



Microelectronic gauge pressure sensors HPL-P Series

- ▶ **Resolution 0,01 %**
- ▶ **Operating pressure range from 0-0,06 to 0-150 MPa**
- ▶ **Operating temperature range from -200 to +200 °C**
- ▶ **Electrical insulation strength – 500 V**
- ▶ **Titanium body**



- **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 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
HPL-P 0,06...	0...0,06	-0,1...0,12	0,18
HPL-P 0,1...	0...0,1	-0,1...0,2	0,3
HPL-P 0,16...	0...0,16	-0,1...0,32	0,48
HPL-P 0,25...	0...0,25	-0,1...0,5	0,75
HPL-P 0,4...	0...0,4	-0,1...0,8	1,2
HPL-P 0,6...	0...0,6	-0,1...1,2	1,8
HPL-P 1...	0...1	-0,1...2	3
HPL-P 1,6...	0...1,6	-0,1...3,2	4,8
HPL-P 2,5...	0...2,5	-0,1...5	7,5
HPL-P 4...	0...4	-0,1...8	12
HPL-P 6...	0...6	-0,1...12	18
HPL-P 10...	0...10	-0,1...20	30
HPL-P 16...	0...16	-0,1...32	48
HPL-P 25...	0...25	-0,1...50	75
HPL-P 40...	0...40	-0,1...80	120
HPL-P 60...	0...60	-0,1...120	180
HPL-P 100...	0...100	-0,1...150	250
HPL-P 150...	0...150	-0,1...165	300

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2 Operating temperature range

2.1 Version 1 (0,06-150 MPa)	from - 45 to + 125°C
2.2 Version 2 (0,06-150 MPa)	from - 45 to + 155°C
2.3 Version 3 (0,06-150 MPa)	from - 45 to + 200°C
2.4 Version 4 (0,06-60 MPa)	
target medium	from - 200 to + 25°C
ambient medium	from - 60 to + 60°C

3 Accuracy parameters

3.1 Resolution, % FS	0,01
3.2 Non-linearity,% FS	
3.2.1 For HPL-P 0,06 ... - HPL-P 1,6	±0,2
3.2.2 For HPL-P 2,5 ... - HPL-P 150	±0,15
3.3 Hysteresis, % FS	0,05
for version 4	0,1
3.4 Output signal repeatability, % FS	±0,05
for version 4	±0,1
3.5 Long-term stability of the output signal range within 12 months, %	±0,2
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 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 by stabilized DC voltage 10 V	
4.1.1 Zero output signal, mV	±10
4.1.2 Output signal range (FS), mV	150±50
for HPL-P 0,06...; HPL-P 0,1...; HPL-P 0,16...; HPL-P 0,25...	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±0,1)·10 ⁻³
operating temperature range from -200 to +25 °C	(1,3±0,2)·10 ⁻³
4.4 Insulation resistance, MOhm	
at room temperature	100
4.5 Electrical insulation strength (AC voltage), V	500
4.6 Power supply by stabilized DC voltage, V	1-10

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5 Mechanical characteristics

5.1 Vibration resistance (sinusoidal vibration):

Frequency range, Hzfrom 10 to 500
 Acceleration amplitude, m/s^2 50

5.2 Shock resistance (multiple mechanical shocks):

Shock acceleration peak, m/s^2 100
 Shock pulse width, ms 2-5

5.3 Torque effect while installation:

Operating pressure range, MPa	Thread code	
	MFA, GFA, MK1, GK1	K, MFE,GFE, MA1, GA1, MT1,GT1
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 IP54

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)

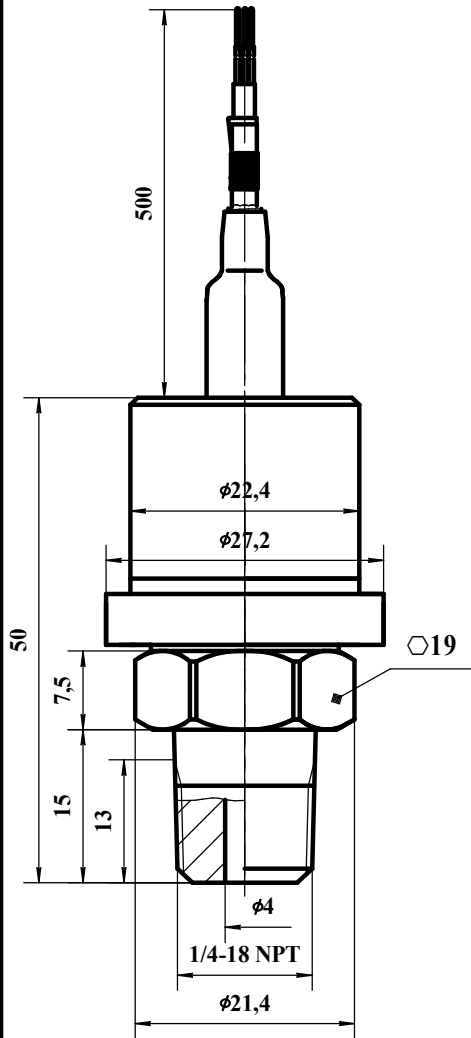
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7 Overall and mounting dimensions

HPL-P 0,06(0,1; 0,16)-...-K-L

HPL-P 0,25(0,4...1)-...-K-L

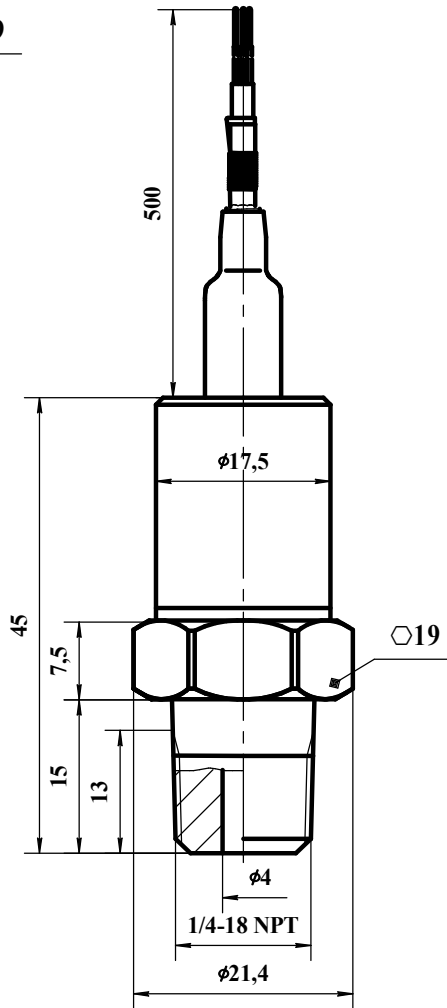


Drawing 1

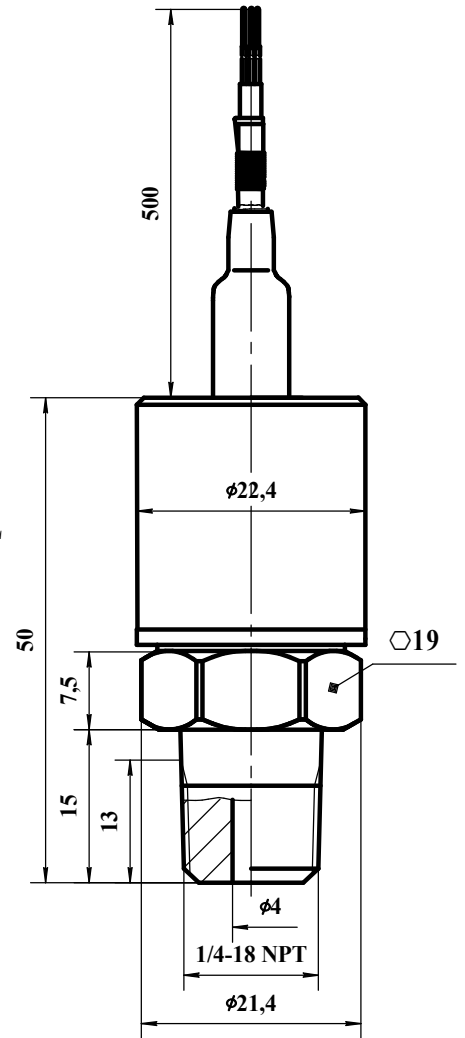
Thread	Code
1/4-18 NPT	K

(in accord with
DIN 3866)

HPL-P 1,6(2,5...100)-...-K-L



Drawing 3



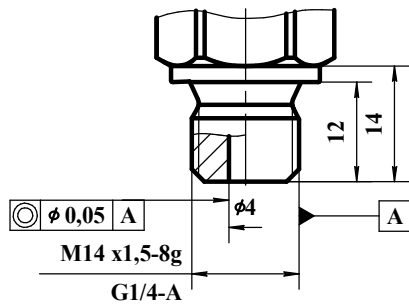
Drawing 2

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7.1 Thread design

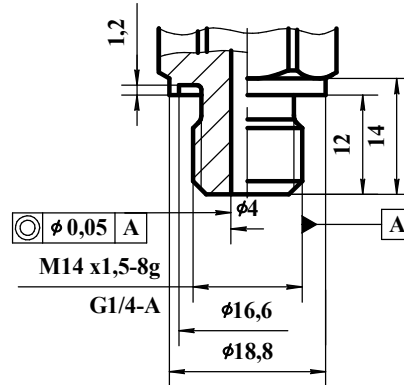
HPL-P 0,06(0,1...100)-...-MFA(GFA)-...



Thread	Code
M14x1,5-8g	MFA
G1/4-A	GFA

(in accord with
DIN 3852)

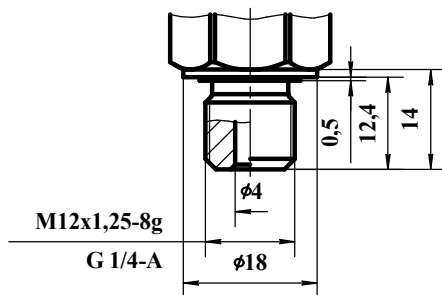
HPL-P 0,06(0,1...100)-...-MFE(GFE)-...



Thread	Code
M14x1,5-8g	MFE
G1/4-A	GFE

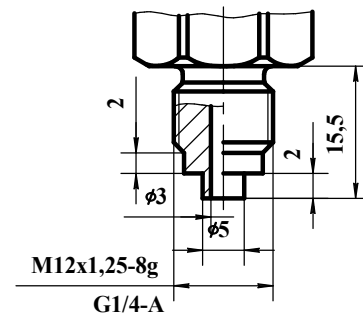
(in accord with
DIN 3852)

HPL-P 0,06(0,1...100)-...-MK1(GK1)-...



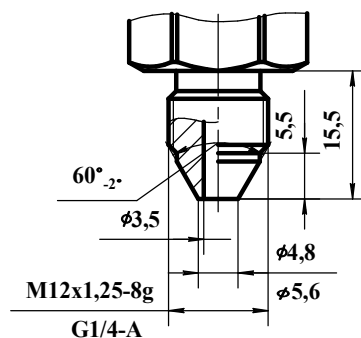
Thread	Code
M12x1,25-8g	MK1
G1/4-A	GK1

HPL-P 0,06(0,1...150)-...-MA1(GA1)-...



Thread	Code
M12x1,25-8g	MA1
G1/4-A	GA1

HPL-P 0,06(0,1...100)-...-MT1(GT1)-...



Thread	Code
M12x1,25-8g	MT1
G1/4-A	GT1

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10 Type designation

HPL-P XXX - XX - XXX - 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 temperature range

Version 1 (0,06-150 MPa) - from - 45 to + 125 °C
Version 2 (0,06-150 MPa) - from - 45 to + 155 °C
Version 3 (0,06-150 MPa) - from - 45 to + 200 °C
Version 4 (0,06-60 MPa): target medium - from - 200 to + 25 °C;
ambient medium - from - 60 to + 60 °C

Circuit

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

Thread code

K - 1/4-18 NPT - for version 1-4;
MFA - M14x1,5-8g, form A - for version 1-3;
GFA - G1/4-A, form A - for version 1-3;
MFE - M14x1,5-8g, form E - for version 1-3;
GFE - G1/4-A, form E - for version 1-3;
MK1 - M12x1,25-8g - for version 1-3;
GK1 - G1/4-A - for version 1-3;
MA1 - M12x1,25-8g, end seal - for version 1-4;
GA1 - G1/4-A, end seal - for version 1-4;
MT1 - M12x1,25-8g, cone seal - for version 1-4;
GT1 - G1/4-A, cone seal - for version 1-4

Electrical connection

L - flexible cable 500 mm length

Order example of pressure sensor

Pressure sensor of HPL-P series, intended for pressure conversion from 0 to 1,6 MPa, for operation within temperature range of target medium from - 200 to + 25 °C, with “open bridge” circuit, 1/4-18 NPT thread and flexible cable 500 mm length:

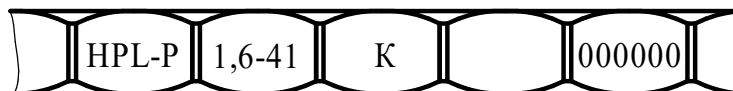
Pressure sensor HPL-P 1,6-41-K-L.

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 HPL-P 1,6-41-K-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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