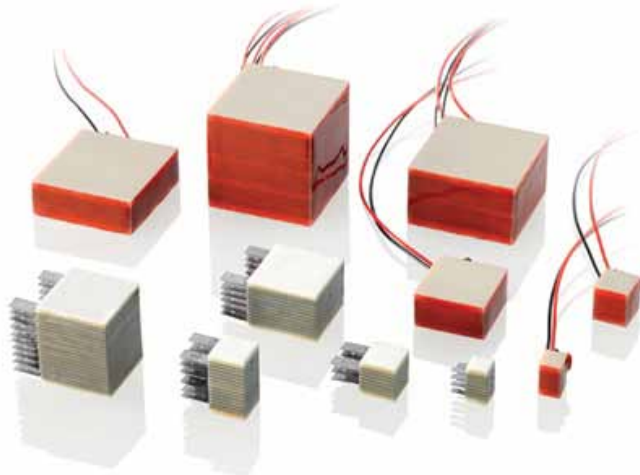


PICA Shear Actuators

COMPACT MULTI-AXIS ACTUATORS



P-111 – P-151

- X, XY, XZ and XYZ versions
- Displacement to 10 μm
- Extreme reliability: $>10^9$ cycles
- Picometer resolution
- Microsecond response
- Large choice of designs

Piezo shear actuators

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

Available options

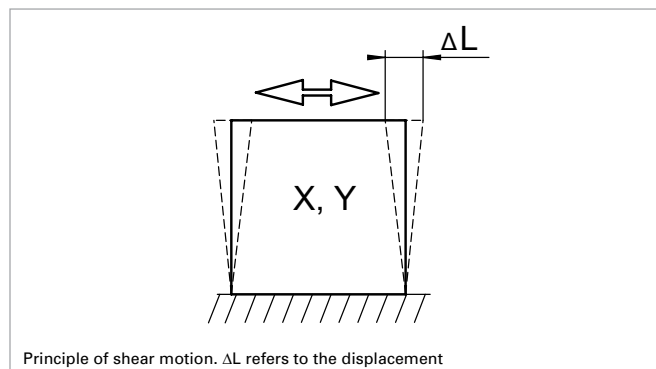
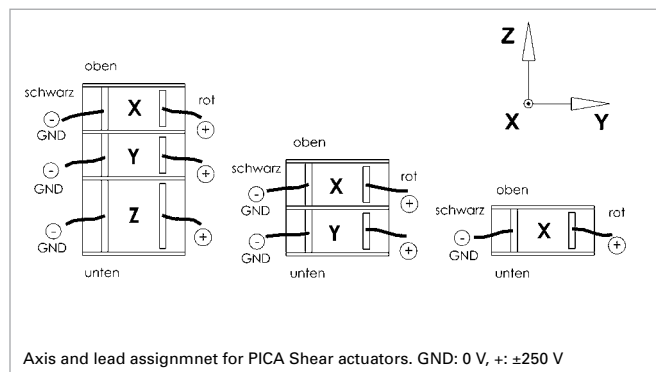
- PZT ceramic material
- Non-magnetic versions
- Operating voltage range, displacement, layer thickness, cross-sectional dimension
- Load capacity, force generation
- Mechanical interfaces: Flat, spherical, metal, ceramic, glass, sapphire, etc.
- Extra-tight length tolerances

Fields of application

Research and industry, low-temperature/vacuum versions to 10^{-9} hPa. For scanning applications, microscopy, precision mechanics, switches

Suitable drivers

E-413 DuraAct and PICA Shear Piezo Amplifier
E-508 PICA Piezo Driver Module



Order number	Active axes	Displacement [μm] (-250 to +250 V) -10/+20%	Cross section A x B / ID [mm]	Length L [mm] ±0.3	Max. shear load [N]	Axial stiffness [N/μm]	Capacitance [nF] ±20%	Axial resonant frequency [kHz]
P-111.01	X	1*	3 × 3	3.5	20	70	0.5	330
P-111.03	X	3*	3 × 3	5.5	20	45	1.5	210
P-111.05	X	5	3 × 3	7.5	20	30	2.5	155
P-121.01	X	1*	5 × 5	3.5	50	190	1.4	330
P-121.03	X	3*	5 × 5	5.5	50	120	4.2	210
P-121.05	X	5	5 × 5	7.5	40	90	7	155
P-141.03	X	3*	10 × 10	5.5	200	490	17	210
P-141.05	X	5	10 × 10	7.5	200	360	28	155
P-141.10	X	10	10 × 10	12	200	230	50	100
P-151.03	X	3*	16 × 16	5.5	300	1300	43	210
P-151.05	X	5	16 × 16	7.5	300	920	71	155
P-151.10	X	10	16 × 16	12	300	580	130	100
P-112.01	XY	1 × 1*	3 × 3	5	20	50	0.5 / 0.5	230
P-112.03	XY	3 × 3*	3 × 3	9.5	10	25	1.5 / 1.5	120
P-122.01	XY	1 × 1*	5 × 5	5	50	140	1.4 / 1.4	230
P-122.03	XY	3 × 3*	5 × 5	9.5	40	70	4.2 / 4.2	120
P-122.05	XY	5 × 5	5 × 5	14	30	50	7 / 7	85
P-142.03	XY	3 × 3*	10 × 10	9.5	200	280	17 / 17	120
P-142.05	XY	5 × 5	10 × 10	14	100	190	28 / 28	85
P-142.10	XY	10 × 10	10 × 10	23	50	120	50 / 50	50
P-152.03	XY	3 × 3*	16 × 16	9.5	300	730	43 / 43	120
P-152.05	XY	5 × 5	16 × 16	14	300	490	71 / 71	85
P-152.10	XY	10 × 10	16 × 16	23	100	300	130 / 130	50
P-123.01	XYZ	1 × 1 × 1*	5 × 5	7.5	40	90	1.4 / 1.4 / 2.9	155
P-123.03	XYZ	3 × 3 × 3*	5 × 5	15.5	10	45	4.2 / 4.2 / 7.3	75
P-143.01	XYZ	1 × 1 × 1*	10 × 10	7.5	200	360	5.6 / 5.6 / 11	155
P-143.03	XYZ	3 × 3 × 3*	10 × 10	15.5	100	170	17 / 17 / 29	75
P-143.05	XYZ	5 × 5 × 5	10 × 10	23	50	120	28 / 28 / 47	50
P-153.03	XYZ	3 × 3 × 3*	16 × 16	15.5	300	450	43 / 43 / 73	75
P-153.05	XYZ	5 × 5 × 5	16 × 16	23	100	300	71 / 71 / 120	50
P-153.10	XYZ	10 × 10 × 10	16 × 16	40	60	170	130 / 130 / 230	30

Versions with inner hole

P-153.10H	XYZ	10 × 10 × 10	16 × 16 / 10	40	20	120	89 / 89 / 160	30
P-151.03H	X	3*	16 × 16 / 10	5.5	200	870	30	210
P-151.05H	X	5	16 × 16 / 10	7.5	200	640	49	155
P-151.10H	X	10	16 × 16 / 10	12	200	400	89	100

Versions for use in cryogenic and UHV environments

P-111.01T	X	1*	3 × 3	2.2	20	110	2 × 0.25	530
P-111.03T	X	3*	3 × 3	4.4	20	55	6 × 0.25	260
P-121.01T	X	1*	5 × 5	2.2	50	310	2 × 0.70	530
P-121.03T	X	3*	5 × 5	4.4	50	150	6 × 0.70	260

* Tolerances ±30%.

Piezo ceramic type: PIC 255.

Standard electrical interfaces: PTFE-insulated wire leads, 100 mm, AWG 32 (Ø 0.49 mm).

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

unilateral clamping.

Capacitance at 1 V_{pp}, 1 kHz, RT.

Operating voltage: -250 to 250 V.

Operating temperature range: -20 to 85°C.

Standard mechanical interfaces:

Ceramics (passive PZT).

Outer surface: Epoxy resin.

Versions for cryogenic and UHV environments

Operating temperature range:

-269 to 150°C.

Standard electrical interfaces: Ta. contacting possible with conductive adhesive or welding. Displacement measured at

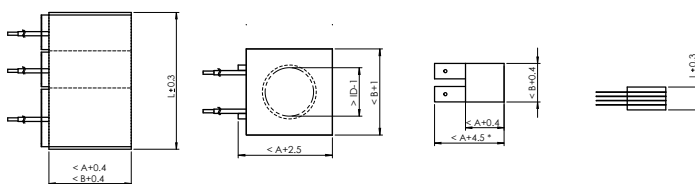
room temperature. Reduced values at low temperatures.

Standard mechanical interfaces: Ceramic

(Al₂O₃, 96% purity).

Outer surface: Epoxy resin.

Custom designs or different specifications on request.



PICA Shear Actuators, A, B, L see table, dimensions in mm. The number of axes and wires depends on the type.

Left: P-1xx.xx and P-1xx.xxH (with inner hole), right: P-1xx.xxT, * <math><A+2.5</math> with a cross section of 3 × 3