

# Newport NEWSLETTER

N° 18 — December 2004

Experience and solutions to make, manage and measure light

## Newport and Spectra-Physics Combine Synergies to Better Serve Customers

*With the acquisition of Spectra-Physics complete, Newport's vision for the combined company is to become the premier global resource for customers who need to make, manage or measure light.*

**WEB** See our website for more info.  
[newport.com/acquisition4](http://newport.com/acquisition4)



Newport has taken a key position in the global laser and photonics market, thanks to the acquisition of Spectra-Physics from Thermo Electron in July. Spectra-Physics is a leading manufacturer of lasers and laser systems, as well as related optical and optoelectronic products, with its former headquarters in Mountain View, California and offices around the world.

The acquisition unites two companies in a common vision to offer you more innovative products, more solutions, and more expertise than ever before — now from a single-source. The goal is to help customers

solve the challenges they face as they continue to unlock the marvels of today's modern science and technology.

What's even more exciting is that customers will benefit from a global team ready to assist you at every level with the largest selection of innovative products, with the right specifications, when you need them. This single trusted source will help save time, and deliver increased value.

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### Newport.com – New and Improved

Now that Newport and Spectra-Physics have joined forces, we've redesigned [www.newport.com](http://www.newport.com) to ensure it provides you with the fastest, easiest and most complete way to get information on our combined suite of products and services. The new site features enhanced content, including information on all of Spectra-Physics products, as well as improved navigability and hassle-free online shopping.

Other features include:

- **The Optics Online Assistant** which helps you calculate the type of lens best suited to your application
- **Category searching** that allows you select and "drill down" within categories of products
- **Customizable 3D CAD drawings** that give you the ability to design Newport right into your project
- **Applications/Markets section** where you can find information and resources suited to your specific industry or application

### [ Summary ]

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# Customer Solutions

## Newport Supplies High Precision Actuator for National Ignition Facility Project



Newport has been selected by Lawrence Livermore National Laboratory (LLNL) to supply a custom built, ultra high precision, class 1000, motorized actuator in support of the NIF program.

The NIF project is a 192-beam experimental laser facility that will be completed in 2008. NIF is the world's largest and highest energy laser facility. NIF experiments are being designed to achieve fusion ignition as an alternative energy source, and to conduct high-energy-density research for basic

### *Newport's Actuator used in High-Energy Laser Project at Lawrence Livermore National Laboratory.*

science and in support of the National Nuclear Security Administration (NNSA) Stockpile Stewardship Program.

Newport has been a long-time partner with NIF, and has designed and supplied several precision positioning devices in recent years to LLNL.

To aid operational and maintenance efficiency, all large beam transport mirrors used in NIF are grouped into Line-Replaceable-Units (LRUs) – modular components that are designed to allow multiple insertions and removals of the optics over the projected thirty year lifetime of NIF. Drawing upon three decades of precision motion control experience, the Newport Systems team designed a custom actuator that precisely adjusts the laser mirrors in each LRU.

The design includes precision-machined screw components, which were developed and manufactured in-house to assure the highest accuracy, and a special surface finish to achieve the required 25 nm minimum step size sensitivity. To meet NIF's stringent cleanliness and outgassing requirements, Newport replaced all of the actuator's plastic and elastomeric materials with metallic materials. After intensive qualification tests performed by the NIF team, Newport was selected as the vendor for the NIF LM1-3 actuators. "We selected Newport bases upon the prototype's exceptional performance in terms of on-axis-accuracy, repeatability, reliability, and their excellent reputation for delivering high performance quality motion devices" said Steve Pratush, Laser Bay Optic Mounts Group Leader at the NIF facility.

## Newport Introduces a New Member to the NewStep™ Family of Miniature Precision Motion Products

Newport has expanded its NewStep™ Series of positioning products by introducing a vacuum compatible version of the NewStep actuator to provide low-cost automation solutions for many laser and electro-optic experiments. Good for processes operating in a vacuum to 10<sup>-6</sup> Torr the NewStep NSA12V6 actuator is a direct replacement for manual micrometers and enables precise motorized control of a wide range of translation stages and mechanically adjustable mounts. Measuring only 60 mm (length) by 30 mm (diameter), this tiny actuator provides up to 11 mm travel with sub-micron incremental motion.

The NewStep NSA12V6 actuator uses a high torque stepper motor to provide better than 0.3 micron incremental steps at 1 mm/sec with a maximum load of 28 Newtons. An integrated 3 meter vacuum compatible cable is included with the actuator which terminates to a non-vacuum compatible connector. This permits the easiest integration as users can simply cut the cable for attachment to each side of the chamber feed-through. The non-rotating tip allows even large loads to be moved without long-term degradation of the actuator-stage interface.



The NSA12V6, along with the MFA-PP, NSA12 and NSC100 adds more functionality to Newport's most economical choice for precision automated positioning. Since its introduction in early 2004 the NewStep has received worldwide acceptance as a high value alternative to manual micrometers.

**WEB** See our website for more info.  
[newport.com/newstep4](http://newport.com/newstep4)

# Customer Solutions

## Taking Custom Vibration Capabilities to the Extreme...Again

*Aerospace Customer Orders Largest Monolithic Table in 35 Year History.*



Imagine you need a 3.6 m x 5.1 m x 0.45 m thick single piece monolithic honeycomb vibration control structure. Who would you call? Newport of course! A long time Newport customer recently challenged our Vibration Control team to design and deliver the largest single piece honeycomb structure ever produced in our 35 year history, weighing more than 5 tons! No other supplier was able to provide a vacuum compatible to  $10^{-6}$  hPa table that can be baked out at 70 °C. In their years of working with various suppliers it was the customer's experience that only Newport had the knowledge or experience to make the project a success.

A leading Aerospace company will use the table as the base for satellite test and calibration. The table will be installed in a 6 m diameter x 9 m tall vacuum chamber and will support a

large satellite, a 760 mm gimbal mount, a laser interferometer and several linear stages for calibration.

### Construction of the table

Although the table was built as a single piece, the top skin was fabricated from 4 separate sheets of stainless steel welded together and ground flat. One-inch thick steel stiffeners with 2 threaded inserts, used to attach lifting hooks were welded through the center of the table creating 4 quadrants. The inserts were then potted with epoxy to distribute the load more evenly and, the core was bonded to the top and bottom skin. The table was bonded one quadrant at a time to ensure the epoxy would not setup and cure before the entire core was set in place. This process took over 4 days to complete. The interferometrically measured flatness

was 0.04 micro-inches over the entire surface and the resonant frequency was between 74 Hz at the table corners and 94 Hz at the midpoint.

### Handling with care

Special permits had to be obtained because the 3.6 m width of the table takes up almost 2 full driving lanes on the freeway. The permits specified a route and time the table could be transported from Newport to the customer's receiving dock.

And although your requirements might not be for such a monster-sized table, Newport can design and custom tune structures to meet your specific application needs. We have over 35 years experience in building simple to complex shapes, sizes and performance levels. Custom access holes, special mounting hole patterns, cutouts and threaded inserts can also be incorporated into any table design. Just give us a call and let Newport's Vibration Control team provide a solution for your application.

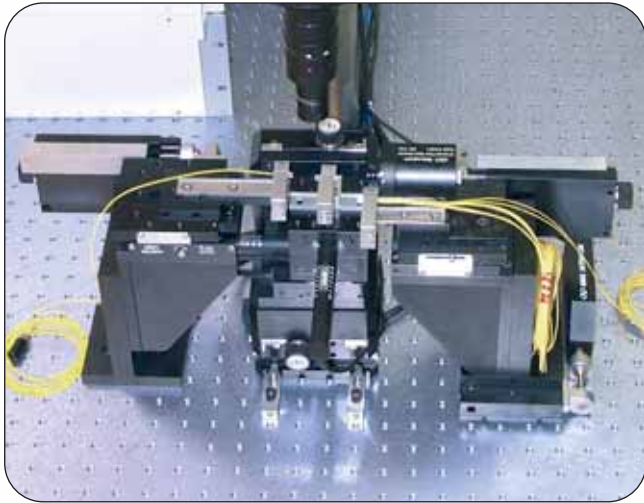


**WEB** See our website for more info.  
[newport.com/vibration4](http://newport.com/vibration4)

# Product Spotlight

## VP-25XL

### Reliable Motion with 10 nm Sensitivity



This system for waveguide alignment and bonding has a total of nine motorized axes.

Acclaimed for their high-precision and ultra-compact size, Newport's VP stages have been recognized as a reliable solution for the testing and micro assembly of fiber optical devices, micro-optics, MEMS, cell probes and semi-conductors.

Featuring high-precision drive technology, including low-friction ball screw and recirculating ball bearings, the VP stages deliver highly reliable positioning performance at a maximum speed of 25 mm/s. Compared to alternative direct-drive technologies, the ball screw drive of the VP stages has greater thrust for higher servo stiffness and load capacity, as well as minimum tuning efforts. Furthermore, the self-locking at power-off considerably simplifies operational safety and improves stability.

The recently released VP-25XL high-resolution version of these stages now delivers a reliable 10 nm motion sensitivity, and better than 140 nm bidirectional repeatability, in combination with Newport's XPS motion controller. These outstanding results are achieved thanks to the advanced encoder interpolation circuitry integrated into the XPS controller that supplies a notable 0.6 nm resolution for internal position calculations.

The modular VP-25XL stages are also highly versatile and can be easily set-up in various configurations to create tailor-made motion platforms.

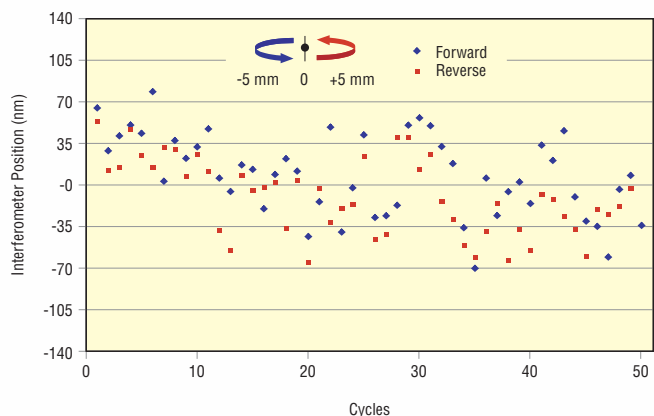
*The XPS motion controller gets the best out of the new VP-25XL stages.*

#### Specifications

Travel range	25 mm
Motion sensitivity	10 nm
Bidirectional repeatability	140 nm
On-axis accuracy	2 $\mu$ m
Maximum speed	25 mm/s
Normal load capacity	60 N



VP-25XL stages deliver 10 nm motion sensitivity with high reliability and position stability.

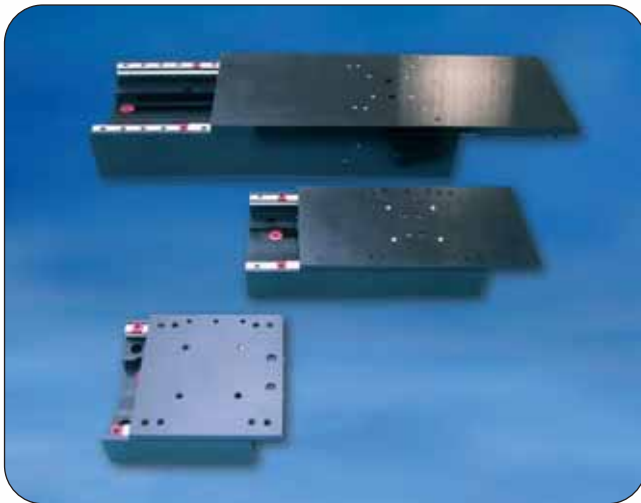


Bidirectional repeatability measurement of a VP-25XL stage during 50 cycles of back and forth motion (5 mm pendulum step size).

# Product Spotlight

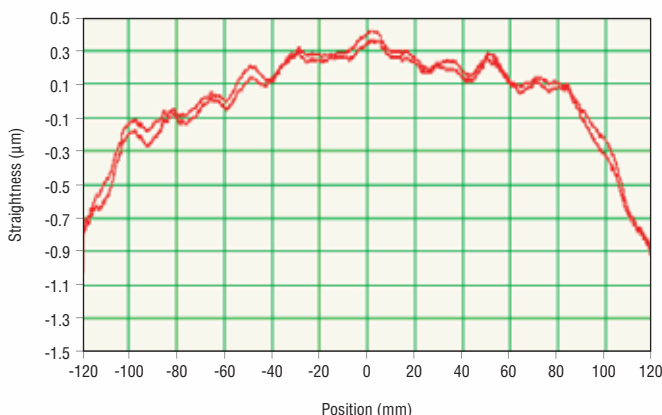
## XM2000

### Best-in-Class Rolling Bearing Stages



The XM2000 rolling bearing stages combine ultra-precision motion with the high dynamics and reliability that was previously met only using complex and costly air-bearing technology. Unlike screw-driven stages, the XM2000 employs a center-driven, iron less linear motor as the driving element.

Since the linear motor is a frictionless direct-drive device, there is no backlash or hysteresis, wind-up or stiction limiting the motion performance. The linear motor drive also offers the advantage of higher speed, acceleration and system responsiveness with no wear to motor brushes or drive screws.



Ultra-quiet, anti-creep crossed roller bearings assure ripple-free motion as required by many scanning, writing and inspection processes.

*The XM2000 provides repeatable, low friction motion, which makes it the ultimate solution for demanding manufacturing, test and measurement applications.*

#### Specifications

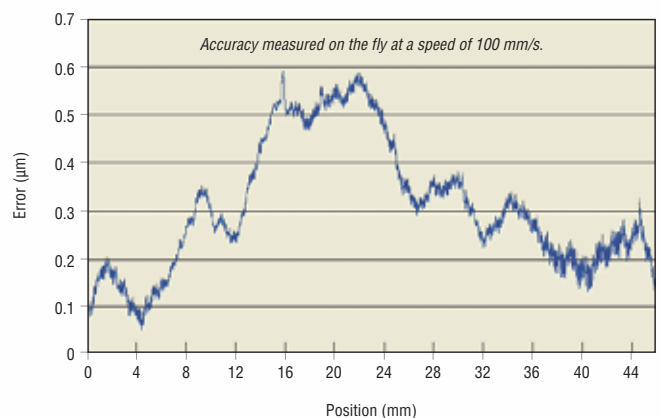
	XM2000-S	XM2000-L
Travel range	50, 100, 160 mm	200, 300 mm
Motion sensitivity	10 nm	10 nm
Bidirectional repeatability*	50 nm	50 nm
On-axis accuracy	1.5 µm	3 µm
Maximum speed	300 mm/s	300 mm/s
Straightness/Flatness	1.5 µm	3 µm
Pitch, Yaw	50 µrad	100 µrad

\* Depending on measurement procedure and temperature stability.

#### Applications

- Semiconductor wafer inspection
- Micro-electronics test and assembly
- Ultra-precision pick-and-place
- Sensor test and calibration
- Ultra-precision laser machining
- Fiber optic test and assembly
- Fiber Bragg gratings
- Fast optical delay lines

**WEB** See our website for more info.  
newport.com/xm4



A high-precision glass scale encoder provides accurate position feedback. The precision alignment and mounting of this low-thermal expansion scale in the center of the stage minimizes also the impact of temperature changes on the stage repeatability.

# Spectroscopy Probes

## Newport's OSM Family Gets Bigger



*A new line of probes and accessories for Newport's compact portable spectrometers is now available.*

Newport recently introduced a full range of spectroscopic probes, light sources and accessories for use with Newport's OSM line of compact spectrometers. These new accessories facilitate optimized measurements based on UV/VIS fluorescence, atomic emission, NIR absorption, and other types of optical spectroscopy.

Included in this product extension are general-use probes, such as dip probes, reflection probes, cosine-

corrected probes and transmission probes, as well as specialty products, such as probes to measure color or the thickness of thin films. The product line also includes integrating spheres, fiber patch cords, cuvette holders, and filter assemblies.

These spectroscopic products are intended for use in research, manufacturing, testing, and OEM applications. These include applications in pharma, agricultural products and foodstuffs, biomedicine, astronomy and semiconductor wet chemistry, in addition to reagent testing and QC in a broad range of industries.

The probes and accessories are compatible with any of the Newport

OSM spectrometers. These grating-based instruments are compact, and come with a choice of detector arrays covering the 200 nm to 1,700 nm range. This includes simple, computer-controlled bench top instruments to complete, self-contained portable systems with onboard, real-time data analysis and storage capabilities.

For the most current selection of accessories, visit our website at: [www.newport.com/osm](http://www.newport.com/osm)

## NewStep™ Actuator

### Smooth Optical Alignment with Motorized Actuators



*NewStep® actuator with Ultima series mirror mount.*

Newport's NewStep™ micrometer replacement actuators are a unique and economical solution for motorizing optical mounts, manual linear stages and other opto-mechanical components. Offered at a price comparable to differential micrometer

*NewStep actuators are specifically designed for remote control adjustment of hard-to-reach or sensitive components.*

screws, NewStep combines sub- $\mu\text{m}$  position sensitivity and accurate position read-out with convenient remote control. The actuators are also now available with an extended load capacity of 28 N and vacuum compatible to  $10^{-6}$  hPa.

Compared to traditional manual screws, NewStep offers the following advantages:

- Non-influential adjustment of sensitive mounts.
- Handy remote control of hard-to-reach or dangerous-to-touch components.

- Precise fine-tuning with 0.1  $\mu\text{m}$  step resolution.
- Fast coarse adjustments at 1 mm/s speed.
- Accurate positioning for repeatable processes.
- RS-485 (RS-232/USB) interface for computer automated methods.

Call your local Newport sales office for a demo.

## 300B Series Precision Temperature Control



The new 300B series of diode laser temperature controllers delivers lower noise and greater temperature stability than any other controller in its price range. The controllers are well suited to provide cost-effective support for applications in scientific research and spectroscopy, as well as fiber optic communications research, development and testing.

*Newport's new 300B Series laser diode controllers provide the finest balance of features, performance and value for today's temperature control needs in laser diode and component testing.*

The new series is the first to use Newport's innovative PID (proportional, integral, derivative) control loop. This enables extremely tight control ( $\pm 0.005$  °C) of laser temperature over a broad range of ambient temperatures. Operating temperature for these new instruments is selected through intuitive front-panel controls. The controllers can also be configured using standard USB interfaces to provide external control of temperature set-point, PID loop parameters, and to allow system status to be read remotely. Two 300B series temperature controllers are available.

The 325B model delivers a maximum current of 2.5 A (17.5 W), while the 350B model provides output power of up to 5.0 A (55 W). Each offers three modes of operation: constant thermistor resistance, constant temperature (for IC type sensors), or constant TEC current.

### Specifications

- Temperature range: -50 °C to +150 °C
- Resolution: 0.1 °C
- Accuracy:  $\pm 0.1$  °C

**WEB** See our website for more info.  
newport.com/300b4

## 500B Series High-Performance Drivers at Affordable Prices



The new 500B series of laser diode drivers offer a level of performance and functionality previously unavailable in low-cost instruments. In particular, they feature improvements in accuracy, linearity, noise, temperature stability, current resolution and modulation bandwidth that puts them on a par with the industry's most advanced products. In addition, the 500B

*Newport's new series of high-power laser diode drivers combines advanced performance with exceptional value.*

series offers improved ease-of-use through a USB interface, and even includes bundled application software and LabView drivers to allow operation through a "virtual control panel".

The new drivers are useful for a wide variety of diode laser development and QA tasks, offering all the tools for automatic generation of LIV curves. Their unique combination of low noise and high stability also enables them to support demanding applications in scientific research and spectroscopy, as well as fiber optic communications research, development and testing.

The 500B series of drivers are available in four models to cover current levels from 0.1 A, 0.5 A, 2.5 A or 6.0 A of maximum output. The 6 A output model can be adjusted with a resolution of just 0.12 mA, while patented noise reduction circuitry lowers ripple to less than 2.5 mA. All models can be operated in either constant current or constant light output mode, and also accept external modulation. The modulation bandwidth ranges up to approximately 800 kHz for the 0.1 A model.

**WEB** See our website for more info.  
newport.com/500b4

(Continued from page 1)

«This unique combination brings together what we believe are the leaders in lasers, and the leaders in photonics instrumentation, motion control and automation, to create a new photonics industry powerhouse», says Robert G. Deuster, Chairman, President and CEO. «The new Newport will have an integrated technology mix that will allow us to better serve many of the world's fastest-growing markets».

#### Acquisition of Spectra-Physics

Here are some of the benefits customers will enjoy from the new Newport as we bring the two companies together:

**Single-source solution:** We have combined two complementary companies to create a single trusted source for customers who need to make, manage or measure light in a wide range of markets.

**Comprehensive product range:** The acquisition adds over 5,000 products sold by Spectra-Physics to the more than 10,000 products offered by Newport. It also creates a strong research and development capability that will lead to the continued development of leading-edge systems and products.

**Continued outstanding customer service:** Over the years, customers have come to rely on excellent support from both Newport and Spectra-Physics, and this will not change. Newport will continue to provide the outstanding service that customers have to come expect.



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For a complete listing of our offices please visit [www.newport.com/contactus/world/](http://www.newport.com/contactus/world/)



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