

U-751.24 XY Stage with Piezomotors

Low-profile and fast, direct position measurement



- Compact design: Only 32 mm in height, no lead screw ducts or flanged motors
- Direct-measuring linear encoder with 100 nm resolution
- Self-locking, no heat generation at rest, no servo jitter
- Clear aperture 78 mm × 78 mm (at maximum displacement 65 mm × 65 mm)
- Noncontact limit and reference point switches

Precision-class XY 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 is inexpensive and can be customized.

PILine® ultrasonic piezomotors

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.

Direct position measurement with incremental encoder

Noncontact optical encoders measure the actual position directly at the motion platform with the greatest accuracy so that nonlinearity, mechanical play or elastic deformation have no influence on position measuring.

Crossed roller bearings

With crossed roller bearings, the point contact of the balls in ball bearings is replaced by a line contact of the hardened rollers. Consequently, they are considerably stiffer and need less preload, which reduces friction and allows smoother running. Crossed roller bearings are also distinguished by high guiding accuracy and load capacity. Forced guiding of the rolling body cages prevents the roller bearings from creeping.

U-751.24 Datasheet



Preliminary version, 8/4/2016

Valid patents

US patent no. 6,765,335B2
European patent no. 1267425B1

Fields of application

Research and industry. For microscopy, biotechnology, laboratory automation. Special versions for standard light microscopes available on request.

Related products

P-561 • P-562 • P-563 PIMars nanopositioning stage
P-541.2 • P-542.2 piezo XY stage
P-541.Z vertical nanopositioner
M-687 PLine® XY stage system with controller and joystick

Specifications of the U-751.24

	U-751.24	Unit	Tolerance
Motion and positioning			
Active axes	x, y		
Travel range	25 mm × 25 mm		
Velocity, closed-loop	100	mm/s	max.
Minimum incremental motion	0.3	μm	typ.
System resolution	0.1	μm	typ.
Bidirectional repeatability	±0.3	μm	
Pitch	±50	μrad	typ.
Yaw	±50	μrad	typ.
Sensor			
Sensor type	Incremental, optical, direct measuring		
Sensor resolution	0.1	μm	typ.
Mechanical properties			
Load capacity*	50	N	max.
Holding force, passive	6	N	max.
Drive properties			
Motor type	PLine® ultrasonic piezomotor, performance class 2		
Drive force	7	N	max.
Connectors			
Motor / sensor	2 × Sub-D, 15-pin (m)		
Miscellaneous			
Reference point switches	Optical		
Limit switches	Hall effect		
Operating temperature range	-20 to 50	°C	
Material	Al (black anodized)		
Mass	1.8	kg	±5 %
Cable length	1.5	m	±10 mm

* At max. velocity 10 N.

Ask about custom designs!

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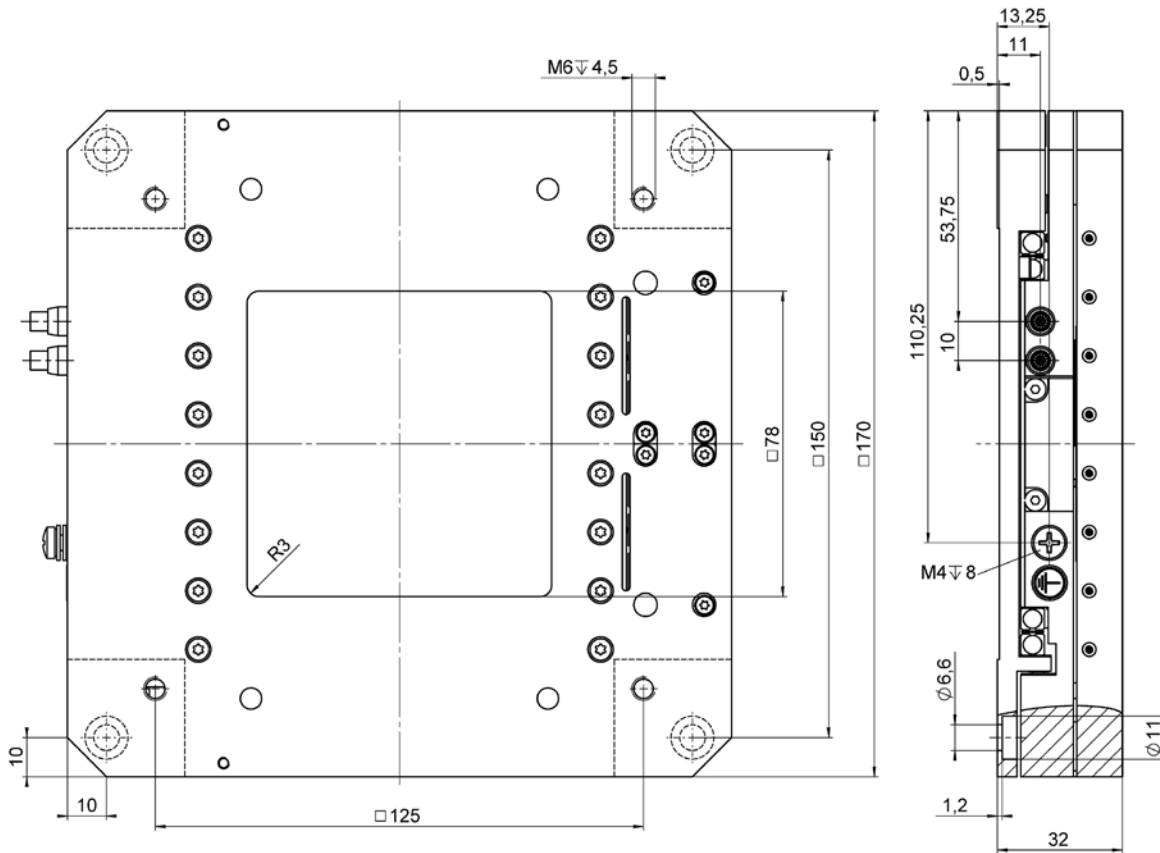


Figure 1: U-751, dimensions in mm. Clear aperture 78 mm x 78 mm (at maximum displacement 65 mm x 65 mm).

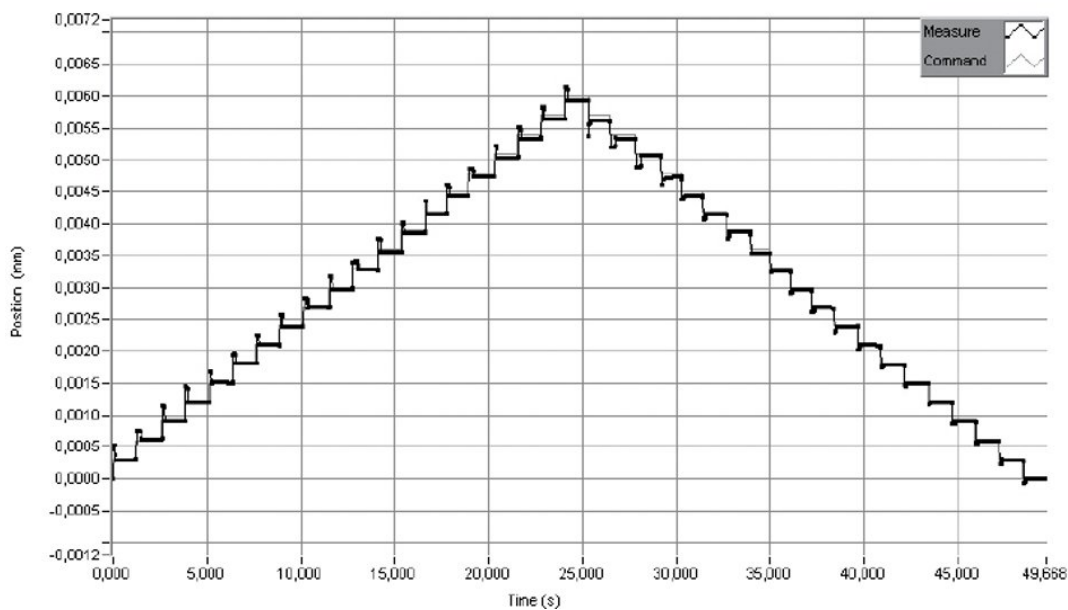


Figure 2: Series of 0.3 μm steps with the U-751

U-751.24

XY stage with PLine® piezomotors, 25 mm x 25 mm travel range, 7 N drive force, 0.1 μm resolution

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