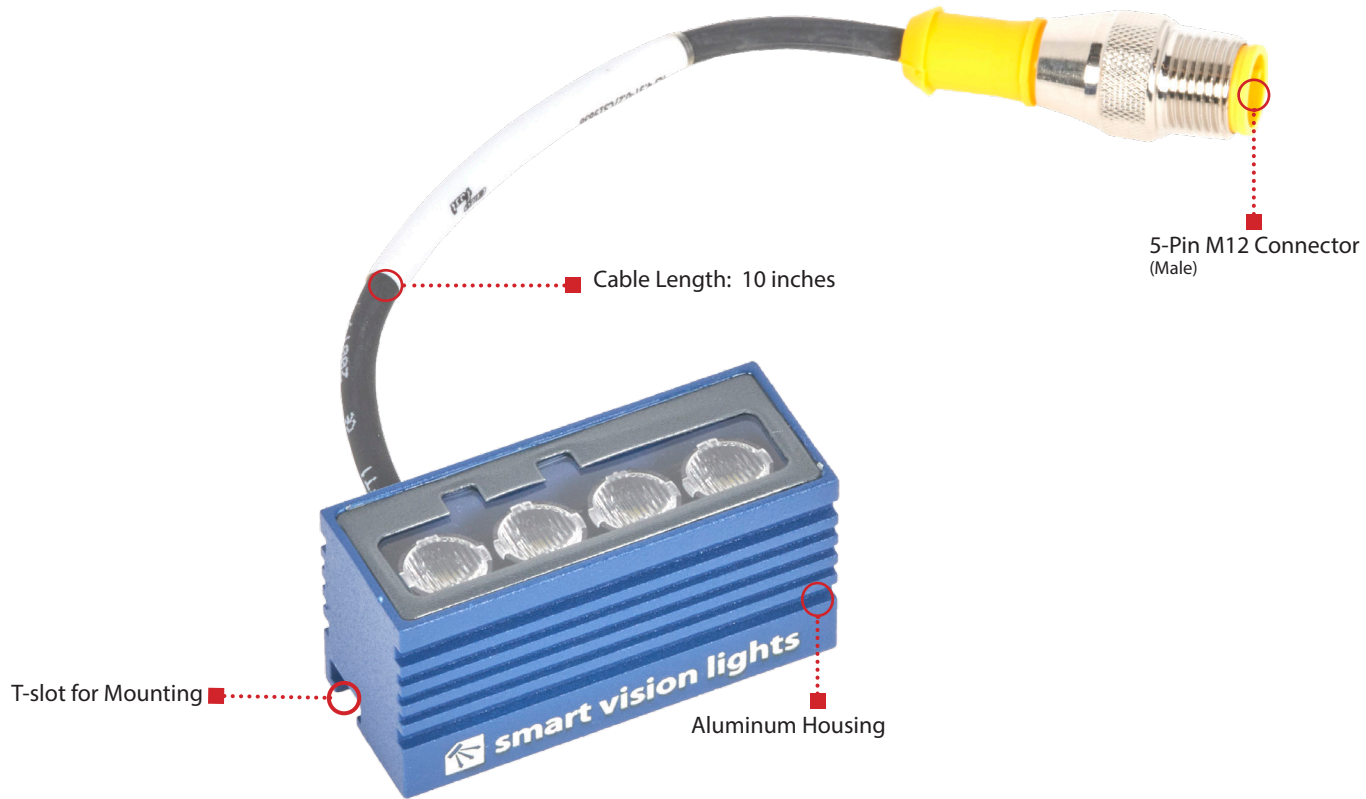


# LM45 Mini Linear Light MULTI-DRIVE™



The LM45 compact linear light features an integrated Multi-Drive™ constant current driver that operates continuously or in OverDrive™ strobe mode depending on wiring method. The light can be mounted via a rear T-slot channel, also offers overcurrent protection and PNP and NPN strobe input.

## PRODUCT HIGHLIGHTS

Warranty <b>10 YEAR</b>	Tested <b>IEC 62471</b>	Compliant <b>CE ROHS</b>	Rated <b>IP 65</b>	Connector <b>5-PIN M12</b>
--------------------------------	--------------------------------	---------------------------------	---------------------------	-----------------------------------

- ✓ Delivering up to 44,000 lux in OverDrive™ mode with standard lenses
- ✓ Built-in Multi-Drive™ allows the light to work in continuous operation or OverDrive™ mode
- ✓ PNP and NPN strobe input
- ✓ SafeStrobe™ technology ensures protected operation of LEDs
- ✓ 5-pin M12 quick connect



## SPECIFICATIONS

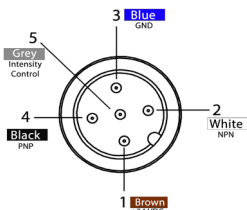
	Continuous Operation	OverDrive Operation
Electrical Input	24 VDC +/- 5%	
Input Current	Max. 140 mA	Peak 1.26 A
Input Power	Max. 3.36 W	Peak 30.24 W
PNP Trigger	2.8 mA @ 4 VDC   8.8 mA @ 12 VDC   17.6 mA @ 24VDC	
NPN Trigger	14.4 mA @ Common (0VDC)	
Trigger Input	PNP > +4 VDC (24 VDC max.) to activate <b>or</b> NPN > GND (<1VDC) to activate ( <b>not both</b> )	
Mode Control	Connect pin 5 to 1-10 VDC (10 - 100% output); 24 VDC (Max)	Connect pin 5 to GND (See wiring configuration for more information)
Strobe Duration	Min. 30 $\mu$ s   Max. $\infty$	Min. 30 $\mu$ s   Max. 50 ms
Strobe Trigger Latency	10 $\mu$ s	6 $\mu$ s
Strobe Frequency	Max 4 kHz or 1 / Duty Cycle as calculated, whichever is less. <sup>1</sup>	
Duty Cycle	Not applicable	Max. 10% <sup>1</sup>
Analog Intensity	The output is adjustable from 10% - 100% of intensity limit by a 1 - 10 VDC signal. Jumpering pin 5 to pin 1 will provide maximum intensity.	
Connection	5-pin M12 connector	
Operating Temperature	-10° to 40° C (14° to 104° F)   RH max 80% non-condensing humidity	
Storage Temperature	-20° to 70° C (-4° to 158° F)   RH max 80% non-condensing humidity	
IP Rating	IP65	
Weight	~0.28 lb   ~128 g	
Compliances	CE, IEC-62471, RoHS	
Warranty	10 years <sup>2</sup>	

<sup>1</sup>See page 7 for more information

<sup>2</sup>See [SmartVisionLights.com/warranty](http://SmartVisionLights.com/warranty) for details.

## 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 maximum intensity, tie pin 5 to pin 1 at +24 VDC.

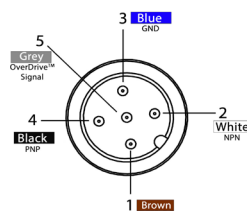
For continuous mode: PNP (pin 4) can be tied to +24 VDC (pin 1) **or** NPN (pin 2) can be tied to Ground (pin 3).

For proper light function, apply either a PNP or NPN signal, not both.

Failure to supply light with correct input current will result in inconsistent lighting behavior.

(see Product Specifications for requirements)

### 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

To enable OverDrive™ mode, tie pin 5 to pin 3.

For proper light function, apply either a PNP or NPN signal, not both.

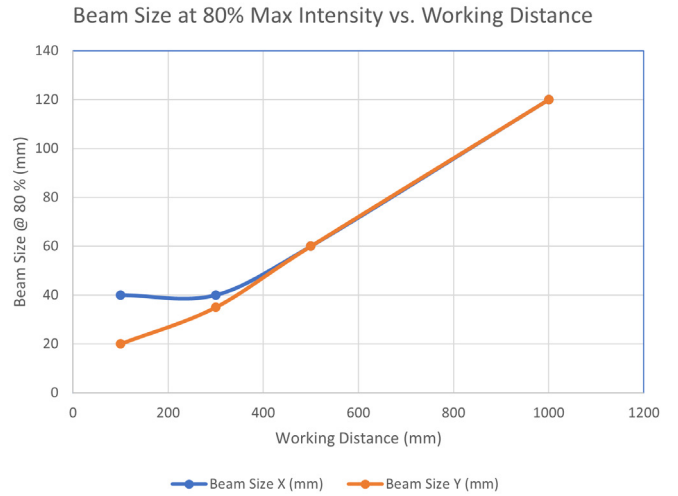
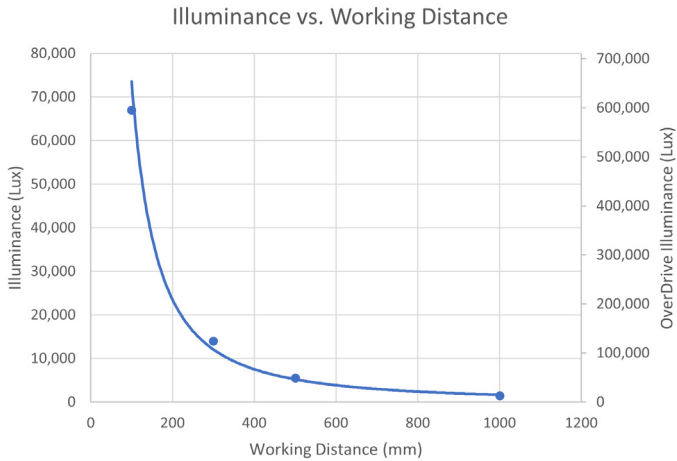
Failure to supply light with correct input current will result in inconsistent lighting behavior.

(see Product Specifications for requirements)

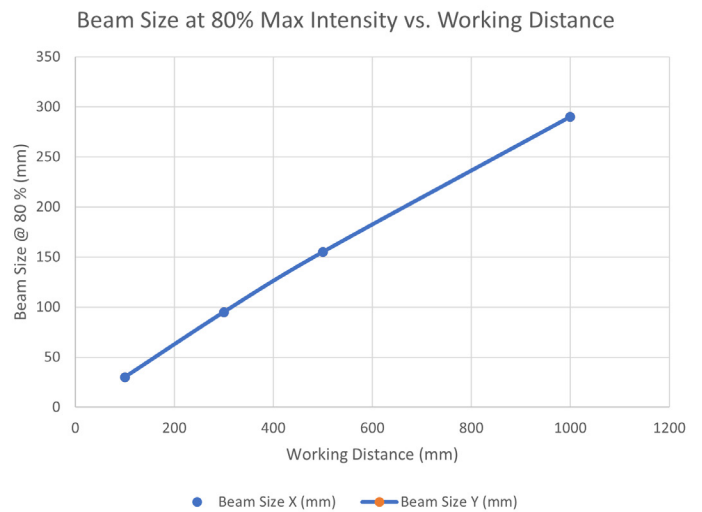
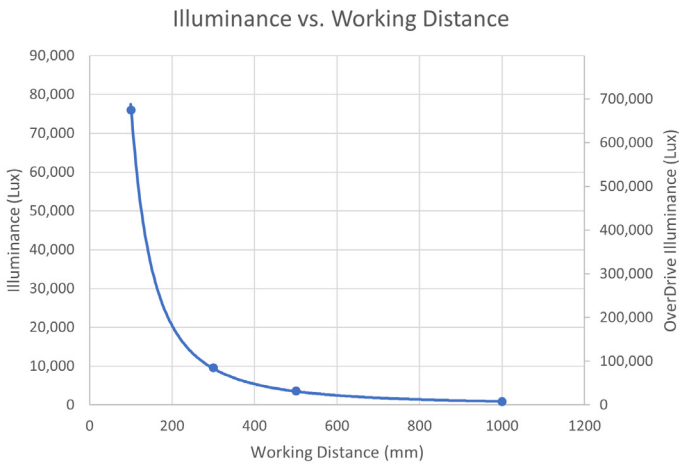
# LIGHTING PATTERNS

The LM45 is recommended to be used at a working distance between 100 mm to 1000 mm. Illuminance values taken on white light - 5700K

## Narrow (16°) lighting patterns



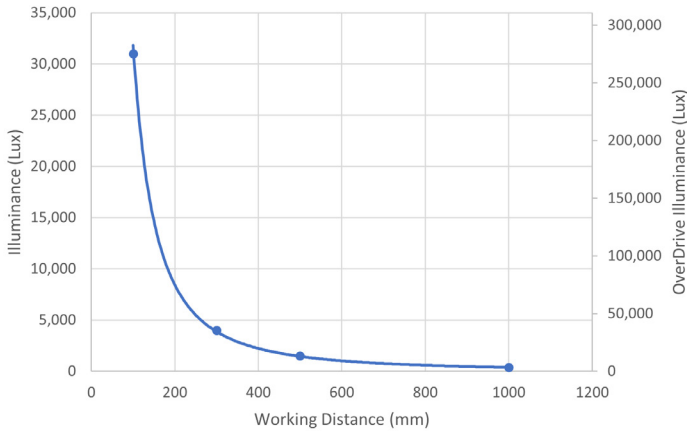
## Narrow (25°) lighting patterns



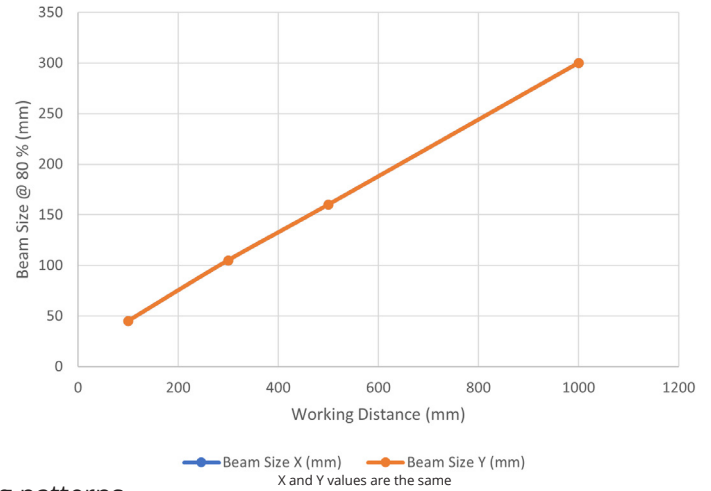
# LIGHTING PATTERNS (continued)

## Standard (50°) lighting patterns

Illuminance vs. Working Distance

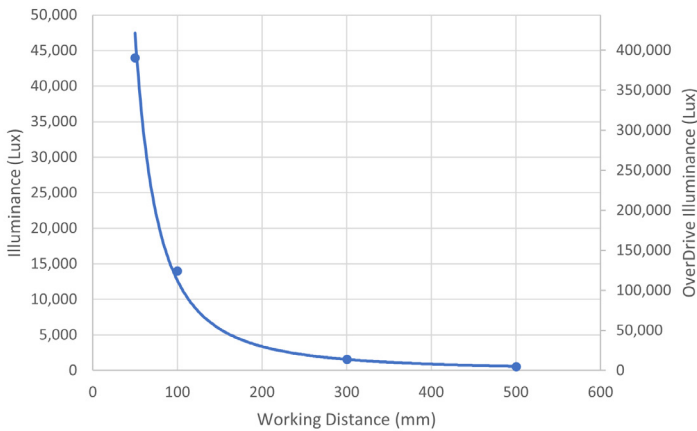


Beam Size at 80% Max Intensity vs. Working Distance

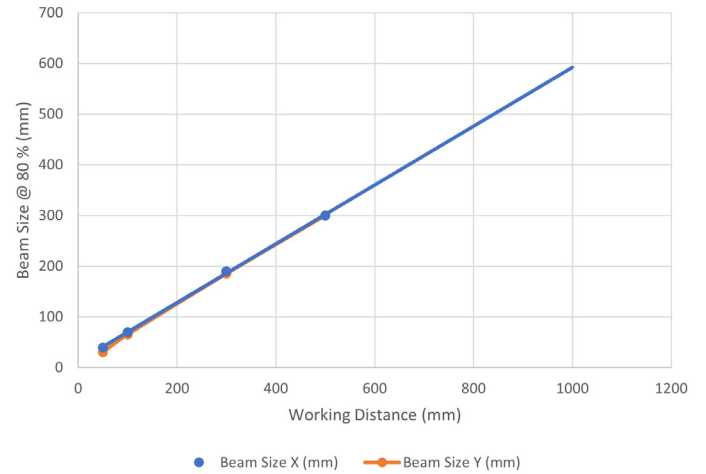


## Wide (80°) lighting patterns

Illuminance vs. Working Distance

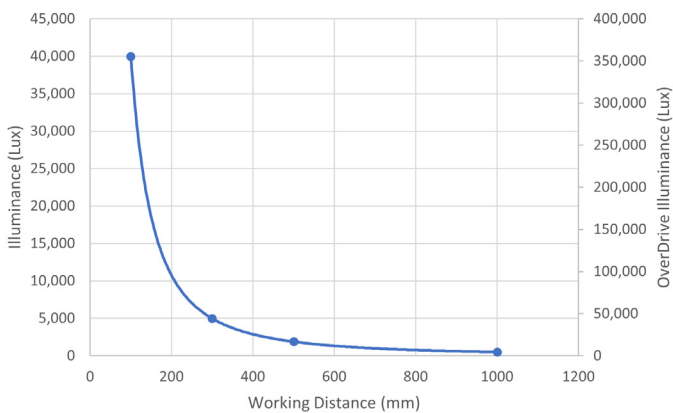


Beam Size at 80% Max Intensity vs. Working Distance

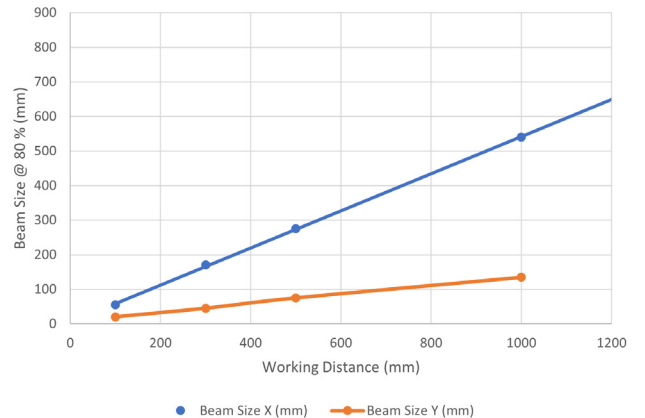


## Line (10° x 50°) lighting patterns

Illuminance vs. Working Distance



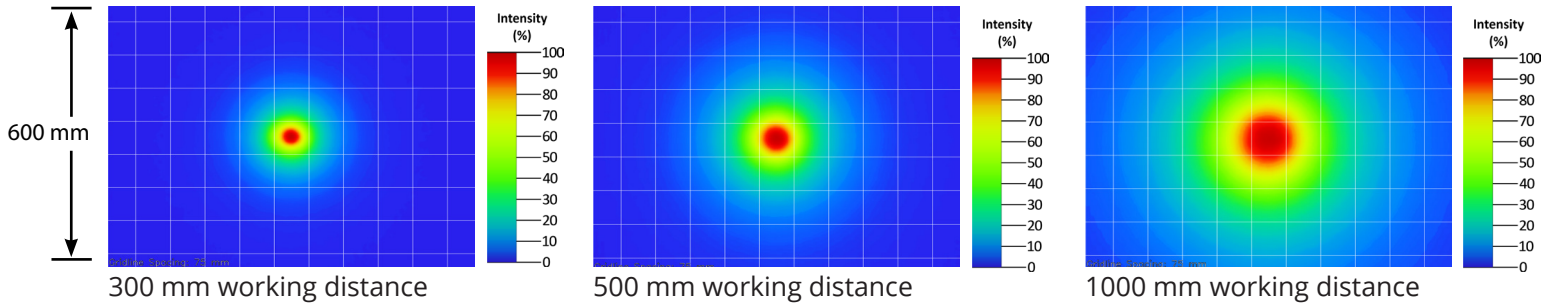
Beam Size at 80% Max Intensity vs. Working Distance



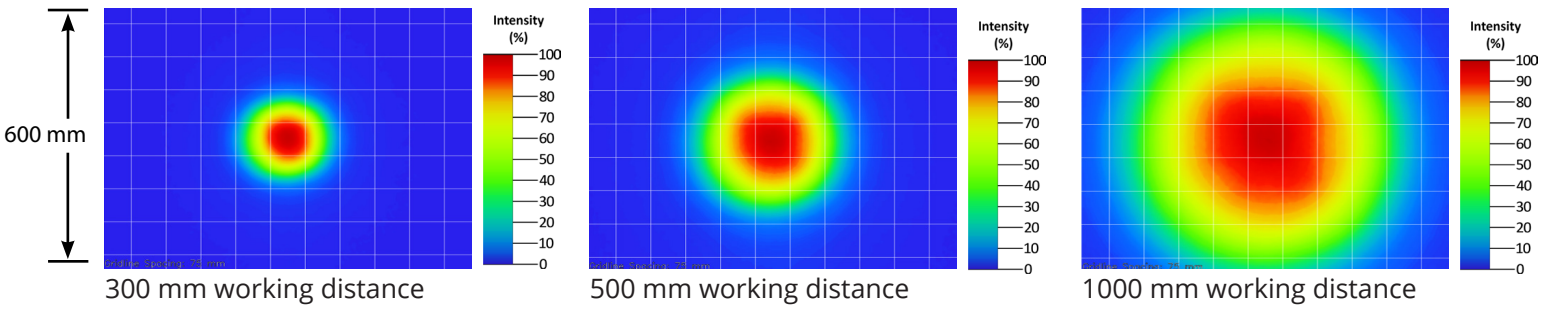
## BEAM PATTERNS

The LM45 is recommended to be used at a working distance between 100 mm to 1000 mm. Illuminance values taken on white light - 5700K

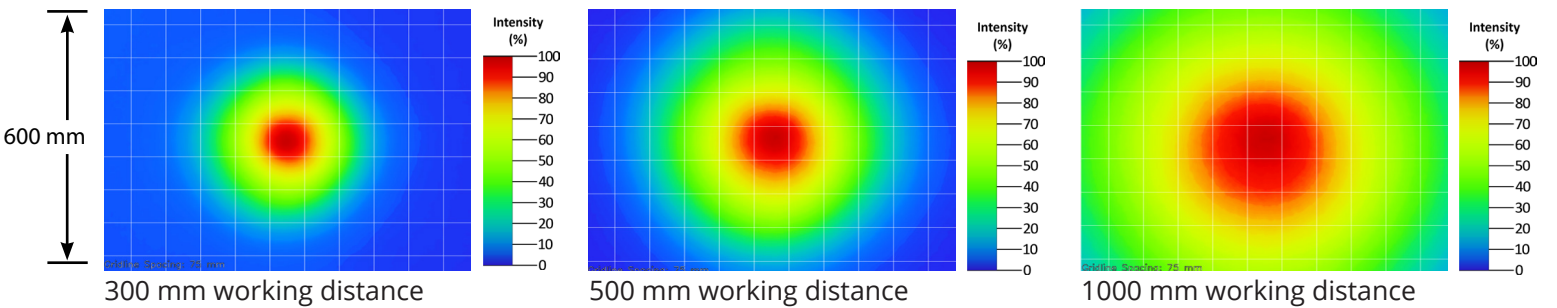
### Narrow (16°) beam patterns



### Narrow (25°) beam patterns



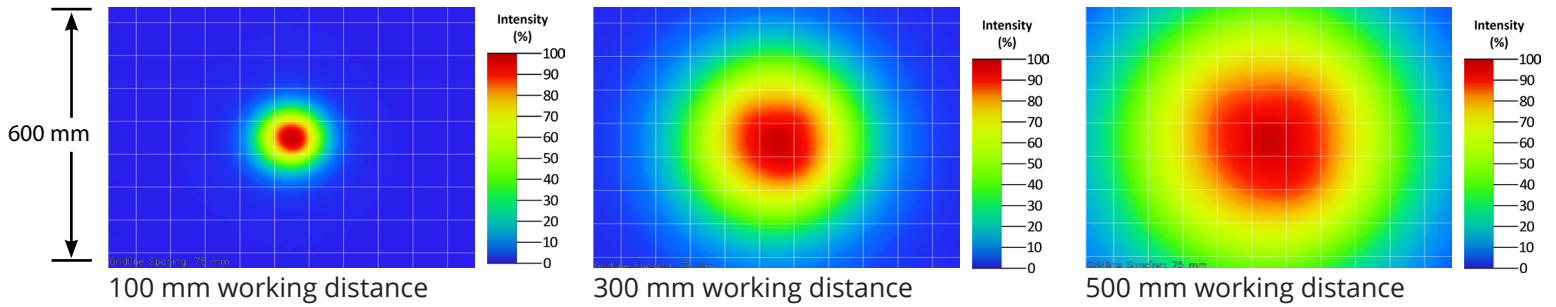
### Standard (50°) beam patterns



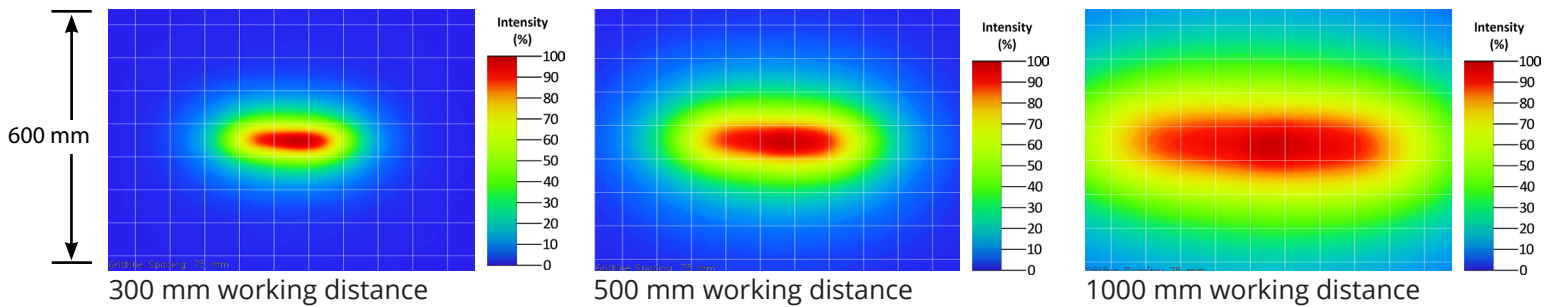


## BEAM PATTERNS (continued)

### Wide (80°) beam patterns



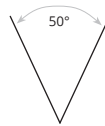
### Line (10° x 50°) beam patterns



## LENS OPTICS

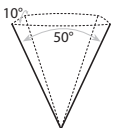
### NARROW (Standard)

The standard lens option uses a 50° beam angle lens. Standard lenses create a narrow beam of illumination and are used for long working distances.



### LINE

The line lens option uses a 10° x 50° beam angle lens. They project a thin, narrow beam of illumination.



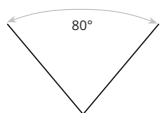
### NARROW 16°

The narrow (16°) lens option uses a 16° beam angle lens. Standard lenses create a narrow beam of illumination and are used for long working distances.



### WIDE

The wide lens option uses a 80° beam angle lens. They create a floodlight effect and can be used for short working distances.



### NARROW 25°

The narrow (25°) option uses a 25° beam angle lens. Standard lenses create a narrow beam of illumination and are used for long working distances.

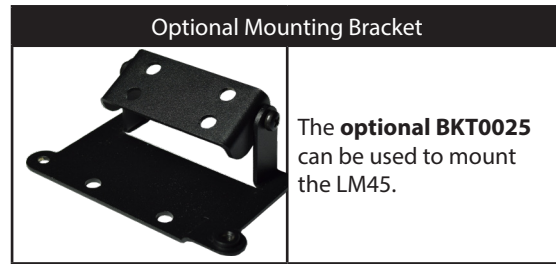
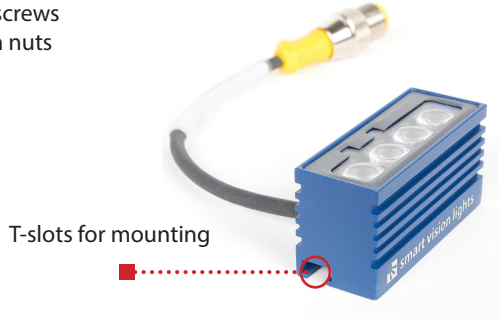


## MOUNTING

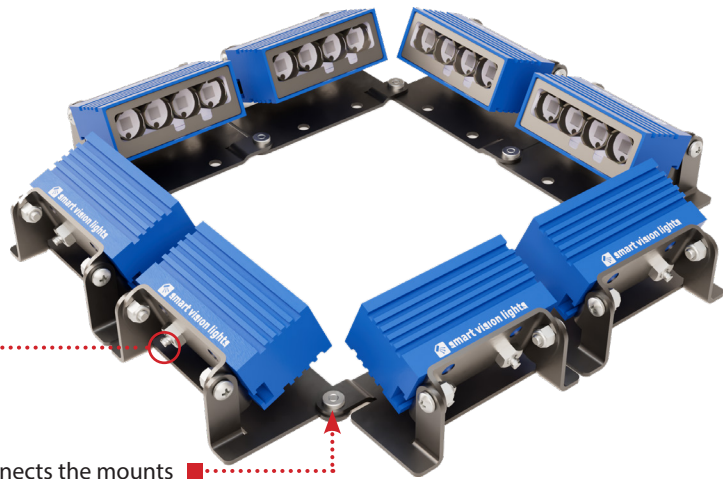
Mounting options include T-slot on bottom of light.

**Hardware includes:**

- (2) M4 x 16 screws
- (2) M4 nylon nuts



Easily connect together multiple LM45 using the BKT0025 bracket. The unique design of the BKT0025 bracket allows for any combination of lights to be easily connected together.



## EYE SAFETY

According to IEC 62471:2006. Full documentation available upon request with purchase of product.

**Notice**

**Exempt Group:** No photobiological hazard to eyes or skin even for continuous, unrestricted use. Applicable for wavelengths 625 and 850.

**Caution**

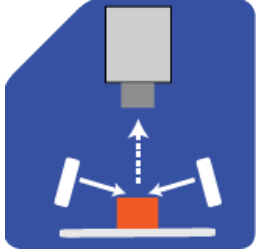
**Risk Group 1:** Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to eyes. Safe for most applications except prolonged exposure. Applicable for wavelengths 470, 530 and WHI.

**Caution**

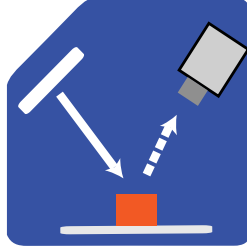
**Risk Group 2:** UV emitted from this product. Eye or skin irritation may result from exposure. Use appropriate shielding. Applicable for wavelength 365.

## ILLUMINATION

LM45 Series of Miniature "Mini" Linear Lights works best for:



Dark Field

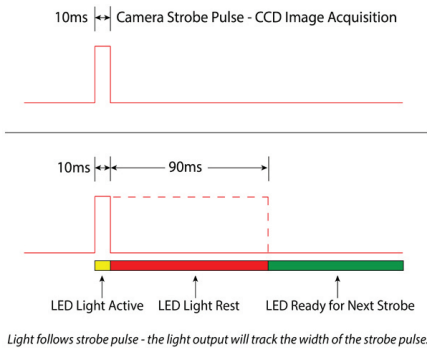


Bright Field

## DUTY CYCLE

**This section applies only if light is in OverDrive™ strobe 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

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

Rest Time is 90 ms for 10 ms Strobe Time

### Calculating Strobe Rate

$$SR = \frac{D}{ST}$$

SR = Strobe Rate (strokes per second)  
ST = Strobe Time (seconds)  
D = Duty Cycle

#### Example

$$1000 = \frac{0.1}{0.0001}$$

Strobe Rate is 1000 strokes per second

### Calculating Duty Cycle

$$D = ST \times SR$$

SR = Strobe Rate (strokes per second)  
ST = Strobe Time (seconds)  
D = Duty Cycle

#### Example

$$0.1 = 0.0001 \times 1000$$

Duty Cycle is 10% (0.1)

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

**Maximum Strobe Frequency is 1 / calculated duty cycle or 4,000 strokes per second, whichever is less.**

## MULTIDRIVE

Multi-Drive™ offers the best of both worlds with continuous operation and OverDrive™ mode (HIGH output strobe/pulse) available in a single light. Capture and freeze motion on high-speed lines with Smart Vision Light's LM150 and other Smart Vision Lights products using Multi-Drive™.



## SAFESTROBE™

SafeStrobe™ is a unique technology that applies safe working parameters to ensure high current LEDs are not damaged by driving them beyond their limits, such as maximum strobe time or duty cycle. This is especially beneficial for overdriving our high current LEDs.



## PART NUMBER GUIDE

LM45 -    -



**LENS:**  
 Leave blank for Standard (50°)

W = Wide (80°)  
 N16 = Narrow (16°)  
 N25 = Narrow (25°)  
 L = Line (10° x 50°)

### Part Number Examples:

- LM45-625** (LM45, 625 Red Wavelength, Standard Lenses)
- LM45-WHI-W** (LM45, White Wavelength, Wide Lenses)
- LM45-470-N25** (LM45, 470 Blue Wavelength, Narrow 25° Lenses)

## ACCESSORIES

Power Cables	
Lengths	Part Number
5 m	5PM12-5
10 m	5PM12-10
15 m	5PM12-15
10 m	HF5PM12-10 (High Flex)

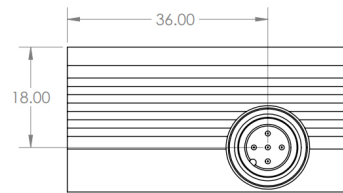
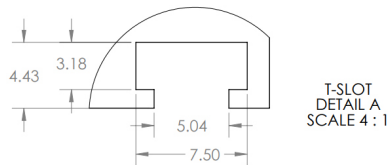
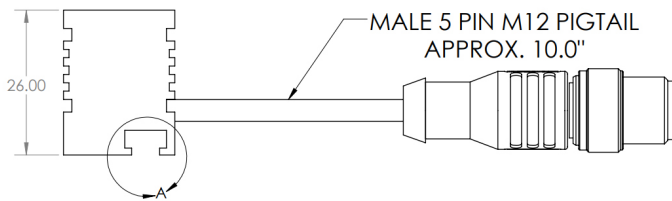
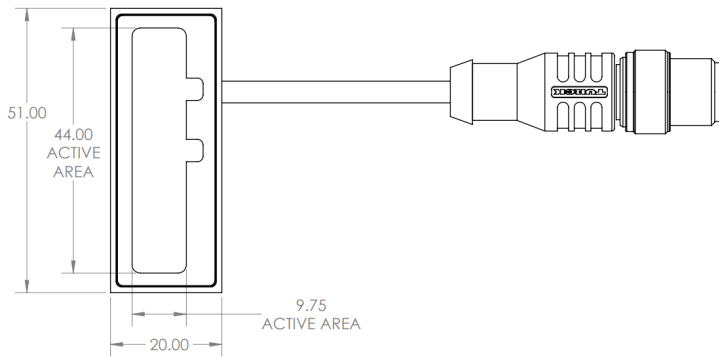
Splitter	
Description	Part Number
5-pin 2 way splitter	5PM12-2SW

Jumper Cables (Used with Splitter)	
Lengths	Part Number
300 mm	5PM12-J300
1000 mm	5PM12-J1000
2000 mm	5PM12-J2000

Mounting Bracket	
Description	Part Number
LM45 Mount	BKT0025

## PRODUCT DRAWINGS

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



## GLOSSARY

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

### TERMINOLOGY

**Continuous Operation** The light stays on continuously.

**OverDrive™** Integrated driver that produces a high-current strobe to the LEDs to drive them beyond their nominal continuous operation output.

**Multi-Drive™** Integrated driver that combines continuous operation and OverDrive™ strobe mode

**NanoDrive™** Integrated driver that provides fast switching where the light can go from off to on in less than 500 ns.

**Built-in Driver** The driver contained within the light that controls the current to the LEDs and provides PNP, NPN, and analog dimming controls.

**SmartVisionLink™** Integrated feature that enables lighting control through the Bluetooth module and app.

**Camera to Light** Connect the light directly to the camera, without the need for additional controllers or equipment.

**Polarizers** Filters that reduce reflections on specular surfaces.

**Diffusers** Widens the angle of emission by scattering light in all directions.

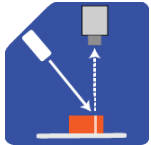
**Pattern Area Lighting** Modulated lighting pattern placed over a backlight's surface used to enhance defect detection on transparent and glossy surfaces

**SafeStrobe** Limiter to keep the light in safe working parameters.

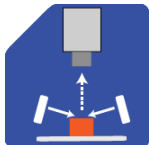
**Direct Connect** Connect lights in a series without the use of cables.

**Daisy-Chain** Connect lights in a series with the use of cables.

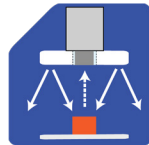
### TYPES OF ILLUMINATION



Projector



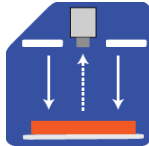
Dark Field



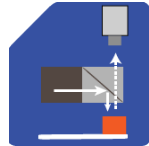
Radial



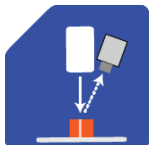
Bright Field



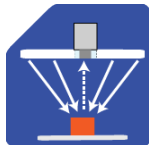
Direct



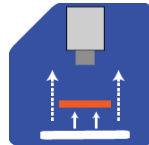
Axial



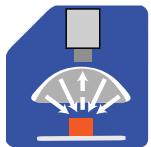
Line



Diffuse Panel



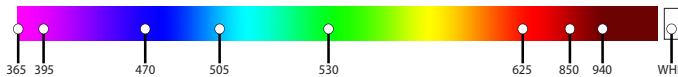
Backlight



Dome  
"Light Tent"

### COMMON COLOR / WAVELENGTHS LEGEND

Wavelength options range from 365 nm to 1650 nm.\*  
Additional wavelengths available for many light families.



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



Shortwave Infrared LEDs are available in 1050 nm, 1200 nm, 1300 nm, 1450 nm, 1550 nm, and 1650 nm.\*

\*Check Part Number section to see if **this light** is available in SWIR wavelengths.



ISO 9001:2015 Certified QMS