



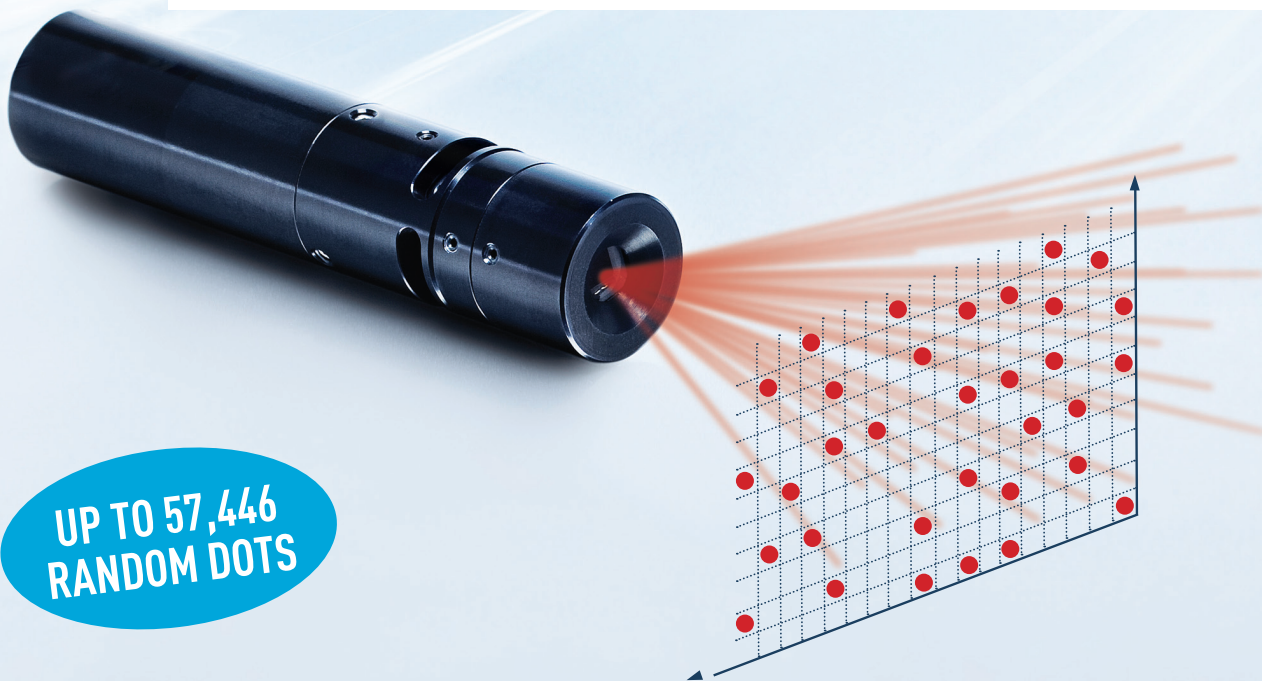
**LASER 2000**



DEVELOPING, CUSTOMIZING AND MANUFACTURING  
INNOVATIVE BEAM SHAPING SOLUTIONS

## RANDOM PATTERN PROJECTOR

Structured lighting laser depth sensing projector, in a self contained laser module for 3D machine vision applications.



**UP TO 57,446  
RANDOM DOTS**

### FEATURES

- Industrial design
- Standard or eye safe version
- Etched in glass diffractive optic
- Externally focusable
- Up to 2 year warranty

### APPLICATIONS

- 3D Stereo Vision
- Gesture recognition
- Volume measurement
- Bin Picking
- Depth Sensing
- Palletizing

## WHAT IS RPP ?

Random Pattern Projector (RPP) is a divergent dot matrix pattern of NxM pixels with a ratio of bright and dark pixels of approximately 15%. Each bright pixel is surrounded by at least 8 dark pixels with no contact between bright pixels. The bright pixels distribution is pseudo-random and the pattern is symmetric with respect to the center. Multiple laser projectors can be tiled to obtain a larger area while maintaining the same random pattern.



Zoom of RPP pixels structured

## SPECIFICATIONS

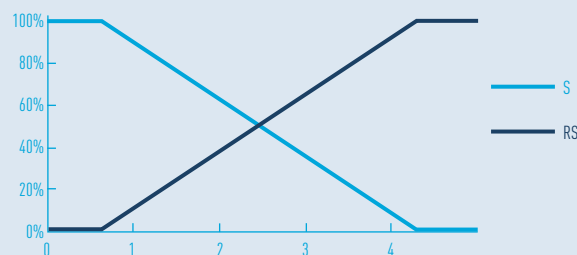
		STANDARD	EYE SAFE
OPTICAL	Total power in the "0" order	<5%	<0.5%
	Pattern uniformity (except "0" order)	<35%	
	Bore sight (mrad)	<3 mrad	
	Wavelength Drift	approx 0.25 nm/ degC	
	Pointing Stability	<6 $\mu$ rad/°C	
MODULATION	Rise/Fall time (usec)	<5	
	Depth (%)	100	
	Input Impedance (Kohm)	>10	
	Intensity Modulation	Linear ( $\approx$ 0.5-4VDC), OPTION: TTL	
ELECTRICAL/ENVIRONMENTAL	Protections (Built in)	ESD, Over voltage (up to 25 VDC), Over-temp Shutoff (>45 deg C)	
	Warm up time	< 2 minute	
	Long term Power stability (8 hours)	<+/- 3 %	
	Operating Voltage	5 $\pm$ 0.5V (4.5 to 30V with 24V option)	
	Operating Current	<250mA, depending on diode	
	Working Temp Range	-10 to +48 °C	
	Weight	<0.25 Kg	
	Power Supply Cable	Belden PN: 9533, 18 inches with flying leads	
	Warranty	Up to 2 year	

## MODULATION

The Streamline laser can be modulated by an external 0 to 5V external signal through the white wire. The **S type** modulation comes by default with the Streamline Module.

FUNCTION	CODE	ON	OFF
TTL	T	0 to 2V	3V to 5V
Reverse TTL	RT	3V to 5V	0 to 2V

Note: One modulation input needs to be selected, S (default), RS, T or RT



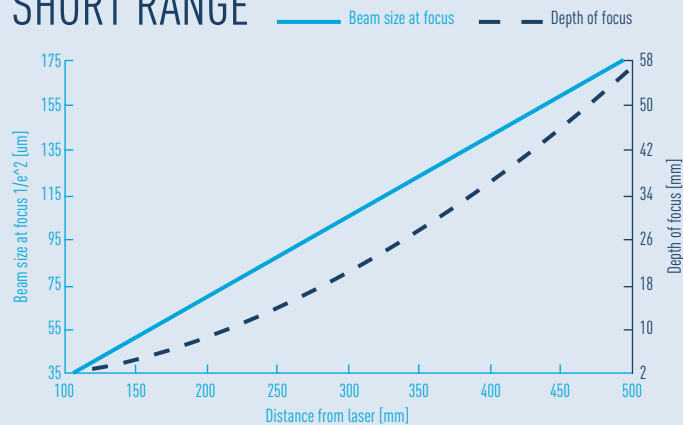
# FOCUSING OPTIONS

The focusing of the laser is very important parameter as it is directly proportional to the resolution one can attain for machine vision applications. It is important to note the relationship between focus and depth of focus, the tighter the beam size at focus that can be attained the smaller the depth of focus. Depth of focus is defined as the distance where the beam size remains within 1.4 times its minimum.

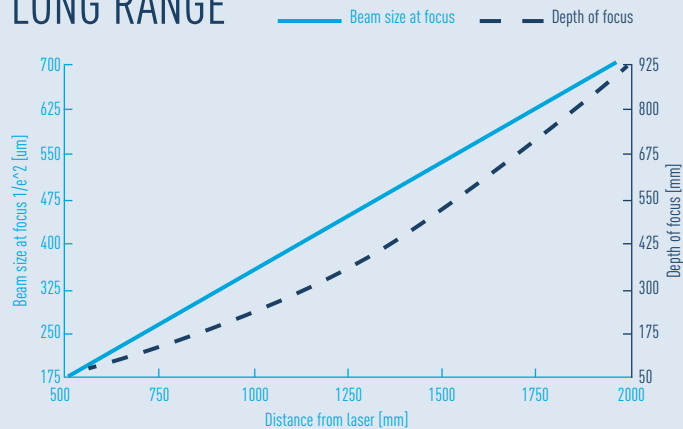
At Osela we provide many different focusing options giving you the flexibility to choose the one that best suits your application. The RPP laser is focusable by the user without removing the RPP optic. From the graphs below note the beam size and Depth of Focus (DOF) values and then multiply by the K constants for the laser diode model and focus option of choice.

Example: From the graphs at 400 mm working distance, Focus = 140 $\mu$ m, DOF = 36 mm. Then for Laser Model 660 nm 130 mW the beam at focus for OPTION A will be an ellipse having a dimension of 212.8 by 299.6  $\mu$ m (i.e. 140  $\mu$ m x 1.52, 140  $\mu$ m x 2.14). Its Depth of focus will be 88.92mm by 177.12 mm (i.e. 36mm x 2.47, 36mm x 4.92) respectively. Also note the beam size and depth of focus is noted for the center beam only.

## SHORT RANGE



## LONG RANGE



DIODE MODEL			FOCUSING & DOF CONFIGURATION AND CONSTANT											
WAVELENGTH BAND (NM)	WAVELENGTH TOLERANCE (NM)	OPERATING CURRENT1 (MA)	TYPE A				TYPE C				TYPE D			
			FAST AXIS		SLOW AXIS		FAST AXIS		SLOW AXIS		FAST AXIS		SLOW AXIS	
			K <sub>FOCUS</sub>	K <sub>DOF</sub>	K <sub>FOCUS</sub>	K <sub>DOF</sub>	K <sub>FOCUS</sub>	K <sub>DOF</sub>	K <sub>FOCUS</sub>	K <sub>DOF</sub>	K <sub>FOCUS</sub>	K <sub>DOF</sub>	K <sub>FOCUS</sub>	K <sub>DOF</sub>
660	+5/-5	200	1.52	2.47	2.14	4.92	0.62	0.41	0.88	0.82	2.20	5.22	3.11	10.37
830	+10/-10	240	1.03	0.91	3.37	9.72	0.58	0.29	1.90	3.08	1.50	1.93	4.90	20.48

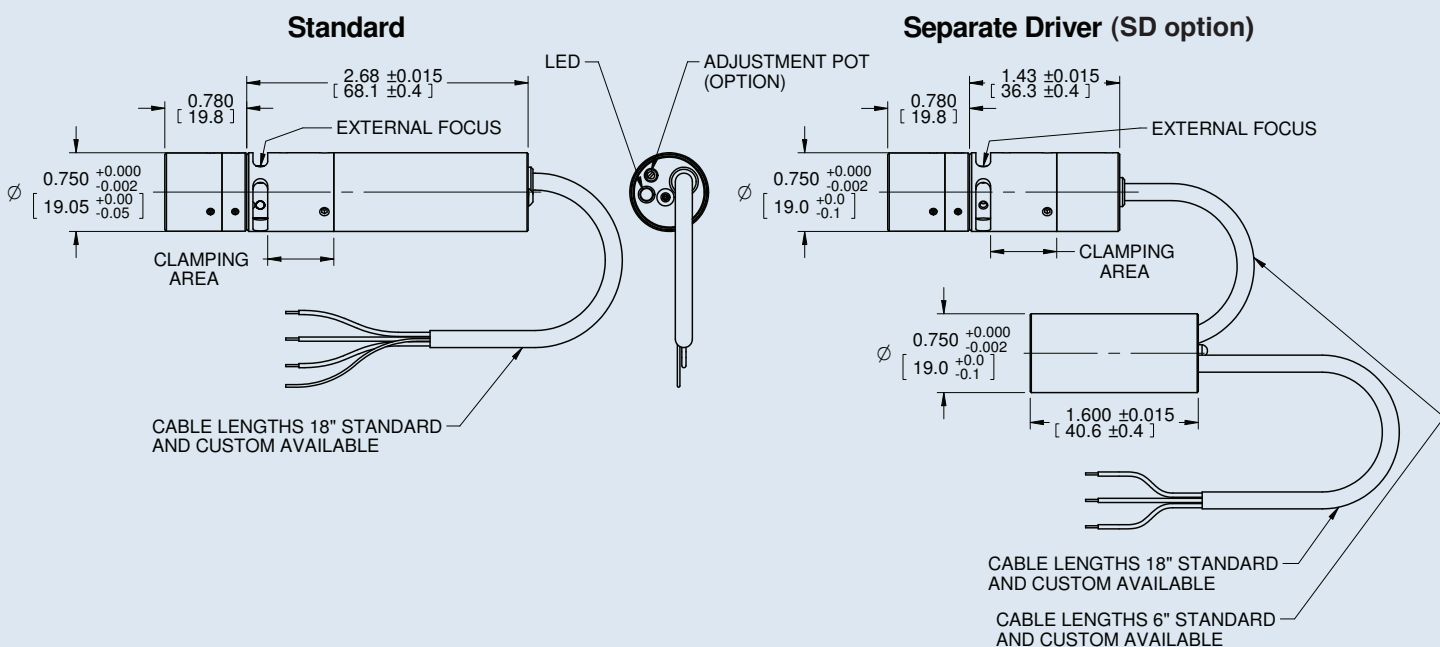
Osela offers two versions of its RPP pattern projector, the Standard (RPP) and Eye Safe (RPPES). The standard version provides you with the highest overall efficiency but with an intense central dot of < 5% thereby having a IEC60825-1 safety rating of 3B. The RPPES has slightly less overall efficiency but with the added advantage of being IEC 60825-1 Class 1 eye safe.

MODEL	SAFETY CLASS	CENTRAL DOT
STANDARD	3B	>5 mW @ 660 nm >3.64 mW @ 830 nm
EYE SAFE	1	<0.39 mW @ 660nm <0.71 mW @ 830nm

# AVAILABLE RPP MODELS

MODEL		OPERATING WAVELENGTH	NUMBER OF DOTS	FIELD OF VIEW
STANDARD	SAFE EYE			
RPP008		660nm	980	12° x 12°
RPP009		660nm	5625	10° x 10°
RPP010		830nm	980	30° x 30°
RPP011		660nm	980	20° x 20°
RPP013		830nm	5625	25° x 25°
RPP014	RPP014ES	660nm	13 410	35° x 35°
RPP015	RPP015ES	830nm	13 410	45° x 45°
RPP016	RPP016ES	660nm	23 880	35° x 35°
RPP017	RPP017ES	830nm	57 446	45° x 45°
RPP018	RPP018ES	830nm	23 880	45° x 45°

## MECHANICAL SPECIFICATIONS



## ORDERING CODE

SL	-	XXX Wavelength	-	X Electronic	X Focusing Option	-	XX RPP type	-	XXXXX Option
		660		S	A		See table		SD
		830		RS	B				24V
				T	C				
				RT	D				

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