

# 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.

**NOTE: Do not plug in the power cord unless the controller is turned to the off position. Severe damage to the system can occur if the power is plugged in when the controller is on.**

## IDENTIFYING YOUR SYSTEM COMPONENTS

The standard NanoScan SP Series system consist of:

1. NanoScan SP Series Piezo Sample Scanner
2. NPC-D-6110 Controller
3. One or more of the sample accessories listed:
  - QGSP301XR - extra recessed microtitre plate
  - QGSP302XR - extra recessed universal specimen
  - QGSP303XR - extra recessed slide holder for a single slide of standard and double width
4. 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).



SP400/600 Piezo Sample Scanner



Sample Holder



Adapter Plate



NPC-D-6110 Controller

## 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:

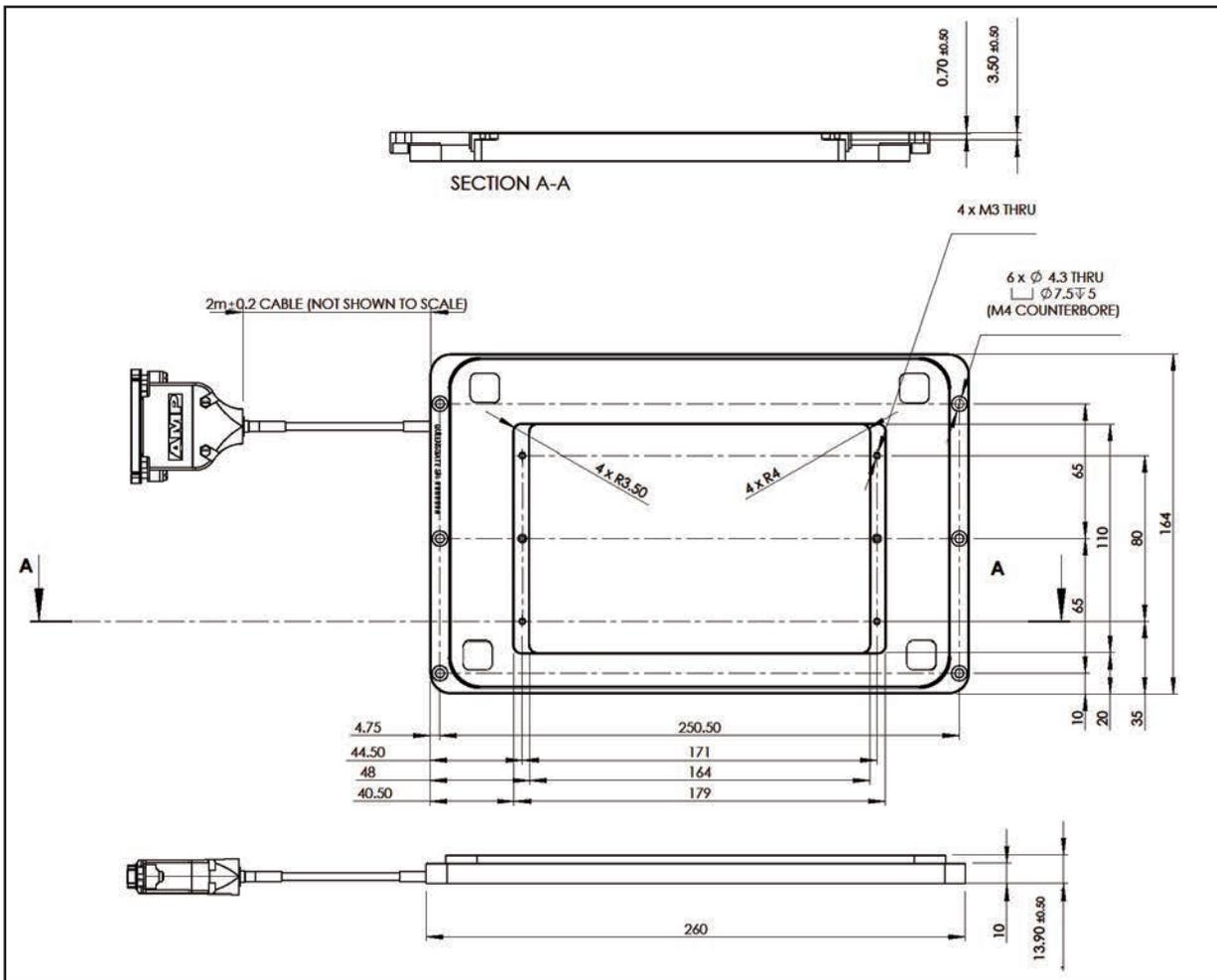
Position the NanoScan SP stage aligning the connection points with those on the XY stage or adapter plate. Mount the stage using M4 screws using all the available thread holes on the XY stage. Where the attachment requires screws of nonstandard length they should be part of the adapter kit. Lightly tighten 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 at 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 4 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).



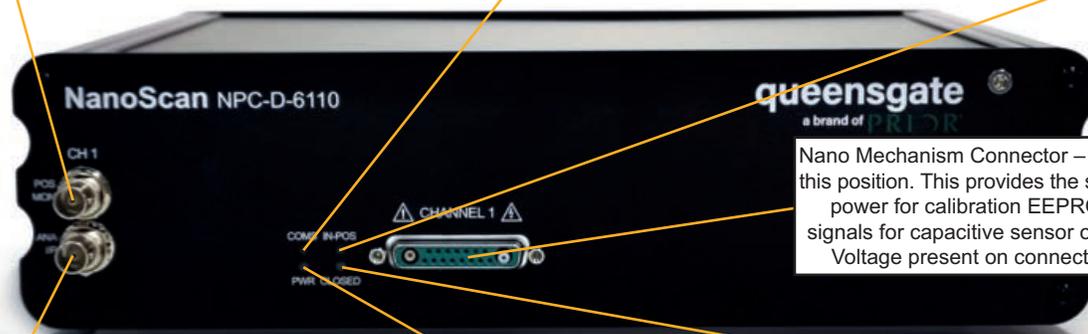
**STEP 4:**  
 Incubators are available from Okolabs and Tokihit that can be mounted within the stage. Where an incubator is used please ensure that the slow (0.5Kg) tuning is selected on the controller.

## CONNECTING YOUR SYSTEM - FRONT OF UNIT

POS MON connector Analogue position monitor (POS MON) output BNC connector(s) – single ended output(s).

COMS Indicator LED  
Indicates the state of the controller communications with the connected computer. Not lit = No communications taking place. GREEN lit or flashing = Communications are taking place

IN POS Indicator LED  
Indicates the status of the stage position in CLOSED loop mode. ORANGE = Stage settings being loaded on connection. OFF = Stage has not reached the desired position. GREEN = Stage has reached the desired position (within specified limits)



Nano Mechanism Connector – connect the OP400 to this position. This provides the stage piezo HV supply, power for calibration EEPROM and measuring signals for capacitive sensor operation. NOTE High Voltage present on connector – up to 160VDC

ANA I/P” connector Analogue command input BNC connector(s) – single ended input(s). Signal used to control the stage position

Power Indicator LED  
Indicates the power status and functionality of the product. RED steady = Controller configuring/not ready (can take up to 30 seconds). GREEN steady = Controller powered and ready for operation

CLOSED INDICATOR LED  
Indicates the status of the stage control Loop  
OFF = Stage NOT connected  
ORANGE = Stage settings being loaded on connection  
RED = Controller operating in OPEN loop mode  
GREEN = Controller operating in CLOSED loop mode  
YELLOW = Controller servo output frozen

## CONNECTING YOUR SYSTEM - BACK OF UNIT

Earth Stud - M4 threaded stud  
Provides additional product ground to help reduce interference of background electrical noise. Do not raise above 0V ground potential

On/Off switch

Controller synchronizing signals and RS-232 NanoScan-Z connection. For RS-232 connection, connect a plug-to-plug 9 pin gender changer/adaptor to the controller, and then connect to the PC's RS-232 port using a 9 pin serial cable.



Power Connector 4 pin miniDIN with screen Input +24V dc  $\pm 0.75V$  @ 5A Provides power to the controller electronics. ONLY connect an approved power supply.

Provides digital inputs and outputs for interfacing controller to external equipment. 25 pin D-type socket; 5V TTL input/output  
**MUST use shielded cable.**

TRIG Input  
TRIG Output  
IN\_POS Output  
Stepped Input  
Stepped Output Interface Connector

USB Connector Type B  
Used to communicate with an external computer.

Ethernet Connector  
Dual connector master/slave configuration. Used to communicate with an external computer.

## 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.
2. Connect Power to controller and USB interface to the PC.
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  $40\mu\text{V}/\text{volt}$ . The analogue input is enabled by default. The Scale Factor is in microns per volt. 50 microns per volt for the OP400.
5. The system has 8 memory positions for PID settling (accessible via the USB interface). The system has been shipped with optimized settings for different objective loads, resolution and step settle requirements. The default setting has been optimized for loads from 150g to 500g. To change to the other settings it is necessary to connect to a computer, the next section demonstrates how to change to other settings. Do not change settings too fast for load used or damage to the unit may occur.

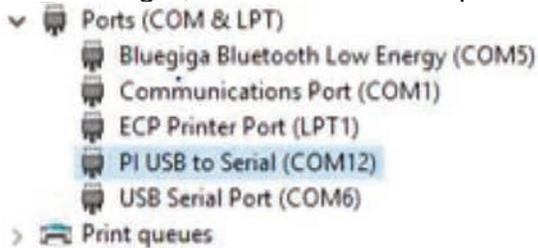
# SOFTWARE

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

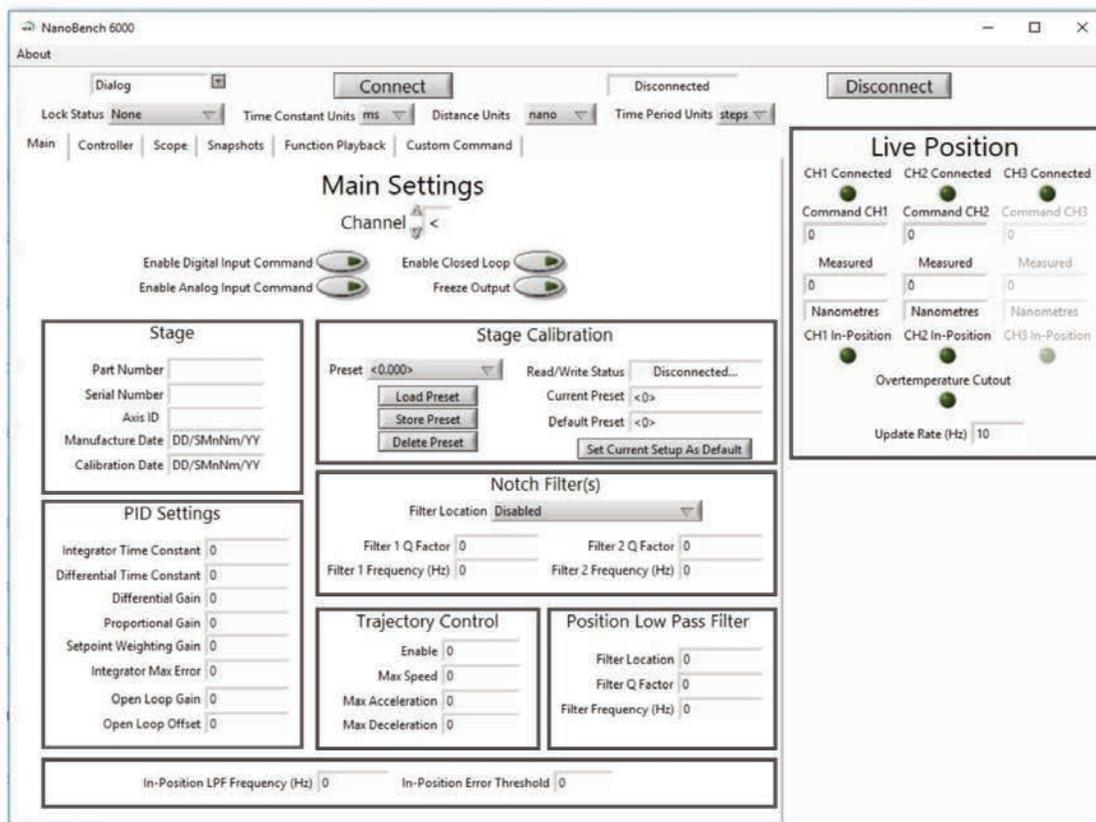
- 🕒 Visual C++ Runtime
- 🕒 Labview Runtime Engine

'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 shown 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.

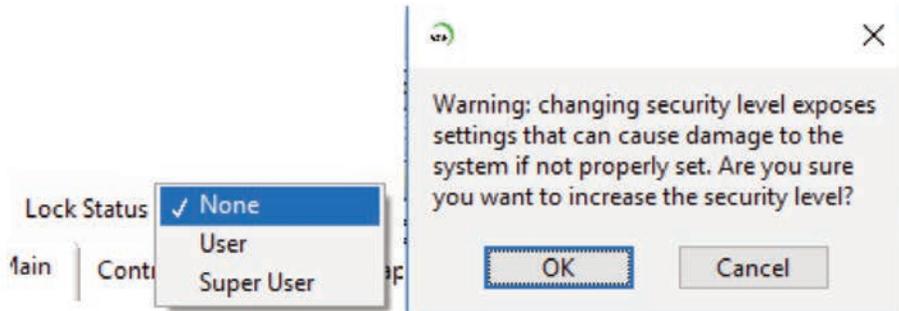


## Dynamic Setups

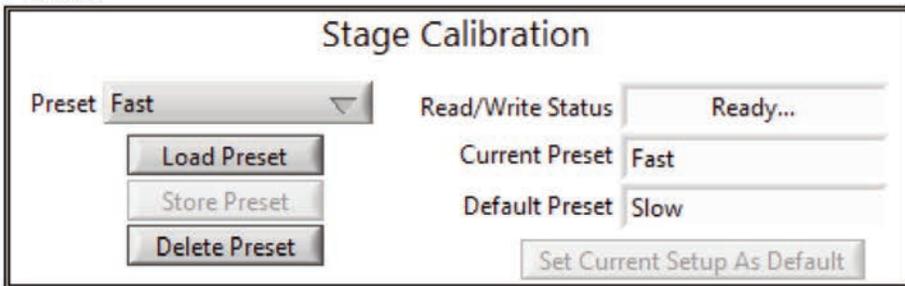
The OP400 stage come pre-loaded with 'dynamic setups', which allow the stage/controller to operate at with different objective loads, optimized step settle times and resolutions.

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' dropdown 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 the most commonly needed settings while still keeping more important settings 'locked'.



The setups can then be changed by selecting a new setup in the 'Preset' dropdown, then clicking 'Load Preset':



## Presets

The QGOP-400-UP/QGOP-400-INV/QGOP-400UP-HL and QGOP-400-INV-HL come with stored settings which have been optimized for fast step settle times and objective loads. The datasheet provided with your OP400 provides information on the presets for your device.