Article Side

Piezo Technology Terms for Motion Control Engineers by Piezo

Article published on February 17th 2012 | Business

There are several piezo actuator types that are currently available to motion control system designers.

A) â€œSimpleâ€• piezo actuator: Expands proportional to voltage, extension ~ 0.1 to 0.2 % of actuator length.

Piezo Actuator Features:

â€¢ High force available, to thousands of pounds

â€¢ Very fast response: microsecond to sub-millisecond

â€¢ Frictionless, sub-nanometer resolution

â€¢ travel range typically 10 to 200 Âµm for stacked actuator; several mm for bender actuator

â€¢ Feedback sensor can be integrated (typically Strain Gauge)

Sub-Groups:

â€¢ Stacked Piezo Actuator (most common). Available in Multilayer construction (100 V) and classical stack design (500 to 1000 V). High force, motion typically limited to 200 Âµm.

â€¢ Shear Actuators: Lateral motion, allows design of small, very fast XY and XYZ systems. High force, travel typically limited to < 20 Âµm.

â€¢ Tube Actuators: Mostly used in micro pumping applications and as scanner tubes for microscopy. Very fast response (very low inertia), low force (can be fragile), travel range typically limited to 20 Âµm. XY scanner tubes available

â€¢ Bender Actuators: Available in Multilayer construction (100 V) and classical (bimorph) stacked design (200 to 1000 V). Low force (< 1 lb), very long deflection (to several millimeters), rather slow response (appr. 10 msec).

B) Piezo Flexure-guided Precision Nano-Positioning Stage

These more complex systems use frictionless flexures and motion amplifiers to provide very straight and flat motion with longer travel.

â€¢ Motion of integrated piezo actuator can be amplified by internal flexure amplifier. Typical motion range up to 2 mm.

â€¢ Monolithic multiaxis-systems available

â€¢ Frictionless, sub-nanometer resolution, fast response (to 0.1 millisec)

â€¢ Essential for nanomanipulation, nanoalignment or scanning optical microscopy. Ideal for imaging resolution enhancement or stabilization.

â€¢ Closed loop with feedback sensor (typically Strain Gauge for entry level, or capacitive for high-end systems / multi-axis measurements)

C1) Piezo Ultrasonic Motors

â€¢ Based on high frequency oscillation of a piezo plate (stator).

â€¢ Oscillation is transferred to a slide or rotor via friction.

â€¢ Unlimited motion, high speed (to 800 mm in PILine designs), fast response (10 to 10s of millisecs).

â€¢ But due to friction, resolution limited to typically 50 nm. Low forces, typically

Article Source:
http://www.articleside.com/business-articles/piezo-technology-terms-for-motion-control-engineers.htm - Article Side

Piezo - About Author:
Technology has always fascinated the technician inside me. And writing about the latest in technologies and mechanisms in usage has been my forte over the last few years. Follow my write ups to know about the latest in technologies and mechanisms this season for one. This fall Hexapod, Precision Positioning system, a piezo mechanism, a piezo actuators, nanopositioning systems, linear slide, linear actuators are very much in demand among the technical and mechanical industries across the world. Keep yourself updated on these products exclusively from USA.

Article Keywords:
Piezo, piezo actuator

You can find more free articles on Article Side. Sign up today and share your knowledge to the community! It is completely FREE!