

FASTUS

FASTUS is a product brand of Optex FA.

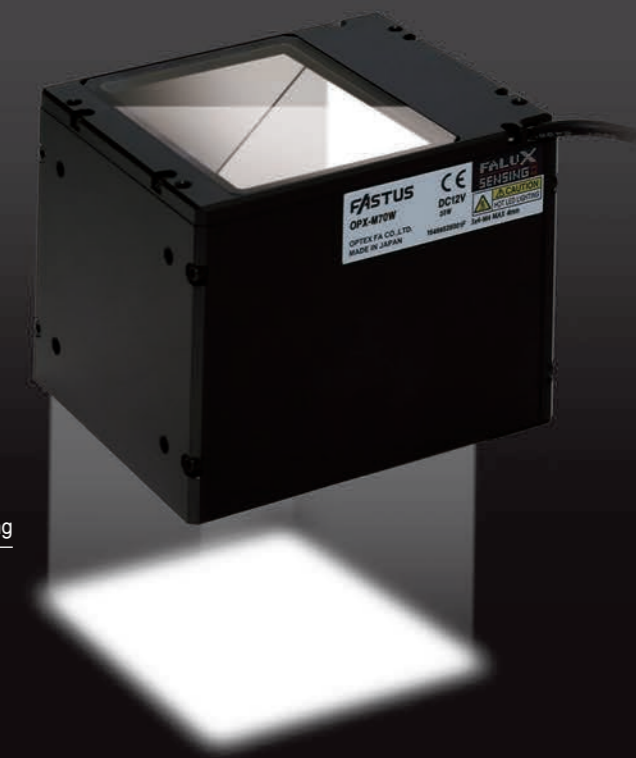


[Product Lineup]

- LED Lighting
 - Ring Lighting
 - Bar Lighting
 - Backlighting
 - Coaxial Lighting
 - Spot Lighting
- Controllers
- Power Supplies
- Options

LED Lighting for Machine Vision

2017



New Product

Sensing Coaxial Lighting

OPX Series

Attention: Not to be Used for Personnel Protection.

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death. These sensors do not include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Please consult our distributors about safety products which meet OSHA, ANSI and IEC standards for personnel protection.

- Specifications are subject to change without prior notice.
- Specifications and technical information not mentioned here are written in Instruction Manual. Or visit our website for details.
- All the warnings and cautions to know prior to use are given in Instruction Manual.



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Catalog content accurate as of June 2016.

78016-00-006-1606

OPTEX FA CO., LTD.

LED Lighting

Ring Lighting

Sensing LED Ring Lighting
OPR Series

High brightness Feedback
 Condensed / Low angle / Wide




FALUX SENSING

p.3

Sensing Ring Lighting (with Temperature Protection Circuit)
OPR-SF Series

High brightness For use with illumination control
 Condensed / Low angle / Wide



New

FALUX SENSING

p.9

Bar Lighting

High-Brightness Bar Lighting
OPB Series

High brightness 50 to 450 mm
 Wide range




FALUX

p.13

Sensing Bar Lighting
OPB-S Series

High brightness 50 to 300 mm
 Feedback




FALUX SENSING

p.23

Backlighting

Sensing LED Backlight
OPF Series

High brightness / High uniformity
 Narrow directivity angle / Diffuse



Added Models

FALUX SENSING

p.27

Coaxial Lighting

Sensing Coaxial Lighting
OPX Series

High brightness / High uniformity
 Narrow directivity angle



New

FALUX SENSING

p.35

Spot Lighting

Sensing Spot Lighting
OPS-S Series

High brightness / High uniformity
 Feedback
 For use with telecentric lenses



FALUX SENSING

p.41

Controllers / Power Supplies

LED Lighting Controller
OPPD Series

PWM dimming Capacity: 15 W
 Ultra-compact



p.47

LED Lighting Controller Advanced
OPPF Series

PWM dimming / Strobe Capacity: 48 W
 Parallel / RS232 / 0 to 5 V



FALUX SENSING

p.51

Dual-Output Power Supply (CC + PWM)
OPPCW Series

PWM dimming / Constant current Capacity: 26.4 W
 Parallel / 0 to 5 V



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Options

Cable
OP Series

Extension / Branching Illumination control
 Robot cable



p.63

Lighting Monitoring and Illumination Check Sensor
MDF Series

Brightness monitoring Illumination verification
 Amplifier / Fiber



p.65

What are FALUX and FALUX sensing?

Optex FA LED lighting is equipped with a proprietary technology designed to maintain brightness automatically over long periods by detecting the temperature and brightness of the lighting.

Problems with LED Lighting

With conventional LED lighting, three problems arise in regard to managing brightness.

Problem 1: Variations in brightness between individual LEDs

Because variations in forward voltage of individual LED can affect the brightness of the LED, the forward voltage must be aligned through sorting or some other means.

Problem 2: Fluctuations in brightness due to heat generated by the LED

When LED lighting is turned on, the LED itself generates heat, causing temperature to rise. As the internal or ambient temperature rises, the brightness decreases.

Problem 3: Management of long-term variations in brightness

After 40,000 hours of use, the brightness of LED lighting drops by 50%. This means that brightness must be adjusted when used for long periods.

Solution



(FALUX)

- Applicable Series**
- OPR ▶ P3
 - OPR-SF ▶ P9
 - OPB ▶ P13
 - OPB-S ▶ P23
 - OPF ▶ P27
 - OPX ▶ P35

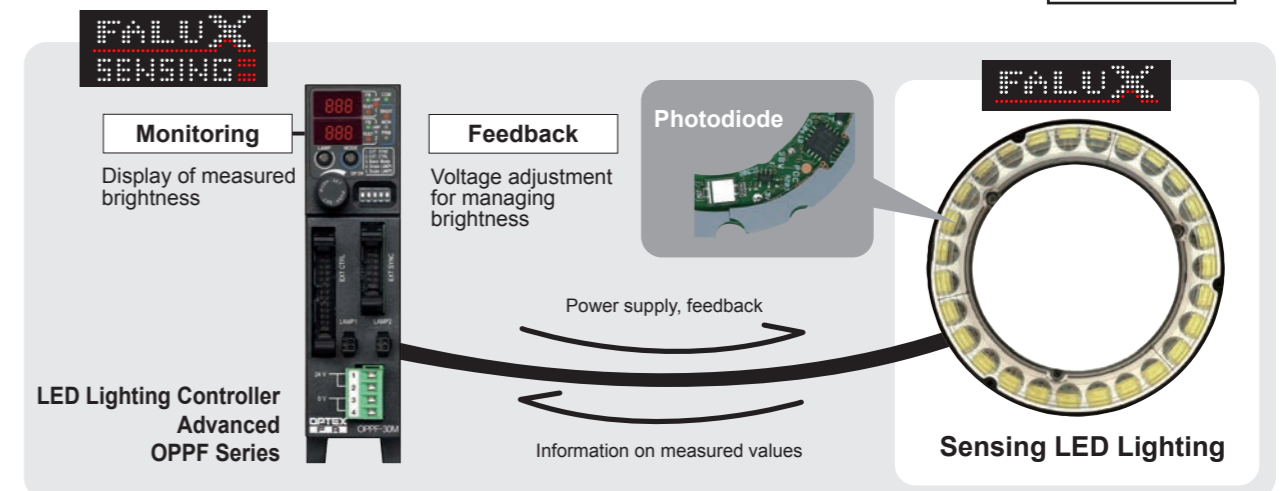
Solution



(FALUX sensing)

- Applicable Series**
- OPR ▶ P3
 - OPR-SF ▶ P9
 - OPB-S ▶ P23
 - OPF ▶ P27
 - OPX ▶ P35
 - OPS-S ▶ P41

Outline of FALUX and FALUX sensing



⇒ See P. 4 for details.



Sensing LED Ring Lighting

OPR Series

Lighting that manages brightness on its own

- “FALUX sensing” enables monitoring of brightness and feedback control
- Using the attachment lens allows switching between 3 illumination angles
- Two to three times the amount of light of conventional models with improved uniformity of illumination distribution

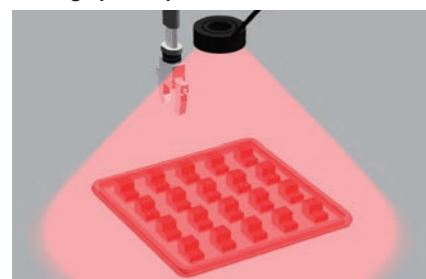


OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options



Applications

Picking up from pallets



Alignment of electronic components on suction nozzle tips



Visual inspection using medical endoscope tubes



Specifications

Model *1	FALUX SENSING *2	Attachment Lens *3	Weight [g]	White	Red	Blue	Outline Drawing
				Power Consumption [W]	Power Consumption [W]	Power Consumption [W]	
OPR-32-10□	-	Applicable	35	3.1	2.1	2.1	①
OPR-S55-28□	Applicable	Applicable	60	5.1	4.2	3.6	②
OPR-S70-43□	Applicable	Applicable	75	7.2	6.2	4.9	③
OPR-S85-58□	Applicable	Applicable	90	9.2	7.2	6.2	④

*1 □: W (white), R (red), B (blue) *2 For "FALUX sensing," connect only to an OPPF Series LED lighting controller.
 *3 A condensing attachment is installed at purchase. The tightening torque for screws during replacement should be 5 cN·m or less.



Features

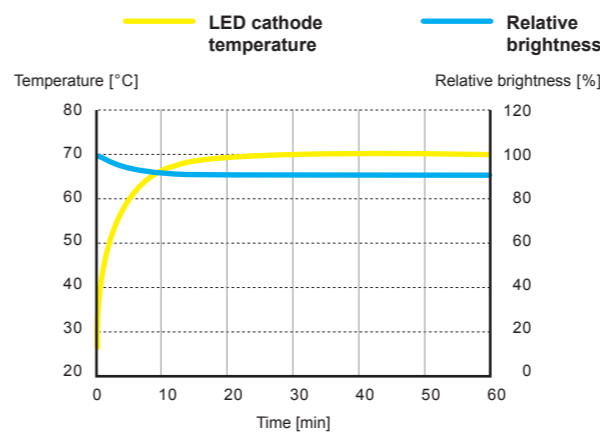
FALUX Built-in “FALUX” brightness variation correction circuit *Included in all models. Patent registered

Using the constant current circuit dependent on the input voltage, variations in the forward current of individual LEDs are corrected for uniform brightness.

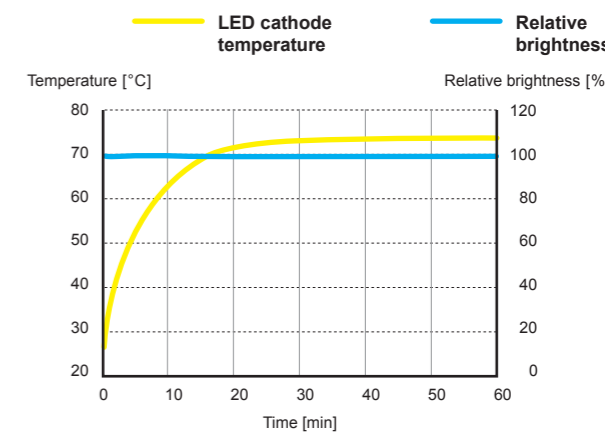
Meanwhile, the temperature compensation circuit compensates for fluctuations in brightness due to increases in temperature after lighting or changes in the ambient temperature.

FALUX not included In order to reduce LED forward voltage variations, the LEDs needed to be sorted according to their Vf measurement. Moreover, illumination efficiency dropped as the temperature increased, reducing the brightness.

FALUX included The brightness of each LED is fixed, virtually eliminating variations in brightness following increases in temperature. Whether with continuous illumination or ON/OFF control, brightness remains fixed.



Conventional model : OPDR-50-28W



OPR Series : OPR-S55-28W

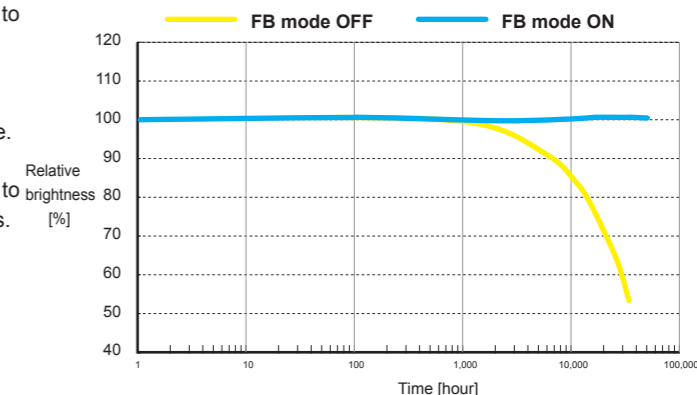
FALUX SENSING Equipped with “FALUX sensing” for monitoring brightness and temperature through sensing Patent registered

*Excluding OPR-32-10□

LED brightness sensing is performed using multiple built-in photodiodes. This allows for accurate measurement of LED brightness not only during continuous illumination but also with short period illumination. Absolute brightness is stored in the lighting's internal memory to allow for instrumental error adjustment. “FALUX sensing” also makes it possible to measure both the LED brightness of lighting and the internal temperature, and then to monitor those measurements on the power supply side. Based on the monitored values, feedback control can also be performed from the OPPF Series controller, making it possible to maintain the factory default brightness for around 40,000 hours.

Comparison of relative brightness with and without feedback control (estimated values)

Measurement lighting: OPR-S55-28W Dimming: 100% Extension cable: 5 m Ta = 30°C

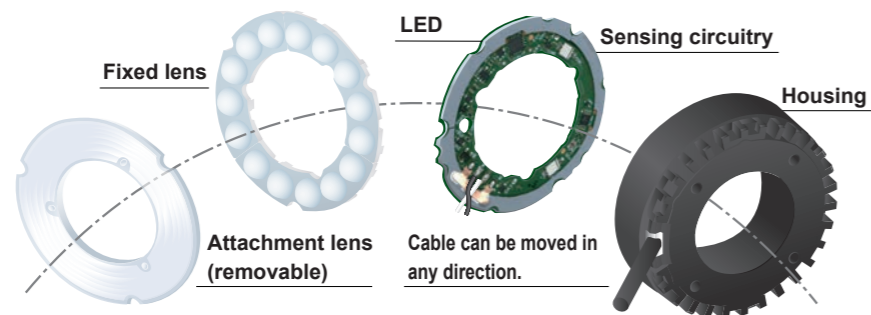


OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

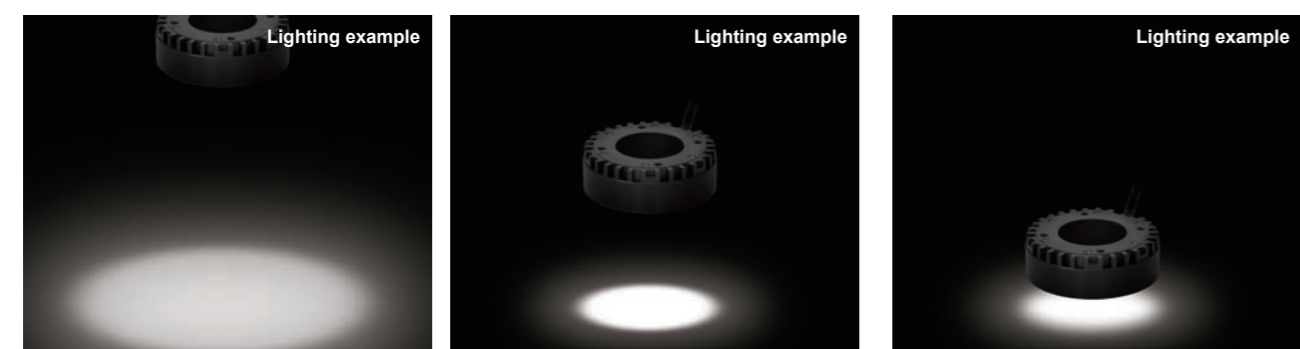
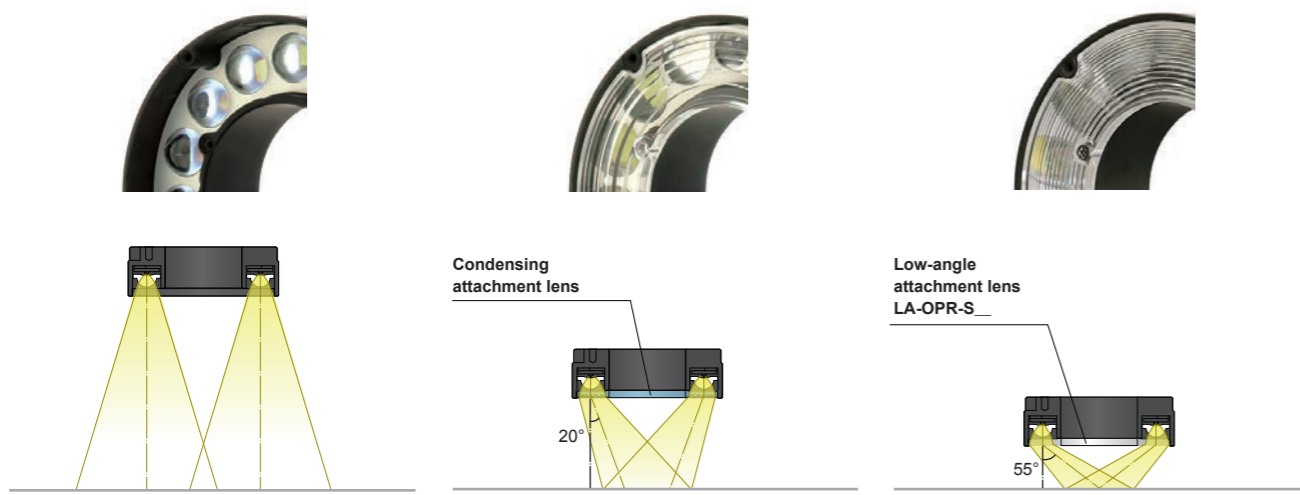


■ 3-way illumination with attachment lenses — wide, condensed, and low-angle

The aluminum die-cast case is equipped with an LED board with a built-in sensor. The first fixed lens optimizes the directivity angle of the LED, and the attachment lens can be used to switch the illumination angle. At the same time, the fixed lens guides the light toward the photodiodes, which makes highly accurate sensing possible.

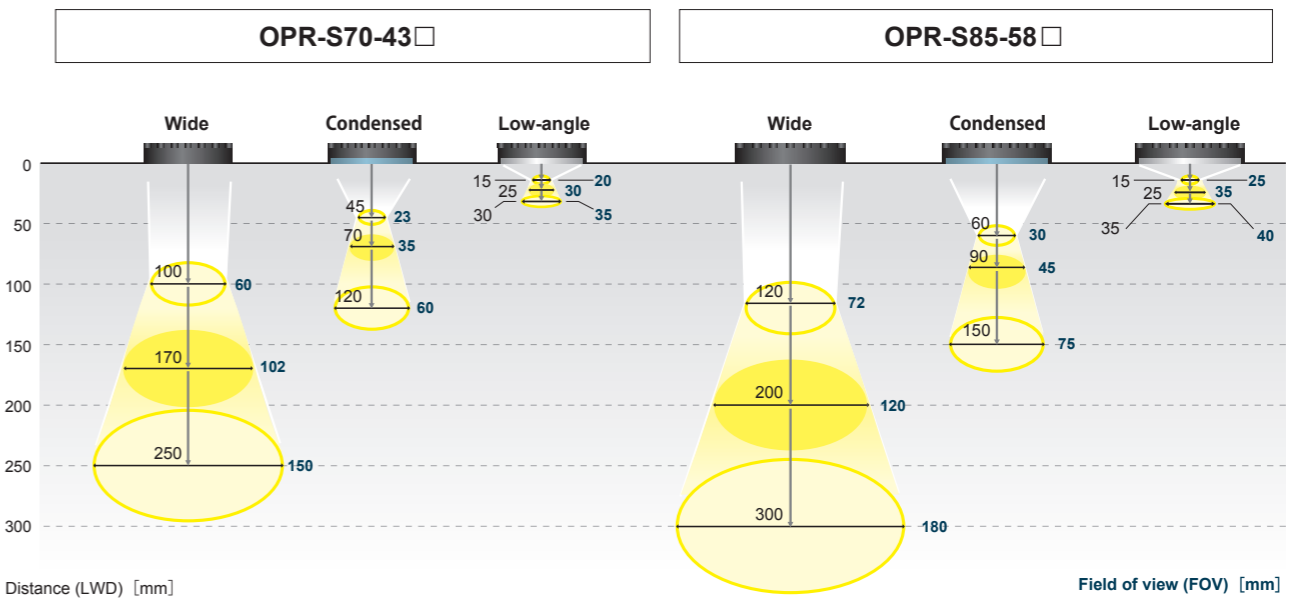
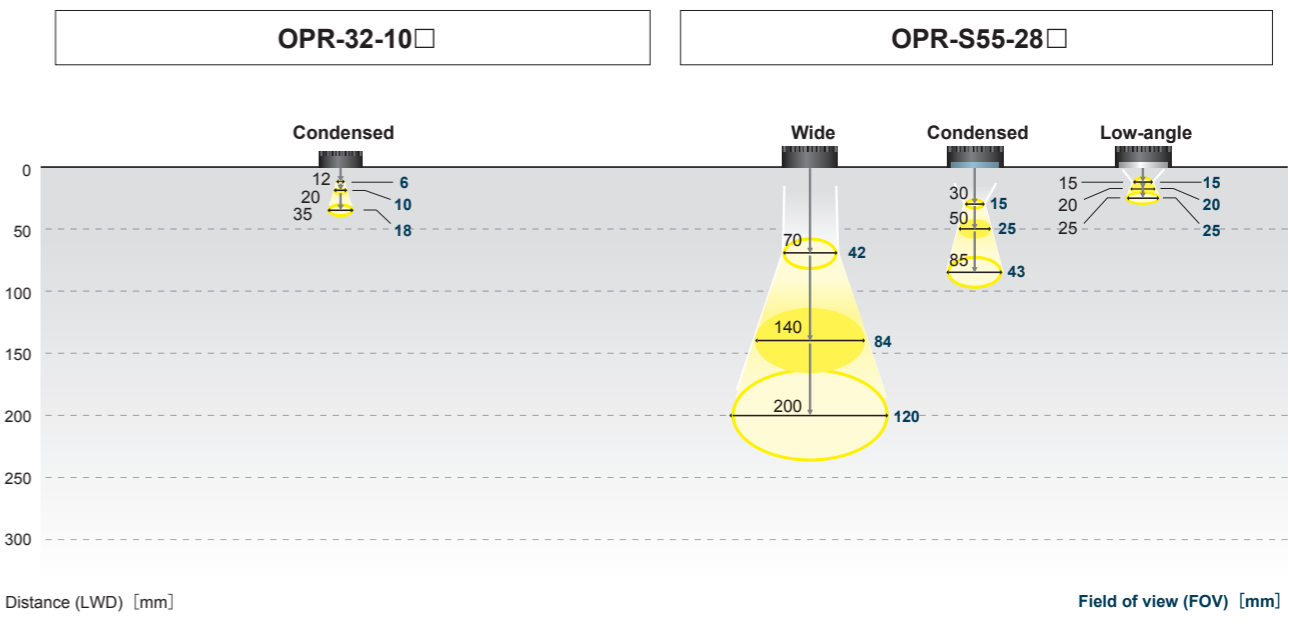


Wide	Condensed (at purchase)	Low-angle (options)
The condensing attachment lens can be removed for direct illumination with a wider field of view obtainable as the distance is increased.	Using the condensing attachment lens to tilt the illumination angle 20° to the inside allows for short-range, high-intensity focusing.	The low-angle attachment lens can be used to tilt the illumination angle 55° to the inside for compatibility with dark-field illumination to facilitate detection of scratches, dirt, and other factors.



Lighting Work-Distance (LWD) and Field of View (FOV)

The optimal light working distance and field of view can be selected in the condensed and low-angle modes with the attachment lens attached or in the wide mode with the lens removed.





Specifications

Illumination color	White	Red	Blue
Color temperature / Peak wavelength	6,000 K	635 nm	470 nm
Input voltage	12 VDC		
Degradation of LED	For brightness to drop 10% after 7,000 hours (Dimming value setting = 100%, 30°C) *Typical values		
Classification (IEC62471: 2006)	Risk Group 1 (Low-Risk)		
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013		
Protection rating	IP40 (IEC 60529: 1989 / A1: 1999 + A2: 2013)		
Ambient temperature/humidity	0 to 40°C / 35 to 85% RH (no condensation)		
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)		
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
Shock resistance	10 G, 3 times in each of the X, Y, and Z directions		
Material	Housing: ADC12 and PC, Lens: PC (UV-resistant) and PMMA		
Options	Low-angle attachment, diffusion plate (60% or 80%), transparent cover, polarizing plate, bracket, dual-side scratch-resistant cover		

● See P. 69 for spectrum distribution diagrams.

Options/Accessories

Low-angle attachment

Model	Weight [g]
LA-OPR-S55-28	10
LA-OPR-S70-43	15
LA-OPR-S85-58	20



Diffusion plate (transmittance: 80%) t2 mm

Model	Weight [g]
DF80-OPR-32-10	5
DF80-OPR-S55-28	10
DF80-OPR-S70-43	15
DF80-OPR-S85-58	20



Transparent cover t1.8 mm

Model	Weight [g]
TC-OPR-32-10	5
TC-OPR-S55-28	10
TC-OPR-S70-43	15
TC-OPR-S85-58	20



Diffusion plate (transmittance: 60%) t2 mm

Model	Weight [g]
DF-OPR-32-10	5
DF-OPR-S55-28	10
DF-OPR-S70-43	15
DF-OPR-S85-58	20



Polarizing plate (with transparent cover) t2 mm (0.2 + 1.8)

Model	Weight [g]
PL-OPR-32-10	5
PL-OPR-S55-26	10
PL-OPR-S70-40	15
PL-OPR-S85-54	20



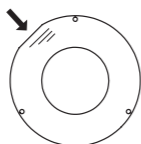
Dual-side scratch-resistant cover t2 mm

Model	Weight [g]
TCSR-OPR-32-10	15
TCSR-OPR-S55-28	20
TCSR-OPR-S70-43	25
TCSR-OPR-S85-58	30



Polarizing Plate

- The polarizing plate has flat edges on the outside.
- The direction of polarization is parallel to these edges.

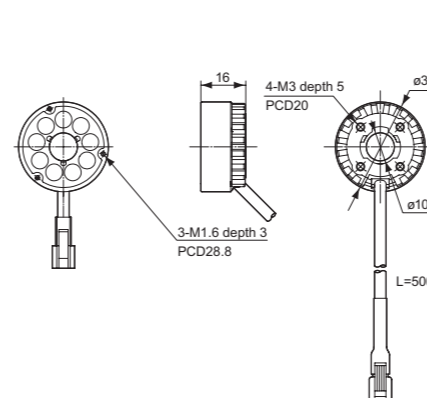


Use this cover as a protective cover for the LED lighting and the camera lens.
The cover is also effective against dust when installed on upward-facing lighting and cameras.
To prevent abrasions when cleaning, both sides feature scratch-resistant surfaces.
(Pencil hardness: 6H)

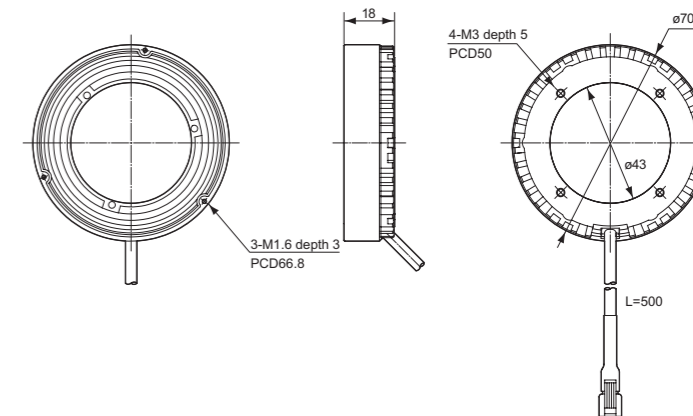
Dimensions

(unit: mm)

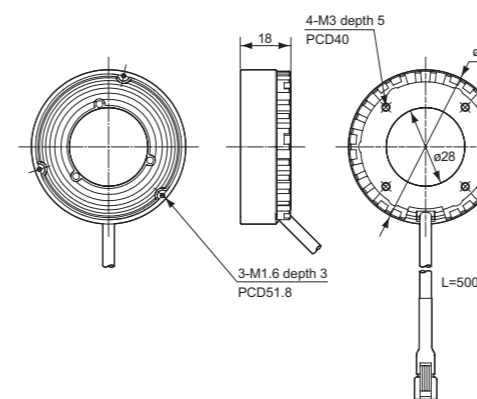
1 OPR-32-10_



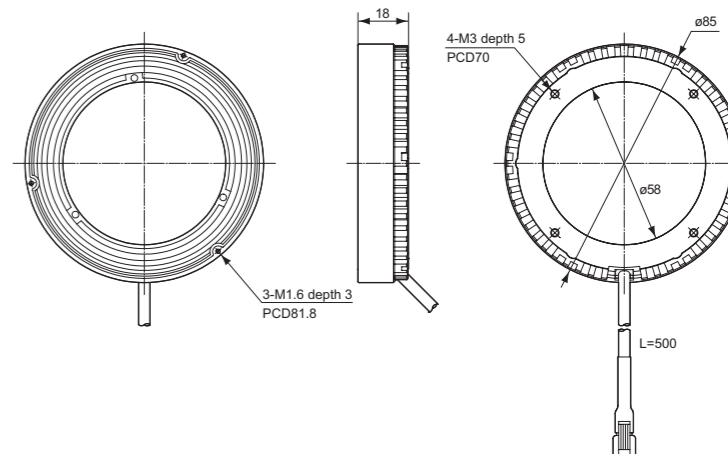
3 OPR-S70-43_

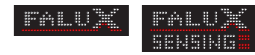
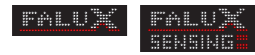


2 OPR-S55-28_



4 OPR-S85-58_





Sensing Ring Lighting (with Temperature Protection Circuit)

OPR-SF Series

No strobe power source required! Ultra-high-brightness ring lighting

- 2.5 times the brightness of conventional products
- Easy camera and lighting synchronization adjustment with illumination control
- Temperature protection circuit for automatic shutoff with increased temperature



Specifications

Model	^{*1}	^{*2}	Illumination Color	Weight [g]	Power Consumption [W]	Outline Drawing
OPR-F32-10W	-	-	White	35	8.3	①
OPR-SF55-28W	Monitoring only	Applicable		60	13.8	②
OPR-SF70-43W	Monitoring only	Applicable		75	19.4	③
OPR-SF85-58W	Monitoring only	Applicable		90	24.9	④

*1 For "FALUX sensing," connect only to an OPPF Series LED lighting controller.

*2 A condensing attachment is installed at purchase. The tightening torque for screws during replacement should be 5 cN·m or less.

Features

Ultra-high-intensity ring lighting offering 2.5 times the brightness of conventional products

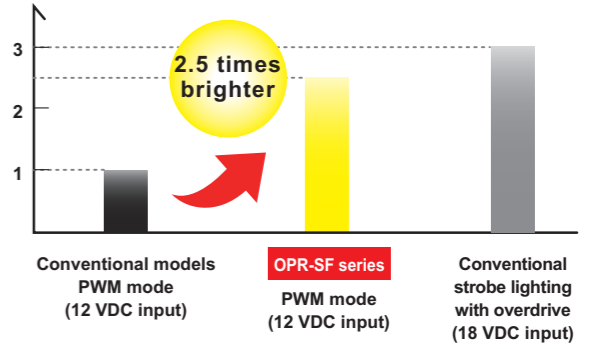


The OPR-SF Series is lighting control-specific ring lighting that offers ultra-high-intensity illumination close to that of strobe lighting with strobe control unit even when connected to a 12 V general purpose power supply.

Because longer illumination times than strobe lighting can be ensured, severe timing adjustments for the camera shutter and lighting necessary with strobe lighting are not required. In addition, high-intensity illumination is possible for illumination times of 1 ms or longer, allowing for even brighter images to be captured with slow shutter speeds.

2.5 times the brightness of conventional products

Thanks to the built-in unique circuitry, brightness has been increased by 2.5 times compared with conventional products for continuous lighting no longer than 10 seconds (10% duty). Even when connected to a general-purpose 12 V power supply, ultra-high-intensity illumination close to that of strobe lighting with strobe control unit is possible.



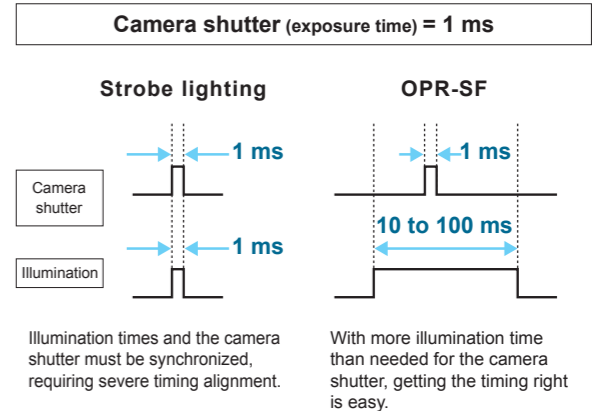
Easy camera and lighting synchronization adjustment with illumination control

With strobe lighting, which limits illumination times to no longer than 1 ms (*1) for three-times the brightness, severe adjustment is required to synchronize the camera shutter and the illumination timing.

The OPR-SF is capable of illumination times of approximately 10 to 100 ms (*2), making it easier to get the timing right with the camera shutter compared with strobe lighting.

*1 Optex OPPF Series with flash-mounted power supply

*2 Continuous lighting of 10 sec. or less (Duty 10%)

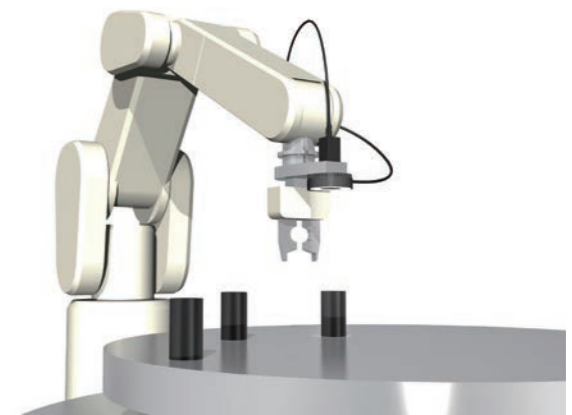


Slow shutter for capturing even brighter images

Strobe lighting, which temporarily increases brightness at illumination times of no longer than 1 ms, cannot be used with slow shutter speeds for obtaining bright images at exposure times exceeding 1 ms.

With the OPR-SF Series, however, the 1 ms time limit is not applicable, allowing for high-intensity illumination with exposure times exceeding 1 ms. This makes the OPR-SF Series suitable for low-reflectivity workpieces such as black rubber and for applications such as robot picking.

For example, with a camera shutter speed (exposure time) of 2 ms, the image obtained with the OPR-SF Series will be five times brighter than conventional model images.

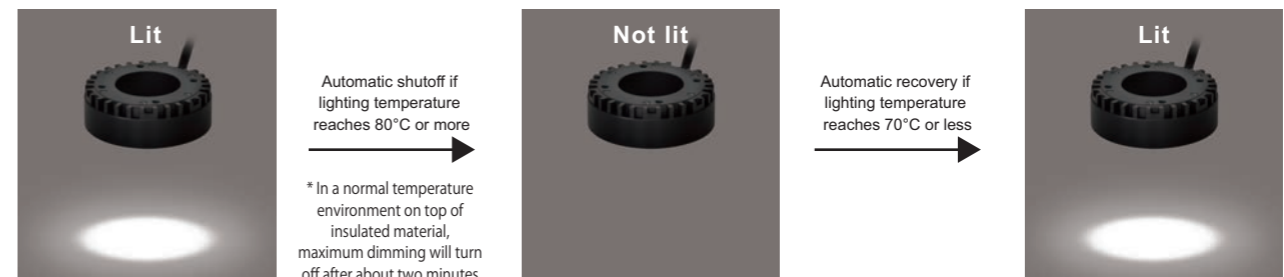


Temperature protection circuit for automatic shutoff with increased temperature

OPR-SF Series devices include a proprietary temperature protection circuit that automatically shuts off lighting if the internal temperature of the illumination part becomes high (80°C or more for OPR-SF55-28W) and turns the lighting back on if the temperature falls (70°C or less for OPR-SF55-28W).

With continuous operation, continuous lighting must be no longer than 10 seconds (10% duty), but illumination exceeding 10 seconds is possible during adjustment and the like.

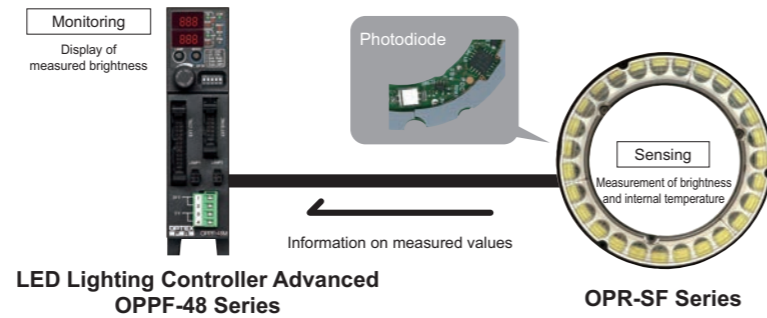
In such cases, in order to protect the lighting, illumination is shut off automatically if the internal temperature rises.





Equipped with “FALUX sensing” for monitoring brightness and temperature through sensing *Excluding OPR-F32-10W

Brightness can be monitored using the built-in photodiodes by connecting an OPPF-48 Series LED lighting controller. This allows for accurate measurement of LED brightness even with short period illumination. Monitoring of internal temperatures is also possible.



Options/Accessories

Low-angle attachment

Model	Weight [g]
LA-OPR-S55-28	10
LA-OPR-S70-43	15
LA-OPR-S85-58	20



Diffusion plate (transmittance: 80%) t2 mm

Model	Weight [g]
DF80-OPR-32-10	5
DF80-OPR-S55-28	10
DF80-OPR-S70-43	15
DF80-OPR-S85-58	20



Transparent cover t1.8 mm

Model	Weight [g]
TC-OPR-32-10	5
TC-OPR-S55-28	10
TC-OPR-S70-43	15
TC-OPR-S85-58	20



Diffusion plate (transmittance: 60%) t2 mm

Model	Weight [g]
DF-OPR-32-10	5
DF-OPR-S55-28	10
DF-OPR-S70-43	15
DF-OPR-S85-58	20



Polarizing plate (with transparent cover) t2 mm (0.2 + 1.8)

Model	Weight [g]
PL-OPR-32-10	5
PL-OPR-S55-26	10
PL-OPR-S70-40	15
PL-OPR-S85-54	20



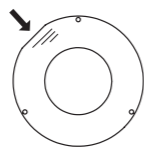
Dual-side scratch-resistant cover t2 mm

Model	Weight [g]
TCSR-OPR-32-10	15
TCSR-OPR-S55-28	20
TCSR-OPR-S70-43	25
TCSR-OPR-S85-58	30



Polarizing Plate

- The polarizing plate has flat edges on the outside.
- The direction of polarization is parallel to these edges.



Use this cover as a protective cover for the LED lighting and the camera lens. The cover is also effective against dust when installed on upward-facing lighting and cameras. To prevent abrasions when cleaning, both sides feature scratch-resistant surfaces. (Pencil hardness: 6H)

Specifications

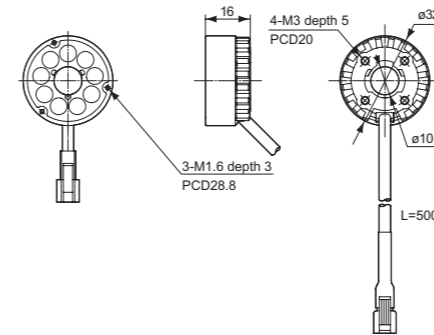
Illumination color	White	
Color temperature	6,000 K	
Input voltage	12 VDC *Connect to dedicated controller. *OPPF flash overdrive not supported.	
Illumination conditions	Illumination control duty*: 10% or less, Continuous lighting width: 10 seconds or less	
Temperature protection	OPR-F32-10W OPR-SF55-28W	Built-in temperature protection circuit (automatic shutoff if internal temperature reaches 80°C or more, automatic recovery if internal temperature reaches 70°C or less) Error with OPFF temperature monitor: ±5°C (typical value)
	OPR-SF70-43W OPR-SF85-58W	Built-in temperature protection circuit (automatic shutoff if internal temperature reaches 60°C or more, automatic recovery if internal temperature reaches 55°C or less) Error with OPFF temperature monitor: ±10°C (typical value)
Degradation of LED	For brightness to drop 10% after 7,000 hours, Conditions: Dimming value setting = 100%, ambient environment = 30°C (typical value)	
Classification (IEC62471: 2006)	Risk group 1 (low risk) (Risk classification based on IEC 62471: 2006)	
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013	
Protection rating	IP40 (IEC 60529: 1989/A1: 1999 + A2: 2013)	
Ambient temperature/humidity	0 to 40°C / 35 to 85% RH (no condensation)	
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)	
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions	
Shock resistance	10 G, 3 times in each of the X, Y, and Z directions	
Material	Housing: ADC12 and PC, Lens: PC (UV-resistant) and PMMA	
Options	Low-angle attachment, diffusion plate (60% or 80%), transparent cover, polarizing plate, bracket, dual-side scratch-resistant cover	

* The illumination control duty is the illumination time percentage for a flash cycle. ● See P. 69 for spectrum distribution diagrams.

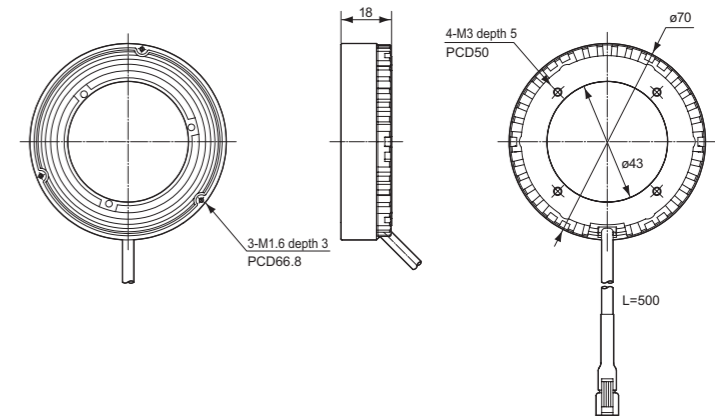
Dimensions

(unit: mm)

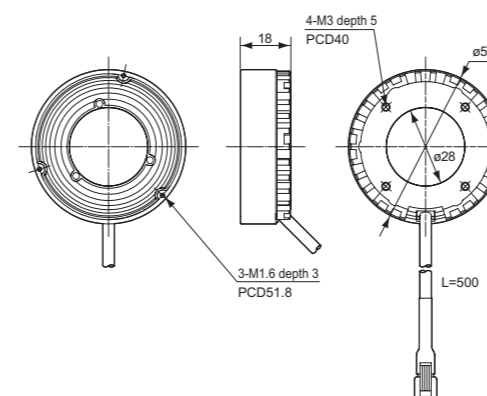
1 OPR-F32-10W



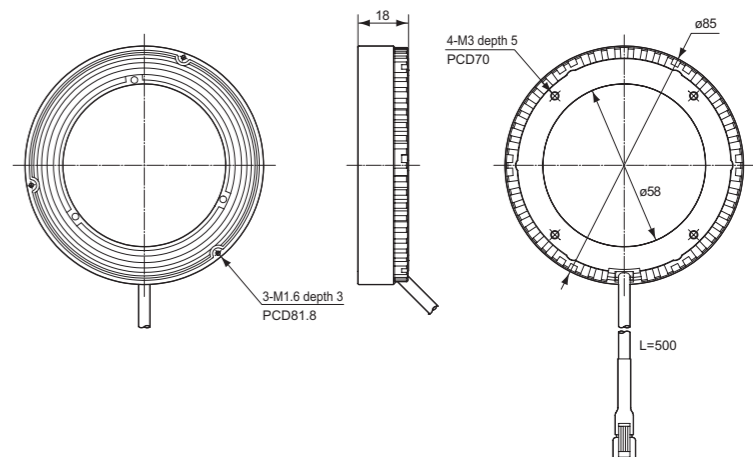
3 OPR-SF70-43W



2 OPR-SF55-28W



4 OPR-SF85-58W



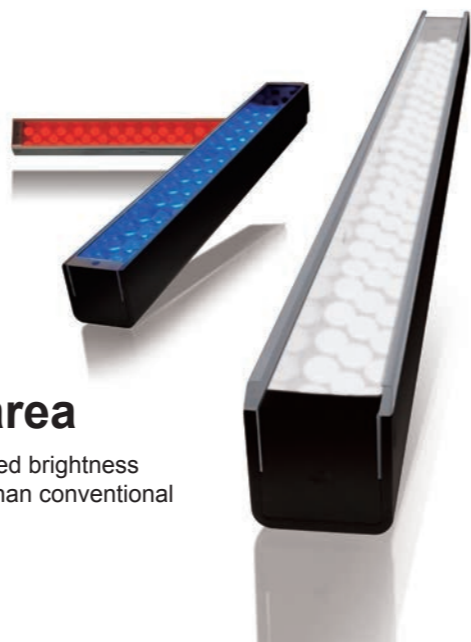


High-Brightness Bar Lighting

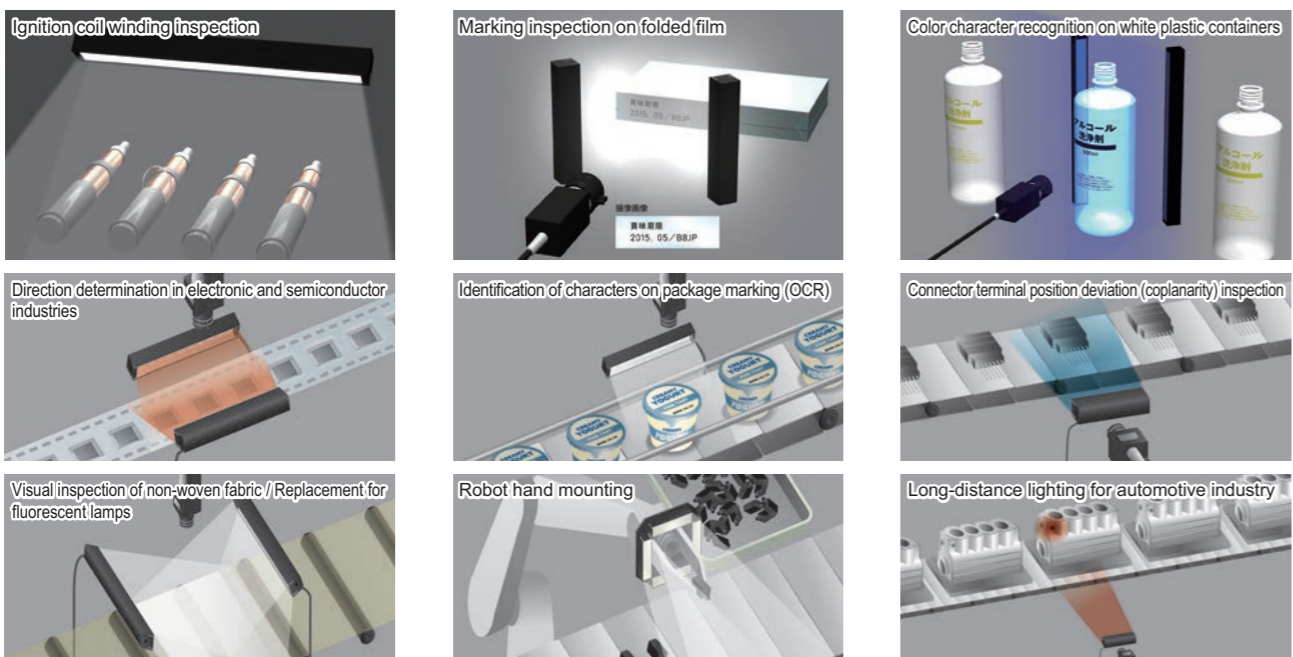
OPB Series

Optex FA's best-selling white bar lighting, now with twice the brightness and wider illumination area

- New high-brightness white (W2) with wider illumination area and increased brightness
- New overdrive strobe lighting type white (OPB-ST) three times brighter than conventional models
- Built-in "FALUX" brightness variation correction circuit



Applications



Specifications

Model	Illumination Area [mm]	Weight [g]	Power Consumption [W]				Outline Drawing
			White (W2)	White (W)	Blue	Red	
OPB-5015□	50 × 15	55	3.4	3.1	-	2.0	①
OPB-10015□	100 × 15	80	-	6.2	-	3.9	②
OPB-15015□	150 × 15	105	-	9.0	-	5.7	③
OPB-20015□	200 × 15	140	-	12.0	-	7.4	④
OPB-25015□	250 × 15	170	-	14.7	-	9.1	⑤
OPB-30015□	300 × 15	200	-	17.6	-	10.9	⑥
OPB-45015□*	450 × 15	280	-	23.8	-	-	⑦

● □ = W2/W: White, B: Blue, R: Red *Only W2 or W is available for OPB-45015□.

Bar lighting with bracket

Model	Illumination Area [mm]	Weight [g]	Power Consumption [W]				Outline Drawing
			White (W2)	White (W)	Blue	Red	
OPB-5015□-B	50 × 15	75	3.4	3.1	-	2.0	⑧
OPB-10015□-B	100 × 15	110	-	6.2	-	3.9	⑨
OPB-15015□-B	150 × 15	140	-	9.0	-	5.7	⑩

● □ = W2/W: White, B: Blue, R: Red

Bar lighting dedicated for overdrive strobe lighting

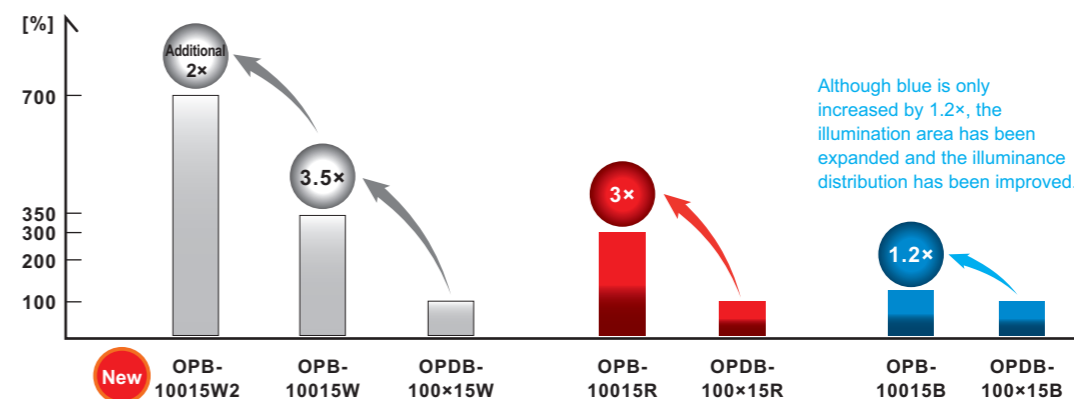
Model	Illumination Area [mm]	Illumination Color	Weight [g]	Power Consumption [W]	Applicable Power Supply	Outline Drawing
OPB-ST10015W	100 × 15	White	80	8.0	OPPF Series (excluding 500 kHz) Strobe mode*	②
OPB-ST15015W	150 × 15	White	105	12.0	(Luminescence width setting: 1 ms or less, Duty: 5% or less)	③

*12 VDC PWM mode cannot be used.

Features

■ New high-brightness white (W2)

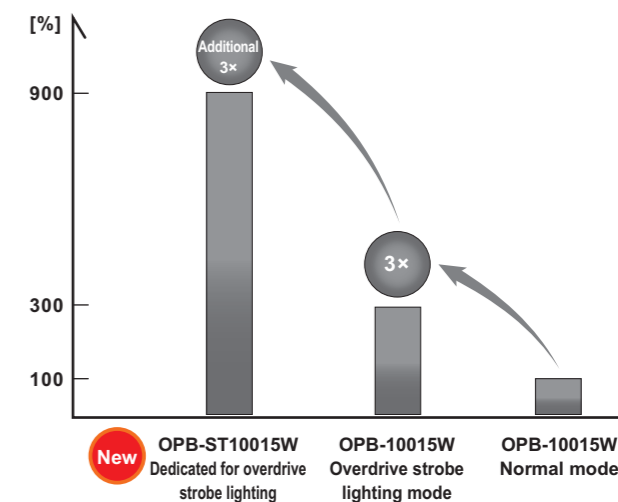
- Twice the brightness of conventional products
- Wider illumination area (See P. 16 "Illumination Area According to Illumination Distance")



■ New white bar lighting dedicated for overdrive strobe lighting

Model: OPB-ST10015W
OPB-ST15015W

Designed to be used specifically as overdrive strobe lighting, these bar lighting devices offer high brightness. Ensuring sufficient brightness even with short exposure times, these devices are ideal for high-speed lines such as those in the electronic components industry.



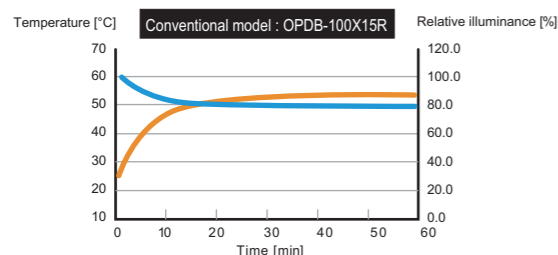


Built-in "FALUX" correction circuit Patent registered

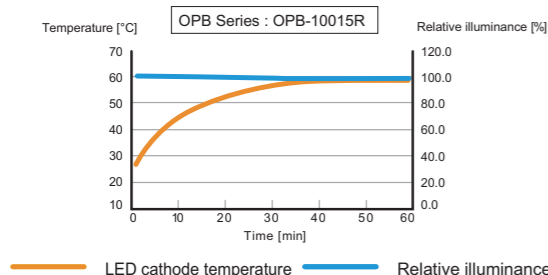
This product is equipped with Optex FA's proprietary "FALUX" brightness variation correction circuit. Using the constant current circuit dependent on the input voltage, variations in the forward current of individual LEDs are corrected. Meanwhile, the temperature compensation circuit compensates for fluctuations in brightness due to increases in temperature after lighting.

FALUX = Input voltage-dependent constant current circuit + Temperature compensation circuit

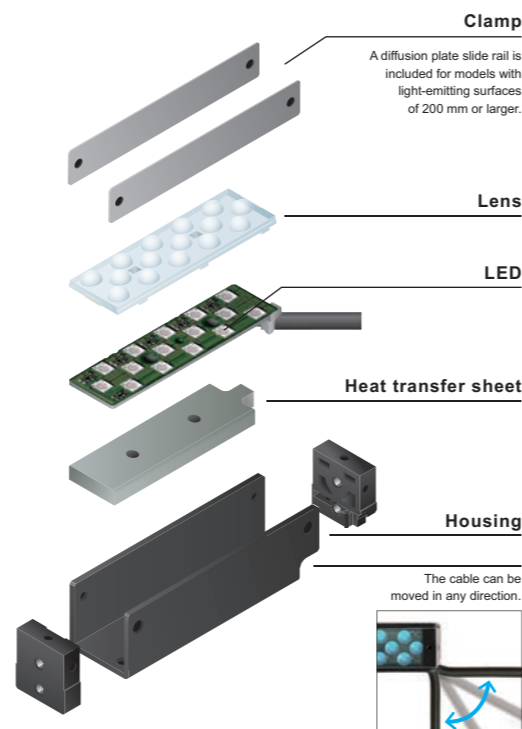
FALUX not included In order to reduce LED forward voltage variations, the LEDs needed to be sorted according to their Vf measurement. Moreover, illumination efficiency dropped as the temperature increased, dramatically reducing the brightness. Red variation was particularly noticeable, requiring a waiting period for brightness to stabilize before beginning tests.



FALUX included The brightness of each LED is fixed, virtually eliminating variations in brightness following increases in temperature. Whether with continuous illumination or ON/OFF control, brightness remains fixed.

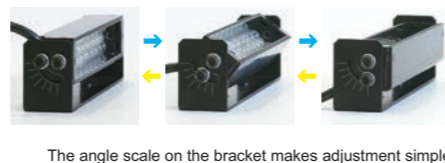


Structure of the OPB Series



Wide variety of options

In addition to diffusion plates, transparent covers, and polarizing plates, the lineup also includes brackets for convenient mounting. Lighting angles can also be adjusted between 0 and 90°. Square brackets for mounting 1 to 4 devices are also available.

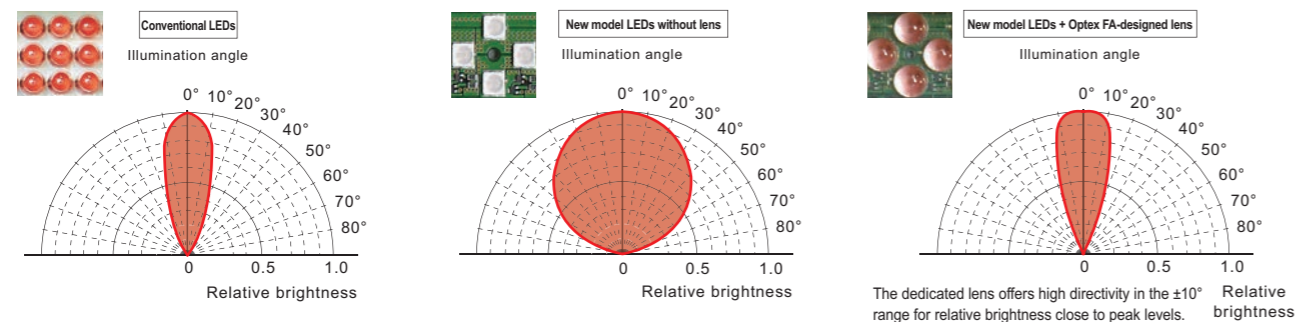


Light distribution characteristics optimized for image processing

The lens features a new design based on technology accumulated from image processor and photoelectric sensor development. In order to take advantage of the high-brightness LED characteristics, the light collection efficiency has been increased and the light distribution characteristics have been optimized for image processing.

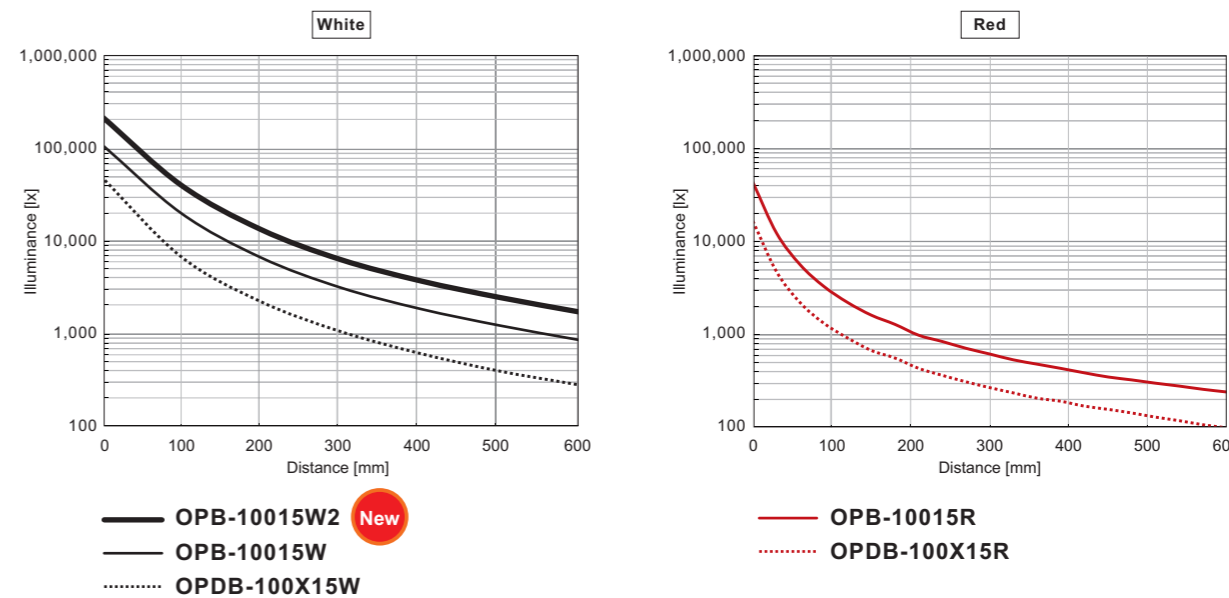
The equipped brightens only the necessary area and offers even light distribution. The red light distribution characteristics are described below.

These photos are for a 1.5 cm square LED.

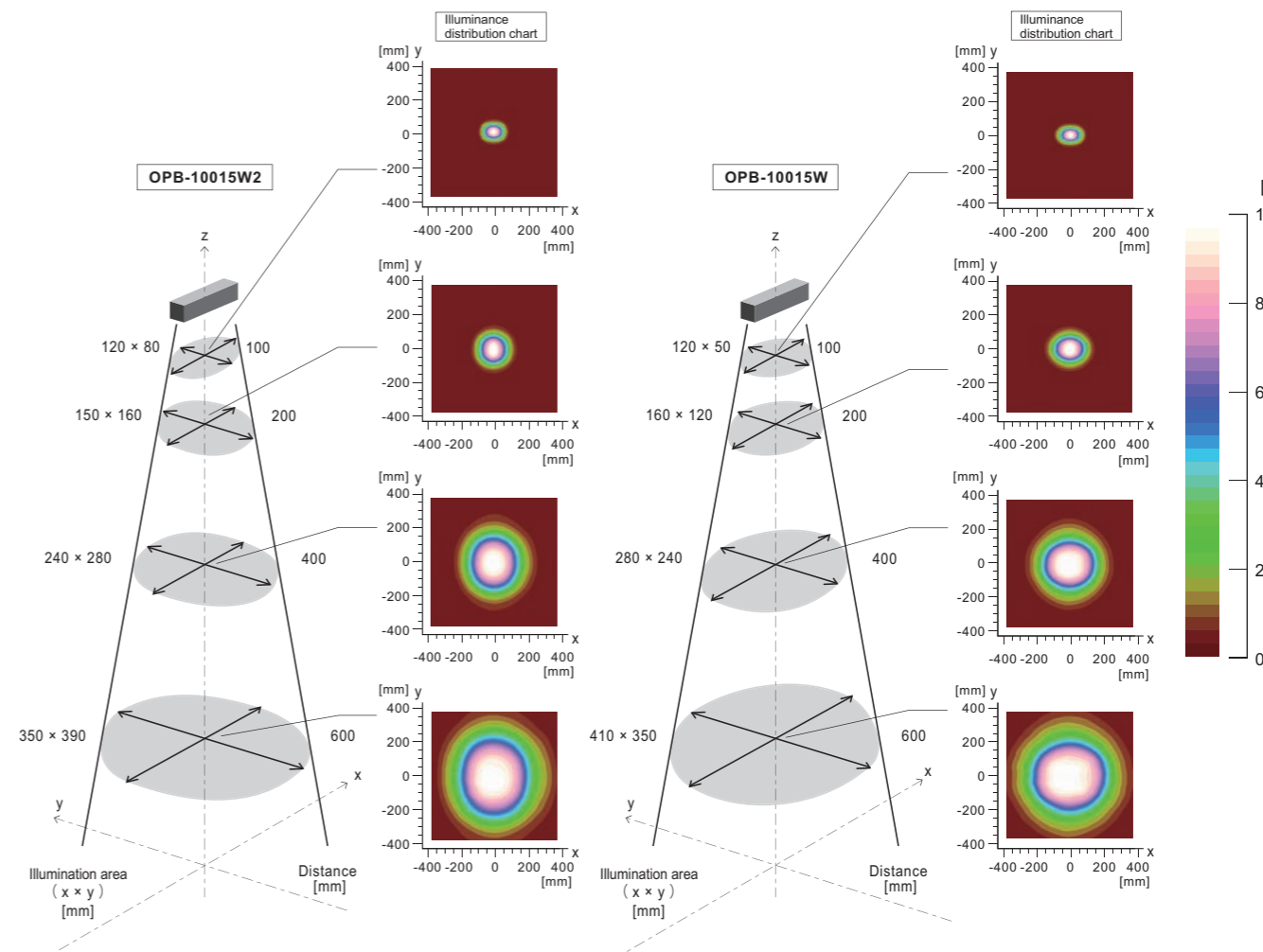


Data

Conventional Model Comparison of Illumination According to Illumination Distance



Illumination Area According to Illumination Distance (Typical example)





Specifications

Series	OPB Series				OPB-ST Series
	White (W2)	White	Blue	Red	White
Illumination color	White (W2)	White	Blue	Red	White
Color temperature / Peak wavelength	6,500 K	7,000 K	470 nm	630 nm	7,000 K
Input voltage	12 VDC				18 VDC
Degradation of LED	For brightness to drop 10% after 10,000 hours (Dimming value setting = 100%, 30°C) *Typical values				
Classification (IEC62471: 2006)	Risk Group 1 (Low-Risk)				
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013				
Protection rating	IP40 (IEC 60529: 1989 / A1: 1999 + A2: 2013)				
Ambient temperature/humidity	0 to 40°C / 35 to 85% RH (no condensation)				
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)				
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions				
Shock resistance	Approximately 10 G, 3 times in each of the X, Y, and Z directions				
Material	Housing: Aluminum and PBT, Lens: PC (UV-resistant)				
Options	Diffusion plate (60% or 80%), transparent cover, polarizing plate, bracket				

● See P. 69 for spectrum distribution diagrams.

Options/Accessories

Diffusion plate (transmittance: 60%) [For backlight]

Model	Applicable Lighting	Weight [g]	
DF-OPB-5015	OPB-5015	5	
DF-OPB-10015	OPB-10015	10	
DF-OPB-15015	OPB-15015	15	
DF-OPB-20015	OPB-20015	20	
DF-OPB-25015	OPB-25015	25	
DF-OPB-30015	OPB-30015	30	
DF-OPB-45015	OPB-45015	45	

Diffusion plate (transmittance: 80%) [For wide-area illumination]

Model	Applicable Lighting	Weight [g]	
DF80-OPB-5015	OPB-5015	5	
DF80-OPB-10015	OPB-10015	10	
DF80-OPB-15015	OPB-15015	15	
DF80-OPB-20015	OPB-20015	20	
DF80-OPB-25015	OPB-25015	25	
DF80-OPB-30015	OPB-30015	30	
DF80-OPB-45015	OPB-45015	45	

Transparent cover

Model	Applicable Lighting	Weight [g]	
TC-OPB-5015	OPB-5015	5	
TC-OPB-10015	OPB-10015	10	
TC-OPB-15015	OPB-15015	15	
TC-OPB-20015	OPB-20015	20	
TC-OPB-25015	OPB-25015	25	
TC-OPB-30015	OPB-30015	30	
TC-OPB-45015	OPB-45015	45	

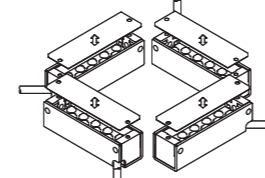
Polarizing plate

Model	Applicable Lighting	Weight [g]	
PL-OPB-5015	OPB-5015	5	
PL-OPB-10015	OPB-10015	10	
PL-OPB-15015	OPB-15015	15	
PL-OPB-20015	OPB-20015	20	
PL-OPB-25015	OPB-25015	25	
PL-OPB-30015	OPB-30015	30	
PL-OPB-45015	OPB-45015	45	

Remarks

The direction of polarization is parallel to the notches on the corners.
When using multiple lighting units, refer to the figure to the right and mount the polarizing plates so that the notches are all parallel.
Attach the included transparent covers so that they overlap on the polarizing plates during use.

Reference diagram for mounting polarizing plates



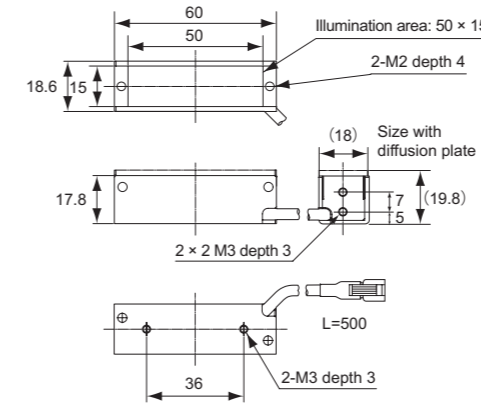
Bracket

Model	Applicable Lighting	Shape	Weight [g]	Outline Drawing	Remarks
BKT-OPB-L	All OPB Series models	L-shaped	20		Lighting angles can also be adjusted between 0 and 90°. Mounting bolts are included.
BKT-OPB-C50	OPB-5015	C-shaped	20		
BKT-OPB-C100	OPB-10015	C-shaped	30		
BKT-OPB-C150	OPB-15015	C-shaped	40		
BKT-OPB-C200	OPB-20015	C-shaped	50		
BKT-OPB-Q50	OPB-5015	Square	180		Can be used for mounting up to four lighting devices. Please prepare the same number of BKT-OPB-L brackets as the lighting devices to mount.
BKT-OPB-Q100	OPB-10015	Square	220		

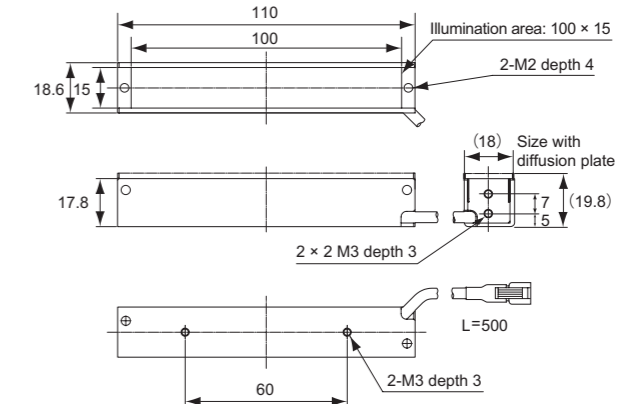
Dimensions

(unit: mm)

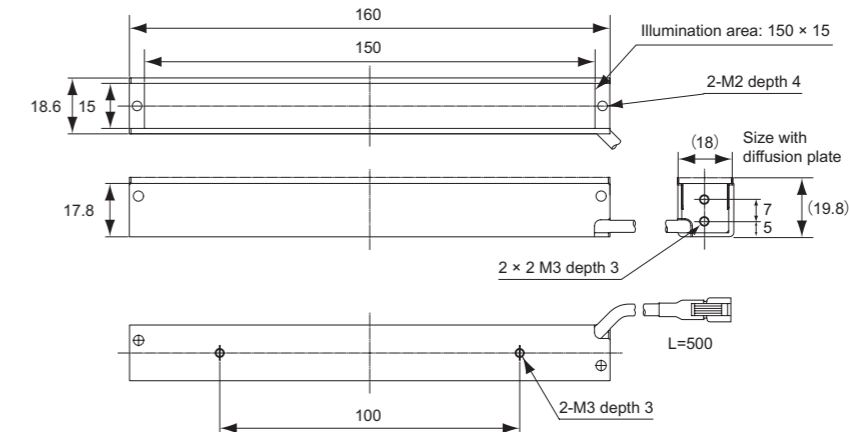
① OPB-5015_



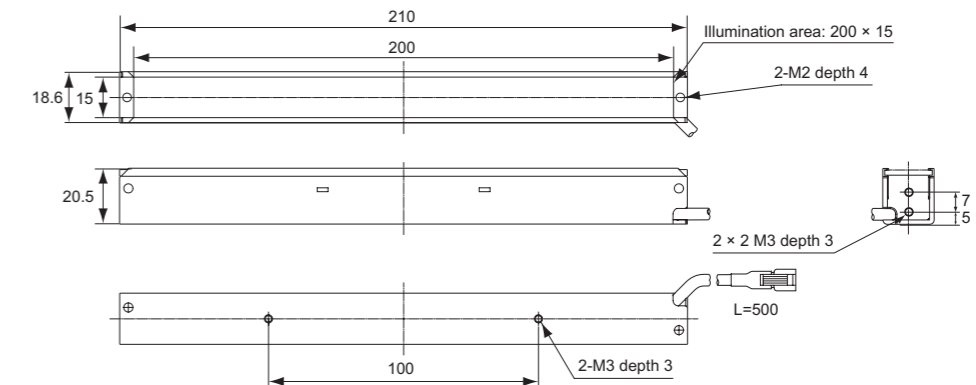
② OPB-10015_ / OPB-ST10015_



③ OPB-15015_ / OPB-ST15015_



④ OPB-20015_

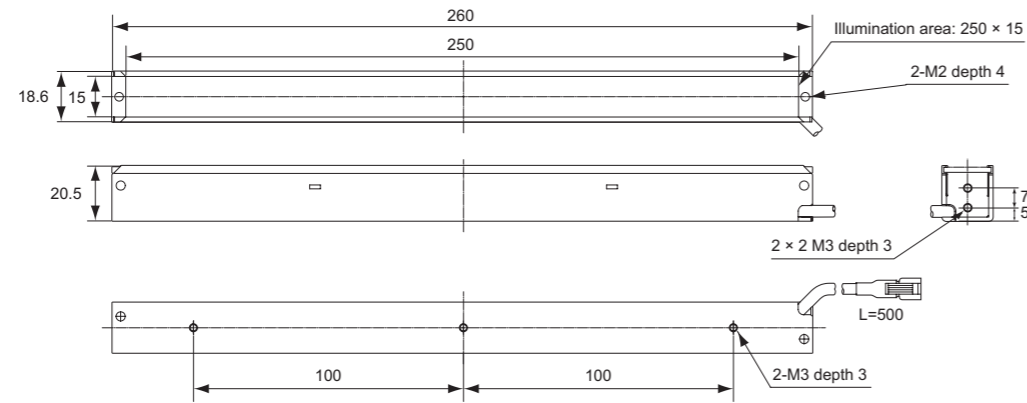




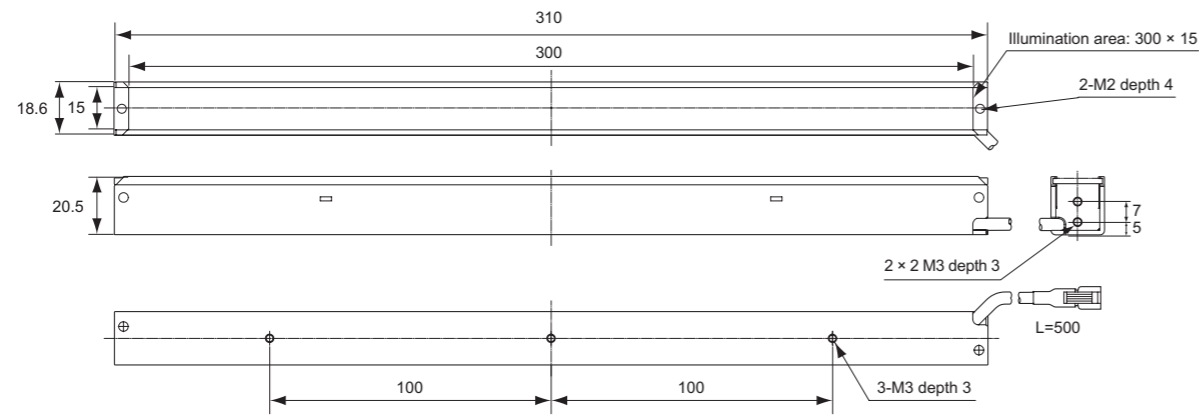
Dimensions

(unit: mm)

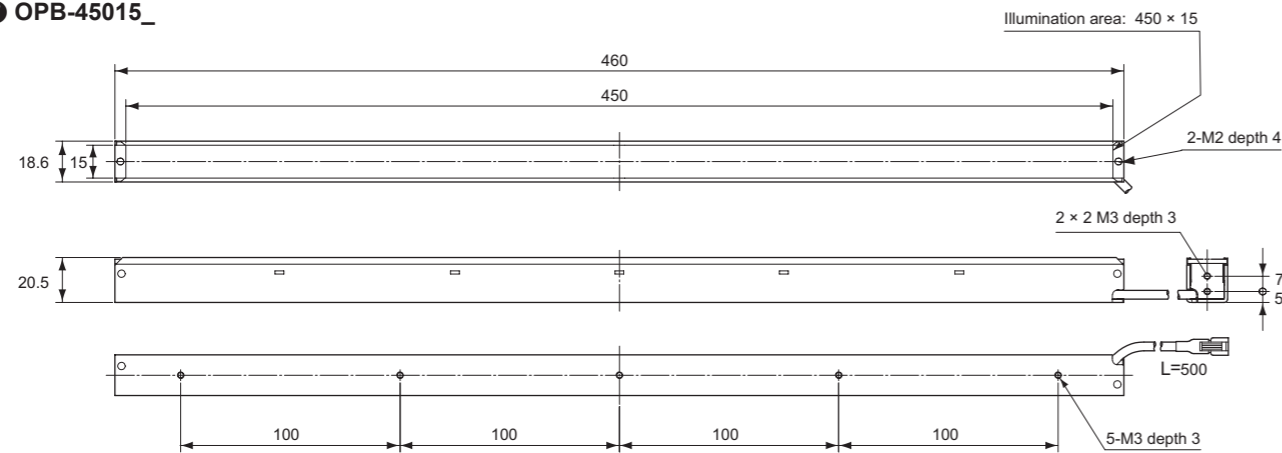
5 OPB-25015_



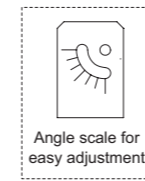
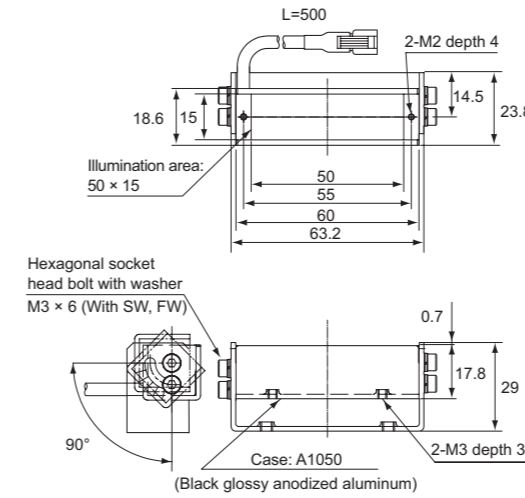
6 OPB-30015_



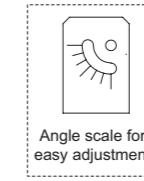
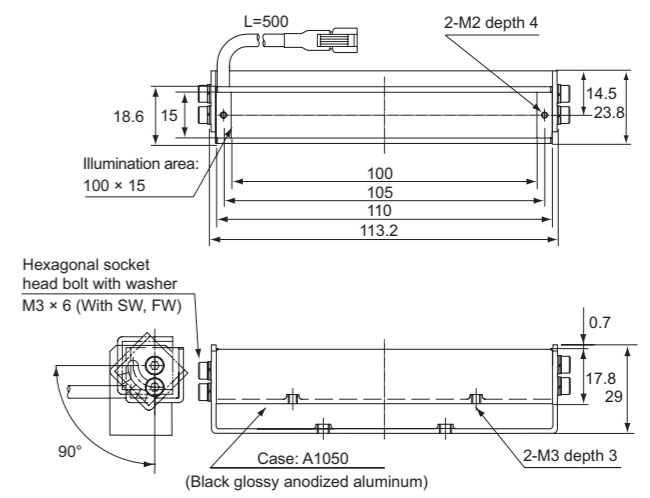
7 OPB-45015_



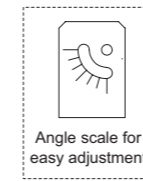
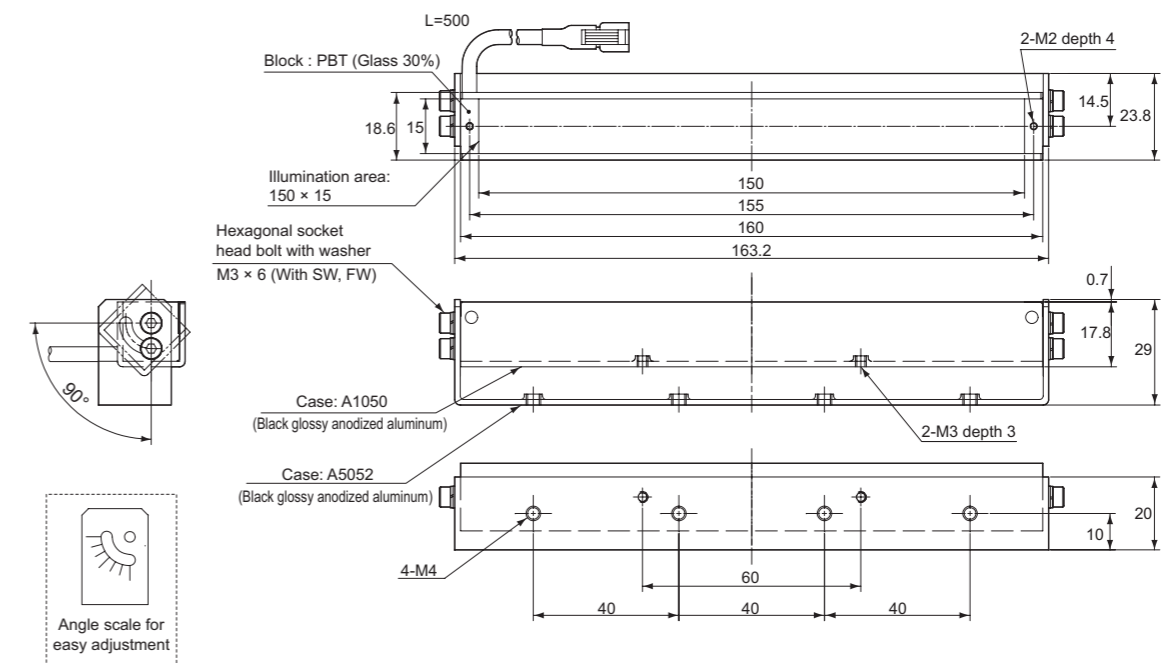
8 OPB-5015_-B (with bracket)



9 OPB-10015_-B (with bracket)



10 OPB-15015_-B (with bracket)



OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options



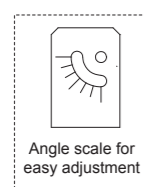
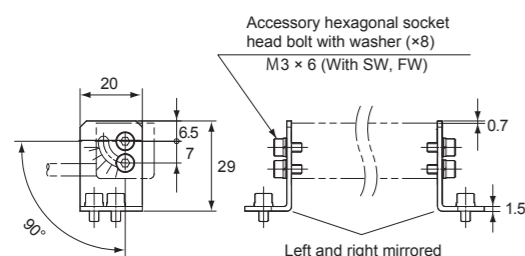
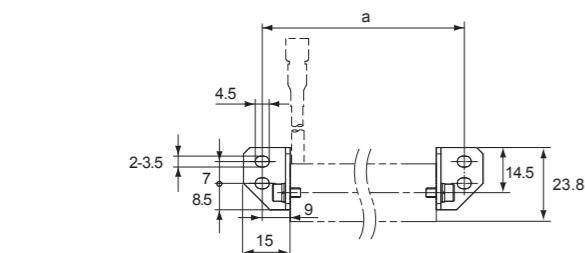
Dimensions

(unit: mm)

Options (brackets)

11 BKT-OPB-L

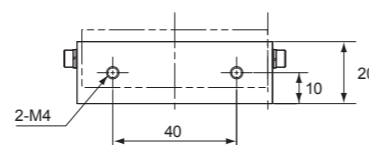
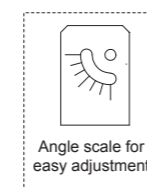
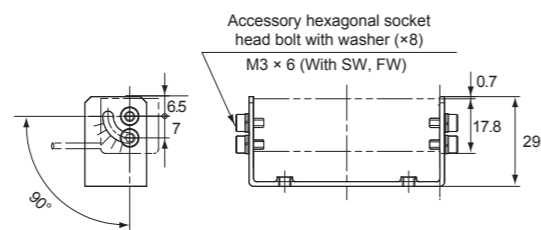
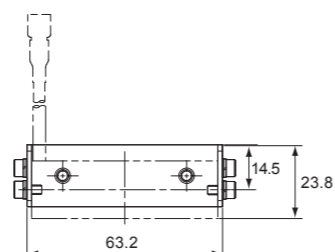
L-shaped bracket common for all sizes



Model	Dimension a
OPB-5015□	78
OPB-10015□	128
OPB-15015□	178
OPB-20015□	228
OPB-25015□	278
OPB-30015□	328
OPB-45015□	478

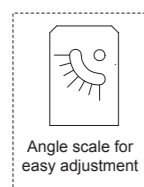
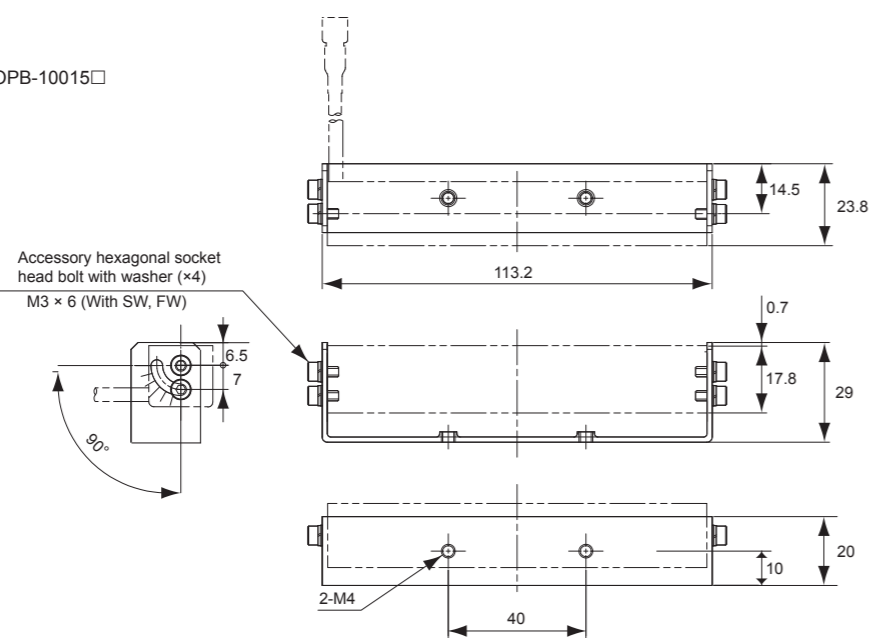
12 BKT-OPB-C50

C-shaped bracket for OPB-5015□



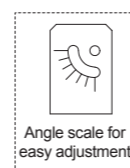
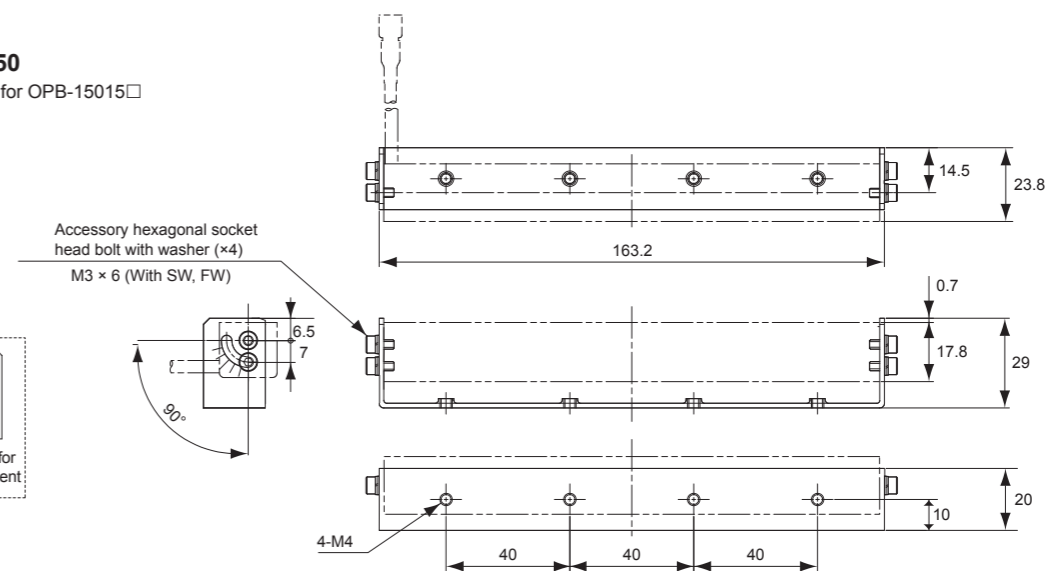
13 BKT-OPB-C100

C-shaped bracket for OPB-10015□



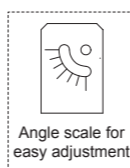
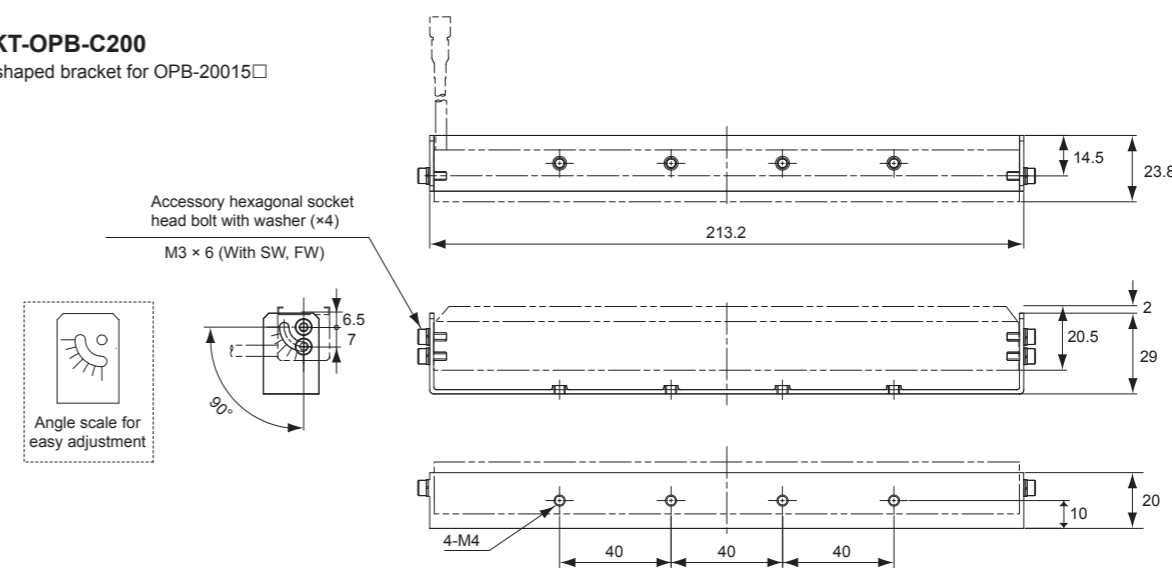
14 BKT-OPB-C150

C-shaped bracket for OPB-15015□



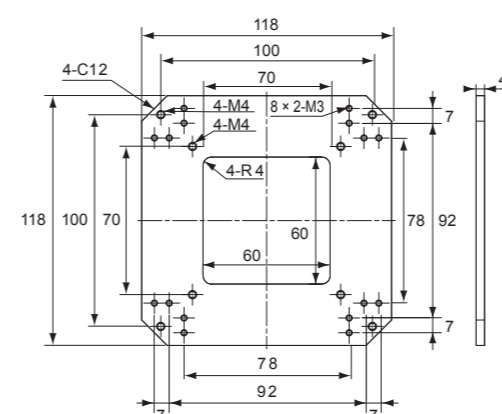
15 BKT-OPB-C200

C-shaped bracket for OPB-20015□



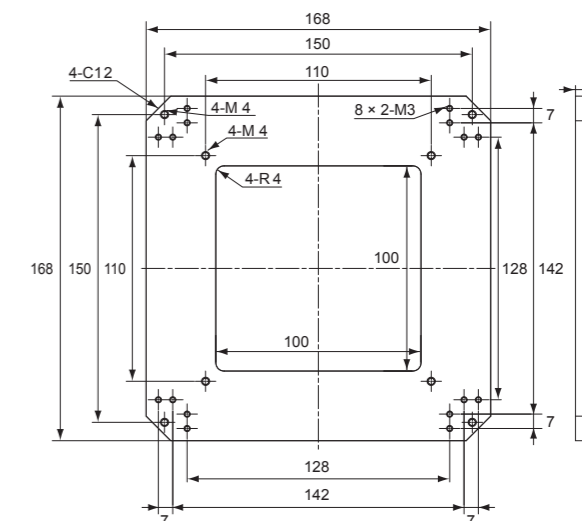
16 BKT-OPB-Q50

Square bracket for OPB-5015□ (for mounting 1 to 4 devices)



17 BKT-OPB-Q100

Square bracket for OPB-10015□ (for mounting 1 to 4 devices)





Sensing Bar Lighting

OPB-S Series

Built-in sensor allows brightness monitoring and feedback control for long-term stability

- “FALUX sensing” enables monitoring of brightness and feedback control.
- Easily adjust multiple lighting elements at the same brightness using default brightness data and standard brightness data stored internally.
- Adopts brightness fluctuation correction and high optical quality of the popular OPB Series.



Specifications

Model	Illumination Area [mm]	Weight [g]	Power Consumption [W]	Outline Drawing
OPB-S5015W	50 × 15	60	3.1	①
OPB-S10015W	100 × 15	85	6.2	②
OPB-S15015W	150 × 15	110	9.0	③
OPB-S20015W	200 × 15	145	12.0	④
OPB-S25015W	250 × 15	175	14.7	⑤
OPB-S30015W	300 × 15	205	17.6	⑥

Illumination color	White
Color temperature	7,000 K
Input voltage	12 VDC
Degradation of LED	For brightness to drop 10% after 10,000 hours (Dimming value setting = 100%, 30°C) *Typical values
Classification (IEC62471: 2006)	Risk Group 1 (Low-Risk)
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013
Protection rating	IP40 (IEC 60529: 1989 / A1: 1999 + A2: 2013)
Ambient temperature/humidity	0 to 40°C, 35 to 85% RH (no condensation)
Storage temperature/humidity	-20 to 70°C, 35 to 95% RH (no condensation)
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions
Shock resistance	Approximately 10 G, 3 times in each of the X, Y, and Z directions
Material	Housing: Aluminum and PBT, Lens: PC (UV-resistant)
Options	Diffusion plate (60% or 80%), transparent cover, polarizing plate, bracket

• See P. 69 for spectrum distribution diagrams.

Features

■ Built-in “FALUX sensing” technology

The built-in photodiodes make it possible to detect LED brightness. This allows for accurate measurement of LED brightness not only during continuous illumination but also with short period illumination. “FALUX sensing” also makes it possible to measure both the LED brightness of lighting and the internal temperature, and then to monitor those measurements on the power supply side. Based on the monitored values, feedback control can also be performed from the OPPF Series controller.



■ Absolute brightness for simple instrumental error adjustment of multiple lighting elements

The factory default brightness and model-specific absolute brightness is stored in the internal memory and can be referenced from OPPF Series products.



This not only allows monitoring of changes in brightness but also enables easy instrumental error adjustment of multiple lighting elements by comparing the absolute brightness.

■ Succeeding the popular OPB Series in performance

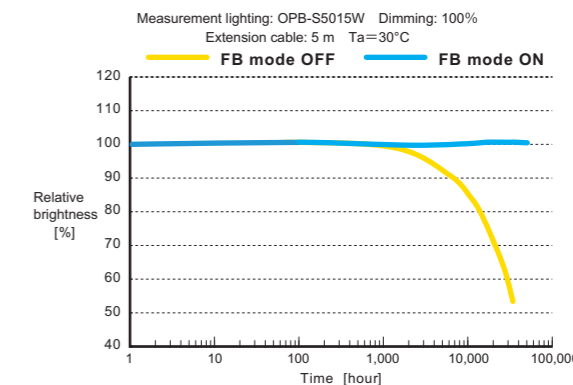
Even with built-in sensor circuitry, the OPB-S Series adds only 3.5 mm in height. In addition to excellent optical properties, users will appreciate brightness fluctuation correction made possible by “FALUX sensing” technology.

Patent registered Input voltage-dependent constant current circuit + Temperature compensation circuit

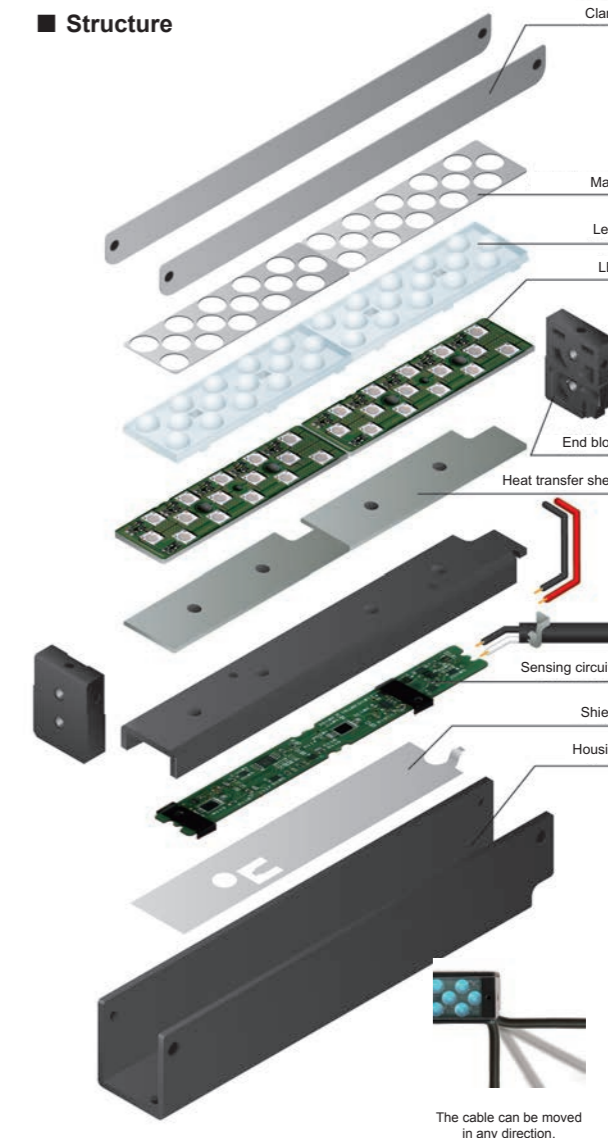


Patent registered Thanks to its original lens, the light distribution characteristics have been optimized for image processing, and the lighting guide to the photodiodes makes highly accurate sensing possible.

Comparison of relative brightness with and without feedback control (estimated values)



■ Structure



The cable can be moved in any direction.

Options/Accessories

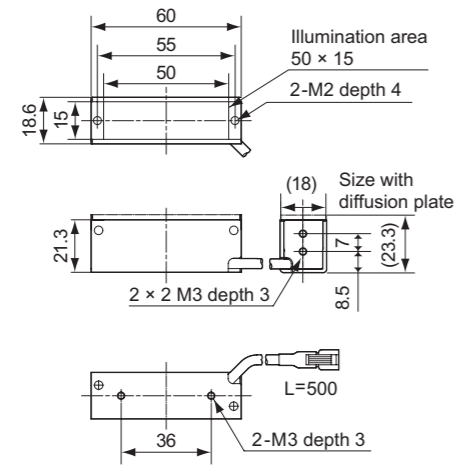
Same as OPB Series. See P. 17.



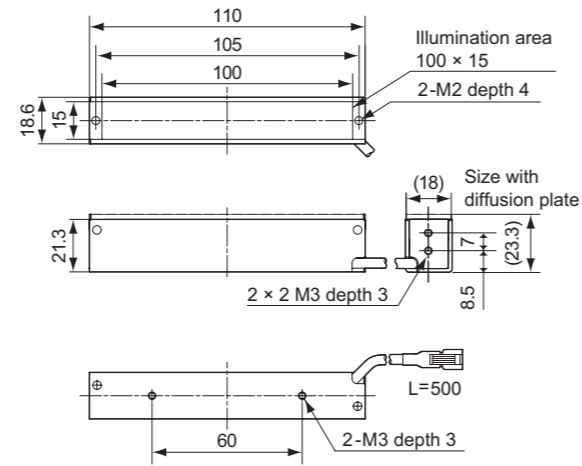
Dimensions

(unit: mm)

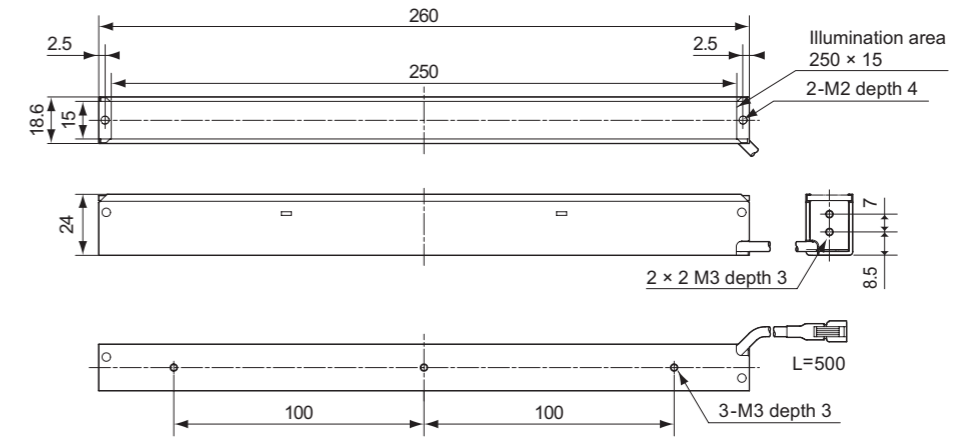
1 OPB-S5015W



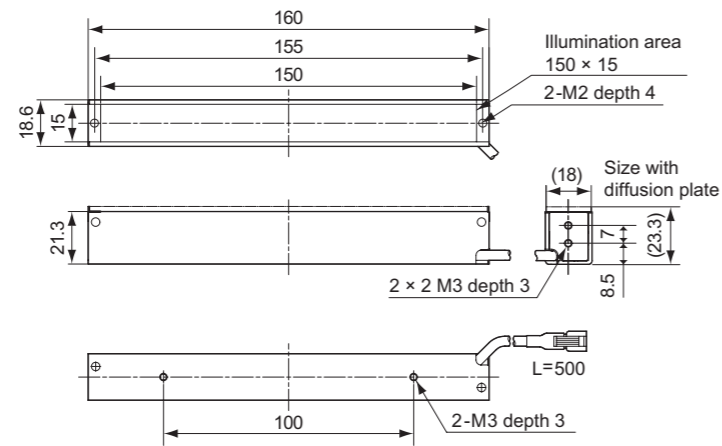
2 OPB-S10015W



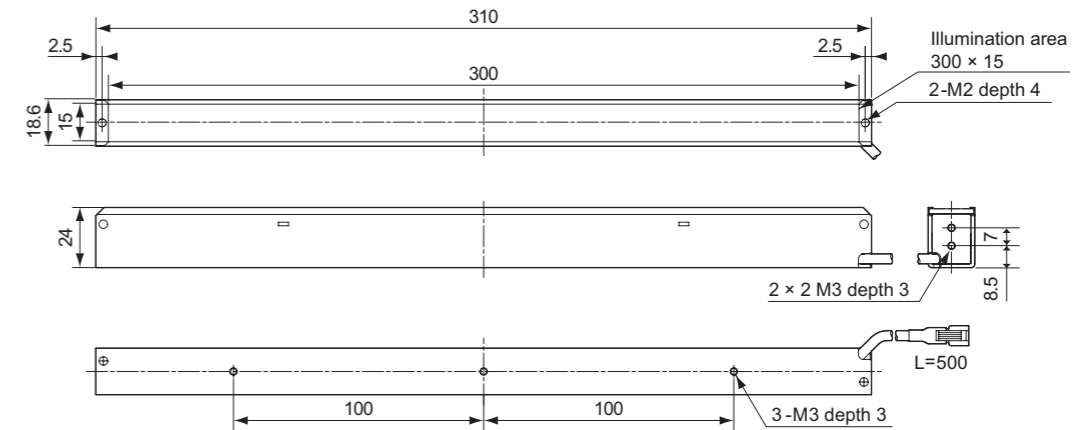
5 OPB-S25015W



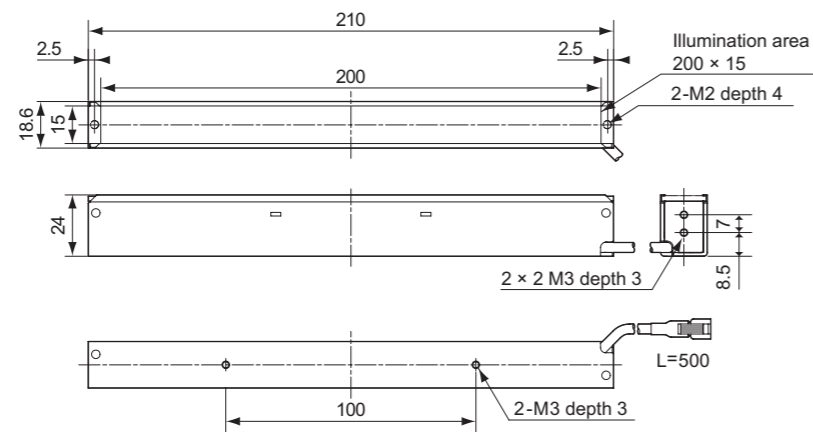
3 OPB-S15015W



6 OPB-S30015W



4 OPB-S20015W



OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	
OPPCW	
OP	Options
MDF	

OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	
OPPCW	
OP	Options
MDF	



Sensing LED Backlight

OPF Series

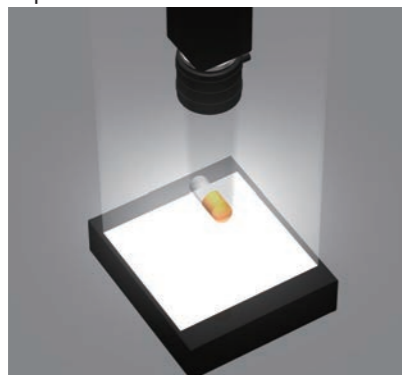
High-accuracy contour extraction and foreign object detection of transparent and metal workpieces

- Increased brightness compared with conventional models (narrow directivity angle type: 4×, diffuse type: 2.5×)
- Long-term brightness stability thanks to built-in "FALUX sensing"
- New 50 × 15 mm narrow directivity angle type!



Applications

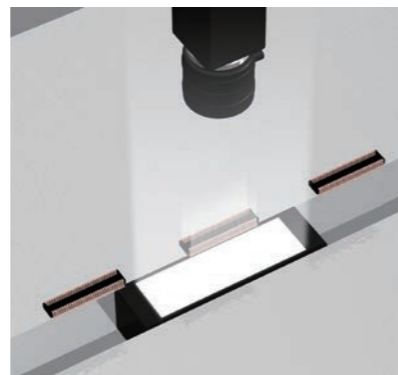
Appearance inspection of transparent capsules



Gear processing inspection



Dimension inspection of connector leads



Specifications

Narrow directivity angle type (50 × 15 mm)

Model	FALUX SENSING *	FALUX	Weight [g]	Input Voltage	Power Consumption [W]	Outline Drawing
OPF-50x15□-PS	-	Applicable	45	12 VDC	2.6	①
OPF-50x15□-PS24V	-	Applicable	45	24 VDC	2.6	①

Narrow directivity angle type

Model	FALUX SENSING *	FALUX	Weight [g]	Input Voltage	Power Consumption [W]	Outline Drawing
OPF-S27x27□-PS	Applicable	Applicable	35	12 VDC	2.2	②
OPF-S43x35□-PS			50		3.7	③
OPF-S51x51□-PS			60		5.2	④
OPF-S63x60□-PS			80		6.7	⑤
OPF-S77x77□-PS			130		9.0	⑥
OPF-S100x100□-PS	-	-	180	-	13.0	⑦
OPF-125x125□-PS	-	-	260	-	18.0	⑧
OPF-150x150□-PS	-	-	340	-	23.5	⑨

Diffuse type (backward-compatible)

Model	FALUX SENSING *	FALUX	Weight [g]	Input Voltage	Power Consumption [W]	Outline Drawing
OPF-S27x27□-DF	Applicable	Applicable	35	12 VDC	2.2	②
OPF-S43x35□-DF			50		3.7	③
OPF-S51x51□-DF			60		5.2	④
OPF-S63x60□-DF			80		6.7	⑤
OPF-S77x77□-DF			130		9.0	⑥
OPF-S100x100□-DF	-	-	180	-	13.0	⑦
OPF-125x125□-DF	-	-	260	-	18.0	⑧
OPF-150x150□-DF	-	-	340	-	23.5	⑨

□ = W: White, B: Blue, R: Red * For "FALUX sensing," connect only to an OPPF Series LED lighting controller.

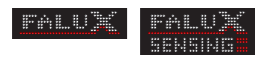
Features

[An industry first!] Narrow directivity angle type and diffuse type available

The OPF Series is available as a narrow directivity angle type or as a diffuse type, allowing for selection of the directivity angle that best suits the target.

Using the industry's first prism sheet, the narrow directivity angle type allows for clear contour extraction with transparent workpieces and metal workpieces that cause glares, targets that were conventionally difficult to handle.





Narrow directivity angle type for powerful contour extraction with transparent or glossy targets

OPF Series lighting is equipped with a proprietary prism sheet on the diffusion plate for a narrow directivity angle (half-value angle of $\pm 17^\circ$) equivalent to that offered by conventional light control (LC) film.

Illuminating from the rear with a narrow directivity light angle prevents unwanted reflected light for projection of a crisp silhouette that is not affected by surface conditions.



Monochrome camera	OPF (diffuse type)	OPF (diffuse type) + LC	OPF (narrow directivity angle type)
Dimensional measurement of shiny metal shaft	Glare is present on the sides and threaded portions of the shaft.	Overlaying an LC film will remove the glare but also darken the view.	No glare is present, and brightness exceeds required amounts.
Contour detection for transparent film	Contours of protective smartphone film mounted on a transparent plate are blurred because the light is reflected by the edges.	Overlaying LC film allows the edges to be determined but brightness is insufficient.	With narrow directivity, reflections on the film edges are reduced and black edges stand out.

Diffuse type for penetrating scattering workpieces

When detecting foreign matter within workpieces that scatter light, including non-woven fabric and cloudy plastic, a diffuse type is available as an upward-compatible product for conventional OPSM models. With highly uniform light that is 2.5 times brighter than conventional models, the diffuse type easily penetrates scattering workpieces and displays the shadows of foreign matter.



Monochrome camera	OPF (diffuse type)	OPF (narrow directivity angle type)
Foreign matter detection with cloudy plastic containers	Black spots are crisp and defined.	Light is not transmitted, preventing black spots from being determined.

Selective use of directivity angles even with color camera

Color camera	OPF (diffuse type)	OPF (narrow directivity angle type)
Ballpoint pen core replacements	<ol style="list-style-type: none"> The narrow directivity angle type captures contours on shiny cylindrical metal with no glare. The diffuse type's ability to permeate plastic with mixed metal-plastic areas makes it possible to capture even interior metal components. 	<ol style="list-style-type: none"> The narrow directivity angle type captures contours on shiny cylindrical metal with no glare. The diffuse type's ability to permeate plastic with mixed metal-plastic areas makes it possible to capture even interior metal components.
Fresnel lens	<ol style="list-style-type: none"> The narrow directivity angle type is capable of capturing clear images of the contours of the countersunk portions of screw holes. Dirt and scratches are clearly displayed using the diffuse type and can be shown in separate red and black colors. 	<ol style="list-style-type: none"> The narrow directivity angle type is capable of capturing clear images of the contours of the countersunk portions of screw holes. Dirt and scratches are clearly displayed using the diffuse type and can be shown in separate red and black colors.

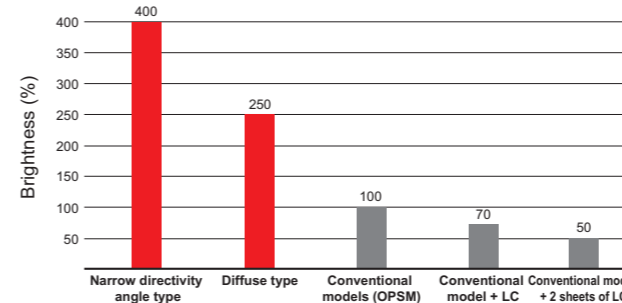


Up to 4 times brighter

The narrow directivity angle type uses the prism sheet to spread light around a wide area and focuses that light at the front for four times the brightness of conventional models.

Because this type offers a narrow illumination directivity angle without mounting LC film, decreases in brightness caused by LC film are not a problem.

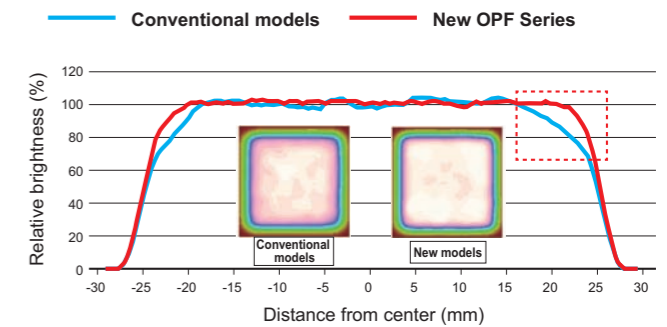
In addition, brightness is 2.5 times that of conventional products just with the diffuse type.



Correction of peripheral decreases in brightness

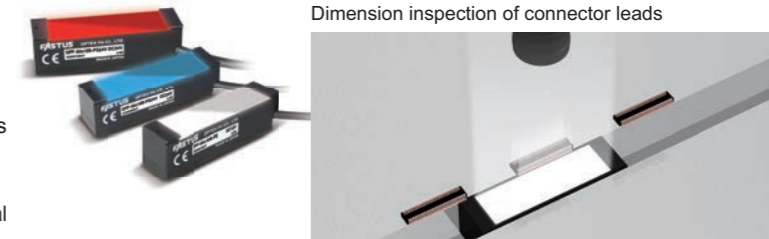
Thanks to an optimized arrangement of LEDs, not only uniformity but also brightness deterioration of the peripheral areas has been improved.

This allows for a larger inspection area than that offered by conventional models to be ensured even with the same light-emitting surface size.



Introducing the 50 × 15 mm narrow directivity angle type specializing in contour extraction of rectangular workpieces

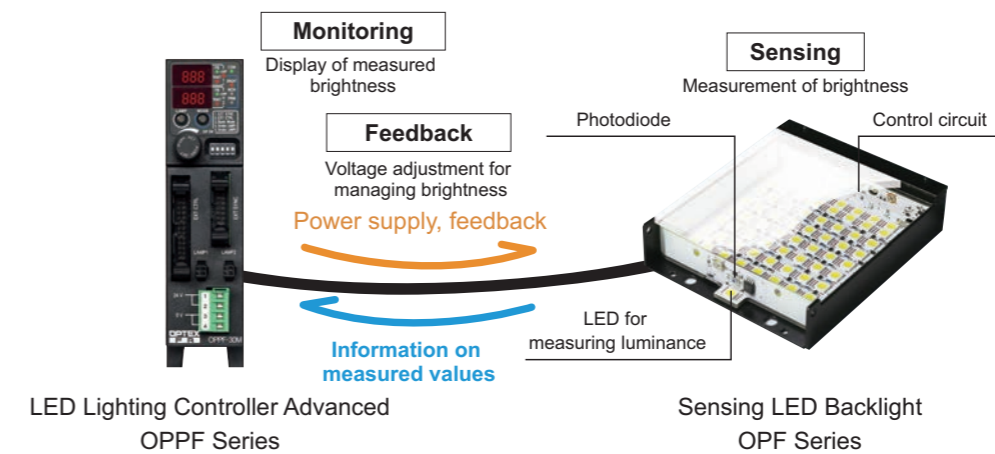
The addition of the rectangular 50 × 15 mm size makes it possible to install lighting on production lines for elongated connector parts and injection needles, and other lines without enough space to install conventional backlighting.



Sensing lighting with automatic brightness management Patent registered

OPF Series devices include Optex FA's "FALUX sensing" technology. The built-in photodiodes are used to monitor the brightness in order to provide feedback on long-term brightness deterioration, making it possible to maintain the factory default brightness for around 50,000 hours. This helps reduce maintenance costs during operation.

The OPF Series also has LEDs and photodiodes for measuring brightness built in to the housing frame, which allows for accurate measurement of luminance without being affected by extraneous light noise. Control circuitry mounted on the inner wall also helps keep lighting compact.



Built-in "FALUX" brightness variation correction circuit Patent registered

The OPF Series is equipped with "FALUX" proprietary technology capable of correcting reductions in luminance due to increased temperatures.

This correction function is activated within the lighting itself by analyzing the temperature inside the lighting device.

Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers / Power Supplies	OPPD
	OPPF
	OPPCW
Options	OP
	MDF



Specifications

Illumination color	White	Blue	Red
Color temperature / Peak wavelength	6,500 K	470 nm	630 nm
Input voltage	12 VDC		
Degradation of LED	For brightness to drop 10% after 10,000 hours (Dimming value setting = 100%, 30°C) *Typical values		
Classification (IEC62471: 2006)	Exempt group	Risk Group 1 (Low-Risk)	Exempt group
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013		
Protection rating	IP40 (IEC 60529: 1989/A1: 1999 + A2: 2013)		
Ambient temperature/humidity	0 to 40°C / 35 to 85% RH (no condensation)		
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)		
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
Shock resistance	10 G, 3 times in each of the X, Y, and Z directions		
Material	Housing: Aluminum alloy and stainless steel		
Options	Scratch-resistant cover, polarizing plate, and bracket		

• See P. 69 for spectrum distribution diagrams.

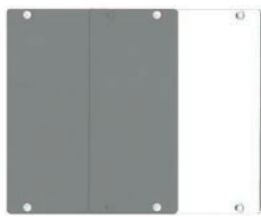
Options/Accessories

Scratch-resistant cover t1.0 mm
(Dual-side pencil hardness: 6H)



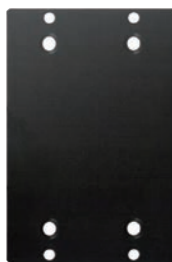
Model	Weight [g]
TCSR-OPF-S27x27	5
TCSR-OPF-S43x35	5
TCSR-OPF-50x15	5
TCSR-OPF-S51x51	5
TCSR-OPF-S63x60	10
TCSR-OPF-S77x77	15
TCSR-OPF-S100x100	25
TCSR-OPF-125x125	35
TCSR-OPF-150x150	45

Polarizing plate (Scratch-resistant cover) t1.2 mm (0.2 + 1.0)



Model	Weight [g]
PL-OPF-S27x27	5
PL-OPF-S43x35	5
PL-OPF-50x15	5
PL-OPF-S51x51	10
PL-OPF-S63x60	15
PL-OPF-S77x77	20
PL-OPF-S100x100	30
PL-OPF-125x125	40
PL-OPF-150x150	50

Bracket t1.5 mm



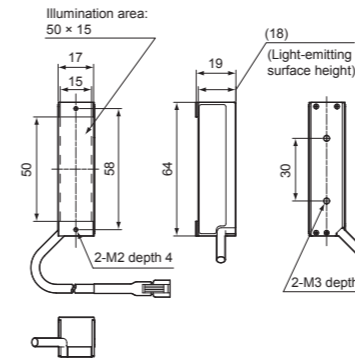
Model	Weight [g]	Outline Drawing
BKT-OPF-S27x27	10	⑩
BKT-OPF-S43x35	20	⑪
BKT-OPF-S51x51	25	⑫
BKT-OPF-S63x60	30	⑬
BKT-OPF-S77x77	40	⑭
BKT-OPF-S100x100	70	⑮
BKT-OPF-125x125	90	⑯
BKT-OPF-150x150	130	⑰

Dimensions

(unit: mm)

Main unit

① OPF-50x15_



12V type

Details of Connector

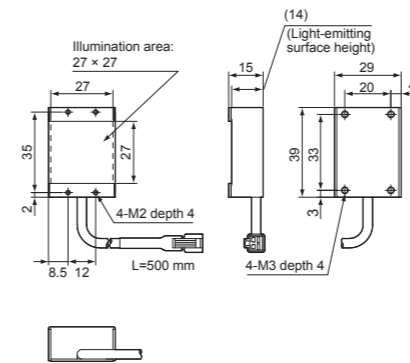


24V type

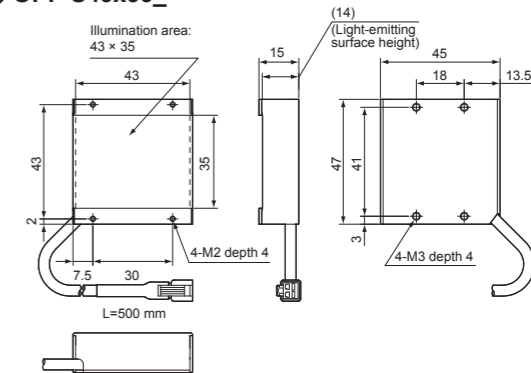
Details of Connector



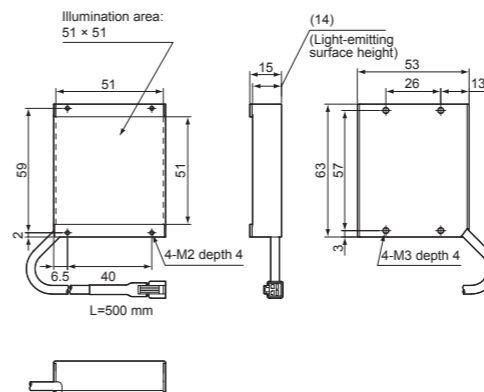
② OPF-S27x27_



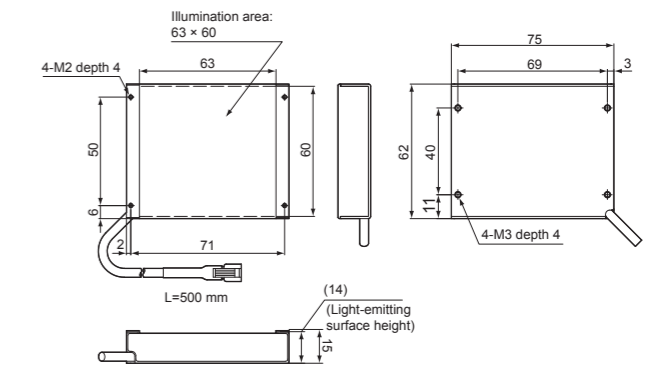
③ OPF-S43x35_



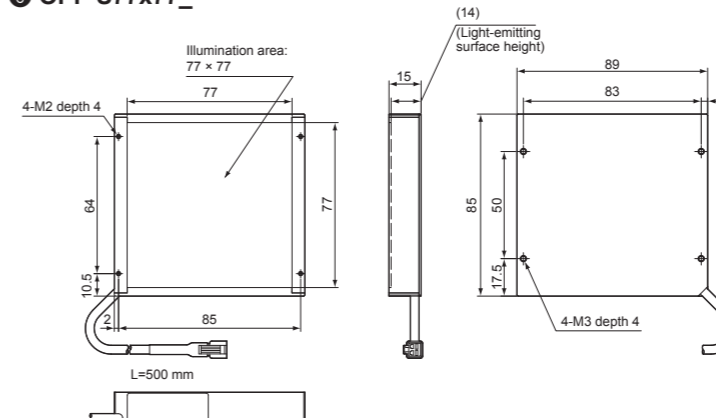
④ OPF-S51x51_



⑤ OPF-S63x60_



⑥ OPF-S77x77_





Sensing Coaxial Lighting

OPX Series

Highly uniform illumination with a narrow directivity angle

- Surface light source with a narrow directivity angle
- 2.5 times brighter than conventional products
- Long-term brightness stability



Specifications

Model ¹	FALUX SENSING ²	Illumination Area [mm]	Weight [g]	Strobe lighting overdriving by OPPF	Power Consumption [W]			Outline Drawing
					White	Blue	Red	
OPX-S35□	Monitoring/feedback	43 × 35	190	Supported	9.0	5.5	①	
OPX-S50□	Monitoring/feedback	51 × 51	280		13.0	8.5	②	
OPX-M75□	Monitoring only	77 × 77	580		23.0	18.0	③	
OPX-M100□	Monitoring only	100 × 100	950	Supported ³	29.0	29.0	④	

¹ □ = W: White, B: Blue, R: Red ² For "FALUX sensing," connect only to an OPPF Series LED lighting controller.
³ Although the power consumption of OPX-M100□ exceeds 24 W, the OPPF-48 Series can be used in strobe mode.

Features

Highly uniform illumination with a narrow directivity angle. Coaxial lighting ideal for detecting scratches and dents.

OPX Series coaxial lighting is equipped with a proprietary prism sheet on the surface light source for a narrow directivity angle (half-value angle of $\pm 17^\circ$).

Suppressing the spread of light allows for high-brightness and highly directional illumination.

Also, highly uniform illumination becomes possible from short distances, a task conventional coaxial illumination models struggle with.

This is especially helpful with applications requiring uniformity such as detecting fine scratches and dents.



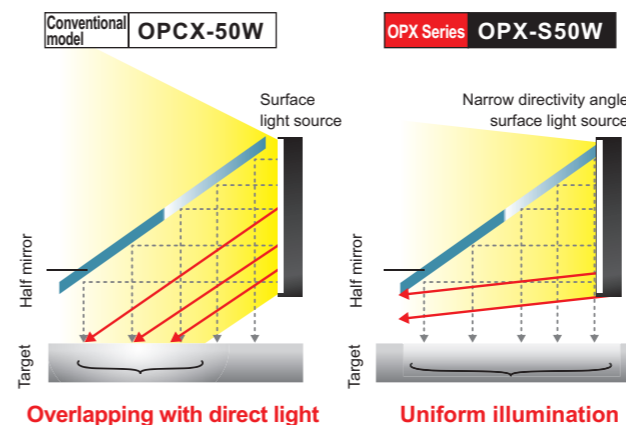
Improved light-emitting surface uniformity

With coaxial lighting, the light from the light source passes through a half mirror twice, causing the light that reaches the camera to be 1/4 or less the original brightness. As a result, bullet-shaped LEDs have become the mainstay with higher brightness requirements. The OPX Series includes a prism sheet built in to the light source that allows for illumination with a narrow directivity angle. Equipped with SMD-type LEDs offering higher light-emitting surface uniformity than bullet-shaped LEDs, the light is condensed in front of the device, significantly improving brightness. In addition, the optimized arrangement of LEDs allows for reduced brightness deterioration of the peripheral areas.

Highly uniform illumination with a narrow directivity angle

Coaxial lighting—which is a diffuse light source—light is applied from multiple directions relative to the object, making it difficult to recognize such aspects as fine scratches and slight differences in surface roughness. Also, with short-distance illumination, direct light from the light source overlaps with reflected light from the half mirror, preventing the inspection surface from being uniformly illuminated. With the OPX Series, the directivity angle of the light source is narrow, suppressing the spread of light and allowing for highly directional illumination. Illumination is highly uniform even when applied at short distances.

Lighting structure



2.5 times brighter than conventional products

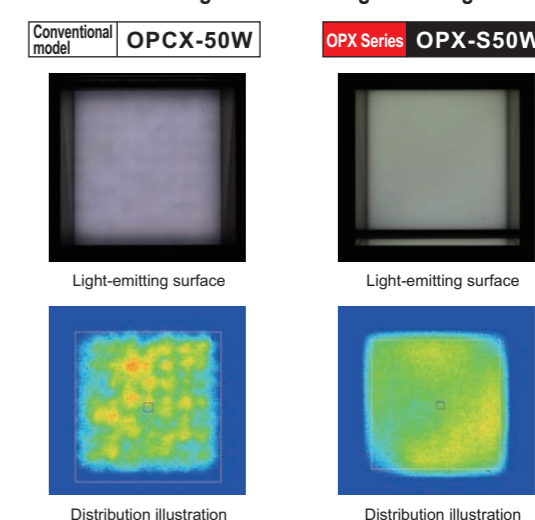
Thanks to the OPX Series' narrow directivity angle light source and aluminum casing offering excellent heat dissipation, brightness is 2.5 times that of conventional models.

Although parallelism and uniformity of conventional models can be improved by mounting LC (light control) film in front of the light source, the LC film reduces brightness by 30%.

The OPX Series not only offers increased directivity but also brightness 3.5 times that of conventional models with LC film mounted.

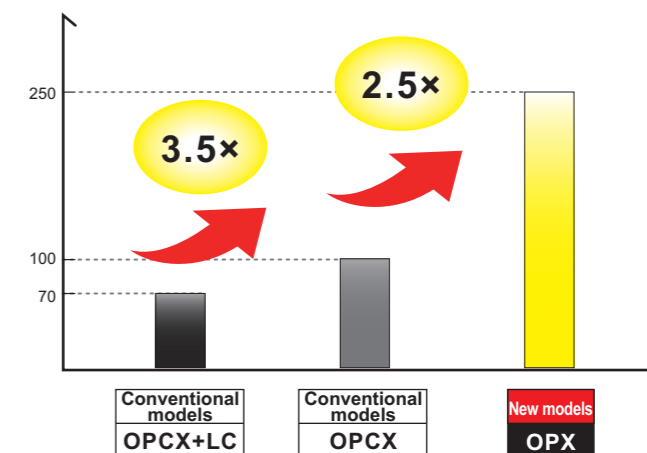
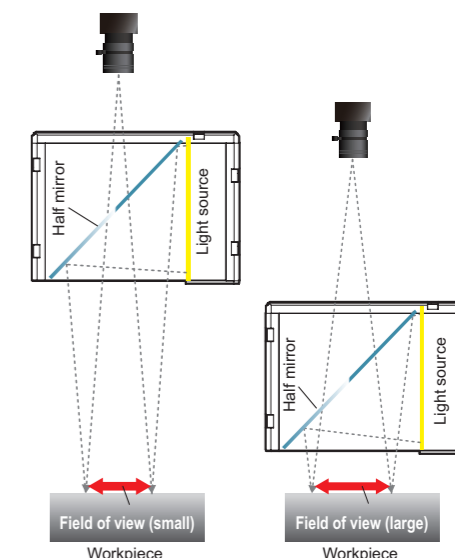


Distribution of brightness on the light-emitting surface



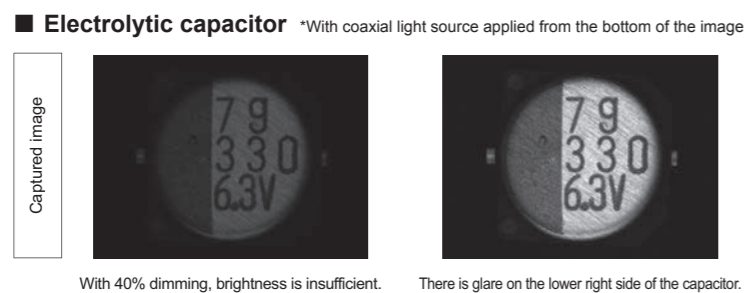
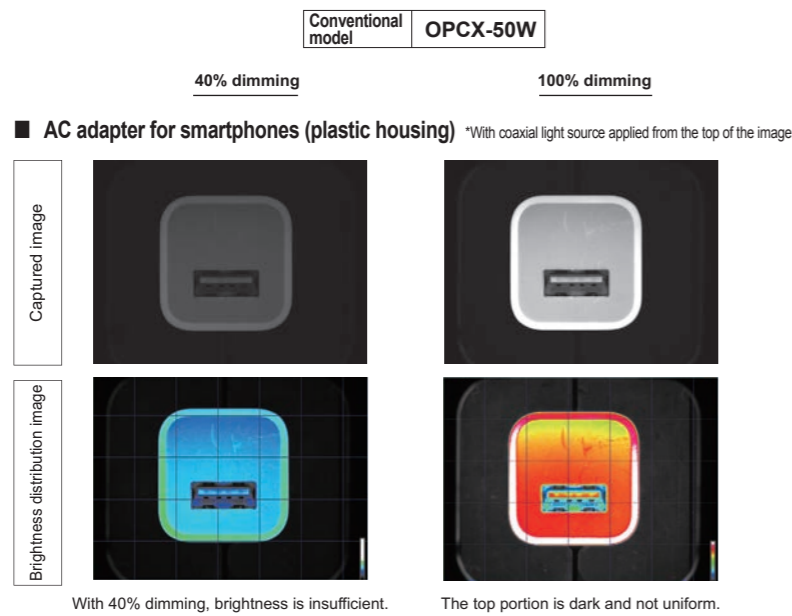
Ensure a wider illumination area

With conventional lighting, in order to illuminate uniformly with increased directivity, coaxial lighting was used at a distance from the workpiece. As a result, the illumination area becomes narrow, requiring an increased lighting size. OPX Series lighting offers uniform illumination even from short distances and reduces brightness deterioration of the peripheral areas, ensuring a wider illumination area.





■ Sample images *Comparison of short-distance illumination with an LWD of 10 mm



■ Structure

Cable lead portions can be mounted flush

The lead portion of the cable is direction-free, allowing for flush mounting on three sides with no interference.

Camera window with excellent environmental resistance

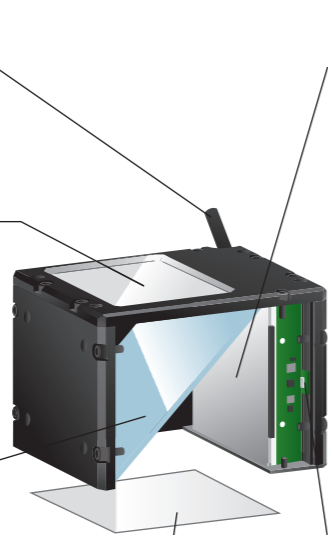
The acrylic window offers dual-side anti-reflection and has been treated with dirt-resistant and scratch-resistant (4-5H pencil hardness) coating. Flat design with no step between the housing and camera window for easy cleaning.

Half mirror

Half-mirror coating and AR-coating flat glass.

Optional cover for emission-side opening

An acrylic cover with dual-side anti-reflection, dirt-resistant, and scratch-resistant (4-5H pencil hardness) coating is available for the emission-side opening to prevent the half mirror from becoming dirty or dusty.



Surface light source with a narrow directivity angle

OPX Series lighting is equipped with a proprietary prism sheet on the diffusion plate for a narrow directivity angle (half-value angle of $\pm 17^\circ$) equivalent to that offered by conventional light control (LC) film.



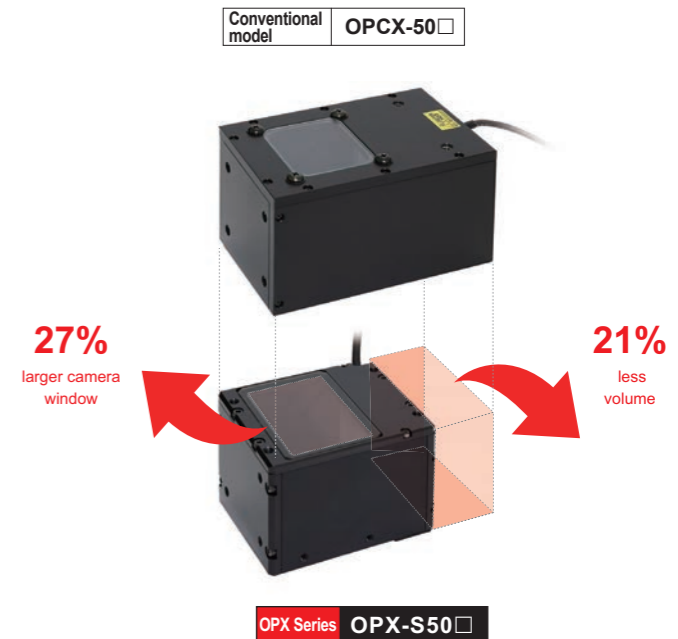
LEDs and photodiodes for measuring brightness built in to light source wall

These LEDs and photodiodes measure brightness exactly without being affected by noise.



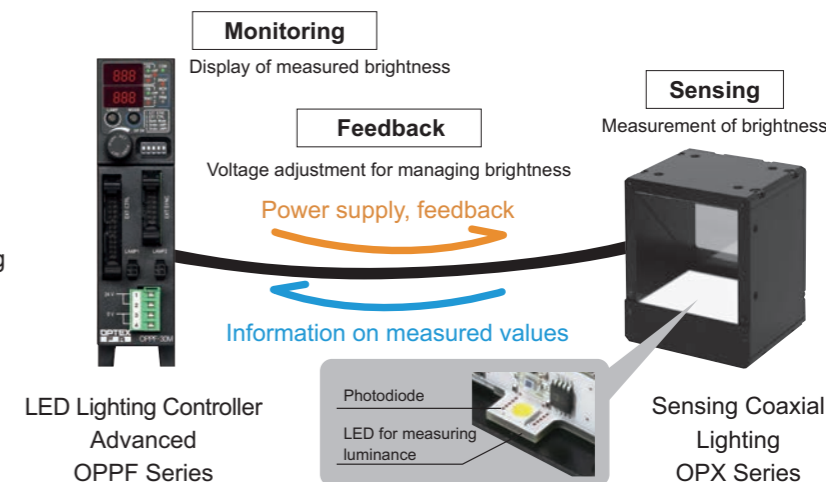
■ Compact size

The adoption of SMD-type LEDs allows for a thin light source, greatly reducing the length of the housing. The volume of OPX Series devices is up to 21% less than that of conventional models. This allows the lighting to be installed even with compact inspection stages with limited space. In addition, by providing mounting holes on three sides of the lighting, the OPX Series offers an even higher degree of freedom when it comes to mounting.



Sensing lighting with automatic brightness management Patent registered

OPX Series devices include Optex's "FALUX sensing" technology. The built-in photodiodes are used to monitor the brightness in order to provide feedback on brightness deterioration, allowing constant maximum brightness to be maintained for up to around 50,000 hours. The OPX Series also has LEDs and photodiodes for measuring brightness built in to the housing frame of the surface light source, which allows for accurate measurement of luminance without being affected by extraneous light noise.



OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options



Specifications

Illumination color	White	Blue	Red
Color temperature / Peak wavelength	6,500 K	470 nm	630 nm
Input voltage	12 VDC *Connect to dedicated controller.		
Degradation of LED	For brightness to drop 10% after 10,000 hours (Dimming value setting = 100%, 30°C) *Typical values		
Classification (IEC62471: 2006)	Exempt group	Risk Group 1 (Low-Risk)	Exempt group
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013		
Protection rating	IP40 (IEC 60529: 1989/A1: 1999 + A2: 2013)		
Ambient temperature/humidity	0 to 40°C / 35 to 85% RH (no condensation)		
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)		
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
Shock resistance	10 G, 3 times in each of the X, Y, and Z directions		
Material	Housing: Aluminum alloy and stainless steel, Optical components: Glass, PMMA		
Options	Scratch-resistant aperture cover (AR-coated)		

● See P. 69 for spectrum distribution diagrams.

Options/Accessories

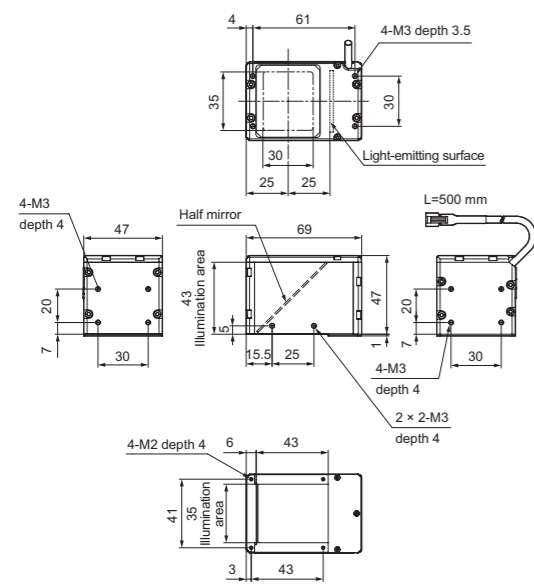
Scratch-resistant aperture cover (AR-coated)

Model	Weight [g]
TCSR-OPX-35	5
TCSR-OPX-50	10
TCSR-OPX-75	30
TCSR-OPX-100	50

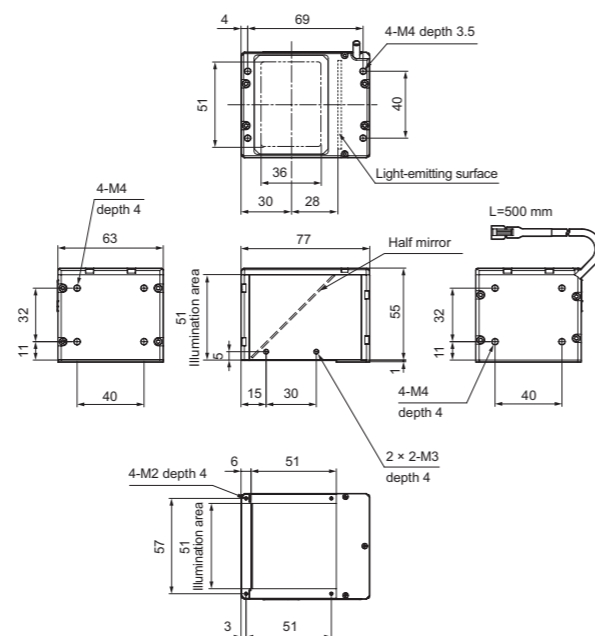
Dimensions

(unit: mm)

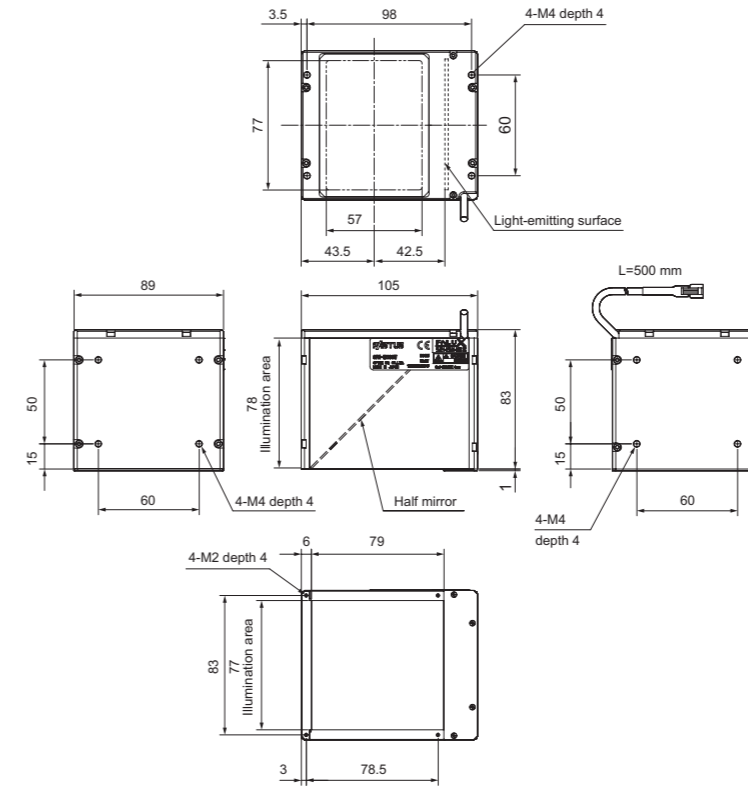
1 OPX-S35_



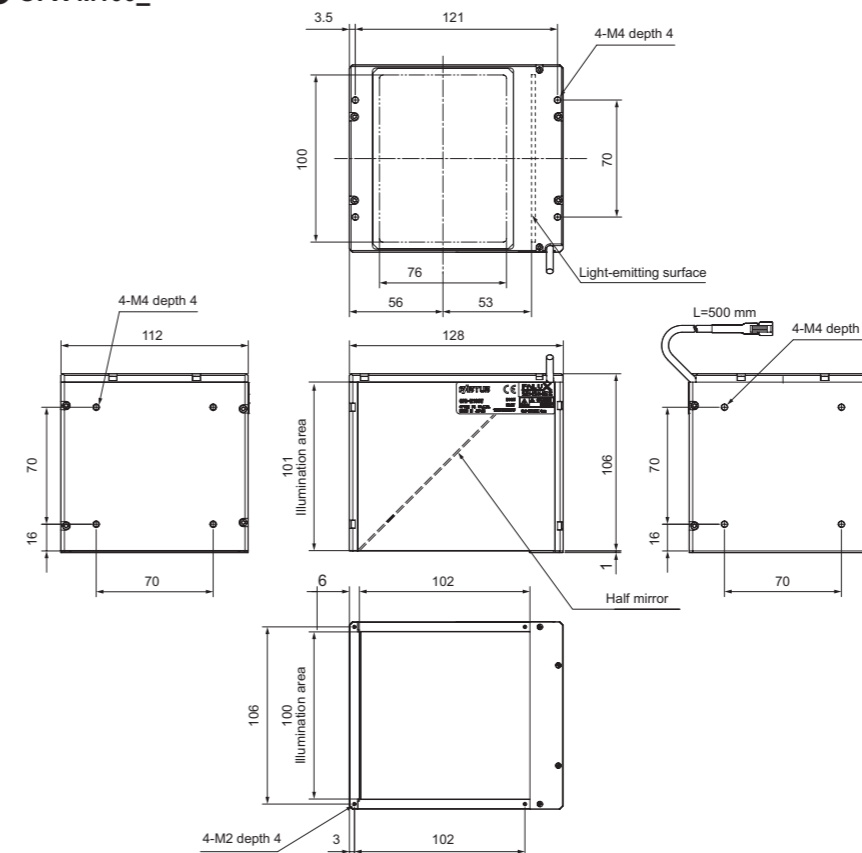
2 OPX-S50_



3 OPX-M75_



4 OPX-M100_



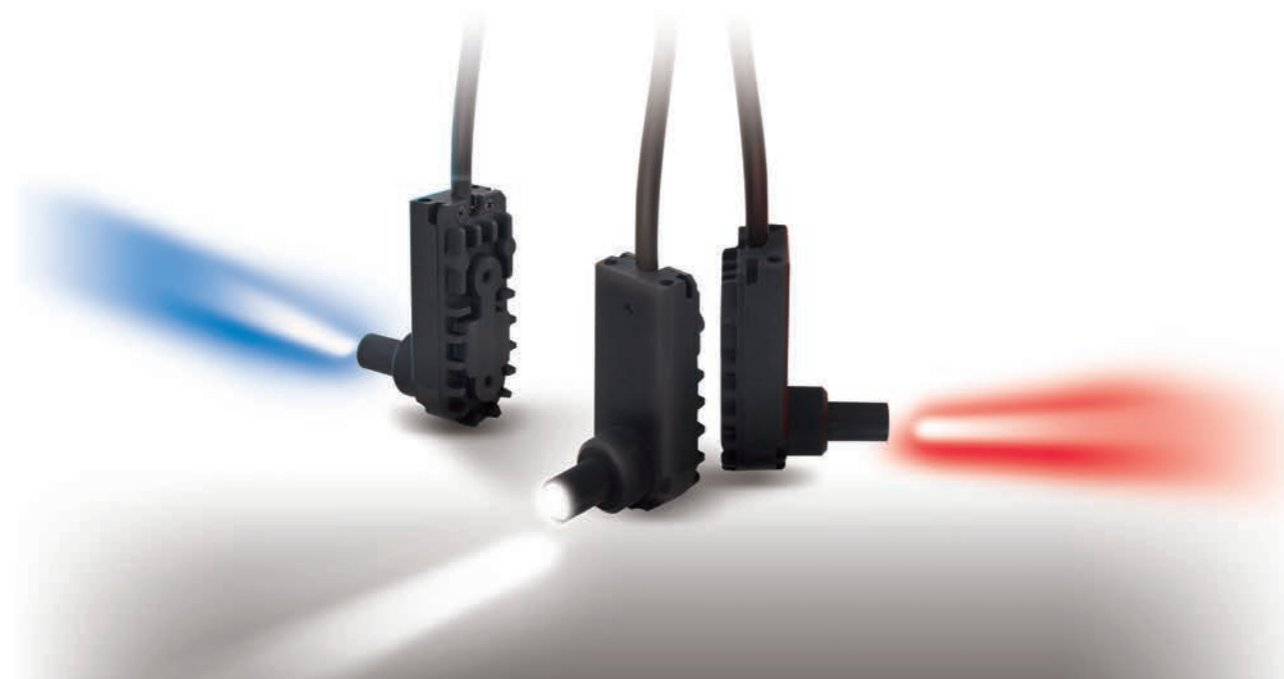


Sensing Spot Lighting

OPS-S Series

Innovative sensing spot lighting

- 5 times the brightness of conventional products! Strobe lighting type for overdrive is 10 times brighter than conventional products!
- High-brightness, high-uniform types for optimization with telecentric lenses
- New "FALUX-it" technology for 12 VDC drivability eliminating the need for a dedicated power supply and resistance box



Specifications

Controller	Type	Model	Illumination Color	Power Consumption [W]	Weight [g]	Input	Outline Drawing
Sensing support PWM type 	High-brightness type	OPS-S20R	Red	2.5	40	12 VDC	①
		OPS-S20□	White, Blue	2.8			
	Highly uniform type	OPS-S20R-U	Red	2.5			
		OPS-S20□-U	White, Blue	2.8			
	High-brightness type dedicated for overdrive strobe lighting	OPS-ST20□	White, Blue	2.8		18 VDC*1	
			Red	2.5			
Constant current type	High-brightness type	OPS-C20R	Red	2.5	Constant current control 700 mA max. *2		
		OPS-C20□	White, Blue	2.8			
	Highly uniform type	OPS-C20R-U	Red	2.5			
		OPS-C20□-U	White, Blue	2.8			

□ = W: White, B: Blue ● See P. 69–70 for spectrum distribution diagrams.

*1 Applicable power supply: OPFF Series
*2 Applicable power supply: OPPCW Series

Features

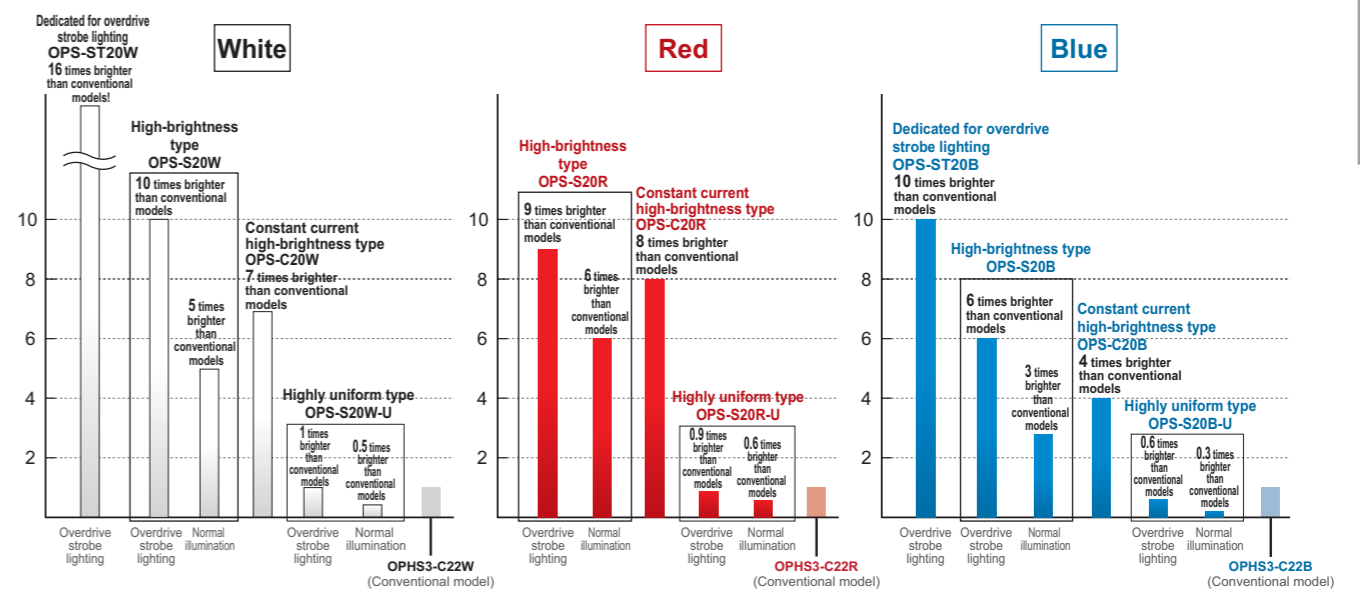
High-brightness type with unique lens design for best-in-class brightness

The OPS-S Series offers 6 times the brightness of conventional models under normal illumination and strobe lighting type for overdrive is 10 times the brightness of conventional models. With conventional spot lighting, constant current driving is the most common, and no strobe power supplies were capable of overdrive. With the OPS-S Series, the power supply is any general-purpose 12 V power, allowing for overdrive functionality with strobe power supplies.

With the highly uniform type, uniformity is improved thanks to a low-magnification lens with a short working distance. In addition, the low brightness requirements of mirror-like workpieces with high reflectance can be met and high dimming resolutions are ensured. Highly uniform types offer about 1/10 the brightness of high-intensity types.

*Applicable power supply: OPFF Series

Brightness magnification (for each color, with conventional model OPHS3 Series considered 1)



Applications





High-brightness, high-uniform types for optimization with telecentric lenses

Optimized for the optical system of telecentric lenses, the OPS-S Series offers both high brightness and high uniformity. High-brightness types are available for high-magnification, long-distance lenses, and highly uniform types are available for low-magnification, short-range lenses. With no bright points in the center of illumination (hot spots) even with the high-brightness type, no light axis deviation occurs even with original lenses. Refer to the chart to the right when specifying a type.

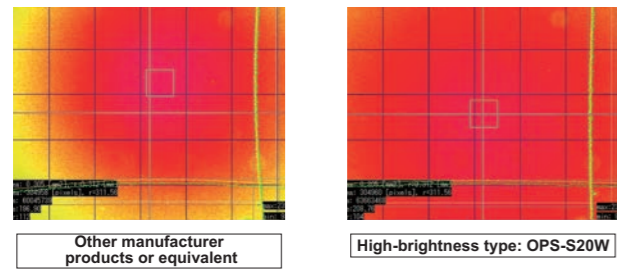
*Brightness and uniformity were evaluated using an actual telecentric lens.

Model selection according to telecentric lens		WD (mm)			
		40	65	110	110 or more
Magnification	0.1× to 0.3×	—	—	—	—
	0.5×	—	③	—	—
	0.8×	—	—	—	—
	1×	②	①	—	—
	1.5×	—	—	—	—
	2×	—	—	—	—
	3×	—	—	—	—
	4×	—	—	—	—
6×	—	—	—	—	
8×	—	—	—	—	

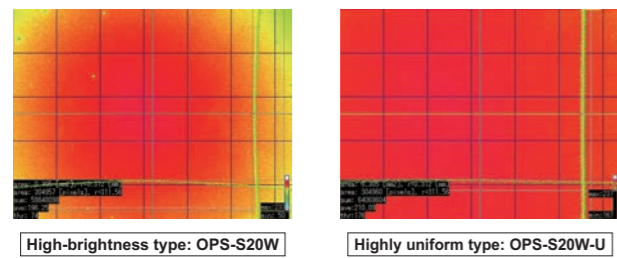
■ Highly uniform type
 ■ High-brightness type
 ■ Available with both highly uniform and high-brightness types

Comparison of uniformity *Camera conditions: 1/3 CCD camera

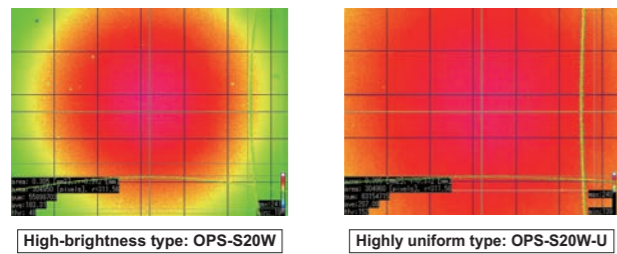
① Comparison with other manufacturers
1× magnification, 65 mm working distance lens



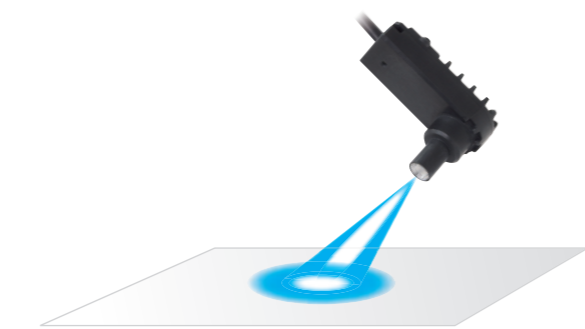
② Type comparison 1
1× magnification, 40 mm working distance lens



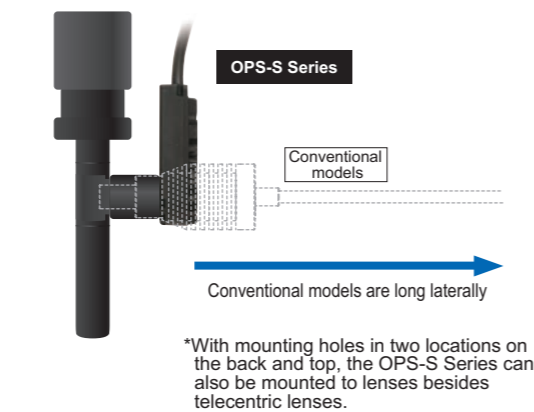
③ Type comparison 2
0.5× magnification, 65 mm working distance lens



Also usable as oblique lighting for direct illumination
Because of the strong directivity of the high-brightness type, this type can be used as oblique lighting for direct illumination even without a condensing lens.



Space-saving L-shaped body
This model uses an L-shaped housing with the control board placed in parallel to the lens. This construction reduces dead space when mounting.

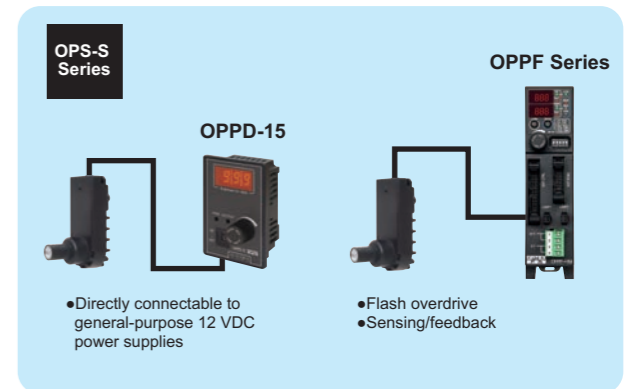
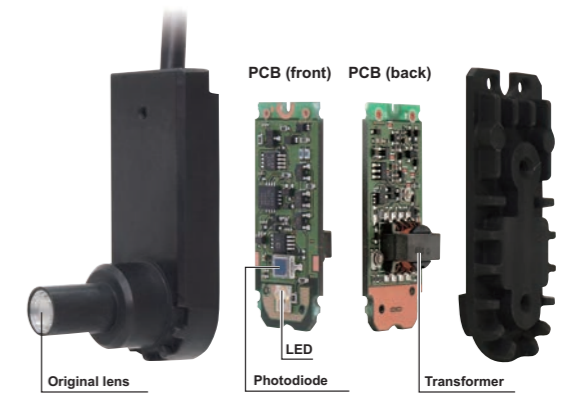


New “FALUX-it” technology for 12 VDC drivability eliminating the need for a dedicated power supply and resistance box

Patent pending

Thanks to the newly developed voltage conversion constant current circuit with a built-in transformer, constant current control according to the voltage is possible for converting to the different forward voltages for each LED color is possible with reduced heat generated by the excess voltage. The temperature of the housing has also been reduced to less than that of conventional models. As a result, OPS-S Series devices can be directly connected to general-purpose 12 VDC power supplies. In addition to eliminating the need for a dedicated constant-current power supply, conventional resistance boxes are no longer necessary, thus reducing costs. Furthermore, even though brightness was reduced under conventional constant current control due to heat generation, the built-in temperature compensation circuit allows brightness to be kept constant even if the temperature increases immediately after lighting or if the ambient temperature changes.

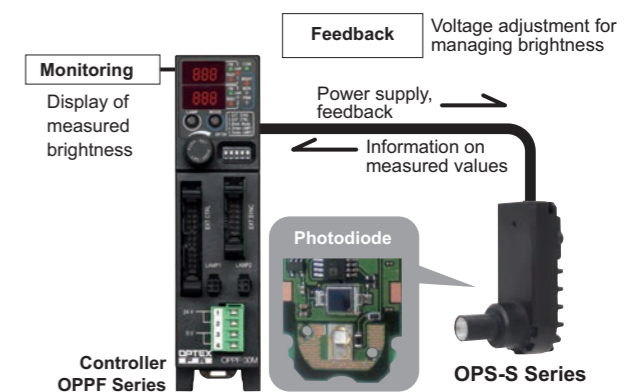
FALUX-it (FALUX integrated transform) technology
Voltage conversion constant current circuit + Temperature compensation circuit



Brightness monitoring and feedback with “FALUX sensing”

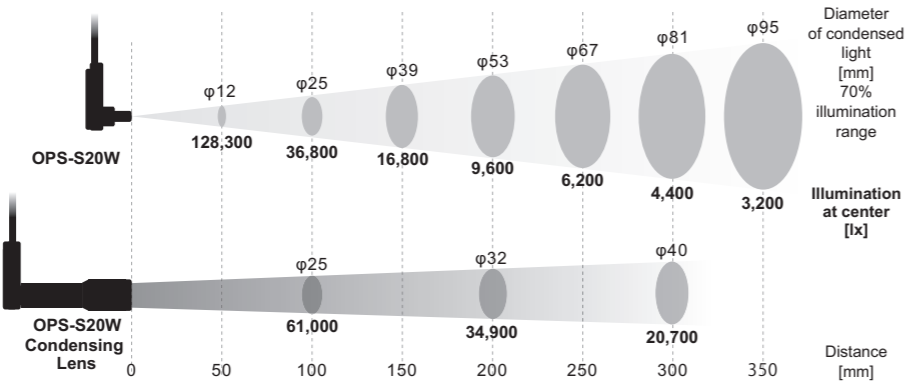
Patent registered

OPS-S Series lighting also includes “FALUX sensing” technology, which features photodiodes that not only monitor brightness but also provide feedback on long-term brightness deterioration, allowing for constant maximum brightness to be maintained for up to around 50,000 hours. This helps reduce maintenance costs during operation.





Illumination Area According to Illumination Distance



Specifications

Type	PWM type with sensing support			High-brightness type for strobe lighting		Constant current type		
Model	OPS-S20W (-U)	OPS-S20R (-U)	OPS-S20B (-U)	OPS-ST20W	OPS-ST20B	OPS-C20W (-U)	OPS-C20R (-U)	OPS-C20B (-U)
Illumination color	White	Red	Blue	White	Blue	White	Red	Blue
Color temperature / Peak wavelength	6,300 K	640 nm	470 nm	6,300 K	470 nm	6,300 K	640 nm	470 nm
Input	12 V			18 V ¹		Constant current control: 700 mA max. ²		
Recommended PWM frequency	50 kHz to 150 kHz							
Self-oscillation frequency when DC voltage is applied	50 kHz to 60 kHz							
Light-emitting surface size	ø7 mm							
Ambient temperature/humidity	0 to 40°C / 35 to 85% RH (no condensation)							
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)							
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 8 hours in each of the X, Y, and Z directions							
Shock resistance	10 G, 3 times in each of the X, Y, and Z directions							
Classification (IEC62471: 2006)	OPS-S20W / OPS-S20B (-U) / OPS-ST20W / OPS-ST20B / OPS-C20W / OPS-C20B (-U): Risk Group 2 (Moderate-Risk) OPS-S20W-U / OPS-S20R (-U) / OPS-C20W-U / OPS-C20R (-U): Risk Group 1 (Low-Risk)							
Applicable regulations/standards	EMC (2014/30/EU), RoHS (2011/65/EU, MIIT Order No.32) / EN 61326-1:2013							
Protection rating	IP40 (IEC 60529: 1989 / A1: 1999 + A2: 2013)							
Degradation of LED	40,000 h	30,000 h	40,000 h			30,000 h	40,000 h	
	For brightness to drop 30% (Dimming value setting = 100%, 25°C) *Typical values							
Protection circuit	Automatic shutoff if internal temperature reaches 100°C				None			
Material	Housing: ADC12, Lens: PC (UV-resistant)							
Options	Condensing lens							

¹ Applicable power supply: OPFF Series (excluding 500 kHz, luminescence width setting: 1 ms or less) ² Applicable power supply: OPPCW Series
 ● See P. 69-70 for spectrum distribution diagrams.

Options/Accessories

Condensing lens

Model	Weight [g]	Outline Drawing
LE-OPS-24	35	②



For constant current type

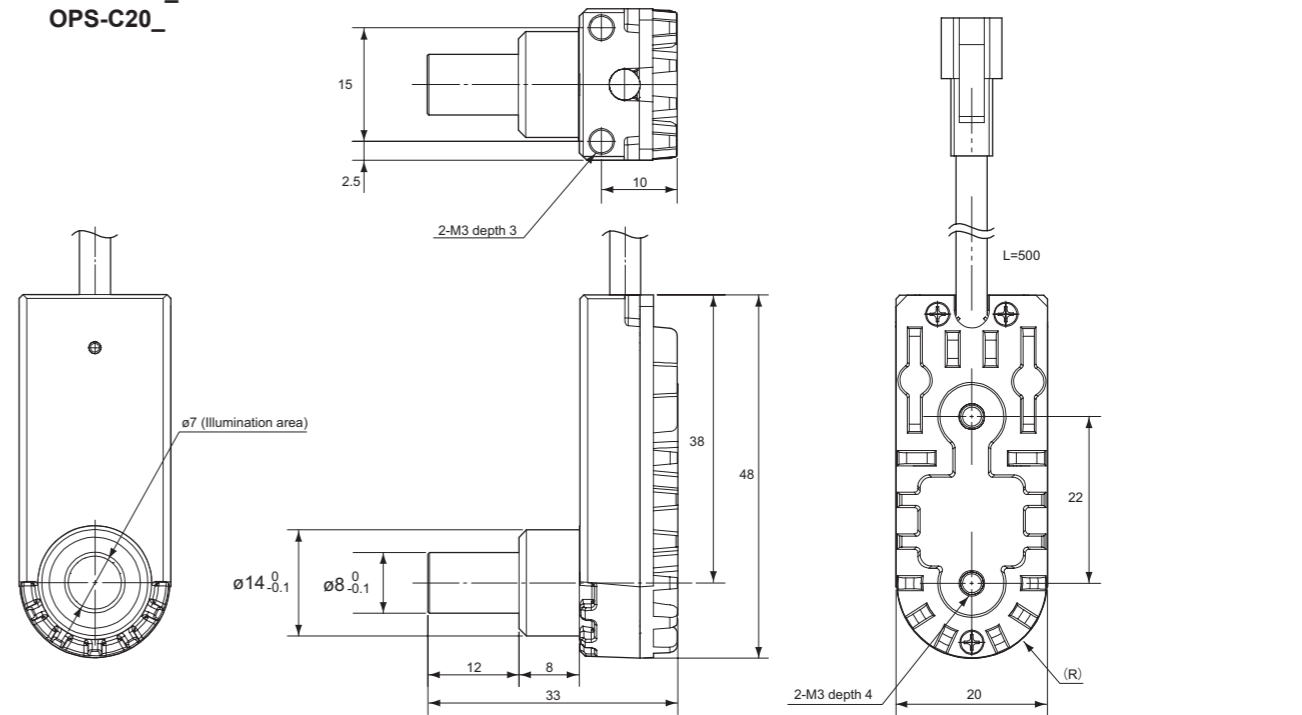
Name	Model	Applicable Lighting	Weight [g]	Outline Drawing
Adapter	RB-R12		100	③
Extension cable	OP-CBCH1-*	OPS-C20_		Cable OP ● P. 63

● * will be replaced by the cable length. (2, 3, 5 m)

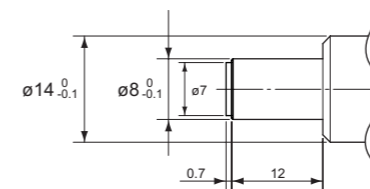
Dimensions

(unit: mm)

① OPS-S20_ / OPS-ST20_ / OPS-C20_



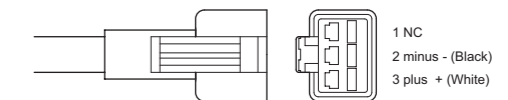
OPS-S20_-U / OPS-C20_-U



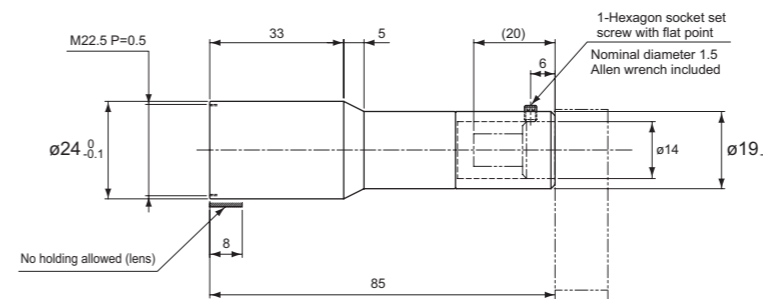
OPS-S20_-U / OPS-ST20_



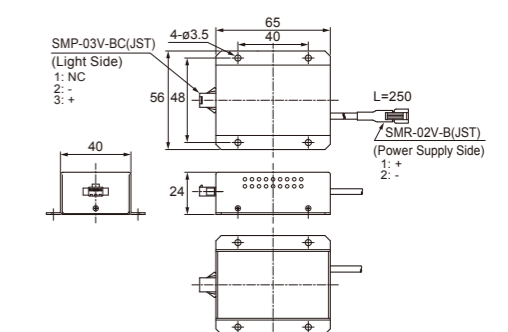
OPS-C20_-U



② LE-OPS-24



③ RB-R12



LED Lighting Controller

OPPD Series

Ultra-compact controller

- 1/12 the size of conventional models
- Easily visible digital display
- Full synchronization between external illumination control input and PWM



Introducing an LED lighting controller packed with advanced features in the industry's smallest compact size class!

Dimming value digital display [0 to 999]

Power and Output indicators

Output selection switch

Illumination output (12 VDC)



Actual size

W48 × H72 × D30 mm
(not including dial and connector)

Dimming value setting dial

24 VDC input / lighting control input screw-less terminal block

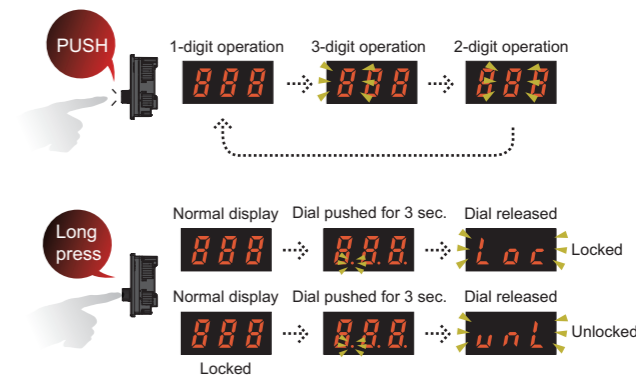
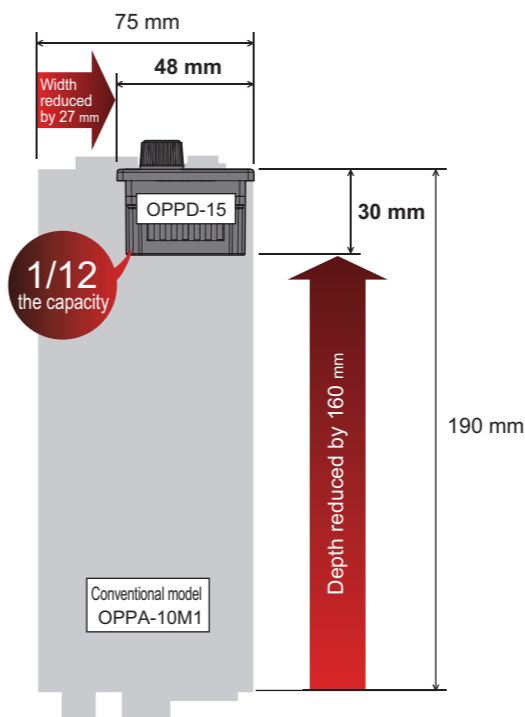
Features

■ Compact, industry's smallest class size!

Thanks to high-density mounting technology and an optimal heat dissipation design, the OPPD Series boasts a size just 1/12 that of conventional digital dimming products. Devices are compact and palm-sized at only W48 × H72 × D30 mm.

■ Easily visible digital display with 1,000 dimming steps!

The OPPD Series features an easily visible digital display with 1,000 dimming steps. Pushing the dimming dial to select the digit to adjust. This makes it possible to configure up to 1,000 steps quickly. In addition, operation can be locked by pressing and holding the push button.



Save dimming values to internal memory

By storing the dimming value in the built-in EEPROM, the value will be retained even if the power is turned OFF. When the line stops, the dimming value will not be lost even if the main equipment power is turned OFF to save energy.

Specifications

Model	PWM Frequency / Dimming	Illumination Output	Capacity [W]	Input Voltage	Weight [g]
OPPD-15	100 kHz, 1,000 steps	1ch	15	24 VDC ±10%	60
OPPD-15-f500	500 kHz, 200 steps				
OPPD-15-f1M	1 MHz, 64 steps				

Options

OPPD panel mounting bracket

Model	Weight [g]
BKT-OPPD	50

Model	OPPD-15-f500
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■ 200 steps even with a PWM frequency of 500 kHz thanks to 100 MHz operation clock ultra-high-speed digital control

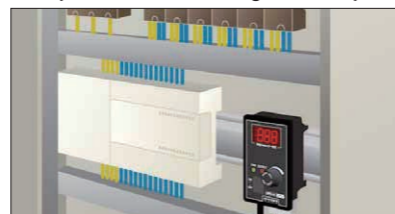
With conventional models, 32 steps at a PWM frequency of 500 kHz is typical. However, with a 100 MHz operation clock capable of ultra-high-speed digital control, OPPD Series controllers are capable of up to 200 steps at 500 kHz, more than 6 times that of conventional models, the industry's highest specification. The OPPD Series can be used for high-precision dimming control in high-speed inspection lines with short shutter speeds as well as with high-speed line cameras with high capture speeds

Model	OPPD-15-f1M
-------	-------------

■ Industry's highest PWM frequency at 1 MHz

New models with a further improved PWM frequency of 1 MHz are now available. At a frequency of twice that of 500 kHz models, light intensity variation has been reduced by half. Dimming is possible at 64 steps.

Example of DIN rail mounting in control panel



One-touch DIN-rail mounting and removal allow for significant reductions in workload. Also, because no extra bracket is required, installations are firm and stable.

Example of mounting in panel

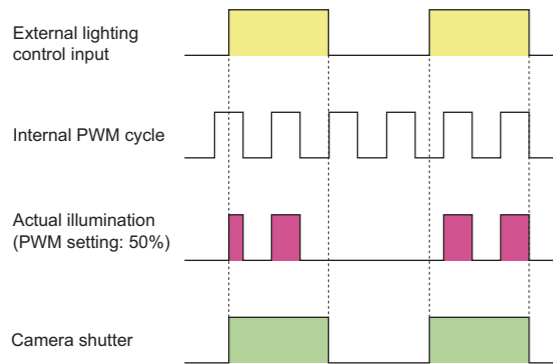


An optional bracket is available for panel installation. Mounting the controller on a panel is convenient for such cases as when the dimming value is frequently changed.

No changes in brightness thanks to full synchronization between illumination control input and PWM
 Even with fast shutter speeds, illumination is synchronized when using external input lighting, eliminating variations in brightness.

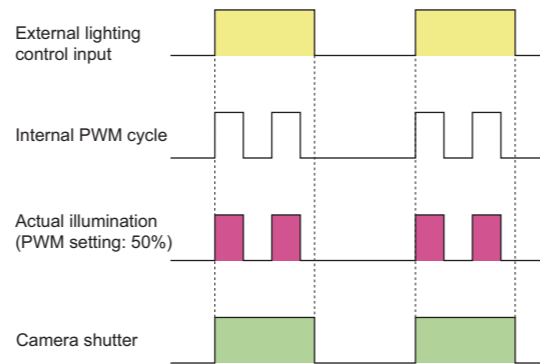
Conventional

The internal input for external control and the PWM frequency are not synchronized, so brightness will vary with every illumination.



Full synchronization between illumination control input and PWM

The external control input and PWM are synchronized before starting is initiated, preventing variations in the cumulative illumination times of each lighting.



External control lighting mode
 The polarity of external lighting control can be switched between "Lighting ON at input" and "Lighting OFF at input." Even when the external input is ON, the output switch can be used to turn the lighting ON and OFF.

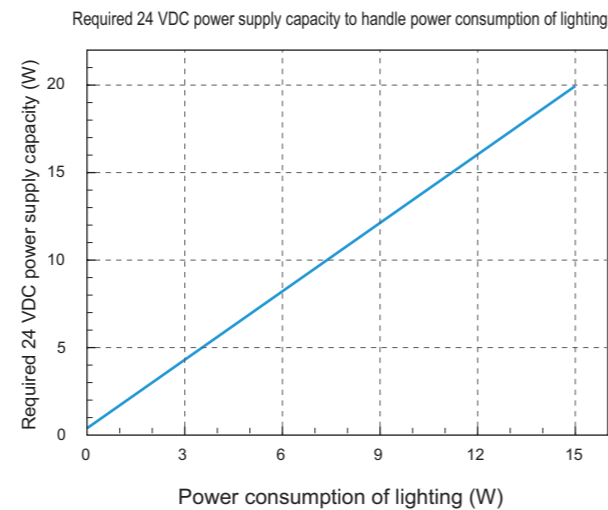
Illumination status	External input	
	OFF	ON
Output selection switch	ON	Lit
	OFF	Not lit

When external input (24 V) is ON, high-speed operation at 18.5 μs is possible. Response times with external input ON and external input OFF are different.

External input (at 24 V) response time until ON: 18.5 μs, until OFF: 65 μs

Illumination status response time	External input	
	ON→OFF	OFF→ON
Output selection switch	ON	18.5 μs
	OFF	65 μs

Required 24 VDC power supply capacity
 Based on the power consumption of the lighting to be connected, select a 24 VDC power source that offers more than the required capacity.
 *Max. power consumption of connectable LED lighting: 15 W

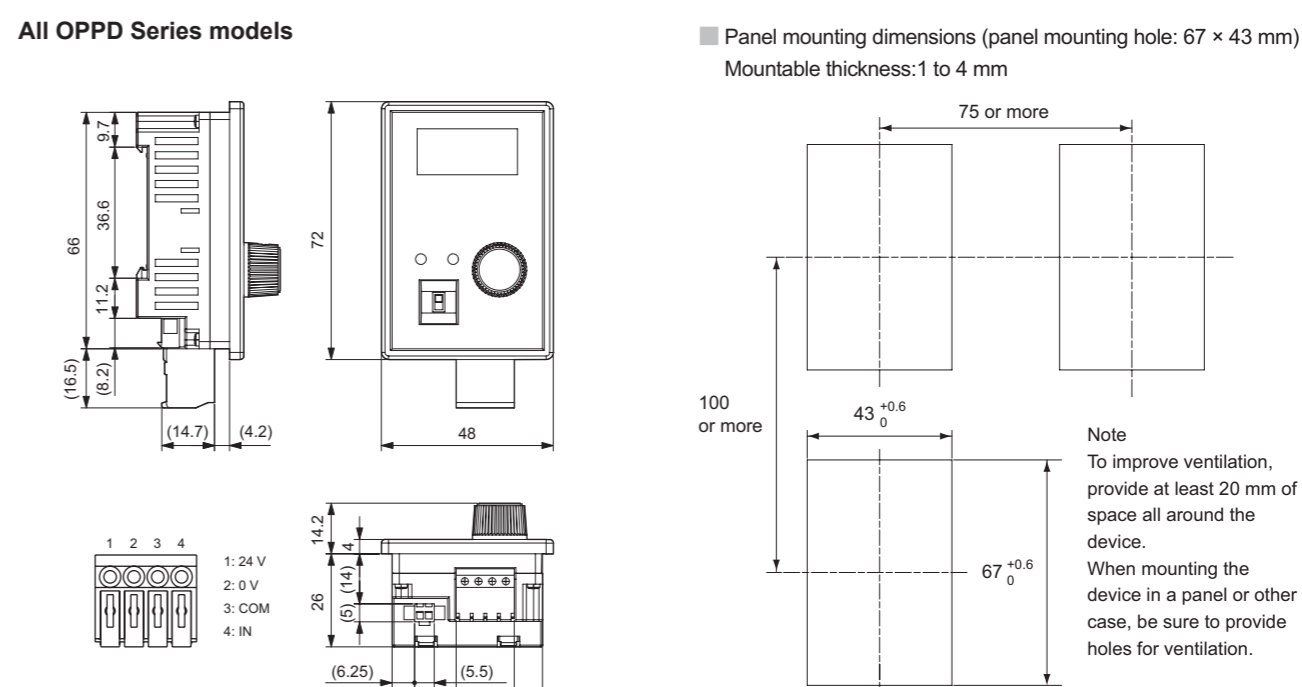


Note:
 When using in conjunction with other equipment, the characteristics of the other equipment will affect the power supply, so be sure to choose a power supply that has a sufficient margin (about twice as much) as that shown in the table.

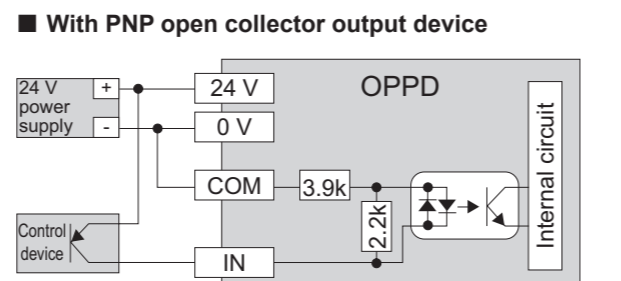
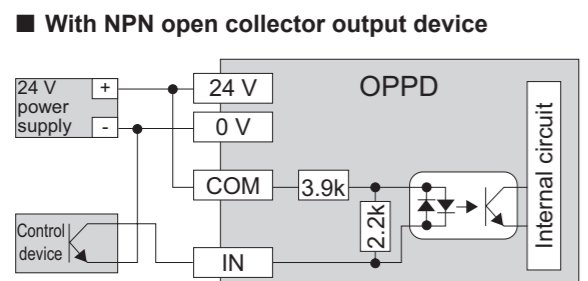
Specifications

Model	OPPD-15	OPPD-15-f500	OPPD-15-f1M
Input voltage	24 VDC ±10%		
Current consumption	Max. 0.9 A		
Dimming control	PWM dimming Frequency: 100 kHz, 1,000 steps	PWM dimming Frequency: 500 kHz, 200 steps 5-step numerical display (0, 5, 10, 15, ..., 995)	PWM dimming Frequency: 1 MHz, 64 steps 15-step numerical display (0, 15, 30, 45, ..., 990)
Dimming setting	Rotary knob / push switch built-in, 7-segment 3-digit display		
Output voltage	12 VDC		
Illumination control input	12 to 30 VDC ON voltage: 8 V or more, OFF voltage: 1.7 V or less, Max. input voltage: 30 V, Input resistance: 3.9 kΩ, Insulated		
Illumination control response time	With 24 V input (OFF→ON): 18.5 μs ON→OFF: 65 μs With 12 V input (OFF→ON): 22.0 μs ON→OFF: 65 μs		
Recommended wiring	Single wire: ø0.8 mm (20 AWG), Twisted wire: 0.50 mm ² (20 AWG)		
Available wiring	Single wire: ø0.4 mm to ø1.2 mm (26 AWG to 16 AWG) Twisted wire: 0.2 mm ² to 1.25 mm ² (24 AWG to 16 AWG) Wire diameter: ø0.18 mm or more, Strip length: 9 mm		
Ambient temperature/humidity	0 to 50°C / 35 to 85% RH (no condensation)		
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)		
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
Shock resistance	Approximately 10 G, 3 times in each of the X, Y, and Z directions		
Material	Polycarbonate		
Protection rating	IP30 (IEC 60529: 1989 / A1: 1999 + A2: 2013)		
Applicable regulations	EMC (2014/30/EU) / RoHS (2011/65/EU, MIIT Order No.32)		
Applicable standards	EN 61000-6-2: 2005 / AC: 2005, EN 55011: 2009 / A1: 2010		
Accessories	Screw-less terminal block × 1		

Dimensions (unit: mm)



Connection to external device (illumination control)



*When connecting voltage output control equipment, input 12 to 30 VDC between IN and COM. The photocoupler input is bipolar.

OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

LED Lighting Controller Advanced

OPPF Series

Increased-capacity controller with built-in sensing function

- Increased capacity with up to 48 W in PWM mode and up to 24 W in strobe mode
- “FALUX sensing” for monitoring brightness and temperature monitoring and for controlling feedback
- Support for RS232, parallel, and 0 to 5 V analog input for external dimming control



Specifications

Type	Model	Type	Weight [g]	Illumination Output	Capacity
Standard type	OPPF-48MN	Master device NPN output	385	2ch	<PWM mode> Max. 30 W per channel Max. 48 W for 2 channels (total) See table 1
	OPPF-48MP	Master device PNP output			
	OPPF-48SN	Slave device NPN output	375		
	OPPF-48SP	Slave device PNP output			
Illumination control input TTL type	OPPF-48MN-TTL	Master device NPN output	385	2ch	<Strobe mode> Max. 24 W per channel Max. 48 W for 2 channels (total)
	OPPF-48MP-TTL	Master device PNP output			
	OPPF-48SN-TTL	Slave device NPN output	375		
	OPPF-48SP-TTL	Slave device PNP output			
PWM frequency 500 kHz type	OPPF-30MN-Pfr	Master device NPN output	385	2ch	See table 2
	OPPF-30MP-Pfr	Master device PNP output			
	OPPF-30SN-Pfr	Slave device NPN output	375		
	OPPF-30SP-Pfr	Slave device PNP output			

*When using NPN or PNP output for error output or illumination output, select the output according to the input device. NPN/PNP is common for lighting output and lighting/dimming control input.

Table 1
OPPF-48 <PWM mode>
Max. lighting combination examples

Lighting 1	Lighting 2	Total
24 W	+ 24 W	→ 48 W
25 W	+ 20 W	→ 45 W
26 W	+ 16 W	→ 42 W
27 W	+ 12 W	→ 39 W
28 W	+ 8 W	→ 36 W
29 W	+ 4 W	→ 33 W
30 W	+ 0 W	→ 30 W

*Max 30 W/ch

Table 2
Pfr type capacity

Mode	Channel	When using master and slave devices alone	When linked
PWM	Using 1 channel only	Max. 25 W	Max. 20 W
	When using 2 channels	Individual	Max. 25 W
		Total	Max. 30 W
Strobe	Using 1 channel only	Max. 15 W	
	When using 2 channels	Individual	Max. 30 W
		Total	

Options

Connection cable

Type	Model	Specifications	Weight [g]
External lighting control	OP-ECBF14-3	MIL 14 → Loose wires	200
External dimming control	OP-ECBF26-3	MIL 26 → Loose wires	250
RS232 communication	OP-ECBF232-2	MIL 26 → 9-pin D-sub for PC	120
	OP-ECBF232ME-2	MIL 26 → 9-pin D-sub for MELSEC	

Features

Support for both PWM dimming and strobe illumination

PWM mode

High-brightness settings with 1,000 dimming steps are possible with a PWM frequency of 100 kHz. Lighting with up to 48 W total for 2 LAMP outputs can be connected. (Max. 30 W per channel)

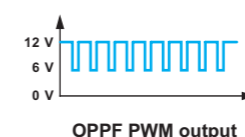
Strobe mode

High-brightness settings with 1,000 dimming steps are possible. In addition, 1,000 steps with light emission widths from 10 μs to 9.99 ms at 10 μs intervals can be set. The minimum settable light emission width is 1 μs (light emission width: 10 μs, dimming setting: 10%). Light emission widths of 1 ms or less offer 3 times the brightness with 18 V overdrive output. Lighting with up to 24 W for each LAMP output can be connected.

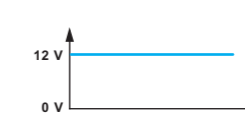
● Voltage of approx. 6 V is applied while the lighting is not lit in order to drive the internal circuit of the lighting. The LEDs will not be illuminated in this case.



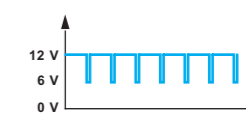
Conventional PWM output



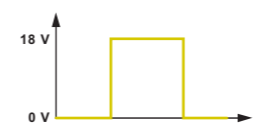
OPFF PWM output



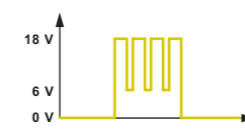
Conventional PWM output (at max. dimming)



OPFF PWM output (at max. dimming)



Conventional strobe output



OPFF strobe output

● In order to superimpose the communication signal, DC lighting is not initiated even with 100% dimming.

Other settings

- Automatic strobe flash cycle
- Illumination control input polarity
- Lighting delay time
- PWM frequency switching
- Illumination control input filter time (noise reduction)

Connect lighting equipped with “FALUX sensing” to monitor brightness and temperature and to control feedback

Patent registered

Monitoring function

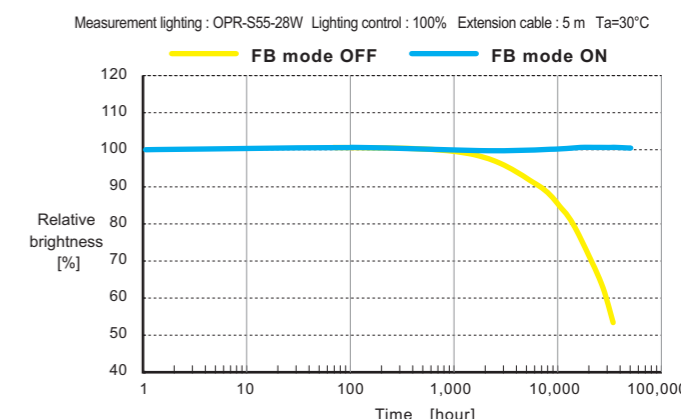
- Accurately measure brightness not only during continuous illumination but also with illumination control and strobe illumination.
- This makes it possible to output an alarm when brightness decreases to a predetermined value.
- Absolute brightness monitoring makes it possible to adjust for lighting instrumental errors.
- In addition to brightness, measurement of internal temperatures is also possible.

Feedback (FB) control

- FB control eliminates not only variations over long periods but also the need to perform periodic adjustments to the dimming setting. By comparing the measured emission brightness with the lighting's recorded reference brightness, FB control fine tunes the output voltage to match the standard brightness.
- FB control also allows for compensation of reductions in brightness due to a voltage drop in the extension cable.
- A signal is output as a feedback error when the upper or lower output voltage adjustment limit is reached.

- Output voltage
PWM mode: 11 to 18 VDC
Strobe mode: 16 to 22 VDC
- FB accuracy: ±1.5% or less (typ.)

Comparison of relative brightness with and without feedback control (estimated values)



The OPFF Series not only provides power for illuminating lighting from two conventional main line cables but also superimposes lighting and communication signals. This allows for conventional use even with lighting that is not equipped with “FALUX sensing”.



Features

External dimming control

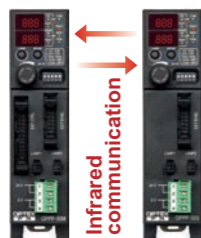
Using RS232 communication and external pulse input, centralized dimming control of all lamps is possible from the master device. Dimming is possible by 0 to 5 V analog input to the individual lamps of each unit.

External dimming control

- Pre-set dimming values can be configured and saved in the main unit, allowing for switching between dimming values with fewer inputs.
- Up to 16 banks can be registered for each LAMP.
- In addition to settings from the operation panel, switching is also possible through external parallel input and RS232 communication.

Multi-channel support

- With 2 channels per unit, support for up to 8 channels is possible by linking (DIN mounting) 3 master and slave devices.
- Communication between units is connector-less and uses infrared.
- A setting copy function allows settings to be batch copied to all channels.
- Connecting a single slave device or just a slave device is possible.



Surprisingly low price for provided functionality

- Progressively expanding functionality to meet the diverse needs of customers.
- Even with these functions, prices are kept lower than general-purpose power supplies.
- Lowest price range available for strobe-equipped devices.

Part Names

OPPF-48M
Master device

OPPF-48S
Slave device

Labels for OPFF-48M:

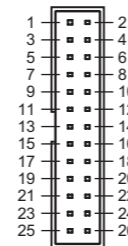
- READY status display
- LAMP1 monitor
- LAMP2 monitor
- MODE switch button
- LAMP switch button
- Value setting dial confirmation button
- MIL 26-pin connector EXT CTRL (Master device only)
- Parallel input
- RS232
- Error output

Labels for OPFF-48S:

- FB (feedback) status display
- Infrared communication between COM master/slave device status display
- LAMP1/2 selection display
- Mode display
- DIP SW DIP switch
- MIL 14-pin connector EXT SYNC
- Illumination control input
- Analog 0 to 5 V input
- Error output
- Illumination output connector (2 ch)
- 24 VDC connector
- DIN rail mounting hook (Rear)

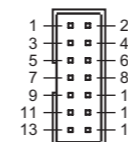
See the page to the right for a list of I/O functions

I/O Function List



Master device MIL 26-pin connector — EXT CTRL

Pin No.	Name	Input/output	Signal name	Description
1	D0	Input	Dimming bit 0 / Bank selection 0 (LSB)	Corresponds to lower bits 0 to 3 when switching the dimming value through external pulse input if not in bank mode (DSW3-OFF) with external dimming (DSW2-ON). The bank number can be specified if not in bank mode (DSW3-OFF) with external dimming (DSW2-ON).
2	D1	Input	Dimming bit 1 / Bank selection 1	
3	D2	Input	Dimming bit 2 / Bank selection 2	
4	D3	Input	Dimming bit 3 / Bank selection 3	
5	D4	Input	Dimming bit 4	Corresponds to upper bits 4 to 9 when switching the dimming value through external pulse input. Values are specified in binary. Enabled if not in bank mode (DSW3-OFF) with external dimming (DSW2-ON).
6	D5	Input	Dimming bit 5	
7	D6	Input	Dimming bit 6	
8	D7	Input	Dimming bit 7	
9	D8	Input	Dimming bit 8	
10	D9	Input	Dimming bit 9	
11	L0	Input	LAMP select 0	Specifies the station number of the target lamp with external dimming or when switching banks. With a master device, LAMP1 is selected if L2, L1, and L0 = OFF, and LAMP2 is selected if L2 and L1 = OFF while L0 = ON.
12	L1	Input	LAMP select 1	
13	L2	Input	LAMP select 2	
14	WR	Input	Dimming writing	Turning ON this input allows dimming values to be written. If bank numbers are specified, this function is not necessary.
15	COMINA	-	Input COM	This is the common terminal for input. This input can be turned ON by applying 5 to 24 V between each input and this common terminal. (No polarity)
16	COMOUTA	-	Output COM	This is the common terminal for output. When output is ON, the current flows from the output toward this common terminal. (Opposite direction for PNP types)
17	ERR	Output	Error output (FB, overcurrent)	This output turns ON when a feedback error or monitor brightness alarm occurs, when the internal temperature is abnormal, or when the overcurrent protection circuit of the lighting is operating. Error output also turns on if an error is output for any connected slave device. (A delay of up to 250 ms will occur before a slave device error status is reflected.)
18 to 23	-	-	-	-
24	TXD	Output	Serial TXD	This is the transmission output for RS232.
25	RXD	Input	Serial RXD	This is the reception input for RS232.
26	SG	-	Serial GND	This is the common terminal for RS232.



Master/slave device MIL 14-pin connector — EXT SYNC

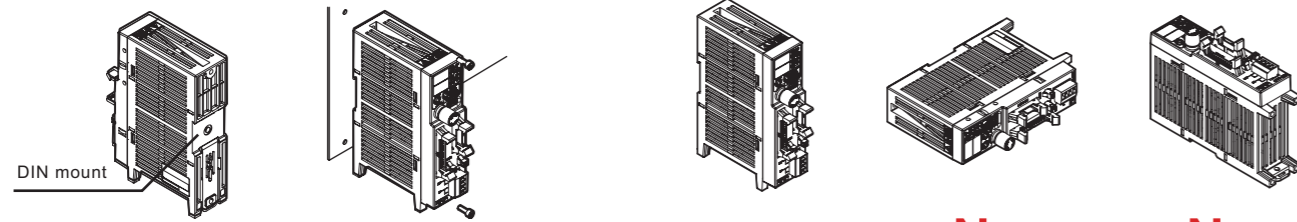
Pin No.	Name	Input/output	Signal name	Description
1	SYNC1	Input	LAMP1 illumination control input	With external illumination control (DWS1=ON), the polarity can be switched from \pm PL in the PRM settings while this input is ON. LAMP1 becomes illuminated. In strobe mode (DSW4=ON), LAMP1 illuminates on the leading edge of this input.
2	SYNC2	Input	LAMP2 illumination control input	With external illumination control (DWS1=ON), the polarity can be switched from \pm PL in the PRM settings while this input is ON. LAMP2 becomes illuminated. In strobe mode (DSW5=ON), LAMP2 illuminates on the leading edge of this input.
3	COMINB	-	Input COM	This is the common terminal for input. This input can be turned ON through illumination control input or analog dimming select input, or by applying 5 to 24 V between each input and this common terminal. (No polarity)
4	COMOUTB	-	Output COM	This is the common terminal for output. When each output is ON, the current flows from the output toward this common terminal. (Opposite direction for PNP types)
5	OVC	Output	Overcurrent error	Overcurrent error output turns ON if an overcurrent occurs for either LAMP1 or LAMP2 lighting.
6	FBERR1	Output	LAMP1 feedback error	This output turns ON when a LAMP1 feedback error or monitor brightness alarm occurs.
7	LON1	Output	LAMP1 outputting	This output turns ON while LAMP1 is output.
8	FBERR2	Output	LAMP2 feedback error	This output turns ON when a LAMP2 feedback error or monitor brightness alarm occurs.
9	LON2	Output	LAMP2 outputting	This output turns ON while LAMP2 is output.
10	ANALOG	Input	Analog dimming switching input	Turning ON this input allows dimming to be performed using analog input AIN1 or AIN2 voltage. Switching individually between LAMP1 and LAMP2 is not possible. Inputting 5 to 24 V to 3 COMINB will turn ON analog dimming. Setting PRM to $\#5$ will also force analog dimming to be enabled.
11	AIN1	Input	LAMP1 analog input	This is the analog input for LAMP1. At 0 to 5 V, the corresponding dimming value will be between 0 and 999.
12	5 V	Output	Service 5 V output	This is the 5 V output for using analog input.
13	AIN2	Input	LAMP2 analog input	This is the analog input for LAMP2. At 0 to 5 V, the corresponding dimming value will be between 0 and 999.
14	ACOM	-	Analog common	This is the common terminal for analog input.



Installation

Installation examples

Rear DIN mounting or screw mounting is possible.



Good

No good

No good

Always use upright to allow for heat dissipation. Do not use in any position other than the upright.

Cable connectivity

Master/slave device: 24 VDC input (power source)
 Applicable wiring: 0.2 to 2.1 mm², 24 to 14 AWG
 Coated strip length: 7 mm
 Upper 2-pole: 24 VDC, Lower 2-pole: 0 V

Master device: MIL 26-pin connector (EXT CTRL)
 Master/slave device: MIL 14-pin connector (EXT SYNC)

[Optional cables]
 MIL socket connector harness (type with one side trimmed)
 28 AWG twisted-pair double-shielded cable

For master device, MIL 26-pin (3 m) → OP-ECBF26-3
 For master/slave device, MIL 14-pin (3 m) → OP-ECBF14-3

Note: Use open terminals to pass power between units with 1 pole per wire.

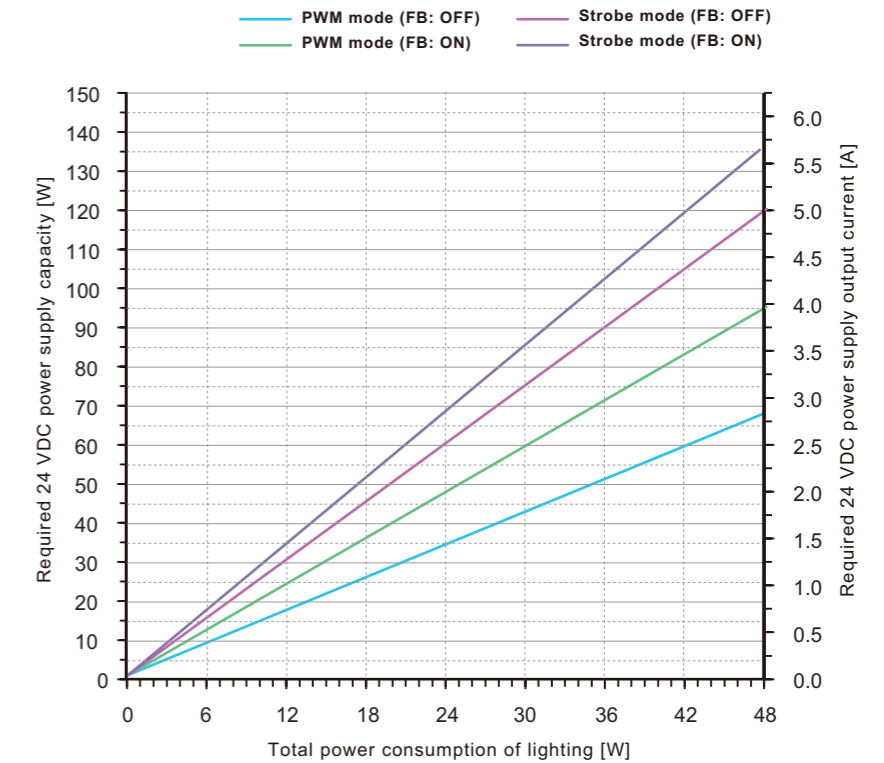
Note: Please use shielded cables in environments susceptible to noise.

Required 24 VDC power supply capacity to handle power consumption of lighting

Based on the total power consumption of the LED lighting to be connected, select a 24 VDC power source that offers more than the required capacity.

Note: When using in conjunction with other equipment, the characteristics of the other equipment will affect the power supply, so be sure to choose a power supply that has a sufficient margin (about twice as much) as that shown in the table.

*Evaluation power source: IDEC PS5R-SF24 (120 W), PS5R-SG24 (240 W)



OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

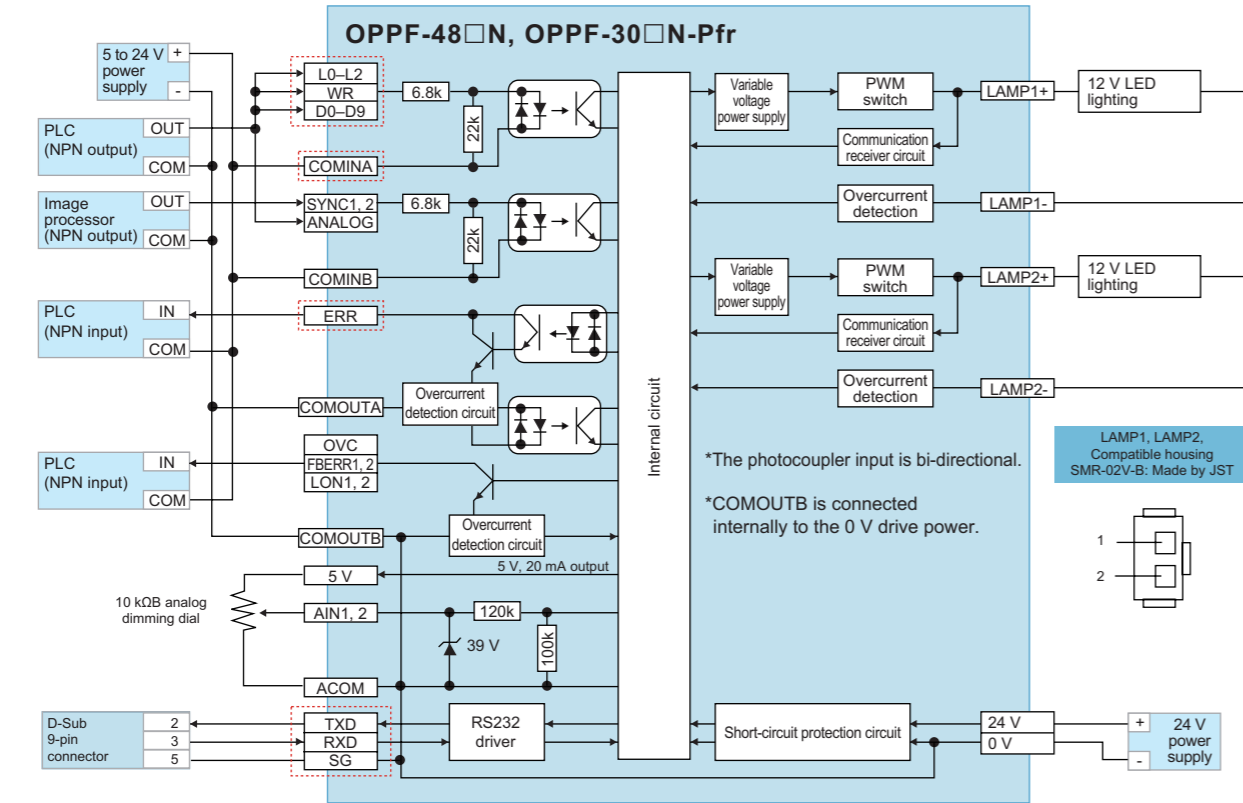


Connection to External Device

Standard type / 500 kHz type

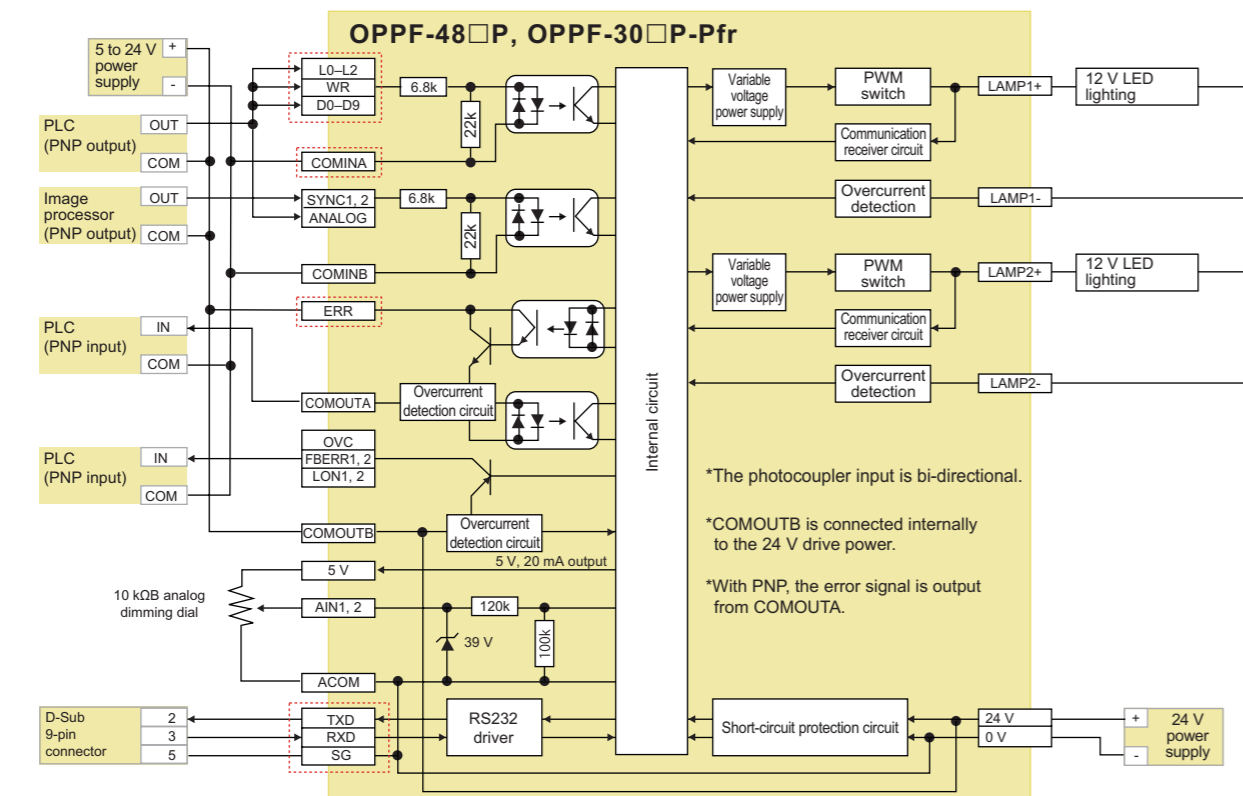
NPN type

: Master device only



PNP type

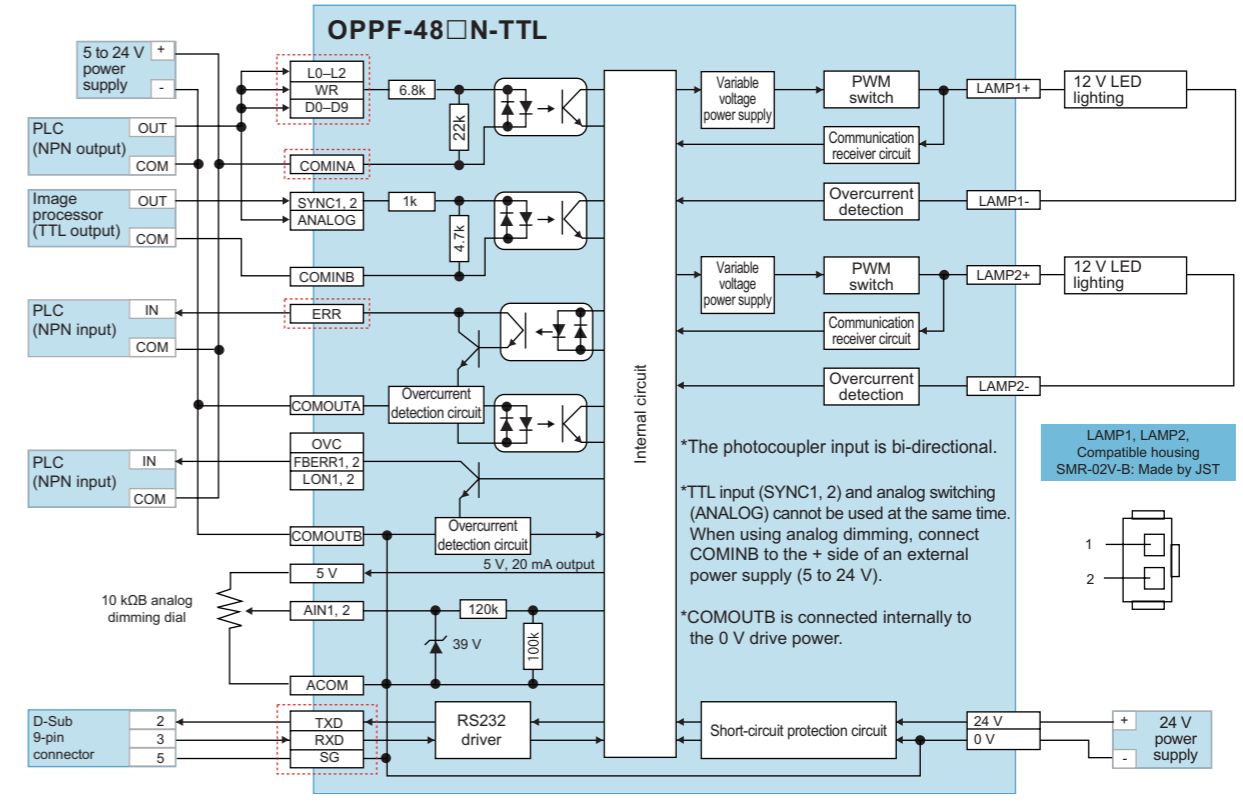
: Master device only



Illumination control TTL type

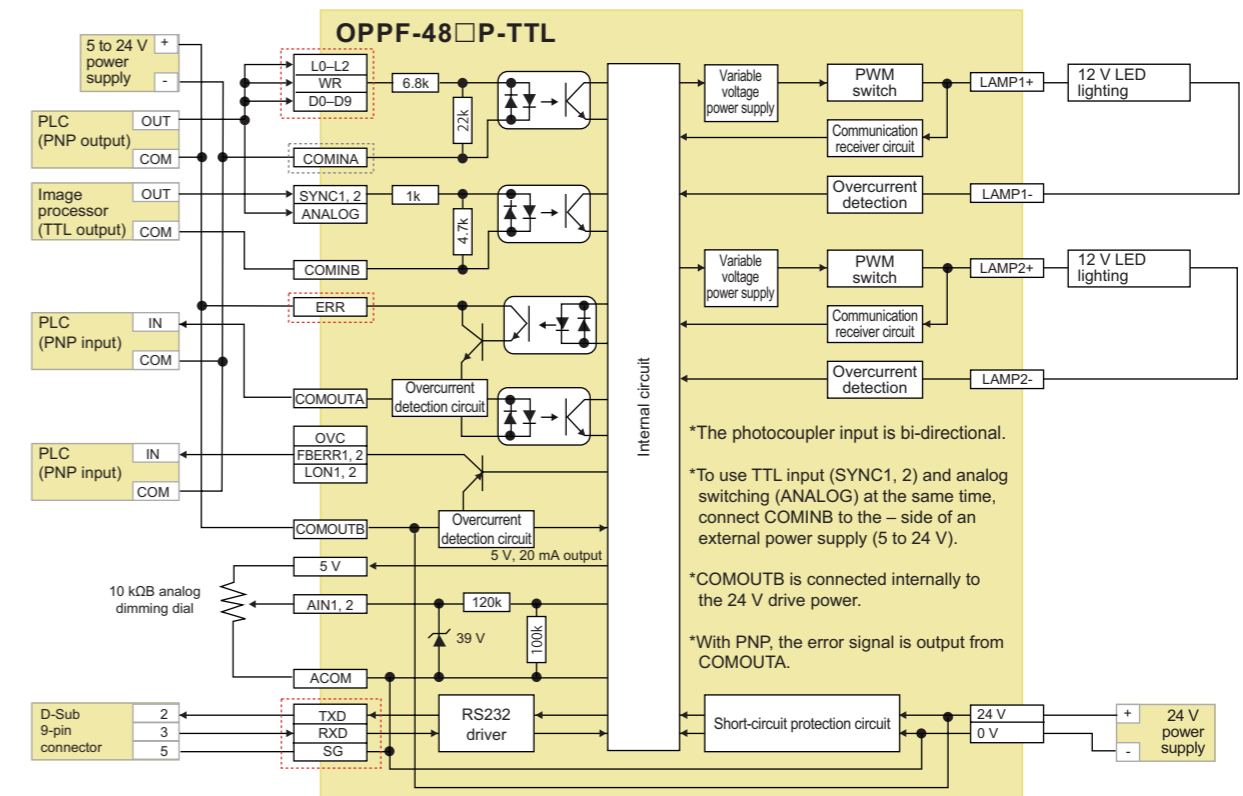
NPN type

: Master device only



PNP type

: Master device only



OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
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OPR	Ring
OPR-SF	Ring
OPB	Bar
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OPPD	Power Supplies
OPPF	Power Supplies
OPPCW	Power Supplies
OP	Options
MDF	Options



Specifications

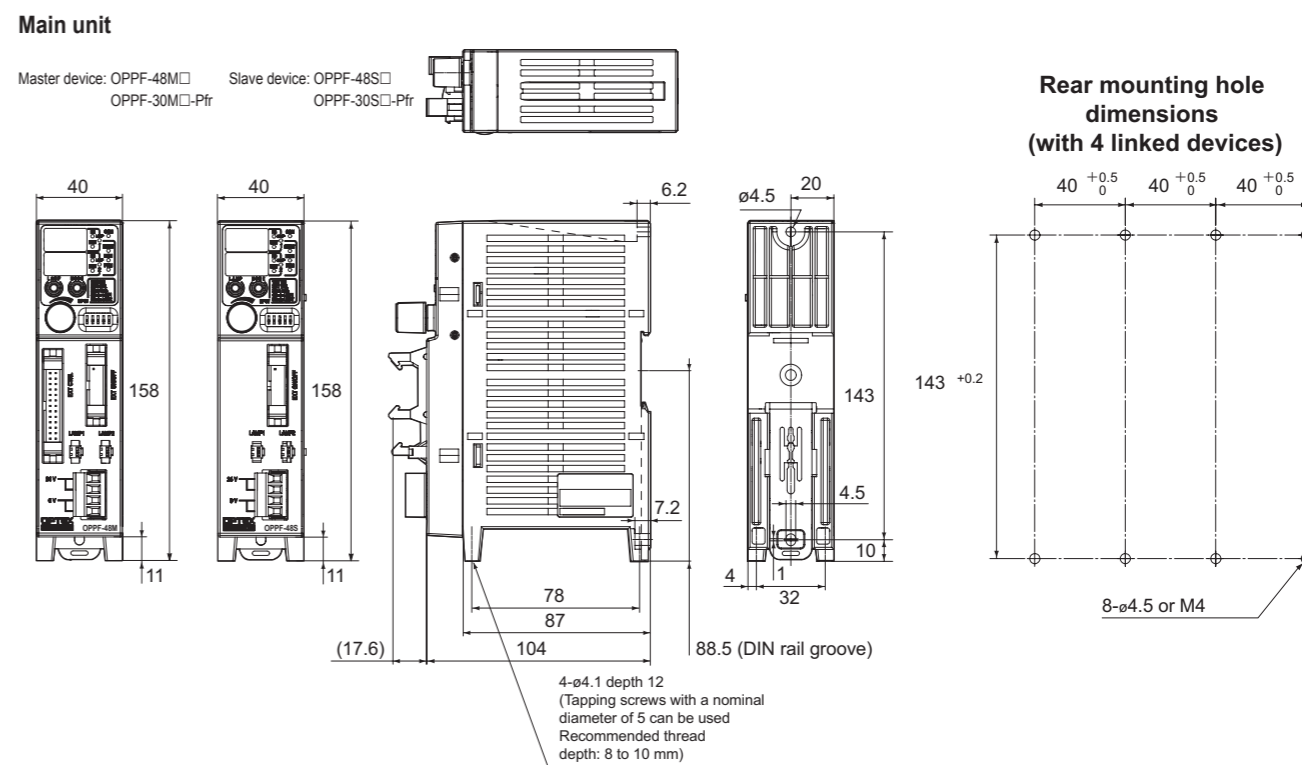
Model	OPPF-48MN	OPPF-48MP	OPPF-48SN	OPPF-48SP
Type	Master device NPN output	Master device PNP output	Slave device NPN output	Slave device PNP output
Power supply voltage	24 VDC ±10%			
Current consumption	PWM mode — Feedback OFF: Max. 2.9 A, Feedback ON: Max. 4.0 A Strobe mode — Feedback OFF: Max. 5.0 A, Feedback ON: Max. 5.7 A			
Illumination output	2 channels			
Connectable lighting	PWM mode: Max. 48 W (2 ch total) *Max 30 W/ch, Strobe mode: Max. 24 W (per channel)			
Illumination output voltage	PWM mode: 12 VDC (standard), Strobe mode: 18 VDC (standard)			
Illumination output current	PWM mode: Max. 4.0 A (2 ch total), Strobe mode: 8.0 A (per channel)			
Dimming method	PWM dimming, Frequency: 20/50/100/99/98/97 kHz 1,000 steps *Common for PWM mode and strobe mode			
Strobe	Luminescence width: 10 µs to 9.99 ms (10 µs steps) or 1 ms to 999 ms (1 ms steps) *12 VDC driving when exceeding 1 ms Flash cycle limit at 18 VDC: 10% Duty (10 times or more the pulse width cycle required)			
Monitoring	Lighting brightness monitor / Lighting internal temperature monitor, Monitor brightness alarm lower limit value setting Update cycle per communication between lighting and power supply, Received light amount: 21 ms, Temperature: 105 ms			
Feedback	Voltage variable method — PWM mode: 11 to 18 VDC Strobe mode: 16 to 22 VDC, Accuracy: ±1.5% or less (typ.) *This specification is for reference only and is not a guarantee of the performance of this product.			
Input	External illumination control × 2, Analog dimming select × 1, Parallel dimming input × 10 (bank select × 4 shared), Parallel dimming writing input × 1, Channel select input × 3		External illumination control × 2, Analog dimming select × 1	
	ON voltage: 5 V or more, OFF voltage: 1.2 V or less, Max. input voltage: 30 V Illumination control input response time (actual value) With 24 V input (OFF→ON: 5 µs, ON→OFF: 60 µs), With 5 V input (OFF→ON: 44 µs, ON→OFF: 41 µs) Input resistance: 6.8 kΩ, insulated; Other input response time: 1.1 to 14.8 ms			
Analog input	0 to 5 V, Input resistance: 220 kΩ, Non-insulated			
Output	Lighting overcurrent error output × 1, Feedback warning output × 2, Lighting illumination output × 2 Open collector, Max. 100 mA / 30 VDC, Residual voltage 1.0 V max.		—	
	Lighting overcurrent / internal temperature abnormal / feedback error output × 1 Open collector, Max. 100 mA / 30 VDC, Residual voltage 1.5 V max.		—	
Communication interface	RS232: 1 ch, Baud rate: 4,800/9,600/19,200/38,400/ 57,600/115,200		—	
Master-slave communication	Infrared communication method — RS232 from master device to slave device, External input control (dimming, bank selection), Transmission from slave device to master device (error information, RS232 reading), Setting copy function Communication cycle: Approx. 15 ms (equivalent response time for controlling slave device with RS232, external input)			
Lighting output protection circuit	Overcurrent			
Signal output protection circuit	Overcurrent			
Other protective functions	Power supply internal temperature monitoring (PWM output cut to 1/4 at 105°C) Lighting internal temperature monitoring, Lighting brightness lower limit alarm			
Ambient temperature/humidity	0 to 45°C / 35 to 85% RH (no condensation)			
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)			
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions			
Shock resistance	Approximately 10 G, 3 times in each of the X, Y, and Z directions			
Insulation resistance	500 VDC, 10 MΩ or more			
Material	Polycarbonate			
Weight	385 g		375 g	
Protection rating	IP20 (IEC 60529: 1989 / A1: 1999 + A2: 2013)			
Applicable regulations	EMC (2014/30/EU) / RoHS (2011/65/EU, MIIT Order No.32)			
Applicable standards	EN 61000-6-2: 2005 / AC: 2005, EN 55011: 2009 / A1: 2010 (EN 55011 testing was performed with the lighting cable passed through shielded tubing grounded to FG.)			
Accessories	Simple Operation Guide, Instruction manual CD-ROM			

Model	OPPF-48MN-TTL	OPPF-48MP-TTL	OPPF-48SN-TTL	OPPF-48SP-TTL
Type	Master device NPN output	Master device PNP output	Slave device NPN output	Slave device PNP output
Input	Illumination control input (TTL)	ON voltage: 2 V or more, OFF voltage: 0.9 V or less Max. input voltage: 16 V, Input resistance: 1 kΩ, Insulated Response time (actual value) — 5 V: 5 µs (OFF → ON) / 75 µs (ON → OFF) 3 V: 8 µs (OFF → ON) / 70 µs (ON → OFF) 2 V: 20 µs (OFF → ON) / 60 µs (ON → OFF)		
		Other inputs ON voltage: 5 V or more, OFF voltage: 1.2 V or less, Max. input voltage: 30 V Input resistance: 6.8 kΩ, insulated; Response time (actual value): 1.1 to 14.8 ms		

Model	OPPF-30MN-Pfr	OPPF-30MP-Pfr	OPPF-30SN-Pfr	OPPF-30SP-Pfr
Type	Master device NPN output	Master device PNP output	Slave device NPN output	Slave device PNP output
Power consumption of connectable lighting	PWM mode: When using master and slave devices alone: Max. 25 W when using 1 ch only Max. 25 W when using 2 ch (individual), Max. 30 W when using 2 ch (total) When linked: Max. 20 W when using 1 ch only, Max. 15 W when using 2 ch (individual) Max. 30 W when using 2 ch (total), Strobe mode: Max. 15 W (per channel)			
	PWM dimming, Frequency: 50/100/500 kHz 1,000 steps (50/100 kHz), 240 steps (500 kHz) *Common for PWM mode and strobe mode Dimming value display at 500 kHz: (0 to 239) × 25/6 (truncated after decimal point) Display examples: 0, 4, 8, 12, 16, 20, 25, 29, ... 991, 995			
	Dimming method			

● Please note that specifications are subject to change without prior notice for product improvement purposes.

Dimensions (unit: mm)



Dual-Output Power Supply (CC + PWM)

OPPCW Series

Dual-output power supply

- Dual output with 12 V PWM and constant current
- Digital dimming method (256 steps using front switch)
- Support for 8-bit parallel and 0 to 5 V analog input for external dimming control



Specifications

Power supply voltage	100 to 240 VAC, 50/60 Hz
Current consumption	Max. 0.43 A (at 100 VAC)
Dimming control	PWM 78.125 kHz, PWM control, 256 steps
	Constant current (CC) Max. current 7-level range switching, 256 steps
Output channels	2 (switching between PWM mode and constant mode for both channels)
Output voltage	12 V ±5% p-p (PWM mode), 1.5 to 17 V (constant current mode)
Output current	0 to 2.2 A / 2 ch total (PWM mode), 0.4 mA to 700 mA ±5% (constant current mode)
External control	Per-channel ON/OFF, Digital dimming, Analog dimming
Digital input	OFF: ±1.2 V or less, ON: ±5 V or more applied (max. ±26.4 V), Input resistance 6.8 kΩ, Insulated
Analog input	0 to 5 V (max. +30 V, -0.5 V), Input resistance: 220 kΩ, Non-insulated
5 V output current for analog input	Max. 20 mA
Response time	SYNC: OFF → ON
	• PWM mode, 24 V input: 7 μs, 12 V input: 14 μs, 5 V input: 135 μs
	*Max. 12.8 μs fluctuations per pulse cycle
Response time	• Constant current mode: 1 ms (common for each input voltage)
	SYNC: ON → OFF 120 μs (common for each input voltage)
Analog dimming input: Approx. 2 ms / Other digital control input: Approx. 2.5 ms	
Ambient temperature/humidity	-10 to 50°C / 35 to 85% RH (no condensation)
Storage temperature/humidity	-20 to 70°C / 35 to 95% RH (no condensation)
Applicable regulations	EMC (2014/30/EU) / Safety (2014/35/EU) / RoHS (2011/65/EU, MIIT Order No.32)
Applicable standards	EN 61326-1: 2013, EN 61010-1: 2010

Specifications

Model	No. of Channels	Dimming Control	Capacity [W]	Weight [g]
OPPCW-910M2	2	12 V PWM / Constant current (CC)	26.4	1,030

Options

External lighting control cable model: OP-ECB2-□ **OP. 63**

External dimming control cable

Model	Length [m]	Weight [g]
OP-ECBM20-3	3	230

Range Setting

Range	Function	Range	Function
0	Reserved	5	CC 500 mA max.
1	CC 100 mA max.	6	CC 600 mA max.
2	CC 200 mA max.	7	CC 700 mA max.
3	CC 300 mA max.	8	Reserved
4	CC 400 mA max.	9	12 V PWM

Illumination Output

12 V PWM		CONSTANT CURRENT	
Pin No.	Signal Name	Pin No.	Signal Name
1	+	1	NC
2	-	2	-
		3	+

● Extension cable model: OP-CB1-□ (cable length)
● Extension cable model: OP-CBCH1-□ (cable length)

External Lighting Control Input

EXT ON/OFF external lighting connector

Pin No.	Terminal Marking	Function
1	SYNC1	LAMP1 ON
2	SYNC2	LAMP2 ON
3	EXSYN	External control switching COM
4	SCOM	

● External lighting control cable: OP-ECB2-□ (cable length)

External Dimming Control Input

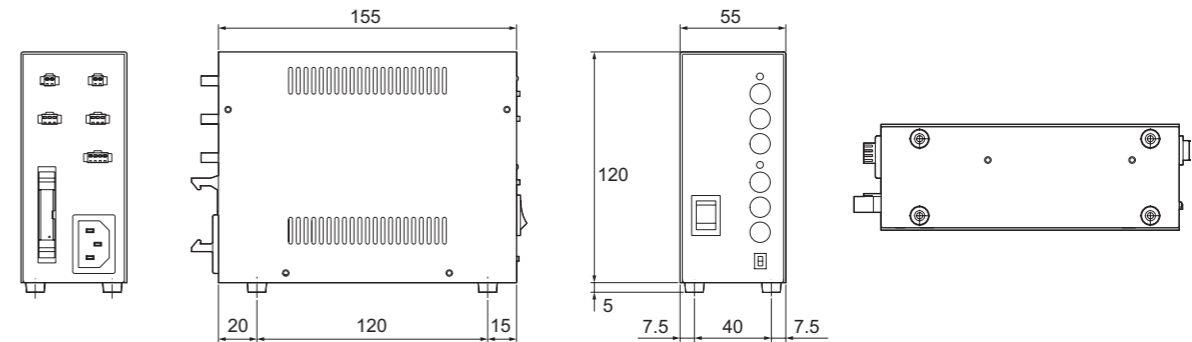
EXT CTRL external dimming control input connector

Pin No.	Terminal Marking	Function
1	COM	Digital input common
2	EXCTRL	Digital input switching
3	A0	OFF: LAMP1, ON: LAMP2
4	HOLD	Not configurable when ON
5	D7	Bit 7 (MSB)
6	D6	Bit 6
7	D5	Bit 5
8	D4	Bit 4
9	D3	Bit 3
10	D2	Bit 2
11	D1	Bit 1
12	D0	Bit 0 (LSB)
13	ANALOG	Analog input switching (for use between 1 COM)
14	GND	Ground
15	24 V	24 V output
16	24 V	24 V output
17	AIN1	LAMP1 0 to 5 V analog input
18	AIN2	LAMP2 0 to 5 V analog input
19	5 V	5 V output
20	ACOM	AIN1/2 common

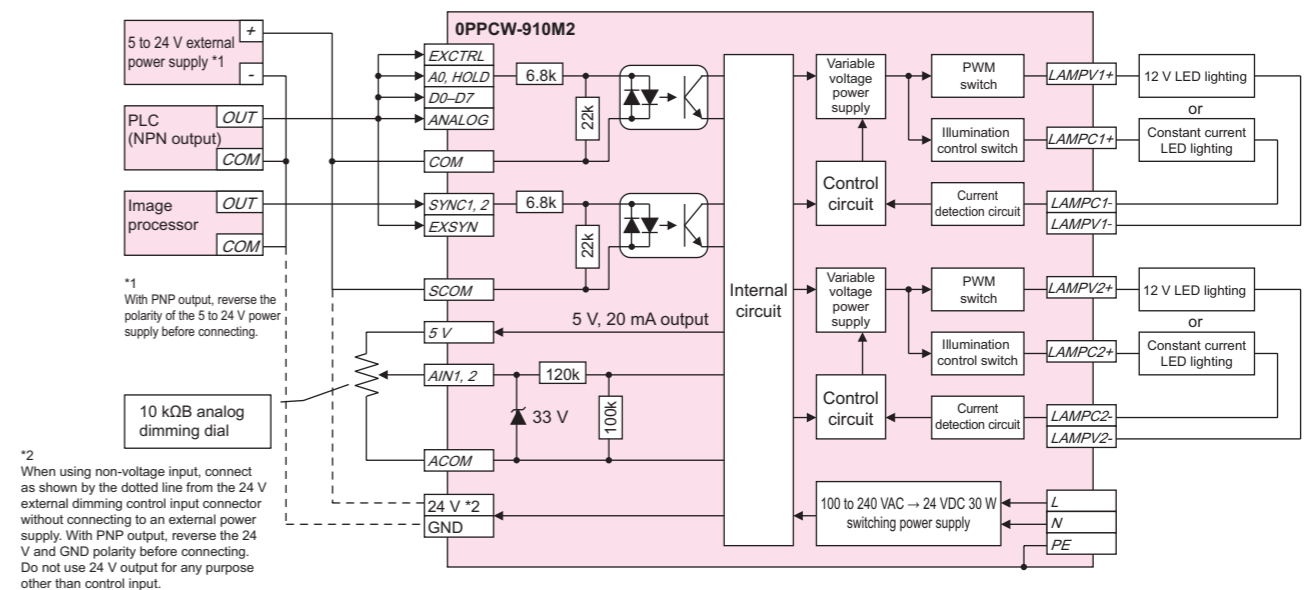
● External dimming control cable: OP-ECBM20-3

Dimensions

(unit: mm)



Circuit Diagram



Note: The included power cord is for 100 V. Power cords that will be used with voltages in excess of the 125 V rating must be provided by the customer.

Cable

OP Series

- Extension cable for use between lighting and controllers/ power supplies
- Control lighting from an external power supply



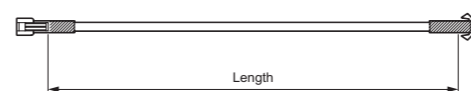
External Lighting Control Cable Wire Color

Pin No.	Wire Color
1	White
2	Green
3	Red
4	Black

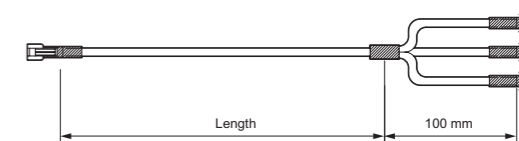
Dimensions

(unit: mm)

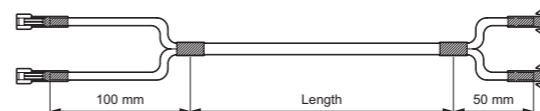
① OP-CB1-_/ OP-RCB1-_/ OP-CBCH1-_/ OP-CB1-_-1.25sq



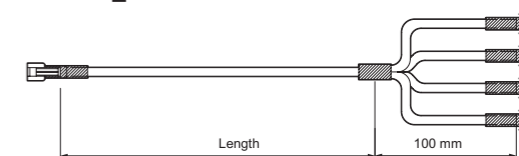
④ OP-CBD3-_/



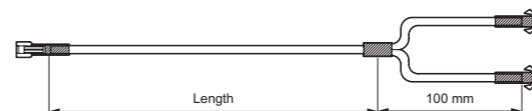
② OP-CB2-_/ OP-RCB2-_/



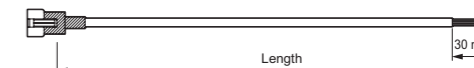
⑤ OP-CBD4-_/



③ OP-CBD2-_/



⑥ OP-ECB2-_/



Extension Cable

Name	Model	Length [m]	Weight [g]	Outline Drawing
1ch	OP-CB1-2	2	60	①
	OP-CB1-3	3	80	
	OP-CB1-5	5	140	
2ch	OP-CB2-2	2	100	②
	OP-CB2-3	3	150	
	OP-CB2-5	5	240	
Constant current-dedicated 1ch	OP-CBCH1-2	2	70	①
	OP-CBCH1-3	3	100	
	OP-CBCH1-5	5	170	

Extension Robot Cable

Name	Model	Length [m]	Weight [g]	Outline Drawing
1ch	OP-RCB1-2	2	60	①
	OP-RCB1-3	3	80	
	OP-RCB1-5	5	140	
2ch	OP-RCB2-2	2	120	②
	OP-RCB2-3	3	170	
	OP-RCB2-5	5	270	

Branched Extension Cable

Name	Model	Length [m]	Weight [g]	Outline Drawing
2-branch cable	OP-CBD2-2	2	80	③
	OP-CBD2-3	3	110	
	OP-CBD2-5	5	170	
3-branch cable	OP-CBD3-2	2	85	④
	OP-CBD3-3	3	115	
	OP-CBD3-5	5	175	
4-branch cable	OP-CBD4-2	2	90	⑤
	OP-CBD4-3	3	120	
	OP-CBD4-5	5	180	

External Lighting Control Cable

For OP-PCW

Name	Model	Length [m]	Weight [g]	Outline Drawing
2ch	OP-ECB2-2	2	100	⑥
	OP-ECB2-3	3	130	
	OP-ECB2-5	5	200	

OPR	Ring
OPR-SF	Ring
OPB	Bar
OPB-S	Bar
OPF	Backlight
OPX	Coaxial
OPS-S	Spot
OPPD	Controllers / Power Supplies
OPPF	Controllers / Power Supplies
OPPCW	Controllers / Power Supplies
OP	Options
MDF	Options

Lighting Monitoring and Illumination Check Sensor

MDF Series

Patent registered

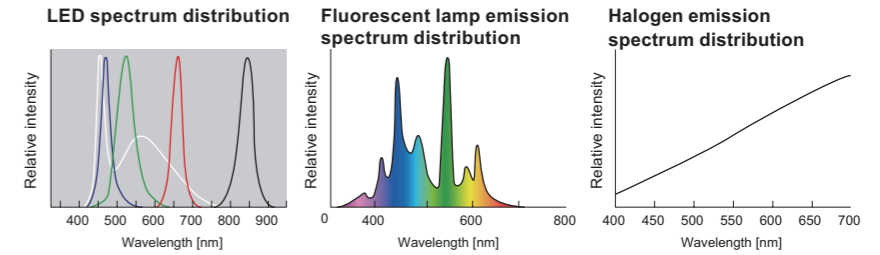
The industry's first solution for light-brightness management by numerical values

- Automatic measurement of continuous lighting and ON/OFF lighting control using an internal trigger
- Clear maintenance timing of lighting
- Reduced wiring with the possibility to link up to 8 devices (inter-connection types)



Features

- **Adaptive light source**
 - Compatible with white, blue, green, red, and infrared LED light sources (Receivable wavelength range: 400 to 1000 nm)
 - Effective for infrared light detection incapable of confirmation through visual inspection
 - Also compatible with fluorescent lamps and halogen lighting



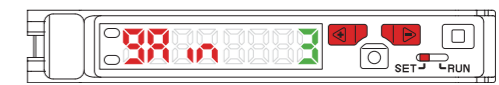
Compatible with various light emission modes

Patent registered

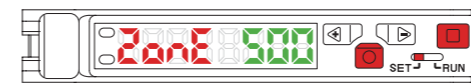
Automatic measurement of continuous lighting, pulse lighting (PWM), and ON/OFF lighting control through the built-in trigger. Acceptability determination for sudden non-lighting with synchronous input from an external input line.

Settings configurable to match lighting brightness

Manual gain (5-level switching)

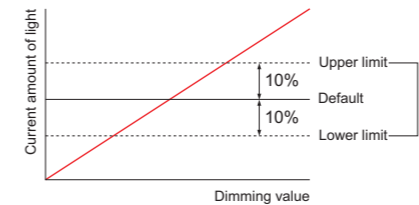


3 teaching modes



① Zone teaching

Automatic measurement of the internal upper and lower limit settings (default: 10%) is done through teaching of the currently received light amount.

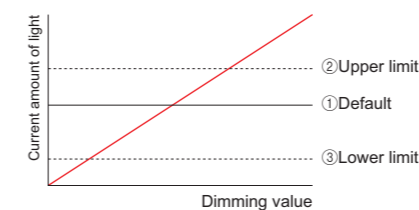


② Lower limit teaching

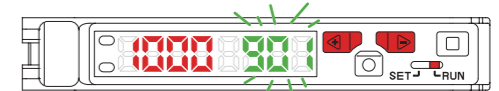
The lighting amount is dimmed to the default value and then the lower limit, and each value is used as the individual setting for teaching.

③ Upper/lower limit teaching

The lighting amount is dimmed to the default value, the upper limit, and then the lower limit, and each value is used as the individual setting for teaching.



Manual configuration of upper/lower limits



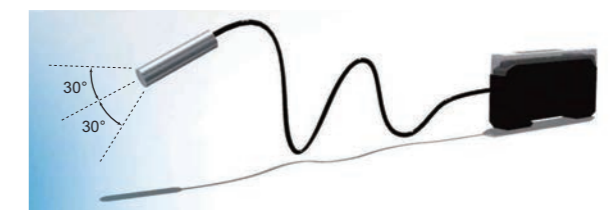
Fine-tune upper and lower limit values even after teaching

External teaching input

Teach externally using a signal to the external input. Re-teach from the operation panel using embedded devices (Synchronous mode: only with Auto/OFF)

Flexible fiber

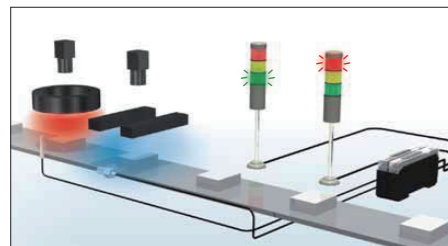
No changes to measured values even when the fiber is bent. Bending radius: 2 mm, Receiving angle: ±30°



Applications

- Manage brightness of image inspection lighting using numerical values
- Verify infrared lighting impossible to confirm visually
- Measure brightness variations of LED lighting
- Verify halogen lighting linearity
- Measure fluctuations in brightness caused by ambient temperatures of fluorescent lamps

Brightness monitoring of camera lighting



The fiber unit receives the lighting output in order to monitor the amount of illumination. The measurements are displayed digitally, and a signal is output when exceeding the set range (upper/lower limits).

LED illumination verification (high gain type)



Verification of LED illumination on a phone

Specifications

Amplifier unit

Type	Shape	Output	Model	Outline Drawing
Normal	Stand-alone	NPN	MDF-TN	①
	Inter-connection master		MDF-TMN	②
	Inter-connection slave		MDF-TSN	
High-gain	Stand-alone	NPN	MDF-HTN	①

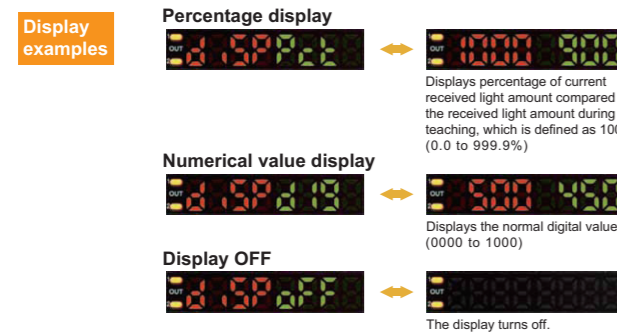
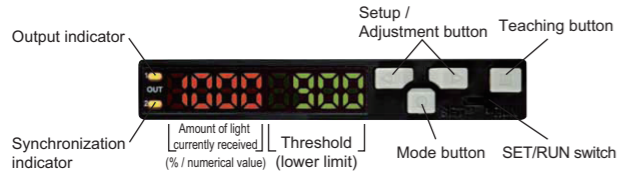
Fiber unit

Type	Shape	Bending radius	Model	Weight [g]
M4 screw		R = 2 mm	NF-MT77	20
ø3 cylinder			NF-MT05	

Options

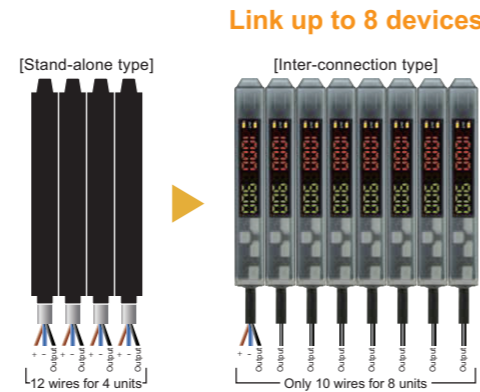
Model	Application	Model	Weight [g]
NF-MTA02	Side-view lens For M4 screw (NF-MT77)		5
BEF-EB01-W190	Expansion endplates (2)		10

Manage lighting brightness using numerical values



Up to 8 units for less wiring
Reduced wiring

Up to 8 units of inter-connection type can be connected. Wiring for slave units only requires an output line, so wiring work can be reduced to 1/2 or more.

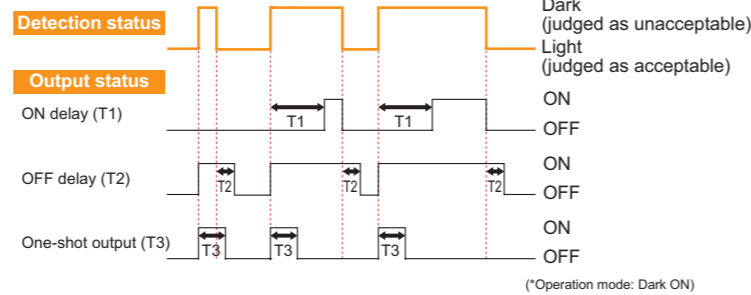


*When using control output only

Equipped with timer function
Configurable from 1 to 9999 ms at 1 ms intervals

The time setting for the timer is configurable. Choose from 3 modes: Off delay, On delay, or One-shot.

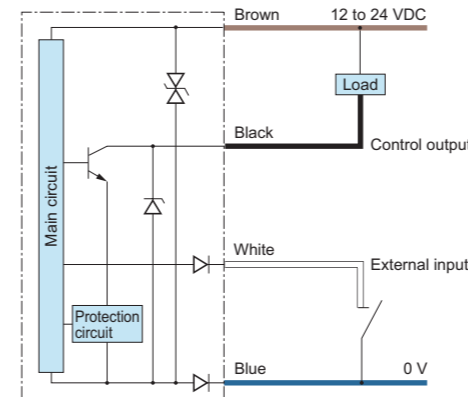
Display examples



Specifications

Type	Normal			High-gain
	Stand-alone	Master unit	Slave unit	Stand-alone
Model	MDF-TN	MDF-TMN	MDF-TSN	MDF-HTN
Measurement range (with white light source)	300 to 50,000 lx (reference values)			10 to 1,500 lx (reference values)
Power supply voltage	12 to 24 VDC (±10%; including ripple)			
Current consumption	45 mA or less / 24 V			
Response time	38.4 ms (min) *The shortest integration time is used with pulse illumination.			
Input settings	External input setting (monitoring synchronous input, external teaching input)			
Indicator/digital display	Output indicator: orange / 7-segment, 8-digit display			
Control output	1 NPN open collector output			
Output method	100 mA / 30 V or less, Load current: 100 mA or less, Residual voltage: 1.8 V or less			
Short-circuit protection	Equipped			
Gain settings	Manual configuration			
Timer function	OFF, On delay timer, Off delay timer, One-shot timer			
Timer time	1 to 9999 ms			
Ambient temperature/humidity	-25 to 55°C, 35 to 85% RH (no freezing or condensation)			
Storage temperature/humidity	-40 to 70°C, 35 to 85% RH (no freezing or condensation)			
Vibration resistance	10 to 55 Hz; amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions			
Protection rating	IP50 (IEC 60529: 1989 / A1: 1999 + A2: 2013)			
Applicable regulations	EMC (2014/30/EU) / RoHS (2011/65/EU, MIIT Order No.32)			
Applicable standards	EN 61000-6-2: 2005 / AC: 2005, EN 61000-6-4: 2007 / A1: 2011			
Material	Case: PPE, Cover: PC			
Weight	Approximately 65 g			

I/O Circuit Diagram



Connecting

- When not used for external input, cut the lead wire and wrap it individually with insulating tape, and do not connect it to any other terminal.
- Important points**
- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 100 ms).

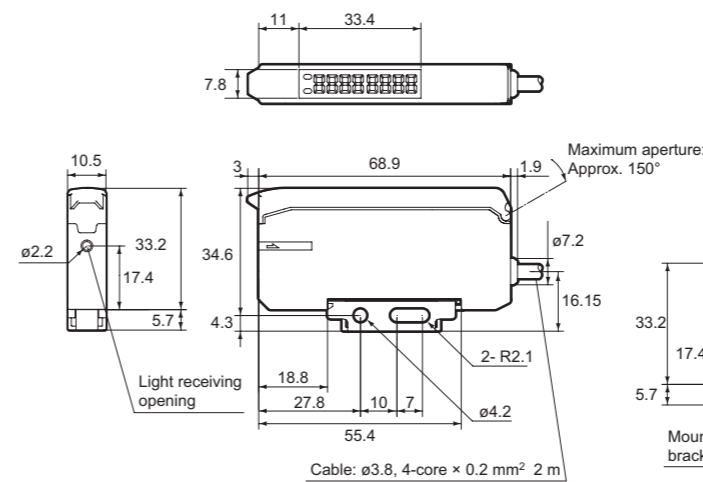
*MDF-TSN inter-connection type slave unit does not have power supply wires (brown/blue) because power is supplied from the master unit.

Dimensions

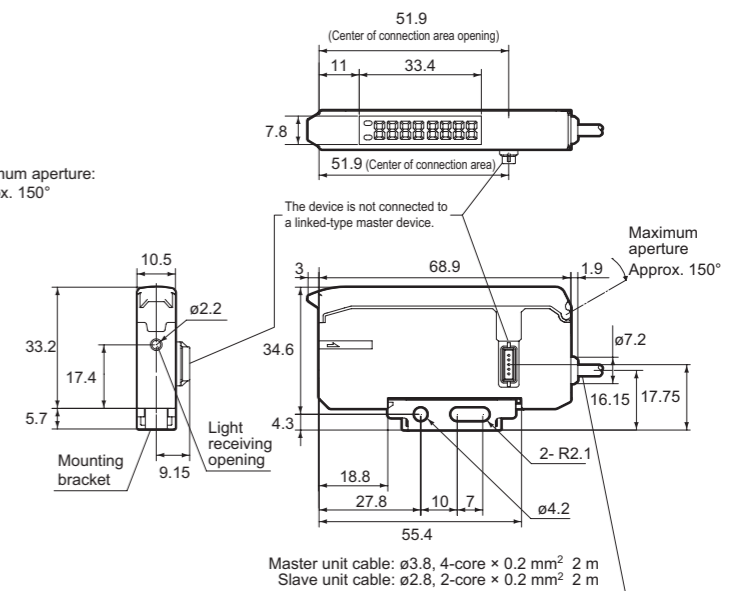
(unit: mm)

Amplifier unit

1 Stand-alone MDF-TN / MDF-HTN

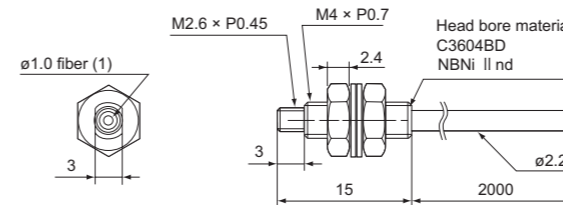


2 Inter-connection type MDF-TMN / MDF-TSN



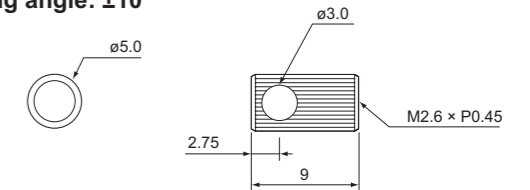
Fiber unit

M4 screw NF-MT77

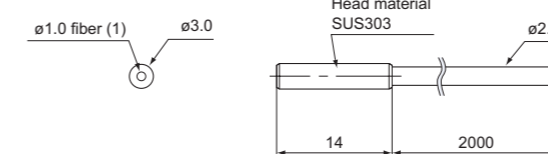


NF-MTA02 side-view lens

Receiving angle: ±10°



ø3 cylinder NF-MT05

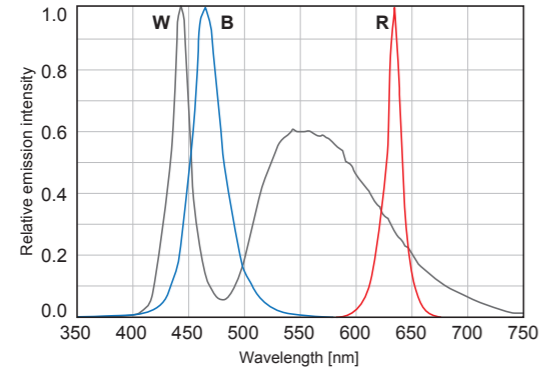


Technical Guide

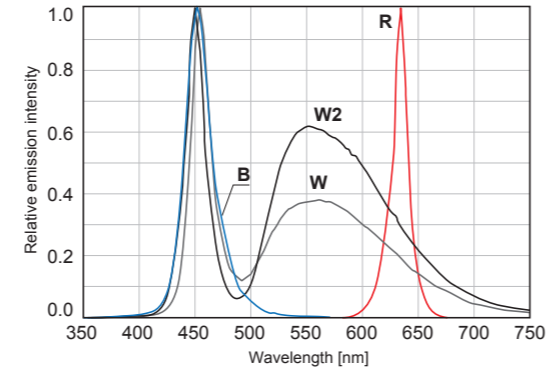
Emission spectrum diagram

The lamp emission spectrum distributions for each LED lighting series are displayed here. The horizontal axis is the wavelength (nm), and the vertical axis is the relative emission intensity. Data is for reference purposes. Please note that actual products will vary slightly.

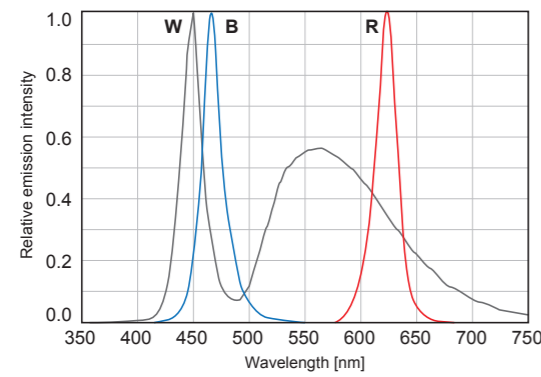
① OPR / OPR-SF



② OPB / OPB-S



③ OPF / OPX



④ OPS-S

