TECHNOLOGY OFFER

PIKOSENS – PIKO NEWTON FORCE AND DISPLACEMENT SENSOR

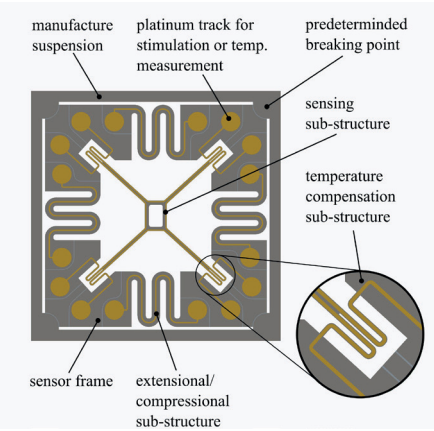
Force sensors convert a force into a linear electrical signal. We demonstrate a low force sensor with 5 DOF, capable of measuring two directional force components and torques around three spatial axes simultaneously, thus allowing precise measurements, particularly for medical technology applications.
The PikoSens force and displacement sensor is providing a sensitivity of almost 10pN/Hz. However, with the alteration of only one design parameter, it is easily possible at any time to detect forces in the kilo-Newton range.

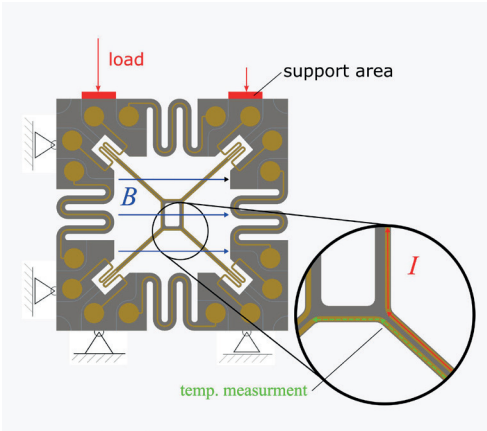
BACKGROUND

In order to detect and measure loads, force sensors have to deform. When subjected to force, the array develops strain that changes the sensor wires' resistance and that triggers a change in electrical output and allow to control the weight in the capacity. This is often of critical importance for industrial processes. Depending on the applied force and mechanics of the application, multiple form factors of sensors are utilized. Force sensors are being employed well beyond their historical uses for repetitive tasks and in rugged environments.

TECHNOLOGY

The gist of the invention is the special suspension geometry of the structure, a resonant vibrating cross-shaped bar. It transfers the force directly into an elastic torsion of the structure and shifts the resonance frequency of the system due to the extended Euler-Bernoulli beam theorem. The Lorentz force excited sensor uses a small permanent magnet to stimulate the inplane modes. The gauging force tunes the resonance frequency of the vibration modes which are detected with a scanning vibrometer. To measure a complete load state we use at least four different modes or rather the tuning of these, simultaneously. To raise the accuracy of the sensing element, we use additional platinum tracks on the surface of the sensor to create a Pt1000 element for temperature measurement.





ADVANTAGES

- Multiaxial sensor providing 5 DOF
- Significantly increased range of sensitivity
- Simultaneous force and displacement tracking
- Cost-efficient design and components

WISSENS/ TRANSFER/ OST/

www.wtz-ost.at

REFERENCE:
M032/2016

APPLICATIONS:
Medical technology Robotics, Robotic surgery, Structural engineering, Industrial process control, Automotive industry, Aerospace and aviation, Polymer processing, Logistics

DEVELOPMENT STATUS:
Working Prototype

KEYWORDS:
force sensor, torsional moment sensor, resonant sensor, magnetic field based sensor, torque sensor, strain gauge

IPR:
Patents AT, FR, DE, CH, GB granted;
US filed

OPTIONS:
R&D - Cooperation
License Agreement
Patent selling

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