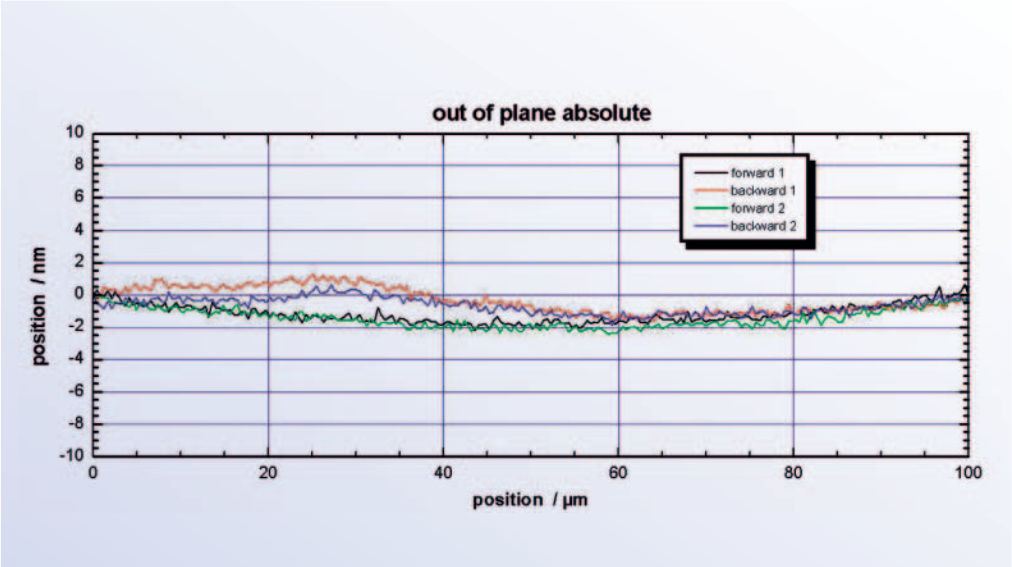
Excellent Guiding Accuracy through Flexure Joints



A piezo stage with integrated flexure guide achieves a guiding accuracy of only a few nanometers or microradians and excellent flatness

Flexure guides from PI have proven their worth for nanopositioning tasks down to 2 mm.

The motion of a flexure joint is based on the elastic deformation of a solid. Therefore, there is no static, rolling or sliding friction.

No Wear

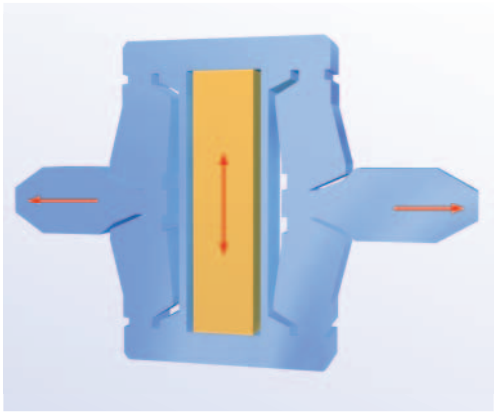
Their advantages are the high stiffness, load capacity and wear-resistance. Flexures are maintenance-free, can be manufactured from nonmagnetic materials, require no lubricants or consumables and hence also function in a vacuum without any problem.

Flexures as Levers

The displacement of a piezo actuator can also be multiplied by integrating a lever mechanism. The actuator is mechanically integrated in a flexure joint in such a way that the travel range is extended to up to 2 mm. Since simple lever structures lose a considerable amount of guiding accuracy and stiffness, however, the design requires much more complex geometries.

Sub-Nanometer Accuracy

Flexures allow motions with extremely high path accuracy. In order to compensate for height or transversal offset, PI uses special multi-link flexure guides. These guiding systems, which are implemented in most nanopositioning systems from PI, allow a flatness and straightness in the sub-nanometer or microradian range.



This lever mechanism with flexure guides transforms the actuator travel range (vertical) to an even, straight motion (horizontal)

The deformation of the flexure guides is checked with FEM stress simulations

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