

Diaphragm Pressure Switches Ex Protection EEx-d, IP 65 Model MA1



WIKA Data Sheet PV 31.11



Applications

- Pressure monitoring and direct switching of electrical loads
- For measuring points with increased overpressure
- For gaseous and liquid, aggressive and highly viscous or contaminated media, also in aggressive ambience
- Process industry: chemical/petro-chemical, on- and offshore, technical gases, environmental technology, machine building and general plant construction, water treatment, pharmaceutical industry

Special Features

- Case flameproof enclosure
- Ingress protection IP 65, NEMA 4
- Ambient temperature -40 ... +85 °C
- 1 or 2 independent switch points, high contact rating up to 15 A / AC 220 V
- Setting ranges from 200 mbar, max. test pressure up to 40 bar



Diaphragm Pressure Switch Model MA1

Description

These high-quality pressure switches have been specifically developed for safety-critical applications. High quality and product manufacturing to ISO 9001:2000 ensures 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 parts materials are from stainless steel as standard. Each switch family is available in IP 65, Ex-ia or Ex-d versions (Ex-ia see model MW1, data sheet PV 31.10). In order to ensure as flexible operation as possible, the pressure switches are equipped with micro switches, which make it possible to switch an electrical load of up to 15 A / AC 220 V directly. For smaller contact ratings, such as

for PLC applications, argon gas filled micro switches with gold-plated contacts can be selected as an option.

By using a diaphragm measuring system, the Model MA1 pressure switch is extremely robust and guarantees optimal operating characteristics. For applications requiring particularly high corrosion protection, variants with PTFE or Monel wetted parts are available.

Standard version

Case

Aluminium,
epoxy resin coated, due to anti-twist device secured against
unauthorised intervention

Ingress protection

IP 65 per EN 60529 / IEC 529

Operating temperature

Ambient: -40 ... +85 °C

Medium: -30 ... +85 °C

Process connection

Stainless steel, lower mount (LM)

¼ NPT (female)

Measuring system

Diaphragm, stainless steel

Sealing towards the pressure chamber

FPM/FKM

Wetted parts

5 variants selectable:

Code	Diaphragm	Process connection
X X	Stainless steel 316 ¹⁾	Stainless steel 316
T X	Stainless steel 316 + PTFE ²⁾	Stainless steel 316
T T	Stainless steel 316 + PTFE ²⁾	Stainless steel 316 + PTFE ^{2) 4)}
K K	Monel ³⁾	Monel
K X	Monel ³⁾	Stainless steel 316

1) Setting range 0 ... 6 and 0 ... 10 bar: Stainless steel 304, ≥ 0 ... 16 bar: Inconel 718

2) Coating

3) Max. setting range 0 ... 10 bar

4) Process connection: G ½ B (male)

Switch contacts

one or two SPDT (changeover) micro switches selectable,
DPDT function through two SPDT
micro switches with simultaneous
triggering within 0.2 % of span, in the
following variants:

Code	Version	Electrical rating (resistive load) 6)	
		AC	DC
Fixed switch hysteresis			
1	Silver contacts	15 A, 220 V	2 A, 24 V 0.5 A, 125 V 0.25 A, 220 V
2	Gold-plated contacts	1 A, 125 V	0.5 A, 24 V
3	Silver contacts inert gas filled Tamb: -30 ... +70 °C	15 A, 220 V	2 A, 24 V 0.5 A, 220 V
4	Gold-plated contacts inert gas filled Tamb: -30 ... +70 °C	1 A, 125 V	0.5 A, 24 V
Adjustable switch hysteresis			
5	Silver contacts 5)	20 A, 220 V	2 A, 24 V 0.5 A, 220 V

5) Max. 1 switch contact

6) Only the underlined data are shown on the product label

Repeatability

≤ 1 % of span

Setting ranges, max. test pressure, max. switch hysteresis

Setting range in bar	Max. test pressure in bar		Max. switch hysteresis		1 switch contact with setttable hysteresis	
	Standard	Option	1 switch contact	2 switch contacts		
-0.2 ... 0	-0.3	10	10 mbar	15 mbar	20 ...	75 mbar
-0.4 ... 0	-0.6	10	15 mbar	20 mbar	35 ...	95 mbar
-1 ... 0	-1	10	15 mbar	50 mbar	80 ...	220 mbar
-1 ... +1.5	2	10	48 mbar	67 mbar	200 ...	550 mbar
-1 ... +5	60 ⁸⁾	100	100 mbar	160 mbar	400 ...	1000 mbar
-1 ... +9	60 ⁸⁾	100	100 mbar	180 mbar	650 ...	1300 mbar
-1 ... +15	60 ⁸⁾	100	150 mbar	250 mbar	1280 ...	2400 mbar
0 ... 0.2	6	40	10 mbar	15 mbar	20 ...	75 mbar
0 ... 0.4	10	40	15 mbar	20 mbar	35 ...	95 mbar
0 ... 1	25	40	15 mbar	50 mbar	80 ...	220 mbar
0 ... 1.2	25	40	15 mbar	50 mbar	80 ...	220 mbar
0 ... 2.5	60 ⁸⁾	100	48 mbar	67 mbar	200 ...	550 mbar
0 ... 6	60 ⁸⁾	100	100 mbar	160 mbar	400 ...	1000 mbar
0 ... 10	60 ⁸⁾	100	100 mbar	180 mbar	650 ...	1300 mbar
0 ... 16	60 ⁸⁾	100	150 mbar	250 mbar	1280 ...	2400 mbar
0 ... 25	60 ⁸⁾	100	200 mbar	300 mbar	2000 ...	4000 mbar
0 ... 40 ⁷⁾	60	-	400 mbar	800 mbar	2000 ...	6500 mbar
-0.1 ... +0.1	-0.2 ... 1	-	10 mbar	15 mbar	20 ...	75 mbar
-0.5 ... +0.5	-1 ... 4	-	15 mbar	50 mbar	80 ...	220 mbar

7) Not with:
- Stainless steel 316 + PTFE / stainless steel 316, Code TX
- Stainless steel 316 + PTFE / stainless steel 316 + PTFE, Code TT

8) Code TT, KK and KX: Test pressure 40 bar

Switch points

The switch points can be set to your requirements, free-of-charge.

Please supply:

Switch point, switching direction for each contact (e.g. switch point 1: 0.5 bar, falling, switch point 2: 3 bar, rising)

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

After unscrewing the case cover, switch point adjustment can be made using the adjustment screw. The switch point is settable within the entire measuring range with the following general rule:

- Define the value $A = 2 \times \text{repeatability} + \text{switch hysteresis}$
- If the pressure is rising, the switch point should be set between (min. + value A) up to max. of the setting range.
- If the pressure is falling, the switch point should be set between min. up to (max. - value A) of the setting range.

Example:

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

Repeatability: 1 % of 1 bar = 10 mbar

Switch hysteresis = 15 mbar (see table setting ranges)

Value $A = 2 \times 10 \text{ mbar} + 15 \text{ mbar} = 35 \text{ mbar}$

If the pressure is rising, the switch point should be set between 35 mbar up to 1 bar.

If the pressure is falling, the switch point should be set between 0 up to 965 mbar.

For optimal performance we suggest the switch point lies between 25 % and 75 % of the setting range.

Electrical connection

1/2 NPT female, cable connector using internal terminal block, ground connection using internal and external screw, max. ground cable cross-section 4 mm²

Pressure switch certified per:

- Pressure Equipment Directive 97/23/EC (PED, Annex 1, Category IV, Safety accessories, Module B + D)
- Low voltage directive 73/23 EEC and 93/68 EEC

Dielectric strength

Safety class I (EN 61 298-2: 1997-06)

Mounting

Direct or wall mounting

Preferred connection location of the process connection should be below. Alternatively the instrument can be installed so that access to internals is from front of the enclosure and the electrical connection is placed on side.

Weight

approx. 3.1 kg

Options

- Other process connection, also with adapter
- Wiring 3/4 NPT, G 1/2 or M20 x 1.5 (female)
- Cable gland on request
- 2" pipe-mounting kit (with clamping element)
- Version for off-shore or tropicalised application ⁹⁾
- Version for applications to NACE ⁹⁾ ¹⁰⁾
- Version for ammonia applications ⁹⁾
- Oil and grease free version for oxygen applications
- Accessories:
 - Pressure gauge valves model 910.11, see data sheet AC 09.02
 - Barstock valves model 910.81, see data sheet AC 09.18

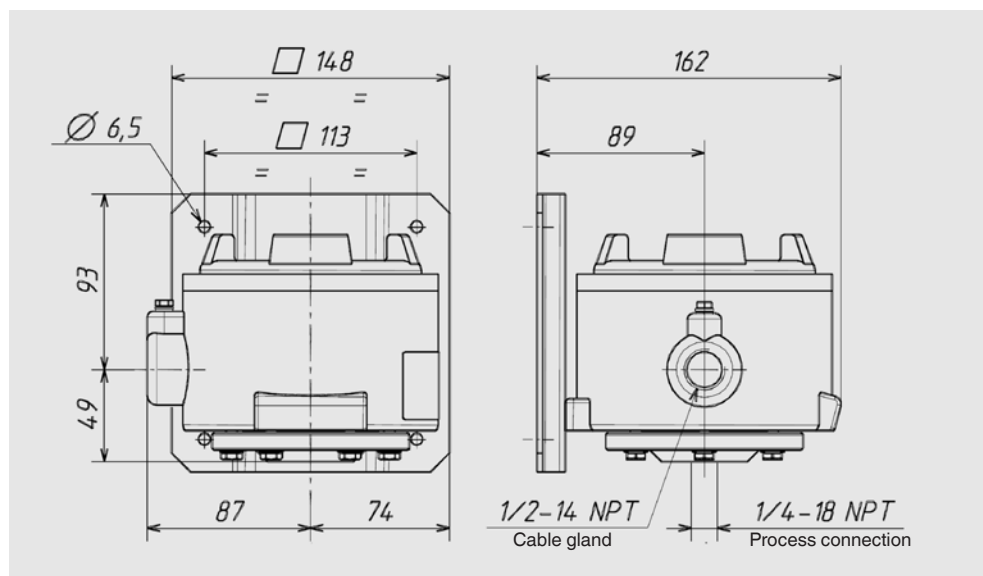
⁹⁾ Inert gas filled contacts required

¹⁰⁾ Max. test pressure 100 bar only with setting ranges 0 ... 16 bar and 0 ... 25 bar

Approvals and certificates

- SIL 2 version
- GOST-R certificate
- Test certificate *CA* (confirmation of the switching accuracy)
- Test report *CP* (3-time listing of the switch point, requires switch point specification)
- Material certificate 3.1 per EN 10204

Dimensions in mm



Ordering information

Model / Wetted parts / Switch contacts with version / Setting range / Process connection / Electrical connection / Switch point(s) / Switching direction(s) / Options

Example: MA1 - TX - U1 - 0/6 bar - 1/4"NPT-F - 1/2"NPT-F

The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.



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