

High Dynamics Piezo Nanopositioning System

1 Axis with Large Aperture



P-630

- Resonant frequency to 3.25 kHz
- Travel ranges to 80 μm
- Narrow and flat design
- Clear aperture with 30 mm diameter

Fields of application

- Optical alignment
- Microscopy
- Biotechnology
- Photonics
- Fiber positioning

Outstanding lifetime thanks to PICMA[®] piezo actuators

The patented PICMA[®] piezo actuators are all-ceramic insulated. This protects them against humidity and failure resulting from an increase in leakage current. PICMA[®] actuators offer an up to ten times longer lifetime than conventional polymer-insulated actuators. 100 billion cycles without a single failure are proven.

Subnanometer resolution with capacitive sensors

Capacitive sensors measure with subnanometer resolution without contacting. They guarantee excellent linearity of motion, long-term stability, and a bandwidth in the kHz range.

High guiding accuracy due to zero-play flexure guides

Flexure guides are free of maintenance, friction, and wear, and do not require lubrication. Their stiffness allows high load capacity and they are insensitive to shock and vibration. They are 100 % vacuum compatible and work in a wide temperature range.

Automatic configuration and fast component exchange

Mechanics and controllers can be combined as required and exchanged quickly. All servo and linearization parameters are stored in the ID chip of the Sub-D connector of the mechanics. The autocalibration function of the digital controllers uses this data each time the controller is switched on.

Maximum accuracy due to direct position measuring

Motion is measured directly at the motion platform without any influence from the drive or guide elements. This allows optimum repeatability, outstanding stability, and stiff, fast-responding control.

Suitable for sophisticated vacuum applications

All components used in the piezo systems are excellently suited for use in vacuum. No lubricant or grease is necessary for operating. Polymer-free piezo systems allow particularly low outgas rates.

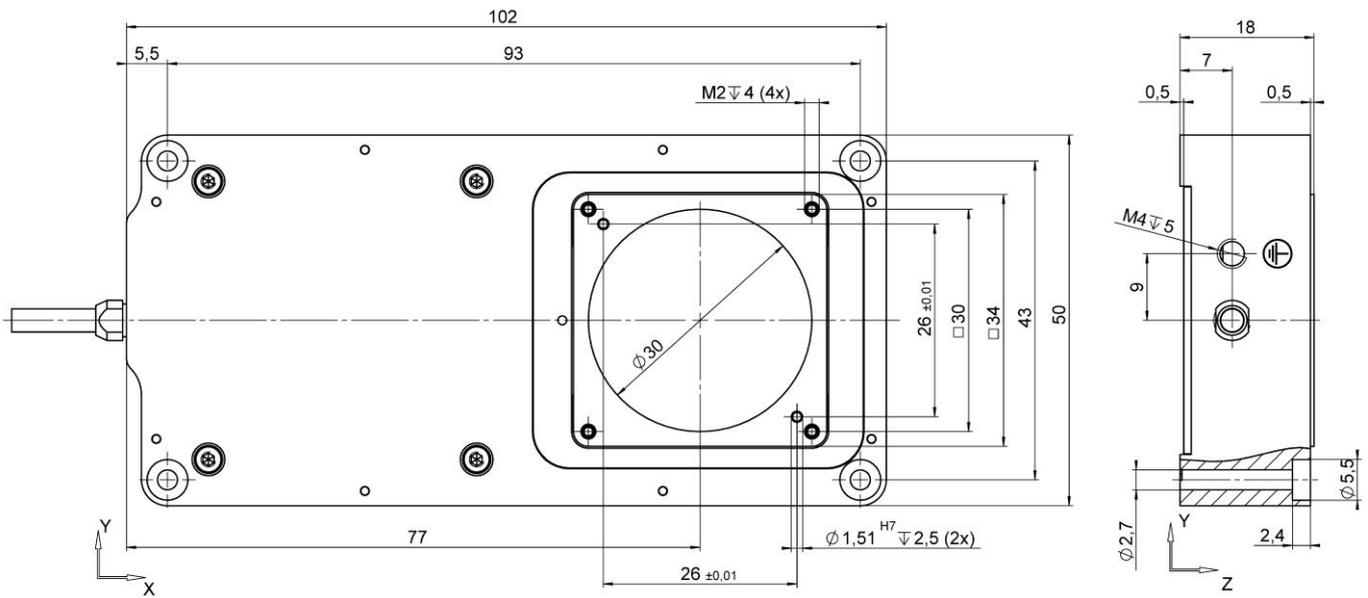
Specifications

| | P-630.XCD | P-631.XCD | Unit |
|--|-------------------------|-------------------------|--------|
| Active axes | X | X | |
| Motion and positioning | | | |
| Integrated sensor | Capacitive | Capacitive | |
| Travel range at -20 to 120 V, open loop | 45 | 90 | μm |
| Travel range, closed loop | 40 | 80 | μm |
| Resolution, open loop | 0.1 | 0.1 | nm |
| Resolution, closed loop | 0.2 | 0.2 | nm |
| Linearity error, closed loop | 0.02 | 0.02 | % |
| Repeatability over the entire travel range | ±2 | ±3 | nm |
| Pitch / yaw | ±5 | ±5 | μrad |
| Straightness / flatness | 50 | 50 | nm |
| Mechanical properties | | | |
| Stiffness in motion direction | 5.5 | 5 | N / μm |
| Resonant frequency, no load | 3250 | 2850 | Hz |
| Resonant frequency, under load, 60 g | 1600 | 1200 | Hz |
| Push/pull force capacity in motion direction | 10 | 10 | N |
| Load capacity | 10 | 10 | N |
| Drive properties | | | |
| Piezo ceramic | PICMA® P-887 | PICMA® P-885; P-887 | |
| Electrical capacitance | 6.4 | 12.6 | μF |
| Miscellaneous | | | |
| Operating temperature range | 0 to 40 | 0 to 40 | °C |
| Material | Aluminum | Aluminum | |
| Dimensions | 102 mm × 50 mm × 18 mm | 102 mm × 50 mm × 18 mm | |
| Mass | 300 | 320 | g |
| Cable length | 1.5 | 1.5 | m |
| Sensor/voltage connection | Sub-D 7W2 (m) | Sub-D 7W2 (m) | |
| Recommended electronics | E-709, E-709.CHG, E-754 | E-709, E-709.CHG, E-754 | |

The resolution of the system is limited only by the noise of the amplifier and the measuring technology because PI piezo nanopositioning systems are free of friction.

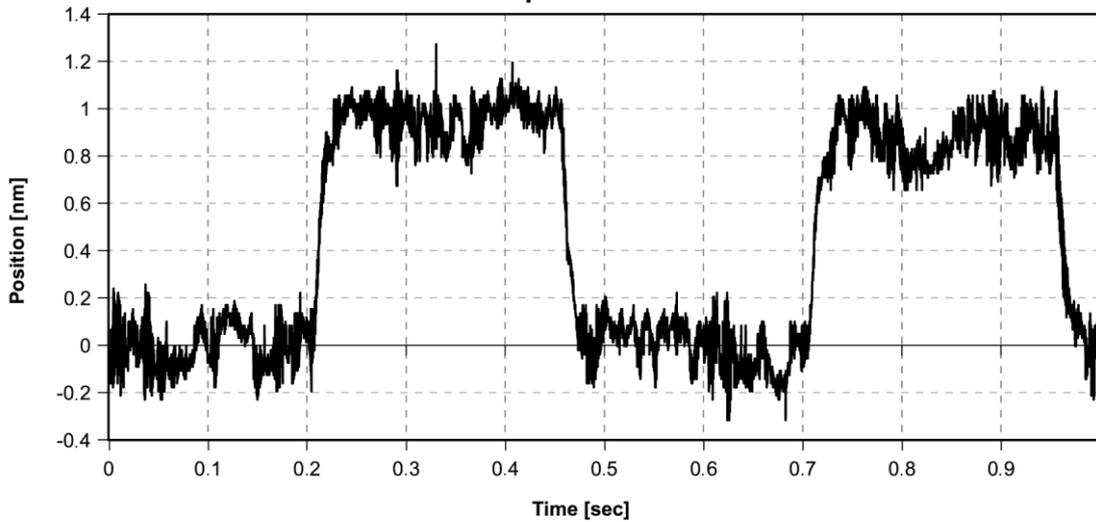
All specifications based on room temperature (22 °C ±3 °C).

Drawings / Images

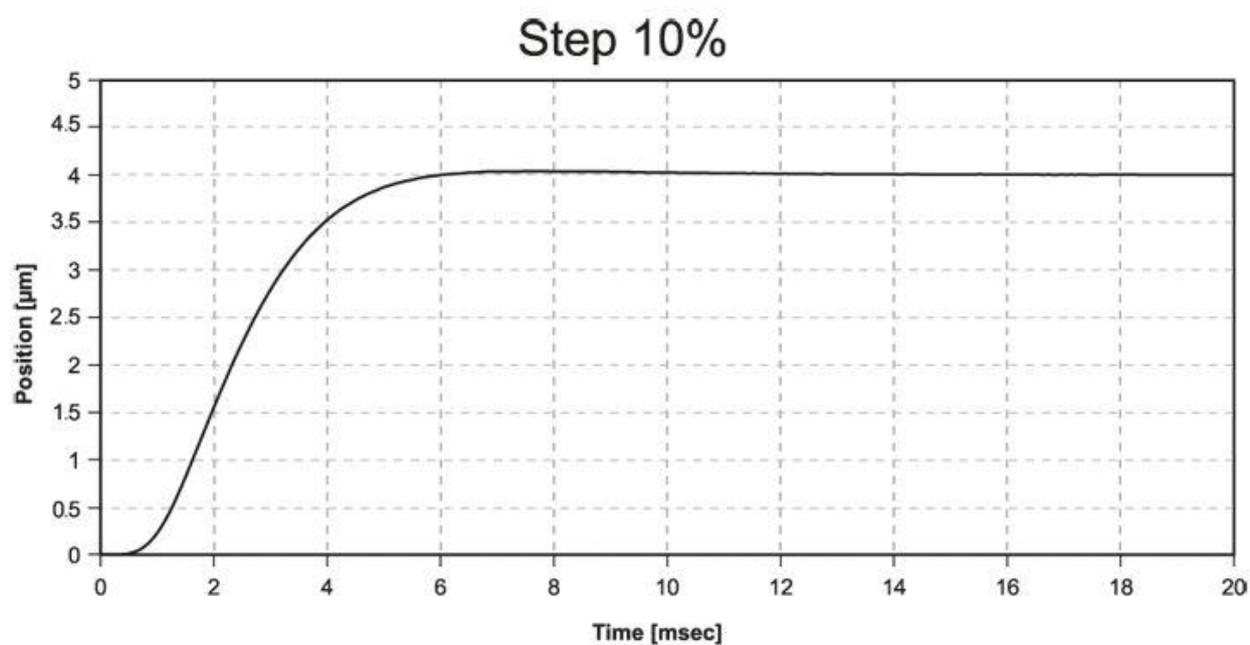


P-630, dimensions in mm

Step 1 nm



The smallest resolvable step size of the P-630.XCD is below one nm with the E-753.1CD digital controller. Measured externally with a laser interferometer.



The settling time of the P-630.XCD is less than 6 milliseconds to 1 % accuracy and a 4 µm step.

Ordering Information

P-630.XCD

Linear piezo nanopositioning system with aperture, 40 µm, direct position measuring, capacitive sensor

P-631.XCD

Linear piezo nanopositioning system with aperture, 80 µm, direct position measuring, capacitive sensor