Beam Analyzer Touch

Multiple Scanning Knife-Edge Beam Profiler

Advanced beam diagnostics for CW lasers

- **Compact:** Small footprint & powerful Stand Alone unit with built-in touch screen and measuring head.
- **Patented technology:** Unique tomographic image reconstruction of 2D/3D images
- **Versatile:** Meaure beam profile, beam size, beam shape, position and power
- **Flexible:** Wide spectral range, from 190nm through 2700nm
- **Accurate:** Beam sizes from 3µm to 9mm with 0.1µm resolution

Main Features

- **New! 12 bit A/D**
- High resolution sampling for all modes simultaneously
- 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/Text files
- Data streaming via RS232 or TCP/IP protocol
- Slave/server modes for remote operation
- **Full Windows application program when connecting an external VGA screen**

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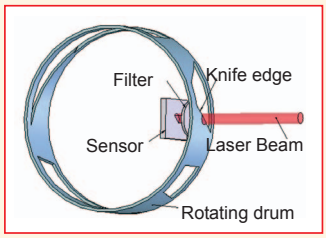
Patented Technology

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

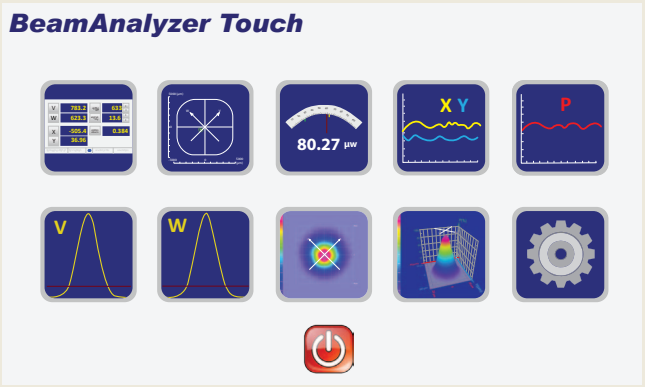
The measuring technique is based on a multiple scanning knife-edge technology, combined with a tomographic image reconstruction for the creation of the 2D/3D display. When the drum spins, the knife-edges cut across the beam in an orthogonal plane to the direction of propagation. A stationary large detector 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:

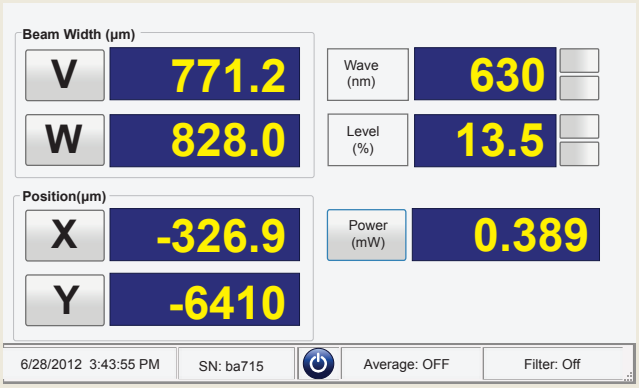
The BA7 uses seven individual knife-edges, providing more accurate measurement of the true beam shape and dimensions by gathering data from all 7 scans, while the BA3 uses only three knife-edges, and is recommended for smaller beams measurement as well as for a near-Gaussian beams. The more knife-edges, 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

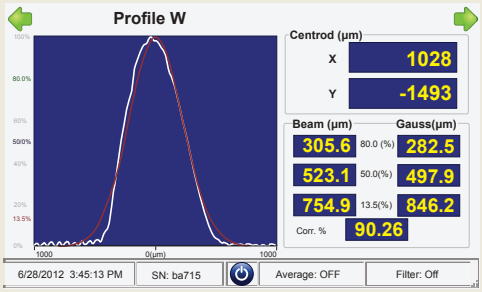


This is the main window from which you access all the instrument functions, activate by tapping on the desired button.



The SA screen presents numerical data of the main measurements: Beam width (V&W) for a certain clip level, power, wavelength and beam position (X,Y).

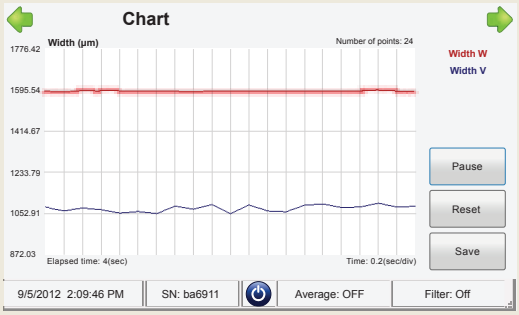
Beam Profiles and Width (profile V or W)



Beam Analyzer displays profiles from two orthogonal knife-edges: these main profiles, located at 45 degrees from the base of the head, are called "V" and "W". Using the touch screen one can select profile V or Profile W. Beam widths are digitally displayed for any three user selected clip levels, with up to 0.1µm resolution. The beam profile displays are auto-scaled (optional) to maximize on-screen detail and resolution. A Gaussian fit profile can be overlaid on profiles in real time, while the correlation and fit values are displayed digitally.

Chart mode

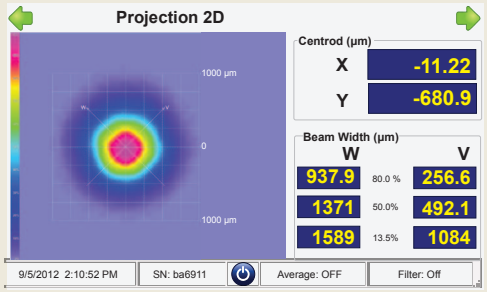
It is frequently necessary to monitor the Beam Width (or alternatively Beam Position) as a function of time. In Chart Mode, these parameters can be viewed in strip chart format, showing long term time-dependent stability or drift. The measured data can be viewed on screen or saved for further analysis.



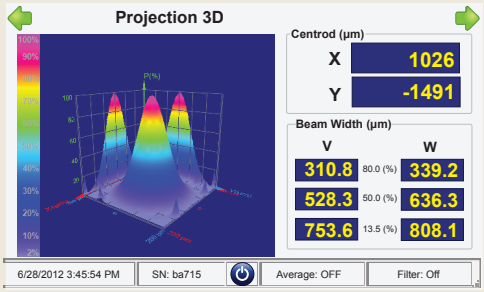
System Presentations (cont.)

2D and 3D Intensity Plots

The Projection functions provide 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. The 3D plot 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, as well as view the 3D figure projections on XZ and YZ planes.
Data about the beam size and centroid position is displayed digitally along with centroid and beam size data.



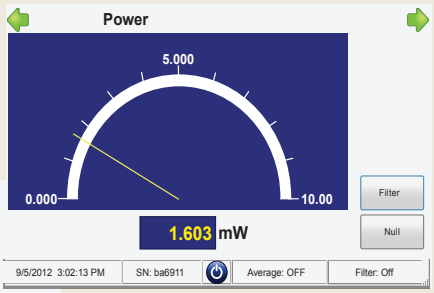
Projection 2D

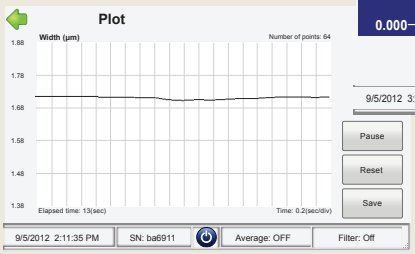


Projection 3D

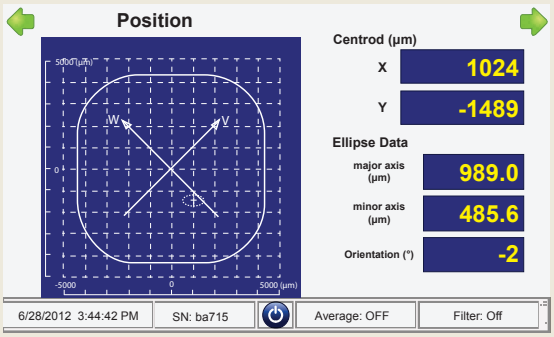
Power Measurement

The beam power is displayed as a digital readout, along with an analog "needle" display. Power presentation units can be chosen as mW, µW or dBm. Null function provides for 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.
The plot power function enables monitoring the beam power as a function of time, in a chart format, for long term testing of power stability.
Data can be viewed on screen or saved for further analysis.





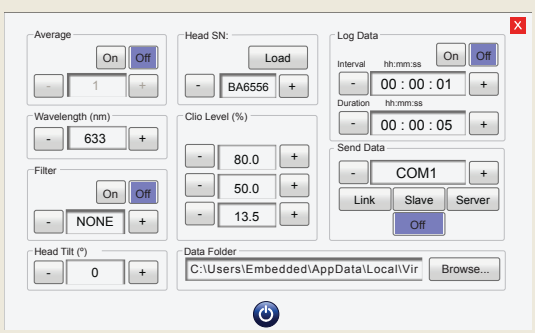
Beam Position and Ellipticity



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

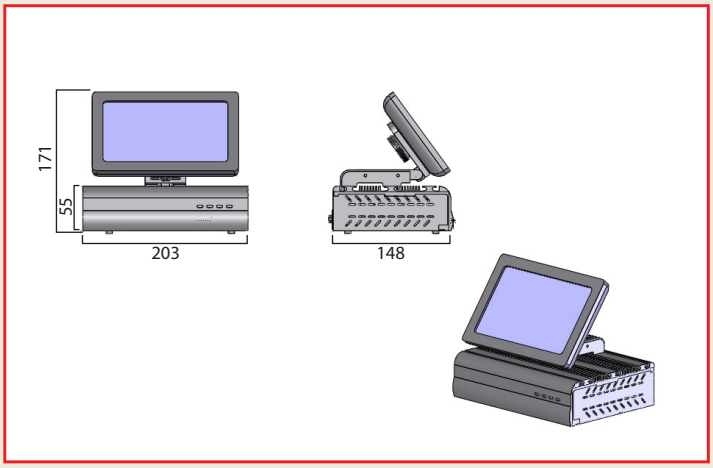
More Software Features

Setup function offers a simple way to configure various parameters, including:
- Average,Wavelength, Filter, Head tilt
- Load head S/N calibration files
- Set clip levels
- Data logging to a Text/Excel files
- TCP/IP communication protocol and remote control
- Data transmission via RS-232 link to another computer
- Slave Mode controlling the measurements upon request
- Server Mode transmitting data to a remote unit

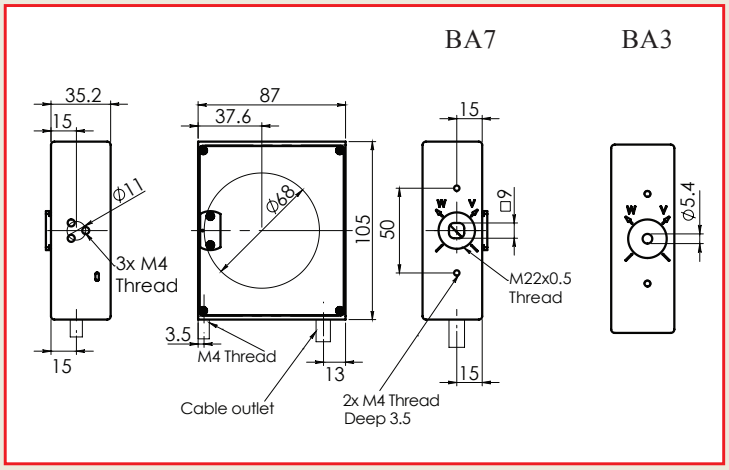


Specifications

Stand Alone Unit Drawing



BA3 / BA7 Head Drawing



Dimensions are in mm

Sensor type	Silicon (Si), UV-Silicon (UV-Si) InGaAs (IR) or IR Enhanced (IRE)
Wavelength range	**Si** 350-1100nm **UV-Si** 190-1100nm **IR** 800-1800nm **IR Enhanced (E)** 1200-2700nm
Number of blades	3 for BA3 heads, 7 for BA7 heads
Beam size range	
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 and BA3-IR3-E
15µm-3mm	for BA7-IR3 and BA7-IR3-E
3µm-5mm	for BA3-IR5
15µm-5mm	for BA7-IR5
Beamwidth resolution	1µm for beams>100 µm in size, 0.1µm for beams<100µm in size
Beamwidth accuracy	±2%
Power accuracy	±5% for Si and UV-Si heads, ±10% for InGaAs heads
Power range	10µW to 1W with filters for Si and UV-Si heads, 10µW to 5mW (no filters provided) for the InGaAs heads
Saturation	0.1 W/cm² without filter, 20W/cm² with NG9 (Si and UV-Si)
Power resolution	0.1µW
Position accuracy	±15µm
Position resolution	1µm
Operating Temperature	10º to 50ºc
Weight	Sensor head 755 gr with cable, Stand alone unite 1.95Kg with built-in touch screen
Measurement rate	5Hz
CE Compliance	

Stand Alone Unit Specifications

Small footprint industrial unit with built-in capacitive touch screen (LCD 7” wide, resolution 800X400, contrast ratio 350:1). Processor Intel Atom D525 1/8Ghz, one 16GB CF(32 optional) Windows 7 pro, 4xRS-232, 2x LAN PORT.

Ordering Information

The system consists of a stand alone unit, a measuring head with 2.5m long attached cable, a post, NG4 and NG9 filters in housing (for Si and UV-Si heads),user manual on CD disk.

BA3-Si-SAT	3-blades, Si detector 5mm circular
BA7-Si-SAT	7-blades, Si detector 9mm square
BA3-UV-SAT	3-blades, UV-Si detector 5mm circular
BA7-UV-SAT	7-blades, UV-Si detector 9mm square
BA3-IR3-SAT	3-blades, InGaAs detector 3mm circular
BA3-IR3E-SAT	3-blades, InGaAs Enhanced 3mm circular
BA7-IR3-SAT	7-blades, InGaAs detector 3mm circular
BA7-IR3E-SAT	7-blades, InGaAs Enhanced 3mm circular
BA3-IR5-SAT	3-blades, InGaAs detector 5mm circular
BA7-IR5-SAT	7-blades, InGaAs detector 5mm circular

Optional Accessories

SAM3-B	Beam Sampler, with mounting adapter - sampling reduction factor 0.0016 average
BA-Fiber	A fiber adapter with an FC connector
BA-Mount	A mount enabling head rotation about the optical axis

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