PUlaudio

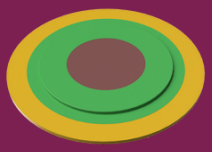
Oct 2023 | Product Highlight

Our New Piezo Haptics

Wide Temperature Range Benders: Perfect for Harsh Environment!.

Target Applications:

- Harsh, outdoor environments
- Automotive
- Human-Machine Interfaces
- Wearable Electronics

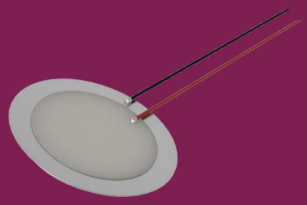


HD-PAB1501

-Dimensions: φ15mm x 0.31mm

-40° to 85° C

-300Vp-p 55μm



AB1270A-LW100

-Dimensions: φ12mm X 0.17mm

-30° to 80° C

-30Vp-p

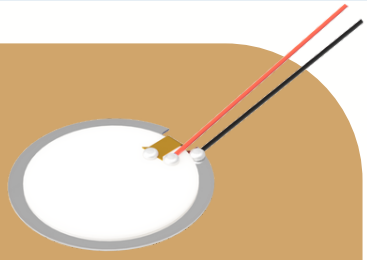
-Resonant Frequency: 7KHz

High Displacement Piezo Bender: Perfect for Pump applications!

HD-PAB2001-LW100

-Dimensions: φ20mm x 0.73mm

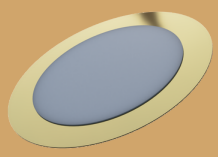
-Multilayer 40μm @ 1Hz±90VDC



HD-PAB2701-2

-Dimensions: φ27mm x 0.23mm

-75μm @ 1Hz±90VDC



Target Applications:

- Air or liquid Piezo pump
- Blood pressure pump or insulin pump
- Printer bulk ink supply system
- Liquid & gas transmission system
- Consumer tablets, notepads

Our newly developed actuator undergoes rigorous testing to ensure optimal compatibility with a wide range of applications

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Wide Temperature Range Benders

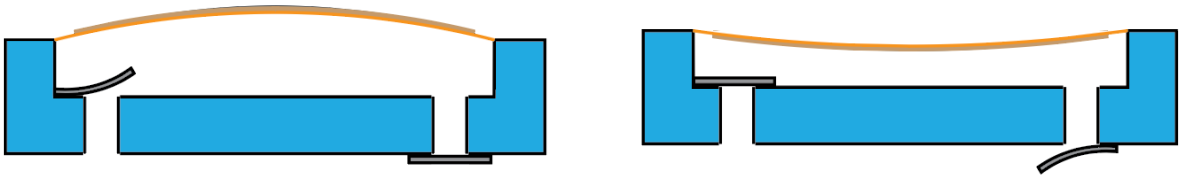
HD-PAB1501 and AB1270A-LW100

Piezoelectric materials are typically limited in their operating temperature range due to their intrinsic properties, which can degrade at high temperatures. However, there are specialized piezoelectric materials and products designed for high-temperature applications. These materials are often referred to as "high-temperature piezoelectric materials". They can withstand elevated temperatures and are used in specific industrial and research applications where standard piezoelectric materials would not be suitable.

Low-Profile, High Displacement Benders

HD-PAB2001-LW100 and HD-PAB2701-2

These new benders rated at high voltage ratings offer higher displacement are designed for a microfluidic pump in which a piezoelectric element rests inside a pump chamber; as the bender is excited by a repetitive signal, it expands and contracts, changing the internal volume and pressure of the pump chamber. When the piezoelectric element expands, the volume of the chamber expands, decreasing pressure and drawing in fluid from a one-way input port attached to the pump chamber. Similarly, a one-way outlet port allows fluid to be pushed out of the pump chamber when the piezoelectric element contracts.



Applications such as these do not require any change to the drive system or actuation pattern after manufacturing, making a clear use case for developing a discrete drive system. Here, the bender receives a repetitive low-level signal from a source such as a microcontroller, which is then amplified using a discrete circuit to cause repetitive motion in the piezoelectric bender, resulting in a constant liquid flow through the pump. Various designs exist for the pump and housing itself, but most rely on this principle.

A critical step in this process is to perform any required signal conditioning to the input signal before it reaches the amplification stage. As this is highly specific to individual environments, the system's design must ensure that the repetitive signal generated for the application is free from any noise or distortion and remains accurate to the intended frequency and electrical parameters after amplification.

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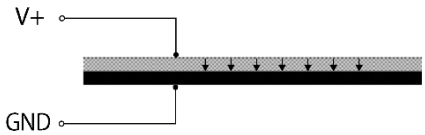
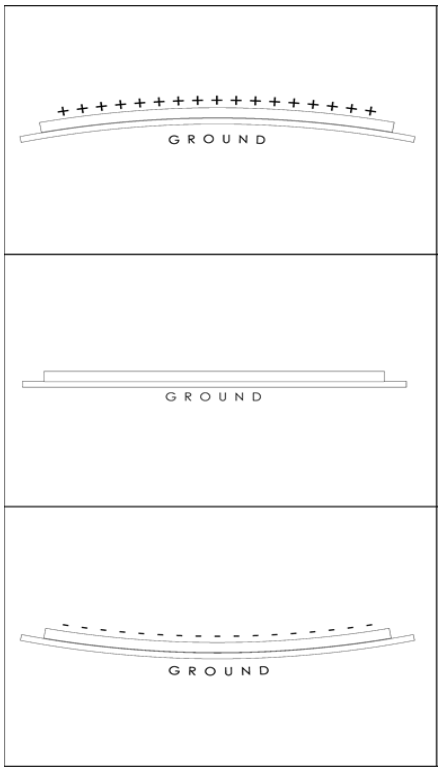
Wiring Configuration

Unimorph Series Wiring:

In this configuration, the unimorph bender is connected to the voltage source, with one terminal connected to the active piezo layer and the other terminal connected to the passive layer.



Unimorph Operation



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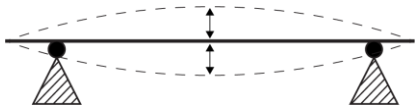
Mounting Configurations

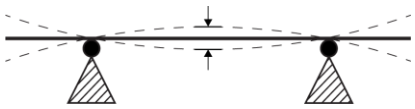
Edge/Beam Mounting:

Edge or beam mounting involves attaching the piezo actuator to a rigid structure by its edges. This type of mounting allows the actuator to produce its maximum deflection in the center while maintaining stability. Edge mounting is commonly used for bending discs.



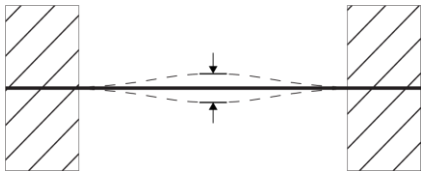
Nodal Mounting:

Nodal mounting refers to fixing the piezo actuator at its nodes, the points where the actuator exhibits minimal displacement. This mounting style ensures that the actuator remains stationary while the rest of the piece undergoes motion. Nodal mounting is ideal for applications requiring precise control over vibration and movement.



Clamped Mounting:

This mounting configuration involves securing all edges of the piezo actuator to a surface, completely restricting deformation. Clamped mounting limits the actuator's movement and is typically used in applications where stability is essential, and vibration must be minimized.



Applications and Reference Designs

Resonant Chamber Design & Drive Circuits

Please view our Whitepaper that details the design of a Helmholtz chamber and associated drive circuits.

As a haptic device, or other actuator

Please refer to the drive circuit section of this Whitepaper that explores different methods of driving piezoelectric actuators.

Want to learn more?

Construction of a Piezo Bender

Soldering Lead Wires to a Piezo Bender

Overcoming the Pitfalls of Poor Audio

Find additional products at:

https://puiaudio.com/products/category/benders

https://puiaudio.com/products/category/haptics