

Now Available for Standard Lights Models!
Ultraviolet (UV) and Infrared (IR) LED Wavelengths

Infrared Lighting

Patent Pending

- Peak wavelength: 850 nm , 940 nm

Ultraviolet Lighting

Patent Pending

- LED with anti-spark protection
- Peak wavelength: 365 nm
- LED light spread: 20degrees

Achieve maximum machine vision accuracy and reliability by choosing from the full range of LED wavelengths

CCS is now offering most standard lights in UV and IR wavelength because achieving the best image for machine vision requires the right light and the right wavelength. You choose the light that achieves the highest levels of system accuracy and reliability.

Comparing the effect of different LED wavelength: multi colored packaging

Imaging sample work

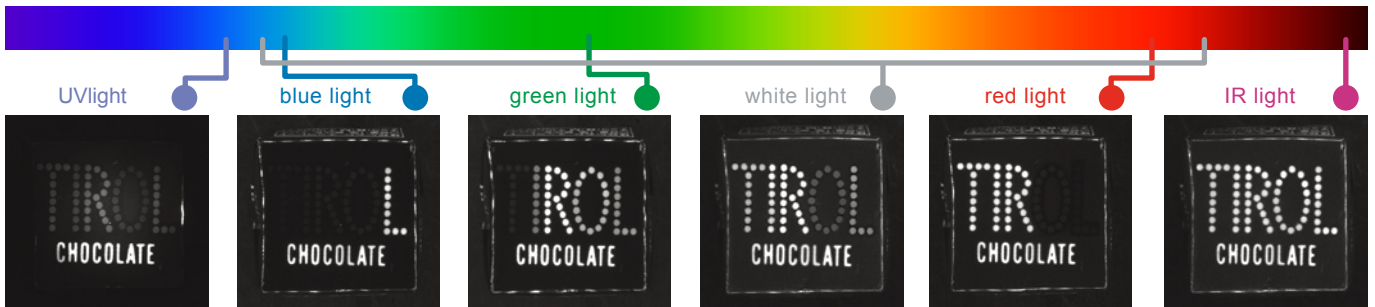
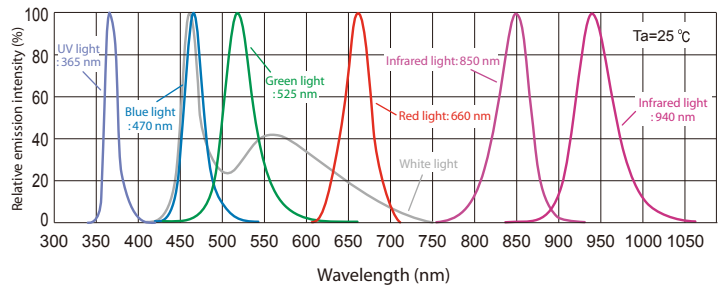


The images below illustrate the effect of different LED colors used to illuminate printed package graphics containing a wide range of colors. Individual colors of print can be highlighted using the like color of light because colored LED lights contain a narrow band of

wavelengths which reflect strongly when chosen to match the color of the surface.

White LED light contains all visible wavelengths and reflects a gray value from all colors according to their relative brightness. IR light reflects almost equally from each print color. Choosing the best wavelength for your inspection needs is essential.

LED emission spectrum distribution for standard models

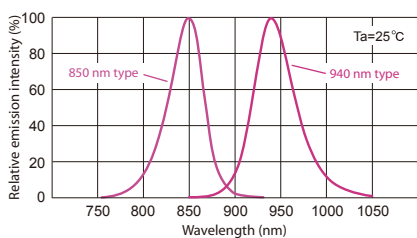


Infrared (IR) Light Series

Infrared light's long wavelength often allows for less scattering from part surfaces and higher transmission rates through them. Higher transmission means it can pass through more materials making IR light ideal for inspecting package fill levels or ensuring against foreign matter. Lower surface scattering means IR light can often be used to ignore some surface paint or print for unobstructed inspection for surface details such as scratches, chips, holes, edges, or characters on a wide variety of materials including paper, cloth, plastics and metals.

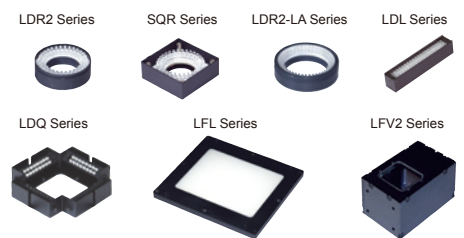
IR Series offers choice of peak wavelengths of 850-nm or 940-nm and features LED light spread angles optimized for the light structure

850-nm versus 940-nm peak wavelength infrared LED emission spectrum

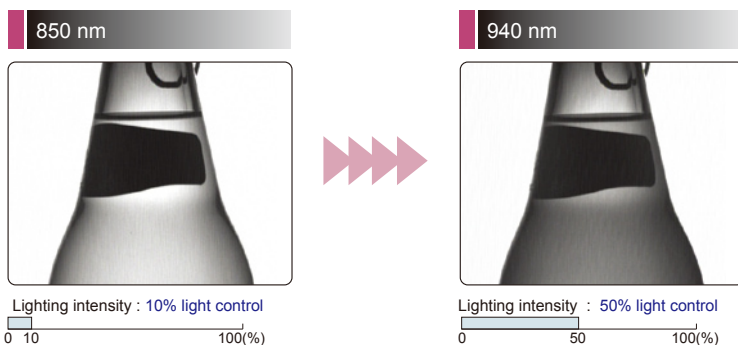


The choice of the IR LED peak wavelength allows you to capture the best images for your application by optimizing for the reflectivity of the object and sensitivity of the sensor. A full line of 32 light models allows you to choose the type of light geometry best suited for your application

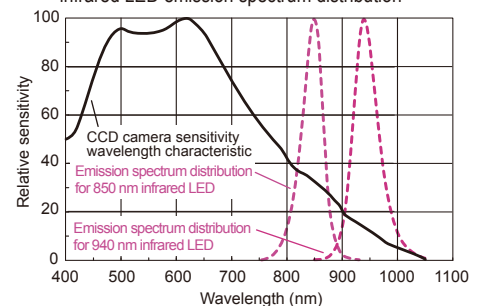
Product line for IR



Imaging with peak wavelength of 850 nm vs. 940 nm






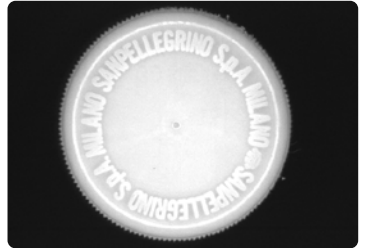

Typical camera* spectral sensitivity characteristic vs. infrared LED emission spectrum distribution



* CV-M50IR provided by JAI Corp.

Infrared lighting application examples

Infrared light often transmits through material more than visible light wavelengths. This common feature can be used as a solution to common machine vision inspection that require seeing through surface layers or material.

<p>Example image</p>  <p>Wafer pattern</p>	<p>Visible light</p>  <p>A backlight with visible light does not transmit through wafer.</p>	<p>Infrared light</p>  <p>An IR backlight passes through the wafer material to uniformly silhouette the pattern.</p>
<p>Example image</p>  <p>With occluding graphics</p>	<p>Visible light</p>  <p>Visible light of any wavelength illuminates the graphics behind the date.</p>	<p>Infrared light</p>  <p>IR light passes through the occluding graphic pigment but not this printed date code enabling reliable OCR/OCV</p>
<p>Example image</p>  <p>Printed date code occluding molded surface features</p>	<p>Visible light</p>  <p>Printed text on the cap absorbs visible light causing it to occlude any surface defects or feature detection in the</p>	<p>Infrared light</p>  <p>IR light passes through the printed text and reflect uniformly from the unbroken surface allowing for defect or feature detection.</p>
<p>Example image</p>  <p>Foreign matter mixed in beverage container</p>	<p>Visible light</p>  <p>A visible light from a backlight does not penetrate the plastic bottle.</p>	<p>Infrared light</p>  <p>An IR backlight penetrates the plastic bottle and silhouettes the foreign object resting at the bottom for reliable detection.</p>

*The sample objects above have been purchased and worked on by CCS and do not represent the original quality or performance of the individual products.

Infrared lighting IR Series Specifications



Model Specifications RoHS-compliant products

	Model	Peak Wavelength (nm)	Power Consumption	Weight (g)		Model	Peak Wavelength (nm)	Power Consumption	Weight (g)
1	LDR2-50IR850	850	12V/3.8W	50	9	LDL-82X15IR850	850	12V/3.8W	60
	LDR2-50IR940	940				LDL-82X15IR940	940		
2	LDR2-70IR850	850	12V/7.6W	130	10	LDL-130X15IR850	850	12V/6.1W	90
	LDR2-70IR940	940				LDL-130X15IR940	940		
3	LDR2-90IR850	850	12V/14W	170	11	LDL-180X16IR850	850	12V/8.4W	110
	LDR2-90IR940	940				LDL-180X16IR940	940		
4	SQR-56IR850	850	12V/3.8W	80	12	LDQ-78IR850	850	12V/6.1W	110
	SQR-56IR940	940				LDQ-78IR940	940		
5	LDR2-74IR850-LA	850	12V/5.7W	90	13	LDQ-150IR850	850	12V/16W	530
	LDR2-74IR940-LA	940				LDQ-150IR940	940		
6	LDR2-132IR850-LA	850	12V/16W	270	14	LDL-100X100IR850	850	24V/21W	650
	LDR2-132IR940-LA	940				LDL-100X100IR940	940		
7	LDL-42X15IR850	850	12V/1.9W	40	15	LFL-100IR850	850	12V/5.3W	220
	LDL-42X15IR940	940				LFL-100IR940	940		
8	LDL-74X27IR850	850	12V/6.9W	80	16	LFV2-50IR850	850	12V/8.4W	260
	LDL-74X27IR940	940				LFV2-50IR940	940		

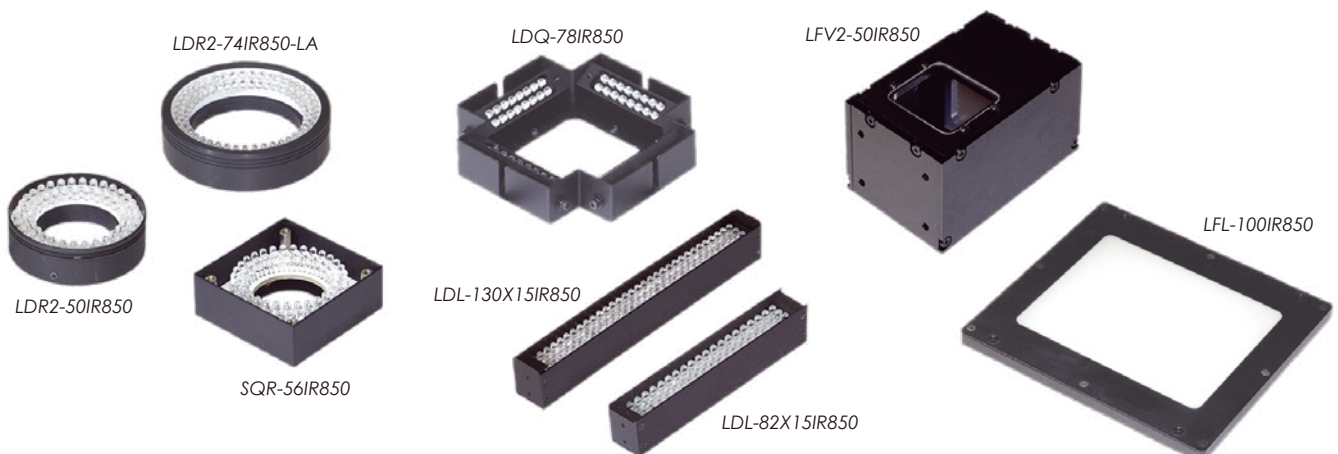
Series Specifications

Series	IR
LED Color	IR
Peak Wavelength(Typ.)	850nm/940nm
Viewing Angle	Plus minus 15 degree (Except 14, 15, 16)
Input Voltage	DC12V(AC or 24VDC adapter available)
Connector	SMR-02V-B (JST)
Polarity, Signal	1: Anode (+) brown / 2: Cathode (-) blue
Cable Length	0.3m
Case Material	Aluminum
Operating Conditions	Temperature: 0 ~ 40.℃ , Humidity: 20 ~ 85%RH (non-condensing)
Storage Conditions	Temperature: -20 ~ 60.℃ , Humidity: 20 ~ 85%RH (non-condensing)
Laser Class	Class 1 LED product: Do not look into or touch the beam directly.

*Lights with a peak wavelength of 950 nm are available by order.

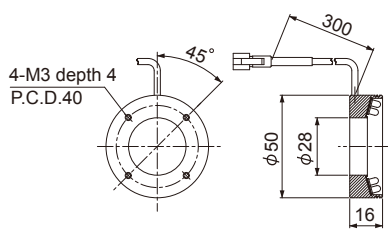
Infrared light is not visible to the human eye. Avoid prolonged direct viewing of LED light.

Images

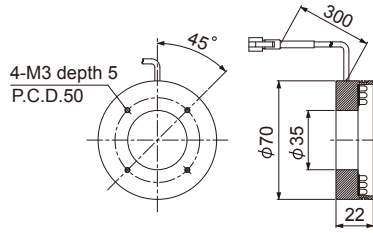


■ Dimensions (mm)

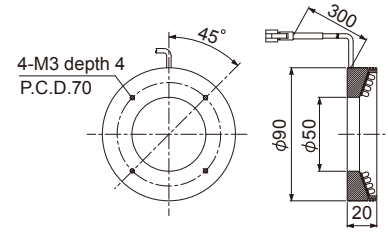
1.LDR2-50IR850/LDR2-50IR940



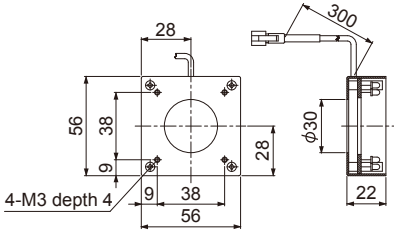
2.LDR2-70IR850/LDR2-70IR940



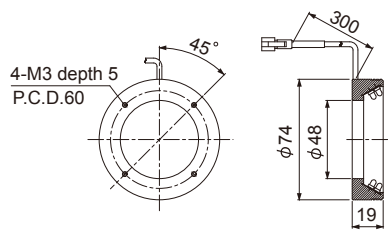
3.LDR2-90IR850/LDR2-90IR940



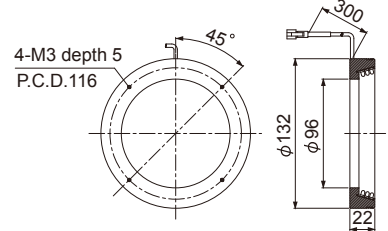
4.SQR-56IR850/SQR-56IR940



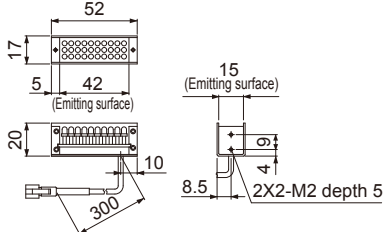
5.LDR2-74IR850-LA/LDR2-74IR940-LA



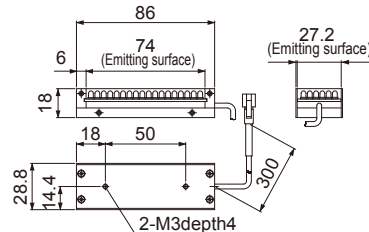
6.LDR2-132IR850-LA/LDR2-132IR940-LA



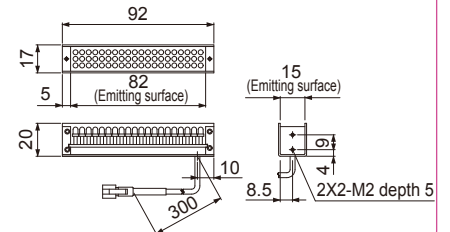
7.LDL-42X15IR850/LDL-42X15IR940



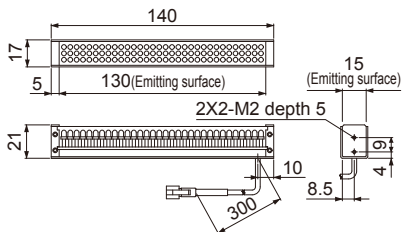
8.LDL-74X27IR850/LDL-74X27IR940



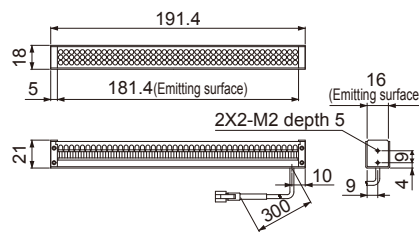
9.LDL-82X15IR850/LDL-82X15IR940



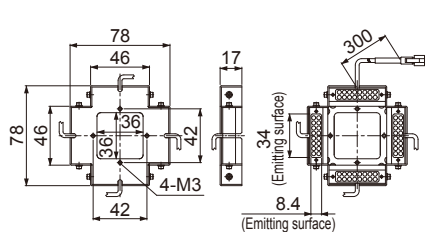
10.LDL-130X15IR850/LDL-130X15IR940



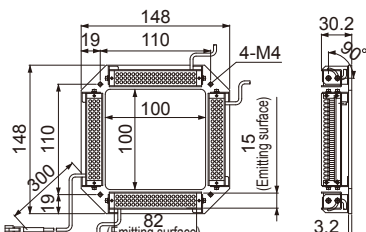
11.LDL-180X16IR850/LDL-180X16IR940



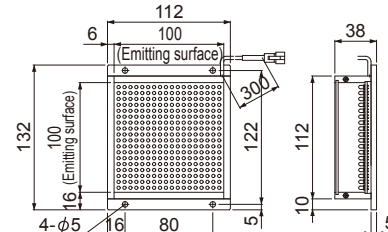
12.LDQ-78IR850/LDQ-78IR940



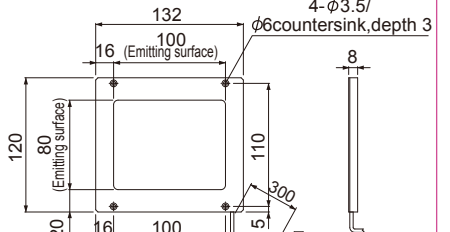
13.LDQ-150IR850/LDQ-150IR940



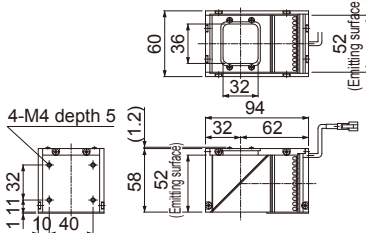
14.LDL-100X100IR850-DF/LDL-100X100IR940-DF



15.LFL-100IR850/LFL-100IR940



16.LFV2-50IR850/LFV2-50IR940

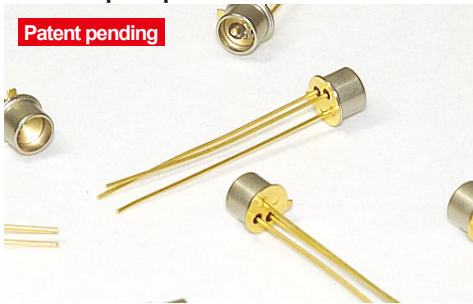


Ultraviolet (UV) Series

The new UV wavelength availability for standard CCS light models allows for the benefits of LED lights----lifetime, flexibility, and strobing----for application that require UV light to solve the application and achieve the best image. In order to ensure maximum lifetime and safety CCS's market leading engineering capability has developed an "anti-spark" protection feature. A moderate 20 degree LED light spread contributes to illumination intensity, range, and uniformity.

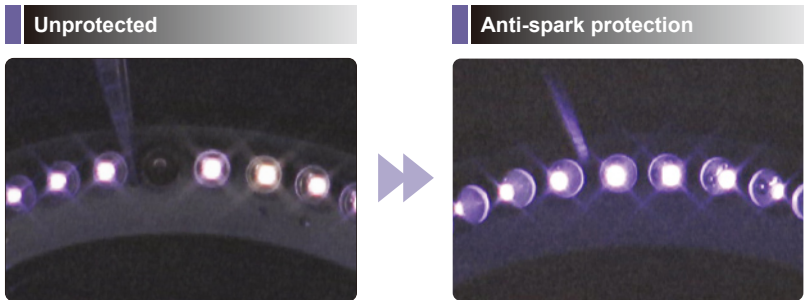
Employment of original ultraviolet LED achieving even higher safety and reliability

■ CCS's proprietary LED package with anti-spark protection



While an LED usually has two leads, CCS's original ultraviolet LED is provided with an additional lead. This unique structure has achieved a spark prevention effect.

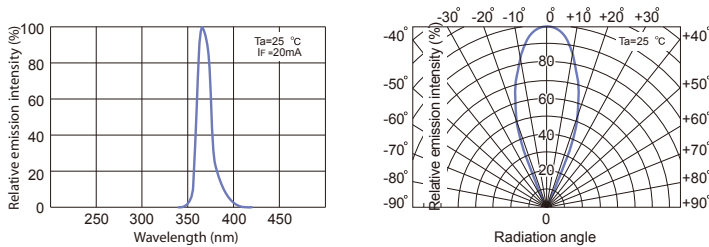
■ Unprotected UV light model vs. new model with anti-spark protection



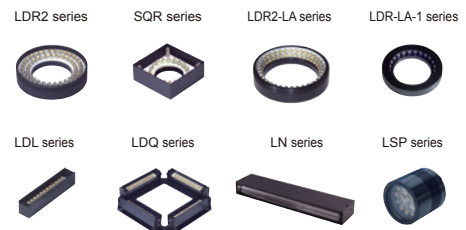
Many ultraviolet LEDs have packages made from iron alloy, making them vulnerable to static electricity. This has created a major problem with individual LED failure due to a spark occurring when there is contact with a piece of conductive material. CCS's original ultraviolet LED has eliminated this problem by employing a proprietary anti-spark protection feature.

The UV Series offers a wavelength of 365 nm and LED light spread of 20°.

■ 365-nm Peak Wavelength Emission Spectrum Distribution and LED Light Spread Characteristic of CCS UV LED

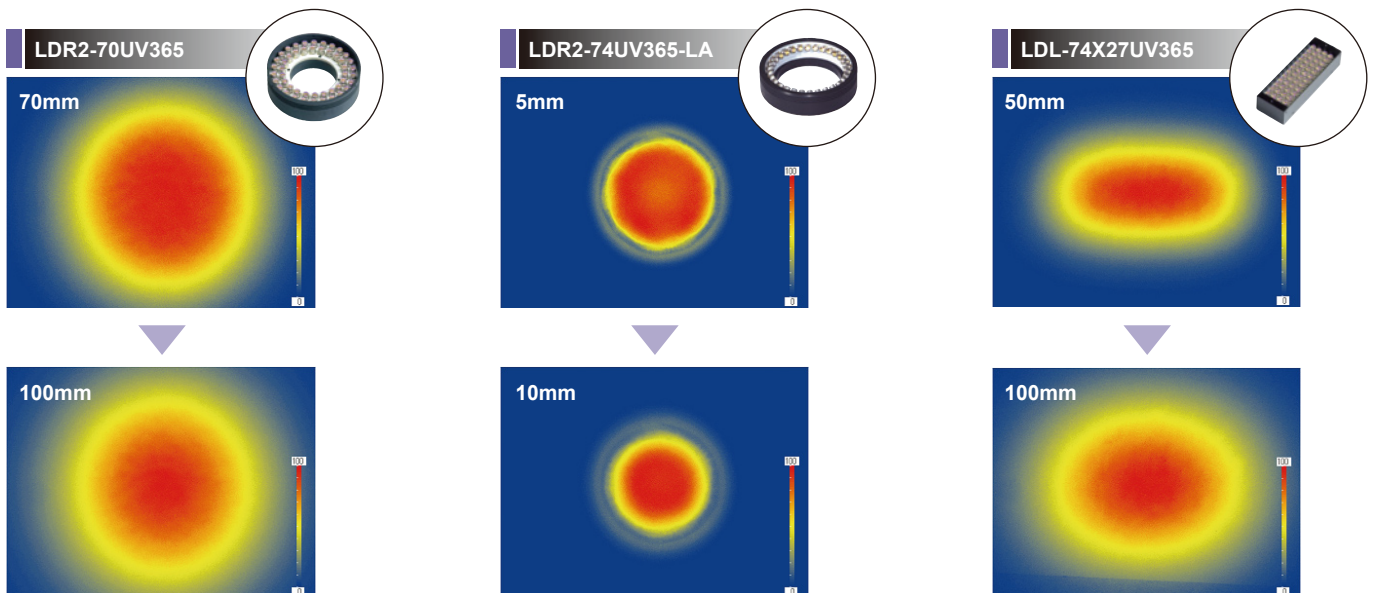


■ Product line for UV



■ Light Pattern and Working Distance Charts

A moderate 20 degree LED light spread contributes to illumination intensity, range, and uniformity for any light model. Use these charts to help choose the most appropriate light pattern and working distance for your application testing. Optimum imaging is available by selecting an appropriate radiation form according to the nature or item of inspection of the Target.



Ultraviolet lighting UV series application examples

Ultraviolet light is most commonly used to cause materials such as inks or glues to fluoresce for identification or bonding integrity inspection. It also easily scatters off very small surface features such as scratches more so than longer wavelengths.

Example image

PCB foreign matter detection

Visible light

Visible light illuminates both the PCB features as well as foreign matter so they are difficult to distinguish.

Ultraviolet light

UV light does scatter from the top layer of the board illuminates only the foreign particle but not the PCB trace pattern.

Example image

Printed text on the bottom of can

Visible light

Uniformly illuminating the bottom of can is very difficult to do with any wavelength of light.

Ultraviolet light

UV light can be used to make an invisible ink fluoresce brightly for easy detecting that doesn't require even illumination of the background.

Example image

Invisible Ink Authenticity Mark

Visible light

Visible light does not illuminate the authenticity code used to identify high value items from imitations.

Ultraviolet light

UV light shows the invisible bar code used to authenticate the merchandise origins.

Example image

Dent on desk mat

Visible light

Visible light penetrates the mat and does not provide sufficient contrast.

Ultraviolet light

UV light reflects off the surfaces with high internal residual stress for reliable detection.

Ultraviolet lighting UV Series Specifications

Model Specifications RoHS-compliant products

	Model	Peak Wavelength (nm)	Power Consumption	Weight (g)		Model	Peak Wavelength (nm)	Power Consumption	Weight (g)
1	LDR2-32UV365	365	24V/0.4W	30	17	LDR-176-UV365-LA-1	365	24V/3.8W	200
2	LDR2-42UV365		24V/0.8W	50	18	LDR-206-UV365-LA-1		24V/4.6W	220
3	LDR2-50UV365		24V/1.2W	50	19	LDL-34X8UV365		24V/0.4W	15
4	LDR2-70UV365		24V/3.1W	130	20	LDL-42X15UV365		24V/0.8W	30
5	LDR2-90UV365		24V/3.8W	170	21	LDL-74X27UV365		24V/3.1W	95
6	LDR2-90-30UV365		24V/6.1W	220	22	LDL-82X15UV365		24V/1.6W	45
7	LDR2-120UV365		24V/9.5W	510	23	LDL-130X15UV365		24V/2.3W	85
8	SQR-56UV365		24V/1.6W	80	24	LDL-180X16UV365		24V/3.8W	110
9	LDR2-74UV365-LA		24V/1.9W	90	25	LDQ-60-25UV365		24V/1.6W	60
10	LDR2-100UV365-LA		24V/4.6W	170	26	LDQ-78UV365		24V/1.6W	100
11	LDR2-132UV365-LA		24V/6.9W	270	27	LDQ-100UV365		24V/3.1W	330
12	LDR2-170UV365-LA		24V/9.9W	350	28	LDQ-150UV365		24V/6.1W	490
13	LDR2-208UV365-LA		24V/12W	380	29	LDQ-200UV365		24V/9.1W	790
14	LDR-75-UV365-LA-1		24V/1.6W	70	30	LN-200UV365		24V/1.9W	400
15	LDR-96-UV365-LA-1		24V/2.3W	100	31	LSP-41UV365		24V/1.2W	115
16	LDR-146-UV365-LA-1		24V/3.1W	160					

Series Specifications

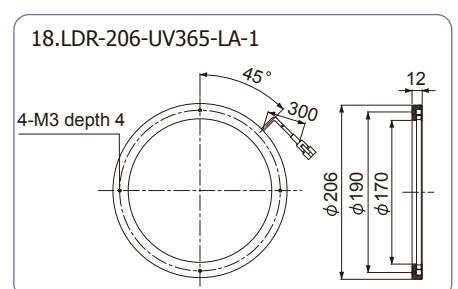
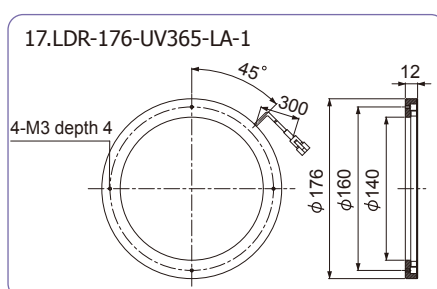
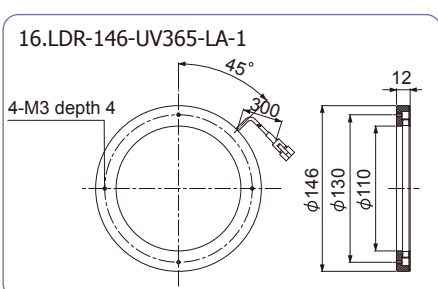
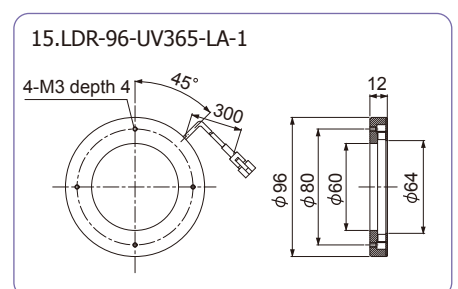
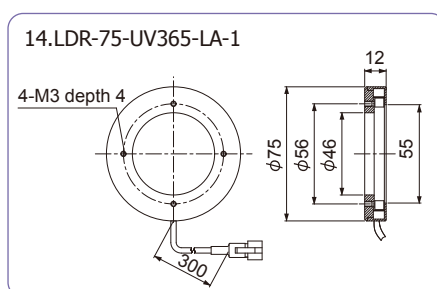
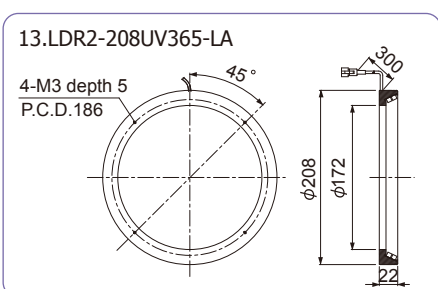
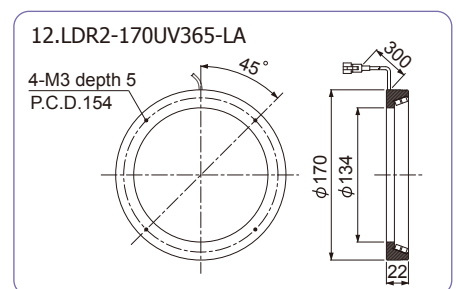
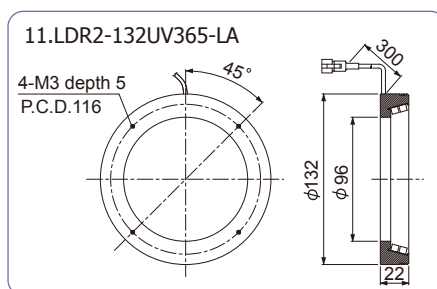
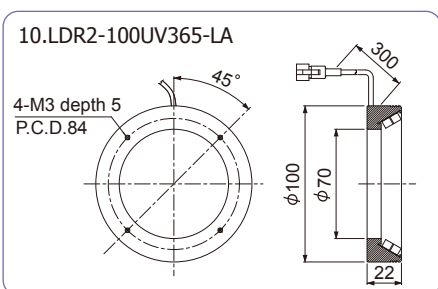
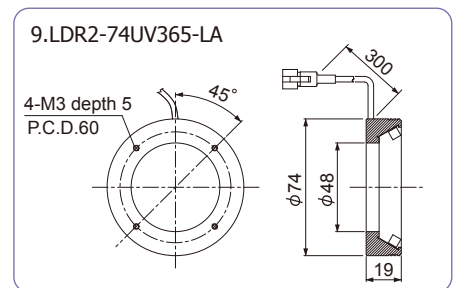
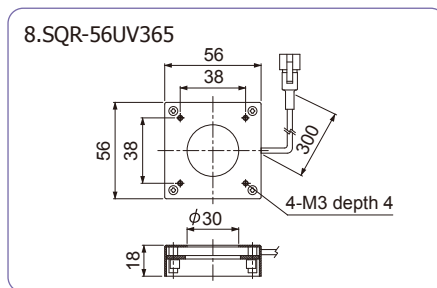
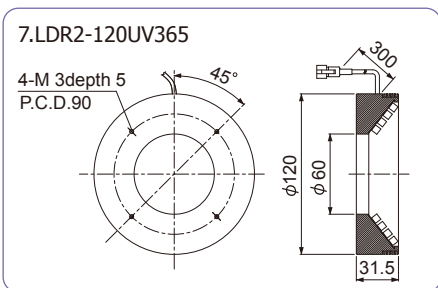
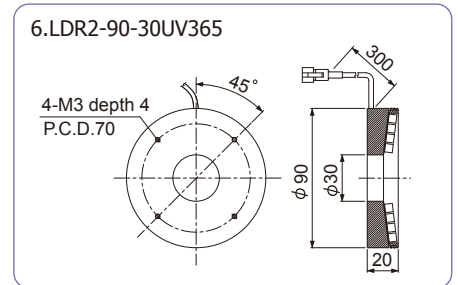
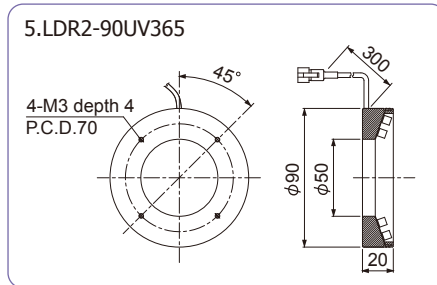
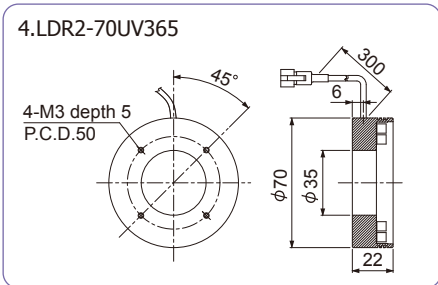
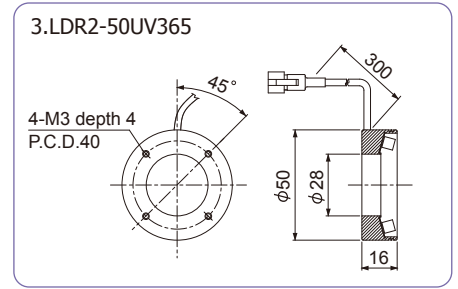
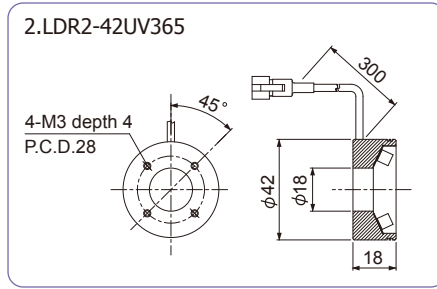
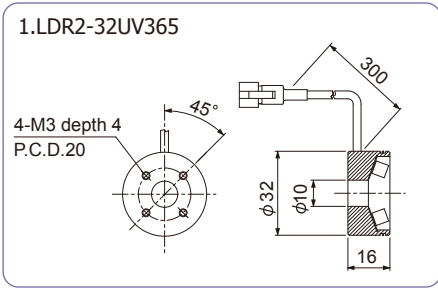
Series	UV
LED Color	Ultraviolet
Peak Wavelength (Typ.)	365 nm
Viewing Angle	Plus minus 20 degree.
Input Voltage	24 VDC
Connector	SMR-03V-B (JST)
Polarity, Signal	1: Anode (+) brown / 2: NC / 3: Cathode (-) blue
Cable Length	0.3 m
Case Material	Aluminum
Operating Conditions	Temperature: 0 ~ 40.C, Humidity: 20 ~ 85%RH (non-condensing)
Storage Conditions	Temperature: -20 ~ 60.C, Humidity: 20 ~ 85%RH (non-condensing)
Laser Class	Class 3B LED product: Do not look into or touch the beam directly.

The UV Series ultraviolet lighting products use a laser beam equivalent to Class 3B. Direct incidence of ultraviolet light into the eye is extremely dangerous. Be sure to put on UV protective glasses when using the product and exercise caution in its handling. Ensure safety with the device or equipment on which to mount the lighting.

Images



■ Dimensions (mm)



Option

Ultraviolet transmission filter



U-340series

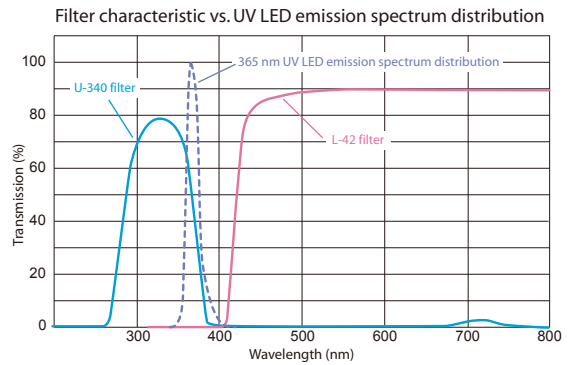
Model	Size	
U340-25	M25.5	P0.5
U340-27	M27.0	P0.5
U340-30	M30.5	P0.5
U340-40	M40.5	P0.5
U340-46	M46.0	P0.75

Ultraviolet cutting filter



L-42series

Model	Size	
L42-25	M25.5	P0.5
L42-27	M27.0	P0.5
L42-30	M30.5	P0.5
L42-40	M40.5	P0.5
L42-46	M46.0	P0.75



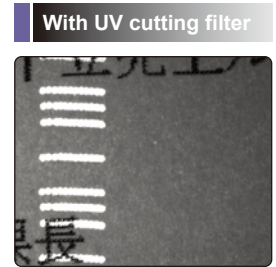
Images with/without ultraviolet transmission/Ultraviolet cutting filter



Without either filter, both ultraviolet and visible light are captured, which causes reduced contrast.



Use of an ultraviolet transmission filter allows capturing of only the components in the ultraviolet region.



Use of an ultraviolet cutting filter allows capturing of only the visible light components from scattered light.

Notes on use of ultraviolet lighting

For safe use

In 1993, the International Electrotechnical Commission (IEC) made effective IEC 825-1, a standard concerning the safety of laser products, the scope of which includes LEDs. Subsequently, relaxation of provisions was considered for diffusive light sources and IEC 60825-1 Edition 1.1 of 1998 introduced methods of measurement with the sizes of light sources taken into account. Later in 2001, IEC 60825-1 Amendment 2 provided for the division of laser into seven classes. The laser used in CCS's ultraviolet LED lighting products corresponds to Class 3B. Never allow any direct or diffusely reflective ultraviolet beam radiate on the eye or skin. Directly looking into the light source may affect the health of the eye. Be sure to wear UV protective glasses when using the product and exercise caution in its handling. Regarding the device or equipment on which to mount the lighting, provide warning indication stating the use of ultraviolet lighting and ensure safety. See the "Ultraviolet LED Lighting Instruction Manual" for details.

Caution

- Never directly look into or touch the ultraviolet beam.
- Before turning the light on, be sure to put on UV protective glasses and prevent the light from entering the eye.
- Do not turn the light on of the ultraviolet LED as the radiating (light emitting) section is directed at the human eye.
- Wear long-sleeved clothes and gloves to prevent exposure of the skin for preventing the ultraviolet light from reaching the skin.
- Be sure to inform all personnel involved in the use of the product or with access to the surrounding areas of the danger of ultraviolet LED.

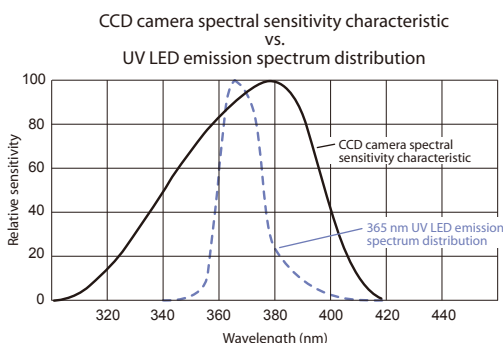
UV protective glasses*



* Make sure of the wavelength range for which the glasses provide protection.

About camera, lens and filter

The image taken may be affected by the emission spectrum distribution of the ultraviolet LED used and the spectral sensitivity characteristic of the CCD camera. For stable imaging, optimize the optical system including a CCD camera, lens and filter.



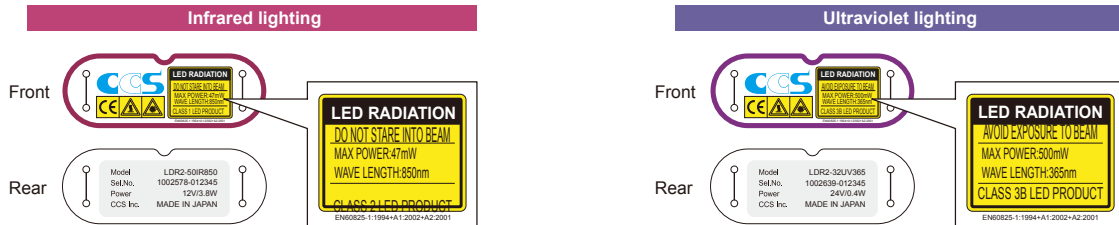
For optimum imaging with ultraviolet lighting, use a CCD camera that is sensitive in the near-ultraviolet region. Ordinary CCD cameras are not very sensitive in the near-ultraviolet region, which may cause images to be darker or susceptible to disturbance light. Use of ultraviolet transmitting filters or ultraviolet cutting filters reduces the light intensity. Allow sufficient margins in the imaging conditions (lighting control, f-stop number, distance between the work and camera, distance between the work and lighting, etc.) when using such filters.

*Graphic representing spectral sensitivity characteristic of CCD camera XC-EU50 provided by Sony Corp.

Information

Infrared and ultraviolet lighting products are supplied with label tags stating the class of danger, which provide important information as well as notes on handling. Be sure to leave the labels on when using the product.

- **Label tag samples** Infrared and ultraviolet lighting products are supplied with label tags stating the class of danger, as shown below. The label tag on the front side contains information including the maximum power and wavelength and the label tag on the rear side states the model number, serial number, etc. Be sure to check the label tags before use and use caution in handling.



● Laser safety standards (IEC 60825-1 Amdt. 2)

The LED lighting products fall in classes of laser products specified by the International Electrotechnical Commission (IEC) and the Japanese Industrial Standards (JIS). The table below provides the classification of the degrees of danger and overview.

Class	Overview of degree of danger
Class 1	Has an inherently safe design.
Class 1M	Equivalent to Class 1 except that it can be harmful when an optical device is used in the beam.
Class 2	Low-output (400-700 nm) visible light; the eye can usually be protected by a natural involuntary response such as blinking.
Class 2M	Equivalent to Class 2 except that it can be more harmful when an optical device is used in the beam.
Class 3R	Direct viewing of the inside of the beam may pose danger.
Class 3B	Direct viewing of the inside of the beam is hazardous in normal conditions. However, diffuse reflection of the beam is believed to be generally safe.
Class 4	May generate hazardous diffuse reflection, which can cause skin damage or fire.

● Infrared lighting IR Series/ultraviolet lighting UV Series laser class (based on IEC 60825-1 Amdt. 2)

IR Series: Class 1

UV Series: Class 3B

The infrared lighting IR Series and ultraviolet lighting UV Series are "environment-conscious products" conforming to the RoHS Directive.

Detailed information on RoHS Directive and compatibility status of products, please visit the CCS's Website.

<http://www.ccs-inc.co.jp>

Caution

- All specifications or design are subject to change without notice
- Samples of the work images described in this catalog are referential for our customers to select lights. When selecting, be sure to check the functions and conditions of the equipment. In addition, the sample works were purchased and processed by our company, and they do not represent their original qualities and performances.

CCS Inc. <http://www.ccs-grp.com>

Headquarters Shimodachiuri-agaru, Karasuma-dori, Kamigyo-ku, Kyoto 602-8011 Japan
 Phone: +81-75-415-8284 / Fax: +81-75-415-8278
 E-mail: intlsales@ccs-inc.co.jp