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NanoScan SP Z Series

Nanopositioning Piezo Sample Scanner

The NanoScan SP Z series of piezo-driven stages delivers the best positioning performance and fastest recovery between z-stacks with travel ranges of up to 800 µm.

The SP Z stages are compatible with Prior Scientific's motorized stages and most brands of microscopes when using appropriate adapter plates.

The super-slim closed-loop design has a height of 14 mm (or less) for all versions, providing better access for illumination of the sample area. Accessory insert plates are available for a wide variety samples, including well plates, microtiter plates, slides, and Petri dishes.

Autocalibration centers the travel range ensuring full range scanning in all appropriate environments.





Key Features

- Selection of travel ranges from 200 µm to 800 µm.
- Capacitive positioning sensors give market leading resolution.
- Step settle times of <10 ms.
- Loads of up to 500 g. Higher loads on request.
- Connectors with built-in stage calibration provide plug and play electronics that can be interchanged, minimizing system downtimes.
- User-configurable settings optimized for different loads (use with an incubator) and performance needs. The user selects the best setting for their application.
- Tested to function over 10 million full range cycles.

Applications

- Optical sectioning producing 3D images
- Live cell imaging
- Autofocus systems for time lapse imaging
- High content screening
- Surface analysis
- Semiconductor die inspection
- OEM custom solutions

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NPC-D-6110 Controller



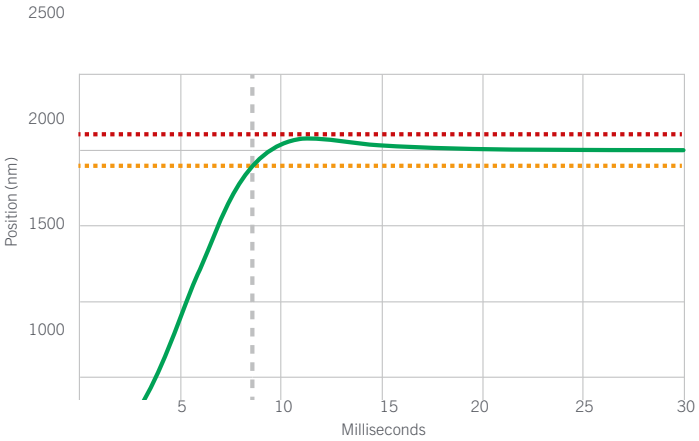
- The powerful digital controller drives the NanoScan SP Z Series at the fastest speeds possible.
- Motion control algorithms with acceleration/ deceleration control and active damping reduce overshoot.
- Velocity control algorithm gives ultra-smooth ramps for applications such as focus stacking or focus bracketing.
- Market-leading 20 µs update rate.
- Fastest recovery time between z-stacks, providing enhanced time resolution.
- Software selectable tuning presets which optimize for step settle with different mass objectives.

Interfacing

- Analog command input and position output (0-10 V) for compatibility with existing systems.
- Digital commands over USB for maximum accuracy with a DLL interface for customer software. In-position digital outputs can be used to control camera imaging by providing rapid z-stacking.
- Digital quadrature/step-and-direction commands allow high-speed control with a standard 2-wire motion controller interface, without the need for expensive high-precision ADCs/DACs.
- Playback of custom-programmed waveforms such as constant-velocity profiles. Separate digital trigger outputs can be activated at custom-defined points to control external equipment such as camera imaging.
- Compatible with Queensgate Nanobench, Micro-Manager, Metamorph, Elements via RS232C, and other customer software using the DLL interface provided.
- Can be connected to Prior ProScan III for integrated fine z-control.

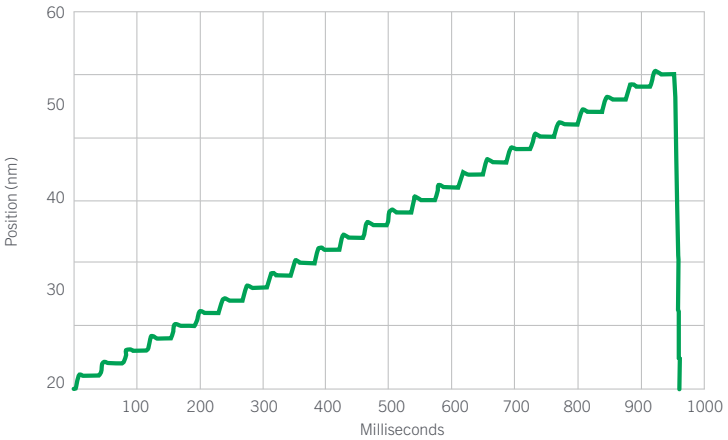
SP200/SP400/SP600/SP800 2 µm step and settle

Settling time of the NanoScan SP Z Series stage with NPC-D-6110 controller including sample holder.



SP200/SP400/SP600/SP800 staircase test with 200 g load

The NanoScan SP Z Series has unsurpassed speed and settle time minimizes rejected images, reduces drift and allows for higher throughput.



Technical specification for NanoScan SP Z Series (typical)

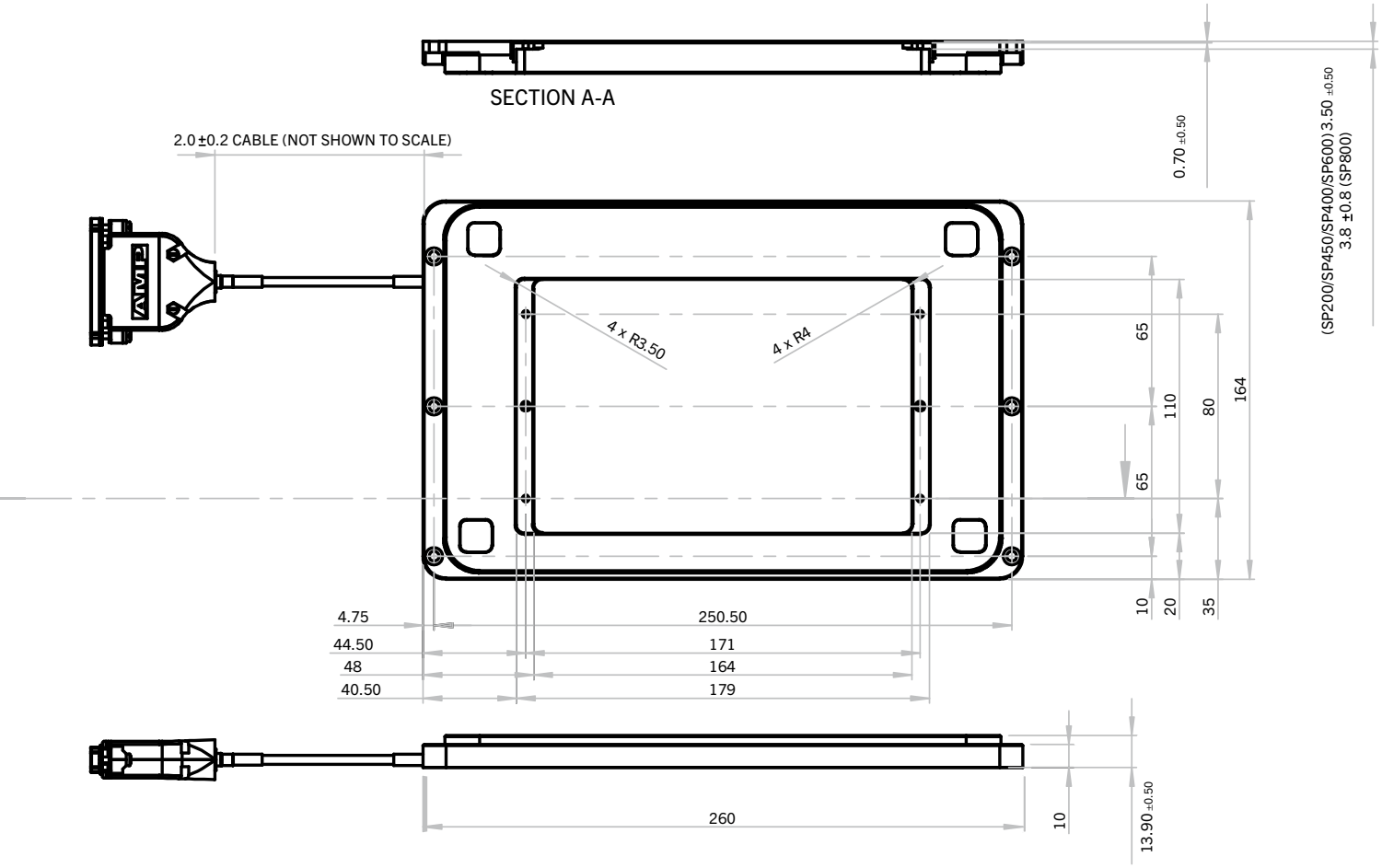
Product specification	SP200	SP400	SP600	SP800
Material	Aluminum/stainless steel	Aluminum/stainless steel	Aluminum/stainless steel	Aluminum/stainless steel
Stage Mass	714 g	714 g	714 g	714 g
Dimensions, external, L x W x H	260 x 164 x 13.7 mm	260 x 164 x 13.7 mm	260 x 164 x 13.7 mm	260 x 164 x 14 mm
Dimensions, internal, L x W	179 x 110 mm	179 x 110 mm	179 x 110 mm	179 x 110 mm
Closed-loop range	200 µm	400 µm	600 µm	800 µm
Open-loop range	235 µm	490 µm	730 µm	970 µm
Resolution (RMS position noise)	0.5 nm	0.7 nm	0.7 nm	1.2 nm
Linearity	0.25 %	0.2 %	0.2 %	0.2 %
Repeatability	3 nm	3 nm	3 nm	3 nm
Resonant frequency, unloaded 200 g loaded (sample holder) 500 g loaded (incubator)	250 Hz 180 Hz 135 Hz	240 Hz 170 Hz 120 Hz	230 Hz 155 Hz 115 Hz	185 Hz 138 Hz 105 Hz
5 % settle 2 µm step (with 200 g)	7.5 ms	8 ms	9 ms	10 ms
0.5 % settle 100 µm step (with 200 g)	21 ms	23 ms	24 ms	35 ms

Technical specification for NPC-D-6110 Controller

Parameter	Value	Comments
Mechanical		
Dimensions	318 x 240 x 90 mm	Space required for rear connectors and cables
Weight	3.0 kg	
Cooling	Convection and temp. controlled fan	Vents on rear and base
Electrical		
Power input	100 to 240 nominal 47 to 63 Vrms Hz	Only use approved power supply
Connectivity		
USB type B connector	2.0 compliant	Power not taken from USB port
Analog input command	BNC - 0 -10 V	Front panel
Analog position monitor output	BNC - 0 -10 V	Front panel
“TRIG” Input, “TRIG” Output, “IN-POS” output and quadrature interface	25 pin D-type socket - 5V TTL	
Controller synchronizing signals	9 pin D-type socket	Rear panel
Environmental - Operational		
Temperature	10 to 40 °C	
Relative Humidity	5 to 80 %RH	Non-condensing

Incubator – various incubators can be used with the NanoScan SP Z series. We reserve the right to introduce improvements and modify specifications without prior notice.

Technical drawing for NanoScan SP Z Series (typical)



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Information for ordering and accessories

Part number	Description
QGSP200-D1	NanoScan SP200 200 µm closed loop Z scanner with NPC-D-6110 digital controller
QGSP400-D1	NanoScan SP400 400 µm closed loop Z scanner with NPC-D-6110 digital controller
QGSP600-D1	NanoScan SP600 600 µm closed loop Z scanner with NPC-D-6110 digital controller
QGSP800-D1	NanoScan SP800 800 µm closed loop Z scanner with NPC-D-6110 digital controller
Accessories	
QGSP301XR	Extra recessed microtitre plate holder
QGSP302XR	Extra recessed universal specimen holder
QGSP303XR	Extra recessed single slide holder for 25 x 75 mm slides (1x3 inch) or 50 x 75 mm slides (2 x 3 inch)
QGSP304XR	Extra recessed four slide holder for 25 x 75 mm slides (1x3 inch). Not compatible with Prior H117 stages.
QGSP305XR	Extra recessed three slide holder for 25 x 75 mm slides (1 x 3 inch). Compatible with Prior H117 stages.
QG-UNIV-DISH-35	Dish holder 33 to 35.3 mm base diameter fits universal specimen holder
QG-UNIV-DISH-40	Dish holder 36 to 40.3 mm base diameter fits in universal specimen holder
QG-UNIV-DISH-55	Dish holder 50 to 55.3 mm base diameter fits in universal specimen holder
QG-UNIV-DISH-60	Dish holder 55 to 60.3 mm base diameter fits in universal specimen holder
QGSPADAPT1	SP Z scanner to Nikon Ti2 motorised XY stage adapter
QGSPADAPT2	SP Z scanner to Prior HLD117NN Linear XY stage adapter
QGSPADAPT3	SP Z scanner to Olympus IX3 SSU XY stage adapter
QGSPADAPT4	SP Z scanner to Prior H101F upright motorized XY stage adapter, requires QGSPADAPT110X160 upright sample holder adapter
QGSPADAPT110X160	Upright sample holder adapter to 110x160mm (H101A stage type sample holder)

The SP Z Series can mount without adapters to a Prior H117 or HLD117 (Excluding HLD117NN) inverted microscope XY stage.

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