



## Sensing LED Backlight

# OPF Series

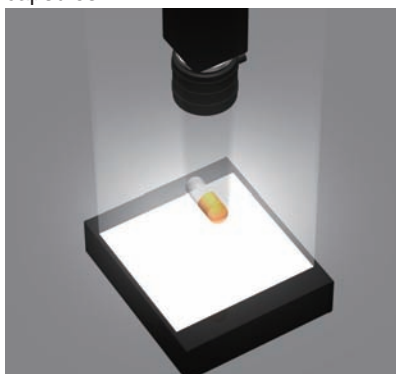
## High-accuracy contour extraction and foreign object detection of transparent and metal workpieces

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



### Applications

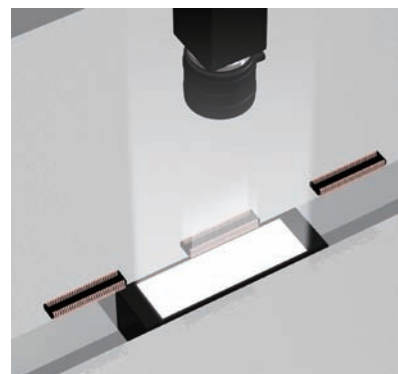
Appearance inspection of transparent capsules



Gear processing inspection



Dimension inspection of connector leads





## Specifications

### Narrow directivity angle type (50 × 15 mm)

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

### Narrow directivity angle type

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

### Diffuse type (backward-compatible)

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

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

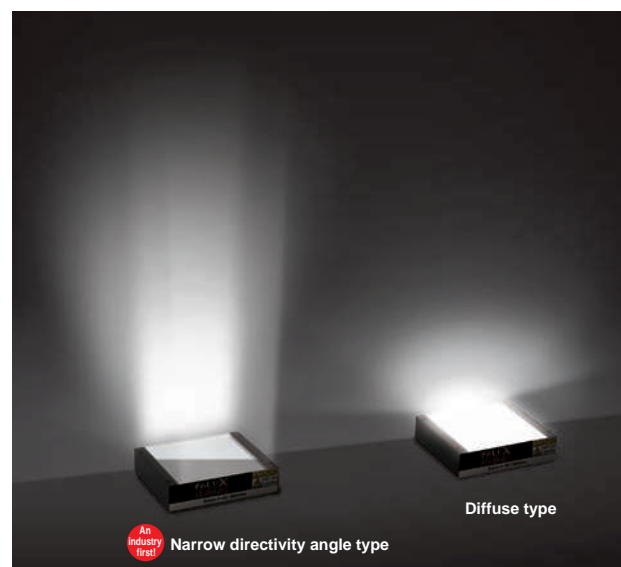
Ring	OPR
	OPR-SF
Bar	OPB
	OPB-S
Backlight	OPF
Coaxial	OPX
Spot	OPS-S
Controllers / Power Supplies	OPPD
	OPPF
	OPPCW
Options	OP
	MDF

## 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.

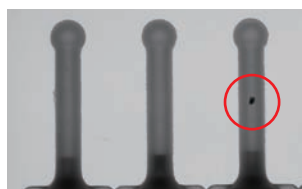


Monochrome camera

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

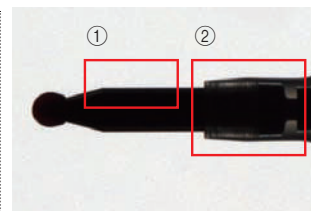
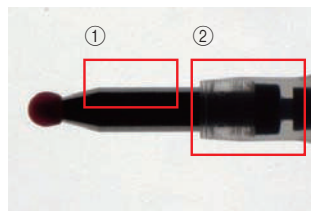
Ballpoint pen core replacements



- 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

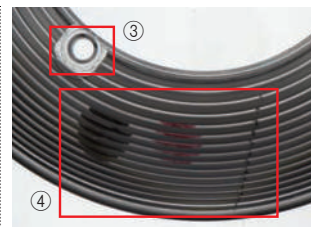
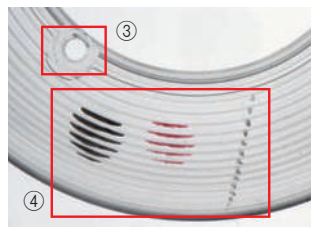
Fresnel lens



- 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)



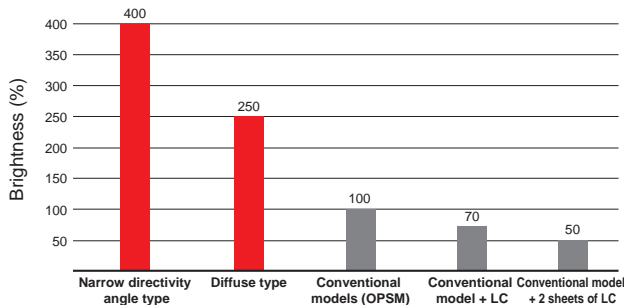


### ■ Up to 4 times brighter

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.

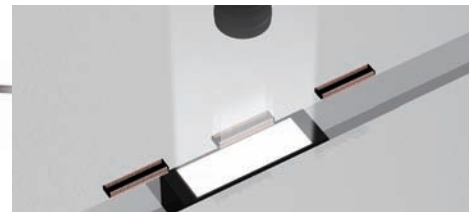


### ■ Introducing the 50 × 15 mm narrow directivity angle type specializing in contour extraction of rectangular workpieces

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.



Dimension inspection of connector leads

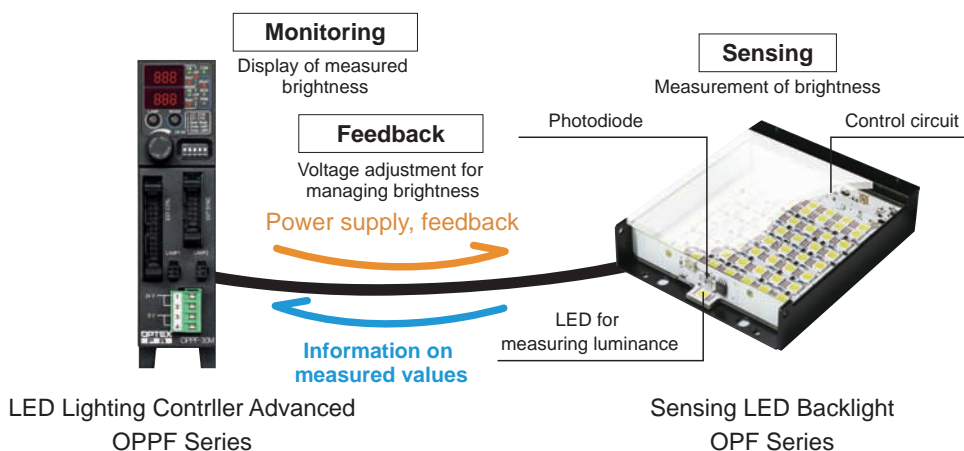


## Sensing lighting with automatic brightness management

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)

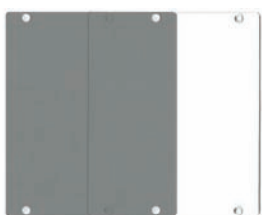


Model	Weight [g]
TCSR-OPF-S27x27	5
TCSR-OPF-S43x35	5
TCSR-OPF-50x15	5
TCSR-OPF-S51x51	5
TCSR-OPF-S63x60	10
TCSR-OPF-S77x77	15
TCSR-OPF-S100x100	25
TCSR-OPF-125x125	35
TCSR-OPF-150x150	45

## 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

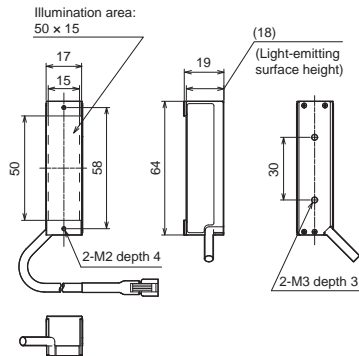


## Dimensions

(unit: mm)

### Main unit

#### ① OPF-50x15\_



#### 12V type

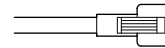
##### Details of Connector



1 plus + (White)  
2 minus - (Black)

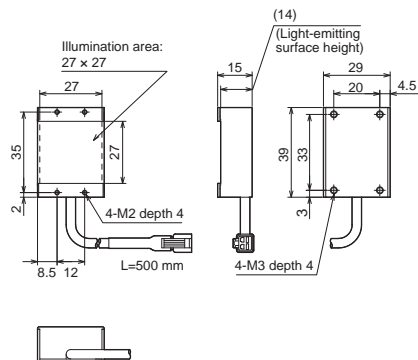
#### 24V type

##### Details of Connector

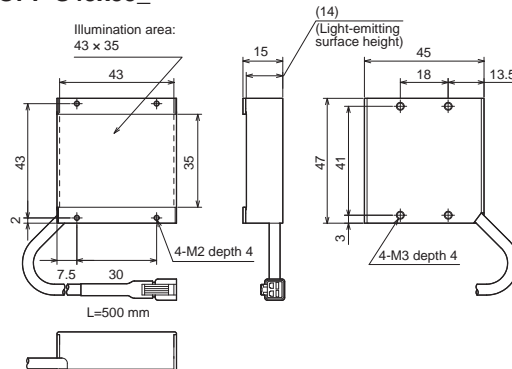


1 plus + (White)  
2 NC  
3 minus - (Black)

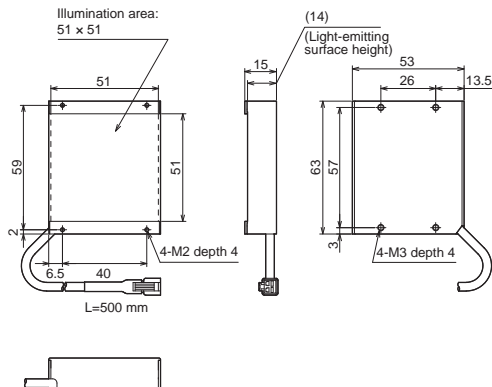
#### ② OPF-S27x27\_



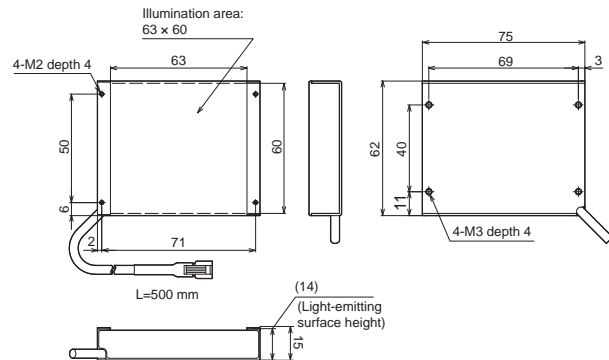
#### ③ OPF-S43x35\_



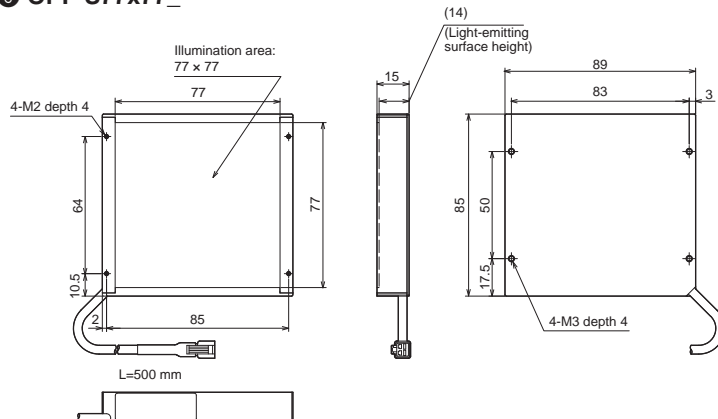
#### ④ OPF-S51x51\_



#### ⑤ OPF-S63x60\_



#### ⑥ OPF-S77x77\_



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

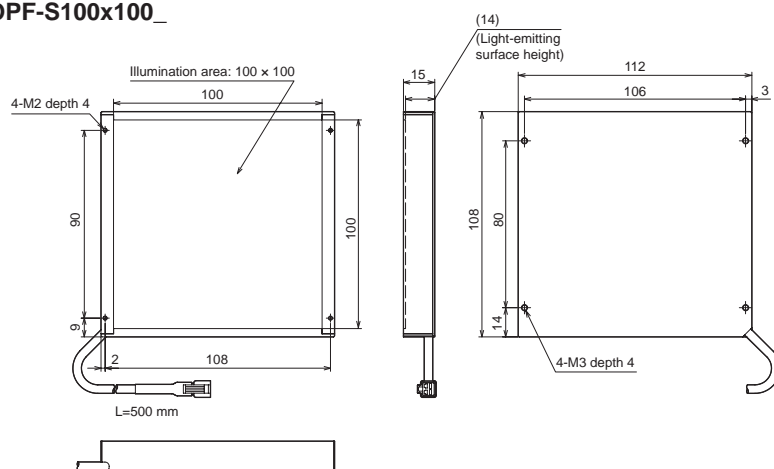




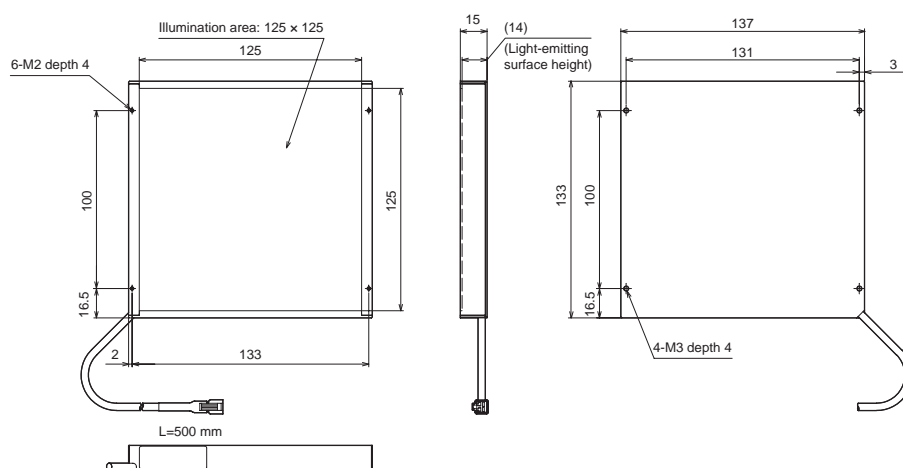
## Dimensions

### Main unit

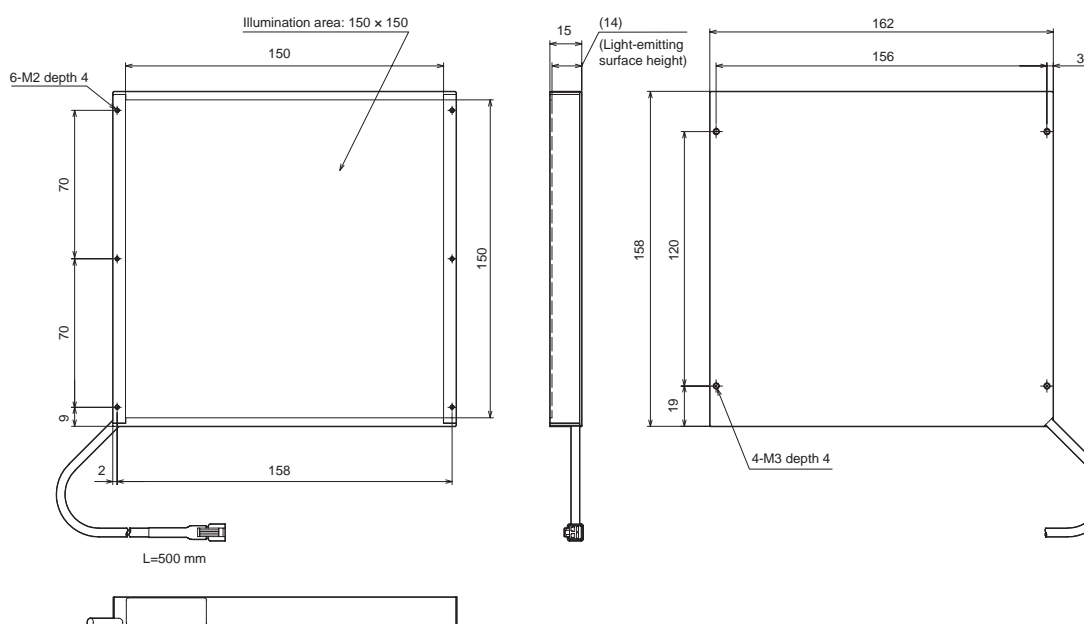
#### ⑦ OPF-S100x100\_



#### ⑧ OPF-125x125\_



#### ⑨ OPF-150x150\_

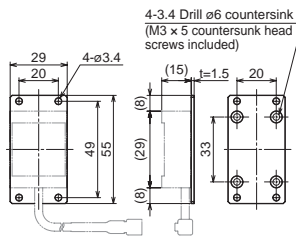




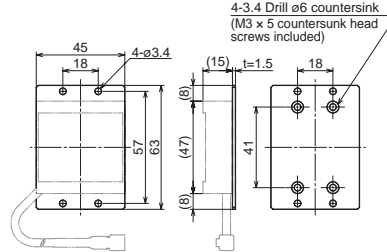
(unit: mm)

## Bracket

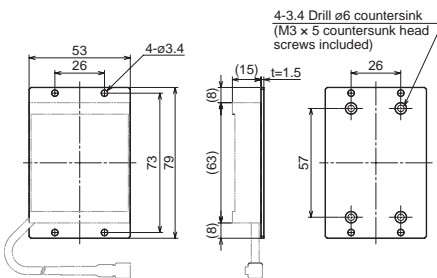
## ⑩ BKT-OPF-S27x27



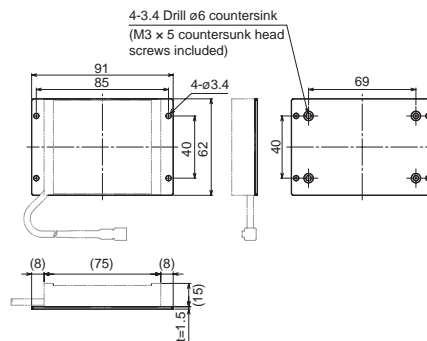
## ⑪ BKT-OPF-S43x35



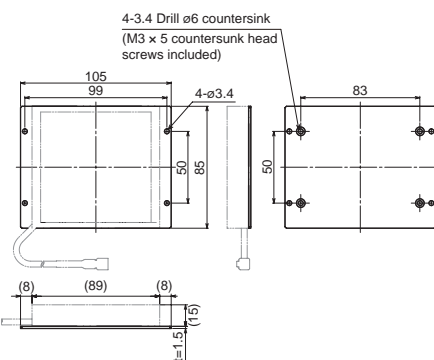
## ⑫ BKT-OPF-S51x51



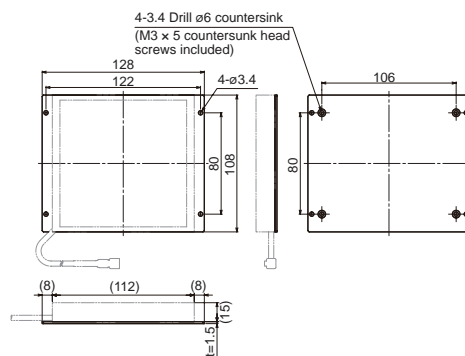
## ⑬ BKT-OPF-S63x60



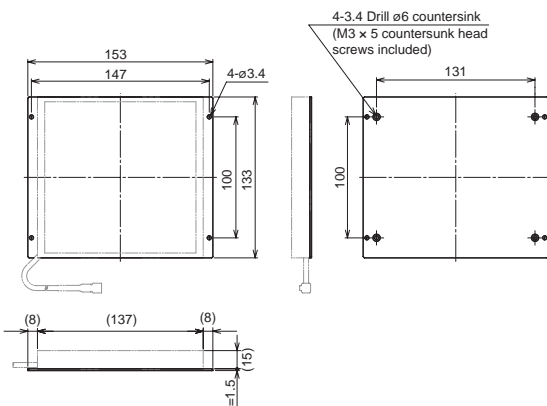
## ⑭ BKT-OPF-S77x77



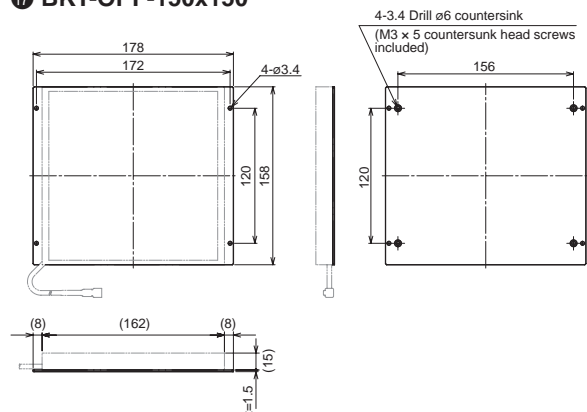
## ⑮ BKT-OPF-S100x100



## ⑯ BKT-OPF-125x125



## ⑰ BKT-OPF-150x150



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