



## Compact Photoelectric Sensor

The CX-400 series of photoelectric sensors is a wide-ranging lineup of 116 different models. Whatever your application entails, SUNX has covered it with this series. Built to IP-67 standards, the CX-400 series is designed for the most demanding environments.

There are also models that are specifically design for resistance to oil, coolant, or ethanol. Couple this with high electrical noise resistance and a built in interference prevention function, and you have one of the most robust sensors on the market.

The CX-400 series is compact in size (W11.2mm x H31.0mm x D20.0mm) with a world standard mounting pitch of 25.4mm. Wiring options include a M8 quick disconnect, M12 quick disconnect, or built-in wire type with a length of 0.5m, 2m, or 5m.

High precision optics as well as high performance circuitry provides extremely stable sensing for determining small height differences, detecting transparent objects, and subtle color differences. Also, the series offers a high luminance beam spot that achieves long distances and can be as small as 2mm in diameter for detection of minute objects.

Four sensing types are available:

- **Diffuse Reflective**

Available in 100, 300, and 800mm detecting distance models, along with a narrow view type that has a 2mm diameter beam spot.

- **Thru-beam**

Available in 10m and a longest in its class 15m detecting distance models. The ultra long range 15m version is made possible by utilizing a powerful infrared LED light source which is great for powering through dust and dirt as well.

- **Retro-Reflective**





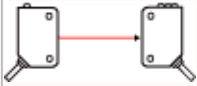

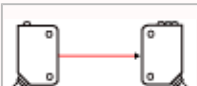













Standard models are available in 3 and 5m detecting distance types. Specialized models for transparent object detection are also available in 0.5 and 2m detecting distances.

- **Adjustable Range Reflective**

Available in 50, 100, and 300m detecting distance models, with the addition of a 2mm diameter small beam spot type. These sensors also incorporate foreground suppression and background suppression functions to limit the effect of unwanted detection.

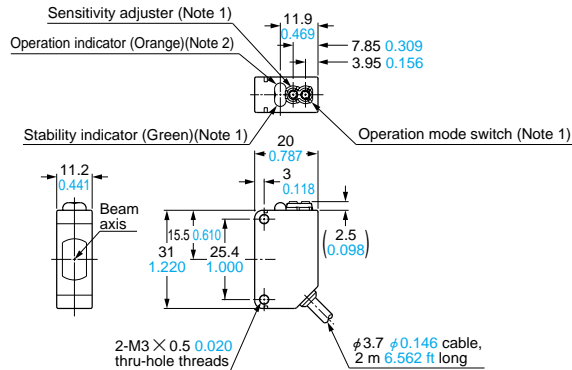
All types are available with NPN or PNP transistor outputs.

Model Name	Model Pic	Type	Output Operation	Output Configuration	Emitting Element	Max. Range (mm)	Max. Range (in)
Sort ▲ ▼		Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼
CX-411		Thru-beam	Light-ON/Dark-ON	NPN	Red LED	10000	393.7
CX-411-J		Thru-beam, M12 Quick Disconnect	Light-ON/Dark-ON	NPN	Red LED	10000	393.7
CX-411-P		Thru-beam	Light-ON/Dark-ON	PNP	Red LED	10000	393.7

CX-411-P-J		Thrubeam, M12 Quick Disconnect	Light-ON/Dark-ON	PNP	Red LED	10000	393.7
CX-411-P-Z		Thrubeam, M8 Quick Disconnect	Light-ON/Dark-ON	PNP	Red LED	10000	393.7
CX-411-Z		Thrubeam, M8 Quick Disconnect	Light-ON/Dark-ON	NPN	Red LED	10000	393.7
CX-412		Thrubeam-Long sensing range	Light-ON/Dark-ON	NPN	Infrared LED	15000	590.6
CX-412-J		Thrubeam-Long sensing range, M12 Quick Disconnect	Light-ON/Dark-ON	NPN	Infrared LED	15000	590.6
CX-412-P		Thrubeam-Long sensing range	Light-ON/Dark-ON	PNP	Infrared LED	15000	590.6
CX-412-P-J		Thrubeam-Long sensing range, M12 Quick Disconnect	Light-ON/Dark-ON	PNP	Infrared LED	15000	590.6
CX-412-P-Z		Thrubeam-Long sensing range, M8 Quick Disconnect	Light-ON/Dark-ON	PNP	Infrared LED	15000	590.6
CX-412-Z		Thrubeam-Long sensing range. M8 Quick Disconnect	Light-ON/Dark-ON	NPN	Infrared LED	15000	590.6
CX-421		Diffuse Reflective	Light-ON/Dark-ON	NPN	Infrared LED	300	11.8
CX-421-J		Diffuse Reflective, M12 Quick Disconnect	Light-ON/Dark-ON	NPN	Infrared LED	300	11.8
CX-421-P		Diffuse Reflective	Light-ON/Dark-ON	PNP	Infrared LED	300	11.8
CX-421-P-J		Diffuse Reflective, M12 Quick Disconnect	Light-ON/Dark-ON	PNP	Infrared LED	300	11.8
CX-421-P-Z		Diffuse Reflective, M8 Quick Disconnect	Light-ON/Dark-ON	PNP	Infrared LED	300	11.8
CX-421-Z		Diffuse Reflective, M8 Quick Disconnect	Light-ON/Dark-ON	NPN	Infrared LED	300	11.8
CX-422		Diffuse Reflective	Light-ON/Dark-ON	NPN	Infrared LED	800	31.496
CX-422-J		Diffuse Reflective, M12 Quick Disconnect	Light-ON/Dark-ON	NPN	Infrared LED	800	31.496
CX-422-P		Diffuse Reflective	Light-ON/Dark-ON	PNP	Infrared LED	800	31.496
CX-422-P-J		Diffuse Reflective, M12 Quick Disconnect	Light-ON/Dark-ON	PNP	Infrared LED	800	31.496
CX-422-P-Z		Diffuse Reflective, M8 Quick Disconnect	Light-ON/Dark-ON	PNP	Infrared LED	800	31.496

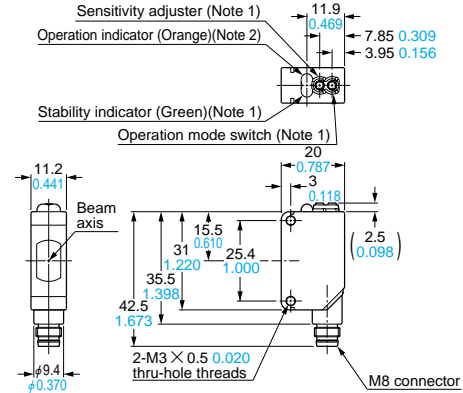
## DIMENSIONS (Unit: mm in)

### CX-41□ Sensor



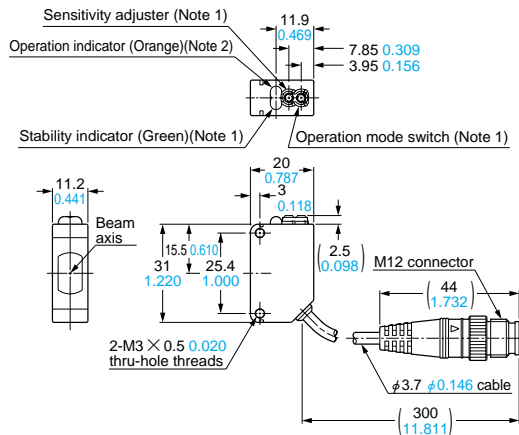
Notes: 1) Not incorporated on the emitter.  
2) It is the power indicator (green) on the emitter.

### CX-41□-Z Sensor



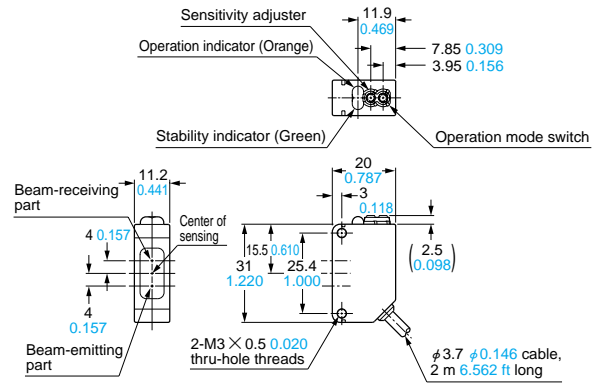
Notes: 1) Not incorporated on the emitter.  
2) It is the power indicator (green) on the emitter.

### CX-41□-J Sensor

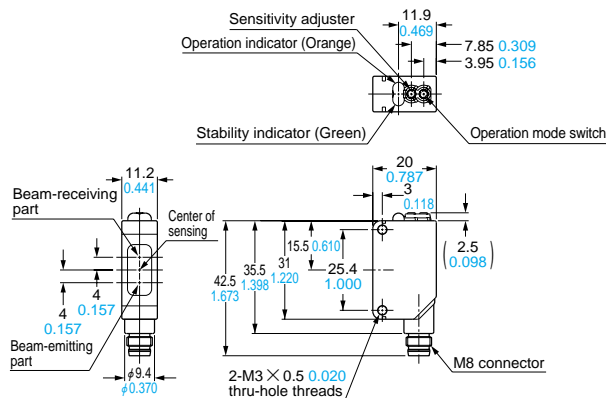


Notes: 1) Not incorporated on the emitter.  
2) It is the power indicator (green) on the emitter.

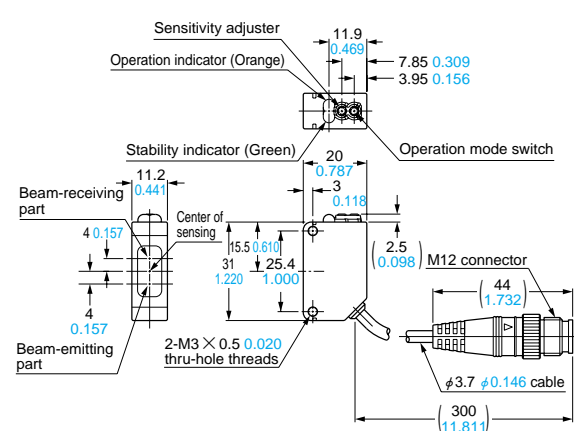
### CX-49□ CX-48□ Sensor



### CX-49□-Z CX-48□-Z Sensor



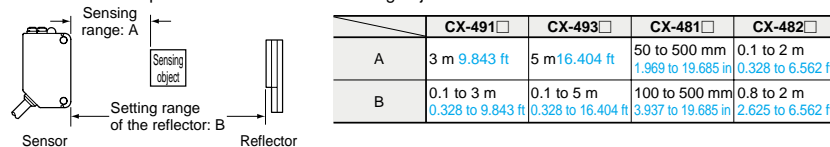
### CX-49□-J CX-48□-J Sensor



## SPECIFICATIONS

		Type	Thru-beam		Retroreflective				Diffuse reflective			
			Long sensing range	With polarizing filters	Long sensing range	For transparent object sensing		Narrow-view				
Item	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			φ 12 mm φ 0.472 in or more opaque object (Note 3)		φ 50 mm φ 1.969 in or more opaque, translucent or specular object (Note 1)		φ 50 mm φ 1.969 in or more opaque or translucent object (Note 1)		φ 50 mm φ 1.969 in or more transparent, translucent or opaque object (Note 1)			Opaque, translucent or transparent object  Min. sensing object: φ 0.5 mm φ 0.020 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)			
			Switchable either Light-ON or Dark-ON									
			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/s <sup>2</sup> 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 mm <sup>2</sup> 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 mm <sup>2</sup> , 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.

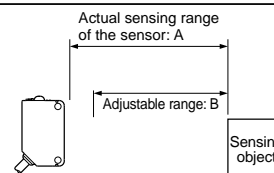


- 2) The sensing range of the diffuse reflective type sensor is specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.  
 3) If slit masks (optional) are fitted, an object of φ 0.5 mm φ 0.020 in (using round slit mask) can be detected.

## SPECIFICATIONS

		Type	Adjustable range reflective				
			Small spot				
Item	Model No.	NPN output	CX-441	CX-443	CX-444	CX-442	
		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)				
	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, 3 mm 0.118 in double amplitude in X, Y and Z directions for two hours each				
	Shock resistance		500 m/s <sup>2</sup> acceleration (50 G approx.) in X, Y and Z directions for three times each				
Emitting element		Red LED (modulated)					
Spot diameter		φ 2 mm φ 0.079 in approx. (at 50 mm 1.969 in distance)	φ 6.5 mm φ 0.256 in approx. (at 50 mm 1.969 in distance)	φ 9 mm φ 0.354 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 <sup>2</sup> 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 <sup>2</sup> , 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 <b>0.079 to 1.969 in</b>	15 to 100 mm <b>0.591 to 3.937 in</b>	20 to 300 mm <b>0.787 to 11.811 in</b>
B	20 to 50 mm <b>0.787 to 1.969 in</b>	20 to 100 mm <b>0.787 to 3.937 in</b>	40 to 300 mm <b>1.575 to 11.811 in</b>