



Microelectronic flush diaphragm gauge pressure sensors PF-P Series

- ▶ Resolution 0,01 %
- ▶ Operating pressure range
from 0-1 to 0-40 MPa
- ▶ Operating temperature range
from -40 to +200 °C
- ▶ Electrical insulation
strength – 500 V
- ▶ Titanium body

Applications

- Industrial automatics
- Pumping stations/ Compressors
- Heat metering

- The sensors are intended for proportional conversion of pressure into electric signal.

New solutions in pressure measurement – “Silicon-on-Sapphire” Technology

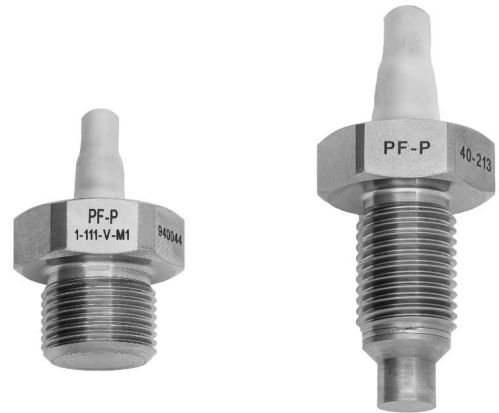
∨ Sensitive element of pressure sensors is a two-layer sapphire-titanium diaphragm with monocrystal silicon resistance strain gauges.

∨ Monocrystal sapphire diaphragm is a perfect elastic element that due to connection with titanium acquires the best quality as to the deformation level, and preserves its elastic properties up to +400°C.

∨ Monocrystal silicon resistance strain gauges are automatically connected with sapphire (heteroepitaxy method) and provide almost no hysteresis or fatigue effects.

∨ Exceptional insulating properties and radiation resistance of sapphire enable to use the sensitive element within temperature range from -200 to +350°C under the effect of high electromagnetic interferences and radiation.

∨ Strain gauges elements are manufactured in groups by solid-state micro-electronic methods and provide high quality and good repeatability of the output parameters.



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Datasheet

1 Nominal, overload and burst pressure

Designation	Nominal pressure, MPa	Overload pressure, MPa	Burst pressure, MPa
PF-P 1...	0...1	-0,1...2	3
PF-P 1,6...	0...1,6	-0,1...3,2	4,8
PF-P 2,5...	0...2,5	-0,1...5	7,5
PF-P 4...	0...4	-0,1...8	12
PF-P 6...	0...6	-0,1...12	18
PF-P 10...	0...10	-0,1...20	30
PF-P 16...	0...16	-0,1...32	48
PF-P 25...	0...25	-0,1...50	75
PF-P 40...	0...40	-0,1...60	80

2 Temperature ranges

2.1 Operating temperature range

- 2.1.1 Version 1 from - 40 to + 125°C
- 2.1.2 Version 2 from - 20 to + 155°C
- 2.1.3 Version 3 from - 20 to + 200°C

2.2 Limiting temperature range

- 2.2.1 Version 1 from - 40 to + 130°C
- 2.2.2 Version 2 from - 20 to + 160°C
- 2.2.3 Version 3 from - 20 to + 200°C

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3 Accuracy parameters

3.1 Resolution, % FS	0,01
3.2 Non-linearity, % FS	±0,2
3.3 Variation, % FS	0,1
3.4 Output signal repeatability, % FS	±0,15
3.5 Long-term stability of the output signal range within 12 months, %	±0,2
3.6 Output signal error caused by the influence of overload pressures, % FS	
for zero output signal	±0,2
for output signal range	±0,05
3.7 Additional ambient temperature error, % FS/1°C	
3.7.1 Zero output signal	0,05±0,07
3.7.2 Output signal range	
operating temperature range from -40 to +125 °C	±0,05
operating temperature range from +125 to +200 °C	-0,05±0,025
3.8 Additional vibration error of the output signal, % FS	±0,05

4 Electrical characteristics

4.1 Output signal at room temperature, mV	
4.1.1 Zero output signal	±20
4.1.2 Output signal range (FS)	150±50
for PF-P 1...	100±35
4.2 Strain gauge bridge resistance at room temperature, kOhm	3,40-4,85
4.3 Temperature resistance coefficient of the strain gauge bridge, K ⁻¹	
4.3.1 Modification V	(1,75±0,1)·10 ⁻³
4.3.2 Modification C	(1,2±0,2)·10 ⁻³
4.4 Insulation resistance, MOhm	
at room temperature	100
at the upper ambient temperature value	20
4.5 Electrical insulation strength (AC voltage), V	500
4.6 Power supply	
4.6.1 Modification V - stabilized DC voltage, V	1-10
4.6.2 Modification C - stabilized DC, mA	0,2-2

Output signal is rated by the voltage 10 V and by the current 1,5 mA.

5 Mechanical characteristics

5.1 Vibration resistance (sinusoidal vibration):

Frequency range, Hzfrom 10 to 2000

Acceleration amplitude, m/s^2 100

5.2 Shock resistance (multiple mechanical shocks):

Shock acceleration peak, m/s^2 500

Shock pulse width, ms 2-5

6 Operating conditions

6.1 IP level IP54

6.2 Sensor body (pressure connection) and diaphragm are made of titanium alloy with 87 % of titanium.

6.3 Pressure media - gases, liquids and their mixtures not aggressive to the titanium alloy (air, sea water, 5 % vitriol acid , chlorine water, chloride solutions, oils etc)

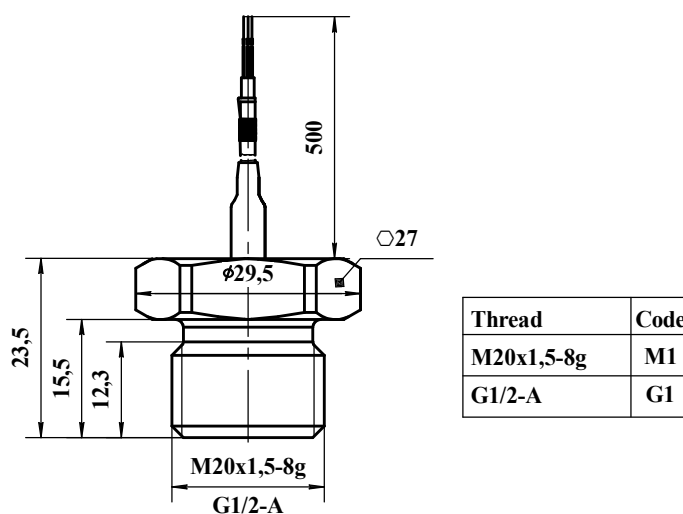
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7 Overall and mounting dimensions

7.1 Pressure sensors of version 1

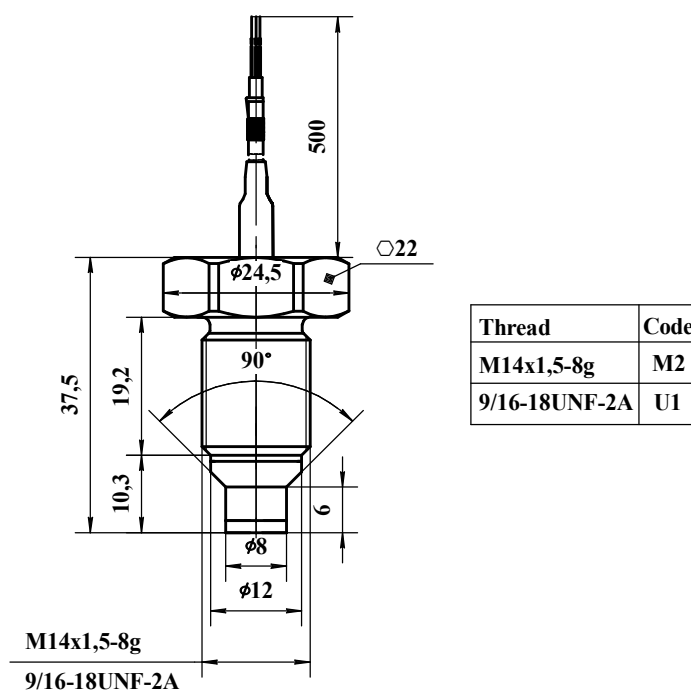
PF-P 1(1,6...10)-101(111, 201, 211, 301, 311)-...-M1(G1)-L



Drawing 1

7.2 Pressure sensors of version 3

PF-P 16(25; 40)-103(113, 203, 213, 303, 313)-...-M2(U1)-L



Drawing 2

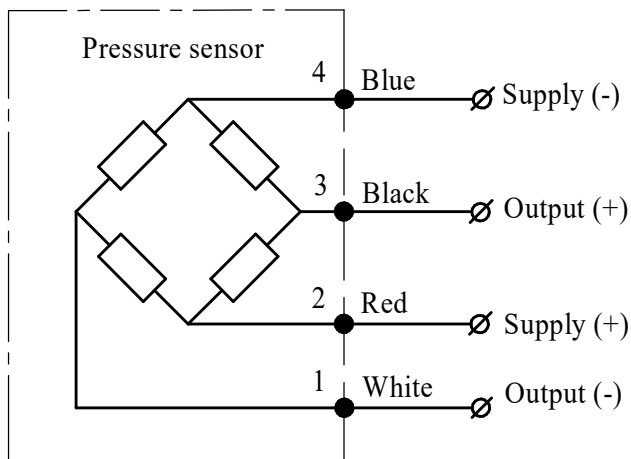
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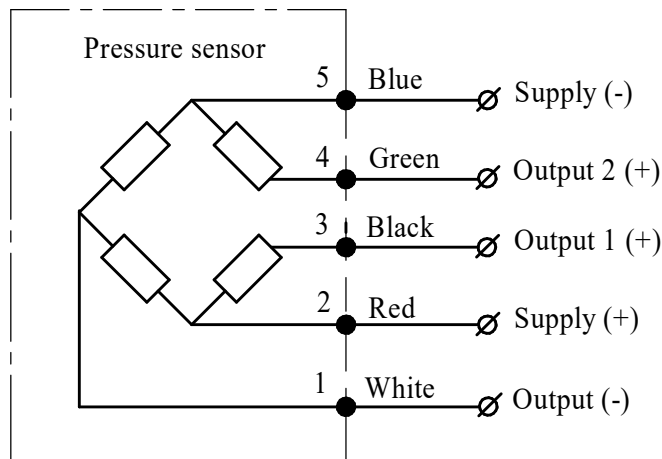
8 Circuit diagram

Electrical connection - flexible wire with section 0,08 or 0,12 mm²
in teflon insulation

"Closed bridge" diagram

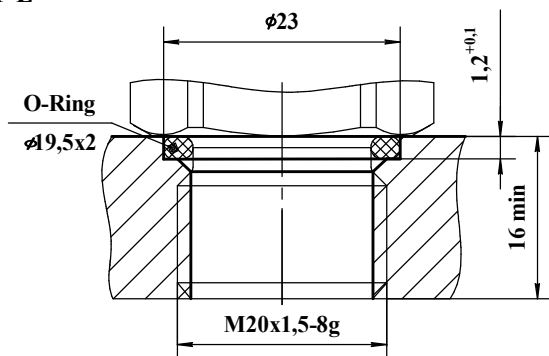


"Open bridge" diagram

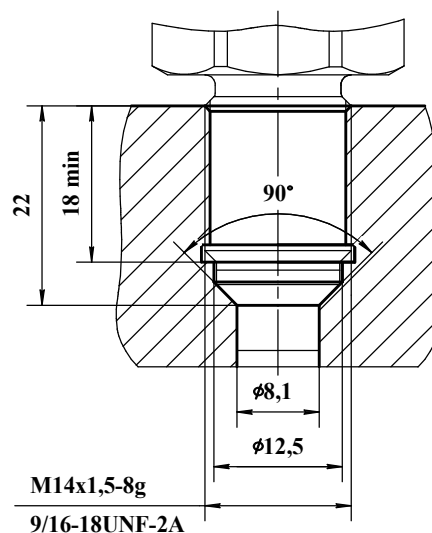


9 Mounting diagrams

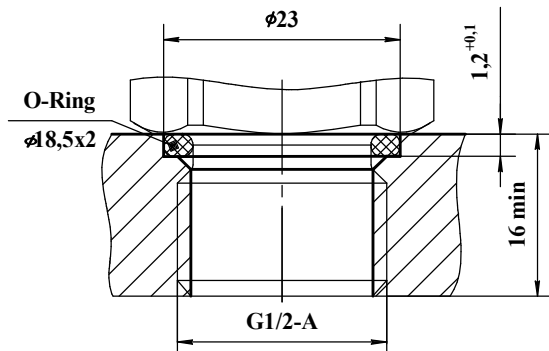
PF 1(1,6...10)-101(111, 201, 211, 301, 311)-...
-M1-L



PF 16(25, 40)-103(113, 203, 213, 303, 313)-...
-M2(U1)-L



PF 1(1,6...10)-101(111, 201, 211, 301, 311)-...
-G1-L



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10 Type designation

	PF-P	XX	XXX	X	XX	X
Series						
Operating ambient temperature range						
1; 1,6; 2,5; 4; 6; 10; 16; 25; 40 MPa						
Operating ambient temperature range						
Version 1 - from - 40 to + 125 °C; Version 2 - from - 20 to + 155 °C; Version 3 - from - 20 to + 200 °C						
Circuit						
0 - “closed bridge” circuit; 1 - “open bridge” circuit						
Version						
1 - with 27 hex (drawing 1); 3 - with 22 hex (drawing 2)						
Power supply modification						
V - stabilized DC voltage (1-10 V); C - stabilized DC (0,2-2 mA)						
Thread code						
M1 - M20x1,5-8g (drawing 1); M2 - M14x1,5-8g (drawing 2); G1 - G1/2-A (drawing 1); U1 - 9/16-18UNF-2A (drawing 2)						
Electrical connection						
L - flexible cable 500 mm length						

Order example of pressure sensor

Pressure sensor of PF-P series, intended for pressure conversion from 0 to 2,5 MPa, for operation within temperature range from - 40 to + 125 °C, with “closed bridge” circuit, with 27 hex, DC voltage power supply, M20x1,5-8g thread and flexible cable 500 mm length:

Pressure sensor PF-P 2,5-101-V-M1-L.

Note: the cable length (standard - 500 mm) can be changed by customer's request. The required length (max 2500 mm) must be specified in the order, for example:

Pressure sensor PF 2,5-101-V-M1-L1200.

11 Marking

Marking on the sensor body must contain following information: series, upper gauge pressure limit in MPa, version of the operating temperature range, circuit type, version of design, power supply modification, thread code and order number.

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