

P-212 · P-216

Preloaded Open- & Closed-Loop PICA™ Power Piezo Actuators (HVPZT) with Sensor Option



From left: P-212.1S and .8S, P-216.9S, .4S and .1S piezo actuators (CD for size comparison)

- Travel Range to 180 µm
- Pushing Forces to 4500 N
- Pulling Forces to 500 N
- Sub-millisecond Response
- Sub-nanometer Resolution
- Options: Vacuum, High- and Low-Temperature

The P-212 and P-216 series are high-resolution linear piezo actuators (translators) for static and dynamic applications. They provide sub-millisecond response and sub-nanometer resolution.

Application Examples

- Optics
- Metrology / Interferometry
- Adaptronics
- Precision engineering / micromechanics
- Adaptive mechanics
- Active vibration damping
- Switches
- Laser tuning
- Force generation / materials testing
- Nanotechnology

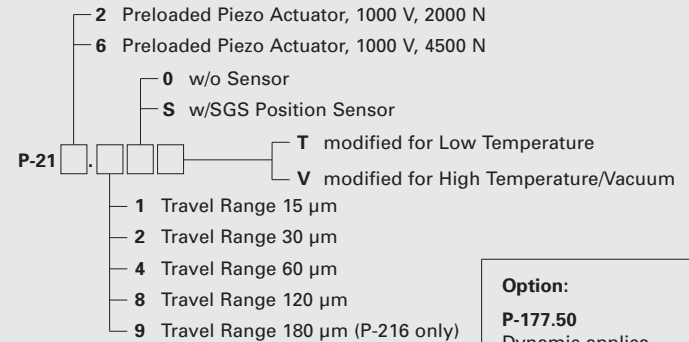
These actuators have the friction-free, preloaded PICA™ Power actuators inside. The preload makes them ideal for dynamic applications like precision machining or active damping.

High Displacement with Ultra-High Reliability

PICA™ Power actuators are optimized for high-temperature working conditions and high-duty-cycle dynamic applications.

All PICA™ piezo ceramics are specifically designed for high-duty-cycle applications. With PI's extensive applications knowledge, gained over several decades, performance does not come at the price of reliability. All materials used are specifically matched for robustness and lifetime. Endurance tests on PICA™ actua-

Ordering Information



Please read "Options and Accessories", page 1-44 ff, for further information.
Extensions cables, adapters & connectors: see in "Accessories" in the "Piezo Drivers & Nanopositioning Controllers" section.

Option:

P-177.50
Dynamic applications (with E-481): temperature sensor and protective air for PICA™ HVPZT

tors prove consistent performance, even after billions (1,000,000,000) of cycles.

guide in the „Piezo Drivers & Nanopositioning Controllers“ section page 6-2 ff.

Mechanical Mounting

Mounting is at the foot, with push/pull forces of less than 5 N, the actuator can be held by clamping the case. The optional ball tip is intended to decouple torque and off-center forces from the translator. Read details in Mounting and Handling Guidelines page 1-48.

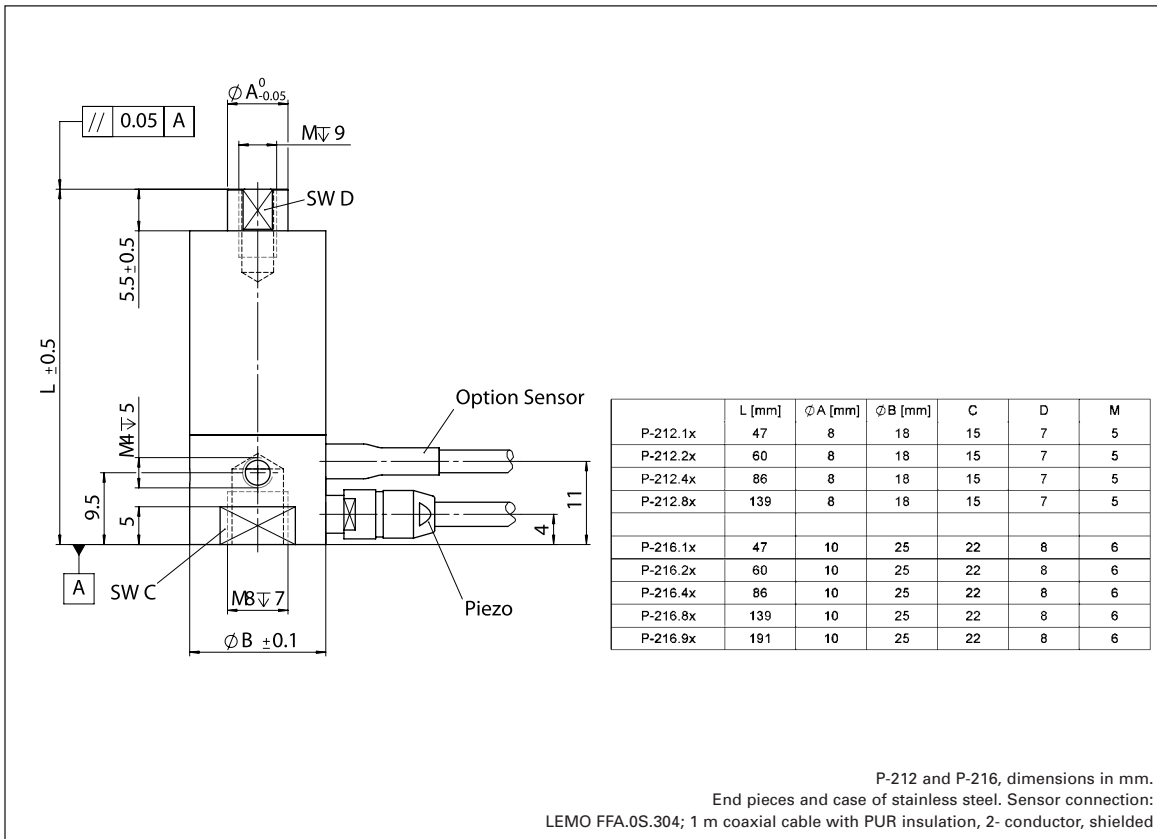
High Flexibility with PI Amplifiers, Drivers & Controllers

PI offers a wide range of control electronics for piezo actuators from low-power drivers to the high-performance amplifier / controller E-481.

For closed-loop operation PI offers a wide variety of analog and digital controllers. The E-500 modular system can be easily upgraded from an amplifier to a servo controller, including different interface / display modules.

Notes

High-resolution amplifiers and servo-control electronics, both digital and analog, see selection



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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Technical Data

	P-212.10	P-212.20	P-212.40	P-212.80	P-216.10	P-216.20	P-216.40	P-216.80	P-216.90	Einh.	Toleranz
Operating voltage	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	V	
Motion and positioning											
Closed-loop travel	15	30	60	120	15	30	60	120	180	µm	
Closed-loop resolution**	0.3	0.6	1.2	2.4	0.3	0.6	1.2	2.4	3.6	nm	typ.
Open-open resolution**	0.15	0.3	0.6	1.2	0.15	0.3	0.6	1.2	1.8	nm	typ.
Linearity*	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	%	typ.
Mechanical properties											
Static large-signal stiffness***	90	60	34	18	210	140	80	50	32	N/µm	±20%
Unloaded resonant frequency	17	12	7	4.5	17	12	7	4.5	3	kHz	±20%
Push/pull force capacity	2000/300	2000/300	2000/300	2000/300	4500/500	4500/500	4500/500	4500/500	4500/500	N	Max.
Shear force limit	15	10	10	10	60	36	23	23	23	N	
Torque limit (on tip)	0.5	0.5	0.5	0.5	1	1	1	1	1	Nm	
Drive properties											
El. capacitance	47	90	180	370	130	250	500	1000	1500	nF	±20%
Dynamic operating current coefficient	5	5	5	5	13	13	13	13	13	µA/(Hz x µm)	±20%
Miscellaneous											
Mass (with cable)	110	120	150	210	170	200	250	370	480	g	±5%

* Requires SGS sensor. SGS versions are shipped with performance reports

** Measured with an Interferometer. The resolution of piezo actuators is not limited by stiction or friction

*** Dynamic small-signal stiffness is ~50% higher

Piezo ceramic type: PICA™ Power

Operating temperature range: -40 to +80 °C

Recommended controller/driver: B, I, J, see codes explanation page 6-11

For maximum lifetime, voltages in excess of 750 V should be applied only for short durations

See Notes (Technical Data) for further information page 2-84 ff