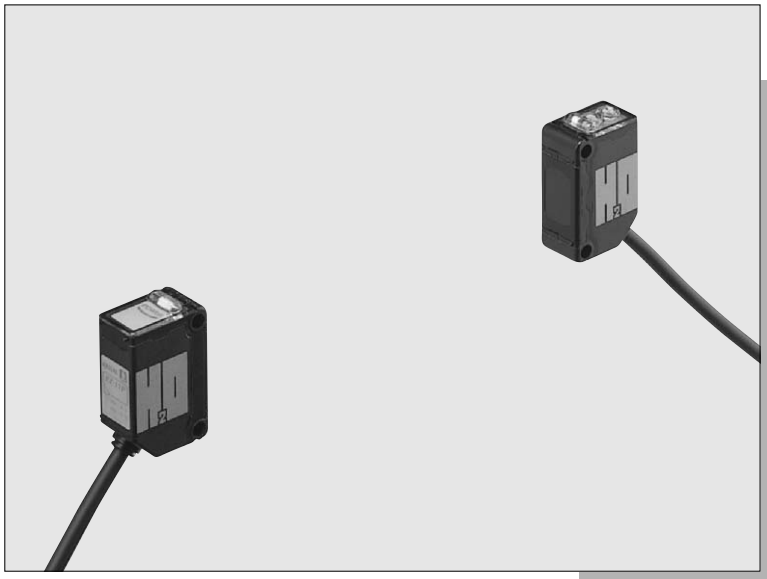
EZ-10 SERIES
Water Detection Sensor



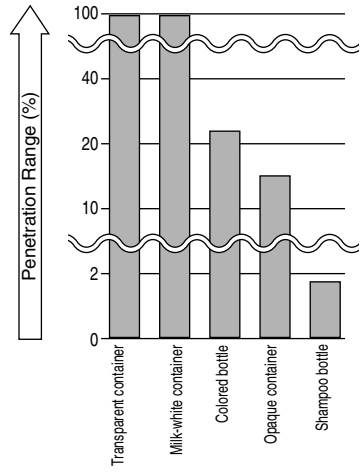
Detects Water reliably

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

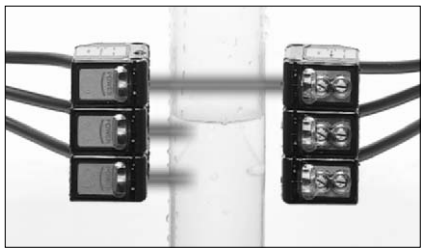


The above graph is to be used as a guideline only. Actual penetration range will vary depending on the material composition, thickness and color of the container. It is recommended that penetration range be tested and confirmed prior to application. Please contact our nearest office for more information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

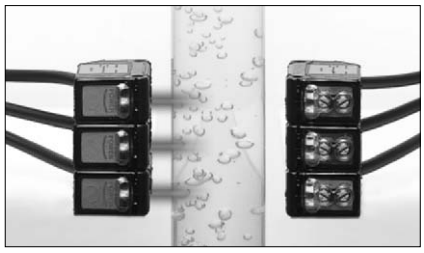
Not Affected by Drops, Bubbles or Froth

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.

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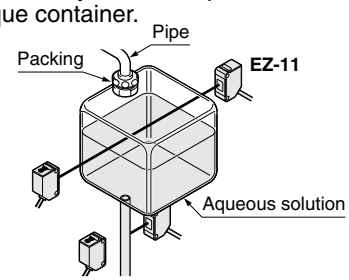
APPLICATIONS

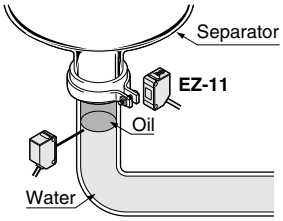
Detecting level of aqueous solution in resin tank

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



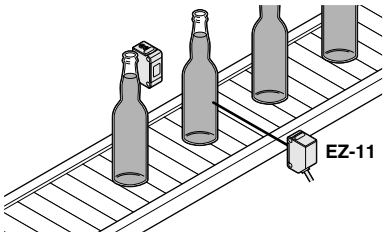
Detecting the boundary between water and oil

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

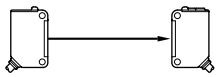


Detecting presence of liquid in colored bottle

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)	**EZ-11**	NPN open-collector transistor
PNP output			**EZ-11-PN**	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.

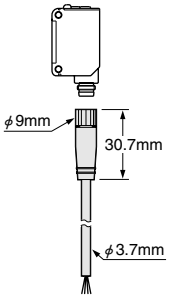
Plug-in connector type

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**'.

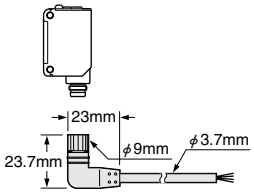
• Mating cable (2 Nos. are required)

Type	Model No.	Description	
Straight	**CN-24E-C2**	Length: 2m	0.2mm² 4-core cabtyre cable with connector on one end Cable outer diameter: ϕ3.7mm
	CN-24E-C5	Length: 5m	
Elbow	**CN-24EL-C2**	Length: 2m	
	CN-24EL-C5	Length: 5m	

• CN-24E-C2, CN-24E-C5



• CN-24EL-C2, CN-24EL-C5



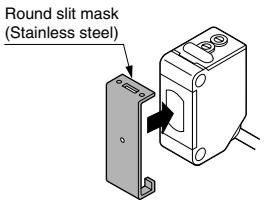
OPTIONS

Designation	Model No.	Description
Round slit mask	**OS-CX-05** (Slit size ϕ0.5mm)	Slit on one side • Sensing range: 200mm
		Slit on both sides • Sensing range: 10mm
	OS-CX-1 (Slit size ϕ1mm)	Slit on one side • Sensing range: 400mm
		Slit on both sides • Sensing range: 60mm
	OS-CX-2 (Slit size ϕ2mm)	Slit on one side • Sensing range: 1m
		Slit on both sides • Sensing range: 250mm
Rectangular slit mask	**OS-CX-05×6** (Slit size 0.5×6mm)	Slit on one side • Sensing range: 800mm
		Slit on both sides • Sensing range: 250mm
	OS-CX-1×6 (Slit size 1×6mm)	Slit on one side • Sensing range: 1.3m
		Slit on both sides • Sensing range: 600mm
	OS-CX-2×6 (Slit size 2×6mm)	Slit on one side • Sensing range: 2m
		Slit on both sides • Sensing range: 1.3m
Sensor mounting bracket (Note 1)	**MS-CX2-1**	Foot angled mounting bracket (Two brackets are required.)
	MS-CX2-2	Foot biangled mounting bracket (Two brackets are required.)
	MS-CX2-4	Protective mounting bracket (Two brackets are required.)
	MS-CX2-5	Back biangled mounting bracket (Two brackets are required.)
	MS-CX-3	Back angled mounting bracket (Two brackets are required.)
Universal sensor mounting stand	**MS-AJ**	Basic assembly
	MS-AJ-A	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.

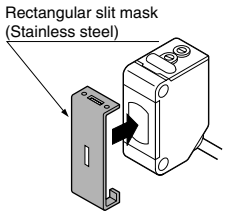
Round slit mask

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



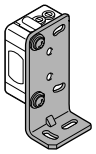
Rectangular slit mask

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



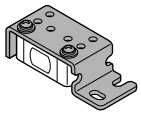
Sensor mounting bracket

• MS-CX2-1



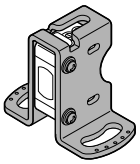
Two M3 (length 12mm) screws with washers are attached.

• MS-CX2-2



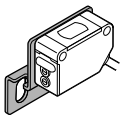
Two M3 (length 12mm) screws with washers are attached.

• MS-CX2-4



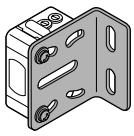
Two M3 (length 14mm) screws with washers are attached.

• MS-CX2-5



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

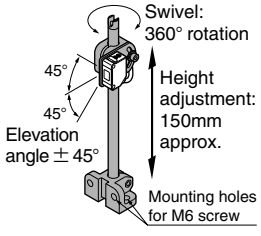
• MS-CX-3



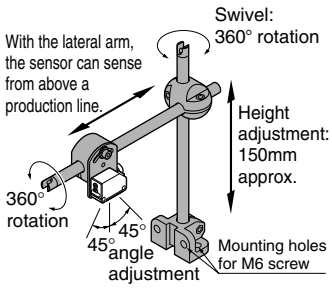
Two M3 (length 12mm) screws with washers are attached.

Universal sensor mounting stand

• MS-AJ



• MS-AJ-A



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SPECIFICATIONS

Item \ Type		NPN output	PNP output
Model No.		**EZ-11**	**EZ-11-PN**
Sensing range		5m (without container or pipe) (Note)	
Sensing object		ϕ12mm 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 • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between output and 0V) • Residual voltage: 1.5V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)	PNP open-collector transistor • Maximum source current: 100mA • Applied voltage: 30V DC or less (between output and + V) • Residual voltage: 1.5V or less (at 100mA source current) 0.4V or less (at 16mA source current)
	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^2 acceleration (50G approx.) in X, Y and Z directions for three times each	
Emitting element		Infrared LED (modulated)	
Material		Polycarbonate	
Cable		0.2mm^2 3-core (emitter: 2-core) oil resistant cabtyre cable, 2m long	
Cable extension		Extension up to total 100m is possible, for both emitter and receiver, with 0.3mm^2, or more, cable.	
Weight		Emitter: 45g approx., Receiver: 50g approx.	
Accessory		Adjusting screwdriver: 1 No.	

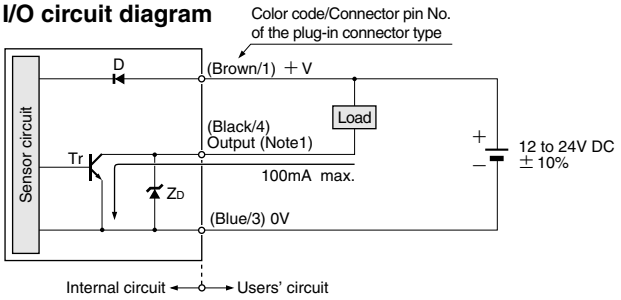
Note: The sensing range shortens depending on the thickness, material, color, etc., of the container or pipe.

EZ-10

I/O CIRCUIT DIAGRAMS

NPN output type

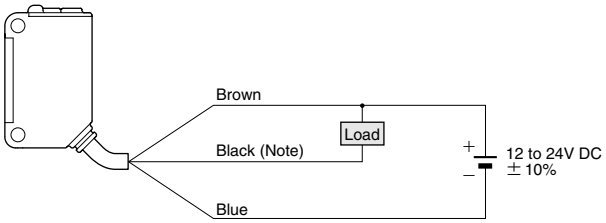
I/O circuit diagram



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.

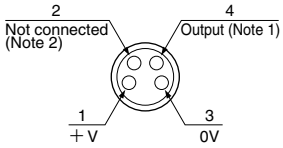
Symbols ... D: Reverse supply polarity protection diode
ZD: Surge absorption zener diode
Tr : NPN output transistor

Wiring diagram



Note: The emitter does not incorporate the black wire.

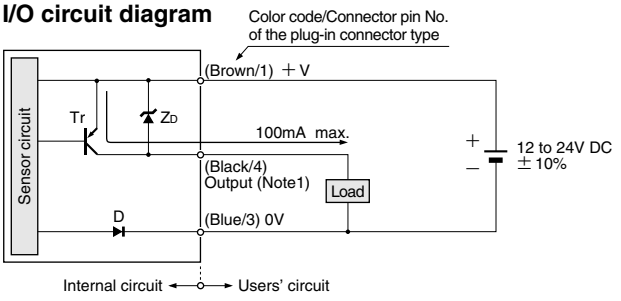
Connector pin position (plug-in connector type)



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

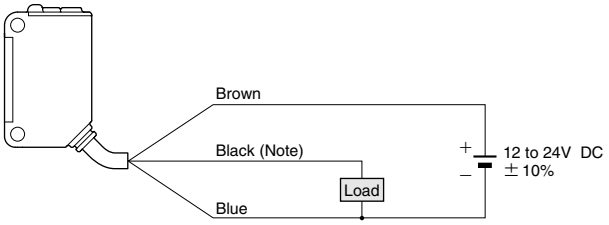
I/O circuit diagram



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.

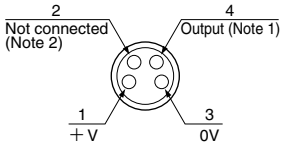
Symbols ... D: Reverse supply polarity protection diode
ZD: Surge absorption zener diode
Tr : PNP output transistor

Wiring diagram



Note: The emitter does not incorporate the black wire.

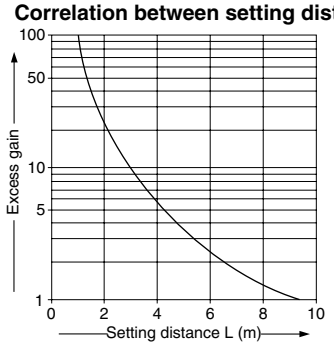
Connector pin position (plug-in connector type)



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



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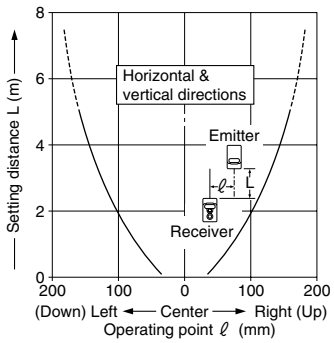
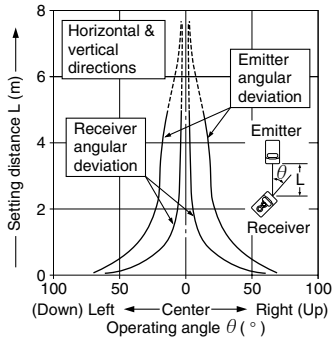
SENSING CHARACTERISTICS (TYPICAL)

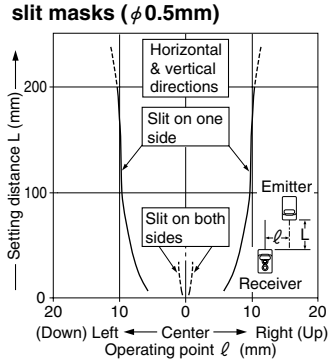
Parallel deviation



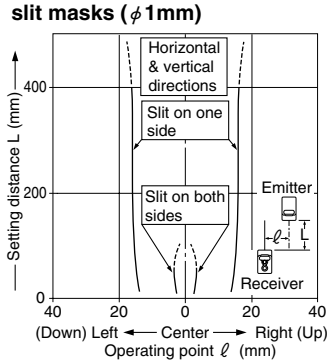
Angular deviation



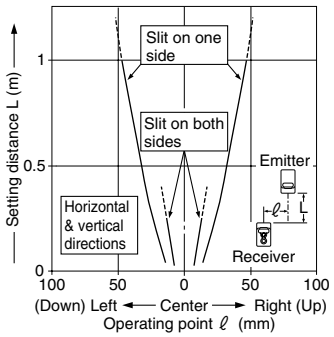
Parallel deviation with round slit masks (ϕ0.5mm)



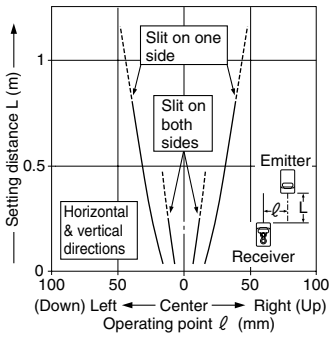
Parallel deviation with round slit masks (ϕ1mm)



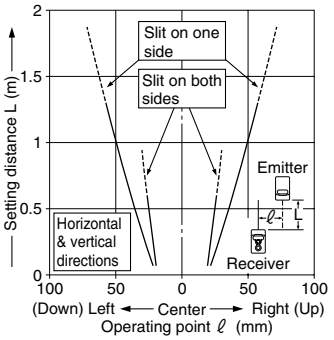
Parallel deviation with round slit masks (ϕ2mm)



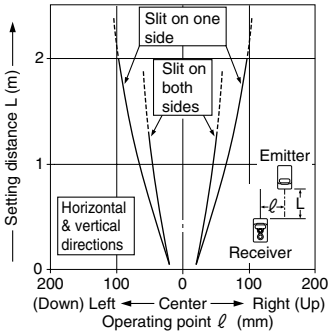
Parallel deviation with rectangular slit masks (0.5 × 6mm)



Parallel deviation with rectangular slit masks (1 × 6mm)



Parallel deviation with rectangular slit masks (2 × 6mm)

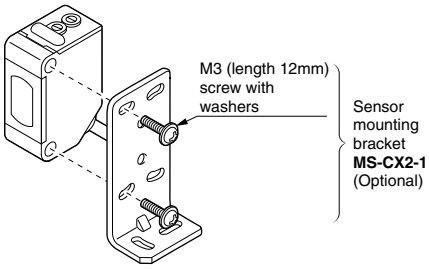


PRECAUTIONS FOR PROPER USE

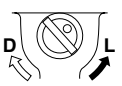
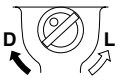
This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

Mounting

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



Operation mode switch

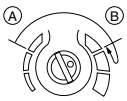
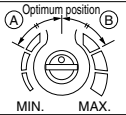
Operation mode switch	Operation
	Light-ON mode is obtained when the switch is turned fully counterclockwise (L side).
	Dark-ON mode is obtained when the switch is turned fully clockwise (D side).

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

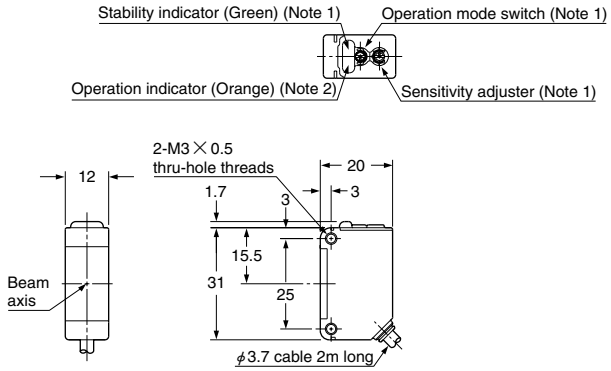
Step	Sensitivity adjuster	Operation
①		Turn the sensitivity adjuster fully counterclockwise to the minimum sensitivity position, MIN.
②		With the liquid which contains water or the opaque object absent (light received condition), turn the sensitivity adjuster slowly clockwise and confirm the point (A) 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. (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

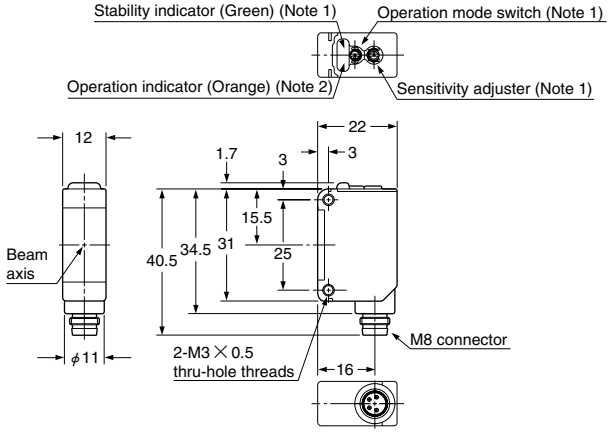
DIMENSIONS (Unit: mm)

EZ-11(-PN) Sensor



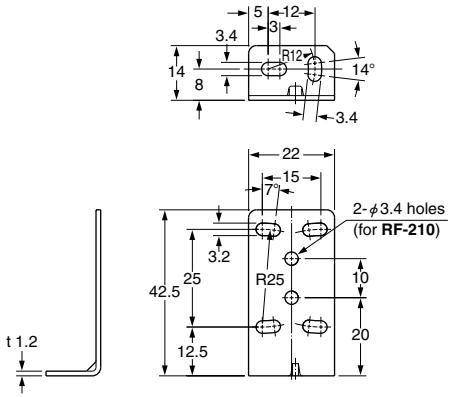
Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (orange) on the emitter.

EZ-11(-PN)-J Sensor



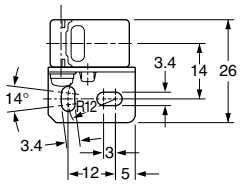
Notes: 1) Not incorporated on the emitter.
2) It is the power indicator (orange) on the emitter.

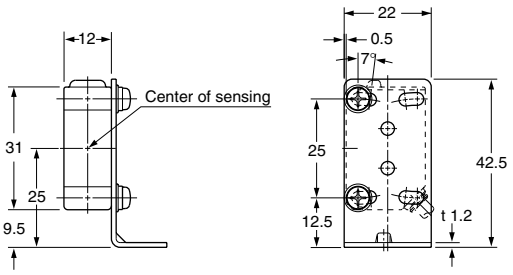
MS-CX2-1 Sensor mounting bracket (Optional)



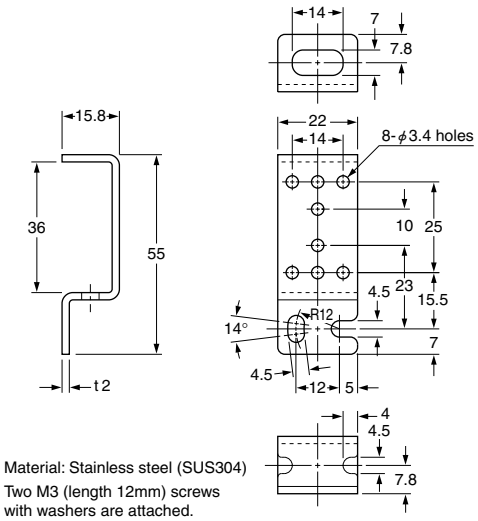
Material: Stainless steel (SUS304)
Two M3 (length 12mm) screws with washers are attached.

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



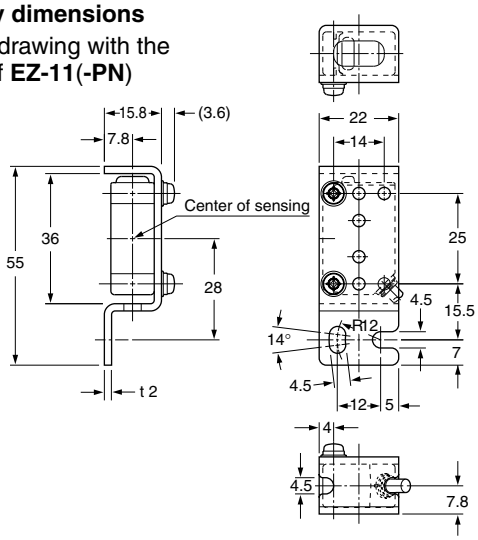


MS-CX2-2 Sensor mounting bracket (Optional)



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

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



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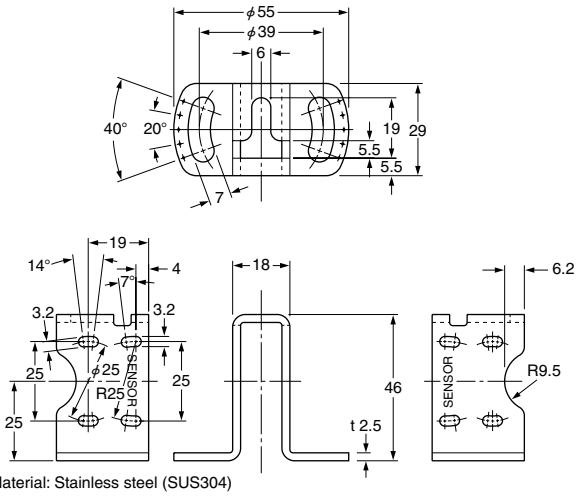
DIMENSIONS (Unit: mm)

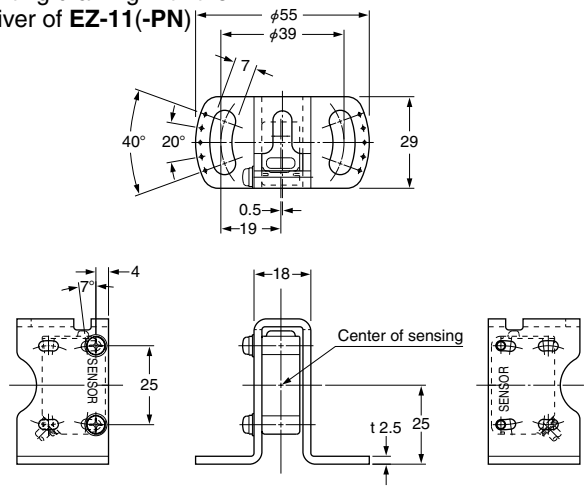
MS-CX2-4 Sensor mounting bracket (Optional)



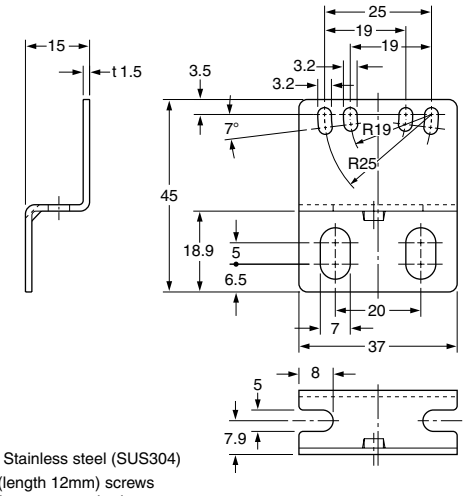
Material: Stainless steel (SUS304)
Two M3 (length 14mm) screws with washers are attached.

Assembly dimensions

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



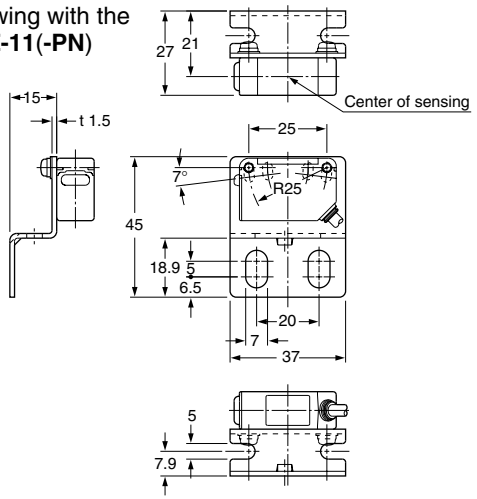
MS-CX2-5 Sensor mounting bracket (Optional)



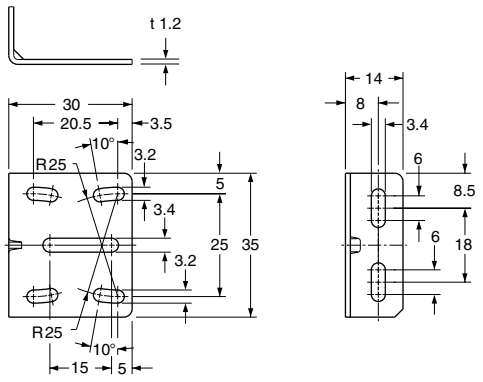
Material: Stainless steel (SUS304)
Two M3 (length 12mm) screws with washers are attached.

Assembly dimensions

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



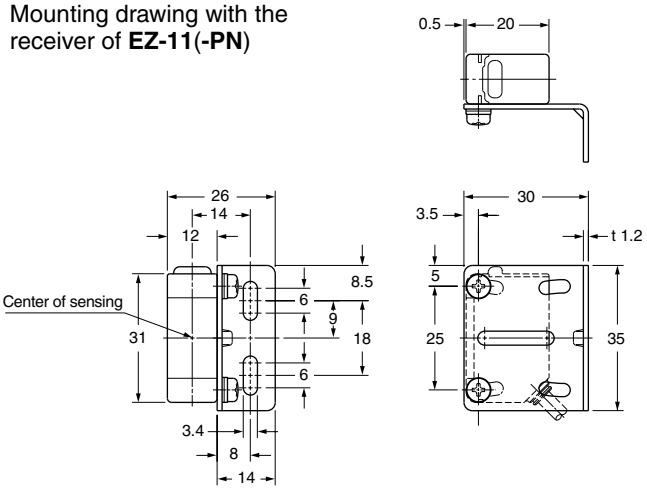
MS-CX-3 Sensor mounting bracket (Optional)



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

Assembly dimensions

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



MEMO

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