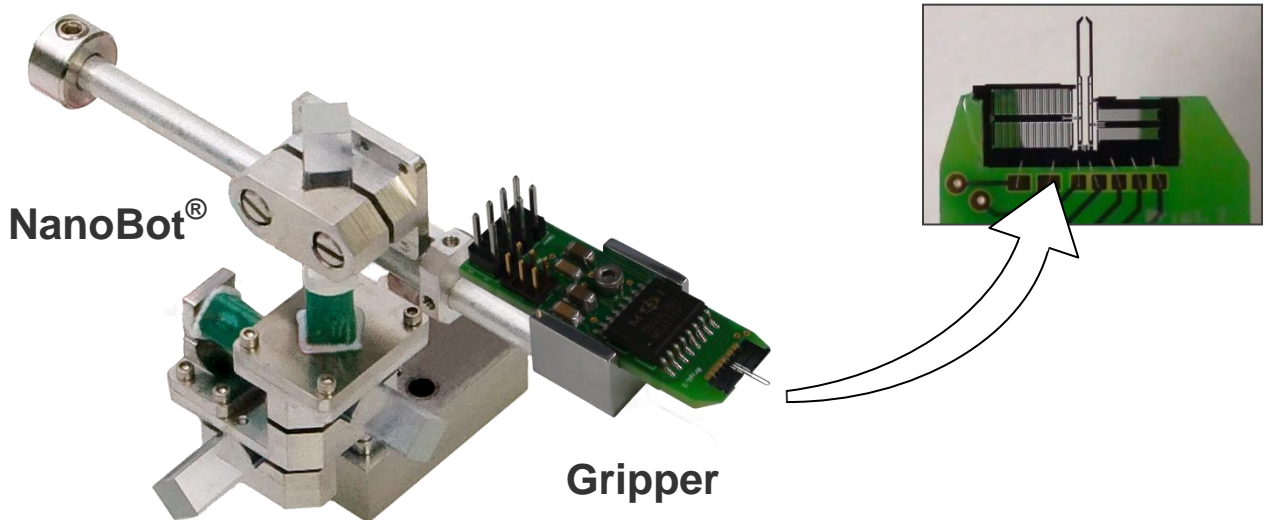


Xidex

Gripper End Effector with Force Feedback



Description

Gripping clamps are available as optional attachments to the positioning arms of Xidex's NanoBot® nanomanipulator. These “grippers” are able to grasp and hold micro- and nano-size objects, and there are two available size ranges for gripping. The Model GF-100 has gripper arms with an initial opening of 100 μm . The Model GF-30 has gripper arms with an initial opening of 30 μm . The clamp size opening can be controlled with nanometer precision. Because of the electrostatic actuation mechanism, there is no extraneous heating caused by the gripper arms. The gripper allows for measurement of the gripping force, greatly enhancing the efficiency and reliability of automated micro-handling and assembly. A LabVIEW™ based application for gripper actuation and force feedback display is installed on a laptop computer running Windows OS which is provided with the system. Users can also create custom LabVIEW applications and add these to the applications library provided with the NanoBot.

Applications

Equipping the NanoBot nanomanipulator with a gripper enables a wide range of applications, including micro- and nano- device assembly, nanomaterial testing, nanofabrication, pick-and-place, sorting, and sample preparation and handling. In the pick-and-place examples shown below the Model GF-100 removes and replaces a washer onto a 0.5 mm diameter wire (Fig. 1) and grips a 10 μm diameter carbon fiber (Fig. 2). The GF 100 is ideal for handling objects in this size range. Smaller objects, up to 30 μm in size, are better suited to the GF-30.



Fig. 1 – Placing a washer on a wire

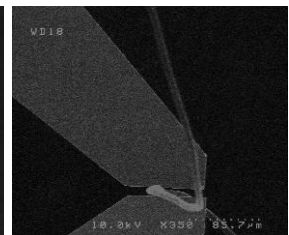


Fig. 2 – Gripping a carbon fiber

Control and User Interface

The controller for the gripper is integrated into the same compact desktop module (Fig. 3) that controls the NanoBot. The joystick that controls the NanoBot (Fig. 3) can be used to simultaneously control the gripper. Force feedback is displayed graphically in both the time and frequency domain (Fig. 4) using the built-in LabVIEW application. The data acquisition system is able to sample the

force feedback signal at up to 100 kHz. Grippers are individually calibrated and the sensitivity is provided for each device. New sensitivity calibration values can be entered via the graphical interface when different devices are installed.

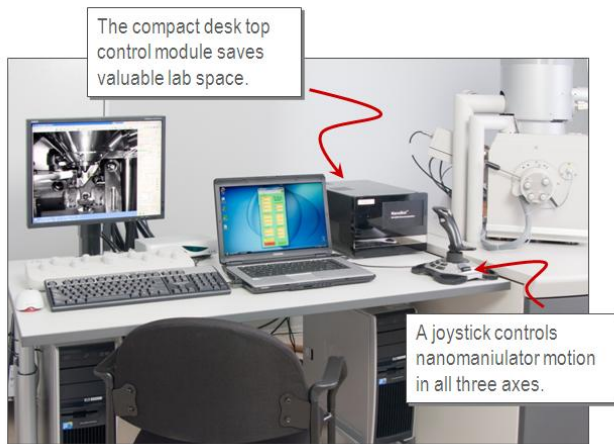


Fig. 3 –Controller, laptop and joystick

Performance Specifications

	GF-100	GF-30
Initial (maximum) gripper opening (μm)	100	30
Force range (μN)	± 125	± 62.5
Force resolution (nN)	10	10

Mounting Options

The gripper can be mounted horizontally, as shown on Page 1, or at other angles, including 45° downward and 90° downward (vertical). The different mounting options allow the gripper to approach objects from different directions and to pick and place objects located on surfaces with different orientations.

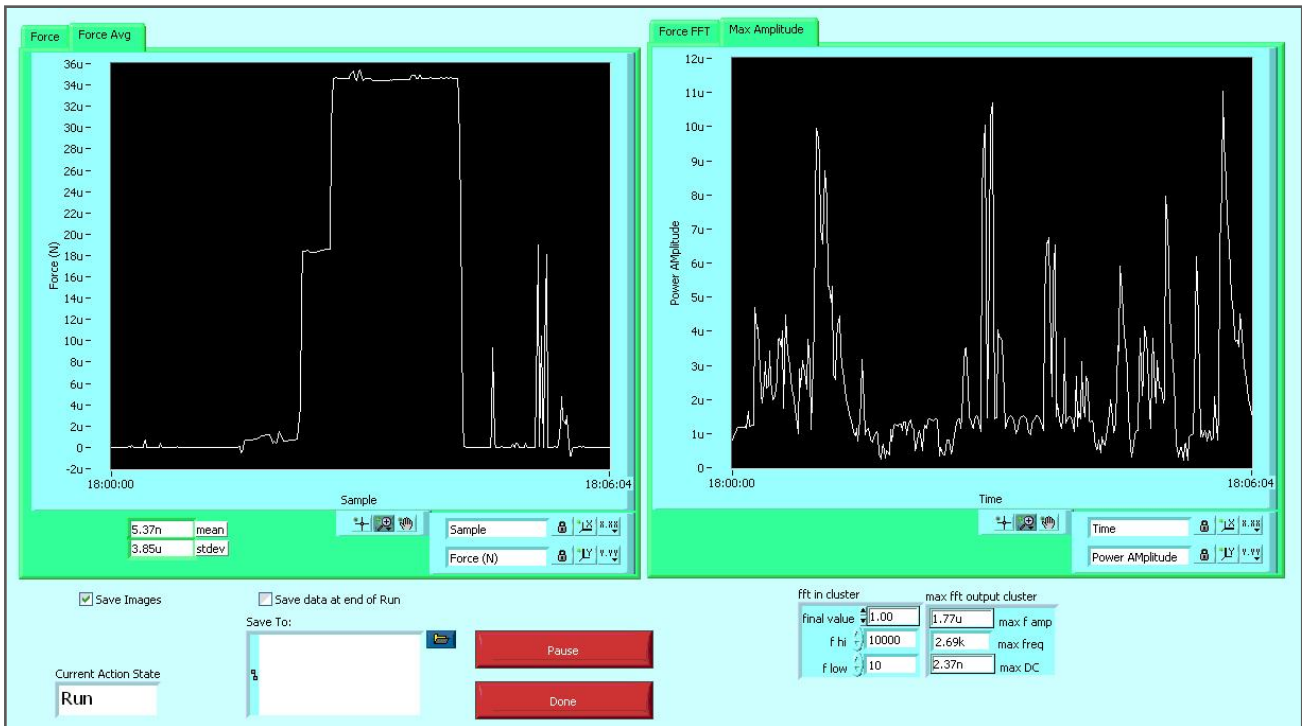


Fig. 4 –LabVIEW application for force display.

Xidex Corporation

Xidex manufactures and sells the NanoBot system, an easy-to-use, highly versatile, user-programmable nanomanipulator built for use inside scanning electron microscopes (SEMs) and focused ion beam (FIB) tools. The NanoBot system transforms a SEM or FIB into a workshop for nanodevice fabrication and testing.

Xidex Corporation was founded in 1997 as an Austin-based Texas Corporation by Vladimir Mancevski, President and Chief Technology Officer and Dr. Paul F. McClure, CEO.

Contacts

For NanoBot sales inquiries contact:

Ray Eby, PhD
NanoBioSystems, Inc.
phone: 312-545-6527
e-mail: nanoray@sbcglobal.net

For other inquiries, contact:

Xidex Corporation
8906 Wall Street, Suite 703
Austin, Texas 78754
phone: 512-339-0608
fax: 512-339-9497
e-mail: info@xidex.com
web: www.xidex.com

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The logo for Xidex Corporation, featuring the word "Xidex" in a stylized, italicized serif font.

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