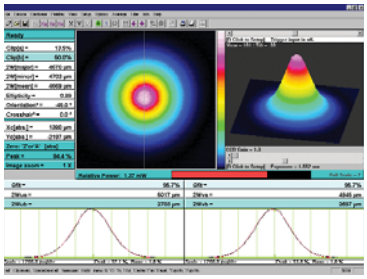


BEAM DIAGNOSTICS

CE

- **Easy USB2.0 Connection (Beamage™ Series)**
- **3 Camera Sensor Options**
- **2D and 3D Profiling, M^2, Divergence**
- **Suitable for Pulsed and CW Lasers**
- **User friendly software**

OVERVIEW

Our diagnostic tools help you quantify and qualify your laser beam. Measure the size, shape and energy distribution of your beam. Determine beam quality metrics like divergence and M^2. In addition, focus, point, and collimate in the lab and production line. There are three basic types of data to choose from.

X-Y Profiling

The **BeamScope™-P7** and **Beam'R** sample sections of the beam by moving slits, pin holes or knife edges through the beam. The aperture puts different fractions of the beam onto a photosensitive detector array. A computer correlates the signal with the motion of the slit to construct an intensity profile of the beam. This is a single 1-D cut through the beam. Passing a slit at an orthogonal orientation gives the orthogonal intensity profile. Often this is enough size and shape information for your application.

Full Area Imaging

There are two ways to measure the full spatial distribution of the beam intensity. One method is to raster scan a pinhole aperture through the beam and reconstruct the beam image in the software. Our **BeamScope™ P7** with 2D Scanning Stage does exactly that. It takes time but may be the only option for a large beam. The easiest and most versatile option is to attenuate and put the beam into a sensitive CMOS/CCD camera like our **Beamage™ Series**. If the beam fits the aperture this is often the most economical and most flexible option.

X-Y-Z-θ-ϕ Profiling

Our **BeamMap™** passes slits through the beam like the **Beam'R™** but at multiple planes along the z-axis. With these 2-D characteristics at multiple planes, you can measure 3-D characteristics like divergence, M^2, beamwaist position and pointing. This patented tool is the only one available that lets you do this in real time.

Beamage™ / Beamage™ Focus

2-D CHARACTERIZATICS

Laser Beam Imaging & M^2 Options

LASERS

CW and pulsed (<20 kHz)

- plug and play USB2.0 direct connection
- no external power supply required
- CMOS/CCD sensors
- 10-14 Bit Digital Camera
- Pulsed laser auto-capture and trigger input
- Single pulse capture up to 20 kHz
- **UV and IR camera options**

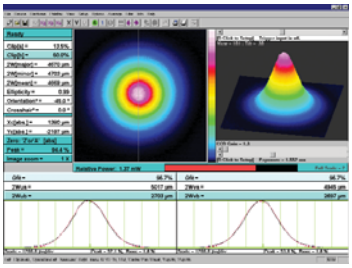
3 VERSIONS

Beamage™-CCD12	• 14-bit digital camera • 6.3 x 4.8 mm imaged area • 4.65 x 4.65 µm pixels
Beamage™-CCD23	• 14-bit digital camera • 8.8 x 6.6 mm imaged area • 6.45 x 6.45 µm pixels
Beamage™-SPEED	• 10-bit digital camera • 6.5 x 4.9 mm imaged area • 9.9 x 9.9 µm pixels

OPTION FOR LARGE BEAMS - THE FOCUS™ EXTENSION

With this fiber taper, you can widden your imaged area to take large beams. The option is available on all 3 Beamage versions.

FOCUS I™: 14 x 10 mm aperture
FOCUS II™: 20 x 15 mm aperture



BeamScope™ P7

2-D CHARACTERISTICS

X-Y Profiling, UV to IR
Laser Beam Imaging & M^2 Options

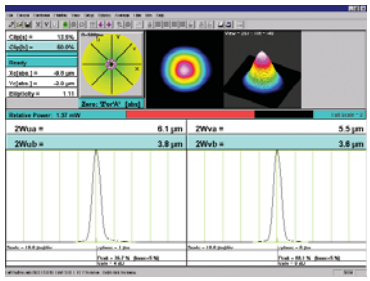
LASERS

CW and Pulsed (> 5 kHz)
Larger beam diameters than Beamage™

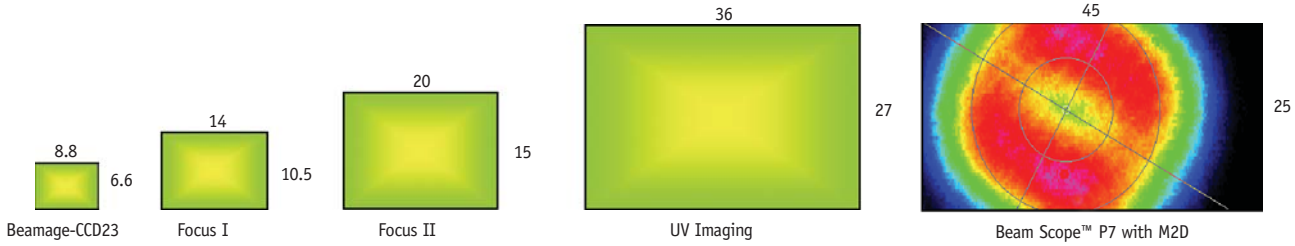
- 3 microns to 25 mm beam dimensions
- 190 nm to 4 µm wavelength options
- Measure in confined spaces
- Linear and log profiles to see energy at the edge of the beam
- Linear scanning slit meets ISO 11146 Standard
- 44 dB dynamic range (300,000 : 1)
- M^2 measurements repeatable to 0.2% (with optional 2D stage)
- 25 x 40 mm scanned area (with optional 2D stage)

TYPICAL APPLICATIONS

Beamscopes are used for characterizing lasers, diodes, diode arrays, microlenses and broad-stripe lasers. Used in development, alignment, production test and QA. This includes lasers for characterizing disks and wafers, printing, marking, medical, and bar code scanners.



Area Imaging Options (Shown actual size in mm)



BeamMap™

3-D CHARACTERISTICS

X-Y-Z-θ-ϕ Profiling and M²

LASERS

CW and Pulsed > 100 kHz
Small beams needing more resolution than Beamage™

- Patented real-time multi-plane profiling
- XYZ position and profile of waists 0.5 µm to 5 mm
- 190 nm to 4 µm wavelength options
- 0.1 micron resolution
- Centroid, Alignment, Divergence, M²
- **ColliMate™ option** for collimation, divergence and pointing to 1 mrad
- **LensPlate™ option** for reimaging the beamwaists of guided beams (eg., waveguides and lens-ended fibers)

TYPICAL APPLICATIONS

This is a great tool for focusing telecom fiber assemblies, verifying precision laser assemblies, and profiling lasers for printing, marking, and medical applications. Used for product development, QA, production assembly and test. This is the only real-time, multi-plane M² and beam waist tool available. By making alignment, focusing and characterization so rapid it is the ideal choice for high volume production.

Beam'R™

2-D CHARACTERISTICS

Affordable submicron X-Y Beam Profiling

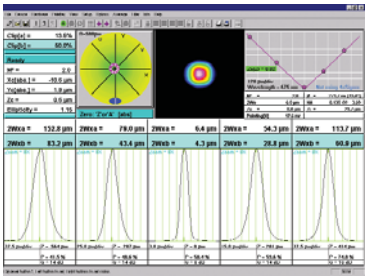
LASERS

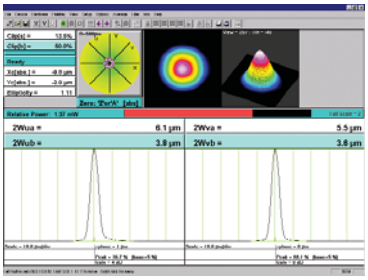
CW and Pulsed > 100 kHz
Small beams needing more resolution than Beamage™

- 0.5 micron resolution
- 0.5 micron to 5 mm beam dimensions
- 190 nm to 4 µm wavelength options
- 3 Hz real-time update rate

TYPICAL APPLICATIONS

Laser assembly verification, use with medical lasers and diode laser instruments. Used in product development, QA, production assembly and test. This is the best single plane XY profiler available for beams smaller than 5 mm diameter.





BeamMap and Beam'R Heads			
Beam'R™	x-y profiler	1 plane	X & Y cross section profiles of beams 0.5 µm to 5 mm.
BeamMap 4XY	x-y-z-θ-ϕ profiler	4 planes	Diverging beam M², divergence and good near field beam waist.
BeamMap 3XYKE	x-y-z-θ-ϕ profiler	3 planes	Diverging beam M², beam waist and high resolution profiles plus knife edge for small beams (< 10 µm)
BeamMap ColliMate™ CM3	x-y-z-θ-ϕ profiler	3 planes	For low divergence beams (<100 mrad): high spatial resolution, best near field detail and beam waist.
BeamMap ColliMate™ CM4	x-y-z-θ-ϕ profiler	4 planes	For low divergence beams (<100 mrad): high angular resolution, best far field detail for divergence and pointing.

BEAM DIAGNOSTICS SPECIFICATIONS

	Beamage™	Beamage Focus™	BeamMap™	Beam'R™	BeamScope™ P7
Description					
	Digital 1.3 MPixel CMOS, Visible, UV & IR 10-bit ADC		X-Y-Z plus θ-ϕ real time profiling	Scanning X-Y slits	Scanning slits or pinhole: probe head
			Slit & Knife-Edge modes		narrow spaces; Rotating head mount option
Function					
Profiling	X-Y	X-Y	X-Y-Z	X-Y	X-Y
Imaging	CMOS/CCD	CMOS/CCD			Pinhole with 2D stage
Focusing	manual	manual	real time	manual	manual
Pointing	manual	manual	real time	manual	manual
Divergence	manual	manual	real time	manual	manual
Collimating	manual	manual	real time	manual	manual
Alignment			✓		
M^2	with 2D stage	with 2D stage	real time, automatic for focussed beams		with 2D stage accessory : pinhole
Method					
Pinhole					(with 2D stage)
Scanning Slit					✓
Scanning X-Y Slit			✓	✓	✓
Slits in Multiple Planes			✓		
Knife-edge Mode			✓	✓	
CMOS/CCD Camera	✓	✓			
Summary Specifications					
CW Lasers	✓	✓	✓	✓	✓
Pulsed Lasers	Up to 20 kHz single pulse capture		Pulsed >100 kHz		Pulsed >5 kHz
Spectral Range					
1 – 350 nm	With UV converter				
190 – 1150 nm			Si detector		
260 – 380 nm	UV version				
355 – 1150 nm	Standard				
355 – 1360 nm	-1310 version				
800 – 1800 nm			InGaAs detector		Ge detector
1475 – 1600 nm	With CamIR Adaptor				
0.8 – 2.5 µm			Extented InGaAs		
1.5 – 4 µm					InAs
3 – 12 µm					II–VI detector
Best Resolution	1 µm read out, 4.65 µm pixel		0.5 µm	0.5 µm	0.1 µm
Smallest Beam	47 µm (CCD12)	145 µm	0.5 µm	0.5 µm	5 µm, (20 µm, 2D Stage)
Update Rate	10 - 25 Hz	10 - 25 Hz	3 Hz (real time)	3 Hz (real time)	1-2 Hz (0.01 Hz, 2D Stage)

Specifications subject to change without notice.

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