Fast Tip/ Tilt Platform

SHORT SETTLING TIME AND HIGH DYNAMIC LINEARITY

S-331

- Tip/ tilt angle up to 5 mrad, optical deflection angle up to 10 mrad (0.57Á)
- Parallel kinematic design for identically high performance characteristics for both tip/ tilt axes
- High resonant frequencies for dynamic motion and fast step- and- settle
- Position sensors for high linearity
- For mirrors up to Ï 12.7 mm (0.5")

Precision class tip/ tilt platform for applications with high demand on the dynamics
Two orthogonal tip/ tilt axes with common centre of rotation. Parallel kinematic design for identical performance characteristics of both axes. Flexure guides for friction- free motion and high stiffness. Direct drive.

Strain sensors for low linear errors
Strain gauge sensors with low temperature sensitivity. Linearity error to 0.1%.

PICMA® High- performance drives
Piezoceramic actuators with all- ceramic insulation. Longer lifetime, insensitive to humidity and high operating temperatures.

Fields of application
Image processing, image stabilization. Laser beam steering. Scanning microscopy. Materials processing, lithography. Optical filters, optical switches.

Specifications

	S-331.2SL / S-331.2SH	S-331.5SL / S-331.5SH	Unit	Tolerance
Active axes	d$_X$, d$_Y$	d$_X$, d$_Y$		
Motion and Positioning				
Integrated sensor	SGS	SGS		
Open- loop tip/ tilt angle in d$_X$, d$_Y$ at -20 to 120 V	4.2	7	mrad	min.
Closed- loop tip/ tilt angle in d$_X$, d$_Y$	3	5	mrad	
Open- loop resolution in d$_X$, d$_Y$	0.05	0.1	Õrad	typ.
Closed- loop resolution in d$_X$, d$_Y$	0.1	0.25	Õrad	typ.
Linearity error in d$_X$, d$_Y$	0.4 * 0.1 **	0.4 * 0.1 **	%	typ.
Repeatability in d$_X$, d$_Y$, 10% tip/ tilt angle	0.3	0.5	Õrad	typ.
Repeatability in d$_X$, d$_Y$, 100% tip/ tilt angle	3	5	Õrad	typ.
Mechanical Properties				
Resonant frequency, unloaded in d$_X$, d$_Y$	10	6	kHz	Ñ20 %
Resonant frequency, unloaded in d$_X$, d$_Y$ (with glass mirror, Ï 12.7 mm, thickness 3 mm)	6	4	kHz	Ñ20 %
Distance of pivot point to platform surface	4	4	mm	Ñ1 mm
Platform moment of inertia	30	30	g Ï mmÌ	Ñ20 %
Drive Properties				
Ceramic type	PICMAÈ	PICMAÈ		
Electrical capacitance	0.96 / axis	1.44 / axis	ÕF	Ñ20 %
Miscellaneous				
ID chip functionality	S-331.2SH	S-331.5SH		
Operating temperature range	-20 to 80	-20 to 80	ÁC	
Material housing	Steel	Steel		
Material platform	Titanium	Titanium		
Mass	0.13	0.14	kg	Ñ5 %
Cable length	2	2	m	Ñ10 mm
Sensor/ voltage connection	LEMO (S-331.2SL), Sub- D 37-pin (m) (S-331.2SH)	LEMO (S-331.5SL), Sub- D 37- pin (m) (S-331.5SH)		

* S-331.xSL in conjunction with E-5xx analog controller modules
** S-331.xSH in conjunction with digital controllers, unidirectional
Recommended controllers/ amplifiers
Versions with LEMO connectors: E-500 modular piezo controller system with E-503.00S amplifier module (three channel) or 1 x E-505.00S and 2 x E-505.00 (highly dynamic applications) and E-509 control module.Versions with Sub- D 37 connector: E-727-3SD / E-727.3SDA digital multi-channel piezo controller for strain gauge sensors (SGS).

Order Information

S-331.2SH
High- Dynamics Tip/ Tilt Platform with High Stiffness, 3 mrad Tip/ Tilt Angle, Strain Gauge Sensor, Sub- D 37 Connector (m)
S-331.2SL
High- Dynamics Tip/ Tilt Platform with High Stiffness, 3 mrad Tip/ Tilt Angle, Strain Gauge Sensor, LEMO Connector(s)
S-331.5SH
High- Dynamics Tip/ Tilt Platform with High Stiffness, 5 mrad Tip/ Tilt Angle, Strain Gauge Sensor, Sub- D 37 Connector (m)
S-331.5SL
High- Dynamics Tip/ Tilt Platform with High Stiffness, 5 mrad Tip/ Tilt Angle, Strain Gauge Sensor, LEMO Connector(s)
Ask about custom designs!

Controllers / Drivers / Amplifiers

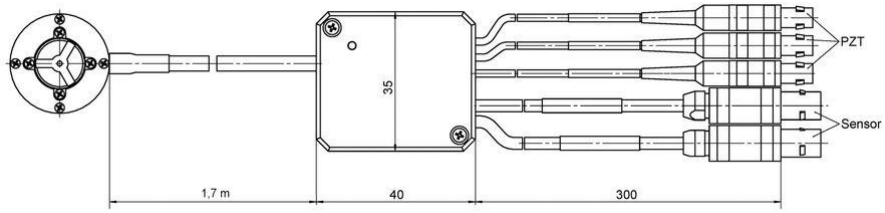
E-727 Digital Multi- Channel Piezo Controller
E-509 Signal Conditioner / Piezo Servo Module
E-503 Piezo Amplifier Module
E-500 ÂE-501 Modular Piezo Controller

Accessories

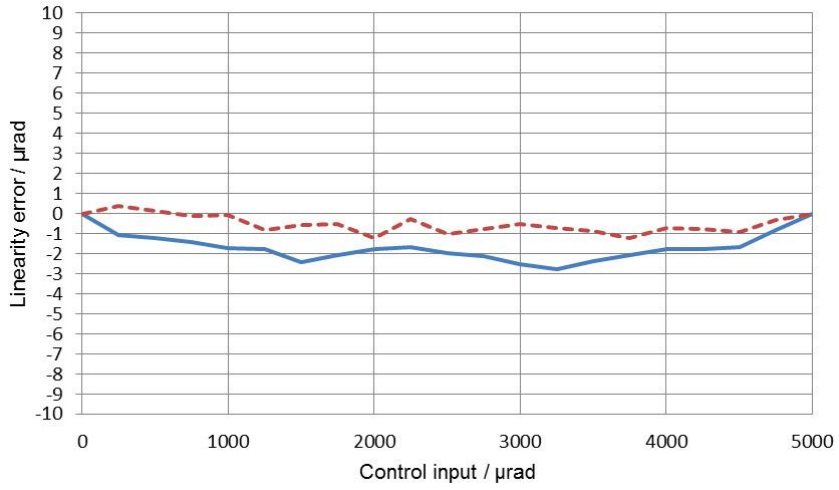
S-330.DLS Adapter Cable, Sub- D 25 to LEMO Connector
P-891.xx Extension Cable for LVPZT Piezo Translators
P-892.xx Sensor Extension Cable

Drawings / Images

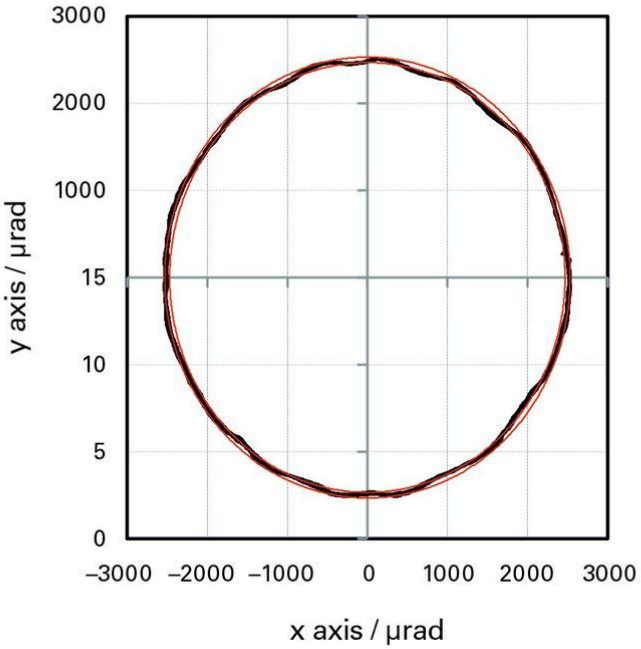
S-331, dimensions in mm



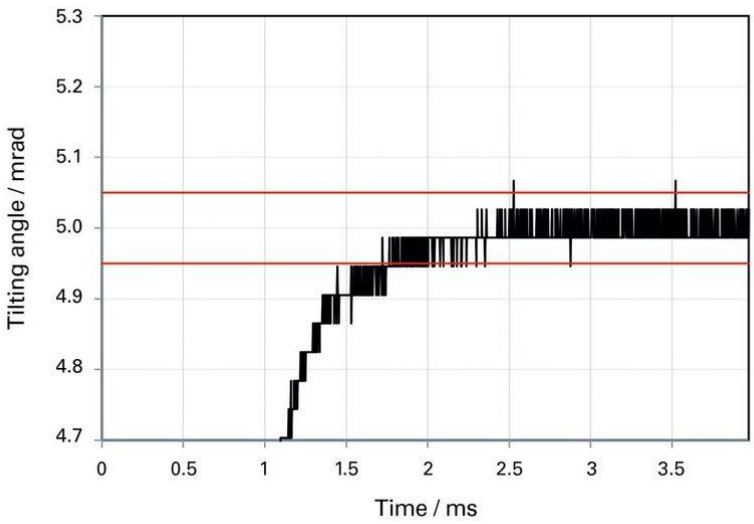
S-331.xSL with cable splitter box, dimensions in mm



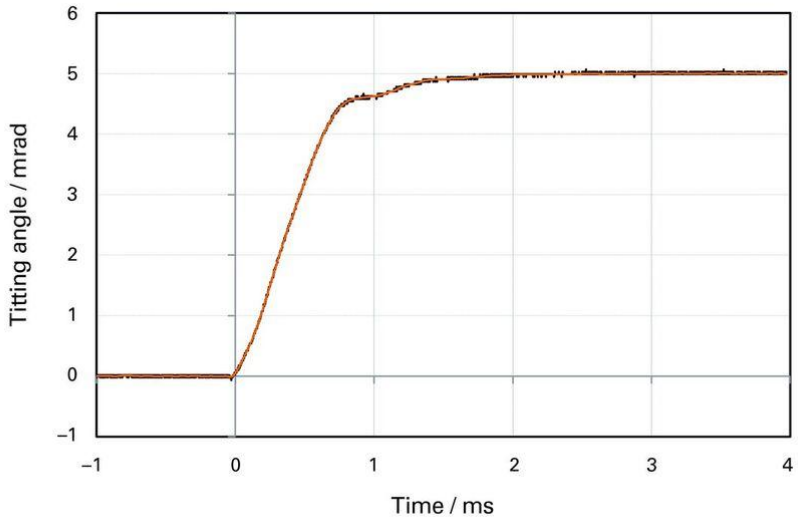
Unidirectional linearity error for both axes: The blue, solid line represents axis 1, the brown, dotted line represents axis 2. The linearity error at full displacement of the S-331.5SH with an E-727.3SD digital piezo controller is less than 0.05 %.



High dynamic linearity of a circular motion with 5 mrad displacement per axis (full displacement of the S-311.5SL with E-505 power amplifier and E-509 controller). The linear error on the ideal circular path at a frequency of 25 Hz is approx. 0.5%, which corresponds to 2.5 µrad.



Settling time of an unloaded S-331.5SL at full displacement with E-505 piezo amplifier and E-509 servo controller: The settling time for a step of 5 mrad is 1.8 ms at accuracy of ±1 %.



The settling time of the unloaded S-331.5SL for one 5 mrad step (full displacement) is 1.8 ms with an accuracy of ± 1%.

	Control Voltage	Frequency
S-331.2SL	20 V 50 V 100 V	2.5 kHz 2.5 kHz 1.75 kHz
S-331.5SL	20 V 50 V 100 V	2 kHz 2 kHz 1.5 kHz

High dynamics are also achieved during continuous operation. For this purpose, these combinations of piezo voltage and frequency are recommended for a single axis.