

# Sensor Selection Guide for Packaging Industry



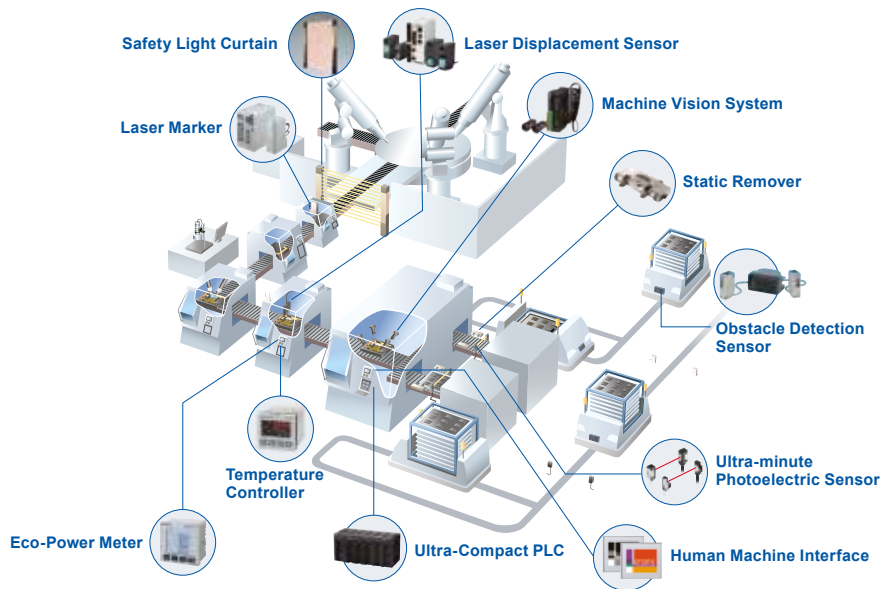
**IN Your  
Future**



# IN Your Future

## Total FA Solution

Panasonic draws on advanced technology and expertise developed through many years of experience in the FA field to offer products for use in a broad array of applications, from food packaging to semiconductor manufacturing and assembly. Through an extensive selection of products including FA sensors, programmable controllers, laser markers, and AC servo motors, we offer onestop solutions to customer needs.



### Panasonic Industrial Devices SUNX Over 50 years of invention

Since Panasonic Industrial Devices SUNX had released the world's first\* reflective type photoelectric sensor using LEDs, we have contributed to total FA solution systems with sensing and control technology over 50 years.

1971



**RS-120H**  
The world's first\* reflective type photoelectric sensor using LEDs

1976



**SX series**  
The world's smallest\* amplifier built-in laser sensors

1979



**LX-23 series**  
The industry's first\* optical lamp fiber sensor

1984

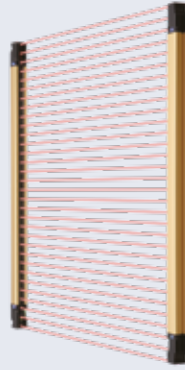


**GXL series**  
Micro-size inductive proximity sensor

1986



**EX2 series**  
The world's smallest\* amplifier built-in laser sensor



## [ INDEX ] Food / Pharmaceutical applications

① Horizontal Packaging Machine.....	P.4
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\*An in-company investigation at the time of release

1992



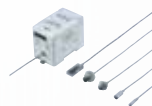
**FX7 series**  
The world's smallest\*  
automatic sensitivity  
setting fiber sensors

1994



**EX-10 series**  
The industry's smallest\*  
ultra-slim photoelectric  
sensors

1999



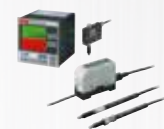
**GP-A series**  
High accuracy eddy  
current type displacement  
sensors

2001



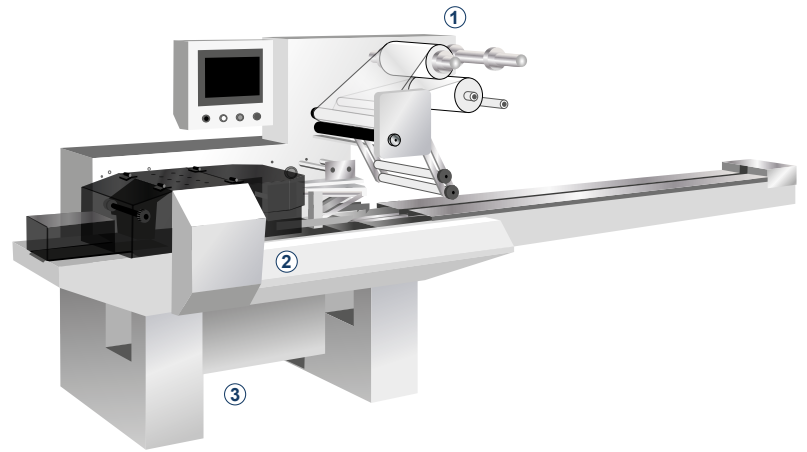
**HL-C1 series**  
High-speed laser  
displacement sensors

2003



**TR series**  
Contact-type  
displacement sensors

# Horizontal Packaging Machine



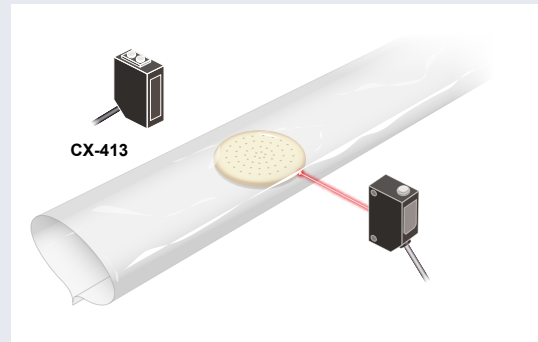
## ① Detecting residual amount of films



EX-L211 ▶ P.15

**EX-L211** is the ultra-compact laser sensor. Even though the compact body, it can stably detect the residual amount of the film.

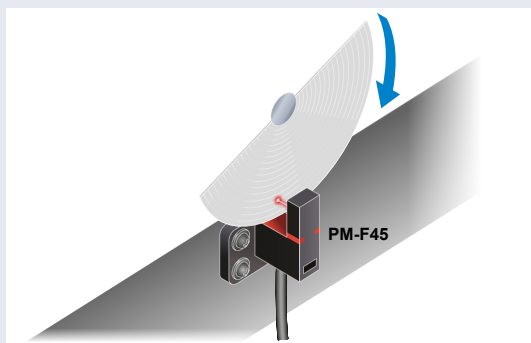
## ② Position misalignment detection through the film



CX-413 ▶ P.14

**CX-413** is a high-powered sensor that uses an infrared light source. It can detect the misalignment of the contents through the film to prevent the seal defects.

## ③ Detecting origin point of the cutter

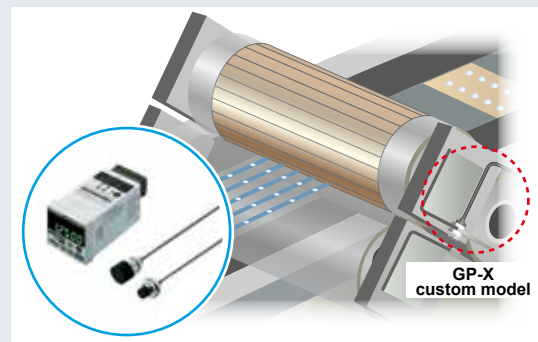


PM-F45 ▶ P.19

In addition to the industry's first\* IP64 protection structure, the **PM-F45** comes standard with three types of protection circuits inside the extremely small casing. These protection circuits minimize the possibility of sensor malfunctions caused by erroneous wiring.

\*As of April 2017, in-company survey.

## ④ Seal defect detection

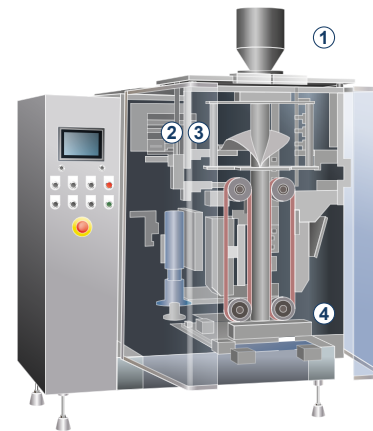


GP-X custom model ▶ Please contact us.

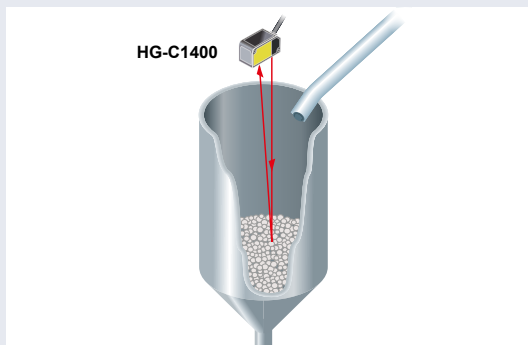
By the high measurement accuracy, **GP-X** can detect seal defects due to foreign material trapped in the seal area. (Linearity:  $\pm 0.3\%$  F.S., Sampling frequency: 40 kHz)



# Vertical Packaging Machine



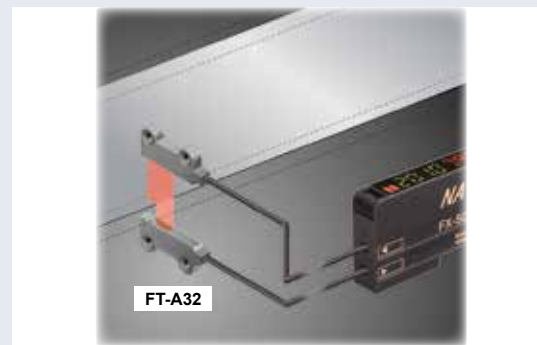
## ① Monitoring fill level inside a hopper



HG-C1400 ▶ P.16

**HG-C1400** is a CMOS type laser distance sensor. It can stably detect height level in the hopper without being affected by the color or the viscosity of the objects.

## ② Edge guiding

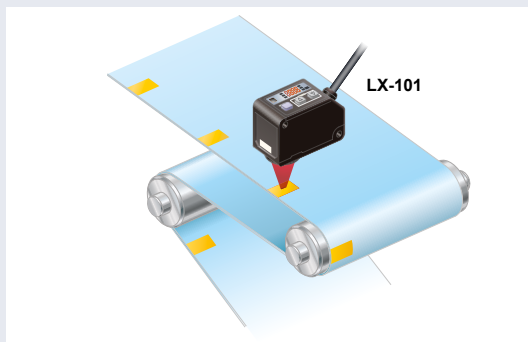


FT-A32 ▶ P.17

With a sensing width of 32 mm, **FT-A32** can sense slight changes in position of the film.

It is also available to detect the level of meandering when used in combination with **FX-502**, a 2-output fiber amplifier.

## ③ Register mark detection



LX-101 ▶ P.18

**LX-101** is a simple color mark sensor which is affordable but equipped with two modes: a "Mark mode" that achieves an ultra-fast response of 45  $\mu$ s and a "Color mode" that performs high-precision detection based on the RGB ratio.

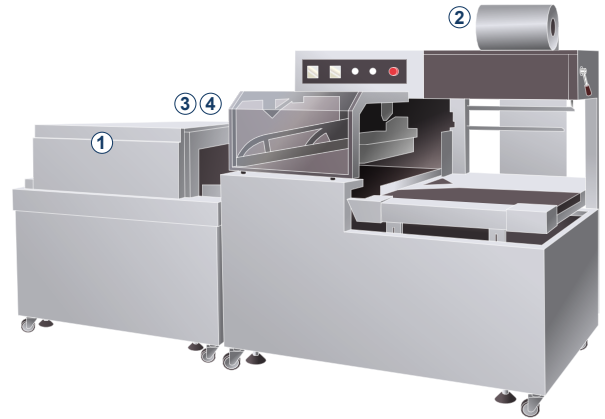
## ④ Confirming presence of packages on the conveyor



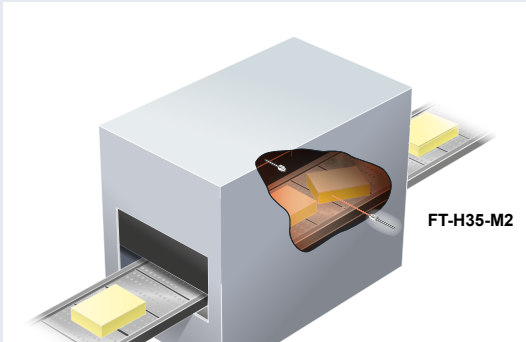
HG-C1200 ▶ P.16

**HG-C1200** can stably detect the presence or absence of packages on a conveyor without being affected by the color or gloss of the packaging material. With its compact casing, it can be mounted anywhere.

# Shrink Wrap Machine



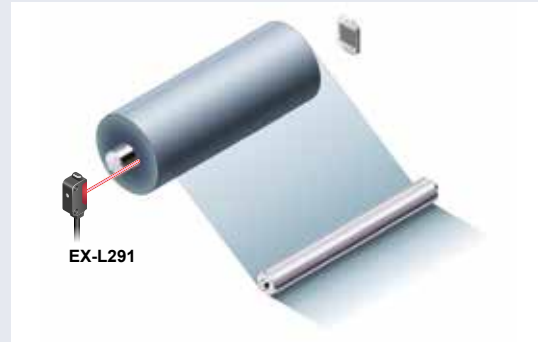
## ① Pouch detection in high-temperature shrink tunnel



FT-H35-M2 ▶ P.17

The heat-resistant fiber units can be used in environments of up to 350 °C (662 °F). When used together with the high power amplifier **FX-550**, it reduces fluctuations in the amount of received light due to heat haze and achieves stable detection.

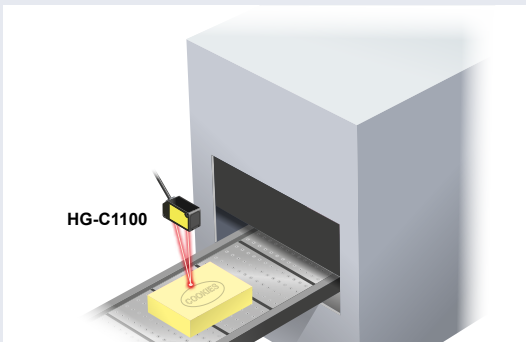
## ② Detecting residual amount of films



EX-L291 ▶ P.15

**EX-L291** uses laser light with high directivity and can stably detect the residual amount of the film. Its mounting is very simple as it is just to install a reflector on the opposite side.

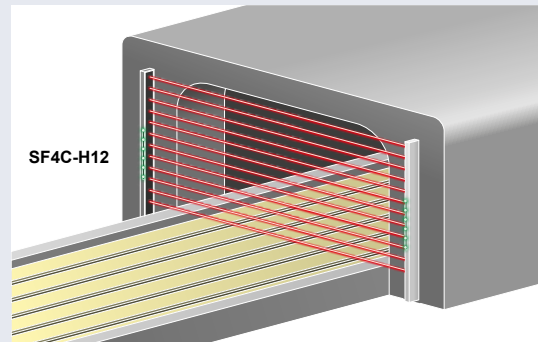
## ③ Confirmation of extraction from the shrink tunnel



HG-C1100 ▶ P.16

**HG-C1000** can stably detect objects without being affected by the color of the objects. Also, maximum sensing distance is 600 mm, so it can be installed away from the heat source.

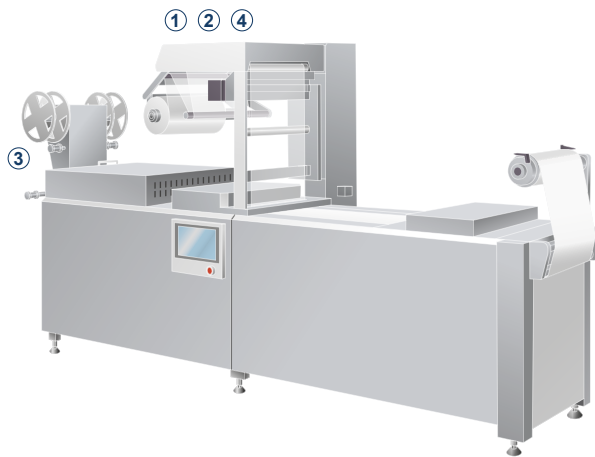
## ④ Safety measures for the tunnel outlet



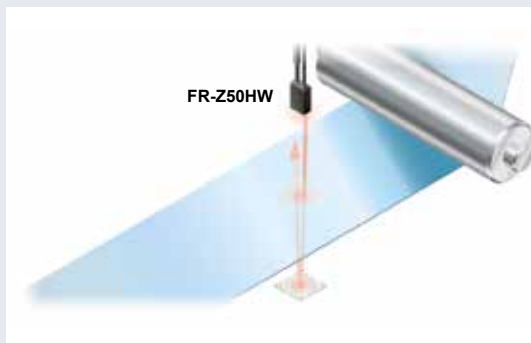
SF4C-H12 ▶ P.21

The ultra-slim shape of **SF4C** contributes to the miniaturization of machines. In addition, operators can easily check its safety status of the light curtain with the large application indicator light.

# Thermoforming Vacuum Packaging Machine



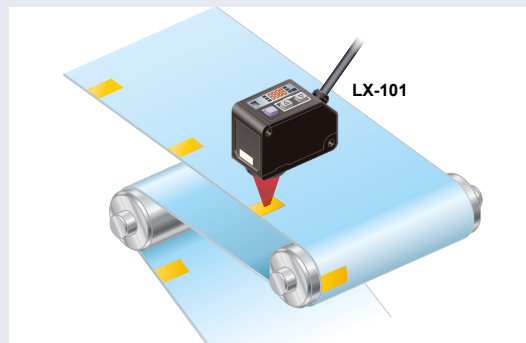
## ① Transparent film breakage detection



FR-Z50HW ▶ P.17

Since **FR-Z50HW** has a built-in polarization filter at its tip, it is not affected by the surface reflection of the transparent film and can stably detect even thin or highly transparent films.

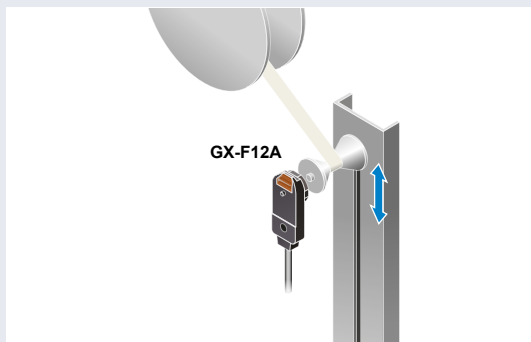
## ② Register mark detection



LX-101 ▶ P.18

**LX-101** is a simple color mark sensor which is affordable but equipped with two modes: a "Mark mode" that achieves an ultra-fast response of 45  $\mu$ s and a "Color mode" that performs high-precision detection based on the RGB ratio.

## ③ Detection of bobbin for tension control

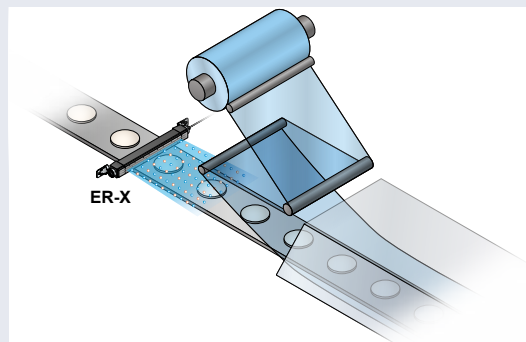


GX-F12A ▶ P.20

Rectangular-shaped inductive proximity sensor **GX-F12A** can stably detect the origin position of a bobbin for tension control. Despite its very compact body, it has the industry's No.1\* stable detection performance and IP68G protection structure.

\*As of July 2017, in-company survey among equivalent rectangular proximity sensors.

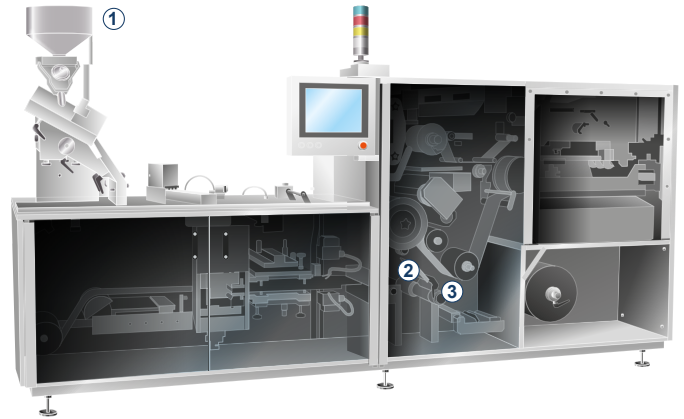
## ④ Removing static electricity from film



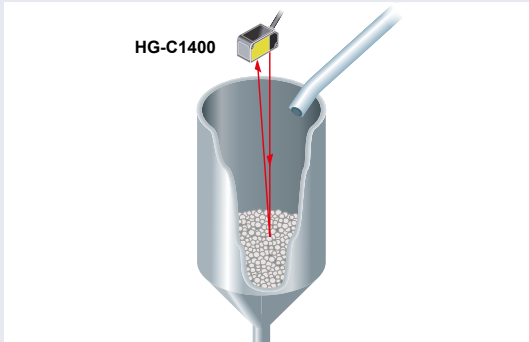
ER-X ▶ P.23

**ER-X** can offer a capability of the airless static electricity removal. It contributes to prevent scattering of tiny foreign materials or flapping of film by compressed air.

# Blister Packaging Machine



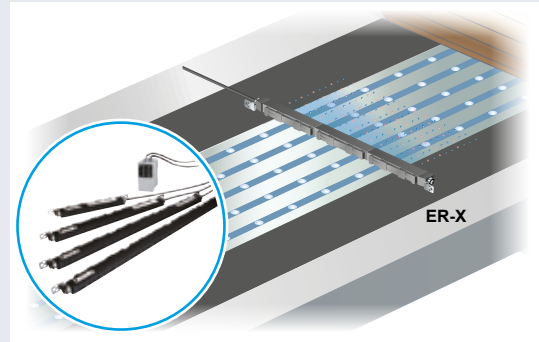
## ① Monitoring fill level inside a hopper



HG-C1400 ▶ P.16

**HG-C1400** can detect fill level in a hopper without being affected by the color of the tablets. Also, since it is equipped with analog output as standard, it is possible to constantly monitor the level of tablets.

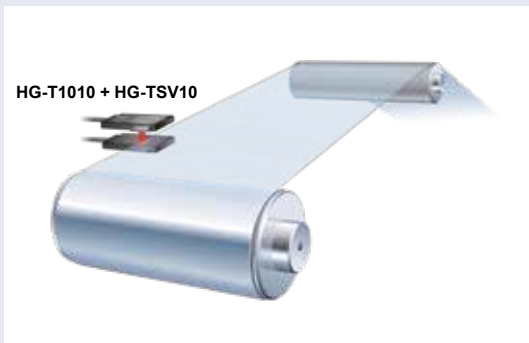
## ② Preventing adhesion of foreign materials



ER-X ▶ P.23

**ER-X** can offer a capability of the airless static electricity removal. There is no need to worry about the scattering of foreign materials or tablets by compressed air.

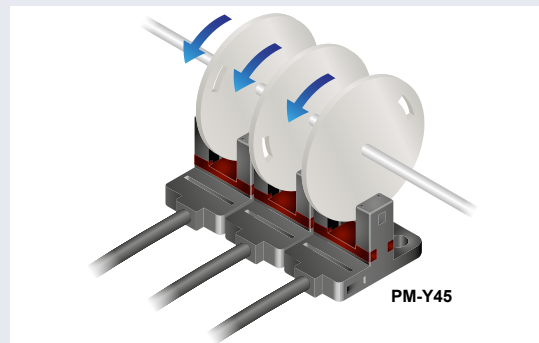
## ③ Edge position control



HG-T1010 ▶ P.16

**HG-T1010** can measure a meandering status of transparent film with high accuracy for more accurate windings. By using in combination with a free tool software for laptop, you can intuitively change settings and collect measurement data without manuals.

## ④ Origin point detection



PM-Y45 ▶ P.19

In addition to the industry's first\* IP64 protection structure, the **PM-Y45** comes standard with three types of protection circuits inside the extremely small casing. These protection circuits minimize the possibility of sensor malfunctions caused by erroneous wiring.

\*As of April 2017, in-company survey.

# Bottling and Capping Machine



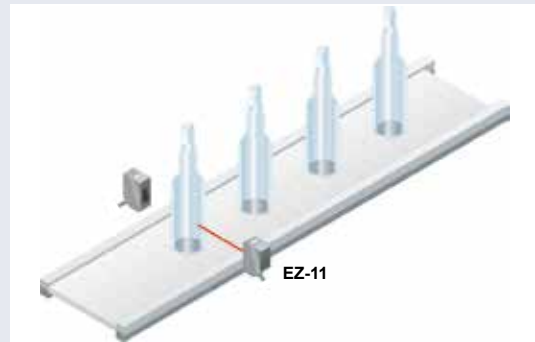
## ① Transparent bottle detection



CX-481 ▶ P.14

**CX-481** is a retroreflective type photoelectric sensor that can stably detect any containers such as a highly-transparent bottle.

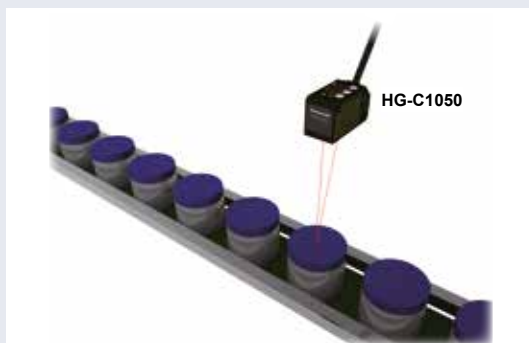
## ② Liquid detection in the container



EZ-11 ▶ P.18

As its penetrating power is strong, beam of **EZ-11** can pass through not only translucent containers (PFA) but also opaque containers such as shampo bottles, and the sensor can reliably detect the liquid inside the containers.

## ③ Wrong cap detection



HG-C1050 ▶ P.16

**HG-C1050** can measure the height of the cap with high accuracy and can distinct wrong caps. (Resolution: 30  $\mu$ m) In addition, IO-Link models of **HG-C1000** series are available for use in a purpose of the "preventive maintenance" and "operation monitoring".

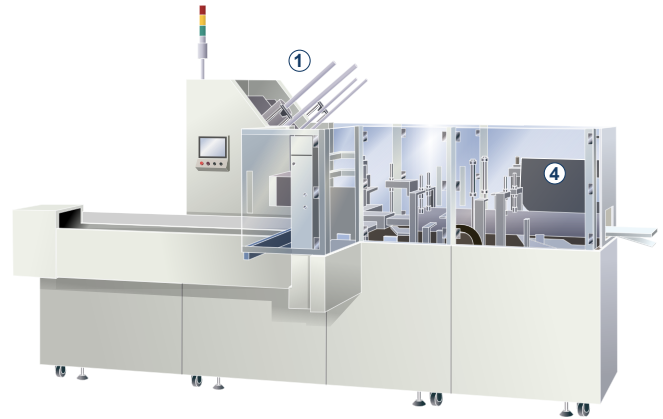
## ④ Removing static electricity from containers



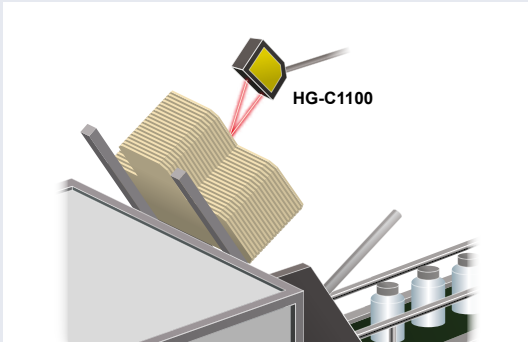
ER-VS02 ▶ P.23

Contamination of containers greatly affects the quality of food, cosmetics or chemical products. By using **ER-VS02** in combination with an optional nozzle, the inside of the containers can be electrically neutralized, and it contributes preventing dust readhering.

# Cartoning Machine



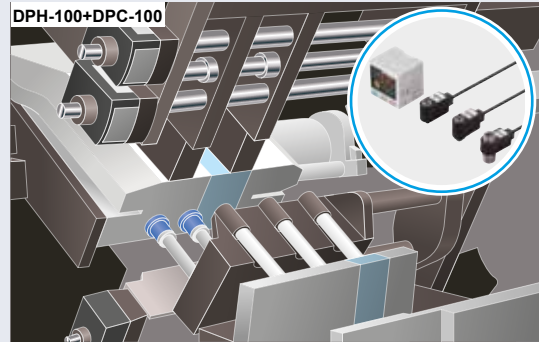
## ① Residual amount detection in the carton magazine



HG-C1100 ▶ P.16

**HG-C1100** can stably detect the height of the carton bundle and can monitor residual amount of it without being affected by the color of the carton. Also, it offers an ease of installation by its ultra compact casing.

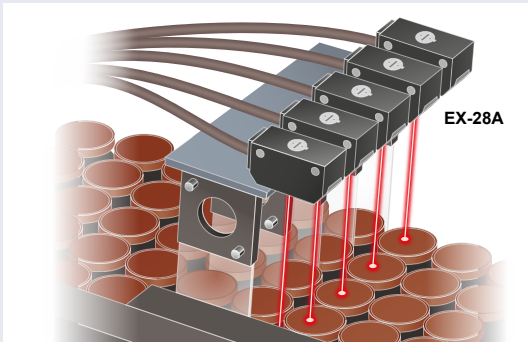
## ② Suction check



DPH-100 / DPC-100 ▶ P.21

Since the **DPC-100** has a fast response time of 500  $\mu$ s, it contributes to the reduction of production cycle time in the carton assembly process.

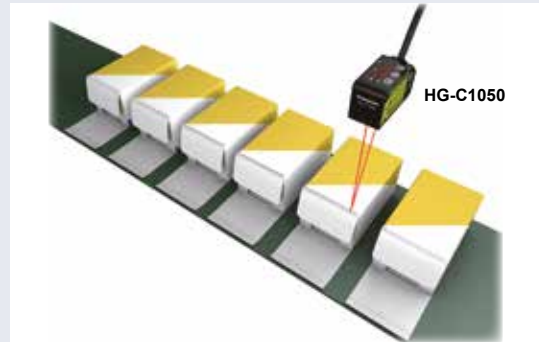
## ③ Small bottle presence/absence detection before packaging



EX-28A ▶ P.14

**EX-28A** is a photoelectric sensor of narrow-view reflective type. Because of its spot beam, where detection point is can be seen and it makes adjustment during installation easier.

## ④ Confirming condition of box flap

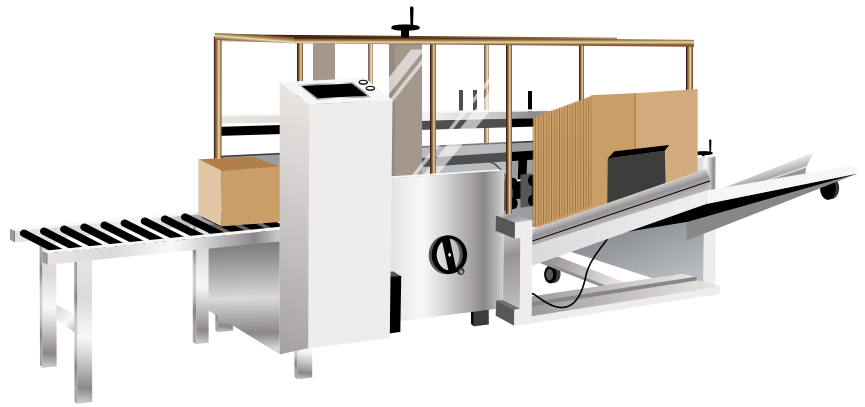


HG-C1050 ▶ P.16

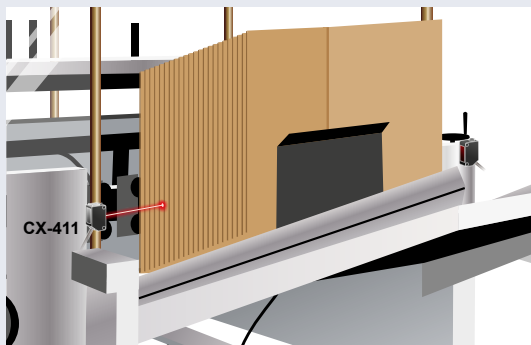
**HG-C1050** is a CMOS type laser distance sensor. It can offer a pinpoint height detection with laser light and available to confirm whether a seal condition of box flap is normal or not.



# Case Packer



## ① Cardboard detection



CX-411 ▶ P.14

**CX-411** is a world standard thru-beam photoelectric sensor. It offers stable cardboard detection with affordable pricing. Also, it has the IP67 protection structure, so you can use it for a long time with peace of mind.

## ② Safety door switches



SG-P ▶ P.14

**SG-P** is a non-contact type safety door switch. By its large and bright indicators, operators can see open/close status of doors at glance even if they are away from the machine.

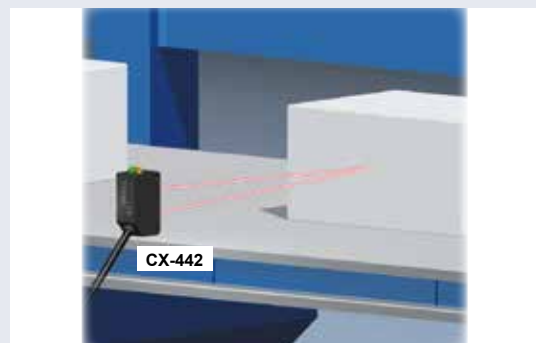
## ③ Suction check



DP-100 ▶ P.20

Our pressure sensor **DP-100** is ideal for checking the adsorption condition when transfer of packages. It is not only affordable but also its 2-screen display makes operation easier and contributes to reduce downtime of machines.

## ④ Leading edge detection

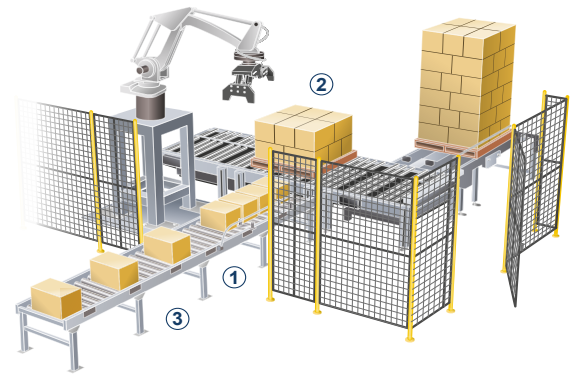


CX-442 ▶ P.14

**CX-442** is a photoelectric distance sensor and it is equipped with the BGS mode. The BGS function is best suited for a situation that no background is present or a situation that object is away from background such as wall. Eliminating the need for installing a reflector or a detector at opposite side.



# Palletizer



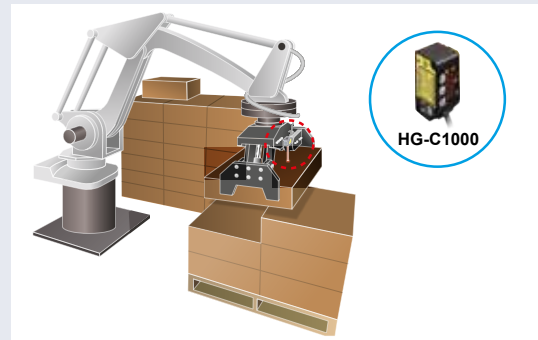
## ① Safety measures



SF4D ▶ P.22

Slim but robust metal housing makes **SF4D** resistant to twisting, warping, vibration, and even direct impact. Additionally, its high power optical emission(49.213 ft of operation range) and its IP67 protection structure allow the **SF4D** to withstand the harsh environments.

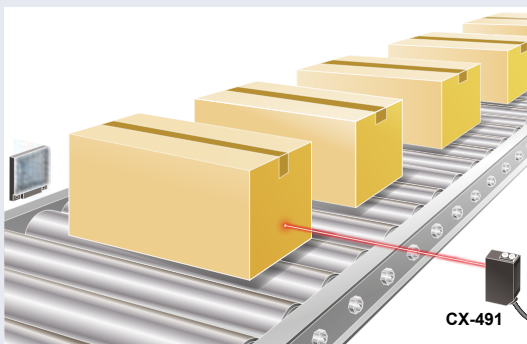
## ② Confirming presence of box on robot arms



HG-C1000 ▶ P.16

**HG-C1000** can stably detect boxes without being affected by the color of them. Also, its extremely small and light body is ideal for mounting on robot arms.

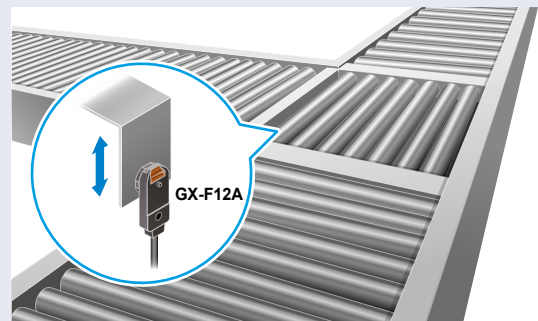
## ③ Leading edge detection



CX-491 ▶ P.14

**CX-491** is a world standard retroreflective photoelectric sensor. For longer conveyor lines that use a large number of sensors, the use of retroreflective type instead of the thru-beam type can significantly reduce man-hours for wiring.

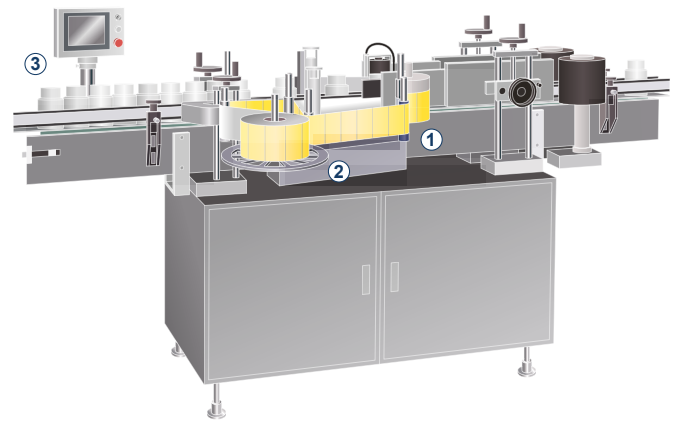
## ④ Detecting moving up of a right-angle transfer module



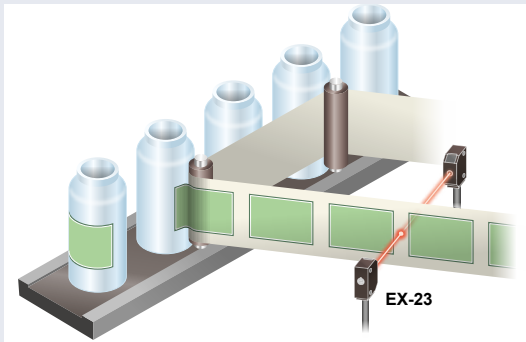
GX-F12A ▶ P.20

**GX-F12A** is a square inductive proximity sensor that has a compact shape and can be installed in even narrow spaces. In addition, due to its IP68G protection structure, it can be used even in environments where are difficult to be cleaned frequently.

# Labeling Machine



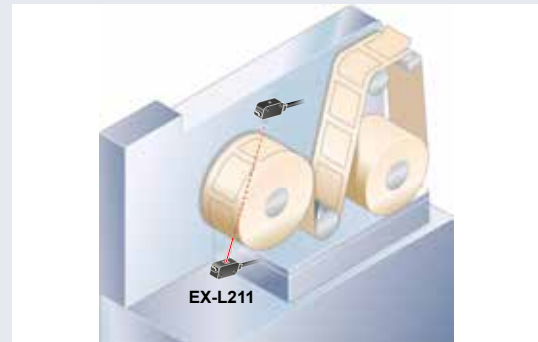
## ① Label seam detection



EX-23 ▶ P.14

EX-23 is a thru-beam type photoelectric sensor with built-in amplifier. Despite its ultra-compact body, it is equipped with a sensitivity adjustment dial, allowing stable detection of label seams.

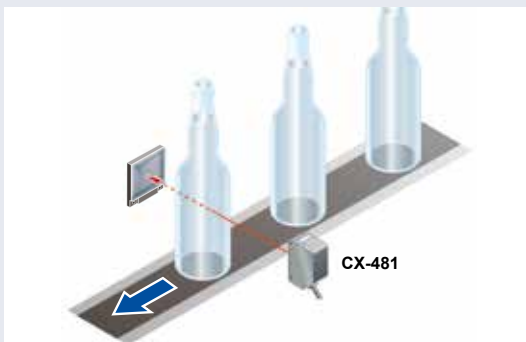
## ② Detecting residual amount of label rolls



EX-L211 ▶ P.15

EX-L211 is the ultra-compact laser sensor. It not only stably detects the remaining amount of rabel rolls but also contributes to space saving.

## ③ Transparent container detection



CX-481 ▶ P.14

CX-481 is a retroreflective photoelectric sensor for detecting transparent objects that can stably detect any container such as a highly transparent bottles.

## ④ Laser marking on labels

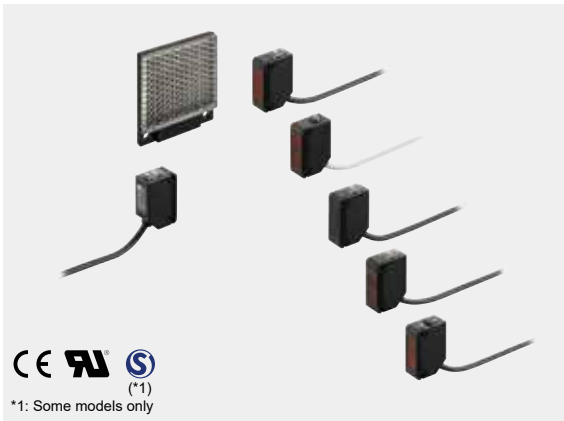


CO<sub>2</sub> laser marker ▶ Please contact us.

Panasonic's CO<sub>2</sub> laser markers offer high speed and stable marking quality, allowing marking on nameplates and half-cutting of labels.

# Compact Photoelectric Sensor CX-400 series Ver. 2

Application  
P.4, 9, 11, 12, 13



\*1: Some models only

Type	Appearance	Sensing range	Model No.		Output operation	Emitting element
			NPN output	PNP output		
Thru-beam		10 m 32.808 ft	CX-411	CX-411-P	Switchable either Light-ON or Dark-ON	Red LED
		30 m 98.425 ft	CX-413	CX-413-P		Infrared LED
Retroreflective		3 m 9.843 ft (Note)	CX-491	CX-491-P	Switchable either Light-ON or Dark-ON	Red LED
		50 to 500 mm 1.969 to 19.685 in (Note)	CX-481	CX-481-P		Infrared LED
Adjustable range reflective		20 to 300 mm 0.787 to 11.811 in	CX-442	CX-442-P	Switchable either Detection-ON or Detection-OFF	Red LED

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

Sensing object	Sensing object size (mm in)
Glass sheet	50 × 50 1.969 × 1.969 t = 0.7 0.028
Cylindrical glass	ø50 ø1.969 ℓ = 50 1.969 t = 1.3 0.051
Acrylic board	50 × 50 1.969 × 1.969 t = 1.0 0.039
Styrol (Floppy case)	50 × 50 1.969 × 1.969 t = 0.9 0.035
Food wrapping film	50 × 50 1.969 × 1.969 t = 10 μm 0.394 mil
Cigarette case film	50 × 50 1.969 × 1.969 t = 20 μm 0.787 mil
Vinyl sack	50 × 50 1.969 × 1.969 t = 30 μm 1.181 mil
PET bottle (500ml)	ø66 ø2.598

Reflector setting range CX-481: 300 to 500 mm 11.811 to 19.685 in, CX-482: 1 to 2 m 3.281 to 6.562 ft

[with the RF-230 reflector at the optimum condition (Note)]  
Each object should pass across the beam at the center between the sensor and the reflector.

ℓ: Length of cylindrical glasses

t: Thickness of sensing object

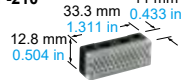
Note: The optimum condition is defined as the condition in which the sensitivity level is set such that the stability indicator just lights up when the object is absent.

Note: The sensing range of the retroreflective type sensor is specified for the RF-230 (optional) reflector.

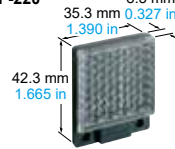
## Options

### Reflector

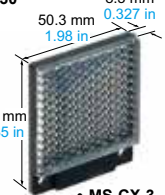
• RF-210



• RF-220



• RF-230



### Sensor mounting bracket

• MS-CX2-1



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

• MS-CX2-2



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

• MS-CX2-4



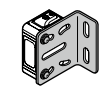
Two M3 (length 14 mm 0.551 in) screws with washers are attached.

• MS-CX2-5



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

• MS-CX-3



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

# Ultra-compact Photoelectric Sensor EX-20 series Ver.2

Application  
P.10, 13



\*1: Excluding 5 m cable length type \*2: Some models only

Type	Appearance	Sensing range	Model No.		Output operation
			NPN output	PNP output	
Thru-beam		1 m 3.281 ft	EX-21A	EX-21A-PN	Light-ON
		2 m 6.562 ft	EX-21B	EX-21B-PN	Dark-ON
Retroreflective		30 to 200 mm 1.181 to 7.874 in (Note)	EX-29A	EX-29A-PN	Light-ON
			EX-29B	EX-29B-PN	Dark-ON
Narrow-view reflective		45 to 115 mm 1.772 to 4.528 in	EX-28A	EX-28A-PN	Light-ON
			EX-28B	EX-28B-PN	Dark-ON

Note: The sensing range of the retroreflective type sensor is specified for the RF-200 reflector.

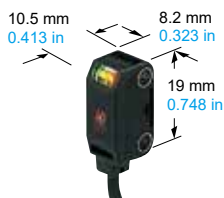
Further, the sensing range is the possible setting range for the reflector.

The sensor can detect an object less than 30 mm 1.181 in away.

However, if the reflector is set 100 mm 3.937 in or less away, the sensing object should be opaque.

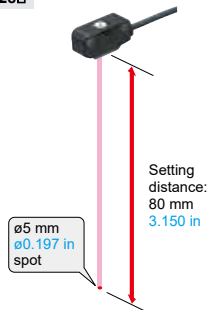
## Ultra-compact

EX-23□



## Clear beam spot using red LED dot light source

EX-28□



## Options

### Sensor mounting bracket

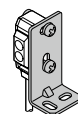
• MS-EX20-1



Material: Stainless steel (SUS304)

Two M3 (length 5 mm 0.197 in) pan head screws [stainless steel (SUS304)] are attached.

• MS-EX20-2



Material: Stainless steel (SUS304)

Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS304)] are attached.

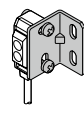
• MS-EX20-3



Material: Stainless steel (SUS304)

Two M3 (length 5 mm 0.197 in) pan head screws [stainless steel (SUS304)] are attached.

• MS-EX20-4



Material: Stainless steel (SUS304)

Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS304)] are attached.

# Ultra-compact Laser Sensor EX-L200 series

Application  
P.4, 13



\* Conforming to FDA regulations

Type	Appearance	Sensing range	Model No.		Emission spot size (Typical)
			NPN output	PNP output	
Thru-beam	Minute object detection	1 m <b>3.281 ft</b>	EX-L211	EX-L211-P	Approx. 6 × 4 mm <b>0.236 × 0.157 in</b> (at a sensing distance of 1 m <b>3.281 ft</b> )
	Long sensing range	3 m <b>9.843 ft</b>	EX-L212	EX-L212-P	Approx. 8 × 5.5 mm <b>0.315 × 0.217 in</b> (at a sensing distance of 1 m <b>3.281 ft</b> )
Retroreflective	Long sensing range	4 m <b>13.123 ft</b> (Note 1)	EX-L291	EX-L291-P	Approx. 6 × 4 mm <b>0.236 × 0.157 in</b> (at a sensing distance of 1 m <b>3.281 ft</b> )
Spot reflective	Minute object detection	45 to 300 mm <b>1.772 to 11.811 in</b>	EX-L221	EX-L221-P	ø1 mm <b>ø0.039 in</b> or less (at a sensing distance of 300 mm <b>11.811 in</b> )
Convergent reflective	Spot	20 to 50 mm <b>0.787 to 1.969 in</b> (Note 2) (Convergent point: 22 mm <b>0.866 in</b> )	EX-L261	EX-L261-P	ø1 mm <b>ø0.039 in</b> or less (at a sensing distance of 50 mm <b>1.969 in</b> )
	Line spot	20 to 70 mm <b>0.787 to 2.756 in</b> (Note 2) (Convergent point: 22 mm <b>0.866 in</b> )	EX-L262	EX-L262-P	Approx. 5 × 1 mm <b>0.197 × 0.039 in</b> (at a sensing distance of 50 mm <b>1.969 in</b> )

Notes: 1) The sensing range is the value for **RF-330** reflector.  
2) The sensing range is specified for white non-glossy paper (100 × 100 mm **3.937 × 3.937 in**) as the object.

## Easy to use

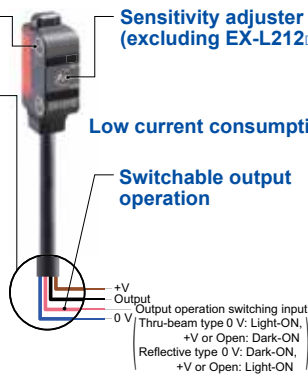
M3 screw used for secure tightening

Conductor thickness 1.5 times increased to make wiring easier

Sensitivity adjuster (excluding EX-L212)

Low current consumption

Switchable output operation



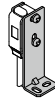
+V Output  
Output operation switching input  
0 V (Thru-beam type 0 V: Light-ON, +V or Open: Dark-ON)  
Reflective type 0 V: Dark-ON, +V or Open: Light-ON

## Options

### Sensor mounting bracket

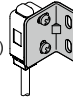
#### • MS-EXL2-1

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



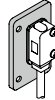
#### • MS-EXL2-5

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



#### • MS-EXL2-6

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



### Universal sensor mounting bracket

#### • MS-EXL2-4

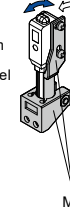
Adjustment ±3°

360° rotation

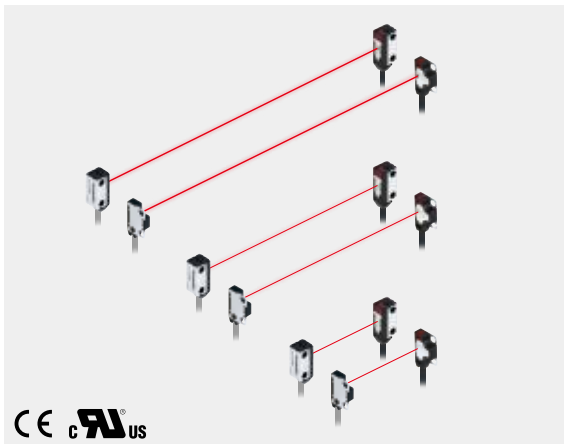
Height adjustment: 15 mm **0.591 in**

Two M3 (length 14 mm **0.551 in**) screws with washers, one M3 (length 10 mm **0.394 in**) hexagon-socket head bolt [stainless steel (SUS)], and one M3 hexagon nut [stainless steel (SUS)] are attached.

Material: Die-cast zinc alloy



# Ultra-minute Photoelectric Sensor EX-Z series



CE cULus

Bending-resistant cable type available for all models

Ultra-minute



EX-Z1□F□  
W8 × H14 × D3 mm  
W0.315 × H0.551 × D0.118 in

EX-Z1□  
W5.5 × H15.9 × D6.5 mm  
W0.217 × H0.626 × D0.256 in



Type	Appearance	Sensing range	Model No.		Output operation
			NPN output	PNP output	
Thru-beam	Front sensing	50 mm <b>1.969 in</b>	EX-Z11FA	EX-Z11FA-P	Light-ON
		200 mm <b>7.874 in</b>	EX-Z12FA	EX-Z12FA-P	Light-ON
		500 mm <b>19.685 in</b>	EX-Z13FA	EX-Z13FA-P	Light-ON
	Side sensing	50 mm <b>1.969 in</b>	EX-Z11A	EX-Z11A-P	Light-ON
		200 mm <b>7.874 in</b>	EX-Z12A	EX-Z12A-P	Light-ON
		500 mm <b>19.685 in</b>	EX-Z13A	EX-Z13A-P	Light-ON

## Options

### Sensor mounting bracket

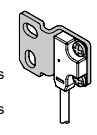
#### • MS-EXZ-1

Material: Stainless steel (SUS304)  
Two M2 (length 4 mm **0.157 in**) pan head screws and two M2 (length 8 mm **0.315 in**) pan head screws are attached.



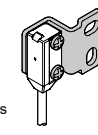
#### • MS-EXZ-2

Material: Stainless steel (SUS304)  
Two M2 (length 4 mm **0.157 in**) pan head screws are attached.



#### • MS-EXZ-3

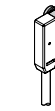
Material: Stainless steel (SUS304)  
Two M2 (length 8 mm **0.315 in**) pan head screws are attached.



### Spacer for mounting at the back

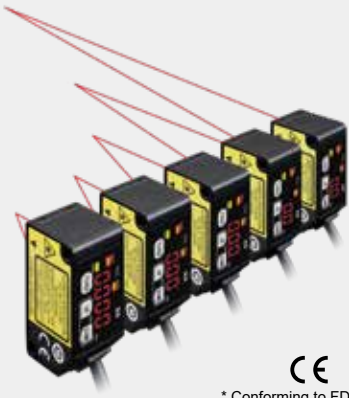
#### • MS-EXZ-4

Material: Polyacetal  
M2 (length: 10 mm **0.394 in**) screws, nuts, spring washers and flat washers are attached. (20 pieces each)



# CMOS Type Micro Laser Distance Sensor HG-C series

Application  
P.5, 6, 8, 9, 10, 12



CE C RU US  
\* Conforming to FDA regulations

Appearance	Measurement center distance and measurement range	Repeatability	Beam diameter (Note)	Model No.	
				NPN output	PNP output
	30 ± 5 mm 1.181 ± 0.197 in	10 μm 0.394 mil	ø50 μm 1.969 mil approx.	HG-C1030	HG-C1030-P
	50 ± 15 mm 1.969 ± 0.591 in	30 μm 1.181 mil	ø70 μm 2.756 mil approx.	HG-C1050	HG-C1050-P
	100 ± 35 mm 3.937 ± 1.328 in	70 μm 2.756 mil	ø120 μm 4.724 mil approx.	HG-C1100	HG-C1100-P
	200 ± 80 mm 7.874 ± 3.150 in	200 μm 7.874 mil	ø300 μm 11.811 mil approx.	HG-C1200	HG-C1200-P
	400 ± 200 mm 15.748 ± 7.874 in	300 μm 11.811 mil (Measuring distance 200 to 400 mm 7.874 to 15.748 in) 800 μm 31.496 mil (Measuring distance 400 to 600 mm 15.748 to 23.622 in)	ø500 μm 19.685 mil approx.	HG-C1400	HG-C1400-P

Note: This is the size in the measurement center distance. These values were defined by using 1/e<sup>2</sup> (13.5% approx.) of the center light intensity.  
Due to leak light outside the specified area, the reflectance around the detecting point may be higher than at the point and this may affect the measurement value.

**Repeatability**

10 μm 0.394 mil  
\*HG-C1030□

**Dimensions**

W20 × H44 × D25 mm  
W0.787 × H1.732 × D0.984 in

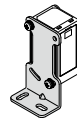
**Inflection resistant cable**

HG-C1□0(-P) are adopted.

### Options

#### Simple mounting bracket

- MS-HG-01



Material: Stainless steel (SUS304)  
Two M3 (length 25 mm 0.984 in) screws with washers (SPCC) are attached.

# Thru-beam Type Digital Displacement Sensor HG-T series

Application  
P.8



CE  
\* Conforming to FDA regulations

### Sensor heads

Type	Appearance	Measurement width	Installation distance	Repeatability (Note 1)	Laser class	Model No.
Standard type		10 mm 0.394 in	0 to 500 mm 0 to 19.685 in	1 μm 0.039 mil Installation distance: 20 mm 0.787 in	Class 1 [IEC / JIS / GB / FDA (Note 2)]	HG-T1010
Slim type						2.5 μm 0.098 mil Installation distance: 100 mm 3.937 in

Notes: 1) This is the P-P value of digital measurement value with half shading at the middle position of the installation distance.  
2) This product complies with 21 CFR 1040.10 and 1040.11 Laser Notice No. 50, dated June 24, 2007, issued by CDRH (Center for Devices and Radiological Health) under the FDA (Food and Drug Administration).

### Sensor head connection cables

Type	Appearance	Model No.	Cable length	Description
Sensor head connection cables		CN-HT-C2	2 m 6.562 ft	This cable is used to connect the sensor head to the controller. The cable is branched into two cables on the sensor head connecting side, but the two cables can be connected interchangeably to the emitter and receiver.
		CN-HT-C5	5 m 16.404 ft	
		CN-HT-C10	10 m 32.808 ft	
		CN-HT-C20	20 m 65.617 ft	

### Controllers

Type	Appearance	Model No.	Output	Maximum number of connectable controllers
Master unit		HG-TC101	NPN open-collector transistor	Up to 15 slave units can be connected per master unit
		HG-TC101-P	PNP open-collector transistor	
Slave units		HG-TC111	NPN open-collector transistor	
		HG-TC111-P	PNP open-collector transistor	
		HG-TC113	—	

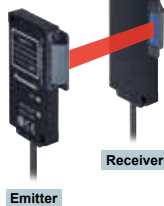
### Wide-angle measurement



### Side view attachment is available (optional) HG-T1010

#### Side view attachment HG-TSV10

Two M2 (length 4 mm 0.157 in) screws with washers are attached.





# Digital Fiber Sensor FX-550 series

Application  
P.5, 6, 7



Sensing range  
**1.6 times**  
longer than  
conventional  
models

Entry  
model

**Amplifiers** Quick-connection cable is not supplied with **FX-551(P)**. Please order it separately.

Type	Appearance	Model No.	Emitting element	Output
Connector type		<b>FX-551</b>	Red LED	NPN open-collector transistor
		<b>FX-551P</b>		PNP open-collector transistor
Cable type		<b>FX-551-C2</b>		NPN open-collector transistor
		<b>FX-551P-C2</b>		PNP open-collector transistor

**Quick-connection cables**

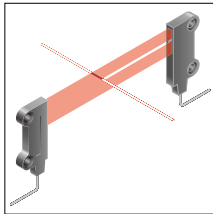
Type	Appearance	Model No.	Description
Main cable (3-core)		<b>CN-73-C1</b>	Length: 1 m 3.281 ft
		<b>CN-73-C2</b>	Length: 2 m 6.562 ft
		<b>CN-73-C5</b>	Length: 5 m 16.404 ft
Sub cable (1-core)		<b>CN-71-C1</b>	Length: 1 m 3.281 ft
		<b>CN-71-C2</b>	Length: 2 m 6.562 ft
		<b>CN-71-C5</b>	Length: 5 m 16.404 ft
		0.2 mm <sup>2</sup> 3-core cabtyre cable, with connector on one end Cable outer diameter: ø3.3 mm ø0.130 in	
		0.2 mm <sup>2</sup> 1-core cabtyre cable, with connector on one end Cable outer diameter: ø3.3 mm ø0.130 in Connectable to a main cable up to 15 cables.	

**End plates** End plates are not supplied with the amplifier. Please order them separately.

Appearance	Model No.	Description
	<b>MS-DIN-E</b>	When amplifiers are mounted in cascade, or when an amplifier moves depending on the way it is installed on a DIN rail, these end plates clamp amplifiers into place on both sides. Make sure to use end plates when cascading multiple amplifiers together. <small>2 pcs. per set</small>

## Introduction of the fiber unit

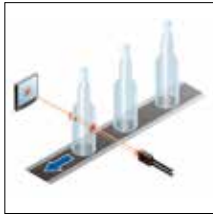
### Wide beam fiber



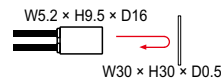
**FT-A32**  
Sensing width.: 32 mm 1.260 in  
Bending radius: R2 mm R0.079 in  
Sensing range: 3,600 mm 141.732 in  
(**FX-550** STD mode)  
Protection: IP40  
Ambient temp.: -40 to + 60 °C  
-40 to + 140 °F

**FT-A11**  
Sensing width.: 11 mm 0.433 in  
Bending radius: R2 mm R0.079 in  
Sensing range: 3,600 mm 141.732 in  
(**FX-550** STD mode)  
Protection: IP40  
Ambient temp.: -40 to + 70 °C  
-40 to + 158 °F

### Retroreflective type fiber



**FR-Z50HW**  
Bending radius: R1 mm R0.039 in  
Sensing range: 100 to 1,150 mm 3.937 to 45.278 in  
(**FX-550** STD mode)  
Protection: IP40  
Ambient temp.: -25 to + 55 °C  
-13 to + 131 °F



### Heat-resistant fiber



**FT-H35-M2**  
Ambient temp.: -60 to + 350 °C -76 to + 662 °F  
Bending radius: R25 mm R0.984  
Sensing range: 1,050 mm 41.339 in  
(**FX-550** STD mode)

**FT-H20W-M1**  
Ambient temp.: -60 to + 200 °C -76 to + 392 °F  
Bending radius: R10 mm R0.394 in  
Sensing range: 730 mm 28.740 in  
(**FX-550** STD mode)

# Digital Mark Sensor LX-100 series

Application  
P.5, 7

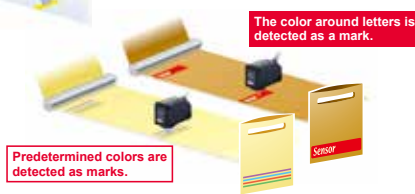


Two detection modes can be selected

### Mark mode



### Color mode



**Sensors** Mating cable is not supplied with the plug-in connector type. Please order it separately.

Type	Appearance	Model No.	Output	Sensing range
Cable type		LX-101	NPN open-collector transistor	10 ±3 mm 0.394 ±0.118 in
		LX-101-P	PNP open-collector transistor	
Plug-in connector type		LX-101-Z	NPN open-collector transistor	
		LX-101-P-Z	PNP open-collector transistor	

### Mating cables for plug-in connector type sensor

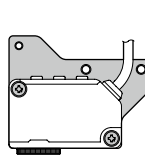
Type	Appearance	Model No.	Description
Straight		CN-24B-C2	Length: 2 m 6.562 ft
		CN-24B-C5	Length: 5 m 16.404 ft
Elbow		CN-24BL-C2	Length: 2 m 6.562 ft
		CN-24BL-C5	Length: 5 m 16.404 ft

0.34 mm<sup>2</sup> 4-core cabtyre cable, with connector on one end  
Cable outer diameter: ø5 mm ø0.197 in

### Options

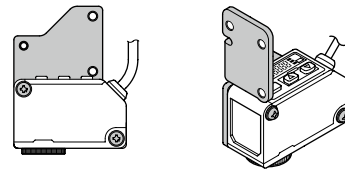
#### Sensor mounting bracket

• MS-LX-1



Two M4 (length 28 mm 1.102 in) screws with washers are attached.

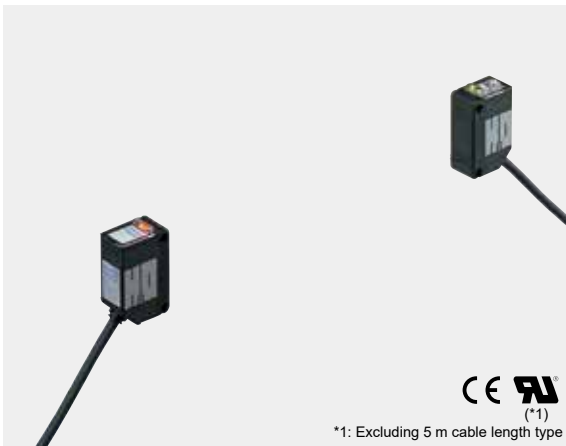
• MS-LX-2



Two M4 (length 30 mm 1.181 in) screws with washers are attached.

# Water Detection Sensor EZ-10 series

Application  
P.9



\*1: Excluding 5 m cable length type

Not affected by drops, bubbles or froth

#### Water drops

#### Bubbles



#### Froth



Type	Appearance	Sensing range (Note)	Model No.	Output
Cable type		5m 16.404 ft (without container or pipe)	EZ-11	NPN open-collector transistor
			EZ-11-PN	PNP open-collector transistor
Plug-in connector type		5m 16.404 ft (without container or pipe)	EZ-11-J	NPN open-collector transistor
			EZ-11-PN-J	PNP open-collector transistor

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

Note: The sensing range shortens depending on the thickness, material, color, etc., of the container or pipe.

• Mating cable for plug-in connector type (2 cables are required)

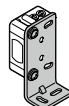
Type	Appearance	Model No.	Description
Straight		CN-24E-C2	Length: 2 m 6.562 ft
		CN-24E-C5	Length: 5 m 16.404 ft
Elbow		CN-24EL-C2	Length: 2 m 6.562 ft
		CN-24EL-C5	Length: 5 m 16.404 ft

0.2 mm<sup>2</sup> 4-core cabtyre cable, with connector on one end  
Cable outer diameter: ø3.7 mm ø0.146 in

### Options

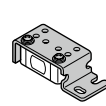
#### Sensor mounting bracket

• MS-CX2-1



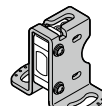
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• MS-CX2-2



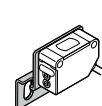
Two M3 (length 12 mm 0.472 in) screws with washers are attached.

• MS-CX2-4



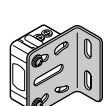
Two M3 (length 14 mm 0.551 in) screws with washers are attached.

• MS-CX2-5



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

• MS-CX-3

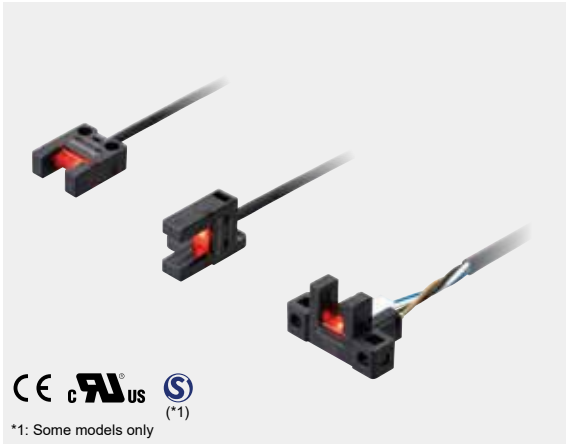


Two M3 (length 12 mm 0.472 in) screws with washers are attached.



# U-shaped Micro Photoelectric Sensor PM-25/45/65 series

Application  
P.4, 8



## Ultra-small / Cable type PM-25 SERIES

Type	Appearance (mm in)	Sensing range	Model No.	Cable length
K type		6 mm 0.236 in (fixed)	PM-K25	1 m 3.281 ft
			PM-K25-R	1 m 3.281 ft, bending-resistant cable
			PM-K25-C3	3 m 9.843 ft
			PM-K25-P	1 m 3.281 ft
L type		6 mm 0.236 in (fixed)	PM-L25	1 m 3.281 ft
			PM-L25-R	1 m 3.281 ft, bending-resistant cable
			PM-L25-C3	3 m 9.843 ft
			PM-L25-P	1 m 3.281 ft
U type		6 mm 0.236 in (fixed)	PM-U25	1 m 3.281 ft
			PM-U25-R	1 m 3.281 ft, bending-resistant cable
			PM-U25-C3	3 m 9.843 ft
			PM-U25-P	1 m 3.281 ft
F type		6 mm 0.236 in (fixed)	PM-F25	1 m 3.281 ft
			PM-F25-R	1 m 3.281 ft, bending-resistant cable
			PM-F25-C3	3 m 9.843 ft
			PM-F25-P	1 m 3.281 ft
R type		6 mm 0.236 in (fixed)	PM-R25	1 m 3.281 ft
			PM-R25-R	1 m 3.281 ft, bending-resistant cable
			PM-R25-C3	3 m 9.843 ft
			PM-R25-P	1 m 3.281 ft

## Compact / Connector built-in type PM-65 SERIES

Type	Appearance (mm in)	Sensing range	Model No.
K type		6 mm 0.236 in (fixed)	PM-K65
			PM-K65-P
T type		6 mm 0.236 in (fixed)	PM-T65
			PM-T65-P
			PM-T65W
L type		6 mm 0.236 in (fixed)	PM-L65
			PM-L65-P
Y type		6 mm 0.236 in (fixed)	PM-Y65
			PM-Y65-P
F type		6 mm 0.236 in (fixed)	PM-F65
			PM-F65-P
			PM-F65W
R type		6 mm 0.236 in (fixed)	PM-R65
			PM-R65-P
			PM-R65W

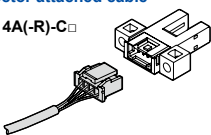
## Compact / Cable type PM-45 SERIES

Type	Appearance (mm in)	Sensing range	Model No.	Cable length
K type		6 mm 0.236 in (fixed)	PM-K45	1 m 3.281 ft
			PM-K45-C3	3 m 9.843 ft
			PM-K45-P	1 m 3.281 ft
T type		6 mm 0.236 in (fixed)	PM-T45	1 m 3.281 ft
			PM-T45-C3	3 m 9.843 ft
			PM-T45-P	1 m 3.281 ft
L type		6 mm 0.236 in (fixed)	PM-L45	1 m 3.281 ft
			PM-L45-C3	3 m 9.843 ft
			PM-L45-P	1 m 3.281 ft
Y type		6 mm 0.236 in (fixed)	PM-Y45	1 m 3.281 ft
			PM-Y45-C3	3 m 9.843 ft
			PM-Y45-P	1 m 3.281 ft
F type		6 mm 0.236 in (fixed)	PM-F45	1 m 3.281 ft
			PM-F45-C3	3 m 9.843 ft
			PM-F45-P	1 m 3.281 ft
R type		6 mm 0.236 in (fixed)	PM-R45	1 m 3.281 ft
			PM-R45-C3	3 m 9.843 ft
			PM-R45-P	1 m 3.281 ft

### Options

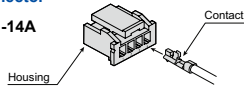
#### Connector attached cable

• CN-14A(-R)-C□



#### Connector

• CN-14A



# Rectangular-shaped Inductive Proximity Sensor GX-F/H series

Application  
P.7, 12



**Tightening strength increased with no damage!**  
(excluding GX-□6)

GX-□8, GX-□12



Approx. 1.4 times greater than before

M3 screw  
Tightening torque: 0.7 N·m or less

GX-□15



M3 screw  
Tightening torque: 1 N·m or less

Type	Appearance (mm in)	Sensing range	Model No. (Note)	Output	Output operation
GX-6 type	Front sensing 6 0.236 24.5 6 0.236 0.965	Maximum operation distance : 1.6 mm 0.063 in Stable sensing range : 0 to 1.3 mm 0 to 0.051 in	GX-F6A	NPN open-collector transistor	Normally open
			GX-F6B		Normally closed
	Top sensing 6 0.236 25 6 0.236 0.984		GX-H6A		Normally open
			GX-H6B		Normally closed
GX-8 type	Front sensing 7.4 0.291 23 8 0.315 0.906	Maximum operation distance : 2.5 mm 0.098 in Stable sensing range : 0 to 2.1 mm 0 to 0.083 in	GX-F8A	NPN open-collector transistor	Normally open
			GX-F8B		Normally closed
	Top sensing 8.2 0.323 25 8 0.315 0.984		GX-H8A		Normally open
			GX-H8B		Normally closed
GX-12 type	Front sensing 7.1 0.280 27.8 12 0.472 1.094	Maximum operation distance : 4.0 mm 0.157 in Stable sensing range : 0 to 3.3 mm 0 to 0.130 in	GX-F12A	NPN open-collector transistor	Normally open
			GX-F12B		Normally closed
	Top sensing 12 0.472 27.4 12 0.472 1.079		GX-H12A		Normally open
			GX-H12B		Normally closed
GX-15 type	Front sensing 8 0.315 31.5 15 0.591 1.240	Maximum operation distance : 5.0 mm 0.197 in Stable sensing range : 0 to 4.2 mm 0 to 0.165 in	GX-F15A	NPN open-collector transistor	Normally open
			GX-F15B		Normally closed
	Top sensing 16.5 0.650 29.5 15 0.591 1.161		GX-H15A		Normally open
			GX-H15B		Normally closed

Note: The PNP output type is also available.

### Options

#### Sensor mounting bracket

• MS-GX6-1

• MS-GL6-1

• MS-GL6-2

• MS-GXL8-4

1pc. each of M3 (length: 12 mm 0.472 in) truss head screw, nut, spring washer and plain washer is attached.

• MS-GXL15

Screw is not attached.



# Dual Display Digital Pressure Sensor DP-100 series Ver. 2

Application  
P.11



CE CULUS (\*1)  
\*1: DP-101(A)/102(A) only

Type	Appearance	Rated pressure range	Model No.	Pressure port	Comparative output	
Standard pressure port type North America	Standard	For low pressure	DP-101-N	M5 female thread + NPT 1/8 male thread	NPN open-collector transistor	
			DP-101-N-P		PNP open-collector transistor	
		For high pressure	DP-102-N		NPN open-collector transistor	
			DP-102-N-P		PNP open-collector transistor	
		Multi-function	For low pressure		DP-101A-N	NPN open-collector transistor
					DP-101A-N-P	PNP open-collector transistor
	For high pressure		DP-102A-N		NPN open-collector transistor	
			DP-102A-N-P		PNP open-collector transistor	

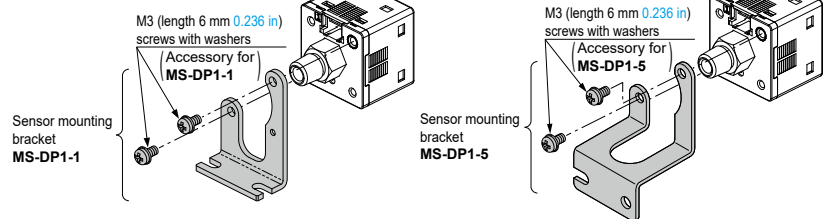
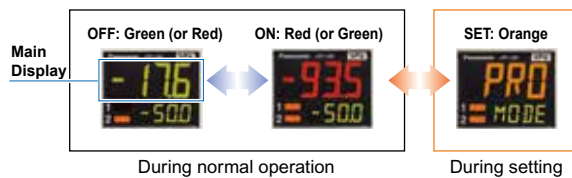
### Options

#### Sensor mounting bracket

• MS-DP1-1

• MS-DP1-5

### 3-color display (Red, Green, Orange)



# Head-separated Dual Display Digital Pressure Sensor DPH-100 / DPC-100 series

Application  
P.10



**Flexible design!**  
Sensor heads can be embedded



Previous problem

DPH-100

Projection sticks out after installation. Easy to knock against objects.

**Embedded installation greatly increases design flexibility!**

## Sensor heads

Type	Appearance	Rated pressure range	Model No.	Pressure port	Applicable fluid
Compound pressure		-100.0 to +100.0 kPa	DPH-101	R1/8 male thread + M5 female thread	Air, non-corrosive gas
			DPH-101-M3	M3 male thread	
			DPH-101-M5	M5 male thread	
			DPH-101-R	R1/8 male thread + M5 female thread	
			DPH-101-M3-R	M3 male thread	
Positive pressure		0 to +1.000 MPa	DPH-102 (Note)	R1/8 male thread + M5 female thread	
			DPH-102-M5	M5 male thread	
			DPH-102-M5-R	M5 male thread	
Vacuum pressure		0 to -101.0 kPa	DPH-103	R1/8 male thread + M5 female thread	
			DPH-103-M3	M3 male thread	
			DPH-103-M5	M5 male thread	
			DPH-103-R	R1/8 male thread + M5 female thread	
			DPH-103-M3-R	M3 male thread	
			DPH-103-M5-R	M5 male thread	

Note: The bending-resistant cable type of DPH-102 is not available.

## Controllers

Appearance	Rated pressure range	Model No.	Comparative output
	Compound pressure: -100.0 to +100.0 kPa Positive pressure: 0 to +1.000 MPa Vacuum pressure: 0 to -101.0 kPa	DPC-101	NPN open-collector transistor
		DPC-101-P	PNP open-collector transistor

\* CN-66A-C2 (Connector attached cable 2 m 6.562 ft) is attached.

# Ultra-slim Safety Light Curtain SF4C series

Type 4

Application  
P.6



Category 4 PLe SIL3

\* Conforming to OSHA / ANSI  
\*1: SF4C-H□(J-05) only

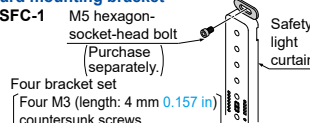
Type	Operating range	Model No.		Number of beam channels	Protective height (mm/in)
		Pigtaited type	Cable type		
Finger protection type	0.1 to 3 m 0.328 to 9.843 ft	SF4C-F15-J05	SF4C-F15	15	160 mm 6.299 in
		SF4C-F23-J05	SF4C-F23	23	240 mm 9.449 in
		SF4C-F31-J05	SF4C-F31	31	320 mm 12.598 in
		SF4C-F39-J05	SF4C-F39	39	400 mm 15.748 in
		SF4C-F47-J05	SF4C-F47	47	480 mm 18.898 in
		SF4C-F55-J05	SF4C-F55	55	560 mm 22.047 in
		SF4C-F63-J05	SF4C-F63	63	640 mm 25.197 in
		SF4C-F8-J05	SF4C-H8	8	160 mm 6.299 in
Hand protection type	0.1 to 3 m 0.328 to 9.843 ft	SF4C-H12-J05	SF4C-H12	12	240 mm 9.449 in
		SF4C-H16-J05	SF4C-H16	16	320 mm 12.598 in
		SF4C-H20-J05	SF4C-H20	20	400 mm 15.748 in
		SF4C-H24-J05	SF4C-H24	24	480 mm 18.898 in
		SF4C-H28-J05	SF4C-H28	28	560 mm 22.047 in
		SF4C-H32-J05	SF4C-H32	32	640 mm 25.197 in

Type	Appearance	Model No.	Description
Mating cables	With connector on one end	SFB-CC3-MU	Length: 3 m 9.843 ft Net weight: 430 g approx. (2 cables) Cable with connector on one end for pigtailed type Two cables per set for emitter and receiver Cable color: Gray (for emitter), Gray with black line (for receiver) Connector color: Gray (for emitter), Black (for receiver) The min. bending radius: R6 mm R0.236 in
		SFB-CC7-MU	Length: 7 m 22.966 ft Net weight: 1,000 g approx. (2 cables)
		SFB-CC10-MU	Length: 10 m 32.808 ft Net weight: 1,300 g approx. (2 cables)
	With connectors on both ends For emitter	SFB-CCJ3E-MU	Length: 3 m 9.843 ft Net weight: 190 g approx. (1 cable) Cable with connectors on both ends for pigtailed type Cable color: Gray (for emitter), Gray with black line (for receiver) Connector color: Gray (for emitter), Black (for receiver)
		SFB-CCJ10E-MU	Length: 10 m 32.808 ft Net weight: 660 g approx. (1 cable)
		SFB-CCJ3D-MU	Length: 3 m 9.843 ft Net weight: 210 g approx. (1 cable)
SFB-CCJ10D-MU	Length: 10 m 32.808 ft Net weight: 680 g approx. (1 cable)		
Designation	Appearance	Model No.	Description
Slim type control unit		SF-C13	Use a discrete wire cable to connect to the safety light curtain. Relay output. Compatible with up to Control Category 4.

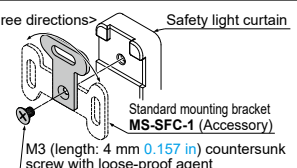
## Options

### Standard mounting bracket

#### • MS-SFC-1



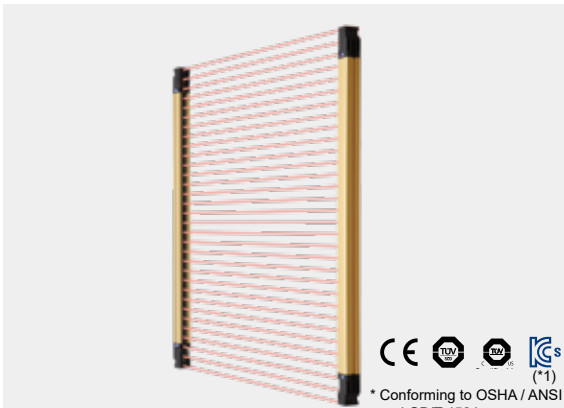
<Mountable in three directions>



Note: The body of the safety light curtain is made of resin, so please take into account the expansion and contraction of the longitudinal dimension. When machining mounting holes, please check the actual product.

# Compact & Robust Safety Light Curtain SF4D series

**Type 4** Application P.12

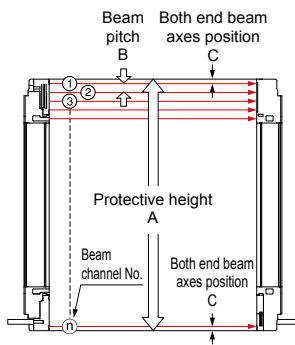


Category 4 PLe SIL3

\* Conforming to OSHA / ANSI and GB/T 4584  
\*1: Excluding SF4D-□-01

\*The control category differs depending on the configuration and wiring of the external circuit.

### All types



Mounting bracket and bottom cap cable are not supplied with the safety light curtain. Be sure to order them separately.

Type	Model No.	Operating range	Number of beam channels	Protective height		Both end beam axes position	
				A	B	C	
Finger protection type Min. sensing object ø14 mm ø0.551 in (10 mm 0.394 in beam pitch)	SF4D-F15	0.2 to 7 m 0.656 to 22.966 ft (Short mode)	15	150 mm	10 mm 0.394 in	5 mm 0.197 in	
	SF4D-F23		23	230 mm			
	SF4D-F31		31	310 mm			
	SF4D-F39	0.8 to 12 m 2.625 to 39.370 ft (Long mode)	39	390 mm			
	SF4D-F47		47	470 mm			
	SF4D-F55		55	550 mm			
	SF4D-F63		63	630 mm			
Hand protection type Min. sensing object ø25 mm ø0.984 in (20 mm 0.787 in beam pitch)	SF4D-H8	0.2 to 9 m 0.656 to 29.528 ft (Short mode)	8	150 mm	20 mm 0.787 in	5 mm 0.197 in	
	SF4D-H12		12	230 mm			
	SF4D-H16		16	310 mm			
	SF4D-H20		20	390 mm			
	SF4D-H24		24	470 mm			
	SF4D-H28		28	550 mm			
	SF4D-H32		32	630 mm			
	SF4D-H36		36	710 mm			
	SF4D-H40		40	790 mm			
	SF4D-H48		48	950 mm			
Arm / Foot protection type Min. sensing object ø45 mm ø1.772 in (40 mm 1.575 in beam pitch)	SF4D-A4	0.2 to 9 m 0.656 to 29.528 ft (Short mode)	4	150 mm	40 mm 1.575 in	15 mm 0.591 in	
	SF4D-A6		6	230 mm			
	SF4D-A8		8	310 mm			
	SF4D-A10		10	390 mm			
	SF4D-A12		12	470 mm			
	SF4D-A14		14	550 mm			
	SF4D-A16		16	630 mm			
	SF4D-A18		18	710 mm			
	SF4D-A20		20	790 mm			
	SF4D-A24		24	950 mm			

Note: Please check our company website for products with a Finger protection type beam axis of 71 or more, a Hand protection type beam axis of 56 or more, and an Arm/Foot protection type beam axis of 28 or more and options.

# Non-contact Safety Door Switch SG-P series

Application P.11



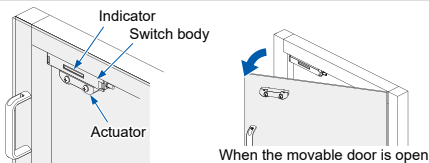
Category 4 PLe SIL3

CE TÜV 2010 FC

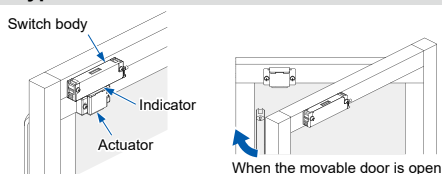
Coding level	Type (Note)	Model No.	Control output (OSSD1, OSSD2)	Cable length	
Low code	Compact type	Standard	SG-P1010-M-P	PNP open-collector transistor, 2 outputs	5 m 16.404 ft
		Standard	SG-P1010-M-N	NPN open-collector transistor, 2 outputs	
		Sub	SG-P1010-S	—	3 m 9.843 ft
	Visible type	Standard	SG-P1020-M-P	PNP open-collector transistor, 2 outputs	5 m 16.404 ft
		Standard	SG-P1020-M-N	NPN open-collector transistor, 2 outputs	5 m 16.404 ft
High code	Compact type	Standard	SG-P2010-M-P	PNP open-collector transistor, 2 outputs	5 m 16.404 ft
		Standard	SG-P2010-M-N	NPN open-collector transistor, 2 outputs	5 m 16.404 ft
	Sub	SG-P2010-S	—	3 m 9.843 ft	
	Visible type	Standard	SG-P2020-M-P	PNP open-collector transistor, 2 outputs	5 m 16.404 ft
		Standard	SG-P2020-M-N	NPN open-collector transistor, 2 outputs	5 m 16.404 ft
	Sub	SG-P2020-S	—	3 m 9.843 ft	

Note: Sub units cannot be used alone. When using a single unit, use a standard unit. When using multiple units in series connection, combine a standard unit with sub units.

### Compact type



### Visible type



### Options

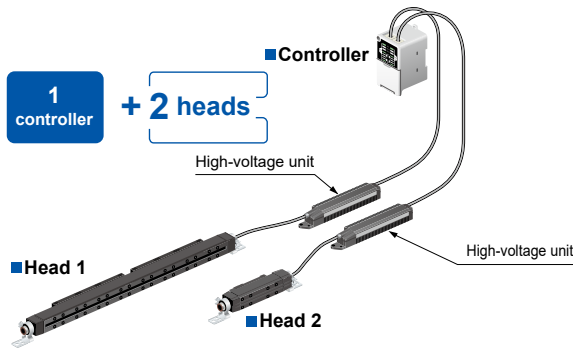
Type	Appearance	Model No.
Maintenance actuator	Overall maintenance type	SG-PK-M1
Maintenance actuator	Maintenance actuator	SG-PK-M2

# Area Ionizer ER-X series

Application  
P.7, 8



Different heads can be combined.



**Heads** Head connection cable is not supplied with the head. Please order it separately.

Type	Appearance	Charge removal time (±1,000 V → ±100 V)	Ion balance	Effective charge removal width	Model No.
Spot type		0.3 sec. or less (Note 1), 0.5 sec. or less (Note 2)	±30 V or less (Note 2, 3)	50 mm <a href="#">1.969 in</a> approx.	ER-X001
				80 mm <a href="#">3.150 in</a> approx.	ER-X008
Bar type		1 sec. or less (Note 2)		160 mm <a href="#">6.299 in</a> approx.	ER-X016
				320 mm <a href="#">12.598 in</a> approx.	ER-X032
				480 mm <a href="#">18.898 in</a> approx.	ER-X048
				640 mm <a href="#">25.197 in</a> approx.	ER-X064

Notes: 1) Typical value in condition of discharge distance 50 mm [1.969 in](#), center of the product, discharge frequency 50 Hz and air supply 60 l/min. (0.3 MPa).  
2) Typical value in condition of discharge distance 100 mm [3.937 in](#) (ER-X001: 50 mm [1.969 in](#)), center of the product, discharge frequency 50 Hz (ER-X-HC: 30 Hz) and no air supply.  
3) Ion balance refers to the average value of plus and minus. The specification value is the typical one in condition used when ambient temperature change is less than ±10 °C, ion balance is set after 30 minutes from the discharge start, the ion balance control function is set ON.

**Controller** Please order power cable or AC adapter separately.

Type	Appearance	Model No.	Number of heads connected	Output
Standard type		ER-XC02	Max. 2 units	PhotoMOS relay

**Head connection cables** Head connection cable is not supplied with the head. Please order it separately.

Appearance	Model No.	Description
	ER-XCCJ2H	Length: 2 m <a href="#">6.562 ft</a> , Net weight: 120 g approx.
	ER-XCCJ5H	Length: 5 m <a href="#">16.404 ft</a> , Net weight: 290 g approx.
	ER-XCCJ10H (Note)	Length: 10 m <a href="#">32.808 ft</a> , Net weight: 560 g approx.

Cable type with both connector

Note: Cannot be used with the high and low temperature resistant type head ER-X-HC. The high and low temperature resistant type heads ER-X-HC are available.

# Ultra-compact Ionizer ER-VS02

Application  
P.9



**Ionizer main unit**

Type	Appearance	Charge removal time (±1,000 V → ±100 V)	Ion balance	Model No.
Spot type	* The photograph shows the unit fitted with a shower nozzle.	1 sec. or less (Note)	±10 V or less (Note)	ER-VS02

Note: A typical sample applied with a supply voltage of 24 V, a distance of 100 mm [3.937 in](#) from the front surface of the air flow outlet and a pressure of 0.25 MPa while the shower nozzle is in use. (Measured on a sample left in the atmosphere at a relative humidity of 65 % RH or less for 24 hours or more.)

**Nozzles** Nozzle is not supplied with the ionizer main unit. Please order it separately.

Type	Appearance	Model No.	Description
Shower nozzle		ER-VAS	Air dispersal type
Straight bar nozzle		ER-VAB020	Effective charge removal length 200 mm <a href="#">7.874 in</a>
		ER-VAB032	Effective charge removal length 320 mm <a href="#">12.598 in</a>
		ER-VAB065	Effective charge removal length 650 mm <a href="#">25.591 in</a>

**Nozzles / Tubes** Nozzle is not supplied with the ionizer main unit. Please order it separately.

Type	Appearance	Model No.	Description
Joint nozzle		ER-VAJK	Joint nozzle for ionizer main unit and shape-preserving tube
		ER-VAK10	Tube length 112 mm <a href="#">4.409 in</a>
		ER-VAK30	Tube length 312 mm <a href="#">12.283 in</a>
		ER-VAK50	Tube length 512 mm <a href="#">20.157 in</a>
Conductive tube		ER-VAJT-64	Joint nozzle for ionizer main unit and conductive tube
		ER-AT50	Tube length 500 mm <a href="#">19.685 in</a>
Tube joint set (Build-to-order product)		ER-VAB-AT	Tube length 500 mm <a href="#">19.685 in</a> (Build-to-order product)
		ER-VAB-ATL	Tube length 500 mm <a href="#">19.685 in</a> (Build-to-order product)

**Cables with connector** Cable with connector is not supplied with the ionizer main unit. Please order it separately.

Appearance	Model No.	Description
	ER-VCCJ2	Length: 2 m <a href="#">6.562 ft</a>
	ER-VCCJ5	Length: 5 m <a href="#">16.404 ft</a>
	ER-VCCJ9	Length: 9 m <a href="#">29.528 ft</a>

0.15mm<sup>2</sup> 8-core cabtyre cable with connector  
Cable outer diameter: ø4.2 mm ø0.165 in



# Panasonic

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