

BLM2-D Series. Broadband Dual SLD Light Sources Technical Product Specification

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Product Description / Applications / Features

Miniature BLM2-D series light source modules are powerful and very broadband light sources based on a combination of two SLDs with slightly different center wavelengths.

These stable, reliable and low noise modules expand Superlum line of D-Broadlighter benchtop series www.superlumdiodes.com/d_broadlighters.htm, allowing easy integration into customer system, especially in OEM applications. BLM2-D are ideal light sources for OCT and biomedical imaging, Bragg Grating and other kinds of optical sensing, and for a lot of other applications requiring miniature powerful light source modules with a broad spectrum and a very short coherence length.

Built-in miniature dual-channel SLD current and temperature controller allows switching SLDs on and off either by a pushbutton on front, or externally by TTL, or from a PC via an RS-232 port.

Although operating parameters of each SLD are pre-set for getting the best combination of spectrum width and output power, Superlum may provide a password key allowing changing of SLD parameters via RS-232 port upon request.

The baseplate of the BLM2-D module features slotted mounting tabs extending from the baseplate. These mounting tabs allow easy fixing of the BLM2-D light source module to a heatsink for getting widest possible ambient operating temperature range. It is also possible to use BLM2-D modules without a heatsink. However, this will limit the maximum ambient operating temperature to +40 °C.

This specification describes standard models offered by Superlum. However, the flexible design of the light source and a great number of different SLD modules available for integration allows a lot of customized light sources to be designed, including dual-wavelength light sources where SLDs at different spectral bands with non-overlapped spectra are combined.

Applications

- Optical Coherence Tomography, including Ultra High Resolution OCT systems
- Fiber Optic Sensing
- Optical Metrology
- Testing of Optical Components
- Biomedical Imaging
- Low-Coherence Interferometry

Features

- High optical power
- Very broad emission spectra
- Coherence length* of 4.5 μm or less (in air)
- Miniature design
- Stable, low noise optical output
- Built-in dual-channel current and temperature controller with a lot of built-in SLD protection features
- Manual and remote control capability; RS-232 and TTL analog control
- Operates from +5V DC supply

*coherence length is defined as full width at half maximum of the coherence function plotted versus mirror displacement.

Mechanical specification

Mechanical drawing of the BLM2-D light source module is shown in Figure 1.

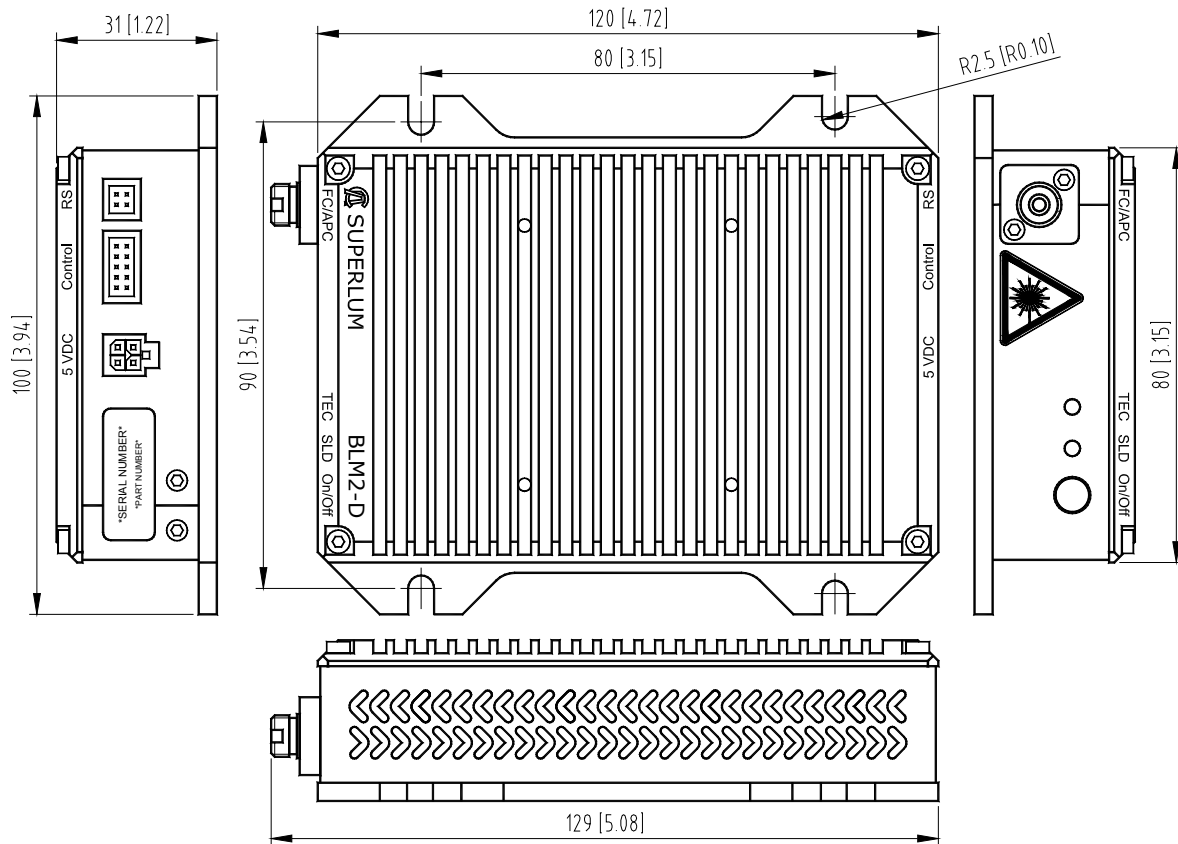
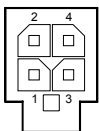


Figure 1. Drawing of the BLM2-D light source module. Dimensions are in millimeters [inches]. Weight of a light source is 400 g.

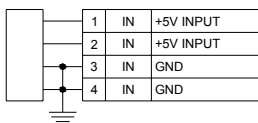
Electrical Connections

Structure of electrical connections of a standard BLM2-D light source is shown in Figure 2 (a) and Figure 2 (b) below. Electrical Inputs/Outputs are described in Table 1 below. There are separate connectors for 5V DC power supply, for remote control and external switching of SLDs on and off by TTL, and for RS-232 interface.

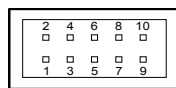
5 VDC



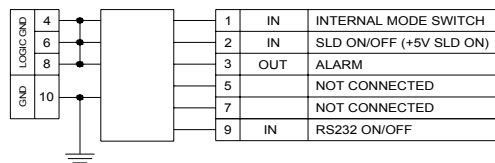
4-pin MOLEX: 43045 0407
Counterpart: 0430250400
Contact: 0430300002



Control



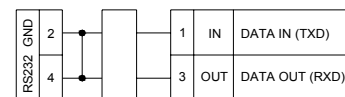
10-pin MOLEX: 87833 1031
Counterpart: 87568 1073
Contact: -



RS



4-pin MOLEX: 87833 0431
Counterpart: 51110 0460
Contact: 0503948400



ATTENTION:
it is not recommended to connect "RS232 GND" and "GND"

Figure 2 (a). Pin-outs of BLM2-D connectors.

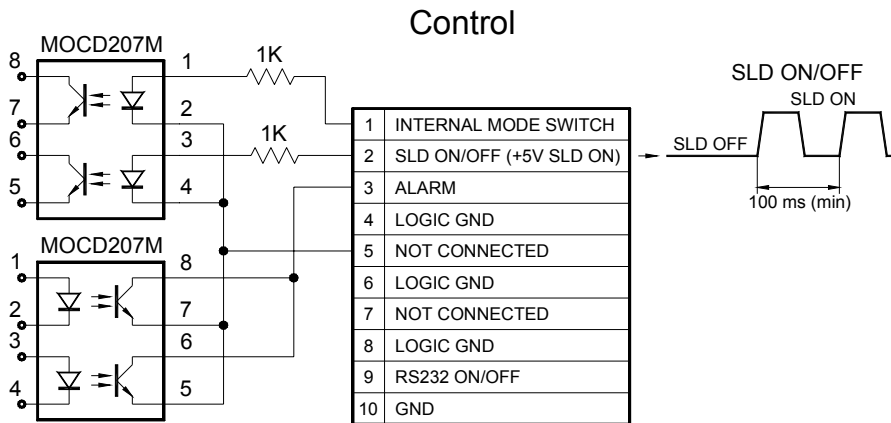


Figure 2 (b). Structure of electrical outputs—"Control" output.

Table 1. Description of BLM2-D control inputs/outputs

Pin number	Name	IN/OUT	Description/structure
DC power supply input, 5V DC: 4 pins MOLEX P/N 43045 0407 (counterpart P/N 0430250400)			
1,2	+5 V INPUT	IN	Input DC supply
3,4	GND	IN	DC supply GND
Attention: DC supply GND and the case of BLM2-D sources are connected inside. It is recommended to connect 5V DC GND and CONTROL GND.			
RS: 4 pin MOLEX P/N 87833 0431 (counterpart P/N 511100460)			
1	TXD	IN	DATA IN
2	RXD	OUT	DATA OUT
3	GND_RS	OUT	RS-232 GND
Attention: it is not recommended to connect GND_RS with both 5V DC GND and CONTROL GND.			
"CONTROL": 10 pins MOLEX P/N 87568 1031 (counterpart P/N 87568 1073)			
1	INTERNAL MODE SWITCH	IN	+5 V must be applied and the service software (supplied with the product) must be run to activate the TTL remote control option. 1kΩ and LED optocoupler in series. Note: While +5 V is applied, operation in the LIGHTSOURCE mode is disabled.
2	SLD ON/OFF	IN	Allows switching SLDs on and off by applying TTL signals. 1kΩ and LED optocoupler in series.
3	ALARM	OUT	Open collector. Goes to low impedance state in case of a fatal error; works in intermittent mode (alternates between low and high impedance states at a rate of 1 Hz) if service is required.
4	LOGIC GND		TTL GND
5	RS232 ON/OFF		Shortening to GND (pin 6) disables the RS-232
6	LOGIC GND		It is recommended to connect 5V DC GND and CONTROL GND.
7	NOT CONNECTED		
8	LOGIC GND		
9	NOT CONNECTED		
10	GND		

The BLM2-D is supplied with companion software for remote control of the light source from a PC via the RS-232 port. The companion software can be also used to enable/disable TTL control in the PROGRAM mode, and to diagnose the status of each SLD.

Absolute Maximum Ratings

Parameter	Condition	Min	Typ	Max	Unit
Storage temperature		-20	-	+80	°C
Operating temperature	BLM2-D mounted on a heatsink capable of dissipating up to 15 W	0	-	+55 ¹	°C
Humidity, non-condensing		-	-	90	% RH
DC supply voltage		4.75	5.00	5.25	V
DC supply current ²		2	-	3.5	A
DC supply ripples	1 kHz...200 kHz frequency range	-	-	20	mV
"INTERNAL MODE SWITCH" input	Pin 1 connector "Control"	4	5	30	V
"SLD ON/OFF" input	Pin 2 connector "Control"	4	5	30	V
ALARM output	Pin 3 connector "Control"; open collector	-	-	150	mA

¹ Light source modules must be fixed onto an appropriate heatsink for getting a widest possible operating temperature range. However, it is also possible to use BLM2-D without a heatsink, although in a limited range of ambient temperatures. The highest operating temperature without heatsinking is +40 °C in case of a free air circulation around the package.

² DC power supply should be capable to produce up to 3.5A. A less powerful power supply may be used, but it will limit the operating temperature range. It is not allowed to use a power supply with a maximum current of less than 2.0 A.

Fiber and Optical Connection Specification

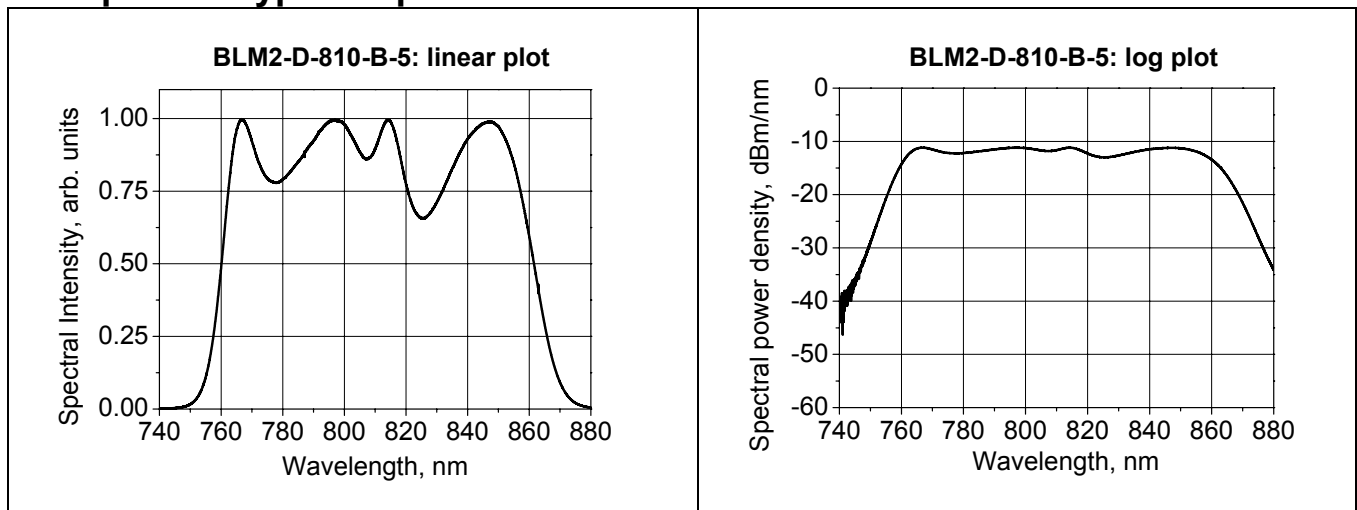
	Type	Comments
Fiber type	SM	Corning HI780 fiber
Mode field diameter / Numerical Aperture (NA)	5 μm / 0.14	
Connector type	FC/APC	FC/APC fiber pigtailed output is available upon request.
Connector key type	Tight-fit/narrow	

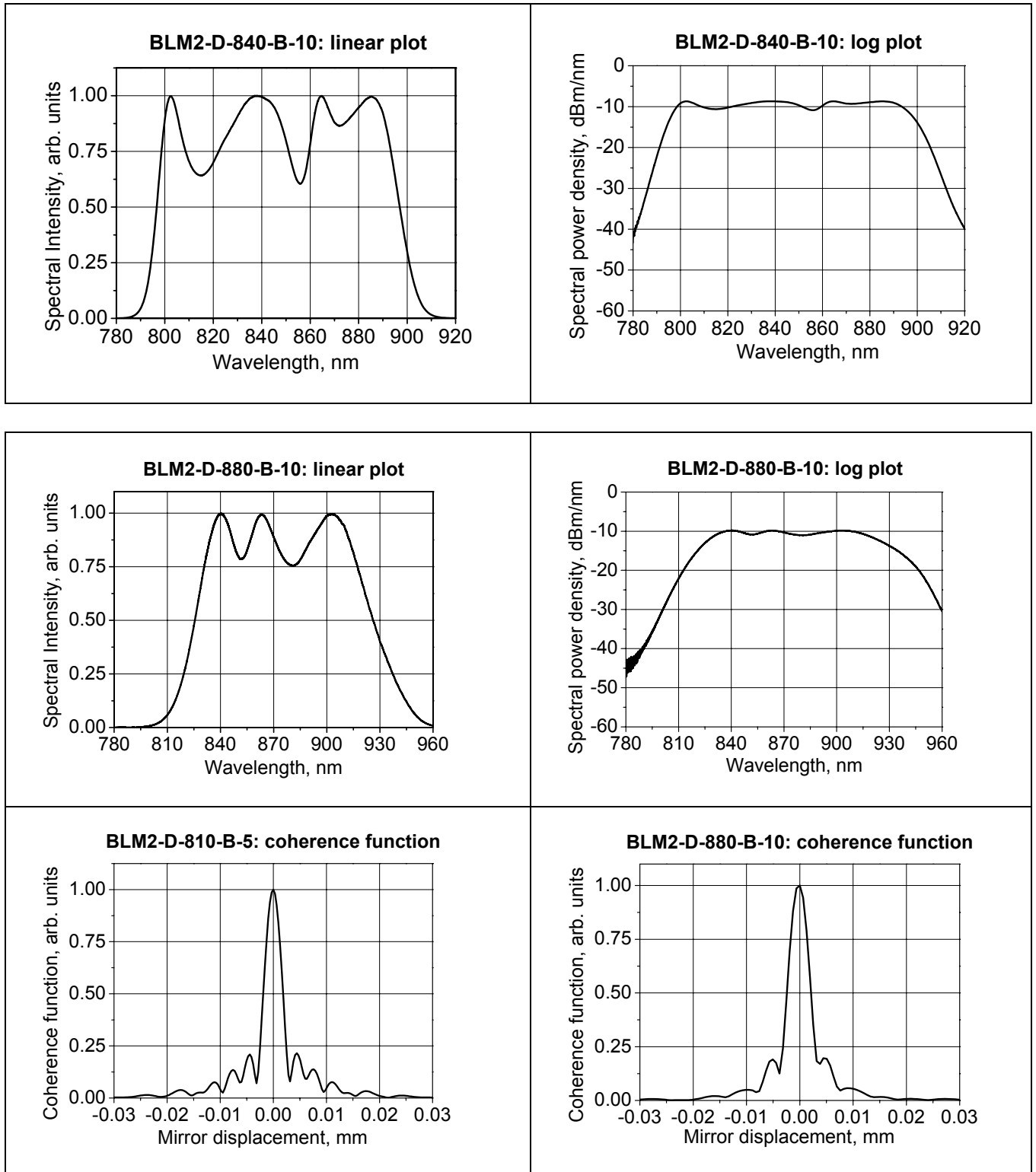
Optical Ratings

This chapter describes optical parameters of standard BLM2-D light source modules of Superlum. Please note that the flexible design of the light source and a great number of different SLD modules available to choose from allow a variety of light sources to be designed to meet a custom specification of optical parameters.

Device P/N	BLM2-D-810-B-5			BLM2-D-840-B-10			BLM2-D-880-B-10		
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
Output optical power, mW	5	7	-	10	12	-	8	10	-
Center wavelength, nm	800	810	820	830	840	850	870	880	890
Spectral bandwidth (FWHM), nm	90	100	-	90	100	-	90	100	-
Spectral Flatness, %	-	-	45	-	-	45	-	-	30
Spectral ripple, %	-	2	5	-	2	5	-	2	5

Examples of Typical Spectra and Coherence Functions





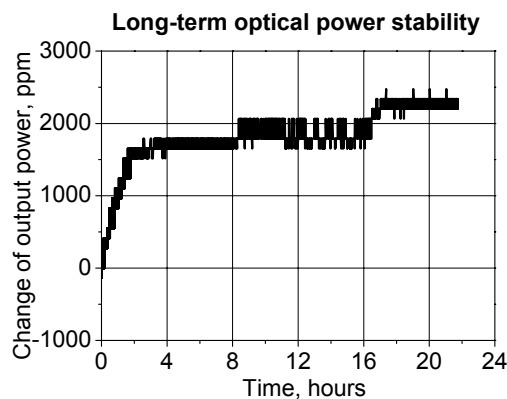
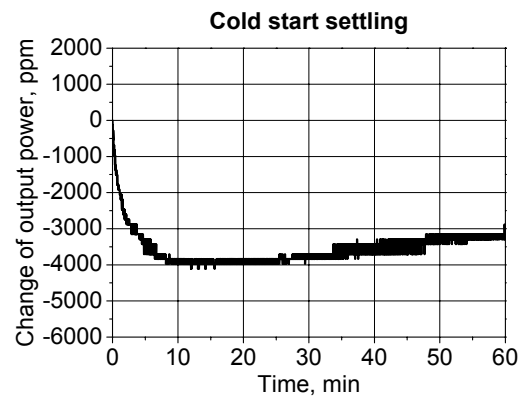
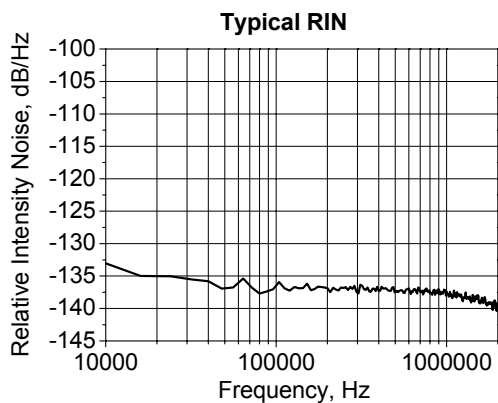
Other Electro-Optical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Temperature dependent optical drift	0...+40 °C	–	75	130	ppm/°C
Relative Intensity Noise (RIN)	10 kHz...2 MHz	–	-130	-125	dB/Hz
Long-term optical power stability	8 h after 60 min warming up	–	–	4 000	ppm
“Ready-to-work” time	After DC power supplied	–	–	7	s
Cold start settling time (system warm-up)		20 ¹	–	60 ²	min
Rise time of optical signal		30	50	100	ms
Fall time of optical signal		1	–	3	µs

¹ at +25 °C

² at high and low extremes of operating temperature range

Examples of Stability and Noise



Mounting / Heatsinking

Light sources should be mounted to an appropriate heatsink capable of dissipating up to 15 W. Free air circulation around top cover is required. A light source may be used without a heatsink, but it will limit the maximum operating temperature to +40 °C. Free air circulation around BLM2-D is absolutely required when it is used without a heatsink.

Laser Safety Considerations

The product emits invisible light that may have a potential hazard associated with CLASSES 3R-3B of IEC 60825-1 (Edition 2.0; 2007-03), depending on a particular P/N.

The BLM2-D light source is designed for use as a component for integration into photonics equipment and it is, therefore, out of scope of applicable standards related to laser safety, such as IEC 60825-1. Note that any equipment incorporating this component may be subject to these standards. BLM2-D modules do not have **ALL** the laser safety features (like remote interlock, key operated master control, warning signals and labels). However, these features can be easily implemented using “Control” or RS-232 interfaces.

Please contact Superlum for more details about laser safety issues for each particular model of BLM2-D light source modules.