Piezo Tip/Tilt Platform

Highly Dynamic, with Large Deflection Angle for Mirrors and Optics

S-330

- Resolution to 20 nrad
- Excellent position stability
- Optical beam deflection to 20 mrad (>1°)
- Parallel kinematics for higher accuracy and dynamics and full bridge strain gauge sensors
- Sub-ms response time
- For mirrors with a diameter up to 50 mm

Fields of application

- Image processing / stabilization
- Optical trapping
- Laser scanning / beam steering
- Laser tuning
- Optical filters / switches
- Optics
- Beam stabilization

Outstanding lifetime thanks to PICMA® piezo actuators

The patented PICMA® piezo actuators are all-ceramic insulated. This protects them against humidity and failure resulting from an increase in leakage current. PICMA® actuators offer an up to ten times longer lifetime than conventional polymer-insulated actuators. 100 billion cycles without a single failure are proven.

High guiding accuracy due to zero-play flexure guides

Flexure guides are free of maintenance, friction, and wear, and do not require lubrication. Their stiffness allows high load capacity and they are insensitive to shock and vibration. They are 100 % vacuum compatible and work in a wide temperature range.

Automatic configuration and fast component exchange

Mechanics and controllers can be combined as required and exchanged quickly. All servo and linearization parameters are stored in the ID chip of the Sub-D connector of the mechanics. The autocalibration function of the digital controllers uses this data each time the controller is switched on.

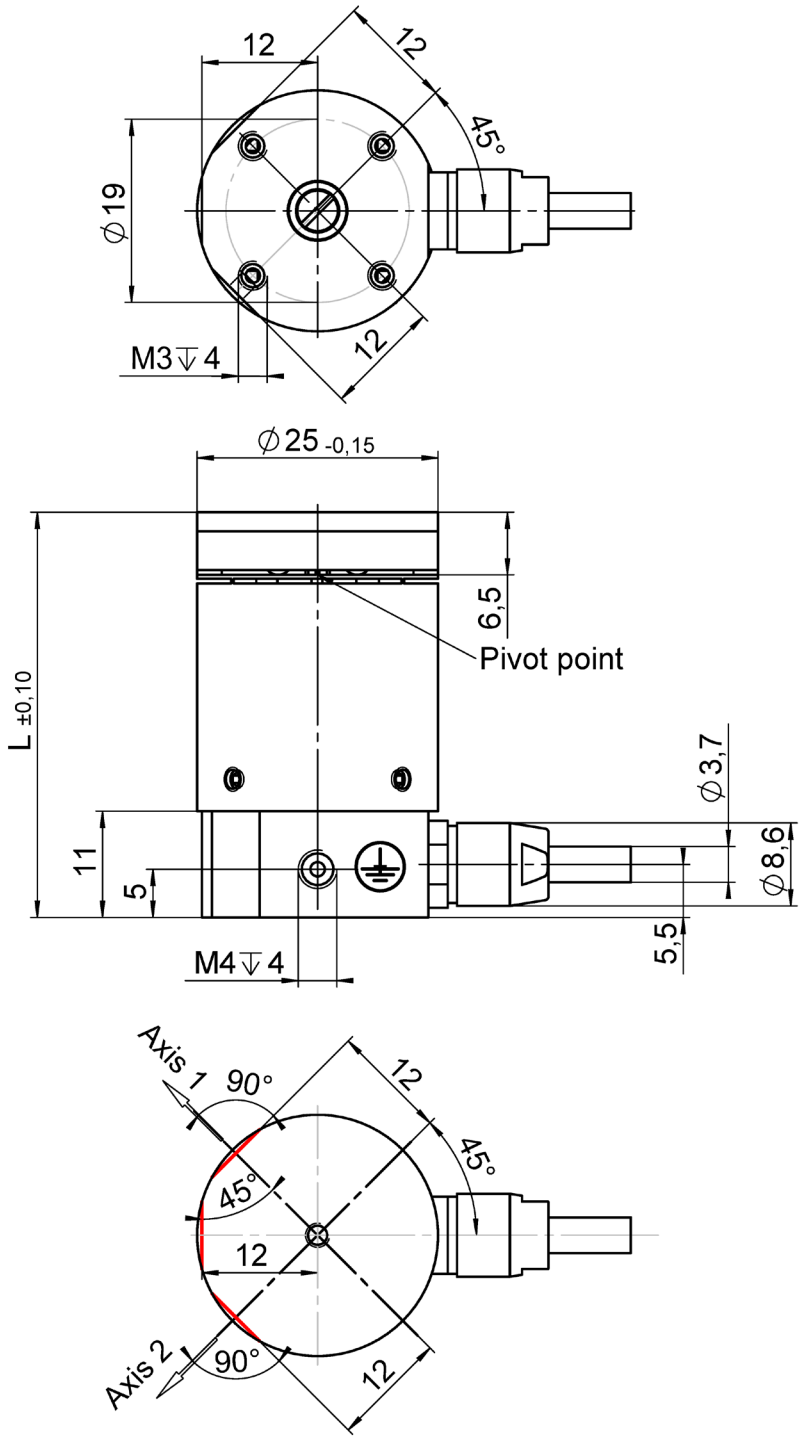
High dynamics multi-axis operation due to parallel kinematics
In a parallel-kinematic multi-axis system, all actuators act on a common platform. The minimum mass inertia and the identical design of all axes allow fast, dynamic, and nevertheless precision motion.

Specifications

	S-330.2SH / S-330.2SL	S-330.4SH / S-330.4SL	S-330.8SH / S-330.8SL	Unit	Tolerance
Active axes	θ_X, θ_Y	θ_X, θ_Y	θ_X, θ_Y		
Motion and positioning					
Integrated sensor *	SGS	SGS	SGS		
Tip/tilt angle in θ_X, θ_Y at -20 to 120 V, open loop	3.5	7	15	mrad	min.
Tip/tilt angle in θ_X, θ_Y, closed loop	2	5	10	mrad	
Resolution in θ_X, θ_Y, open loop	0.02	0.1	0.2	µrad	typ.
Resolution in θ_X, θ_Y, closed loop	0.05	0.25	0.5	µrad	typ.
Linearity error in θ_X, θ_Y	0.05 ** 0.2 ***	0.1 ** 0.2 ***	0.1 ** 0.2 ***	%	typ.
Repeatability in θ_X, θ_Y, 10% tip/tilt angle	0.06 ** 0.15 ***	0.08 ** 0.5 ***	0.15 ** 1 ***	µrad	typ.
Repeatability in θ_X, θ_Y, 100% tip/tilt angle	0.6 ** 1.5 ***	0.8 ** 5 ***	1.5 ** 10 ***	µrad	typ.
Mechanical properties					
Resonant frequency, no load, in θ_X, θ_Y	2.4	2.0	1.0	kHz	±20 %
Resonant frequency, under load, in θ_X, θ_Y (with glass mirror, Ø 25 mm, thickness 8 mm)	1.6	1.5	1.0	kHz	±20 %
Distance of pivot point to platform surface	6.5	6.5	6.5	mm	±1 mm
Platform's moment of inertia	1530	1530	1530	g × mm²	±20 %
Drive properties					
Ceramic type	PICMA®	PICMA®	PICMA®		
Electrical capacitance	3 / axis	6 / axis	12.5 / axis	µF	±20 %
Miscellaneous					
ID chip functionality	S-330.2SH	S-330.4SH	S-330.8SH		
Operating temperature range	-20 to 80	-20 to 80	-20 to 80	°C	
Material housing	Steel	Steel	Steel		
Material platform	Invar	Invar	Invar		
Mass	0.2	0.38	0.7	kg	±5 %
Cable length	2	2	2	m	+100 mm / -0 mm
Sensor/voltage connection	SH version: Sub-D 37 (m) SL version: LEMO	SH version: Sub-D 37 (m) SL version: LEMO	SH version: Sub-D 37 (m) SL version: LEMO		
Recommended electronics	E-503, E-505, E-663, E-727	E-503, E-505, E-663, E-727	E-503, E-505, E-663, E-727		

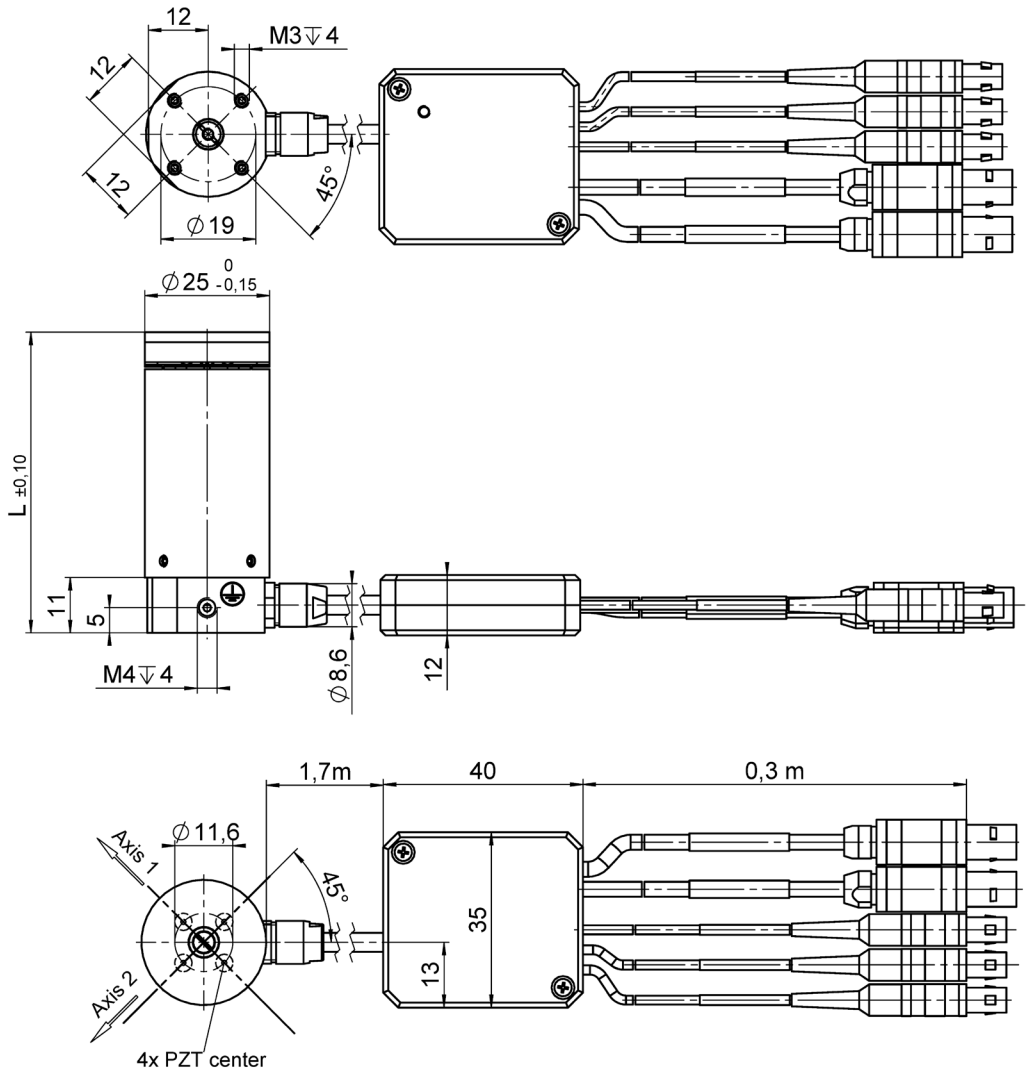
* Models without sensor are available on request.
** S-330.xSH in conjunction with digital controllers.
*** S-330.xSL in conjunction with E-5xx analog controller modules.
The resolution of the system is limited only by the noise of the amplifier and the measuring technology because PI piezo nanopositioning systems are free of friction.
All specifications based on room temperature (22 °C ±3 °C).

Drawings / Images



	L
S-330.2SH	42 mm
S-330.4SH	60 mm
S-330.8SH	96 mm

S-330.xSH, dimensions in mm.



	L
S-330.2SL	42 mm
S-330.4SL	60 mm
S-330.8SL	96 mm

S-330.xSL with cable splitter box; dimensions in mm.

Ordering Information

S-330.2SL
High-dynamics tip/tilt platform, 2 mrad tip/tilt angle, strain gauge sensors, LEMO connector(s)

S-330.2SH
High-dynamics tip/tilt platform, 2 mrad tip/tilt angle, strain gauge Sensors, Sub-D 37 connector (m)

S-330.4SL
High-dynamics tip/tilt platform, 5 mrad tip/tilt angle, strain gauge sensors, LEMO connector(s)

S-330.4SH
High-dynamics tip/tilt platform, 5 mrad tip/tilt angle, strain gauge sensors, Sub-D 37 connector (m)

S-330.8SL
High-dynamics tip/tilt platform, 10 mrad tip/tilt angle, strain gauge sensors, LEMO connector(s)

S-330.8SH
High-dynamics tip/tilt platform, 10 mrad tip/tilt angle, strain gauge sensors, Sub-D 37 connector (m)