Compact Photoelectric Sensor Amplifier Built-in

**CX-400 SERIES Ver.2**

- General terms and conditions .......... F-3
- MS-AJ / CHX-SC2 ............. P.953 / P.959
- General precautions ............. P.1552~
- Selection guide .................. P.231~
- Glossary of terms ................ P.1549~
- Korean’s S-mark .................. P.1602

**Sensors that are environmentally and user friendly.**

**Reducing environmental burdens further**
**Up to 60% less power consumption**

The various lineup covers through the inclusion of a newly developed custom integrated circuit. The CX-400 series achieves reductions in power consumption of up to 60%, averaging 44% reduction when upgrading due to its unique design. These sensors reduce carbon emissions and contribute to environmental friendliness.

**Strong against oil and coolant liquids**

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**

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).

**Contributing to reduced carbon dioxide emissions**

Electricity consumed by the CX-400 series has been reduced on average 10.5 mA. Calculating 8 hours/day, 260 days (operating 5 days/week) for a total of 2,080 hours/year leads to:

- Approx. 84.6 t annually in carbon dioxide reductions to the world

**Selection Guide**

- Related Information
- Amplifier Built-in
- Power Supply Built-in
- Amplifiers separated
- EX-Z
- CX-400
- CY-100
- EX-10
- EX-20
- EX-30
- EX-40
- EX-440
- EQ-30
- EQ-500
- MQ-W
- RX-LS200
- RX
- RT-610

**Related Information**

- General terms and conditions .......... F-3
- MS-AJ / CHX-SC2 ............. P.953 / P.959
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- Selection guide .................. P.231~
- Glossary of terms ................ P.1549~
- Korean’s S-mark .................. P.1602

**Recommended Test Oils**

<table>
<thead>
<tr>
<th>Test Oil</th>
<th>JIS Standard</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-insoluble cutting oil</td>
<td>2-5</td>
<td>Daphnecut AS-35D</td>
</tr>
<tr>
<td>Water-soluble cutting oil</td>
<td>2-11</td>
<td>Yushiron Oil No.2ac (Note)</td>
</tr>
<tr>
<td>Water-soluble cutting oil</td>
<td>W2-1</td>
<td>Yushiron Lubric HWG88 (Note)</td>
</tr>
<tr>
<td></td>
<td>W2-2</td>
<td>Yushironkien 550N (Note)</td>
</tr>
</tbody>
</table>

1,000 hours; Immersion (depth 0 m); Insulation resistance 20 MΩ/250 V
Note: Yushiron and Yushironkien are registered trademarks of Yushiro Chemical Industry Co., Ltd.

**Strong against ethanol (Some models only)**

Upgrade for up to 60% reduction

Contributing to reduced carbon dioxide emissions

The CX-400 contributes

Panasonic.net/id/pidsx/global

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APPLICATIONS

Detecting out of position tape feeder cassette
![Detecting out of position tape feeder cassette](image1)

Detecting objects in dusty environment
![Detecting objects in dusty environment](image2)

Passage confirmation of object on a conveyor belt
![Passage confirmation of object on a conveyor belt](image3)

Detecting transparent glass bottles
![Detecting transparent glass bottles](image4)

Detecting a small tablet
![Detecting a small tablet](image5)

Detecting a biscuit
![Detecting a biscuit](image6)

BASIC PERFORMANCE

Strong infrared beam
![Strong infrared beam](image7)

Can sense differences as small as 0.4 mm 0.016 in, with hysteresis of 2 % or less
![Can sense differences as small as 0.4 mm 0.016 in, with hysteresis of 2 % or less](image8)

Hardly affected by colors
![Hardly affected by colors](image9)

Retroreflective type with polarizing filters
![Retroreflective type with polarizing filters](image10)

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.

Selecting Guide

Amplifier
Built-in
Power Supply
Built-in
Amplifier-separated

Selection Guide

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

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**BASIC PERFORMANCE**

Introducing the transparent object sensing type sensor

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

Translucent objects detectable with CX-48□:

<table>
<thead>
<tr>
<th>Sensing object</th>
<th>Sensing object size (mm in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass sheet</td>
<td>50 × 50 1.969 × 1.969 t = 0.7 0.026</td>
</tr>
<tr>
<td>Cylindrical glass</td>
<td>ø50 ø1.969 t = 50 1.969 t = 1.3 0.051</td>
</tr>
<tr>
<td>Acrylic board</td>
<td>50 × 50 1.969 × 1.969 t = 1.0 0.039</td>
</tr>
<tr>
<td>Styrol (Floppy case)</td>
<td>50 × 50 1.969 × 1.969 t = 0.9 0.035</td>
</tr>
<tr>
<td>Food wrapping film</td>
<td>50 × 50 1.969 × 1.969 t = 10 µm 0.394 mil</td>
</tr>
<tr>
<td>Cigarette case film</td>
<td>50 × 50 1.969 × 1.969 t = 20 µm 0.787 mil</td>
</tr>
<tr>
<td>Vinyl sack</td>
<td>50 × 50 1.969 × 1.969 t = 30 µm 1.181 mil</td>
</tr>
<tr>
<td>PET bottle (500ml)</td>
<td>ø66 ø2.598</td>
</tr>
</tbody>
</table>

**ENVIRONMENTAL RESISTANCE**

**Strong on dust and dirt**

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

**Stronger noise resistance**

The CX-400 series has a higher noise resistance than its previous model. By incorporating an inverter countermeasure circuit that appropriately shifts with peak wavelength, the sensor now resists high-frequency noise from high-voltage inverter motors and inverter lights more effectively.

**Long sensing range of 5 m 16.4 ft**

A long 5 m 16.4 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.

**Ultra-long sensing range of 30 m 98.4 ft**

The CX-413 achieves the ultra-long sensing range of 30 m 98.4 ft. It can be used for a stacker crane or a multilevel parking structure.

**Thoroughly eliminating unnecessary waste, Reducing many environmental burdens**

The CX-400 series has three different cable length types and uses very simple packaging to reduce waste. The bag is made of polyethylene and does not emit toxic gasses.
**MOUNTING**

Beam axis alignment made easy with a high luminance spot beam **CX-423**

These sensors have a high luminance red LED spot beam which provides bright visibility enabling the sensing position to be checked at a glance. Because it achieved small beam spot approx. ø2 mm ø0.079 in at setting distance 100 mm 3.937 in, approx. ø5 mm ø0.197 in at setting distance 200 mm 7.874 in, even the minutest object can be accurately detected.

The bright spot makes beam axis alignment easy **CX-441/443**

These sensors have 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 ø2 mm ø0.079 in approx., even the minutest object can be accurately detected.

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**OPERABILITY**

Reduction of volume adjustment labor **CX-42a**

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

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 300 mm 2.756 to 11.811 in

Can be used for sensing minute differences **CX-44a**

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

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**VARIETIES**

Basic type available

Omit the sensitivity adjuster and operation mode switch and release a basic type cable 0.5 m 1.641 ft in length. If the usage is clear, quick construction can be performed onsite without detailed adjustments and the cost can be controlled.

Less processing time

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.

No unnecessary cables or terminal blocks

Select from 2 spot diameters as per the application **CX-441/443**

Within the choice of 50 mm 1.969 in sensing range sensors, we offer small spot approx. ø2 mm ø0.079 in type optimal for detecting minute object and large approx. ø6.5 mm ø0.256 in spot type capable of sensing object covered with holes and grooves.
FUNCTIONS

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

For details on the operation of the BGS/FGS functions, refer to “BGS/FGS functions (p.267)” of “PRECAUTIONS FOR PROPER USE”.

The BGS function is best suited for the following case

**Background not present**
When object and background are separated

![Diagram of BGS function](image)

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

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

The FGS function is best suited for the following case

**Background present**
When object and background are close together

![Diagram of FGS function](image)

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 being sensed is glossy.

Strong against interference

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

**BGS (Background suppression) function**

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

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

**FGS (Foreground suppression) function**

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

#### Standard type

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Sensing range</th>
<th>Model No. (Note 1)</th>
<th>Output operation</th>
<th>Emitting element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thru-beam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long sensing range</td>
<td></td>
<td>10 m 32.808 ft</td>
<td>CX-411</td>
<td>NPN output</td>
<td>Red LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 m 49.213 ft</td>
<td>CX-412</td>
<td>PNP output</td>
<td>Infrared LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 m 98.425 ft</td>
<td>CX-413</td>
<td>Switchable either Light-ON or Dark-ON</td>
<td>微光或暗光</td>
</tr>
<tr>
<td>Reflector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 5 m</td>
<td></td>
<td>3 m 9.843 ft (Note 2)</td>
<td>CX-491</td>
<td>NPN output</td>
<td>Red LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 m 16.404 ft (Note 2)</td>
<td>CX-493</td>
<td>PNP output</td>
<td>Infrared LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 to 500 mm 1.969 to 19.685 in (Note 2)</td>
<td>CX-481</td>
<td>Switchable either Light-ON or Dark-ON</td>
<td>微光或暗光</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 to 1,000 mm 1.969 to 39.37 in (Note 2)</td>
<td>CX-483</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1 to 2 m 0.328 to 6.562 ft (Note 2)</td>
<td>CX-482</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For transparent object sensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 mm 3.937 in</td>
<td>CX-424</td>
<td>NPN output</td>
<td>Red LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>300 mm 11.811 in</td>
<td>CX-421</td>
<td>PNP output</td>
<td>Infrared LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>800 mm 31.496 in</td>
<td>CX-422</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 to 300 mm 2.756 to 11.811 in</td>
<td>CX-423</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diffuse reflective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrow-view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 to 50 mm 0.079 to 1.969 in</td>
<td>CX-441</td>
<td>NPN output</td>
<td>Red LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 to 100 mm 0.591 to 3.937 in</td>
<td>CX-444</td>
<td>PNP output</td>
<td>Infrared LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 to 300 mm 0.787 to 11.811 in</td>
<td>CX-442</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjustable range reflective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small spot</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Notes:
1. The model No. with "E" shown on the label affixed to the thru-beam type sensor is the emitter, "D" shown on the label is the receiver.
2. The sensing range of the retroreflective type sensor is specified for the RF-230 (optional) 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.
## ORDER GUIDE

### Basic type (Without operation mode switch and sensitivity adjuster. Cable is 0.5 m 1.64 ft long.)

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Sensing range</th>
<th>Model No.(Note 1)</th>
<th>Output operation</th>
<th>Emitting element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thru-beam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long sensing range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m 32.808 ft</td>
<td>CX-411A-C05</td>
<td>Light-ON</td>
<td>Red LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CX-411B-C05</td>
<td>Dark-ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 m 49.213 ft</td>
<td>CX-412A-C05</td>
<td>Light-ON</td>
<td>Infrared LED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CX-412B-C05</td>
<td>Dark-ON</td>
<td></td>
</tr>
<tr>
<td>Retroreflective</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With polarizing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>filters</td>
<td>Optional</td>
<td>3 m 9.843 ft (Note 3)</td>
<td>CX-491A-C05-Y</td>
<td>Light-ON</td>
<td>Red LED</td>
</tr>
<tr>
<td></td>
<td>Optional</td>
<td></td>
<td>CX-491B-C05-Y</td>
<td>Dark-ON</td>
<td></td>
</tr>
</tbody>
</table>

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

Notes:
1. The model No. with “E” shown on the label affixed to the thru-beam type sensor is the emitter, “D” shown on the label is the receiver.
2. The reflector is an option. The sensing range of the reflector is specified for the RF-230.
3. The sensing range of the retroreflective type sensor is specified for the RF-230 (optional) reflector (p.253). The sensing range represents the actual sensing range of the sensor. The sensing range : 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.

### Sensor Reflector

<table>
<thead>
<tr>
<th>Setting range of the reflector: B</th>
<th>Sensing range: A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 to 3 m</td>
<td>0.328 to 9.843 ft</td>
</tr>
<tr>
<td>0.1 to 3 m</td>
<td>0.328 to 9.843 ft</td>
</tr>
</tbody>
</table>

![Diagram showing sensing range and setting range of the reflector](https://example.com/diagram.png)

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ORDER GUIDE

0.5 m 1.640 ft / 5 m 16.404 ft cable length types

0.5 m 1.640 ft / 5 m 16.404 ft cable length types (standard: 2 m 6.562 ft, basic: 0.5 m 1.640 ft) are also available. When ordering this type, suffix "-C05" for the 0.5 m 1.640 ft cable length type, "-C5" for the 5 m 16.404 ft cable length type to the model No.

(Excluding CX-4□: and basic type)
(e.g.) 0.5 m 1.640 ft cable length type of CX-411-P is “CX-411-P-C05”
5 m 16.404 ft cable length type of CX-411-P is “CX-411-P-C5”

M8 plug-in connector type, M12 pigtailed type

M8 plug-in connector type and M12 pigtailed type are also available. When ordering this type, suffix "-Z" for the M8 connector type, "-J" for the M12 pigtailed type to the model No.

(Please note that M12 pigtailed type is not available for CX-4□: Excluding basic type)
(e.g.) M8 connector type of CX-411-P is “CX-411-P-Z”
M12 pigtailed type of CX-411-P is “CX-411-P-J”

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

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

Package without reflector

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

Accessory

• RF-230 (Reflector)
## OPTIONS

### Round slit mask

For thru-beam type sensor only

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Slit mask</th>
<th>Sensor</th>
<th>Slit size</th>
<th>Sensing range</th>
<th>Min. sensing object</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS-CX-05</td>
<td>OS-CX-1</td>
<td>CX-411</td>
<td>ø0.05 mm</td>
<td>400 mm 15.748 in</td>
<td>ø12 mm ø0.472 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-1</td>
<td>CX-412</td>
<td>ø0.020 in</td>
<td>600 mm 23.622 in</td>
<td>ø0.5 mm ø0.020 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-1</td>
<td>CX-413</td>
<td>1,200 mm 47.242 in</td>
<td>60 mm 2.362 in</td>
<td></td>
</tr>
<tr>
<td>OS-CX-1</td>
<td>OS-CX-2</td>
<td>CX-411</td>
<td>ø1 mm</td>
<td>900 mm 35.443 in</td>
<td>ø1 mm ø0.039 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-2</td>
<td>CX-412</td>
<td>ø0.039 in</td>
<td>1.35 m 4.429 ft</td>
<td>ø12 mm ø0.472 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-2</td>
<td>CX-413</td>
<td>2.7 m 8.587 ft</td>
<td>300 mm 11.811 in</td>
<td>ø1.5 mm ø0.059 in</td>
</tr>
<tr>
<td>OS-CX-2</td>
<td>OS-CX-5×6</td>
<td>CX-411</td>
<td>ø2 mm</td>
<td>2 m 6.562 ft</td>
<td>ø2 mm ø0.079 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-5×6</td>
<td>CX-412</td>
<td>ø0.079 in</td>
<td>3 m 9.843 ft</td>
<td>ø12 mm ø0.472 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-5×6</td>
<td>CX-413</td>
<td>6 m 19.685 ft</td>
<td>1,200 mm 47.242 in</td>
<td>ø3 mm ø0.118 in</td>
</tr>
</tbody>
</table>

### Rectangular slit mask

For thru-beam type sensor only

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Slit mask</th>
<th>Sensor</th>
<th>Slit size</th>
<th>Sensing range</th>
<th>Min. sensing object</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS-CX-05×6</td>
<td>OS-CX-1×6</td>
<td>CX-411</td>
<td>0.5 × 6 mm</td>
<td>600 mm 23.622 in</td>
<td>ø12 mm ø0.472 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-1×6</td>
<td>CX-412</td>
<td>0.020 × 0.236 in</td>
<td>2 m 6.562 ft</td>
<td>ø0.5 × 6 mm ø0.020 × 0.236 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-1×6</td>
<td>CX-413</td>
<td>6 m 19.685 ft</td>
<td>1,200 mm 47.242 in</td>
<td></td>
</tr>
<tr>
<td>OS-CX-1×6</td>
<td>OS-CX-2×6</td>
<td>CX-411</td>
<td>1 × 6 mm</td>
<td>9 m 3.943 ft</td>
<td>ø12 mm ø0.472 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-2×6</td>
<td>CX-412</td>
<td>0.039 × 0.236 in</td>
<td>4.5 m 14.764 ft</td>
<td>1 × 6 mm ø0.039 × 0.236 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-2×6</td>
<td>CX-413</td>
<td>9 m 3.943 ft</td>
<td>3 m 9.843 ft</td>
<td></td>
</tr>
<tr>
<td>OS-CX-2×6</td>
<td>OS-CX-3×6</td>
<td>CX-411</td>
<td>2 × 6 mm</td>
<td>5 m 16.404 ft</td>
<td>ø12 mm ø0.472 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-3×6</td>
<td>CX-412</td>
<td>0.079 × 0.236 in</td>
<td>2 m 6.562 ft</td>
<td>2 × 6 mm ø0.079 × 0.236 in</td>
</tr>
<tr>
<td></td>
<td>OS-CX-3×6</td>
<td>CX-413</td>
<td>15 m 49.213 ft</td>
<td>6 m 19.685 ft</td>
<td></td>
</tr>
</tbody>
</table>

### Interference prevention filter

For CX-411: only

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Sensing range</th>
<th>Min. sensing object</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF-CX4-V</td>
<td>5 m 16.404 ft (Note 1)</td>
<td>ø12 mm ø0.472 in (Note 1)</td>
</tr>
<tr>
<td>PF-CX4-H</td>
<td>2 pcs. per set</td>
<td>ø30 mm ø1.181 in</td>
</tr>
</tbody>
</table>

### Reflector

For retro-reflexive type sensor only

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Sensing range</th>
<th>Min. sensing object</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF-210</td>
<td>1 m 3.281 ft (Note 2)</td>
<td>ø35 mm ø1.378 in</td>
</tr>
<tr>
<td>RF-220</td>
<td>1.5 m 4.921 ft (Note 2)</td>
<td></td>
</tr>
<tr>
<td>RF-230</td>
<td>3 m 9.843 ft (Note 2)</td>
<td></td>
</tr>
<tr>
<td>RF-230Y</td>
<td>3 m 9.843 ft (Note 2)</td>
<td>ø50 mm ø1.969 in</td>
</tr>
</tbody>
</table>

### Notes:
1. Value when attached on both sides.
2. Set the distance between the CX-491a/CX-493a and the reflector to 0.1 m 0.328 ft or more. However, see the table below for CX-486a. The sensing range “A” may vary depending on the shape of sensing object. Be sure to check the operation with the actual sensing object.

### Round slit mask

- **OS-CX-05**
  - Fitted on the front face of the sensor with one-touch.

### Rectangular slit mask

- **OS-CX-1×6**
  - Fitted on the front face of the sensor with one-touch.

### Interference prevention filter

- **PF-CX4-V**
  - (Vertical, Silver)
- **PF-CX4-H**
  - (Horizontal, Light brown)

**RF-210**

- 1.311 in
- 34.9 mm
- 1.311 in

**RF-220**

- 3.279 in
- 83.1 mm
- 1.311 in

**RF-230**

- 4.331 in
- 110.0 mm
- 1.311 in

**RF-230Y**

- 5.354 in
- 135.9 mm
- 1.311 in

**Notes:**
1. Value when attached on both sides.
2. Set the distance between the CX-491a/CX-493a and the reflector to 0.1 m 0.328 ft or more. However, see the table below for CX-486a. The sensing range “A” may vary depending on the shape of sensing object. Be sure to check the operation with the actual sensing object.
## OPTIONS

### Reflective tape

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF-11</td>
<td>• Sensing range (Note 4): 0.5 m 1.640 ft [CX-491-1] 0.8 m 2.625 ft [CX-493-1]</td>
<td>• Ambient temperature: –25 to 50 °C (–13 to +122 °F) • Ambient humidity: 35 to 85 % RH</td>
</tr>
<tr>
<td>RF-12</td>
<td>• Sensing range (Note 4): 0.7 m 2.297 ft [CX-491-1] 1.2 m 3.937 ft [CX-493-1] 0.1 to 0.6 m 0.328 to 1.969 ft [CX-482-1]</td>
<td>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.</td>
</tr>
<tr>
<td>RF-13</td>
<td>• Sensing range (Note 5): 0.5 m 1.640 ft [CX-491-1]</td>
<td>• Ambient temperature: –25 to 55 °C (–13 to 131 °F) • Ambient humidity: 35 to 85 % RH</td>
</tr>
</tbody>
</table>

### Sensor mounting bracket (Note 1)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-CX2-1</td>
<td>Foot angled mounting bracket It can also be used for mounting RF-210.</td>
<td></td>
</tr>
<tr>
<td>MS-CX2-2</td>
<td>Foot biangled mounting bracket It can also be used for mounting RF-210.</td>
<td></td>
</tr>
<tr>
<td>MS-CX2-4</td>
<td>Protective mounting bracket</td>
<td></td>
</tr>
<tr>
<td>MS-CX2-5</td>
<td>Back angled mounting bracket</td>
<td></td>
</tr>
<tr>
<td>MS-CX-3</td>
<td>Back biangled mounting bracket</td>
<td></td>
</tr>
<tr>
<td>MS-AJ1</td>
<td>Horizontal mounting type</td>
<td></td>
</tr>
<tr>
<td>MS-AJ2</td>
<td>Vertical mounting type</td>
<td></td>
</tr>
<tr>
<td>MS-AJ1-A</td>
<td>Horizontal mounting type</td>
<td></td>
</tr>
<tr>
<td>MS-AJ2-A</td>
<td>Vertical mounting type</td>
<td></td>
</tr>
<tr>
<td>MS-AJ1-M</td>
<td>Horizontal mounting type</td>
<td></td>
</tr>
<tr>
<td>MS-AJ2-M</td>
<td>Vertical mounting type</td>
<td></td>
</tr>
</tbody>
</table>

### Sensor mounting stand (Note 2)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-RF21-1</td>
<td>Protective bracket for RF-210 It protects the reflector from damage and maintains alignment.</td>
<td></td>
</tr>
<tr>
<td>MS-RF22</td>
<td>For RF-220</td>
<td></td>
</tr>
<tr>
<td>MS-RF23</td>
<td>For RF-230</td>
<td></td>
</tr>
</tbody>
</table>

### Sensor checker (Note 3)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHX-SC2</td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

### 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 p.953 for the universal sensor mounting stand MS-AJ series.
3. Refer to p.959 for the sensor checker CHX-SC2.
4. Set the distance between the sensor and the reflective tape to 0.1 m (0.4 ft) or more.
5. Set the distance between the sensor and the reflective tape to 0.2 m (0.656 ft) or more.

### Universal sensor mounting stand

#### MS-AJ1

- With the lateral arm, the sensor can sense from above a production line.
- Forward / back adjustment: 130 mm 5.118 in approx.
- Height adjustment: 150 mm 5.906 in approx.
- Angle adjustment: ±45°
- Mounting hole for M6 screw

#### MS-AJ2

- With the lateral arm, the sensor can sense from above a production line.
- Forward / back adjustment: 130 mm 5.118 in approx.
- Height adjustment: 150 mm 5.906 in approx.
- Angle adjustment: ±45°
- Mounting hole for M6 screw

#### MS-AJ1-A

- With the lateral arm, the sensor can sense from above a production line.
- Forward / back adjustment: 130 mm 5.118 in approx.
- Height adjustment: 150 mm 5.906 in approx.
- Angle adjustment: ±45°
- Mounting hole for M6 screw

#### MS-AJ2-A

- With the lateral arm, the sensor can sense from above a production line.
- Forward / back adjustment: 130 mm 5.118 in approx.
- Height adjustment: 150 mm 5.906 in approx.
- Angle adjustment: ±45°
- Mounting hole for M6 screw

#### MS-AJ1-M

- With the lateral arm, the sensor can sense from above a production line.
- Forward / back adjustment: 130 mm 5.118 in approx.
- Height adjustment: 150 mm 5.906 in approx.
- Angle adjustment: ±45°
- Mounting hole for M6 screw

#### MS-AJ2-M

- With the lateral arm, the sensor can sense from above a production line.
- Forward / back adjustment: 130 mm 5.118 in approx.
- Height adjustment: 150 mm 5.906 in approx.
- Angle adjustment: ±45°
- Mounting hole for M6 screw

### Reflector mounting bracket

#### MS-RF21-1

- Two M3 (length 12 mm 0.472 in) screws with washers are attached.
- Two M3 (length 8 mm 0.315 in) screws with washers are attached.

#### MS-RF22

- Two M4 (length 10 mm 0.394 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

- 8 mm 0.315 in
- 30 mm 1.181 in
- 30 mm 1.181 in

#### RF-13

- 0.5 mm 0.020 in
- 30 mm 1.181 in
- 30 mm 1.181 in

#### RF-12

- 0.7 mm 0.028 in
- 30 mm 1.181 in
- 30 mm 1.181 in

### 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 12 mm 0.472 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 14 mm 0.508 in) screws with washers are attached.

#### MS-CX3

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

### Sensor checker

#### 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.
### SPECIFICATIONS

#### Standard type

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Thru-beam</th>
<th>Retroreflective</th>
<th>Diffuse reflective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Long sensing range</td>
<td></td>
<td>Narrow-view</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with polarizing film</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>long sensing range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPN output</td>
<td>CX-411-P</td>
<td>CX-412-P</td>
<td>CX-413-P</td>
<td>CX-411</td>
</tr>
<tr>
<td>PNP output</td>
<td>CX-411</td>
<td>CX-412</td>
<td>CX-413</td>
<td>CX-412-P</td>
</tr>
<tr>
<td>CE marking directive compliance</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>EMC Directive, RoHS Directive</td>
</tr>
</tbody>
</table>

#### Sensing range

- 10 m: 32.808 ft
- 15 m: 49.213 ft
- 30 m: 98.425 ft

#### Sensing object

- ø12 mm ±0.472 in or more opaque object (Note 4)
- ø45 mm ±0.185 in or more opaque, translucent or specular object (Note 2, 5)

#### Hysteresis

- 0 to 2 mm (Note 1)

#### Sensitivity adjuster

- Continuously variable adjuster (incorporated on the receiver for thru-beam type)

#### Operation 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)

#### Automatic interference prevention function

- Incorporated (Two units of sensors can be mounted close together.)

#### Protection

- IP67 (IEC)

#### Ambient temperature

- -25 to +65 °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 illumination

- Incandescent light, 3,000 ℓx or less at the light-receiving face

#### Insulation resistance

- 20 MΩ or more, with 250 V DC megger between all supply terminals connected together and enclosure

#### Shock resistance

- 500 m/s² (in acceleration (50 G approx.) in X, Y and Z directions three times each)

#### Emitted element (modulated)

<table>
<thead>
<tr>
<th></th>
<th>Red LED</th>
<th>Infrared LED</th>
<th>Red LED</th>
<th>Infrared LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak emission wavelength</td>
<td>630 nm/3.95 μm</td>
<td>940 nm/3.45 μm</td>
<td>670 nm/3.43 μm</td>
<td></td>
</tr>
</tbody>
</table>

#### Material


#### 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

<table>
<thead>
<tr>
<th>Item</th>
<th>Net</th>
<th>Gross</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 g approx.</td>
<td>100 g approx.</td>
</tr>
</tbody>
</table>

#### Notes:

1. Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C ±1.8 °C, +73.4 °F ±3.2 °F.
2. 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 range - 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.
3. The sensing range and hysteresis of the diffuse reflective type sensor are specified for white non-glossy paper (200 × 200 mm 7.874 × 7.874 in) as the object.
4. If slit masks (optional) are fitted, an object of ø0.5 mm ø0.020 in (using round slit mask) can be detected.
5. Make sure to confirm detection with an actual sensor before use.
### Specifications

#### Standard Type

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Adjustable Range Reflective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod. No.</td>
<td>NPN output</td>
<td>Small Spot</td>
</tr>
<tr>
<td></td>
<td>PNP output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CX-441</td>
<td>CX-441-P</td>
</tr>
<tr>
<td></td>
<td>CX-443</td>
<td>CX-443-P</td>
</tr>
<tr>
<td></td>
<td>CX-444</td>
<td>CX-444-P</td>
</tr>
<tr>
<td></td>
<td>CX-442</td>
<td>CX-442-P</td>
</tr>
</tbody>
</table>

#### CE Marking Directive Compliance
- EMC Directive, RoHS Directive

#### Adjustable Range (Note 2)
- 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: 0.787 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 (with white non-glossy paper)
- 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

#### Red LED (Peak emission wavelength)
- 650 nm

#### Emitting Element
- Ø9 mm Ø0.354 in

#### Material
- Enclosure: PBT (Polybutylene terephthalate), Lens: Polycarbonate, Indicator cover: Polycarbonate

#### Cable
- 0.2 mm² 4-core cabtyre cable, 2 m 6.562 ft long

#### Cable Extension
- Extension up to total 100 m

#### 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 ±7.34 °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 at CX-444(P); 15 mm 0.591 in, CX-442(P); 20 mm 0.787 in, or more, away.
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.
### SPECIFICATIONS

#### Basic type

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Thru-beam</th>
<th>Retreflective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Long sensing range</td>
<td>With polarizing filters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Light-ON</td>
<td>Dark-ON</td>
</tr>
<tr>
<td>NPN output</td>
<td>CX-411A-C05</td>
<td>CX-411B-C05</td>
<td>CX-412A-C05</td>
</tr>
<tr>
<td>PNP output</td>
<td>CX-411A-P-C05</td>
<td>CX-411B-P-C05</td>
<td>CX-412A-P-C05</td>
</tr>
</tbody>
</table>

#### CE marking directive compliance
- EMC Directive, RoHS Directive
- N/A

#### Supply voltage
- 12 to 24 V DC ±10 %
- Ripple P-P 10 % or less

#### Emitter
- 15 mA or less

#### Receiver
- 10 mA or less

#### 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)

#### Sensitivity adjuster
- Green LED (lights up under stable light received condition or stable dark condition) (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.)

#### Protection
- IP67 (IEC)

#### Ambient temperature
- –25 to +55 °C
- –13 to +131 °F

#### Ambient humidity
- 35 to 85 % RH
- 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 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 three times each

#### Emitter element (modulated)
- Red LED
- Infrared LED
- Red LED

#### Peak emission wavelength
- 680 nm 0.027 mil
- 870 nm 0.034 mil
- 680 nm 0.027 mil

#### Material
- Enclosure: PBT (Polybutylene terephthalate), Lens: Acrylic, Indicator cover: Acrylic

#### Cable extension
- Extension up to total 100 m 328.084 ft is possible with 0.3 mm 2 0.2 mm² 3-core (thru-beam type emitter: 2-core) cable, 0.5 m 1.640 ft long

#### Weight
- Emitter: 20 g approx., Receiver: 20 g approx.
- 20 g approx.
- 30 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 sensing range and the sensing object of the retroreflective type sensor are specified for the RF-230 reflector (optional). The sensing range represents the actual sensing range of the sensor. The sensing range 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.
3. If slit masks (optional) are fitted, an object of ø0.5 mm ø0.020 in (using round slit mask) can be detected.
4. Make sure to confirm detection with an actual sensor before use.
**Compact Photoelectric Sensor CX-400 SERIES Ver.2**

### I/O CIRCUIT AND WIRING DIAGRAMS

#### NPN output type

**I/O circuit diagram**

<table>
<thead>
<tr>
<th>Sensor circuit</th>
<th>Internal circuit</th>
<th>User's circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>D (Brown / 1)</td>
<td>Load</td>
<td>12 to 24 V DC ±10 %</td>
</tr>
<tr>
<td>Pink / 2 Sensing mode selection input (Note 2, 3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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) as mentioned *1. Unstable operation may occur.
3) When the mating cable is connected to the plug-in connector type of CX-44-□-P, its color is white.

*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

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#### PNP output type

**I/O circuit diagram**

<table>
<thead>
<tr>
<th>Sensor circuit</th>
<th>Internal circuit</th>
<th>User's circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>D (Brown / 1)</td>
<td>Load</td>
<td>12 to 24 V DC ±10 %</td>
</tr>
<tr>
<td>Pink / 2 Sensing mode selection input (Note 2, 3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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) as mentioned *1. Unstable operation may occur.
3) When the mating cable is connected to the plug-in connector type of CX-44-□-P, its color is white.

*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
COMPONENTS

Thru-beam type

Parallel deviation

Angular deviation

Parallel deviation with round slit masks (ø0.5 mm ø0.020 in)

Parallel deviation with round slit masks (ø1 mm ø0.039 in)

Parallel deviation with round slit masks (ø2 mm ø0.079 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)

Please contact our office for the sensing characteristics of CX-413 and CX-483.

Downloaded from Arrow.com.
Please contact our office for the sensing characteristics of CX-413 and CX-483.

**Compact Photoelectric Sensor CX-400 SERIES Ver.2**

**SENSING CHARACTERISTICS (TYPICAL)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Parallel deviation</th>
<th>Angular deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX-491</td>
<td>Retroreflective</td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td>CX-492</td>
<td>Retroreflective</td>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td>CX-481</td>
<td>Retroreflective</td>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td>CX-482</td>
<td>Retroreflective</td>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
</tbody>
</table>

**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.

**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.
### SENSING CHARACTERISTICS (TYPICAL)

**CX-422a**

**Sensing field**

![Sensing field diagram](cx422a_sensing_field.png)

**Correlation between sensing object size and sensing range**

As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 x 200 mm 7.874 x 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 x 200 mm 7.874 x 7.874 in white non-glossy paper is just detectable at a distance of 800 mm 31.496 in.

**CX-423a**

**Sensing field**

![Sensing field diagram](cx423a_sensing_field.png)

**Correlation between sensing object size and sensing range**

As the sensing object size becomes smaller than the standard size (white non-glossy paper 200 x 200 mm 7.874 x 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 x 200 mm 7.874 x 7.874 in white non-glossy paper is just detectable at a distance of 200 mm 7.874 in. Contact us for the sensing characteristics of 300 mm 11.811 in distance. Please contact us for the sensing field at the setting distance 300 mm 11.811 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.

**Emitted beam**

![Emitte beam diagram](cx422a_emitted_beam.png)
SENSING CHARACTERISTICS (TYPICAL)

**CX-441**

**Sensing fields**
- Setting distance: 25 mm 0.984 in
- Setting distance: 50 mm 1.969 in

**Emitted beam**
- White non-glossy paper
- Grey non-glossy paper
- Lightness: 5

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

- 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, respectively, with white non-glossy paper.
- The sensing range also varies depending on material.

**CX-443**

**Sensing fields**
- Setting distance: 25 mm 0.984 in
- Setting distance: 50 mm 1.969 in

**Emitted beam**
- White non-glossy paper
- Grey non-glossy paper
- Lightness: 5

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

- 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, respectively, with white non-glossy paper.
- The sensing range also varies depending on material.
Compact Photoelectric Sensor CX-400 SERIES Ver.2

**SENSING CHARACTERISTICS (TYPICAL)**

### CX-444a

**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**

- White non-glossy paper
- Grey non-glossy paper
- Non-glossy paper

**Correlation between color**

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

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 and 50 mm 1.969 in long, respectively, with white color. The sensing range also varies depending on material.

**Correlation between material**

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

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 and 50 mm 1.969 in long, respectively, with white non-glossy paper.

### CX-442a

**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**

- White non-glossy paper
- Grey non-glossy paper
- Non-glossy paper

**Correlation between color**

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

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**

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

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

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Mounting

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

Others

- Do not use during the initial transient time (50 ms) after the power supply is switched on.

CX-41□  CX-42□  CX-49□  CX-48□

Part description and functions

Stability indicator (Green) (Note 1) Lights up under the stable light condition or the stable dark condition
Sensitivity adjuster (Note 1) Sensing range becomes longer when turned.

Operation mode switch

<table>
<thead>
<tr>
<th>Operation mode switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-ON mode is obtained when the operation mode switch (thru-beam type incorporated in the receiver) is turned fully clockwise (L side).</td>
<td></td>
</tr>
<tr>
<td>Dark-ON mode is obtained when the operation mode switch (thru-beam type incorporated in the receiver) is turned fully counterclockwise (D side).</td>
<td></td>
</tr>
</tbody>
</table>

Beam alignment

Thru-beam type

1. Set the operation mode switch to the Light-ON mode position (L side).
2. Place 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

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

### Sensitivity adjustment

<table>
<thead>
<tr>
<th>Step</th>
<th>Sensitivity adjuster</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position, MIN.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point $\mathcal{P}$ where the sensor enters the “Light” state operation.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters 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 $\mathcal{Q}$.</td>
</tr>
<tr>
<td>4</td>
<td>Optimum position</td>
<td>The position at the middle of points $\mathcal{Q}$ and $\mathcal{P}$ is the optimum sensing position.</td>
</tr>
</tbody>
</table>

Note: Use the flathead screwdriver (purchase separately) to turn the adjuster slowly. Turning with excessive strength will cause damage to the adjuster.

### Retrospective type sensor (excluding CX-491□)

- Please take care of the following points when detecting materials having a gloss.
  - Make L shown in the diagram, sufficiently long.
  - Install at an angle of 10 to 30 degrees to the sensing object.

### Retrospective 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 retrospective 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.

### CX-48□

#### Retrospective 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 sensor object, etc.

### Relation between output and indicators

<table>
<thead>
<tr>
<th>In case of Light-ON</th>
<th>Sensing condition</th>
<th>In case of Dark-ON</th>
<th>Operation indicator</th>
<th>Output</th>
<th>Sensing condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stable light receiving</td>
<td>Stable dark receiving</td>
<td></td>
<td>OFF</td>
<td>Stable dark receiving</td>
</tr>
<tr>
<td></td>
<td>Unstable light receiving</td>
<td>Stable dark receiving</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$\bullet$ : Lights up, $\bullet$ : Turns OFF
**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.

---

**CX-44□**

**Mounting**

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

**Operation mode switch**

<table>
<thead>
<tr>
<th>Operation mode switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Diagram of correct operation mode switch]</td>
<td>Detecting-ON mode is obtained when the operation mode switch is turned fully clockwise (L side).</td>
</tr>
<tr>
<td>[Diagram of incorrect operation mode switch]</td>
<td>Not detecting-ON is obtained when the operation mode switch is turned fully counterclockwise (D side).</td>
</tr>
</tbody>
</table>

**Note:** Use the flathead screwdriver (purchase separately) to turn the operation mode switch 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.

**Interference prevention filter (CX-411□□)**

- By mounting the interference prevention filters PF-CX4□□, two sets of the 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.

- Since there are two types of the interference prevention filter, the two sets of sensors should be fitted with different types of interference prevention filters, as shown in the figure below.

The interference prevention does not work even if the filters are mounted for emitters only, receivers only or the same model. No. of the interference prevention filters are mounted on both the sets of the sensor.

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**Arrow.com**
PRECAUTIONS FOR PROPER USE

**CX-44q**

**Stability indicator**
- Since the CX-44q 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.
- Further, the stability indicator (green) shows the margin to 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.
- Please use the FGS function together with a conveyor or other background unit.

**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 A and B is adjusted as explained in the table right, there may be more than 1 turn between the point A and B. Therefore, make sure to remember the turns of both points to find the optimum position.
- Be sure to use 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 (purchase 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.

---

**When using the BGS function**

<When a sensing object is moving right or to the left of the sensor>

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Distance adjuster</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Turn the distance adjuster fully counterclockwise to the minimum sensing range position. (CX-441: 20 mm 0.787 in approx.. CX-442: 40 mm 1.575 in approx.)</td>
<td>Near</td>
</tr>
<tr>
<td>②</td>
<td>Place an object at the required distance from the sensor, turn the distance adjuster gradually clockwise, and find out point A where the sensor changes to the detecting condition.</td>
<td>Near</td>
</tr>
<tr>
<td>③</td>
<td>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 B. 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 B. / There may be more than 1 turn between point A and B, since this sensor incorporates a 1.5-turn adjuster.</td>
<td>Near</td>
</tr>
<tr>
<td>④</td>
<td>The optimum position to stably detect objects is the center point between A and B.</td>
<td>Optimum position</td>
</tr>
</tbody>
</table>

<When a sensing object is approaching / moving away from the sensor>

- Follow only steps ① and ④. Since the sensing point may change depending on the sensing object, be sure to check the operation with the actual sensing object.

**When using the FGS function**

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Distance adjuster</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Turn the distance adjuster fully clockwise to the maximum sensing range position. (CX-441: 100 mm 3.937 in approx.. CX-442: 300 mm 11.811 in approx.)</td>
<td>Near</td>
</tr>
<tr>
<td>②</td>
<td>In the state where the sensor detects the background, turn the distance adjuster gradually counterclockwise, and find out point A where the sensor changes to the non-detecting condition.</td>
<td>Near</td>
</tr>
<tr>
<td>③</td>
<td>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 B. 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 B. / There may be more than 1 turn between point A and B, since this sensor incorporates a 1.5-turn adjuster.</td>
<td>Near</td>
</tr>
<tr>
<td>④</td>
<td>The optimum position to stably detect objects is the center point between A and B.</td>
<td>Optimum position</td>
</tr>
</tbody>
</table>

**Others**
- Its distance adjuster is mechanically operated. Do not drop; avoid other shocks.
The CAD data can be downloaded from our website.

**DIMENSIONS (Unit: mm in)**

**CX-41□ Sensor**

<table>
<thead>
<tr>
<th>Sensitivity adjuster (Note 1)</th>
<th>Operation indicator (Orange)(Note 2)</th>
<th>Stability indicator (Green)(Note 3)</th>
<th>Operation mode switch (Note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.2</td>
<td>7.85 0.309</td>
<td>0.157</td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>3.95 0.156</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.220 1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-M3 × 0.5 0.020 thru-hole threads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1) Not incorporated on the emitter and the basic type sensor.
2) It is the power indicator (green) on the emitter.
3) Not incorporated on the emitter.
4) Basic type: 0.5 m 1.640 ft long

**CX-41□-Z Sensor**

<table>
<thead>
<tr>
<th>Sensitivity adjuster (Note 1)</th>
<th>Operation indicator (Orange)(Note 2)</th>
<th>Stability indicator (Green)(Note 1)</th>
<th>Operation mode switch (Note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.8 7.85 0.309</td>
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<td>11.3</td>
<td>0.157</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td></td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>2-M3 × 0.5 0.020 thru-hole threads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**CX-41□-J Sensor**

<table>
<thead>
<tr>
<th>Sensitivity adjuster (Note 1)</th>
<th>Operation indicator (Orange)(Note 2)</th>
<th>Stability indicator (Green)(Note 1)</th>
<th>Operation mode switch (Note 1)</th>
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<td></td>
</tr>
<tr>
<td></td>
<td>1.220 1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-M3 × 0.5 0.020 thru-hole threads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**CX-49□ Sensor**

<table>
<thead>
<tr>
<th>Sensitivity adjuster (Note 1)</th>
<th>Operation indicator (Orange)(Note 2)</th>
<th>Stability indicator (Green)(Note 1)</th>
<th>Operation mode switch (Note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.8</td>
<td>7.85 0.309</td>
<td>11.3</td>
<td>0.157</td>
</tr>
<tr>
<td></td>
<td>3.95 0.156</td>
<td></td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-M3 × 0.5 0.020 thru-hole threads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1) Not incorporated on the emitter and the basic type sensors.
2) Basic type: 0.5 m 1.640 ft long

**CX-49□-Z Sensor**

<table>
<thead>
<tr>
<th>Sensitivity adjuster (Note 1)</th>
<th>Operation indicator (Orange)(Note 2)</th>
<th>Stability indicator (Green)(Note 1)</th>
<th>Operation mode switch (Note 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.8</td>
<td>7.85 0.309</td>
<td>11.3</td>
<td>0.157</td>
</tr>
<tr>
<td></td>
<td>3.95 0.156</td>
<td></td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-M3 × 0.5 0.020 thru-hole threads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**CX-49□-J Sensor**

<table>
<thead>
<tr>
<th>Sensitivity adjuster (Note 1)</th>
<th>Operation indicator (Orange)(Note 2)</th>
<th>Stability indicator (Green)(Note 1)</th>
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<td></td>
<td>3.95 0.156</td>
<td></td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-M3 × 0.5 0.020 thru-hole threads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1) Not incorporated on the emitter and the basic type sensors.
2) Basic type: 0.5 m 1.640 ft long

Downloaded from Arrow.com.
**DIMENSIONS (Unit: mm in)**

### CX-44a

- **Sensor**
  - Operation indicator (Orange)
  - Distance adjuster (5-turn)
  - Operation mode switch

- **Reflector (Accessory for the retroreflective type sensor)**
  - Reflector
  - Reflective tape (Optional)

### CX-44a-Z

- **Sensor**
  - Operation indicator (Orange)
  - Distance adjuster (5-turn)
  - Operation mode switch

- **Reflector (Accessory for the retroreflective type sensor)**
  - Reflector
  - Reflective tape (Optional)

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**RF-230**

- **Reflector (Accessory for the retroreflective type sensor)**
  - Material: Acrylic (Reflector)
  - ABS (Base)
  - 2-M3 × 0.5 0.020 thru-hole threads
  - Center of sensing
  - Beam-receiving part
  - Beam-emitting part

**RF-220**

- **Reflector (Optional)**
  - Material: Acrylic (Reflector)
  - ABS (Base)
  - 2-M3 × 0.5 0.020 thru-hole threads

**RF-210**

- **Reflector (Optional)**
  - Material: Acrylic (Reflector)
  - ABS (Base)
  - 2-M3 nut mounting holes

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**RF-11**

- **Reflective tape (Optional)**
  - Material: Acrylic

**RF-12**

- **Reflective tape (Optional)**
  - Material: Flexible polyvinyl chloride

**RF-13**

- **Reflective tape (Optional)**
  - Material: Pressure-sensitive adhesive

---

**Note:** It is not attached with the basic type sensor.

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The CAD data can be downloaded from our website.

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### DIMENSIONS (Unit: mm in)

**MS-CX2-1**

Assembly dimensions

Mounting drawing with the receiver of CX-41

Material: Stainless steel (SUS304)

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

**MS-CX2-2**

Assembly dimensions

Mounting drawing with the receiver of CX-41

Material: Stainless steel (SUS304)

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

**MS-CX2-4**

Assembly dimensions

Mounting drawing with the receiver of CX-41

Material: Stainless steel (SUS304)

Two M3 (length 14 mm 0.551 in) screws with washers are attached.
### DIMENSIONS (Unit: mm in)

**MS-CX2-5**

<table>
<thead>
<tr>
<th>Material: Stainless steel (SUS304)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two M3 screws with washers are attached.</td>
</tr>
</tbody>
</table>

**MS-CX3**

<table>
<thead>
<tr>
<th>Material: Stainless steel (SUS304)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two M3 screws with washers are attached.</td>
</tr>
</tbody>
</table>

**Assembly dimensions**

Mounting drawing with the receiver of CX-41□

---

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**DIMENSIONS (Unit: mm in)**

The CAD data can be downloaded from our website.

### MS-RF21-1

**Assembly dimensions**

Material: Stainless steel (SUS304)

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

### MS-RF22

**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

**Assembly dimensions**

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

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