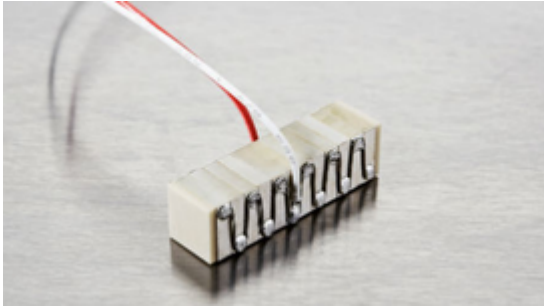


NAC2014-Hxx



Noliac plate stack actuator NAC2014-Hxx (height in mm – Hxx) is based on the multilayer actuator NAC2014 and can be stacked to match your requirements. The standard range of NAC2014-Hxx is produced in a height between 4-70 mm. The plate stack provides a stroke up to 112.2 μm and blocking force up to 2060 N depending on the height of the stack.

SPECIFICATIONS

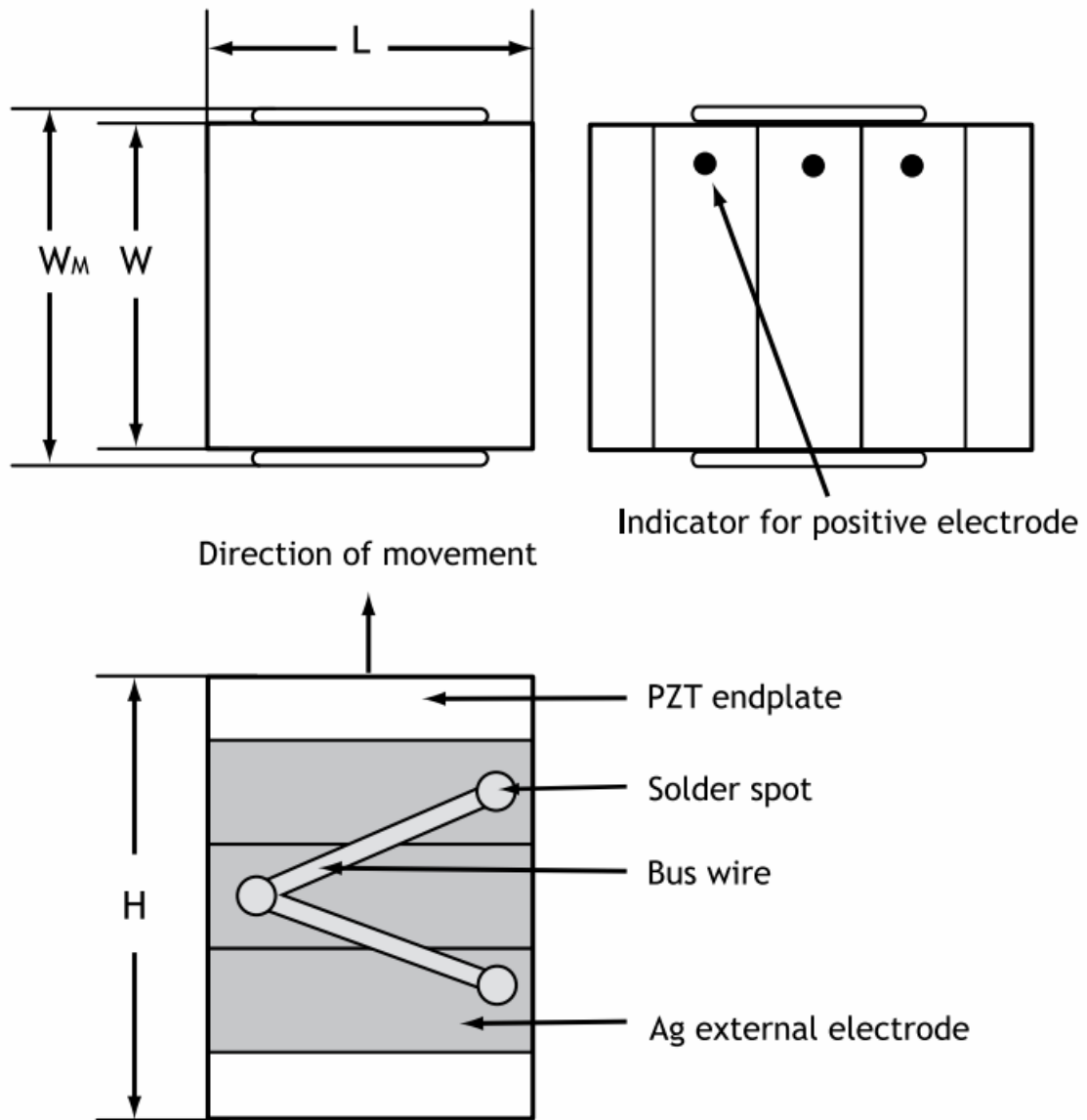
| Attributes | Value | Tolerance |
|--------------------------------|---|--|
| Length / outer diameter | 7 mm | +0.35/-0.15 mm |
| Width / inner diameter | 7 mm | +0.35/-0.15 mm |
| Max width / outer diameter max | 8.8 mm | |
| Height | 4 — 70 mm | +/-0.2 mm or 1% (whichever is largest) |
| Operating voltage, max. | 150 V | |
| Free stroke, max. | 3.3 — 112.2 μm | +/- 15% |
| Blocking force, max. | 2060 N | +/-20% |
| Capacitance | 340-11650 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 (option: glued connections) | |

Stack options

| Height | Stroke | Capacitance |
|--------|--------------------|-------------|
| 4 mm | 3.3 μm | 340 nF |
| 6 mm | 6.6 μm | 680 nF |
| 8 mm | 9.9 μm | 1030 nF |
| 10 mm | 13.2 μm | 1370 nF |

| | | |
|-------|---------------------|----------|
| 12 mm | 16.5 μm | 1710 nF |
| 14 mm | 19.8 μm | 2050 nF |
| 16 mm | 23.1 μm | 2390 nF |
| 18 mm | 26.4 μm | 2740 nF |
| 20 mm | 29.7 μm | 3080 nF |
| 22 mm | 33 μm | 3420 nF |
| 24 mm | 36.3 μm | 3760 nF |
| 26 mm | 39.6 μm | 4100 nF |
| 28 mm | 42.9 μm | 4450 nF |
| 30 mm | 46.2 μm | 4790 nF |
| 32 mm | 49.5 μm | 5130 nF |
| 34 mm | 52.8 μm | 5470 nF |
| 36 mm | 56.1 μm | 5810 nF |
| 38 mm | 59.4 μm | 6160 nF |
| 40 mm | 62.7 μm | 6500 nF |
| 42 mm | 66 μm | 6840 nF |
| 44 mm | 69.3 μm | 7180 nF |
| 46 mm | 72.6 μm | 7520 nF |
| 48 mm | 75.9 μm | 7870 nF |
| 50 mm | 79.2 μm | 8210 nF |
| 52 mm | 82.5 μm | 8550 nF |
| 54 mm | 85.8 μm | 8890 nF |
| 56 mm | 89.1 μm | 9230 nF |
| 58 mm | 92.4 μm | 9580 nF |
| 60 mm | 95.7 μm | 9920 nF |
| 62 mm | 99 μm | 10260 nF |
| 64 mm | 102.3 μm | 10600 nF |
| 66 mm | 105.6 μm | 10940 nF |
| 68 mm | 108.9 μm | 11290 nF |
| 70 mm | 112.2 μm | 11630 nF |

DRAWINGS



MOUNT AND CONNECT

Mounting

The actuators are usually grinded on top and bottom surfaces (perpendicular to the direction of expansion) in order to obtain parallel surfaces for mounting. The actuators may be mounted either by mechanical clamping or gluing.

Avoiding short circuit can either be achieved by:

- Adding Kapton foil on the metallic surfaces.
- Having inactive ceramic plates between the actuator and the metal plate.
- Stacked actuators are manufactured with top and bottom insulating ceramic end-plates.

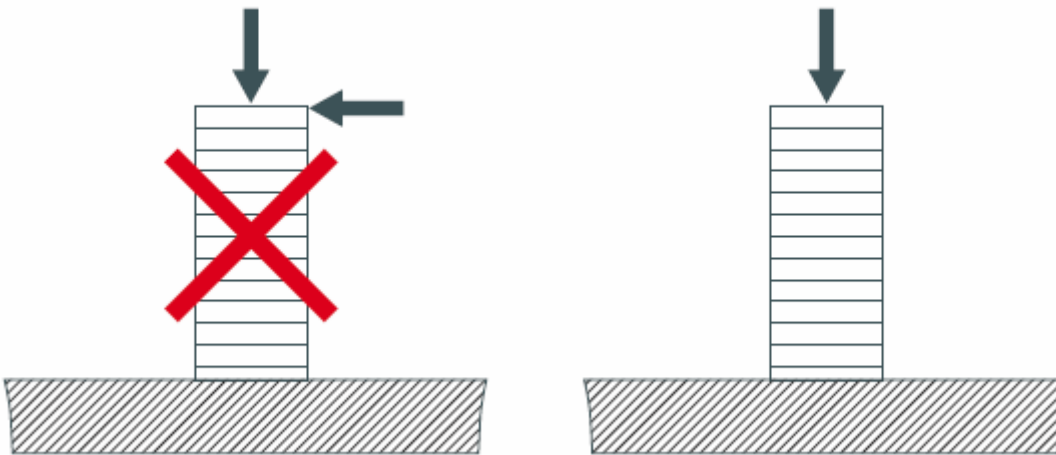
If glued, it is important to ensure a very thin glue line between the actuator and the substrate. It is recommended that a pressure is applied during the curing process.

To avoid significant loss of performance, the mounting of the actuators should avoid mechanical clamping and/or gluing on the side of the actuator.

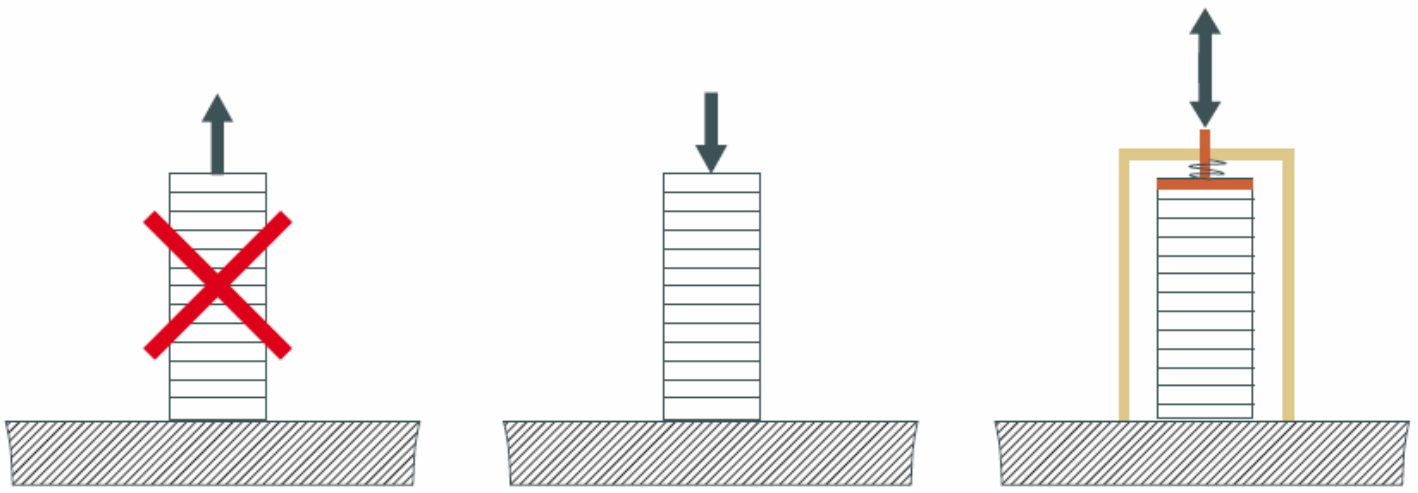
During manufacturing or handling, minor chips on the end-plates can appear. Minor chips cannot be avoided, but such chips can affect performance.

Electrical connection

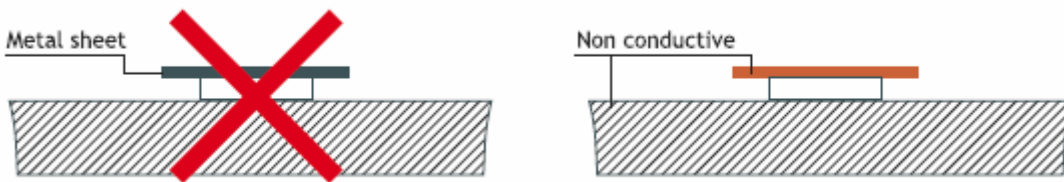
The actuators may only be stressed axially. Tilting and shearing forces must be avoided.



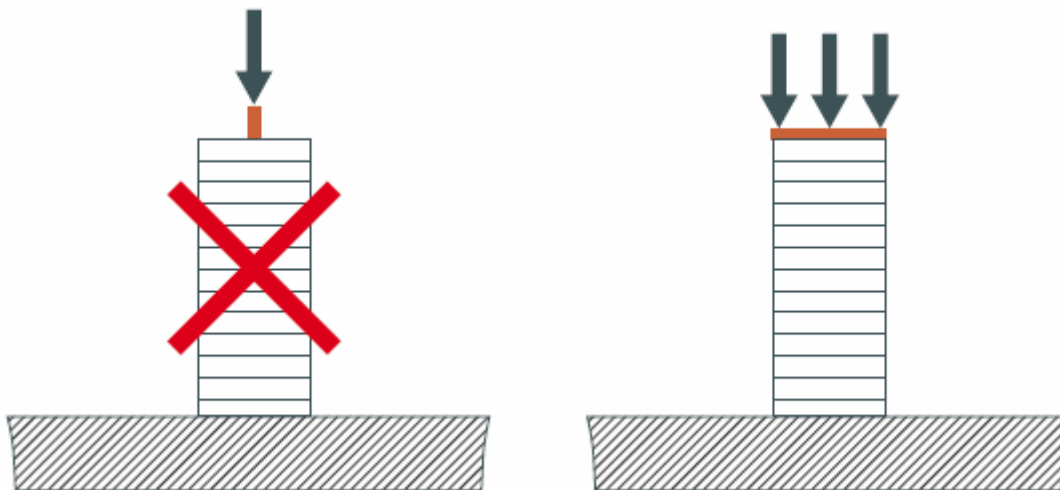
The actuators without preload are sensitive to pulling forces. It is recommended to apply a pre-load in order to optimize the performances of the actuators.



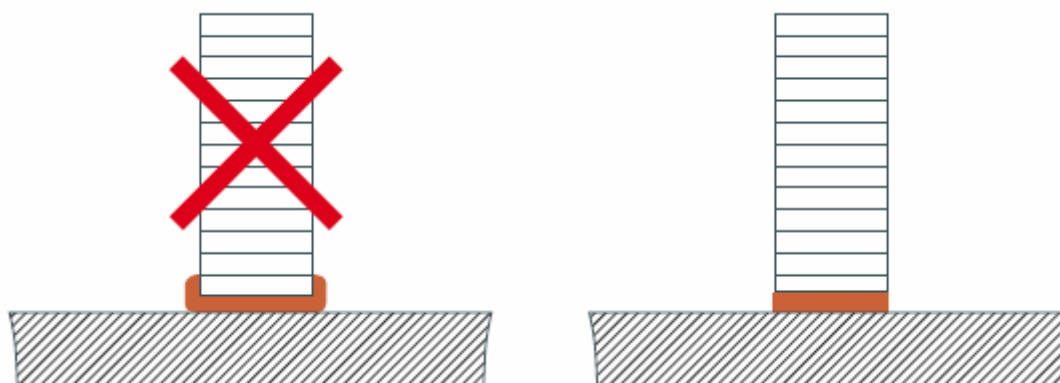
For linear actuators it is recommended not to use a metal plate on top and bottom in order to avoid short circuit.



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

When you order actuators from Noliac, you can have wires fitted to save time and money. However, you should consider these parameters, when you select a wire for connection:

- Operation voltage
- Intensity of current
- Operating temperature
- Environment for example vacuum

We recommend Teflon wires

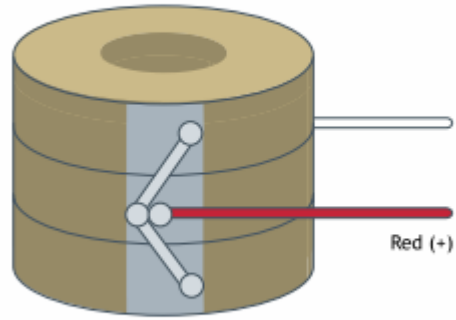
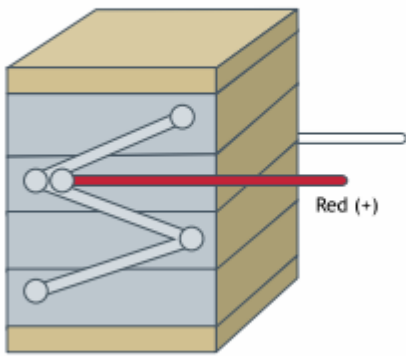
Teflon wires can stand temperatures above 200 °C, whereas PVC wires only resist temperatures up to 80 °C. In tough operating conditions or in vacuum, it is recommended always to use Teflon isolated wire to guarantee the proper performance of PZT-elements.

Wire thickness (AWG)

The wire thickness (AWG) 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 |

Type A01



Type A02

