

# NanoScan SP200/SP400/SP600/SP800

## Nanopositioning Piezo Sample Scanner

The NanoScan-SP range of piezo-driven stages delivers the best positioning performance and fastest recovery between z-stacks.

The SP-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 14mm (or less) for all versions, providing better access for illumination of the sample area. Accessory insert plates are available for a wide variety of 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

- 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
- Wafer inspection
- OEM custom solutions

## NPC-D-6110 Controller



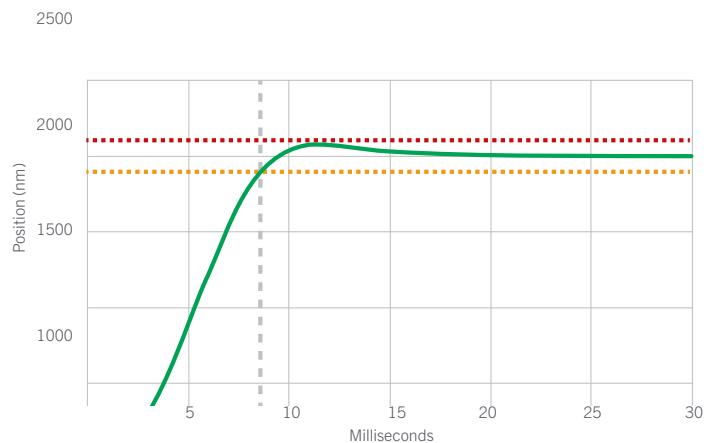
- The powerful digital controller drives the SP200/400/600/800 at the fastest speeds possible.
- Motion control algorithms with acceleration/ deceleration control and active damping reduce overshoot.
- Velocity control algorithm gives ultra-smooth ramps for applications such as focus stacking or focus bracketing.
- Market-leading 20  $\mu$ s 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.

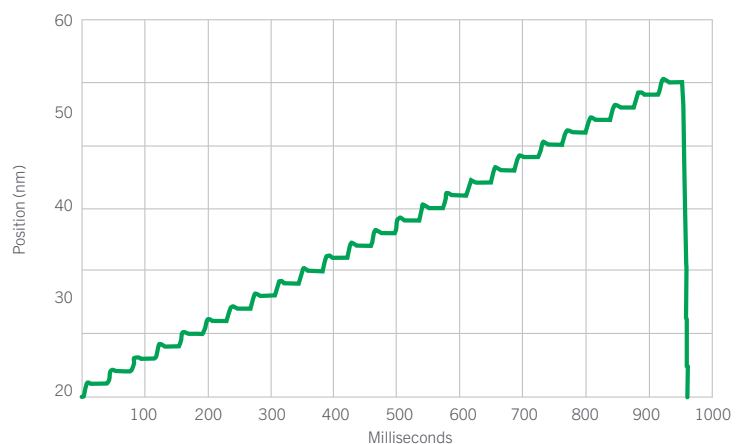
## SP200/SP400/SP600/SP800 2 $\mu$ m step and settle

Settling time of the NanoScan SP200/400/600/800 stage with NPC-D-6110 controller including sample holder.



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

The NanoScan SP200/400/600/800 have unsurpassed speed and settle time minimizes rejected images, reduces drift and allows for higher throughput.



## Technical specification for NanoScan SP200/SP400/SP600/SP800 (typical)

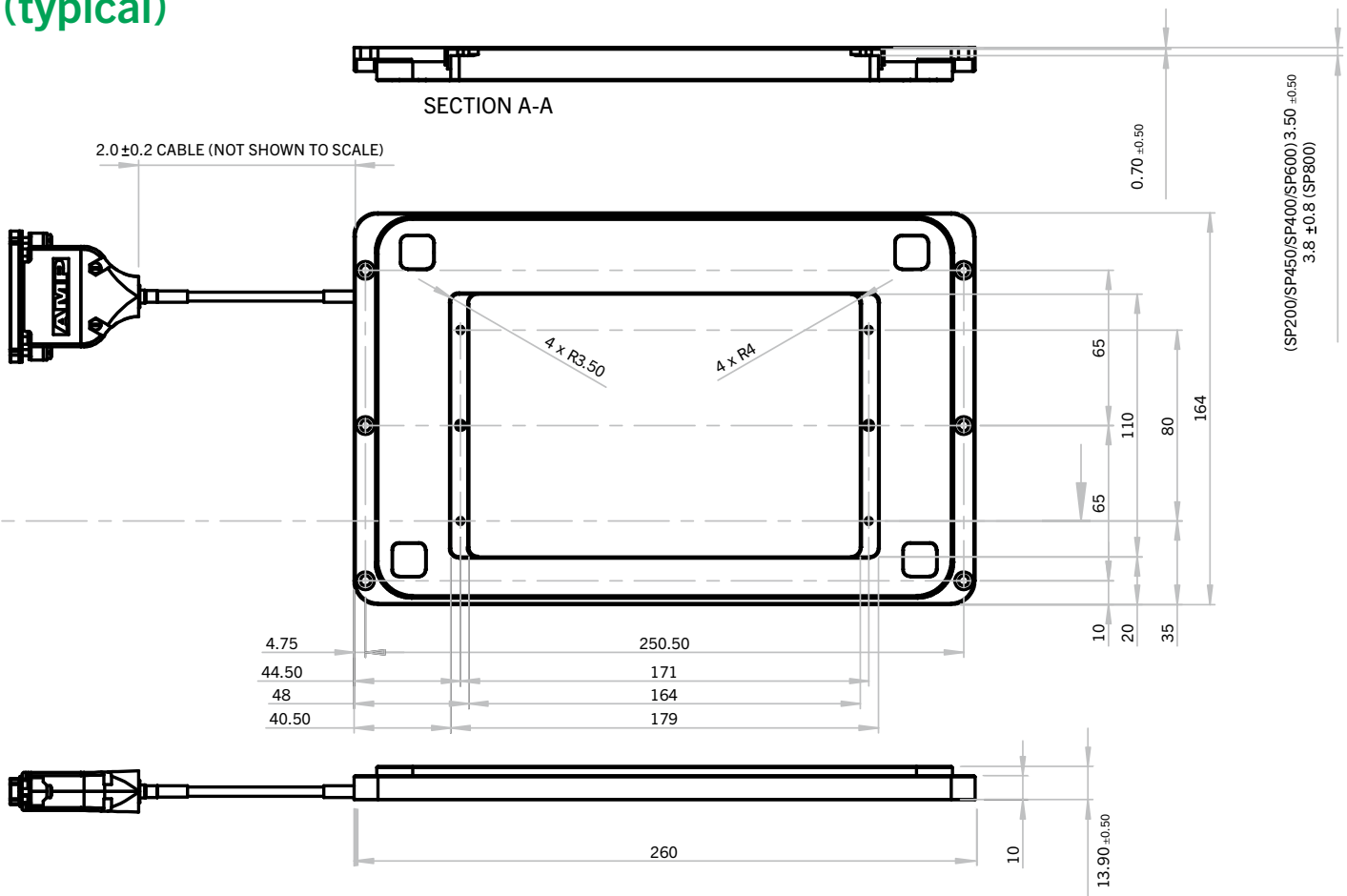
Product specification	SP200	SP400	SP600	SP800
Material	Aluminum/stainless steel	Aluminum/stainless steel	Aluminum/stainless steel	Aluminum/stainless steel
Stage Mass	714 g	714 g	714 g	714 g
Dimensions, external, L x W x H	260 x 164 x 13.7 mm	260 x 164 x 13.7 mm	260 x 164 x 13.7 mm	260 x 164 x 14 mm
Dimensions,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

## Technical specification for NPC-D-6110 Controller

Parameter	Value	Comments
<b>Mechanical</b>		
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
<b>Electrical</b>		
Power input	100 to 240 nominal 47 to 63 Vrms Hz	Only use approved power supply
<b>Connectivity</b>		
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
<b>Environmental - Operational</b>		
Temperature	10 to 40 °C	
Relative Humidity	5 to 80 %RH	Non-condensing

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

# Technical drawing for NanoScan SP200/SP400/SP600/SP800 (typical)



## Information for ordering and accessories

Part number	Description
<b>QGSP200-D1</b>	NanoScan SP200 200 µm closed loop Z scanner with NPC-D-6110 digital controller
<b>QGSP400-D1</b>	NanoScan SP400 400 µm closed loop Z scanner with NPC-D-6110 digital controller
<b>QGSP600-D1</b>	NanoScan SP600 600 µm closed loop Z scanner with NPC-D-6110 digital controller
<b>QGSP800-D1</b>	NanoScan SP800 800 µm closed loop Z scanner with NPC-D-6110 digital controller
<b>Accessories</b>	
<b>QGSP301XR</b>	Extra recessed microtitre plate holder
<b>QGSP302XR</b>	Extra recessed universal specimen holder
<b>QGSP303XR</b>	Extra recessed single slide holder for 25 x 75 mm slides (1x3 inch) or 50 x 75 mm slides (2 x 3 inch)
<b>QG-UNIV-DISH-35</b>	Dish holder 33 to 35.3 mm base diameter fits universal specimen holder
<b>QG-UNIV-DISH-40</b>	Dish holder 36 to 40.3 mm base diameter fits in universal specimen holder
<b>QG-UNIV-DISH-55</b>	Dish holder 50 to 55.3 mm base diameter fits in universal specimen holder
<b>QG-UNIV-DISH-60</b>	Dish holder 55 to 60.3 mm base diameter fits in universal specimen holder
<b>QGSPADAPT1</b>	SP Z scanner to Nikon Ti2 motorised XY stage adapter
<b>QGSPADAPT2</b>	SP Z scanner to Prior HLD117NN Linear XY stage adapter
<b>QGSPADAPT3</b>	SP Z scanner to Olympus IX3 SSU XY stage adapter
<b>QGSPADAPT4</b>	SP Z scanner to Prior H101F upright motorized XY stage adapter, requires QGSPADAPT110X160 upright sample holder adapter
<b>QGSPADAPT110X160</b>	Upright sample holder adapter to 110x160mm (H101A stage type sample holder)

The SP200/400/SP600/SP800 can mount without adapters to a Prior H117 or HLD117 (Excluding HLD117NN) inverted microscope XY stage.

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