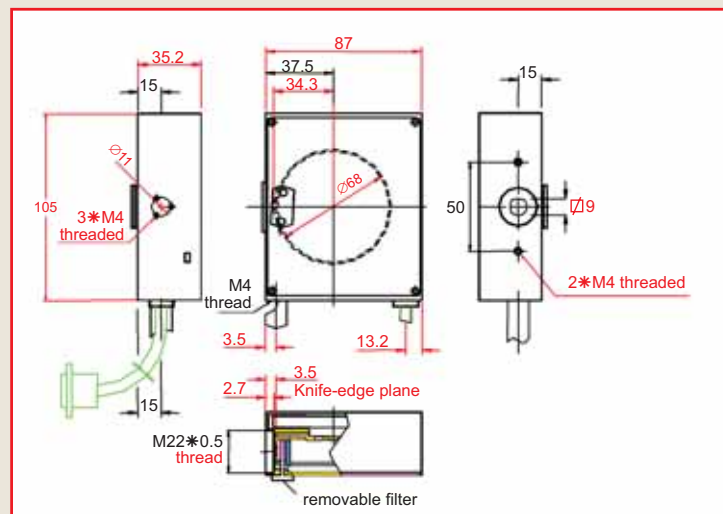


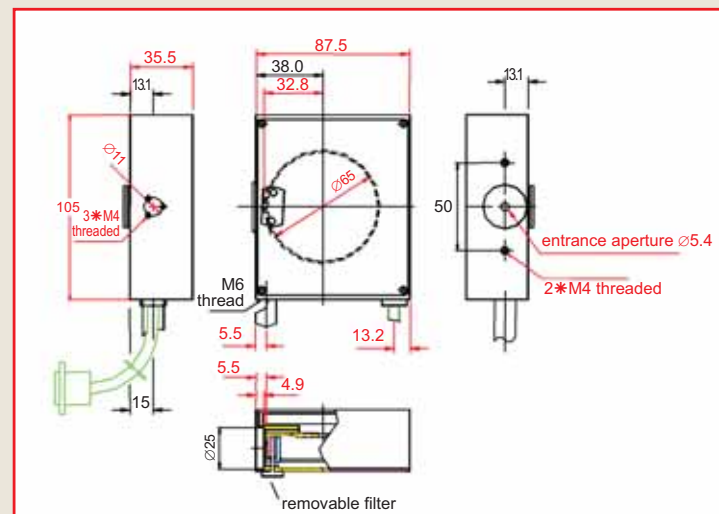


## Specifications

BA7 Head Drawing



BA3 Head Drawing



Dimensions are in mm

<b>Sensor type</b>	Silicon (Si), UV-Silicon (UV-Si) or InGaAs (IR)
<b>Wavelength range</b>	<b>Si</b> 400-1100nm <b>UV-Si</b> 190-1100nm <b>IR</b> 800-1800nm
<b>Number of blades</b>	3 for BA3 heads, 7 for BA7 heads
<b>Beam size range</b>	3µm-5mm for BA3-Si and BA3-UV 15µm-10mm for BA7-Si and BA7-UV (Oval) 15µm-9mm for BA7-Si and BA7-UV (Round) 3µm-3mm for BA3-IR3 15µm-3mm for BA7-IR3 3µm-5mm for BA3-IR5 15µm-5mm for BA7-IR5
<b>Beamwidth resolution</b>	1µm for beams > 100µm in size, 0.1µm for beams < 100µm in size
<b>Beamwidth accuracy</b>	±2%
<b>Power accuracy</b>	±5% for Si and UV-Si heads, ±10% for InGaAs heads
<b>Power range</b>	10µW to 1W with filters for Si and UV-Si heads, 10µW to 5mW (no filters provided) for the InGaAs heads
<b>Saturation</b>	0.1 W/cm <sup>2</sup> without filter, 20W/cm <sup>2</sup> with NG9 (Si and UV-Si)
<b>Power resolution</b>	0.1µW
<b>Position accuracy</b>	±15µm
<b>Position resolution</b>	1µm
<b>PC interface</b>	½ size P&P PCI card
<b>Temperature</b>	-10° to 50°c
<b>Sensor head weight</b>	755 Gram with cable
<b>Measurement rate</b>	5Hz
<b>CE Compliance</b>	

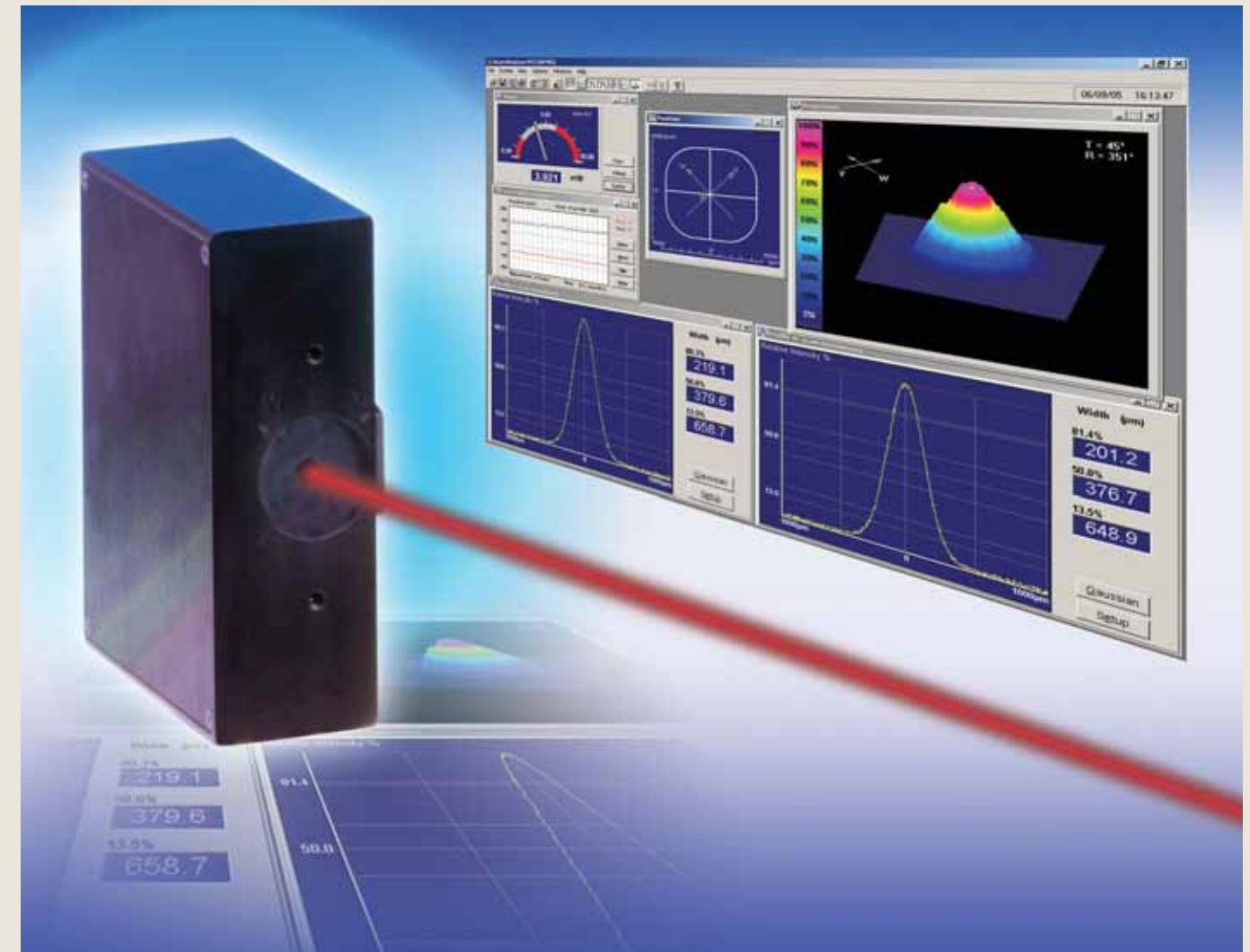
<b>Host Computer Requirements</b>	Pentium III, 128MB RAM, 10MB Free HDD, 8 MB 16 bit VGA card, CD ROM any type, 1 free ½ size PCI slot, OS: Windows 98/ME/NT 4.0/2000/XP
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<b>Ordering Information</b>	The system consists of a measuring head with 2.5m long attached cable, a post, ½ length PCI card, NG4 and NG9 filters in housing (for Si and UV-Si heads), software on CD disk, carrying case.
<b>BA3-Si</b>	3-blades, Si detector 5mm circular
<b>BA7-Si</b>	7-blades, Si detector 9mm square
<b>BA3-UV</b>	3-blades, UV-Si detector 5mm circular
<b>BA7-UV</b>	7-blades, UV-Si detector 9mm square
<b>BA3-IR3</b>	3-blades, InGaAs detector 3mm circular
<b>BA7-IR3</b>	7-blades, InGaAs detector 3mm circular
<b>BA3-IR5</b>	3-blades, InGaAs detector 5mm circular
<b>BA7-IR5</b>	7-blades, InGaAs detector 5mm circular

<b>Optional Accessories</b>	
<b>BA-Fiber</b>	A fiber adapter with an FC connector designed to fit onto the aperture of the BA head close to the knife-edge aperture.
<b>BA-Mount</b>	An optional mount is available to enable rotation of the BA head about the Optical axis. The mount has 360 degree calibrated scale with locking screw.

# Beam Analyzer

Multiple Scanning Knife-Edge Beam Profiler



High precision beam diagnostics for CW lasers

- **Patented technology:** Unique tomographic image reconstruction of 2D/3D images
- **Versatile:** Measure beam profile, beam size, beam shape, position and power
- **Flexible:** Wide spectral range, from 190nm through 1800nm
- **Accurate:** Beam sizes from 3µm to 9mm with 0.1µm resolution
- **Compact:** Based on a PCI card, measuring head, software

## Main Software Features

- Real time beam profiles, beam size and gaussian fit
- 2D/3D plots of beam in real time
- Beam centroid and ellipticity, Power measurement
- Direct data logging to Excel files
- Data streaming via RS232 or TCP/IP
- Save image and snapshot files
- Automatic Pass/Fail analysis report
- ActiveX software for integration in user's program



**DUMA OPTRONICS LTD.**

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**DUMA OPTRONICS LTD.**

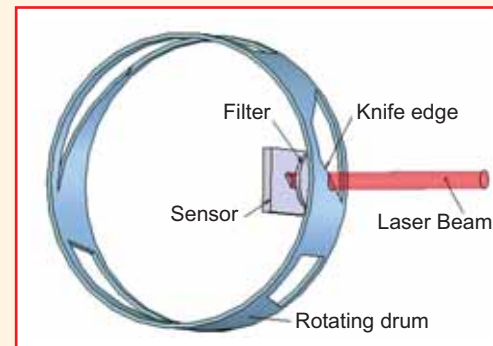
1st Hazait St., P.O.Box 3370 Neshar 20306, Israel Tel:972-4-8200577 Fax: 972-4-8204190  
Website: <http://www.duma.co.il> E-mail: [sales@duma.co.il](mailto:sales@duma.co.il)

## Patented Technology

*The Beam Analyzer provides a bridging technology, producing the 3D intensity reconstruction of CCD cameras, while being capable of measuring very small spots at high resolution and huge dynamic range*

The measuring technique is based on a multiple scanning knife-edge technology, combined with a tomographic image reconstruction for the creation of the 2D/3D display. When the drum spins, the knife-edges cut across the beam in an orthogonal plane to the direction of propagation. A stationary large detector inside the spinning drum measures light intensity. For attenuation, when needed, a built-in distortion free optical filter is inserted between the spinning drum and the detector. This technique provides the required attenuation without affecting beam quality. Each scanning knife-edge is oriented at a different angle on the drum and moves across the beam path in a different direction as the drum rotates. Consequently, during a single rotation of the drum, the instrument generates a set of profile curves, each representing the intensity profile of the beam from a different direction. This data is the input for the tomographic reconstruction algorithm to generate the 2D/3D intensity profile of the beam.

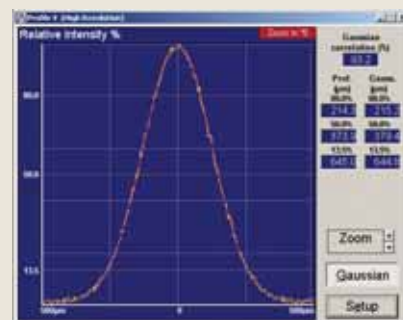
The **Beam Analyzer** is offered in two types of measuring heads: The BA7 uses seven individual knife-edges, providing more accurate measurement of the true beam shape and dimensions by gathering data from all 7 scans, while the BA3 uses only three knife-edges, and is recommended for smaller beams measurement as well as for a near-Gaussian beams. The more knife-edges, the greater the level of detail obtained. For a beam distribution that is significantly non-Gaussian the BA7 would reconstruct a plot that closely matches the real beam.



## System Presentations

*Beam Analyzer* provides an extensive range of graphical presentations and analysis of laser beam parameters.

### Beam Profiles and Width

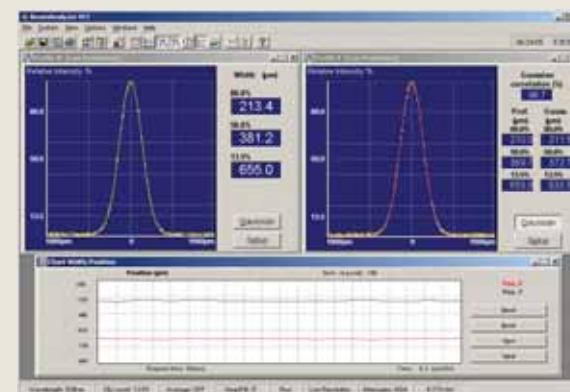


Beam Analyzer' control software simultaneously displays two profiles from two orthogonal knife-edges, or show each profile individually for greater visual detail. These main profiles, located at 45 degrees from the base of the head, are called "V" and "W".

Beam widths are digitally displayed for any three user selected clip levels, with up to 0.1  $\mu\text{m}$  resolution. The beam profile displays are auto-scaled (optional) to maximize on-screen detail and resolution. Added detail can be obtained in a special high-resolution mode. A Gaussian fit profile can be overlaid on profiles in real time, while the correlation and fit values are displayed digitally. Zoom function automatically increases the displayed spatial resolution.

### Chart mode

It is frequently necessary to monitor the Beam Width (or alternatively Beam Position) as a function of time. In Chart Mode, these parameters can be viewed in strip chart format, showing long term time-dependent stability or drift. The measured data can be viewed on screen, saved or printed for further analysis.



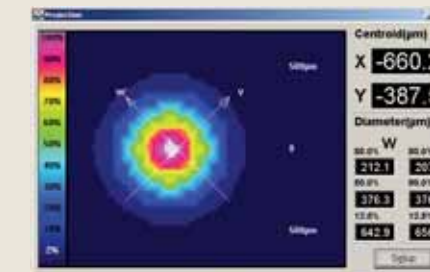
## System Presentations (cont.)

### 2D and 3D Intensity Plots

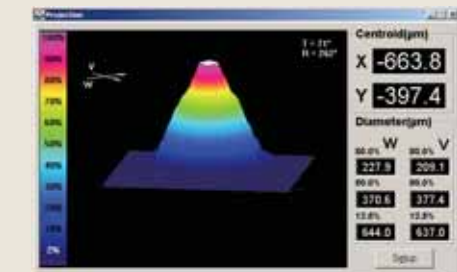
The Projection function provides either a 2D or a 3D plot of the beam intensity profile, and is created using reconstructive tomography.

The 2D contour maps and the 3D isometric plots can be displayed with or without scan axis and grids. These plots can be rotated along the beam optical axis, as well as be flipped. This feature enables the user to view the image from various angles around the beam. It is also possible to control the 3D plot wire density.

Data about the beam size and centroid position is displayed digitally along with centroid and beam size data.



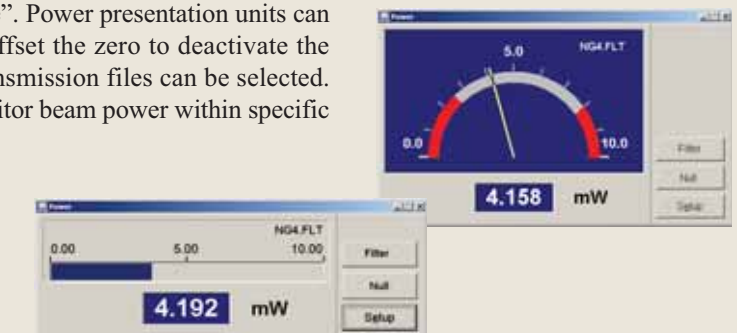
2D Plot



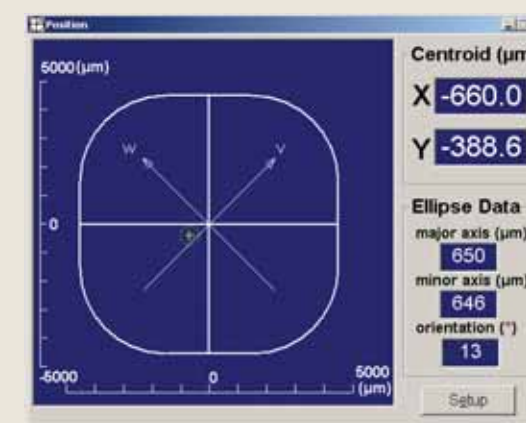
3D Plot

### Power Measurement

The beam power can be displayed either as a digital readout, or as a bar-type display or in combination with an analog "needle". Power presentation units can be chosen as mW,  $\mu\text{W}$  or dBm. The user can offset the zero to deactivate the ambient light suppression. Pre-defined filter transmission files can be selected. A test range can be defined and displayed to monitor beam power within specific limits, audio alarms are optional.



### Beam Position and Ellipticity



The beam centroid position is continuously monitored relative to the center of the sensor area in real-time, along with beam shape, ellipticity (major and minor axes) and angular orientation. A zoom function is available for viewing the footprint of small beams more clearly.

Observing beam position stability versus time is available upon setting up of the Chart function to monitor beam position at the selected clip level.

### More Software Features

- Pass/Fail testing can be performed on measured results for acceptance within specific tolerances.
- Data logging to a Text file or to Excel file
- Live Snapshot files replay for complete analysis of results
- Average setting, Zooming
- TCP/IP communication protocol and remote control
- Data transmission via RS-232 link to another computer
- Slave Mode controlling the measurements upon request
- Screen images can be saved as BMP/JPG files or printed out
- ActiveX software for integration in user's application program

