Technical Specification of Nano positioning Compliant Mechanism (Flexure)

Vashishtha Research

Introduction

Compliant Mechanism:

Compliant mechanism is developed by Vashishtha research for making nano positioners. This setup is a single axis linear motion mechanism that is able to covert a large linear motion into a smaller liner motion at the final stage. It uses flexure mechanisms and lever principles to achieve this change. This enable the user to convert precise large motions in micrometre range into precise motions in nanometre ranges.

To provide a smooth and exact motion, high-precision hardware, bearings, tolerances, and machined parts are often preferred. One may take advantage of the material's elastic qualities and carefully construct a compliant mechanism for microscopic motions. Making a working component from a single block of material is possible with the help of the compliant mechanisms; this greatly lowers the number of components (to just one!) and gives outstanding precision (since now there is no need for loose coupling between holes and pins). In the context of the flexural hinges used in high-precision devices, the optimisation concept is used to optimise the stress levels (and hence the fatigue lifespan) of a hinge for a certain amount of deflection. Hysteresis, overload sensitivity, temperature sensitivity, limited range of motion, etc., are all problems that might arise with the compliant guiding systems

Specifications

- **Material : Invar 36**
- **Mounting: Has 6 threaded holes for mounting base, 5 holes with counterbore for mounting mirror mounts. Outer mounting holes will match optical table specifications.**
- **Output travel :**
  - **Travel range: 35 microns**
  - **Travel resolution: 10.5 nm per step**
- **Input: Input is given via digital micrometer**
- **Calibration: Carried out via Laser interferometry before dispatch**
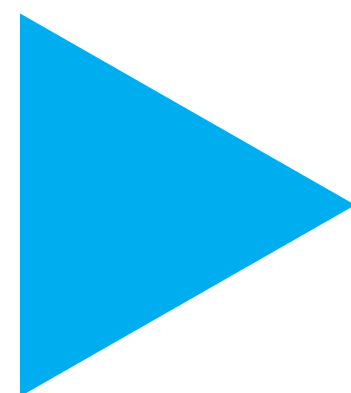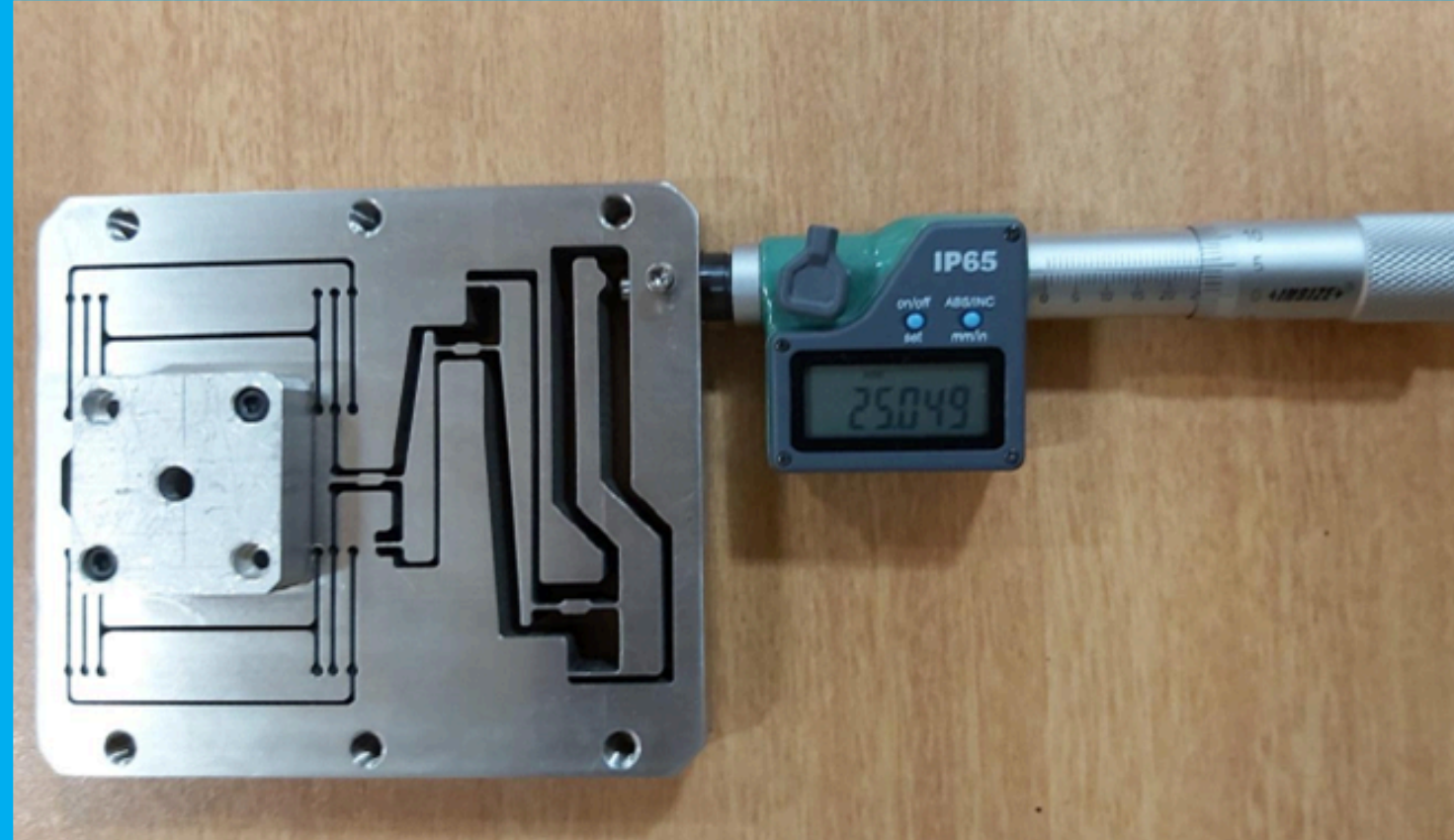
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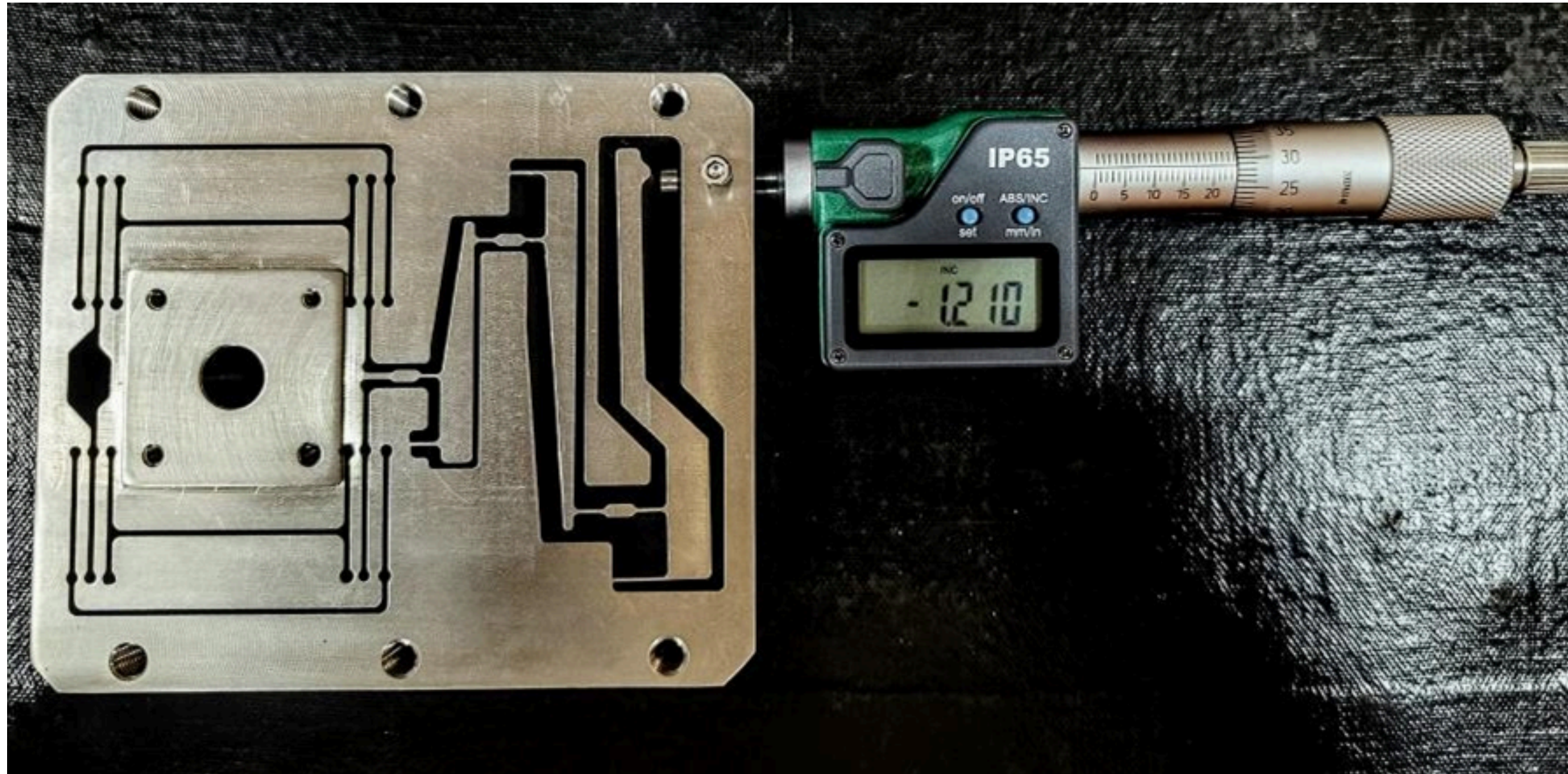
NANO POSITIONING COMPLIANT MECHANISM

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