

S-325

High-Speed Piezo Tip/Tilt Platform and Z Positioner

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- Piezo Tripod Design Allows Z Motion and Tilt
- 10 mrad Optical Beam Deflection
- Piston Movement up to 30 µm
- Closed-Loop Versions for Better Linearity
- For Mirrors up to 25 mm (1") Diameter
- Zero Friction Flexure Guides
- Single-Moving-Platform, Parallel-Kinematics Design: Equal Dynamics for all Axes, Better Linearity & Temperature Stability

The S-325 multi-axis tip/tilt platforms and Z-positioners are fast and compact units based on a piezo tripod design (see page 3-10 for details).

High Resolution, Rapid Motion and Stable Positioning

The S-325 offers piston movement up to 30 µm (ideal for path length adjustment) and tilt movement up to 5 mrad (mechanical tilt, which is equiv-

alent to 10 mrad optical beam deflection) with sub-msec response and settling. The zero-friction PZT drives allow sub-µm linear resolution and sub-µrad angular resolution. The S-325 systems are designed for mirrors and optics up to 25 mm diameter and can be mounted in any orientation.

OEM-Proven

Developed for industrial applications, S-325s have performed 10⁹ motion cycles without failure for OEM systems.

S-325.30L Open-Loop Z, Tip/Tilt Positioner

The S-325.30L open-loop model is ideal for applications where the position is controlled by an external loop based on data provided by a sensor (e. g. PSD, quad cell, CCD chip, etc.). All three piezo linear actuators can be driven individually (or in parallel) by a three-channel amplifier. Vertical (piston movement) positioning and tip/tilt positioning are possible.

S-325.3SL Closed-Loop Z, Tip/Tilt Positioner

The S-325.3SL closed-loop version allows absolute position control, high linearity and repeatability based on internal position sensors. All three piezo linear actuators are equipped with high-resolution strain gauge sensors and can be driven individually (or in parallel). Vertical positioning (piston movement) and tip/tilt positioning are possible. The integrated position feedback sensors provide sub-µrad resolution (sub-nanometer for piston mode).

Ordering Information

S-325.3SL
Piezo Tip/Tilt Platform and Z-Positioner, 5 mrad, 30 µm, Closed-Loop

S-325.30L
Piezo Tip/Tilt Platform and Z-Positioner, 5 mrad, 30 µm, Open-Loop

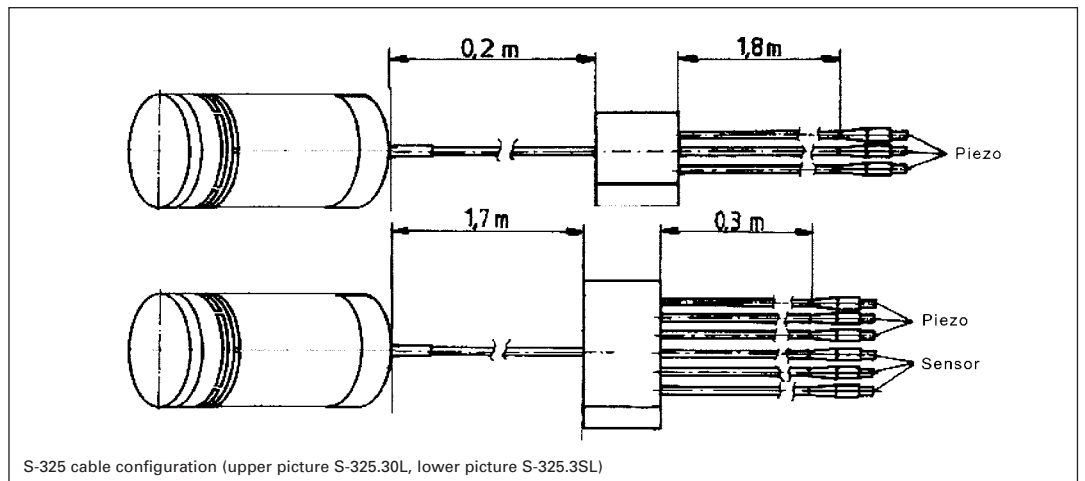
Ask about custom designs!

Higher Performance Through Parallel Kinematics

S-325 tip/tilt systems feature a single moving platform, parallel-kinematics design. Compared to stacked, multi-axis systems, the parallel-kinematics design provides faster response and better linearity with equal dynamics for all axes in a smaller package.

Working Principle / Lifetime

The S-325 tip/tilt platforms are equipped with three long-life, ceramic-encapsulated, high-performance PICMA[®] piezo drives. The closed-loop model features additional position feedback. Since drives and guides are frictionless and not subject to wear and tear, these units offer an exceptionally high level of reliability.



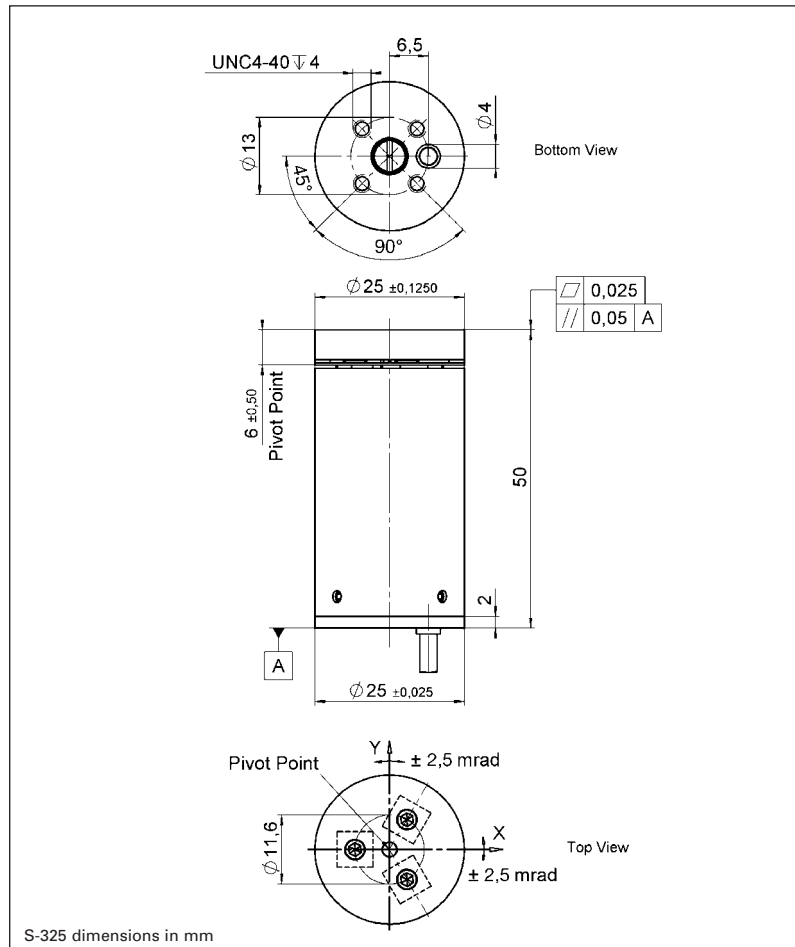
Application Examples

- Image stabilisation
- Laser beam stabilization
- Beam switching
- Adaptive optics systems
- Laser beam steering and scanning
- Laser cavity tuning

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 control electronics for computer and manual control.



Technical Data

Models	S-325.30L	S-325.3SL	Units	Notes see page 3-26
Active Axes	Θ_x, Θ_y, Z	Θ_x, Θ_y, Z		
* Open-loop tilt angle @ 0 to 100 V	**5	**5	mrad $\pm 20\%$	
* Closed-loop tilt angle	-	**4	mrad	A3
* Open-loop linear travel @ 0 to 100 V	30	30	$\mu\text{m} \pm 20\%$	A5
* Closed-loop linear travel @ 0 to 100 V	-	30	μm	A6
Integrated feedback sensor	-	strain gauge sensor		B
*** Closed-loop/open-loop angular resolution	- / 0.05	0.1 / 0.05	μrad	C1
*** Closed-loop/open-loop linear resolution	- / 0.5	1.0 / 0.5	nm	C1
Electrical capacitance	3 x 3.0	3 x 3.0	$\mu\text{F} \pm 20\%$	F1
Unloaded resonant frequency	2	2	kHz $\pm 20\%$	G1
Resonant frequency with 25 x 8 mm glass mirror	1	1	kHz $\pm 20\%$	G3
Distance of pivot point to platform surface	6 ± 0.5	6 ± 0.5	mm	
Platform moment of inertia	515	515	$\text{g} \cdot \text{mm}^2$	
Operating temperature range	-20 to 80	-20 to 80	$^{\circ}\text{C}$	H2
Voltage connection	3 x VL, 2.0 m	3 x VL, 2.0 m		J1
Sensor connection	-	3 x L, 2.0 m		J2
Weight (without cables)	65	65	$\text{g} \pm 5\%$	
Material casing	Al	Al		L
Recommended amplifier/controller (codes explain page 3-9)	G, C	H, D		

* For maximum tilt range, all three piezo actuators must be biased at 50 V. Linear travel and tilt angle are interdependent. The values quoted here refer to pure linear / pure angular motion. See piezo tripod drive equation on page 3-10 for more information.

** 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.