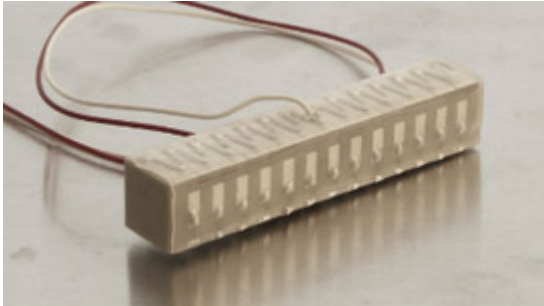


NAC5021-Hxx



Noliac damage tolerant actuator stack NAC5021-Hxx (height in mm - Hxx) is a multilayer actuator that can be stacked to match your requirements. The fuse technology of the damage tolerant stack fuses out any damaged ceramic element and the remaining ceramic elements continue to operate. This makes the damage tolerant stack an effective way to ensure high reliability for critical applications. The damage tolerant stack provides a stroke up to 112.2 μm and blocking force up to 2060 N depending on the height of the stack.

SPECIFICATIONS

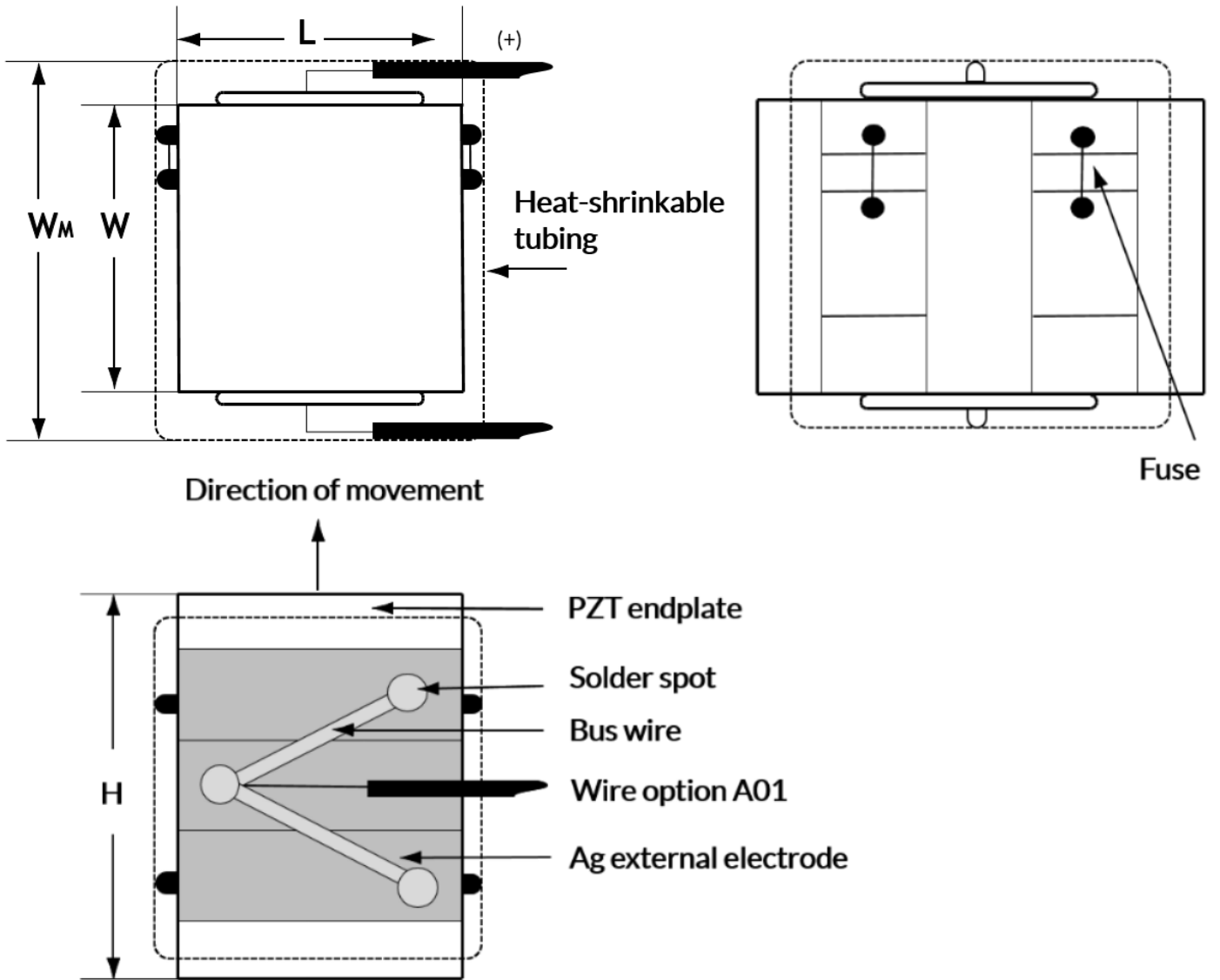
Attributes	Value	Tolerance
Length / outer diameter	7 mm	+0.35/-0.15 mm
Width / inner diameter	7 mm	+0.35/-0.15 mm
Max width / outer diameter max	9.56 mm (see remarks)	
Height	4 — 70 mm	+/-0.2 mm or 1% (whichever is largest)
Operating voltage, max.	200 V	
Free stroke, max.	3.3 — 112.2 μm	+/- 15%
Blocking force, max.	2060 N	+/-20%
Capacitance	200-6750 nF	+/- 15%
Stiffness	624-18 N/ μm	+/-20%
Maximum operating temperature	150 °C	
Material	NCE51F	
Unloaded resonance frequency	>248 k - 16 k Hz	
Electrodes	Screen-printed Ag and soldered bus wire	
Remarks	Max width and length	

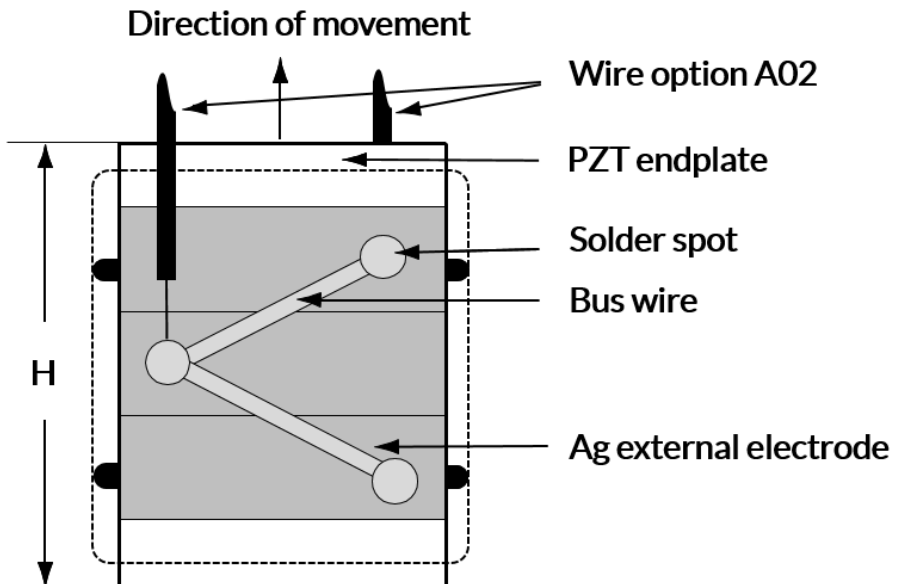
Stack options

Height	Stroke	Capacitance
4 mm	3.3 μm	200 nF

6 mm	6.6 μm	400 nF
8 mm	9.9 μm	590 nF
10 mm	13.2 μm	790 nF
12 mm	16.5 μm	990 nF
14 mm	19.8 μm	1190 nF
16 mm	23.1 μm	1390 nF
18 mm	26.4 μm	1580 nF
20 mm	29.7 μm	1780 nF
22 mm	33 μm	1980 nF
24 mm	36.3 μm	2180 nF
26 mm	39.6 μm	2380 nF
28 mm	42.9 μm	2570 nF
30 mm	46.2 μm	2770 nF
32 mm	49.5 μm	2970 nF
34 mm	52.8 μm	3170 nF
36 mm	56.1 μm	3370 nF
38 mm	59.4 μm	3560 nF
40 mm	62.7 μm	3760 nF
42 mm	66 μm	3960 nF
44 mm	69.3 μm	4160 nF
46 mm	72.6 μm	4360 nF
48 mm	75.9 μm	4550 nF
50 mm	79.2 μm	4750 nF
52 mm	82.5 μm	4950 nF
54 mm	85.8 μm	5150 nF
56 mm	89.1 μm	5350 nF
58 mm	92.4 μm	5540 nF
60 mm	95.7 μm	5740 nF
62 mm	99 μm	5940 nF
64 mm	102.3 μm	6140 nF
66 mm	105.6 μm	6340 nF
68 mm	108.9 μm	6530 nF
70 mm	112.2 μm	6730 nF

DRAWINGS





MOUNT AND CONNECT

Mounting

The stacks have ground top and bottom insulating ceramic end-plates in order to obtain flat and parallel surfaces for mounting. The stacks may be mounted either by mechanical clamping or gluing.

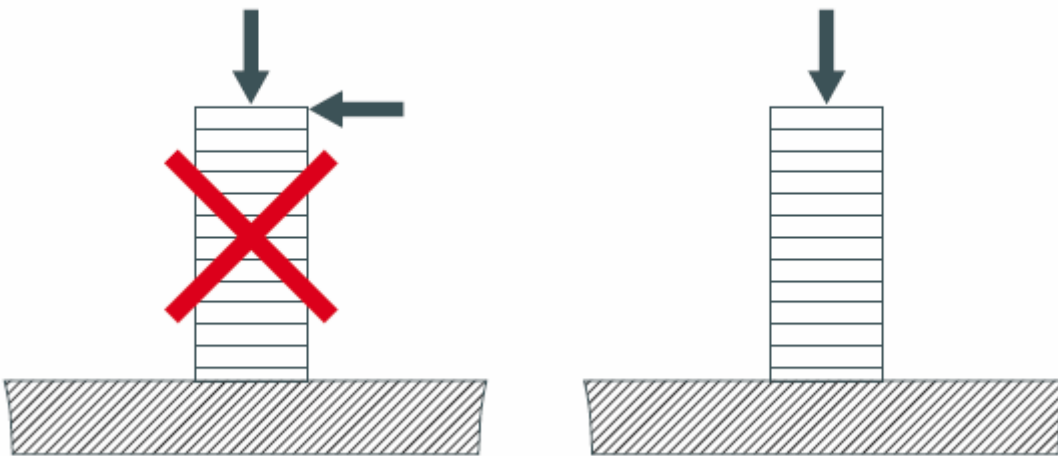
If glued, it is important to ensure a very thin glue line between the actuator and the substrate. It is recommended that a pressure, e.g. 2-5 MPa, is applied during the curing process.

During manufacturing or handling, minor chips on the end-plates can appear. Minor chips cannot be avoided, but such chips do not affect performance.

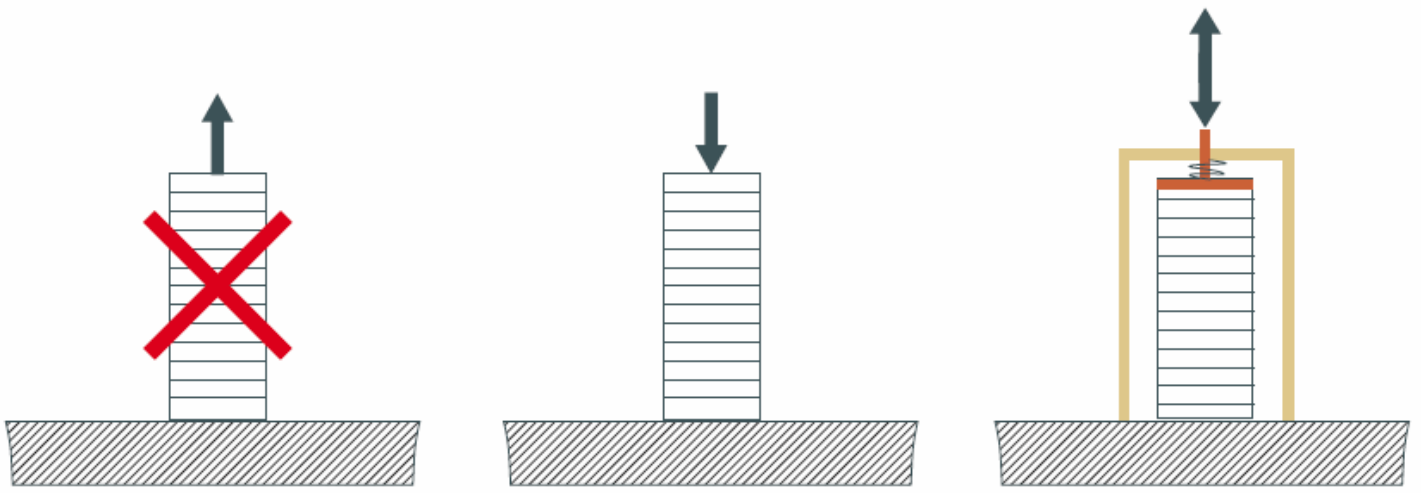
Electrical connection

The positive electrode is indicated by the red wire.

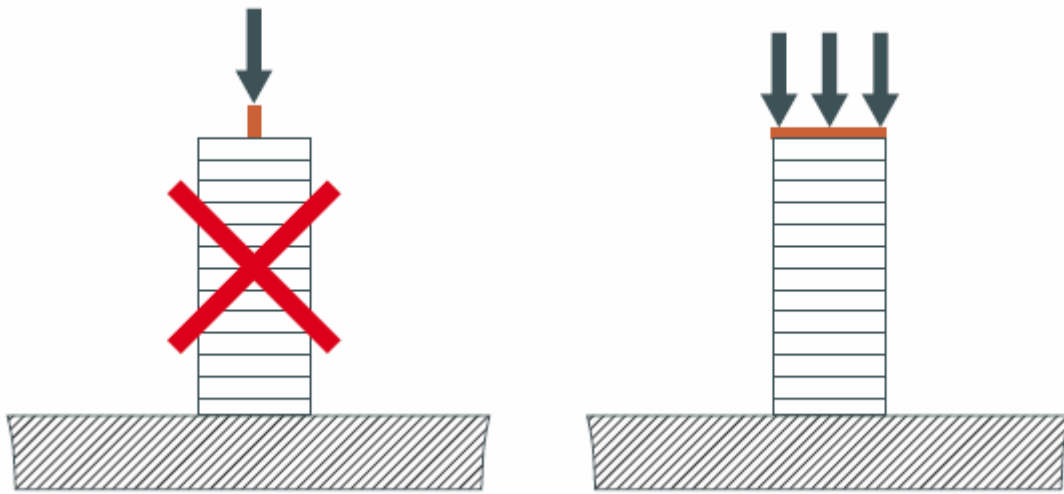
The actuators may only be stressed axially. Tilting and shearing forces must be avoided.



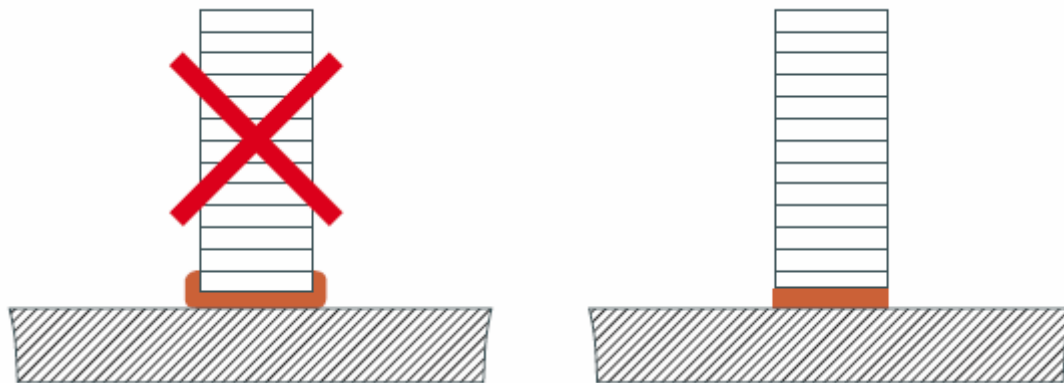
The actuators without preload are sensitive to pulling forces. It is recommended to apply a pre-load in order to optimize the performances of the actuators.



The force must be applied on the full surface of the actuator in order to assure a good load distribution.



Epoxy glues are well suited for gluing piezoceramics.



WIRES

The Noliac fuse stack is delivered with wires. Therefore, when you order a fuse stack from Noliac, you have to select one of our wire options below. You should consider these parameters, when you select a wire for connection:

- Operation voltage
- Intensity of current
- Operating temperature
- Environment

We recommend Teflon wires

Teflon wires can stand temperatures above 200 °C, whereas PVC wires only resist temperatures up to 80 °C. In tough operating conditions or in vacuum, it is recommended always to use Teflon isolated wires to guarantee the proper performances of PZT elements.

Wire thickness (AWG)

The wire thickness is determined by the current that has to be transmitted to and from the PZT element. The required current is determined by the capacitance of the PZT element, the maximum driving frequency and the maximum voltage U_{p-p} .

	Option A01	Option A02	Option C
Type	28 AWG Teflon	28 AWG Teflon	Custom
Length	200 +/- 10mm	200 +/- 10mm	To be defined
Position	Middle of the actuator	Middle of the actuator	To be defined
Direction	Perpendicular to the height	Toward top	To be defined

