

N-765 Precision Z Stage

NEXACT® Piezo Stepping Drive with Subnanometer Encoder Resolution



- Direct measurement with PIONe incremental encoder, 0.5 nm resolution
- Min. incremental motion 1 nm
- Travel range 6.5 mm
- Load capacity to 25 N
- Can be mounted directly on an N-565 linear positioner

NEXACT® reference-class linear positioner

Linear positioner with NEXACT® PiezoWalk® drives allow high-precision positioning in the nanometer range over long travel ranges. They are equipped with direct-measuring linear encoders and crossed roller bearings for the highest accuracy. Due to their compact and flat design, easy mechanical integration of the positioners is possible. Only low voltages are required for operation.

PiezoWalk® technology: High resolution and low wear

The PiezoWalk® technology combines the technological advantages of piezo actuators with those of piezomotors. PiezoWalk® stepping drives offer not only subnanometer resolution, high forces, and high stiffness but, based on their drive principle, allow theoretically unlimited travel ranges. In contrast to other piezo-motorized drive principles, PiezoWalk® stepping drives are not subject to sliding friction effects. They are based on stiction contacts of several piezo actuators that step along a runner. For feed forward, the actuators are lifted physically from the runner, which causes hardly any wear and abrasion. Preloading the actuators against the runner ensures self-locking of the stepping drive. Therefore, the stepping drive holds the position at rest and mechanically stable when switched off (no servo jitter). Due to the self-locking at rest, no energy is consumed and no heat is generated.

Direct position measuring with PIONe linear encoder

The high-resolution PIONe encoder was developed by PI and, with corresponding processing of the measured value, allows a position resolution of much less than one nanometer. The optical and noncontact PIONe encoders are based on an interferometric measuring principle. They measure the actual position directly at the motion platform with the highest accuracy so that nonlinearity, mechanical play or elastic deformation have no influence on position measuring. Due to the short signal period of 0.5 μm and the high quality of the signals, the linearity error of PIONe encoders is less than 1 %. PIONe encoders support direction sensing when evaluating a reference signal.

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.

Valid patents

In the technological field of piezo stepping drives (NEXACT®, NEXLINE®), PI has the following patents and patent applications:

DE10148267B4, EP1267478B1, EP2209202B1, EP2209203B1, US6800984B2

Fields of application

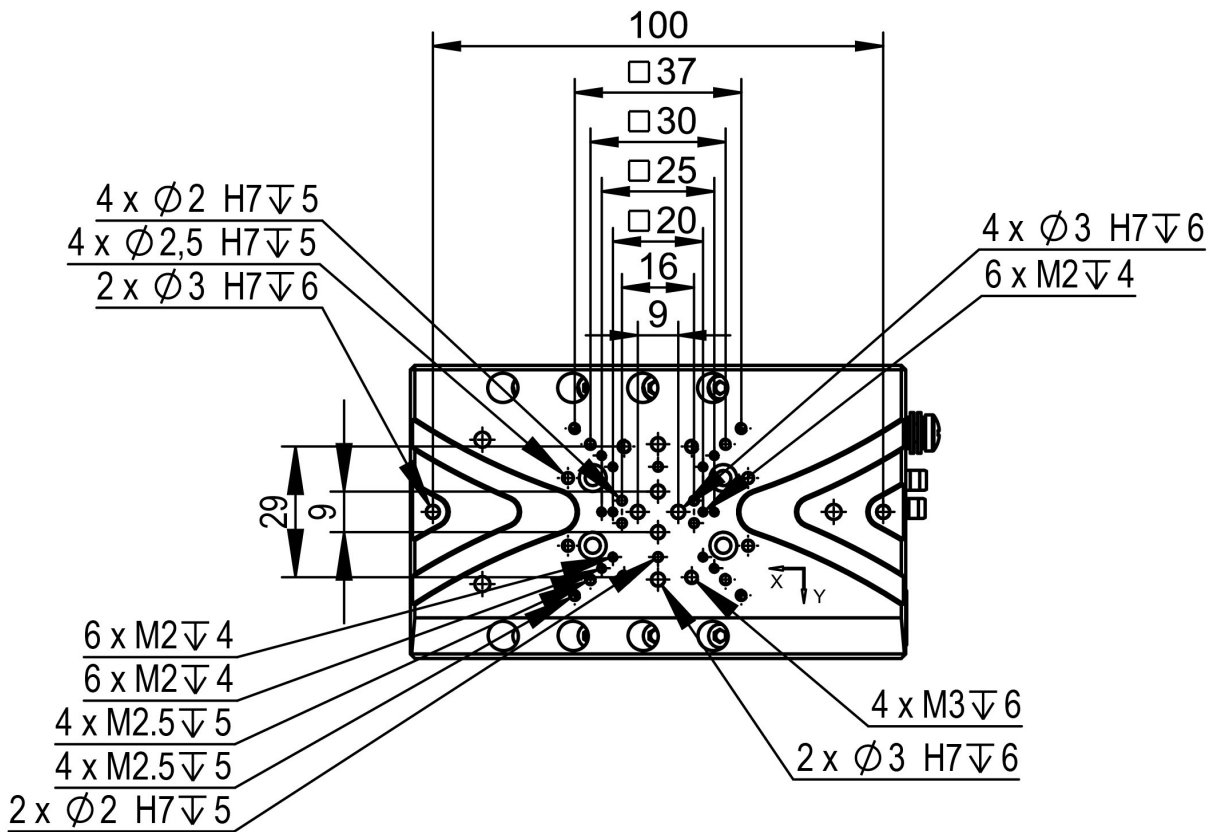
Sample manipulation, sample positioning, optics or mechanical components with high precision and stability, precision mechanics in the semiconductor industry, micromanipulation, microscopy, automation, applications in confined spaces, applications in a vacuum or nonmagnetic environments

Specifications

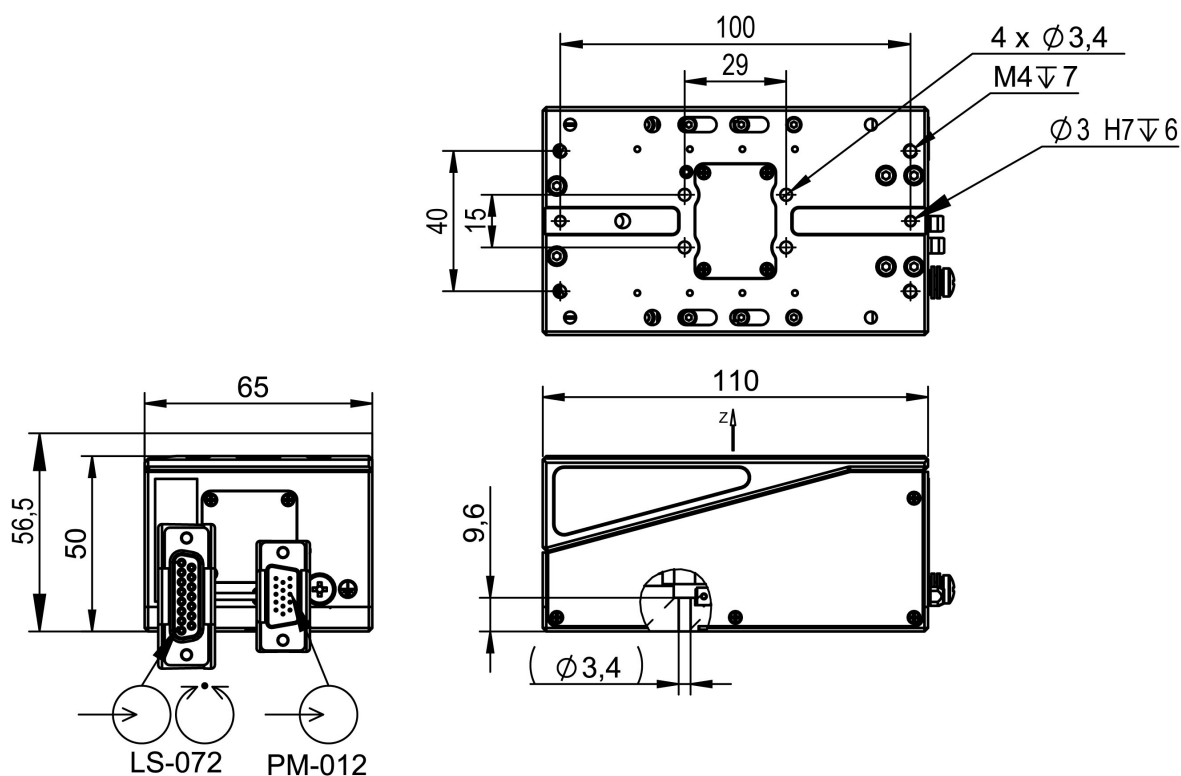
	N-765.060	Unit	Tolerance
Motion and positioning			
Active axes	Z		
Travel range	6.5	mm	
System resolution	0.5	nm	
Integrated sensor	PIONe linear encoder: Incremental, optical, direct measuring		
Sensor resolution	0.5	nm	
Minimum incremental motion	1	nm	typ.
Velocity, closed-loop	2.5	mm/s	max.
Unidirectional repeatability	6	nm	typ.
Bidirectional repeatability	7	nm	typ.
Linear crosstalk on X with motion on Z	1.8	μm	typ.
Linear crosstalk on Y with motion on Z	2	μm	typ.
Rotational crosstalk on θ_x with motion on Z	25	μrad	typ.

Rotational crosstalk on θ_y with motion on Z	41	μrad	typ.
Rotational crosstalk on θ_z with motion on Z	34	μrad	typ.
Mechanical Properties			
Load capacity	25	N	max.
Drive properties			
Motor type	NEXACT® piezo stepping drive		
Drive force	20	N	max.
Holding force (passive)	25	N	max.
Operating voltage	-10 to 45	V	
Miscellaneous			
Operating temperature range	10 to 50 °C		
Mass	920	g	±5 %
Material	Aluminum, black anodized		
Cable length	3	m	±10 mm
Connection	HD Sub-D 15 (m)		
Sensor connection	Sub-D 15 (f)		
Recommended controller/driver	E-861.1A1, E-712		

Zeichnungen und Bilder



N-765.060, dimensions in mm



N-765.060, dimensions in mm

Ordering Information

N-765.060

Precision Z Stage, 6.5 mm Travel Range, PIOne Linear Encoder, 0.5 nm Resolution, 25 N Push/Pull Force, Dimensions 65 × 110 × 56 mm (W × L × H), Piezoelectric Stepping Drive NEXACT®

Ask about custom designs!