

LaserDec CL



## Laser detection in a new dimension

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## IR Laser Beam Profiler

## TABLE OF CONTENTS

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PRODUCT DESCRIPTION

TECHNICAL DATA LASERDEC CL200

TECHNICAL DATA LASERDEC CL500

DIMENSIONS

ACCESSORIES

ATTENUATION UNIT 0°

ATTENUATION UNIT 90°

BEAM REDUCER

IR MICROSCOPE OBJECTIVE

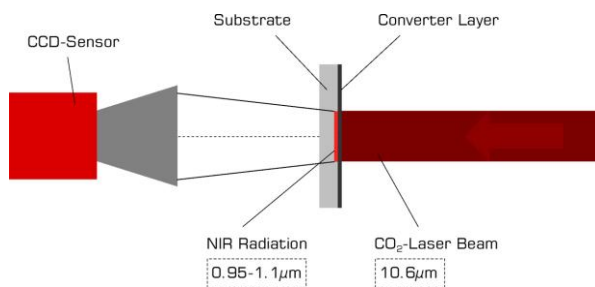
BEAM PROFILING SOFTWARE RAYCI



## LaserDec CL - Product Description -

The high performance LaserDec system is based on industry's unique imaging technique. It is designed for monitoring high-power IR-lasers in best performance. Thanks to its high resolution and its incomparable real-time capabilities, this highly efficient beam profiler is optimized for laser beam analysis of continuous wave (cw) and pulsed laser systems.

### TECHNICAL PRINCIPAL



The LaserDec system ensures beam profiling:

- By high frame rates and high resolution,
- Without optical components in the beam path,
- Without scanning techniques, fluorescent materials or toxic fumes through acrylic mode burns.

The LaserDec supports the ultra-fast FireWire IEEE 1394a / b interface with data transfer rates up to 800 Mbit/s. The plug and play design facilitates easy and flexible integration and operation.

The compact and portable LaserDec is designed to be used in a variety of applications in industry, science, research and development, including:

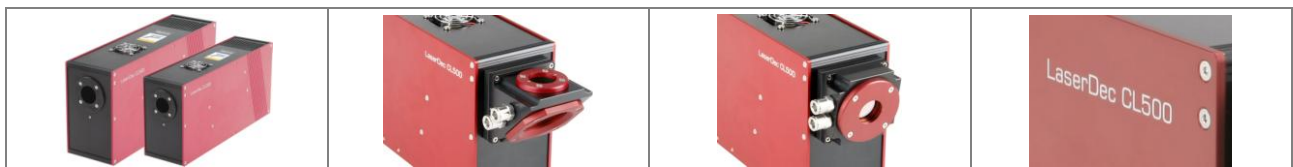
- Laser beam analysis of cw and pulsed lasers,
- Quick control of laser modes and adjustment errors,
- Test equipment for scientific research,
- Near-Field and Far-Field analyses of lasers.

The enhancement of product quality, process reliability and efficiency are just a few of the many benefits of CINOGY Technologies unique beam profiling system.

The LaserDec system includes the specifically designed analysis software RayCi. Its software architecture opens up new opportunities in laser beam analysis according to ISO standards.

### ACCESSORIES

- Attenuation Units
- Beam Reducer / Beam Expander
- IR Microscope Objective
- FireWire Components
- Trigger Device





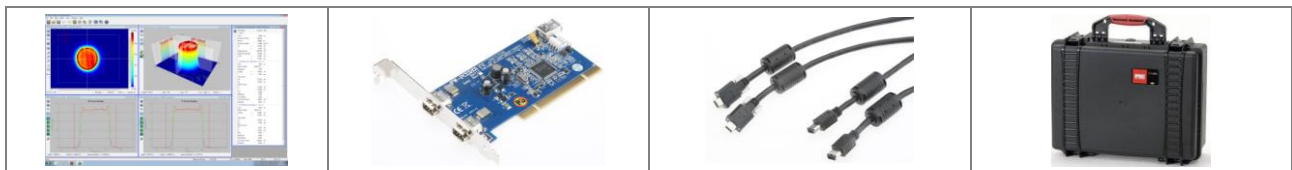
## LaserDec CL200 - Technical Data -

	<b>CL200</b>	<b>CL200 HP</b>	<b>CL200 HP - HS</b>
<b>IMAGE CONVERTER</b>	<i>Standard</i>	<i>High Performance</i>	<i>High Sensitivity</i>
Spectral sensitivity:	8µm - 12µm	8µm - 12µm	8µm - 12µm
Clear aperture:	Ø=20mm	Ø=20mm	Ø=20mm
Beam diameter (1/e <sup>2</sup> ):	1mm - 10mm	1mm - 10mm	1mm - 10mm
Intensity range*:	10W/cm <sup>2</sup> - 1.000W/cm <sup>2</sup>	20W/cm <sup>2</sup> - 2.000W/cm <sup>2</sup>	<1W/cm <sup>2</sup> - 100W/cm <sup>2</sup>
Input power (max):	200W	200W	50W
With attenuation unit 0°:	up to 2kW	up to 2kW	up to 2kW
With attenuation unit 90°:	up to 2.5kW	up to 2.5kW	up to 2.5kW
Effective pixel size:	x=78µm / y=73µm	x=44µm / y=42µm*	x=46µm / y=40µm*
<b>CAMERA FEATURES</b>			
Sensor:	CCD	CCD	CCD
Resolution:	376 x 288pixel	640 x 482pixel*	608 x 514pixel*
Bit depth (output):	8Bit	14Bit	14Bit
Frame rate:	20Hz	15Hz*	15Hz*
Interface:	FireWire 1394a	FireWire 1394b	FireWire 1394b
Mode:	cw or pulsed	cw or pulsed	cw or pulsed
<b>SPECIFICATIONS</b>			
Mechanical dimensions (W x H x L):	298mm x 141mm x 76mm	298mm x 141mm x 76mm	298mm x 141mm x 76mm
Weight:	2.6kg	2.6kg	2.7kg
Electrical requirements:	AC120V / 240V; 48 - 63Hz; 285W	AC120V / 240V; 48 - 63Hz; 285W	AC120V / 240V; 48 - 63Hz; 285W
Storage temperature**:	0°C...+60°C	0°C...+60°C	0°C...+60°C
Operating temperature**:	+5°C...+35°C	+5°C...+35°C	+5°C...+35°C
Humidity:	20%...80%	20%...80%	20%...80%
Regulations:	CE, RoHs	CE, RoHs	CE, RoHs

\* different parameters on request

\*\* without condensation

Design and specification of the described product(s) are subject to change without notice.





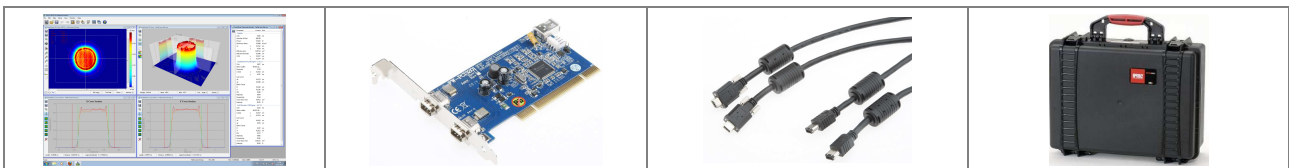
## LaserDec CL500 - Technical Data -

	<b>CL500</b>	<b>CL500 HP</b>	<b>CL500 HP - HS</b>
<b>IMAGE CONVERTER</b>	<i>Standard</i>	<i>High Performance</i>	<i>High Sensitivity</i>
Spectral sensitivity:	8µm - 12µm	8µm - 12µm	8µm - 12µm
Clear aperture:	Ø=30mm	Ø=30mm	Ø=30mm
Beam diameter (1/e <sup>2</sup> ):	1mm - 15mm	1mm - 15mm	1mm - 15mm
Intensity range*:	10W/cm <sup>2</sup> - 1.000W/cm <sup>2</sup>	20W/cm <sup>2</sup> - 2.000W/cm <sup>2</sup>	<1W/cm <sup>2</sup> - 100W/cm <sup>2</sup>
Input power (max):	450W	450W	100W
With attenuation unit 0°:	up to 2kW	up to 2kW	up to 2kW
With attenuation unit 90°:	up to 3kW	up to 3kW	up to 2.5kW
Effective pixel size:	x=110µm / y=102µm	x=65µm / y=63µm*	x=61µm / y=59µm*
<b>CAMERA FEATURES</b>			
Sensor:	CCD	CCD	CCD
Resolution:	376 x 288pixel	640 x 482pixel*	608 x 514pixel*
Bit depth (output):	8Bit	14Bit	14Bit
Frame rate:	20Hz	15Hz*	15Hz*
Interface:	FireWire 1394a	FireWire 1394b	FireWire 1394b
Mode:	cw or pulsed	cw or pulsed	cw or pulsed
<b>SPECIFICATIONS</b>			
Mechanical dimensions (W x H x L):	340mm x 165mm x 92mm	340mm x 165mm x 92mm	340mm x 165mm x 92mm
Weight:	3.3kg	3.4kg	3.5kg
Electrical requirements:	AC120V / 240V; 48 - 63Hz; 570W	AC120V / 240V; 48 - 63Hz; 570W	AC120V / 240V; 48 - 63Hz; 320W
Storage temperature**:	0°C...+60°C	0°C...+60°C	0°C...+60°C
Operating temperature**:	+5°C...+35°C	+5°C...+35°C	+5°C...+35°C
Humidity:	20%...80%	20%...80%	20%...80%
Regulations:	CE, RoHs	CE, RoHs	CE, RoHs

\* different parameters on request

\*\* without condensation

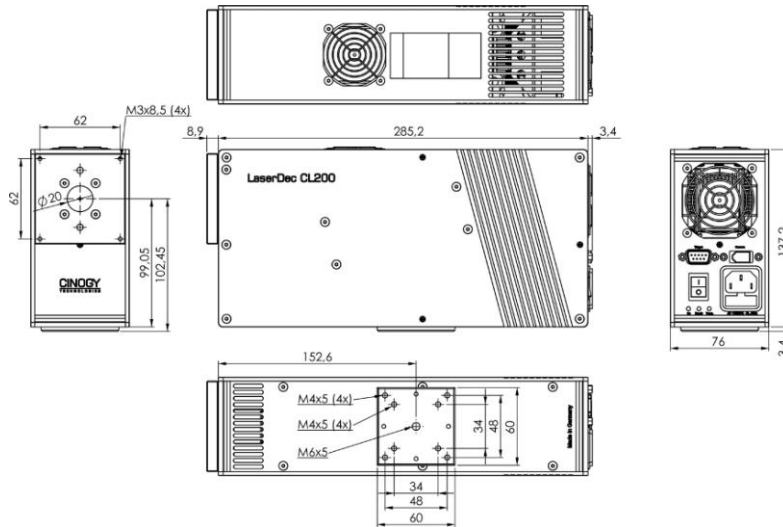
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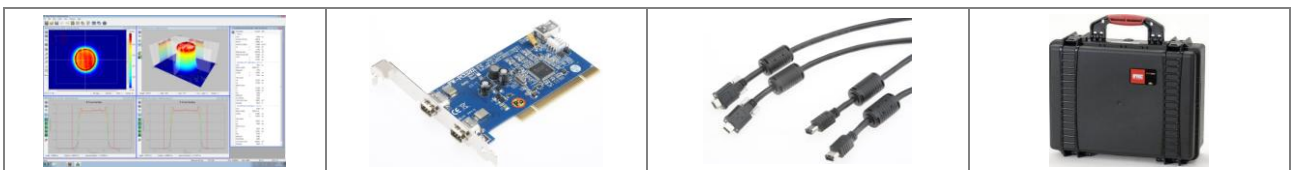
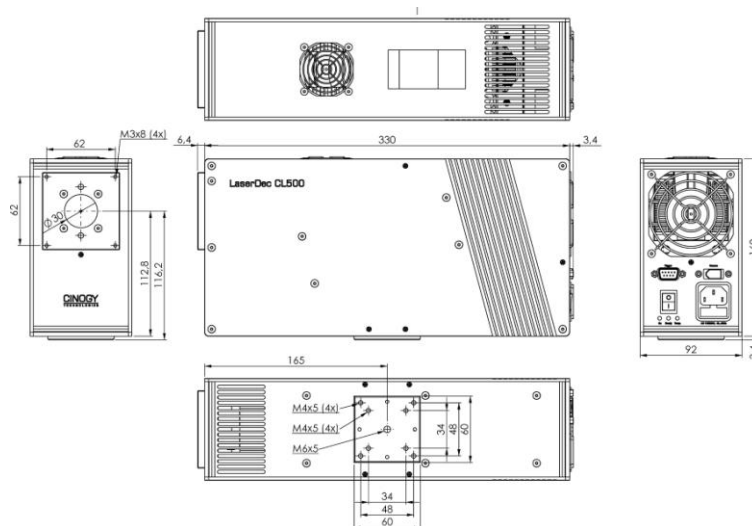


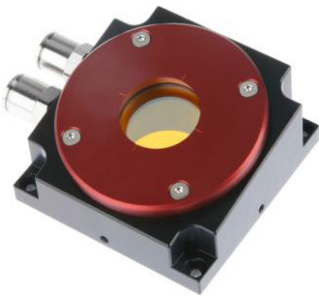
# LaserDec CL - Dimensions -

## LaserDec CL200 / CL200 HP / CL200 HP-HS



## LaserDec CL500 / CL500 HP / CL500 HP-HS





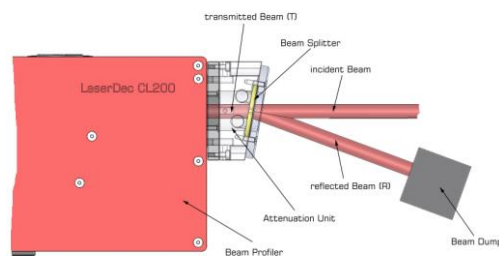
## Attenuation Unit 0° - Technical Data -

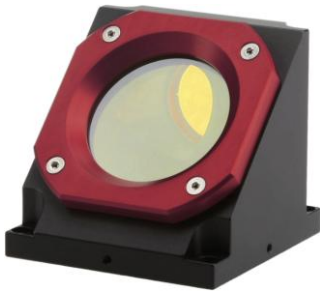
The attenuation unit is based on a zinc selenide (ZnSe) beam splitter and can be mounted in four positions on the LaserDec aperture. It is designed for a 10° angle of incidence and can be used up to intensities of 4kW/cm<sup>2</sup>. The absorbed heat is dissipated by cooling water whereby thermal lens effects are eliminated. The water-cooling allows the utilization of lasers up to powers of 2kW. To avoid interference patterns the beam splitter is designed as wedge angle.

	<b>AU-05-0</b>	<b>AU-10-0</b>	<b>AU-15-0</b>	<b>AU-20-0</b>
Spectral Range*:	10.6µm	10.6µm	10.6µm	10.6µm
Transmission rates*:	T=5%	T=10%	T=15%	T=20%
Angle of incidence:	10°	10°	10°	10°
Aperture:	Ø=25mm	Ø=25mm	Ø=25mm	Ø=25mm
Beam diameter (1/e <sup>2</sup> ) LaserDec CL200:	max. 10mm	max. 10mm	max. 10mm	max. 10mm
Beam diameter (1/e <sup>2</sup> ) LaserDec CL500:	max. 15mm	max. 15mm	max. 15mm	max. 15mm
Wedge angle:	6-10min	6-10min	6-10min	6-10min
Surface:	S1=plan - 95% R S2=plan - AR	S1=plan - 90% R S2=plan - AR	S1=plan - 85% R S2=plan - AR	S1=plan - 80% R S2=plan - AR
Intensity (I <sub>max</sub> ):	4kW/cm <sup>2</sup>	4kW/cm <sup>2</sup>	4kW/cm <sup>2</sup>	4kW/cm <sup>2</sup>
Power (P <sub>max</sub> ) LaserDec CL200:	2kW	2kW	1.5kW	1kW
Power (P <sub>max</sub> ) LaserDec CL500:	2kW	2kW	2kW	2kW
Water-cooling:	2l/min / 2bar	2l/min / 2bar	2l/min / 2bar	2l/min / 2bar
Hose diameter:	OD=8mm	OD=8mm	OD=8mm	OD=8mm

\* different parameters on request

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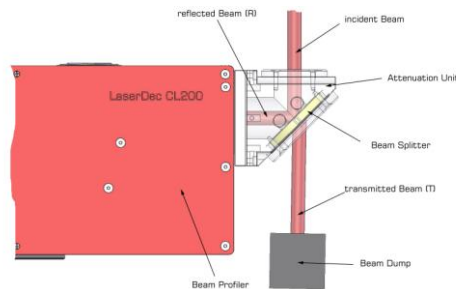
## Attenuation Unit 90° - Technical Data -

The attenuation unit is based on a zinc selenide (ZnSe) beam splitter and can be mounted in four positions on the LaserDec aperture. It is designed for a 45° angle of incidence and can be used up to intensities of 5kW/cm<sup>2</sup>. The absorbed heat is dissipated by cooling water whereby thermal lens effects are eliminated. The water-cooling allows the utilization of lasers up to powers of 3kW. To avoid interference patterns the beam splitter is designed as wedge angle.

	Polarization-dependent	Polarization-independent	
	AU-SP-90	AU-33-90	AU-50-90
Spectral Range *	10.6µm	10.6µm	10.6µm
Reflection rates:	R <sub>S</sub> =28% / R <sub>P</sub> =7.8%	R=33.3%	R=50%
Angle of incidence:	45°	45°	45°
Aperture:	Ø=26mm	Ø=26mm	Ø=26mm
Beam diameter (1/e <sup>2</sup> ) LaserDec CL200:	max. 10mm	max. 10mm	max. 10mm
Beam diameter (1/e <sup>2</sup> ) LaserDec CL500:	max. 15mm	max. 15mm	max. 15mm
Wedge angle:	1°	6-10min	6-10min
Surface:	S1=plan - uncoated S2=plan - AR	S1=plan - 33.3%R S2=plan - AR	S1=plan - 50%R S2=plan - AR
Intensity (I <sub>max</sub> ):	5kW/cm <sup>2</sup>	3kW/cm <sup>2</sup>	3kW/cm <sup>2</sup>
Power (P <sub>max</sub> ) LaserDec CL200:	700W (R <sub>S</sub> ) / 2.5kW (R <sub>P</sub> )	600W	400W
Power (P <sub>max</sub> ) LaserDec CL500:	1.7kW (R <sub>S</sub> ) / 3kW (R <sub>P</sub> )	1.5kW	1kW
Water-cooling:	2l/min / 2bar	2l/min / 2bar	2l/min / 2bar
Hose diameter:	OD=8mm	OD=8mm	OD=8mm

\* different parameters on request

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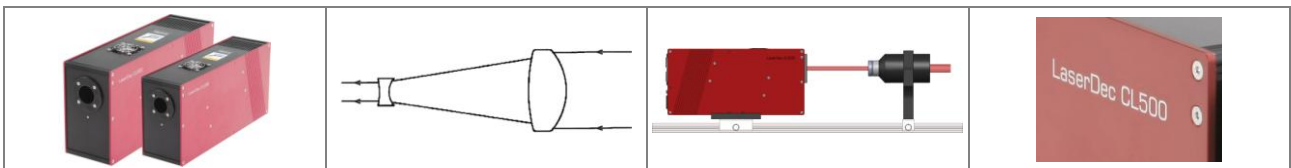
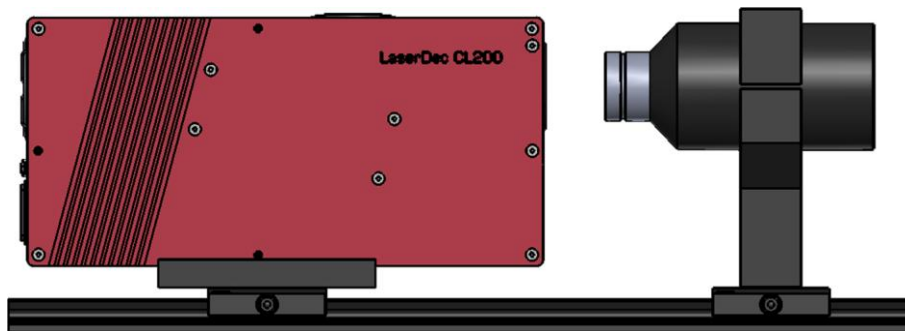
## Beam Reducer - Technical Data -

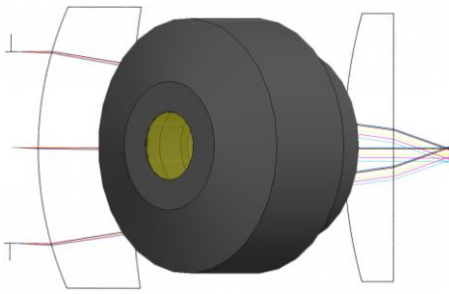
The beam reducers are based on zinc selenide (ZnSe) lens elements with adjustable lens spacing. The large input aperture allows beam profiling of lasers with diameters up to 40mm with CINOGY's LaserDec systems. A high transmission rate >97% and a low wavefront distortion <1/4 Wave ensure beam reducing without loss. The beam reducers can be used up to intensities of 20kW/cm<sup>2</sup> for pulse wave and 1kW/cm<sup>2</sup> for continuous wave. They have one positive input lens and one negative output lens (Galilean telescope).

	<b>BR-25-2x</b>	<b>BR-50-2x</b>	<b>BR-50-5x</b>	<b>BR-75-5x</b>
Spectral Range <sup>*</sup> :	10.6µm	10.6µm	10.6µm	10.6µm
Ratio:	2x	2x	5x	5x
Large aperture:	25mm	50mm	50mm	75mm
Beam diameter (1/e <sup>2</sup> ):	max. 13mm	max. 26mm	max. 26mm	max. 40mm
Intensity (I <sub>max</sub> ) CL200:	1kW/cm <sup>2</sup>	-	400W/cm <sup>2</sup>	400W/cm <sup>2</sup>
Intensity (I <sub>max</sub> ) CL500:	-	1kW/cm <sup>2</sup>	400W/cm <sup>2</sup>	400W/cm <sup>2</sup>
Coating damage threshold:	100MW/cm <sup>2</sup>	100MW/cm <sup>2</sup>	100MW/cm <sup>2</sup>	100MW/cm <sup>2</sup>
Dimensions (O.D. x L):	38.1mm x 83mm	69.9mm x 147mm	69.9mm x 147mm	85.7mm x 230mm

\* different parameters on request

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## IR Microscope Objective - Technical Data -

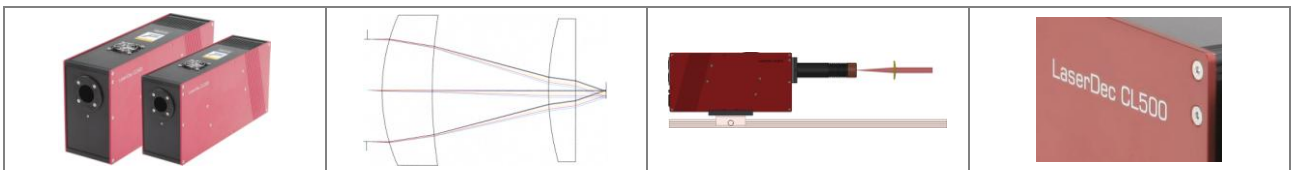
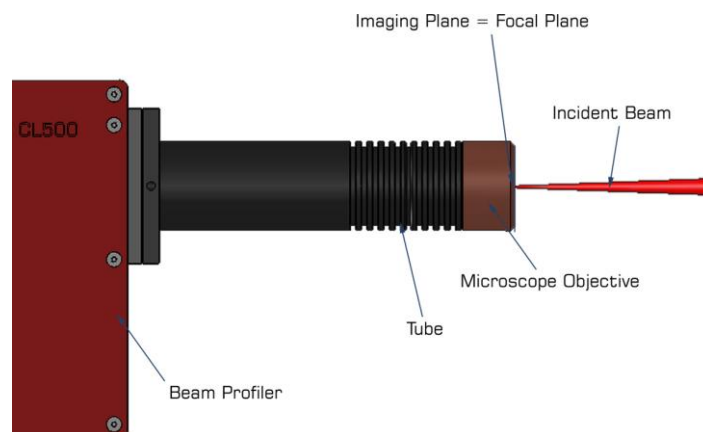
The IR objective is an add-on to the standard LaserDec CL Beam Profiler. It is based on zinc selenide (ZnSe) and can be mounted on the LaserDec aperture. This special designed objective is optimized for focus spot measurements in the range of 100µm - 500µm up to 100W (cw) laser power. The focal plane is imaged with 35x magnification to the effective area of the LaserDec CL Beam Profiler.

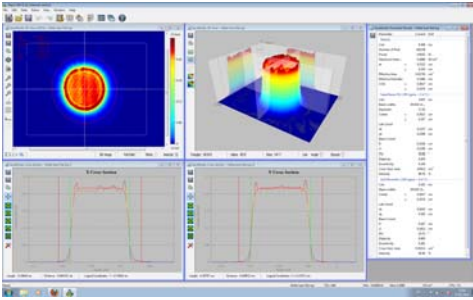
### OB-IR-01

Spectral Range*:	10.6µm
Magnification:	35x
Numerical aperture:	0.23
Focus size max:	300µm @ CL200 series
Focus size max:	500µm @ CL500 series
Resolution:	<10µm
Power (P <sub>max</sub> ):	<100W (depending on focus spot size)

\* different parameters on request

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## RayCi - Product Description -

CINOGY Technologies sophisticated beam profilers are available with the specifically designed analysis software, RayCi, which supports XP / Vista / Windows 7 operating systems. It is available as 32 Bit / 64 Bit version and can control several beam profiler cameras on a single computer simultaneously.

Due to its clearly designed menu structure, RayCi shows self-explanatory functions, which help the user to access quickly standard settings. Incomparable visualization modes, extensive analytical capabilities as well as new developed correction algorithms ensure the highest accuracy in laser beam analysis.

A wide range of beam width techniques e.g. 2<sup>nd</sup> Moment, Knife Edge, Moving Slit, Plateau and Gauss-Fit can be applied to determine quick and reliable standard beam parameters. The unique measurement tool enables the continuous monitoring of beam parameters, beam position and power density distribution. Moreover a new beam quality  $M^2$  tool enables accurate beam propagation analysis.

Helpful features like AOI Tracking, AOI Optimization, Zoom Functions, Look-Up Tables, etc. simplify the laser beam analysis.

The extraordinary graphical and analytical tool of RayCi can be used for live data (LiveMode) and stored data (SaveMode) simultaneously, while each mode has its own individual functions. This makes RayCi the most advanced analysis software on the market.

RayCi is equipped with flexible data and image output capabilities. This permits the user to store data and images in the format that is compatible with their needs.

A clearly arranged and printable protocol view displays the chosen measurement parameters as well as the most important laser beam analysis results.

RayCi is compatible with guidelines of the international standard organization for laser beam measurements:

- ISO 11145: Vocabularies and symbols
- ISO 11146: Beam width, propagation ratio,...
- ISO 11670: Beam positional stability,...
- ISO 11554: Beam power, energy,...
- ISO 13694: Beam power density distribution,...

RayCi works only with a USB software protection lock. It is a hardware based security solution to protect and encrypt the software against piracy.

### MINIMUM SYSTEM REQUIREMENTS

- XP / Vista / Windows 7
- Pentium IV / AMD Processor (Dual / Quad Core)
- 512MB graphic, Open GL V1.4 (NVIDIA)
- 2GB RAM
- 500MB free memory
- PCI / PCIe slot for FireWire interface
- USB ports
- CD / DVD-ROM drive
- Internet access for update request

