

BeamScope™-P8

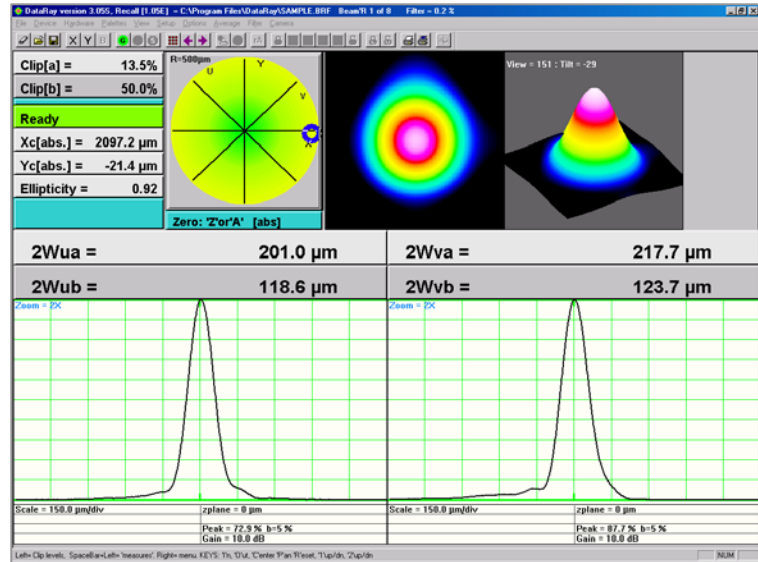
Beam Profiler for beams 3µm to 44 mm

Real-time:

- X-Y Profile Measurement
- Angular Divergence
- Ellipticity, Centroid, Gaussian fit
- Relative Power

Features:

- Beam dimensions 3 µm to 45 mm
- Resolution 0.5 µm or 0.5 %
- 190 nm to 4 µm options
- M² measurement accessory
- ISO 11146 Compliant
- Narrow probe for confined spaces
- Front mounted apertures
- Wide dynamic range
- Powerful, intuitive software
- Upgrade option, BeamScope-P7 to USB 2.0

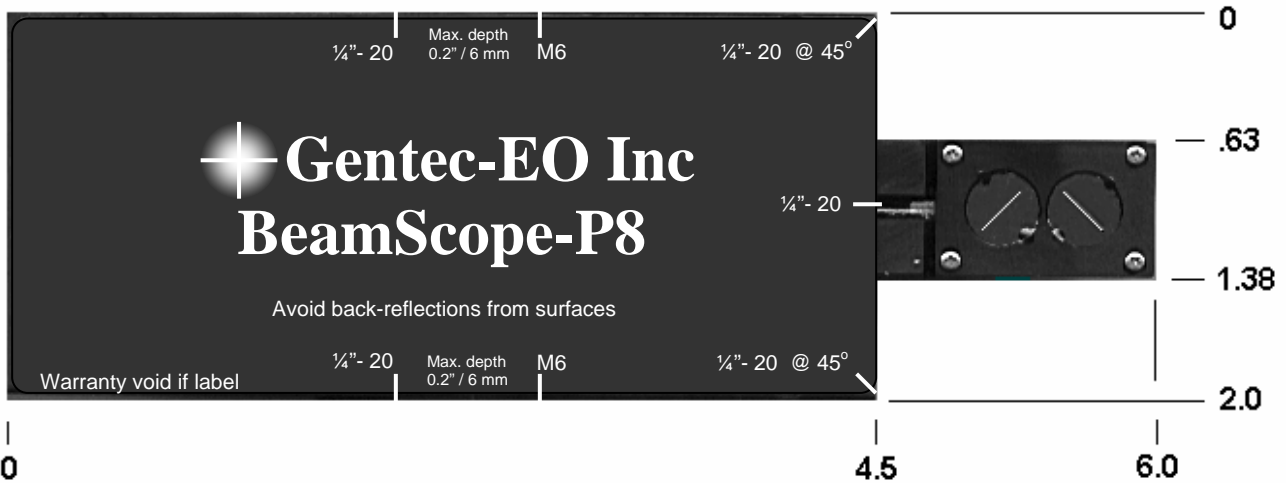


Typical Applications

- Laser/Diode Laser characterization
 - Laser assembly development, alignment, characterization, production test & QA.
- e.g. Lasers And Laser Assemblies for
- Disk/Wafer Characterization
 - Laser Printing/Marking
 - Medical Lasers
 - Bar Code Scanners ... etc.

Accessories & Options

- M² Measurement Accessory-USB 2.0
- UV - IR Options 190 to 4 µm
- 2-D Scan Stage for 23 x 45 mm profiling



Distribution in the UK

BeamScope-P8 comprises a compact head, Interface box, 3 m (10 ft.) USB 2.0 cable, User Manual, Software for Windows XP or Vista.

Principle of Operation: A linear scanning probe carries either a single pinhole, a single slit, or orthogonal X-Y slits. This linear scan satisfies the strict requirements of the ISO 11146 laser profiling standard*. Light passing through the slits falls onto a Silicon (190 to 1150 nm) or Germanium (800 to 1800 nm) detector. [* Until the introduction of the Gentec-EO BeamScope Beam Profiler, no commercially available slit scan or knife-edge scan beam profiler met the ISO 11146 Standard. The Standard requires that the scan be performed in a *plane* orthogonal to the propagation axis. Drum style scanners cannot meet the Standard. Gentec-EO's unique linear scan probe is designed to fully comply with the Standard.]

Acquire Beam Profiles In Constricted Areas

BeamScope-P8 has made the measurement of once inaccessible beam profiles not merely possible, but simple. The unique probe-style scan head easily peers into confined axial gaps between lens, mirrors, and filters. Its ability to probe along-axis spaces as narrow as 12mm creates a whole new world of applications.

No Beam Distortion From Optics Or Filters

There's no distortion of the beam due to ancillary optics or filters because the BeamScope-P8 doesn't need them when analyzing most type of lasers. The AUTO GAIN feature can continually adjust the detector amplifier gain to ensure full use of the 55 dB (300,000:1) gain range. Spot dimensions from 3 μm to 23 mm can be measured from a single scan head. Scan beam areas up to 23 x 45 mm with the new 2-D stage accessory.

Front Mounted Apertures

Front mounted apertures enable you to see precisely where the beam is being measured. Rapidly diverging and fast focusing beams are simple to capture if you can get close to your source. Now it's easier than ever to measure laser diode arrays, micro-lensed sources, broad stripe lasers, etc. Available apertures can accommodate power densities up to 100 W/mm² onto small pinhole apertures. (Max. Total power = 0.5 W) Change apertures in minutes from slits to pinholes. This makes the BeamScope-P8 an unbeatable value in beam analyzers.

Notebook PC Portability with USB 2.0

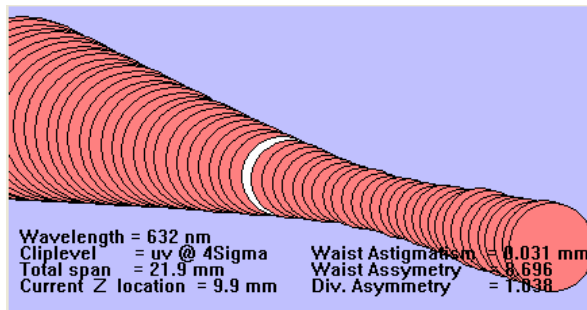
BeamScope now plugs interfaces to a USB 2.0 port on your notebook PC to give a portable unit with a small footprint.

Perfect For R&D, QA & Production

R&D users will appreciate the comprehensive range of analytical functions. QA & Production engineers will appreciate the ability to save test configurations as JOB files, and to indicate **Pass/Fail** on-screen.

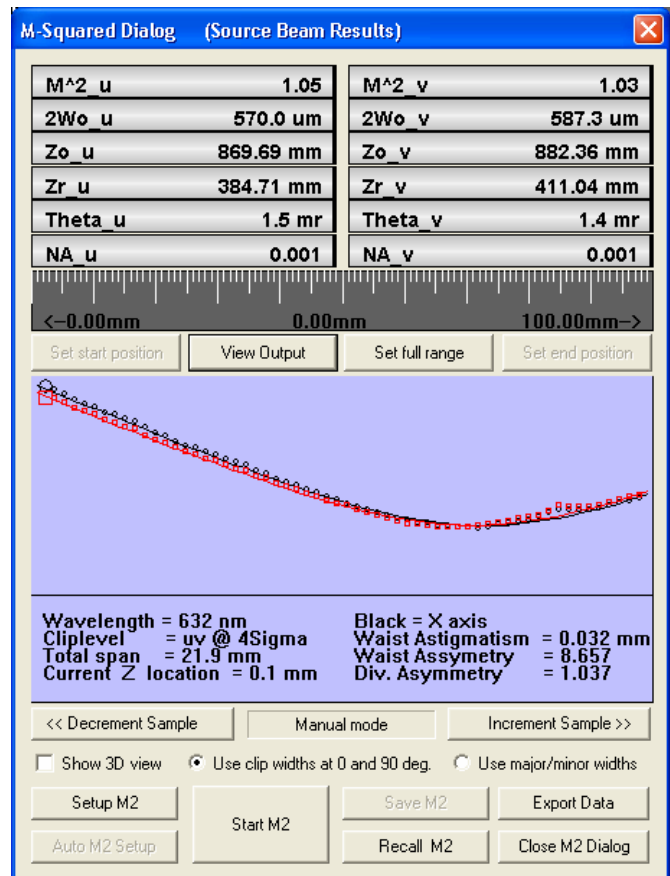
Unparalleled M² Measurements

The BeamScope™ P8 optional M2DU-P8 accessory is unlike any other on the market. There are no complicated adjustments, yet the user can achieve highly repeatable measurements. The software automatically takes more frequent measurements in the waist area in order to accurately determine the true waist diameter.



23 x 45 mm 2-D Scan Stage





Gentec-EO's latest beam profiling innovation offers *extraordinary* 0.2% (512 x 512 pixels) resolution, down to 5 x 5 μm (HxV), over beam areas up to 23 x 45 mm. 2-D scan results display in the integral imaging software for area image analysis.



BeamScope

P8 Product Specifications

[Subject to change without notice.]

Measurable Sources	CW or Pulsed sources: >5kHz Pulse Repetition Rate @ 5% duty factor. Higher PRR is better
Measured Beam Powers	See the graph in the Notes, below. E.g. 6 μ W to 3 W, for a 1 mm diameter ($1/e^2$) Gaussian beam @ 633 nm, 5 μ m slit.
Optical Dynamic Range	55 dB (= 300,000:1) [75 dB with Neutral Density 2.0 film]
Shape of Maximum Scanned Area	Important: For accurate measurements, beamwidth should be < 0.5 x Scan Dimension / EPH extended probe head, dimension 23 mm below, becomes 35 mm. Shape Cross Scan x Scanned Length Pinholes (PA series)  Line Scan Pinhole diameter x 23 mm Single Slits (SS series)  Rectangle 7* x 23 mm, (* 5 for Ge, 3 for InAs) X-Y Slits (XY series)  Trapezoid 5* x 15/5 mm, (* 3 for Ge, 2 for InAs, 3.5 x 13.5/6.5 for XYPI5) 2-D Stage (M2B)  Rectangle 45 x 23 mm scanned area image. Scans a pinhole over this area.
Measured Beam Diameters/Widths	0.5 μ m to ~25 mm (Defined as the $1/e^2$ diameter, = 13.5% of peak for Gaussian beam)
Measurement Resolution	0.5 μ m, or 0.5% of the measured beam diameter, whichever is greater
Measurement Accuracy	$\pm 1 \mu$ m $\pm 2\%$ of measured beam diameter
Measured Beam Profiles	X & Y Linear & logarithmic profile display modes
Measured Profile Parameters	Gaussian beam diameter Gaussian fit Second Moment beam diameter Knife-Edge beam diameter Centroid position, relative and absolute Ellipticity + Orientation of Major Axis Beam Wander display
Displayed Profiles (Note 1)	X only, Y only, X & Y 2-D plot (10,16 or 256 colors) 3-D plot (10,16 or 256 colors)
Update Rate	1 to 2 Hz. Depends upon the PC Processor Speed, Scanned Profile & Selected Options
Data Analysis Pass/Fail Averaging Standard Deviation	On all measured parameters, on-screen, in selectable Pass/Fail colors Beam Diameter Running Average and Accumulating Average options On Accumulation Averaging Screen
Power Measurement	Units of mW, dBm, dB, % or user entered (relative to a reference measurement provided by the user.)
Source to Slit Distance	1.0 mm minimum
Aperture sizes (Note 2) Slits Pinholes	Important: See Scanned Area (above) for measurable beam dimensions 2.5, 5, 10, 25 and 100 μ m wide 7 mm long (Planar version of 5 μ m slits are 5 mm long) 5, 10, 25 and 50 μ m diameter (Larger or smaller pinholes to special order)
Wavelength Range Silicon Detector Germanium Detector InAs	190 to 1150 nm 800 to 1800 nm 1500 to 4 μ m
Mounting	1/4-20 & M6 threaded mounting holes
Temp. Range (inc. Accessories) Operating Storage	10° to 35° C 5° to 45° C
Minimum PC Requirements (Mac version is not available)	USB2.0 port, Windows XP or Vista; 512 MB RAM; 10 MB Hard Drive space; 1024x768 monitor.

Notes:

1. The 2-D and 3-D profiles are 'reconstructed' from the X-Y scan, making the assumption that the measured X beam profile is the same for all values of Y, and that the measured Y beam profile is the same for all values of X.
2. In Single Slit or Pinhole mode, the slit/pinhole width should be $\leq 1/3^{\text{rd}}$ of the diameter of the beam under measurement.
For X-Y slit pairs inclined at $\pm 45^\circ$, the ratio is approximately $1/5^{\text{th}}$.
E.g., for any beam below $20 \mu\text{m}$ diameter, use the $2.5 \mu\text{m}$ slits wherever possible.

In Knife-Edge mode, the slit width should be $\geq 3x$ the beam diameter. For X-Y slit pairs inclined at $\pm 45^\circ$, the ratio is ≥ 4.3 times the beam diameter.

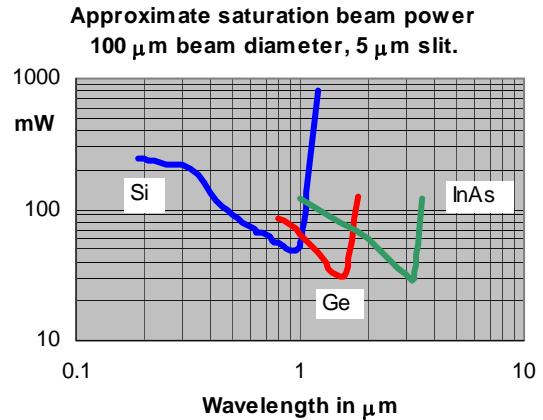
Power Limit

The graph allows you to simply determine the *approximate* maximum CW optical power that BeamScope can measure without additional attenuation. The limit is a detector current limit.

The graph shows the approximate saturation beam power in mW versus wavelength for a $100 \mu\text{m}$ diameter beam ($1/e^2$) and a $5 \mu\text{m}$ slit.

To calculate the power limit at the laser wavelength:

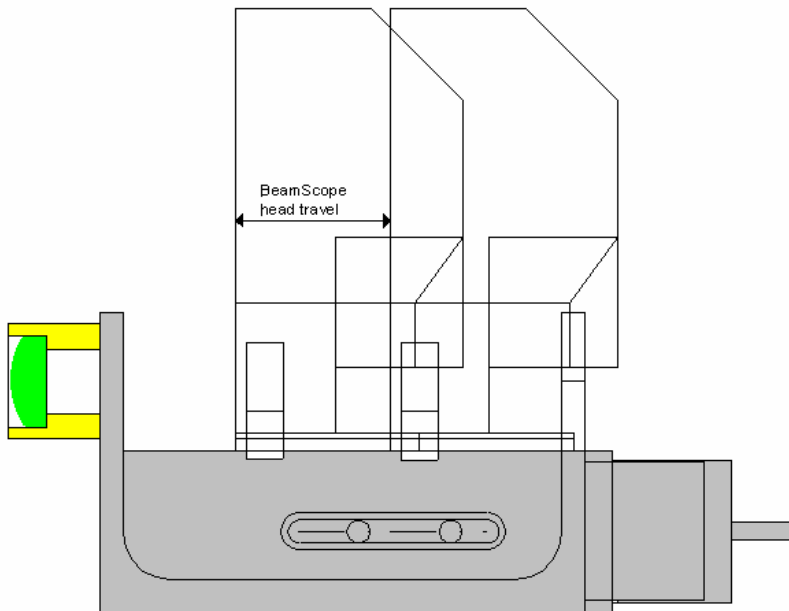
1. Determine the plotted value, P_s mW, for your wavelength (e.g. 70 mW at 633 nm).
2. For a different slit or beam, multiply P_s by:
 $0.05 \times (\text{beam diam.}, \mu\text{m}) / \text{slit width}, \mu\text{m}$
3. For a pinhole, multiply P_s by:
 $0.05 \times (\text{beam diam.}, \mu\text{m})^2 / (\text{pinhole diam.}, \mu\text{m})^2$



These slit and head damage limits always apply:

- Total power on the head must not exceed 1 W, or head/slit damage may occur.
- Total irradiance (power density) at any $\lambda > 500 \text{ nm}$ must not exceed 0.5 mW/cm^2 (mm of beam diameter), or slit damage may occur.

BeamScope-P8 on M2DU stage



P8 USB 2.0 interface



Part Numbers

BeamScope Products & Accessories

System Examples	[Includes Software, 3 m long USB 2.0 cable, User Manual]
BS8-XY5	Silicon Detector system with 5 μm X-Y Slit
BS8-XY2.5	Silicon Detector system with 2.5 μm X-Y Slits
BS8G-XY5	Germanium Detector system with 5 μm X-Y Slits
BS8G-PA10	Germanium Detector system with 10 μm Pinhole
BS8-InAs SSX	Indium Arsenide Detector system with Single slit (pinholes are also available)
/EPH	Suffix for +10 mm Extended probe head, for probing deeper recesses
Accessories	
PA5	Pinhole 5 μm diameter
PA10	Pinhole 10 μm diameter
PA25	Pinhole 25 μm diameter
PA50	Pinhole 50 μm diameter
SS2.5	Single Slit 2.5 μm wide x 3 mm long
SS5	Single Slit 5 μm wide x 7 mm long
SS10	Single Slit 10 μm wide x 7 mm long
SS25	Single Slit 25 μm wide x 7 mm long
SS100	Single Slit 100 μm wide x 7 mm long
XY2.5	X-Y Slit 2.5 μm wide x 3 mm long @ $\pm 45^\circ$ Planarity $\pm \sim 40 \mu\text{m}$
XY5	X-Y Slit 5 μm wide x 7 mm long @ $\pm 45^\circ$ " " "
XY10	X-Y Slit 10 μm wide " " "
XY25	X-Y Slit 25 μm wide " " "
XY100	X-Y Slit 100 μm wide " " "
XYPI5	Dual planar X-Y Slit 5 μm wide x 5 mm long, planarity set to $\pm 4 \mu\text{m}$ (for tightly focused beams).
M2DU-BS-UV-100	M ² Accessory, 44 mm scan/2.5 μm steps, + 3 m long USB cable + M ² lens 400-700 nm
M2DU-BS-VIS-100	M ² Accessory, 44 mm scan/2.5 μm steps, + 3 m long USB cable + M ² lens 185-450 nm
M2DU-BS-NIR-100	M ² Accessory, 44 mm scan/2.5 μm steps, + 3 m long USB cable + M ² lens 630-1100 nm
M2DU-BS-TEL-100	M ² Accessory, 44 mm scan/2.5 μm steps, + 3 m long USB cable + M ² lens 1030- 1800 nm Additional lenses/ focal lengths are available. Please contact us for custom configurations
M2DU-2D M2DU-AP	2D Scanning Stage 44 mm travel, 2.5 μm steps. Beam size to 23 x 44 mm with M2DU-AP plate Additional adapter plate to connect BeamScope to M2DU-2D Scanning stage.
P7-P7U-UPGRD	Upgrade a PCI BeamScope-P7 to USB 2.0 interfaced BeamScope-P7U with rebuilt head, calibration certificate, Interface box, USB 2.0 cables + Universal wall socket power supply and 3 year warranty.
P7-USB2-IF	Add USB2.0 interfacing to a BeamScope-P7.. [No head rebuild, no calibration, no warranty extension.]

M2 Accessory / 2D Stage Specifications

Standard Lens Assembly	Coated Achromat, $\lambda/4$ @ 550 nm (see below for other wavelengths)
(Detached for 2-D Stage operation)	Focal Length 100 mm
Stage Travel / Step Size	Clear Aperture 22 mm
Dimensions	44 mm / 2.5 μm
M2DU	Across axis width x Height with BeamScope x Along axis depth
Weight M2DU	90 x 100 x 200 mm (5.5 x 6.5 x 8 inches)
M2DU + BeamScope-P8	0.8 kg (1.8 lb)
	1.5 kg (3.3 lb)

Other Gentec-EO Beam Profiling Instruments

BeamMap2	Real Time M-Squared Multi-plane profiler 0.1 micron resolution on CW lasers. XYZ profiles, XYZ focus, Centroid, Alignment, Divergence, M ² , Visible to Telecom wavelengths. Port-powered USB2.0
Beam'R2	0.1 micron resolution on CW lasers, 0.5 micron to 4 mm beam dimensions. Port-powered USB2.0
Beamage	High performance, high resolution CCD imaging systems. Port-powered USB2.0