GMP INFO

Special Positioning Systems

Summary:

1. Smallest 3D positioning system in the world!

Piezosystem Jena is pleased to announce the immediate release of the **smallest piezo** based for **3-D positioning system** in the world!

The new system offers a total range of motion up to **9 µm in the x-, y- and z-axes.** The outside dimensions for this new nano positioning system are **only 15 x 15 x 15 mm!** A key feature is the high resonant frequency of nearly 2.3 kHz!

There is no other piezo based multi-axes translation system, that can reach this value worldwide.

This is an exceptional value for customer working in the field of **AFM microscopy** or other scanning applications.

The engineers from ***piezosystem Jena*** created a sophisticated monolithic guidance design of solid flexure hinges. Free of mechanical play and friction, it is designed for the highest requirements in the nanotechnology.

The small size allows an easy integration into scanning microscopes and other similar devices. Vacuum and cryogenic versions are available on demand as well.

application examples:

- Scanning microscopy
- nano positioning
- fiber optics
- AFM, SNOM, RAMAN microscopy

2. Piezomotors with unlimited travel!

Nanomotion offers a wide range of **motors based on ultrasonic standing waves**, for advanced motion control and automation systems. Nanomotion's patented technology offers **exceptionally high resolution, unlimited travel, and no intrinsic magnetic field.** The **compact packaging** and **ability to drive linear or rotary devices** makes this technology well suited to applications in Semiconductor, Fiber Optic, Electronics, Bio-Medical/ Pharmaceutical, Automotive, and General Assembly manufacturing equipment.

GMP SA Avenue des Baumettes 17 CH-1020 Renens Tél. 021 633 21 21 Fax 021 633 21 70 laser@gmp.ch
Filiale: Im Schossacher 12, CH-8600 Dübendorf Tel. 044 802 30 80 Fax 044 802 30 88 www.gmp.ch

3. Piezoelectrical rotor with 11mrad torque and sub micro radiant resolution

The ***ROTOR***$_{10/10SG}$ one axis low voltage rotary stage is a development within our ultra-fast ***ROTOR*** –line. It provides a **long steering and scanning range of up to 11mrad**. The well defined axis of rotation is located centrically. An incorporated free aperture allows axial beam applications also.

Due to FEA-optimization of these stages you can meet the highest dynamical performance and high planar guiding accuracy. This is accomplished even with **high mass loads** in a compact package. Our optimization also incorporates **excellent temperature compensation** properties for the stage.

Typical application:

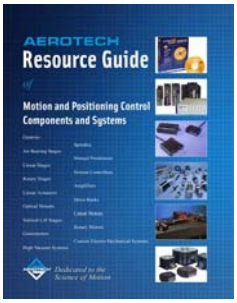
- adjustment optical components,
- laser beam stabilization,
- fiber adjustment laser beam profiling.

4. The complete resource guide for positioning systems on CD available now

« The new Aerotech's catalogue on CD »

The **all-new online** version of **Aerotech's complete product catalog** features product information on our complete product line. Information includes an overview of the product, specifications, downloadable CADs and data sheet pdfs, product ordering information, an engineering reference, and much more.

Aerotech's advanced motion control and positioning components and systems are used in aerospace, assembly, automotive, disk drive, electronic manufacturing, flat panel, imaging, laser machining, machine tool, MEMS, metrology, nanotechnology, packaging, photonics, print, semiconductor, test and inspection, and textile applications.



5. A new low cost micromanipulator system for cultured cells

New! The Burleigh® **PCS-4100 micromanipulator** was designed by and for electrophysiologists, primarily **for patching cultured cells**. The low-cost PCS-4100 is the only micromanipulator in the world to **include memory positions on the Z axis as well as both rotary stages.** Pipette exchange has never been faster or easier.

Key Features

- Simple, efficient, affordable
- Memory positions on Z axis and rotary stages
- Ultra-high stability with negligible drift
- Quick to learn, easy to use.

6. Stents manufacturing : up to 5 times faster !

VascuLatheTM represents a revolutionary approach to satisfying the demanding requirements of **stent manufacturing applications**. The fully integrated motion system couples automated material handling functionality with high performance direct-drive linear and rotary motion capability. The integral linear-rotary design **increases throughput by 2 to 5 times** when compared to traditional screw-based or other manufacturing approaches, while still maintaining submicron tolerances on tight part geometries.

Key features

- Automated material handling system
- Built-in ASR1200 direct-drive rotary stage
- Advanced, fully integrated control system
- Networked, fully digital drives
- Fluid handling system
- Unique path planning and laser control

7. XYZ Flexure Stage

The Series of **XYZ Flexure Stages** have been developed from the highly successful MDE 102 Series. With over **15 years experience** designing and building XYZ Flexure Stages, we have introduced a product which encapsulates updated mechanical design with customer requested features.

Key features

- 20 nm resolution
- Patented XYZ Flexure Stage
- Patented High Resolution Adjuster
- 2 mm travel in X,Y & Z
- Orthogonal alignment groove allows device positioning along X or Y axis
- Many adjuster options
- Left-handed version available

« 15 years experience designing and building XYZ Flexure Stages»

8. Nanomotion's Z-Axis Auto Focus Stage

Nanomotions's Z axis Auto Focus Stage is designed specifically to meet the demanding needs of focus applications, making incremental moves in milliseconds. The stage utilizes a high resolution encoder, with a ceramic servo motor sized appropriately for the user load. A spring counter balance provides for the ability to manage larger loads in a vertical orientation, without excessive motor force.

Key Features

- Ceramic Servo Motor with **travel to 25mm**
- High resolution from **10nm to 100nm** (1nm optional)
- Zero backlash with direct drive
- **High speed** move & settle for focusing operation
- Superior position stability and zero power consumption at rest
- Position holding without power provides optical stability and reduces thermal drift
- Easy add-on mounting to **standard microscopes**

9. E 3100 Optical Tweezer System

The E3100 is a fully interlocked optical tweezer system for single-beam **trapping and manipulation of micron sized particles.**
Optical tweezers have found many applications in biophysics, biology, chemistry and physics. Measuring properties of DNA, **spectroscopy of trapped particles and cell sorting** have all been undertaken. Until now optical or laser tweezers have been used in optical laboratories or on complex microscopes. This new system brings the ability to use optical tweezers in a class 1 laser environment with a compact, desktop unit.
Our particular unit **can also be used in education,** where we can supply kit versions for undergraduate laboratories and special applications.
The product was developed to meet the needs of those wishing to use optical tweezing but without the knowledge or time to develop themselves. The alignment of lasers in a complex microscope can be daunting for the non-optical scientist. We can provide optical tweezer systems to biochemistry laboratories, chemistry laboratories and the classroom with **a turnkey system requiring little laser knowledge**..
Commercially available systems have been based around expensive research microscopes with complex motorised stages and software control. Whilst these systems work well they come at a price. Our solution can bring the same physics to biochemistry and chemistry research **at a much lower cost**. By using precision manual stages and high quality imaging optics the system can be used **to easily manipulate particles of 1 micron to sub micron accuracy.**
The basic principles of optical tweezers have been known since the late 1980s where it was demonstrated by researchers at Bell Labs that **particles can be trapped by a highly focussed laser beam.**

Light rays refracted through the particle experience a change in momentum. The particles

undergo an equal and opposite change in momentum **and are drawn to the most intense part of the beam.**

The laser beam has a Gaussian profile and as such the most intense part of the beam lies in the centre of the beam. **The force created therefore keeps the particle in the centre of the beam.** By using a high NA objective the particle is **trapped in 3 dimensions** due to the high intensity gradient in the focal axis.

By careful choice of the internal diode laser, **dielectric spheres, biological samples and cells can all be trapped and manipulated.** Both visible 685nm 40mw and 785nm 56mw are available as standard. The diodes used have a circular near Gaussian profile with diffraction limited performance. For those applications where more power is required an external laser can be injected.
Once trapped, the **cell manipulation is carried out using conjugate beam steering optics.** Alternatively the particle can be trapped and the **whole sample moved with the precision XY stage. Rotation of birefringent particles can be performed with polarisation optics.**
This product has taken a well know technique from the physics lab and brought it to the wider scientific community, **allowing progress in the fields of bio- and nano-technology.**

ELLIOT SCIENTIFIC LTD

NEW

GMP
General Microtechnology & Photonics
Instruments for Industry, Research, Telecom & Medicine

GMP SA
Case postale
Av. des Baumettes 17
CH-1020 RENENS
Tél : 021/633 21 21
Fax : 021/633 21 70

Filiale:
Im Schossacher 12
CH-8600 DÜBENDORF
Tél : 044/802 30 80
Fax : 044/802 30 88

GMP : The one stop photonic shop!

Find us on the Web:

www.gmp.ch

As early as 1977, Jean-Jacques Goy was among Switzerland's early laser pioneers when he founded GMP SA, designed to be an active interface between manufacturers and users of high-tech systems and instruments. The relations he established with the world's leading manufacturers helped him obtain the exclusivity for their avant-garde systems. GMP soon ranked first in its field on the Swiss market. The Company began to supply the research laboratories of Switzerland's Federal Institutes of Technology, joined in the development of research centers operated by major industrial groups and set out to serve hospitals, clinics and doctor's practices.

Please, contact our photonic specialists for all your inquiries:

Marcel Dubey
Ing. Phys. Dipl. EPFL
marcel.dubey@gmp.ch

Stefano Okretic
Dipl.Phys.Dr.rer.nat.
Stefano.okretic@gmp.ch