

PILine® Linear Stage

Compact Linear Stage with Ultrasonic Piezo Motor



U-523

- Fast positioning
- Space-saving and light
- High guiding accuracy
- High sensor resolution of 10 nm
- Self-locking, no heat generation at rest
- Low-noise operation

Precision-class linear positioning stage

PILine® stages are particularly suitable for applications that require fast precision positioning. When switched off, the self-locking drive holds the position of the stage mechanically stable. Energy consumption and heat generation are therefore considerably reduced. Applications with a low duty cycle that are battery-powered or heat-sensitive benefit from these characteristics. The position of the axis is measured by an encoder and an optical reference switch allows reliable repeatable motion. The piezomotor drive principle and its electrical operation are inexpensive and can be customized.

PILine® ultrasonic piezomotor

An integral part of a PILine® ultrasonic piezomotor is a piezo actuator that is preloaded against a movable, guided runner via a coupling element. The piezoceramic actuator is excited to ultrasonic oscillation by a high-frequency AC voltage between 100 and 200 kHz. Deformation of the actuator leads to periodic diagonal motion of the coupling element relative to the runner. The feed created is a few nanometers per cycle; the high frequencies lead to the high velocities. Preloading the piezoceramic actuator against the runner ensures self-locking of the drive when at rest and switched off.

Highly accurate position measuring with incremental encoder

Noncontact optical encoders measure the position directly at the platform with the greatest accuracy. Nonlinearity, mechanical play or elastic deformation have no influence on the measurement.

Fields of application

Micromanipulation, automation, biotechnology, sample manipulation, sample positioning, applications with limited space, vacuum applications to 10^{-6} hPa (optional).

Specifications

Motion	U-523.25	Unit	Tolerance
Active axis	x		
Travel range	22	mm	
Velocity, closed-loop	200	mm/s	max.
Bidirectional repeatability	±0,2	µm	
Pitch	±60	µrad	max.
Yaw	±300	µrad	max.

Mechanical properties	U-523.25	Unit	Tolerance
Load capacity in z	5	N	max.
Mass without cable	70	g	
Linear guide	Crossed roller bearing with anti-creep system		

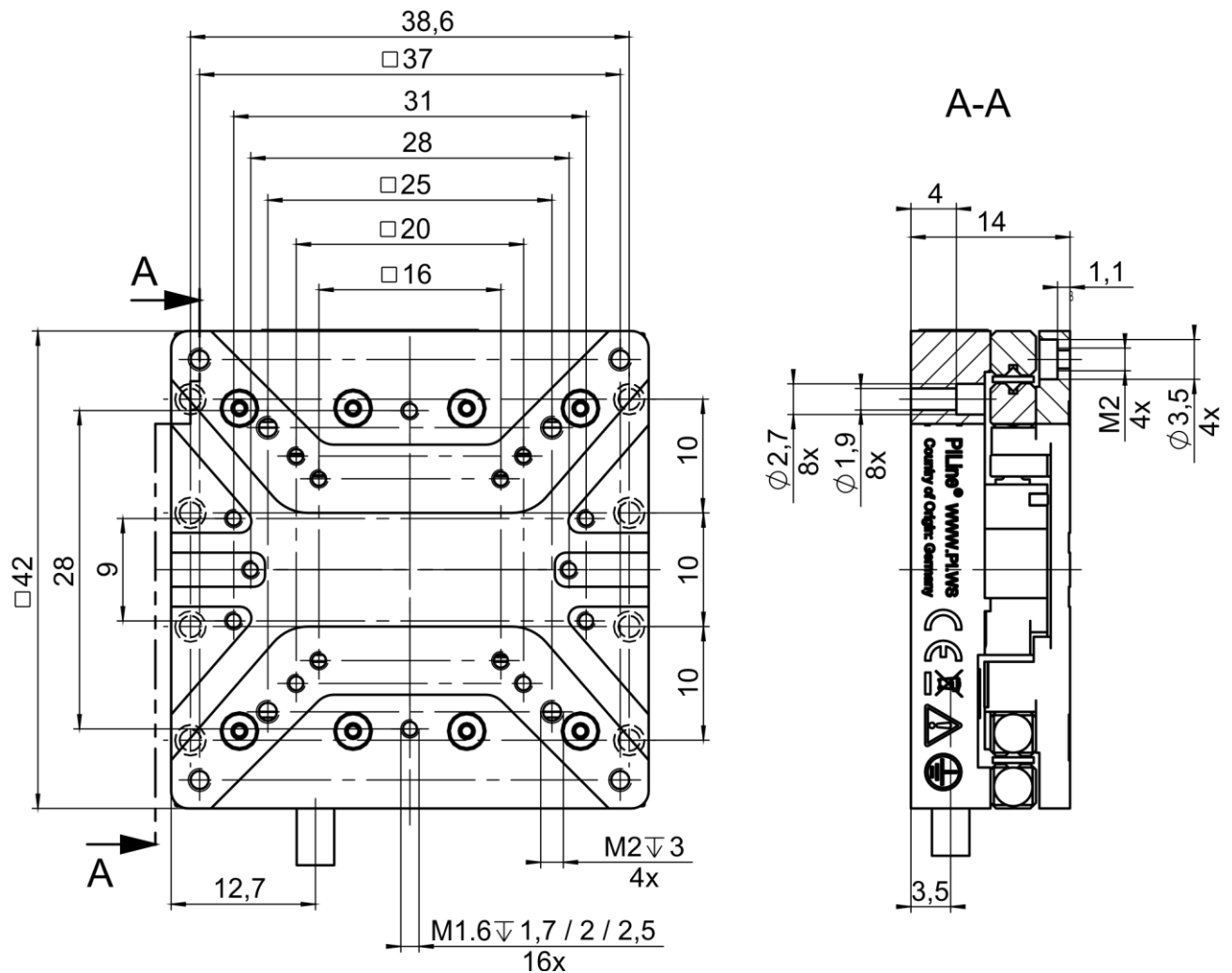
Drive properties	U-523.25	Unit	Tolerance
Drive type	PILine® ultrasonic piezo motor, performance class 1		
Nominal force	2	N	typ.
Holding force	2	N	typ.

Positioning	U-523.25	Unit	Tolerance
Integrated sensor	Optical, incremental sensor, sin/cos signal		
Sensor resolution	10	nm	
Minimum incremental motion	0.1	µm	typ.
Reference point switch	Direction-sensing optical reference point switch		

Miscellaneous	U-523.25	Unit	Tolerance
Operating temperature range	0 to 40	°C	
Humidity	20 – 90% rel., not condensing		
Material	Aluminum, anodized		
Motor / sensor connection	Sub-D 15 (m)		
Cable length	1.5	m	
Recommended electronics	C-867.1U		

Technical data specified at room temperature (22±3 °C) with C-867.1U.
Ask about customized versions.

Drawings / Images



U-523, Dimensions in mm

Ordering Information

U-523.25

PILine® linear stage, compact design, 22 mm travel range, 2 N drive force, 10 nm sensor resolution

Accessories

U-600.A01

Extension cable for PILine®, Sub-D 15-pin, 1 m

U-600.A03

Extension cable for PILine®, Sub-D 15-pin, 3 m

U-600.A05

Extension cable for PILine®, Sub-D 15-pin, 5 m