



Microelectronic gauge pressure sensors MP-P Series

- ▶ Resolution 0,01 %
- ▶ Operating pressure range
from 0-1 to 0-150 MPa
- ▶ Operating temperature range
from -45 to +200 °C
- ▶ Electrical insulation
strength – 500 V
- ▶ Titanium body

Applications

- Oil and gas industry
- Hydraulics/Pneumatic
- Pumping stations/ Compressors

- 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
MP-P 1...	0...1	-0,1...2	3
MP-P 1,6...	0...1,6	-0,1...3,2	4,8
MP-P 2,5...	0...2,5	-0,1...5	7,5
MP-P 4...	0...4	-0,1...8	12
MP-P 6...	0...6	-0,1...12	18
MP-P 10...	0...10	-0,1...20	30
MP-P 16...	0...16	-0,1...32	48
MP-P 25...	0...25	-0,1...50	75
MP-P 40...	0...40	-0,1...80	120
MP-P 60...	0...60	-0,1...120	180
MP-P 100...	0...100	-0,1...150	250
MP-P 150...	0...150	-0,1...165	300

2 Temperature ranges

2.1 Operating temperature range

2.1.1 Version 1from - 45 to + 125°C

2.1.2 Version 2from - 45 to + 155°C

2.1.3 Version 3from - 45 to + 200°C

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2.2 Limiting temperature range

- 2.2.1 Version 1 from - 60 to + 130°C
- 2.2.2 Version 2 from - 60 to + 160°C
- 2.2.3 Version 3 from - 60 to + 205°C

3 Accuracy parameters

- 3.1 Resolution, % FS0,01
- 3.2 Non-linearity, % FS±0,15
- 3.3 Hysteresis, % FS 0,05
- 3.4 Output signal repeatability, % FS±0,05
- 3.5 Long-term stability of the output signal range within 12 months, %±0,15
- 3.6 Output signal error caused by the influence of overload pressure, % 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 For zero output signal±0,05
 - 3.7.2 For output signal range
 - operating temperature range from -45 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±15
 - 4.1.2 Output signal range (FS)150±50
 - for MP-P 1... 100±35
 - 4.2 Strain gauge bridge resistance at room temperature, kOhm3,40-4,85
 - 4.3 Temperature resistance coefficient of the strain gauge bridge, K⁻¹ (1,70±0,15)·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), V500
 - 4.6 Power supply - stabilized DC voltage, V 1-10
- Output signal is rated by the voltage 10 V.

5 Mechanical characteristics

- 5.1 Vibration resistance (sinusoidal vibration):
 - Frequency range, Hzfrom 10 to 5000
 - Acceleration amplitude, m/s² 500

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5.2 Shock resistance (multiple mechanical shocks):	
Shock acceleration peak, m/s^2	1000
Shock pulse width, ms	2-5
5.3 Torque effect while installation should not be higher, N·m	
for pressure port types M1, U1, U2	25
M2, U3, M3, U4, M4,	
U5, M5, U6, M6, U7	5

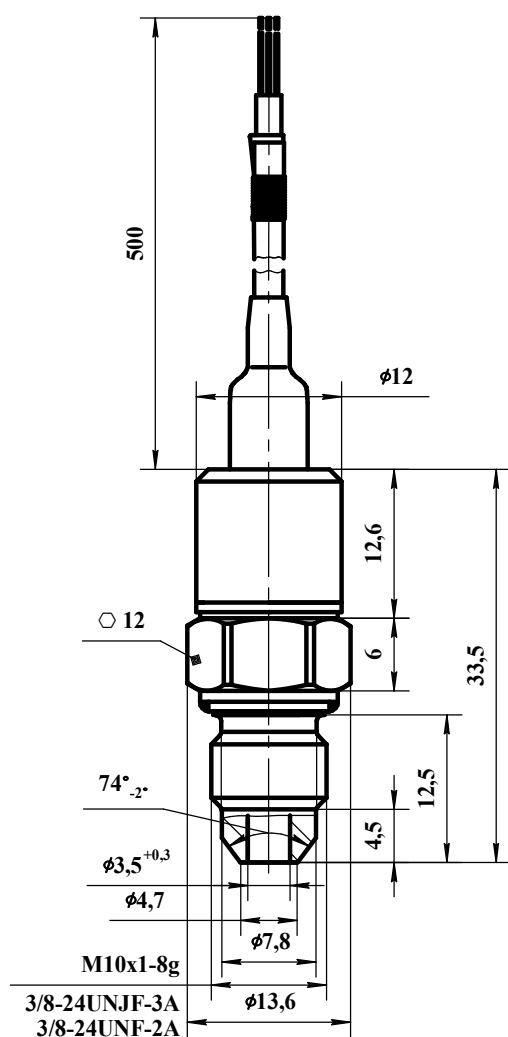
6 Operating conditions

6.1 IP level	IP54
6.2 Sensor body (pressure connection part) and membrane 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, ethyne etc).	

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7 Overall and mounting dimensions

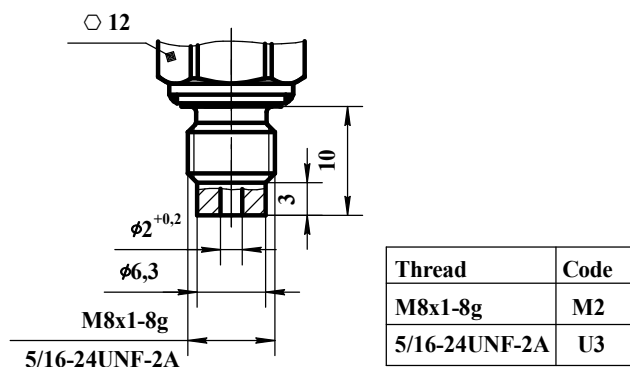


Thread	Code
M10x1-8g	M1
3/8-24UNJF-3A	U1
3/8-24UNF-2A	U2

Drawing 1

7.1 Thread design

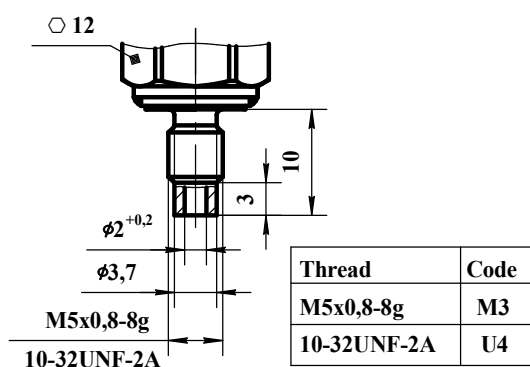
MP-P 1(1,6...25)-...-M2(U3)-...



Thread	Code
M8x1-8g	M2
5/16-24UNF-2A	U3

Drawing 2

MP-P 1(1,6...10)-...-M3(U4)-...



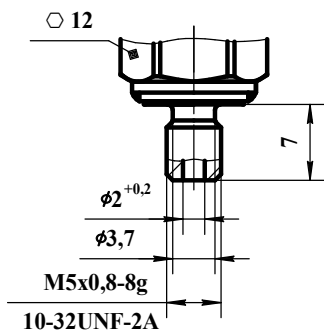
Thread	Code
M5x0,8-8g	M3
10-32UNF-2A	U4

Drawing 3

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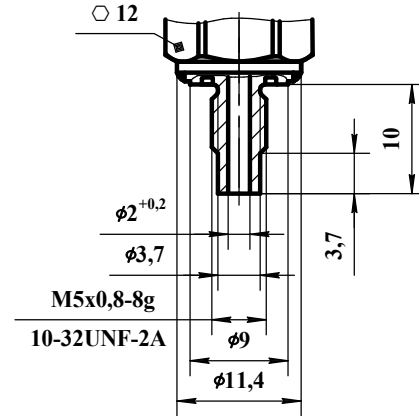
MP-P 1(1,6...10)-...-M4(U5)-...



Thread	Code
M5x0,8-8g	M4
10-32UNF-2A	U5

Drawing 4

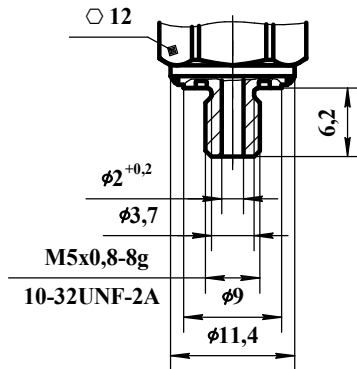
MP-P 1(1,6...10)-...-M5(U6)-...



Thread	Code
M5x0,8-8g	M5
10-32UNF-2A	U6

Drawing 5

MP-P 1(1,6...25)-...-M6(U7)-...

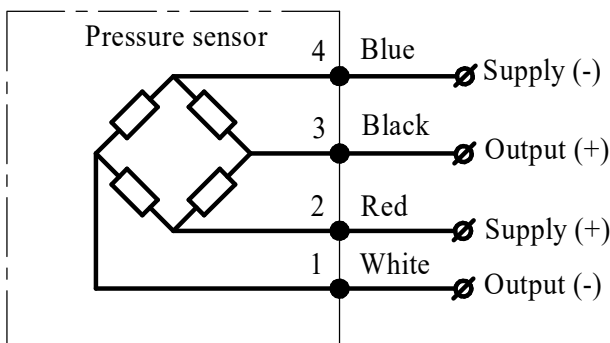


Thread	Code
M5x0,8-8g	M6
10-32UNF-2A	U7

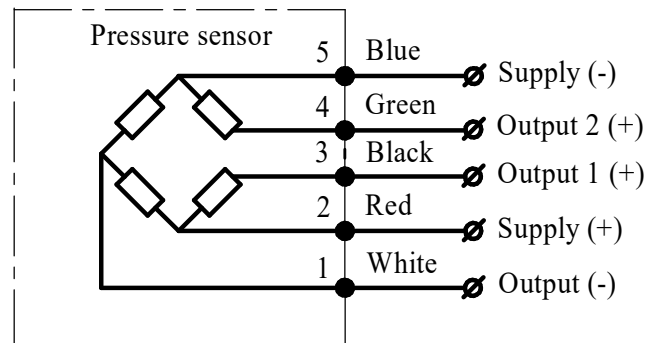
Drawing 6

8 Circuit diagram

"Closed bridge" diagram



"Open bridge" diagram

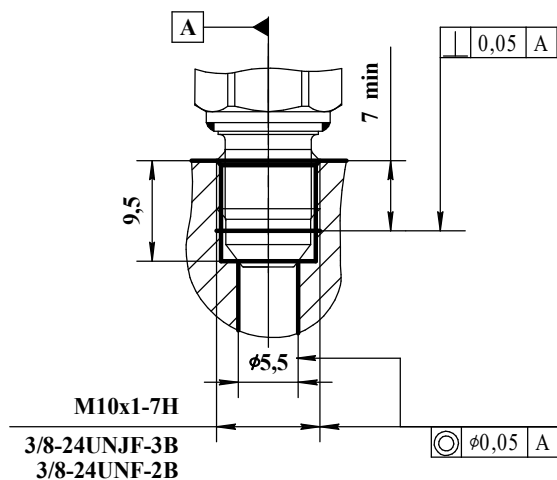


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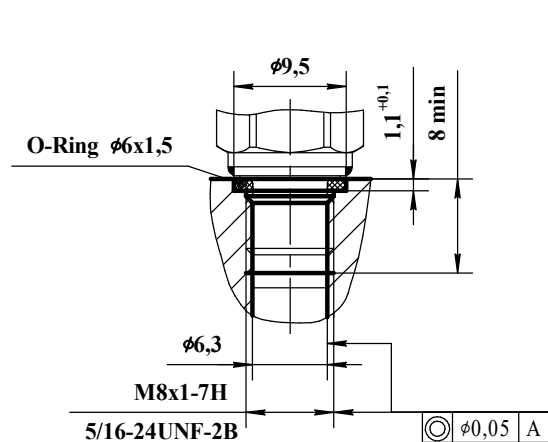
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9 Mounting diagrams

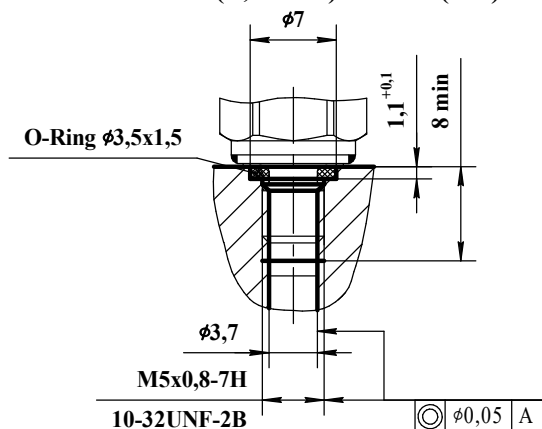
MP-P 1(1,6...150)-...-M1(U1, U2)-...



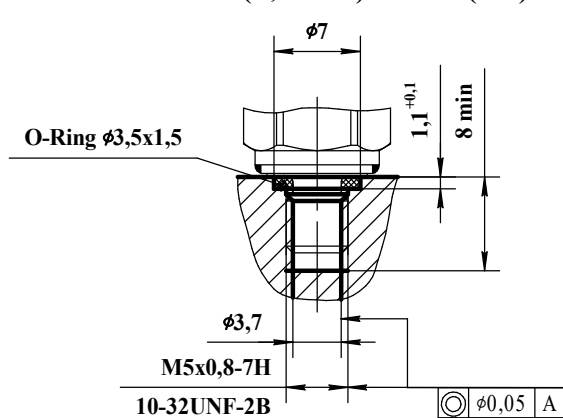
MP-P 1(1,6...25)-...-M2(U3)-...



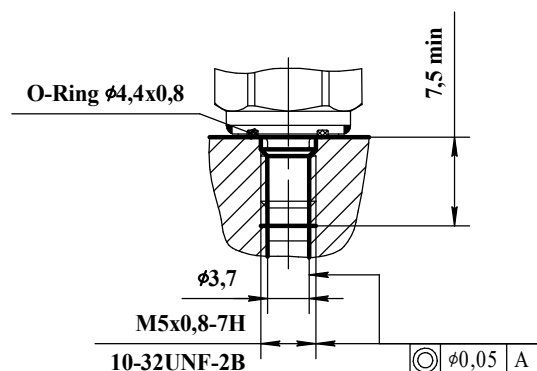
MP-P 1(1,6...10)-...-M3(U4)-...



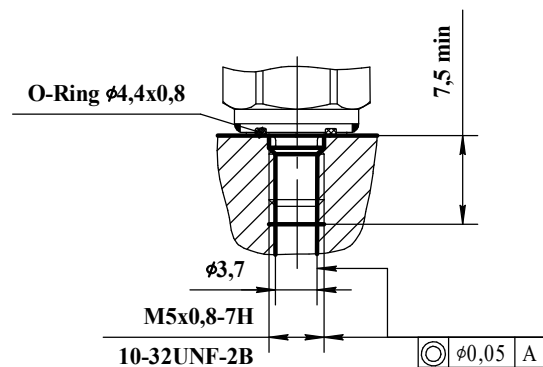
MP-P 1(1,6...10)-...-M4(U5)-...



MP-P 1(1,6...10)-...-M5(U6)-...



MP-P 1(1,6...10)-...-M6(U7)-...



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10 Type designation

MP-P XXX - XX - X - X

Series

Upper gauge pressure limit

1; 1,6; 2,5; 4; 6; 10; 16; 25;
40; 60; 100; 150 MPa

Operation ambient temperature range

Version 1 - from minus 45 to plus 125 °C;
Version 2 - from minus 45 to plus 155 °C;
Version 3 - from minus 45 to plus 200 °C

Circuit

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

Thread code

M1 - M10x1-8g (1-150 MPa, drawing 1);
U1 - 3/8-24UNJF-3A (1-150 MPa, drawing 1);
U2 - 3/8-24UNF-2A (1-150 MPa, drawing 1);
M2 - M8x1-8g (1-25 MPa, drawing 2);
U3 - 5/16-24UNF-2A (1-25 MPa, drawing 2);
M3, M4, M5, M6 - M5x0,8-8g (1-10 MPa, drawings 3-6);
U4, U5, U6, U7 - 10-32UNF-2A (1-10 MPa, drawings 3-6)

Electrical connection

L - flexible cable 500 mm length

Order example of pressure sensor

Pressure sensor of MP-P series, intended for pressure conversion from 0 to 60 MPa, for operation within temperature range from - 45 to + 200 °C, with “open bridge” circuit, 3/8-24UNJF-3A thread and flexible cable 500 mm length:

Pressure sensor MP-P 60-31-U1-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 MP-P 60-31-U1-L1000.

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, thread code and order number



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