



ULTRA-COMPACT PHOTOELECTRIC SENSOR

# EX-20

## SERIES

*Mountable with M3 screws!*



*Isn't this what you wanted?*



# The Solution to Your Requirements!



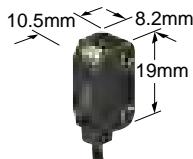
## Ultra-compact Photoelectric Sensor

# EX-20 SERIES

**Requirement 1** The sensor should be smaller.

**Solution** Miniaturization by using single chip optical IC!

The beam-receiving photodiode and the A/D conversion circuit have been fabricated on a single chip optical IC (full custom). Hence, in spite of its miniature size, it has a performance and reliability which is equal to or better than the conventional product.



**Requirement 2** Even though the sensor is small, it should have enough sensing range.

**Solution** Long sensing range realized!

The EX-20 series achieves long distance sensing [thru-beam type: 2m, retroreflective type: 200mm (when using the attached reflector), diffuse reflective type: 160mm], despite its miniature size. Hence, it is usable even on a wide conveyor.

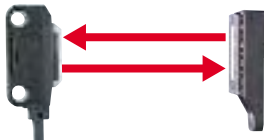
**Thru-beam type**

2m long sensing distance even in this size!



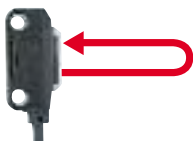
**Retroreflective type**

200mm long sensing distance even in this size!



**Diffuse reflective type**

160mm long sensing distance even in this size!



**Requirement 3** The beam spot should be clearly visible.

**Solution** Clear beam spot by using a red LED dot light source!

The emission area of a dot light source is smaller than that of a conventional LED flat light source, and it is possible to design a high power, narrow beam. Since a red LED dot light source is used, the red beam spot is clear even at a far place, so that alignment and confirmation of sensing position is easy. Further, since the thru-beam type, too, incorporates a visible narrow beam, it can also reliably detect small parts, such as, chip components, lead frames, etc.

EX-28



Setting distance 80mm

EX-26



φ 1mm spot

Setting distance 10mm

φ 5mm spot

**Requirement 4** Sensitivity should be adjustable, even though the sensor is small.

**Solution** Incorporates a sensitivity adjuster even in this size!

The sensor incorporates a sensitivity adjuster in spite of its miniature size. It is convenient when you need fine adjustment. Further, the receiver of the thru-beam, side sensing type sensor incorporates an operation mode switch which can change the output operation.



# Ease of Use Pursued by Designing from the User's Viewpoint!

## 2 types for suitable mounting

Two types, side sensing type and front sensing type are available. Select depending on the place of mounting.

Side sensing type



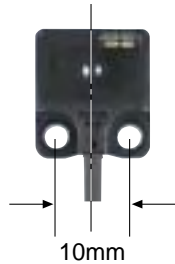
Front sensing type



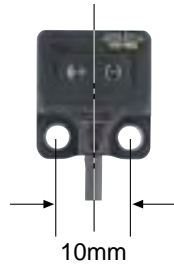
## Identical size

Front sensing type of thru-beam type and diffuse reflective type have identical appearance. Moreover, since the mounting holes are symmetrical with respect to the beam axis center, the design becomes easy.

Thru-beam type



Diffuse reflective type



## Mounting section reinforced

It can be tightened with M3 screws. Moreover, metal inserts have been provided in the mounting holes so that the product is not damaged even in case of excess tightening.

Side sensing type



Front sensing type



Metal inserts

Mountable with M3 screws

## Globally Usable!

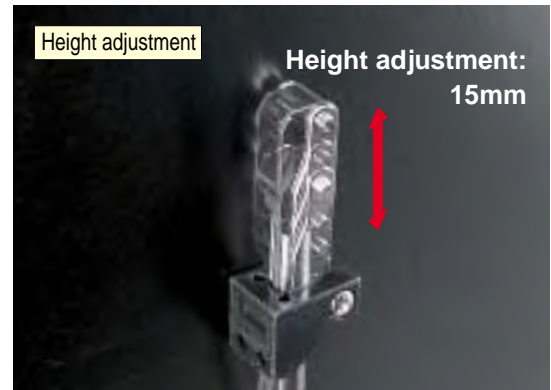
PNP output type which is much in demand in Europe is now available. Of course, it conforms to the EMC directive.

## Bright Two-color Indicator

Bright two-color indicator has been incorporated in all types.

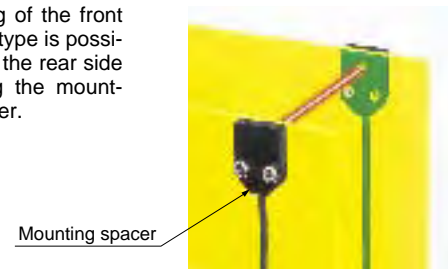
## Universal sensor mounting bracket is available

Universal sensor mounting bracket (for thru-beam side sensing type EX-23□ only) which can freely adjust the height and the angle of the sensor is available.



## Mounting spacer for front sensing type is available

Mounting of the front sensing type is possible from the rear side by using the mounting spacer.



Mounting spacer

## Waterproof IP67

The sensor can be hosed down because of its IP67 construction. Further, the sensor mounting bracket is also made of stainless steel.

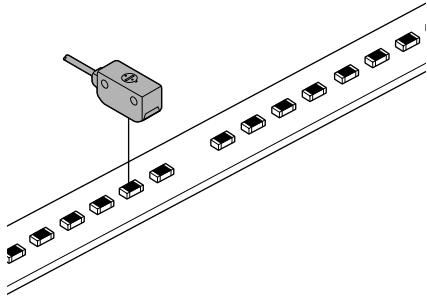
## Slit Mask Is Available

φ0.5mm round slit mask and 0.5×3mm rectangular slit mask are available for both side sensing type and front sensing type.

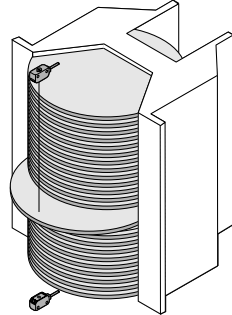
# EX-20

## APPLICATIONS

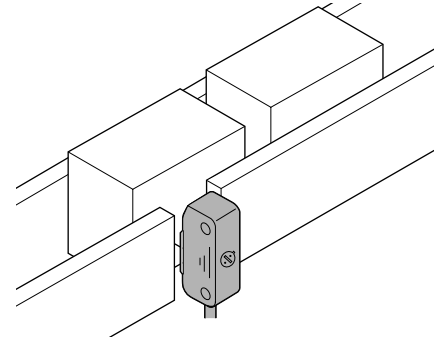
Detecting chip components



Checking protrusion of wafer



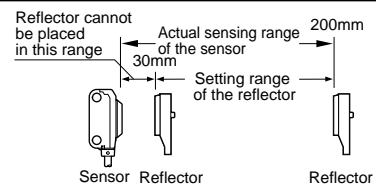
Sensing objects from an opening



## ORDER GUIDE

Type	Appearance	Sensing range	Model No.	Output	Output operation	
Thru-beam	Front sensing	1m	EX-21A	NPN open-collector transistor	Light-ON	
			EX-21A-PN	PNP open-collector transistor		
			EX-21B	NPN open-collector transistor	Dark-ON	
			EX-21B-PN	PNP open-collector transistor		
Side sensing	2m	EX-23	NPN open-collector transistor	Switchable either Light-ON or Dark-ON		
		EX-23-PN	PNP open-collector transistor			
Retroreflective	Side sensing	30 to 200mm (Note 1)	EX-29A	NPN open-collector transistor	Light-ON	
			EX-29A-PN	PNP open-collector transistor		
			EX-29B	NPN open-collector transistor	Dark-ON	
			EX-29B-PN	PNP open-collector transistor		
Diffuse reflective	Side sensing	5 to 160mm (Note 2)	EX-22A	NPN open-collector transistor	Light-ON	
			EX-22A-PN	PNP open-collector transistor		
			EX-22B	NPN open-collector transistor	Dark-ON	
			EX-22B-PN	PNP open-collector transistor		
Convergent reflective	Diffused light type	2 to 25mm (Convergent point: 10mm)	EX-24A	NPN open-collector transistor	Light-ON	
			EX-24A-PN	PNP open-collector transistor		
	Small spot light type		6 to 14mm (Convergent point: 10mm)	EX-26A	NPN open-collector transistor	Light-ON
				EX-26A-PN	PNP open-collector transistor	
Side sensing	Dark-ON	EX-26B		NPN open-collector transistor		
		EX-26B-PN		PNP open-collector transistor		
Narrow-view reflective	Long distance spot light type	45 to 115mm	EX-28A	NPN open-collector transistor	Light-ON	
			EX-28A-PN	PNP open-collector transistor		
			EX-28B	NPN open-collector transistor	Dark-ON	
			EX-28B-PN	PNP open-collector transistor		

Notes: 1) The sensing range of the retroreflective type sensor is specified for the RF-200 reflector. Further, the sensing range is the possible setting range for the reflector. The sensor can detect an object less than 30mm away. However, if the reflector is set 100mm or less away, the sensing object should be opaque.  
 2) In case of using this product at a sensing range of 50mm or less, take care that the sensitivity adjustment range becomes extremely narrow.



# EX-20

## ORDER GUIDE

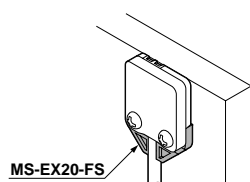
### Package without reflector

EX-29□ is also available without the reflector **RF-200** when ordering this type, add suffix '-Y' at the end of the model No.  
EX.: EX-29□-Y is EX-29□ without the reflector.

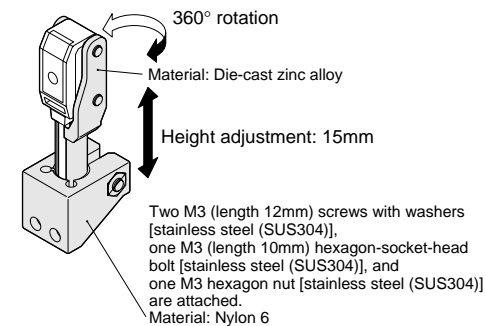
## OPTIONS

Designation	Model No.	Description	
Round slit mask (For thru-beam type sensor only)	For front sensing type	<b>OS-EX20-05</b> (Slit size $\phi 0.5\text{mm}$ )	Slit on one side • Sensing range: 200mm • Min. sensing object: $\phi 2.6\text{mm}$ Slit on both sides • Sensing range: 40mm • Min. sensing object: $\phi 0.5\text{mm}$
		<b>OS-EX20E-05</b> (Slit size $\phi 0.5\text{mm}$ )	Slit on one side • Sensing range: 350mm • Min. sensing object: $\phi 3\text{mm}$ Slit on both sides • Sensing range: 70mm • Min. sensing object: $\phi 0.5\text{mm}$
	For side sensing type		<b>OS-EX20-05 × 3</b> (Slit size $0.5 \times 3\text{mm}$ )
		<b>OS-EX20E-05 × 3</b> (Slit size $0.5 \times 3\text{mm}$ )	Slit on one side • Sensing range: 800mm • Min. sensing object: $\phi 3\text{mm}$ Slit on both sides • Sensing range: 400mm • Min. sensing object: $0.5 \times 3\text{mm}$
Reflector (For retroreflective type sensor only)	<b>RF-210</b>	• Sensing range: 50 to 400mm • Min. sensing object: $\phi 30\text{mm}$	
Reflector mounting bracket	<b>MS-RF21-1</b>	Protective mounting bracket for <b>RF-210</b> Protects the reflector from damage and maintains alignment.	
Reflective tape (For retroreflective type sensor only)	<b>RF-11</b>	• Ambient temperature: $-25$ to $+50^\circ\text{C}$ • Ambient humidity: 35 to 85% RH Notes: i) Keep the tape free from stress. If it is pressed too much, its capability may deteriorate. ii) Do not cut the tape. It will deteriorate the sensing performance.	
	<b>RF-12</b>	• Sensing range: 70 to 200mm • Sensing range: 60 to 280mm	
Sensor mounting bracket	<b>MS-EX20-1</b>	Back angled mounting bracket for front sensing type (The thru-beam type sensor needs two brackets.)	
	<b>MS-EX20-2</b>	Foot angled mounting bracket for side sensing type (The thru-beam type sensor needs two brackets.)	
	<b>MS-EX20-3</b>	L-shaped mounting bracket for front sensing type (The thru-beam type sensor needs two brackets.)	
	<b>MS-EX20-4</b>	Back angled mounting bracket for side sensing type (The thru-beam type sensor needs two brackets.)	
Universal sensor mounting bracket (For EX-23(-PN) only)	<b>MS-EX20-5</b>	It can adjust the height and the angle of the sensor. (Two brackets are needed.)	
Mounting spacer (For front sensing type only)	<b>MS-EX20-FS</b>	It is used when mounting the front sensing type from the rear side. (One set consists of 10 Nos.)	

### Mounting spacer • MS-EX20-FS



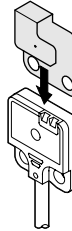
### Universal sensor mounting bracket • MS-EX20-5



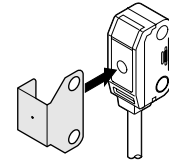
### Round slit mask

Fitted on the front face of the sensor with one-touch.

#### • OS-EX20-05



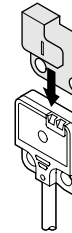
#### • OS-EX20E-05



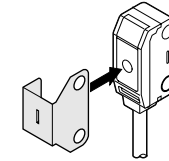
### Rectangular slit mask

Fitted on the front face of the sensor with one-touch.

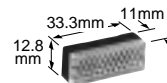
#### • OS-EX20-05 × 3



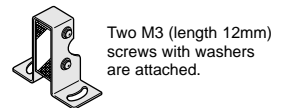
#### • OS-EX20E-05 × 3



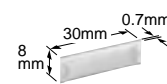
### Reflector • RF-210



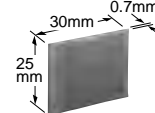
### Reflector mounting bracket • MS-RF-21-1



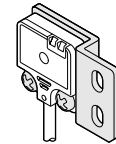
### Reflective tape • RF-11



### • RF-12

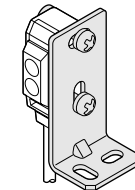


### Sensor mounting bracket • MS-EX20-1



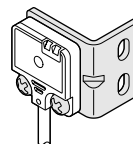
Material: Stainless steel (SUS304)  
Two M3 (length 5mm) pan head screws [stainless steel (SUS304)] are attached.

### • MS-EX20-2



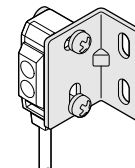
Material: Stainless steel (SUS304)  
Two M3 (length 14mm) screws with washers [stainless steel (SUS304)] are attached.

### • MS-EX20-3



Material: Stainless steel (SUS304)  
Two M3 (length 5mm) pan head screws [stainless steel (SUS304)] are attached.

### • MS-EX20-4



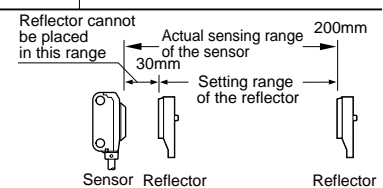
Material: Stainless steel (SUS304)  
Two M3 (length 14mm) screws with washers [stainless steel (SUS304)] are attached.

# EX-20

## SPECIFICATIONS

Item	Model No.	Type	Thru-beam		Retroreflective	Diffuse reflective	Convergent reflective		Narrow-view reflective	
			Front sensing	Side sensing	Side sensing	Side sensing	Front sensing	Side sensing	Side sensing	
			Light-ON	EX-21A(-PN)	EX-23(-PN) (Note 1)	EX-29A(-PN)	EX-22A(-PN)	EX-24A(-PN)	EX-26A(-PN)	EX-28A(-PN)
Dark-ON	EX-21B(-PN)		EX-29B(-PN)	EX-22B(-PN)	EX-24B(-PN)	EX-26B(-PN)	EX-28B(-PN)			
Sensing range			1m	2m	30 to 200mm (Note 2)	5 to 160mm (Note 3) (with 200 × 200mm white non-glossy paper)	2 to 25mm (Conv. point: 10mm) (with 50 × 50mm white non-glossy paper)	6 to 14mm (Conv. point: 10mm) (with 50 × 50mm white non-glossy paper, spot diameter φ1mm at setting distance 10mm)	45 to 115mm (with 100 × 100mm white non-glossy paper, spot diameter φ5mm at setting distance 80mm)	
Sensing object			Min. φ2.6mm opaque object (Setting distance between emitter and receiver: 1m)	Min. φ3mm opaque object (Setting distance between emitter and receiver: 2m)	φ15mm or more opaque or translucent object (Note 2)	Opaque, translucent or transparent object	Min. φ0.1mm copper wire (Setting distance: 10mm)	Min. φ0.1mm copper wire (Setting distance: 10mm)	Opaque, translucent or transparent object (Min. φ1mm copper wire at setting distance 80mm)	
Hysteresis			—			15% or less of operation distance				
Repeatability (Perpendicular to sensing axis)			0.05mm or less		0.5mm or less	0.3mm or less	0.1mm or less (Setting distance: 10mm)	0.05mm or less (Setting distance: 10mm)	0.3mm or less	
Supply voltage			12 to 24V DC ± 10% Ripple P-P 10% or less							
Current consumption			Emitter: 10mA or less, Receiver: 15mA or less		20mA or less					
Output			(NPN output type) NPN open-collector transistor • Maximum sink current: 50mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)			(PNP output type) PNP open-collector transistor • Maximum source current: 50mA • Applied voltage: 30V DC or less (between output and +V) • Residual voltage: 1V or less (at 50mA source current) 0.4V or less (at 16mA source current)				
	Utilization category		DC-12 or DC-13							
	Short-circuit protection		Incorporated							
Response time			0.5ms or less							
Operation indicator			Orange LED (lights up when the output is ON) (thru-beam type: located on the receiver)							
Stability indicator			Green LED (lights up under stable light received condition or stable dark condition), located on the receiver		Green LED (lights up under stable light received condition or stable dark condition)					
Sensitivity adjuster			—	Continuously variable adjuster, located on the emitter	Continuously variable adjuster	—	Continuously variable adjuster			
Operation mode switch			—	Located on the receiver	—					
Environmental resistance	Pollution degree		3 (Industrial environment)							
	Protection		IP67 (IEC)							
	Ambient temperature		- 25 to + 55°C (No dew condensation or icing allowed), Storage: - 30 to + 70°C							
	Ambient humidity		35 to 85% RH, Storage: 35 to 85% RH							
	Ambient illuminance		Sunlight: 10,000ℓx at the light-receiving face, Incandescent light: 3,000ℓx at the light-receiving face							
	EMC		Emission: EN50081-2, Immunity: EN50082-2							
	Voltage withstandability		1,000V AC for one min. between all supply terminals connected together and enclosure							
	Insulation resistance		20MΩ or more with 250V DC megger between all supply terminals connected together and enclosure							
	Vibration resistance		10 to 500Hz frequency, 3mm amplitude (20G max.) in X, Y and Z directions for two hours each							
	Shock resistance		500m/s <sup>2</sup> acceleration (50G approx.) in X, Y and Z directions for three times each							
Emitting element			Red LED (modulated)							
Material			Enclosure: Polyethylene terephthalate, Lens: Polyallylate							
Cable			0.1mm <sup>2</sup> 3-core (thru-beam type sensor emitter: 2-core) cabtyre cable, 2m long							
Cable extension			Extension up to total 50m is possible with 0.3mm <sup>2</sup> , or more, cable (thru-beam type: both emitter and receiver).							
Weight			Emitter: 20g approx., Receiver: 20g approx.		20g approx.					
Accessories			—	Adjusting screwdriver: 1 No.	RF-200 (Reflector): 1 No. Adjusting screwdriver: 1 No.	Adjusting screwdriver: 1 No.	—	Adjusting screwdriver: 1 No.		

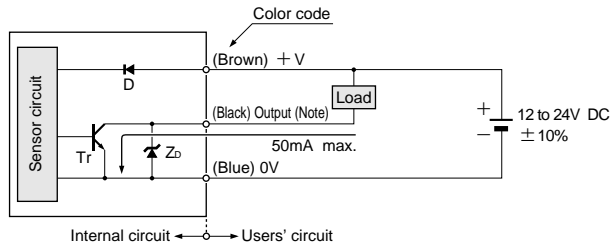
- Notes: 1) Either Light-ON or Dark-ON can be selected by the operation mode switch (located on the receiver).  
 2) The sensing range and the sensing object of the retroreflective type sensor is specified for the **RF-200** reflector. Further, the sensing range is the possible setting range for the reflector. The sensor can detect an object less than 30mm away. However, if the reflector is set 100mm or less away, the sensing object should be opaque.  
 3) In case of using this product at a sensing range of 50mm or less, take care that the sensitivity adjustment range becomes extremely narrow.



## I/O CIRCUIT AND WIRING DIAGRAMS

### NPN output type

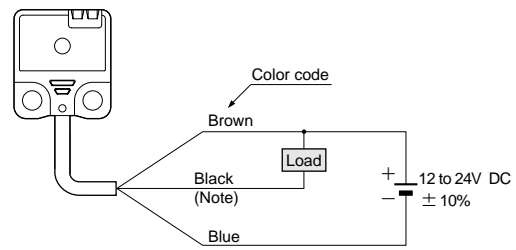
#### I/O circuit diagram



Note: The thru-beam type sensor emitter does not incorporate the output.

Symbols...D: Reverse supply polarity protection diode  
Zb: Surge absorption zener diode  
Tr: NPN output transistor

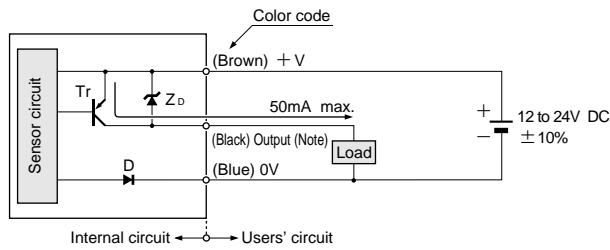
#### Wiring diagram



Note: The thru-beam type sensor emitter does not incorporate the black wire.

### PNP output type

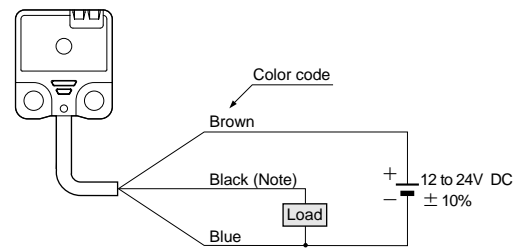
#### I/O circuit diagram



Note: The thru-beam type sensor emitter does not incorporate the output.

Symbols...D: Reverse supply polarity protection diode  
Zb: Surge absorption zener diode  
Tr: PNP output transistor

#### Wiring diagram

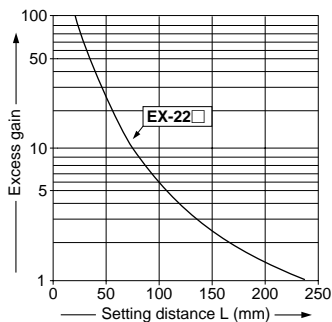
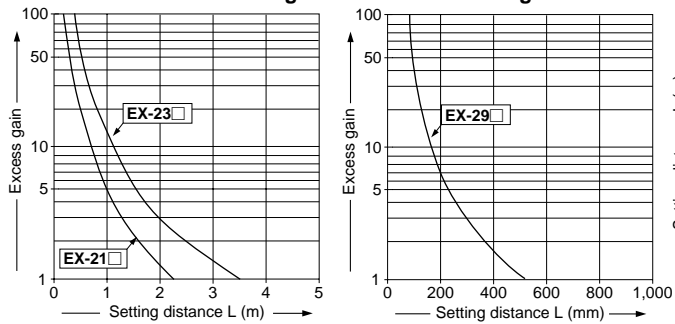


Note: The thru-beam type sensor emitter does not incorporate the black wire.

## SENSING CHARACTERISTICS (TYPICAL)

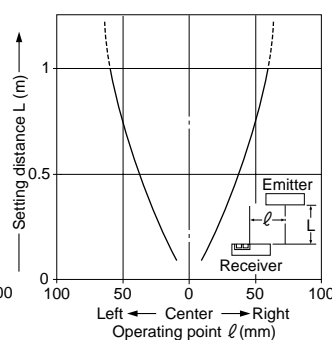
EX-21 □ EX-23 □  
EX-29 □ EX-22 □

#### Correlation between setting distance and excess gain

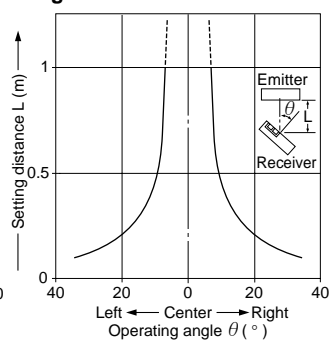


EX-21 □ Thru-beam type

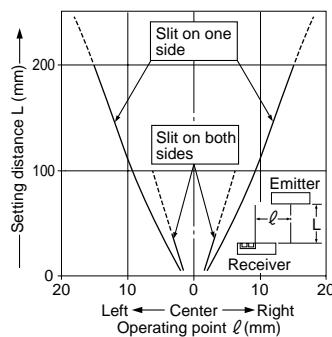
#### Parallel deviation



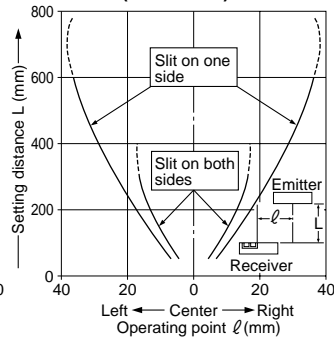
#### Angular deviation



#### Parallel deviation with round slit masks (φ0.5mm)



#### Parallel deviation with rectangular slit masks (0.5 × 3mm)

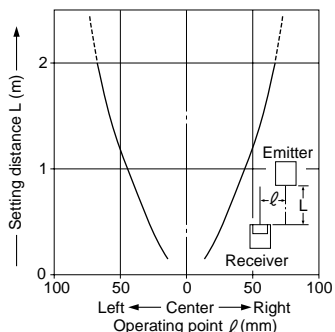


# EX-20

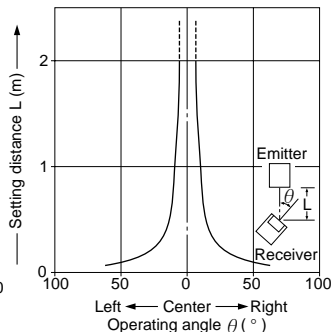
## SENSING CHARACTERISTICS (TYPICAL)

### EX-23 Thru-beam type

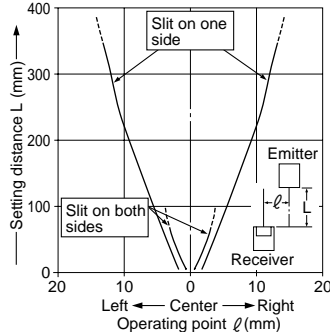
Parallel deviation



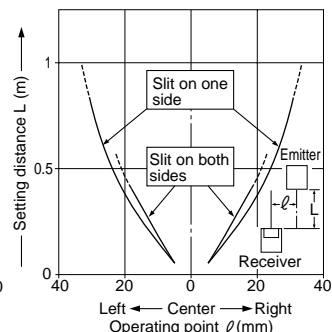
Angular deviation



Parallel deviation with round slit masks ( $\phi 0.5\text{mm}$ )

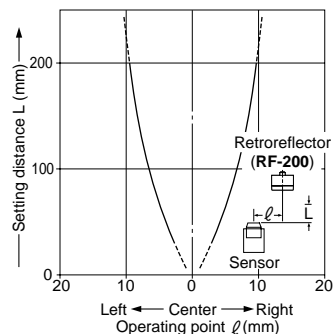


Parallel deviation with rectangular slit masks ( $0.5 \times 3\text{mm}$ )

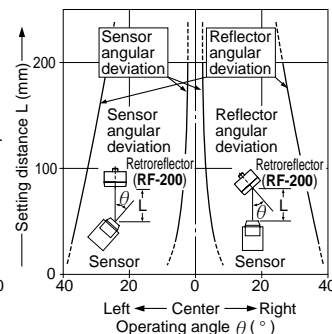


### EX-29 Retroreflective type

Parallel deviation

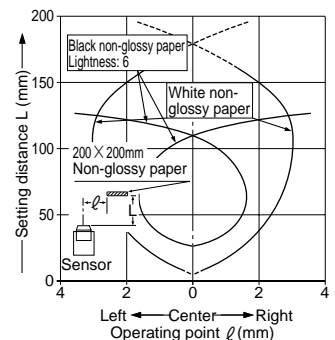


Angular deviation

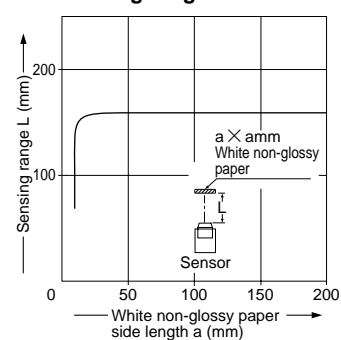


### EX-22 Diffuse reflective type

Sensing field



Correlation between object size and sensing range

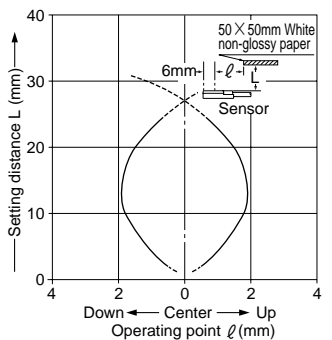
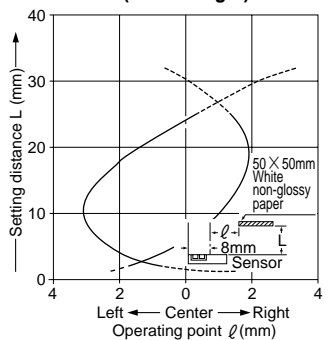


As the object size becomes smaller than the standard size (white non-glossy paper  $200 \times 200\text{mm}$ ), the sensing range shortens, as shown in the left graph.

### EX-24 Convergent reflective type

Sensing field

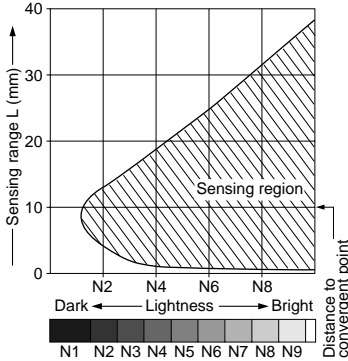
• Horizontal (left and right) direction • Vertical (up and down) direction



## SENSING CHARACTERISTICS (TYPICAL)

### EX-24 Convergent reflective type

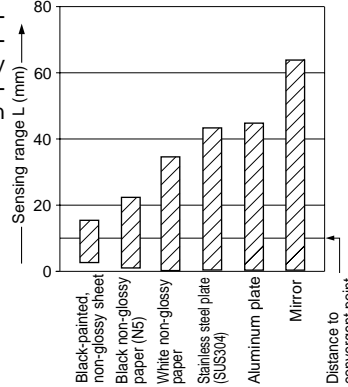
#### Correlation between lightness and sensing range



The sensing region is represented by oblique lines in the left figure. However, the sensitivity should be set with enough margin because of slight variation in products.

(Lightness shown on the left may differ slightly from the actual object condition.)

#### Correlation between material (50 X 50mm) and sensing range

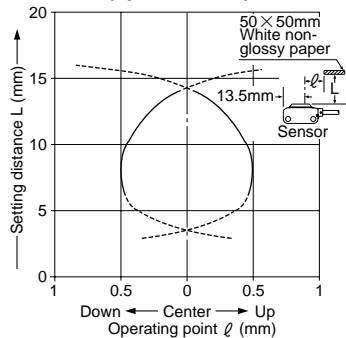
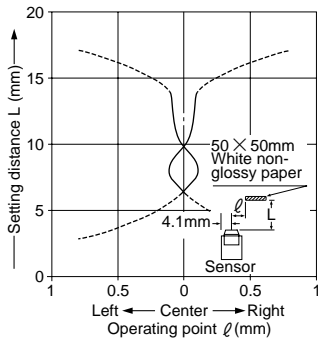


The bars on the graph indicate the sensing range with each object. However, there is a variation in the sensing range depending on the product. Further, if there is a reflective object (conveyor, etc.) in the background of the sensing object, since it affects the sensing, separate it by more than twice the sensing range shown in the left graph.

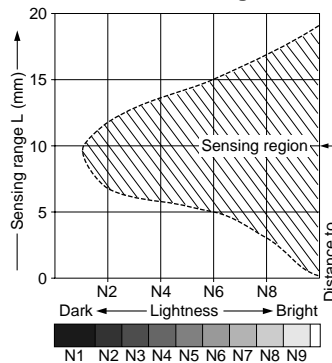
### EX-26 Convergent reflective type

#### Sensing field

- Horizontal (left and right) direction
- Vertical (up and down) direction



#### Correlation between lightness and sensing range

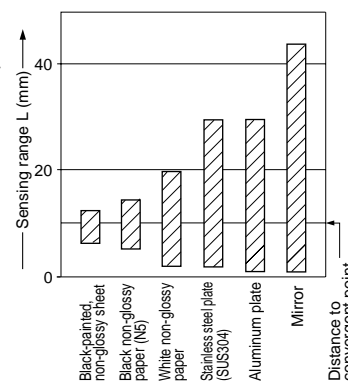


The sensing region is represented by oblique lines in the left figure. However, the sensitivity should be set with enough margin because of slight variation in products.

(The graph is drawn for the maximum sensitivity setting.)

(Lightness shown on the left may differ slightly from the actual object condition.)

#### Correlation between material (50 X 50mm) and sensing range

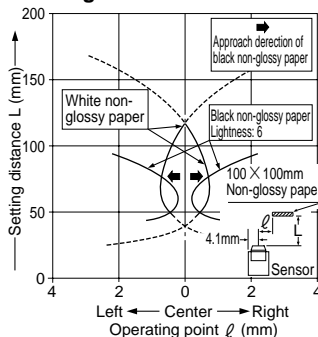


The bars on the graph indicate the sensing range with each object. However, there is a variation in the sensing range depending on the product. Further, if there is a reflective object (conveyor, etc.) in the background of the sensing object, since it affects the sensing, separate it by more than twice the sensing range shown in the left graph, or adjust the sensitivity adjuster.

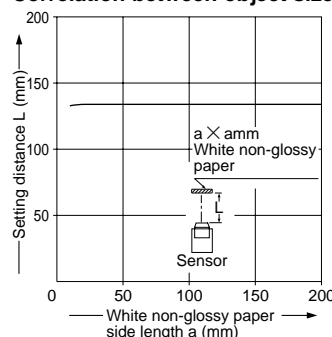
(The graph is drawn for the maximum sensitivity setting.)

### EX-28 Narrow-view reflective type

#### Sensing field



#### Correlation between object size and sensing range



As the object size becomes smaller than the standard size (white non-glossy paper 100 X 100mm), the sensing range shortens, as shown in the left graph.

# EX-20

## PRECAUTIONS FOR PROPER USE

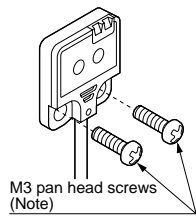


This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

### Mounting

- Mount using M3 screws. The tightening torque should be 0.5N·m or less.

#### Front sensing



Note: When mounting the front sensing type sensor, use M3 pan head screws without washers, etc.

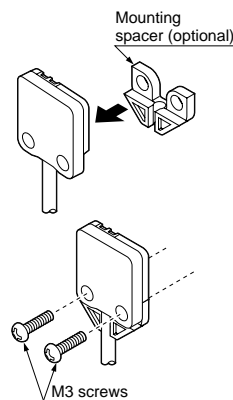
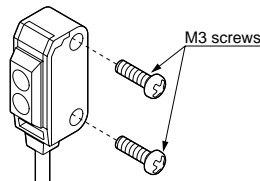
- When mounting the front sensing type from the backside, fit the mounting spacer **MS-EX20-FS** and fix with screws.

#### Mounting method

- ① Fit the mounting spacer on the sensor.

- ② Align the mounting holes of the mounting spacer and the sensor and mount with M3 screws. The tightening torque should be 0.5N·m or less.

#### Side sensing



### Sensitivity adjustment (Side sensing type only)

Step	Sensitivity adjuster	Description
①		Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position (• mark).
②		In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point <b>(A)</b> where the sensor enters the 'Light' state operation.
③		In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters the 'Light' state operation and then bring it back to confirm point <b>(B)</b> where the sensor just returns to the 'Dark' state operation. (If the sensor does not enter the 'Light' state operation even when the sensitivity adjuster is turned fully clockwise, this extreme position is point <b>(B)</b> .)
④		The position at the middle of points <b>(A)</b> and <b>(B)</b> is the optimum sensing position.

Notes: 1) Use the accessory adjusting screwdriver to turn the adjuster slowly. Turning with excessive strength will damage the adjuster.  
2) In case of using **EX-22** at a sensing distance of 50mm or less, take care that the sensitivity adjustment range becomes extremely narrow.

### Operation mode switch (EX-23 only)

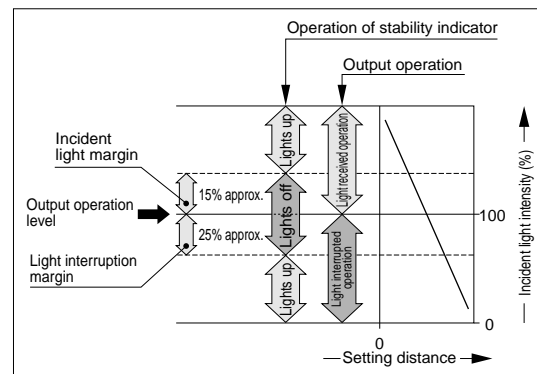
Switch position	Description
	Light-ON mode is obtained when the operation mode switch (located on the receiver) is turned fully clockwise (L side).
	Dark-ON mode is obtained when the operation mode switch (located on the receiver) is turned fully counterclockwise (D side).

Note: Operation mode switch should be turned fully till it stops.

### Stability indicator

- The stability indicator (green) lights up when the incident signal light intensity has sufficient margin with respect to the operation level.

If the incident light intensity level is such that the stability indicator lights up, stable sensing can be done without the light received operation and the light interrupted operation being affected by a change in ambient temperature or supply voltage.



### Wiring

- Make sure to carry out the wiring in the power supply off condition.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.

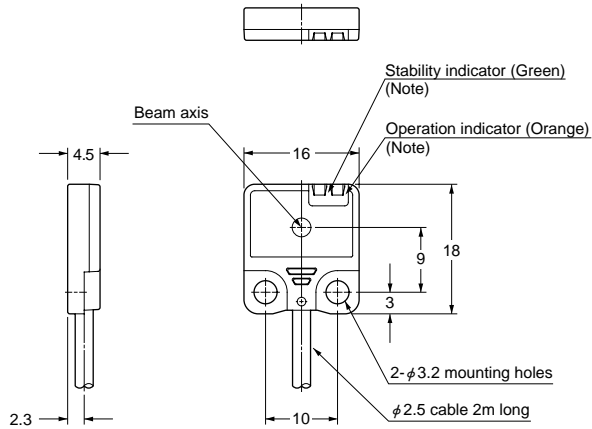
### Others

- Do not use during the initial transient time (50ms) after the power supply is switched on.
- Avoid dust, dirt, and steam.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- If sensors are mounted close together and the ambient temperature is near the maximum rated value, provide for enough heat radiation/ventilation.

# EX-20

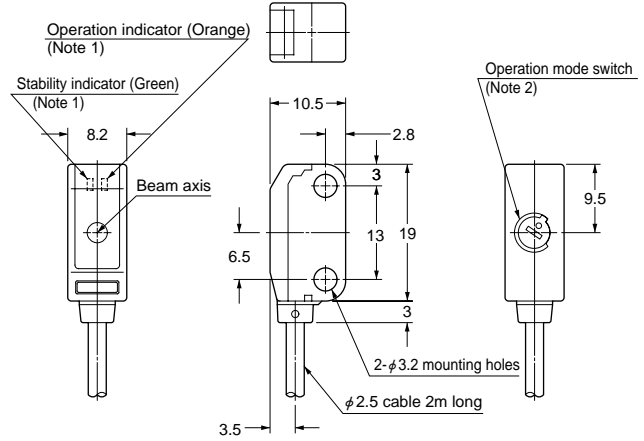
## DIMENSIONS (Unit: mm)

**EX-21** □ Sensor



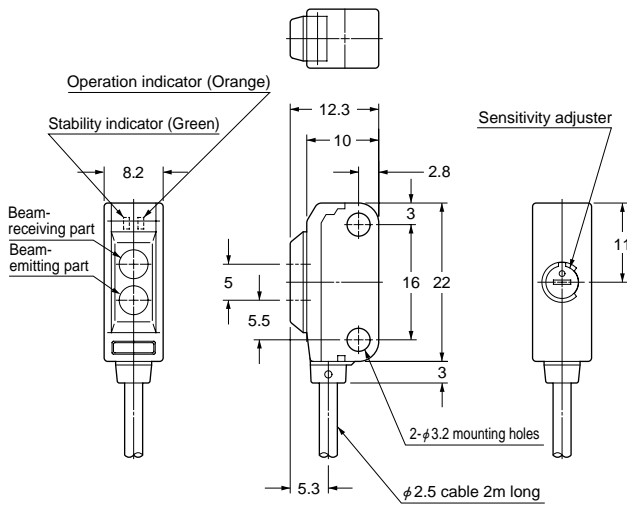
Note: Not incorporated on the emitter.

**EX-23** □ Sensor

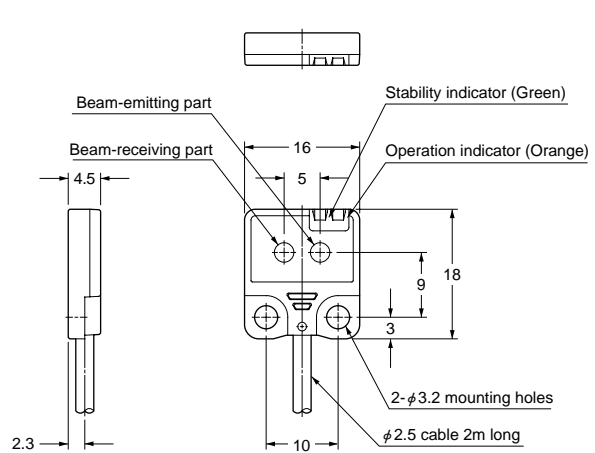


Note: 1) Not incorporated on the emitter.  
2) It is the sensitivity adjuster on the emitter.

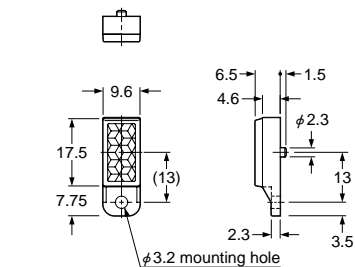
**EX-29** □ **EX-22** □  
**EX-26** □ **EX-28** □ Sensor



**EX-24** □ Sensor

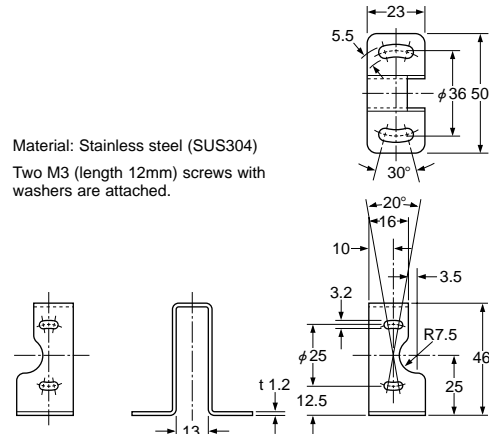


**RF-200** Reflector (Accessory for the retroreflective type sensor)



Material: Acrylic (Reflector)  
ABS (Base)

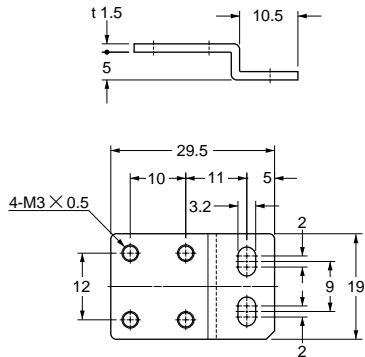
**MS-RF21-1** Reflector mounting bracket for RF-210 (Optional)



Material: Stainless steel (SUS304)  
Two M3 (length 12mm) screws with washers are attached.

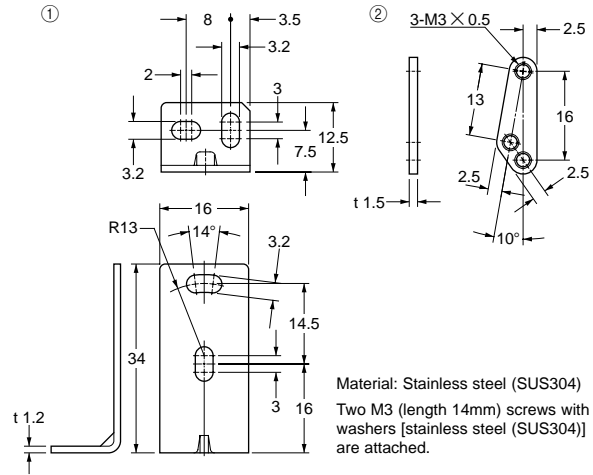
# EX-20 SERIES ULTRA-COMPACT PHOTOELECTRIC SENSOR

**MS-EX20-1** Sensor mounting bracket (Optional)



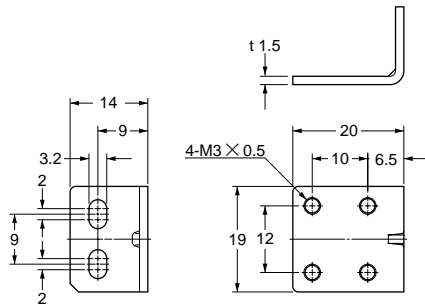
Material: Stainless steel (SUS304)  
Two M3 (length 5mm) pan head screws [stainless steel (SUS304)] are attached.

**MS-EX20-2** Sensor mounting bracket (Optional)



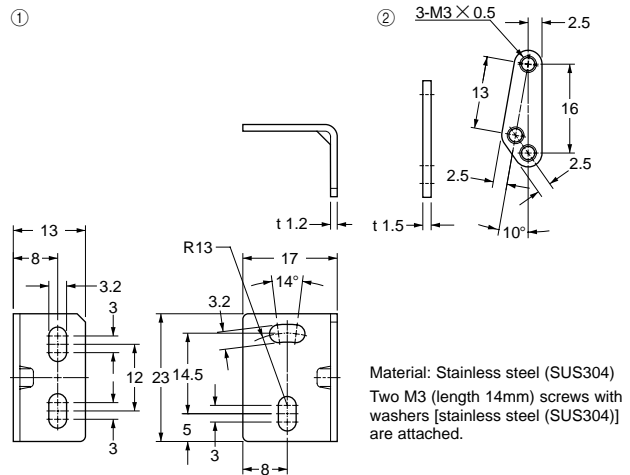
Material: Stainless steel (SUS304)  
Two M3 (length 14mm) screws with washers [stainless steel (SUS304)] are attached.

**MS-EX20-3** Sensor mounting bracket (Optional)



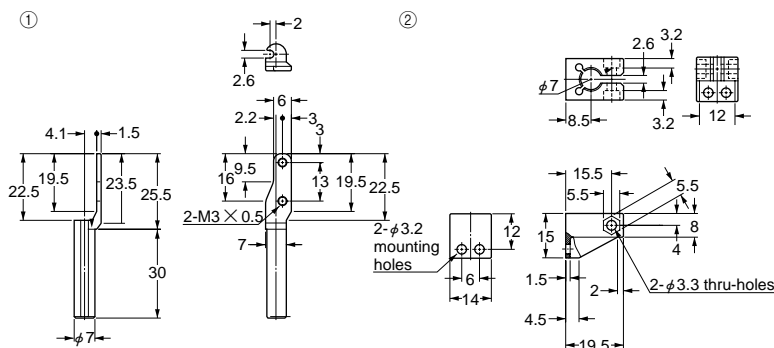
Material: Stainless steel (SUS304)  
Two M3 (length 5mm) pan head screws [stainless steel (SUS304)] are attached.

**MS-EX20-4** Sensor mounting bracket (Optional)



Material: Stainless steel (SUS304)  
Two M3 (length 14mm) screws with washers [stainless steel (SUS304)] are attached.

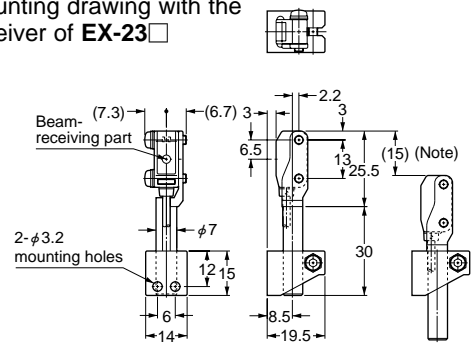
**MS-EX20-5** Universal sensor mounting bracket (Optional)



Material: Die-cast zinc alloy  
Two M3 (length 12mm) screws with washers [stainless steel (SUS304)], one M3 (length 10mm) hexagon-socket-head bolt, and one M3 hexagon nut [stainless steel (SUS304)] are attached.

Material: Nylon 6

**Assembly dimensions**  
Mounting drawing with the receiver of EX-23



Note: This is the adjustable range of the movable part.



All information is subject to change without prior notice.