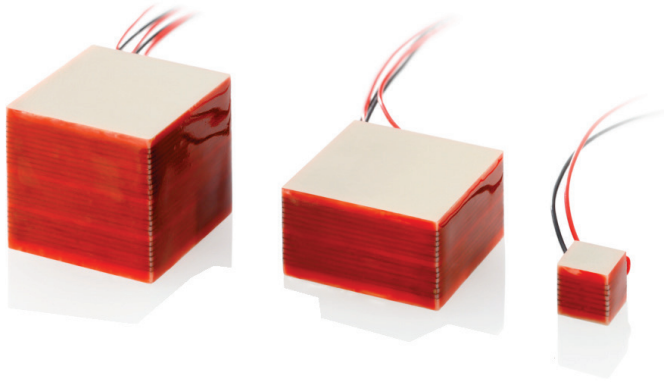
PICA Shear Actuators

Compact Multi-Axis Actuators



P-111 – P-153

- Single and multi-axis versions
- Travel ranges to 10 × 10 × 10 µm
- Extreme reliability: >10^9 cycles
- Picometer resolution
- Short lead times

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

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
- Scanning applications
- Microscopy
- Precision mechanics
- Switching applications

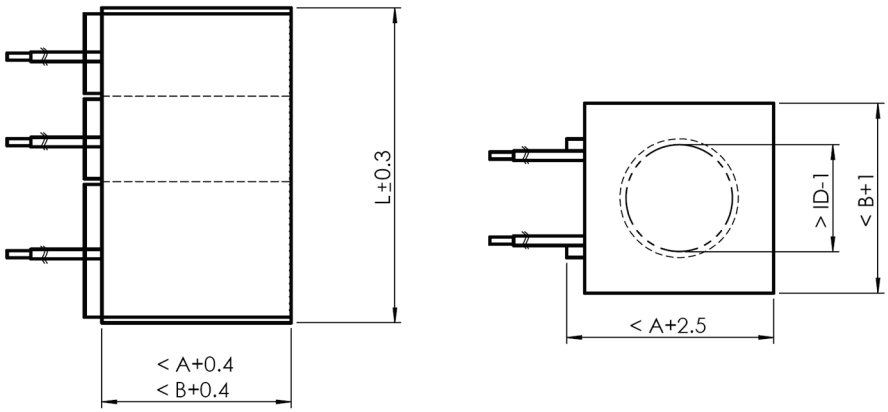
25.04.2018

Specifications

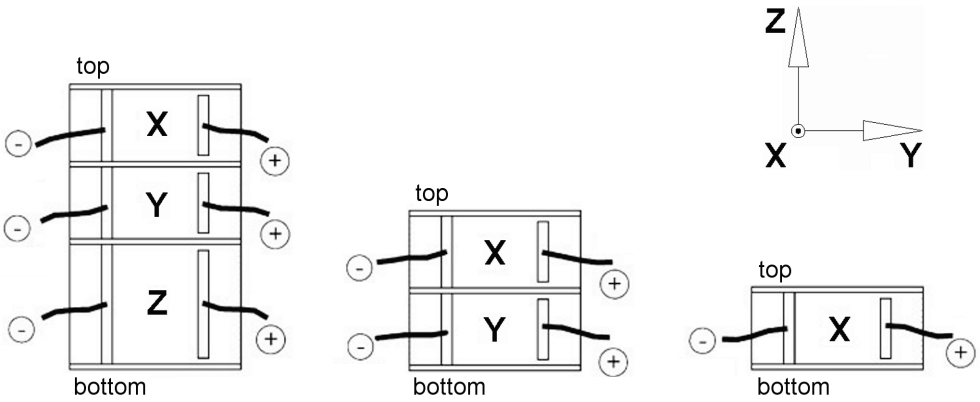
	Travel range	Surface A × B	Length L	Max. shear load	Axial stiffness	Electrical capacitance	Axial resonant frequency
	µm	*mm*	*mm*	*N*	*N/µm*	*nF*	*kHz*
Active axis X							
P-111.01	1*	3 × 3	3.5	20	70	0.5	330
P-111.03	3*	3 × 3	5.5	20	45	1.5	210
P-111.05	5	3 × 3	7.5	20	30	2.5	155
P-121.01	1*	5 × 5	3.5	50	190	1.4	330
P-121.03	3*	5 × 5	5.5	50	120	4.2	210
P-121.05	5	5 × 5	7.5	40	90	7	155
P-141.03	3*	10 × 10	5.5	200	490	17	210
P-141.05	5	10 × 10	7.5	200	360	28	155
P-141.10	10	10 × 10	12	200	230	50	100
P-151.03	3*	16 × 16	5.5	300	1300	43	210
P-151.05	5	16 × 16	7.5	300	920	71	155
P-151.10	10	16 × 16	12	300	580	130	100
Active axes XY							
P-112.01	1 × 1*	3 × 3	5	20	50	0.5 / 0.5	230
P-112.03	3 × 3*	3 × 3	9.5	10	25	1.5 / 1.5	120
P-122.01	1 × 1*	5 × 5	5	50	140	1.4 / 1.4	230
P-122.03	3 × 3*	5 × 5	9.5	40	70	4.2 / 4.2	120
P-122.05	5 × 5	5 × 5	14	30	50	7 / 7	85
P-142.03	3 × 3*	10 × 10	9.5	200	280	17 / 17	120
P-142.05	5 × 5	10 × 10	14	100	190	28 / 28	85
P-142.10	10 × 10	10 × 10	23	50	120	50 / 50	50
P-152.03	3 × 3*	16 × 16	9.5	300	730	43 / 43	120
P-152.05	5 × 5	16 × 16	14	300	490	71 / 71	85
P-152.10	10 × 10	16 × 16	23	100	300	130 / 130	50
Active axes XYZ							
P-123.01	1 × 1 × 1*	5 × 5	7.5	40	90	1.4 / 1.4 / 2.9	155
P-123.03	3 × 3 × 3*	5 × 5	15.5	10	45	4.2 / 4.2 / 7.3	75
P-143.01	1 × 1 × 1*	10 × 10	7.5	200	360	5.6 / 5.6 / 11	155
P-143.03	3 × 3 × 3*	10 × 10	15.5	100	170	17 / 17 / 29	75
P-143.05	5 × 5 × 5	10 × 10	23	50	120	28 / 28 / 47	50
P-153.03	3 ×3 × 3*	16 × 16	15.5	300	450	43 / 43 / 73	75
P-153.05	5 × 5 × 5	16 × 16	23	100	300	71 / 71 / 120	50
P-153.10	10 × 10 × 10	16 × 16	40	60	170	130 / 130 / 230	30

Travel range: At -250 to 250 V, tolerance -10/+20 %; * ±30 %.
Length L: Tolerance ±0.3 mm
Electrical capacitance: Measured at 1 V_{pp}, 1 kHz, RT, tolerance ±20 %.
Axial resonant frequency: Measured at 1 V_{pp}, unloaded, unclamped. The value is halved for unilateral clamping.
Piezo ceramic type: PIC255
Standard connections: PTFE-insulated stranded wires, 100 mm, AWG 32, Ø 0.49 mm.
Operating voltage range: -250 to 250 V
Operating temperature range: -20 to 85 °C
Standard mechanical interfaces: Ceramic (passive PZT)
Outer surface: Epoxy resin
Recommended electronics: E-413, E-508.
Other specifications on request.
Ask about customized versions.

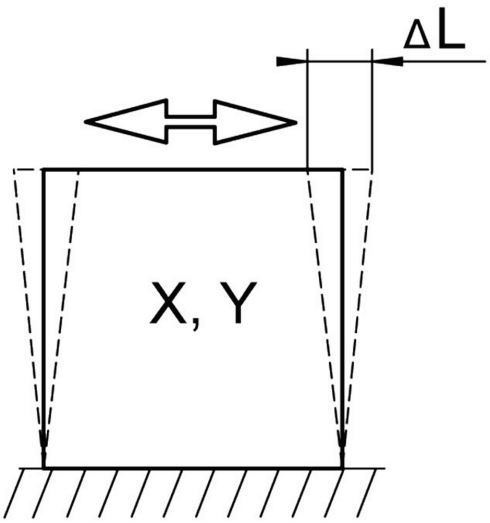
Drawings / Images



PICA Shear P-1xx.xx and P-1xx.xxH actuator (with inner hole). A, B, L, see data table. Dimensions in mm. The number of axes and wires depends on the type.



Axis and cable assignment for PICA shear actuators. GND: 0 V, +: ±250 V.



Principle of shear motion. ΔL refers to the travel range.

Ordering Information

Active axes X

P-111.01
PICA Shear X piezo actuator, 1 µm travel range, 3 mm × 3 mm cross section

P-111.03
PICA Shear X piezo actuator, 3 µm travel range, 3 mm × 3 mm cross section

P-111.05
PICA Shear X piezo actuator, 5 µm travel range, 3 mm × 3 mm cross section

P-121.01
PICA Shear X piezo actuator, 1 µm travel range, 5 mm × 5 mm cross section

P-121.03
PICA Shear X piezo actuator, 3 µm travel range, 5 mm × 5 mm cross section

P-121.05
PICA Shear X piezo actuator, 5 µm travel range, 5 mm × 5 mm cross section

P-141.03
PICA Shear X piezo actuator, 3 µm travel range, 10 mm × 10 mm cross section

P-141.05
PICA Shear X piezo actuator, 5 µm travel range, 10 mm × 10 mm cross section

P-141.10
PICA Shear X piezo actuator, 10 µm travel range, 10 mm × 10 mm cross section

P-151.03
PICA Shear X piezo actuator, 3 µm travel range, 16 mm × 16 mm cross section

P-151.05
PICA Shear X piezo actuator, 5 µm travel range, 16 mm × 16 mm cross section

P-151.10
PICA Shear X piezo actuator, 10 µm travel range, 16 mm × 16 mm cross section

Active axes XY

P-112.01
PICA Shear XY piezo actuator, 1 µm × 1 µm travel range, 3 mm × 3 mm cross section

P-112.03
PICA Shear XY piezo actuator, 3 µm × 3 µm travel range, 3 mm × 3 mm cross section

P-122.01
PICA Shear XY piezo actuator, 1 µm × 1 µm travel range, 5 mm × 5 mm cross section

P-122.03
PICA Shear XY piezo actuator, 3 µm × 3 µm travel range, 5 mm × 5 mm cross section

P-122.05
PICA Shear XY piezo actuator, 5 µm × 5 µm travel range, 5 mm × 5 mm cross section

P-142.03
PICA Shear XY piezo actuator, 3 µm × 3 µm travel range, 10 mm × 10 mm cross section

P-142.05
PICA Shear XY piezo actuator, 5 µm × 5 µm travel range, 10 mm × 10 mm cross section

P-142.10
PICA Shear XY piezo actuator, 10 µm × 10 µm travel range, 10 mm × 10 mm cross section

P-152.03
PICA Shear XY piezo actuator, 3 µm × 3 µm travel range, 16 mm × 16 mm cross section

P-152.05
PICA Shear XY piezo actuator, 5 µm × 5 µm travel range, 16 mm × 16 mm cross section

P-152.10
PICA Shear XY piezo actuator, 10 µm × 10 µm travel range, 16 mm × 16 mm cross section

Active axes XYZ

P-123.01
PICA Shear XYZ piezo actuator, 1 µm × 1 µm × 1 µm travel range, 5 mm × 5 mm cross section

P-123.03
PICA Shear XYZ piezo actuator, 3 µm × 3 µm × 3 µm travel range, 5 mm × 5 mm cross section

P-143.01
PICA Shear XYZ piezo actuator, 1 µm × 1 µm × 1 µm travel range, 10 mm × 10 mm cross section

P-143.03
PICA Shear XYZ piezo actuator, 3 µm × 3 µm × 3 µm travel range, 10 mm × 10 mm cross section

P-143.05
PICA Shear XYZ piezo actuator, 5 µm × 5 µm × 5 µm travel range, 10 mm × 10 mm cross section

P-153.03
PICA Shear XYZ piezo actuator, 3 µm × 3 µm × 3 µm travel range, 16 mm × 16 mm cross section

P-153.05
PICA Shear XYZ piezo actuator, 5 µm × 5 µm × 5 µm travel range, 16 mm × 16 mm cross section

P-153.10
PICA Shear XYZ piezo actuator, 10 µm × 10 µm × 10 µm travel range, 16 mm × 16 mm cross section