TECHNOLOGY OFFER

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POTENTIAL-FREE SENSOR FOR ELECTRIC FIELDS

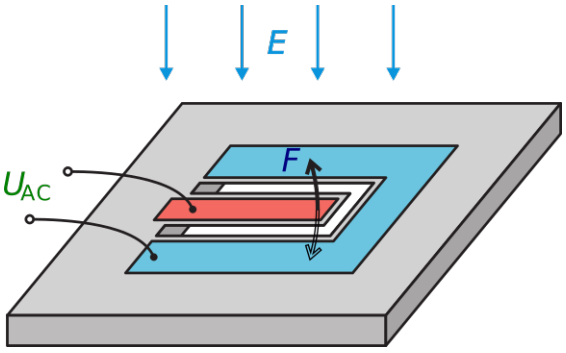
The potential-free sensor allows distortion-free and temperature-stable measurement of static and low-frequency electric fields. In contrast to existing systems, it features simple, calibration-free operation, significantly better resolution limits and a larger dynamic range. Moreover, the lack of grounded supply lines offers new application areas and better employee protection.

BACKGROUND

Small-scale and distortion-free measurement of electric fields is important in many areas ranging from meteorology to high-voltage infrastructure or safety. However, although the electric field strength is one of the fundamental physical parameters, it is still extremely difficult to measure. Current approaches, such as field mills, are afflicted with pronounced temperature dependency or severe field distortion due to related grounded leads and metallic components, thus require well-defined process environments and complex calibration procedures. Here, our novel micromechanical system (MEMS) devices offer a remedy.

TECHNOLOGY

The new technology is based on a MEMS structure, which features suspensions that suppress cross-sensitivities to electric fields or vibrations to enable distortion-free and temperature-stable measurements. In doing so, static or low-frequency electrical fields are converted into a mechanical oscillation, which is then read out optically. The field to be measured is hardly disturbed as the required electrical excitation takes place via a potential-free voltage source (e.g. button battery) without earth connections directly at the structure. Thereby, the novel potential-free sensor exhibits significantly better resolution limits down to 1 V/m/√Hz with a dynamic range up to 1 MV/m. It promises reliable, accurate and quasi punctiform measurement of electrical fields, as well as simple, calibration-free use for a wide variety of practical applications. Furthermore, the principle can be miniaturized for inexpensive mass production of portable measuring devices.



ADVANTAGES

- Distortion-free and temperature-stable measurement
- Reliable, accurate and quasi punctiform
- Calibration-free operation
- Highly sensitive detection of DC and low-frequency
- Suppressing cross-sensitivities to magnetic fields or vibrations
- MEMS technology allows mass production of low-cost, small-sized devices

REFERENCE:
M023/2019

DEVELOPMENT STATUS:
TRL-3

APPLICATIONS:
E-field measurements
High- and medium voltage
Safeguarding areas
Geophysics
Meteorology
Atmospheric research
Mining
Material science

KEYWORDS:
Electric field sensor
Distortion-free
Floating potential

IPR:
Patents AT and PCT filed

OPTIONS:
R&D Co-operation,
License Agreement,
Patent sale

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