

Piezo Tip/Tilt Platform

High Dynamics for Mirrors and Optics to Ø 75 mm (3")



S-340

- Resolution up to 20 nrad, excellent position stability
- Optical beam deflection to 4 mrad
- Various different materials for adapting the CTE between the platform and mirror
- Parallel kinematics for higher accuracy and dynamics
- Sub-ms response time
- For mirrors to Ø 75 mm (3"); Ø 100 mm (4") on request
- Closed-loop versions for improved linearity
- Excellent temperature stability

Application fields

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

Outstanding lifetime thanks to PICMA® piezo actuators

The 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 work in a wide temperature range.

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.

Material options for adapting the CTE of the mirror and platform

The following material combinations are recommended for adapting the thermal expansion coefficient:

- Platform made of aluminum: Mirror made of aluminum
- Platform made of Invar: Mirror made of quartz glass / Zerodur

Motion	Unit	Tolerance	S-340.A0L	S-340.ASL	S-340.I0L	S-340.ISL
Active axes			$\theta X, \theta Y$	$\theta X, \theta Y$	$\theta X, \theta Y$	$\theta X, \theta Y$
Rotation range in θX	mrad			2		2
Rotation range in θY	mrad			2		2
Rotation range in θX , open loop	mrad	$\pm 20\%$	2	2	2	2
Rotation range in θY , open loop	mrad	$\pm 20\%$	2	2	2	2
Linearity error in θX	%	Typ.		0.1		0.1
Linearity error in θY	%	Typ.		0.1		0.1

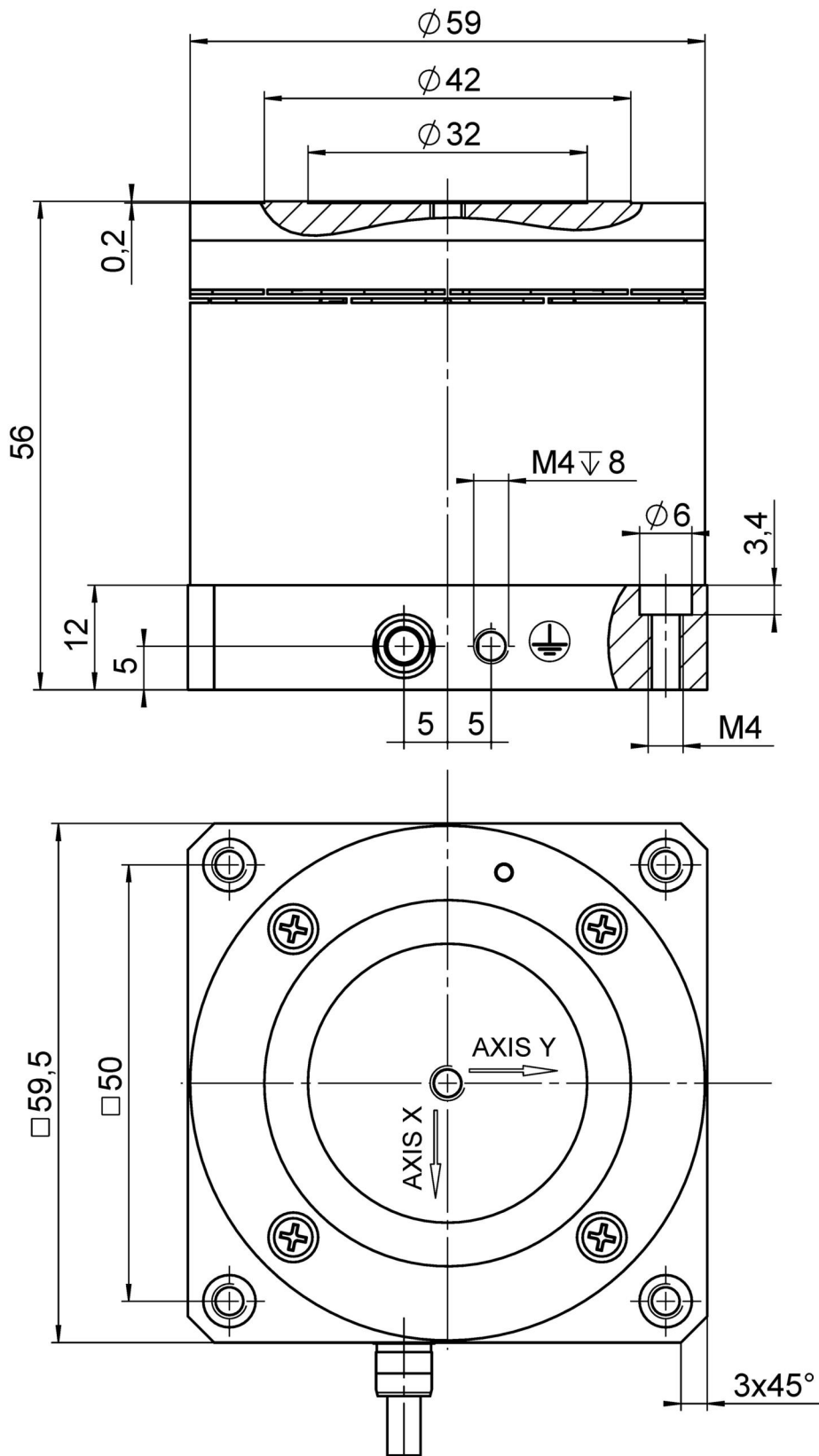
Positioning	Unit	Tolerance	S-340.A0L	S-340.ASL	S-340.I0L	S-340.ISL
Bidirectional repeatability in θX	μrad	Typ.		0.075		0.075
Bidirectional repeatability in θY	μrad	Typ.		0.075		0.075
Resolution in θX , open loop	μrad	Typ.	0.02	0.02	0.02	0.02
Resolution in θY , open loop	μrad	Typ.	0.02	0.02	0.02	0.02
Integrated sensor				SGS, indirect position measuring		SGS, indirect position measuring
System resolution in θX	μrad			0.2		0.2
System resolution in θY	μrad			0.2		0.2

Drive Properties	Unit	Tolerance	S-340.A0L	S-340.ASL	S-340.I0L	S-340.ISL
Drive type			Piezo actuator/PICMA®	Piezo actuator/PICMA®	Piezo actuator/PICMA®	Piezo actuator/PICMA®
Maximum power consumption	W					
Electrical capacitance in θX	μF	$\pm 20\%$	6	6	6	6
Electrical capacitance in θY	μF	$\pm 20\%$	6	6	6	6

Mechanical Properties	Unit	Tolerance	S-340.A0L	S-340.ASL	S-340.I0L	S-340.ISL
Resonant frequency in ΘX , unloaded	kHz	$\pm 20\%$	1.7	1.7	1.1	1.1
Resonant frequency in ΘX , under load with glass mirror ($\varnothing 50$ mm; thickness 5 mm; 21 g)	kHz	$\pm 20\%$	1.4	1.4	1	1
Resonant frequency in ΘX , under load with glass mirror ($\varnothing 50$ mm; thickness 13 mm; 63 g)	kHz	$\pm 20\%$	1	1	0.85	0.85
Resonant frequency in ΘX , under load with glass mirror ($\varnothing 75$ mm; thickness 19 mm; 197 g)	kHz	$\pm 20\%$	0.55	0.55	0.5	0.5
Resonant frequency in ΘY , unloaded	kHz	$\pm 20\%$	1.7	1.7	1.1	1.1
Resonant frequency in ΘY , under load with glass mirror ($\varnothing 50$ mm; thickness 5 mm; 21 g)	kHz	$\pm 20\%$	1.4	1.4	1	1
Resonant frequency in ΘY , under load with glass mirror ($\varnothing 50$ mm; thickness 13 mm; 63 g)	kHz	$\pm 20\%$	1	1	0.85	0.85
Resonant frequency in ΘY , under load with glass mirror ($\varnothing 75$ mm; thickness 19 mm; 197 g)	kHz	$\pm 20\%$	0.55	0.55	0.5	0.5
Moment of inertia in ΘX , unloaded	kg·mm ²	$\pm 20\%$	18	18	54	54
Moment of inertia in ΘY , unloaded	kg·mm ²	$\pm 20\%$	18	18	54	54
Distance of pivot point to platform surface	mm	± 0.1 mm	7.5	7.5	7.5	7.5
Guide			Flexure guide/Flexure guide with lever amplification	Flexure guide/Flexure guide with lever amplification	Flexure guide/Flexure guide with lever amplification	Flexure guide/Flexure guide with lever amplification
Overall mass	g		355	355	443	443
Material			Housing: Aluminum. Platform: Aluminum.	Housing: Aluminum. Platform: Aluminum.	Housing: Aluminum. Platform: Invar.	Housing: Aluminum. Platform: Invar.

Miscellaneous	Unit		S-340.A0L	S-340.ASL	S-340.I0L	S-340.ISL
Operating temperature range	°C		-20 to 80	-20 to 80	-20 to 80	-20 to 80
Connector			LEMO LVPZT	LEMO LVPZT	LEMO LVPZT	LEMO LVPZT
Sensor connector				LEMO for strain gauge sensors		LEMO for strain gauge sensors
Cable length	m		2	2	2	2
Recommended controllers / drivers			E-503, E-727	E-503, E-727	E-503, E-727	E-503, E-727

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 \pm 3 °C).



S-340, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point. The general tolerance according to DIN ISO 2768-f-H applies to all nontolerated dimensions.

Order Information

S-340.A0L

Tip/tilt platform, 2 mrad, open loop, LEMO connectors, aluminum cover plate

S-340.ASL

Tip/tilt platform, 2 mrad, SGS, LEMO connectors, aluminum cover plate

S-340.I0L

Tip/tilt platform, 2 mrad, open loop, LEMO connectors, Invar cover plate

S-340.ISL

Tip/tilt platform, 2 mrad, SGS, LEMO connectors, Invar cover plate