PiezoMike Linear Actuator

With Position Sensor for Closed-Loop Operation

N-472

- High stability and holding force 100 N
- Self-locking at rest even when closed-loop control is switched off
- Compact design with integrated incremental encoder
- Feed force 22 N
- Lifetime >1,000,000,000 steps at ambient conditions and >50,000,000 steps under vacuum conditions

Inertia drive
Compact, inexpensive inertia drive principle (stick-slip). At rest, the drive is self-locking, requires no current, and does not generate any heat. It holds the position with maximum force.

Integrated position sensor
An incremental encoder measures the relative motion to a freely definable reference position.

Alignment of mechanical and optomechanical components
Stable alignment of optical paths. Long-term positioning stability: High stability at target position, reliable startup even after longer downtimes. High holding force and resolution by combining piezo actuators with mechanical thread translation. Vacuum-compatible versions to 10^{-6} hPa available.

Motion	Unit	Tolerance	N-472.110	N-472.110Y	N-472.11V	N-472.120	N-472.120Y	N-472.12V
Active axes			X	X	X	X	X	X
Travel range in X	mm		7	7	7	7	7	7
Maximum velocity in X, unloaded	mm/min		2	2	2	2	2	2
Linearity error in X	%	Typ.	0.3	0.3	0.3	0.3	0.3	0.3

Positioning	Unit	Tolerance	N-472.110	N-472.110Y	N-472.11V	N-472.120	N-472.120Y	N-472.12V
Minimum incremental motion in X	nm	Typ.	50	50	50	50	50	50
Unidirectional repeatability in X	nm	Typ.	±200	±200	±200	±200	±200	±200
Integrated sensor			Incremental angle-measuring system	Incremental angle-measuring system	Incremental angle-measuring system	Incremental angle-measuring system	Incremental angle-measuring system	Incremental angle-measuring system
Sensor signal			Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak

Drive Properties	Unit	Tolerance	N-472.110	N-472.110Y	N-472.11V	N-472.120	N-472.120Y	N-472.12V
Drive type			Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive
Operating voltage, peak-to-peak	V		80	80	80	80	80	80
Maximum power consumption	W		5	5	5	5	5	5
Drive force in positive direction of motion in X	N	Max.	22	22	22	22	22	22
Maximum operating frequency during continuous operation	Hz		400	400	200	400	400	200
Short-term maximum operating frequency	Hz		2000	2000	2000	2000	2000	2000

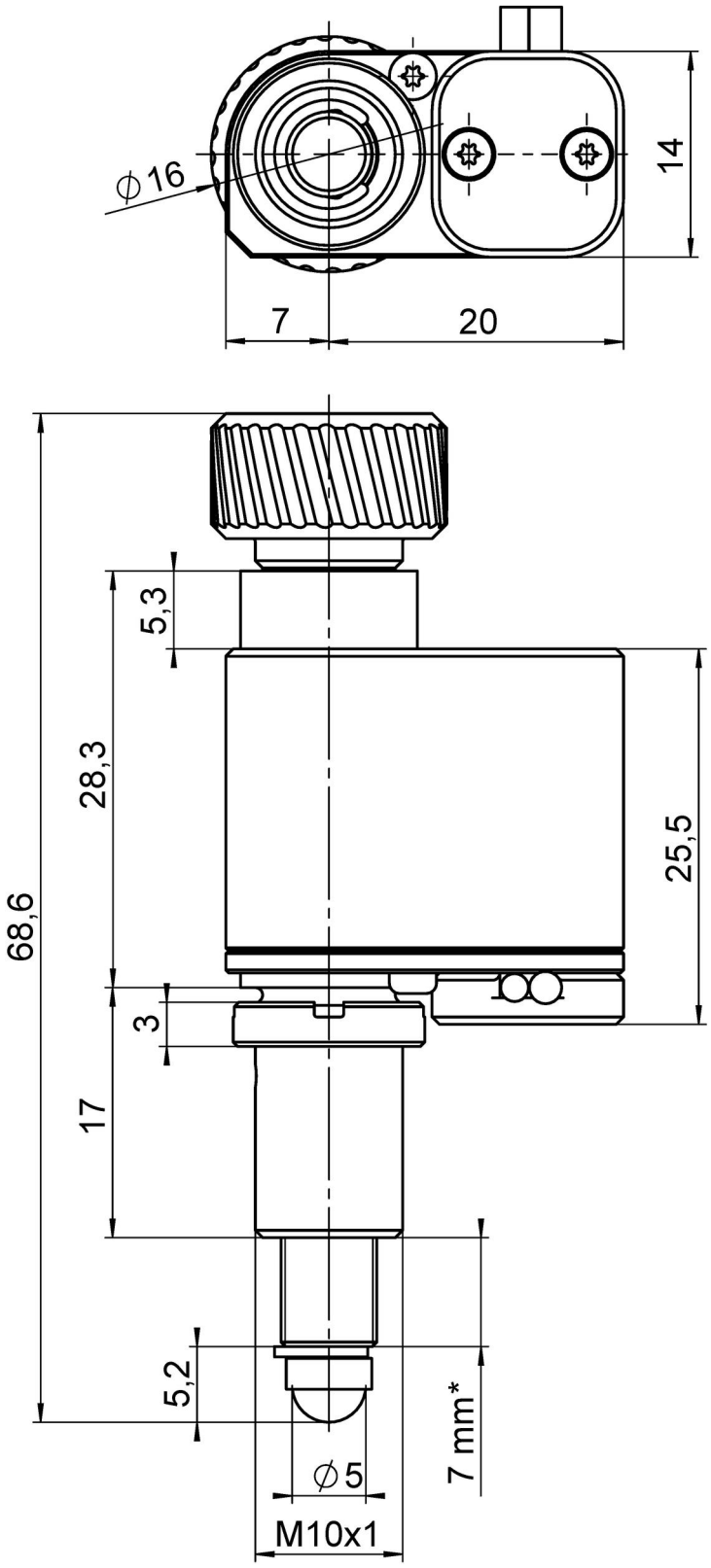
Mechanical Properties	Unit	Tolerance	N-472.110	N-472.110Y	N-472.11V	N-472.120	N-472.120Y	N-472.12V
Holding force in X, passive	N	Min.	100	100	100	100	100	100
Overall mass	g		200	200	250	200	200	250
Material			Screw: stainless steel; housing: aluminum, bronze	Screw: stainless steel; housing: aluminum, bronze	Screw: stainless steel; housing: aluminum, bronze	Screw: stainless steel; housing: aluminum, bronze	Screw: stainless steel; housing: aluminum, bronze	Screw: stainless steel; housing: aluminum, bronze
Mechanical interface			M10×1 mounting thread	M10×1 mounting thread	M10×1 mounting thread	9.5 mm clamping shank	9.5 mm clamping shank	9.5 mm clamping shank

Miscellaneous	Unit		N-472.110	N-472.110Y	N-472.11V	N-472.120	N-472.120Y	N-472.12V
Operating temperature range	°C		10 to 40	10 to 40	10 to 40	10 to 40	10 to 40	10 to 40
Vacuum class	hPa		—	—	10^{-6}	—	—	10^{-6}
Connector			D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)	D-sub 15 (m)
Cable length	m		2	2	1	2	2	1
Recommended controllers / drivers			E-873.1AT	E-873.1AT	E-873.1AT	E-873.1AT	E-873.1AT	E-873.1AT

Maximum velocity not suitable for continuous operation (refer to the user manual).
Linearity error: 20 N preload, measured over the entire stroke, compensated for temperature drift.
Unidirectional repeatability / minimum incremental motion: 20 N preload, measured at 100 µm stroke, compensated for temperature drift.
Cable length of vacuum-compatible models: 1 m connecting cable on the actuator, with stranded wires on the cable end; 2 m separate connecting cable, D-sub 15 (m) to stranded wires.
Ask about customized versions.

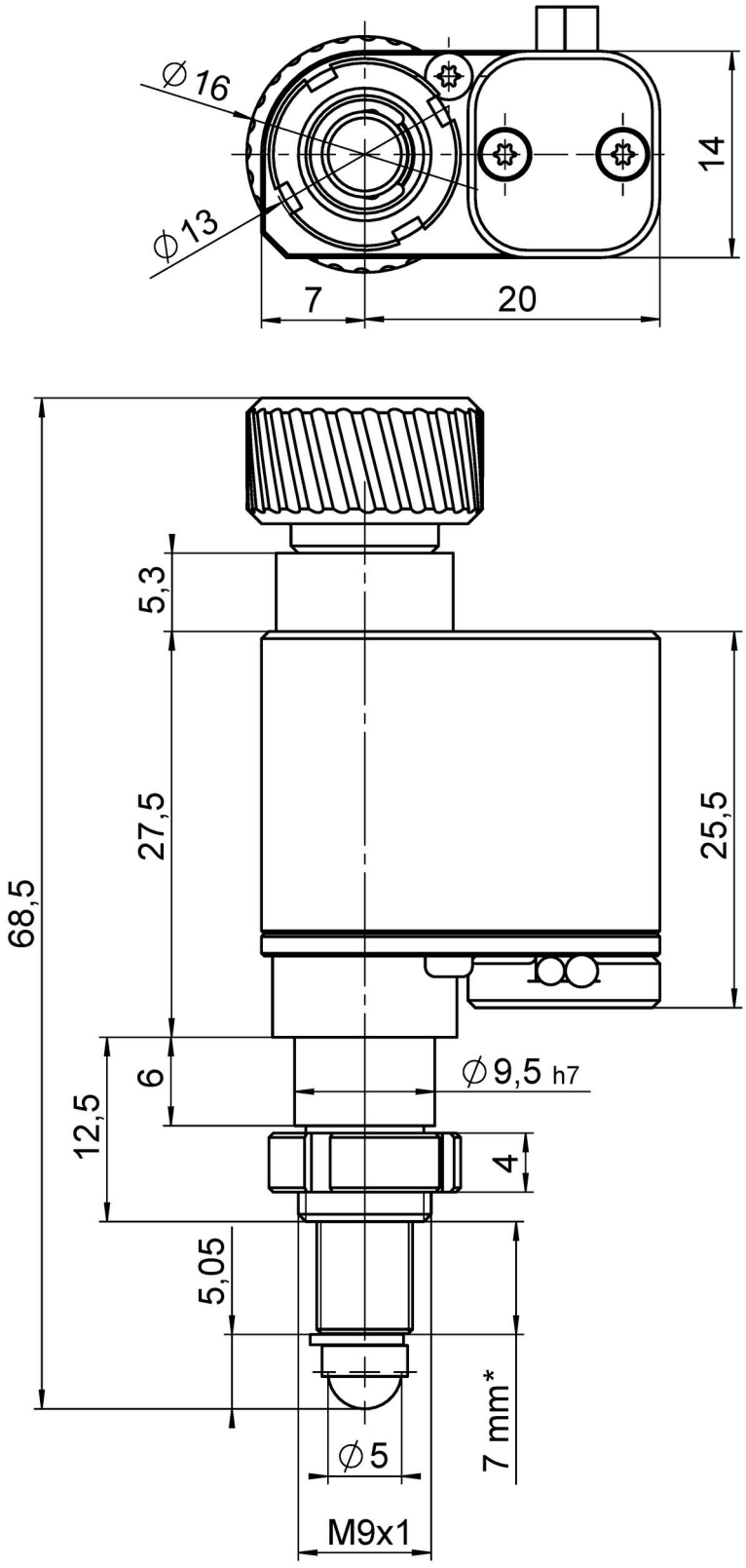
At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images



Models N-472.11x(x) with M10x1 thread, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point. (* travel range)

Drawings / Images



Models N-472.12x(x) with clamping shank, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point. (* travel range)

Order Information

N-472.110
Closed loop PiezoMike linear actuator; piezoelectric inertia drive; 7 mm travel range; M10×1 thread; 22 N feed force; 2 mm/min maximum velocity; 2 m cable length

N-472.110Y
Closed loop PiezoMike linear actuator; piezoelectric inertia drive; 7 mm travel range; M10×1 thread; 22 N feed force; 2 mm/min maximum velocity; 2 m cable length; turned cable exit

N-472.11V
Closed loop PiezoMike linear actuator; piezoelectric inertia drive; 7 mm travel range; M10×1 thread; 22 N feed force; 2 mm/min maximum velocity; vacuum compatible to 10^{-6} hPa; 1 m cable length

N-472.120
Closed loop PiezoMike linear actuator; piezoelectric inertia drive; 7 mm travel range; 9.5 mm (0.375") clamping shank; 22 N feed force; 2 mm/min maximum velocity; 2 m cable length

N-472.120Y
Closed loop PiezoMike linear actuator; piezoelectric inertia drive; 7 mm travel range; 9.5 mm (0.375") clamping shank; 22 N feed force; 2 mm/min maximum velocity; 2 m cable length; turned cable exit

N-472.12V
Closed loop PiezoMike linear actuator; piezoelectric inertia drive; 7 mm travel range; 9.5 mm (0.375") clamping shank; 22 N feed force; 2 mm/min maximum velocity; vacuum compatible to 10^{-6} hPa; 1 m cable length