Microelectronic flush diaphragm gauge pressure sensors
PF 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.

Datasheet

1 Nominal, overload and burst pressure

Designation	Nominal pressure, MPa	Overload pressure, MPa	Burst pressure, MPa
PF 1...	0...1	-0,1...2	3
PF 1,6...	0...1,6	-0,1...3,2	4,8
PF 2,5...	0...2,5	-0,1...5	7,5
PF 4...	0...4	-0,1...8	12
PF 6...	0...6	-0,1...12	18
PF 10...	0...10	-0,1...20	30
PF 16...	0...16	-0,1...32	48
PF 25...	0...25	-0,1...50	75
PF 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 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 . . . . . .$(1,75\pm0,1)\cdot10^{-3}$
4.3.2 Modification C . . . . . .$(1,2\pm0,2)\cdot10^{-3}$
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.

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5 Mechanical characteristics

5.1 Vibration resistance (sinusoidal vibration):

Frequency range, Hz . . . . . .from 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 IP40

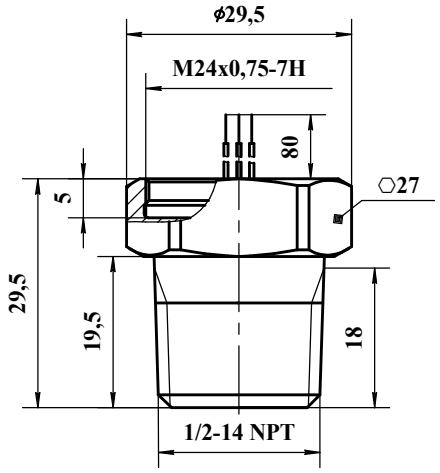
6.2 Sensor body (pressure connection) and diaphragm are made of titanium alloy with 87 % of titanium.

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)

7 Overall and mounting dimensions

7.1 Pressure sensors of version 1

PF 1(1,6...10)-101(111, 201, 211, 301, 311)-...-К1

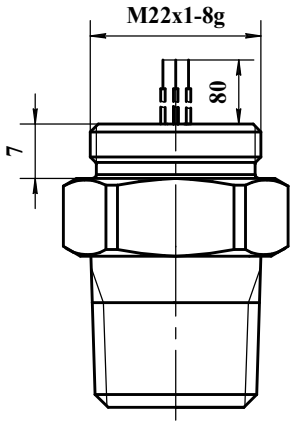


Drawing 1

Thread	Code
1/2-14 NPT	К1

7.2 Pressure sensors of version 2

PF 1(1,6...10)-102(112, 202, 212, 302, 312)-...-К1

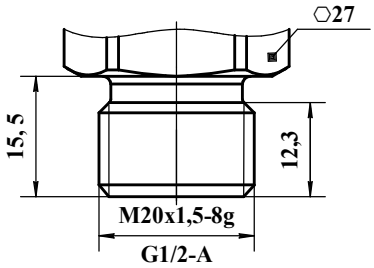


The rest - ref. drawing 1

Drawing 2

Thread design

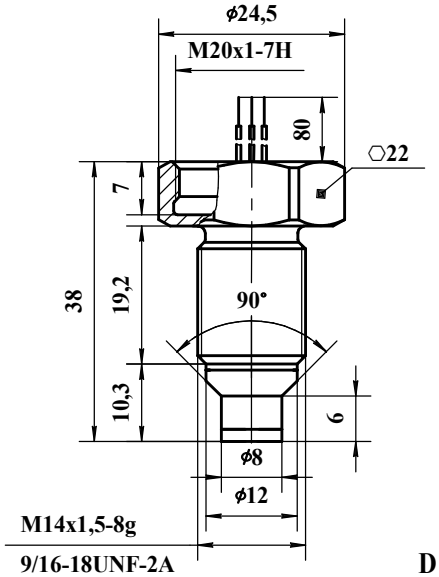
PF 1(1,6...10)-101(111, 201, 211, 301, 311, 102, 112, 202, 212, 302, 312)-...-М1(G1)



Thread	Code
M20x1,5-8g	M1
G1/2-A	G1

7.3 Pressure sensors of version 3

PF 16(25; 40)-103(113, 203, 213, 303, 313)-...-М2(U1)



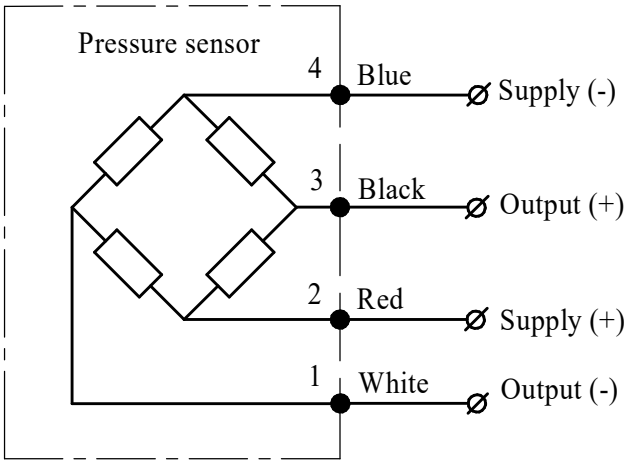
Drawing 3

Thread	Code
M14x1,5-8g	M2
9/16-18UNF-2A	U1

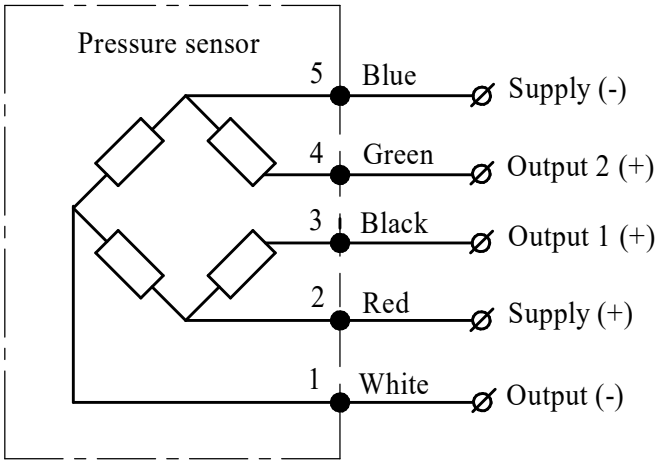
8 Circuit diagram

Electrical connection - flexible wire with section 0,08 or 0,12 mm^2 in teflon insulation

"Closed bridge" diagram

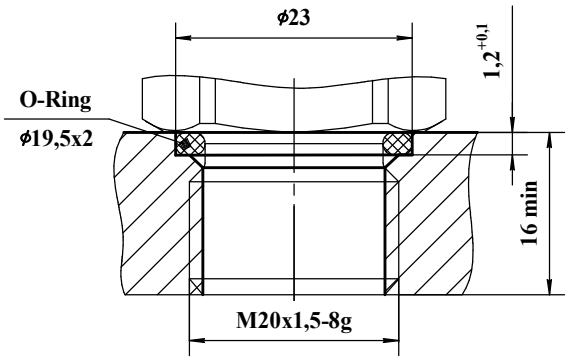


"Open bridge" diagram

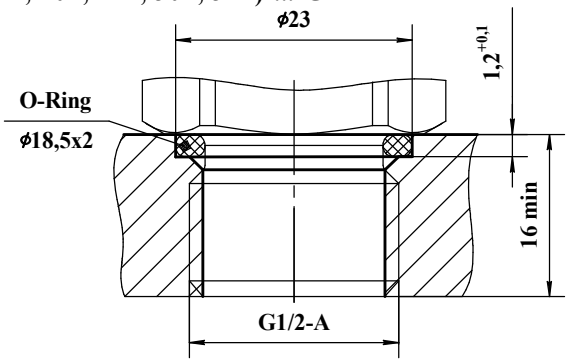


9 Mounting diagrams

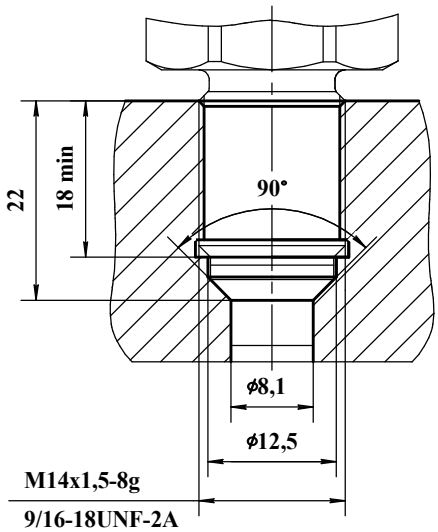
PF 1(1,6...10)-101(111, 201, 211, 301, 311, 102 112, 202, 212, 302, 312)-...-M1



PF 1(1,6...10)-101(111, 201, 211, 301, 311, 102 112, 202, 212, 302, 312)-...-G1



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



10 Type designation

PF XX - XXX - X - XX

Series

Upper gauge pressure limit

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

Curcuit

0 - “closed bridge”circuit;
1 - “open brigde” circuit

Version

1 - with 27 hex and thread M24x0,75 (drawing 1);
2 - with 27 hex and thread M22x1 (drawing 2);
3 - with 22 hex and thread M20x1 (drawing 3)

Power supply modification

V - stabilized DC voltage (1-10 V);
C - stabilized DC (0,2-2 mA)

Thread code

K1 - 1/2-14 NPT (drawings 1, 2);
M1 - M20x1,5-8g (drawings 1, 2);
G1 - G1/2-A (drawings 1, 2);
M2 - M14x1,5-8g (drawing 3);
U1 - 9/16-18UNF-2A (drawing 3)

Order example of pressure sensor

Pressure sensor of PF 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 and thread M24x0,75, DC voltage power supply, M20x1,5-8g thread:

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

Note: if wished, the wire length (standard 80 mm) can be changed, in this case the required length should be added to the wire code L, for example:

Pressure sensor PF 2,5-101-V-M1-L120.

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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