

### Electrical Power

- 230 VAC
- 50/60 Hz
- single phase
- circuit breaker: 15 amp  
(though the system typically runs well under 10-amp, we recommend a 15-amp circuit breaker to be safe.)
- Maximum power rating? 12 amp FLA max
- Typical power usage? Typical operation pulls about 8 amps.

### Compressed Air Requirements

- Minimum supply pressure? 15 psi
- Maximum allowable pressure? 35 psi

We typically connect to a spare regulated air outlet on the diamond turning machine. It needs to get regulated down to 20-30 psi. It is used as a purge air, so it will require continuous flow.

For the Laser, I attached the full manual from IPG. Below is an excerpt from the specification section:

### Optical Characteristics-YLM-50-AC

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Mode of Operation			CW or modulated			
Polarization State			Random			
Maximum Output Power		$P_{Nom}$	50			W
Central Emission Wavelength	$P_{OUT} = 50\text{ W}$	$\lambda_c$		1070		nm
Emission Bandwidth	$P_{OUT} = 50\text{ W}$	$\Delta\lambda_c$		1.5	2.0	nm
Short-term Power Instability	Output power:50 W Frequency range: 10KHz-20MHz			1.0	2.0	rms %
Long-term Power Instability	Output power :50 W Time interval : 4hrs (after full stabilization time, T=constant)			+1	+3	%
Power Modulation Rate	$P_{OUT} = 50\text{ W}$				50	kHz
Red Guide Laser Power*				0.5		mW

\*Installation of red guide laser is optional.

## Optical Output

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Output Beam Quality		$M^2$		1.05	1.1	
Delivery Fiber Length		L		5.0	TBD	m
Delivery Cable Bending Radius		R	50			mm
Output Fiber Termination			Collimator*			
Beam Diameter		$W_0$	4.5	5.0	5.5	mm
Beam Divergence	Full Angle Far Field	$1/e^2$		0.3	0.5	mrad

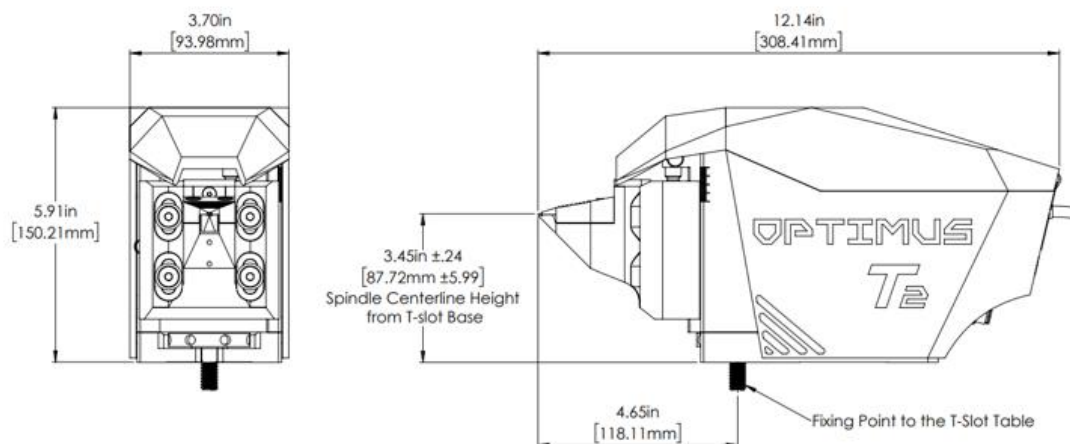
\*By default a collimator with beam diameter 5mm is installed. Other beam diameters are available upon request.

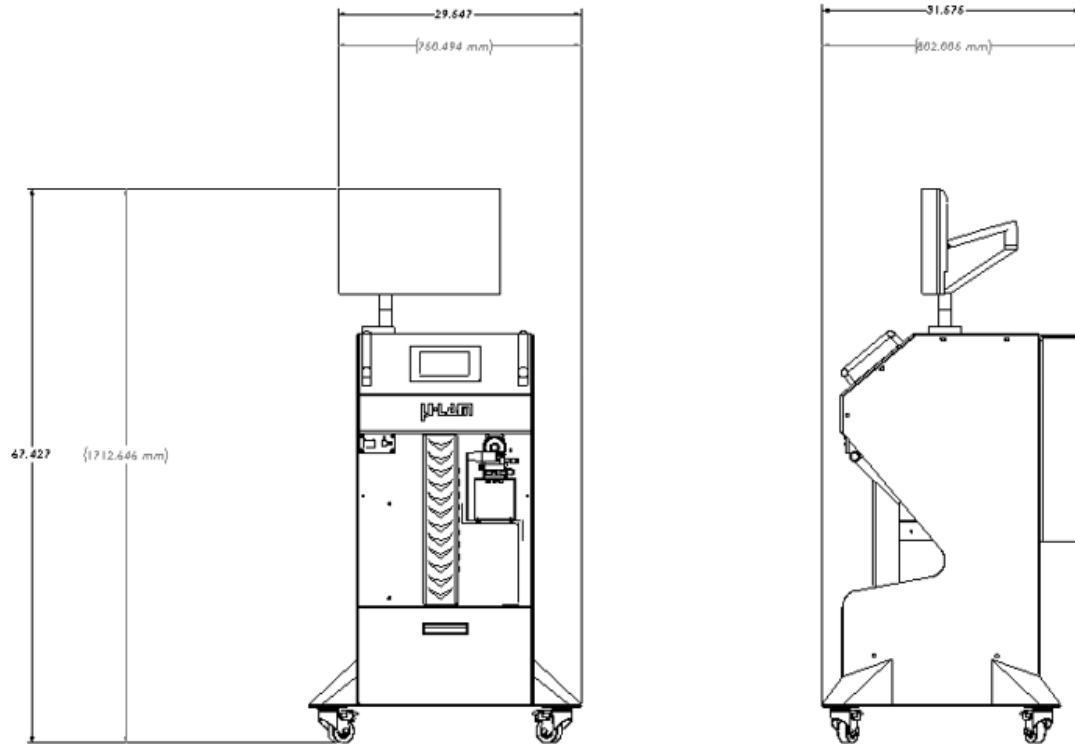
## General Characteristics

Characteristic	Test Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range (YLM-100-AC)	Ambient air temperature	+10		+35	°C
Operating Temperature Range (YLM-50-AC)	Ambient air temperature	+10		+40	°C
Storage Temperature		-40		+75	°C
Humidity		10		95	%
Cooling Method		Forced air			
Module Dimensions	W x H x L	270 x 75 x 255			mm
Weight			6		kg

## Electrical Characteristics

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage for house keeping	$U_{HK}$	4.5		25	VDC
Main supply voltage for pump diodes	$U_P$	23	24	25	VDC
Power consumption (YLM-100-AC)			350	450	W
Power consumption (YLM-50-AC)			170	200	W





## MPE and NOHD

MPE (Maximum Permissible Exposure) and NOHD (Nominal Ocular Hazard Distance) for Class 4 and Class 2M laser products for the different class of laser used in the Micro-LAM product are calculated and listed as below.

MPE for class 4 laser (1070 nm):

- Ocular exposure:  $5 \times 10^{-3} \text{ W/cm}^2$
- Skin Exposure:  $1 \text{ W/cm}^2$

NOHD for class 4 laser:

- Ocular exposure: 2708 cm
- Skin Exposure: 191.5 cm

MPE for class 2M laser (650 nm):

- Ocular exposure:  $1 \times 10^{-3} \text{ W/cm}^2$
- Skin Exposure:  $0.2 \text{ W/cm}^2$

NOHD for class 2M laser:

- Ocular exposure: 27 cm

## Laser Information

Two laser beams coming out of the aperture of the product with following specifications:

### **Class 4 Laser:**

Wavelength: 1070nm

Beam divergence: 25mrad

Continuous Wave Laser

Max. Power: 50W and 100W

### **Class 2M Laser:**

Wavelength: 650nm

Beam divergence: 25mrad

Continuous Wave Laser

Max. Power: 0.5mW

The data in the chart from IPG is for what gets sent by their unit and comes out of the collimator in a 5mm beam. The beam size at the tool tip is approximately 300µm Though it will vary a bit with the focal length adjustment.

Collimator Fiber Length is 15ft

Laser Glass Protection Level at 1070nm: OD6+ (DIRM LB6)

Please also see accompanying documents :

The EC Declaration Of Conformity (Word document)

YLM-50\_100-ac (Micro-LAM) User Guide (PDF)

Laser glass Certification of compliance (PDF)