Piezo shear actuators
Operating voltage -250 to 250 V. Suitable for use in cryogenic and UHV environments to $10^{-9}$ hPa. Lateral displacement is based on the piezoelectric shear effect. Excellent dynamics with minimum electric power requirement. Variants for multi-axis motion, also with inner hole.

Possible modifications
- Piezo ceramic material
- Nonmagnetic versions
- Operating voltage range, displacement, layer thickness, cross-sectional dimension
- Load capacity, force generation
- Mechanical interfaces: flat, spherical, metal, ceramic, glass, sapphire, etc.
- Extra-tight length tolerances

Fields of application
- Industry and research
- Low temperature / vacuum environment to $10^{-9}$ hPa
- Scanning applications
- Microscopy
- Precision mechanics
- Switching applications

PICA Shear Actuators
Compact Actuators for Cryogenic and UHV Environments

P-1x1.0xT
- UHV-compatible to $10^{-9}$ hPa
- For cryogenic environments
- Extreme reliability: >$10^9$ cycles
- Picometer resolution
- µs response time
Specifications

<table>
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<tr>
<th>Active axis</th>
<th>Travel range</th>
<th>Surface A x B</th>
<th>Length L</th>
<th>Max. shear load</th>
<th>Axial stiffness</th>
<th>Electrical capacitance</th>
<th>Axial resonant frequency</th>
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<tr>
<td>P-111.01T</td>
<td>X 1</td>
<td>3 x 3</td>
<td>2.2</td>
<td>20</td>
<td>110</td>
<td>2 x 0.25</td>
<td>530</td>
</tr>
<tr>
<td>P-111.03T</td>
<td>X 3</td>
<td>3 x 3</td>
<td>4.4</td>
<td>20</td>
<td>55</td>
<td>6 x 0.25</td>
<td>260</td>
</tr>
<tr>
<td>P-121.01T</td>
<td>X 1</td>
<td>5 x 5</td>
<td>2.2</td>
<td>50</td>
<td>310</td>
<td>2 x 0.70</td>
<td>530</td>
</tr>
<tr>
<td>P-121.03T</td>
<td>X 3</td>
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<td>260</td>
</tr>
</tbody>
</table>

Travel range: At -250 to 250 V, measured at room temperature. Value is reduced at lower temperatures. Tolerance ±30 %.

Length L: Tolerance ±0.3 mm

Electrical capacitance: Measured at 1 Vpp, 1 kHz, RT, tolerance ±20 %.

Axial resonant frequency: Measured at 1 Vpp, unloaded, unclamped. The value is halved for unilateral clamping.

Piezo ceramic type: PIC255

Standard connections: Ta. contacting with conductive adhesive possible.

Operating voltage range: -250 to 250 V

Operating temperature range: -269 to 85 °C. Temporary short-term bakeout to 150 °C only when short-circuited.

Standard mechanical interfaces: Ceramic (Al2O3, 96 % pure)

Outer surface: Epoxy resin

Recommended electronics: E-413, E-508.

Other specifications on request.

Ask about customized versions.

Drawings / Images

PICA Shear P-1xx.xxT actuators. A, B, L, see data table. Dimensions in mm. The number of axes and wires depends on the type. (*<A+2.5 with cross section 3 x 3)

Axis and cable assignment for PICA shear actuators. GND: 0 V, +: ±250 V.
Principle of shear motion. $\Delta L$ refers to the travel range.

Ordering Information

P-111.01T
PICA Shear X piezo actuator, 1 µm travel range, 3 mm x 3 mm cross section, vacuum compatible to $10^{-9}$ hPa, operating temperature up to -269°C

P-111.03T
PICA Shear X piezo actuator, 3 µm travel range, 3 mm x 3 mm cross section, vacuum compatible to $10^{-9}$ hPa, operating temperature up to -269°C

P-121.01T
PICA Shear X piezo actuator, 1 µm travel range, 5 mm x 5 mm cross section, vacuum compatible to $10^{-9}$ hPa, operating temperature up to -269°C

P-121.03T
PICA Shear X piezo actuator, 3 µm travel range, 5 mm x 5 mm cross section, vacuum compatible to $10^{-9}$ hPa, operating temperature up to -269°C