Microelectronic force sensors
C Series

- **Nominal force range**
  5, 10, 40, 50 N
- **Operating temperature range**
  from -50 to +80 °C
- **Electrical insulation**
  strength – 150 V
- **Titanium body**

Application

★ **Industrial automatics**

■ **The sensors are intended for proportional conversion of force into electric signal.**

New solutions in pressure measurement – "Silicon-on-Sapphire" Technology

✓ Sensitive element of force 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.

Datasheet

1 Nominal and limiting force

Designation	Nominal force range, N	Limit operating force, N	Overforce, N
C 05	5	from -2,5 to +5	±8
C 10	10	from -5 to +10	±16
C 40	40	from -20 to +40	±64
C 50	50	from -25 to +50	±80

Note: "-" and "+" correspond to the opposite directions of force action.

2 Temperature ranges

2.1 Operating temperature range . . . . . from - 50 to + 80°C

2.2 Limiting temperature range . . . . . from - 60 to + 130°C

3 Accuracy parameters

3.1 Non-linearity, % FS . . . . . ±0,15

for sensors with alternating force values within the nominal force range . . . . . .±0,25

3.2 Variation, % FS 0,1

3.3 Overforce influence error, % FS

- one-sided

for zero output signal . . . . . .±0,15

for output signal range . . . . . .±0,1

- alternating

for zero output signal . . . . . .±1,5

3.4 Additional ambient temperature error

3.4.1 For zero output signal, mV/10 °C . . . . . ±1,5

3.4.2 For output signal range, % FS/10°C . . . . . -0,25±0,5

3.5 Displacement of the lever end, corresponding to the change of force from zero to the highest value, mm . . . . . .0,25±0,03

4 Electrical characteristics

4.1 Output signal at room temperature, mV

4.1.1 Zero output signal . . . . . ±15

4.1.2 Output signal range (FS) . . . . . 320±80

4.2 Strain gauge bridge resistance at room temperature, kOhm . . . . . 4,5±0,35

4.3 Temperature resistance coefficient of the strain gauge bridge, K^{-1} . . . $(1,2\pm0,2)\cdot10^{-3}$

4.4 Insulation resistance, MOhm

at room temperature 100

at the highest ambient temperature 5

4.5 Power supply - stabilized DC, mA . . . . . .1,5±0,3

Output signal is rated by the current, mA . . . . . 1,5±0,003

5 Mechanical characteristics

5.1 Vibration strength (sinusoidal vibration):

Frequency range, Hz . . . . . from 5 to 120

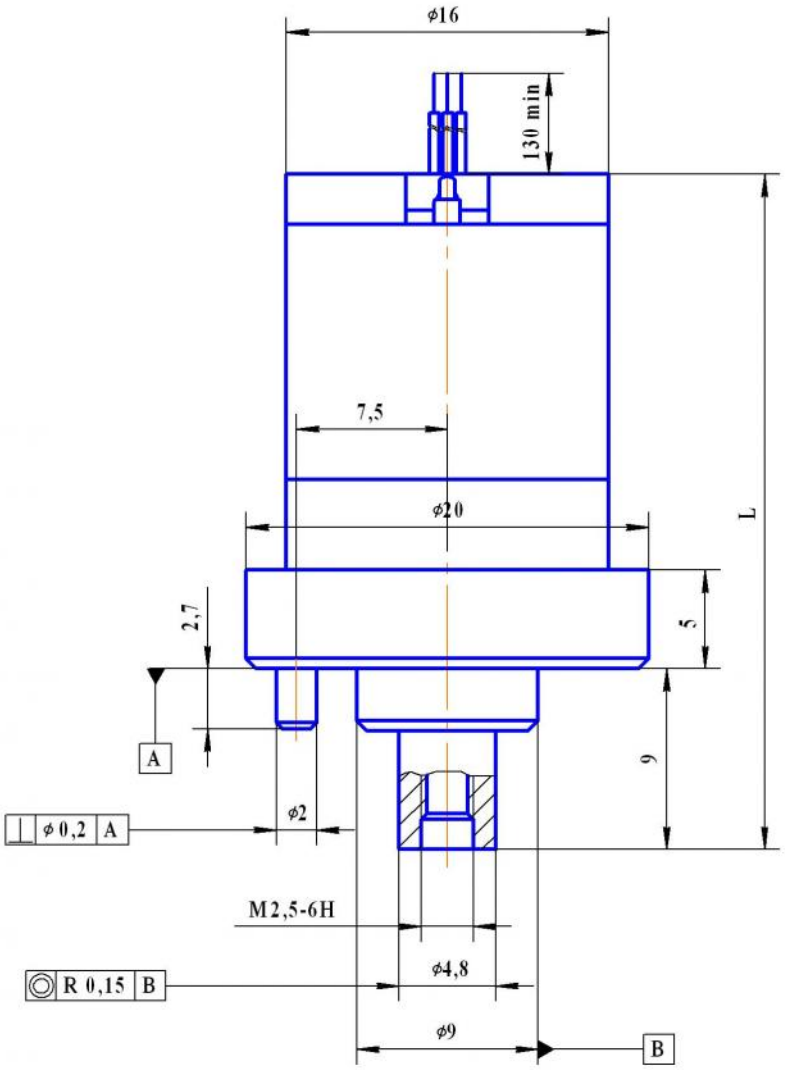
Acceleration amplitude, m/s^2 20

6 Operating conditions

6.1 IP level IP30

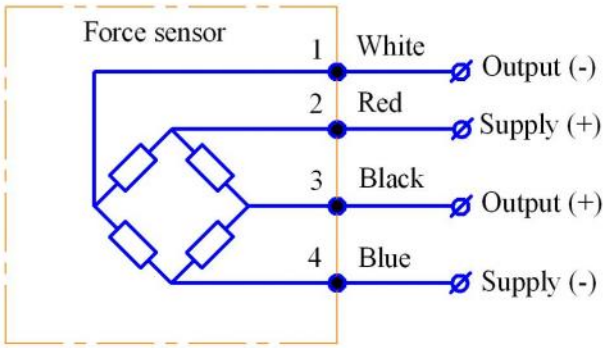
6.2 Sensor body and membrane are made of titanium alloy with 87 % of titanium.

7 Overall and mounting dimensions



Force, N	L
5	46,5
10, 40, 50	34,5

8 Circuit diagram



9 Order example of force sensor

Force sensor of C series with nominal force range 50 N:

Force sensor C 50.

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:

Force sensor C50-L150.

10 Marking

Marking on the sensor body must contain following information: designation of the sensor and order number.