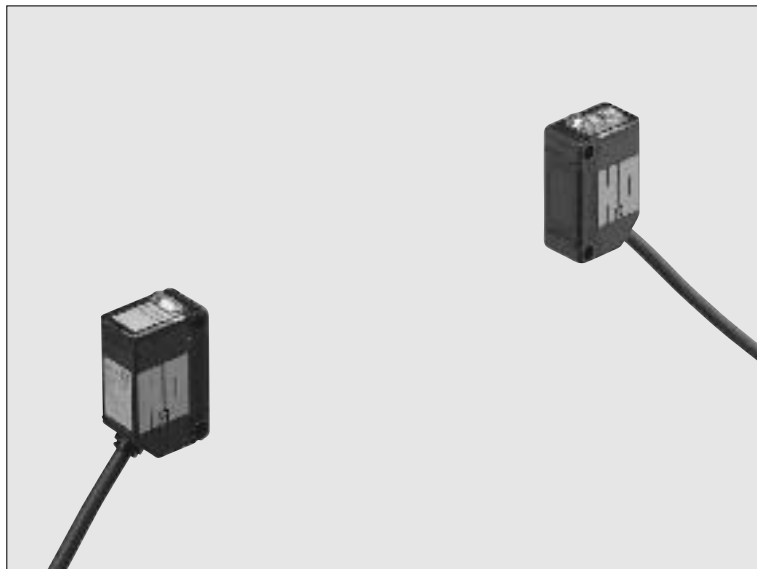


# EZ-10

SERIES

## Water Detection Sensor



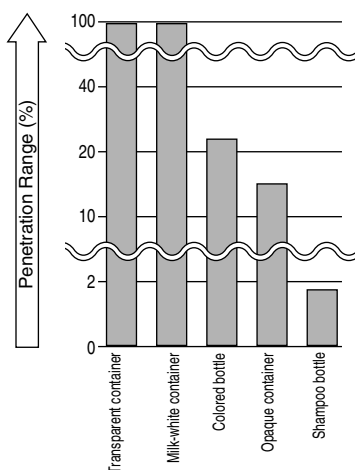
**Detects Water reliably**

**CE Marked**  
Conforming to EMC Directive

### 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.

Comparison of Penetration Ranges for Empty Containers

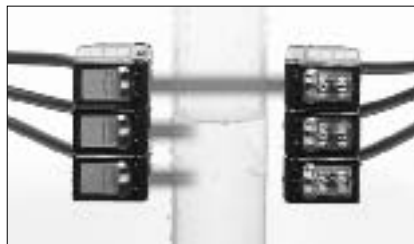


The above graph is to be used as a guideline only. Actual penetration range will vary depending on the material composition, thickness and color of the container. It is recommended that penetration range be tested and confirmed prior to application. Please contact our nearest office for more

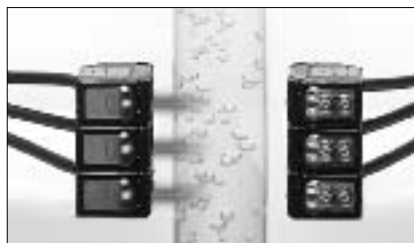
### Not Affected by Drops, Bubbles or Froth

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.

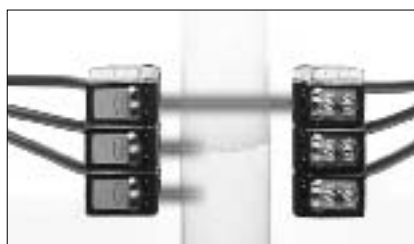
#### Water drops



#### Bubbles



#### Froth



### 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.

### IP67 protection

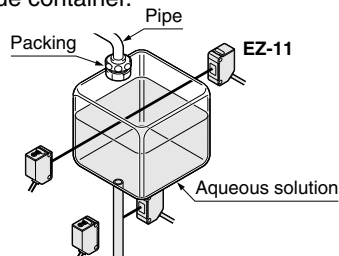
The sensor can be hosed down because of its IP67 construction and the non-corrosive stainless steel sensor mounting bracket.

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

## APPLICATIONS

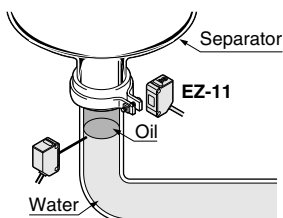
### Detecting level of aqueous solution in resin tank

It can reliably detect a liquid even in an opaque container.



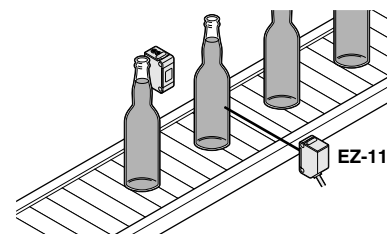
### Detecting the boundary between water and oil

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.       | Output                        |
|------------|------------|--------------------------------|-----------------|-------------------------------|
| NPN output |            | 5m (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).**

Note 1: The sensing range shortens depending on the thickness, material, color, etc., of the container or pipe.

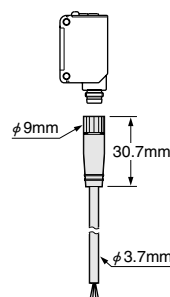
### Plug-in connector type

Plug-in connector type is available (Standard is cable type). When ordering this type, add suffix '-J' to the model No. (e.g.) Plug-in connector type of **EZ-11-PN** is '**EZ-11-PN-J**'.

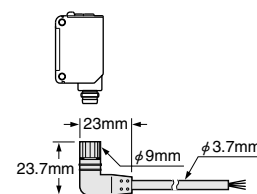
### • Mating cable (2 Nos. are required)

| Type     | Model No.         | Description   |
|----------|-------------------|---|
| Straight | <b>CN-24E-C2</b>  | Length: 2m<br>0.2mm <sup>2</sup> 4-core cabtyre cable with connector on one end |
|          | <b>CN-24E-C5</b>  | Length: 5m  |
| Elbow    | <b>CN-24EL-C2</b> | Length: 2m<br>Cable outer diameter: $\phi 3.7\text{mm}$                         |
|          | <b>CN-24EL-C5</b> | Length: 5m  |

### • CN-24E-C2, CN-24E-C5



### • CN-24EL-C2, CN-24EL-C5



# EZ-10

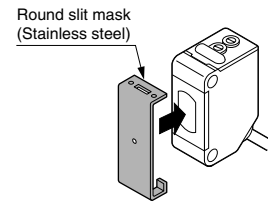
## OPTIONS

| Designation                      | Model No.                                    | Description  |
|----------------------------------|--|--|
| Round slit mask                  | <b>OS-CX-05</b><br>(Slit size $\phi$ 0.5mm)  | Slit on one side • Sensing range: 200mm                        |
|                                  |  | Slit on both sides • Sensing range: 10mm                       |
|                                  | <b>OS-CX-1</b><br>(Slit size $\phi$ 1mm)     | Slit on one side • Sensing range: 400mm                        |
|                                  |  | Slit on both sides • Sensing range: 60mm                       |
|                                  | <b>OS-CX-2</b><br>(Slit size $\phi$ 2mm)     | Slit on one side • Sensing range: 1m                           |
|                                  |  | Slit on both sides • Sensing range: 250mm                      |
| Rectangular slit mask            | <b>OS-CX-05 × 6</b><br>(Slit size 0.5 × 6mm) | Slit on one side • Sensing range: 800mm                        |
|                                  |  | Slit on both sides • Sensing range: 250mm                      |
|                                  | <b>OS-CX-1 × 6</b><br>(Slit size 1 × 6mm)    | Slit on one side • Sensing range: 1.3m                         |
|                                  |  | Slit on both sides • Sensing range: 600mm                      |
|                                  | <b>OS-CX-2 × 6</b><br>(Slit size 2 × 6mm)    | Slit on one side • Sensing range: 2m                           |
|                                  |  | Slit on both sides • Sensing range: 1.3m                       |
| Sensor mounting bracket (Note 1) | <b>MS-CX2-1</b>                              | Foot angled mounting bracket<br>(Two brackets are required.)   |
|                                  | <b>MS-CX2-2</b>                              | Foot biangled mounting bracket<br>(Two brackets are required.) |
|                                  | <b>MS-CX2-4</b>                              | Protective mounting bracket<br>(Two brackets are required.)    |
|                                  | <b>MS-CX2-5</b>                              | Back biangled mounting bracket<br>(Two brackets are required.) |
|                                  | <b>MS-CX-3</b>                               | Back angled mounting bracket<br>(Two brackets are required.)   |
| Universal sensor mounting stand  | <b>MS-AJ</b>                                 | Basic assembly   |
|                                  | <b>MS-AJ-A</b>                               | Lateral arm assembly   |

Notes: 1) The plug-in connector type sensor does not allow use of some sensor mounting brackets because of the protrusion of the connector.

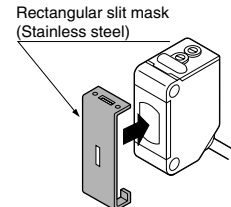
### Round slit mask

Fitted on the front face of the sensor with one-touch.



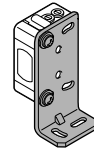
### Rectangular slit mask

Fitted on the front face of the sensor with one-touch.



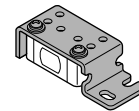
### Sensor mounting bracket

#### • MS-CX2-1



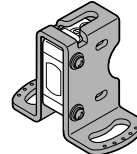
Two M3 (length 12mm) screws with washers are attached.

#### • MS-CX2-2



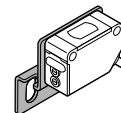
Two M3 (length 12mm) screws with washers are attached.

#### • MS-CX2-4



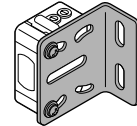
Two M3 (length 14mm) screws with washers are attached.

#### • MS-CX2-5



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

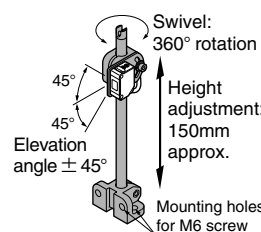
#### • MS-CX-3



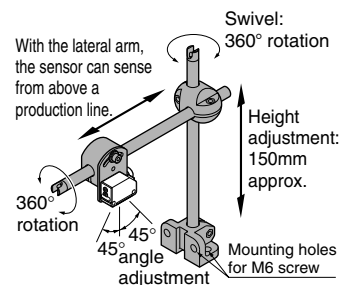
Two M3 (length 12mm) screws with washers are attached.

### Universal sensor mounting stand

#### • MS-AJ



#### • MS-AJ-A



## SPECIFICATIONS

| Item                     | Type                     | NPN output  | PNP output   |
|--------------------------|--------------------------|---|--|
|                          | Model No.                | EZ-11   | EZ-11-PN   |
| Sensing range            |                          | 5m (without container or pipe) (Note)   |  |
| Sensing object           |                          | φ 12mm or more liquid which contains water, or opaque object  |  |
| Supply voltage           |                          | 12 to 24V DC ± 10% Ripple P-P 10% or less   |  |
| Current consumption      |                          | Emitter: 25mA or less, Receiver: 25mA or less   |  |
| Output                   |                          | NPN open-collector transistor<br><ul style="list-style-type: none"> <li>• Maximum sink current: 100mA</li> <li>• Applied voltage: 30V DC or less (between output and 0V)</li> <li>• Residual voltage: 1.5V or less (at 100mA sink current)<br/>0.4V or less (at 16mA sink current)</li> </ul> | PNP open-collector transistor<br><ul style="list-style-type: none"> <li>• Maximum source current: 100mA</li> <li>• Applied voltage: 30V DC or less (between output and + V)</li> <li>• Residual voltage: 1.5V or less (at 100mA source current)<br/>0.4V or less (at 16mA source current)</li> </ul> |
|                          | Utilization category     | DC-12 or DC-13  |  |
|                          | Output operation         | Switchable either Light-ON or Dark-ON   |  |
|                          | Short-circuit protection | Incorporated  |  |
| Response time            |                          | 12ms 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 (No dew condensation or icing allowed), Storage: - 30 to + 70°C   |  |
|                          | 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                      | Emission: EN50081-2, Immunity: EN50082-2  |  |
|                          | Voltage withstandability | 1,000V AC for one min. between all supply terminals connected together and enclosure  |  |
|                          | Insulation resistance    | 20MΩ, or more, with 250V DC megger between all supply terminals connected together and enclosure  |  |
|                          | Vibration resistance     | 10 to 500Hz frequency, 3mm amplitude (20G max.) in X, Y and Z directions for two hours each   |  |
|                          | Shock resistance         | 500m/s <sup>2</sup> acceleration (50G approx.) in X, Y and Z directions for three times each  |  |
| Emitting element         |                          | Infrared LED (modulated)  |  |
| Material                 |                          | Polycarbonate   |  |
| Cable                    |                          | 0.2mm <sup>2</sup> 3-core (emitter: 2-core) oil resistant cable, 2m long  |  |
| Cable extension          |                          | Extension up to total 100m is possible, for both emitter and receiver, with 0.3mm <sup>2</sup> , or more, cable.  |  |
| Weight                   |                          | Emitter: 45g approx., Receiver: 50g approx.   |  |
| Accessory                |                          | Adjusting screwdriver: 1 No.  |  |

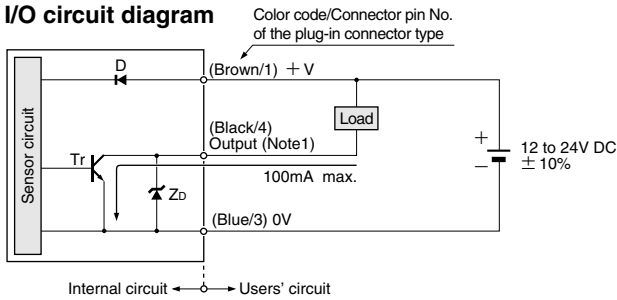
Note: The sensing range shortens depending on the thickness, material, color, etc., of the container or pipe.

# EZ-10

## I/O CIRCUIT DIAGRAMS

### NPN output type

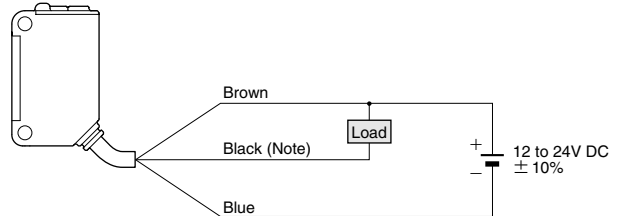
#### I/O circuit diagram



- 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.

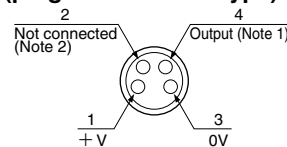
Symbols ... D: Reverse supply polarity protection diode  
 Zd: Surge absorption zener diode  
 Tr: NPN output transistor

#### Wiring diagram



Note: The emitter does not incorporate the black wire.

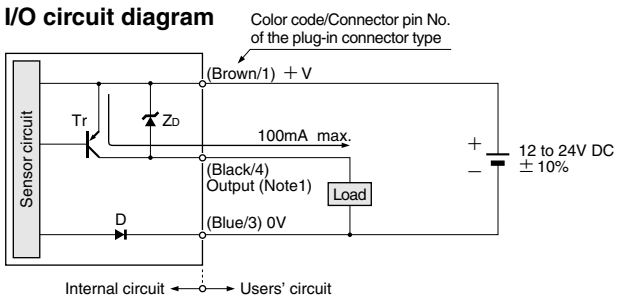
#### Connector pin position (plug-in connector type)



- 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

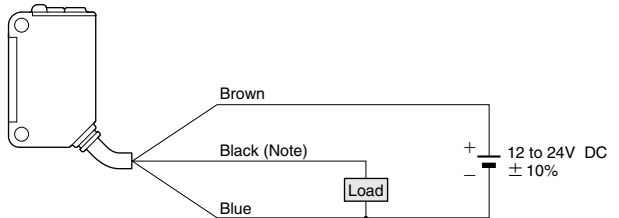
#### I/O circuit diagram



- 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.

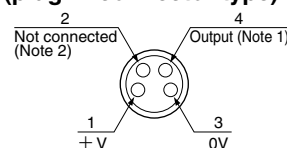
Symbols ... D: Reverse supply polarity protection diode  
 Zd: Surge absorption zener diode  
 Tr: PNP output transistor

#### Wiring diagram



Note: The emitter does not incorporate the black wire.

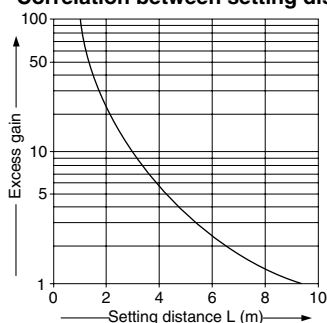
#### Connector pin position (plug-in connector type)



- 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.

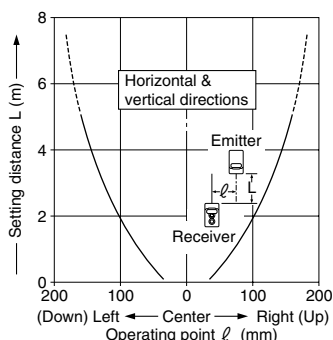
## SENSING CHARACTERISTICS (TYPICAL)

### Correlation between setting distance and excess gain

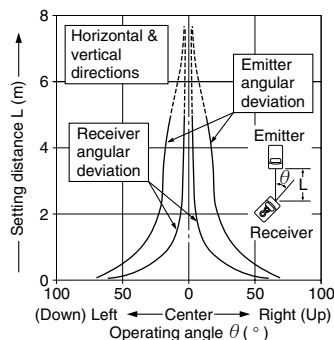


## SENSING CHARACTERISTICS (TYPICAL)

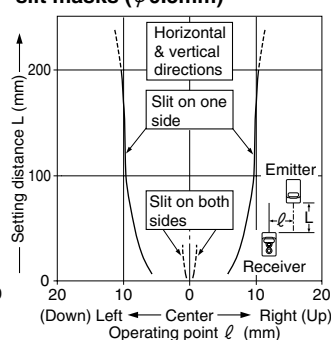
**Parallel deviation**



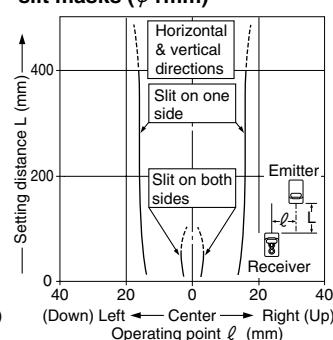
**Angular deviation**



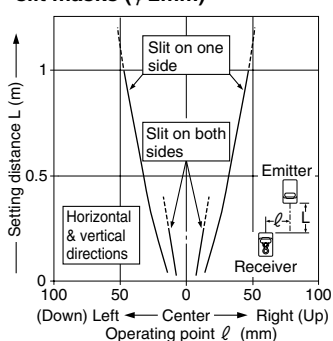
**Parallel deviation with round slit masks (φ 0.5mm)**



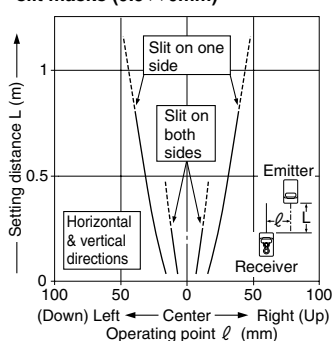
**Parallel deviation with round slit masks (φ 1mm)**



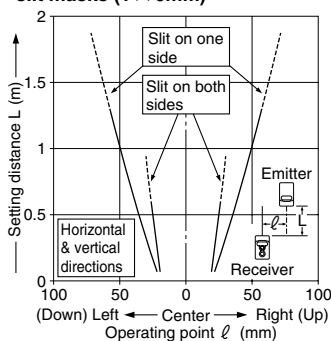
**Parallel deviation with round slit masks (φ 2mm)**



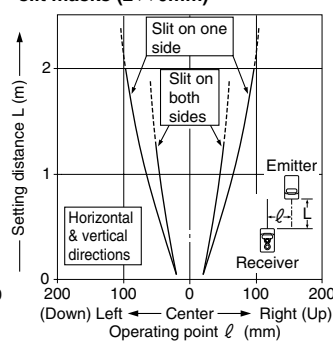
**Parallel deviation with rectangular slit masks (0.5 X 6mm)**



**Parallel deviation with rectangular slit masks (1 X 6mm)**



**Parallel deviation with rectangular slit masks (2 X 6mm)**



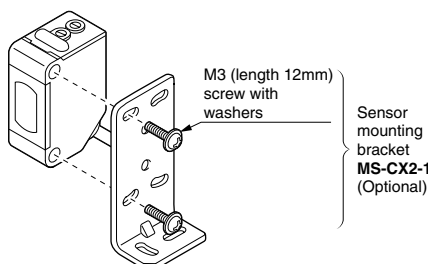
## PRECAUTIONS FOR PROPER USE



This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

### Mounting

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



### Operation mode switch

| Operation mode switch | Operation  |
|-----------------------|--|
|                       | Light-ON mode is obtained when the switch is turned fully counterclockwise (L side). |
|                       | Dark-ON mode is obtained when the switch is turned fully clockwise (D side).         |

### Others

- Do not use during the initial transient time (100ms) after the power supply is switched on.
- When connecting the mating cable to the plug-in connector type sensor, the tightening torque should be 0.4N·m or less.

### Sensitivity adjustment

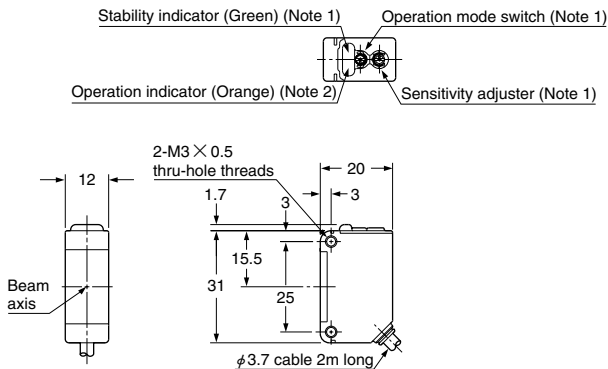
| Step | Sensitivity adjuster | Operation   |
|------|----------------------|---|
| ①    |                      | Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position, MIN.  |
| ②    |                      | With the liquid which contains water or the opaque object absent (light received condition), turn the sensitivity adjuster slowly clockwise and confirm the point (A) where the sensor enters the 'Light' state operation.  |
| ③    |                      | With the liquid which contains water or the opaque object present (light interrupted condition), turn the sensitivity adjuster further clockwise until the sensor enters the 'Light' state operation and then bring it back to confirm point (B) where the sensor just returns to the 'Dark' state operation.<br>(If the sensor does not enter the 'Light' state operation even when the sensitivity adjuster is turned fully clockwise, this extreme position is point (B).) |
| ④    |                      | The position at the middle of points (A) and (B) is the optimum sensing position.   |

- Notes: 1) Use the accessory adjusting screwdriver to slowly turn the adjuster. Turning with excessive force will cause damage to the adjuster.  
2) Special emitting and receiving devices are used in this product. As they are easily affected by changes in ambient temperature and humidity, do the sensitivity adjustment under the actual operating conditions.

# EZ-10

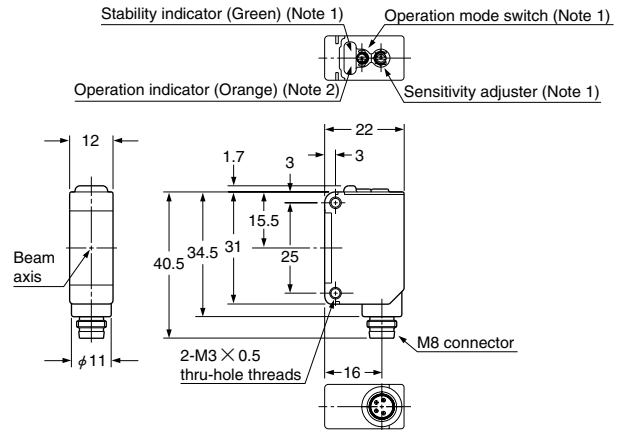
## DIMENSIONS (Unit: mm)

### EZ-11(-PN) Sensor



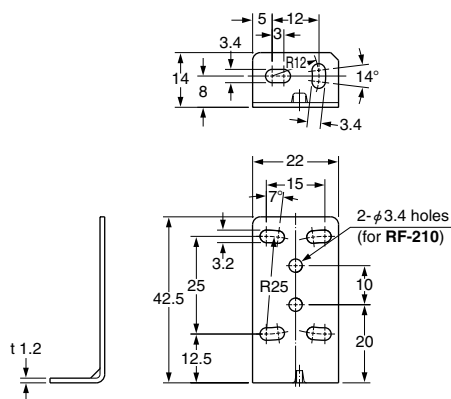
Notes: 1) Not incorporated on the emitter.  
2) It is the power indicator (orange) on the emitter.

### EZ-11(-PN)-J Sensor



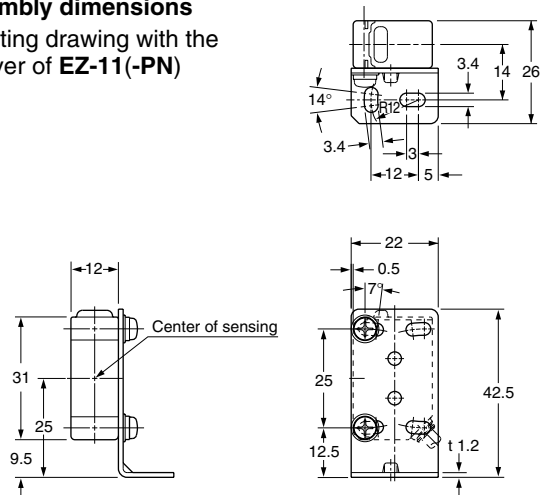
Notes: 1) Not incorporated on the emitter.  
2) It is the power indicator (orange) on the emitter.

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

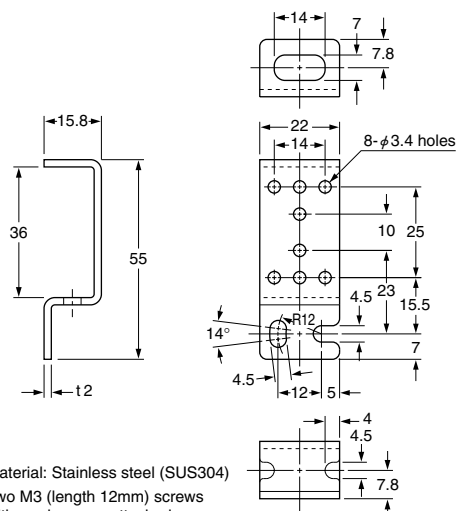


Material: Stainless steel (SUS304)  
Two M3 (length 12mm) screws with washers are attached.

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

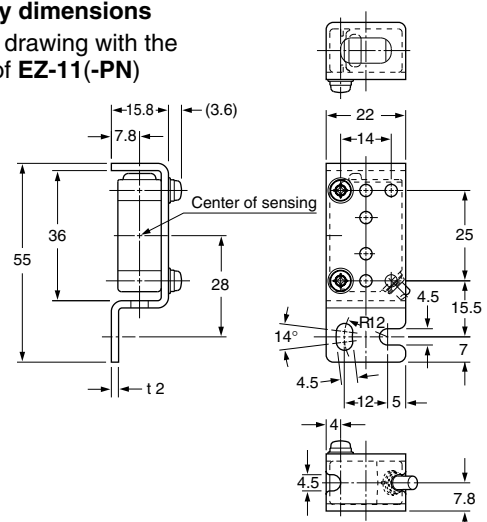


### MS-CX2-2 Sensor mounting bracket (Optional)



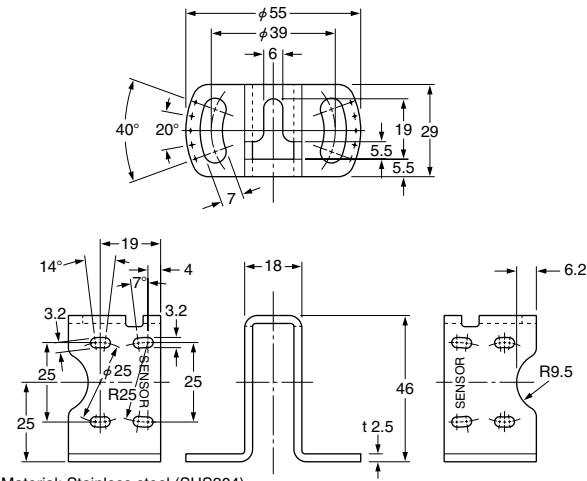
Material: Stainless steel (SUS304)  
Two M3 (length 12mm) screws with washers are attached.

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



## DIMENSIONS (Unit: mm)

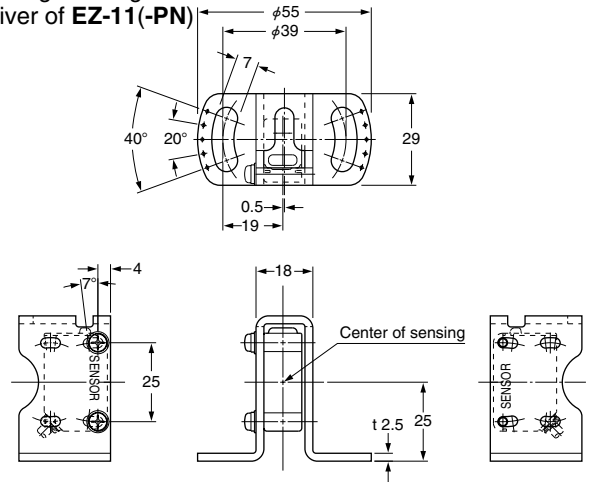
### MS-CX2-4 Sensor mounting bracket (Optional)



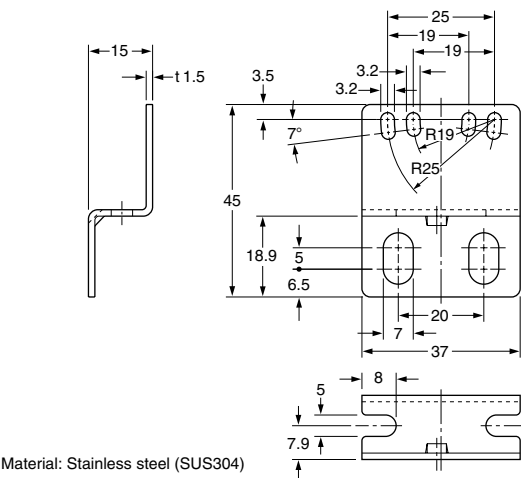
Material: Stainless steel (SUS304)  
Two M3 (length 14mm) screws with washers are attached.

### Assembly dimensions

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



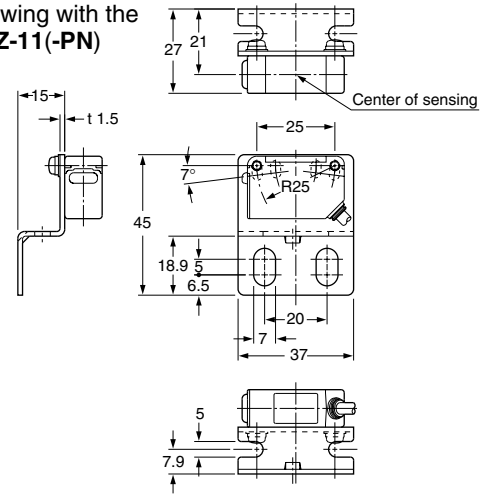
### MS-CX2-5 Sensor mounting bracket (Optional)



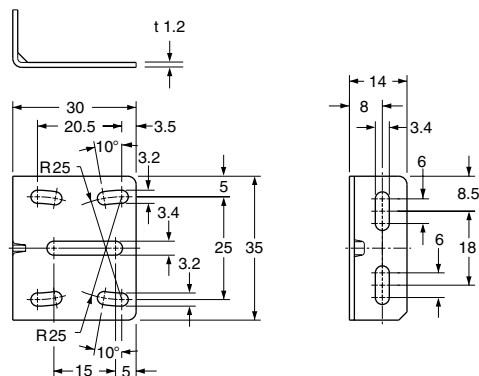
Material: Stainless steel (SUS304)  
Two M3 (length 12mm) screws with washers are attached.

### 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 12mm) screws with washers are attached.

### Assembly dimensions

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

