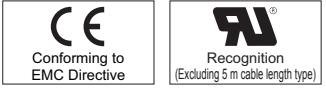
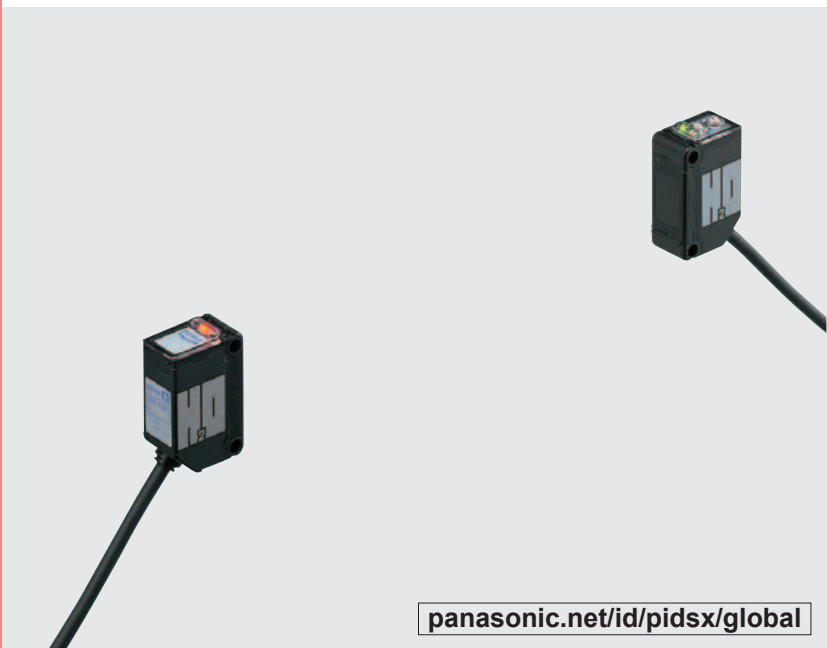


# Water Detection Sensor EZ-10 SERIES

Related Information	■ General terms and conditions.....F-7	■ Sensor selection guide..... P.885~
	■ Glossary of terms.....P.1455~	■ General precautions.....P.1458~

- FIBER SENSORS
- LASER SENSORS
- PHOTOELECTRIC SENSORS
- MICRO PHOTOELECTRIC SENSORS
- AREA SENSORS
- LIGHT CURTAINS / SAFETY COMPONENTS
- PRESSURE / FLOW SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS**
- SENSOR OPTIONS
- SIMPLE WIRE-SAVING UNITS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC ELECTRICITY PREVENTION DEVICES
- LASER MARKERS
- PLC
- HUMAN MACHINE INTERFACES
- ENERGY CONSUMPTION VISUALIZATION COMPONENTS
- FA COMPONENTS
- MACHINE VISION SYSTEMS
- UV CURING SYSTEMS
- Selection Guide
- Wafer Detection
- Liquid Leak Detection
- Liquid Level Detection
- Water Detection**
- Color Mark Detection
- Hot Melt Glue Detection
- Ultrasonic
- Small / Slim Object Detection
- Obstacle Detection
- Other Products

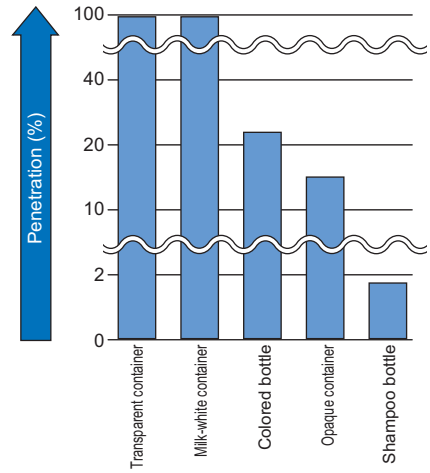


## Detects water...reliably!

### Strong penetration power

As the penetration power is strong, its beam can pass through not only translucent containers (PFA tanks, etc.) but also opaque containers of shampoo bottles, etc., and can reliably detect the liquid inside.

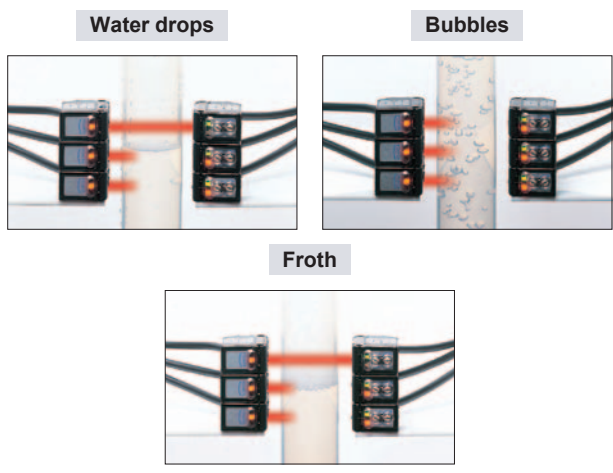
Penetration in case of an empty container (Typical)



\* The graph above is merely a guideline. Penetration power changes due to container material, thickness and color. We strongly recommend that you conduct verification tests prior to use.

### Not affected by drops, bubbles or froth

It is possible to set its sensitivity adjuster so that water drops, bubbles in the water, or froth on the water surface are not detected.



### IP67 protection

The sensor can be hosed down because of its IP67 construction and the non-corrosive stainless steel sensor mounting bracket.

Note: However, take care that if it is exposed to water splashes during operation, it will detect the splashed water itself.

### Adjacent sensor mounting possible

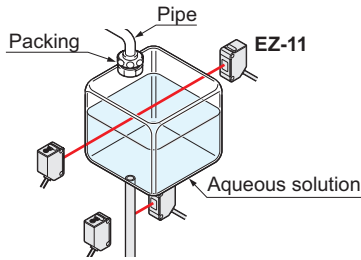
Several sensors can be mounted adjacently by fitting optional slit masks. Further, they can detect the liquid level accurately.

### Plug-in connector type is available

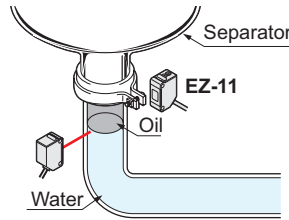
Plug-in connector type which enables connection / disconnection of the cable by one-touch is available. Anyone can easily replace the sensor in a minute.

**APPLICATIONS**

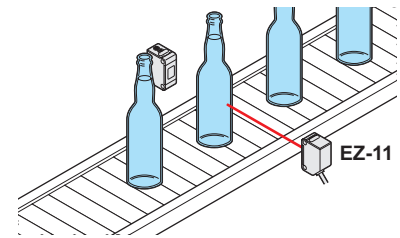
**Detecting level of aqueous solution in resin tank**  
It can reliably detect a liquid even in an opaque container.



**Detecting the boundary between water and oil**  
Since it does not detect oil, it can reliably detect the boundary between water and oil.



**Detecting presence of liquid in colored bottle**  
Aqueous liquids in translucent colored bottles can be reliably detected.



**ORDER GUIDE**

Type	Appearance	Sensing range (Note 1)	Model No. (Note 2)	Output
NPN output		5m 16.404 ft (without container or pipe)	<b>EZ-11</b>	NPN open-collector transistor
PNP output			<b>EZ-11-PN</b>	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).**

Notes: 1) The sensing range shortens depending on the thickness, material, color, etc., of the container or pipe.  
2) Models whose model name on the product nameplate is followed by "P" are emitters, while those whose model name is followed by "D" are receivers.

**5 m 16.404 ft cable length type and plug-in connector type**

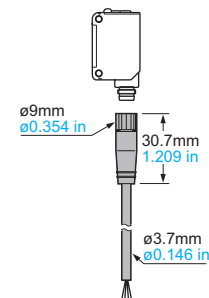
5 m 16.404 ft cable length type (standard: 2 m 6.562 ft) and plug-in connector type (standard: cable type) are also available. (5 m 16.404 ft cable length type is not available for the **EZ-11-PN**.)  
When ordering this type, suffix "-C5" for 5 m 16.404 ft cable length type, "-J" for plug-in connector type to the model No. Please order the suitable mating cable separately for plug-in connector type. (e.g.) Plug-in connector type of **EZ-11-PN** is "**EZ-11-PN-J**".

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

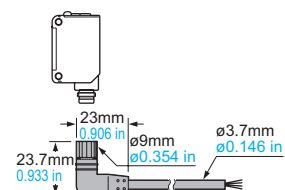
Type	Model No.	Description
Straight	<b>CN-24E-C2</b>	Length: 2 m 6.562 ft
	<b>CN-24E-C5</b>	Length: 5 m 16.404 ft
Elbow	<b>CN-24EL-C2</b>	Length: 2 m 6.562 ft
	<b>CN-24EL-C5</b>	Length: 5 m 16.404 ft

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

**• CN-24E-C2 □ CN-24E-C5**



**• CN-24EL-C2 □ CN-24EL-C5**



FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Wafer Detection

Liquid Leak Detection

Liquid Level Detection

Water Detection

Color Mark Detection

Hot Melt Glue Detection

Ultrasonic

Small / Slim Object Detection

Obstacle Detection

Other Products

**EZ-10**

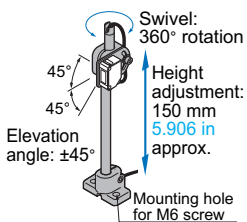
**OPTIONS**

Designation	Model No.	Description	
Round slit mask	<b>OS-CX-05</b> (Slit size $\varnothing 0.5$ mm) $\varnothing 0.020$ in	Slit on one side	• Sensing range: 200 mm <b>7.874 in</b>
		Slit on both sides	• Sensing range: 10 mm <b>0.394 in</b>
	<b>OS-CX-1</b> (Slit size $\varnothing 1$ mm) $\varnothing 0.039$ in	Slit on one side	• Sensing range: 400 mm <b>15.748 in</b>
		Slit on both sides	• Sensing range: 60 mm <b>2.362 in</b>
	<b>OS-CX-2</b> (Slit size $\varnothing 2$ mm) $\varnothing 0.079$ in	Slit on one side	• Sensing range: 1 m <b>3.281 ft</b>
		Slit on both sides	• Sensing range: 250 mm <b>9.843 in</b>
Rectangular slit mask	<b>OS-CX-05×6</b> (Slit size $0.5 \times 6$ mm) $0.020 \times 0.236$ in	Slit on one side	• Sensing range: 800 mm <b>31.496 in</b>
		Slit on both sides	• Sensing range: 250 mm <b>9.843 in</b>
	<b>OS-CX-1×6</b> (Slit size $1 \times 6$ mm) $0.039 \times 0.236$ in	Slit on one side	• Sensing range: 1.3 m <b>4.265 ft</b>
		Slit on both sides	• Sensing range: 600 mm <b>23.622 in</b>
	<b>OS-CX-2×6</b> (Slit size $2 \times 6$ mm) $0.079 \times 0.236$ in	Slit on one side	• Sensing range: 2 m <b>6.562 ft</b>
		Slit on both sides	• Sensing range: 1.3 m <b>4.265 ft</b>
Sensor mounting bracket (Note 1)	<b>MS-CX2-1</b>	Foot angled mounting bracket (Two brackets are required.)	
	<b>MS-CX2-2</b>	Foot biangled mounting bracket (Two brackets are required.)	
	<b>MS-CX2-4</b>	Protective mounting bracket (Two brackets are required.)	
	<b>MS-CX2-5</b>	Back biangled mounting bracket (Two brackets are required.)	
	<b>MS-CX-3</b>	Back angled mounting bracket (Two brackets are required.)	
Universal sensor mounting stand (Note 2)	<b>MS-AJ1</b>	Horizontal mounting type	Basic assembly
	<b>MS-AJ2</b>	Vertical mounting type	
	<b>MS-AJ1-A</b>	Horizontal mounting type	Lateral arm assembly
	<b>MS-AJ2-A</b>	Vertical mounting type	

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.979 for details of the universal sensor mounting stand **MS-AJ** series.

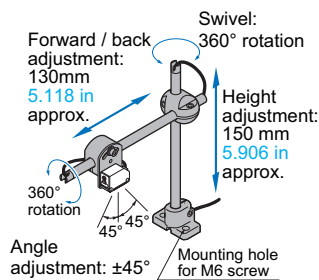
**Universal sensor mounting stand**

• **MS-AJ1**

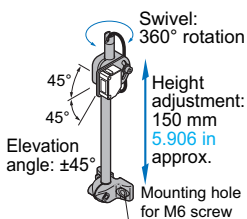


• **MS-AJ1-A**

With the lateral arm, the sensor can sense from above a production line.

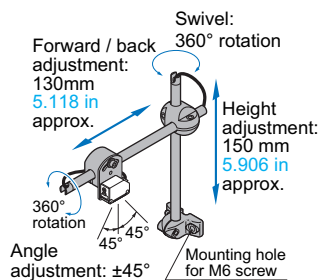


• **MS-AJ2**



• **MS-AJ2-A**

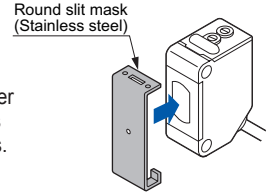
With the lateral arm, the sensor can sense from above a production line.



**Round slit mask**

• **OS-CX-□**

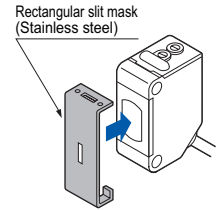
Used for narrowing the beam for cases when detecting water or other substances inside slender pipes. Fitted on the front face of the sensor with one-touch.



**Rectangular slit mask**

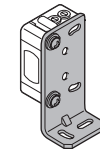
• **OS-CX-□×6**

Used for narrowing the beam for cases when detecting water or other substances inside slender pipes. Fitted on the front face of the sensor with one-touch.



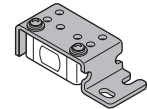
**Sensor mounting bracket**

• **MS-CX2-1**



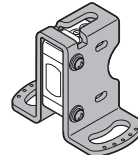
Two M3 (length 12 mm **0.472 in**) screws with washers are attached.

• **MS-CX2-2**



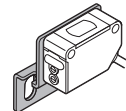
Two M3 (length 12 mm **0.472 in**) screws with washers are attached.

• **MS-CX2-4**



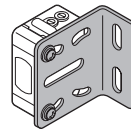
Two M3 (length 14 mm **0.551 in**) screws with washers are attached.

• **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.

- Selection Guide
- Wafer Detection
- Liquid Leak Detection
- Liquid Level Detection
- Water Detection
- Color Mark Detection
- Hot Melt Glue Detection
- Ultrasonic
- Small / Slim Object Detection
- Obstacle Detection
- Other Products

**SPECIFICATIONS**

Item	Type	NPN output	PNP output
	Model No.	<b>EZ-11</b>	<b>EZ-11-PN</b>
Sensing range	5 m <b>16.404 ft</b> (without container or pipe)(Note 2)		
Sensing object	ø12 mm <b>ø0.472 in</b> or more liquid which contains water, or opaque object (Note 3)		
Supply voltage	12 to 24 V DC ±10 % Ripple P-P 10 % or less		
Current consumption	Emitter: 25 mA or less, Receiver: 25 mA or less		
Output	NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage : 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)		PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and V) • Residual voltage: 1.5 V or less (at 100 mA source current) 0.4 V or less (at 16 mA source current)
	Utilization category	DC-12 or DC-13	
	Output operation	Switchable either Light-ON or Dark-ON	
	Short-circuit protection	Incorporated	
Response time	12 ms or less		
Operation indicator	Orange LED (lights up when the output is ON), located on the receiver		
Stability indicator	Green LED (lights up under stable light received condition or stable dark condition), located on the receiver		
Power indicator	Orange LED (lights up when the power is ON), located on the emitter		
Sensitivity adjuster	Continuously variable adjuster		
Environmental resistance	Pollution degree	3 (Industrial environment)	
	Protection	IP67 (IEC)	
	Ambient temperature	0 to +55 °C <b>+32 to +131 °F</b> (No dew condensation or icing allowed), Storage: -30 to +70 °C <b>-22 to +158 °F</b>	
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH	
	Ambient illuminance	Sunlight: 10,000 lx at the light-receiving face, Incandescent light: 3,000 lx at the light-receiving face	
	EMC	EN 50081-2, EN 50082-2, EN 60947-5-2	
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure	
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure	
	Vibration resistance	10 to 500 Hz frequency, 3 mm <b>0.118 in</b> amplitude (20 G max.) in X, Y and Z directions for two hours each	
Shock resistance	500 m/s <sup>2</sup> acceleration (50 G approx.) in X, Y and Z directions for three times each		
Emitting element	Infrared LED (modulated)		
Material	Polycarbonate		
Cable	0.2 mm <sup>2</sup> 3-core (emitter: 2-core) oil resistant cabtyre cable, 2 m, <b>6.562 ft</b> long		
Cable extension	Extension up to total 100 m <b>328.084 ft</b> is possible, for both emitter and receiver, with 0.3 mm <sup>2</sup> , or more, cable.		
Weight	Emitter: 45 g approx., Receiver: 50 g approx.		
Accessory	Adjusting screwdriver: 1 pc.		

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 shortens depending on the thickness, material, color, etc., of the container or pipe.

3) If there are two slit on both sides, the size of those slit represents the min. sensing object.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Wafer Detection

Liquid Leak Detection

Liquid Level Detection

Water Detection

Color Mark Detection

Hot Melt Glue Detection

Ultrasonic

Small / Slim Object Detection

Obstacle Detection

Other Products

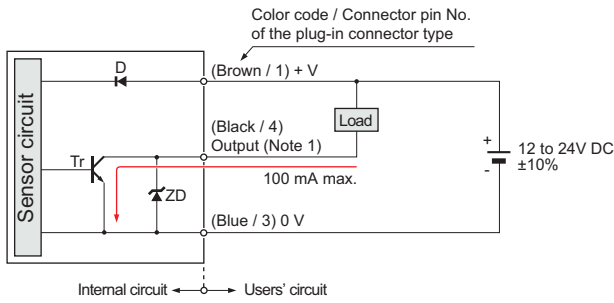
**EZ-10**

- FIBER SENSORS
- LASER SENSORS
- PHOTO-ELECTRIC SENSORS
- MICRO PHOTO-ELECTRIC SENSORS
- AREA SENSORS
- LIGHT CURTAINS / SAFETY COMPONENTS
- PRESSURE / FLOW SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- WIRE-SAVING UNITS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC ELECTRICITY PREVENTION DEVICES
- LASER MARKERS
- PLC
- HUMAN MACHINE INTERFACES
- ENERGY CONSUMPTION VISUALIZATION COMPONENTS
- FA COMPONENTS
- MACHINE VISION SYSTEMS
- UV CURING SYSTEMS
- Selection Guide
- Wafer Detection
- Liquid Leak Detection
- Liquid Level Detection
- Water Detection
- Color Mark Detection
- Hot Melt Glue Detection
- Ultrasonic
- Small / Slim Object Detection
- Obstacle Detection
- Other Products

## I/O CIRCUIT DIAGRAMS

### NPN output type

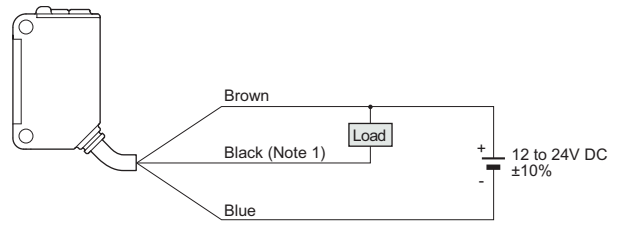
#### I/O circuit diagram



- Notes: 1) The emitter does not incorporate the output.  
 2) When the mating cable is connected to the plug-in connector type sensor, the white wire of the mating cable is not connected.

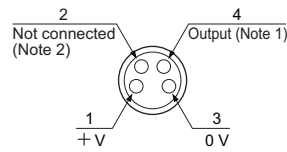
Symbols ... D : Reverse supply polarity protection diode  
 Zd: Surge absorption zener diode  
 Tr : NPN output transistor

#### Wiring diagram



Note: The emitter does not incorporate the black wire.

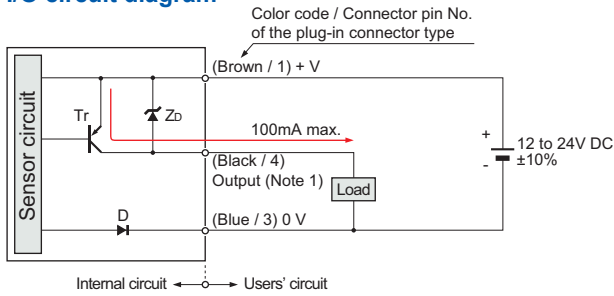
#### Connector pin position (plug-in connector type)



- Notes: 1) The emitter does not incorporate the output.  
 2) When the mating cable is connected to the plug-in connector type sensor, the white wire of the mating cable is not connected.

### PNP output type

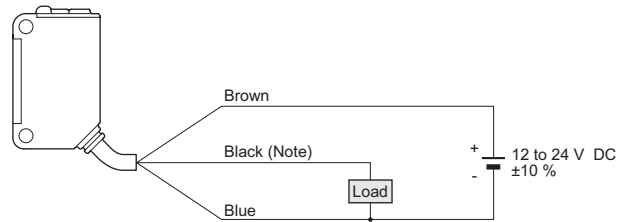
#### I/O circuit diagram



- Notes: 1) The emitter does not incorporate the output.  
 2) When the mating cable is connected to the plug-in connector type sensor, the white wire of the mating cable is not connected.

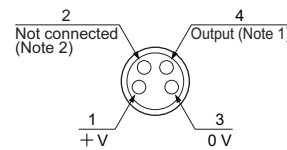
Symbols ... D : Reverse supply polarity protection diode  
 Zd: Surge absorption zener diode  
 Tr : PNP output transistor

#### Wiring diagram



Note: The emitter does not incorporate the black wire.

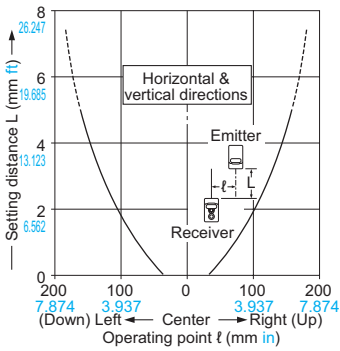
#### Connector pin position (plug-in connector type)



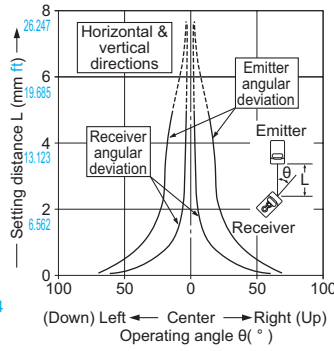
- Notes: 1) The emitter does not incorporate the output.  
 2) When the mating cable is connected to the plug-in connector type sensor, the white wire of the mating cable is not connected.

**SENSING CHARACTERISTICS (TYPICAL)**

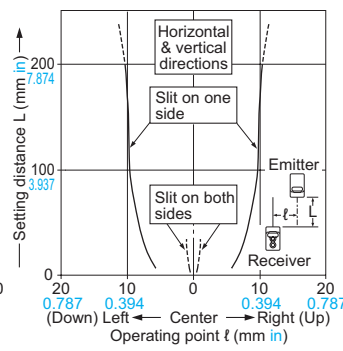
**Parallel deviation**



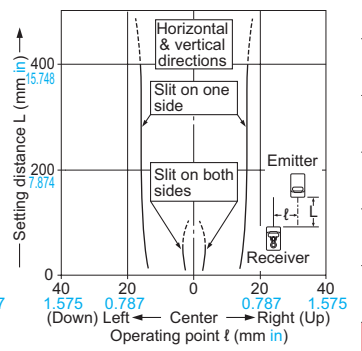
**Angular deviation**



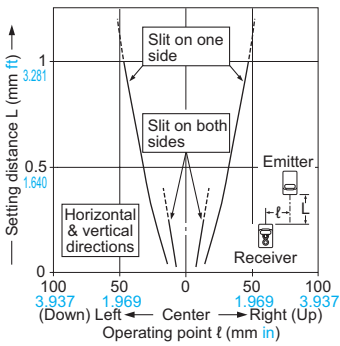
**Parallel deviation with round slit masks (ø0.5 mm ø0.020 in)**



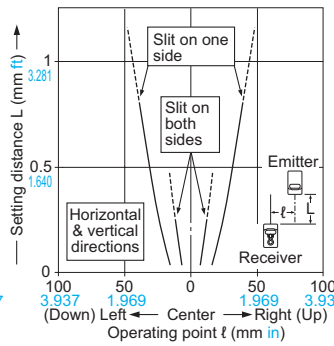
**Parallel deviation with round slit masks (ø1 mm ø0.039 in)**



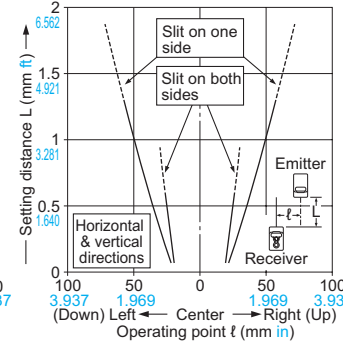
**Parallel deviation with round slit masks (ø2 mm ø0.079 in)**



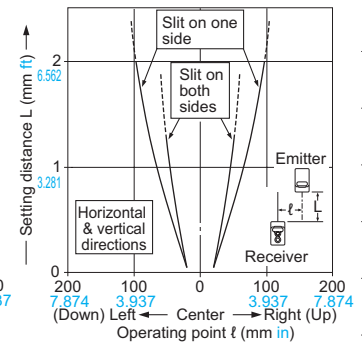
**Parallel deviation with rectangular slit masks (0.5x6 mm 0.020x0.236 in)**



**Parallel deviation with rectangular slit masks (1x6 mm 0.039x0.236 in)**



**Parallel deviation with rectangular slit masks (2x6 mm 0.079x0.236 in)**



**PRECAUTIONS FOR PROPER USE**

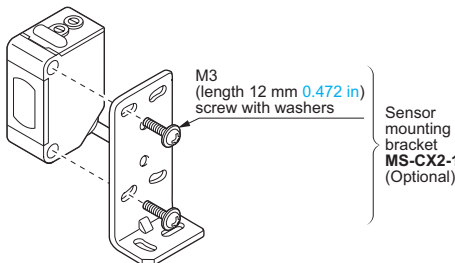
Refer to p.1458~ for general precautions.



- 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.

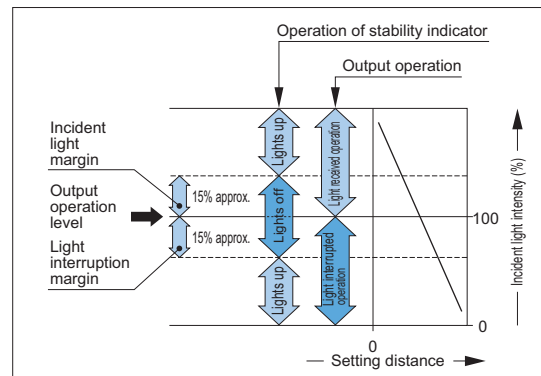


**Wiring**

- When connecting the mating cable to the plug-in connector type sensor, the tightening torque should be 0.4 N·m or less.

**Stability indicator**

- The stability indicator (green) lights up when the incident light intensity has sufficient margin with respect to the operation level. If the incident light intensity level is such that the stability indicator lights up, stable sensing can be done without the light received operation and the light interrupted operation being affected by a change in ambient temperature or supply voltage.



**Others**

- Because these units use special emitter and receiver elements, they are susceptible to the effects of operating ambient temperature and humidity. Sensitivity adjustment should be performed in the environment in which they will actually be used.
- Do not use during the initial transient time (100 ms) after the power supply is switched on.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Wafer Detection

Liquid Leak Detection

Liquid Level Detection

Water Detection

Color Mark Detection

Hot Melt Glue Detection

Ultrasonic

Small / Slim Object Detection

Obstacle Detection

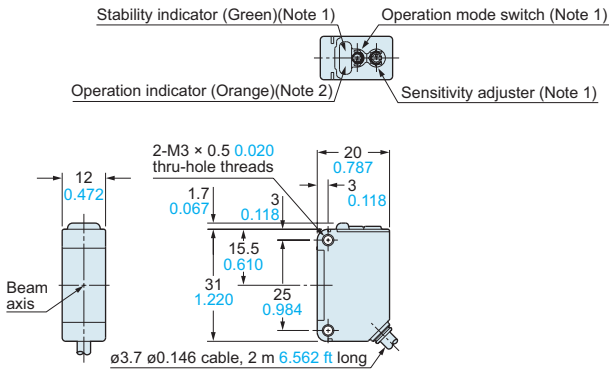
Other Products

EZ-10

**DIMENSIONS (Unit: mm in)**

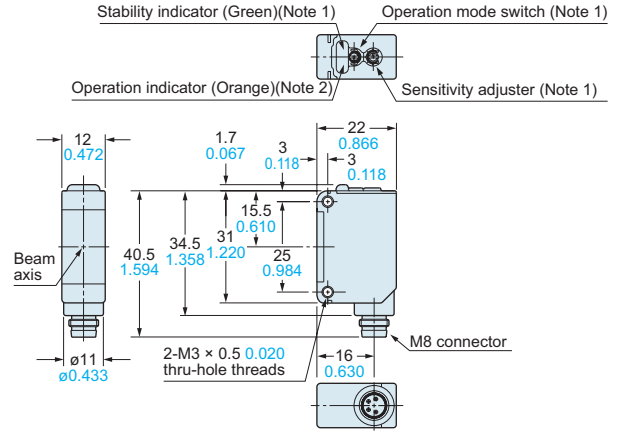
The CAD data in the dimensions can be downloaded from our website.

**EZ-11 EZ-11-PN** Sensor



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

**EZ-11-J EZ-11-PN-J** Sensor

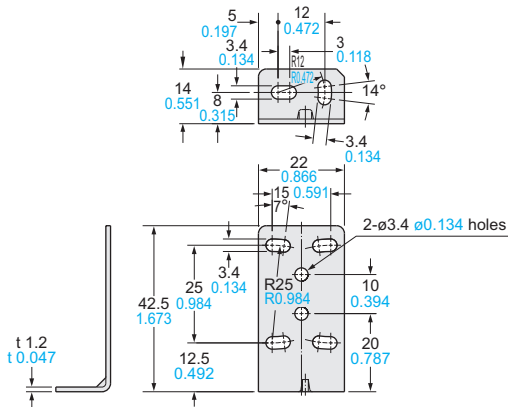


Notes: 1) Not incorporated on the emitter.  
 2) It is the power indicator (orange) on the emitter.

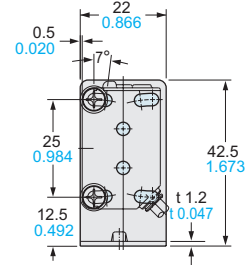
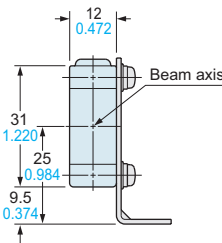
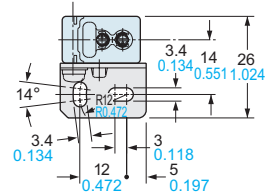
**MS-CX2-1** Sensor mounting bracket (Optional)

**Assembly dimensions**

Mounting drawing with the receiver of **EZ-11(-PN)**



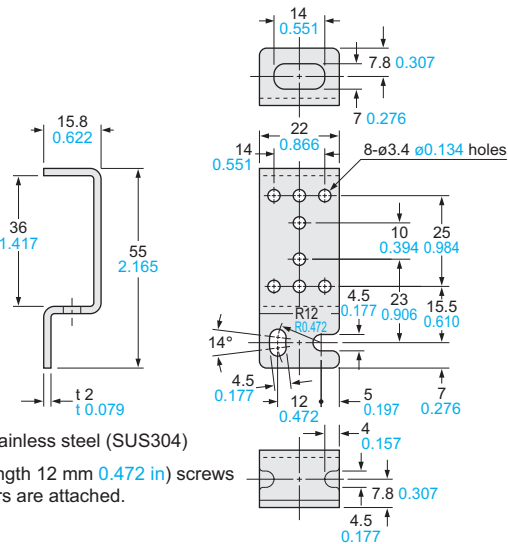
Material: Stainless steel (SUS304)  
 Two M3 (length 12 mm 0.472 in) screws with washers are attached.



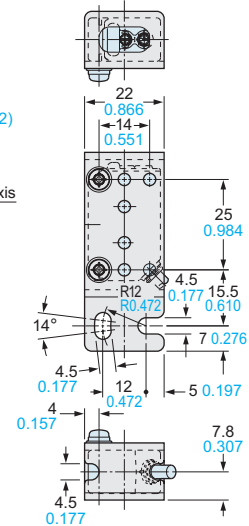
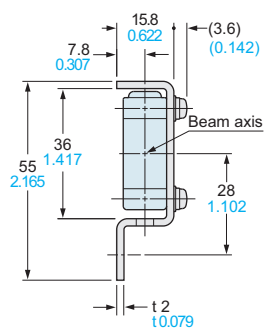
**MS-CX2-2** Sensor mounting bracket (Optional)

**Assembly dimensions**

Mounting drawing with the receiver of **EZ-11(-PN)**



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

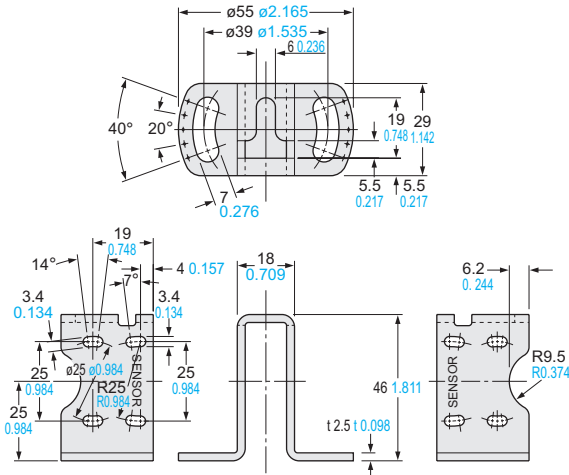


**DIMENSIONS (Unit: mm in)**

The CAD data in the dimensions can be downloaded from our website.

**MS-CX2-4**

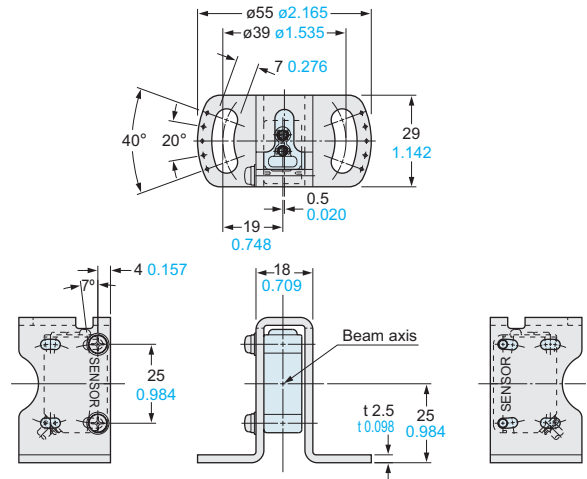
Sensor mounting bracket (Optional)



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

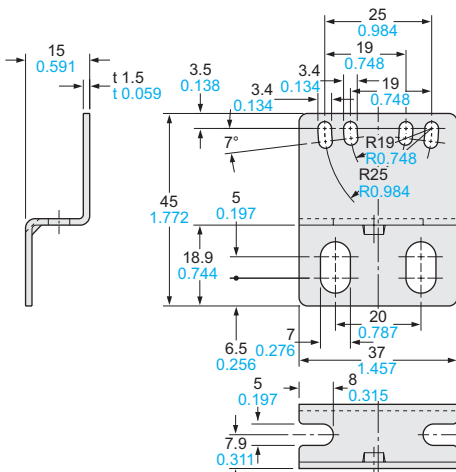
**Assembly dimensions**

Mounting drawing with the receiver of EZ-11(-PN)



**MS-CX2-5**

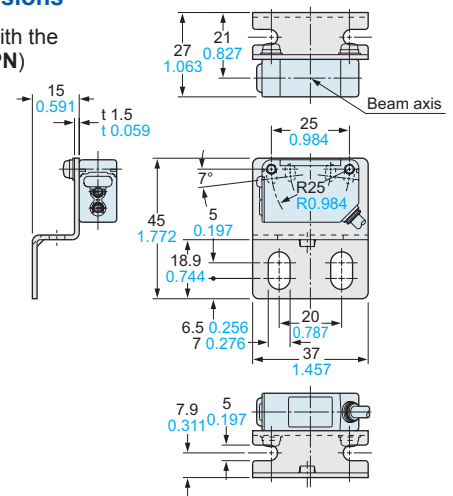
Sensor mounting bracket (Optional)



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

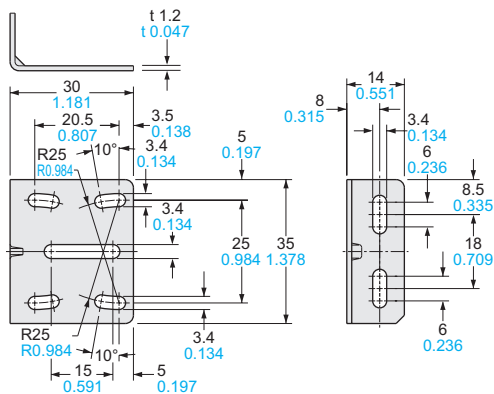
**Assembly dimensions**

Mounting drawing with the receiver of EZ-11(-PN)



**MS-CX-3**

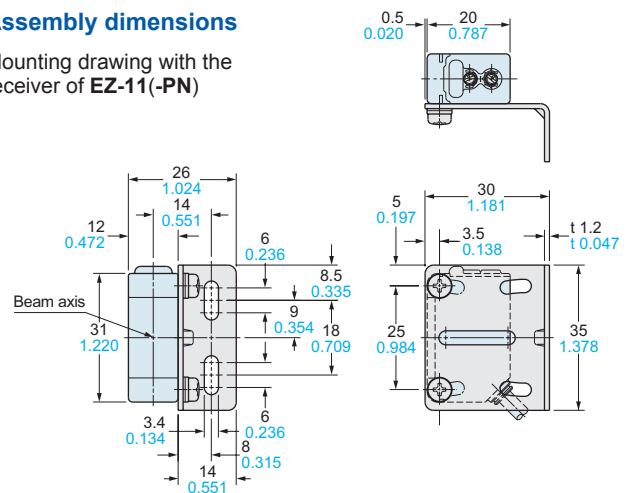
Sensor mounting bracket (Optional)



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

**Assembly dimensions**

Mounting drawing with the receiver of EZ-11(-PN)



FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS / SAFETY COMPONENTS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SMILE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC ELECTRICITY PREVENTION DEVICES

LASER MARKERS

PLC

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Wafer Detection

Liquid Leak Detection

Liquid Level Detection

Water Detection

Color Mark Detection

Hot Melt Glue Detection

Ultrasonic

Small / Slim Object Detection

Obstacle Detection

Other Products

**EZ-10**