

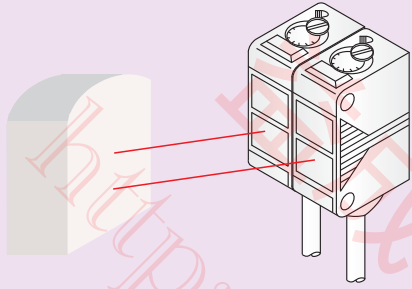
# CP20 SERIES

## Advantage and Applications

### Advantage

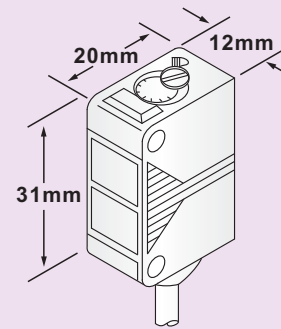
#### Equipped with auto crosstalk prevention function

CP20 series is equipped with the automatic crosstalk prevention function so that two sets of it can be installed closely together or facing each other.



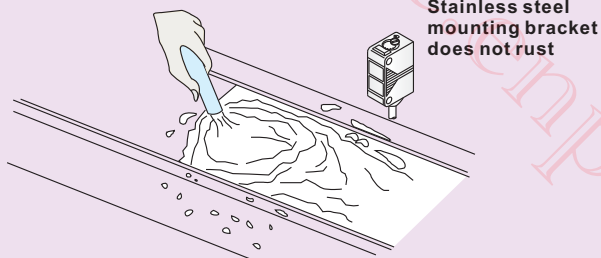
#### Compact Size

It realizes the space-saving. (W12xH31xD20mm)



#### Waterproof

Achieves IP 67. The sensor can be put on machinery washed with water. The mounting bracket (option) is not corrosive as it is made of stainless steel material.

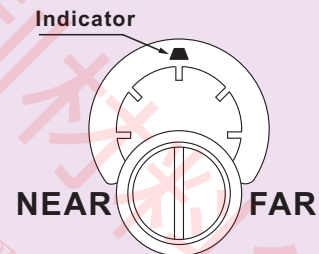


Stainless steel mounting bracket does not rust

Caution: a water drop on the sensing face may cause the sensor generate the output.

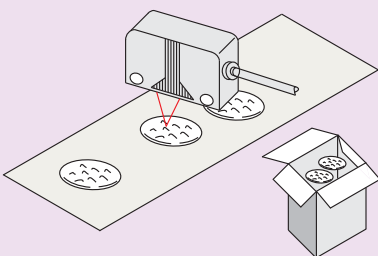
#### Two-turn adjuster with the indicator

It has two turn adjuster that is possible to set the fine distance. Moreover, the indicator shows the adjustment position at a glance.

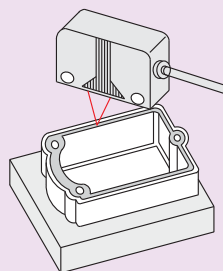


### Applications

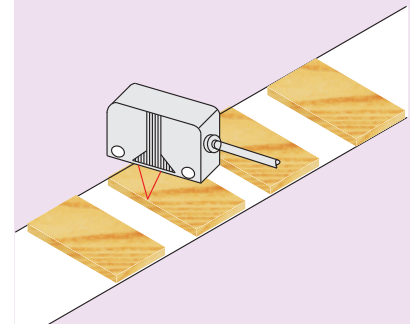
#### Sensing of thin-baked rice crackers



#### Detecting Gasket on Die-casting



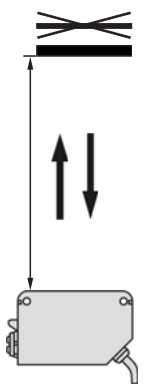



#### Positioning of veneer boards



# CP20 SERIES

## Diffuse Mode with Background Suppression

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Sensing Mode	Connection	Supply Voltage	Output Mode	Part Number
<p>Light Source: Red LED</p>  <p>Sensing Distance: 20 to 40mm ; 30 to 100mm ; 30 to 200mm (Adjustable)</p>	<p>2m Cable</p> 	<p>10 -30V DC (Sn=20~40mm)</p>	NPN	<u>GP20-D0040N-CY6C3U2-BS</u>
			PNP	<u>GP20-D0040P-CY6C3U2-BS</u>
		<p>10 -30V DC (Sn=30~100mm)</p>	NPN	<u>GP20-D0100N-CY6C3U2-BS</u>
			PNP	<u>GP20-D0100P-CY6C3U2-BS</u>
		<p>10 -30V DC (Sn=30~200mm)</p>	NPN	<u>GP20-D0200N-CY6C3U2-BS</u>
			PNP	<u>GP20-D0200P-CY6C3U2-BS</u>
	<p>Quick Disconnect (Pico-Style)</p> 	<p>10 -30V DC (SN=20~40mm)</p>	NPN	<u>GP20-D0040N-CY6Q4UP-BS</u>
			PNP	<u>GP20-D0040P-CY6Q4UP-BS</u>
		<p>10 -30V DC (Sn=30~100mm)</p>	NPN	<u>GP20-D0100N-CY6Q4UP-BS</u>
			PNP	<u>GP20-D0100P-CY6Q4UP-BS</u>
		<p>10 -30V DC (Sn=30~200mm)</p>	NPN	<u>GP20-D0200N-CY6Q4UP-BS</u>
			PNP	<u>GP20-D0200P-CY6Q4UP-BS</u>
<p>6" Pigtail (Pico-Style)</p> 	<p>10 -30V DC (SN=20~40mm)</p>	NPN	<u>GP20-D0040N-CY6P4UP-BS</u>	
		PNP	<u>GP20-D0040P-CY6P4UP-BS</u>	
	<p>10 -30V DC (Sn=30~100mm)</p>	NPN	<u>GP20-D0100N-CY6P4UP-BS</u>	
		PNP	<u>GP20-D0100P-CY6P4UP-BS</u>	
	<p>10 -30V DC (Sn=30~200mm)</p>	NPN	<u>GP20-D0200N-CY6P4UP-BS</u>	
		PNP	<u>GP20-D0200P-CY6P4UP-BS</u>	

Note:  
 Coming Soon : Part numbers with underline  
 In Preparation: Part numbers with a line through the middle  
 — An-01 —

## CP20 SERIES

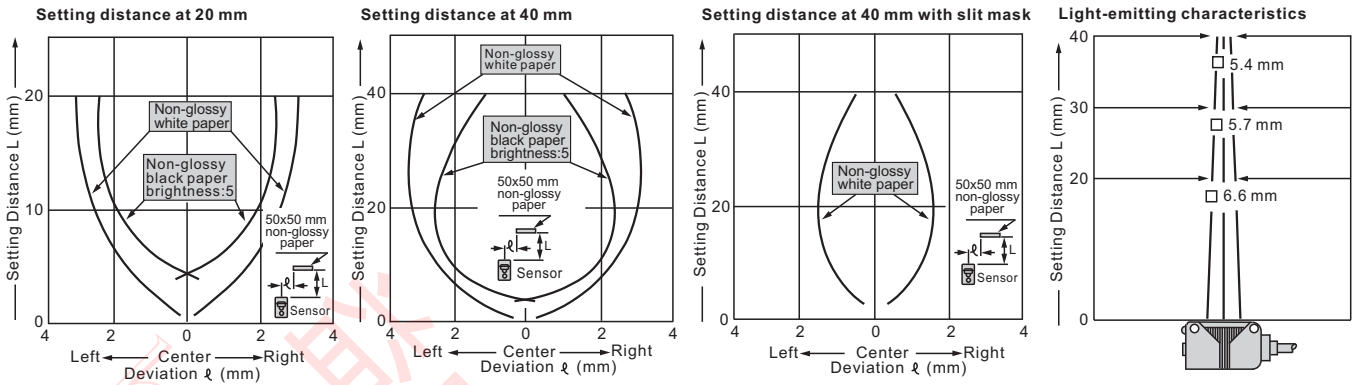
## Specifications

Type		Diffuse Mode with Background Suppression					
		NPN output type			PNP output type		
Item	Model No.	CP20-D0040N-CY6x4Ux-BS	CP20-D0100N-CY6x4Ux-BS	CP20-D0200N-CY6x4Ux-BS	CP20-D0040P-CY6x4Ux-BS	CP20-D0100P-CY6x4Ux-BS	CP20-D0200P-CY6x4Ux-BS
Sensing distance		20 to 40mm	30 to 100mm	30 to 200mm	20 to 40mm	30 to 100mm	30 to 200mm
Detectable target		More than 30x30 mm					
Hysteresis		5% or less of sensing distance		20% or less of sensing distance	5% or less of sensing distance		20% or less of sensing distance
Repeat accuracy		Along sensing axis: 1mm or less , Perpendicular to sensing axis: 0.2mm or less (with non-glossy white paper)					
Power source		10 to 30V DC 10% Ripple P-P: Less than 10%					
Current consumption		Less than 45mA			Less than 50mA		
Sensing output		NPN open-collector transistor Sink current : Max. 100mA Applied voltage: Max. 30V DC Residual voltage: Less than 1.0V at 100mA sink current Less than 0.4V at 16mA sink current			PNP open-collector transistor Source current : Max. 100mA Applied voltage: Max. 30V DC Residual voltage: Less than 1V at 100mA source current Less than 0.4V at 16mA source current		
	Output operation	Light-ON/Dark-ON selectable with selection switch					
	Short-circuit protection	Incorporated					
Response time		Less than 1 ms					
Operation indicator		Red LED(Lights up when the sensing output is ON)					
Stability indicator		Green LED(Lights up under stable light received condition or stable dark condition)					
Distance adjuster		2 turn adjuster with indicator					
Environmental resistance	Protection	IP 67					
	Ambient temperature	-20 to +55°C (No dew condensation or icing allowed), storage: -25 to +70°C					
	Ambient humidity	35 to 85 % RH, Storage:35 to 85 % RH					
	Extraneous light	Sunlight: 10000 lx at the light receiving face, Incandescent light: 3000 lx at the light-receiving face.					
	Noise	Power line: 240Vp with 0.5us pulse duration, Radiation: 600Vp with 0.5us pulse duration (by noise simulator)					
	Dielectric	1000 V AC applied between live parts and enclosure for 1 min.					
	Insulation	More than 20M Ω applied between live parts and enclosure at 250V DC					
	Vibration	3mm amplitude at frequency of 10 to 500Hz in each of X, Y and Z directions for 2 hours each					
	Shock	500m/s <sup>2</sup> (approx.50G) impulse in each of X, Y and Z directions for 3 times each					
Emitting element		Red LED (modulated)					
Material		Enclosure: PBT (polybutylene terephthalate), lens: acrylic, front cover: acrylic					
Cable		0.2mm <sup>2</sup> 4-cores of oil, heat and cold resistant cable of 2m long					
Cable extension		Extension up to total 100mby using a min. 0.3mm <sup>2</sup> cable					
Pigtail and connector		Connector type: 4pins M8 Pico-style; Pigtail type: See <b>Pigtail Series</b> or our <b>Cables &amp; Connectors</b> catalogue.					
Weight		85g approx.					

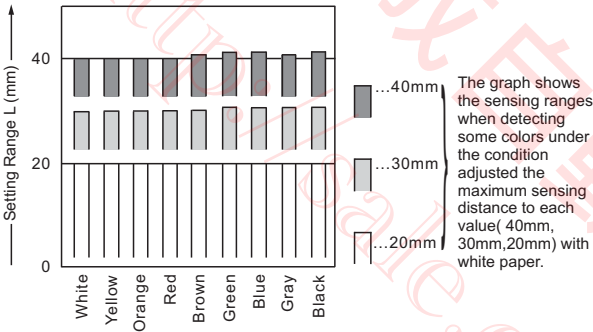
# CP20 SERIES

## Sensing Characteristics (Typical)

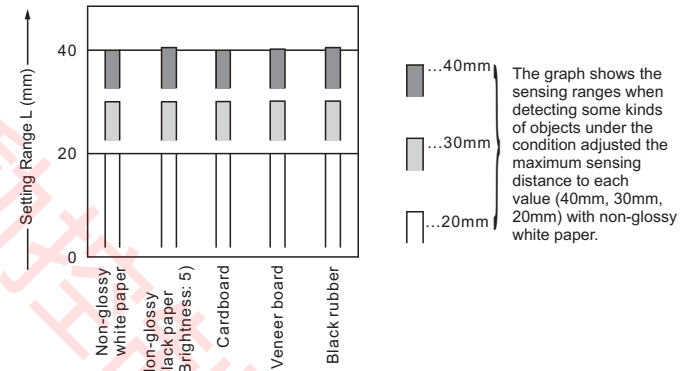
### CP20-D0040N(P)... (Sensing Range=40mm)



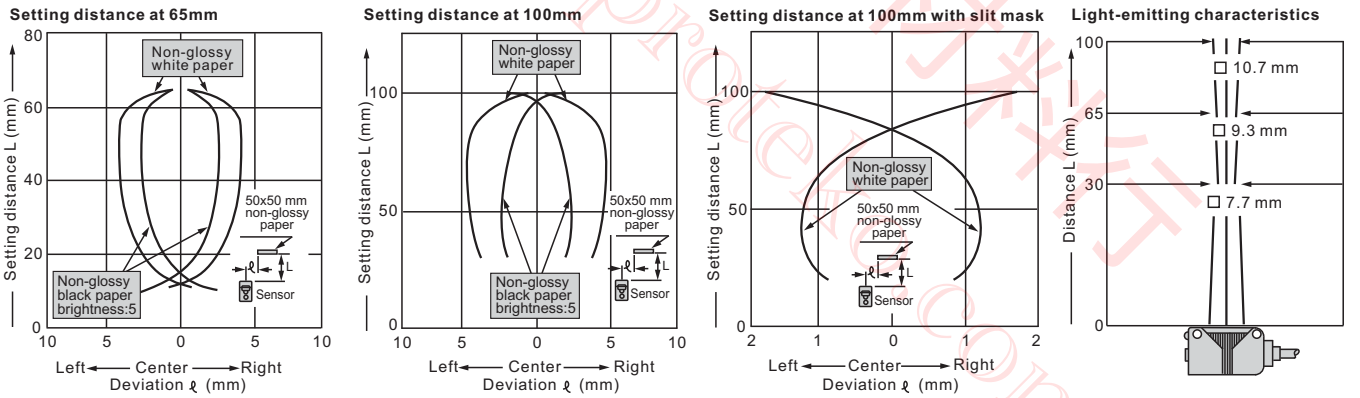
Correlation between color (50x50mm) and sensing range



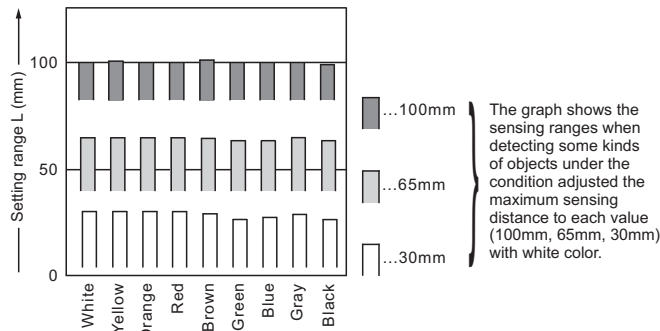
Correlation between material (50x50mm) and sensing range



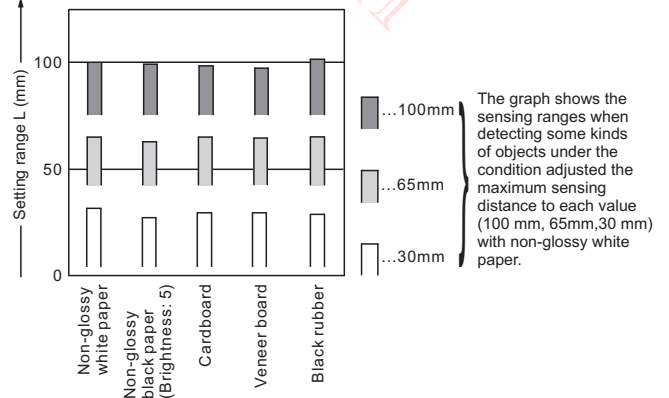
### CP20-D0100N(P)...(Sensing Range=100 mm)



Color (50x50mm)--Sensing range correlation



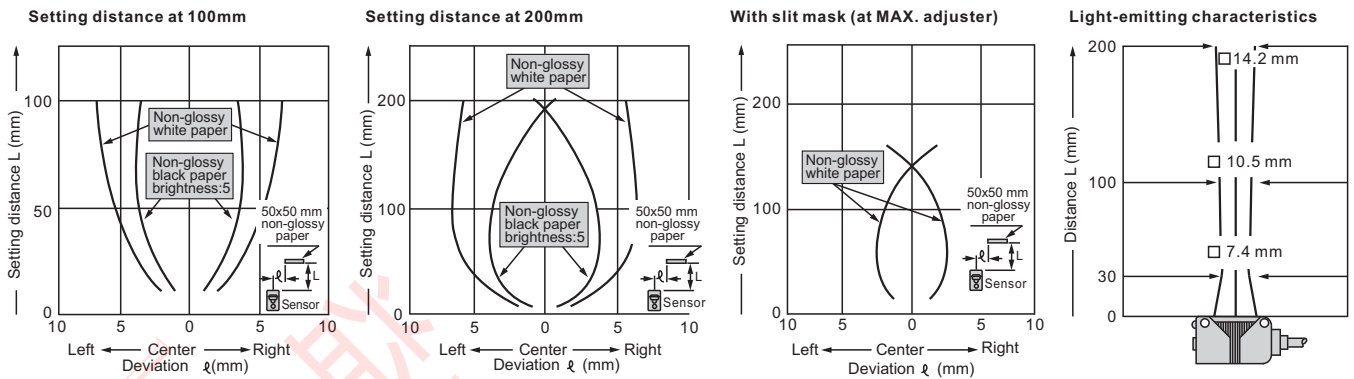
Material (50x50mm)--Sensing range correlation



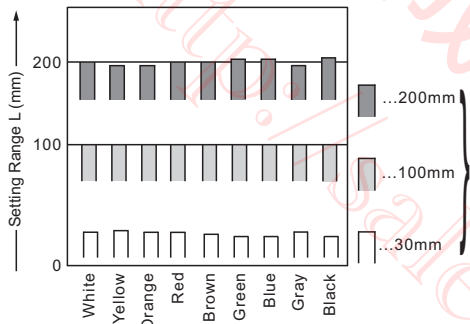
# CP20 SERIES

## Sensing Characteristics (Typical)

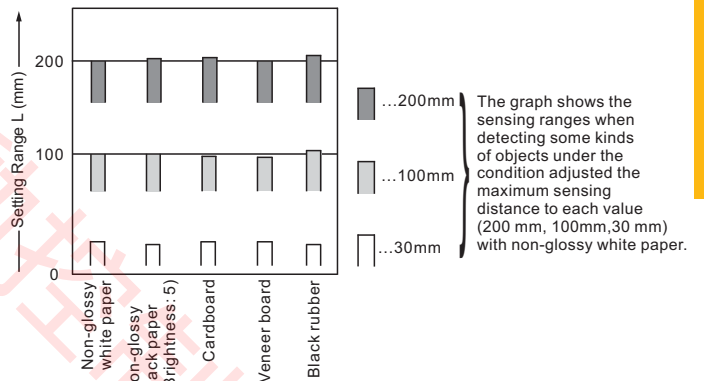
### CP20-D0200N(P)... (Sensing Range=200 mm)



#### Correlation between color (50x50mm) and sensing range

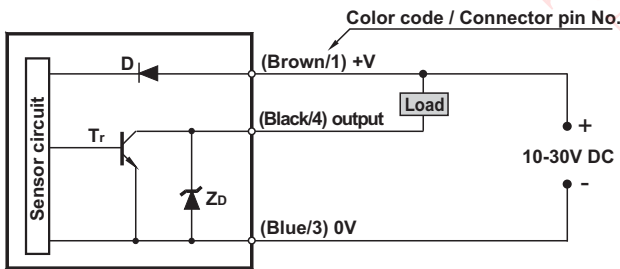


#### Correlation between material (50x50mm) and sensing range



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### NPN Output Type



Symbol...D: Reverse polarity protection diode.  
 Zd: Surge absorption zener diode.  
 Tr: NPN output transistor.

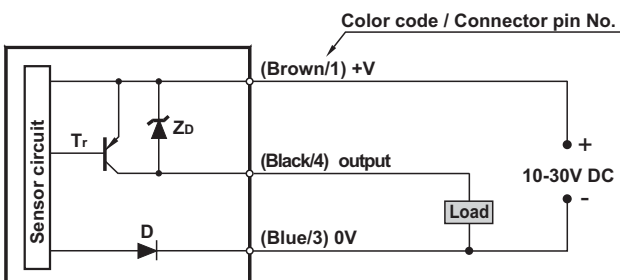
#### Connector face view

##### Pico-Style



1. Brown (+)
2. Not used
3. Blue (-)
4. Black (Output)

### PNP Output Type



Symbol...D: Reverse polarity protection diode.  
 Zd: Surge absorption zener diode.  
 Tr: PNP output transistor.

#### Connector face view

##### Pico-Style



1. Brown (+)
2. Not used
3. Blue (-)
4. Black (Output)

# CP20 SERIES

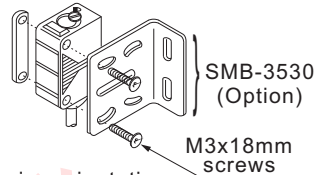
## Precautions For Proper Use



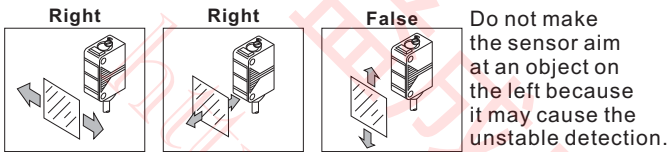
This products is not a safety sensor designed to intend to protect life and prevent bodily injury or property damage from dangerous parts of machinery, but a normal object detection sensor.

### Mounting

Tightening torque should be 0.5N m{5.1kgf cm} or less.



Notice must be taken of the sensing orientation of the sensor against the moving direction or objects.



Sensing object Sensing object Sensing object  
Neither specular objects such as aluminum foil, copper foil, or so nor shiny materials painted or coated might be detected on condition with some sensing angle error or wrinkles on their surfaces.

Tilt the sensor upwards to prevent an unexpected misdetection where a specular material presents under it.

The sensor should lose the detect ability if any specular or shiny materials behind objects might slightly change the angle toward it (background influence). In such case, the sensor should be angled against them and fixed again, then tested the operation to eliminate any miss-detection.

Notice that the sensor compulsory goes into the light condition (ON) when much excessive ambient light is received.

Notice that a dead zone will appear in right front of the sensor when the distance adjuster is set in NEAR side.

### Distance adjustment

<Adjusters>

Stable operation indicator(green)

(Lights under the stable light condition or the stable dark condition)

Distance adjuster(two turns)  
(The sensing range lengthens by turning it clockwise.)

Operation indicator(red)

Lights when the sensing output is ON.

Operation mode switch

L: Sensing ON  
D: Sensing OFF  
(Turn the switch fully)

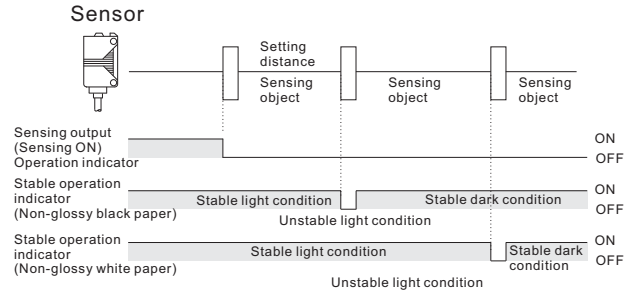
<Setting procedure>

①	Turn the distance adjuster fully counterclockwise to take the minimum setting position (about 30mm or 20mm with CP20-D0040N-xX6x4Ux and CP20-D0040P-xX6x4Ux).	
②	Place an object at a certain distance from the sensor, turn the distance adjuster gradually clockwise, and find out "A" point where the sensor changes into the light condition.	
③	Remove the object, turn the distance adjuster still clockwise, and find out "B" point where the sensor changes into the light condition again with only a background. (When the sensor does not go into the light condition until the adjuster is fully turned clockwise, "B" point should be at the maximum point in the range.)	
④	The optimum position to stably detect objects must be the center between "A" and "B" point.	

(\*1): in order to protect itself, notice that the distance adjuster idles if turned fully

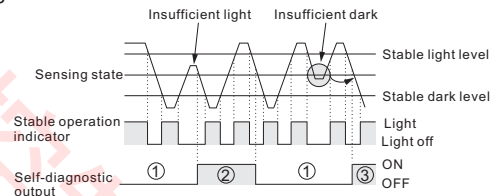
### Stable operation indicator

CP20 series avails PSD inside as a beam-receiving device and recognizes where the beam is received, not how much the beam is received as standard diffuse reflective sensors work. Notice that the positions where the stable operation indicator lights off vary by the dissimilar reflective ratio of objects instead of the same detecting position. Do not have the sensor detect objects where the stable indicator lights off( in the unstable light condition).



### Self-diagnostic output

The self-diagnostic output is in the ON state when the light-receiving intensity is reduced due to dirty lens and/or alignment deviation.



- ① The self-diagnostic output transistor is in the ON state during the stable sensing.
- ② If the sensor does not arrive at either stable light level or stable dark level when the sensing output turns on or off, the self-diagnostic output turns on.
- ③ If the light is insufficient intensity, there will be a time lag before the self-diagnostic output turns on.

### Wiring

Short-circuit protection is not equipped for the self-diagnostic output. Do not connect it directly to the power supply or capacitive load.

Power supply should be turned off before wiring.

Verify voltage fluctuation so that it should not exceed the rated value.

When using a switching regulator readily available in the market for the power supply, always ground the frame ground(F.G)terminal.

When using equipment which generates the noises (switching regulator or inverter motor, etc.) Near the sensor, ground the frame ground(F.G.) Terminal of equipment.

Do not run sensor cables near high-voltage lines or power lines, nor put them together in the same raceway. Doing so may cause malfunctions due to inductive interference.

### Others

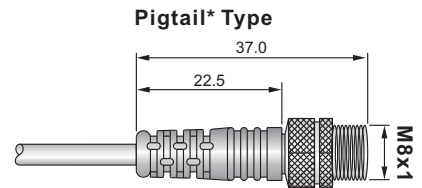
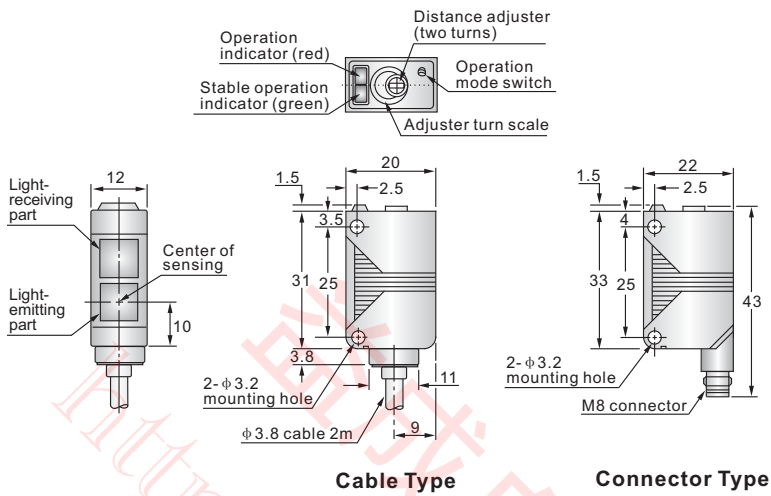
Do not use the sensor output signal for 50ms immediately after the power is supplied to the sensor.

Avoid places where the sensor may be directly exposed to fluorescent lights with rapid-starters or high frequency lighting as it may affect the sensing performance.

# CP20 SERIES

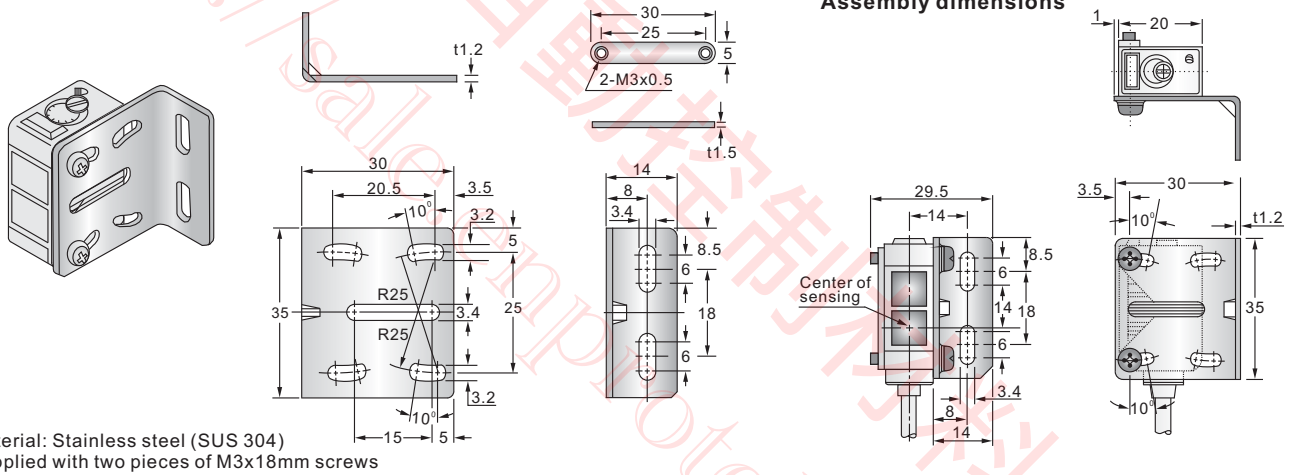
## Dimensions (Unit: mm)

### Sensor Type

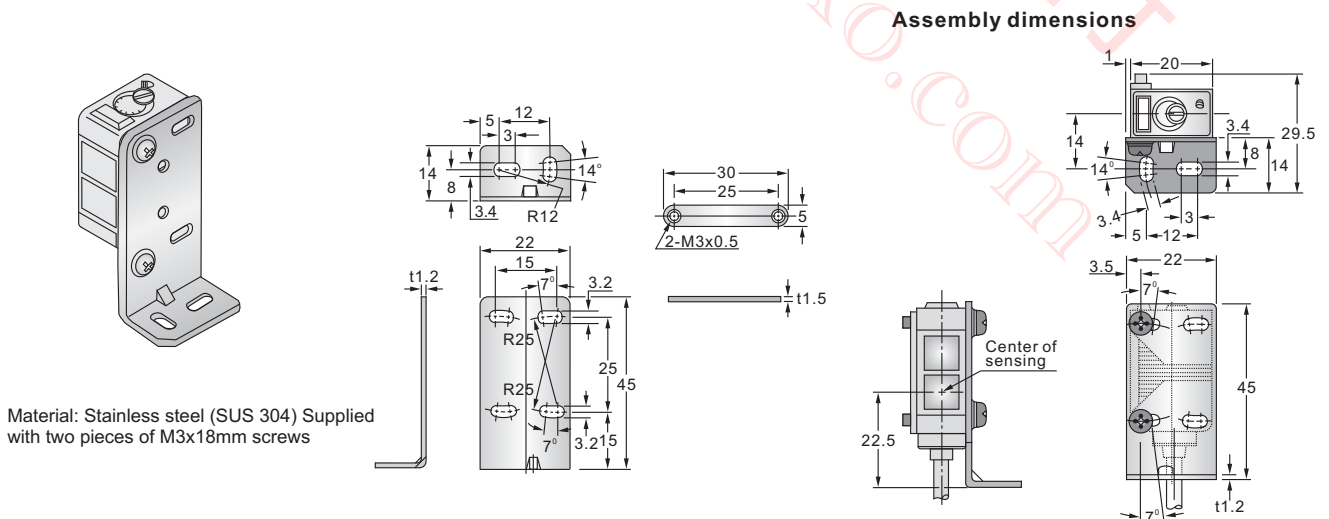


\*: Please see **Pigtail Series** or our **Cables & Connectors** catalogue for more information.

### MB-3530 (Sensor mounting bracket-optional)



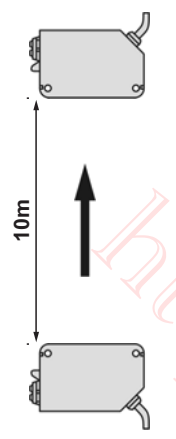




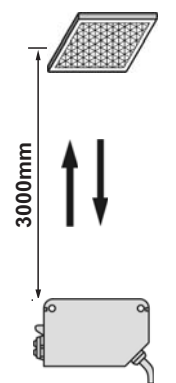




### MB-4522 (Sensor mounting bracket-optional)



An: CP20 SERIES

# CP31 SERIES

## Thru-beam Mode / Retroreflective Mode with Polarizing Filter






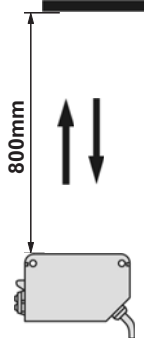



Sensing Mode	Connection	Supply Voltage	Output Mode	Part Number
 <p><b>Thru-beam Mode</b> Sensing Distance 10m Red LED</p>	<b>2m Cable</b> 	<b>10-30V DC</b>	Emitter	<b>GP31-T010MD-EY6G3L2</b>
			NPN	<b>GP31-T010MN-CY6G3U2</b>
			PNP	<b>GP31-T010MP-CY6G3U2</b>
	<b>Quick Disconnect (Pico-Style)</b> 	<b>10-30V DC</b>	Emitter	<b>GP31-T010MD-EY6Q4LP</b>
			NPN	<b>GP31-T010MN-CY6Q4UP</b>
			PNP	<b>GP31-T010MP-CY6Q4UP</b>
	<b>6" Pigtail (Pico-Style)</b> 	<b>10-30V DC</b>	Emitter	<b>GP31-T010MD-EY6P4LP</b>
			NPN	<b>GP31-T010MN-CY6P4UP</b>
			PNP	<b>GP31-T010MP-CY6P4UP</b>
	<b>6" Pigtail (Euro-Style)</b> 	<b>10-30V DC</b>	Emitter	<b>GP31-T010MD-EY6P4LE</b>
			NPN	<b>GP31-T010MN-CY6P4UE</b>
			PNP	<b>GP31-T010MP-CY6P4UE</b>
 <p><b>Retroreflective Mode</b> (with polarizing filter) Sensing Distance 3000mm (Note) Red LED</p>	<b>2m Cable</b> 	<b>10-30V DC</b>	NPN	<b>GP31-L3000N-CY6G3U2-PF</b>
			PNP	<b>GP31-L3000P-CY6G3U2-PF</b>
	<b>Quick Disconnect (Pico-Style)</b> 	<b>10-30V DC</b>	NPN	<b>GP31-L3000N-CY6Q4UP-PF</b>
			PNP	<b>GP31-L3000P-CY6Q4UP-PF</b>
	<b>6" Pigtail (Pico-Style)</b> 	<b>10-30V DC</b>	NPN	<b>GP31-L3000N-CY6P4UP-PF</b>
			PNP	<b>GP31-L3000P-CY6P4UP-PF</b>
	<b>6" Pigtail (Euro-Style)</b> 	<b>10-30V DC</b>	NPN	<b>GP31-L3000N-CY6P4UE-PF</b>
			PNP	<b>GP31-L3000P-CY6P4UE-PF</b>

**Note:** Used with RE-6152 (supplied with sensor) reflector.  
**Coming Soon :** Part numbers with underline  
**In Preparation:** Part numbers with a line through the middle



# CP31 SERIES

## Standard Diffuse Mode / Long Range Diffuse Mode

Sensing Mode	Connection	Supply Voltage	Output Mode	Part Number
 <p>300mm</p> <p>Diffuse Mode</p> <p>Sensing distance 300mm</p> <p>Infrared LED</p>	2m Cable 	10-30V DC	NPN	<u>GP31-D0300N-CY9G3U2</u>
			PNP	<u>CP31-D0300P-CY9C3U2</u>
			---	---
	Quick Disconnect (Pico-Style) 	10-30V DC	NPN	<u>GP31-D0300N-CY9Q4UP</u>
			PNP	<u>GP31-D0300P-CY9Q4UP</u>
			---	---
	6" Pigtail (Pico-Style) 	10-30V DC	NPN	<u>GP31-D0300N-CY9P4UP</u>
			PNP	<u>CP31-D0300P-CY9P4UP</u>
			---	---
	6" Pigtail (Euro-Style) 	10-30V DC	NPN	<u>GP31-D0300N-CY9P4UE</u>
			PNP	<u>CP31-D0300P-CY9P4UE</u>
			---	---
 <p>800mm</p> <p>Diffuse Mode</p> <p>Long sensing range 800mm</p> <p>Infrared LED</p>	2m Cable 	10-30V DC	NPN	<u>GP31-D0800N-CY9G3U2</u>
			PNP	<u>GP31-D0800P-CY9C3U2</u>
			---	---
	Quick Disconnect (Pico-Style) 	10-30V DC	NPN	<u>GP31-D0800N-CY9Q4UP</u>
			PNP	<u>GP31-D0800P-CY9Q4UP</u>
			---	---
	6" Pigtail (Pico-Style) 	10-30V DC	NPN	<u>GP31-D0800N-CY9P4UP</u>
			PNP	<u>GP31-D0800P-CY9P4UP</u>
			---	---
	6" Pigtail (Euro-Style) 	10-30V DC	NPN	<u>GP31-D0800N-CY9P4UE</u>
			PNP	<u>CP31-D0800P-CY9P4UE</u>
			---	---

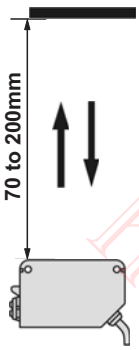




A0: CP31 SERIES

**Note:**  
 Coming Soon : Part numbers with underline  
 In Preparation: Part numbers with a line through the middle

# CP31 SERIES

## Narrow-view Diffuse Mode / Options

Ao: CP31 SERIES

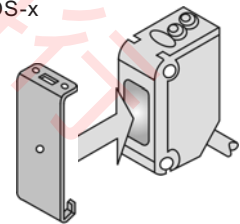
Sensing Mode	Connection	Supply Voltage	Output Mode	Part Number
 Diffuse Mode (Narrow-view) Sensing Distance 70 to 200mm Red LED	2m Cable 	10-30V DC	NPN	<u>CP31-D0200N-CY6G3U2-N</u>
			PNP	<u>CP31-D0200P-CY6G3U2-N</u>
			---	---
	Quick Disconnect (Pico-Style) 	10-30V DC	NPN	<u>CP31-D0200N-CY6Q4UP-N</u>
			PNP	<u>CP31-D0200P-CY6Q4UP-N</u>
			---	---
	6" Pigtail (Pico-Style) 	10-30V DC	NPN	<u>CP31-D0200N-CY6P4UP-N</u>
			PNP	<u>CP31-D0200P-CY6P4UP-N</u>
			---	---
	6" Pigtail (Euro-Style) 	10-30V DC	NPN	<u>CP31-D0200N-CY6P4UE-N</u>
			PNP	<u>CP31-D0200P-CY6P4UE-N</u>
			---	---

### Options

Designation	Model No.	Slit size	Sensing range		Min.sensing object	
			Slit on one side	Slit on both sides	Slit on one side	Slit on both sides
Round slit mask (For thru-beam type sensor only)	OS-0.5	φ 0.5mm	400 mm	20 mm	φ 12mm	φ 0.5mm
	OS-1	φ 1mm	900 mm	100 mm	φ 12mm	φ 1mm
	OS-2	φ 2mm	2 m	400 mm	φ 12mm	φ 2mm
Rectangular slit mask (For thru-beam type sensor only)	RS-0.5x6	0.5x6mm	2 m	400 mm	φ 12mm	0.5x6mm
	RS-1x6	1x6mm	3 m	1 m	φ 12mm	1x6mm
	RS-2x6	2x6mm	5 m	2 m	φ 12mm	2x6mm

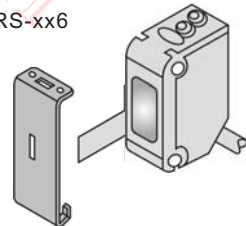
**Round slit mask**  
Fitted on the front face of the sensor with one-touch

- OS-x



**Rectangular slit mask**  
Fitted on the front face of the sensor with one-touch

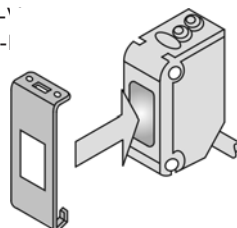
- RS-xx6



Designation	Model No.	Sensing Range	Min. sensing object
Interference prevention filter (for thru-beam type sensor only)	PF-V (Vertical)	5m (Note 1)	φ 12mm (Note 1)
	PF-H (Horizontal)	5m (Note 1)	φ 12mm (Note 1)

**Interference prevention filter**  
Two sets of thru-beam type sensors can be mounted close together.

- PF-V
- PF-H



Notes: 1) Value when attached to both sides.

**Note:**  
Coming Soon : Part numbers with underline  
In Preparation: Part numbers with a line through the middle

**CP31 SERIES****Specifications**

Item	Model No.	Type	Thru-beam	Retroreflective (with polarizing filters)	Diffuse reflective			
					Standard	Long sensing range	Narrow-view reflective	
		NPN output type	CP31-T010MN-xY6xxUx	CP31-L3000N-xY6xxUx-PF	CP31-D0300N-xY9xxUx	CP31-D0800N-xY9xxUx	CP31-D0200N-xY6xxUx-N	
		PNP output type	CP31-T010MP-xY6xxUx	CP31-L3000P-xY6xxUx-PF	CP31-D0300P-xY9xxUx	CP31-D0800P-xY9xxUx	CP31-D0200P-xY6xxUx-N	
<b>Sensing range</b>			<b>10m</b>	<b>3m</b> (Note 1)	<b>300mm</b> (Note 2)	<b>800mm</b> (Note 2)	<b>70 to 200mm</b> ( Note 2)	
<b>Sensing object</b>			φ 12mm or more opaque object (Note 3)	φ 50mm or more opaque, translucent or specular object	Opaque, translucent or transparent object		Opaque, translucent or transparent object (Min. Sensing object φ0.5mm copper wire)	
<b>Hysteresis</b>			—————		15% or less of operation distance			
<b>Repeatability( Perpend- icular to sensing axis)</b>			0.5mm or less		1mm or less	0.5mm or less		
<b>Supply voltage</b>			10 to 30V DC 10% Ripple P-P 10% or less					
<b>Current consumption</b>			Emitter: 20mA or less Receiver:20mA or less	20mA or less	25mA or less		20mA or less	
<b>Sensing output</b>			<NPN output type> NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less( between output and 0V) • Residual voltage: 1V or less ( at 100mA sink current) 0.4V or less( at 16mA sink current)				<PNP output type> PNP open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less( between output and +V) • Residual voltage: 1V or less ( at 100mA source current) 0.4V or less( at 16mA source current)	
<b>Utilization category</b>			DC-12 or DC-13					
<b>Output operation</b>			Switchable either Light-ON or Dark-ON					
<b>Short-circuit protection</b>			Incorporated					
<b>Response time</b>			1 ms or less					
<b>Operation indicator</b>			Orange LED (lights up when the output is ON) (incorporated on the receiver for thru-beam type)					
<b>Stability indicator</b>			Green LED( lights up under stable light received condition or stable dark condition) (incorporated on the receiver for thru-beam type)					
<b>Power indicator</b>			Green LED	—————				
<b>Sensitivity adjuster</b>			Continuously variable adjuster (incorporated on the receiver for thru-beam type)					
<b>Automatic interference prevention function</b>			Two units of sensors can be mounted close together interference prevention filters. (sensing range: 5m)	Incorporated (Two units of sensors can be mounted close together.)				
<b>Environmental resistance</b>	<b>Pollution degree</b>		3 (Industrial environment)					
	<b>Protection</b>		IP 67 (IEC)					
	<b>Ambient temperature</b>		-25 to +55°C (No dew condensation or icing allowed), storage: -30 to +70°C					
	<b>Ambient humidity</b>		35 to 85 % RH, storage:35 to 85% RH					
	<b>Ambient illuminance</b>		Sunlight: 10000 lx at the light receiving face, Incandescent light: 3000 lx at the light-receiving face.					
	<b>EMC</b>		IEC 60947-5-2, Parts 7.2.6.1.2.3 or RFI>3V/m(in 30-1000MHZ), EFT>1KV, ESD>4KV(contact)					
	<b>Voltage withstandability</b>		1000 V AC for one min. Between all supply terminals connected together and enclosure.					
	<b>Insulation resistance</b>		20M Ω ,or more, with 250V DC megger between all supply terminals connected together and enclosure					
	<b>Vibration resistance</b>		IEC 60947-5-2, Part 7.4.2 or 10-55HZ, 1.0mm amplitude In X, Y and Z directions for 30 min					
<b>Shock resistance</b>		IEC 60947-5-2, Part 7.4.1 or 30g,11ms in X,Y and Z directions for six times each						
<b>Emitting element</b>			Red LED (modulated)	Infrared LED (modulated)		Red LED (modulated)		
<b>Material</b>			Enclosure: PBT (polybutylene terephthalate), lens: acrylic, front cover: acrylic					
<b>Cable</b>			0.2mm <sup>2</sup> 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2m long					
<b>Cable extension</b>			Extension up to total 100m is possible with 0.3mm <sup>2</sup> , or more, cable (thru-beam type: both emitter and receiver)					
<b>Pigtail type</b>			See <b>Pigtail Series</b> or our <b>Cables &amp; Connectors</b> catalogue.					
<b>Connector type</b>			Pico style (M8) 4pin; Euro style(M12) 4pin.					
<b>Weight</b>			50g approx. (Emitter or thru-beam type: 45g approx.)					
<b>Accessories</b>			—————	RE-6152(Reflector):1 pc.	—————			

Notes: 1) The sensing range and the sensing object of the retroreflective type sensor are specified for the **RE-6152** (supplied with sensor) reflector. In addition, set the distance between the sensor and the reflector to 0.1m or more.

2) The sensing range of the diffuse reflective type sensor and narrow-view reflective type sensor are specified for white non-glossy paper(200x200 mm) as the object.

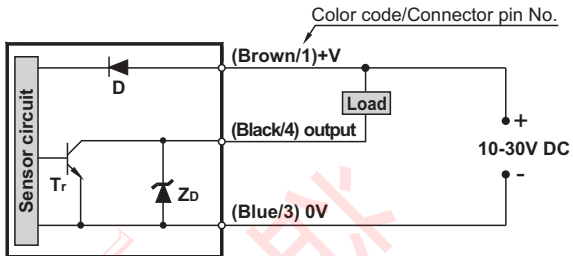
3) If slit masks (optional) are fitted, an fitted, an object of φ0.5mm (using round slit mask) can be detected.

# CP31 SERIES

## Connection Diagrams

### NPN output type

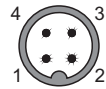
#### I/O circuit diagram



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

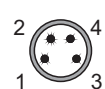
#### Connector pin position

##### Euro-style



1. Brown (+)
2. Not used
3. Blue (-)
4. Black (Output)

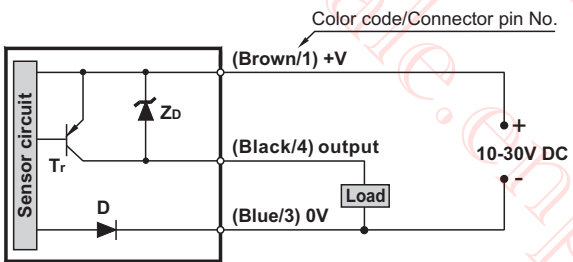
##### Pico-Style



1. Brown (+)
2. Not used
3. Blue (-)
4. Black (Output)

### PNP output type

#### I/O circuit diagram



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

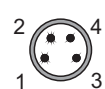
#### Connector pin position

##### Euro-style



1. Brown (+)
2. Not used
3. Blue (-)
4. Black (Output)

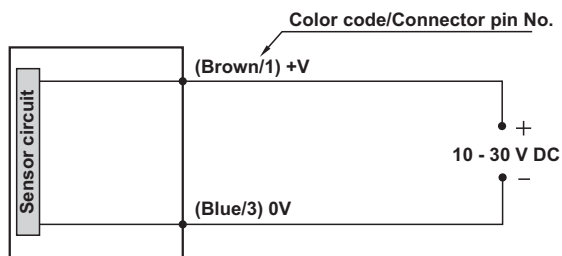
##### Pico-Style



1. Brown (+)
2. Not used
3. Blue (-)
4. Black (Output)

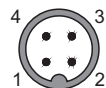
### Emitter of Thru-beam Mode

#### I/O circuit diagram



#### Connector pin position

##### Euro-style



1. Brown (+)
2. Not used
3. Blue (-)
4. Not used

##### Pico-Style

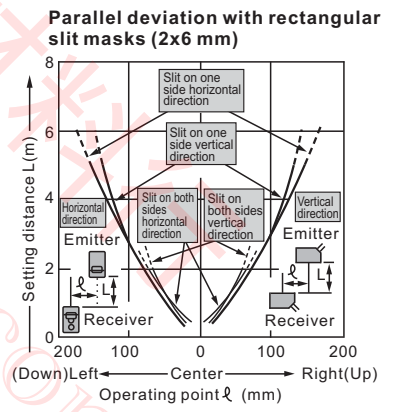
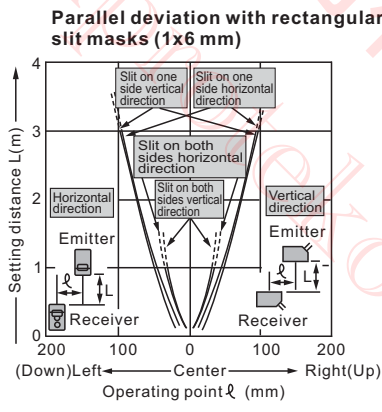
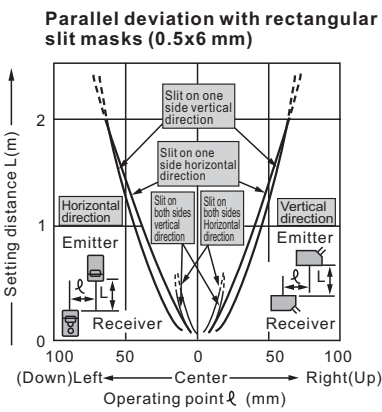
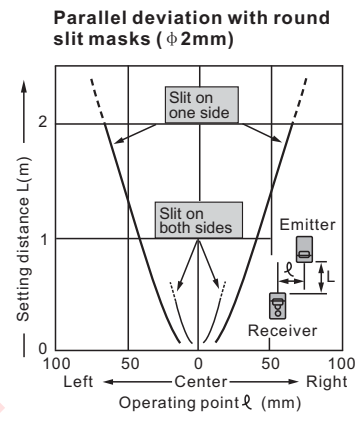
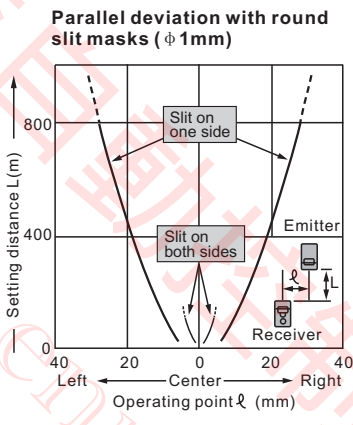
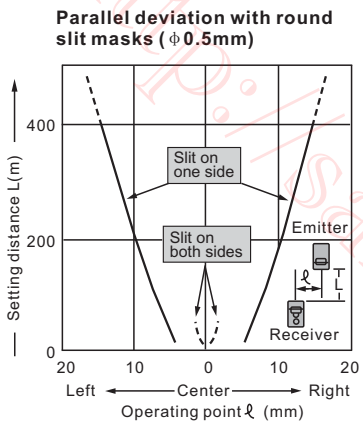
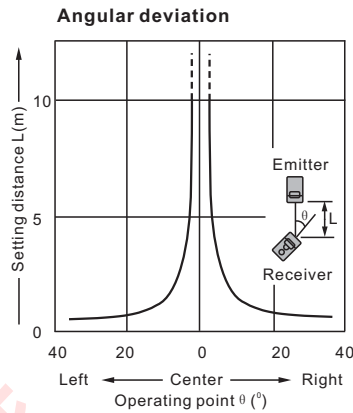
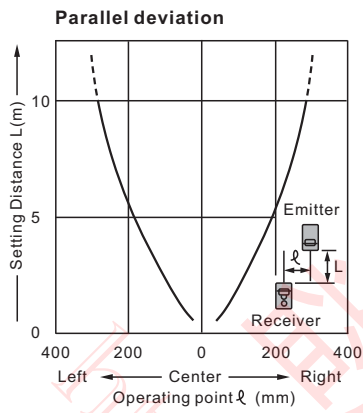


1. Brown (+)
2. Not used
3. Blue (-)
4. Not used

# CP31 SERIES

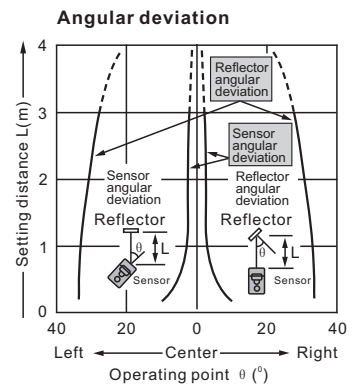
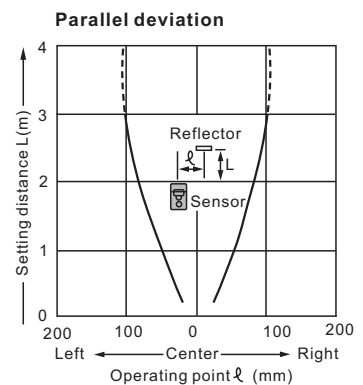
## Sensing Characteristics (Typical)

### Thru-beam Mode (Sn=10m)



A0: CP31 SERIES

### Retroreflective Mode (Sn=3m, performance on RE-6152 reflector)

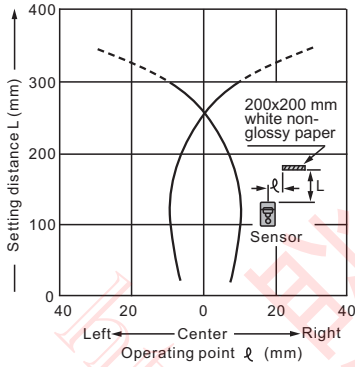


# CP31 SERIES

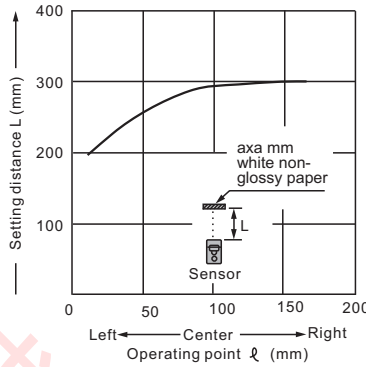
## Sensing Characteristics (Typical)

### Standard Diffuse Mode (Sn=300mm)

**Sensing field**



**Correlation between sensing object size and sensing range**

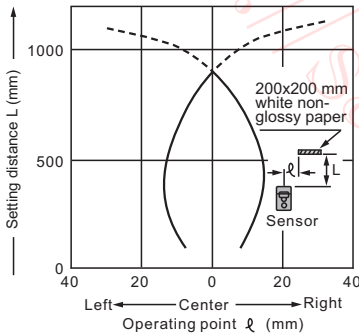


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200x200 mm), the sensing range shortens, as shown in the left graph.

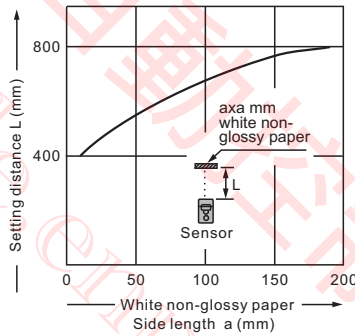
For plotting the left graph, the sensitivity has been set such that a 200x200 mm white non-glossy paper is just detectable at a distance of 300 mm.

### Long Range Diffuse Mode (Sn=800mm)

**Sensing field**



**Correlation between sensing object size and sensing range**

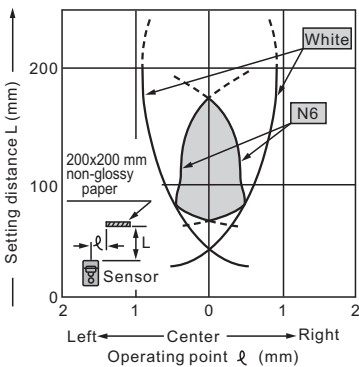


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200x200 mm), the sensing range shortens, as shown in the left graph.

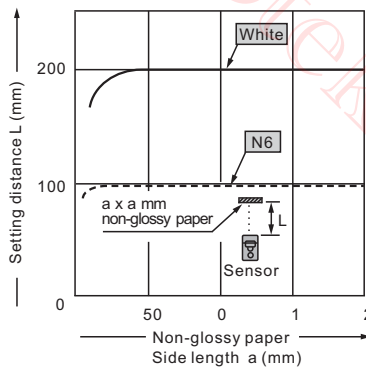
For plotting the left graph, the sensitivity has been set such that a 200x200 mm white non-glossy paper is just detectable at a distance of 800mm.

### Narrow-view Diffuse Mode (Sn=200mm)

**Sensing field**



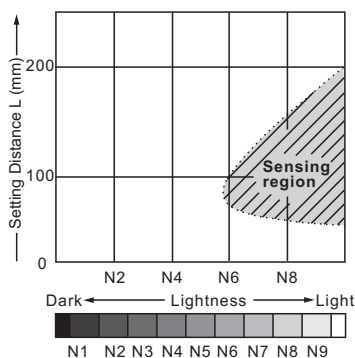
**Correlation between sensing object size and sensing range**



As the sensing object size becomes smaller than the standard size (white non-glossy paper 200x200 mm), the sensing range shortens, as shown in the left graph.

For plotting the left graph, the sensitivity has been set such that a 200x200 mm white non-glossy paper is just detectable at a distance of 200mm.

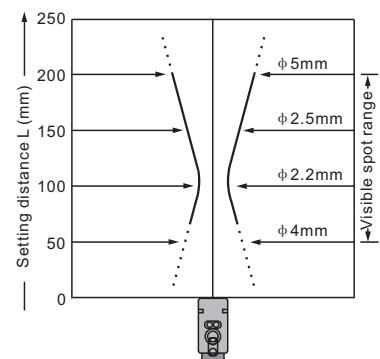
**Correlation between sensing object size and sensing range**



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

Lightness shown on the lift may differ slightly from the actual object condition.

**Emitted beam**



# CP31 SERIES

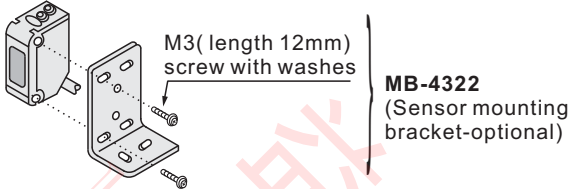
## Precautions For Proper Use



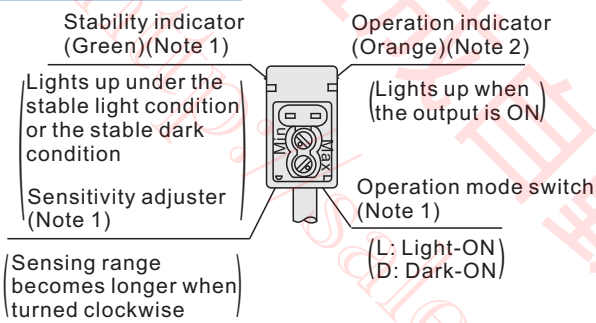
This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

### Mounting

- The tightening torque should be 0.5N·m or less.



### Functional description



Notes: 1) Not incorporated on the thru-beam type sensor emitter.  
2) It is the power indicator (Green LED)(lights up when the power is ON) for the thru-beam type sensor emitter.

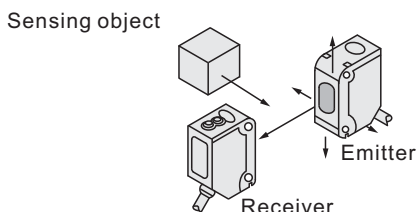
### Operation mode switch

Operation mode switch	Description
	Light-ON mode is obtained when the operation mode switch (located on the receiver for the thru-beam type) is turned fully clockwise(L side)
	Dark-ON mode is obtained when the operation mode switch (located on the receiver for the thru-beam type) is turned fully counterclockwise (D side).

### Beam alignment

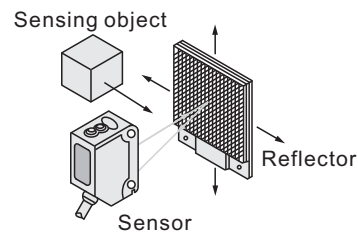
- Thru-beam type sensor

- Set the operation mode switch to the Light-ON mode position (L side).
- Placing the emitter and the receiver face to face along a straight line, move the emitter in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (orange). Then, set the emitter at the center of this range.
- Similarly, adjust for up, down, left and right angular movement of the emitter.
- Further, perform the angular adjustment for the receiver also.
- Check that the stability indicator (green) lights up.
- Choose the operation mode, Light-ON or Dark-ON, as per your requirement, with the operation mode switch.



- Retroreflective type sensor

- Set the operation mode switch to the Light-ON mode position(L side).
- Placing the sensor and the reflector face to face along a straight line, move the reflector in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (orange). Then, set the reflector at the center of this range.
- Similarly, adjust for up, down, left and right angular movement of the reflector.
- Further, perform the angular adjustment for the sensor also
- Check that the stability indicator(green) lights up.
- Choose the operation mode, Light-ON or Dark-ON, as per your requirement, with the operation mode switch.



### Sensitivity adjustment

Step	Sensitivity adjuster	Description
①		Turn the sensitivity adjuster fully counter-clockwise to the minimum sensitivity position, MIN.
②		In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point A 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 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, the position is point B)
④		The position at the middle of point A and B is the optimum sensing position.

Note: Use the 'minus' adjusting screwdriver( please arrange separately) to turn the adjuster slowly. Turning with excessive strength will cause damage to the adjuster.

	Light received condition	Dark condition
Thru-beam type		
Retroreflective type		
Diffuse reflective type and Narrow-view reflective type		

# CP31 SERIES

## Precautions For Proper Use

### Relation between output and indicators

In case of Light-ON			Sensing condition	In case of Dark-ON		
Stability indicator	Operation indicator	Output		Stability indicator	Operation indicator	Output
○	○	ON	Stable light receiving	OFF	●	○
●			●			
○	●	OFF	Unstable light receiving	ON	○	●
			Unstable dark receiving			○
○			Stable dark receiving			○

○ :Lights up    ● :Lights off

### Retroreflective type sensor with polarizing filters

- If a shiny object is covered or wrapped with a transparent film, such as those described below, the retroreflective type sensor with polarizing filters may not be able to detect it. In that case, follow the steps given below.

#### Example of sensing objects

- Can wrapped by clear film
- Aluminum sheet covered by plastic film
- Gold or silver color (specular) label or wrapping paper

#### Steps

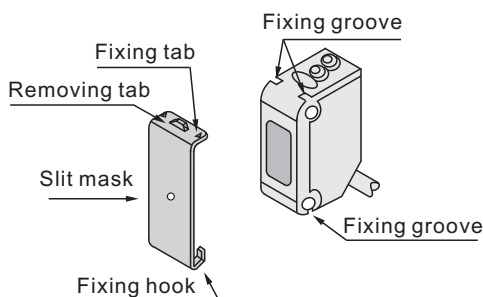
- Tilt the sensor with respect to the sensing object while fitting.
- Reduce the sensitivity.
- Increase the distance between the sensor and the sensing object.

### Slit mask (optional) (Exclusively for thru-beam type sensor)

- With the slit mask (OS-x), the sensor can detect a small object. However, the sensing range is reduced when the slit mask is mounted.

#### How to mount

Insert the fixing hook into the fixing groove. Then, pressing the slit mask against the main unit, insert the fixing tab into the fixing groove.

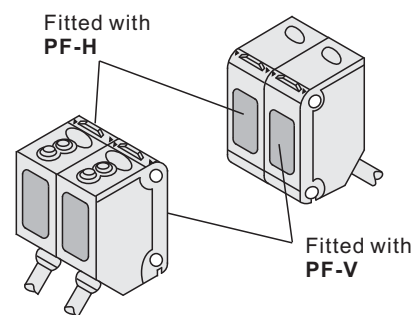


#### How to remove

Insert a screwdriver into the removing tab. Pull forward while lifting the remove tab.

### Interference prevention filter (Optional) (Exclusively for thru-beam type sensor)

- By mounting interference prevention filters (PF-x), two sets of CP31-T10000x-xX6xxUx can be mounted close together. However, the sensing range is reduced when the interference prevention filter is mounted.
- The filters can be mounted by the same method as for the slit masks.
- The two sets of sensors should be fitted with different types of interference prevention filters. The interference prevention does not work even if the filters are mounted for emitters only, receivers only or the same model No. Of the interference prevention filters are mounted on both the set of the sensor.



### Wiring

- Make sure to carry out the wiring in the power supply off condition.
- Take care that wrong wiring will damage the sensor.
- 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 product, 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.
- Extension up to total 100m (thru-beam type: both emitter and receiver) is possible with 0.3mm<sup>2</sup>, or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.

### Others

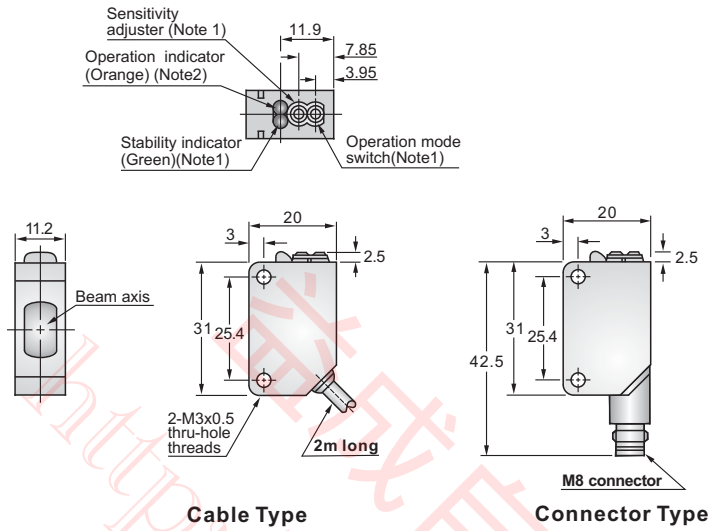
- Do not use during the initial transient time (50 ms) after the power supply is switched on.
- This sensor is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.



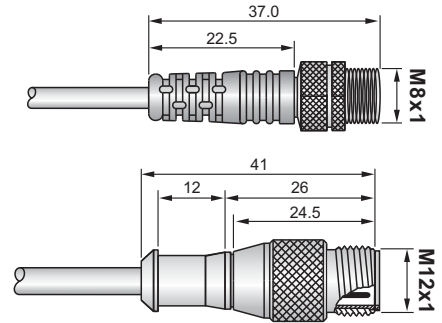
# CP31 SERIES

## Dimensions (Unit: mm)

### Sensor Type



### Pigtail\* Type



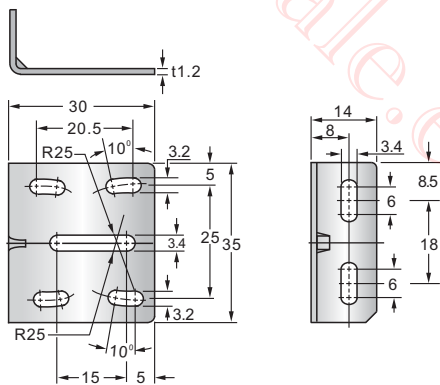
### Cable Type

### Connector Type

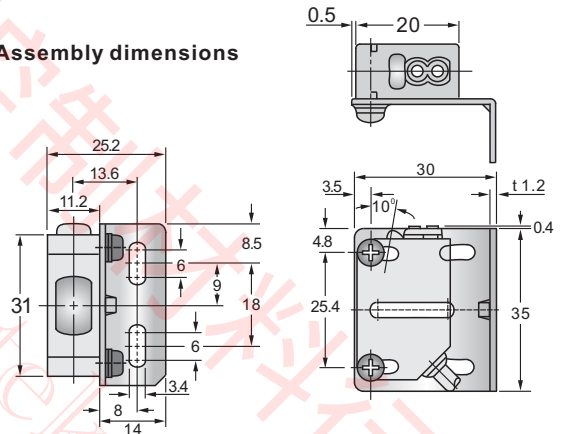
Notes: 1) Not incorporated on the emitter of thru-beam mode.  
2) It is the power indicator (green) on the emitter of thru-beam mode.

\*: Please see **Pigtail Series** or our **Cables & Connectors** catalogue for more information.

### MB-3530 (Sensor mounting bracket-optional)

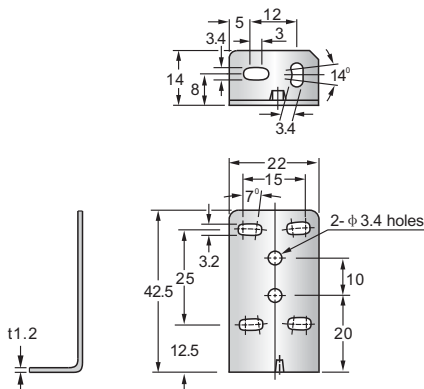


### Assembly dimensions

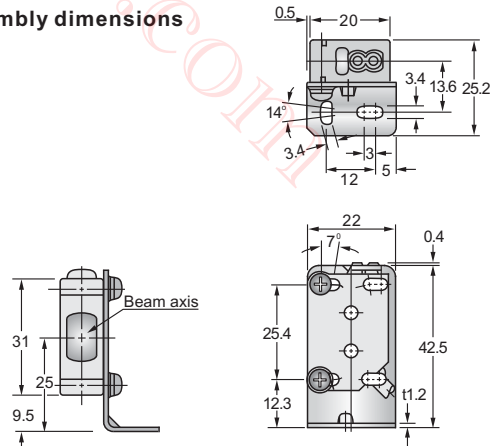


Material: Stainless steel (SUS 304)  
Two M3 (length 12mm) screws with washers are attached

### MB-4322 (Sensor mounting bracket-optional)



### Assembly dimensions

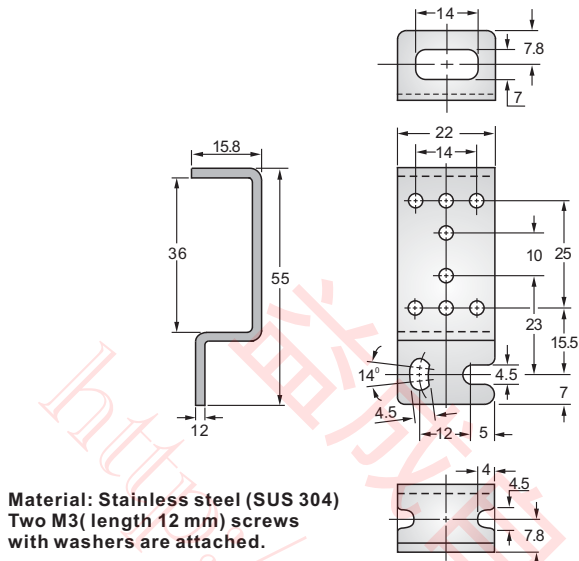


Material: Stainless steel (SUS 304)  
Two M3 (length 12mm) screws with washers are attached.

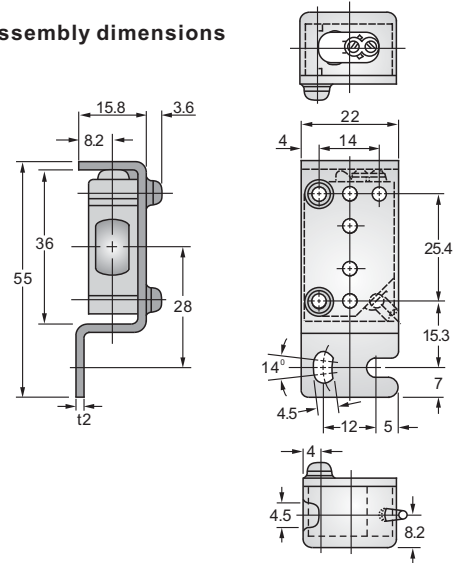
# CP31 SERIES

## Dimensions (Unit: mm)

### MB-5522 (Sensor mounting bracket-optional)

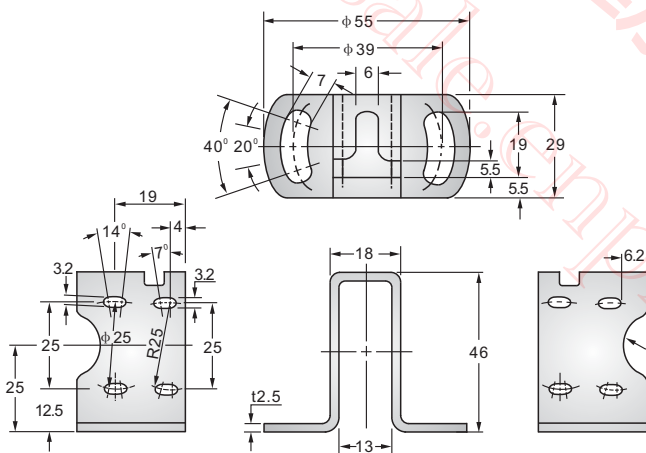


#### Assembly dimensions

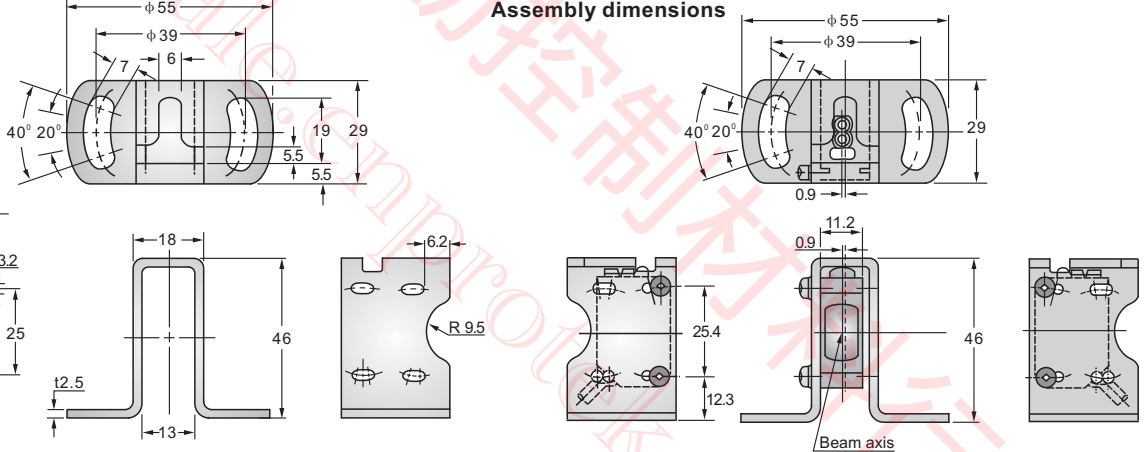


Material: Stainless steel (SUS 304)  
Two M3 (length 12 mm) screws with washers are attached.

### MB-4629 (Sensor mounting bracket-optional)

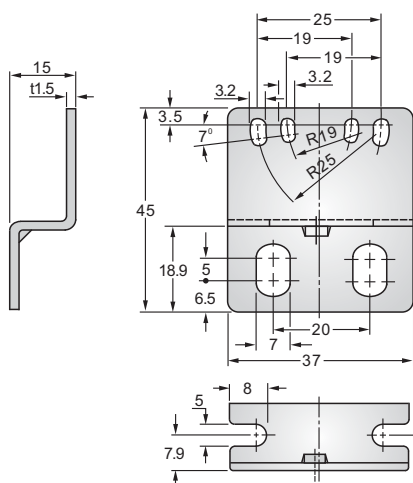


#### Assembly dimensions

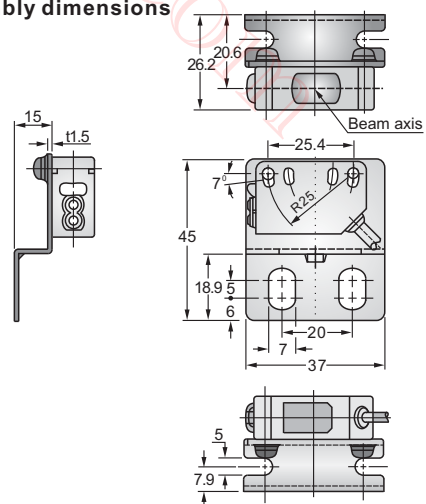


Material: Stainless steel (SUS 304). Two M3 (length 12 mm) screws with washers are attached.

### MB-4537 (Sensor mounting bracket-optional)



#### Assembly dimensions



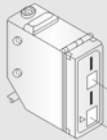
Material: Stainless steel (SUS 304)  
Two M3 (length 12 mm) screws with washers are attached.

# CP35 SERIES

## Advantage & Applications

### Advantage

#### Strong Light Beam

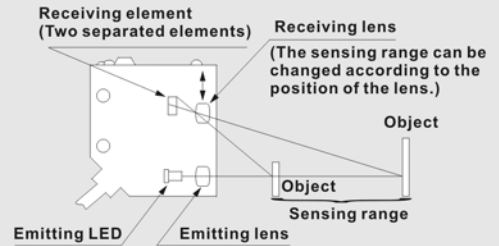


20 sheets of copy paper

CP35 series offers a strong light beam potential which passes through 20 sheets of paper. For easy maintenance, the sensor is an infrared LED light source strong against dust and dirt.

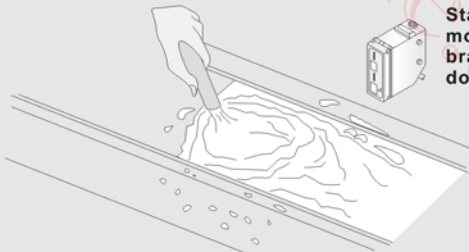
#### Optical systems

The sensing range that the sensor detects an object is settled by the incident beam angle regardless of the incident beam intensity.



#### Waterproof

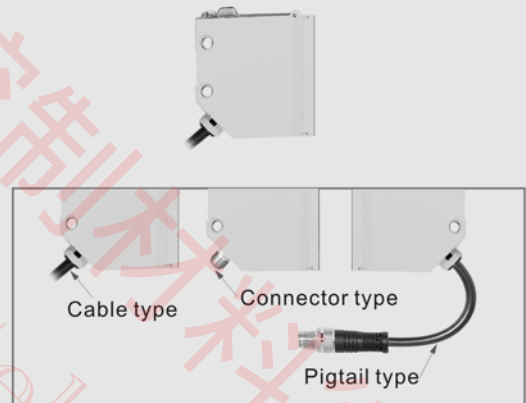
Achieves IP 67. The sensor can be put on machinery washed with water. The mounting bracket (option) is not corrosive as it is made of stainless steel material.



Stainless steel mounting bracket does not rust

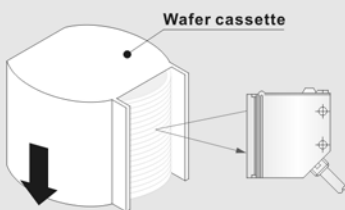
Caution: a water drop on the sensing face may cause the sensor generate the output.

#### Three connecting ways

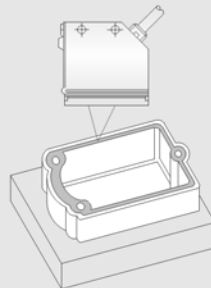


### Applications

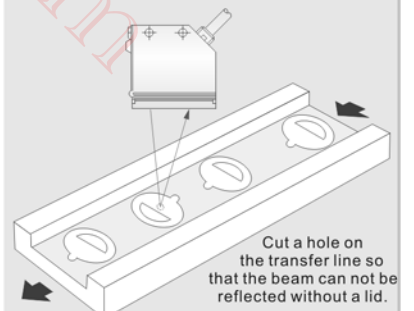
#### Wafer counting in cassette



#### Detecting Gasket on Die-casting







#### Detecting lids of cups



# CP35 SERIES

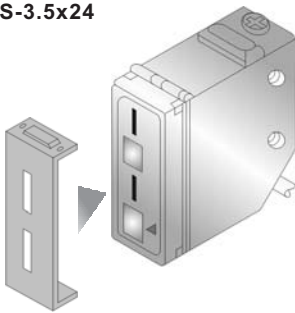
## Diffuse Mode with Background Suppression

Sensing Mode	Connection	Supply Voltage	Output Mode	Part Number
 <p>50 to 200mm</p> <p>Sensing Distance 50 to 200mm</p> <p>Infrared LED</p>	<b>2m Cable</b> 	10-30V DC	NPN	GP35-D0200N-CY9C3U2-BS
			PNP	GP35-D0200P-CY9C3U2-BS
	<b>Quick Disconnect (Pico-Style)</b> 	10-30V DC	NPN	GP35-D0200N-CY9Q4UP-BS
			PNP	GP35-D0200P-CY9Q4UP-BS
	<b>6" Pigtail (Pico-Style)</b> 	10-30V DC	NPN	GP35-D0200N-CY9P4UP-BS
			PNP	GP35-D0200P-CY9P4UP-BS

### Options

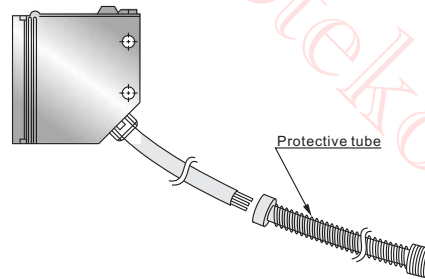
#### Narrow-view slit mask(optional)

RS-2.5x24  
RS-3.0x24  
RS-3.5x24



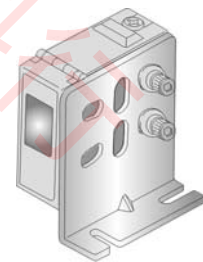
#### Protective tube (optional)

PT-RP500 / PT-RP1000



#### Sensor mounting bracket

MB-4537 (optional)



Two M4 hexagon-socket-head bolts are attached.

Ar: CP35 SERIES

Designation	Model No.	Description		
Narrow-view slit mask	RS-2.5x24	Slit size	2.5x24mm	The sensing view is narrowed laterally so that the sensor detects an object precisely.
	RS-3.0x24		3.0x24mm	
	RS-3.5x24		3.5x24mm	
Protective tube	PT-RP500	Length	500mm	Cable is protected from external forces. It does not rust because of stainless steel.
	PT-RP1000		1000mm	

**Note:**

In Preparation: Part numbers with a line through the middle

# CP35 SERIES

## Specifications

Type		Diffuse Mode with Background Suppression	
		NPN output type	PNP output type
Item	Model No.	CP35-D0200N-CY9xxUx-BS	CP35-D0200P-CY9xxUx-BS
<b>Sensing distance</b>		50 to 200 mm ( with 50x50mm non-glossy white paper)	
<b>Detectable target</b>		More than 30x30mm	
<b>Hysteresis</b>		Less than 10% of sensing distance	
<b>Repeat accuracy</b>		Axial direction: 1mm, Lateral direction to beam axis: 0.5mm to 5x5cm, non-glossy white paper	
<b>Power source</b>		10 to 30V DC 10% Ripple P-P 10% or less	
<b>Current consumption</b>		Less than 40mA	
<b>Sensing output</b>		NPN open-collector transistor Sink current : Max. 100mA Applied voltage: Max. 30V DC Residual voltage: Less than 1.5V at 100mA sink current Less than 0.4V at 16mA sink current	PNP open-collector transistor Source current : Max. 100mA Applied voltage: Max. 30V DC Residual voltage: Less than 1V at 100mA source current Less than 0.4V at 16mA source current
<b>Output operation</b>		Light-ON/Dark-ON selectable with selection switch	
<b>Short-circuit protection</b>		Incorporated	
<b>Response time</b>		Less than 1 ms	
<b>Operation indicator</b>		Red LED( illuminates when output is ON state)	
<b>Stability indicator</b>		Green LED( illuminates under stable light intensity condition or stable insufficient light intensity condition)	
<b>Distance adjuster</b>		Two revolution mechanical adjustor	
<b>Environmental resistance</b>	<b>Protection</b>	IP 67	
	<b>Ambient temperature</b>	-25 to +60°C (No dew condensation or icing allowed), storage: -30 to +70°C	
	<b>Ambient humidity</b>	35 to 85 % RH, Storage: 35 to 85% RH	
	<b>Extraneous light</b>	Sunlight: 10000 lx at the light receiving face, Incandescent light: 3000 lx at the light-receiving face.	
	<b>Noise</b>	Power line: 240Vp with 0.5us pulse duration, Radiation: 600Vp with 0.5us pulse duration (by noise simulator)	
	<b>Dielectric</b>	1000 V AC applied between live parts and enclosure for 1 min.	
	<b>Insulation</b>	More than 20M Ω applied between live parts and enclosure at 250V DC	
	<b>Vibration</b>	1.5mm amplitude at frequency of 10 to 500Hz in each of X, Y and Z directions for 3 times each in power OFF state	
	<b>Shock</b>	500m/s <sup>2</sup> (approx.50G) impulse in each of X, Y and Z directions for 2 hours each in power OFF state.	
<b>Emitting element</b>		Infrared LED (modulated)	
<b>Material</b>		Enclosure: Zinc die casting, Cover: Polyethersulphone, Lens: Polycarbonate	
<b>Cable</b>		0.15mm <sup>2</sup> x3cores with 1m of cabtyre cable.	
<b>Cable extension</b>		Up to 100m using more than 0.3mm <sup>2</sup> cable	
<b>Pigtail and connector</b>		See <b>Pigtail Series</b> or our <b>Cables &amp; Connectors</b> catalogue.	
<b>Weight</b>		85g approx.	
<b>Accessories</b>		MS-RP-1, MS-RP-2, PT-RP500, PT-RP1000, RS-2.5x24, RS-3.0x24, RS-3.5x24	

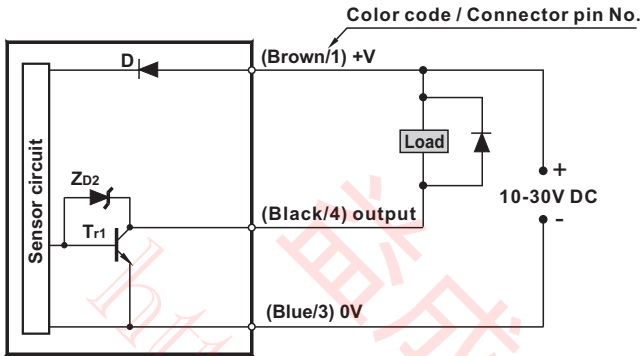
Ar: CP35 SERIES

# CP35 SERIES

## Connection Diagrams

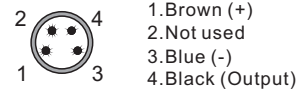
### NPN output type

#### I/O circuit diagram



#### Connector pin position

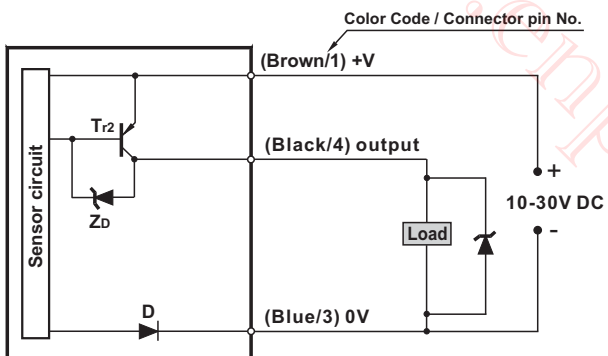
##### Pico-Style



Symbol...D : Reverse polarity protection diode.  
 ZD2: Surge absorption zener diode  
 Tr1 : NPN output transistor.

### PNP output type

#### I/O circuit diagram



#### Connector pin position

##### Pico-Style



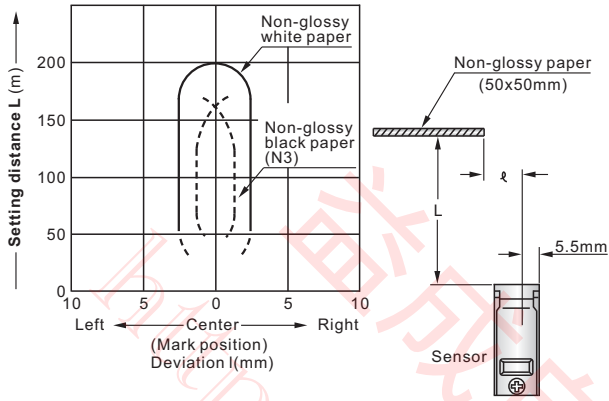
Symbol... D : Reverse supply polarity protection diode  
 ZD: Surge absorption zener diode.  
 Tr2: PNP output transistor.

# CP35 SERIES

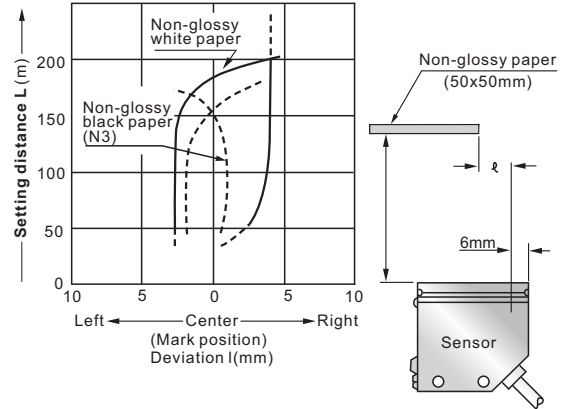
## Sensing Characteristics (Typical)

The span adjuster is so adjusted that a non-glossy white paper of 50x50mm is detected at a 200mm distance.

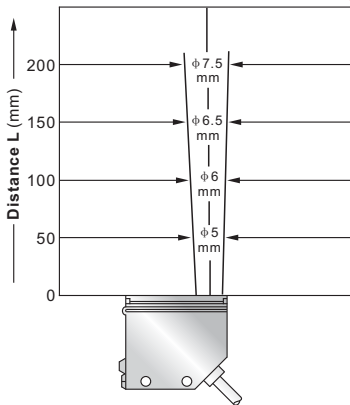
### ● Lateral approach



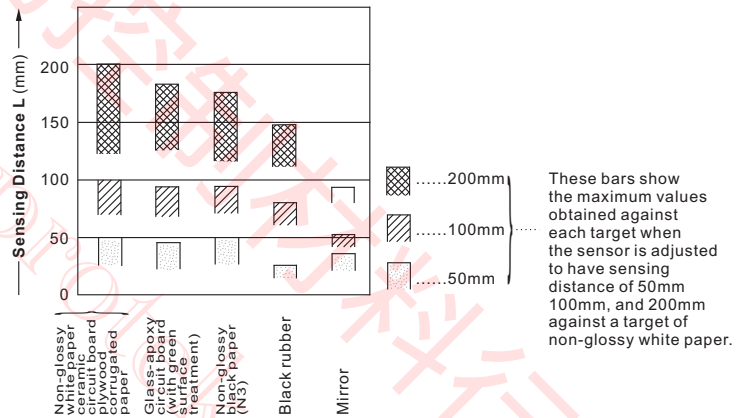
### ● Axial approach



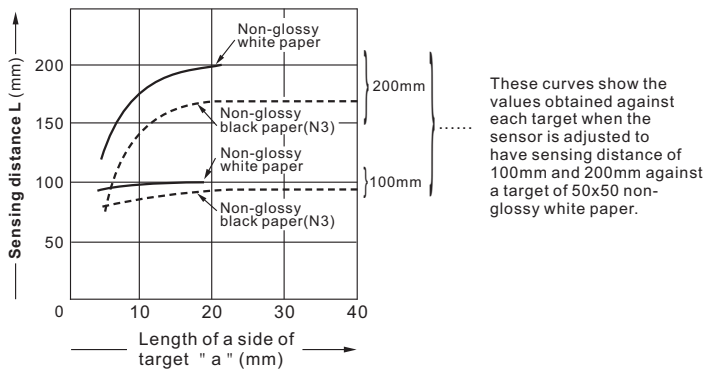
### Light Beam Pattern



### Material (50x50mm)---Sensing Distance correlation



### Target size-sensing distance correlation



Ar: CP35 SERIES

# CP35 SERIES

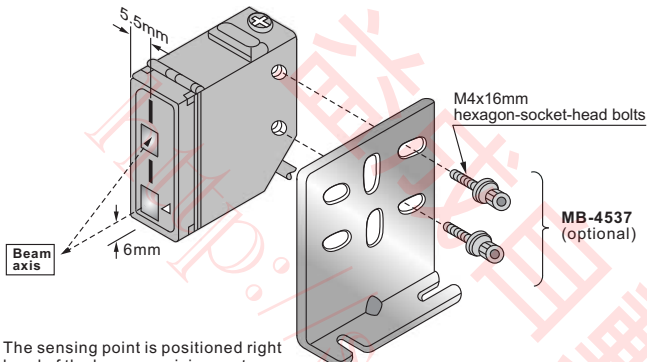
## Precautions For Proper Use



This products is not a safety sensor designed to intend to protect life and prevent bodily injury or property damage from dangerous parts of machinery, but a normal object detection sensor.

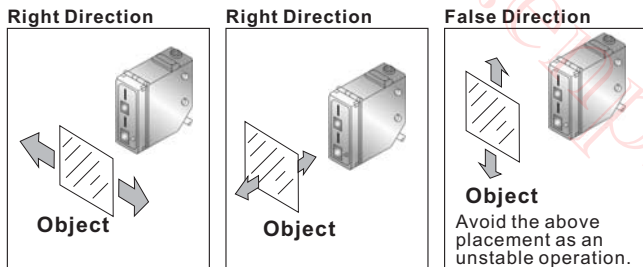
### Mounting

- The tightening torque should be 1.17N m{12kgf cm} or less.



The sensing point is positioned right head of the beam receiving part indicated by "◀" mark

- Before installing the sensor, make sure of the travelling direction of objects to attitude of the sensor facing to them.



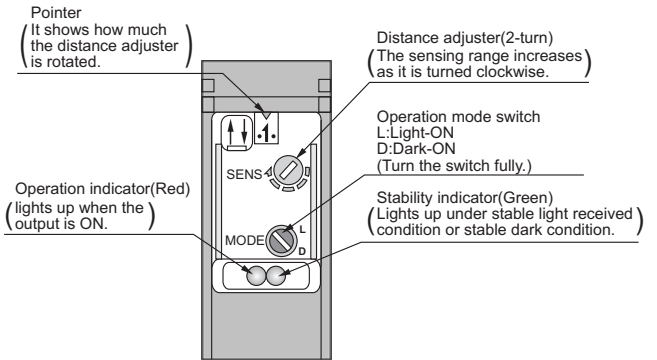
- With a specular sensing object such as an aluminum foil or a copper foil, or a glossy object polished or coated, the detectability may become unsteady by only a small change of the facing angle to the object.
- If there is a specular material facing the sensor even at a distance, it may affect the detectability. In that case, tilt the sensor to avoid the reflection on it.
- If there is a specular material or the like beyond a target object, the sensor may be affected by its angle change. In that case, tilt the sensor to avoid the reflection on the background changeable in angle and make sure of the detectability with the target object.
- Do not install the sensor near to an object less than 50mm because of the unstable detecting range.

### Others

The transient time duration is 50ms after power-up.

### Distance adjustment

#### • Adjusters



#### • Adjusting procedure

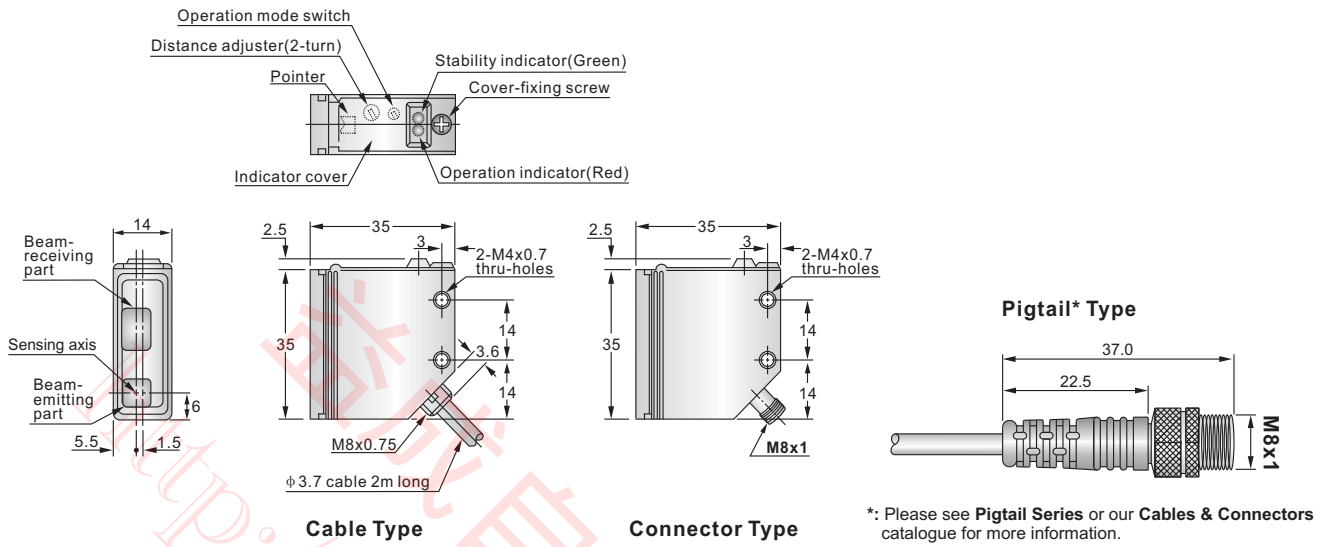
step	Description	Distance adjuster
1	Turn the distance adjuster fully counterclockwise to the minimum sensing ranges position(50 mm 1.969 in approx.). (Do not turn excessively.)	turn
2	Place an object at the required distance from the sensor, turn the distance adjuster gradually clockwise, and find out point 'A' where the sensor changes to the light received condition.	
3	Remove the object, turn the distance adjuster further clockwise, and find out point 'B' where the again with only the background. (When the sensor does not go to the light received condition even if the adjuster is fully turned clockwise, point 'B' is this extreme point.)	
4	The optimum position to stably detect objects is the center point between 'A' and 'B'	Optimum position



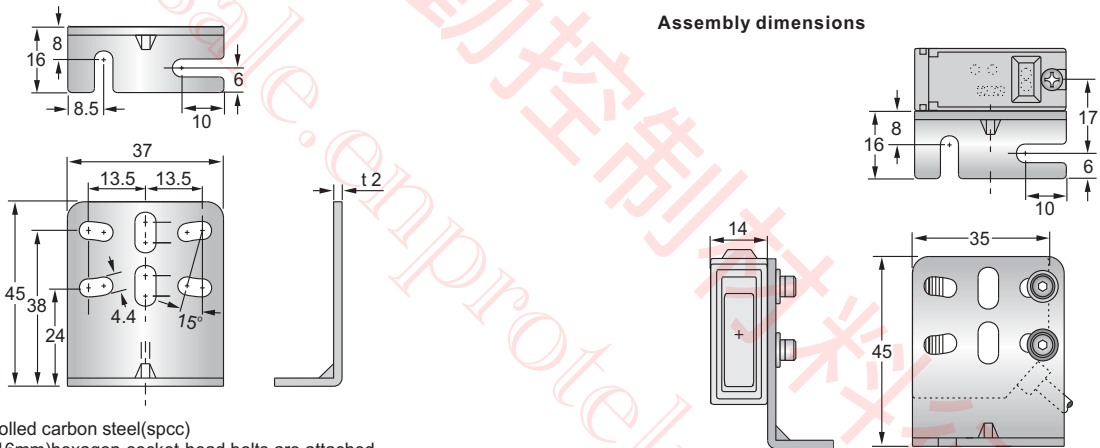
# CP35 SERIES

## Dimensions (Unit: mm)

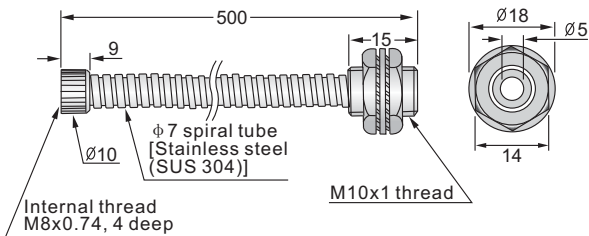
### Sensor Type



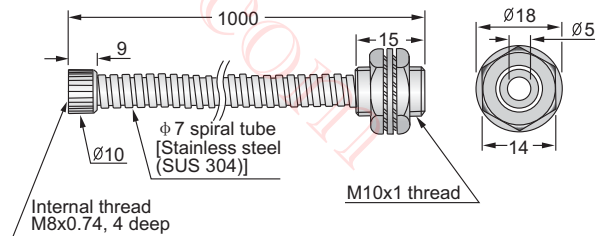
### MB-4537(Sensor mounting bracket-optional)



### PT-RP500 (Protective tube-optional)



### PT-RP1000 (Protective tube-optional)



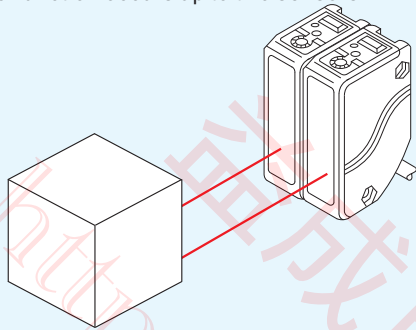
# CP68 SERIES

## Advantage & Applications

### Advantage

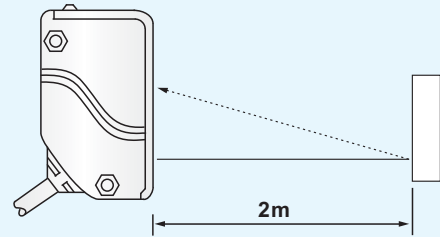
#### Automatic crosstalk prevention

Until the CP68 series, no other fixed-field sensing sensor has been equipped with the automatic crosstalk prevention. Even if mounted closely together or face to face, no malfunction occurs up to two sensors.



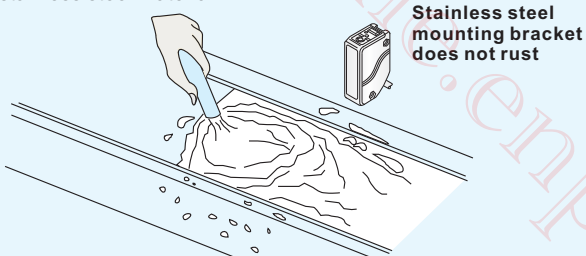
#### Long sensing range 2 m

The CP68 series catches an object 2m away. Long-range fixed-field sensing with sharp beam gives a variety of new ideas for your applications such as linear positioning or wide range detecting.



#### Waterproof

Achieves IP 67. The sensor can be put on machinery washed with water. The mounting bracket (option) is not corrosive as it is made of stainless steel material.

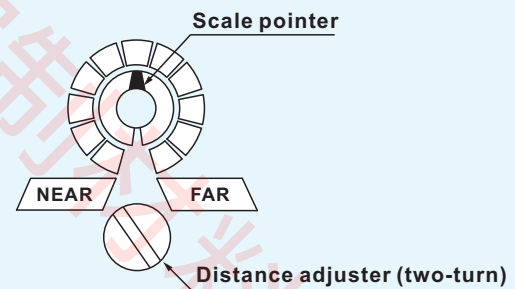


Stainless steel mounting bracket does not rust

Caution: a water drop on the sensing face may cause the sensor generate the output.

#### Two-turn adjuster with the indicator

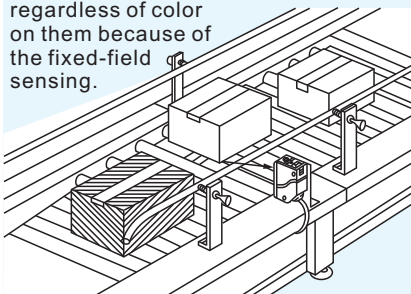
The CP68 series features the mechanical two-turn distance adjuster and the scale pointer that shows the set distance remarkably.



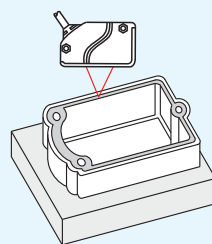
### Applications

#### Detecting cardboard boxes passing by

It securely detects cardboard boxes regardless of color on them because of the fixed-field sensing.

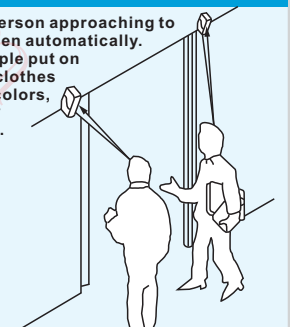


#### Detecting Gasket on Die-casting



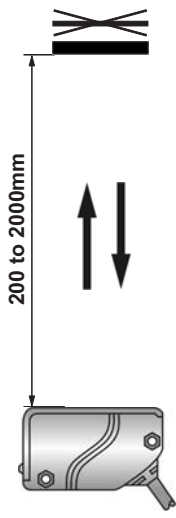



#### Detecting people in front of automatic door

They detect person approaching to the door to open automatically. Although people put on own-desired clothes with various colors, they perfectly detect people.



# CP68 SERIES

## Diffuse Mode with Background Suppression (Sn=2000 mm)

Sensing Mode	Connection	Supply Voltage	Output Mode	Part Number
<p>Light Source: Infrared LED</p>  <p>200 to 2000mm</p> <p>Diffuse Mode (with Background Suppression) Sensing Distance: 200 to 2000mm</p>	<p>2m Cable</p> 	<p>10-30V DC</p>	NPN	GP68-D2000N-CY9C3U2-BS
			PNP	GP68-D2000P-CY9C3U2-BS
			NPN/PNP	GP68-D2000D-CY9C4U2-BS
		<p>12~240V DC/ 24~240V AC</p>	SPDT Relay L.O./D.O. (4-wire)	<u>CP68-D2000R-CY9C4L2-BS</u>
			SPST Solid-state L.O./D.O. (2-wire)	GP68-D2000G-CY9C2U2-BS
	<p>Quick Disconnect</p> 	<p>10-30V DC (Euro-style)</p>	NPN	GP68-D2000N-CY9Q4UE-BS
			PNP	GP68-D2000P-CY9Q4UE-BS
			NPN/PNP	GP68-D2000D-CY9Q4UE-BS
		<p>12~240V DC/ 24~240V AC (Micro-style)</p>	SPDT Relay L.O./D.O. (4-wire)	GP68-D2000R-CY9Q4LM-BS
			SPST Solid-state L.O./D.O. (2-wire)	GP68-D2000G-CY9Q3UM-BS
<p>6" Pigtail</p> 	<p>10-30V DC (Euro-style)</p>	NPN	GP68-D2000N-CY9P4UE-BS	
		PNP	GP68-D2000P-CY9P4UE-BS	
		NPN/PNP	GP68-D2000D-CY9P4UE-BS	
	<p>12~240V DC/ 24~240V AC (Micro-style)</p>	SPDT Relay L.O./D.O. (4-wire)	<u>CP68-D2000R-CY9P4LM-BS</u>	
		SPST Solid-state L.O./D.O. (2-wire)	GP68-D2000G-CY9P3UM-BS	

**Note:**  
 Coming Soon : Part numbers with underline  
 In Preparation: Part numbers with a line through the middle

**CP68 SERIES****Specifications (DC)**

Type	Diffuse Mode with Background Suppression		
	NPN output type	PNP output type	
Item	Model No.	CP68-D2000N-CY9xxUx-BS	CP68-D2000P-CY9xxUx-BS
Adjustable range	0.2 to 2m		
Sensing range( with white non-glossy paper and adjuster in Max.)	0.1 to 2m		
Hysteresis	10% or less at operation distance		
Repeatability	Beam axial: 10mm or less, Perpendicular to beam axis: 1mm or less		
Supply voltage	10 to 30V DC Ripple P-P: 10% or less		
Current consumption	50mA or less	55mA or less	
Sensing output	NPN open-collector transistor Maximum sink current: 100mA Applied voltage: 30V DC or less Residual voltage: 1V or less( at 100mA sink current) 0.4V or less( at 16mA sink current)	PNP open-collector transistor Maximum source current: 100mA Applied voltage: 30V DC or less Residual voltage: 1V or less( at 100mA source current) 0.4V or less( at 16mA source current)	
Output operation	Selectable either Normally Open or Normally Closed		
Short-circuit protection	Incorporated		
Response time	2ms or less		
Operation indicator	Red LED (lights up when the output is activated)		
Stability indicator	Green LED (lights up during the stable Light or the stable Dark condition).		
Distance adjuster	Mechanical two-turn adjuster with scale pointer		
Automatic crosstalk prevention function	Incorporated		
Environmental resistance	Protection	IP 67	
	Ambient temperature	-20 to +55°C( No dew condensation nor icing allowed), storage:-25 to +70°C	
	Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH	
	Ambient light	Sunlight: 10000 lx at the light receiving face, Incandescent light: 3000 lx at the light-receiving face.	
	Noise immunity	Power line: 240Vp, 10ms cycle, and 0.5us pulse duration. Radiation: 300Vp, 10ms cycle, and 0.5us pulse duration (With noise simulator)	
	Withstand voltage	AC 1000V for one min. Between all terminals connected and enclosure.	
	Insulation resistivity	20MΩ or more at 250V Megger between all terminals connected and enclosure.	
	Vibration-proof	10 to 55Hz frequency, 0.75mm amplitude, and X, Y, and Z directions each for two hours (unenergized)	
	Shock-proof	500m/s <sup>2</sup> acceleration (approx.50G), and X, Y, and Z directions each for three times(unenergized)	
Emitting element	Infrared LED (modulated)		
Material	Polyarilate		
Connections	Cable type: 2m long PVC , Connector type: M12(Euro-style) connector, Pigtail type: See Pigtail Series or our Cables & Connectors catalogue.		
Cable extension	Extendable up to 100m long with equivalent cable of which core is 0.3mm <sup>2</sup> or more		
Weight	Approx. 150g		

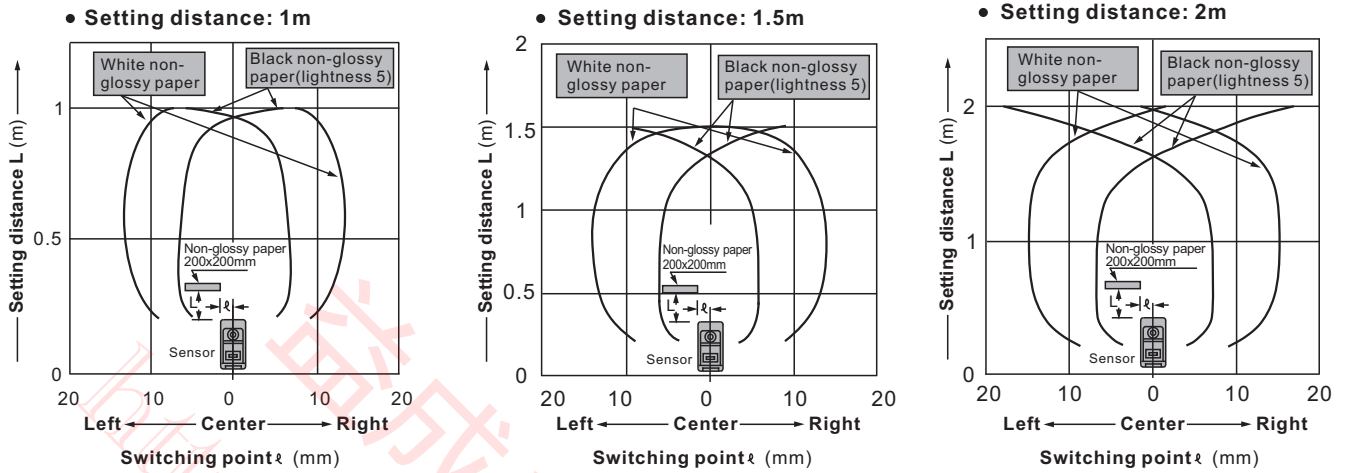
**CP68 SERIES****Specifications (AC/DC)**

Type	Diffuse Mode with Background Suppression		
Item	Model No.	RP68-D2000R-CY9C4L2-BS (Relay Type) RP68-D2000C-CY9C2U2-BS (2-wire type)	
Sensing range	0.2 to 2m		
Sensing object	Opaque, translucent or transparent object		
Hysteresis	10% or less of sensing distance		
Repeatability	0.3mm or less		
Supply voltage	12 to 240V DC	10% or 24 to 240V AC	10% Ripple P-P 10% or less
Switching Current Max.	3 VA		
Current consumption	< 30mA (no load)		
Output	<b>Relay contact 1c</b> <ul style="list-style-type: none"> <li>Switching capacity:250V AC 1A (resistive load) 30V DC 2A (resistive load)</li> <li>Electrical life:100,000 or more operations (at rated AC load) 500,000 or more operations (at rated DC load)</li> <li>Mechanical life:100,000,000 or more operations</li> </ul>		
Light/Dark Operation	Light-ON/Dark-ON selectable via switch		
Response time/Frequency	< 20ms / 25 Hz		
Operation indicator	Red LED (lights up under stable light received condition or stable dark condition )		
Stability indicator	Green LED (lights up under stable light received condition or stable dark condition)		
Sensitivity adjuster	Continuously variable adjuster		
Interference immunity	Incorporated (Two units of sensors can be mounted closely.)		
Pollution degree	3 (Industrial environment)		
Enclose category	IP 66 (IEC)		
Ambient temperature	-20 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: 11,000 lx at the light receiving face, Incandescent light: 3000 lx at the light-receiving face.		
EMC	IEC 60947-5-2, Parts 7.2.6.1.2.3 or RFI>3V/m(in 30-1000MHZ), EFT>1KV, ESD>4KV(contact)		
Voltage withstandability	IEC 60947-5-2 Parts 8.3.3.4, or 500V DC for one min between all supply terminals connected together and enclosure		
Insulation resistance	20M Ω ,or more, with 500V DC megger between all supply terminals		
Vibration resistance	IEC 60947-5-2, Part 7.4.2 or 10-55HZ, 1.0mm amplitude In X, Y and Z directions for 30 min		
Shock resistance	IEC 60947-5-2, Part 7.4.1 or 30g,11ms in X,Y and Z directions for six times each		
Emitting element	Infrared LED (modulated)		
Material	Enclosure: Acrylonitrile Butadine Styrene (ABS), Lens: Polycarbonate, Cover: Acrylonitrile Butadine Styrene (ABS), Front cover: Acrylic (retroreflective type sensor only)		
Connections	<b>Cable type:</b> 2m long PVC cable , <b>Connector type:</b> M12(Micro-style) connector, <b>Pigtail type:</b> See <b>Pigtail Series</b> or our <b>Cables &amp; Connectors</b> catalogue.		
Cable extension	Extendable up to 100m long with equivalent cable of which core is 0.3mm <sup>2</sup> or more		
Weight	150g approx.		

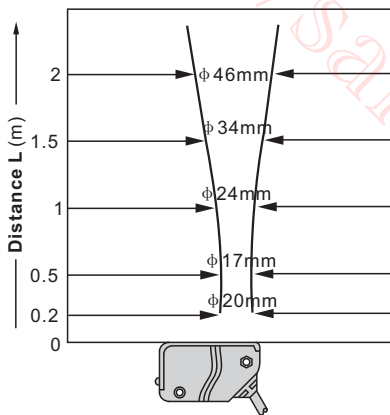
# CP68 SERIES

## Sensing Characteristics (Typical)

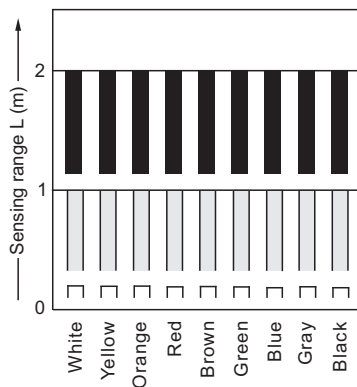
### Sensing Fields



### Emitting Beam



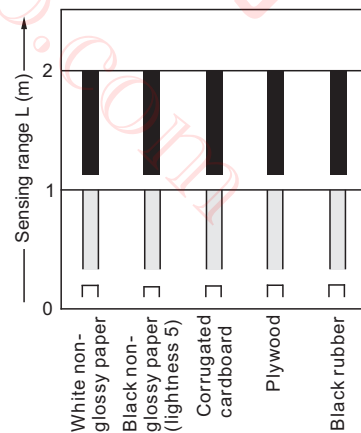
### Correlation between color (200x200mm non-glossy paper) and sensing range



...2m  
 ...1m  
 ...0.2m

These bars indicate the sensing range with the respective colors when the distance adjuster is set at the sensing range of **2m, 1m** and **0.2m** long, each, with white color. The sensing distance varies depending also on material.

### Correlation between material (200x200mm) and sensing range



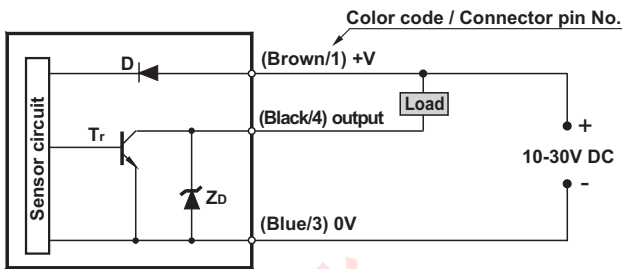
...2m  
 ...1m  
 ...0.2m

These bars indicate the sensing range with respective objects when the distance adjuster is set at the sensing range of **2m, 1m** and **0.2m** long, each, with white non-glossy paper.

# CP68 SERIES

## Connection Diagrams

### NPN output type



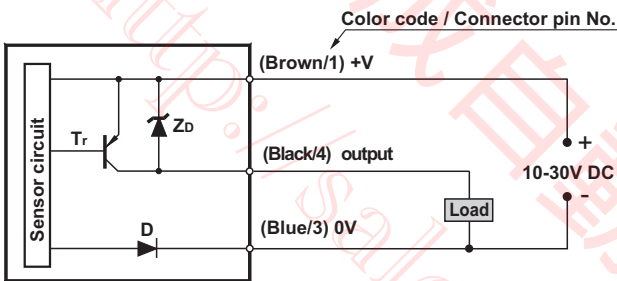
Symbol...D: Reverse polarity protection diode.  
Zd: Surge absorption zener diode.  
Tr: NPN output transistor.

### Connector pin position

#### Euro-style



### PNP output type



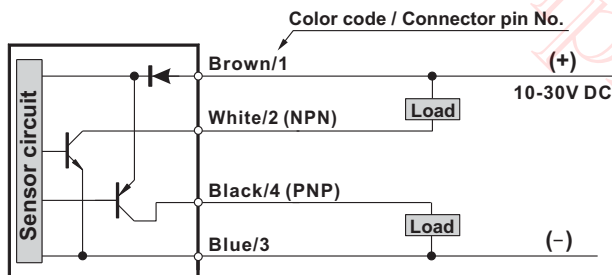
Symbol...D: Reverse polarity protection diode.  
Zd: Surge absorption zener diode.  
Tr: PNP output transistor.

### Connector pin position

#### Euro-style



### NPN/PNP output type

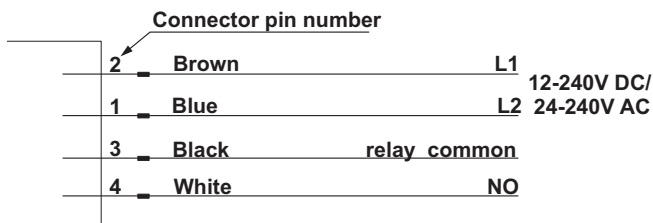


### Connector pin position

#### Euro-style



### Relay output (AC/DC)

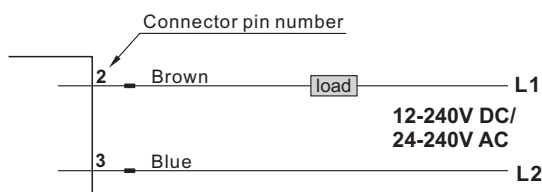


### Connector pin position

#### Micro-style

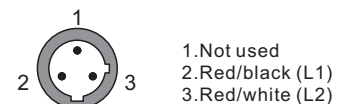


### SPST Solid-state output type (AC/DC)



### Connector face view

#### Micro-style



# CP68 SERIES

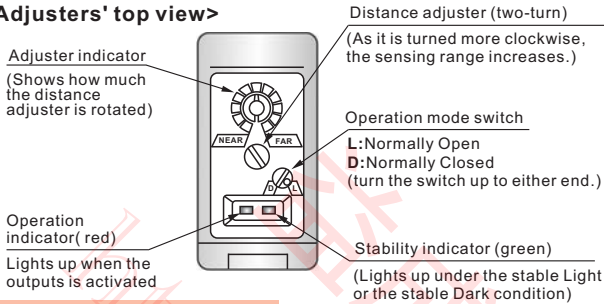
## Precautions For Proper Use



This products is not a safety sensor designed to intend to protect life and prevent bodily injury or property damage from dangerous parts of machinery, but a normal object detection sensor.

### Distance adjustment

#### <Adjusters' top view>



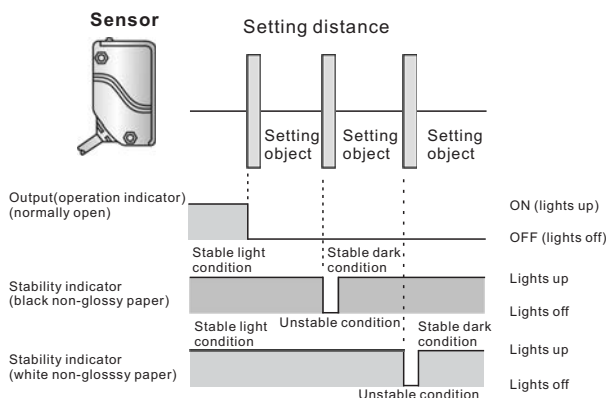
#### <Adjusting procedure>

1	Turn the distance adjuster counterclockwise fully to the minimum distance of approx. 0.2m.	
2	Locate your sample object at the place that you expect the sensor to detect. Turn the adjuster gradually clockwise and find out the point A where the sensor goes into the light condition.	
3	Remove the object. Turn the adjuster clockwise until the sensor goes into the light condition again. Once it switches on, turn the adjuster back a little until the sensor goes into the dark condition where called the point B. (If the sensor does not go into the light condition over the scale without the object, the point B shall be identified as the maximum point in the scale.)	
4	Settle the adjuster at the center between the point A and B that should be the optimum setting point to detect you object.	

(\*1): Turn the distance adjuster gradually and lightly with the attached screwdriver. If the distance adjuster is over-turned or pressed heavily, it may be damaged.

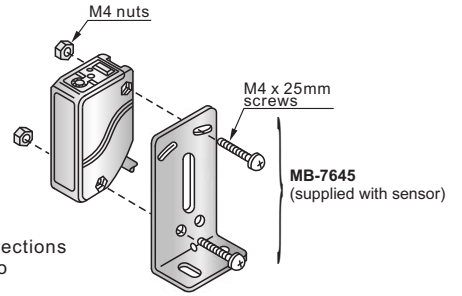
### Stability indicator

CP68 series incorporates the two-divided photo-diode as the receiving element. The sensor compares two parts of it; which one receives incident beam reflected by an object more intensely to the other. Because this optical system is based on the angle of incident beam, the sensor generates output relating to the distance between the sensor and the object. However, the stability indicator signifies the sufficiency of incident beam, not the distance operating. As an object is approaching to the sensor, the unstable condition that the indicator light off and immediately on again arises before the maximum operating point that the operation indicator lights up. It also shifts according to the difference of reflection ratio among objects. Make sure that the stability indicator always lights up while the sensor is detecting your object.

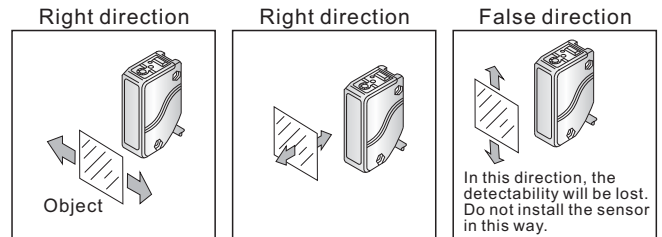


### Mounting

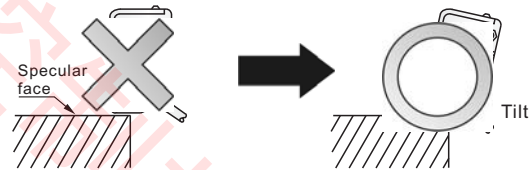
- Tightening torque should be 0.8N·m {8.2kgf·cm} or less



- Make sure which directions your objects move to the sensor.



- If your object is specular such as aluminum foil or copper foil, or its surface is painted or coated glossily, the sensor may not detect it by wrinkle on it or the severity of the sensing angle.
- Tilt the sensor slightly upwards to prevent the irregular reflection where the sensor is placed on a specular substance.



- If there is a specular substance or the like beyond the sensing field, the sensor may lose the detectability by slight angle change or motion of it. In such case, angle the sensor not to be affected and test the detectability in actual.
- Some object may produce the dead zone right in front of the sensor.

### Wiring

- Do not supply power while wiring.
- Verify that supply voltage ripple is within the rating.
- With a commercial switching regulator, ground the F.G. Terminal.
- Where equipment generating noise such as a switching regulator or an inverter motor is placed around the sensor, ground its F.G. Terminal.
- Do not run the sensor cable along any high-voltage or power cable in parallel or in a same raceway. It may cause a malfunction by induction.

### Other

Do not use the sensor output signal for 50ms immediately after the power is supplied to the sensor.

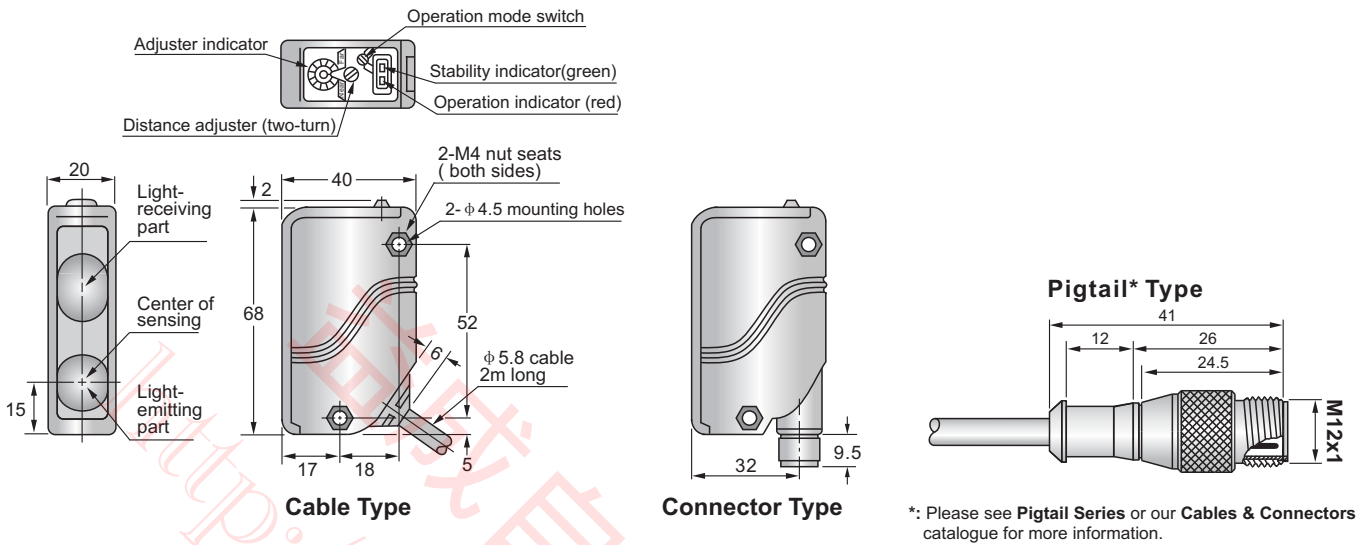
Avoid places where the sensor will be directly exposed to fluorescent lamp of rapid starter or high frequency lighting as it may affect the sensing performance.



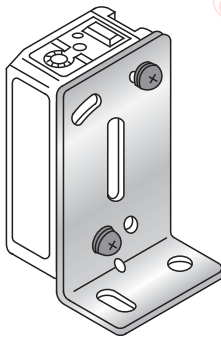
# CP68 SERIES

## Dimensions (Unit: mm)

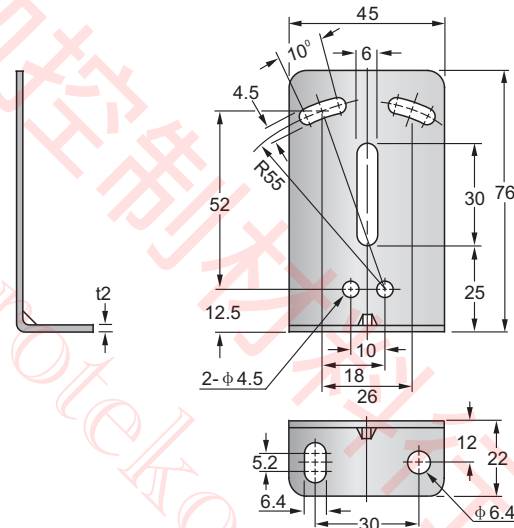
### Sensor Type



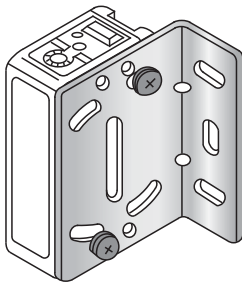
### MB-7645 (Sensor mounting bracket-supplied with sensor)



Material: Cold rolled carbon steel (SPCC)  
Two M4 (length 25mm) screws with washers and two M4 nuts are attached.



### MB-6954 (Sensor mounting bracket-optional)



Material: Cold rolled carbon steel (SPCC)  
Two M4 (length 25mm) screws with washers and two M4 nuts are attached.

