

P-871

Closed-Loop, High-Deflection PICMA® Multilayer Piezo Bender Actuators (LVPZT)

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P-871.140, P-871.128, P-871.122 and P-871.112 closed-loop bender actuators (from left to right).

- Closed-Loop Operation for Superior Accuracy
- Nanometer-Range Resolution
- Deflection up to 1.6 mm
- Ceramic Insulation for Extended Lifetime
- Ideal for Scanning Applications
- Vacuum-Compatible Versions
- Low Operating Voltage
- Mounting Hardware Included
- Special Controllers / Drivers Available

P-871 transducers are unique closed-loop piezo benders based on the open-loop PL122 to PL140 PICMA®-series multilayer actuators. Equipped with high-resolution position feedback sensors they provide better linearity, accuracy and repeatability than other piezo benders on the market. P-871 bender actuators achieve

longer positioning ranges than typical piezo actuators, up to 1.6 mm, and response times in the millisecond range. For ease of installation, the units come complete with the mounting hardware, cables and connectors.

Long Lifetime and High Performance—Ideal for Dynamic Operation

PICMA® Bender actuators are superior to conventional actuators in high-endurance situations. They show substantially longer lifetimes both in static and dynamic operation, even in harsh environments. The monolithic, ceramic-encapsulated design provides better humidity protection than polymer-film insulation. Diffusion of water molecules into the

insulation layer is greatly reduced by the use of cofired, outer ceramic encapsulation.

Closed-Loop Position Control for Higher Accuracy

P-871s are ideal devices for scanning, positioning and beam deflection applications and provide much better accuracy, stability and repeatability than conventional open-loop actuators. The special bender design allows the direct application of a strain gauge sensor to the surface without the need for a polymer insulation layer in between. The advantages are faster response, reduced phase lag and precise position control with non-linearity of <0.5%. The settling time for a small-signal step (up to 1% nominal travel) to an accuracy of better than 1% is between 10 ms (P-871.112) and 30 ms (P-871.140).

Amplifiers, Drivers & Controllers

PI offers a wide range of standard amplifiers and controllers for piezo actuators. The E-651.1S and E-651.2S desktop controllers and the E-614.2BS OEM board are specifically designed to operate P-871 bender actuators.

Ordering Information

- P-871.112**
Closed-loop Piezo Bender Actuator, 160 µm, 9.6 mm Width, SGS
- P-871.122**
Closed-loop Piezo Bender Actuator, 400 µm, 9.6 mm Width, SGS
- P-871.127**
Closed-loop Piezo Bender Actuator, 720 µm, 9.6 mm Width, SGS
- P-871.128**
Closed-loop Piezo Bender Actuator, 720 µm, 6.3 mm Width, SGS
- P-871.140**
Closed-loop Piezo Bender Actuator, 1600 µm, 11.0 mm Width, SGS

Of course, PI also designs custom actuators, amplifiers and controllers.

Application Examples

- Wire bonding
- Fiber optic switches
- Beam deflection and stabilization
- Scanning of optical components
- Alignment of optical components



E-651 2-channel and 1-channel controllers with P-871 bender actuators

Piezo Actuators

Nanopositioning & Scanning Systems

Active Optics / Steering Mirrors

Tutorial: Piezo-electrics in Positioning

Capacitive Position Sensors

Piezo Drivers & Nanopositioning Controllers

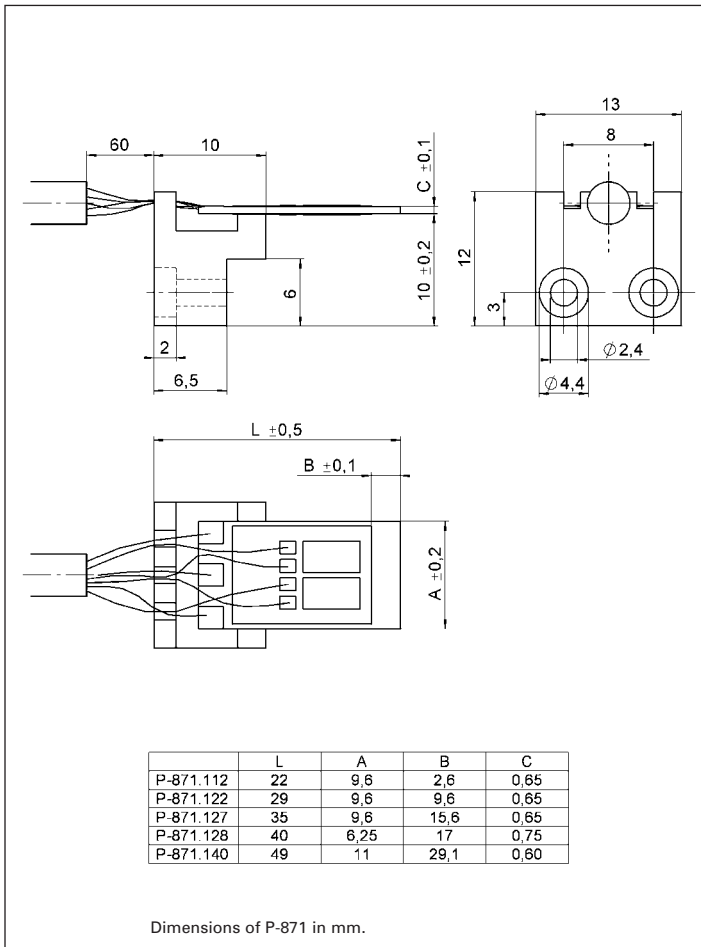
Hexapods / Micropositioning

Photonics Alignment Solutions

Motion Controllers

Ceramic Linear Motors & Stages

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Technical Data

Models	P-871.112 *	P-871.122	P-871.127	P-871.128 *	P-871.140	Units
Closed-Loop Deflection	160	400	720	720	1600	μm
Integrated Feedback Sensor	SGS	SGS	SGS	SGS	SGS	
Closed-loop linearity	0.5	0.5	0.5	0.5	0.5	%
Stiffness	0.02	0.01	0.003	0.002	0.0007	N/μm ± 20%
Blocking force	2.0	1.1	1.0	0.5	0.5	N ± 20%
Electrical capacitance	2 x 1.1	2 x 1.6	2 x 2.3	2 x 1.2	2 x 2.7	μF ± 20%
Unloaded resonant frequency	2540	1010	560	340	195	Hz ± 20%
Resonant frequency @ 6.5 g load	480	220	145	100	60	Hz ± 20%
Mass (incl. cables)	33.5	34.5	34.5	34.0	35.5	g
Recommended driver / controller	E-651 / E-614	E-651 / E-614	E-651 / E-614	E-651 / E-614	E-651 / E-614	

Operating voltage: 0 to 60 V
 Cable length: >1000 mm
 Connector: 1 LEMO connector
 for both sensor and voltage supply
 Parameters depend on applied load
 Operating temperature:
 -20 °C to +85 °C
 * -20 °C to +150 °C