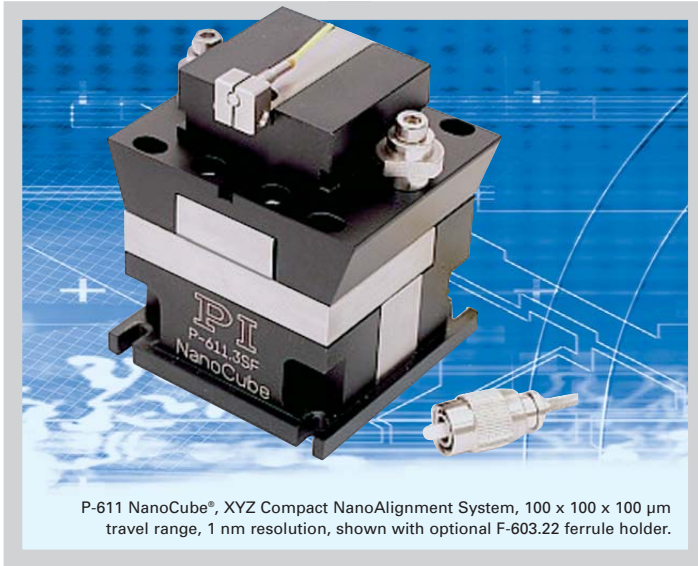


P-611.30F · P-611.3SF

NanoCube® XYZ Rapid Photonics NanoAlignment Add-on System

>> Click <http://www.pi.ws/fwd/Piezo-Stage> for the Latest Specs on these Products



P-611 NanoCube®, XYZ Compact NanoAlignment System, 100 x 100 x 100 µm travel range, 1 nm resolution, shown with optional F-603.22 ferrule holder.

- **Ideal for Fiber Alignment and Photonics Packaging Applications**
- **100 x 100 x 100 µm Travel Range, Ultra-Compact Package!**
- **1 nm Resolution**
- **Closed- and Open-Loop Versions**
- **Precision Trajectory Control w/ Frictionless Flexures**
- **Fast Scanning and Settling**
- **Large Variety of Controllers**

The P-611.30F and P-611.3SF NanoCube® NanoAlignment systems are based on PI's vast experience with ultra-high-precision piezo scanning systems (see the "Nanopositioning &

Scanning Systems" section) and photonics packaging applications. They combine a 100 x 100 x 100 µm XYZ positioning and scanning range with a zero stiction/friction wire-EDM-cut guiding system in an extremely compact package. NanoCube® systems provide motion with nanometer-scale resolution and settling times of only a few milliseconds.

Open- & Closed-Loop Models

Open- and closed-loop versions are offered to suit your application. Several fiber, waveguide and optics adapters are available for mounting on the NanoCube® (e.g. model F-603.60, see "Fiber, Objective and Waveguide Holders" see page 8-26).

NanoCubes® are also available in a slightly different package without the fiber adapter interface, see the P-611 article on page 2-74 in the "Nanopositioning & Scanning Systems" section.

Automatic Alignment

NanoCubes® can be operated with the E-664 bench-top controller. A special controller card (model E-760, see page 6-33) featuring built-in optical metrology can be installed in the F-206 hexapod controller or the C-880 automation controller. A variety of other rackmount and bench-top controllers is also available.

NanoCubes® can be easily combined with a number of automated or manual PI micropositioning systems, from single axis stages to 6-degree-of-freedom micromanipulators.

Working Principle / Lifetime

P-611 nanopositioners are equipped with the award-winning PICMA® long-life piezoelectric drives integrated into a sophisticated flexure guiding system. The force exerted by the piezo drive pushes a multi-flexure parallelogram via an integrated motion amplifier. The wire-EDM-cut flexures are FEA modeled (finite element analysis) for zero stiction and friction, ultra-high resolution and exceptional guiding precision. All components are frictionless and maintenance-free.

Notes

For versions without the fiber adapter interface see p. 2-36, p. 2-38 and p. 2-74 in the "Nanopositioning & Scanning Systems" section.

Ordering Information

P-611.3SF
NanoCube® XYZ NanoAlignment Stage, 100 x 100 x 100 µm, Closed-Loop, Fiber Adapter Interface

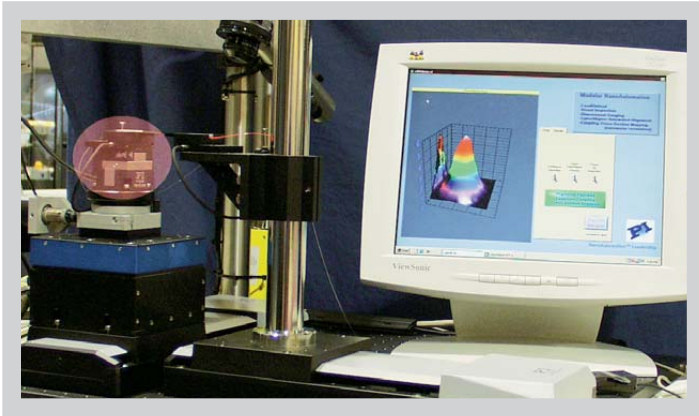
P-611.30F
NanoCube® XYZ NanoAlignment Stage, 100 x 100 x 100 µm, Open-Loop, Fiber Adapter Interface

Recommended Controllers
E-760, E-664 (see pp. 6-32 ff.)

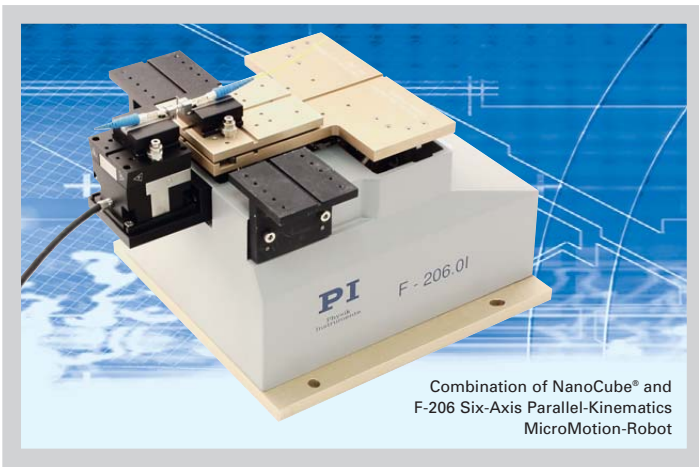
Ask about custom designs!

Application Examples

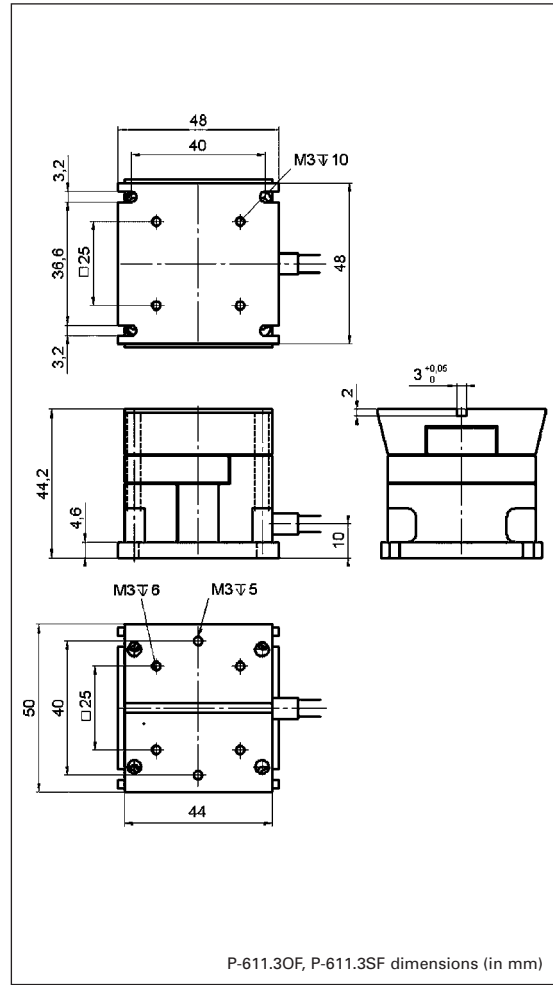
- Photonics packaging
- Optical device testing
- MEMS positioning/alignment
- Fiber alignment
- Micromachining
- Micromanipulation (life sciences)
- Semiconductor test systems



P-611 NanoCube® in a coarse/fine travel alignment application with M-511, M-501 and M-037 stages. CyberAligner™ software takes data of the complete cross-coupling section, aligns the platform and displays the profile on screen (this process only takes a few seconds).



Combination of NanoCube® and F-206 Six-Axis Parallel-Kinematics MicroMotion-Robot



P-611.3OF, P-611.3SF dimensions (in mm)

Piezo Actuators

Nanopositioning & Scanning Systems

Active Optics / Steering Mirrors

Tutorial: Piezo-electrics in Positioning

Capacitive Position Sensors

Piezo Drivers & Nanopositioning Controllers

Hexapods / Micropositioning

Photonics Alignment Solutions

Motion Controllers

Ceramic Linear Motors & Stages

Index

Technical Data

Models	P-611.3SF	P-611.3OF	Units	Notes see page 2-44
Active axes	X,Y,Z	X,Y,Z		
Open-loop travel @ 0 to 100 V	100 / axis	100 / axis	$\mu\text{m} \pm 20 \%$	A2
Closed-loop travel	100 / axis	-	μm	A5
Integrated feedback sensor	SGS	-		B
** Closed-loop / open-loop resolution	2 / 1	- / 1	nm	C1
Stiffness	0.3	0.3	N / $\mu\text{m} \pm 20 \%$	D1
Max. (+/-) normal load	1.5	1.5	kg	D4
Electrical capacitance	1.5 / axis	1.5 / axis	$\mu\text{F} \pm 20 \%$	F1
* Dynamic operating current coefficient (DOCC)	1.7 / axis	1.7 / axis	$\mu\text{A}/(\text{Hz} \times \mu\text{m})$	F2
Unloaded resonant frequency (X/Y/Z)	350/220/250	350/220/250	Hz $\pm 20 \%$	G2
Operating temperature range	- 20 to 80	- 20 to 80	$^{\circ}\text{C}$	H2
*** Voltage connection	Sub-D-Special	Sub-D-Special		J1
*** Sensor connection	Sub-D-Special	-		J2
Weight (w/o cables)	250	250	g $\pm 5 \%$	
Body material	S/Al	S/Al		L
Recommended Amplifier/Controller (codes explained see page 6-46)	N, C, D ,G , H	N, G, C		

* Dynamic Operating Current Coefficient in μA per hertz and μm . Example: Sinusoidal scan of $50 \mu\text{m}$ at 10 Hz requires approximately 0.8 mA drive current.

** Resolution of PZT NanoPositioners is not limited by stiction or friction. Noise equivalent motion with E-503 amplifier.

*** Adapter cable with LEMO connectors for sensor and operating voltage available.