

series N

Stack type actuators without casing

Concept:

PZT multilayer stack type actuators are made for industrial applications. They are specially shielded by a flexible insulation material which guarantees the highest possible dynamic performance under the toughest requirements. Based on their design, they are well suited for easy integration into specific customer systems. The flexible polymer coating material gives the PZT actuators proven protection against various and harsh environments. The advantage of a flexible insulation versus brittle ceramic insulation is a longer lifetime. These PZT multilayer stack type actuators have been successfully working for more than 15 years in a vast number of applications in the fields of nano-metrology, semiconductor, material sciences and scanning applications.

Specials:

PZT multilayer stack can be used in cryogenic applications down to a few Kelvin. They can also be used in vacuum atmosphere conditions as well. The Curie temperature for baking is 150°C.

Mounting:

It is rather important, not to subject the actuator tip to non-axial forces during the manufacturing process and use. To assist the mounting of the ceramic, ball tip end plates and flat tungsten carbide endplates are available in different sizes.

The standard cable length is 100mm. As an option, flat tungsten carbide or ball tip end plates are available. The PZT multilayer stacks are not pre-loaded.

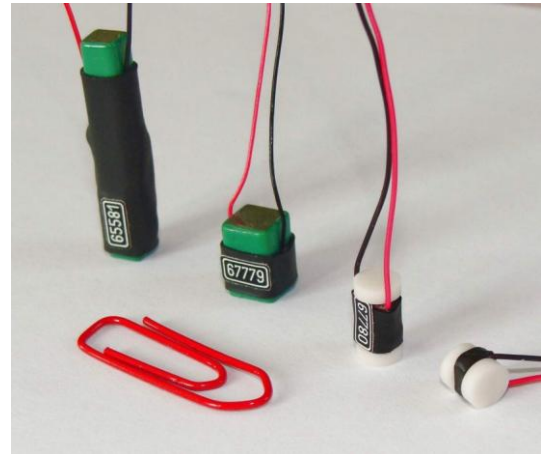


Image: series N

Product highlights:

- PZT multilayer stack without housing
- without pre-load
- motion up to 123µm
- high stiffness up to 250N/µm
- flexible mounting
- unlimited resolution
- flexible epoxy insulation to guarantee long life

Applications:

- positioning application demanding high accuracy under high load environment conditions, long lifetime, permanent movement in industrial applications

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| series N /5 | | unit | N 2/5 | N 4/5 | N 6/5 | | | | |
|------------------------------|------------|------------------|------------|-----------|-----------|-----------|-----------|-----------|----------|
| part no.: | | | P-211-00 | P-212-00 | P-213-00 | | | | |
| motion ($\pm 10\%$)* | | μm | 2 | 4 | 6 | | | | |
| capacitance ($\pm 20\%$ **) | | μF | 0.1 | 0.2 | 0.3 | | | | |
| resolution*** | | nm | 0.004 | 0.008 | 0.012 | | | | |
| stiffness | | N/ μm | 250 | 125 | 83 | | | | |
| blocking force | | N | 500 | 500 | 500 | | | | |
| operating voltage | | V | -20...+120 | | | | | | |
| dimensions | length L | mm | 5 | 7 | 9 | | | | |
| | diameter D | mm | 5 | 5 | 5 | | | | |
| series N /S3.5 | | unit | N 8/S3.5 | N 16/S3.5 | N 25/S3.5 | N 35/S3.5 | | | |
| part no.: | | | P-214-40 | P-216-40 | P-217-40 | P-218-40 | | | |
| motion ($\pm 10\%$)* | | μm - | 9 | 20 | 30 | 41 | | | |
| capacitance ($\pm 20\%$ **) | | μF | 0.4 | 0.8 | 1.2 | 1.6 | | | |
| resolution*** | | nm | 0.018 | 0.04 | 0.06 | 0.08 | | | |
| stiffness | | N/ μm | 46 | 21 | 14 | 10 | | | |
| blocking force | | N | 420 | 420 | 420 | 420 | | | |
| operating voltage | | V | -20...+130 | | | | | | |
| dimensions | length L | mm | 9 | 18 | 27 | 36 | | | |
| | width W | mm | 5.5 | 5.5 | 5.5 | 5.5 | | | |
| | height H | mm | 7.5 | 7.5 | 7.5 | 7.5 | | | |
| series N /S5 | | unit | N 8/S5 | N 16/S5 | N 25/S5 | N 35/S5 | N 50/S5 | N 80/S5 | N 100/S5 |
| part no.: | | | P-201-40 | P-202-40 | P-203-40 | P-204-40 | P-205-40 | P-206-40 | P-207-40 |
| motion ($\pm 10\%$)* | | μm - | 9 | 20 | 30 | 41 | 61 | 82 | 103 |
| capacitance ($\pm 20\%$ **) | | μF | 0.8 | 1.8 | 2.4 | 3.6 | 5.4 | 7.2 | 9.0 |
| resolution*** | | nm | 0.018 | 0.04 | 0.06 | 0.08 | 0.12 | 0.16 | 0.2 |
| stiffness | | N/ μm | 94 | 42 | 28 | 20 | 14 | 10 | 8 |
| blocking force | | N | 850 | 850 | 850 | 850 | 850 | 850 | 850 |
| operating voltage | | V | -20...+130 | | | | | | |
| dimensions | length L | mm | 9 | 18 | 27 | 36 | 54 | 72 | 108 |
| | width W | mm | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| | height H | mm | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| series N /S10 | | unit | N 20/S10 | N 40/S10 | N 60/S10 | N 80/S10 | N 100/S10 | N 120/S10 | |
| part no.: | | | P-232-40 | P-233-40 | P-234-40 | P-235-40 | P-236-40 | P-237-40 | |
| motion ($\pm 10\%$)* | | μm - | 20 | 41 | 61 | 82 | 103 | 123 | |
| capacitance ($\pm 20\%$ **) | | μF | 7.2 | 14.4 | 18.2 | 25.4 | 31.0 | 36.4 | |
| resolution*** | | nm | 0.04 | 0.08 | 0.12 | 0.16 | 0.21 | 0.25 | |
| stiffness | | N/ μm | 175 | 85 | 57 | 42 | 34 | 28 | |
| blocking force | | N | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | |
| operating voltage | | V | -20...+130 | | | | | | |
| dimensions | length L | mm | 18 | 36 | 54 | 72 | 90 | 108 | |
| | width W | mm | 12 | 12 | 12 | 12 | 12 | 12 | |
| | height H | mm | 14 | 14 | 14 | 14 | 14 | 14 | |

* typical value measured with NV 40/3 ** typical value for small signal strength

*** limited by signal noise only

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Technical details

series N – round shape size stack type actuator

- top and bottom plate: round ceramics (Al₂O₃, diameter 5mm)
- isolation by thermal shrinking tube, resulting overall diameter less then 6mm

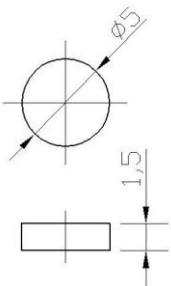
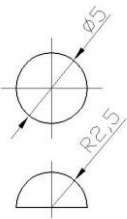
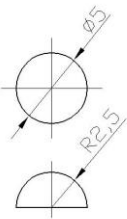
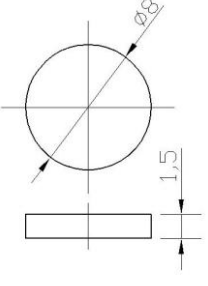
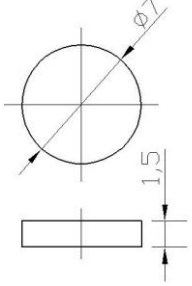
series N – rectangular shape size stack type actuator:

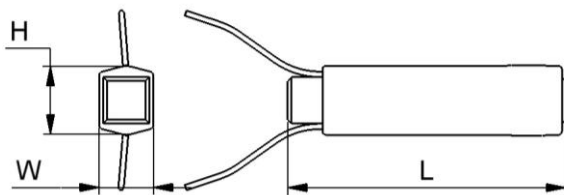
- epoxy isolation of the stack itself
- additional isolation by thermal shrinking tube (also for fastening the cables)
- outlet of the cable about 5mm below the end of the stack
- standard version without top and plates

further options:

- -different top/end plates available (please see table below)
- -vacuum version
- -cryogenic temperature version

end pieces:

| part no. | Z-299-25 | Z-299-45 | Z-299-65 | Z-299-28 | Z-299-47 |
|----------|---|---|---|--|---|
| material | Al ₂ O ₃ | tungsten carbide | tungsten carbide | Al ₂ O ₃ | tungsten carbide |
| drawing |  |  |  |  |  |



sketch: series Nx/Sx

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