

# P-287

## Z/Tilt Piezoelectric Flexure Stage



- Frictionless Precision Flexure Guiding System
- Vertical Travel to 700  $\mu\text{m}$
- Tilt to 0.7 degrees
- Non-Magnetic Stainless Steel Design

The P-287 is a high-resolution, piezoelectrically driven flexure stage providing tilt up to 12 mrad and vertical travel up to 700  $\mu\text{m}$  at the tip. A ball seat is machined into the tip to decouple any rotation if the P-287 is used as a linear drive. In that case an external guiding system is recommended (e.g. frictionless diaphragm spring).

### Working Principle

P-287 positioners are equipped with high-voltage piezoelectric drives (0 to -1000 V) integrated into a zero stiction/friction, ultra-high-resolution, wire-EDM-cut flexure motion amplifier system. The linear motion of the piezo translator produces an arc motion of the tip.

### Application Examples

- Wafer inspection
- Nanopositioning
- Medical analysis
- Biology
- Optics

### Notes

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

### Technical Data

Models	P-287.70	Units	Notes see p. 2-84
Active axes	$\theta_x, (Z)$		
Open-loop travel @ 0 to -1000 V	12 (700)	mrad, ( $\mu\text{m}$ at tip) $\pm 20\%$	A4
* Open-loop resolution	0.2 (7)	$\mu\text{rad}$ (nm at tip)	C0
Stiffness (in operating direction)	0.13 (at tip)	N/ $\mu\text{m}$ $\pm 20\%$	D1
Push / pull force capacity (in operating direction)	80 / 10	N	D3
Electrical capacitance	290	nF $\pm 20\%$	F1
** Dynamic operating current coefficient (DOCC)	30	$\mu\text{A}/(\text{Hz} \times \text{mrad})$	F2
	0.5	$\mu\text{A}/(\text{Hz} \times \mu\text{m}$ at tip)	
Unloaded resonant frequency	380	Hz $\pm 20\%$	G2
Operating temperature range	- 40 to 80	$^{\circ}\text{C}$	H2
Voltage connection	VH		J1
Weight (with cables)	195	g $\pm 5\%$	
Body material	N-S		L
Recommended amplifier/controller (codes explained p. 2-17)	B, I		

\* For further information see p. 2-8. Resolution of PI piezo nanostagers is not limited by friction or stiction. The value given is noise equivalent motion with E-507 amplifier.

\*\* Dynamic Operating Current Coefficient in  $\mu\text{A}$  per Hz and mrad ( $\mu\text{m}$ ).

Example: Sinusoidal scan of 10 mrad at 10 Hz requires approximately 3 mA drive current.

### Ordering Information

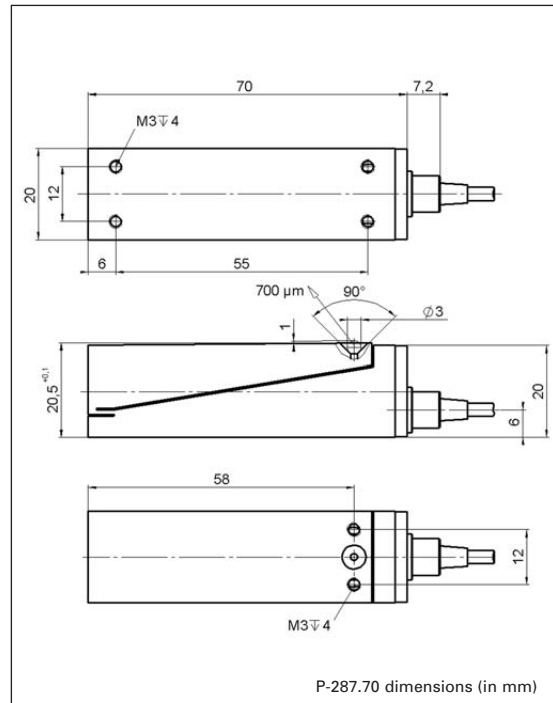
#### P-287.70

Vertical / Tilt Piezo Flexure Stage, 12 mrad, 700  $\mu\text{m}$

#### Options:

#### P-703.20

High-Vacuum Modification



Piezo Actuators

**Nanopositioning & Scanning Systems**

Active Optics / Steering Mirrors

Tutorial: Piezo-electrics in Positioning

Capacitive Position Sensors

Piezo Drivers &amp; Nanopositioning Controllers

Hexapods / Micropositioning

Photonics Alignment Solutions

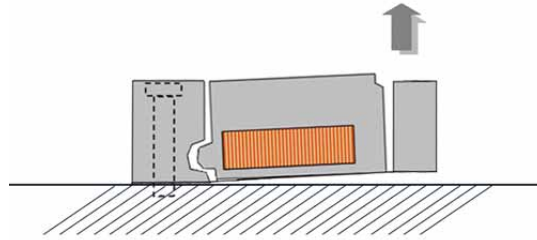
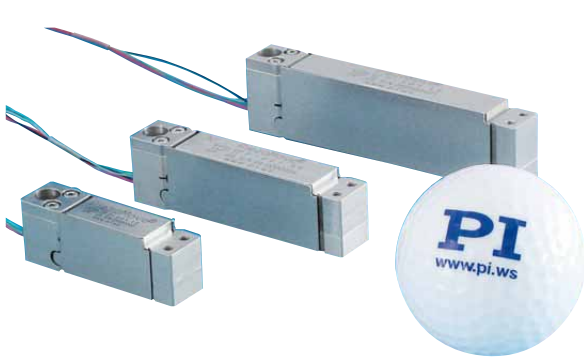
Motion Controllers

Ceramic Linear Motors &amp; Stages

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# P-601 PiezoMove™ Z-Actuator

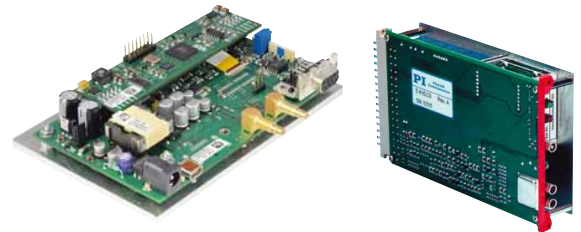
## Flexure-Guided OEM Piezo Actuator with Long Stroke to 400 μm



The flexure guiding system prevents tip and tilt at the drive head

PiezoMove™ Lever-amplified piezo actuators of the P-601 series

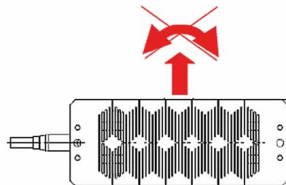
- Flexure Guidance for Frictionless, Ultra-Straight Motion
- Travel Ranges to 400 μm
- Resolution to 0.2 nm
- High Dynamics and Stiffness
- Custom Designs with Longer Travel or Faster Response and Non-Magnetic Versions Feasible
- Outstanding Lifetime Due to PICMA® Piezo Actuators
- Choice of Closed-Loop and Open-Loop Models
- Ideal OEM Actuator for Precision Motion Control in Optics, Medical, Biotech and Microfluidics Applications



The E-610 analog controller OEM module left or the E-609 digital OEM controller are available for closed-loop versions with position sensor

# P-602 PiezoMove Flexure Actuator with High Stiffness

## Integrated Guiding System, High Force and Large Travel Ranges



P-602: Flexure guides provide straight motion with no tip and minimum tilt

- Frictionless Flexure Guiding System for Straight Motion
- Integrated Motion Amplifier for Travel Ranges to 1 mm
- High Dynamics and Stiffness, Forces to 400 N, Backlash-Free Construction
- Outstanding Lifetime Due to PICMA® Piezo Actuators
- Available with Integrated Position Sensor
- Custom Designs with Larger Travel or Faster Response and Non-Magnetic Versions Feasible
- Ideal for OEM-Applications in Adaptronics, Biotechnology or Microfluidics

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