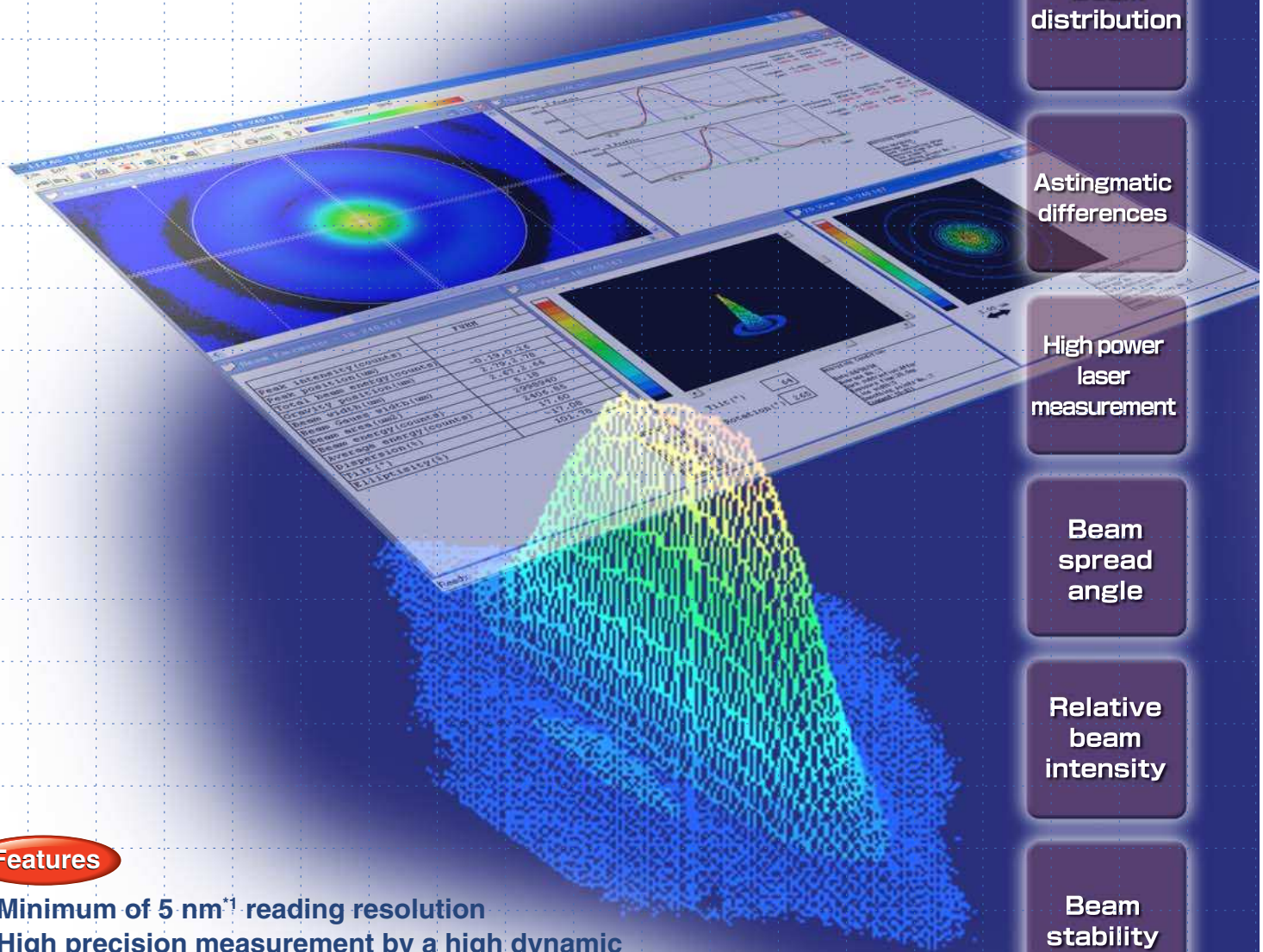
Laser Beam Profiler LEPAS-12

Analyzes various optical beam parameters with high sensitivity and high resolution in VIS to NIR range!



Beam diameter
Ellipticity
Tilt

Beam position
Gravity position

Beam distribution

Astingmatic differences

High power laser measurement

Beam spread angle

Relative beam intensity

Beam stability

Automatic adjustment beam

Features

- Minimum of 5 nm[*1] reading resolution
- High precision measurement by a high dynamic range (1: 1000 or better[*2])
- Pulse light measurement is possible
- Fine tuning of exposure time is possible[*3]

*1: Using C9664-01G02 and A4859-02 *2: Integration processing, smoothing processing *3: Tuning by exposure time of digital camera

HAMAMATSU

PHOTON IS OUR BUSINESS

Laser Beam Profiler LEPAS-12 for digital camera

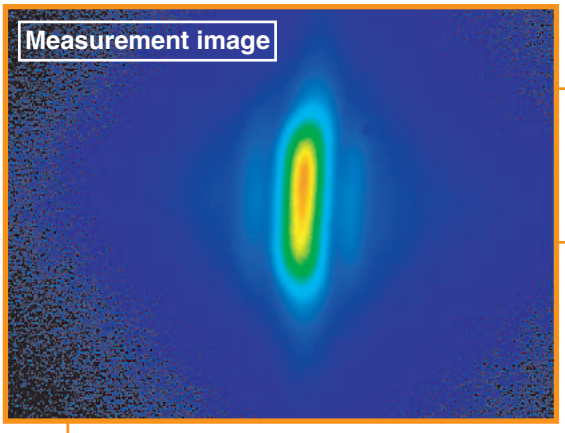
The Laser Beam Profiler LEPAS-12 is a key product for configuring an optical beam measurement system. Combining the LEPAS-12 with a dedicated optics and a digital camera allows high precision beam analysis using sophisticated functions. The LEPAS-12 supports high performance digital cameras for beam measurement with high spatial resolution over a wide dynamic range including pulsed light measurement. Besides displaying the measurement image, the LEPAS-12 verifies measurement and analysis results using the various display functions such as an equiluminance display, 3D display, XY profile display, and beam parameter display.

The LEPAS-12 supports different applications by selecting the optics!	
Semiconductor laser NFP/FFP measurement (Also supports infrared lasers)	Fiber N.A. measurement
LED pulse emission evaluation	Spatial beam measurement
Optical pickup beam measurement & evaluation	Measurement of high-power machining YAG lasers

* See the LEPAS-12 Application Notes for detailed information on each application.

Measurement example

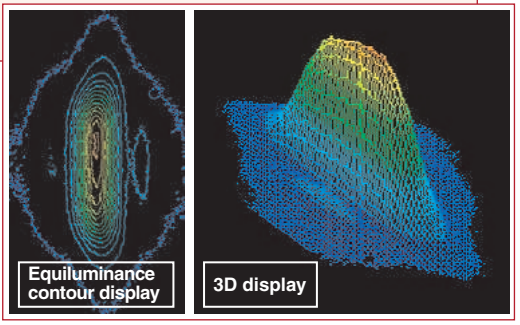
Semiconductor laser NFP (Near Field Pattern) measurement



Display Function 1

● Equiluminance display and 3D display

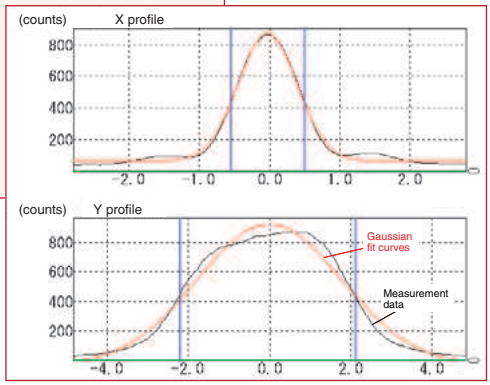
Displays a 2D or 3D profile of a specified region in pseudo color. The 3D display viewing angle is adjustable.



Display Function 2

● XY profile display

Displays an XY profile of a specified region. Overlays not only measurement data but also gaussian fit curves (red line). XY profire can be zoomed by mouse operation. The cursors appear on groph, and data can be read directly at any desired postion.

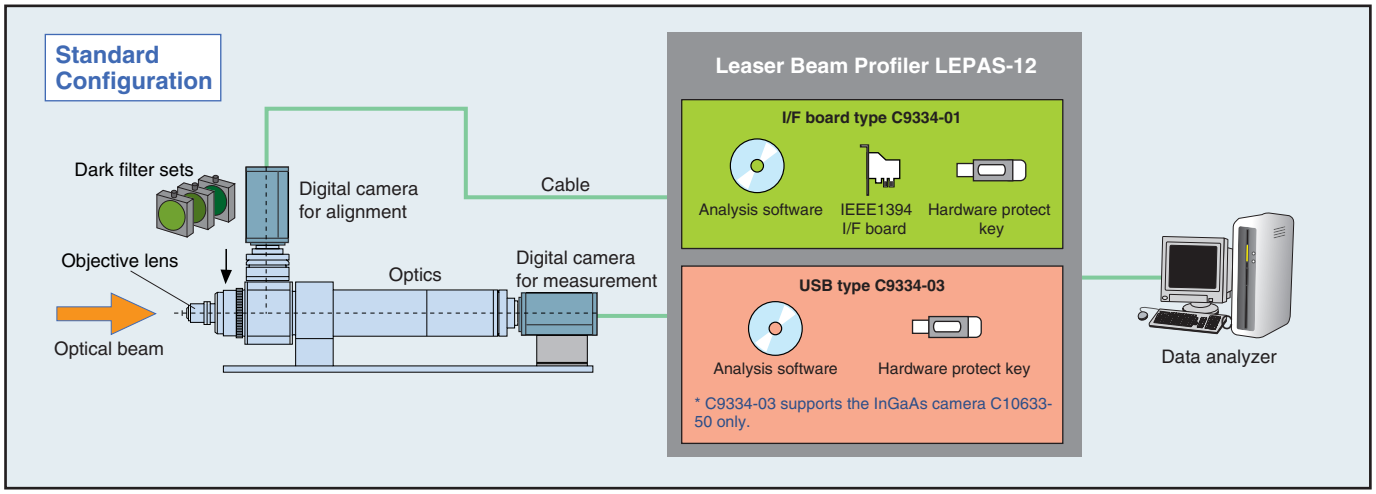


Display Function 3

● Beam parameter display

Analyzes and displays various beam parameters of a specified region. The slicing levels used for analysis are FWHM, 1/e, 1/e^2, and any other two points specified by the user.

	FWHM	1/e	1/e^2
Peak intensity (count)	894		
Peak position (μm)	0.65, 1.25		
Total beam energy (count)	8 361 730		
Gravity position (μm)	0.63, 0.47	0.63, 0.47	0.63, 0.44
Beam width (μm)	1.04, 4.30	1.25, 4.79	1.84, 6.16
Beam gauss width (μm)	1.02, 4.22	1.24, 4.97	1.93, 6.64
Beam area (μm^2)	3.83	5.17	9.60
Beam energy (count)	3 715 586	4 480 638	5 813 300
Average energy (count)	659.03	588.09	410.89
Dispersion (%)	19.12	27.62	55.77
Tilt (°)	86.91	86.92	86.83
Ellipticity (%)	428.92	399.09	360.18



Functions

● High resolution measurement

Combination with a high resolution digital camera (C8484-05G02, C9664-01G02) can perform beam measurement with 1344 × 1024 pixels spatial resolution.

● High dynamic range measurement

1:1000 or more high dynamic range measurement is possible by combining with the digital camera of 12 bit A/D converter, and performing various smooth processings.

● External trigger function

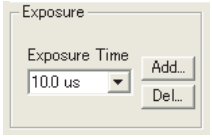
By inputting the electrical pre-trigger which synchronized with pulse light, an pulse light image can be captured and analyzed synchronizing with emission timing.

● Multiple camera inputs

Using IEEE1394 camera I/F, Multiple camera connection is possible with an IEEE1394 HUB. By software operation, an active camera can be selected.

● Beam intensity adjustmen function

The intensity value of the beam being displayed can be fine tuned by adjusting the digital camera exposure time. Precise analysis is possible by always optimizing the maximum intensity value for the beam.



● Automatic measurement function

When consecutive measurements are carried out on the same beam, the measurement conditions and measurement analysis procedures can be registered ahead of time, enabling a series of measurement analysis to be carried out with a single operation of the mouse.

● Simple connection

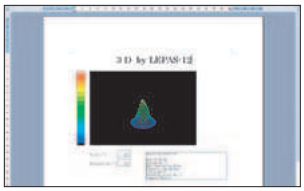
The camera connection only requires the IEEE 1394 I/F cable, and the AC adapter, camera cable and signal cable connections for analog camera systems are unnecessary.

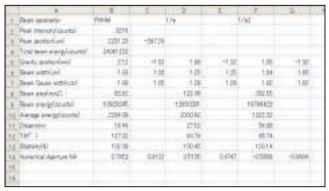
● Controllable from user applications

It is easily possible to carry out and control beam measurements from user applications by using the optional DLL software.

● Easy operation using Windows® XP/Vista/7

The software runs on Windows XP/Vista/7, making operation easy. Images can be saved in both Tiff and Text formats, and can be processed in using commercial image processing software such as Photoshop® and Paintshop.
In addition, beam parameters and XY profiles which have been analyzed can be saved in Text format, making it easy to carry out statistical processing using Excel® or another commercial spreadsheet software. Numerical data and profile data can be transmitted automatically to Excel.





Specificaion

● LEPAS-12

Type number	C9334-01	C9334-03
Interface	IEEE1394-1995	USB 2.0
Video A/D	12 bit	14 bit
External trigger	TTL level/680 Ω	-
Image input function	Averaging: 1 time to 16 times, Dark subtraction: on/off	Averaging: 1 time to 4 times, Dark subtraction: on/off
Real-time monitor	Peak position, Peak intensity, FWHM, 1/e² width, Total intensity, XY profile	
Recording function	Recording, Playback, Frame feed, Pause, Rewinding	
Automatic measurement function	Automatic measurement by using registered operation procedures	
Analysis function	FWHM, 1/e width, 1/e² width, Width of any desired %, Peak intensity, Peak coordinates, Center of gravity coordinates, Surface area, Relative energy, Average brightness, Luminance dispersion, Beam tilt, Ellipticity, Distance between centers of gravity, Distance between any 2 points, N.A.	
Interpolation function	Sub-pixel processing (FWHM, 1/e width, 1/e² width, any desired width)	
Region settings function	XY axis origin point, XY axis rotation, Rectangle or ellipse, Region rotation	
Display function	Live images, Acquired images, XY profiles, Gaussian fit XY profiles, Two-dimensional profiles, Three-dimensional profiles	
Calibration	Absolute length, Absolute angle, Gamma correction	
Output	External printers: Numerical data, Graph data, Image data, 2D data, 3D data	
Data transfer function	Automatic transfer to Microsoft Excel of numeric data, graph data, image data	
Saving of data	Numerical data/XY profile data: Text	
	Image data: Tiff, Text	
	All windows image: copy to clipboard	
Setting functions	Measurement conditions, Analysis conditions, Field setting conditions	

* NFP system is upgradable to FFP.
  Can not use the C9334-01 and the C9334-03 at the same time.

Camera specificaion

Digital CCD Camera

C8484-05G02

The C8484-05G02 is a high resolution, high sensitivity CCD camera that uses a 1.3 megapixel 2/3 inch interline CCD for which all pixels are readable. With its wide dynamic range, it is capable of high sensitivity imaging of light over a broad range from the visible to near infrared of 1100 nm.

Imaging element	2/3 inch interline CCD, all pixels read
Effective no. of pixels	1344 (H) × 1024 (V)
Imaging area	8.67 mm × 6.60 mm
Cell size	6.45 µm × 6.45 µm
Wavelength range	400 nm to 1100 nm
A/D converter	12 bit
Lens mount	C-mount
Exposure time	10 µs to 1 s

Laser Measurement Digital CCD Camera

C9664-01G02

The C9664-01G02 is a 2/3-inch interline CCD camera developed specifically for laser beam measurement. The basic performance is the same as the C8484-05G02, but the CCD element carries out special processing to enable measurement of the laser beam without interference fringes occurring. Using this camera enables high precision laser measurement.

Imaging element	2/3 inch interline CCD, all pixels read
Effective no. of pixels	1344 (H) × 1024 (V)
Imaging area	8.67 mm × 6.60 mm
Cell size	6.45 µm × 6.45 µm
Wavelength range	400 nm to 1100 nm
A/D converter	12 bit
Lens mount	C-mount
Exposure time	10 µs to 1 s
Other function	Interference fringe countermeasure

InGaAs Camera

C10633-50

The C10633-50 is a dedicated infrared camera for the LEPAS-12, it is the InGaAs camera with USB interface. This camera has 14 bit wide dynamic range and high sensitivity in infrared region from 900 nm to 1700 nm. Using this camera with IR interference fringes deletion optics A6502-10, it measures beam patterns without interference fringes.

Imaging element	InGaAs
Effective no. of pixels	320 (H) × 256 (V)
Imaging area	9.60 mm × 7.68 mm
Cell size	30 µm × 30 µm
Wavelength range	900 nm to 1700 nm
A/D converter	14 bit
Lens mount	C-mount
Exposure time	100 µs to 15 ms

HAMAMATSU

Web site **www.hamamatsu.com**

HAMAMATSU PHOTONICS K.K., Systems Division
812 Joko-cho, Higashi-ku, Hamamatsu City, 431-3196, Japan, Telephone: (81)53-431-0124, Fax: (81)53-435-1574, E-mail:export@sys.hpk.co.jp

U.S.A. and Canada: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1) 908-231-0960, Fax: (1)908-231-0852, E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658, E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10, E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BW, U.K., Telephone: (44) 1707-294888, Fax: (44) 1707-325777, E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171-41 Solna, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01, E-mail: info@hamamatsu.se
Italy: Hamamatsu Photonics Italia S.R.L.: Strada della Moia, 1 int.6-20020 Arese (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741, E-mail: info@hamamatsu.it

Cat. No. SOCS0007E04
SEP/2011 HPK
Created in Japan (PDF)