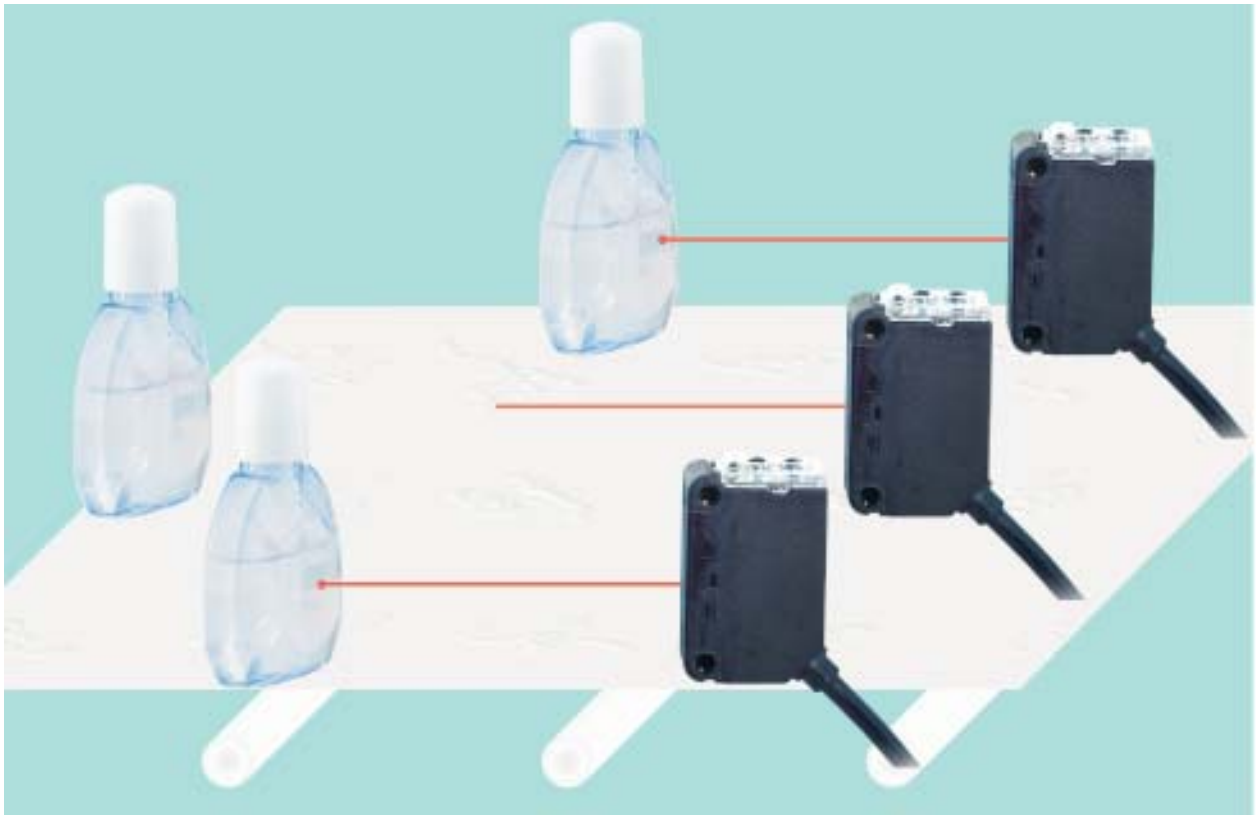
CP20 SERIES

Any target of any color and material can be detected at a consistent distance.....



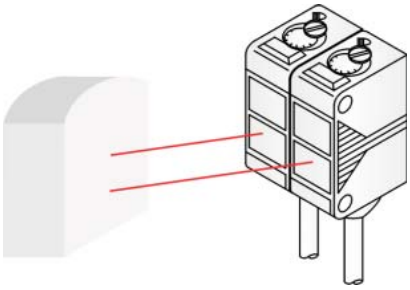
CP20 SERIES

PHOTOELECTRIC
ADVANTAGE AND APPLICATION

Advantage

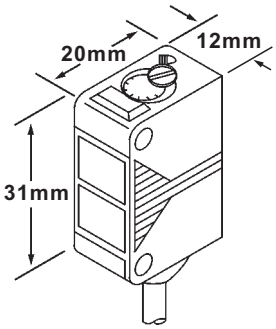
Equipped with auto crosstalk prevention function

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

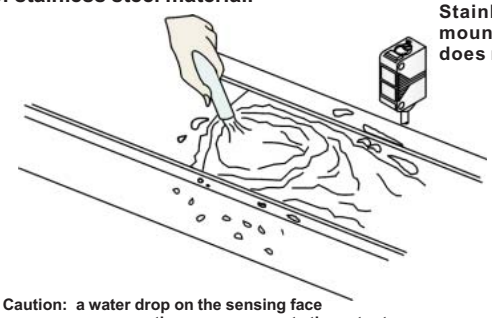
It realizes the space-saving.
(W12xH31xD20mm)



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.

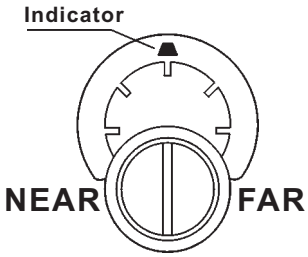
Stainless steel mounting bracket does not rust



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

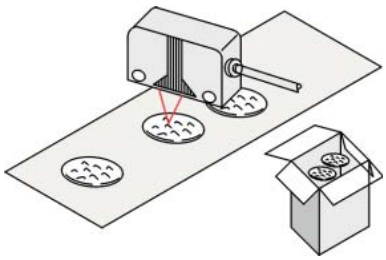
Two-turn adjuster with the indicator

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

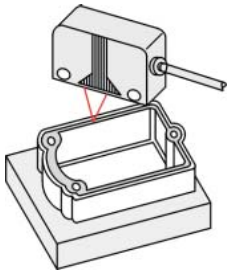


Application

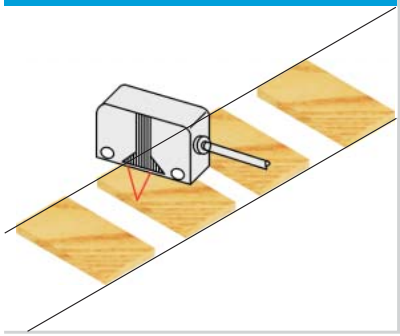
Sensing of thin-baked rice crackers



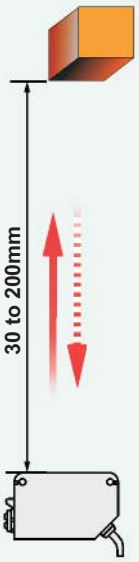
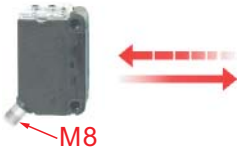
Detecting Gasket on Die-casting



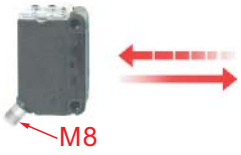
Positioning of veneer boards

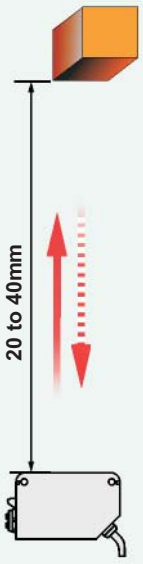


Order guide

Sensing mode	Appearance	Supply voltage	OUTPUT MODE	Part Number
 **Diffuse mode** sensing distance 30 to 200mm Red LED		10 to 30V DC	NPN light-ON	CP20-D0200N-LX6C4U2
			NPN dark-ON	CP20-D0200N-DX6C4U2
			PNP light-ON	CP20-D0200P-LX6C4U2
			PNP dark-ON	CP20-D0200P-DX6C4U2
		10 to 30V DC	NPN light-ON	CP20-D0200N-LX6P4UP
			NPN dark-ON	CP20-D0200N-DX6P4UP
			PNP light-ON	CP20-D0200P-LX6P4UP
			PNP dark-ON	CP20-D0200P-DX6P4UP
		10 to 30V DC	NPN light-ON	CP20-D0200N-LX6P4UE
			NPN dark-ON	CP20-D0200N-DX6P4UE
			PNP light-ON	CP20-D0200P-LX6P4UE
			PNP dark-ON	CP20-D0200P-DX6P4UE
		10 to 30V DC	NPN light-ON	CP20-D0200N-LX6Q4UP
			NPN dark-ON	CP20-D0200N-DX6Q4UP
			PNP light-ON	CP20-D0200P-LX6Q4UP
			PNP dark-ON	CP20-D0200P-DX6Q4UP
		10 to 30V DC	NPN light-ON	CP20-D0200N-LX6Q4UE
			NPN dark-ON	CP20-D0200N-DX6Q4UE
			PNP light-ON	CP20-D0200P-LX6Q4UE
			PNP dark-ON	CP20-D0200P-DX6Q4UE

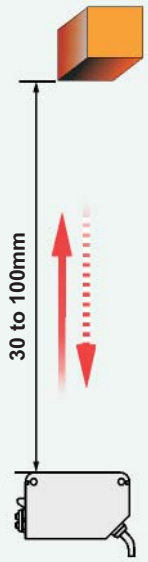
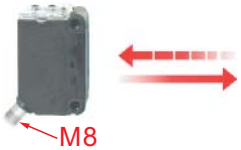
Order guide

Sensing mode	Appearance	Supply voltage	OUTPUT MODE	Part Number
Diffuse mode sensing distance 20 to 40mm Red LED		10 to 30V DC	NPN light-ON	CP20-D0040N-LX6C4U2
			NPN dark-ON	CP20-D0040N-DX6C4U2
			PNP light-ON	CP20-D0040P-LX6C4U2
			PNP dark-ON	CP20-D0040P-DX6C4U2
		10 to 30V DC	NPN light-ON	CP20-D0040N-LX6P4UP
			NPN dark-ON	CP20-D0040N-DX6P4UP
			PNP light-ON	CP20-D0040P-LX6P4UP
			PNP dark-ON	CP20-D0040P-DX6P4UP
		10 to 30V DC	NPN light-ON	CP20-D0040N-LX6P4UE
			NPN dark-ON	CP20-D0040N-DX6P4UE
			PNP light-ON	CP20-D0040P-LX6P4UE
			PNP dark-ON	CP20-D0040P-DX6P4UE
		10 to 30V DC	NPN light-ON	CP20-D0040N-LX6Q4UP
			NPN dark-ON	CP20-D0040N-DX6Q4UP
			PNP light-ON	CP20-D0040P-LX6Q4UP
			PNP dark-ON	CP20-D0040P-DX6Q4UP
		10 to 30V DC	NPN light-ON	CP20-D0040N-LX6Q4UE
			NPN dark-ON	CP20-D0040N-DX6Q4UE
			PNP light-ON	CP20-D0040P-LX6Q4UE
			PNP dark-ON	CP20-D0040P-DX6Q4UE



CP20 SERIES

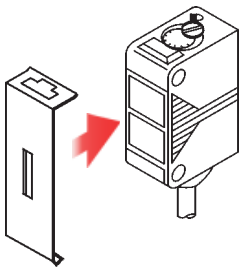
Order guide

Sensing mode	Appearance	Supply voltage	OUTPUT MODE	Part Number
 **Diffuse mode** sensing distance 30 to 100mm Red LED		10 to 30V DC	NPN light-ON	CP20-D0100N-LX6C4U2
			NPN dark-ON	CP20-D0100N-DX6C4U2
			PNP light-ON	CP20-D0100P-LX6C4U2
			PNP dark-ON	CP20-D0100P-DX6C4U2
		10 to 30V DC	NPN light-ON	CP20-D0100N-LX6P4UP
			NPN dark-ON	CP20-D0100N-DX6P4UP
			PNP light-ON	CP20-D0100P-LX6P4UP
			PNP dark-ON	CP20-D0100P-DX6P4UP
		10 to 30V DC	NPN light-ON	CP20-D0100N-LX6P4UE
			NPN dark-ON	CP20-D0100N-DX6P4UE
			PNP light-ON	CP20-D0100P-LX6P4UE
			PNP dark-ON	CP20-D0100P-DX6P4UE
		10 to 30V DC	NPN light-ON	CP20-D0100N-LX6Q4UP
			NPN dark-ON	CP20-D0100N-DX6Q4UP
			PNP light-ON	CP20-D0100P-LX6Q4UP
			PNP dark-ON	CP20-D0100P-DX6Q4UP
		10 to 30V DC	NPN light-ON	CP20-D0100N-LX6Q4UE
			NPN dark-ON	CP20-D0100N-DX6Q4UE
			PNP light-ON	CP20-D0100P-LX6Q4UE
			PNP dark-ON	CP20-D0100P-DX6Q4UE

Order guide

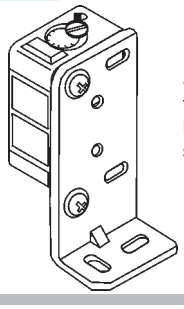
Narrow-view slit mask

RS-1.5x18



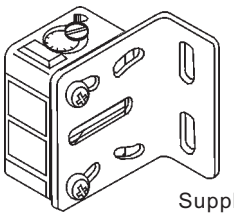
Sensor mounting bracket

SMB-3530



Supplied with two pieces of M3x18mm screws

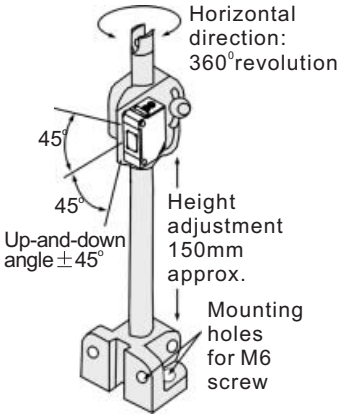
SMB-4522



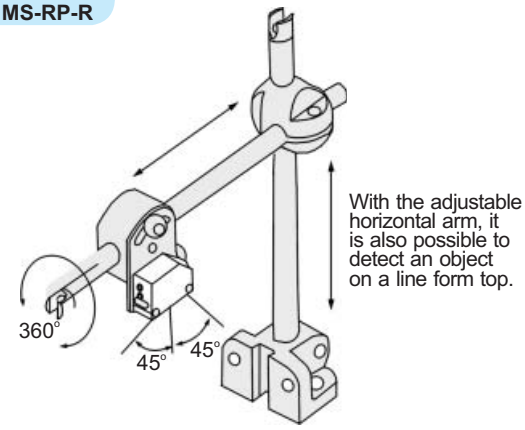
Supplied with two pieces of M3x18mm screws

Free adjustment sensor mounting stand

MS-RP-B



MS-RP-R



Component	Model No.	Description
Narrow-view slit mask(*1)	RS-1.5x18	It makes the horizontal view narrow, and surrounding influence of the sensing object little. (Slit size: 1.5x18 mm)
Sensor mounting bracket	SMB-3530	Vertical backward mounting bracket
	SMB-4522	Vertical mounting bracket
Free adjustment sensor mounting stand(*2)	MS-RP-B	Basic assembly
	MS-RP-R	Arm assembly

(*1): In case of using to CP20-D0200N-xX6x4Ux, CP20-D0200P-xX6x4Ux, the adjustable range is 30 to 160mm.
(*2): Please contact our distributors about Free adjustment sensor mounting stand.

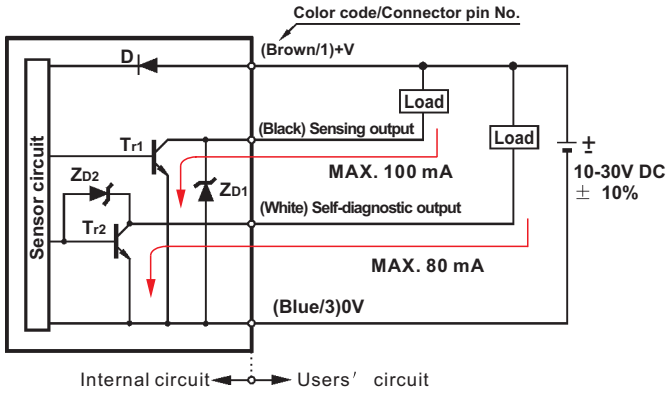
SPECIFICATIONS

SPECIFICATIONS

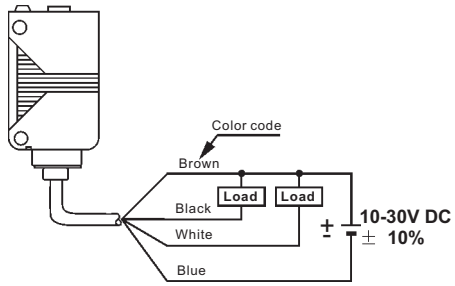
Item \ Type	NPN output type	PNP output type
Model No.	CP20-D0040N-xL6x4Ux CP20-D0100N-xL6x4Ux CP20-D0200N-xL6x4Ux	CP20-D0040P-xL6x4Ux CP20-D0100P-xL6x4Ux CP20-D0200P-xL6x4Ux
Sensing distance	50 to 200 mm (to 5x5cm, non-glossy white paper)	
Detectable target	More than 3x3cm	
Hysteresis	Less than 10% of sensing distance (to 5X5 cm, non-glossy white paper)	
Repeat accuracy	Axial direction: 1mm, Lateral direction to beam axis: 0.5mm to 5x5cm, non-glossy white paper	
Power source	10 to 30V DC ±10% Ripple P-P: Less than 10%	
Current consumption	Less than 40mA	
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 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(illuminates when output is ON state)	
Stability indicator	Green LED(illuminates under stable light intensity condition or stable insufficient light intensity condition)	
Distance adjuster	Two revolution mechanical adjustor	
Environmental resistance: Protection	IP 67	
Environmental resistance: Ambient temperature	-25 to +60℃ (No dew condensation or icing allowed), storage: -30 to +70℃	
Environmental resistance: Ambient humidity	35 to 85 % RH	
Environmental resistance: Extraneous light	Sunlight: 10000ℓx at the light receiving face, Incandescent light: 3000ℓx at the light-receiving face.	
Environmental resistance: Noise	Power line: 240Vp with 0.5us pulse duration, Radiation: 600Vp with 0.5us pulse duration (by noise simulator)	
Environmental resistance: Dielectric	1000 V AC applied between live parts and enclosure for 1 min.	
Environmental resistance: Insulation	More than 20MΩ applied between live parts and enclosure at 250V DC	
Environmental resistance: Vibration	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	
Environmental resistance: Shock	500m/s^2(approx.50G) impulse in each of X, Y and Z directions for 2 hours each in power OFF state.	
Emitting element	Red LED (modulated)	
Material	Enclosure: PBT (polybutylene terephthalate), lens: acrylic, front cover: acrylic	
Cable	0.2mm^2 4-cores of oil, heat and cold resistant cable of 2m long	
Cable extension	Extension up to total 100mby using a min. 0.3mm^2 cable	
Pigtail and connector	M8 pico 4pin+6” cable; M12 Euro 4pin+6” cable.	
Weight	85g approx.	

NPN output type

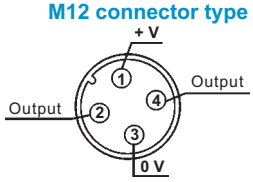
I/O circuit diagram



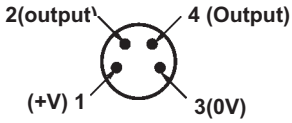
Symbol...D: Reverse polarity protection diode.
Z_{D1},Z_{D2}: Surge absorption zener diode.
Tr_1,Tr_2: NPN output transistor.



M12 connector type

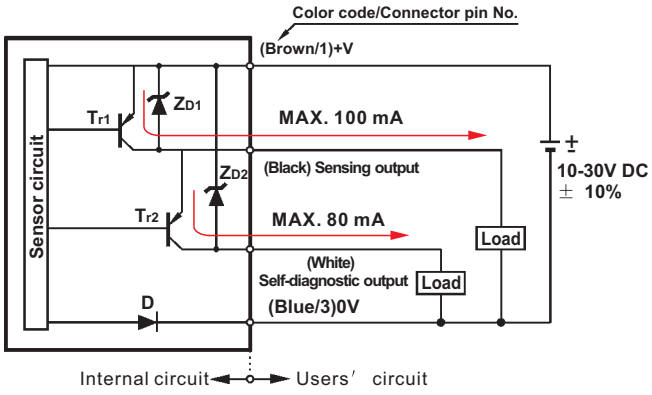


M8 connector type



PNP output type

I/O circuit diagram



Symbol...D: Reverse polarity protection diode.
Z_{D1},Z_{D2}: Surge absorption zener diode.
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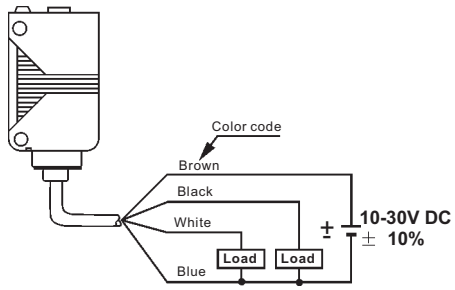
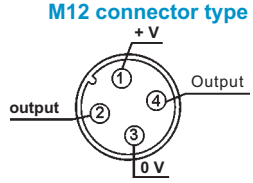
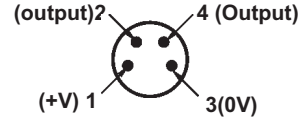


M12 connector type



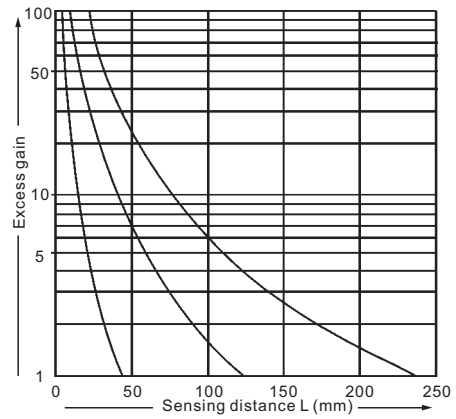
M8 connector type



SENSING FIELDS(TYPICAL)

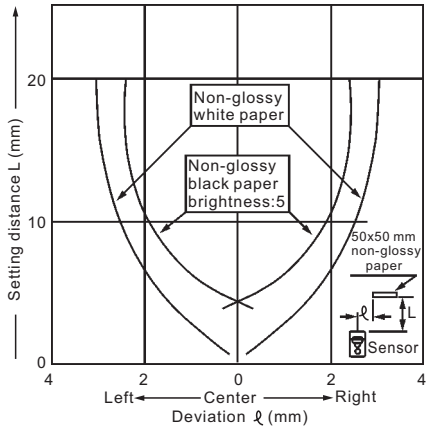
All models

Sensing range-Excess gain correlation

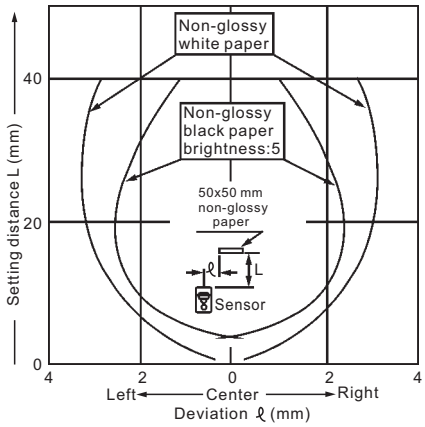


CP20-D0040N-xX6x4Ux CP20-D0040P-xX6x4Ux

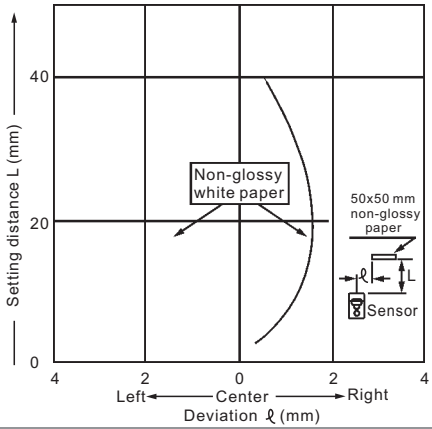
Setting distance at 20 mm



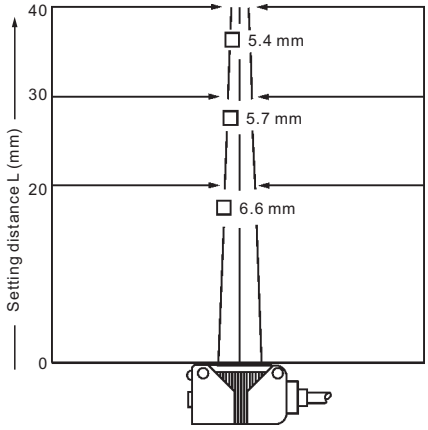
Setting distance at 40 mm



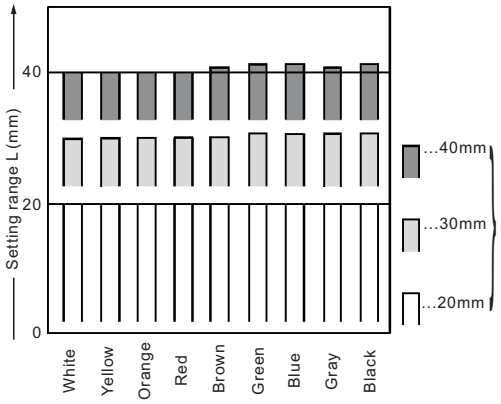
Setting distance at 40 mm with slit mask



Light-emitting characteristics

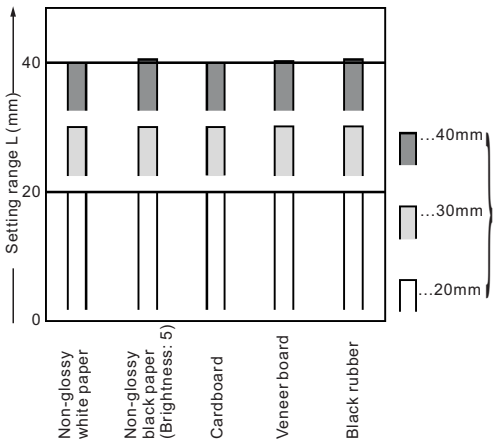


Color (50x50 mm)--Sensing range correlation



The graph shows the sensing ranges when detecting some colors under the condition adjusted the maximum sensing distance to each value(40mm, 30mm,20mm) with white paper.

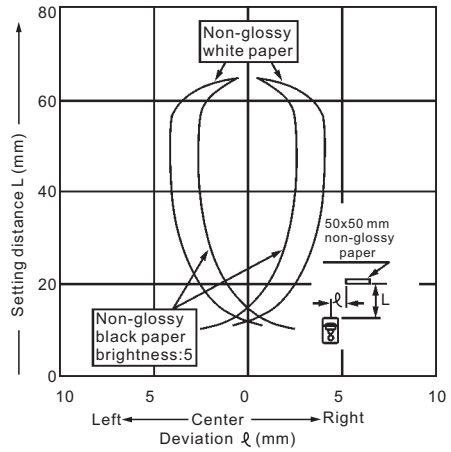
Material (50x50 mm)-- Sensing range correlation



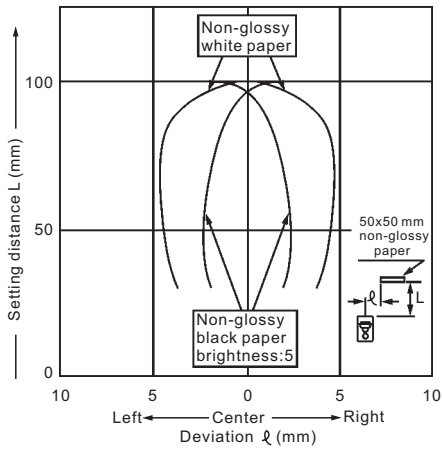
The graph shows the sensing ranges when detecting some kinds of objects under the condition adjusted the maximum sensing distance to each value (40mm, 30mm, 20mm) with non-glossy white paper.

CP20-D0100N-xX6x4Ux CP20-D0100P-xX6x4Ux

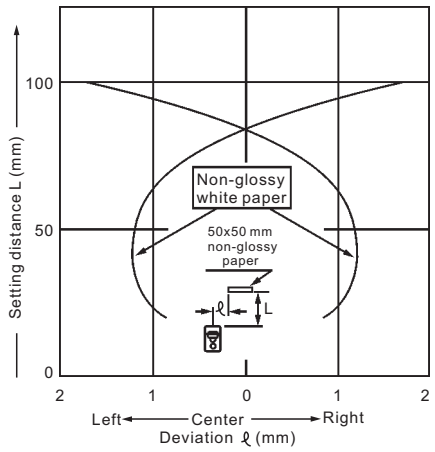
Setting distance at 65mm



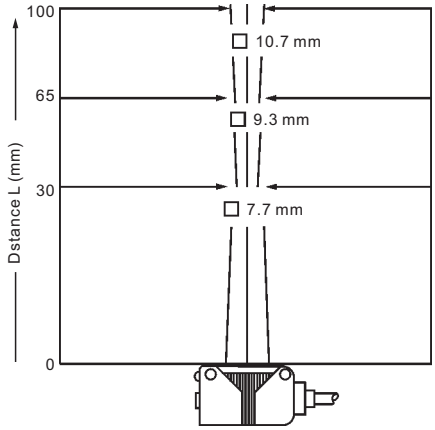
Setting distance at 100mm



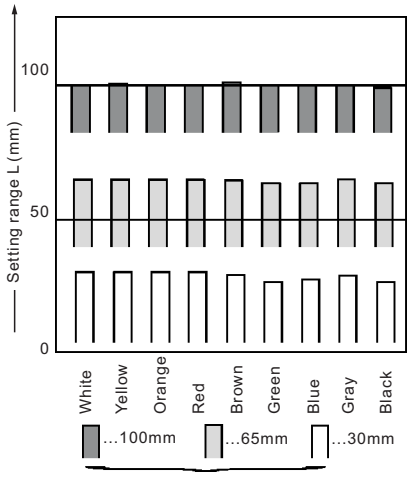
Setting distance at 100mm with slit mask



Light-emitting characteristics

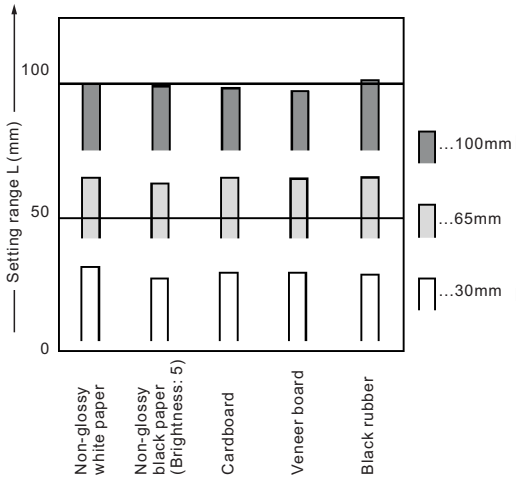


Color (50x50mm)--Sensing range correlation



The graph shows the sensing ranges when detecting some kinds of objects under the condition adjusted the maximum sensing distance to each value(100mm, 65mm, 30mm)with white.

Material (50x50mm)--Sensing range correlation

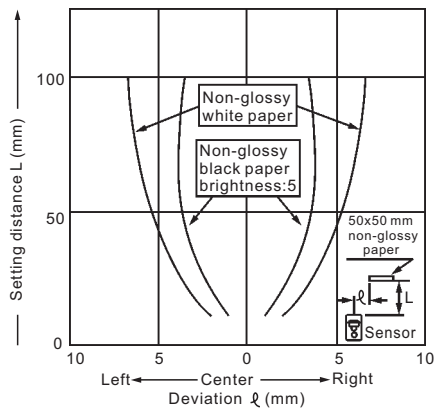


The graph shows the sensing ranges when detecting some kinds of objects under the condition adjusted the maximum sensing distance to each value (100 mm, 65mm, 30 mm)with non-glossy white paper.

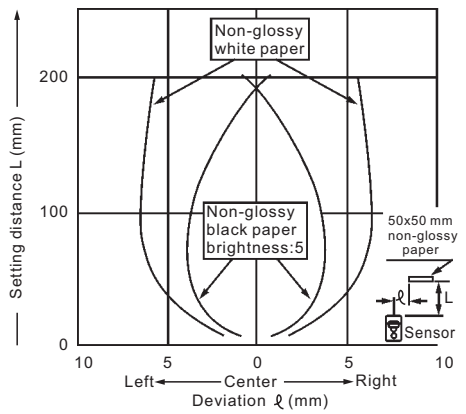
SENSING FIELDS(TYPICAL)

CP20-D0200P-xX6x4Ux CP20-D0200N-xX6x4Ux

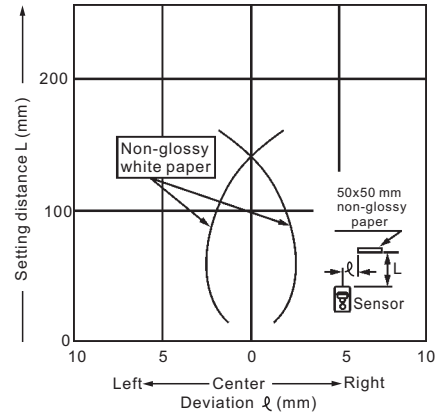
Setting distance at 100mm



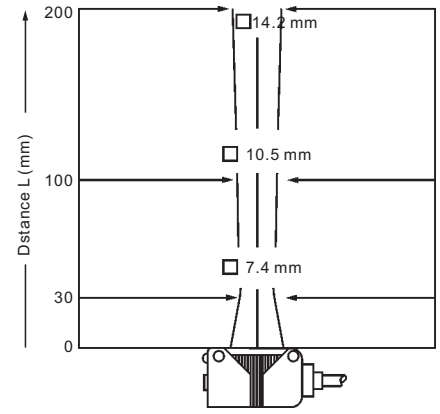
Setting distance at 200mm



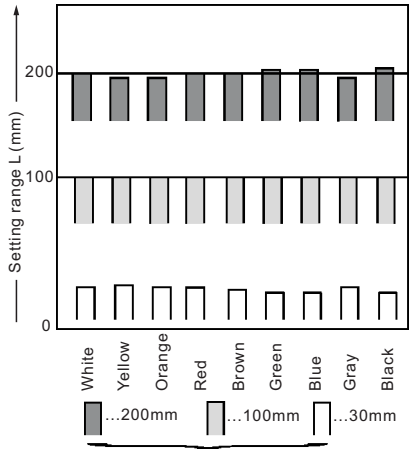
With slit mask (at MAX. adjuster)



Light-emitting characteristics

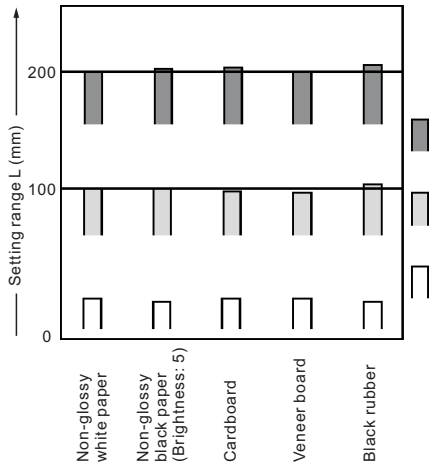


Color (50x50mm)--Sensing range correlation



The graph shows the sensing ranges when detecting some colors under the condition adjusted the maximum sensing distance to each value(200mm, 100mm, 30mm)with white.

Material (50x50mm)--Sensing range correlation

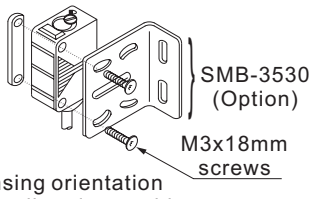


The graph shows the sensing ranges when detecting some kinds of objects under the condition adjusted the maximum sensing distance to each value (200 mm, 100mm,30 mm)with non-glossy white paper.

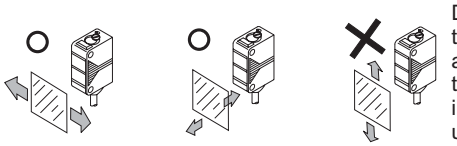
This products is not a safety sensor designed to intend to protect life and prevent bodily injury or property damage from dangerous parts of machinery, but a normal object detection sensor.

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

Do not make the sensor aim at an object on the left because it may cause the unstable detection.

Neither specular objects such as aluminum foil, copper foil, or so nor shinny 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 missdetection where a specular material presents under it.

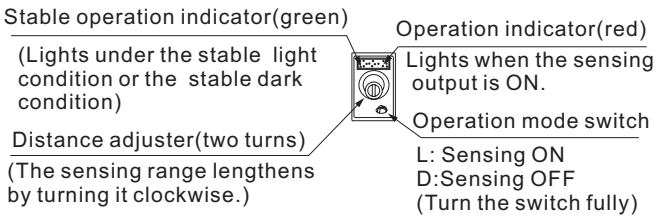
The sensor should lose the detect ability if any specular or shinny materials behind objects might slightly change the angle toward it (background influence). In such case, the sensor should be angled against them and fixed again, then tested the operation to eliminate any miss-detection.

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

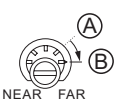
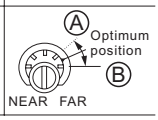
Notice that a dead zone will appear in right front of the sensor when the distance adjuster is set in NEAR side.

Distance adjustment

<Adjusters>



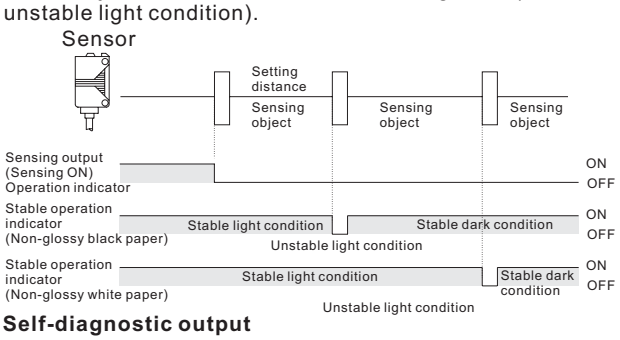
<Setting procedure>

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 " Ⓐ " point where the sensor changes into the light condition.	
③	Remove the object, turn the distance adjuster still clockwise, and find out "Ⓑ" 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, "Ⓑ" point should be at the maximum point in the range.)	
④	The optimum position to stably detect objects must be the center between "Ⓐ" and "Ⓑ" point.	

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

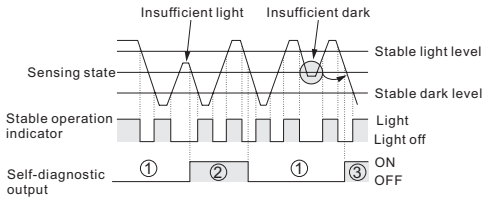
Stable operation indicator

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

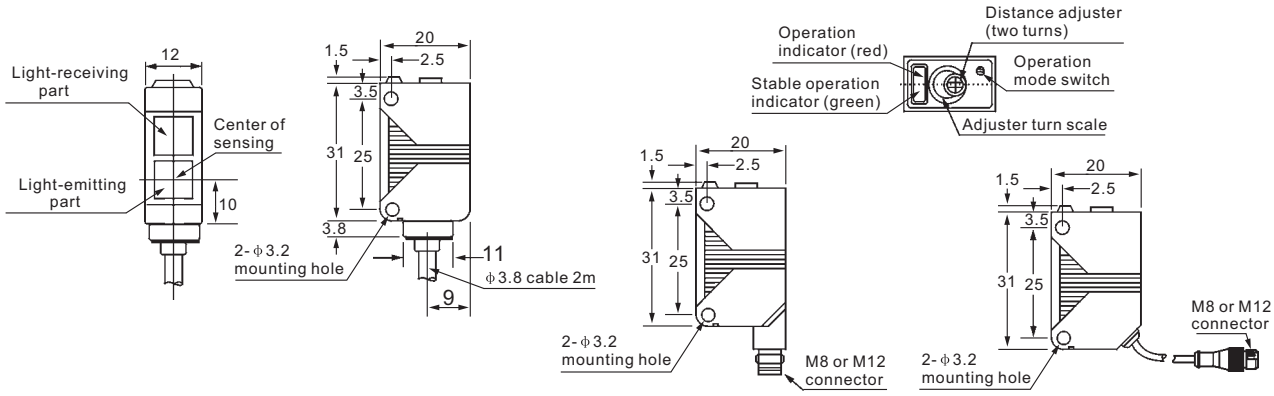
Short-circuit protection is not equipped for the self-diagnostic output. Do not connect it directly to the power supply or capacitive load.
Power supply should be turned off before wiring.
Verify voltage fluctuation so that it should not exceed the rated value.
When using a switching regulator readily 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

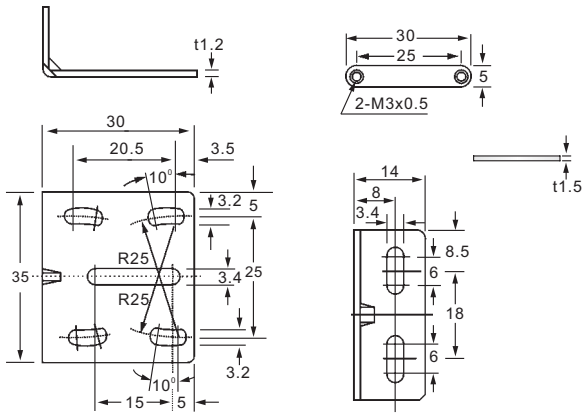
Do not use the sensor output signal for 50ms immediately after the power is supplied to the sensor.
Avoid places where the sensor may be directly exposed to fluorescent lights with rapid-starters or high frequency lighting as it may affect the sensing performance.

DIMENSIONS(Unit:mm)

CP20-D0040N-xL6x4Ux CP20-D0100N-xL6x4Ux CP20-D0200N-xL6x4Ux
CP20-D0040P-xL6x4Ux CP20-D0100P-xL6x4Ux CP20-D0200P-xL6x4Ux

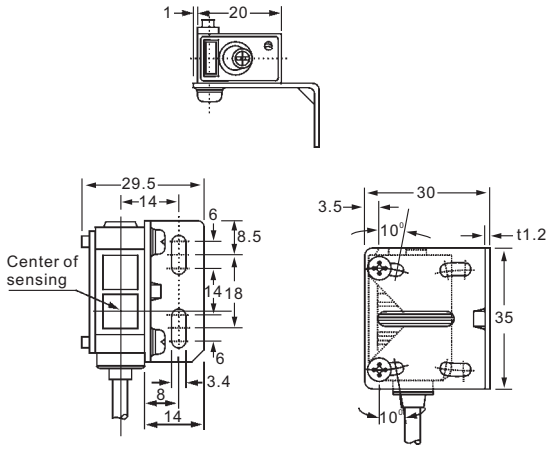


SMB-3530 Sensor mounting bracket (option)

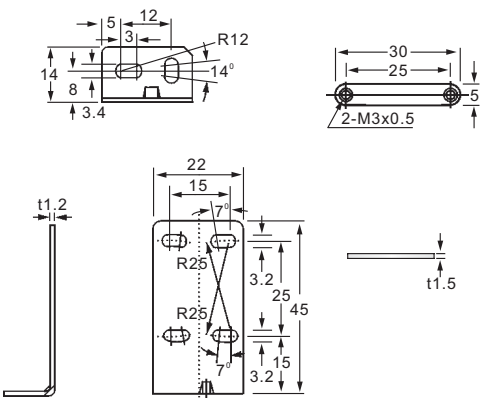


Material: SUS 304
Supplied with two pieces of M3x18mm screws

Mounting drawing



SMB-4522 Sensor mounting bracket (option)



Material: SUS 304
Supplied with two pieces of M3x18mm screws

Mounting drawing