Piezo-Based Long-Travel Actuators for Special Environments

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PiezoWalk™ precision drives are based on piezo actuators that generate motion through sequenced clamping, unclamping and shear motion. These linear, piezo stepping drives break the barriers of conventional nanopositioning actuators. They provide basically unlimited travel combined with picometer open-loop resolution and very high stiffness. Two PI product lines, NEXLINE® and NEXACT®, use different versions of the PiezoWalk™ principle offering specific advantages.

Advantages of PiezoWalk™ Stepping Drives
- Open-Loop Resolution in the Picometer Range
- Closed-Loop Applications with High-Resolution Incremental and Capacitive Sensor
- Very Compact Dimensions
- High Drive Forces, from 10 N (NEXACT®) up to 600 N (NEXLINE®)
- High-Dynamics Performance with Sub-Millisecond Response
- Self-Locking at Rest: No Holding Current for Position Stability in the Nanometer Range
- Basically Unlimited Travel
- Zero Backlash: No Mechanical Components Like Gears/Leadscrews, No Wear or Maintenance
- Non-Magnetic and Vacuum-Compatible Operating Principle
- Integration in Multi-Axis Systems

PiezoWalk™ Performance

PiezoWalk™ Motor Characteristics

Use in Special Environments

PiezoWalk™ drives can be designed to work under difficult environmental conditions. The following modifications can be made to meet the requirements:

- Space-Based Applications
  - Full integration of cold redundant actuator design for maximum lifetime with no maintenance. The piezo modules consist of two independent clamps and shear segments. The actuator motion characteristics are identical for both driving units in regard to step size and force
  - Specially adapted drive design to withstand the vibration during launch

- Ultra-High Vacuum
  - Specially adapted piezo actuator design
  - Vacuum-compatible polymers: PEEM, Kapton
  - Electro-polished metals

- High Magnetic Fields
  - Optimized piezoceramics for <10 nT residual magnetism after exposure
  - Fully non-magnetic/non-magnetizable design
  - Ceramic joints for multi-axis stages

- Cryogenic Temperatures
  - Specially adapted piezo drive design
  - Specially adapted piezo actuator design
  - Electric circuitry designed for reduced sparking voltage

- Radiation
  - Specially adapted cryogenic system
  - Capacitive sensors

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