

Piezo Stack Linear Stages

NPX SERIES



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.

- Sub-nanometer piezoelectric positioning resolution
- Motion in X, XY, or XYZ
- Piezoelectric travel range of up to 400 μm
- Optional integrated strain-gauge for closed-loop operation
- High resonant frequency for high dynamic applications
- Vacuum versions

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.

NPX SERIES

SPECIFICATIONS

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

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

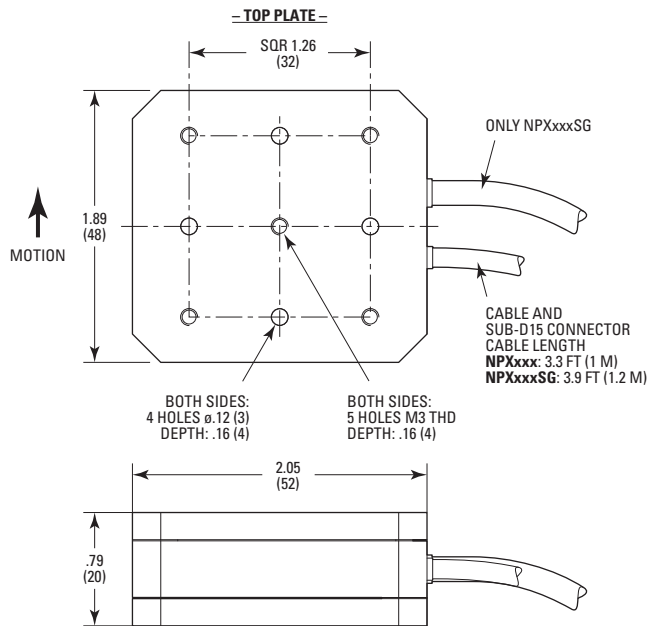
²⁾ Applies to devices with ending SG in closed-loop control only.

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.

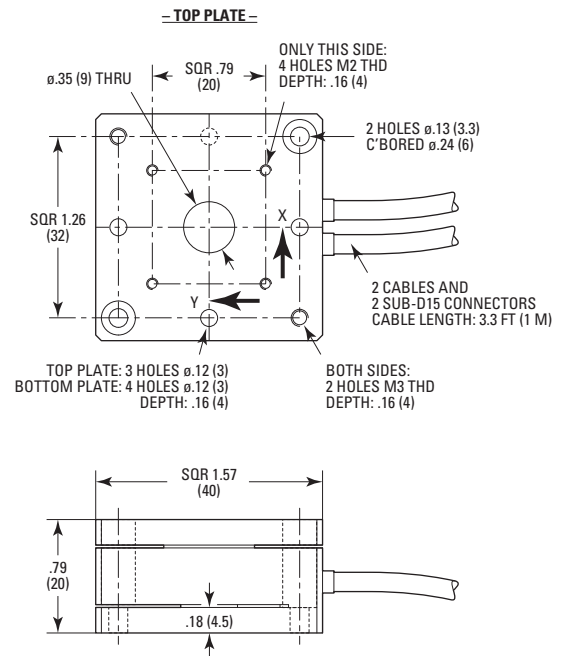
DIMENSIONS

NPX200(SG) and NPX400(SG)



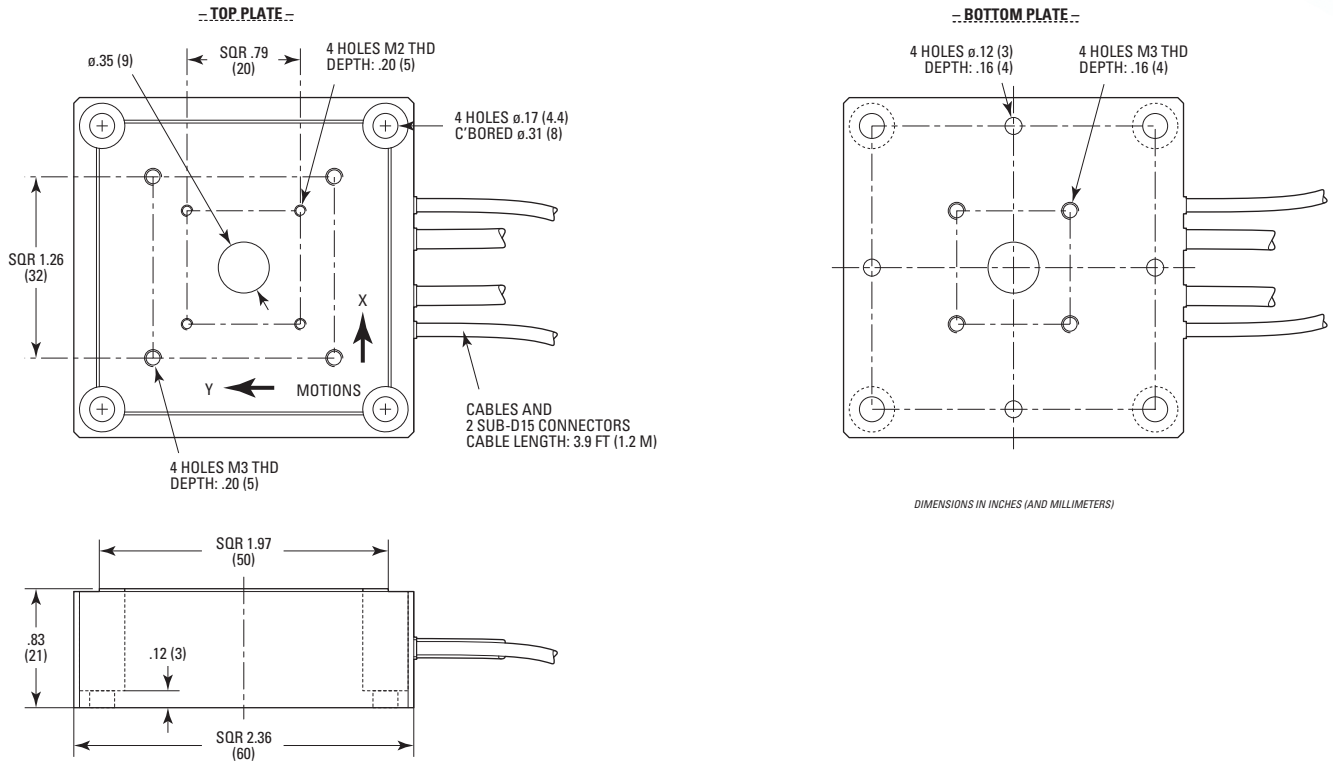
DIMENSIONS IN INCHES (AND MILLIMETERS)

NPXY100

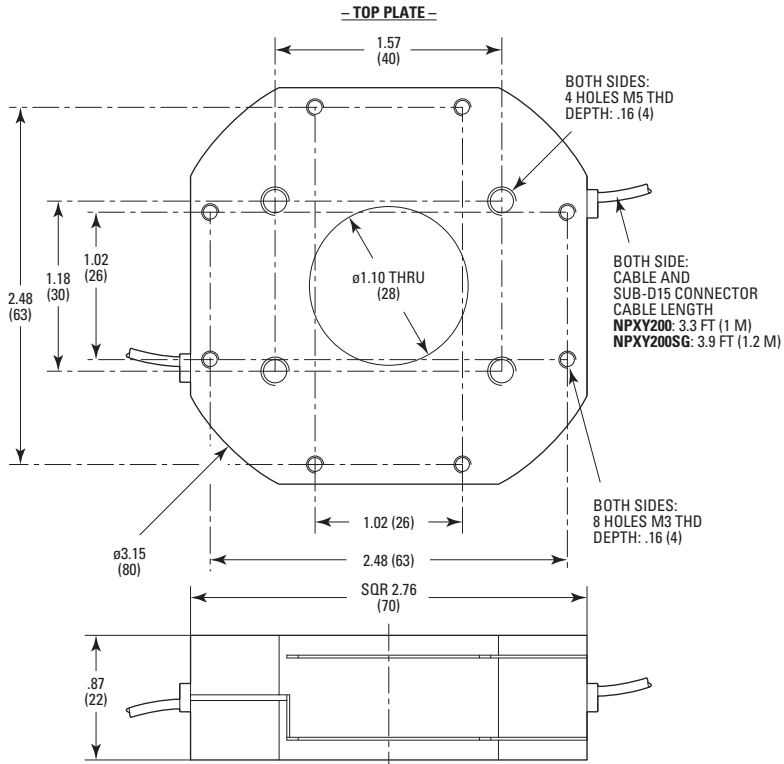


DIMENSIONS IN INCHES (AND MILLIMETERS)

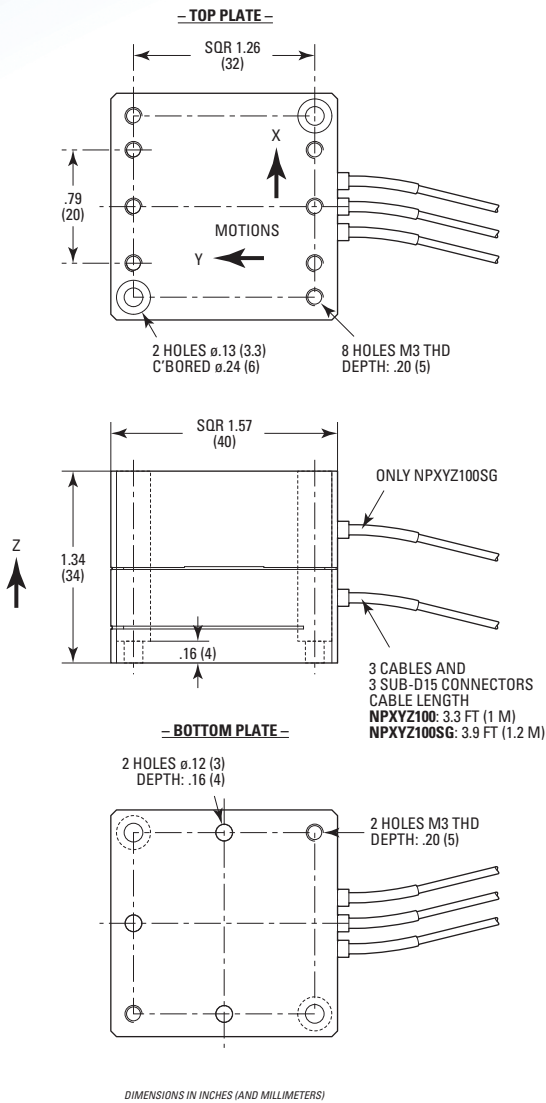
NPXY100SG



NPXY200 and NPXY200SG



NPXYZ100 and NPXYZ100SG

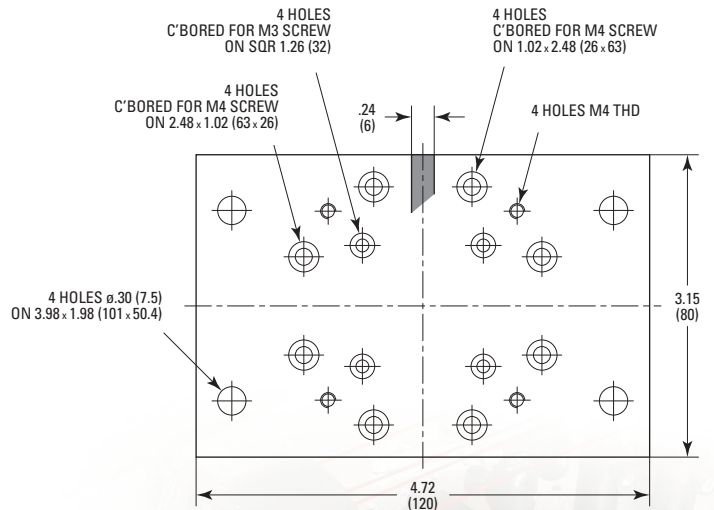


ORDERING INFORMATION

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 Open-loop 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
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-DRV1P1	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



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