⁾	T6/T85°C	T _M ≤ 60 °C ²⁾
	T4/T135°C	T _M ≤ 85 °C ²⁾
	Non-Ex versions	→ See table "Sensor element"
Ambient temperature range	T6/T85°C	T _a -60 ... +60 °C
	T4/T135°C	T _a -60 ... +85 °C
	Non-Ex versions	■ -40 ... +85 °C ■ -60 ... +85 °C
Ingress protection of the complete instrument	IP66 per EN/IEC 60529 (NEMA 4X)	
Weight	■ 0.8 kg, switch enclosure aluminium alloy ■ 1.5 kg, switch enclosure stainless steel	

1) Further restriction possible, depending on sensor element and sealing. → See table "Sensor element".

2) Medium temperature at the process connection

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	Pressure equipment directive PED, annex 1, category IV, safety accessories, module B + D	
	Low voltage directive	
	RoHS directive	

Optional approvals

Logo	Description	Region
 	EU declaration of conformity	European Union
	ATEX directive ¹⁾ I M 1 (only available with stainless steel 316L switch enclosure) II 1 GD	
 	IECEx ¹⁾ Ex ia I Ma (only available with stainless steel 316L switch enclosure) Ex ia IIC T6/T4 ²⁾ Ga Ex ia IIIC T85°C/T135°C ²⁾ Da IP66	International
	EAC	Eurasian Economic Community
	Low voltage directive (applies only for non-Ex versions) Hazardous areas ¹⁾	
	Ex Ukraine Hazardous areas ¹⁾	Ukraine
	CCC Hazardous areas ¹⁾	China
	KCs Hazardous areas ¹⁾	South Korea

¹⁾ Double marking ATEX and IECEx on the same product label. Country-specific Ex marking according to selected option.

²⁾ The temperature class is related to the ambient temperature range

Manufacturer's information and certificates

Logo	Description
	SIL 3-capable (option) Functional safety per IEC 61508 Contains performance level calculation per ISO 13849-1

Certificates (option)

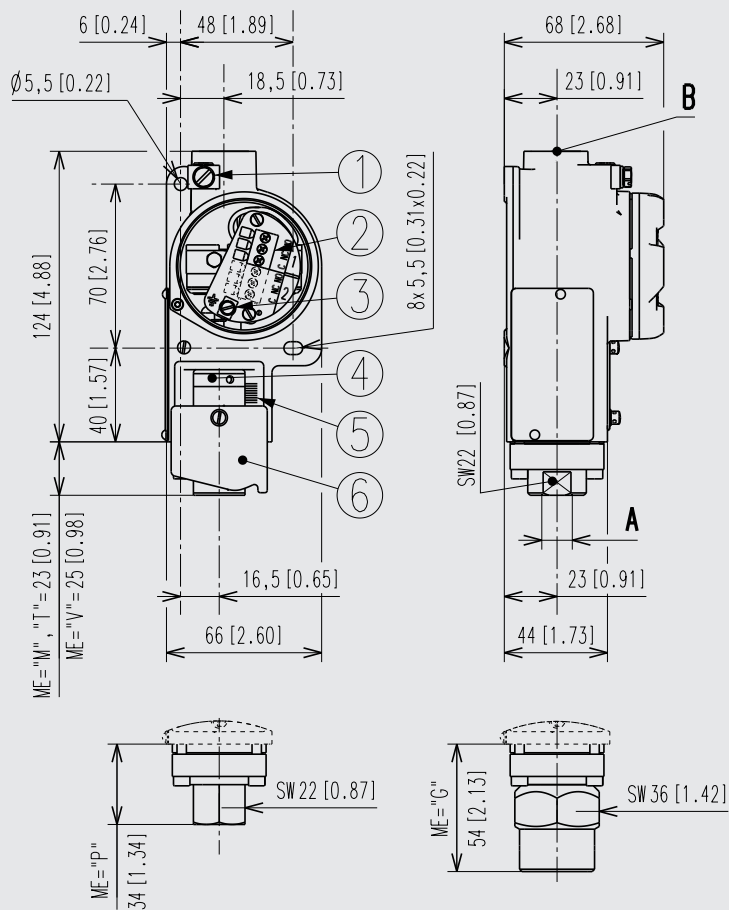
Certificates	
Certificates	■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)
Recommended recalibration interval	1 year (dependent on conditions of use)

For approvals and certificates, see website

Safety-related characteristic values (only for Ex version)

Safety-related characteristic values (Ex)	
Voltage	$U_i = \text{DC } 30 \text{ V}$
Current	$I_i = 100 \text{ mA}$
Power	$P_i = 750 \text{ mW}$
Effective internal capacitance	$C_i = 0 \text{ }\mu\text{F}$
Effective internal inductance	$L_i = 0 \text{ mH}$

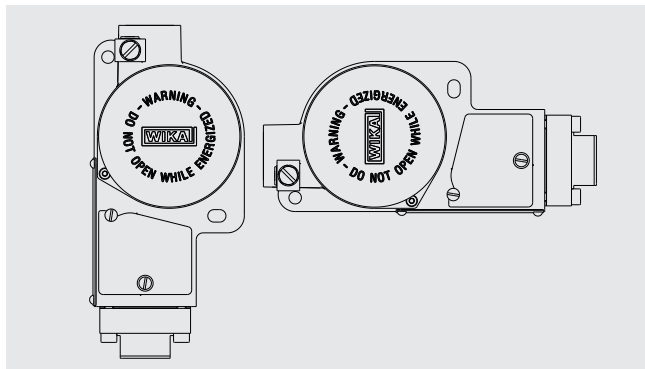
Dimensions in mm [in]



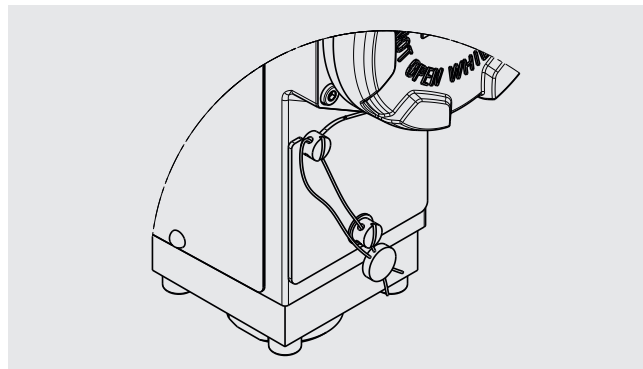
Legend

- | | |
|----------------------------|--|
| ① Grounding screw, outside | ⑥ Access cover plate |
| ② Terminal block | A Process connection |
| ③ Grounding screw, inside | B Electrical connection |
| ④ Adjustment bushing | ME For sensor element, see table on page 3 |
| ⑤ Calibration scale | SW Spanner width |

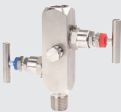
Permissible mounting positions



With affixed lead seal



Accessories and spare parts

Model	Description	
	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

Ordering information

Model / Unit / Setting range of set point / Contact version / Process connection / Electrical connection / Wetted parts / Options

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We reserve the right to make modifications to the specifications and materials.



Pressure switch

For industrial applications

Model PSM-520

WIKA data sheet PV 35.01



Applications

- Pumps
- Compressors

Special features

- Adjustable on site
- Protection cap for switch point setting
- Setting ranges:
 - 0.4 ... +7 to 6 ... 30 bar
 - 6 ... 100 to 85 ... 425 psi
 - 0.04 ... +0.7 to 0.6 ... 3 MPa
- Electrical rating up to AC 230 V, 50/60 Hz, 10 A



Pressure switch, model PSM-520

Configurator



Standard articles



Description

The model PSM-520 is used in industrial control, monitoring and alarm applications.

The switch point can be specified by the customer on site.

The instrument can switch electrical loads of up to AC 230 V, 50/60 Hz, 10 A.

The model PSM-520 pressure switch offers many application possibilities with non-corrosive media like oil, water and air.

Specifications

Unit	Setting range ¹⁾	Permissible switch point on rising pressure	Adjustable switch differential ²⁾	Max. working pressure
bar	0 ... 5	0.4 ... 5	0.4 ... 4	16
	0 ... 7	0.6 ... 7	0.6 ... 6	16
	6 ... 15	7.5 ... 15	1.5 ... 5	32
	6 ... 30	9 ... 30	3 ... 8	42
	-0.4 ... +7	0.2 ... 7	0.6 ... 6	16
MPa	0 ... 0.5	0.04 ... 0.5	0.04 ... 0.4	1.6
	0 ... 0.7	0.06 ... 0.7	0.06 ... 0.6	1.6
	0.6 ... 1.5	0.75 ... 1.5	0.15 ... 0.5	3.2
	0.6 ... 3	0.9 ... 3	0.3 ... 0.8	4.2
	-0.04 ... +0.7	0.02 ... 0.7	0.06 ... 0.6	1.6
psi	0 ... 70	6 ... 70	6 ... 55	230
	0 ... 100	9 ... 100	9 ... 85	230
	85 ... 215	107 ... 215	22 ... 72	450
	85 ... 425	130 ... 425	45 ... 115	610
	-6 ... +100	3 ... 100	9 ... 85	230

1) Switch point and reset point have to be within the setting range

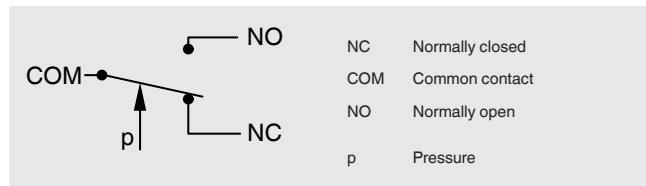
2) The difference between the switch point and the reset point is also known as switch hysteresis

Non-repeatability of the switch point

≤ 2 % of span

Switch contact

1 x change-over / SPDT ³⁾



³⁾ Single pole double throw

Electrical rating

Current consumption ⁴⁾	Voltage	Current
Resistive load AC-1	AC 230 V, 50/60 Hz	10 A
Inductive load AC-15	AC 230 V, 50/60 Hz	6 A

4) per DIN EN 60947-1

Operating conditions

Permissible temperature ranges

Ambient: -40 ... +70 °C [-40 ... +158 °F]

Medium: -20 ... +100 °C [-4 ... +212 °F]

Storage: -20 ... +80 °C [-4 ... +176 °F]

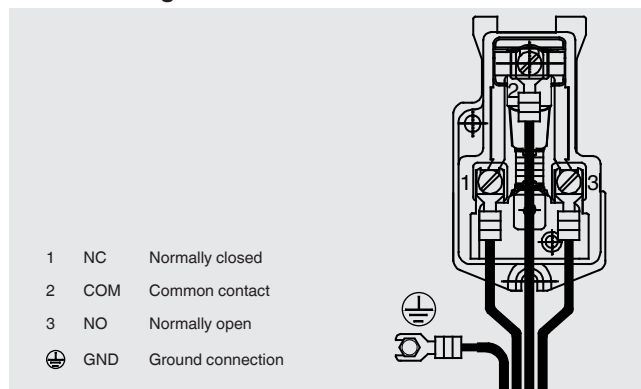
Reference conditions

Relative humidity per BS 6134

< 50 % r. h. at 40 °C [104 °F]

< 90 % r. h. at 20 °C [68 °F]

Terminal assignment



Electrical connection

Rubber grommet for cables Ø 6 ... 14 mm [Ø 0.24 ... 0.55 in]

Ingress protection per IEC/EN 60529

IP30

The ingress protection is only valid if all mounting holes on the rear of the instrument are covered, or for panel mounting on flat surfaces.

Process connections

Process connection per	Thread size
ISO 228-1	G 1/4 female
	G 1/4 B

Materials

Wetted parts

Bellow: Copper alloy CuSn6 per EN 1652

Process connection: Free cutting steel EN1A per
EN 10277-3, tin-plated

Approvals

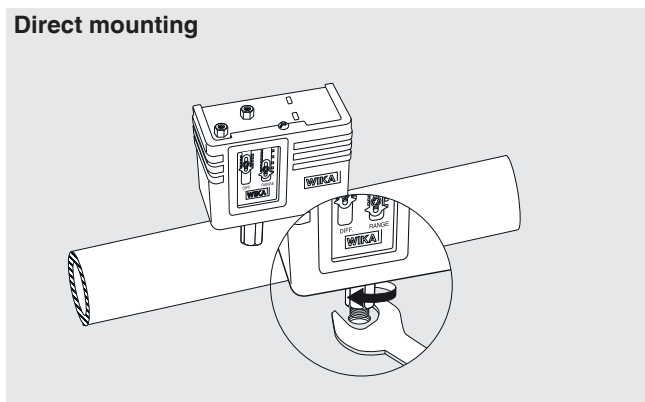
Logo	Description	Country
	EU declaration of conformity ■ Low voltage directive ■ RoHS directive	European Union
	EAC (option)	Eurasian Economic Community

Approvals and certificates, see website

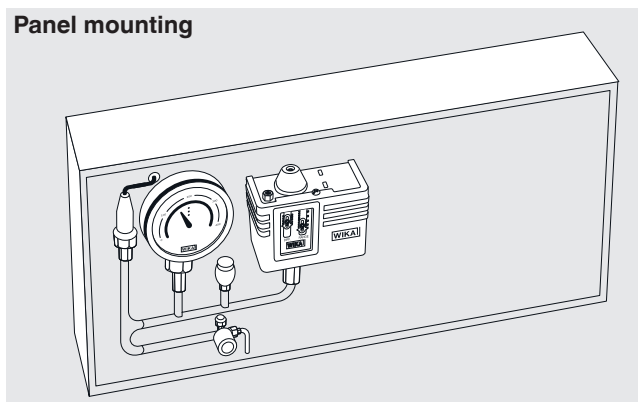
Mounting

Mounting option

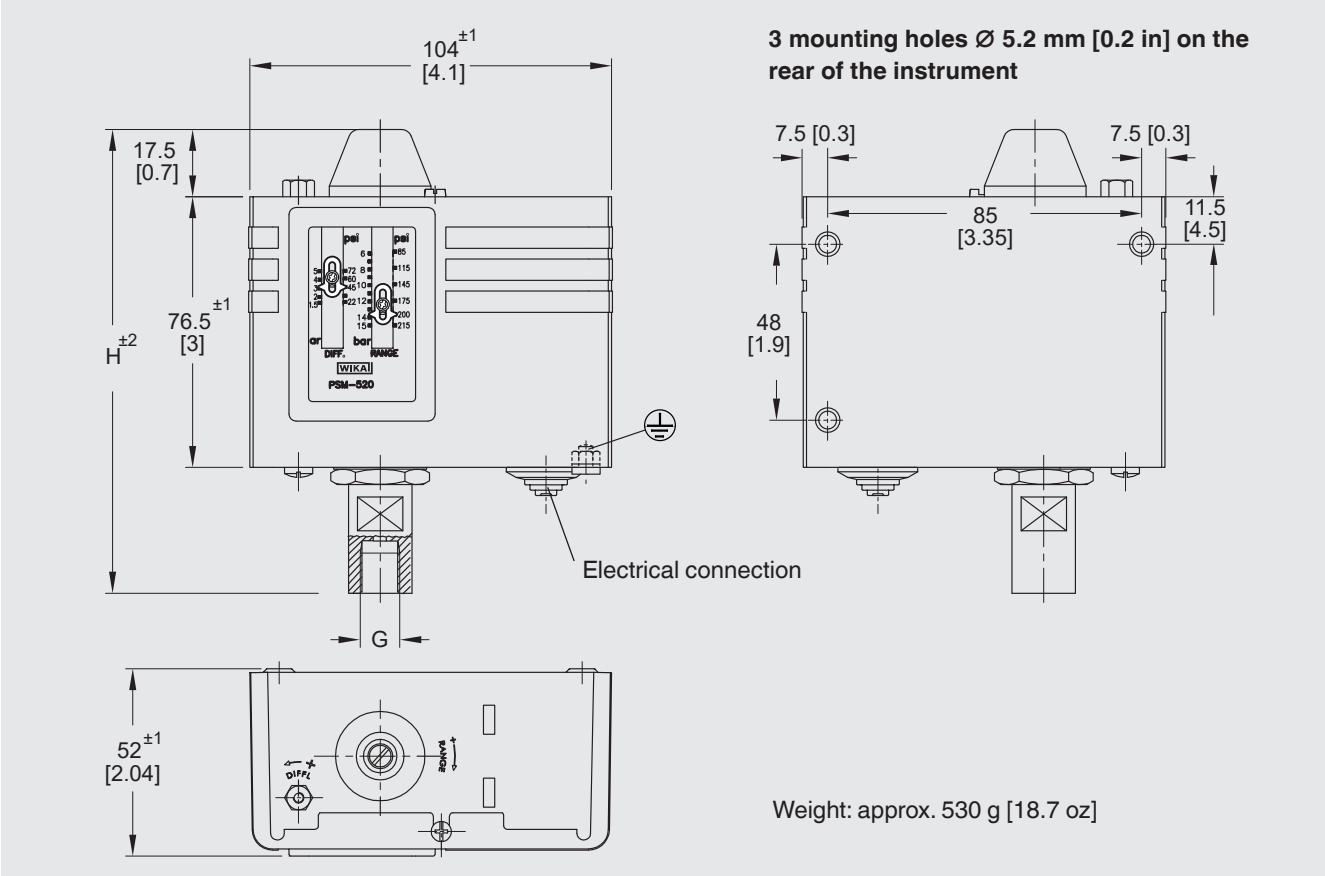
Direct mounting



Panel mounting



Dimensions in mm [in]



Process connection: G ¼ female

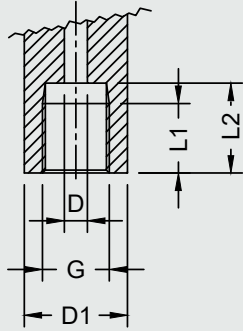
Setting range			Dimensions in mm [in]
psi	bar	MPa	H
0 ... 70	0 ... 5	0 ... 0.5	122 [4.8]
0 ... 100	0 ... 7	0 ... 0.7	
-6 ... +100	-0.4 ... +7	-0.04 ... +0.7	
85 ... 215	6 ... 15	0.6 ... 1.5	127 [5.0]
85 ... 425	6 ... 30	0.6 ... 3	

Process connection: G ¼ B

Setting range			Dimensions in mm [in]
psi	bar	MPa	H
0 ... 70	0 ... 5	0 ... 0.5	117 [4.6]
0 ... 100	0 ... 7	0 ... 0.7	
-6 ... +100	-0.4 ... +7	-0.04 ... +0.7	
85 ... 215	6 ... 15	0.6 ... 1.5	129 [5.1]
85 ... 425	6 ... 30	0.6 ... 3	

Process connections

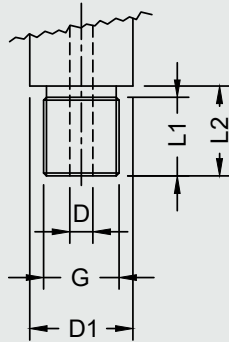
G ¼ female per ISO 228-1



Setting range			Dimensions in mm [in]				
psi	bar	MPa	G	D	D1 ¹⁾	L1	L2
0 ... 70	0 ... 5	0 ... 0.5	G ¼ female	Ø 4 [0.157]	SW 18 [0.709]	12 [0.472]	15 [0.59]
0 ... 100	0 ... 7	0 ... 0.7			Ø 17.8 [0.7]		
-6 ... +100	-0.4 ... +7	-0.04 ... +0.7					
85 ... 215	6 ... 15	0.6 ... 1.5					15.5 [0.61]
85 ... 425	6 ... 30	0.6 ... 3					

1) SW = spanner width

G ¼ B per ISO 228-1



Setting range			Dimensions in mm [in]				
psi	bar	MPa	G	D	D1 ¹⁾	L1	L2
0 ... 70	0 ... 5	0 ... 0.5	G ¼ B	Ø 4 [0.157]	SW 14 [0.551]	12 [0.472]	14 [0.551]
0 ... 100	0 ... 7	0 ... 0.7			Ø 17.8 [0.7]		
-6 ... +100	-0.4 ... +7	-0.04 ... +0.7					
85 ... 215	6 ... 15	0.6 ... 1.5				15.5 [0.61]	
85 ... 425	6 ... 30	0.6 ... 3					13.5 [0.531]

1) SW = spanner width

Ordering information

Model / Setting range / Process connection

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