

NANOSCAN OP400 QUICK START INSTRUCTIONS



PLEASE READ THE INSTRUCTIONS BEFORE ATTEMPTING TO USE THE NANOSCAN OP400 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 OP400 system consists of:

- (1) - NanoScan OP400 Piezo Objective Scanner
- (1) - NPC-D-6110 Controller
- (1) - Microscope Thread Adapter
- (1) - 1.3mm (0.05 inch) Hex Key
- (1) - Objective Lens Thread Adapter (optional)
- (1) - Objective Lens Spacers (optional)



Microscope Thread Adapter



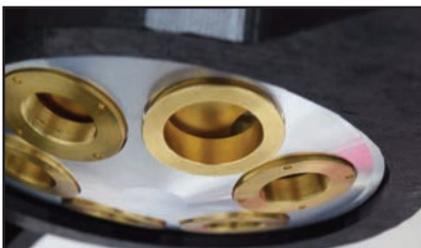
Objective Lens Thread Adapter



Parfocal Objective Spacer

INSTALLING YOUR SYSTEM

Please take care with the cabling. **Under no circumstances use the cabling to hold the stage.**



STEP 1: Select the position for the OP400 on the nosepiece.



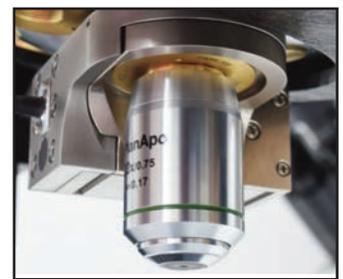
STEP 2: Insert the microscope thread adapter.



STEP 3: Connect the OP400 to the nosepiece. Tighten with the hex key.



STEP 4: Insert the objective lens using the appropriate objective lens adapter. Note no adapter is necessary for M32. Other objectives can be inserted into the nose piece using option parfocal spacers.



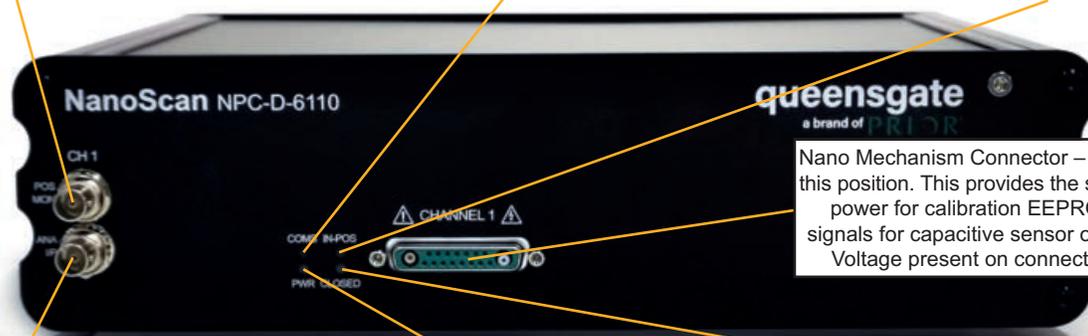
STEP 5: The OP400 unit is now properly installed.

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

Controller Synchronizing signals.
Only used to synchronize multiple 6000 controllers.

On/Off switch



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 $40\mu\text{V/volt}$. 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.

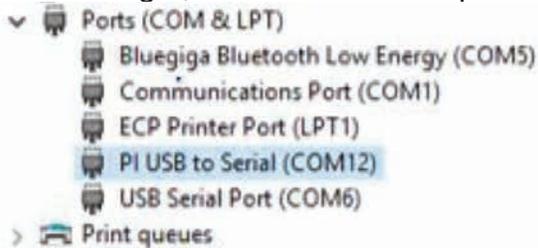
SOFTWARE

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.

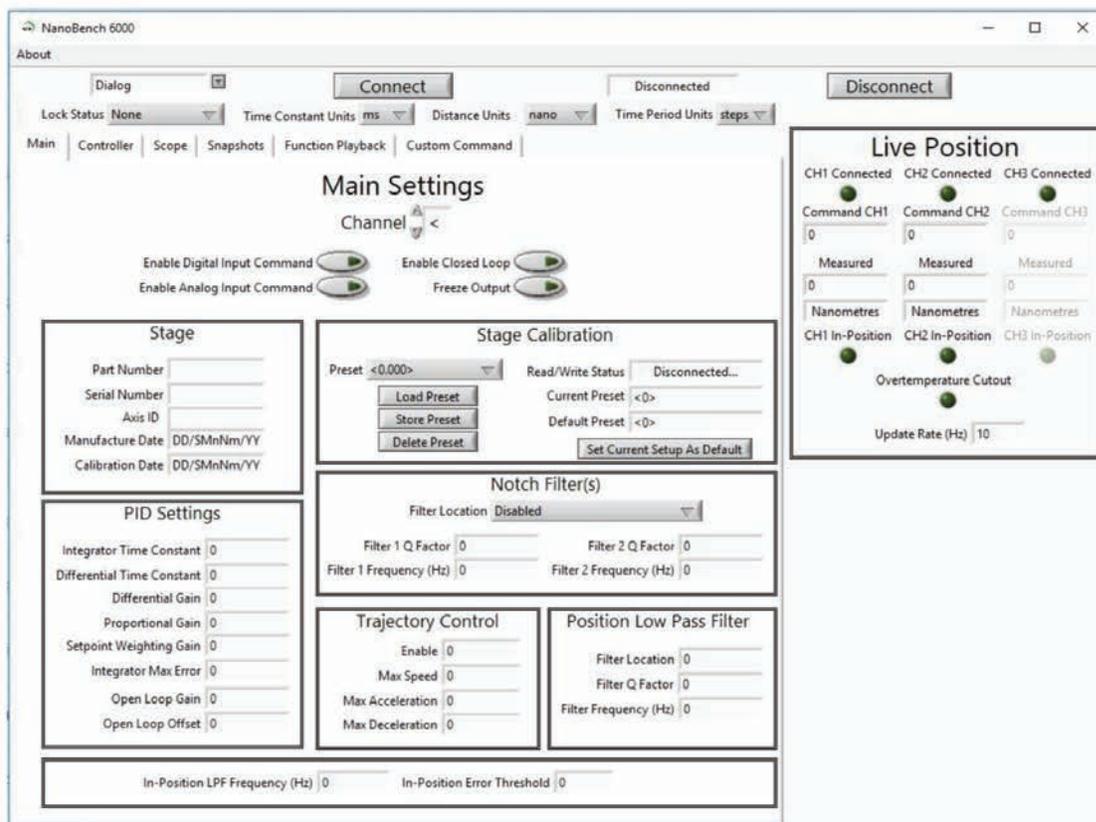
- 🕒 Visual C++ Runtime
- 🕒 Labview Runtime Engine

'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.

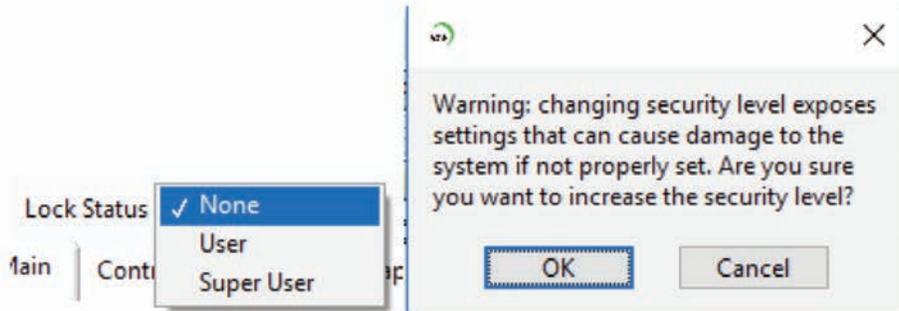


Dynamic Setups

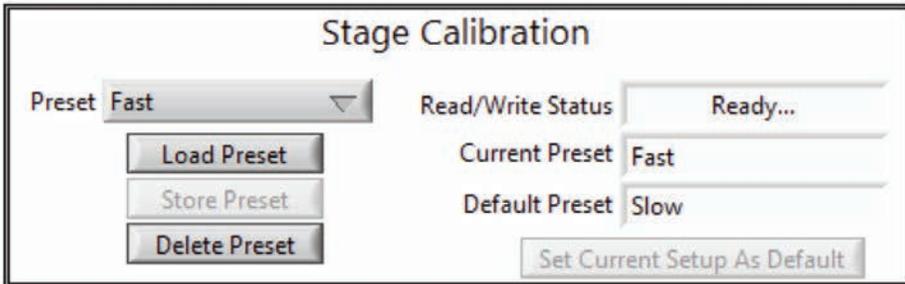
The OP400 stage come pre-loaded with 'dynamic setups', which allow the stage/controller to operate at with different objective loads, optimized step settle times and resolutions.

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.