

Diaphragm pressure switch Flameproof enclosure Ex d Model MA

WIKA data sheet PV 31.11



for further approvals
see page 3

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 ambience

Special features

- No power supply needed for switching of electrical loads
- Robust switch enclosure from aluminium alloy, IP66, NEMA 4X
- Setting ranges from 0 ... 16 mbar to 0 ... 600 bar, vacuum ranges
- Repeatability of the set point $\leq 1\%$ of span
- 1 or 2 independent set points, SPDT or DPDT, high switching power up to AC 250 V, 20 A



Model MA, wall mounting

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 as an option.

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

By using a diaphragm measuring system, the model MA pressure switch is extremely robust and guarantees optimal-operating characteristics.

For setting ranges from 4 ... 40 bar a piston replaces or completes the diaphragm as a measuring element. The wetted parts of this variant from stainless steel are particularly suited for liquid media.

Standard version

Switch enclosure

Aluminium alloy, copper-free, epoxy-resin coated, tamper-proof. Laser-engraved product label from stainless steel

Ingress protection

IP66 per EN/IEC 60529, NEMA 4X

Ignition protection type

Ex d IIC T6/T4 ¹⁾ Ga/Gb (gas)
Ex ta/tb IIIC T85/T135 ¹⁾ Da/Db (dust)

¹⁾ The temperature class is related to the ambient temperature range. See the type examination certificate for further details.

Permissible temperature

Ambient T_{amb} : -40 ... +85 °C
Medium T_M : -30 ... +85 °C

Switch contacts with micro switch

Fixed dead band

- 1 x or 2 x SPDT (single pole double throw)
- 1 x DPDT (double pole double throw)

Adjustable dead band

- 1 x SPDT (single pole double throw)

The DPDT function is realised with 2 simultaneously triggering SPDT micro switches within 0.2 % of the setting range. Information on the dead band can be found on page 4.

Contact version	Electrical rating (resistive load)	
	AC	DC
Fixed dead band		
Silver-plated contact	250 V, 15 A	24 V, 2 A 125 V, 0.5 A 220 V, 0.25 A
Silver-plated contact Filling with argon gas T_{amb} : -30 ... +70 °C	250 V, 15 A	24 V, 2 A 220 V, 0.5 A
Gold-plated contact	125 V, 1 A	24 V, 0.5 A
Gold-plated contact Filling with argon gas T_{amb} : -30 ... +70 °C	125 V, 1 A	24 V, 0.5 A
Adjustable dead band	AC	DC
Silver-plated contact	250 V, 20 A	24 V, 2 A 220 V, 0.5 A

Repeatability of the set point

≤ 1 % of span

Set point adjustment

The set point can be specified by the customer or factory set. Subsequent adjustment of the set point on site is made using the adjustment screw, which is fastened to the switch and thus secured against loss.

Distance between set points

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

Electrical connection

- 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

Cable connection using internal terminal block, protective conductor connection using internal and external screw, max. grounding cable cross-section 4 mm²

Dielectric strength

Safety class I (IEC 61298-2: 2008)

Wetted parts

Setting range 0 ... 16 mbar to 0 ... 40 bar	
Diaphragm element	Process connection
Stainless steel 316 ²⁾	Stainless steel 316L
Stainless steel 316 ²⁾ + PTFE ³⁾	Stainless steel 316L
Stainless steel 316 ²⁾ + PTFE ³⁾	Stainless steel 316L + PTFE (only for G ½ A)
Monel ⁴⁾	Monel
Monel ⁴⁾	Stainless steel 316L

²⁾ 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

³⁾ PTFE coating not available for setting ranges:
-16 ... 0, -25 ... 0, -40 ... 0, 0 ... 16, 0 ... 25, 0 ... 40 mbar, 0 ... 40 bar

⁴⁾ Only for setting ranges ≤ 10 bar

Setting range 4 ... 40 bar to 30 ... 600 bar	
Piston with diaphragm element ⁵⁾	Process connection
Hastelloy C276	Stainless steel 316L
Piston ⁶⁾	Process connection
Stainless steel 316	Stainless steel 316L

⁵⁾ The measuring element is a piston with welded diaphragm element, therefore particularly suited for gaseous media. Extended permissible medium temperature -40 ... +85 °C

⁶⁾ The measuring element is a piston, therefore particularly suited for liquid media. Limited permissible medium temperature -10 ... +85 °C for sealing material NBR or 0 ... 85 °C for sealing material FPM.
Ignition protection type is: Ex d II C T6/T4 Gb and Ex tb III C T85/T135 Db

Sealing

PTFE, FPM, NBR, without sealing: Welded diaphragm element, depending on setting range and operating conditions

Process connection

Stainless steel, lower mount (LM)

- ¼ NPT female (standard)
- ½ NPT, G ½ A, G ¼ A male via adapter
- ½ NPT, G ¼ female via adapter
- Flange connection

Mounting

Direct or wall mounting

- Mounting fixture from stainless steel (AISI 304)
- Option: Mounting bracket for 2" pipe mounting

For mounting positions see drawing on page 5.

Weight

approx. 3.1 ... 3.5 kg, depending on setting range

Options

- Cleaned for oxygen service
- Protection from stainless steel 316L or Hastelloy for setting ranges 2.5 bar up to 25 bar
- Sealing towards the pressure chamber PTFE/NBR
- Permissible ambient temperature to -60 °C, not available for argon gas-filled contacts
- Offshore version with increased corrosion protection ¹⁾
- NACE version ¹⁾

1) WIKA recommends argon gas-filled contact versions. The use of switch contacts with adjustable dead band is allowed.

Please specify

Set point, switching direction for each contact, e.g.

- set point 1: 0.5 bar, falling
- set point 2: 3 bar, rising

With two micro switches, the set points can be adjusted independently of each other.

After unscrewing the cover, **set point adjustment** can be made using the adjustment screw. The set point is selectable within the entire setting range.

For optimal performance we suggest to adjust the set point between 25 % and 75 % of the setting range.

Example






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

Repeatability: 1 % of 1 bar = 10 mbar

Dead band = 15 mbar (see table setting ranges)

If the pressure is rising, the set point should be adjusted between 35 mbar and 1 bar. If the pressure is falling, the set point should be adjusted between 0 and 965 mbar


Approvals

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ Pressure equipment directive PED, annex 1, category IV, safety accessories, module B + D ■ ATEX ²⁾ directive; annex III, IV 1/2 GD (Versions MAB, MA, MAG) 2 GD (Version MAH) 	European Community
	IECEx ²⁾ , per IEC 60079-0, IEC 60079-1, IEC 60079-31, IEC 60079-26 Ex d IIC T6/T4 ³⁾ Ga/Gb, Ex ta/tb IIIC T85/T135 ³⁾ Da/Db (Versions MAB, MA, MAG) Ex d IIC T6/T4 ³⁾ Gb, Ex ta/tb IIIC T85/T135 ³⁾ Db (Version MAH)	IECEx member states
	EAC (option) Hazardous areas	Eurasian Economic Community
	INMETRO (option) Hazardous areas (option)	Brazil
	KOSHA (option) Hazardous areas	South Korea

2) Double marking ATEX and IECEx on the same product label.

3) The temperature class is related to the ambient temperature range.

Manufacturer's information and certifications

Logo	Description
	SIL 2 rating (option) , per IEC 61508 Functional safety The electrical rating for DC applications is limited to 30 V ... 100 mA.
	Conformity per EN 12952-11 and EN 12953-9 Standards for limiting devices in water-tube boiler and shell boiler applications
	Conformity per EN 1854 Pressure sensing devices for gas burners and gas burning appliances

Certificates (option)

- 2.2 test report per EN 10204
- 3.1 inspection certificate per EN 10204

Approvals and certificates, see website

Measuring element: Diaphragm (versions MAB, MA)

Version MAB: Span 16 mbar to max. 100 mbar

Standard		Option 1		Option 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
-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

Version MA: Span 0.2 bar to max. 40 bar

Standard		Option 1		Option 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) Option diaphragm element with PTFE not available

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

Measuring element: Piston with diaphragm (version MAG), piston only (version MAH)

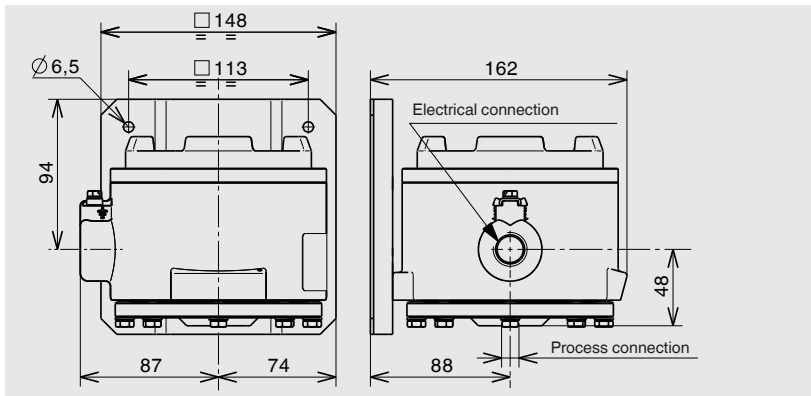
Versions MAH, MAG: Span 36 bar to max. 570 bar

Standard			Dead band		
Setting range	Working range	Proof pressure	1 contact, fixed	2 contacts, fixed	1 contact, adjustable ³⁾
in bar			in bar	in bar	in bar
4 ... 40	0 ... 40	100	≤ 3	≤ 4	5 ... 11 to 8 ... 15
10 ... 100	0 ... 100	200	≤ 4	≤ 6	10 ... 22 to 15 ... 28
10 ... 250	0 ... 250	400	≤ 10	≤ 13	15 ... 38 to 27 ... 55
20 ... 400	0 ... 400	600	≤ 10	≤ 25	35 ... 80 to 43 ... 90
30 ... 600	0 ... 600	700	≤ 20	≤ 25	45 ... 105 to 83 ... 155

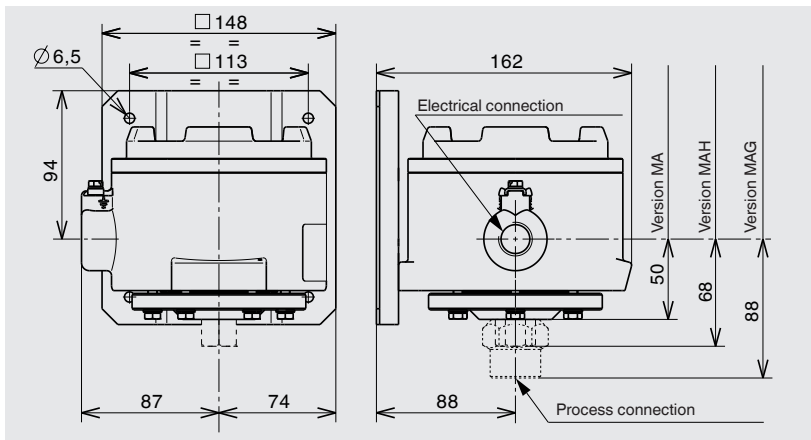
3) The adjustable dead band depends on the set point adjustment. The indicated ranges are valid for start and end of the setting range. Other setting ranges are proportional.

Dimensions in mm

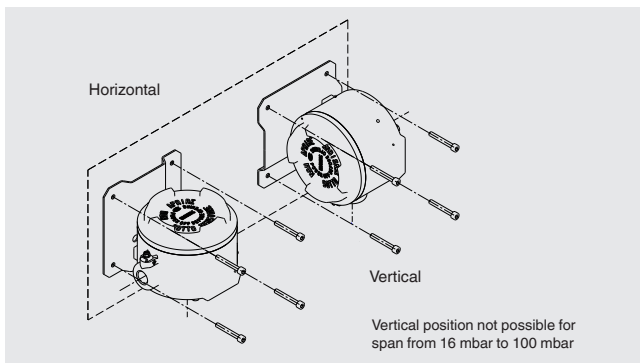
Version MAB



Versions MA, MAH, MAG



Mounting positions



Ordering information

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

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