WenglorTPL Vision Lighting Modular Ring Light, Dome, and Low-Angle Accessories

wenglor TPL

The WenglorTPL Modular Ring Light offers bi-color LED illumination. Models are available in two sets of colors (only one color can be used at a time) and in two different sizes. All have been designed with tough production environments in mind with IP65 as standard and overdrive embedded.

To further enhance the Modular Ring Light's versatility, users have the ability to select colors and quadrants via the simple controls on the device or via I/O from a connected PLC.

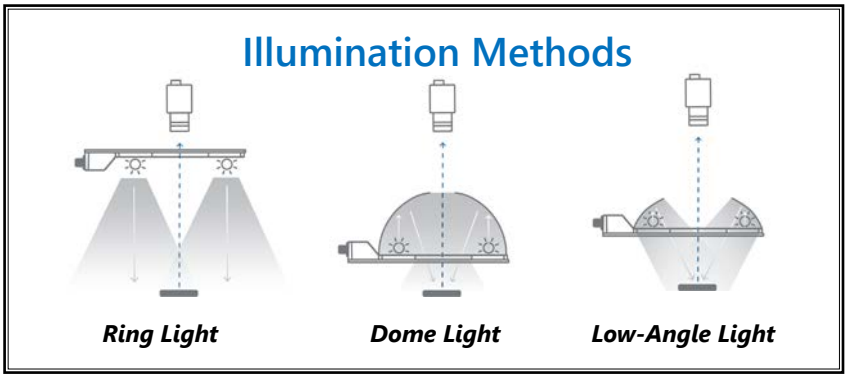
OPT2425

OPT2427

WenglorTPL Modular Ring Light Selection Guide

Part Number	Price	Colors	Size* (mm [in])	Overdrive	Mode of Operation	Drawings
OPT2424	$757.00	Red / Cyan	80 [3.15]	Yes	Continuous or strobe	PDF
OPT2425	$757.00	White / Infared	80 [3.15]			PDF
OPT2426	$1,005.00	Red / Cyan	130 [5.12]			PDF
OPT2427	$1,005.00	White / Infared	130 [5.12]			PDF

** Approximate diameter to inner ring of LEDs*



Ring Light Accessories

WenglorTPL ring light accessories transform a ring light into a dome light or a low-angle light. These accessories attach to the appropriate sized modular ring light by use of built-in magnets. They are then secured using the provided screws.

For dome light applications, the aperture size for the dome light may need to be reduced to decrease the dark spot on the field of view. The WenglorTPL dome accessory comes with multiple aperture covers to maximize flexibility.

WenglorTPL Ring Light Accessory Selection Guide

Part Number	Price	Item	Corresponding Ring Light Size* (mm [in])	Drawings
OPT2428	$91.00	Dome	80 [3.15]	PDF
OPT2429	$116.00	Dome	130 [5.12]	PDF
OPT2430	$91.00	Low-angle dome	80 [3.15]	PDF
OPT2431	$116.00	Low-angle dome	130 [5.12]	PDF

** Approximate diameter to inner ring of LEDs on corresponding ring light*

OPT2428

OPT2430

WenglorTPL Mounting Bracket Selection Guide

Part Number	Price	Description	Material	Drawings
OPT2434	$65.00	Mounting bracket	Aluminium	PDF

OPT2434

WenglorTPL Vision Lighting Modular Ring Light

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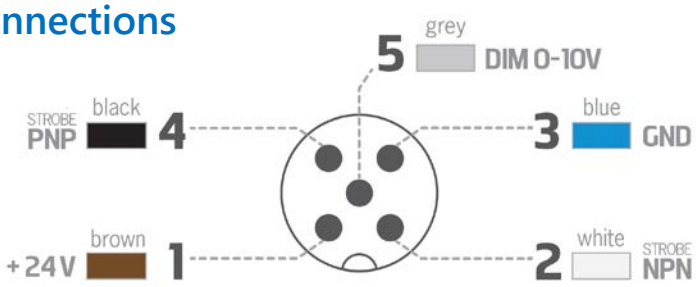
Modular Ring Light General Specifications		
	80mm [3.15 in]	***130mm [5.12 in]***
Electronics		
Power Supply	24VDC ±10%	
Functioning Mode	Continuous, strobe, overdrive, dimming, sector control, LED color	
Rising Time	10µs	
Falling Time	10µs	
Wiring	5-pin M12 male connector for power Optional: 8-pin M12 male connector for remote control	
Maximum Consumption, Red-Cyan	9W average / 51W peak	11W average, 82W peak
Maximum Consumption, White-IR	10W average / 42W peak	13W average / 62W peak
Optics		
Color	Red (625nm) - Cyan (505nm) - White (5000K) - Infrared (860nm)	
Number of LEDs	96	144
Mechanical		
Height	Lighting portion: 11mm Wiring portion, with connectors: 31mm	
Weight	360g [0.8 lb]	550g [1.2 lb]
Material	Aluminum and ABS	
Mounting	2 x M5 screws (included with OPT2434 bracket)	
Environment		
Operating Temperature	-10°C to 40°C / 80% humidity without condensation No thermal shock (maximum temperature variation 10C in 24 hours)	
Storage Temperature	-20°C to 60°C / 80% humidity without condensation No thermal shock (maximum temperature variation 10C in 24 hours)	
IP Protection	IP65	

Connections



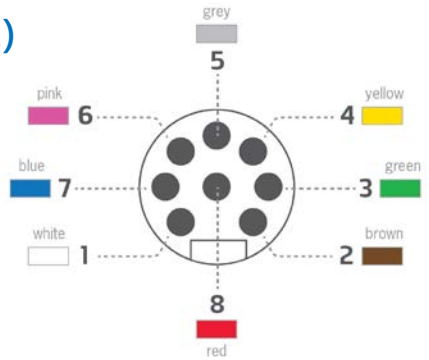
Strobe PNP	
1	+24V
2	+24V*
3	Ground
4	PNP
5	Dim 0-10 V

Strobe NPN	
1	+24V
2	NPN
3	Ground
4	Ground
5	Dim 0-10 V

* Using this connection increases EMC immunity. This connection is not required.

Continuous Mode			
1	+24V		+24V
2			Ground
3	Ground	OR	Ground
4	+24V		
5	Dim 0-10 V		Dim 0-10 V

Optional Remote Connection I/O (8-pin M12)



NOTE: The colors used in this connection chart are for 292 series 8-pin cables.

Remote I/O	
1	Overdrive
2	LED color selection
3	Ground
4	Sector 1 ON
5	Sector 2 ON
6	Sector 3 ON
7	Sector 4 ON
8	Deactivate Keyboard

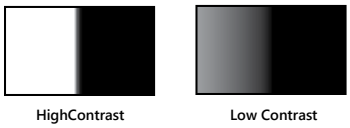
Machine Vision Lighting Overview

Generic lighting products are designed to provide basic illumination. However, lights designed for use as part of machine vision systems are designed with high-quality LEDs to provide consistent and uniform light across the desired field of view. Here are some considerations that should be kept in mind when designing an optimized machine vision lighting system.

Goals for Machine Vision Lighting

Contrast

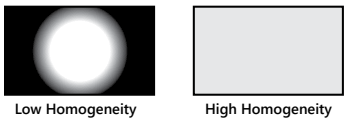
Maximizing contrast is the ultimate goal for any machine vision lighting system. If high contrast can be obtained, then detection is going to be a lot easier. In fact, maximizing contrast is the reason that most camera vision applications are monochrome. Contrast in monochrome images makes image processing easier.



To achieve the best contrast, the user must have a balance between homogeneity and brightness.

Homogeneity

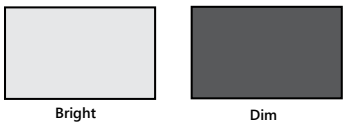
Homogeneity can be thought of as uniformity. The light needs to illuminate the whole field of view uniformly. Hot spots or dark spots remove contrast from specific regions of the field of view and can adversely impact vision accuracy, while a homogenous (uniform) field of illumination can greatly enhance accuracy.



Brightness

Brightness, which is essential in creating contrast, is important in machine vision systems.

By increasing the brightness, system designers can create more robust systems using shorter exposure times. As an added benefit, this will also reduce motion blur.



It is true that if you put more current through an LED, it will get brighter. But one of the worst things for an LED's lifespan is over-current. Even though more current means a brighter LED, that brightness comes at a cost, for the brighter the LED gets the more heat is generated and the more its lifespan is reduced. In other words, the lifespan of an LED is directly related to the current through the LED.

The manufacturers of our machine vision lights have taken great care in selecting the brightest and highest quality LEDs. They have also carefully engineered these lights to maximize light output and LED lifespan in order to deliver a product that will work consistently well for a long period of time. For instance, in order to achieve higher brightness, some of our lights can be strobed with higher current. In these lights, built-in microprocessors manage strobe duration to maximize brightness without adversely impacting life expectancy of the LEDs.

Dealing With Ambient Light

One of the hardest things to design out of a machine vision application is interference with your controlled lighting coming from unwanted ambient light in the location where the system will be used. Ambient light varies greatly from location to location, so designers must keep potential ambient light impacts in mind when designing machine vision lighting systems.

A common misconception is that ambient light comes only from overhead. However, the truth is that ambient light can come from several sources. Among the conditions which can impact ambient lighting are sunlight through a window, the reflection off of a reflective surface, or even a shadow.

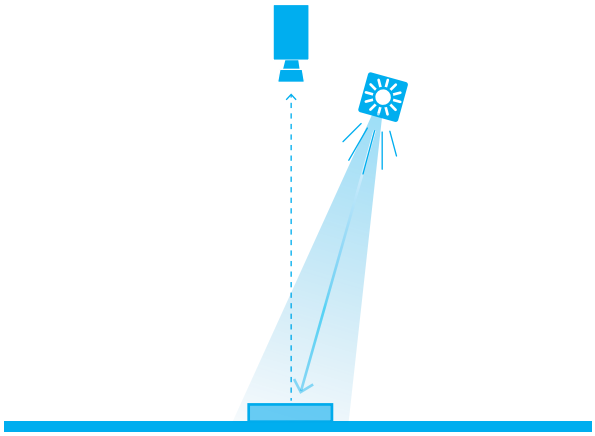
There are situations in which building a shroud around the inspection area is the most appropriate way to deal with ambient light. In other situations, the best way to deal with it is to increase the brightness of the light source.

Another solution to deal with ambient light is to use a specific color (wavelength) of light along with a corresponding filter to only allow that color of light to pass through to the camera. For example, when using a red light (625nm), you can use a 625nm bandpass filter to block out unwanted ambient light of other wavelengths.

Machine Vision Lighting Overview, continued

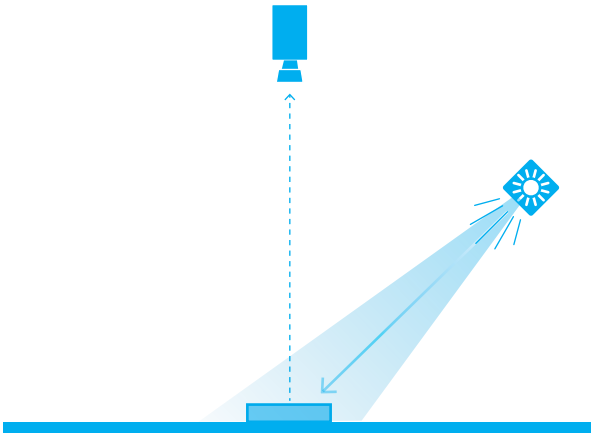
Lighting Principles

Effective machine vision lighting relies on several factors, including what is known as the "angle of incidence." Angle of incidence is defined as the angle at which the light strikes the object being illuminated. This angle is measured from an imaginary line between the camera and the light source, The examples below illustrate how different lighting angles can be used in various applications.



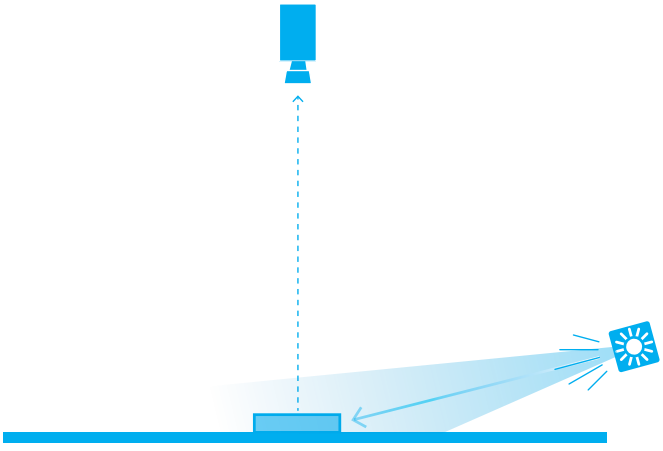
Bright field

- Usually, the angle of incidence is between 0 and 30 degrees.
- Bright field is the easiest type of lighting principle for humans to understand, because this is how we generally see the world. However, this type of lighting system may not be well suited for use where shiny parts are involved.
- Diffusers or polarizers might be needed to decrease the unintended direct reflections.



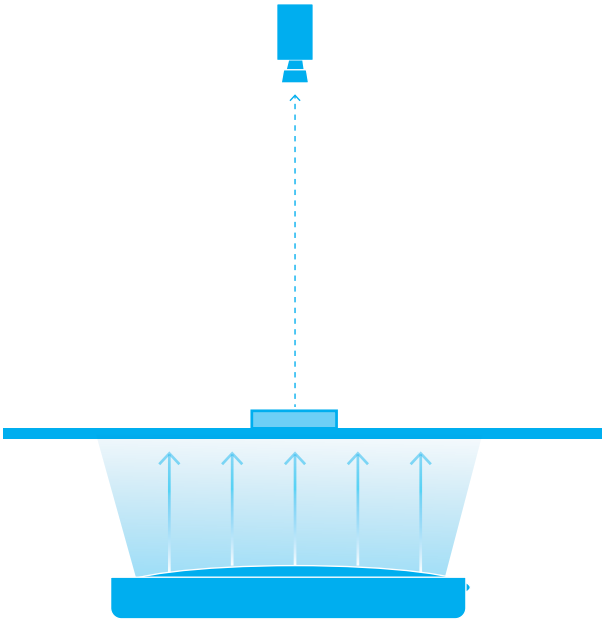
Low angle

- Usually, the angle of incidence is between 30 and 80 degrees.
- The lighting source is placed between the dark field and the bright field so that the user can take advantage of both illumination methods.
- Good for engravings



Dark field

- Usually, the angle of incidence is between 80 and 90 degrees
- This lighting configuration will generally bring high contrast to the edges. For parts that are not shiny, a narrow beam angle is usually best. For shiny parts, a diffused light source usually works best.
- Applications include edge detection and measurement.



Backlight

- The light source is placed behind the object.
- When using this method, it is important that the light is bigger than the field of view.
- Backlighting light sources should be highly diffused and offer high homogeneity.
- Backlighting makes it possible to see a silhouette.