

BEAM STEERING

- Rapid accurate laser pointing
- Stable laser positioning
- Optical trepanning trajectory
- Continuous beam positioning

OPTRA Inc.
461 Boston Street
Topsfield, MA 01983



TWO-AXIS STAGE METROLOGY

- Sub-nanometer resolution
- Sub-micron accuracy
- Nanometer level repeatability
- High speed tracking

Z-POSITION METROLOGY

- Auto-focussing of laser beam
- Wafer leveling
- Hole size measurement
- Depth control of blind holes

BEAM STEERING & METROLOGY FOR LASER MICROMACHINING

OPTRA

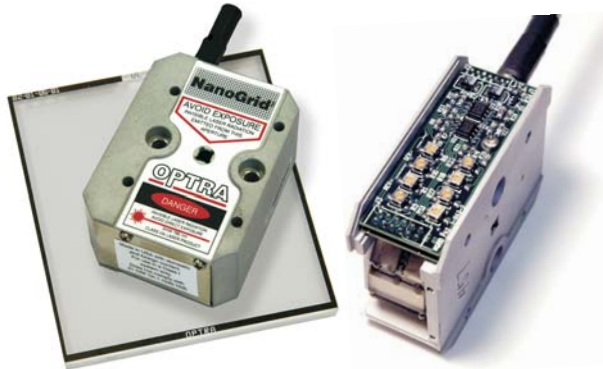
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LASER BEAM STEERER

OPTRA's family of **Beam Steerers** uses compact Risley Prism pairs for fast steering of laser beams. The family of products accept laser beams from 3mm to 100mm in diameter, and provides steering over a 120° full cone angle. Optimized closed loop bandwidth allows for high-speed continuous spiral scanning for laser trepanning systems or step-and-stare positioning for percussion drilling. Custom designs are available upon request.

LASER BEAM STEERER SPECIFICATIONS (TYPICAL)	
Steering Range	120° Full Cone Angle
Pointing Accuracy	1 mrad
Scan Modes	Spiral, Circular or Step-and-stare
Positioning resolution	0.1mrad
Data Protocol	RS-232



NANOGRID

OPTRA's NanoGrid sensor uses a highly accurate **XY Grid Encoder** to make 2-dimensional position measurements with better than 30 nm accuracy, 5nm repeatability, and sub-nanometer resolution. It can handle velocities up to 4000 mm/sec and, unlike laser interferometers, is compact and largely immune to environmental conditions. The sensor head is based on a patented technology.*

*US Patent No. 5,530,543

NANOGRID SPECIFICATIONS (TYPICAL)	
Encoder size	Up to 400 mm x 400 mm
Encoder speed	Up to 4 m/sec
Accuracy	<1µm
Repeatability	< 5 nm
Sensor head size	23.5 x 47.0 x 60.5 mm

NANO GAGE

OPTRA's NanoGage **Proximity Sensor** precisely measures the distance from the sensor head to a nearby reflective surface. The measurement range is 100 microns and the resolution is 15nm RMS at a measurement bandwidth of 100 kHz. This sensor is ideal for applications such as run-out measurement, surface profiling, surface vibration monitoring, and auto-focus. The sensor output is a voltage proportional to the position of the surface relative to the nominal stand-off. In addition to the standard NanoGage product, OPTRA also offers custom through-the-lens autofocus solutions.



NANO GAGE SPECIFICATIONS (TYPICAL)	
Position resolution	15 nm RMS @ 100 kHz
Linear measurement range	100 microns
Measurement repeatability	Better than 75 nm
Surface reflectivity for full resolution	≥ 4% (specular)
Sensor head standoff	3 mm

Systems may be customized to meet your specific needs.