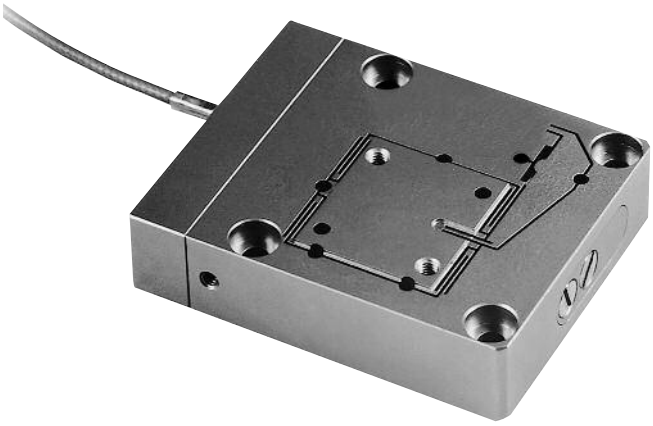
This product family has been replaced by the following new product:
>> P-620.1 – P-629.1 PIHera® Piezo Linear Stage

P-780

Miniature Piezo Nanopositioning/Scanning Stage with Direct Metrology



P-780 flexure nanopositioner

- **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.

Application Examples

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

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

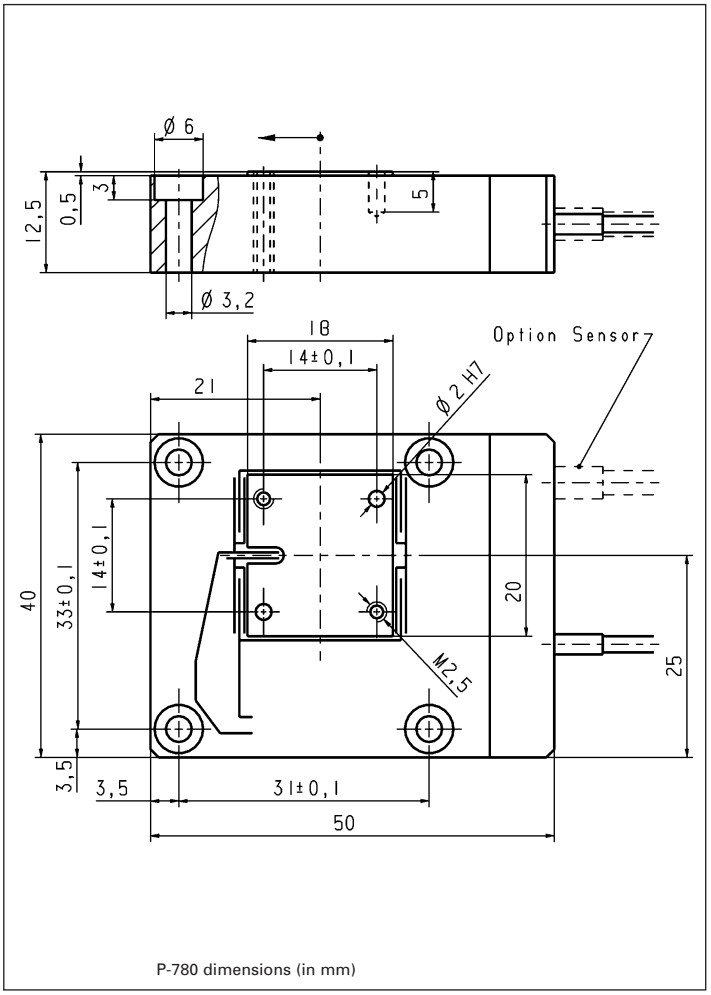
See the “Selection Guide” on p. 2-14 *ff.* for comparison with other nanopositioning systems.

Ordering Information

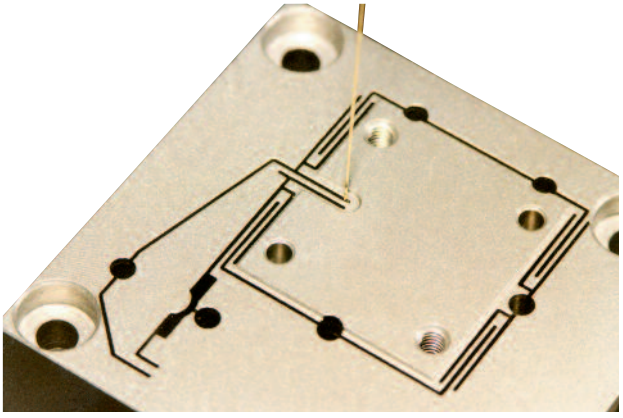
P-780.00
Miniature Piezo Flexure Stage, 80 µm

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

Ask about custom designs!



P-780 dimensions (in mm)



Wire EDM cutting process being used on a P-780 flexure NanoPositioner

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	µm ±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	N/µm ±20%	D1
Push/pull force capacity (in operating direction)	50 / 5	50 / 5	N	D3
Max. (±) 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	µF ±20%	F1
** Dynamic operating current coefficient (DOCC)	4.7	4.7	µA/(Hz x µm)	F2
Unloaded resonant frequency	1000	1000	Hz ±20%	G2
Resonant frequency @ 100 g load	600	600	Hz ±20%	G3
Operating temperature range	-20 to 80	-20 to 80	°C	H2
Voltage connection	VL	VL		J1
Sensor connection	-	L		J2
Weight (with cables)	150	170	g ±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 µm at 10 Hz requires approximately 1.4 mA drive current.