Miniature Multilayer Piezo Actuators

Piezo linear actuator with PICMA® multilayer technology
Operating voltage -20 to 100 V. Ceramic insulation, polymer free. Humidity resistance. UHV-compatible to $10^{-9}$ hPa, no outgassing, high bakeout temperature. Flexible thanks to numerous designs. Versions with rectangular, round or annular cross section.

Possible modifications
PTFE-insulated wire leads. Various geometric shapes, inner hole. Precision-ground ceramic end plates.

Fields of application
Industry and research. For laser tuning, microdispensing, life sciences.

PLOxx
- Superior lifetime
- Ultra-compact: From $2 \text{ mm} \times 2 \text{ mm} \times 2 \text{ mm}$
- Ideal for dynamic operation
- Microsecond response
- Subnanometer resolution
- UHV-compatible to $10^{-9}$ hPa
## Specifications

<table>
<thead>
<tr>
<th></th>
<th>PL022.3x</th>
<th>PL033.3x</th>
<th>PL055.3x</th>
<th>PL088.3x</th>
<th>Unit</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Side length (A)</strong></td>
<td>2 ±0.10</td>
<td>3 ±0.10</td>
<td>5 ±0.15</td>
<td>10 ±0.20</td>
<td>mm</td>
<td></td>
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<tr>
<td><strong>Side length (B)</strong></td>
<td>2 ±0.10</td>
<td>3 ±0.10</td>
<td>5 ±0.15</td>
<td>10 ±0.20</td>
<td>mm</td>
<td></td>
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<tr>
<td><strong>Height (TH)</strong></td>
<td>2 ±0.10</td>
<td>3 ±0.10</td>
<td>5 ±0.15</td>
<td>10 ±0.20</td>
<td>mm</td>
<td></td>
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<tr>
<td><strong>Travel range</strong>*</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>μm</td>
<td>±20 %</td>
</tr>
<tr>
<td><strong>Blocking force</strong></td>
<td>&gt;120</td>
<td>&gt;300</td>
<td>&gt;500</td>
<td>&gt;2000</td>
<td>N</td>
<td></td>
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<tr>
<td><strong>Electrical capacitance</strong>*</td>
<td>25</td>
<td>75</td>
<td>250</td>
<td>1100</td>
<td>nF</td>
<td>±20 %</td>
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<tr>
<td><strong>Axial resonant frequency</strong>**</td>
<td>&gt;600</td>
<td>&gt;600</td>
<td>&gt;600</td>
<td>&gt;600</td>
<td>KHz</td>
<td></td>
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<tr>
<td><strong>Piezo ceramic</strong></td>
<td>PIC252</td>
<td>PIC252</td>
<td>PIC252</td>
<td>PIC252</td>
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<td></td>
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<tr>
<td><strong>Operating voltage range</strong></td>
<td>-20 to 100</td>
<td>-20 to 100</td>
<td>-20 to 100</td>
<td>-20 to 100</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature range</strong></td>
<td>-40 to 150</td>
<td>-40 to 150</td>
<td>-40 to 150</td>
<td>-40 to 150</td>
<td>°C</td>
<td></td>
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<tr>
<td><strong>Recommended preload for dynamic operation</strong></td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>MPa</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum preload for constant force</strong></td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>MPa</td>
<td></td>
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<tr>
<td><strong>Recommended electronics</strong></td>
<td>E-610, E-617, E-831</td>
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</tbody>
</table>

Standard connections: PL0xx.31: PTFE-insulated stranded wires, UHV compatible, 100 mm, AWG 32, Ø 0.49 mm; PL0xx.30: Solderable contacts

* At 0 to 100 V. The values refer to the unattached component and can be lower when glued on.

** At 0 to 100 V

*** Measured at 1 Vpp, 1 kHz, RT

**** Measured at 1 Vpp, no load, unclamped. The value is halved for unilateral clamping. Depending on the installation situation, the lateral resonant frequencies can be lower than the axial resonant frequencies.

Ask about custom designs!
On request, PICMA® Chip piezo actuators can be manufactured with all-ceramic insulated inner hole (left) or with precision-ground ceramic end plates (right).
Ordering Information

PICMA® Chip actuators

PL088.30
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 10 mm × 10 mm × 2 mm

PL055.30
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 5 mm × 5 mm × 2 mm

PL033.30
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 3 mm × 3 mm × 2 mm

PL022.30
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 2 mm × 2 mm × 2 mm

PICMA® Chip actuators with PTFE-insulated stranded wires

PL088.31
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 10 mm × 10 mm × 2 mm, stranded wires

PL055.31
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 5 mm × 5 mm × 2 mm, stranded wires

PL033.31
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 3 mm × 3 mm × 2 mm, stranded wires

PL022.31
PICMA® Chip miniature piezo actuator, 2.2 µm travel range, 2 mm × 2 mm × 2 mm, stranded wires

Ask about custom designs!