

Microelectronic gauge pressure sensors HD Series

- Resolution 0,01 %
- Operating pressure range
from 0-100 to 0-500 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 membrane with monocrystal silicon resistance strain gauges.
- ✓ Monocrystal sapphire membrane 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

Nominal pressure, MPa	0 ... 100	0 ... 160	0 ... 200	0 ... 250	0 ... 400	0 ... 500
Overload pressure, MPa	-1 ... 150	-1 ... 240	-1 ... 300	-1 ... 375	-1 ... 500	-1 ... 600
Burst pressure, MPa	250	400	450	500	600	750

2 Temperature ranges

2.1 Operating temperature range

- 2.1.1 Version 1from - 45 to + 125°C
- 2.1.2 Version 2from - 45 to + 155°C
- 2.1.3 Version 3from - 45 to + 200°C

2.2 Limiting temperature range

- 2.2.1 Version 1from - 60 to + 130°C
- 2.2.2 Version 2from - 60 to + 160°C
- 2.2.3 Version 3from - 60 to + 205°C

3 Accuracy parameters

- 3.1 Resolution, % FS0,01
- 3.2 Non-linearity, % FS±0,15
- 3.3 Variation, % FS0,05
- 3.4 Output signal repeatability, % FS±0,05

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- 3.5 Long-term stability of the output signal range within 12 months, % ±0,15
- 3.6 Additional ambient temperature error, % FS/1°C
 - 3.6.1 For zero output signal ±0,05
 - 3.6.2 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
- 3.7 Additional vibration error of the output signal, % FS ±0,05
- 3.8 Zero output signal error caused by the torque effect on the sensors, % FS
 - with male thread (MH1, MH2, MB1, MB2) ±0,02
 - with female thread (2M, 2U) ±0,25

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
- 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 700
- 4.6 Power supply by stabilized DC voltage, V 1-10

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
- 5.3 Torque effect while installation:

Operating pressure range, MPa	Female thread	Male thread
100-250	35 N·m	50 N·m
400-500	50 N·m	80 N·m

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6 Operating conditions

- 6.1 IP level IP40
- 6.2 Sensor body (pressure connection) and membrane are made without joint welds and 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)

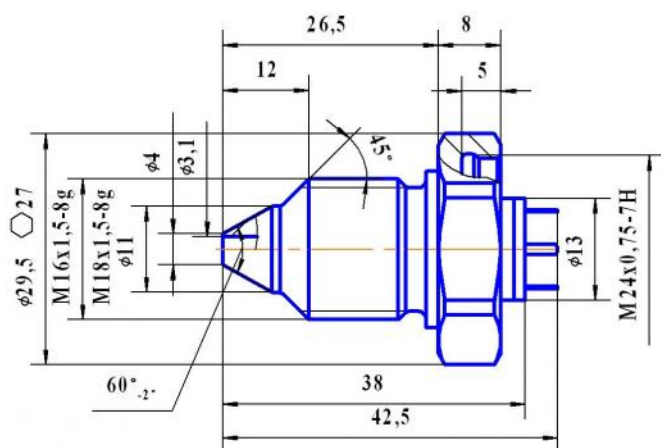
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7 Overall and mounting dimensions

7.1 Version with pins

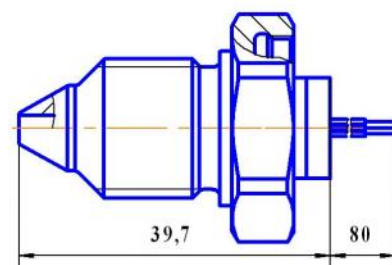
HD 100(160...500)-...-MH1(MH2)-P



Drawing 1

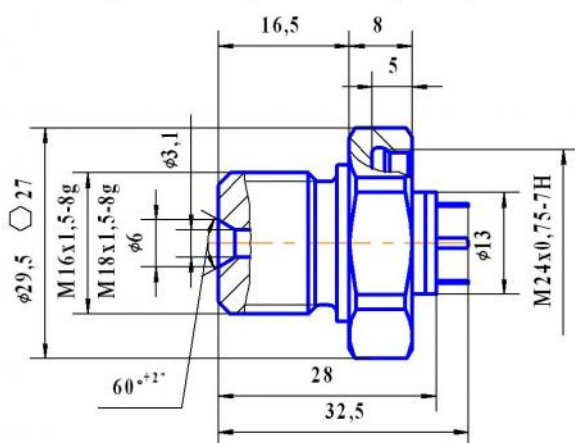
7.2 Version with wires

HD 100(160...500)-...-MH1(MH2)-L



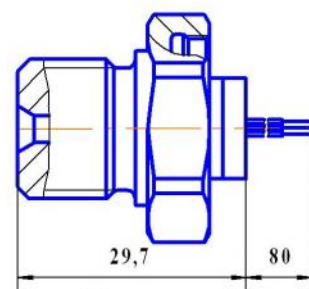
The rest -
ref. drawing 1
Drawing 2

HD 100(160...500)-...-MB1(MB2)-P



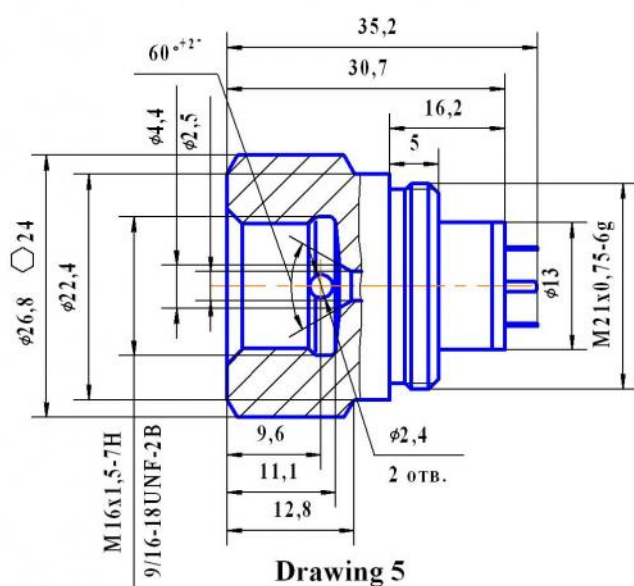
Drawing 3

HD 100(160...500)-...-MB1(MB2)-L



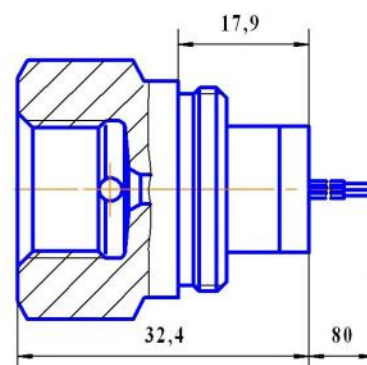
The rest -
ref. drawing 3
Drawing 4

HD 100(160...500)-...-2M(2U)-P



Drawing 5

HD 100(160...500)-...-2M(2U)-L



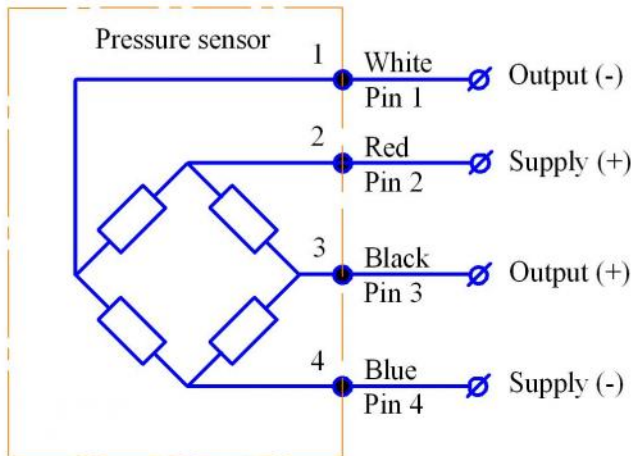
The rest -
ref. drawing 5
Drawing 6

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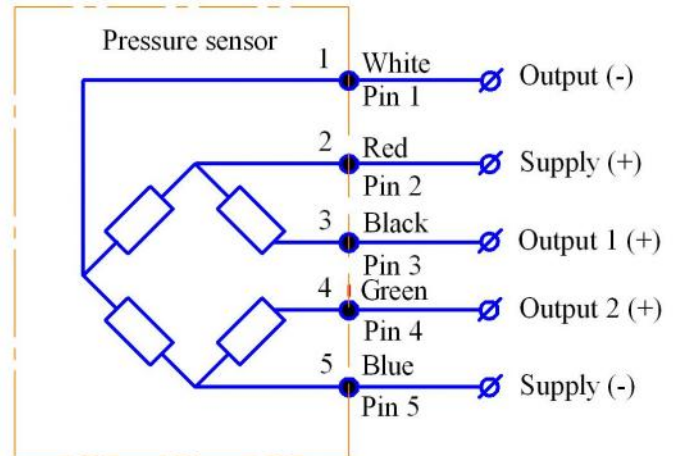
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8 Circuit diagram

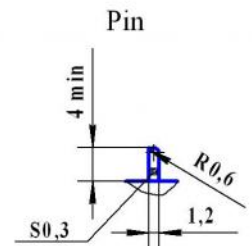
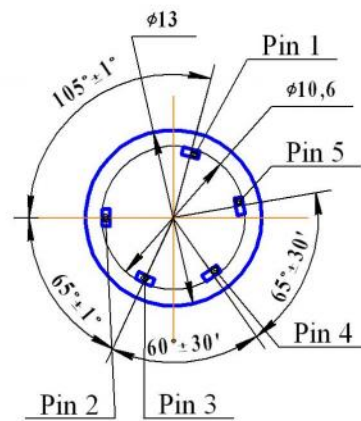
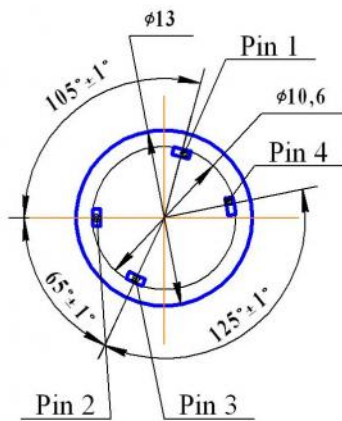
"Closed bridge" diagram



"Open bridge" diagram



Pins configuration

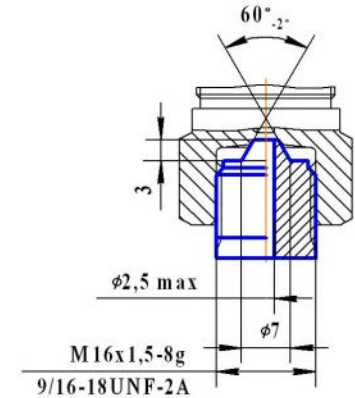
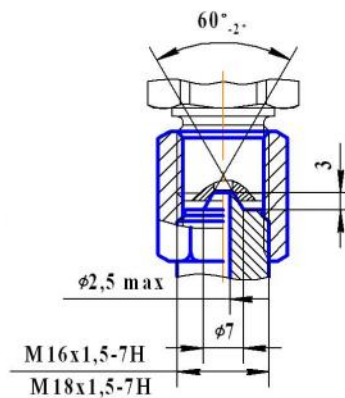
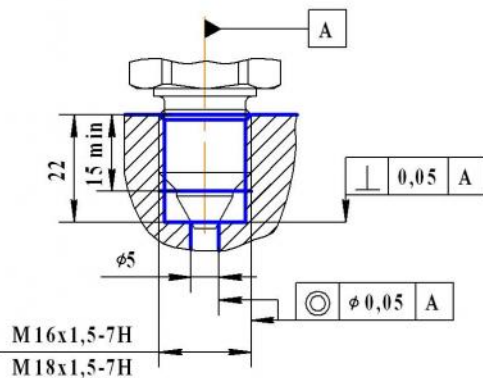


9 Mounting diagrams

HD 100(160...500)-...-MH1(MH2)...

HD 100(160...500)-...-2M(2U)...

HD 100(160...500)-...-MB1(MB2)...



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10 Type designation

HD XXX - XX - XXX - X

Series

Upper gauge pressure limit

100; 160; 200; 250; 400; 500 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

Thread code

MH1 - M16x1,5-8g - external with male cone;

MH2 - M18x1,5-8g - external with male cone

MB1 - M16x1,5-8g - external with female cone;

MB2 - M18x1,5-8g - external with female cone

2M - M16x1,5-7H - internal;

2U - 9/16-18UNF-2B - internal

Electrical connection

L - flexible wire 80 mm length;

P - pin 4,5 mm height

Order example of pressure sensor

Pressure sensor of HD series, intended for pressure conversion from 0 to 200 MPa, for operation within temperature range from - 45 to + 200 °C, with "open bridge" circuit, M16x1,5-8g thread, external with female cone and flexible wire 80 mm length:

Pressure sensor HD 200-31-MB1-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 HD 200-31-MB1-L200.

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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