

Microelectronic gauge pressure sensors MC Series

- Resolution 0,01 %
- Operating pressure range
from 0-1,6 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 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

Designation	Nominal pressure, MPa	Overload pressure, MPa	Burst pressure, MPa
MC 1,6...	0...1,6	-0,1...3,2	4,8
MC 2,5...	0...2,5	-0,1...5	7,5
MC 4...	0...4	-0,1...8	12
MC 6...	0...6	-0,1...12	18
MC 10...	0...10	-0,1...20	30
MC 16...	0...16	-0,1...32	48
MC 25...	0...25	-0,1...50	75
MC 40...	0...40	-0,1...80	120
MC 60...	0...60	-0,1...120	180
MC 100...	0...100	-0,1...150	250
MC 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 MC 1,6...	±0,2
3.2.2 For MC 2,5... - MC 150...	±0,15
3.3 Variation, % FS	0,05
3.4 Output signal repeatability, % FS	±0,05
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
3.7 Additional ambient temperature error, % FS/1°C	
3.7.1 For zero output signal	
3.6.1.1 V type	±0,05
3.6.1.2 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

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	
4.3.1 V type	(1,75±0,1)·10 ⁻³
4.3.2 C type	(1,2±0,2)·10 ⁻³
4.4 Insulation resistance, MOhm	
at room temperature	100
by the upper ambient temperature value	20
4.5 Electrical insulation strength (AC voltage), V	700

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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
5.3 Torque effect while installation should not be higher, N·m	30

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)	

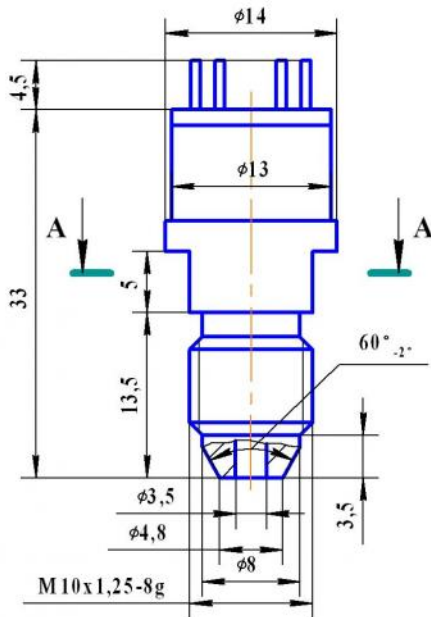
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7 Overall and mounting dimensions

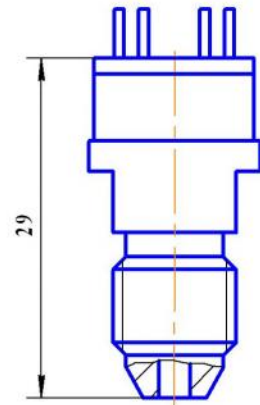
7.1 Version with pins

MC 1,6(2,5...10)-...-P



Drawing 1

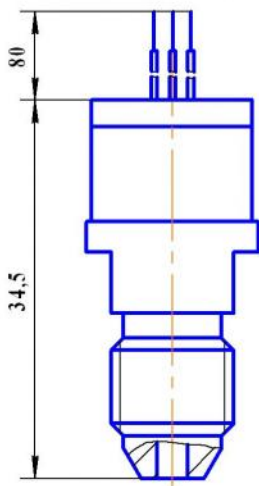
MC 16(25...150)-...-P



The rest -
ref. drawing 1
Drawing 2

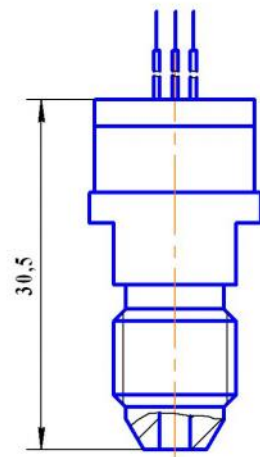
7.2 Version with wires

MC 1,6(2,5...10)-...-L



The rest -
ref. drawing 1
Drawing 3

MC 16(25...150)-...-L



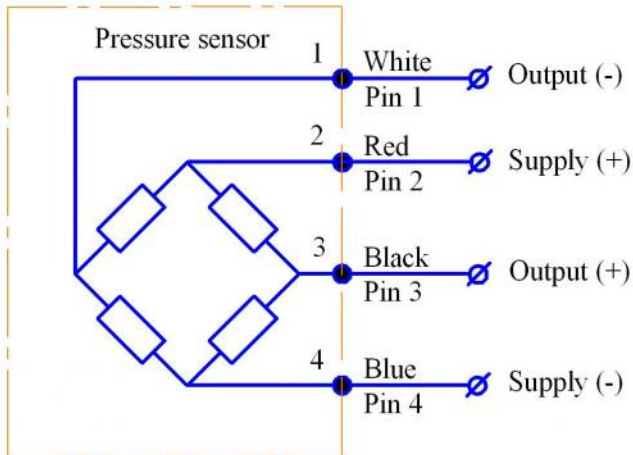
The rest -
ref. drawings 1 and 3
Drawing 4

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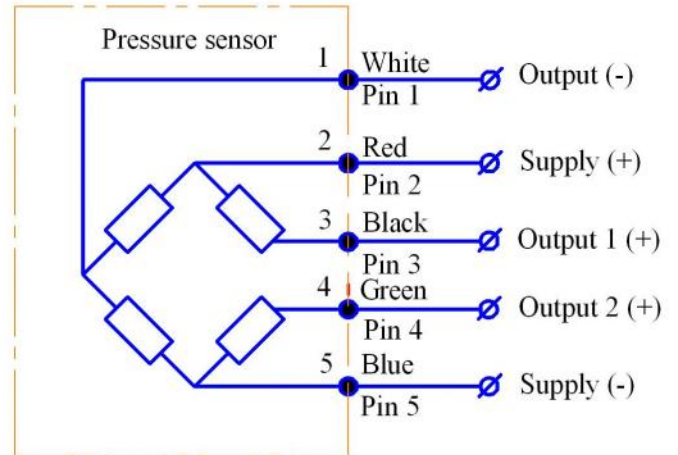
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8 Circuit diagram

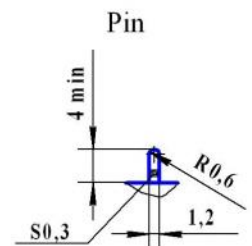
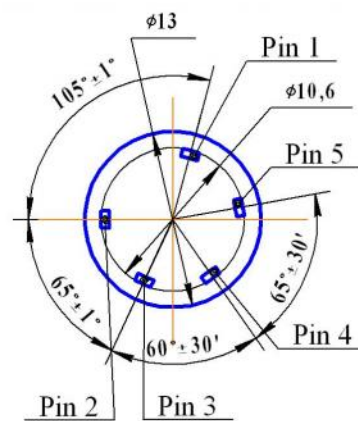
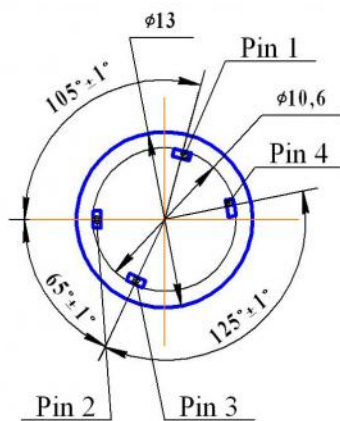
"Closed bridge" diagram



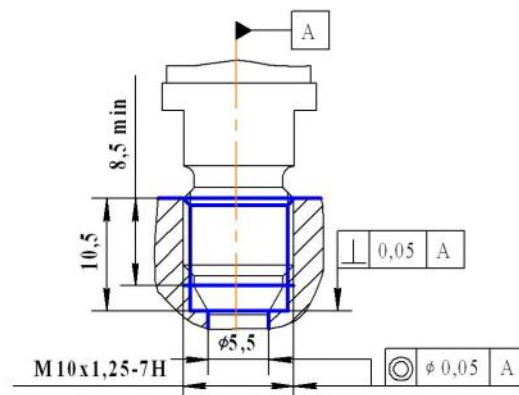
"Open bridge" diagram



Location of pins on a collector



9 Mounting diagram



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10 Type designation

	MC	XXX	XX	X	X
Series					
Upper gauge pressure limit					
1,6; 2,5; 4; 6; 10; 16; 25; 40; 60; 100; 150 MPa					
Operating ambient temperature range					
Version 1 - from minus 45 to plus 125 °C; Version 2 - from minus 45 to plus 155 °C; Version 3 - from minus 45 to plus 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)					
Electrical connection					
L - flexible wire 80 mm length; P - pin 4,5 mm height					

Order example of pressure sensor

Pressure sensor of MC series, intended for pressure conversion from 0 to 40 MPa, for operation within temperature range from - 45 to + 155 °C, with "closed bridge" circuit, DC power supply and flexible wire 80 mm length:

Pressure sensor MC 40-20-C-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 MC 40-20-C-M8x1-8g-L120.

11 Marking

Marking on the sensor body must contain following information: designation of the sensor (no code of connection with external electric circuits) and order number.

Note - The marking on the customer's request is available.

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