SUNX

COMPACT PHOTOELECTRIC SENSOR **Amplifier Built-in**

New

CX-400 SERIES

CE Conforming to EMC Directive

UL Recognition

World Standard

New world standard photoelectric sensors from SUNX!

The keywords that are fundamental to basic operation of sensors are 'Less' and 'Strong'.
By pursuing 'less' waste, the sensors become easier to use, and they are more thoroughly suited to their environment.
Furthermore, the sensors are 'Strong' to maintain fully reliable and stable levels of performance, no matter how adverse the work environment.
SUNX brings to you the leading benchmark in sensors for the 21st century.

The ideal sensors that are people and environmentally friendly are born from the concept of 'less' waste.

Less man-hours

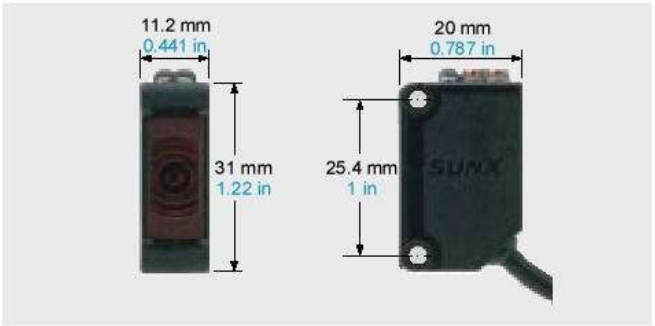
It is very important to select the right type of sensor from the many types available.
The **CX-400** series has a high level of basic functionality and excellent cost performance, and furthermore the wide number of variations mean that there is sure to be a sensor that fits you needs. The **CX-400** series lets you spend less time selecting.

Type	Sensing range	Output		Connecting method			Cable length type		
Thru-beam	10 m 32.808 ft	NPN	PNP	Cable type	M8 Plug-in connector type	M12 Pigtailed type	0.5 m 1.64 ft	2 m 6.562 ft	5 m 16.404 ft
Retroreflective (with polarizing filters)	3 m 9.845 ft								
Diffuse reflective (long sensing range)	800 mm 31.496 in								
Diffuse reflective (short sensing range)	300 mm 11.811 in								
Narrow-view reflective	70 to 200 mm 2.756 to 7.874 in								

Less space

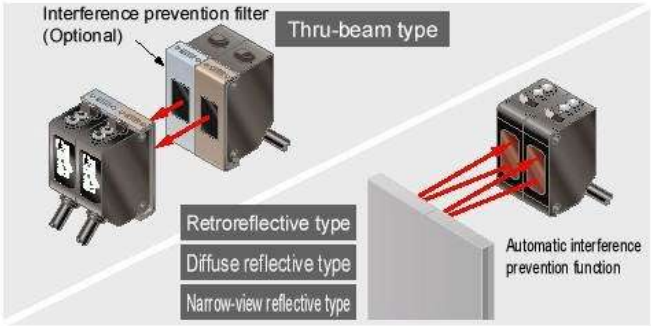
Compact size

The sensors are compact in size at W11.2 × H31 × D20 mm W0.441 × H1.22 × D0.787 in.
The mounting pitch is also at the world standard size of 25.4 mm 1 in.



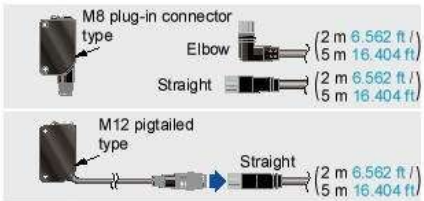
Two sensors can be mounted close together

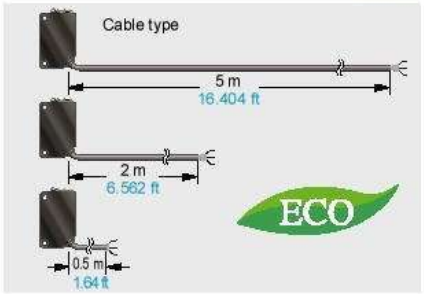
The interference prevention function lets two sensors of any types to be mounted close together precisely.



Less processing

All models are available in M8 plug-in connector type and M12 pigtailed type. This contributes to less time spent in setting up. In addition, cable types are available with cable lengths of 0.5 m 1.64 ft, 2 m 6.562 ft and 5 m 16.404 ft. This results in less wastage.





Less power consumed

These sensors are low current consumption types that use 60% of the power for previous models. They also contribute to preserving the environment.

Less resources used

For environmental considerations, simplified packaging is adopted in order to use less natural resources.
In addition, the bag is made from polyethylene which produces no toxic gases even when burned.

'Strong' against even the harshest conditions is the guarantee of reliability.

Strong against coolant liquids

The enclosure material is made from PBT which is strongly resistant to coolants. These sensors can be used with confidence even around metal processing machinery that disperses oil mists. The protection mechanism also conforms to IP67 (IEC).

Strong against noise

The sensors are fully protected against electrical noise and extraneous light such as inverter light.

Strong even in cold environments

Stable performance can be maintained even in environments of −25 °C −13 °F.

A varied lineup that is suitable for a variety of applications.

Thru-beam type

Sensing at long distances of up to 10 m 32.808 ft is possible. Sufficient beam power can even be obtained in areas with lots of dust and steam.

Retroreflective type with polarizing filters

Polarizing filters allow stable sensing of even highly-reflective objects.

Diffuse reflective type (short sensing range)

Objects that pass near the sensing surface can be sensed with high accuracy.

Diffuse reflective type (long sensing range)

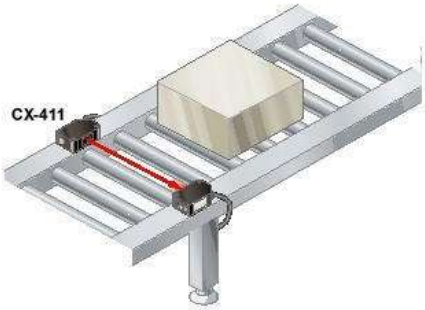
Sensing at long distances of up to 800 mm 31.496 in is possible. They allow greater flexibility during setup.

Narrow-view reflective type

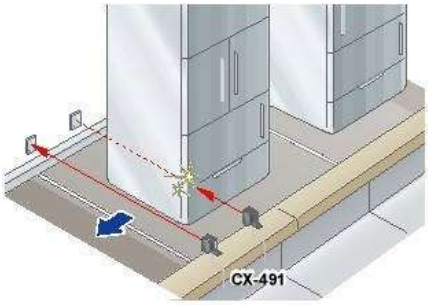
These sensors are ideal for sensing through narrow gaps. In addition, red spot light is used, so the sensing points can be identified and settings can be made more easily.

APPLICATIONS

Detecting object on conveyor line

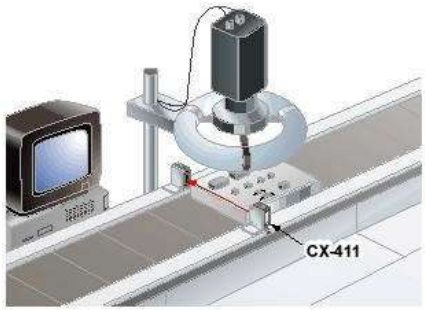


Sensing large electrical appliances

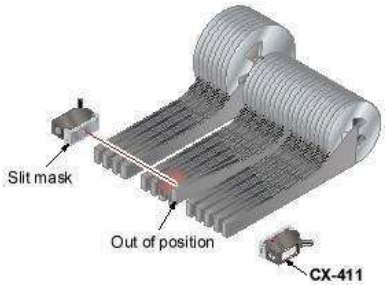


Detecting label

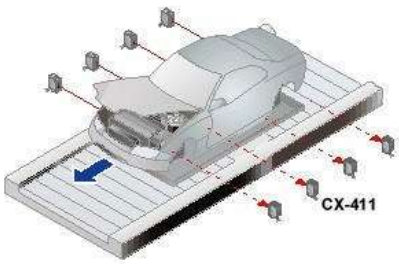
Synchronizing sensor for image processing systems



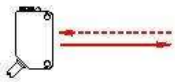
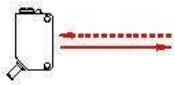
Detecting out of position tape feeder cassette



Detecting car on conveyor line

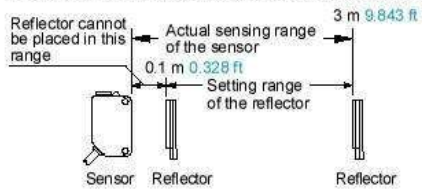


ORDER GUIDE

Type	Appearance	Sensing range	Model No.	Output	Emitting element
Thru-beam		10 m 32.808 ft	**CX-411**	NPN open-collector transistor	Red LED
			CX-411-P	PNP open-collector transistor	
Retroreflective with polarizing filters		3 m (Note) 9.843 ft	**CX-491**	NPN open-collector transistor	
			CX-491-P	PNP open-collector transistor	
Diffuse reflective – Short sensing range		300 mm 11.811 in	**CX-421**	NPN open-collector transistor	Infrared LED
			CX-421-P	PNP open-collector transistor	
Diffuse reflective – Long sensing range		800 mm 31.496 in	**CX-422**	NPN open-collector transistor	
			CX-422-P	PNP open-collector transistor	
Narrow-view reflective		70 to 200 mm 2.756 to 7.874 in	**CX-423**	NPN open-collector transistor	Red LED
			CX-423-P	PNP open-collector transistor	

NOTE: Mounting bracket is not supplied with the sensor.
Please select from the range of optional sensor mounting brackets.

Note: The sensing range of the retroreflective type sensor is specified for the **RF-230** reflector.
In addition, set the distance between the sensor and the reflector to 0.1 m 0.328 ft or more.



ORDER GUIDE

0.5 m 1.64 ft / 5 m 16.404 ft cable length type, M8 plug-in connector type, M12 pigtailed type

0.5 m 1.64 ft / 5 m 16.404 ft cable length type (standard: 2 m 6.562 ft), M8 plug-in connector type and M12 pigtailed type are available.

Type		Output	Standard	0.5 m 1.64 ft cable length type	5 m 16.404 ft cable length type	M8 plug-in connector type (Note)	M12 pigtailed type (Note)
Thru-beam		NPN output	CX-411	CX-411-C05	CX-411-C5	CX-411-Z	CX-411-J
		PNP output	CX-411-P	CX-411-P-C05	CX-411-P-C5	CX-411-P-Z	CX-411-P-J
Retroreflective with polarizing filters		NPN output	CX-491	CX-491-C05	CX-491-C5	CX-491-Z	CX-491-J
		PNP output	CX-491-P	CX-491-P-C05	CX-491-P-C5	CX-491-P-Z	CX-491-P-J
Diffuse reflective	Short sensing range	NPN output	CX-421	CX-421-C05	CX-421-C5	CX-421-Z	CX-421-J
		PNP output	CX-421-P	CX-421-P-C05	CX-421-P-C5	CX-421-P-Z	CX-421-P-J
	Long sensing range	NPN output	CX-422	CX-422-C05	CX-422-C5	CX-422-Z	CX-422-J
		PNP output	CX-422-P	CX-422-P-C05	CX-422-P-C5	CX-422-P-Z	CX-422-P-J
Narrow-view reflective		NPN output	CX-423	CX-423-C05	CX-423-C5	CX-423-Z	CX-423-J
		PNP output	CX-423-P	CX-423-P-C05	CX-423-P-C5	CX-423-P-Z	CX-423-P-J

Note : Please order the suitable mating cable separately for M8 plug-in connector type and M12 pigtailed type.

Package without reflector

Package without reflector is available.

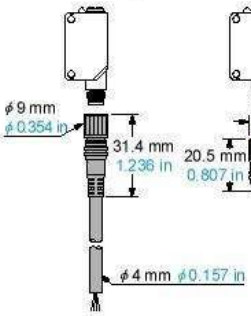
Type	Output	Standard	0.5 m 1.64 ft cable length type	5 m 16.404 ft cable length type	M8 plug-in connector type (Note)	M12 pigtailed type (Note)
Retroreflective with polarizing filters without reflector	NPN output	CX-491-Y	CX-491-C05-Y	CX-491-C5-Y	CX-491-Z-Y	CX-491-J-Y
	PNP output	CX-491-P-Y	CX-491-P-C05-Y	CX-491-P-C5-Y	CX-491-P-Z-Y	CX-491-P-J-Y

Note : Please order the suitable mating cable separately for M8 plug-in connector type and M12 pigtailed type.

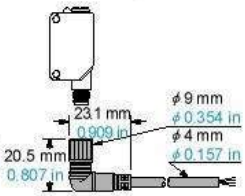
• Mating cables (2 cables are required for the thru-beam type.)

Type		Model No.	Cable length	Description
For M8 plug-in connector type	Straight	CN-24A-C2	2 m 6.562 ft	Can be used with all models
		CN-24A-C5	5 m 16.404 ft	
	Elbow	CN-24AL-C2	2 m 6.562 ft	
		CN-24AL-C5	5 m 16.404 ft	
For M12 pigtailed type	2-core	CN-22-C2	2 m 6.562 ft	For thru-beam type emitter (2-core)
		CN-22-C5	5 m 16.404 ft	
	4-core	CN-24-C2	2 m 6.562 ft	Can be used with all models
		CN-24-C5	5 m 16.404 ft	

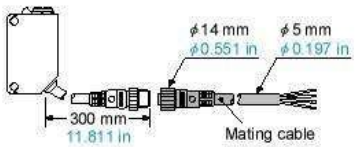
• CN-24A-C2
CN-24A-C5



• CN-24AL-C2
CN-24AL-C5



• CN-22-C2, CN-22-C5
CN-24-C2, CN-24-C5



Accessory

RF-230 (Reflector)

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-CX-05**	ϕ0.5 mm ϕ0.02 in	400 mm 15.748 in	20 mm 0.787 in	ϕ12 mm ϕ0.472 in	ϕ0.5 mm ϕ0.02 in
	OS-CX-1	ϕ1 mm ϕ0.039 in	900 mm 35.433 in	100 mm 3.937 in	ϕ12 mm ϕ0.472 in	ϕ1 mm ϕ0.039 in
	OS-CX-2	ϕ2 mm ϕ0.079 in	2 m 6.562 ft	400 mm 15.748 in	ϕ12 mm ϕ0.472 in	ϕ2 mm ϕ0.079 in
Rectangular slit mask (For thru-beam type sensor only)	**OS-CX-05×6**	0.5× 6 mm 0.02× 0.236 in	2 m 6.562 ft	400 mm 15.748 in	ϕ12 mm ϕ0.472 in	0.5× 6 mm 0.02× 0.236 in
	OS-CX-1×6	1× 6 mm 0.039× 0.236 in	3 m 9.843 ft	1 m 3.281 ft	ϕ12 mm ϕ0.472 in	1× 6 mm 0.039× 0.236 in
	OS-CX-2×6	2× 6 mm 0.079× 0.236 in	5 m 16.404 ft	2 m 6.562 ft	ϕ12 mm ϕ0.472 in	2× 6 mm 0.079× 0.236 in

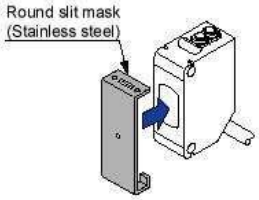
Designation	Model No.	Sensing range	Min. sensing object
Interference prevention filter (For thru-beam type sensor only)	**PF-CX4-V** (Vertical)	5 m 16.404 ft (Note 1)	ϕ12 mm ϕ0.472 in (Note 1)
	PF-CX4-H (Horizonal)	5 m 16.404 ft (Note 1)	ϕ12 mm ϕ0.472 in (Note 1)
Reflector (For retro-reflective type sensor only)	**RF-210**	1 m 3.281 ft (Note 2)	ϕ30 mm ϕ1.181 in
	RF-220	1.5 m 4.921 ft (Note 2)	ϕ35 mm ϕ1.378 in

Notes: 1) Value when attached to both sides.
2) Set the distance between the sensor and the reflector to 0.1 m 0.328 ft or more.

Round slit mask

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

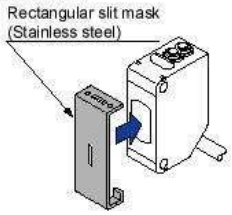
- **OS-CX-□**



Rectangular slit mask

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

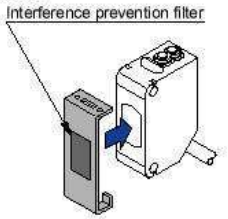
- **OS-CX-□×6**



Interference prevention filter

Two sets of thru-beam type sensors can be mounted close together.

- **PF-CX4-V**
- **PF-CX4-H**



Reflector

- **RF-210**
- **RF-220**

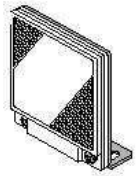
OPTIONS

Designation	Model No.	Description		
Reflector mounting bracket	**MS-RF21-1**	Protective mounting bracket for **RF-210** It protects the reflector from damage and maintains alignment.		
	MS-RF22	For **RF-220**		
	MS-RF23	For **RF-230**		
Reflective tape	**RF-11**	• Sensing range: 0.5 m 1.64 ft (Note 3)	• Ambient temperature: − 25 to + 50 °C − 13 to + 122 °F • Ambient humidity: 35 to 85 % RH	
	RF-12	• Sensing range: 0.7 m 2.297 ft (Note 3)	Notes: 1) Keep the tape free from stress. If it is pressed too much, its capability may deteriorate. 2) Do not cut the tape. It will deteriorate the sensing performance.	
Sensor mounting bracket (Note 1)	**MS-CX2-1**	Foot angled mounting bracket It can also be used for mounting **RF-210**		The thru-beam type sensor needs two brackets.
	MS-CX2-2	Foot biangled mounting bracket It can also be used for mounting **RF-210**		
	MS-CX2-4	Protective mounting bracket		
	MS-CX2-5	Back biangled mounting bracket		
	MS-CX-3	Back angled mounting bracket		
Sensor checker (Note 2)	**CHX-SC2**	It is useful for beam alignment of thru-beam type sensors. The optimum receiver position is given by indicators, as well as, an audio signal.		

Notes: 1) The plug-in connector type sensor does not allow use of some sensor mounting brackets because of the protrusion of the connector.
2) Refer to Sensor general catalog for details of the sensor checker **CHX-SC2**.
3) Set the distance between the sensor and the reflective tape to 0.1 m 0.328 ft or more.

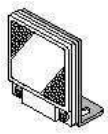
Reflector mounting bracket

• **MS-RF23**



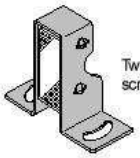
Two M4 (length 10 mm 0.394 in) screws with washers are attached.

• **MS-RF22**



Two M3 (length 8 mm 0.315 in) screws with washers are attached.

• **MS-RF21-1**



Two M3 (length 12 mm 0.472 in) screws with washers are attached.

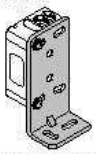
Reflective tape

• **RF-11**

• **RF-12**

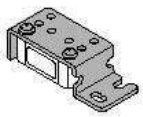
Sensor mounting bracket

• **MS-CX2-1**



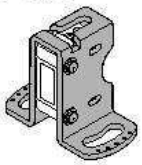
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• **MS-CX2-2**



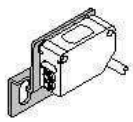
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• **MS-CX2-4**



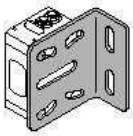
Two M3 (length 14 mm 0.551 in) screws with washers are attached.

• **MS-CX2-5**



Two M3 (length 12 mm 0.472 in) screws with washers are attached.

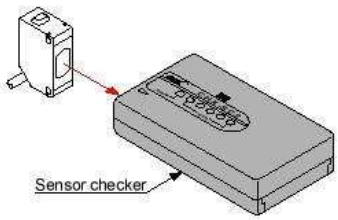
• **MS-CX-3**



Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Sensor checker

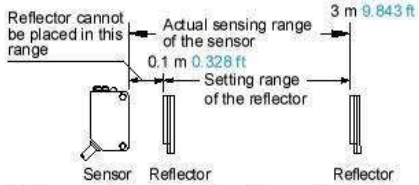
• **CHX-SC2**



SPECIFICATIONS

Item \ Type		Thru-beam	Retroreflective	Diffuse reflective		Narrow-view reflective
			With polarizing filters	Short sensing range	Long sensing range	
Model No.	NPN output type	**CX-411**	**CX-491**	**CX-421**	**CX-422**	**CX-423**
	PNP output type	**CX-411-P**	**CX-491-P**	**CX-421-P**	**CX-422-P**	**CX-423-P**
Sensing range		10 m 32.808 ft	3 m 9.843 ft (Note 1)	300 mm 11.811 in (Note 2)	800 mm 31.496 in (Note 2)	70 to 200 mm 2.756 to 7.874 in (Note 2)
Sensing object		ϕ 12 mm ϕ 0.472 in or more opaque object (Note 3)	ϕ 50 mm ϕ 1.969 in or more opaque, translucent or specular object	Opaque, translucent or transparent object		Opaque, translucent or transparent object (Min. sensing object: ϕ0.5 mm ϕ0.02 in copper wire)
Hysteresis		———		15 % or less of operation distance		
Repeatability (perpendicular to sensing axis)		0.5 mm 0.02 in or less		1 mm 0.039 in or less		0.5 mm 0.02 in or less
Supply voltage		12 to 24 V DC ± 10 % Ripple P-P 10 % or less				
Current consumption		Emitter: 20 mA or less Receiver: 20 mA or less	20 mA or less	25 mA or less		20 mA or less
Output		<NPN output type> NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)		<PNP output type> PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and + V) • Residual voltage: 1 V or less (at 100 mA source current) 0.4 V or less (at 16 mA source current)		
	Utilization category	DC-12 or DC-13				
	Output operation	Switchable either Light-ON or Dark-ON				
	Short-circuit protection	Incorporated				
Response time		1 ms or less				
Operation indicator		Orange LED (lights up when the output is ON) (incorporated on the receiver for thru-beam type)				
Stability indicator		Green LED (lights up under stable light received condition or stable dark condition) (incorporated on the receiver for thru-beam type)				
Power indicator		Green LED (lights up when the power is ON) (incorporated on the emitter)	———			
Sensitivity adjuster		Continuously variable adjuster (incorporated on the receiver for thru-beam type)				
Automatic interference prevention function		Two units of sensors can be mounted close together with interference prevention filters. (Sensing range 5 m 16.404 ft)	Incorporated (Two units of sensors can be mounted close together.)			
Environmental resistance	Pollution degree	3 (Industrial environment)				
	Protection	IP67 (IEC)				
	Ambient temperature	− 25 to + 55 °C − 13 to + 131 °F (No dew condensation or icing allowed), Storage: − 30 to + 70 °C − 22 to + 158 °F				
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH				
	Ambient illuminance	Sunlight: 10,000 ℓx at the light-receiving face, Incandescent light: 3,000 ℓx at the light-receiving face				
	EMC	EN 60947-5-2				
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure				
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure				
	Vibration resistance	10 to 500 Hz frequency, 1.5 mm 0.059 in amplitude (10 G max.) in X, Y and Z directions for two hours each				
	Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions for three times each				
Emitting element		Red LED (modulated)		Infrared LED (modulated)		Red LED (modulated)
Material		Enclosure: PBT (polybutylene terephthalate), Lens: acrylic, Front cover: acrylic				
Cable		0.2 mm² 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2 m 6.562 ft long				
Cable extension		Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable (thru-beam type: both emitter and receiver)				
Weight		50 g approx. (Emitter of thru-beam type: 45 g approx.)				
Accessories		———	**RF-230** (Reflector): 1 pc.	———		

Notes: 1) The sensing range and the sensing object of the retroreflective type sensor are specified for the **RF-230** reflector.
In addition, set the distance between the sensor and the reflector to 0.1 m 0.328 ft or more.

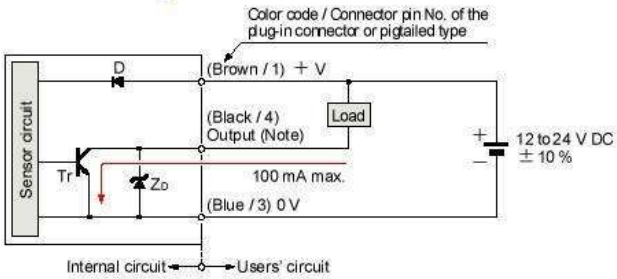


2) The sensing range of the diffuse reflective type sensor and narrow-view reflective type sensor are specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.
3) If slit masks (optional) are fitted, an object of ϕ0.5 mm ϕ0.02 in (using round slit mask) can be detected.

I/O CIRCUIT AND WIRING DIAGRAMS

NPN output type

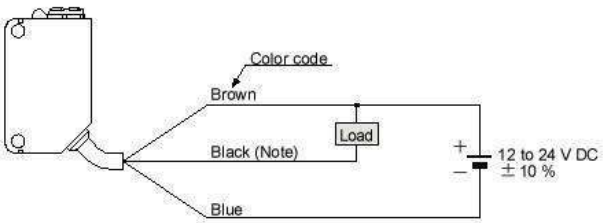
I/O circuit diagram



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

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

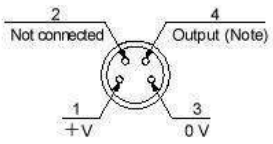
Wiring diagram



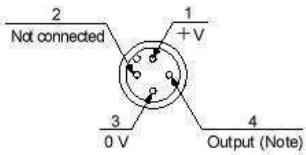
Note: The emitter of the thru-beam type sensor does not incorporate the black wire.

Connector pin position

M8 plug-in connector type



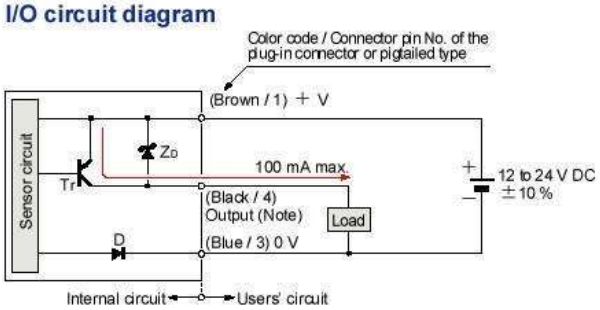
M12 pigtailed type



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

PNP output type

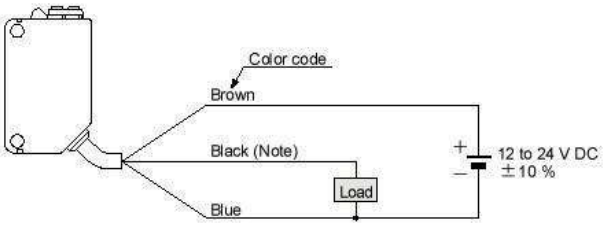
I/O circuit diagram



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

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

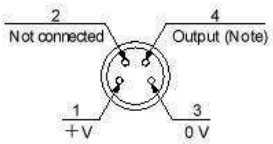
Wiring diagram



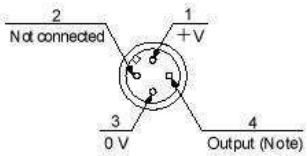
Note: The emitter of the thru-beam type sensor does not incorporate the black wire.

Connector pin position

M8 plug-in connector type



M12 pigtailed type

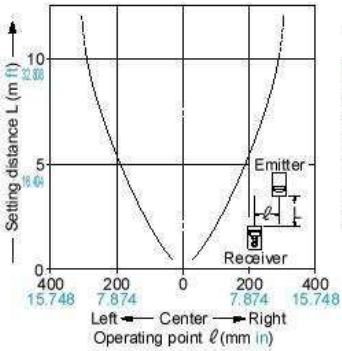


Note: The emitter of the thru-beam type sensor does not incorporate the output.

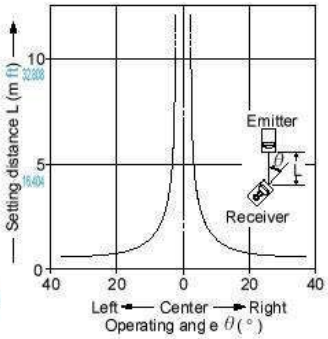
SENSING CHARACTERISTICS (TYPICAL)

CX-411□ Thru-beam type

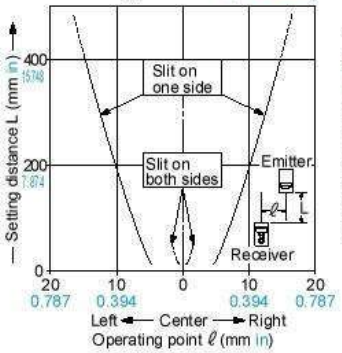
Parallel deviation



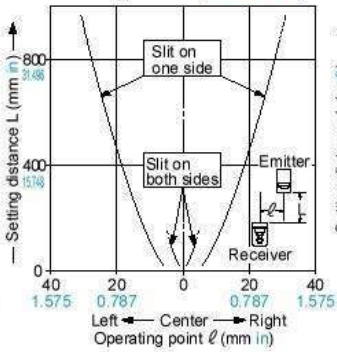
Angular deviation



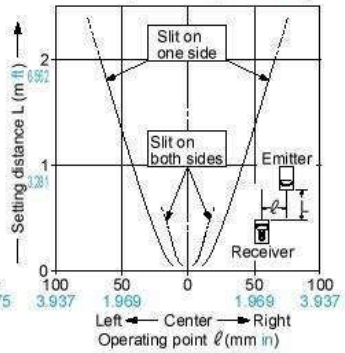
Parallel deviation with round slit masks (ϕ0.5 mm ϕ0.02 in)



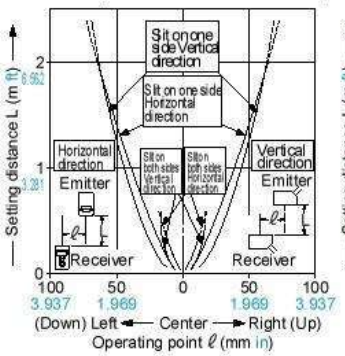
Parallel deviation with round slit masks (ϕ1 mm ϕ0.039 in)



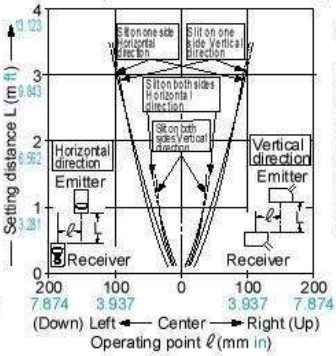
Parallel deviation with round slit masks (ϕ2 mm ϕ0.079 in)



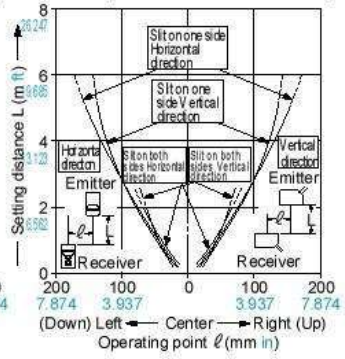
Parallel deviation with rectangular slit masks (0.5 × 6 mm 0.02 × 0.236 in)



Parallel deviation with rectangular slit masks (1 × 6 mm 0.039 × 0.236 in)

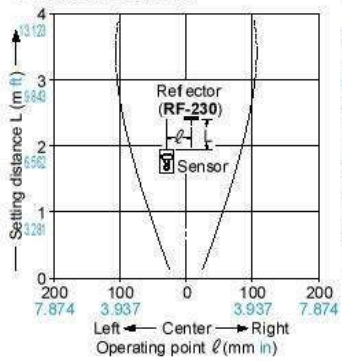


Parallel deviation with rectangular slit masks (2 × 6 mm 0.079 × 0.236 in)

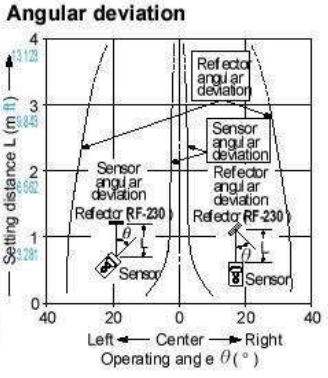


CX-491□ Retroreflective type

Parallel deviation



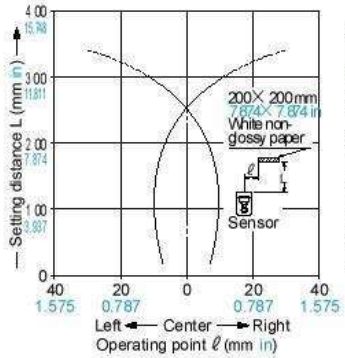
Angular deviation



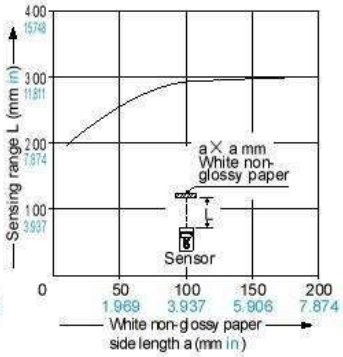
SENSING CHARACTERISTICS (TYPICAL)

CX-421□ Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range

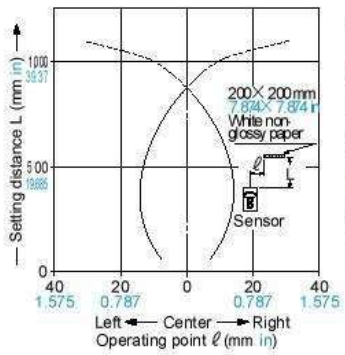


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200×200 mm 7.874×7.874 in), the sensing range shortens, as shown in the left graph.

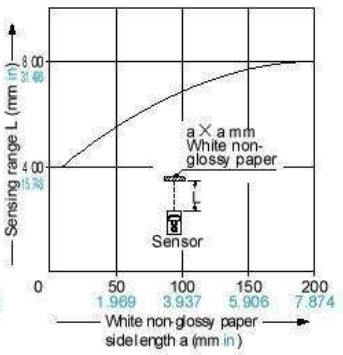
(For plotting the left graph, the sensitivity has been set such that a 200×200 mm 7.874×7.874 in white non-glossy paper is just detectable at a distance of 300 mm 11.811 in.)

CX-422□ Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range

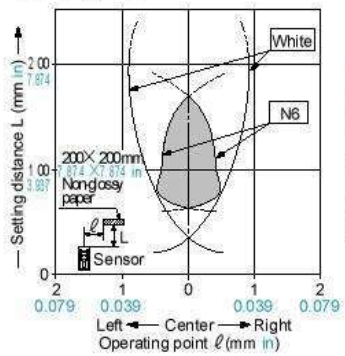


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200×200 mm 7.874×7.874 in), the sensing range shortens, as shown in the left graph.

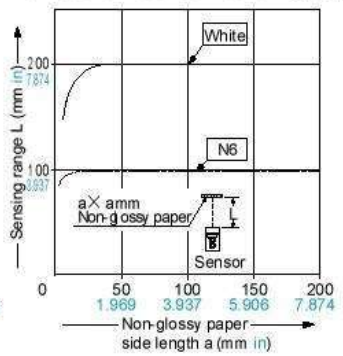
(For plotting the left graph, the sensitivity has been set such that a 200×200 mm 7.874×7.874 in white non-glossy paper is just detectable at a distance of 800 mm 31.496 in.)

CX-423□ Narrow-view reflective type

Sensing field



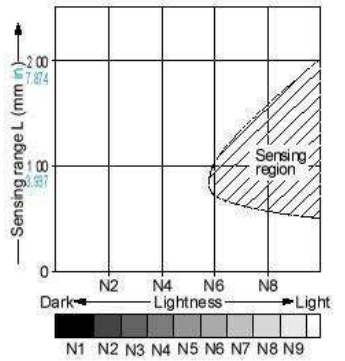
Correlation between sensing object size and sensing range



As the sensing object size becomes smaller than the standard size (white non-glossy paper 200×200 mm 7.874×7.874 in), the sensing range shortens, as shown in the left graph.

(For plotting the left graph, the sensitivity has been set such that a 200×200 mm 7.874×7.874 in white non-glossy paper is just detectable at a distance of 200 mm 7.874 in.)

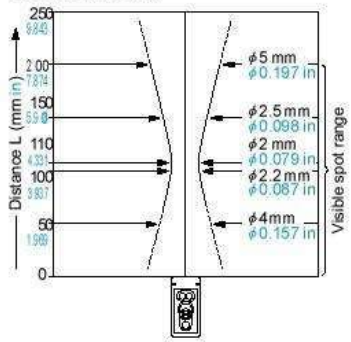
Correlation between lightness and sensing range



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

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

Emitted beam



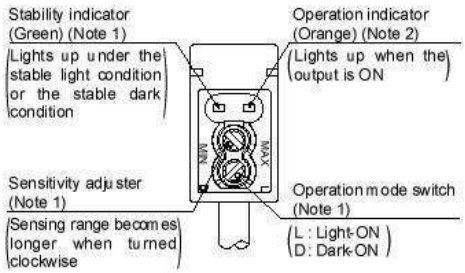
PRECAUTIONS FOR PROPER USE

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

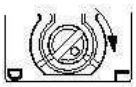
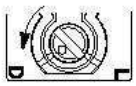
• The tightening torque should be 0.5 N·m or less.

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.

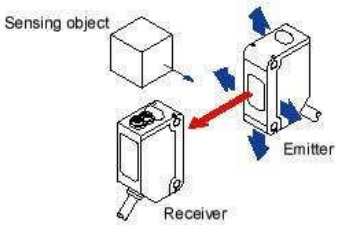
Operation mode switch

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

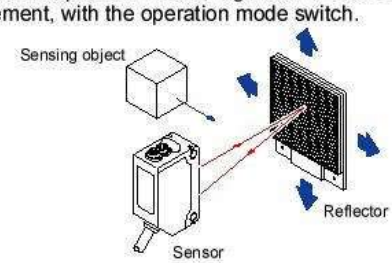
Thru-beam type sensor

① Set the operation mode switch to the Light-ON mode position (L side).
② 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.
③ Similarly, adjust for up, down, left and right angular movement of the emitter.
④ Further, perform the angular adjustment for the receiver also.
⑤ Check that the stability indicator (green) lights up.
⑥ Choose the operation mode, Light-ON or Dark-ON, as per your requirement, with the operation mode switch.

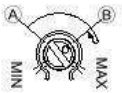
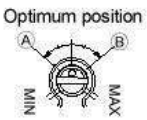


Retroreflective type sensor

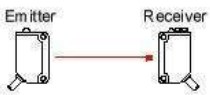
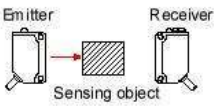
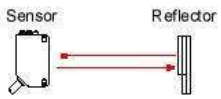
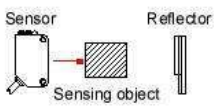
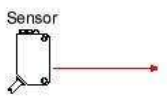
① Set the operation mode switch to the Light-ON mode position (L side).
② Placing the sensor and the reflector face to face along a straight line, move the reflector in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (orange).Then, set the reflector at the center of this range.
③ Similarly, adjust for up, down, left and right angular movement of the reflector.
④ Further, perform the angular adjustment for the sensor also.
⑤ Check that the stability indicator (green) lights up.
⑥ 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 Ⓐ 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 Ⓑ 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 Ⓑ.)
④		The position at the middle of point Ⓐ and Ⓑ 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		

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		Output	Operation indicator	Stability indicator
●	●	ON	Stable light receiving	OFF	●	●
●	●	ON	Unstable light receiving	OFF	●	●
●	●	OFF	Unstable dark receiving	ON	●	●
●	●	OFF	Stable dark receiving	ON	●	●

●, ● : 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

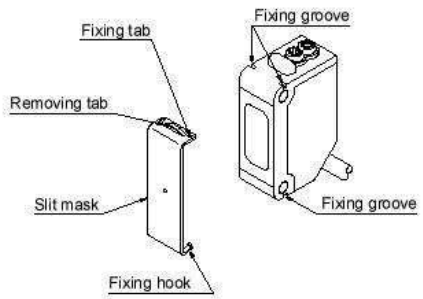
- Tilt the sensor with respect to the sensing object while fitting.
- Reduce the sensitivity.
- Increase the distance between the sensor and the sensing object.

Slit mask (Optional) (Exclusively for thru-beam type sensor)

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

How to mount

① Insert the fixing hook into the fixing groove.
② Then, pressing the slit mask against the main unit, insert the fixing tab into the fixing groove.

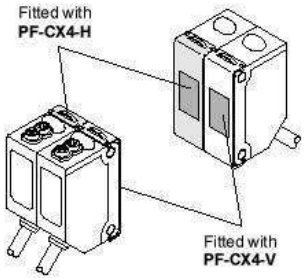


How to remove

① Insert a screwdriver into the removing tab.
② Pull forward while lifting the removing tab.

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

- By mounting interference prevention filters (**PF-CX4-□**), two sets of **CX-411□** 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 dose 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 100 m 328.084 ft (thru-beam type: both emitter and receiver) is possible with 0.3 mm^2, 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.

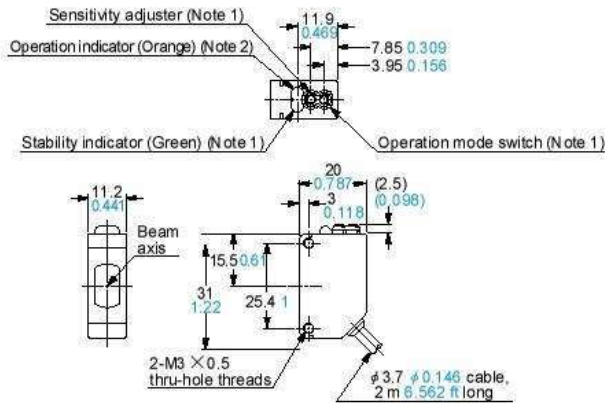
Others

- 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.

DIMENSIONS (Unit: mm in)

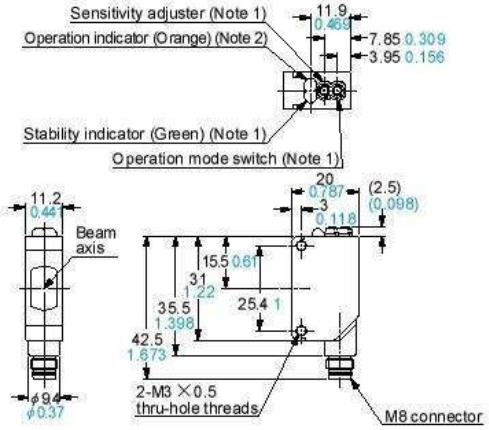
The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

CX-411□ Sensor



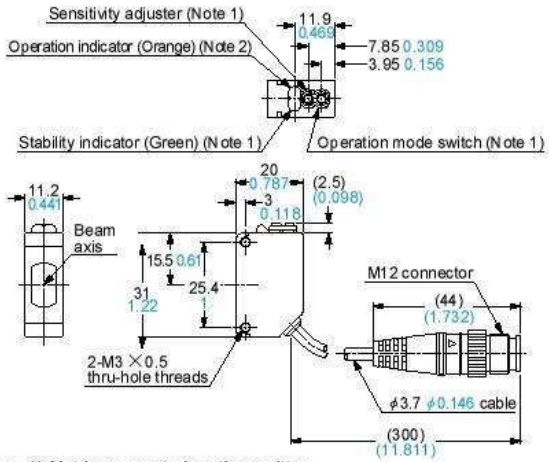
Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (green) on the emitter.

CX-411□-Z Sensor



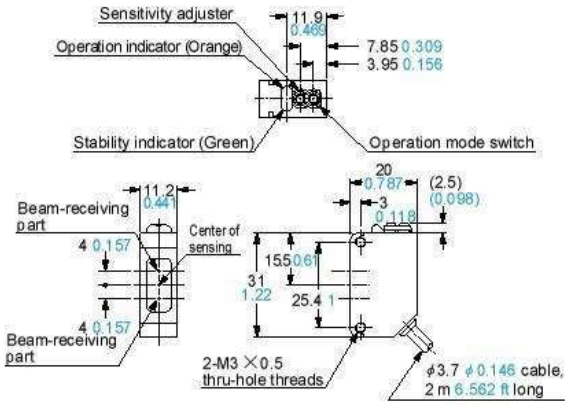
Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (green) on the emitter.

CX-411□-J Sensor

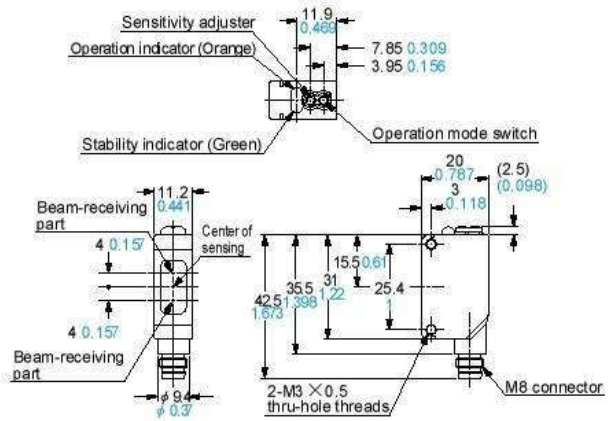


Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (green) on the emitter.

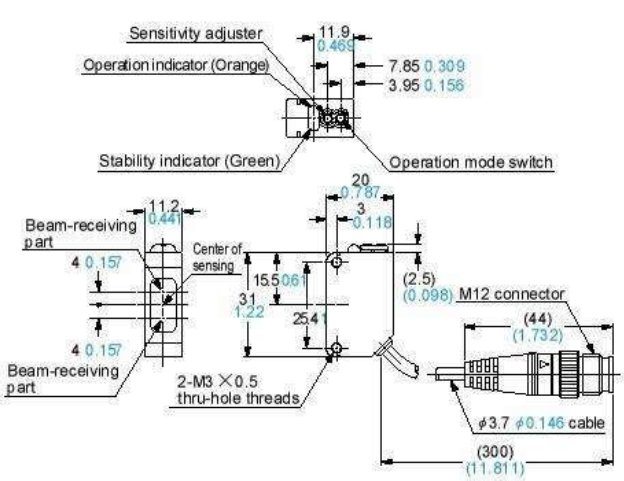
CX-491□ CX-421□/422□ Sensor



CX-491□-Z CX-421□/422□-Z



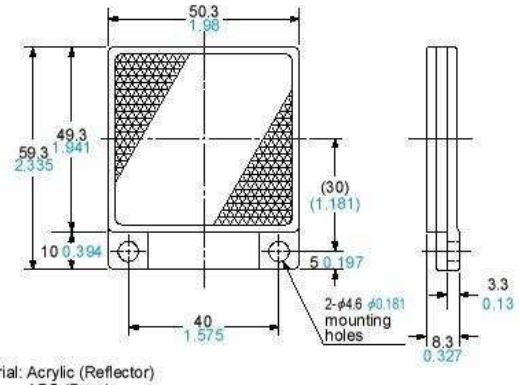
CX-491□-J CX-421□/422□-J



DIMENSIONS (Unit: mm in)

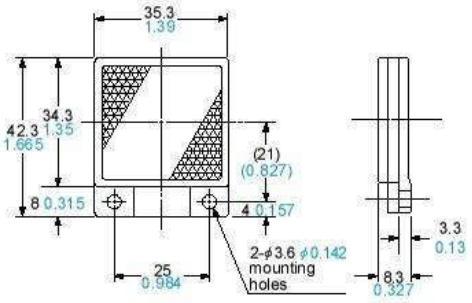
The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

RF-230 Reflector (Accessory for the retroreflective type sensor)



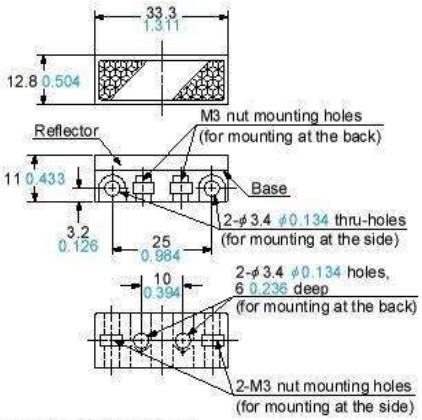
Material: Acrylic (Reflector)
ABS (Base)

RF-220 Reflector (Optional)



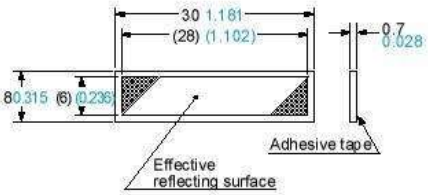
Material: Acrylic (Reflector)
ABS (Base)

RF-210 Reflector (Optional)



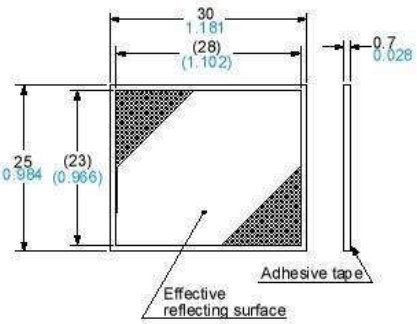
Material: Acrylic (Reflector)
ABS (Base)
Two M3 (length 8 mm 0.315 in) screws with washers and two nuts are attached.

RF-11 Reflective tape (Optional)



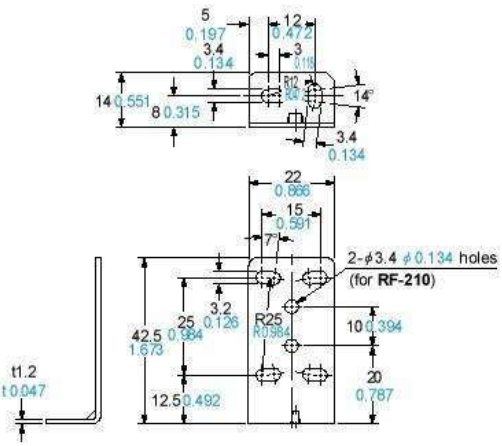
Material: Acrylic

RF-12 Reflective tape (Optional)



Material: Acrylic

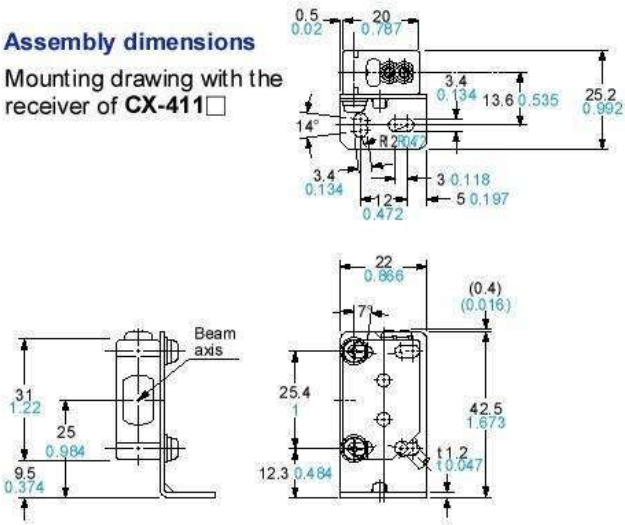
MS-CX2-1 Sensor mounting bracket (Optional)



Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

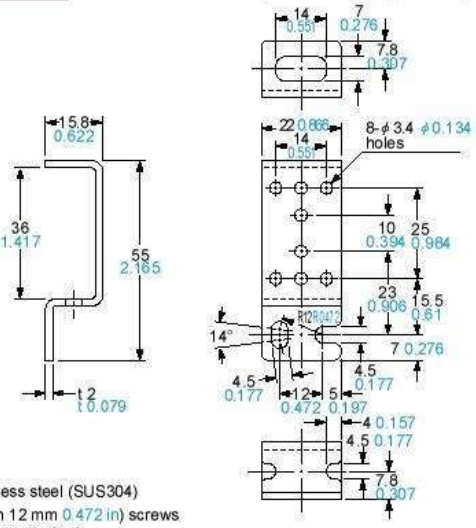
Mounting drawing with the receiver of **CX-411**□



DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

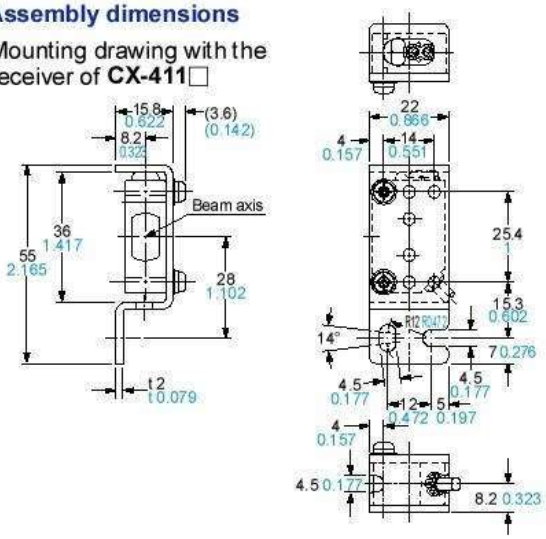
MS-CX2-2 Sensor mounting bracket (Optional)



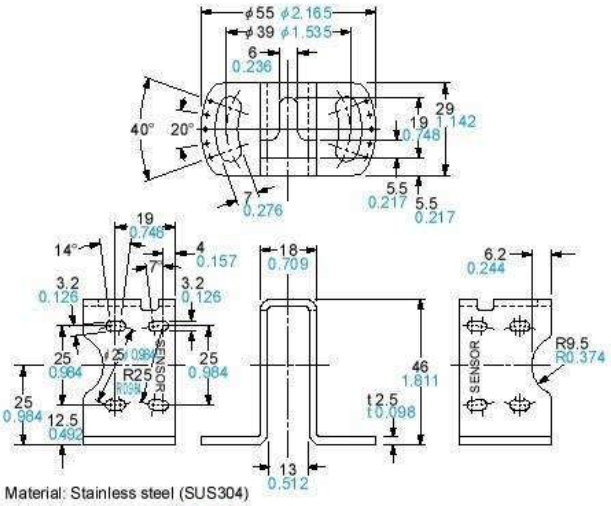
Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

Mounting drawing with the receiver of **CX-411□**



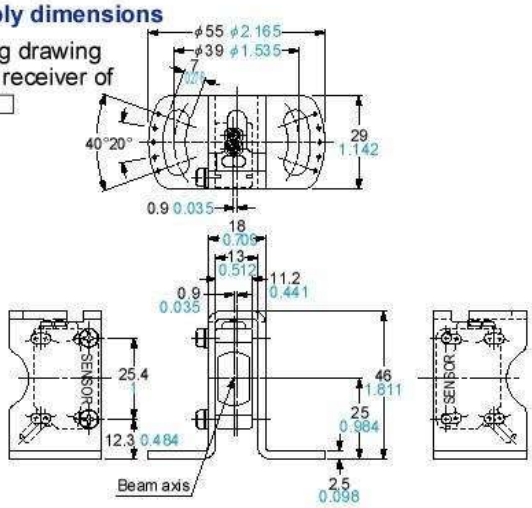
MS-CX2-4 Sensor mounting bracket (Optional)



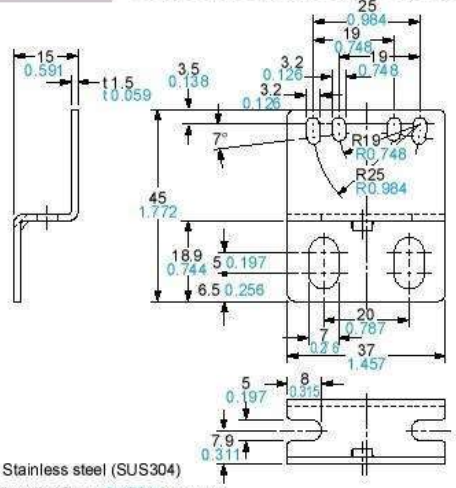
Material: Stainless steel (SUS304)
Two M3 (length 14 mm 0.551 in) screws with washers are attached.

Assembly dimensions

Mounting drawing with the receiver of **CX-411□**



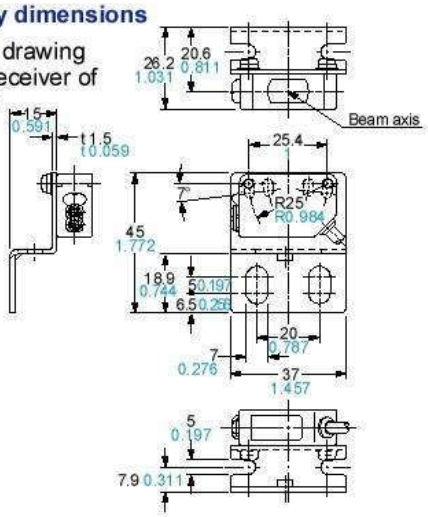
MS-CX2-5 Sensor mounting bracket (Optional)



Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

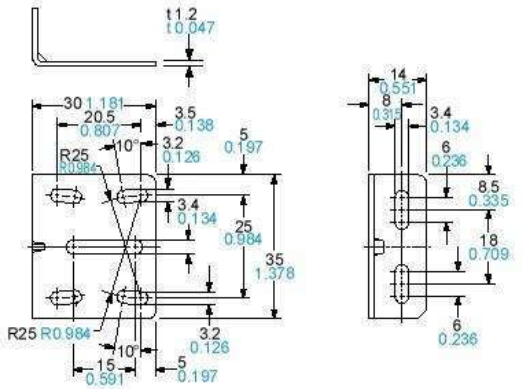
Mounting drawing with the receiver of **CX-411□**



DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

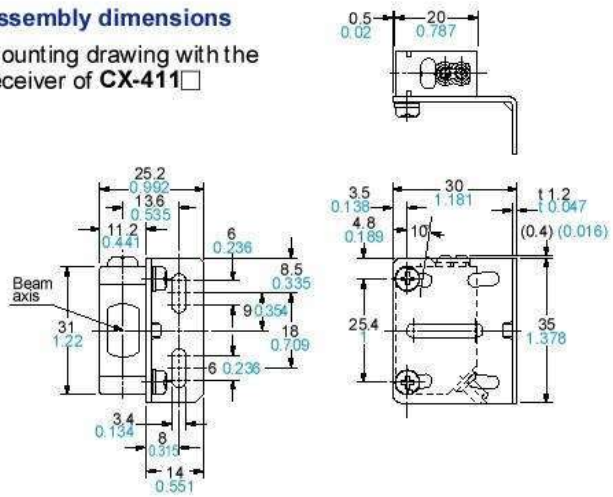
MS-CX-3 Sensor mounting bracket (Optional)



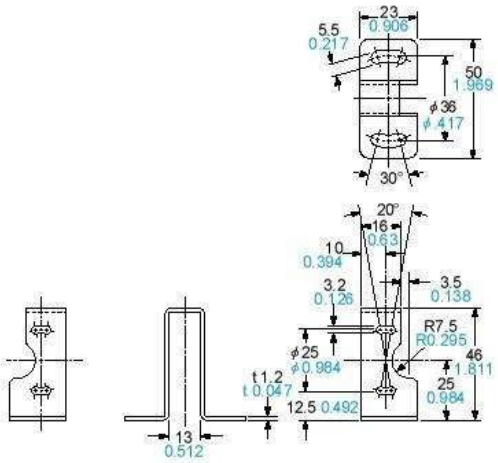
Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

Mounting drawing with the receiver of **CX-411**□

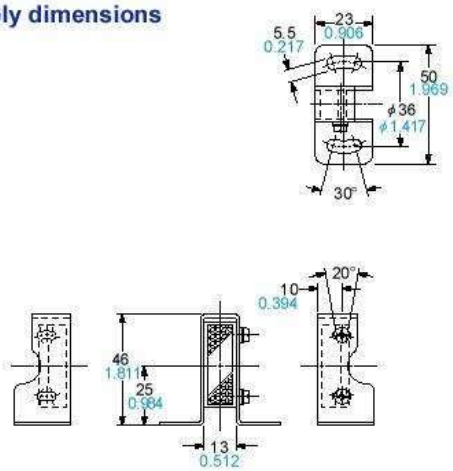


MS-RF21-1 Reflector mounting bracket for **RF-210** (Optional)

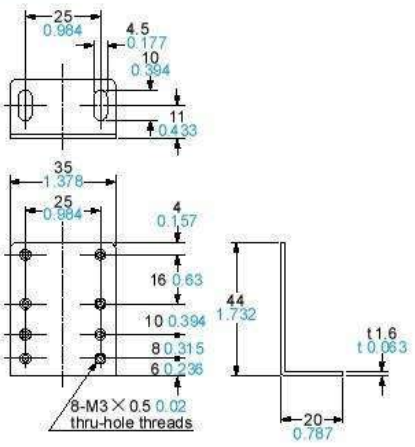


Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

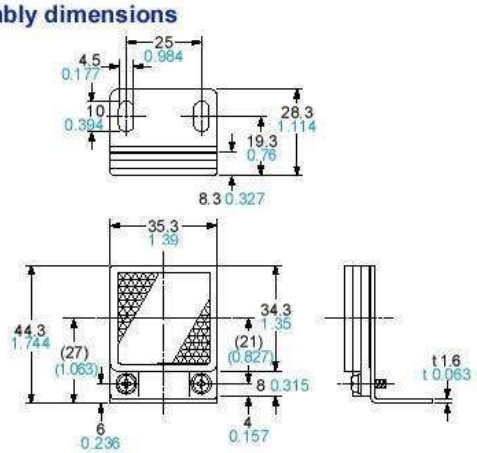


MS-RF22 Reflector mounting bracket for **RF-220** (Optional)



Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)
Two M3 (length 8 mm 0.315 in) screws with washers are attached.

Assembly dimensions

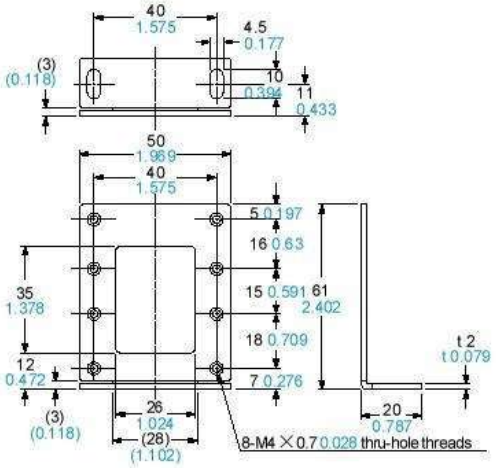


DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

MS-RF23

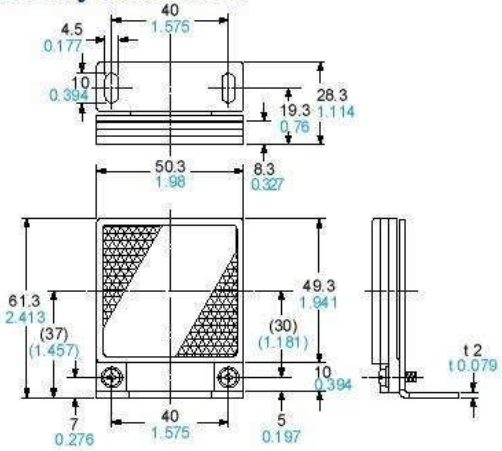
Reflector mounting bracket for **RF-230** (Optional)



Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Two M4 (length 10 mm 0.394 in) screws with washers are attached.

Assembly dimensions



All information is subject to change without prior notice.

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