

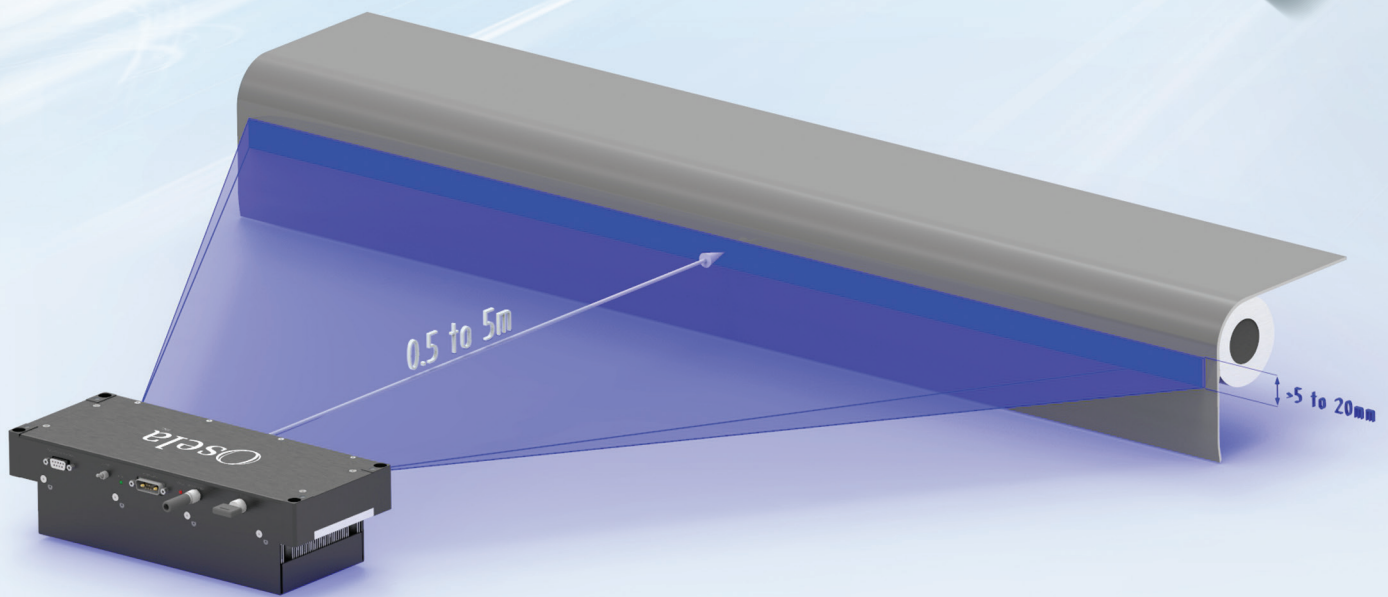


## STRUCTURED LIGHT AND LASER BEAM SHAPING SOLUTIONS

# LONG RANGE ILLUMINATOR

High power density LINE SCAN illuminator for long distance applications in a compact light engine.

DEDICATED  
LINE SCAN  
CAMERA  
ILLUMINATION



## FEATURES

- Up to 5 meters working range
- Up to 20 W of direct optical power
- 450, 520, 640, 808 nm Wavelength
- Compact
- Electrically efficient

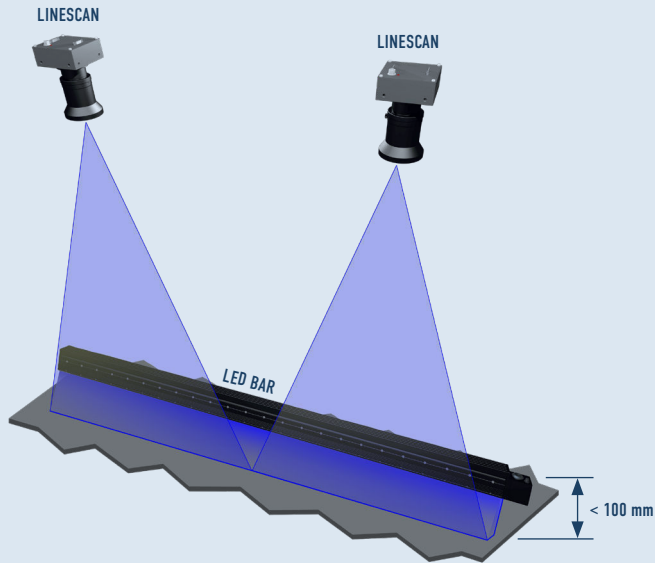
## APPLICATIONS

- Line scan camera illumination
- 2D machine vision
- Outdoor industrial inspection
- Road, Rail, Train inspection
- Hot Steel inspection
- 3D line Scan Stereo

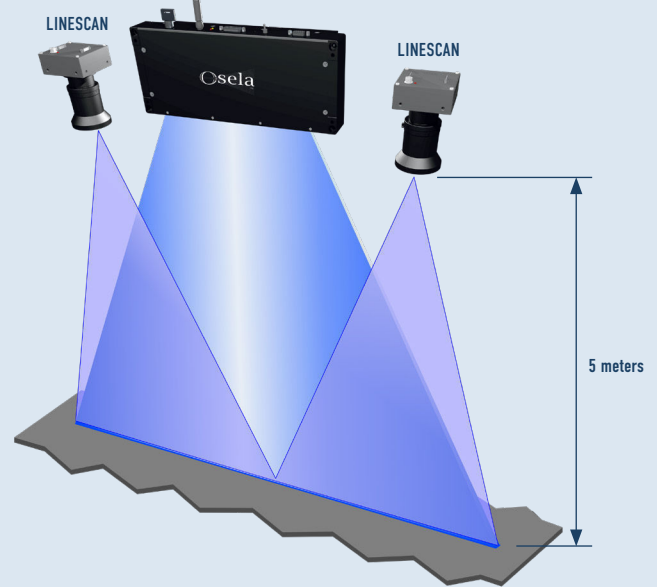
# WHAT IS THE LONG RANGE ILLUMINATOR?

Osela's Long Range Illuminator (LRI) is designed to project high intensity uniform illumination for long range Line Scan imaging applications. Unlike LED based systems our unique technology's spatial coherence maintains high power over long distances while still providing high clarity images with reduced image specularity. The unique laser based solution has the added advantage of having high electrical efficiency reducing the need of costly active cooling.

## TRADITIONAL LED BAR



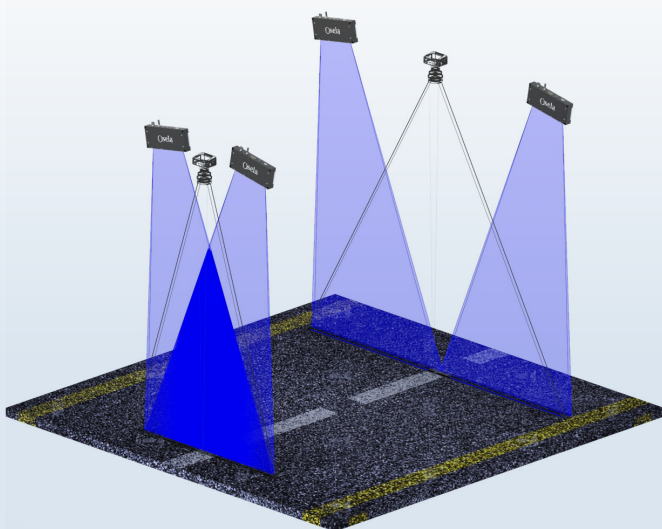
## OSELA LRI



The LONG RANGE ILLMINATOR provides high on target power irrespective of distance

## LRI FLEXIBLE PROJECTION

LRI can be used with different projection orientations: superimposed, stacked or stitched and projected at different angles. Intensity profile can be compensated for image plane uniformity.



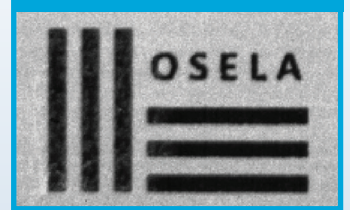
## SUPERIOR IMAGE QUALITY

The LONG RANGE ILLUMINATOR uses a specialized optical technology in order to project laser illumination with a significantly lower speckle noise factor vs common laser projection systems. This results in the ability to capture LED like images and resolve fine features at any working distance. A comparison can be seen below of a standard laser image vs one taken with the LRI.

LASER IMAGE



LRI IMAGE



# HIGH POWER DENSITY AT LONG DISTANCES

For working distances from a few hundred millimeters the Osela's Long Range Illuminator provides high optical power in the region of interest clearly shown in the graphs below. LED based systems optical power drops off drastically with distance while the LRI holds its power irrespective of distance where power density is simply a function of illuminated area. For long range applications there is no better alternative available.

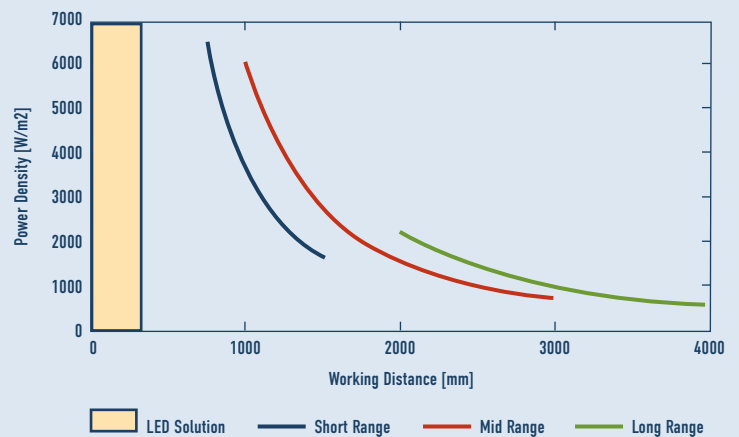
$$\text{Power Density} = \frac{\text{Optical Power}}{\text{Line Length} \times \text{Line Thickness}}$$

## POWER DENSITY AND WORKING RANGE CONFIGURATIONS

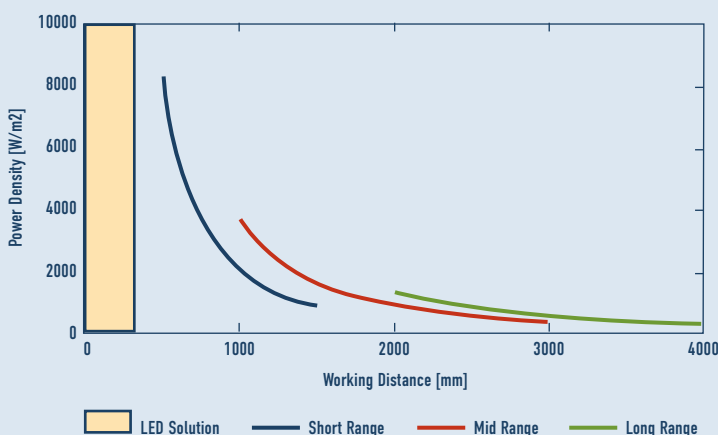
MODELS	WORKING DISTANCE (mm)	WORKING RANGE (mm)	LINE THICKNESS AT WORKING DISTANCE [AT RANGE](MM)
Short Range	1000	500-1500	10 [5-15]
Mid Range	2000	1000-3000	10 [5-15]
Long Range	3000	3000-4000	10 [5-13]

The following graphs show power density [W/m<sup>2</sup>] of the LRI illumination in the working range for the Short, Mid, and Long Range models considering different fan angles of the laser line projection. The yellow shaded regions represent the very limited illumination potential of competing LED based systems.

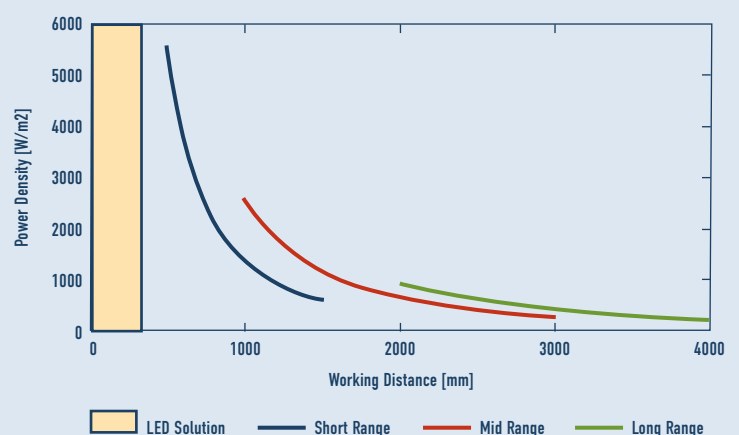
### POWER DENSITY (Fan Angle 30 deg)



### POWER DENSITY (Fan Angle 45 deg)



### POWER DENSITY (Fan Angle 60 deg)



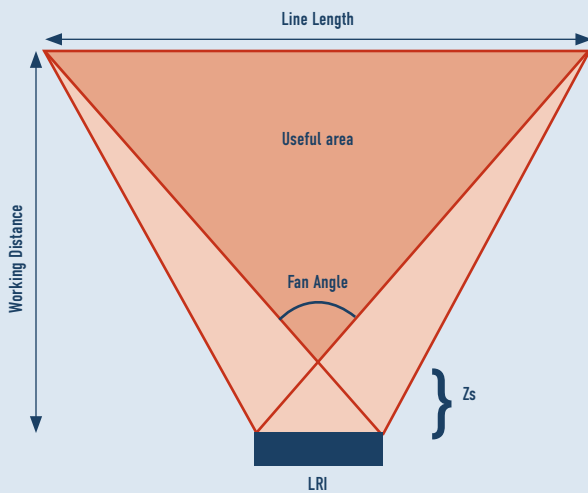
# EFFECTIVE LINE LENGTH AND FAN ANGLE

Osela's Long Range Illuminator has the unique advantage of having a large working range with flexible line lengths. The fan angle projection allows for generating extended illumination areas while maintaining the compact mechanical footprint of the LRI. The Long Range Illuminator can be used at distances starting at the point source (Zs) of the fan angle and onwards as shown in diagram below. The line length can be calculated

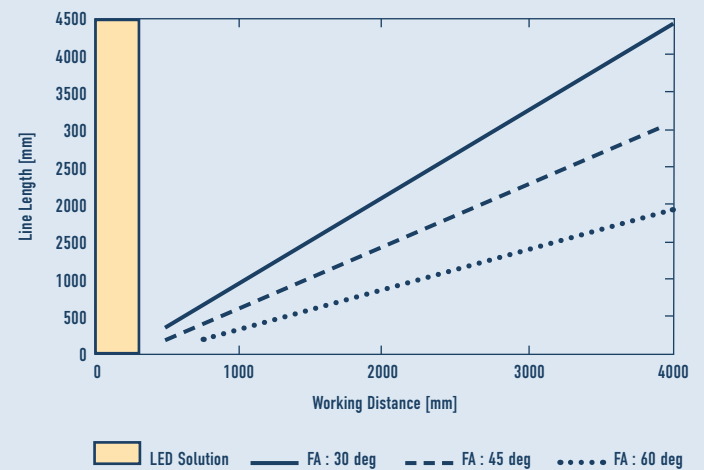
$$LL = 2 * \left( \frac{FA}{2} \right) * (WD - Zs)$$

LL = Effective Line Length  
FA = Fan angle of projection  
WD = Working Distance  
Zs = FA start point

FA [DEG]	Zs [mm]
30	425
45	275
60	197



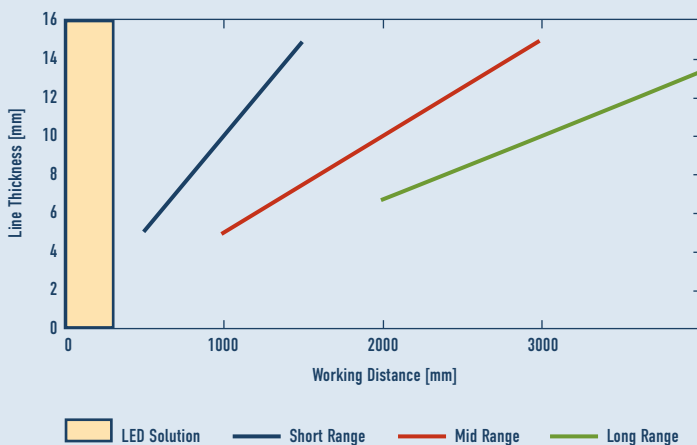
## LINE LENGTH



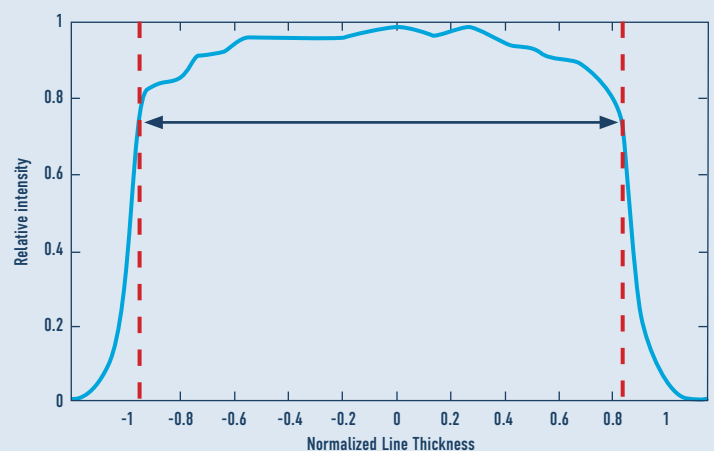
## LINE THICKNESS

Unlike LED Illumination with very narrow working range [yellow shaded area on graph below], the LONG RANGE ILLUMINATOR's line thickness increases minimally over working distance thereby holding its power density over a long range. The power profile along the cross-section is also very uniform allowing for ease in camera alignment.

### LINE THICKNESS



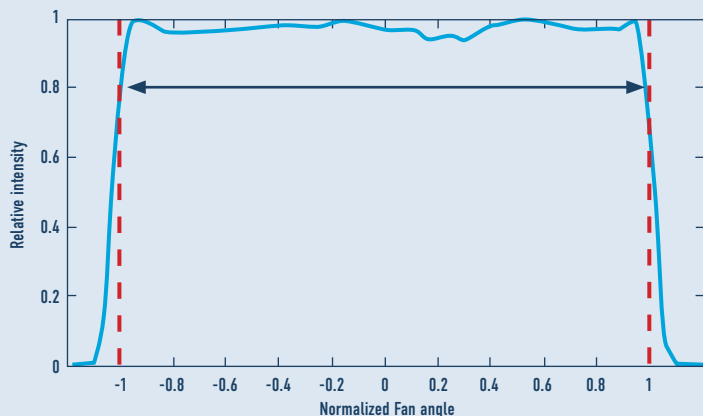
### LINE THICKNESS PROFILE



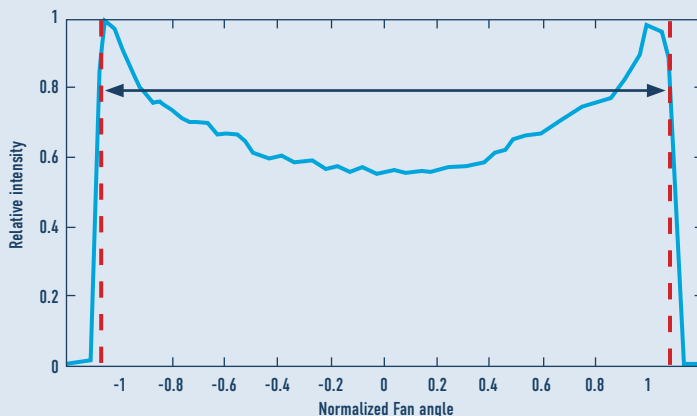
# INTENSITY PROFILE ALONG ILLUMINATION LENGTH

The LONG RANGE ILLUMINATOR unique optical system provides high intensity uniformity across the length. The intensity uniformity profile can be custom shaped to customers request (i.e. Cosine Corrected, Power Sloped), ask your sales representative for more information.

## STANDARD INTENSITY LINE LENGTH PROFILE



## OPTION COSINE CORRECTED



## SPECIFICATIONS

	UNIT	PARAMETER			
WAVELENGTH	nm	450	520	640	810
TOTAL OUTPUT POWER	W	20	7	4	15
OPERATING CURRENT	A	19	8.5	4.5	18
DISSIPATION HEAT LOAD	W	98	48	18.5	75
OPERATING VOLTAGE	V	6.5 ± 0.5	6.5 ± 0.5	5 ± 0.5	5 ± 0.5

NOTE: 375 nm , 405 nm wavelength options also available. CALL for details

## OTHER SPECIFICATIONS

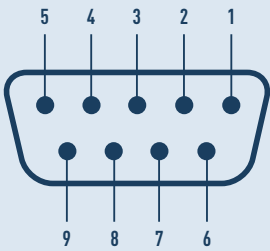
MODEL TYPE	SHORT RANGE (SR)	MID RANGE (MR)	LONG RANGE (LR)
OPTIMIZED WORKING DISTANCE(MM)	1000	2000	3000
WORKING RANGE (MM)	500-1500	1000-3000	2000-4000
LINE THICKNESS (75% INTENISTY CLIP) (MM)	SEE GRAPH (PAGE 8)		
LINE UNIFORMITY	< 20%		
MODULATION INPUT ( V), ENABLE HIGH	0 to 5		
MODULATION RISE/FALL TIME (USEC)	< 10		
BASE PLATE TEMPERATURE (DEG C)	0 to 50		
STORAGE TEMPERATURE (DEG C)	-40 to 80		

# INTERFACING WITH LASER

The LRI comes standard with RS485 Digital Communication capabilities. It allows users to retrieve key information such as real time health monitoring, current, output power and temperatures. Users can also set output power, modulation logic, dimmer curve and temperature cutoff.

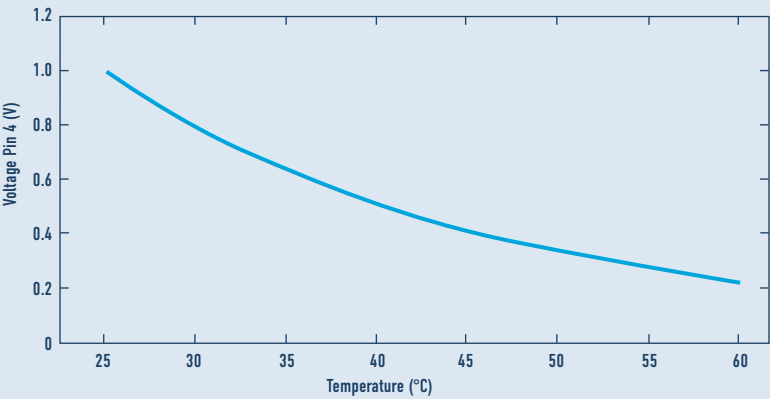
PIN		DESCRIPTION
NAME	NO	
NC	1	
B	2	RS485 Communication line (B line)
A	3	RS485 Communication line (A line)
VTMOD	4	Voltage monitoring of temperature inside the module (see table below)
ND	5	Device ground
MOD	6	TTL Modulation (0V laser ON, 5V laser OFF)
RIND	7	Red LED indicator
DIM	8	0 to 5V Dimmer
YIND	9	Yellow LED indicator

## DB9 PIN OUT



# TEMPERATURE READ OUT

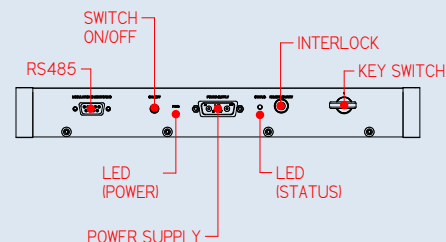
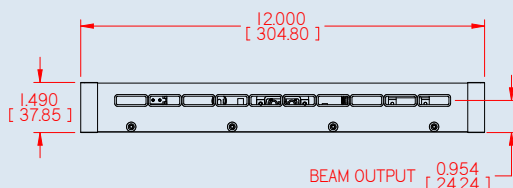
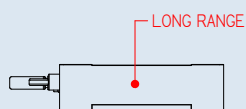
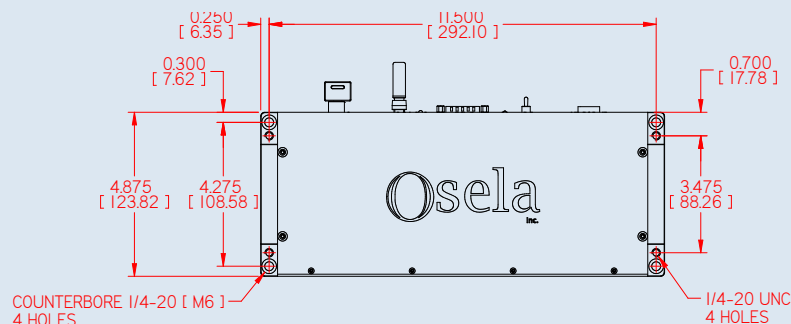
## ANALOG TEMPERATURE READ OUT



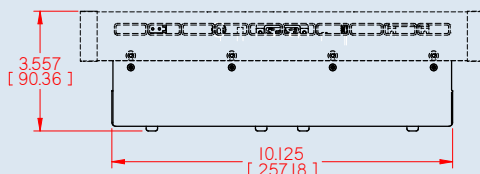
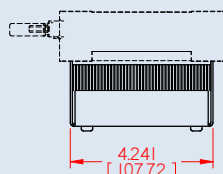
# POWER SUPPLY (OPTIONAL)

PART NUMBER DESCRIPTION	FOR WAVELENGTH MODEL	DESCRIPTION
LRI-AC-5V-30A	640 and 810nm in AC operation	DIN RAIL AC-DC 80-240V, Output 5V 200W 30A, DIM:234.8x124.5x34.8 mm
LRI-AC-6.5V-30A	450 and 520nm in AC operation	DIN RAIL AC-DC 80-240V, Output 6.5V 200W 30A, DIM:234.8x124.5x34.8 mm
LRI-DC-9/40V-20A	For all models in DC operation	DIN RAIL DC-DC 9-40V Input, 3.3 to 15V Output 20A, 250W, DIM:124.4x116x36.5 mm

# MECHANICAL SPECIFICATIONS



## HEATSINK-FAN OPTION



## OTHER HEAT SINK OPTIONS

- TEC-thermally electrically cooled
- WC-water cooled with chiller

CALL FOR ADVANCED HEAT SINKING OPTIONS  
OR GO TO [OSELA.COM/LRI/HEATSINK](http://OSELA.COM/LRI/HEATSINK)

## ORDERING CODE

LRI	Wavelength-Power*	Fan Angle	Working Distance	Heat Sink
	450-20	30	1000	FAN
	520-7	45	2000	TEC
	640-4	60	3000	WC
	810-15			NHS (No Heat Sink)

EX: LRI-450-20-30-1000-FAN

Long Range Illuminator, 450 nm wavelength, 20 Watt power, 30 degree fan angle  
1000 mm working distance with Fan option

\*NOTE: 375 nm , 405 nm, 660, 690, 780, 830, 850, 980 and other wavelength options also available. CALL for details