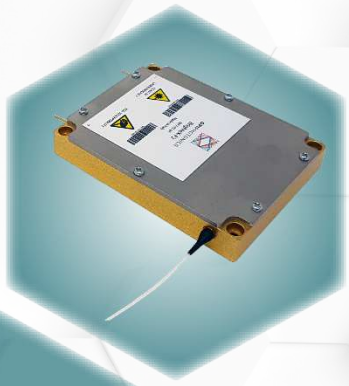
OPIPHOTONICS

HIGH-POWER LASER DIODES

BrighteX Line

Fiber coupled laser diodes



BrightboX Line

Laser diode systems

High-Power Laser Switch and Coupler

High-Power Laser Collimator and Optics

HIGH-POWER LASER BEAM DELIVERY SYSTEMS

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OPIPHOTONICS

BRIGHTBOX-E1

LASER DIODE ENGINE

OPI Photonics S.R.L.

Registered Office	*Operational Headquarters*
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1 BrightboX-E1 overview

OPI BrightboX-E1 is a laser diode engine specifically designed to be used as a direct diode source or a pump unit for fiber laser engine. Off-the-shelf products include two variants with different configurations.

List of products:

Model	Wavelength	-	Power	-	Fiber Core	-	Page
Bb-E1-808-300W-200-00	808 nm		300 W		200 µm		4
Bb-E1-915-500W-200-00	915 nm		500 W		200 µm		5

2 Bb-E1-808-300W-200:

Applications

- DPSS laser pumping
- Material processing

Features

- 300W output power
- 200µm/0.22NA delivery fiber

Optional

- Aiming beam
- Temperature sensors
- Scattered light sensors

2.1 *Specifications*

	Parameter	Unit	Minimum	Typical	Maximum
Electro-optical characteristics (1)	CW output power	W	300		
	Operating current (2)	A		8	10
	Operating voltage (2)	V		36	42
	Threshold current	A			1.5
	Rise and fall time (3)	µs			1
	Wall plug efficiency	%	35	40	
	Central wavelength	nm		808	
	Wavelength temperature gradient	nm/°C		0.3	
Cable characteristics (4)	Fiber core diameter	µm		200	
	Fiber cladding diameter	µm		220	
	Fiber NA	-		0.22	
	Cable type	-	Ø 5mm stainless steel armoured cable		
	Cable length	m	4.5	5	5.5
	Cable termination	-	SMA (5)		
Cooling requirements	Cooling method	-	Liquid		
	Water connections ID/OD	mm	6/8		
	Input water temperature	°C	18		23
	Water flow-rate	l/min	4		7
	Cooling capacity	W	750		
Maximum ratings (6)	Operating temperature	°C	15		45
	Relative humidity	%	35		60
	Storage temperature	°C	-20		85
	Reverse voltage on PS pins	V			2

Notes

(1) Values at 20°C cold plate temperature
(2) Values for each power supply input (PS1, PS2, and PS3 connectors on technical drawing)
(3) 10% to 90% of power, laser biased above threshold
(4) Other options (fiber type, length, jackets, termination etc.…) available upon request
(5) AR coating available upon request
(6) Exceeding absolute maximum ratings may lead to device degraded performance, shorter lifetime or sudden failure

3 Bb-E1-915-500W-200:

Applications

- Fiber laser pumping
- Material processing

Features

- 500W output power
- 200µm/0.22NA delivery fiber

Optionals

- Aiming beam
- Temperature sensors
- Scattered light sensors

3.1 *Specifications*

	Parameter	Unit	Minimum	Typical	Maximum
Electro-optical characteristics (1)	CW output power	W	500		
	Operating current (2)	A		12	13
	Operating voltage (2)	V		36	42
	Threshold current	A			1
	Rise and fall time (3)	µs			1
	Wall plug efficiency	%	45	50	
	Central wavelength	Nm		915	
	Wavelength temperature gradient	nm/°C		0.35	
Cable characteristics (4)	Fiber core diameter	µm		200	
	Fiber cladding diameter	µm		220	
	Fiber NA	-		0.22	
	Cable type	-	Ø 5mm stainless steel armoured cable		
	Cable length	M	4.5	5	5.5
	Cable termination	-	SMA (5)		
Cooling requirements	Cooling method	-	Liquid		
	Water connections ID/OD	Mm	6/8		
	Input water temperature	°C	18		23
	Water flow-rate	l/min	4		7
	Cooling capacity	W	1100		
Maximum ratings (6)	Operating temperature	°C	15		45
	Relative humidity	%	35		60
	Storage temperature	°C	-20		85
	Reverse voltage on PS pins	V			2

Notes

(1) Values at 20°C cold plate temperature
(2) Values for each power supply input (PS1, PS2, and PS3 connectors on technical drawing)
(3) 10% to 90% of power, laser biased above threshold
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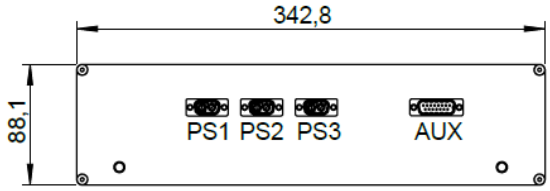
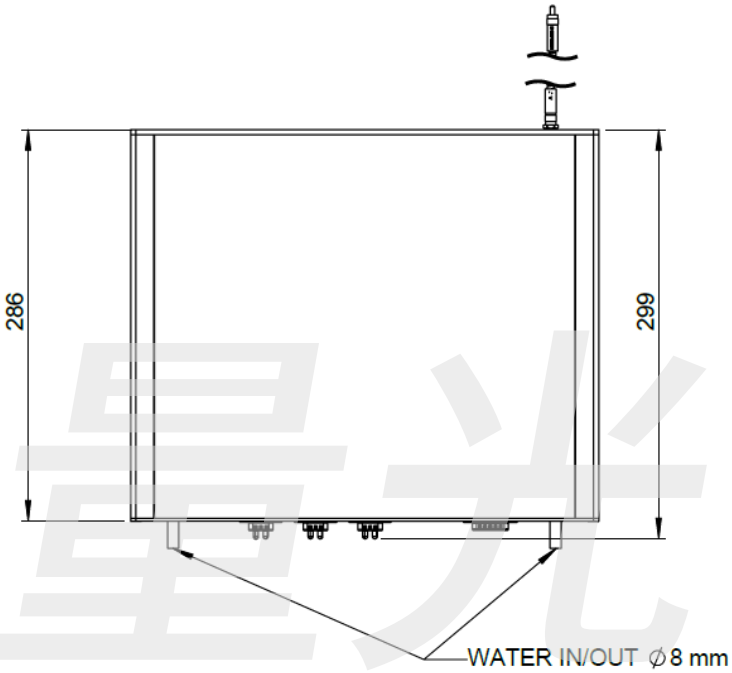
4 Technical drawings



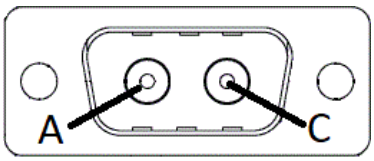


All dimensions are in millimetres.

5 Electrical connections

5.1 *Laser power supply connector:*

Power Supply connector pinout (PS1, PS2, PS3):



- A – Laser Anode (+)
- C – Laser Cathode (-)

5.2 *Auxiliary connector:*

The Auxiliary connector (AUX) is a 15 ways d-sub connector used as interface for the internal optional sensors.

6 Customization

The BrightboX line of laser diode systems is conceived as a platform, so customizations are easily implemented. Both minor and major changes are possible.

Minor customizations are available also on the standard part numbers and involve the following items and are tracked by the "CC" suffix in the extended part number:

- Fiber cable length
- Aiming beam
- Temperature sensor (up to 10 sensors can be fitted)
- Scattered light sensor

Major customizations will apply to the components used inside the module and will change:

- Emission wavelength ("XXX" field of the extended part number)
- Multiple emission wavelengths ("XXX" field populated with alphabetic characters)
    - up to 3 different wavelengths with independent power control with current configuration
    - up to 6 wavelengths with independent power control by adding more PS connectors
- Output power ("YYY" field of the extended part number)
- Delivery fiber ("ZZZ" field of the extended part number)
- Cable type and termination (tracked by the "CC" suffix in the extended part number)
- Cable interlock (tracked by the "CC" suffix in the extended part number)

7 Ordering information

Extended part number: Bb-E1-XXX-YYYW-ZZZ-CC

Model	Wavelength	-	Power	-	Fiber Core	-	Customization
Bb-E1-808-300W-200-00	808 nm		300 W		200 µm		00 (standard) or 01-99
Bb-E1-915-500W-200-00	915 nm		500 W		200 µm		00 (standard) or 01-99

8 General safety and operating precautions

8.1 *Electrostatic discharge (ESD)*

ESD is the primary cause of device sudden failure. Use good ESD practice (wrist straps, dissipative working surfaces, air ionizers etc…) whenever handling the device.

8.2 *Operating instructions*

Laser diodes may be damaged by excessive bias current or transient current spikes. Use proper electronics to drive the device.

Contact OPI Photonics for driving electronics recommendation and reference design solutions.

8.3 *Laser safety*

Extremely **dangerous invisible laser radiation** is emitted by this laser diode when in operation. Laser radiation can be emitted by the laser only when connected to a power supply and current is flowing through the connecting pins.

Wear the proper protecting devices selected for the laser beam power and wavelength. Apply all safety measures in the area where the device is operated (warning signals, controlled access, safety interlocks).

This device is not certified for 21CFR 1040.10 or IEC 60825-1:2014, since it is meant for system integration. Certification is to be performed at system level.

BrigtheX Line:

BrightboX Line:

9 Summary