



## Microelectronic flush diaphragm gauge pressure sensors P Series

- ▶ Resolution 0,01 %
- ▶ Operating pressure range  
from 0-0,16 to 0-10 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
P 0,16...	0...0,16	-0,1...0,32	0,48
P 0,25...	0...0,25	-0,1...0,5	0,75
P 0,4...	0...0,4	-0,1...0,8	1,2
P 0,6...	0...0,6	-0,1...1,2	1,8
P 1...	0...1	-0,1...2	3
P 1,6...	0...1,6	-0,1...3,2	4,8
P 2,5...	0...2,5	-0,1...5	7,5
P 4...	0...4	-0,1...8	12
P 6...	0...6	-0,1...12	18
P 10...	0...10	-0,1...20	30

## 2 Temperature ranges

### 2.1 Operating temperature range

2.1.1 Version 1 ..... from - 40 to + 100°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

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).

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### 3 Accuracy parameters

3.1 Resolution, % FS	.....0,01
3.2 Non-linearity, % FS	..... $\pm 0,25$
3.3 Variation, % FS	.....0,1
3.4 Output signal repeatability, % FS	..... $\pm 0,1$
3.5 Long-term stability of the output signal range within 12 months, %	..... $\pm 0,25$
3.6 Output signal error caused by the influence of overload pressures, % FS	
for zero output signal	..... $\pm 0,2$
for output signal range	..... $\pm 0,05$
3.7 Additional ambient temperature error, % FS/1°C	
3.7.1 Zero output signal	..... 0,05 $\pm 0,07$
3.7.2 Output signal range	
operating temperature range from -40 to +100 °C	..... $\pm 0,05$
operating temperature range from +100 to +200 °C	..... -0,05 $\pm 0,025$
3.8 Additional vibration error of the output signal, % FS	..... $\pm 0,05$

### 4 Electrical characteristics

4.1 Output signal at room temperature, mV	
4.1.1 Zero output signal	..... $\pm 10$
4.1.2 Output signal range (FS)	.....150 $\pm 50$
for P 0,16 (D19); P 0,25 (D17)	..... 100 $\pm 35$
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 <sup>-1</sup>	
4.3.1 Modification V	..... (1,75 $\pm 0,1$ ) $\cdot 10^{-3}$
4.3.2 Modification C	..... (1,2 $\pm 0,2$ ) $\cdot 10^{-3}$
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, 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

## 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)

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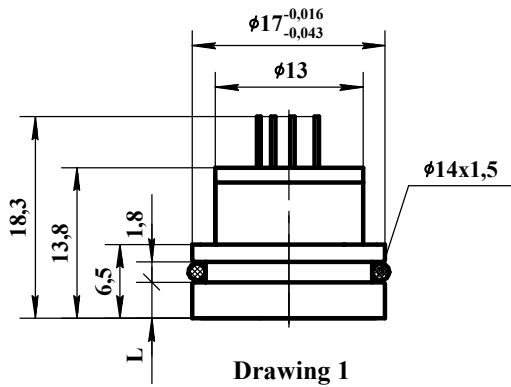
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## 7 Overall and mounting dimensions

### 7.1 Version with pins

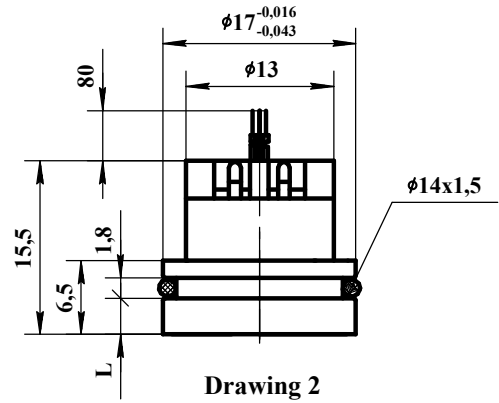
### 7.2 Version with wires

P 0,25(0,4...10)-...-D17-P



Drawing 1

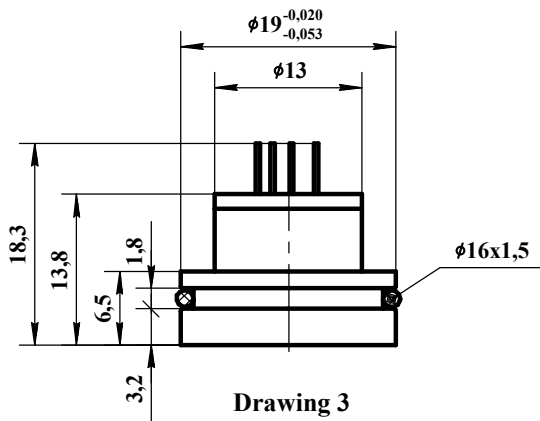
P 0,25(0,4...10)-...-D17-L



Drawing 2

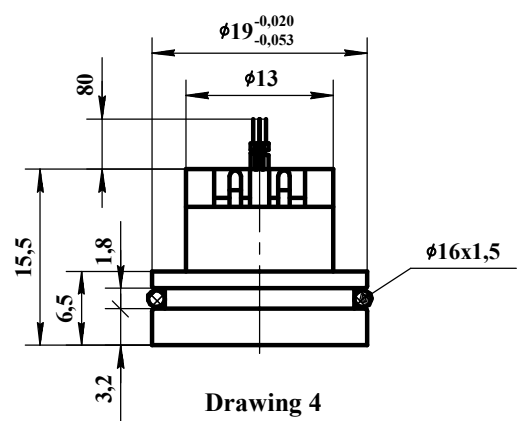
Pressure, MPa	L
from 0-0,25 to 0-6	3,2
from 0 to 10	2

P 0,16(0,25...1)-...-D19-P



Drawing 3

P 0,16(0,25...1)-...-D19-L



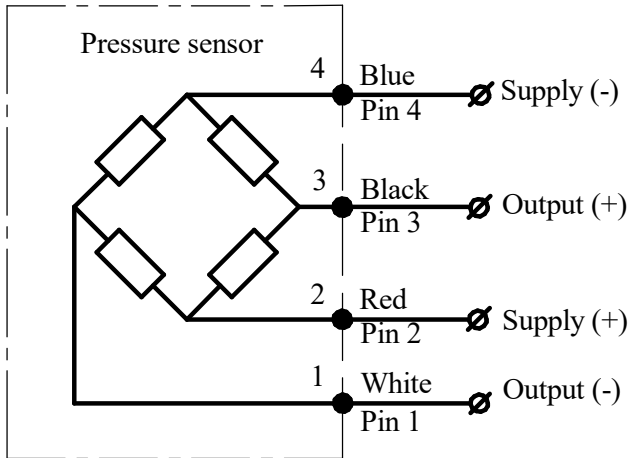
Drawing 4

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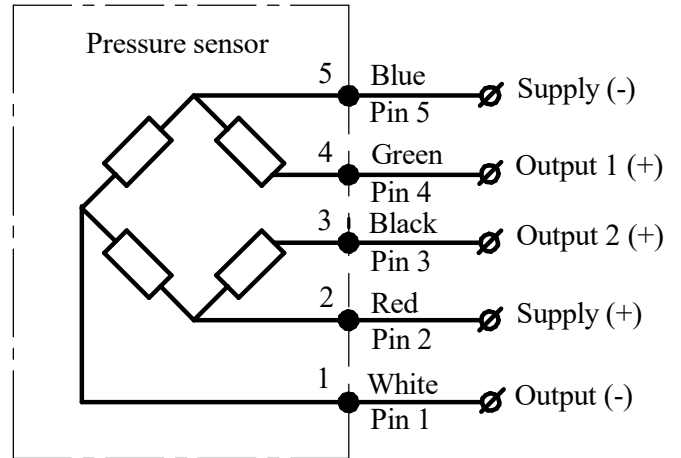
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## 8 Circuit diagram

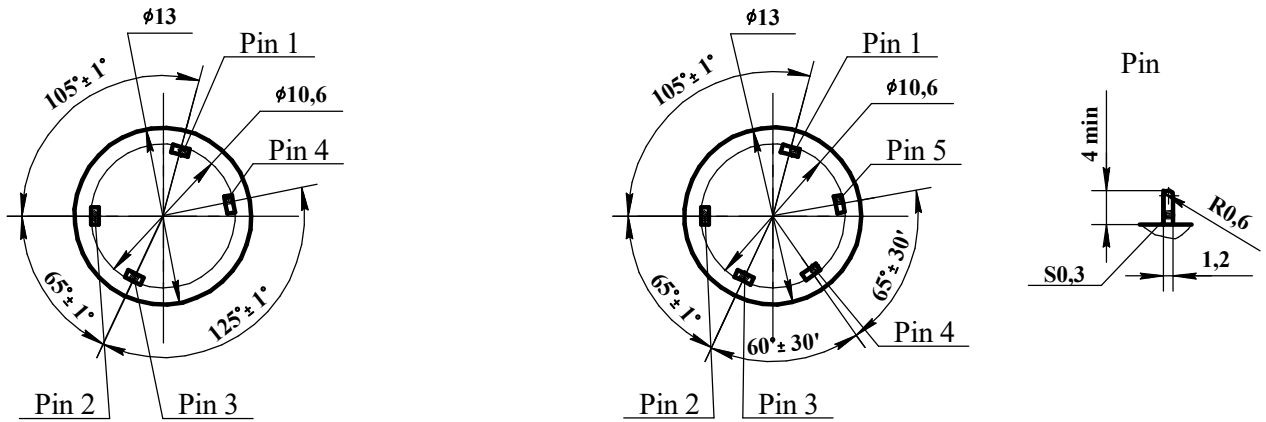
"Closed bridge" diagram



"Open bridge" diagram

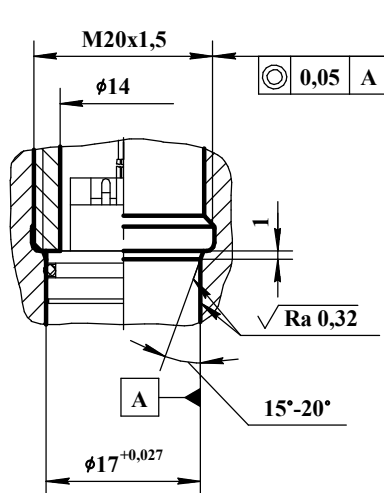


Pins configuration

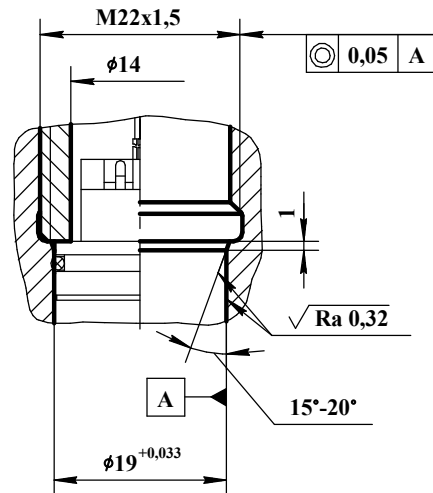


## 9 Mounting diagrams

P 0,25(0,4...10)-...-D17-...



P 0,16(0,25...1)-...-D19-...



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## 10 Type designation

**P      XXX - XXX - X - XXX - X**

Series

Upper gauge pressure limit

0,16; 0,25; 0,4; 0,6; 1; 1,6; 2,5; 4; 6; 10 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

Circuit

0 - "closed bridge" circuit;

1 - "open bridge" circuit

Version

1 - flush diaphragm

Power supply modification

V - stabilized DC voltage (1-10 V);

C - stabilized DC (0,2-2 mA)

Conjoint part code

D17 - diameter 17 mm (0,25 - 10 MPa, drawings 1, 2);

D19 - diameter 19 mm (0,16 - 1 MPa, drawings 3, 4)

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 0,4 MPa, for operation within temperature range from - 40 to + 100 °C, with "closed bridge" circuit, flush diaphragm, DC voltage power supply, diameter of the conjoint part 17 mm and flexible wire 80 mm length:

Pressure sensor P 0,4-101-V-D17-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 0,4-101-V-D17-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 the diaphragm, power supply modification, conjoint part code and order number

P 0,4-101-V-D17 000000

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