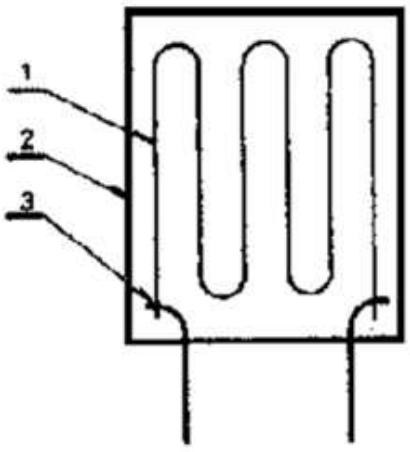
Measurement of static characteristic of strain gauge bridge

Task

1. Acquaint with the device and application of strain gauge FL 102
2. Realize the measurement on model of strain gauge connected to PC
3. Find nonlinearities of static characteristic

Description of sensor

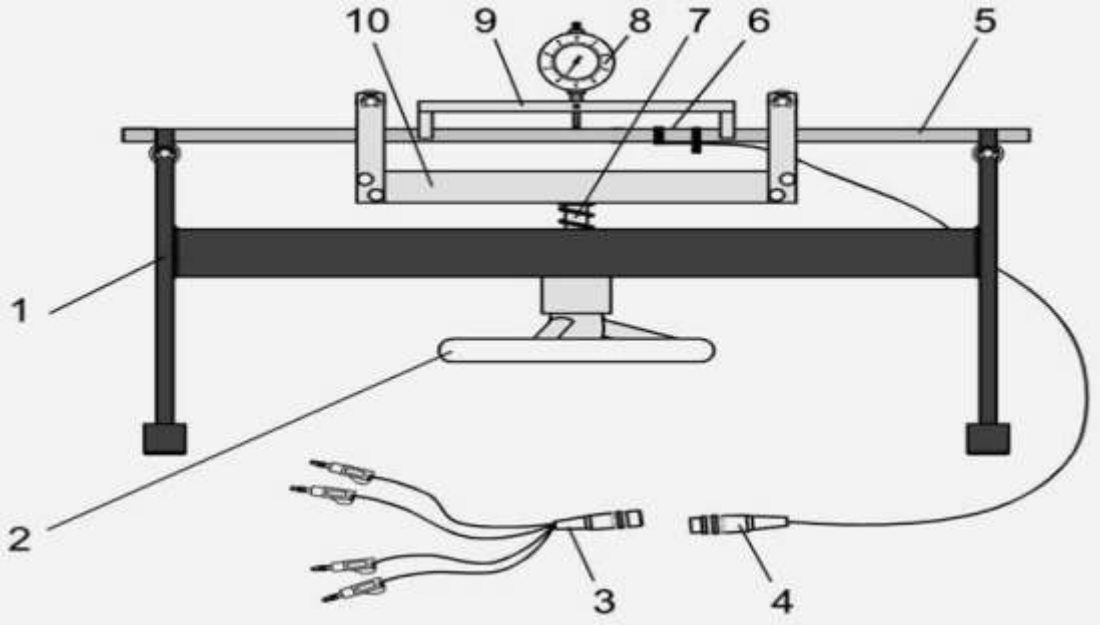
Resistance wire strain gauge (pic. 1) is electric conductor with insignificant cross-section, which is glued to deformed component so, deformation is transmitted to a conductor, and cause its extension. Material of that conductor is constantan (alloy of copper and nickel), whose resistance has small temperature dependence. Diameter of constantan wire is between 0.01 and 0.05 mm. By extension of the conductor is increased its length and reduced its diameter. By that is increased total resistance of strain gauge and this is scale of deformation. For measurement of longitudinal deformation is strain gauge formed by lengthwise loops of conductor (pic. 1). Cross-section of strain gauge may be circular, flat or strain gauge is formed by metal foil by etching relevant shape. Conductor /1/ is cemented onto soft paper pad /2/, has stiffening inlets /3/ and this is glued to the measurement component as complete.



Pic. 1 Wire strain gauge

Because these strain gauges are sensitive to changes of surrounding temperature, is necessary compensate influence of temperature, mostly by placing more strain gauges to bridge connection. In practical measurement are strain gauges connected to measuring apparatus known as strain gauge bridges, which are appropriate for static and dynamic measurement.

Description of model FL 102



Pic. 2 Strain gauge model GUNT FL 102

1- primary frame, 2- control nut, 3- cable of adapter, 4- connector, 5- horizontal crossbeam, 6- measuring point of strain gauge, 7- spindle 8- measuring watch, 9- accessories of measuring watch, 10- crossbeam

Strain gauges are glued onto crossbeam from both side (compress, thrust), their connection to bridge prevent detune by changing of temperature. Measurement voltage is realized in computer through application ControlWeb.

Measurement of static characteristic

Static characteristic shows proportion of deformation in millimeters to voltages. Perform a measurement for ten values, from zero deformation to 1 mm, with step 0.1 mm. Perform this measurement in ascending order and later in descending order. Draw static characteristic for both direct of measurement. In conclusion compare these two static characteristics and draw a hysteresis curve.