

# Coherent PL-501

## High-Power Structured Light Pattern Generating Laser

Coherent's PL-501 structured light laser is a line generator developed for demanding industrial machine vision and scientific applications. Bridging the power gap between the popular Coherent StingRay and Magnum series lasers, this thermo-electrically cooled device is able to emit uniform laser lines at high powers.

With exceptional beam pointing and focusing stabilities, the PL-501 laser can be operated in extreme environments ranging from -20°C to +55°C. The laser beam can be modulated by an external signal through a DB-9 connector on the back panel and can operate in either CW or external modulation mode. The laser is protected against over-voltage, reverse polarity of the power supply, over-temperature, and ESD.

### FEATURES & BENEFITS

- Rugged industrial package
- Power up to 2 W
- TEC cooled
- Exceptional pointing stability
- 445 nm to 808 nm
- Uniform intensity distribution
- Focusable
- Fan angles from 5 to 60 degrees
- ESD, over-temperature, and reverse polarity protection

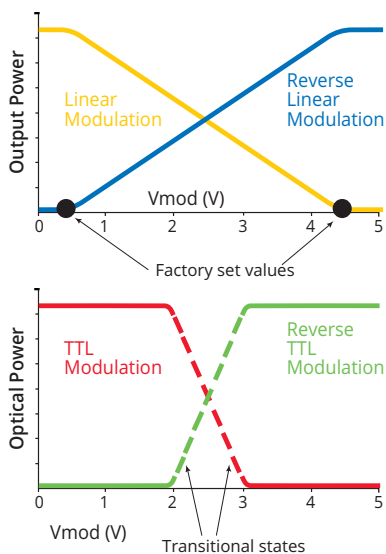
### APPLICATIONS

- Road/Rail Inspection
- Tunnel Profiling
- Infrastructure
- Lumber
- Steel/Extrusion Profiling
- Solar Panel



SPECIFICATIONS	Coherent PL-501 445	Coherent PL-501 670	Coherent PL-501 808
Wavelength (nm)	445	670	808
Wavelength Tolerance (nm)	±10	±10	±5
Laser Power (mW)	375	500	1500
Spatial Mode	Multi Transverse Mode		
Fan Angles	5, 10, 20, 30, 45, 60 ±10%		
Straightness (%)	≤0.10		
Relative Intensity Floor (%)	>50		
Warm-up Time (minutes)	<2		
Laser Drive Modes	CW, Analog, or Digital		
Digital (kHz)	10		
Rise/Fall (µsec)	<10		
Analog (kHz)	10		
Rise/Fall (µsec)	<10		
Operating Voltage (VDC)	12	5	5
Operating Current (A)	3	2	4
Modulation Input Impedance (kohm)	>90		
Connector, Power	Socket, 3-pin, KV30, Lumberg		
Pointing Stability (µRad/°C)	<5		
Beam Angle (mrad)	<3		
ESD Protection	Level 4		
Operating Temperature	-20 to 55°C		
Storage Temperature	-40 to 70°C		

## MODULATION OPTIONS



Option -S  
Option -RS

**Analog Modulation (Linear)**  
S (synchro) or RS (reverse synchro)  
DC to 10 kHz  
Linear for amplitude 0.7 V to 4.0 V  
Rise/Fall Time: <10 µs

Option -T  
Option -RT

**Digital Modulation (TTL)**  
T (TTL) or RT (Reverse TTL)  
DC to 10 kHz  
Rise/Fall Time: <10 µs

**Note:**  
0 VDC → laser "ON" S, T  
5 VDC → laser "OFF" RS, RT

## ORDERING INFORMATION

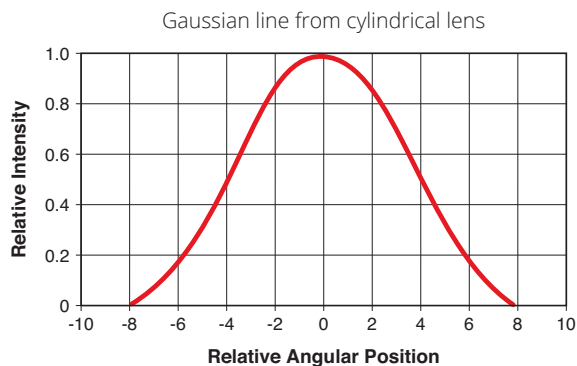
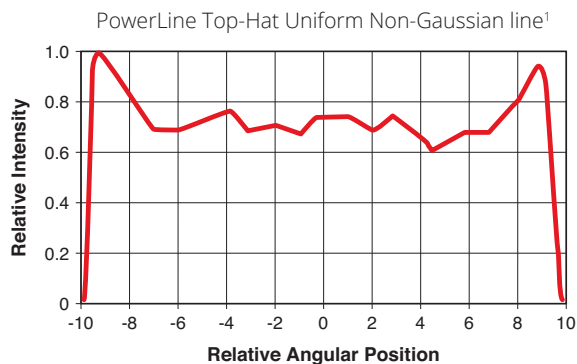
To order, use the following code: PL - 501L - Wavelength - Modulation Option (S, RS, T, RT) - Diode Power - Fan Angle (e.g., PL-501L-670T-500-45°).

SPECIFICATIONS	Coherent PL-501 445	Coherent PL-501 670	Coherent PL-501 808
Wavelength (nm)	445	670	808
Laser Power (mW)	375	500	1500
Final Beam Power (mW)	375	500	1500
Electrical Power	12VDC, 3A	5VDC, 2A	5VDC, 4A
Lens Fan Angle	5°, 10°, 20°, 30°, 45°, 60°		

## UNIFORM INTENSITY

Conventional laser line patterns are often generated by cylindrical optics that produce a Gaussian line profile with a bright center and fading ends. Coherent patented beam shaping optics distribute the light into an evenly illuminated line. The result is an exceptional, uniform line with sharp ends.

### Line Intensity Profile Along Line Length



<sup>1</sup> Typical profile.

Relative intensity vs. angular position along line length

## MECHANICAL SPECIFICATIONS

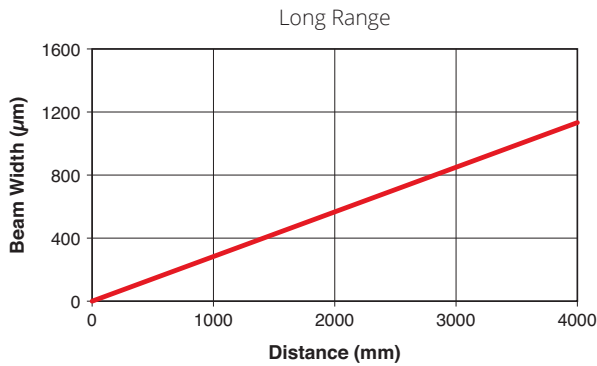
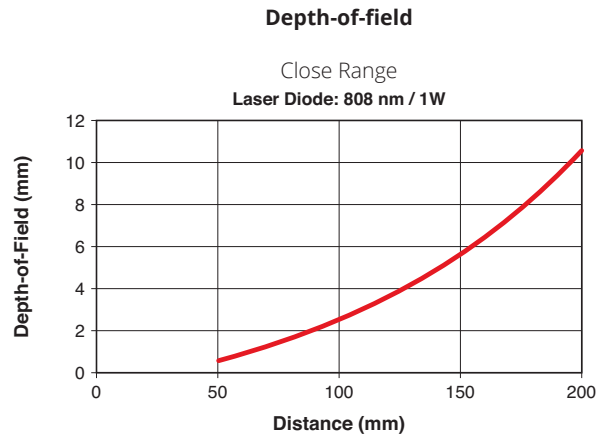
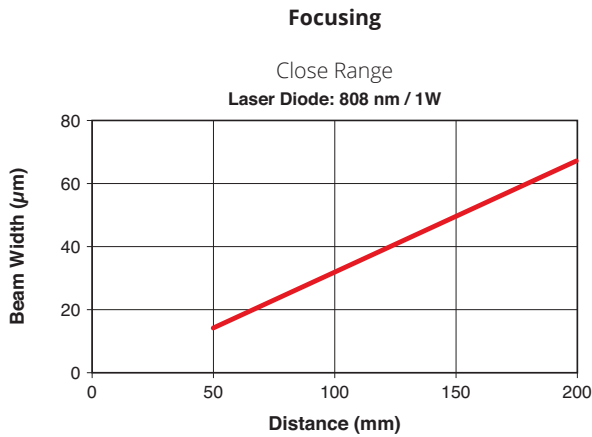
Definition	Description
Fan Angle or Line Length	Length of flat top profile, measured at 80% intensity clip levels. Reported in degrees for the fan angle.
Straightness	Maximum deviation from the best fit line. Measured as the delta from the best fit line divided by the line length. Reported as a percentage.
Relative Intensity Floor	Minimum relative intensity at any point along the line length. Reported as a relative intensity.

Note: Line is optimized in the factory at 500 mm working distance from laser

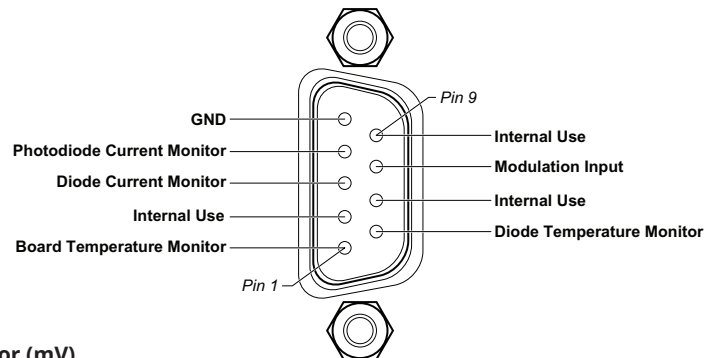
## FOCUSING PERFORMANCE

The following figures show the typical focus and depth-of-field performance of the laser. The focus charts indicate the minimum line thickness (at  $1/e^2$ ) achievable for a specific projection distance. The depth-of-field is defined as twice the distance over which the thickness of the line has increased by a factor of  $\sqrt{2}$ .

### Focusing and Depth-of-Field Performance



## DB9 CONNECTOR/MONITORING & MODULATION



Diode Current (mA) = diode monitor (mV)  
Power (mW) = photodiode monitor (mV)

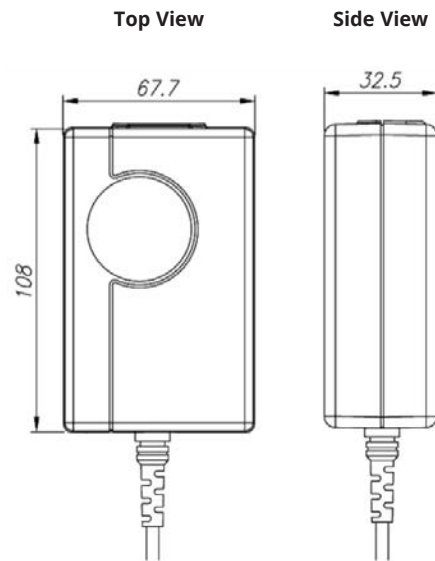
PL-501 Accessories	Part Number
Power Supply, 115V input includes USA Power Cord, 5V DC Output	320-1705G
Power Supply, 220V input includes German Power Cord, 5V DC Output	320-1706G
Focusing Key Adjustment Tools	320-0793

## POWER SENSOR ACCESSORIES

### Power Supply 320-1705G/320-1706G

Part Number: 320-1705G (for 115 Volt Input)

Part Number: 320-1706G (for 220 Volt Input)



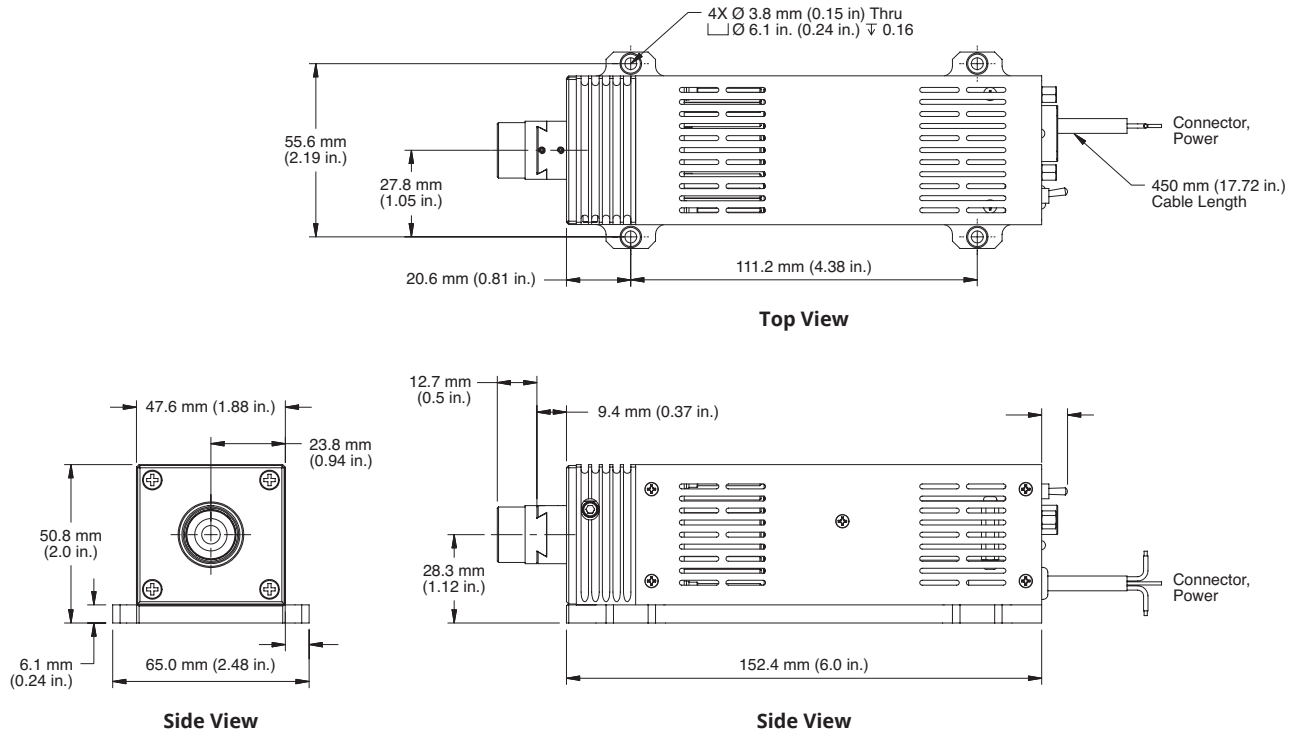
### Focusing Key Adjustment Tool 320-0793

Part Number: 320-0793



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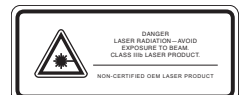
### Standard PL-501 Laser



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U.S. Patent No. 4,826,299  
 CAN. Patent No. 1,276,827



Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all Coherent PL-501 Lasers. For full details of this warranty coverage, please refer to the Service section at [www.coherent.com](http://www.coherent.com) or contact your local Sales or Service Representative. MC-012-10-0M1119Rev.D Copyright ©2019 Coherent, Inc.