

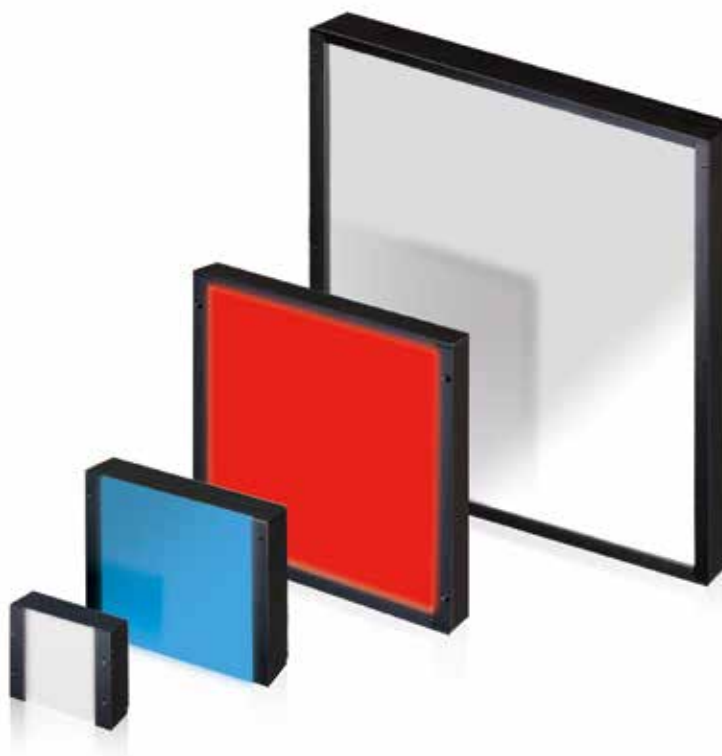


Sensing LED Backlight

OPF Series

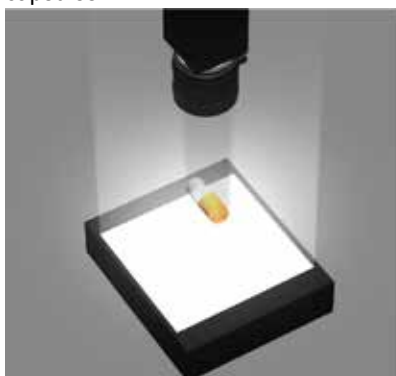
High-accuracy contour extraction and foreign object detection of transparent and metal workpieces

- 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”



Applications

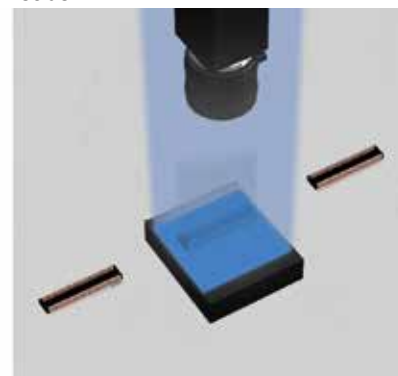
Appearance inspection of transparent capsules



Gear processing inspection



Dimension inspection of connector leads





Specifications

Narrow directivity angle type

Model			Weight [g]	Input Voltage	Power Consumption [W]	Outline Drawing
OPF-S27x27□-PS	Applicable	Applicable	35	12 VDC	2.2	①
OPF-S43x35□-PS			50		3.7	②
OPF-S51x51□-PS			60		5.2	③
OPF-S63x60□-PS			80		6.7	④
OPF-S77x77□-PS			130		9.0	⑤
OPF-S100x100□-PS			180		13.0	⑥

Diffuse type (backward-compatible)

Model			Weight [g]	Input Voltage	Power Consumption [W]	Outline Drawing
OPF-S27x27□-DF	Applicable	Applicable	35	12 VDC	2.2	①
OPF-S43x35□-DF			50		3.7	②
OPF-S51x51□-DF			60		5.2	③
OPF-S63x60□-DF			80		6.7	④
OPF-S77x77□-DF			130		9.0	⑤
OPF-S100x100□-DF			180		13.0	⑥

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

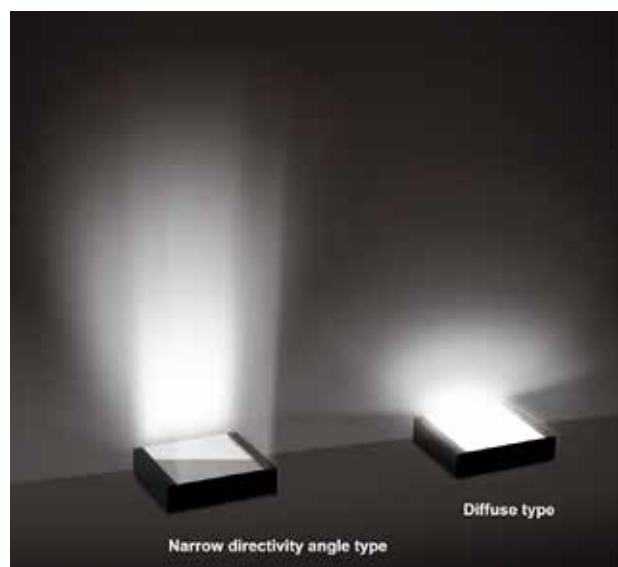
Ring	OPR
	OPR-SF
Bar	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers	OPPD-15
	OPPD-30
	OPPF
Options	CB/RCB

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.



Sensing Backlight — OPF Series



■ 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

Dimensional measurement of shiny metal shaft



OPF (diffuse type)



✗ Glare is present on the sides and threaded portions of the shaft.

OPF (diffuse type) + LC



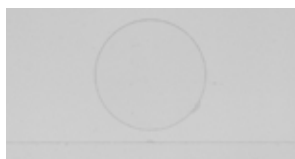
△ Overlaying an LC film will remove the glare but also darken the view.

OPF (narrow directivity angle type)

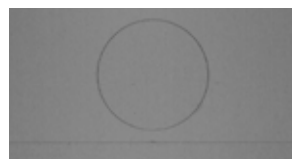


○ No glare is present, and brightness exceeds required amounts.

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

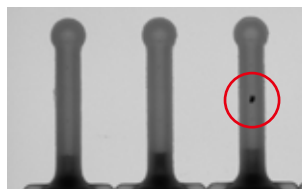
When detecting foreign matter within workpieces that scatter light, including non-woven fabric and cloudy plastic, a diffuse type is available as an upward-compatible product for conventional OPSM models. With highly uniform light that is 2.5 times brighter than conventional models, the diffuse type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

Monochrome camera

Foreign matter detection with cloudy plastic containers



OPF (diffuse type)



○ Black spots are crisp and defined.

OPF (narrow directivity angle type)



✗ Light is not transmitted, preventing black spots from being determined.



■ Selective use of directivity angles even with color camera

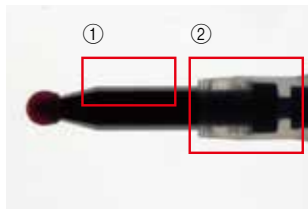
Color camera

Ballpoint pen core replacements

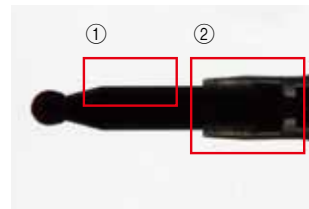


- ① The narrow directivity angle type captures contours on shiny cylindrical metal with no glare.
- ② The diffuse type's ability to permeate plastic with mixed metal-plastic areas makes it possible to capture even interior metal components.

OPF (diffuse type)



OPF (narrow directivity angle type)



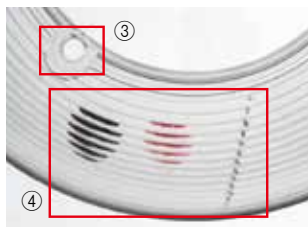
Color camera

Fresnel lens

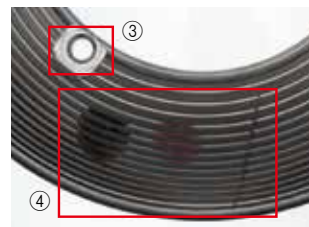


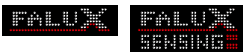
- ③ The narrow directivity angle type is capable of capturing clear images of the contours of the countersunk portions of screw holes.
- ④ Dirt and scratches are clearly displayed using the diffuse type and can be shown in separate red and black colors.

OPF (diffuse type)



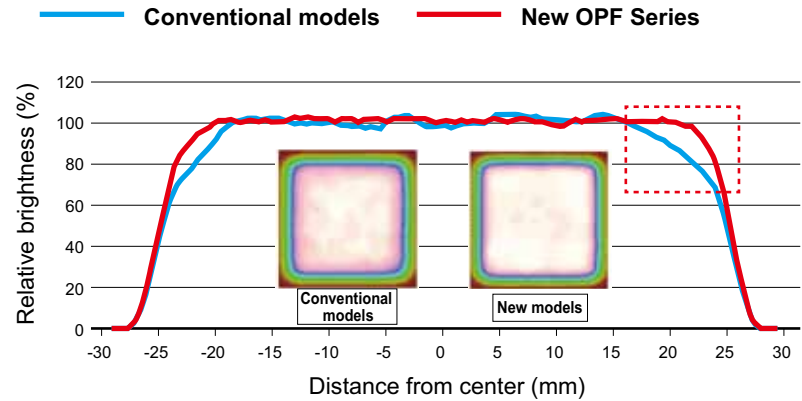
OPF (narrow directivity angle type)





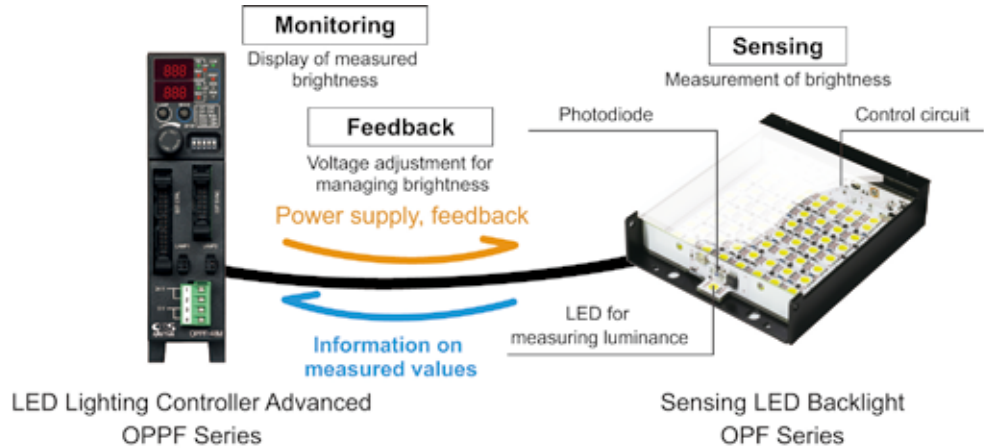
■ Correction of peripheral decreases in brightness

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.



Sensing lighting with automatic brightness management

OPF Series devices include CCS FASTUS’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” circuit to correct variations in brightness

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-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers	OPPD-15
	OPPD-30
	OPPF
Options	CB/RCB



Specifications

Illumination color	White	Blue	Red
Color temperature / Peak wavelength	6,500 K	470 nm	630 nm
Input voltage	12 VDC		
Degradation of LED	The brightness will drop by 10% (typical value) for accumulated time of 10,000 hours. Conditions: Light intensity setting = 100%, ambient environment = 30°C		
Classification (IEC62471: 2006)	Exempt group	Risk Group 1 (Low-Risk)	Exempt group
Regulations/standards	Conforms to 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-S51x51	5
TCSR-OPF-S63x60	10
TCSR-OPF-S77x77	15
TCSR-OPF-S100x100	25

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

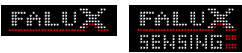


Model	Weight [g]
PL-OPF-S27x27	5
PL-OPF-S43x35	5
PL-OPF-S51x51	10
PL-OPF-S63x60	15
PL-OPF-S77x77	20
PL-OPF-S100x100	30

Bracket t1.5 mm



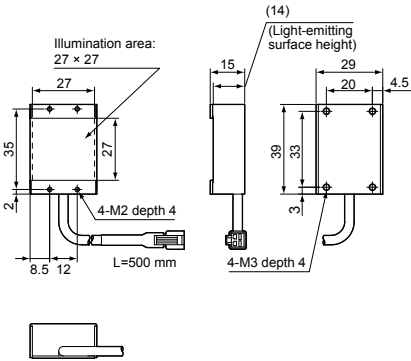
Model	Weight [g]	Outline Drawing
BKT-OPF-S27x27	10	7
BKT-OPF-S43x35	20	8
BKT-OPF-S51x51	25	9
BKT-OPF-S63x60	30	10
BKT-OPF-S77x77	40	11
BKT-OPF-S100x100	70	12



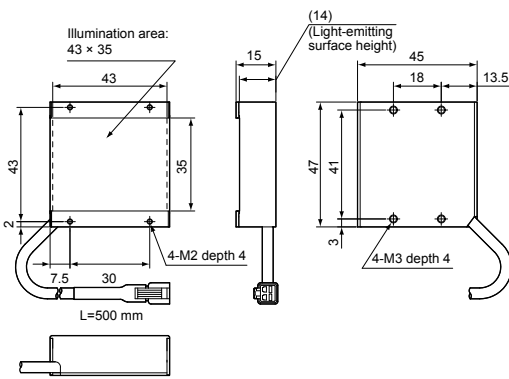
Dimensions (unit: mm)

Main unit

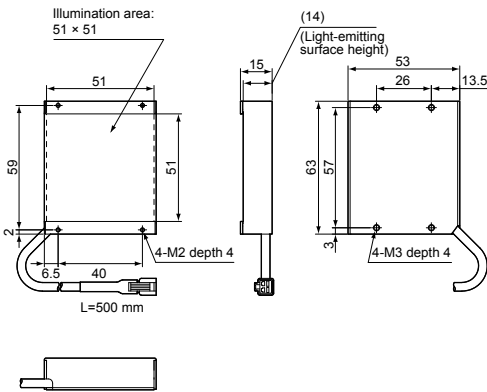
1 OPF-S27x27



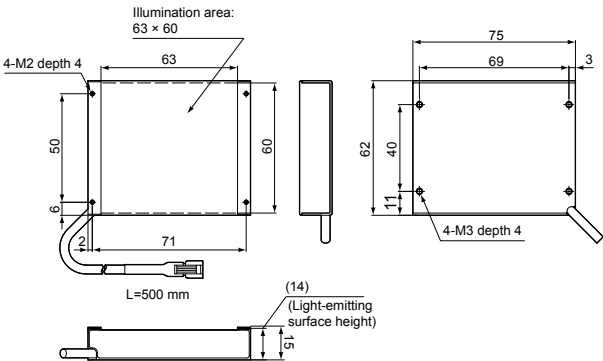
2 OPF-S43x35



3 OPF-S51x51



4 OPF-S63x60



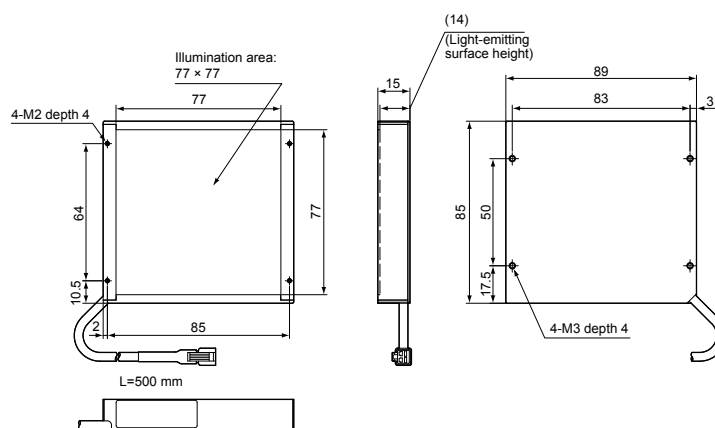
Ring	OPR
	OPR-SF
Bar	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers	OPPD-15
	OPPD-30
	OPPF
Options	CB/RCB



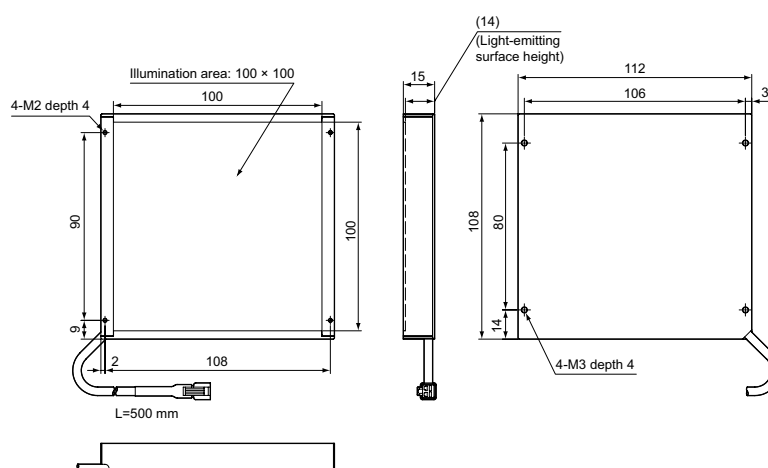
Dimensions

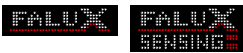
Main unit

⑤ OPF-S77x77



⑥ OPF-S100x100

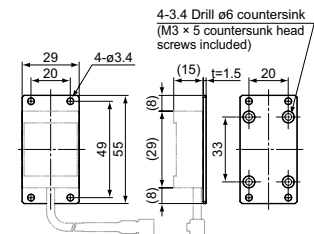




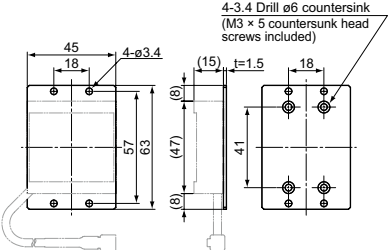
(unit: mm)

Bracket

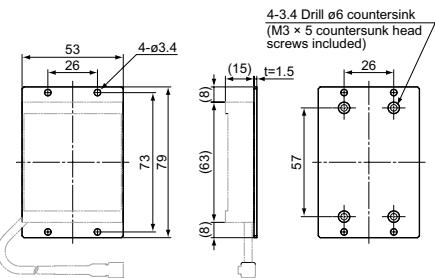
7 BKT-OPF-S27x27



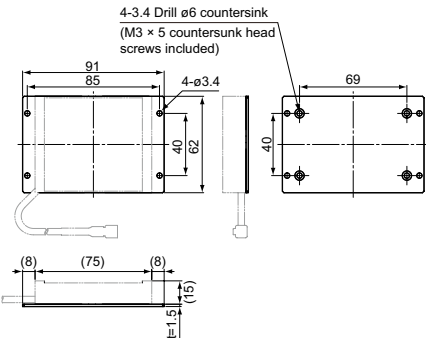
8 BKT-OPF-S43x35



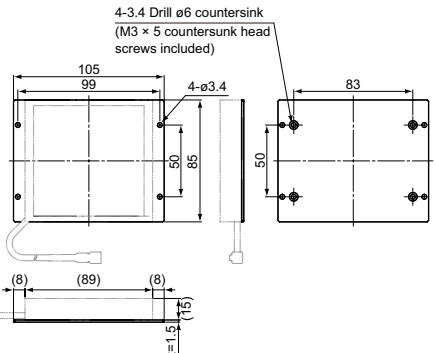
9 BKT-OPF-S51x51



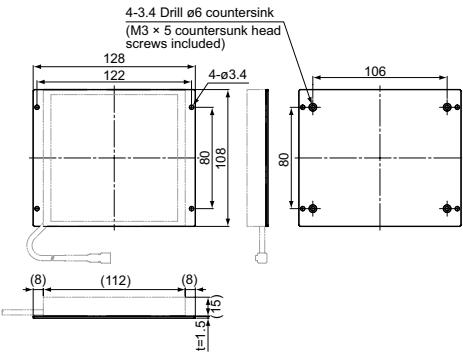
10 BKT-OPF-S63x60



11 BKT-OPF-S77x77



12 BKT-OPF-S100x100



Ring	OPR
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Options	CB/RCB