XZ and XYZ Nanopositioner

Compact Two-Axis Piezo Nanopositioner

P-611.XZ • P-611.2

- Compact: Surface 44 mm × 44 mm
- Travel range to 120 µm × 120 µm
- Resolution to 0.2 nm
- Particularly inexpensive systems (mechanics and controller)
- Zero-play, high-precision flexure guide system
- Outstanding lifetime due to PICMA® piezo actuators
- Also available as linear and Z stage, and as XYZ version

Application fields

- Interferometry
- Microscopy
- Nanopositioning
- Biotechnology
- Test procedures and quality assurance
- Photonics
- Fiber positioning
- Semiconductor technology

Outstanding lifetime thanks to PICMA® piezo actuators

The PICMA® piezo actuators are all-ceramic insulated. This protects them against humidity and failure resulting from an increase in leakage current. PICMA® actuators offer an up to ten times longer lifetime than conventional polymer-insulated actuators. 100 billion cycles without a single failure are proven.

Motion	Unit	Toleran-ce	P-611.20	P-611.2S	P-611.XZ0	P-611.XZS
Active axes			X, Y	X, Y	X, Z	X, Z
Travel range in X	µm			100		100
Travel range in Y	µm			100		
Travel range in Z	µm					100
Travel range in X, open loop, at -20 to 120 V	µm	+20 / -0 %	120	120	120	120
Travel range in Y, open loop, at -20 to +120 V	µm	+20 / -0 %	120	120		
Travel range in Z, open loop, at -20 to 120 V	µm	+20 / -0 %			120	120
Linearity error	%	Typ.		0.1		0.1
Pitch (Rotational crosstalk in θX with motion in Y)	µrad	Typ.	±5	±5	±5	±5
Yaw (Rotational crosstalk in θX with motion in Z)	µrad	Typ.			±10	±10
Pitch (Rotational crosstalk in θY with motion in X)	µrad	Typ.	±5	±5	±5	±5
Pitch (Rotational crosstalk in θY with motion in Z)	µrad	Typ.			±10	±10
Yaw (Rotational crosstalk in θZ with motion in X)	µrad	Typ.	±20	±20	±20	±20
Yaw (Rotational crosstalk in θZ with motion in Y)	µrad	Typ.	±10	±10		

Positioning	Unit	Toleran-ce	P-611.20	P-611.2S	P-611.XZ0	P-611.XZS
Unidirectional repeatability in X	nm	Typ.		±10		±10
Unidirectional repeatability in Y	nm	Typ.		±10		
Unidirectional repeatability in Z	nm	Typ.				±10
Resolution, open loop	nm	Typ.	0.2	0.2	0.2	0.2
Integrated sensor				SGS, indirect position measuring		SGS, indirect position measuring
System resolution	nm	Typ.		2		2

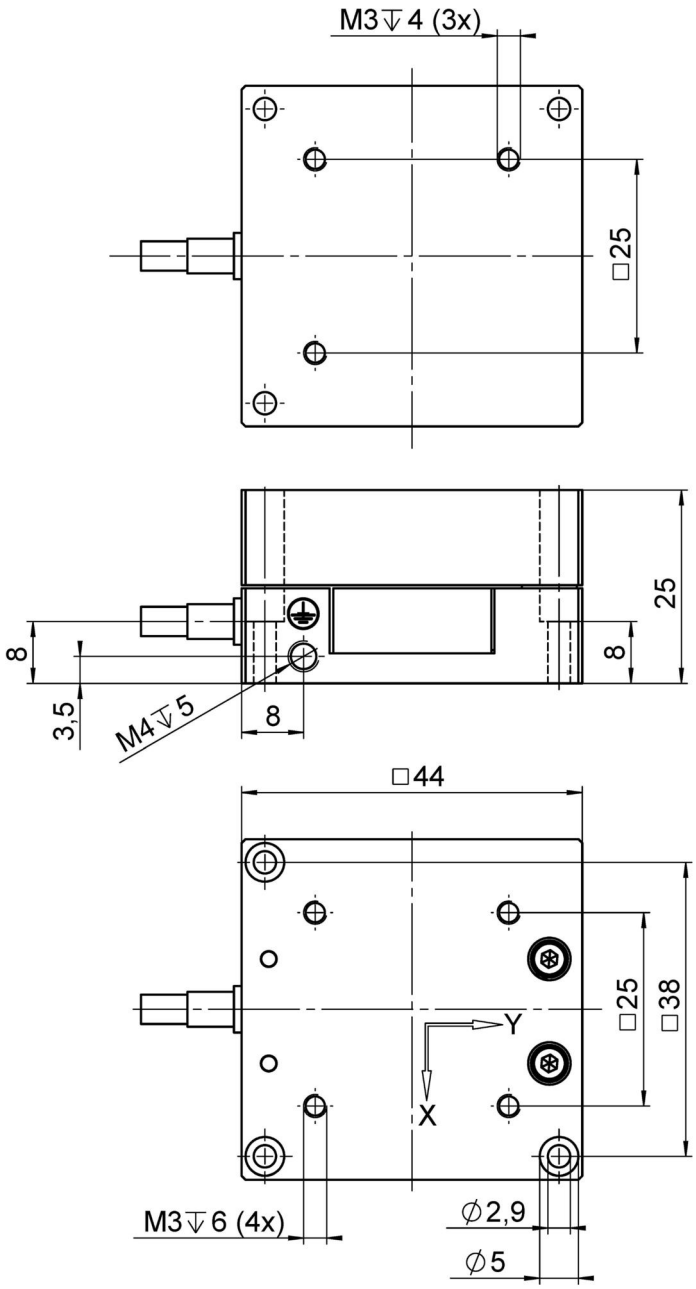
Drive Properties	Unit	Toleran-ce	P-611.20	P-611.2S	P-611.XZ0	P-611.XZS
Drive type			Piezo actuator/PICMA®	Piezo actuator/PICMA®	Piezo actuator/PICMA®	Piezo actuator/PICMA®
Electrical capacitance	µF	±20%	1,5	1,5	1,5	1,5

Mechanical Properties	Unit	Toleran-ce	P-611.20	P-611.2S	P-611.XZ0	P-611.XZS
Stiffness in X	N/µm	±20%	0.2	0.2	0.2	0.2
Stiffness in Y	N/µm	±20%	0.2	0.2		
Stiffness in Z	N/µm	±20%			0.35	0.35
Resonant frequency in X, unloaded	Hz	±20%	345	345	365	365
Resonant frequency in X, under load with 30 g	Hz	±20%	270	270	280	280
Resonant frequency in X, under load with 100 g	Hz	±20%	180	180	185	185
Resonant frequency in Y, unloaded	Hz	±20%	270	270		
Resonant frequency in Y, under load with 30 g	Hz	±20%	225	225		
Resonant frequency in Y, under load with 100 g	Hz	±20%	165	165		
Resonant frequency in Z, unloaded	Hz	±20%			340	340
Resonant frequency in Z, under load with 30 g	Hz	±20%			295	295
Resonant frequency in Z, under load with 100 g	Hz	±20%			230	230
Permissible push force in X	N	Max.	15	15	15	15
Permissible push force in Y	N	Max.	15	15		
Permissible push force in Z	N	Max.	15	15	15	15
Permissible pull force in X	N	Max.	10	10	10	10
Permissible pull force in Y	N	Max.	10	10		
Permissible pull force in Z	N	Max.			10	10
Overall mass	g	±5%	235	235	270	270
Material			Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel

Miscellaneous	Unit	Toleran-ce	P-611.20	P-611.2S	P-611.XZ0	P-611.XZS
Operating temperature range	°C		-20 to 80	-20 to 80	-20 to 80	-20 to 80
Connector			LEMO FFA.00.250.CTAC22	LEMO FFA.00.250.CTAC22	LEMO FFA.00.250.CTAC22	LEMO FFA.00.250.CTAC22
Sensor connector				LEMO FFA.0S.304.CLAC32		LEMO FFA.0S.304.CLAC32
Cable length	m	±10 mm	1.5	1.5	1.5	1.5
Recommended controllers / drivers			E-503, E-505, E-663, E-664, E-727	E-503, E-505, E-663, E-664, E-727	E-503, E-505, E-663, E-664, E-727	E-503, E-505, E-663, E-664, E-727

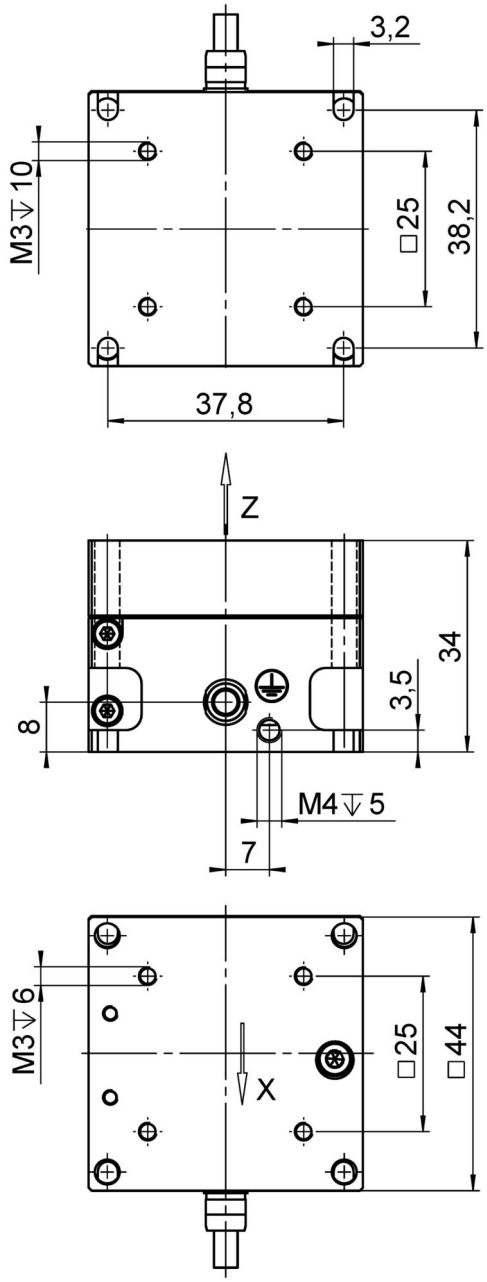
The resolution of the system is limited only by the noise of the amplifier and the measuring technology because PI piezo nanopositioning systems are free of friction.

Drawings / Images



P-611.2S, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Drawings / Images



P-611.XZS, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

P-611.20
XY nanopositioner; 120 µm × 120 µm travel range (open loop) (X × Y); LEMO connectors; 1.5 m cable length

P-611.2S
XY nanopositioner; 100 µm × 100 µm travel range (X × Y); SGS, indirect position measuring; LEMO connectors; 1.5 m cable length

P-611.XZ0
XZ nanopositioner; 120 µm × 120 µm travel range (open loop) (X × Z); LEMO connectors; 1.5 m cable length

P-611.XZS
XZ nanopositioner; 100 µm × 100 µm travel range (X × Z); SGS, indirect position measuring; LEMO connectors; 1.5 m cable length