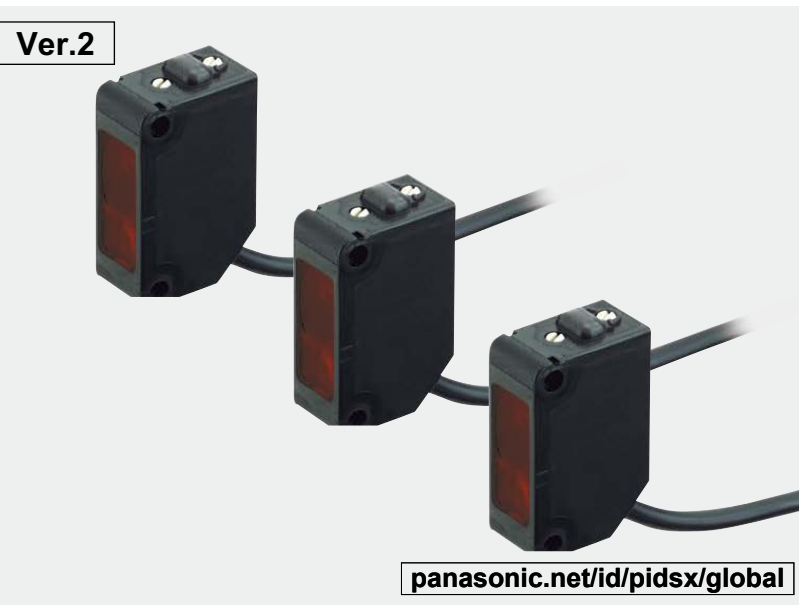


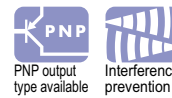
# CX-440 SERIES Ver.2

Related Information	■ General terms and conditions..... F-3	■ Selection guide ..... P.231~
	■ <b>CX-400</b> ..... P.245~	■ Glossary of terms ..... P.1549~
	■ General precautions ..... P.1552~	■ Korea's S-mark..... P.1602



Refer to p.245~ of **CX-400 series Ver.2** for details of **CX-440 series Ver.2**.

**OPTIONS** ..... P.254  
**SPECIFICATIONS** ..... P.256  
**I/O CIRCUIT AND WIRING DIAGRAMS** ... P.258  
**SENSING CHARACTERISTICS** ... P.262~  
**PRECAUTIONS FOR PROPER USE** ... P.264~  
**DIMENSIONS** ..... P.269~



## 2% hysteresis - demonstrates power in level difference sensing and heterochromatic object stability sensing

**Can sense differences as small as 0.4 mm 0.016 in, with hysteresis of 2 % or less** **CX-441/443**

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

2.5 times the sensing capability!

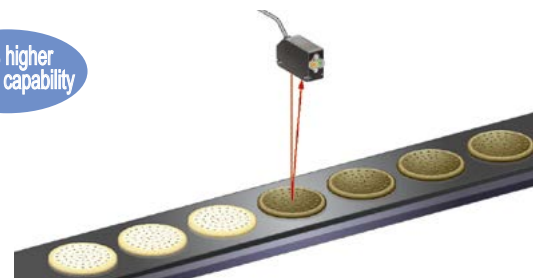
Height differences of as little as 0.4 mm **0.016 in** can be detected at a setting distance of 20 mm **0.787 in**



**Hardly affected by colors** **CX-441/443**

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.

30 % higher sensing capability

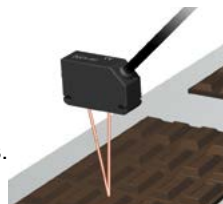


[The difference in sensing ranges is 1% or less between non-glossy white paper with a setting distance of 50 mm **1.969 in** and non-glossy gray paper with a brightness level of 5.]

## ENVIRONMENTAL RESISTANCE

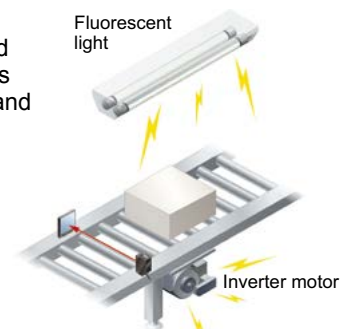
**Strong against ethanol**

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).



**Stronger noise resistance**

Significantly stronger against inverter light and other extraneous light as well as high frequency and electromagnetic noise.

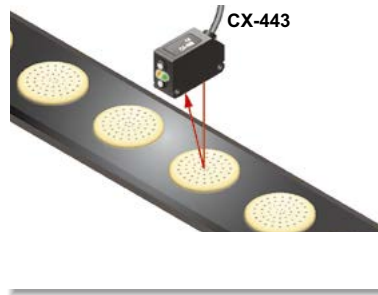
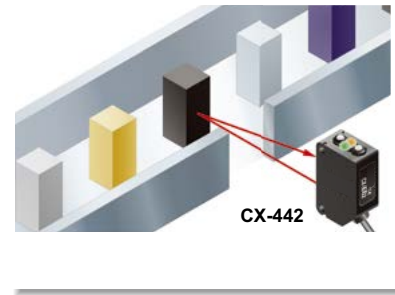


**Strong even in cold environments**

Stable performance can be maintained even in environments of  $-25\text{ }^{\circ}\text{C}$   $-13\text{ }^{\circ}\text{F}$ .

- FIBER SENSORS
- LASER SENSORS
- PHOTOELECTRIC SENSORS
- MICRO PHOTOELECTRIC SENSORS
- AREA SENSORS
- SAFETY LIGHT CURTAINS / SAFETY COMPONENTS
- PRESSURE / FLOW SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- SIMPLE WIRE-SAVING UNITS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC CONTROL DEVICES
- LASER MARKERS
- PLC
- HUMAN MACHINE INTERFACES
- ENERGY MANAGEMENT SOLUTIONS
- FA COMPONENTS
- MACHINE VISION SYSTEMS
- UV CURING SYSTEMS
- Selection Guide
- Amplifier Built-in
- Power Supply Built-in
- Amplifier-separated
- EX-Z
- CX-400
- CY-100
- EX-10
- EX-20
- EX-30
- EX-40
- CX-440**
- EQ-30
- EQ-500
- MQ-W
- RX-LS200
- RX
- RT-610

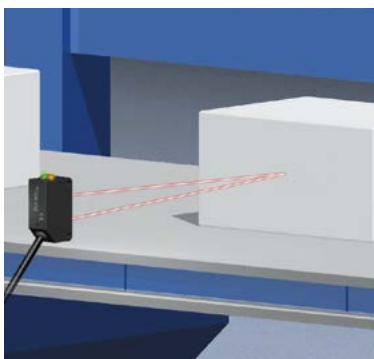
**APPLICATIONS**
**Small tablet detection**

**Thin biscuit detection**

**Passage confirmation of a different color object**

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

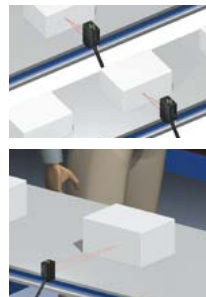
For details on the operation of the BGS/FGS functions, refer to p.267 “**BGS/FGS functions**” of “**PRECAUTIONS FOR PROPER USE**” in CX-400 series Ver.2 pages.

**The BGS function is best suited for the following case**
**Background not present**

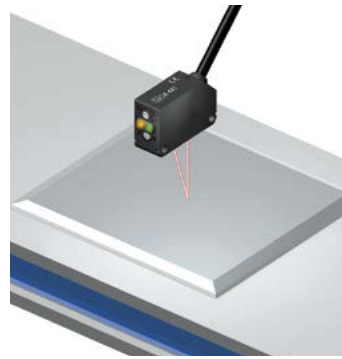
When object and background are separated



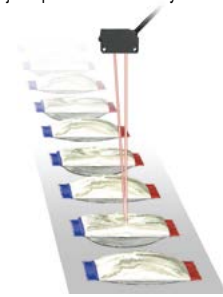
Not affected if the background color changes or someone passes behind the conveyor.


**The FGS function is best suited for the following case**
**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.



Caution : Please use the FGS function together with a conveyor or other background unit.

**ORDER GUIDE**

Type	Appearance	Sensing range	Model No.		Emitting element
			NPN output	PNP output	
Adjustable range reflective Small spot		2 to 50 mm 0.079 to 1.969 in	<b>CX-441</b>	<b>CX-441-P</b>	Red LED
		15 to 100 mm 0.591 to 3.937 in	<b>CX-443</b>	<b>CX-443-P</b>	
		20 to 300 mm 0.787 to 11.811 in	<b>CX-444</b>	<b>CX-444-P</b>	
			<b>CX-442</b>	<b>CX-442-P</b>	

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

**M8 plug-in connector type**

M8 plug-in connector type is also available.  
When ordering this type, suffix “-Z” for the M8 connector type to the model No.  
(e.g.) M8 connector type of CX-441-P is “CX-441-P-Z”.

FIBER SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

AREA SENSORS

SAFETY LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

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STATIC CONTROL DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY MANAGEMENT SOLUTIONS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Amplifier Built-in

Power Supply Built-in

Amplifier-separated

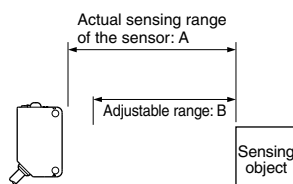
**EX-Z**
**CX-400**
**CY-100**
**EX-10**
**EX-20**
**EX-30**
**EX-40**
**CX-440**
**EQ-30**
**EQ-500**
**MQ-W**
**RX-LS200**
**RX**
**RT-610**

## SPECIFICATIONS

### Standard type

Item	Model No.	Type	Adjustable range reflective				
		NPN output	CX-441	CX-443	CX-444	CX-442	
		PNP output	CX-441-P	CX-443-P	CX-444-P	CX-442-P	
CE marking directive compliance		EMC Directive, RoHS Directive					
Adjustable range (Note 2)		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>		
Sensing range (with white non-glossy paper)		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>		
Hysteresis (with white non-glossy paper)		2 % or less of operation distance				5 % or less of operation distance	
Repeatability		Along sensing axis: 1 mm <b>0.039 in</b> or less, Perpendicular to sensing axis: 0.2 mm <b>0.008 in</b> or less (with white non-glossy paper)					
Supply voltage		12 to 24 V DC $\pm 10$ % Ripple P-P 10 % or less					
Current consumption		20 mA or less					
Output		<NPN output type> NPN open-collector transistor			<PNP output type> PNP open-collector transistor		
		<ul style="list-style-type: none"> <li>• Maximum sink current: 100 mA</li> <li>• Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>• Residual voltage: 2 V or less (at 100 mA sink current)</li> </ul>			<ul style="list-style-type: none"> <li>• Maximum source current: 100 mA</li> <li>• Applied voltage: 30 V DC or less (between output and +V)</li> <li>• Residual voltage: 2 V or less (at 100 mA source current)</li> </ul>		
		1 V or less (at 16 mA sink current)			1 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 3)					
Distance adjuster		5-turn mechanical adjuster					
Sensing mode		BGS/FGS functions Switchable with wiring of sensing mode selection input					
Automatic interference prevention function (Note 4)		Incorporated					
Environmental resistance	Protection	IP67 (IEC)					
	Ambient temperature	-25 to +55 °C <b>-13 to +131 °F</b> (No dew condensation or icing allowed), Storage: -30 to +70 °C <b>-22 to +158 °F</b>					
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH					
	Ambient illuminance	Incandescent light: 3,000 lx or less at the light-receiving face					
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure					
	Insulation resistance	20 M $\Omega$ , or more, with 250 V DC megger between all supply terminals connected together and enclosure					
	Vibration resistance	10 to 500 Hz frequency, 3 mm <b>0.118 in</b> double amplitude (20 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 three times each						
Emitting element		Red LED (Peak emission wavelength: 650 nm <b>0.026 mil</b> , modulated)					
Spot diameter		$\varnothing 2$ mm <b>0.079 in</b> approx. (at 50 mm <b>1.969 in</b> distance)	$\varnothing 6.5$ mm <b>0.256 in</b> approx. (at 50 mm <b>1.969 in</b> distance)	$\varnothing 9$ mm <b>0.354 in</b> approx. (at 100 mm <b>3.937 in</b> distance)	$\varnothing 15$ mm <b>0.591 in</b> approx. (at 300 mm <b>11.811 in</b> distance)		
Material		Enclosure: PBT (Polybutylene terephthalate), Lens: Polycarbonate, Indicator cover: Polycarbonate					
Cable		0.2 mm <sup>2</sup> 4-core cabtyre cable, 2 m <b>6.562 ft</b> long					
Cable extension		Extension up to total 100 m <b>328.084 ft</b> is possible with 0.3 mm <sup>2</sup> , or more, cable.					
Weight		Net weight: 55 g approx., Gross weight: 65 g approx.					

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.  
 2) 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.



	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>

- 3) Refer to "Stability indicator (p.267)" of "PRECAUTIONS FOR PROPER USE" for operation of the stability indicator.  
 4) 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.

 FIBER  
SENSORS

 LASER  
SENSORS

 PHOTO-  
ELECTRIC  
SENSORS

 MICRO  
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SENSORS

 AREA  
SENSORS

 SAFETY LIGHT  
CURTAINS/  
SAFETY  
COMPONENTS

 PRESSURE /  
FLOW  
SENSORS

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USE  
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 LASER  
MARKERS

PLC

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