

P-601

PiezoMove® High-Precision Lever Amplified Z-Actuator with Flexure Guiding



- Flexure Guidance for Frictionless, Ultra-Straight Motion
- Travel Ranges to 480 µm
- Resolution to 0.2 nm
- High Dynamics and Stiffness
- PICMA® High-Performance Piezo Actuators
- Open and Closed-Loop Versions
- Ideal for OEM Applications

Lever amplified PiezoMove® P-601 actuators combine large vertical travel ranges up to 480 µm and a high positioning accuracy in a very compact design. With settling times of only a few milliseconds and a resolution in the sub-nanometer range they are well suited for static and dynamical applications.

PiezoMove® P-601 lever amplified actuators cover the range between direct-driven pre-loaded piezo translators, such as the P-840 series, and single-axis nanopositioning stages, like the P-611 series. Compared to direct-driven piezo transla-

tors, lever amplified actuators offer larger travel ranges, a much higher lateral stiffness and guiding precision. Compared to single-axis nanopositioning stages, they offer clearly smaller dimensions. PiezoMove® lever amplified actuators feature a resolution to 0.2 nm and a repeatability to 8 nm.

With their highly precise, frictionless flexure guidance, a very high stiffness and excellent straightness of motion are reached. Together with their small dimensions and the cost-effective design, the P-601 lever amplified actuators are especially suited for OEM applications. Versions with strain-gauge sensors (SGS) are equipped with a full bridge circuit that is insensitive to thermal drift. Versions without a sensor are also available for open-loop applications. In addition to standard models made from steel special versions from Invar or aluminum,

Ordering Information

- P-601.1S**
PiezoMove® Lever Amplified Actuator, 100 µm, SGS
- P-601.3S**
PiezoMove® Lever Amplified Actuator, 250 µm, SGS
- P-601.4S**
PiezoMove® Lever Amplified Actuator, 400 µm, SGS
- P-601.10**
PiezoMove® Lever Amplified Actuator, 110 µm, Open-Loop
- P-601.30**
PiezoMove® Lever Amplified Actuator, 300 µm, Open-Loop
- P-601.40**
PiezoMove® Lever Amplified Actuator, 480 µm, Open-Loop

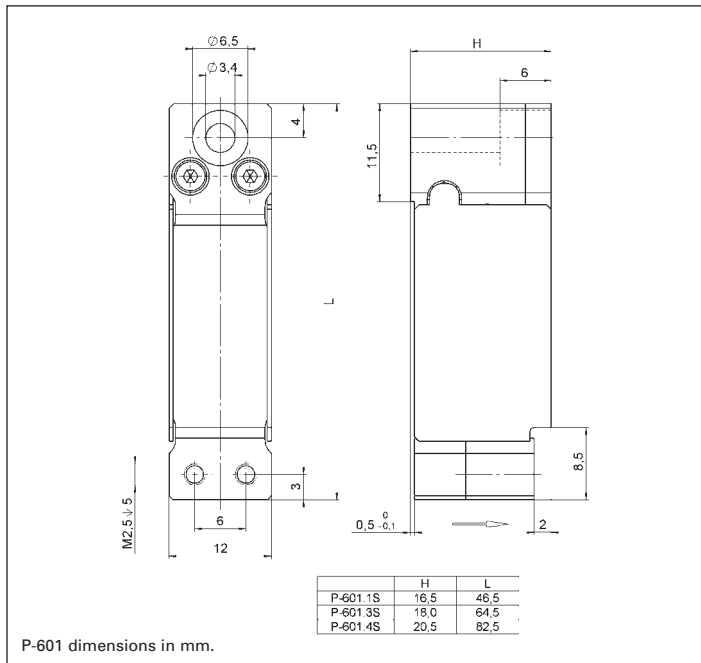
as well as non-magnetic ones are available on request.

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.

Application Example

- Nanopositioning
- Semiconductor Testing
- Adaptronics
- Photonics / Integrated Optics
- Biotechnology



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-601.10	P-601.1S	P-601.30	P-601.3S	P-601.40	P-601.4S	Units	Tolerances
Active Axis	Z	Z	Z	Z	Z	Z		
Motion and Positioning								
Integrated sensor	–	SGS	–	SGS	–	SGS		
Travel range -20 to +120 V, open-loop	110	110	300	300	480	480	µm	min.
Travel range closed-loop	–	100	–	250	–	400	µm	
Resolution open-loop	0.2	0.2	0.3	0.3	0.4	0.4	nm	typ.
Resolution closed-loop	2	2	6	6	12	12	nm	typ.
Linearity	–	0.1	–	0.3	–	0.3	%	typ.
Unidirectional repeatability	–	8	–	10	–	30	nm	typ.
Pitch	20	20	20	20	20	20	µrad	typ.
Yaw	10	10	10	10	10	10	µrad	typ.
Mechanical Properties								
Stiffness in motion direction	0.8	0.8	0.38	0.38	0.28	0.28	N/µm	±20 %
Resonant frequency unloaded	750	750	440	440	350	350	Hz	±20 %
Resonant frequency loaded (30 g)	620	620	350	350	290	290	Hz	±20 %
Push-/pull force in motion direction	30/10	30/10	20/10	20/10	15/10	15/10	N	Max.
Lateral force	30	30	30	30	30	30	N	Max.
Drive Properties								
Drive type	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®	PICMA®		
Electrical capacitance	1.5	1.5	3.1	3.1	4.6	4.6	µF	±20 %
DOOC	1.9	1.9	1.6	1.6	1.4	1.4	µA/(Hz x µm)	±20 %
Miscellaneous								
Operating temperature range	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	-20 to 80	°C	
Material	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel		
Mass	50	50	75	75	110	110	g	±5 %
Cable length	250	250	250	250	250	250	mm	±10 mm
Sensor connection	Open leads	Open leads	Open leads	Open leads	Open leads	Open leads		
Voltage connection	Open leads	Open leads	Open leads	Open leads	Open leads	Open leads		
Recommended driver/controller	A, G	D, H	A, G	D, H	A, G	D, H		