XY Stage with Piezomotors

Low-Profile and Fast, Direct Position Measurement

U-751.24

- 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 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 are 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.

Highly accurate position measuring with incremental linear 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.

Crossed roller guide
With crossed roller guides, the point contact of the balls in ball guides is replaced by line contact of the hardened rollers. Consequently, they are considerably stiffer and need less preload, which reduces friction and allows smoother running. Crossed roller guides are also distinguished by high guiding accuracy and load capacity. Force-guided rolling element cages prevent cage creep.

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

Motion	Unit	Toleran-ce	U-751.24
Active axes			X, Y
Travel range in X	mm		25
Travel range in Y	mm		25
Maximum velocity in X	mm/s		100
Maximum velocity in Y	mm/s		100
Pitch (Rotational crosstalk in θX with motion in Y)	µrad	Typ.	±50
Pitch (Rotational crosstalk in θY with motion in X)	µrad	Typ.	±50
Roll (Rotational crosstalk in θY with motion in Y)	µrad	Typ.	±50
Yaw (Rotational crosstalk in θZ with motion in X)	µrad	Typ.	±50
Yaw (Rotational crosstalk in θZ with motion in Y)	µrad	Typ.	±50

Positioning	Unit	Toleran-ce	U-751.24
Integrated sensor			Incremental linear encoder
Bidirectional repeatability in X	µm	Typ.	±0.3
Bidirectional repeatability in Y	µm	Typ.	±0.3
Minimum incremental motion in X	µm	Typ.	0.075
Minimum incremental motion in Y	µm	Typ.	0.075
Sensor resolution	µm		0.1
Reference switch			Optical
Limit switches			Hall effect

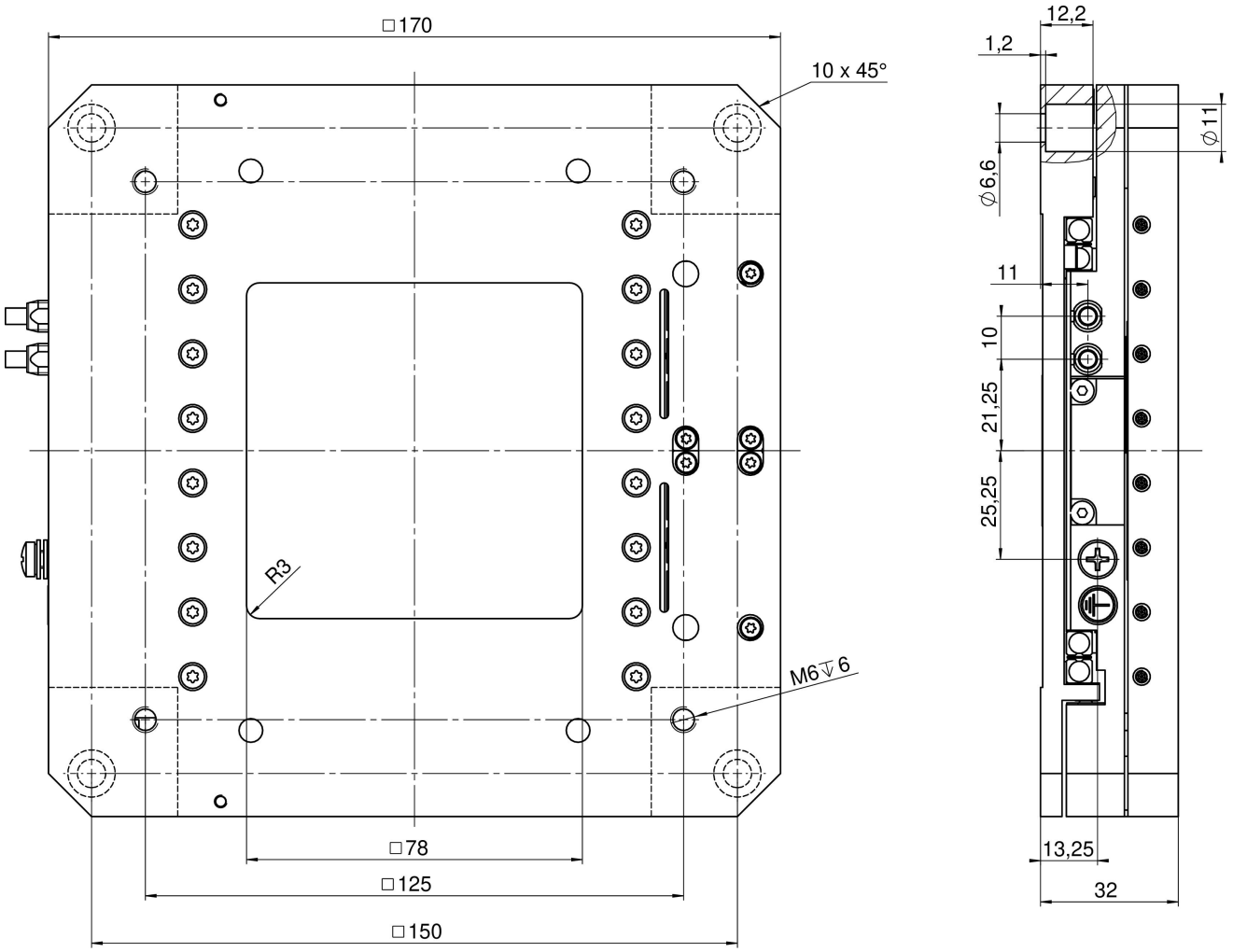
Drive Properties	Unit	Toleran-ce	U-751.24
Drive type			PILine® piezo motor, performance class 2
Drive force in X	N	Typ.	7
Antriebskraft in X	N	Typ.	7

Mechanical Properties	Unit	Toleran-ce	U-751.24
Guide			Crossed roller guide
Holding force in X, passive	N	Min.	6
Holding force in Y, passive	N	Min.	6
Permissible push force in Z	N	Max.	50
Overall mass	g		1800
Material			Aluminum, black anodized

Miscellaneous	Unit		U-751.24
Operating temperature range	°C		0 to 40
Connector			2 × D-sub 15-pin (m)
Cable length	m		1.5
Recommended controllers / drivers			C-867.2U2, C-867.10C885

Permissible push force in Z: At max. velocity 10 N.
Ask about customized versions.

Drawings / Images



U-751.24, dimensions in mm. Clear aperture 78 mm × 78 mm (at maximum displacement 65 mm × 65 mm). Note that a comma is used in the drawings instead of a decimal point.

Order Information

U-751.24
PILine® XY stage; PILine® piezo motor, performance class 2; 25 mm × 25 mm travel range (X × Y); 50 N load capacity; 100 mm/s × 100 mm/s maximum velocity; incremental linear encoder, 0.1 µm sensor resolution; 1.5 m cable length