The NPX Piezo Stack linear stages provide long travel and sub-nanometer resolution motion in one, two, or three axes all in a compact package. They feature rapid response and fast settling performance, allowing them to be used in dynamic processes such as high-frequency error compensation, tracking, fast stepping, or continuous scanning.

Sub-Nanometer Positioning Resolution

With positioning resolution as low as 0.2 nm, the NPX Piezo Stack linear stage make ultra-fine adjustments with resolution only limited by the noise of the control electronics.

Large Piezoelectric Travel Range

NPX Piezo Stack linear stages feature highly reliable, multi-layer, low-voltage piezoelectric transducer stacks for high-duty cycle operations. A sophisticated, FEA-optimized, parallelogram solid state flexure guide system ensures perfect parallel motion and up to 400 µm travel range. Due to the frictionless guide principle, NPX Piezo Stack linear stages are maintenance-free and are not subject to wear. Furthermore, the output motion sensitivity is not affected by mechanical friction.

Optional Integrated Strain-Gauge for Closed-Loop Operation

The closed-loop systems (model numbers ending in SG) feature high resolution strain-gauge position sensors for highly accurate and repeatable motion which also compensates for actuator creep. The assembly is done as a full Wheatstone bridge and is temperature insensitive. The closed-loop devices can be used in either open or closed-loop control.

Vacuum Versions Available

The NPX Piezo Stack linear stages are available in vacuum compatible versions which can be used in vacuum (10-6 Torr) environments.

Motion in X, XY, or XYZ

NPX Piezo Stack linear stages are available as X, XY, and XYZ motion systems. The multi-axis XY and XYZ devices utilize an advanced parallel motion principle, meaning all actuators act directly on the moving platform. Smaller form factor and lower inertia for faster motion can be achieved as opposed to other piezo systems with serial kinematics such as stacks of individual stages.
**SPECIFICATIONS**

<table>
<thead>
<tr>
<th></th>
<th>NPX200</th>
<th>NPX400</th>
<th>NPXY100</th>
<th>NPXY200</th>
<th>NPXYZ100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Axes</strong></td>
<td>X</td>
<td>X</td>
<td>X, Y</td>
<td>X, Y</td>
<td>X, Y, Z</td>
</tr>
<tr>
<td>Open loop travel per axis (±10%) ( ^{(1)} ), (µm)</td>
<td>200</td>
<td>400</td>
<td>100</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Closed loop travel per axis ( ^{(1)} ), (µm)</td>
<td>160</td>
<td>320</td>
<td>80</td>
<td>160</td>
<td>80</td>
</tr>
<tr>
<td>Open loop resolution ( ^{(2)} ) (nm)</td>
<td>0.4</td>
<td>0.8</td>
<td>0.2</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Closed loop resolution ( ^{(3)} ) (nm)</td>
<td>4</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Typ. Repeatability ( ^{(2)} ) (nm)</td>
<td>36</td>
<td>75</td>
<td>36</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Capacitance (± 20%) (µF)</td>
<td>1.8</td>
<td>5.2</td>
<td>1.8</td>
<td>5.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Resonant frequency, unloaded (Hz)</td>
<td>177</td>
<td>200</td>
<td>380/480</td>
<td>350/350</td>
<td>500/550/480</td>
</tr>
<tr>
<td>Resonant frequency, with 80 g load (Hz)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>210/200/300</td>
</tr>
<tr>
<td>Resonant frequency, with 105 g load (Hz)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>190/180/200/250</td>
</tr>
<tr>
<td>Resonant frequency, with 300 g load (Hz)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>110/110/150</td>
</tr>
<tr>
<td>Axial stiffness (N/µm)</td>
<td>0.08</td>
<td>0.16</td>
<td>1.1/0.95</td>
<td>0.65/0.6520</td>
<td>1/1/1</td>
</tr>
<tr>
<td>Max centered load (N)</td>
<td>10</td>
<td>10</td>
<td>75</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>Max axial load ( ^{(4)} ) (N)</td>
<td>16</td>
<td>64</td>
<td>110/95</td>
<td>40/40</td>
<td>40/40/32</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>180</td>
<td>180</td>
<td>175</td>
<td>350</td>
<td>165</td>
</tr>
</tbody>
</table>

\( ^{(1)} \) Typical value measured with NPC3 and NPC3SG, \(-20\) V to \(+130\) VDC range.

\( ^{(2)} \) Applies to devices with ending SG in closed-loop control only.

\( ^{(3)} \) Equal to rms noise value measured with NPC3 and NPC3SG controller.

\( ^{(4)} \) Maximum load that can be applied in direction of motion. For multi-axis system read as X/Y/Z.

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**DIMENSIONS**

**NPX200(SG) and NPX400(SG)**

![Dimensions Diagram](image1)

**NPXY100**

![Dimensions Diagram](image2)

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**DIMENSIONS IN INCHES (AND MILLIMETERS)**

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**DIMENSIONS IN INCHES (AND MILLIMETERS)**
NPXY100SG

- TOP PLATE -

- BOTTOM PLATE -

NPXY200 and NPXY200SG

- TOP PLATE -

- BOTTOM PLATE -

DIMENSIONS IN INCHES (AND MILLIMETERS)
NPX SERIES

PIEZO STACK LINEAR STAGES

NPXYZ100 and NPXYZ100SG

ORDERING INFORMATION

Model | Description
--- | ---
NPX200 | Nanopositioning Open-loop Stage, 200 µm
NPX200-D | Nanopositioning Open-loop Stage, 200 µm, XPS
NPX200SG | Nanopositioning Stage, 200 µm, Strain-gauge
NPX200SG-D | Nanopositioning Stage, 200 µm, Strain-gauge, XPS
NPX200SGV6 | Vacuum Nanopositioning Stage, 200 µm, Strain-gauge
NPX400 | Nanopositioning Open-loop Stage, 400 µm
NPX400-D | Nanopositioning Open-loop Stage, 400 µm, XPS
NPX400SG | Nanopositioning Stage, 400 µm, Strain-gauge
NPX400SG-D | Nanopositioning Stage, 400 µm, Strain-gauge, XPS
NPX400SGV6 | Vacuum Nanopositioning Stage, 400 µm, Strain-gauge
NPXY100 | Nanopositioning Open-loop XY Stage, 100 µm
NPXY100-D | Nanopositioning Open-loop XY Stage, 100 µm, XPS
NPXY100SG | Nanopositioning XY Stage, 100 µm, Strain-gauge
NPXY100SG-D | Nanopositioning XY Stage, 100 µm, Strain-gauge, XPS
NPXY100SGV6 | Vacuum Nanopositioning XY Stage, 100 µm, Strain-gauge
NPXY200 | Nanopositioning Open-loop XY Stage, 200 µm
NPXY200-D | Nanopositioning XY Stage, 200 µm, XPS
NPXY200SG | Nanopositioning XY Stage, 200 µm, Strain-gauge
NPXY200SG-D | Nanopositioning XY Stage, 200 µm, Strain-gauge, XPS
NPXYZ100 | Nanopositioning Open-loop XYZ Stage, 100 µm
NPXYZ100-D | Nanopositioning XYZ Stage, 100 µm, XPS
NPXYZ100SG | Nanopositioning XYZ Stage, 100 µm, Strain-gauge
NPXYZ100SG-D | Nanopositioning XYZ Stage, 100 µm, Strain-gauge, XPS
NPXYZ100SGV6 | Vacuum Nanopositioning XYZ Stage, 100 µm, Strain-gauge
NPXYZ100V6 | Vacuum Nanopositioning Open-loop XYZ Stage, 100 µm

ACCESSORIES

Model | Description
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NPX-BP | Base Plate, Nanopositioning Translation Stages

RECOMMENDED CONTROLLERS/DRIVERS

Model | Description
--- | ---
XPS-D | 1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11 | Universal digital driver card for stepper, DC, brushless and direct motors
XPS-RL | 1- to 4-axis universal high-performance motion controller/driver
XPS-DRV1 | NanoPositioning drive module for piezo-stack based products
NPC3 | 3-channel piezo stack amplifier, open-loop control
NPC3SG | 3-channel piezo amplifier, strain-gauge position control