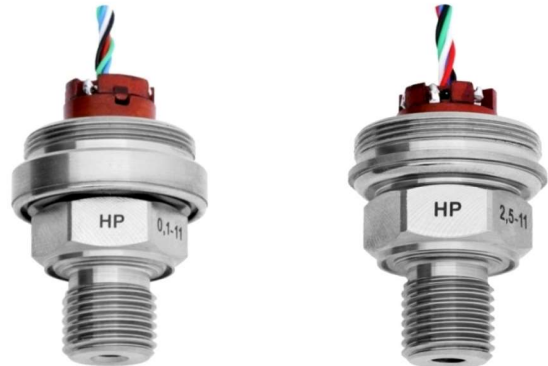




## Microelectronic gauge pressure sensors HP Series

- ▶ Resolution 0,01 %
- ▶ Operating pressure range  
from 0-0,06 to 0-150 MPa
- ▶ Operating temperature range  
from -45 to +200 °C
- ▶ Electrical insulation  
strength – 700 V
- ▶ Titanium body



### Applications

- Industrial automatics
- Oil and gas industry
- Hydraulics/Pneumatic
- 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 interference 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
HP 0,06...	0...0,06	-0,1...0,12	0,18
HP 0,1...	0...0,1	-0,1...0,2	0,3
HP 0,16...	0...0,16	-0,1...0,32	0,48
HP 0,25...	0...0,25	-0,1...0,5	0,75
HP 0,4...	0...0,4	-0,1...0,8	1,2
HP 0,6...	0...0,6	-0,1...1,2	1,8
HP 1...	0...1	-0,1...2	3
HP 1,6...	0...1,6	-0,1...3,2	4,8
HP 2,5...	0...2,5	-0,1...5	7,5
HP 4...	0...4	-0,1...8	12
HP 6...	0...6	-0,1...12	18
HP 10...	0...10	-0,1...20	30
HP 16...	0...16	-0,1...32	48
HP 25...	0...25	-0,1...50	75
HP 40...	0...40	-0,1...80	120
HP 60...	0...60	-0,1...120	180
HP 100...	0...100	-0,1...150	250
HP 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

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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, % FS	0,01
3.2 Non-linearity, % FS	
3.2.1 For HP 0,06... - HP 1,6...	±0,2
3.2.2 For HP 2,5... - HP 150...	±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, %	
3.5.1 For HP 0,06... - HP 1...	±0,25
3.5.2 For HP 1,6... - HP 150...	±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	
3.7.1.1 V type	±0,05
3.7.1.2 C type	0,03±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
3.9 Zero output signal error caused by the torque effect on the sensors, % FS	
3.9.1 For HP 0,25... - HP 1...	±0,25
3.9.2 For HP 0,06... - HP 0,16...; HP 1,6... - HP 150...	±0,025

## 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
for HP 0,06	100±35
4.2 Strain gauge bridge resistance at room temperature, kOhm	3,40-4,85

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- 4.3 Temperature resistance coefficient of the strain gauge bridge,  $K^{-1}$
- 4.3.1 V type .....  $(1,70 \pm 0,15) \cdot 10^{-3}$
- 4.3.2 C type .....  $(1,2 \pm 0,2) \cdot 10^{-3}$
- 4.4 Insulation resistance, MOhm
- at room temperature ..... 100
- at the upper ambient temperature value ..... 20
- 4.5 Electrical insulation strength (AC voltage), V ..... 700
- 4.6 Power supply
- 4.6.1 V type - stabilized DC voltage, V ..... 1-10
- 4.6.2 C type - 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 ..... 2-5
- 5.3 Torque effect while installation:

Operating pressure range, MPa	Thread code	
	M, G	K, MA, GA
0,06-10	30-35 N·m	30-35 N·m
16-40	50-60 N·m	
60-150	80-100 N·m	

## 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, ethyne etc)

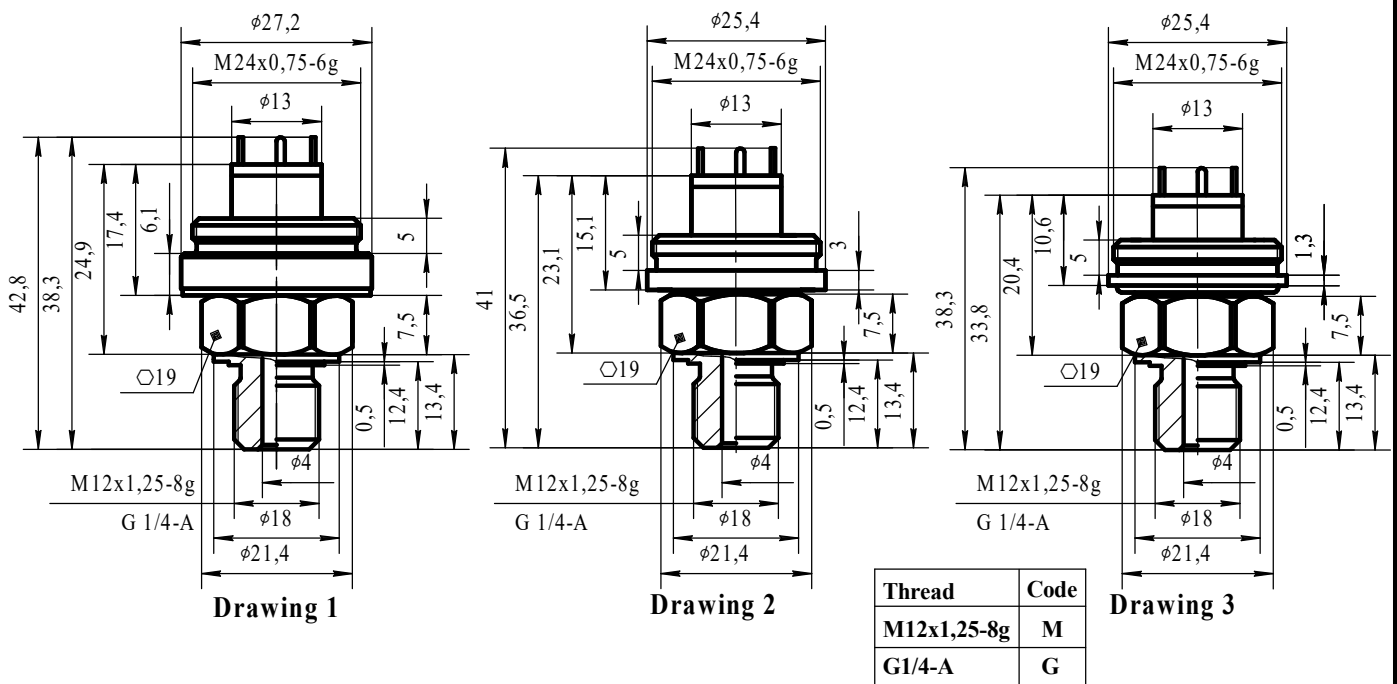
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## 7 Overall and mounting dimensions

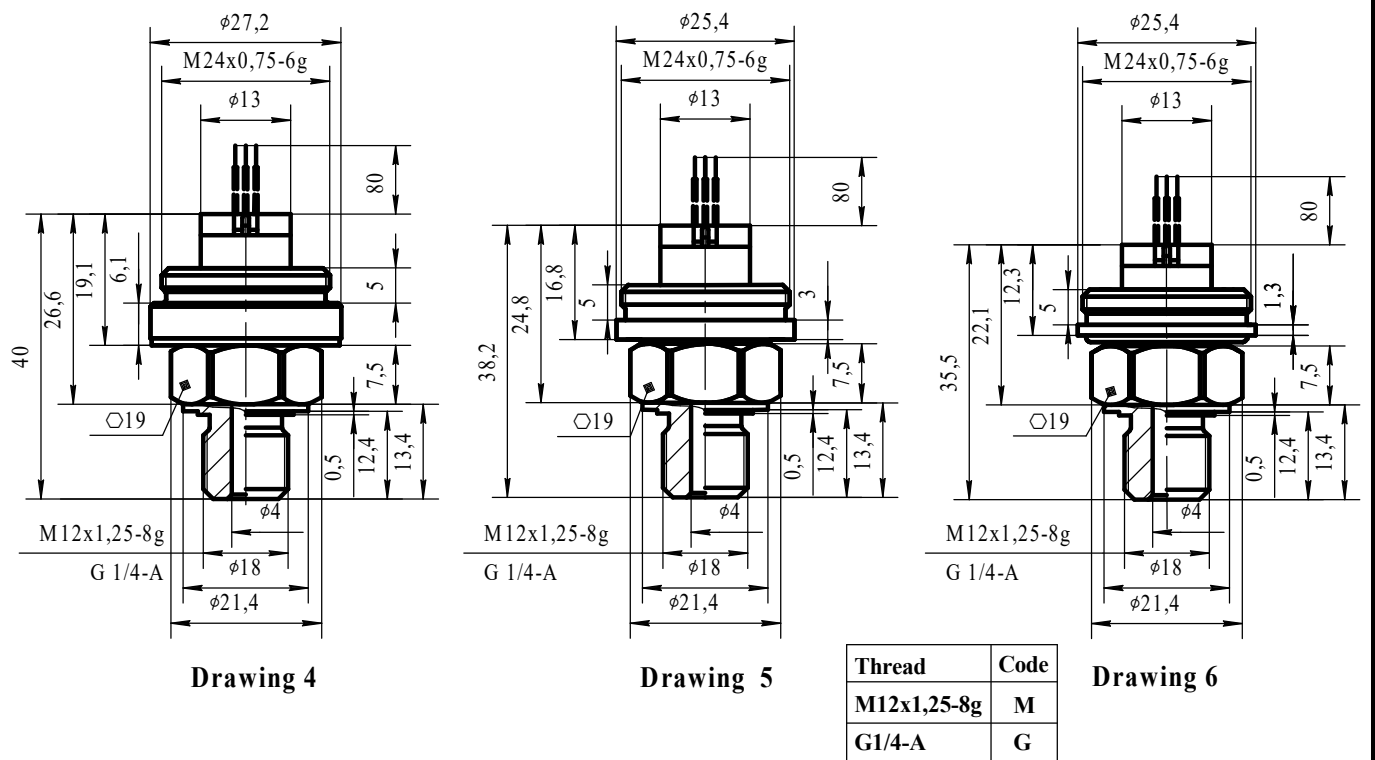
### 7.1 Version with pins

HP 0,06(0,1; 0,16)-...-M(G)-P    HP 0,25(0,4...1)-...-M(G)-P    HP 1,6(2,5...100)-...-M(G)-P



### 7.2 Version with wires

HP 0,06(0,1; 0,16)-...-M(G)-L    HP 0,25(0,4...1)-...-M(G)-L    HP 1,6(2,5...100)-...-M(G)-L

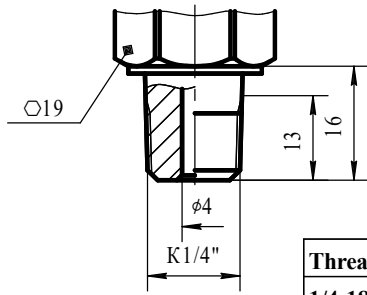


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### 7.3 Thread design

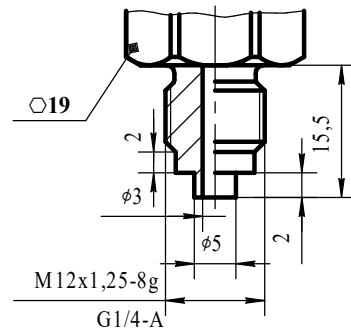
HP 0,06(0,1...100)-...-K-...



Thread	Code
1/4-18 NPT	K

(in accord with  
DIN 3866)

HP 0,06(0,1...150)-...-MA(GA)-...

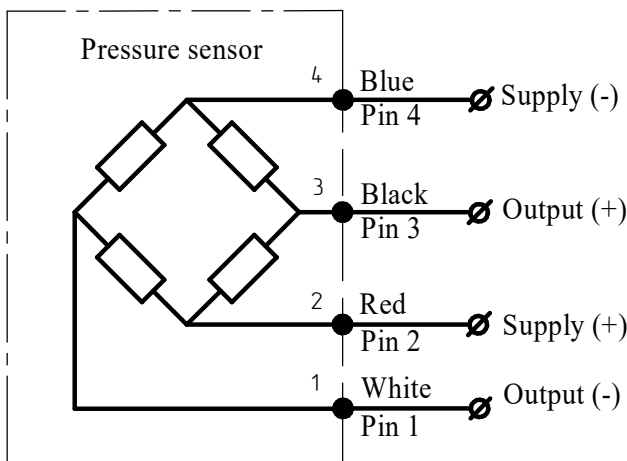


Thread	Code
M12x1,25-8g	MA
G1/4-A	GA

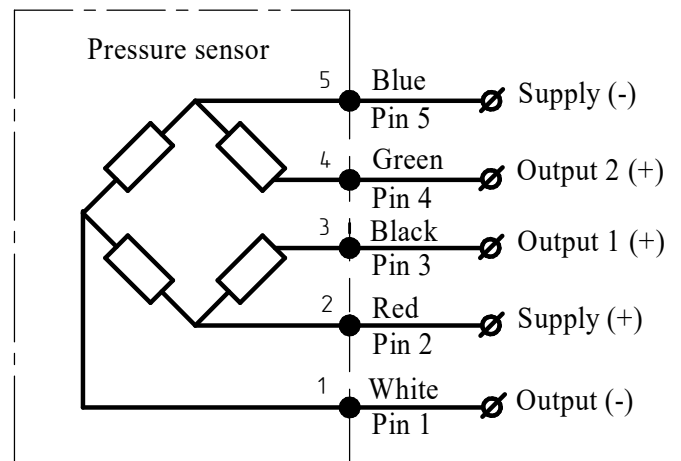
### 8 Circuit diagram

Electrical connection - flexible wire with section 0,08 or 0,12 mm<sup>2</sup>  
in teflon insulation

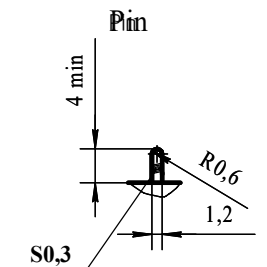
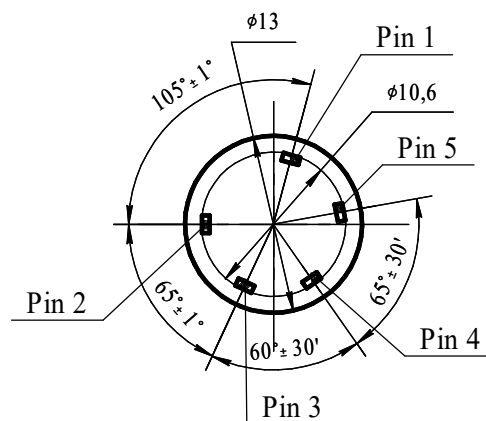
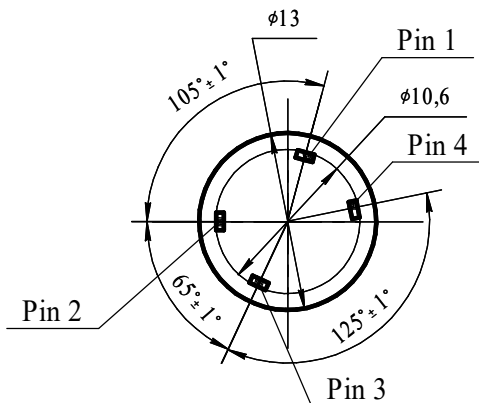
"Closed bridge" diagram



"Open bridge" diagram



Location of pins on the collector

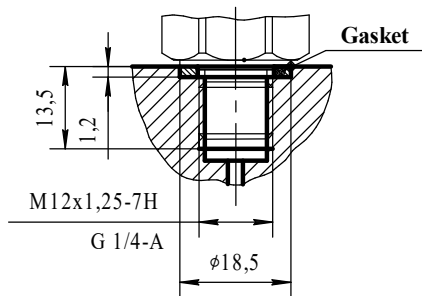


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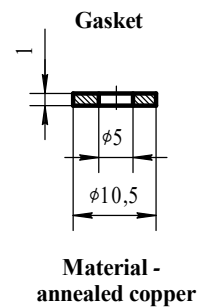
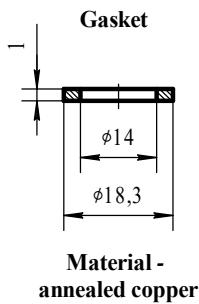
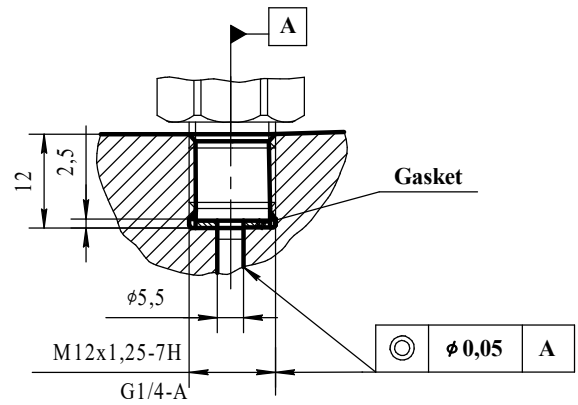
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## 9 Mounting diagrams

HP 0,06(0,1...100)-...-M(G)-...



HP 0,06(0,1...150)-...-MA(GA)-...



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## 10 Type designation

HP XXX - XX - X - XX - X

Series

Upper gauge pressure limit

0,06; 0,1; 0,16; 0,25; 0,4; 0,6; 1; 1,6; 2,5; 4;  
6; 10; 16; 25; 40; 60; 100; 150 MPa

Operating ambient temperature range

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

Circuit

0 - "closed bridge" circuit;  
1 - "open bridge" circuit

Power supply type

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

Thread code

K - 1/4-18 NPT;  
M - M12x1,25-8g;  
G - G1/4-A;  
MA - M12x1,25-8g, end seal;  
GA - G1/4-A, end seal

Electrical connection

L - flexible wire 80 mm length;  
P - pin 4,5 mm height

### Order example of pressure sensor

Pressure sensor of HP series, intended for pressure conversion from 0 to 0,25 MPa, for operation within temperature range from - 45 to + 200 °C, with "open bridge" circuit, DC voltage power supply and M12x1,25-8g thread:

Pressure sensor HP 0,25-31-V-M-L.

Note: if wished, typical size and wire length (standard 80 mm) can be changed in this case - in the order should be denoted thread designation and the required length should be added to the wire code L, for example:

Pressure sensor HP 0,25-31-V-M12x1-8g-L200.

## 11 Marking

Marking on the sensor body must contain following information: series, upper gauge pressure limit is in MPa, version of the operating temperature range, circuit type, power supply modification, thread code and order number



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