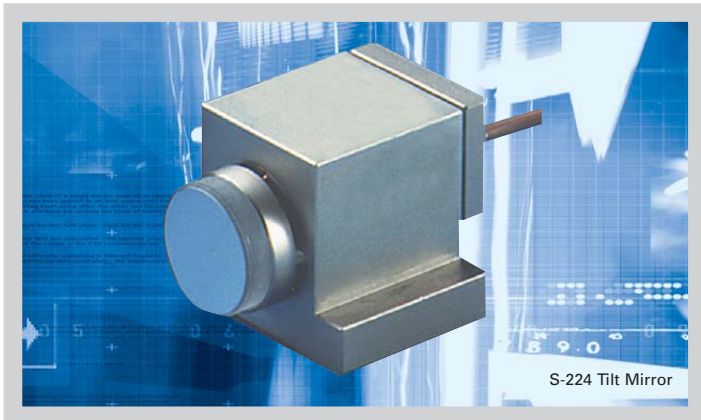


S-224 · S-226

High-Speed Miniature Piezo Tilt Mirror

>> Click <http://www.pi.ws/fwd/Piezo-Mirror> for the Latest Specs on these Products



S-224 Tilt Mirror

- Sub- μ rad Resolution
- Sub-Millisecond Response
- Up to 4.4 mrad Optical Beam Deflection
- Closed-Loop Versions for Better Linearity
- Includes BK7 Mirror
- Zero Friction Flexure Guiding System

S-224/S-226 miniature tilt platforms are extremely fast and compact tilt units, providing a tilt range of 2.2 mrad and sub-millisecond response. The S-224 and S-226 are delivered with a \varnothing 15 x 4 mm BK7 glass mirror.

Open- and Closed-Loop Operation

The S-224 is specifically designed for open-loop operation. The S-226 closed-loop version is available for highest accuracy and repeatability. In open-loop operation, the platform's angular position is roughly proportional to the drive voltage (see page 4-17 in the "Tutorial" section for behavior of open-loop piezos).

Open-loop operation is ideal for applications where the position is controlled by data provided by an external optical sensor, a CCD camera, etc.

The closed-loop version (S-226) allows absolute position control, high linearity, and repeatability based on the internal ultra-high-resolution feedback sensor.

Working Principle / Lifetime

S-224/S-226 miniature tilt platforms are equipped with long-life, ceramic-encapsulated, high-performance PICMA[®] piezo drives pushing a frictionless, flexure-mounted platform. The flexure is FEA (finite element analysis) modeled for zero stiction, zero friction and exceptional guiding precision; it also serves as the pivot point and preload for the piezo actuator.

Since drives and guides are frictionless and not subject to wear and tear, these units offer an exceptionally high level of reliability.

Notes

See the "Selection Guide" on p. 3-8 for comparison with other steering mirrors.

See "Piezo Drivers & Nanopositioning Controllers" section for our comprehensive line of low-noise modular and OEM

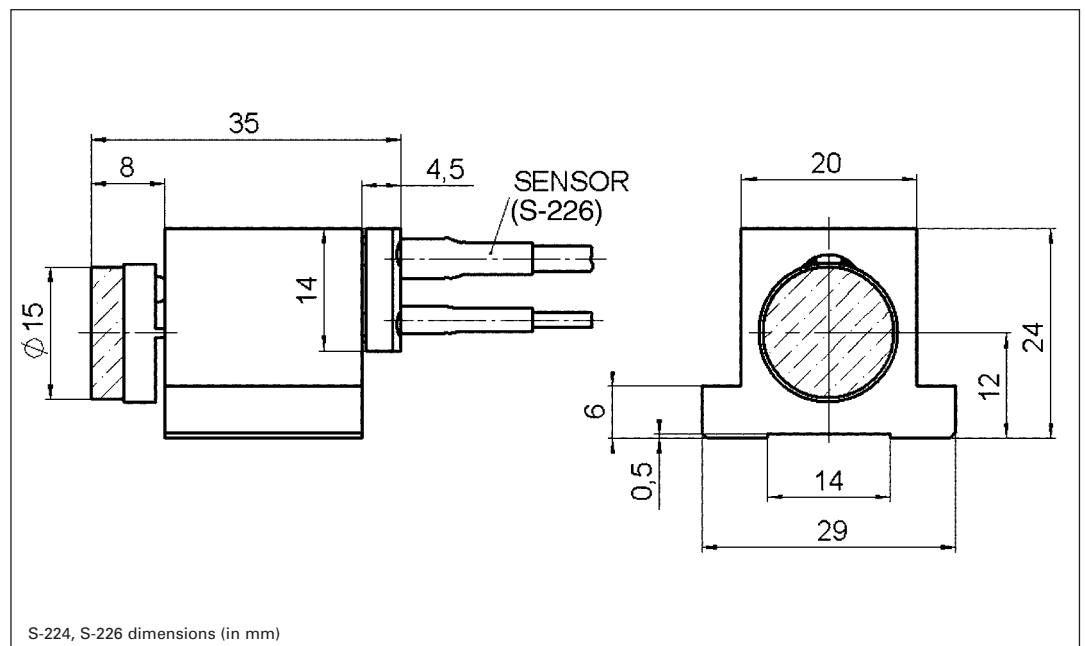
Ordering Information

S-224.00
Piezo Tilt Platform 2.2 mrad (4.4 mrad optical) with Mirror, Open-Loop

S-226.00
Piezo Tilt Platform 2.0 mrad (4.4 mrad optical) with Mirror, Closed-Loop

Ask about custom designs!

control electronics for computer and manual control.



Application Examples

- Laser beam steering & scanning
- Beam switching
- Correction of polygon scanner errors
- Laser beam stabilization

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

Index

Technical Data

Models	S-224.00	S-226.00	Units	Notes see page 3-26
Active axes	Θ_x	Θ_x		
* Open-loop tilt angle @ 0 to 100 V	2.2	2.2	mrad $\pm 20\%$	A2
* Closed-loop tilt angle	-	2.0	mrad	A3
Integrated feedback sensor	-	strain gauge		B
** Closed-loop / open-loop resolution	- / 0.05	0.1 / 0.05	μrad	C1
Closed-loop linearity (typ.)	-	0.2	%	
Full-range repeatability (typ.)	-	± 3	μrad	C3
Electrical capacitance	1.5	1.5	$\mu\text{F} \pm 20\%$	F1
*** Dynamic operating current coefficient (DOCC)	0.1	0.1	$\mu\text{A}/(\text{Hz} \times \mu\text{rad})$	F2
Unloaded resonant frequency (f_0)	9.0	9.0	$\text{kHz} \pm 20\%$	G2
Resonant frequency w/ $\varnothing 15 \times 4$ mm glass mirror (included)	7.5	7.5	$\text{kHz} \pm 20\%$	G3
Resonant frequency w/ $\varnothing 15 \times 4$ mm copper mirror	5.7	5.7	$\text{kHz} \pm 20\%$	G3
Distance, pivot point to platform surface (T)	4	4	mm	
Platform moment of inertia	215	215	$\text{g} \cdot \text{mm}^2$	
Operating temperature range	- 20 to 80	- 20 to 80	$^{\circ}\text{C}$	H2
Voltage connection	VL	VL		J1
Sensor connection	-	L		J2
Weight (w/o cables)	98	98	$\text{g} \pm 5\%$	
Material (case / platform)	N-S / N-S	N-S / N-S		L
Recommended amplifier / controller (codes explained page 3-9)	G, C	H, D		

* Mechanical tilt, optical beam deflection is twice as large.

** For calibration information see p. 3-7. Resolution of PZT tip/tilt platforms is not limited by friction or stiction. Noise equivalent motion with E-503 amplifier.

*** Dynamic Operating Current Coefficient in μA per Hz and μrad . Example: Sinusoidal scan of $100 \mu\text{rad}$ at 10 Hz requires approximately 0.1 mA drive current.