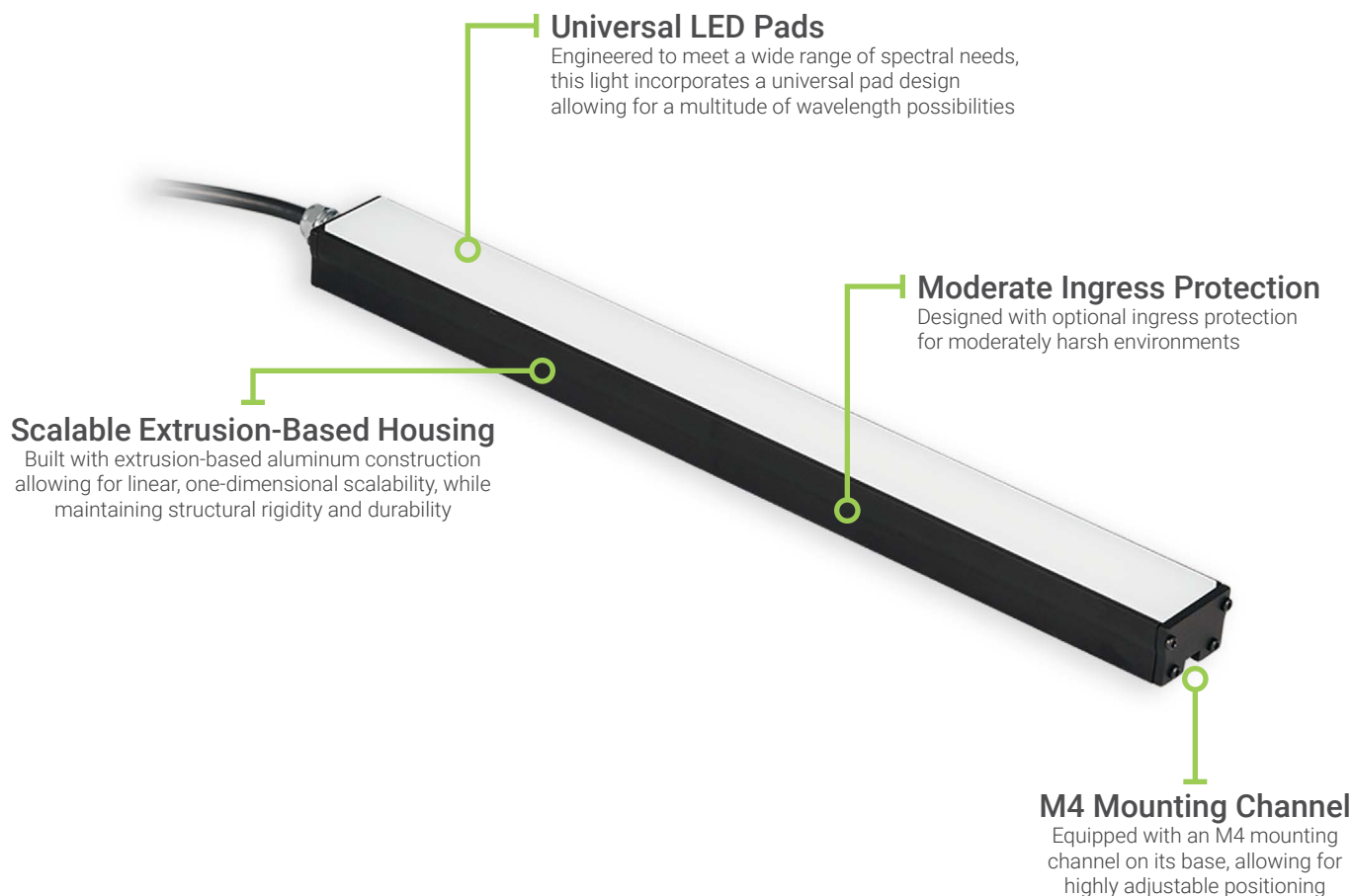


BL313 Series

Medium Intensity Linear Backlights

Product Datasheet



BL313 Series Description

The BL313 Series is a group of versatile linear light sources capable of producing highly diffuse illumination for a wide range of applications.

These uniform backlights can be used behind the object of interest for line scan applications or as non-directional bar light illuminators for more diffuse general-purpose machine vision lighting.

As with all Advanced illumination products, this series is built for customizability while maintaining best-in-class build-to-order lead times of only one to two weeks.

2in1

Dual Purpose Illuminator



Scalable Linear Design



8 Available Wavelengths



Ingress Protection Available



1-2 Week BTO Lead Times Typical

General Information

General Specifications

Category	Specification			Detail		
Optical	Available Wavelengths			White, 455 nm, 470 nm, 530 nm, 590 nm, 625 nm, 850 nm, 940 nm		
	Available Lensing			No Lenses		
	Available Light Conditioning			None		
Electrical	Power Consumption Info			See Power Requirements on Page 10		
	Cable Info			80" -0/+6" Long (2 m -0/+150 mm), 105 °C Rated, Foil Shield w/ Drain		
Mechanical	Sizing Info	Standard	Length	3.15"(80.1mm) to 21.15"(537.2mm)	See Page 8 for More Details	
			Width	1.27"(32.2mm)		
			Height	.85"(21.7mm)		
		Sealed	Length	3.31"(84.1mm) to 21.31"(541.3mm)		
			Width	1.27"(32.2mm)		
			Height	.85"(21.7mm)		
	Weight Info (Standard)			~ 0.47 lbs (~213 g) per 4" Unit Length		
	Mounting Info			M4 Mounting Nut Channel, See Page _ for More Details		
Material Info			Anodized Aluminum Housing, Acrylic Window, Nickel Plated Brass Strain Relief, PVC Cable Jacket, Steel Black Oxide, Optional: Silicone Sealant, Neoprene Gasket/ Buna-N Rubber O-Rings			
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 and IP65		
	Lumen Maintenance - White Only			L70 (50,000 Hours)		

General Information - Continued

Part Number Key

Model	Emitting Length (in)	-	Peak Wavelength	Connector/Control	Washdown Option	-	Alternative Connector
BL313	XX	-	XXX	XX	X	-	XXX
BL313	02" increments from 02" to 20"		455 (royal-blue)	C1	W		M8 ¹
			470 (blue)	C5			M12 ¹
			530 (green)	Q4			
			590 (amber)	IC			
			625 (red-orange)	I3			
			850 (IR)	I3S			
			940 (IR)	24			
			WHI (white)				
more information on page	8		5	10			12

Example Part Numbers:
BL31312-530IC-M12
BL31308-WHIC1W

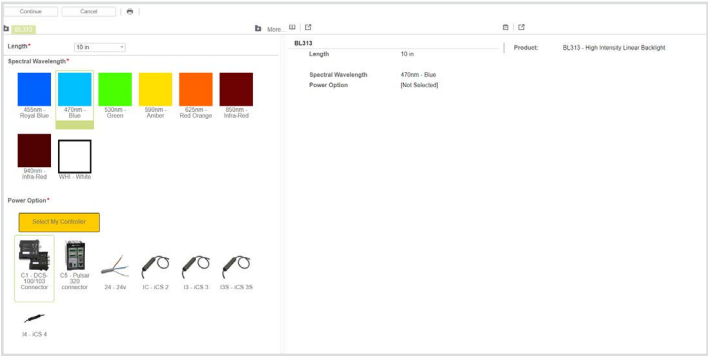
¹ Available with IC, I3, I3S, and 24 V

In StockLead Times

Unavailable

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

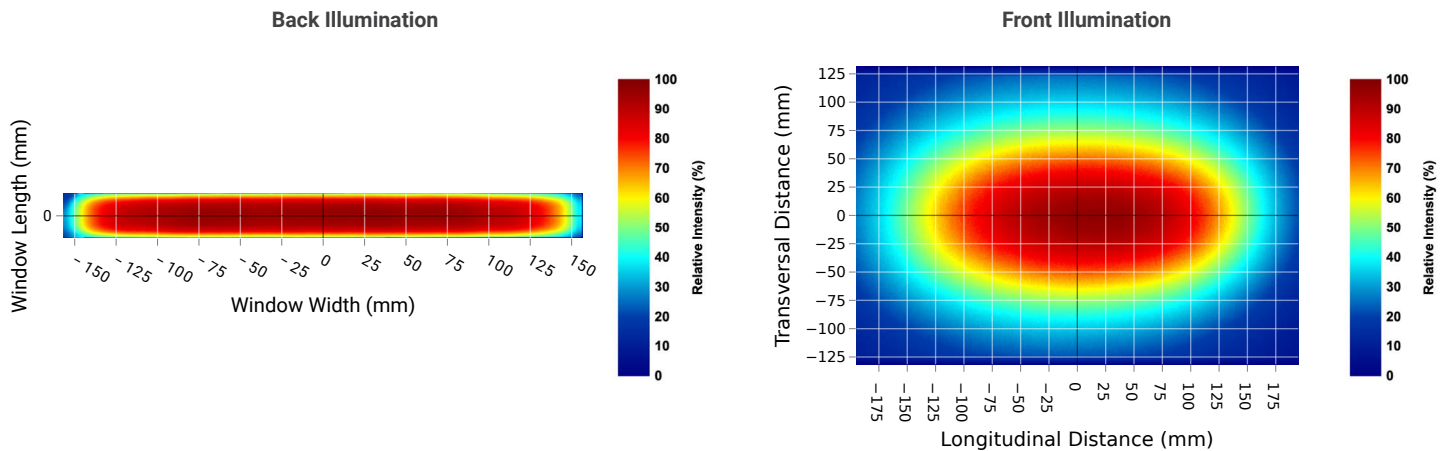
Configurator



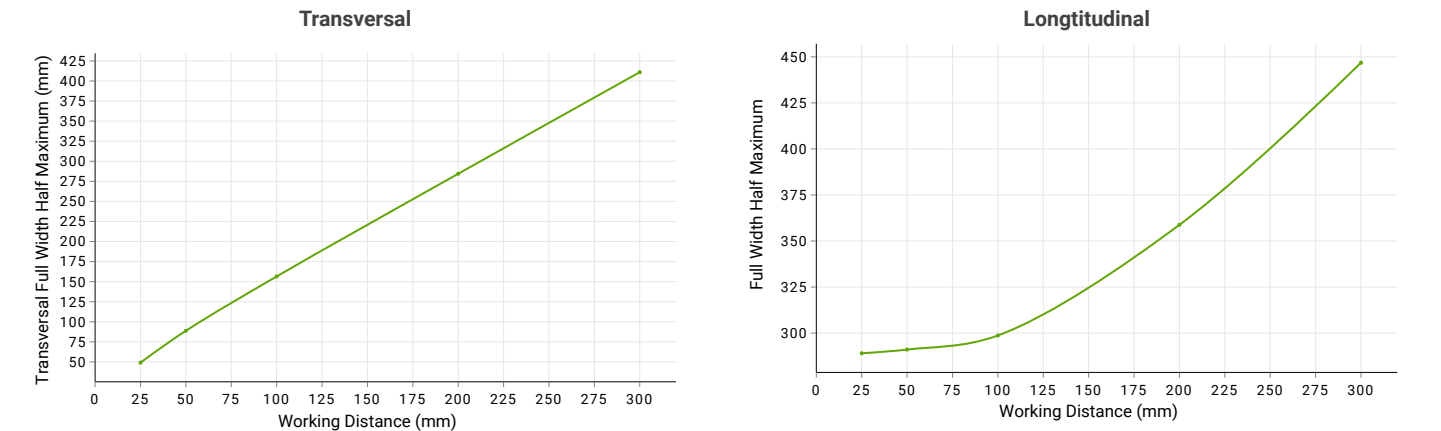
Need a build-to-order custom lighting solution in 3 weeks or less? Advanced Illumination's online configurator helps you tailor our BL313 Medium Intensity Linear Backlight Series to your specific needs. For a guided configuration, [visit our online configurator](#).

Optical Information

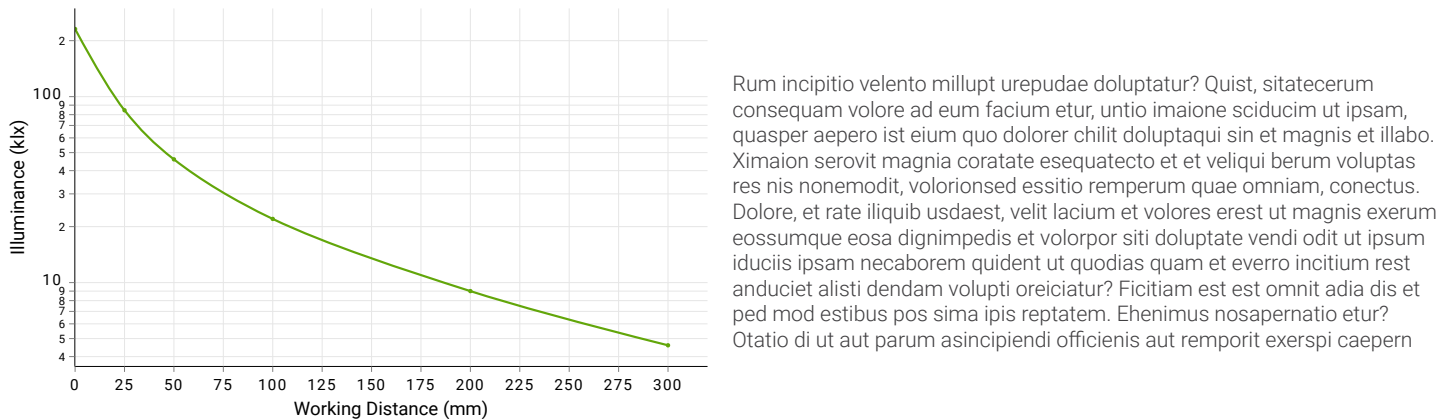
Intensity Distribution



FWHM vs Working Distance



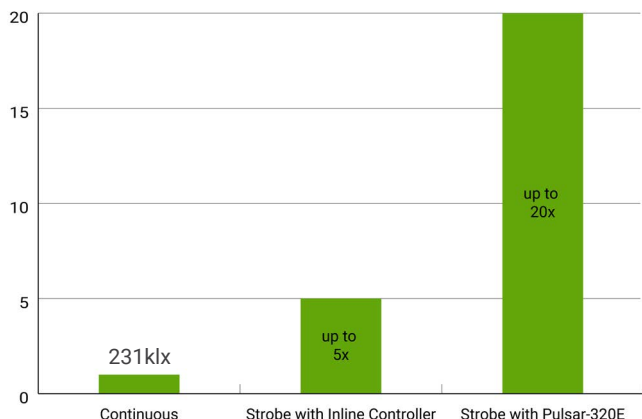
Illuminance Vs. Working Distance



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

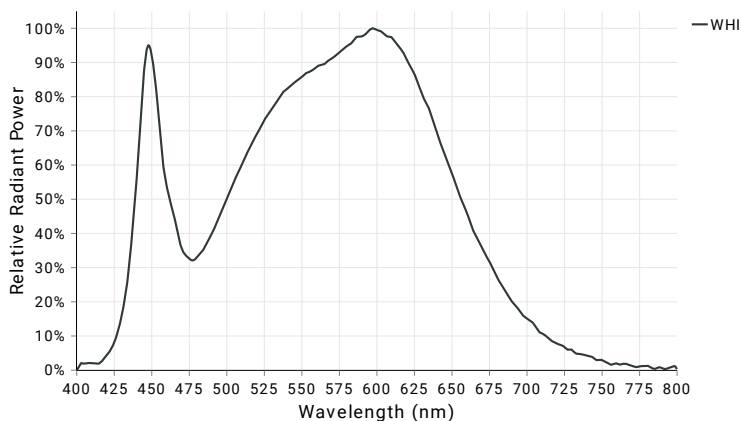
Optical Information

Continuous vs Pulsed Intensity



Under continuous operation, a 12-inch white BL313 unit will output an **illuminance of 231 klx** and an **irradiance of 735 W/m²** at the emitting surface. For applications that require higher output, the BL313 Series has been engineered to be overdrive strobe capable. When configured with AI's strobe enabled Inline Controller (ICS-3 and ICS-3S), the BL313 is capable of outputting up-to 5X continuous levels. When configured with a C5 connector, compatible with AI's Pulsar 320, a BL313 can be strobed up-to 20X continuous intensity levels.

White Spectral Profile

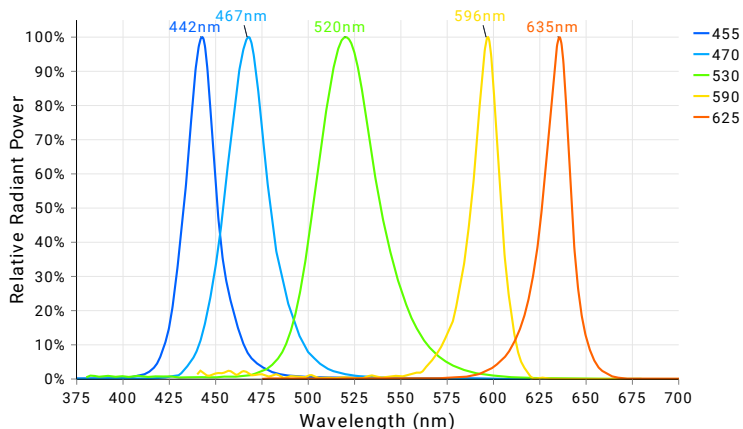


White LED illumination is the most commonly used machine vision lighting configuration. It is often the default choice when specific features of interest do not require color-based highlighting. However, **white LEDs can vary in color temperature, which can impact machine vision systems**, specifically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

The BL313 Series white LEDs have a relatively neutral color correlated temperature (CCT) of **5500 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



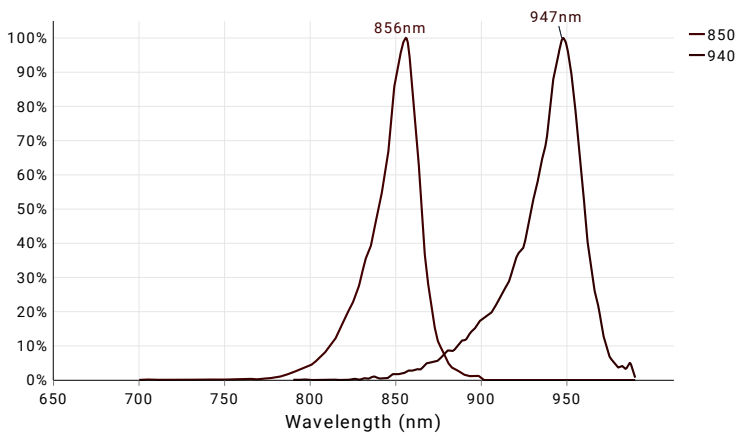
Visible color illumination consists of using wavelengths between 400-700 nm to either create or eliminate contrast on an inspection subject based on differences in a features color hue. When referring to a color wheel, simply remember the following: like colors reflect and brighten surfaces; conversely,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

The BL313 Series is available in **455 nm, 470 nm, 530 nm, 590 nm, and 625 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](#).

Optical Information - Continued

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 BL313 Series is available in **850 nm** and **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](#).

Photobiological Risk Factors

Group	Description	Affected Wavelengths
Exempt	No Photobiological Hazard	850 nm, 940 nm
Group 1	No Photobiological hazard under normal behavioral limitations	455 nm, 470 nm, 530 nm, 590 nm, 625 nm
Group 2	Does not pose a hazard due to aversion response to bright light or thermal discomfort	White

Advanced Illumination's lighting products have been tested and classified to IEC standards by accredited testing services. For more information on our of 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.

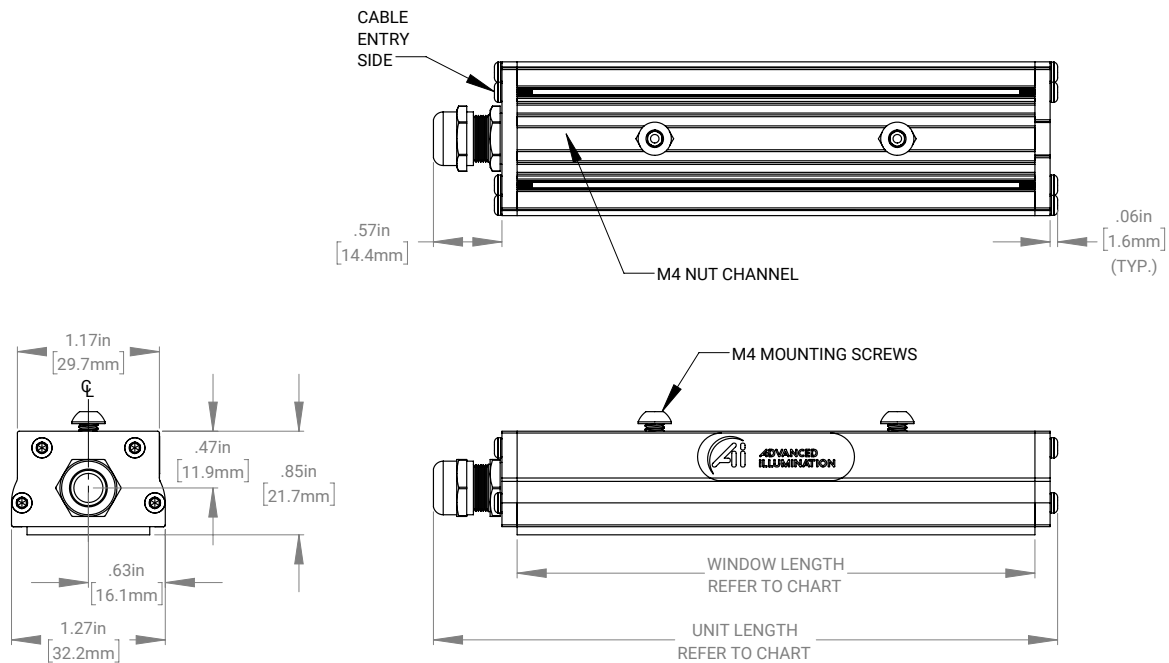
Polarizers, beam splitters and collimated films should never be wiped with any type of cloth or solvent, only use the air dusting method to clean these types of optics.

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

Category Comparisons

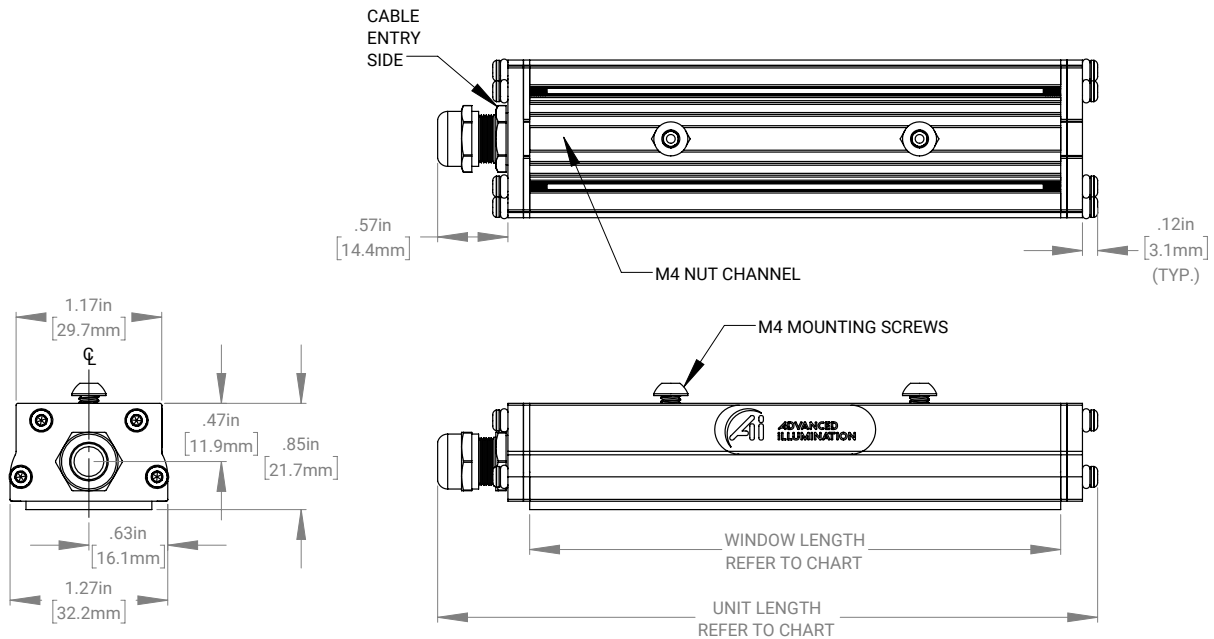
Mechanical Information

Installation Drawings



For XX and YY dimensions refer to Part Number Key.

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



For XX and YY dimensions refer to Part Number Key.

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

Mechanical Information - Continued

Sizing Chart

Part Number	Length (Inches)				Length (Millimeters)			
	Non-Washdown		Washdown		Non-Washdown		Washdown	
	Unit	Window	Unit	Window	Unit	Window	Unit	Window
BL13802	3.15	2.27	3.31	2.27	80.01	57.658	84.07	57.658
BL13804	5.15	4.27	5.31	4.27	130.81	108.458	134.87	108.458
BL13806	7.15	6.27	7.31	6.27	181.61	159.258	185.67	159.258
BL13808	9.15	8.27	9.31	8.27	232.41	210.058	236.47	210.058
BL13810	11.15	10.27	11.32	10.27	283.21	260.858	287.27	260.858
BL13812	13.15	12.27	13.31	12.27	334.01	311.658	338.07	311.658
BL13814	15.15	14.27	15.31	14.27	384.81	362.458	388.87	362.458
BL13816	17.15	16.27	17.33	16.27	435.61	413.258	439.67	413.258
BL13818	19.15	18.27	19.31	18.27	486.41	464.058	490.47	464.058
BL13820	21.15	20.27	21.31	20.27	537.21	514.858	541.27	514.858

Electrical Information

Power Requirements

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

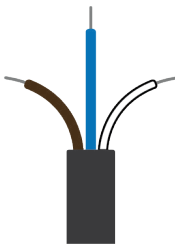
Wavelengths	Configured w/ Voltage Drive (24)	All Controller Based Models (C1, C5, IC, I3, I3S, Q4, Q1)	Inline Controller Current Draw (IC, I3, I3S)
WHI	0.120A per sq. inch	0.0160A per sq. inch	0.240A per sq. inch
455 nm	0.120A per sq. inch	0.0160A per sq. inch	0.240A per sq. inch
470 nm	0.120A per sq. inch	0.0160A per sq. inch	0.240A per sq. inch
530 nm	0.120A per sq. inch	0.0160A per sq. inch	0.240A per sq. inch
590 nm	0.120A per sq. inch	0.200A per sq. inch	0.240A per sq. inch
625 nm	0.120A per sq. inch	0.200A per sq. inch	0.240A per sq. inch
850 nm	0.120A per sq. inch	0.200A per sq. inch	0.240A per sq. inch
940 nm	0.120A per sq. inch	0.200A per sq. inch	0.240A 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.

Control Options

Controller Image	Controller Details	Connector Image
	DCS Single Output Controller - Compatible with C1 Configurations PN: DCS-100E The DCS100E is a compact, din-rail mounted general-purpose controller with (1) output, wired with (3) channels. Power Output: 100W Continuous, 525W pulsed Channels: (3), drives one lighthead with either monochrome or mixed-wavelengths (Ex. RGB) Modes: Continuous, Gated, Pulsed (with overdrive) I/Os: (3) External trigger inputs Interface: 10/100 Ethernet with SW GUI and browser-based GUI. SDK available. For more information about our DCS-100E, please visit the controller product page.	
	DCS Triple Output Controller - Compatible with C1 Configurations PN: DCS103E The DCS103E is a compact, din-rail mounted general-purpose controller with (3) outputs. Power Output: 100W Continuous, 525W pulsed Outputs: (3), drives up to three lights in sync or asynchronous Modes: Continuous, Gated, Pulsed (with overdrive) I/Os: (3) External trigger inputs Interface: 10/100 Ethernet with SW GUI and browser-based GUI. SDK available For more information about our DCS-103E, please visit the controller product page.	
	Pulsar 320E High Current Controller - Compatible with C5 Configuration PN: Pulsar 320E The Pulsar-320E is a high-power pulse-mode controller geared for driving lights at very short flash durations and high current. Power Output: 10,000W pulsed Outputs: (2), drives two lights in sync or asynchronous Modes: Pulsed I/Os: (2) External trigger inputs Interface: 10/100 Ethernet with SW GUI and browser-based GUI. SDK available For more information about our Pulsar 320E, please visit the controller product page.	

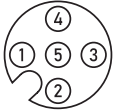
Electrical Information - Continued

Controller Image	Controller Details	Connector Image
	Inline Controller - Continuous Only - IC Configurations <i>PN: N/A</i> The ICS-2 is an inline, cable-mounted general-purpose driver. The ICS-2 is configured and wired directly for the ordered lighthead and is not intended to be used as a standalone driver. Power Output: 25W Continuous Outputs: (1) Fixed with lighthead Modes: Continuous, gated I/Os: (1) External trigger input, (1) 0-10V 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 <i>PN: N/A</i> The ICS-3 is an inline, cable-mounted general-purpose driver. The ICS-3 is configured and wired directly for the ordered lighthead and is not intended to be used as a standalone driver. Power Output: 25W Continuous, 100W pulsed Outputs: (1) Fixed with lighthead Modes: Continuous, gated, pulsed with overdrive (Adaptive Overdrive) I/Os: (1) External trigger input, (1) 0-10V 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 <i>PN: N/A</i> 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) For more information about our 24V Driver, please visit the driver product page.	

Electrical Information - Continued

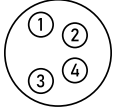
Inline Control Option Wiring Information

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 (M12)	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 M12 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 .
		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 .

Electrical Information - 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.

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

Advanced Illumination
440 State Garage Road, Rochester, VT 05767
Phone: +1 (802) 767 3830
Fax: +1 (802) 767 2636
Email: info@advancedillumination.com
Web: advancedillumination.com
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