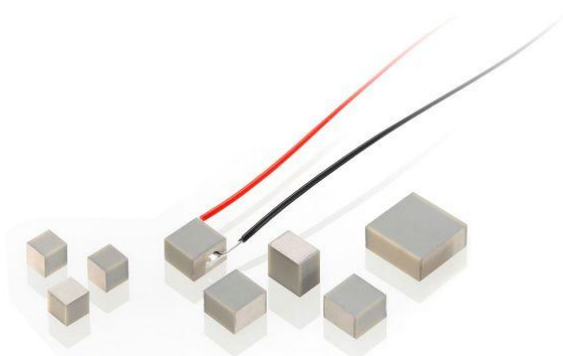


PICMA® Chip Actuators

MINIATURE MULTILAYER PIEZO ACTUATORS



PL0xx

- + Superior lifetime
- + Ultra- compact: From 2 mm x 2 mm x 2 mm
- + Ideal for dynamic operation
- + Microsecond response
- + Sub- nanometer resolution

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. Large choice of designs. Versions with rectangular or annular cross- section

Available Options

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

Fields of Application

Research and industry. For laser tuning, micro- dispensing, life sciences

Specifications

	Dimensions A x B x TH	Displacement	Blocking force	Capacitance	Resonant frequency
		μm	N	nF	kHz
PL022.30	2 mm x 2 mm x 2 mm	2.2	>120	25	>600
PL033.30	3 mm x 3 mm x 2 mm	2.2	>300	85	>600
PL055.30	5 mm x 5 mm x 2 mm	2.2	>500	250	>600
PL088.30	10 mm x 10 mm x 2 mm	2.2	>2000	1100	>600

Travel range: at 0 to 100 V, tolerance $\pm 20\%$. The values refer to the free component and can be lower when glued on.

Blocking force: at 0 to 100 V.

Electrical capacitance: Tolerance $\pm 20\%$, 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. Lateral resonant frequencies can be lower than the axial ones, depending on the installation situation.

Piezo ceramic type: PIC252.

Standard connections: Solderable contacts. For optional PTFE- insulated wire leads, 100 mm, AWG 32, $\varnothing 0.49$ mm, change order number extension to 1 (e.g. PL022.31).

Operating voltage: -20 to 100 V.

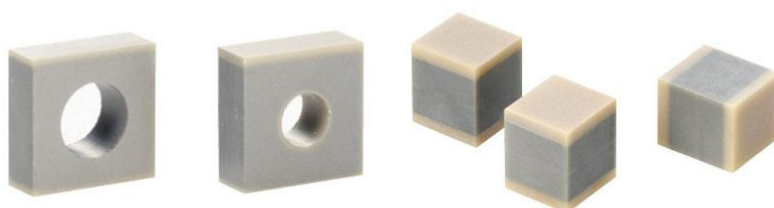
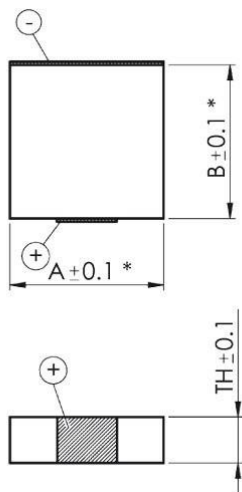
Operating temperature range: -40 to 150 °C.

Recommended preload for dynamic operation: 15 MPa.

Maximum preload for constant force: 30 MPa.

Ask about custom designs!

Drawings / Images



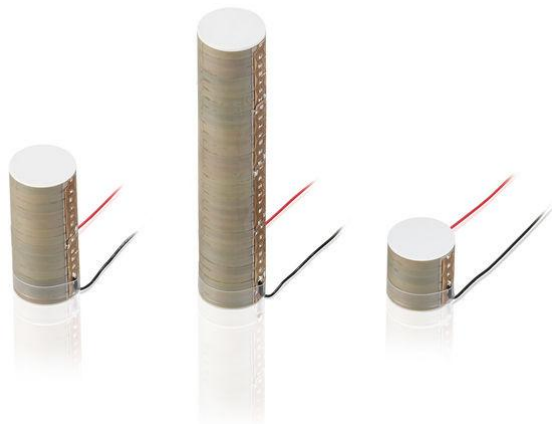
On request PICMA®
Chip piezo actuators
can be manufactured
with ceramic- insulated
inner hole (left) or with
precision- ground
ceramic end plates
(right)

Round PICMA® Stack Multilayer Piezo Actuator

HIGH BLOCKING FORCE

P-088

- + Superior lifetime
- + Ideal for dynamic operation
- + Flexible, adaptable overall height
- + OEM versions available without stranded wires



Multilayer stack actuators

The actuators are easily scaled, thanks to the stacked construction, flexible adaptation of the travel range is possible. The annular cross section ensures easy integration. Versions with solderable contacts are also UHV- compatible to 10^{-9} hPa. The actuators do not outgas and can be baked out at high temperatures.

PICMA® piezo linear actuators

Low operating voltage -20 to 100 V. Ceramic insulation. High reliability and long lifetime

Possible modifications

Different heights, easy to mount on customer request. Variety of shapes. Precision- ground end plates for reduced tolerances Spherical end pieces

Fields of application

Industry and research. For laser tuning, microdispensing, life sciences

Specifications

	P-088.721	P-088.741	P-088.781	Unit	Tolerance
Dimensions OD x L	16 x 16	16 x 36	16 x 77	mm	
Nominal travel range	14	32	70	µm	-10 % / +20 %
Blocking force	7500	7500	7500	N	
Stiffness	535	235	105	N/µm	
Electrical capacitance	13	30	68	µF	±20 %
Resonant frequency	68	35	17	kHz	±20 %

Nominal travel range, blocking force and stiffness at 0 to 100 V.
Standard connections: 100 mm PTFE- insulated stranded wires, AWG 28 (Ø 0.69 mm). Optional: For solderable contacts without stranded wires, change the last digit of the order number to 0.

Piezo ceramic type: PIC252. ceramic end plates made of Al₂O₃.

Recommended preload for dynamic operation: 15 MPa.

Maximum preload for constant force: 30 MPa.

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

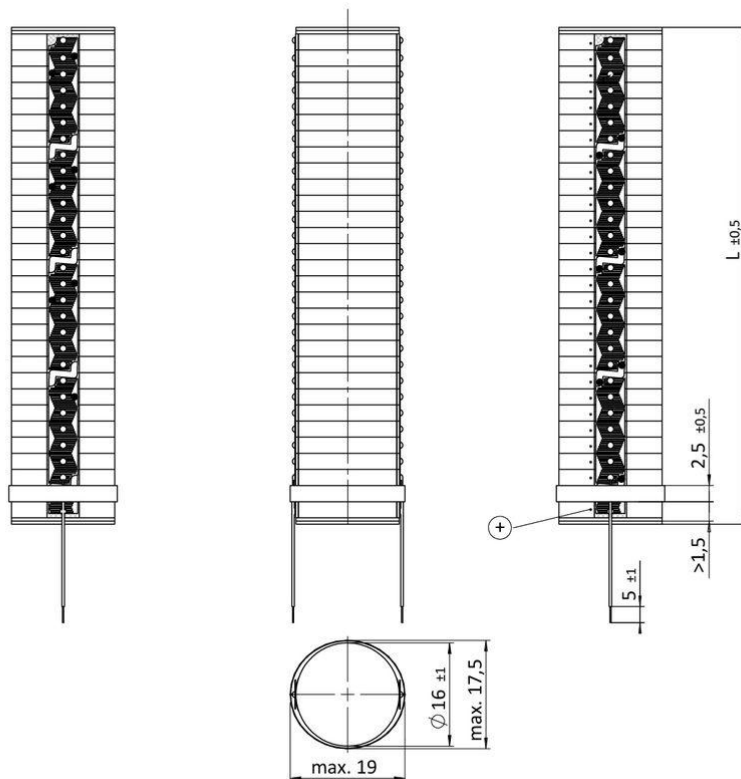
Electrical capacitance: measured at 1 V_{pp}, 1 kHz, RT

Operating voltage: -20 to 100 V.

Operating temperature range: -40 to 150 °C.

Ask about custom designs!

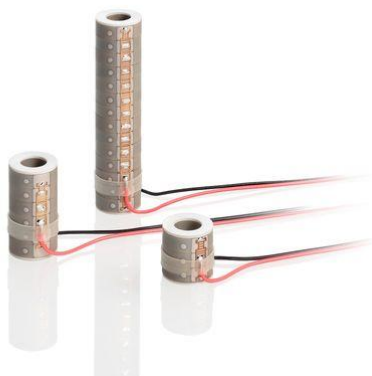
Drawings / Images



P-088 PICMA®
Stack Multilayer
Piezo Actuator,
dimensions in mm

PICMA® Stack Multilayer Ring Actuator

WITH INNER HOLE



P-080

- + Inner hole for preload or as aperture for optical applications
- + Superior lifetime
- + Ideal for dynamic operation
- + Microsecond response
- + Subnanometer resolution

Multilayer stack actuators

Flexible travel range up to 30 μm . Annular cross-section for easy integration. UHV- compatible to 10^{-9} hPa, no outgassing, high bakeout temperature

PICMA® piezo linear actuators

Low operating voltage -20 to 100 V. Ceramic insulation. High reliability and long lifetime

Available options

Different heights, easy to mount on customer request. Variety of shapes. Precision-ground end plates for reduced tolerances

Fields of application

Industry and research. For laser tuning, micro-dispensing, life sciences

Specifications

Preliminary data	P-080.311	P-080.341	P-080.391	
Dimensions OD x ID x L	8 x 4.5 x 8.5	8 x 4.5 x 16	8 x 4.5 x 36	mm
Nominal travel range	5.5 \pm 20 %	11 \pm 20 %	25 \pm 10 %	μm
Blocking force	800	825	850	N
Stiffness	145	75	34	N/ μm
Electrical capacitance	0.86	1.7	4.0	μF
Resonant frequency	135 \pm 20 %	85 \pm 20 %	40 \pm 20 %	kHz

All data at 0 to 100 V.

Standard connections: PTFE- insulated stranded wires, 100 mm, AWG 30 (\varnothing 0.61 mm). For optional solderable contacts without wire leads, change order number extension to 0.

Piezo ceramic type PIC252. Ceramic end plates made of Al_2O_3 .

Recommended preload for dynamic operation: 15 MPa.

Maximum preload for constant force: 30 MPa.

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

Electrical capacitance: Tolerance \pm 20 %, measured at 1 V_{pp} , 1 kHz, RT.

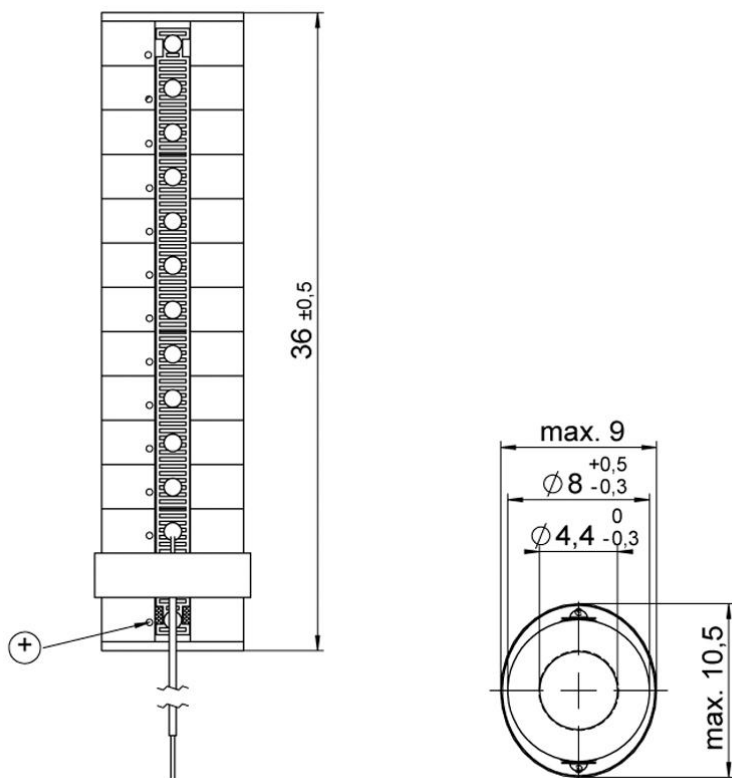
Operating voltage: -20 to 100 V.

Operating temperature range: -40 to 150°C.

Ask about custom designs!

Drawings / Images

P-080.390, dimensions
in mm



Round PICMA® Chip Actuators

MINIATURE MULTILAYER PIEZO ACTUATOR WITH AND WITHOUT INNER HOLE



PD0xx

- + Superior lifetime
- + Ultra- compact: From 5 mm Ø
- + Ideal for dynamic operation
- + Microsecond response
- + Subnanometer resolution

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

Specifications

	PD050.3x	PD080.3x	PD120.3x	PD150.3x	PD160.3x	PD161.3x	Unit	Tolerance
OD	5 ±0.2	8 ±0.3	12 ±0.4	15±0.3	16 ±0.5	16 ±0.5	mm	
ID	2.5 ±0.15	4.5 ±0.15	6 ±0.2	9±0.15	8 ±0.25	–	mm	
TH	2.5 ±0.05	2.5 ±0.05	2.5 ±0.05	2±0.05	2.5 ±0.05	2.5 ±0.05	mm	
Travel range*	2	2	2	1.8	2	2.3	µm	±20 %
Blocking force	>400	>1000	>2500	>3300	>4400	>6000	N	
Electrical capacitance**	110	300	900	1000	1700	2400	nF	±20 %
Axial resonant frequency***	>500	>500	>500	>500	>500	>500	kHz	
Piezo ceramic	PIC252	PIC252	PIC252	PIC252	PIC252	PIC252		
Operating voltage	-20 to 100	-20 to 100	-20 to 100	-20 to 100	-20 to 100	-20 to 100	V	
Operating temperature range	-40 to 150	-40 to 150	-40 to 150	-40 to 150	-40 to 150	-40 to 150	°C	
Recommended preload for dynamic operation	15	15	15	15	15	15	MPa	
Maximum preload for constant force	30	30	30	30	30	30	MPa	

Standard connections: PDxxx.31: PTFE- insulated wire leads, 100 mm, AWG 32, Ø 0.49 mm; PDxxx.30: Solderable contacts
Blocking force: At 0 to 100 V

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

** measured at 1 Vpp, 1 kHz, RT

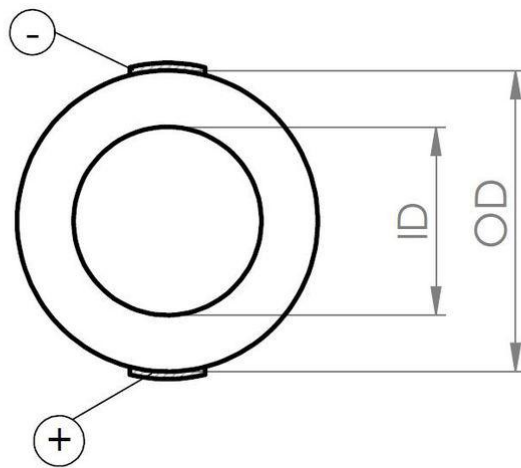
*** measure at 1 Vpp, unloaded, open on both sides. The value is halved for unilateral clamping. Lateral resonant frequencies can be lower than the axial ones, depending on the installation situation.

Ask about custom designs!

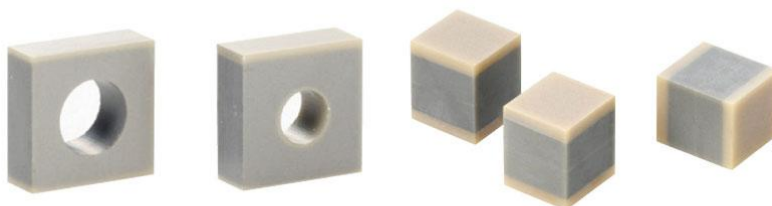
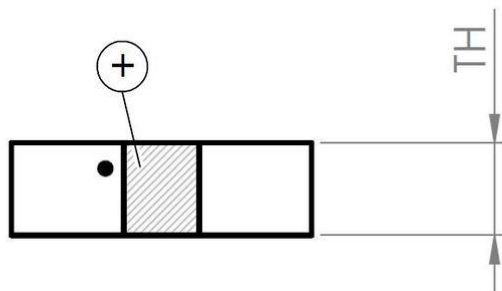
Drawings / Images



PICMA® Chip rings and discs are available in different variants with up to 16 mm in diameter



Round PICMA® Chip miniature piezo actuator, lapped end surfaces. OD, ID, TH see table.



On request PICMA® Chip piezo actuators can be manufactured with ceramic- insulated inner hole (left) or with precision- ground ceramic end plates (right)