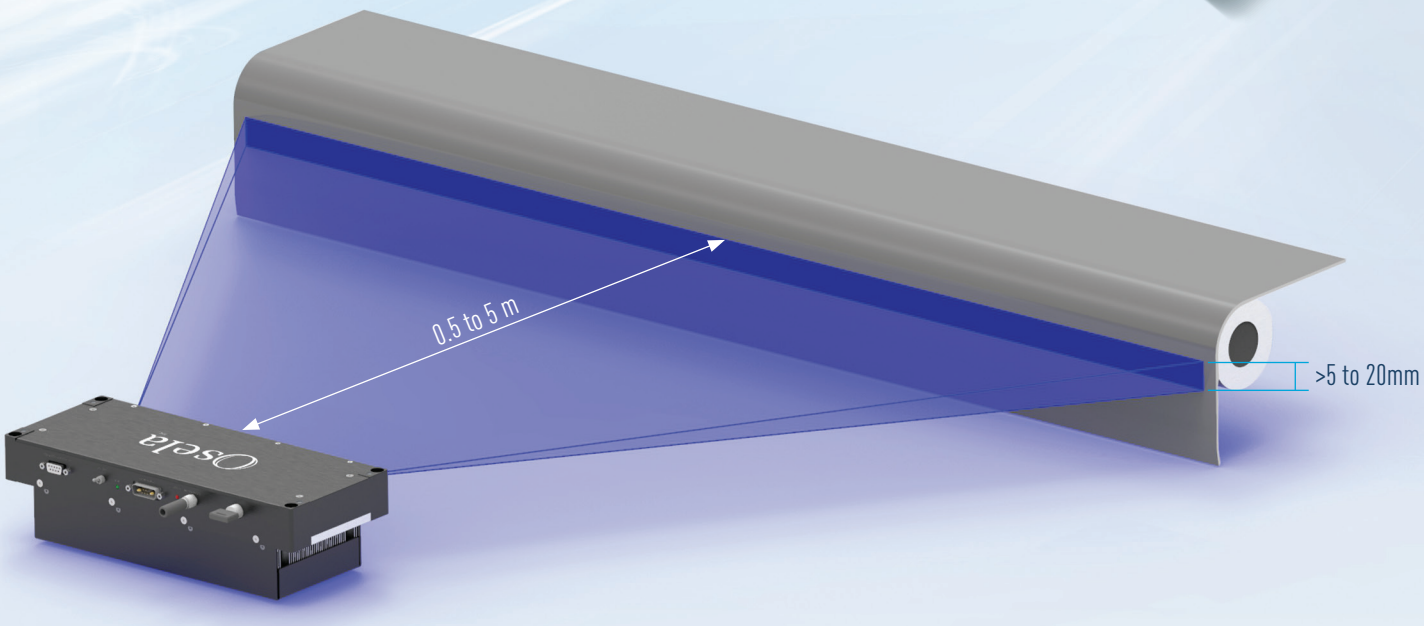
Osela Inc.

STRUCTURED LIGHT AND
LASER BEAM SHAPING SOLUTIONS

LONG RANGE ILLUMINATOR

DEDICATED LINE SCAN CAMERA ILLUMINATION

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



FEATURES

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

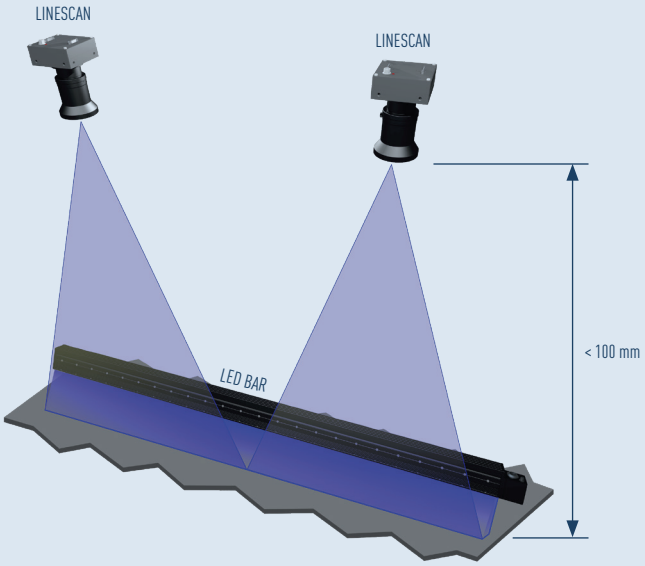
APPLICATIONS

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

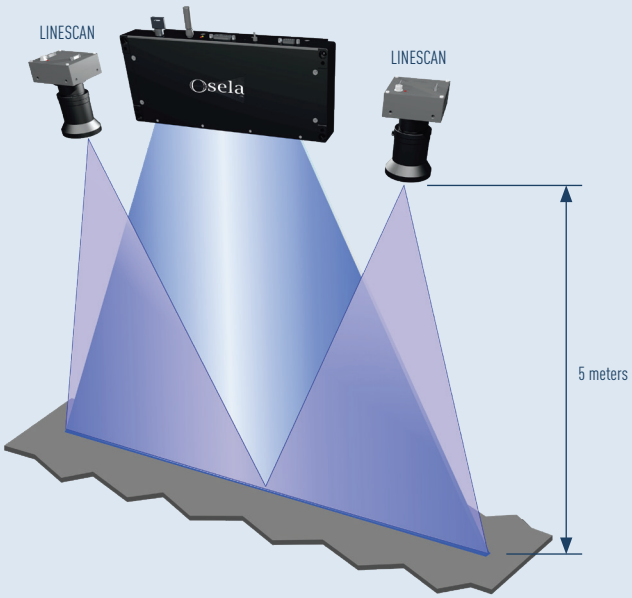
WHAT IS THE LONG RANGE ILLUMINATOR?

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 of active cooling.

TRADITIONAL LED BAR



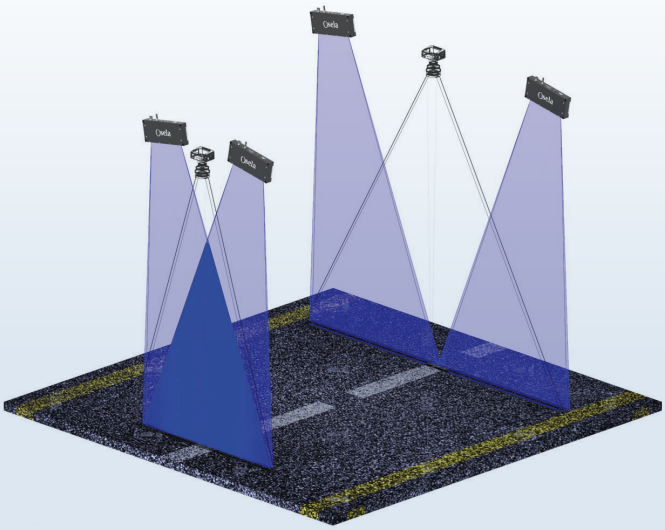
OSELA LRI



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

LRI FLEXIBLE PROJECTION

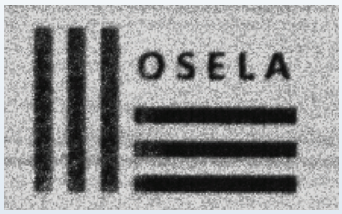
LRI can be used with different projection orientations: superimposed, stacked or stitched and projected at different angles. Intensity profile can be compensated for image plane uniformity.



SUPERIOR IMAGE QUALITY

The LONG RANGE ILLUMINATOR image quality shows very low speckling enabling the user to resolve the fine features required for the most demanding machine vision applications.

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 graph 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.

$$\text{power density} = \frac{\text{optical power}}{\text{(line length x line thickness)}}$$

3 line thickness and working range configs:

1. Line thickness of 10mm at 1000mm

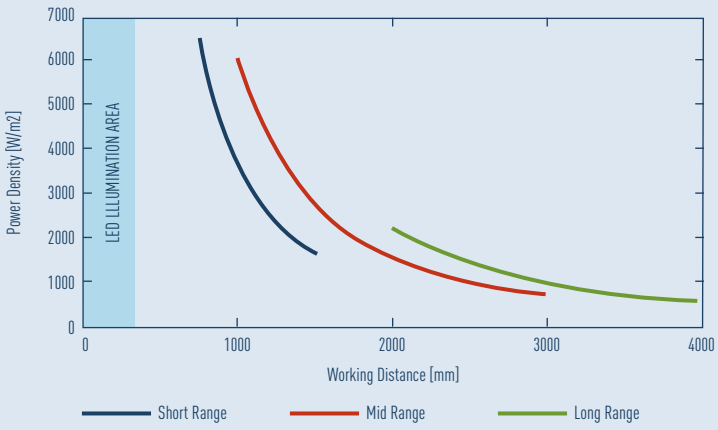
MODELS	WORKNG DISTANCE (mm)	WORKING RANGE (mm)
Short Range	1000	500-1500
Mid Range	2000	1000-3000
Long Range	3000	3000-4000

NOTE: For 30 deg Fan angle working range starts at 750 mm

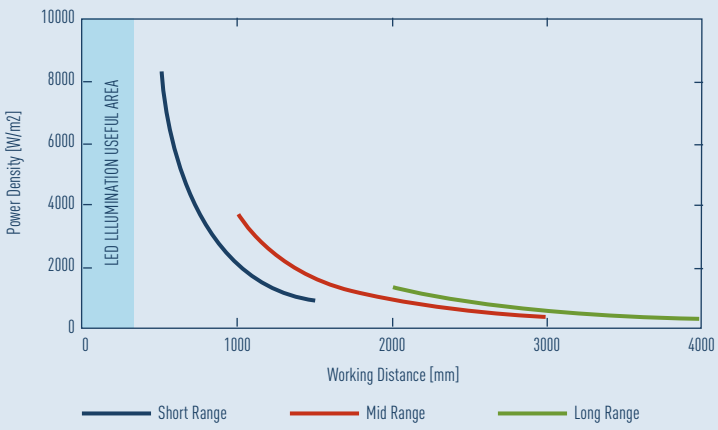
2. Line thickness of 10mm at 2000mm
   Working Range from 1000mm to 3000mm
   Perfect overlap at 3000mm

3. Line thickness of 10mm at 3000mm
   Working Range from 2000mm to 4000mm
   Perfect overlap at 4000mm

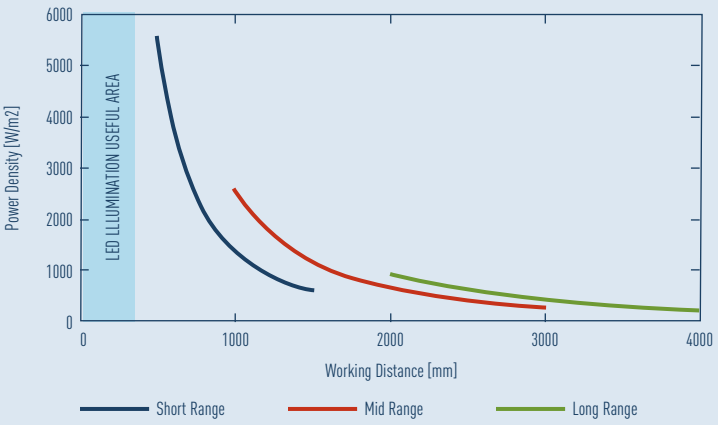
POWER DENSITY (Fan Angle 30 deg)



POWER DENSITY (Fan Angle 45 deg)



POWER DENSITY (Fan Angle 60 deg)



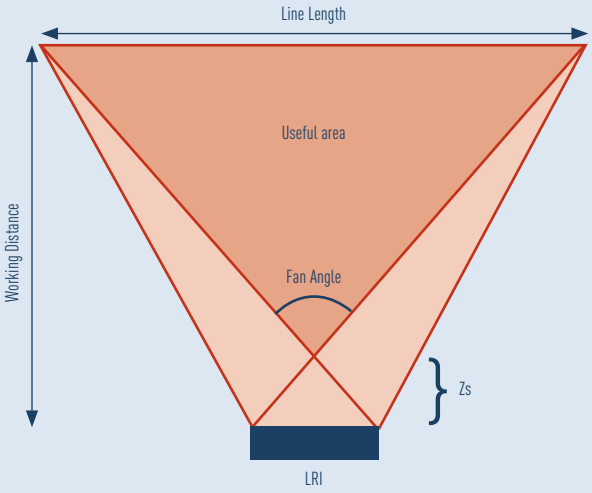
EFFECTIVE LINE LENGTH AND FAN ANGLE

Osela's Long Range Illuminator has the unique advantage of having a large working range with flexible line lengths. The 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 from the following formula:

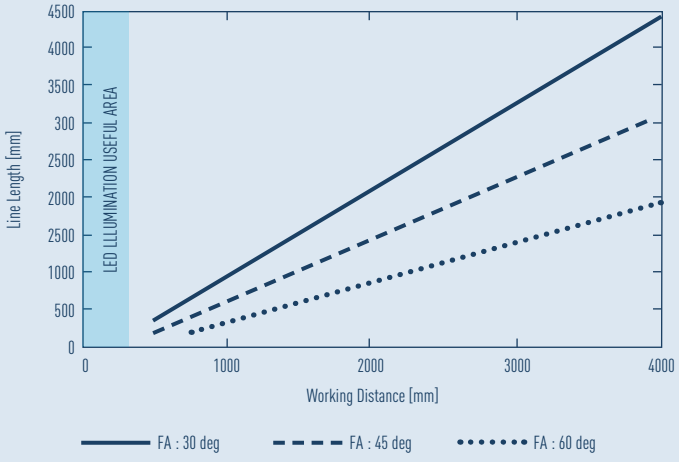
$$LL = 2 * \tan\left(\frac{FA}{2}\right) * (WD - Zs)$$

Where LL defines the line length, FA defines the fan angle, WD defines the working distance and Zs is the distance from the LRI to the beginning of the useful area.

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



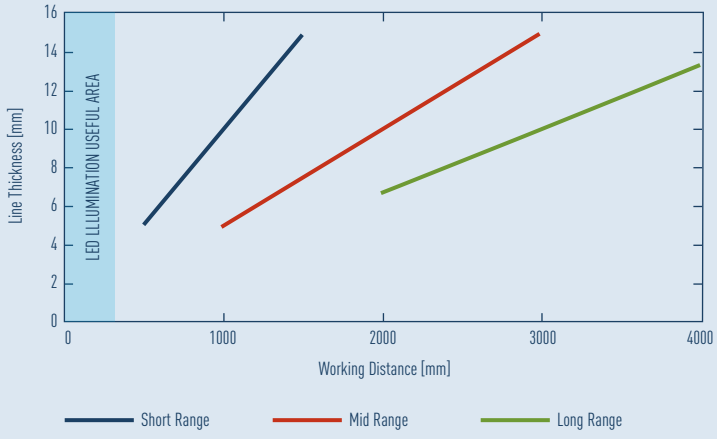
LINE LENGTH



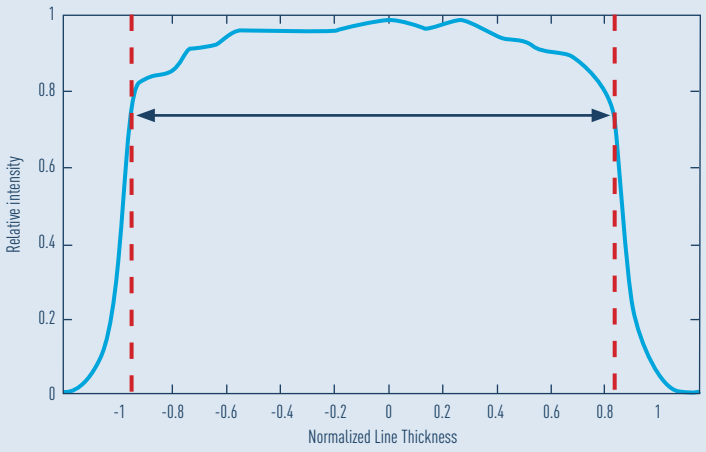
LINE THICKNESS

Unlike LED Illumination with very narrow woriking range, the LONG RANGE ILLUMINATOR line thickness increases slowly over working distance thereby holding its power density over a long range. Its cross-section is also very uniform allowing for ease in camera alignment.

LINE THICKNESS



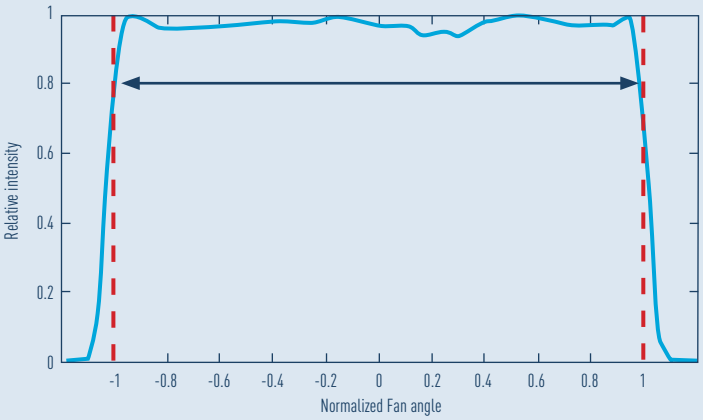
LINE THICKNESS PROFILE



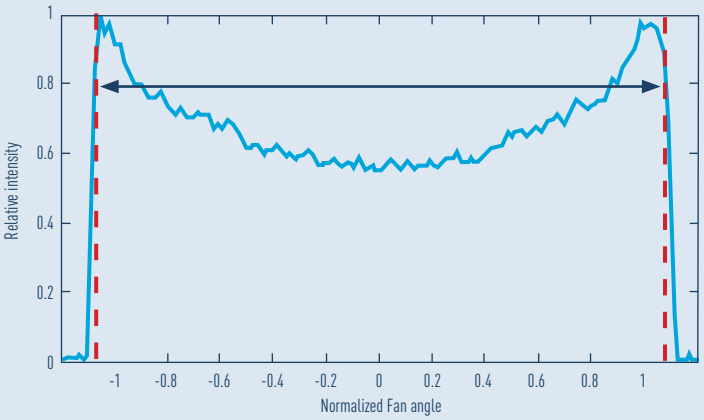
INTENSITY PROFILE ALONG ILLUMINATION LENGTH

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 LENGHT PROFILE



STANDARD UNIFORM, OPTION COSINE CORRECTED



SPECIFICATIONS

	UNIT				
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 6.5 7	6 6.5 7	4.5 5 5.5	4.5 5 5.5

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 (PAGE3)		
LINE UNIFORMITY (%) (IMAX-IMIN)/ (IMAX+ MIN)	< 20%		
PITCH			
ROLL			
MODULATION INPUT (V), ENABLE HIGH	0 to 5		
MODULATION RISE/FALL TIME (USEC)	< 10		
OUTPUT POWER STABILITY			
BASE PLATE TEMPERATURE (DEG C)	0 to 50		
STORAGE TEMPERATURE (DEG C)	-40 to 80		

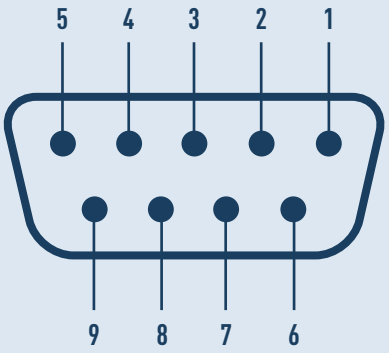
INTERFACING WITH LASER

The Line Scan Laser 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 an temperature cutoff.

PIN NAME	PIN NO	DESCRIPTION
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

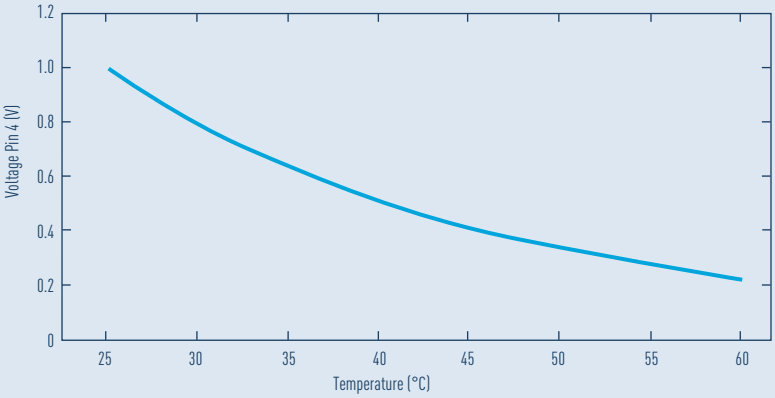
DB9 PIN OUT



Voltage on pin 4 VS module temperature

TEMPEARATURE READ OUT

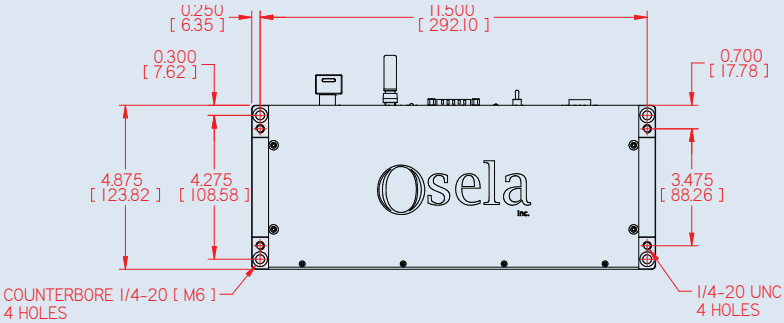
LRI TEMPERATURE READ OUT

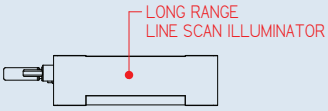


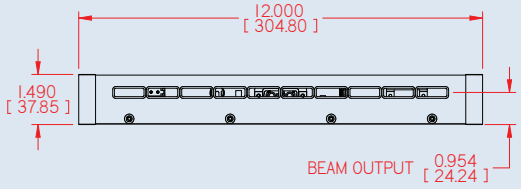
POWER SUPPLY

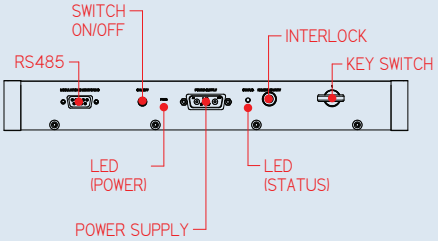
PART NUMBER	DESCRIPTION
LRI-AC-5V-30A	DIN RAIL AC-DC 80-240V, Output 5V 200W 30A, DIM:234.8x124.5x34.8 mm
LRI-AC-6.5V-30A	DIN RAIL AC-DC 80-240V, Output 6.5V 200W 30A, DIM:234.8x124.5x34.8 mm
LRI-AC-6.5V-60A	DIN RAIL AC-DC 80-240V, Output 6.5V 200W 60A, DIM:234.8x124.5x34.8 mm
LRI-DC-9/40V-20A	DIN RAIL DC-DC 9-40V Input, 3.3 to 15V Output 20A, 250W, DIM:124.4x116x36.5 mm

MECHANICAL SPECIFICATIONS

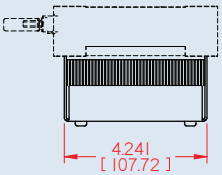


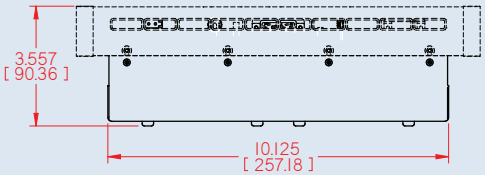






HEATSINK-FAN OPTION





OTHER HEAT SINK OPTIONS

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

CALL FOR ADVANCED HEAT SINKING OPTIONS

ORDERING CODE

LRI	–	Wavlength-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 wavlength, 20 Watt power, 30 degree fan angle
1000 mm working distance with Fan option

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

19-02-2021