

3D PRO™ Laser

Structured Light Laser Diode Module



Seamless Integration, Excellent Uniformity.

The 3D PRO™ Laser has been designed specifically for the demanding requirements of machine vision applications. The laser modules have a compact cylindrical form factor based on industry standard dimensions for easy integration into existing applications.

The 3D PRO Laser is 19mm in diameter, compatible with the majority of existing Machine Vision systems. The laser is available with a customer-specified fixed focus.

3D PRO lasers offer excellent uniformity with line widths down to 30µm at 120mm which is ideal for inspection applications that demand a high degree of accuracy. They are available with output powers up to 100 mW and fan angles between 10° and 90°. Wavelengths range from 520nm to 850nm and include 635nm and 660nm. Electronic options consist of TTL modulation up to 100kHz and Analogue power control for intensity adjustment. The 3D PRO range is available in a wide variety of line and diffractive optic options.

Key Features

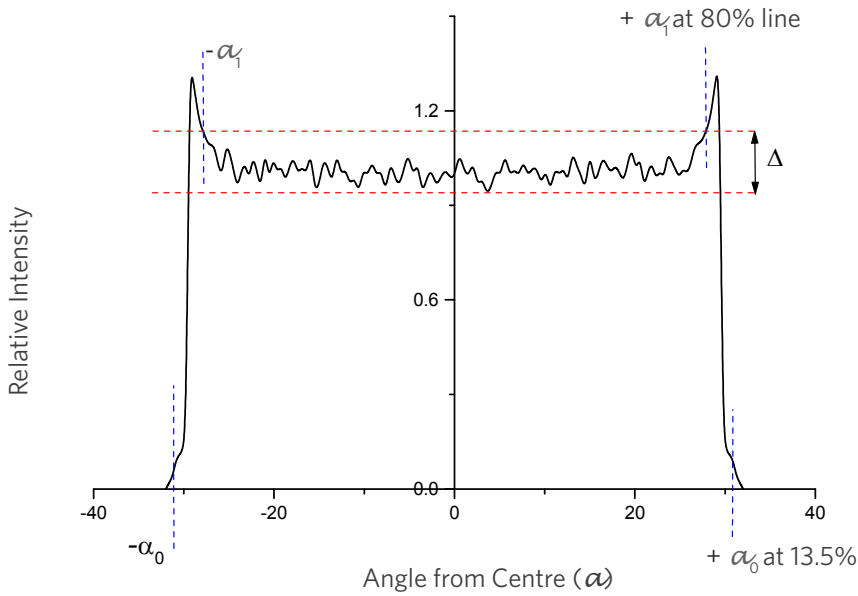
- Compact, Cylindrical Form Factor for Easy Mounting
- Excellent Uniformity
- Line Width of 30µm at 120mm
- Available Options include: Wavelengths, Power Levels, Fan Angles, Intensity Control & Modulation

Key Applications

- 3D Measurement
- Dimensional Scanning
- High Precision Alignment, Pointing, Positioning
- Automated Inspection

Uniformity

3D PRO Lasers can deliver a range of uniformities dependent on customer requirements. The graph below shows a typical intensity profile along the length of a line and our method for defining the uniformity and beam angle. 3D PRO Laser achieves a standard uniformity $\pm 22.5\%$. A higher uniformity option is available with a uniformity of $\pm 12.5\%$.



I : Optical power

$2\alpha_0$: Fan angle

$$\alpha_1 = 2 \text{ Arctan} \left(0.8 \tan \frac{\alpha_0}{2} \right)$$

$$\Delta : \text{Max } I(-\alpha_1, \alpha_1) - \text{Min } I(-\alpha_1, \alpha_1)$$

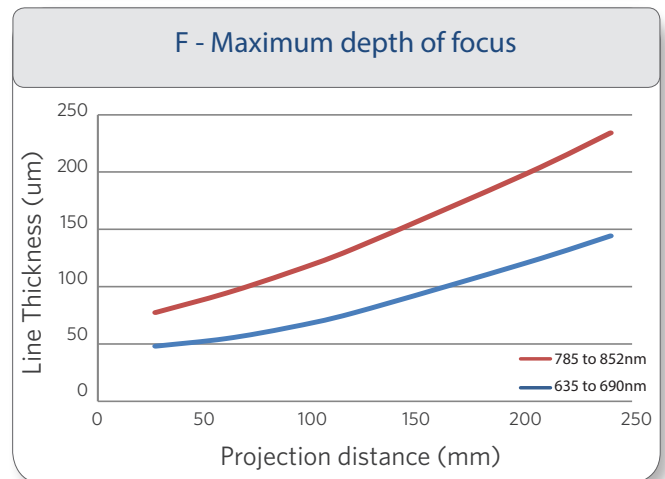
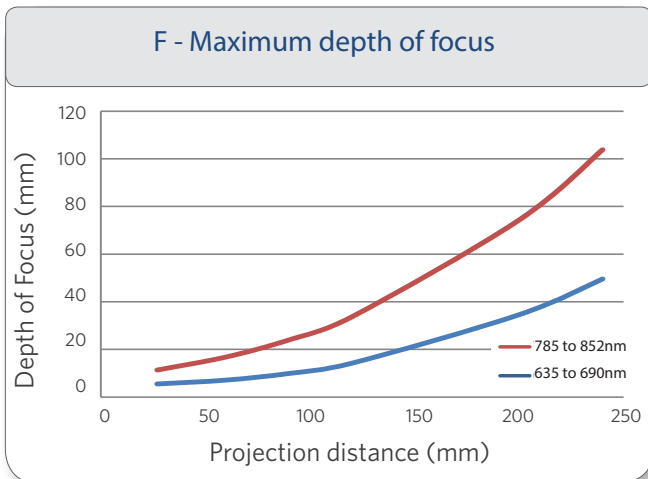
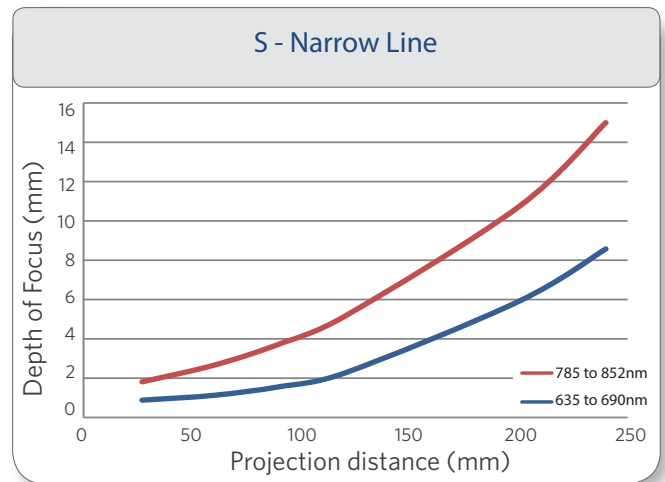
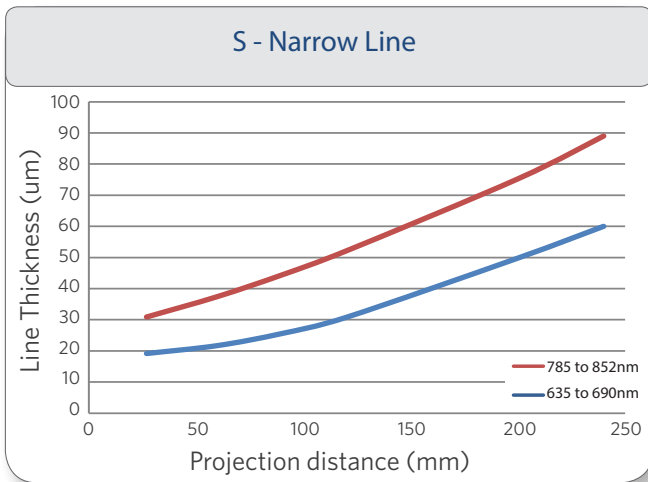
$$\text{Uniformity} = \pm \frac{\Delta}{2I(-\alpha_1, \alpha_1)} * 100$$

$I(-\alpha_1, \alpha_1)$: average intensity between $(-\alpha_1, \alpha_1)$

Uniformity		
S	Standard	$\pm 22.5\%$
H	Higher	$\pm 12.5\%$

Focusing and Depth of Focus performance

The following graphs show the focusing and depth of focus performance of the 3D PRO Laser at different wavelengths, representing two different optical configurations. S will provide a narrower line while F will provide a greater depth of focus. The focus charts indicate the minimum line thickness achievable for a specific projection distance. The depth of focus is defined as the region around the nominal working distance where the line width does not increase by more than a factor of $\sqrt{2}$.



Product Specifications

Mechanical Specifications	
Weight	<45g
Housing Material	Anodized Aluminum
Protection Category	IP56
Electrical Isolation	Potential-free Housing
Bore Sighting	<3mrad

Wavelength (nm)	Diode Power (mW)							
	1	5	10	15	35	45		
635	1	5	10	15	35	45		
650	1	5	10					
660	1	5	10	20	35	50	80	100
670	5	10	15					
690	20	35	50					
785	20	35	50	80	100			
830	50	100						
850	35	50						

Other wavelengths and diode power levels are available on request

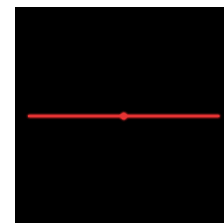
Please Note: Power levels refer to maximum diode output power. Module output power will vary depending on optical configuration.

Electrical and Environmental Specifications	Min	Max
	Input Voltage	5VDC
Input Current	Up to 200mA	
Mode of Operation	Automatic Power Control with current limiting	
Optical Power Stability	±3%	
Operating Temperature*	-10°C	40°C
Storage Temperature	-10°C	80°C
Reverse polarity voltage	-30VDC	
Digital Modulation	TTL, 0-5V DC up to 1MHz	
Analog Modulation (Amplitude, Frequency)	0 - 3.3VDC, DC up to 100kHz	

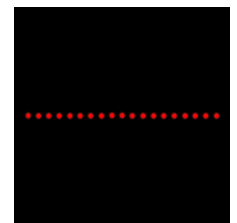
*Module surface temperature

Fan Angle
10°, 20°, 30°, 45°, 60°, 75°, 90°

Diffractive Options	
L01	1 Line
L05	5 Lines
L07	7 Lines
↓	↓
L65	65 Lines
S01	Spot
X01	Crosshair
Other Diffractive Options are available on request	



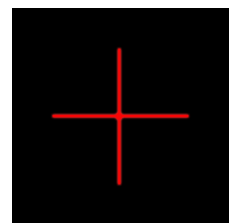
Single Line



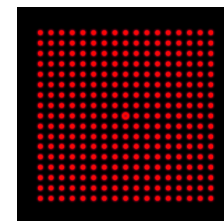
Dot Line



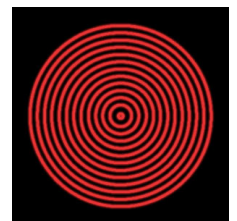
Multilines



Cross



Dot Matrix

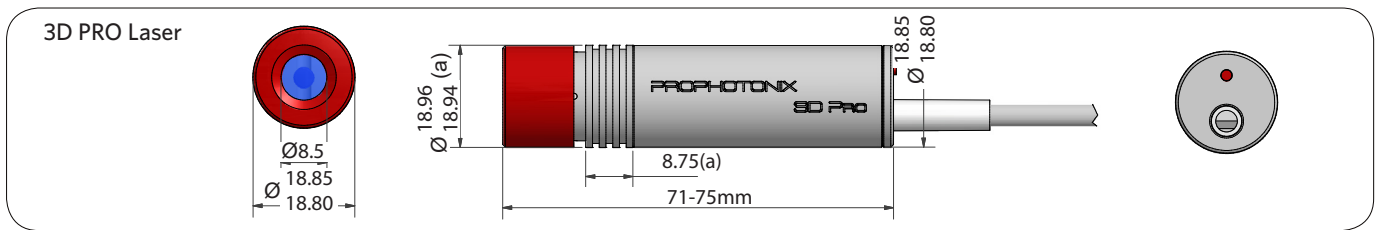


Concentric Circles

Electronic Options	
S	Standard
A	Analogue Control
T	TTL Modulation
B	Both Analogue & TTL

*Images courtesy of HOLOEYE Photonics AG

Dimensional Drawing

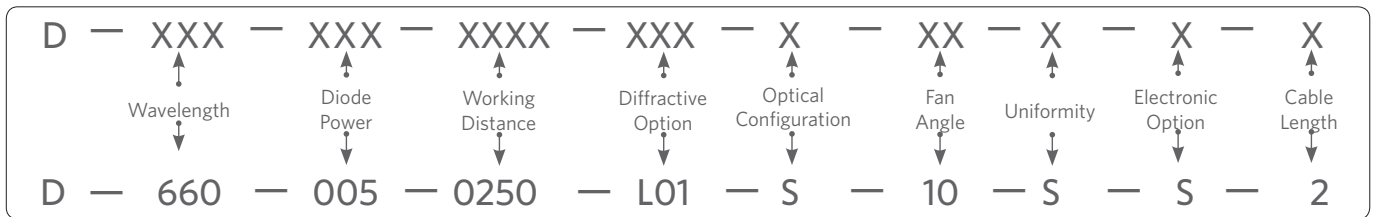


Part Numbers

3D PRO Lasers are covered by a 2 year warranty.

To order your 3D PRO Laser use the product code D - Select Wavelength(XXX)- Select Diode Power (XXX) - Select Working Distance (in mm) (XXXX) - Select Diffractive Option (XXX) - Select Optical configuration (see graph) (X) - Select Fan Angle (XX) - Select Uniformity option (S/H) - Select Electronic Option (X) - Select Cable Length in metres (X)

E.G. D - 660 - 005 - 0250 - L01 - S - 10 - S - S - 2



Laser Safety Information

The light emitted from these devices has been set in accordance with IEC EN 60825-1:2007. However, staring into the beam, whether directly or indirectly must be avoided. It is recommended that the user wears appropriate laser safety glasses. Our laser modules are classified into one of the IEC EN 60825-1:2007 classifications shown below, depending on the wavelength and power.



Class 1

This class is eye-safe under normal operating conditions.



Class 1M

This class of visible laser (500-700nm) is safe for viewing directly with the naked eye, but may be hazardous to view with the aid of magnifying optics such as microscopes and telescopes.



Class 2

This class of visible laser (400-700nm) is safe for accidental viewing under all operating conditions. However, it may not be safe for a person who deliberately stares into the laser beam for longer than 0.25 s, by overcoming their natural aversion response to the very bright light.



Class 2M

This class of visible laser (400-700nm) is safe for accidental viewing with the naked eye, as long as the natural aversion response is not overcome as with Class 2, but may be hazardous (even for accidental viewing) when viewed with the aid of optical instruments, as with class 1M.



Class 3R

Radiation in this class is considered low risk, but potentially hazardous. The class limit for 3R is 5x the applicable class limit for Class 1 (for invisible radiation) or class 2 (for visible radiation).



Class 3B

Radiation in this class is hazardous if the eye is exposed directly. The AEL for a continuous wave laser in the wavelength range 315nm to far infrared is 500mW. For pulsed lasers between 400 and 700 nm, the limit is 30mJ. The radiation can be a hazard to the eye or skin. Class-3B lasers must be equipped with a key switch and a safety interlock.

NB: It is important to note that while complying with the above classifications, unless otherwise stated, our laser diode products are not certified and are designed solely for use in OEM products. The way in which the device is used in the final product may alter its original design classification, and it is the responsibility of the OEM to ensure their products comply with the relevant standards.

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