smart vision lights

LE Everything Light LINEAR LIGHT
MULTI-DRIVE™

PRODUCT DATA SHEET

multi drive™

Warranty	Compliant	Compliant	Rated	Connector
10 YEAR	IEC 62471	CE RoHS	IP 40	5-PIN M12

PRODUCT HIGHLIGHTS

- ✓ Bright linear light, delivering up to 100,000 lux in OverDrive™ mode
- ✓ Direct connect up to six lights in a line without loss of uniformity for a fraction of the cost of monolithic designs
- ✓ Built-in Multi-Drive™ allows the light to work in continuous operation or OverDrive™ mode
- ✓ PNP and NPN strobe input
- ✓ 5-pin M12 quick connect

PRODUCT DESCRIPTION

The Multi-Drive controller combines the Constant ON operation and the high pulse operation into one easy to use product. The Multi-Drive controller allows the user to run the product in Constant ON operation or pulse/strobe the light at the maximum allowed intensity by the LED manufacturer by simply setting the product parameters. The built-in Multi-Driver also protects the LEDs from premature degradation and failure caused by excessive heat by regulating the current delivered to the LEDs and limiting the duty cycle of the light. NPN or PNP signal input options, a 0-10V analog intensity control, and an industry standard M12 power cable allow for versatility and eases installation time.

PRODUCT SPECIFICATIONS

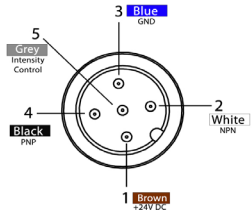
	CONTINUOUS OPERATION	OVERDRIVE™ STROBE MODE
Electrical Input	24VDC +/- 5%	
Input Current	Max. 850 mA	Max. 4.7 A
Wattage	Max. 20 W	Max. 110 W (During Strobe)
PNP Line	4 mA @ 4VDC | 10 mA @ 12VDC | 20 mA @24VDC	
NPN Line	15 mA @ Common (0VDC)	
OverDrive™ Strobe Mode	**Not applicable**	Connect pin 5 to GND (see Wiring Configuration for more information)
Strobe Duration	**Not applicable**	Min. 10 µs | Max. 50 ms
Duty Cycle	**Not applicable**	Max. 10%
Strobe Input	**Not applicable**	PNP: +4VDC or greater to activate NPN: GND (<1VDC) to activate
Continuous Operation Mode	NPN can be tied to ground **OR** PNP can be tied to 24VDC (not both)	**Not applicable**
On/Off Input	PNP: +4VDC or greater to activate NPN: GND (<1VDC) to activate	**Not applicable**
Connection	5-pin M12 connector	
Ambient Temperature	-10° to 40 ° C (14 ° to 104 ° F) | RH max 80% non-condensing humidity	
IP Rating	IP40	
Weight	~660 g	
Power Supply	A separate power supply for OverDrive™ mode (high-pulse operation) is recommended. *(See Input Current for value)*	
Compliances	CE, RoHS, IEC 62471	

RESOURCE CORNER

Additional resources are available on our website, including CAD files, videos, and application examples.

WIRING CONFIGURATION

CONTINUOUS OPERATION MODE



Pin layout for light (male connector)

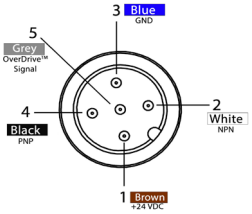
Pins	Function	Signal	Wire Color
1	Power In	+24VDC	BROWN
2	NPN	Sinking Signal	WHITE
3	GND	Ground	BLUE
4	PNP	Sourcing Signal	BLACK
5	Intensity Control	1–10VDC	GREY*

For the light to function properly, apply either a PNP or NPN signal, not both.

Failure to supply light with correct input current will result in non-repeatable lighting
(see Product Specifications for requirements)

** Some cables use green/yellow for pin 5*
For maximum intensity, it is possible to tie pin 5 to pin 1 at +24VDC.
*For continuous mode: PNP (pin 4) can be tied to +24VDC (pin 1) **or** NPN (pin 2) can be tied to Ground (pin 3).*

OVERDRIVE™ OPERATION MODE



Pin layout for light (male connector)

Pins	Function	Signal	Wire Color
1	Power In	+24VDC	BROWN
2	NPN	Sinking Signal	WHITE
3	GND	Ground	BLUE
4	PNP	Sourcing Signal	BLACK
5	OverDrive™ Signal	Ground	GREY*

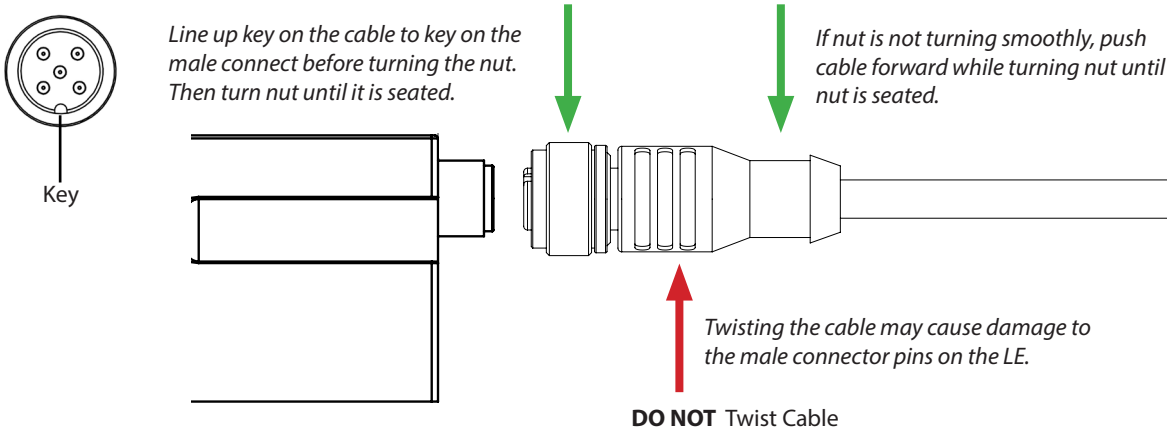
Failure to supply light with correct input current will result in non-repeatable lighting
(see Product Specifications for requirements)

** Some cables use green/yellow for pin 5*

CONNECTING A 5-PIN M12 CABLE

WARNING:

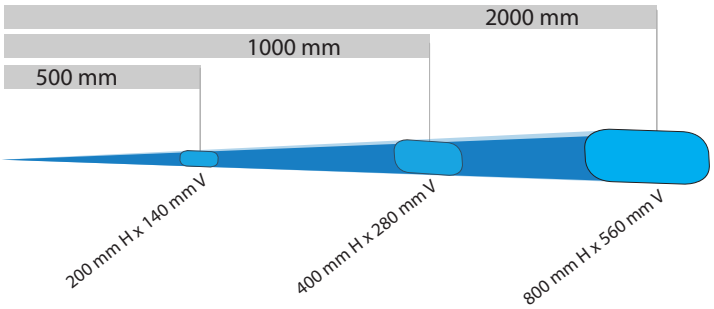
When connecting a 5-pin M12 cable to the male connector on the LE, do not twist the cable. Tighten the nut only. Twisting the cable may result in damage to the pins.



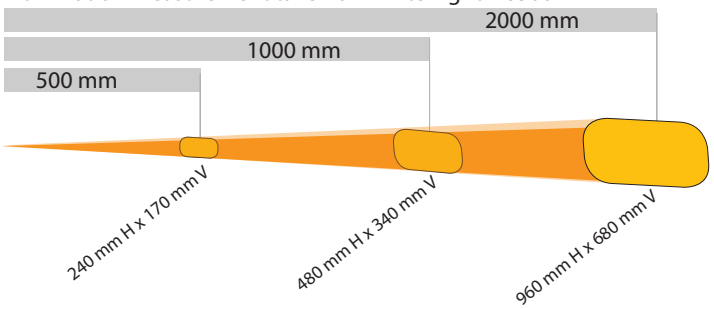
LIGHT PATTERNS

Smart Vision Lights recommends the LE be used at a working distance between 300 mm to 4000 mm.

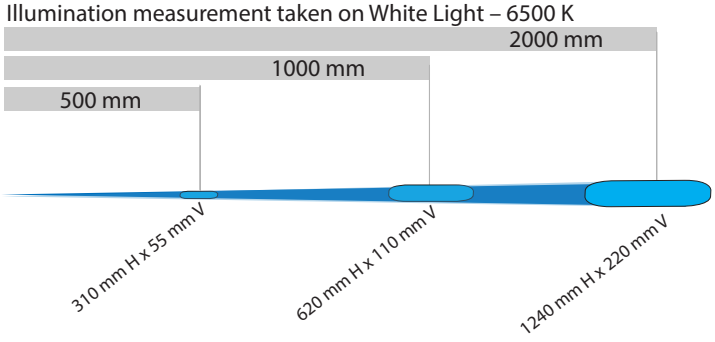
Illumination measurement taken on White Light – 6500 K



Illumination measurement taken on White Light – 6500 K



Illumination measurement taken on White Light – 6500 K



LIGHTING PATTERN FOR THE LE **with Narrow (Standard) Lenses**

Working Distance mm (inches)	Pattern (80% – 100% Measured Intensity) mm (inches)
500 mm (19.7")	200 mm (~7.8") H x 140 mm (~5.5") V
1000 mm (39.4")	400 mm (~15.7") H x 280 mm (~11") V
2000 mm (78.8")	800 mm (~31.5") H x 560 mm (~22") V

Operation	Typical Output Performance	Illumination (Lux)
Continuous Mode	Distance = 500 mm	20,000
OverDrive™ Mode	Distance = 500 mm	100,000
Illumination measurement taken on White Lights – 6500K		

LIGHTING PATTERN FOR THE LE **with Wide (W) Lenses**

Working Distance mm (inches)	Pattern (80% – 100% Measured Intensity) mm (inches)
500 mm (19.7")	240 mm (~9.4") H x 170 mm (~6.7") V
1000 mm (39.4")	480 mm (~18.9") H x 340 mm (~13.4") V
2000 mm (78.8")	960 mm (~37.8") H x 680 mm (~26.7") V

Operation	Typical Output Performance	Illumination (Lux)
Continuous Mode	Distance = 500 mm	8600
OverDrive™ Mode	Distance = 500 mm	43,000
Illumination measurement taken on White Lights – 6500K		

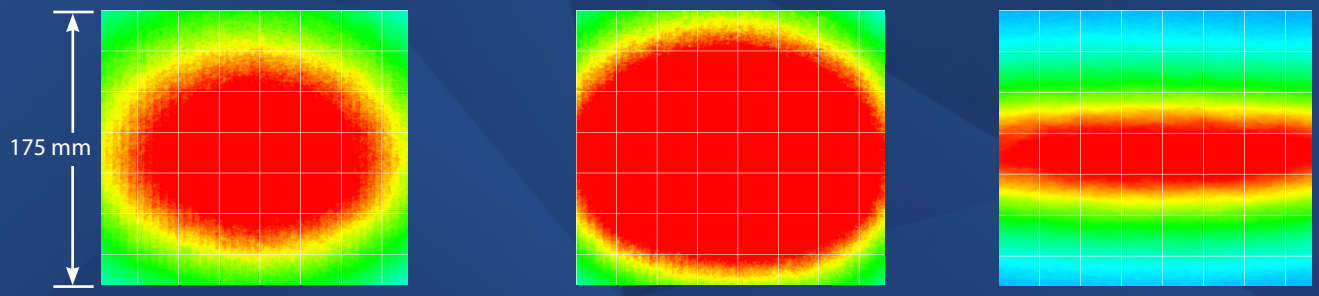
LIGHTING PATTERN FOR THE LE **with Line (L) Lenses**

Working Distance mm (inches)	Pattern (80% – 100% Measured Intensity) mm (inches)
500 mm (19.7")	310 mm (~12.2") H x 55 mm (~2.1") V
1000 mm (39.4")	620 mm (~24.4") H x 110 mm (~4.3") V
2000 mm (78.8")	1240 mm (~48.8") H x 220 mm (~8.7") V

Operation	Typical Output Performance	Illumination (Lux)
Continuous Mode	Distance = 500 mm	18,000
OverDrive™ Mode	Distance = 500 mm	90,000
Illumination measurement taken on White Lights – 6500K		

The LE Linear Light produces a uniform light pattern.

Working Distance = 500 mm (Grid set to 25 mm x 25 mm)



Narrow Wide Line

MULTI-DRIVE™

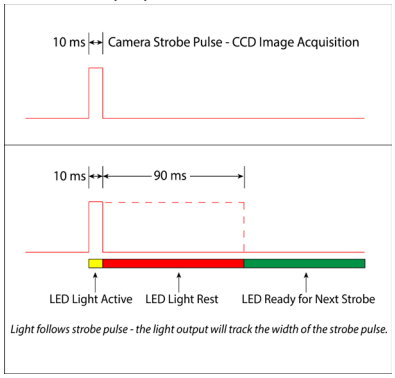
Multi-Drive™ allowing users to operate the light in continuous operation or OverDrive™ strobe (high-pulse operation) mode. An advantage of Multi-Drive™ is faster imaging. It also enchances capture/freeze motion imaging on high-speed lines.

The Multi-Drive™ feature allows the user to run the light in continuous operation or OverDrive™ strobe mode at maximum intensity. OverDrive™ strobe mode is **up to five times** the power of continuous operation.

DUTY CYCLE (OVERDRIVE™ MODE ONLY)

This section applies only if light is in OverDrive™ Mode.

The Duty Cycle (D) is related to the Strobe Time (ST) and Rest Time (RT).



Calculating Rest Time

$$RT = \frac{ST}{D} - ST$$

RT = Rest Time
ST = Strobe Time
D = Duty Cycle

Example

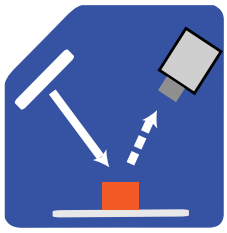
$$RT = \frac{10\ ms}{.1} - 10\ ms = 90\ ms$$

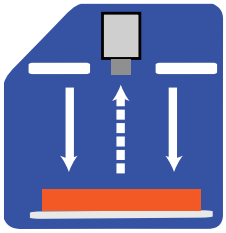
Rest Time is 90 ms for 10 ms Strobe Time

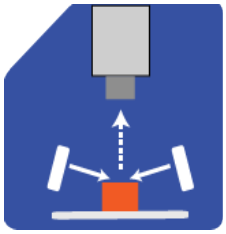
Maximum Duty Cycle for OverDrive™ light is 10% (0.1)

ILLUMINATION

LE Series of Linear Lights works best for:


Bright Field


Direct Lighting


Dark Field

EYE SAFETY

According to IEC 62471:2006. Full documentation available upon request.

Notice

Exempt Group: No photobiological hazard to eyes or skin even for continuous, unrestricted use. Applicable for wavelengths: 625, 850, 940, 1050, 1200, 1300, 1450, 1550, and 1650.

Caution

Risk Group 1: Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to eyes. Safe for most applications except prolonged exposure. Applicable for wavelengths: 470, 505, 530, and WHI.

PART NUMBER

LE – □□□x□□□ – □□□ – □□□

SIZE:
300mm
600mm
900mm
1200mm

COLOR:
WHI, 365 395, 470, 505, 530, 625, 850 940

LENS:
Leave blank for standard (narrow)
W25 = Wide
L10 = Line

Additional wavelengths and lens options available upon request.
UV wavelengths are not available.

Part Number Examples:

LE-625 LE, 625 Red Wavelength, Standard (Narrow) Lenses
LE-WHI-W25 LE, White, Wide Lenses
LE-470-W25-LPI LE, 470 Blue Wavelength, Wide Lenses, Linear Polarizer Installed

STANDARD LENS OPTICS

NARROW
Narrow lenses are standard.
Standard lenses create a narrow beam of illumination. They can be used when long working distances are needed. Narrow are 10° angle cone lenses.

WIDE
Wide lenses create a large area of illumination. Wide lenses can be used when short working distances are needed. Wide are 25° angle cone lenses.

** Additional lens options available upon request.*

When to Use a Linear Polarizers?

Polarizing filters can reduce reflections on specular surfaces.

A Linear Polarizer has a typical transmission of 38% while blocking 62% of the light not in the polarization plane.

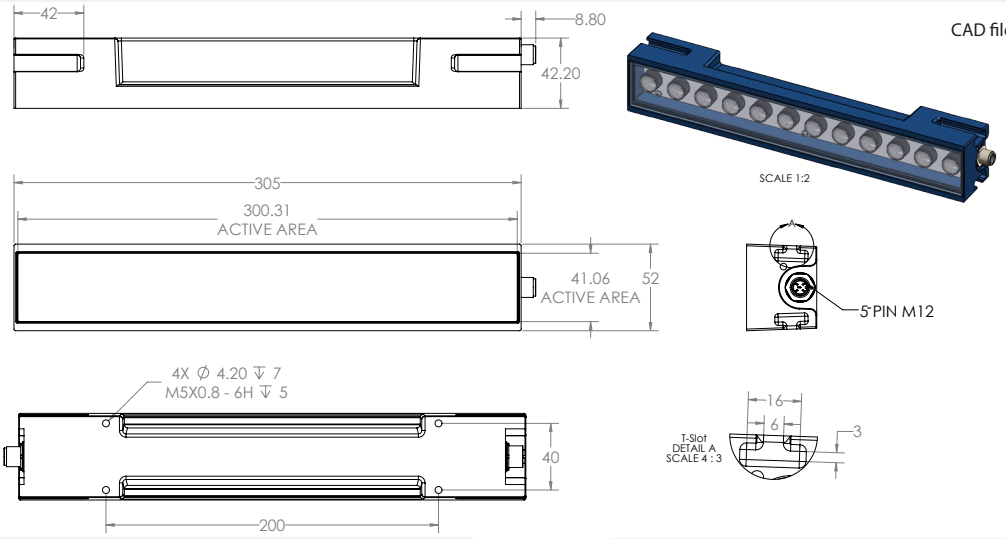
WARNING: Running a light in continuous operation while using a polarizer with certain wavelengths (ex. white, blue) may result in burning of the polarizer.

MOUNTING

One rail is located along the bottom of the LE light.

Four M5 screws included with light.

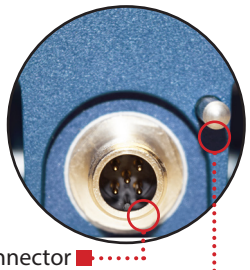
PRODUCT DRAWING



CAD files available on our website.
Dimensions are in mm.

DIRECT CONNECT

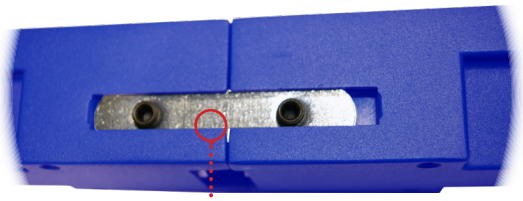
The LE allows for connecting lights together with no additional cables. Lights are directly connected together, with no space between the lights. Up to six LE lights can be directly connected together.



5-Pin M12 Connector
(Male)

Alignment Pin

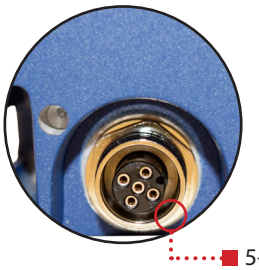
The part number **LXJ-2DTN** is required to directly connect two or more LE together.



Part Number: LXJ-2DTN

DAISY-CHAIN

Daisy-chain allows for a locking 5PM-12 jumper cable to be used when connecting LE lights together. Lights are able to be spaced apart from each other. Up to six LE lights can be daisy-chained together.



5-Pin M12 Connector
(Female)

LE can be daisy-chained together using a locking jumper cable.

ACCESSORIES

Power Cables

Lengths	Part Number
5 m	5PM12-5
10 m	5PM12-10
15 m	5PM12-15

Connector (Only for Direct Connect)

Description	Part Number
Set of 2 Connectors	LXJ-2DTN

Jumper Cables (Only for Daisy Chaining)

Lengths	Part Number
300 mm	5PM12-J300-LXE
1000 mm	5PM12-J1000-LXE

Mount

Description	Part Number
3-Axis Pan and Tilt Mount	PB300-M5

Power Adapters *

Description	Part Number
AC, 24 Volt, 1.7 Amp	T1 Power Supply
24 V DC, 9 Amp / AC input	T2 Power Supply

* **European Versions Available** (Add -EURO to end of T1 or T2. Example T1-EURO Power Supply)

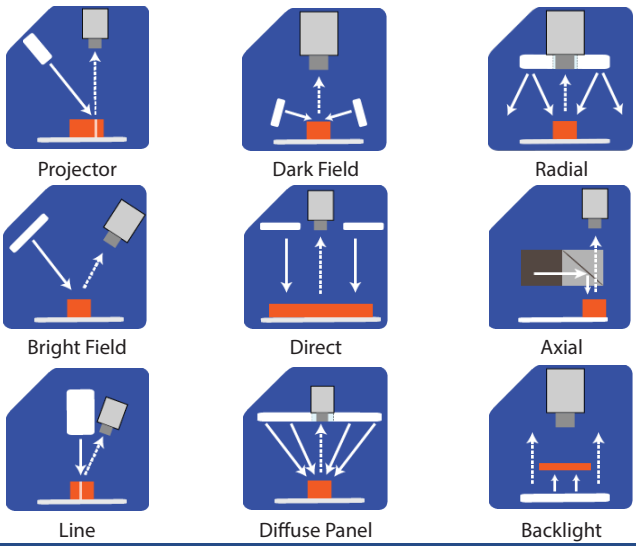
GLOSSARY

This glossary covers all Smart Vision Lights product families; some content in this section may not apply to this specific light.

TERMINOLOGY

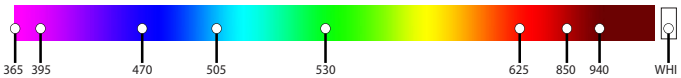
OverDrive™ Lights include an integrated high-pulse driver for complete LED light control.
Continuous Operation Lights stay on continuously.
Multi-Drive™ Combines continuous operation and OverDrive™ strobe (high-pulse operation) mode into one easy-to-use light.
Built-in Driver The built-in driver allows full function without the need of an external controller.
Camera to Light Connecting the light directly to the camera, without the need for additional controllers or equipment.
Polarizers Filters that reduce reflections on specular surfaces.
Diffusers Used to widen the angle of light emission, reduce reflections, and increase uniformity.

TYPES OF ILLUMINATIONS



COMMON COLOR/WAVELENGTHS LEGEND

Wavelengths options range from 365 nm to 1550 nm.*
Additional wavelengths available for many light families.



*See Part Number section for ***this light's*** available standard wavelengths.

SWIR SHORT WAVE **INFRARED**

Short Wave Infrared LEDs are available in 1050 nm, 1200 nm, 1300 nm, 1450 nm, and 1550 nm.