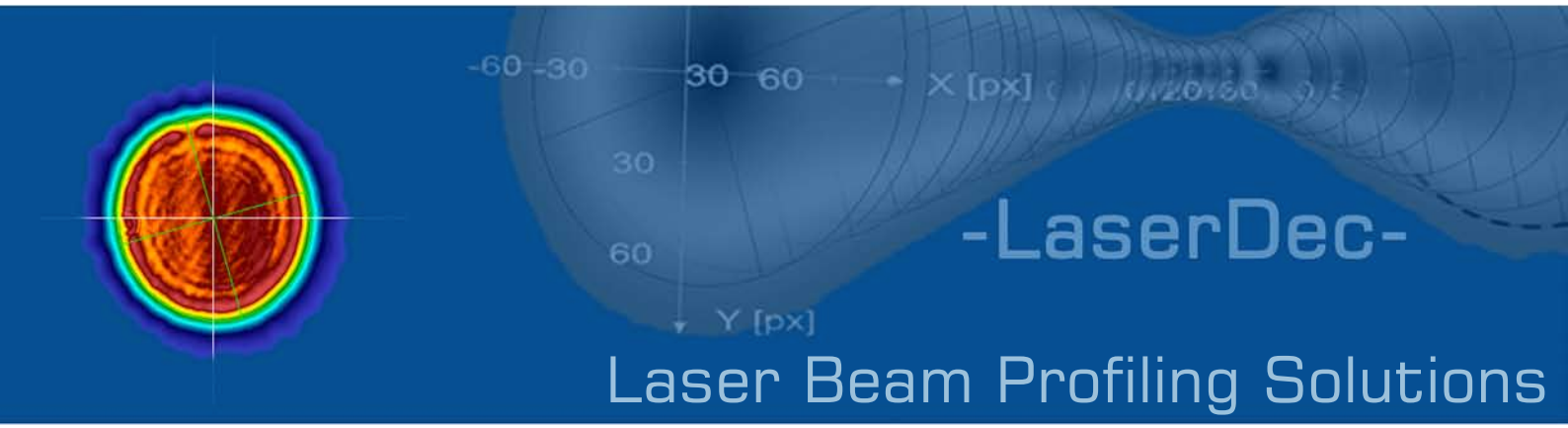


IR Laser Beam Profiler

CINOGY
TECHNOLOGIES

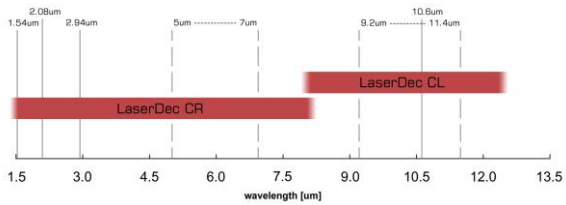
TABLE OF CONTENTS

IR LASER BEAM PROFILER

LaserDec CL/CR
- 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. 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.



Spectral response:	1.5 - 12µm
Effective pixel size:	~45µm - ~124µm
Resolution:	320 x 240pixel / 640 x 480pixel
Technologie:	Image Converter
Data output:	14Bit
Interface:	FireWire 1394b / GigE

LaserDec CL

The LaserDec CL is optimized to provide excellent sensitivity from 8µm-12µm spectral range. This model provides unique beam analysis capabilities for CO_2-Laser wavelengths.

LaserDec CR

The LaserDec CR is optimized to provide excellent sensitivity from 1.5µm-8µm spectral range. The wide application spectrum ranges from high-power telecom lasers to medical lasers.

The plug & play design and the ultra-fast FireWire 1394b / GigE interface facilitate easy and flexible integration and operation. The portable LaserDec is designed to be used in a variety of applications in industry, science, R&D, including:

- Laser beam analysis of high-power IR lasers
- Quick control of laser modes and adjustment errors
- Test equipment for scientific research
- Near-Field and Far-Field analyses of lasers.

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CINOGY TECHNOLOGIES

IR LASER BEAM PROFILER

LaserDec CL200
- Technical Data -

	CL200	CL200 HP	CL200 HP - HS
	Standard	*High Performance*	*High Sensitivity*
IMAGE CONVERTER			
Spectral sensitivity:	8µm - 12µm	8µm - 12µm	8µm - 12µm
Clear aperture:	∅=20mm	∅=20mm	∅=20mm
Beam diameter ($1/e^2$):	1mm - 10mm	1mm - 10mm	1mm - 10mm
Intensity range:	10W/cm² - 1.000W/cm²	20W/cm² - 1.500W/cm²	1W/cm² - 100W/cm²
Input power (max):	200W	200W	50W
With attenuation unit 0°:	up to 2kW	up to 2kW	up to 1kW
With attenuation unit 90°:	up to 2.5kW	up to 2.5kW	up to 1.5kW
Effective pixel size*:	~90µm	~45µm	~45µm
CAMERA FEATURES			
Sensor:	CCD	CCD	CCD
Resolution*:	320 x 240pixel	640 x 480pixel	640 x 480pixel
Bit depth (output):	14 Bit	14 Bit	14 Bit
Frame rate:	up to 20Hz	up to 20Hz	up to 20Hz
Interface:	FireWire 1394b / GigE	FireWire 1394b / GigE	FireWire 1394b / GigE
Mode:	cw or pulsed	cw or pulsed	cw or pulsed
SPECIFICATIONS			
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

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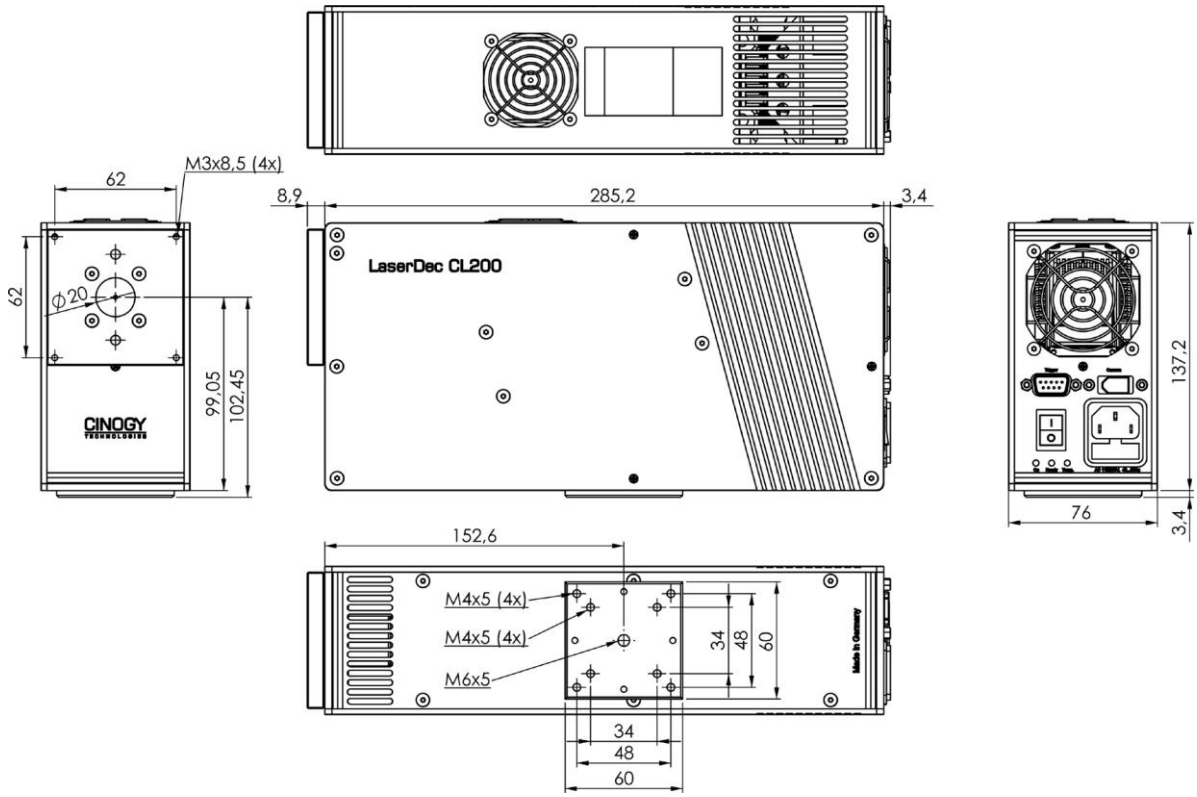
LaserDec CL200
- Dimensions -



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LaserDec CL500
- Technical Data -

	CL500	CL500 HP	CL500 HP - HS
	Standard	***High Performance***	***High Sensitivity***
IMAGE CONVERTER			
Spectral sensitivity:	8µm - 12µm	8µm - 12µm	8µm - 12µm
Clear aperture:	∅=30mm	∅=30mm	∅=30mm
Beam diameter ($1/e^2$):	1mm - 15mm	1mm - 15mm	1mm - 15mm
Intensity range:	10W/cm² - 1.000W/cm²	20W/cm² - 1.500W/cm²	1W/cm² - 100W/cm²
Input power (max):	450W	450W	100W
With attenuation unit 0°:	up to 2kW	up to 2kW	up to 1kW
With attenuation unit 90°:	up to 3kW	up to 3kW	up to 1.5kW
Effective pixel size*:	~124µm	~62.5µm	~62.5µm
CAMERA FEATURES			
Sensor:	CCD	CCD	CCD
Resolution*:	320 x 240pixel	640 x 480pixel	640 x 480pixel
Bit depth (output):	14 Bit	14 Bit	14 Bit
Frame rate:	up to 20Hz	up to 20Hz	up to 20Hz
Interface:	FireWire 1394b / GigE	FireWire 1394b / GigE	FireWire 1394b / GigE
Mode:	cw or pulsed	cw or pulsed	cw or pulsed
SPECIFICATIONS			
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

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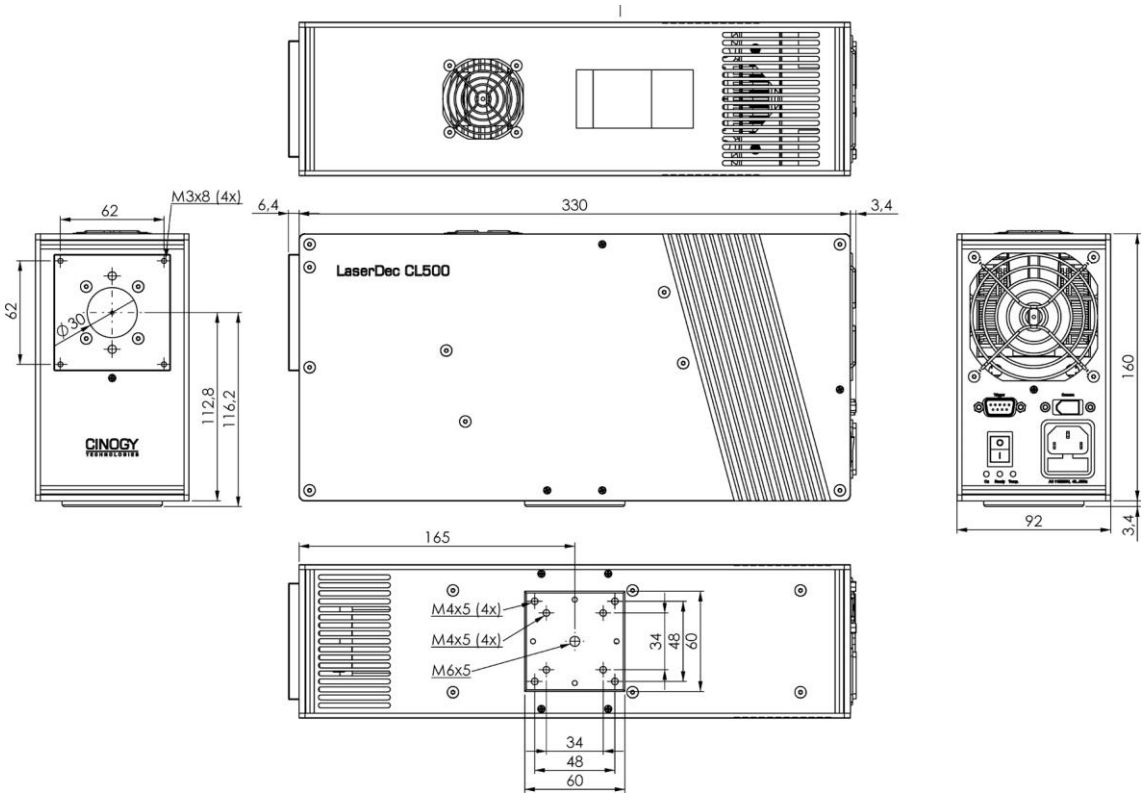
LaserDec CL500
- Dimensions -



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LaserDec CR200
- Technical Data -

	CR200	CR200 HP
	Standard	***High Performance***
IMAGE CONVERTER		
Spectral sensitivity:	1.5µm - 8µm	1.5µm - 8µm
Clear aperture:	∅=20mm	∅=20mm
Beam diameter (1/e²):	1mm - 10mm	1mm - 10mm
Intensity range:	10W/cm² - 1.000W/cm²	15W/cm² - 1.500W/cm²
Input power (max):	150W	150W
Effective pixel size*:	~90µm	~45µm
CAMERA FEATURES		
Sensor:	CCD	CCD
Resolution*:	320 x 240pixel	640 x 480pixel
Bit depth (output):	14 Bit	14 Bit
Frame rate:	up to 20Hz	up to 20Hz
Interface:	FireWire 1394b / GigE	FireWire 1394b / GigE
Mode:	cw or pulsed	cw or pulsed
SPECIFICATIONS		
Mechanical dimensions (W x H x L):	298mm x 141mm x 76mm	298mm x 141mm x 76mm
Weight:	2.6kg	2.8kg
Electrical requirements:	AC120V/240V; 48 - 63Hz; 285W	AC120V/240V; 48 - 63Hz; 285W
Storage temperature**:	0°C…+60°C	0°C…+60°C
Operating temperature**:	+5°C…+35°C	+5°C…+35°C
Humidity:	20%...80%	20%...80%
Regulations:	CE, RoHS	CE, RoHS

* Different parameters on request

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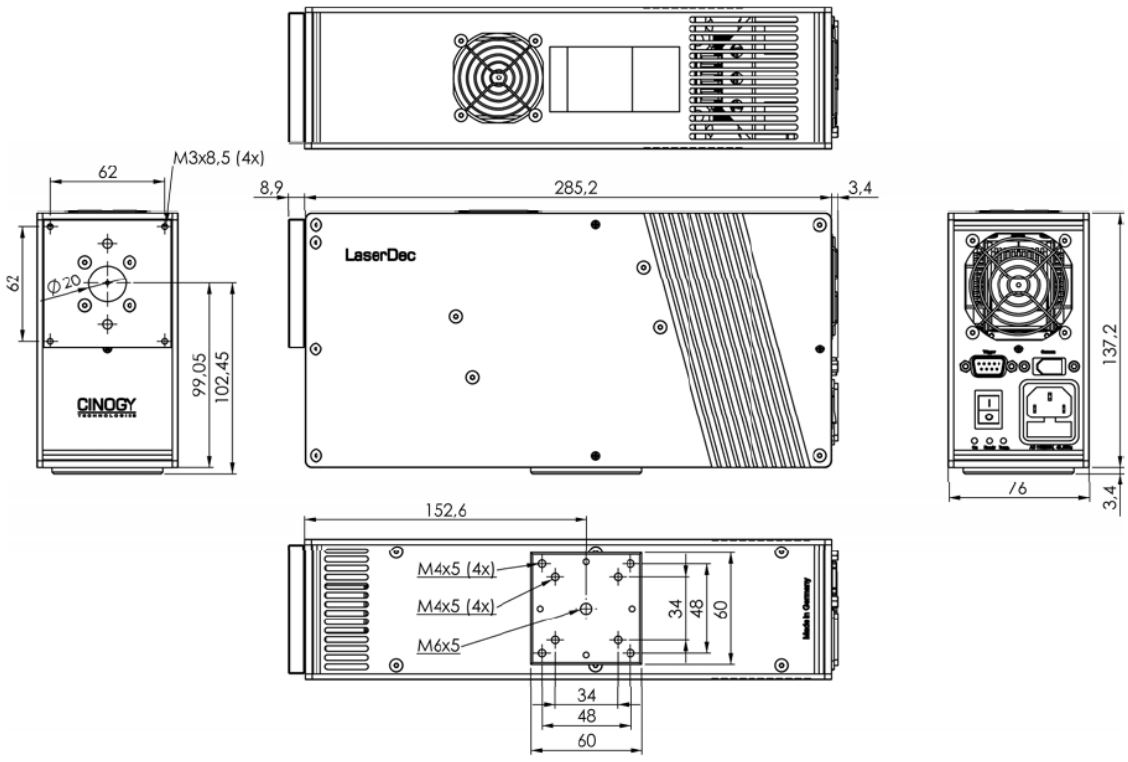
LaserDec CR200
- Dimensions -



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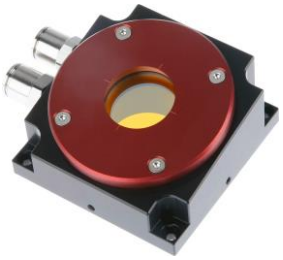


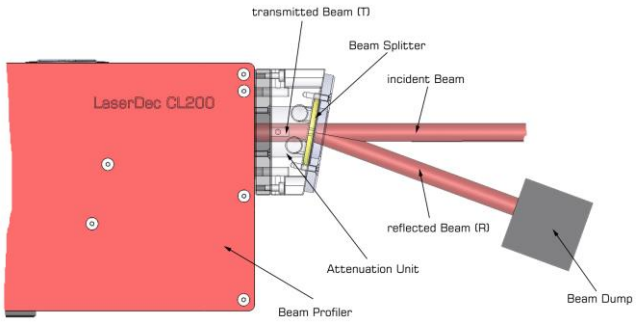
Attenuation Unit 0°
- Technical Data -

The attenuation unit is based on a zinc selenide (ZnSe) beam slitter 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/cm². 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.

	AU-05-0	AU-10-0	AU-15-0	AU-20-0
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:	∅=25mm	∅=25mm	∅=25mm	∅=25mm
Beam diameter (1/e²) LaserDec CL200:	max. 10mm	max. 10mm	max. 10mm	max. 10mm
Beam diameter (1/e²) 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_{max}):	4kW/cm²	4kW/cm²	4kW/cm²	4kW/cm²
Power (P_{max}) LaserDec CL200:	2kW	2kW	1.5kW	1kW
Power (P_{max}) 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

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



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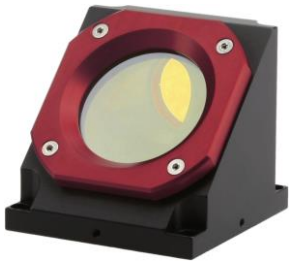


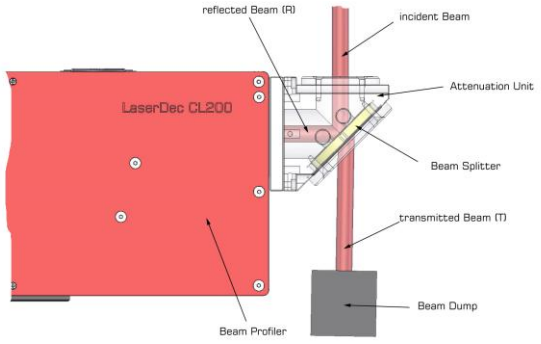
Attenuation Unit 90°
- Technical Data -

The attenuation unit is based on a zinc selenide (ZnSe) beam slitter 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/cm². 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.

	AU-SP-90	AU-33-90	AU-50-90
Spectral range*:	10.6µm	10.6µm	10.6µm
Polarization:	Polarization-dependent	Polarization-independent	Polarization-independent
Reflection rates:	R_S=28% / R_P=7.8%	R=33.3%	R=50%
Angle of incidence:	45°	45°	45°
Aperture:	∅=26mm	∅=26mm	∅=26mm
Beam diameter ($1/e^2$) LaserDec CL200:	max. 10mm	max. 10mm	max. 10mm
Beam diameter ($1/e^2$) 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_{max}):	5kW/cm²	3kW/cm²	3kW/cm²
Power (P_{max}) LaserDec CL200:	700W (R_S) / 2.5kW (R_P)	600W	400W
Power (P_{max}) LaserDec CL500:	1.7kW (R_S) / 3kW (R_P)	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

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



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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/cm² for pulse wave and 1kW/cm² for continuous wave. They have one positive input lens and one negative output lens (Galilean telescope).

	BR-25-2x	BR-50-2x	BR-50-5x	BR-75-5x
Spectral range*:	10.6µm	10.6µm	10.6µm	10.6µm
Ratio:	2x	2x	5x	5x
Large aperture:	25mm	50mm	50mm	75mm
Beam diameter (1/e²):	max. 13mm	max. 26mm	max. 26mm	max. 40mm
Intensity (I_{max}) CL200:	1kW/cm²	-	400W/cm²	400W/cm²
Intensity (I_{max}) CL500:	-	1kW/cm²	400W/cm²	400W/cm²
Coating damage threshold:	100MW/cm²	100MW/cm²	100MW/cm²	100MW/cm²
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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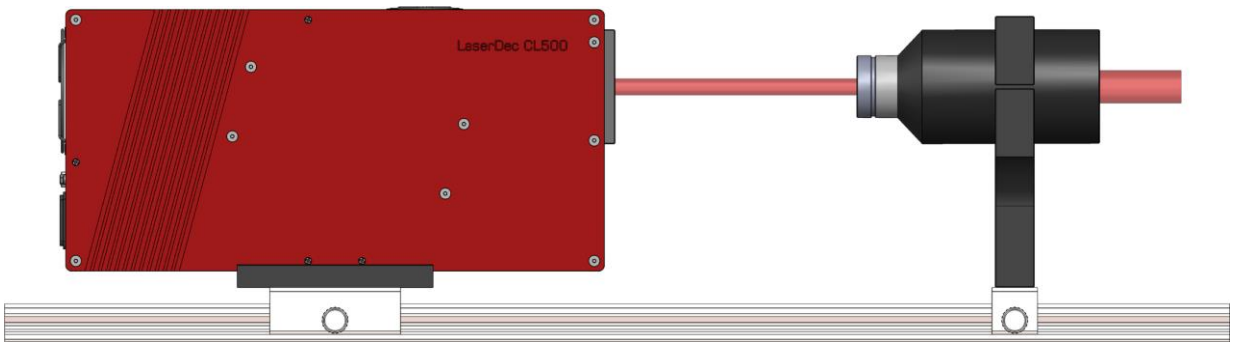

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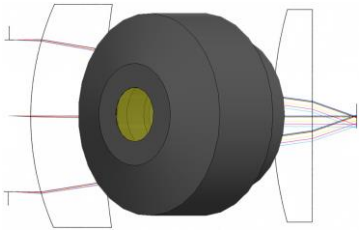

Microscope Objective
- Technical Data -

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:	100µm-300µm @ CL200 series
Focus size:	100µm-500µm @ CL500 series
Resolution:	<10µm
Power (P_{max}):	<100W (depending on focus spot size)

* Different parameters on request

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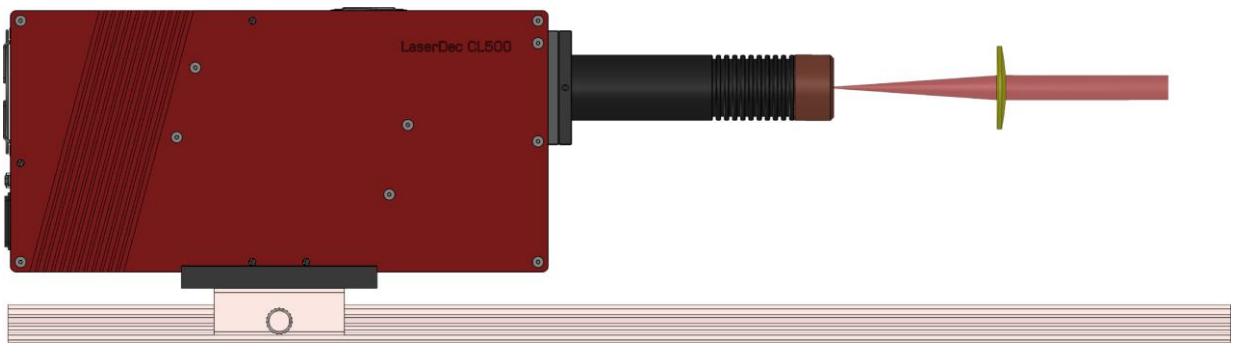

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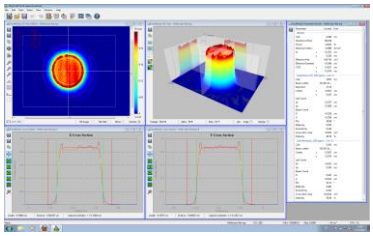
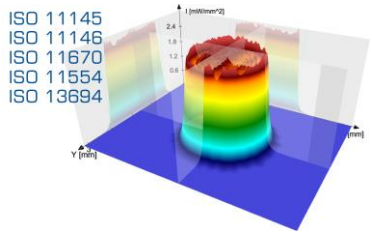


Beam Profiler Software RayCi
- Product Description -

CINOGY Technologies beam profilers are available with the specifically designed analysis software, RayCi, which supports XP / Vista / Windows 7 / 8 operating systems. It is available as 32 Bit / 64 Bit version and can control several beam profiler cameras on a single computer simultaneously.



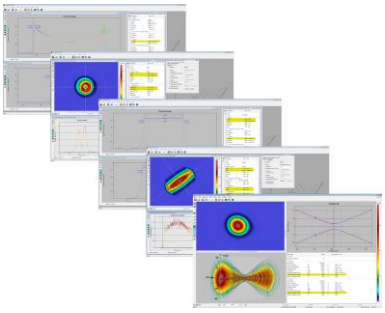
	XP / Vista / Windows 7 / 8
	Pentium IV / AMD Processor (Dual / Quad Core)
	512MB graphic, Open GL V1.4 (NVIDIA)
	2GB RAM
	500MB free memory
	PCI / PCIe slot
	USB ports
	CD / DVD-ROM drive
	Internet access for update request

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. 2nd 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 quality 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. Helpful features like AOI Tracking, AOI Optimization, Zoom Functions, Look-Up Tables, etc. simplify the laser beam analysis.

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 measurement parameters as well as the most important laser beam analysis results.



CINOGY'S laser beam profiler can easily be integrated in different automation systems and processes. The supplied Software Development Kit (SDK) based on a XML-rpc interface. The user can write programs in a number of platforms, such as Python, Visual Basic, LabVIEW, etc. which will remote-control the beam profiler.

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