



Microelectronic high pressure sensors P Series

- ▶ Resolution 0,01 %
- ▶ Operating pressure range
from 0-60 to 0-150 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
P 60...	0...60	-0,1...120
P 100...	0...100	-0,1...150
P 150...	0...150	-0,1...165

2 Temperature ranges

2.1 Operating temperature range

2.1.1 Version 1from - 40 to + 100°C

2.1.2 Version 2from - 20 to + 155°C

2.1.3 Version 3from - 20 to + 200°C

2.2 Limiting temperature range

2.2.1 Version 1from - 40 to + 130°C

2.2.2 Version 2from - 20 to + 160°C

2.2.3 Version 3from - 20 to + 200°C

Note: operating and limiting temperature ranges of the sensors are determined by the applying O-rings from ethylene propylene rubber Keltan (operating temperature from -40 to +130°C) and from fluoric rubber Viton (operating temperature range from -20 to +200°C).

3 Accuracy parameters

3.1 Resolution, % FS0,01

3.2 Non-linearity, % FS±0,2

3.3 Hysteresis, % FS0,1

3.4 Output signal repeatability, % FS±0,1

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 pressures, % FS

for zero output signal ±0,2

for output signal range ±0,05

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3.7 Additional ambient temperature error, % FS/1°C

3.7.1 Zero output signal ±0,05

3.7.2 Output signal range

operating temperature range from -40 to +100 °C ±0,05

operating temperature range from +100 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 ±10

4.1.2 Output signal range (FS) 150±50

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±0,1)·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 - 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/s² 500

5.2 Shock resistance (multiple mechanical shocks):

Shock acceleration peak, m/s² 1000

Shock pulse width, ms 2-5

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6 Operating conditions

6.1 IP level IP40

6.2 Sensor body (pressure connection) 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 etc)

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M-301
2021

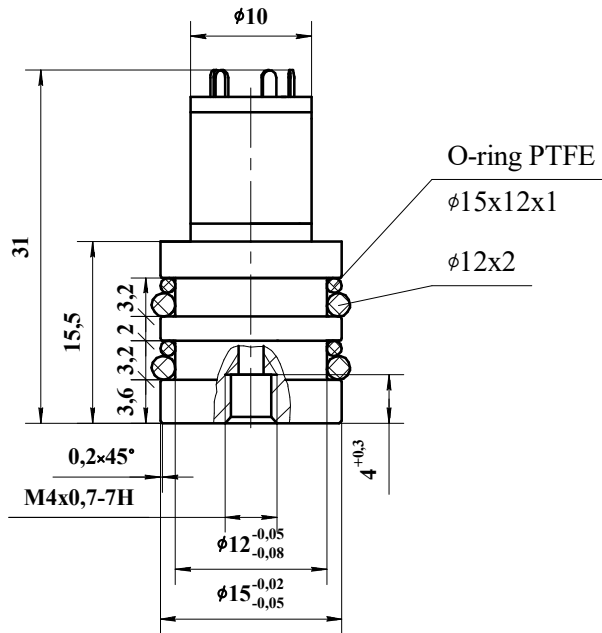
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7 Overall and mounting dimensions

7.1 Version with pins

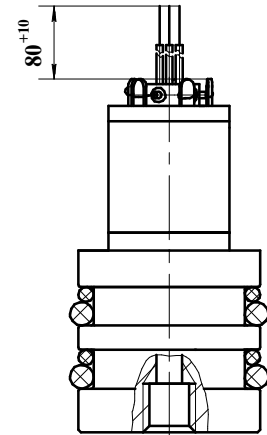
P 60(100, 150-...-D15-P)



Drawing 1

7.2 Version with wires

P 60(100, 150-...-D15-L)



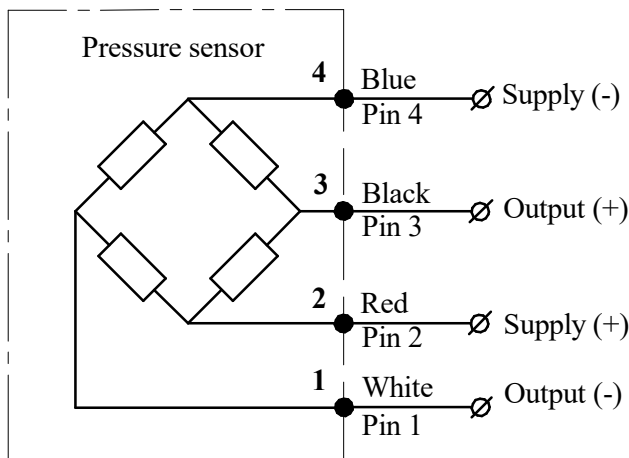
Drawing 2

The rest -

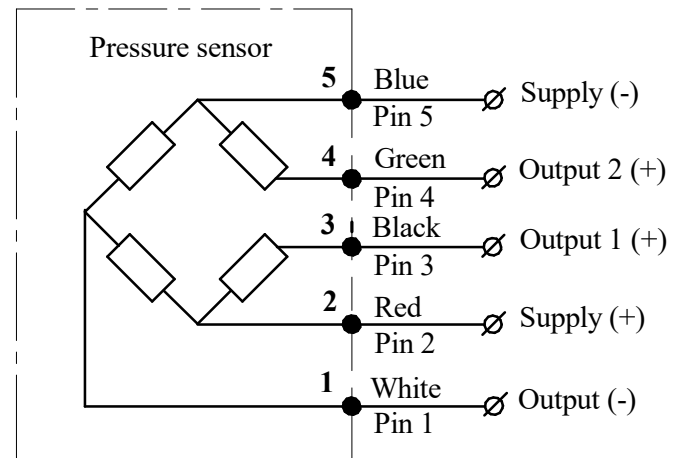
ref. drawing 1

8 Circuit diagram

"Closed bridge" diagram



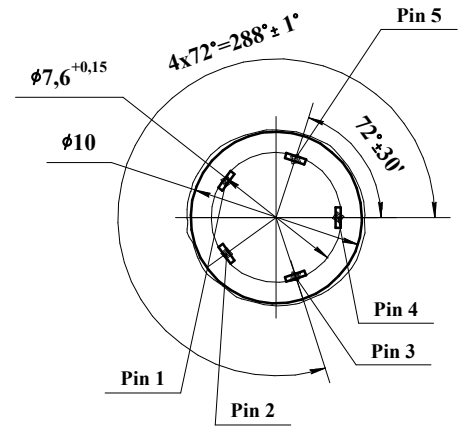
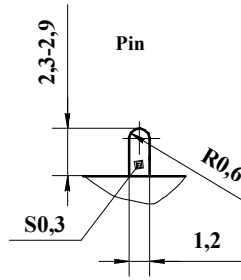
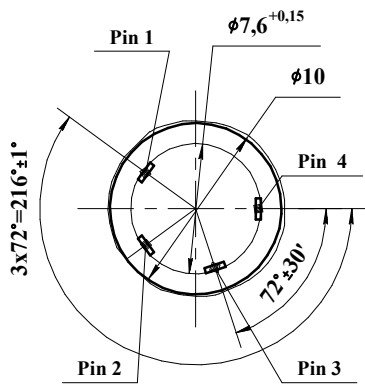
"Open bridge" diagram



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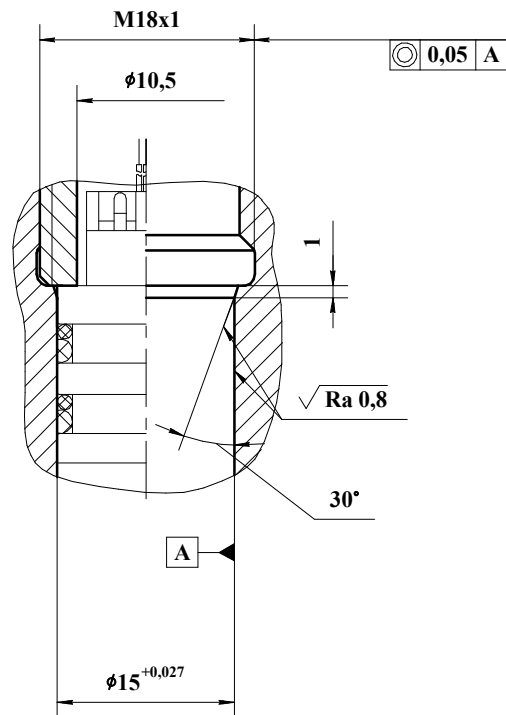
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Pins configuration



9 Mounting diagrams

P 60(100, 150)-...-D15-...



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10 Type designation

	P	XXX - XX - X - XXX - X
Series		
Upper gauge pressure limit		
60, 100, 150 MPa		
Operating ambient temperature range		
Version 1 - from - 40 to + 100 °C; Version 2 - from - 20 to + 155 °C; Version 3 - from - 20 to + 200 °C		
Curcuit		
0 - “closed bridge” circuit; 1 - “open brigde” circuit		
Power supply modification		
V - stabilized DC voltage (1-10 V)		
Conjoint part code		
D15 - diameter 15 mm (drawings 1, 2)		
Electrical connection		
L - flexible wire 80 mm length; P - pin 4,5 mm height		

Order example of pressure sensor

Pressure sensor of P series, intended for pressure conversion from 0 to 150 MPa, for operation within temperature range from - 20 to + 200 °C, with “open bridge” circuit, DC voltage power supply, diameter of the conjoint part 15 mm and flexible wire 80 mm length:

Pressure sensor P 150-31-V-D15-L.

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 P 150-31-V-D15-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, power supply modification, conjoint part code and order number

P 150-31-V-D15 000000

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