

Title : An optical system for monitoring the movement of a micro multipede

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Abstract

A micromechanical actuator has been developed using materials with different coefficients of thermal expansion combined in a sandwich cantilever structure. The actuator is thermally operated and could be used in different applications including temperature controlled electrical switches and sensors. A novel application for the microactuator is as the prime mover for a micro multipede. The latter is essentially a multicantilever array where each element can be actuated in sequence to produce planar movements. The actuation is provided by micro heaters integrated into each cantilever. This paper presents the design of an optical system for monitoring the movements of a micro multipede using two methods. The first method, triangulation was adopted to measure the downward movement and flattening of the cantilevers under load. The second method involved direct deflection measurement with an optical microscope. The paper presents both simulation and test results for temperature and mechanical loading and the relationship between electrical power and cantilever deflection.

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