

P-010.xxH

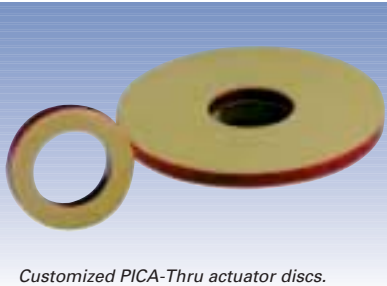
P-016.xxH

P-025.xxH

## PICA-Thru Piezo Stack Actuators with Aperture



PICA-Thru piezo stack actuators with clear aperture.



Customized PICA-Thru actuator discs.

- **Clear Aperture for Transmitted-Light Applications**
- **Large Cross-Sections Available (to 56 mm Diameter)**
- **Variety of Shapes**
- **Extreme Reliability >10<sup>9</sup> Cycles**
- **Proven and Flexible Design**
- **Sub-Nanometer Resolution / Sub-Millisecond Settling-Time**
- **Vacuum Compatible Versions**

PICA-Thru actuators are hollow piezo stack actuators, offered in a large variety of standard shapes and sizes with additional custom designs to meet all customer requirements. They combine the advantage of a clear aperture with the strength and force generation of stack actuators. These tubular devices are high-resolution linear actuators for static and dynamic applications.

### Ultra-High Reliability, High Displacement, Low Power Requirements

PICA piezo actuators are specifically designed for high-duty-cycle applications. With our extensive applications knowledge, gained over several decades, we know how to build performance that does not come at the price of reliability. All materials used are specifically matched for robustness and lifetime. Endurance tests on PICA actuators prove consistent performance, even after billions (1,000,000,000) of cycles. The combination of high displacement and low electrical capacitance provides for excellent dynamic behavior with reduced driving-power requirements.

### Flexibility: PI Ceramic's Strength

All manufacturing processes at PI Ceramic are set up for maximum flexibility. Should our standard actuators not fit your application, let us provide you with a custom design. Our engineers will work with you to find the optimum solution for your application at a very attractive price, even for small quantities. Some of our custom capabilities are listed below:

- Custom Materials
- Custom Voltage Ranges
- Custom Geometries
- Custom Displacement
- Custom Load / Force Ranges
- Custom Endplates (Alumina, Glass, Sapphire, ...)
- Extra-Tight Length Tolerances
- Custom-Molded Versions
- Integrated Piezoelectric Sensor Discs
- Low Temperature Versions
- Vacuum Versions

### Short Leadtime for Standard & Custom Designs

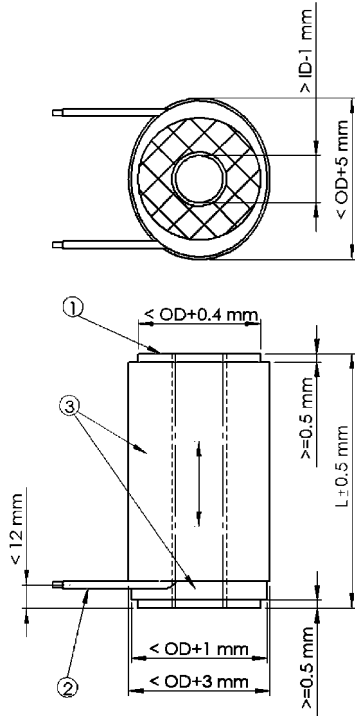
Because all piezoelectric materials used in PICA actuators are manufactured at PI Ceramic, leadtimes are short and quality is outstanding. All standard and custom PICA actuators are delivered with performance test sheets.

### Amplifiers, Drivers & Controllers

PI offers a wide range of control electronics for piezo actuators (see page 28 and [www.pi.ws](http://www.pi.ws)) from low-power drivers to multi-channel, closed-loop, digital controllers. Of course, PI also designs custom amplifiers and controllers.

### Application Examples

- Optics
- Image stabilization
- Laser tuning
- Laser treatment
- Precision mechanics
- Confocal microscopy
- Micropositioning



- ① ceramic interface (both sides)
- ② PTFE insulated wires for high voltage control (red max. 1000 V / black GND, length >100 mm, D<1.2 mm)
- ③ shrink tube

PICA-Thru piezo actuator dimensions, see technical data table for further information.

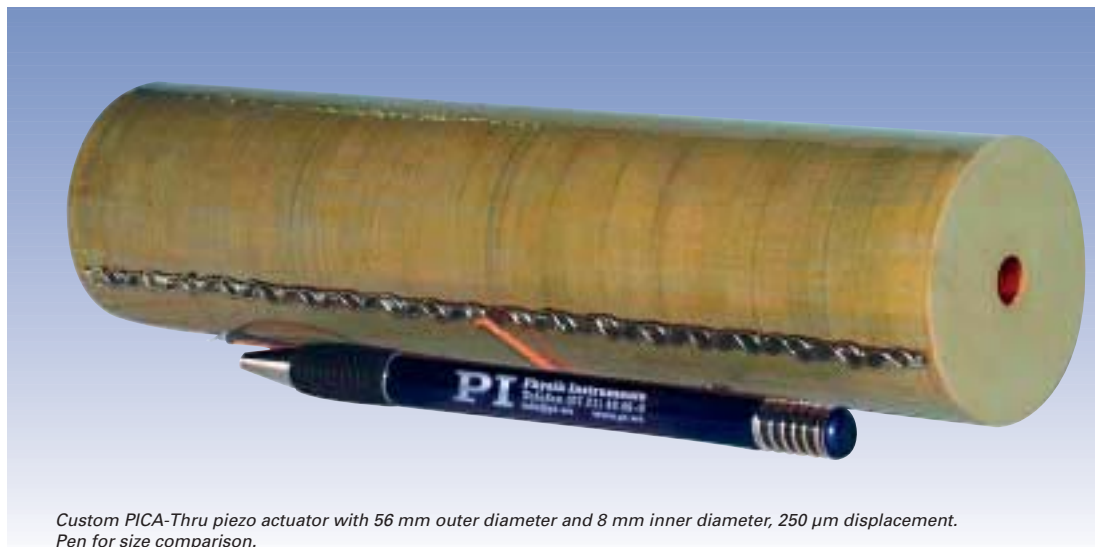
### Technical Data / Ordering Numbers

Ordering Number	Displacement [ $\mu\text{m}$ -10/+20%]	Diameter OD [mm]	Diameter ID [mm]	Length L [mm $\pm 0.5$ ]	Blocking force [N]	Stiffness [N/ $\mu\text{m}$ ]	Capacitance [nF $\pm 20\%$ ]	Resonant frequency [kHz]
P-010.00H	5	10	5	7	1200	230	15	144
P-010.05H	10	10	5	12	1300	130	27	84
P-010.10H	15	10	5	15	1700	110	40	67
P-010.15H	20	10	5	21	1500	76	51	48
P-010.20H	30	10	5	27	1800	59	82	39
P-010.30H	40	10	5	40	1600	40	110	28
P-010.40H	60	10	5	52	1800	31	170	21
P-016.00H	5	16	8	7	2900	580	42	144
P-016.05H	10	16	8	12	3400	340	78	84
P-016.10H	15	16	8	15	4100	270	120	67
P-016.15H	20	16	8	21	3800	190	150	48
P-016.20H	30	16	8	27	4500	150	230	39
P-016.30H	40	16	8	40	4000	100	310	28
P-016.40H	60	16	8	52	4700	78	490	21
P-025.10H	15	25	16	16	7400	490	220	63
P-025.20H	30	25	16	27	8700	290	430	39
P-025.40H	60	25	16	51	9000	150	920	22
P-025.50H	80	25	16	66	9600	120	1200	17

Unloaded (longitudinal) resonant frequency measured at  $1 V_{pp}$ , capacitance at  $1 V_{pp}$ , 1 kHz. Blocking force at 1000 V.

Standard PZT ceramic type: PIC 151 (see page 40)  
 Operating voltage range: 0 to 1000 V  
 Operating temperature range: -20 to +85 °C  
 Standard mechanical interface (top & bottom): ceramic, 0.5 - 2 mm thick  
 Standard electrical interface: two PTFE insulated wires, pigtail length 100 mm  
 Available options: integrated piezo sensor or strain gauge sensors, vacuum compatible, etc.

Other specifications on request.  
 Specifications subject to change without notice.



Custom PICA-Thru piezo actuator with 56 mm outer diameter and 8 mm inner diameter, 250  $\mu\text{m}$  displacement. Pen for size comparison.