

Linear Positioner with the Highest Precision

NEXACT® PIEZO STEPPING DRIVE WITH SUBNANOMETER ENCODER RESOLUTION



N-565

- + Ultraprecision: 2 nm minimum incremental motion and direct- measuring PIOne encoder with 0.5 nm resolution
- + Long travel ranges: 13 mm, 26 mm or 52 mm
- + Self- locking when switched off: Saves energy and reduces generation of heat
- + Long lifetime and high reliability due to PiezoWalk® technology
- + Compact design: 65 mm width, 20 mm height

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, DE4408618B4

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-565.160 | N-565.260 | N-565.360 | Unit | Tolerance |
|---------------------------------------|------------------------------|------------------------------|------------------------------|------|-----------|
| Motion and Positioning | | | | | |
| Active axes | x | x | x | | |
| Travel range | 13 | 26 | 52 | mm | |
| Velocity, closed-loop | 10 | 10 | 10 | mm/s | max. |
| Minimum incremental motion | 2 | 2 | 2 | nm | |
| System resolution | 0.5 | 0.5 | 0.5 | nm | |
| Bidirectional repeatability | 12 | 12 | 12 | nm | typ. |
| Unidirectional repeatability | ±5 | ±5 | ±5 | nm | typ. |
| Straightness / flatness | ±1 | ±1 | ±1.5 | µm | typ. |
| Pitch | ±30 | ±40 | ±80 | µrad | typ. |
| Yaw | ±30 | ±30 | ±30 | µrad | typ. |
| Sensor | | | | | |
| Sensor type | PIOne linear encoder | PIOne linear encoder | PIOne linear encoder | | |
| Measurement principle | Optical | Optical | Optical | | |
| Measuring method | Direct measuring | Direct measuring | Direct measuring | | |
| Sensor resolution | 0.5 | 0.5 | 0.5 | nm | |
| Mechanical Load Capacity | | | | | |
| Push force capacity | 20 | 20 | 20 | N | max. |
| Holding force (passive) | 10 | 10 | 10 | N | min. |
| Drive Properties | | | | | |
| Motor type | NEXACT® piezo stepping drive | NEXACT® piezo stepping drive | NEXACT® piezo stepping drive | | |
| Drive force | 10 | 10 | 10 | N | max. |
| Holding force | 10 | 10 | 10 | N | min. |
| Connectors | | | | | |
| Motor | 1 × HD Sub- D, 15- pin, m. | 1 × HD Sub- D, 15- pin, m. | 1 × HD Sub- D, 15- pin, m. | | |
| Sensor | 1 × Sub- D, 15- pin, f. | 1 × Sub- D, 15- pin, f. | 1 × Sub- D, 15- pin, f. | | |
| Miscellaneous | | | | | |
| Reference point switch | Optical | Optical | Optical | | |
| Operating temperature | 10 to 50 | 10 to 50 | 10 to 50 | °C | |
| Operating voltage | -10 to 45 | -10 to 45 | -10 to 45 | V | |
| Material | Aluminum, black anodized | Aluminum, black anodized | Aluminum, black anodized | | |
| Mass (stage with cable and connector) | 0.3 | 0.4 | 0.6 | kg | ±5 % |
| Dimensions | 65 × 80 × 20 | 65 × 110 × 20 | 65 × 160 × 20 | mm | |
| Cable length | 3 | 3 | 3 | m | ±10 mm |

The N-565 stage series replaces the LPS-65 series.

Order Information

N-565.160

Precision Linear Positioning Stage, 13 mm Travel Range, PIOne Linear Encoder, 0.5 nm Resolution, 10 N Drive Force, Dimensions 65 × 80 × 20 mm (W × L × H), NEXACT® Piezoelectric Stepping Drive

N-565.260

Precision Linear Positioning Stage, 26 mm Travel Range, PIOne Linear Encoder, 0.5 nm Resolution, 10 N Drive Force, Dimensions 65 × 110 × 20 mm (W × L × H), NEXACT® Piezoelectric Stepping Drive

N-565.360

Precision Linear Positioning Stage, 52 mm Travel Range, PIOne Linear Encoder, 0.5 nm Resolution, 10 N Drive Force, Dimensions 65 × 160 × 20 mm (W × L × H), NEXACT® Piezoelectric Stepping Drive

Ask about custom designs!

Controllers / Drivers / Amplifiers

[E-861 PiezoWalk® NEXACT® Controller / Driver](#)

[E-861.10C885 NEXACT® Controller Module](#)

Related Products

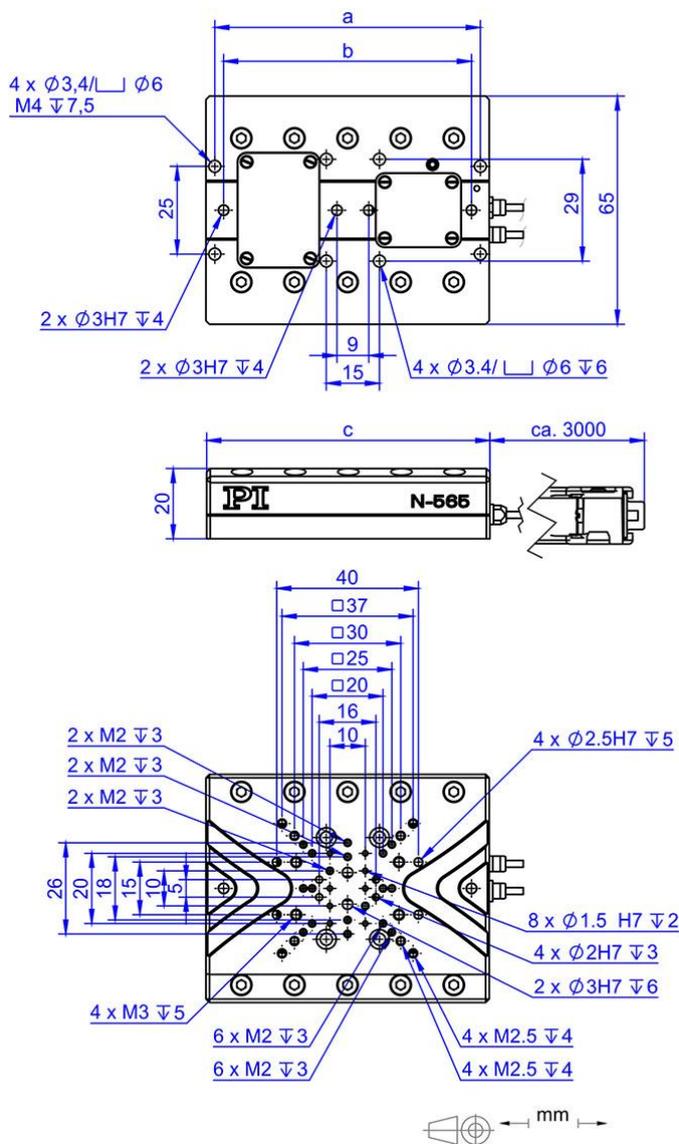
[LPS-24 Miniature Positioning Stage](#)

[Q-545 Q- Motion® Precision Linear Stage](#)

Technology

[PiezoWalk® Piezo Stepping Drives](#) | PiezoWalk® drives were developed more than 10 years ago for the semiconductor industry, a demanding industry when it comes to reliability, position resolution and long-term stability. [Learn more ...](#)

Drawings / Images



N-565, dimensions in mm

N-565.160: a=75;

b=70; c=80

N-565.260: a=100;

b=100; c=110

N-565.360: a=150;

b=150; c=160