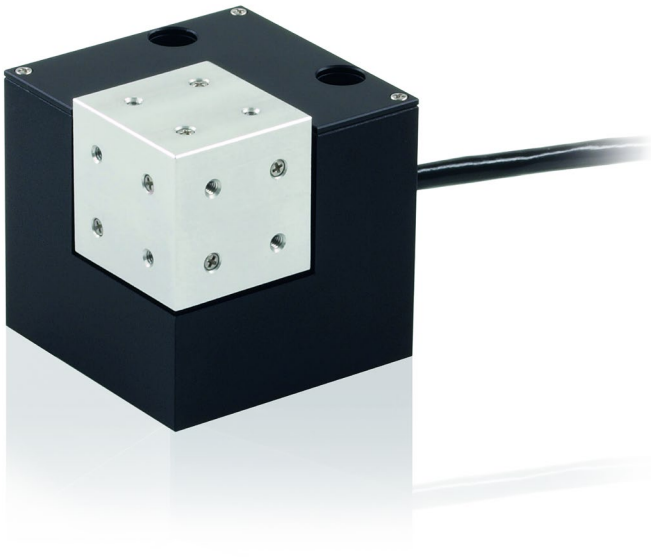


NanoCube® Nanopositioner

Compact Parallel-Kinematic Piezo System for Nanopositioning and Fiber Alignment



P-616

- Parallel-kinematic design for the highest stiffness in all spatial directions
- Highly dynamic motion due to high resonant frequencies even with loads up to 100 g
- Innovative product design for flexible use due to single mounting platform.
- Only nanopositioner available on the market with ID chip functionality
- Smallest and lightest NanoCube® with 100 µm travel range on the market

Fields of application

- Fiber positioning and alignment
- Scanning microscopy
- 2-photon polymerization
- Nanotechnology and nanomanufacturing
- Photonics / integrated optics
- Micromanipulation
- Sample 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 D-sub connector of the mechanics. The autocalibration function of the digital controllers uses this data each time the controller is switched on.

High dynamics multi-axis operation due to parallel kinematics

In a parallel-kinematic multi-axis system, all actuators act on a common platform. The minimum mass inertia and the identical design of all axes allow fast, dynamic, and nevertheless precision motion.

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

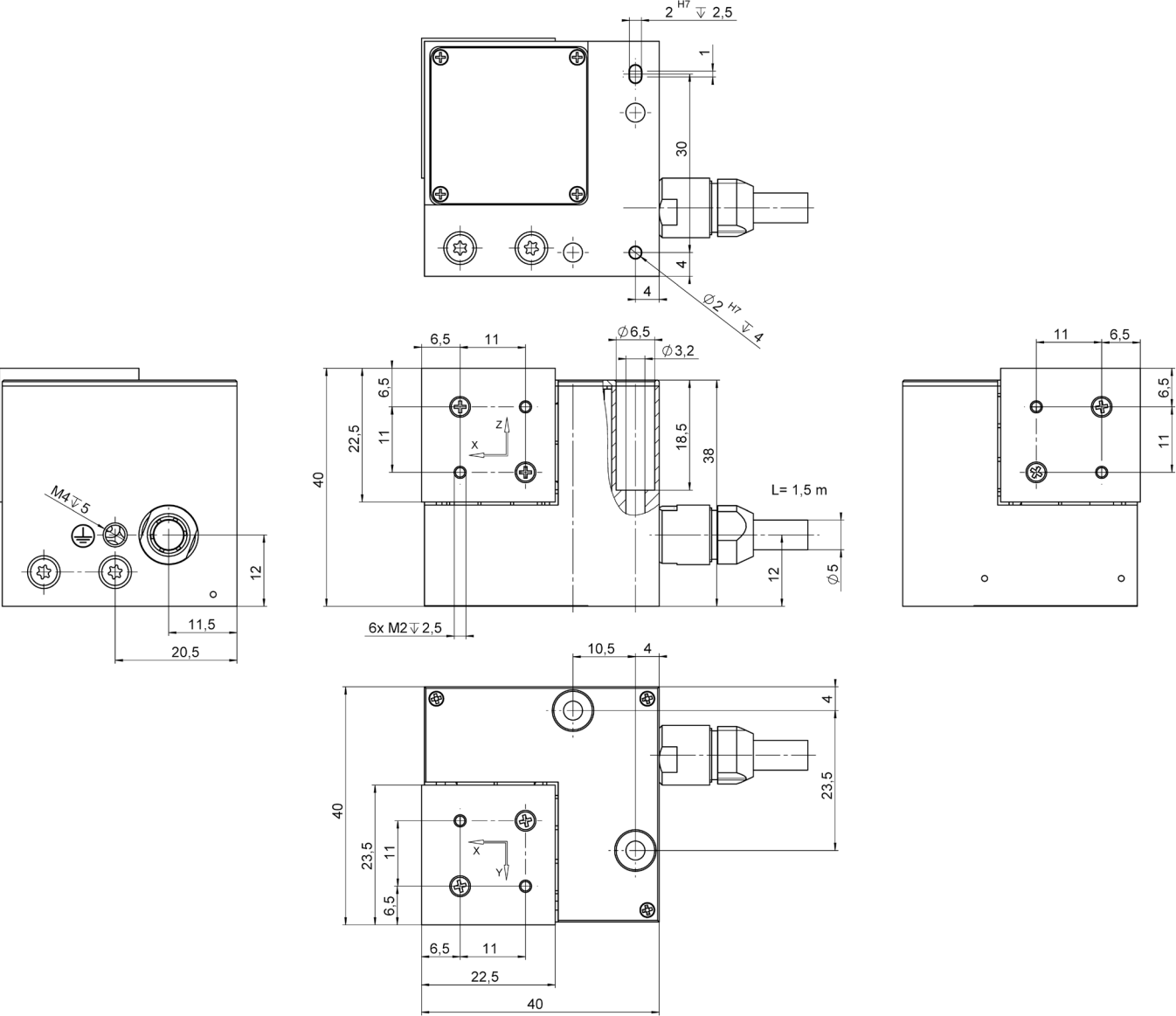
Specifications	P-616.3C	Unit	Tolerance
Motion and positioning			
Active axes	X, Y, Z		
Travel range at -20 to 120 V, open loop	110 / axis	µm	+20 % / -0 %
Travel range, closed loop	100 / axis	µm	+20 % / -0 %
Resolution, 1 σ, open loop	0.3	nm	typ.
Resolution, 1 σ, closed loop	0.4	nm	typ.
Linearity error	0.03	%	typ.
Bidirectional repeatability, 1 σ, 10 % travel range	<10	nm	typ.
Bidirectional repeatability, 1 σ, 100 % travel range	<15	nm	typ.
Sensor			
Sensor type	Capacitive sensors		
Mechanical properties			
Stiffness	0.5	N/µm	±10 %
Resonant frequency X / Y / Z, no load	700	Hz	±10 %
Resonant frequency with 30 g load X / Y / Z	380	Hz	±20 %
Resonant frequency with 100 g load X / Y / Z	250	Hz	±20 %
Push/pull force capacity	15	N	max.
Maximum permissible torque	0.4	Nm	max.
Drive properties			
Ceramic type	PICMA® P-885.50		
Electrical capacitance	1.5 / axis	µF	±20 %
Miscellaneous			
Operating temperature range	-20 to 80	°C	
Material	Aluminum, steel		
Dimensions	40 × 40 × 40	mm	
Moved mass without load	0.021	kg	
Mass without cable	0.125	kg	
Mass with cable	0.4	kg	
Cable length	1.5	m	±10 mm
Connector	D-sub 25W3 (m)		
Recommended electronics	E-503, E-663, E-712, E-727		

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.

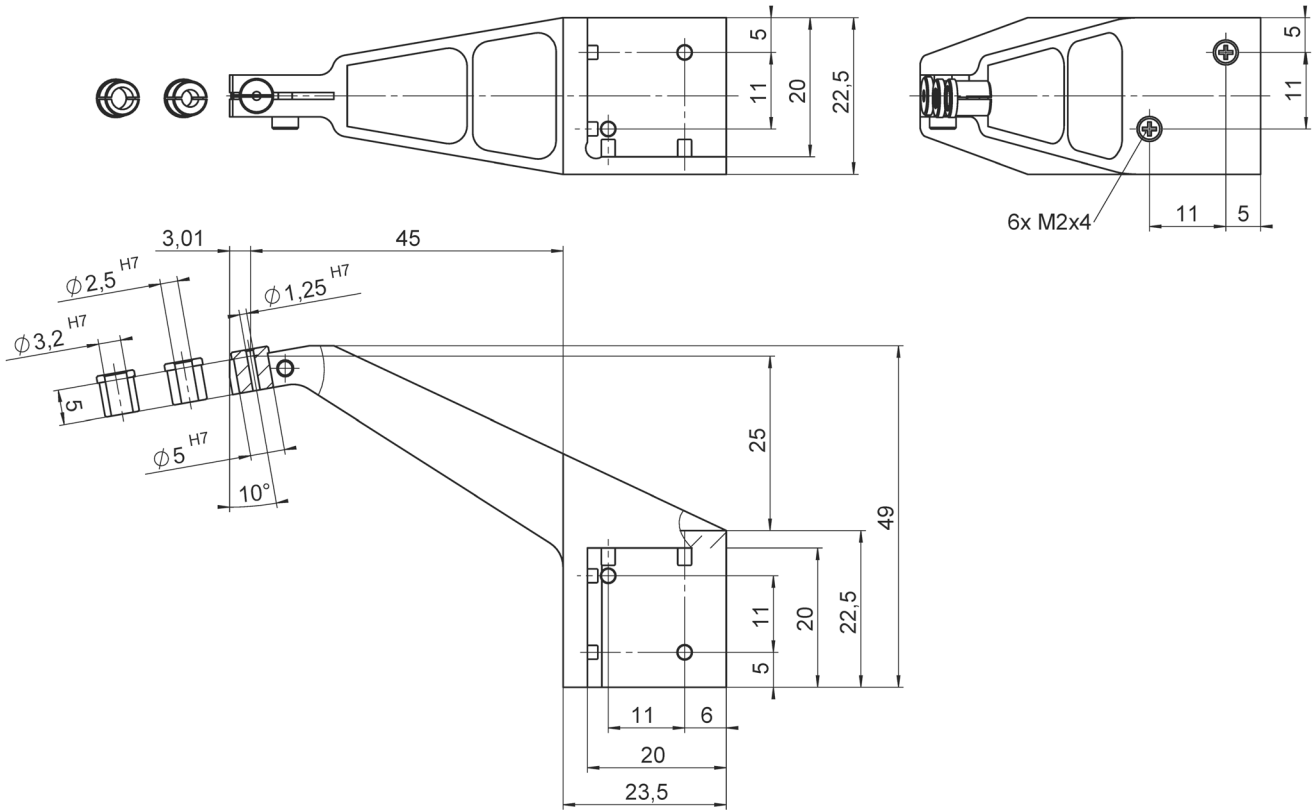
All specifications based on room temperature (22 °C ±3 °C).

Ask about customized versions.

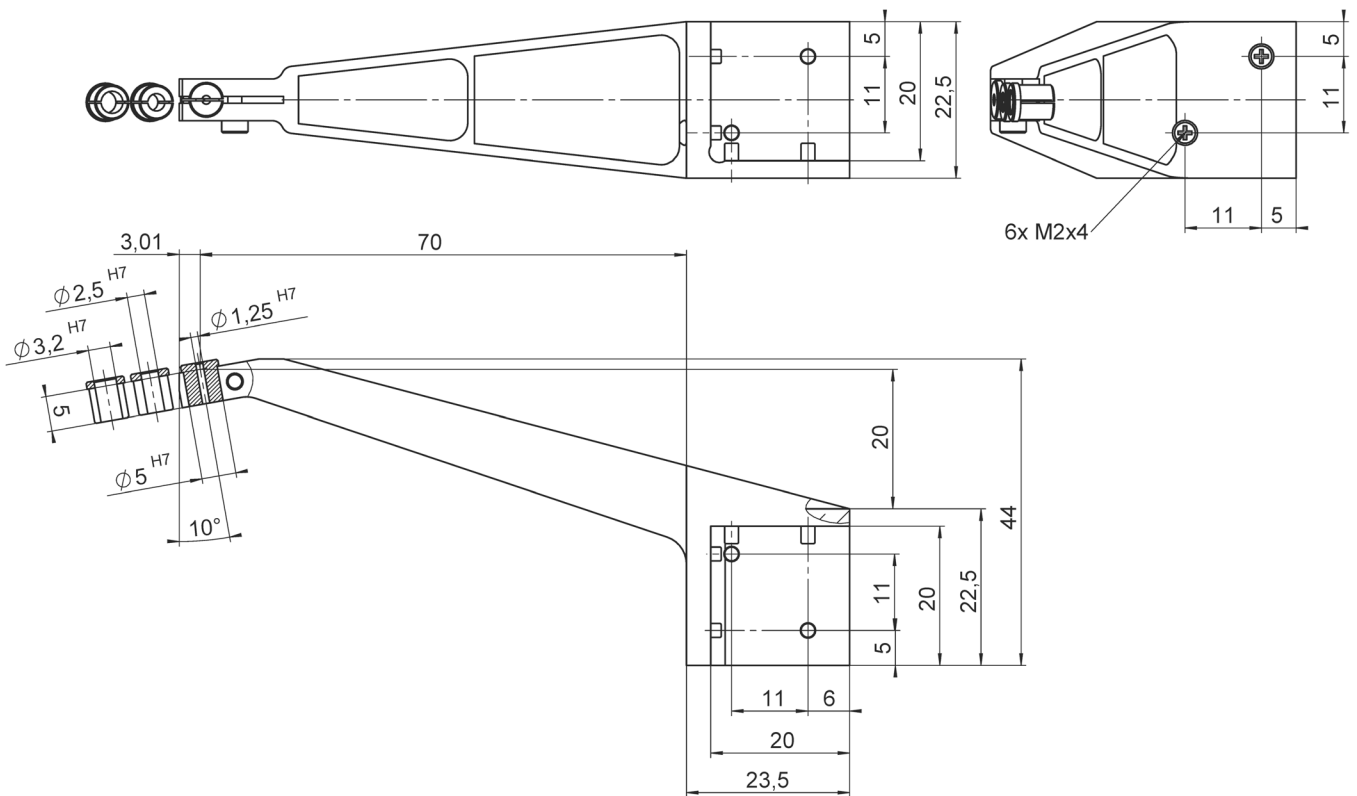
Drawings / Images



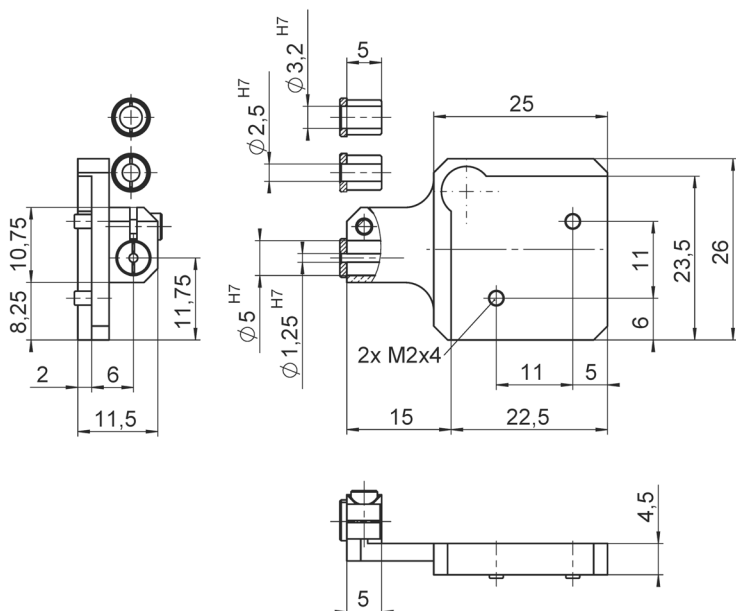
P-616.3C, dimensions in mm.



Fiber holder F-603.41 (optional), dimensions in mm.



Fiber holder F-603.42 (optional), dimensions in mm.



Fiber holder F-603.43 (optional), dimensions in mm.

Ordering Information

P-616.3C

Parallel-kinematic NanoCube® XYZ nanopositioner, 100 µm × 100 µm × 100 µm travel range, capacitive sensors

Accessories for fiber alignment (optional)

F-603.41

Fiber holder 10° for P-616, short, with fiber optic ferrules 1.25 mm, 2.5 mm, and 3.2 mm

F-603.42

Fiber holder 10° for P-616, long, with fiber optic ferrules 1.25 mm, 2.5 mm, and 3.2 mm

F-603.43

Fiber holder 90° for P-616, with fiber optic ferrules 1.25 mm, 2.5 mm, and 3.2 mm