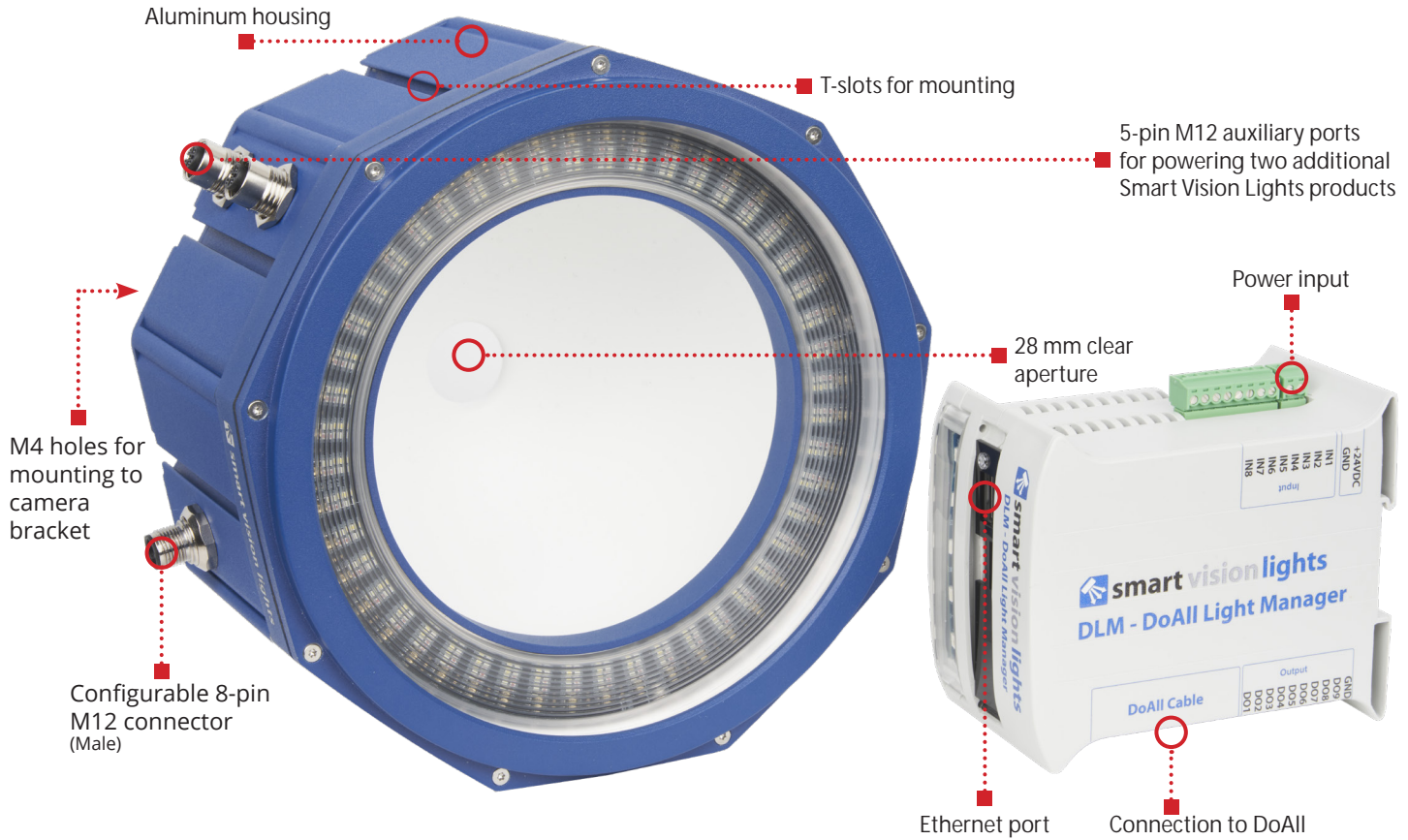


# DOALL-KIT All-in-one light kit MULTI-DRIVE™



The patented DoAll is an all-in-one solution unprecedented in its flexibility for machine vision lighting applications and automatic inspection. The DoAll combines 6 machine vision lights into one easy-to-use multi-functional product; with each DoAll you get a dome light, a low angle dark field ring light, a mid angle dark field ring light, an RGBW ring light, a four quadrant ring light, and a NIR ring light.

## DOALL-KIT HIGHLIGHTS

Warranty <b>10 YEAR</b>	Tested <b>IEC 62471</b>	Compliant <b>CE ROHS</b>
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- ✓ Combines a dome light, low and mid angle dark field ring light, RGBW ring light, four quadrant right light, and NIR ring light into one light into one package.
- ✓ Advanced controller system capable of saving various sequences and jobs.
- ✓ Mounting brackets capable of mounting the light directly to a robot arm
- ✓ Compact, integrated package made of robust aluminum.
- ✓ Truly unique light capable of handling any inspection



## SPECIFICATIONS

### DLM Specifications

<b>Electrical Input</b>	24 VDC +/- 5%
<b>Electrical Input Connector</b>	2 position screw terminal block – 14 AWG max wire size
<b>Operating Current (No Load)</b>	315 mA
<b>Number of Input Channels</b>	8 (including 1 input channel with interrupt capability) – All inputs are configurable for PNP or NPN operation
<b>Input Connector</b>	8 position screw terminal block – 14 AWG max wire size
<b>Max Input Channel Voltage</b>	Not to exceed electrical input voltage
<b>Trigger Input</b>	PNP > +3.3 VDC (24 VDC max.) to activate <b>or</b> NPN > GND (<1.4 VDC) to activate ( <b>not both</b> )
<b>Input Channel Current</b>	PNP Mode: 4 mA @ 4VDC   10 mA @ 12VDC   20 mA @ 24VDC NPN Mode: 15 mA @ Ground (0VDC)
<b>Output Channels</b>	4 Dedicated Outputs (DO1-DO4), 4 User Programmable Outputs (DO5-DO8), 1 Non-programmable Output Used to Communicate DLM Status (DO9)
<b>Output Channel Current</b>	Outputs 1-4: 20mA @ 24VDC, Outputs 5-8: 2A @ 24VDC, Output 9: 50mA @ 24VDC
<b>Output Connectors</b>	10 position screw terminal block – 14 AWG max wire size
<b>Indicator Lights</b>	Power indicator will turn green when turned on. Status indicator will turn blue when the controller is booted Status indicator will flash blue when theres a light connection error
<b>Protection Circuitry</b>	Polyfuse protection
<b>Programming Connector</b>	Ethernet port
<b>Mounting</b>	DIN rail
<b>Operating Temperature</b>	-28° to 40° C (0° to 104° F)   RH max 95% non-condensing humidity
<b>Warning</b>	The user must ensure that the potential difference between any combination of applied signals does not exceed the supply voltage. The DoAll Light Manager (DLM) must not be used in an application where its failure could cause a danger to personal health or damage to other equipment.
<b>Terminal Blocks (Included with DLM)</b>	2 position terminal block plug 8 position terminal block plug 10 position terminal block plug
<b>Weight</b>	0.7 lbs   0.31 kg
<b>Warranty*</b>	3 Years

\*See [SmartVisionLights.com/warranty](http://SmartVisionLights.com/warranty) for details.

### DoAll Specifications

<b>Auxiliary Output Channels</b>	2 5-Pin M12 Connectors
<b>Auxiliary Output Channel Max Current</b>	15 A for both outputs combined
<b>Auxiliary Output Channel Pinout</b>	Standard Smart Vision Lights pinout. These auxiliary outputs are designed for use only with Smart Vision Lights products.
<b>Weight</b>	3.5 lbs   1.58 kg
<b>Warranty*</b>	5 Years

\*See [SmartVisionLights.com/warranty](http://SmartVisionLights.com/warranty) for details.

## WIRING CONFIGURATION

For the wiring configuration, as well as instructions for setting up and using the DLM, please visit [Downloads.SmartVisionLights.com](http://Downloads.SmartVisionLights.com) or scan the code to the right.



## LIGHTING PATTERNS

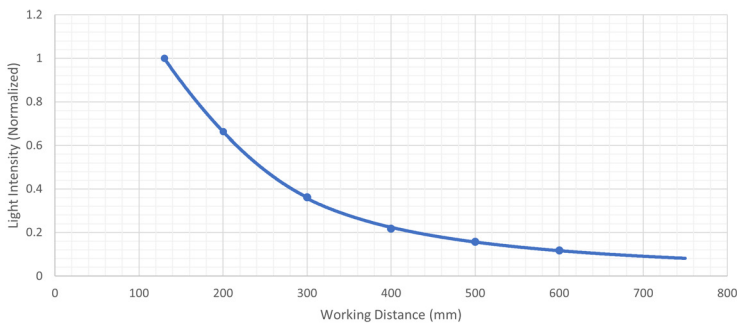
Smart Vision Lights recommends the DOALL-KIT be used at a working distance of 0 mm to 750 mm.

### RGBW+IR Four-zone ring light

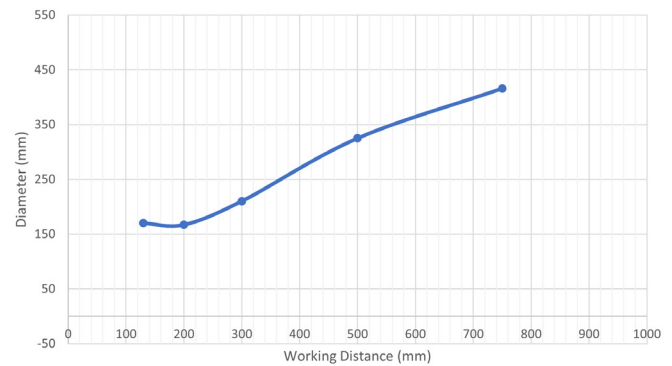
Data in table collected using a working distance of 130 mm

	Dominant Wavelength	Irradiance	OverDrive™ Irradiance	Illuminance	OverDrive™ Illuminance
<b>Red</b>	625 nm	1.4 mW/cm <sup>2</sup>	10.6 mW/cm <sup>2</sup>	2,469 lux	18,300 lux
<b>Green</b>	533 nm	1.9 mW/cm <sup>2</sup>	9.5 mW/cm <sup>2</sup>	10,420 lux	51,900 lux
<b>Blue</b>	484 nm	2.5 mW/cm <sup>2</sup>	14.1 mW/cm <sup>2</sup>	2,860 lux	15,900 lux
<b>White</b>	556 (5443 K)	2.8 mW/cm <sup>2</sup>	17.6 mW/cm <sup>2</sup>	8,960 lux	57,100 lux
<b>IR</b>	850 nm	8.2 mW/cm <sup>2</sup>	36.6 mW/cm <sup>2</sup>	N/A	N/A

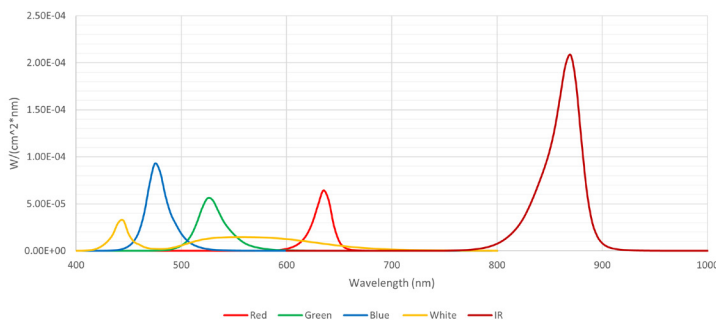
Normalized Illuminance (Irradiance) vs. Working Distance  
RGBW + IR



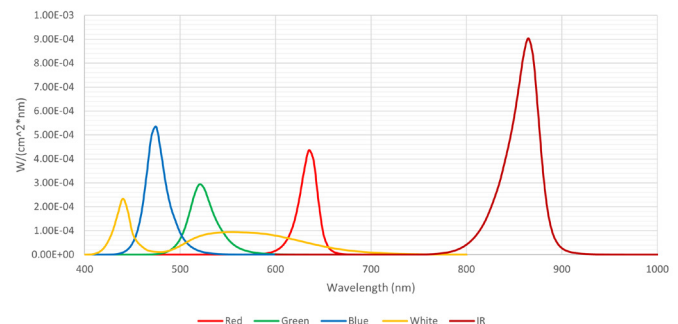
Beam Diameter vs. Working Distance



Spectral irradiance  
RGBW+IR ring (continuous)  
WD: 130 mm



RGBW+IR ring (OverDrive™)  
WD: 130 mm



## LIGHTING PATTERNS (continued)

### Dome light

	Continuous Mode	OverDrive™
CCT	4,800 lux	4,900 lux
Illuminance	48,000 lux	113,000 lux
Irradiance	14 mw/cm <sup>2</sup>	33 mw/cm <sup>2</sup>

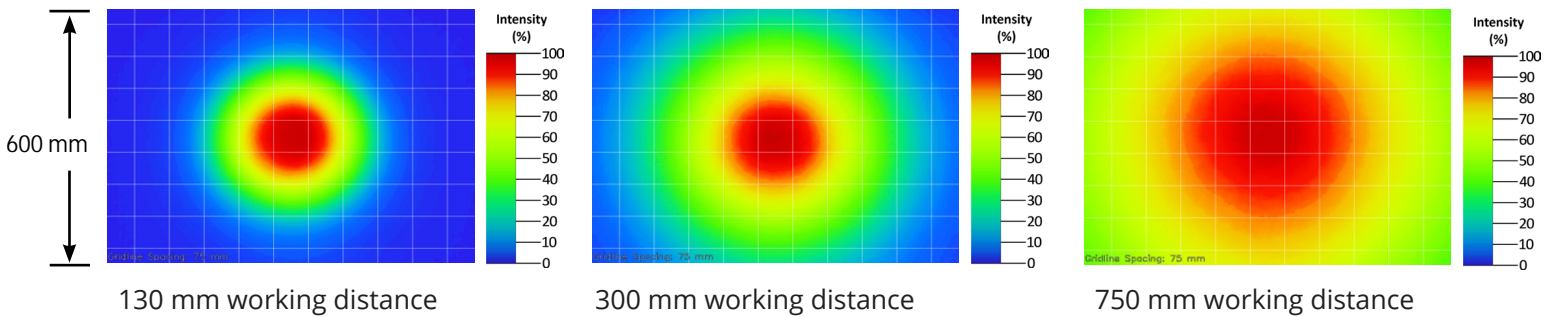
### Dark field lights

	Working Distance	Depth of Field	Irradiance Continuous	Irradiance OverDrive™
All On	40 mm	50	11 mw/cm <sup>2</sup>	67 mw/cm <sup>2</sup>
Far	35 mm	35	16 mw/cm <sup>2</sup>	88 mw/cm <sup>2</sup>
Near	15 mm	20	9 mw/cm <sup>2</sup>	51 mw/cm <sup>2</sup>

## BEAM PATTERNS

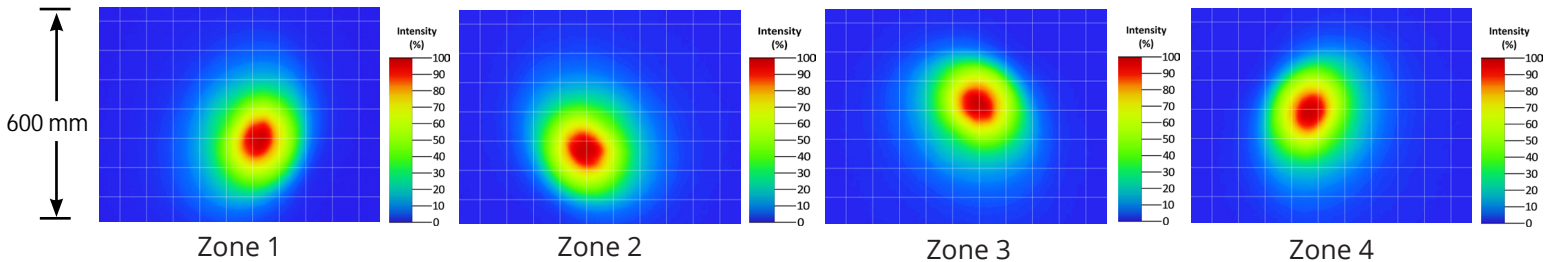
### Ring light beam patterns

Grid size set to 75 mm



### Four-zone beam patterns

Grid size set to 75 mm, 130 mm working distance

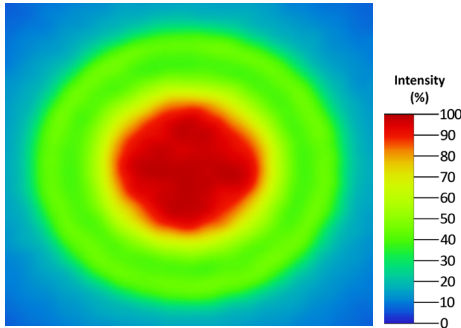




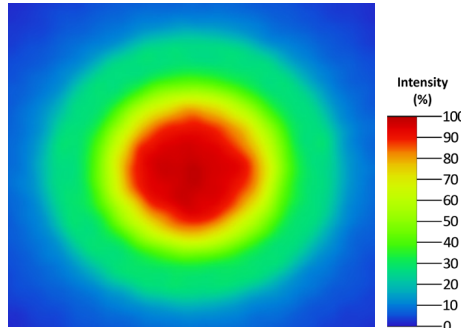
## BEAM PATTERNS (continued)

### Dark field beam patterns

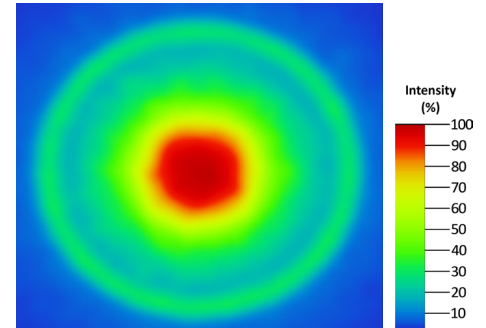
#### Front view



Both dark field, 35 mm working distance

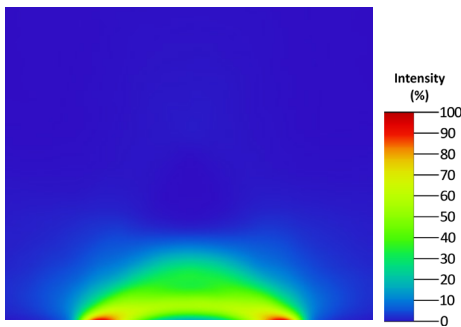


Far dark field, 35 mm working distance

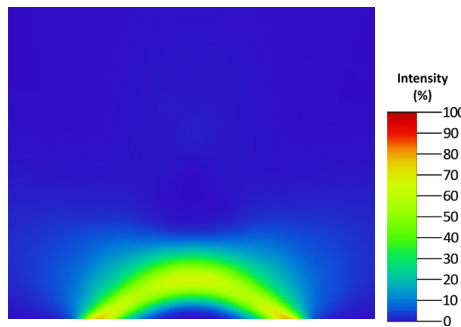


Near dark field, 15 mm working distance

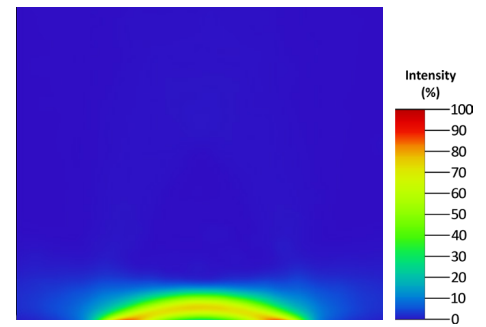
#### Side view



Both dark field, 35 mm working distance



Far dark field, 35 mm working distance

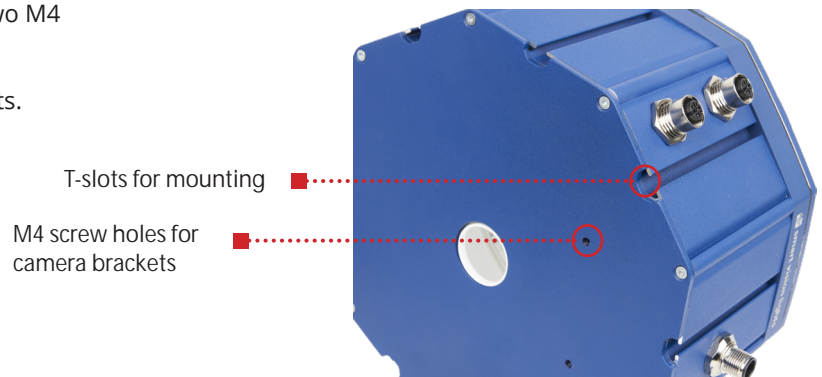


Near dark field, 15 mm working distance

## MOUNTING

T-Slots are located along the sides of the DOALL-KIT. There are two M4 screw holes for mounting optional camera brackets.

The DOALL-KIT comes with two T-bolts, two washers, and two nuts.



## EYE SAFETY

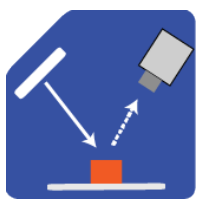
According to IEC 62471:2006. Full documentation available upon request with purchase of product.

### Notice

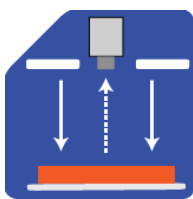
Exempt Group: No photobiological hazard to eyes or skin even for continuous, unrestricted use. Applicable for all standard DOALL-KIT wavelengths.

## ILLUMINATION

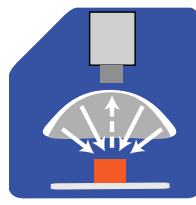
The DOALL-KIT works best for:



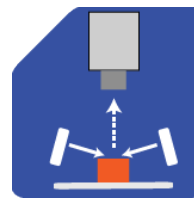
Bright Field



Direct Lighting



Dome  
"Light Tent"

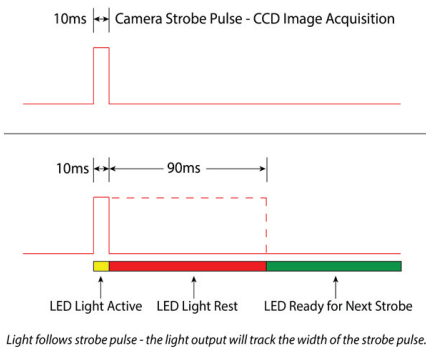


Dark Field

## 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 7%.**

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

## MULTI-DRIVE™

Multi-Drive™ provides both continuous and OverDrive™ modes from a single integrated driver. Users can select the lighting mode via the input wiring configuration. With OverDrive™, the light can be strobed at up to 10 times the intensity\* of continuous mode.

\*See lighting section for more information on this light's OverDrive values.



## PART NUMBER GUIDE

DOALL -   -   - KIT

**UNIVERSAL ROBOT:**

Leave blank for none

UR = Universal Robot Kit

**POWER SUPPLY:**

Leave blank for none

PS = Universal Robot Kit with Power Supply

*Custom wavelengths, such as UV, are available upon request.*

## PACKING LIST

The DoAll is available in three kits. The following is a breakdown of what comes in each kit.

DoAll-UR-PS-KIT

DoAll-UR-KIT

DoAll-KIT



DoAll Light



DoAll Controller (DLM)



10 Meter High Flex 8-Pin m12



- Universal Robot mounting bracket
- 4x M6 fasteners to mount the bracket to the robot
- 6x T-nuts, bolts, and washers to mount the DoAll to the bracket



6 Foot Ethernet Cable



URCap USB installation stick



4 mm allen wrench for bracket to robot fasteners and a 5/16" wrench for bracket to DoAll fasteners.




Power supply and cable




DLM Power Leads

## ACCESSORIES

Power Cable	
	
Lengths	Part Number
10 m	HF8PM12-10

Light comes with one power cable.

Mounting Kit	
	
Description	Part Number
M5x12 mm T-bolt	SC0161
Stainless Steel Nylon Insert Lock Nut	NU0022
Stainless Steel Flat Washer	WA0018

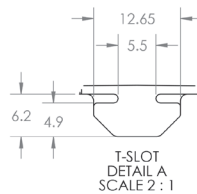
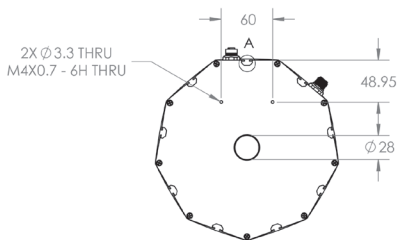
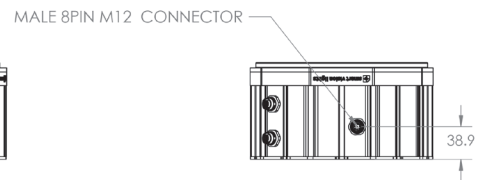
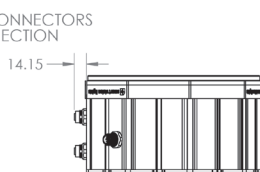
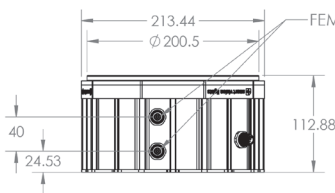
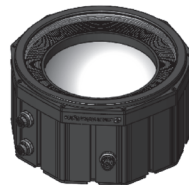
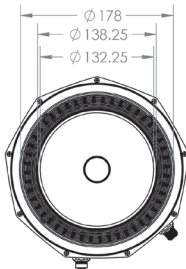
Light comes with two T-bolts, two nuts, and two washers.

Camera Mount	
	
Description	Part Number
Right Angle Mount	BKT0004

Camera Mount	
	
Description	Part Number
Adjustable Point Mount	BKT0007

## 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.

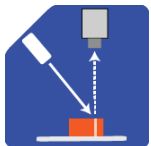
**Pattern Area Lighting** Modulated lighting pattern placed over a backlight's surface used to enhance defect detection on transparent and glossy surfaces

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

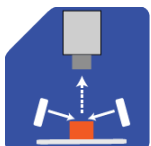
**Direct Connect** Connect lights in a series without the use of cables.

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

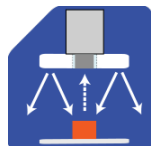
### TYPES OF ILLUMINATION



Projector



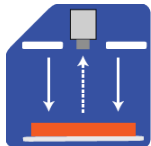
Dark Field



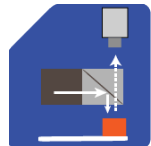
Radial



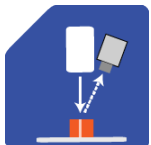
Bright Field



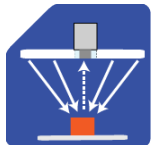
Direct



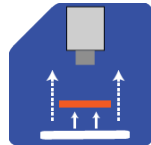
Axial



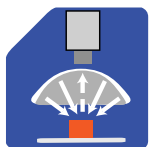
Line



Diffuse Panel



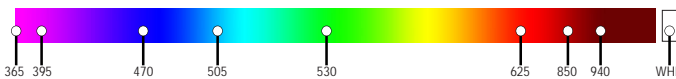
Backlight



Dome  
"Light Tent"

### COMMON COLOR / WAVELENGTHS LEGEND

Wavelengths 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.

For more information please contact:

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