CCS
CREATIVE CUSTOMER SATISFACTION

LIGHTING SOLUTION
LED Illuminators for Machine Vision

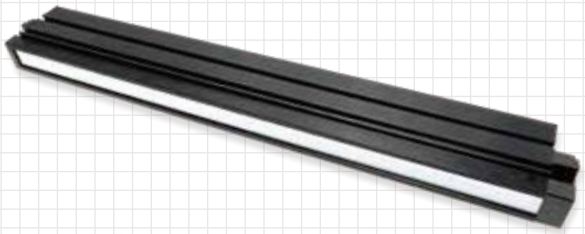
Line Sensor LED Lights Catalog

Vol. 1

CCS Inc.

Line Sensor LED Lights - Line-Up

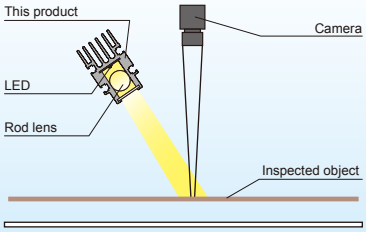
LNSP series Reflection type



→ P.7

Illuminating mechanism

Achieve high output illumination with controlled diffusion due to this unique illuminating mechanism.
Because light does not easily diffuse, there is little loss for the amount of light, allowing for illumination over long distances.



Natural air cooling with a brightness of 400,000 lx, the highest level in the industry.* By controlling light diffusion through the unique illuminating mechanism, there is little change in the brightness due to distance, allowing you to flexibly set the distance between the inspected item and the light. The emitting surface can be made from a minimum of 100 mm up to a maximum of 1,000mm, in 100 mm increments.

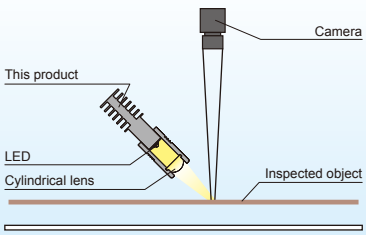
* Measured values with an illuminating distance of 50 mm

LN-HK-STK series Reflection type

→ P.11

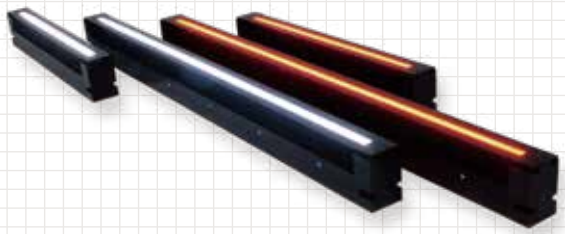
Illuminating mechanism

Illuminated light from the LED is passed through a cylindrical lens at the tip, thus illuminating a convergent line of light.



A cylindrical lens allows for illuminating with a convergent line of light. There are two types of emitting surface lengths: 60 mm or 200 mm.
By changing the position of the lens unit on the tip, you can freely set the converging length or the converging width for the illuminated light.

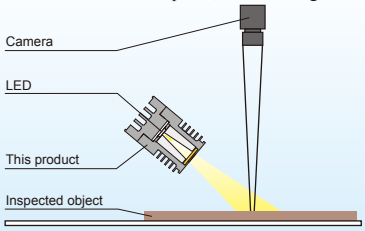
HLND series R type Reflection type



→P.15

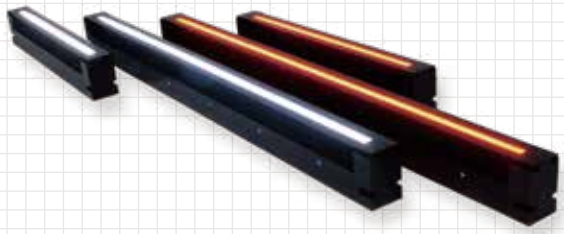
Illuminating mechanism

Achieve high output by employing unique radiating and illuminating mechanisms.
The emitting surface can be made up to 2,700 mm long.



Achieve the optimal high output as reflection lighting by using a diffusion plate with a high transmittance rate. Supports use with higher brightness than the T-type (transmission lighting) of the same series. The emitting surface can be made from a minimum of 100 mm up to a maximum of 2,700 mm, in 100 mm increments.

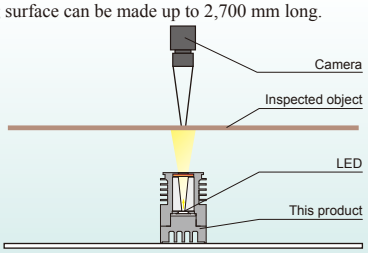
HLND series T type Transmission type



→P.19

Illuminating mechanism

Achieve high uniformity by employing unique radiating and illuminating mechanisms.
The emitting surface can be made up to 2,700 mm long.



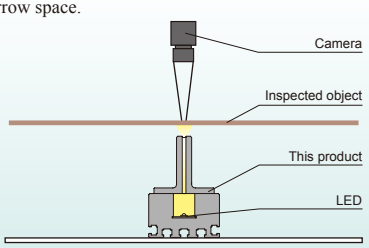
Achieve the optimal uniformity as transmission lighting by using a diffusion plate with a high diffusion rate. Supports use with higher uniformity than the R-type (reflection lighting) of the same series. The emitting surface can be made from a minimum of 100 mm up to a maximum of 2,700 mm, in 100 mm increments.

LT series Transmission type

→P.23

Illuminating mechanism

By employing a mechanism where the emitting surface sticks out from the main unit, it's possible to illuminate with the tip near the inspected item, even in a narrow space.



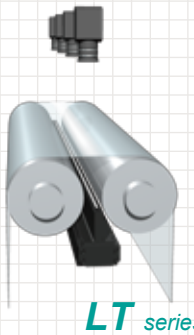
Achieve both high uniformity and high brightness through this unique optical system. It can perform highly-accurate inspections, as well as handle high-speed scan rates as well.
The emitting surface can be made from a minimum of 100 mm up to a maximum of 1,800mm, in 100 mm increments.

Selecting for Application by Industry

Plastic film and glass industry
Inspecting for scratches on transparent film

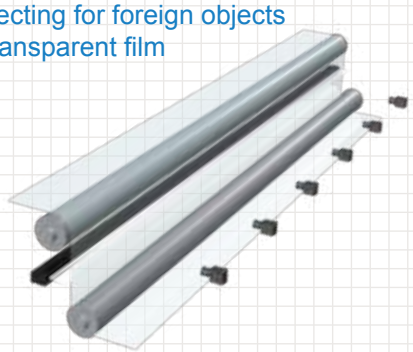
LNSP series → P.7

Plastic film and glass industry
Inspecting for fish eyes, scratches, and foreign materials on transparent film



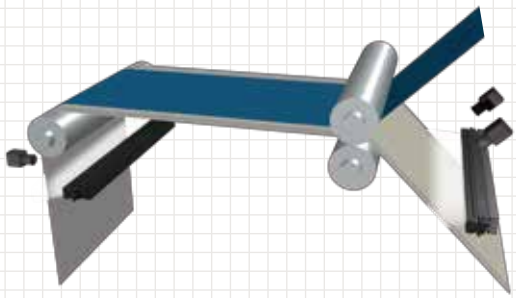
LT series → P.23

Plastic film and glass industry
Inspecting for foreign objects on transparent film



HLND series T type → P.19

Papermaking industry
Inspecting alignment for label seals



LNSP series → P.7

Non-woven fabric industry
Inspecting for faults in non-woven fabrics

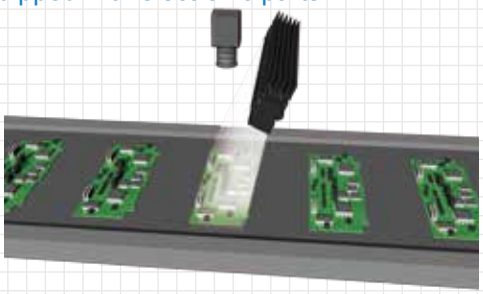
LN-HK-STK series → P.11

Food product industry
Inspecting for foreign materials mixed in rice

HLND series R type → P.15

Substrates and electronics industry

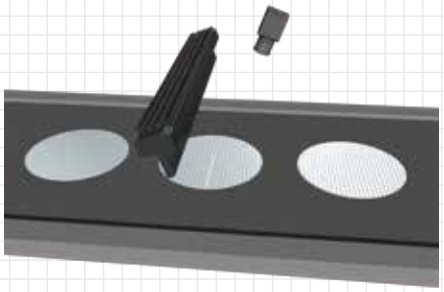
Inspecting the exterior of substrates equipped with electronic parts



LNSP series → P.7

Substrates and electronics industry

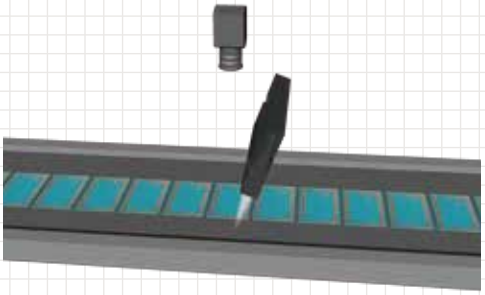
Inspecting for cracks and damage in wafers



LT series → P.23

Substrates and electronics industry

Inspecting the exterior of film substrates



LN-HK-STK series → P.11

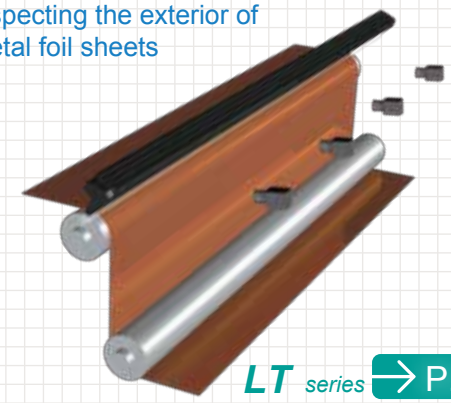
Mechanical parts industry

Inspecting for scratches and dents in motor axles

HLND series *T* type → P.19

Metal industry

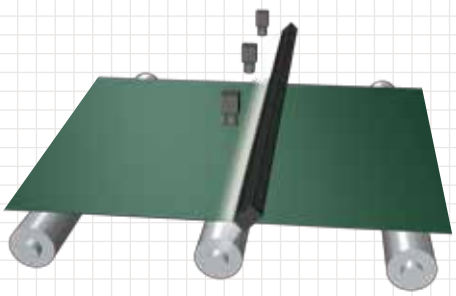
Inspecting the exterior of metal foil sheets



LT series → P.23

Steel plate industry

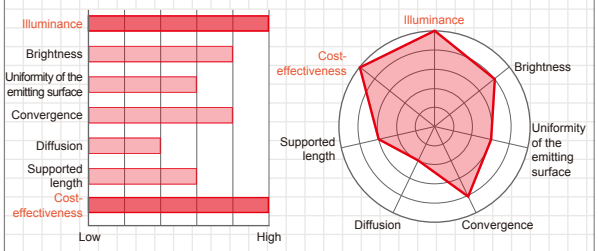
Inspecting the exterior of colored steel plates



HLND series *R* type → P.15

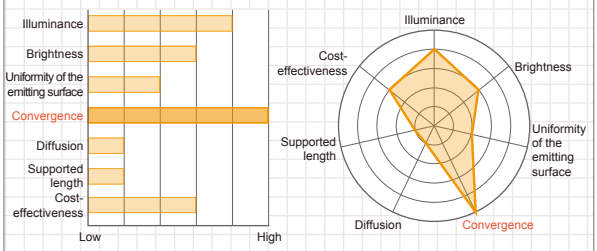
Selecting based on lighting characteristics

If selecting based on illuminance or cost-effectiveness...



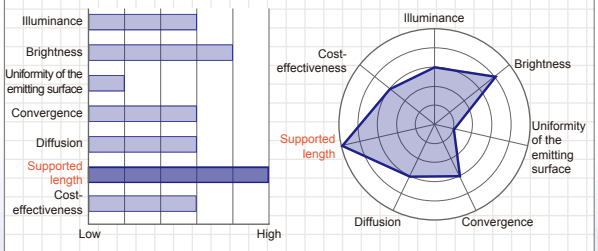
LNSP series → P.7

If selecting based on convergence...



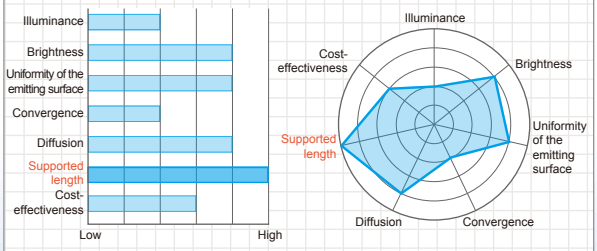
LN-HK-STK series → P.11

If selecting based on supported length...



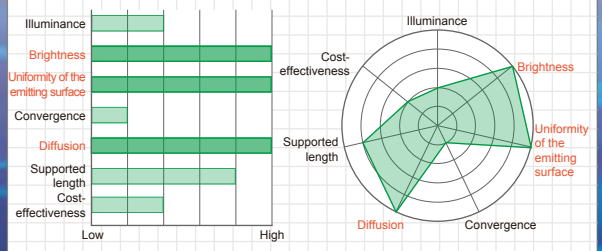
HLND series *R* type → P.15

If selecting based on supported length...



HLND series *T* type → P.19

If selecting based on brightness, uniformity of the emitting surface, or diffusion...



LT series → P.23

Conditions for comparing each light

Illuminance:
Comparison of measured values 100 mm away from the light's emitting surface

Brightness:
Comparison using our measurement conditions

Uniformity of the emitting surface:
Comparison of measured values 100 mm away from the light's emitting surface with the lens focal point aligned

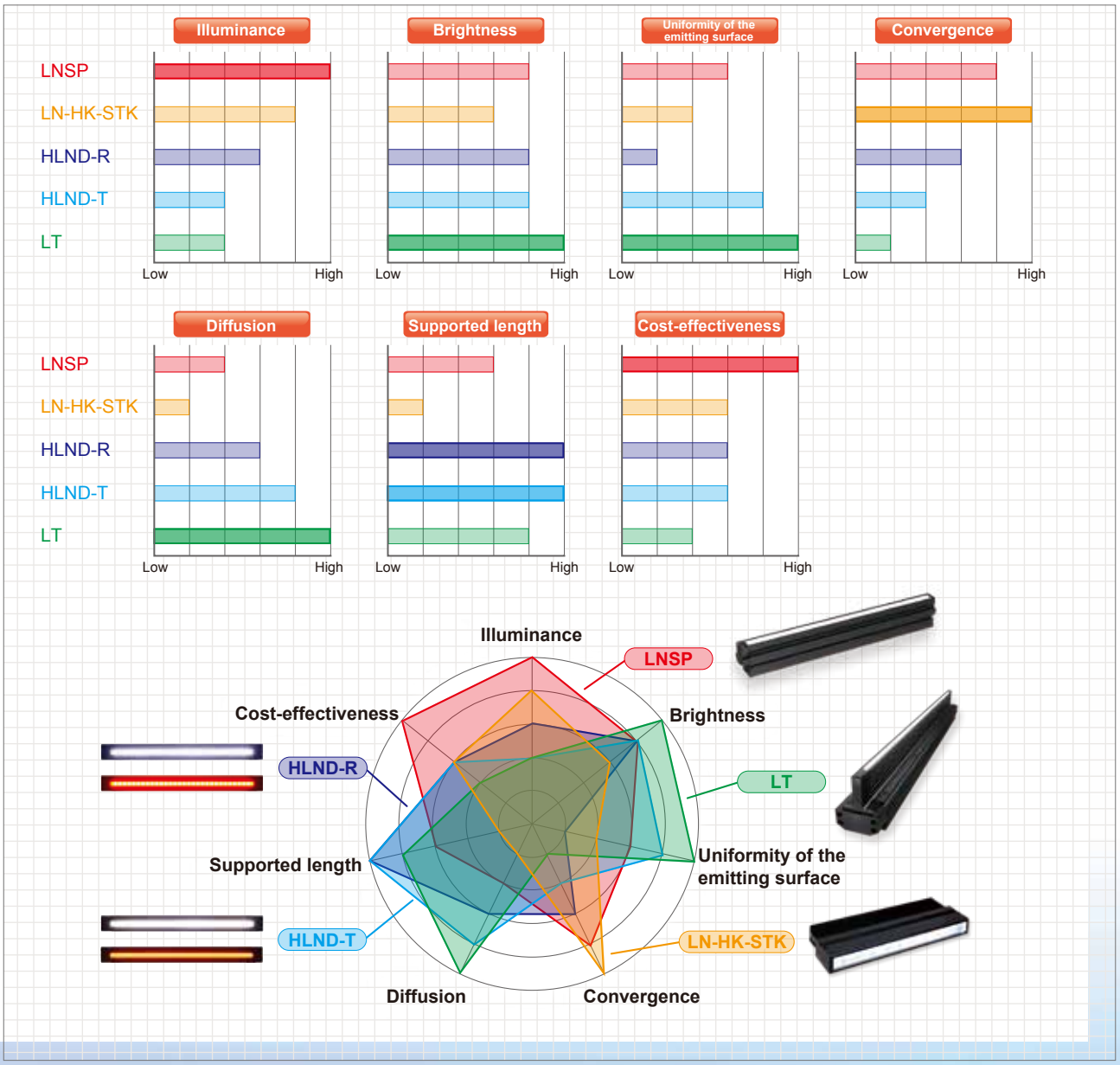
Convergence:
Comparison using our measurement conditions

Diffusion:
Comparison using our measurement conditions

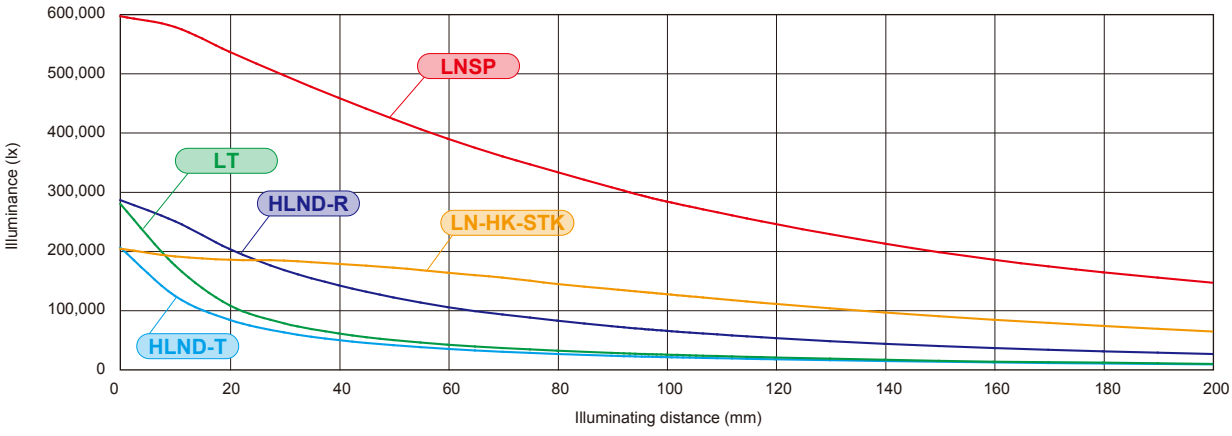
Supported length:
Comparison using the product line-up

Cost-effectiveness:
Comparison using standard price for a 200 mm emitting surface

*Data listed here are actually measured values.
Results may vary for individual units.



Graph of the change in illuminance of line sensor lighting



Achieved brightness of 400,000 lx*1 with a natural air cooling type

Line sensor lighting that achieves both high output and compact size

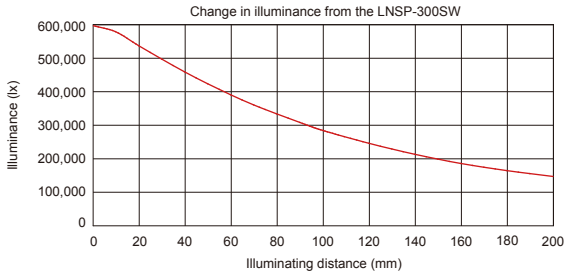
*1. Actual measurement values at a 50 mm illumination distance, current as of our in-house inspection in September of 2011.

LNSP-600SW

Brightness of 400,000 lx*1, the top class in the industry

Through our unique illuminating mechanism, we achieved a brightness of 400,000 lx, the top class in the industry for natural air cooling types.

Graph of the change in illuminance

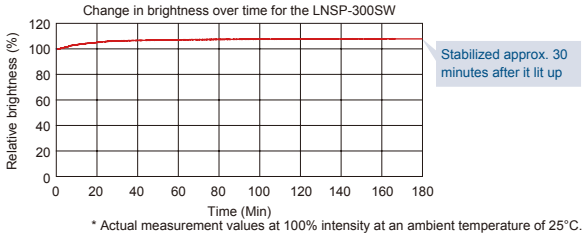


* Actual measurement values at 100% intensity in each illuminating distance. (Results may vary for individual units.)

Providing a stable inspection environment

We provide a stable examination environment. The light stabilizes about 30 minutes after being turned on, and furthermore, the output variance is low.

Graph of the change in brightness over time

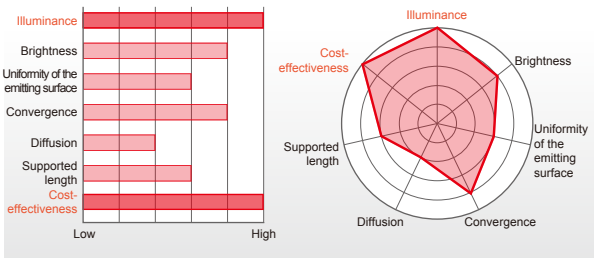


* Actual measurement values at 100% intensity at an ambient temperature of 25°C. (Results may vary for individual units.)

Lighting characteristics

The following radar chart introduces the LNSP Series' characteristics.

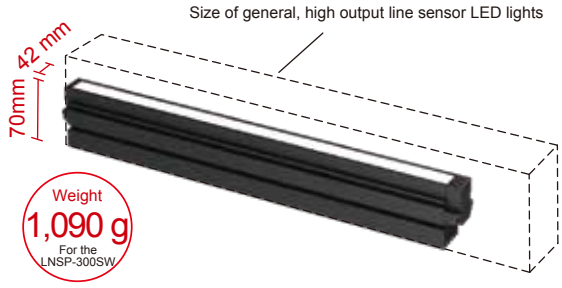
Lighting characteristics radar chart



Achieving both high output and compact space

We achieved a compact design compared to general, high output line sensor LED lights.

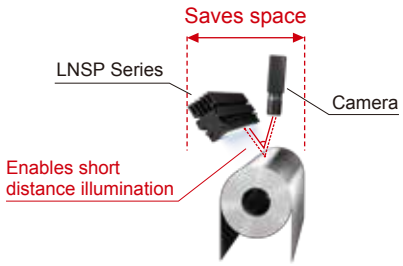
Compact design



Saving space for your inspection environment

By making the light more compact, we contribute to saving space in your inspection environment or equipment environment.

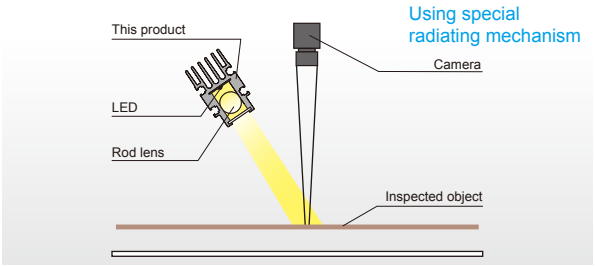
Space-saving environment



Illuminating mechanism

Achieve high output illumination with controlled diffusion due to this unique illuminating mechanism.
Because light does not easily diffuse, there is little loss for the amount of light, allowing for illumination over long distances.

Figure of the LNSP's illuminating mechanism

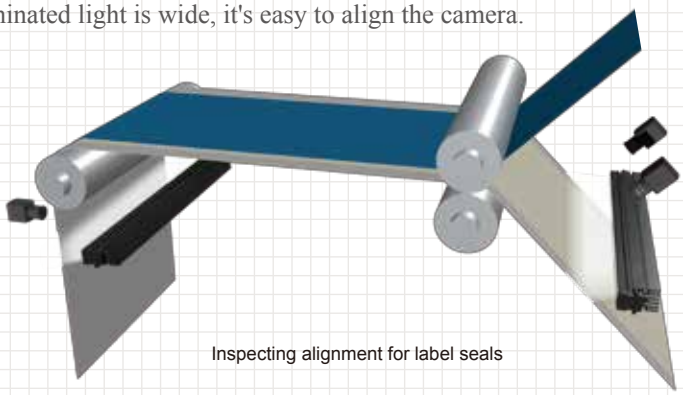


LNSP Series Direct Number
Direct No. 1500

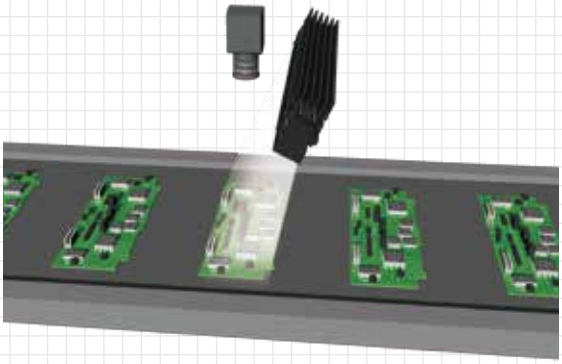
You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Applications

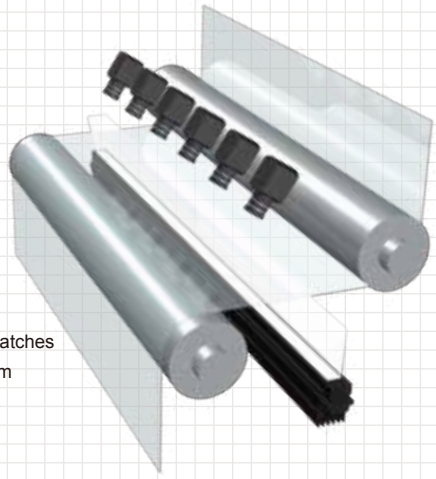
We use high output and uniform illumination to provide optimal imaging for a wide variety of objects, from glossy test material to objects with diffusion.
Also, because the illuminated light is wide, it's easy to align the camera.



Inspecting alignment for label seals



Inspecting the exterior of substrates equipped with electronic parts

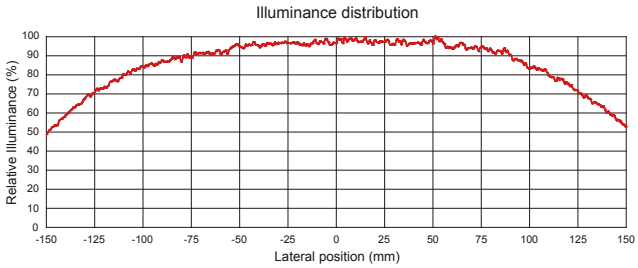


Inspecting for scratches on transparent film

Data

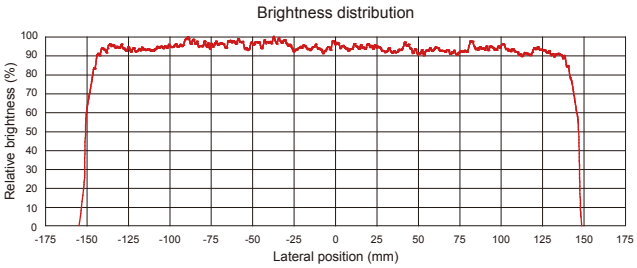
Measurement data for the LNSP-300SW (Data listed here are actual measurement values. Results may vary for individual units.)

Graph of the distribution of illuminance



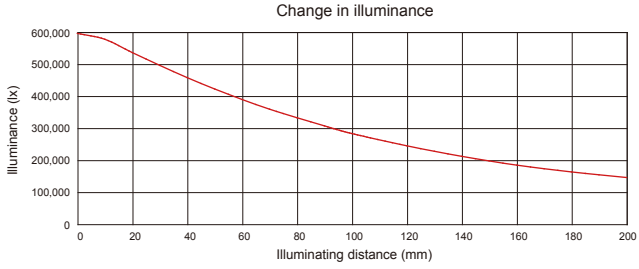
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the distribution of brightness



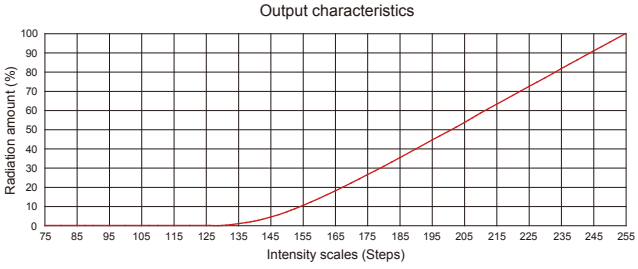
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the change in illuminance



* Actual measurement values at 100% intensity at each illuminating distance.

Graph of output characteristics



* Actual measurement values when using analog Control Unit, PSB3-30024.

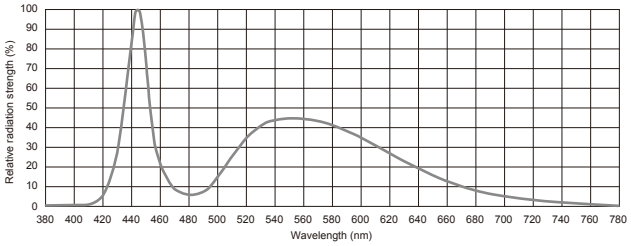
Information about Web Member registration

If you register as a member on our website, you can download various materials, such as 3D-CAD drawings and instruction guides. Also, we accept applications for lighting selections and free demo products from our contact page. Please feel free to use it.

Lineup

Direct number	Model	LED color	Emitting surface length	Power consumption (max.)	Weight (max.)	Applicable Control Unit	Dimensions
1005084	LNSP-100SW	White	100mm	21W	430g	PSB3-30024	1
1005085	LNSP-200SW		200mm	41W	760g		
1005086	LNSP-300SW		300mm	61W	1,090g		
1005087	LNSP-400SW		400mm	81W	1,420g		
1005088	LNSP-500SW		500mm	101W	1,740g		
1005089	LNSP-600SW		600mm	121W	2,070g		
1005090	LNSP-700SW		700mm	142W	2,400g		
1005091	LNSP-800SW		800mm	162W	2,730g		
1005092	LNSP-900SW		900mm	182W	3,050g		
1005093	LNSP-1000SW		1,000mm	202W	3,380g		

Common specifications

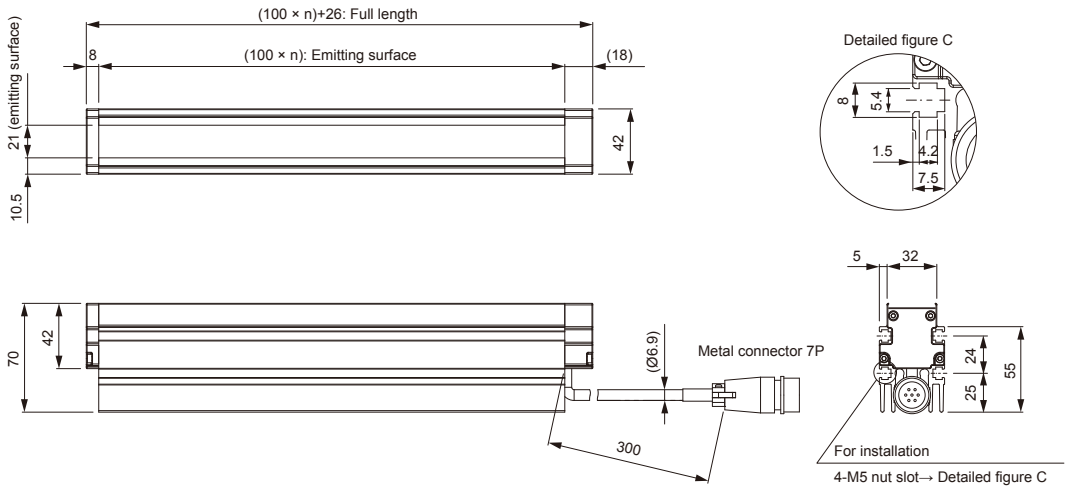
LED color	White (SW)	Cable length	0.3 m
Correlated color temperature	5,800 K (typ.)	Case material	Emitting surface: Acrylic, Base: Aluminum alloy, Side plate: PC
Input voltage	DC24V (max.)	Operating environment	Temperature: 0 to 40 °C, Humidity: 20 to 70%RH (with no condensation)
Connector	Metal connector: SRCN1A16-7P (Made by Japan Aviation Electronics Industry, Limited)	Storage environment	Temperature: -10 to 60 °C, Humidity: 20 to 70%RH (with no condensation)
Polarity/signal	1, 2, 3: (+), 4, 5, 6: (−), 7: NC	Cooling method	Natural air cooling
Light spectrum			

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Dimensions (mm)

1 LNSP- (100 × n)SW

*n = Number from 1 to 10



Applicable Control Unit

PSB3-30024

Direct number	Model	Applicable light	No. of channels
2000762	PSB3-30024	300W	1

→P.27

Options

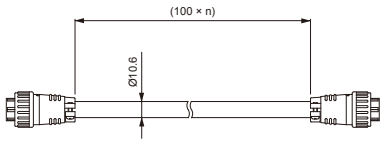
- Extension cable

This cable connects the light and the Control Unit. You can choose from 2 m, 3 m, 5 m, 10 m, and 20 m.

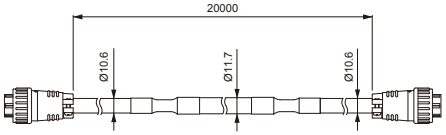
Direct number	3000142	3000151	3000159	3000131	3000149
Model	FCB-2-1.25SQ-ME7	FCB-3-1.25SQ-ME7	FCB-5-1.25SQ-ME7	FCB-10-1.25SQ-ME7	FCB-20-2.0SQ-ME7
Cable length	2 m	3 m	5 m	10 m	20 m

- Dimensions (mm)

FCB-n-1.25SQ-ME7 (n=2, 3, 5, 10)



FCB-20-2.0SQ-ME7



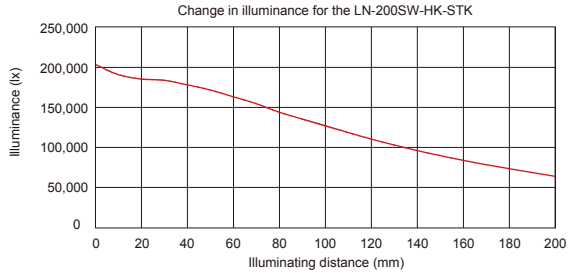
Illuminating converged line light

Cylindrical lens allows for convergent illumination without wasting any light

Achieving high output using unique lighting technology

We achieved high output with low power consumption using our unique radiation mechanism and optical design.

Graph of the change in illuminance



* Actual measurement values at 100% intensity in each illuminating distance.
(Results may vary for individual units.)

Illuminating converged line light

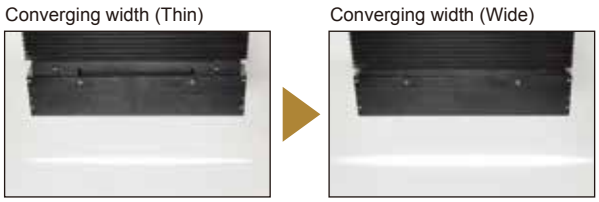
A cylindrical lens allows for convergent illuminance without wasting any light.

Illuminance image for the LN-200SW-HK-STK

You can freely set the converging length and converging width

By changing the position of the lens unit on the tip, you can freely set the converging length or the converging width for the illuminated light.

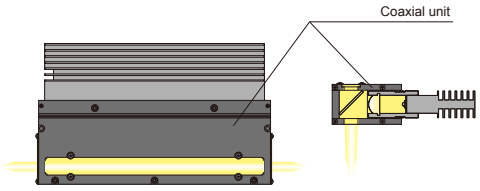
The lens unit can be moved.



A coaxial unit can be installed

Install the optional coaxial unit to use coaxial illumination.

A coaxial unit can be installed.

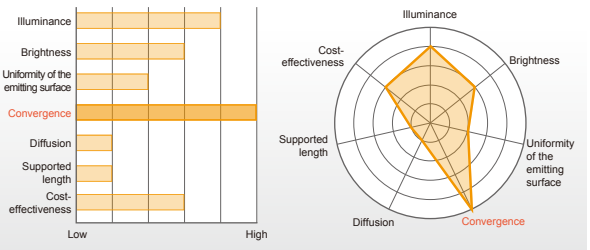


Page 33 contains examples with the coaxial unit installed.

Lighting characteristics

The following radar chart introduces the LN-HK-STK Series' characteristics.

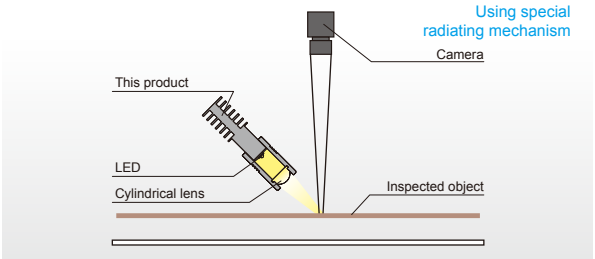
Lighting characteristics radar chart



Illuminating mechanism

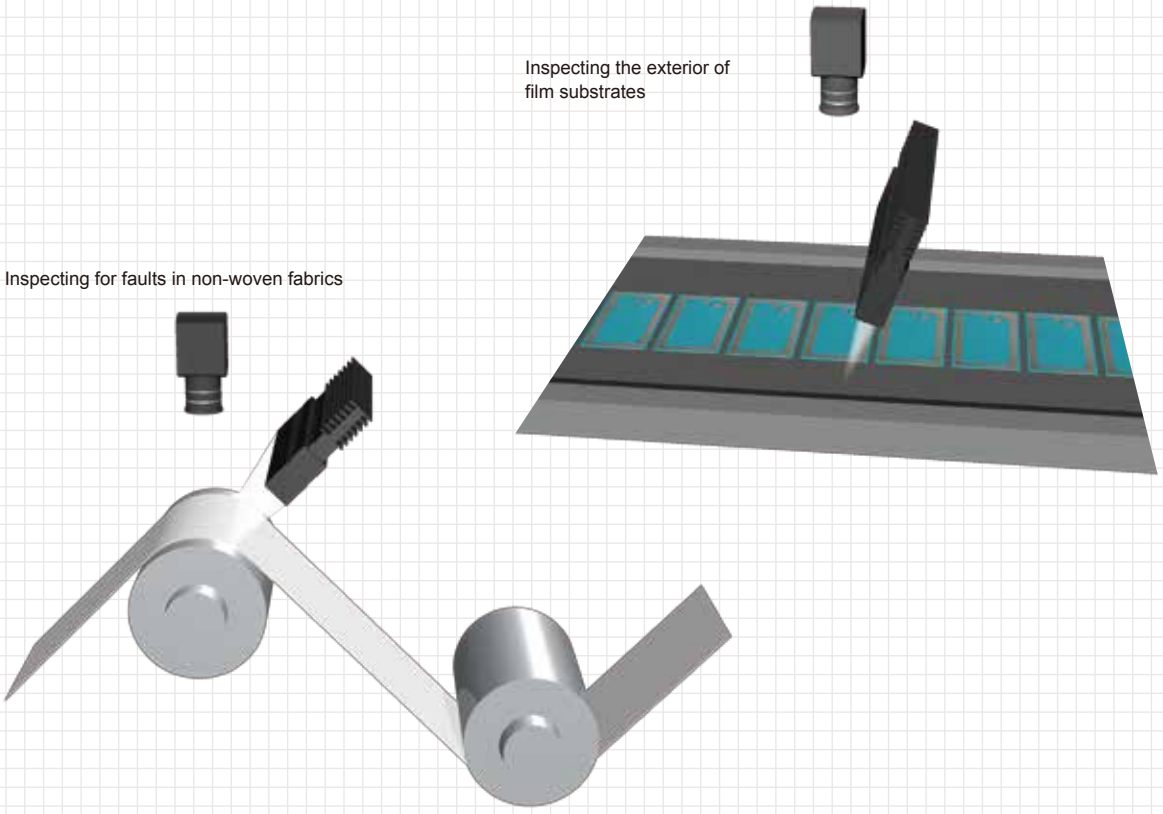
Illuminated light from the LED is passed through a cylindrical lens at the tip, thus illuminating a convergent line of light.

Figure of the LN-HK-STK illuminating mechanism



Applications

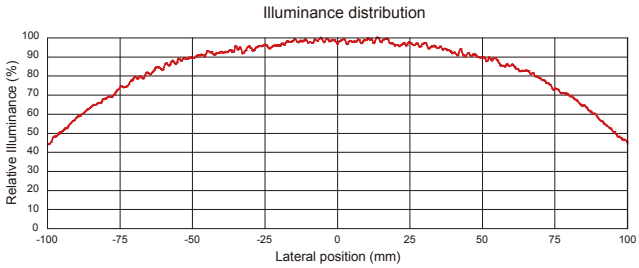
By changing the position of the lens unit on the tip, you can freely set the converging length or the converging width for the illuminated light.
Efficient convergence allows for optimal imaging even with relatively little power consumption.



Data

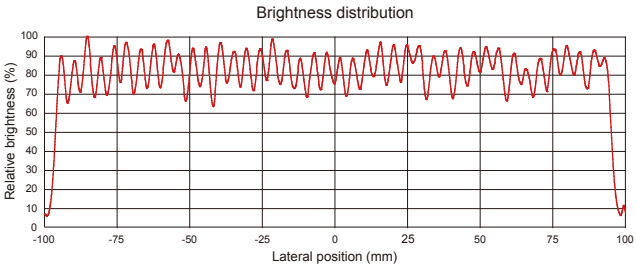
Measured data for the LN-200SW-HK-STK (Data listed here are actual measurement values. Results may vary for individual units.)

Graph of the distribution of illuminance



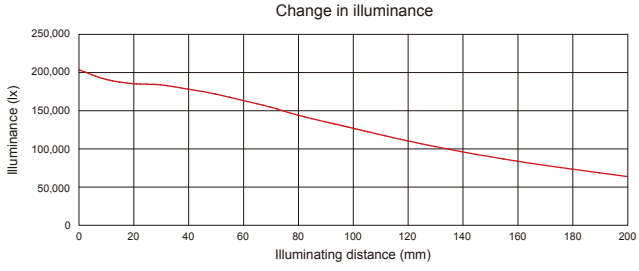
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm (With the custom optional diffusion film installed).

Graph of the distribution of brightness



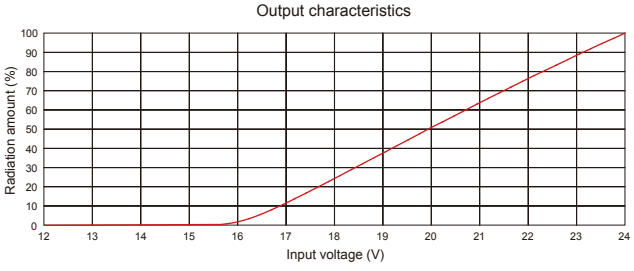
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm (With the custom optional diffusion film installed).
Change the brightness distribution by moving the lens unit's position.

Graph of the change in illuminance



* Actual measurement values at 100% intensity at each illuminating distance.

Graph of output characteristics



* Actual measurement values when using analog Control Unit, PSB-3024VB.

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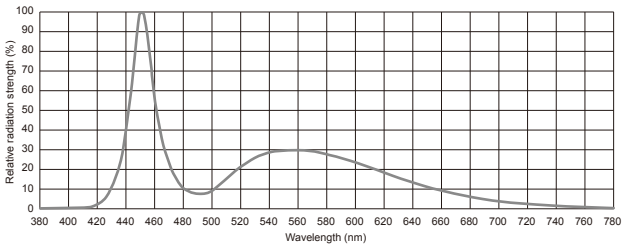
Lineup

Direct number	Model	LED color	Emitting surface length	Power consumption (max.)	Weight (max.)	Applicable Control Unit*	Dimensions
1003120	LN-60SW-HK-STK	White	60mm	6.1W	250g	PD3-3024-3 series PSB series	1
1003067	LN-200SW-HK-STK		200mm	22W	750g		2

*Regarding applicable Control Unit: The digital Control Unit PD3-3024-3 Series controls light intensity through pulse width modulation (PWM). Please evaluate your actual inspection environment before making a selection.

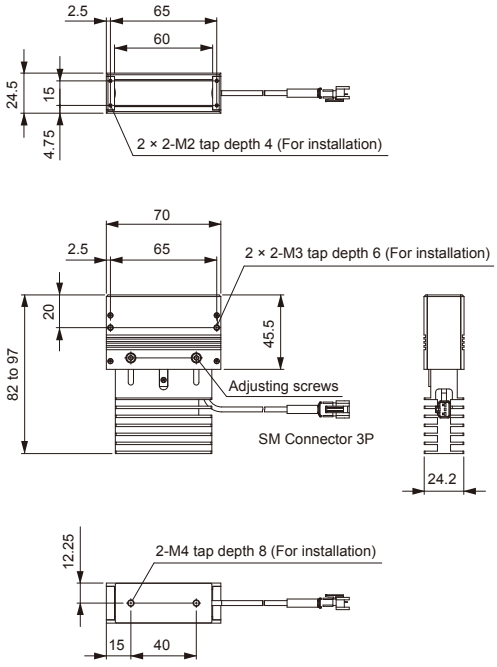
Common specifications

LED color	White (SW)	Cable length	0.3 m
Correlated color temperature	5,500K (typ.)	Case material	Aluminum alloy
Input voltage	DC24V (max.)	Operating environment	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)
Connector	SMR-03V-B × 1	Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)
Polarity/signal	1: Anode (+) Brown, 2: NC, 3: Cathode (−) Blue	Cooling method	Natural air cooling
Light spectrum			

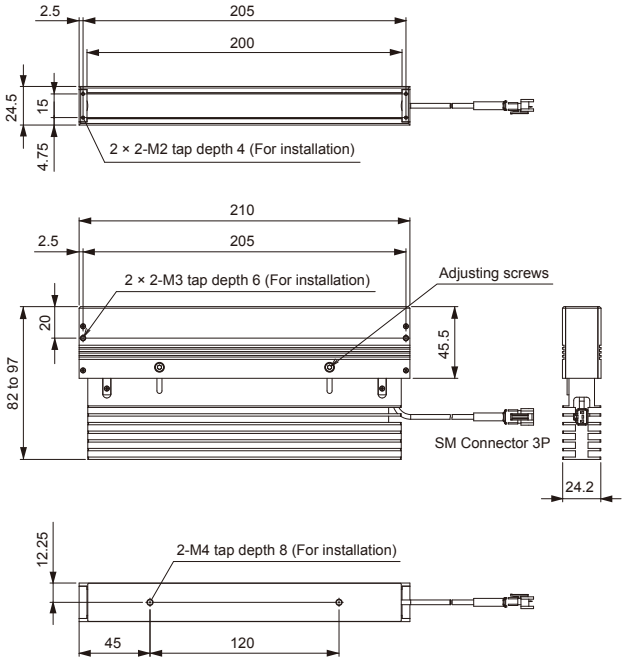
Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Dimensions (mm)

1 LN-60SW-HK-STK



2 LN-200SW-HK-STK



Applicable Control Unit

- Digital Control Unit PD3-3024-3 series

PD3-3024-3-PI

Direct number	Model	Applicable light	No. of channels
2000775	PD3-3024-3-PI	24V 28W	3

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PD3-3024-3-SI

Direct number	Model	Applicable light	No. of channels
2000777	PD3-3024-3-SI	24V 28W	3

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PD3-3024-3-EI

Direct number	Model	Applicable light	No. of channels
2000776	PD3-3024-3-EI	24V 28W	3

P.29

- Analog Control Unit PSB series

PSB-1024VB

Direct number	Model	Applicable light	No. of channels
2000194	PSB-1024VB	24V 10W	1

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PSB-3024VB

Direct number	Model	Applicable light	No. of channels
2000215	PSB-3024VB	24V 30W	1

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PSB-1024V-WW

Direct number	Model	Applicable light	No. of channels
2000191	PSB-1024V-WW	24V 10W	1

P.31

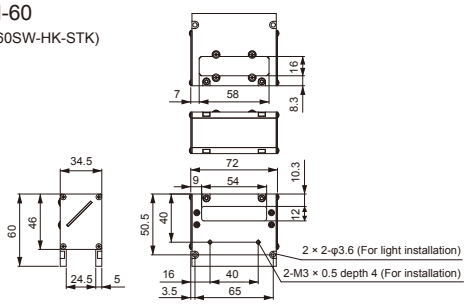
Options

- Coaxial unit

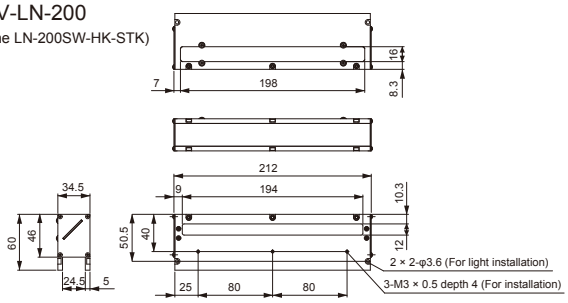
Install on the LN-HK-STK series light to use coaxial illumination.

- Dimensions (mm)

KTV-LN-60
(For the LN-60SW-HK-STK)



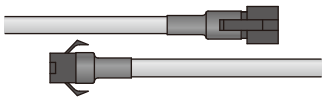
KTV-LN-200
(For the LN-200SW-HK-STK)



- Extension cable

The cable included with the light is 30 cm. Use an extension cable to match your installation environment.

FCB



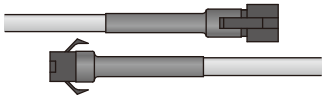
Cable diameter: Ø4.8 mm

Direct number	3000122	3000140	3000150	3000158
Model	FCB-1	FCB-2	FCB-3	FCB-5
Cable length	1 m	2 m	3 m	5 m
Application	Used when extending the space between the light and the Control Unit.			

- Flexible cable

It can even withstand tests where it is bent 10 million times.

FRCB



Cable diameter: Ø4.8 mm

Direct number	3000222	3000231	3000232	3000234
Model	FRCB-1	FRCB-2	FRCB-3	FRCB-5
Cable length	1 m	2 m	3 m	5 m
Application	Use this cable with excellent endurance when extending the space between the light and the Control Unit.			

* If using flexible cables, affix the cable section on the light side (including the connector section).

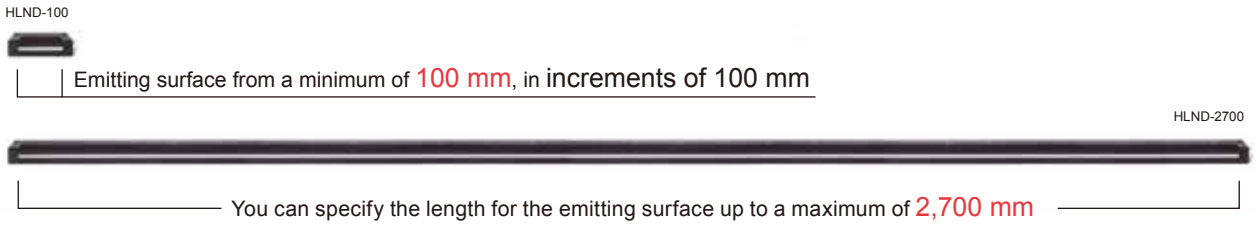
Caution: If you join cables for a length over 5 m, the intensity may be unstable.

We can make emitting surfaces up to 2,700 mm

Line sensor lighting with both high output and length support

We can make emitting surfaces from a minimum of 100 mm up to a maximum of 2,700 mm

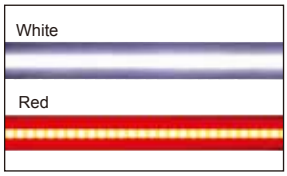
The HLND Series provides light with the optimal length to meet your needs. Because we manufacture the product joining the LED panels, we can manufacture the emitting surface in 100 mm increments. You can specify a maximum of 2,700 mm. Also, we used aluminum alloy as the material for the chassis, and ensured sufficient strength through integral extrusion.



R-type, optimal as reflection lighting

The HLND series R-type achieves the optimal high output as reflection lighting.
Also, the LED can emit white light or red light.
Select your light based on your needs.

R-type (Reflection lighting)



Achieve the optimal high output as reflection lighting by using a diffusion plate with a high transmittance rate. You can use higher brightness than the T-type (transmission lighting) of the same series.

High quality design you can use stably

This light displays stable performance over a long period by using a radiation mechanism that prevents the temperature from rising due to the heat emitted by the LED, as well as a mechanism for efficient illumination.

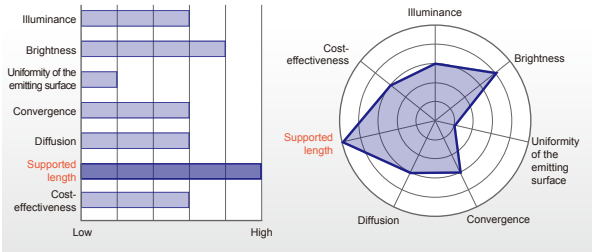
Using a radiating mechanism

Using metal connectors

Lighting characteristics

The following radar chart introduces the HLND Series' R-type's characteristics.

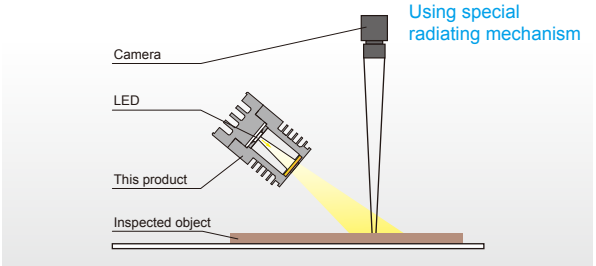
Lighting characteristics radar chart



Illuminating mechanism

Achieve high output by employing unique radiating and illuminating mechanisms.

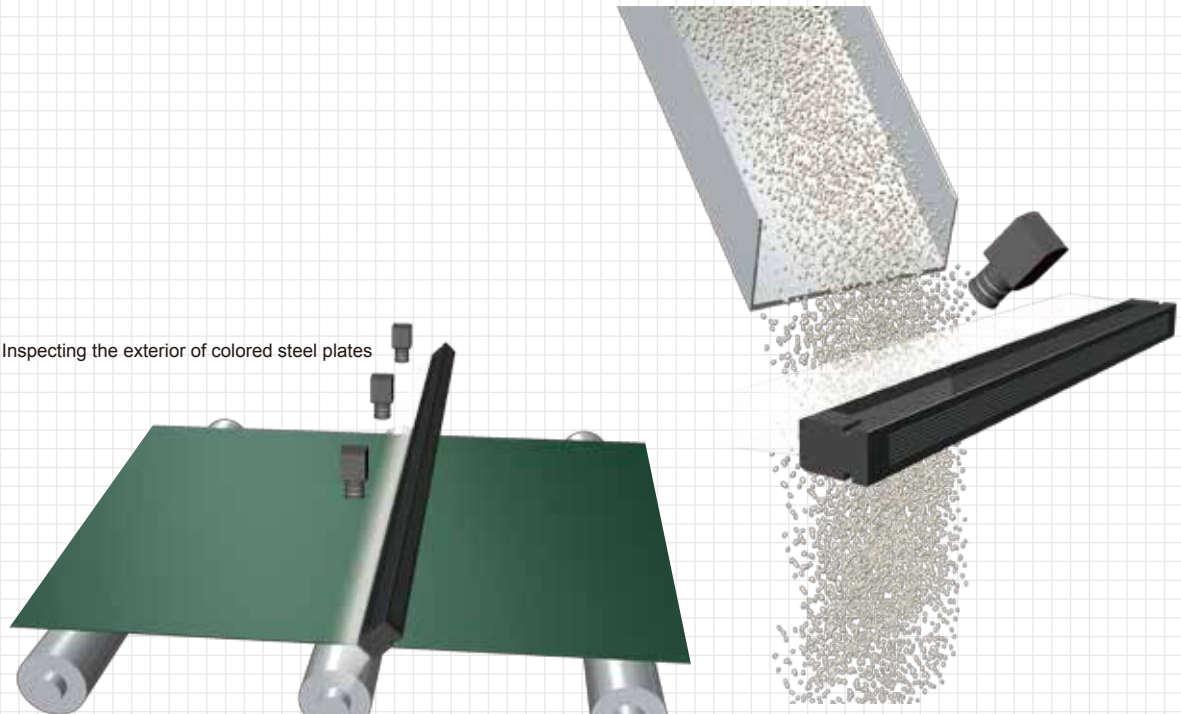
Figure of HLND-R's illuminating mechanism



Applications

We ensured optimal brightness by using a diffusion plate with a high transmittance rate.
It's optimal for imaging in a dark field using scattered light.

Inspecting for foreign materials mixed in rice

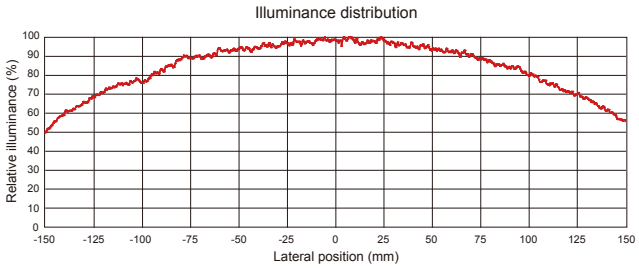


Inspecting the exterior of colored steel plates

Data

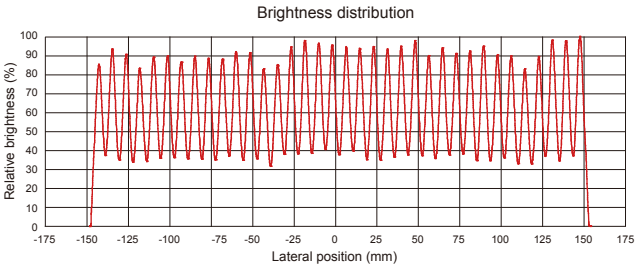
Measured data for the HLND-300SW2-R (Data listed here are actual measurement values. Results may vary for individual units.)

Graph of the distribution of illuminance



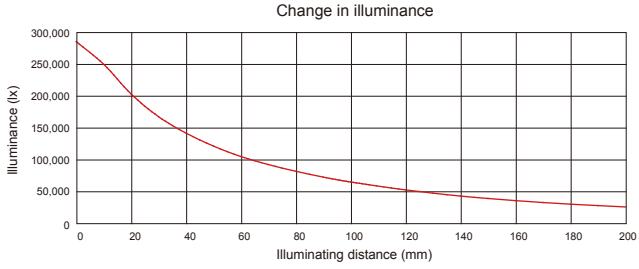
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the distribution of brightness



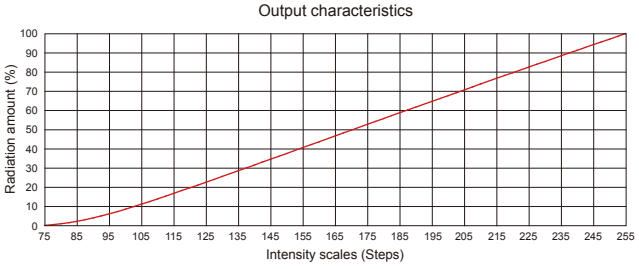
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the change in illuminance



* Actual measurement values at 100% intensity at each illuminating distance.

Graph of output characteristics



* Actual measurement values when using analog Control Unit, PSB3-30024.

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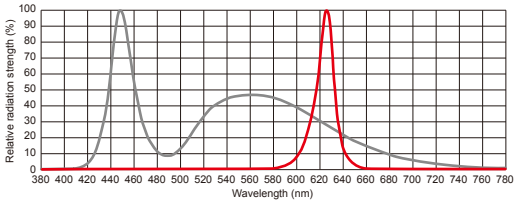
Lineup

Direct number	Model	LED color	Emitting surface length	Power consumption (max.)	Weight (max.)	Applicable Control Unit	Dimensions
1002661	HLND-100RD-R	Red	100mm	4.8W	520g	PSB3-30024	1
1004367	HLND-100SW2-R	White		10W			
1000169	HLND-200RD-R	Red	200mm	9.6W	840g		
1004287	HLND-200SW2-R	White		20W			
1000180	HLND-300RD-R	Red	300mm	14W	1,160g		
1004013	HLND-300SW2-R	White		30W			
1003362	HLND-400RD-R	Red	400mm	19W	1,480g		
1004254	HLND-400SW2-R	White		40W			
1002912	HLND-500RD-R	Red	500mm	24W	1,800g		
1004667	HLND-500SW2-R	White		50W			
1000195	HLND-600RD-R	Red	600mm	29W	2,120g		
1004015	HLND-600SW2-R	White		60W			
1004600	HLND-700RD-R	Red	700mm	34W	2,440g		
1005109	HLND-700SW2-R	White		71W			
1003306	HLND-800RD-R	Red	800mm	38W	2,760g		
1004375	HLND-800SW2-R	White		81W			
1003297	HLND-900RD-R	Red	900mm	43W	3,080g		
1004555	HLND-900SW2-R	White		91W			
1002913	HLND-1000RD-R	Red	1,000mm	48W	3,400g		
1004919	HLND-1000SW2-R	White		89W			
1002822	HLND-1100RD-R	Red	1,100mm	53W	3,750g		
-	HLND-1100SW2-R	White		91W			
1003313	HLND-1200RD-R	Red	1,200mm	58W	4,040g		
1004193	HLND-1200SW2-R	White		107W			
-	HLND-1300RD-R	Red	1,300mm	62W	4,360g		
-	HLND-1300SW2-R	White		115W			
1005106	HLND-1400RD-R	Red	1,400mm	67W	4,680g		
1005013	HLND-1400SW2-R	White		124W			
-	HLND-1500RD-R	Red	1,500mm	72W	5,000g		
1004699	HLND-1500SW2-R	White		133W			
-	HLND-1600RD-R	Red	1,600mm	77W	6,320g		
1004582	HLND-1600SW2-R	White		142W			
-	HLND-1700RD-R	Red	1,700mm	82W	5,640g		
1005018	HLND-1700SW2-R	White		151W			
1004977	HLND-1800RD-R	Red	1,800mm	86W	5,960g		
1004568	HLND-1800SW2-R	White		160W			
-	HLND-1900RD-R	Red	1,900mm	91W	6,280g		
1004726	HLND-1900SW2-R	White		169W			
-	HLND-2000RD-R	Red	2,000mm	96W	6,600g		
1004694	HLND-2000SW2-R	White		178W			
-	HLND-2100RD-R	Red	2,100mm	101W	6,920g		
1004613	HLND-2100SW2-R	White		186W			
-	HLND-2200RD-R	Red	2,200mm	106W	7,240g		
1005101	HLND-2200SW2-R	White		195W			
-	HLND-2300RD-R	Red	2,300mm	110W	7,560g		
1004499	HLND-2300SW2-R	White		204W			
-	HLND-2400RD-R	Red	2,400mm	115W	7,880g		
1004732	HLND-2400SW2-R	White		213W			
-	HLND-2500RD-R	Red	2,500mm	120W	8,200g		
-	HLND-2500SW2-R	White		222W			
-	HLND-2600RD-R	Red	2,600mm	125W	8,520g		
1004878	HLND-2600SW2-R	White		231W			
-	HLND-2700RD-R	Red	2,700mm	130W	8,840g		
1004733	HLND-2700SW2-R	White		240W			

HLND Series R-Type Direct Number
Direct No. 1280

You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Common specifications

LED color	White (SW2)	Red (RD)	Cable length	–
Correlated color temperature/ Peak wavelength	6,500 K (typ.)	624 nm (typ.)	Case material	Aluminum alloy
Input voltage	DC24V (max.)		Operating environment	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)
Connector	Metal connector: SRCN2A16-7P (Made by Japan Aviation Electronics Industry, Limited)		Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)
Polarity/signal	1, 2, 3: (+), 4, 5, 6: (−), 7: NC		Cooling method	Natural air cooling
Light spectrum				

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Applicable Control Unit

PSB3-30024

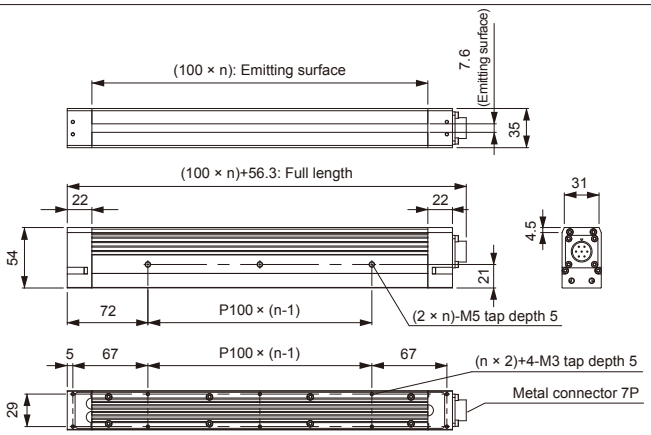
Direct number	Model	Applicable light	No. of channels
2000762	PSB3-30024	300 W	1

→P.27

Dimensions (mm)

1 HLND-(100 × n)-R

*n = Number from 1 to 27



Options

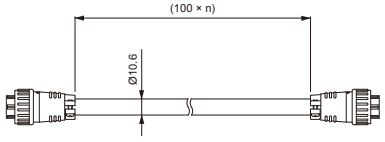
• Extension cable

This cable connects the light and the Control Unit. You can choose from 2 m, 3 m, 5 m, 10 m, and 20 m.

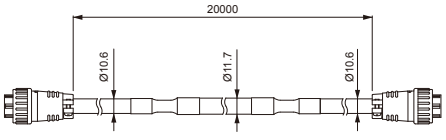
Direct number	3000142	3000151	3000159	3000131	3000149
Model	FCB-2-1.25SQ-ME7	FCB-3-1.25SQ-ME7	FCB-5-1.25SQ-ME7	FCB-10-1.25SQ-ME7	FCB-20-2.0SQ-ME7
Cable length	2 m	3 m	5 m	10 m	20 m

• Dimensions (mm)

FCB-n-1.25SQ-ME7 (n=2, 3, 5, 10)



FCB-20-2.0SQ-ME7



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We can make emitting surfaces up to 2,700 mm

Line sensor lighting with both uniformity and length support

We can make emitting surfaces from a minimum of 100 mm up to a maximum of 2,700 mm

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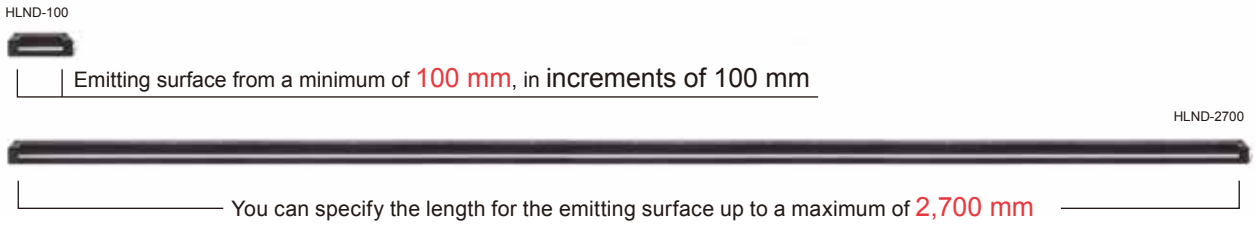
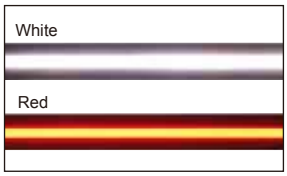


T-type, optimal as transmission lighting

The HLND series T-type achieves the optimal uniformity for transmission lighting.
Also, the LED can emit white light or red light.
Select your light based on your needs.

T-type (Transmission lighting)



Achieve the optimal uniformity as transmission lighting by using a diffusion plate with a high diffusion rate.
You can use higher uniformity than the R-type (reflection lighting) of the same series.

High quality design you can use stably

This light displays stable performance over a long period by using a radiation mechanism that prevents the temperature from rising due to the heat emitted by the LED, as well as a mechanism for efficient illumination.

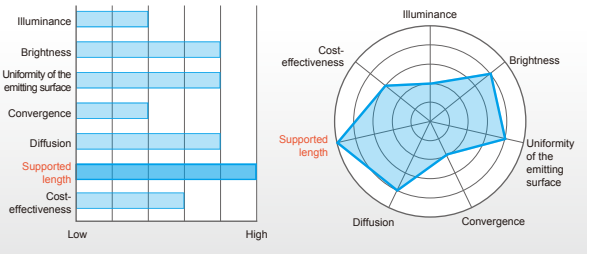
Using a radiating mechanism

Using metal connectors

Lighting characteristics

The following radar chart introduces the HLND Series' T-type's characteristics.

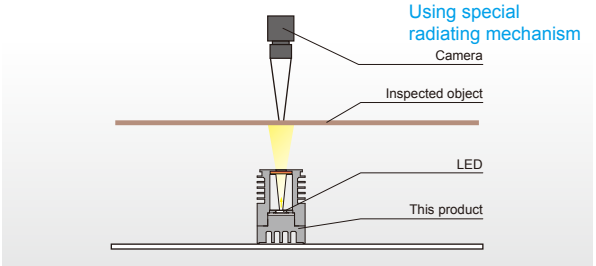
Lighting characteristics radar chart



Illuminating mechanism

Achieve high uniformity by employing unique radiating and illuminating mechanisms.
The emitting surface can be made up to 2,700 mm long.

Figure of HLND-T's illuminating mechanism

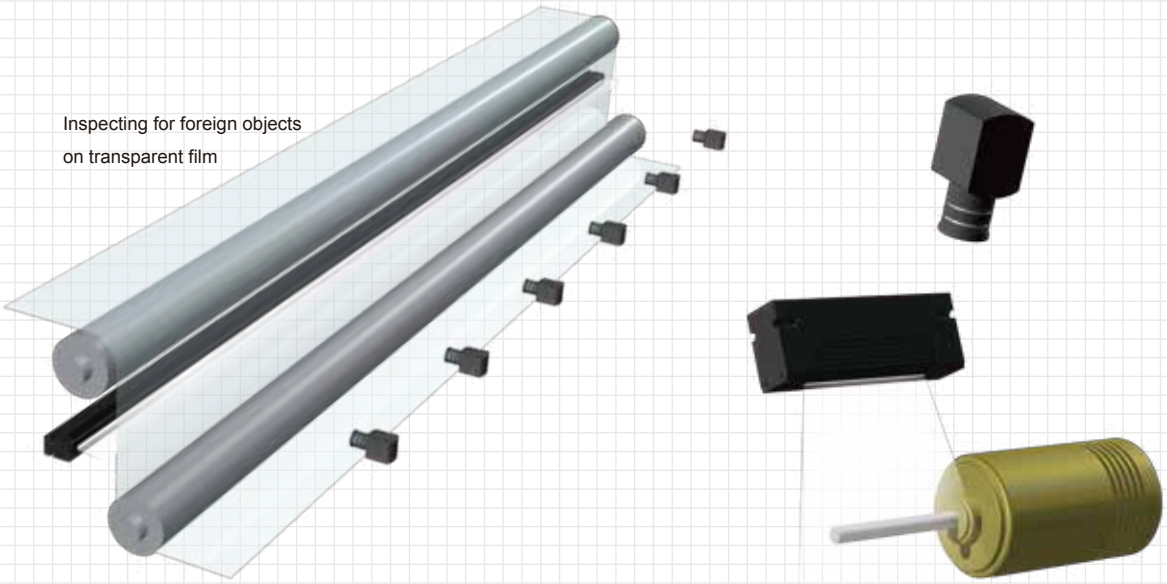


HLND Series T-Type Direct Number
Direct No. 1280

You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Applications

We achieved both brightness and uniformity by using a diffusion plate with a high diffusion rate.
It's optimal for imaging in a bright field using reflected or transmitted light.



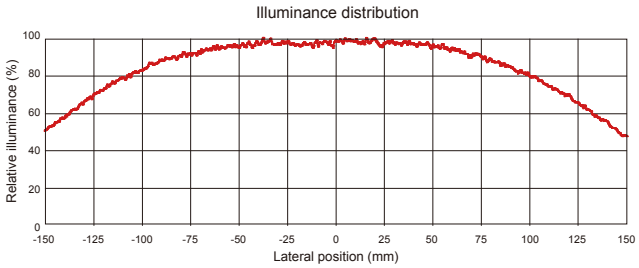
Inspecting for foreign objects on transparent film

Inspecting for scratches and dents in motor axles

Data

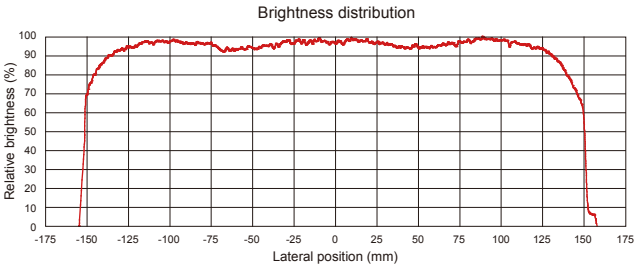
Measured data for the HLND-300SW2-T (Data listed here are actual measurement values. Results may vary for individual units.)

Graph of the distribution of illuminance



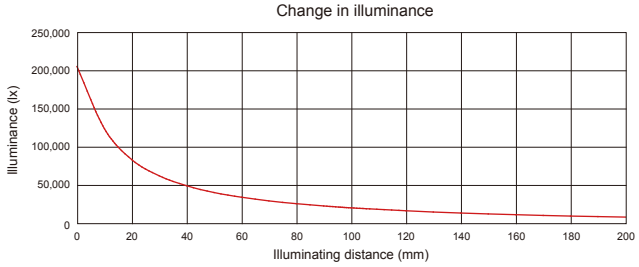
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the distribution of brightness



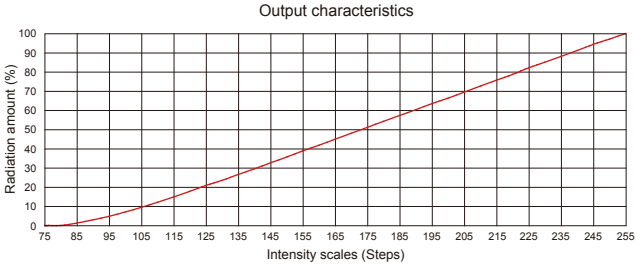
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the change in illuminance



* Actual measurement values at 100% intensity at each illuminating distance.

Graph of output characteristics



* Actual measurement values when using analog Control Unit, PSB3-30024.

Information about Web Member registration

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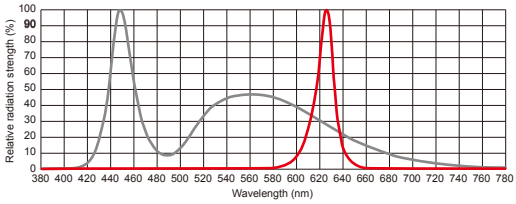
Lineup

Direct number	Model	LED color	Emitting surface length	Power consumption (max.)	Weight (max.)	Applicable control unit	Dimensions
1000159	HLND-100RD-T	Red	100mm	4.8W	520g	PSB3-30024	1
1004366	HLND-100SW2-T	White		10W			
1002660	HLND-200RD-T	Red	200mm	9.6W	840g		
1004469	HLND-200SW2-T	White		20W			
1000182	HLND-300RD-T	Red	300mm	14W	1,160g		
1004012	HLND-300SW2-T	White		30W			
1000189	HLND-400RD-T	Red	400mm	19W	1,480g		
1004331	HLND-400SW2-T	White		40W			
1000193	HLND-500RD-T	Red	500mm	24W	1,800g		
1004672	HLND-500SW2-T	White		50W			
1000197	HLND-600RD-T	Red	600mm	29W	2,120g		
1004014	HLND-600SW2-T	White		60W			
1004483	HLND-700RD-T	Red	700mm	34W	2,440g		
1004530	HLND-700SW2-T	White		71W			
1003020	HLND-800RD-T	Red	800mm	38W	2,760g		
1004840	HLND-800SW2-T	White		81W			
1003139	HLND-900RD-T	Red	900mm	43W	3,080g		
1004554	HLND-900SW2-T	White		91W			
1004790	HLND-1000RD-T	Red	1,000mm	48W	3,400g		
1004337	HLND-1000SW2-T	White		89W			
-	HLND-1100RD-T	Red	1,100mm	53W	3,750g		
-	HLND-1100SW2-T	White		91W			
1000162	HLND-1200RD-T	Red	1,200mm	58W	4,040g		
1004269	HLND-1200SW2-T	White		107W			
-	HLND-1300RD-T	Red	1,300mm	62W	4,360g		
-	HLND-1300SW2-T	White		115W			
1003439	HLND-1400RD-T	Red	1,400mm	67W	4,680g		
1004846	HLND-1400SW2-T	White		124W			
1003649	HLND-1500RD-T	Red	1,500mm	72W	5,000g		
1004503	HLND-1500SW2-T	White		133W			
-	HLND-1600RD-T	Red	1,600mm	77W	6,320g		
-	HLND-1600SW2-T	White		142W			
-	HLND-1700RD-T	Red	1,700mm	82W	5,640g		
-	HLND-1700SW2-T	White		151W			
1005021	HLND-1800RD-T	Red	1,800mm	86W	5,960g		
1004912	HLND-1800SW2-T	White		160W			
1003958	HLND-1900RD-T	Red	1,900mm	91W	6,280g		
-	HLND-1900SW2-T	White		169W			
-	HLND-2000RD-T	Red	2,000mm	96W	6,600g		
-	HLND-2000SW2-T	White		178W			
-	HLND-2100RD-T	Red	2,100mm	101W	6,920g		
1004560	HLND-2100SW2-T	White		186W			
-	HLND-2200RD-T	Red	2,200mm	106W	7,240g		
-	HLND-2200SW2-T	White		195W			
-	HLND-2300RD-T	Red	2,300mm	110W	7,560g		
-	HLND-2300SW2-T	White		204W			
-	HLND-2400RD-T	Red	2,400mm	115W	7,880g		
1005008	HLND-2400SW2-T	White		213W			
-	HLND-2500RD-T	Red	2,500mm	120W	8,200g		
-	HLND-2500SW2-T	White		222W			
-	HLND-2600RD-T	Red	2,600mm	125W	8,520g		
-	HLND-2600SW2-T	White		231W			
1002831	HLND-2700RD-T	Red	2,700mm	130W	8,840g		
-	HLND-2700SW2-T	White		240W			

HLND Series T-Type Direct Number
Direct No. 1280

You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Common specifications

LED color	White (SW2)	Red (RD)	Cable length	–
Correlated color temperature/ Peak wavelength	6,500 K (typ.)	624 nm (typ.)	Case material	Aluminum alloy
Input voltage	DC24V (max.)		Operating environment	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)
Connector	Metal connector: SRCN2A16-7P (Made by Japan Aviation Electronics Industry, Limited)		Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)
Polarity/signal	1, 2, 3: (+), 4, 5, 6: (−), 7: NC		Cooling method	Natural air cooling
Light spectrum				

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Applicable Control Unit

PSB3-30024

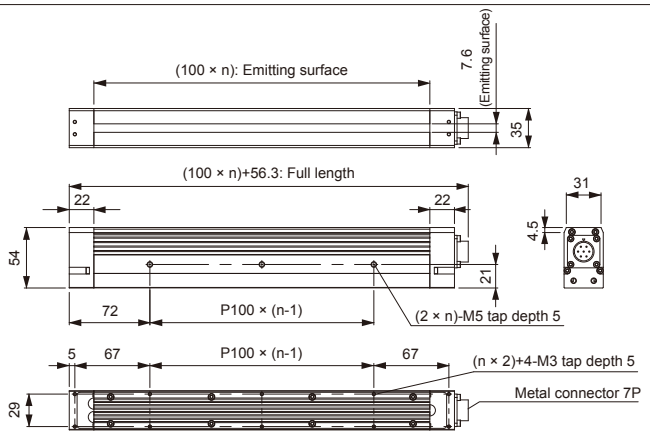
Direct number	Model	Applicable light	No. of channels
2000762	PSB3-30024	300W	1

P.27

Dimensions (mm)

1 HLND-(100 × n)-T

*n = Number from 1 to 27



Options

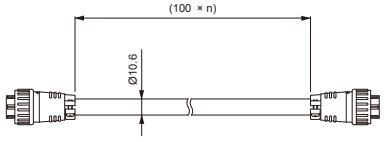
- Extension cable

This cable connects the light and the Control Unit. You can choose from 2 m, 3 m, 5 m, 10 m, and 20 m.

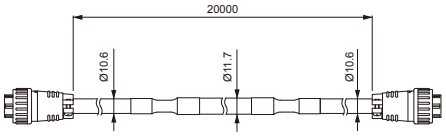
Direct number	3000142	3000151	3000159	3000131	3000149
Model	FCB-2-1.25SQ-ME7	FCB-3-1.25SQ-ME7	FCB-5-1.25SQ-ME7	FCB-10-1.25SQ-ME7	FCB-20-2.0SQ-ME7
Cable length	2 m	3 m	5 m	10 m	20 m

- Dimensions (mm)

FCB-n-1.25SQ-ME7 (n=2, 3, 5, 10)



FCB-20-2.0SQ-ME7



Information about Web Member registration

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Achieves both high uniformity and high brightness

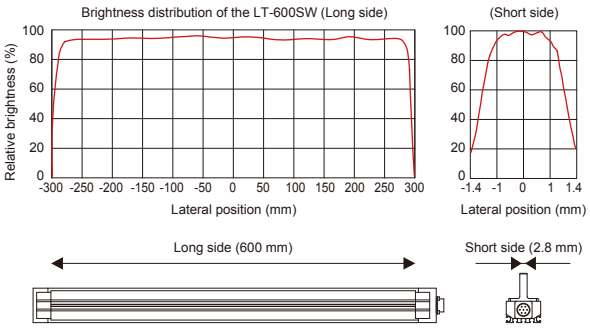
Provides optimal imaging with its unique illuminating mechanism

LT-600SW

Supports highly-accurate inspection in a high-speed environment

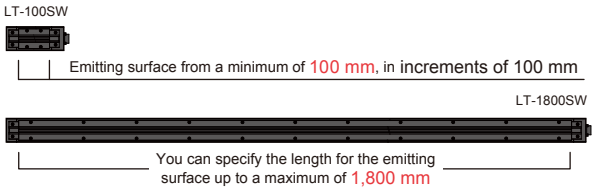
We achieved both high uniformity and high brightness through our unique optical system. It can perform highly-accurate inspections at a high-speed scan rate, and supports a wide range of uses.

Graph of the distribution of brightness



* Actual measurement values at 100% intensity in 100 mm illuminating distance.
(Results may vary for individual units.)

Because we manufacture the product joining the LED panels, you can specify the length of the emitting surface in 100 mm increments.
It can support various applications with its variety of sizes, from 100 mm to a maximum of 1,800 mm.

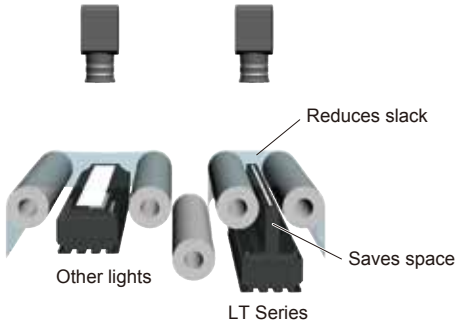


Illuminating mechanism optimal for on-site work

Because the LT Series has mechanism where the emitting surface sticks out from the main unit, it's possible to illuminate with the tip near the inspected item.
This contributes to saving space in your inspection environment or equipment environment.

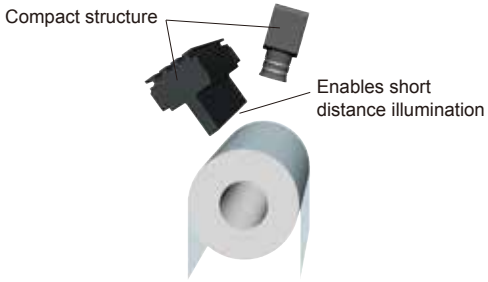
Use for transmission

By reducing the space between rolls, you can improve inspection speed.



Used in direct reflection

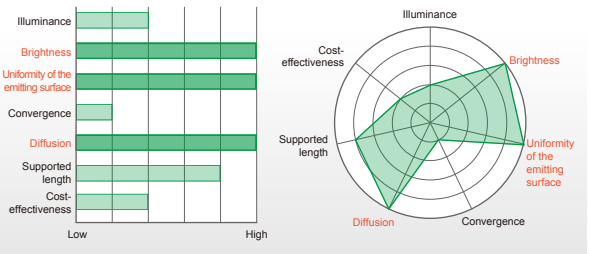
Allows for inspections where the light is installed at a narrow angle with the camera.



Lighting characteristics

The following radar chart introduces the LT Series' characteristics.

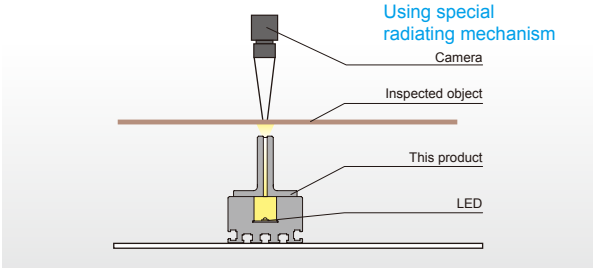
Lighting characteristics radar chart



Illuminating mechanism

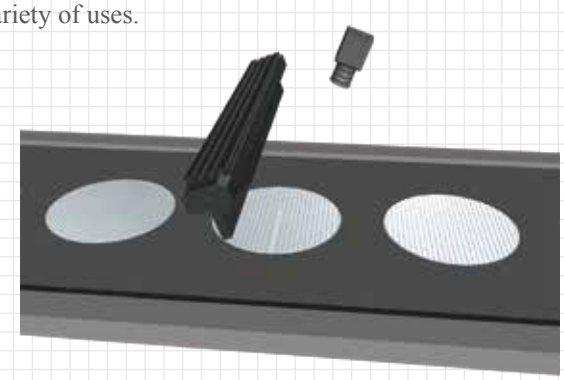
By employing a mechanism where the emitting surface sticks out from the main unit, it's possible to illuminate with the tip near the inspected item, even in a narrow space.

Figure of LT's illuminating mechanism



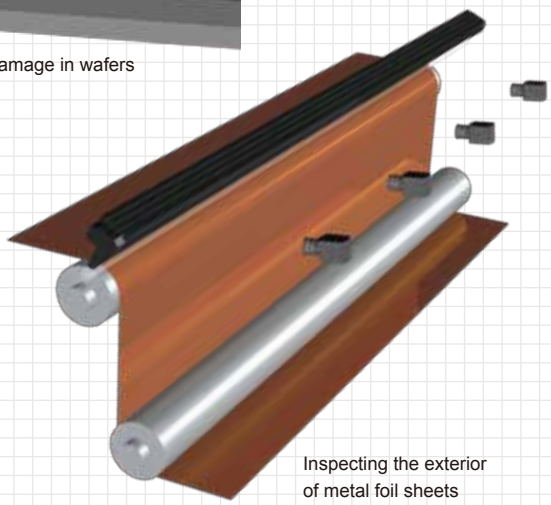
Applications

This is particularly effective for highly-accurate inspections which require noticing fine changes. Even for uniformity on the long side, we ensured high uniformity not just for the center of the short side but to both edges. You can use it for a wide variety of uses.



Inspecting for cracks and damage in wafers

Inspecting for fish eyes, scratches, and foreign materials on transparent film

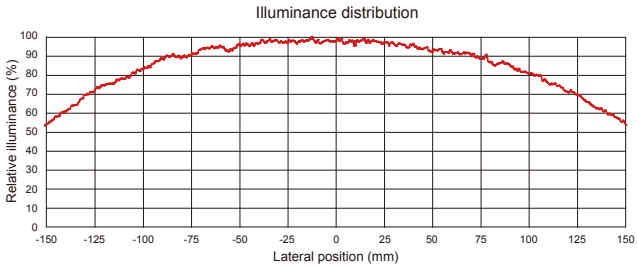


Inspecting the exterior of metal foil sheets

Data

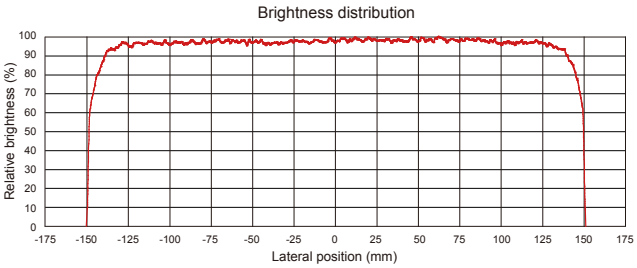
Measured data for the LT-300SW (Data listed here are actual measurement values. Results may vary for individual units.)

Graph of the distribution of illuminance



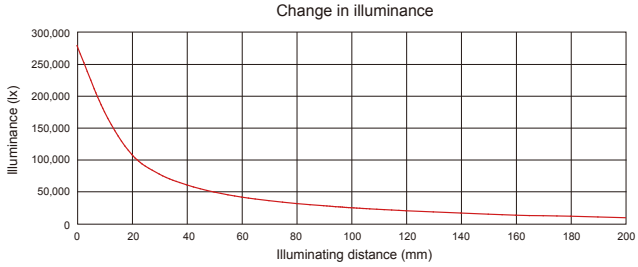
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the distribution of brightness



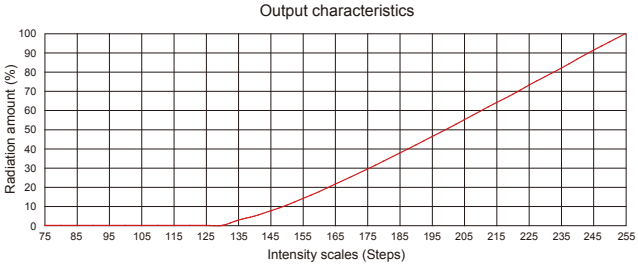
* Actual measurement values at 100% intensity with an illuminating distance of 100 mm.

Graph of the change in illuminance



* Actual measurement values at 100% intensity at each illuminating distance.

Graph of output characteristics



* Actual measurement values when using analog Control Unit, PSB3-30024.

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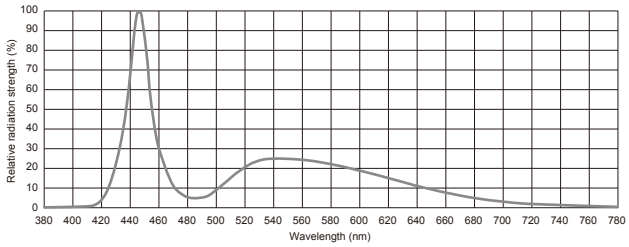
Lineup

Direct number	Model	LED color	Emitting surface length	Power consumption (max.)	Weight (max.)	Applicable Control Unit	Dimensions
1004500	LT-100SW	White	100mm	15W	500g	PSB3-30024	1
1004828	LT-200SW		200mm	29W	1,000g		
1004372	LT-300SW		300mm	43W	1,500g		
1004989	LT-400SW		400mm	57W	2,000g		
1004786	LT-500SW		500mm	71W	2,500g		
1004476	LT-600SW		600mm	85W	3,000g		
1004852	LT-700SW		700mm	99W	3,500g		
-	LT-800SW		800mm	113W	4,000g		
-	LT-900SW		900mm	128W	4,500g		
1004477	LT-1000SW		1,000mm	142W	5,000g		
-	LT-1100SW		1,100mm	156W	5,500g		
1004478	LT-1200SW		1,200mm	170W	6,000g		
-	LT-1300SW		1,300mm	184W	6,500g		
-	LT-1400SW		1,400mm	198W	7,000g		
-	LT-1500SW		1,500mm	212W	7,500g		
1004479	LT-1600SW		1,600mm	226W	8,000g		
1004758	LT-1700SW		1,700mm	240W	8,500g		
1004373	LT-1800SW		1,800mm	255W	9,000g		

Common specifications

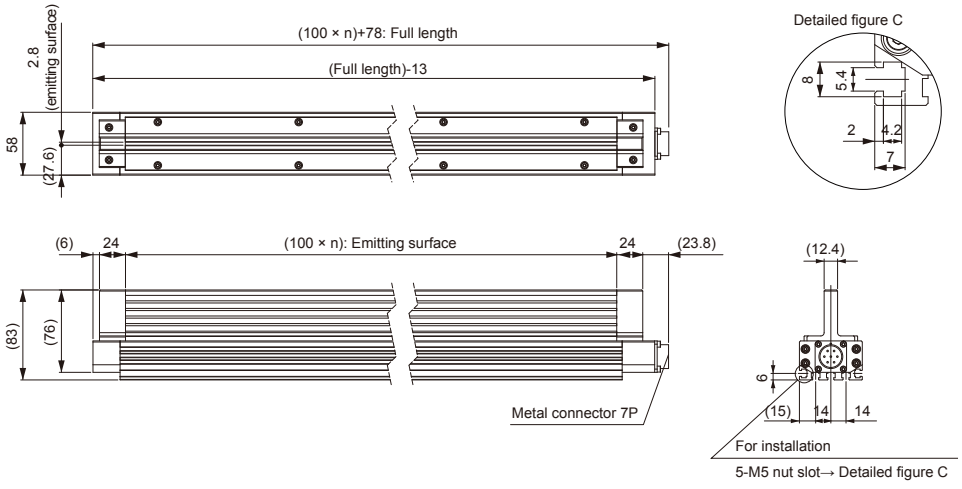
LED color	White (SW)	Cable length	–
Correlated color temperature	10,000 K (typ.)	Case material	Aluminum alloy
Input voltage	DC24V (max.)	Operating environment	Temperature: 0 to 40°C, Humidity: 20 to 85%RH (with no condensation)
Connector	Metal connector: SRCN2A16-7P (Made by Japan Aviation Electronics Industry, Limited)	Storage environment	Temperature: -20 to 60°C, Humidity: 20 to 85%RH (with no condensation)
Polarity/signal	1, 2, 3: (+), 4, 5, 6: (-), 7: NC	Cooling method	Natural air cooling
Light spectrum			

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Dimensions (mm)

1 LT-(100 × n)SW

*n = Number from 1 to 18



LT Series Direct Number
Direct No. 1281

You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Applicable Control Unit

PSB3-30024

Direct number	Model	Applicable light	No. of channels
2000762	PSB3-30024	300W	1

→P.27

Options

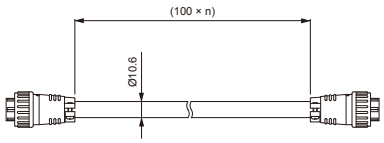
- Extension cable

This cable connects the light and the Control Unit. You can choose from 2 m, 3 m, 5 m, 10 m, and 20 m.

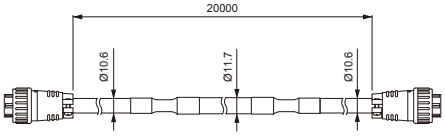
Direct number	3000142	3000151	3000159	3000131	3000149
Model	FCB-2-1.25SQ-ME7	FCB-3-1.25SQ-ME7	FCB-5-1.25SQ-ME7	FCB-10-1.25SQ-ME7	FCB-20-2.0SQ-ME7
Cable length	2 m	3 m	5 m	10 m	20 m

- Dimensions (mm)

FCB-n-1.25SQ-ME7 (n=2, 3, 5, 10)



FCB-20-2.0SQ-ME7

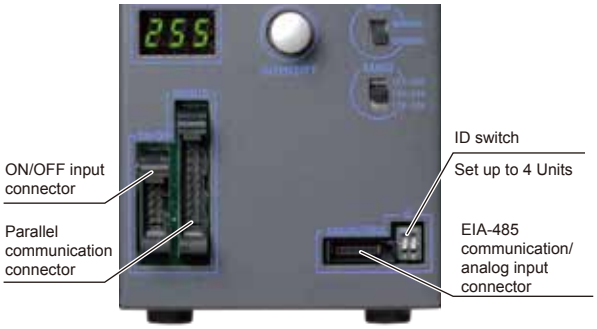


Highly functional analog Control Unit that brings out the performance of line sensor lighting

The PSB3-30024 analog Control Unit is a highly functional analog Control Unit equipped with three types of external control methods for a massive output capacity of 300 W.

- **Can set intensity in 256 steps**
- **Equipped with an intensity range selection function**
- **Equipped with three types of external control functions (Parallel, EIA-485, and Analog)**
- **Supports high output of 300 W**
- **Achieves a lightweight, compact design**

This single Unit is equipped with three types of control functions for parallel communication, EIA-485 communication, and analog input

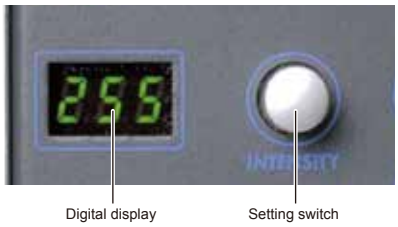


Control mode	Description	
Parallel communication	Intensity control	Control the intensity in 256 steps via parallel signal input
EIA-485 communication	Intensity control	Command input for 256 steps of intensity via EIA-485 communications
	ON/OFF control	Command input via EIA-485 communication
Analog input	Intensity control	Control the intensity in 256 steps via analog voltage (0 to 5 V)

ON/OFF control is possible in combination with parallel, EIA-485, or analog control

ON/OFF control	LED Lights ON/OFF control via OFF signal input (parallel bit method)

Digital display supports recreating intensity



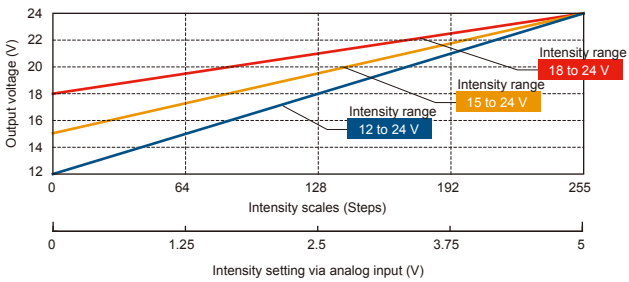
- Quick operation using a pushbutton dial
  - Intensity setting to 256 steps.
  - Turn on the power while pressing the button to select external control mode.
  - Press and hold for 2 seconds to lock the intensity value.

Optimize your intensity setting with the intensity range selection function

Output voltage
18 to 24 V
15 to 24 V
12 to 24 V

- You can choose an intensity range to match the lighting characteristics.

* LED output varies depending on the lighting (Graph is for reference purposes).



PSB3-30024 Direct Number Direct No. 2190

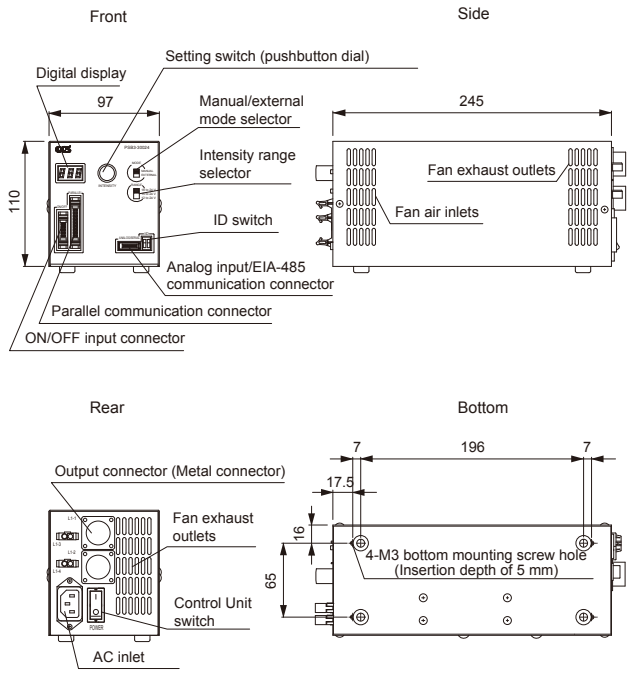
You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Specifications

Model		PSB3-30024	
Direct number		2000762	
Emitting method		Constant emitting	
Drive method		Constant-voltage system	
Intensity control method		Variable voltage control	
No. of channels		1 channel	
Applicable light (rated)		24V 300W	
Intensity control		Manual and external intensity	Front manual/external switch (MODE)
		Variable output voltage range	Select between 3 steps via the front intensity range selector (RANGE).
	Manual	Set any of 256 steps via the setting switch. Press and hold the switch for 2 seconds to lock the intensity value.	
	External	Parallel communication	8-bit intensity value setting (B0 to B7) and write signal (WR)
		Serial communication	Command input via EIA-485 communication
		Analog input	Analog voltage (0 V to 5 V)
		External control mode can be selected by pushing the setting switch while turning ON the power.	
Lighting control		Parallel bit input	Lighting signal (OFF)
		Serial communication	Command input via EIA-485 communication
EIA-485 communication 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).
Emitting delay (typ.)		0.1 s	
Error detection display		"Err" is displayed on the front-panel digital display.	
Error detection output		Errors are output and light output is stopped for an internal AC/DC error.	
		External control connector	Error output terminal (OC, OE), photocoupler insulation, open-collector output, alarm open (load current of 10 mA or less), and error status (serial communication)
Overcurrent protection		Operates at 105% of the rated current or higher. Resets by cycling the Control Unit.	
Over voltage protection		Operates at 120% to 155% of the rated voltage. Resets by cycling the Control Unit.	
Input voltage (rated)		AC100−240V	
Power consumption (typ.)		410VA	
Frequency		50/60Hz	
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 VAC, 60 Hz, with no load)	
Output voltage variation range (typ.)		Select between 3 steps via the front intensity range selector.	
		12V to 24V	* With no load
		15V to 24V	* With no load
		18V to 24V	* 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/sec2, frequency: 10 to 55 Hz, cycle: 3 min, sweep cycle: each hour in the X, Y, and Z directions	
Cooling method		Forced air cooling	
CE marking		Safety standard: EN61010-1 compliant	Conforms to EMC standard EN61326-1 Class A
Environmental regulation		RoHS compliant	
Material, coating, surface processing		Steel plate, Thickness of cover: 1.0, Thickness of chassis: 1.6, N3 leather tone finish	
Weight		2,300 g max.	
Accessories		3-prong grounded AC cord (2 m): (× 1)	

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Dimensions (mm)



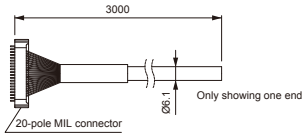
Options

External control cables

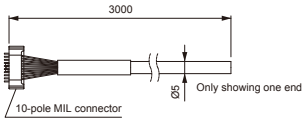
These are cables for parallel communication, EIA-485 communication, and analog input. Select yours to match your control method.

(mm)

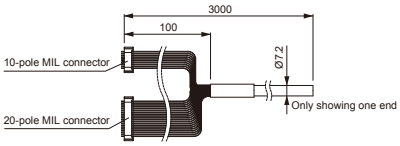
■ Parallel Communication Cable
Direct number: 3000683
Model: EXCB2-M20-3



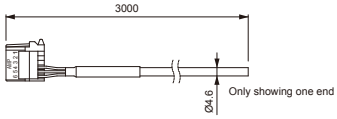
■ ON/OFF Input Cable
Direct number: 3000682
Model: EXCB2-M10-3



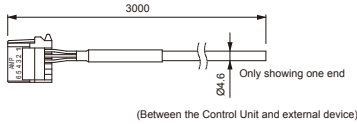
■ Parallel Communication / ON/OFF Input Shared Cable
Direct number: 3000684
Model: EXCB2-M10M20-3



■ Analog Input Cable
Direct number: 3000687
Model: EXCB2-E6AN-3

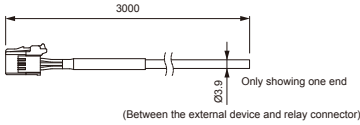


■ EIA-485 Communication Cable
Direct number: 3000686
Model: EXCB2-E6SR-3
* This cable connects the Control Unit and an external device.



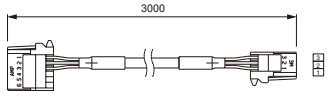
(Between the Control Unit and external device)

■ EIA-485 Communication Relay Cable
Direct number: 3000685
Model: EXCB2-E3-3
* If connecting two or more Control Units, connect this cable to the external device side.



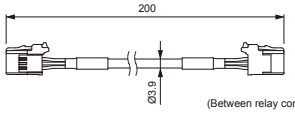
(Between the external device and relay connector)

■ EIA-485 Communication Relay Cable
Direct number: 3000717
Model: EXCB2-E6SR-E3-3
* If connecting two or more Control Units, use this cable to connect the Control Unit and the relay connector.



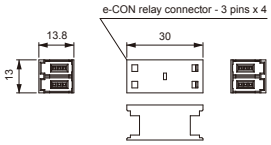
(Between the Control Unit and relay connector)

■ EIA-485 Communication Relay Cable
Direct number: 3000721
Model: EXCB2-E3-E3-0.2
* If connecting four Control Units, use this cable to connect relay connectors to one another.



(Between relay connectors)

■ EIA-485 Communication Relay Connector
Direct number: 3000720
Model: ECNR-E3CN4



Download a detailed procedure for connecting the EIA-485 communication cable from the Web.

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PD3-3024-3 series

PD3-3024-3 Series Direct Number
Direct No. 2180

Highly-functional digital Control Units you can choose to match your network

The digital Control Unit PD3-3024-3 Series is a digital Control Unit equipped with an interface optimal for on-site work and a variety of functions.

- Can set intensity in 256 steps
- Can control intensity with 3 independent channels
- Equipped with strobe emitting function
- Lineup of three types of external control functions (Parallel, EIA-485, and Ethernet)
- Equipped with standard DIN rail
- Achieves a lightweight, compact design

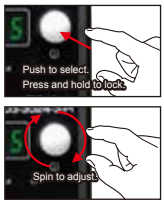
Weight 600g

CE

* Protrusions such as switches and rubber padding are not included.

Quick operation using a pushbutton dial

- Intensity setting to 256 steps
- Strobe emitting time setting
- Setting lock

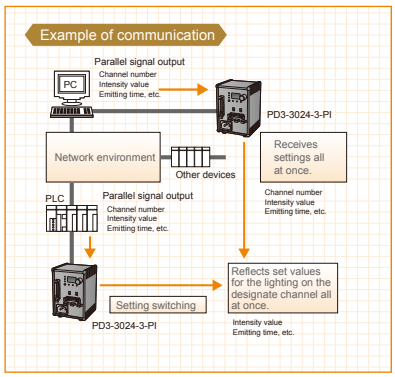


The digital Control Unit PD3-3024-3 Series controls light intensity through pulse width modulation (PWM).
Please evaluate your actual inspection environment before making a selection.

3 types of external control available 》You can choose between the parallel, EIA-485, and Ethernet types.

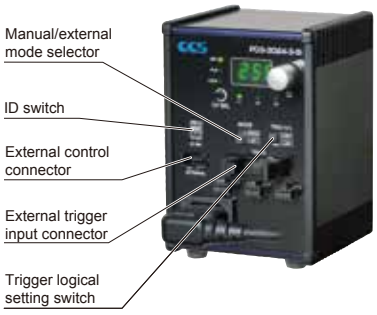
PD3-3024-3-PI

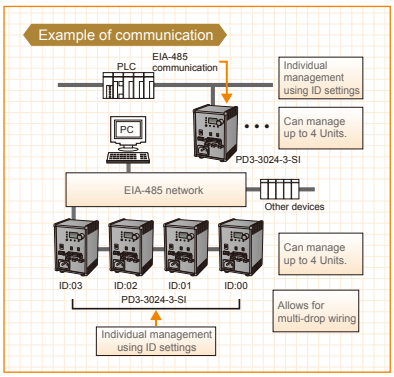
The parallel type has the fastest switching for settings.
Perform high-speed control through batch transmission.



PD3-3024-3-SI

The EIA-485 type can individually manage units using multi-drop wiring.
Can manage up to 4 Units.

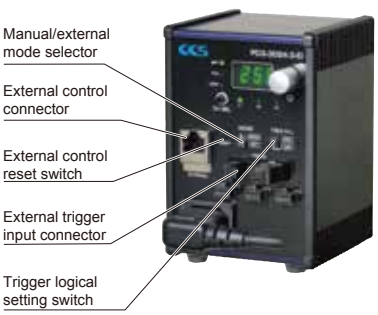


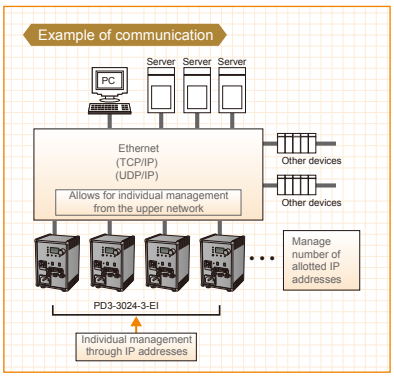


* If using multi-drop wiring, please use the optional EIA-485 Communication Relay Cable (EXCB2-E3-E3-0.2).

PD3-3024-3-EI

The Ethernet type supports standard protocols TCP/IP and UDP/IP.
Pursuing even more convenience.





PD3-3024-3 Series Direct Number
Direct No. 2180

You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Common specifications

Emitting method	Constant emitting
Drive method	Constant-voltage system
Intensity control method	PWM control and emitting time control
No. of channels	3 channels
Applicable light (rated)	24 V 28 W
PWM frequency	125 kHz
Error detection display	"OCP" displayed on front digital display.
Overcurrent protection*	Operates at 107% of output current or higher. Resets by cycling the Control Unit.
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: EN61010-1 compliant, EMC standard: EN61326 Class A compliant
Material/Surface processing	Material: Aluminum and resin, Surface processing: Blue alumite
Weight	600 g max.
Accessories	3-prong grounded AC cord (2 m)

* Do not intentionally short-circuit the positive and negative output terminals.

PD3-3024-3-PI (Parallel Type) Specifications

Direct number	2000775	
Intensity setting	Manual	Set 256 steps using the front setting switch
	External	8-bit input (B0 to B7), write pulse (BRTWR), and channel selection (CHSEL0 to CHSEL2)
ON/OFF setting	External trigger input	
Emitting mode setting	Manual	Set 11 steps using the front setting switch
	External	4-bit input (M0 to M3), write pulse (TRGWR), and channel selection (CHSEL0 to CHSEL2)
Error detection output	Transistor output between pins 19 and 20 of the external control connector Normal operation: Open, Overcurrent output detected: Closed	
External control connector	Trigger input	MIL connector, 10 poles
	Intensity/emitting mode setting	MIL connector, 20 poles

PD3-3024-3-SI (EIA-485 Type) Specifications

Direct number	2000777	
Intensity setting	Manual	Set 256 steps using the front setting switch
	External	Command input via EIA-485 communication
ON/OFF setting	External trigger input or command input via EIA-485 communication	
Emitting mode setting	Manual	Set 11 steps using the front setting switch
	External	Command input via EIA-485 communication
Error detection output	Command sent when overcurrent output is detected.	
External control connector	Trigger input	MIL connector, 10 poles
	Intensity/emitting mode setting	e-CON connector, 3 poles

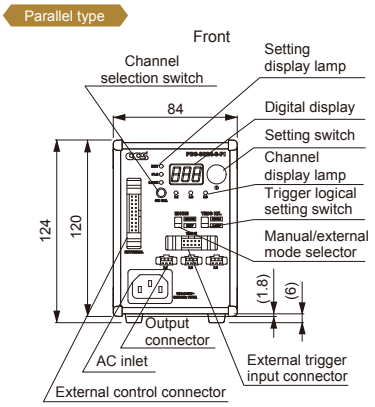
PD3-3024-3-EI (Ethernet Type) Specifications

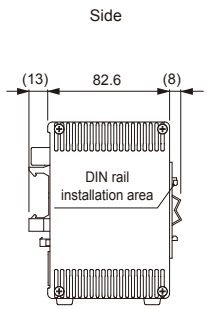
Direct number	2000776	
Intensity setting	Manual	Set 256 steps using the front setting switch
	External	Command input via TCP/IP or UDP/IP communication
ON/OFF setting	External trigger input or command input via TCP/IP or UDP/IP communication	
Emitting mode setting	Manual	Set 11 steps using the front setting switch
	External	Command input via TCP/IP or UDP/IP communication
Error detection output	Command sent when overcurrent output is detected.	
External control connector	Trigger input	MIL connector, 10 poles
	Intensity/emitting mode setting	RJ-45 connector

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

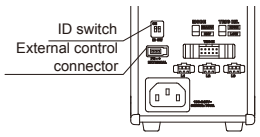
Dimensions (mm)

Parallel type

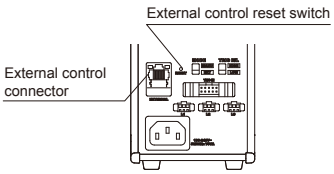


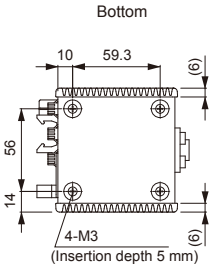


EIA-485 type



Ethernet type





* The EIA-485 and Ethernet types have the same dimensions as the Parallel type.

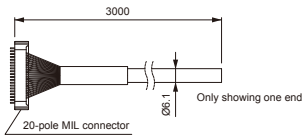
Options

External control cables

(mm)

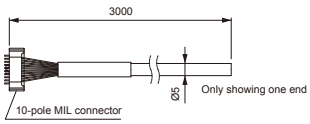
■ Parallel Communication Cable

Direct number: 3000683
Model: EXCB2-M20-3



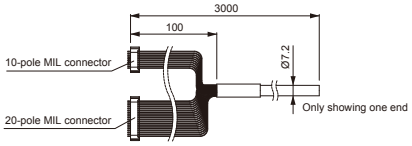
■ Trigger Input Cable (Parallel Bit Input)

Direct number: 3000682
Model: EXCB2-M10-3



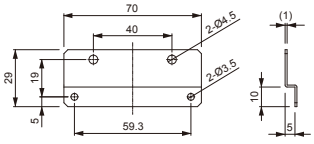
■ Parallel Communication/Trigger Input Branch Cable

Direct number: 3000684
Model: EXCB2-M10M20-3



■ Bottom Mounting Bracket

Direct number: 4001164
Model: BK-PD3

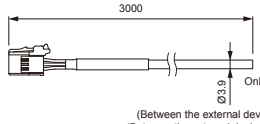


* 1 set (2 pieces)

■ EIA-485 Communication Relay Cable

Direct number: 3000685
Model: EXCB2-E3-3

* This cable connects the external device to the Control Unit or to the relay connector.

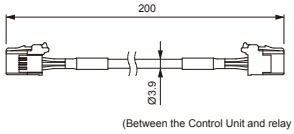


(Between the external device and Control Unit),
(Between the external device and relay connector)

■ EIA-485 Communication Relay Cable

Direct number: 3000721
Model: EXCB2-E3-E3-0.2

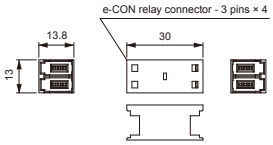
* If connecting two or more Control Units, use this cable to connect the Control Unit and the relay connector.



(Between the Control Unit and relay connector)

■ EIA-485 Communication Relay Connector

Direct number: 3000720
Model: ECNR-E3CN4



Download a detailed procedure for connecting the EIA-485 communication cable from the Web.

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Standard Analog Control Unit Series

The PSB Series Control Unit provides stepless intensity control for variable voltage.

PSB-1024VB

PSB-3024VB

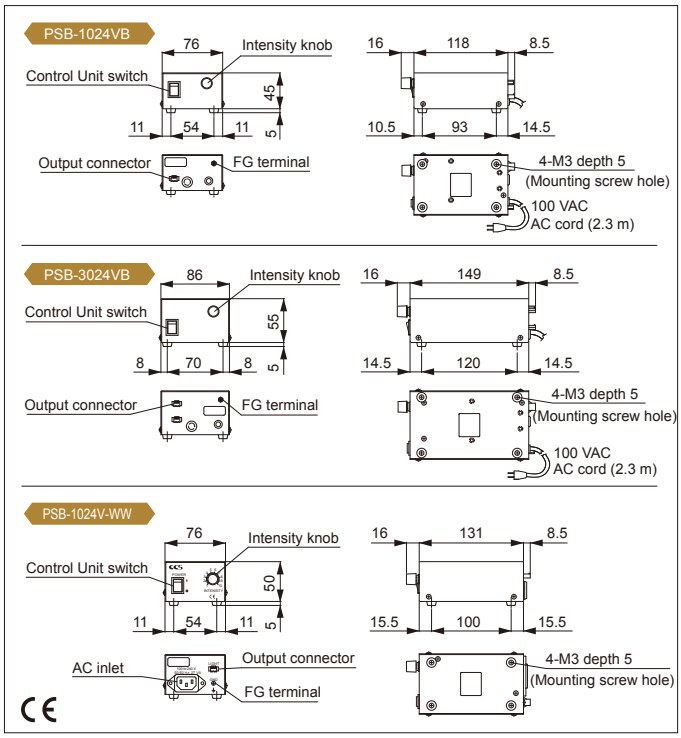
PSB-1024V-WW

Specifications

Product name	LED Light Analog Control Unit		
Model	PSB-1024VB	PSB-3024VB	PSB-1024V-WW
Direct number	2000194	2000215	2000191
Emitting method	Constant emitting		
Drive method	Constant-voltage system		
Intensity control method	Variable voltage control		
No. of channels	1 channel		
Applicable light (rated)	24 V, 10 W	24 V, 30W	24 V, 10 W
Intensity control	Intensity knob on the unit front panel		
Overcurrent protection	Operates at 125% of the rated current or higher. Resets automatically.		Operates at 105% of the rated current or higher. Resets automatically.
Input voltage (rated)	AC100−120V		AC100−240V
Power consumption (typ.)	27 VA	78 VA	27 VA
Frequency	50/60 Hz		
Inrush current (typ.)	15 A (For 100 VAC) * From a cold start		15 A (For 100 VAC) 20 A (For 200 VAC) * From a cold start
Ground leakage current	3.5 mA max.		3.5 mA max. (264 VAC, 60 Hz, with no load)
Output voltage (rated)	12 (±1) VDC to 24.05 (±0.25) VDC		
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: EN61010-1 compliant EMC standard: EN61326 compliant
Environmental regulation	RoHS compliant		
Material, coating, surface processing	Steel plate, Thickness: 1.0, N3, Matte finish		
Weight	Approx. 470 g	Approx. 700g	Approx. 470 g
Accessories	Instruction Guide (1)		Instruction Guide (1) AC cord (Grounded) (1)

Be sure to read the "Instruction Guide" included with the product before use and observe cautionary information.

Dimensions (mm)



Options

Options include a type where the intensity knob can be locked.
Model: PSB-1024VBL/PSB-3024VBL

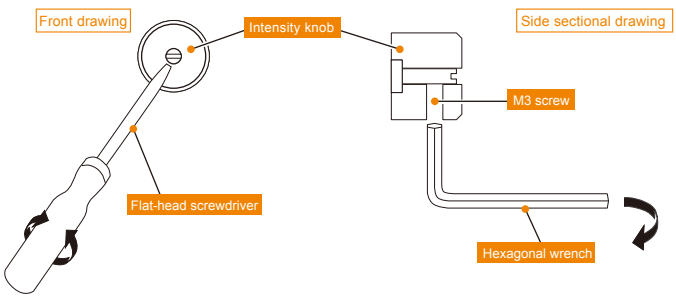
- How to use the type with a function for locking the intensity knob

1) Adjust the intensity using a flat-head screwdriver.

2) To lock the knob, use a hexagonal wrench to spin the M3 set screw on the knob body and lock it.

Regarding use

Use the PD3-3024-3 Series digital Control Unit if you require fine intensity settings, controllability, or reproducibility.



PSB Series Direct Number
Direct No. 2070

You can easily access the product information page you want just by inputting the 7-digit number in the direct number input space from CCS's website (Machine Vision Application page).
The direct number is included on the "Lineup" of each product page.

Inquiry Sheet

If you would like to use lighting selections, free demo products, or a testing room, please fill in the required information below and fax it to your local Sales Office. A sales representative will contact you.

Date	/ /

Company		Tel	
Department		Fax	
Name		E-mail	
Address	Postal code:		

• Information about the inspected item

(1) Inspected item: ☐ Metal ☐ Paper (printed) ☐ Non-woven cloth ☐ Glass/film ☐ Plastic ☐ Ceramics ☐ Other ( )

(2) Surface condition: ☐ Glossy ☐ Not glossy ☐ Stain finishing ☐ Other ( )

(3) Surface shape: ☐ Flat ☐ Curved ☐ Other ( )

(4) Color: ☐ White ☐ Black ☐ Other ( )

(5) Transparency: ☐ Transparent ☐ Opaque ☐ Other ( )

• Inspection contents

(1) Exterior inspections: ☐ Surface unevenness ☐ Foreign material/dirt ☐ Pin holes ☐ Coating breaks/wrinkles ☐ Coating unevenness ☐ Scratches ☐ Form ☐ Other ( )

(2) Reading: ☐ Characters ☐ OCR ☐ Patterns ☐ Other ( )

(3) Misalignment/Alignment

(4) Measurement

(5) Other: ( )

• Inspection conditions/environment

Sheet width	mm	Inspection (field of vision) width	mm
Carrying speed	m/minute	Resolution	μm
Scan rate	Hz (μs)	Illuminating format	Reflection/Transmission
Snaking	mm	Rattling	± mm
Distance between the camera and the sheet	mm	Distance between the Light and the sheet	mm
Camera angle		Lighting angle	
Presumed camera		Camera pixel count	
Presumed lens		F-Stop	
Lighting restraints			
Environmental requirements	Temperature/Water resistance/Dust/Ambient light/Other ( )		

• If there is anything else besides the above (schematics, etc.), please include it here.

• Requests regarding follow-up

☐ I'd like for a visit/meeting. ☐ I'd like an experiment/verification.

☐ Borrowing a sample product ☐ Other ( )

Desired response date
(Urgent/By _____/_____)

Please copy and use this sheet

Information about Web Member registration

If you register as a member on our website, you can download various materials, such as 3D-CAD drawings and instruction guides. Also, we accept applications for lighting selections and free demo products from our contact page. Please feel free to use it.

The following introduces custom lights that CCS has designed, developed, and manufactured

1 Coaxial Convergent Line Sensor Light

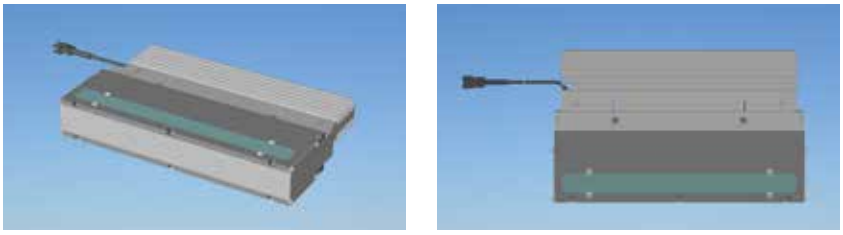
Characteristics

Installed a coaxial unit for convergent lighting. The half mirror allows for illumination from the camera axis. Uniform illumination is possible even for the highly reflective mirror surface.

Application

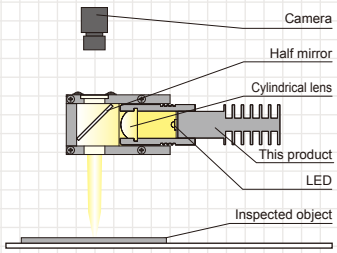
- ○ Inspecting for dents/scratches in sheet metal
- ○ Inspecting for uneven film coating
- ○ Inspecting for scratches on LCD panels

■ **3D exterior figure**



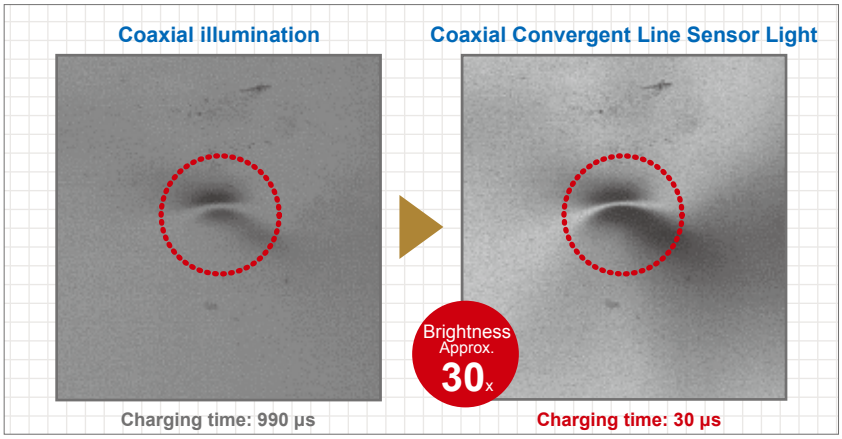
■ **Figure of the illuminating mechanism**

Line light converged by the cylindrical lens is illuminated by the half mirror on the same axis as the camera.

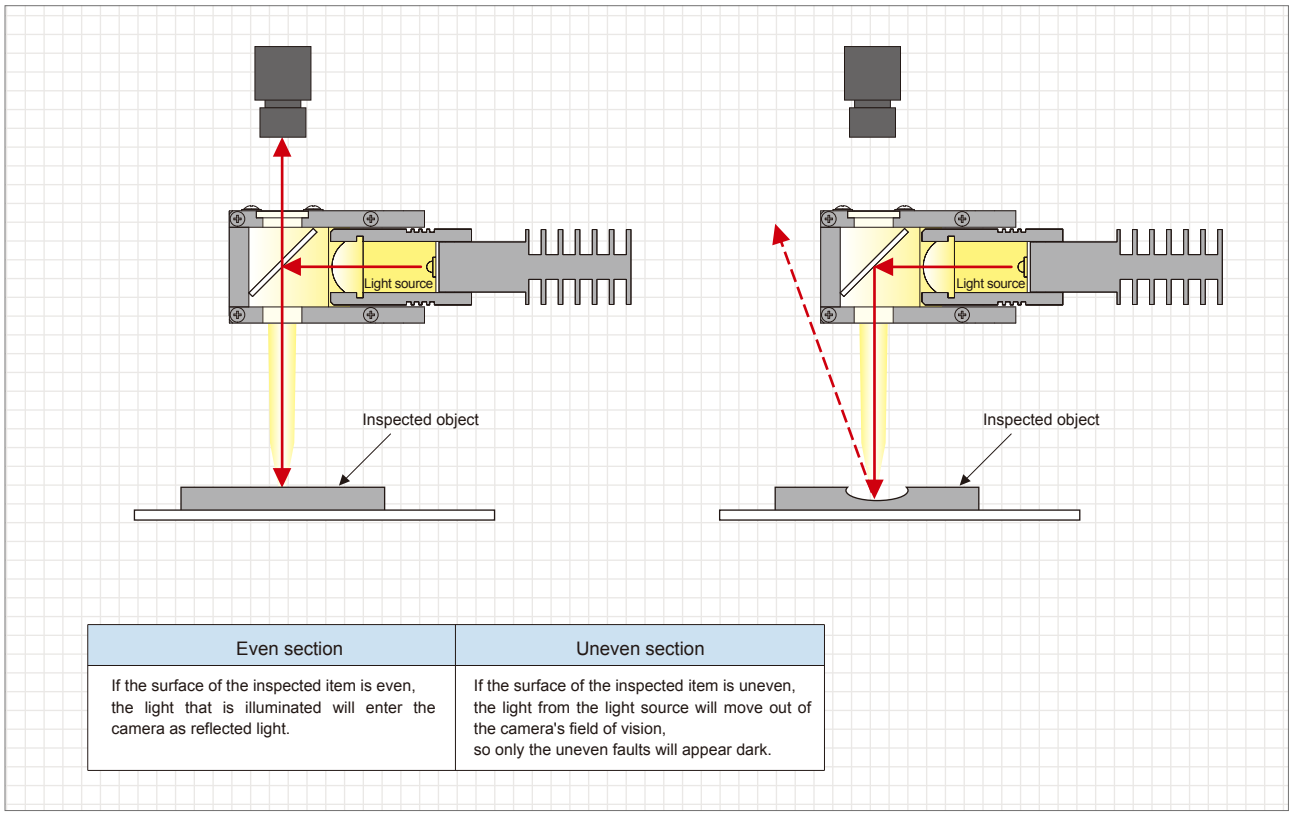


■ Imaging sample: **Image of a dent in sheet metal**

Imaging environment:
Identical to camera and optical conditions except during charging time.



■ **Mechanism for imaging uneven faults using a coaxial convergent line sensor light**



Even section	Uneven section
If the surface of the inspected item is even, the light that is illuminated will enter the camera as reflected light.	If the surface of the inspected item is uneven, the light from the light source will move out of the camera's field of vision, so only the uneven faults will appear dark.

* The imaging samples that are used have been purchased by our company.
The samples have been processed for imaging, and are not intended to represent product quality and performance.

Inquire at your local Sales Office regarding customized lights

2 Dome Line Sensor Light

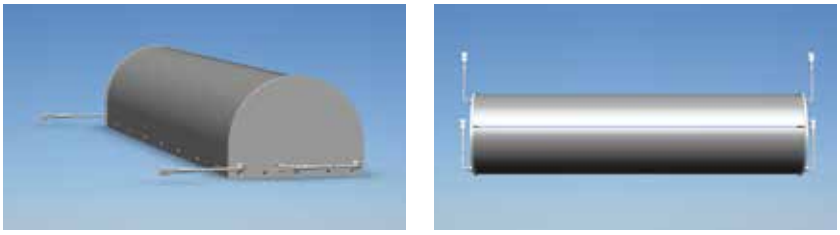
Characteristics

Achieve uniform diffused illumination by using curved reflective panels. It allows for uniform illumination of 3-dimensional objects which do not have a uniform surface forms or states.

Application

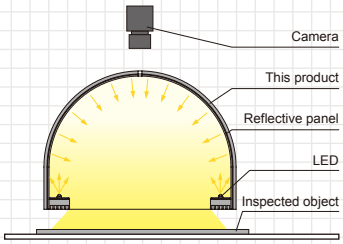
- ○ Inspecting the exterior of resin pellets
- ○ Inspecting the exterior of polysilicon
- ○ Inspecting the exterior of galvanized steel plates

■ 3D exterior figure

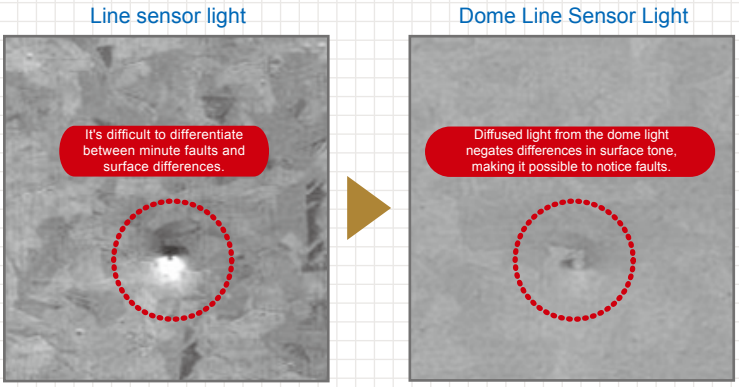


■ Figure of the illuminating mechanism

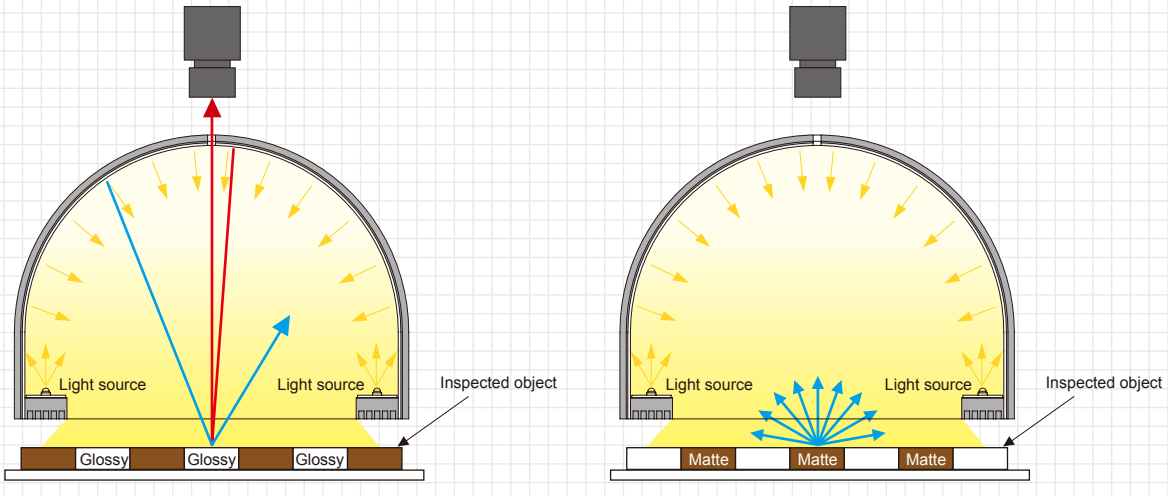
Illuminated light from the LED diffused by the curved reflective panel. Illuminating the inspected item with even, uniform diffused light.



■ Imaging sample: Image of the exterior of galvanized steel plates



■ Mechanism for imaging the exterior of galvanized steel plates using a dome line sensor light



Glossy section	Matte section
Only the light illuminated from near the roof of the reflective panel is reflected by the glossy section at nearly a direct reflection and is seen by the camera.	The matte section has a lower reflection rate compared to the glossy section, but light illuminated from the whole reflective panel is diffused and is seen by the camera.

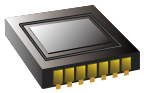
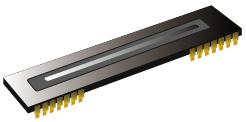
Pull the light away from the sheet.
The diffused reflection is weaker, so the matte sections are darker.

Bring the light closer to the sheet.
The diffused reflection is intense, so the matte sections are brighter.

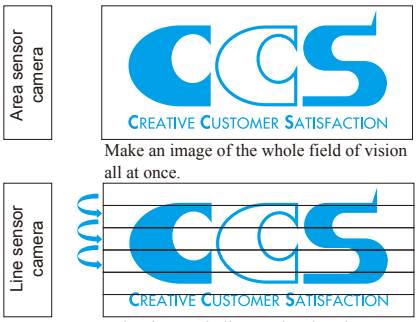
* The imaging samples that are used have been purchased by our company.
The samples have been processed for imaging, and are not intended to represent product quality and performance.

Basic line sensor camera knowledge

1 Differences between area sensor cameras and line sensor cameras

	Area sensor camera	Line sensor camera
Shape of imaging element		
Lens mount	C mount, F mount, etc.	F mount, M72 mount, etc.
Pixel expression	2M (1,600 × 1,200 pix)	8 K (8,192 pix)
Capture expression	Shutter speed 1/4,000 (250 µsec) 1/60 (16.67 msec)	Charge storage time 4,000 Hz (250 µsec) 1,000 Hz (1 msec)

Imaging methods for the area sensor camera and the line sensor camera
(Conceptual image)



2 Reading line sensor camera specifications

	Specifications
Pixel count	16,384
Pixel size	3.5 µm × 3.5 µm
Optical element length	57.344 mm
Video rate	640 MHz (80 MHz × 8TAP)
Scan rate	35 kHz
Line transferring panel	28.57 µsec (Min.)
Video output (Digital output)	8-bit Full Configuration
Sensitivity	gain1 = 1.2, gain2 = 4.8 DNnj/cm2
Amount of saturated exposure	23 ke (Representative value)
Dynamic range	60 dB (By element)
Output non-uniformity	Standard 10% When at 50% saturation power (By element)
Power supply capacity	12 V ± 0.5 V (0.5 A or less)
Operating temperature range	0°C to 40°C
Operating humidity range	85% (max.)
Storage temperature range	-10°C to +65°C
Weight	720 g max.
Dimensions	100 (W) x 100 (H) × 34 (D) (Not including protrusions)
Lens mount	M72, P = 0.75 mm

Size of 1 pixel
- Related to receiving sensitivity.
- Larger sizes can receive more brightness.

Length of the whole image sensor
- Related to the lens' image cycle.
- It's necessary to use a lens with an image cycle larger than this.

Speed at which the digital data is sent
- Speed for forwarding 1 pixel's worth of data.
- Normally displayed in bits per second (bps). (The example on the left is displayed by frequency)

Frequency for reading 1 line
- The inverse of this value is the exposure time.
- Multiply the video rate by the pixel count to calculate the minimum scan rate.

Length of time it is exposed to light
- Relative to the shutter speed for an area camera.
- Sometimes called the charging time.

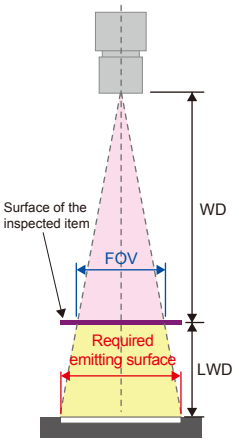
3 About the pixel count for line cameras

Pixel count	Pixel size	Ratio of receiving surface area
2K(2,048)	14 × 14 µm	16
4K(4,096)	10 × 10 µm	8
8K(8,192)	7 × 7 µm	4
12K(12,288)	5 × 5 µm	2
16K(16,384)	3.5 × 3.5 µm	1

Note: Brightness varies based on the wavelength of the light source and the receiving sensitivity of the image sensor.
Brightness does not necessarily correspond to the receiving surface area ratio.

4 How to find the required emitting surface when selecting a line sensor light

Setup examples



Information required when selecting the length of your light

(1) WD (Working distance)
: Distance from the camera to the surface of the inspected item

(2) LWD (Light working distance)
: Distance from the light to the surface of the inspected item

(3) FOV (Field of vision)

Calculate the require emitting surface using the items above

Solve Use the trigonometric ratio and calculate using the following procedure.

WD : FOV = (WD + LWD) : required emitting surface

$$\text{Required emitting surface} = \frac{\text{FOV} \times (\text{WD} + \text{LWD})}{\text{WD}}$$

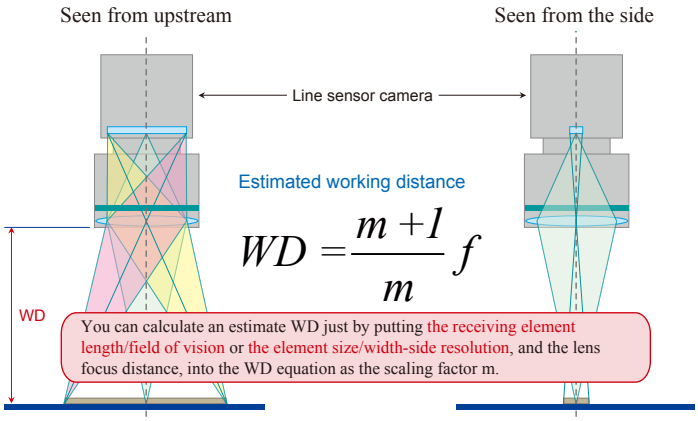
Note: The above is only valid for applications using direct light transmission or direct light reflection.
The emitting surface must be uniform.
Select a light longer than the emitting surface you calculated.

Setting optical and lighting conditions

1 How to find the working distance (WD) * Reference value

Optical system for the line sensor camera (Wide-side resolution)

It is necessary to calculate the working distance in advance.



Method for testing line sensor image input

When using a line sensor camera, calculate the working distance (WD), carrying speed, and scan rate before starting the test.

■ Example calculation with the following camera specs and conditions

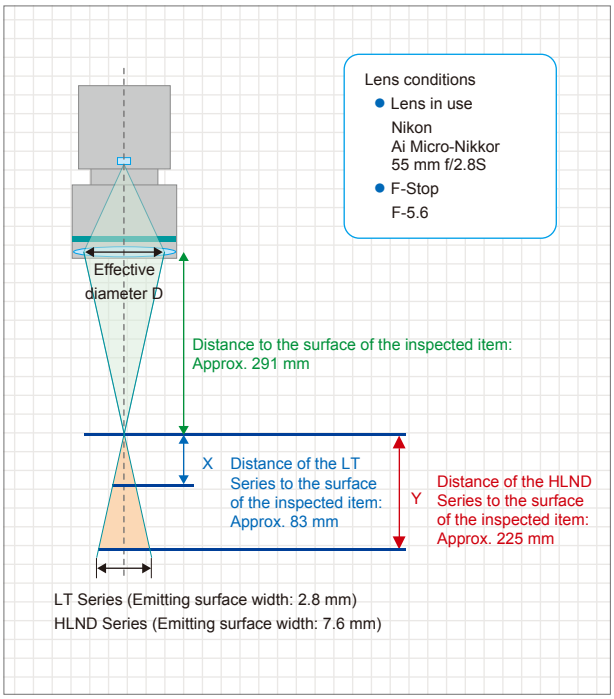
Pixel size: 7 µm × 7 µm (Pixel count: 8,192)
Focus distance: In regard to the scan rate and working distance when performing an image input test with the following conditions for a lens where f = 55 mm

1. Carrying speed: 200 mm/sec
2. Resolution:
   Carrying direction 30 µm × Lateral direction 30 µm

Scan rate = 0.03 mm ÷ 200 mm/sec = 0.00015 sec = 150 µsec

Working distance = {(7/30 + 1) / (7/30)} × 55 mm = Approx. 291 mm

2 Relationship between the lens' effective diameter and the light's installation distance * Reference value



What is the effective diameter for the lens in the conditions on the left?

D = Lens focus distance ÷ F-stop = 55 ÷ 5.6 = 9.8

What is the longest distance where the most efficient brightness can be achieved for the emitting width (short side) of each light?

⇒ Find it using similar relationships

1) If using the LT Series

9. 8: 291 = 2. 8 : X
X = (291 x 2. 8) ÷ 9. 8 = Approx. 83 mm

2) If using the HLND Series

9. 8: 291 = 7. 6 : Y
Y = (291 x 7. 6) ÷ 9. 8 = Approx. 225 mm

For both the above lights, if the light is farther than the distance above, it will be darker, but if the light is closer than the distance above, there will be virtually no change in the brightness. (However, this assumes that the inspected item is limited to something transparent where the illuminated light can be observed directly. This cannot be applied to an inspected item with a possibility for diffusion.)
Also, if the lens in use or the F-stop changes, various conditions such as the effective diameter and WD change. Therefore, please consider this only as a reference value under certain conditions. Furthermore, the camera's pixel size is a large factor regarding brightness.

3 Comparison of the images for the area sensor camera and the line sensor camera

■ Imaging sample (Metal bar)

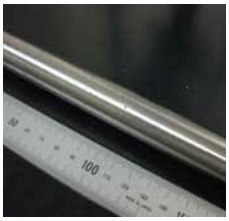
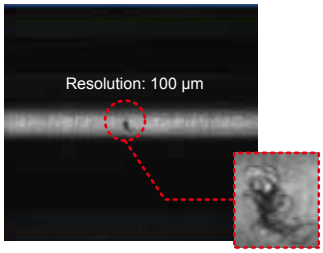


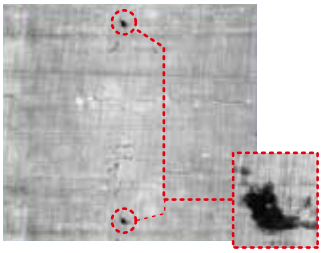
Image of scratches on a metal bar

- ○ Sample size: Length 150 mm, φ20 mm
- ○ Resolution: 100 µm
- ○ Pixels of the camera in use
  - • Line camera: 8,192 pixels
  - • Area camera: 300,000 pixels

■ Imaging with the area sensor camera



■ Imaging with the line sensor camera

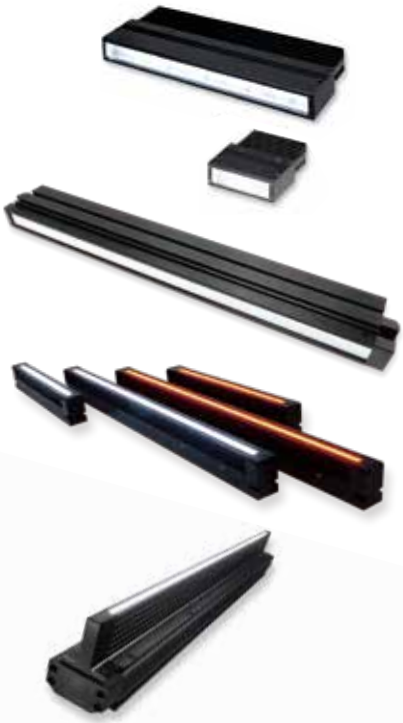


Support

We provide various kinds of support so that you can select the optimal light for you

Free demos

We will ask you about the item you're inspecting and the contents and conditions of the inspection, then select the optimal light for you. We will lend you a free demo product so you can verify how it works in your environment. Feel free to apply if you're confirming imaging or verifying settings before purchasing a product.



Flow for free demos

Receive your request → Confirm inspection conditions → Select device → Loan device → Customer verification → Return device

Free testing room

You can use our testing rooms free of charge. We looking forward to helping you.

■ Flow for using our testing rooms

Advance preparation

Receive your request → Confirm test conditions → Preliminary experiment using flawed sample

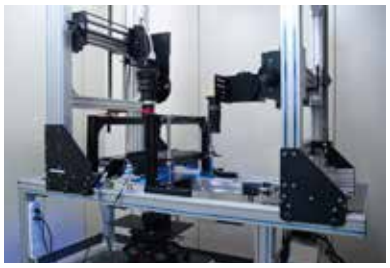
Day of the test

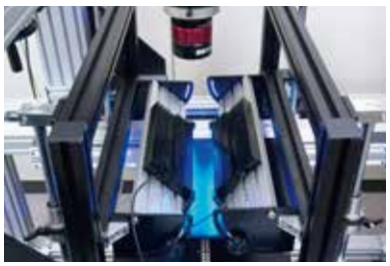
Visit → Suggesting the optimal light

■ Installation example

Optical system (Lens)	Nikon Ai Micro-Nikkor 55 mm f/2.8S Large format lens x0.7
Camera	8,192 pixel line sensor camera
Image processing	Hardware image processing board
Uniaxial table	Stepping motor Stroke: MAX 600 mm, 50 mm/sec to 400 mm/sec
Resolution	10 µm × 10 µm to 100 µm × 100 µm
Variety of setups	Direct light setup, diffused light setup, transmitted light setup

■ Testing room





We perform tests, nearly recreating your imaging environment.
We suggest the lighting solution for getting optimal images using our LED Lights, Control Units, and options.

Testing Room

CCS's strong product lineup meets your diverse lighting needs

CCS provides lighting solutions and technical consultation on locations worldwide so that you can choose the best illumination.
Please feel free to contact us. All locations have testing rooms where you can do experiments of your workpieces with our lightings.
(Please make an appointment in advance.)

Products Display Shelf

Testing Room

CCS website

http://www.ccs-grp.com

CCS Corporate Profile >> Machine Vision Applications >> **Machine Vision Applications Topics**

- **Products**
  Product information, such as specifications and accessories, is provided. Downloadable information is also provided.
- **New Product Information**
  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.
- **Contact Us**
  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

- **New Registration**
  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 Product Lineup Table or on the product web page.

We accept requests regarding lighting selections, free demo products, testing rooms, and more.
Please feel free to inquire.

Caution

- To ensure proper and safe use of the product, please read the *Instruction Guide* completely before using the product.
- For product improvement, specifications and designs are subject to change without notice.
- The sample images in this catalog are intended to serve only as references to help you select lighting. The samples that are used have been purchased by our company and processed for imaging. They are not intended to represent product quality and performance.
- Please verify the functionality and conditions required for your particular application before you consider our products and make a selection.

CCS Inc.

CREATIVE CUSTOMER SATISFACTION

■Headquarters
Shimodachiuri-agaru, karasuma-dori, kamigyo-ku,
Kyoto 602-8011 JAPAN
TEL : +81-75-415-8284 / FAX : +81-75-415-8278
URL : http://www.ccs-grp.com/
E-mail : sales@ccs-inc.co.jp

■CCS America, Inc
5 Burlington Woods Suite 204 Burlington, MA 01803 USA
TEL : +1-781-272-6900 / FAX : +1-781-272-6902
URL : http://www.ccsamerica.com/
Email : info@ccsamerica.com

■CCS Europe NV/SA
Bergensesteenweg 423, Bus 13
1600 Sint-Pieters-Leeuw, Belgium
TEL : +32-(0)2-333-0080 / FAX : +32-(0)2-333-0081
Email : info@ccseu.com

■CCS Asia PTE LTD
63 Hillview Avenue #07-10, Lam Soon Industrial Building, Singapore 669569
TEL : +65-6769-1669 / FAX : +65-6769-3422
URL : http://www.ccs-asia.com.sg/
Email : sales@ccs-asia.com.sg

■CCS Inc. Shanghai Office
Room 308B-309, CIMIC Tower No.1090 Century Avenue,
Pu Dong New Area, Shanghai 200120, P.R. China
TEL : +86-21-5835-8728 / FAX : +86-21-5835-8928
Email : ccschina@ccs-inc.co.jp

■CCS Inc. Shenzhen office
17B,China Economic Trade Building, 7Rd Zizhu, Zhuzilin,
Futian District, Shenzhen 518040 P.R.China
TEL : +86-755-8279-0477 / FAX : +86-755-8279-0478
Email : ccschina@ccs-inc.co.jp

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