



World's highest standards of LED Lighting Technology  
Let our expertise work for you

# **LIGHTING SOLUTION**

*LED Illuminators for Machine Vision*

Improved Quality for Standard Red Lights with “RD” Changed to “RD2” in the Model Names

# Renewed Red Lights

CCS will provide the optimum Red Lights for your site environment.



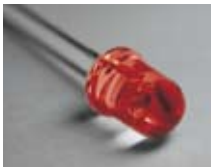
Manufacture of the RD-type Red Lights will be discontinued from the end of December 2012. If you require a Red Light, select an RD2-type Red Light.

For details on discontinued products, refer to page 107.

## High-quality LEDs

Quality improved with the use of long-life four-element LEDs. The slower degradation in brightness provides a longer period of reliable application.

Four-element LED



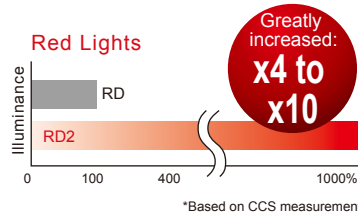
A four-element LED is a compound semiconductor device that is composed of four elements (In, Ga, Al, and P). It is brighter and has a longer life than a three-element LED.

## Greatly Increased Brightness

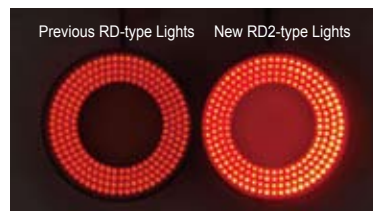
Increase in Brightness:

**4 to 10 Times Brighter Than Previous Models**

\*The brightness ratio to the previous RD-type Lights depends on the model.



\*Based on CCS measurements.



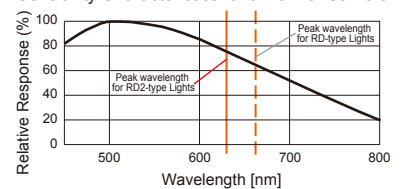
Brightness is increased to 4 to 10 times that of the previous RD-type Lights. This brings solutions for difficult applications that require a higher output level.

Peak Wavelength:

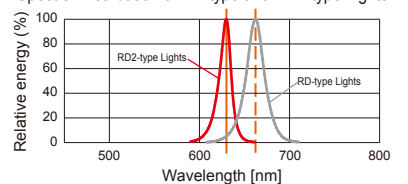
**630 nm**

\*Sensitivity characteristics depend on the camera that is used.

Sensitivity Characteristics for a Normal Camera



Spectral Distribution of RD-type and RD2-type Lights



The peak wavelength has changed from 660 to 630 nm. This shift produces the optimum wavelength for camera sensitivity characteristics.

# LIGHTING SOLUTION



## Control Units for RD2-type LED Lights

3 Channels/28 W    4 Channels/46 W    8 Channels/95 W

Parallel Communications    EIA-485 Communications    Ethernet

A Complete Lineup with Nine Different Models

### Digital Control Units

#### PD3 series

PD3-3024-3 series    PD3-5024-4 series    PD3-10024-8 series

Perform external control through parallel, EIA-485, or Ethernet communications.

PD3-series External Controls    External Light Intensity Control    ON/OFF Control    Strobe Lighting

\*These Control Units do not include an overdrive.

For details, refer to page 79.

### No Changes Required to Installation Dimensions

Size Example

Previous RD-type Lights    New RD2-type Lights

LDR2-120RD-WD    LDR2-120RD2-WD

The external dimensions and mounting hole positions are the same as those of the previous RD-type Lights. This allows you to use the previous installation dimensions.

### Input Voltage Unified to 24 V

Previous Models

12-V Lights    24-V Lights

Previous RD-type Lights    Red, Blue, and Green Lights

Renewed.

All Lights unified to 24 V.

RD2-type Lights

White Lights    Green Lights    Blue Lights

Lights that previously had 12-V input voltages were changed to 24 V. This allows you to use the same Control Units for Lights of any color.



# Environmentally Friendly

Contributing to Society Through the Science of Light



## The PFB2 Series<sup>\*1</sup> for replacement of Halogen Light Sources

<sup>\*1</sup> Refer to page 69 for details on the PFB2 Series LED Light Source Units.

### PFB2 Series LED Light Source Units

Ecological performance with lower power consumption and longer lifetime.



<sup>\*</sup> The Light Guide is not a CCS product.

### Features

- Achieves illumination of approximately 220,000 lx.  
\*Actual value observed 50 mm from the end of the fiber.
- Features an LED light source with a long lifetime of 25,000 hours.
- Low power consumption at 15 W.
- Unique heat dissipating construction.
- Compatible with your current Light Guide.  
\*Some brands are not supported.
- Three types of external light intensity control are available: serial, parallel, and analog.
- All models available with AC or DC input power supply.
- Compact, width of 70 mm, a depth of 150 mm, and a height of 100 mm.

\*The light intensity and lifetime are reference values only.

**Refer to page 69 for details.**

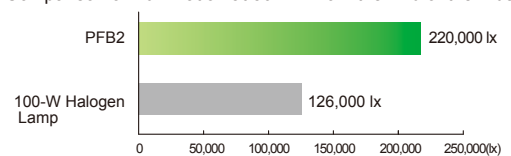
### Long Lifetime at High Output

The LED Light Source Unit features a long lifetime while maintaining a high output by using power LEDs and a unique irradiation structure.

### High Output

#### Illumination of 220,000 lx.

- Comparison of Illumination at 50 mm from the End of the Fiber

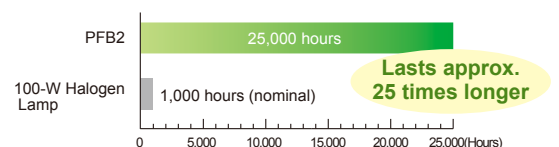


\*Actual values observed at 50 mm from the end of the fiber when a straight light guide with light intensity control of 100% and joint diameter of 8 mm is attached.

### Long Lifetime

**LEDs will not burn out like halogen lamps, and thus provide a much longer lifetime.**

- Lifetime comparisons between the PFB2 and a 100-W Halogen Lamp



\*Calculated values until the light output decreases to 70% at a light intensity of 100% and an ambient temperature of 25°C.  
\*The lifetime of halogen lamps is the nominal value provided by the manufacturer.

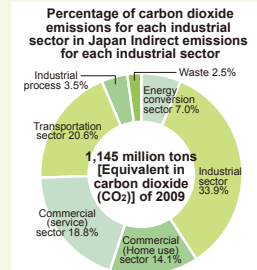
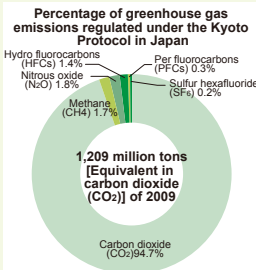


# LIGHTING SOLUTION



## About Global Warming

Japan has implemented many measures to cut emissions of CO<sub>2</sub> and other greenhouse gases by 6% from 1990 levels between 2008 and 2012, as stipulated under the Kyoto Protocol that was issued February 16, 2005. Then at the UN Climate Change Summit in New York in September 2009, Japan announced plans to cut greenhouse gas emissions by 25% over 1990 levels by 2020. The name chosen, Challenge 25, acquired fresh life the following January with the Challenge 25 Campaign, a national movement to promote measures to prevent global warming. Carbon dioxide alone accounts for at least 90% of the total emissions for the targeted six greenhouse gases, so reducing CO<sub>2</sub> emissions is imperative. The second graph below shows how manufacturing factories and other parts of the industry category constitute over 30% of emissions, making it the largest group. For this reason, cutting down on emissions demands improvements in energy utilization efficiency in production facilities and processes, along with technology developments and other measures. From here on, tackling environmental issues will be an increasingly important task as businesses address the demands for emission reductions.



For more information about Global Warming please use the following resources.

- Ministry of the Environment (Global Environment / Global Environmental Cooperation) <http://www.env.go.jp/>
- Japan Center for Climate Change Actions(JCCCA) <http://www.jccca.org/>

Source: Greenhouse Gas Inventory Office "The Greenhouse Gases Emissions Data of the Years 1990 to 2009" (Released on April 26, 2011)

## The PFB2 Series Helps Reduce the Load on the Environment

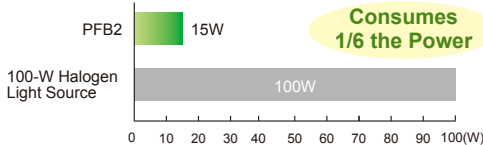
### Energy Efficient with Low Heat Generation

A low energy consumption of 15 W reduces operating costs. Temperature increases in the surrounding environment will also be suppressed with a unique heat dissipating construction.

### Power Consumption As Low As 15 W

Operating costs, such as for electricity, are reduced with energy efficiency.

- Comparison of Power Consumption between the PFB2 and a 100-W Halogen Lamp



### Case Temperature

Temperature increases in the surrounding environment are suppressed with a unique heat dissipating construction.

- Comparison of Case Temperature between the PFB2 and a 100-W Halogen Lamp



\*Observed using a thermograph one hour after continuous lighting is turned ON with light intensity control of 100% (reference values).  
\*The Halogen Light Source is not a CCS product.

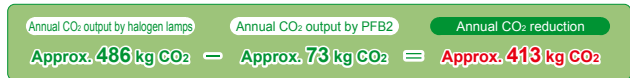
### Contribute to the Prevention of Global Warming by Reducing Approx. 413 kg of CO<sub>2</sub>

The PFB2 Series LED Light Source Units consume only 15 W, reducing power consumption greatly compared with 100-W halogen lamps. Low power consumption leads to the reduction of CO<sub>2</sub> output, contributing to the prevention of global warming. By replacing halogen lamps with PFB2 Series LED Light Source Units, you can help reduce the load on the environment. To be environmentally friendly, that is the CCS approach.

- Comparison of CO<sub>2</sub> Output between the PFB2 and a 100-W Halogen Lamp

	PFB2	100-W Halogen Light Source
<b>Power consumption</b>	Daily power consumption 15 W x 24 h = 360 Wh	Daily power consumption 100 W x 24 h = 2,400 Wh
	Annual power consumption 360 Wh x 365 (days) = 131,400 Wh	Annual power consumption 2400 Wh x 365 (days) = 876,000 Wh
<b>Annual CO<sub>2</sub> output</b>	131,400 Wh x 0.555 kg CO <sub>2</sub> = 72.93 kg CO <sub>2</sub>	876 kWh x 0.555 kg CO <sub>2</sub> = 486.18 kg CO <sub>2</sub>

\*Calculated by multiplying the output coefficient (0.555 kg CO<sub>2</sub> per 1 kWh) by the power consumption.



# Know

**We know that lighting is the key to successful**



## Development in Image Processing and the Mission of Illumination

Recently, image processing devices with high performance and low price come to the market one after another. The fields of application of them, such as the detection of appearances, the decision of position and the assembling of products become wider and wider. It is mainly due to the high-speed processing, the improvement of sensitivity, the improvement of the processing performance of CPU of a personal computer and the development of the device technology. This means that it is difficult to discriminate one maker treating image processing devices from others. As for end-users, it is possible to budget for illuminations because the price of image processing units is low.

The recognition that the success of introducing an image processing system depends on the lightings becomes widespread.

To realize a stable system, it is a necessary condition to get images with sharp contrasts constantly in spite of the

various changes of external conditions, such as external noise lights, the lean of a work, the variation of materials and the type of a system. Keeping this in mind, it is important to choose an illumination system that can overcome the factors normally present in a factory setting, yet still provide superior, high contrast images. Unfortunately, there is no one universal illumination system that would be applicable to all types of work such as the manufacturing of semiconductors, electronic parts, medical products, food products, printed materials and automobile parts. In order to achieve maximum stability under a limited set of conditions, it has become even more vital to select the best type of illumination for



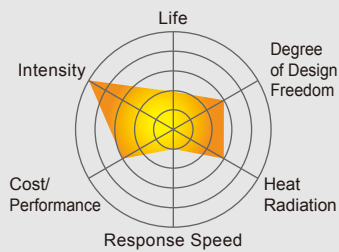
the target application from the many systems that are available. Many times this requires custom lighting development. As the adage goes "better to light than write!" This evolution has naturally spurred massive development in the area of illumination. In spite of this, 20% to 30% or more of all work requiring illumination still cannot be solved with standard solutions, requiring custom illumination development and further driving the advancements in illumination. Indeed, it is clear that the future advancement of image processing technology must go hand-in-hand with the requisite advances in illumination.

# LIGHTING SOLUTION

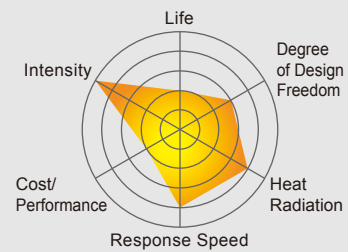
## image processing.

### Comparison of Image Processing Illumination Systems

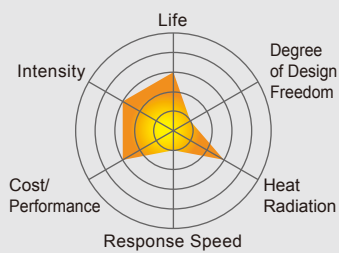
#### Halogen Lamps



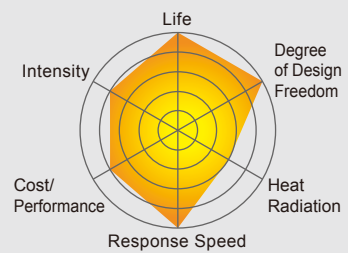
#### Xenon Lamps



#### Fluorescent Lamps



#### LEDs



### Why is LED illumination so important now?

#### 1. Flexible Shape Design

A LED illumination system consists of a collection of individual LEDs, providing much greater shape flexibility than other illumination systems and allowing comparatively greater freedom in designing the shape and size of the illumination system to meet application needs.

#### 2. Long Life

In order for an image processing unit to maintain a consistently precise level of detection, the system must be able to provide stable image input over the long term.

Our LED illumination systems have an intensity half-life of from 10,000 to 30,000 hours under continuous use, far greater than other types of illumination. Furthermore, by using a control system to turn the LEDs on and off, heat development can be suppressed and the life of the LEDs more than doubled.

#### 3. Fast Response

LEDs have fast response time and display their greatest strength by switching multiple illuminations or switching multiple circuits in a single illumination. In addition, they may be synchronized with a strobe or camera and may be regulated with high-precision pulse modulation. When used together with our power source, our LED illumination can reach the maximum luminance within 10 $\mu$  sec after a trigger signal is input.

#### 4. Selectable Color

In addition to flexible format design, another important aspect in achieving stable images is selectable illumination color. The recorded image will vary greatly depending on the light color of the illumination system, even when the same illumination format is used. We are also putting major effort into the development of contrast technologies based on light color.

#### 5. Low Total Running Cost

A low initial installation cost can be quickly negated by costs related to daily operation and maintenance. Other types of illumination not only consume from 2 to 10 times more electric power than our LED illumination systems, many also require that the light source be changed monthly, consuming the valuable time of a company's manufacturing engineers.

The more illumination systems that are installed, the greater the cost of both light source replacement and human labor. Therefore, installation of long-life LED illumination systems also offers a great advantage in terms of cost performance.



The necessity of customization.

# Think

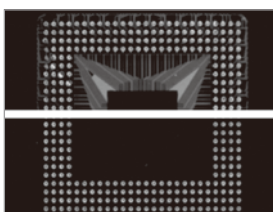
The desire to meet our customers' needs of 4,000 has



## Development

As our company strives to meet the diverse needs of all our customers, we have come to realize that the advantages offered by LED illumination - compact size, low power consumption, long life and design flexibility - make LEDs ideally suited to a diverse range of work applications.

When imaging identical work pieces using identical illumination, the installation position and illumination angle can greatly affect the resulting image. Therefore, four aspects of the work process must always be considered when developing an illumination system.



## The four points to specifying a lighting solution.

### 1 Application

Image processing applications can be classified into four general groups: visual inspection, character recognition, measuring dimensions, and positioning. In designing a lighting system, it is necessary to optimize the signal-to-noise ratio of the acquired image by adjusting the irradiation wavelength and the parallelism of the light for each of these applications.

### 2 Workpiece to be illuminated

Attention must be paid to the wavelength and parallelism of the specified light, carefully matching it to the physical characteristics, surface status, shape, material, and color of the object and features to be imaged.

### 3 Imaging and optics system

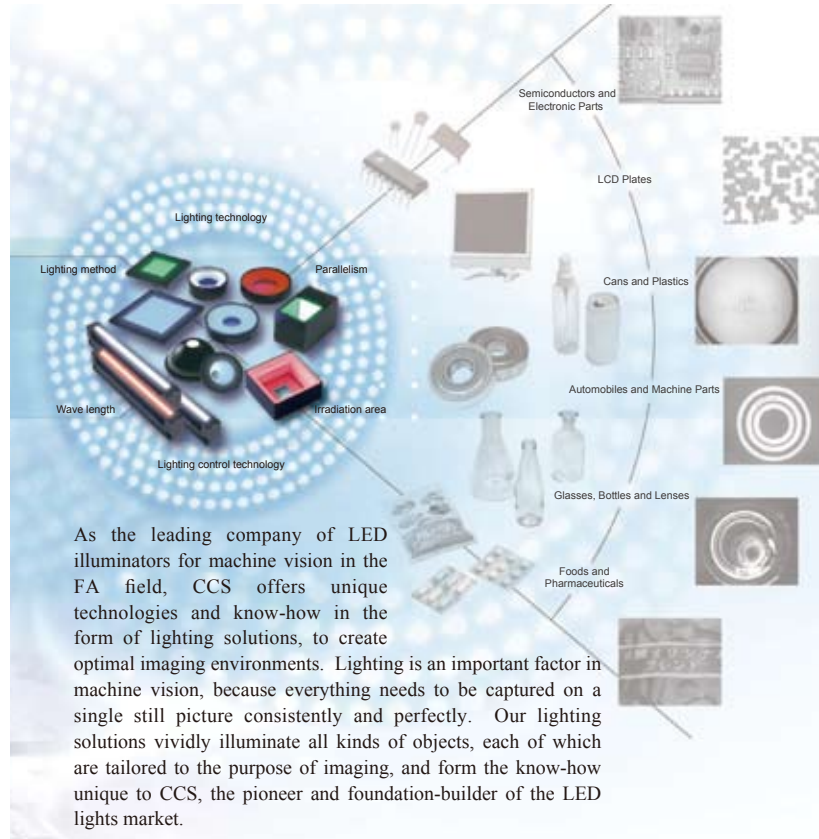
As the solid angle of the utilized light changes significantly depending on the FOV range, work distance, and numerical aperture, the image will change in a similar way as it changes when lighting is changed. In addition, the lighting system is dependant on whether the imaging method is area or line.

### 4 Operation mechanism and ambient environment

The shutter speed and scan rate will change depending on whether the workpiece is stopped or moving, so techniques to optimize of the quantity of light such as strobing and overdriving may be necessary, as well as designing resistance against ambient conditions such as moisture, vibration, and ambient light.

# LIGHTING SOLUTION

led us to develop an advanced customization system.



## Quality

Our company has developed a system for customizing light sources to meet a diverse range of needs. Still, one problem we face in the manufacturing process is the quality control of individual LEDs. To achieve a high level of quality control, CCS uses its own original manufacturing and inspection processes for strict product inspection and control. The Vf value is measured individually for each LED type. The LEDs are then carefully sorted according to their measured Vf value, intensity rank and color rank, and installed in the illumination system for the first time. The layout of the LED array is also a very important factor in achieving even illumination. At CCS, we have established a special method that aligns each individual LED perpendicular to the circuit board. Our control system has successfully minimized the number of product defects and the degree of variance between products, making it possible for us to supply consistently high-quality, stable products.

## Finding the answers at last.

Answers to questions that we have faced over many years have led us to develop seven comprehensive principles for our company.

- 1. Quality Assurance:** CCS conducts strict quality management through all stages from LED selection, fitting, assembly, and delivery. We offer a 2-years warranty on our products from the date of delivery as proof of our responsibility and confidence in the quality of our products. (The quantity of radiation is guaranteed for 1 year: If the quantity of radiation falls below 50% within the guarantee period, repairs or replacement will be provided free of charge.)
- 2. Product Stock Management:** We are prepared to deliver more than 300 types of standard lighting products at any time.
- 3. Reliable Track Record:** Since our establishment in 1993 as a manufacturer specializing in LED illumination for image processing, CCS has designed, developed, and constructed over 40,000 workpiece imaging technologies and approximately 4,000 types of custom lighting systems. It is through our extensive experience that we can offer the best lighting solutions for any application.

**4. Inventions and Patents:** Everyday, CCS strives to develop new lighting technologies and innovative solutions to remain number one in LED lighting. As the result of our high technical ability, we have applied for over 500 patents across the globe and many of our products are protected by industrial property rights.

**5. Data Analysis:** Useful measurement data from product development and references for selecting products are available.

**6. Technical Support:** We offer the world's highest class of lighting technology through our consulting services, and conduct tests free of charge before finalizing sales contracts. We assist in selecting the best lighting solutions for our customers.

**7. Free Loaning of Products:** At CCS we will loan any of several hundred models and several thousand devices for free. For many of the products, we offer free samples prior to sales, as well as advice and consulting services.

CCS - a company that is meeting needs.

# Realize

Like the changing times, there is no limit to the

**Direct  
Lighting**

## Direct Lighting Ring Lights

LEDs mounted at high density in ring form.



Flexible circuit boards.  
Unique heat dissipating construction.

**Indirect  
Lighting**

## Indirect Lighting Flat-ring Lights

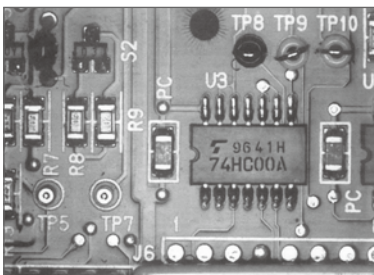
Uniform light diffusion is achieved through unique illumination technology.



A special dot pattern controls light diffusion and transmission.

The characteristics of coaxial lighting and dome lighting are recreated.

## Semiconductors and Electronic Parts



Parts for the semiconductor industry, parts which are growing continuously smaller, require the use of image processing at various stages of the automatic manufacturing line. Numerous illumination systems are used in these processes.

## LCD Plates



Today, LCD plates are used in virtually all types of home electronics, from computers to cellular telephones. CCS LED illumination systems are being used in the manufacturing and control of these types of transparent plates.

## Cans and Plastics



The full advantages of LED illumination systems can be realized in the high-speed, reliable inspection processes required for the mass production of cans, plastic drink bottles, etc.



# LIGHTING SOLUTION

## challenges CCS undertakes.

**Convergent-beam Lighting**  
Radiation of converged line light.



White power LEDs.  
Light is converged using cylindrical lenses.

**Special LED Light Source Unit**  
LED Light Sources that can replace halogen light sources.



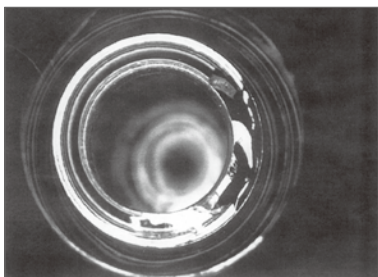
White power LEDs.  
Unique light converging technology and heat dissipating construction.

### Automobile and Machine Parts



LED illumination systems are being used for damage inspection and external inspection as part of the manufacturing processes of O-rings and bearings used to manufacture automobile and machine parts.

### Glass Sheets, Bottles and Lenses



Chipping and scratching can occur during the manufacturing of clear objects such as glass sheets, bottles and lenses. Many objects that could not be accurately inspected visually can now be inspected using LED illumination and image processing.

### Food Products and Pharmaceuticals



The stable, color-selectable output of LED illumination systems makes them ideal for use in the inspection processes required by the strict quality controls used in food and pharmaceutical product manufacturing.

# Create

The answers to all types of needs can be found

## Ring Lights

LEDs mounted at high density in ring form.



### LDR2 series .....P.17

Any angle can be created through the use of flexible circuit boards. Direct light is radiated towards the center of the ring from LEDs mounted at high density. The LDR2 Series features a rich lineup of Ring Lights.

## Ring Lights

Rings of LEDs mounted on a square case.



### SQR series .....P.17

In the SQR Series, LEDs are mounted in a ring form on a square case. The lineup includes the SQR Series with bullet-shaped LEDs and the SQR-TP Series with chip LEDs.

## Low-angle Ring Lights

Illumination towards the center from a low angle.



### LDR2-LA series ..P.19

The optimum angle can be created through the use of flexible circuit boards. Features of the workpiece can be observed by radiating direct light from a low angle towards the center of the ring.

## Low-angle Ring Lights

Illuminates the center in close proximity to the workpiece.



### LDR-LA-1 series ..P.19

The cases are designed with a thickness of only 10 mm, allowing the Light Units to be placed close to the workpiece. The LDR-LA-1 Series provides ultra-low-angle illumination.

## Bar Lights

Highly functional Bar Lights.



### LDL2 series .....P.21

LDL2 Series of Bar Lights containing chip LEDs. There is a selection of output directional patterns: narrow and wide. The lineup offers over sixty combinations of size, color, and other selections. There are also many special options.

## Flood Lights

Flood Lights that are ideal for large-scale workpieces.



### HLDL2 series .....P.23

These Flood Lights have a high enough output to illuminate objects up to 2,000 mm away. You can select the output directional pattern: Narrow or Wide. The lineup features light-emitting surface lengths from 150 mm to 1,200 mm.

## Ring Lights

Uniform light distribution over a wide region.



### HPR series .....P.25

The Ring Light Units achieve high output, uniform light, and are easy to use. Uniform diffused light is emitted using power LEDs and a unique illumination structure. Uniform light distribution can be achieved across a wide region, making Ring Light Units useful for a wide range of applications.

## Flat-ring Lights

Uniformly diffused light from a flat light-emitting surface.



### LFR series .....P.27

LEDs are embedded around a circular light-guiding diffusion plate. Uniform diffused light is radiated from a flat light-emitting surface.

## Flat-ring Lights

Uniformly diffused light from an angled light-emitting surface.



### LKR series .....P.27

LEDs are embedded around a circular light-guiding diffusion plate. Uniform diffused light is radiated from a light-emitting surface at an angle to the workpiece.

## Low-angle Square Lights

Diffused illumination with a square case.



### FPQ2 series .....P.29

The FPQ2 Series offers high-output, square, low-angle Light Units. Uniform diffused light is radiated from a low angle towards the workpiece by transmitting the light from the LEDs through the light-guiding plates.

## Low-angle Square Lights

Diffused illumination with a square case.



### FPQ series .....P.31

These Rectangular Light Units have light-guiding plates arranged in four directions. Uniform diffused light is radiated from a low angle towards the workpiece by transmitting the light from the LEDs through the light-guiding plates.

## Low-angle Ring Lights

Uniform illumination from a low angle.



### FPR series .....P.31

When used at a low angle, these Ring Light Units can be used to detect the edges, characters, or scratches of a workpiece in a dark field, then highlight and photograph them. When used at a high angle, these Ring Light Units can be used to uniformly photograph the entire workpiece in a bright field. CCS provides various types of lighting according to the application.

## Flat Lights

High output and High Uniformity.



### TH series .....P.33

The TH Series features high-output Flat Lights. There are eleven models with different sizes of light-emitting surfaces from 27 × 27 to 211 × 200 mm. Red lights, white lights, and blue lights are available. The lineup offers 33 size and color combinations.

## Flat Lights

Diffused illumination from a flat light-emitting surface.



### LFL series .....P.35

LEDs are embedded around a square light-guiding diffusion plate. Diffused light is radiated from a flat light-emitting surface.

## Flat-Dome Lights

High Output, uniform diffused light.



### LFX2 series .....P.37

The LFX2 Series features high-output Flat-dome Lights. There is a selection of five light-emitting surface sizes: 50, 75, 100, 150, and 200 mm. There is a selection of three colors: red, white, and infrared.

# LIGHTING SOLUTION

## in our creativeness.

### Flat-Dome Lights

Unique lighting technology achieves uniform, shadowless diffused illumination.



#### LFX series .....P.39

The diffusion and transmission of light is controlled through the dot pattern on the surface of the light-guiding diffusion plate, enabling the workpiece to be illuminated with uniform diffused light. Mounting space is reduced due to the slim, compact, and lightweight construction. Application is possible in locations where coaxial or dome lighting was difficult to install previously.

### Dome Lights

Uniform diffused radiation.



#### HPD series .....P.41

These Dome Light Units achieve high output, uniform light, and are easy to use. Uniform diffused light is radiated using power LEDs and a unique illumination structure. Uniform light distribution can be achieved across a wide region, making Dome Light Units useful for a wide range of applications.

### Dome Lights

Photographing curved glossy workpieces.

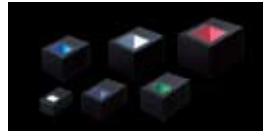


#### LDM2 series .....P.43

The light from LEDs is transmitted through a light-guiding plate to illuminate the entire workpiece with uniform diffused light from a wide light-emitting surface.

### Coaxial Lights

Uniform illumination of mirrored surfaces.



#### LFV2 series .....P.45

The LFV2 Series features Coaxial Drop Lights with a built-in heat-dispersing structure. Even illumination is provided for mirrors and other highly reflective workpieces. These lights are ideal for photographing scratches, dents, and text.

### Coaxial Lights

Uniform illumination of mirrored surfaces.



#### LFV series .....P.45

The LFV Series features Coaxial Drop Lights. Even illumination is provided for mirrors and other highly reflective workpieces. These lights are ideal for photographing scratches, dents, and text.

### Coaxial Lights

Uniform illumination of mirrored surfaces.

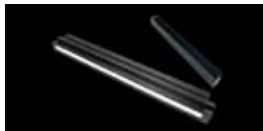


#### LNV series .....P.45

These are line-type Coaxial Light Units. They are ideal for photography with a line sensor camera.

### Line Lights

High-output Line Light Unit with Reduced Diffusion



#### LNSP series .....P.47

Less diffusion means less loss of light quantity for long distance irradiation. Select from sizes of 100 mm to 1,000 mm to meet your specific needs for a wide variety of applications.

### Line Lights

High Uniformity and High Intensity.



#### LT series .....P.49

Unique optics achieve the twin goals of high uniformity and high luminance. They enable highly precise inspections, and can also be used for fast shutter speeds. We can manufacture light-emitting surface lengths from 100 mm to 1,800 mm in 100 mm increments.

### Line Lights

Line Light Units with high output.



#### HLND series .....P.51

These Line Light Units achieve a high output by using power LEDs and a unique illumination structure. A standard type (T) and a high-intensity type (R) are available. The light-emitting surface can have a minimum length of 100 mm and a maximum length of 2,700 mm and can be created in increments of 100 mm. Red or white LEDs can be chosen.

### Line Lights

Ideal for photographing with a line sensor camera.



#### LND series .....P.53

These Line Light Units feature high-density chip LEDs. The A-type Light Units have a wide emitting surface, and the H-type Light Units have a narrow light-emitting surface.

### Line Lights

Line Light Units that radiate converged light.



#### LN series .....P.55

These Line Light Units radiate light that is converged into a straight line by cylindrical lenses. Two types are available, one with a light-emitting surface length of 60 mm and another with a length of 200 mm. There is also the LN-HK Series, which achieve high output using white power LEDs and a unique heat dissipating construction.

### Coaxial Lights

Detecting scratches, dents, and marks on mirrored surfaces.



#### MSU series .....P.57

Parallel light beams are created by a special lens. These Collimated Light Units are ideal for detecting minute scratches, dents, and marks.

### Coaxial Lights

Detecting scratches, dents, and marks on mirrored surfaces.



#### MFU series .....P.57

These Collimated Backlight Units are used to radiate parallel light from behind the workpiece, enabling external inspection with high accuracy by suppressing the scattering of light.

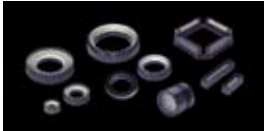


# Create

The answers to all types of needs can be found

## Ultraviolet Lights

For various inspections by using differences in scattering rates.



### UV series .....P.59

Ultraviolet lighting Series using UV light LEDs with CCS's unique spark prevention structure. Since ultraviolet light with its shorter wavelength has a higher scattering rate and is likely to cause fluorescence it can be effectively used for various inspections that cannot be performed well by means of visible light.

## Infrared Lights

Higher transmittance than visible light.



### IR series .....P.61

Infrared lighting Series using infrared light LEDs with peak wavelengths of 850nm and 940nm. Since infrared light with its longer wavelengths has a lower scattering rate and higher transmittance, it can be optimally used for various inspections by means of its property of transmission through objects.

## Spot Lights

High-output Spot Light.



### HLV2 series .....P.63

These Compact Spotlights have long life time with their light weight, compactness, and low power consumption. The HLV2 Series of high-output Spot Lights can be used to replace 100-watt halogen light sources.

## Micro Fiber-heads

LED fiber system.



### HFR series .....P.65

This lighting system combines the advantages of LEDs and fibers.

## Micro Fiber-heads

LED fiber system.



### HFS-14-500 .....P.65

This lighting system combines the advantages of LEDs and fibers.

## Light Sources for Micro Fiber-heads

Allow users to choose the illumination color and intensity.



### HLV2-22-NR-3W series ..P.66

The HLV2-22-NR-3W Series features high-output Light Sources for Microfiber Heads. There is a selection of four colors: red, white, blue, and green.

## Light Sources for Micro Fiber-heads

Allow users to tailor the illumination color to the target object.



### HLV2-3M-RGB-3W ..P.67

The HLV2-3M-RGB-3W Light Source for Microfiber Heads combine a light source and a Blending Unit. They incorporate a high-output HLV2-22-NR-3W-series Light Source. Freely mix red, blue, and green light to produce the desired illumination color.

## LED Light Source Unit

Used to replace halogen light sources.



### PFB2 series .....P.69

An output that is high enough to enable replacing halogen light sources is achieved using white power LEDs and a unique light-converging technology. These environmentally friendly, next-generation LED Light Sources feature low power consumption, a long service life, and a significant reduction in maintenance work compared with 100-W halogen light sources.

## Macro Lens

Unique macro lens.



### SE-16 series .....P.71

The SE-16 Series of original Macro Lenses provide both high performance and low prices. The lineup offers magnifications of 0.5, 1.0, and 2.0.

## Macro Lens

Unique macro lens.



### SE-18 series .....P.71

The SE-18 Series of original Macro Lenses provide both high performance and low prices. The lineup offers magnifications of 2, 4, and 6.

## Spot Lights

Super-Uniform Spotlights.



### LSP-41 series ....P.73

Super-Uniform Spotlight for wide variety of applications.

## Spot Lights

Lightweight and compact Spotlights.



### LV series .....P.74

The LV Series of light, compact, power-saving, long-life Spot Lights. These attach to, for example, Macro Lenses with coaxial drop lighting.

## Digital Control Units

Fully Equipped with External Control Functions



### PD3 series .....P.79

The PD3 Series consists of high-performance Digital Control Units with a full suite of external control functions. It supports parallel communications, EIA-485 communications, and Ethernet. The light intensity can be set to any of 256 different levels. It supports constant lighting, ON/OFF lighting, and strobe lighting modes.

## Digital Control Units

Intensity control to 256 levels.



### PD2 series .....P.87

The PD2 Series of Digital Control Units were designed specially for CCS LED Lights. They offer a broader range of intensity control in comparison to analog Control Units: 256 levels. A full lineup supports a broad range of applications.

## Analog Control Units

High-capacity Analog Control Unit



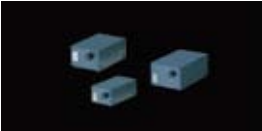
### PSB3-30024 .....P.89

The PSB3-30024 Analog Control Units provide a high capacity of 300 W. The light intensity can be set to any of 256 different levels. The PSB3-30024 is equipped for parallel communications, serial communications, and analog input for external control all in a single Unit. You can easily change the intensity range for the optimal output for any Light Unit.

# LIGHTING SOLUTION

in our creativeness.

**Analog Control Units**  
Popularly priced LED light Control Units.



**PSB series .....P.91**

The PSB Series of Analog Control Units provide stepless intensity control for a variable voltage. The constant output makes them ideal for high shutter speeds of 1/4,000 and faster.

**Strobe Control Units**  
Strobing provides control over illumination intervals.



**PTU2 series .....P.92**

The PTU2 Series of Control Units enable strobe operation of LED Lights. Features include switching the Digital control unit ON and OFF and boosting strobe output beyond those available with the STU-3000 Series. And an overdrive feature is also provided.

**Strobe Unit**  
Strobing with a Digital Power Supply.



**STU-3000 .....P.92**

Connected to one of our PD2-series Digital Control Units, an STU-3000 Strobe Unit converts a constantly lit LED Light into a strobe.

**Analog Control Units**  
Compact and Efficient.



**PB-2430 .....P.93**

These Analog control unit Units enable controlling the light intensity for both 12V and 24V LED Light Units from a single Unit.

**Strobe Control Units**  
High Performance and Low Price.



**PS-3012-D24 .....P.93**

Cost-effective, easy-to-use strobe control unit with overdriving power output. It operates with 24V DC voltage input.

**Compact Controller**  
Compact, lightweight Controllers.



**CC-ST-1024 .....P.94**

The compact, lightweight CC-ST-1024 Controller was designed specially for LED Lights. Installing the Controller inside panels or equipment (e.g., next to sensor amplifiers) makes the system configuration more compact. They provide constant output, strobing, and ON/OFF control. They support DIN rail mounting. Input specification: 24 V DC.

**Building Block Control Units**  
A wide variety of system configurations.



**BB series .....P.95**

The BB Series features building-block Control Units that link together. Link the necessary units together to enable flexible illumination control. The 10-model lineup offers such selections as constant output and strobing. They support DIN rail mounting. Input specification: 24 V DC.

**Dedicated Compact Controller**  
HLV2 Series dedicated compact controller.



**CC-PJ-0707 .....P.97**

This Compact Controller is for HLV2-series Spotlights. They provide constant output, strobing, and ON/OFF control. They support DIN rail mounting. Input specification: 24 V DC.

**Dedicated Control Units**  
HLV2 Series dedicated control unit.



**PJ series .....P.98**

These Control Units are for the HLV2 Series of Spot Lights. They provide stepless intensity control for a variable current. There is a selection of inputs available: 100 to 240 V AC and 24 V DC.

**Option**  
Variety of options available.



**Optional Parts ....P.99**

Sharp Cut Filters, Diffusion Plates, Polarizing Plates, and Mounting Brackets are among the many optional parts that are available.

**Option**  
Wide variety of cables.



**Optional Cable ..P.102**

Extension Cables and Branch Cables are among the many cables that are available.

## Contents

LIGHTING SOLUTION ..... P.1 to 14



### Direct Lighting

- Ring Lights *LDR2/SQR series* ..... P.17  
High-density light output produces fresh, vivid images.
- Low-angle Ring Lights *LDR2-LA/LDR-LA-1 series* ..... P.19  
Ideal for work piece edge detection and for detecting scratches on glossy surfaces.
- Bar Lights *LDL2 series* ..... P.21  
Highly functional Bar Lights.
- Flood Lights *HLDL2 series* ..... P.23  
Flood Lights that are ideal for large-scale workpieces.



### Indirect Lighting

- Ring Lights *HPR series* ..... P.25  
"Brighter" "More uniform" "Easy to use" High-Power Ring Lights.
- Flat-ring Lights *LFR/LKR series* ..... P.27  
Even, diffused top lighting.
- Low-angle Square Lights *FPQ2 series* ..... P.29  
Even, diffused side lighting.
- Low-angle Square Lights *FPQ series* ..... P.31
- Low-angle Ring Lights *FPR series*  
Even, diffused side lighting.
- Flat Lights *TH series* ..... P.33  
High output and High Uniformity.
- Flat Lights *LFL series* ..... P.35  
Inspection of work by silhouette using uniform light.
- Flat-Dome Lights *LFX2 series* ..... P.37  
High Output, uniform diffused light.
- Flat-Dome Lights *LFX series* ..... P.39  
Unique lighting technology achieves uniform omni directional diffused light.
- Dome Lights *HPD series* ..... P.41  
"Brighter" "More uniform" "Easy to use" High-Power Dome Lights.
- Dome Lights *LDM2 series* ..... P.43  
For inspection of workpiece with curved and glossy surface.
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- Line Lights with Coaxial System *LNV series*  
Uniform illumination for highly reflective surfaces.
- Line Lights *LNSP series* ..... P.47  
High-output Line Light Unit with Reduced Diffusion.
- Line Lights *LT series* ..... P.49  
High Uniformity and High Intensity.
- Line Lights *HLND series* ..... P.51  
Next-generation light for line scan applications featuring unprecedented intensity and uniformity.

Line Lights *LND series* ..... P.53  
Ideal for use in line sensors.



### Convergent-beam Lighting

Line Lights *LN series* ..... P.55  
Line shaped, convergent-beam lighting.



### Collimated-Lighting

Coaxial Lights *MSU/MFU series* ..... P.57  
Used to detect scratches, indentations and dirt on mirrored work surfaces.



### Ultraviolet Lighting

Ultraviolet Lights *UV series* ..... P.59  
For various inspections by using differences in scattering rates.



### Infrared Lighting

Infrared Lights *IR series* ..... P.61  
Higher transmittance than visible light.



### Special

- Spot Lights *HLV2-14/HLV2-22/HLV2-22-3W series* ..... P.63  
High-output Spot Light.
- Micro Fiber-heads *HFR/HFS series* ..... P.65
- Light Sources for Micro Fiber-heads *HLV2-22-NR-3W series* .. P.66  
LED fiber system and light sources.
- Light Sources for Micro Fiber-heads *HLV2-3M-RGB-3W* ... P.67  
Allow users to tailor the illumination color to the target object.
- LED Light Source Unit *PFB2 series* ..... P.69  
Used to replace halogen light sources.
- Macro Lenses *SE-16/SE-18 series* ..... P.71  
CCS macro lens, high performance at a low price.
- Spot Lights *LSP-41 series* ..... P.73
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For special applications.
- Control Units for LED lights ..... P.75 to P.98
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# Information

## ● Accessories listed in the 「Product lineup tables」

The following codes are used to indicate options in the product selection tables:

D	Diffuser (DF)	Used to eliminate glare etc. that can be a problem when imaging glossy objects.
P	Polarizer (PL)	Used in combination with a polarizing filter to eliminate surface reflection
C	Protector (CV)	This cover shields the light-emitting portion. *It is not intended to protect the surface from dust or water droplets.
A	Adapter (AD)	Used when attaching a diffuser or polarizer to an illuminators.
L	Light Control Film (LC)	Plastic film with fine louvers. Suppresses diffusion of light and improves parallelism. Prevents leakage and diffraction of light that may occur when the distance of illumination and the workpiece is close.
B	Bracket (BK)	This Bracket is for securing the Light.

## ● About EU Directive ...

	<p>In accordance with EU machinery directive, EMC directive, and low voltage directive, machines and electronic devices not marked with the CE logo are subject to distribution restrictions within the EU.</p> <p>All CCS LED illumination system products and illumination system control units conform to corresponding EN regulations.</p> <p>These products will maintain the EU mandate compatibility of our customers' machinery and electronic devices.</p>
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## ● List of CE certified control unit with compatible LED Illuminators

	Part Number	Low Voltage Directive	EMC Directive	
			EMS	EMI
Illuminators	<i>LDR2, SQR, LDR2-LA, LDR-LA-1, LDL2, HLDL2, HPR, LFR, LKR, FPR, FPQ, FPQ2, TH, LFL, LFX2, LFX, HPD, LDM2, LFV, LFV2, LFV2-CP, LFV2-5, LNV, LNSP, LT, HLND, LND, LN, MSU, MFU, UV, IR, HLV2-14, HLV2-22, HLV2-22-3W, PFB2, HLV2-22-NR-3W, HLV2-3M-RGB-3W, LV, LSP-41</i>	EN62471	—	—
Control Unit	<i>PD2, PD3, PTU2, PS-3012-D24, PB-2430, STU-3000, PSB, PSB3-30024, PJ, CC-PJ-0707, BB, CC-ST-1024</i>	EN61010-1	EN61000-6-2	EN61000-6-4

Some of the products in the Series listed above do not conform to CE standards. Please contact CCS for additional information.

## Warranty Information

EXCEPT FOR THE EXPRESS WARRANTIES STATED IN THIS DOCUMENT, CCS MAKES NO ADDITIONAL WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, AS TO ANY MATTER WHATSOEVER. IN PARTICULAR, ANY AND ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, CCS MAKES NO WARRANTIES WITH RESPECT TO THE PRODUCTS.

WARRANTY PERIOD: TWO YEARS (ONE YEAR FOR RADIANT QUANTITY), STARTING FROM CCS Inc. SHIPPING DATE.

CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF IT SHOULD FAIL TO FUNCTION OR IF THE RADIANT QUANTITY OF THE PRODUCT SHOULD DROP TO 50% OR LESS OF ITS INITIAL RADIANT QUANTITY WITHIN THE SPECIFIED WARRANTY PERIOD. IF EITHER OF THESE CONDITIONS OCCURS, PLEASE TAKE THE PRODUCT TO YOUR CCS SALES REPRESENTATIVE.

### WARRANTY TERMS

1. CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF IT SHOULD FAIL TO FUNCTION UNDER USE ON OUR SPECIFIED CONDITION IN ACCORDANCE WITH THE INSTRUCTION GUIDE AND OTHER WRITTEN CAUTIONS DURING THE INDICATED WARRANTY PERIOD OF TWO YEARS.
2. CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF ITS RADIANT QUANTITY SHOULD DROP TO 50% OR LESS OF ITS INITIAL RADIANT QUANTITY UNDER USE ON OUR SPECIFIED CONDITION IN ACCORDANCE WITH THE INSTRUCTION GUIDE AND OTHER WRITTEN CAUTIONS DURING THE INDICATED WARRANTY PERIOD OF ONE YEAR.
3. CCS Inc. WILL CHARGE A REPAIR FEE UNDER THE FOLLOWING CONDITIONS:
  - 1) IF THE PRODUCT HAS BEEN SUBJECTED TO MISUSE, UNAUTHORIZED REPAIRS, OR MODIFICATION FROM ITS ORIGINAL DESIGN.
  - 2) IF THE PRODUCT HAS BEEN DAMAGED FROM IMPACTS DUE TO INAPPROPRIATE HANDLING.
  - 3) IF DAMAGE TO THE PRODUCT RESULTS FROM EXTERNAL CAUSES INCLUDING ACCIDENTS, FIRE, POLLUTION, RIOTS, COMMUNICATION FAILURES, EARTHQUAKES, THUNDERSTORMS, WIND AND FLOOD DAMAGE, OR ANY OTHER ACT OF PROVIDENCE, OR FROM ANY EXTRAORDINARY CONDITIONS SUCH AS ELECTRICAL SURGES, WATER LEAKAGE, CONDENSATION, OR THE USE OF CHEMICALS.
  - 4) IF THE DAMAGE RESULTS FROM CONNECTION TO ANY POWER SUPPLY OR TO ANY EQUIPMENT WHICH CCS Inc. DOES NOT MANUFACTURE OR DOES NOT SPECIFY FOR USE.
4. CCS ASSUMES NO LIABILITY FOR ANY PURCHASER'S SECONDARY DAMAGE (DAMAGE OF EQUIPMENT, LOSS OF OPPORTUNITIES, LOSS OF PROFITS, ETC.) OR ANY OTHER DAMAGE RESULTING FROM A FAILURE OF OUR PRODUCT.

THIS WARRANTY INFORMATION PROVIDES THE SCOPE OF CCS'S PRODUCT WARRANTY WITHIN THE SPECIFIED PERIOD, AND DOES NOT INDICATE OR imply ANY FURTHER GUARANTEE BEYOND THE WARRANTY TERMS.

CONTACT CCS FOR INQUIRIES OR INFORMATION ON REPAIRS TO THE PRODUCT AFTER THE EXPIRATION OF THE WARRANTY.

NOTE: THE RADIANT QUANTITY REFERS TO THE WATTAGE OF PHYSICAL ENERGY RADIATED FROM A LED. IT REFERS TO THE RADIATION LUMINOSITY OF THE LED MEASURED UNDER CONDITIONS SPECIFIED BY CCS OR THE RADIATION ILLUMINATION OF THE LED UNDER SPECIFIED IRRADIATION CONDITIONS. CCS SPECIFIES THE RADIANT QUANTITY FOR EACH LED LIGHT BECAUSE THE MEASUREMENT AND IRRADIATION CONDITIONS VARY FROM THE FORM, THE APPLICATION AND THE IRRADIATION WAVELENGTH.



# Ring Lights

## LDR2/SQR Series

### High-intensity light output, creating crisp vivid image

Direct light can be irradiated with focus on the center of the workpiece from any angle.



#### Flexible Circuit Boards

CCS has established a manufacturing method using flexible circuit boards. Using a flexible board makes it possible to improve product quality and increase manufacturing speed.

##### Flexible Board

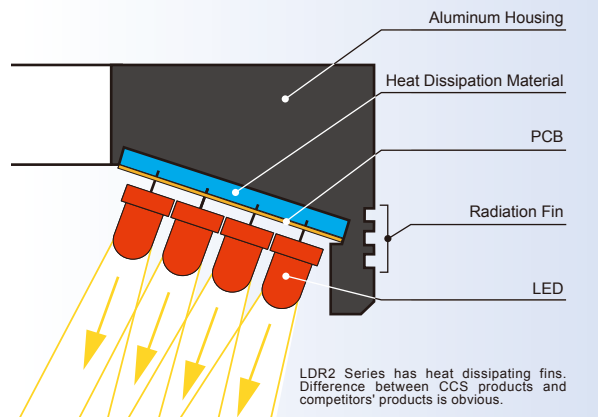


Using a flexible board makes it possible to adjust the outer diameter, inner diameter, illumination angle, and other characteristics to create an illumination system that is ideal for the object being illuminated.

#### Significantly Suppressing the Temperature Rise of LEDs

The LDR2 Series uses a special heat dissipating casing to prevent heat from building up in the LEDs and increase the life expectancy.

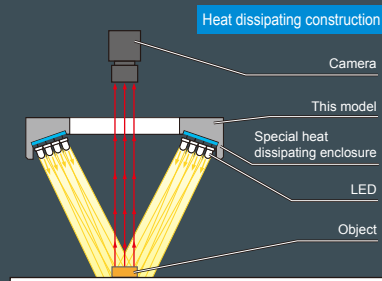
##### Structure of LDR2



With conventional construction, LED lights were not able to efficiently dissipate heat due to the gap between the PCB and aluminum housing. By employing a special heat dissipating material between the PCB and the housing in the new CCS construction, heat generated from the LEDs can be more effectively conducted into the housing. This new design suppresses the temperature rise of the LEDs, providing stable images for a long period of time. (Refer to page 103.)

#### Illumination Structure of LDR2-90

The flexible board is formed to the desired shape and a high-density LED array placed on the substrate. The light is concentrated at the center of the illumination system.

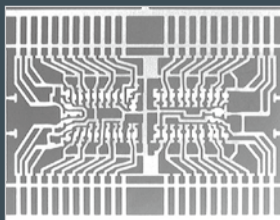


#### Examples of Ring Light Images

##### Lead Frame Inspection

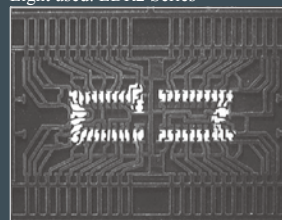
The whole frame is illuminated from above using an LDR2 Series.

##### Standard Illumination



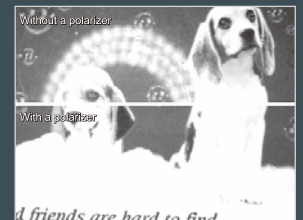
By decreasing the working distance of the illuminator, the silver plated sections of the lead frame become much more clear.

Light used: LDR2 Series



##### Image comparisons utilizing a polarizer

LED glare in the top half of the image distorts the image. Using a polarizing plate and filter can eliminate this glare, as shown in the bottom half of the image.



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDR2	1005296	LDR2-32RD2	●	24V / 1.6W	D·P·A	1
	1001435	LDR2-32RD	●	12V / 1.5W		
	1002719	LDR2-32SW2	○	24V / 1.9W		
	1001427	LDR2-32BL	●	24V / 2.0W		
	1001434	LDR2-32GR	●			
	1005297	LDR2-42RD2	●	24V / 2.1W	D·P·A	2
	1001443	LDR2-42RD	●	12V / 2.1W		
	1002720	LDR2-42SW2	○	24V / 2.7W		
	1001439	LDR2-42BL	●	24V / 2.9W		
	1001440	LDR2-42GR	●			
	1005298	LDR2-50RD2	●	24V / 3.1W	D·P·A	3
	1001460	LDR2-50RD	●	12V / 3.0W		
	1005303	LDR2-50RD2-WD	●	24V / 3.1W		
	1001462	LDR2-50RD-WD	●	12V / 3.0W		
	1002721	LDR2-50SW2	○	24V / 3.8W		
	1001455	LDR2-50BL	●	24V / 4.1W	D·P*	4
	1001457	LDR2-50GR	●			
	1005299	LDR2-70RD2	●	24V / 6.1W		
	1001479	LDR2-70RD	●	12V / 6.0W		
	1005302	LDR2-70RD2-WD	●	24V / 6.1W		
	1001481	LDR2-70RD-WD	●	12V / 6.0W	D·P*	5
	1002722	LDR2-70SW2	○	24V / 7.6W		
	1001475	LDR2-70BL	●	24V / 8.2W		
	1001476	LDR2-70GR	●			
	1005301	LDR2-90RD2	●	24V / 11W		
	1001516	LDR2-90RD	●	12V / 9.5W		
	1005304	LDR2-90RD2-WD	●	24V / 11W		
	1001518	LDR2-90RD-WD	●	12V / 9.5W		
	1002723	LDR2-90SW2	○	24V / 14W		
	1001510	LDR2-90BL	●	24V / 15W		
1001514	LDR2-90GR	●				

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDR2	1005300	LDR2-90-30RD2	●	24V / 14W	—	7
	1001507	LDR2-90-30RD	●	12V / 14W		
	1002755	LDR2-90-30SW2	○	24V / 18W		
	1001505	LDR2-90-30BL	●			
	1001506	LDR2-90-30GR	●	D·P·A	8	
	1005305	LDR2-120RD2-WD	●			24V / 24W
	1001388	LDR2-120RD-WD	●			12V / 24W
	1002756	LDR2-120SW2	○			24V / 28W
	1001384	LDR2-120BL	●			
	1001385	LDR2-120GR	●	D·P	9	
	1005317	SQR-56RD2	●			24V / 3.1W
	1002524	SQR-56-N	●			12V / 3.0W
1005318	SQR-56RD2-WD	●	24V / 3.1W			
1002519	SQR-56	●	12V / 3.0W			
1002525	SQR-56-SW	○	24V / 4.1W	D·P	10	
1002520	SQR-56-BL	●				
1002585	SQR-56-GR	●	24V / 0.4W	—	11	
1005258	SQR-TP-28RD	●				
SQR-TP	1005259	SQR-TP-34RD	●	24V / 0.8W	—	12

\*WD in the model name represents LED cone angle (±) 40 (refer to P.104).

\*N in the model name represents LED cone angle (±) 20 (refer to P.104).

\*The peak wavelength for SQR-TP-28RD/SQR-TP-34RD is 630 nm.

\*Items marked with an asterisk under 'Options' are items with an adapter used for installation.

\*The following letters indicate options.

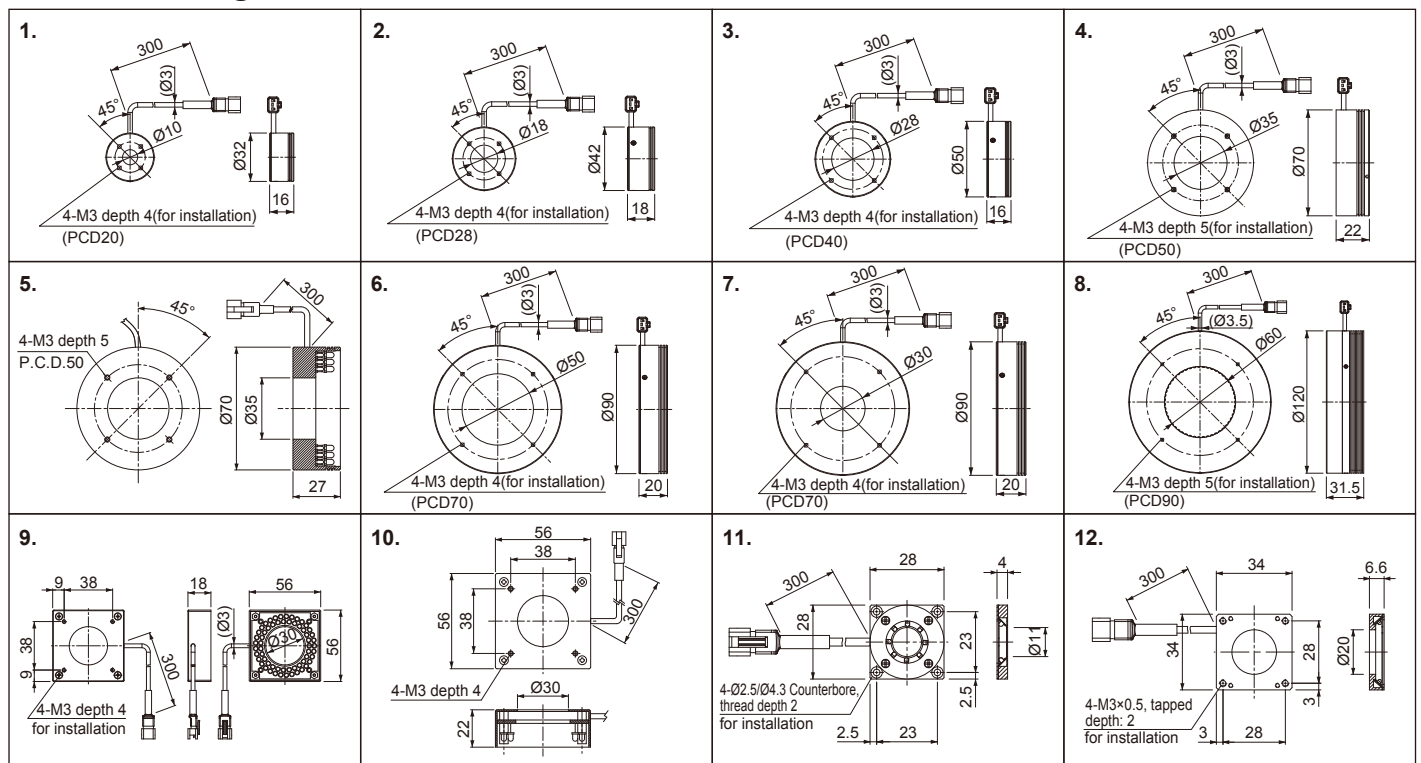
D: Diffusion Plate, P: Polarizing Plate, A: Fixing Adapter

\*For further details on these options, refer to page 99 to 101.

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement.

The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

## Dimension Diagrams (Unit: mm)







# Low-angle Ring Lights

## LDR2-LA/LDR-LA-1 Series

### Ideal for edge detection and highlighting scratches on glossy surfaces

Low-angle illumination is ideally suited for edge detection and for emphasizing incused characters or scratches on metal surfaces.



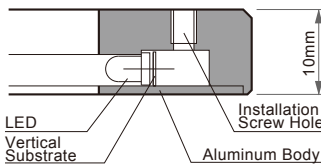
### Low-angle illumination can be used to highlight characteristic features of workpieces

The LDR-LA-1 is an ultra-low-angle illumination system with an ultra-thin design of just 10 mm. The thin design means that only minimal space is required for installation. At a working distance from the light of 5 to 10 mm, the system can emphasize edges and height variations when taking photographs.

Sample Edge Detection Using a 1-Yen Coin



Cross-Sectional Illustration of the LA-1 Series



LDR-146LA-1

### Aluminum Body Also Acts as a Highly Effective Heat Sink

Aluminum is used as the outer material for nearly all of the image processing LEDs systems produced by CCS. Aluminum is a good heat conductor and acts as a heat sink to keep the internal temperature of the illumination system from rising. Heat can be a major problem for LED illumination systems, decreasing light intensity and reducing the life of the LEDs. The use of an aluminum body helps minimize these problems.



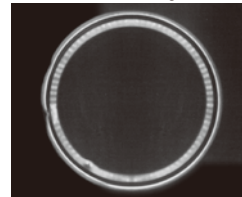
LDR2-74SW-LA

### Compatible with Optional Diffusion Rings and Diffusion Plates

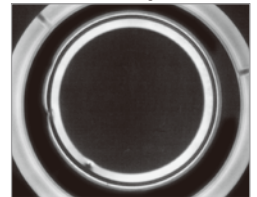
#### Comparison of can's dent image

Light used: LDR2-132RD-LA Diffusion Ring: DF-LDR-132LA

Without Diffusion Ring



With Diffusion Ring

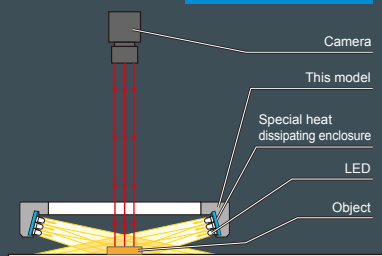


Using a Diffusion Ring or Diffusion Panel suppresses glare and LED reflections that may be a problem when capturing images of glossy workpieces.

#### Illumination structure of LDR2-132-LA

A flexible circuit board is fixed at the desired angle to illuminate the workpiece from a low angle.

#### Heat dissipating construction



#### Examples of Low-Angle Ring Light Images

##### Inspection of Printed Characters on the Bottom of a Battery

A WD of 15 mm emphasizes printed characters.

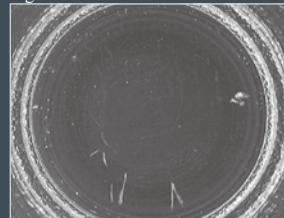
Light used: LDR-75LA-1



##### Inspection of Disposable Camera Lenses for Damage

Low-angle illumination emphasizes scratches on the lens surface.

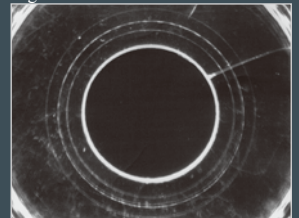
Light used: LDR2-132RD-LA



##### Inspection of CD-ROM for Inner Ring Cracking

Low-angle illumination emphasizes cracks while preventing LED reflections from appearing in the photographed image.

Light used: LDR2-74RD-LA



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDR2-LA	1005306	LDR2-48RD2-LA	●	24V / 2.1W	D	1
	1001453	LDR2-48RD-LA	●	12V / 2.4W		
	1002724	LDR2-48SW2-LA	○	24V / 3.1W		
	1001452	LDR2-48BL-LA	●			
	1003004	LDR2-48GR-LA	●	D	2	
	1005307	LDR2-74RD2-LA	●			24V / 4.6W
	1001490	LDR2-74RD-LA	●			12V / 4.5W
	1002725	LDR2-74SW2-LA	○			24V / 5.7W
	1001487	LDR2-74BL-LA	●	24V / 6.1W	D	3
	1001488	LDR2-74GR-LA	●			
	1005308	LDR2-100RD2-LA	●	24V / 9.1W	D	4
	1001370	LDR2-100RD-LA	●	12V / 9.0W		
	1002726	LDR2-100SW2-LA	○	24V / 12W		
	1001368	LDR2-100BL-LA	●			
	1001369	LDR2-100GR-LA	●	D	5	
	1005309	LDR2-132RD2-LA	●			24V / 13W
	1001398	LDR2-132RD-LA	●			12V / 13W
	1002727	LDR2-132SW2-LA	○			24V / 16W
	1001391	LDR2-132BL-LA	●	24V / 17W	D	6
	1001396	LDR2-132GR-LA	●			
	1005310	LDR2-170RD2-LA	●	24V / 18W	D	5
	1001411	LDR2-170RD-LA	●	12V / 18W		
	1002757	LDR2-170SW2-LA	○	24V / 22W		
	1001407	LDR2-170BL-LA	●	24V / 23W		
1001409	LDR2-170GR-LA	●				
1005311	LDR2-208RD2-LA	●	24V / 22W	D	6	
1001420	LDR2-208RD-LA	●	12V / 22W			
1002758	LDR2-208SW2-LA	○	24V / 28W			
1001417	LDR2-208BL-LA	●				
1001418	LDR2-208GR-LA	●				

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDR-LA-1	1005312	LDR-75RD2-LA1	●	24V / 2.6W	—	7
	1001316	LDR-75LA-1	○	12V / 3.0W		
	1001323	LDR-75LA-1-SW	○	24V / 4.1W		
	1001318	LDR-75LA-1-BL	●			
	1001319	LDR-75LA-1-GR	●	D	8	
	1005313	LDR-96RD2-LA1	●			24V / 3.1W
	1001348	LDR-96LA-1	●			12V / 3.0W
	1001353	LDR-96LA-1-SW	○			24V / 4.1W
	1001350	LDR-96LA-1-BL	●			
	1001351	LDR-96LA-1-GR	●	D	9	
	1005314	LDR-146RD2-LA1	●			24V / 4.6W
	1001136	LDR-146LA-1	●			12V / 4.8W
	1001140	LDR-146LA-1-SW	○			24V / 6.5W
	1001137	LDR-146LA-1-BL	●			
	1001139	LDR-146LA-1-GR	●	D	10	
	1005315	LDR-176RD2-LA1	●			24V / 6.1W
	1001163	LDR-176LA-1	●			12V / 6.0W
	1001166	LDR-176LA-1-SW	○			24V / 8.2W
	1001164	LDR-176LA-1-BL	●			
	1001165	LDR-176LA-1-GR	●	D	11	
	1005316	LDR-206RD2-LA1	●			24V / 7.1W
	1001169	LDR-206LA-1	○			12V / 7.2W
	1001172	LDR-206LA-1-SW	○			24V / 9.8W
	1001170	LDR-206LA-1-BL	●			
1001171	LDR-206LA-1-GR	●				

\*The following letters indicate options.

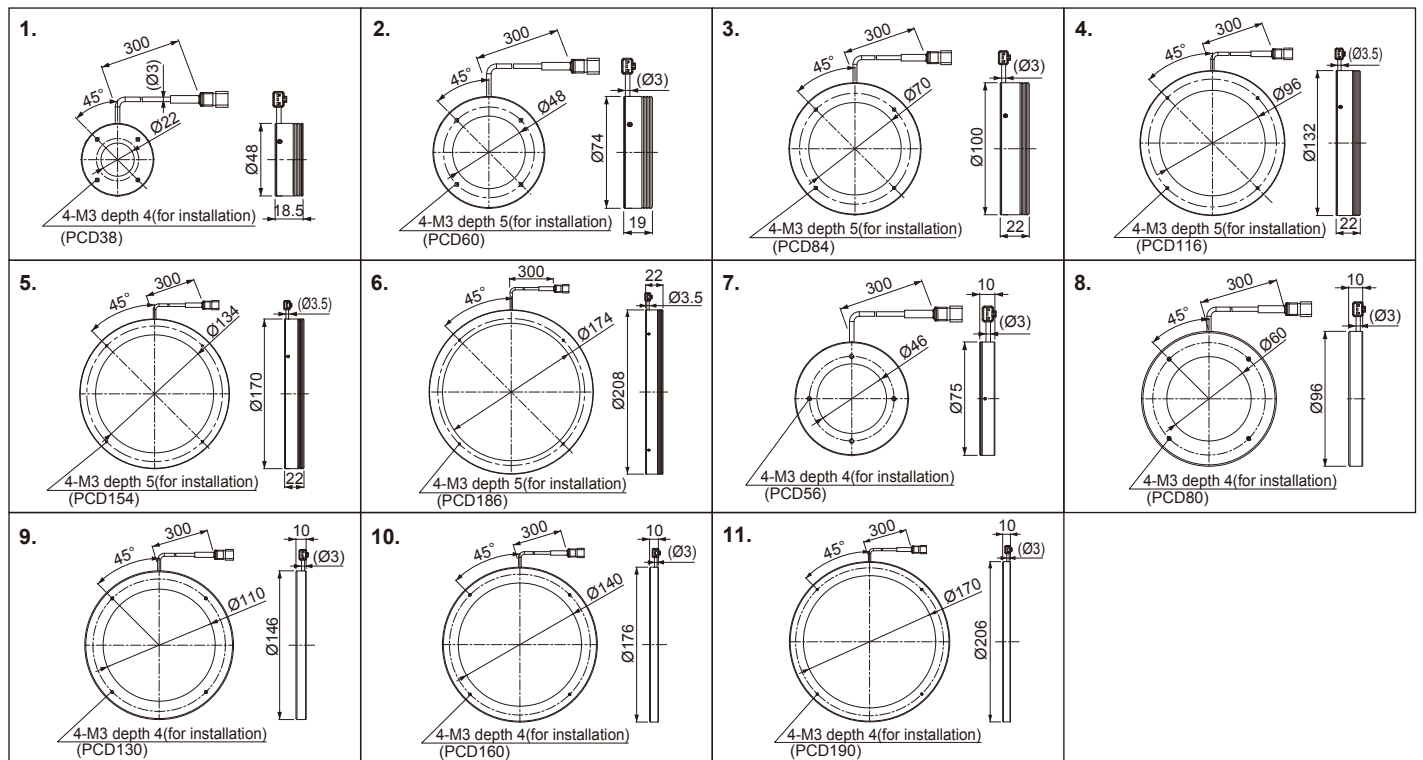
D: Diffusion Plate

\*For further details on these options, refer to page 100.

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement.

The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

## Dimension Diagrams (Unit: mm)





# Bar Lights

## LDL2 Series

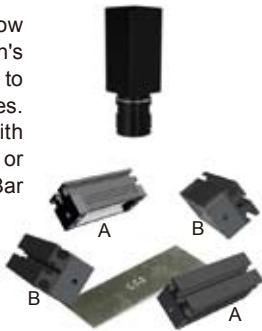
**Highly functional Bar Lights**  
New mounting methods for Installation flexibility.



### A Broad Range of Applications

A freely adjustable light direction and angle allow these models to handle a wide variety of applications.

The two figures shown below demonstrate how the illumination's axis and angle can be changed to yield completely different images. This becomes an issue with workpieces with glossy surfaces or parallel grooves, for example. Bar Lights are adjustable allowing you to change the light direction and angle to obtain the optimal image.



Light Direction, Image A



Light Direction, Image B



Image A is washed out because the light reflects straight back from parallel metallic grooves. Image B shows the lettering clearly because the light reflects out of the field of view, leaving the background dark.

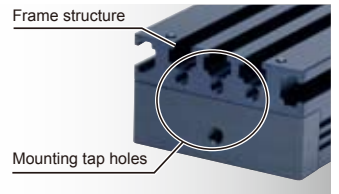
Mounting brackets are available for four different illumination directions. For further details, refer to page 101.



For the LDL2-33x8 Series For the LDL2 Series

### Flexibility of Mounting to Match Your Site Environment

Installation can be achieved with either frame mounting or traditional mounting with tap holes. You therefore have the freedom to select the installation method according to your site environment.



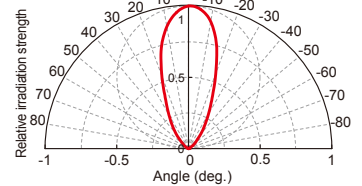
\*The LDL2-33x8 Series provides only tap holes for installation.

### Focus Angle Characteristics of Wide and Narrow Types

There are two directional pattern selections: narrow, which focuses the light into a beam, and wide (WD), which spreads the light out over a broad area. This selection is available over the entire lineup.

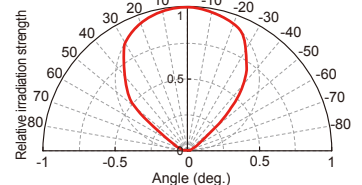
#### Directional Characteristics of Narrow Model

Larger emission surface



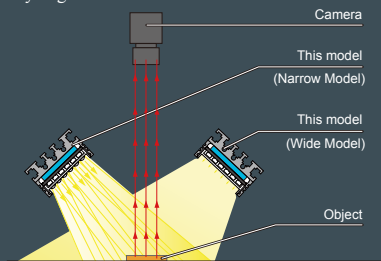
#### Directional Characteristics of Wide Model

Larger emission surface



### Illumination structure of LDL2-74x30

LEDs are arranged at high-density on a single flat circuit board and the work can be illuminated from any angle as desired.



### The LDL2-33x8, the smallest member of the Series, helps you save space

Lightweight, compact designs lend themselves to installation in tight equipment spaces.



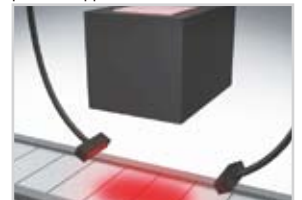
\*Only the wide directional pattern is available.

#### Application Examples

Installation in tight equipment spaces is also possible.



Supplementing other lighting is another possible application.





Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDL2	1004646	LDL2-33×8RD	●	24V / 0.8W	D P B	1
	1004647	LDL2-33×8SW	○			
	1004648	LDL2-33×8BL	●			
	1004649	LDL2-33×8GR	●	24V / 1.9W	D P C B	2
	1003702	LDL2-41×16RD	●			
	1003705	LDL2-41×16SW	○			
	1003704	LDL2-41×16BL	●			
	1003703	LDL2-41×16GR	●			
	1003706	LDL2-41×16RD-WD	●			
	1003709	LDL2-41×16SW-WD	○			
	1003708	LDL2-41×16BL-WD	●			
	1003707	LDL2-41×16GR-WD	●			
	1003710	LDL2-80×16RD	●	24V / 3.8W	D P C B	2
	1003713	LDL2-80×16SW	○			
	1003712	LDL2-80×16BL	●			
	1003711	LDL2-80×16GR	●			
	1003714	LDL2-80×16RD-WD	●			
	1003717	LDL2-80×16SW-WD	○			
1003716	LDL2-80×16BL-WD	●				
1003715	LDL2-80×16GR-WD	●				
1003718	LDL2-119×16RD	●	24V / 5.7W			
1003721	LDL2-119×16SW	○				
1003720	LDL2-119×16BL	●				
1003719	LDL2-119×16GR	●				
1003722	LDL2-119×16RD-WD	●				
1003725	LDL2-119×16SW-WD	○				
1003724	LDL2-119×16BL-WD	●				
1003723	LDL2-119×16GR-WD	●				

\*The peak wavelength for Red lights is 635 nm. If a sharp-cut filter is required, use a R60 Filter (optional).

\*The LDL2-33×8 provides only the wide directional pattern.

\*The following letters indicate options.

D: Diffusion Plate, P: Polarizing Plate, C: Cover, B: Bracket

\*For further details on these options, refer to page 99 to 101.

Existing Bar Light LDL series was discontinued at the end of July, 2011. LDL2 series is recommended as replacement.

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDL2	1003726	LDL2-74×30RD	●	24V / 5.7W	D P C B	3
	1003729	LDL2-74×30SW	○			
	1003728	LDL2-74×30BL	●			
	1003727	LDL2-74×30GR	●			
	1003730	LDL2-74×30RD-WD	●			
	1003733	LDL2-74×30SW-WD	○			
	1003732	LDL2-74×30BL-WD	●	24V / 12W	D P C B	3
	1003731	LDL2-74×30GR-WD	●			
	1003734	LDL2-146×30RD	●			
	1003737	LDL2-146×30SW	○			
	1003736	LDL2-146×30BL	●			
	1003735	LDL2-146×30GR	●			
	1003738	LDL2-146×30RD-WD	●	24V / 18W	D P C B	3
	1003741	LDL2-146×30SW-WD	○			
	1003740	LDL2-146×30BL-WD	●			
	1003739	LDL2-146×30GR-WD	●			
	1003742	LDL2-218×30RD	●			
	1003745	LDL2-218×30SW	○			
	1003744	LDL2-218×30BL	●	24V / 21W	D P C B	3
	1003743	LDL2-218×30GR	●			
	1003746	LDL2-218×30RD-WD	●			
	1003749	LDL2-218×30SW-WD	○			
	1003748	LDL2-218×30BL-WD	●			
	1003747	LDL2-218×30GR-WD	●			
	1003750	LDL2-266×30RD	●	24V / 21W	D P C B	3
	1003753	LDL2-266×30SW	○			
	1003752	LDL2-266×30BL	●			
	1003751	LDL2-266×30GR	●			
	1003754	LDL2-266×30RD-WD	●			
	1003757	LDL2-266×30SW-WD	○			
	1003756	LDL2-266×30BL-WD	●			
	1003755	LDL2-266×30GR-WD	●			

## Built-to-order models

Series	Model Name	Color	Emission surface size	Power Consumption	Option	Dimension
LDL2	LDL2-158×16(-WD)	● ○ ●	158×16mm	24V / 7.6W	D P C B	2
	LDL2-197×16(-WD)		197×16mm	24V / 9.5W		
	LDL2-236×16(-WD)		236×16mm	24V / 12W		
	LDL2-275×16(-WD)		275×16mm	24V / 14W		
	LDL2-314×16(-WD)		314×16mm	24V / 16W		
	LDL2-353×16(-WD)		353×16mm	24V / 18W		
	LDL2-392×16(-WD)		392×16mm	24V / 19W		
	LDL2-431×16(-WD)		431×16mm	24V / 21W		
	LDL2-470×16(-WD)		470×16mm	24V / 23W		
	LDL2-509×16(-WD)		509×16mm	24V / 25W		

\*The peak wavelength for Red lights is 635 nm. If a sharp-cut filter is required, use a R60 Filter (optional).

\*The optional WD suffix indicates the wide directional pattern.

\*The following letters indicate options.

D: Diffusion Plate, P: Polarizing Plate, C: Cover, B: Bracket

\*For the availability of other options, ask your CCS representative.

Series	Model Name	Color	Emission surface size	Power Consumption	Option	Dimension
LDL2	LDL2-26×30(-WD)	● ○ ●	26×30mm	24V / 1.9W	D P C B	3
	LDL2-50×30(-WD)		50×30mm	24V / 3.8W		
	LDL2-98×30(-WD)		98×30mm	24V / 7.6W		
	LDL2-122×30(-WD)		122×30mm	24V / 9.5W		
	LDL2-170×30(-WD)		170×30mm	24V / 14W		
	LDL2-194×30(-WD)		194×30mm	24V / 16W		
	LDL2-242×30(-WD)		242×30mm	24V / 19W		
	LDL2-290×30(-WD)		290×30mm	24V / 23W		
	LDL2-314×30(-WD)		314×30mm	24V / 25W		
	LDL2-338×30(-WD)		338×30mm	24V / 27W		
	LDL2-362×30(-WD)		362×30mm	24V / 29W		
	LDL2-386×30(-WD)		386×30mm	24V / 31W		
	LDL2-410×30(-WD)		410×30mm	24V / 33W		
	LDL2-434×30(-WD)		434×30mm	24V / 35W		
	LDL2-458×30(-WD)		458×30mm	24V / 37W		
	LDL2-482×30(-WD)		482×30mm	24V / 38W		
	LDL2-506×30(-WD)		506×30mm	24V / 40W		

## Dimension Diagrams (Unit: mm)

Standard part
Special order

**1.**

Two M2, Option mounting holes  
Two M2 holes, depth: 4 (Same on opposite side, for mounting)  
Two M3 holes, depth: 4 (for mounting)

**2.**

2x2 M3, Depth: 5 (same for opposite side)  
Slot for three, M3 nuts

The wide versions (-WD) have the same sizes.

Model Name	A	B	Model Name	A	B
LDL2-41×16(RD/SW/BL/GR)	53	41	LDL2-314×16(RD/SW/BL/GR)	326	314
LDL2-80×16(RD/SW/BL/GR)	92	80	LDL2-353×16(RD/SW/BL/GR)	365	353
LDL2-119×16(RD/SW/BL/GR)	131	119	LDL2-392×16(RD/SW/BL/GR)	404	392
LDL2-158×16(RD/SW/BL/GR)	170	158	LDL2-431×16(RD/SW/BL/GR)	443	431
LDL2-197×16(RD/SW/BL/GR)	209	197	LDL2-470×16(RD/SW/BL/GR)	482	470
LDL2-236×16(RD/SW/BL/GR)	248	236	LDL2-509×16(RD/SW/BL/GR)	521	509
LDL2-275×16(RD/SW/BL/GR)	287	275			

**3.**

2x4 M3, Depth: 5 (same for opposite side)  
Slot for five, M3 nuts

The wide versions (-WD) have the same sizes.

Model Name	A	B	Model Name	A	B
LDL2-26×30(RD/SW/BL/GR)	38	26	LDL2-194×30(RD/SW/BL/GR)	206	194
LDL2-50×30(RD/SW/BL/GR)	62	50	LDL2-218×30(RD/SW/BL/GR)	230	218
LDL2-74×30(RD/SW/BL/GR)	86	74	LDL2-242×30(RD/SW/BL/GR)	254	242
LDL2-98×30(RD/SW/BL/GR)	110	98	LDL2-266×30(RD/SW/BL/GR)	278	266
LDL2-122×30(RD/SW/BL/GR)	134	122	LDL2-290×30(RD/SW/BL/GR)	302	290
LDL2-146×30(RD/SW/BL/GR)	158	146	LDL2-314×30(RD/SW/BL/GR)	326	314
LDL2-170×30(RD/SW/BL/GR)	182	170	LDL2-338×30(RD/SW/BL/GR)	350	338
			LDL2-362×30(RD/SW/BL/GR)	374	362
			LDL2-386×30(RD/SW/BL/GR)	398	386
			LDL2-410×30(RD/SW/BL/GR)	422	410
			LDL2-434×30(RD/SW/BL/GR)	446	434
			LDL2-458×30(RD/SW/BL/GR)	470	458
			LDL2-482×30(RD/SW/BL/GR)	494	482
			LDL2-506×30(RD/SW/BL/GR)	518	506



# Flood Lights

## HLDL2 Series

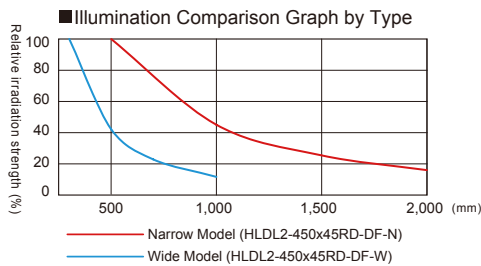
### High-output LED Flood Lights Perfect for Large-scale Workpieces

Can illuminate objects up to 2,000 mm away. Many sizes available to handle a wide range of applications.



#### Illuminate Objects Up to 2,000 mm Away

The high output of these Flood Lights makes long-distance illumination possible. The models with narrow directional characteristics can illuminate objects 2,000 mm away.



\*The graphs provided here are for reference only. Results for individual Lights may vary.

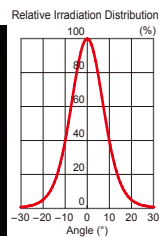
#### Selectable Directional Characteristics

Two models are available with different directional characteristics: a Narrow Model, which enables long-distance illumination, and a Wide Model, which provides diffuse illumination over a wide area.

##### Narrow Model



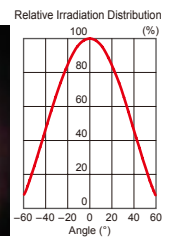
##### Light Distribution Characteristics



##### Wide Model

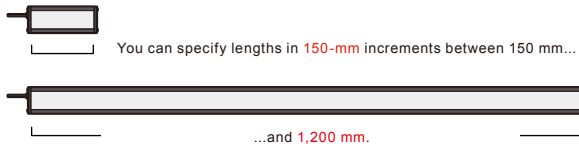


##### Light Distribution Characteristics



#### Available in Lengths from 150 mm to 1,200 mm

The design uses multiple LED boards connected together. Lengths can be specified in increments of 150 mm. With sizes ranging from 150 mm to a maximum of 1,200 mm, these Flood Lights are suitable for a wide range of applications.



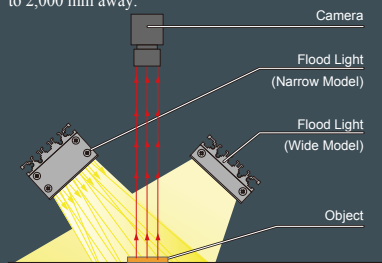
#### Lineup Includes LED Colors of Red, White, and Infrared

A wide range of colors, from visible light to infrared, is available. (The peak emitted light wavelength of the Infrared Flood Lights is 860 nm.)



#### Illumination structure of HLHL2 series

Many sizes are available to handle a wide range of applications. The high output will illuminate objects up to 2,000 mm away.



#### Examples of Flood Light Images

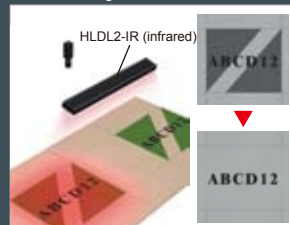
##### Ideal for Large-scale Applications

##### Picking Operations with Robots



The ideal solution to replace fluorescent lights.

##### Character Recognition on Cardboard



Characters can be read without interference from printed patterns.

##### Inspection of Door Assembly Gaps



The gaps can be checked.

Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Specifications

Illumination type	Narrow			Wide		
Model name	HLDL2-△△△x45RD-DF-N	HLDL2-△△△x45SW-DF-N	HLDL2-△△△x45IR-DF-N	HLDL2-△△△x45RD-DF-W	HLDL2-△△△x45SW-DF-W	HLDL2-△△△x45IR-DF-W
Direct number	1510					
△△△	"△△△" is the light-emitting surface length between 150 and 1,200 mm in 150-mm increments.					
LED color	Red	White	Infrared	Red	White	Infrared
Input voltage	24 VDC					
Peak emitted light wavelength (typ.)	640 nm	—	860 nm	640 nm	—	860 nm
Correlated color temperature (typ.)	—	5,600 K	—	—	5,600 K	—
Connector	Light-emitting surface length of 150 to 450 mm: SM Connector (SMR-03V-B), Light-emitting surface length of 600 to 1,200 mm: EL Connector (ELP-02V)					
Polarity and signals	SM Connector (1: Anode (+), 2: NC, 3: Cathode (-)), EL Connector (1: Anode (+), 2: Cathode (-))					
Cooling method	Natural air cooling					
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85% RH (with no condensation)					
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85% RH (with no condensation)					
Case material	Aluminum base with black alumite surface					

\*These Flood Lights cannot be used with Strobe Light Control Units (PTU2-3024, BB-V24S30-M, and BB-V24S30-S).

PD3-series Control Units can be used for Strobe Mode and ON/OFF Mode, and Constant Lighting Control Units (PD2 Series, BB Series, etc.) can be used for ON/OFF light control.

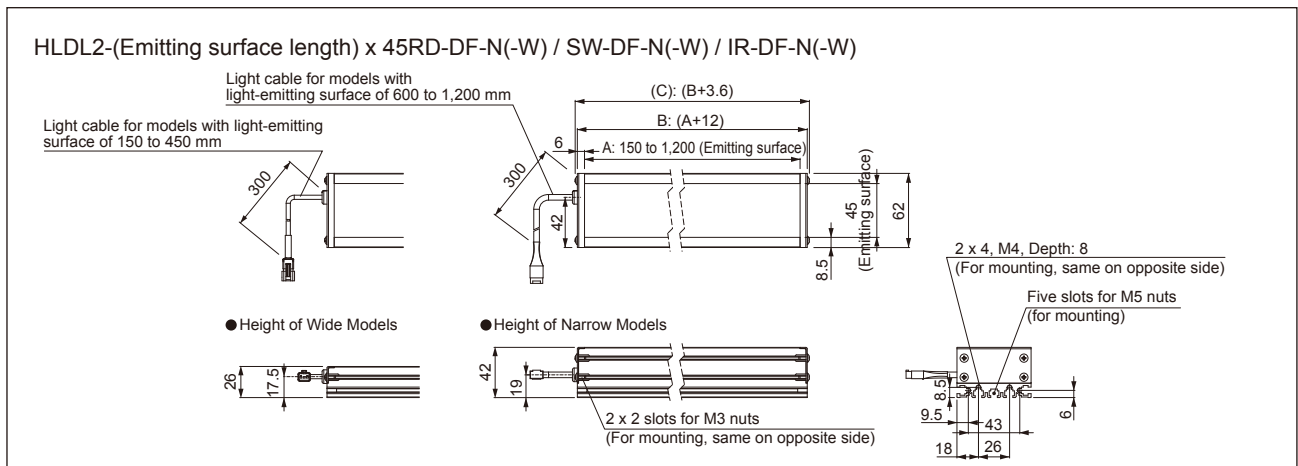
\*The peak emitted light wavelength of the Red Flood Lights is 640 nm. For a Sharp-cut Filter, use the optional R60 Sharp-cut Filter.

\*Refer to page 99 for information on options.

## Model-specific Specifications

Model name	Power consumption (max.)	Weight	Model name	Power consumption (max.)	Weight	Model name	Power consumption (max.)	Weight			
Red Narrow Models	HLDL2-150x45RD-DF-N	14 W	390 g	White Narrow Models	HLDL2-150x45SW-DF-N	16 W	390 g	Infrared Narrow Models	HLDL2-150x45IR-DF-N	12 W	390 g
	HLDL2-300x45RD-DF-N	28 W	770 g		HLDL2-300x45SW-DF-N	31 W	770 g		HLDL2-300x45IR-DF-N	24 W	770 g
	HLDL2-450x45RD-DF-N	42 W	1,160 g		HLDL2-450x45SW-DF-N	46 W	1,160 g		HLDL2-450x45IR-DF-N	36 W	1,160 g
	HLDL2-600x45RD-DF-N	56 W	1,540 g		HLDL2-600x45SW-DF-N	61 W	1,540 g		HLDL2-600x45IR-DF-N	48 W	1,540 g
	HLDL2-750x45RD-DF-N	70 W	1,930 g		HLDL2-750x45SW-DF-N	76 W	1,930 g		HLDL2-750x45IR-DF-N	60 W	1,930 g
	HLDL2-900x45RD-DF-N	84 W	2,310 g		HLDL2-900x45SW-DF-N	91 W	2,310 g		HLDL2-900x45IR-DF-N	72 W	2,310 g
	HLDL2-1050x45RD-DF-N	98 W	2,700 g		HLDL2-1050x45SW-DF-N	106 W	2,700 g		HLDL2-1050x45IR-DF-N	84 W	2,700 g
	HLDL2-1200x45RD-DF-N	111 W	3,080 g		HLDL2-1200x45SW-DF-N	121 W	3,080 g		HLDL2-1200x45IR-DF-N	96 W	3,080 g
Red Wide Models	HLDL2-150x45RD-DF-W	14 W	300 g	White Wide Models	HLDL2-150x45SW-DF-W	16 W	300 g	Infrared Wide Models	HLDL2-150x45IR-DF-W	12 W	300 g
	HLDL2-300x45RD-DF-W	28 W	590 g		HLDL2-300x45SW-DF-W	31 W	590 g		HLDL2-300x45IR-DF-W	24 W	590 g
	HLDL2-450x45RD-DF-W	42 W	880 g		HLDL2-450x45SW-DF-W	46 W	880 g		HLDL2-450x45IR-DF-W	36 W	880 g
	HLDL2-600x45RD-DF-W	56 W	1,170 g		HLDL2-600x45SW-DF-W	61 W	1,170 g		HLDL2-600x45IR-DF-W	48 W	1,170 g
	HLDL2-750x45RD-DF-W	70 W	1,460 g		HLDL2-750x45SW-DF-W	76 W	1,460 g		HLDL2-750x45IR-DF-W	60 W	1,460 g
	HLDL2-900x45RD-DF-W	84 W	1,750 g		HLDL2-900x45SW-DF-W	91 W	1,750 g		HLDL2-900x45IR-DF-W	72 W	1,750 g
	HLDL2-1050x45RD-DF-W	98 W	2,040 g		HLDL2-1050x45SW-DF-W	106 W	2,040 g		HLDL2-1050x45IR-DF-W	84 W	2,040 g
	HLDL2-1200x45RD-DF-W	111 W	2,330 g		HLDL2-1200x45SW-DF-W	121 W	2,330 g		HLDL2-1200x45IR-DF-W	96 W	2,330 g

## Dimension Diagrams (Unit: mm)



## Model-specific Dimensions

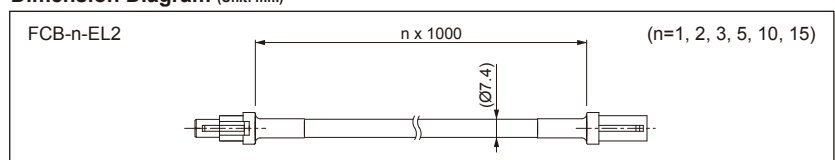
Model Name for Narrow Model	Dimension A (Emitting Surface)	Dimension B	Dimension C	Model Name for Narrow Model	Dimension A (Emitting Surface)	Dimension B	Dimension C
HLDL2-150x45RD-DF-N / SW-DF-N / IR-DF-N	150 mm	162 mm	165.6 mm	HLDL2-150x45RD-DF-W / SW-DF-W / IR-DF-W	150 mm	162 mm	165.6 mm
HLDL2-300x45RD-DF-N / SW-DF-N / IR-DF-N	300 mm	312 mm	315.6 mm	HLDL2-300x45RD-DF-W / SW-DF-W / IR-DF-W	300 mm	312 mm	315.6 mm
HLDL2-450x45RD-DF-N / SW-DF-N / IR-DF-N	450 mm	462 mm	465.6 mm	HLDL2-450x45RD-DF-W / SW-DF-W / IR-DF-W	450 mm	462 mm	465.6 mm
HLDL2-600x45RD-DF-N / SW-DF-N / IR-DF-N	600 mm	612 mm	615.6 mm	HLDL2-600x45RD-DF-W / SW-DF-W / IR-DF-W	600 mm	612 mm	615.6 mm
HLDL2-750x45RD-DF-N / SW-DF-N / IR-DF-N	750 mm	762 mm	765.6 mm	HLDL2-750x45RD-DF-W / SW-DF-W / IR-DF-W	750 mm	762 mm	765.6 mm
HLDL2-900x45RD-DF-N / SW-DF-N / IR-DF-N	900 mm	912 mm	915.6 mm	HLDL2-900x45RD-DF-W / SW-DF-W / IR-DF-W	900 mm	912 mm	915.6 mm
HLDL2-1050x45RD-DF-N / SW-DF-N / IR-DF-N	1050 mm	1062 mm	1065.6 mm	HLDL2-1050x45RD-DF-W / SW-DF-W / IR-DF-W	1050 mm	1062 mm	1065.6 mm
HLDL2-1200x45RD-DF-N / SW-DF-N / IR-DF-N	1200 mm	1212 mm	1215.6 mm	HLDL2-1200x45RD-DF-W / SW-DF-W / IR-DF-W	1200 mm	1212 mm	1215.6 mm

## Cable Lengths for EL Connectors on Models with Emitting Surface of 600 to 1,200 mm

### Model-specific Dimensions

Direct Number	Model Name	Cable Length (n)
3000690	FCB-1-EL2	1 m
3000691	FCB-2-EL2	2 m
3000692	FCB-3-EL2	3 m
3000693	FCB-5-EL2	5 m
3000760	FCB-10-EL2	10 m
3000766	FCB-15-EL2	15 m

### Dimension Diagram (Unit: mm)



Use the FCB-series or FRCB-series Extension Cables for models with light-emitting surfaces of 150 to 450 mm. Refer to page 102 for information on Extension Cables.

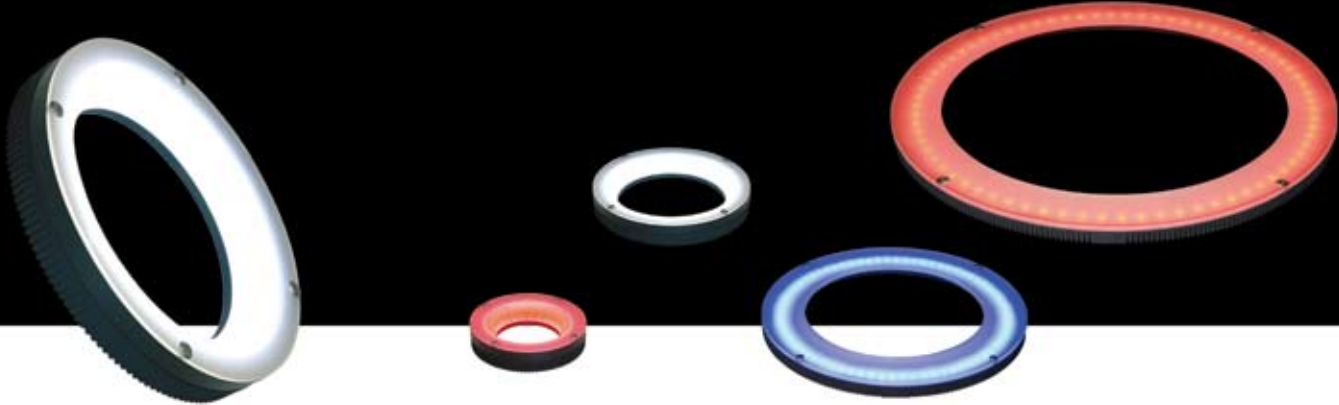




# Ring Lights

## HPR Series

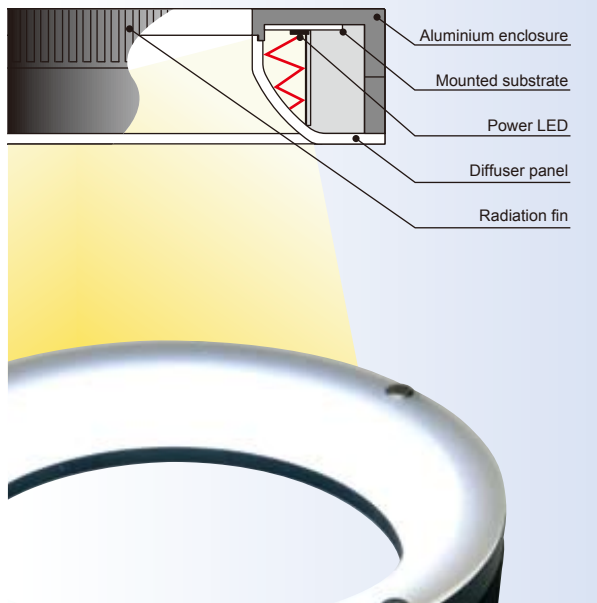
**"Brighter" "More uniform" "Easy to use" High-Power Ring Lights**  
 Enhanced light intensity and larger uniform area enables more diversified applications.



### Radiation of High-intensity Diffused Light

The use of power LEDs and the unique illumination structure achieves a high-intensity with uniform diffused illumination. The HPR Series realized higher light intensity compared with conventional diffusion ring lights and it makes possible to use under various situations.

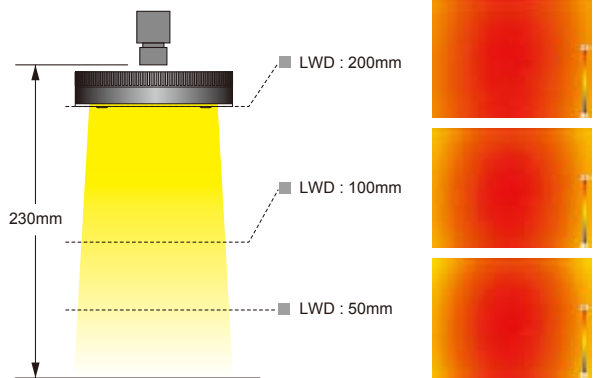
Cross section structure of HPR Series



### Achievement of Larger Uniform Areas

The unique illumination structure irradiates diffused light effectively from the LEDs. Since there is little change in the uniform area even if the distance from the workpiece to the Light Unit will be changed, HPR Series can be used in a wide variety of environments and for diverse applications.

Uniformity data of HPR-100SW

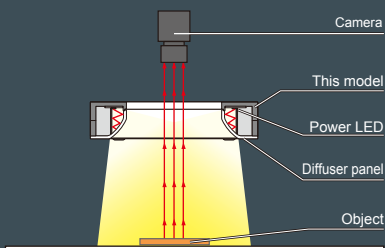


\* This shows the relative brightness distribution when the brightest area is set at 100. The data given here is intended for reference purposes only and is not intended to assure the quality of the product.

Measuring conditions	Camera	1/2 inch sensor
	Lens	f25mm
	Macro ring	2mm
	WD	230mm
	Field (Y direction)	40mm
	Lighting	HPR-100SW
	LWD	50,100,200mm

### Illumination structure of HPR-100

The use of power LEDs and the unique illumination structure achieves high-intensity, uniform diffused illumination.



### Examples of surface-emitting ring light images

Image of date on food product  
 Macroscopic image



Light intensity is not adequate at a shutter speed of 1/10,000 with the LED diffusion ring light.

Light used: LED diffusion ring light



The surface of a workpiece is imaged evenly and brightly with the high-power ring light.

Light used: HPR-100SW



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

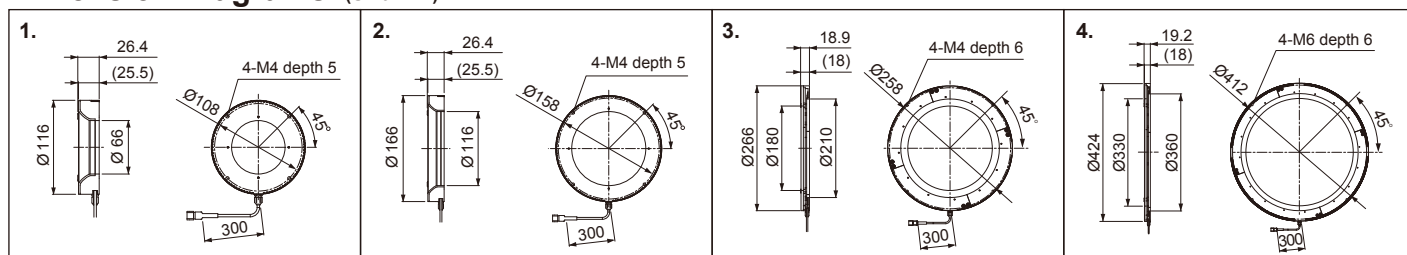
Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
HPR	1002932	HPR-100RD	●	24V / 9.0W	—	1
	1002931	HPR-100SW	○	24V / 14W		
	1002933	HPR-100BL	●			
	1002938	HPR-150RD	●	24V / 16W	—	2
	1002937	HPR-150SW	○	24V / 20W		
	1002939	HPR-150BL	●			
	1003206	HPR-250RD	●	24V / 25W	—	3
	1003205	HPR-250SW	○	24V / 37W		
	1003207	HPR-250BL	●			
	1003209	HPR-400RD	●	24V / 25W	—	4
	1003208	HPR-400SW	○	24V / 41W		
	1003210	HPR-400BL	●			

\*HPR Series cannot be used in combination with CCS Strobe Control Unit (PTU2 Series, etc.)

\*The peak wavelength for Red lights is 625 nm. If a sharp-cut filter is required, use a R60 Filter (optional).

\*For further details on these options, refer to page 99.

## Dimension Diagrams (Unit: mm)



## Examples of surface-emitting ring light images

### Image of letters on package bottom

Light intensity is not adequate at a shutter speed of 1/10,000 with the fluor ring lamp.

Light used: Fluor ring lamp



Light intensity is adequate at the shutter speed of 1/10,000 with the HPR-100RD (red).

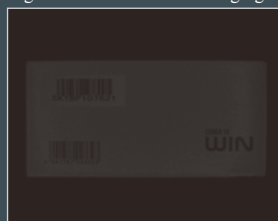
Light used: HPR-100RD



### Image of characters on mobile phone box

Light intensity is not adequate at a shutter speed of 1/4,000 with the LED diffused ring light.

Light used: LED diffusion ring light



Light intensity is adequate at the shutter speed of 1/4,000 with the HPR-250RD (red).

Light used: HPR-250RD



# Flat-ring Lights

## LFR/LKR Series

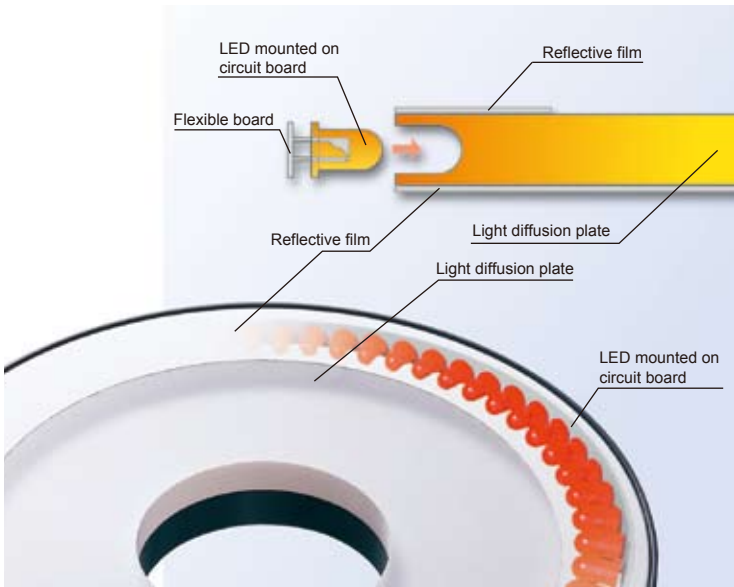
### Evenly diffused top lighting

A unique light guiding method provides uniform diffused illumination and eliminates LED glare and shadows.



#### Thin Flat Ring with a Unique Light Guiding Method

The LEDs are arranged in a straight line on a flexible circuit board, and then wrapped around the perimeter of a light diffusion plate. This channels the light directly from the LEDs into the light diffusion plate. In addition, a reflective film is applied to the surfaces of the light diffusion plate to refract and scatter the light in a complex way after it is introduced from the emitters. The light will spread evenly through the entire light diffusion plate and produce a very even light distribution.

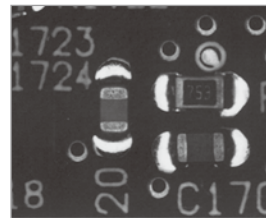
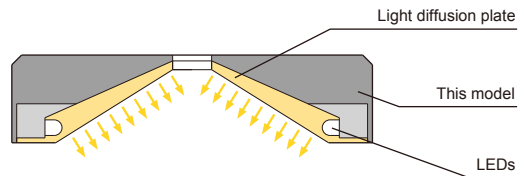


#### Even illumination without shadows (LKR)

LKR Series. Light shines from the conical emitting surface at all angles, making it possible to evenly illuminate the work without forming shadows.



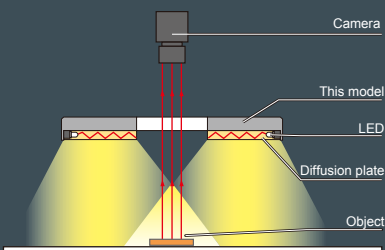
LKR-70-8



Solder joint inspection for chip components on printed circuit board.  
FOV 10mm, LWD 10mm  
No hot spots, uniform illumination, only the solder joints stand out in white.  
Lighting: LKR-70A

#### Illumination structure of LFR-100

Light from the LEDs around the periphery of the light diffusion plate is scattered and reflected within the plate to create diffuse light that illuminates from directly overhead.

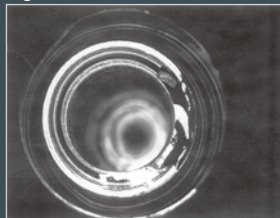


#### Examples of Flat Ring Light Images

##### Inspecting for nicks on a glass bottle

Normal areas of the bottle appear illuminated as a white ring. Broken parts can be detected as dark spots within the rings.

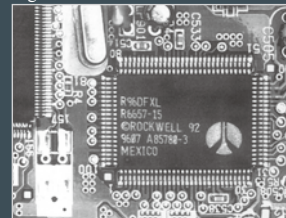
Light used: LFR-100



##### Inspecting characters on a QFP package

The characters are illuminated with good contrast.

Light used: LFR-130



##### Inspecting of stains on plastic caps

The stains on inside and bottom face of plastic caps can be detected.

Light used: LKR-70A





Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

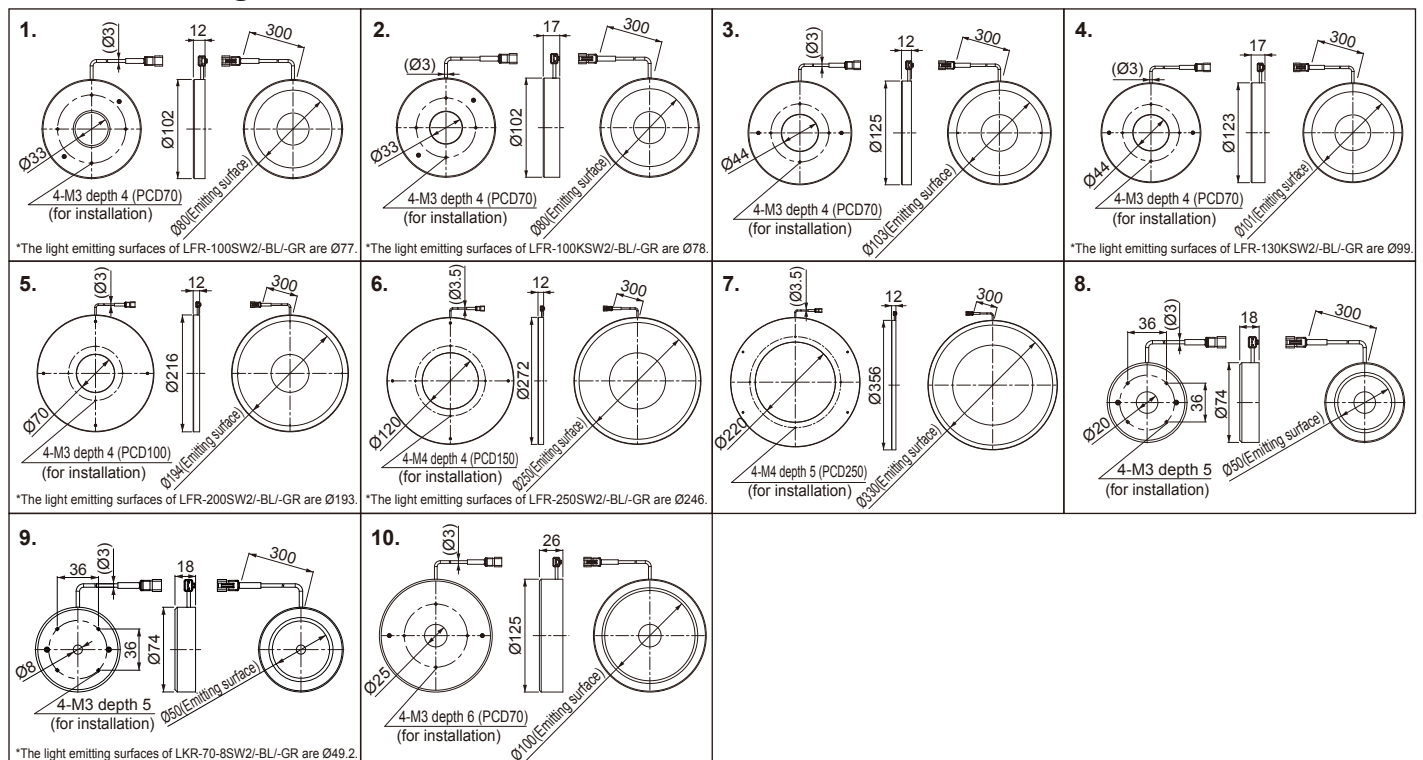
## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LFR	1005534	LFR-100RD2	●	24V / 3.6W	—	1
	1001715	LFR-100	●	12V / 3.6W		
	1004300	LFR-100SW2	○	24V / 4.6W		
	1001720	LFR-100-BL	●	24V / 4.9W		
	1001723	LFR-100-GR	●	24V / 4.9W		
	1005535	LFR-100RD2-K	●	24V / 3.6W	—	2
	1001728	LFR-100K	●	12V / 3.6W		
	1004301	LFR-100KSW2	○	24V / 4.6W		
	1001730	LFR-100K-BL	●	24V / 4.9W		
	1001731	LFR-100K-GR	●	24V / 4.9W		
	1005536	LFR-130RD2	●	24V / 4.6W	—	3
	1001740	LFR-130	●	12V / 4.5W		
	1004302	LFR-130SW2	○	24V / 5.7W		
	1001745	LFR-130-BL	●	24V / 6.1W		
	1001746	LFR-130-GR	●	24V / 6.1W		
	1005537	LFR-130RD2-K	●	24V / 4.6W	—	4
	1001750	LFR-130K	●	12V / 4.5W		
	1004303	LFR-130KSW2	○	24V / 5.7W		
	1001751	LFR-130K-BL	●	24V / 6.2W		
	1001752	LFR-130K-GR	●	24V / 6.2W		
	1005538	LFR-200RD2	●	24V / 8.1W	—	5
	1001757	LFR-200	●	12V / 8.1W		
	1004304	LFR-200SW2	○	24V / 11W		
	1001758	LFR-200-BL	●	24V / 11W		
	1005539	LFR-250RD2	●	24V / 11W		
	1001762	LFR-250	●	12V / 9.0W	—	6
	1004305	LFR-250SW2	○	24V / 13W		
	1001764	LFR-250-BL	●	24V / 14W		
	1001765	LFR-250-GR	●	24V / 14W		
	1005540	LFR-330RD2	●	24V / 14W		
	1001768	LFR-330	●	12V / 14W		

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LKR	1005531	LKR-70RD2	●	24V / 2.6W	—	8
	1002082	LKR-70A	●	12V / 3.0W		
	1004205	LKR-70SW2	○	24V / 3.8W		
	1002085	LKR-70A-BL	●	24V / 4.1W		
	1002087	LKR-70A-GR	●	24V / 4.1W		
	1005530	LKR-70-8RD2	●	24V / 2.6W		
	1002077	LKR-70-8	●	12V / 3.0W		
	1004204	LKR-70-8SW2	○	24V / 3.8W		
	1002078	LKR-70-8-BL	●	24V / 4.1W	—	9
	1002079	LKR-70-8-GR	●	24V / 4.1W		
	1005532	LKR-125RD2	●	24V / 4.6W		
	1002063	LKR-125	●	12V / 4.5W		
	1004203	LKR-125SW2	○	24V / 5.7W		
	1002066	LKR-125-BL	●	24V / 6.1W		
1002067	LKR-125-GR	●	24V / 6.1W			

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement. The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

## Dimension Diagrams (Unit: mm)





# Low-angle Square Lights

## FPQ2 Series

### Even, diffused side lighting

Low-angle, diffuse illumination enables characters and defects to be uniformly illuminated with no LED glare.



#### High-output Low-angle Light Unit

This square-shaped Light Unit was developed with a high shutter speed and low angle, while still maintaining a high output.

Previous Model: FPQ series (Red)



Shutter speed: 1/1,000 sec.  
Light intensity: 100% dimming



FPQ2 series (Red)



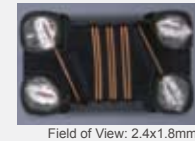
Shutter speed: 1/1,000 sec.  
Light intensity: 100% dimming

#### Perfect Compact Size for Extremely Small Parts

The 20 x 20-mm compact size of this Light Unit makes it perfect for chip parts, integrated circuits, and other extremely small parts.

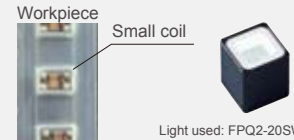


Imaging example: Imaging exterior of a coil



The entire outer surface of the coil is irradiated uniformly.

Field of View: 2.4x1.8mm



Workpiece  
Small coil

Light used: FPQ2-20SW

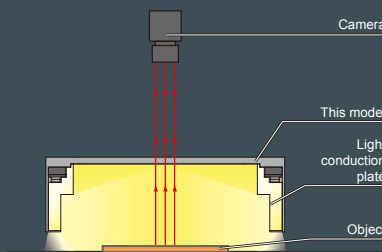
#### A Lineup of Light Units for a Wide Range of Applications

Select from six sizes: 20 x 20 mm, 32 x 32 mm, 48 x 48 mm, 75 x 75 mm, 96 x 96 mm, or 120 x 120 mm. There is a selection of three LED light colors: red, white, and blue. The lineup offers 18 size and color combinations.



#### Illumination structure of FPQ2-96

The object is illuminated from a low angle by uniform diffuse light through the light conduction plate.



#### Examples of low-angle Square Light images

##### Imaging Exterior of Food Packs

The entire outer surface of the square-shaped pack is uniformly illuminated.

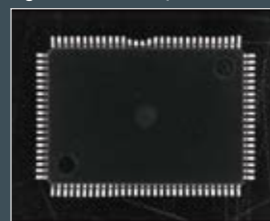
Light used: FPQ2-96RD



##### The lead of the IC is uniformly illuminated

The lead of the IC is uniformly illuminated.

Light Unit used: FPQ2-75SW



##### Imaging Exterior of Food Products

Even the entire surface of this rounded shape is illuminated uniformly.

Light used: FPQ2-75SW



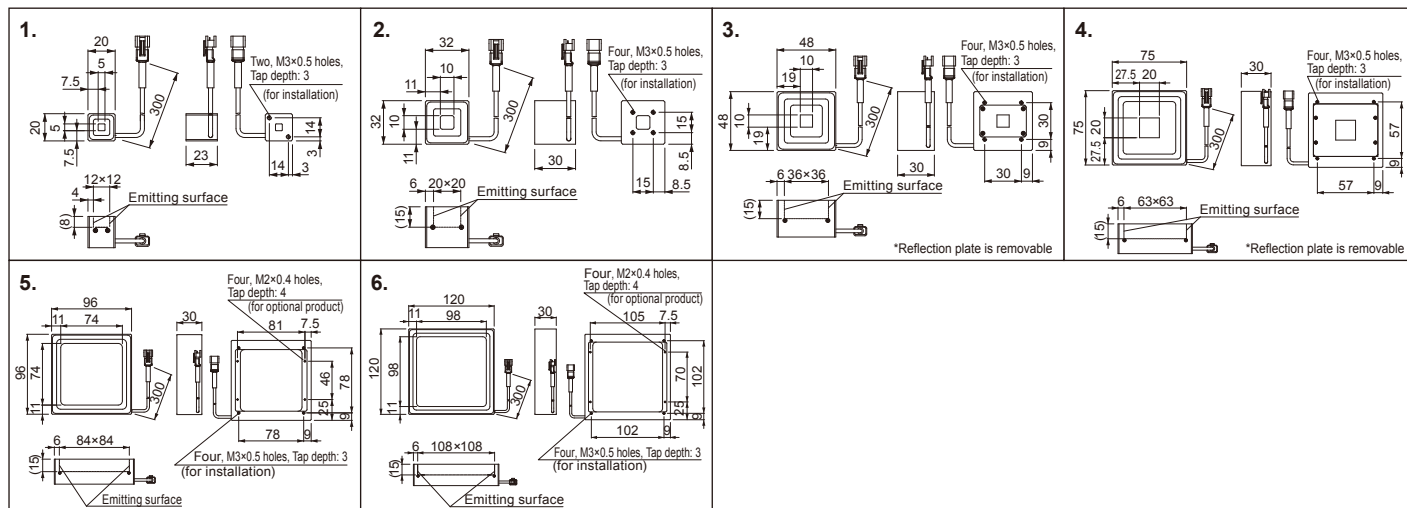
Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
FPQ2	1005263	FPQ2-20RD	●	24V/1.5W	—	1
	1005264	FPQ2-20SW	○	24V/2.6W		
	1005265	FPQ2-20BL	●	24V/1.8W		
	1005266	FPQ2-32RD	●	24V/6.1W	—	2
	1005267	FPQ2-32SW	○	24V/5.1W		
	1005268	FPQ2-32BL	●	24V/3.1W		
	1005269	FPQ2-48RD	●	24V/5.8W	—	3
	1005270	FPQ2-48SW	○	24V/11W		
	1005271	FPQ2-48BL	●	24V/7.1W		
	1005272	FPQ2-75RD	●	24V/17W	—	4
	1005273	FPQ2-75SW	○	24V/16W		
	1005274	FPQ2-75BL	●	24V/9.1W		
	1005275	FPQ2-96RD	●	24V/15W	—	5
	1005276	FPQ2-96SW	○	24V/21W		
	1005277	FPQ2-96BL	●	24V/13W		
	1005278	FPQ2-120RD	●	24V/18W	—	6
	1005279	FPQ2-120SW	○	24V/21W		
1005280	FPQ2-120BL	●	24V/11W			

Existing Low-angle Square Light FPQ series will be discontinued. FPQ2 series is recommended as replacement.

## Dimension Diagrams (Unit: mm)





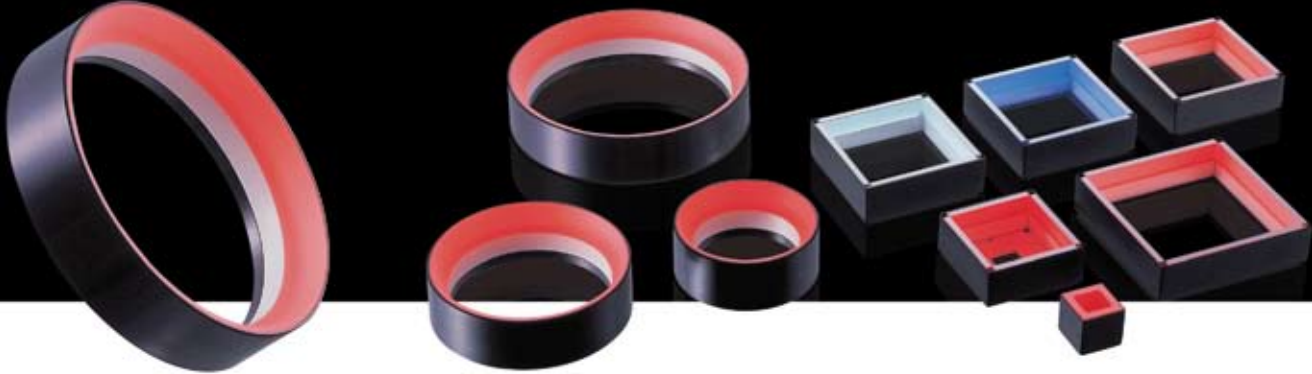


# Low-angle Ring Lights / Low-angle Square Lights

## FPR Series / FPQ Series

### Even, diffused side lighting

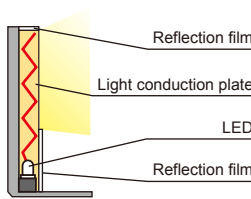
Low-angle, diffuse illumination enables characters and defects to be uniformly illuminated with no LED glare.



#### Diffused Lighting from Four Sides of the Square Case

To capture the image of rectangular workpiece uniformly such as a BGA or QFP, the four corners of the workpiece would be too close to the lighting if a round array is used. For this type of application, the rectangular FPQ Series is ideal.

Example of image using FPQ



#### Selectable lighting colors for optimal images

White, blue, and green colors are supported along with red. By selecting the illumination color to match the material and color of the work, a higher level of detection precision is possible.



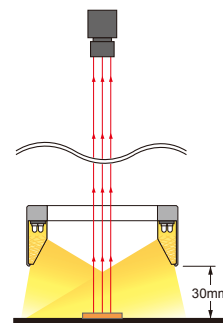
#### Even diffuse light enables optimal imaging

The image will vary depending on the distance between the workpiece and the light (light-workpiece distance = LWD) even when the light is the same.

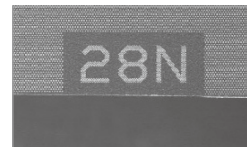
It is key to successful image processing to find the best illumination according to the surface state and the content of inspection.

#### Inspection of engraved letters on metal surface (Lighting: FPR-136)

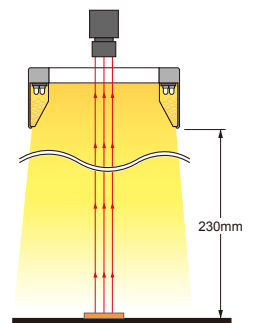
Imaging with LWD 30mm



Illumination from a low angle highlights the engraved letters white.



Imaging with LWD 230mm

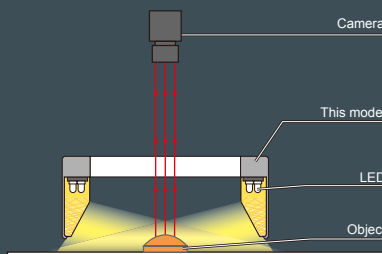


With diffuse light illuminated from LWD 230mm, the entire area is imaged in bright field.



#### Illumination structure of FPR-100

The object is illuminated from a low angle by uniform diffuse light through the light conduction plate.

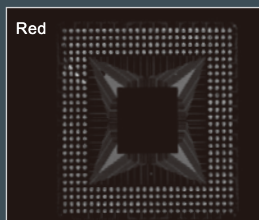


#### Examples of low-angle Ring Light images

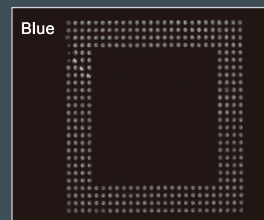
##### Inspecting a BGA solder balls

Blue light is used to eliminate the background gold pattern and to enhance the visibility of the solder balls.

Light used: FPQ-96



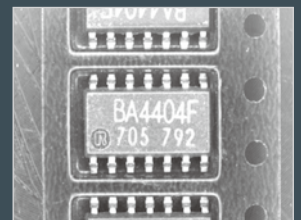
Light used: FPQ-96-BL



##### Inspecting SOP leads in embossed tape

There is minimal glare from the sides of the embossed tape.

Light used: FPQ-48



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

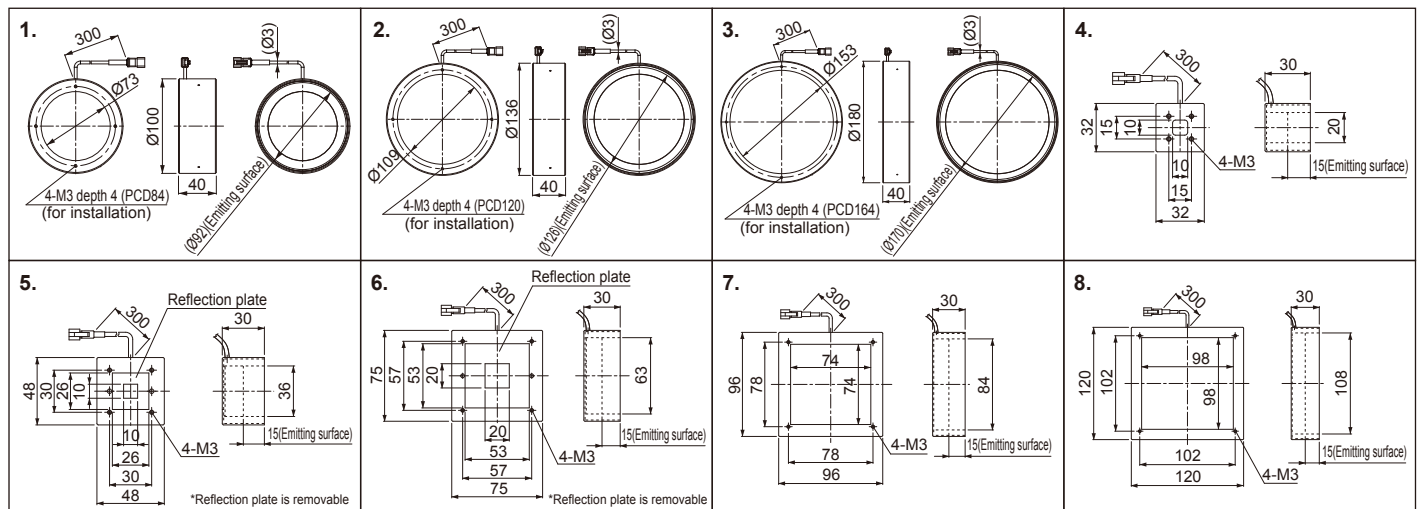
Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
FPR	1005544	FPR-100RD2	●	24V / 6.1W	—	1
	1000083	FPR-100	●	12V / 6.0W		
	1004200	FPR-100SW2	○	24V / 7.6W		
	1000084	FPR-100-BL	●	24V / 8.2W		
	1000085	FPR-100-GR	●	24V / 8.2W	—	2
	1005545	FPR-136RD2	●	24V / 9.1W		
	1000093	FPR-136	●	12V / 9.3W		
	1004201	FPR-136SW2	○	24V / 12W		
	1000094	FPR-136-BL	●	24V / 13W		
	1000095	FPR-136-GR	●	24V / 13W		
	1005546	FPR-180RD2	●	24V / 13W	—	3
	1000101	FPR-180	●	12V / 13W		
	1004202	FPR-180SW2	○	24V / 16W		
	1000103	FPR-180-BL	●	24V / 17W		
1000104	FPR-180-GR	●	24V / 17W			

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement.  
The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
FPQ Scheduled for discontinuation of production	1000037	FPQ-32	●	12V / 1.2W	—	4
	1004187	FPQ-32SW2	○	24V / 1.6W		
	1000040	FPQ-32-BL	●	24V / 1.6W		
	1000041	FPQ-32-GR	●	24V / 1.6W		
	1000047	FPQ-48	●	12V / 2.4W	—	5
	1004188	FPQ-48SW2	○	24V / 3.1W		
	1000049	FPQ-48-BL	●	24V / 3.3W		
	1000050	FPQ-48-GR	●	24V / 3.3W		
	1000059	FPQ-75	●	12V / 3.6W	—	6
	1004189	FPQ-75SW2	○	24V / 4.6W		
	1000060	FPQ-75-BL	●	24V / 4.9W		
	1000062	FPQ-75-GR	●	24V / 4.9W		
	1000074	FPQ-96	●	12V / 4.8W	—	7
	1004190	FPQ-96SW2	○	24V / 6.1W		
	1000075	FPQ-96-BL	●	24V / 6.5W		
	1000076	FPQ-96-GR	●	24V / 6.5W		
	1000031	FPQ-120	●	12V / 6.0W	—	8
	1004191	FPQ-120SW2	○	24V / 7.6W		
	1000032	FPQ-120-BL	●	24V / 8.2W		

Existing Low-angle Square Light FPQ series will be discontinued at the April 15, 2013. FPQ2 series is recommended as replacement.

## Dimension Diagrams (Unit: mm)

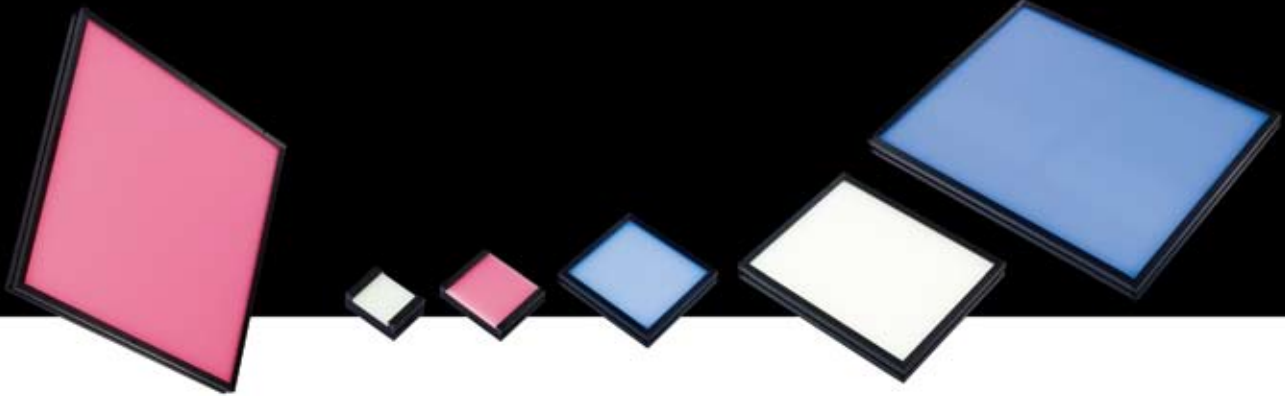




# Flat Lights

## TH Series

**High output and High Uniformity**  
Ideal for silhouette inspection.



### High-output Flat Lights

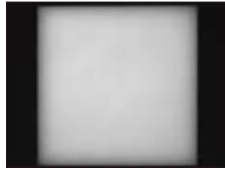
By redesigning the optical system and improving illumination efficiency we created a flat light with unprecedented high output.

Previous model: LDL-TP(Red)



Shutter speed: 1/10,000 sec.  
Light intensity: 100% dimming

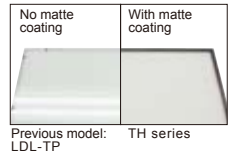
TH series(Red)



Shutter speed: 1/10,000 sec.  
Light intensity: 100% dimming

### New Diffusing Plate with Anti-Reflection Effect

Previously, there were cases in which the camera lens was subject to secondary reflections which caused glare to appear on the image. For the TH series, the matte coating on the surface of the diffusion plate eliminates light reflections.



The ambient light is reflecting on the diffusing plate.

The matte coating prevents the reflection.

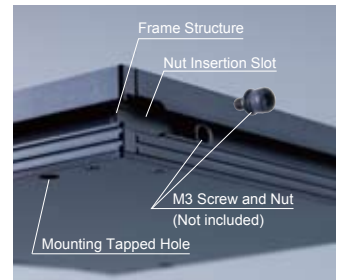
### Broad Selection

There are over 11 emitting surface sizes ranging from the smallest at 27 mm × 27 mm to the largest at 211 mm × 200 mm. LED colors are available in red, white, or blue. The increased lineup now includes 33 different size and color combinations.



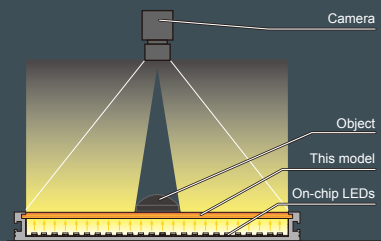
### Flexibility of Mounting to Match Your Site Environment

Mounting is possible with frames or with tap holes on the bottom. You therefore have the freedom to select the installation method according to your site environment.



### Illumination structure of TH-140×105

A high output is achieved with a flat design. You can illuminate the workpiece from the back, through a Diffusion Plate.



### Examples of Flat light Images

#### Imaging Plastic Bottle Liquid Levels

Sharply captures the liquid level.

Light used: TH-200x150RD



#### Imaging Plastic Containers for Defect Inspections

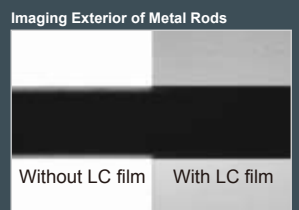
Can check for lid deformations and the quality of the seal of the transparent case.

Light used: TH-140x105RD



#### Example using Light Control (LC) Film

On the left side, light diffraction occurs. On the right side, the outline is accurately inspected.





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## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
TH	1004715	TH-27×27RD	●	24V / 1.9W	L-B	1
	1004716	TH-27×27SW	○	24V / 2.2W		
	1004717	TH-27×27BL	●	24V / 2.2W		
	1004718	TH-43×35RD	●	24V / 3.8W	L-B	2
	1004719	TH-43×35SW	○	24V / 3.0W		
	1004720	TH-43×35BL	●	24V / 3.0W		
	1004721	TH-51×51RD	●	24V / 5.1W	L-B	3
	1004722	TH-51×51SW	○	24V / 5.2W		
	1004723	TH-51×51BL	●	24V / 5.2W		
	1004307	TH-63×60RD	●	24V / 8.1W	L-B	4
	1004308	TH-63×60SW	○	24V / 7.9W		
	1004309	TH-63×60BL	●	24V / 7.9W		
	1004310	TH-83×75RD	●	24V / 11W	L-B	5
	1004311	TH-83×75SW	○	24V / 12W		
	1004312	TH-83×75BL	●	24V / 12W		
1004313	TH-100×100RD	●	24V / 19W	L-B	6	
1004314	TH-100×100SW	○	24V / 18W			
1004315	TH-100×100BL	●	24V / 18W			

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
TH	1004316	TH-140×105RD	●	24V / 25W	L-B	7
	1004317	TH-140×105SW	○	24V / 24W		
	1004318	TH-140×105BL	●	24V / 24W		
	1004319	TH-160×120RD	●	24V / 28W	L-B	8
	1004320	TH-160×120SW	○	24V / 30W		
	1004321	TH-160×120BL	●	24V / 30W		
	1004322	TH-200×150RD	●	24V / 38W	L-B	9
	1004323	TH-200×150SW	○	24V / 37W		
	1004324	TH-200×150BL	●	24V / 37W		
	1004325	TH-224×170RD	●	24V / 41W	L-B	10
	1004326	TH-224×170SW	○			
	1004327	TH-224×170BL	●			
	1004328	TH-211×200RD	●	24V / 45W	L-B	11
	1004329	TH-211×200SW	○			
	1004330	TH-211×200BL	●			

\*The peak wavelength for Red lights is 635 nm. If a sharp-cut filter is required, use a R60 Filter (optional).

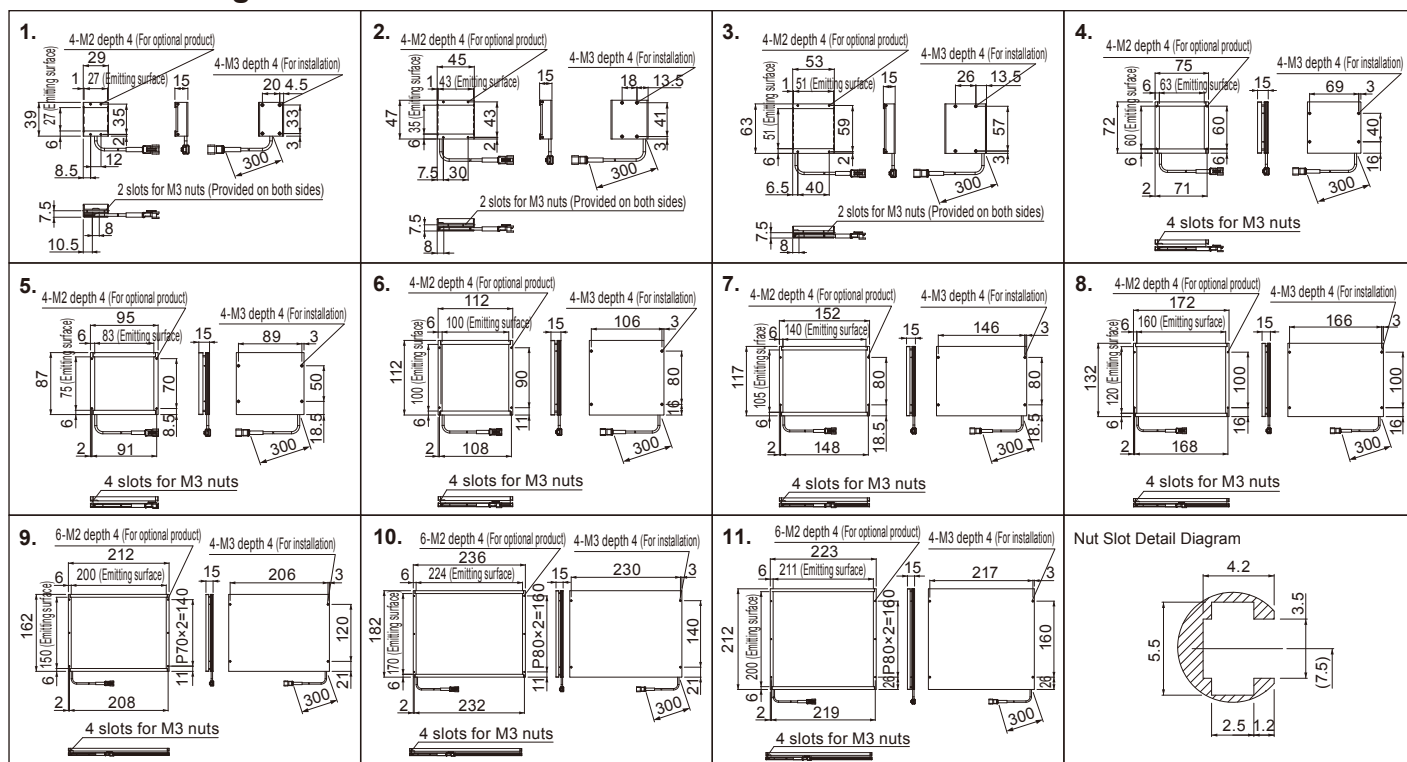
\*The following letters indicate options.

L: Light Control Film, B: Bracket

\*For further details on these options, refer to page 99 to 101.

Existing Flat Light LDL-TP/LDL series was discontinued at the end of July, 2011. TH series is recommended as replacement.

## Dimension Diagrams (Unit: mm)



# Flat Lights

## LFL Series

### Silhouette inspection of an object using uniform lighting

Power-saving Flat Lights with a compact design.

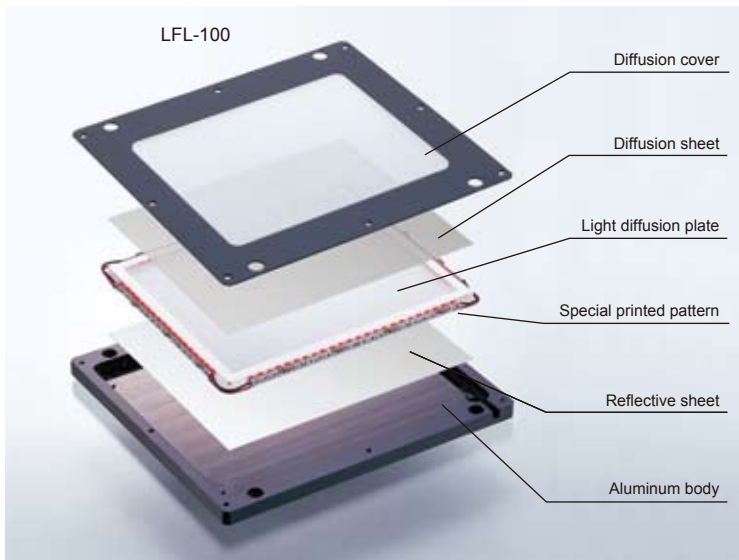


#### Flat Lights with Unique Light-guiding Technology

The use of a unique CCS light-guiding method realized to irradiate uniform diffused light.

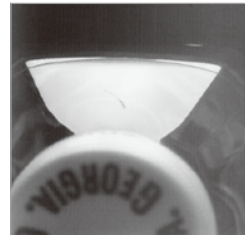
#### Lightweight, Thin Design with Low Power Consumption

With a thin design allows installing this light in any place.



Allocated LEDs are fixed around the periphery of the Diffusion Plate with a transparent fixing material. This unique structure makes more complex to reflect and scatter the light from LEDs and it makes possible to irradiate uniform diffused light from flat light emitting surface.

Inspecting for defects in rectangular PET bottles

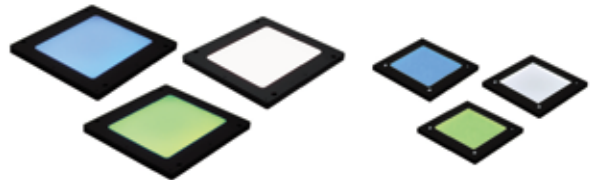


Inspecting the level of a liquid in bottles



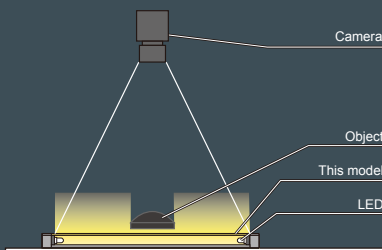
#### Varied Selection

A wide variety of sizes and colors are available to use for various applications. Models with a mounting panel (P) for installing lights are also available.



#### Illumination Structure of LFL-100

Light from the LEDs that are arranged around the periphery of the light diffusion plate passes through the plate to produce uniform illumination.



#### Examples of Flat-light images

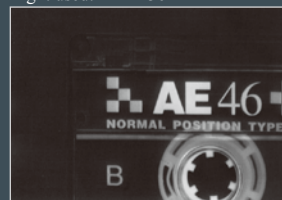
##### Inspecting printing on tape cassettes

Image as seen with the human eye in normal light.



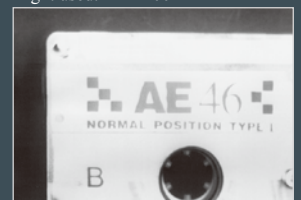
The entire object is evenly illuminated without shadows; however, internal parts are also being imaged and it makes inspection difficult.

Light used: FPR-136



The entire object is evenly illuminated and the printed surface stands out clearly.

Light used: LFL-100



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension		
LFL	1005528	LFL-612RD2	●	24V / 0.6W	—	1		
	1001674	LFL-612	●	12V / 0.3W				
	1004230	LFL-612SW2	○	24V / 0.4W				
	1001676	LFL-612-BL	●					
	1001679	LFL-612-GR	●					
	1005529	LFL-612RD2-P	●				24V / 0.6W	
	1001691	LFL-612P	●	12V / 0.3W	—	2		
	1004231	LFL-612SW2-P	○	24V / 0.4W				
	1001677	LFL-612-BL-P	●					
	1001680	LFL-612-GR-P	●					
	1005520	LFL-1012RD2	●				24V / 0.6W	
	1001568	LFL-1012	●				12V / 0.6W	
	1004225	LFL-1012SW2	○		24V / 0.8W	—	3	
	1001570	LFL-1012-BL	●					
	1001573	LFL-1012-GR	●					
	1005521	LFL-1012RD2-P	●	24V / 0.6W				
	1001582	LFL-1012P	●	12V / 0.6W				
	1004293	LFL-1012SW2-P	○	24V / 0.8W	—			4
	1001571	LFL-1012-BL-P	●					
	1001574	LFL-1012-GR-P	●					
	1005524	LFL-3212RD2	●			24V / 1.6W		
	1001633	LFL-3212	●	12V / 1.8W		—	5	
	1004232	LFL-3212SW2	○	24V / 2.3W				
	1001634	LFL-3212-BL	●	24V / 2.4W				
1001635	LFL-3212-GR	●						
1005526	LFL-4012RD2	●	24V / 2.1W					
1001640	LFL-4012	●	12V / 2.1W					
1004228	LFL-4012SW2	○	24V / 2.7W	—	6			
1001642	LFL-4012-BL	●	24V / 2.9W					
1001643	LFL-4012-GR	●						

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension	
LFL	1005527	LFL-50RD2	●	24V / 2.1W	—	7	
	1001650	LFL-50	●	12V / 2.4W			
	1004229	LFL-50SW2	○	24V / 3.1W			
	1001654	LFL-50-BL	●	24V / 3.3W			
	1001655	LFL-50-GR	●				
	1005519	LFL-100RD2	●				24V / 5.1W
	1001556	LFL-100	●		12V / 4.2W		
	1004226	LFL-100SW2	○	24V / 5.3W	L	8	
	1001558	LFL-100-BL	●	24V / 5.7W			
	1001559	LFL-100-GR	●				
	1005522	LFL-180RD2	●				24V / 7.1W
	1001597	LFL-180	●				12V / 7.2W
	1004223	LFL-180SW2	○	24V / 9.1W			L
	1001598	LFL-180-BL	●	24V / 9.8W			
	1001599	LFL-180-GR	●				
	1005523	LFL-200RD2	●		24V / 12W		
	1001604	LFL-200	●		12V / 9.0W		
	1004224	LFL-200SW2	○	24V / 12W	L	10	
	1001607	LFL-200-BL	●				
	1003050	LFL-200-GR	●				
	1005525	LFL-360RD2	●				24V / 30W
	1001638	LFL-360	●	12V / 27W			
	1004227	LFL-360SW2	○	24V / 37W			—
	1003567	LFL-360-BL	●	24V / 40W			

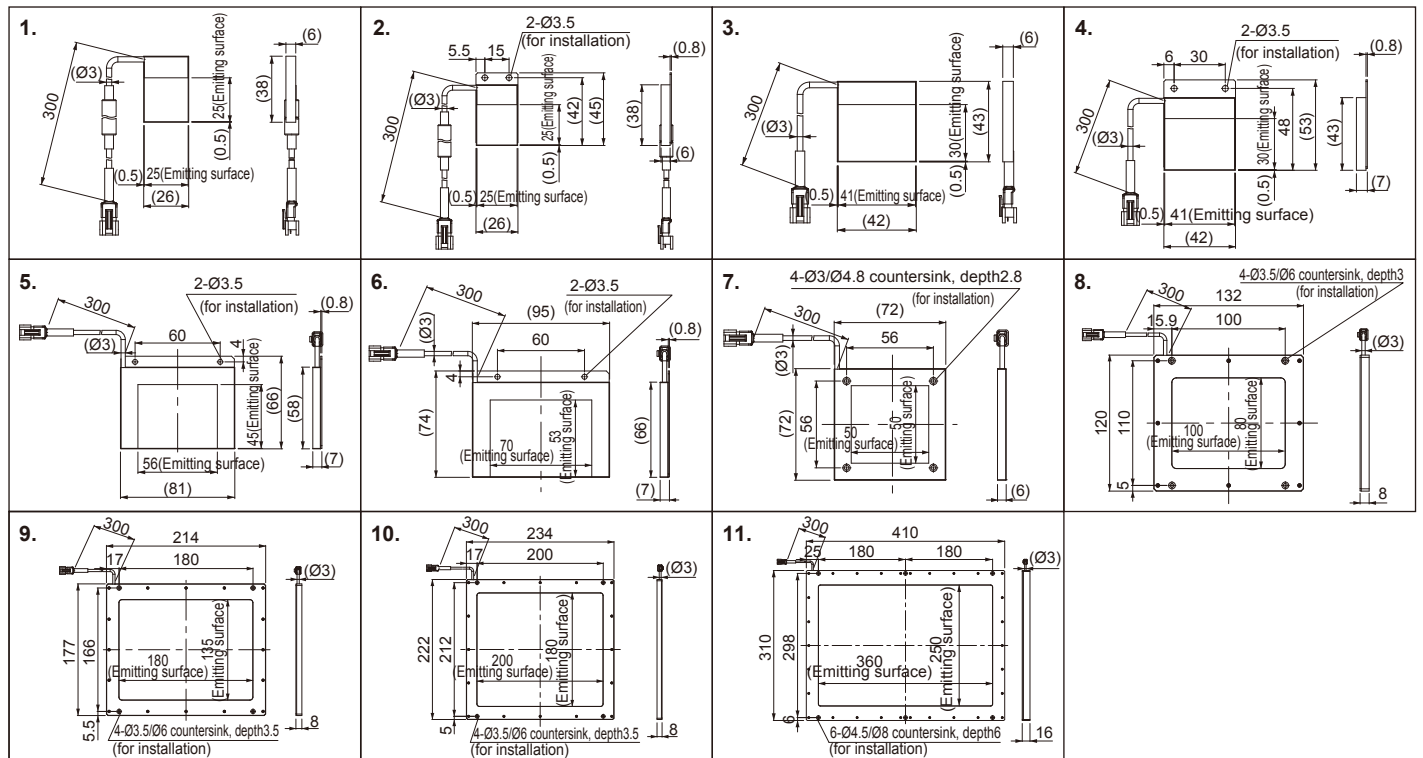
Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement.  
The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

\*The following letters indicate options.

L: Light Control Film

\*For further details on these options, refer to page 100.

## Dimension Diagrams (Unit: mm)







# Flat-Dome Lights

## LFX2 Series

### High Output, uniform diffused light

Reproduce the effects of both coaxial and dome illumination.



#### High output, uniform diffused light

The high output enables use with high-speed cameras. There is more than enough illumination for imaging at a shutter speed of 1/4,000.

Previous Model(LFX-100RD)



The output of the previous model was too low for some applications.

LFX2-100RD



With the LFX2, the output is sufficient for proper imaging at a shutter speed of 1/4,000.

#### Wavelengths from Visible Light to Infrared

Use these lights for a wide range of applications from visible light to invisible infrared light. The peak wavelength for Infrared lights is 850 nm.

Red Light



The printed pattern is still visible, making it difficult to see the surface condition.

Infrared Light



The printed pattern is completely eliminated so that the surface condition can be easily inspected.

#### Broad Lineup for Optimal Images

Models are available with five emitting surface sizes: 50, 75, 100, 150, and 200 mm. Select red, white, or infrared light.



LFX2-50RD

LFX2-75RD

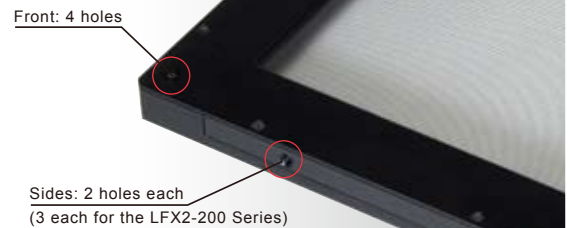
LFX2-100RD

LFX2-150IR850

LFX2-200SW

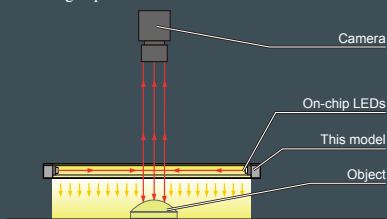
#### Variety of Mounting Methods

There are a total of twelve mounting holes: four in the front and two on each side. This selection of mounting surfaces means better matches to your application site environment.



#### Illumination structure of LFX2-100

The dot pattern on the surface of the Light Guide Diffusion Plate controls illumination diffusion and transmission. The result is uniformly diffused light over the workpiece. The high output also enables the use of high-speed cameras.



#### Examples of Flat-Dome Light Images

##### Application Examples in Packaging

The products are uniformly lit without showing the printed pattern on the packages.

Light used: LFX2-200RD



##### Application Examples in Food Industry

Light is transmitted through tea leaves to detect only foreign objects.

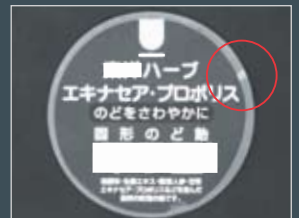
Light used: LFX2-200IR850



##### Application Examples in Pharmaceuticals

The surface is uniformly lit to inspect the edge or overlap of transparent film.

Light used: LFX2-200RD



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

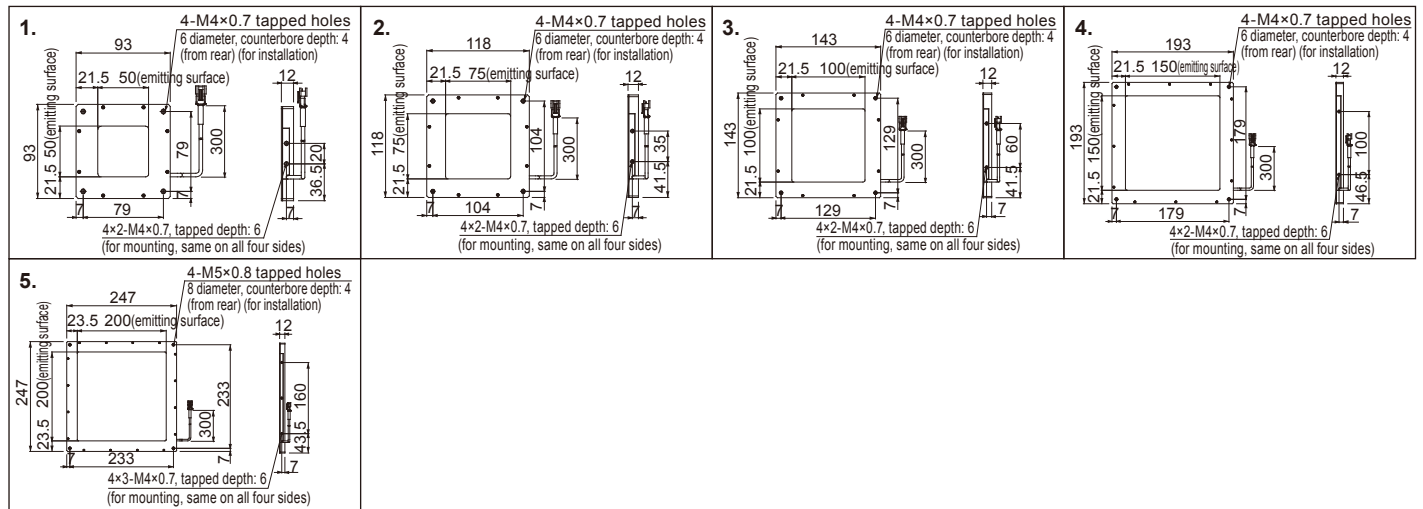
Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LFX2	1004156	LFX2-50RD	●	24V / 11W	—	1
	1004160	LFX2-50SW	○	24V / 6.1W		
	1004164	LFX2-50IR850	●	24V / 6.6W	—	2
	1004157	LFX2-75RD	●	24V / 11W		
	1004161	LFX2-75SW	○	24V / 9.1W		
	1004165	LFX2-75IR850	●	24V / 14W		
	1004158	LFX2-100RD	●	24V / 16W	—	3
	1004162	LFX2-100SW	○	24V / 13W		
	1004166	LFX2-100IR850	●	24V / 14W	—	4
	1004159	LFX2-150RD	●	24V / 21W		
	1004163	LFX2-150SW	○	24V / 19W		
	1004167	LFX2-150IR850	●	24V / 20W		
	1004115	LFX2-200RD	●	24V / 31W	—	5
	1004116	LFX2-200SW	○	24V / 25W		
1004117	LFX2-200IR850	●	24V / 27W			

\*The peak wavelength for Red lights is 635 nm. If a sharp-cut filter is required, use a R60 Filter (optional).

\*LFX2 Flat-Dome Lights cannot be used in combination with CCS Strobe Control Unit (PTU2 Series, etc.).

\*For further details on these options, refer to page 99.

## Dimension Diagrams (Unit: mm)

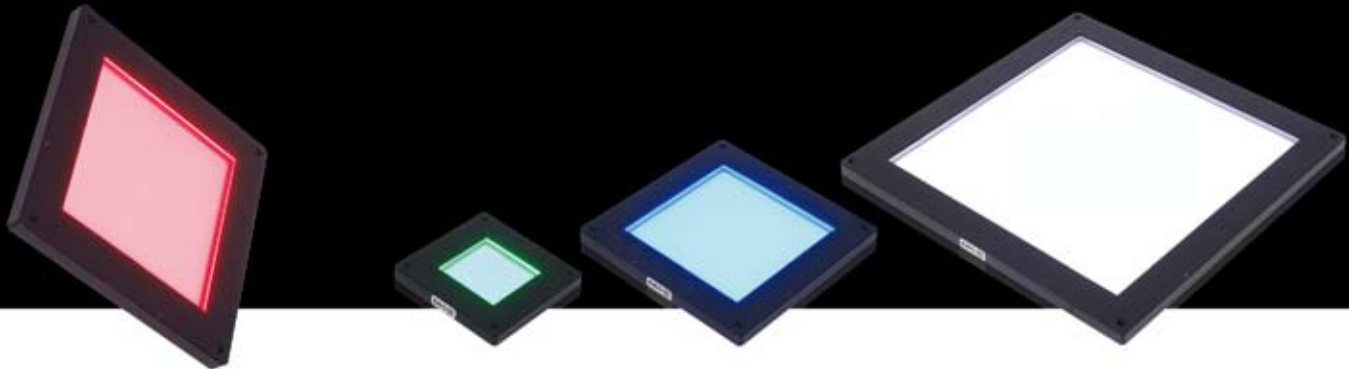




# Flat-Dome Lights

## LFX Series

Unique lighting technology allows either coaxial lighting or a dome effect depending on the working distance

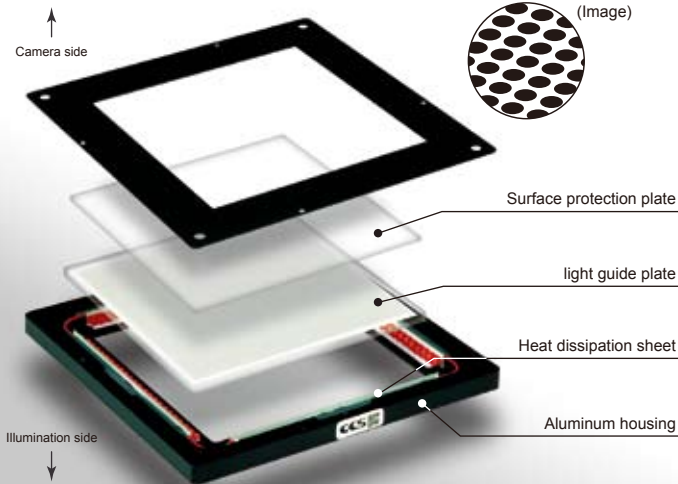


### Unique lighting technology achieves uniform omni directional diffused light

The special dotted-pattern reproduces the characteristics of a coaxial light or a dome light.

LFX-100RD

Dot printing on the surface of light guide plate (Image)

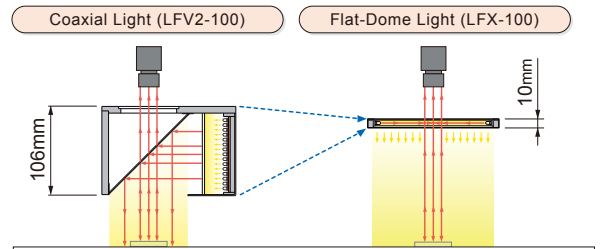


\* Under certain conditions dots may be focused by lens or produce an interference pattern with reflections from some highly reflective surfaces. These effects are not defects and testing should be done to ensure this light is appropriate for your application.

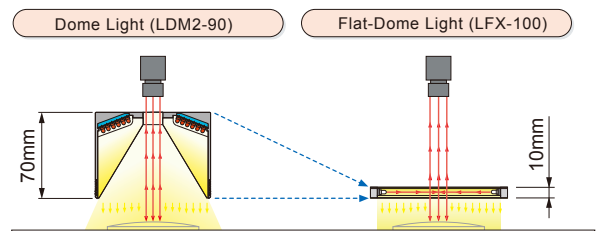
The LFX Series is a completely new type of light product enabled by CCS's cutting research and development capabilities. The pattern of dots on the surface of the light guiding diffuser plate controls light diffusion and transmission making uniform, omni-directional light possible.

### Lightweight, thin design enables installation in constrained spaces

The LFX-100 requires 96-mm less installation height than the comparable standard LFXV2-100 coaxial light with the same light-emitting surface.



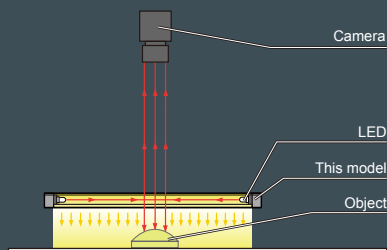
The LFX 100 requires 60-mm less installation height than the comparable standard LDM2-90 dome light with the same field of view.



Compared to coaxial lights and dome lights, the flat-dome lights have achieved lightweight and compact design. The flat-dome lights are designed to require thickness of only 10 mm.

### Illumination structure of LFX-100

LEDs mounted in the rim emit light through the light guiding diffuser plate and exit the surface as uniform omni directional diffused light.



### Examples of Flat-Dome Light Images

Printed characters on food packaging film  
Ambient light image



When the light is too small or is too far away it behaves like a coaxial light, creating a uniform reflection only where the surface has sufficiently low curvature.

Light used: LFX-50RD



When an LFX flat dome is used very close to the part and is sufficiently large it eliminates shadows and uniformly illuminates the surface even on curved highly reflective objects.

Light used: LFX-100RD



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

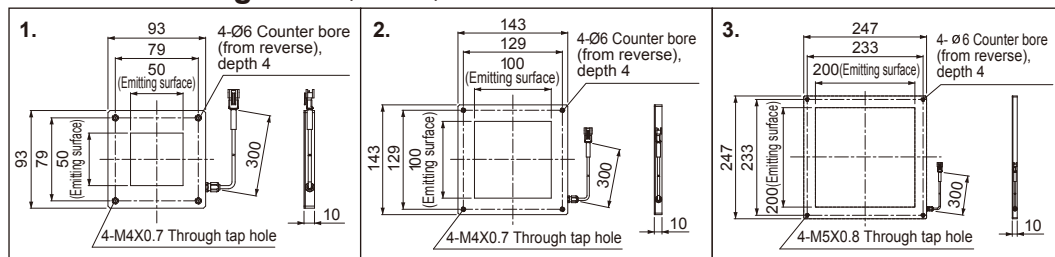
## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LFX	1002059	LFX-50RD	●	24V / 2.4W	—	1
	1002060	LFX-50SW	○			
	1002057	LFX-50BL	●			
	1002058	LFX-50GR	●	24V / 3.3W	—	1
	1002050	LFX-100RD	●			
	1002051	LFX-100SW	○	24V / 4.8W	—	2
	1002048	LFX-100BL	●			
	1002049	LFX-100GR	●			
	1002055	LFX-200RD	●	24V / 6.5W	—	2
	1002056	LFX-200SW	○			
1002052	LFX-200BL	●				
1002053	LFX-200GR	●	24V / 9.6W	—	3	

\*Red (RD) LFX Lights cannot be used in combination with CCS Strobe Control Unit (PTU2 Series, etc.).

Existing Flat-Dome Light LFX series will be discontinued at the April 15, 2013. LFX2 series is recommended as replacement.

## Dimension Diagrams (Unit: mm)



## Examples of Flat-Dome Light Images

### Cans lid print and features

Ambient light image



With the LFX at distance of 10 mm from the light to the object the shadows from the non planar features on the lid a minimized and all but disappear.

Light used: LFX-100RD



With the LFX at distance of 85 mm from the light to the object, the light is able to highlight the significantly raised pull-tab.

Light used: LFX-100RD



With the LFX at distance of 295 mm from the light to the object, the more collimated light shows the smaller ridges in the can surface clearly.

Light used: LFX-100RD







# Dome Lights

## HPD Series

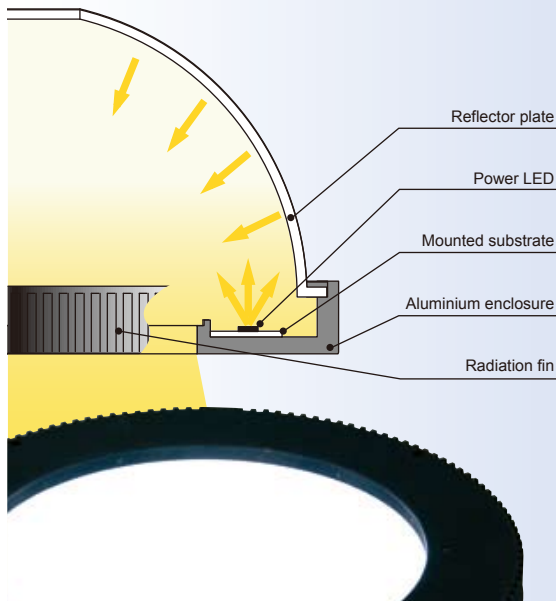
**"Brighter" "More uniform" "Easy to use" High-Power Dome Lights**  
Enhanced light intensity and larger uniform area allows for use in more diversified applications.



### Achievement of high-luminosity uniform diffusion light

The use of power LEDs greatly enhances the light intensity compared with conventional dome lights. The unique illumination structure allows for a larger uniform area.

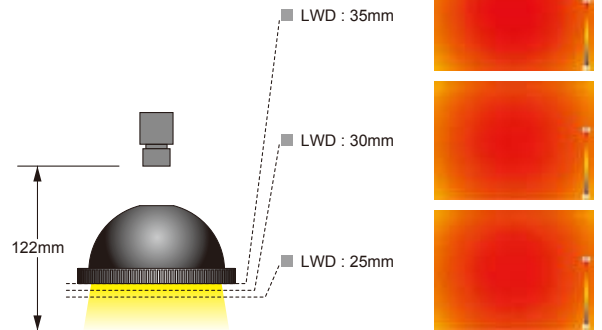
Cross section structure of HPD Series



### Achievement of larger uniform areas

Enhanced light intensity and larger uniform area broaden the use of the lights to more diverse environments and applications.

Uniformity data of HPD-150SW

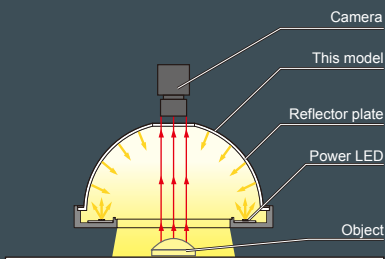


\* This shows the relative brightness distribution when the brightest area is set at 100. The data given here is intended for reference purposes only and is not intended to assure the quality of the product.

Measuring conditions	Camera	1/2 inch CCD
	Lens	f12mm
	Macro ring	0mm
	WD	122mm
	Field (Y direction)	50mm
	Lighting	HPD-150SW
	LWD	25mm / 30mm / 35mm

### Illumination structure of HPD-150

The use of power LEDs significantly enhances the light intensity compared with conventional lights. The unique illumination structure achieves a larger uniform area.



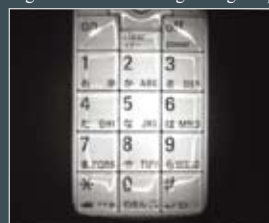
### Examples of surface-emitting dome light images

Images of appearance of cell phone  
Macroscopic image



Unevenness occurs in the illumination area with the 100W halogen ring lamp.

Light used: 100W halogen ring lamp



The surface of a workpiece is imaged evenly and brightly with the high-power dome light.

Light used: HPD-100RD



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## Product Lineup Table

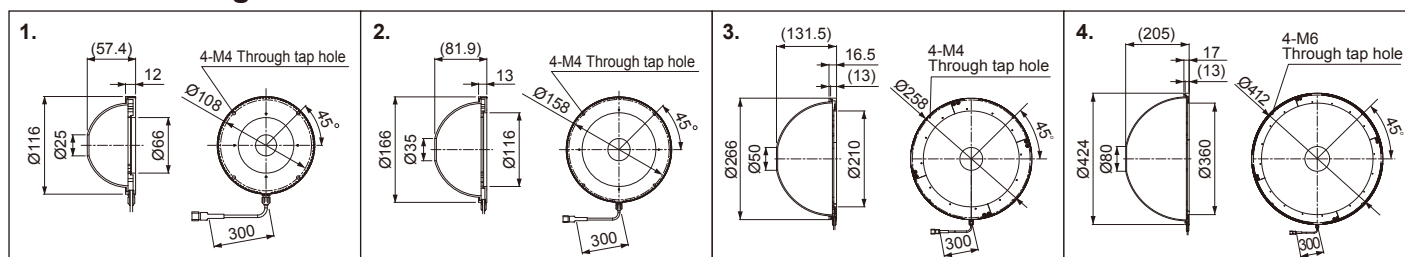
Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
HPD	1002935	HPD-100RD	●	24V / 9.0W	—	1
	1002934	HPD-100SW	○	24V / 14W		
	1002936	HPD-100BL	●			
	1002941	HPD-150RD	●	24V / 16W	—	2
	1002940	HPD-150SW	○	24V / 20W		
	1002942	HPD-150BL	●			
	1003214	HPD-250RD	●	24V / 25W	—	3
	1003213	HPD-250SW	○	24V / 37W		
	1003215	HPD-250BL	●			
	1003217	HPD-400RD	●	24V / 25W	—	4
	1003216	HPD-400SW	○	24V / 41W		
	1003218	HPD-400BL	●			

\*HPD Series cannot be used in combination with CCS Strobe Control Unit (PTU2 Series, etc.)

\*The peak wavelength for Red lights is 625 nm. If a sharp-cut filter is required, use a R60 Filter (optional).

\*For further details on these options, refer to page 99.

## Dimension Diagrams (Unit: mm)



## Examples of surface-emitting dome light images

### Images of appearance and printed date of food product

The surface of a workpiece cannot be irradiated uniformly with the LED ring light

Light used: LED ring light



The surface of a workpiece is imaged evenly and brightly with the high-power dome light.

Light used: HPD-150SW



### Images of appearance of food product

Diffused LED light is not available to have a sufficient intensity level for 1/4,000 sec of exposure time.

Light used: Diffused LED light



HPD-250SW has a sufficient intensity level as it is available to use even in 1/4,000 sec of exposure time.

Light used: HPD-250SW





# Dome Lights

## LDM2 Series

### For inspection of workpieces with curved and glossy surfaces

Perfectly suited for character inspection on a workpiece with a rippled and glossy surface or for illuminating bowl-shaped metal surfaces.



#### Even light emission with all direction illumination

Light generation without unevenness radiated in every direction. A high-intensity type of diffused light illumination. Allows shadowless radiation in applications with fast checking speeds as well.

Suitable for character inspection of workpieces with glossy surface and illuminating bowl-shaped metal surface such as can bottoms and workpieces with mirror finished surface such as ball bearings.

With direct light (LDR-70A-W)



With dome light (LDM-90BL)

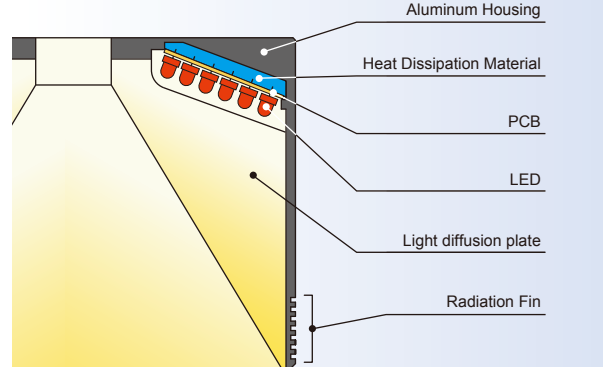


LDM2 Series illuminates light from a wide diffusion area to encompass the entire workpiece. Curved metal surfaces etc. can be illuminated evenly. The bottom of aluminum cans can be illuminated evenly to highlight the letters only.

#### A heat dissipating architecture is adopted

Utilizing our original heat dissipating architecture, the rise in temperature is suppressed and degradation of intensity is reduced. (Refer to page 103.)

##### Structure of LDM2



\*LDM2 Series has heat dissipating fins. Difference between CCS products and competitors' products is obvious.

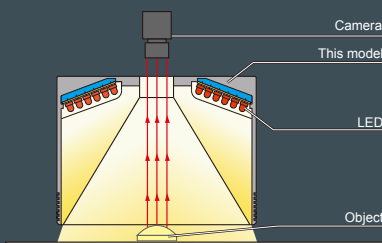
With the conventional construction, the light was not able to dissipate heat with total efficiency due to the gap between the PCB and aluminum housing.

By employing a special heat dissipating enclosure between the PCB and the housing in the new construction, there is substantial absorption of heat generation from LED, and efficient heat conductivity into the housing. This new construction suppresses the temperature rise of LED sharply, providing stable images for a long period of time.

#### Illumination Structure of LDM2-90

It irradiates from all the directions of large diffusion side without any lighting unevenness.

##### Heat dissipating construction



#### Examples of Dome Light Images

##### Electronic Parts Inspection with ambient light



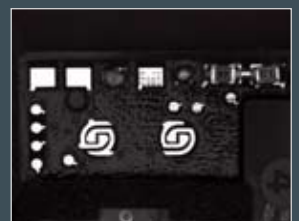
With direct light, the glare from bumpy and glossy surface disturb the pattern image.

Light used: LDR2-90RD



The diffused light illumination of the dome light emphasize patterns, and eliminates glare.

Light used: LDM2-90RD



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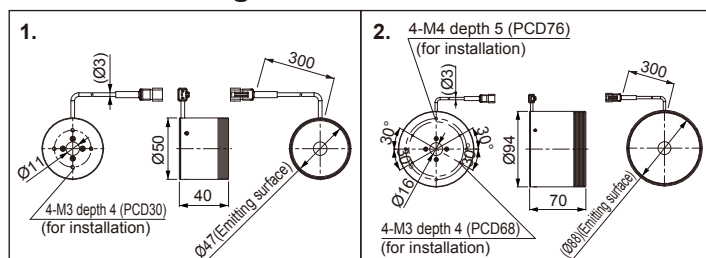
## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDM2	1005542	LDM2-50RD2	●	24V / 3.6W	—	1
	1000994	LDM2-50RD	●	12V / 3.9W		
	1004306	LDM2-50SW2	○	24V / 5.0W		
	1000992	LDM2-50BL	●	24V / 5.3W		
	1000993	LDM2-50GR	●			
	1005543	LDM2-90RD2	●	24V / 14W	—	2
	1001000	LDM2-90RD	●	12V / 14W		
	1004299	LDM2-90SW2	○	24V / 18W		
	1000997	LDM2-90BL	●			
	1000999	LDM2-90GR	●			

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement.

The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

## Dimension Diagrams (Unit: mm)







# Coaxial Lights / Line Lights with Coaxial System

## LFV/LFV2 Series / LNV Series

### Even illumination on reflective object surfaces

Bright, even illumination across the entire field of view makes on-axis illumination systems ideally suited for inspecting mirror-finish work for scratches etc.



#### LFV/LFV2/LFV2-CP Series

##### LFV2 / LFV2-CP Series Features

- The use of CCS's unique heat dissipating construction minimizes temperature increases due to the heat generation in LEDs, increasing the service life of the LED. (Refer to page 103.)

##### LFV/LFV2-CP Series Features

- The use of a half mirror with an anti-reflection coating eliminates ghost images.
- The viewing window is protected with optical glass, preventing dust entry.
- Coaxial lights with a lens mounting ring are available. These lights can be mounted directly to the threaded part of the lens commonly used for mounting a filter and are best suited for installation in confined places. (Available in M25.5, M27, and M30.5 models.)



LFV-34-M27

#### LFV2-5 Series

##### LFV2-5 Series.

- The micro lens and illumination system are combined in one unit, making the system much easier to use than a separate illumination system combined with a standard f50 lens.
- The field of view can be adjusted by changing the macro lens on the lens barrel.



LFV2-5-5

Example of installation  
\*The camera is not a CCS product.

BGA Alignment Mark Inspection



#### LNV-300

The LNV-300 provides coaxial drop illumination for line sensors. Chip LEDs are used to achieve ultra-even illumination.

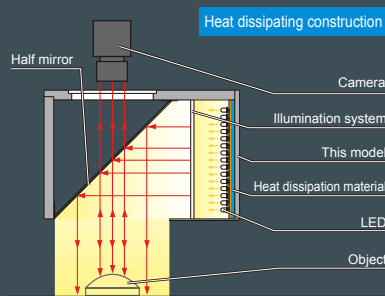


#### Magnification / Field of View

	Magnification	L	WD	1/3 inch sensor	1/2 inch sensor
LFV2-5-2	2.4 X	-	28mm or less	Field of View:1.5mm	Field of View:2mm
LFV2-5-5	1.1 X	0mm	45mm or less	Field of View:3.2mm	Field of View:4.2mm
	3 X	70mm	23mm or less	Field of View:1.2mm	Field of View:1.6mm
LFV2-5-12	1 X	0mm	22mm or less	Field of View:3.5mm	Field of View:4.6mm
	0.4 X	20mm	53mm or less	Field of View:9.3mm	Field of View:12.2mm

#### Illumination structure of LFV2-100

A half mirror aligns the diffused light from the LED array to the same optical axis as the lens.



#### Examples of Coaxial Light Images

##### Inspecting for Bearing Face Damage

Even small scratches are made clearly visible, using an on-axis illumination system.

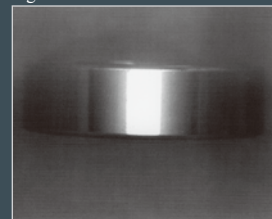
Light used: LFV2-70RD



##### Bearing Periphery Inspection

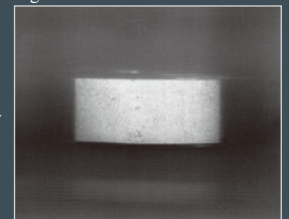
With standard coaxial illumination, the light is concentrated at the center of the illumination area.

Light used: LFV2-50RD



With the LNV-300, even lumination is achieved over a wide area.

Light used: LNV-300



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## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension	
LFV	1001830	LFV-34	●	12V / 2.9W	—	1	
	1002739	LFV-34SW2	○	24V / 2.2W			
	1001838	LFV-34-BL	●	24V / 2.4W			
	1001843	LFV-34-GR	●				
	1001848	LFV-34-M25	●	12V / 2.9W	—	2	
	1001849	LFV-34-M27	●				
	1001850	LFV-34-M30	●				
	1001867	LFV-40	●	12V / 2.4W	—	3	
	1002763	LFV-40SW2	○	24V / 3.1W			
	1001868	LFV-40-BL	●	24V / 3.3W			
1001869	LFV-40-GR	●					
LFV2	1002006	LFV2-35RD	●	12V / 2.4W	P-L	4	
	1002764	LFV2-35SW2	○	24V / 3.1W			
	1002002	LFV2-35BL	●	24V / 3.3W			
	1002004	LFV2-35GR	●				
	1002024	LFV2-50RD	●	12V / 6.6W	P-L	5	
	1002740	LFV2-50SW2	○	24V / 8.4W			
	1002022	LFV2-50BL	●	24V / 9.0W			
	1002023	LFV2-50GR	●				
	1002030	LFV2-70RD	●	12V / 9.3W	P-L	6	
	1002741	LFV2-70SW2	○	24V / 14W			
	1002027	LFV2-70BL	●				
	1002028	LFV2-70GR	●	12V / 18W	P-L	7	
	1001990	LFV2-100RD	●				
	1002765	LFV2-100SW2	○				24V / 23W
	1001987	LFV2-100BL	●	24V / 24W			
	1001988	LFV2-100GR	●				
	LFV2	1001995	LFV2-130RD	●	12V / 28W	P-L	8
		1002766	LFV2-130SW2	○	24V / 38W		
1001993		LFV2-130BL	●	24V / 41W			
1001994		LFV2-130GR	●				
1002000		LFV2-200RD	●	24V / 42W	P-L	9	
1002767		LFV2-200SW2	○	24V / 46W			
1001998		LFV2-200BL	●				
1001999		LFV2-200GR	●				
LFV2-CP		1002034	LFV2-CP-13RD	●	12V / 0.9W	—	10
		1002762	LFV2-CP-13SW2	○	12V / 0.6W		
	1002032	LFV2-CP-13BL	●	12V / 0.7W			
	1002033	LFV2-CP-13GR	●				
	1002040	LFV2-CP-18RD	●	12V / 1.2W	—	11	
	1002738	LFV2-CP-18SW2	○	24V / 1.6W			
	1002036	LFV2-CP-18BL	●				
	1002038	LFV2-CP-18GR	●	12V / 1.2W	—	12	
1002041	LFV2-CP-18RD-M27	●					
1002042	LFV2-CP-18RD-M30	●					
LFV2-5	1002016	LFV2-5-2RD	●	12V / 1.2W	—	13	
	1002020	LFV2-5-5RD	●	12V / 1.2W	—	14	
	1002012	LFV2-5-12RD	●	12V / 1.2W	—	15	
LNV	1002285	LNV-300	●	24V / 5.4W	—	16	
	1002289	LNV-300-SW	○	24V / 10W			
	1002286	LNV-300-BL	●				
	1002288	LNV-300-GR	●				

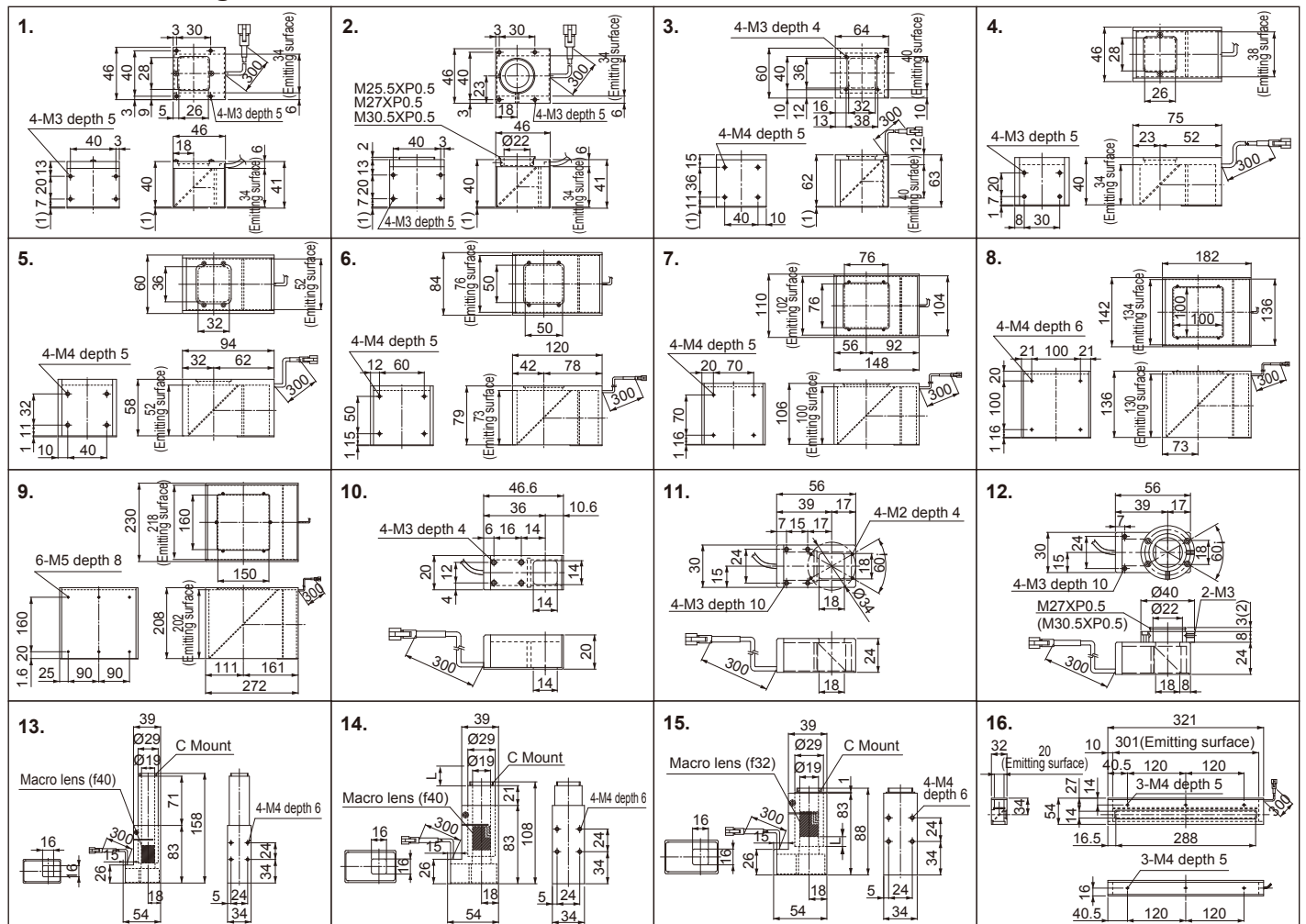
\*LNV-300 Red Lights cannot be used with a CCS Strobe Control Unit (such as the PTU2 Series). The Lights can be turned ON and OFF with a normal Control Unit.

\*The following letters indicate options.

P: Polarizing Plate, L: Light Control Film

\*For further details on these options, refer to page 99 to 101.

## Dimension Diagrams (Unit: mm)





# Line Lights LNSPseries

## High-output Line Light Unit with Reduced Diffusion

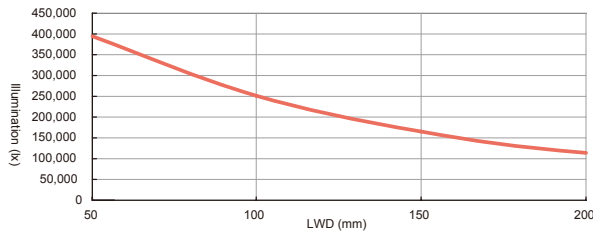
Less diffusion means less loss of light quantity for long distance irradiation.



### High Output of 400,000 lx

High-output LED Light Units for line sensors with natural air cooling.

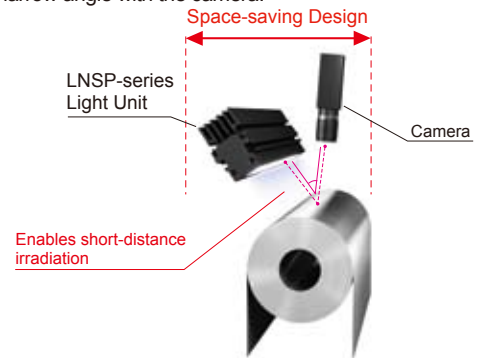
Illuminance Graph



\* Measured value at 100% light intensity and an LWD of 50 mm. Results for individual Units may vary.

### Compact for Short-distance Irradiation

The compact design of the Light Unit allows for installation at a narrow angle with the camera.



### Order any Emitting Surface Length between 100 and 1,000 mm

You can specify the length of the emitting surface you want in increments of 100 mm. Select from sizes of 100 mm to 1,000 mm to meet your specific needs for a wide variety of applications.



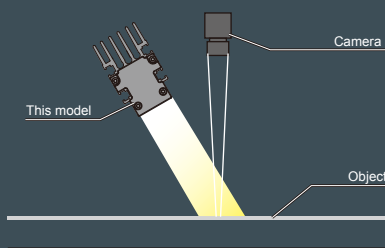
You can specify lengths in 100-mm increments between **100 mm...**



**...and 1,000 mm.**

### Illumination structure of LNSP series

These high-output line Light Units feature reduced light diffusion. Less diffusion means less loss of light for long-distance irradiation.



### Examples of Line Light Images

Liquid Crystal Glass, Batteries, Can Manufacturing, and More

Inspecting liquid crystal glass for imperfections



Visual inspection of cans



Inspecting metal sheets for imperfections

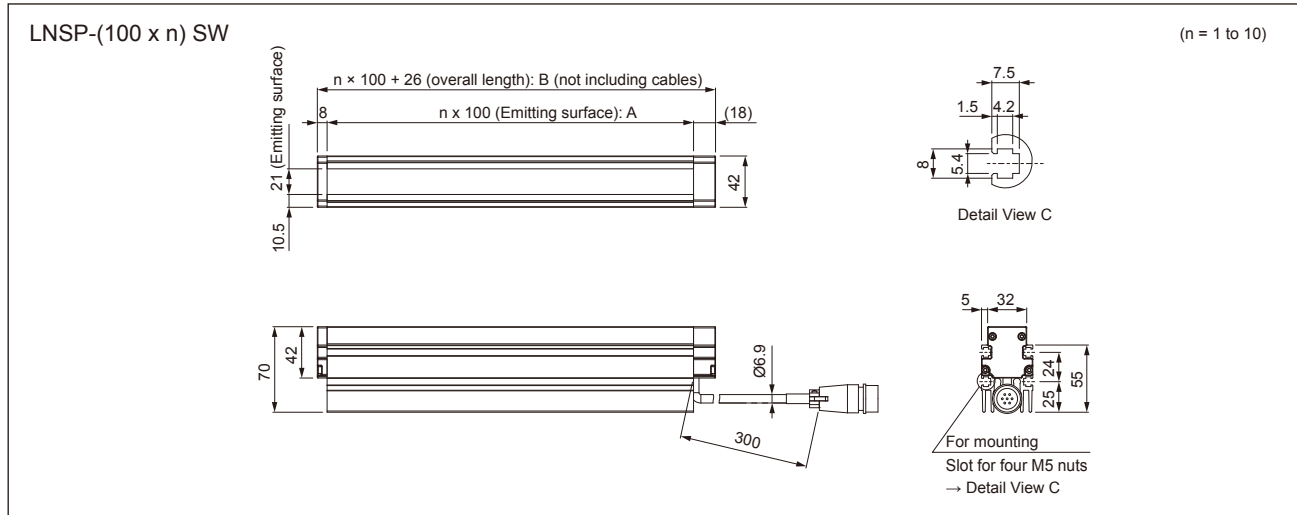


Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## specifications

Model	LNSP-□□□ SW "□□□" is the length of emitting surface. Available in 100 mm increments up to 1,000 mm.	
Direct number	1500	
Input voltage	24V DC	
LED color	White	
Correlated color temperature	5,800 K	
Connector	SRCN1A16-7P Metal Connector (manufactured by Japan Aviation Electronics Industry, Limited)	
Polarity and signals	1,2,3:(+) 4,5,6:(-) 7:NC	
Cooling method	Natural air cooling	
Operating environment (indoors only)	Temperature: 0 to 40°C, Humidity: 20% to 85%RH (with no condensation)	
Storage environment	Temperature: -20 to 60°C, Humidity: 20% to 85%RH (with no condensation)	
Case material	Emitting surface: Acrylic, Base: Aluminum alloy, Side plates: PC	
Compatible Control Unit	PSB3-30024 Refer to page 89 for details.	

## Dimension Diagrams (Unit: mm)



## Specifications/Dimensions by Total Illumination Length

Model	Power consumption (W)	Weight (g)	Dimensions (See Dimension Diagrams.)		
			n	A: Emitting surface (mm)	B: Overall length (mm) (not including cables)
LNSP-100SW	21	430	1	100	126
LNSP-200SW	41	760	2	200	226
LNSP-300SW	61	1,090	3	300	326
LNSP-400SW	81	1,420	4	400	426
LNSP-500SW	101	1,740	5	500	526
LNSP-600SW	121	2,070	6	600	626
LNSP-700SW	142	2,400	7	700	726
LNSP-800SW	162	2,730	8	800	826
LNSP-900SW	182	3,050	9	900	926
LNSP-1000SW	202	3,380	10	1,000	1,026

## LNSP extension cable

FCB-2-1.25SQ-ME7 •••• 2-m Cable

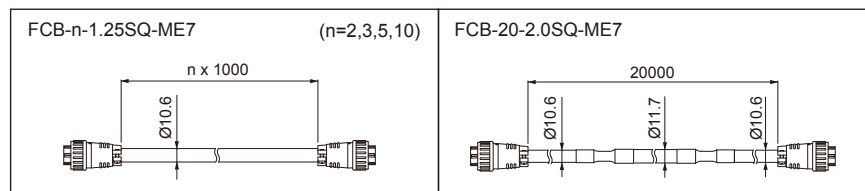
FCB-3-1.25SQ-ME7 •••• 3-m Cable

FCB-5-1.25SQ-ME7 •••• 5-m Cable

FCB-10-1.25SQ-ME7 •••• 10-m Cable

FCB-20-2.0SQ-ME7 •••• 20-m Cable

## Dimension Diagrams of LNSP extension cable (Unit: mm)



\* The Light Unit must be connected to a PSB3-30024 Control Unit.

Refer to page 89 for Compatible Control Unit.





# Line Lights LT Series

## High Uniformity and High Intensity

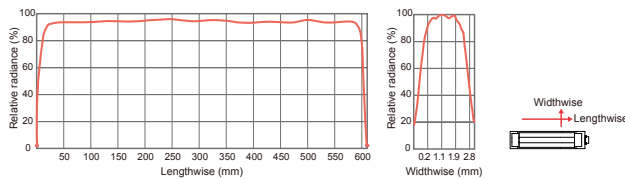
Provide a structure matching the worksites to provide ideal imaging.



### Realize both high uniformity and high intensity

Unique optics achieve the twin goals of high uniformity and high luminance. Highly precise inspections are enabled, and application is also possible on high-speed lines. These Lights can be used to replace quartz rod lights with metal halide lamp or fluorescent line light sources.

#### LT Series uniformity

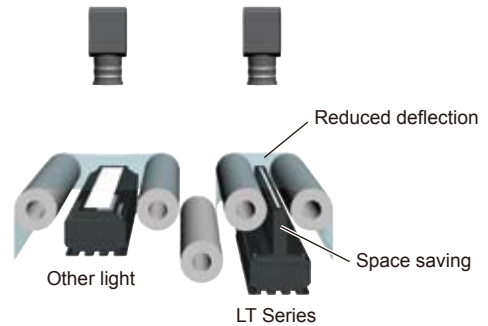


\* Data is for reference only and does not ensure product quality.

### An illumination structure suitable for any working environment

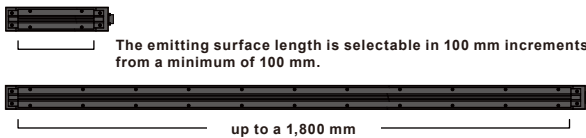
#### Transparent example

Inspection speed can be improved by narrowing the distance between rollers.



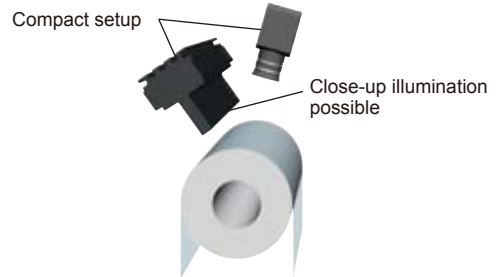
### Various sizes available

Emitting surface lengths can be ordered in 100 mm increments. Lengths from 100 mm to 1,800 mm make the LT Series suitable for a wide variety of applications.



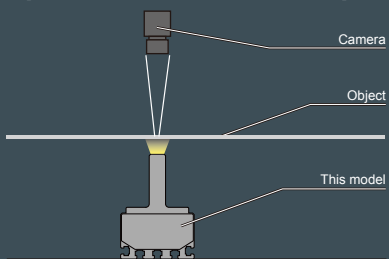
#### Direct reflection example

Inspection is possible by mounting the camera at a narrow angle.



### Illumination structure of LT series

Unique optics achieve the twin goals of high uniformity and high luminance. They enable highly precise inspections, and can also be used for fast shutter speeds.



### Examples of Line Light Images

#### Inspecting Colored Acrylic Panels for Defects

Fish-eye clearly captured

Light used: LT series



Sink marks clearly captured

Light used: LT series



#### Inspecting Metal Plates for Defects

Slight dents accurately captured

Light used: LT series

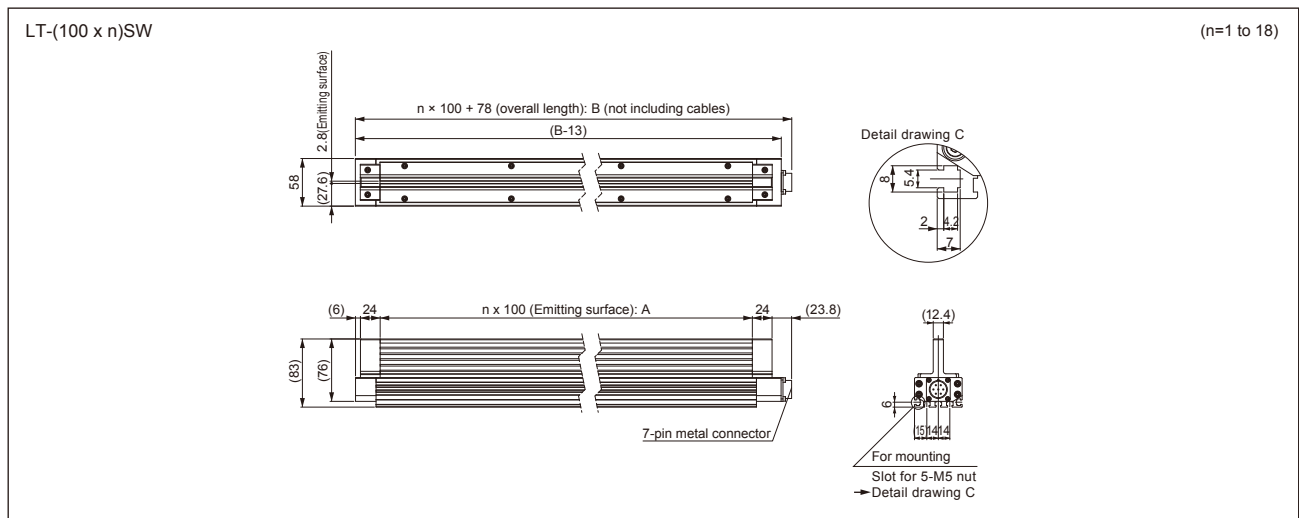


Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## specifications

Model	LT- (100x□□□) SW "□□□" is the length of emitting surface. Available in 100 mm increments up to 1,800 mm.
Input voltage	24V DC
LED color	White
Correlated color temperature	10,000K
Connector	Metal (7-pin and plug)
Polarity and signal	1, 2, 3: (+) 4, 5, 6: (-) 7: NC
Cooling method	Natural air cooling
Operating environment (for indoor use only)	Temperature: 0 to 40°C, Relative humidity: 20 to 85%RH (non-condensing)
Storage environment	Temperature: -20 to 60°C, Relative humidity: 20 to 85%RH (non-condensing)
Case material	Aluminum alloy
Compatible Control Unit	PSB3-30024 Refer to page 89 for details.

## Dimension Diagrams (Unit: mm)



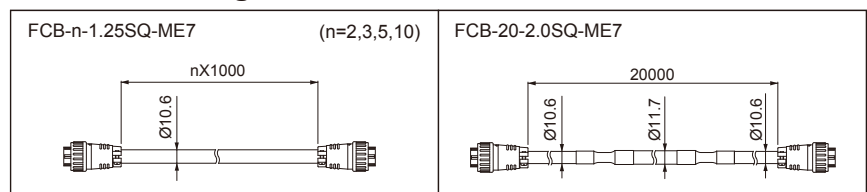
## Specifications/Dimensions by Total Illumination Length

Model	Power consumption(W)	Weight(g)	Dimensions (See Dimension Diagrams.)			Model	Power consumption(W)	Weight(g)	Dimensions (See Dimension Diagrams.)		
			n	A(mm)	B(mm)				n	A(mm)	B(mm)
LT-100SW	15	500	1	100	178	LT-1000SW	142	5,000	10	1,000	1,078
LT-200SW	29	1,000	2	200	278	LT-1100SW	156	5,500	11	1,100	1,178
LT-300SW	43	1,500	3	300	378	LT-1200SW	170	6,000	12	1,200	1,278
LT-400SW	57	2,000	4	400	478	LT-1300SW	184	6,500	13	1,300	1,378
LT-500SW	71	2,500	5	500	578	LT-1400SW	198	7,000	14	1,400	1,478
LT-600SW	85	3,000	6	600	678	LT-1500SW	212	7,500	15	1,500	1,578
LT-700SW	99	3,500	7	700	778	LT-1600SW	226	8,000	16	1,600	1,678
LT-800SW	113	4,000	8	800	878	LT-1700SW	240	8,500	17	1,700	1,778
LT-900SW	128	4,500	9	900	978	LT-1800SW	255	9,000	18	1,800	1,878

## LT extension cable

- FCB-2-1.25SQ-ME7 ..... 2m cable
- FCB-3-1.25SQ-ME7 ..... 3m cable
- FCB-5-1.25SQ-ME7 ..... 5m cable
- FCB-10-1.25SQ-ME7 ..... 10m cable
- FCB-20-2.0SQ-ME7 ..... 20m cable

## Dimension Diagrams of LT extension cable (Unit: mm)



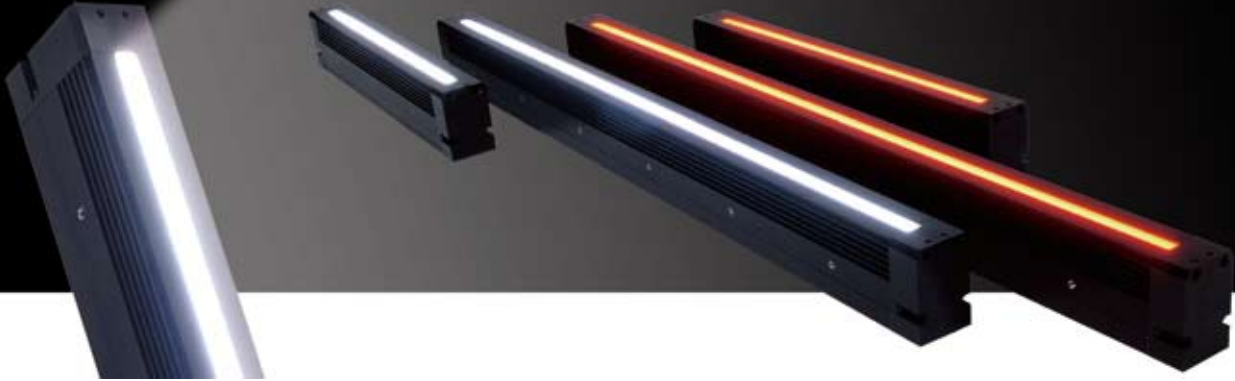
\* The Light Unit must be connected to a PSB3-30024 Control Unit.

Refer to page 89 for Compatible Control Unit.



# Line Lights HLND Series

Next-generation light construction satisfies the requirements of line scan applications



## Light-emitting surfaces are available in lengths from 100 to 2,700 mm

Use of high intensity LEDs has achieved substantial increase in the light intensity comparable to conventional line lights. Heat dissipation efficiency has been enhanced by the application of the CCS's unique heat transfer expertise, thus making the prolonged use at high intensities possible. Since the HLND Series is manufactured by joining printed circuit boards with chip-mounted LEDs, customers are able to specify an emitting surface length best suited for the application. Solid aluminum extrusion is used for the enclosure to ensure adequate strength.



Length can be specified in increments of 100 mm .....

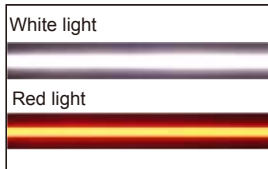


..... Up to a maximum of **2,700 mm** .....

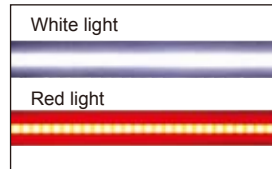
The HLND Series offers line lengths best suited to illumination applications of customers. Since the HLND Series is manufactured by joining LED-mounted printed circuit boards, customers are able to specify an emitting surface length up to maximum of 2,700 mm in the increments of 100 mm. Furthermore, solid aluminum extrusion is used for the enclosure to ensure adequate strength.

## Unprecedented luminosity for a wide variety of applications

T Type (Transmitted Illumination)



R Type (Reflected Illumination)



Two types of products are available by using diffusers with different transmittance.

T-type provides excellent uniformity which is suitable for using as a backlight and R-type achieves high intensity.

## High quality design for reliability

New heat-dissipating structure



New metal industrial connector



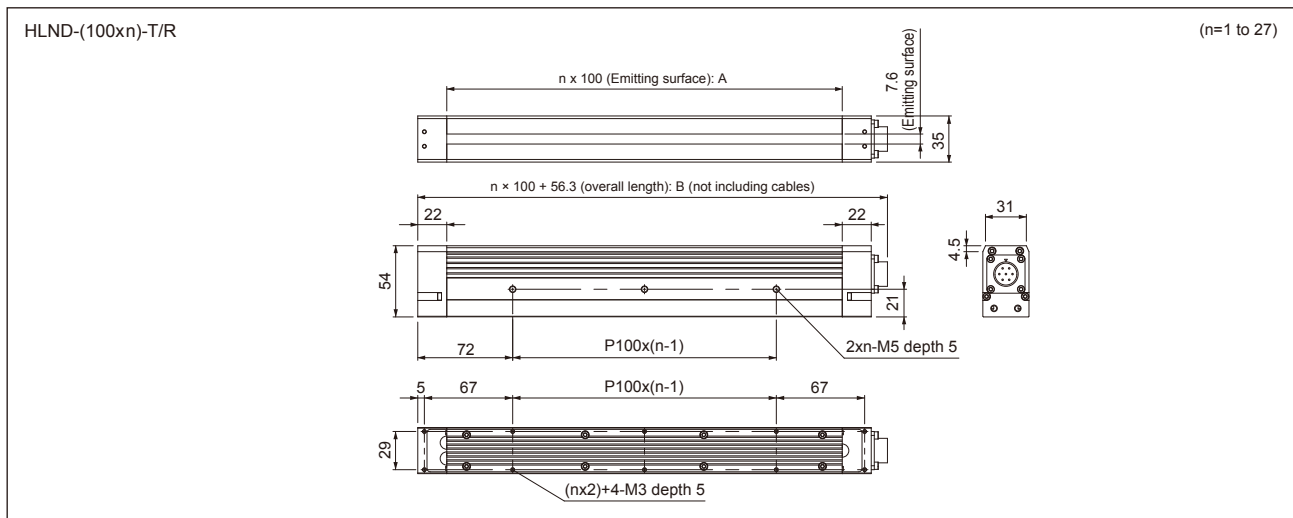
Always striving to maximize performance, quality, and value, CCS has incorporated its most advanced expertise in constructing LED lighting products for machine vision in the HLND series.

Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Specifications

Model	HLND- $\Delta\Delta\Delta$ SW2- $\square$		HLND- $\Delta\Delta\Delta$ RD- $\square$	
$\Delta\Delta\Delta$	" $\Delta\Delta\Delta$ " is the length of emitting surface. Available in 100 mm increments up to 2,700 mm.			
LED color	SW2(White)		RD(Red)	
$\square$	T	R	T	R
Type	Transmissive	Reflective	Transmissive	Reflective
Peak wavelength / Color temp.	6,500K		624nm	
Full Width at Half Maximum of peak emission wavelength	-		15nm	
Connector	Metal connector (7 pins, male)			
Polarity and signal	1,2,3:(+) 4,5,6:(-) 7:NC			
Cooling method	Natural air cooling (Special heat-dissipating structure)			
Housing material	Aluminum			
Operating environment	Temperature: 0 to 40°C, Relative humidity: 20 to 85%RH (non-condensing)			
Storage environment	Temperature: -20 to 60°C, Relative humidity: 20 to 85%RH (non-condensing)			
Compatible Control Unit	PSB3-30024		Refer to page 89 for details.	

## Dimension Diagrams (Unit: mm)



## Specifications/Dimensions by Total Illumination Length

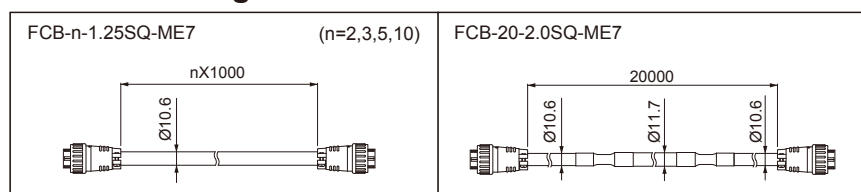
Light emitting surface(mm)	Model	LED color	Type	Power consumption(W)		Weight(g)	Dimensions (See Dimension Diagrams.)		
				SW2(White)	RD(Red)		n	A(mm)	B(mm)
100	HLND-100	SW2(White) / RD(Red)	T Type (Transmitted Illumination)	10	4.8	520	1	100	156.3
200	HLND-200			20	9.6	840	2	200	256.3
300	HLND-300			30	14	1,160	3	300	356.3
600	HLND-600			60	29	2,120	6	600	656.3
900	HLND-900			91	43	3,080	9	900	956.3
1,200	HLND-1200		107	58	4,040	12	1,200	1,256.3	
1,500	HLND-1500		133	72	5,000	15	1,500	1,556.3	
1,800	HLND-1800		160	86	5,960	18	1,800	1,856.3	
2,100	HLND-2100		186	101	6,920	21	2,100	2,156.3	
2,700	HLND-2700		240	130	8,840	27	2,700	2,756.3	

\* Please contact your CCS sales representative for product specifications different from those listed above.

## HLND extension cable

- FCB-2-1.25SQ-ME7 ..... 2m cable
- FCB-3-1.25SQ-ME7 ..... 3m cable
- FCB-5-1.25SQ-ME7 ..... 5m cable
- FCB-10-1.25SQ-ME7 ..... 10m cable
- FCB-20-2.0SQ-ME7 ..... 20m cable

## Dimension Diagrams of HLND extension cable (Unit: mm)



\* The Light Unit must be connected to a PSB3-30024 Control Unit.

Refer to page 89 for Compatible Control Unit.



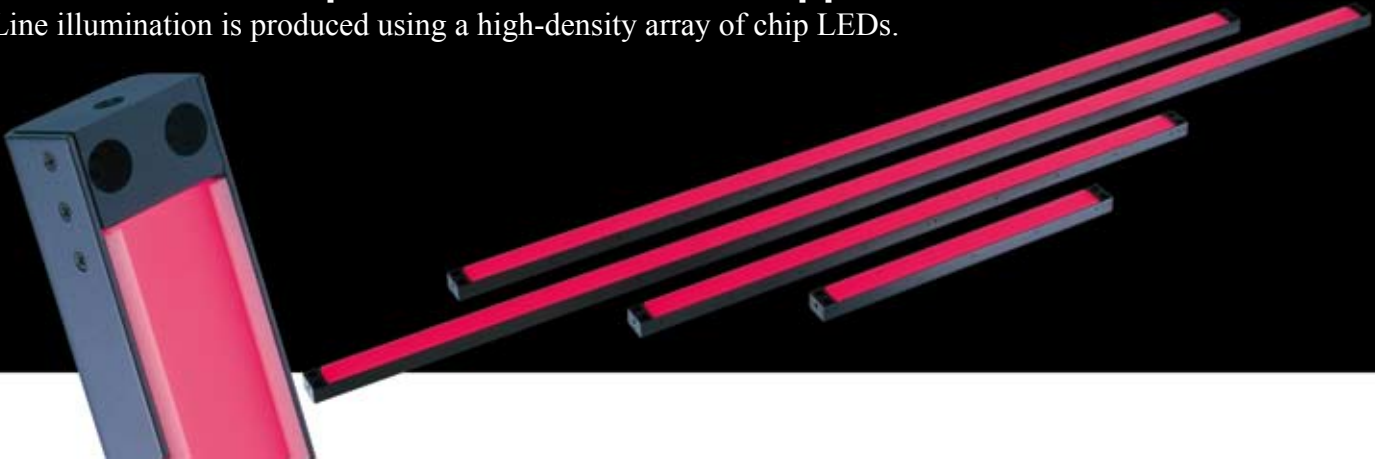


# Line Lights

## LND Series

### Ideal for web inspection and line-scan applications

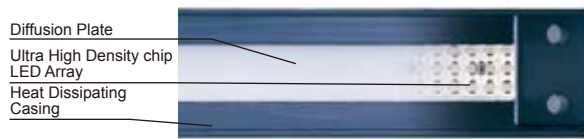
Line illumination is produced using a high-density array of chip LEDs.



#### H Series with Light-emitting Width of 12 mm

The LND-H Series features a 12-mm wide light-emitting surface. Chip LEDs are arranged at high density. It has a narrower light-emitting width than the A Series, making it effective for illuminating specific areas.

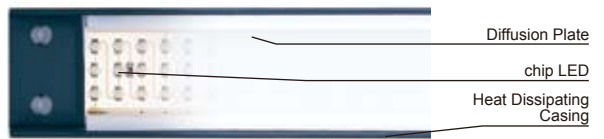
##### Internal Structure of an LND-H Light



#### A Series with Light-emitting Width of 18 mm

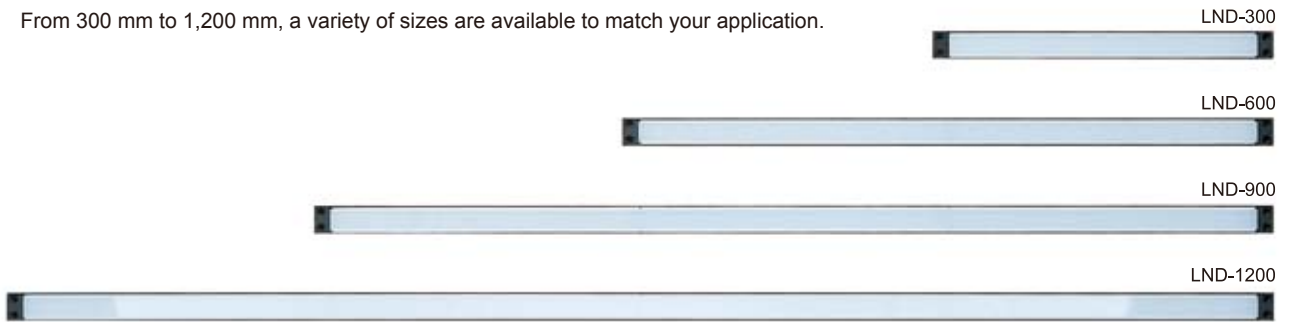
The LND-A Series features an 18-mm wide light-emitting surface, making it useful for overall illumination with diffused light.

##### Internal Structure of an LND-A Light



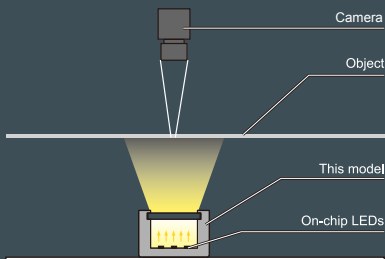
#### A variety of sizes are available

From 300 mm to 1,200 mm, a variety of sizes are available to match your application.



#### Illumination Structure of LND-A

Light from the linear mounted on-chip LEDs passes through a diffusion plate to produce a long band of even illumination.



#### Examples of Line Light Images

##### Print Inspection

Printed material, 1,150mm in length, is evenly illuminated along its entire length with a 1,200mm line light.

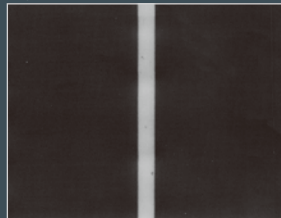
Light used: LND-1200A-DF



##### Defect Inspection

A line light is used to illuminate defects in wrapping, creating excellent contrast.

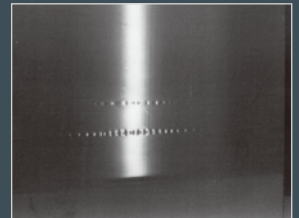
Light used: LND-300H-SW-DF



##### Web Defect Inspection

This shows how line illumination from above makes indentations clearly visible.

Light used: LND-300A-DF



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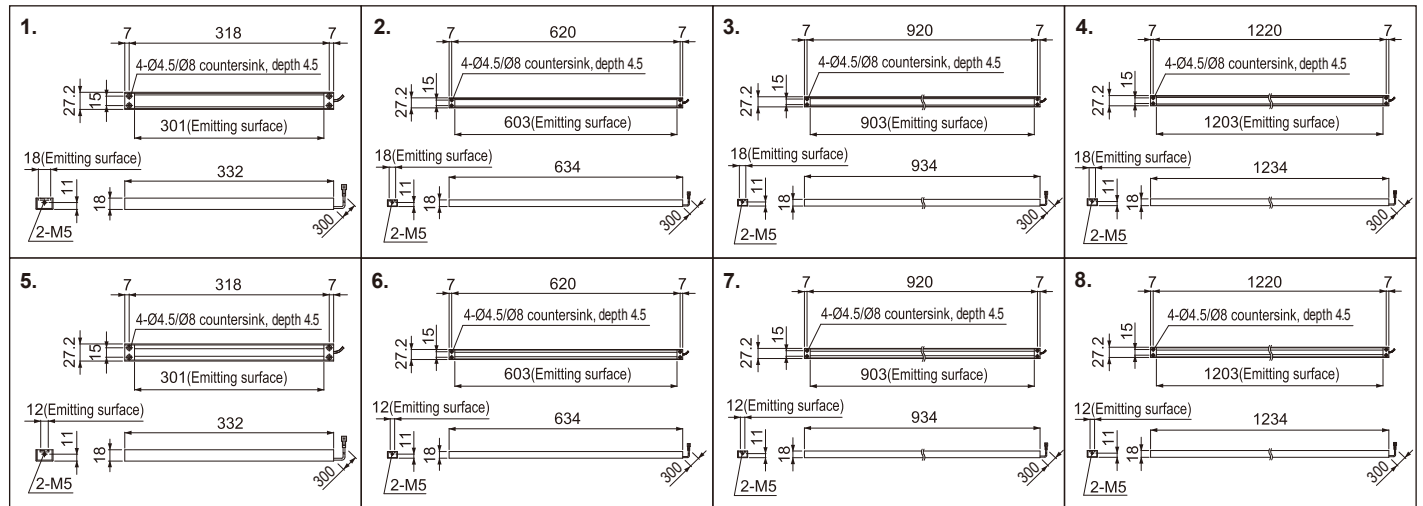
## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LND-A	1002161	LND-300A-DF	●	24V / 7.2W	—	1
	1002164	LND-300A-SW-DF	○	24V / 10W		
	1002160	LND-300A-BL-DF	●			
	1002163	LND-300A-GR-DF	●			
	1002189	LND-600A-DF	●	24V / 14W	—	2
	1002192	LND-600A-SW-DF	○	24V / 22W		
	1003388	LND-600A-GR-DF	●			
	1002212	LND-900A-DF	●	24V / 22W	—	3
	1002214	LND-900A-SW-DF	○	24V / 30W		
	1002211	LND-900A-BL-DF	●			
	1002213	LND-900A-GR-DF	●	24V / 28W	—	4
	1002135	LND-1200A-DF	●			
	1002138	LND-1200A-SW-DF	○			
	1002592	LND-1200A-BL-DF	●	24V / 40W	—	4
1002136	LND-1200A-GR-DF	●				

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LND-H	1002167	LND-300H-DF	●	24V / 7.2W	—	5
	1002171	LND-300H-SW-DF	○	24V / 13W		
	1002166	LND-300H-BL-DF	●			
	1002170	LND-300H-GR-DF	●			
	1002194	LND-600H-DF	●			
	1002198	LND-600H-SW-DF	○	24V / 27W		
	1002193	LND-600H-BL-DF	●			
	1002197	LND-600H-GR-DF	●	24V / 22W	—	6
	1002215	LND-900H-DF	●			
	1002219	LND-900H-SW-DF	○			
	1002670	LND-900H-BL-DF	●			
	1002217	LND-900H-GR-DF	●	24V / 29W		
	1002139	LND-1200H-DF	●			

\* LND-series Red Lights cannot be used with a CCS Strobe Control Unit (such as the PTU2 Series). The Lights can be turned ON and OFF with a normal Control Unit.  
 \* When the light-level is high and the light is left continually on, we recommend air-cooling the device by blowing air through the M5 hole.

## Dimension Diagrams (Unit: mm)



# Line Lights

## LN Series

### Line-shaped, convergent-beam system

The convergent beam system uses a cylindrical lens to produce highly focused LED illumination.



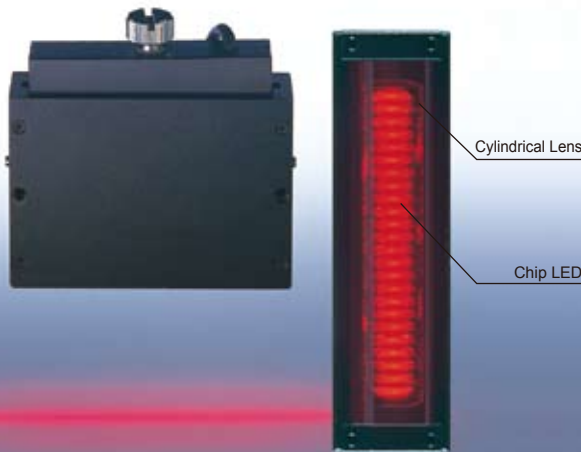
#### LN-series Convergent Line Lights

Light from the chip LEDs inside the unit passes through the cylindrical lens and is formed into a high-intensity, tightly focused beam. The beam width can be adjusted by changing the End Unit. Units with 60-mm or 200-mm light-emitting surfaces are available. The LEDs comes in red, white, blue, or green.

#### High-output LN-HK Series

High output is achieved by the use of white power LEDs and a unique heat dissipating construction. Units with 60-mm or 200-mm light-emitting surfaces are available. The standard models come with white LEDs.

#### LN-60A Illumination Image



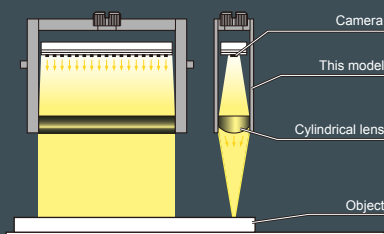
#### LN-200SW-HK-STK Illumination Image



The LN-HK Series has an output that is high enough to replace halogen light sources. The LN-200SW-HK-STK with a 200-mm light-emitting surface consumes only 22 W, which can provide a large energy savings. Running costs will also be reduced as LEDs have a long service life and they do not burn out like halogen lamps.

#### Illumination Structure of LN-60A

The workpiece is illuminated with high-luminosity light from chip LEDs that has been converged into a line by passing it through a cylindrical lens on the front.

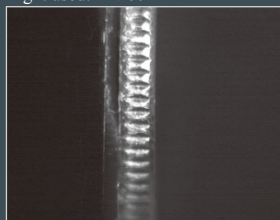


#### Examples of Convergent Beam Light Images

##### Inspecting the side of a coin

Convergent line light illuminates only the side of the coin.

Light used: LN-60A



##### Measurement inspection of connector pin widths

Only the tip of each connector pin is illuminated, enabling point inspection.

Light used: LN-60A



##### Surface inspection on glass surface.

Light is projected from side, thus illuminating scratch.

Light used: LN-60A







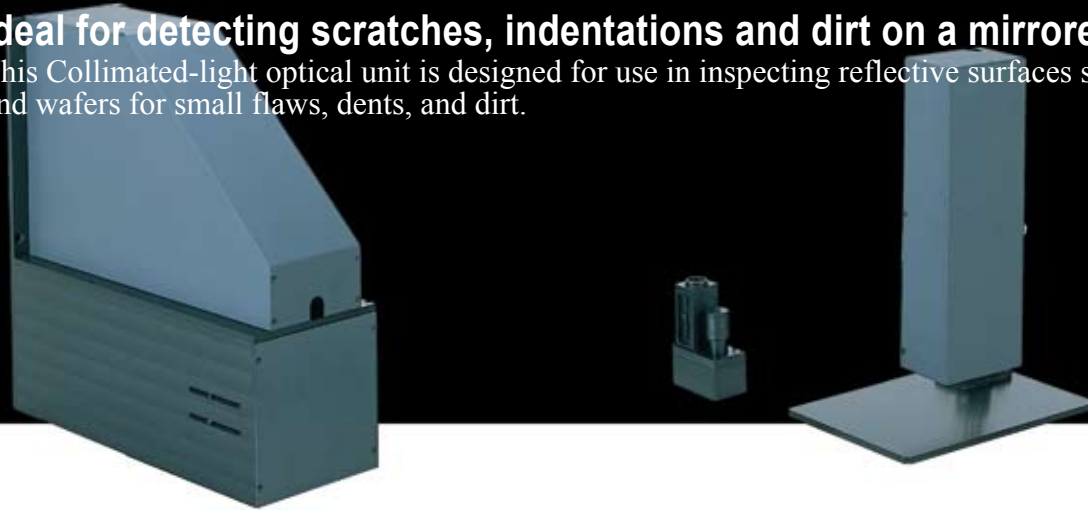


# Coaxial Lights

## MSU/MFU Series

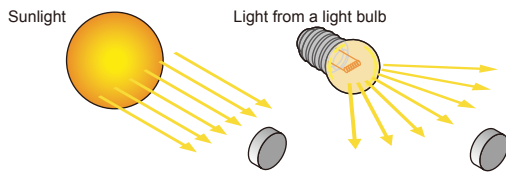
**Ideal for detecting scratches, indentations and dirt on a mirrored work surface**

This Collimated-light optical unit is designed for use in inspecting reflective surfaces such as CDs and wafers for small flaws, dents, and dirt.



### New technology: Collimated-light optical unit

Light emitted from any normal light source propagates in a radial fashion, and disperses as it gets further from the source. Light from a distant source such as the sun (considered to be from an infinite distance) strikes any surface uniformly. The rays are parallel or collimated. The MSU-series Coaxial Light Units have been developed using this principle.



### Inspect for flaws, dents, and dirt on reflective surfaces

Using light from a collimated light source is useful for detecting shallow flaws and dents in flat, reflective objects, which were previously difficult to detect. It is also ideal for reading bar codes and laser-engraved characters.

Reading two-dimensional code



The use of LED illumination achieves the triple benefits of high performance, high stability, and low cost. Proving the sophistication of our technology, this ground-breaking product opens up new fields of application for LED lights.

### For small, glossy applications (MSU-10)

The MSU Series enables clear imaging of flaws on CD surfaces, engraved characters on lead frames, and 2D code, that were previously difficult to detect using normal coaxial light.



#### MSU-10 Features

- The camera can be mounted directly onto the C mount at the top of the unit.
- Built-in macro lens allows the field of view to be adjusted from 5 to 15 mm.
- The enclosed focusing adapter allows you to select the optimum light for the workpiece. (Select according to the surface condition and roughness of the workpiece; light intensity is adjustable.)
- A lightweight and compact design enables installation in cramped locations.

#### Reference of F.O.V.

Camera used: 1/3 CCD camera

Model name	Field of View	WD
MSU-10	7.5mm	58mm
MSU-30	18.7mm	50mm
MSU-30X20	15mm	24mm
MSU-100	60mm	50mm

Note:  
The above reference is used as a guide when you select a LED light. The actual data may differ under different imaging conditions or other environment.

### Examples of Collimated Light Images

#### Inspecting for flaws on a lens surface

Flaws and nicks on the lens surface are imaged.

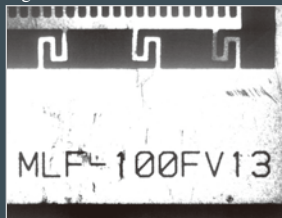
Light used: MSU-10



#### Inspecting laser characters on a lead frame

The fine laser characters are clearly imaged

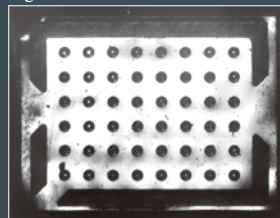
Light used: MSU-10



#### Inspecting for warping and depressions in a CSP

Warped and depressed parts are clearly imaged as black cloudy areas.

Light used: MSU-10



#### Inspecting laser engraved characters on a wafer

Very finely engraved characters appear with clarity and good contrast.

Light used: MSU-10



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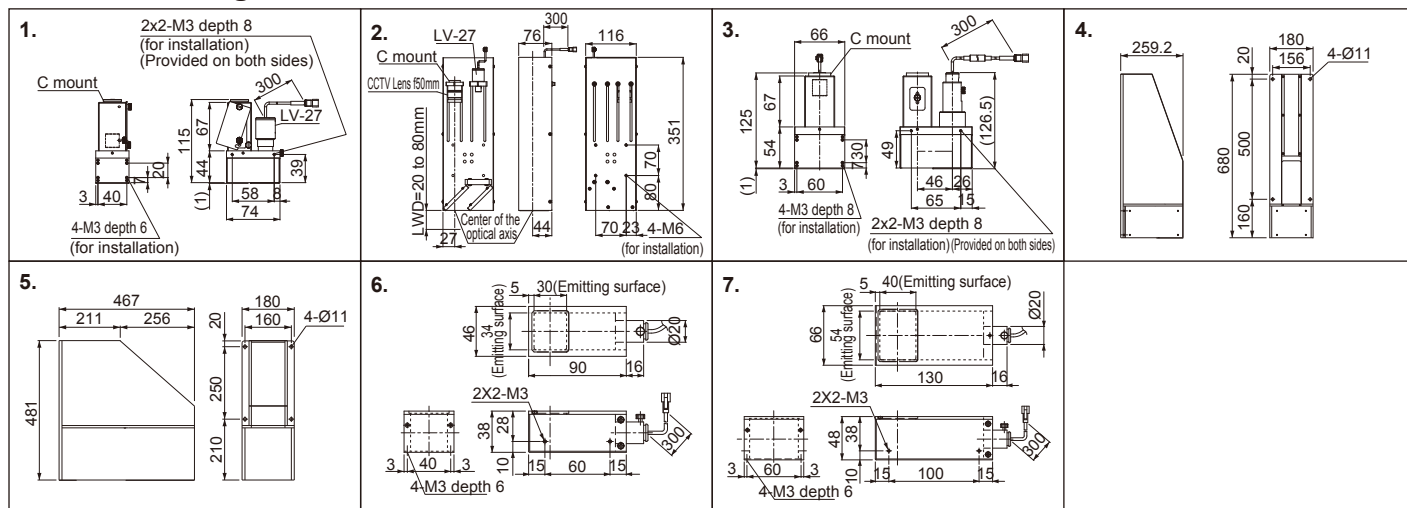
## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
MSU	1005549	MSU-10RD2	●	24V / 0.8W	—	1
	1002469	MSU-10	●	12V / 0.7W		
	1002471	MSU-10-SW	○			
	1002470	MSU-10-BL	●	12V / 0.7W	—	2
	1005550	MSU-30RD2	●			
	1002476	MSU-30	●	12V / 0.7W	—	3
	1002477	MSU-30-BL	●			
	1005547	MSU-30X20RD2	●	24V / 0.8W	—	3
	1002479	MSU-30X20	●	12V / 0.5W		
	1002485	MSU-30X20-SW	○			
	1002481	MSU-30X20-BL	●			
	1002483	MSU-30X20-GR	●	12V / 0.7W	—	4
	1002472	MSU-100	●			
	1002473	MSU-130	●			
	1002474	MSU-130-CL	○	12V / 0.7W	—	5
			24V / 4.9W			

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
MFU	1002460	MFU-34X30-BL	●	12V / 0.3W	—	6
	1002462	MFU-54X40-BL	●	12V / 0.3W	—	7

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement. The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

## Dimension Diagrams (Unit: mm)



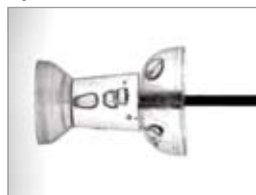
## Suppressing stray light reflections for precise appearance inspection and measurement

Using collimated illumination, stray light reflections are suppressed even when the distance between the light source and the object is short, enabling high-precision dimensional measurement. This light method also allows accurate appearance and measurement inspections of glass or other transparent objects without blurring or loss of contrast due to light refraction.

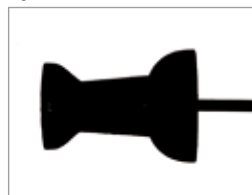


### Image Comparisons between the Collimated Backlight and the Diffused Backlight

Light used: LFL-100



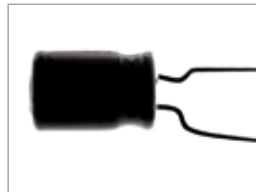
Light used: MFU-34X30-BL



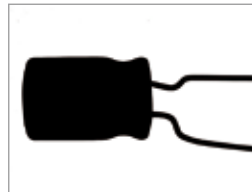
### Inspecting Pushpin Appearance

When the transparent resin body of the pushpin is backlit using surface illumination from diffused light, the transparent section remains transparent. With collimated illumination, the incident light is refracted from the transparent resin, making the entire surface appear black.

Light used: LFL-100



Light used: MFU-34X30-BL



### Inspecting Capacitor Appearance and Dimensions

The diffused light of a backlight spreads around the sides of the capacitor body. This light reflection is suppressed with collimated illumination, and even the capacitor leg width is uniformly imaged.

## Examples of Collimated Light Images

Inspecting for flaws on a mirrored CD surface

Fine flaws on the surface are brought out clearly and blackly.

Light used: MSU-130



Inspecting the print on a CD surface

A uniformly illuminated image can be captured.

Light used: MSU-130CL



Inspecting for dents in a button battery

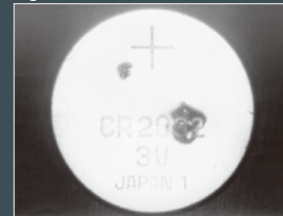
The dents are not visible when coaxial light is used

Light used: LFV-70



Even shallow, tiny dents are brought out with parallel light.

Light used: MSU-30x20



# Ultraviolet Lights

## UV Series

**Spark-prevention structure achieves enhanced safety and reliability**

Use of an original UV light LED with a peak wavelength of 365nm and a directional pattern of  $\pm 20^\circ$ .



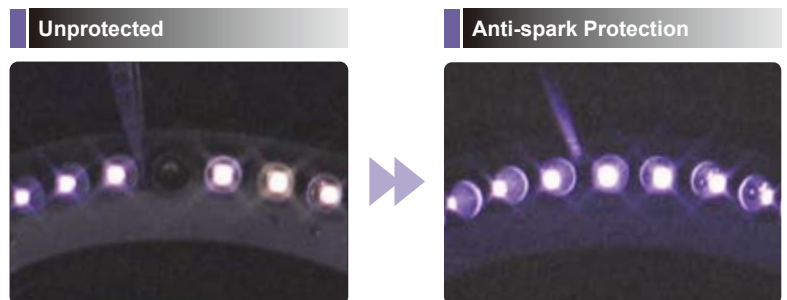
### Employment of original ultraviolet LED achieving even higher safety and reliability

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.

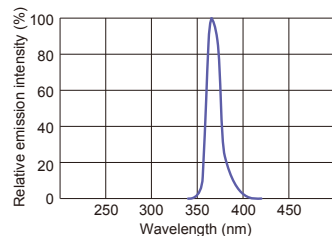
Unprotected UV Light Model vs. New Model with Anti-spark Protection



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.

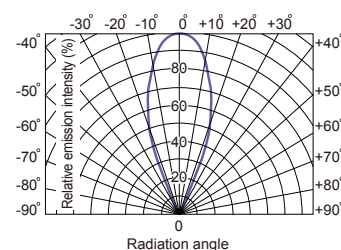
### Wavelength of 365 nm and LED light spread of $\pm 20^\circ$

Distribution of emission spectrum of UV light LED



The original UV light LED is available with a peak wavelength of 365nm and a directional pattern of  $\pm 20^\circ$ . The use of a single wavelength as a characteristic of the LED gives a more precise image of the characteristics of a workpiece compared with the use of conventional black lights, and allows for stable shooting over an extended period of time. A wide product lineup offers optimum lighting solutions best suited to a variety of inspection objects, inspection environments and optical systems.

Directional pattern of UV light LED



### Option filter

Ultraviolet transmission filter



U340 Series

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

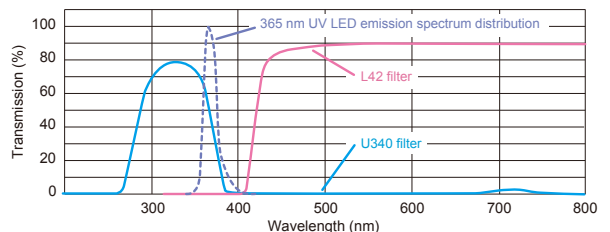
Ultraviolet cutting filter



L42 Series

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

Filter characteristic vs. UV LED emission spectrum distribution





Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension	
LDR2	1002639	LDR2-32UV365	●	24V / 0.4W	—	1	
	1002640	LDR2-42UV365	●	24V / 0.8W	—		
	1002641	LDR2-50UV365	●	24V / 1.2W	—		
	SQR	1002605	LDR2-70UV365	●	24V / 3.1W	—	2
		1002642	LDR2-90UV365	●	24V / 3.8W	—	
		1002638	LDR2-90-30UV365	●	24V / 6.1W	—	1
		1002643	LDR2-120UV365	●	24V / 9.5W	—	
LDR2-LA	1002649	SQR-56UV365	●	24V / 1.6W	—	4	
	1002606	LDR2-74UV365-LA	●	24V / 1.9W	—	5	
	1002637	LDR2-100UV365-LA	●	24V / 4.6W	—	6	
	1002634	LDR2-132UV365-LA	●	24V / 6.9W	—		
	1002636	LDR2-170UV365-LA	●	24V / 9.9W	—		
	1002635	LDR2-208UV365-LA	●	24V / 12W	—		
LDR-LA-1	1002630	LDR-75UV365-LA-1	●	24V / 1.6W	—	7	
	1002629	LDR-96UV365-LA-1	●	24V / 2.3W	—	8	
	1002632	LDR-146UV365-LA-1	●	24V / 3.1W	—		

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension	
LDR-LA-1	1002633	LDR-176UV365-LA-1	●	24V / 3.8W	—	8	
	1002631	LDR-206UV365-LA-1	●	24V / 4.6W	—		
LDL	1002648	LDL-34×8UV365	●	24V / 0.4W	—	9	
	1002604	LDL-42×15UV365	●	24V / 0.8W	—	10	
	1002603	LDL-74×27UV365	●	24V / 3.1W	—	11	
	1002602	LDL-82×15UV365	●	24V / 1.6W	—	12	
	1002647	LDL-130×15UV365	●	24V / 2.3W	—	13	
	1002628	LDL-180×16UV365	●	24V / 3.8W	—	14	
	LDQ	1002644	LDQ-60-25UV365	●	24V / 1.6W	—	15
		1002645	LDQ-78UV365	●	24V / 1.6W	—	16
1002608		LDQ-100UV365	●	24V / 3.1W	—	17	
1002607		LDQ-150UV365	●	24V / 6.1W	—	18	
1002646		LDQ-200UV365	●	24V / 9.1W	—	19	
LN	1002650	LN-200UV365	●	24V / 1.9W	—	20	
LSP	1002651	LSP-41UV365	●	24V / 1.2W	—	21	

## Dimension Diagrams (Unit: mm)

**1.**

Model Name	A	B	C	D
LDR2-32UV365	Ø32	Ø10	16	P.C.D.20
LDR2-42UV365	Ø42	Ø18	18	P.C.D.28
LDR2-50UV365	Ø50	Ø28	16	P.C.D.40
LDR2-90UV365	Ø90	Ø50	20	P.C.D.70
LDR2-90-30UV365	Ø90	Ø30	20	P.C.D.70

**2.**

**3.**

**4.**

**5.**

**6.**

Model Name	A	B	C	D
LDR2-100UV365-LA	Ø100	Ø70	22	P.C.D.84
LDR2-132UV365-LA	Ø132	Ø96	22	P.C.D.116
LDR2-170UV365-LA	Ø170	Ø134	22	P.C.D.154
LDR2-208UV365-LA	Ø208	Ø174	22	P.C.D.186

**7.**

**8.**

Model Name	A	B	C
LDR-96UV365-LA-1	Ø96	Ø80	Ø60
LDR-146UV365-LA-1	Ø146	Ø130	Ø110
LDR-176UV365-LA-1	Ø176	Ø160	Ø140
LDR-206UV365-LA-1	Ø206	Ø190	Ø170

**9.**

**10.**

**11.**

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**14.**

**15.**

**16.**

**17.**

**18.**

**19.**

**20.**

**21.**



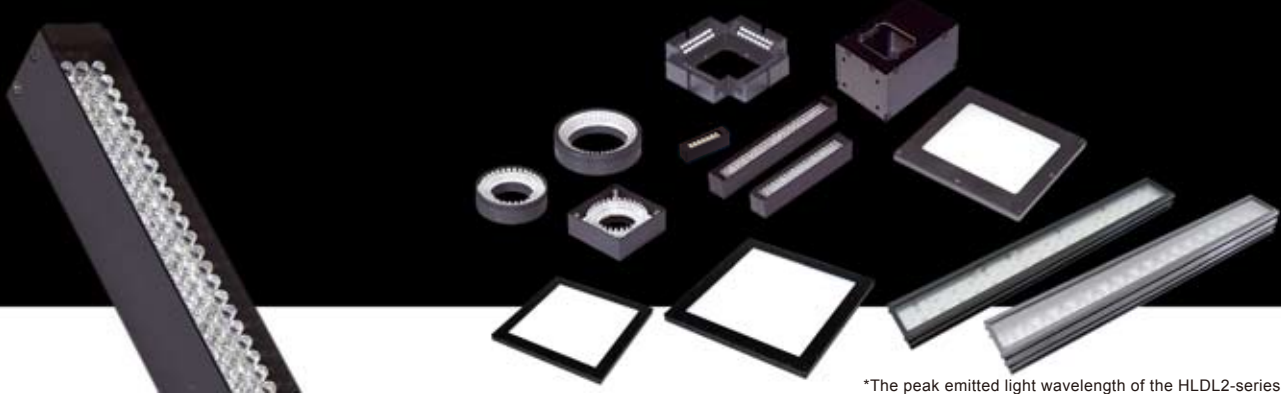


# Infrared Lights

## IR Series

### Higher transmittance than visible light

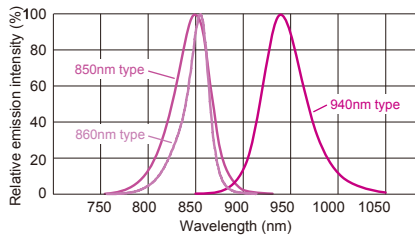
Suitable for checking the presence of substances, inclusions of foreign matter, and character recognition.



\*The peak emitted light wavelength of the HLDL2-series Lights is 860 nm.

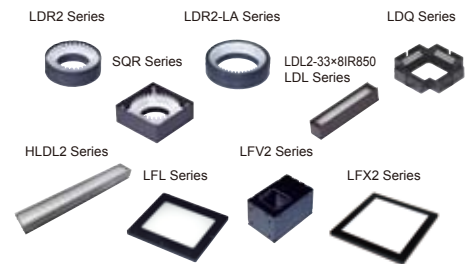
### Lineup Includes Peak Emitted Light Wavelengths of 850, 860, and 940 nm

#### Spectral Distribution of Peak Emitted Light Wavelengths of 850, 860, and 940 nm

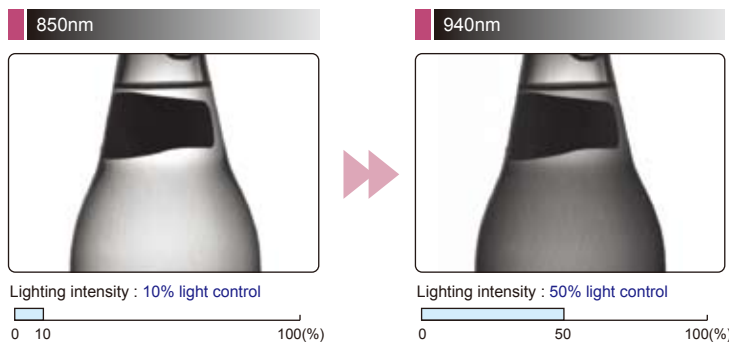


The IR Series of Infrared Lights includes peak emitted light wavelengths (typical) of 850, 860, and 940 nm. CCS can provide the optimum Infrared Light for your inspection object, inspection environment, and optical system.

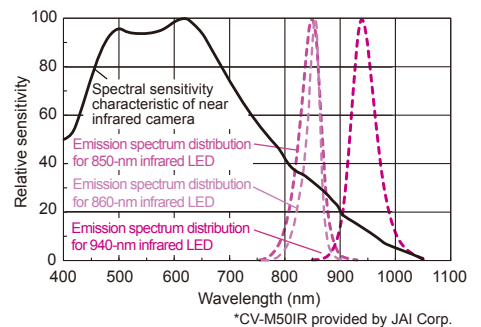
#### Product line for IR



#### Imaging with peak wavelength of 850 nm vs. 940 nm



#### Spectral Sensitivity Characteristics of Near Infrared Camera Sensors



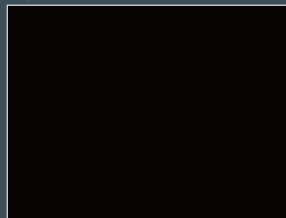
Use a camera sensitive in the near infrared region for use with an Infrared Light. The photographed image is affected by the distribution of the emission spectrum of the infrared LED and the spectral sensitivity characteristics of the camera. Optimized combination with an optical system is very important to achieve stable images.

### Examples of Infrared light Images

#### Wafer image

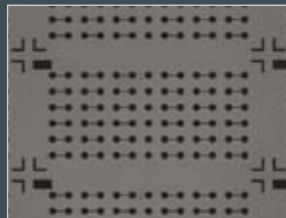
A backlight with visible light does not transmit through wafer.

Light used: LDL-100x100



An IR backlight passes through the wafer material to uniformly silhouette the pattern.

Light used: LDL-100x100IR850



#### With occluding graphics

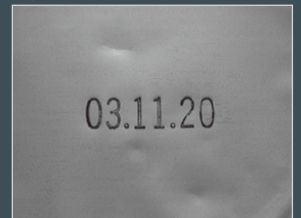
Visible light of any wavelength illuminates the graphics behind the date.

Light used: LDL-74x27-SW



IR light passes through the occluding graphic pigment but not this printed date code enabling reliable OCR/OCV.

Light used: LDL-74x27IR850



# Product Lineup Table

Direct Number : You can easily access the web page providing information on any desired product by simply entering the 7-digit direct number in the space provided. (Refer to the back cover of this brochure.)

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
LDR2	1002578	LDR2-50IR850	●	12V / 3.8W	—	1
	1002577	LDR2-50IR940	●			
	1002576	LDR2-70IR850	●	12V / 7.6W		
	1002575	LDR2-70IR940	●			
	1002574	LDR2-90IR850	●	12V / 14W		
1002573	LDR2-90IR940	●				
SQR	1002580	SQR-56IR850	●	12V / 3.8W	—	2
	1002556	SQR-56IR940	●			
LDR2-LA	1002557	LDR2-74IR850-LA	●	12V / 5.7W	—	3
	1002558	LDR2-74IR940-LA	●			
	1002559	LDR2-132IR850-LA	●			
1002560	LDR2-132IR940-LA	●				
LDL2	1004650	LDL2-33x8IR850	●	24V / 1.3W	B	5
LDL	1002561	LDL-42x15IR850	●	12V / 1.9W	—	7
	1002562	LDL-42x15IR940	●			
	1002563	LDL-74x27IR850	●			
	1002564	LDL-74x27IR940	●			

\*The LDL2-33x8 provides only the wide directional pattern.  
 \*The peak emitted light wavelength of the HLDL2-series Lights is 860 nm.  
 \*The following letters indicate options.  
 B: Bracket  
 \*For further details on these options, refer to page 101.

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension	
LDL	1002565	LDL-82x15IR850	●	12V / 3.8W	—	7	
	1002566	LDL-82x15IR940	●				
	1002567	LDL-130x15IR850	●				12V / 6.1W
	1002568	LDL-130x15IR940	●				
	1002569	LDL-180x16IR850	●				12V / 8.4W
1002570	LDL-180x16IR940	●					
LDQ	1002571	LDQ-78IR850	●	12V / 6.1W	—	9	
	1002572	LDQ-78IR940	●				
	1002581	LDQ-150IR850	●				12V / 16W
1002582	LDQ-150IR940	●					
LDL	1002748	LDL-100x100IR850	●	24V / 21W	—	11	
	1002749	LDL-100x100IR940	●				
LFL	1002742	LFL-100IR850	●	12V / 5.3W	—	12	
LFL	1002745	LFL-100IR940	●	12V / 8.4W	—	13	
	1002746	LFV2-50IR850	●				
LFX2	1004164	LFX2-50IR850	●	24V / 6.6W	—	14	
	1004165	LFX2-75IR850	●				
LFX2	1004166	LFX2-100IR850	●	24V / 14W	—	14	
	1004167	LFX2-150IR850	●				
	1004117	LFX2-200IR850	●				
HLDL2	1510	HLDL2-△△△x45IR-DF-N	●	—	—	15	
		HLDL2-△△△x45IR-DF-W	●				

\*"△△△" is the light-emitting surface length between 150 and 1,200 mm in 150-mm increments. \*Refer to page 23 for specifications.

## Dimension Diagrams (Unit: mm)

**1.**

Model Name	A	B	C	D	E
LDR2-50IR850	∅50	∅28	16	4-M3 depth 4	P.C.D.40
LDR2-50IR940	∅50	∅28	16	4-M3 depth 4	P.C.D.40
LDR2-70IR850	∅70	∅35	22	4-M3 depth 5	P.C.D.50
LDR2-70IR940	∅70	∅35	22	4-M3 depth 5	P.C.D.50
LDR2-90IR850	∅90	∅50	20	4-M3 depth 4	P.C.D.70
LDR2-90IR940	∅90	∅50	20	4-M3 depth 4	P.C.D.70

**2.**

**3.**

**4.**

**5.**

**6.**

**7.**

Model Name	A	B	C
LDL-42x15IR850	52	42	20
LDL-42x15IR940	52	42	20
LDL-82x15IR850	92	82	20
LDL-82x15IR940	92	82	20
LDL-130x15IR850	140	130	21
LDL-130x15IR940	140	130	21

**8.**

**9.**

**10.**

**11.**

**12.**

**13.**

**14.**

Model Name	A	B	C	D	E	F
LFX2-50IR850	93	21.5	50	79	36.5	20
LFX2-75IR850	118	21.5	75	104	41.5	35
LFX2-100IR850	143	21.5	100	129	41.5	60
LFX2-150IR850	193	21.5	150	179	46.5	100
LFX2-200IR850	247	23.5	200	233	43.5	160

\*Dimension diagrams are also provided on the product page (page 38).

**15.**

Light cable for models with light-emitting surface of 600 to 1,200 mm  
 Light cable for models with light-emitting surface of 150 to 450 mm

(C): (B+3.6)  
 B: (A+12)  
 A: 150 to 1,200 (Emitting surface)

● Height of Wide Models  
 ● Height of Narrow Models

2X4, M4, Depth: 8 (For mounting, same on opposite side)  
 Five slots for M5 nuts (for mounting)  
 2X2 slots for M3 nuts (For mounting, same on opposite side)

## Examples of Infrared light Images

### Printed date code occluding molded surface features

Printed text on the cap absorbs visible light causing it to occlude any surface defects or feature detection in the image.

Light used: LDR2-132SW-LA



IR light passes through the printed text and reflect uniformly from the unbroken surface allowing for defect or feature detection.

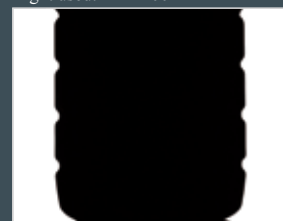
Light used: LDR2-132IR940-LA



### Foreign matter mixed in beverage container

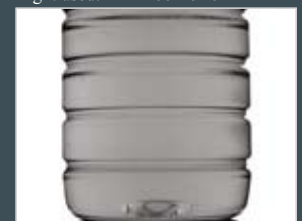
A visible light from a backlight does not penetrate the plastic bottle.

Light used: LFL-100



An IR backlight penetrates the plastic bottle and silhouettes the foreign object resting at the bottom for reliable detection.

Light used: LFL-100IR940





# Spot Lights

## HLV2-14/HLV2-22/HLV2-22-3W Series

### High-output Spot Light

Lightweight and compact with a low power consumption and long service life.



### Broad Lineup to Match Your Applications

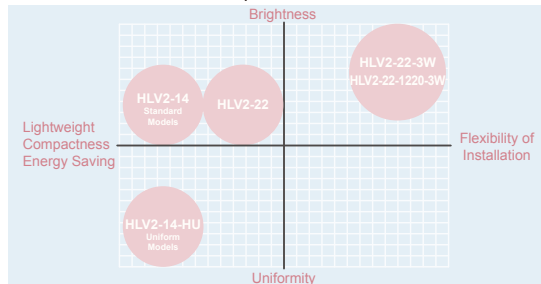
Saving Space / Demands for Small Spotlights  
 Demands for Bright Spotlights / Demands for Spotlights with Uniform Illumination  
 Reducing operating Costs / Reducing CO<sub>2</sub> Emissions

The HLV2 Series can be chosen to meet your specific needs and application environment.

HLV2 Series Evaluation Chart

	Brightness	Uniformity	Lightweight	Compactness	Flexibility of Installation	Energy Saving
HLV2-14	○	○	◎	◎	○	◎
HLV2-14-HU Highly Uniform Model	△	◎	◎	◎	○	◎
HLV2-22 (for comparison)	○	○	○	○	○	○
HLV2-22-3W	◎	○	△	△	◎	○
HLV2-22-1220-3W	◎	○	△	△	◎	○

HLV2 Series Evaluation Graph



\*Comparison of CCS products

### High-output Spot Light

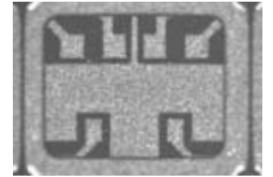
Improving the optics and boosting the light generation efficiency have yielded high-output illumination.

Previous Model(HLV-24SW-3W)



Previous models lacked sufficient output for some applications.

HLV2-22SW-3W



The HLV2 Series provides more than enough illumination for imaging.

Operating conditions: Shutter speed: 1/7,000 sec. Light intensity: 100%

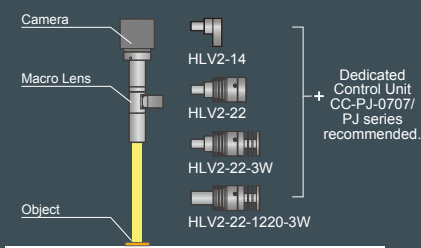
### Smallest in the Industry: HLV2-14 Series

Low weight and compact designs reduce space requirements.



### Application Example of HLV2 series

Combine this Series with our unique Macro Lenses to achieve optimal illumination solutions.



### Examples of Spot Light Images

#### Imaging of Alignment Marks for LCD Panels

Light used: HLV2-14RD



Shutter speed: 1/2,000 sec.  
 Light intensity: 20%

#### Character Recognition on Wafers

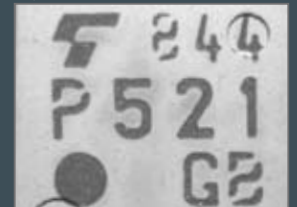
Light used: HLV2-22SW



Shutter speed: 1/20,000 sec.  
 Light intensity: 35%

#### Character Recognition on Photocouplers

Light used: HLV2-22BL-3W



Shutter speed: 1/7,000 sec.  
 Light intensity: 50%

Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

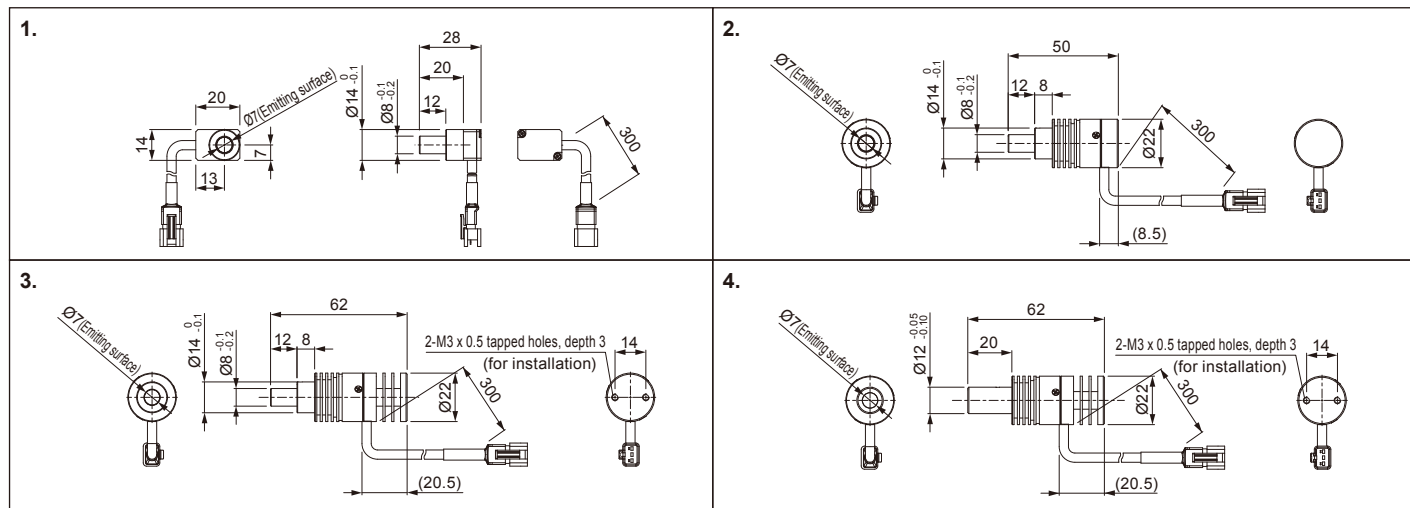
Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
HLV2-14	1004853	HLV2-14RD	●	0.9W	—	1
	1004854	HLV2-14SW	○			
	1004855	HLV2-14BL	●			
	1004856	HLV2-14GR	●			
	1004857	HLV2-14RD-HU	●			
	1004858	HLV2-14SW-HU	○			
	1004859	HLV2-14BL-HU	●			
	1004860	HLV2-14GR-HU	●			
HLV2-22	1004512	HLV2-22RD	●	1.4W	—	2
	1004513	HLV2-22SW	○			
	1004514	HLV2-22BL	●			
	1004515	HLV2-22GR	●			

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
HLV2-22-3W	1004516	HLV2-22RD-3W	●	2.8W	—	3
	1004517	HLV2-22SW-3W	○			
	1004518	HLV2-22BL-3W	●			
	1004519	HLV2-22GR-3W	●			
HLV2-22-1220-3W	1004524	HLV2-22RD-1220-3W	●	2.8W	—	4
	1004525	HLV2-22SW-1220-3W	○			
	1004526	HLV2-22BL-1220-3W	●			
	1004527	HLV2-22GR-1220-3W	●			

Series	Direct Number	Model Name	Outline
HL	4000249	HL-30	Condensing Lens Dedicated to the HLV2-22/-3W Series
	4000248	HL-24-21	

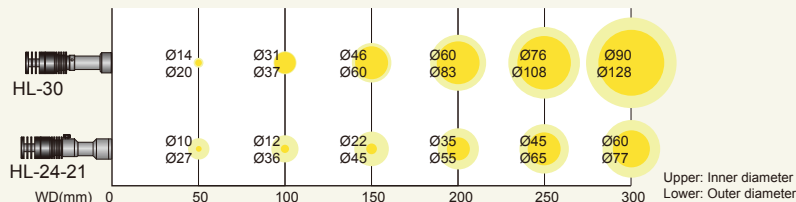
Please use CC-PJ-0707 or PJ Series control unit for HLV2 Spotlights.  
Refer to pages 97 and 98 for details on Control Units for HLV2 Spotlights.

## Dimension Diagrams (Unit: mm)



## Condensing Lens for the HLV2-22 Series: HL-30/HL-24-21

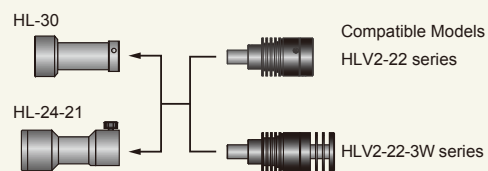
Illumination Range of the HL-30/HL-24-21



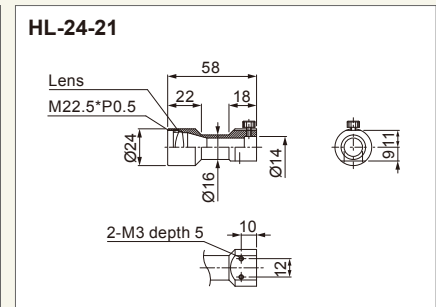
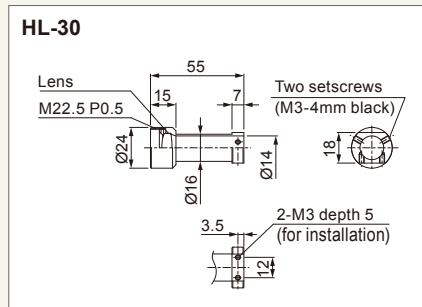
\*The data shown here represents actual measurements. Value is not guaranteed.

## Dimension Diagrams (Unit: mm)

### Mounting to the HLV2-22 Series



\*Cannot be used with the HLV2-14, HLV2-22-1220-3W, or HLV2-22-NR-3W Series.



## Optional Extension Cable

Standard models	Models with robot cables
FCB-1/-2/-3/-5 (1m/2m/3m/5m) *Refer to Page 102.	FRCB-1/-2/-3/-5 (1m/2m/3m/5m) *Refer to Page 102.

### Using an Extension Cable

Do not connect longer than 5 m of Extension Cables.  
\*If you need to use an Extension Cable longer than 5 m, please contact a CCS sales representative.  
Branch cables cannot be used.

Refer to pages 97 and 98 for details on Control Units for HLV2 Spotlights.



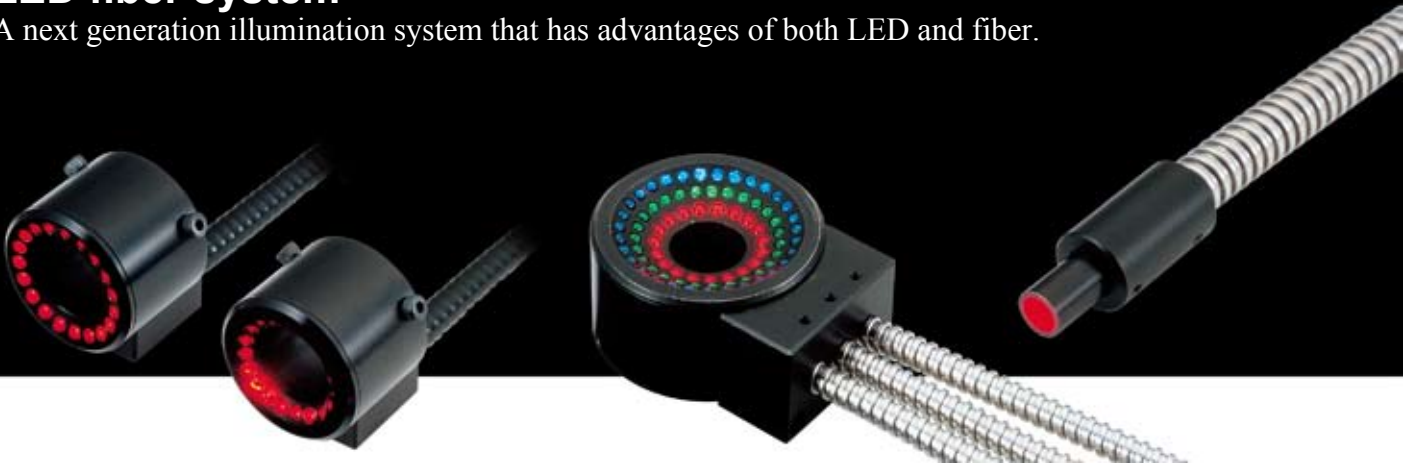


# Micro Fiber-heads

## HFS/HFR Series

### LED fiber system

A next generation illumination system that has advantages of both LED and fiber.



#### Our original light focusing technology reaches unprecedented brightness

While halogen fiber lighting illuminates a wide area, the HFR Series using original-condensing techniques provides high intensity by illuminating only a required field of view.

Selectable in the lineup according to the work sample character is tics.

 <p><b>HFR-25-10</b></p>			<p>High-condensed illumination by Ø5 from 10mm LWD (high-condensed illuminating by single array)</p>
 <p><b>HFR-25-30</b></p>			<p>Condensed illumination from 30mm LWD (condensed by single array)</p>
 <p><b>HFR-40-20</b></p>			<p>High-condensed illumination by wide-view of Ø10 from 20mm LWD (condensed by three independent arrays)</p>

LWD: Light Working Distance (Distance from a light to an object)

#### Clear images can be captured by selecting illumination range, illumination angle and luminosity

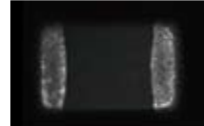
##### Actual images of chip part

100W Halogen light + Ø20Ring light guide

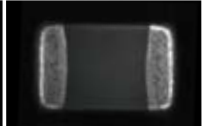


The ring type HFR Series offers a wide variety of products so that you can choose the irradiation range, illumination angle, and luminance most suitable for the objects to be inspected and the environment.

HFR-25-30 (Blue)



HFR-25-10 (Blue)



HFR-40-20 (Blue)



Operating conditions:  
Shutter speed: 500µsec (1/20,000 sec.) Lens: Double magnification  
Light intensity: 100% Light used: HLV2-22BL-NR-3W

#### Detecting a small part that is difficult to capture with an existing halogen light source can be achieved with high contrast

##### Image comparison of alignment of TAB tape

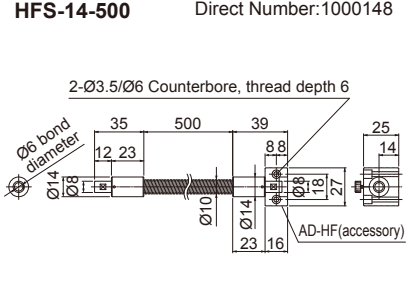
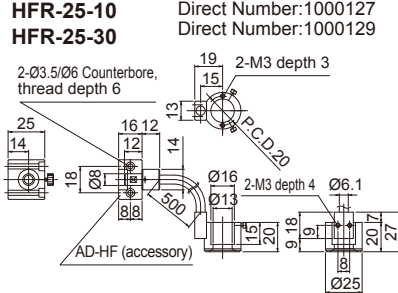
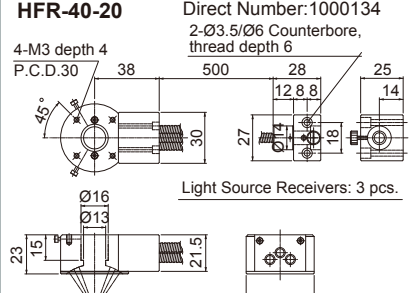
100W Halogen light + Ring light guide



HFR-25-30 (Blue) LWD 30mm



### Dimension Diagrams (Unit: mm)

<p><b>HFS-14-500</b> Direct Number:1000148</p>  <p>2-Ø3.5/Ø6 Counterbore, thread depth 6 Ø6 bond diameter 35 500 39 25 12 23 8.8 14 Ø14 16 23 16 AD-HF (accessory)</p>	<p><b>HFR-25-10</b> Direct Number:1000127 <b>HFR-25-30</b> Direct Number:1000129</p>  <p>2-Ø3.5/Ø6 Counterbore, thread depth 6 19 2-M3 depth 3 15 13 P.C.D.20 25 16 12 14 12 12 14 Ø16 2-M3 depth 4 Ø6.1 Ø13 15 15 20 7 11 15 9 18 27 AD-HF (accessory)</p>	<p><b>HFR-40-20</b> Direct Number:1000134</p>  <p>2-Ø3.5/Ø6 Counterbore, thread depth 6 4-M3 depth 4 P.C.D.30 38 500 28 25 12 8 8 14 27 18 14 Light Source Receivers: 3 pcs. Ø40</p>
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# Light Sources for Micro Fiber-heads

## HLV2-22-NR-3W Series

**Allow users to choose the illumination color and intensity**  
 Micro Fiber-head combination ensures compatibility with a wide array of applications.



**By changing the light source color, features can be clearly extracted according to the application purpose**

Red (RD), green (GR), blue (BL), and white (SW) light sources are available for near monochromatic LED lighting that can be matched to the spectral characteristics of the target object. Combination with a Micro Fiber-head allows the user to tailor the best illumination color and lighting configuration to extract the most accurate image.

Straight type HFS-14-500



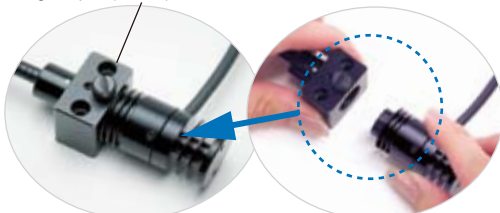
Ring type HFR-25-10/ HFR-25-30



**Change color with ease**

HLV2-22-NR-3W Series for Micro-Fiber-heads are easily attached and detached.

Connecting Adaptor (AD-HF) is included with the HFS/HFR Series



Please use with a connecting adaptor, AD-HF

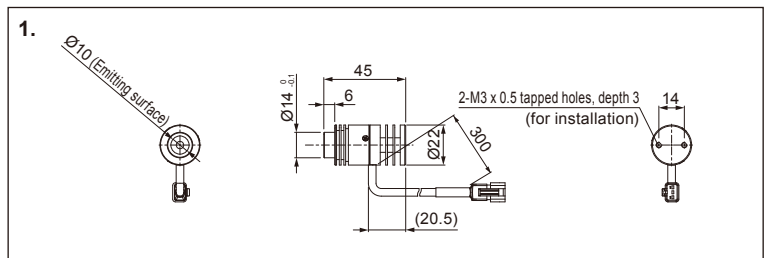
**Direct Number :** A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

### Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption	Option	Dimension
HLV2-22-NR-3W	1004520	HLV2-22RD-NR-3W	●	2.8W	—	1
	1004521	HLV2-22SW-NR-3W	○			
	1004522	HLV2-22BL-NR-3W	●			
	1004523	HLV2-22GR-NR-3W	●			

Please use CC-PJ-0707 or PJ Series control unit for HLV2 Spotlights.  
 Refer to pages 97 and 98 for details on Control Units for Spotlight Units.

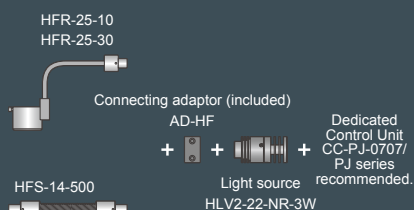
### Dimension Diagrams (Unit: mm)



Refer to pages 97 and 98 for details on Control Units for HLV2 Spotlights.

### Application Example of HLV2-22-NR-3W

Micro Fiber-head combination ensures compatibility with a wide array of applications



### Optional Extension Cable

Standard models

FCB-1/-2/-3/-5  
(1m/2m/3m/5m)

\*Refer to Page 102.

Models with robot cables

FRCB-1/-2/-3/-5  
(1m/2m/3m/5m)

\*Refer to Page 102.

#### Using an Extension Cable

Do not connect longer than 5 m of Extension Cables.

\*If you need to use an Extension Cable longer than 5 m, please contact a CCS sales representative.

Branch cables cannot be used.



# Light Sources for Micro Fiber-heads

## HLV2-3M-RGB-3W

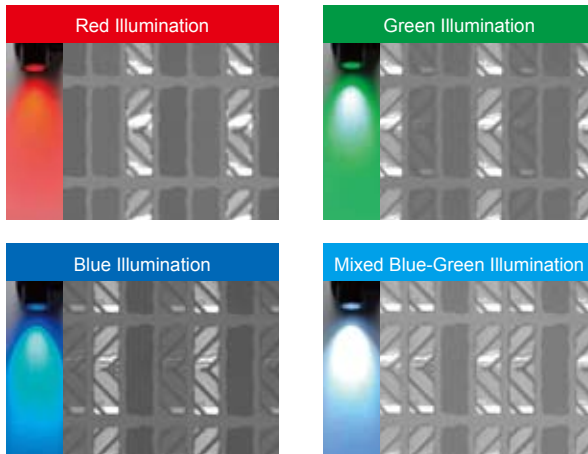
**Allow users to tailor the illumination color to the target object**  
 Micro Fiber-head combination ensures compatibility with a wide array of applications.



### Blend the color as you want

The HLV2-3M-RGB-3W is an exclusive light source comprised of a light source section and a blending unit. It enables step-less, independent dimming of each color. The special construction of the blending unit eliminates irregularities to provide uniform light emission. Connection to a model from the CCS Micro Fiber Head Ring Series allows you to create the optimal illumination color for a variety of configurations.

#### Image Examples of Liquid Crystal Color Filters

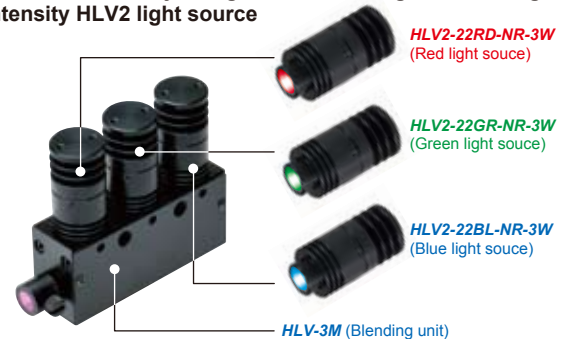


Independent control of intensity provides the optimal illumination according to the spectral characteristics of object.

### Precise color blending using CCS's mixing chamber and three-channel power supply

The HLV2-22RD-NR-3W red light source, HLV2-22GR-NR-3W green light source, and HLV2-22BL-NR-3W blue light source are built into the HLV2-3M-RGB-3W. The R, G, and B light sources can be independently controlled to create any combination up to full-spectrum lighting. This ensures that the best illumination color will be available for the spectroscopic reflectivity of the workpiece.

#### Increased intensity using CCS's second-generation high intensity HLV2 light source



Straight type HFS-14-500

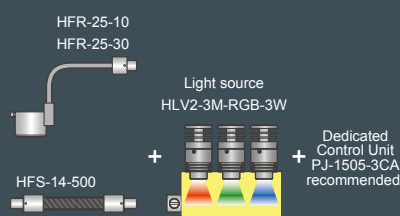


Ring type HFR-25-10/ HFR-25-30



### Application Example of HLV2-3M-RGB-3W

Micro Fiber-head combination ensures compatibility with a wide array of applications



### Optional Extension Cable

#### Standard models

FCB-1/-2/-3/-5  
 (1m/2m/3m/5m)

\*Refer to Page 102.

#### Models with robot cables

FRCB-1/-2/-3/-5  
 (1m/2m/3m/5m)

\*Refer to Page 102.

#### Using an Extension Cable

Do not connect longer than 5 m of Extension Cables.

\*If you need to use an Extension Cable longer than 5 m, please contact a CCS sales representative.

Branch cables cannot be used.







# LED Light Source Unit PFB2 Series

## Used to replace halogen light sources

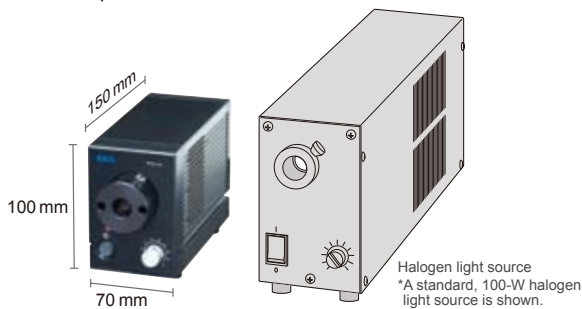
Achieved with white power LEDs and a unique light converging technology.



Relevant information is listed on page3.

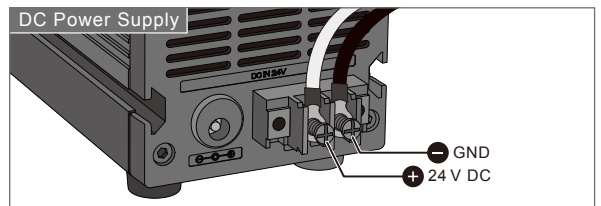
### Compact Size That Fits Almost Anywhere

A compact design (70×150×100 mm (W×D×H)) helps conserve space.

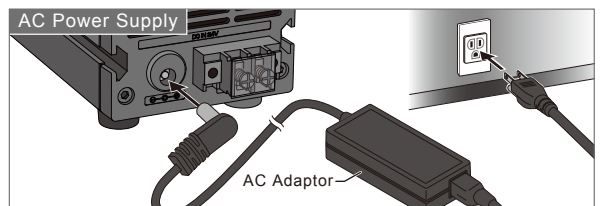


### Select the Power Supply According to the User Environment

The terminal block on the rear panel accepts a 24-V DC input. The optional AC Adaptor supports an AC input of 100 to 240 V. Select the best one for your site environment.



Use the terminal block on the back of the Light Source for 24-V DC power supply.



Use the AC Adaptor for a 100 to 240-V AC power supply. (Model: ADP2460-PFB-JT)

### Compatible with a Wide Variety of Light Guides

Light Guides from five companies in Japan and six companies in other countries can be used

\*For further details, refer to the adapter dimensions table for mounting the Light Guide on page 70.

### Selection of External Control Types

The PFB2 Series provides Light Sources with only manual light intensity control and Light Sources that also provide external light intensity control. Three types of external light intensity control are available: serial, parallel, and analog. Both intensity control and ON/OFF control are possible with any of these types.



Standard Type  
PFB2-20SW-F-JT series

Manual light intensity control No external control



Serial Type  
PFB2-20SW-F-SJT series

Manual light intensity control External control



Parallel Type  
PFB2-20SW-F-PJT series

Manual light intensity control External control



Analog Type  
PFB2-20SW-F-AJT series

Manual light intensity control External control

Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Product Lineup Table

Series	Direct Number	Model Name	Color	Power Consumption
PFB2	6010	PFB2-20SW-F-JT-□□□□	○	15W
		PFB2-20SW-F-SJT-□□□□		
		PFB2-20SW-F-PJT-□□□□		
		PFB2-20SW-F-AJT-□□□□		

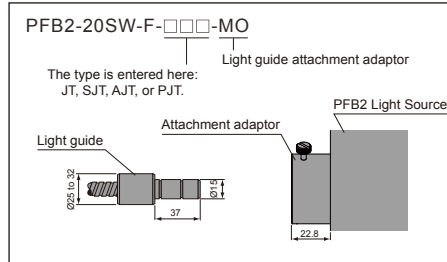
\*Ask the manufacturer for details on Light Guides.

\*Installation Method: Do not place anything within 50 mm of the fan exhaust outlet on the rear panel, the fan air inlets on the side panels, or the top panel.

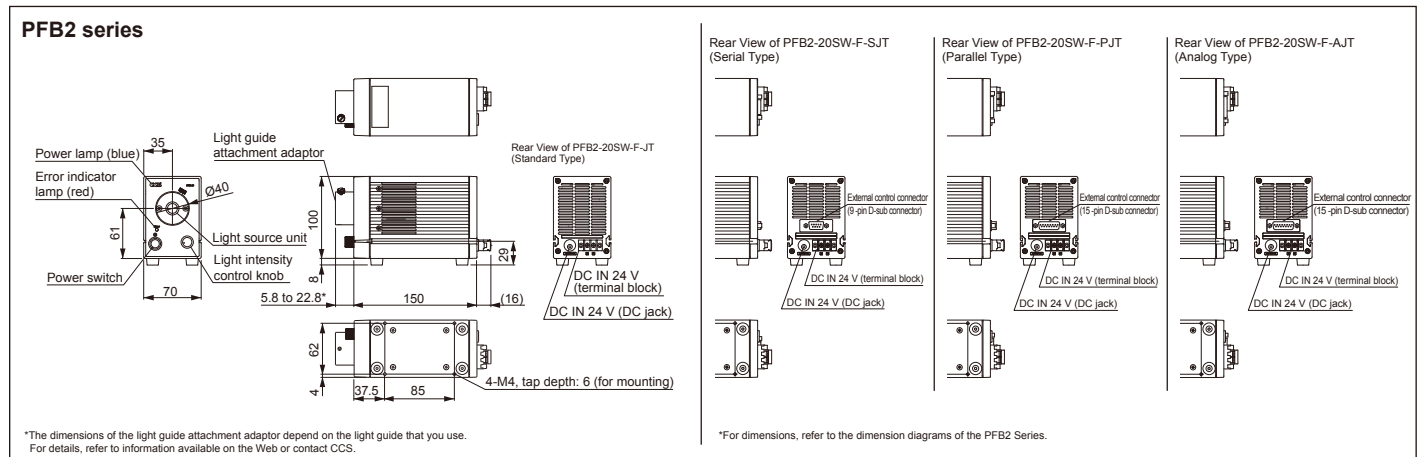
### Reading Lineup Selection Table

PFB2-20SW-F-JT-□□□□	The Light Guide Mounting Adaptor is specified here.
Model name JT/SJT/AJT/PJT	-MO/-NP/-MI/-HY/-SU/-VL/-TF/ -TE/-SH1/-SH2/-DJ1/-DJ2/-DJ3/ -DJ4/-CS1/-IT

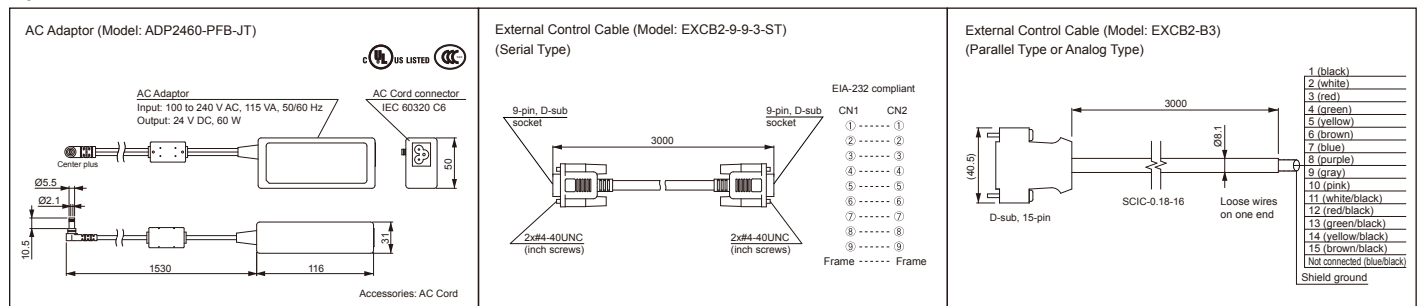
### Reading Light Guide Mounting Adapter Dimensions



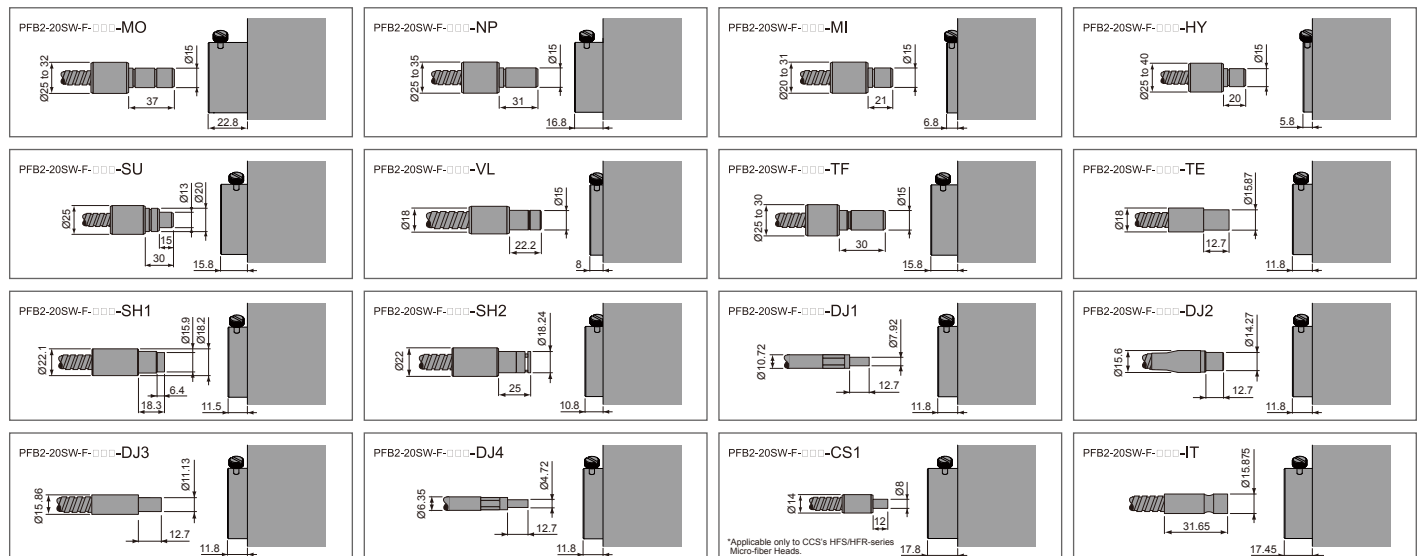
## Dimension Diagrams (Unit: mm)



## Optional Accessories



## Light Guide Attachment Adaptor Dimension Diagrams (Unit: mm)





# Macro Lens

## SE-16/SE-18 Series

**CCS Macro Lens provides high magnification and performance at a low cost**

Magnification ranging from 0.5x to 6x and option for HLV2 Series coaxial light port.



### SE-16 Series with 0.5x, 1x, and 2x magnifications

Straight Tube			Coaxial Port for HLV Series Light		
					
Direct Number:4000516 Type: SE-16SM05 Magnification: 0.5 x	Direct Number:4000517 Type: SE-16SM1 Magnification: 1 x	Direct Number:4000518 Type: SE-16SM2 Magnification: 2 x	Direct Number:4000520 Type: SE-16VM05 Magnification: 0.5 x	Direct Number:4000521 Type: SE-16VM1 Magnification: 1 x	Direct Number:4000522 Type: SE-16VM2 Magnification: 2 x

Combined use of lens unit, either optional magnification tube, and either mount changes magnification. Interchangeable mount allows for coaxial or external lighting.








**Full set**



Type: SE-16MS  
Full set includes:  
Straight mount  
Coaxial mount  
Lens unit  
Lens barrel (short)  
Lens barrel (long)

Direct Number:4000515

**Configuring system for desired magnification**

	+		0.5x
	+	 + 	1x
	+	 + 	2x

### SE-18 Series with 2x, 4x, and 6x magnifications

Straight Tube			Coaxial Port for HLV Series Light		
					
Type: SE-18SM2 Magnification: 2x	Direct Number:4000526 Type: SE-18SM4 Magnification: 4x	Direct Number:4000527 Type: SE-18SM6 Magnification: 6x	Direct Number:4000528 Type: SE-18VM2 Magnification: 2x	Direct Number:4000529 Type: SE-18VM4 Magnification: 4x	Direct Number:4000530 Type: SE-18VM6 Magnification: 6x

Combined use of C-mount ring with either lens unit either optional magnification tube changes magnification. Interchangeable lens unit allows for coaxial or external lighting.








**Full set**



Type: SE-18MS  
Full set includes:  
Straight lens unit  
Coaxial lens unit  
C mount ring  
4x ring  
6x ring

Direct Number:4000524

**Configuring system for desired magnification**

	+		2x
	+	 + 	4x
	+	 + 	6x

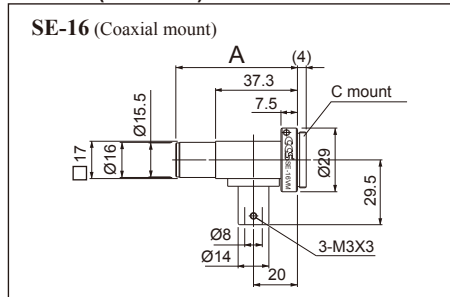
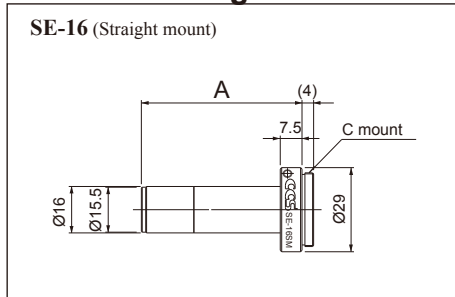
## SE-16 Series Specifications

Type	Straight			Coaxial			
Model	SE-16SM05	SE-16SM1	SE-16SM2	SE-16VM05	SE-16VM1	SE-16VM2	
Magnification	0.5x	1x	2x	0.5x	1x	2x	
WD	107mm	67mm	47mm	107mm	67mm	47mm	
Actual F number (image)	5.93	7.74	11.5	5.92	7.88	11.7	
Physical distance (O/I)	179.9mm	160mm	180.6mm	179.9mm	160mm	180.6mm	
Depth of field *1	1900 $\mu$ m	620 $\mu$ m	230 $\mu$ m	1900 $\mu$ m	620 $\mu$ m	230 $\mu$ m	
Resolution ( $\mu$ m) *2	8 $\mu$ m	5.2 $\mu$ m	3.9 $\mu$ m	8 $\mu$ m	5.2 $\mu$ m	3.9 $\mu$ m	
Distortion (%)	-0.001335%	-0.000957%	-0.000232%	-0.026569%	-0.014059%	-0.005588%	
Numerical aperture (object side)	0.042	0.065	0.087	0.042	0.065	0.087	
Field of view (W x H x Diagonal)	1/3 inch sensor	9.6x7.2x12mm	4.8x3.6x6mm	2.4x1.8x3mm	9.6x7.2x12mm	4.8x3.6x6mm	2.4x1.8x3mm
	1/2 inch sensor	12.8x9.6x16mm	6.4x4.8x8mm	3.2x2.4x4mm	12.8x9.6x16mm	6.4x4.8x8mm	3.2x2.4x4mm
Lens outer diameter (lens barrel)	$\varnothing 16$						
Lens barrel length A	55.4mm	75.5mm	116.1mm	55.4mm	75.5mm	116.1mm	
Weight	29.6g	34g	43.5g	41.9g	46.3g	55.8g	
Maximum suitable sensor size	1/2 inch						
Camera mount	C mount						

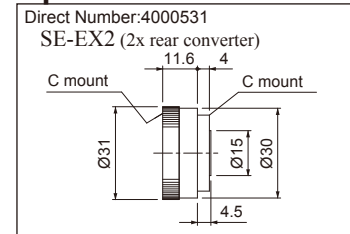
\*1 The depth of field is obtained with 40 $\mu$ m permissible circle of confusion.

\*2 The resolving power was obtained at a wavelength of 550nm. These specifications are numeric values based on optical design. Actual values will vary with physical factors such as the assembly accuracy.

## Dimension Diagrams of SE-16 Series (Unit: mm)



## Option



\*Insert between the lens and the camera mount to double the magnification. Note that luminosity and resolution are reduced.

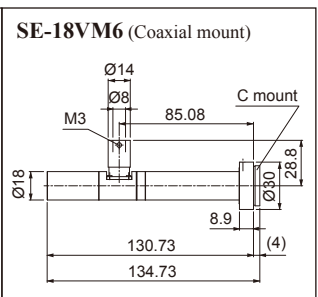
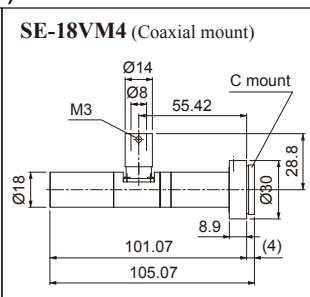
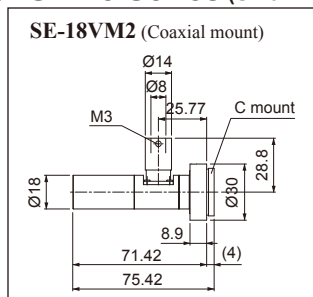
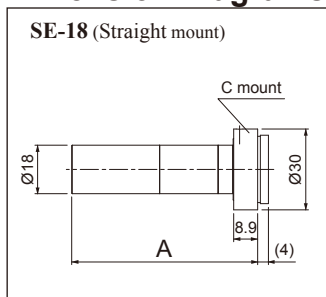
## SE-18 Series Specifications

Type	Straight			Coaxial			
Model	SE-18SM2	SE-18SM4	SE-18SM6	SE-18VM2	SE-18VM4	SE-18VM6	
Magnification	2x	4x	6x	2x	4x	6x	
WD	114 $\pm$ 1mm	110 $\pm$ 1mm	109 $\pm$ 1mm	114 $\pm$ 1mm	110 $\pm$ 1mm	109 $\pm$ 1mm	
Actual F number (image)	18.9	37.7	56.6	18.9	37.7	56.6	
Physical distance (O/I)	199.1mm	224.8mm	254.4mm	201.4mm	227.1mm	256.7mm	
Depth of field *1	380 $\mu$ m	190 $\mu$ m	130 $\mu$ m	380 $\mu$ m	190 $\mu$ m	130 $\mu$ m	
Resolution ( $\mu$ m) *2	6.3 $\mu$ m						
Distortion (%)	-0.058268%	-0.073489%	-0.031328%	-0.058268%	-0.073489%	-0.031328%	
Numerical aperture (object side)	0.053						
Field of view (W x H x Diagonal)	1/3 inch sensor	2.4x1.8x3mm	1.2x0.9x1.5mm	0.8x0.6x1mm	2.4x1.8x3mm	1.2x0.9x1.5mm	0.8x0.6x1mm
	1/2 inch sensor	3.2x2.4x4mm	1.6x1.2x2mm	1.07x0.8x1.33mm	3.2x2.4x4mm	1.6x1.2x2mm	1.07x0.8x1.33mm
	2/3 inch sensor	4.4x3.3x5.5mm	2.2x1.65x2.75mm	1.47x1.1x1.83mm	4.4x3.3x5.5mm	2.2x1.65x2.75mm	1.47x1.1x1.83mm
Lens outer diameter (lens barrel)	$\varnothing 18$						
Lens barrel length A	69.1mm	98.8mm	128.4mm	-	-	-	
Weight	40g	50g	55g	50g	60g	65g	
Maximum suitable sensor size	2/3 inch						
Camera mount	C mount						

\*1 The depth of field is obtained with 40 $\mu$ m permissible circle of confusion.

\*2 The resolving power was obtained at a wavelength of 550nm. These specifications are numeric values based on optical design. Actual values will vary with physical factors such as the assembly accuracy.

## Dimension Diagrams of SE-18 Series (Unit: mm)







# Spot Lights

## LSP-41 Series

Super-Uniform Spotlight for wide variety of applications



### Bright at a long working distance

High luminance spot lights "LSP-41 Series" is suited for limited and long working distance from 300mm to 500mm, with a compact design-Ø41mm diameter housing.

Applications; reading bar codes/2D codes. Inspecting die cast products such as automobile parts, wooden materials, and plastic materials.

Reading bar code  
Light used: LSP-41RD



Reading QR code  
Light used: LSP-41RD



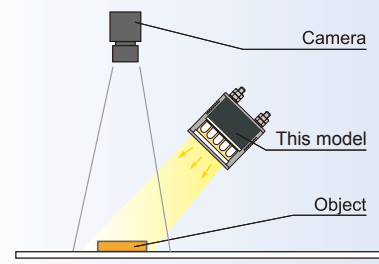
Inspecting dot-marked characters on pipe  
Light used: LSP-41RD



\* Optional Parts  
Polarizing plate: PL-LSP-41

### Illumination Structure of LSP-41RD

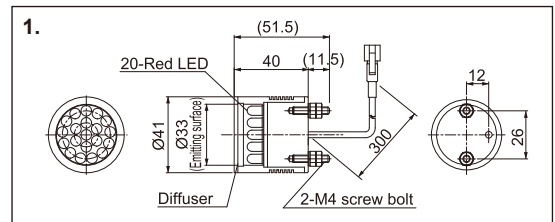
Narrow directive LEDs provide high condensing illumination. It also provides soft, even illumination through the diffusion plate.



### Product Lineup Table

Series	Model Name	Color	Power Consumption	Options	Dimension
LSP-41	LSP-41RD	●	12V / 2.0W	P	1

### Dimension Diagrams (Unit: mm)





# Spot Lights

## LV Series

### Lightweight, Compact Spotlights LV Series



#### Lightweight, Compact Design

The low weight and compact design reduce space requirements.



These Spotlights can be used to directly illuminate workpieces, or they can be mounted on the coaxial epi-illumination sections of macro lens or other devices.

#### Complete Lineup

The standard lineup includes LED colors of red, white, and blue.



Spotlights are available with an 8-mm diameter opening, and optionally with 10-mm and 12-mm diameter openings.

#### Low Power Consumption

The LV-series Spotlights consume only 0.7 W to help save energy.

**Direct Number :** A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

#### Product Lineup Table

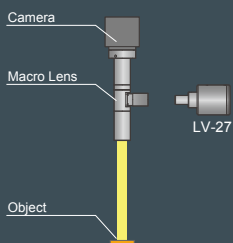
Series	Direct Number	Model Name	Color	Power Consumption	Dimension
LV	1005548	LV-27RD2	●	24V / 0.8W	1
	1002432	LV-27-R	●	12V / 0.7W	
	1002438	LV-27-SW	○	12V / 0.7W	
	1002425	LV-27-BL	●	12V / 0.7W	
	1002428	LV-27-GR	●	12V / 0.7W	

Existing RD-type Red Lights will be discontinued at the April 15, 2013. RD2-type Red Lights is recommended as replacement. The RD-type and RD2-type Lights have different input voltages. Always use a 24-VDC Control Unit with RD2-type Lights. For a comparison between the RD-type and RD2-type Lights, refer to page 1.

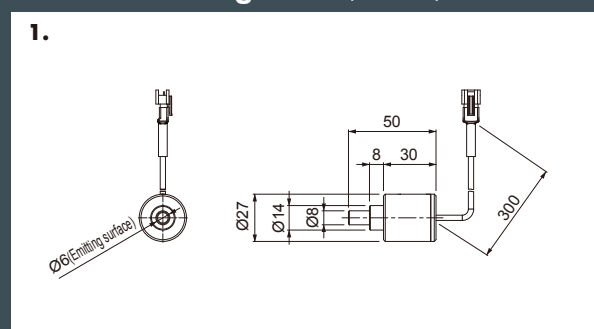
\*The peak light frequency of the LV-27RD2 (red light) is 630 nm.  
\*The peak light frequency of the LV-27-R (red light) is 623 nm.

### Application Example of LV series

Combine this Series with our unique Macro Lenses to achieve optimal illumination solutions.



### Dimension Diagrams (Unit: mm)



# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

## Control Unit Series for LED Lights

Ensure total power consumption (W) of lights connected and simultaneously powered do not exceed the chosen controllers power rating. Failure to do so will reduce maximum achievable light intensity.

Type	Feature	Model Name	Direct Number	Output	Power required	Number of channels	External control cable	Page listed	
Control Units for Regular Lighting	<b>Repeatable, linear light intensity control</b> ● Intensity control with 256 discrete levels using course and fine adjustments ● 1-channel ● Full featured external control functionality	PD2-1012	2000519	12V / 9.5W	100 to 120VAC 27VA	1	EXCB2-B3	P.87	
		PD2-1024	2000520	24V / 9.0W	100 to 120VAC 27VA	1			
		PD2-3012	2000521	12V / 28W	100 to 240VAC 78VA	1			
		PD2-3024	2000522	24V / 28W	100 to 240VAC 78VA	1			
		PD2-5012	2000536	12V / 46W	100 to 240VAC 122VA	1			
		PD2-5024	2000537	24V / 46W	100 to 240VAC 122VA	1			
	<b>Multi-channel, independent intensity control</b> ● Intensity control with 256 discrete levels using course and fine adjustments ● 2-channel, 4-channel, or 8-channel models ● Full featured external control functionality	2-channel	PD2-3012-2	2000523	12V / 28W	100 to 240VAC 78VA	2	EXCB2-B3	P.87
		4-channel	PD2-3024-2	2000524	24V / 28W	100 to 240VAC 78VA	2		
		8-channel	PD2-3012-4	2000525	12V / 27W	100 to 240VAC 78VA	4	EXCB2-25-3	
			PD2-3024-4	2000526	24V / 27W	100 to 240VAC 78VA	4		
			PD2-3012-8	2000527	12V / 25W	100 to 240VAC 78VA	8		
			PD2-3024-8	2000528	24V / 25W	100 to 240VAC 78VA	8		
	<b>Fully Equipped with External Control Functions</b> <b>Multi-channel, independent intensity control</b> ● Select from parallel, EIA-485, and Ethernet models ● 3-channel	Parallel	PD3-3024-3-PI	2000775	24V / 28W	100 to 240VAC 78VA	3	EXCB2-M20-3	P.79
			PD3-5024-4-PI	2000778	24V / 46W	100 to 240VAC 70VA	4		
			PD3-10024-8-PI	2000781	24V / 95W	100 to 240VAC 130VA	8		
		EIA-485	PD3-3024-3-SI	2000777	24V / 28W	100 to 240VAC 78VA	3	EXCB2-E3-3	
			PD3-5024-4-SI	2000780	24V / 46W	100 to 240VAC 70VA	4		
			PD3-10024-8-SI	2000783	24V / 95W	100 to 240VAC 130VA	8		
		Ethernet	PD3-3024-3-EI	2000776	24V / 28W	100 to 240VAC 78VA	3	---	
			PD3-5024-4-EI	2000779	24V / 46W	100 to 240VAC 70VA	4		
	PD3-10024-8-EI	2000782	24V / 95W	100 to 240VAC 130VA	8				
	<b>Continuous intensity control for simple, cost sensitive applications with</b> ● Analog step-less intensity control	PSB-512V	2000229	12V / 5W	100 to 120VAC 15VA	1	---	P.91	
		PSB-524V	2000233	24V / 5W	100 to 120VAC 15VA	1			
		PSB-1012VB	2000185	12V / 10W	100 to 120VAC 27VA	1			
		PSB-1024VB	2000194	24V / 10W	100 to 120VAC 27VA	1			
		PSB-3012VB	2000206	12V / 30W	100 to 120VAC 78VA	1			
		PSB-3024VB	2000215	24V / 30W	100 to 120VAC 78VA	1			
		PSB-1012V-WW	2000178	12V / 10W	100 to 240VAC 27VA	1			
PSB-1024V-WW		2000191	24V / 10W	100 to 240VAC 27VA	1				
<b>High Capacity of 300 W</b> ● Intensity control with 256 discrete levels using course and fine adjustments ● Full featured external control functionality	PSB3-30024	2000762	24V / 300W	100 to 240VAC 410VA	1	EXCB2-M20-3(parallel) EXCB2-E6SR-3(serial) EXCB2-E6AN-3(analog)	P.89		
<b>Continuous intensity control for simple, cost sensitive applications with</b> <b>Repeatable, linear light <sup>*1</sup> intensity control</b> ● Intensity control with 256 discrete levels using course and fine adjustments ● 1-channel ● Full featured external control functionality <sup>*2</sup>	PB-2430	2000018	L1:12V / 24W L1:22V / 24W	24VDC	1 1	---	P.93		
	BB-V12P30-M	2000394	12V / 30W	24VDC	1	EXCB2-BBP-5 <sup>*3</sup>	P.95		
	BB-V24P30-M	2000389	24V / 30W	24VDC	1				
	BB-V12P30-S	2000445	12V / 30W	24VDC	1				
	BB-V24P30-S	2000443	24V / 30W	24VDC	1				
<b>Repeatable, linear light intensity control</b> ● Intensity control with 100 discrete levels using course and fine adjustments ● 1-channel ● Full featured external control functionality Strobing and ON/OFF Operation	CC-ST-1024	2000654	24V / 10W	24VDC	1	NFCB2-CC-3	P.94		

\*1)This applies for a frequency setting of 62.5 kHz with the PWM option.(This is the default value.)

\*2)External control requires an Interface Unit.

\*3)Connect to Interface Unit.

# Control Unit



Type	Feature	Model Name	Direct Number	Output	Power required	Number of channels	External control cable	Page listed
Strobe control unit	Strobing with override ● Strobe length: 10 to 990 $\mu$ s ● 2-channel	PTU2-3012	2000540	18V / 27W	100 to 240VAC 78VA	2	EXCB2-25-3	P.92
		PTU2-3024	2000541	48V / 27W	100 to 240VAC 78VA	2		
	Strobing without override ● Strobe length: 40 $\mu$ s to 40 ms <sup>*7</sup> ● 3-channel	PD3-3024-3-PI	2000775	24V / 28W	100 to 240VAC 78VA	3	EXCB2-M20-3	P.79
		PD3-5024-4-PI	2000778	24V / 46W	100 to 240VAC 70VA	4		
		PD3-10024-8-PI	2000781	24V / 95W	100 to 240VAC 130VA	8		
		PD3-3024-3-SI	2000777	24V / 28W	100 to 240VAC 78VA	3	EXCB2-E3-3	
		PD3-5024-4-SI	2000780	24V / 46W	100 to 240VAC 70VA	4		
		PD3-10024-8-SI	2000783	24V / 95W	100 to 240VAC 130VA	8		
		PD3-3024-3-EI	2000776	24V / 28W	100 to 240VAC 78VA	3	—	
		PD3-5024-4-EI	2000779	24V / 46W	100 to 240VAC 70VA	4		
	PD3-10024-8-EI	2000782	24V / 95W	100 to 240VAC 130VA	8			
	Strobing with override ● Strobe length: 0.001 to 1 ms ● 1-channel	PS-3012-D24	2000157	18V / 30W	24VDC	1	EXCB2-BBP-5 <sup>*3</sup>	P.95
		BB-V12S30-M	2000395	18V / 30W	24VDC	1		
		BB-V24S30-M	2000390	48V / 30W	24VDC	1		
		BB-V12S30-S	2000446	18V / 30W	24VDC	1		
BB-V24S30-S		2000444	48V / 30W	24VDC	1			
Strobing without override <sup>*4</sup> ● Strobe length: 0.1 to 100 ms ● 1-channel		BB-V12P30-M	2000394	12V / 30W	24VDC	1	EXCB2-BBP-5 <sup>*3</sup>	P.95
		BB-V24P30-M	2000389	24V / 30W	24VDC	1		
		BB-V12P30-S	2000445	12V / 30W	24VDC	1		
		BB-V24P30-S	2000443	24V / 30W	24VDC	1		
Strobing without override <sup>*5</sup> ● Strobe length: 50 $\mu$ s to 40 ms <sup>*6</sup> ● 1-channel		CC-ST-1024	2000654	24V / 10W	24VDC	1	NFCB2-CC-3	P.94
	Connecting to your current control unit for strobing (Strobing without override) ● Strobe length: 0.01 to 99.99 ms <sup>*8</sup>	STU-3000	2000366	—	—	—	—	P.92

Dedicated Control Unit	HLV2	AC Input	HLV2 Series dedicated control unit ● 2-channel, or 3-channel type ● Analog step-less intensity control ● External control function incorporated	PJ-1505-2CA	2000131	—	100 to 240VAC 27VA	2	EXCB2-B3	P.98
				PJ-1505-3CA	2000136	—	100 to 240VAC 37VA	3		
				PJ-1505-2CD24	2000134	—	24VDC	2		
				PJ-1505-3CD24	2000139	—	24VDC	3		
	DC Input	HLV2 Series dedicated Controller ● 1-channel ● Intensity control with 100 discrete levels using course and fine adjustments ● Full featured external control functionality Strobing and ON/OFF Operation	CC-PJ-0707	2000756	—	24VDC	1	NFCB2-CC-3	P.97	

\*4) This applies when Trigger Mode is set for the PWM option.

\*5) This applies when the switch is set to Strobe Mode.

\*6) The selections are 50  $\mu$ s, 100  $\mu$ s, 250  $\mu$ s, 500  $\mu$ s, 1 ms, 4 ms, 10 ms, and 40 ms.

\*7) The selections are 40  $\mu$ s, 80  $\mu$ s, 120  $\mu$ s, 200  $\mu$ s, 600  $\mu$ s, 1 ms, 4 ms, 10 ms, 20 ms, and 40 ms.

\*8) The following Control Units are supported: PD2-1012, PD2-1024, PD2-3012, PD2-1024, PD2-5012, PD2-5024, PD2-3012-2, and PD2-3024-2.

\* Other optional Control Units have different units for strobe times.

\* Overdrive boosts the voltage and current supplied to the Light to produce a higher output.



# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

## Control Unit Specifications

\* Special Control Units are not included.

■ Digital Control Unit

■ Analog Control Unit

Model	PD2-1024	PD2-3024	PD2-3024-2	PD2-3024-4	PD2-3024-8	PD2-5024	PD3-3024-3-PI	PD3-3024-3-SI	PD3-3024-3-EI	PD3-5024-4-PI	PD3-5024-4-SI
Direct number	2000520	2000522	2000524	2000526	2000528	2000537	2000775	2000777	2000776	2000778	2000780
Output voltage	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V	24 V
Output power	9 W	28 W	28 W	27 W	25 W	46 W	28 W	28 W	28 W	46 W	46 W
Number of channels	1	1	2	4	8	1	3	3	3	4	4
Lighting method	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant and strobe lighting	Constant and strobe lighting	Constant and strobe lighting	Constant and strobe lighting	Constant and strobe lighting
Light intensity control method	PWM control	PWM control	PWM control	PWM control	PWM control	PWM control	PWM and lighting time control	PWM and lighting time control	PWM and lighting time control	PWM and lighting time control	PWM and lighting time control
PWM frequency	62.5kHz	62.5kHz	62.5kHz	62.5kHz	62.5kHz	62.5kHz	125kHz	125kHz	125kHz	125kHz	125kHz
Light intensity control value	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels
Input voltage	100 to 120 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Power consumption	27 VA	78 VA	78 VA	78 VA	78 VA	122 VA	78 VA	78 VA	78 VA	70 VA	70 VA
External control method	Parallel communications	○	○	○	○	○	○	—	—	○	—
	EIA-485 communications	—	—	—	—	—	—	○	—	—	○
	Ethernet	—	—	—	—	—	—	—	○	—	—
	Analog input	—	—	—	—	—	—	—	—	—	—
External control functions	External intensity control	○	○	○	○	○	○	○	○	○	○
	ON/OFF lighting	○	○	○	○	○	○	○	○	○	○
	Strobe lighting	—	—	—	—	—	○(Without overdrive)	○(Without overdrive)	○(Without overdrive)	○(Without overdrive)	○(Without overdrive)
	Lighting time	—	—	—	—	—	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms
	Lighting delay time	—	—	—	—	—	10μs max.	10μs max.	10μs max.	20μs max.	20μs max.
CE Marking	— (Not covered by CE.)	○	○	○	○	○	○	○	○	○	○
Weight	700 g	1.1 kg	1.1 kg	1.2 kg	1.5 kg	1.3 kg	600 g	600 g	600 g	1.2 kg	1.2 kg
Cooling method	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Forced air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Forced air cooling	Forced air cooling
Mounting method	Bottom	Bottom or side	Bottom or side	Bottom or side	Bottom or side	Bottom or side	Bottom or DIN rail	Bottom or DIN rail	Bottom or DIN rail	Bottom or DIN rail	Bottom or DIN rail
Page	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 79 to 86	P. 79 to 86	P. 79 to 86	P. 79 to 86	P. 79 to 86

Model	PSB-524V	PSB-1024VB	PSB-3024VB	PSB-1024V-WV	PSB3-30024	PD2-1012	PD2-3012	PD2-3012-2	PD2-3012-4	PD2-3012-8	PD2-5012
Direct number	2000233	2000194	2000215	2000191	2000762	2000519	2000521	2000523	2000525	2000527	2000536
Output voltage	24 V	24 V	24 V	24 V	24 V	12 V	12 V	12 V	12 V	12 V	12 V
Output power	5 W	10 W	30 W	10 W	300 W	9.5 W	28 W	28 W	27 W	25 W	46 W
Number of channels	1	1	1	1	1	1	1	2	4	8	1
Lighting method	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting
Light intensity control method	Variable-voltage control	Variable-voltage control	Variable-voltage control	Variable-voltage control	Variable-voltage control	PWM control	PWM control	PWM control	PWM control	PWM control	PWM control
PWM frequency	—	—	—	—	—	62.5 kHz	62.5 kHz	62.5 kHz	62.5 kHz	62.5 kHz	62.5 kHz
Light intensity control value	Stepless	Stepless	Stepless	Stepless	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels	256 levels
Input voltage	100 to 120 VAC	100 to 120 VAC	100 to 120 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC
Frequency	50/60Hz	50/60Hz	50/60Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Power consumption	15 VA	27 VA	78 VA	27 VA	410 VA	27 VA	78 VA	78 VA	78 VA	78 VA	122 VA
External control method	Parallel communications	—	—	—	—	○	○	○	○	○	○
	EIA-485 communications	—	—	—	—	○	—	—	—	—	—
	Ethernet	—	—	—	—	—	—	—	—	—	—
	Analog input	—	—	—	—	○	—	—	—	—	—
External control functions	External intensity control	—	—	—	—	○	○	○	○	○	○
	ON/OFF lighting	—	—	—	—	○	○	○	○	○	○
	Strobe lighting	—	—	—	—	—	—	—	—	—	—
	Lighting time	—	—	—	—	—	—	—	—	—	—
	Lighting delay time	—	—	—	—	—	—	—	—	—	—
CE Marking	— (Not covered by CE.)	— (Not covered by CE.)	○	○	○	— (Not covered by CE.)	○	○	○	○	○
Weight	420 g	470 g	700 g	470 g	2.3 kg	700 g	1.1 kg	1.1 kg	1.2 kg	1.5 kg	1.3 kg
Cooling method	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Forced air cooling
Mounting method	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom or side	Bottom or side	Bottom or side	Bottom or side	Bottom or side
Page	P. 91	P. 91	P. 91	P. 91	P. 89 to 90	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 87 to 88	P. 87 to 88

\*The PSB Series also includes a model that has an optional intensity control knob.

\*For the BB Series, you can select between 62.5 kHz (intensity level 256), 125 kHz (intensity level 128), 250 kHz (intensity level 64), or 500 kHz (intensity level 32) for the lighting frequency.

**Direct Number :** A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

# Control Unit



Model	PD3-5024-4-EI	PD3-10024-8-PI	PD3-10024-8-SI	PD3-10024-8-EI	PTU2-3024	BB-V24P30-M	BB-V24P30-S	BB-V24S30-M	BB-V24S30-S	CC-ST-1024	PB-2430
Direct number	2000779	2000781	2000783	2000782	2000541	2000389	2000443	2000390	2000444	2000654	2000018
Output voltage	24 V	24 V	24 V	24 V	48 V	24 V	24 V	48 V	48 V	24 V	L1:12V / L2:24 V
Output power	46 W	95 W	95 W	95 W	27 W	30 W	30 W	30 W	30 W	10 W	30 W
Number of channels	4	8	8	8	2	1	1	1	1	1	2
Lighting method	Constant and strobe lighting	Constant and strobe lighting	Constant and strobe lighting	Constant and strobe lighting	Strobe lighting	Constant and strobe lighting	Constant and strobe lighting	Strobe lighting	Strobe lighting	Constant and strobe lighting	Constant lighting
Light intensity control method	PWM and lighting time control	PWM and lighting time control	PWM and lighting time control	PWM and lighting time control	Lighting time control	PWM and lighting time control	PWM and lighting time control	Lighting time control	Lighting time control	PWM and lighting time control	Variable-voltage control
PWM frequency	125kHz	125kHz	125kHz	125kHz	—	62.5 kHz (Default)	62.5 kHz (Default)	—	—	100 kHz	—
Light intensity control value	256 levels	256 levels	256 levels	256 levels	10% to 100% (10% increments)	256 levels (default value)	256 levels (default value)	—	—	100 levels	Stepless
Input voltage	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	100 to 240 VAC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	—	—	—	—	—	—
Power consumption	70 VA	130 VA	130 VA	130 VA	78 VA	42 W	42 W	16 W (average power consumption), 26 W (peak power consumption)	16 W (average power consumption), 26 W (peak power consumption)	11 W	36 W
External control method	Parallel communications	—	○	—	—	○ (Uses Interface Unit.)	○ (Uses Interface Unit.)	○ (Uses Interface Unit.)	○ (Uses Interface Unit.)	—	—
	EIA-485 communications	—	—	○	—	—	—	—	—	—	—
	Ethernet	○	—	—	○	—	—	—	—	—	—
	Analog input	—	—	—	—	—	—	—	—	—	—
External control functions	External intensity control	○	○	○	○	○	○	○	○	○	○
	ON/OFF lighting	○	○	○	○	—	○	○	○	○	—
	Strobe lighting	○ (Without override)	○ (Without override)	○ (Without override)	○ (Without override)	○ (With override)	○ (Without override)	○ (Without override)	○ (With override)	○ (With override)	○ (Without override)
	Lighting time	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	40 μs/80 μs/120 μs/ 200 μs/600 μs/1 ms/4 ms/ 10 ms/20 ms/40 ms	10 to 990 μs (10-μs increments, can be set via the front-panel switch only)	0.1 to 100 ms (set via the front-panel button only)	0.1 to 100 ms (set via the front-panel button on the Master Unit only)	0.001 to 1 ms	0.001 to 1 ms	50 μs/100 μs/ 250 μs/500 μs/ 1 ms/4 ms/10 ms/40 ms
Lighting delay time	20 μs max.	20 μs max.	20 μs max.	20 μs max.	15 μs max.	3 μs max.	3 μs max.	1 to 1,000 μs	1 to 1,000 μs	3 μs max.	—
CE Marking	○	○	○	○	○	○	○	○	○	— (Not covered by CE.)	○
Weight	1.2 kg	1.5 kg	1.5 kg	1.5 kg	1.2 kg	350 g	350 g	400 g	400 g	80 g	300 g
Cooling method	Forced air cooling	Forced air cooling	Forced air cooling	Forced air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling
Mounting method	Bottom or DIN rail	Bottom or DIN rail	Bottom or DIN rail	Bottom or DIN rail	Bottom	DIN rail	DIN rail	DIN rail	DIN rail	DIN rail	Bottom
Page	P. 79 to 86	P. 79 to 86	P. 79 to 86	P. 79 to 86	P. 92	P. 95 to 96	P. 95 to 96	P. 95 to 96	P. 95 to 96	P. 94	P. 93

Model	PS-3012-D24	PTU2-3012	BB-V12P30-M	BB-V12P30-S	BB-V12S30-M	BB-V12S30-S	PSB-512V	PSB-1012VB	PSB-3012VB	PSB-1012V-WW
Direct number	2000157	2000540	2000394	2000445	2000395	2000446	2000229	2000185	2000206	2000178
Output voltage	18 V	18 V	12 V	12 V	18 V	18 V	12 V	12 V	12 V	12 V
Output power	30 W	27 W	30 W	30 W	30 W	30 W	5 W	10 W	30 W	10 W
Number of channels	1	2	1	1	1	1	1	1	1	1
Lighting method	Strobe lighting	Strobe lighting	Constant and strobe lighting	Constant and strobe lighting	Strobe lighting	Strobe lighting	Constant lighting	Constant lighting	Constant lighting	Constant lighting
Light intensity control method	Lighting time control	Lighting time control	PWM and lighting time control	PWM and lighting time control	Lighting time control	Lighting time control	Variable-voltage control	Variable-voltage control	Variable-voltage control	Variable-voltage control
PWM frequency	—	—	62.5 kHz (Default)	62.5 kHz (Default)	—	—	—	—	—	—
Light intensity control value	—	10% to 100% (10% increments)	256 levels (default value)	256 levels (default value)	—	—	Stepless	Stepless	Stepless	Stepless
Input voltage	24 VDC	100 to 240 VAC	24 VDC	24 VDC	24 VDC	24 VDC	100 to 120 VAC	100 to 120 VAC	100 to 120 VAC	100 to 240 VAC
Frequency	—	50/60 Hz	—	—	—	—	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Power consumption	20 W	78 VA	42 W	42 W	16 W (average power consumption), 72 W (peak power consumption)	16 W (average power consumption), 72 W (peak power consumption)	15 VA	27 VA	78 VA	27 VA
External control method	Parallel communications	—	○ (Uses Interface Unit.)	○ (Uses Interface Unit.)	○ (Uses Interface Unit.)	○ (Uses Interface Unit.)	—	—	—	—
	EIA-485 communications	—	—	—	—	—	—	—	—	—
	Ethernet	—	—	—	—	—	—	—	—	—
	Analog input	—	—	—	—	—	—	—	—	—
External control functions	External intensity control	—	○	○	○	—	—	—	—	—
	ON/OFF lighting	—	—	○	○	—	—	—	—	—
	Strobe lighting	○ (With override)	○ (With override)	○ (Without override)	○ (Without override)	○ (With override)	○ (With override)	—	—	—
	Lighting time	10 μs to 1 ms (Pulse width control by potentiometer)	10 to 990 μs (10-μs increments, can be set via the front-panel switch only)	0.1 to 100 ms (set via the front-panel button only)	0.1 to 100 ms (set via the front-panel button on the Master Unit only)	0.001 to 1 ms	0.001 to 1 ms	—	—	—
Lighting delay time	10 μs max.	15 μs max.	3 μs max.	3 μs max.	1 to 1,000 μs	1 to 1,000 μs	—	—	—	—
CE Marking	○	○	○	○	○	○	— (Not covered by CE.)	— (Not covered by CE.)	— (Not covered by CE.)	○
Weight	650 g	1.2 kg	350 g	350 g	400 g	400 g	420 g	470 g	700 g	470 g
Cooling method	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling	Natural air cooling
Mounting method	DIN rail	Bottom	DIN rail	DIN rail	DIN rail	DIN rail	Bottom	Bottom	Bottom	Bottom
Page	P. 93	P. 92	P. 95 to 96	P. 95 to 96	P. 95 to 96	P. 95 to 96	P. 91	P. 91	P. 91	P. 91

# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

## Digital Control Units

### PD3series

### Select a Control Unit According to the Network System

The PD3-series Digital Control Units provide high performance and a choice of external control methods: parallel, EIA-485, or Ethernet communications. Depending on the outputs to the Lights, you can select from 3-channel 28 W Models, 4-channel 46 W Models, and 8-channel 95 W Models. The light intensity can be set to any of 256 different levels. Lighting control includes constant lighting, ON/OFF lighting, and strobe lighting.



Control Unit Model	Output Power	Channels	Connects to
<b>PD3-3024-3 Control Units</b>	28 W	3 Channels	24-V Lights
PD3-3024-3-PI (Direct number: 2000775)	28 W	3 Channels	24-V Lights
PD3-3024-3-SI (Direct number: 2000777)	28 W	3 Channels	24-V Lights
PD3-3024-3-EI (Direct number: 2000776)	28 W	3 Channels	24-V Lights
<b>PD3-5024-4 Control Units</b>	46 W	4 Channels	24-V Lights, HLV2 Series (Spotlights)
PD3-5024-4-PI (Direct number: 2000778)	46 W	4 Channels	24-V Lights, HLV2 Series (Spotlights)
PD3-5024-4-SI (Direct number: 2000780)	46 W	4 Channels	24-V Lights, HLV2 Series (Spotlights)
PD3-5024-4-EI (Direct number: 2000779)	46 W	4 Channels	24-V Lights, HLV2 Series (Spotlights)
<b>PD3-10024-8 Control Units</b>	95 W	8 Channels	24-V Lights, HLV2 Series (Spotlights)
PD3-10024-8-PI (Direct number: 2000781)	95 W	8 Channels	24-V Lights, HLV2 Series (Spotlights)
PD3-10024-8-SI (Direct number: 2000783)	95 W	8 Channels	24-V Lights, HLV2 Series (Spotlights)
PD3-10024-8-EI (Direct number: 2000782)	95 W	8 Channels	24-V Lights, HLV2 Series (Spotlights)

### PD3-series Basic Performance

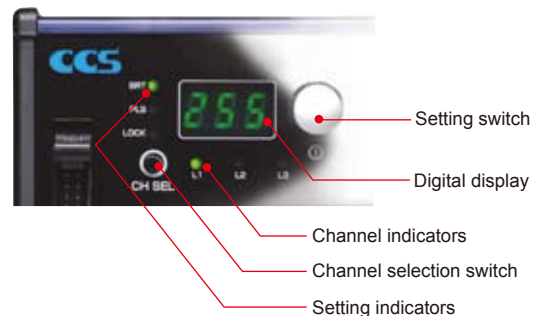
**1** One Control Unit for Constant Lighting, ON/OFF Lighting, and Strobe Lighting \*Strobe lighting is not possible for HLV2-series Spotlights.

Perform PWM control at a frequency of 125 kHz. The light intensity can be adjusted to any of 256 levels. ON/OFF and strobe lighting control is synchronized with an external trigger signal. The lighting time can be set to any of 10 steps.

■ Strobe lighting time: 40 μs, 80 μs, 120 μs, 200 μs, 600 μs, 1 ms, 4 ms, 10 ms, 20 ms, or 40 ms  
\*These Control Units do not include an overdrive function.

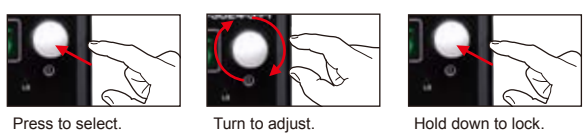
**2** Easy to Use. Digital Display Brings Easy Confirmation on Settings

The easy-to-use user interface emphasizes simple operation. A newly designed digital power supply introduces new features with digital display and digital pushbutton.



### Quick Operation with a Dial Pushbutton

- Intensity setting in 256 levels
- Strobe lighting time setting
- Setting lock



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

# Control Unit



## 3 Selection of Three Types of External Control

The lineup includes models with external control through parallel, EIA-485, or Ethernet communications to suit any network environment.

PD3-series  
External Controls

External Light  
Intensity Control

ON/OFF  
Control

Strobe  
Lighting

\*These Control Units do not include an overdrive.

Parallel communications  
EIA-485 communications  
Ethernet communications



## 4 Selection of Installation Method to Match the Site, with DIN Rail Mounting as a Standard Feature

\*These installation examples show a PD3-3024-3 Control Unit.



● Free-standing Installation



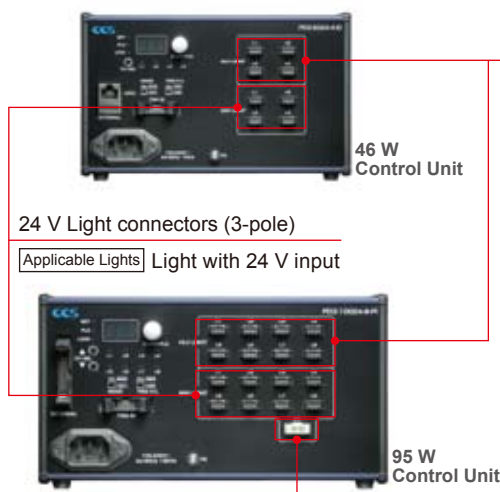
● Bottom-mounted Installation



● Installation on DIN Rail

\*A Base Bracket is required for bottom-mounted installation.

## 5 Connection of Both 24 V Lights and HLV2-series Spotlights to 46 W or 95 W Control Units



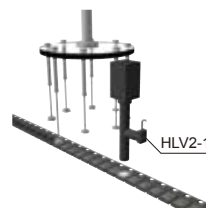
### HLV2-series Spotlight connectors

Applicable Lights

- HLV2-series
- HLV2-22-NR-3W-series
- HLV2-3M-RGB-3W
- HLV-24-series
- HLV-24-3W-series
- HLV-24-NR-series
- HLV-24-NR-3W-series
- HLV-3M-RGB-3W



PD3-10024-8 Control Unit



24-V Light

HLV2-14-series Light

### Connection Examples

- Connect 24 V Lights of many different types.
- Connect HLV2-series Spotlights.
- Connect 24 V Lights and HLV2-series Spotlights at the same time.
- Connect a High-output 24 V Light (95 W Control Unit only).
- Etc.



# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

PD3-series  
External Controls

## Parallel Communications for Quick Changeover of Settings and High-speed Data Transfer.

**PD3-3024-3-PI**

Direct number: 2000775



Capacity: 28 W  
3 Channels  
Connects to 24-V Lights

**PD3-5024-4-PI**

Direct number: 2000778



Capacity: 46 W  
4 Channels  
Connects to 24-V Lights  
Connects to HLV2 Series (Spotlights)

**PD3-10024-8-PI**

Direct number: 2000781



Capacity: 95 W  
8 Channels  
Connects to 24-V Lights  
Connects to HLV2 Series (Spotlights)

**External Light Intensity Control**  
Control the light intensity to 256 levels with parallel communications.

**ON/OFF Control**  
Turn the Lights ON or OFF by inputting an external trigger signal.

**Strobe Lighting**  
\*Possible only for 24-V Lights.  
Turn ON the Lights for the set time after inputting the external trigger signal.

Strobe lighting time: 40  $\mu$ s, 80  $\mu$ s, 120  $\mu$ s, 200  $\mu$ s, 600  $\mu$ s, 1 ms, 4 ms, 10 ms, 20 ms, or 40 ms

\*These Control Units do not include an overdrive.

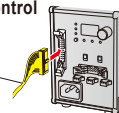
### Examples of Combining External Control Cables

\*External Control Cables are sold as options.

#### External Control with Parallel Communications

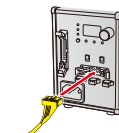
External Light Intensity Control

Parallel Communications Cable (EXCB2-M20-3)



#### External Control with Trigger Input

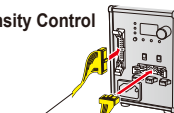
ON/OFF or Strobe Control  
Trigger Input Cable (EXCB2-M10-3)



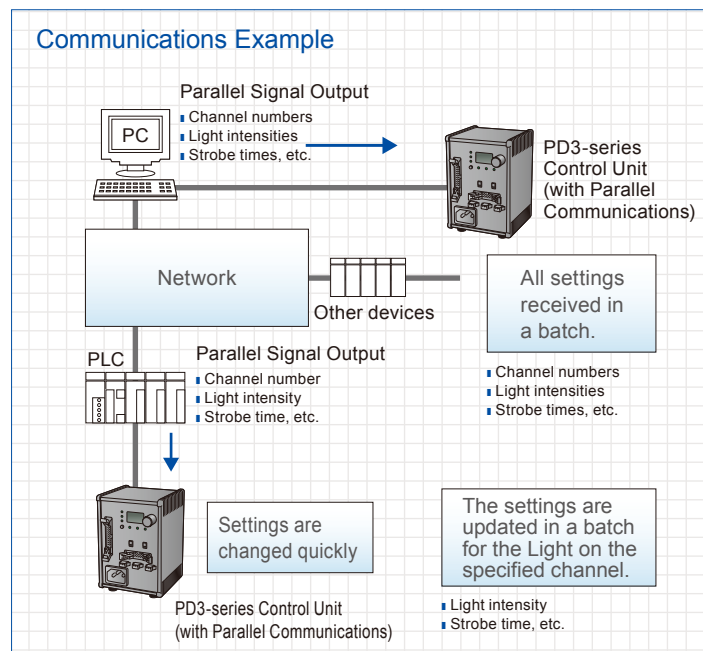
#### External Control with Parallel Communications and Trigger Input

External Light Intensity Control with ON/OFF or Strobe Control

Parallel Communications/Trigger Input Branch Cable (EXCB2-M10-3)



### Communications Example



# Control Unit



**PD3-series  
External Controls**

## EIA-485 Serial Communications for ID Management on Multidrop Wiring. Manage Up to Four Control Units.

**PD3-3024-3-SI**

Direct number: 2000777



Capacity: 28 W  
3 Channels  
Connects to 24-V Lights

**PD3-5024-4-SI**

Direct number: 2000780



Capacity: 46 W  
4 Channels  
Connects to 24-V Lights  
Connects to HLV2 Series (Spotlights)

**PD3-10024-8-SI**

Direct number: 2000783



Capacity: 95 W  
8 Channels  
Connects to 24-V Lights  
Connects to HLV2 Series (Spotlights)

**External Light Intensity Control**  
Control the light intensity to 256 levels with command inputs on EIA-485 communications.

**ON/OFF Control**  
• External trigger signal input  
• Command input via EIA-485 communications  
Turn the Lights ON or OFF with inputs.

**Strobe Lighting**  
\*Possible only for 24-V Lights.  
Turn ON the Lights for the set time after inputting the external trigger signal.

Strobe lighting time: 40  $\mu$ s, 80  $\mu$ s, 120  $\mu$ s, 200  $\mu$ s, 600  $\mu$ s, 1 ms, 4 ms, 10 ms, 20 ms, or 40 ms

\*These Control Units do not include an overdrive.

### Examples of Combining External Control Cables

\*External Control Cables are sold as options.

#### External Control with EIA-485 Communications

External Light Intensity Control  
ON/OFF Control  
Parallel Communications Cable (EXCB2-E3-3)

#### External Control with Trigger Input

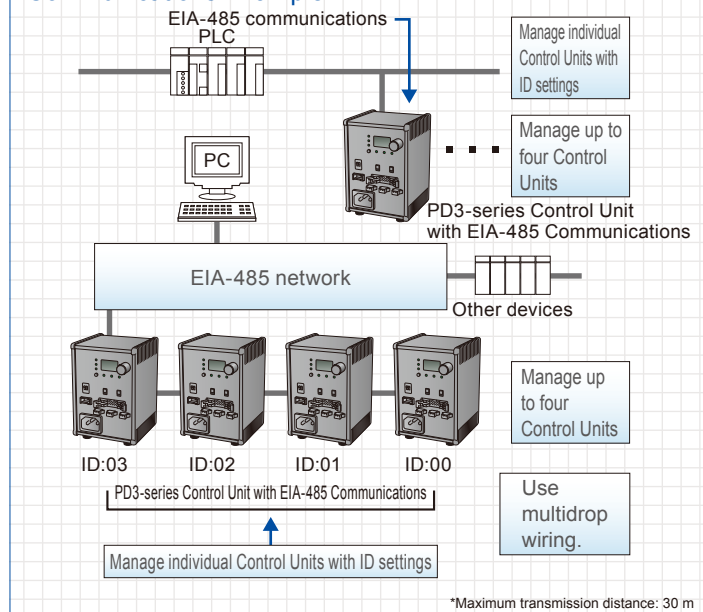
ON/OFF or Strobe Control  
Trigger Input Cable (EXCB2-M10-3)

\* You can also use the EIA-485 Communications Cable and the Trigger Input Cable together.

#### Communications Specifications

Protocol	EIA-485 compliant
Baud rate	19200bps
Data bit length	8 bits
Parity bit	None
Stop bits	1 bit

### Communications Example



\*For multidrop wiring, use the optional EXCB2-E3-E3-0.2 EIA-485 Communications Relay Cable.

# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

PD3-series  
External Controls

## Ethernet Communications with Standard TCP/IP and UDP/IP Protocols. The User-friendly Solution.

### PD3-3024-3-EI

Direct number: 2000776



Output: 28 W  
3 Channels  
Connects to 24-V Lights

### PD3-5024-4-EI

Direct number: 2000779



Output: 46 W  
4 Channels  
Connects to 24-V Lights  
Connects to HLV2 Series (Spotlights)

### PD3-10024-8-EI

Direct number: 2000782



Output: 95 W  
8 Channels  
Connects to 24-V Lights  
Connects to HLV2 Series (Spotlights)

**External Light Intensity Control**  
Control the light intensity in 256 levels with command inputs through Ethernet communications.

**ON/OFF Control**  
• External trigger signal input  
• Command input via Ethernet communications  
ON/OFF light control with input signal.

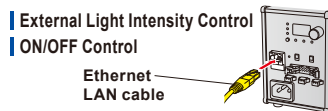
**Strobe Lighting**  
\*Applicable only for 24 V Lights.  
Turn ON the Lights for the set time after inputting the external trigger signal.

Strobe lighting time: 40  $\mu$ s, 80  $\mu$ s, 120  $\mu$ s, 200  $\mu$ s, 600  $\mu$ s, 1 ms, 4 ms, 10 ms, 20 ms, or 40 ms

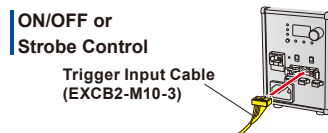
\*These Control Units do not include an overdrive function.

### Examples of Wiring External Control Cables

#### External Control via Ethernet Communications



#### External Control with Trigger Input

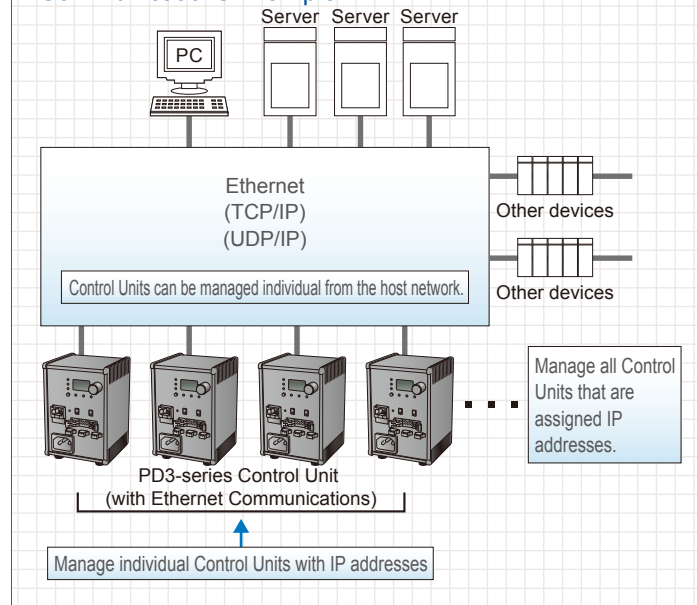


\* The LAN cable and the Trigger Input Cable can be used together.

#### Communications Specifications

Communications protocol	TCP/IP UDP/IP
Standards	IEEE802.3, IEEE802.3u, IEEE802.3x
Baud rate	10 Mbps/100 Mbps (Automatically detected.)
Transmission medium	10BASE-T, 100BASE-TX

### Communications Example



# Control Unit



## ● PD3-3024-3 Common Specifications

Lighting method	Constant lighting/strobe lighting
Drive method	Constant-voltage system
Light intensity control method	PWM control and lighting time control
Number of channels	3 channels
Applicable Lights (rated)	24-VDC input, Total for all channels: 28 W
PWM frequency	125 kHz
Error detection display	Front-panel digital OCP display
Overcurrent protection*	Operates at 107% of rated output current or higher. Reset by pressing operation setting switch for at least 1 second or by cycling the power supply.
Input voltage (rated)	100 to 240 VAC
Power consumption (typ.)	78 VA
Frequency	50/60 Hz
Output voltage (rated)	24 VDC
Output current (rated)	Total for 3 channels: 1.1 A
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85% RH (with no condensation)
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85% RH (with no condensation)
Cooling method	Natural air cooling
CE Marking	Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN 61326, Class A.
Material and surface processing	Materials: Aluminum and resin, Surface processing: Blue alumite
Weight	600 g max.
Accessories	2-m long power cord with 3-prong connector (with ground terminal)

\*Do not intentionally short-circuit the positive and negative output terminals.

## ● PD3-5024-4 Common Specifications

Lighting method	Constant lighting/strobe lighting
Drive method	24V LIGHT connectors: Constant-voltage system, HLV LIGHT connectors: Constant-current system
Light intensity control method	24V LIGHT connectors: PWM control and lighting time control, HLV LIGHT connectors: Variable-current control
Number of channels	4 channels
Applicable Lights (rated)	24V LIGHT connectors: Lights with 24-VDC input, HLV LIGHT connectors: HLV2/HLV-series Spotlights, Total for 4 channels: 46 W
PWM frequency	125 kHz
Error detection display	Front-panel digital OCP display; Overcurrent error, EFN display: Fan Stop Error, and EID display: ID error (HLV2/HLV-series Spotlights only)
Overcurrent protection	Operates at 107% of rated output current or higher. Reset by pressing operation setting switch for at least 1 second or by cycling the power supply. <span style="float: right;">*Do not intentionally short-circuit the positive and negative output terminals.</span>
Input voltage (rated)	100 to 240 VAC
Power consumption (typ.)	70 VA
Frequency	50/60 Hz
Output voltage (rated)	24 VDC
Output current (rated)	Total for 4 channels: 1.91 A
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85% RH (with no condensation)
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85% RH (with no condensation)
Cooling method	Forced air cooling
CE Marking	Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN 61326, Class A.
Material and surface processing	Materials: Aluminum and resin, Surface processing: Blue alumite
Weight	1,200 g max.
Accessories	2-m long power cord with 3-prong connector (with ground terminal)

\*HLV LIGHT: Strobe lighting is not possible for HLV2-series Spotlights. The HLV-14-R/-SW/-BL/GR and HLV-27-series Spotlights cannot be connected.

\*Strobe lighting is possible only with 24-V Lights. (These Control Units do not include an overdrive function.)

## ● PD3-10024-8 Common Specifications

Lighting method	Constant lighting/strobe lighting
Drive method	24V LIGHT connectors: Constant-voltage system, HLV LIGHT connectors: Constant-current system
Light intensity control method	24V LIGHT connectors: PWM control and lighting time control, HLV LIGHT connectors: Variable-current control
Number of channels	8 channels
Applicable Lights (rated)	24V LIGHT connectors: Lights with 24-VDC input, HLV LIGHT connectors: HLV2/HLV-series Spotlights, Total for 8 channels: 95 W (High-output Light connector: 95 W (1 connector))
PWM frequency	125 kHz
Error detection display	Front-panel digital OCP display; Overcurrent error, EFN display: Fan Stop Error, and EID display: ID error (HLV2/HLV-series Spotlights only)
Overcurrent protection	Operates at 107% of rated output current or higher. Reset by pressing operation setting switch for at least 1 second or by cycling the power supply. <span style="float: right;">*Do not intentionally short-circuit the positive and negative output terminals.</span>
Input voltage (rated)	100 to 240 VAC
Power consumption (typ.)	130 VA
Frequency	50/60 Hz
Output voltage (rated)	24 VDC
Output current (rated)	Total for 8 channels: 3.95 A
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85% RH (with no condensation)
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85% RH (with no condensation)
Cooling method	Forced air cooling
CE Marking	Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN 61326, Class A.
Material and surface processing	Materials: Aluminum and resin, Surface processing: Blue alumite
Weight	1,500 g max.
Accessories	2-m long power cord with 3-prong connector (with ground terminal)

\*HLV LIGHT: Strobe lighting is not possible for HLV2-series Spotlights. The HLV-14-R/-SW/-BL/GR and HLV-27-series Spotlights cannot be connected.

\*Strobe lighting is possible only with 24-V Lights. (These Control Units do not include an overdrive function.)

## ● Specifications of Control Unit with Parallel Communications

Light intensity setting	Manual	Set to any of 256 levels on front-panel setting switch.
	External	8-bit input (B0 to B7), write pulse (BRTWR), and channel selection (CHSEL0 to CHSEL2)
ON/OFF setting	External trigger input	
Lighting mode setting	Manual	Set to any of 11 levels on front-panel setting switch.
	External	4-bit input (M0 to M3), write pulse (TRGWR), and channel selection (CHSEL0 to CHSEL2)
Error detection output	NPN transistor output between pins 19 (OC) and 20 (OE) of external control connector Normal: Open, Overcurrent output detected: Closed	
External control connector	Trigger input	MIL connector, 10 pins
	Lighting intensity/lighting mode setting	MIL connector, 20 pins

## ● Specifications of Control Unit with EIA-485 Communications

Light intensity setting	Manual	Set to any of 256 levels on front-panel setting switch.
	External	Command input via EIA-485 communications
ON/OFF setting	External trigger input or command input via EIA-485 communications	
Lighting mode setting	Manual	Set to any of 11 levels on front-panel setting switch.
	External	Command input via EIA-485 communications
Error detection output	Command sent when overcurrent output is detected.	
External control connector	Trigger input	MIL connector, 10 pins
	Lighting intensity/lighting mode setting	e-CON connector, 3 pins

## ● Specifications of Control Unit with Ethernet Communications

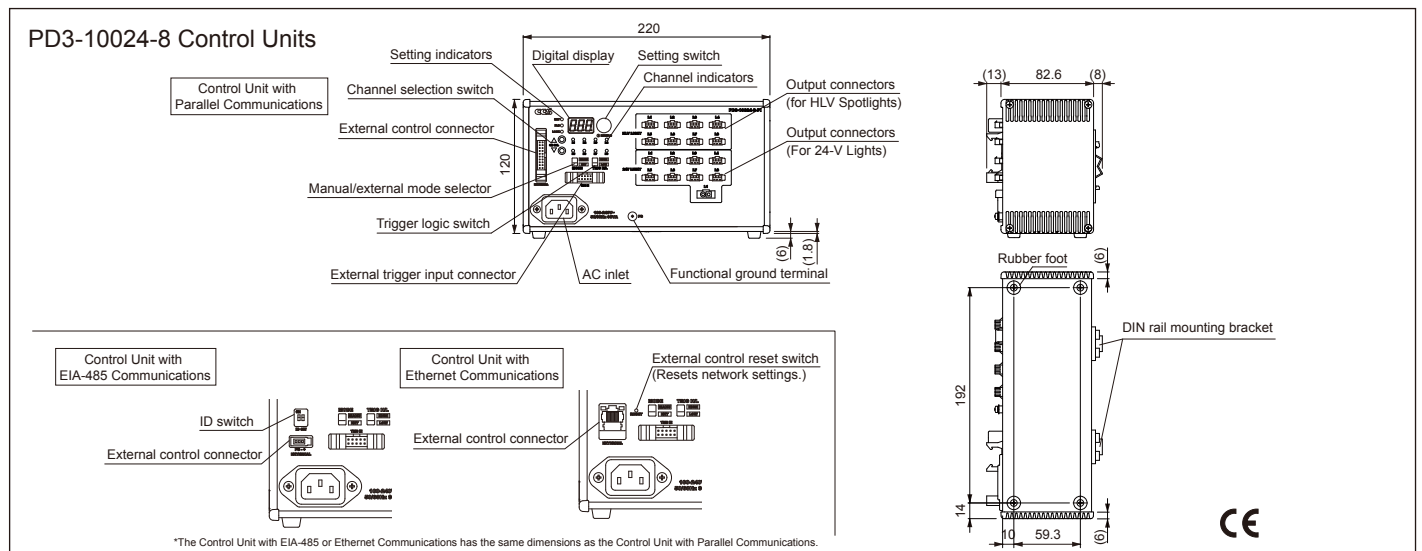
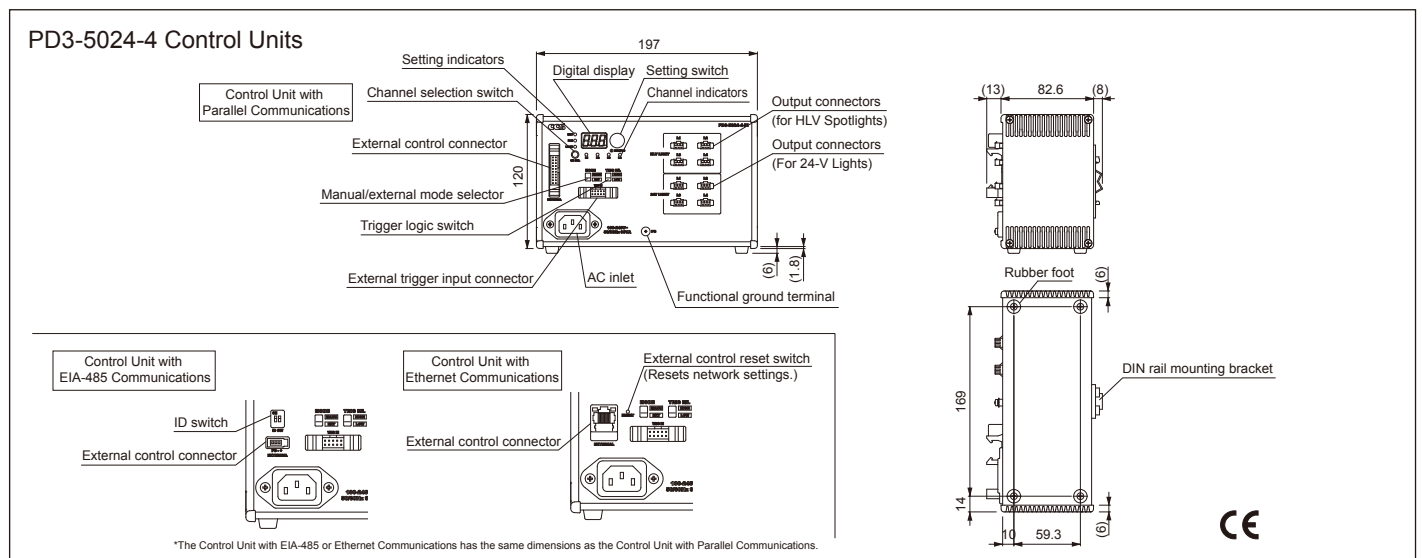
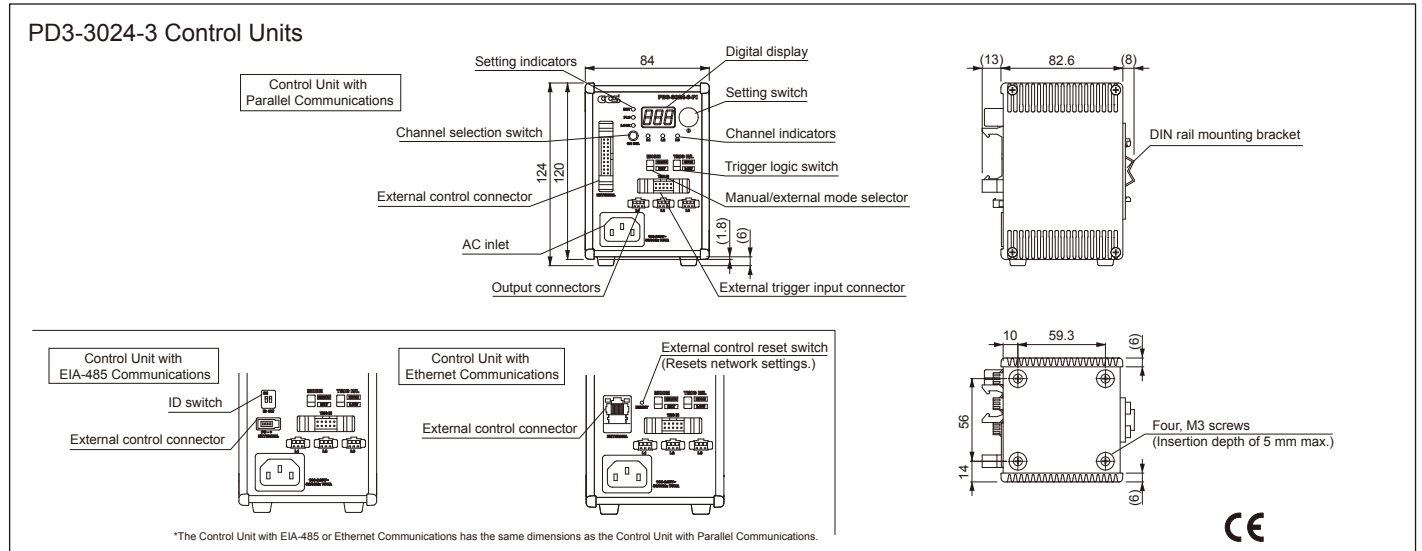
Light intensity setting	Manual	Set to any of 256 levels on front-panel setting switch.
	External	Command input via TCP/IP or UDP/IP communications
ON/OFF setting	External trigger input or command input via TCP/IP or UDP/IP communications	
Lighting mode setting	Manual	Set to any of 11 levels on front-panel setting switch.
	External	Command input via TCP/IP or UDP/IP communications
Error detection output	Command sent when overcurrent output is detected.	
External control connector	Trigger input	MIL connector, 10 pins
	Lighting intensity/lighting mode setting	RJ-45 connector



# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

## Dimension Diagrams (Unit: mm)



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

# Control Unit



## Options for PD3 Series

### External Control Cables

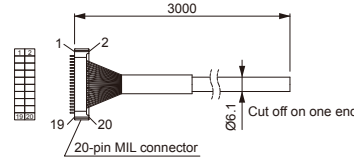
#### Parallel Communications Cable

This Cable is used for external control with parallel communications. The channel, light intensity setting, and lighting mode constant mode, ON/OFF mode, or strobe mode) can be selected.



### Dimension Diagrams (Unit: mm)

EXCB2-M20-3 Direct number: 3000683



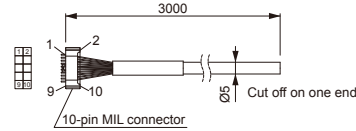
PIN No.	Wire color	Marks	PIN No.	Wire color	Marks
1	Orange	Red 1	11	Orange	Black 2
2	Orange	Red 2	12	Orange	Red 2
3	Gray	Black 1	13	Gray	Black 2
4	Gray	Red 1	14	Gray	Red 2
5	White	Black 1	15	White	Black 2
6	White	Red 1	16	White	Red 2
7	Yellow	Black 1	17	Yellow	Black 2
8	Yellow	Red 1	18	Yellow	Red 2
9	Pink	Black 1	19	Pink	Black 2
10	Pink	Red 1	20	Pink	Red 2

#### Trigger Input Cable

This cable is used to input an external trigger signal using parallel bits. The external trigger signal can be used to turn Lights ON or OFF, or to flash the strobes.



EXCB2-M10-3 Direct number: 3000682



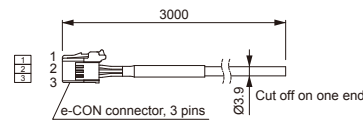
PIN No.	Wire color	Marks
1	Orange	Black 1
2	Orange	Red 1
3	Gray	Black 1
4	Gray	Red 1
5	White	Black 1
6	White	Red 1
7	Yellow	Black 1
8	Yellow	Red 1
9	Pink	Black 1
10	Pink	Red 1

#### EIA-485 Serial Communications Cable

This Cable is used for external control with EIA-485 communications. The channel, light intensity setting, ON/OFF setting, and lighting mode (constant mode, ON/OFF mode, or strobe mode) can be selected.



EXCB2-E3-3 Direct number: 3000685



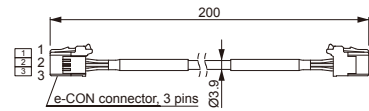
PIN No.	Wire color	Embedded line color
1	Black	None
2	Black	White
3 (shield)	Drain wire	None

#### EIA-485 Serial Communications Relay Cable

This Cable is required to connect two or more PD3-series Control Units with EIA-485 communications.



EXCB2-E3-3-0.2 Direct number: 3000721



Relay connector  
Direct number: 3000720  
Model name: ECNR-E3CN4

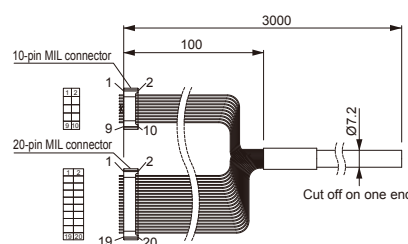
e-CON relay connector,  
3-pin, 4x4

#### Parallel Communications/Trigger Input Branch Cable

This Cable includes the Parallel Communications Cable and the Trigger Input Cable in one cable.



EXCB2-M10M20-3 Direct number: 3000684



20-pin MIL connector	PIN No.	Wire color	Marks
1	Orange	Black 2	
2	Orange	Red 2	
3	Gray	Black 2	
4	Gray	Red 2	
5	White	Black 2	
6	White	Red 2	
7	Yellow	Black 2	
8	Yellow	Red 2	
9	Pink	Black 2	
10	Pink	Red 2	

10-pin MIL connector	PIN No.	Wire color	Marks
1	Orange	Black 1	
2	Orange	Red 1	
3	Gray	Black 1	
4	Gray	Red 1	
5	White	Black 1	
6	White	Red 1	
7	Yellow	Black 1	
8	Yellow	Red 1	
9	Pink	Black 1	
10	Pink	Red 1	

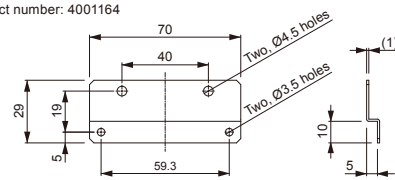
### Base Brackets

These Brackets are used to secure a PD3-series Control Unit to the floor, a shelf, or other surface.

\* The Base Brackets are included with the PD3-5024-4 and PD3-10024-8 Control Units.



BK-PD3 Direct number: 4001164



\*One set (two Brackets)

# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

## Digital Control Units

### PD2 Series

CE	Models with CE Marking:
	PD2-3012 / PD2-3024 / PD2-5012 / PD2-5024 / PD2-3012-2 / PD2-3024-2 / PD2-3012-4 / PD2-3024-4 / PD2-3012-8 / PD2-3024-8

Offers repeatable, linear light intensity control with 256 discrete levels using course and fine adjustments

The PD2 Series of digital power supplies are designed specifically for use with CCS LED lights. Compared with analog power supplies, the PD2 Series provides a more linear and repeatable intensity control because of the force-detent adjustment course/fine adjustment knobs and benefits of pulse duty control. The PD2 Series is suitable for all CCS lights without dedicated power supplies. The Series is designed to meet the requirements of the widest variety of applications with the 12 and 24V options, power ratings range, and the number of independent output channels.



### Selecting a PD2 Series control unit

- (1) Select a 12-V or 24-V output models according to the voltage of a LED lights used.
- (2) Select from the 10-watt or 30-watt models according to the total of power consumption of LED lights to be used.
- (3) Select from 2-channel, 4-channel, or 8-channel models to according to the number of independent outputs needed (multiple lights can be connected to a single output channel with a 2 or 4 way split cables).
- (4) Select one of the optional external control cables. (Refer to information on page 88)

### Specifications

Model	PD2-1012	PD2-1024	PD2-3012	PD2-3024	PD2-5012	PD2-5024	PD2-3012-2	PD2-3024-2	PD2-3012-4	PD2-3024-4	PD2-3012-8	PD2-3024-8
Direct Number	2000519	2000520	2000521	2000522	2000536	2000537	2000523	2000524	2000525	2000526	2000527	2000528
Input voltage 1)	100 to 120V AC						100 to 240V AC					
Input current 2)	0.25A typ.		0.78A typ.		1.3A typ.		0.78A typ.					
Frequency	50 / 60Hz											
Inrush current 2)	15A typ.											
Number of channels	1	1	1	1	1	1	2	2	4	4	8	8
DC output voltage	12V	24V	12V	24V	12V	24V	12V	24V	12V	24V	12V	24V
Output power	9.5W max.	9.0W max.	28W max.	28W max.	46W max.	46W max.	28W max.	28W max.	27W max.	27W max.	25W max.	25W max.
Intensity control	Control method : 60kHz (approx.) pulse duty control Manual : 256-level of intensity control using dual 16 position Coarse and Fine rotary knob on the control panel External control : Intensity control using 8-bit parallel signal											
External control input	Input circuit : At + 5.0V with 4.7k Pull-up resistor.						Input circuit : At + 5.0V with 1.5k Pull-up resistor.					
External control connector	D-Sub 15-pin (plug)						D-Sub 25-pin (plug)					
ON/OFF control	Manual : Ø3.5-mm microphone jack External control : D-Sub 15-pin ON signal (Asynchronous with write sequence)						Manual : D-Sub 25-pin OFF signal External control (Asynchronous with write sequence)					
ON/OFF response	OFF - ON: 10µs typ., ON - OFF: 10µs typ.											
Startup time	0.5sec typ.											
Output overcurrent protection	Activated by 107% minimum of the rated output current and reset by turning the power supply ON with front panel power switch.											
Operating environment	Temperature 0 to 40°C, humidity 20 to 85%RH (with no condensation)											
Storage environment	Temperature -20 to 60°C, humidity 20 to 85%RH (with no condensation)											
Weight	0.7kg or less		1.1kg or less		1.3kg or less		1.1kg or less		1.2kg or less		1.5kg or less	

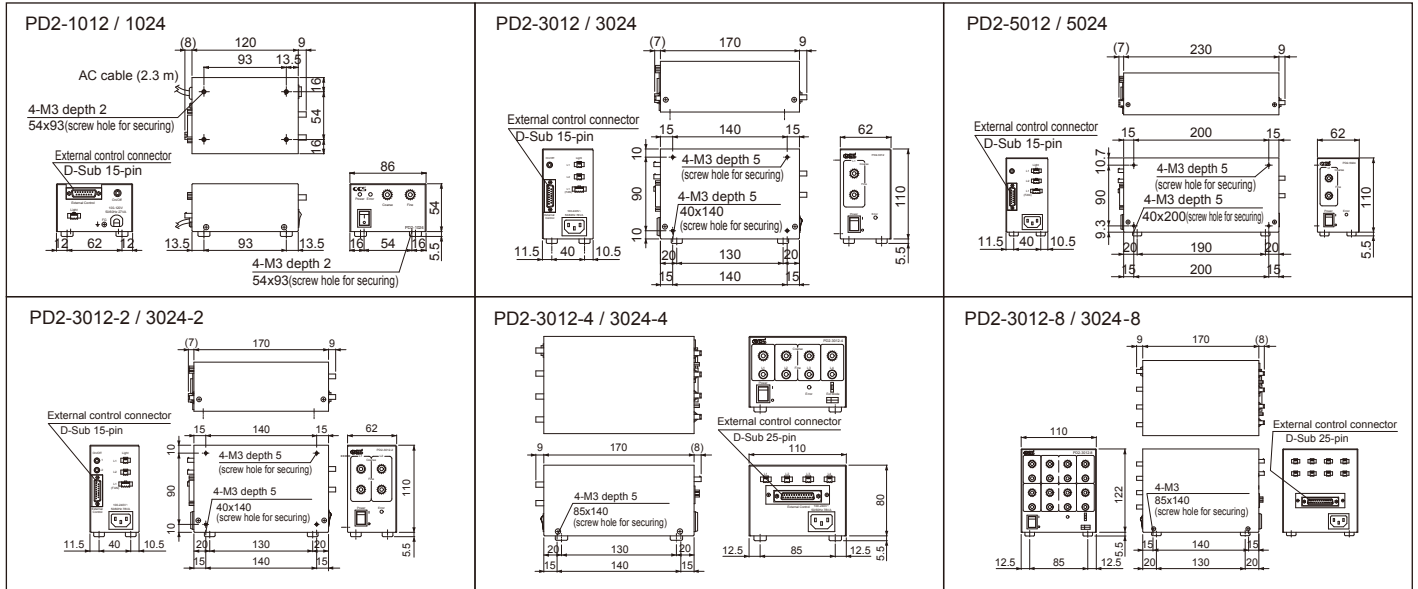
1) Operating voltage: 85 to 132VAC or 85 to 264VAC. 2) At a voltage of 100VAC

**Direct Number :** A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

# Control Unit



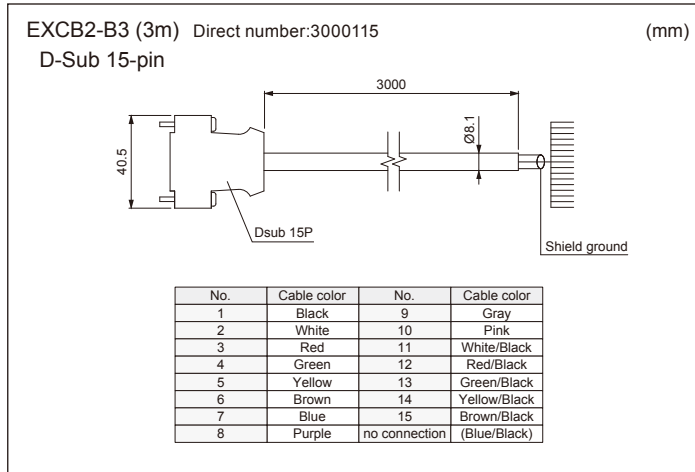
## Dimension Diagrams (Unit: mm)



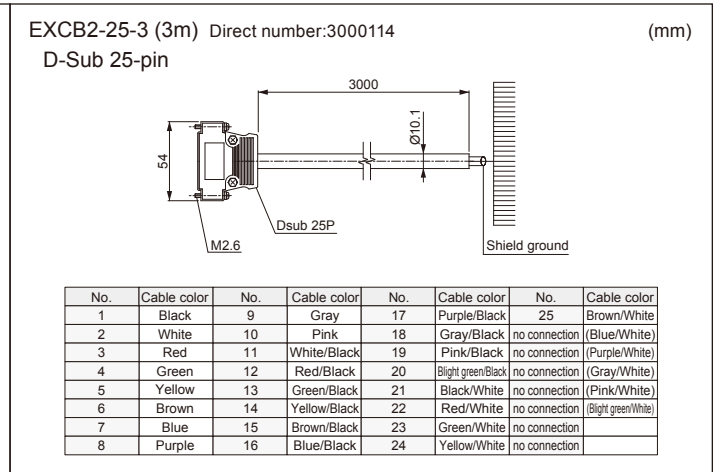
## Options for PD2 Series

### External control cable for Intensity AND On/Off

For PD2(1-channel or 2-channel type) series

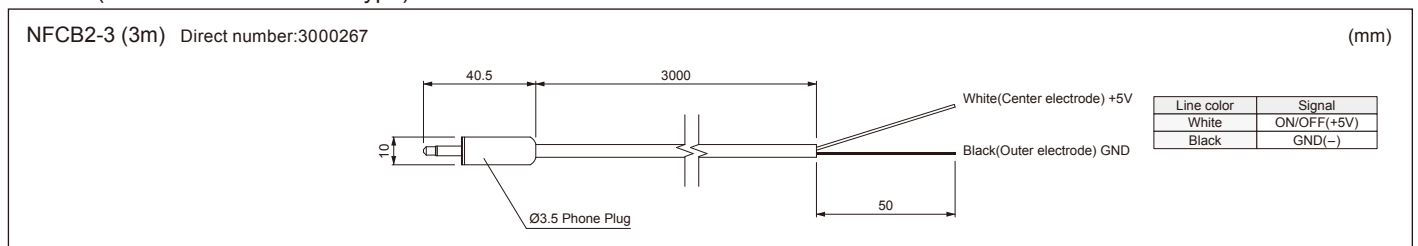


For PD2(4-channel or 8-channel type) series / PTU2 series



### External control cable for ON/OFF ONLY

For PD2(1-channel or 2-channel type) series





# Control Units for CCS LED Lights

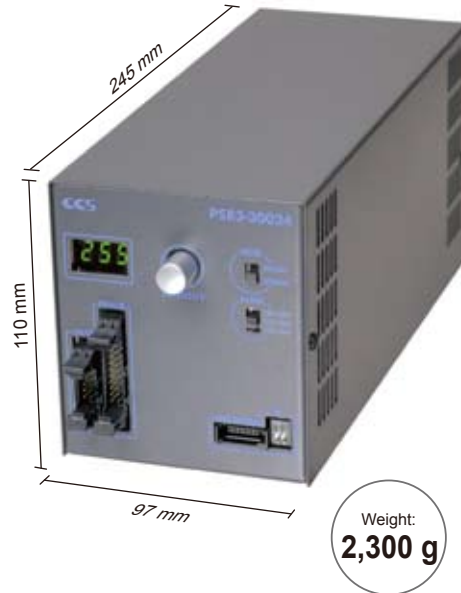
Please select a best-suited control unit according to your intended use and objective.

## Analog Control Units

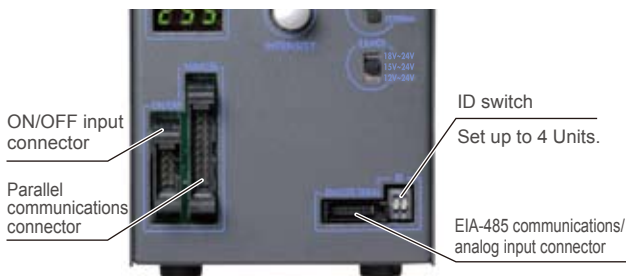
### PSB3-30024

#### Analog Control Units with High Capacity of 300 W

The PSB3-30024 is a high-capacity (300 W) Analog Control Unit. Light Unit output is provided for one channel/four connectors (two metal connectors and two EL connectors). Light intensity can be set to any of 256 levels, even though the PSB3-30024 is an Analog Control Unit. Equipped for parallel, serial, or analog control all in a single Unit. Setting the light intensity has been optimized via the intensity range switch to select the optimal output for your Light Units.



#### Parallel, Serial, and Analog Control in a Single Unit



Control mode	Description	
Parallel communications	Light intensity control	Control the intensity to 256 levels via parallel signal inputs.
EIA-485 communications(serial)	Light intensity control	Command input for 256 levels of intensity via EIA-485 communications.
	ON/OFF control	Command input via EIA-485 communications
Analog input	Light intensity control	Control the intensity to 256 levels via an analog voltage (0 to 5 V).

#### ON/OFF input connector

ON/OFF control is possible in combination with parallel, serial, or analog control.

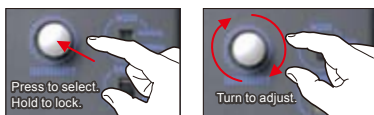
ON/OFF control	ON/OFF control via OFF signal input (parallel bit method).
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#### Supports the reproducibility of intensity values through a digital display.

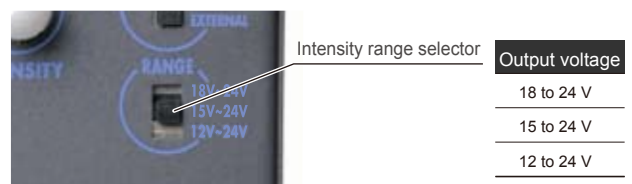


Quick operation through a pushbutton dial

- Intensity setting to any of 256 levels
- Turn ON the power supply while pressing the button for external control mode.
- Push and hold for two seconds to lock the intensity value.

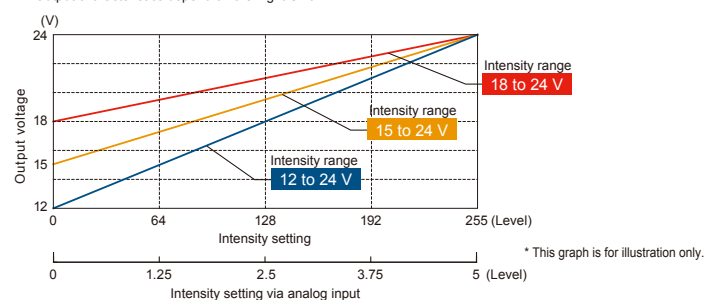


#### Optimal Intensity Settings through Minimum Intensity Value Switching



Select the intensity range that best suits the Light Unit.

\* Output characteristics depend on the Light Unit.



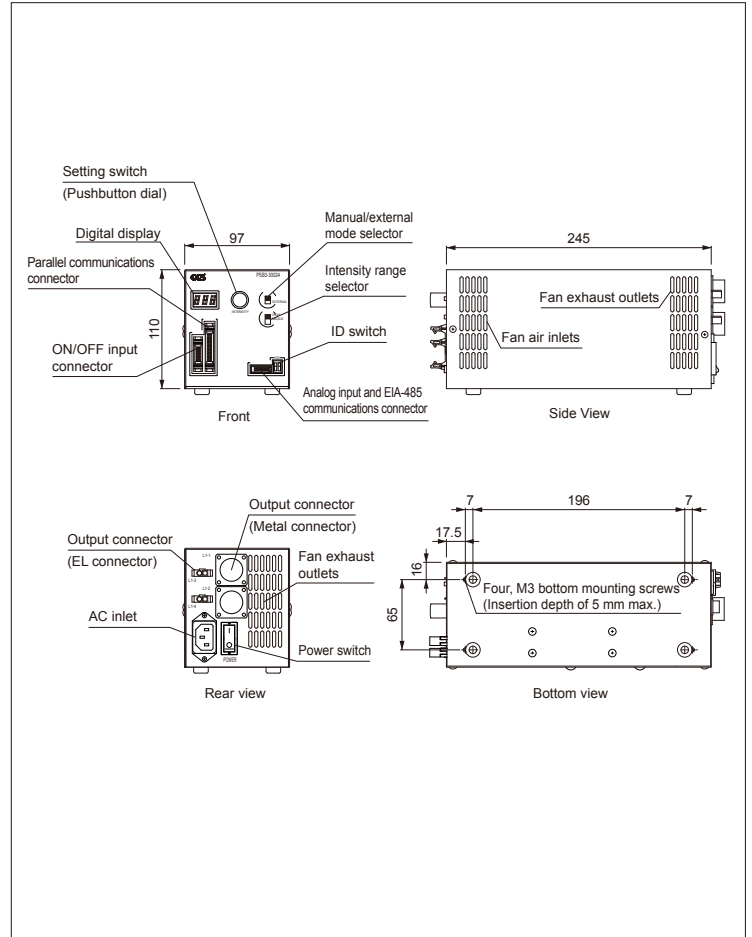
# Control Unit



## Common Specifications

Model	PSB3-30024	
Direct number	2000762	
Lighting method	Constant lighting	
Drive method	Constant-voltage system	
Light intensity control method	Variable-voltage control	
Number of channels	1 channel	
Applicable Light Unit rating	24 V 300 W	
Light intensity control	Manual and external intensity control	Front manual/external switch (MODE)
	Variable output voltage range	Select between 3 ranges via the front intensity range selector (RANGE).
	Manual	Set any of 256 levels via the setting switch. Press and hold the switch for 2 seconds to lock the intensity value.
	Parallel communications	8-bit intensity value setting (B0 to B7) and write signal (WR)
	External	Serial communications Command input via EIA-485 communications
	Analog input	Analog voltage (0 to 5 V)
	External control mode can be selected by pushing the setting switch while turning ON the power to the Control Unit.	
Lighting control	Parallel bit input	Lighting signal (OFF)
	Serial communications	Command input via EIA-485 communications
EIA-485 communications settings	ID	Set via the front ID switch (00 to 03). Maximum of 4 connected Units.
	Terminating resistance	Set via the front ID switch (terminating resistance is ON only when the ID is 00).
Lighting delay (typ.)	0.1 s	
Error detection display	"Err" displayed on front-panel digital display	
Error detection output	Error is output and light output is stopped for internal AC/DC error.	
	External control connector	Error output terminal (0C, 0E), photocoupler insulation, open-collector output, alarm open (load current of less than 10 mA), and error status (serial communications)
Overcurrent protection	Operation is restored automatically at 105% of the rated current.	
Overvoltage protection	Operation is restored when the power is turned ON again at 120% to 155% of the rated current.	
Rated input voltage	100-240 VAC	
Power consumption (typ.)	410 VA	
Frequency	50/60 Hz	
Inrush current (typ.)	20 A/40 A (primary/secondary value at 100 VAC), 40 A/40 A (primary/secondary value at 240 VAC) * From a cold start	
Ground leakage current	3.5 mA max. (264 V AC, 60 Hz, with no load)	
Output voltage variation range (typ.)	Select between 3 ranges via the front intensity range selector.	
	12 to 24 V	*With no load.
	15 to 24 V	*With no load.
	18 to 24 V	*With no load.
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85%RH (with no condensation)	
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85%RH (with no condensation)	
Vibration resistance	Acceleration: 19.6 m/s <sup>2</sup> , frequency: 10 to 55 Hz, cycles: 3 minutes, sweep cycle: for 1 hour each in X, Y, and Z directions	
Cooling method	Forced air cooling	
CE Marking	Conforms to safety standard EN 61010-1.	Conforms to EMC standard EN 61326-1, Class A.
Environmental regulations	RoHS compliant	
Material, coating and surface processing	Steel plate, thickness of cover: 1.0, thickness of chassis: 1.6, N3 leather tone finish	
Weight	2,300 g max.	
Accessories	2-meter long 3-prong power cord with ground terminal (1)	

## Dimension Diagrams (Unit: mm)



## Options

### External Control Cables

These cables are used for parallel communications, EIA-485 communications, and the analog input. Select the right cable for the required control method. (Unit: mm)

<p>■ Parallel Communications Cable EXCB2-M20-3 Direct number: 3000683</p>	<p>■ ON/OFF Input Cable EXCB2-M10-3 Direct number: 3000682</p>	<p>■ Parallel Communications and ON/OFF Input Branch Cable EXCB2-M10M20-3 Direct number: 3000684</p>	<p>■ Analog Input Cable EXCB2-E6AN-3 Direct number: 3000687</p>
<p>■ EIA-485 Communications Cable EXCB2-E6SR-3 Direct number: 3000686</p>	<p>■ EIA-485 Communications Relay Cable EXCB2-E6SR-E3-3 Direct number: 3000717 This cable is used to connect two or more Control Units together. (Unit to relay connector)</p> <p>EXCB2-E3-E3-0.2 Direct number: 3000721 (Relay connector to Relay connector)</p> <p>ECNR-E3CN4 Direct number: 3000720 e-CON relay connector 3 pins, 4x4</p>	<p>■ EIA-485 Communications Relay Cable EXCB2-E3-3 Direct number: 3000685 This cable is used to connect to an external device when connecting two or more Control Units together.</p>	

# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

## Analog Control Units

### PSB Series

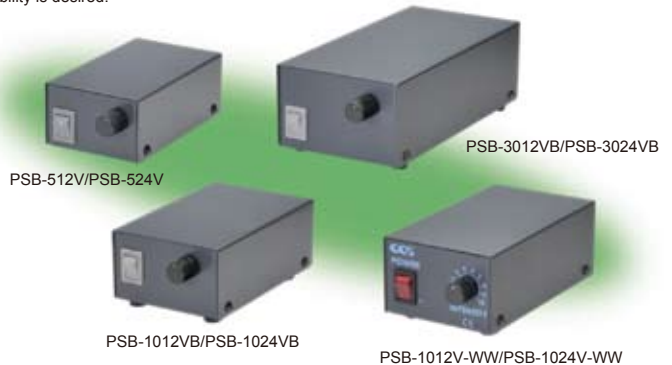
#### CCS Standard Analog Control Units

\*Use the PD2 Series of Digital Control Units if detailed control settings, control accuracy, or reproducibility is desired.

The PSB Series is an analog control unit series providing stepless intensity control through variable voltage control. It is ideal for continuous use with cameras having a shutter speed of 1/4,000 or faster. Worldwide type also available.

\* Models with lock of dimming control knob are available as option.

Models: PSB-512VL / PSB-524VL / PSB-1012VBL / PSB-1024VBL / PSB-3012VBL / PSB-3024VBL



<b>CE</b>	Models with CE Marking
	PSB-1012V-WW / PSB-1024V-WW

### Specifications

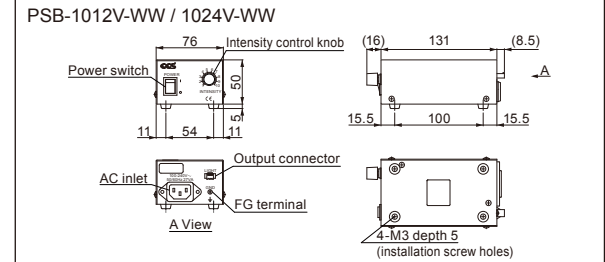
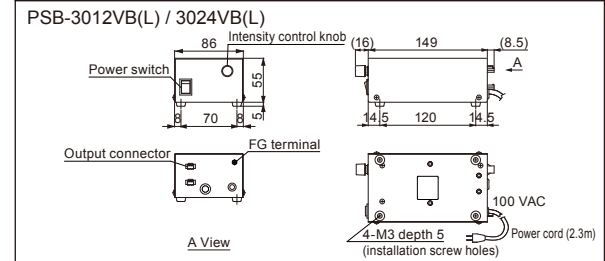
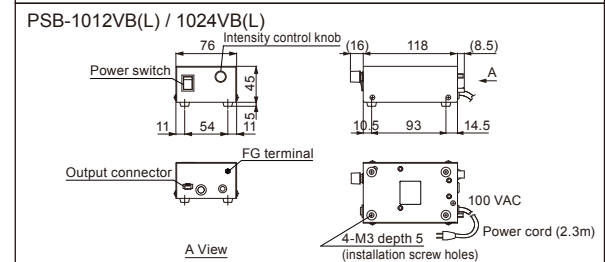
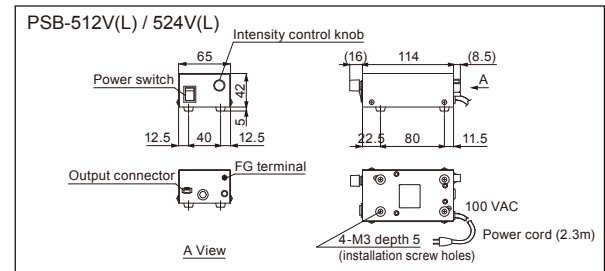
Model	PSB-512V	PSB-512VL	PSB-524V	PSB-524VL
Direct Number	2000229	2000231	2000233	2000236
Lighting method	Constant lighting			
Drive method	Constant-voltage system			
Light control method	Variable voltage control			
Number of channels	1 channel			
Applicable illuminators (rating)	12V / 5W		24V / 5W	
Input voltage (rating)	100 to 120V AC			
Power consumption (typ.)	15VA			
Weight (typ.)	420g			

Model	PSB-1012VB	PSB-1012VBL	PSB-1024VB	PSB-1024VBL
Direct Number	2000185	2000187	2000194	2000197
Lighting method	Constant lighting			
Drive method	Constant-voltage system			
Light control method	Variable voltage control			
Number of channels	1 channel			
Applicable illuminators (rating)	12V / 10W		24V / 10W	
Input voltage (rating)	100 to 120V AC			
Power consumption (typ.)	27VA			
Weight (typ.)	470g			

Model	PSB-3012VB	PSB-3012VBL	PSB-3024VB	PSB-3024VBL
Direct Number	2000206	2000209	2000215	2000219
Lighting method	Constant lighting			
Drive method	Constant-voltage system			
Light control method	Variable voltage control			
Number of channels	1 channel			
Applicable illuminators (rating)	12V / 30W		24V / 30W	
Input voltage (rating)	100 to 120V AC			
Power consumption (typ.)	78VA			
Weight (typ.)	700g			

Model	PSB-1012V-WW	PSB-1024V-WW
Direct Number	2000178	2000191
Lighting method	Constant lighting	
Drive method	Constant-voltage system	
Light control method	Variable voltage control	
Number of channels	1 channel	
Applicable illuminators (rating)	12V / 10W	24V / 10W
Input voltage (rating)	100 to 240V AC	
Power consumption (typ.)	27VA	
Weight (typ.)	470g	

### Dimension Diagrams (Unit: mm)



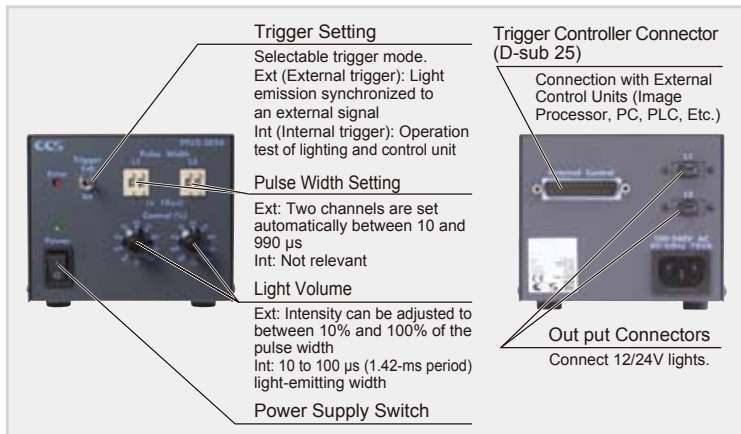
## Strobe Control Units

### PTU2-3012/PTU2-3024

#### Compatible with more than CCS LED lights

The PTU2 control unit Series enables CCS standard lights to be used with strobes. It enables the lights to emit several times brighter than using the On/Off control function of the conventional PSB and PD2 Series, or by strobe lighting using STU-3000. The units have two independent circuits with separate controls for each circuit. The strobe illumination time can be set from 10  $\mu$ s to 990  $\mu$ s using rotary controls.

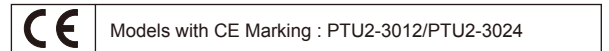
#### Part Names and Functions



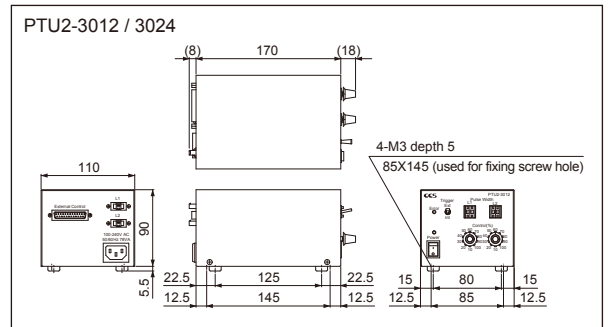
\*The PTU2 Series produces strobing with overdrive. Overdrive boosts the voltage and current supplied to the Light to produce a higher output.

#### Specifications

Model	PTU2-3012	PTU2-3024
Direct Number	2000540	2000541
Output	2 circuits max, 27W	
Illumination Mode	(Strobe) Internal Trigger/External Trigger	
Trigger Input	Photocoupler Input (5 mA), with Insulated Power Supply	
Power Supply	100 to 240V AC 78VA	
Output Connector	SMP-02V X 2 (12V) / SMP-03V X 2 (24V)	
Trigger Input Connector	D-sub 25pin, male	
Strobe illumination Width	10 $\mu$ s to 990 $\mu$ s, set with 2-digit thumb-rotary switch	
Trigger Cycle	Int: 1msec, Ext: 1msec or more at 10% duty or less	
Option	External Trigger Cable: EXCB2-25-3 (3m) Refer to page 88.	

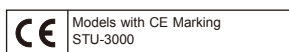


#### Dimension Diagrams (Unit: mm)



## Strobe Unit

### STU-3000



Achievement of strobe function in combination with CCS's digital control unit



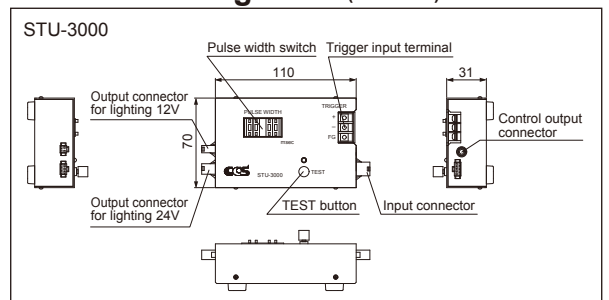
By connecting the STU-3000 to CCS's PD2 Series digital control units, an ambient light can be used as a strobe light. The one-shot circuit in the adaptor is activated by external trigger signals, the power ON/OFF supply is controlled at a defined pulse width, and an LED light is flashed as a strobe light. The strobe flash time can be set between 0.01 and 99.99msec. by means of the four-digit digital switch.

#### Specifications

Direct Number	2000366
Input	SMP-04V-BC (12V DC or 24V DC) M3 terminal block 3P (Trig+ Trig- FG)
Output	SMP-02V-BC (12V DC) SMP-03V-BC (24V DC) M3 jack (ON/OFF control signal)
Trigger	Photo-coupler input 5V to 24V DC Current: 5mA max. Pulse width: 20 $\mu$ s min. Rising / falling edge: 10 $\mu$ s max.
ON/OFF control signal	Connection to lighting ON/OFF jack of the PD/PD2 control unit Inside: Signal Outside: GND
ON pulse width	Set with the 4-digit thumbwheel switch (0.01 to 99.99ms).
Light delay	10 $\mu$ s max.
Accessories	ON/OFF control cable Power cable (12V) / Power cable (24V)
Weight	0.4kg max.
Connectable control unit	PD2-1012/1024/3012/3024/5012/5024/3012-2/3024-2/ Other optional control unit

\*For uses requiring large light volumes in short time periods, use the PTU2 Series.

#### Dimension Diagrams (Unit: mm)





# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

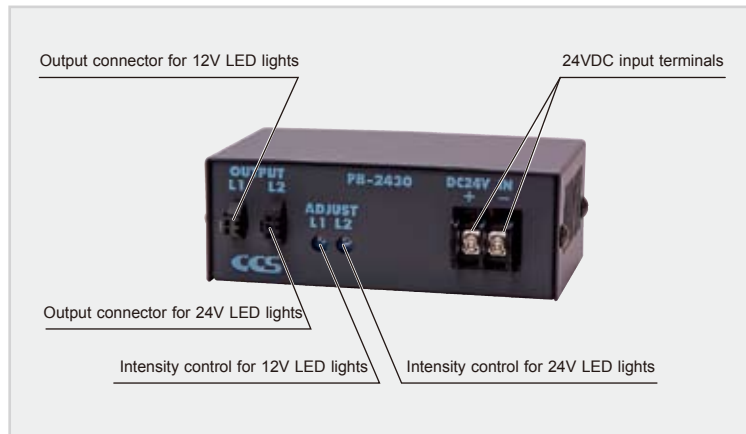
## Compact and Efficient

### PB-2430



This single compact control unit handles 12V and 24V CCS LED lights at the same time, and allows the user to control the light intensity of each one simultaneously or separately. It operates with 24VDC voltage input, and is DIN rail mountable.

#### Part Names and Functions

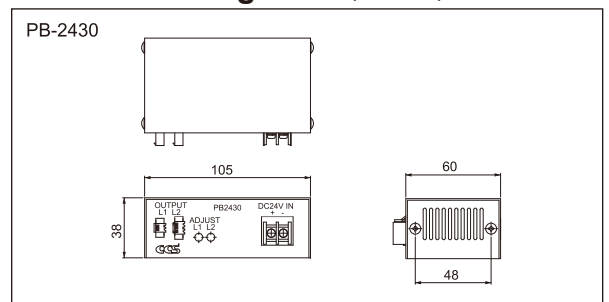


#### Specifications

Direct Number	2000018
Input	24VDC $\pm 10\%$ , 50W max (36W typ.)
DC output <sup>1)</sup>	L1: 12VDC 2A 24W max., L2: 22VDC 1.1A 24W max. Total power consumption must not exceed 30W max.
Output voltage range/ Light intensity control	L1: Approx. 8.3 to 12.0VDC L2: Approx. 15.0 to 22.0VDC Intensity control by the 'ADJUST' potentiometers
Input terminal	Two terminals with 7.62 mm pitch, M3 screw
Output Connector	L1: SMP-02V-BC [JST] 1: Output + 2: Output - L2: SMP-03V-BC [JST] 1: Output + 2: NC 3: Output -
Over-current protection	Built-in input Polyswitch
Insulation	Non-insulation between input and output
Cooling method	Natural air-cooling
Weight	Approx. 300g

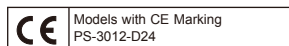
Note: 1)When input voltage decreases, the output L2 will also decrease (Input voltage must be 1.5V or higher than output voltage).

#### Dimension Diagrams (Unit: mm)



## High Performance and Low Price

### PS-3012-D24



#### Strobe Control Unit

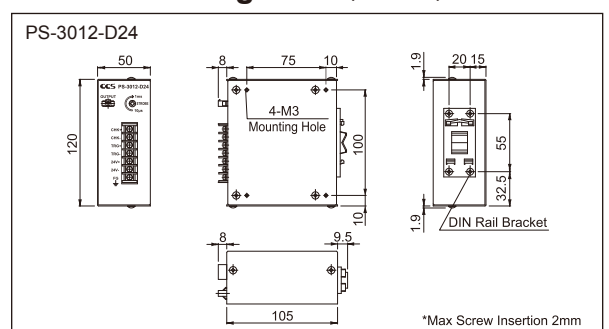


- Cost-effective, easy-to-use strobe control unit with overdriving power output
- Overdriving capability provides CCS 12V standard lights with 2-3 times brighter output
- High performance allows synchronization of light and camera
- Rugged, compact housing
- For use with 24VDC input
- DIN rail mountable

#### Specifications

Direct Number	2000157
Input	24VDC $\pm 10\%$ 20W minimum (average)
Output	Strobe output, 18VDC, 8A max. (The peak value of using 30W of load.)
Drivable Illuminators	12V/30W max.
Input terminal	7 terminals with 7.62mm pitch, M3 screw
Output Connector	SMP-02V-BC [JST] (Pin 1: + Pin 2: -)
Lighting Method	Strobe with overdriving (Built-in Protection Circuit)
Pulse Width	10.0 $\mu$ s to 1.0ms (Pulse width control by potentiometer)
Trigger Interval	12.5ms min. (The trigger interval to the next signal should be more than 12.5ms, otherwise the signal will be ignored.)
Trigger Input	Photo-coupler input, Input current 5mA or more, Over 20 $\mu$ s pulse width, Rise/Fall time 10 $\mu$ s max.
Delay Time	Max. 10 $\mu$ s (Trigger input-Strobing)

#### Dimension Diagrams (Unit: mm)



Direct Number : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Compact Controller

### CC-ST-1024

#### A Compact, Lightweight Controller for LED Light

The CC-ST-1024 is a special LED Illumination Controller that is the size of a sensor amplifier. It mounts to DIN rail. It can be installed inside a control panel, alongside the sensor amplifiers inside a device, and in various other locations. The 24-V DC power input is suited for worksites.

#### Control the LED Light with Three Lighting Modes

##### ■ Constant Lighting Mode



In this mode, the light is lit constantly. The intensity of the light can be set to any of 100 levels.

##### ■ Strobe Mode



In this mode, strobe lighting is synchronized with the trigger signal from the image processing device. The lighting time can be set.

##### ■ ON/OFF Mode

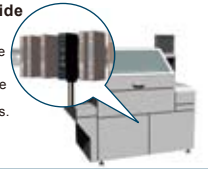


In this mode, lighting is synchronized with the high signal from the image processing device.



##### Installation Inside Equipment:

Install in large-scale equipment.  
Install in small-scale equipment or stand-alone devices.



##### Install in control box for central control with other devices.



##### Install next to the camera or near the Light for compact installation.

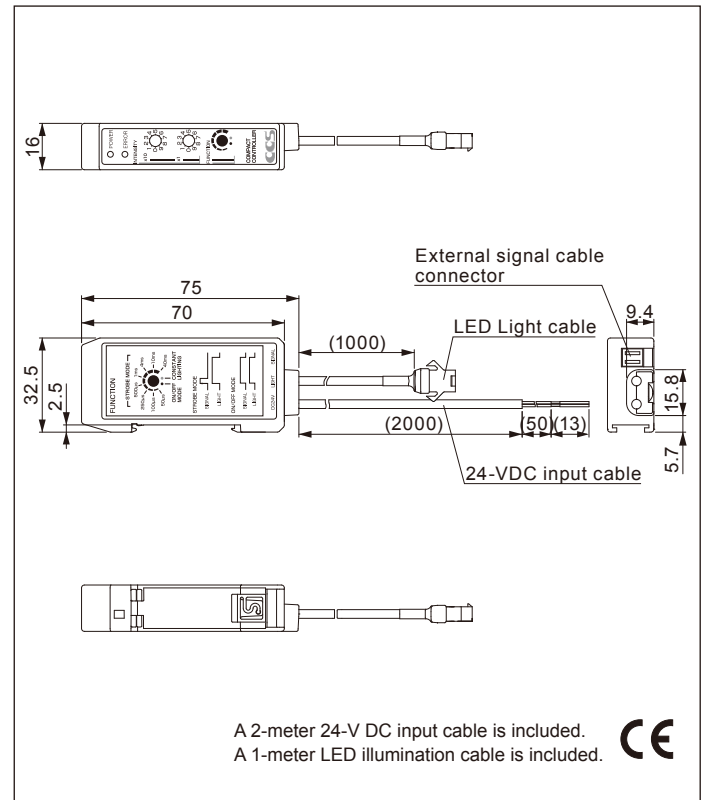


Note: These application examples are only conceptual. Actual application will depend on the installation environment.

## Specifications

Product name	Compact Controller for LED Light (Strobe Light Type)
Model	CC-ST-1024
Direct number	2000654
Drive method	Constant-voltage system
Light control method	PWM control, lighting time control
Applicable Light Units(rating)	24 V, 10 W
PWM frequency	100 kHz
Input overcurrent protection	A fuse cuts the circuit to protect the Controller from overcurrent.
Input voltage	24 VDC $\pm$ 10%
Power consumption(typ.)	11.0 W (10-W LED Light Unit at maximum light intensity)
Output voltage(rating)	24 VDC
Output current(rating)	0.42 A
Operating environment (indoors only)	Temperature: 0 to 40°C, Humidity: 20% to 85%RH (no condensation)
Storage environment	Temperature: -20 to 60°C, Humidity: 20% to 85%RH (no condensation)
Vibration resistance	Acceleration: 19.6 m/s <sup>2</sup> , frequency: 10 to 55 Hz, cycles: 3 minutes, for 1 hour each in X, Y, and Z directions
Impact resistance	Acceleration: 49.0 m/s <sup>2</sup> , operation time: 30 ms, number of times: 3 times each in 6 directions
Cooling method	Natural air cooling
CE marking	Conforms to EMC standard EN 61326, Class A.
Environmental regulations	RoHS compliant
Materials	ABS
Weight	80 g
Accessories	Flat-blade screwdriver

## Dimension Diagrams (Unit: mm)



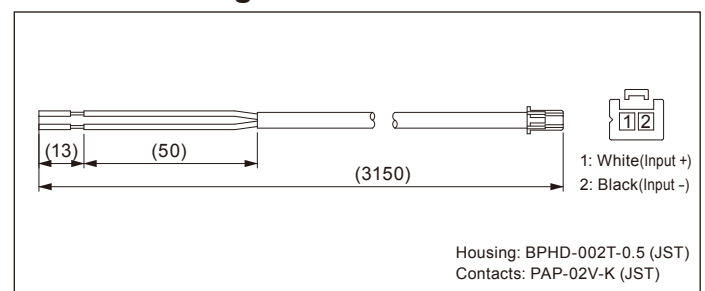
## Option: NFCB2-CC-3 Direct number:3000569

### External Signal Cable (3 m)



This cable is for external signal. Use it to input external signal into the Controller.

## Dimension Diagrams (Unit: mm)



# Control Units for CCS LED Lights

Please select a best-suited control unit according to your intended use and objective.

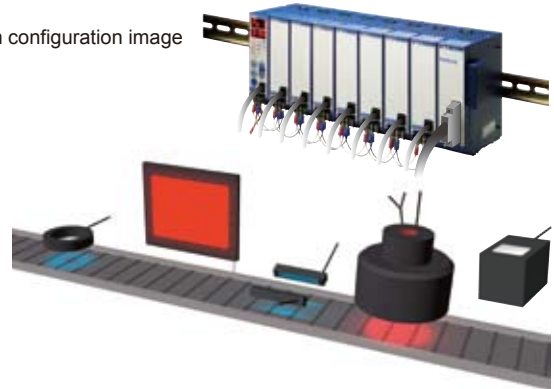
## Building Block Control Units

### BB Series

Building Block Control Units that enable modular connection between Units.

A variety of system configurations can be achieved through different combinations of Master Units, Slave Units, and Interface Units. Units can be easily added or changed, enabling flexible lighting control. (Up to 18 Units can be connected.) The input specification is 24 VDC, suitable for on-site power supply conditions, and DIN rail mounting is supported.

System configuration image



#### Master unit

Unit provided with setting and control functions.  
This controls all connected units.  
Constant lighting and strobe (overdrive-capable) lighting types are available.  
You can choose from either 12V or 24V output types depending on the type of lighting to be connected.



	Model	Direct Number
Constant lighting	12V BB-V12P30-M	2000394
	24V BB-V24P30-M	2000389
Strobe lighting	12V BB-V12S30-M	2000395
	24V BB-V24S30-M	2000390

#### Slave unit

Unit designed for expanding lighting.  
This can be added and connected depending on the number of lights you use.  
Constant lighting and strobe (overdrive-capable) lighting types are available.  
You can choose from either 12V or 24V output types depending on the type of lighting to be connected.



	Model	Direct Number
Constant lighting	12V BB-V12P30-S	2000445
	24V BB-V24P30-S	2000443
Strobe lighting	12V BB-V12S30-S	2000446
	24V BB-V24S30-S	2000444

#### Interface unit

Unit for external control provided with a parallel communication function.  
CMOS input and photocoupler input types are available.



	Model	Direct Number
CMOS	BB-CPC-S	2000411
Photo coupler	BB-CPP-S	2000412



## Specifications

Product name		Master unit / Slave unit			
Model name	Master unit	BB-V12P30-M	BB-V24P30-M	BB-V12S30-M	BB-V24S30-M
	Slave unit	BB-V12P30-S	BB-V24P30-S	BB-V12S30-S	BB-V24S30-S
Lighting system	Constant lighting		Strobe lighting		
Drive method	Constant voltage				
Light control method	PWM control		Pulse width		
Channels	1 channel				
Applicable light (rating)	12V/30W	24V/30W	12V/30W	24V/30W	
Input voltage (rated)	24 VDC				
Input voltage (range)	21.6 to 26.4 VDC	21.6 to 25.3 VDC	21.6 to 26.4 VDC	21.6 to 26.4 VDC	
Power consumption (typ.)	42W (during connection to 30W load)	42W (during connection to 30W load)	Mean power consumption: 16W (during connection to 30W load) Peak power consumption: 72W (during connection to 30W load and strobe)	Mean power consumption: 16W (during connection to 30W load) Peak power consumption: 26W (during connection to 30W load and strobe)	
Output voltage (rated)	12 VDC	24 VDC	18 VDC	48 VDC	
Output current (rated)	2.5A	1.25A	8.0A	4.3A	
Power code length	5m max.				
Terminal block control cable length	5m max.				
Light cable length	5m max.				
Mounting method	DIN rail, bottom surface mounting holes, or optional self-support stand				
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85%RH (with no condensation)				
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85%RH (with no condensation)				
Weight	350g max.	350g max.	350g max.	400g max.	

Product name		Interface unit (parallel communications)	
Model name	BB-CPC-S	BB-CPP-S	
Input voltage (rating)	24 VDC(Supplied via coupled connector)		
Input voltage (range)	21.6 to 26.4 VDC(Supplied via coupled connector)		
Power consumption (typ.)	10W(Supplied via coupled connector)		
External control input/output	Parallel bit system		
External control input/output specifications	No insulation, C-MOS level input/output LOW : 1.5V max., High : 3.5V min. 2.2k Ohms, 5V pull-up Input voltage range : 0 to 5.5 VDC	Photocoupler insulation : 24V input/output OFF : 10V max., ON : 14V min. OFF current : 4mA max., ON current : 5.8mA min. Input voltage range : 0 to 26.4 VDC	
External control cable length	Less than or equal to 5m		
Use environment	Temperature: 0 to 40°C, Humidity: 20% to 85%RH (with no condensation)		
Storage environment	Temperature: -20 to 60°C, Humidity: 20% to 85%RH (with no condensation)		
Weight	300g max.		

## Options for BB Series

### Stand: BB-FT

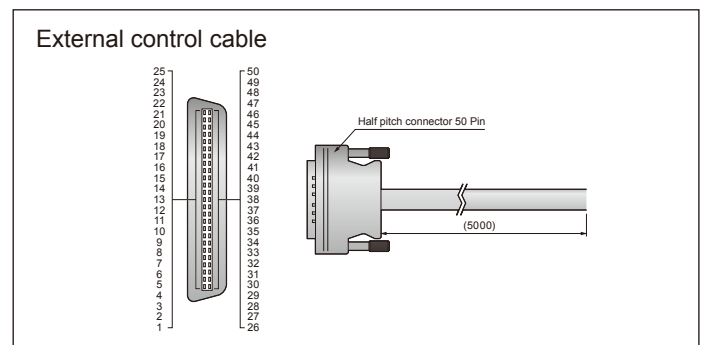
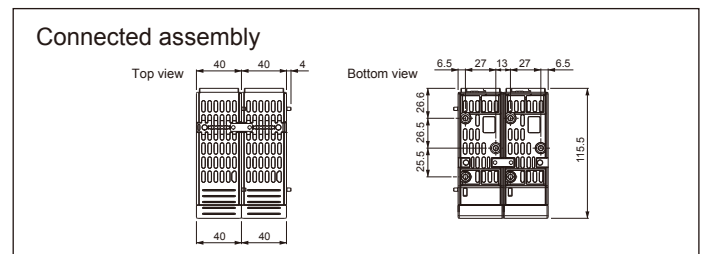
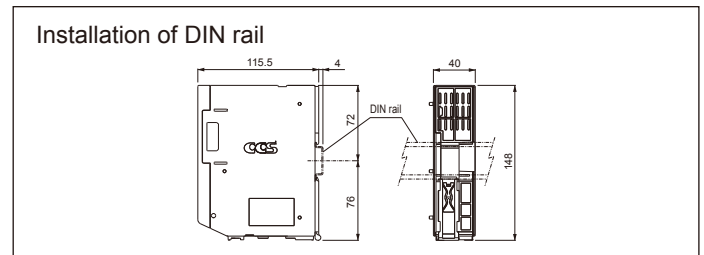
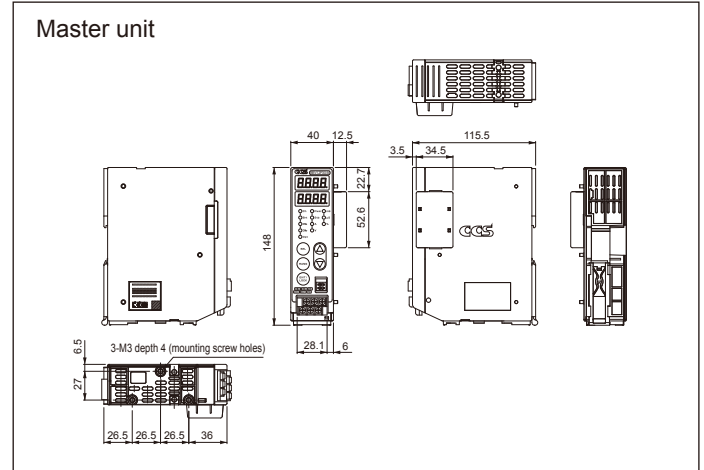


Optional to be attached to the unit.  
Use this when fixing the unit with something other than DIN rail for desktop or floor-top use.

### External control cable(5m): EXCB2-BBP-5

Cable for connecting interface units (parallel communication type) and external equipment such as PLCs and image processing units.

## Dimension Diagrams (Unit: mm)



No.	Line color	Color and segments of broken line	BB-CPC-S (CMOS input)	BB-CPP-S (Photocoupler input)	No.	Line color	Color and segments of broken line	BB-CPC-S (CMOS input)	BB-CPP-S (Photocoupler input)
1	Orange	Black1	GND	NC	26	Orange	Red1	NC	NC
2	Gray	Black1	GND	NC	27	Gray	Red1	NC	NC
3	White	Black1	GND	NC	28	White	Red1	NC	NC
4	Yellow	Black1	GND	B7-	29	Yellow	Red1	B7	B7+
5	Pink	Black1	GND	B6-	30	Pink	Red1	B6	B6+
6	Orange	Black2	GND	B5-	31	Orange	Red2	B5	B5+
7	Gray	Black2	GND	B4-	32	Gray	Red2	B4	B4+
8	White	Black2	GND	B3-	33	White	Red2	B3	B3+
9	Yellow	Black2	GND	B2-	34	Yellow	Red2	B2	B2+
10	Pink	Black2	GND	B1-	35	Pink	Red2	B1	B1+
11	Orange	Black3	GND	B0-	36	Orange	Red3	B0	B0+
12	Gray	Black3	GND	OFF7-	37	Gray	Red3	OFF7	OFF7+
13	White	Black3	GND	OFF6-	38	White	Red3	OFF6	OFF6+
14	Yellow	Black3	GND	OFF5-	39	Yellow	Red3	OFF5	OFF5+
15	Pink	Black3	GND	OFF4-	40	Pink	Red3	OFF4	OFF4+
16	Orange	Black4	GND	OFF3-	41	Orange	Red4	OFF3	OFF3+
17	Gray	Black4	GND	OFF2-	42	Gray	Red4	OFF2	OFF2+
18	White	Black4	GND	OFF1-	43	White	Red4	OFF1	OFF1+
19	Yellow	Black4	GND	OFF0-	44	Yellow	Red4	OFF0	OFF0+
20	Pink	Continuous black line	GND	ERR0UT-	45	Pink	Red4	ERR0UT	ERR0UT+
21	Orange	Continuous black line	GND	EXT-	46	Orange	EXT	EXT	EXT+
22	Gray	Continuous black line	GND	WR-	47	Gray	Continuous black line	WR	WR+
23	White	Continuous black line	GND	CS2-	48	White	Continuous black line	CS2	CS2+
24	Yellow	Continuous black line	GND	CS1-	49	Yellow	Continuous black line	CS1	CS1+
25	Pink	Continuous black line	GND	CS0-	50	Pink	Continuous black line	CS0	CS0+



# Control Units for CCS Spot Lights

Please select a best-suited control unit according to your intended use and objective.

HLV2-14series / HLV2-22series / HLV2-22-3Wseries / HLV2-22-NR-3Wseries / HLV2-3M-RGB-3W

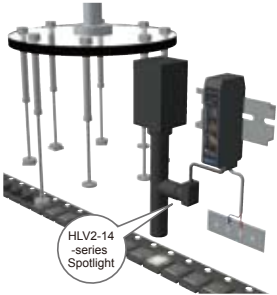
## Compact Controller CC-PJ-0707

Supports constant lighting, ON/OFF lighting, and strobe lighting modes in a single Unit.

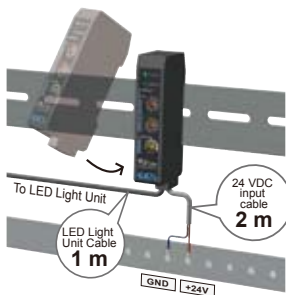
The CC-PJ-0707 is a Controller for the HLV2 Series. With a compact size of 16 x 70 x 32.5 (WxHxD) mm, the CC-PJ-0707 is perfect for tight spaces and for conserving valuable space. One output channel for Light Units is provided. Light intensity can be set to any of 100 different levels. The 24-VDC power input is suited for worksites.



The compact designs of both the Spotlight and the Controller make them perfect for areas with limited space.



DIN rail mounting and 24 VDC input makes this Controller ideal for onsite applications.



### Intensity Setting

x10	0	0	...	1	...	9
x1	0	1	...	1	...	9
Intensity	1	2	...	12	...	100

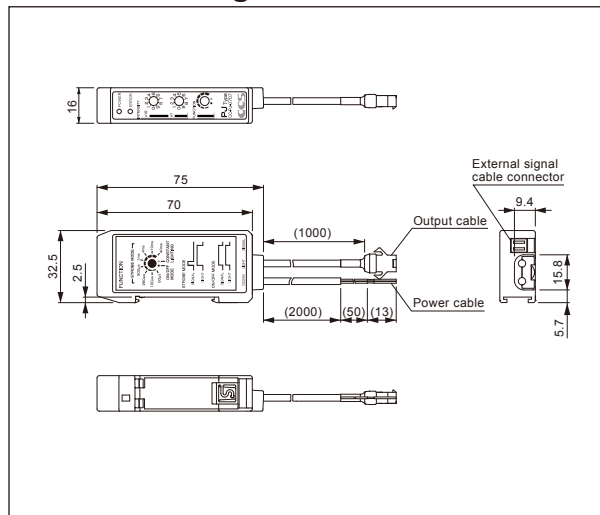
### Strobe Lighting Time Setting

50 μs/100 μs/250 μs/500 μs/  
1 ms/4 ms/10 ms/40 ms  
Response time: 50 μs max.

## Specifications

Product name	Compact Controller for HLV2/HLV-series Spotlights
Model	CC-PJ-0707
Direct number	2000756
Drive method	Constant-current system
Light intensity control method	Variable-current control method or lighting time control
Input overcurrent protection	A fuse breaks the circuit to protect the Controller from overcurrent.
Input voltage	24 VDC ± 10%
Power consumption (typ.)	7 W (3-W Spotlight at maximum light intensity)
Output voltage (maximum)	7 VDC
Output current (rating)	700 mA
Operating environment (indoors only)	Temperature: 0 to 40°C, Humidity: 20% to 85%RH (with no condensation)
Storage environment	Temperature: -20 to 60°C, Humidity: 20% to 85%RH (with no condensation)
Vibration resistance	Acceleration: 19.6 m/s <sup>2</sup> , frequency: 10 to 55 Hz, cycle: 3 minutes, sweep cycles: 1 hour each in X, Y, and Z directions
Shock	Acceleration: 49.0 m/s <sup>2</sup> , Application time: 30 ms, Repetitions: 3 times each in 6 directions
Cooling method	Natural air cooling
CE Marking	EMC standards: EN 6100-6-2 and EN 6100-6-4
Environmental regulations	RoHS compliant
Material	ABS
Weight	100 g
Accessories	Flat-blade screwdriver

## Dimension Diagrams (Unit: mm)



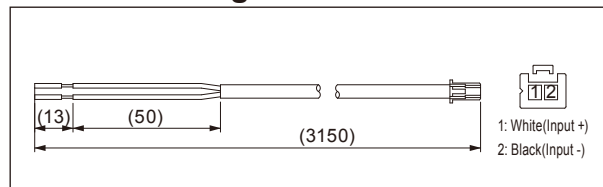
## Option: NFCB2-CC-3 Direct number:3000569

External Signal Cable (3 m)



This cable is for external signal. Use it to input external signal into the Controller.

## Dimension Diagrams (Unit: mm)



## Analog Control Units

### PJ Series

#### Four Models for your Working Environment.

The PJ Series consists of Analog Control Units for the HLV2 Series. They provide stepless intensity control for a variable current. Models are available with 2 or 3 output channels for Light Units. You can also select between AC and DC for the power source.

100 to 240V AC



PJ-1505-2CA  
2-channel



PJ-1505-3CA  
3-channel

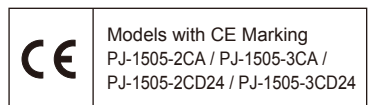
24V DC



PJ-1505-2CD24  
2-channel



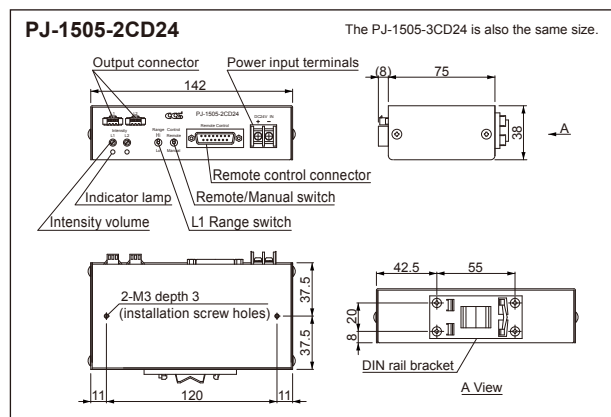
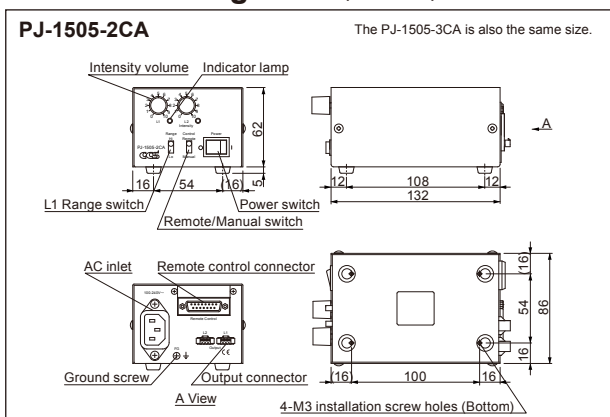
PJ-1505-3CD24  
3-channel



### Specifications

Model	PJ-1505-2CA	PJ-1505-3CA	PJ-1505-2CD24	PJ-1505-3CD24
Direct number	2000131	2000136	2000134	2000139
Input voltage(rated)	100 to 240 VAC		24 VDC	
Input voltage(range)	85 to 264 VAC		10 to 24 VDC	
Power consumption	27VA typ.	37VA typ.	10W typ.	14.5W typ.
Number of channels	2	3	2	3
Output voltage (maximum rated)	5.5 VDC			
Light intensity control	Manual: Front light intensity dial Remote (external): Analog input voltage of 0 to 5 V (5.25 V maximum)			
ON/OFF control	OFF: 2.5 to 5.0 V (24 V maximum) ON: 0.8 to 0 V (pulled down with 4.7 KΩ)			
External control connector	D-Sub, 15-pin (plug)			
Weight(max.)	640g	660g	380g	

### Dimension Diagrams (Unit: mm)



### Options for PJ Series

External control cable  
Direct number:3000569  
Model:EXCB2-B3(3m)

No.	Cable color	No.	Cable color
1	Black	9	Gray
2	White	10	Pink
3	Red	11	White/Black
4	Green	12	Red/Black
5	Yellow	13	Green/Black
6	Brown	14	Yellow/Black
7	Blue	15	Brown/Black
8	Purple	no connection	(Blue/Black)

# Optional Parts

**Direct Number** : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Filter

Blocks ambient light out of red wavelength range

### Sharp Cut Filters (Longpass filter)

#### R60 Series



#### R64 Series



Mounted in front of a lens, R60 blocks light of 600nm or less, and R64 light of 640nm or less, and both transmit approximately 85% of light in wavelength bands longer than these.

Direct number	Model Name	Notes
4000658	R60-C	For C-mount
4000657	R60-16	M16.0 P0.5
4000609	R60-25	M25.5 P0.5
4000489	R60-27	M27.0 P0.5
4000490	R60-30	M30.5 P0.5
4000491	R60-40	M40.5 P0.5
4000659	R60-46	M46.0 P0.75

Direct number	Model Name	Notes
4000508	R64-C	For C-mount
4000493	R64-16	M16.0 P0.5
4000494	R64-25	M25.5 P0.5
4000495	R64-27	M27.0 P0.5
4000496	R64-30	M30.5 P0.5
4000498	R64-40	M40.5 P0.5
4000500	R64-46	M46.0 P0.75

Blocks ambient light out of blue wavelength range

### Blue-light Filters (Bandpass filter)

#### V44 Series



Mounted on front lens thread to transmit approximately 47% of in a wavelength band centered on 440nm in the wavelength range from 350 to 520 nm.

Direct number	Model Name	Notes
4000539	V44-C	For C-mount
4000534	V44-25	M25.5 P0.5
4000535	V44-27	M27.0 P0.5
4000536	V44-30	M30.5 P0.5
4000537	V44-40	M40.5 P0.5
4000538	V44-46	M46.0 P0.75

## Filter

Prevents glare from the light

### Polarizing Filters

#### PL Series



Screw the polarizing filter onto the front of the camera lens. The filter eliminates reflections and glare from the surface in combination with the polarizer.

Direct number	Model Name	Notes
4000370	PL-25	M25.5 P0.5
4000372	PL-25-NL	M25.5 P0.5 (With lock)
4000374	PL-27	M27.0 P0.5
4000376	PL-27-NL	M27.0 P0.5 (With lock)
4000377	PL-30	M30.5 P0.5
4000379	PL-30-NL	M30.5 P0.5 (With lock)

Direct number	Model Name	Notes
4000383	PL-40	M40.5 P0.5
4000384	PL-40-NL	M40.5 P0.5 (With lock)
4000388	PL-46	M46.0 P0.75

## Polarization Plate

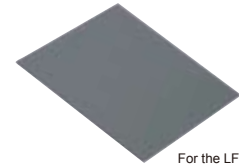
Prevents glare from the light

### Polarizer

#### PL Series



Ring type



For the LFFV2 Series

Square type

Attach the polarizer to lights. It eliminates reflections and glare in combination with the polarizing filter.

Direct number	Model Name
4000428	PL-LDR-32
4000430	PL-LDR-42
4000432	PL-LDR-50
4000623	PL-LDR2-70*
4000441	PL-LDR-90
4000424	PL-LDR-120-40
4000465	PL-SQR-56

\*PL-LDR2-70 comes with an adaptor for installation.

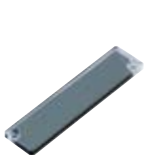
Direct number	Model Name
4000458	PL-LFV2-35
4000459	PL-LFV2-50
4000460	PL-LFV2-70
4000455	PL-LFV2-100
4000456	PL-LFV2-130
4000457	PL-LFV2-200

## Polarization Plate

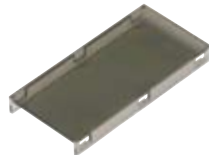
Prevents glare from the light

### Polarizer

#### PL Series



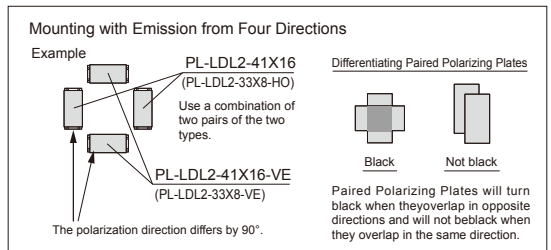
For the LDL2-33x8 Series



For the LDL2 Series

Square type

There are two types of Polarizing Plates for the LDL2-33x8 and LDL2 Series. They are used together as shown below.



Direct number	Model Name	Direct number	Model Name	Direct number	Model Name
4001028	PL-LDL2-33x8-HO	4000854	PL-LDL2-146x30	4000891	PL-LDL2-74x30-VE
4001029	PL-LDL2-33x8-VE	4000851	PL-LDL2-218x30	4000892	PL-LDL2-146x30-VE
4000847	PL-LDL2-41x16	4000853	PL-LDL2-266x30	4000893	PL-LDL2-218x30-VE
4000848	PL-LDL2-80x16	4000888	PL-LDL2-41x16-VE	4000894	PL-LDL2-266x30-VE
4000849	PL-LDL2-119x16	4000889	PL-LDL2-80x16-VE		
4000850	PL-LDL2-74x30	4000890	PL-LDL2-119x16-VE		

### Caution

Heat may cause deformation or discoloring depending on the operation environment. Make sure that countermeasures against overheating are implemented and that the temperature does not exceed the operating limit.

## Diffusion Plate

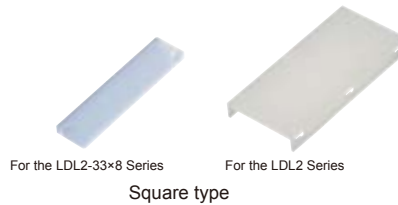
Prevents shine and glare

### Diffuser DF Series



Ring type

Low-angle type



For the LDL2-33x8 Series

For the LDL2 Series

Square type

Attaches to many different lights to reduce shine from glossy applications.

Direct number	Model Name	Direct number	Model Name
4000140	DF-LDR-32	4000146	DF-LDR-48LA
4000143	DF-LDR-42	4000160	DF-LDR-74LA
4000147	DF-LDR-50	4000123	DF-LDR-100LA
4000156	DF-LDR-70	4000129	DF-LDR-132LA
4000164	DF-LDR-90	4000134	DF-LDR-170LA
4000125	DF-LDR-120-45	4000138	DF-LDR-208LA
4000201	DF-SQR-56		

Direct number	Model Name	Direct number	Model Name
4001026	DF-LDL2-33x8	4000844	DF-LDL2-146x30
4000840	DF-LDL2-41x16	4000845	DF-LDL2-218x30
4000841	DF-LDL2-80x16	4000846	DF-LDL2-266x30
4000842	DF-LDL2-119x16		
4000843	DF-LDL2-74x30		

## Protective Plate

Protects the emission section

### Protector CV Series



For the LDL2 Series

The plate protects the emission section of the Light Unit.

Note: The Protective Plate is not intended to provide protection against dust or water droplets.

Direct number	Model Name
4000860	CV-LDL2-41x16
4000861	CV-LDL2-80x16
4000862	CV-LDL2-119x16
4000863	CV-LDL2-74x30
4000864	CV-LDL2-146x30
4000865	CV-LDL2-218x30
4000866	CV-LDL2-266x30

## Light Control Film

Converts diffused light into parallel light

### Light Control Films LC Series

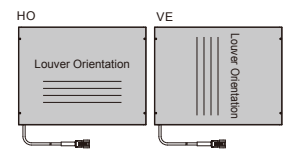


Plastic film arrayed with fine louvers suppresses the diffusion of light in specific directions and improves parallelism.

The TH Series offers a selection for louver direction: longitudinal or transverse.

HO:  
The direction of louvers is horizontal when installing LC film on the TH series as shown on the right-hand side.

VE:  
The direction of louvers is vertical when installing LC film on the TH series as shown on the right-hand side.



Mounted to back lights to suppress light diffraction for visual inspections, enabling sharp imaging of profiles.

Direct number	Model Name	Direct number	Model Name	Direct number	Model Name	Direct number	Model Name	Direct number	Model Name
4001043	LC-TH-27x27-HO	4000946	LC-TH-140x105-HO	4001046	LC-TH-27x27-VE	4001006	LC-TH-140x105-VE	4000300	LC-LFL-100
4001044	LC-TH-43x35-HO	4000947	LC-TH-160x120-HO	4001047	LC-TH-43x35-VE	4001007	LC-TH-160x120-VE	4000301	LC-LFL-180
4001045	LC-TH-51x51-HO	4000948	LC-TH-200x150-HO	4001048	LC-TH-51x51-VE	4001008	LC-TH-200x150-VE	4000302	LC-LFL-200
4000943	LC-TH-63x60-HO	4000949	LC-TH-224x170-HO	4001003	LC-TH-63x60-VE	4001009	LC-TH-224x170-VE		
4000944	LC-TH-83x75-HO	4000950	LC-TH-211x200-HO	4001004	LC-TH-83x75-VE	4001010	LC-TH-211x200-VE		
4000945	LC-TH-100x100-HO			4001005	LC-TH-100x100-VE				

By mounting this on a co-axial light, the parallelism of light is improved and the particularities of a workpiece can be effectively imaged.

Direct number	Model Name
4000315	LC-LFV2-35
4000316	LC-LFV2-50
4000317	LC-LFV2-70
4000312	LC-LFV2-100
4000313	LC-LFV2-130
4000314	LC-LFV2-200

## Using Polarizing Filters and Polarizing Plates

The Polarizing Filters and Polarizing Plates are used together. Regular reflective components are cut out and the effects can be observed when the polarizing direction of the polarizing plate installed on the Light Unit and the polarizing direction of the filter attached to the camera are at a right angle (90°) to each other.

### Application Instructions

- ① Install the Polarizing Plate on the light-emitting side of the Light Unit.
- ② Attach the Polarizing Filter to the tip of the camera lens.
- ③ Rotate the Polarizing Filter so that the angle of polarization is a right angle (90°) in relation to the Polarizing Plate.

### No Polarizing Plate



### With a Polarizing Plate



### Sharp-cut Filter Application Example



When you want to view a workpiece as a silhouette, contrast cannot be made with only a red backlight via ambient light (due to indoor lighting or other factors). However, you can use a sharp-cut filter to cut out ambient light and allow only the red light to pass through. This allows you to capture a clear contrast of the shape of the workpiece.



# Optional Parts

**Direct Number :** A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Bracket

Securing the Light

### Brackets BKseries



For the LDL2 Series (Contains 2)



For the LDL2 Series



For the LDL2-33x8 Series

When you secure the light, the angle of the irradiation can be adjusted as desired. A variety of methods are available for securing the Light Units, such as parallel emission from two directions or enveloped emission from four directions.

Direct number	Model Name	Notes
4000867	BK-LDL2	Shared with LDL2 Series

Direct number	Model Name	Notes
4000985	BK-LDQ2-41x16	Four-way Mounting Bracket for LDL2 Series
4000986	BK-LDQ2-80x16	
4000987	BK-LDQ2-119x16	
4000988	BK-LDQ2-74x30	
4000989	BK-LDQ2-146x30	
4000990	BK-LDQ2-218x30	
4000991	BK-LDQ2-266x30	

Direct number	Model Name	Notes
4001027	BK-LDQ2-33x8	Four-way Mounting Bracket for LDL2-33x8 Series

## Bracket

Securing the Light

### Brackets BKseries



For the TH Series (Contains 4)

When you secure the light, the angle of the irradiation can be adjusted as desired. A variety of methods are available for securing the Light Units, such as parallel emission from two directions or enveloped emission from four directions.

Direct number	Model Name	Notes
4001031	BK-TH-LE12	Shared with TH Series

## Fixing adapter

To install a diffusion plate or polarizing plate

### Light Adapter Rings AD Series



For use with LDR2-32, 42, 50, 90, and 120. This is used for mounting a diffuser panel and a polarizing plate on a light

Direct number	Model Name	Notes
4000679	AD-LDR-32	Common use for LDR2-32 / LDR-32
4000680	AD-LDR-42	Common use for LDR2-42 / LDR-42
4000681	AD-LDR-50	Common use for LDR2-50 / LDR-50B
4000686	AD-LDR-90	Common use for LDR2-90 / LDR-90B
4000675	AD-LDR-120	Common use for LDR2-120 / LDR-120B

## Holder

Attaches to filter section of lens

### Lens Attachment Rings MR Series



For use with LDR2-32, and 50. A light can be directly attached onto the thread for a lens filter using this. Suitable for use in installations in restricted spaces.

Direct number	Model Name	Notes
4000692	MR-LDR-32-M25	M25.5 P0.5
4000693	MR-LDR-32-M27	M27.0 P0.5
4000694	MR-LDR-32-M30	M30.5 P0.5
4000697	MR-LDR-50-M25	M25.5 P0.5
4000698	MR-LDR-50-M27	M27.0 P0.5
4000699	MR-LDR-50-M30	M30.5 P0.5

Secures any type of light

### Flexible Arms FA Series



Holds a 10mm or 12mm rod for light attachment. Can be secured at any angle for easy light adjustment.

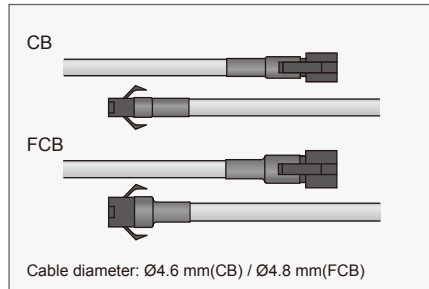
Direct number	Model Name	Notes
5000051	FA-12	Ø12 mm rod
5000050	FA-10	Ø10 mm rod

# Optional Cable Select a cable to match the light used

**Direct Number** : A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the space provided on the CCS website pages for machine vision. (Refer to the back cover of this brochure.)

## Extension Cables

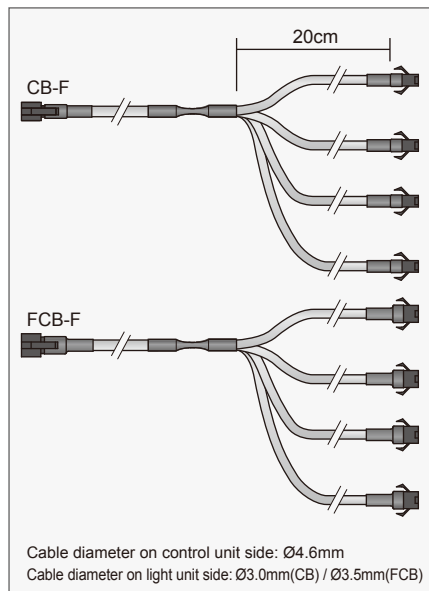
Cables that come with lights are about 30 cm. The following are available as cable extensions.



	Model Name	Direct number	Application	Cable length
12V	CB-1	3000010	Used to connect a 12 V light to a control unit.	1m
	CB-2	3000025		2m
	CB-3	3000029		3m
	CB-5	3000035		5m
24V	FCB-1	3000122	Used to connect 24-V Light Units to the control unit.	1m
	FCB-2	3000140		2m
	FCB-3	3000150	Used to connect HLV2-series Light Units to the Control Units.	3m
	FCB-5	3000158		5m

## Branch Cables

Use a branch cable when you need to connect several lights to one control unit. \*Branch cables cannot be used with HLV2-series Light Units.

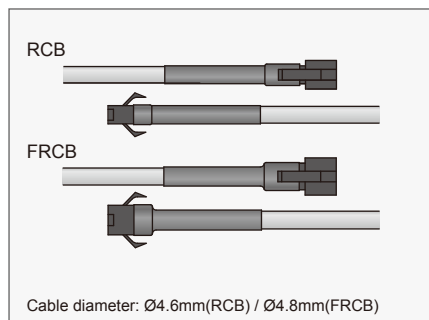


	Model Name	Direct number	Application	Cable length
2-branch 12V	CB-W-1	3000073	Used to connect 12-V lights to a control unit. One channel for the control unit and two channels for the lights. Branch ends: 20 cmX2.	1m
	CB-W-2	3000077		2m
	CB-W-3	3000078		3m
	CB-W-5	3000079		5m
2-branch 24V	FCB-W-1	3000206	Used to connect 24-V lights to a control unit. One channel for the control unit and two channels for the lights. Branch ends: 20 cmX2.	1m
	FCB-W-2	3000211		2m
	FCB-W-3	3000213		3m
	FCB-W-5	3000214		5m
4-branch 12V	CB-F-1	3000048	Used to connect 12-V lights to a control unit. One channel for the control unit and four channels for the lights. Branch ends: 20 cmX4.	1m
	CB-F-2	3000049		2m
	CB-F-3	3000051		3m
	CB-F-5	3000052		5m
4-branch 24V	FCB-F-1	3000176	Used to connect 24-V lights to a power unit. One channel for the control unit and four channels for the lights. Branch ends: 20 cmX4.	1m
	FCB-F-2	3000178		2m
	FCB-F-3	3000180		3m
	FCB-F-5	3000181		5m

\* Total power consumption of the connected illuminations should not exceed the output of the power source. In addition, if you wish to set light levels separately for each illumination, use a multi-channel power source.

## Robot Cables

These cables stand up even to a 10 million-repetition bending test.



	Model Name	Direct number	Application	Cable length
12V	RCB-1	3000269	Robot cable to connect a 12-V light to a control unit.	1m
	RCB-2	3000277		2m
	RCB-3	3000279		3m
	RCB-5	3000280		5m
24V	FRCB-1	3000222	Robot cable to connect a 24-V light to a control unit.	1m
	FRCB-2	3000231		2m
	FRCB-3	3000232	Used to connect HLV2-series Light Units to the Control Units.	3m
	FRCB-5	3000234		5m

\*When using a robot cable, secure the section of the cable that connects to the light, including the connector.

Notes
If cables are connected together to form a length of 5 m or more, lighting may become unstable. When using a robot cable, secure the section of the cable that connects to the light, including the connector.

# Technology Overview An introduction to the characteristics of LED lighting

## Skillful use of LED lighting

### The life of LED lights is shorter at high temperatures

LEDs will radiate less light when they become hotter. Heat may cause LEDs to deteriorate. Details depend on the specific Light Unit that is used, as well as the application environment.

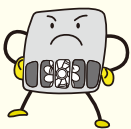
- ① Red LEDs are particularly sensitive and will radiate 1% less light for every 1°C rise in temperature. The normal radiant quantity is restored when the LEDs cool down again.
- ② If the LEDs are used at high temperatures for an extended period of time, they will deteriorate and the radiant quantity will decline. In this case, the normal radiant quantity is not restored when the LEDs cool down again.

### How to prevent reduction in radiation quantity and LED deterioration due to heat generated by LEDs

Turn down the light intensity control knob on the power supply as far as possible.

When used with a low Control Unit intensity value, the Light Unit is supplied with a lower amount of current, which therefore reduces the heat given off as well as LED deterioration. As a guideline, we recommend that you set the light intensity low at first and then turn it up gradually when the radiant quantity of the Light Unit decreases.

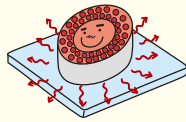
Luminosity weakening can be reduced by installing a fan or providing air flow for heat dissipation.



Install a fan



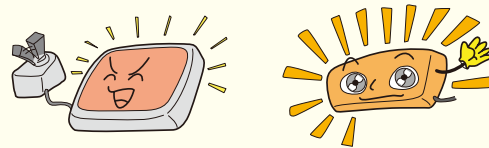
Provide air flow



Install on a bracket with good heat conductivity

Turn ON the light unit only when taking images.

LED lights can withstand being turned ON and OFF frequently. Turning ON the Light Unit only when taking images using a strobe or external signal input will reduce heat generation, provide a more stable radiant quantity, and increase the life of the Light Unit.



#### Strobe Control Unit

PTU2-3012/  
PTU2-3024



Refer to P.92 for details.

PS-3012-D24



Refer to P.93 for details.

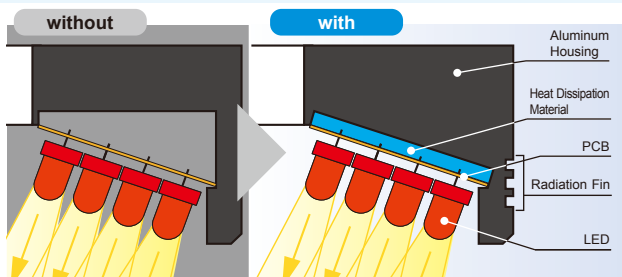
BB-V12S30-M/  
BB-V24S30-M



Refer to P.95 for details.

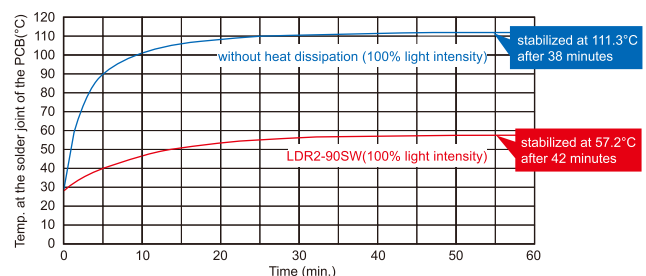
### Decrease deterioration of light intensity against heat generation

Structure comparison



With the conventional construction, the light was not able to dissipate heat with total efficiency due to the gap between the PCB and aluminum housing. By employing a special heat dissipating enclosure between the PCB and the housing in the new construction, there is substantial absorption of heat generation away from the LEDs, and efficient heat conductivity into the housing. This new construction of LDR2 suppresses the temperature rise of LED considerably, providing stable images for a long period of time.

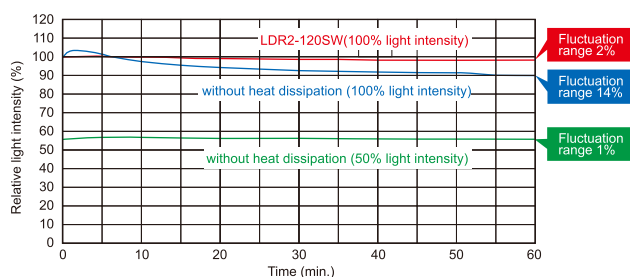
LDR2-90SW vs. Light without heat dissipation



While the light without heat dissipation material goes into a 'heat-balanced state' after 38 minutes with a temperature of 111.3°C, the new LDR2 ring light attains a 'heat-balanced state' after 42 minutes and temperature is stabilized at only 57.2°C. This shows the success of the LDR2 light in sharply suppressing temperature rise, compared with the light without heat dissipation.

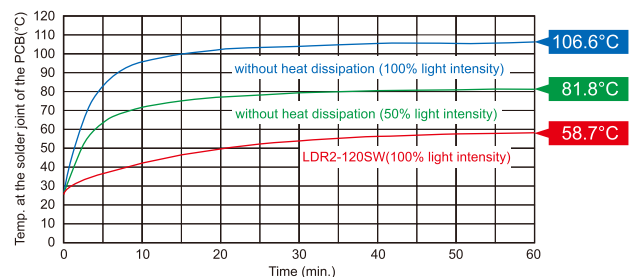
Note: Less than ±0.5°C is a stable range.

LDR2-120SW(white) vs. Light without heat dissipation



Although the white LED ring light without heat dissipation has a range of fluctuation of about 14% over a period of 60 minutes at 100% light intensity, the new ring light, LDR2 maintains the highest intensity with a fluctuation range of only 2% over the same period.

LDR2-120SW (white) vs. Light without heat dissipation



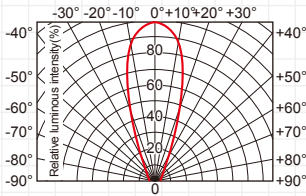
With Ø120 white LED ring light, the temperature rise of the solder joint is measured with 100% light intensity. Although the soldered part of the PCB of the light without heat dissipation material heated up to 106.6°C after 60 minutes, the new LDR2 ring light was measured at a maximum of 58.7°C, representing a successful suppression of heat, a decrease of 45% less than the temperature of the earlier light in the same conditions.

Data Acquisition Environment: LED light is installed inside environmental chamber at 40°C, and light intensity and temperature are measured (LED light is fixed to an aluminum plate of 5mm thickness).

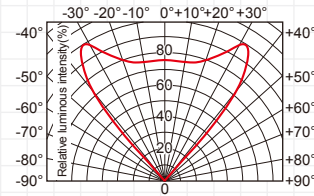
## LED Radiation Pattern

The following figures show the directional dependence of an LED's relative radiation intensity. The radiation intensity generally shows a maximum along the optical axis and reduces as the angle away from the optical axis increases. Different LED characteristics are used for the CCS narrow type (N) and wide type (W or WD) LEDs.

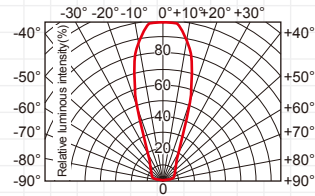
■ Directional pattern of Red LED N-type (Model:RD)



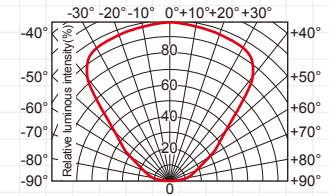
■ Directional pattern of Red LED W-type (Model:RD)



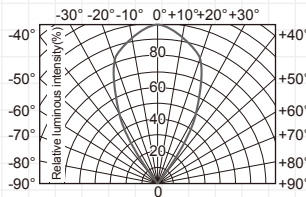
■ Directional pattern of Red LED N-type (Model:RD2)



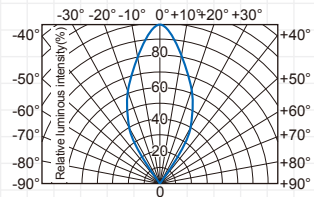
■ Directional pattern of Red LED WD-type (Model:RD2)



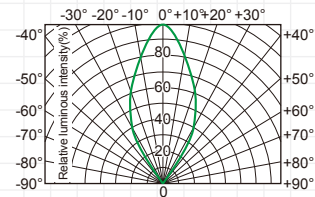
■ Directional pattern of White LED



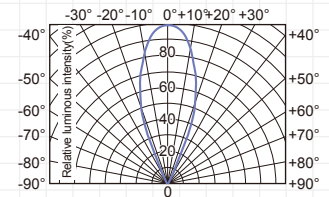
■ Directional pattern of Blue LED



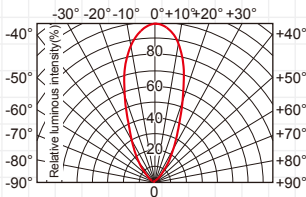
■ Directional pattern of Green LED



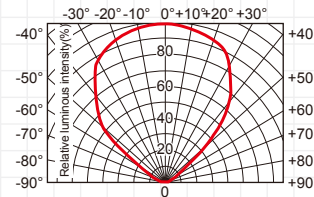
■ Directional Pattern of Ultraviolet LED



■ Directional Pattern of Red LED N-type for LDL2 Series

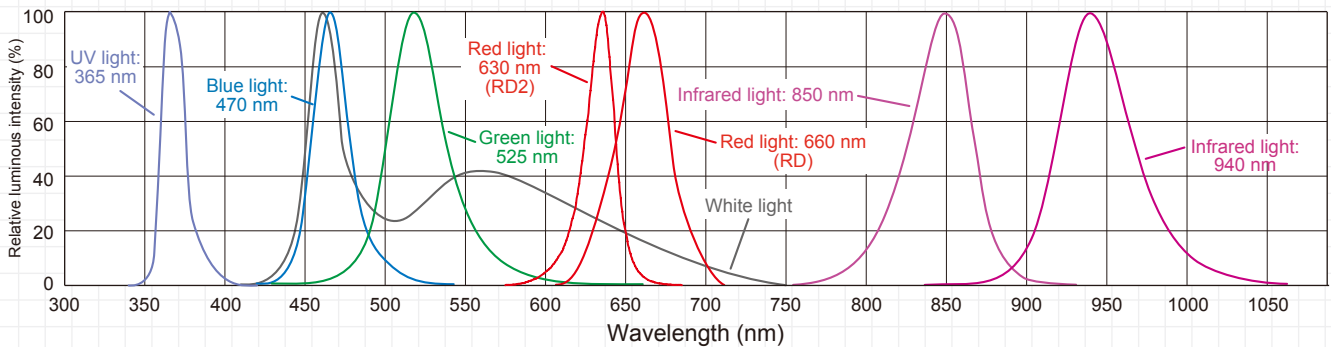


■ Directional Pattern of Red LED W-type for LDL2 Series



## Light Spectrum

The following figures show the spectral distribution and peak emission wavelength (typ) for different colors of LEDs. Each LED has a unique distribution, which affects the camera when photographing. A good image cannot be obtained if the light spectral distribution and camera sensor's spectral sensitivity are mismatched.





To help you better understand our LED light catalogue

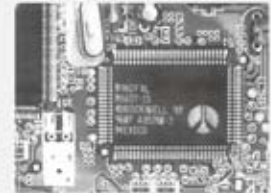
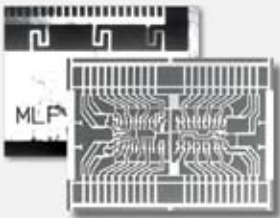
## What to consider when selecting a light

Size of the field of view

Distance from the light to the work (the object of inspection)

Shape, condition, and color of the work

Obtaining an image with good contrast



CCD sensitivity change and brightness distribution characteristics provide a good guideline for selecting a light based on the above conditions.

## Spectral luminous efficiency and CCD sensitivity

The human eye is most sensitive to a wavelength of 555 nm. As the wavelength grows longer or shorter, the human eye becomes less sensitive. (Although there is some variation depending on the person, most people can view a wavelength range of 380 nm to 760 nm.) This sensitivity of the eye to light is called spectral luminous efficacy.

Spectral luminous efficiency is a measure based on a value of 1 for the spectral luminous efficacy of 555 nm light. Figure 1 shows a standard spectral luminous efficiency curve for the human eye. Wavelengths longer than the visible range are called infrared light and wavelengths shorter than the visible range are called ultraviolet light.

Figure 2 shows the spectral sensitivity characteristics of a typical CCD camera (NC300, Takenaka System Devices). It can be seen that sensitivity to infrared light is better than in Figure 1. In this way, there is a difference between the sensitivity of the human eye and that of a CCD camera.

Figure 2 Spectral sensitivity characteristics of a CCD camera

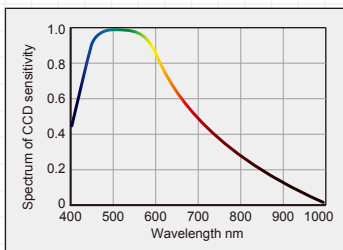
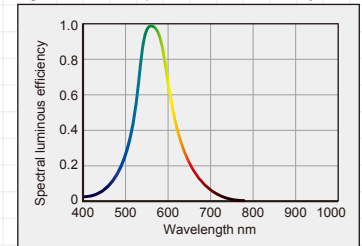


Figure 1 Standard spectral luminous efficiency curve



Figures 3 and 4 show the relationship between brightness and distance for our LDR-50B (red) and GR (green) LED lights. Figure 3 shows the change of brightness, and the green light has a higher brightness than the red light. Figure 4 shows the change of CCD sensitivity, and in this case red has a higher brightness than green. (Brightness/luminosity meters are correlated to the spectral luminous efficiency of the human eye.)

In this way, green appears brighter than red to the human eye, whereas red appears brighter than green to a CCD camera. A CCD camera is normally used for image processing, and thus we provide graphs showing CCD sensitivity change rather than brightness and luminosity values.

Figure 3 Brightness comparison graph

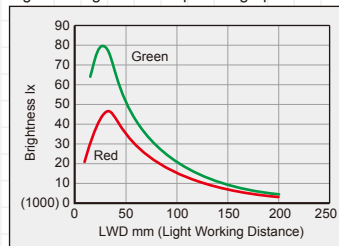
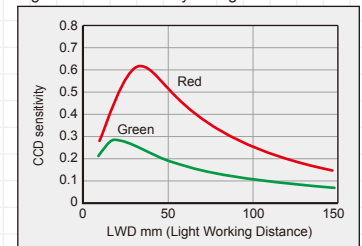


Figure 4 CCD sensitivity change

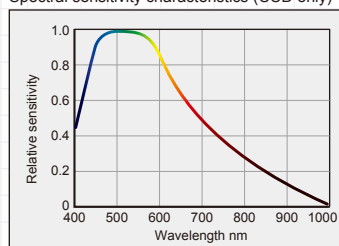


## Important points when using a red LED light and a CCD camera with a built-in infrared cutoff filter

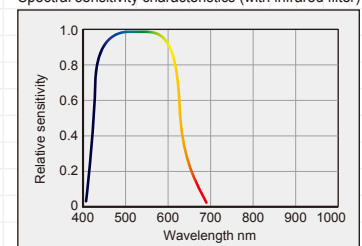
When using a red LED light, remove the infrared cutoff filter from the CCD camera. If the infrared cutoff filter is not removed, the light intensity will decrease by more than one half as the wavelength of red LED light is 660 nm.

In addition, the light shifts toward infrared if it becomes hot, and thus heating will cause the image to darken.

Spectral sensitivity characteristics (CCD only)



Spectral sensitivity characteristics (with infrared filter)



## Determining the field of view of coaxial lighting

Figure 1 shows a cross-section of a coaxial light (LFV Series). Light from the LED is reflected using a half-mirror, and thus the position of the emitting surface can be treated as if it is directly behind the mirror. In this case, the distance from the emitting surface to the work is called the "LWD".

The effective field of view of coaxial light is determined by 1) the LWD (distance from the light to the work) and 2) the WD (distance to the CCD camera). Figure 2 shows how to determine the field of view "V" when the WD is held constant and the LWD (distance to the light) is varied. The following is an explanation of what the effective field of view will be when the provisional emitting surface is at positions A and B.

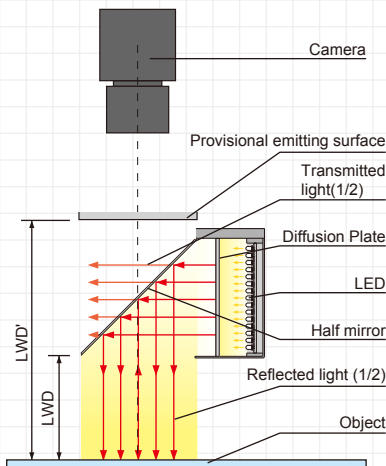
In the case of position A, if we assume that the work is a reflecting surface, we can say that there is an emitting surface at A opposite to the work (position A' of the LWD'a distance). Therefore, when the work piece is viewed through the camera, it appears as if the emitting surface is at A', and thus the effective field of view is Va.

In the same way, in the case of B the emitting surface is at B' and the effective field of view is Vb. Comparing Va to Vb, we find that Va, which has the shorter LWD, has a greater effective field of view. In this way, the effective field of view grows as the LWD shortens.

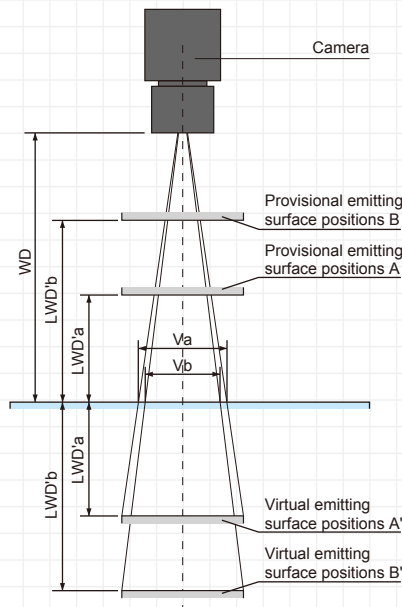
<What is the effective field of view?>

For example, when reading characters engraved on a shiny piece of metal, if we assume that the provisional emitting surface is at position B, Vb will be determined by the virtual provisional emitting surface position B'. For this reason, only the letters CDEFG will be visible as dark letters against a light background, and the letters AB and HI, which appear dark against a dark background, will not be discernible. In this way, the effective field of view Vb is smaller than the field of view V.

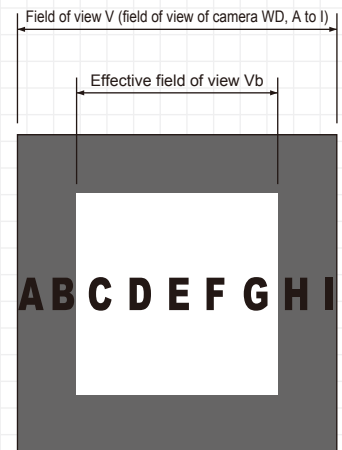
**Figure 1**  
Cross-section of coaxial light



**Figure 2**  
Determining field of view by LWD

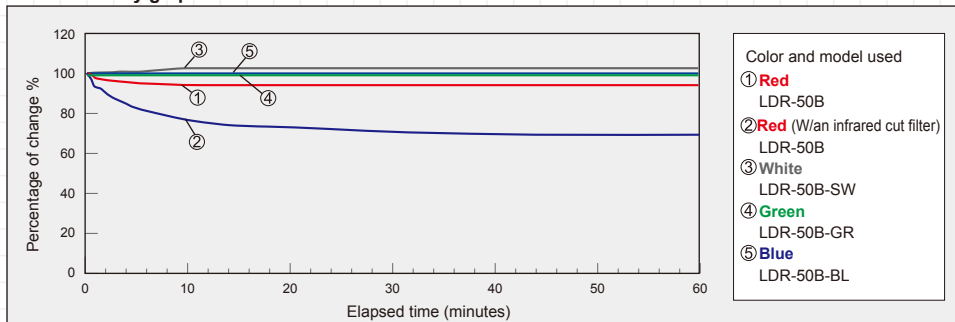


**Figure 3**  
Field of view and effective field of view



## Changes in CCD sensitivity due to illumination time for each color of LED

**CCD sensitivity graph**



### Measurement results

- Approximately 6% reduction in camera output was observed with red lighting (1).
- Approximately 31% reduction in camera output was observed for red lighting with an infrared filter (2).
- Approximately 26% increase in camera output was observed with white lighting (3).
- No change in camera output was observed for green lighting (4) or blue lighting (5).



















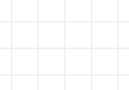
### Test configuration















Camera	NC-300(Takenaka system)
Shutter speed	1/60 Sec.
Camera Lens	f25mm Lens
F-Stop	F-16
Extension tube	5mm
Field of view	20mm
Volume Level	100%(Max)
Temperature	25°C
Humidity	50%
WD	99mm
LWD	50mm

Infrared cut filter is used. The intensity is measured on the light reflected from the standard white plate.

# Discontinued products Information

as of Mar. 2012

Discontinued products				Successor			
Series		No. of models involved	Note	Series			
Direct Lighting	LDR2 series SW type(White)	7 models	Obsolete	Direct Lighting	LDR2 series SW2 type(White)		P.17 P.18
Ring Lights				Ring Lights			
Direct Lighting	LDR2-LA series SW type(White)	6 models	Obsolete	Direct Lighting	LDR2-LA series SW2 type(White)		P.19 P.20
Low-angle Ring Lights				Low-angle Ring Lights			
Direct Lighting	LDL series SW type(White)	7 models	Obsolete	Direct Lighting	LDL series SW2 type(White)		—
Bar Lights				Bar Lights			
Indirect Lighting	LFR series SW type(White)	6 models	Obsolete	Indirect Lighting	LFR series SW2 type(White)		P.27 P.28
Flat-ring Lights				Flat-ring Lights			
Indirect Lighting	LKR series SW type(White)	3 models	Obsolete	Indirect Lighting	LKR series SW2 type(White)		P.27 P.28
Flat-ring Lights				Flat-ring Lights			
Indirect Lighting	FPQ series SW type(White)	5 models	Obsolete	Indirect Lighting	FPQ series SW2 type(White)		P.31 P.32
Low-angle Square Lights				Low-angle Square Lights			
Indirect Lighting	FPR series SW type(White)	3 models	Obsolete	Indirect Lighting	FPR series SW2 type(White)		P.31 P.32
Low-angle Ring Lights				Low-angle Ring Lights			
Indirect Lighting	LFL series SW type(White)	11 models	Obsolete	Indirect Lighting	LFL series SW2 type(White)		P.35 P.36
Flat Lights				Flat Lights			
Indirect Lighting	LDL-TP series SW type(White)	7 models	Obsolete	Indirect Lighting	LDL-TP series SW2 type(White)		—
Flat Lights				Flat Lights			
Indirect Lighting	LDM2 series SW type(White)	2 models	Obsolete	Indirect Lighting	LDM2 series SW2 type(White)		P.43 P.44
Dome Lights				Dome Lights			
Indirect Lighting	LFV series SW type(White)	2 models	Obsolete	Indirect Lighting	LFV series SW2 type(White)		P.45 P.46
Coaxial Lights				Coaxial Lights			
Indirect Lighting	LFV2 series SW type(White)	8 models	Obsolete	Indirect Lighting	LFV2 series SW2 type(White)		P.45 P.46
Coaxial Lights				Coaxial Lights			
Direct Lighting	LDL series	30 models	Obsolete	Direct Lighting	LDL2 series		P.21 P.22
Bar Lights				Bar Lights			
Direct Lighting	LDQ series	16 models	Obsolete	Direct Lighting	LDL2 series		P.21 P.22
Bar Lights				Bar Lights			
Special	PFB series	41 models	Obsolete	Special	PFB2 series		P.69 P.70
LED Light Source Unit				LED Light Source Unit			
Indirect Lighting	LDL-TP series LDL series (Flat type)	25 models	Obsolete	Indirect Lighting	TH series		P.33 P.34
Flat Lights		4 models		Flat Lights			
Special	HLV series	26 models	Obsolete	Special	HLV2 series		P.63 to P.68
Spot Lights				Spot Lights			
Direct Lighting	SQR-TP-28-OR	5 models	Obsolete	Direct Lighting	SQR-TP-28RD		P.17 P.18
Ring Lights				Ring Lights			
Direct Lighting	SQR-TP-34-OR	3 models	Obsolete	Direct Lighting	SQR-TP-34RD		P.17 P.18
Ring Lights				Ring Lights			

Discontinued products				Successor			
Series		No. of models involved	Note	Series			
Control Units	PSB2 series	2 models	Obsolete	Control Units	PSB3-30024		P.89 P.90
Special High Intensity Spot Lights	HSL series	1 models	Obsolete	/			
Control Units	PHL-0508-CD24	1 models	Obsolete	/			
Direct Lighting Ring Lights	LDR2 series RD type(Red)	7 models	Supply until April 15, 2013	Direct Lighting Ring Lights	LDR2 series RD2 type(Red)		P.17 P.18
Direct Lighting Ring Lights	SQR series RD type(Red)	1 models	Supply until April 15, 2013	Direct Lighting Spot Lights	SQR series RD2 type(Red)		P.17 P.18
Direct Lighting Low-angle Ring Lights	LDR2-LA series RD type(Red)	6 models	Supply until April 15, 2013	Direct Lighting Low-angle Ring Lights	LDR2-LA series RD2 type(Red)		P.19 P.20
Direct Lighting Low-angle Ring Lights	LDR-LA-1 series RD type(Red)	5 models	Supply until April 15, 2013	Direct Lighting Low-angle Ring Lights	LDR-LA1 series RD2 type(Red)		P.19 P.20
Indirect Lighting Flat-ring Lights	LFR series RD type(Red)	7 models	Supply until April 15, 2013	Indirect Lighting Flat-ring Lights	LFR series RD2 type(Red)		P.27 P.28
Indirect Lighting Flat-ring Lights	LKR series RD type(Red)	3 models	Supply until April 15, 2013	Indirect Lighting Flat-ring Lights	LKR series RD2 type(Red)		P.27 P.28
Indirect Lighting Low-angle Ring Lights	FPR series RD type(Red)	3 models	Supply until April 15, 2013	Indirect Lighting Low-angle Ring Lights	FPR series RD2 type(Red)		P.31 P.32
Indirect Lighting Flat Lights	LFL series RD type(Red)	11 models	Supply until April 15, 2013	Indirect Lighting Flat Lights	LFL series RD2 type(Red)		P.35 P.36
Indirect Lighting Dome Lights	LDM2 series RD type(Red)	2 models	Supply until April 15, 2013	Indirect Lighting Dome Lights	LDM2 series RD2 type(Red)		P.43 P.44
Collimated Lighting Coaxial Lights	MSU series RD type(Red)	3 models	Supply until April 15, 2013	Collimated Lighting Coaxial Lights	MSU series RD2 type(Red)		P.57 P.58
Special Spot Lights	LV series RD type(Red)	1 models	Supply until April 15, 2013	Special Spot Lights	LV series RD2 type(Red)		P.74
Indirect Lighting Low-angle Square Lighting	FPQ series	5 models	Supply until April 15, 2013	Indirect Lighting Low-angle Square Lighting	FPQ2 series		P.29 P.30
Indirect Lighting Flat-Dome Lights	LFX series	3 models	Supply until April 15, 2013	Indirect Lighting Flat-Dome Lights	LFX2 series		P.37 P.38

Note: Please refer to CCS Web site for more details.

[http://www.ccs-grp.com/s2\\_ps/s1/s\\_05/product-2011.html](http://www.ccs-grp.com/s2_ps/s1/s_05/product-2011.html)



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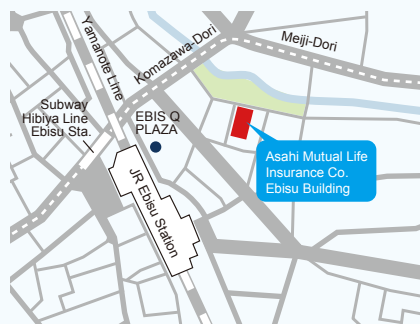
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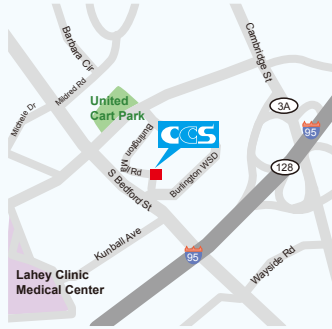
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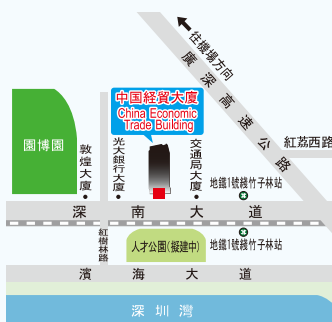
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# CCS website

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

CCS Corporate Profile >>> Machine Vision Applications >>> Machine Vision Applications Topics

## ● Product Information

Product information, such as specifications and accessories, is provided. Downloadable information is also provided.

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Information on new and popular products is provided.

## ● Downloads

This page is for downloading 3D-CAD drawings, PDF drawings, DXF drawings, operation manuals, PDF catalogs, and PDF brochures.

## ● Services and Support

Items such as Warranty Information, Repairs, FAQs, Domestic and Overseas Branches, Testing Rooms, are listed.

## ● Contacting CCS

Inquiries on LED Lighting, Borrowing Products, Estimates, Requests for Catalogs, Product-related Questions, and Other Questions are handled from this web page.



## Registration for New CCS Members

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If you register as a CCS member, you can download all materials (such as PDF or DXF drawings and operation manuals) from our website. You can also send in applications for selecting the appropriate Light Unit or borrowing Demonstration Units, and post requests for estimates or for catalogs. Go ahead and register as a member.

## Direct Number Input Fields

### ● Direct Number

A direct number is a 7-digit number assigned to a CCS product. You can easily access the web page providing information on any desired product by simply entering the direct number in the field provided. The direct number assigned to each product is listed in the Direct Number Table or on the product web page.

Download the Direct Number Table to find direct numbers that are not listed in this catalog. Refer to Direct Numbers under the Services and Support page for details.  
[http://www.ccs-grp.com/s6\\_common/direct.html](http://www.ccs-grp.com/s6_common/direct.html)

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\*Many of our products are protected by intellectual property rights (patents, industrial designs, and trademarks). Be warned against imitations of the CCS brand.

## Notes:

- Carefully read the product's instruction manual before use to ensure correct operation.
- Product specifications and design are subject to change without notice.
- Examples of workpiece imaging in this catalog are a guide that may be informative for choosing illuminators. Please check the functions of the equipment and requirements when choosing. In addition, the sample workpieces that are used are processed by us and do not represent the original quality and performance.



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