SUNX

PHOTOELECTRIC SENSOR

COMPACT PHOTOELECTRIC SENSOR Amplifier Built-in

New

CX-400 SERIES

CE Conforming to EMC Directive

UL Recognition

World Standard

‘Strong’, ‘High’ and ‘Less’ are keywords that everyone in the world understands



Ramco Innovations
(800) 280-6933
www.ramcoinnovations.com

We have a full lineup of world standard photoelectric sensors!

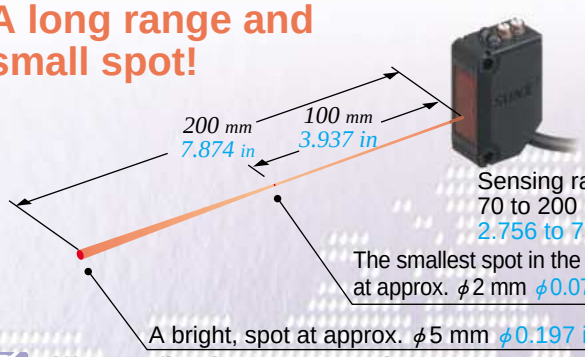
'Strong', 'High' and 'Less': three keywords that reflect the fundamental concepts in the design and operation of our sensors.
Strong: meaning being able to maintain fully reliable and stable levels of performance, no matter how adverse the work environment.
High: meaning technology-backed high detectability.
Less: meaning less waste, less time lost, less power consumption, less human and natural resources needed.
We bring you the ideal standard sensors for the 21st century.

Full line up 116 models!

- Output...NPN, PNP
- Connecting method...Cable type, M8 Plug-in connector type, M12 Pigtailed type
- Cable length of cable type...0.5 m 1.640 ft, 2 m 6.562 ft, 5 m 16.404 ft

Refer to p.9 ~ for '**ORDER GUIDE**'.

A long range and small spot!



Sensing range
70 to 200 mm
2.756 to 7.874 in

The smallest spot in the industry
at approx. ϕ2 mm ϕ0.079 in

A bright, spot at approx. ϕ5 mm ϕ0.197 in

Diffuse reflective • narrow-view type
CX-423

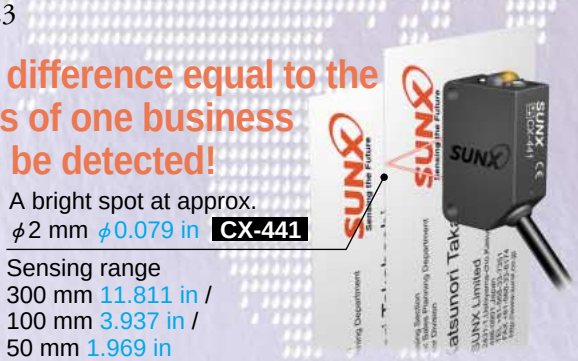
Special transparent object circuit enhances detectability!



Sensing range
2 m 6.562 ft / 0.5 m 1.640 ft

Retroreflective type for transparent object sensing
CX-482/481

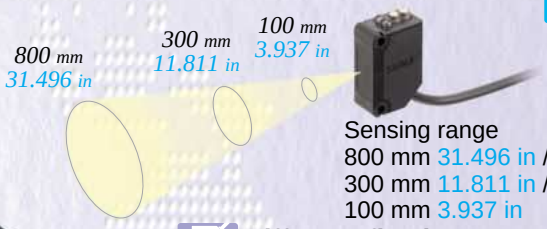
A height difference equal to the thickness of one business card can be detected!



A bright spot at approx.
ϕ2 mm ϕ0.079 in **CX-441**

Sensing range
300 mm 11.811 in /
100 mm 3.937 in /
50 mm 1.969 in

Adjustable range reflective type
CX-442/444/443/441



Sensing range
800 mm 31.496 in /
300 mm 11.811 in /
100 mm 3.937 in

Diffuse reflective type
CX-422/421/424



Sensing range
5 m 16.404 ft /
3 m 9.843 ft

Retroreflective type
CX-493/491



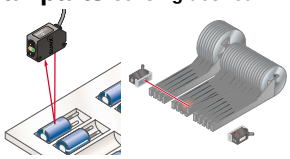
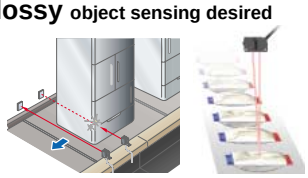
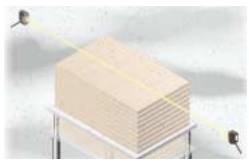
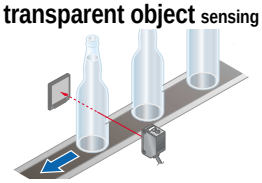
Sensing range
15 m 49.213 ft /
10 m 32.808 ft

Thru-beam type
CX-412/411

Ramco Innovations (800) 280-6933 www.ramcoinnovations.com

CX-400 Series Selection

■ **CX-400** series sensors solves all your sensing troubles.

Long range sensing desired 	Thru-beam type	Longest in its class with a distance of 15 m 49.213 ft	CX-412
	Rertroreflective type	Longest in its class with a distance of 5 m 16.404 ft	CX-493
	Diffuse reflective type	Long sensing range 800 mm 31.496 in	CX-422
Small parts sensing desired 	Fit slit for thru-beam type	Minimum size for sensing object ϕ0.5 mm ϕ0.020 in with slit fitted	CX-411
	Diffuse reflective • narrow-view type	LED light source realizes a spot diameter of approx. ϕ2 mm ϕ0.079 in	CX-423
	Adjustable range reflective type	Approx. ϕ2 mm ϕ0.079 in spot unaffected by background objects	CX-441
Minute height difference discernment desired (Background present) 	Adjustable range reflective type	High precision, 0.4 mm 0.016 in height difference sensing possible	CX-441/443
		Long sensing range 300 mm 11.811 in / 100 mm 3.937 in	CX-442/444
Glossy object sensing desired 	Thru-beam type	Sensing range 15 m 49.213 ft / 10 m 32.808 ft	CX-411/412
	Rertroreflective type	Polarizing filter built-in	CX-491
	Adjustable range reflective type	FGS function ensures stable sensing	CX-44□
Area prone to **dirt** and **dust** 	Thru-beam type	Uses penetrating infrared light	CX-412
	Adjustable range reflective type	Judgment based on incidence angle to avoid light-receiving amount swaying	CX-44□
Oil is scattered about 	Thru-beam type	Uses acrylic for lens surface for superior oil resistance	CX-41□
	Diffuse reflective type	Uses acrylic for lens surface for superior oil resistance	CX-42□
	Rertroreflective type	Uses acrylic for lens surface for superior oil resistance	CX-49□
Simple **light beam axis adjustment** desired 	Diffuse reflective • narrow-view type	The bright spot makes the beam axis clearly visible	CX-423
	Adjustable range reflective type	The bright spot makes the beam axis clearly visible	CX-44□
Precise **transparent object** sensing desired 	Rertroreflective type	High precision type with built-in special transparent object circuit	CX-481
		Built-in special transparent object circuit. Long sensing range 2 m 6.562 ft.	CX-482

‘Strong’ against even the harshest conditions guarantees reliability.

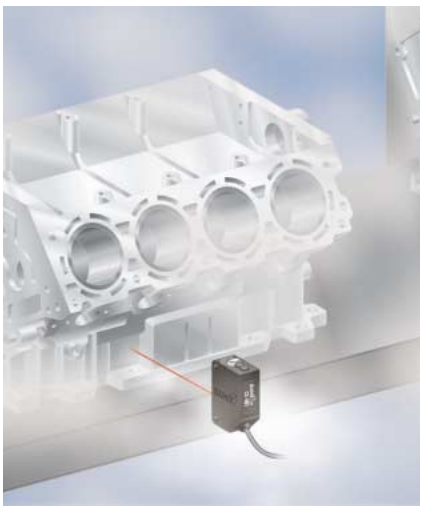
Strongest in its class ※

Strong against oil and coolant liquids

※ As of April 2004 and based on research conducted by SUNX.

CX-41□/42□/49□

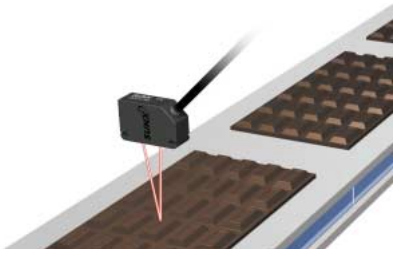
The lens material for the thru-beam type, retroreflective type (excluding the **CX-48**□) and the diffuse reflective type are made of a strong acrylic that resists the harmful effects of coolants. These sensors can be used with confidence even around metal processing machinery that disperses oil mists. The protection mechanism also conforms to IP67 (IEC).



Strong against ethanol

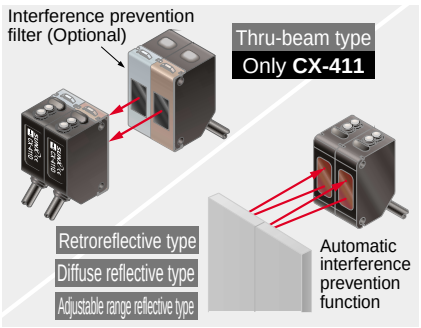
CX-44□/48□

A strong, ethanol resistant polycarbonate was used for the front and display covers. Safe even for installing near food processing machinery that disperses ethanol based detergents. The protection mechanism also conforms to IP67 (IEC).



Strong against interference

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

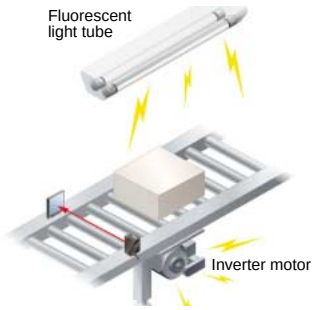


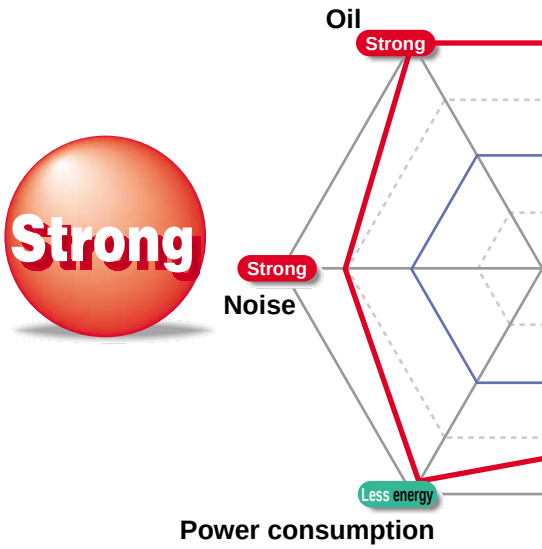
Strong even in cold environments

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

Strong against noise

Significantly stronger against inverter light and other extraneous light as well as high frequency and electromagnetic noise generated by high-pressure inverter motors and other devices.



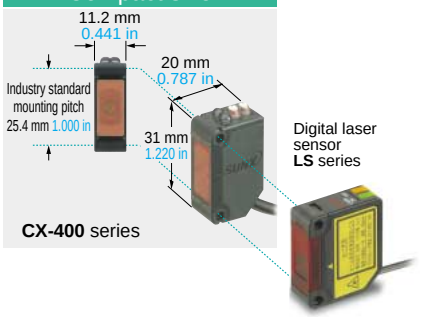


The ideal sensors that are people and environmentally friendly are born from the concept of ‘less’ waste.

Less space

The sensors are compact in size at W11.2 × H31 × D20 mm W0.441 × H1.220 × D0.787 in. The mounting pitch is also at the world standard size of 25.4 mm 1.000 in.

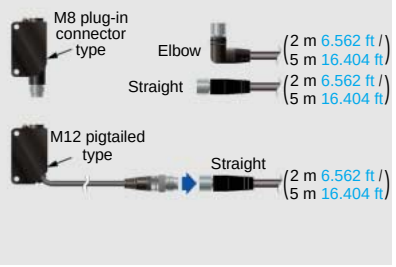
Compact size



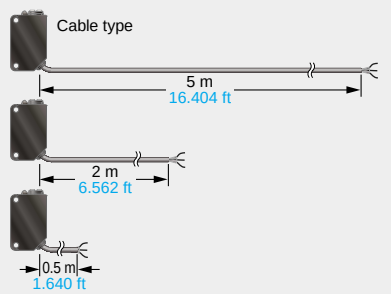
Less processing

M8 plug-in connector type and M12 pigtailed type are available. This contributes to less time spent in setting up. In addition, cable types are available with cable lengths of 0.5 m 1.640 ft, 2 m 6.562 ft and 5 m 16.404 ft. This results in less wastage.

Great maintainability



No unnecessary cables or terminal blocks



The new standard sensors for the 21st Century provide 'high' performance detection.

High precision optics and high performance special circuitry

SUNX's unique optical systems and specially designed electronic circuits provide stable sensing of even the minutest height difference and the thinnest transparent film.

Highest performance in its class ※

※ As of April 2004 and based on research conducted by SUNX.

CX-441/443

Detecting a height difference of even as little as 0.4 mm 0.016 in possible (equivalent to one business card).

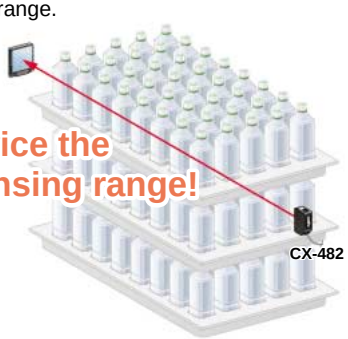
2.5 times the sensing capability!



CX-481/482

A full range of 2 m 6.562 ft sensing range types are available. They are capable of sensing a 10 μm transparent film even at a long range.

Twice the sensing range!

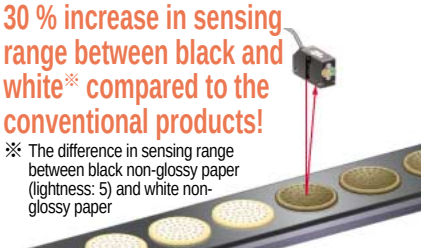


CX-44□

- Even different colored object can be sensed at roughly the same distance. No adjuster control is needed when the setup is changed.

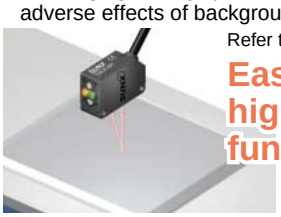
30 % increase in sensing range between black and white※ compared to the conventional products!

※ The difference in sensing range between black non-glossy paper (lightness: 5) and white non-glossy paper

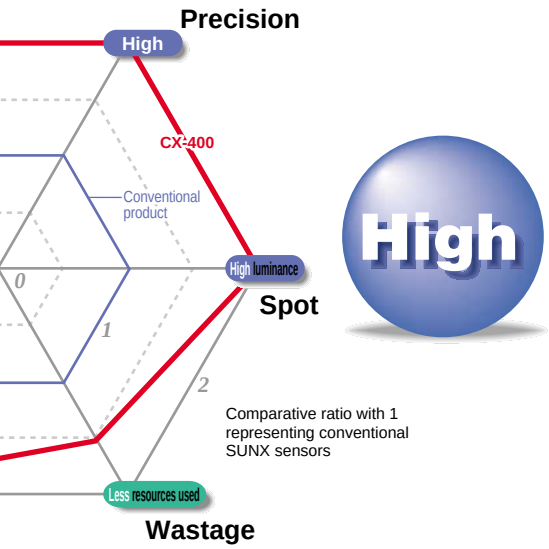


- BGS / FGS functions make even the most challenging settings possible. Controls the adverse effects of background objects.

Refer to p.8 for details.



Easy to use high-level functions!



High

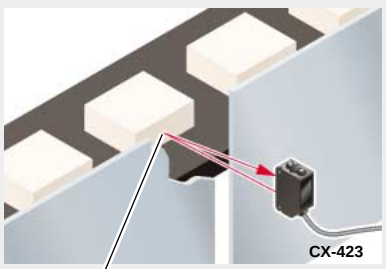
Comparative ratio with 1 representing conventional SUNX sensors

Smallest spot in its class ※

High luminance spot ※ As of April 2004 and based on research conducted by SUNX.

CX-423/44□

These sensors realize a high luminance red spot that provides bright visibility. The sensing position can be checked at a glance.
Because it has the smallest spot in its class, approx. ϕ2 mm ϕ0.079 in (**CX-423/441**), even the minutest object can be accurately detected.

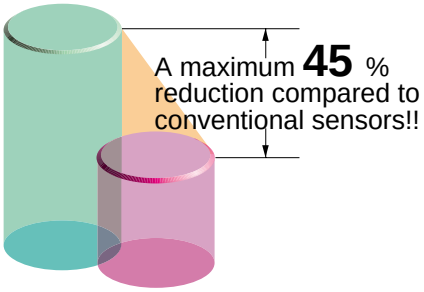


Great visibility approx. ϕ2 mm ϕ0.079 in high luminance spot

Less

Less power consumed

The **CX-400** series sensors achieve a maximum of approx. 55 % the power consumption of conventional sensors.
Contributes to preserving the environment.



Less resources used

Based on environmental considerations, simplified packaging is used in order to reduce waste.
In addition, the bag is made from polyethylene which produces no toxic gases even when burned.



Thru-beam type

CX-411: 10 m 32.808 ft



CX-412: 15 m 49.213 ft
The longest in its class※

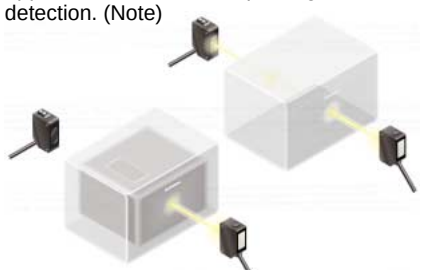
※ As of April 2004 and based on research conducted by SUNX.

The longest in its class※

Strong infrared beam

CX-412

The longest in its class, it realizes a 15 m 49.213 ft long-distance sensing range. Remarkable penetrating power enables applications such as package content detection. (Note)



Note: When sensing utilizing penetrating power, make sure to verify using the actual sensor.

Strong on dust and dirt

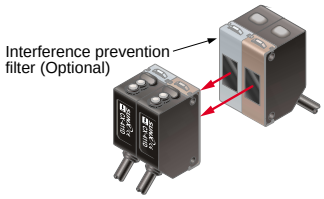
CX-412

Because the light source is an infrared light, it is strong on dust and dirt compared to the red beam type.

Even the thru-beam type is strong on mutual interference

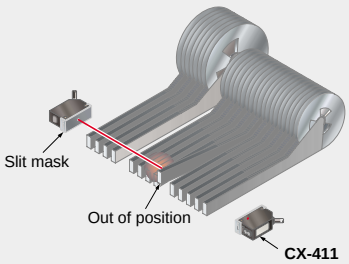
CX-411

Two **CX-411** sensors, with their red beam light source, can be installed close together by fitting an interference prevention filter.

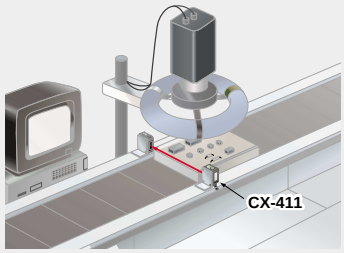


Applications

- Detecting out of position tape feeder cassette



- Synchronizing sensor for image processing systems



Retroreflective type

CX-493: 5 m 16.404 ft The longest in its class※
CX-491: 3 m 9.843 ft



New For transparent object sensing
CX-482: 2 m 6.562 ft
CX-481: 0.5 m 1.640 ft



※ As of April 2004 and based on research conducted by SUNX.

The longest in its class※

Long sensing range of 5 m 16.404 ft

CX-493

A long 5 m 16.404 ft sensing range is possible with the red LED type that is easy to align with the beam axis. Can be used for wide automatic door shutters.



Retroreflective type with polarizing filters

CX-491

Built-in polarizing filters ensure stable sensing even on a mirror surface object.

No.1 in the industry※

Strong against extraneous light and noise

CX-491

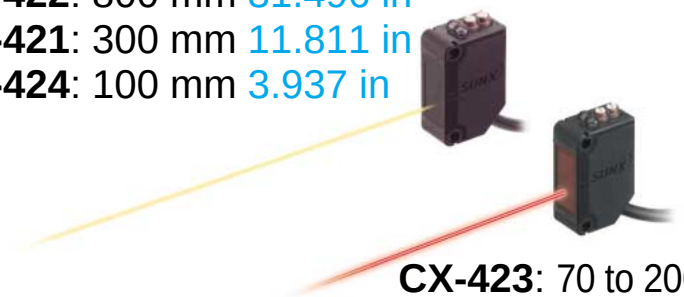
With a level of performance ranked No.1 in the industry※, these sensors provide stable sensing.

Two sensors can be mounted close together

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

Diffuse reflective type

CX-422: 800 mm 31.496 in
CX-421: 300 mm 11.811 in
CX-424: 100 mm 3.937 in



CX-423: 70 to 200 mm
Narrow-view type 2.756 to 7.874 in

Smallest spot in its class ※

Beam axis alignment made easy with a high luminance spot beam

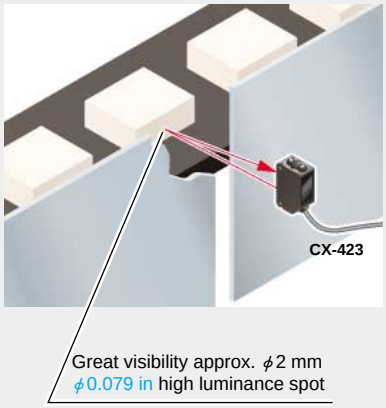
CX-423

These sensors realize a high luminance red LED spot that provides bright visibility enabling the sensing position to be checked at a glance.
Because it has the smallest spot in its class, approx. ϕ2 mm ϕ0.079 in, even the minutest object can be accurately detected.

Reduction of volume adjustment labor

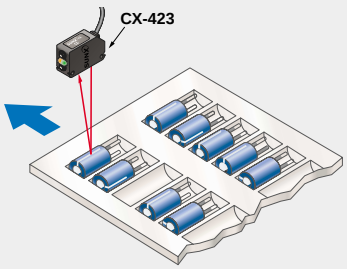
Because these sensors possess many variations depending on the sensing range, enables you to make optimal volume adjustment easily.

※ As of April 2004 and based on research conducted by SUNX.

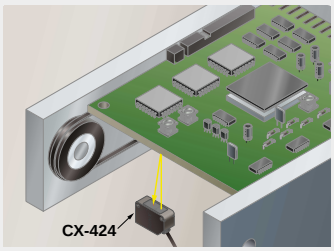


Applications

- Small parts sensing



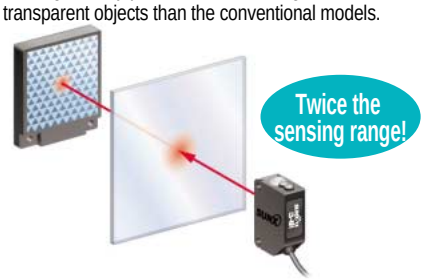
- Passage confirmation on substrate conveyance equipment



Introducing the transparent object sensing type sensor New

CX-48□

Our unique optical system and transparent object sensing circuitry provide stable sensing of even thinner transparent objects than the conventional models.



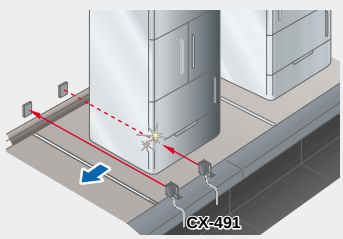
Transparent objects detectable with CX-48□ (Typical examples)

Sensing object	Sensing object size (mm in)
Glass sheet	□50 □1.969 t = 0.7 t = 0.028
Cylindrical glass	ϕ50 ϕ1.969 ℓ = 50 ℓ = 1.969 t = 1.3 t = 0.051
Acrylic board	□50 □1.969 t = 1.0 t = 0.039
Styrol (Floppy case)	□50 □1.969 t = 0.9 t = 0.035
Food wrapping film	□50 □1.969 t = 10 μm t = 0.394 mil
Cigarette case film	□50 □1.969 t = 20 μm t = 0.787 mil
Vinyl sack	□50 □1.969 t = 30 μm t = 1.181 mil
Pet bottle (500mℓ)	ϕ66 ϕ2.598

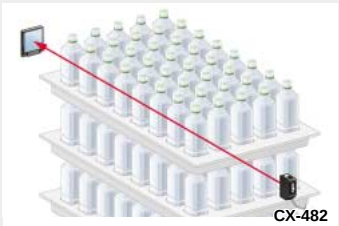
Reflector setting range **CX-481**: 300 to 500 mm 11.811 to 19.685 in,
CX-482: 1 to 2 m 3.281 to 6.562 ft
[with the **RF-230** reflector at the optimum condition (Note)]
Each object should pass across the beam at the center between the sensor and the reflector.
ℓ: Length of cylindrical glasses
t: Thickness of sensing object
Note: The optimum condition is defined as the condition in which the sensitivity level is set such that the stability indicator just lights up when the object is absent.

Applications

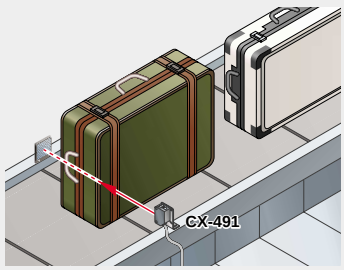
- Sensing glossy white electric appliances



- Sensing plastic bottles stacked on pallets



- Passage confirmation of object on a conveyor belt



- Detecting transparent film



Adjustable range reflective type



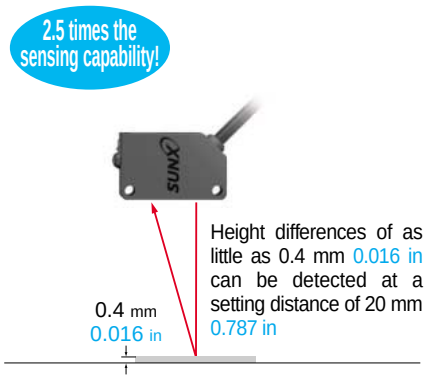
High precision type

Highest performance in its class ※

CX-441/443

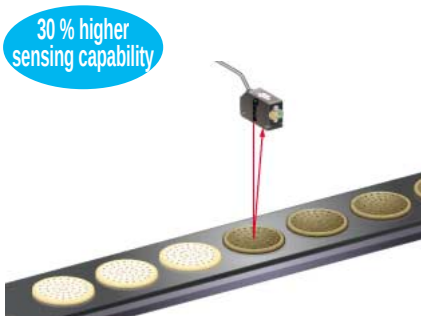
- **Can sense differences as small as 0.4 mm 0.016 in, with hysteresis of 2 % or less**

  An advanced optical system provides sensing performance that is approx. 2.5 times than conventional models. Even ultra-small differences of 0.4 mm 0.016 in can be detected accurately.



- **Not affected by color. The difference in sensing range between black and white is 1 % or less.** (Note)

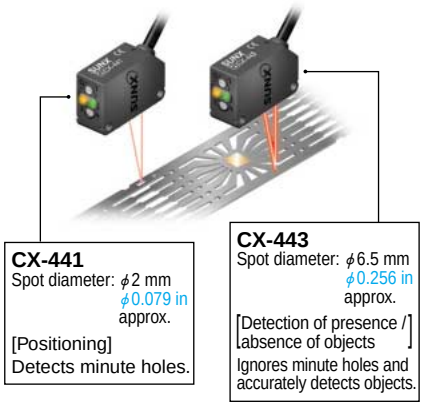
  Both black and white objects can be sensed at the same distances. No adjuster control is needed, even when products of different colors are moving along the production line.



Note: The difference in sensing range between black non-glossy paper (lightness: 5) and white non-glossy paper

- **Select from 2 spot diameters as per the application**

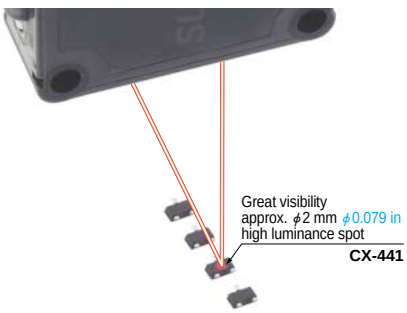
  Within the choice of 50 mm 1.969 in sensing range sensors, we offer small approx. ϕ2 mm ϕ0.079 in spot type optimal for detecting minute object and large approx. ϕ6.5 mm ϕ0.256 in spot type capable of sensing object covered with holes and grooves.



Smallest spot in its class ※

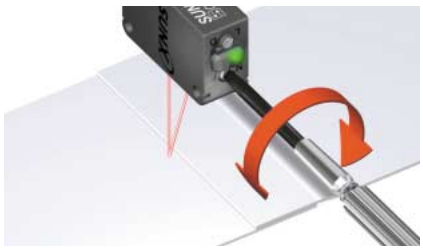
The bright spot makes beam axis alignment easy

These sensors realize a high luminance red spot that provides bright visibility. The sensing position can be checked at a glance. Because the **CX-441** sensor has the smallest spot in its class, approx. ϕ2 mm ϕ0.079 in, even the minutest object can be accurately detected.



Can be used for sensing minute differences

Equipped with a 5-turn adjuster so that even challenging range settings can be handled with ease.



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※ As of April 2004 and based on research conducted by SUNX.

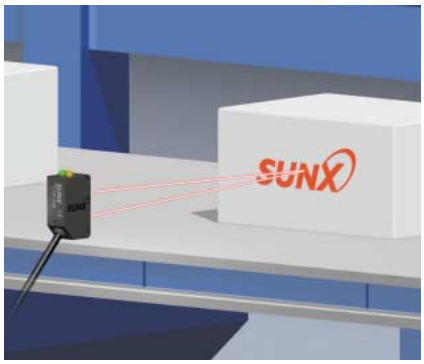
BGS / FGS functions make even the most challenging settings possible!

For details on the operation of the BGS / FGS functions, refer to p.24, '**PRECAUTIONS FOR PROPER USE**'.

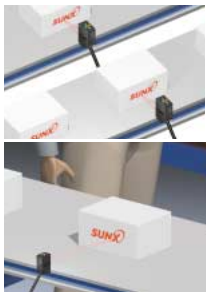
The BGS function is best suited for the following case

BGS **Background not present**

When object and background are separated



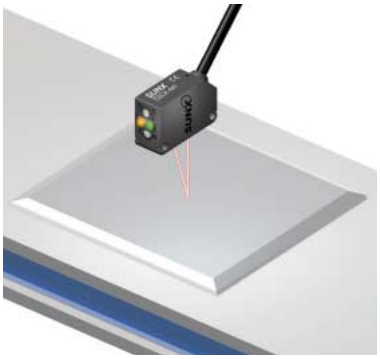
Not affected if the background color changes or someone passes behind the conveyor.



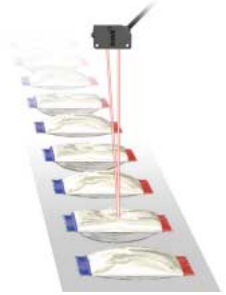
The FGS function is best suited for the following case

FGS **Background present**

When object and background are close together
When the object is glossy or uneven

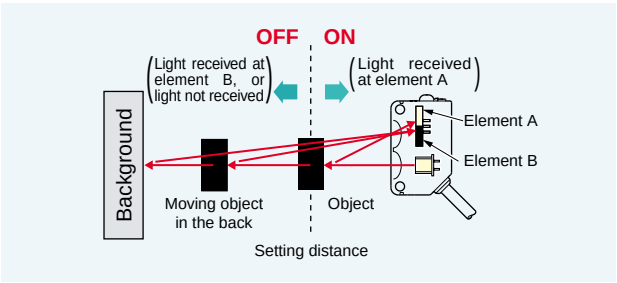


Unaffected by gloss, color or uneven surfaces when sensing objects present on a conveyor belt.



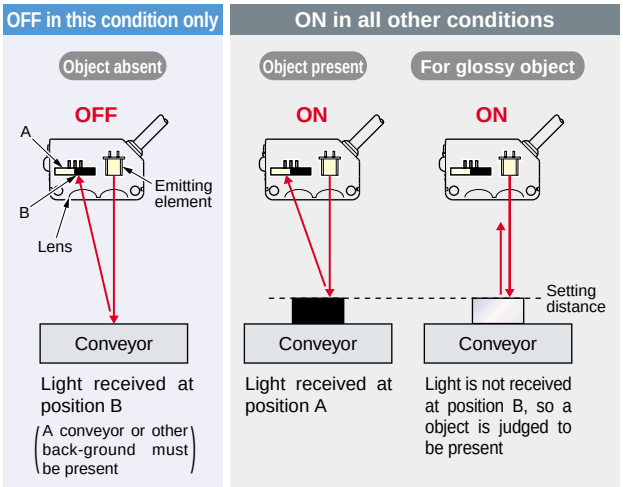
BGS (Background suppression) function

The sensor judges that an object is present when light is received at position A of the light-receiving element (2-segment element). This is useful if the object and background are far apart. The distance adjustment method is the same as the conventional adjustment method for adjustable range reflective type sensors.



FGS (Foreground suppression) function

The sensor judges that an object is present when no light is received at position B of the light-receiving element (2-segment element). Accordingly, even objects that are glossy can be sensed. This is useful if the object and background are close together, or if the object being sensed is glossy.

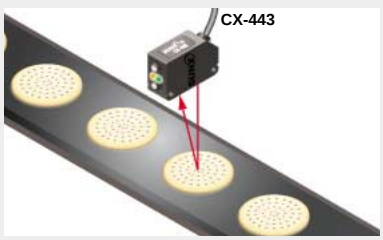


Applications

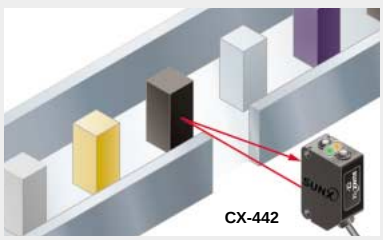
- Small tablet sensing
  Detects minute objects unaffected by glossy background objects. Uses FGS function.



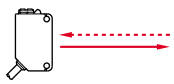
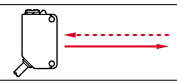
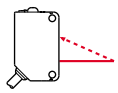
- Biscuit sensing
  Stable sensing even for thin objects. Uses FGS function.



- Passage confirmation
  Not affected by color variations in objects and background objects. Uses BGS function.

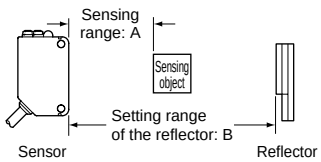


ORDER GUIDE

Type	Appearance	Sensing range	Model No. NPN output	Model No. PNP output	Emitting element
Thru-beam, Long sensing range		10 m 32.808 ft	**CX-411**	**CX-411-P**	Red LED
		15 m 49.213 ft	**CX-412**	**CX-412-P**	Infrared LED
Retroreflective, With polarizing filters		3 m 9.843 ft (Note 1)	**CX-491**	**CX-491-P**	Red LED
Retroreflective, Long sensing range		5 m 16.404 ft (Note 1)	**CX-493**	**CX-493-P**	
Retroreflective, For transparent object sensing		50 to 500 mm 1.969 to 19.685 in (Note 1)	**CX-481**	**CX-481-P**	Infrared LED
		0.1 to 2 m 0.328 to 6.562 in (Note 1)	**CX-482**	**CX-482-P**	
Diffuse reflective		100 mm 3.937 in (Note 2)	**CX-424**	**CX-424-P**	Infrared LED
		300 mm 11.811 in (Note 2)	**CX-421**	**CX-421-P**	
		800 mm 31.496 in (Note 2)	**CX-422**	**CX-422-P**	
Diffuse reflective, Narrow-view		70 to 200 mm 2.756 to 7.874 in (Note 2)	**CX-423**	**CX-423-P**	Red LED
Adjustable range reflective, Small spot		2 to 50 mm 0.079 to 1.969 in	**CX-441**	**CX-441-P**	Red LED
			CX-443	**CX-443-P**	
		15 to 100 mm 0.591 to 3.937 in	**CX-444**	**CX-444-P**	
		20 to 300 mm 0.787 to 11.811 in	**CX-442**	**CX-442-P**	

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

Notes: 1) The sensing range of the retroreflective type sensor is specified for the **RF-230** reflector. The sensing range represents the actual sensing range of the sensor. The sensing ranges itemized in 'A' of the table below may vary depending on the shape of sensing object. Be sure to check the operation with the actual sensing object.



	CX-491□	CX-493□	CX-481□	CX-482□
A	3 m 9.843 ft	5 m 16.404 ft	50 to 500 mm 1.969 to 19.685 in	0.1 to 2 m 0.328 to 6.562 ft
B	0.1 to 3 m 0.328 to 9.843 ft	0.1 to 5 m 0.328 to 16.404 ft	100 to 500 mm 3.937 to 19.685 in	0.8 to 2 m 2.625 to 6.562 ft

2) The sensing range of the diffuse reflective type sensor is specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.

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ORDER GUIDE

0.5 m 1.640 ft / 5 m 16.404 ft cable length type, M8 plug-in connector type, M12 pigtailed type

0.5 m 1.640 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 1.640 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 type	**CX-411**	**CX-411-C05**	**CX-411-C5**	**CX-411-Z**	**CX-411-J**
		PNP output type	**CX-411-P**	**CX-411-P-C05**	**CX-411-P-C5**	**CX-411-P-Z**	**CX-411-P-J**
	Long sensing range	NPN output type	**CX-412**	**CX-412-C05**	**CX-412-C5**	**CX-412-Z**	**CX-412-J**
		PNP output type	**CX-412-P**	**CX-412-P-C05**	**CX-412-P-C5**	**CX-412-P-Z**	**CX-412-P-J**
Retro-reflective	With polarizing filters	NPN output type	**CX-491**	**CX-491-C05**	**CX-491-C5**	**CX-491-Z**	**CX-491-J**
		PNP output type	**CX-491-P**	**CX-491-P-C05**	**CX-491-P-C5**	**CX-491-P-Z**	**CX-491-P-J**
	Long sensing range	NPN output type	**CX-493**	**CX-493-C05**	**CX-493-C5**	**CX-493-Z**	**CX-493-J**
		PNP output type	**CX-493-P**	**CX-493-P-C05**	**CX-493-P-C5**	**CX-493-P-Z**	**CX-493-P-J**
	For transparent object sensing	NPN output type	**CX-481**	**CX-481-C05**	**CX-481-C5**	**CX-481-Z**	**CX-481-J**
		PNP output type	**CX-481-P**	**CX-481-P-C05**	**CX-481-P-C5**	**CX-481-P-Z**	**CX-481-P-J**
		NPN output type	**CX-482**	**CX-482-C05**	**CX-482-C5**	**CX-482-Z**	**CX-482-J**
		PNP output type	**CX-482-P**	**CX-482-P-C05**	**CX-482-P-C5**	**CX-482-P-Z**	**CX-482-P-J**
Diffuse reflective		NPN output type	**CX-424**	**CX-424-C05**	**CX-424-C5**	**CX-424-Z**	**CX-424-J**
		PNP output type	**CX-424-P**	**CX-424-P-C05**	**CX-424-P-C5**	**CX-424-P-Z**	**CX-424-P-J**
		NPN output type	**CX-421**	**CX-421-C05**	**CX-421-C5**	**CX-421-Z**	**CX-421-J**
		PNP output type	**CX-421-P**	**CX-421-P-C05**	**CX-421-P-C5**	**CX-421-P-Z**	**CX-421-P-J**
		NPN output type	**CX-422**	**CX-422-C05**	**CX-422-C5**	**CX-422-Z**	**CX-422-J**
		PNP output type	**CX-422-P**	**CX-422-P-C05**	**CX-422-P-C5**	**CX-422-P-Z**	**CX-422-P-J**
	Narrow-view	NPN output type	**CX-423**	**CX-423-C05**	**CX-423-C5**	**CX-423-Z**	**CX-423-J**
		PNP output type	**CX-423-P**	**CX-423-P-C05**	**CX-423-P-C5**	**CX-423-P-Z**	**CX-423-P-J**
Adjustable range reflective	Small spot	NPN output type	**CX-441**	———	———	**CX-441-Z**	———
		PNP output type	**CX-441-P**	———	———	**CX-441-P-Z**	———
		NPN output type	**CX-443**	———	———	**CX-443-Z**	———
		PNP output type	**CX-443-P**	———	———	**CX-443-P-Z**	———
		NPN output type	**CX-444**	———	———	**CX-444-Z**	———
		PNP output type	**CX-444-P**	———	———	**CX-444-P-Z**	———
		NPN output type	**CX-442**	———	———	**CX-442-Z**	———
		PNP output type	**CX-442-P**	———	———	**CX-442-P-Z**	———

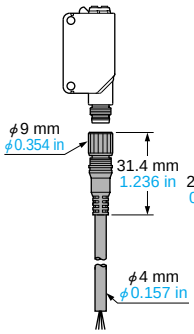
Note : Please order the suitable mating cable separately for M8 plug-in connector type and M12 pigtailed type.

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

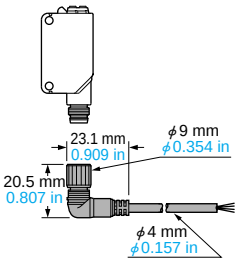
Type		Model No.	Cable length	Description
For M8 plug-in connector type	Straight	**CN-24A-C2**	2 m 6.562 ft	Can be used with all models
		CN-24A-C5	5 m 16.404 ft	
	Elbow	**CN-24AL-C2**	2 m 6.562 ft	
		CN-24AL-C5	5 m 16.404 ft	
For M12 pigtailed type	2-core	**CN-22-C2**	2 m 6.562 ft	For thru-beam type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

Mating cables

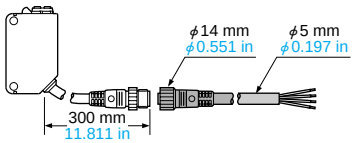
• CN-24A-C2
• CN-24A-C5



• CN-24AL-C2
• CN-24AL-C5



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



Package without reflector

NPN output type: **CX-491-Y**
PNP output type: **CX-491-P-Y**

Accessory

RF-230 (Reflector)



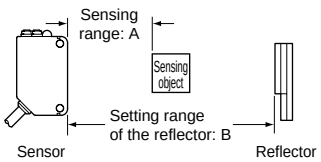
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OPTIONS

Designation	Model No.		Slit size	Sensing range		Min. sensing object	
	Slit	Sensor		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**	**CX-411**□	ϕ0.5 mm ϕ0.020 in	400 mm 15.748 in	20 mm 0.787 in	ϕ12 mm ϕ0.472 in	ϕ0.5 mm ϕ0.020 in
		CX-412□		600 mm 23.622 in	30 mm 1.181 in		
	OS-CX-1	**CX-411**□	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
		CX-412□		1.35 m 4.429 ft	150 mm 5.906 in		ϕ1.5 mm ϕ0.059 in
	OS-CX-2	**CX-411**□	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
		CX-412□		3 m 9.843 ft	600 mm 23.622 in		ϕ3 mm ϕ0.118 in
Rectangular slit mask (For thru-beam type sensor only)	**OS-CX-05 × 6**	**CX-411**□	0.5 × 6 mm 0.020 × 0.236 in	2 m 6.562 ft	400 mm 15.748 in	ϕ12 mm ϕ0.472 in	0.5 × 6 mm 0.020 × 0.236 in
		CX-412□		3 m 9.843 ft	600 mm 23.622 in		
	OS-CX-1 × 6	**CX-411**□	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
		CX-412□		4.5 m 14.764 ft	1.5 m 4.921 ft		
	OS-CX-2 × 6	**CX-411**□	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
		CX-412□		7.5 m 24.606 ft	3 m 9.843 ft		

Designation	Model No.		Sensing range	Min. sensing object
Interference prevention filter (For **CX-441**□ 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**	**CX-491**□	1 m 3.281 ft (Note 2)	ϕ30 mm ϕ1.181 in
		CX-493□	1.5 m 4.921 ft (Note 2)	
		CX-481□	———	
		CX-482□	0.1 to 0.6 m 0.328 to 1.969 ft (Note 2)	
	RF-220	**CX-491**□	1.5 m 4.921 ft (Note 2)	ϕ35 mm ϕ1.378 in
		CX-493□	3 m 9.843 ft (Note 2)	
		CX-481□	50 to 300 mm 1.969 to 11.811 in (Note 2)	
		CX-482□	0.1 to 1.3 m 0.328 to 4.265 ft (Note 2)	

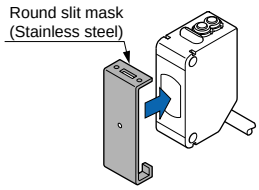
Notes: 1) Value when attached to both sides.
2) Set the distance between the **CX-491**□**/493**□ and the reflector to 0.1 m 0.328 ft or more.
However, see the table below for **CX-48**□.
The sensing range 'A' may vary depending on the shape of sensing object.
Be sure to check the operation with the actual sensing object.



Model No.		A	B
Sensor	Reflector		
CX-481□	**RF-220**	50 to 300 mm 1.969 to 11.811 in	100 to 300 mm 3.937 to 11.811 in
CX-482□	**RF-220**	0.1 to 1.3 m 0.328 to 4.265 ft	0.5 to 1.3 m 1.640 to 4.265 ft
	RF-210	0.1 to 0.6 m 0.328 to 1.969 ft	0.3 to 0.6 m 0.984 to 1.969 ft

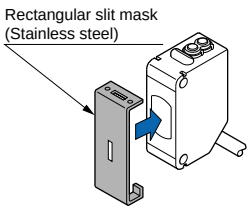
Round slit mask

• **OS-CX-**□
Fitted on the front face of the sensor with one-touch.



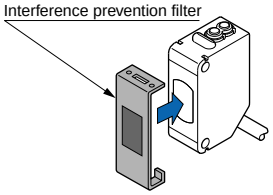
Rectangular slit mask

• **OS-CX-**□ **× 6**
Fitted on the front face of the sensor with one-touch.



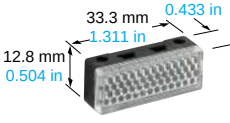
Interference prevention filter

• **PF-CX4-V**
• **PF-CX4-H**
Two sets of **CX-441**□ can be mounted close together.



Reflector

• **RF-210**



• **RF-220**



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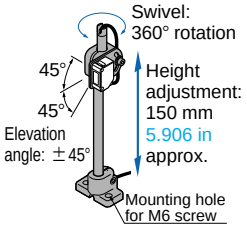
OPTIONS

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 (Note 4): 0.5 m 1.640 ft [**CX-491**□] 0.8 m 2.625 ft [**CX-493**□]	• Ambient temperature: −25 to +50 °C −13 to +122 °F • Ambient humidity: 35 to 85 % RH 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.
	RF-12	• Sensing range (Note 4): 0.7 m 2.297 ft [**CX-491**□] 1.2 m 3.937 ft [**CX-493**□] 0.1 to 0.6 m 0.328 to 1.969 ft [**CX-482**□]	
	RF-13	• Sensing range (Note 4): 0.5 m 1.640 ft [**CX-491**□] 0.8 m 2.625 ft [**CX-493**□]	• Ambient temperature: −25 to +55 °C −13 to +131 °F • Ambient humidity: 35 to 85 % RH
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	
Universal sensor mounting stand (Note 2)	**MS-AJ1**	Horizontal mounting type	Basic assembly
	MS-AJ2	Vertical mounting type	
	MS-AJ1-A	Horizontal mounting type	Lateral arm assembly
	MS-AJ2-A	Vertical mounting type	
	MS-AJ1-M	Horizontal mounting type	Assembly for reflector
	MS-AJ2-M	Vertical mounting type	
Sensor checker (Note 3)	**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.	

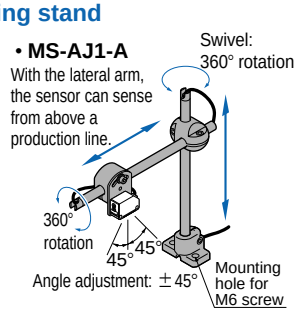
Notes: 1) The plug-in connector type sensor does not allow use of some sensor mounting brackets because of the protrusion of the connector.
2) Refer to the Sensor general catalog 2003-2004 for details of the universal sensor mounting stand.
3) Refer to the Sensor general catalog 2003-2004 for details of the sensor checker **CHX-SC2**.
4) Set the distance between the sensor and the reflective tape to 0.1 m 0.328 ft (**CX-482**□: 0.4 m 1.312 ft) or more.

Universal sensor mounting stand

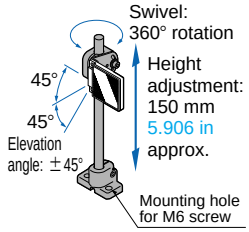
• **MS-AJ1**



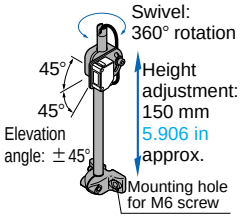
• **MS-AJ1-A**



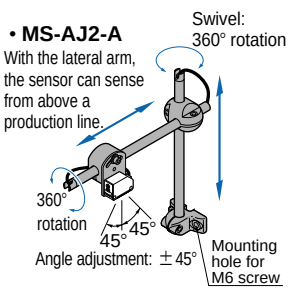
• **MS-AJ1-M**



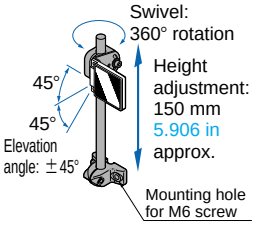
• **MS-AJ2**



• **MS-AJ2-A**

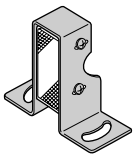


• **MS-AJ2-M**



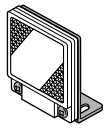
Reflector mounting bracket

• **MS-RF21-1**



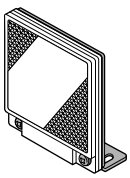
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• **MS-RF22**



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

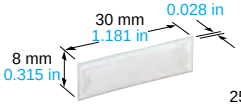
• **MS-RF23**



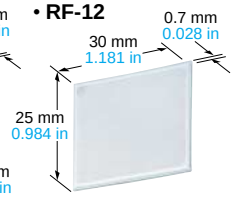
Two M4 (length 10 mm 0.394 in) screws with washers are attached.

Reflective tape

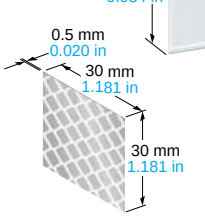
• **RF-11**



• **RF-12**

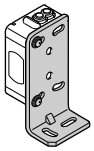


• **RF-13**



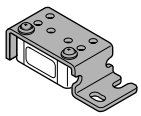
Sensor mounting bracket

• **MS-CX2-1**



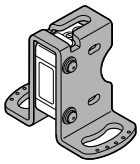
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• **MS-CX2-2**



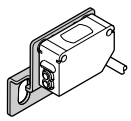
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• **MS-CX2-4**



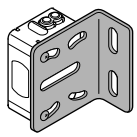
Two M3 (length 14 mm 0.551 in) screws with washers are attached.

• **MS-CX2-5**



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

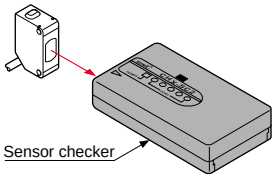
• **MS-CX-3**



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

Sensor checker

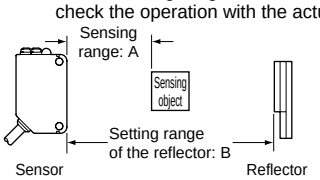
• **CHX-SC2**



SPECIFICATIONS

Item \ Type		Thru-beam		Retroreflective				Diffuse reflective			
			Long sensing range	With polarizing filters	Long sensing range	For transparent object sensing					Narrow-view
Model No.	NPN output	CX-411	CX-412	CX-491	CX-493	CX-481	CX-482	CX-424	CX-421	CX-422	CX-423
	PNP output	CX-411-P	CX-412-P	CX-491-P	CX-493-P	CX-481-P	CX-482-P	CX-424-P	CX-421-P	CX-422-P	CX-423-P
Sensing range		10 m 32.808 ft	15 m 49.213 ft	3 m 9.843 ft (Note 1)	5 m 16.404 ft (Note 1)	50 to 500 mm 1.969 to 19.685 in (Note 1)	0.1 to 2 m 0.328 to 6.562 ft (Note 1)	100 mm 3.937 in (Note 2)	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		ϕ12 mm ϕ0.472 in or more opaque object (Note 3)		ϕ50 mm ϕ1.969 in or more opaque, translucent or specular object (Note 1)	ϕ50 mm ϕ1.969 in or more opaque or translucent object (Note 1)	ϕ50 mm ϕ1.969 in or more transparent, translucent or opaque object (Note 1)		Opaque, translucent or transparent object			Opaque, translucent or transparent object (Min. sensing object: ϕ0.5 mm ϕ0.020 in copper wire)
Hysteresis		———						15 % or less of operation distance			
Repeatability (perpendicular to sensing axis)		0.5 mm 0.020 in or less						1 mm 0.039 in or less			0.5 mm 0.020 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	Emitter: 25 mA or less Receiver: 20 mA or less	20 mA or less			25 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)			
	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	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 double 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 (modulated)		Red LED	Infrared LED	Red LED		Infrared LED					Red LED
Material		Enclosure: PBT (polybutylene terephthalate), Lens: acrylic (**CX-48**□: polycarbonate), Front cover: acrylic (**CX-48**□: polycarbonate)									
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. The sensing range represents the actual sensing range of the sensor. The sensing ranges itemized in 'A' of the table below may vary depending on the shape of sensing object. Be sure to check the operation with the actual sensing object.



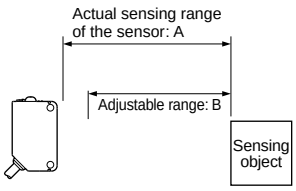
	CX-491□	CX-493□	CX-481□	CX-482□
A	3 m 9.843 ft	5 m16.404 ft	50 to 500 mm 1.969 to 19.685 in	0.1 to 2 m 0.328 to 6.562 ft
B	0.1 to 3 m 0.328 to 9.843 ft	0.1 to 5 m 0.328 to 16.404 ft	100 to 500 mm 3.937 to 19.685 in	0.8 to 2 m 2.625 to 6.562 ft

2) The sensing range of the diffuse reflective type sensor is 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 ϕ0.020 in (using round slit mask) can be detected.

SPECIFICATIONS

Item \ Type	Small spot	Adjustable range reflective		
Model No. NPN output	CX-441	CX-443	CX-444	CX-442
Model No. PNP output	CX-441-P	CX-443-P	CX-444-P	CX-442-P
Adjustable range (Note 1)	20 to 50 mm 0.787 to 1.969 in		20 to 100 mm 0.787 to 3.937 in	40 to 300 mm 1.575 to 11.811 in
Sensing range (with white non-glossy paper)	2 to 50 mm 0.079 to 1.969 in		15 to 100 mm 0.591 to 3.937 in	20 to 300 mm 0.787 to 11.811 in
Hysteresis	2 % or less of operation distance			5 % or less of operation distance
Repeatability	Along sensing axis: 1 mm 0.039 in or less, Perpendicular to sensing axis: 0.2 mm 0.008 in or less (with white non-glossy paper)			
Supply voltage	12 to 24 V DC ± 10 % Ripple P-P 10 % or less			
Current consumption	25 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)	
Output operation	Switchable either Detection-ON or Detection-OFF			
Short-circuit protection	Incorporated			
Response time	1 ms or less			
Operation indicator	Orange LED (lights up when the output is ON)			
Stability indicator	Green LED (lights up under stable operating condition) (Note 2)			
Distance adjuster	5-turn mechanical adjuster			
Sensing mode	BGS / FGS functions Switchable with wiring of sensing mode selection input			
Automatic interference prevention function (Note 3)	Incorporated			
Environmental resistance: Protection	IP67 (IEC)			
Environmental resistance: 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			
Environmental resistance: Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH			
Environmental resistance: Ambient illuminance	Sunlight:10,000 ℓx at the light-receiving face, Incandescent light: 3,000 ℓx at the light-receiving face			
Environmental resistance: EMC	EN 60947-5-2			
Environmental resistance: Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure			
Environmental resistance: Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure			
Environmental resistance: Vibration resistance	10 to 500 Hz frequency, 3 mm 0.118 in double amplitude in X, Y and Z directions for two hours each			
Environmental resistance: Shock resistance	500 m/s^2 acceleration (50 G approx.) in X, Y and Z directions for three times each			
Emitting element	Red LED (modulated)			
Spot diameter	ϕ2 mm ϕ0.079 in approx. (at 50 mm 1.969 in distance)	ϕ6.5 mm ϕ0.256 in approx. (at 50 mm 1.969 in distance)	ϕ9 mm ϕ0.354 in approx. (at 100 mm 3.937 in distance)	□15 mm □0.591 in approx. (at 300 mm 11.811 in distance)
Material	Enclosure: PBT (Polybutylene terephthalate), Front cover: Polycarbonate, Indicator cover: Polycarbonate			
Cable	0.2 mm^2 4-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 mm^2, or more, cable.			
Weight	55 g approx.			

Notes: 1) The adjustable range stands for the maximum sensing range which can be set with the distance adjuster. The sensor can detect an object 2 mm 0.079 in [**CX-444(-P)**: 15 mm 0.591 in, **CX-442(-P)**: 20 mm 0.787 in], or more, away.
2) Refer to '**Stability indicator**' (p.24) of '**PRECAUTIONS FOR PROPER USE**' for the details of operation indicator.
3) Note that detection may be unstable depending on the mounting conditions or the sensing object. In the state that this product is mounted, be sure to check the operation with the actual sensing object.



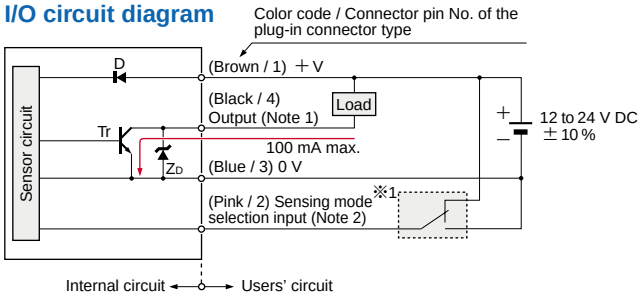
	CX-441□/443□	CX-444□	CX-442□
A	2 to 50 mm 0.079 to 1.969 in	15 to 100 mm 0.591 to 3.937 in	20 to 300 mm 0.787 to 11.811 in
B	20 to 50 mm 0.787 to 1.969 in	20 to 100 mm 0.787 to 3.937 in	40 to 300 mm 1.575 to 11.811 in

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I/O CIRCUIT AND WIRING DIAGRAMS

NPN output type

I/O circuit diagram



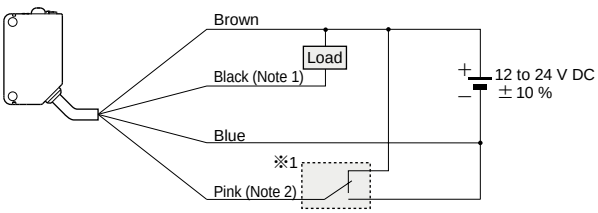
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output.
2) Sensing mode selection input is incorporated only for the **CX-44□** adjustable range reflective type. When using the **CX-44□**, be sure to wire the sensing mode selection input (pink / 2).

※1

- Sensing mode selection input
  BGS function: Connect to 0 V
  FGS function: Connect to ＋V

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

Wiring diagram



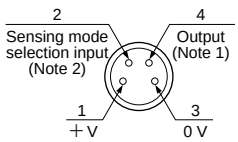
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the black wire.
2) The pink wire is incorporated only for the **CX-44□** adjustable range reflective type. When using the **CX-44□**, be sure to wire the pink wire.

※1

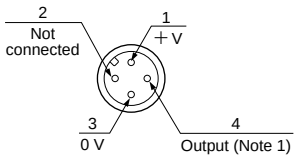
- Sensing mode selection input
  BGS function: Connect to 0 V
  FGS function: Connect to ＋V

Connector pin position

M8 plug-in connector type



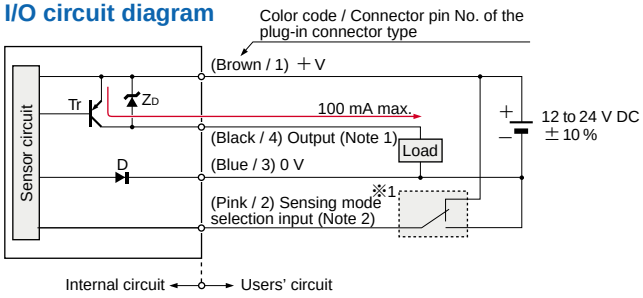
M12 pigtailed type



Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output.
2) Sensing mode selection input is incorporated only for the **CX-44□** adjustable range reflective type. When using the **CX-44□**, be sure to wire the sensing mode selection input (pink / 2).

PNP output type

I/O circuit diagram



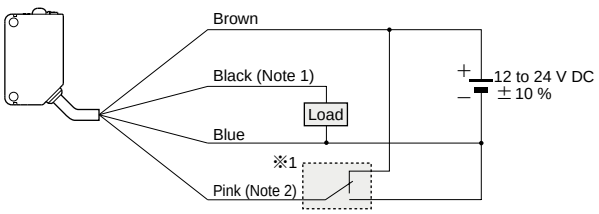
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output.
2) Sensing mode selection input is incorporated only for the **CX-44□-P** adjustable range reflective type. When using the **CX-44□-P**, be sure to wire the sensing mode selection input (pink / 2).

※1

- Sensing mode selection input
  BGS function: Connect to 0 V
  FGS function: Connect to ＋V

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

Wiring diagram



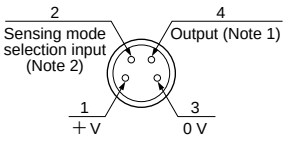
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the black wire.
2) The pink wire is incorporated only for the **CX-44□-P** adjustable range reflective type. When using the **CX-44□-P**, be sure to wire the pink wire.

※1

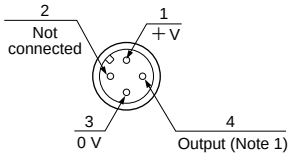
- Sensing mode selection input
  BGS function: Connect to 0 V
  FGS function: Connect to ＋V

Connector pin position

M8 plug-in connector type



M12 pigtailed type



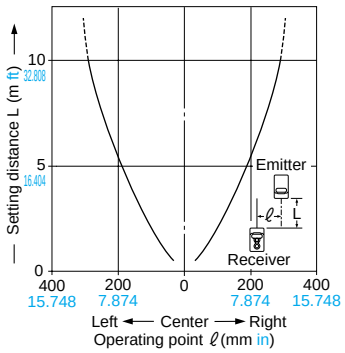
Notes: 1) The emitter of the thru-beam type sensor does not incorporate the output.
2) Sensing mode selection input is incorporated only for the **CX-44□-P** adjustable range reflective type. When using the **CX-44□-P**, be sure to wire the sensing mode selection input (pink / 2).

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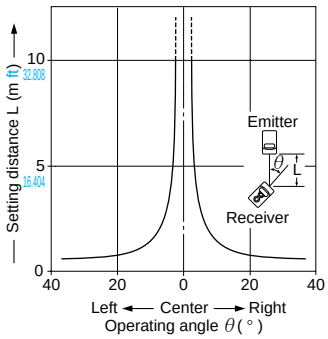
SENSING CHARACTERISTICS (TYPICAL)

CX-411□ Thru-beam type

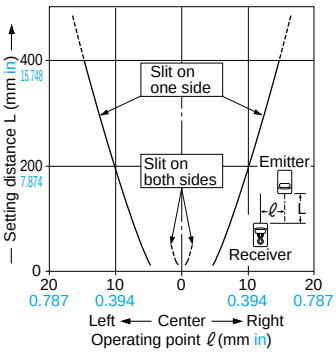
Parallel deviation



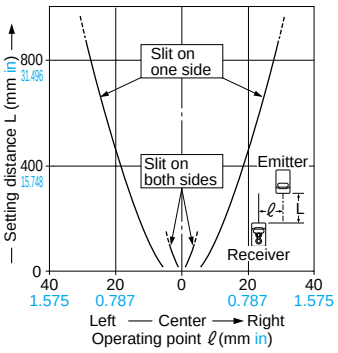
Angular deviation



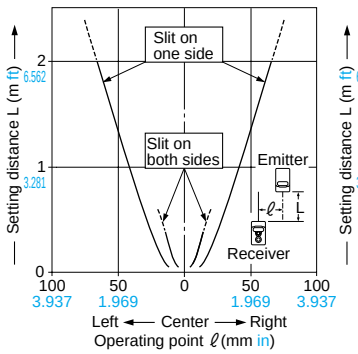
Parallel deviation with round slit masks (ϕ0.5 mm ϕ0.020 in)



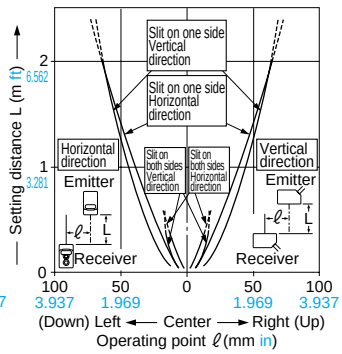
Parallel deviation with round slit masks (ϕ1 mm ϕ0.039 in)



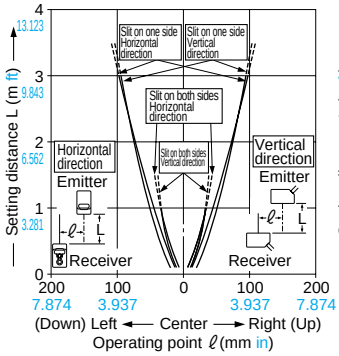
Parallel deviation with round slit masks (ϕ2 mm ϕ0.079 in)



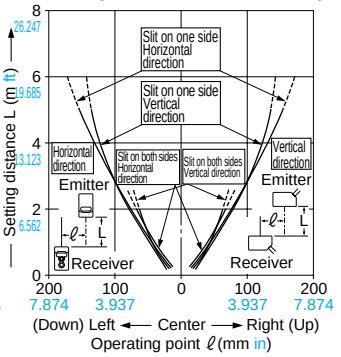
Parallel deviation with rectangular slit masks (0.5×6 mm 0.020×0.236 in)



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

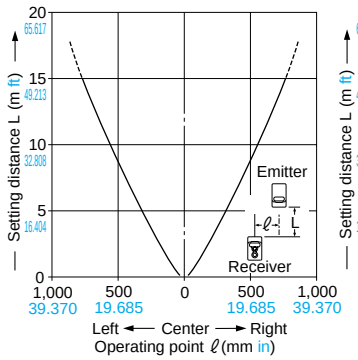


Parallel deviation with rectangular slit masks (2×6 mm 0.079×0.236 in)

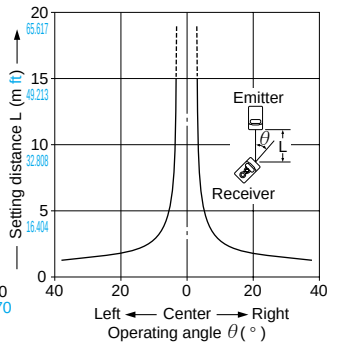


CX-412□ Thru-beam type

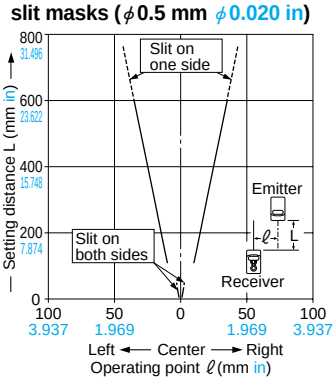
Parallel deviation



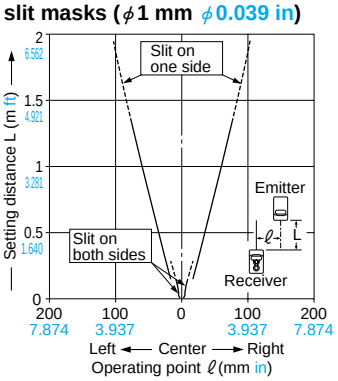
Angular deviation



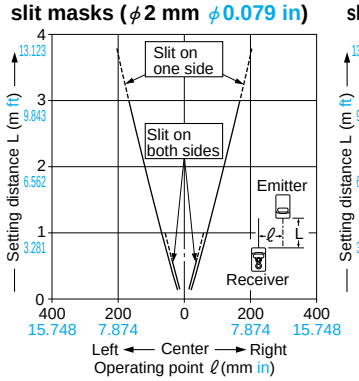
Parallel deviation with round slit masks (ϕ0.5 mm ϕ0.020 in)



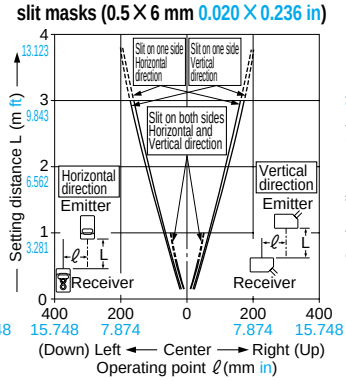
Parallel deviation with round slit masks (ϕ1 mm ϕ0.039 in)



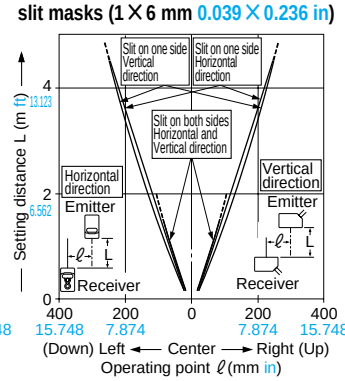
Parallel deviation with round slit masks (ϕ2 mm ϕ0.079 in)



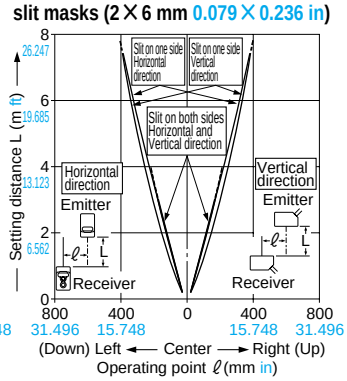
Parallel deviation with rectangular slit masks (0.5×6 mm 0.020×0.236 in)



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



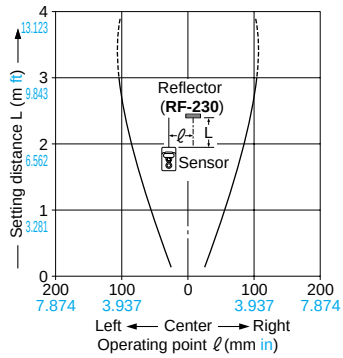
Parallel deviation with rectangular slit masks (2×6 mm 0.079×0.236 in)



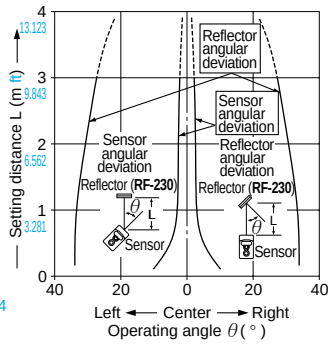
SENSING CHARACTERISTICS (TYPICAL)

CX-491□ Retroreflective type

Parallel deviation

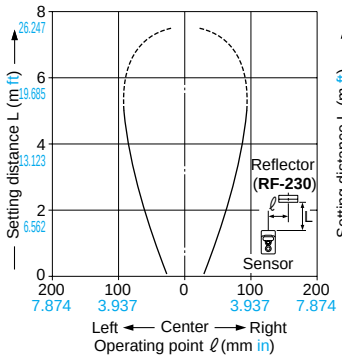


Angular deviation

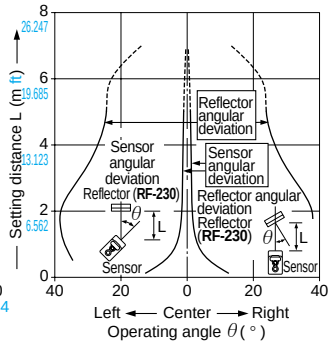


CX-493□ Retroreflective type

Parallel deviation

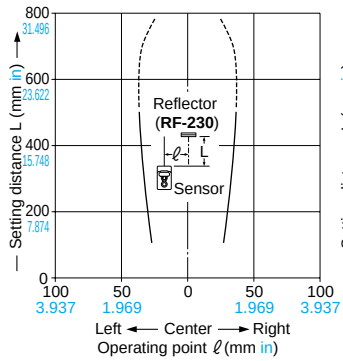


Angular deviation

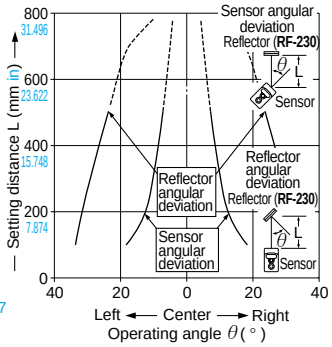


CX-481□ Retroreflective type

Parallel deviation

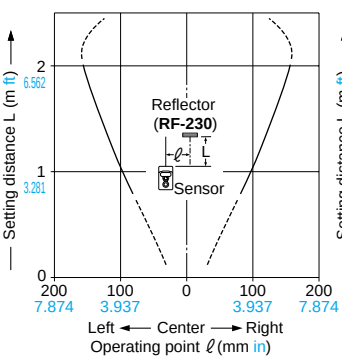


Angular deviation

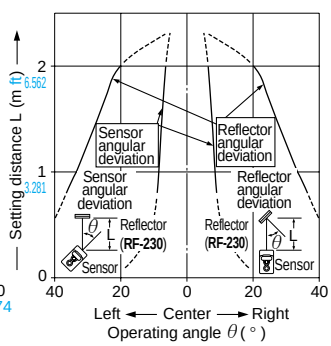


CX-482□ Retroreflective type

Parallel deviation

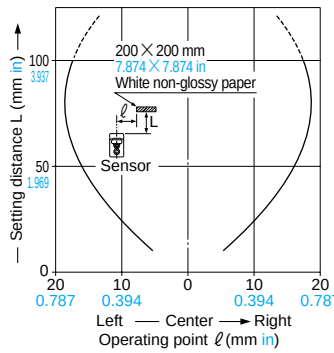


Angular deviation

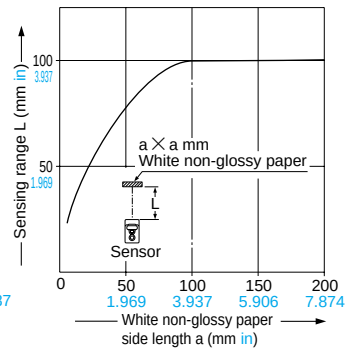


CX-424□ Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range

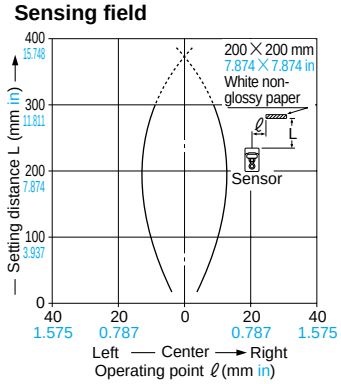


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 × 200 mm 7.874 × 7.874 in), the sensing range shortens, as shown in the left graph.

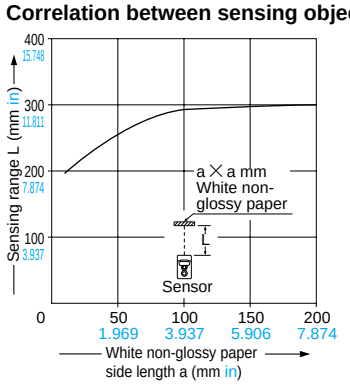
(For plotting the left graph, the sensitivity has been set such that a 200 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 100 mm 3.937 in.)

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.

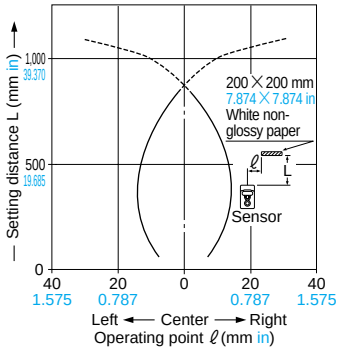
(For plotting the left graph, the sensitivity has been set such that a 200 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 300 mm 11.811 in.)

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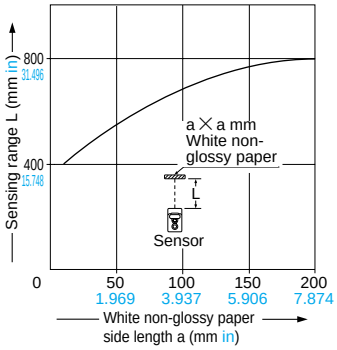
SENSING CHARACTERISTICS (TYPICAL)

CX-422□ Diffuse reflective type

Sensing field



Correlation between sensing object size and sensing range

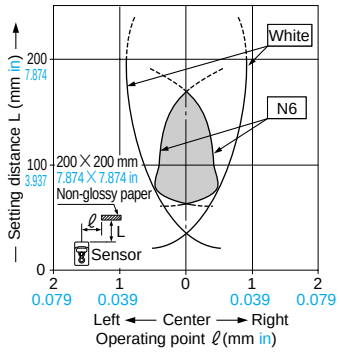


As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 × 200 mm 7.874 × 7.874 in), the sensing range shortens, as shown in the left graph.

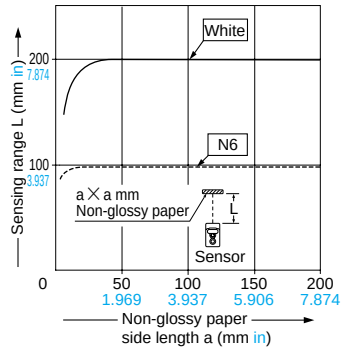
(For plotting the left graph, the sensitivity has been set such that a 200 × 200 mm 7.874 × 7.874 in white non-glossy paper is just detectable at a distance of 800 mm 31.496 in.)

CX-423□ Diffuse reflective type

Sensing field



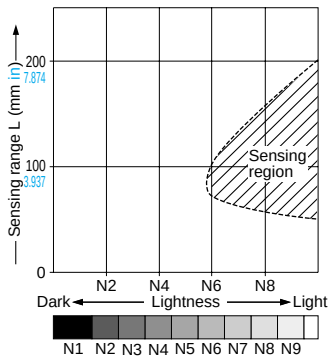
Correlation between sensing object size and sensing range



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 200 mm 7.874 in.)

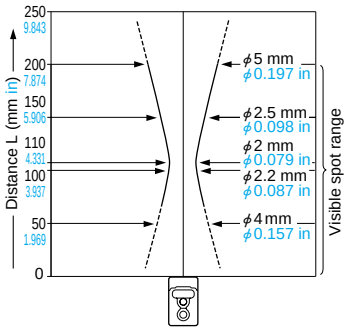
Correlation between lightness and sensing range



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



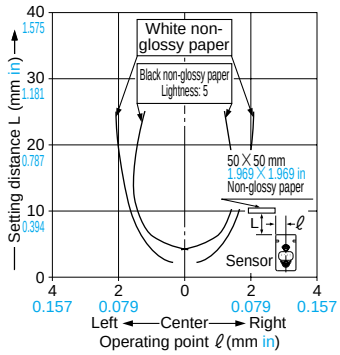
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SENSING CHARACTERISTICS (TYPICAL)

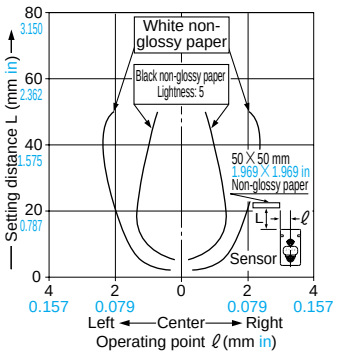
CX-441□ Adjustable range reflective type

Sensing fields

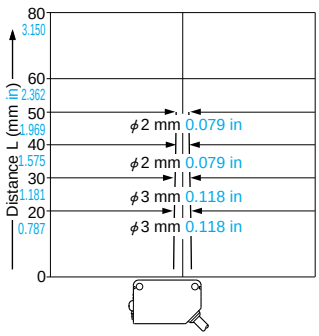
• Setting distance: 25 mm 0.984 in



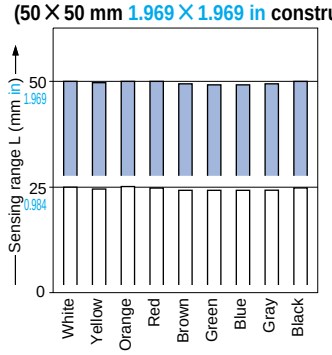
• Setting distance: 50 mm 1.969 in



Emitted beam



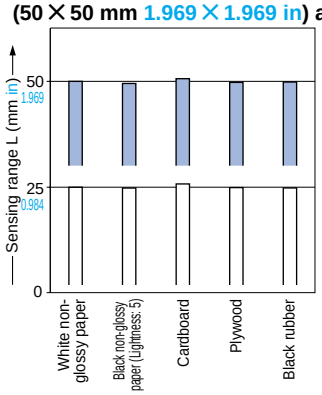
Correlation between color (50 X 50 mm 1.969 X 1.969 in construction paper) and sensing range



50 mm 1.969 in
25 mm 0.984 in

These bars indicate the sensing range with the respective colors when the distance adjuster is set to a sensing range of 50 mm 1.969 in and 25 mm 0.984 in long, respectively, with white color. The sensing range also varies depending on material.

Correlation between material (50 X 50 mm 1.969 X 1.969 in) and sensing range



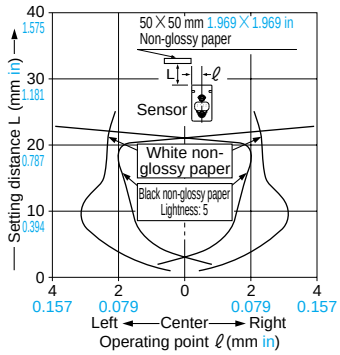
50 mm 1.969 in
25 mm 0.984 in

These bars indicate the sensing range with the respective objects when the distance adjuster is set to a sensing range of 50 mm 1.969 in and 25 mm 0.984 in long, respectively, with white non-glossy paper.

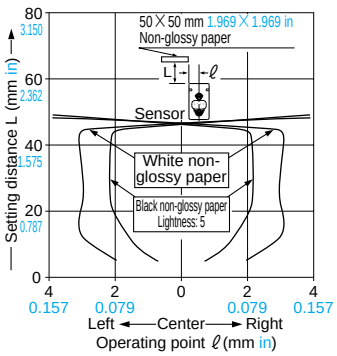
CX-443□ Adjustable range reflective type

Sensing fields

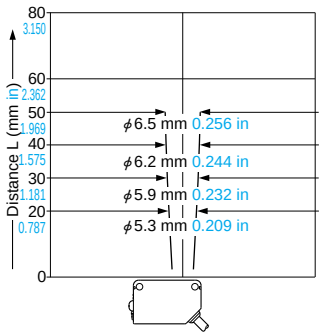
• Setting distance: 25 mm 0.984 in



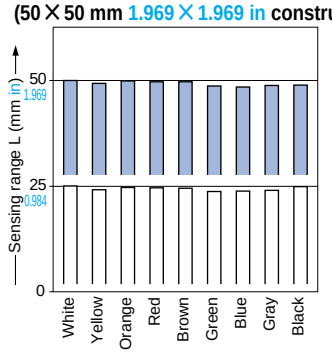
• Setting distance: 50 mm 1.969 in



Emitted beam



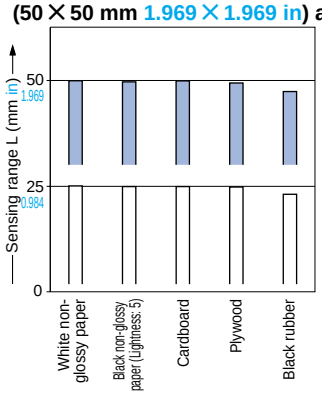
Correlation between color (50 X 50 mm 1.969 X 1.969 in construction paper) and sensing range



50 mm 1.969 in
25 mm 0.984 in

These bars indicate the sensing range with the respective colors when the distance adjuster is set to a sensing range of 50 mm 1.969 in and 25 mm 0.984 in long, respectively, with white color. The sensing range also varies depending on material.

Correlation between material (50 X 50 mm 1.969 X 1.969 in) and sensing range



50 mm 1.969 in
25 mm 0.984 in

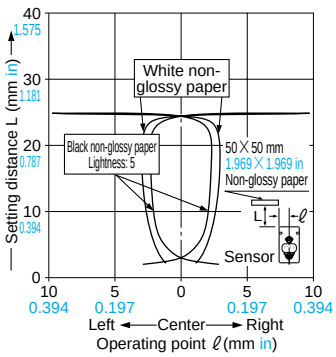
These bars indicate the sensing range with the respective objects when the distance adjuster is set to a sensing range of 50 mm 1.969 in and 25 mm 0.984 in long, respectively, with white non-glossy paper.

SENSING CHARACTERISTICS (TYPICAL)

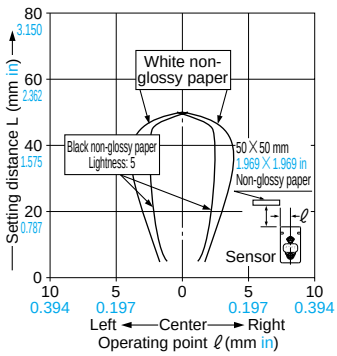
CX-444□ Adjustable range reflective type

Sensing fields

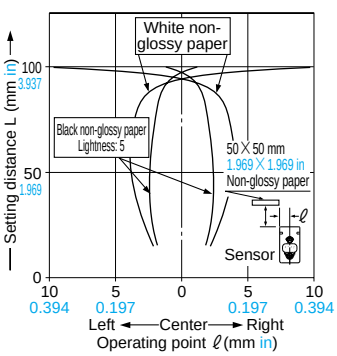
• Setting distance: 25 mm 0.984 in



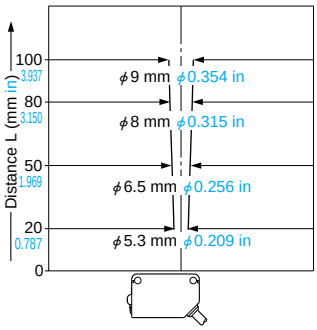
• Setting distance: 50 mm 1.969 in



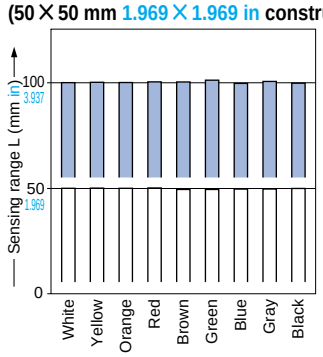
• Setting distance: 100 mm 3.937 in



Emitted beam



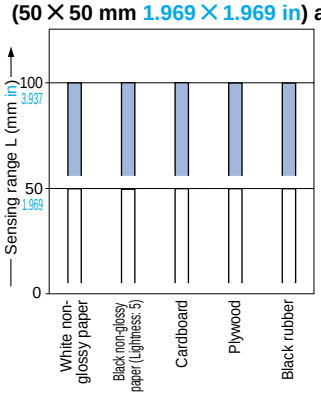
Correlation between color (50 X 50 mm 1.969 X 1.969 in construction paper) and sensing range



100 mm 3.937 in
50 mm 1.969 in

These bars indicate the sensing range with the respective colors when the distance adjuster is set to a sensing range of 100 mm 3.937 in, 50 mm 1.969 in long, respectively, with white color. The sensing range also varies depending on material.

Correlation between material (50 X 50 mm 1.969 X 1.969 in) and sensing range



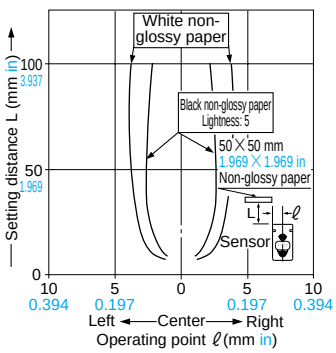
100 mm 3.937 in
50 mm 1.969 in

These bars indicate the sensing range with the respective objects when the distance adjuster is set to a sensing range of 100 mm 3.937 in, 50 mm 1.969 in long, respectively, with white non-glossy paper.

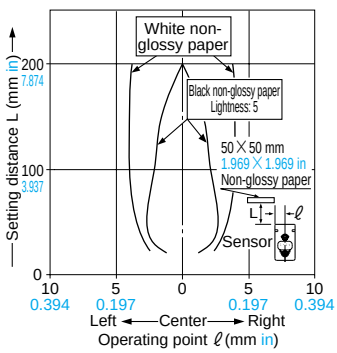
CX-442□ Adjustable range reflective type

Sensing fields

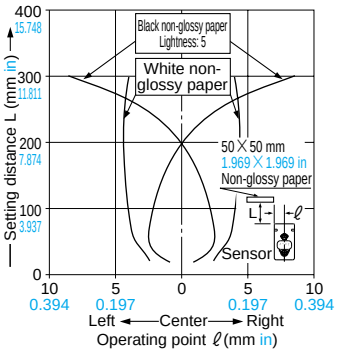
• Setting distance: 100 mm 3.937 in



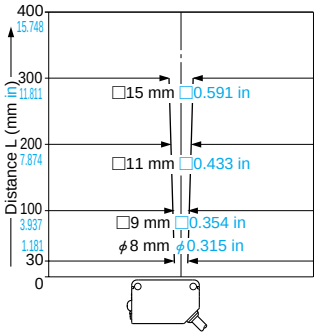
• Setting distance: 200 mm 7.874 in



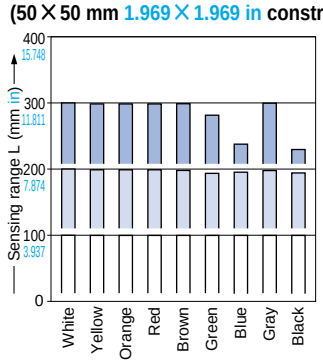
• Setting distance: 300 mm 11.811 in



Emitted beam



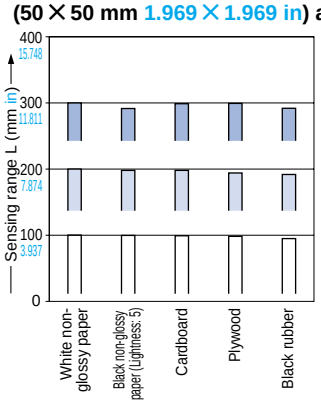
Correlation between color (50 X 50 mm 1.969 X 1.969 in construction paper) and sensing range



300 mm 11.811 in
200 mm 7.874 in
100 mm 3.937 in

These bars indicate the sensing range with the respective colors when the distance adjuster is set to a sensing range of 300 mm 11.811 in, 200 mm 7.874 in and 100 mm 3.937 in long, respectively, with white color. The sensing range also varies depending on material.

Correlation between material (50 X 50 mm 1.969 X 1.969 in) and sensing range



300 mm 11.811 in
200 mm 7.874 in
100 mm 3.937 in

These bars indicate the sensing range with the respective objects when the distance adjuster is set to a sensing range of 300 mm 11.811 in, 200 mm 7.874 in and 100 mm 3.937 in long, respectively, with white non-glossy paper.

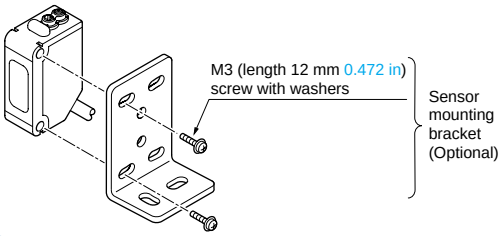
PRECAUTIONS FOR PROPER USE

All models

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.



Wiring

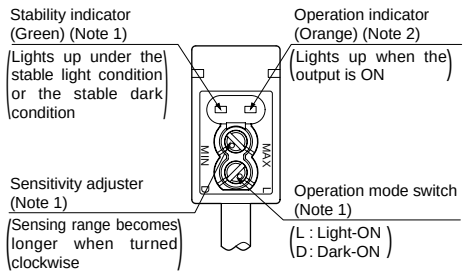
- Make sure that the power supply is off while wiring.
- Take care that wrong wiring will damage the sensor.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply 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.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- This sensor is suitable for indoor use only.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in direct contact with water or corrosive gas.
- Take care that the sensor does not come in direct contact with water, oil, grease or organic solvents, such as, thinner, etc.
- This sensor cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify the sensor.

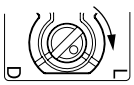
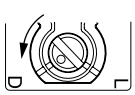
CX-41□/42□
CX-49□/48□

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.

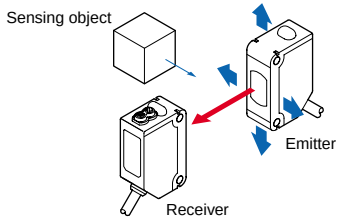
Operation mode switch

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

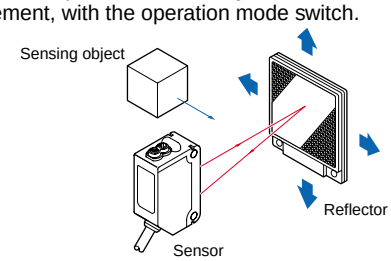
Thru-beam type sensor

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

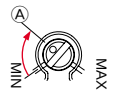
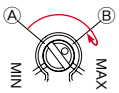
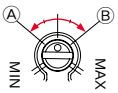
① Set the operation mode switch to the Light-ON mode position (L side).
② Placing the sensor and the reflector face to face along a straight line, move the reflector in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation 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.



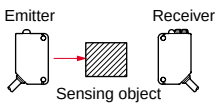
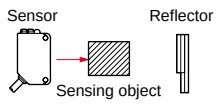
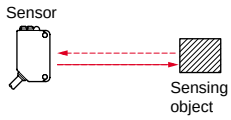
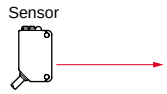
PRECAUTIONS FOR PROPER USE

CX-41□/42□ CX-49□/48□

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	Optimum position 	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		

Relation between output and indicators

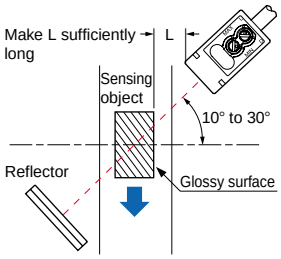
In case of Light-ON			Sensing condition	In case of Dark-ON		
Stability indicator	Operation indicator	Output		Output	Operation indicator	Stability indicator
●	●	ON	Stable light receiving	OFF	●	●
●			Unstable light receiving			●
●	●	OFF	Unstable dark receiving	ON	●	
●			Stable dark receiving			●

●, ● : lights up ● : lights off

Retroreflective type sensor (except CX-491□)

- Please take care of the following points when detecting materials having a gloss.

① Make L, shown in the diagram, sufficiently long.
② Install at an angle of 10 to 30 degrees to the sensing object.



Retroreflective type sensor with polarizing filters (CX-491□)

- 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

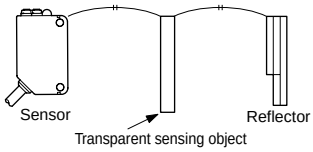
- Can wrapped by clear film
- Aluminum sheet covered by plastic film
- Gold or silver color (specular) label or wrapping paper

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.

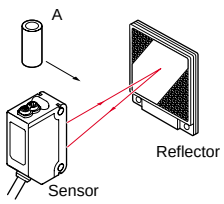
Retroreflective type sensor for transparent object sensing (CX-48□)

- Optimum sensing is possible when the position of the transparent sensing object is set at the center of the sensor and the reflector. If the sensing position is set near the sensor or the reflector, the sensing may be unstable. In this case, set the sensing position at the center of the sensor and the reflector.

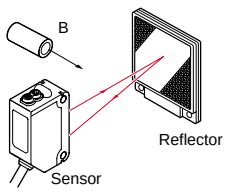


- When the sensor detects an uneven plastic receptacle or glass bottle, the received-light amount may differ with the sensing position or direction. Adjust the sensitivity after confirming the stable sensing condition by turning the sensing object, etc.
- When sensing pipe-shaped transparent sensing object, set it in a standing, not lying, position as shown in Figure A. The sensor may fail to detect a lying object as shown in Figure B.

<Correct>



<Incorrect>



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(800) 280-6933
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PRECAUTIONS FOR PROPER USE

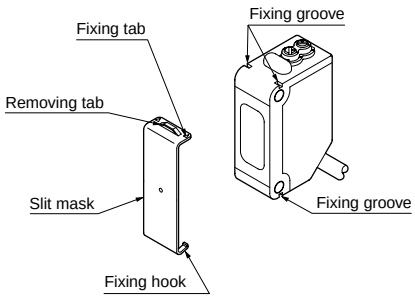
CX-41□

Slit mask (Optional)

- 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.

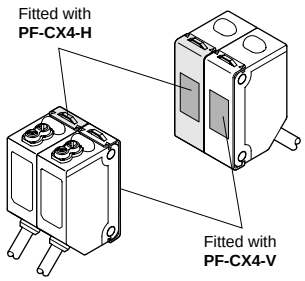


How to remove

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

Interference prevention filter (Optional) (Exclusively for CX-411□)

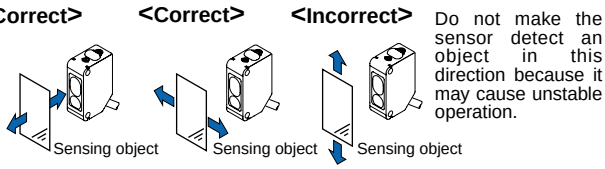
- By mounting interference prevention filters (**PF-CX4-**□), two sets of **CX-411**□ can be mounted close together.
  However, the sensing range is reduced when the interference prevention filter is mounted.
- The filters can be mounted by the same method as for the slit masks.
- The two sets of sensors should be fitted with different types of interference prevention filters.
  Interference prevention does not work if the filters are mounted for emitters only, receivers only or if the same model No. of interference prevention filters are mounted on both sets of sensors.



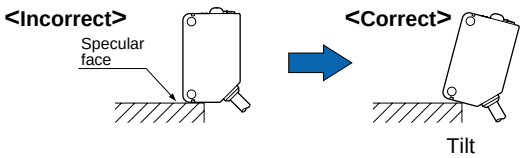
CX-44□

Mounting

- Care must be taken regarding the sensor mounting direction with respect to the object's direction of movement.



- When detecting a specular object (aluminum or copper foil, etc.) or an object having a glossy surface or coating, please take care that there are cases when the object may not be detected due to a change in angle, wrinkles on the object surface, etc.
- When a specular body is present below the sensor, use the sensor by tilting it slightly upwards to avoid wrong operation.



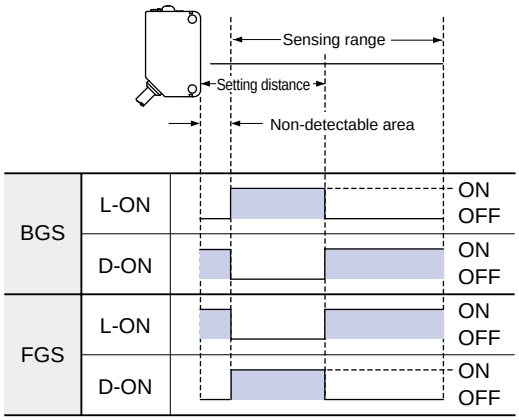
- If a specular body is present in the background, wrong operation may be caused due to a small change in the angle of the background body. In that case, install the sensor at an inclination and confirm the operation with the actual sensing object.
- Take care that there is a non-detectable area right in front of the sensor.

Operation mode switch

Operation mode switch	Description
	Detection-ON mode is obtained when the operation mode switch is turned fully clockwise (L side).
	Detection-OFF mode is obtained when the operation mode switch is turned fully counterclockwise (D side).

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

- Depending on whether you select the BGS or FGS function, the output operation changes as follows.



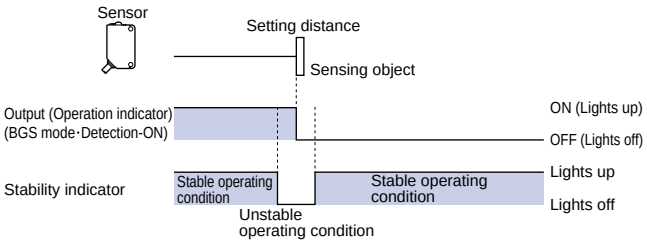
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PRECAUTIONS FOR PROPER USE

CX-44□

Stability indicator

- Since the **CX-44**□ uses a 2-segment photodiode as its receiving element, and sensing is done based on the difference in the incident beam angle of the reflected beam from the sensing object, the output and the operation indicator (orange) operate according to the object distance.
  Furthermore, the stability indicator (green) shows the margin of the setting distance.

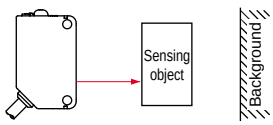


BGS / FGS functions

- This sensor incorporates BGS / FGS functions. Select either BGS or FGS function depending on the positions of the background and sensing object.

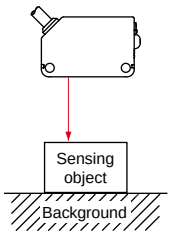
BGS function

- This function is used when the sensing object is apart from the background.



FGS function

- This function is used when the sensing object contacts the background or the sensing object is glossy, etc.

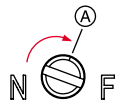
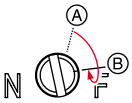
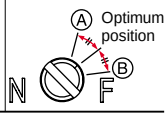


Distance adjustment

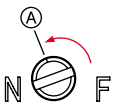
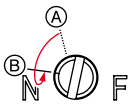
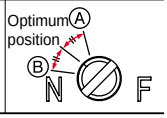
- When this product is used, be sure to carry out the distance adjustment.
- Since the distance adjuster of this sensor is a 5-turn adjuster, when the point Ⓐ and Ⓑ is adjusted as explained in the table right, there may be more than 1 turn between the point Ⓐ and Ⓑ. Therefore, make sure to remember the turns of both points to find the optimum position.
- Be sure to wire the sensing mode selection input (Pink / 2) before distance adjustment. If the wiring is done after the distance adjustment, the sensing area is changed.

- Turn the distance adjuster gradually and lightly with a 'minus' screwdriver (please arrange separately). In order to protect itself, the distance adjuster idles if turned fully.
  If the adjuster is idled when distance adjustment is done, carry out the adjustment again.

BGS function

Step	Description	Distance adjuster
①	Turn the distance adjuster fully counterclockwise to the minimum sensing range position. (**CX-441**□**/443**□**/444**□: 20 mm 0.787 in approx., **CX-442**□: 40 mm 1.575 in approx.)	
②	Place an object at the required distance from the sensor, turn the distance adjuster gradually clockwise, and find out point Ⓐ where the sensor changes to the detecting condition.	
③	Remove the object, turn the adjuster clockwise further until the sensor goes into the detecting state again. Once it has entered, turn the distance adjuster backward until the sensor returns to the non-detecting condition. This position is designated as point Ⓑ. When the sensor does not go into the detecting condition even if the adjuster is turned fully clockwise, the position where the adjuster was fully turned is regarded as the point Ⓑ. (There may be more than 1 turn between point Ⓐ and Ⓑ, since this sensor incorporates a 5-turn adjuster.)	
④	The optimum position to stably detect objects is the center point between Ⓐ and Ⓑ.	

FGS function

Step	Description	Distance adjuster
①	Turn the distance adjuster fully clockwise to the maximum sensing range position. (**CX-441**□**/443**□: 50 mm 1.969 in approx., **CX-444**□: 100 mm 3.937 in approx., **CX-442**□: 300 mm 11.811 in approx.)	
②	In the state where the sensor detects the background, turn the distance adjuster gradually counterclockwise, and find out point Ⓐ where the sensor changes to the non-detecting condition.	
③	Place an object at the required distance from the sensor, turn the adjuster counterclockwise further until the sensor goes into the non-detecting condition again. Once entered, turn the distance adjuster backward until the sensor returns to the detecting condition. This position is designated as point Ⓑ. When the sensor does not go into the non-detecting condition even if the adjuster is turned fully counterclockwise, the position where the adjuster was fully turned is regarded as the point Ⓑ. (There may be more than 1 turn between point Ⓐ and Ⓑ, since this sensor incorporates a 5-turn adjuster.)	
④	The optimum position to stably detect objects is the center point between Ⓐ and Ⓑ .	

Others

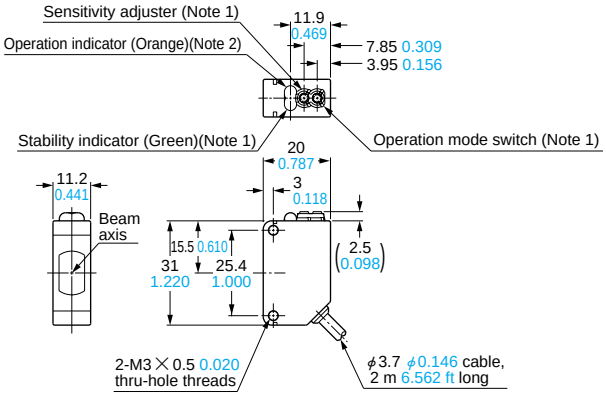
- Its distance adjuster is mechanically operated. Do not drop; avoid other shocks.

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DIMENSIONS (Unit: mm in)

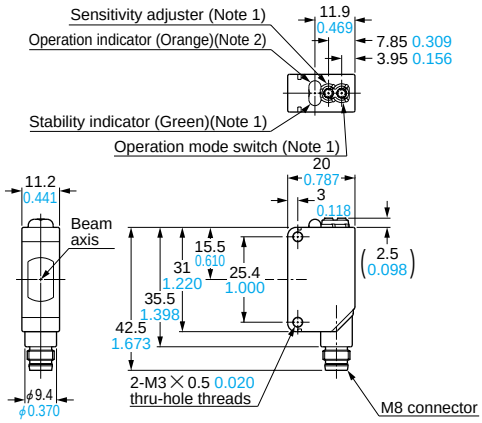
The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

CX-41□ Sensor



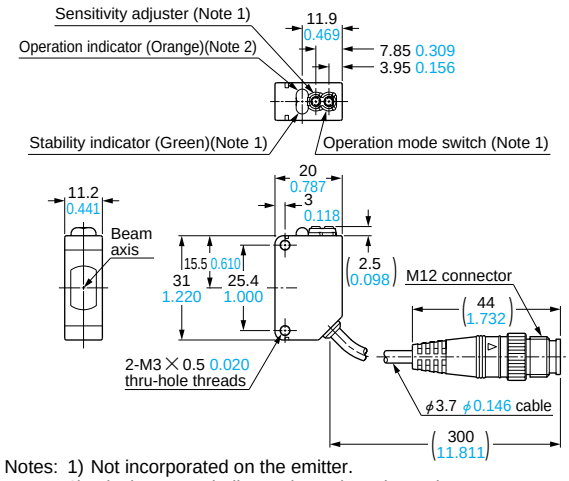
Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (green) on the emitter.

CX-41□-Z Sensor



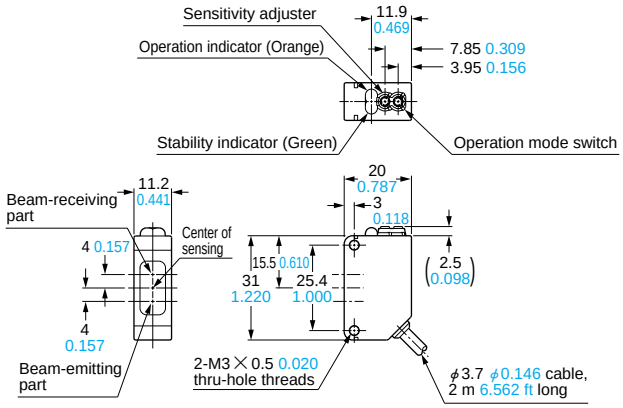
Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (green) on the emitter.

CX-41□-J Sensor

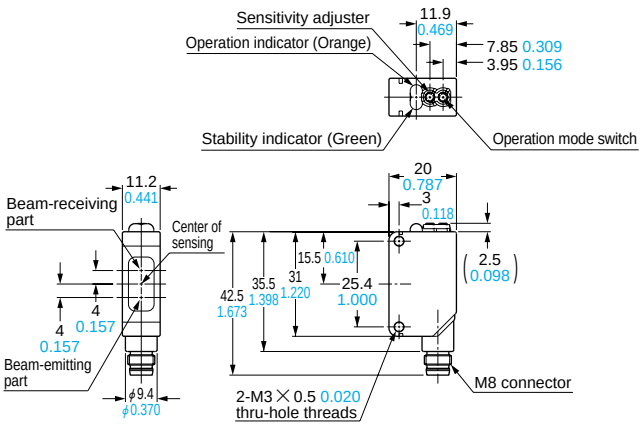


Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (green) on the emitter.

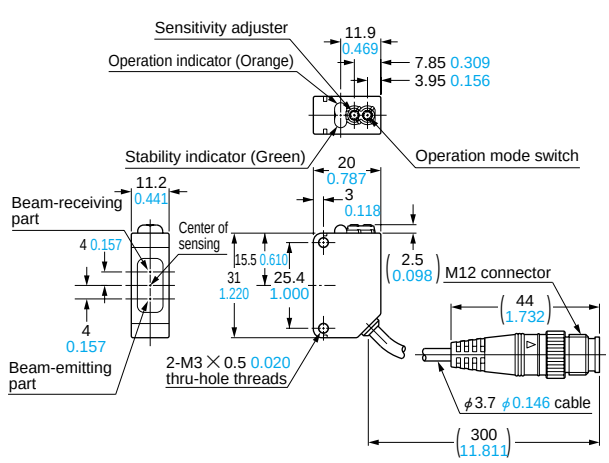
CX-49□ CX-48□ CX-42□ Sensor



CX-49□-Z CX-48□-Z CX-42□-Z Sensor



CX-49□-J CX-48□-J CX-42□-J Sensor

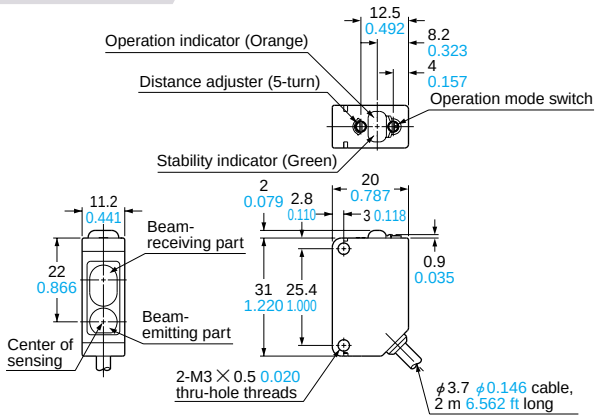


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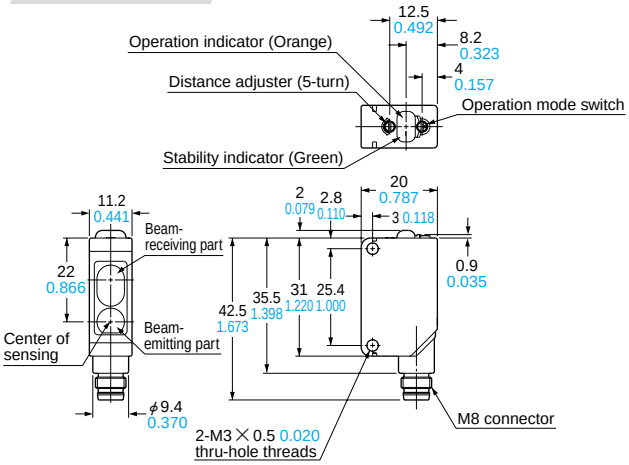
DIMENSIONS (Unit: mm in)

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

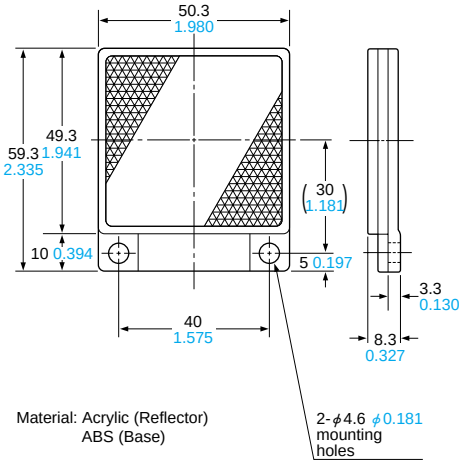
CX-44□ Sensor



CX-44□-Z Sensor

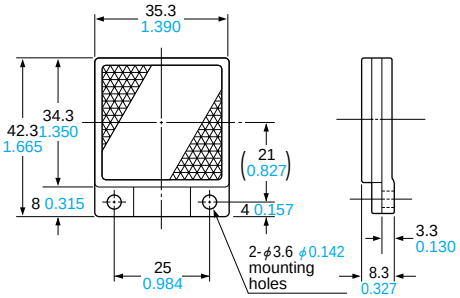


RF-230 Reflector (Accessory for the retroreflective type sensor)



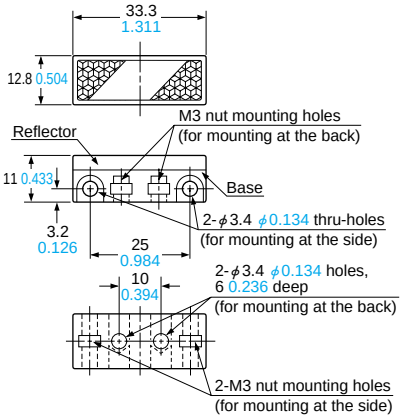
Material: Acrylic (Reflector)
ABS (Base)

RF-220 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

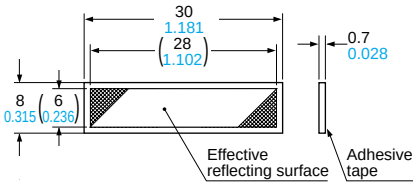
RF-210 Reflector (Optional)



Material: Acrylic (Reflector)
ABS (Base)

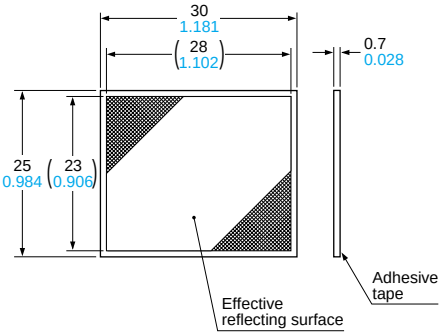
Two M3 (length 8 mm 0.315 in) screws with washers and two nuts are attached.

RF-11 Reflective tape (Optional)



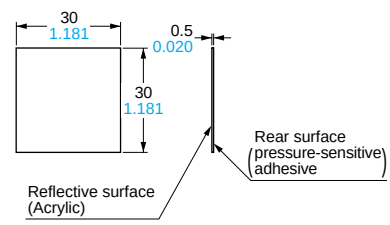
Material: Acrylic

RF-12 Reflective tape (Optional)



Material: Acrylic

RF-13 Reflective tape (Optional)

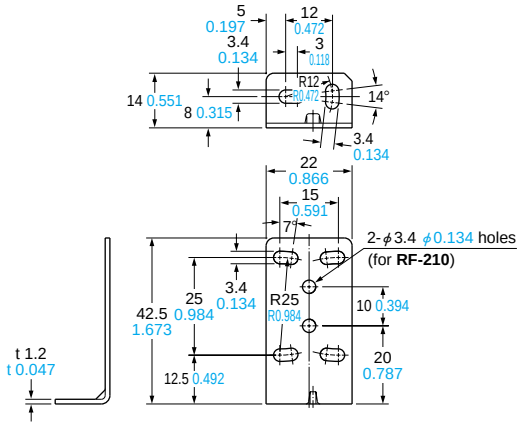


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DIMENSIONS (Unit: mm in)

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

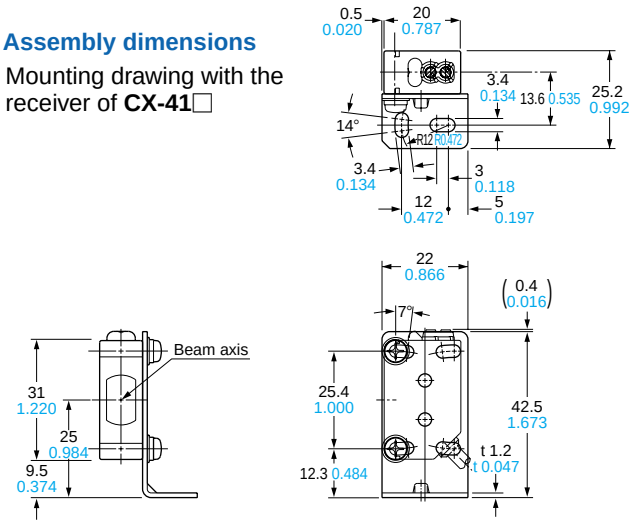
MS-CX2-1 Sensor mounting bracket (Optional)



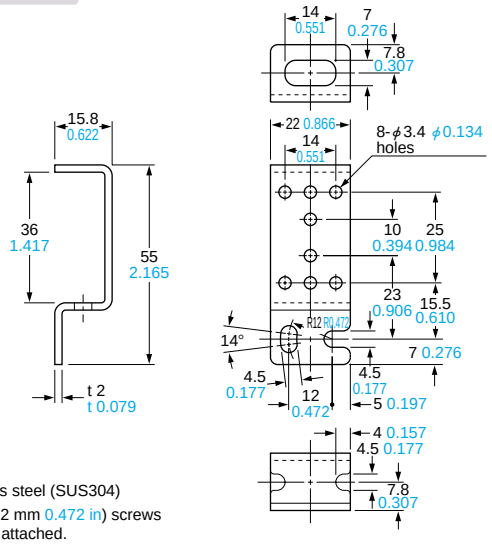
Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

Mounting drawing with the receiver of **CX-41**□



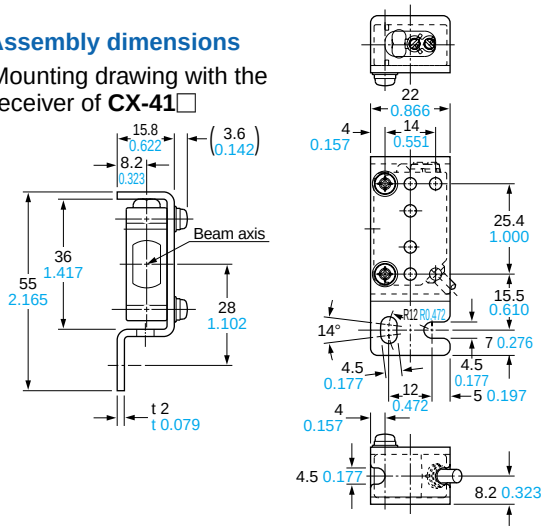
MS-CX2-2 Sensor mounting bracket (Optional)



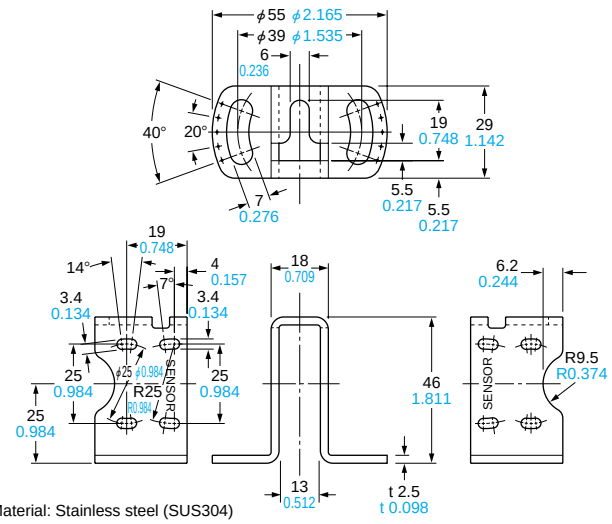
Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions

Mounting drawing with the receiver of **CX-41**□



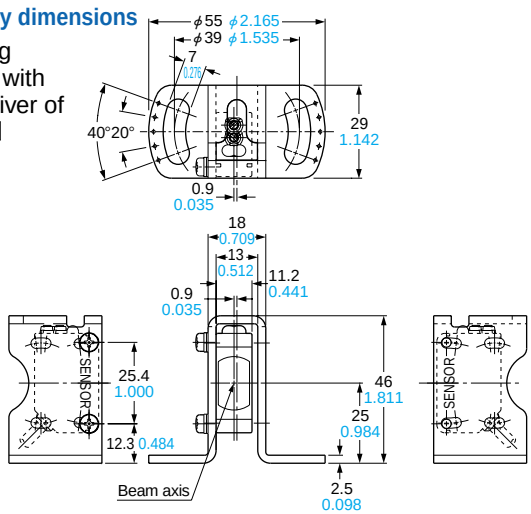
MS-CX2-4 Sensor mounting bracket (Optional)



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

Assembly dimensions

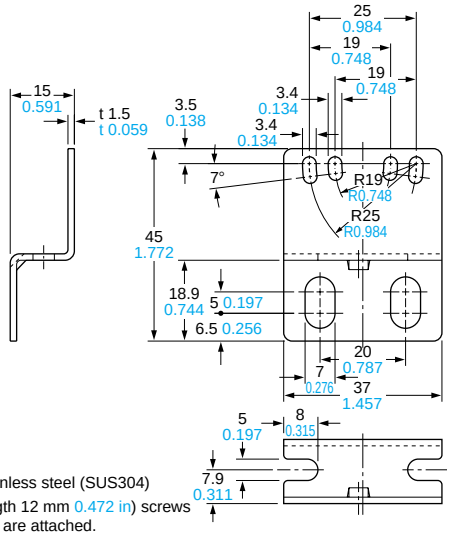
Mounting drawing with the receiver of **CX-41**□



DIMENSIONS (Unit: mm in)

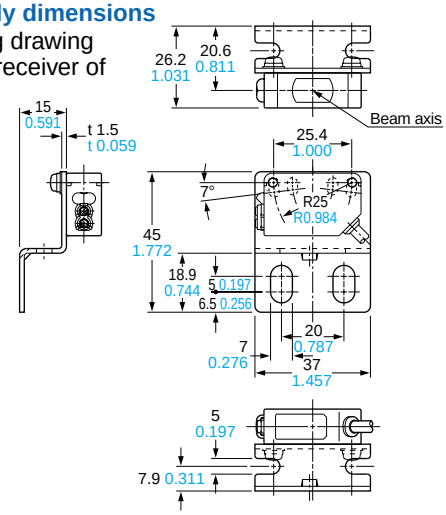
The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

MS-CX2-5 Sensor mounting bracket (Optional)

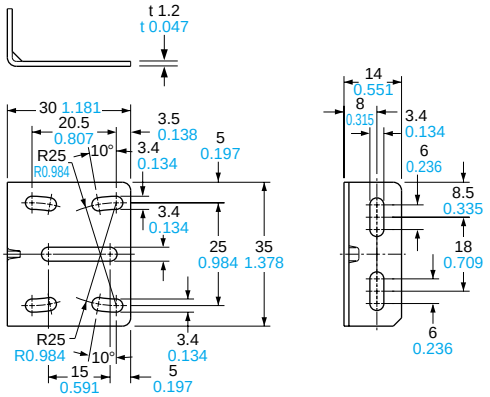


Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions
Mounting drawing with the receiver of **CX-41□**

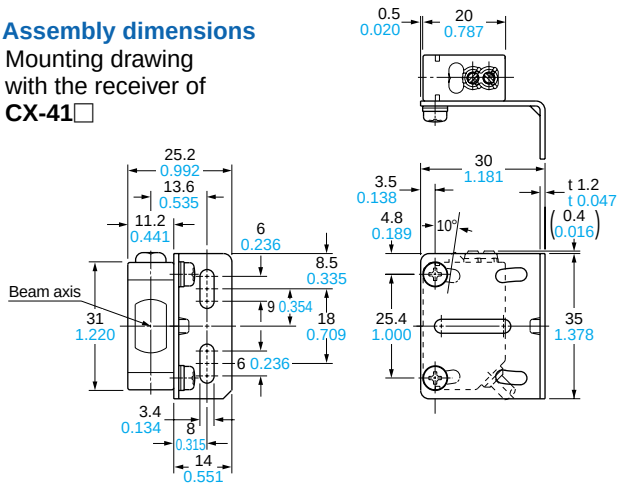


MS-CX-3 Sensor mounting bracket (Optional)

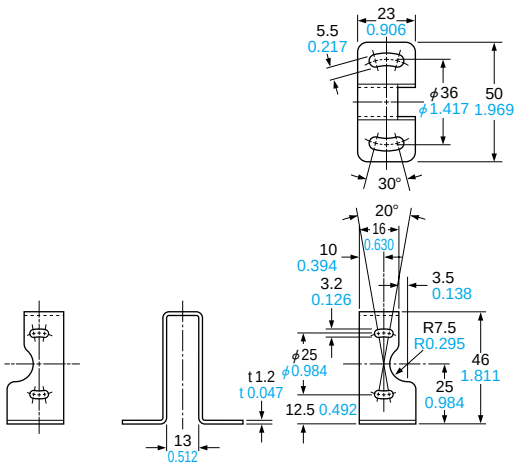


Material: Stainless steel (SUS304)
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

Assembly dimensions
Mounting drawing with the receiver of **CX-41□**

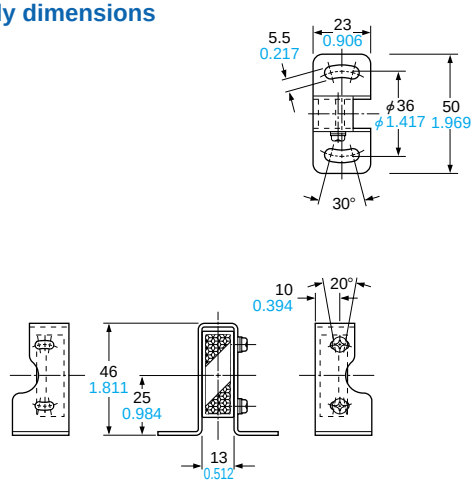


MS-RF21-1 Reflector mounting bracket for **RF-210** (Optional)



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

Assembly dimensions

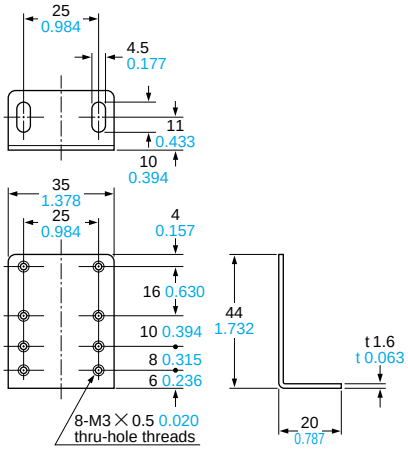


DIMENSIONS (Unit: mm in)

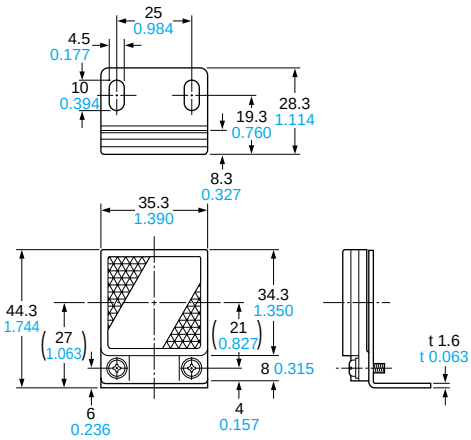
The CAD data in the dimensions can be downloaded from the SUNX website: http://www.sunx.co.jp/

MS-RF22

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



Assembly dimensions

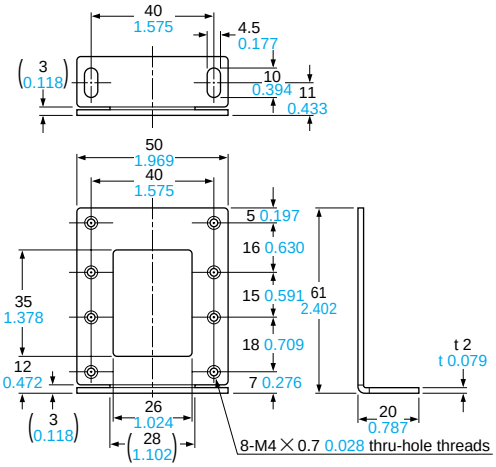


Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

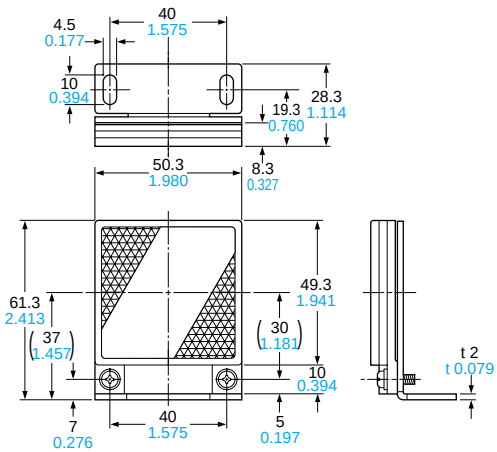
Two M3 (length 8 mm 0.315 in) screws with washers are attached.

MS-RF23

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



Assembly dimensions



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

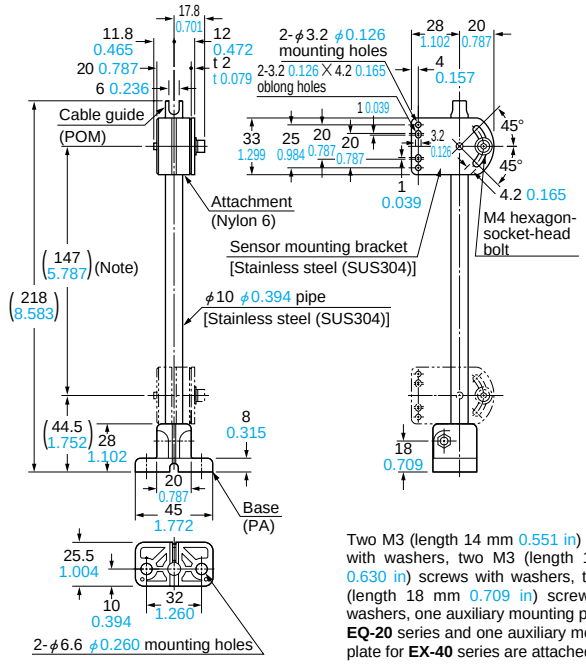
Two M4 (length 10 mm 0.394 in) screws with washers are attached.

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DIMENSIONS (Unit: mm in)

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

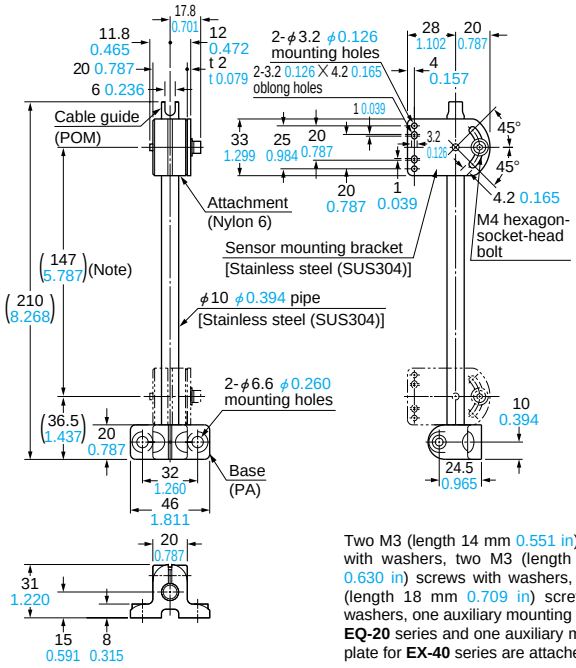
MS-AJ1 Universal sensor mounting stand (Optional)



Two M3 (length 14 mm 0.551 in) screws with washers, two M3 (length 16 mm 0.630 in) screws with washers, two M3 (length 18 mm 0.709 in) screws with washers, one auxiliary mounting plate for **EQ-20** series and one auxiliary mounting plate for **EX-40** series are attached.

Note: The dimensions in the brackets indicate the adjustable range of the movable part.

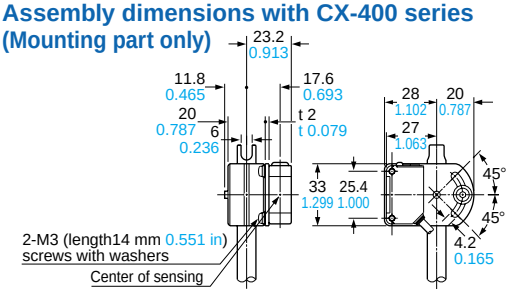
MS-AJ2 Universal sensor mounting stand (Optional)



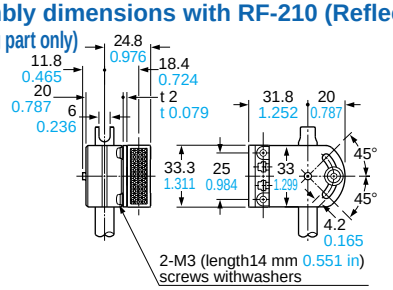
Two M3 (length 14 mm 0.551 in) screws with washers, two M3 (length 16 mm 0.630 in) screws with washers, two M3 (length 18 mm 0.709 in) screws with washers, one auxiliary mounting plate for **EQ-20** series and one auxiliary mounting plate for **EX-40** series are attached.

Note: The dimensions in the brackets indicate the adjustable range of the movable part.

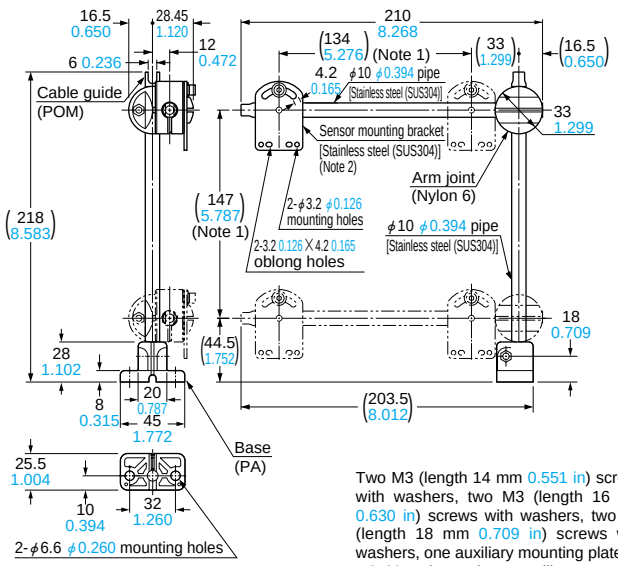
Assembly dimensions with CX-400 series (Mounting part only)



Assembly dimensions with RF-210 (Reflector) (Mounting part only)



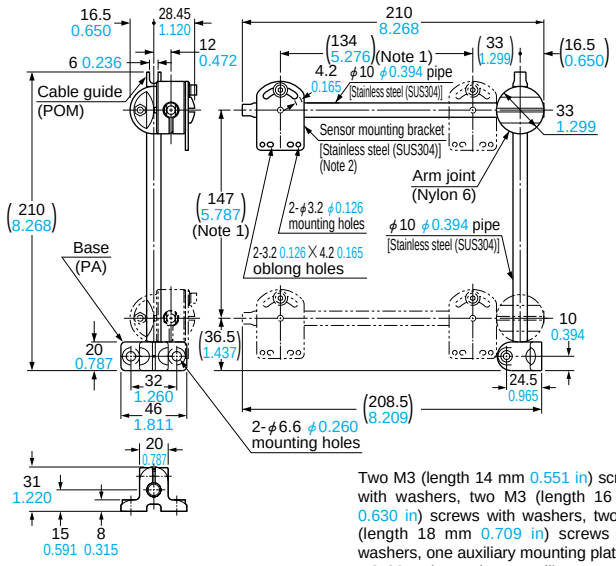
MS-AJ1-A Universal sensor mounting stand (Optional)



Two M3 (length 14 mm 0.551 in) screws with washers, two M3 (length 16 mm 0.630 in) screws with washers, two M3 (length 18 mm 0.709 in) screws with washers, one auxiliary mounting plate for **EQ-20** series and one auxiliary mounting plate for **EX-40** series are attached.

Notes: 1) The dimensions in the brackets indicate the adjustable range of the movable part.
2) Refer to **MS-AJ1/AJ2** for the assembly dimensions with the sensor mounting bracket, sensor or reflector.

MS-AJ2-A Universal sensor mounting stand (Optional)



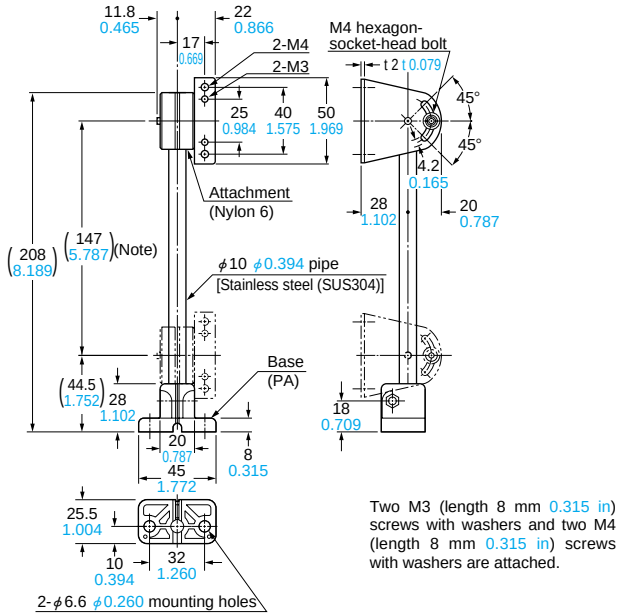
Two M3 (length 14 mm 0.551 in) screws with washers, two M3 (length 16 mm 0.630 in) screws with washers, two M3 (length 18 mm 0.709 in) screws with washers, one auxiliary mounting plate for **EQ-20** series and one auxiliary mounting plate for **EX-40** series are attached.

Notes: 1) The dimensions in the brackets indicate the adjustable range of the movable part.
2) Refer to **MS-AJ1/AJ2** for the assembly dimensions with the sensor mounting bracket, sensor or reflector.

DIMENSIONS (Unit: mm in)

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

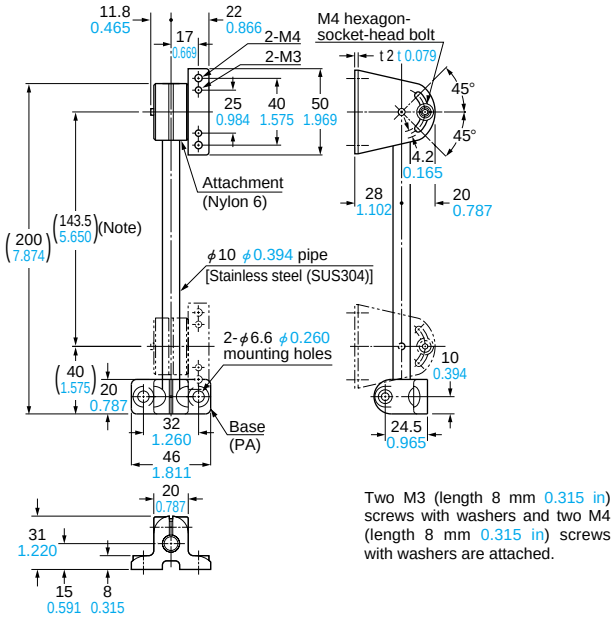
MS-AJ1-M Universal sensor mounting stand (Optional)



Two M3 (length 8 mm 0.315 in) screws with washers and two M4 (length 8 mm 0.315 in) screws with washers are attached.

Note: The dimensions in the brackets indicate the adjustable range of the movable part.

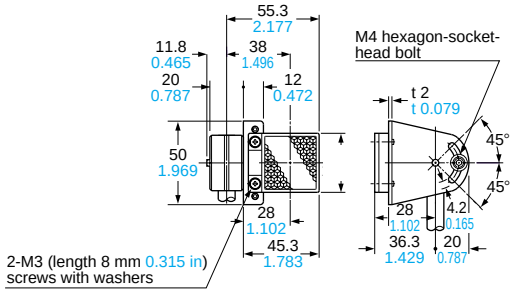
MS-AJ2-M Universal sensor mounting stand (Optional)



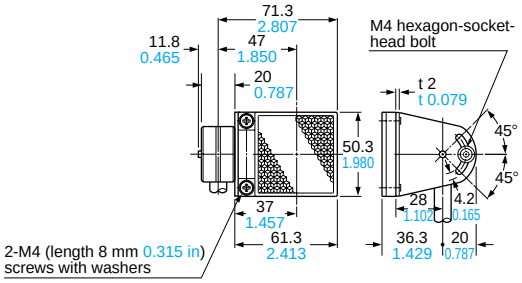
Two M3 (length 8 mm 0.315 in) screws with washers and two M4 (length 8 mm 0.315 in) screws with washers are attached.

Note: The dimensions in the brackets indicate the adjustable range of the movable part.

Assembly dimensions with RF-220 (Reflector) (Mounting part only)



Assembly dimensions with RF-230 (Reflector) (Mounting part only)



Protecting the environment is one of SUNX's guiding business principles

Promoting a totally lead-free working environment

We are now working to eliminate the use of lead in all our in-house manufacturing processes such as in reflow ovens, hand soldering and parts and substrates procurement.

Using simple packaging

Simple, environmentally friendly packaging material reduces waste.



ISO 14001 environmental management system certification acquired

Our Nagoya Head Office and Factory acquired ISO 14001 certification in September 1999. Now and into the future, we will continuously improve environmental management systems based on our Environment Policy, which focuses on the promotion of environmentally friendly business activities and product development.

ISO 14001
JQA-EM0528

All information is subject to change without prior notice.

SUNX Sensing the Future

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