

3D PRO™ Adjustable Focus Laser

Structured Light Laser Diode Module



Seamless Integration, Excellent Uniformity.

The 3D PRO Adjustable Focus 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 Adjustable Focus Laser is 19mm in diameter and is compatible with the majority of existing Machine Vision systems. The laser is externally focusable and designed for smooth adjustment with a lock-in mechanism for maintaining desired focal distance.

3D PRO Adjustable Focus 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 diode powers up to 100 mW* and fan angles between 10° and 90°. Wavelengths range from 375nm to 940nm. Electronic options consist of modulation up to 100kHz and Analog power control for intensity adjustment. The 3D PRO range is available in a wide variety of line and diffractive optic options.

*Wavelength dependent

Key Features

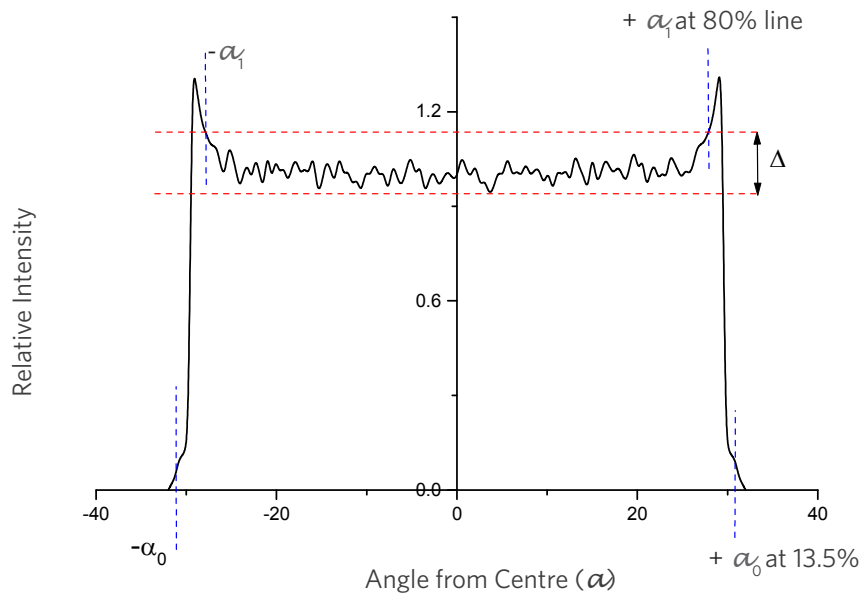
- Compact, Cylindrical Form Factor for Easy Mounting
- Excellent Uniformity
- Line Width of 30µm at 120mm
- User Adjustable Focus for Increased Flexibility
- Available Options Include: Wavelengths, Power Levels, Fan Angles, Intensity Control & Modulation

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

$$\alpha_1 = 2 \arctan(0.8 \tan \frac{\alpha_0}{2})$$

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

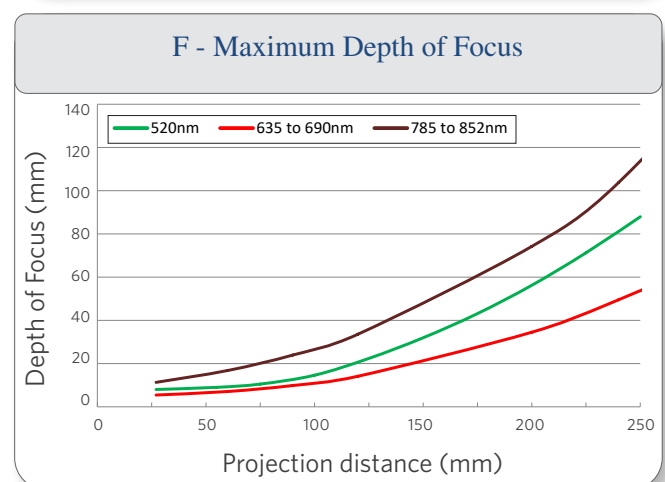
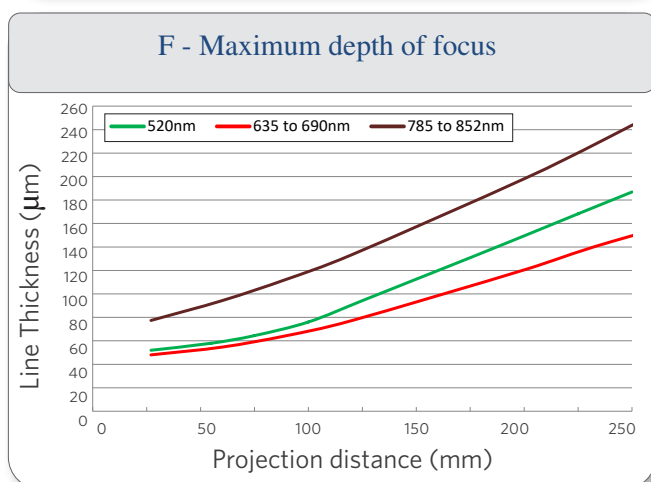
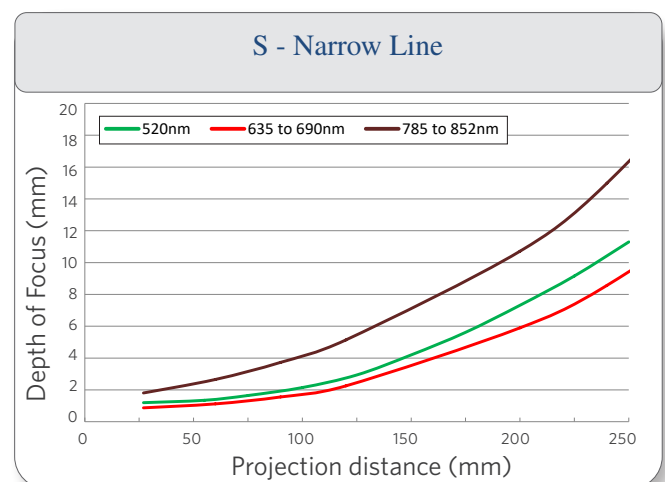
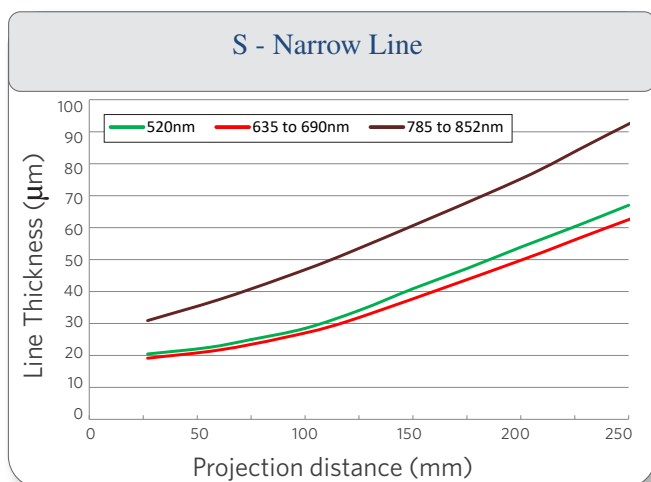
$$\text{Uniformity} = \pm \frac{\Delta}{2I(-\alpha_1, \alpha_1)} * 100$$

$I(-\alpha_1, \alpha_1)$: 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	<48g							
Housing Material	Anodized Aluminum							
Protection Category	IP54							
Electrical Isolation	Potential-free Housing							
Bore Sighting	<3mrad							
Wavelength (nm)	Diode Power (mW)							
375	35	50						
405	50	100						
450	10	35						
520	5	10	20	35				
635	1	5	10	15	35	45		
650	1	5	10					
660	1	5	10	20	35	50	80	100
785	20	35	50	80	100			
830	50	100						
850	35	50						
905	35	50						
940	50	100						
Other wavelengths and diode power levels are available on request								

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

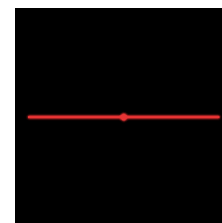
Electrical and Environmental Specifications

Parameter	Applicable Wavelength	Min	Max
Input Voltage Supply V+: Red wire Supply 0V: Black wire	Between 375nm & 520nm	8V_dc	12V_dc
	Between 635nm & 940nm	5V_dc	30V_dc
Input Current	All Wavelengths	Up to 200mA	
Mode of Operation	520nm	Direct Current Control	
	All Other Wavelengths	Automatic Power Control with current limiting	
Optical Power Stability	All Wavelengths	±3%	
Operating Temperature*	All Wavelengths	-10°C	+40°C
Storage Temperature	All Wavelengths	-10°C	+80°C
Reverse Polarity Voltage	All Wavelengths	-30 V_dc	
Digital Modulation When Specified: Yellow wire	All Wavelengths	DC up to 1MHz V _{IL} maximum 0.53V_dc V _{IH} maximum 2.0V_dc Absolute maximum 6.0V_dc	
Analog Power Control When Specified: Blue wire Note: White wire can be used as 0V connection for Analog Power Control. White wire is internally connected to Supply 0V (Black wire)	All Wavelengths	0V_dc to 3.3V_dc (up to 100kHz) for full range power control.	

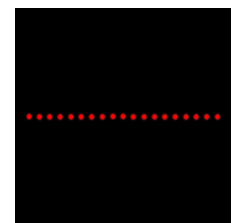
*Module surface temperature

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

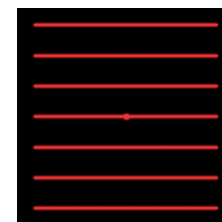
Diffractive Options	
L01	1 Line
L05	5 Lines
L07	7 Lines
↓	↓
L65	65 Lines
S01	Spot
X01	Crosshair
Other Diffractive Options are available on request	



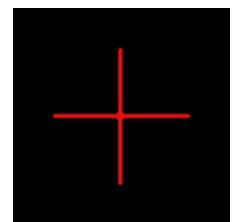
Single Line



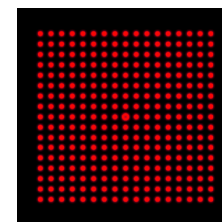
Dot Line



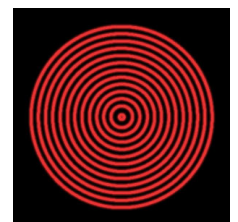
Multilines



Cross



Dot Matrix



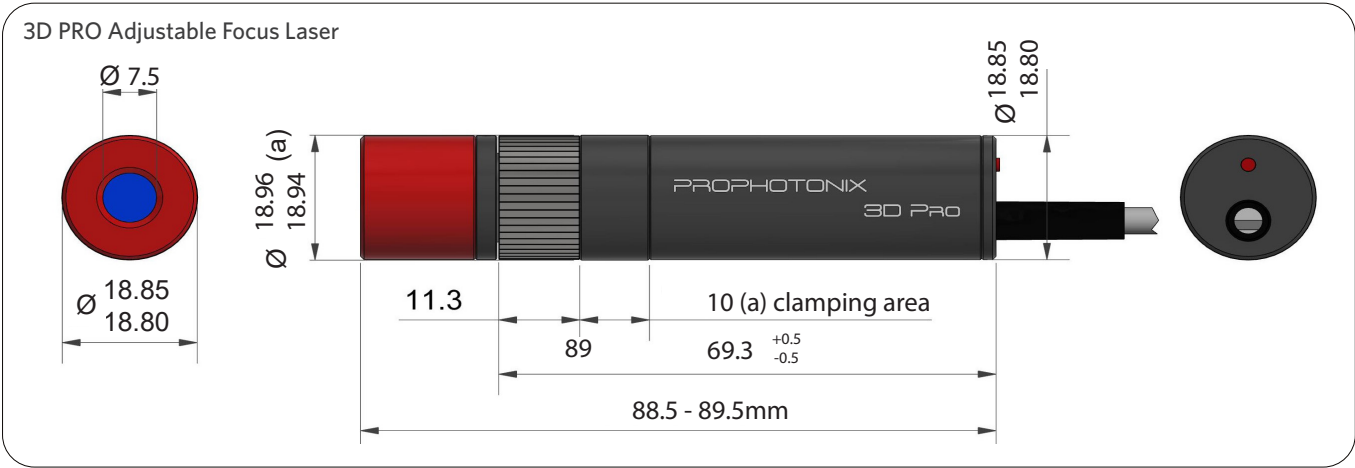
Concentric Circles

Electronic Options	
S	Standard
A	Analog Power Control
T	Modulation
B	Both Analog Power Control and Modulation

*Images courtesy of HOLOEYE Photonics AG

*Note that dependent on the functions selected at time of order, not all wire colours may be available on the supplied laser module.

Dimensional Drawing

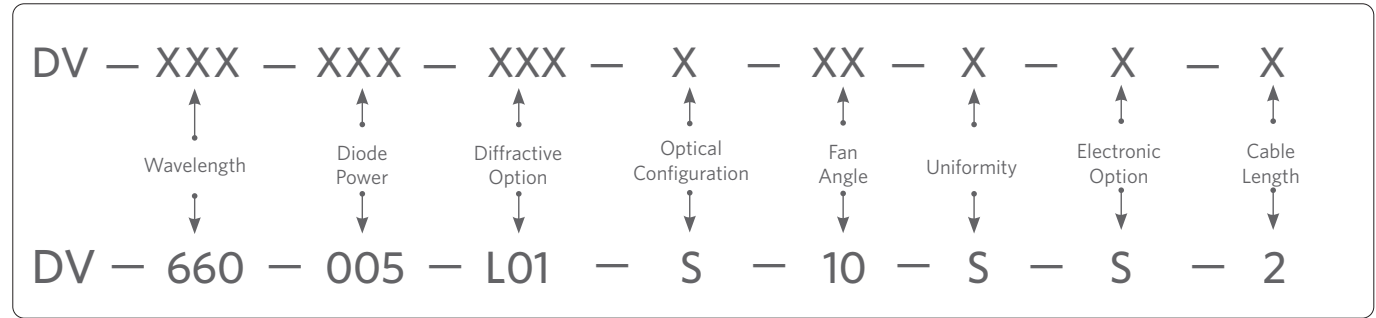


Part Numbers

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

To order your 3D PRO Laser use the product code DV - Select Wavelength(XXX) - Select Diode Power (XXX) - 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. DV - 660 - 005 - L01 - S - 10 - S - S - 2





Laser Safety

The light emitted from these devices has been set in accordance with IEC60825. However, staring into the beam, whether directly or indirectly, must be avoided. IEC60825 classifies laser products into three different categories depending on light emitted, wavelength and eye safety.

CLASS II

“Caution”, visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina.

CLASS IIIR

“Danger”, visible laser light between 1.0mW and 5.0mW. Considered eye safe with caution. Focusing of this light into the eye could cause some damage.

CLASS IIIB

“Danger”, infrared (IR), and high power visible lasers considered dangerous to the retina if exposed.

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 compliance with the relevant standards.

NB. Without the inclusion of laser drive circuits, the output powers cannot be set in accordance with EN60825 since they are designed for OEM use and not certified devices as defined in the specification. The manufacturer of the complete laser product is responsible for complying with the requirements of EN60825. If the case temperature of the laser diode exceeds its maximum specification, premature or catastrophic failure may occur. To ensure the maximum life of the laser diode, it is recommended that an additional electrically insulated heatsink, of at least 35 sq. cm. be used, Thermal transfer paste can be used to improve contact and heat dissipation.

Do not restrict air circulation around the device. Specifications subject to change without notice.

Document Revision:
(070524)

US Sales

Tel: +1 603-893-8778
sales@prophotonix.com

EMEA & ROW Sales

Tel: +44-1279-717170
sales@prophotonix.com

ProPhotonix and the ProPhotonix logo are trademarks of ProPhotonix, Inc. All other brand and product names are trademarks or registered trademarks of their respective holders. Copyright © 2024 ProPhotonix, Inc. All rights reserved.