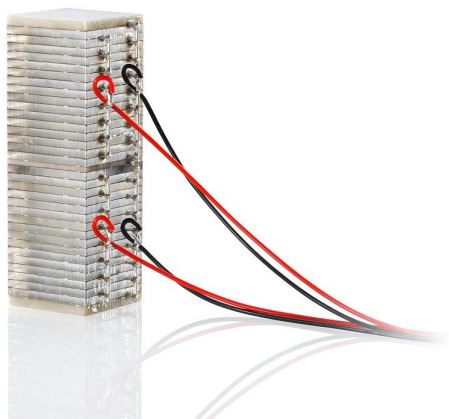


Picoactuator®

Multi-axis Actuators with Highly Linear Displacement



P-405

- Lead-free, crystalline actuator material
- High dynamics
- Ideal for operation without position control
- Low electrical power consumption
- Minimal length tolerances

Stack actuator

Bipolar operating voltage up to ± 500 V. Nearly hysteresis-free motion ($< 0.2\%$). No creep. Picoactuators®, as longitudinal and shear actuators, are configurable up to heights of 20 mm and travel ranges of 1 μm .

Technology

Picoactuator® longitudinal and shear actuators consist of a crystalline piezoelectric material. The specific displacement for shear actuators is $\pm 0.02\%$ of the actuators length and $\pm 0.01\%$ for longitudinal piezo actuators. This value is ten times lower when compared to piezo actuators made of lead zirconate titanate (PZT). The motion is highly linear and almost hysteresis-free.

Customized versions and other specifications on request

- UHV-compatible to 10^{-9} hPa
- Inner hole
- Tips

Fields of application

- Industry and research
- Vacuum applications
- High dynamics, open-loop scanning applications
- Compensation of undesired transverse motion with nanopositioning systems ("out-of-plane" and "out-of-line")

Motion	Unit	Tolerance	P-405.05	P-405.08	P-405.15	P-405.18	P-405.28
Active axes			Z	Z	X	X	X Z
Travel range in X, open loop	μm	$\pm 20\%$	—	—	1	1	1
Travel range in Z, open loop	μm	$\pm 20\%$	1	1	—	—	1

Drive Properties	Unit	Tolerance	P-405.05	P-405.08	P-405.15	P-405.18	P-405.28
Actuator type			Linear actuator	Linear actuator	Shear actuator	Shear actuator	Multi-axis actuator
Drive type			Picoactuator®	Picoactuator®	Picoactuator®	Picoactuator®	Picoactuator®
Electrical capacitance in X	nF	$\pm 10\%$	—	—	0.7	2.75	2.75
Electrical capacitance in Z	nF	$\pm 10\%$	0.95	3.75	—	—	3.75

Mechanical Properties	Unit		P-405.05	P-405.08	P-405.15	P-405.18	P-405.28
Axial stiffness	N/μm		140	550	230	900	350
Axial resonant frequency, unloaded	kHz		160	160	—	—	105
Maximum shear load	N		10	100	20	150	50
Material			Standard end parts: Ceramics. Lateral surface: Epoxy resin.	Standard end parts: Ceramics. Lateral surface: Epoxy resin.	Standard end parts: Ceramics. Lateral surface: Epoxy resin.	Standard end parts: Ceramics. Lateral surface: Epoxy resin.	Standard end parts: Ceramics. Lateral surface: Epoxy resin.
Surface A × B	mm		5 × 5	10 × 10	5 × 5	10 × 10	10 × 10
Length L	mm		12.5	12.5	7.5	7.5	19

Miscellaneous	Unit		P-405.05	P-405.08	P-405.15	P-405.18	P-405.28
Operating temperature range	°C		-20 to 85	-20 to 85	-20 to 85	-20 to 85	-20 to 85
Connector			Stranded wires, PTFE isolated, AWG 32, Ø 0.76 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.76 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.76 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.76 mm	Stranded wires, PTFE isolated, AWG 32, Ø 0.76 mm
Cable length	m		0.1	0.1	0.1	0.1	0.1
Recommended controllers / drivers			E-508	E-508	E-508	E-508	E-508

Travel range: At -500 to 500 V.

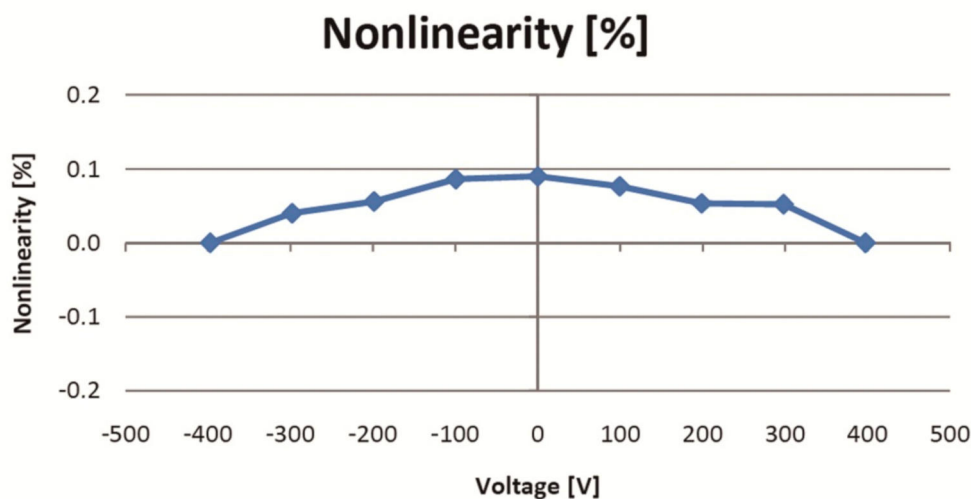
Electrical capacitance: Measured at 1 V_{pp}, 1 kHz, RT.

Axial resonant frequency: Measured at 1 V_{pp}, unloaded, unclamped. The value is halved for unilateral clamping.

Ask about customized versions!

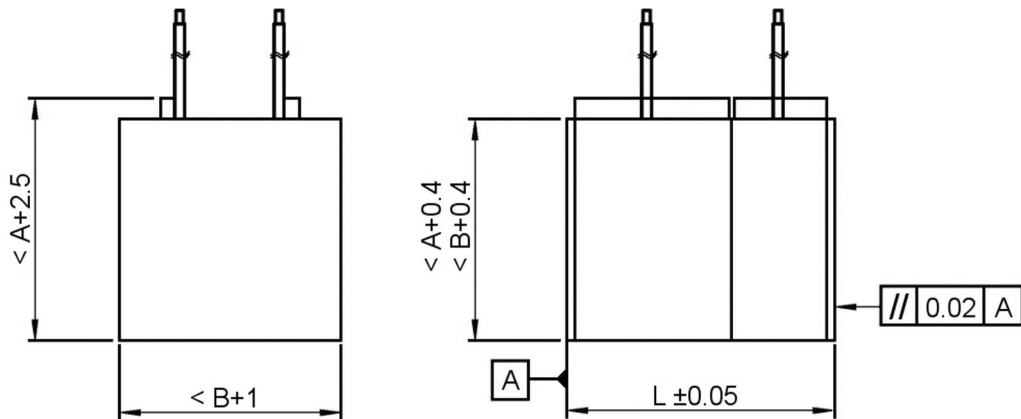
At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images



A special feature of the Picoactuators® is the highly linear displacement with a deviation from the ideal line of less than 0.2 %

Drawings / Images



	A	B	L
P-405.05	5	5	12.5
P-405.08	10	10	12.5
P-405.15	5	5	7.5
P-405.18	10	10	7.5
P-405.28	10	10	19

P-405, dimensions in mm



Picoactuators® can be produced in a variety of designs.

Drawings / Images



Picoactuators® can be produced in a variety of designs.

Order Information

P-405.05

Picoactuator® Z piezo actuator; 1 μm travel range (open loop); 5 mm \times 5 mm \times 12.5 mm (A \times B \times L); bare wire strands; 0.1 m cable length

P-405.08

Picoactuator® Z piezo actuator; 1 μm travel range (open loop); 10 mm \times 10 mm \times 12.5 mm (A \times B \times L); bare wire strands; 0.1 m cable length

P-405.15

Picoactuator® X piezo actuator; 1 μm travel range (open loop); 5 mm \times 5 mm \times 7.5 mm (A \times B \times L); bare wire strands; 0.1 m cable length

P-405.18

Picoactuator® X piezo actuator; 1 μm travel range (open loop); 10 mm \times 10 mm \times 7.5 mm (A \times B \times L); bare wire strands; 0.1 m cable length

P-405.28

Picoactuator® XZ piezo actuator; 1 μm \times 1 μm travel range (open loop); 10 mm \times 10 mm \times 19 mm (A \times B \times L); bare wire strands; 0.1 m cable length