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TWO CHANNEL MEMS-GRAVIMETER

Development of science and technology is never standing on the same place. Nowadays microelectromechanical systems and technologies (MEMS), that include microelectronic and micromechanical components, are one of the most perspective. MEMS-devices are produced on silicon lining with micro processing help, similar to technologies of single-chip electronic circuit production. One channel MEMS-gravimeter consists of two plates with dielectric between them and inertial mass. At the time of affecting acceleration along vertical axis inertial power is appeared, that affects on mass. The plates are contracted under this power affecting. Proportional electric charge is appeared; it is removed through a conductor. Size of charges will be proportional to size of acceleration that is registered further.

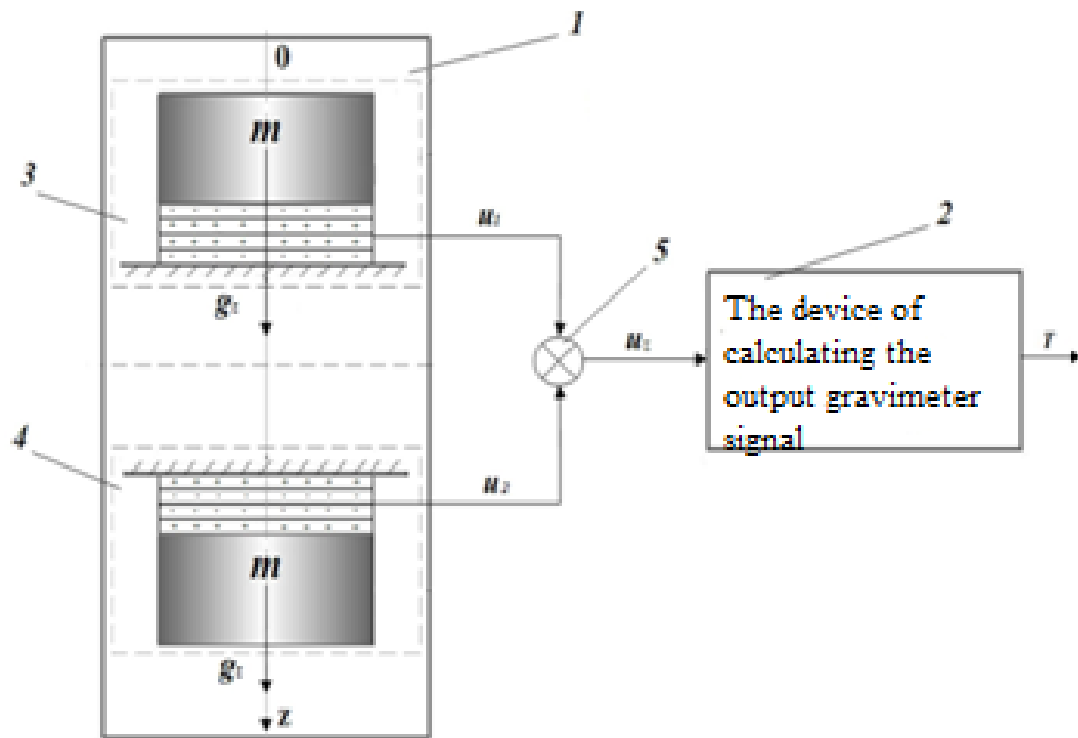
The one channel MEMS-gravimeter construction doesn't provide the compensation of instrumental mistakes under temperature changing influence, humidity and pressure of environment, which are important in extreme conditions.

So the main disadvantage of one channel MEMS-gravimeter is low accuracy of the measurements of gravitational acceleration.

The main idea of the two channel MEMS-gravimeter is improving the one channel MEMS-gravimeter. The two channel MEMS-gravimeter has a sensitive element with two channels. They are situated one above the other and are made in one carcass. The first channel consists of two plates with dielectric between them and inertial mass that is situated above those plates. The construction of the second channel is almost the same but the inertial mass is situated below those plates.

The improving of accuracy of the measurements is provided by creating the second channel. The sensitive element is made with two channels. The element of the first channel, inertial mass in above plates, works on contraction. Identical element of the second channel, inertial mass is below plates, works on straining. Output electrical signals of the both channels are summarized in the adder. The resulting helpful electrical signal will be proportional to the double signal of gravitation acceleration.

Due to using the second channel there are no signals of mistakes under temperature changing influence, humidity and pressure of environment.



Picture 1. The block diagram of the two channel MEMS-gravimeter: 1- carcass of gravimeter, 2- device of calculating the output signal, 3- element of the first channel (mass is below), 4- element of the second channel (mass is above), 5- adder