This product family has been replaced by the following new product:
>> P-541.2 – P-542.2 Piezo XY-Stage

P-770

Large-Aperture, XY Nanopositioning Stage with Parallel Metrology

P-770 flexure-guided nanopositioning system

- **Precision Trajectory Control**
- **Parallel-Kinematics/Metrology for Enhanced Responsiveness / Multi-Axis Precision**
- **For XY Scanning and Positioning**
- **200 x 200 mm Clear Aperture**
- **200 x 200 µm Range**
- **Closed-Loop Resolution <10 nm**
- **PICMA® High-Performance Piezo Drives**

The P-770 is a low-profile, highly accurate, XY scanning and positioning system, providing a positioning and scanning range of 200 x 200 µm with better than 10 nm resolution. The P-770 was specially designed for semiconductor inspection systems.
The 200 x 200 mm clear aperture is ideal for all transmitted-light applications, such as mask alignment.

Higher Precision Through Parallel Kinematics/Metrology

P-770 piezo scanning stages feature a parallel-kinematics design with direct-measuring, non-contact LVDT sensors (parallel, direct metrology).

Unlike indirect sensors, direct-metrology sensors measure the actual distance between the fixed frame and the moving part of the stage. This results in higher motion linearity, long-term stability, phase fidelity, and—because external disturbances are seen by the sensor immediately—a stiffer, faster-responding servo-loop. See p. 2-4 *ff.* and p. 5-2 *ff.* for more information.

Parallel kinematics means that all actuators act directly on the same moving platform leading to reduced size, inertia and the elimination of microfriction caused by moving cables. The advantages are enhanced dynamics and better reproducibility.

With parallel metrology, all sensors measure the position of the same moving platform against the same stationary reference (the fixed frame). This means that all motion is inside the servo-loop, no matter which actuator may have caused it, resulting in superior multi-axis precision.

Working Principle / Reliability

P-770 nanopositioning stages are equipped with the award winning PICMA® piezo drives, integrated into a sophisticated, single-module, parallel-kinematics, flexure guiding system.

Ordering Information

P-770.00
Large-Aperture XY Piezo Flexure Stage, 200 µm, LVDT Sensor

Ask about custom designs!

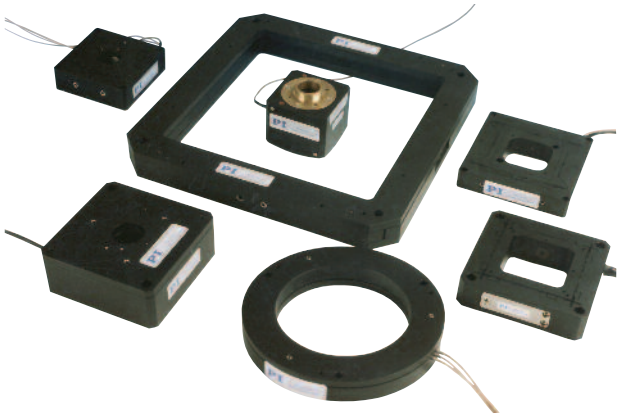
The wire-EDM-cut flexures are FEA modeled for zero stiction, zero friction and exceptional guiding precision. The ceramic-encapsulated PICMA® drives are more robust than conventional piezo actuators, featuring superior lifetime and performance in both dynamic and static applications.
Because guidance, actuators and sensors are all frictionless and maintenance-free, these nanopositioning systems achieve outstanding levels of reliability.

Notes

See the "Piezo Drivers & Nanopositioning Controllers" section, p. 6-8 *ff.* for our comprehensive line of low-noise control electronics.
See the "Selection Guide" on p. 2-14 *ff.* for comparison with other nanopositioning systems.

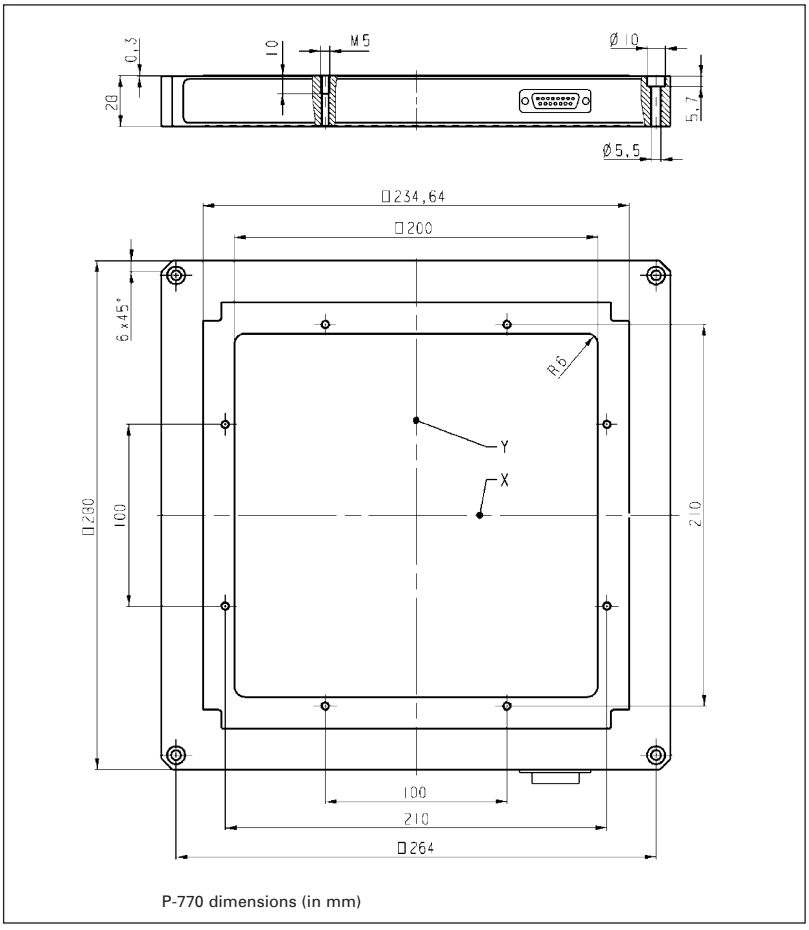
Application Examples

- Metrology
- Nanopositioning
- Semiconductor test equipment
- Precision mask and wafer alignment
- Scanning interferometry
- Surface structure analysis, etc.



Variety of small- and large-aperture nanopositioning systems. Call your PI Sales Engineer about your application.

XY Nanopositioning Stage



P-770 dimensions (in mm)

Piezo Actuators
Nanopositioning & Scanning Systems
Active Optics / Steering Mirrors
Tutorial: Piezoelectrics in Positioning
Capacitive Position Sensors
Piezo Drivers & Nanopositioning Controllers
Hexapods / Micropositioning
Photonics Alignment Solutions
Motion Controllers
Ceramic Linear Motors & Stages
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Technical Data

Models	P-770.00	Units	Notes see p. 2-84
Active axes	X,Y		
Open-loop travel @ 0 to 100 V	200	µm ±20%	A2
Closed-loop travel	200	µm	A5
Integrated feedback sensor	LVDT		B
* Closed-loop / open-loop resolution	10 / 2	nm	C1
Closed-loop linearity (typ.)	0.1	%	
Full-range repeatability (typ.)	±20	nm	C3
Stiffness	0.2	N/µm ±20%	D1
Push / pull force capacity (in operating direction)	50 / 10	N	D3
Max. (±) normal load	20	N	D4
Electrical capacitance	12 / axis	µF ±20%	F1
** Dynamic operating current coefficient (DOCC)	10 / axis	µA/(Hz x µm)	F2
Unloaded resonant frequency	90	Hz ±20%	G2
Operating temperature range	-20 to 80	°C	H2
*** Voltage connection	D		J1
*** Sensor connection	D		J2
Weight	2000	g ±5%	
Body material	Al		L
Recommended amplifier/controller (codes explained p. 2-17)	H, F		

* For calibration information see p. 2-8. Resolution of PI piezo nanopositioners is not limited by friction or stiction. The value given is noise equivalent motion with E-503 amplifier.

** Dynamic Operating Current Coefficient in µA per Hz and µm. Example: Sinusoidal scan of 50 µm at 10 Hz requires approximately 5 mA drive current.

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