P-545 PInano™ Cap Super-Stability XY / XYZ Piezo Stages

Capacitive Feedback for Highest Stability & Linearity: Ideal for SR-Microscopy

PInano™ series nanopositioning stages feature a very low profile of 0.8" (20mm) and use a full slide mounted a the bottom. They deliver very fast and highly accurate motion to 200µm with sub-nanometer resolution in up to 3 axes. PInano™ systems come complete with a high performance USB controller and software.

- **Capacitive Direct Metrology Sensors: Higher Linearity, Stability and Accuracy than PR-Sensor Versions**
- **Closed Loop USB Controller (24 Bit Resolution) & Software Included**
- **Low Profile for Easy Integration: 20 mm (0.8")**
- **Bottom Slide Mount: No Interference with Turret Rotation**
- **200 µm Travel Range per Axis**
- **10X Longer Lifetime with Proprietary Piezo Technology**
- **Compatible w/ Leading Image Acquisition Software**
- **Sub-Nanometer Resolution and Millisecond Step Time,**
- **Ideal for Super-Resolution Microscopy**
- **Optional Long Travel Piezomotor / Manual Stage**

High Stability and Linearity Optimized for High-Resolution Microscopes

The new PInano™ Cap XY and XYZ capacitive sensor piezo stages are optimized for easy integration into high resolution optical microscopes. They feature a very low profile of 0.8" (20 mm), a large aperture, and extremely fast response with subnanometer closed-loop resolution–ideal for leading-edge microscopy and imaging applications. The stage design permits a full slide to be mounted at bottom allowing the turret to be rotated without moving the objective in and out. Longest lifetime is guaranteed by the integrated ceramic encapsulated PICMA® piezo actuators. Due to the significantly higher humidity resistance, the patented PICMA® design provides up to 10 times longer life than conventional piezo actuators.

High Performance, Yet Cost Effective

PInano™ Cap series piezo stages provide even higher performance than their piezoresistive (PR) sensor equipped cousins. Systems consist of the piezo mechanics, an advanced controller optimized for capacitive feedback and software. For the highest linearity and stability, these stages are based on direct measuring, non-contact capacitive sensors, a principle free of Johnson noise. RF excitation circuitry in the controller further reduces sensitivity to external noise sources or DC voltage drift of electronic components that can limit the long term stability of DC signal excited sensors such as film and PR strain gauges. The proprietary servo design improves the motion linearity compared to conventional piezo controllers.

Stage Working Principle / Reliability

Flexures optimized with Finite Element Analysis (FEA) are employed to guide the PI nano™ series stages. FEA techniques give the design the highest possible stiffness in, and perpendicular to, the direction of motion, and to minimize linear and angular runout. Flexures allow extremely high-precision motion, no matter how minute, as they are completely free of play and friction. The award-winning PICMA® piezo drives are more robust than conventional piezo actuators, featuring superior lifetime and performance in both dynamic and static applications. Because guidance, actuators and sensors are all maintenance-free, these nanopositioning systems achieve outstanding levels of reliability:

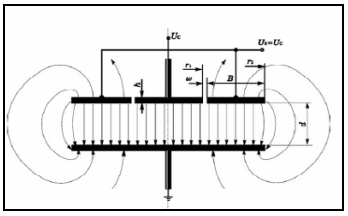
Ordering Information

P-545.2C7
PInano™ Cap XY Piezo Stage with large Aperture, 200x200µm, Capacitive direct Metrology Sensors, with USB Controller

P-545.3C7
PInano™ Cap XYZ Piezo Stage with large Aperture, 200x200x200µm, Capacitive direct Metrology Sensors, with USB Controller

Application Examples

- Biotechnology
- SR-Microscopy
- Scanning microscopy
- Confocal microscopy
- Sample Positioning



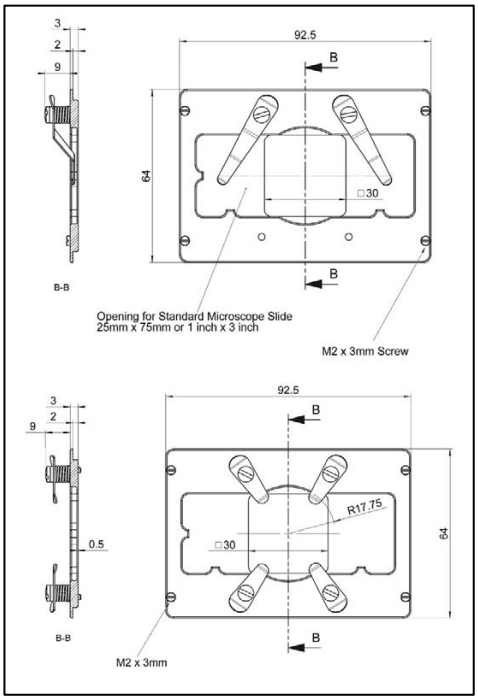
Non-contact capacitive position sensors measure directly and provide higher linearity and long term stability compared to piezoresistive or film sensors that infer position information from strain.

Long Travel XY Microscope Tables, 25x25 mm

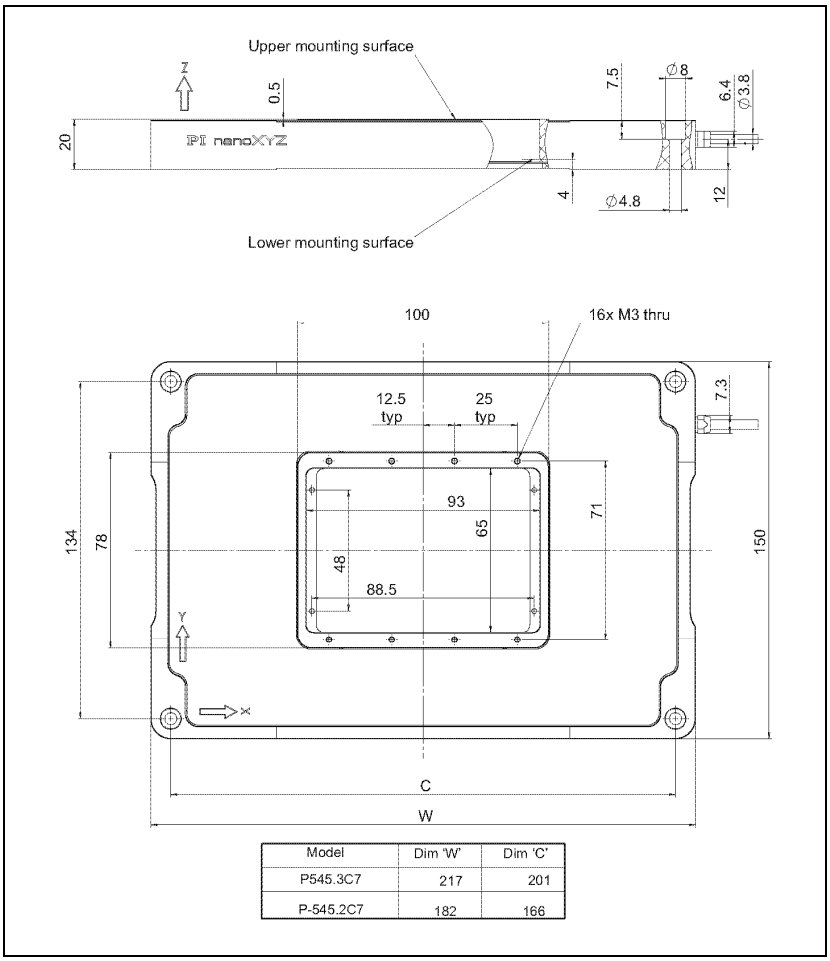
PI also offers manual and motorized long-travel microscope stages. These high-stability designs are ideal mounting platforms for the fast PInano™ piezo scanning stages.
Motorized stages are available for Nikon and Olympus microscopes
Manual stages are available for Nikon, Olympus, Zeiss & Leica microscopes

Models	PInano™ XY	PInano™ XYZ	Units	Tolerance
Active axes	X,Y	X,Y,Z		
Integrated sensor	Capacitive	Capacitive		
Closed-loop travel	200x200	200x200x200	µm	
*Resolution	<1	<1	nm	1 σ
Linearity	+/-0.05	+/-0.05	%	typ.
Repeatability	<5	<5	nm	typ.
Push/pull force capacity in motion direction	100 / 30	100 / 30		max.
Max. payload	500	500	g	max.
Ceramic type	PICMA®	PICMA®		
Recommended operating temperature range	20 to 30	20 to 30	°C	
Material	Aluminum	Aluminum		
Mass	1	1.2	kg	±5%
Cable length	2	2	m	±10 mm

*Resolution of PI Piezo Nanopositioners is not limited by friction or stiction.
Value given is noise equivalent motion measured with interferometer



Accessories: P-545.SH3 Slide holder (above) and P-545.PD3 petri dish holder (below), dimensions in mm



Model	Dim 'W'	Dim 'C'
P545.3C7	217	201
P-545.2C7	182	166

P-545, PInano™ piezo stage, dimensions in mm

A powerful 24 bit resolution controller with USB, TCP/IP and analog interfaces and software are included.