

RL121

High Intensity Bright Field Ring Lights Product Datasheet



Dispersed, Diffuse Illumination

High Intensity LEDs with a wide dispersion angle allowing for relatively close-up work.

High Power LEDs

Equipped with industrial grade LEDs capable of high output strobe and continuous operation, all while maintaining a long lifespan.

Universal LED Pads

Designed to meet a wide range of spectral needs, this light incorporates a universal pad design allowing for a multitude of wavelength possibilities

M4 Mounting

Engineered with four opposing M4 mounting points for highly adjustable positioning

RL121 Series Description

The RL121 provides high-intensity, diffuse light best suited for on-axis applications with non-reflective, flat to moderately mixed height surfaces.

The RL121 differs from the larger RL127 diffuse Bright Field ring light in that it is IP50. Optional film polarization and extra diffusion are available.

As with the RL127, the LEDs do not have secondary lenses, so the light dispersion angle is much broader, meaning it delivers slightly less radiant power on target in favor of a larger area of illumination. It is therefore best suited for relatively close-up work or for low intensity apps that require more diffuse light and a larger field-of-view at longer working distances.



High Intensity



Diffusion and Polarization



16 Available Wavelengths



Multiple Control Options



1-2 Week BTO Lead Times Typical

General Information

General Specifications

Category	Specification			Detail	
Optical	Available Wavelengths			WHI, 395 nm, 375 nm, 385 nm, 395 nm, 405 nm, 455 nm, 470 nm, 530 nm, 590 nm, 625 nm, 850 nm, 940 nm	
	Available Lensing			No Lenses	
	Available Light Conditioning			Diffuser & or Polarizer	
Electrical	Power Consumption Info			See Power Requirements on Page 8	
	Cable Info			80" -0/+6" Long (2 m -0/+150 mm), -105 °C Rated, Foil Shield w/ Drain	
Mechanical	Sizing Info	Standard	Width	0.72"(18.3mm)	See Page 7 for More Details
			Outer Diameter	2.95"(75.0mm)	
			Inner Diameter	1.38"(35.1mm)	
	Weight Info (Standard)			~ 0.36 lbs (~192g) per Unit	
	Mounting Info			M4 Mounting Hole	
Material Info			Anodized Aluminum Housing, Acrylic Window, PVC Cable Jacket, Steel Black Oxide Fasteners		
Thermal	Operating Case Temperatures			25 °C to 60 °C	
	Operating Ambient Temperatures			0 °C to 35 °C	
Certification	Compliance			CE, RoHS, IEC 62471	
	IP Rating			IP50	
	Lumen Maintenance - White Only			L70 (50,000 Hours)	

General Information - Continued

Part Number Key

Model	-	Peak Wavelength	Connector/Control	Light Conditioning Option	-	Alternative Connector
RL121	-	XXX	XX	X	-	XXX
RL121		395 (UV)	C1	D ² (Diffuser)		M8 ¹
		375 (UV)	C5	P ² (Polarizer)		M12 ¹
		385 (UV)	IC			
		395 (UV)	I3			
		405 (violet)	I3S			
		455 (royal blue)	24			
		470 (blue)				
		530 (green)				
		590 (amber)				
		625 (red orange)				
		850 (IR)				
		940 (IR)				
		WHI (white)				
more info on page		5	9			12

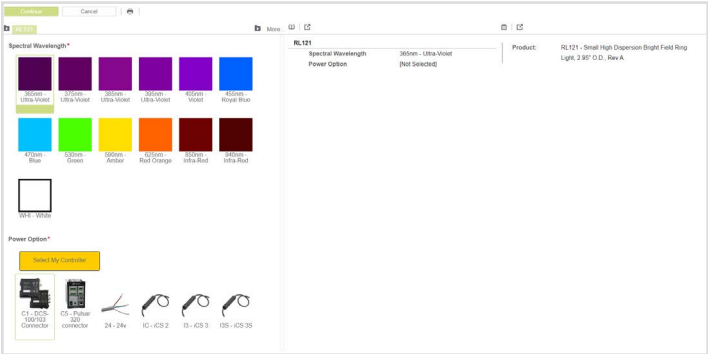
Example Part Numbers:
RL121-470C5D
RL121-WHI24P-M12

¹Only available with IC, I3, I3S configurations
² Only available up to 16" x 16"
³ 470nm will reduce the life of the polarizer if selected

In Stock Lead Times

RL121-WHIIC Stock products ship within three days.
Build-to-Order custom products ship within one to three weeks.

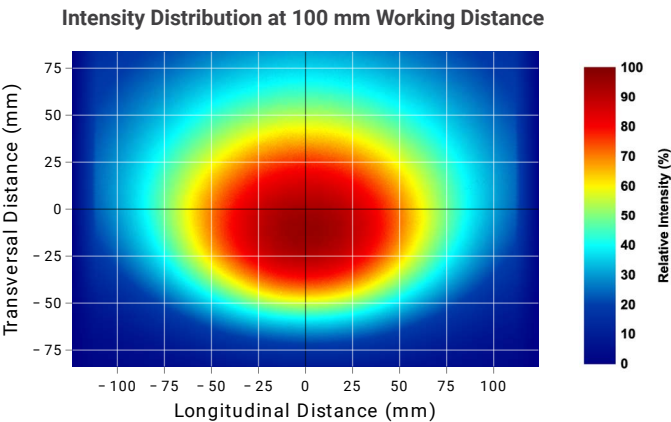
Configurator



Need a build-to-order custom lighting solution in 3 weeks or less? Advanced Illumination's online configurator helps you tailor our RL121 High Intensity Back-lit Backlight Series to your specific needs. For a guided configuration, [visit our online configurator](#).

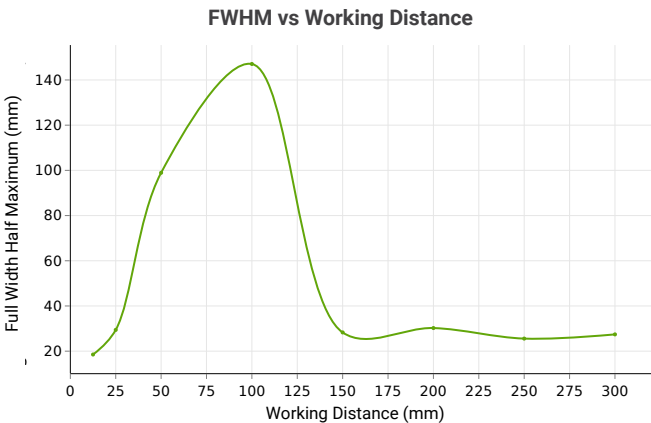
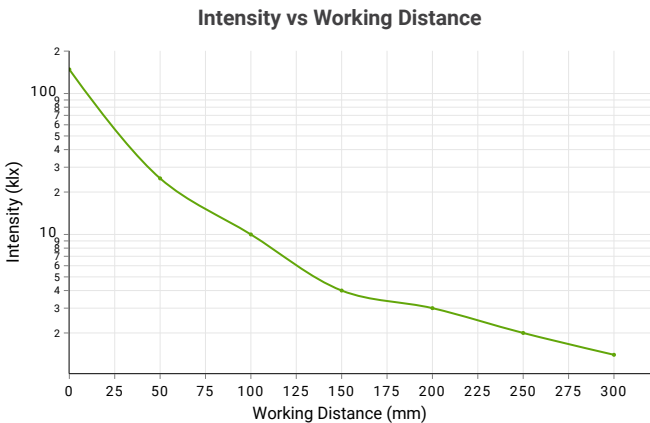
Optical Information

Intensity Distribution Sample

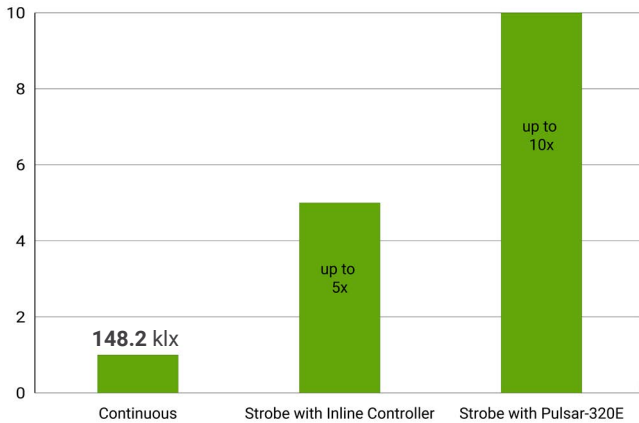


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Intensity and FWHM vs Working Distance



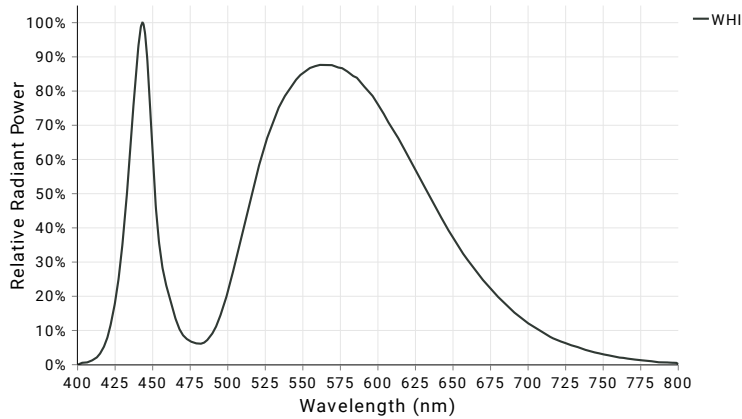
Continuous vs Pulsed Intensity



Under continuous operation, a white RL121 unit will output an **illuminance of 148.2 klx** and an **irradiance of 505.2 W/m²** at the emitting surface. For applications that require higher output, the RL121 Series has been engineered to be overdrive strobe capable. When configured with AI's strobe enabled Inline Controller (ICS-3 and ICS-3S), the RL121 is capable of outputting up-to 5X continuous levels. When configured with a C5 connector, compatible with AI's Pulsar 320, a **RL121 can be strobed up-to 10X continuous intensity levels.**

Optical Information - Continued

White Spectral Profile

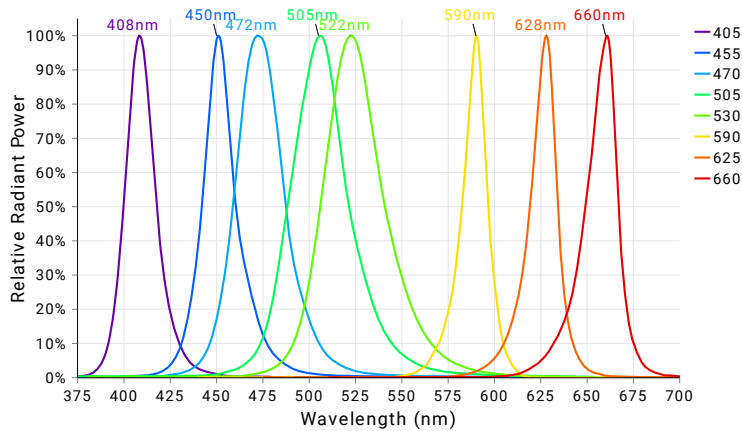


White LED illumination is the most commonly used machine vision lighting configuration. It is often the default choice when specific features of interest do not require color-based highlighting. However, [white LEDs can vary in color temperature, which can impact machine vision systems](#), specifically when matching white light sources.

The RL121 Series white LEDs have a relatively neutral color correlated temperature (CCT) of **5700 K**.

For a more detailed look at the white spectral data, download the [csv file of the raw spectral values](#) and refer to our [Product Spectra Distribution Charts PDF](#).

Visible Spectral Profiles

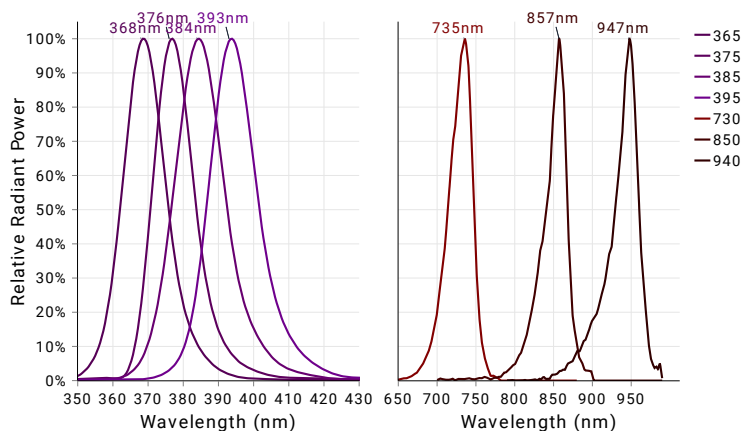


Visible color illumination consists of using wavelengths between 400-700 nm to either create or eliminate contrast on an inspection subject based on differences in a features color hue. When referring to a color wheel, simply remember the following: like colors reflect and brighten surfaces; conversely, opposing colors absorb and darken surfaces.

The RL121 Series is available in **405 nm, 455 nm, 470 nm, 505 nm, 530 nm, 590 nm, 625nm, and 660 nm** configurations.

For a more detailed look at the visible color spectral data, download the [csv file of the raw spectral values](#) and refer to our [Product Spectra Distribution Charts PDF](#).

Non-Visible Spectral Profiles



Near-infrared (NIR) imaging is a machine vision technique using longer wavelengths of 700-1000 nm to penetrate specific materials that are otherwise opaque to under the visible spectrum. When paired with a NIR camera, a NIR light can be ideal for applications such as fill level inspection, circuit board inspection, food safety inspection, and medical imaging.

The RL121 Series is available in **365 nm, 375 nm, 385 nm, 395 nm, 730 nm, 850 nm, 940 nm** configurations.

For a more detailed look at the NIR spectral data, download the [csv file of the raw spectral values](#) and refer to our [Product Spectra Distribution Charts PDF](#).

Disclaimer: The measurements provided above are for approximations only and may vary depending on the method of measurement and the specific configuration being measured.

Optical Information - Continued

Photobiological Risk Factors

Group	Description	Affected Wavelengths
Exempt	No Photobiological Hazard	730, 850
Group 1	No Photobiological hazard under normal behavioral limitations	455, 470, 505, 530, 590, 625, 660
Group 2	Does not pose a hazard due to aversion response to bright light or thermal discomfort	365, 375, 385, 395, 405, White

Advanced Illumination's lighting products have been tested and classified to IEC standards by accredited testing services. For more information on photobiological risk factors, please view the following PDF: <https://www.advancedillumination.com/wp-content/uploads/2019/04/IEC-040119.pdf>

Cleaning Guidelines



To clean our light's optics, it is best to only clean when necessary. Dusting is always the first step in cleaning your optics. Wiping a dusty optic is like cleaning it with sandpaper. So always dust with a canned air duster or compressed and filtered air before wiping any optic. If the dusted optic has no visible stains after you dust it, then remember: "If it's not dirty, don't clean it." Avoid wiping optics when possible.

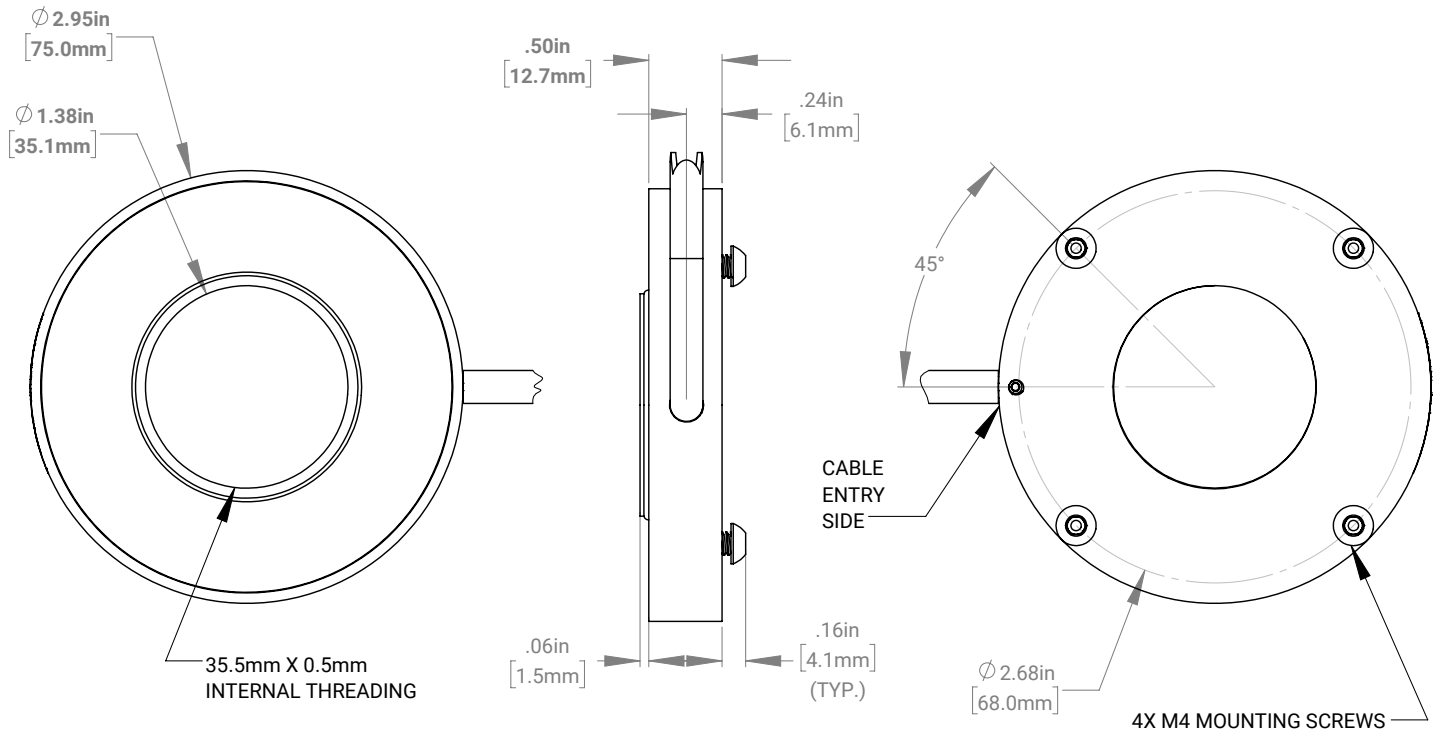
If dusting did not clean the lens or the lens has stains, use only de-ionized water and mild dish soap with a low lint cloth designed for optics to avoid damage to the optic by any harsh chemicals.

Polarizers, beam splitters and collimated films should never be wiped with any type of cloth or solvent, only use the air dusting method to clean these types of optics.

The aluminum housing can be wiped down when dusting is not a sufficient means to thoroughly clean.

Mechanical Information

Installation Drawings



For full installation drawings and complete CAD models of this non-sealed configuration, please visit the [downloads](#) section of the [product webpage](#).

Electrical Information

Power Requirements

Current Required for Power Supply Sizing, per 6" Unit Length

Wavelengths	Configured w/ Voltage Drive (24)	Configured w/ Standard Controller (IC, I3, I3S, C1, C5)	Inline Controller Draw (IC, I3, I3S)
365 nm	0.240A per sq. inch	0.310A per sq. inch	0.350A per sq. inch
375 nm	0.240A per sq. inch	0.310A per sq. inch	0.350A per sq. inch
385 nm	0.240A per sq. inch	0.310A per sq. inch	0.350A per sq. inch
395 nm	0.240A per sq. inch	0.310A per sq. inch	0.350A per sq. inch
405 nm	0.240A per sq. inch	0.310A per sq. inch	0.350A per sq. inch
455 nm	0.240A per sq. inch	0.290A per sq. inch	0.350A per sq. inch
470 nm	0.240A per sq. inch	0.290A per sq. inch	0.350A per sq. inch
530 nm	0.240A per sq. inch	0.290A per sq. inch	0.350A per sq. inch
590 nm	0.120A per sq. inch	0.290A per sq. inch	0.450A per sq. inch
625 nm	0.120A per sq. inch	0.290A per sq. inch	0.450A per sq. inch
850 nm	0.240A per sq. inch	0.270A per sq. inch	0.570A per sq. inch
940 nm	0.240A per sq. inch	0.270A per sq. inch	0.570A per sq. inch
WHI	0.240A per sq. inch	0.290A per sq. inch	0.350A per sq. inch

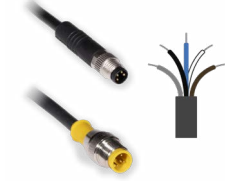
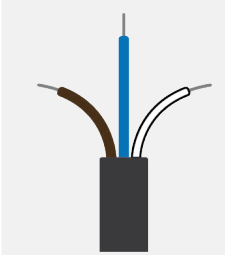
Note: All Advanced Illumination lights and controllers are nominally powered by 24V DC unless otherwise noted. Strobe overdriving with controller based models may require more current and voltage overhead. The values above do not include background current draw from the controller (~100 mA total).

Control Options

Controller Image	Controller Details	Connector Image
	DCS Single Output Controller - Compatible with C1 Configurations PN: DCS-100E The DCS-100E is a compact, din-rail mounted general-purpose external controller with one C1 output connector, wired with three channels. Capable of providing single channel control or multi-channel control for RGB compatible lights. Output Power: 90 W Max Continuous, 540 W Max Pulsed (Overdrive Strobe) Output Current: 4.5A Max Continuous, 15 A Max Pulsed I/Os: 3 External Trigger Inputs Interface: 10/100 Ethernet with Software and browser-based GUIs. SDKs are also available. For more information about our DCS-100E, please visit the controller product page.	
	DCS Triple Output Controller - Compatible with C1 Configurations PN: DCS-103E The DCS-103E is a din-rail mounted general-purpose multi-light controller with three C1 output connectors. Capable of driving three lights in sync or asynchronously. Output Power: 30 W Max Continuous / Output, 180 W Max Pulsed / Output Output Current: 1.5A Max Continuous / Output, 5 A Max Pulsed / Output I/Os: 3 External Trigger Inputs Interface: 10/100 Ethernet with Software and browser-based GUIs. SDKs are also available. For more information about our DCS-103E, please visit the controller product page.	

Electrical Information - Continued

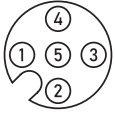
Control Options - Continued

Controller Image	Controller Details	Connector Image
	Pulsar 320E High Current Controller - Compatible with C5 Configuration PN: Pulsar 320E The Pulsar 320E is a high-power, dual output, pulse-only controller geared for overdriving driving lights at very short flash durations with very high current. Output Power: 2500 W Max Pulsed / Output Output Current: 50 A Max Pulsed / Output I/Os: 2 External Trigger Inputs Interface: 10/100 Ethernet with Software GUI. SDKs are also available. For more information about our Pulsar 320E, please visit the controller product page.	
	Inline Controller - Continuous Only - IC Configurations PN: N/A The IC is an inline, cable-mounted continuous-only controller configured/wired directly for the ordered light head. Output Power: 25 W Max Continuous Output Current: 1.25 A Max Continuous I/O: 1 0-10 V Analog Dimming Input Interface: Direct Cable (flying leads or optional connector) For more information about our IC Controller please visit the controller product page.	
	Inline Controller - Strobe and Continuous - I3 & I3S Configurations PN: N/A The I3 and I3S are inline, cable-mounted continuous and pulse (overdrive strobe) capable controllers configured/wired directly for the ordered light head. When operated in pulsed mode, the I3 is a default-on device on power up, whereas the I3S is default-off, requiring a trigger to illuminate. Output Power: 25 W Max Continuous, 125 W Max Pulsed Output Current: 1.25 A Max Continuous, 8 A Max Pulsed (Load Dependent) I/Os: 1 Gated Trigger Signal, 1 0-10 V Analog Dimming Input Interface: Direct Cable (flying leads or optional connector) For more information about our I3/I3S Controller, please visit the controller product page.	
	24V Driver - Continuous Only - 24 Configurations PN: N/A 24V option allows lights to operate continuous output with 24V connection and no additional controllers. Modes: Continuous, can be wired to some 3rd party controllers or external relays for gated operation Interface: Direct cable (flying leads or connector options)	

Electrical Information - Continued

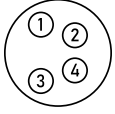
Inline Control Option Wiring Information

Standard Flying Lead and Optional M12 Connector Pinout Functions

Pin (M12)	Wire Color	24V Functions	IC Functions	I3/I3S Functions	M12 Pinout
1	BROWN	24V DC	24V DC	24V DC	 5-Position Male Connector
2	WHITE	N/A	0-10V Analog Control	Reserved	
3	BLUE	DC GND	DC GND	DC GND	
4	BLACK	N/A	Gate Low	PNP/Active High Trigger	
5	GRAY	N/A	N/A	0-10V Analog Control	

The functions above are only applicable when ordering an 24, IC, I3, or I3s power configuration with our without an M12 connector. For more wiring information pertaining to strobing and dimming functionality, please [visit this webpage](#).

Optional M8 Connector Pinout Functions

Pin (M8)	Wire Color	24V Functions	IC Functions	I3/I3S Functions	M8 Pinout
1	BROWN	24V DC	24V DC	24V DC	 4-Position Male Connector
2	WHITE	N/A	0-10V Analog Control	Reserved	
3	BLUE	DC GND	DC GND	DC GND	
4	BLACK	N/A	Gate Low	Active High Trigger	

The functions above are only applicable when ordering an 24, IC, I3, or I3s power configuration with our without an M8 connector. For more wiring information pertaining to strobing and dimming functionality, please [visit this webpage](#).

Accessories

Category	Accessory Image	Accessory Detail
Power Supply		24 Volt DC Power Supply PN: PS24-TL This convenient power source is a universal AC input switching power supply with a regulated output DC current. The power supply comes with an LED Power Indicator, tinned leads marked Positive (+) and Negative (-) and 2 WAGO connectors for simplified assembly. For more information about our 24 Volt DC Power Supply, please visit this webpage .
Dimmer		Manual Dimming Accessory for the IC, I3 and I3s PN: DCS-MP The DCS-MP is a 30-position potentiometer, detented for precision level control and provides repeatable dimming with cable inline controllers. Features include DIN-rail mountable, a flip up cover to prevent accidental adjustments, spring clamp wiring terminal for flying leads or an M12 connector for use with the IC or I3/I3S Inline Controllers. For more information about our Manual Dimming Accessory please visit this webpage .
Dimmer		Manual Dimming Accessory for the IC PN: MP-ICS The MP-ICS is a dimmer which is designed for use on lights with the IC Inline Controller. This unit provides for 0 – 100% intensity control. It is NOT COMPATIBLE with LLI37, BLI38, LLI67, and BLI68 "IC" Lights or lights built with the "24v controller" option. For more information about our Manual Dimming Accessory, please visit this webpage .

Accessories - Continued

Category	Accessory Image	Accessory Detail
Extension Cable		DCS-100E/103E Extension Cable, Single Light Power Cable - C1 Configuration PN: LC-XX-S This extension cable was designed for applications requiring power cables longer than the standard 2 meters provided with Ai lights. This single light cable features a single male and single female 7 pin locking connector (C1) and can be purchased in 3 - 15-meter lengths. For more information about our DCS-100E/103E Extension Cable, Single Output, please visit this webpage.
		DCS-100E/103E Extension Cable, Dual Light Power Cable - C1 Configuration PN: LC-XX-Y This extension cable was designed for applications requiring two identical lights to be powered through a single controller. These Y cables feature a single male and dual female 7 pin locking connectors (C1) and can be purchased in 3 - 15-meter lengths. See attached spec sheet for compatible light configuration. For more information about our DCS-100E/103E Extension Cable, Split Output, please visit this webpage.
Extension Cable		Pulsar 320E Extension Cable - C5 Configuration PN: LC-XX-S-C5 This extension cable was designed for applications requiring power cables longer than the standard 2 meters provided with Ai lights. This single light cable features a single male and single female Pulsar 320 connector (C5) and can be purchased in 3 - 15 meter lengths. For more information about our Pulsar 320E Extension Cable, please visit this webpage.
Adaptor Cable		Cognex Gen2 Inline Controller Adaptor Cable PN: AD-I3-CGX2 This cable adaptor is for connecting I3/I3S configured lights with Cognex Gen2 Cameras, and comes with a male to female M12 connectors. For more information about our Cognex Gen2 Inline Controller Adaptor Cable, please visit this webpage.
Filters		Camera Lens Band Pass Filters PN: BPXXX-YYY Eliminating all but a narrow band of light (+/- 40nm) centered on the specified wavelength, band pass filters are used to enhance colors, or to stop unwanted ambient light from reaching the camera. Filtering can replace existing shrouds, simplifying the physical set up of an inspection site. Ai offers 635nm and 660nm band pass filters to fit several different lens sizes. For more information about our Camera Lens Band Pass Filters, please visit this webpage.
Mounting Brackets		Mounting Brackets PN: LB For mounting purposes this product is compatible with Fastens to the M4 mounting channel for simplified mounting. Included in product purchase. For more information about our Mounting Brackets, please visit this webpage.

Additional Information

Warranty

Every Advanced illumination, Inc. (Ai) product is thoroughly inspected and tested before leaving the factory. Products are warranted to be free of defects in workmanship and materials for a period of FIVE YEARS from the original date of purchase. Should a defect develop during this period, customers may return the complete product, freight prepaid, to one of Ai's distributors or to the Ai factory. All product warranty returns require a Return Merchandise Authorization (RMA) number which is obtained from Customer Service. The RMA number must be clearly marked on the outside of the package. Ai will inspect the unit, and if a defect is found will, at our option, repair or replace the product without charge. Ai disclaims liability for any implied warranties, including implied warranties of "merchantability" and "fitness for a specific purpose." For products under warranty that have since been discontinued, Ai will make an effort to replace with equivalent parts; for circumstances that do not allow for equivalent replacement, Ai reserves the right to repair or replace these products with an updated version. Ai cannot be held responsible for the unauthorized or inappropriate use of its products. Any unauthorized repair or modifications will result in a voided warranty. No Liability for Consequential Damages: In no event shall Ai be liable for any consequential, special, incidental, or indirect damages of any kind arising from the sale or use of the products.

Compliance

Our lighting products are designed and tested to meet CE, RoHS, and IEC standards. As a global ISO 9001 certified company, we understand the importance of compliance and perform accelerated testing on every product before shipment. For more information on our compliance standards, please see our compliance documentation here: <https://www.advancedillumination.com/services/compliance-statements/>

Electromagnetic Compatibility

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) as stated in the product specifications. These requirements and limits are designed to provide reasonable protection against harmful interference only when the product is operated in its intended industrial electromagnetic environment. To minimize the potential for electromagnetic interference or unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Customer Service

For information on existing orders, or to make an order adjustment, contact us Monday through Friday 8:00 am to 5:00 pm ET or send an email to orders@advancedillumination.com.

Company Information

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