

Piezo Phase Shifters

High Dynamics, Nanometer-Precision Piezo Phase Shifters



S-303

- Resonant frequency 25 kHz for the highest dynamics
- Travel range of up to 3 μm
- Compact dimensions: $\varnothing$ 30 mm $\times$ 10 mm
- Open-loop versions with aperture
- Invar option for the highest thermal stability

Application fields

- (Fizeau) interferometry
- Optical nanomanipulation and inspection
- Scanning microscopy

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.

Subnanometer resolution with capacitive sensors

Capacitive sensors measure with subnanometer resolution without contacting. They guarantee excellent linearity of motion, long-term stability, and a bandwidth in the kHz range.

Maximum accuracy due to direct position measuring

Motion is measured directly at the motion platform without any influence from the drive or guide elements. This allows optimum repeatability, outstanding stability, and stiff, fast-responding control.

Motion	Unit	Tolerance	S-303.0L	S-303.0LI	S-303.CD	S-303.CDI
Active axes			Z	Z	Z	Z
Travel range in Z	μm				2	2
Travel range in Z, open loop	μm	$\pm 20\%$	3	3	3	3
Linearity error in Z	%	Typ.			1	1

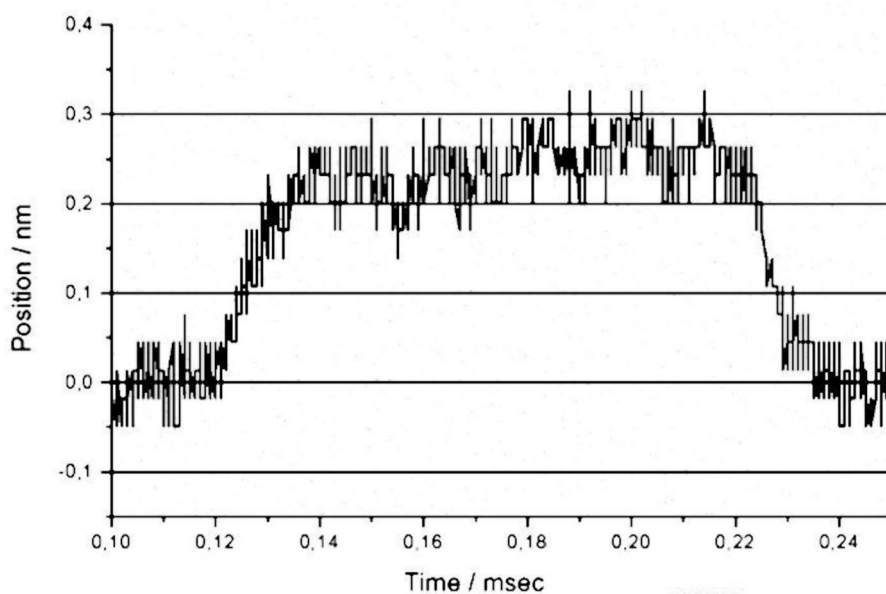
Positioning	Unit	Tolerance	S-303.0L	S-303.0LI	S-303.CD	S-303.CDI
System resolution in Z	nm				0.03	0.03
Resolution in Z, open loop	nm	Typ.	0.03	0.03	0.03	0.03
Bidirectional repeatability in Z, 10% travel range	nm	Typ.	± 1.4	± 1.4	± 1.4	± 1.4
Integrated sensor					Capacitive, direct position measuring	Capacitive, direct position measuring

Drive Properties	Unit	Tolerance	S-303.0L	S-303.0LI	S-303.CD	S-303.CDI
Drive type			Piezo actuator/PICMA®	Piezo actuator/PICMA®	Piezo actuator/PICMA®	Piezo actuator/PICMA®
Operating voltage	V		-20 to 120	-20 to 120	-20 to 120	-20 to 120
Electrical capacitance in Z	μF	±20%	0.9	0.9	0.9	0.9

Mechanical Properties	Unit	Tolerance	S-303.0L	S-303.0LI	S-303.CD	S-303.CDI
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
Stiffness in Z	N/μm	±20%	400	400	400	400
Resonant frequency in Z, unloaded	Hz	±20%	25000	25000	25000	25000
Permissible push force in Z	N	Max.	0.5	0.5	0.5	0.5
Permissible pull force in Z	N	Max.	0.5	0.5	0.5	0.5
Permissible torque in θZ	N·m	Max.	0.1	0.1	0.1	0.1
Overall mass	g		30	30	100	100
Material			Aluminum	Invar	Aluminum	Invar

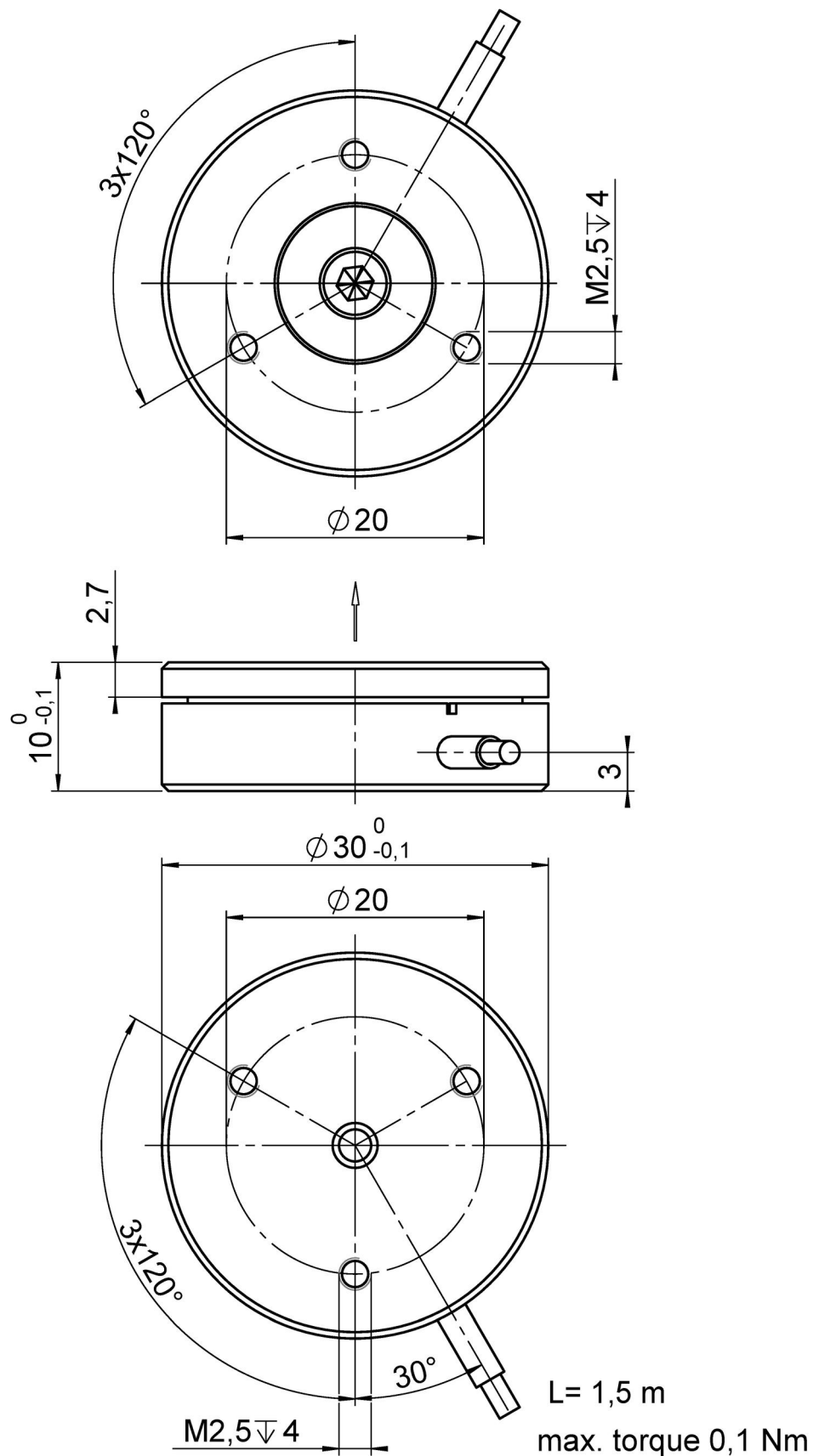
Miscellaneous	Unit		S-303.0L	S-303.0LI	S-303.CD	S-303.CDI
Connector			LEMO FFS.00.250.CTCE24	LEMO FFS.00.250.CTCE24	D-sub 7W2 (m)	D-sub 7W2 (m)
Sensor connector					D-Sub 7W2 (m)	D-Sub 7W2 (m)
Recommended controllers / drivers			E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-709.CHG, E-754	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-709.CHG, E-754	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-709.CHG, E-754	E-503, E-505, E-610, E-621, E-625, E-663, E-665, E-709, E-709.CHG, E-754
Cable length	m		1.5	1.5	1.5	1.5
Operating temperature range	°C		-20 to 80	-20 to 80	-20 to 80	-20 to 80

Drawings / Images



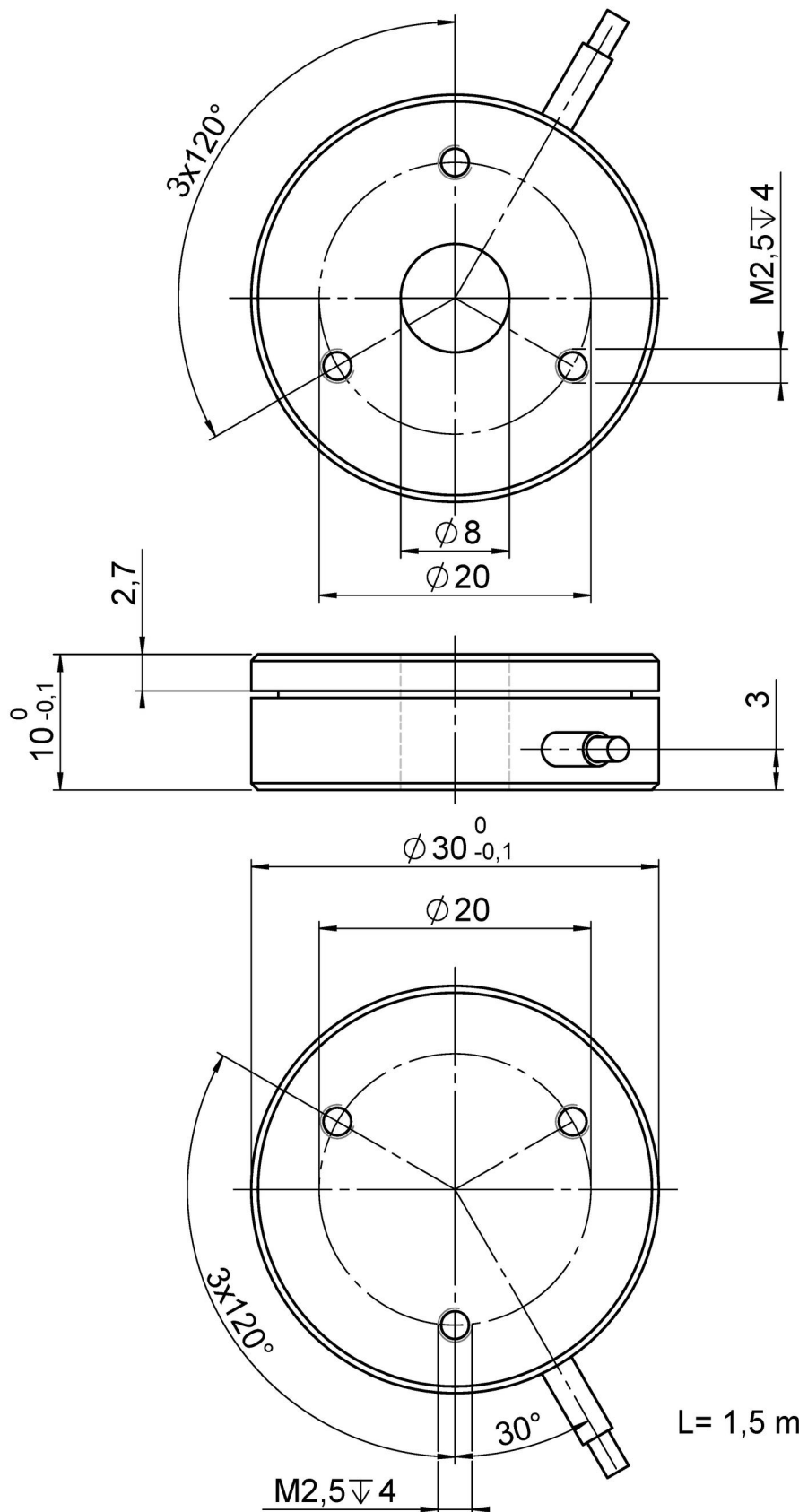
A 250-picometer step (0.25 nm) of the S-303 platform, controlled by an E-503 amplifier module and an E-509.C1A servo controller module. Measured with a special ultrahigh-resolution, capacitive measuring device, ±0.02 nm resolution.

Drawings / Images



S-303.CD / .CDi, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Drawings / Images



S-303.0L / .0Li, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order information

S-303.0L

Piezo phase shifter, 3 μm , without sensor

S-303.0LI

Piezo phase shifter, 3 μm , without sensor, Invar

S-303.CD

Piezo phase shifter, 3 μm , capacitive sensor

S-303.CDI

Piezo phase shifter, 3 μm , capacitive sensor, Invar