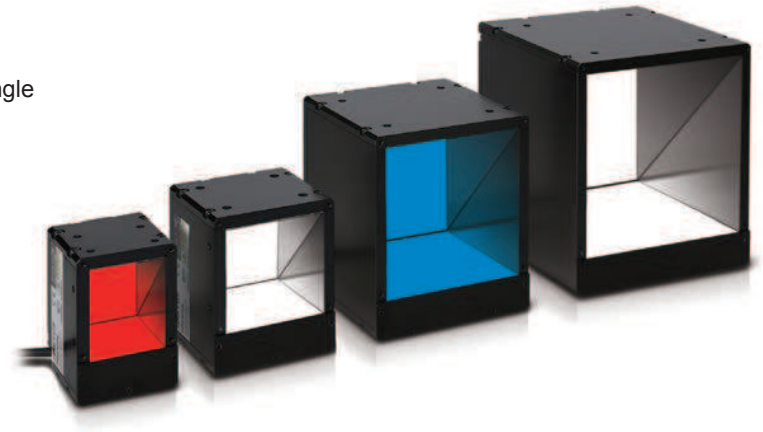
Sensing Coaxial Lighting

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



CE

Specifications

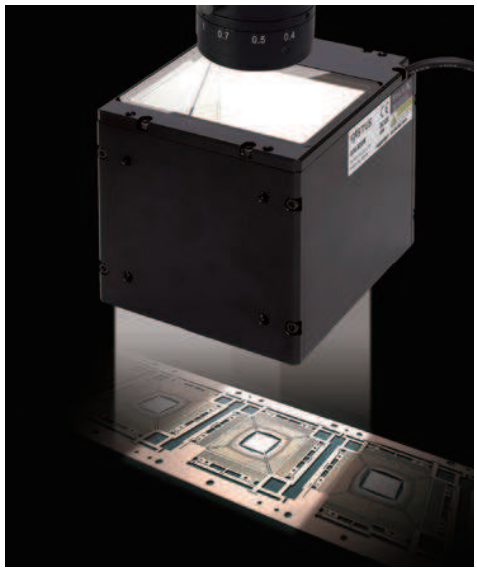
Model*1	FALUX SENSING *2	Illumination Area [mm]	Weight [g]	Strobe lighting overdriving by OPPF	Power Consumption [W]			Outline Drawing
					White	Blue	Red	
OPX-S35□	Monitoring/feedback	43 × 35	190	Supported	9.0		5.5	❶
OPX-S50□	Monitoring/feedback	51 × 51	280		13.0		8.5	❷
OPX-M75□	Monitoring only	77 ×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

*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.

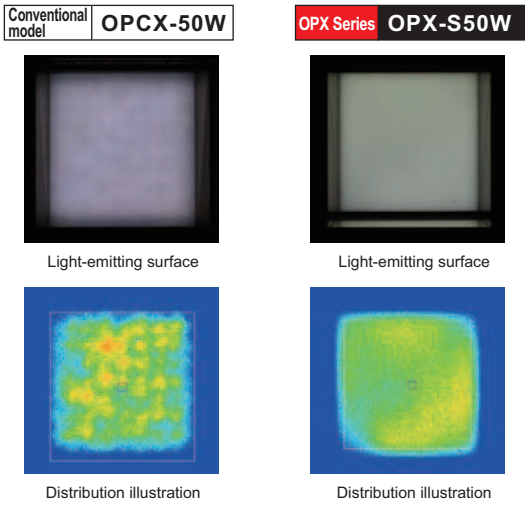
OPX Series coaxial lighting is equipped with a proprietary prism sheet on the surface light source for a narrow directivity angle (half-value angle of ±17°).
Suppressing the spread of light allows for high-brightness and highly directional illumination.
Also, highly uniform illumination becomes possible 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.

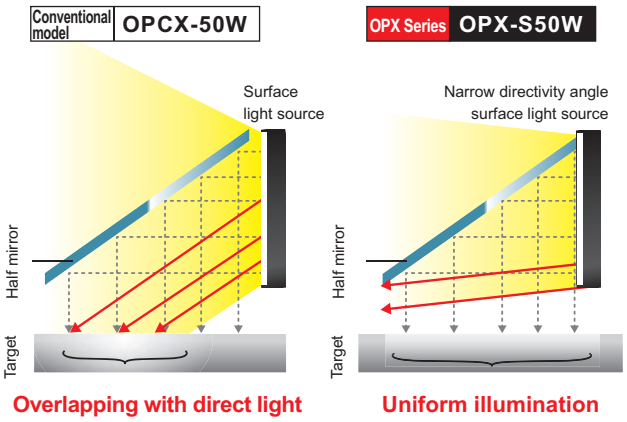
Distribution of brightness on the light-emitting surface



■ Highly uniform illumination with a narrow directivity angle

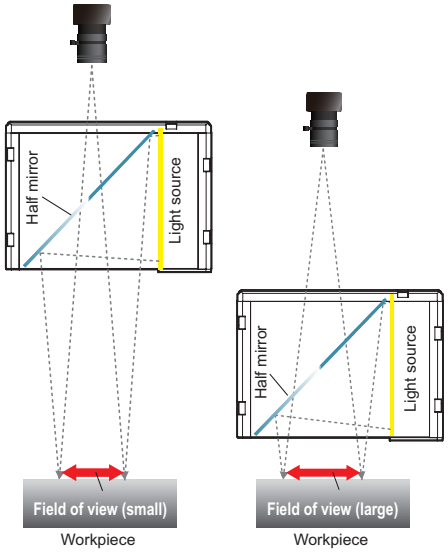
Coaxial lighting—which is a diffuse light source—light is applied from multiple directions relative to the object, making it difficult to recognize such aspects as fine scratches and slight differences in surface roughness. Also, with short-distance illumination, direct light from the light source overlaps 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



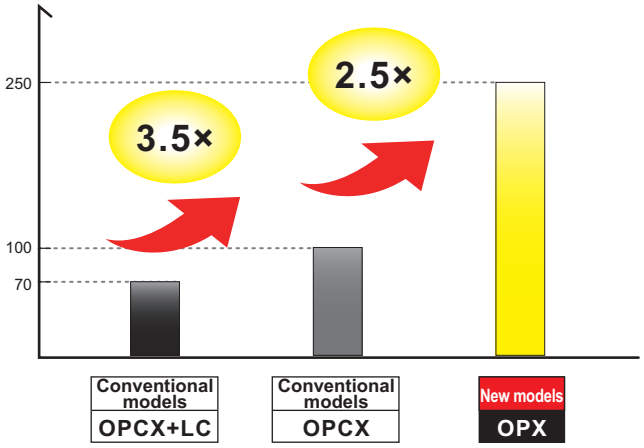
■ Ensure a wider illumination area

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.



■ 2.5 times brighter than conventional products

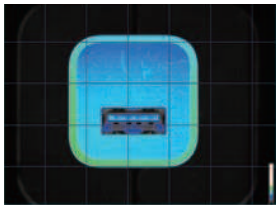
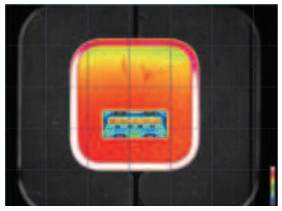
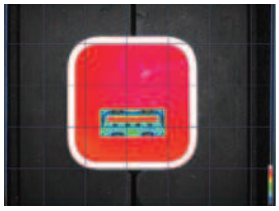
Thanks to the OPX Series' narrow directivity angle light source and aluminum casing offering excellent heat dissipation, brightness is 2.5 times that of conventional models.
Although parallelism and uniformity of conventional models can be improved by mounting LC (light control) film in front of the 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.



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

Conventional model **OPCX-50W** | OPX Series **OPX-S50W**

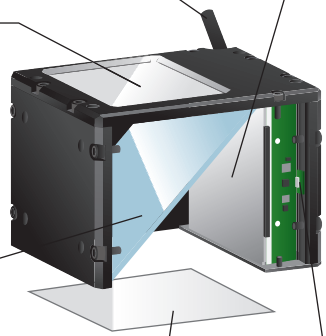
■ AC adapter for smartphones (plastic housing) *With coaxial light source applied from the top of the image

	40% dimming	100% dimming	40% dimming
Captured image			
Brightness distribution image			
	With 40% dimming, brightness is insufficient.	The top portion is dark and not uniform.	Lighting is sufficient and evenly distributed even at 40% dimming.

■ Electrolytic capacitor *With coaxial light source applied from the bottom of the image

Captured image			
	With 40% dimming, brightness is insufficient.	There is glare on the lower right side of the capacitor.	The black characters appear darker and crisper.

■ 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

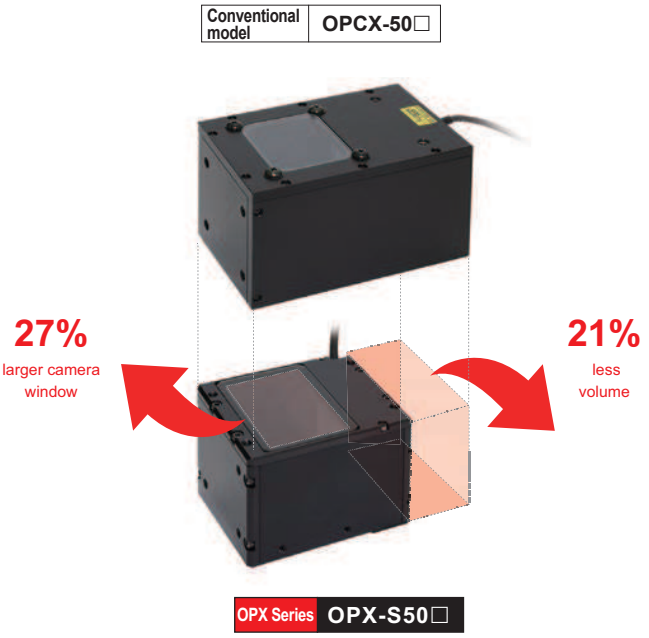
OPF Series lighting is equipped with a proprietary prism sheet on the diffusion plate for a narrow directivity angle (half-value angle of ±17°) equivalent to that offered by conventional light control (LC) film.

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

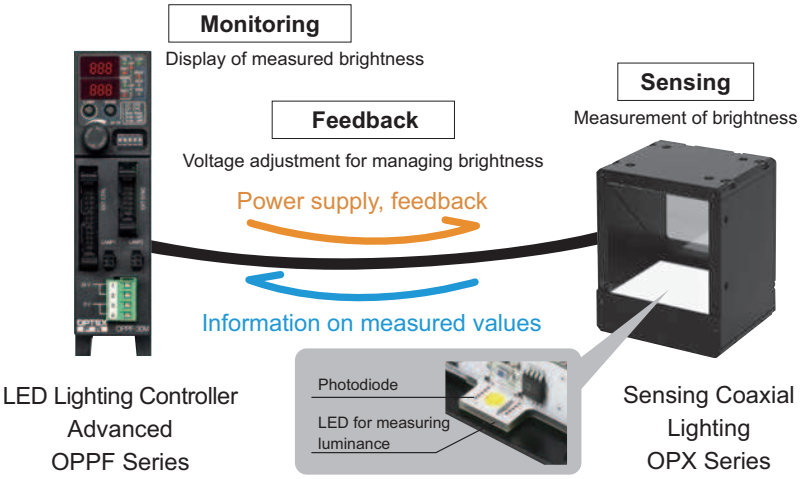
The adoption of SMD-type LEDs allows for a thin light source, greatly reducing the length of the housing. The volume of OPX Series devices is up to 21% less that of conventional models. This allows the lighting to be installed even with compact inspection stages with limited space. In addition, by providing 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
OPB Bar
OPB-S
OPF Backlight
OPX Coaxial
OPS-S Spot
OPPD Controllers / Power Supplies
OPPF
OPPCW
OP Options
MDF

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

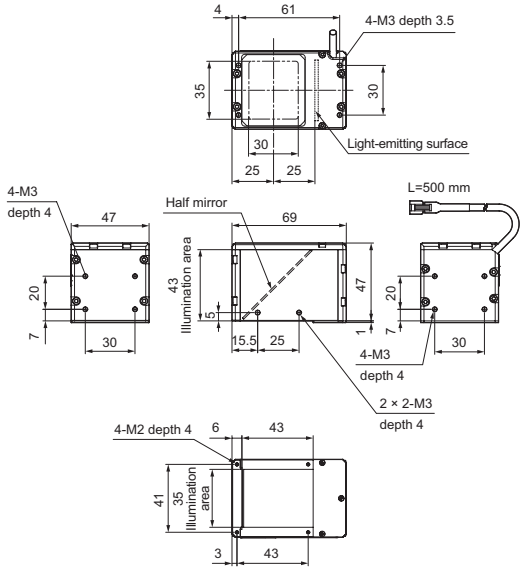
Scratch-resistant aperture cover (AR-coated)

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

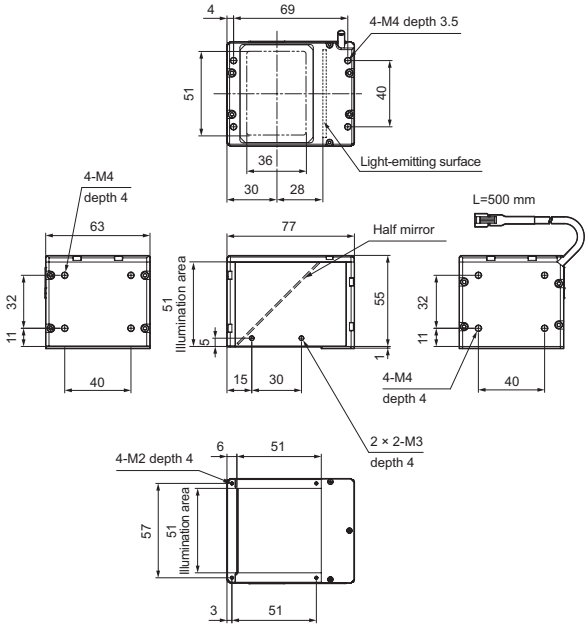
Dimensions

(unit: mm)

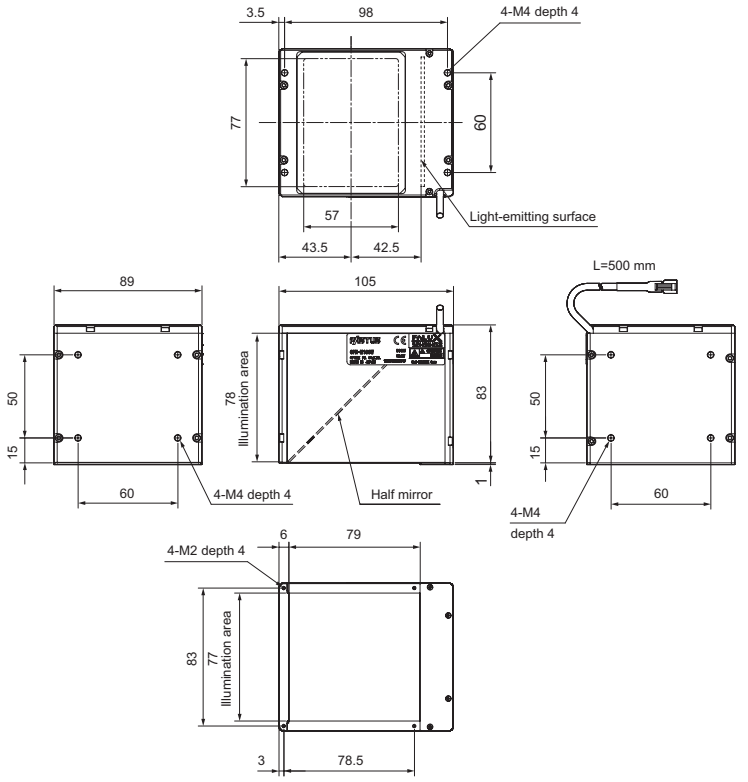
❶ OPX-S35_



❷ OPX-S50_



❸ OPX-M75_



❹ OPX-M100_