

## Ruggedized Piezoelectric Benders



### Product data sheet (Jul 2023)

High performance unimorph and bimorph bending actuators designed for applications requiring extremely high reliability. With dual-layer protection technology, the piezo actuators can run billions of cycles without experiencing any degradation.

### Advantages

- Super reliable
- Easy integration
- Highly customizable

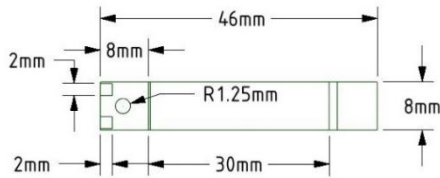
### Applications

- Research, vibration control, energy harvesting, precision control, robotics...

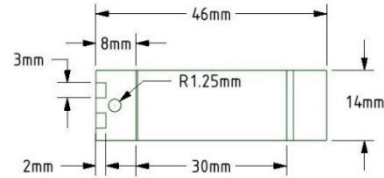
## Specifications

	Unit	Tolerance	PUA3008-5H200	PUA3014-5H200	PUA6020-5H200	PBA3008-5H200	PBA3014-5H200	PBA6020-5H200
Type			Unimorph	Unimorph	Unimorph	Bimorph	Bimorph	Bimorph
Total length	mm	±0.4	46	46	80	46	46	80
PZT length	mm	±0.2	30	30	60	30	30	60
PCB length	mm	±0.2	8	8	10	8	8	10
Width	mm	±0.2	8	14	20	8	14	20
Thickness	mm	±0.1	0.54	0.54	0.54	0.65	0.65	0.65
Dome-height	mm	±0.2	0.45	0.45	1.3	0	0	0
Mass	g	±0.1	0.59	1.12	2.87	0.82	1.52	4.23
Displacement	mm	±15%	-0.15 to 0.42	-0.15 to 0.42	-0.68 to 1.85	±0.39	±0.43	±1.69
Blocking force	N	±15%	0.18	0.3	0.24	0.15	0.29	0.23
Resonance	Hz	±15%	271	271	65	219	219	58
Piezo thickness	mm	±10%	0.2	0.2	0.2	0.2	0.2	0.2
Capacitance	nF	±15%	26	45	142	52	90	284
Operating volt	V	-	-90 to +160	-90 to +160	-90 to +160	-90 to +160	-90 to +160	-90 to +160
Operating T	C	-	-20 to 85	-20 to 85	-20 to 85	-20 to 85	-20 to 85	-20 to 85

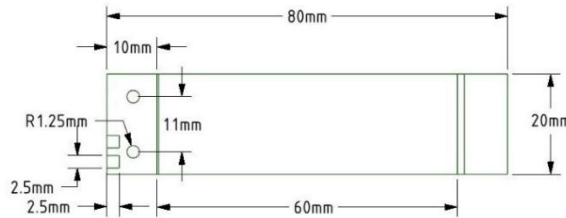
### Mechanical dimensions



PxA3008-5H200



PxA3014-5H200

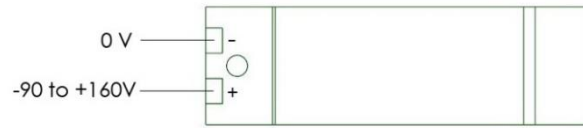


PxA6020-5H200

### Electrical connections

The bending actuators are designed with thermally isolated copper pads for convenient wire connections. The actuator can be driven using both unipolar voltages (0 to 160V) or semi-bipolar voltages (-90 to 160V). However, caution should be exercised when using semi-bipolar voltages, as they may result in significant hysteresis and energy loss of the actuators. It is recommended to utilize semi-bipolar voltages only when additional displacement is required.

PUAxxxx-xxxxx



PBAxx14-xxxxx



Top view



Bottom view

PBAxx08-xxxxx

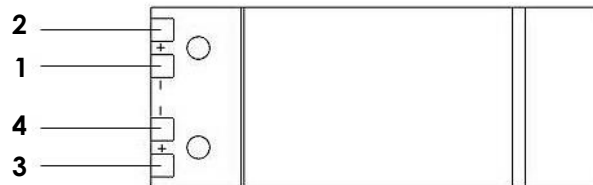


Top view



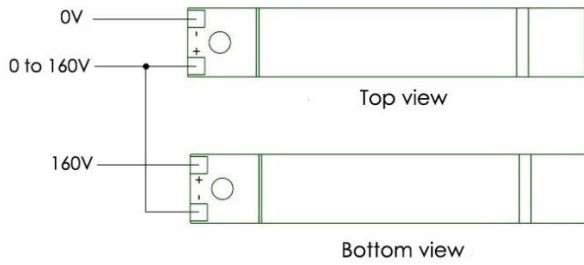
Bottom view

PBAxx20-xxxxx

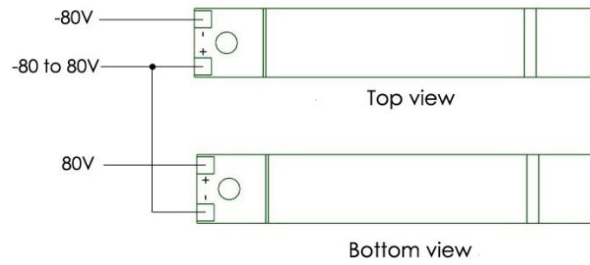


Wire #	1	2	3	4	Displacement
Configuration 1	0V	0 to 160V	0V	0V	Single side - upward
Configuration 2	0V	0V	0 to 160V	0V	Single side - downward
Configuration 3	0V	0 to 160V	160V	0 to 160V (connected to 2)	Both side - symmetrical
Configuration 4	-80V	-80 to 80V	80V	-80 to 80V (connected to 2)	Both side - symmetrical
Configuration 5	0V	0 to 160V	0V	0 to 90V	Single side - upward
Configuration 6	0 to 90V	0V	0 to 160V	0V	Single side - downward

Configuration 3

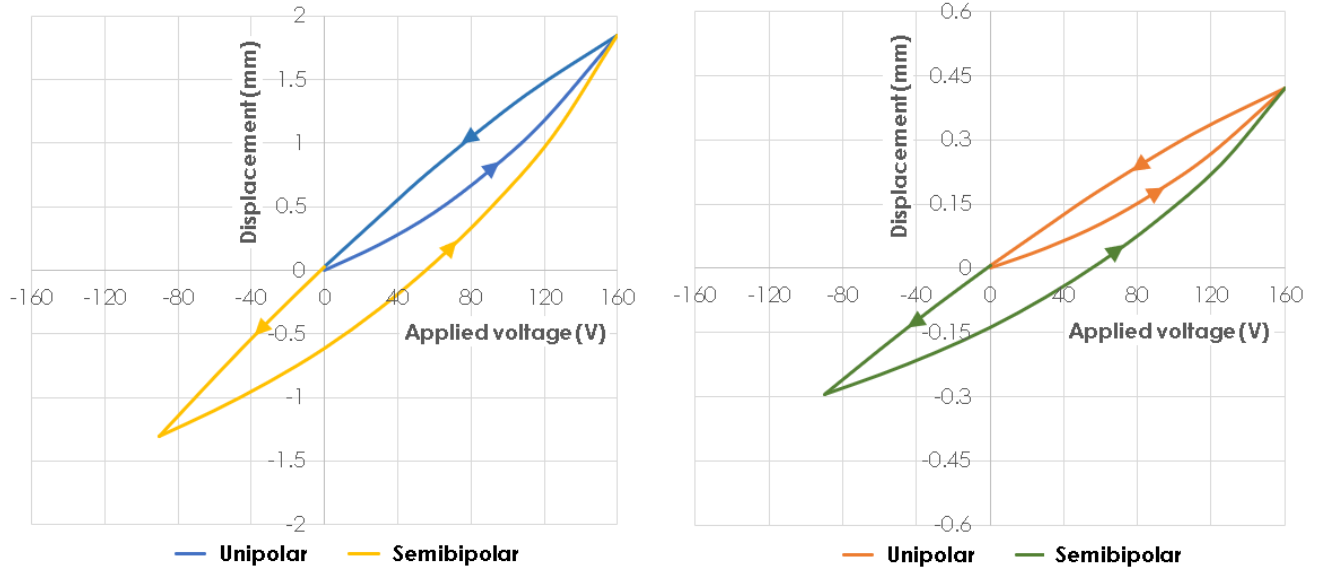


Configuration 4

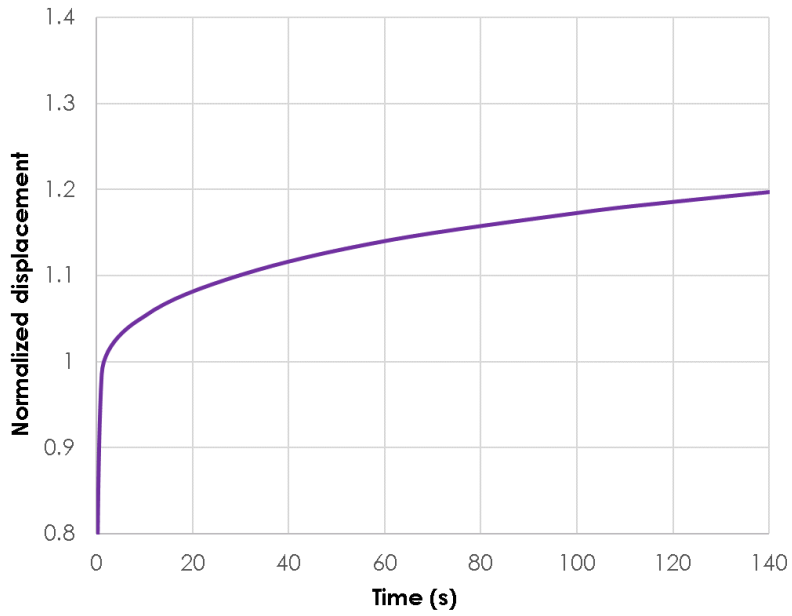


Performance

Hysteresis

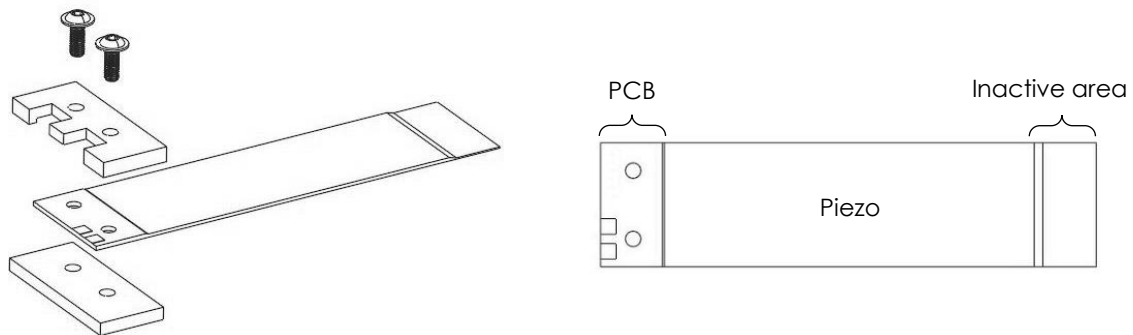


Creep



## Mounting instructions

The PCB features hole(s) that enable secure clamping of the actuator using screws, holders, and washers. An example design of the holder, depicted in the picture below, can be utilized. It is crucial to apply clamping force to the PCB area only, as direct clamping on the piezo layer may result in damage. Alternatively, epoxy can be employed as another mounting method. Please note that the other end of the actuator comprises an inactive area, allowing for additional mechanical integration. If required, this area can be drilled, machined, or entirely removed as needed.



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