

# NANOSCAN SP SERIES QUICK START INSTRUCTIONS



## PLEASE READ THE INSTRUCTIONS BEFORE ATTEMPTING TO USE THE NANOSCAN SP SERIES SYSTEM



- Save this manual as it contains important safety information and operating instructions.
- Before using the system, please follow and adhere to all warnings, safety and operating instructions located on the product and in this user manual.
- Do not expose the product to open flames, extreme hot or cold temperatures, water or moisture.
- Do not allow objects to fall on or liquids to spill on the product.
- Connect the AC power cord only to designated power sources as marked on the product.
- Make sure the electrical cord is located so that it will not be subject to damage.
- To reduce the risk of damage, unplug the product from the power source before connecting the components together.
- **DANGER** - never alter the AC cord or plug. If the plug will not fit into the outlet, have a proper outlet installed by a qualified electrician.
- Use only the proper type of power supply cord set (provided with the system) for this unit.
- Do not attempt to disassemble the product. Doing so will void the warranty. This product does not contain consumer serviceable components. Service should be performed by authorized service centers.

## IDENTIFYING YOUR SYSTEM COMPONENTS

The standard NanoScan SP Series system consist of:

(1) NanoScan SP Series Piezo Sample Scanner

(1) NPC-D-6110 Controller and power supply

One or more of the sample accessories listed:

QGSP301XR - extra recessed microtitre plate

QGSP302XR - extra recessed universal specimen

QGSP303XR - extra recessed slide holder

(1) Adapter plate to mount the NanoScan SP on the microscope XY stage.

No adapter plate is require for Prior XY stages H117 & HLD117 (Except HLD117NN).

(12) M4x8 Mounting screws

(1) USB Cable QGPA0096-SK-102 + (1) 1.2 metre BNC to BNC cable QGBNCCAB+

(1) RS232C QG-0494-SK-200002

(1) 9 pin gender changer for RS232C QG-0494-SK-200001

(1) USB stick containing manuals and test report.

Note: The stage is a moving platform, the height will vary when powered compared to unpowered. The stage must be mounted to a flat surface before being powered. Do not connect the stage to a controller until properly mounted.



SP400/600 Piezo Sample Scanner



Sample Holders



Gender changer for RS232C



Adapter Plate

## INSTALLING YOUR SYSTEM

### STEP 1:

Where an adapter plate is included, attach it to your XY stage using the screws provided. Do not screw the adapter plate for the HLD117NN in place.

Use all available thread holes to mount the plate. Lightly nip each screw with a hex key (0.3Nm / 300cNm/ 0.2lbf torque). In the event that the screw bottoms out before the head seats, STOP. Do not force the screw as it may be too long; back the screw out before moving the XY stage.

Shown with base plate attached to back of NanoScan SP unit.



### STEP 2:

Position the NanoScan SP stage aligning the connection points with those on the XY stage or adapter plate. Mount the stage using M4 screws using all the available thread holes on the XY stage. Where the attachment requires screws of nonstandard length they should be part of the adapter kit. Lightly tighten each screw with a hex key (0.3Nm / 300cNm/ 0.2lbf Torque). In the event that the screw bottoms out before the head seats, STOP. Do not force the screw as it may be too long; back the screw out before moving the XY stage. It is important to attach the stage using as many mounts as possible to achieve the specified performance.



## INSTALLING YOUR SYSTEM

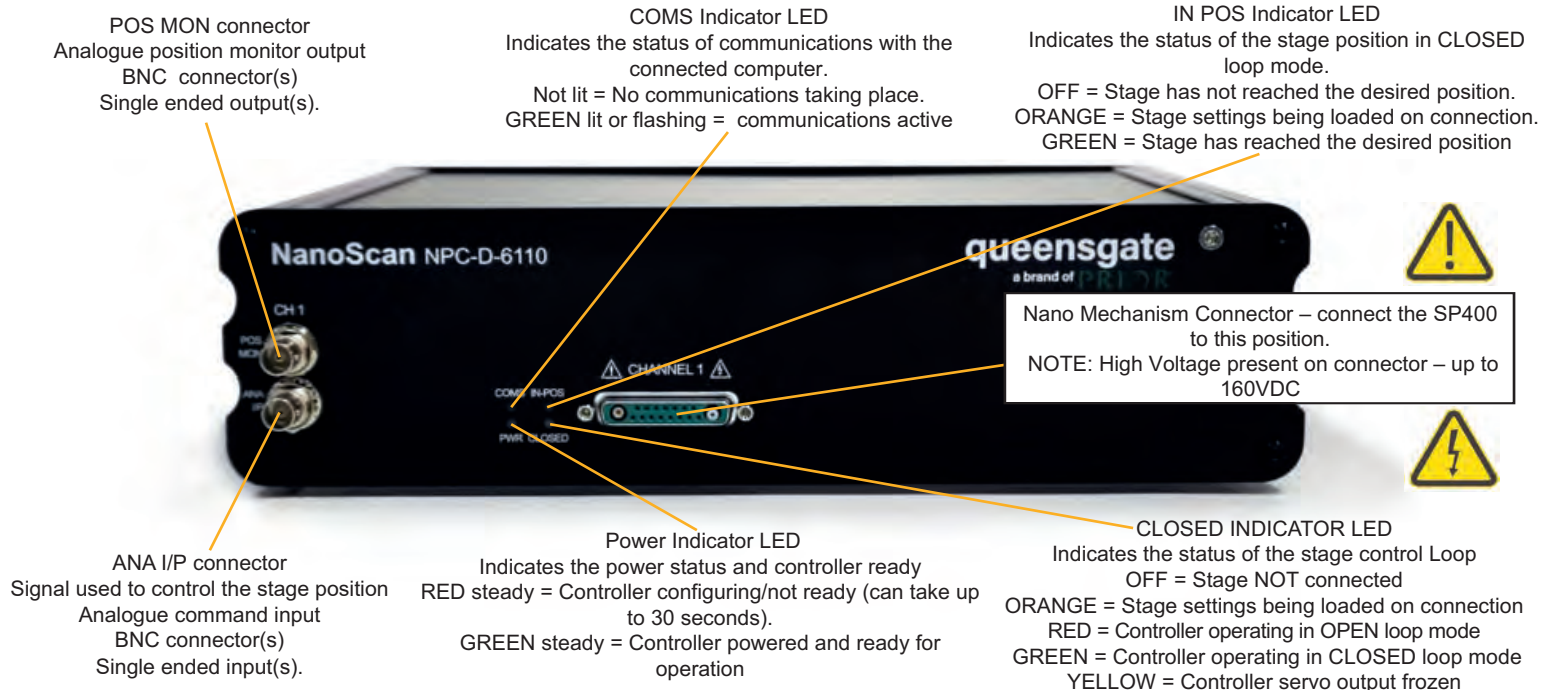


**STEP 3:**  
The sample holder has a slight offset, place the sample holder so the offset matches the XY stage. The sample holder is lightly held in place by two magnets, however it is better to use the four nylon M3 screws provided to hold the sample more securely. To level the sample loosen the four screws and use the levelling grub screws to tip and tilt the sample, then retighten M3 screws. Note: Only nylon screws should be used (other screws risk damaging the stage thread).

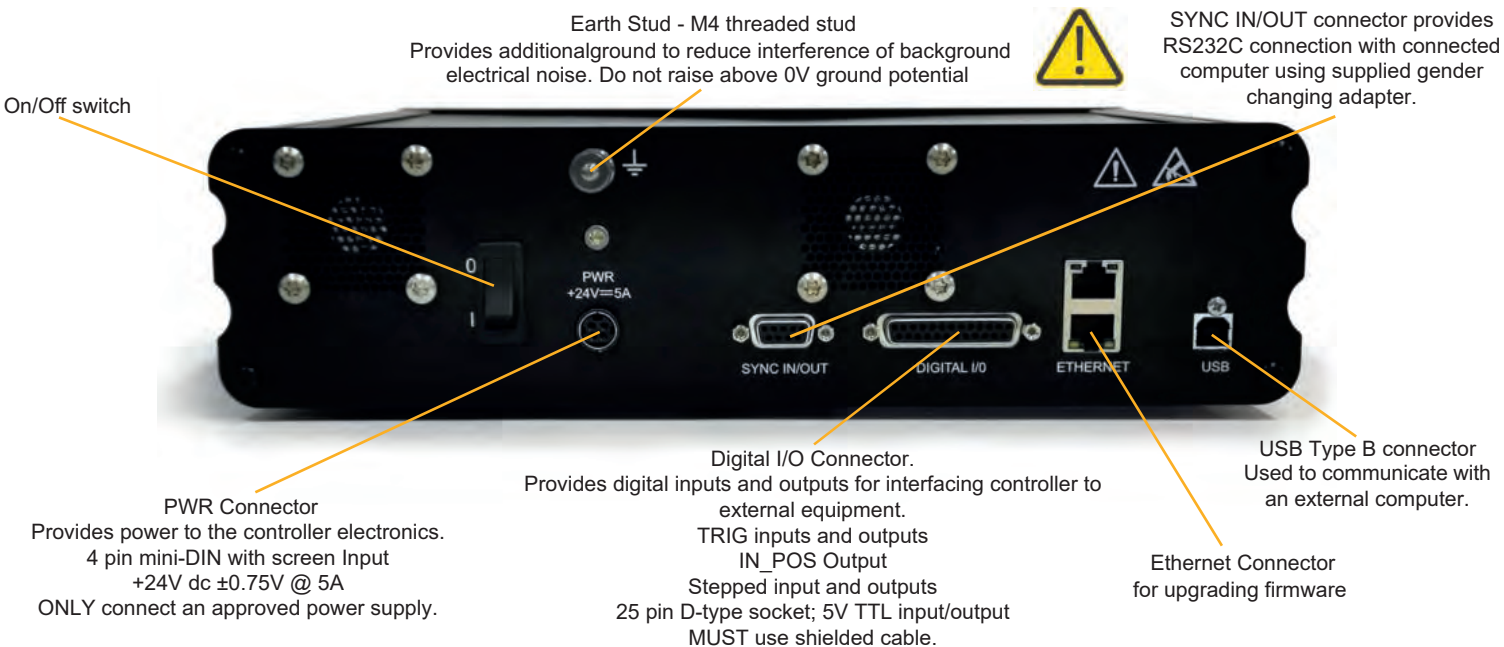
**STEP 4:**  
Incubators are available from Okolabs and Tokaihit that can be mounted within the stage. Where an incubator is used please ensure that the Sample holder/incubator (0.5kg) tuning is selected on the controller (this is the default setting). The stage dimensions are available from the installation diagram found on the USB stick included or downloaded from the website [www.nanopositioning.com](http://www.nanopositioning.com) or [www.prior.com](http://www.prior.com).

It is important that the controller tuning is selected for the sample load to protect the stage. If on power-on the stage resonates/vibrates, quickly power-down the system. Check the mounting of the stage and tuning (see below). If the stage continues to vibrate, please contact Prior for assistance.

## CONNECTING YOUR SYSTEM - FRONT OF UNIT



## CONNECTING YOUR SYSTEM - BACK OF UNIT



## TURNING ON YOUR SYSTEM

1. Once the stage is mounted, connect stage to the controller ensuring that the connector screws are tightened to the controller lock posts. The stage must be mounted to a flat surface before being powered. **On power-up the controller will always move the stage across its range to carry out autocalibration. It is important to ensure that there is sufficient clearance between the lens, sample and illumination to allow this to take place.** If the temperature or load changes significantly the stage can clip at one end of the travel. Should this happen restart your system to allow auto-calibration; this rebalances the stage so that the closed loop range is centered within the open loop range.
2. Connect Power to the controller and/or USB as required.
3. Switch ON controller using switch on rear panel. After approx. 30 seconds, the relevant stage channel should show two green lights (CLOSED and IN-POS). This indicates the stage is operating in the CLOSED loop mode and IN-POS LED indicates stage has reached position within a pre-defined band.
4. The analogue input and POS MON output is 0V to +10V giving a scale factor of 40 $\mu$ m/volt for the SP400 and 60 $\mu$ m/volt for the SP600. The analogue input is enabled by default.
5. The system has 8 memory positions for PID settling (accessible via the USB interface). The system has been shipped with two optimized settings. The default setting has been optimized for loads from 150g to 500g for use with an incubator, it is possible to switch to a fast setting for loads up to 350g. Do not use the fast setting with an incubator or loads over 350g as damage may occur. To change to other settings it is necessary to connect to a computer, described in the software section below.

# SOFTWARE

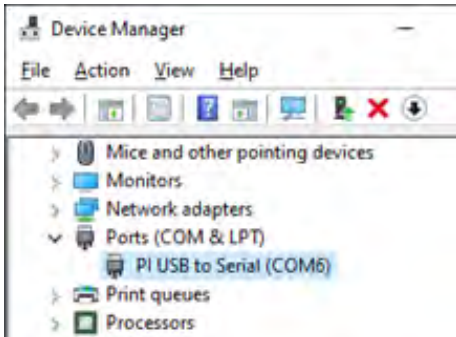
The standard customer-facing application for the system is called 'Nanobench 6000', and is included on the USB stick included in the shipment. This also includes software or links to software which must be installed before the software can be used.

- Visual C++ Runtime

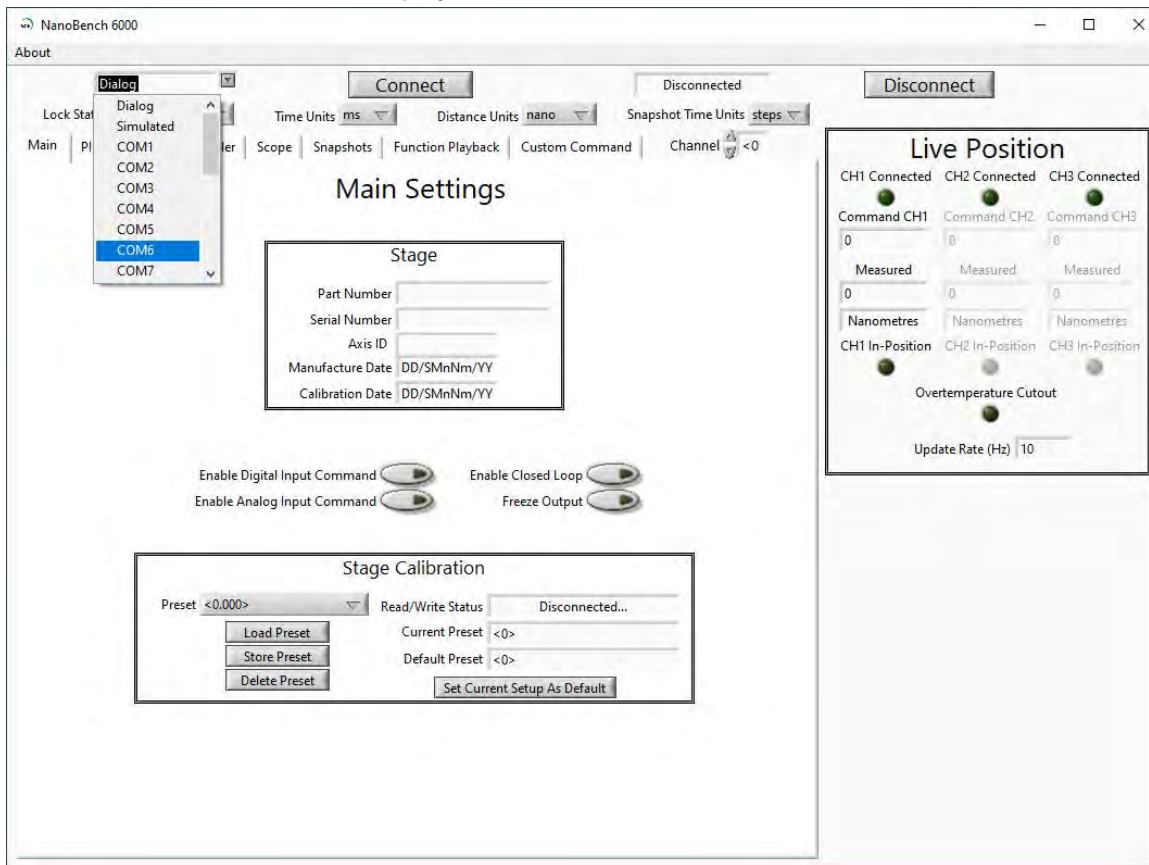
- Labview Runtime Engine 2017 SPI F3

'Nanobench 6000' runs on Windows XP, 7, 8, 10.

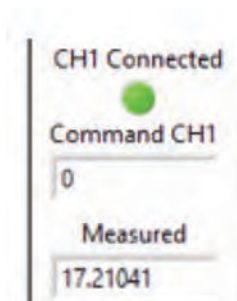
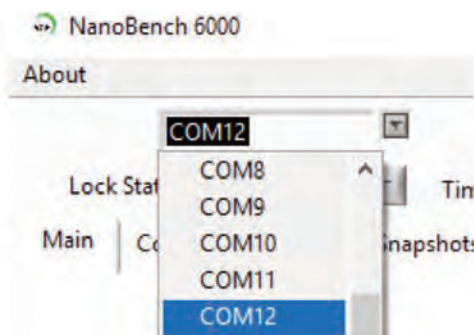
Once Nanobench and associated software has been installed and controller functional, go to Windows Device Manager, and find the COM port that the controller is connected to (e.g. 'COM12').



Start Nanobench - the screen displayed will be similar to the one show below:



Select the correct COM port within Nanobench 6000, then click 'Connect': At this point the software should connect to the controller and begin reading the live measured position.



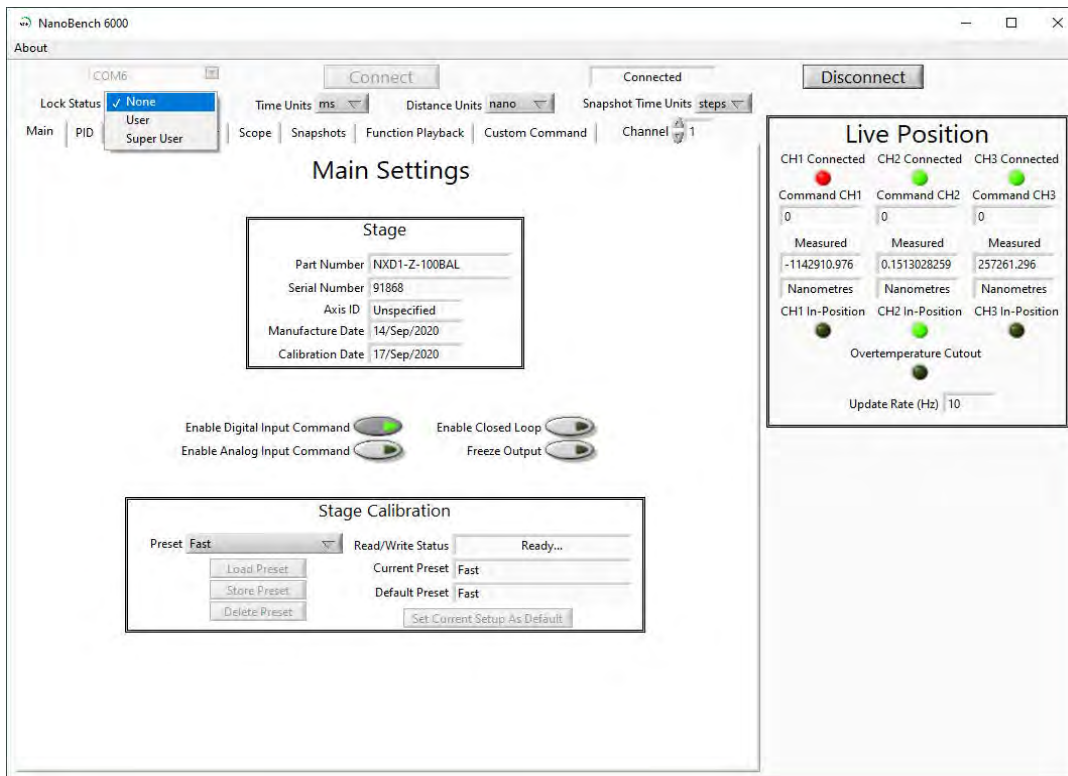
# SOFTWARE

## Dynamic Setups

The SP series stages come pre-loaded with 'dynamic setups', which allow the stage/controller to operate with two different loads (e.g. incubator), optimize step settle times and resolutions.

To swap between these setups the controller must be unlocked to at least 'User' security. The setups can then be changed by selecting a new setup in the 'Preset' dropdown, then clicking 'Load Preset':

To change the security level, simply open the 'Lock Status' drop down and select the appropriate lock state. A warning is displayed to ensure the user knows that unlocking the controller exposes commands that can potentially cause damage to the stage if set incorrectly. In most cases, a security level of 'User' is best, as it allows access to most commonly needed settings while still keeping more important settings 'locked'.



## Presets

The QGSP400 and QGSP600 come with stored settings which have been optimized for use with an incubator (the default) and a faster step settle times for loads less than 350g. The presets can be changed by selecting a new preset in the 'Preset' dropdown, then clicking 'Load'. The test report provided with your SP stage provides information on the presets for your device. Please note that the presets will revert to the default presets on power-down of the controller.

## Caring For Your Stage

- When the stage is not in use for long periods it is advisable to either power down the stage or leave it at mid-point. This will help to ensure a long life.
- Avoid using the stage above 60% relative humidity for long periods.
- For loads greater than 600g please specify as the stage must be setup to support this. Default settings are optimised for 350g sample holder and a slower setting for 500g typical incubator. Other loads can be optimised on request.
- Avoid spilling liquids on the stage (150v risk of shock!) if this happens power down the controller immediately. After 30 seconds unplug the stage, tip the stage on its end to drain any liquids. Leave to dry fully. Once fully dry re-power the system. If the stage is non-operational return for repair.
- The stage is robust compared to most stages of this type, however avoid excess load (eg. leaning) on the stage or flexure mechanisms within the stage may be damaged.
- The cable is sensitive - do not lift the stage by the cable or bend beyond the 30mm radius.

## External Control

The QGOP-400-UP/QGOP-400-INV/QGOP-400UP-HL and QGOP-400-INV-HL can be controlled from Prior ProScan, Micromanager, Metamorph and Ni Elements. Quickstart guides are available.

DLL commands are available for interfacing with other software and integration into OEM systems.