

S-325

High-Speed Piezo Tip / Tilt Platform and Z Positioner



S-325

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

Application Examples

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

- **Tip/Tilt Range up to 5 mrad**
- **Piston Movement up to 30 µm**
- **Compact Design**
- **Closed-Loop Versions**
- **For mirrors up to 25 mm (1") Diameter**

The S-325 multi-axis tip/tilt platforms and Z-positioners are fast and compact units based on the triple-piezo-drive supported platform design (see page 3-7 in the PI NanoPositioning catalog 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 equivalent to 10 mrad optical beam deflection) with sub-msec response and settling. The zero-friction PZT drives allow sub-nm 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 applications.

Working Principle

The S-325 tip/tilt platforms are equipped with three low-voltage piezoelectric (0 to 100 V) linear drives. The closed-loop model features additional position feedback.

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

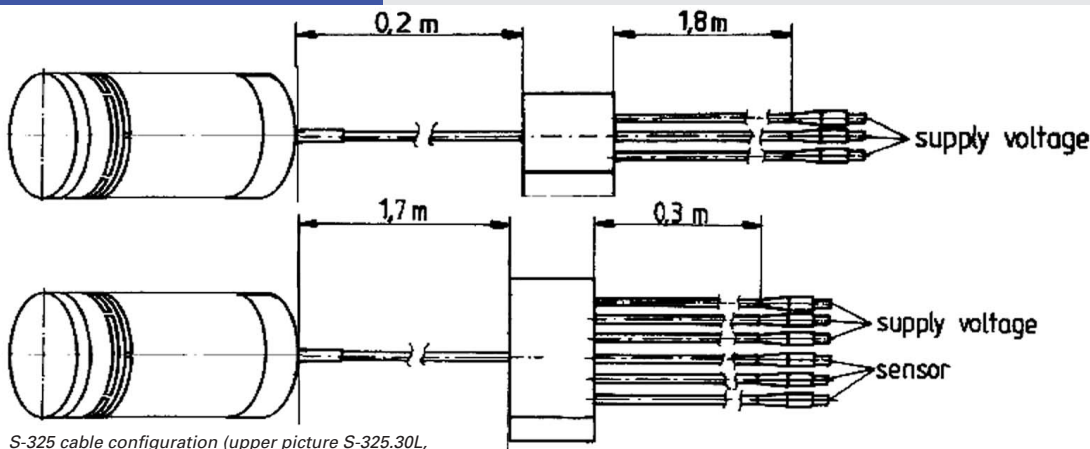
The S-325.30L open-loop model is ideal for applications where the position is controlled by an external loop based on data provided by a sensor (e. g. PSD quad cell, CCD chip,...). All three piezo linear actuators can be driven individually (or in parallel) by a three-channel amplifier. Vertical (piston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

Recommended control electronics: E-663.00, the E-500 system, configured for 3 channels (low or high-power amplifiers) or 3 x E-610.00 or 3 x E-621.00.

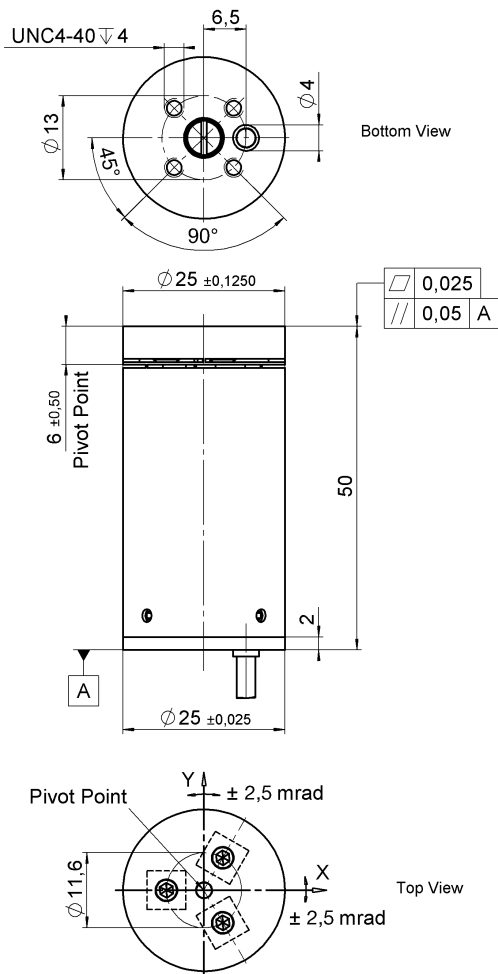
S-325.3SL Closed-Loop Z, Tip/Tilt Positioner

The S-325.3SL closed-loop version allows absolute position control, high linearity and repeatability based on the 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 is possible. The integrated position feedback sensors provide sub-µrad (sub-nanometer for piston mode) resolution (with PI control electronics).

Recommended control electronics: The E-500 system, configured for 3 channels (low or high-power amplifiers) and E-509 controller, or 3 x E-610.SR or 3 x E-621.SR.



S-325 cable configuration (upper picture S-325.30L, lower picture S-325.3SL)



S-325 dimensions in mm

Technical Data

Models	S-325.30L	S-325.3SL	Units
Active Axes	θ_x, θ_y, Z	θ_x, θ_y, Z	
* Open-loop tilt angle @ 0 to 100 V	"5 (± 2.5)	"5 (± 2.5)	mrad ± 20%
* Closed-loop tilt angle	-	"4 (± 2)	mrad
* Open-loop linear travel @ 0 to 100 V	30	30	μm ± 20%
* Closed-loop linear travel @ 0 to 100 V	-	30	μm
Integrated feedback sensor	-	strain gauge sensor	
Closed-loop/open-loop angular resolution	-/±0.05	0.1/±0.05	μrad
Closed-loop/open-loop linear resolution	-/1.0	0.5/1.0	nm
Electrical capacitance	3 x 3.6	3 x 3.6	μF ±20%
Unloaded resonant frequency	2	2	kHz ±20%
Resonant frequency with 25 x 8 mm glass mirror	1	1	kHz ±20%
Distance of pivot point to platform surface	6 ±0.5	6 ±0.5	mm
Platform moment of inertia	515	515	gmm^2
Operating temperature range	-20 to 80	-20 to 80	°C
Voltage connection	3 x VL, 2.0 m	3 x VL, 2.0 m	
Sensor connection	-	3 x L, 2.0 m	
Weight (without cables)	65	65	g ±5%
Material casing	Al	Al	

* 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.

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