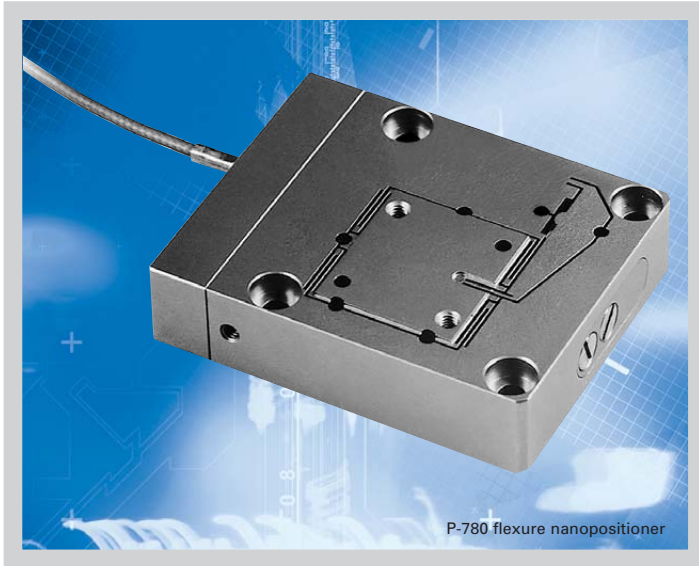


P-780

Miniature Piezo Nanopositioning/Scanning Stage with Direct Metrology

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



- Fast Response (1 kHz Resonant Frequency)
- Stainless Steel Construction
- Frictionless Precision Flexure Guiding System
- 80 µm Travel Range
- Direct Metrology with LVDT Sensor
- Resolution <5 nm
- PICMA® High-Performance Piezo Drives

P-780 piezo-driven, flexure-guided stages are extremely compact and fast devices, providing a positioning and scanning range of up to 80 µm with settling times of only a few milliseconds. The P-780 is designed for applications with loads up to 100 g. Closed-loop and open-loop versions are offered to fit your application.

Direct-metrology LVDT sensor P-780.20 models feature direct-measuring, non-contact LVDT sensors (direct metrology).

Unlike indirect strain-measuring, piezoresistive 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.

Working Principle / Reliability

P-780 nanopositioning stages are equipped with the award winning PICMA® piezo drives, integrated into a sophisticated single-module, flexure guiding

system. 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

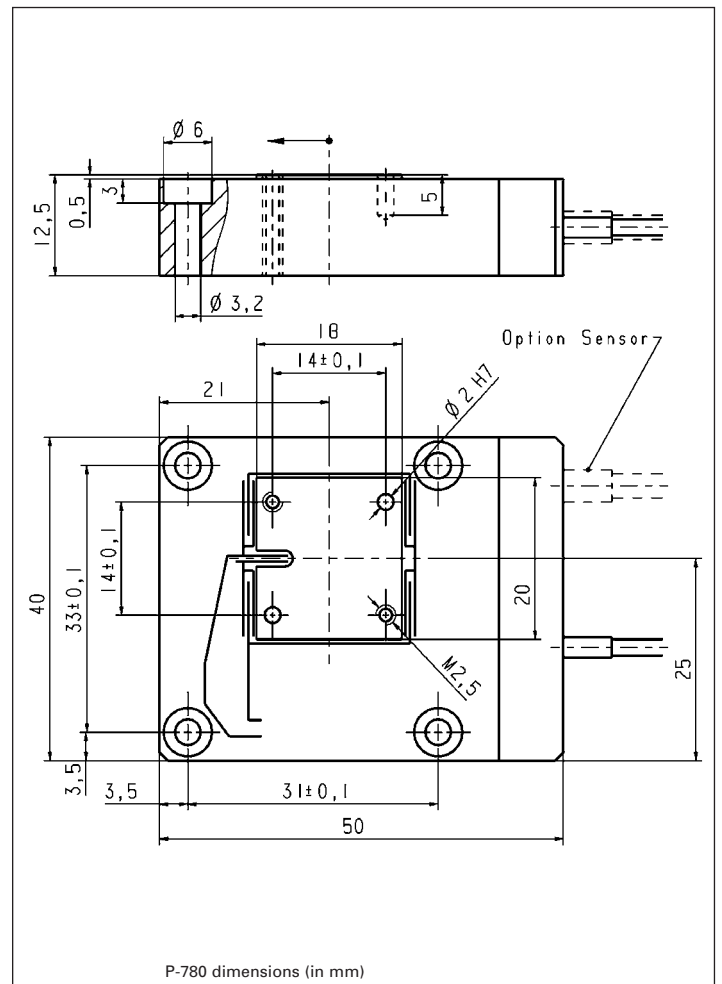
See the "Selection Guide" on p. 2-14 ff. for comparison with other nanopositioning systems.

Ordering Information

P-780.00
Miniature Piezo Flexure Stage,
80 µm

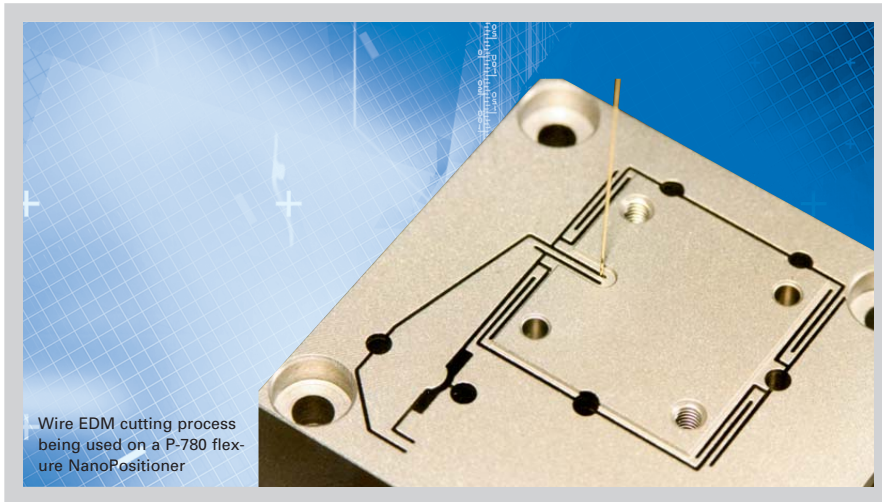
P-780.20
Miniature Piezo Flexure Stage,
80 µm, LVDT Sensor

Ask about custom designs!



Application Examples

- Metrology
- Nanopositioning
- Scanning microscopy
- Disk drive testing
- Fiber optics
- Scanning interferometry
- Biotechnology
- Micromanipulation



Technical Data

Models	P-780.00	P-780.20	Units	Notes see p. 2-84
Active axes	X	X		
Open-loop travel @ 0 to 100 V	80	80	$\mu\text{m} \pm 20\%$	A2
Closed-loop travel	-	80	μm	A5
Integrated feedback sensor	-	LVDT		B
* Closed-loop / open-loop resolution	- / 1	5 / 1	nm	C1
Closed-loop linearity (typ.)	-	0.1	%	
Full-range repeatability (typ.)	-	± 20	nm	C3
Stiffness	1.5	1.5	$\text{N}/\mu\text{m} \pm 20\%$	D1
Push/pull force capacity (in operating direction)	50 / 5	50 / 5	N	D3
Max. (\pm) normal load	10	10	N	D4
Lateral force limit	10	10	N	D5
Lateral runout (X/Y/Z) (typ.)	10	10	nm	E2
Electrical capacitance	3.0	3.0	$\mu\text{F} \pm 20\%$	F1
** Dynamic operating current coefficient (DOCC)	4.7	4.7	$\mu\text{A}/(\text{Hz} \times \mu\text{m})$	F2
Unloaded resonant frequency	1000	1000	$\text{Hz} \pm 20\%$	G2
Resonant frequency @ 100 g load	600	600	$\text{Hz} \pm 20\%$	G3
Operating temperature range	-20 to 80	-20 to 80	$^{\circ}\text{C}$	H2
Voltage connection	VL	VL		J1
Sensor connection	-	L		J2
Weight (with cables)	150	170	$\text{g} \pm 5\%$	
Body material	N-S	N-S		L
Recommended amplifier/controller (codes explained p. 2-17)	G, C	H, E		

* 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 $30 \mu\text{m}$ at 10 Hz requires approximately 1.4 mA drive current.

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

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