PICMA® Bender
All-Ceramic Bending Actuators with High Displacement

PL112 – PL140
- Displacement to 2 mm
- Fast response in the ms range
- Nanometer resolution
- Low operating voltage
- Operating temperature up to 150°C
- UHV-compatible to 10⁻⁹ hPa

PICMA® multilayer bender elements with high reliability
Operating voltage 0 to 60 V. Bidirectional displacement, bimorph design. Ceramic insulation, polymer free. UHV-compatible to 10⁻⁹ hPa, no outgassing, high bakeout temperature. Reliable even under extreme conditions.

Fields of application
Industry and research, vacuum. For medical technology, laser technology, sensor technology, automation tasks, pneumatic valves.
Specifications

<table>
<thead>
<tr>
<th></th>
<th>PL112.10</th>
<th>PL122.10</th>
<th>PL127.10</th>
<th>PL128.10</th>
<th>PL140.10</th>
<th>Unit</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage range</td>
<td>0 to 60 (±30)</td>
<td>0 to 60 (±30)</td>
<td>0 to 60 (±30)</td>
<td>0 to 60 (±30)</td>
<td>0 to 60 (±30)</td>
<td>V</td>
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<tr>
<td>Displacement</td>
<td>±100</td>
<td>±130</td>
<td>±450</td>
<td>±450</td>
<td>±1000</td>
<td>µm</td>
<td>±20 %</td>
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<tr>
<td>Remaining length Lₐ</td>
<td>12</td>
<td>22</td>
<td>27</td>
<td>28</td>
<td>40</td>
<td>mm</td>
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<tr>
<td>Length L</td>
<td>18</td>
<td>25</td>
<td>31</td>
<td>36</td>
<td>45</td>
<td>mm</td>
<td>±0.5 mm</td>
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<tr>
<td>Width W</td>
<td>9.60 ±0.2</td>
<td>9.60 ±0.2</td>
<td>9.60 ±0.2</td>
<td>6.15 ±0.1</td>
<td>9.00 ±0.2</td>
<td>mm</td>
<td></td>
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<tr>
<td>Height TH</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
<td>0.55</td>
<td>mm</td>
<td>±0.1 mm</td>
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<tr>
<td>Blocking force</td>
<td>±2.1</td>
<td>±1.25</td>
<td>±1.1</td>
<td>±0.55</td>
<td>±0.5</td>
<td>N</td>
<td>±20 %</td>
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<tr>
<td>Electrical capacitance</td>
<td>2 × 1.1</td>
<td>2 × 2.5</td>
<td>2 × 3.4</td>
<td>2 × 1.2</td>
<td>2 × 4.1</td>
<td>µF</td>
<td>±20 %</td>
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<tr>
<td>Resonant frequency</td>
<td>1800</td>
<td>600</td>
<td>420</td>
<td>360</td>
<td>160</td>
<td>Hz</td>
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<td>Operating temperature range</td>
<td>-20 to 150</td>
<td>-20 to 85</td>
<td>-20 to 85</td>
<td>-20 to 150</td>
<td>-20 to 85</td>
<td>°C</td>
<td>±20 %</td>
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<td>Piezo ceramic</td>
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</table>

Electrical capacitance: Measured at 1 Vpp, 1 kHz, RT, clamped on one side with remaining length Lₐ, no load.
Resonant frequency: Measured at 1 Vpp, clamped on one side with remaining length Lₐ, no load.
Standard connections: Solderable contacts (PL1xx.10) or PTFE-insulated stranded wires, UHV compatible, 100 mm, AWG 32, Ø 0.49 mm (PL1xx.11).
Recommended mounting: Epoxy resin adhesive.
All specifications depend on actual clamping conditions and mechanical load applied.
Custom designs or different specifications on request.

Drawings / Images

**Pl112.10 – Pl140.10. L, Lⱼ, W, TH, see data table.**

**PICMA® Bender actuators have differential control.**
Displacement of the PICMA® bending actuators: Clamped on one side (top) and on both sides (bottom).

Multilayer contracting plates can be manufactured in a variety of shapes, e.g., square- or disc-shaped, and are available on request. These plates can be applied for example, to metal or silicon substrates, in order to realize bender or pump elements with low control voltages.
Ordering Information

Round PICMA® Bender actuators with PTFE-insulated stranded wires

**PL112.11**
PICMA® multilayer piezo bending actuator, 200 µm travel range, 18 mm × 9.60 mm × 0.67 mm, stranded wires

**PL122.11**
PICMA® multilayer piezo bending actuator, 620 µm travel range, 25 mm × 9.60 mm × 0.67 mm, stranded wires

**PL127.11**
PICMA® multilayer piezo bending actuator, 900 µm travel range, 31 mm × 9.60 mm × 0.67 mm, stranded wires

**PL128.11**
PICMA® multilayer piezo bending actuator, 900 µm travel range, 36 mm × 6.15 mm × 0.67 mm, stranded wires

**PL140.11**
PICMA® multilayer piezo bending actuator, 2000 µm travel range, 45 mm × 11.00 mm × 0.55 mm, stranded wires

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