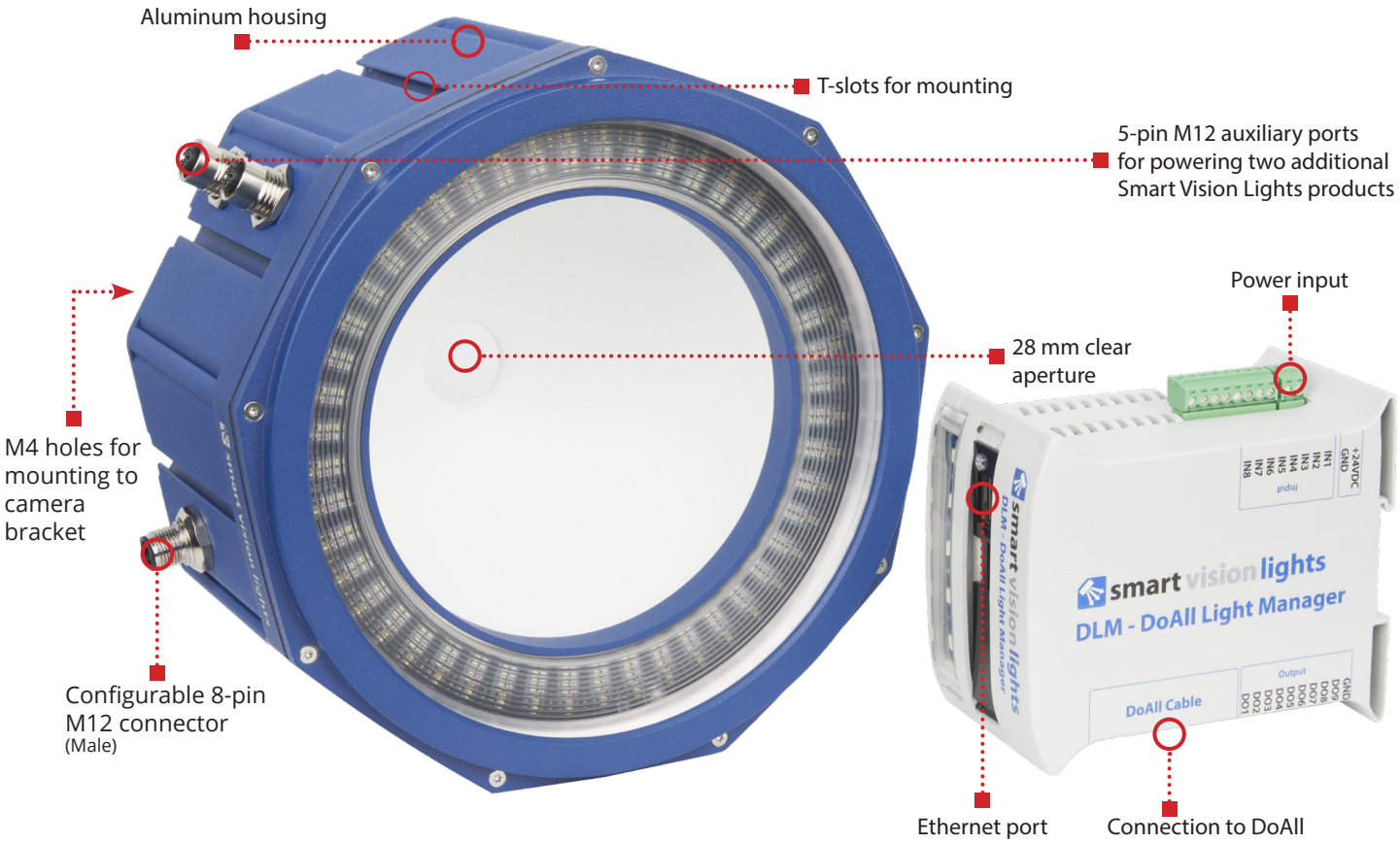
DOALL-KIT

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	Tested	Compliant
10 YEAR	IEC 62471	CE ROHS

- ✔ 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

multi drive™

REV 10/23/23

SPECIFICATIONS

DLM Specifications

Electrical Input	24 VDC +/- 5%
Electrical Input Connector	2 position screw terminal block – 14 AWG max wire size
Operating Current (No Load)	315 mA
Number of Input Channels	8 (including 1 input channel with interrupt capability) – All inputs are configurable for PNP or NPN operation
Input Connector	8 position screw terminal block – 14 AWG max wire size
Max Input Channel Voltage	Not to exceed electrical input voltage
Trigger Input	PNP > +3.3 VDC (24 VDC max.) to activate **or** NPN > GND (<1.4 VDC) to activate **(not both)**
Input Channel Current	PNP Mode: 4 mA @ 4VDC | 10 mA @ 12VDC | 20 mA @ 24VDC NPN Mode: 15 mA @ Ground (0VDC)
Output Channels	4 Dedicated Outputs (DO1-DO4), 4 User Programmable Outputs (DO5-DO8), 1 Non-programmable Output Used to Communicate DLM Status (DO9)
Output Channel Current	Outputs 1-4: 20mA @ 24VDC, Outputs 5-8: 2A @ 24VDC, Output 9: 50mA @ 24VDC
Output Connectors	10 position screw terminal block – 14 AWG max wire size
Indicator Lights	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
Protection Circuitry	Polyfuse protection
Programming Connector	Ethernet port
Mounting	DIN rail
Operating Temperature	-28° to 40° C (0° to 104° F) | RH max 95% non-condensing humidity
Warning	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.
Terminal Blocks (Included with DLM)	2 position terminal block plug 8 position terminal block plug 10 position terminal block plug
Weight	0.7 lbs | 0.31 kg
Warranty*	3 Years

**See SmartVisionLights.com/warranty for details.*

DoAll Specifications

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

**See 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 or scan the code to the right.

LIGHTING PATTERNS

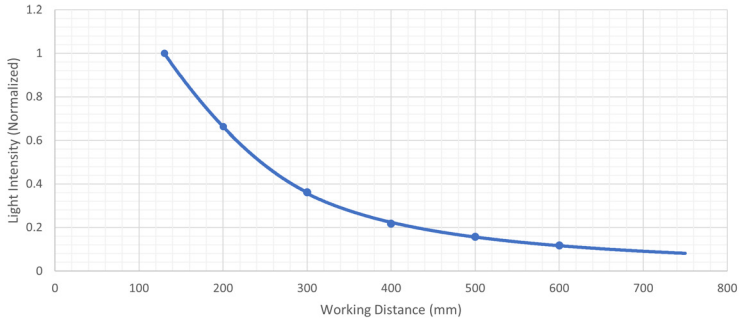
Smart Vision Lights recommends the DOALL-KIT be used at a working distance of 0 mm to 750 mm.

RGBW+IR Four-zone ring light

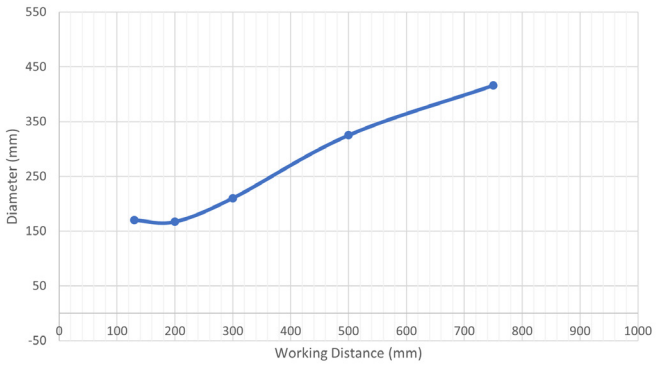
Data in table collected using a working distance of 130 mm

	Dominant Wavelength	Irradiance	OverDrive™ Irradiance	Illuminance	OverDrive™ Illuminance
Red	625 nm	1.4 mW/cm²	10.6 mW/cm²	2,469 lux	18,300 lux
Green	533 nm	1.9 mW/cm²	9.5 mW/cm²	10,420 lux	51,900 lux
Blue	484 nm	2.5 mW/cm²	14.1 mW/cm²	2,860 lux	15,900 lux
White	556 (5443 K)	2.8 mW/cm²	17.6 mW/cm²	8,960 lux	57,100 lux
IR	850 nm	8.2 mW/cm²	36.6 mW/cm²	N/A	N/A

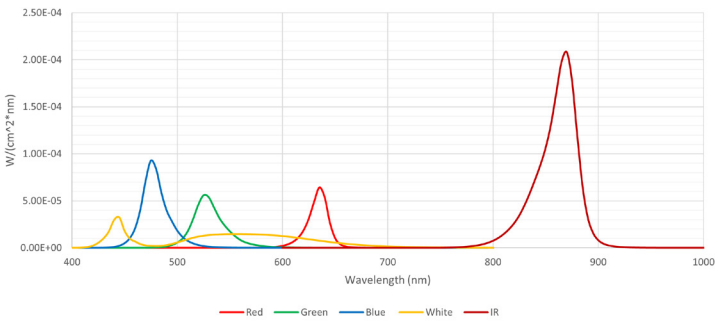
Normalized Illuminance (Irradiance) vs. Working Distance
RGBW + IR



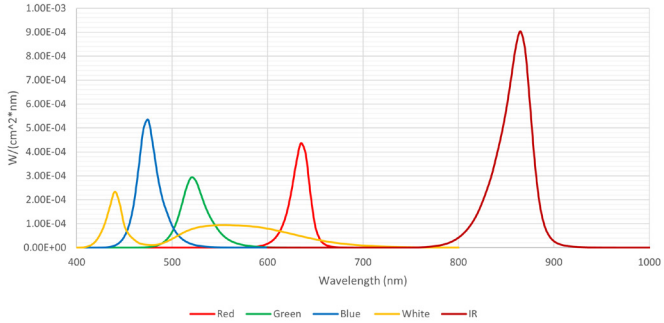
Beam Diameter vs. Working Distance



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/cm²	33 mw/cm²

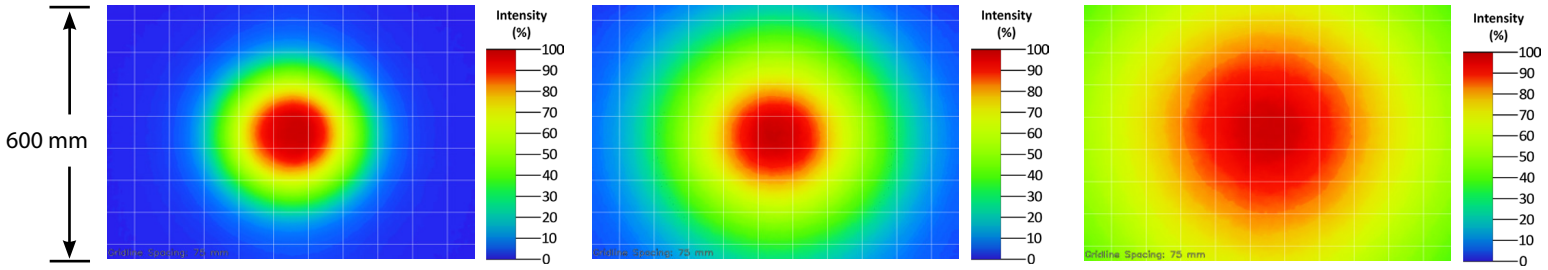
Dark field lights

	Working Distance	Depth of Field	Irradiance Continuous	Irradiance OverDrive™
All On	40 mm	50	11 mW/cm²	67 mW/cm²
Far	35 mm	35	16 mW/cm²	88 mW/cm²
Near	15 mm	20	9 mw/cm²	51 mW/cm²

BEAM PATTERNS

Ring light beam patterns

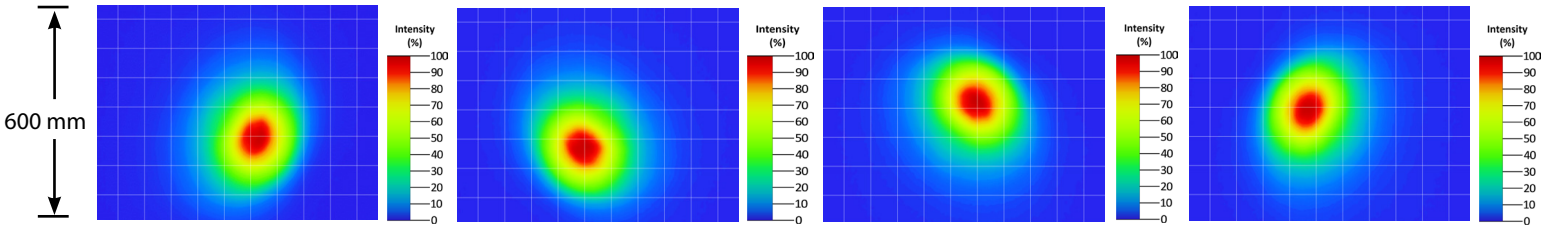
Grid size set to 75 mm



130 mm working distance | 300 mm working distance | 750 mm working distance

Four-zone beam patterns

Grid size set to 75 mm, 130 mm working distance

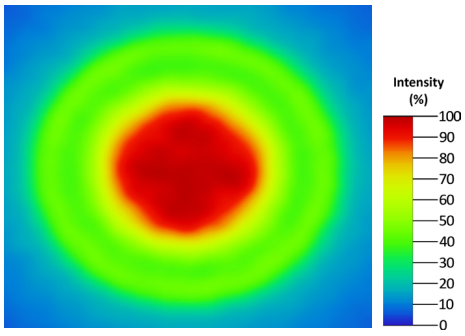


Zone 1 | Zone 2 | Zone 3 | Zone 4

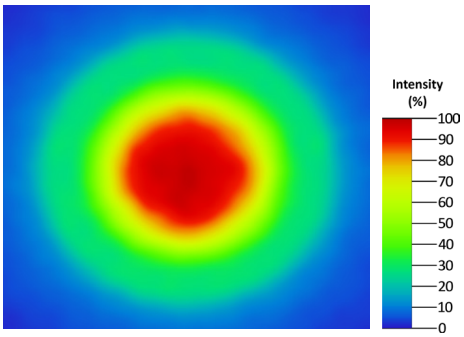
BEAM PATTERNS (continued)

Dark field beam patterns

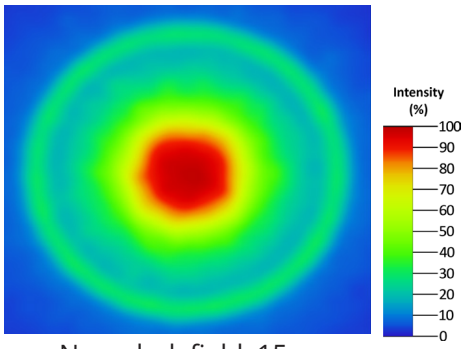
Front view



Both dark field, 35 mm working distance

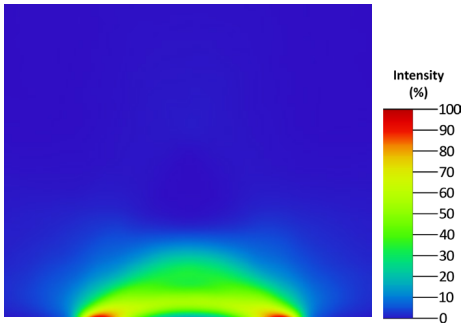


Far dark field, 35 mm working distance

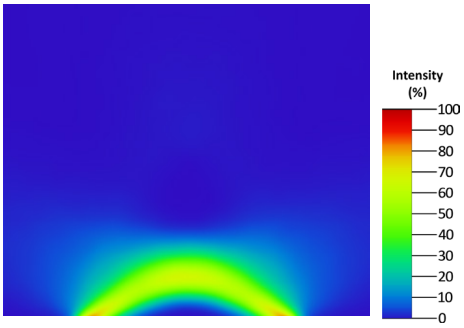


Near dark field, 15 mm working distance

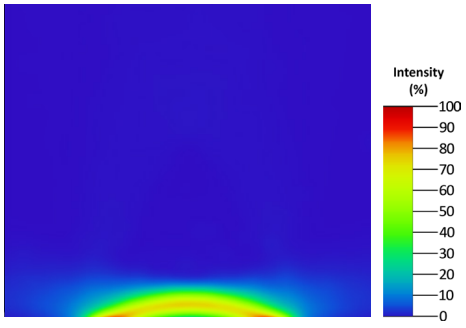
Side view



Both dark field, 35 mm working distance



Far dark field, 35 mm working distance

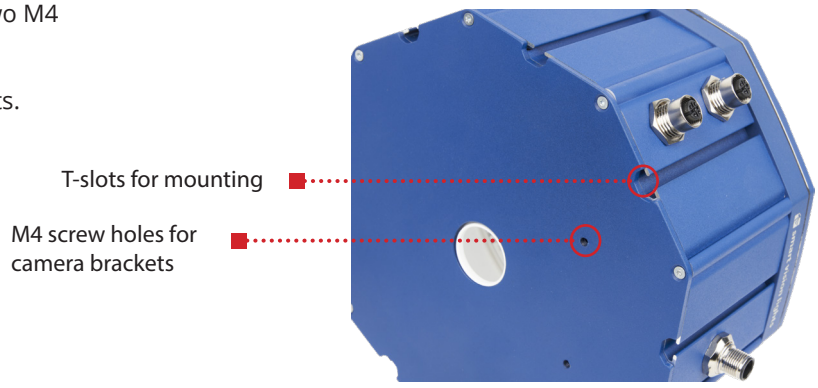


Near dark field, 15 mm working distance

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

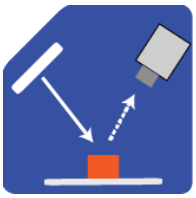
According to IEC 62471:2006. Full documentation available upon request with purchase of product.

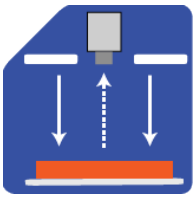
Notice

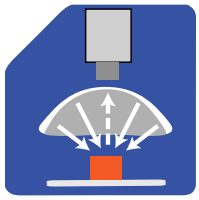
Exempt Group: No photobiological hazard to eyes or skin even for continuous, unrestricted use. Applicable for all standard DOALL-KIT wavelengths.

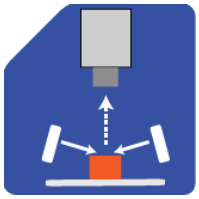
ILLUMINATION

The DOALL-KIT works best for:


Bright Field


Direct Lighting

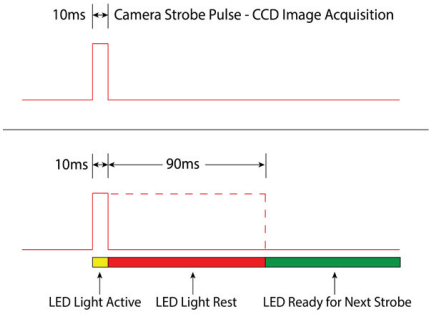

Dome
"Light Tent"


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).



Light follows strobe pulse - the light output will track the width of the strobe pulse.

Calculating Rest Time

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

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

Example

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

Rest Time is 90 ms for 10 ms Strobe Time

Calculating Strobe Rate

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

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

Example

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

Strobe Rate is 1000 strobes per second

Calculating Duty Cycle

$$D = ST \times SR$$

SR = Strobe Rate (strobes 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 strobes 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
- DLM Power Leads

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

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

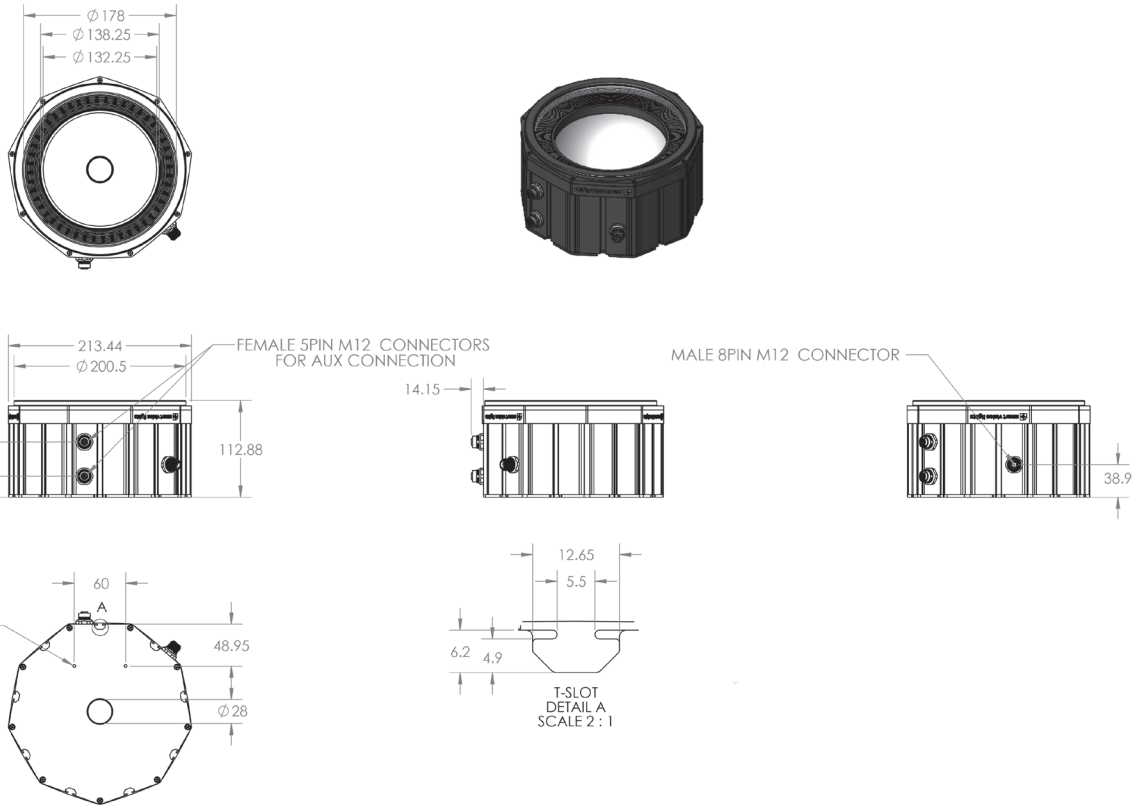
Description	Part Number
Right Angle Mount	BKT0004

Camera Mount

Description	Part Number
Adjustable Point Mount	BKT0007

PRODUCT DRAWINGS

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



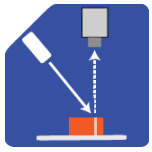
GLOSSARY

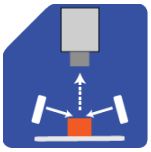
This glossary covers all Smart Vision Lights product families; some content in this section may not apply to this specific light.

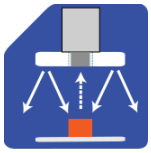
TERMINOLOGY

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.

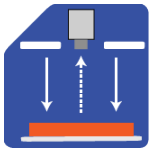
TYPES OF ILLUMINATION

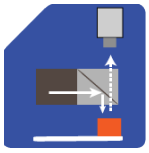

Projector

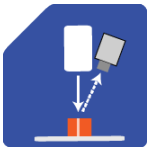

Dark Field

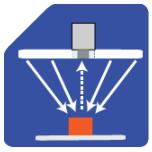

Radial

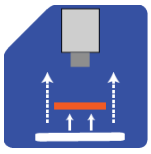
Bright Field

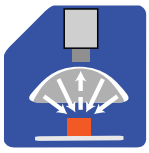

Direct


Axial


Line

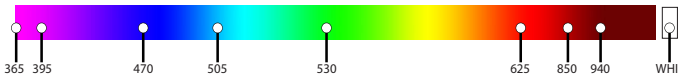

Diffuse Panel


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.*

SWIR SHORT WAVE INFRARED

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.*

ASR American Systems Registrar

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17021-1 MANAGEMENT SYSTEMS CERTIFICATION BODY

ISO 9001:2015 Certified QMS

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