

P-611.ZS · P-611.XZS

Compact Z and XZ Piezoelectric Nanopositioning Systems



Z and XZ nanopositioning system, 100 µm travel range, to 0.2 nm resolution.

- Small Footprint: 44 x 44 mm
- 100 µm Travel Range
- Resolution to 0.2 nm
- For Cost-Sensitive Applications
- PICMA® High-Performance Piezo Actuators
- Open- and Closed-Loop Models

P-611's are piezo-based nanopositioning systems featuring a compact footprint of only 44 x 44 mm. The Z- and XZ-versions described here are ideally suited for use in applications like microscopy, auto-focusing and photonics packaging. Both versions are available with 100 µm travel range per axis. Equipped with piezo drives and zero-stiction, zero-friction flexure guiding system, the series provides nanometer-range resolution and millisecond response time.

Flexibility

The P-611 family is very flexible because of the variety of

Application Examples

- Photonics packaging & fiber optics (see also P-611.3SF, p. 8-18)
- Micromachining
- Micromanipulation (life sciences)
- Semiconductor test systems

single- and multi-axis versions (X, XY, Z, XZ and XYZ) and because all versions can be easily combined with a variety of micropositioning systems to form hybrid systems with longer travel ranges (see p. 8-20).

Open- and Closed-Loop Models

Open- and closed-loop versions are available to suit your application. The open-loop models are ideal for applications where fast response and very high resolution are essential, but absolute positioning is not important. They can also be used when the position is controlled by an external linear position sensor such as an interferometer, a PSD (position sensitive diode), CCD chip / image processing system, or the eyes and hands of an operator.

The closed-loop versions are equipped with high-resolution strain gauge sensors mounted

on the flexure guiding system for optimum position stability and responsiveness. The sensors are operated in a full bridge circuit and provide position information with nanometer resolution to the servo-controller.

Superior Lifetime

Reliability is assured by the use of award-winning PICMA® multilayer actuators, which are integrated into a sophisticated, single-module, flexure guiding system. The PICMA® actuators feature cofired ceramic encapsulation and thus offer better performance and reliability than conventional piezo actuators. The wire-EDM-cut flexures are FEA modeled to make them extremely precise. In addition they are maintenance-free and not subject to wear.

Ordering Information

P-611.ZS
Z Nanopositioning System
100 µm, SGS Sensor

P-611.Z0
Z Nanopositioning System
100 µm, Open-Loop

P-611.XZS
XZ Nanopositioning System
100 x 100 µm, SGS Sensor

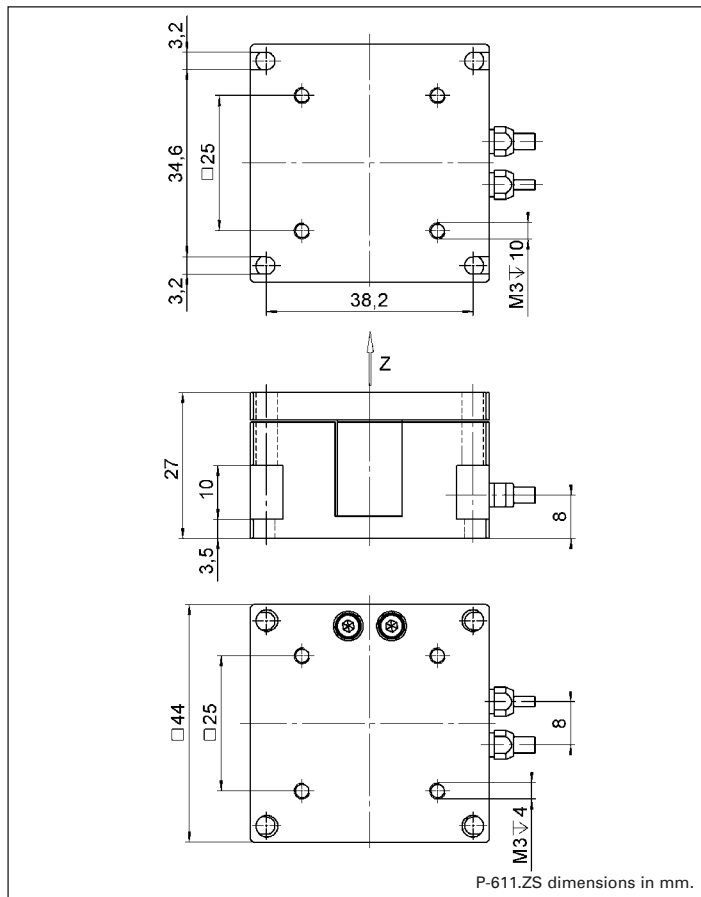
P-611.XZ0
XZ Nanopositioning System
100 x 100 µm, Open-Loop

X and XY Versions see p. 2-36
NanoCube® XYZ Version see p. 2-74

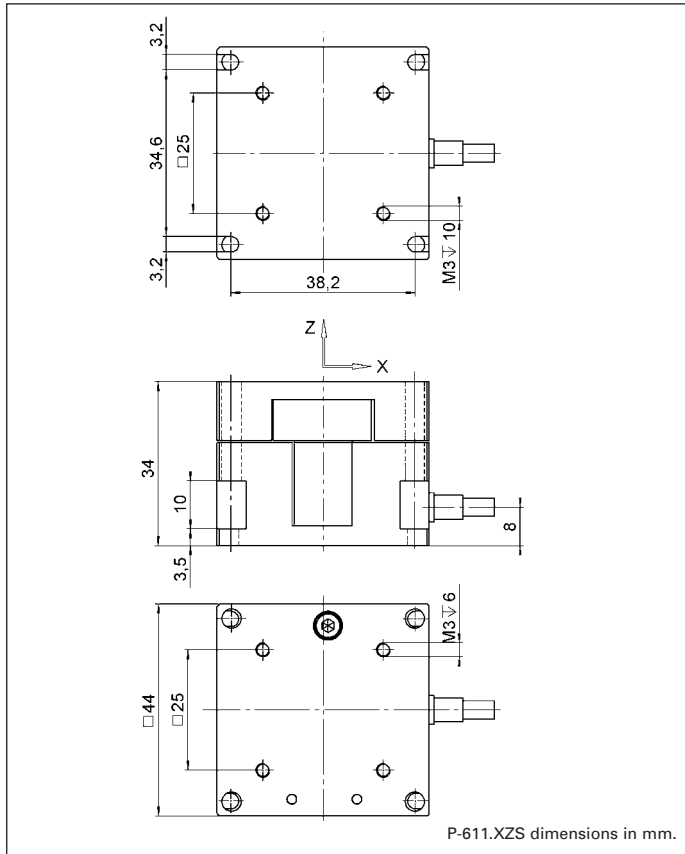
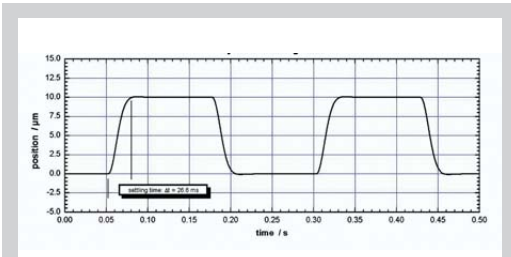
Ask about custom designs!

Notes

See the "Selection Guide" on p. 2-14 ff. for comparison with other nanopositioning systems.



P-611.ZS dimensions in mm.



Piezo Actuators

Nanopositioning & Scanning Systems

Active Optics / Steering Mirrors

Tutorial: Piezo-electrics in Positioning

Capacitive Position Sensors

Piezo Drivers & Nanopositioning Controllers

Hexapods / Micropositioning

Photonics Alignment Solutions

Motion Controllers

Ceramic Linear Motors & Stages

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Technical Data

Models	P-611.ZS	P-611.Z0	P-611.XZS	P-611.XZ0	Unit	Notes see p. 2-84
Active axis	Z	Z	X, Z	X, Z		
Min. Open-loop travel @ -20 to 120 V	120	120	120 / axis	120 / axis	µm	A2
Closed-loop travel	100	-	100 / axis	-	µm	A5
Integrated feedback sensor	SGS	-	SGS	-		B
* Closed- / open-loop resolution	2 / 0.2	- / 0.2	2 / 0.2	- / 0.2	nm	C1
Repeatability	<10	-	<10	-	nm	
Closed-Loop linearity (typ.)	0.1	-	0.1	-	%	
Stiffness	0.45	0.45	0.21 / 0.35	0.21 / 0.35	N/µm ±20%	D1
Max. normal load	+15 / -5	+15 / -5	+15 / -5	+15 / -5	N	D4
Electrical capacitance	1.5	1.5	1.5 / axis	1.5 / axis	µF ±20%	F1
** Dynamic operating current coefficient (DOCC)	1.7	1.7	1.7 / axis	1.7 / axis	µA/(Hz x µm)	F2
Unloaded resonant frequency (X/Z)	460	460	365 / 340	365 / 340	Hz ±20%	G2
Resonant frequency with 30 g load	370	370	280 / 295	280 / 295	Hz ±20%	
Resonant frequency with 100 g load	265	265	185 / 230	185 / 230	Hz ±20%	
Operating temperature range	-20 to 80	-20 to 80	-20 to 80	-20 to 80	°C	H2
Voltage connection	VL	VL	VL	VL		J1
Sensor connection	L	-	L	-		J2
Weight (with cable)	176	176	270	270	g ±5%	
Body material	S / Al	S / Al	S / Al	S / Al		L
Recommended amplifier/controller (codes explained p. 2-17)	D, H	A, G	D, H	A, G		

* For calibration information see p. 2-8. Resolution of PI piezo nanopositioners is not limited by friction and stiction. Noise equivalent motion with E-503 amplifier.
 ** Dynamic Operating Current Coefficient in µA per Hz and µm. Example: Sinusoidal scan of 50 µm at 10 Hz requires approximately 0.8 mA drive current.