Microelectronic gauge pressure sensors
AMP-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 – 700 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

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

ˇ 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.

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

ˇ 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.

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

2 Temperature ranges

2.1 Operating temperature range

2.1.1 Version 1 . . . . . .from - 45 to + 125°C

2.1.2 Version 2 . . . . . .from - 45 to + 155°C

2.1.3 Version 3 . . . . . .from - 45 to + 200°C

2.2 Limiting

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, % FS 0,01

3.2 Non-linearity, % FS . . . . . .±0,15

3.3 Variation, % 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 AMP-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}. .$(1,75\pm0,1)\cdot10^{-3}$

4.4 Insulation resistance, MOhm

at room temperature 100

at the upper ambient temperature value 20

4.5 Electrical insulation strength (AC voltage), V 700

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, Hz . . . . . .from 10 to 5000

Acceleration amplitude, m/s^2 500

5.2 Shock resistance (multiple mechanical shocks):

Shock acceleration peak, m/s^2 1000

Shock pulse width, ms 2

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

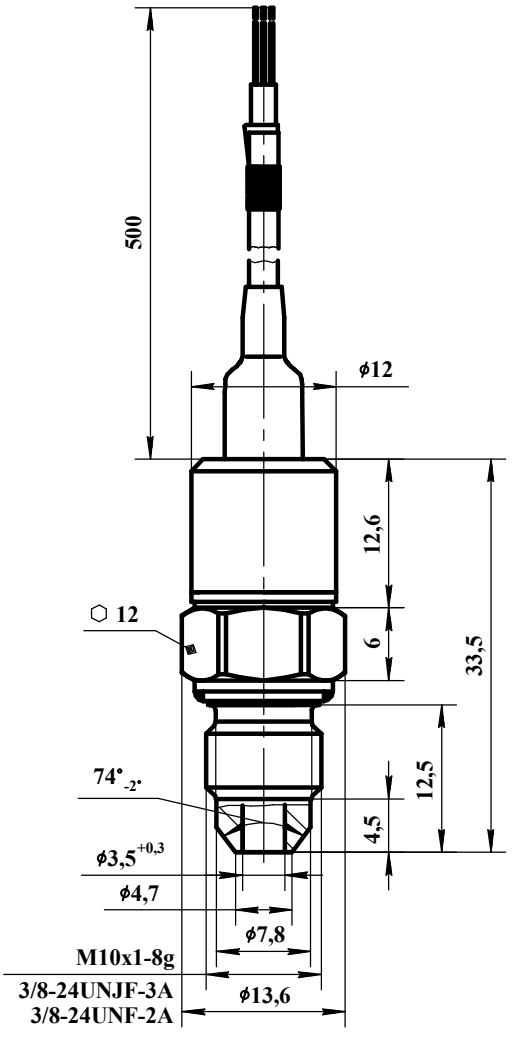
6 Operating conditions

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).

7 Overall and mounting dimensions

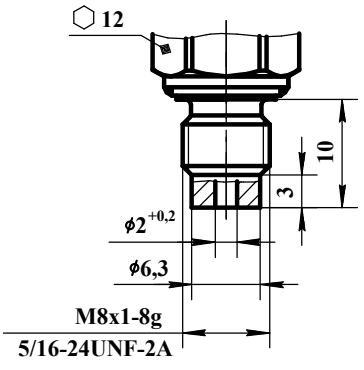


Thread	Code
M10x1-8g	M1
3/8-24UNJF-3A	U1
3/8-24UNF-2A	U2

Drawing 1

7.1 Thread design

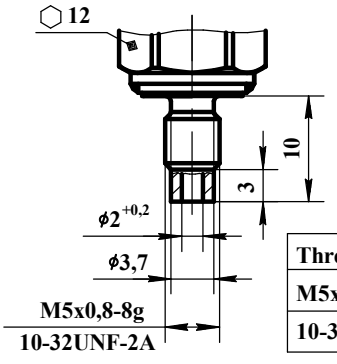
AMP 1(1,6...25)-...-M2(U3)-...



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

Drawing 2

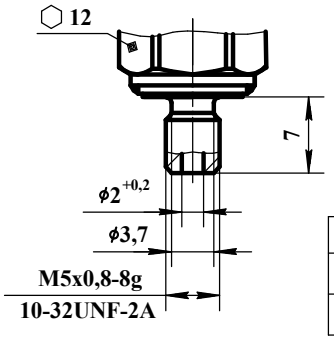
AMP 1(1,6...10)-...-M3(U4)-...



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

Drawing 3

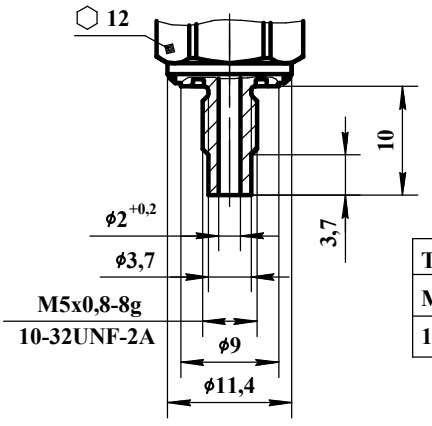
AMP-P 1(1,6...10)-...-M4(U5)-...



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

Drawing 4

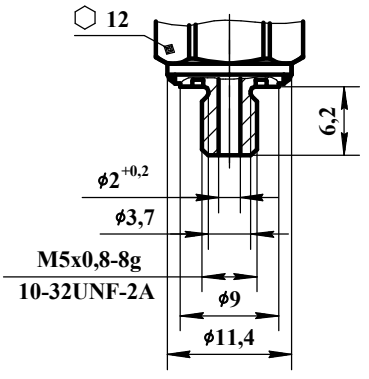
AMP-P 1(1,6...10)-...-M5(U6)-...



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

Drawing 5

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

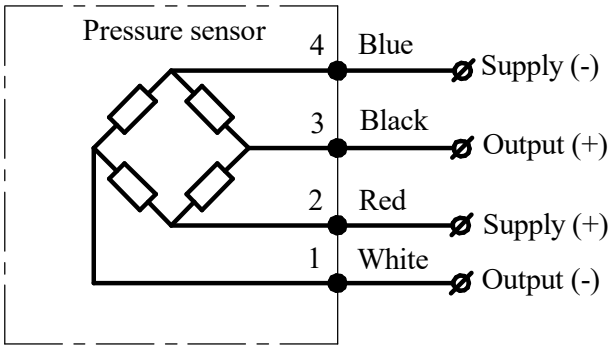


Thread	Code
M5x0,8-8g	M6
10-32UNF-2A	U7

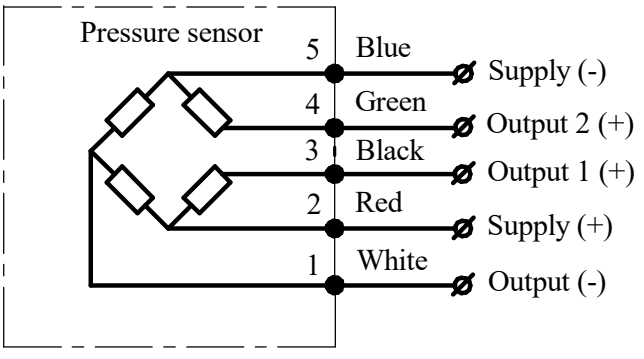
Drawing 6

8 CCircuit diagram

"Closed bridge" diagram

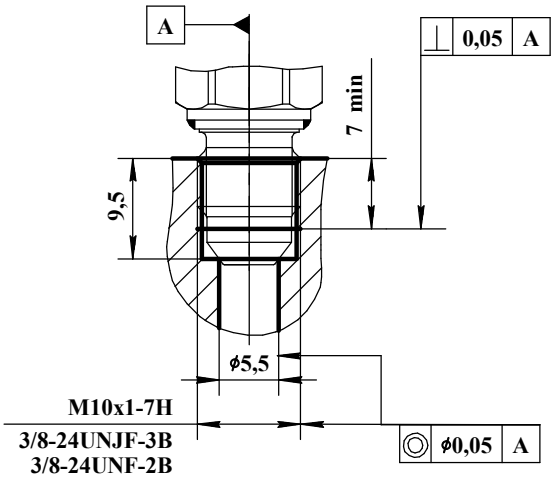


"Open bridge" diagram

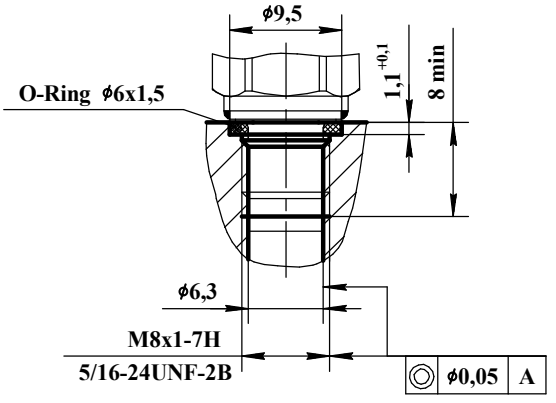


9 Mounting diagrams

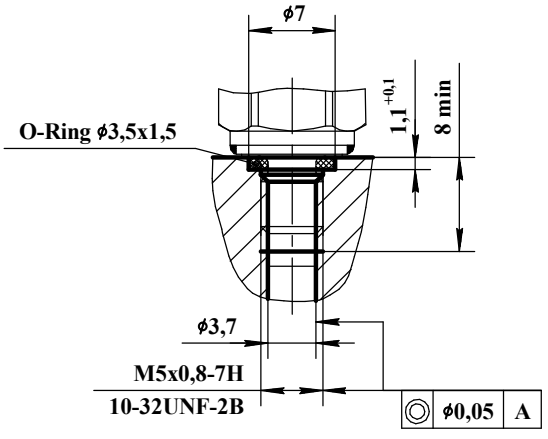
AMP-P 1(1,6...150)-...-M1(U1, U2)-...



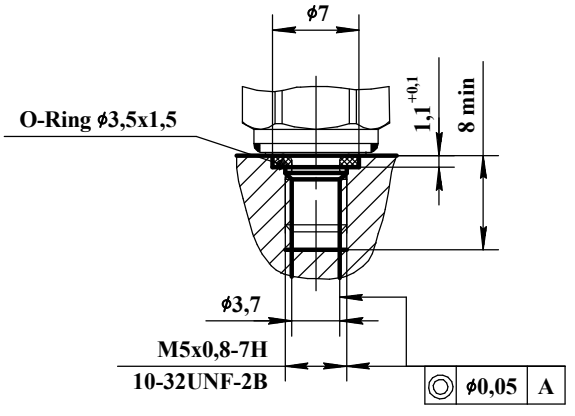
AMP-P 1(1,6...25)-...-M2(U3)-...



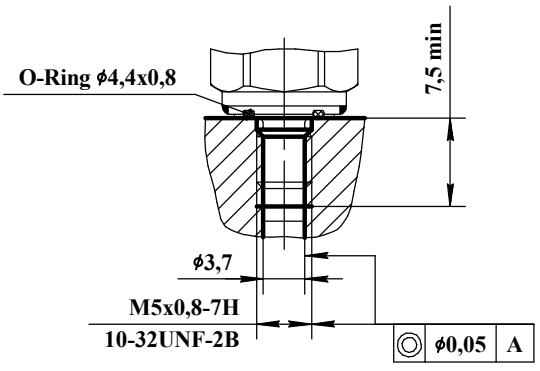
AMP-P 1(1,6...10)-...-M3(U4)-...



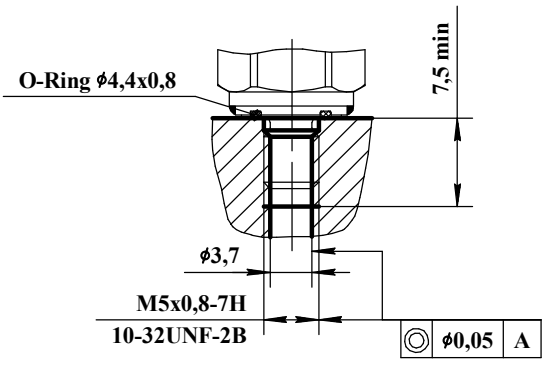
AMP-P 1(1,6...10)-...-M4(U5)-...



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



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



10 Type designation

AMP-PXXX - XX - X - X

Series

Upper gauge pressure limit

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

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

Curcuit

0 - “closed bridge”circuit; 1 - “open brigde” 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 AMP-P series, intended for pressure conversion from 0 to 60 MPa, for operation within temperature range from - 45 to + 200 ℃, with “open bridge” circuit, 3/8-24UNJF-3A thread and flexible cable 500 mm length:

Pressure sensor MAMP-P 60-31-U1-L.

Note: if wished, the cable length (standard 500 mm) can be changed, in this case the required length should be added to the cable code L, for example:

Pressure sensor MAMP-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